

IMS
Version 12

Diagnosis



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Note

Before using this information and the product that it supports, be sure to read the general information under “Notices” on page 665.

This edition applies to IMS Version 12 (program number 5635-A03), IMS Database Value Unit Edition, V12.1 (program number 5655-DSQ), and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this information

These topics provide guidance and reference information for setting up an IMS[™] system for diagnosis, collecting information to help diagnose IMS problems, and searching problem-reporting databases, such as the IBM[®] Electronic Incident Submission (EIS) web site. These topics also describe how to use keywords to develop a failure description that you can use to search problem-reporting databases and communicate with IBM Software Support.

This information is available as part of the Information Management Software for z/OS[®] Solutions Information Center at pic.dhe.ibm.com/infocenter/dzichelp. A PDF version of this information is available in the information center.

Prerequisite knowledge

You will be most successful in using this information if you have a basic understanding of:

- IMS concepts and externals
- How to access an IBM Software Support database
- Dump analyses
- z/OS diagnostic practices
- Telecommunications
- System Network Architecture (SNA)

You can learn more about z/OS by visiting the z/OS Basic Skills Information Center.

You can gain an understanding of basic IMS concepts by reading *An Introduction to IMS*, an IBM Press publication. An excerpt from this publication is available in the Information Management Software for z/OS Solutions Information Center.

IBM offers a wide variety of classroom and self-study courses to help you learn IMS. For a complete list of courses available, go to the IMS home page at www.ibm.com/ims and link to the Training and Certification page.

IMS function names used in this information

In this information, the term HALDB Online Reorganization refers to the integrated HALDB Online Reorganization function that is part of IMS Version 12, unless otherwise indicated.

How new and changed information is identified

New and changed information in most IMS library PDF publications is denoted by a character (revision marker) in the left margin. The first edition (-00) of *Release Planning*, as well as the *Program Directory* and *Licensed Program Specifications*, do not include revision markers.

Revision markers follow these general conventions:

- Only technical changes are marked; style and grammatical changes are not marked.

- If part of an element, such as a paragraph, syntax diagram, list item, task step, or figure is changed, the entire element is marked with revision markers, even though only part of the element might have changed.
- If a topic is changed by more than 50%, the entire topic is marked with revision markers (so it might seem to be a new topic, even though it is not).

Revision markers do not necessarily indicate all the changes made to the information because deleted text and graphics cannot be marked with revision markers.

New and changed information in the information center is denoted by blue carets (<< and >>) at the beginning and end of the new or changed information.

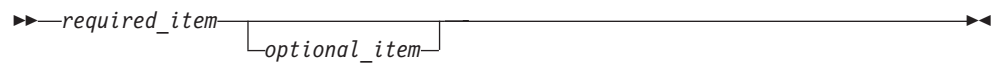
How to read syntax diagrams

The following rules apply to the syntax diagrams that are used in this information:

- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following conventions are used:
 - The >>--- symbol indicates the beginning of a syntax diagram.
 - The ---> symbol indicates that the syntax diagram is continued on the next line.
 - The >--- symbol indicates that a syntax diagram is continued from the previous line.
 - The --->< symbol indicates the end of a syntax diagram.
- Required items appear on the horizontal line (the main path).



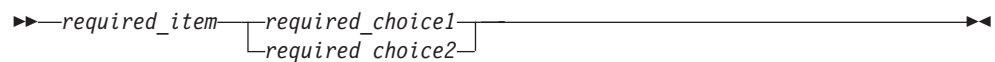
- Optional items appear below the main path.



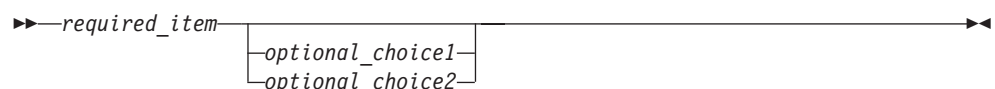
If an optional item appears above the main path, that item has no effect on the execution of the syntax element and is used only for readability.



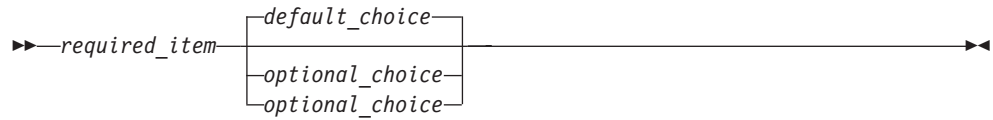
- If you can choose from two or more items, they appear vertically, in a stack. If you *must* choose one of the items, one item of the stack appears on the main path.



If choosing one of the items is optional, the entire stack appears below the main path.



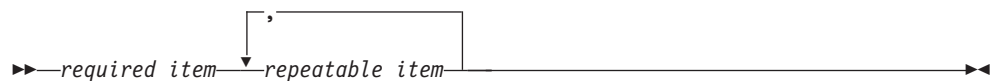
If one of the items is the default, it appears above the main path, and the remaining choices are shown below.



- An arrow returning to the left, above the main line, indicates an item that can be repeated.

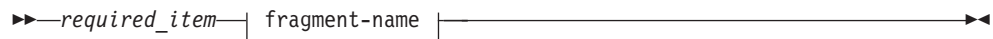


If the repeat arrow contains a comma, you must separate repeated items with a comma.

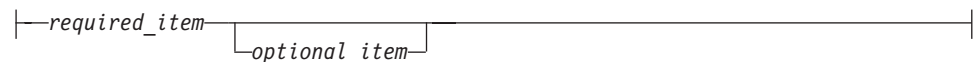


A repeat arrow above a stack indicates that you can repeat the items in the stack.

- Sometimes a diagram must be split into fragments. The syntax fragment is shown separately from the main syntax diagram, but the contents of the fragment should be read as if they are on the main path of the diagram.



fragment-name:



- In IMS, a b symbol indicates one blank position.
- Keywords, and their minimum abbreviations if applicable, appear in uppercase. They must be spelled exactly as shown. Variables appear in all lowercase italic letters (for example, *column-name*). They represent user-supplied names or values.
- Separate keywords and parameters by at least one space if no intervening punctuation is shown in the diagram.
- Enter punctuation marks, parentheses, arithmetic operators, and other symbols, exactly as shown in the diagram.
- Footnotes are shown by a number in parentheses, for example (1).

Accessibility features for IMS Version 12

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

The following list includes the major accessibility features in z/OS products, including IMS Version 12. These features support:

- Keyboard-only operation.
- Interfaces that are commonly used by screen readers and screen magnifiers.
- Customization of display attributes such as color, contrast, and font size.

Note: The Information Management Software for z/OS Solutions Information Center (which includes information for IMS Version 12) and its related publications are accessibility-enabled for the IBM Home Page Reader. You can operate all features by using the keyboard instead of the mouse.

Keyboard navigation

You can access IMS Version 12 ISPF panel functions by using a keyboard or keyboard shortcut keys.

For information about navigating the IMS Version 12 ISPF panels using TSO/E or ISPF, refer to the *z/OS TSO/E Primer*, the *z/OS TSO/E User's Guide*, and the *z/OS ISPF User's Guide Volume 1*. These guides describe how to navigate each interface, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

Related accessibility information

Online documentation for IMS Version 12 is available in the Information Management Software for z/OS Solutions Information Center.

IBM and accessibility

See the *IBM Human Ability and Accessibility Center* at www.ibm.com/able for more information about the commitment that IBM has to accessibility.

How to send your comments

Your feedback is important in helping us provide the most accurate and highest quality information. If you have any comments about this or any other IMS information, you can take one of the following actions:

- From any topic in the information center at pic.dhe.ibm.com/infocenter/dzichelp, click the **Feedback** link at the bottom of the topic and complete the Feedback form.
- Send your comments by e-mail to imspubs@us.ibm.com. Be sure to include the title, the part number of the title, the version of IMS, and, if applicable, the specific location of the text on which you are commenting (for example, a page number in the PDF or a heading in the information center).

Chapter 1. Collecting IMS diagnostic information

Before you report a problem to IBM Software Support, collect information to help document the problem at your installation. Having this information available when you call IBM can save you time because you might not need to create the problem again.

As a result of its complexity, IMS can experience problems that must be diagnosed and corrected. Examples of problems that you might encounter while running IMS include an abnormal end (known as an *abend*) occurs in processing, a job hangs in the system and does not process, a process repetitively loops through a series of instructions, or processing slows down.

For these types of problems, IMS displays symptoms that can help you with your diagnosis, but, in order to obtain that information, you need to gather all of the correct data to diagnose a problem.

To collect data about a system problem:

1. Collect the symptom data and determine what type of problem it is.
2. Use the procedures recommended to diagnose the problem to determine whether the problem is an IMS problem or a user problem.
3. If the problem is an IMS or system problem, build a search argument from the data that you collect as a result of following the procedure for that problem. For example, the data you gather from a control region wait can be helpful in building a search argument to search the symptom database with.
4. Search the symptom database. You might need to refine your search with more data from the problem.
5. If you cannot find a known problem with the same symptoms, report the problem to IBM Software Support.

Related concepts:

 [Setting up IMS for diagnostics \(System Definition\)](#)

Standard IMS diagnostic information

If you contact IBM Software Support for assistance with a problem, you might be asked to collect a standard set of logs, data sets, and dumps that can help them determine the source of your problem. Collecting this information before you contact IBM Software Support will shorten the amount of time required to resolve your problem.

The following table describes the types of information that are most commonly requested by IBM Software Support:

Table 1. Information IBM Software Support might need

Log, data set, or dump name	Purpose	Which version to save
SYSLOG	The SYSLOG is useful when the dumped MTRACE buffer is not large enough to contain all necessary error messages.	Save the SYSLOG from time of IMS start up.

Table 1. Information IBM Software Support might need (continued)

Log, data set, or dump name	Purpose	Which version to save
LOGREC data set	z/OS failures are logged internally.	Save the LOGREC data set from IMS start up time.
IMS master console log	The master console log provides a different message set than the SYSLOG.	Save the master console log from IMS start up time.
IMS log data sets (OLDS)	The IMS log data sets track IMS transaction and database activity.	Save the IMS online data sets that are active at the time of the error.
IMS system log data sets (SLDS)	The IMS system log data sets track IMS transaction and database activity.	Save the SLDS from IMS start up time.
JES job log of jobs related to failure	The JES job log provides JCL start up parameters and isolated system messages.	Save the JES job log from IMS start up time.
All dumps created near the time of IMS failure	Multiple SYS1.DUMPs might be created for related failures. SYSMDUMP for the IMS Control, DLI/SAS, and DBRC regions might be created if the primary SYS1.DUMP encounters problems. Also, look for related SYSUDUMPs for IMS dependent regions	Save copies of these dump datasets.
z/OS log data sets	The z/OS log data sets provide information for structure rebuild and checkpoint related problems.	Save the current z/OS log data sets for the failing CQS job stream.

Related tasks:

“Collecting data about IMS Connect problems” on page 19

Managing standard diagnostic information

You can preserve documentation that can be helpful near the time of error.

Consider implementing normal operating procedures for the following tasks:

Preserving the z/OS console (syslog)

The z/OS Console should be saved to view relevant system messages.

- The ideal time frame:
 - Back to the last IMS restart
 - z/OS Console from the prior clean execution (for comparison)
- The moderate time frame:
 - 24 hours of z/OS Console messages
- The minimum time frame:
 - Two IMS system checkpoint intervals

Preserving the JES JOBLOG

Preserve the JES JOBLOG to view relevant job-related messages.

- Save the JES JOBLOGs for:
 - The IMS control region
 - The IMS DLI/SAS region
 - The IMS DBRC region
 - Any suspicious IMS dependent regions
 - The CQS regions
 - The OM region
 - The RM region
 - The SCI regions
- The ideal time frame:
 - JES JOBLOG from the current error execution
 - JES JOBLOG from the prior clean execution (for comparison)
- The moderate time frame:
 - 24 hours of JES JOBLOG
- The minimum time frame:
 - Two IMS system checkpoint intervals, or two hours, whichever is greater

Preserving the IMS master console log

The IMS Master Console Log should be saved to view relevant IMS messages:

- The ideal time frame:
 - IMS Master Console Log from the current error execution
 - IMS Master Console Log from the prior clean execution (for comparison)
- The moderate time frame:
 - 24 hours of IMS Master Console
- The minimum time frame:
 - Two IMS system checkpoint intervals or two hours, whichever is greater

Preserving the SYS1.LOGREC

The SYS1.LOGREC should be saved to view system failures logged internally.

- The ideal time frame:
 - Back to the last IMS restart
- The moderate time frame:
 - 48 hours of SYS1.LOGREC data
- The minimum time frame:
 - Current SYS1.LOGREC data set

Preserving memory dumps

Retain all IMS memory dumps generated at or near the time of a problem.

- SYS1.DUMP data sets should be examined:
 - Multiple dumps might be created.
 - Keep all dumps at time of failure, regardless of the subsystem.
- SYSMDUMP for the IMS Control, DLI/SAS, and DBRC regions need to be examined in case of primary SYS1.DUMP failures.

- Save these data sets, if a dump was produced.
- SYSUDUMP should be saved for IMS dependent regions.

Preserving the IMS OLDS and SLDS

The IMS OLDS and SLDS should be saved in case IMS log analysis is required.

- The ideal time frame:
 - From the time of the last IMS restart
 - Prior execution
- The moderate time frame:
 - 24 hours of IMS log records
- The minimum time frame:
 - Active IMS OLDS

Manual intervention for dump creation

IMS produces SDUMPs for some internal errors without manual intervention. However, IMS Wait/Loop or partial loss-of-function conditions require manual intervention to produce an SVC dump.

IMS hangs can be caused by interaction with many address spaces, including those shown in the list below:

- IMS control region
- IMS DLI/SAS region
- DBRC region
- IRLM region
- CQS
- Operations Manager
- Resource Manager
- Structured Call Interface
- Troublesome IMS dependent regions
- CCTL regions
- ODBA
- IXGLOGRC
- z/OS Resource Recovery Services
- APPC
- VTAM®
- WLM
- TCPIP
- WebSphere® Application Server
- ESAF - DB2® for z/OS, WebSphere MQ, others
- Other regions
- Other IMSplex members with all their related regions

Deciding when to create a memory dump

Because of the complex interactions between these address spaces, it is difficult to determine exactly where the source of the problem lies without a dump of the associated address spaces.

Omission of any interrelated address space adds to the possibility that the dump might not be sufficient to solve the problem.

The time that is required to produce the dump must be weighed against the possibility that there might not be sufficient data to solve the problem, adding to the possibility that the problem could recur.

Creating IMS memory dumps

IMS SVC dumps can be requested using three different commands.

- z/OS SYS1.PARMLIB IEADMCxx
 - DUMP command parmlib member
- z/OS SYS1.PARMLIB IEASLPxx
 - SLIP command parmlib member
- z/OS DUMP command
- Customized JCL can be built and submitted

IEADMCxx, z/OS SYS1.PARMLIB

You can use the IEADMCxx, member of the z/OS SYS1.PARMLIB to create an SVC dump.

The following are characteristics of the IEADMCxx member of the z/OS SYS1.PARMLIB data set:

- DUMP command parmlib member
- Can be used to customize IMS memory dumps prior to error event.
- Simple operator interface.
- Create SYS1.PARMLIB members called IEADMCxx for each customized dump command.

Related reference:

 Syntax for the IEADMCxx member of the z/OS SYS1.PARMLIB data set

IEADMCxx example for IMS

This example shows creating a SYS1.PARMLIB member called IEADMCI1. DUMP parameters are given.

Create a SYS1.PARMLIB member called IEADMCI1 containing the following DUMP parameters:

```
JOBNAME=(j1,j2,j3,j4),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,GRSQ)
```

Where:

- j1* IMS Control region job name.
- j2* IMS DL/I region job name.
- j3* DBRC region job name.
- j4* IRLM region job name.

Create a second SYS1.PARMLIB member called IEADMCI2 containing the following DUMP parameters:

```
JOBNAME=(j5,j6,j7),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT)
```

Where:

j5 IMS CCTL region 1.
j6 IMS CCTL region 2.
j7 IMS CCTL region 3.

IEADMCxx DUMP activation

When you request a dump from the IEADMCI1 and IEADMCI2 parmlib members, two dump data sets are created on the z/OS image from which the dump command was entered.

To request a dump from the IEADMCI1 and IEADMCI2 parmlib members, enter the following z/OS command:

```
DUMP TITLE=(DUMP OF IMS and CCTL Regions ),PARMLIB=(I1,I2)
```

IMS sysplex dump considerations

IMS produces SDUMPs for some internal errors without manual intervention. However, IMS Wait/Loop or partial loss-of-function conditions require manual intervention to produce an SVC dump. IMS hangs can be caused by interaction with many address spaces.

The following are considerations for IMS sysplex dumps:

- IMS sysplex implementations need to consider the possibility that a hang or problem on one IMSplex member might be due to a problem originating from another member.
- Problems such as IMS Wait/Loops or partial loss-of-function conditions which require manual intervention to produce an SVC dump, should include SVC dumps from other members of the IMSplex.
- Ensure that a dump is taken for all necessary address spaces on each system.

Sysplex IEADMCxx example

This example shows how to create a SYS1.PARMLIB member containing various DUMP parameters.

Create a SYS1.PARMLIB member called IEADMCI1 containing the following DUMP parameters:

```
JOBNAME=(j1,j2,j3,j4),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,GRSQ),  
REMOTE=(SYSLIST=(*('j1','j2','j3','j4'),SDATA))
```

Where:

j1 IMS Control region job name.
j2 IMS DLI region job name.
j3 DBRC region job name.
j4 IRLM region job name.

Create a second SYS1.PARMLIB member called IEADMCI2 containing the following DUMP parameters:

```
JOBNAME=(j5,j6,j7),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,XESDATA),  
REMOTE=(SYSLIST=(*('j5','j6','j7'),SDATA))
```

Where:

j6 CCTL region 1.
j7 CCTL region 3.

j8 CCTL region 2.

Note: The XESDATA and REMOTE parameters are for use in sysplex environments.

Sysplex IEADMCxx DUMP activation

Activating a sysplex dump using the z/OS command DUMP is shown.

To request a dump from the IEADMCI1 and IEADMCI2 parmlib members, enter the following z/OS command:

```
DUMP TITLE=(IMS/CCTL SYSPLEX Dumps),PARMLIB=(I1,I2)
```

Two dump data sets are created on each z/OS image in the sysplex matching the REMOTE parameter specifications for the JOBNAMEs.

Chapter 2. Collecting data about specific problems

Occasionally, there are problems in specific environments or certain problem types that require special handling.

Collecting data about a control region wait or hang

When an IMS control region waits or hangs, IMS can appear frozen or lose partial function. The most critical piece of information in diagnosing such problems is the z/OS SVC dump.

Recommendation: Do not use the z/OS MODIFY dump (F jobname,DUMP) command as a source of IMS diagnostic information. This command adds unnecessary complexity to the dump while processing the modify abends.

Obtain a z/OS SVC dump by issuing this series of commands:

```
DUMP COMM=(dump title) R id JOBNAME=(j1,j2,j3,j4,j5,j6),  
          SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In the previous example,

j1 is the IMS CTL or DBCTL region job name
j2 is the IMS DL/I region job name
j3 is the suspicious IMS dependent region job name, if any
j4 is the suspicious CCTL (CICS®) region name, if any
j5 is the IRLM region job name (if IRLM DB locking is used)
j6 is the DBRC region job name

Also, consider dumping related regions:

- IMS Control region
- IMS DLI/SAS region
- DBRC region
- IRLM region
- CQS
- Operations Manager
- Resource Manager
- Structured Call Interface
- Troublesome IMS dependent regions
- CCTL regions
- ODBA
- IXGLOGRC
- z/OS Resource Recovery Services
- APPC
- VTAM
- WLM
- TCPIP

- WebSphere Application Server
- ESAF - DB2 for z/OS, WebSphere MQ, others
- Other Regions
- Other IMSplex members with all their related regions

Most likely, a dump of the IMS CTL, DL/I, and a suspicious dependent region or CCTL region is sufficient to solve wait or hang problems. Occasionally, the DBRC and IRLM (if used for DB locking) regions are a factor, so include DBRC and IRLM.

If IMS is not completely stopped (for example, IMS commands can still be entered, BMPs are still processing, and some transactions still process), taking a second z/OS SVC dump will help differentiate normal IMS processing from the problem.

Collecting data about a control region or DL/I region loop

Occasionally, there are problems in specific environments or certain problem types, that require special handling. If IMS can accept commands, you can set a trace.

1. If IMS can accept commands, use the following IMS command to set up the internal trace environment:

```
/TRA SET ON TABLE nnnn
```

where *nnnn*= is the DISP, SCHD, DLI, LOCK or LATCH parameter. Each parameter must be entered in a separate /TRA command.

2. Set the z/OS system trace table size to 999K and turn on branch tracing by issuing the following command:

```
TRACE ST,999K,BR=ON
```

3. Obtain two z/OS SVC dumps of the CTL, DL/I, suspicious dependent region, or CCTL, DBRC, and IRLM regions. Taking a second z/OS SVC dump will help differentiate normal IMS processing from the problem. Obtain a z/OS SVC dump with this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5,j6),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In the previous example,

- j1* is the IMS CTL or DBCTL region job name
- j2* is the IMS DL/I region job name
- j3* is the suspicious IMS dependent region job name, if any
- j4* is the suspicious CCTL (CICS) region name, if any
- j5* is the IRLM region job name (if IRLM DB locking is used)
- j6* is the DBRC region job name

4. Reset the z/OS system trace table to its original settings.

Note: IMSplex partner dumps are probably not required for loop problems, unless they are also looping.

Collecting data about an IMS dependent region wait or loop

Occasionally, there are problems in specific environments or certain problem types, that require special handling. If IMS can accept commands, you can set a trace.

If the dependent region appears to be looping, follow these steps:

1. If IMS can accept commands, use the following IMS command to set up the internal trace environment:

```
/TRA SET ON TABLE nnnn
```

where *nnnn*= can be DISP, SCHD, DLI, LOCK, or LATCH. Each must be entered separately.

2. Set the z/OS system trace table size to 999K and turn on branch tracing with this command:

```
TRACE ST,999K,BR=ON
```

3. If the problem is a wait, obtain two z/OS SVC dumps of the CTL, DL/I, suspicious dependent region, or CCTL, DBRC, and IRLM regions. If the problem is a loop, obtain two z/OS SVC dumps of the CTL, DL/I, suspicious dependent region, or CCTL, DBRC, and IRLM regions. Obtaining a second z/OS SVC dump will help differentiate normal IMS processing from the problem. Obtain a z/OS SVC dump with this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

j1 is the IMS CTL or DBCTL region job name

j2 is the IMS DL/I region job name

j3 is the suspicious IMS dependent region job name, if any

j4 is the IRLM region job name (if IRLM DB locking is used)

j5 is the DBRC region job name

In the previous example,

4. Reset the z/OS system trace table to its original settings.

Note: IMSplex partner dumps are probably not required for loop problems, unless they are also looping.

Formatting a BPE trace entry

You can format a BPE trace entry by using either the Interactive Problem Control System (IPCS) or a batch job.

Before you begin to format BPE trace entries, ensure that the user ID that you use to format and print the external BPE trace records is authorized by RACF® to access the external trace data sets.

To format BPE trace entries by using the IPCS:

1. Select option 0 from the IPCS Primary Option menu to specify the generation data group (GDG) to analyze.
2. Specify the data set name for the GDG in the **Source** field of the IPCS Default Values menu. For example, specify: `DSNAME('BPEEXTRC.GDG01.G0001V00')`.

3. Select option 2.6 from the IPCS Primary Option menu to display a list of the dump component analysis tools.
4. Select option DFSAAMPR from the IPCS MVS™ Dump Component Data Analysis menu to display options for the IMS Dump Formatter.
5. Select option 6 from the IMS Dump Formatting Primary menu to display formatting for other IMS components, such as BPE.
6. Select one of the options from the IMS Component Selection Dump Formatting menu to display formatting options for an IMS component (BPE, CQS, DBRC, ODBM, OM, REPO, RM, SCI, or IMS Connect). For example, select option **B** to display general BPE formatting options.
7. Select option 4 from the component subsystem dump formatting menu, for example the IMS BPE Subsystem Dump Formatting menu, to display the options for external trace formatting.
8. Specify the various formatting options for the external trace data from the subsystem's external trace formatting menu, for example the BPE External Trace Formatting menu.

You can also format BPE external trace records by using a batch job. The following figure shows sample JCL for formatting the BPE external trace records from a batch job.

Figure 1. Batch JCL for formatting BPE external trace records

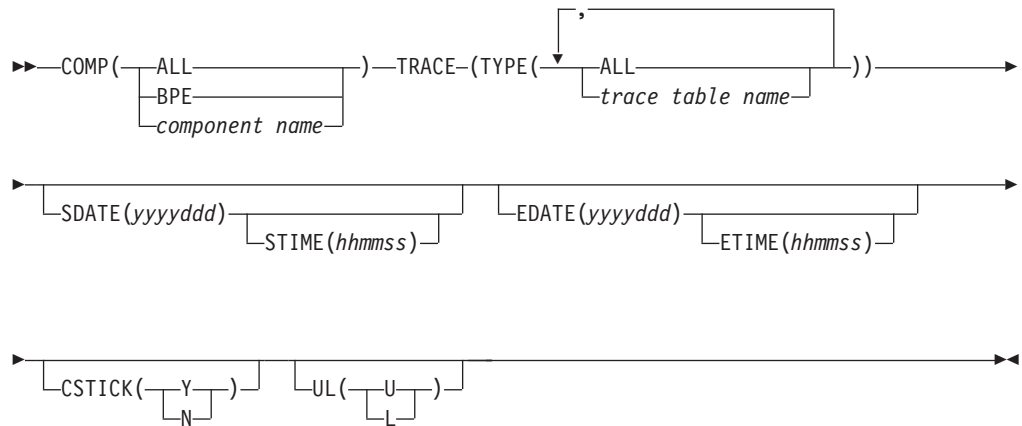
```
//BPEEXTPR JOB ...
//*****
// * Job to print all traces in a BPE external trace data set. *
//*****
//JOB LIB DD DSN=IMS.SDFSRESL,DISP=SHR
//IPCS DMP EXEC PGM=IKJEFT01,REGION=8M
//SYSTSPRT DD SYSOUT=*
//IPCS PRNT DD SYSOUT=*
//INDEX DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//IPCS PARM DD DSN=USER.PARMLIB,DISP=SHR
// DD DSN=SYS1.PARMLIB,DISP=SHR
//SYSTSIN DD *
DELETE 'SYS1.IPCSDDIR'
ALLOC SP(1) TRACK VOL(333333)
DEFINE CLUSTER (NAME('SYS1.IPCSDDIR') +
  VOLUMES(333333)) +
  INDEX(NAME('SYS1.IPCSDDIR.DDX') +
  TRACKS(1 1)) +
  DATA( NAME('SYS1.IPCSDDIR.DDD') +
  CYLINDERS(1 1) BUFSP(X'10000') KEYS(128 0) CISZ(X'1000'))
IPCSDDIR 'SYS1.IPCSDDIR'
ALLOC FILE(IPCSDDIR) +
  DA('SYS1.IPCSDDIR') +
  REUSE SHR
ALLOC FILE(INFILE) +
  DA('BPEEXTRC.GDG01.G0001V00') +
  REUSE SHR
IPCS NOPARM
SETDEF DSN('BPEEXTRC.GDG01.G0001V00') +
  NOPROBLEM PRINT NOTERMINAL
VERBX BPETRFM0 +
  'COMP(HWS) +
  TRACE(TYPE(RCTR)) +
  SDATE(2008080) STIME(110909) +
  EDATE(2008090) ETIME(140000) +
  UL(L) +
```



```

    CSTCK(Y) '
END
DELETE 'SYS1.IPCSDDIR'
/*

```



BPETRFM0 Parameter Keywords

COMP()

| Specify 'ALL' to format all trace records, 'BPE' to format BPE trace records, or
| a specific component name (BPE, CQS, DBRC, ODBM, OM, REPO, RM, SCI, or
| HWS) to format trace records for only that component.

TYPE()

Specify 'ALL' to format trace records for all trace tables or specify a specific trace table name to format records only for that trace table type.

SDATE()

Specify a starting date for the trace entries in Julian format (yyyyddd). Trace entries with a store clock (STCK) value prior to the specified date are filtered and not printed.

STIME()

Specify a starting time for the trace entries in 24 hour format (hhmmss). Trace entries with an STCK value prior to the specified time are filtered and not printed. SDATE() is required with STIME().

EDATE()

Specify an ending date for the trace entries in Julian format (yyyyddd). Trace entries with an STCK value after the specified date are filtered and not printed.

ETIME()

Specify an ending time for the trace entries in 24 hour format (hhmmss). Trace entries with an STCK value after the specified time are filtered and not printed. EDATE() is required with ETIME().

CSTCK()

Specify 'Y' to have the value for each trace entry printed in JDAYTIME format (DDD HHMMSS.thmiju).

UL()

Specify 'L' if the specified filtering time is based on the local time in the trace record or 'U' if the specified filtering time is based on UTC.

BPETRFM0 formatted BPE external trace record header output

--- BPE ERRV Trace Table ---

ETHD: 00000000
+0000 LL..... 4010 ZZ..... 0000 TYPE..... 01 SUBTYPE.. 02 VERSION.. 0001 RESERVED. 00000000
+000C NAME..... ERRV LENGTH... 00000080 UDATALEN. 00000000 TDATALEN. 00003F80 NUMPGS... 0008 ENTLN... 0020
+0020 ENTSKPD.. 00000000 BVERS.... 010700 RESERVED. 00 UTYPE.... HWS UVERS.... 0B0100 RESERVED. 00
+0030 USYSNAME. UTRMOD... 00000000 00000000 FLG1..... 48 FLG2..... 00 LEVEL.... 04
+0043 IDX..... CB CYCLECT.. 00000000 OFFSET... 00000000 BYTELOST. 00000000 LDT0..... FFFFA21F 68400000
+0058 LSO..... 00000000 00000000 STCK..... C233AA77 1692DF60 RESERVED. 00000000 NEXT..... 00000000
+0070 FIRST.... 0BC01C60 TOKVAL... 00000000 ID..... ETHD END
Flag analysis for ethd_flg1:
ethd_fl_system (40x) - Trace table is a BPE system table
ethd_fl_var (08x) - Trace type creates variable length entries
Trace level for this table is: HIGH

ETSF: 00004000
+0000 STCK..... C233AA7D AE68F180 SEQNUM... 00000000 00000004

Variable trace table entries follow with oldest entry printed first

Formatted BPE external trace variable trace entry

ERRV trace table entry:
Code: SSRV Record #: 1
Subcode: *BPEDYA10 ERROR Continue: 0
TimeStmp: 096 183544.830765

TTVE: 00000000

Variable entry prefix:
LL..... 1FC0 REC#..... 00000001
ZZ..... 0000 CONT..... 00000000
VLEN.... 00001F90

TTE: 00000010

Variable entry fixed section:
CODE.... C6 WD02.... 00000002
SCDE.... 1B WD03.... 00000003
B1B2.... C1C2 WD04.... 00000004
WD01.... 00000001 WD05.... 00000005
STCK..... C233AA77 1692DF60
Data +00: |F.AB.....| Data +10: |.....B....k.-|

Data: 00000030 Length: 8080

Variable entry variable section:		EBCDIC Data			
Offset	0	4	8	C	
+000000	81818181	81818181	81818181	81818181	|aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa|
LINES +000020 TO +001F7F SAME AS ABOVE					
+001F80	81818181	81818181	81818181	81818181	|aaaaaaaaaaaaaaaaaaaaaa|

Related concepts:

“IMS Connect traces” on page 387

Related tasks:

“Formatting the trace data from an external trace of IMS Connect” on page 392

Collecting data about DBRC-related problems

DBRC related problems can cause a variety of symptoms, including waits and loops. If you need to create the problem again, copies of the RECON listing, before and after the problem occurred, are most useful.

To diagnose a DBRC related problem, you need the following information:

- A listing of the DBRC RECON data sets for the time that is as close as possible to the time of the failure.
 - Use the DBRC LIST.RECON command to obtain the listing.
- A subsystem listing if you cannot obtain a RECON listing because of its size.

- Use the DBRC LIST.SUBSYS ALL command to obtain a subsystem listing.
- If recreates are possible, obtain the before and after copies of the RECON data sets.
- Use the D GRS,CONTENTION command on each system that shares the RECON data set to determine if the data set is held at the exclusion of other waiters. If so, dump the owning address space by issuing the following command:

```
DUMP COMM=(dump title)
R nn,JOBNAME=(j1),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,GRSQ),END
```

Related reference:

 VSAM Record-Level Sharing (RLS) Diagnostic Aids

DBRC security override

To set a RCNQUAL value in the RECON that can be used to override DBRC security for copies of RECON data sets, use the DBRC command CHANGE.RECON with the CMDAUTH keyword.

You can then use the RECON data set for further testing purposes or to send on to an IBM Software Support representative without requiring a zap of the RECON, an exit routine, or requiring that you find an authorized individual to change the authorization level.

Collecting data about DBCTL-related problems

DBCTL-related problems can originate from either the CCTL region or one of the IMS regions (CTL, DL/I, DBRC, or IRLM), so it is important to obtain dumps that relate to all these regions.

1. Issue the following IMS commands (because they include region ID numbers and recovery tokens in their various display output):

```
/DISPLAY ACTIVE
/DISPLAY CCTL
```

The information that is returned by these commands greatly increases the accuracy and speed that is required to diagnose the problem. The DISPLAY ACTIVE command provides the reasons for waits and region numbers. The DISPLAY CCTL command provides recovery tokens and region numbers. Save the IMS console output.

2. Set the AP portion of the CICS trace to level 1-2. Save this output.
3. Set the FILE CONTROL portion of the CICS trace to level 1-2. Save this output.
4. Obtain the necessary z/OS SVC DUMP of the IMS regions by issuing this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5,j6),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In the previous example,

- j1* is the IMS CTL or DBCTL region job name
- j2* is the IMS DL/I region job name
- j3* is the suspicious IMS dependent region job name, if any
- j4* is the suspicious CCTL (CICS) region name, if any
- j5* is the IRLM region job name (if IRLM DB locking is used)

- j6* is the DBRC region job name
5. Save the IMS online log data set that was active during the failure.

Collecting data about VTAM-related DC problems

IMS DC-related problems are associated mainly with VTAM or OTMA. Use these guidelines to collect diagnostic information about VTAM when you experience a problem.

VTAM dumps are often required to help diagnose problems, but are infrequently obtained by operations personnel. IMS NODE traces, VTAM BUFFER traces, and VTAM INTERNAL traces are often required, in conjunction with the IMS region dumps and VTAM dumps, to solve DC problems.

The IMS log tapes contain much of the transaction data that flows through IMS. This transaction data includes the following IMS records:

- TYPE01
- TYPE03 (MSG queue entries)
- TYPE11 through TYPE16 (SPAs, DIALs, SIGN)

To start the recreate attempt after issuing an IMS /SWITCH OLDS command to have the related data placed on a new OLDS:

1. Issue the following IMS command and save the IMS console output:

```
/DIS NODE nodename
```

2. Turn on the IMS NODE trace by issuing the following command.

```
/TRA SET ON NODE nodename
```

Data is captured in the IMS TYPE6701 log record. Save the IMS online log data set input to the IMS utility programs DFSERA10 and DFSERA30.

3. (Optional) Turn on the VTAM Buffer Trace and VTAM Internal Trace to complement the IMS NODE trace by issuing this series of commands:

```
F NET,TRACE,TYPE=BUF,ID=nodename
F NET,TRACE,TYPE=VTAM,MODE=EXT,
OPT=(API,PIU,MSG)
```

To capture these trace entries, GTF must be active with the USR option specified.

4. Obtain a z/OS dump of the IMS regions by issuing this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5,j6),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

```
j1      IMS CTL or DBCTL region job name
j2      IMS DL/I region job name
j3      Suspicious IMS dependent region job name, if any
j4      Suspicious CCTL (CICS) region name, if any
j5      IRLM region job name (if IRLM DB locking is used)
j6      DBRC region job name
```

In the previous example,

5. Obtain a dump of the VTAM address space by issuing this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(vtam jobname),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

6. Save the IMS log tapes created during the error period.

Collecting data about OTMA-related DC problems

IMS DC-related problems are frequently related to either OTMA or VTAM. Use these guidelines to collect diagnostic information about OTMA when you experience a problem.

There are four main tools that you can use to diagnose problems with OTMA message traffic:

- OTMT table trace
- /DISPLAY commands
- OTMA tmember and tpipe traces
- IMS log records

1. Enable the OTMT trace table. Issue the following command:

```
/TRA SET ON TABLE OTMT OPTION LOG VOLUME HIGH
```

This trace data is used by IBM Software Support to diagnose OTMA problems. You can also specify OTMADB=Y in the DFSPBxxx member of the IMS.PROCLIB data set to get more trace data. However, using OTMADB=Y causes a large amount of WTO output to be written to the MVS console, and the setting can be removed only by recycling IMS.

Recommendation: Do not set OTMADB=Y unless instructed to do so by IBM Software Support.

2. Get the current status of OTMA clients and servers. Issue the following command:

```
/DISPLAY OTMA
```

Save the console output.

3. Enable the OTMA tmember trace. Issue the following command:

```
/TRA SET ON TMEMBER XXXXXXXX
```

Where XXXXXXXX is the tmember name. If you cannot identify a specific OTMA tmember, specify ALL for the tmember name to enable the trace for all members.

4. If you know that the problem is associated with a specific OTMA tmember, you can get the current status for that tmember. Issue the following command:

```
/DISPLAY TMEMBER XXXXXXXX TPIPE ALL
```

Where XXXXXXXX is the tmember name. Save the console output.

5. If you know that the problem is associated with a specific OTMA tpipe, you can enable tracing at the tpipe level. Issue the following command:

```
/TRA SET ON TMEMBER XXXXXXXX TPIPE YYYYYYYY
```

Where XXXXXXXX is the tmember name and YYYYYYYY is the tpipe name.

6. For CM1 and CM0 problems that are associated with a specific PSB, enable DL/I tracing. Issue the following command:

```
/TRA SET ON PGM pppppppp
```

Where *pppppppp* is the PSB name.

After you enable the required traces, preserve the X'67D0' and X'6701' log records and the console output from the /DISPLAY commands.

Collecting data about APPC-related DC problems

APPC problems that originate from IMS dependent regions and that make calls explicitly rely heavily on the dependent region dumps.

To diagnose an APPC-related IMS problem:

1. Turn on the IMS LUMI trace for the external trace data set by issuing the following IMS /TRACE commands:

```
/TRACE SET ON TABLE LUMI OPTION LOG
```

The LOG option can be set up to cause the output to be sent to the external trace data set with this /TRACE command:

```
/TRACE SET ON LUNAME XXXXXXXX INPUT
```

```
TRACE SET ON LUNAME XXXXXXXX OUTPUT
```

where XXXXXXXX is the partner LU

2. Turn on the VTAM buffer trace and VTAM internal trace to complement the IMS LUMI trace by issuing the following commands:

```
F NET,TRACE,TYPE=BUF,ID=luname
```

```
F NET,TRACE,TYPE=VTAM,MODE=EXT,  
  OPT=(API,PIU,MSG)F
```

To capture these trace entries, GTF must be active with the USR option specified

3. Turn on the program trace to trace TPPCB DL/I calls, so that the APPC component trace can send its trace buffers to a SYS1.DUMP data set when it stops. Turn on the program trace by issuing the following command:

```
/TRACE SET ON PROGRAM pppppppp
```

where *pppppppp* is the program name of the application.

4. Turn on the z/OS APPC component trace by issuing the following command:

```
TRACE CT,ON,200M,COMP=SYSAPPC
```

5. Start the recreate attempt after issuing an IMS /SWITCH OLDS command to have related data placed in a new OLDS. Save the IMS log tapes that are created during the error period. IMS log records are not as useful for explicit APPC applications as they are for implicit APPC applications because little information is logged about explicit APPC applications.

6. Reply to the z/OS outstanding reply with the following response:

```
nn,OPTIONS=(GLOBAL),END
```

7. When the problem has been recreated, stop the component trace with this command:

```
TRACE CT,OFF,COMP SYSAPPC
```

You can use the following IPCS commands to format the trace:

- For one-line entries:

```
CTRACE COMP SYSAPPC SHORT
```

- Summary of each entry:

CTRACE COMP SYSAPPC FULL

8. Obtain a z/OS SVC dump of the IMS regions with this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5,j6),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In the previous example,

- j1* is the IMS CTL or DBCTL region job name
- j2* is the IMS DL/I region job name
- j3* is the suspicious IMS dependent region job name, if any
- j4* is the suspicious CCTL (CICS) region name, if any
- j5* is the IRLM region job name (if IRLM DB locking is used)
- j6* is the DBRC region job name

9. Obtain a dump of the APPC, APPC Scheduler, and VTAM address spaces with this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In the previous example,

- j1* is the APPC job name
- j2* is the APPC scheduler job name
- j3* is the VTAM job name

Collecting data about IMS Connect problems

If a problem occurs during IMS Connect execution, you need to collect logs, data sets, and dumps to determine the source of the problem.

For almost all problems that might occur during IMS Connect execution, you can take the following action to collect the data that is needed to diagnose the problem:

- Create a dump of the IMS Connect address space.
- Save the IMS Connect joblog, which contains only IMS Connect messages. IMS Connect messages are also written to the MVS system log (SYSLOG), but the IMS Connect messages can be difficult to find in the SYSLOG, because of the other z/OS subsystem messages that the SYSLOG contains.
- Save the MVS SYSLOG. The SYSLOG is useful for seeing what messages other subsystems issued before and after the IMS Connect messages were issued, because the MVS SYSLOG contains messages from all z/OS subsystems, including TCP/IP, IMS, and IMS Connect.
- Turn on the IMS Connect Recorder Trace facility and attempt to re-create the problem.

In addition to collecting data about IMS Connect, you might need to collect data about other components or products if they appear to be related to the problem in some way. For example:

- If the problem appears to be network related, you might also need to initiate a TCP/IP packet trace to trace the IP packets flowing to and from a TCP/IP stack on the z/OS Communications Server. For more information about initiating packet traces, see *z/OS Communications Server IP Diagnosis Guide*.

- If the problem is related to IMS Connect support for an IMS TM system, where the connections to IMS are through OTMA, you might also need to collect data about the IMS system.
- If the problem is related to IMS Connect support for an IMS DB system, where the connections to IMS are through an instance of the Open Database Manager (ODBM), which runs in its own address space as a component of the IMS Common Service Layer (CSL), you might also need to collect data about both the IMS system and any ODBM instance that might be associated with the problem.
- If the problem is related to two-phase-commit processing, you might also need to collect data related to z/OS Resource Recovery Services.

Related tasks:

“Collecting data about CSL-related problems”

“Collecting data about z/OS Resource Recovery Services problems” on page 26
Chapter 14, “IMS Connect service aids,” on page 385

Related reference:

“Standard IMS diagnostic information” on page 1

Collecting data about CQS-related problems

CQS problems can appear in various ways and, like the IMS control region, they can manifest themselves in the form of WAITs, HANGs, LOOPs, or some other type of internal error that results in an SDUMP being taken.

These dumps are in the SYS1.DUMP data sets. CQS can also produce LOGREC data set entries for these types of errors.

If an isolated event type within CQS encounters an error, then IBM Software Support might request additional CQS-trace level settings for the various trace types.

For a CQS WAIT problem, one or more inflight dumps might be required. Multiple dumps might need to be taken if the problem is a LOOP. If a structure rebuild or structure checkpoint related problem occurs, you will also need to dump the CQS address spaces for any CQS associated with the given structure, and save the associated SRDS (structure recovery data set) for the CQS structure checkpoints and CQS system checkpoints.

Collecting data about CSL-related problems

The Common Service Layer address spaces, Open Database Manager (ODBM), Operations Manager, Structured Call Interface, and Resource Manager, produce SDUMPs for internal errors. The CSL dumps are in the SYS1.DUMP data sets.

You might need to collect one or more of the following types of information to diagnose CSL related problems:

SYSLOG

To determine the sequence of events, collect the SYSLOG from every logical partition (LPAR) where a CSL member resides. CSL address spaces issue messages that begin with “CSL”

- ODBM messages - CSLDxxxx

- OM messages - CSLOxxxx
- RM messages - CSLRxxxx
- SCI messages - CSLSxxxx
- CSL common messages - CSLZxxxx

QUERY IMSPLEX SHOW(ALL) command output

Issue the QUERY IMSPLEX command to display the members of the IMSplex and their status.

If there are problems accessing OM or RM services, verify that at least one OM or RM is active in the IMSplex and that an active SCI resides on every LPAR where a CSL address space resides.

Obtain z/OS SVC dumps

Obtain a z/OS SVC dump of the CSL address spaces that appear to have a problem, are waiting, or are looping. CSL dumps contain the CSL traces, which can be very useful for diagnosing CSL related problems. Dump all of the CSL address spaces that appear to have a problem with the following series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(odbm1,om1,rm1,sci1)
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In the previous example:

odbm1 An ODBM address space.

om1 An OM address space.

rm1 An RM address space.

sci1 An SCI address space.

For some CSL problems, IBM Software Support might request additional trace level settings for the various trace types.

Related tasks:

“Collecting data about IMS Connect problems” on page 19

Related reference:

Chapter 7, “CSL - Common Service Layer service aids,” on page 145

Repository Server audit log records

If AUDIT=YES is specified in the FRPCFG member of the IMS PROCLIB data set, the Repository Server (RS) writes to the z/OS logger audit log stream name specified in the AUDIT_LOG= parameter.

Maintaining the RS audit log is optional.

The RS audit log contains information about selected events that occur during server execution.

The audit access rule identifies the information that can be written to the audit log. The default access rule can be specified in the FRPCFG member of the IMS PROCLIB data set using the AUDIT_DEFAULT parameter. This specification is applicable to all IMS repositories managed by the RS. The value for the

AUDIT_DEFAULT parameter can be overridden by setting the AUDITACCESS parameter in the CSLRIxxx member of the IMS PROCLIB data set.

If an audit access rule is already set for a given repository type, setting it again replaces the rule. Setting AUDITACCESS=DEFAULT removes the audit rule for the given repository type. The audit rule is then set to the default access rule specified in the FRPCFG member.

Audit log entries can be triggered in the audit log by the following events:

- RS and repository events
- ADMIN and CONTROL requests
- Registration, connection, and UOW events
- Events relating to repository members during a client member session:
 - Access failure due to a security restriction
 - Update
 - Read
 - System-level read

Refer to the FRPLGREC macro that maps the RS audit log records to view the event types and subtypes that are written and the data in each log record type.

Related concepts:

 Overview of the IMSRSC repository (System Definition)

Related reference:

“Log records” on page 477

 FRPCFG member of the IMS PROCLIB data set (System Definition)

 CSLRIxxx member of the IMS PROCLIB data set (System Definition)

Managing Repository Server audit log records

Issuance of Repository Server (RS) audit log records can be controlled by specifying parameters in the FRPCFG and CSLRIxxx members of the IMS PROCLIB data set and through the F reposervername,AUDIT RS command.

Auditing can be enabled for the RS to connect to the z/OS log stream by specifying AUDIT=Y in the FRPCFG member of the IMS PROCLIB data set, but no audit records are written if AUDIT_LEVEL=NONE is specified.

Auditing can be restarted after an error during RS initialization if AUDIT_FAIL=CONTINUE is specified.

You can also dynamically change the value specified for the AUDIT_LEVEL parameter in the FRPCFG member by issuing the RS command F reposervername,AUDIT.

You can control which types of events and member access are audited during client member sessions by specifying the AUDIT_DEFAULT= parameter in the FRPCFG member or the AUDITACCESS= parameter in the CSLRIxxx member. Audit access can also be modified through the UPDATE RM command. An audit access rule applies to all members of a specified repository type.

A read request from an authorized client that is done as a part of the update request is identified as a *system read* request. With an audit access rule of READ,

system read requests do not cause a read audit record to be generated. With an audit access rule of SYSTEMREAD, all read requests, including system read requests, are audited.

Related concepts:

 Overview of the IMSRSC repository (System Definition)

Related reference:

 FRPCFG member of the IMS PROCLIB data set (System Definition)

 CSLRIxxx member of the IMS PROCLIB data set (System Definition)

 F reposervername,AUDIT (Commands)

How the Repository Server handles z/OS logger errors

The Repository Server (RS) uses the ENF48 exit to detect when system logger resources become unavailable or available.

This process enables the RS to resume logging when transient logger errors are resolved.

If AUDIT_FAIL=CONTINUE is specified in the FRPCFG member of the IMS PROCLIB data set, during RS startup, the RS starts after an error and no audit log is enabled.

If AUDIT_FAIL=ABORT is specified, during RS startup, the RS terminates on an error.

During a client request, if AUDIT_FAIL=CONTINUE is specified, the RS continues processing as if the audit log is not enabled.

If AUDIT_FAIL=ABORT is specified, the client request is rejected.

Related concepts:

 Overview of the IMSRSC repository (System Definition)

Related reference:

 FRPCFG member of the IMS PROCLIB data set (System Definition)

Printing Repository Server audit log records

To print the audit log records from the Repository Server (RS) audit log stream on the z/OS system logger, use the IMS File Select and Formatting Print utility (DFSERA10) with exit routine CSLRERA3.

DD statements

The DD statements for printing RS audit log records are:

STEPLIB DSN=

Points to IMS.SDFSRESL, which contains the IMS File Select and Formatting Print utility, DFSERA10.

SYSPRINT

Describes the output data set to which the formatted print records and control messages are to be directed. SYSPRINT is usually defined as SYSOUT=A. DCB should not be specified on the SYSPRINT DD.

SYSUT1 DSN=

Points to the RS audit log stream name that is specified on the AUDIT_LOG= parameter in the FRPCFG member of the IMS PROCLIB data set.

Control statements

The control statements for printing the RS audit log records are:

H= Specifies the number of log records to print. H=EOF specifies to print all of the log records.

EXITR=

Identifies the Resource Manager (RM) audit log record exit routine that is called to format each log record. EXITR=CSLRERA3 specifies to print the records in a memory dump format, including the record type and time-stamp information for each record.

Limiting log data to a specific time range

To limit the log data to a specific time range, use the FROM and TO parameters on the SUBSYS statement, as shown in the following example. This DD card prints log records from 11:00 to 12:00 on day 42 of the year 2010:

```
//SYSUT1 DD DSN=SYSLOG.REPO.AUDIT.LOG
// SUBSYS=(LOGR,IXGSEXIT,
// 'FROM=(2010/042,11:00:00),TO=(2010/042,12:00:00)'),
// DCB=(BLKSIZE=32760)
```

Dates and times are specified in Greenwich mean time (GMT). The seconds field in the time value is optional. To use local dates and times, add the LOCAL keyword, as shown in the following example:


```
//SYSUT1 DD DSN=SYSLOG.REPO.AUDIT.LOG,
// SUBSYS=(LOGR,IXGSEXIT,
// 'FROM=(2007/042,11:00:00),TO=(2007/042,12:00:00),LOCAL'),
// DCB=(BLKSIZE=32760)
```

Sample


The following JCL shows what is required to print RS log records from the RS audit log stream:

```
//CSLERA1 JOB MSGLEVEL=1,MSGCLASS=A,CLASS=K
//STEP1 EXEC PGM=DFSERA10
//STEPLIB DD DISP=SHR,DSN=IMS.SDFSRESL
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=SYSLOG.REPO.AUDIT.LOG,
// SUBSYS=(LOGR,IXGSEXIT),
// DCB=(BLKSIZE=32760)
//SYSIN DD
CONTROL CNTL H=EOF
OPTION PRINT EXITR=CSLRERA3
END
//
```

Related concepts:

 [Overview of the IMSRSC repository \(System Definition\)](#)

Related reference:

 [File Select and Formatting Print utility \(DFSERA10\) \(System Utilities\)](#)

Collecting data about ESAF and DB2 ESS interface problems

ESAF (External Subsystem Attach Facility) interface problems can be diagnosed by using the external trace data set. You can use the IMS /TRACE command to direct and control the tracing of internal IMS events.

The IMS external subsystem (ESS) trace impacts performance. Activate the trace only when you notice a problem or if you need to re-create a problem. IBM software support may ask you to provide dumps of IMS CTL, z/OS SVC and the IMS online log data set.

To document problems that involve the DB2 for z/OS ESS interface:

1. Use the following TRACE command to turn on the IMS ESS trace and to direct its output to the external trace data set:

```
/TRACE SET ON TABLE SUBS OPTION LOG
```

2. Obtain dumps of the IMS CTL and involved dependent regions, before and after the failure, by issuing this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

3. Obtain a z/OS SVC dump of the DB2 MSTR and DBM1 regions by issuing this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(dbtmstr,dbwdbm1),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

4. Save the IMS online log data set that was active during the failure because IMS TYPE5501, 08, 07, 56 and other log records can be critical to diagnosis. The IMS TYPE5501 records are updated by DB2. The internal buffer for these records is stored at the location described by the CDE entry named WAL in the IMS regions.

5. If the IMS monitor is started, issue the following command to monitor the IMS data set:

```
/TRACE SET ON MONITOR ALL
```

Related reference:

 [Diagnosing DB2 problems](#)

Collecting data about database problems

The first step to diagnosing an IMS problem is to collect data about the problem. If you call an IBM service representative, you will be asked for documentation about the problem.

For database problems, obtain the following information:

- The damaged database data set.
- The database image copy of the damaged database in a state prior to damage.
- The image copy of logically related databases.

- The IMS OLDS from all data-sharing IMS subsystems.
 - Save from the last good database image copy of damaged database.
- If possible, and not already set, use the following IMS commands and save the output:


```
/TRA SET ON TABLE DLI OPTION LOG
```

and

```
/TRA SET ON TABLE LOCK OPTION LOG
```
- The SYSOUT from the Pointer Checker jobs for the damaged database.
- The SYSOUT from batch jobs that accessed the damaged database.
- The LIST.RECON and LIST.HISTORY DBD from the damaged database.
- The SMF 60, 62, and 64 records from all data-sharing systems back to the last good image copy of damaged database.
- For VSAM data sets:
 - Issue IDCAMS LISTC for the damaged VSAM data set.
 - Issue IDCAMS DIAGNOSE and IDCAMS EXAMINE for the damaged VSAM KSDS data sets.

Collecting data about z/OS Resource Recovery Services problems

RRS provides a system resource recovery platform such that applications that run on z/OS can have access to local and distributed resources and have system-coordinated recovery management of these resources.

If you use RRS with your IMS system:

- Take an SVC dump of the standard IMS regions using one of the methods discussed earlier: CTL, DL/I, DBRC, suspicious dependent regions, IRLM, and so on.
 - In addition, include the z/OS RRS address space and the z/OS logger address space (IXGLOGR).
 - Consider setting the following SLIP trap to supplement standard IMS/RRS ABENDU0711 diagnostics:


```
SLIP SET,C=U0711,JOBLIST=(ctljname,rrsjname,IXGLOGR),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,GRSQ,LPA,ALLNUC),
ID=nnnn,DSPNAME=('RRS'.*),END
---
```

In the previous example:

ctljname

IMS control region job name

rrsjname

RRS region job name

nnnn Name used to recognize this SLIP

- Turn on the RRS component trace.
 - Place the following statements in the CTIRRSxx PARMLIB member:


```
TRACEOPTS
ON
BUFSIZE(500M)
OPTIONS('EVENTS(URSERVS,LOGGING,CONTEXT,EXITS,STATECHG,RRSAPI,RESTART)')
```
 - Place the following statement in the z/OS COMMNDxx SYS1.PARMLIB member:

```
TRACE CT,ON,COMP=SYSRRS,500M,PARM=CTIRRSxx
```

Note: This statement allows the trace to be active at IPL.

- Use the D TRACE,COMP=SYSRRS command to view the current trace setting.
- RRS component trace is present in the RRS address space.
- Format the trace by using IPCS CTRACE COMP(SYSRRS) FULL command.
- Save the IMS OLDS
 - IMS 67D0 log records are produced for some ABENDU0711 abends.
 - Print these records by using the IMS utility programs DFSERA10 and DFSERA30.
 - Other RRS related records that are produced:
 - TYPE4098 - Checkpoint for RRS log name.
 - TYPE5615 - IMS restarted with RRS.
 - TYPE5616 - Start of protected UOW.
 - Issue two or three IMS DISPLAY UOR ALL commands to show status about the IMS UOR for protected resources on the RRS recovery platform.
 - The RRS-URID provided by RRS and the IMS recovery token are displayed.
- If the problem is recreatable, then:
 - Turn on the RRS component trace:

```
TRACE CT,ON,500M,COMP=SYSRRS  
nn,OPTIONS=(EVENTS(ALL)),END
```
 - When the problem has been recreated, stop the component trace:

```
TRACE CT,OFF,COMP=SYSRRS
```

 - RRS component trace is present in the RRS address space.
 - Format the trace by using the IPCS CTRACE COMP(SYSRRS) FULL command.
- Issue two or three IMS DISPLAY UOR ALL commands to show status about the IMS UOR for protected resources on the RRS recovery platform.
 - The RRS-URID provided by RRS and the IMS recovery token are displayed.

Related tasks:

“Collecting data about IMS Connect problems” on page 19

Collecting data about MSC-related problems

If you experience IMS Multiple Systems Coupling (MSC) related problems, you can collect diagnosis data with SVC dumps.

If you use IMS MSC and experience a related problem, complete the following tasks:

- Create an SVC dump of the coupled IMS regions (minimally, the CTL regions, but the problem might reside in any IMS-related region). In addition, ensure that the VTAM address space is also included. Create this dump as close to the time of the problem as possible, before you try to fix the problem.
- Save the IMS OLDS for both coupled systems from the time of the message creation.
- To show the status and queue counts for the logical link, issue the type-1 commands /DISPLAY LINK ALL and /DISPLAY LINK ALL MODE, or issue the type-2 command QUERY MSLINK NAME(*linkname*) SHOW(ALL).
- If the problem is recreatable:
 - Turn on the VTAM Internal Trace for both coupled systems:

F NET,TRACE,TYPE=VTAM,OPT=(API,PIU,MSG),DSPSIZE=5,SIZE=999

- Using the options shown above, the VIT (VTAM internal trace) is created in a VTAM data space. After the problem has been recreated, the dump parameters should also include the VTAM data space:

DSPNAME=('NET'.ISTITDS1)

- Turn on the MSC LINK trace for both coupled systems by issuing either the type-1 command /TRACE SET ON LINK *link#* LEVEL 3 MODULE ALL or the type-2 command UPDATE MSLINK NAME(*linkname*) START(TRACE).
- The type-2 command UPDATE MSLINK NAME(*linkname*) START(TRACE) uses the same level and module settings that were used the last time the command /TRACE SET ON LINK *link#* was issued. If a /TRACE SET ON LINK *link#* command has not been issued since the last cold start, this command defaults to MODULE ALL and LEVEL 4.

Chapter 3. Collecting data about abends by using IMS abend search and notification

IMS abend search and notification enables IMS to send an email or text message to a designated email address when an abend occurs.

When an abnormal termination (or *abend*) occurs, IMS sends a message that contains an abend code to an operator's console or to the master terminal operator (MTO). This process delays a response because the person who can respond to the abend might not be near the console when the message is sent. Therefore, action in response to the abend is delayed until the message reaches the correct person.

IMS abend search and notification enables IMS to send an email or text message to a designated email address when an abend occurs, in order to:

- Notify the correct person of an abnormal termination (abend).
- Provide a web address (URL) to the location of additional informational resources, such as IMS product documentation, technical notes in an IBM technical support database, and information in the preventive service planning (PSP) database.

You can also use IMS abend search and notification to dynamically research abends and build links to web addresses that provide information that relates to the abend, such as online product documentation and technical support databases.

Enabling IMS abend search and notification

Before you can use IMS abend search and notification to search online documents and technical support databases for information related to IMS abends, you must enable it.

Complete the setup procedures for the IMS abend search and notification, as described in “Setting up IMS for diagnostics” in *IMS Version 12 System Definition*.

Researching information about abends dynamically

You can use IMS abend search and notification to dynamically generate emails for specific abends, specify research criteria, and replicate the search criteria that IMS used in a particular abend event and generate an email.

To research information about abends dynamically:

1. Start IMS abend search and notification by using one of the following methods:

Option	Description
Select IMS abend search and notification from the IMS Application Menu.	The IMS Abend Search and Notification panel is displayed.
From the ISPF option 6, enter the following command, where <i>hlq</i> is the high-level qualifier used to install IMS: <code>exec 'hlq.SDFSEEXEC(DFSASNO)' 'HLQ(hlq)'</code>	The IMS Abend Search and Notification panel is displayed.

2. Type 2 in the IMS ASN On-Demand Interface field and press **Enter**.

The IMS Abend Search and Notification panel - on demand interface panel is displayed, as shown in the following figure.

IMS Abend Search and Notification - on demand interface

COMMAND ==>

*Product Name _____ REQUIRED (example: IMS)

Provide one or more of the following web search arguments

PSP for FMID _____ (example: JMK7701)

Abend Code _____ (example: S0C4)

Return Code (RC) _____ (example: 44)

Module Name. _____ (example: DFSSAMP0)

APAR Number (PE or other). . . _____ (example: PQ99999)

Message ID _____ (example: EFS555i)

Generic Search Argument . . . _____ (example: SQL+OVERFLOW)

Recipient Information

Recipient email Address. . . _____ (example: name@company.com)

Specify Additional Addresses? _ (Y-Yes/N-No)

JOB JCL Statement. _ (E-Edit/Y-Yes/N-No)

Figure 2. IMS Abend Search and Notification - on demand interface panel

3. Type your search criteria and press Enter.

Chapter 4. How to search problem-reporting databases

After you obtain background information about the problem you are diagnosing, you can then use that information to create search arguments to search problem-reporting databases for known problems that describe an aspect of a program failure.

You use keyword strings to search an IBM Technical Support database for documents such as Authorized Program Analysis Reports (APARs), Preventative Service Planning buckets, or Technotes for information about the resolution of reported problems. If the search is successful, you will find a similar problem description, and usually a fix or recommendation. If the failure is one that is not known, you will use the keywords to describe the failure when you contact IBM Product Software Support for assistance.

Some optional search tools might require keywords in a structured database (SDB) format.

Developing search arguments

A keyword describes one aspect of a program failure. A set of keywords, called a *keyword string*, describes a specific problem in detail. Because you use a keyword string to search a database, a keyword string is also called a *search argument*.

The keywords you use to search for problems in IMS are:

- The component identification

This is the first keyword in the string. A search of the database with this keyword alone detects all reported problems for that version of IMS.

- The type of failure

The second keyword specifies the type of failure that occurred. Its values can be:

- ABENDxxx
- ABENDUxxxx
- DOC
- PERFM
- MSGx
- INCORROUT
- WAIT/LOOP

- Symptom keywords

These can follow the keywords above and supply additional details about the failure. You select these keywords as you proceed through the type-of-failure keyword procedure that applies to your problem.

Add symptom keywords to the search argument gradually so that you receive all data matches or *hits*, which are problem descriptions that might match your problem. If you receive too many problem descriptions to examine, you can add AND or OR operators to additional keywords in various combinations to the keyword string to reduce the number of hits.

- Dependency keywords

These are program or device dependent keywords that define the specific environment that the problem occurred in. When added to your set of

keywords, they can help reduce the number of problem descriptions you need to examine. See “Dependency keywords” on page 65 for a list.

Creating a search argument

After you have performed some analysis on the problem you are diagnosing, you can then use that information to search problem reporting databases. To do that, you create a search argument comprised of keyword strings. If that search technique is unsuccessful, you can prepare an Authorized Program Analysis Report (APAR).

To build the keyword string and search the IBM software support database for a problem similar to the one you are experiencing, follow these steps:

1. Begin with “Component identification keyword procedure” to determine the failing IMS component.
2. Follow the sequential steps in one of the “Type-of-Failure Keyword” procedures until you build a keyword string.
3. Go to “Searching the database” on page 66, to learn how to search the IBM software support database with your completed string.
 - a. Optional: Use the “IMS keyword dictionary” on page 63, which provides guidance on translating free-form keywords into structured database (SDB) format.
 - b. If needed, you could use “Dependency keywords” on page 65, which are used to narrow search arguments.
4. If your search is unsuccessful, go to “Procedures for preparing an APAR” on page 68.

Selecting the keywords

You select the proper keywords to search the IBM Software Support database for a problem similar to the one you are experiencing. The keywords you select depend on the component that is experiencing the problem and the type of failure that occurred.

Related tasks:

“Analyzing DRA problems” on page 358

Component identification keyword procedure

Use a component identification number with at least one other keyword to search the IBM software support database.

The component identification numbers for IMS appear in the following table.

Table 2. IMS component identification numbers

Identification number	Description
5635A03	IMS Services Database Manager Transaction Manager Extended Terminal Option (ETO) Recovery-level Tracking Database-level Tracking
569516401	Internal Resource Lock Manager (IRLM) version 2

Some of the procedures in these topics contain offsets within control blocks. Be aware that maintenance might change the offsets in these control blocks. For a current version of the layout of the control blocks for your system, assemble the DFSADSCT module that is in the IMS.ADFSSMPL library.

Related concepts:

“PERFM procedure” on page 38

Related tasks:

“Type-of-failure keyword”

Type-of-failure keyword

You choose the keyword that best describes the program failure you experienced, and then go to the procedure for that type of failure.

Related reference:

“Component identification keyword procedure” on page 32

ABENDxxx procedure

Use this procedure when the system terminates abnormally with a system abend completion code.

Keyword: ABENDxxx

Compare the completion code and PSW address in both the z/OS-formatted section of the dump and the IMS-formatted section of the dump. If the code and address do not match, use only the data from the IMS-formatted section, because the system dump data might be produced if an abend occurs during abend processing.

Replace the xxx part of the ABENDxxx keyword with the abend code from either the termination message or the abend dump.

Keyword: RCxx

This keyword applies only if the abend has an associated return code as described in *z/OS MVS System Commands*.

Replace the xx part of the RCxx keyword with the return code.

Keyword: module name

You can determine the name of the module that received the abend in one of the following ways:

- Check both the dump title and message DFS629I, which might contain the name of the module that ended abnormally.
- Check the summary section, called “Diagnostic Area”, in the offline formatted dump.
- Find the PSW address at the time of abend. Locate this address in the storage section of the dump, and scan backward through the eye catchers until you find a module identifier.

Module-specific keyword: Failing instruction, register

You can use these module-specific keywords to further narrow the field of hits.

- **Failing Instruction:** The PSW address at the time of abend usually points to the next instruction to be executed. If ABEND0C4 or ABEND0C5 occurs and the INTC (interrupt code) field on the PSW AT ENTRY TO ABEND line contains X'0011' (segment exception) or X'0010' (page translation exception), the PSW points directly to the instruction that failed.

- **Register in Error:** Examine the code near the failure to determine the register that is invalid or in error, if possible.

For example, if the failing instruction is BALR (05EF), look at registers 14 (E) and 15 (F). If register 15 (F) contains zeros, the program cannot branch to that location. Therefore, register 15 is in error.

In performing system-abend analysis, another module might have passed the register in error. You might be able to determine this by looking at the registers on entry to the failing module. If the incorrect value is in one of the registers, that value might have been passed.

Module-specific keyword: Search argument example

If, for example, ABEND0C4 occurred in IMS module DFSFXC30 on a BALR (05EF) instruction because register 15 (F) contained zeros, use the following search argument:

```
5655J3800 ABEND0C4 DFSFXC30
```

For a structured database search, use the following search argument:

```
PIDS/5655J3800 AB/S00C4 RIDS/DFSFXC30
```

With this search argument, you might receive numerous hits, which would most likely include the APAR that describes your problem. You can add module-specific keywords to narrow the field of hits received. Use the OR operator with these additional keywords at first.

The additional keywords for this example are:

```
BALR | R15 ZEROS
```

For a structured database search, use the following search argument:

```
OPCS/BALR | REGS/GR15 VALU/H00000000
```

Related concepts:

“ABENDUxxxx procedure”

ABENDUxxxx procedure

Use this procedure when an IMS user abnormal termination occurs. For user abends, you must gather more information before calling IBM Software Support.

A message usually precedes a user abend. First, find the message and then the abend code in *IMS Messages and Codes, Volume 1: DFS Messages* or *IMS Messages and Codes, Volume 2: Non-DFS Messages*. Then, if you need further diagnostic information (such as return codes) that you can use to build the search argument, or information about why the abend was issued, refer to the *IMS Messages and Codes, Volume 3: IMS Abend Codes*.

If you cannot solve the problem by using the information in the *IMS Messages and Codes, Volume 3: IMS Abend Codes*, develop a search argument.

ABENDUxxxx keywords

Replace the xxxx part of the ABENDUxxxx keyword with the user abend code from either the termination message or the abend dump. User abends are always represented in decimal.

Keyword: module name

You can determine the name of the module that received the abend in either of the following ways:

- Check both the dump title and message DFS629I, which might contain the name of the module that ended abnormally.
- Use the PSW address at the time of abend. You can find this address in the IMS-formatted section of the dump under the diagnostic area or in the z/OS-formatted section. From the PSW address, scan backward through the eye catchers until you find a module identifier.

Use the module name in the search argument for standard user abends only. For pseudoabends, do not include the module name as part of the argument. *IMS Messages and Codes, Volume 3: IMS Abend Codes* indicates whether the abend is a pseudoabend or a standard abend.

Abend-specific keywords

By examining the information in *IMS Messages and Codes, Volume 3: IMS Abend Codes*, you might gather additional keywords that can be pertinent to the problem, such as:

- User call function
- Internal call function
- Database organization
- Messages

Replace the xxxxxx part of keyword MSGxxxxxx with the actual message identifier (for example, the keyword for message DFS053I is MSGDFS053I).

- Return codes

Replace the xx part of keyword RCxx with the associated hexadecimal return code (for example, the keyword for return code C is RC0C).

- Function codes

Replace the xxxx part of keyword FCxxxx with the associated hexadecimal function code (for example, the keyword for function code 13 is FC0013).

Search argument example

If, for example, ABENDU3046 occurred in IMS module DFSPCC20 with message DFS3624I indicating function code 291 and return code 4, the search argument to use is:

```
5655J3800 ABENDU3046
```

For a structured database search, use this search argument:

```
PIDS/5655J3800 AB/U3046
```

With this search argument, you might receive numerous hits, which would most likely include the APAR describing your problem. You can add keywords from the section “Type-of-failure keyword” on page 33 to narrow the field of hits received.

It is a good idea to use the **OR** operator on these additional keywords at first. Module name DFSPCC20 is not included as part of the search argument because ABENDU3046 is a pseudoabend.

The additional keywords for the above scenario are:

MSGDFS3624I | RC04 | FC0291

For a structured database search, use this search argument:

MS/DFS3624I PRCS/00000004 OPCS/0291

Additional documentation

IBM Software Support might ask you to obtain certain information to determine and resolve the problem. At times you might need to create the problem again in order to gather this documentation.

For database problems, ensure that you have access to the following documentation before calling IBM Software Support:

- A dump of the problem
- DBDGENs
- PSBGENs
- A copy of the databases involved in the error
- Logs and archive tapes that might have activity against the databases
- Output from both the DL/I and LOCK traces
- When tracing to the log, a printout of the traces
- A current CDS list or a current SMP/E target zone
- A current assembly listing of DFSADSCS from IMS.ADFSSMPL (control block DSECTs)

Problems can be resolved more quickly if the documentation listed above is available.

IRLM procedure

Use this procedure when the IRLM terminates abnormally.

1. Locate the PSW and register contents at entry to the abend either from the software LOGREC entry or from the RTM2WA summary in the formatted section of the SDUMP.
 - a. If the PSW is not within an IRLM module (prefixed with DXR), determine the system component in which the abend occurred and use the diagnostic procedure for that component to resolve the problem.
 - b. If the RTM2WA summary entry shows that the IRLM was terminated by an abend completion code of U2017, U2018, U2019, U2020, U2022, U2023, U2024, U2025, U2027, U2031 (X'7E1', X'7E2', X'7E3', X'7E4', X'7E6', X'7E7', X'7E8', X'7E9', X'7EB', or X'7EF'), the IRLM task was terminated because of an error either in a subtask or in an SRB related to the IRLM. To diagnose the problem, use the software LOGREC entry or the RTM2WA summary entry for the original error in the subtask or related SRB.
2. Register 12 normally contains the base register contents for the module that was in control at the time of the error.
3. Register 9 normally contains the address of the RLMCB if the error occurred during IRLM processing.

4. Using the module name, find the function keyword and locate the function and subfunction keywords.

Examples

An example of a search argument for an IRLM problem is:

569516401 ABEND0C4 DXRRL200

For a structured database search, an example is:

PIDS/569516401 AB/S00C4 RIDS/DXRRL200

Related tasks:

“ABENDxxx procedure” on page 33

DOC procedure

Use this procedure if you find a deficiency in documentation through omission or inaccuracy.

Keyword: order-number

Your feedback is important in helping us provide the most accurate and highest quality information. If you have any comments about this or any other IMS information, you can take one of the following actions:

- From any topic in the information center at publib.boulder.ibm.com/infocenter/imzic, click the **Feedback** link at the bottom of the topic and complete the Reader Comment Form.
- Send your comments by email to imspubs@us.ibm.com. Be sure to include the title, the part number of the title, the version of IMS, and, if applicable, the specific location of the text on which you are commenting (for example, a page number in the PDF or a heading in the information center).

Corrections resulting from readers' comments are included in future editions of the manual, but are not included in the software support database.

If a problem can have severe results or cause lost time for many other users, contact IBM Software Support to initiate a documentation change.

APARs are not generally accepted for documentation errors. However, APARs that correct a programming error can result in documentation changes.

Use this keyword to search for all changes to a specific manual. The format for the order-number is *ppnnnnnnnee*, where *pp* is the alphabetic prefix, *nnnnnn* is the 6-digit base publication number, and *ee* is the edition number. For example, the order number for *IMS Messages and Codes, Volume 1: DFS Messages* is GC18-9712-00. Replace *ppnnnnnnnee* with GC18971200. The edition number is optional. To broaden the search to include all editions of a publication, either omit the edition number or replace it with two asterisks (**).

Search argument example

Use this search argument to search for all changes to any edition of *IMS Messages and Codes, Volume 1: DFS Messages*:

5655J3800 GC189712**

For a structured database search, use this search argument:

PIDS/5655J3800 PUBS/GC269712**

You can add more keywords to narrow the search. For example, if you cannot find message DFS3007 in *IMS Messages and Codes, Volume 1: DFS Messages*, add this keyword to the above search argument:

MSGDFS3007

For a structured database search, use this search argument:

MS/DFS3007

If you do not find an APAR that adds message DFS3007, you can report the omission to IBM by clicking the **Feedback** link at the bottom of any topic in the information center.

PERFM procedure

Most performance problems are related to system tuning and should be handled by system programmers.

Keyword: PERFM or PERFORMANCE

Always use the keywords PERFM and PERFORMANCE for performance problems. You should use the **OR** operator to link them together in the search argument.

You can use the following search argument to check for all performance APARs in IMS Fast Path:

5655J3800 PERFM | PERFORMANCE FAST | PATH | FASTPATH

For a structured database search, you can use this search argument:

PIDS/5655J3800 PERFM | PERFORMANCE RIDS/FASTPATH

You can add the **OR** operator to the general component identifier together with the Fast Path component identifier. With this search argument, the resulting number of hits could be very large, but would include APARs describing performance problems in Fast Path.

You can add more keywords to narrow the number of hits. For example, if the performance problem occurs because of an excessive number of file opens and closes, you can add the **OR** operator with the following keywords to the above search argument:

OPEN | CLOSE

For a structured database search, use this search argument:

PCSS/OPEN | PCSS/CLOSE

If you cannot find an appropriate APAR with these search arguments, contact IBM Software Support.

Appropriate documentation for performance problems might include:

- Traces, such as DL/I, lock, dispatcher, scheduler, external subsystem, and others, depending on the area of the performance problem
- Dumps of the problem during the period of performance degradation
- Dumps of the problem during normal periods, for comparison
- DB or IMS Monitor reports during the performance problem period

- DB or IMS Monitor reports during normal operations, for comparison
- Copy of the IMS log during the performance problem period
- Copy of the IMS log during the normal period, for comparison

If a coordinator controller (CCTL) application program experiences a performance problem in a Database Control (DBCTL) environment, you might need the following documentation in addition to that listed above:

- Any CCTL traces or monitor reports
- A dump of the CCTL subsystem during the period of performance degradation

Related reference:

“Component identification keyword procedure” on page 32

MSG procedure

If, after analyzing the message, you believe that the message should not have been issued or describes an error condition, use the MSGxxxxxxx keyword.

Keyword: MSGxxxxxxx

Replace the xxxxxxxx part of keyword MSGxxxxxxx with the actual message identifier (for example, the keyword for message DFS0861 is MSGDFS0861).

Search argument examples

If, for example, you receive message DFS3401I RACF NOT AVAILABLE, and you determine that RACF is indeed available in your system, the search argument to use is:

5655J3800 MSGDFS3401I

For a structured database search, use this search argument:

PIDS/5655J3800 MS/DFS3401I

IncorROUT procedure

INCORROUT is when either output is missing, or output is incorrect.

Keyword: INCORROUT

Use this procedure to determine the appropriate search argument.

Always use the keyword INCORROUT for problems related to incorrect or missing output.

Keyword: utility module name

If the incorrect or missing output is associated with a utility, use the utility module name as a keyword. For example, if output from the File Select and Formatting Print utility (DFSERA10) is incorrect, use DFSERA10 as a keyword.

Keyword: command

If the output from a command is missing or incorrect, use the first three letters of the command as a keyword. Also, you should use the **OR** operator in the search argument with CMDxxx, where xxx is replaced by the first three letters of the command.

If, for example, the DISPLAY command provides incorrect output, use the following search argument:

```
5655J3800 INCORROUT DIS | CMDDIS
```

For a structured database search, use this search argument:

```
PIDS/5655J3800 INCORROUT PCSS/DIS
```

If applicable, you can add the output column or heading as a keyword in the search argument.

Keywords: columns, headings, fields

Whenever possible, you can add additional keywords to narrow the field of search results. If a particular heading, field name, or column is incorrect, use it as a keyword. For example, if the deadlock event summary section of the IMS Monitor report (DFSUTR20) is incorrect for the DMB NAME column, use the following search argument:

```
5655J3800 INCORROUT DFSUTR20 DEADLOCK | DMB
```

For a structured database search, use this search argument:

```
PIDS/5655J3800 INCORROUT RIDS/DFSUTR20  
PCSS/DEADLOCK PCSS/DMB
```

If you receive too many search results, remove the **OR** operator (|) to focus the selection.

Keyword: database type or call

If the incorrect output is a database record, use the database type (such as VSAM, HDAM, or HIDAM) and possibly the call (such as GU, ISRT, or DELETE).

Additional diagnostics

This section does not apply to a Database Control (DBCTL) environment.

If the output is a transaction message produced as output from an application program, perform the steps below. (The message can be directed either to a terminal or to another application program. This is called a program switch.)

1. If the output is missing, continue with this step; otherwise, go to step 2.
 - a. When the output is missing, determine if the transaction is being scheduled.
 - Issue the /DIS ACTIVE command to make sure the transaction is not stopped.
 - Then issue the /DIS TRAN command to find out if the transaction is scheduled.

QCT should decrease by at least one each time the transaction is scheduled and terminates normally.

If the transaction is not being scheduled, go to step 1f.
 - b. Determine if the message is being enqueued to the proper output destination by issuing one of the following commands:
 - Issue the /DIS TRAN command (for program switch). ENQCT should increase.
 - Issue the /DIS LTERM command (for output to terminal). ENQCT should increase.

If the message is not being enqueued to the proper output destination, go to step 1e.

- c. If the output destination is another application program, it should be scheduled as a result of the message enqueue.

If the transaction is scheduled but there is no input, the problem is probably within the SYS function.

If the application program is not scheduled, go to step 1f.

- d. If the output destination is a terminal, verify that I/O errors did not prevent the message from being sent. Take both of the following actions.

- Review the console log for I/O error messages.
- Issue the /DIS LTERM command for operational status.

If you detected valid I/O errors, stop here and correct the hardware problem. Otherwise, the problem is probably within the TM function. Stop here and build your search argument.

- e. Determine if the application program is using the proper PCB for the ISRT call.

- Force a dump in the application program at the time of the ISRT call.

If the proper PCB is being used, the problem is probably within the SYS function. Stop here and build your search argument. Otherwise, stop here and correct the application program.

- f. Determine if the resources necessary to schedule the application program are available.

- Issue the /DIS ACTIVE command for the active region.
- Issue the /DIS SUBSYS ALL command for all external subsystems connected to or in the process of being connected to IMS.
- Issue the /DIS TRAN command to make sure the transaction is not stopped.
- Issue the /DIS DATABASE command to determine if the necessary databases are available.

If a resource is not available, stop here and make it available. Otherwise, force a console dump. Use the PST ANALYSIS step in procedure "WAIT/LOOP procedure" on page 42 to determine the reason the transaction is not being scheduled. Stop here and build your search argument using that information.

- 2. If the incorrect data is input to an application, perform this step, otherwise go to step 3.

- a. Verify the text data in the X'01' log record to determine if the data reached IMS properly.

If the data did not reach IMS properly, go to step 2c.

- b. Force a dump in the application program immediately after the application program GU call, in order to determine if the data reached the I/O area correctly.

If the data did not reach the I/O area correctly, the problem is probably within the SYS function. Stop here and report the problem. Otherwise, the application program received the data correctly. Stop here.

- c. Start the line or node trace and verify the data in the X'6701' log record to determine if the data reached the input TP buffer correctly.

If the data reached the input TP buffer correctly, the problem is probably within the DC function. Stop here and report the problem. Otherwise, if the data did not reach the input TP buffer correctly, the problem is probably a

hardware or an operating system failure. Stop here and correct the hardware or operating system problem.

3. Determine if the message data is actually incorrect rather than merely formatted incorrectly.
 - Compare received data with expected data.
 - Check MFS blocks for correct format definition.
 - a. Force a dump in the application program just before the ISRT call to determine whether the data is correct in the I/O area at the time of the ISRT.

If the data in the I/O area is incorrect, the problem is probably in the application program. Stop here and correct the application program. Otherwise, continue. Verify the text in the X'03' log record to determine whether the data reached the message queue correctly.

If the message did not reach the message queue correctly, the problem is probably within the SYS function. Stop here and build your search argument. Otherwise, continue.

- b. Start the line or node trace and verify the data in the X'6701' log records, in order to determine if the data reached the output TP buffer correctly.

If the data did not reach the output TP buffer correctly, the problem is probably within the DC function. Stop here and build your search argument. Otherwise, if the data is correct in the output TP buffer, but not at the terminal, the problem is probably a hardware or operating system failure. Stop here and correct the hardware or operating system problem.

IRLM problems

Incorrect output from the IRLM can be divided into the following three areas:

- Incorrect information on a display status command
- Locks granted when locks should not be granted
- Locks not granted when locks should be granted

For help in diagnosing these problems, call the IBM Support Center. A support representative will tell you what type of documentation to gather.

WAIT/LOOP procedure

The procedures for the WAIT and LOOP keywords are combined because the WAIT and LOOP symptoms might not be distinguishable at first.

Determine the type of WAIT or LOOP that is in progress

Use the following procedure to determine the type of WAIT or LOOP occurring, and to find the appropriate keywords for the problem.

Maintenance might change the offsets in these control blocks. For a current version of the control blocks assemble DFSADSCT.

1. Is IMS being shut down?
 - If the operator issued a CHECKPOINT DUMPQ, PURGE, or FREEZE command before the manifestation of the wait/loop, go to "Shutdown processing" on page 58.
 - If IMS is not being shut down, continue with the next step.
2. Determine whether IMS was in selective dispatching mode.

Find the dispatch work areas in the formatted dump. The dispatch work areas are created using the DISPATCH or ALL IMS dump formatting options. The dispatch work area eye catcher is **DSP.

The selective dispatch bits are in the SFLAGS field in the DYNAMIC SAP EXT. section, where the X'xxxxxx8x' bit represents selective dispatching. To determine whether selective dispatching was entered for save area prefixes (SAPs), search the DISPATCH AREA section for the following message:

*** NOTE: THIS TCB IS IN SELECTIVE DISPATCHING FOR SAPS

If you find this message, IMS wrote an X'450F' log record to the OLDS. This log record contains information about dynamic SAPs, such as the highest number of dynamic SAPs used and the number of times IMS was in selective dispatch for dynamic SAPs.

Examine this X'450F' log record to help determine what might have led to the shortage of dynamic SAPs. Then go to the "Determine the type of WAIT or LOOP that is in progress" on page 42. While performing SAP analysis, keep in mind that the dynamic SAPs are labeled DYNAMIC SAP, and that the CURRENT TCB= indicates the associated task control block (TCB).

If IMS is not in selective dispatching mode, continue with the next step.

3. Can the operator communicate with IMS through the z/OS system console by using the IMS outstanding reply to enter an IMS command, such as /DISPLAY?

- If no, or if you are not sure, go to step 5 now.
- If yes, the problem might be caused by:
 - A data communication failure.
 - The inability of a task to acquire a resource.
 - Non-completion of an event, such as I/O.

Continue with the next step.

4. Can the IMS master terminal operator (MTO) communicate with IMS by issuing various IMS commands, such as /DISPLAY?

- If yes, go to "Determine the type of WAIT or LOOP that is in progress" on page 42.
- If no, the problem might be data communication related. If IMS is still running, issue the following commands:
 - Issue the IMS /DIS NODE *nodename* command. Save the IMS console output.
 - Turn on the IMS node trace with the /TRA SET ON NODE *nodename* command.

Data is captured in the IMS X'6701' log record. Save the IMS OLDS for execution with IMS utility programs DFSERA10 and DFSERA30.

- Consider turning the VTAM buffer trace and VTAM internal trace on to complement the IMS node trace, as follows:

```
F NET,TRACE,TYPE=BUF,ID=nodename
F NET,TRACE,TYPE=VTAM,MODE=EXT,OPT=(API,PIU,MSG)
```

GTF must be active for this option.

- Obtain a memory dump of the IMS and VTAM regions using this series of commands:

```
DUMP COMM=(dump title)
R id JOBNAME=(j1,j2,j3,j4,j5,j6,j7),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

The variables have the following meanings:

- j1 IMS CTL region job name.
- j2 VTAM region job name.

- j3 IMS DL/I region job name.
- j4 Suspicious IMS dependent region job name, if any.
- j5 Suspicious CCTL (CICS) region name, if any.
- j6 DBRC region job name.
- j7 IRLM region job name (if IRLM database locking was used).

The jobs are listed in order of importance.

Recommendations: A memory dump of the IMS CTL, VTAM, DL/I, and suspicious dependent region or CCTL is usually sufficient to solve wait/hang problems. Occasionally, the DBRC and IRLM (if they are used for database locking) can be a factor. Obtain a memory dump of DBRC and IRLM as well to ensure that the problem can be resolved quickly. SYS1.DUMP data sets are often not large enough to hold all regions requested in the DUMP command. Make them large enough to hold the regions. If the z/OS SVC DUMP command fails due to lack of space, take separate memory dumps in smaller combinations to accommodate the smaller SYS1.DUMP data set size.

- Go to the “Determine the type of WAIT or LOOP that is in progress” on page 42.

5. Query the IMS Dispatch Work Areas.

- a. Find the Dispatch Work Areas in the formatted dump. The Dispatch Work Areas are created using the DISPATCH or ALL IMS dump formatting options. The Dispatch Work Area eye catcher is **DSP.
- b. Scan each Dispatch Work Area (STM, CTL, restart data set, and so on) except for the DRC and dependent region entries (labeled DEP, MPP, BMP, DBT, DRA, or IFP). Examine the QPOST field at offset X'1C'.
If the high-order bit of the QPOST field is off, note the address and type of Dispatch Work Area.
- c. If, after scanning all Dispatch Work Areas, except for the DBRC (DRC) task and dependent regions, you find that the QPOST high-order bit is always set, one of the following situations has occurred:
 - IMS is in an IMS WAIT (IWAIT) state. Go to “Determine the type of WAIT or LOOP that is in progress” on page 42 now.
 - If at least one Dispatch Work Area has an incorrect high-order bit, a LOOP or operating system WAIT has occurred. Continue with the next step.

6. Query the TCB/RB chain.

- a. Find the current ECB, address space ID (ASID), and TCB address for each Dispatch Work Area noted previously in step 5b.
 - In IDSPWRK SECTION 1, find field CECB at offset X'28'. The field CECB at offset X'28' contains the ECB of the current dispatched ECB.
 - In IDSPWRK SECTION 1, find the field ASIDS at offset X'30'. The first halfword of the field ASIDS at offset X'30' contains the ASID number for the task; the second halfword contains the CTL region ASID.
 - In IDSPWRK SECTION 1, find the field TCB at offset X'40'. The field TCB at offset X'40' contains the TCB address for the task.
- b. Find the formatted TCB/RB chain in the z/OS formatted dump. Use the IPCS SUMMARY FORMAT ASID(X'__') command for the ASID/TCB found in step 6a. Use the following FIND command to locate the TCB:

F 'TCB: xxxxxxxx' 1 16

where xxxxxxxx is the 8-character TCB address, including leading zeros.

- c. Examine the request block (RB) structure (PRBs, SVRBs, or IRBs), focusing on the last RB in the chain for that TCB. The TCBRBP field at offset X'00' contains the address of the last RB. Use the following FIND command to locate the RB:

F 'RB: xxxxxxxx' 1 16

where xxxxxxxx is the 8-character RB address, including leading zeros.

Exception: Using the last RB in the TCBs RB chain is usually accurate.

However, there are occasions when additional RBs might be appended to the end of the chain to facilitate dump processing, but they have nothing to do with the problem. X'00020033' in the WLIC field in any RB in the RB chain normally indicates dump processing. In such a case, examine the RBs prior to the RB with WLIC=X'00020033'. If the RB before the RB containing WLIC=X'00020033' contains WLIC=X'0002000C, it might be necessary to examine the RB before the RB containing WLIC=X'0002000C'.

Example:

```
PRB WLIC = X'00020006'  
PRB WLIC = X'00020078'  
SVRB WLIC = X'0002000C'   Examine prior RB.  
SVRB WLIC = X'00020033'   <== Indicates dump processing  
SVRB WLIC = X'00020078'
```

- d. Examine the LINK field in the RB found in step 6c. The high-order byte of the LINK field is the wait count field.
- If the wait count is X'00', the task is probably looping. Perform the following steps:
 - Perform system loop diagnostics. Obtain the OPSW and registers from the looping RB, (located in the following RB or in the TCB, if this is the last RB (TCBRBP)) for a snapshot of the loop.
 - Obtain the PSW address from the z/OS system trace table. Use the IPCS VERBX TRACE ASID(xx) command to obtain the entries for the ASID in question. Focus on the entries for the TCB found in step 6a. You can ignore entries between any SVC and associated SVCR because they reflect necessary z/OS operating system activity indirectly involved in the loop. (The IMS TYPE2 SVC is an exception to this since it results in execution of IMS code.) Sorting the pertinent addresses by OPSW address greatly aids in laying out the loop.
 - Resolve the PSW address found by using either IPCS BROWSE mode, the IPCS WHERE command, or by using an LPA or NUCLEUS MAP to obtain the name of the modules involved in the loop. The IPCS commands used to obtain the maps are LPAMAP, and VERBX NUCMAP. Calculate the offset at which the instruction appears in the modules to outline the path of the loop.
 - Another source of information for the looping task can sometimes be found at the top of the IMS SAPS AND SAVEAREA section (**SSA) of the IMS formatted dump. Look for the **** A C T I V E **** save area set nearest the top of the **SSA with the SAPECB filed matching the CECB field obtained in step 6a. The save area flow can indicate IMS modules involved in the loop or those passing control to the looping function.
 - If the wait count is not X'00' (that is, = X'01', or X'02', and so on), a system WAIT has probably occurred. Perform the following steps:

- Obtain the address portion of the OPSW. It points to the waiting module.
- Resolve the PSW address found by using either IPCS BROWSE mode, the IPCS WHERE command, or by using an LPA or NUCLEUS MAP to obtain the name of the waiting module. The IPCS commands used to obtain the maps are LPAMAP, and VERBX NUCMAP, respectively. Calculate the offset at which the wait occurred in the module. This information can be used for APAR searches and to assist IBM Software Support representatives.
- Use the CECB field obtained in step 6a to find the related SAP save area by scanning for the SAPECB match in the IMS formatted memory dump **SSA section.

SAP analysis procedure

1. Find the formatted SAP AND SAVE AREA section in the IMS formatted dump. Choose either the SAVEAREA, SYSTEM, ALL or SAVEAREA,SUM options of the IMS Offline Dump Formatter. The eye catcher of the SAP AND SAVE AREA section is **SSA.

The following table defines the key fields in SAP analysis.

Table 3. Key fields in SAP analysis

Offset	Field name	Length	Field description
SAP+X'00'	SAPFLAG1	1	X'80' = Active SAP X'40' = Waiting SAP
SAP+X'01'	SAPDSPCD	1	IMS TCB number. This number matches the associated TCB number at offset X'3B' in the dispatch work area.
SAP+X'14'	SAPIWAIT	4	In waiting SAPs, this is the address of the last active save area. Those below this address are residual. In SAPs that are active but not waiting, this field is residual and should not be used. Exception: SAPIWAIT might not be valid for Fast Path save area sets (DBF-prefixed modules). The active save area set usually ends with DBFXSL30, the Fast Path wait module, unless DFSIWAIT or DFSISERW appears previously in a save area set.
SAP+X'18'	SAPECB	4	Address of the ECB associated with this ITASK. If the PST is used, this field points to the beginning of the PST.
SAP+X'24'	SAPCDSP	4	Address of the current dispatch work area.
SAP+X'30'	SAPSDPNO	4	Dispatch number for the ITASK.

2. Begin SAP analysis at the end of the sorted SAPs.
Find the end of the sorted SAPs. Eye catcher ***END OF SORTED SAP FORMATTING marks the end of the list. SAPs are sorted by the SAPSDPNO (system dispatch number). The most recently dispatched ITASKs are at the end of the sorted

SAPs. These are the ITASKS that have been waiting the longest and possibly causing the other ITASKS to wait behind them by holding a resource, such as a lock or a latch.

3. Scan backwards from the end, examining only active or waiting SAPs. Focus only on the active save area sets (that is, SAPFLAG1 has the X'00' bit turned on (X'08', X'Cx', X'Dx', X'Fx')). Active save area sets are marked with the eye catcher **** WAITING **** or **** ACTIVE ****. To find waiting or active SAPs, use the following find command:

```
F ' **** ' PREV
```

The SAVEAREA,SUM option of the Offline Dump Formatter produces only active save area sets. Active running SAPs are marked with the eye catcher RUN. The end of this formatting is marked by the eye catcher ***** END SAP SUMMARY.

4. Skip all normal save area sets.

This step describes all normal save area sets. After you have identified all types of normal save area sets, you can disregard them because they are unrelated to the problem.

- a. WAITING save area sets in which module name DFSIWAIT appears after label EP at the second-level save area are considered normal save area sets.

The following example shows a normal save area set at the second level:

```
***SAVE AREA SET***
EP DFSQMRT0-11/13/94
SA 00133BC4          WD1 8091E430    HSA 80000000    LSA 00133C0C ...

EP DFSIWAIT
SA 00133C0C          WD1 00000000    HSA 00133BC4    LSA 00133C54 ...

EP DFSFLLG0-220-PL46803
SA 00133C54          WD1 00000000    HSA 00133C0C    LSA 00133C9C ...
.....
```

- b. The only normal save area sets in which the save area set contains DFSIWAIT at the third level are shown in the following example. Ensure that register 08 contains a value of X'00000003' for any of the first four save area sets, as shown in the example. Otherwise, it is abnormal and indicates an intent conflict, as described in "Intent conflict" on page 55. Use the SAPSECB field to obtain the PST address for use in the intent conflict procedure.

```
EP DFSSMIC0 --> EP SMSC2      --> EP DFSIWAIT with REG08 = x'00000003'
EP DFSSMIC0 --> EP DFSSMSC2 --> EP DFSIWAIT with
REG08 = x'00000003'
EP DFSSMIC0 --> EP DFSSMSC1 --> EP DFSIWAIT with
REG08 = x'00000003'
EP DFSSMIC0 --> EP MPPENQ00 --> EP DFSIWAIT with REG08 = x'00000003'

EP DFSFXC30 --> EP DFSFXC30-WFTEST --> EP DFSIWAIT
EP DFSVTP00 --> EP VTPWORK --> EP DFSIWAIT
EP DBFHCL00 --> EP DBFHGU10 --> DBFXSL30
```

- c. The only normal save area sets in which the save area contains DFSIWAIT at the fourth level are those shown in the following example. Ensure that register 08 in the DFSIWAIT save area set contains X'00000003'. Otherwise, it is abnormal and indicates an intent conflict, as described in "Intent conflict" on page 55. Use the SAPSECB field to obtain the PST address for use in the intent conflict procedure.

The following examples show normal save area sets at the fourth level:

```
DFSSMIC0 --> DFSSMSC0 --> SMSC1000 --> DFSIWAIT  REG08 = x'00000003'
DFSFXC30 --> DFSDLA30 --> DLA32000 --> DFSIWAIT
```

d. The following active save area sets are probably normal, so you can ignore them.

- Save area sets marked ACTIVE or RUN with SAPDSPCD=X'07'. This is a DRC task SAP. This condition is usually normal for the DBRC task.
- Save area sets marked ACTIVE or RUN with SAPDSPCD=X'0F'. This is the ESI task SAP if SAPCDSP=X'00000000'.
- Dependent region save area sets marked ACTIVE with SAPDSPCD=X'03'(MPP), X'04'(BMP), X'0D'(DRA), X'12' (IFP), X'13'(DBT), X'0C' (ESS), or X'00' (RESIDUAL), in which the top save area indicates it was returned. (The last bit of the address in the field labeled RET, which is register 14, is odd or has X'FF' in the high-order byte.)
- If the SAPDSPCD=X'13'(DBT), and the first save area EPA is marked UNKNOWN with the second-level save area RET field marked returned (the last bit of the address in RET is odd), this is a normal save area set if the first save area EPA is within module DFSDASC0 or DFSDAST0.

5. Obtain abnormal save area set information.

The remaining save area sets (those that are ACTIVE or WAITING, but abnormal, as described in step 4 are involved in the wait in some way.

Recommendation: Concentrate on one save area set at a time, beginning with the first abnormal save area set. Remember to start from the end of the sorted SAPs.

If you find an abnormal save area set marked **** ACTIVE **** (SAPFLAG1=X'80'), the problem is associated with the TCB/RB save area set. Use the address of the current dispatch area in SAPCDSP to find the dispatch work area associated with this save area set. Go to step 6a in the WAIT/LOOP procedure. Continue from there, using the ASID/TCB obtained from the dispatch work area. If the high-order bit in QPOST is on (QPOST=X'8x'), this SAP is suspended. Record this save area set and continue to the next abnormal save area set. Discontinue step 6a because this save area set should probably be ignored. Otherwise, continue.

Record the following key fields from the abnormal save area sets flagged as:**** WAITING ****

- a. The address of the SAP.
- b. For each save area in the save area set, from the first save area down to the save area pointed to by the SAPIWAIT field, obtain the following information. (See exception for SAPIWAIT in Table 3 on page 46 before proceeding.)
 - 1) EP module name
 - 2) APAR level (the APAR number and last few letters of the changeID string)
 - 3) RET address (this is register 14)
 - 4) EPA addressIf the module name is UNKNOWN and the module save area set begins with DFSDLA00, the EPA address can probably be resolved in the DL/I region dump by using IPCS BROWSE mode for the DL/I ASID.
- c. The offset from which DFSIWAIT, DFSISERW, or DBFXSL was invoked from the calling module.

You can calculate the offset by subtracting the EPA address in the save area **before** the save area pointed to by SAPIWAIT from the RET address of the save area pointed to by SAPIWAIT.

The following table shows key data from an abnormal save area set.

Table 4. Key data from an abnormal save area set

EP module name	APAR number	Last few ChangeIDs	RET	EPA	Wait call offset
DFSCST00	PL45938	abcde	80A7BA14	00A8E110	
DFSDBDR0	PL49770	..mnopr	60A8E6D6	00A07A58	
DFSBML00	none		50A07AC2	00B5DAE0	X'10E'
DFSIWAIT	none		40B5DBEE	70A7C7F6	

6. Identify the reason for the WAIT.

To identify the reason for the WAIT, do the following:

- a. Assemble the module that issued the wait. Use the offset obtained in step 5 as an approximate displacement into the module where an IWAIT or ISERWAIT was issued. Examine the code and comments at that point. Most modules give the reason for the IWAIT in the comments above the IWAIT issue point.

The EP name might not be the actual module name, but rather a CSECT within a module. To find the actual module name, using IPCS BROWSE mode, scan backwards from the EPA address for the actual module name.

7. Repeat steps 5 and 6 for the first three abnormal save area sets you found.

You should be able to gather enough information from the first three abnormal save area sets to perform a search or determine the cause of the problem.

Keyword: WAIT

At this point, you can be sure that you are in an IMS WAIT. Therefore, WAIT is an appropriate keyword for the search argument.

Keyword: module name issuing IWAIT or ISERWAIT

The Module Name column in your worksheet indicates the modules that issued the IWAITs. These modules can provide useful search arguments. Use the 8-character module name for this keyword.

Keyword: WAIT reason

The IWAIT REASON column in your worksheet indicates the reason or resource, or both, that is causing the IMS WAIT.

For example, if the reason was a WAIT for the DPST latch, the IWAIT REASON keyword is DPST LATCH.

Keyword: additional related keywords

External events might trigger WAITs. These events might be indicated by console messages, or they might be related to a procedure that was being performed at the time the WAIT began.

You can use each of these additional keywords in the search argument when applicable.

Search argument example

Consider this scenario:

- IMS went into a IWAIT after a WADS write error occurred.
- Multiple unusual save area sets were found from module DFSFLLG0.
- The reason for the IWAIT was found to be the LOG LATCH.

The broad search argument to use is:

5655J3800 WAIT LOG | LATCH | W ADS | DFSFLLG0

For a structured database search, use this search argument:

PIDS/5655J3800 WAIT PCSS/LOG | PCSS/LATCH | PCSS/WADS | RIDS/DFSFLLG0

With this search argument, you might receive numerous search results, which will probably contain the APAR describing your problem. You can then take various combinations of the additional keywords that were compared with the **OR** operator in the above example and use the **AND** operator on the keywords instead. You can use this technique to narrow your field of search until you find the appropriate APAR.

PST analysis

This section deals with analyzing regions for possible problems in scheduling, intent conflicts, and so forth.

1. Determine the number of active regions.

SCDREGCT at SCD+X'C8A' is a 2-byte field that contains the number of active regions, if any.

If SCDREGCT = X'0000', no regions are active. Go back to "Determine the type of WAIT or LOOP that is in progress" on page 42.

If SCDREGCT is not equal to X'0000', go to step 2.

2. Determine if the scheduler sequence queues (SSQs) have any entries.

Obtain the address of the transaction anchor block (TAB) from the SCDTAB field in the DSECT (label TABEP in the formatted dump). The TAB, which is mapped by DSECT DFSTAB, consists of:

- TAB header
- Headers for each of the six subqueues (SSQ1 - SSQ6)
- Class vector table (CVT)
- Transaction class tables (TCTs)

If the count of partition specification tables (PSTs) waiting on any subqueue (field TABSCHQC) equals 0, no region should be waiting on any subqueue. However, you should also check each subqueue header. Calculate the address of the subqueue header for a specific subqueue (SSQ#) as follows:

a. $SSQ\# \times X'18' - X'8' = \text{offset of header for } SSQ\#$

b. $\text{Offset of header for } SSQ\# + \text{SCDTAB address} = \text{address of header for } SSQ\#$

Perform this calculation for each subqueue number. If field TABSSQ n F, where n is the subqueue number, is not zero, this field contains the address of an entry on the SSQ for the specified subqueue.

- a. The SSQ consists of the following six subqueues. All subqueues are formatted in a dump.

Subqueue 1

Reserved for future use.

Subqueue 2

JMP region waiting for work.

Subqueue 3

MPP region waiting for work.

Subqueue 4

MPP/JMP region waiting for intent.

Subqueue 5

BMP/JBP region waiting for intent.

Subqueue 6

MPP/BMP/JMP region waiting for input.

- b. Each subqueue represents a resource. A PST enqueued on a subqueue is waiting for that resource.
- c. The TAB and SSQs are formatted after the SCD LATCH EXTENSION in an IMS formatted dump, as follows:

```
**TAB - TRANSACTION ANCHOR BLOCK**
0D1873B0          005800FF 00000000  * .....*
0D1873C0 0000000E 00000000 00000000 00000000 *.....*
0D1873D0 00000000 00000000 00000000 00000000 *.....*
      LINES  0D1873E0-0D1873EF  SAME AS THE ABOVE
0D1873F0 00000000 00000000 0CF18544 0CF00C40 *.....1...0. *
0D187400 00000000 00000000 00003614 00000000 *.....*
0D187410 0CF18C40 0CF18C40 00000000 00000000 *.1. .1. ....*
0D187420 00003AEB 00000000 00000000 00000000 *.....*
0D187430 00000000 00000000 0000396E 00000000 *.....*
0D187440 00000000 00000000 00000000 00000000 *.....*
0D187450 000010B4 00000000 0D187858 0D1878B0 *.....*
0D187460 0D187908 0D187960 0D1879B8 0D187A10 *.....*
0D187470 0D187A68 0D187AC0 0D187B18 0D187B70 *.....*
.....
.....
.....
```

*****SCHEDULER SEQUENCE QUEUES*****

DFSPSTQE	00000000	SUBQ	1	NOT ACTIVE
		SUBQ	2	NOT ACTIVE
		SUBQ	3	NOT ACTIVE
		SUBQ	4	NOT ACTIVE
		SUBQ	5	NOT ACTIVE
		SUBQ	6	NOT ACTIVE

- d. If the words NOT ACTIVE follow the subqueue entry, no PSTs are enqueued on that entry.
 - e. If entries are listed for subqueue 3, go to “No work to do” on page 53.
 - f. If no entries are listed for subqueue 3, go to step 3.
3. Are there subqueue 4 or 5 entries?
- Subqueue 4 does not apply to a DBCTL environment.
- Entries on subqueue 4 or 5 are waiting for intent conflicts to be resolved.
- a. If entries are listed for subqueue 4 or 5, go to “Intent conflict” on page 55.
 - b. If not, go to step 4.
4. Are there subqueue 6 entries?
- This step does not apply to a DBCTL environment. Continue with the next step.
- Entries on subqueue 6 are waiting for input.

- a. If there are entries listed for subqueue 6, go to “WAIT for input” on page 55.
 - b. If there are no entries, go to step 5.
5. Are all regions accounted for?
Compare the number of regions in the SCDREGCT (SCD+X'C92') with the number of regions enqueued on the subqueues. (The SCDREGCT is 2 bytes.)
 - a. If the numbers of regions are equal, go to step 6.
 - b. If the numbers of regions are not equal, all regions are unaccounted for. Go to the analysis for “PST analysis” on page 50.
6. Report the problem.
This problem occurs when there are entries queued on the subqueues and no reason can be found to prevent their scheduling, but nothing schedules. Report the problem to the IBM Support Center.

PST active

You reach this point in the analysis either when:

- The SCDREGCT field is not equal to zero, and there are no entries on the Scheduler Sequence Queues, or
 - No problem was found in analyzing the PSTs on the subqueues, and the number of PSTs on the subqueues is less than that in the SCDREGCT field.
1. Locate the PSTs.
Find the stack of dependent region PSTs in the dump. (Two stacks of PSTs exist in the dump. System PSTs are printed separately from the dependent region PSTs.)
 2. Is the PST scheduled?
 - a. Find all the PSTs with PSTTERM (X'1BC') = X'02' (ACTIVE) and PSTCODE1 (X'B7A') = X'10' (SCHEDULED).
 - b. Ignore the PSTs without the SCHEDULED bit on.
 3. For the scheduled PSTs, do SAP analysis.
 - a. PST at offset minus X'04' (field name PTR) is usually the SAP address. (The PTR field is the last entry on the line above the X'0000' line in the dump.) If not, PST + X'5B8' (PSTSAV1) is the address of the first Save Area in a set, and WD1 in that Save Area is the address of the SAP.
 - b. Go to “Determine the type of WAIT or LOOP that is in progress” on page 42. Return here after doing SAP analysis for the scheduled PSTs only.
 4. Are there any ACTIVE non WAITING SAPs?
 - a. If any of the SAPs are marked ACTIVE go to step 5.
 - b. If SAPs are found WAITING, use normal SAP analysis to report the problem. Use the search argument format “Search argument example” on page 50.
 5. Is the dependent region active within an IMS save area set?
 - a. If SAP +X'08' (SAPCNTRL) = X'10', this region is in a DL/I call within IMS. Go to step 6.
 - b. Otherwise go to step 7.
 6. Analyze the region dump.
You must analyze the region dump using the PSW address to identify the problem. Refer to “WAIT/LOOP procedure” on page 42, steps 6c and 6d.
 7. Determine what the application program is doing.

You must analyze the region dump using the PSW address to identify what the application program is doing.

In a DBCTL environment, you must analyze the CCTL region dump using the PSW address to find out what the DRA, CCTL, or application program is doing. Refer to “WAIT/LOOP procedure” on page 42, steps 6c and 6d.

8. Determine the reason the latch is not freed.

If a latch is being waited for, and the owner is not waiting for I/O, use SAP analysis to identify the reason for the WAIT.

No work to do

This section does not apply to a DBCTL environment.

You came to this point because subqueue 3 contains PSTs.

1. Locate the PSTs on subqueue 3.

The addresses under the field name SQPSTADD are the PST addresses. In the formatted dump, the PSTs start with the eye catcher *** DB PST AREA ***. Locate the PSTs that are on subqueue 3.

2. Find the classes the PSTs can execute.

PST + X'C68' (PSTCLASS) is a 4-byte field. Each byte indicates a class transaction that the PST is allowed to process. If, for example, PSTCLASS = 01030506, the PST can process classes 01, 03, 05, and 06.

3. For each PST on subqueue 3, locate the transaction class table (TCT) for each class that the PST can process. There is one TCT for each class.

a. Obtain the TAB address from the SCDTAB.

b. Take the first PSTCLASS value and subtract 1.

c. Multiply this result by 4.

d. Add this value to the TABCLASS offset value + X'70'.

e. $TCT = 4 \times (\text{first PSTCLASS value} - 1) + X'70'$.

When the high-order byte contains a X'80' this indicates the TCT class is not active.

4. Can any SMBs be scheduled?

$TCT + X'04' = \text{zero}$ or the address of an SMB that can be scheduled.

a. If zero, no SMBs can be scheduled. Go to step 7.

b. If SMBs can be scheduled, locate the SMBs and then go to step 5.

5. Is SMB locked or stopped?

a. If $SMB + X'24'$ (SMBSTATS) = X'10' (STOPPED) or X'08' (LOCKED), go to step 6.

b. Otherwise, go to step 9.

6. Are there any more SMBs on this class?

a. If $SMB + X'04'$ (SMBQEFP) is not equal to zero, it is the address of the next SMB. Move on to the next SMB and repeat step 5.

b. If $SMB + X'04'$ (SMBQEFP) = zero, there are no more SMBs. Go to step 7.

7. Are all classes accounted for?

a. If all classes found in PST + X'C68' (PSTCLASS) are not accounted for, repeat step 4 for each remaining class.

b. Otherwise, go to step 8.

8. Are all regions accounted for?

To determine whether all regions are accounted for, use SCDREGCT (SCD + X'C8A'). The SCDREGCT is 2 bytes. There is one PST for each region.

a. If the number of PSTs on subqueue 3 is equal to the SCDREGCT and they have been examined and accounted for, there are no transactions scheduled for the regions. This is a normal WAIT, and there is no work for IMS to perform. This is not a problem.

b. Otherwise, go back to 3 to continue the scheduler queue analysis.

9. Locate the PSB directory (PDIR).

If the SMB is not locked or stopped, locate the PDIR: SMB+X'3C' (SMBPDIR) = address of the PDIR.

10. Can PDIR schedule?

Locate the PDIR entry. When any of the following bits are ON, the PDIR is unable to schedule.

PDIR +X'20' (PDIRCODE) =
X'40'X'10'X'08'X'02'

a. If the PDIR cannot schedule, go back to step 6.

b. Otherwise, go to step 11.

11. Is PDIR marked parallel?

a. If the PDIR is marked scheduled but not parallel:

PDIR+X'20' (PDIRCODE) = X'04' (Scheduled)

and:

PDIR+X'21' (PDIROPTC) is not equal to X'04' (Not parallel)

If there are entries listed for subqueue 6, go to "WAIT for input" on page 55 to determine if any of the waiters on subqueue 6 are pseudo WFIs scheduled against the same PDIR. If there is a pseudo WFI scheduled against the same PDIR, report the problem to the IBM Support Center.

If there are no entries listed for subqueue 6 or none of the waiters on subqueue 6 point to the same PDIR, go back to step 6.

b. If marked parallel (PDIR +X'21' = X'04'), go to step 12.

12. Are enough messages enqueued for another PST?

If the PDIR is marked parallel, check if enough messages are enqueued on the SMB to schedule another PST.

a. You do this by finding:

1) SMB+X'46' (SMBPARLM) = number of messages per region (2 bytes).

2) SMB+X'44' (SMBRGNS) = number of message regions scheduled for the SMB (2 bytes).

3) SMB+X'1A'(SMBENQCT) minus SMB +X'18' (SMBDEQCT) = number of messages currently enqueued. (To find the number currently enqueued, subtract the messages dequeued from those enqueued.)

b. If the number of messages currently enqueued (step 12a3) is greater than the number of messages per region (step 12a1) multiplied by the number of message regions scheduled (step 12a2), there are enough messages enqueued on the SMB to schedule another PST. Go back to step 6.

c. Otherwise, go to step 13.

13. Report the problem.

At this point, regions are waiting, enqueued on subqueue 3 with transactions that can be scheduled. Report the problem to the IBM Support Center.

Intent conflict

You reach this point by having entries on subqueue 4 or 5.

An intent problem is indicated when the PST is on the intent queue.

1. Locate the PSTs that are on subqueue 4 or subqueue 5, or both.

The addresses under the field name SQPSTADD are the PST addresses. To analyze the INTENT CONFLICT fields in a PST, you must locate the PST in the unformatted section of the dump.

2. Is the PSB work pool too small?

- a. If PST + X'B7A' (PSTCODE1) = X'06', the PST is on the PSB WAIT queue for pool space. The PSB work pool is too small. You must increase the size of the PSBW parameter in the DFSPBxxx member.

- b. Otherwise, go to step 3.

3. Is the Data Management Block (DMB) pool too small?

- a. If PST + X'B7A' (PSTCODE1) = X'20', the DMB pool is too small. You must increase the size of the DMB parameter in the DFSPBxxx member.

- b. Otherwise, go to step 4.

4. Can intent be satisfied?

- a. If PST + X'B7A' (PSTCODE1) = X'40', the intent cannot be satisfied. Go to step 6.

- b. Otherwise, go to step 5.

5. Is the region scheduled?

- a. If any PST has the following:

- PST +X'B7A' (PSTCODE1) = X'10'(SCHEDULED)
- and:
- PST +X'1BC' (PSTTERM) = X'02'(ACTIVE)

the region is scheduled, and this a normal WAIT for subqueue 4 and subqueue 5. Usually this is not a problem. Go back to the subqueue 6 entry of "PST analysis" on page 50, step 4 and continue.

- b. Otherwise, go to step 7.

6. There is an intent conflict.

If you reach this point, there is an intent conflict. Usually, the intent conflict is caused by a PSB having the exclusive option. This option is defined during the PSBGEN. See the PSBGEN section of *IMS Version 12 System Utilities*. If the exclusive option did not cause the intent conflict, report the problem to the IBM Support Center.

7. Report the problem.

If you reach this point, the problem is that the last region to terminate should have posted the PST on subqueue 4 and subqueue 5 and did not. In a DBCTL environment, the last thread to unschedule a PSB did not post subqueue 4 or 5. Thus, there is a WAIT with a PST on subqueue 4 or subqueue 5 with no scheduled regions. Use subqueue 4 or subqueue 5 in your search argument, or report the problem to the IBM Support Center.

WAIT for input

You can reach this point only by having entries on subqueue 6.

1. Find the PSTs on subqueue 6.

The addresses under the field name SQPSTADD are the PST addresses. The PSTs are found in the stack of PSTs.

2. Find Scheduler Message Blocks (SMBs) for the PSTs.

For each PST enqueued on subqueue 6, find the related SMB: PST +X'C4' (PSTSMB) = address of the SMB.

3. Are any of the regions on subqueue 6 pseudo WFIs?

- If SMB+X'27' (SMBFLAG3) = X'08' (WFI transaction), the region is not a pseudo WFI.
- If the region is a pseudo WFI, check if the region is holding any resources needed by transactions waiting to be processed.

4. Are any messages enqueued on SMB?

There should be no messages enqueued on the SMB.

- SMB+X'1A' (SMBENQCT) minus SMB+X'18' (SMBDEQCT) = number of messages enqueued
 - If there are messages enqueued on the SMB, go to step 6.
 - If no messages are enqueued, go to step 5.

5. Are all regions accounted for?

Compare the count of regions enqueued on the subqueues with the count in SCDREGCT (SCD + X'C8A') (2 bytes).

- If the counts are equal, all regions are accounted for, and the IMS regions are in a normal scheduling environment. The problem is not with scheduling.
- If not equal, other regions are active in IMS. Go to "PST active" on page 52.

6. Report the problem.

The problem is that IMS messages are enqueued on the SMB and wait-for-input (subqueue 6) is not posted. Report the problem to the IBM Support Center.

Loop

Use standard z/OS system diagnostic procedures for loops.

Using the RB found in step 6c of "WAIT/LOOP procedure" on page 42, determine the PSW address. The PSW address is labeled OPSW. The PSW address is always the second word following the label. This PSW address belongs to one of the modules involved in the loop.

You can use the z/OS system trace to examine entries for the ASID and TCB indicated in the Dispatch Work Area at step 5 of the "WAIT/LOOP procedure" on page 42. The PSW address in the system trace entries indicates the modules involved in the loop.

Locate the PSW addresses in the storage section of the dump and scan backward through the eye catchers on the right side of the dump until you find a module identifier.

The looping module might not be an IMS module. Sometimes, the addresses are in the Link Pack Area (LPA) or the nucleus and might require an LPA or nucleus map.

Create the search argument

You can use the following additional keywords in the search argument to narrow the search, but they might not be necessary.

Keyword: LOOP

At this point, you can be sure that you are in a loop situation. Therefore, LOOP is an appropriate keyword for the search argument.

Keyword: module names involved in the loop

The module names derived in the loop procedure above are also valid keywords.

Keyword: label in module

If it is a tight loop, labels from the assembly listing of the modules involved might be useful keywords.

Keyword: additional related keywords

External events can trigger loops. These events might be indicated by console messages or be related to a procedure that was being performed at the time the LOOP began.

Search argument example

Consider the following scenario:

- IMS went into a loop.
- The active modules indicated in the RB chain and the z/OS system trace table were DFSCFEI0 and DFSCFE00.
- The loop began after the operator issued a /DISPLAY NODE command.

The broad search argument to use is:

```
5655J3800 LOOP DFSCFE00 | DFSCFEI0 | DISPLAY | NODE
```

For a structured database search, use this search argument:

```
PIDS/5655J3800 LOOP RIDS/DFSCFE00 | RIDS/DFSCFEI0 | PCSS/DIS | PCSS/NODE
```

With this search argument you might receive numerous hits, which will probably contain the APAR describing your problem. You can then take various combinations of the additional keywords that were compared with the **OR** operator in the above example and use the **AND** operator on them instead. You can use this technique to narrow the field of search until you find the appropriate APAR.

If the loop was not in an IMS module, do not use the IMS component ID, 5655J3800.

System wait

Use standard z/OS systems diagnostic procedures.

If the PSW address is for a system module, include that information when reporting the problem. You can use the module name in your search along with the WAIT keyword.

Shutdown processing

Use this analysis if the operator issued a /CHECKPOINT FREEZE, DUMPQ, or PURGE to IMS and IMS failed to come down normally. Before taking IMS out of the system, be sure to use a /DISPLAY SHUTDOWN STATUS command. Obtain the listing of the /DISPLAY command and any subsequent activity to find any unusual conditions that might have prevented an orderly termination of IMS.

You should also use this analysis if IMS shut itself down and failed to terminate normally. For example, when IMS runs low on message queue space, it shuts itself down.

Before starting this procedure, you need to obtain an IMS dump in order to examine bit settings. Be aware that if you received only the first part of the DFS994I message during shutdown processing, VTAM might be involved in the failure. (For a DBCTL environment, ignore any further instructions that refer to VTAM in this topic and in the next topic, "Shutdown analysis (CHE FREEZE, DUMPQ, or PURGE)" on page 59.) If you received the DFS994I xxx (FREEZE, DUMPQ, PURGE), but not DFS994I IMS SHUTDOWN COMPLETED, be sure to obtain a dump of VTAM and IMS. Here are two ways to get a dump:

- Enter the z/OS DUMP command to dump the VTAM address space and then modify IMS down with a dump.
 - Enter the z/OS DUMP command to dump the VTAM, IMS control, DL/I, and CCTL address spaces, and then modify IMS down without a dump.
- Be sure to include the RGN option along with the other standard SDATA defaults in the DUMP command.

In the section "Shutdown Analysis" that follows, note the following:

- Displacements and test conditions can change when maintenance is applied to a system.
- The bit settings shown are cumulative. This means that they usually combine with any bits already set in the byte. Check the bit settings as described. If a bit was not set or reset as shown, include both the module name and the cumulative bit settings in each byte in your search argument.
- SET turns the bit ON. RESET turns the bit OFF. Other bits in the byte might already be ON.
- It is essential in using the following analysis to find out if the indicated bits were SET or RESET and to use only the DUMPQ/FREEZE or PURGE sections where applicable.
- The Save Areas (SAs) might not always identify the last module to have control. In some cases, control is passed back to the initiating module (such as DFSCST00), and you can find no trace of any lower modules in the SAs.
- The main control block in shutdown problem analysis is the system contents directory (SCD). This flow of control lists most of the modules involved. When you find a field that does not have the bits SET or RESET as indicated, stop the analysis and report the problem.
- Be aware that defective code can produce results that appear to contradict this information.
- The following analysis does not list every action that is taking place in IMS shutdown processing, but only activity that causes bit setting to be changed in key SCD fields.

- Comments scattered throughout the analysis are for information only. For example, the statement, “If input or output is pending, return to DFSICIO0 with RC=C to complete”, is for information. Do not look at return codes, but examine only the bit settings.

Shutdown analysis (CHE FREEZE, DUMPQ, or PURGE)

Remember that in this analysis you will be looking at bit settings, not hexadecimal values.

These sections do not apply to DBCTL shutdown:

- PURGE
- DFSICL20
- DFSICLX0
- DFSICIO0
- DFSIPCP0
- DFSCPCP0
 - DFSICL20
 - If PURGE, then set SCDCKCTL(X'C08') = X'34' and then set SCDSTOP1(X'C02') = X'80'
 - If not PURGE, then:
 - If DUMPQ, set SCDCKCTL(X'C08') = X'1C'
 - If FREEZE, set SCDCKCTL(X'C08') = X'14'
 - Reset POLL the lines and then (not applicable to DBCTL)
 - Set SCDSTOP1(X'C02') = X'C0' (for DBCTL, set AWE to TRM1)
 - DFSICLX0
 - DFSICIO0
 - DFSIPCP0
 - If SCDCFLG1(X'AC7') = X'08', then
 - Set SCDCQFLG(X'AC8') = X'04' and
 - Set SCDCNXW4(X'ACF') = X'40'
 - If input or output is pending, return to DFSICIO0 with RC=C to complete.
 - When there is no input or output pending, or when the input or output is finished, then:
 - Set SCDCPCTL(X'AC4') = X'80'
 - Set AWE to TRM1
 - DFSCST00
 - DFSTRM00
- For PURGE**
 - AWE = TRM1, First phase of termination
 - If SCDIDCNT +1 (X'BC8') is not equal to X'000000' and SCDCKCTL(X'C08') = X'20' (PURGE):
 - Set SCDSTOP1(X'C02') = X'10'
 - Set SCDSTOP1(X'C02') = X'02'
 - If SCDFTF LG(X'290') = X'20' (Fast Path active), DBFTERM0 posts the Fast Path regions for SHUTDOWN
 - DFSTRM00

For DUMPQ or FREEZE

- If SCDIDCNT+1(X'BC8') is not equal to X'000000' and SCDCKCTL(X'C08') is not equal to X'20' (Not PURGE)
 - Set SCDSTOP1(X'C02') = X'04'
 - Set SCDSTOP1(X'C02') = X'02'
- If SCDFTFLG(X'290') = X'20' (Fast Path Active), DBFTERM0 posts the Fast Path regions for SHUTDOWN

For DUMPQ, PURGE, or FREEZE

- If Fast Path was active on return from DBFTERM0, *or* if Fast Path was not active, and SCDREGCT(X'C8A') is not equal to X'0000' (ACTIVE REGIONS), then post the PSTs waiting in the scheduler.
- If SCDSHFL1(X'3A4') = X'80' (IRLM in system) or SCDIDCNT+1(X'BC8'), or both, is not equal to X'000000' then return to DFSCST00 to wait for regions to end, If DBCTL, notify DRA before returning to DFSCST00.
- When or if SCDIDCNT+1(X'BC8') = X'000000' (REGIONS ENDED), set SCDSTOP1(X'C02') = X'01'.

For PURGE only

- If SCDCKCTL(X'C08') = X'20' (PURGE)
- Set SCDSTOP1(X'C02') = X'20'
- IWAIT for all output to go.

For DUMPQ, PURGE, or FREEZE

When all output is done for PURGE or FREEZE or DUMPQ, then:

- If SCDFTFLG(X'290') = X'20' (Fast Path active), DBFTERM1 closes the areas.
- If SCDFTFLG(X'290') is not equal to X'20' or when Fast Path areas are closed then:
 - If SCDSMMS1(X'033') = X'02' (DLI SAS), then:
 - Tell the DL/I region to close the databases (DFSSDL40).
 - IWAIT for the databases to close.
 - If not DLI/SAS, then let DFSDLOC0 close the databases.

Then when all databases and areas are closed: Set SCDSTOP1+1(X'C02') = X'04'.

- DFSCPCP0
 - Set return code (RC) = 8 to ask DFSIPCP0 if communication is still going on.
- DFSIPCP0 (DFSIPCP2)
 - If no output or no messages on Q3, set return code (RC) = 0 to inform DFSCPCP0.
 - If output or messages on Q3, set return code (RC) = 4 to inform DFSCPCP0, which causes DFSCPCP0 to IWAIT.
- DFSCPCP0
 - If output is pending (RC = 4)
 - Set SCDPCCTL(X'AC4') = X'08'
 - Set SCDSTOP1(X'C02') = X'40'
 - IWAIT for DC to finish.
 - If no output or when output finishes

- Set off SCDCPCTL(X'AC4') = X'08' (reset the bit)
- Set SCDSTOP1+1(X'C02') = X'08'
- Reset Poll all lines that are candidates for the SHUTDOWN message
- Set CTBFLAG3(0D) = X'10' (for all terminals that are to receive the shutdown message)
- DFSICLX0
- DFSICIO0
- DFSIPCP0
 - If any CTBFLAG3(0D) = X'10':
 - Set CTBACTL(10) = X'20'
 - Set CTBACTL(10) = X'10'
 - RC = 8 to DFSICIO0 (send SHUTDOWN message)
 - If NO CTBFLAG3(0D) = X'10':
 - Set SCDDFLGS(X'718') = X'80'
 - Set SCDCPCTL(X'AC4') = X'20'
 - RC = 4 to DFSICIO0 (quiesce lines)
- DFSICIO0
 - If RC = 4, idle the lines
 - If RC = 8, send DFS991 - IMS SHUTDOWN message
 - The WRITE interrupt from the SHUTDOWN message results in the following:
 - Set off CTBFLAG5(0F) = X'80' (reset)
 - Set off CTBFLAG3(0D) = X'10' (the)
 - Set off CTBACTL (10) = X'30' (bits)
- DFSIPCP0

When all line activity is stopped
- DFSCPCP0
- DFSTRM00
 - If DBCTL set SCDSTOP =SCDSTSNT, then set SCDSTOP1+1(X'C02') = X'01'
- DFSRCRT0
- DFSRCP00
 - Send "DFS994I *CHKPT yyddd/hhmmss*ctype" (first part of DFS994I message)
 - Set AWE = "TRM2"
 - Set off SCDCKCTL(X'C08') = X'04' (reset the bit)
- DFSTRM00

Set SCDTRMFL(X'430') = X'40'
- DFSCST00
- DFSTRM00
 - If DLI/SAS SCDSMMS1(X'033') = X'02', pass AWE to DFSSDL40 to begin Normal Termination
 - If not DLI/SAS or when DFSSDL40 returns
 - If SCDRFPIN(X'C32') = X'80' (Fast Path errors):
 - Print error message

- Set off SCDRFPIN(X'C32') = X'80' (reset the bit)
 - Close queue data sets (not applicable to DBCTL)
 - IWAIT for closing
 - Set off SCDSTOP1(X'C02') = X'08' (reset the bit)
- DFSTERM0
 - Terminate DASD log
 - Set off SCDRECTL(X'146') = X'80' (reset the bit)
 - Terminate RDS
 - Terminate IMS system type tasks
 - Signoff DBRC
 - Quit IRLM
 - Close VTAM ACB (not applicable to DBCTL)
 - If DLI/SAS, SCDSMMS1(X'033') = X'02' and the ECB at SCDRSETF(X'D1C') is not equal to X'40' (posted) :
 - IWAIT for the DL/I region to end
 - Set AWE = "TRM3"
 - Set SCDTRMFL(X'430') = X'20'
 - Send "DFS994I IMS SHUTDOWN COMPLETED" (second part of DFS994I message)
 - DFSTRM00
 - DFSCST00

IRLM procedure

WAIT states can be encountered during IRLM processing in four areas:

- "Deadlock involving non-IRLM resources"
- "Deadlock involving only IRLM resources" on page 63
- "Lock request not granted because holder did not release lock" on page 63
- "IRLM latch unavailable" on page 63

Deadlock involving non-IRLM resources

Failure Description

Application programs waiting for non-IRLM resources and holding IRLM resources are waiting for other applications also holding IRLM resources. The IRLM cannot detect deadlocks involving non-IRLM resources.

Detection

Use the IMS WAIT diagnostic procedures to discover the non-IRLM resources being waited for. Follow the RLB chains representing resources held or requested for each requesting work unit (WHB) to discover the IRLM resources being waited for. If the wait state occurred as a result of an IRLM error, the function/subfunction is IRLM/DEADLK.

An example of a search argument is:

569516401 AR101 WAIT IRLM IRLM/DEADLK

For a structured database search, use this search argument:

PIDS/569516401 LVLS/101 WAIT RIDS/IRLM RIDS/DEADLK

Deadlock involving only IRLM resources

Failure Description

Application programs are deadlocked for IRLM resources. If all the application programs are waiting for IRLM resources (there are no application programs running which could release the locks that the other application programs are waiting for), this is a deadlock. The IRLM should detect this condition and post one of the waiters as unable to obtain the lock because of a deadlock.

Detection

Follow the RLB chains representing resources held or requested for each requesting work unit (WHB) to discover the IRLM resources being waited for. If the wait state occurred as a result of an IRLM error, the function/subfunction is IRLM/DEADLK.

An example of a search argument is:

```
569516401 AR101 WAIT IRLM IRLM/DEADLK
```

For structured database search, use this search argument:

```
PIDS/569516401 LVLS/101 WAIT RIDS/IRLM RIDS/DEADLK
```

Lock request not granted because holder did not release lock

Failure Description

An application program requested a lock, but the request was not granted because the holder of the resource did not release it. This does not result in a deadlock. However, If the requester is not timed out, its task and any others waiting after it might enter a wait state.

An example of a search argument is:

```
569516401 AR101 WAIT IRLM
```

For structured database search, use this search argument:

```
PIDS/569516401 LVLS/101 WAIT RIDS/IRLM
```

IRLM latch unavailable

Failure Description

An error in IRLM processing can result in an IRLM latch being permanently unavailable. If this condition exists, no new IRLM requests can be processed.

If this error occurs, call the IBM Support Center for help in diagnosing the problem. The support representative will tell you what type of documentation to gather.

Related tasks:

 Receive-any buffer analysis (Diagnosis)

IMS keyword dictionary

You can use free-form searches to retrieve the RETAIN records that contain all the search keywords that you specify. The IMS keyword dictionary describes the conventions for free-form search keywords.

The following table describes the IMS keywords.

Table 5. IMS keyword dictionary

Category/keyword	Examples	RETAIN formats keyword
Abends	System 0C4 User 0845	ABEND0C4 ABENDU0845
Access methods	OSAM VSAM	OSAM VSAM
Automatic Operator Interface		AOI
APARs		PL12345
Checkpoint processing	Checkpoint Extended Checkpoint	CHKPT XCHKPT
CICS interface		CICS
IMS commands (sample list)	/ASSIGN /CHECKPOINT /ERESTART /TRACE /STOP	CMDASS CMDCHE CMDERE CMDTRA CMDSTO
DBRC commands	INIT.RECON CHANGE.PRILOG	INITRECON CHANGEPRILOG
Condition code		X'CC08' (hexadecimal)
Control blocks	Data Control Block Database Descriptor	DCB DBD
Database organization		HDAM
Database pre-open		PRE-OPEN
Data-sharing environment		DATA SHARING
Devices	3270 LU TYPE1	D/T3270 SLU1
DL/I address space		DLISAS
DSECTs		IDSPWRK
Emergency restart processing		ERE
Error codes (DBRC)		EC0182062
Extended restart		XRST
Fast Path	Fast path area Second CI Main storage database Sequential dependent	FASTPATH FPAREA DMAC MSDB SDEP
Feedback code		FDBK0C (HEX)
Fields	PSTUSID	PSTUSID
Function sub-function		SYS CHKRT
Function codes		FC0291
System definition	ACB NUCLEUS	ACBGEN NUC
IRLM		IRLM
Labels	LOOPNEXT FREEMAIN	LOOPNEXT FREEMAIN
Log records	TYPE 18 TYPE 67FF	TYPE18 TYPE67FF
Macros	RWOS TERMINAL	RWOS TERMINAL
Master Terminal Operator		MTO
Messages	DFS045I IEC030I	MSGDFS045I MSGIEC030I

Table 5. IMS keyword dictionary (continued)

Category/keyword	Examples	RETAIN formats keyword
Modules	DFSPCC20	DFSPCC20
Online change		OLCHG
Online data set		OLDS
Online image copy		OLIC
Parameters	ERROPT=ACCEPT	ERROPT=ACCEPT
Processing options	PROCOPT=GO	PROCOPT=GO
Publication numbers	GC18-9717	GC189717
Reason codes		RSN08 (HEX)
Use RSN as the prefix and use the hexadecimal reason code of any length. Do not include leading zeros.		
Registers	General purpose registers Control registers Floating point registers	REG13 (DECIMAL) CREG10 FPREG01
Restart processing		RSTRT
Return codes:	Return code 12 (X'0C')	RC0C
Minimum of 2 digits. If there are more than 2 digits, do not include leading zeros.		
RSR environment	RSR	IMSRSR
Sense codes	Sense 080B	SN5080B
Status codes	Status code GE Status blank BLANK	STATUSGE STATUS4040
Sub-code		SUBCODE101
SVC numbers		SVC255 (DECIMAL)
Trace entry function code		TRACEE6 (DL/I) TRACE03 (DISP)
XRF environments	XRF Takeover Alternate	IMSXRF TAKEOVER ALTERNATE

Dependency keywords

Dependency keywords can be used with the keyword string to select only those APARs that apply to a certain environment. These keys are useful when a search yields a large number of hits and you suspect that the program failure occurs only in a specific environment.

Keyword	Environment	Keyword	Environment
D/CICS	CICS	D/TRKREC	Track Recovery
D/CONVPROC	Conversational Processing	D/TWX	Teletype
D/FP	Fast Path	D/UCF	Utility Control Facility
D/GSAM	GSAM	D/VSAM	VSAM
D/HDAM	HDAM	D/VTAM	VTAM
D/HIDAM	HIDAM	D/1050	1050 Device Type
D/IRLM	MS/VS Resource Lock Manager (Intersystem Communication)	D/2260	2260 Device Type
D/MFS	Message Format Service (MFS)	D/2770	2770 Device Type
D/MSC	Multiple System Coupling	D/2980	2980 Device Type
D/MVS	z/OS	D/3270	3270 Large Screen
		D/3270L	3270 Local
		D/3270R	3270 Remote

Keyword	Environment	Keyword	Environment
D/None	No dependencies	D/3274	3274 Device Type
D/OSAM	OSAM	D/3276	3276 Device Type
D/SB	Sequential Buffering	D/3278	3278 Device Type
D/SECINDX	Secondary Index	D/3279	3279 Device Type
D/SHISAM	Simple HISAM	D/3284	3284 Device Type
D/SLU1	VTAM Type SLU 1	D/3286	3286 Device Type
D/SLU2	VTAM Type SLU 2	D/3287	3287 Device Type
D/SLU4	VTAM Type SLU 4	D/3350	3350 Device Type
D/SLU P	VTAM Type SLU P	D/3375	3375 Device Type
D/SYSGEN	PTFs that should be applied prior to system definition	D/3380	3380 Device Type
		D/3600	3600 Device Types
		D/3790	3790 Device Types

Searching the database

To find out if a problem like the one you experienced has already been reported, you use the keyword string you completed to search an IBM Software Support database (such as Software Support Facility), or you can use it when talking to your Level 1 support representative.

1. Determine the maintenance level of the IMS system by identifying the APARs and PTFs that have been applied.
 - Run the SMP PTF list program or have access to online SMP/E dialogs.

Tip: You can extract the current maintenance level of your IMS system (or of a specific IMS load module) by using the `/DIAGNOSE SNAP MODULE(modname)` command.

2. Search SSF, using the keyword string developed by following procedures from “Selecting the keywords” on page 32. Your search is most successful if you follow these guidelines:
 - Start with a broad search argument so you receive all problem descriptions that might match your problem.
 - If you find too many Authorized Program Analysis Reports (APARs) to examine, add the logical operators **AND** or **OR** to the keyword string in various combinations gradually to reduce the number of database matches (hits). If the keywords are connected by the logical operator **AND** (a blank), a record is selected if it contains both words separated by the blank. If the keywords are connected by the logical operator **OR** (`|`), a record is selected if it contains either of the words separated by the character, `|`.
 - You can use dependency keywords with the keyword string to select only those APARs that apply to a certain environment. These can be particularly useful when a search yields a large number of database matches and you are almost certain that the program failure occurred in a specific environment. For the list of dependency keywords, see “Dependency keywords” on page 65.

Recommendation: Use dependency keywords only if you are sure the problem is limited to that dependency. If you do not get any database matches, eliminate the dependency keyword.

- If you want to narrow the search to a specific release level, you can add the logical operators **AND** or **OR** for the release level keywords to the search argument. The following list describes the release level keywords for IMS Version 12:

AR100 IMS Services

AR101 Database Manager

AR102 Transaction Manager

AR103 Extended Terminal Option

AR104 Recovery-level Tracking

AR105 Database-level Tracking

AR106 IMS Java™ On Demand features

R220 Internal Resource Lock Manager (IRLM) 2.2

R230 Internal Resource Lock Manager (IRLM) 2.3

For a structured database search, the release level keywords are:

LVLS/100

IMS Services

LVLS/101

Database Manager

LVLS/102

Transaction Manager

LVLS/103

Extended Terminal Option

LVLS/104

Recovery-level Tracking

LVLS/105

Database-level Tracking

LVLS/106

IMS Java On Demand features

LVLS/R220

Internal Resource Lock Manager (IRLM) 2.2

LVLS/R230

Internal Resource Lock Manager (IRLM) 2.3

Examples:

- For the Database Manager, type 5635A0300 AR101
- For a structured database search, type: PIDS/5635A0300 LVLS/101

Tip: If you do not get any database matches, remove the release level from your search argument.

3. Eliminate the APARs that also appear in the SMP PTF list from the list of database matches. These will have already been applied.
4. Compare each remaining APAR with the current failure symptoms. Analyze trace output for your problem situation, looking for similarities in the situations described by APARs that you are reviewing. Frequently, APAR descriptions include information about the traces that were run for those problems.
5. If you find an appropriate APAR, determine if it has been closed. If it has been closed, you can correct the problem by applying the fix that is associated with the APAR. If it has not been closed, contact IBM Software Support for information about what you can do until it is closed.

6. If you do not find an appropriate APAR, verify that the problem is not caused by a user specification error.
7. If you find no user specification error, contact IBM Software Support for assistance.

Procedures for preparing an APAR

An Authorized Program Analysis Report (APAR) might be necessary if the keyword search proves unsuccessful. Call IBM Software Support for help in determining if an APAR is necessary. Only authorized IBM personnel can generate APARs.

The information in the following table describes the procedures for preparing an APAR.

Table 6. Procedures for preparing an APAR

Procedure	Action
Reporting a problem	<p>To report a problem, contact IBM Software Support. Be prepared to supply such information as:</p> <ul style="list-style-type: none">• Customer number.• Release level.• Current maintenance level (from PTF list). <p>Tip: You can extract the current maintenance level of your IMS system (or of a specific IMS load module) from your IMS system by using the <code>/DIAGNOSE SNAP MODULE(modname)</code> command.</p> <ul style="list-style-type: none">• The keyword string or strings used to search the IBM Software Support database.

Table 6. Procedures for preparing an APAR (continued)

Procedure	Action
Gathering APAR documentation	<p>You might be asked to supply various types of information that describe the IMS nucleus, database, environment, or activities. Include applicable items from the following list with the APAR.</p> <ul style="list-style-type: none"> • JCL listings • Address space storage dumps at time of failure—the entire machine-readable dump data set (normally copied to tape) and the JCL used to copy the dump to tape • Bind map • z/OS console printout. A partial console is generally in the offline formatted dump. • Master terminal printout • Local/remote terminal printout • IMS log data sets • IMSGEN listing • DBD listing • PSB listing • ACB generation output • Log trace • Consolidated trace output • Transmittal notes explaining any unusual events leading up to the problem symptoms • SNAPs produced before and after the failing call by DFSDDLTO • Type X'67FF' SNAP log records • Type X'6705' SNAP log records • DBRC RECON data set • LPA map • LOGREC (especially software diagnostic records)
Submitting APAR documentation	<p>When submitting material for an APAR to IBM, carefully pack and clearly label all materials sent to IBM with the following information:</p> <ol style="list-style-type: none"> 1. The APAR number assigned by IBM 2. A list of data sets on the tape, including JCL, if any 3. A description of how the tape was made, including: <ul style="list-style-type: none"> • The exact JCL listing or the list of commands used • The recording mode and density • Tape labeling • The record format and block size used for each data set

Chapter 5. Data areas and record formats

This section describes the major IMS control blocks and their interrelationships. It also describes the formats of records that you need to analyze when diagnosing problems.

Finding more information on modules, control blocks, and record formats

You can find the module directory, IMS control block DSECTs, and the log record formats on Service Link. Contact your systems engineer for further information on accessing Service Link.

Control block linkage

The IMS.ACBLIB is a partitioned data set whose members are pre-system-generated, expanded PSB and DMB control blocks. You can view the formats of these control blocks by assembling the database DSECT and CSECT control blocks macro IDLI. You can also find the layout of IMS.ACBLIB members in the ACBGEN module, DFSUACB0, and the Write-PSBs-and-DMBs-to-ACBLIB module, DFSUAMB0.

The following figure provides an overview of the linkage between the major control blocks used for diagnosis.

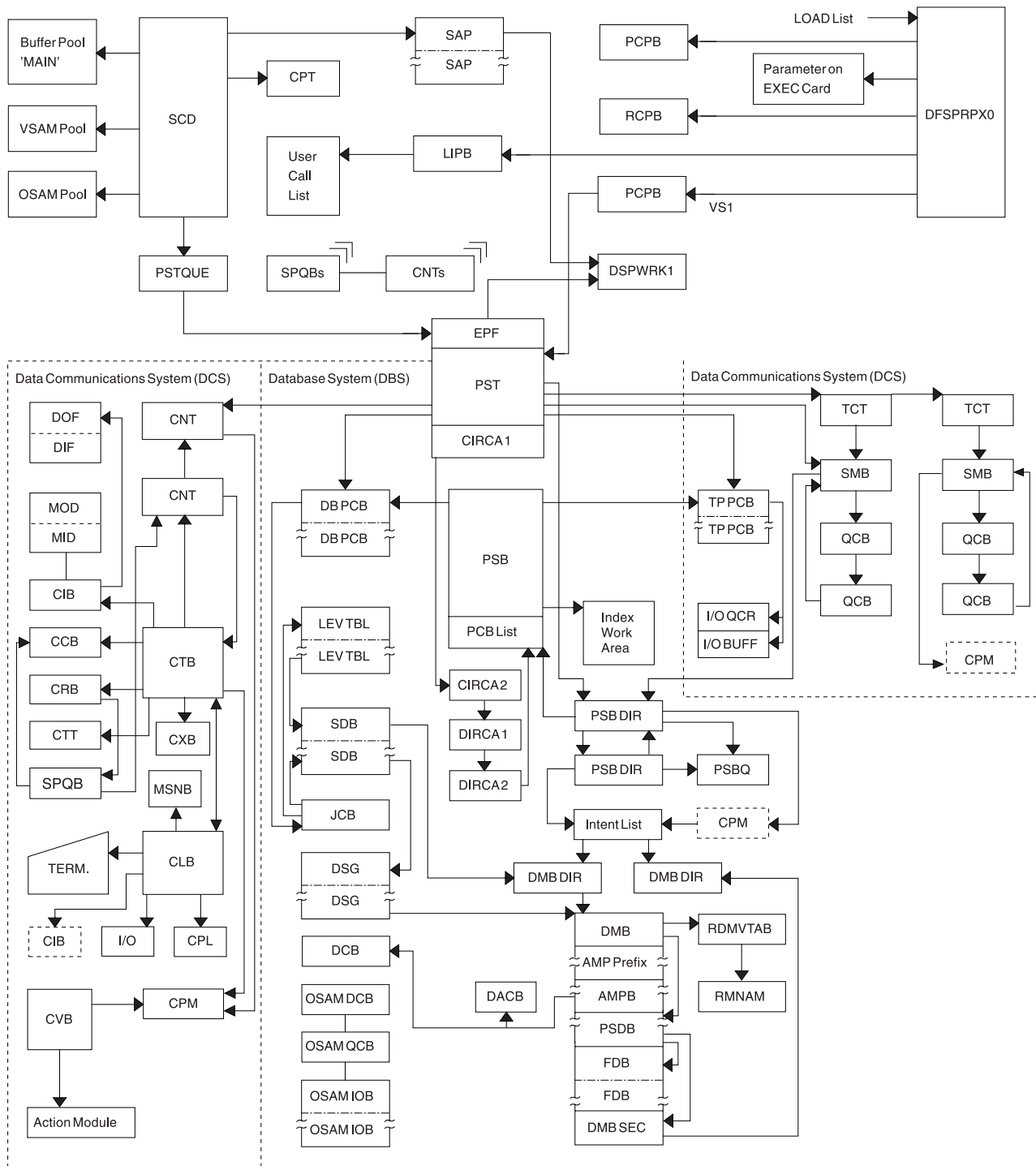


Figure 3. IMS control block linkage for a static DB/DC environment

Table of control block definitions

All of the control blocks are listed, and for each control block the acronyms, macros and descriptions are given.

Table 7. Control block definitions

Control block acronym	Mapping macro	Description
ADSC	DBFADSC	Area data set control block.
ALDS	DBFAREA	Area list data set.
AMPB	IDLI DMBASE=0	Access method prefix block. Contains information relative to a data set belonging to a database.
BALG	DBFBALG	Balancing group control block.
BFSP	IDLIVSAM BFSP	DL/I VSAM buffer handler pool prefix.
BFUS	IDLIVSAM BFUS	Subpool statistics block.
BHDR	BHDR	MSDB header.
BLOCKHDR	DFSSPBLK	Block header used by DFSPPOOL Storage Manager.
BSPH	IDLIVSAM BSPH	Buffer subpool header block. Contains the number of buffers in this subpool.
BUFC	IDLIVSAM BUFC	Buffer control block. Contains pointers to buffers.
BUFENTRY	DFSSPBLK	Used by DFSPPOOL Storage Manager to map the buffer size entries within the pool header.
CADSECT	ICADSECT	Communication area block. Contains the main dump formatter control block.
CBT	DFSCBTS	Control block. Represents storage pools (IPAGES) defined in DFSCBT00.
CCB	ICLI CCBASE=0	Conversational control block. Controls resources for conversational tasks.
CIB	ICLI CIBASE=0	Communication interface block. Contains information the device-dependent module needs to determine Message Format Service (MFS) operation.
CIRCA	IPST	IMS control region interregion communication area.
CLB	ICLI CLBBASE=0	Communication line block. One exists for each communication line and for each node.
CLLE	DFSCLE	Common Latch List Element. There is one block for each IMS ITASK, which is maintained in Key 7 storage.
CNT	ICLI CNTBASE=0	Communication name table. One exists for each named logical terminal and component.
CPM	(generated)	Communication password matrix. Length varies based upon the number of passwords in the CPT.
CPT	(generated)	Communication password table. Defined by user.
CRB	ICLI CRBBASE=0	Communication restart block.
CSAB	OCO	Callable Service Anchor Block. Used by IMS callable services modules.
CSVT	DFSCSVT	Callable Services Vector Table. Used by IMS callable services modules.
CTB	ICLI CTBBASE=0	Communication terminal block. One exists for each terminal and for each subpool in the system.

Table 7. Control block definitions (continued)

Control block acronym	Mapping macro	Description
CTM	(generated)	Communication terminal matrix. Length varies based upon the number of logical terminals (CNTs).
CTT	ICLI CTTBASE=0	Communication terminal table. There is one for each different type of terminal, as well as different features.
CULE	DFSCULE	Common Use List Element. Used in latching by the IMS Use Manager.
CVB	ICLI CVBBASE=0	Communication verb block. Reflects the relationship between the command message verbs and the passwords. It also reflects logical terminals associated with those commands.
CXB	(generated)	Communication extension block. Contains information that is required for control of a particular terminal. It is a logical extension of the CTB.
DBPCB	IDLI DPCBASE=0	DL/I DB PCB.
DCB	IDCBOSD	Data communication block. Contains data pertinent to the current use of a data set.
DCB-EXT	DFSDCBEX	OSAM extension to the DCB.
DDIR	IDLI DDRBASE=0	DMB directory entry. Contains an entry for each DMB known to IMS.
DFSAVEC	DFSAVECT	Dump formatter vector table.
DFSDOPTE	DFSDOPTB	Dump option entry block. It is the dump formatter CBTE request definition block.
DFSDPBFH	DFSDPBFH	Dump buffer pool blocks. Used for buffering offline dump storage.
DFSSBWO	DFSSBWA	Work area used by sequential buffering.
DMAC	DBFDMAC	DEDB area control block.
DMB	IDLI DMBBASE=0	Data management block. There is one for each database descriptor entry described in the DDIR.
DMBSEC	IDLI DMBBASE=0	Secondary list. There is one or more entry for each logically related segment and each index relationship.
DMCB	DBFDMCB	DEDB master control block.
DMHR	DBFDMHR	The buffer header for Fast Path. Describes the status of a particular buffer. The buffer headers (and buffers) are allocated in DBFCONT0. ESCDDMHR points to the first buffer and ESCDMBFN contains the number of headers. The relationship between buffer headers and buffers is fixed during IMS control region initialization.
DSEB	DFSDSPDS	Dynamic SAP Extension Block. Used to manage dynamic SAPs.
DSG	IDLI DSGBASE=0	Data set group control block. There is typically one for each data set group referenced by the DBPCB.
DSPWRK1	IDSPWRK	Dispatcher work area. There is one for each VS task (TCB) in an IMS environment.
ECB	z/OS macro	Event control block. Describes the status of an event in an IMS environment.
ECNT	DBFECNT	Extended communications name table. (Fast Path)
EDSG	DFSSBDSG	Sequential buffering extension to the DSG.
EMHB	DBFEMHB	Expedited message handler block. (Fast Path)
EIB	DFSPCA	Partition Exit Interface Block Prefix.

Table 7. Control block definitions (continued)

Control block acronym	Mapping macro	Description
EPCB	DBFEPCB	Extended PCB. (Fast Path)
EPF	IEPF	ECB prefix. Used to indicate the current status of the ECB and to connect the ECB to the appropriate SAP.
EPST	DBFEPTST	Extended partition specification table. (Fast Path)
EQEL	DFSEQEL	Recoverable in-doubt structure queue elements. Identifies inaccessible data due to in-doubt status.
ESCD	DBFESCD	Extended system contents directory. (Fast Path)
ESRB	DBFESRB	Extended service request block. (Fast Path)
ESRT	DBFESRT	Expedited message handling region insert buffer. This buffer is a temporary save area for a message input. ESRTs are allocated in module DBFCONT0 by IMS control region initialization with a length equal to the largest terminal buffer defined. ESCDESRT points to the first ESRT. EPSTESRT points to a related ESRT. (Fast Path)
FAQE	DFSSPBLK	Free allocated queue element. Used by the DFSISMN0 Storage Manager to manage storage within a pool.
FDB	IDLI FDBBASE=0	Field descriptor block.
FDT	DBFMFDB	Field description table.
FEDB	ICLI FEDBBASE=0	Front end directory block. Stores global information about the front end switching facility.
FEIB	ICLI FEIBBASE=0	Front end interface block. Contains data to allow the front end switching user exit to communicate with the transaction manager.
FRB	DFSFRB	Fast restart block.
GB	IGLI	GSAM data set control block. Contains information concerning the data set operation and pointers to other control blocks used for accessing records.
GBCB	IGLI	GSAM buffer control block. Contains the address of a unique buffer.
GLT	IGLI	GSAM load table. Provides all addresses of the GSAM load modules necessary for initialization.
GPT	IGLI	GSAM pointer table. Provides information required by resident and nonresident GSAM routines.
GQCB	IGLI	GSAM queues control block. Contains first and last pointers for the four queues of GSAM GBCBs used by GSAM BUFFIO.
HSSR	DBFHSSR	Holds area range information from SETR statements. HSSR is formatted in the offline dump.
HSSO	DBFHSSO	Holds image copy (IC) information from SETO statements.
HSSD	DBFHSSD	Holds information for the /DISPLAY HSSP command. HSSD is formatted in the offline dump.
HSSP	DBFHSSPS	Skeleton block. Temporarily holds HSSO/HSSR/HSSD information before scheduling.
IBFPRF	IBFPRF	Buffer prefix. There is one for each buffer described in each subpool used by the OSAM buffer manager.
IBPOOL	IBPOOL	OSAM buffer handler main buffer pool. Contains statistics and vectors to OSAM buffer subpools.

Table 7. Control block definitions (continued)

Control block acronym	Mapping macro	Description
IDSC	DBFIDSC	IDSC is the image copy data set control block. It represents the Image Copy data set (IDS) the same way the area data set control block (ADSC) represents the area data set (ADS). IDSC also uses the same control block structure as the ADSC. An IDSC contains a description of the Image Copy data set. There are up to two IDSCs for each DEDB area with the Image Copy option. An IDSC is built dynamically at the first call to the area that is running as HSSP with the Image Copy option requested. The IDSC is released during Image Copy termination. The IDSC control block is formatted in the offline dump.
IEEQE	DFSIEQE	In-doubt error queue element. Contains buffers of changed data (data in the in-doubt state).
ISPL	ISUBPL	OSAM buffer subpool. Provides a base for fixed length buffers and statistics about the buffers.
ISL	DXRRLISL	IRLM identified subsystem list. Contains the name of each subsystem and its status.
JCB	IDLI JCBBASE=0	Job control block. There is one for each PCB. It contains level tables and segment blocks and a trace table of the previous calls.
LCB	LCB	Link control block. Represents the link for channel to channel, memory to memory, VTAM, and binary synchronous connections in MSC.
LCD	LCDSECT	Log contents directory. Controls the interface between the logical and physical loggers in a DB/DC environment.
LCRE	DFSLCRE	Local current recovery element. Contains the sync point, checkpoint recovery information relative to each PST.
LEV	IDLI LEVBASE=0	Level table. Consists of two parts: previous call and current call that is filled in by the call analyzer.
LIPARMS	PARMBLK	Language interface parameter block.
LLB	ICLI CLBBASE=0	Link line block.
LTB	ICLI CTBBASE=0	Link terminal block.
LXB	LXB	Link extension block.
MRMB	DBFMRMB	DEDB randomizing module block.
MSNB	MSNB	Message Control/Error exit interface block. Contains the block content before and after calling Message Control/Error exit DFSCMUX0 or during the interface processing.
PAC	DFSPAC	Database Resource Adapter (DRA) control block.
PAPL	DFSPAPL	DRA architected parameter list.
PARMLIST	ICADSECT	Dump formatter bulk print interface block.
PAT	DFSPAT	DRA thread control block.
PATE	DFSPAT	DRA thread entry control block.
PCA	DFSPCA	Partition Communication Area.
PCIB	ICLI PCIBASE=0	Partition communication interface block.
PCPARMS	PARMBLK	Program control parameter block.
PCT	DFSPCT	Partition chaining table.
PDAE	DFSPSEIB	Partition Definition Area Prefix. Partition Definition Area Entry.

Table 7. Control block definitions (continued)

Control block acronym	Mapping macro	Description
PDEX	DFSDDIR	Partition Directory Extension
PDIR	IDLI PDRBASE=0	Program specification block directory. Contains entries for every program known to IMS.
PDL	DFSPDL	DRA dump parameter list.
PECA	DFSPSEIB	Partition Exit Communication Area.
PNT	DFSPNT	Partition Name Table.
POOLHDR	DFSPBLK	Storage pool header used by the DFSPPOOL storage manager to keep track of pool information.
PPRE	DFSPPRE	Standard IPAGE prefix mapping macro. Used for all IPAGEs created in IMS.
PQE	DFSPQE	DRA queuing element.
PSB	IDLI PSBBASE=0	Program specification block. Relates to the application program and contains the PCBs associated with this PSB.
PSDB	IDLI DMBBASE=0	Physical segment descriptor block. Describes each segment in the database.
PST	IPST	Partition specification table. There is one for each message or batch region; it contains a DECB for this partition, I/O terminal PCB, and parameters required for this region.
PTBWA	DXRPTBWA	IRLM pass-the-buck work area.
PTE	DFSPNT	Partition Table Entry.
PTK	DFSPTK	Partition Key Index Table.
PTX	DFSPTX	Partition Entry Index Table.
PXPARMS	PARMBLK	Parameter Anchor Block.
QCB	IAPS SMBBASE=0	Queue control block.
QEL	IAPS SMBBASE=0	Queue Element.
QMBA	DFSQMGR	Queue Manager Buffer Area.
RCPARMS	IDLI PSTBASE=0	Region control parameter block.
RCTE	DBFRCTE	Routing code table entry.
RDLWA	DXRRDLWA	IRLM deadlock process work area. Contains information that must be communicated between the deadlock process modules.
RHB	DXRRHB	IRLM resource header block. Represents a resource.
RHT	DXRRHT	IRLM resource hash table. Provides a series of anchors for resource chains.
RLB	DXRRLB	IRLM resource lock block. Represents a request for a lock or a lock held on a resource.
RLCBT	DXRRLCBT	IRLM private area control block and table. Contains addresses of IRLM entry points.
RLMCB	DXRRLMCB	IRLM master control block. Contains branch entry addresses for all RLMREQ as well as queue anchors.
RLPL	DXRRPL	IRLM request parameter list. This is the parameter list for all functional requests for the resource lock manager.
RLQD	DXRRQLD	IRLM query mapping macro. Maps IRLM control blocks/structures returned to the IMS invoker of QUERY.

Table 7. Control block definitions (continued)

Control block acronym	Mapping macro	Description
RPL	IDLIVSAM	Request parameter list. Contains parameters passed to VSAM from IMS and the status returned to IMS from VSAM.
RPST	DFSRPST	Restart PST. Contains identifying information and characteristics of units of recovery.
RRE	DFSRRE	Residual recovery element. Contains sync point actions, such as Commit and Abort, relative to eachDB2 for z/OS connection out of a dependent region and is used for BMP restart processing, in-doubt processing, and restartable backout processing.
SAP	ISAP	Save area prefix. Relates to a save area set.
SBHE	DFSSBHE	Sequential buffering hash entry. Used to hash or anchor SDCB control blocks and to serialize the sequential buffer SDCB and SDSG control block subsystem chains. The SBHEs are part of the SBSCD.
SBPARMS	DFSSBPAR	Sequential buffering extension to PXPARDS.
SBPSS	DFSSBPSS	Small section of the SBPST that needs to be in CSA.
SBPST	DFSSBPST	Sequential buffering extension to the PST.
SBSCD	DFSSBSCD	Sequential buffering extension to the SCD. This extension contains the SBHE hash entries.
SBUE	DFSSBBUF	Sequential buffering buffer extension. There is one SBUE for each SBUF.
SBUF	IBFPRF SBEXT=YES	Sequential buffering buffer. One SBUF control block is used by sequential buffering to control each SB buffer. The SBUF control blocks of one SB buffer pool are contiguous in storage and are formatted as one entity.
SCAR	DFSSBCAR	Control block containing the interpreted data of one SBPARD control statement in the //DFSCTL file.
SCA1	DFSSBCAR	Control block containing the uninterpreted data of one SBPARD control statement in the //DFSCTL file.
SCD	ISCD	System contents directory. Produced at system definition time, it contains major entry points for all facilities and system control information.
SDB	IDLI SDBBASE=0	Segment descriptor block. Contains a logical description of the segment.
SDCB	DFSSBDCB	Sequential buffering extension to the DCB. Is for those DB data sets that are buffered by sequential buffering.
SDSG	DFSSBDSG	Sequential buffering extension to the DSG. Describes one I/O process. There is typically one SDSG control block for each data set group control block (DSG) that might potentially be buffered by sequential buffering.
SDWA	IHASDWA	System diagnostic work area.
SGT	DFSPRSGT	Segment table. Describes the segments used by the partial reorganization process. It is built during the DBD analysis phase. Its address is held in the common area field (COMASGT). The segment extension table (SGX) holds additional information about the segments.
SIDB	DXRSIDB	IRLM subsystem identification block. Used to identify each subsystem that relates to IRLM.
SIDX	DFSSSIE	Subsystem index entry.

Table 7. Control block definitions (continued)

Control block acronym	Mapping macro	Description
SMB	IAPS	Scheduler message block. Related to a transaction.
SPQB	ICLI SPQBASE=0	Subpool queue block. The SPQB represents the dynamic user for an ETO terminal and represents a set of static queues (CNTs) for a static ISC parallel session terminal.
SQPST	ISQPST	PST queue. Associated with the scheduler sequence queue.
SRAN	DFSSBRAN	Sequential range. Used in sequential buffering to describe a recently referenced set of consecutive DB blocks. Sequential buffering allocates one Sequential SRAN control block for each buffer set of each buffer pool. SB also allocates Random SRAN control blocks to each buffer pool. The Sequential SRANs and Random SRANs of one SB buffer pool are contiguous in storage and are formatted as one entity.
SSIB	IEFJSSIB	Subsystem identification block. Identifies the subsystem that requested services.
SSOB	IEFJSSOB	Subsystem options block. Used to request a particular function from the z/OS subsystem.
SSVP	DFSSSVPL	System Services Parameter List. Used by IMS System Macros for parameter lists for mailing out of line calls. There is one SSVP per ITASK, anchored off of the SAP.
TAB	DFSTAB	Transaction anchor block.
TCT	DFSTAB	Transaction class table. Used for queuing of messages in a priority sequence within a specified class.
TPPCB	IDLI TPCBASE=0	Program communication block. There is one for each logical database being referenced by the application program.
UEHB	UEHB	User exit header block. Used for automated operator exit interface processing.
UXDT	DFSUSRX	User Exit Definition Table. Contains control information and user exit addresses for user exits managed by IMS standard user exit service.
UXRB	DBRUXRB	A unit of work (UOW) is represented by a UOW exclusive resource control block (UXRB), similar to the XCRB representing the CI. The UXRb contains information about the UOW (for example, Area, RBA) and is used for resolving potential UOW resource contention among dependent regions. Other UXRb fields include the lock token, number of associated XCRBs, the owning EPST, the update intent flag, and the PCB. The UXRb control block is formatted in the offline dump.
VSI	IDLIVSAM VSI	VSAM sharing information control block. Controls VSAM sharing between subsystems.
WHB	DXRWHB	IRLM work unit block. Contains the anchor for all requests associated with that owner.
XCRB	DBFXCRB	Exclusive control resource block.
XMCA	DFSXMC	Cross-Memory Control-Address Spaces. There is one block for each IMS subsystem, which is maintained in Key 0 storage.
XMCI	DFSXMC	Cross Memory Control-ITASKs. There is one block for each IMS ITASK, which is maintained in Key 7 storage.
ZIB	IZIB	Zone initialization block. Used by the DFSISMN0 Storage Manager to keep track of a buffer obtained using ICREATE.

Related reference:

“Contents formatted for FMTIMS options” on page 528

Control block interrelationship diagrams

These diagrams show the interrelationships between major control blocks in an IMS environment.

Note: This information is intended for users with experience in obtaining and reading IMS system dumps. The training course IMS Diagnostic Approaches provides an introduction to this information. Further information about this training course is available on the Information Management Training and Certification web site.

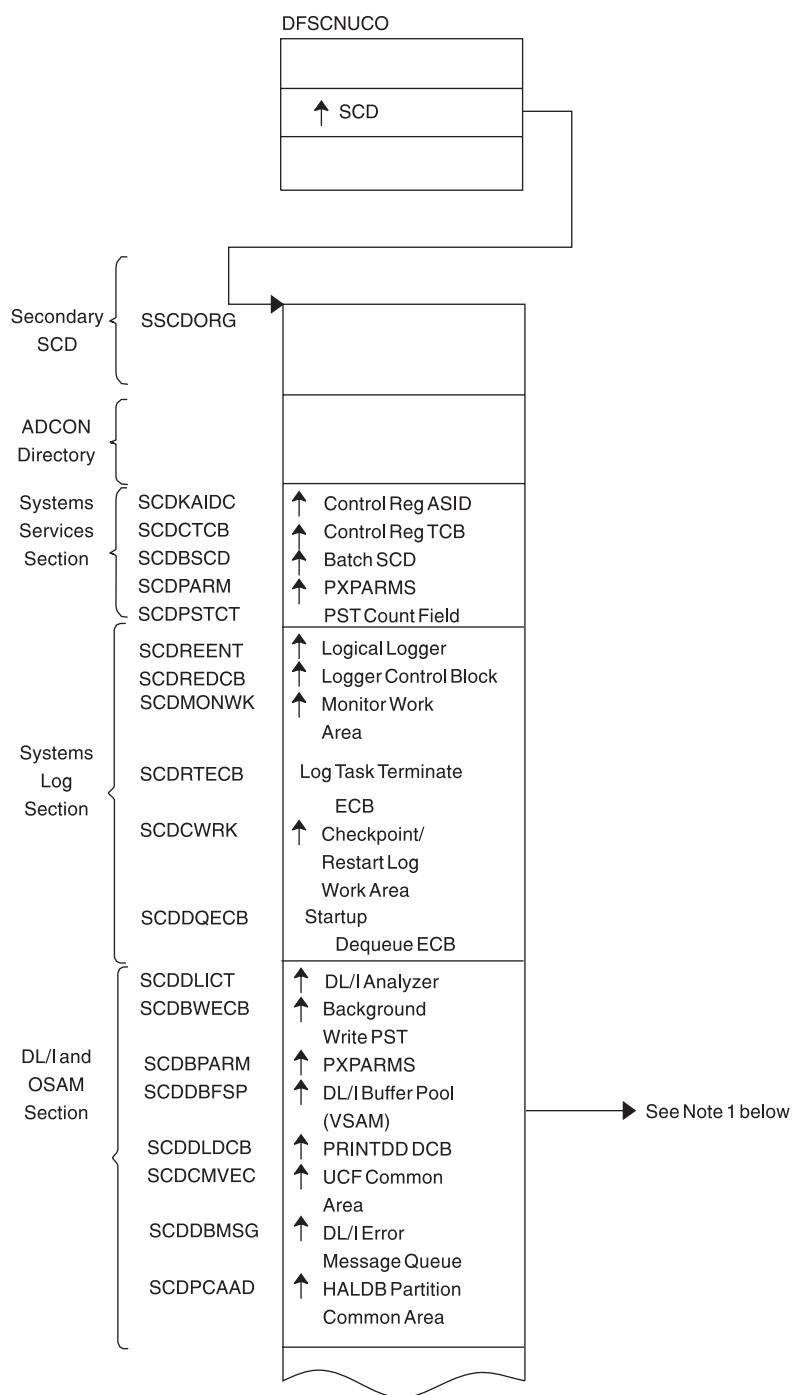
Subsections:

- “Online system contents directory (SCD)” on page 81
- “DFSPRX0–parameter blocks” on page 87
- “DL/I OSAM buffer pool” on page 88
- “Sequential buffering control blocks” on page 89
- “Buffer handler pool (VSAM)” on page 91
- “OSAM DECB with IOB in use” on page 92
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- “Storage management control block relationships created for the MAIN pool” on page 94
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- “Storage management control block relationships (DFSPOOL pools)” on page 97
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- “Database Manager control blocks for a representative database” on page 99
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- “Multiple Systems Coupling (MSC) control block overview” on page 112
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- “Control block overview of Database Recovery Control (DBRC)” on page 118
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- “Organization and basic linkages: DIF (Device Input Format) and MID (Message Input Descriptor)” on page 119

Online system contents directory (SCD)

The following graphics show the online system contents directory.



- Note 1: See Figure 11 on page 89 and Figure 13 on page 92.

Figure 4. Online system contents directory (SCD) Part 1 of 6

Sequential Buffering Section	SCDSBPTR	▲ SB SCD
Data Sharing Section	SCDIRPM	▲ IRLM Parms
	SCDRDSH0	▲ DFSRDSH0 (ASYNC Data Sharing Routine)
	SCDPCCC0	▲ DFSPCCC0 (IRLM/DBRC Handler)
Common Services Section	SCDQHDS	▲ Queue Header Table Address
	SCDCIR00	▲ Create ITASK Module
	SCDFMOD0	▲ Entry Point of Attach ITASK
STAE/ESTAE Section	SCDXSTA0	A(ESTAE)
Latch/Lock Section	SCDLRSAP	▲ Latch Recovery ITASK SAP
	SCDLMGRA	▲ Latch Manager Address
Formatted Dump Section	SCDDSDWA	▲ SDWA at Dump Time
Timer Services Section	SCDCKVAL	Clock Value
	SCDTIMEP	▲ Timer Services Module (DFSFTIM0)
Trace Services Section	SCDTRBLK	▲ Trace Control Block
External Subsystem Section	SCDPITME	PITRACE Buffer
	SCDESETP	▲ ESET Prefix
Dynamic Control Block Builder Section	SCDCBTA	▲ Control Block Extension Address
	SCDBCBO0	▲ Address of Control Block Build

Figure 5. Online system contents directory (SCD) Part 2 of 6

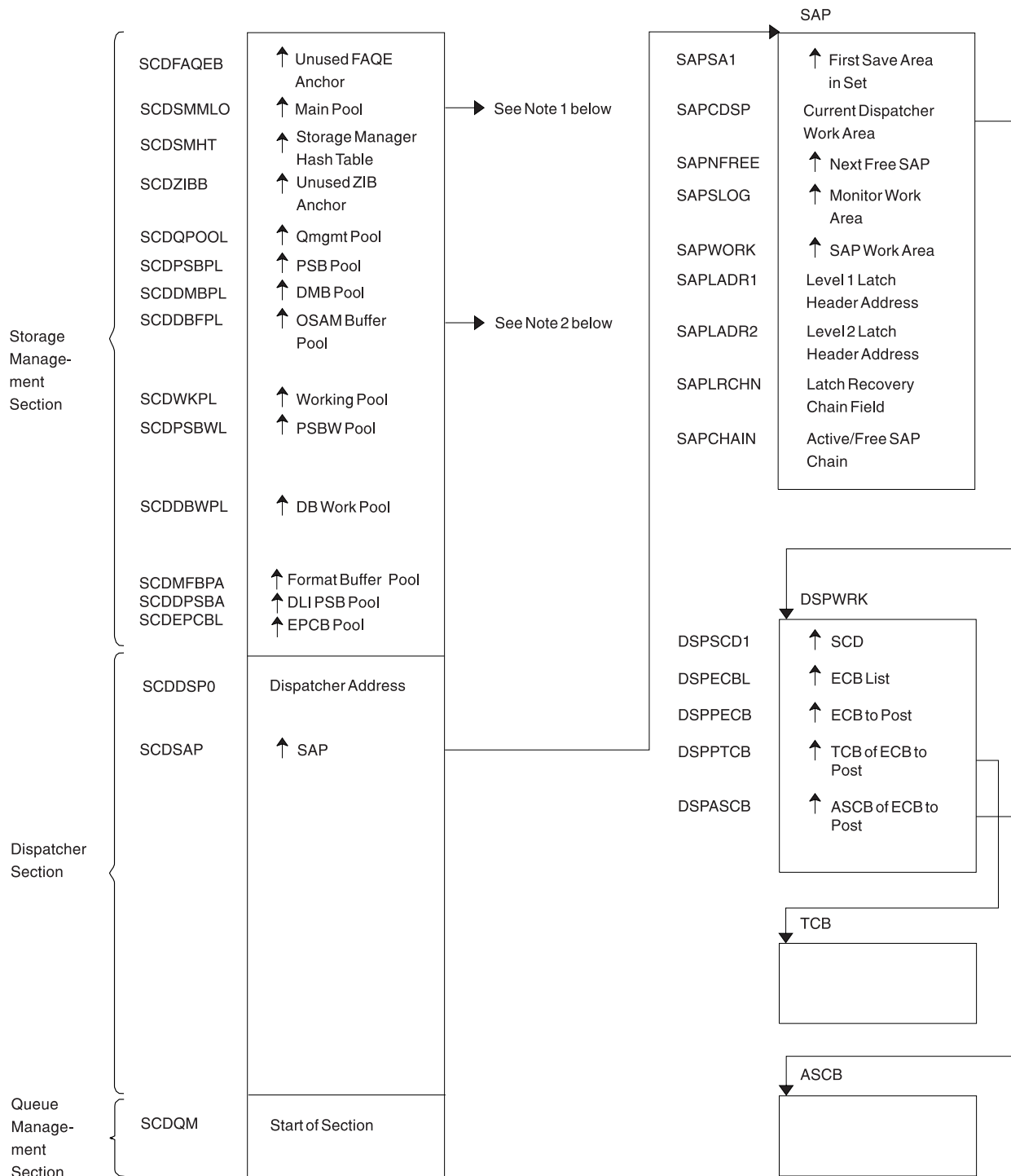


Figure 6. Online system contents directory (SCD) Part 3 of 6

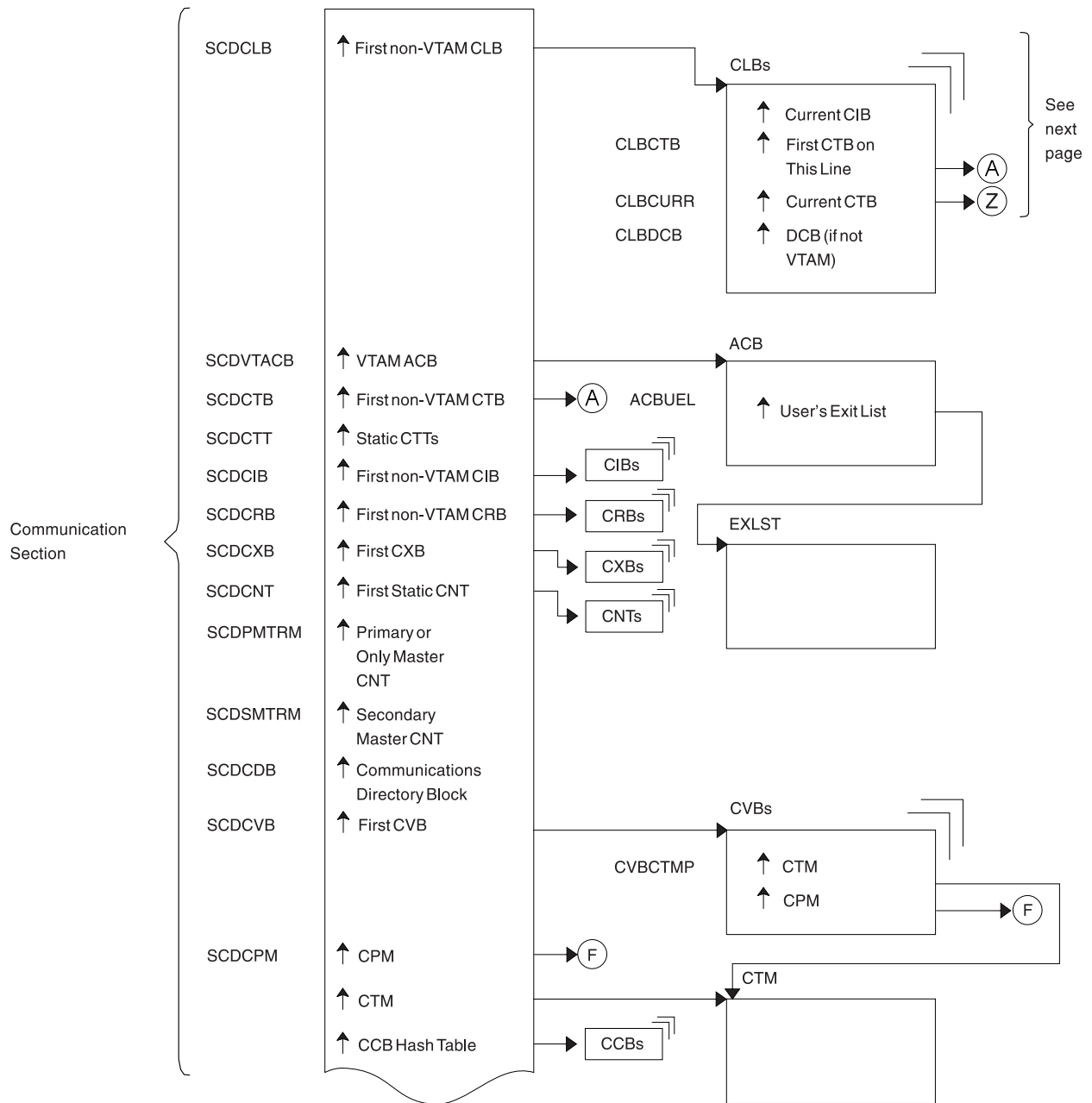


Figure 7. Online system contents directory (SCD) Part 4 of 6

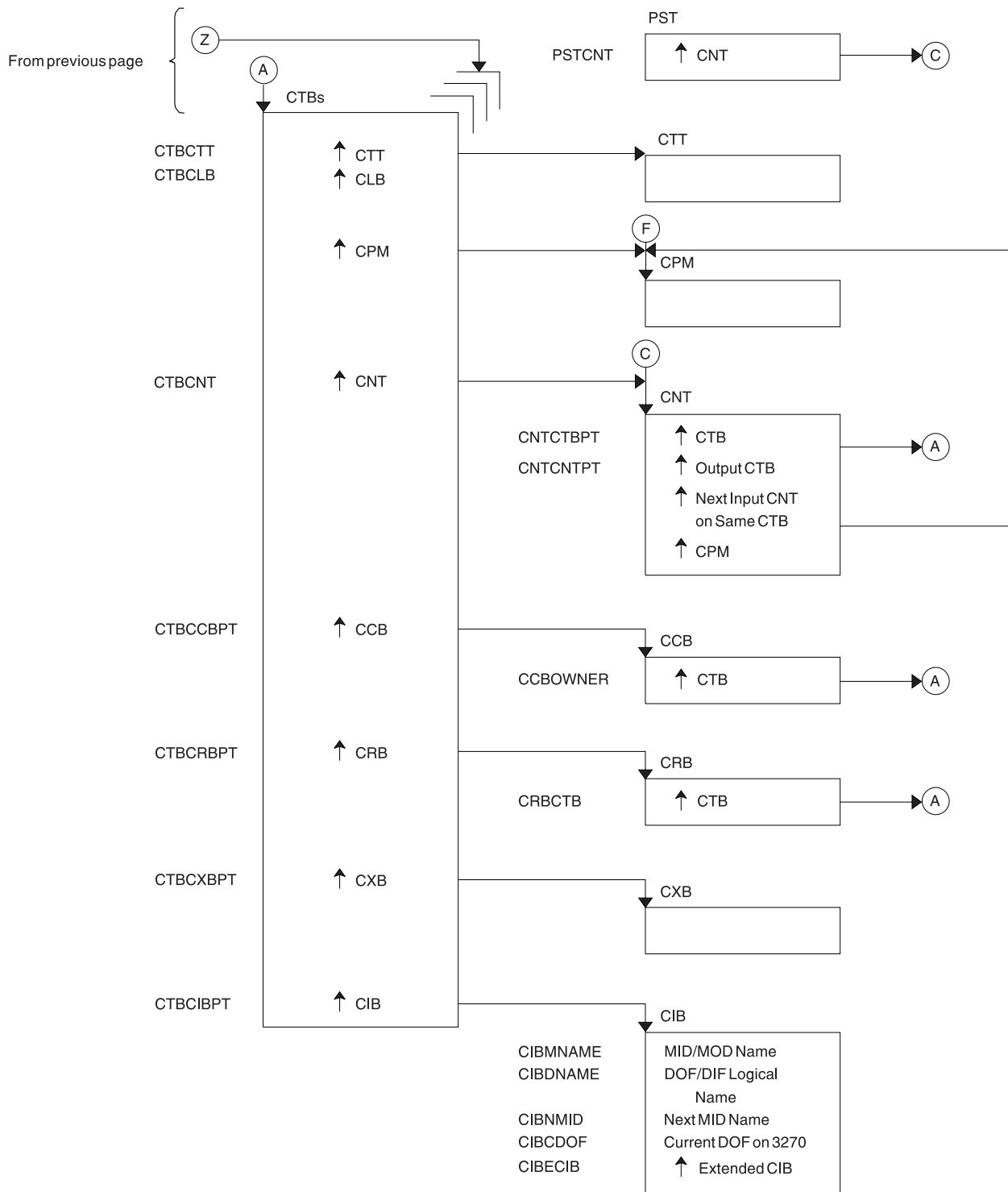


Figure 8. Online system contents directory (SCD) Part 5 of 6

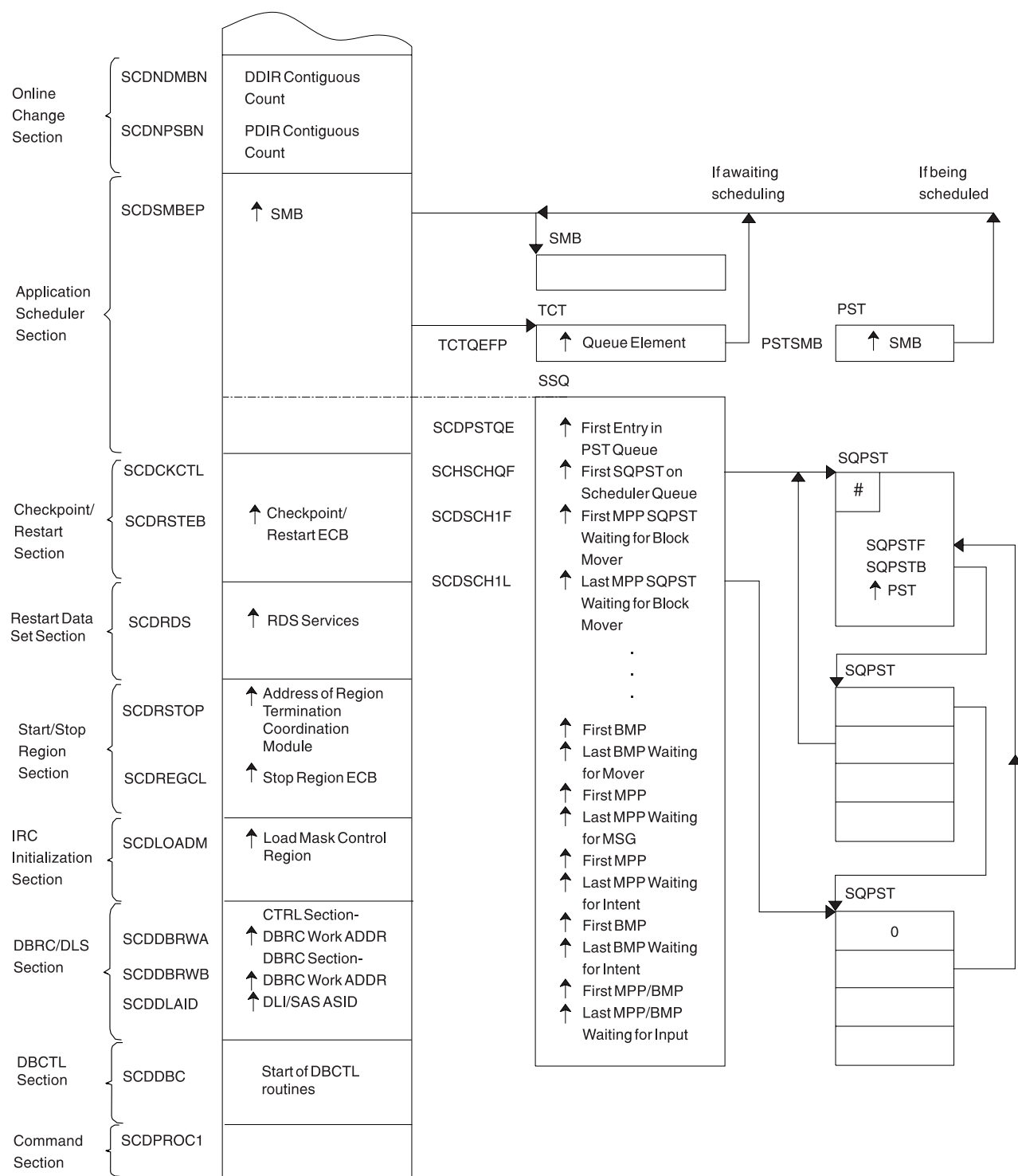
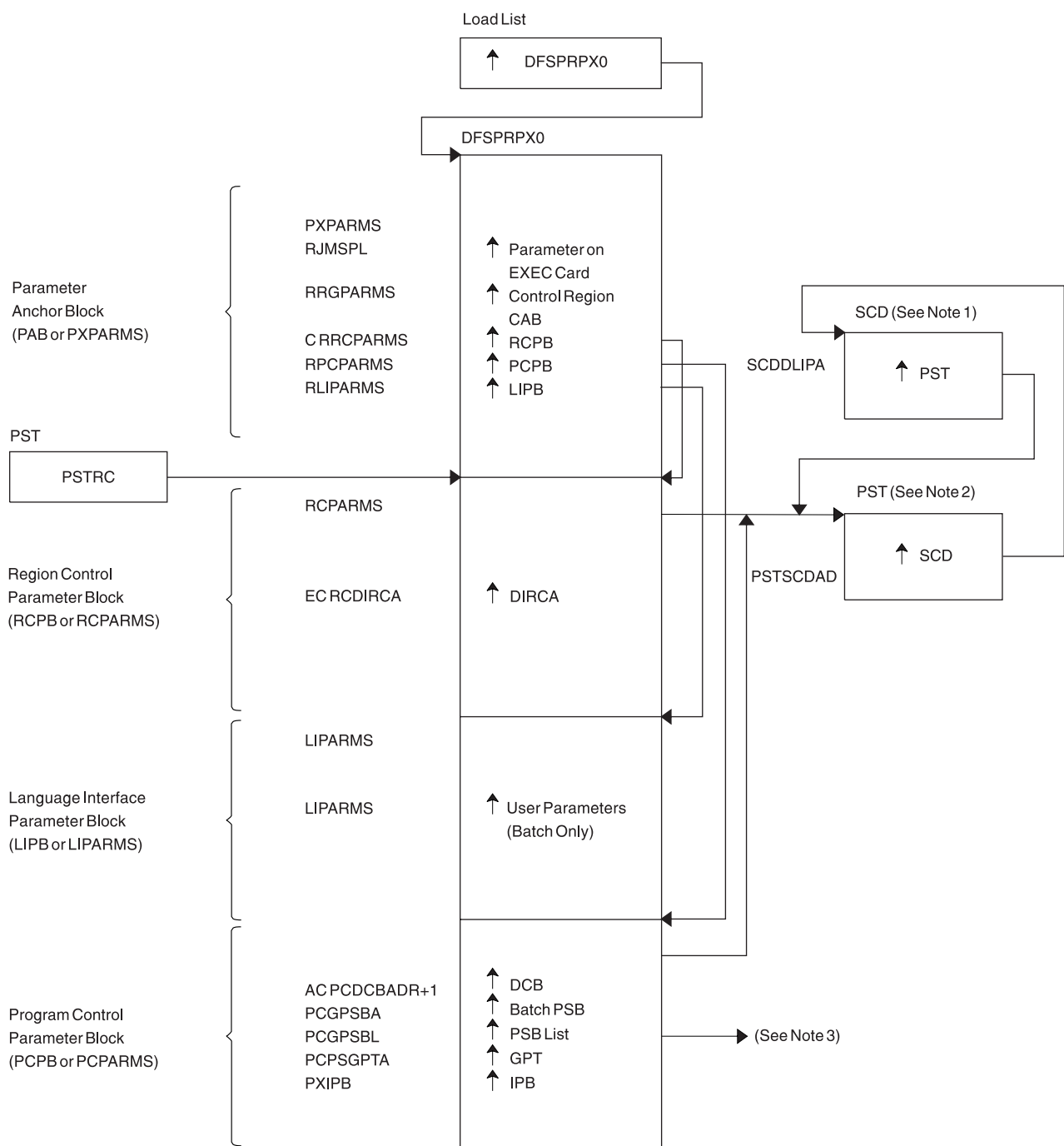


Figure 9. Online system contents directory (SCD) Part 6 of 6

DFSPRPX0-parameter blocks

The following figure shows the parameter blocks for DFSPRPX0.



- Note 1: See Figure 4 on page 82
- Note 2: See Figure 21 on page 102
- Note 3: See Figure 26 on page 107

Figure 10. DFSPRPX0-parameter blocks

DL/I OSAM buffer pool

The following figure shows the control blocks for DL/I OSAM buffer pool.

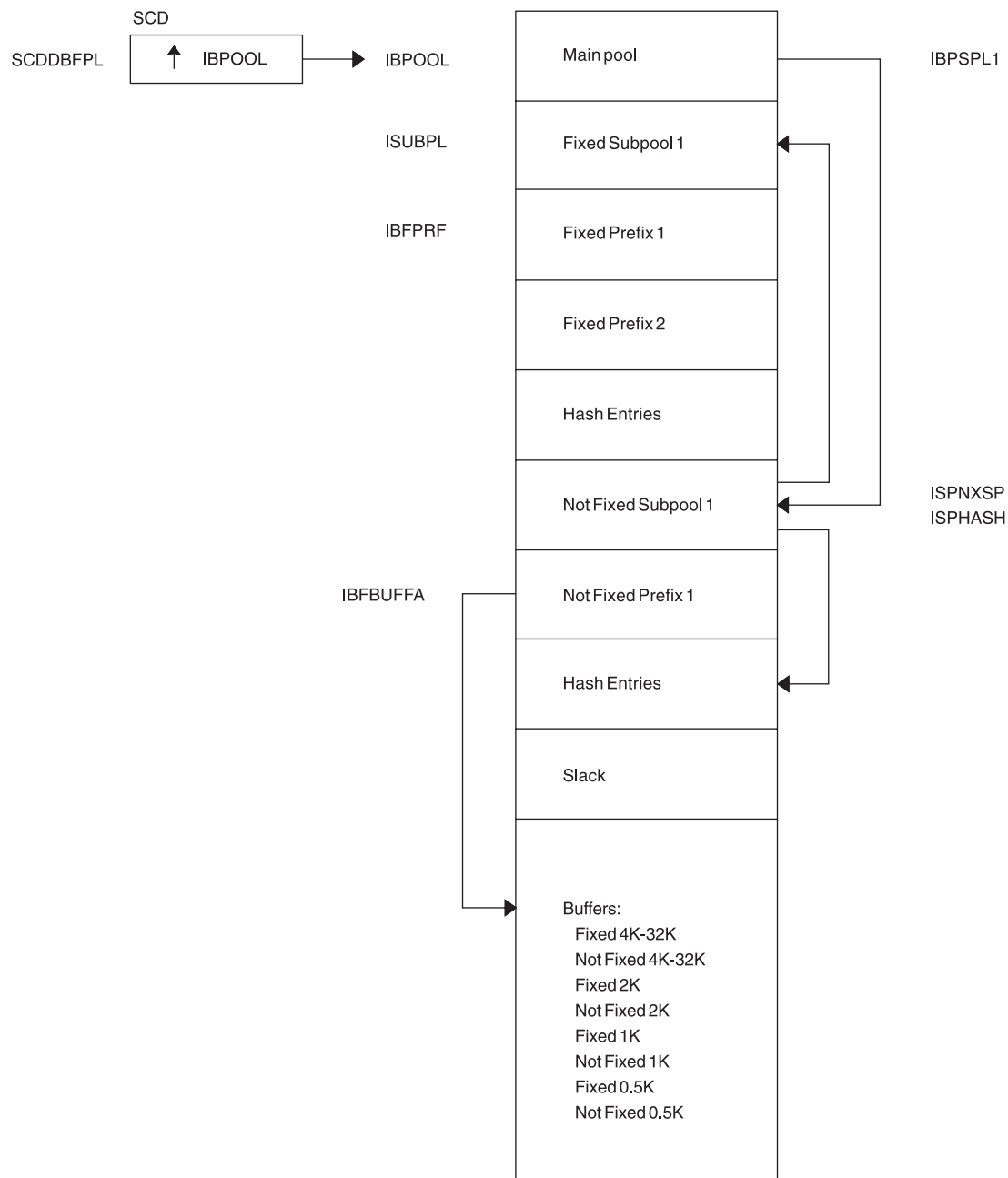


Figure 11. DL/I OSAM buffer pool

Sequential buffering control blocks

The following figure shows the sequential buffering control blocks.

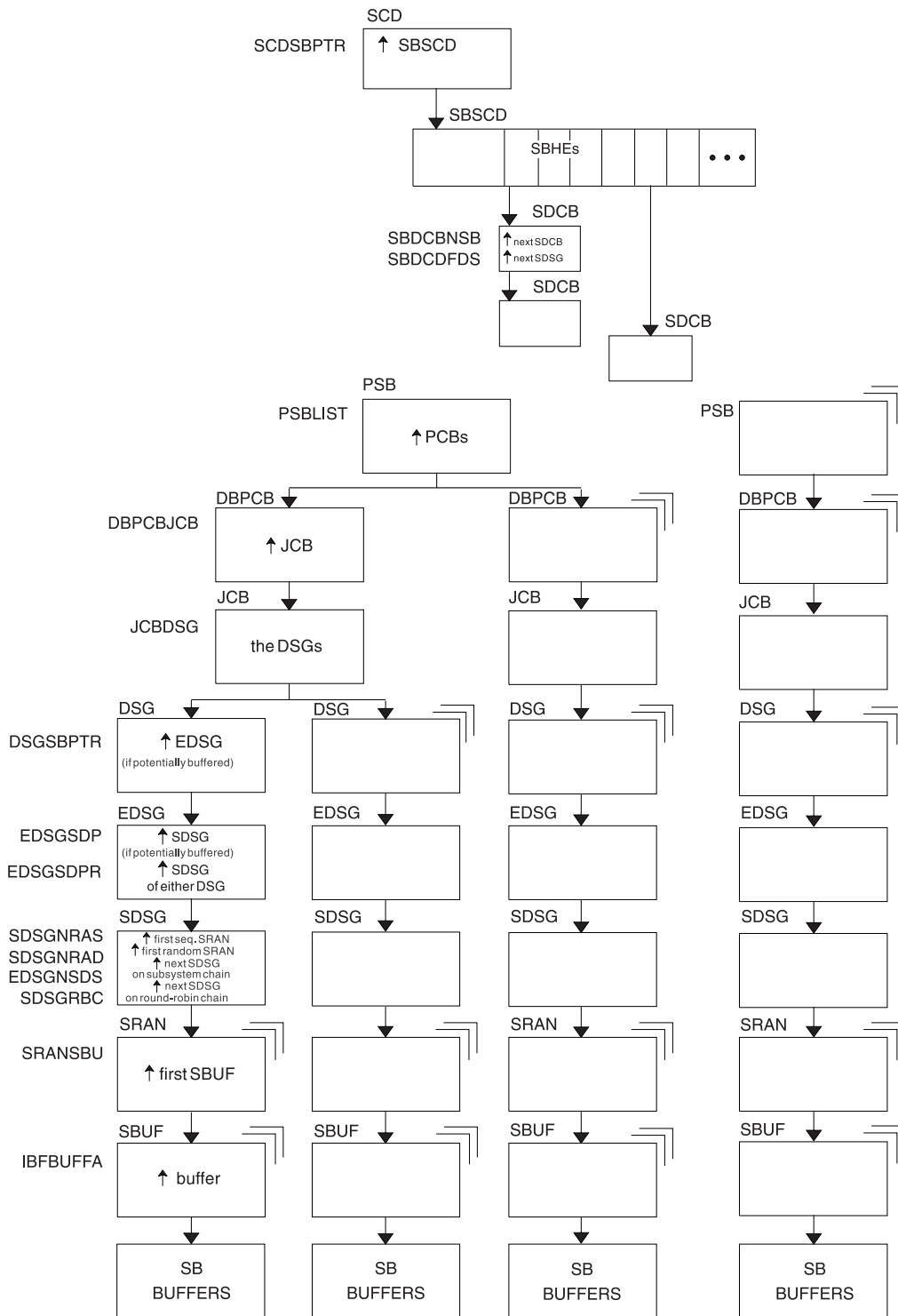


Figure 12. Sequential buffering control blocks

Notes to Figure 12:

1. SCD is the IMS systems content directory.
2. SBSCD is a sequential buffering extension to the SCD.
3. SBHEs are sequential buffering hash entries located within the SBSCD (sequential buffering extension to the systems content directory). IMS uses SBHEs to:

- Anchor the sequential buffering extension to the DCB (SDCB)
 - Serialize the SDCB and SDSG subsystem chains (defined in notes 4 and 8).
4. SDCB is a sequential buffering extension to the data communication block. There is one SDCB for each data set that is actively being sequentially buffered. There must be a separate SDCB for each SBPST that references a HALDB partition, because information in the SDSG will change as the DL/I calls go from partition to partition. As a result, multiple SBPSTs cannot share an SDCB, as is possible for non-HALDB databases. For HALDB, there is one SDCB for each partition used by a PST. IMS uses each SDCB to anchor any sequential buffering SDSGs that have buffer pools allocated to them.
 5. The chains of SDCBs and SDSGs anchored in the SBHEs are called the SDCB and SDSG subsystem chains.
 6. The program specification blocks, DBPCBs, job control blocks, and the data set group control blocks in the figure are DL/I control blocks.
 7. EDSG is a sequential buffering extension to the DSG. The field EDSGSDP points to the SDSG if the data set group control block is potentially buffered by SB. If the DSG is not potentially buffered (but another DSG for the same data set and same application is), then the field EDSGSDPR points to one of the SDSGs of these “other” DSGs.
 8. SDSG is a sequential buffering extension to the data set group control block. The SDSG is present if the user wants to have the DSG sequentially buffered. The SDSG is the control block that controls one sequential buffering buffer pool.
 9. SRAN is a sequential buffering control block that describes references in one set of recently referenced consecutive data set blocks.
 10. SBUF is a sequential buffering control block that describes one individual buffer.

Buffer handler pool (VSAM)

The following figure shows the buffer handler pool (VSAM).

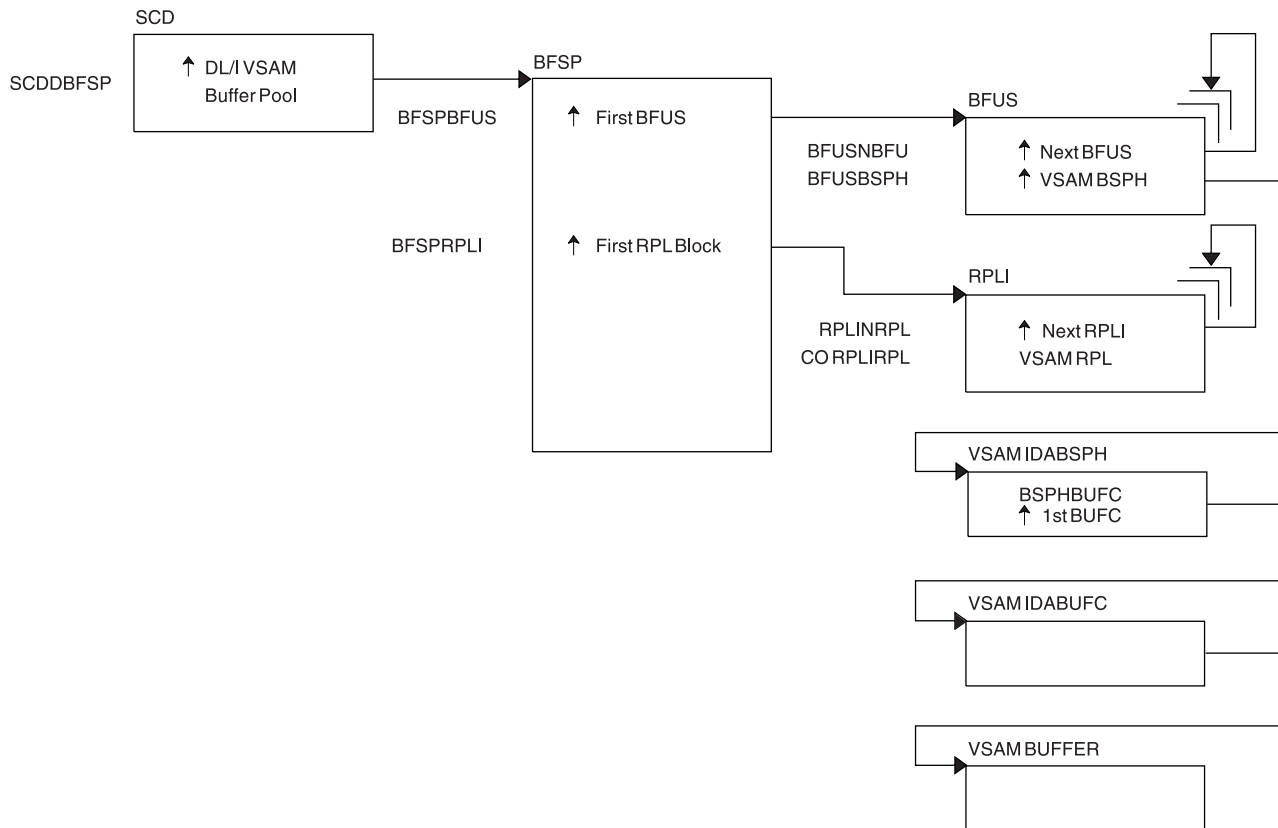


Figure 13. Buffer handler pool (VSAM)

OSAM DECB with IOB in use

The following figure shows the OSAM DECB with IOB in use.

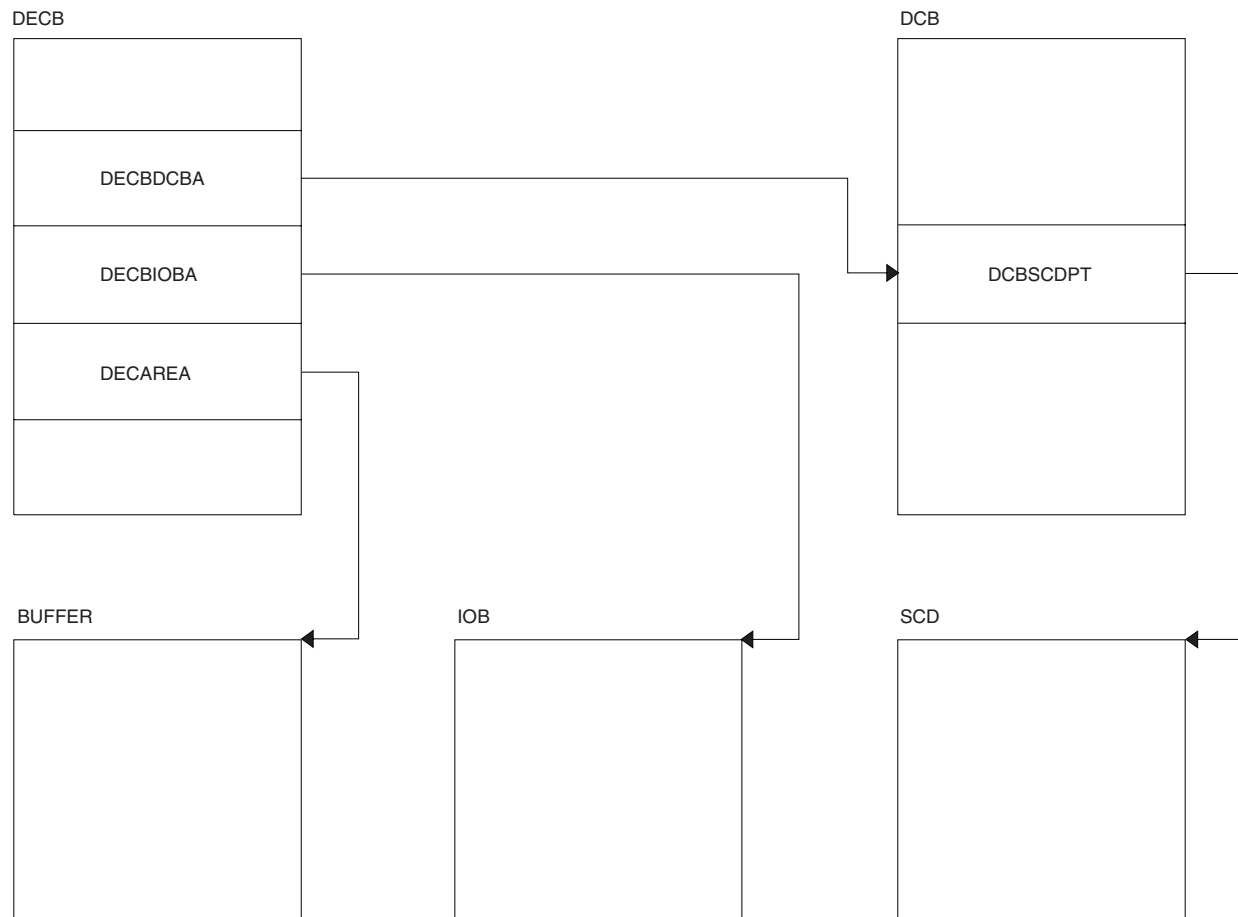


Figure 14. OSAM DECB with IOB in use

OSAM IOB pool showing available IOBs

The following figure shows OSAM IOB pool showing available IOBs.

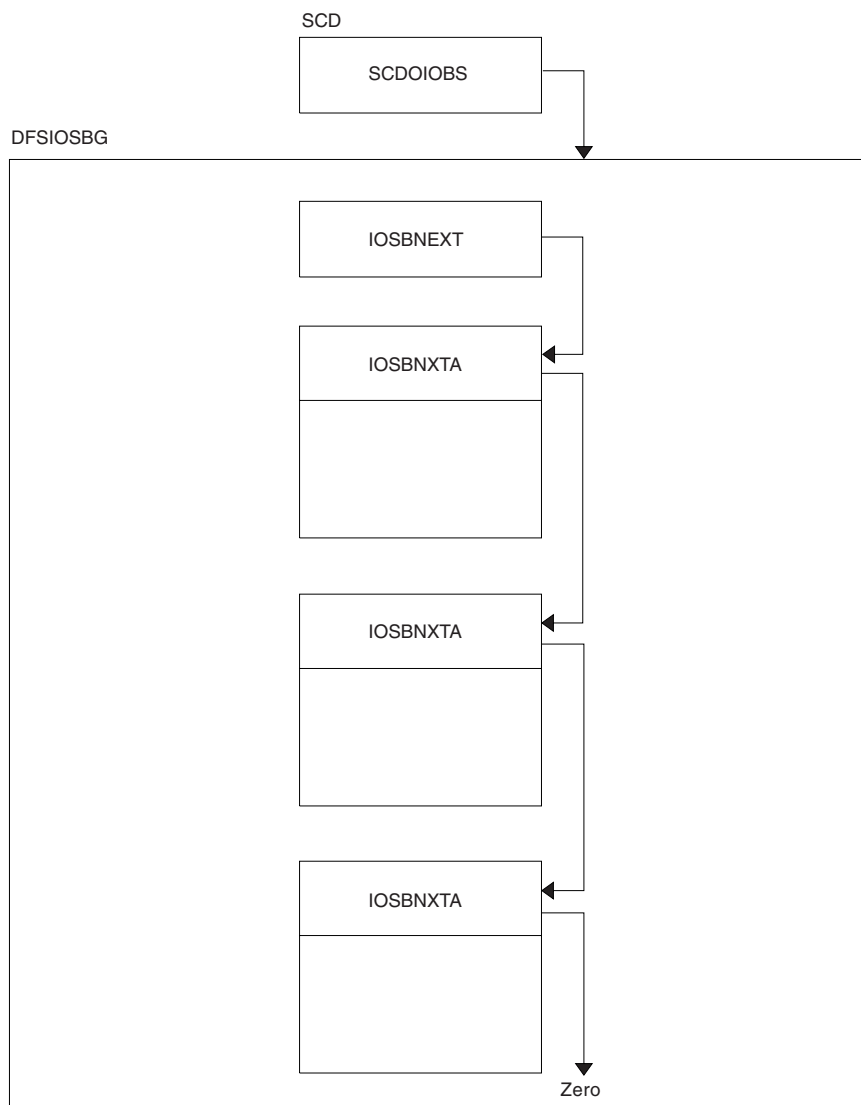


Figure 15. OSAM IOB pool showing available IOBs

Storage allocated using the ICREATE/IDESTROY macros is obtained from the MAIN (WKAP) pool. The control block relationship for the MAIN pool is shown in Figure 16 on page 95.

Storage management control block relationships created for the MAIN pool

The following figure shows storage management control block relationships created for the MAIN pool.

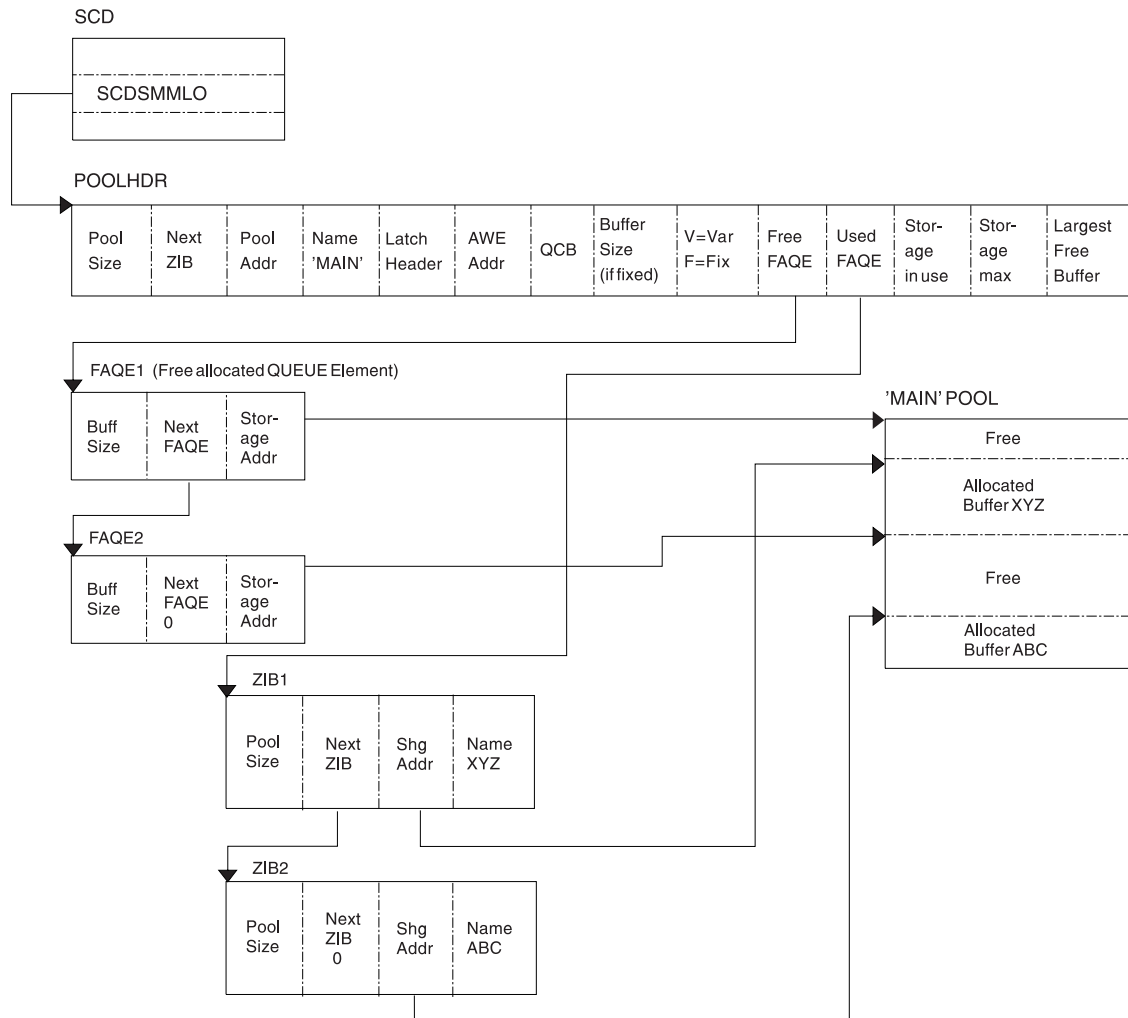


Figure 16. Storage management control block relationships created for the MAIN pool

Storage management control block relationships for preallocated storage blocks

The following diagram shows the control block relationships for those pools managed by the DFSISMN0 Storage Manager.

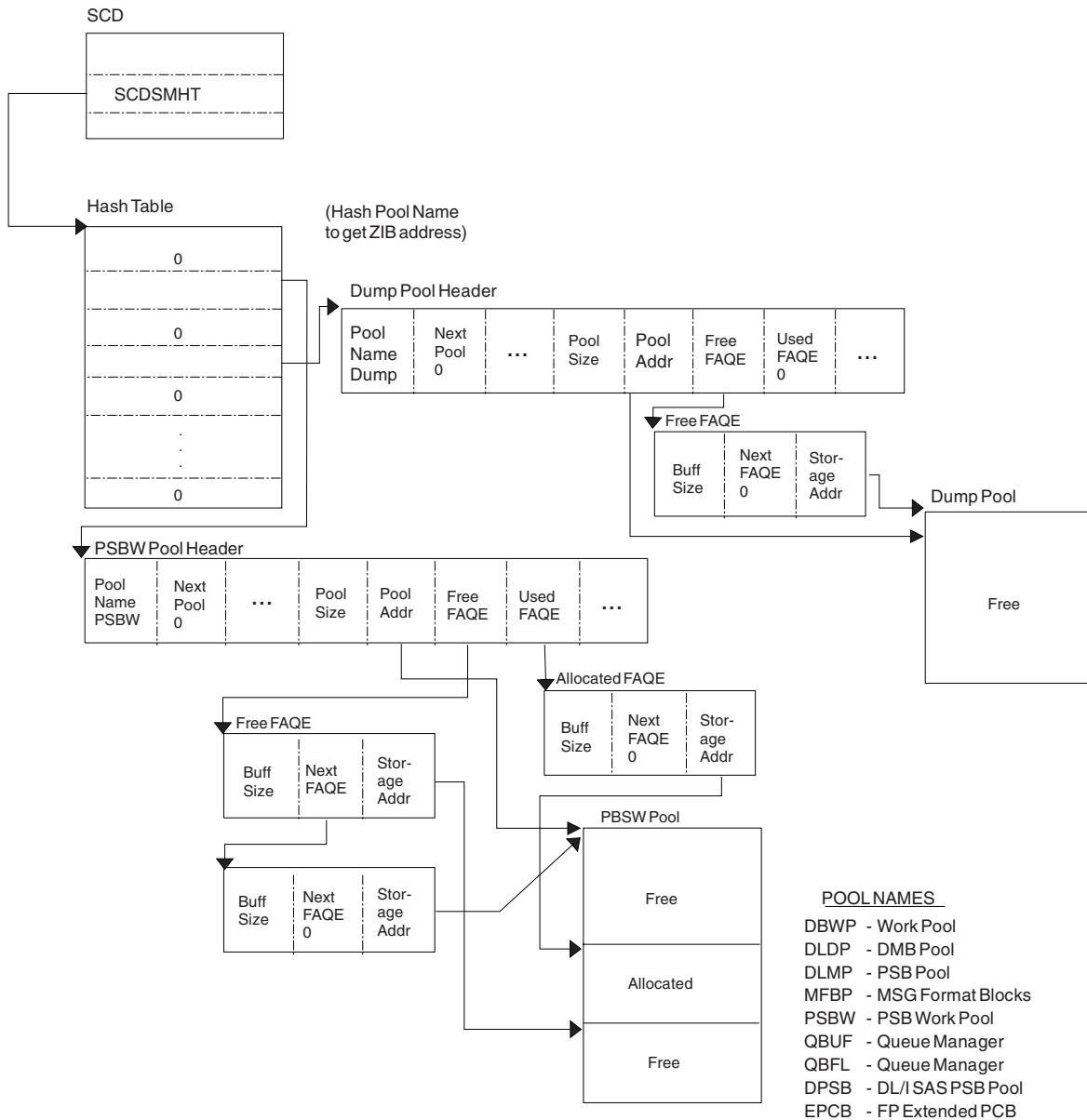


Figure 17. Storage management control block relationships for preallocated storage blocks

Figure 18 on page 98 shows the control block relationship for pools managed by the DFSPool Storage Manager. Each pool consists of zero or more noncontiguous storage blocks anchored off a pool header. By obtaining new blocks and releasing unused blocks, you can expand and contract a pool as needed during the execution of IMS.

Each block is divided into a number of fixed-length buffers that are used to satisfy storage requirements. The size and number of buffers can vary from block to block within a pool. Each block also has a block header which contains various information on the block

Each pool can be allocated with a maximum of thirty-two different buffer sizes. The pool header contains a noncompressible block pointer and a compressible block chain anchor for each buffer size available.

The pool header also contains an oversized block chain anchor. If the request size is larger than the largest buffer size available, a block is obtained containing a single buffer of the requested size. Blocks obtained in this manner are placed on the oversized chain. The intention of the oversized chain is to allow for exceptional requests, since normal processing should not need any oversized buffers.

The first block allocated for each buffer size is referred to as the primary block. The number of buffers contained within the primary block can vary from any secondary blocks of the same buffer size. If the primary block is obtained when the pool is allocated, it is held until IMS termination. Because it cannot be compressed, serialization logic is not required when allocating or releasing a buffer from one of these blocks.

If the primary block is not obtained until the first GET request, it along with any secondary blocks are placed on the compressible block chain anchored off the pool header. Serialization logic must be used when scanning the blocks on the compressible chains.

An 8-byte prefix and an 8-byte suffix is added to each buffer. The prefix and suffix are used by the Storage Manager exclusively. The size of the prefix and suffix is included in the current pool size.

The buffer size used to satisfy an incoming request is determined on a best fit basis. Unless the size of the buffer requested is the same size as the actual buffer, there is some unused storage between what the caller views as the end of the buffer and the actual end of the buffer. The buffer the user receives appears to be of the size requested. Any unused space is transparent.

The following pools are defined with user overlay detection: AOIP, CIOP, CMDP, DYNP, EMHB, HIOP, LUMC, LUMP, and SPAP. If a pool is defined with user overlay detection, an 8-byte constant is added to the user portion of the buffer. As far as the caller is concerned, the length of the buffer received is the length requested, followed by an 8-byte constant. For example, if a caller requests a 100-byte buffer from a pool with a user overlay detection, and the smallest buffer size available to satisfy the request is 128 bytes, the user overlay detection constant is placed at an offset of 100 bytes into the buffer. Bytes 107 through 127 are unused.

The user overlay detection constant is used by IMS modules. The Storage Manager does not look at the user overlay detection constant.

Storage management control block relationships (DFSPOOL pools)

The following figure shows storage management control block relationships (DFSPOOL pools).

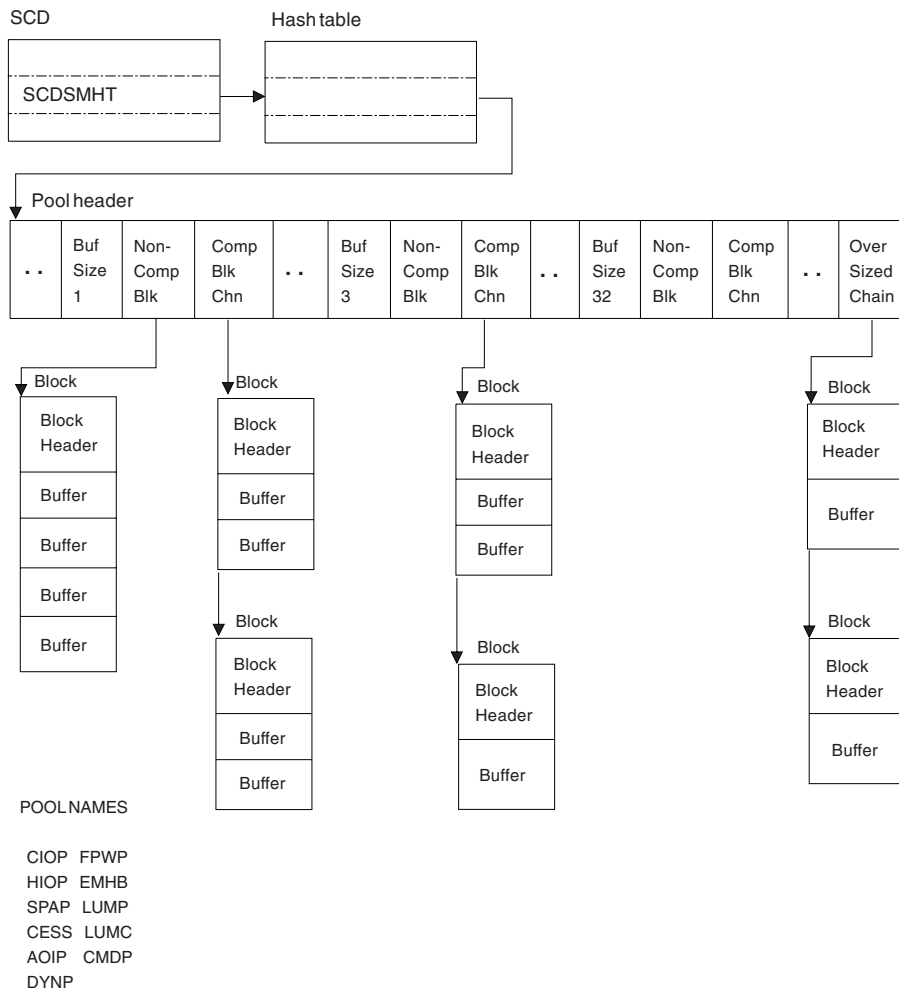


Figure 18. Storage management control block relationships (DFSPOOL pools)

Storage management control block relationships (DFSCBT00 pools)

The following figure shows the Storage Management (DFSCBT00 Pools) control blocks relationships.

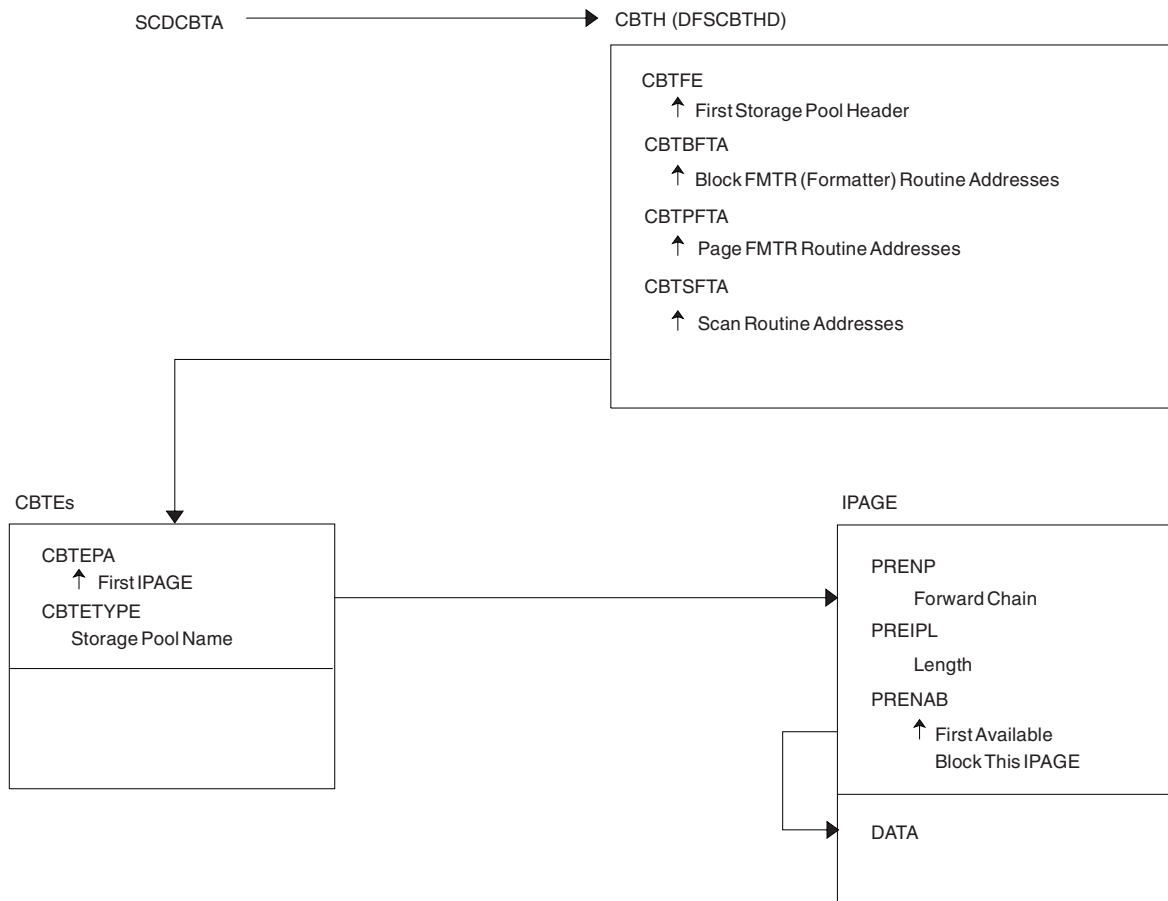


Figure 19. Storage management control block relationships (DFSCBT00 pools)

Database Manager control blocks for a representative database

The following figure shows the Database Manager control blocks for a representative database.

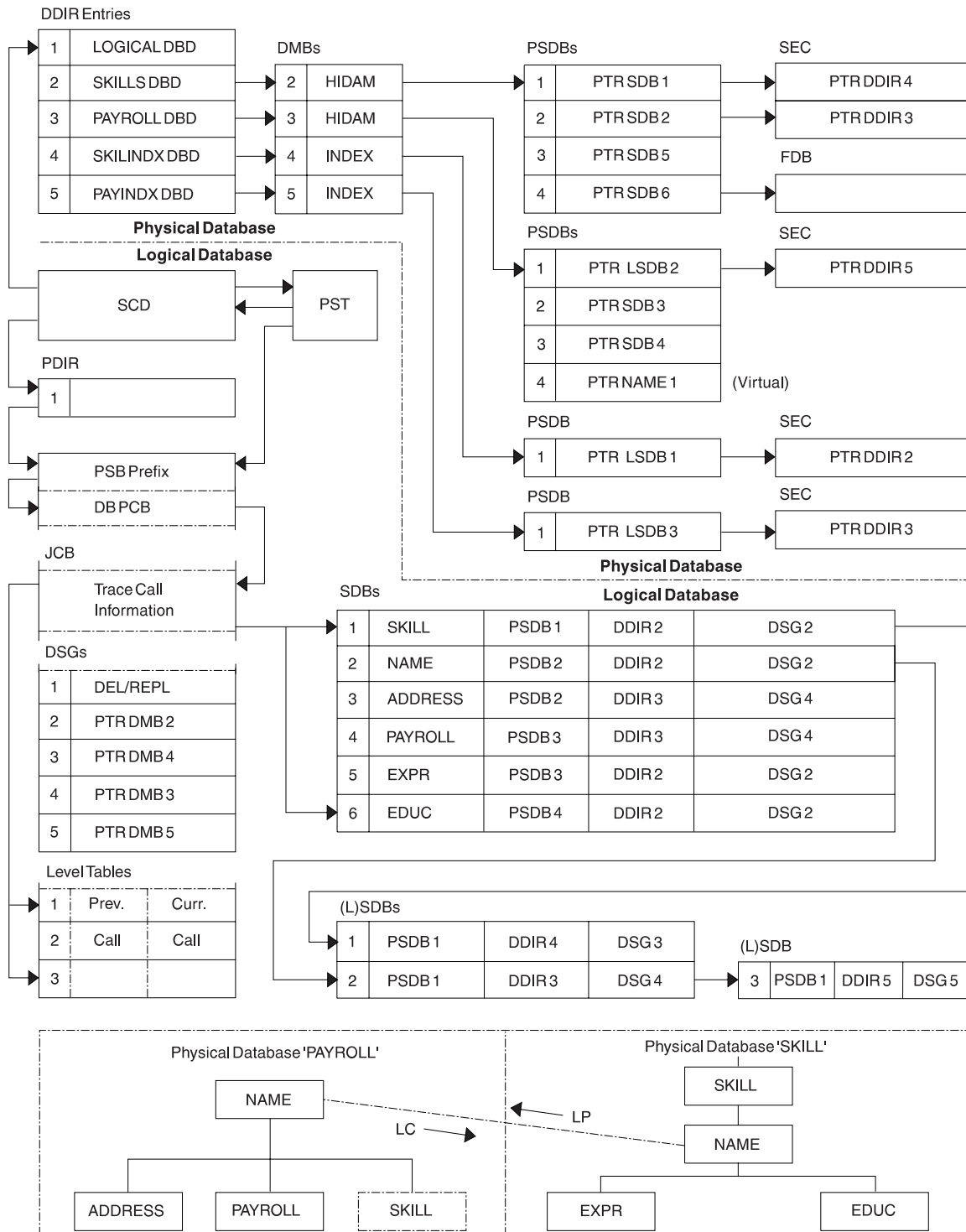


Figure 20. Database Manager control blocks for a representative database

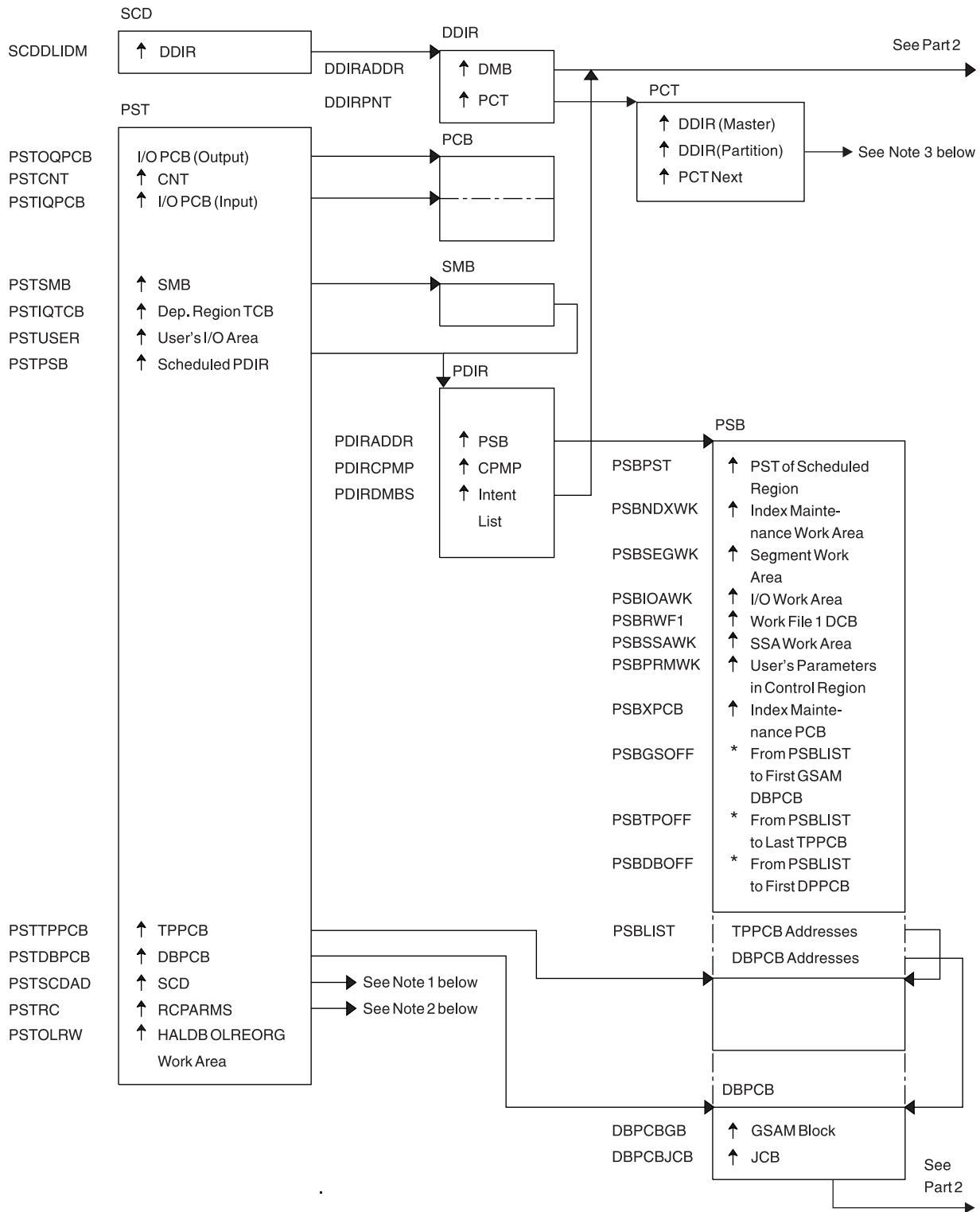
Note the following HALDB differences for Figure 20:

- The SDBs pointer to the DDIR always points to the HALDB Master's DDIR.
- The PSDBs are under the HALDB master DMB in the DMB pool. The partition DMBs do not contain PSDBs.

- There is no separately defined DDIR or DMB for the primary INDEX database of a PHIDAM. Instead there is an additional AMP in the partition DMB for the primary index.
- There is an ILE DSG for the ILDS which follows the Delete/Replace DSG.

Database control blocks

The following figure shows the relationships between database control blocks.



See the notes that follow Figure 21.

Figure 21. Database control blocks: Part 1 of 2

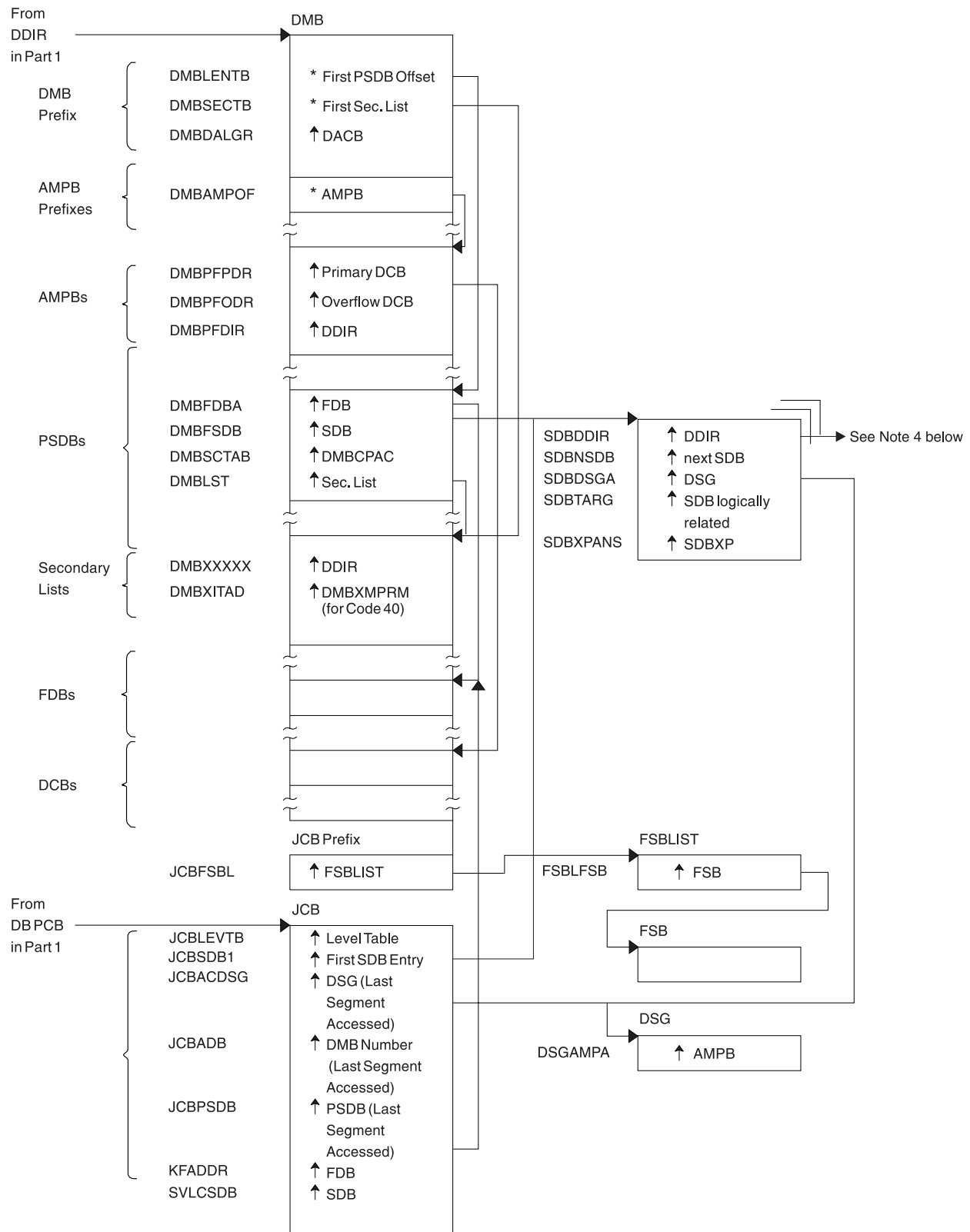


Figure 22. Database control blocks: Part 2 of 2

Notes to Figure 21 on page 102:

1. See Figure 4 on page 82.

2. See Figure 10 on page 88.
3. This is a unique HALDB control block. This control block points the partition DDIR to each other and points the partition DDIR to the master DDIR.
4. For HALDB, the SDB points to the Master DDIR.

Diagram of a Data Management Block (DMB)

The following figure shows a diagram of a Data Management Block (DMB).

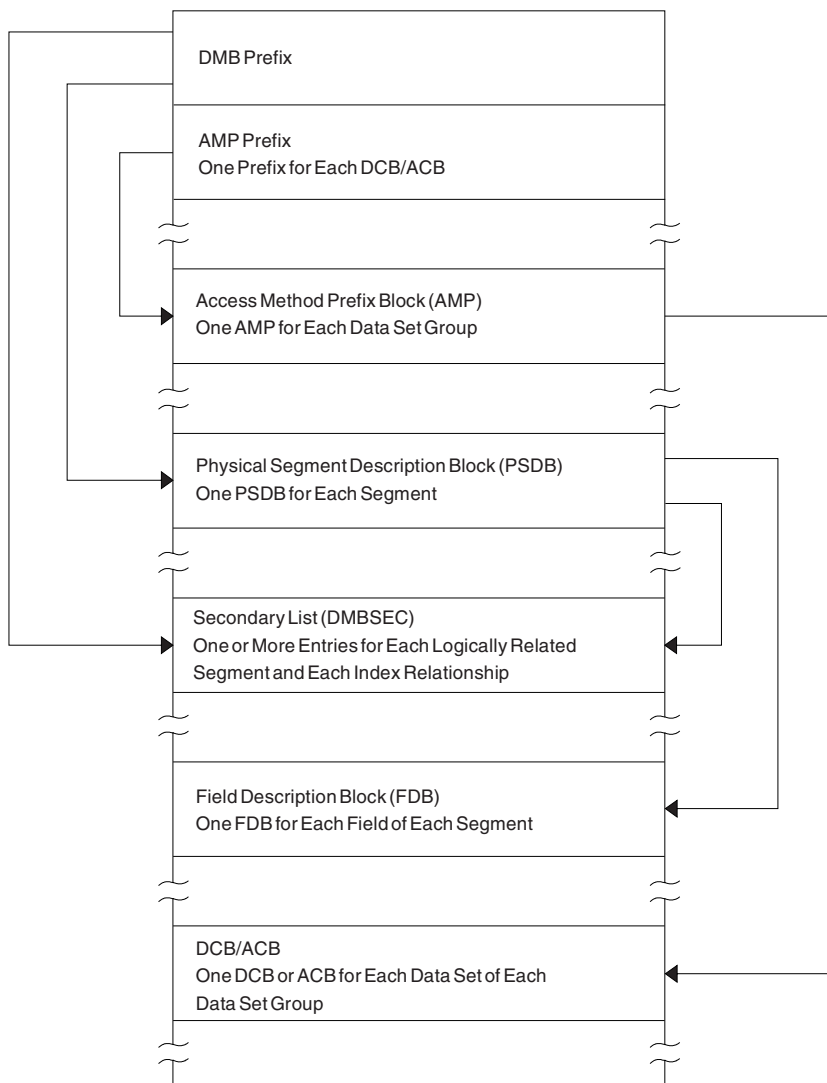


Figure 23. Diagram of a Data Management Block (DMB)

Note to Figure 23: For a HALDB, dual DMBs exist in storage. When HALDB Online Reorganization is not in progress, one DMB is active and the other inactive. When HALDB Online Reorganization is in progress, both DMBs are active, with one DMB representing the input data sets, and one DMB representing the output data sets.

Overview of Fast Path control blocks

The following figure shows an overview of Fast Path Control Blocks.

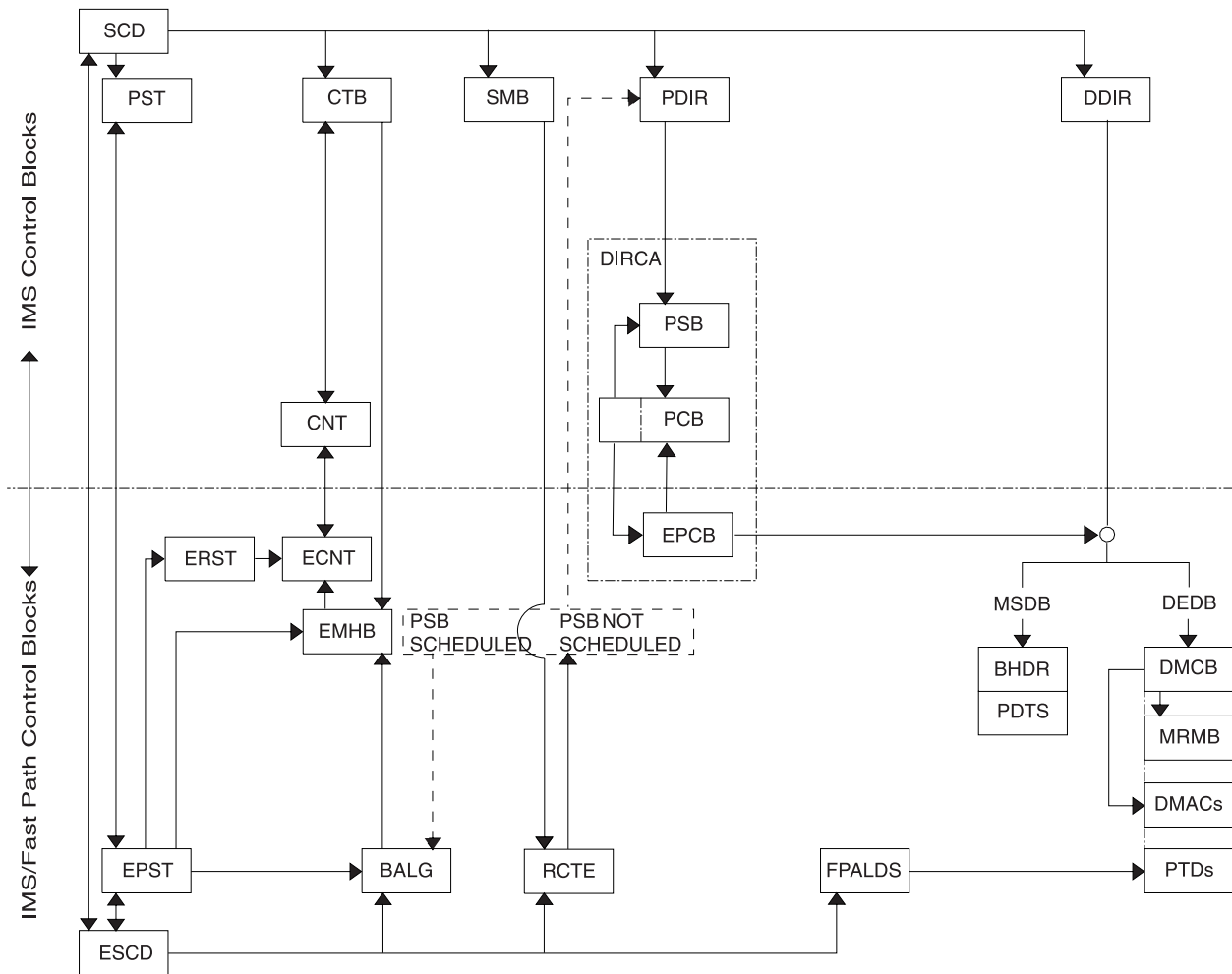
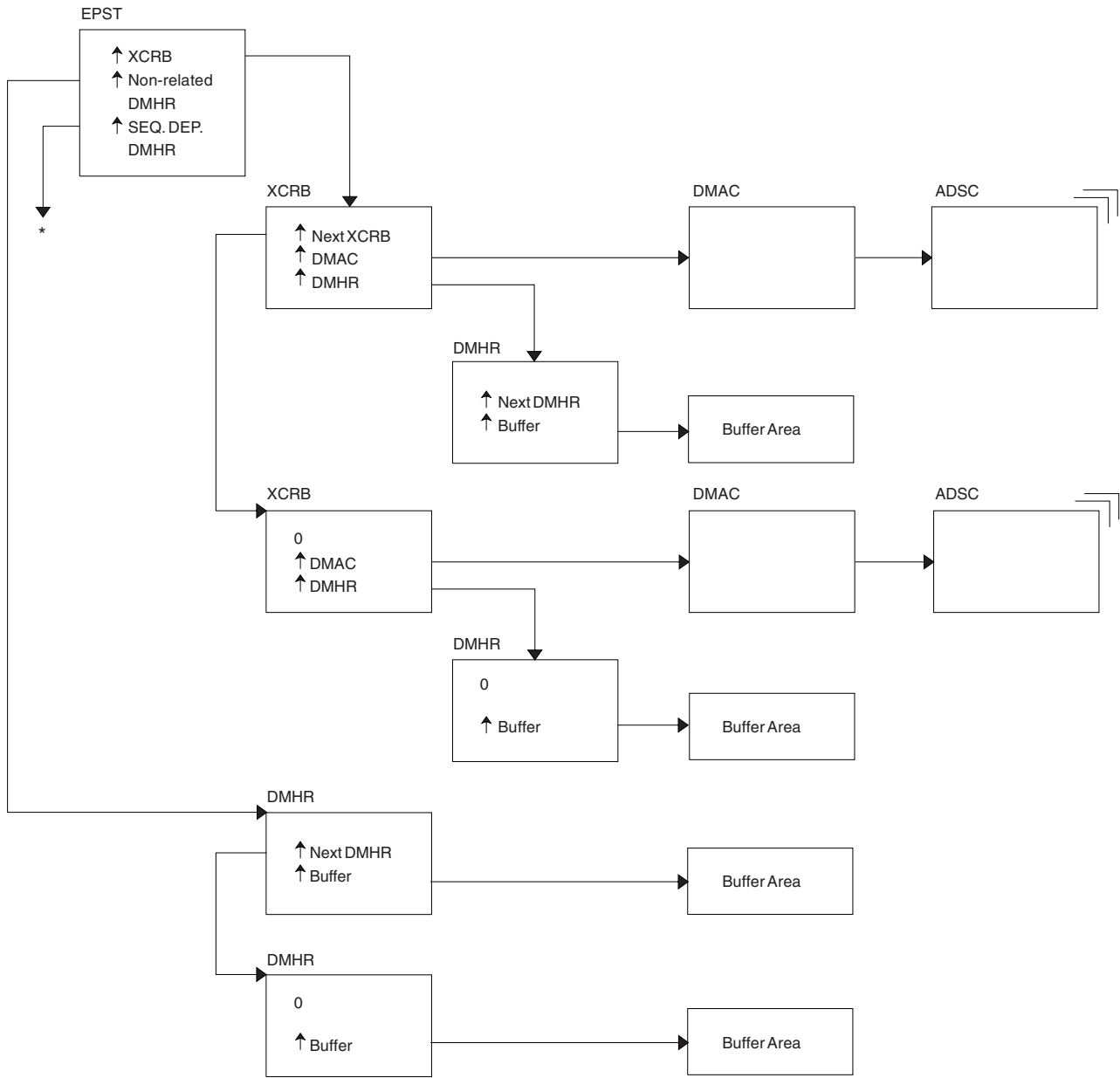


Figure 24. Overview of Fast Path control blocks

Relationships between buffer control blocks for Fast Path databases

The following figure shows the relationships between buffer control blocks for Fast Path databases.



* EPSTSDBH (This chain is identical to non-related DMHR chain.)

Figure 25. Relationships between buffer control blocks for Fast Path databases

GSAM control block overview

The following figure shows a GSAM control block overview.

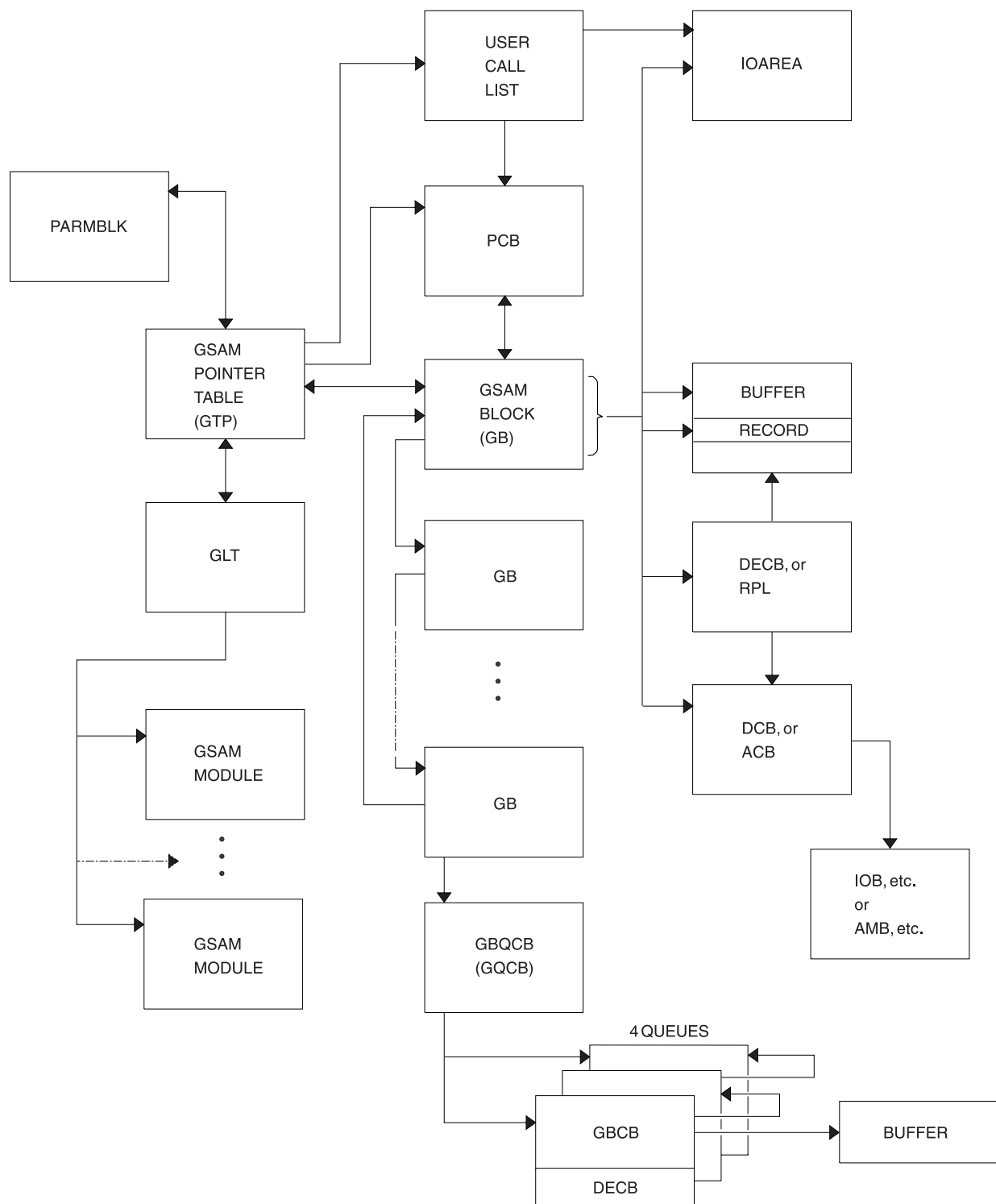


Figure 26. GSAM control block overview

GSAM control blocks

The following figure shows the GSAM control blocks.

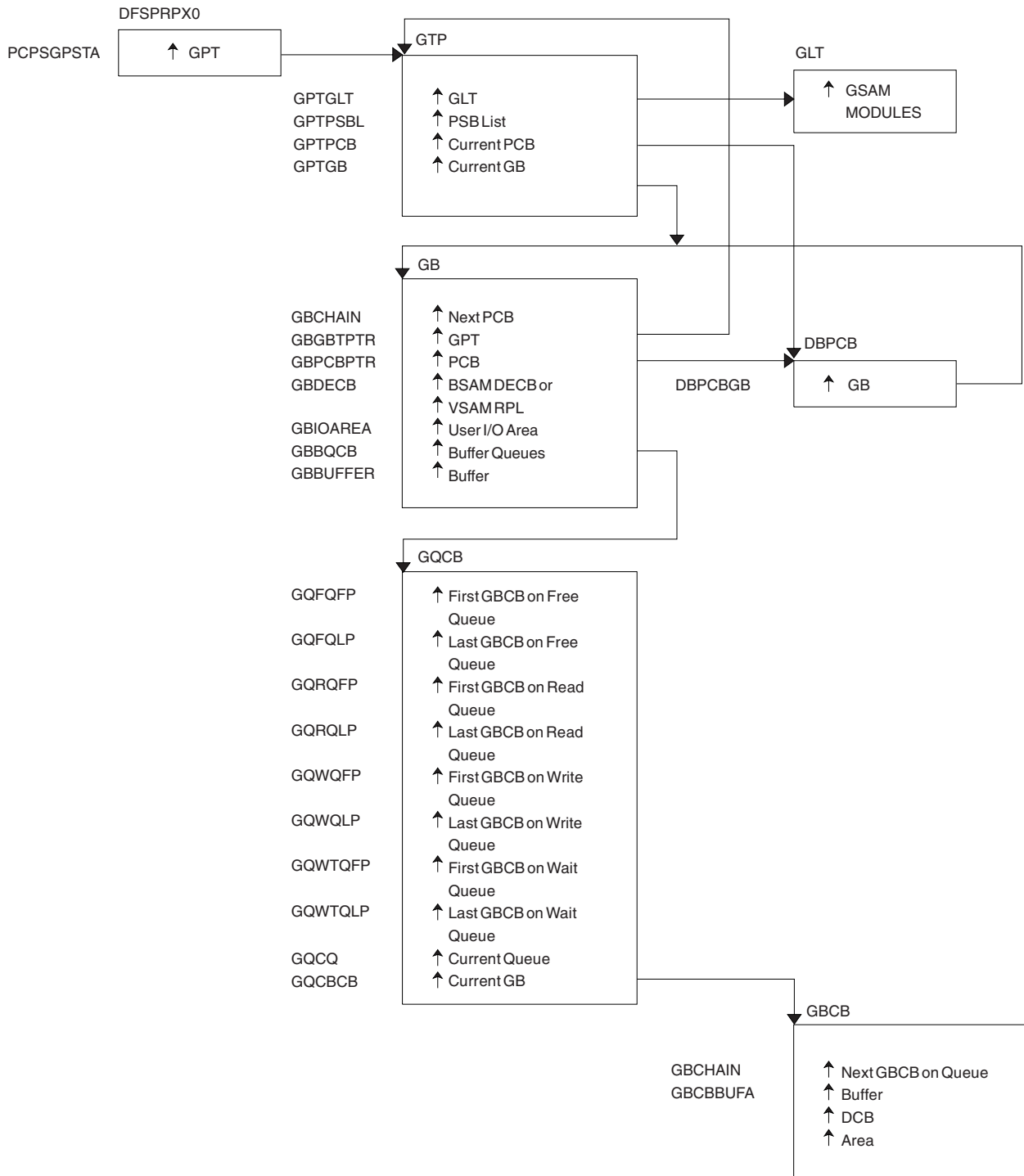


Figure 27. GSAM control blocks

DL/I control block relationships

The following figure shows the DL/I control block relationships.

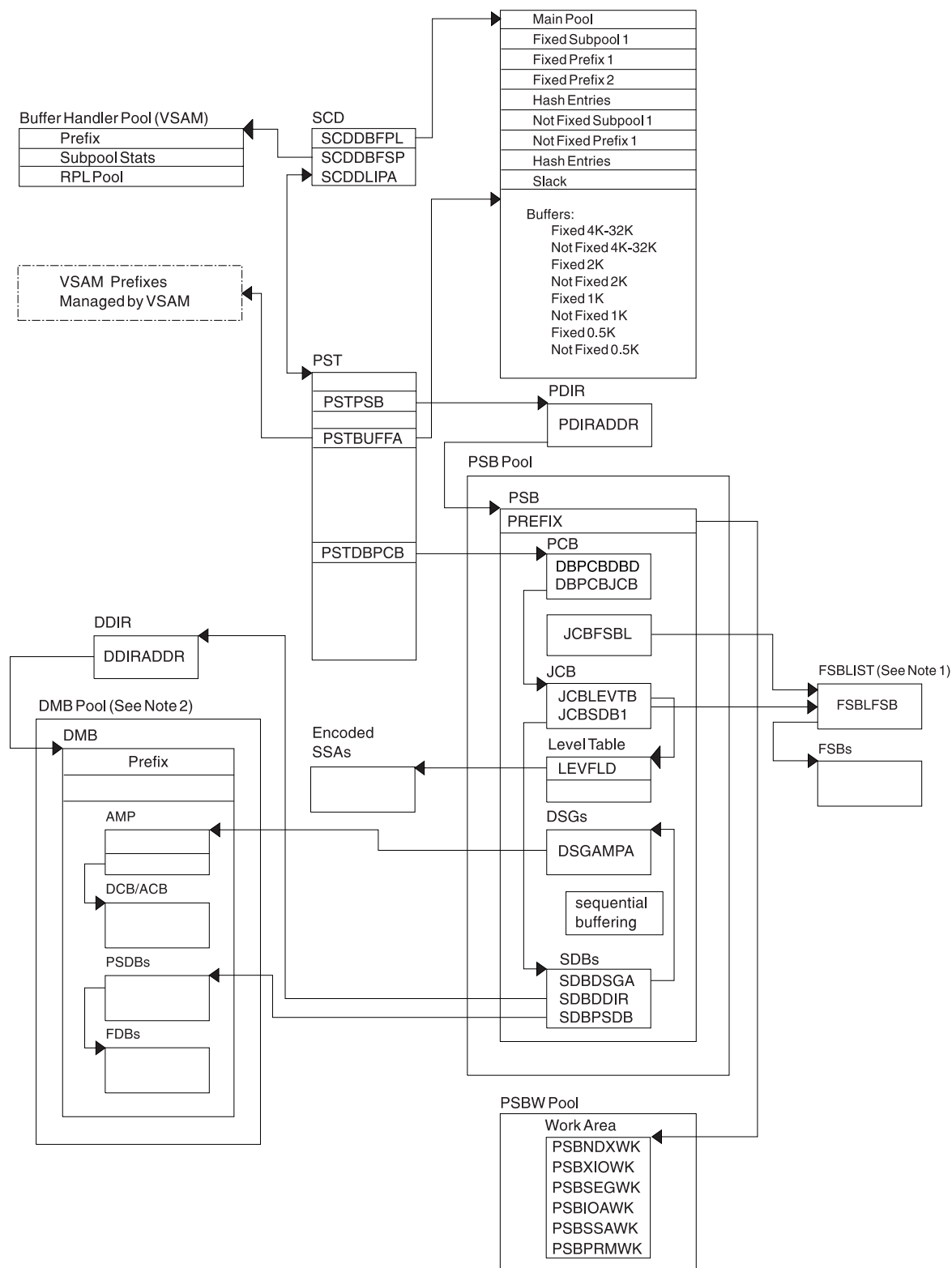


Figure 28. DL/I control block relationships

Notes to Figure 28:

1. The FSBLIST contains pointers to the Field Sensitivity Block (FSB). The FSB describes this user's logical use of the sensitive field.

2. A partition HALDB DMB is not in the DMB pool. For HALDB, only the Master DMB is in the DMB pool.

IMS Transaction Manager control blocks

The following figure shows the IMS Transaction Manager control blocks.

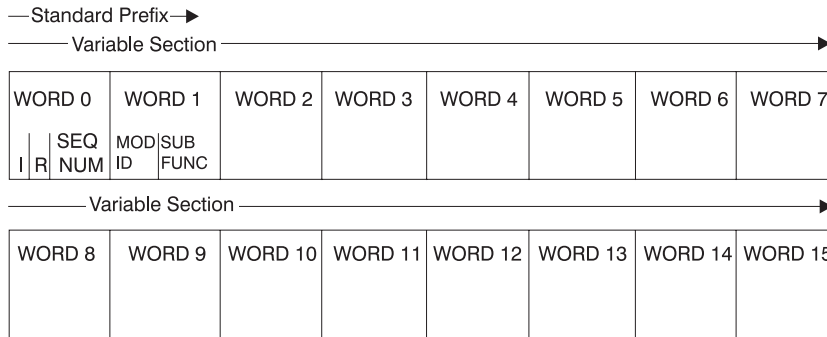
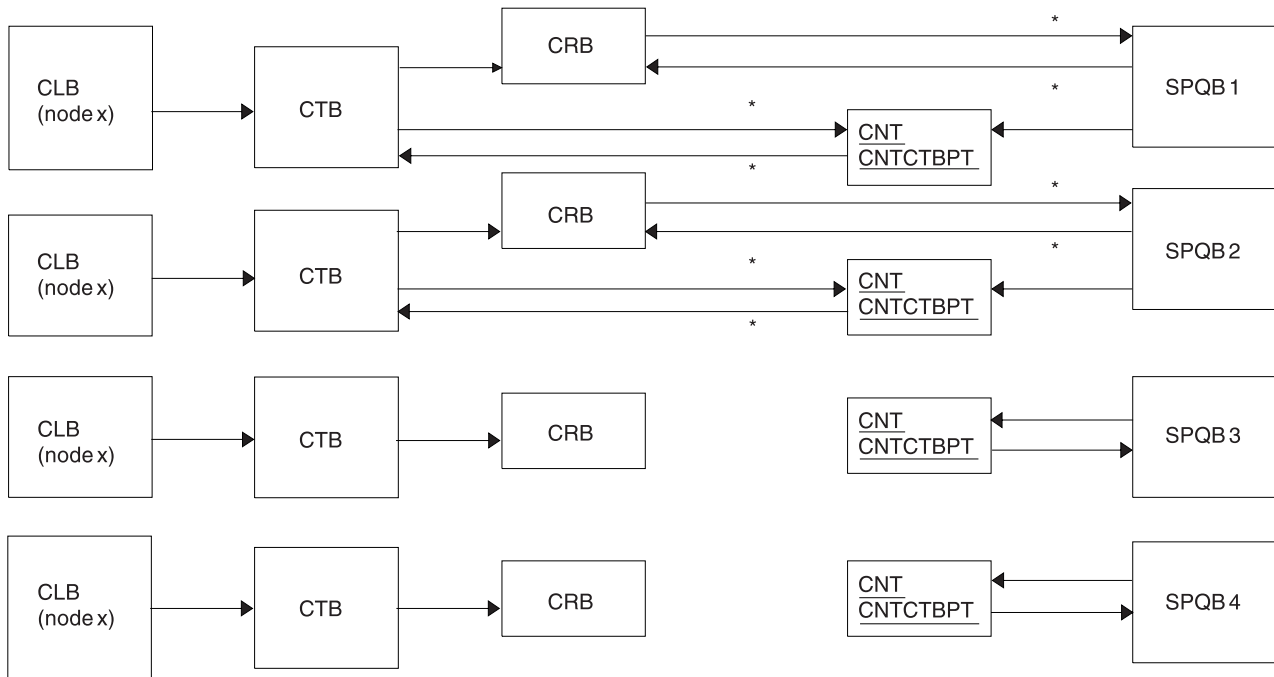


Figure 29. IMS Transaction Manager control blocks

Intersystem communication control block structure

The following figure shows the intersystem communication control block structure.



Note

Subpool Queue Blocks (SPQB1 and SPQB2) are allocated for sessions. SPQB3 and SPQB4 are not. One SPQB is required for each parallel session.

* Asterisks indicate that these pointers are set when blocks are allocated.

Figure 30. Intersystem communication control block structure

VTCB load module

The following figure shows the VTCB Load Module.

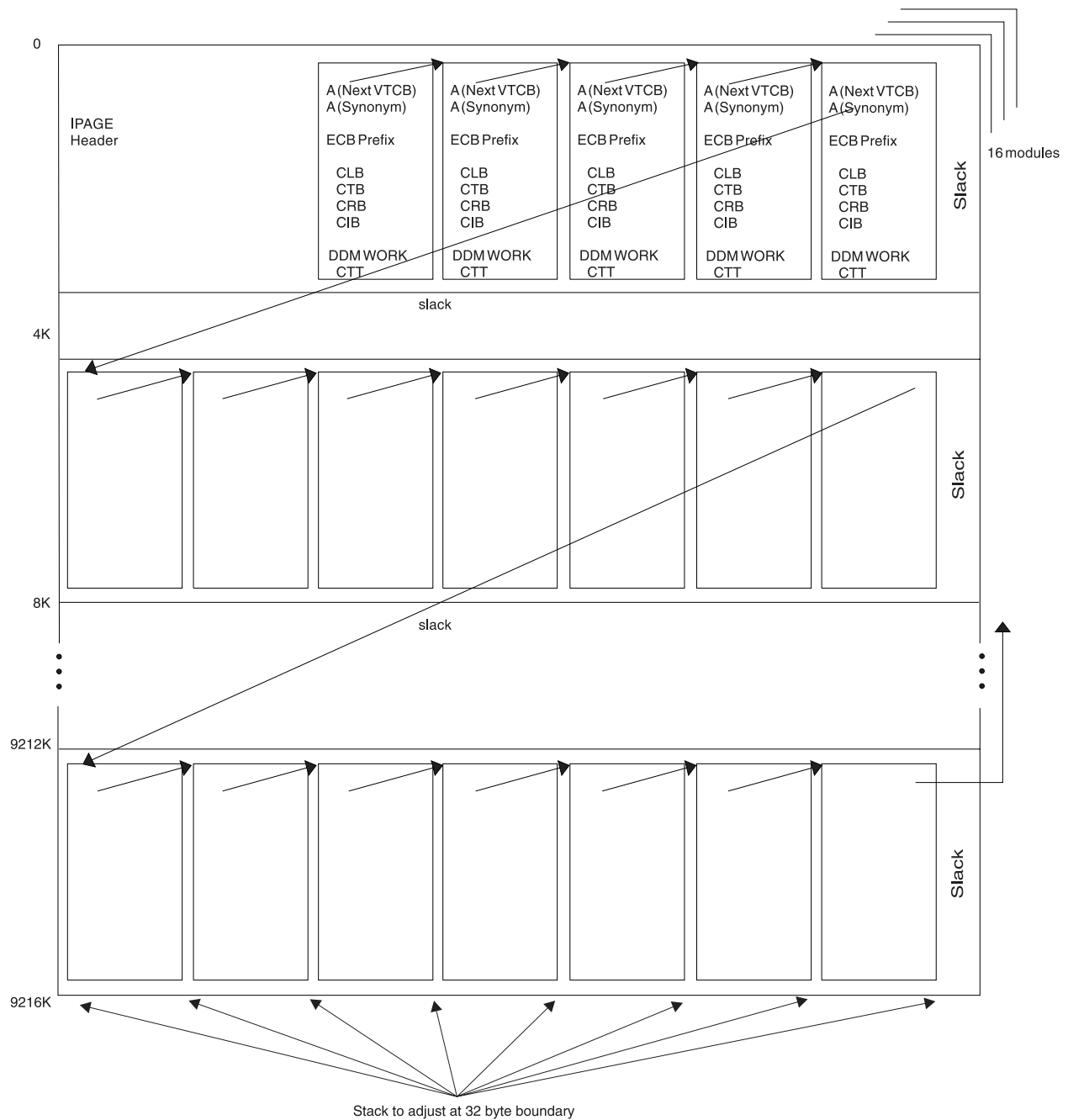


Figure 31. VTCB load module

As illustrated in the following figure, IMS maintains a VTAM terminal control block (VTCB) for each VTAM terminal except MSC VTAM terminals. A VTCB can contain a:

- Communication line block (CLB)
- Communication terminal block (CTB)
- Communication restart block (CRB)

- Communication interface block (CIB)
- Device-dependent module (DDM) work area
- Communication terminal table (CTT) (used only for ETO terminals)

The system of pointers between blocks within a VTCB is the same as the system of pointers used for VTAM terminals.

Some terminals do not require all six blocks. For example, static VTAM blocks use a statically created CTT.

You can find the VTCB for a terminal through the terminal's node name. To do so, you use the DFSCBTS macro interface.

Multiple Systems Coupling (MSC) control block overview

The following figure shows the Multiple Systems Coupling (MSC) control block overview.

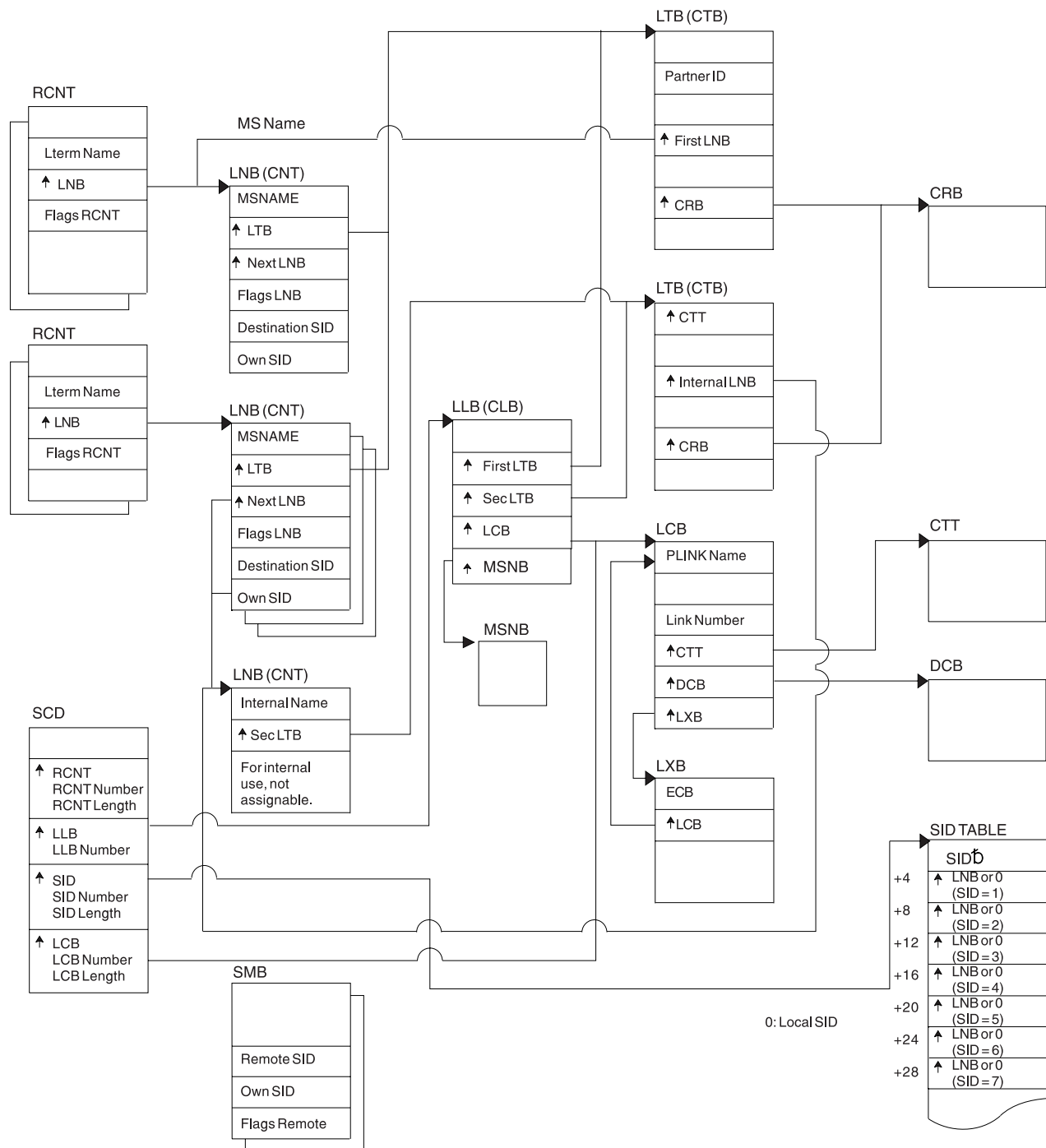


Figure 32. Multiple Systems Coupling (MSC) control block overview

Multiple Systems Coupling (MSC) main storage-to-main storage control block overview

The following figure shows the Multiple Systems Coupling (MSC) Main Storage-to-Main Storage control block overview.

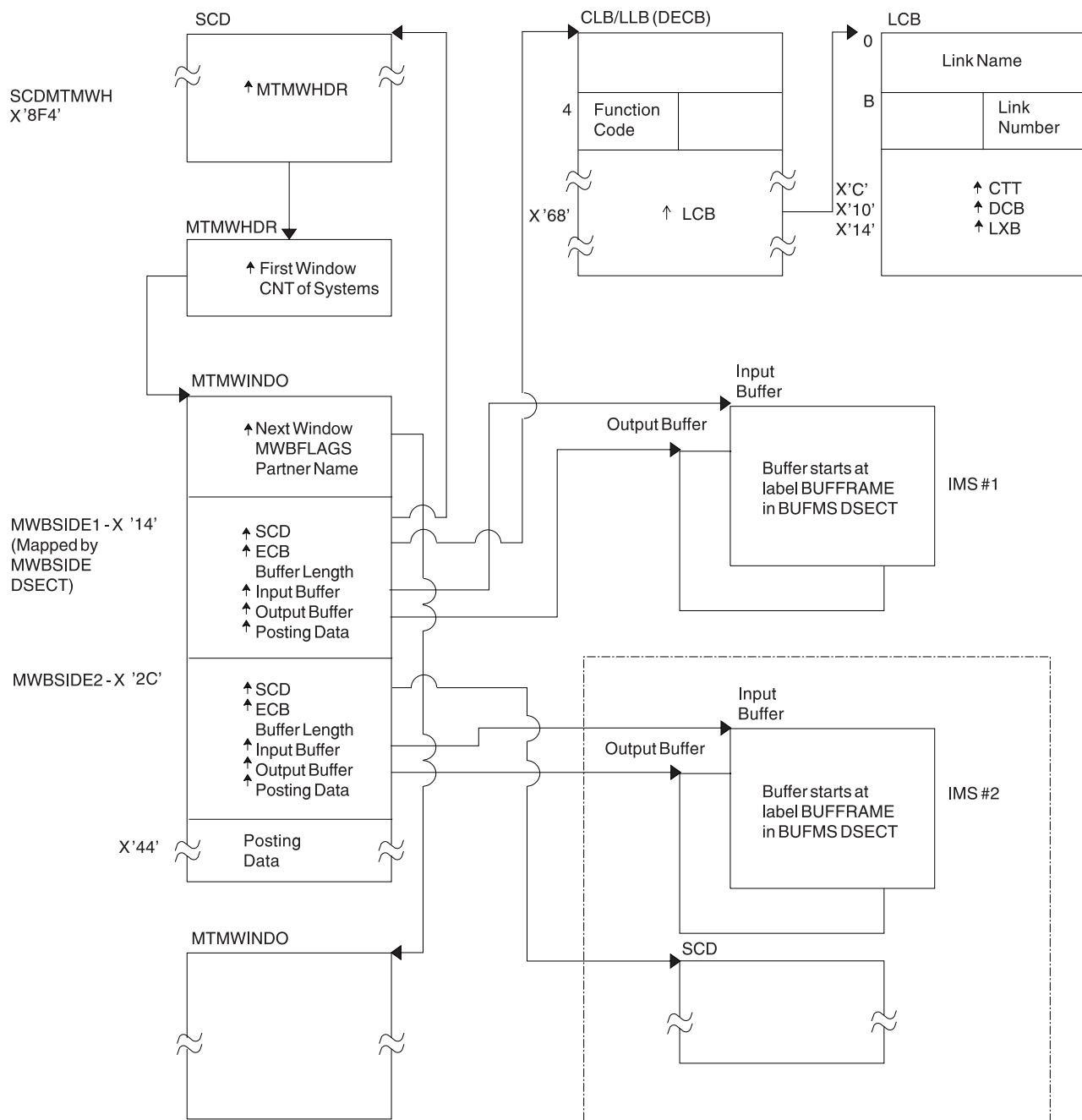


Figure 33. Multiple Systems Coupling (MSC) main storage-to-main storage control block overview

z/OS storage map showing IMS-to-IRLM interrelationships

The following figure shows a z/OS storage map displaying IMS-to-IRLM interrelationships.

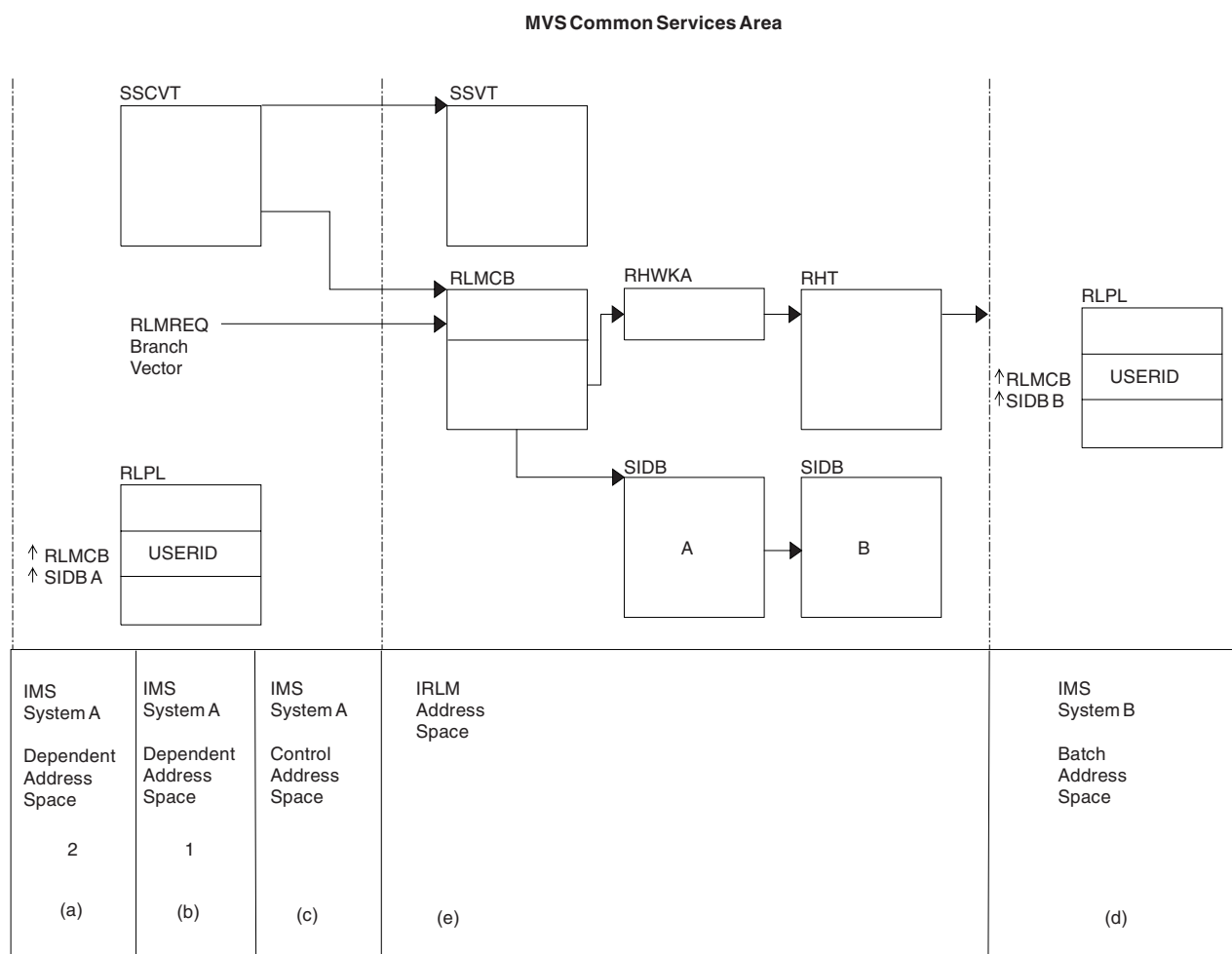


Figure 34. z/OS storage map showing IMS-to-IRLM interrelationships

Notes to Figure 34:

1. (a), (b), and (c) are z/OS address spaces that make up one online IMS subsystem.
2. (d) is a z/OS address space containing an IMS batch subsystem.
3. (e) is an IRLM address space to which the two IMS subsystems are connected.
4. The RLPLs used by both IMS subsystems reside in the z/OS common services area (CSA).
5. To obtain and release global locks, the IMS subsystems branch to the IRLM code (The subsystems enter the IRLM code through the RLMREQ branch vector within the RLMCB that resides in the CSA.)
6. The IRLM control block structure that controls the global locks resides in the CSA.
7. When PC=YES is in effect, the RHT is in a private address space.

IRLM overall control block structure

The following figure shows the overall control block structure of IRLM.

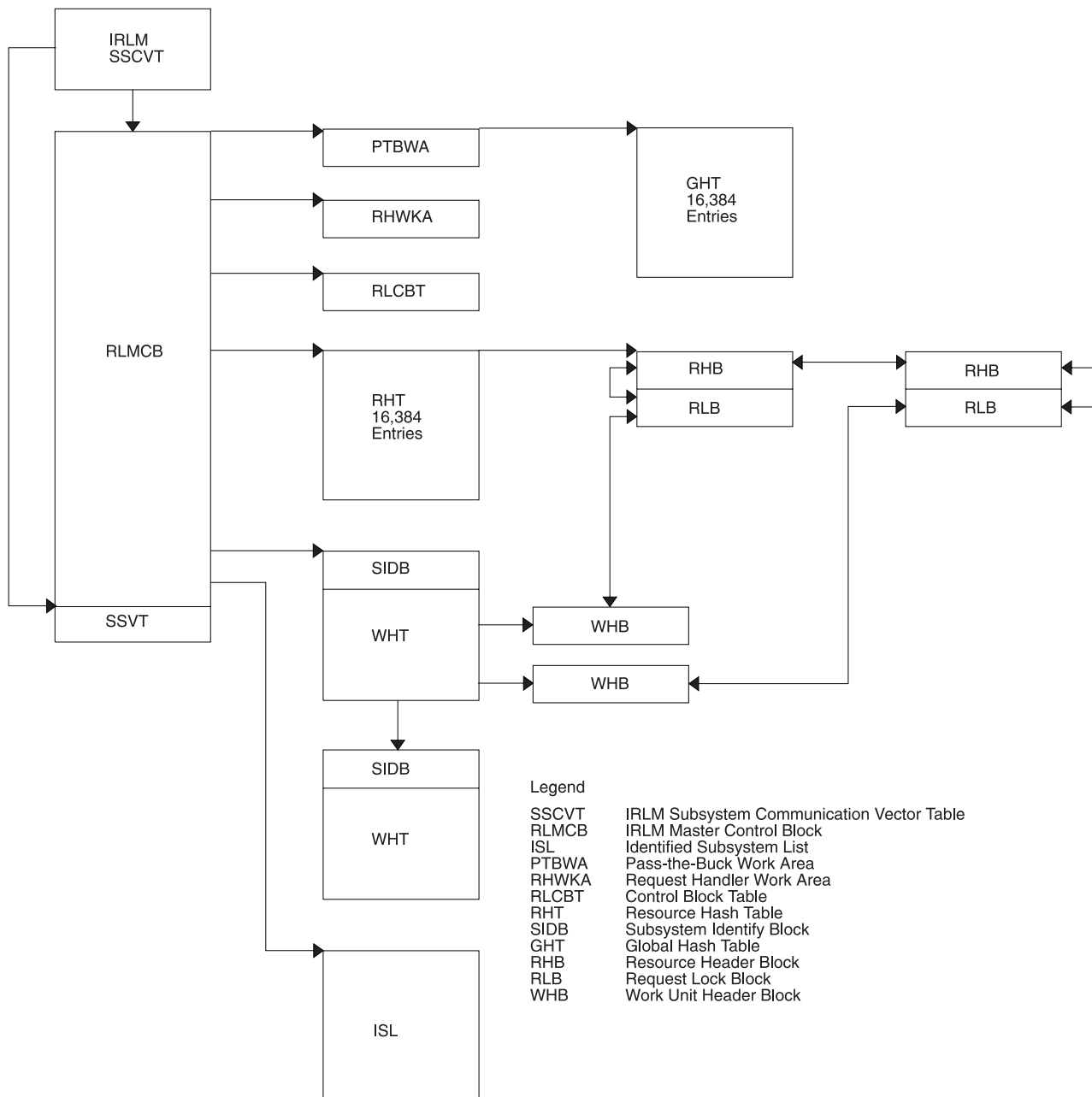


Figure 35. IRLM overall control block structure

IRLM storage manager pools

The following figure shows the IRLM Storage Manager pools.

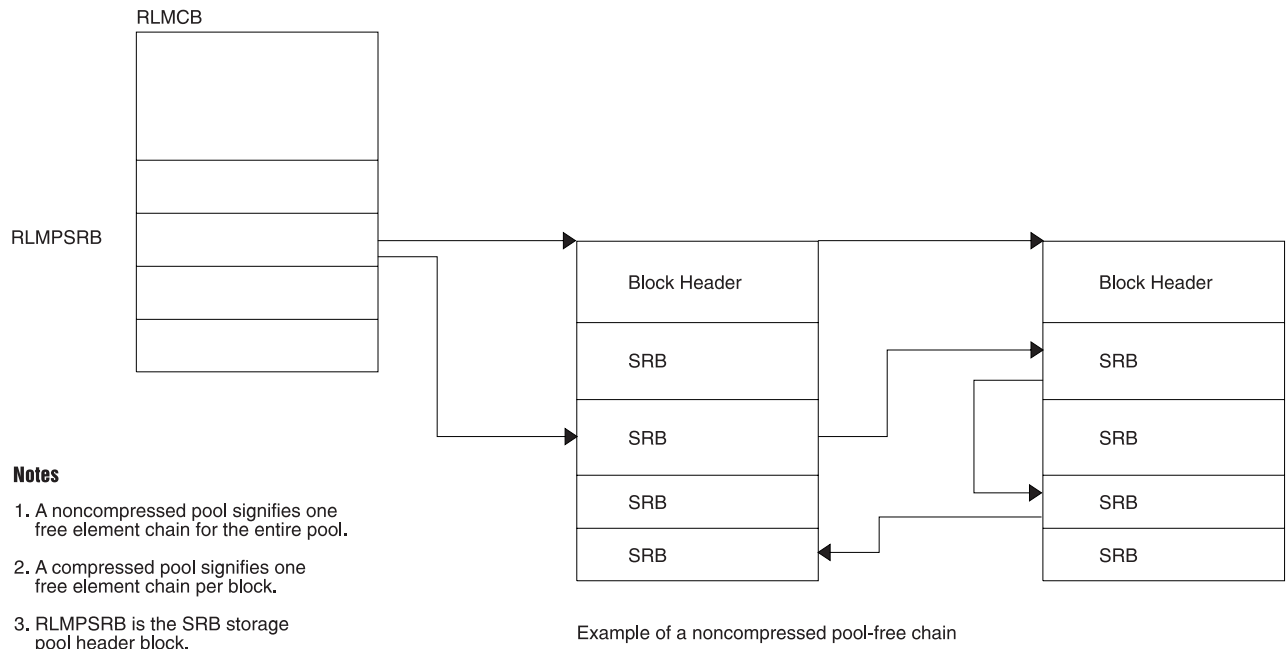


Figure 36. IRLM storage manager pools

IRLM lock request examples

The following figure shows examples of IRLM lock requests.

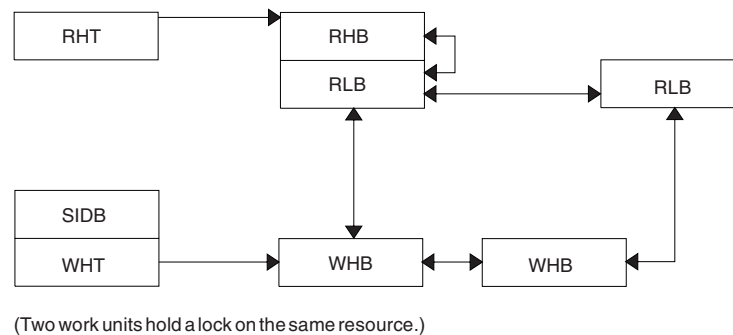
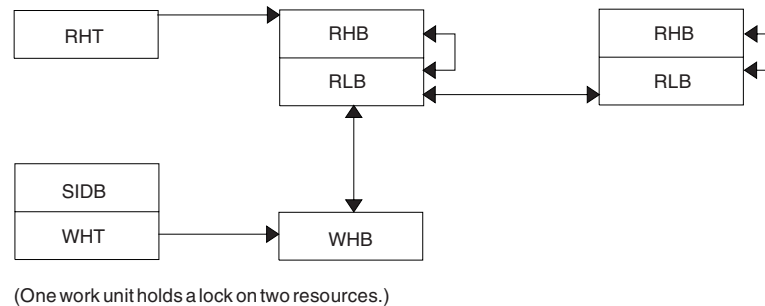


Figure 37. IRLM lock request examples

Control block overview of Database Recovery Control (DBRC)

The following figure shows an overview of the Database Recovery Control (DBRC) control blocks.

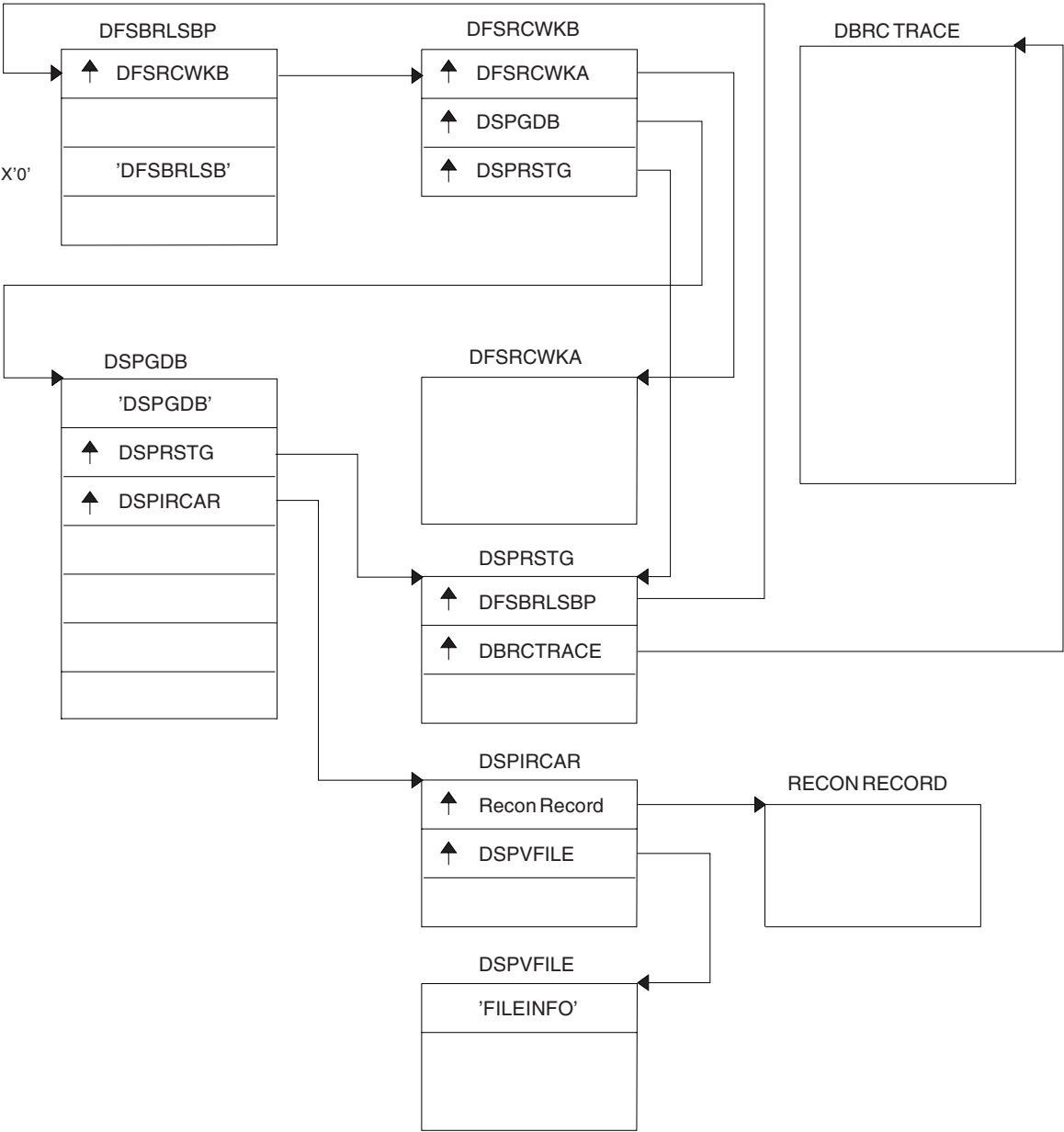


Figure 38. Control block overview of Database Recovery Control (DBRC)

Organization and basic linkages: DOF (Device Output Format) and MOD (Message Output Descriptor)

The following figure shows the organization and basic linkages of Description Output Format (DOF) and Message Output Descriptor (MOD).

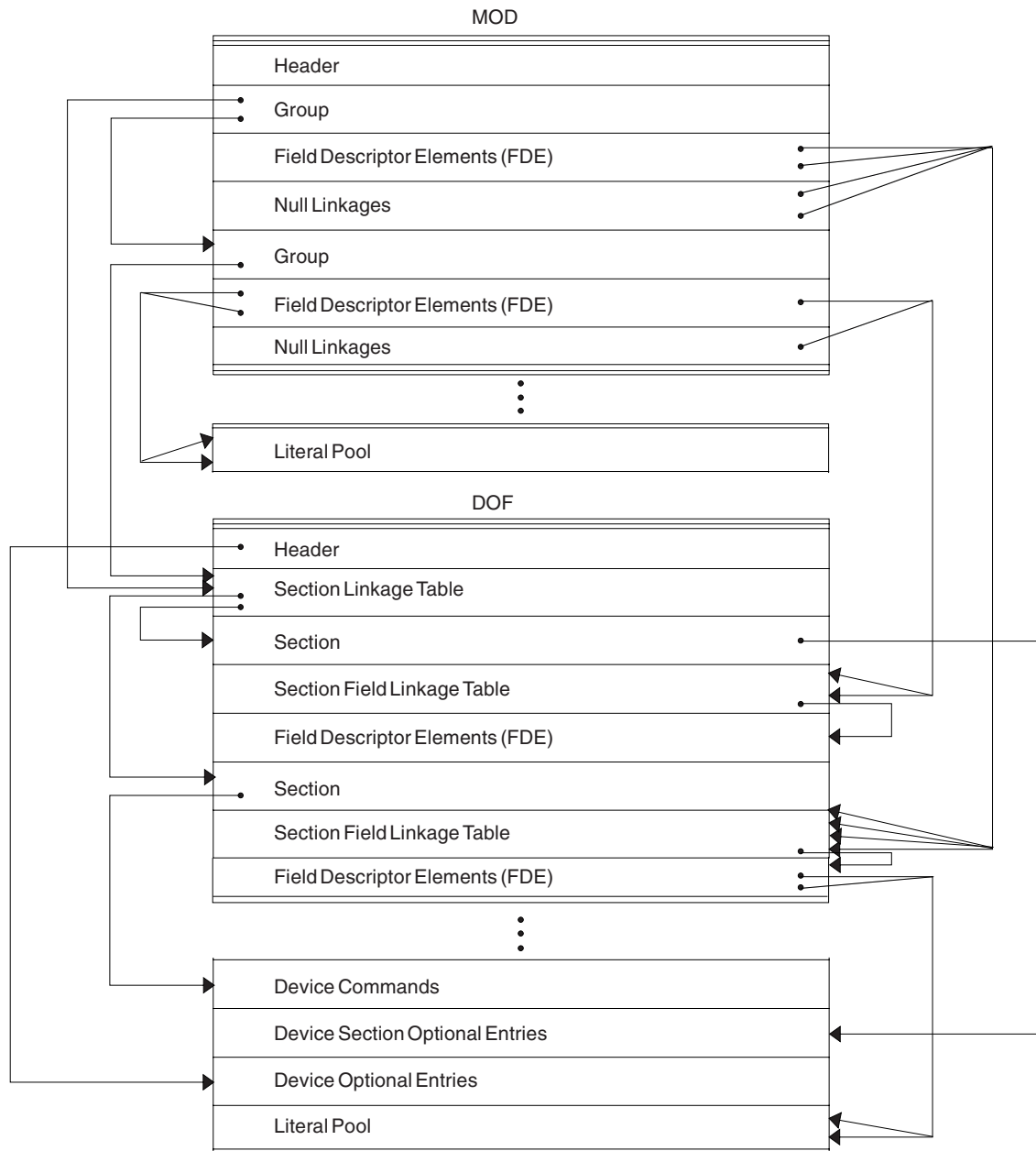


Figure 39. Organization and basic linkages: DOF (Device Output Format) and MOD (Message Output Descriptor)

Organization and basic linkages: DIF (Device Input Format) and MID (Message Input Descriptor)

The following figure shows the organization and basic linkages between Device Input Format (DIF) and Message Input Descriptor (MID).

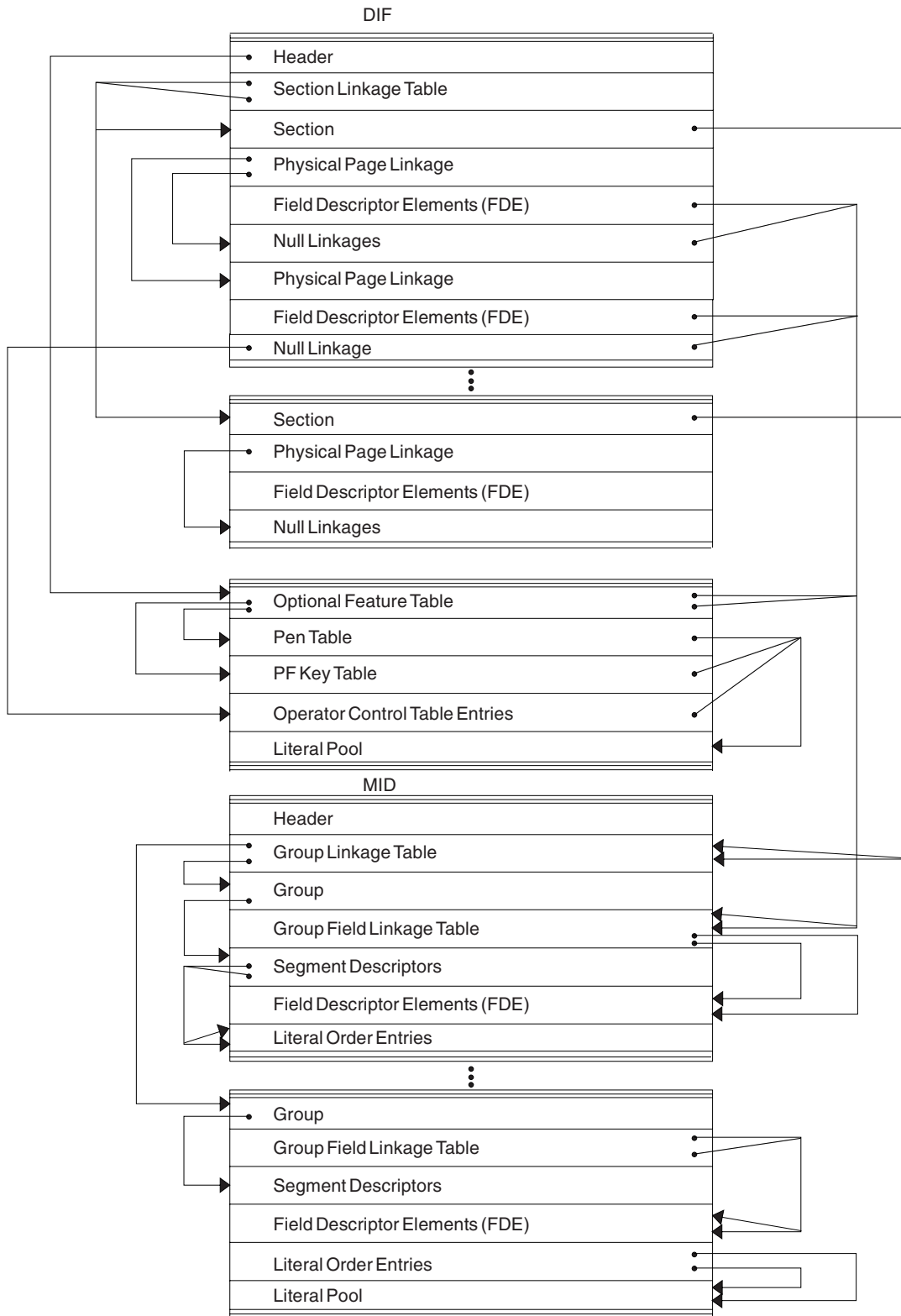


Figure 40. Organization and basic linkages: DIF (Device Input Format) and MID (Message Input Descriptor)

DL/I record formats

The DL/I address space has seven distinct record formats.

HSAM and SHSAM database

HSAM and SHSAM databases share the following record formats.

Segment Formats

The following figure shows the DL/I data record formats for HSAM and SHSAM databases.

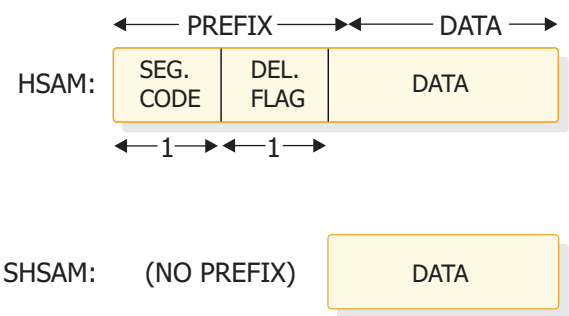


Figure 41. HSAM and SHSAM segment format

Delete Byte (Flag) Format

The following figure shows the delete byte (flag) format.

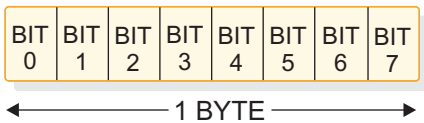


Figure 42. Delete byte (flag) format

Bit	Description
0	Segment deleted (HSAM or index).
1	DB record deleted (HSAM or index).
2	Segment processed by DELETE.
3	Reserved.
4	Data and prefix are separated in storage.
5	Segment has been deleted on its physical path.
6	Segment has been deleted on its logical path.
7	Segment space available to be freed; bits 5 and 6 must also be set on.

Block Format for HSAM and SHSAM

There are no dependent segments in a SHSAM block. Block size must be a multiple of segment size. The following figure shows the block format for HSAM and SHSAM.

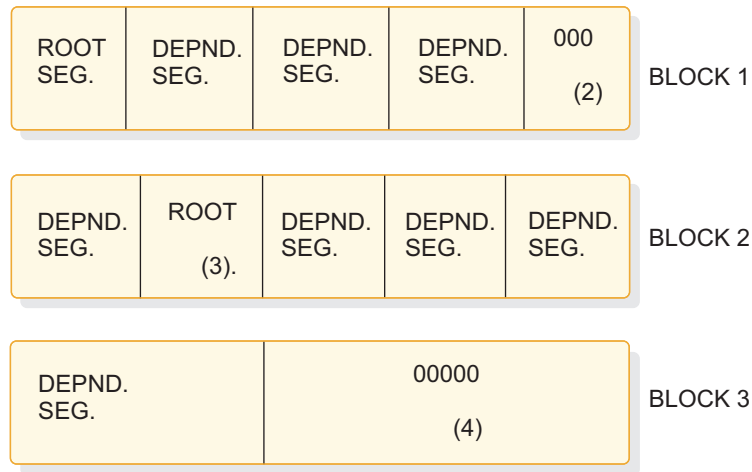


Figure 43. Block format for HSAM and SHSAM

Notes:

1. Pad with zeros if no room for next segment.
2. Next database record starts immediately.
3. Pad with zeros in last block, after last segment.

HISAM and SHISAM database

HISAM and SHISAM databases share the following record formats.

Segment Format

Figure 44 and Figure 45 on page 123 show the segment format of HISAM and SHISAM.

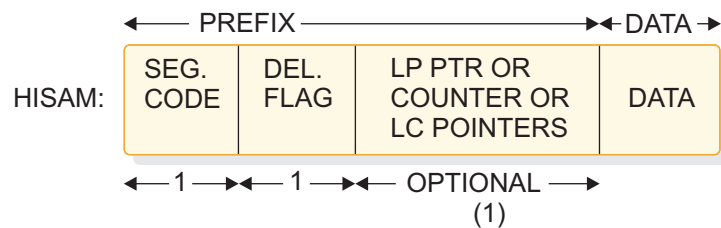


Figure 44. HISAM segment format

Note:

1. This field can be omitted, or it can be used to hold:
 - A 4-byte LP pointer (if this segment is an LC).
 - A 4-byte counter (if this segment is an LP).
 - One or more 4-byte LC pointers (if this segment is an LP).

SHSAM: (NO PREFIX)

DATA

Figure 45. SHISAM segment format

Note: This diagram is for a root-only database.

LRECL Format

The following figure shows the LRECL format.

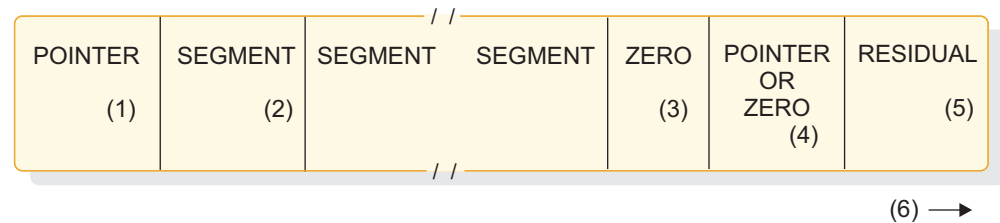


Figure 46. LRECL format

Notes:

1. 4-byte RBA of ESDS record containing additional dependent segments for this root occurrence.
SHISAM: This field is omitted.
2. HISAM: Segment includes prefix and data.
SHISAM: Segment includes only data (no prefix). (See Figure 45)
3. 1-byte of zeros indicates the end of segments in this LRECL.
4. This field is omitted.
5. Space not used.
6. VSAM LRECLs must have an even length.

VSAM Block Formats

The following figure shows the VSAM block formats.

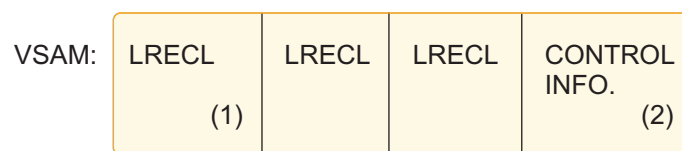


Figure 47. VSAM block formats

Notes:

1. LRECL length might change between KSDS and ESDS, depending on user definition.
2. 10 bytes in a blocked data set; 7 bytes in an unblocked data set.

HDAM, HIDAM, PHDAM, or PHIDAM database

HDAM, HIDAM, PHDAM, and PHIDAM databases share the following record format.

Segment Format

The following figure shows the segment format of HDAM, HIDAM, PHDAM, and PHIDAM databases.

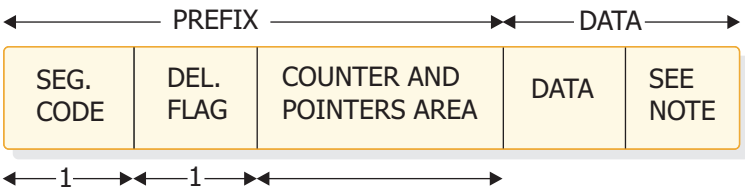


Figure 48. HDAM, HIDAM, PHDAM, or PHIDAM segment format

In order for all segments to be half-word-aligned, a slack byte is added to the end of any segment whose length is an odd number.

Prefix of a Segment

The following figure maps the prefix of a segment.

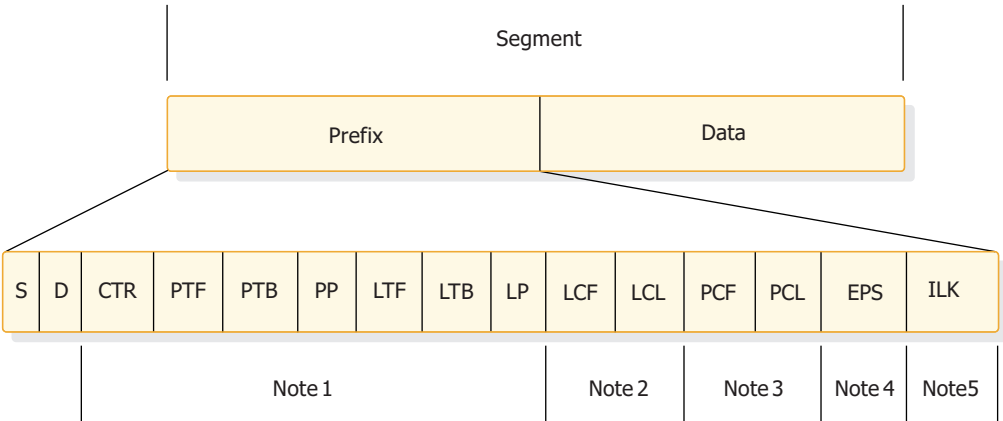


Figure 49. Mapping the prefix of a segment

Notes to Figure 49:

1.

Prefix Flag

Prefix Flag Description

Segment code (S)

Delete flag (D)

The pointers that exist in this section of the prefix are identified in the PSDB field DMBPTR, as shown in the following list:

- X'80' Counter (CTR) for logical relationships
- X'40' Physical twin forward (PTF)
- X'20' Physical twin backward (PTB)
- X'10' Physical parent (PP)
- X'08' Logical twin forward (LTF)
- X'04' Logical twin backward (LTB)

- X'02' Logical parent (LP)
 - X'01' Hierarchical direct pointing (For twin-type pointing, this bit is off)
2. How to locate all logical children: logical child first (LCF); logical child last (LCL)
 - a. At DMBFLAG, if flag DMBLCEX (X'20') is on, then DMBLST points to a secondary list for this segment. Secondary lists are used for information concerning indexes, logical children, or the logical parents.
 - b. Secondary list entries whose field DMBSCDE (SEC+0) has flag DMBSLC (X'02') on are descriptions of logical children for a logical parent. Within these secondary lists, the field DMBSLCFL (X'02') has the number of the first and last logical child pointers in the prefix of the logical parent.
 - c. A logical parent can have multiple types of logical children; thus, there can be more than one logical child secondary list entry for a logical parent. The last secondary list for each segment has the DMBSND flag (X'80') set on in the field DMBSCDE (SEC+0).
 3. How to locate all physical children: physical child first (PCF); physical child last (PCL)
 - a. Physical child pointers are only present if this segment uses twin-type pointing rather than hierarchic-type pointing. The PSDB entries for the children of the segment being mapped indicate the number of the pointer in the prefix of the parent segment which points to the first and last occurrence of the child segments.
 - b. The PSDB fields DMBPPFD and DMBPPBK are used for these numbers. The PSDB entries for the children of the segment being mapped can be found by scanning the PSDBs for those segments with a parent segment code (PSDB+1) that matches the segment code (PSDB+0) of the segment being mapped.
 4. An EPS (extended pointer set) that is 28 bytes in length is present in the prefix of an LC segment prefix of a HALDB.
 5. An ILK (indirect list entry key) that is 8 bytes in length is present in each segment of a PHIDAM or PHDAM.

Related concepts:

"Dump analysis introduction" on page 155

OSAM and VSAM ESDS block format

OSAM and VSAM ESDS blocks share the following format.

Block format

The following figure shows the OSAM and VSAM ESDS block format.

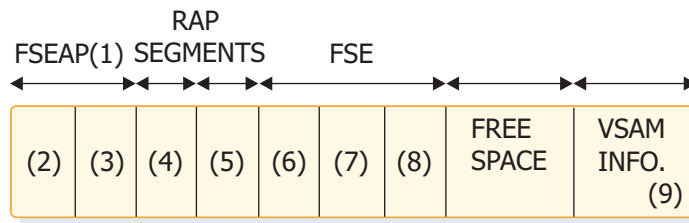


Figure 50. OSAM and VSAM ESDS block format

Notes:

1. Free space element anchor point.
2. 2-byte offset to first free space element; contains zeros in a bit map block.
3. 2-byte length (see 7); value is zero.
4. 4-byte root anchor point (RAP). The number per block is specified in DBDGEN, except if HIDAM with TF (and not TB) is pointing at root level, one anchor point per block is provided and it heads a LIFO chain of roots inserted in that block. If HIDAM or PHIDAM with TB or NT is pointing at the root level, there are no anchor points provided.
5. User database segments (prefix and data). In a bit map block, the bit map starts here and extends to the end of the block or to the VSAM control information.
6. 2-byte offset to next free space element (FSE) from start of block.
7. 2-byte length of free space, including 8-byte FSE.
8. 4-byte identification of the task that freed this space.
9. 7 bytes of VSAM control data; omitted for OSAM.

This format applies at the conclusion of initial load. The subsequent deletion of segments can result in free space elements that alternate with user database segments.

VSAM LRECL for a primary index

The format of a VSAM LCRECL for a primary index depends on whether it is currently on a storage device, in the buffer pool, or being returned by the buffer handler.

Format on a storage device or in the buffer pool

The following figure shows the format on a storage device or in the buffer pool.

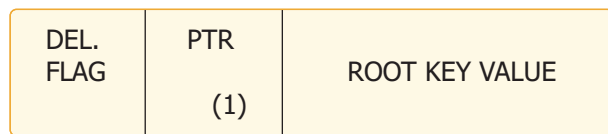


Figure 51. LRECL format on storage device and in buffer pool

Note:

1. Four-byte RBA pointer to VSAM database root segment whose key value is the same as the value in the next field of this segment.

Format as returned by the buffer handler

The following figure shows the VSAM LRECL format as returned by buffer handler (1).

Notes:

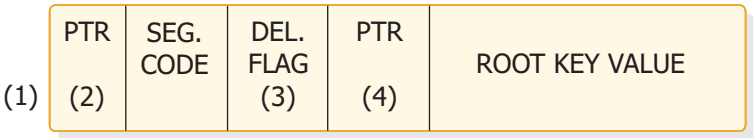


Figure 52. VSAM LRECL format as returned by buffer handler

- 1. Same as buffer pool format, except for pointer and segment code in front.
- 2. Four-byte pointer with value of zero.
- 3. The segment code value is 01.
- 4. Four-byte RBA pointer to VSAM database root segment whose key value is the same as the value in the next field of this segment.

VSAM block format on a storage device or in the buffer pool

The following figure shows the VSAM block format on device and in buffer pool.



Figure 53. VSAM block format on device and in buffer pool

Secondary index or PSINDEX database (VSAM only)

The LRECL Format on Device and in Buffer Pool are described.

LRECL Format on Device and in Buffer Pool

One segment per LRECL. The following figure shows the LRECL Format on Device and in Buffer Pool.

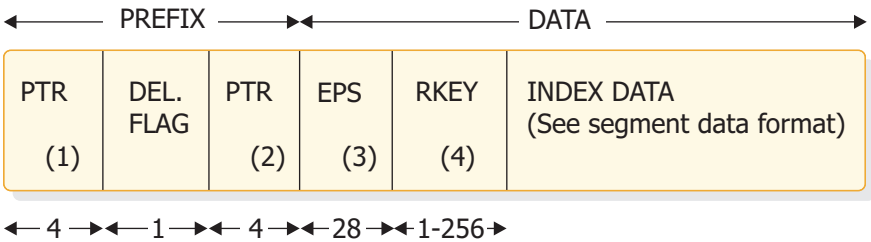


Figure 54. LRECL format on device and in buffer pool

Notes:

- 1. Nonunique keys: This points to ESDS LRECL with the same key value. Unique keys or PSINDEX: This field is omitted.
- 2. Direct pointer to index target segment. Omit this field if symbolic pointing is used or if this is a HALDB PSINDEX.

- 3 The EPS is present only if this is a HALDB PSINDEX. The 4-byte pointer to the target segment is included in the EPS.
- 4 RKEY means root key. The RKEY field is present only if this is a HALDB PSINDEX. This is the key value for the root of the target segment and its length can be from 1 to 256 bytes.

LRECL as Returned by Buffer Handler

The following figure shows LRECL as returned by buffer handler.

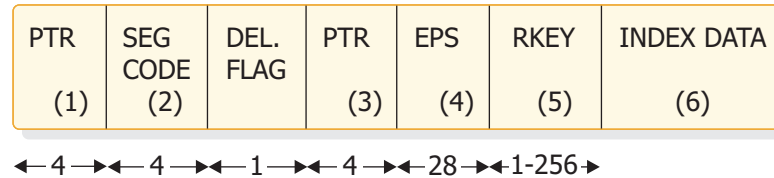


Figure 55. LRECL as returned by buffer handler

Notes:

1. Four-byte pointer contains zeros.
2. Code value is 01.
3. Direct pointer to index target segment. Omit this field if symbolic pointing is used or if this is a HALDB PSINDEX.
4. The EPS is present only if this is a HALDB PSINDEX. The 4-byte pointer to the target segment is included in the EPS.
5. The RKEY field is present only if this is a HALDB PSINDEX. This is the key value for the root of the target segment and its length can be from 1 to 256 bytes.
6. Sequential segment data format.

Block Format on Device and in Buffer Pool

The following figure shows the block format on device and in buffer pool.

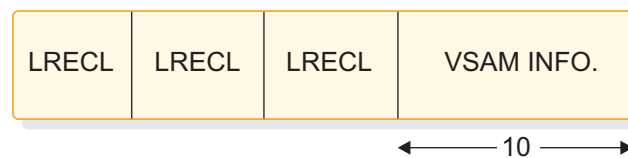


Figure 56. VSAM block format on device and in buffer pool

Segment Data Format

The following figure shows the segment data format.

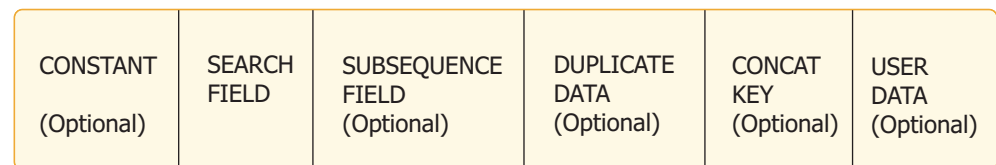


Figure 57. Segment data format

Variable-length segments

The HISAM, HDAM, HIDAM, PHDAM, and PHIDAM Segment Format are described.

HISAM, HDAM, HIDAM, PHDAM, and PHIDAM Segment Format

The following figure shows the HISAM, HDAM, HIDAM, PHDAM, and PHIDAM Segment Format.

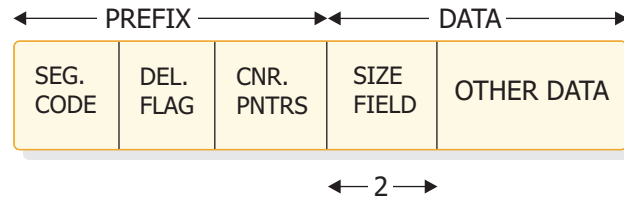


Figure 58. HISAM, HDAM, HIDAM, PHDAM, and PHIDAM segment format

Note: Variable-length segment must have a 2-byte length field at the front of the DATA portion.

HDAM, HIDAM, PHDAM, and PHIDAM

When prefix and data are separated. The following figure shows HDAM, HIDAM, PHDAM, and PHIDAM.

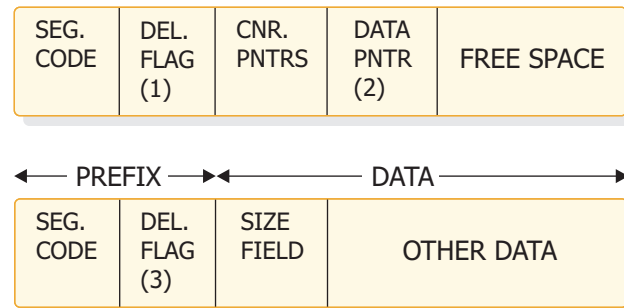


Figure 59. HDAM, HIDAM, PHDAM, and PHIDAM

Notes:

1. DEL FLAG containing X'08' indicates that the data has been separated from the prefix.
2. DATA PNTR is a direct pointer to the segment containing the "other data".
3. The flag value is X'FF'.

Chapter 6. CQS - Common Queue Server service aids

Use trace records, log records, and utilities to analyze problems in Common Queue Server (CQS).

Diagnosing a CQS related problem

CQS produces SDUMPs for internal errors. The CQS dumps are in the SYS1.DUMP data sets. CQS can also produce LOGREC data set entries for errors.

CQS related problems

For a CQS environment, related problems might include:

- IMS WAIT problems
- CQS WAIT/HANG problems
- CQS checkpoint problems
- CQS restart problems
- CQS structure rebuild problems

Implement normal operating procedures to preserve the following documentation close to the time the error occurred:

- Additional manual dump intervention
- z/OS log stream (for problems related to IMS shared queues)
- Most recent SRDS (structure recovery data set) for each dumped structure

For a CQS WAIT/HANG problem, obtain dumps and syslogs of CQS address spaces in the sysplex such as:

- One dump and syslog from the master CQS
- One dump and syslog from the non-master CQS
- One dump and syslog from the error CQS
- One dump and syslog from the normal CQS

A sysplex contains only one master CQS and, most likely, one error CQS in a sysplex. Thus, the maximum number of CQS dumps and syslogs taken is three. If the sysplex contains fewer than three CQS address spaces, then dumps and syslogs of all CQS address spaces are needed.

Before obtaining the syslog, issue the following z/OS DISPLAY commands to write the sysplex information to the syslog:

```
D CF,CFNAME=cfname
D XCF,CF
D XCF,STRUCTURE,STRNAME=strname
```

For a CQS loop problem, obtain two dumps. To obtain the two dumps:

1. Obtain a z/OS SVC dump of the CQS and its associated IMS control region address space by issuing the following command:

```
DUMP COMM=(dump title)
R id,JOBNAME=(j1,j2),
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

In this command, *j1* is the CQS job name, and *j2* is the IMS control region job name.

2. Save the IMS log data sets that are created during the error period.
3. Save the current z/OS log data sets that are created. You can copy the current z/OS log data sets for the CQS log stream by using the IEBGENER utility. No z/OS log data sets are logged (unlike the IMS logger, which does have log archive capability through SLDS).

If an isolated event type within CQS encounters an error, IBM Software Support might request additional trace level settings for the various trace types. If a structure rebuild or structure checkpoint related problem occurs, you will also need to dump the CQS address spaces for any CQS associated with the given structure, and save the associated SRDS (structure recovery data set) for the CQS structure checkpoints and CQS system checkpoints.

CQS additional manual intervention for dump creation

Additional considerations for dump creation are presented.

Additional dump considerations

CQS environment additional dump considerations include:

- Structure dumps
- CQS regions and other CQS clients with their related CQS regions
- CQS regions and other CQS clients with their related CQS regions from other IMSplex members
- z/OS Logger

CQS structure dump contents

CQS structure dumps should include the primary structures, the overflow structures, and the associated lock entries.

CQS structure dump example

The following example shows the STRLIST for a dump:

```
DUMP COMM=(MSGQ STRUCTURE DUMP)
R nn,
  STRLIST=(STRNAME=imsmsgq01,LOCKE,(LISTNUM=ALL,ADJ=CAPTURE,EDATA=UNSER),
  STRNAME=imsmsgq01oflw,LOCKE,(LISTNUM=ALL,ADJ=CAPTURE,EDATA=UNSER)),END
```

Where *imsmsgq01* is the main structure name, and *imsmsgq01oflw* is the overflow structure name.

When an IMS structure dump is necessary, the z/OS Logger function might be involved with the problem. The following example dumps the z/OS Logger address spaces, the logger structure, and the IMS CF structure.

```
DUMP COMM=(CQS/LOGR STRUCTURE DUMP)
R xx,STRLIST=(STRNAME=imsmsgq01,LOCKE,
  (LISTNUM=ALL,ADJ=CAPTURE,EDATA=UNSER),CONT
R xx,STRNAME=imsmsgq01oflw,LOCKE,
  (LISTNUM=ALL,ADJ=CAPTURE,EDATA=UNSER),CONT
R xx,STRNAME=mvslogqmsg01,LOCKE,ACC=NOLIM,
  (LISTNUM=ALL,EDATA=UNSER,ADJ=CAPTURE)),CONT
R xx,JOBNAME=(IXGLOGR),DSPNAME=('IXGLOGR'.SYSLOGRO),CONT
R xx,SDATA=(COUPLE,ALLNUC,LPA,LSQA,PSA,RGN,SQA,TRT,CSA,GRSQ,XESDATA),END
```


Where:

imsmsgq01

The main structure name.

imsmsgq01oflw

The overflow structure name.

mvslogmsg01

The associated logger structure.

CQS - IEADMCxx example with structures

Create three SYS1.PARMLIB members named IEADMCIA, IEADMCIB, and IEADMCIC by issuing the following command:

```
JOBNAME=(j1,j2,j3,j4,j5),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,GRSQ),  
REMOTE=(SYSLIST=(*('j1','j2','j3','j4','j5'),SDATA))
```

Where:

j1 IMS Control Region Jobname.

j2 IMS DLI Region Jobname.

j3 DBRC Region Jobname.

j4 IRLM Region Jobname.

j5 IMS CQS Region.

```
JOBNAME=(j6,j7,j8,j9,j10),SDATA=(CSA,PSA,RGN,SQA,SUM,TRT,XESDATA),  
REMOTE=(SYSLIST=(*('j6','j7','j8','j9','j10'),SDATA))
```

Where:

j6 APPC Region.

j7 APPC Scheduler.

j8 VTAM.

j9 Other CQS Client Region.

j10 Other CQS Region.

```
JOBNAME=(IXGLOGR),DSPNAME=('IXGLOGR'.SYSLOGR0),  
SDATA=(COUPLE,ALLNUC,LPA,PSA,RGN,SQA,TRT,CSA,GRSQ,XESDATA),  
STRLIST=(STRNAME=imsmsgq01,LOCKE,(LISTNUM=ALL,ADJ=CAPTURE,EDATA=UNSER),  
STRNAME=imsmsgq01oflw,LOCKE,(LISTNUM=ALL,ADJ=CAPTURE,EDATA=UNSER),  
STRNAME=mvslogqmsg01,LOCKE,ACC=NOLIM,(LISTNUM=ALL,EDATA=UNSER,ADJ=CAPTURE))
```

Where:

imsmsgq01

The main structure name.

imsmsgq01oflw

The overflow structure name.

mvslogqmsg01

The associated logger structure.

CQS - IEADMCxx dump activation

To create a dump from the IEADMCIA, IEADDMCIB and IEADMCIC parmlib members, issue the following z/OS command: DUMP TITLE=(DUMP OF IMSPlex and Partners),PARMLIB=(IA,IB,IC).

Three dump data sets are created on the z/OS image from which the command is issued. Two dump data sets are created on each image in the sysplex that matches the REMOTE specifications for the JOBNAMES.

Recommendation: Provide the z/OS logger address space from the system experiencing problems to z/OS logger support.

CQS - z/OS log stream example

The merged z/OS log stream can be used to examine CQS log records. IEBGENER can be used along with the default log stream subsystem exit routine, IXGSEXIT, to copy the log records at time of failure for later analysis.

```
//CQSCPYLG JOB USERID,USERID,MSGLEVEL=1,CLASS=K
//*****
/* This job copies a CQS log stream to a dataset (max 32K / record) *
/*
/* - Replace the DSN on the SYSUT1 card with your CQS logstream *
/* name. *
/*
/* - Replace the DSN on the SYSUT2 card with your desired output *
/* dataset name. You may also need to adjust the space *
/* allocations, depending on the size of your logstream. *
//*****
//STEP1 EXEC PGM=IEBGENER,REGION=1024K
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD DUMMY
//SYSUT1 DD DSN=SYSLOG.MSGQ01.LOG,
// SUBSYS=(LOGR,IXGSEXIT),
// DCB=(BLKSIZE=32760)
//SYSUT2 DD DSN=CQS.LOG.COPY,
// DISP=(NEW,KEEP,DELETE),
// VOL=SER=USER05,
// SPACE=(CYL,(2,10)),
// UNIT=SYSDA
```

CQS structure recovery data set

Save the most recent CQS SRDS (structure recovery data set) for each structure that is dumped. Use the IDCAMS REPRO command if the LRECL is acceptable (less than 32 761).

CQS checkpoint problems

There are two types of CQS checkpoints: system checkpoint and structure checkpoints.

CQS checkpoint messages

Most problems are of structure checkpoint type because it is a sysplex-wide operation with shared resources (SRDS data set, structures on the CF), and it needs cooperation through z/OS IXLUSYNC between all CQSs within the sysplex. Sometimes, another CQS process (initialization, termination, rebuild, overflow threshold, or overflow scan) can interfere with the checkpoint process and cause it to fail.

CQS System Checkpoint Messages

1. CQS0030I for a successful CQS system checkpoint.
2. CQS0035E for a failed CQS system checkpoint. If the CQS system checkpoint failed with CQS0035E, refer to “CQS messages” in *IMS*

Messages and Codes, Volume 2: Non-DFS Messages for the details of the failure and the recommended system programmer action.

CQS Structure Checkpoint Messages

The syslog of a successful CQS structure checkpoint will contain five CQS messages in the following order:

```
CQS0220I CQS cqname START STRUCTURE CHECKPOINT FOR STRUCTURE strname
CQS0200I STRUCTURE strname QUIESCED FOR STRUCTURE CHECKPOINT
CQS0201I STRUCTURE strname RESUME AFTER STRUCTURE CHECKPOINT
CQS0030I SYSTEM CHECKPOINT COMPLETE, STRUCTURE strname LOGTOKEN logtoken
CQS0221I CQS COMPLETE STRUCTURE CHECKPOINT FOR STRUCTURE strname
```

If the CQS structure checkpoint failed with a CQS0222E message, refer to the “CQS messages” section in *IMS Messages and Codes, Volume 2: Non-DFS Messages* for the details of the failure and the recommended system programmer action.

If message CQS0222E is not displayed and all five of the normal structure checkpoint messages did not appear on the console, CQS probably has encountered a serious WAIT/HANG problem.

The CQS log records, the structure dump of the related structure, and the SRDSs (structure recovery data sets) are helpful in diagnosing the problem. After collecting all the documents, you can stop the CQS in error and restart it to resolve the WAIT/HANG problem.

CQS structure rebuild problems

The most common structure rebuild problem is a rebuild failure. Some environmental situations can occur that cause rebuild to fail.

Rebuild failures

Other types of rebuild problems are much more rare, such as rebuild hanging, rebuild not being initiated when required, work hanging after a successful rebuild, rebuild losing data objects, and rebuild duplicating data objects. Follow these general steps to address any rebuild failure you encounter:

- **Collect SYSLOGs**

Collect the syslog for each LPAR that is running a CQS that is sharing queues. Evaluate each syslog for the following information:

- How the rebuild was initiated (operator command, structure failure, CF failure, link failure).
- How the rebuild was stopped (operator command or CQS).
- Rebuild master (CQS0240I message).
- Rebuild type (COPY or RECOVERY in CQS0240I message).
- Structure quiesced or resumed messages:
 - CQS0200I STRUCTURE *strname* QUIESCED FOR *reason*
 - CQS0201I STRUCTURE *strname* RESUMED AFTER *reason*
- Structure status change messages (CQS0202I).
- Structure rebuild messages:
 - CQS0240I CQS *cqname* STARTED STRUCTURE *copy/recovery* FOR STRUCTURE *strname*
 - CQS0241I CQS *cqname* COMPLETED STRUCTURE *copy/recovery* FOR STRUCTURE *strname*

- CQS0242E CQS FAILED STRUCTURE *copy/recovery/rebuild* FOR STRUCTURE *strname*
- CQS0243E CQS *cqsname* UNABLE TO PARTICIPATE IN REBUILD FOR STRUCTURE *strname*
- CQS0244E STRUCTURE RECOVERY REQUIRED AFTER RECOVERY FAILURE FOR STRUCTURE *strname*
- CQS0245E STRUCTURE *strname* REBUILD ERROR
- **Consult the CQS Restart and Rebuild Error Reason Codes table**
- **Check rebuild status**
 Check the rebuild status by issuing the following command on every LPAR where a CQS participating in the rebuild resides:
 D XCF,STRUCTURE,STRNAME=*strname*
 If the output indicates that rebuild is waiting for a particular event, a CQS might not be responding to a rebuild event because it is hung or in a loop, which hangs the rebuild. Consider dumping the CQS address space and canceling the CQS that is not responding to the rebuild event, to see if that enables the rebuild to continue.
- **Analyze if structure still viable**
 If a structure copy initiated by an operator failed, no action needs to be taken to restore access to the structure. The structure is still viable and you still have access. Analyze why the structure copy failed, to determine whether you need to take action to prevent a subsequent rebuild failure.
- **Restore link, if applicable**
 If a structure rebuild was initiated because of a link failure and the structure rebuild failed, try to restore the link to restore access to the structure. The structure is still viable. Analyze why the structure rebuild failed, to determine whether you need to take action to prevent a subsequent rebuild failure.
- **Contact IBM**
 If you are unable to resolve the problem, take the following actions:
 - Copy the SYSLOG, including the D XCF,STRUCTURE,STRNAME=*strname* output from every LPAR.
 - Dump all the CQS address spaces, including the rebuild master CQS address space. Message CQS0240I indicates the rebuild master name.
 - Retain the CQS log records. The CQS log might contain important log records pertaining to data objects put on the structure, moved on the structure, or deleted from the structure. The CQS log might also contain important log records pertaining to rebuild, such as:
 - Rebuild begin log record (4301).
 - Rebuild end log record (4302).
 - Rebuild failed log record (4303).
 - Rebuild lost UOW list log record (4304).
 - Request log records (03xx, 07xx, 08xx, 0Bxx, 0Dxx).
 - Retain the IMS log records.
 - Create a structure dump if you suspect a rebuild hang. The structure dump might contain important information about structure locks.
 - Call the IBM Software Support for help.

CQS trace records

Analyze CQS trace records in a formatted dump to determine which function encountered an error, and whether a problem is environmental or internal.

Trace tables

Trace record eye catchers in a formatted dump provide clues about which functions resulted in errors. You might be able to correct environmental problems immediately. Refer internal IBM problems to IBM with appropriate documentation, such as system console logs and dumps.

CQS trace records are written to one or more of the trace tables shown in the following table.

Table 8. Trace tables that contain CQS trace records

Table name	Number of tables	Table description
ERR	1	Errors
CQS	1	CQS activity, including errors
INTF	1	CQS interface events
OFLW	1 per structure (EMHQ, MSGQ)	Structure overflow events
SEVT	1 per structure (EMHQ, MSGQ)	Structure event activity
STR	1 per structure (EMHQ, MSGQ)	Client activity for this structure, including errors

Each CQS trace record is 32 bytes long, except records in the SEVT and OFLW tables. Those tables use an expanded 64-byte format. In a standard 32-byte trace entry, the first byte is the trace code and the second byte is the trace subcode. Many trace records contain a structure ID that identifies which structure the trace record applies to: the MSGQ primary structure, the MSGQ overflow structure, the EMHQ primary structure, or the EMHQ overflow structure. Trace records that apply to a client request contain a client ID that identifies the client that issued the request. The last 8 bytes are the STCK time stamp of when the trace record was written. The mapping of the rest of the bytes in the trace record is unique to the trace code and subcode.

The expanded 64-byte format used by trace records in the SEVT and OFLW tables contains 16 words of trace data in the following format:

Word 0

Byte 0 contains the trace code of the event.

Byte 1 contains the trace subcode of the event.

Byte 2 contains data dependent on the type of event, typically the structure ID.

Byte 3 contains data dependent on the type of event, typically the client ID.

Word 1 - word 12

These 48 bytes contain trace data generated by the event. The exact content is dependent on the type of event.

Word 13

This word contains the ID of the event control block (ECB) of the task that wrote the trace record in the table.

Word 14 - word 15

These 8 bytes contain the time stamp of the event in STCK format.

CQS trace records are mapped by macros that use the naming convention CQSTRxxx, where xxx represents the function that is being traced. For example, CQSTRPUT maps trace records associated with the CQSPUT request. Trace record mapping is based upon the trace code and the trace subcode.

Find the CQS trace code in the following table to locate the CQS macro that maps the trace record. The following table shows the CQS trace codes, the macro that maps the trace code, and a description of the trace macro.

Table 9. CQS trace codes and mapping macros

Trace code	Macro	Description
3	CQSTRCON	CQSCONN request
4	CQSTRDSC	CQSDISC request
5	CQSTRRSY	CQSRSYNC request
6	CQSTRINF	CQSINFRM request
7	CQSTRPUT	CQSPUT request
8	CQSTRRD	CQSREAD request
9	CQSTRBRW	CQSBRWSE request
0A	CQSTRUNL	CQSUNLCK request
0B	CQSTRMOV	CQSMOVE request
0C	CQSTRRCV	CQSRECVR request
0D	CQSTRDEL	CQSDEL request
E	CQSTRQRY	CQSQUERY request
0F	CQSTRCHK	CQSCHKPT request
10	CQSTRSHT	CQSSHUT request
11	CQSTRUPD	CQSUPD request
30	CQSTRICQ	CQS initialization
31	CQSTRTCQ	CQS termination
32	CQSTRYCH	System checkpoint
40	CQSTRIST	Structure initialization
41	CQSTRSTS	Structure service
42	CQSTRTCH	Structure checkpoint
43	CQSTRRBL	Rebuild
44	CQSTROFL	Overflow
45	CQSTRSTE	Structure event
50	CQSTRLOG	Log services
51	CQSTRTBL	Table services
52	CQSTRDYA	Dynamic allocation services
53	CQSTRDSS	Data set services

Table 9. CQS trace codes and mapping macros (continued)

Trace code	Macro	Description
54	CQSTRDSP	Data space services
55	CQSTRLRR	Log record router
56	CQSTRXCF	z/OS cross-system coupling facility interface
57	CQSTRCMD	Command
60	CQSTRSTT	Statistics
70	CQSTRINT	CQS client interface

Trace codes for CQS requests are defined in the CQSRQTYP macro. Trace codes for other CQS functions are defined in the CQSCODES macro. CQS trace records in a formatted dump might contain eye catchers that provide clues about which function encountered an error, such as “overflow,” “rbl,” “str chkpt,” and “duplex.”

CQS request trace records sometimes contain a return code, reason code, and completion code from the request. CQS request return codes, reason codes, and completion codes are mapped by macros that use the naming convention CQSRRxxx, where xxx represents the function that is being traced. For example, the macro CQSRRPUT maps return codes, reason codes, and completion codes that are associated with the CQSPUT request. The following table shows the macros that define the return codes, reason codes, and completion codes for CQS requests.

Table 10. CQS mapping macros and request trace records

Macro	CQS request macro for return codes, reason codes, and completion codes
CQSRRCON	CQSCONN
CQSRRDSC	CQSDISC
CQSRRRSY	CQSRSYNC
CQSRRINF	CQSINFRM
CQSRRPUT	CQSPUT
CQSRRD	CQSREAD
CQSRRBRW	CQSBRWSE
CQSRRUNL	CQSUNLCK
CQSRRMOV	CQSMOVE
CQSRRRCV	CQSRECVR
CQSRRDEL	CQSDEL
CQSRRQRY	CQSQUERY
CQSRRCHK	CQSCHKPT
CQSRRSHT	CQSSHUT
CQSRRUPD	CQSUPD

CQS trace records in formatted dumps contain eye catchers that identify the trace code and the trace subcode.

The following example shows a CQS trace record with eye catchers:

```
INFRM: INF DONE FOR Q      06090101 05E3F3F2 F7F0D3C1 40404040
                           40404040 05541160 AF975E81 59426906
```

The trace code is in the first byte (X'06'), which the CQSRQTYP macro documents as the CQSINFRM request. The eye catcher is INFRM. The CQSTRINF macro maps the trace records for trace code X'06'.

The trace subcode is in the second byte (X'09'), which the CQSTRINF macro documents as "inform done for queue." The eye catcher is INF DONE FOR Q.

The CQSTRINF macro documents byte 3 for trace code X'06' as containing the structure ID (X'01'). Structure ID X'01' indicates the primary MSGQ structure.

The CQSTRINF macro documents byte 4 for trace subcode X'06' as containing the client ID (X'01'). Client ID X'01' represents the client that issued the CQSINFRM request. The CQSTRINF macro documents words 2, 3, 4, and 5 for trace subcode X'06' as containing the name of the queue for which the inform was done. This queue name is for queue type 05 (the IMS transaction queue). The queue name is T3270LA (X'E3F3F2F7F0D3C1').

The CQSTRINF macro documents word 6 for trace subcode X'06' as the ECB of the task that wrote this trace record (X'05541160').

The CQSTRINF macro documents words 7 and 8 as the STCK time of when the trace record was written.

CQS log records

You can use Common Queue Server (CQS) log records to diagnose problems related to the CQS address space and generate various reports, such as statistics about the number of requests.

CQS writes records to the z/OS log stream that contains all CQS log records from all CQs that are connected to a structure pair. You can use the log records to:

- Diagnose problems related to the CQS address space.
For CQS internal errors, the IBM support representative will direct you to print the appropriate log records.
You can sometimes use information in the log records to set up a keyword string to search APAR descriptions and compare them to your own problem.
- Generate various reports related to the CQS address space, such as statistics about the number of requests.
By knowing the content and format of the log records, you can set up a DFSERA10 job to format and print the specific log records you want.

Each CQS log record contains a log record prefix, followed by data that is unique to the record. Macro CQSLGRFX maps the log record prefix.

You can view the CQS log record formats by assembling mapping macro CQSLGREC with TYPE=ALL.

Individual log record DSECTs can be obtained by assembling the ILOGREG macro while including a format statement for the desired log record.

Table 11. CQS log records

Type	Subtype	Mapping macro	Conditions for writing the log record
X'03'	X'01'	CQSLGCON	CQSCONN request: The client connect to a structure completed.
X'04'	X'01'	CQSLGDSC	CQSDISC request: The client disconnect from a structure completed.
X'07'	X'01'	CQSLGPUT	CQSPUT OBJECT request completed.
	X'02'		CQSPUT COMMIT request completed.
	X'03'		CQSPUT START request completed.
	X'04'		CQSPUT FORGET request completed.
	X'05'		CQSPUT ABORT request completed.
	X'06'		CQSPUT request failed.
	X'07'		CQSPUT system checkpoint record was written.
	X'08'		CQSPUT FORGET request completed. This is a batched log record.
X'08'	X'01'	CQSLGRD	CQSREAD request completed.
	X'02'		CQSREAD request failed.
	X'03'	CQSLGCHD	CQSREAD system checkpoint record was written.
			This system checkpoint header record is not a complete log record, but it is used in CQSLGPUT and CQSLGRD system checkpoint log records.
X'0B'	X'01'	CQSLGMOV	CQSMOVE or CQSUNLCK request completed.
	X'02'		CQSMOVE or CQSUNLCK request failed.
	X'03'		CQSMOVE or CQSUNLCK request moved an object between the primary and overflow structure.
X'0D'	X'01'	CQSLGDEL	CQSDDEL request: Delete-type 1 (delete by token) completed.
	X'02'		CQSDDEL request: Delete-type 2 (delete by queue name) completed.
	X'03'		CQSDDEL request: Delete-type 3 (delete by queue name and UOW) completed.
	X'04'		CQSDDEL request: Delete-type 1 (delete by token) completed. This is a batched log record.
		CQSLGBHD	This batched log record header record is not a complete log record, but is used in CQSLGPUT and CQSLGDEL batched log records.
X'10'	X'01'	CQSLGSHT	CQSSHUT request completed.
X'32'	X'01'	CQSLGYCH	System checkpoint started.
	X'02'		System checkpoint ended.
	X'03'		System checkpoint failed.
X'40'	X'01'	CQSLGIST	Beginning of log stream.
X'42'	X'01'	CQSLGTCH	Structure checkpoint started.
	X'02'		Structure checkpoint ended.
	X'03'		Structure checkpoint failed.
X'43'	X'01'	CQSLGRBL	Structure rebuild started. Statistics about the old structure, the rebuild structure, and rebuild failure are mapped by CQSSSTT6.
	X'02'		Structure rebuild ended. Statistics about the old structure, the rebuild structure, and rebuild failure are mapped by CQSSSTT6.

Table 11. CQS log records (continued)

Type	Subtype	Mapping macro	Conditions for writing the log record
	X'03'		Structure rebuild failed. Statistics about the old structure, the rebuild structure, and rebuild failure are mapped by CQSSSTT6.
	X'04'		Structure rebuild resulted in a lost UOW list. This record lists the lost UOWs.
X'44'	X'01'	CQSLGOFL	Overflow threshold began.
	X'02'		Overflow threshold ended.
	X'03'		Overflow threshold failed.
	X'04'		Overflow mode ended.
	X'05'		Overflow status change.
	X'06'		Qnames were moved to overflow.
	X'07'		Qnames were removed from overflow.
	X'08'		CQSOVERFLOWQNMR, a control list entry containing the list of queue names deleted from overflow, was deleted.
	X'09'		Overflow Scan Begin.
	X'0A'		Overflow Scan End.
	X'0B'		Private Queue Scan Begin.
	X'0C'		Structure to be deleted.
X'60'	X'01'	CQSLGSTT	Structure statistics were written at the end of system checkpoint. Individual statistics areas are mapped by CQSSSTT1, CQSSSTT2, CQSSSTT3, CQSSSTT4, and CQSSSTT5.
	X'C0'		Internal BPE service statistics were written at the end of system checkpoint.

Printing CQS log records

To print the CQS log records from the z/OS system log, use the IMS File Select and Formatting Print utility (DFSERA10) with exit routine CQSERA30.

Example JCL to print CQS log records

The following example shows the required JCL to print the log records from a z/OS system log. This JCL causes the z/OS logger to invoke the default log stream subsystem exit routine, IXGSEXIT, to copy the log records. The exit routine returns a maximum of 32 760 bytes of data for each log record even though CQS supports larger log records. You can specify the name of a different exit routine, if necessary.

Use the following JCL to print the CQS log records:

```
//CQSERA10 JOB MSGLEVEL=1,MSGCLASS=A,CLASS=K
//STEP1 EXEC PGM=DFSERA10
//STEPLIB DD DISP=SHR,DSN=IMS.SDFSRESL
//SYSPRINT DD SYSOUT=A
//TRPUNCH DD SYSOUT=A,DCB=BLKSIZE=80
//SYSUT1 DD DSN=SYSLOG.MSGQ01.LOG,
// SUBSYS=(LOGR,IXGSEXIT),
// DCB=(BLKSIZE=32760)
//SYSIN DD *
```

```
CONTROL    CNTL H=EOF
OPTION     PRINT EXITR=CQSERA30
END
//
```

DD statements

STEPLIB

DSN= points to IMS.SDFSRESL, which contains the IMS File Select and Formatting Print utility (DFSERA10).

SYSUT1

DSN= points to the CQS log stream name that was specified in the LOGNAME= parameter in the CQSSGxxx PROCLIB member.

Control Statements

H= Specifies the number of log records to print. H=EOF prints all log records.

EXITR=CQSERA30

The CQS log record routine that is called to format each log record. This routine prints the record type and time-stamp information for each record, and dumps the contents of the record (up to a maximum of 32 760 bytes (X'7FF8')).

Limiting Log Data to a Specified Time Range

You can limit the log records you print to those in a particular interval of time by using the FROM and TO parameters on the SUBSYS statement. For example, the following DD card:

```
//SYSUT1 DD DSN=SYSLOG.MSGQ01.LOG,
//          SUBSYS=(LOGR,IXGSEXIT,
//          'FROM=(2001/042,11:00:00),TO=(2001/042,12:00:00)'),
//          DCB=(BLKSIZE=32760)
```

would pass log records only from 11:00 to 12:00 on day 42 of the year 2001 to the DFSERA10 program. Dates and times specified in this manner are in GMT, and the seconds field of the time values is optional. If you want to use local dates and times, add the LOCAL keyword to the statement:

```
//SYSUT1 DD DSN=SYSLOG.MSGQ01.LOG,
//          SUBSYS=(LOGR,IXGSEXIT,
//          'FROM=(2001/042,11:00:00),TO=(2001/042,12:00:00),LOCAL'),
//          DCB=(BLKSIZE=32760)
```

Copying CQS log records for diagnostics

IBM Software Support sometimes requires a copy of a range of CQS log records for problem determination. You can use the IEBGENER utility program to copy some or all of the CQS log for a structure to a BSAM data set for sending to IBM Software Support.

IEBGENER utility program example

The copy made by the IEBGENER utility is a binary image of the log records. The following JCL is a job that copies CQS log records between 15:10 and 15:30 local time on day 89 of 2001 to a data set named CQS.LOG.COPY:

```
//CQSCPYLG JOB MSGLEVEL=1,CLASS=K
//*****
//* THIS JOB COPIES A CQS LOG STREAM TO A DATASET (MAX 32K / RECORD) *
//*****
```

```

//STEP1    EXEC  PGM=IEBGENER
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSIN     DD   DUMMY
//SYSUT1    DD  DSN=SYSLOG.MSGQ01.LOG,
//           SUBSYS=(LOGR,IXGSEXIT,
//           'FROM=(2001/089,15:10),TO=(2001/089,15:30),LOCAL'),
//           DCB=(BLKSIZE=32760)
//SYSUT2    DD  DSN=CQS.LOG.COPY,
//           DISP=(NEW,KEEP,DELETE),
//           VOL=SER=EDSDMP,
//           SPACE=(CYL,(10,10)),
//           UNIT=SYSDA

```

If you copy CQS log records using the IEBGENER utility, the following guidelines apply:

- The copied records cannot be used by CQS in any way (such as restart or recovery). They are for diagnostic purposes only.
- CQS log records that are greater than 32 KB in length are truncated. The SUBSYS exit supports a maximum of a 32 KB record size.

Chapter 7. CSL - Common Service Layer service aids

Common Service Layer (CSL) and Resource Manager (RM) trace records can help you analyze problems in CSL.

Related tasks:

“Collecting data about CSL-related problems” on page 20

CSL trace records

You can analyze CSL address space trace records (for example OM, RM, or SCI) in a formatted dump to determine whether a problem is environmental or internal.

Trace records

Trace record eye catchers in a formatted dump provide clues about which function resulted in an error. You might be able to take action to correct environmental problems immediately. Refer internal problems to IBM with appropriate documentation, such as system console logs and dumps.

ODBM trace records are written to one or more of the trace tables shown in the following table.

Table 12. Trace tables for ODBM trace records

Table name	Number of tables	Table description
CSL	1	CSL activity, including errors
ERR	1	Errors
ODBM	1	ODBM activity
PLEX	1 per IMSplex	IMSplex activity, including errors

OM trace records are written to one or more of the trace tables shown in the following table.

Table 13. Trace tables for OM trace records

Table name	Number of tables	Table description
CSL	1	CSL activity, including errors
ERR	1	Errors
OM	1	OM activity
PLEX	1 per IMSplex	IMSplex activity, including errors

RM trace records are written to one or more of the trace tables shown in the following table.

Table 14. Trace tables for RM trace records

Table name	Number of tables	Table description
CSL	1	CSL activity, including errors
ERR	1	Errors
PLEX	1 per IMSplex	IMSplex activity, including errors

Table 14. Trace tables for RM trace records (continued)

Table name	Number of tables	Table description
REPO	1	IMSRSC repository activity, including errors
RM	1	RM activity, including errors

SCI trace records are written to one or more of the trace tables shown in the following table.

Table 15. Trace tables for SCI trace records

Table name	Number of tables	Table description
CSL	1	CSL activity, including errors
ERPL	1	Parmlist errors
ERR	1	Errors
INTF	1	SCI interface activity
INTP	1	Interface parmlist
PLEX	1 per IMSplex	IMSpIex activity, including errors
SCI	1	SCI activity, including errors

Each CSL trace record contains 32 bytes (the ERPL and INTP tables in the SCI address space contain records that are 256 bytes). The first byte is the trace code, which indicates the function that wrote the trace record. Examples of trace code functions include address space initialization, address space termination, the CSLOMCMD request, the CSLRMUPD request, and the CSLSCRQS request. The second byte is the trace subcode, which indicates the category of the trace record. Examples of trace subcode categories include begin request, end request, CQS error, and SCI error. Most trace records include a 2-byte module identifier of the module that wrote the trace record. The last 8 bytes are the STCK time stamp of when the trace record was written. Trace record mapping of the rest of the fields is unique to the trace subcode.

CSL address space trace codes and other common codes used in trace records are mapped by a macro following the naming convention of CSL x CODE macro, where x represents the CSL address space as shown in the following table.

Table 16. CSL address space trace code mapping macros

Codes macro name	Description
CSLDCODE	ODBM codes
CSLOCODE	OM codes
CSLRCODE	RM codes
CSLSCODE	SCI codes
CSLZCODE	CSL codes common to multiple CSL address spaces

CSL address space trace records are mapped by a macro following the naming convention of CSL x TRC macro, where x represents the CSL address space as shown in the following table.

Table 17. CSL address space trace record mapping macros

Trace macro name	Description
CSLDTRC	ODBM trace records
CSLOTRC	OM trace records
CSLRTRC	RM trace records
CSLSTRC	SCI trace records
CSLZTRC	CSL trace records common to multiple CSL address spaces

Trace record mapping is based upon the trace subcode, which identifies the category of trace record. One particular trace subcode can apply to many trace codes. Each trace record mapping also includes a pictorial representation in a comment block. Use the trace subcode to locate the trace record mapping in the CSL x TRC macro. Some trace codes are unique to a particular CSL address space, others are common to more than one CSL address space.

The CSL x CODE macro includes 2-byte module identifier codes that are used in trace records and messages when it is necessary to identify a CSL module. The module identifier represents the module that wrote the trace record. Module identifier codes are defined as follows:

CSL address spaces

X'0001'-X'6FFF'

CSLZ modules

X'7000'-X'77FF'

BPE modules

X'7800'-X'7FFF'

Not used

X'8000'

Reserved for BPE tracing

X'8001'-X'FFFF'


CSL request trace records sometimes contain a return code, reason code, and completion code from the request. CSL request return codes, reason codes, and completion codes are mapped by macros following the naming convention CSL x RR, where x represents the CSL address space as shown in the following table.

Table 18. CSL request return, reason, and completion codes mapping macros


Macro	Description
CSLDRR	ODBM return codes, reason codes, and completion codes
CSLORR	OM return codes, reason codes, and completion codes
CSLRRR	RM return codes, reason codes, and completion codes
CSLSRR	SCI return codes, reason codes, and completion codes

CSL trace records in formatted dumps contain eye catchers that identify the trace code, the trace subcode, and the module that wrote the trace record. The EPL and INTF trace tables in SCI contain parameter lists, tables, and other data areas that cross the SCI interface. These data areas are formatted in the SCI dump.

Related concepts:

 Overview of the IMSRSC repository (System Definition)

Related reference:

 BPE configuration parameter member of the IMS PROCLIB data set (System Definition)

RM trace record example

An example of an RM trace record with eye catchers is described.

RM trace record with eye catchers

```
CEVTX:*CQS SERVICE ERR  RCQE 60110000 03000042 0000000C 00000304 00000008 0BC60C20 B6B1AF09 07C68F08
```

The trace code is in the first byte (X'60'), which the CSLRCODE macro documents as CQS Event Exit. The eye catcher for this is CEVTX. The trace subcode is in the second byte (X'11'), which the CSLRTRC macro documents as a miscellaneous CQS service error. The eye catcher for this is *CQS SERVICE ERR. The asterisk at the beginning of the eye catcher indicates an error.

The CSLRTRC macro documents byte 5 for trace subcode X'11' as containing the service request X'03', which is the CQSCONN request.

The CSLRTRC macro documents byte 8 for trace subcode X'11' as containing the module ID X'0042', which the CSLRCODE macro defines as module CSLRCQE0. The module name is included in the eye catcher on RCQE. The CSLRTRC macro documents word 3 for trace subcode X'11' as containing the CQSCONN return code X'0000000C'. The CQSRRCON macro defines the CQSCONN return codes, reason codes, and completion codes. The CQSRRCON macro defines return code X'0000000C' as a list error.

The CSLRTRC macro documents word 4 for trace subcode X'11' as containing the CQSCONN reason code X'00000304'. The CQSRRCON macro defines reason code X'00000304' as no requests successful.

The CSLRTRC macro documents word 5 for trace subcode X'11' as containing the CQSCONN completion code X'00000008'. CQSRRCON macro defines completion code X'00000008' as no resource structure is defined. RM was unable to connect to the resource structure because it is not defined. This is probably an environmental problem where the resource structure was not correctly defined to CQS.

The CSLRTRC macro documents word 6 for trace subcode X'11' as containing the ECB address (X'0BC60C20').

Chapter 8. DB - Database service aids

You can use service aids, such as the IMS test program (DFSDDLTO), as well as various diagnostic techniques, to analyze problems with IMS databases.

Job control block trace

The job control block (JCB) trace is one of most useful diagnosis tools for any application problem that might occur. The trace is an easy way to determine the last five calls that were issued, and what their return codes were.

Analyzing the JCB trace

Analyzing the JCB trace is a good way to identify application problems. For example, sometimes the application programmer forgets to handle a certain status code, even though it identifies an error situation. Seeing the call and its return code draws attention to this application error and makes it easier to resolve.

The JCB trace is always on (you do not need to do anything to turn it on), and is included in every IMS dump. The job control block portion of the dump is formatted under the heading, JCB. The JCB trace is a wrap-around area that consists of six 2-byte entries. The first entry begins at the offset of JCBTRACE in the JCB portion of the dump and is followed immediately by the remaining five entries. As the entries are inserted into the trace area, previous entries are shifted left.

In the first through fifth entries, the first byte identifies the DL/I call. The second byte in these entries contains the second character of the DL/I I/O status code (return code). The sixth entry contains information about the call that immediately preceded the call that was being processed when the abend occurred; this information can be useful in determining what occurred prior to the failure. The function of that prior call is identified in field JCBPREVF of the JCB, and the status code of the prior call is in field JCBPREVR.

If one of the 2-byte fields in the JCB trace contains X'0000', no call was made.

Example JCB trace

The JCB trace might contain the following six fields:

```
0000 0000 0205 0305 0140 0140
```

This trace indicates that only four calls were made, the most recent of which was a get-unique call (either GU or GHU), as indicated by the first-byte code of X'01'. The status code for the most recent call was X'40'.

Related concepts:

“Dump analysis introduction” on page 155

Sample JCB trace

A sample JCB trace is shown.

JCB dump example

The following table shows an example of a JCB dump.

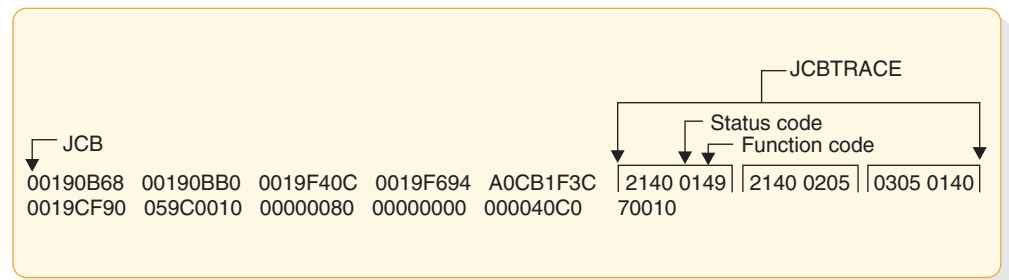


Figure 60. Example of a JCB dump

JCB trace call function codes

DL/I user calls are listed, including codes and calls.

DL/I user call encoded functions

The following table shows the DL/I user call encoded functions, which are contained in DFSDLA00, at label FUNCSTRT.

Table 19. DL/I user call encoded functions

Code	Call	Code	Call
00	GB	65	LOG
00	GBT	70	RELOAD
00	GHB	80	OPEN
00	GHBT	81	CLOSE
00	GHP	82	STOP
00	GL	83	CHANGE
00	GND	84	SNAP
00	GNX	85	CHECK POINT
00	GP	86	STATISTICS REQUEST
01	GHU	87	CMD
01	GU	88	GCMD
03	GHN	89	ROLB
03	GN	90	PURGE
04	GHNP	A0	UNLD
04	GNP	A1	GSCD
20	DLET or REPL	A2	MOVE
21	REPL	B0	SPND
22	DLET	F1	XSET
23	DLET or REPL	F2	XRUN
40	ISRT	F3	XFIN
41	ISRT	F4	XSCD
42	ASRT	F5	XOFF

Table 19. DL/I user call encoded functions (continued)

Code	Call	Code	Call
60	DEQ		

DL/I test program - DFSDDLTO

The DL/I test program is an IMS application that issues calls to DL/I based on control statement information. For diagnostic purposes, this allows you a means of separating the application logic from DL/I logic to resolve problems.

Optionally, the DL/I test program compares the results of the calls with expected results provided in control statements. If the returned results do not match the expected results, the program can provide a SNAP of any combination of DL/I blocks, I/O buffer pool, subpools 0-127, and the entire region. The test program can also invoke the IMS SNAP call, by means of its control statements, during normal execution to provide diagnostic information on the DL/I calls that are executing correctly.

COMPARE statement SNAPs

When a DL/I call does not produce the results you expect, you can use the COMPARE statement to compare the actual results of a call with the expected results. The normal output of this statement usually provides enough information to determine what is causing the problem.

When the output from a COMPARE statement does not provide enough information, you can use the SNAP option of the COMPARE statement to obtain additional diagnostic information. Specifically, the I/O buffer pool and the DL/I blocks are dumped. You can use the generated diagnostic output, in conjunction with *IMS Messages and Codes, Volume 3: IMS Abend Codes* to determine the cause of the user abend you are diagnosing.

Attention: The COMPARE SNAP statement is a call to DL/I. Therefore, when a SNAP option is issued, some data in the captured area might be changed as a result. To prevent inadvertent change to data that is not involved in the problem, use a COMPARE SNAP statement only for the specific data that is involved in the problem.

Some control blocks are always dumped. Others are dumped only when you request them in the SNAP options.

The following control blocks are always dumped:

- The SCD
- The PST (save areas related to the current DL/I task are a part of the PST)
- The Retrieve trace area

The following SNAP option requests dump the control blocks or buffers listed:

- A request for the buffer pool dumps:
 - OSAM buffer pool prefix and buffer pool, if present
 - VSAM subpool prefix and buffer prefix and subpools
 - Header for the DL/I, dispatcher, scheduler, and latch trace tables
 - The DL/I trace table

- The dispatcher trace table
 - The scheduler trace table
 - The latch trace table
 - Hierarchical direct (HD) trace table, if present
 - Sequential buffering control blocks and buffer pools, if present
 - A request for the current DB PCB or all PSB-related control block dumps:
 - Delete/replace work areas, when allocated
 - ENQ/DEQ trace table, if present
 - PSB and PSB work areas
 - PCB information, including JCB, DSGs, and level table
 - The block of SDBs, SDB expansion blocks, and generated SDBs
 - DMB directories
 - DMBs for the current PSB
 - PNTs associated with partition DMBs
- If you also requested buffers, a request for the current DB PCB or all PSB-related control block dumps:
- Any HISAM/QSAM buffers
 - Any VSAM LRECs for each qualifying DSG
- A request for the entire region, or subpools 0-127, dumps the entire region or the subpools.
- A SNAP of the entire region or subpools is sent to a SNAP data set.
- If the SNAP destination is the IMS log, the request is changed to a SNAP of all control blocks, regardless of other option specifications.
- A region or subpool SNAP, when requested, appears before any additional SNAPs that were requested.
- If the destination of the SNAP is the IMS log, you can select and format these records (type X'67FD') from the log by using the File Select and Formatting Print utility (DFSERA10) with formatting exit routine DFSERA30.

SNAPs on exceptional conditions

IMS produces SNAPs of DL/I control blocks on the IMS log (or the CICS system log).

The SNAP call facility identifies calling routines that generate snap dumps. Supervisor call (SVC) dumps are generated only for the intended abend codes or status codes, and for unknown calling routines.

IMS produces SNAPs of DL/I control blocks on the IMS log (or the CICS system log) in the following exceptional situations:

- A pseudoabend condition is encountered in a DL/I module.
- A system or user abend occurs for either a message region or a batch message region.

Control block SNAPs are produced in the same format as those produced by a DL/I SNAP call specifying ALL or YYY as SNAP options.

The SNAP IMS log records are record type X'67', subrecord type X'FF'. You can select these log records from the IMS log with the File Select and Formatting Print utility (DFSERA10). You can format output selected from the log with the formatting edit routine DFSERA30.

Internal IMS functions can request the snapping of specific virtual storage areas by issuing a SNAP Specific call to DFSERA20.

The following IMS functions request or use the SNAP Specific facility:

- SBSNAP option, on completion of calls from IMS modules to the Sequential Buffering buffer handler
- SBESNAP option, during SB evaluation
- SB COMPARE option, when detecting a mismatch between the buffer content that the SB buffer handler was returning to the OSAM buffer handler and the content of the database block as it is stored on DASD

For IMS online regions and CICS, these SNAPs are written to the IMS log. For IMS batch regions, these SNAPs can be written to either the log or to a data set specified on another DD statement.

When written to the log, the IMS log records have a record type X'67' and a subrecord type X'E'. The value of the low-order half-byte of the subrecord type depends on the IMS function that requests the SNAP. The subrecord types are:

X'ED' SBESNAP option

X'EE' SBSNAP option

X'EF' SB COMPARE option

The formatting edit routine DFSERA30 can format output selected from the log.

Related reference:

“Printing log records and trace table entries” on page 507

“Sequential buffering service aids” on page 217

DL/I call image capture

DL/I call image capture (module DFSDLTR0) enables you to trace and record all DL/I calls issued by an application program. The trace output is in a format acceptable as input to the DL/I test program DFSDDLTO.

DL/I call image capture is a useful debugging tool because it allows you to rerun an application program and generate the DL/I calls necessary to duplicate the condition that caused the program failure. This run provides you with documentation to assist you in problem determination.

You can run the trace in either a batch or DB/DC environment.

Related tasks:

“DL/I call image capture program” on page 211

Batch environment

In a batch environment, you start DL/I call image capture using the DLITRACE control statement in the DFSVSAMP DD data set.

The control statement allows you to trace either all DL/I calls issued by an application program or a range of calls. The traced information can be put in a sequential data set, the IMS log data set, or into both concurrently.

Online environment

In a DB/DC, DCCTL, or DBCTL environment, you start and terminate DL/I call image capture by issuing the /TRACE command from the master terminal (DB/DC and DCCTL only) or from the system console.

For example, to trace full-function database calls for a named PSB and send the output to an external data set, issue the following command:

```
/TRACE SET ON PSB psbname OPTION LOG
```

How to retrieve DL/I call image capture data from the log data set

If trace data is sent to the IMS log data set, you can retrieve it using the File Select and Formatting Print utility (DFSERA10) and the DL/I call image capture exit DFSERA50.

To use DFSERA50, you need to insert a DD statement defining the output data set in the DFSERA10 input stream. The default ddname for this DD statement is TRCPUNCH. The statement must specify LRECL=80.

DL/I analysis

Debugging suggestions for a batch environment, including DL/I and DBB regions are described.

These debugging suggestions are useful in a batch environment. The information is valid for DL/I or DBB regions.

Before diagnosing abends in a batch region, review the external conditions. Verify that your environment is correct by asking the following questions:

- Are the JOBLIB/STEPLIB DD statements pointing to the correct libraries?
- Are the PSBLIBs and DBDLIBs at the same level as the JOBLIB/STEPLIB modules?
- If running with an ACBLIB, was the ACBGEN run under the same level of IMS you are currently running on?
- Were the databases correctly allocated and intact before starting the current run?

Related tasks:

“Locating database-related traces” on page 159

IMS abends

User abends and system abends are discussed.

In general, abend dumps have two causes:

- An abend issued by an IMS module (user abend)
- A program check within an IMS module (system abend)

All IMS abends are issued with the dump option.

User abends

There are two methods by which an IMS module can issue an abend when an error condition is detected.

- The first method is the standard ABEND macro issued by the code at the point of error detection. With this method, the PSW, at entry to the abend, points at the code within the module that both detected the error and issued the abend.
- With the second method, the module that detects the error does not issue the abend, but instead passes the error indication back to the program request handler, which then issues a real abend. The PSW, at entry to the abend, now points to the program request handler rather than to the module that detected the error. The pseudoabend method is used by DL/I modules that abend an application program in a dependent region but do not abend the IMS control region in a DB/DC environment.

When the DL/I test program is used as the application program, the pseudoabend is passed back to the test program rather than to the program request handler. This allows the test program to request a formatted SNAP rather than only an abend dump.

Dump analysis introduction

In a pseudoabend supervisor call (SVC) dump that is generated by module DFSERA20, you can find the failing program specification table (PST) by searching the save areas for the caller of module DFSERA20. In the save area flow, DFSERA20 is called INTERA20 and register 1 contains the failing PST address.

The SNAP call facility identifies calling routines that generate snap dumps. SVC dumps are generated only for the intended abend codes or status codes, and for unknown calling routines.

The following list provides general considerations for dump analysis:

- The first request block (RB) on the RB chain represents the IMS batch region controller (DFSRR00). The second RB on the RB chain represents the batch program controller (DFSPCC30). Module DFSPCC30 always links to the application program that is named in the parameter field of the EXEC statement. Therefore, the application program must be represented by the third RB. However, if the application program uses an IMS service, and that service abends, the third RB points to the offending IMS routine.
- The last two SVRBs represent ABEND and ABDUMP. The register contents at the time of abend are usually found in the first abend SVRB. The IMS STAE work area (DFSFSWA0) and the RTM work area in z/OS are also used to hold the register contents at abend time.
- There are two PSTs in a batch environment. One is used for all application calls and the second is used for background write whenever it is activated.
- Each PST has a 20-level save area set as part of the PST. When the abend occurs, ABDUMP prints the save areas that are associated with the active PST.
- At abend time, the IMS STAE routine gets control to flush the database buffers and close the log data set. It builds six additional save areas and chains them to the last save area in the active PST. The IMS STAE routine is partially contained within module DFSPCC30 and has an entry ID starting with the characters PCE.
- Most IMS modules use register 12 as a base register.

Related concepts:

“Job control block trace” on page 149

“DL/I trace formats” on page 161

Related reference:

“HDAM, HIDAM, PHDAM, or PHIDAM database” on page 123

Dump analysis - detailed

To thoroughly analyze a dump, you need to understand the save area, DL/I call sequence, and the buffer handler request sequence. This section discusses each of these elements.

Save areas

A DL/I call passes from the application program to the DL/I language interface (DFSLI000), to the program request handler (DFSPR000), to the batch nucleus (DFSBNUC0), and then to the DL/I call analyzer (DFSDLA00).

If everything works properly, the save area trace shows the contents of the registers at entry to the application program, the program request handler, and the DL/I analyzer. The DL/I analyzer passes the first save area in the PST to a DL/I module. This PST save area is the first save area below the save area that holds the contents of the registers at entry to the DL/I analyzer.

The contents of register 1 at entry to the DL/I analyzer is a pointer to the PST. This is the only register passed to the analyzer (the user call list pointer is passed to the analyzer in PSTIQPRM).

If the abend is a program check or an inline abend, the save area trace always gives a true indication of the flow of control between DL/I modules and the current depth of save area set usage. Most DL/I modules or X'01' with the low-order byte of register 14 on return to a higher-level module.

If the abend is a pseudoabend, the save areas below the analyzer might have been reused and therefore would not reflect the conditions at the time the abend condition was detected; for example, the DB Monitor might have been called by the analyzer.

Note: When pseudoabends are detected by some modules, the registers 14 to 12 at error, are stored at PSTSAVL+12. The high order byte in PSTSAVL+12 will contain a one-byte code for the module detecting the error. Here are the modules which will save registers and their corresponding codes in PSTSAVL+12:

X'AA' DFSDLR00

X'BB' DFSDDLE0

X'CC' DFSDLD00

X'DD' DFSDXMT0

X'EE' DFSURGU0

X'FF' DFSRCHB0

Here is an example from the formatted PST of an abend U0853:

```
WD1 00000000 HSA 202C6BC8 LSA 2CD73B08 RET AA049128 EPA 30B02F40 R0 30000355
R1 212AD040 R2 2CD78790 R3 2FB6F5B4 R4 8004911E R5 2FB6FA8C R6 01410254
R7 21748060 R8 2FB6F82C R9 00000002 R10 30B053C0 R11 000401E0 R12 00047DC0
```


Since "RET" (PSTSAVL+12) contains X'AA', module DFSDLR00 detected this pseudoabend.

DL/I call sequence

You can determine the current DL/I call and the sequence of calls leading up to the failure by scanning the DL/I trace table. Find the last entry made in the trace table by using the current entry pointer and then scanning backward in the table for the last entry made by the DL/I analyzer (entry code AA). This entry represents the current DL/I call.

You can determine the call sequence by continuing the backward scan, noting each entry made by the analyzer. Along with the call function, the analyzer also records the PCB address that was passed in the user's call list.

Buffer handler request sequence

The buffer handler router traces each request to the buffer handler from a DL/I module. When the router receives the request, it passes the request to the OSAM buffer handler or the VSAM interface module. When the call is complete, control returns to the router. The router obtains the next available trace table entry and stores information describing the input and output for the buffer handler call.

By looking at all buffer handler entries between two DL/I analyzer DFSDLA00 entries (two specific DL/I calls), you can determine all requests made to the buffer handler to satisfy any specific DL/I call. A typical request to the buffer handler is a GET by relative byte address from the retrieve module. The entry made for this GET by relative byte address has a function code of E2, the RBA requested, and, if the request was satisfied (return code 0), the address of the segment read into the buffer pool.

Generalized DL/I problem analysis

One method of problem analysis is discussed. Not all DL/I abends can be diagnosed using this sequence, but you can use the steps as a guide to DL/I debugging. All numbers are in hexadecimal.

1. The following approaches are valid if the IMS dependent region subtask appears in the dump.
 - Look at the user's call list for the current or last call. PSTIQPRM points to the call list. For all dependent region types, if the reentrant DL/I language interface, DFSLI000, is used, the user's call list address can be found in the contents of register 1 in the save area set at entry point to DFSPROX0-115 from the save area trace.
 - To find the last call parameters in a MPP or BMP dump, locate module DFSFSWA0 in the dump. Scan this module for ECP. At offset X'104' from ECP is a pointer to the parameters that made the last call to DL/I.
 - To find the PCBs in an MPP or BMP dump, find DIRCA in module DFSFSWA0. The word immediately following DIRCA contains the address of an area of storage obtained by the GETMAIN macro instruction. This area contains the PCB list and all non-GSAM PCBs. The format of this area is:
 - At offset X'14' is the beginning of the PCB list passed to the program.
 - Immediately following the end of the PCB list is a copy of the I/O PCB, if one exists.
 - The next PCB (and subsequent PCBs) follow the end of the I/O PCB.

- Because they exist elsewhere in the dump, GSAM PCBs are not copied here. The pointers to the GSAM PCBs can be found in the PCB list at offset X'14.'
2. If the abend occurred after the DL/I analyzer received the call, but before the application program got control back, the last call entry (code AA) in the DL/I trace table matches the current call. Use the technique described in "DL/I call sequence" on page 157 to determine the call sequence as far back as possible, noting the PCB address associated with each call.
 3. Compare the contents of PSTDBPCB to the PCB address in the last call entry in the trace table. If they are different, index maintenance is probably in control using its PCB within the PSB. Check the save area trace to verify this.
 4. Find the current PCB from the address in the trace table, and then find the JCB. Starting at label JCBTRACE in the JCB are six 2-byte trace entries for the last six calls issued against this PCB. The oldest entry is at the beginning and the newest entry is at the end of JCBTRACE. The first byte of an entry is the encoded call function and the second byte is the last half of the status code for that call. For example, an 0140 is an entry for a GET UNIQUE call that resulted in a blank status code. This trace is maintained by the DL/I analyzer at the completion of the call.
 5. Look at the contents of JCBLEV1C. If the call is a get or an insert, the retrieve module zeros this word at entry and then stores a pointer to each level table entry when it completes the call for that particular level. If the word is zero, retrieve is still trying to satisfy the call at the root level. Generally, JDBLEV1C reflects the lowest level satisfied during the current or last get or insert call.
 6. Check each level table entry to see if it holds a valid current position. Valid position is indicated by the absence of the empty bit in FLAG1 (LEVEMPTY in LEVF1, bit 1 byte 1). If this bit is off (valid position), LEVSDB points to the SDB currently in use or the last one used for this level. At the same time, LEVTTR, which contains either a relative byte address (RBA) or a relative record number (RRN), should match the current position saved in the SDB (SDBPOSC). In addition, if the database is HISAM, LEVSEGOFF matches SDBPOSN. This is the offset into the current relative record number.
 7. Look at the key feedback area—level table position. The key feedback area contains the fully concatenated key of the segment currently positioned on. If a level table entry contains a valid position, the contents of the key feedback area for that level is the key (if any) of the segment whose SDB is pointed to by LEVSDB and whose database position is contained within LEVTTR and LEVSEGOFF. The contents of the key feedback area are never cleared or blanked out. Therefore, unless the level table entry indicates it has a valid position, the residue in the key feedback area might not be meaningful.
 8. Map the database structure involved in the failure. Starting with the root SDB, which you can find with a pointer in the JCB (JCBSDB1), take each SDB in the sequence it is found in the dump and examine the field SDBPARA. This field is a pointer to the parent SDB (the root SDB points at the PCB). Map the structure according to SDBPARA; the result should match the logical structure defined at PSBGEN time. When mapping the structure, note the contents of SDBTARG. If this field is nonzero, the segment is involved in either logical relationships or indexing. The code in the high-order byte indicates which is the case.
 9. Use the DL/I trace table to analyze the sequence of buffer handler calls. The buffer handler trace is the most useful debugging tool for DL/I. The trace is available in both batch and DB/DC environments, and the entries are identical
 - Get calls are the most common, so this section uses a get call as an example. In an attempt to satisfy a get call, the retrieve module must examine a segment or a series of segments to see if it meets the call requirements. All

segments must be requested from the buffer handler and the request must be in the form of an RBA, RRN, or a specific key request.

- The most common request from retrieve to the buffer handler is a byte locate. The parameters passed to the buffer handler are the function (byte locate), the RBA requested, and the data set in which the RBA exists. At exit to the buffer handler router, the next available trace entry is obtained and the code of the function requested is stored in the first byte. The buffer handler function codes are listed in the PST DSECT under PSTFNCTN. The byte locate function code is E2. The second byte of the trace entry is the relative PST number responsible for the request, which in batch is always an 01.
- Along with the function code, the DSG and RBA are placed into the entry. When the call to the buffer handler (OSAM or VSAM) is completed, the results are traced, again by the buffer handler router. The return code is stored in the third byte. The return codes are listed in the PST DSECT under PSTRTCDE. If the call is successful, the address of the segment within the buffer pool is stored at displacement C. This trace now shows each segment (RBA) requested by retrieve; by examining the buffer pools the contents of the segments and their prefixes can be seen. RBAs found in the trace table can be compared to position fields in the SDB and level table to accurately re-create the get call.

Locating database-related traces

Locating Retrieve trace, JCBTRACE, DL/I trace and LOG data set are shown.

The following figure shows how to locate the following traces:

- Retrieve trace—records the flow through the retrieve module subroutines.
- JCBTRACE—traces the status of the prior six calls.
- DL/I trace—shows calls made to the call analyzer, buffer handler, and hierarchic direct space management, as well as information on Delete/Replace.
- LOG data set—records database changes, before and after images.

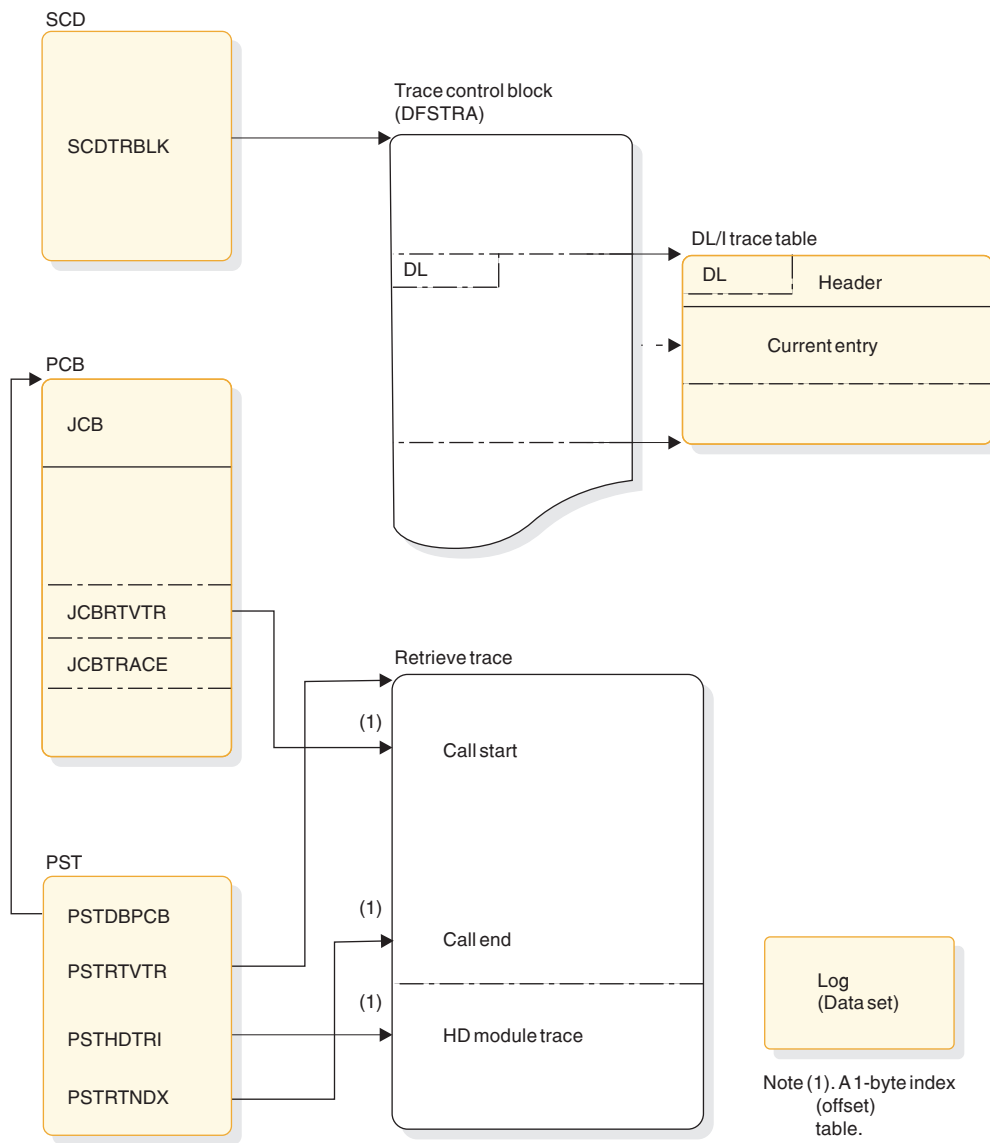


Figure 61. How to locate the database traces

Related concepts:

“DL/I analysis” on page 154

DL/I trace

The DL/I trace table is a combined trace consisting of entries from DL/I calls, the DL/I buffer handler, DL/I OPEN/CLOSE, HD space management, lock activity (using PI or IRLM), OSAM, DFP interface, HALDB OLR trace, and ABENDU0427.

IMS always sets the DL/I and lock trace on at initialization except for batch, for which the default for traces is off. The trace level is set to high and it is written in memory.

The DL/I trace and the DL/I Call Image trace are different traces. The DLITRACE statement in IMS.PROCLIB member DFSVSMxx sets the DL/I Call Image trace on, the DL/I trace does not.

If the trace was written to the log, you can use the File Select and Formatting Print utility (DFSERA10) with an exit routine (DFSERA40 or DFSERA60).

Related reference:

“Common trace table interface” on page 574

“X'D4': database tracker trace entries (D4)” on page 433

“Sequential buffering service aids” on page 217

Using the DL/I trace facility

The DL/I trace facility is an important diagnostic tool that can help you determine the cause of a problem. Frequently, a problem occurs as a result of the interaction between two separate tasks. Interpreting the DL/I trace entries can be the best way of determining what each task was doing, and when.

Example for using the DL/I trace facility

An IMS Fast Path application receives an abend 1027, and the user reports the problem to the support staff. Some of the steps the diagnostician might take are:

1. Find the abend code in *IMS Messages and Codes, Volume 3: IMS Abend Codes*. This information indicates that the return code is in register 15.
2. Register 15 in the dump contains a value of X'0D.'
IMS Messages and Codes, Volume 3: IMS Abend Codes indicates that this return code indicates that an enqueue or dequeue call was issued by module DBFBENQ0, and the return code from DFSLRH00 was X'12,' which indicates an invalid call.
3. Look at the DL/I trace to determine what resource was involved (if the DL/I trace was on at the time of the abend). If the DL/I trace was not on, it might be necessary to create the problem again with the DL/I trace facility on.
The list of trace entry IDs in “DL/I trace formats” indicates that one of the trace entries is “Exclusive control ENQ/DEQ PI trace entry” (“The X'CA' trace entry for Fast Path calls” on page 174). This is a good place to start the DL/I trace analysis.

What you learn from the DL/I trace might help you to:

- Identify and resolve an application error.
- Review APAR descriptions to see if this problem has occurred previously.
- Report the problem to IBM Software Support.

Related concepts:

“DL/I trace formats”

Related reference:

“X'C4' trace entry” on page 170

DL/I trace formats

The figures in this section show the formats of the most commonly used DL/I trace entries. The figures are included to help you understand the DL/I trace entries in order to communicate more effectively with IBM Software Support representatives and to build a valid search argument.

Exception: Not every trace entry is shown. You can obtain the entries that are not described by assembling IDLIVSAM TRACENT from IMS.SDFSMAAC.

Related concepts:

"Dump analysis introduction" on page 155

"Using the DL/I trace facility" on page 161

Related tasks:

"Program isolation trace" on page 211

X'0C' trace entry

The X'0C' trace entry is shown.

TRACE ID = X'0C'

word 0 – byte 1 - X'0C' - DL/I OPEN/CLOSE trace entry for each data set. This entry shows a successful OPEN/CLOSE. For an error during OPEN/CLOSE, the data in ENTRY6 and ENTRY7, X'18' and X'1C' respectively, is shown in the "error condition"

byte 2 - PST number

bytes 3-4 - Trace sequence number description.

word 1 – byte 1 - PSTFNCTN (See note below)

bytes 2-3 - DMB number

byte 4 - DCB number

word 2 – DCB address

word 3 – DD name

word 4 – DD name

word 5 – PSTDBPCB - database PCB address

word 6 – DMB address (Error condition) - Offset in DFSDLOC0 where error was detected.

word 7 – bytes 1-3 - PSTPSB-PSB address - database PCB address (Error condition) - Word "LKER" or reason codes described in message DFS07301

byte 4 - Not used

X'31', X'32', X'34', X'B1', and X'B2' trace entries

The X'31', X'32', X'34', X'B1', and X'B2' trace entries are shown.

Example of X'31', X'32', X'34', X'B1', and X'B2' trace entries

TRACE ID = X'31', X'32', X'34', X'B1', X'B2'

word 0 – byte 1 - X'31', X'32', X'34', X'B1', or X'B2' - Function code for HD space management (see note 1 below)

byte 2 - PST number

bytes 3-4 - Trace sequence number

word 1 – bytes 1-2 - Length of request (see note 3 below)

bytes 3-4 - Offset (requested or returned)

word 2 – byte 1 - PSTTRNID (ID of module calling space management)

byte 2 - PSTTRMSC (subcode of module calling the buffer handler - see note 4 below)

byte 3 - Not used

byte 4 - PSTRTCODE (return code from space management)

word 3 – byte 1 - Flag byte (X'80' - entry already in use)

bytes 2-4 - PSTDATA (core address - see note 5 below)

word 4 – PSTBYTNM (RBA or RRN - see note 6 below)

word 5 – RBA of space given to caller

word 6 – bytes 1-2 - DMB number

byte 3 - DCB number

byte 4 - Reserved

word 7 – MSG/ABEND feedback

Notes:

1. You need the X'32' entries to resolve this problem.

2. Numbers 3 and 4 are very important. In most cases, the segment was deleted by another task (see PST number), and this task (see PST number) tried to enqueue on the segment that waited while the other PST finished its processing. During the attempt, an FSE was found and abend U0832 resulted. An IMS internal error usually causes this problem.
3. The length of the segment that was freed.
4. The real storage address of the segment during the time of deletion.
5. The PSTBYTNM is the key field in the trace table. Look for a X'32' entry with the PSTBYTNM field equal to the PSTBYTNM field found in the buffer trace.

X'60' trace entry

The X'60' trace entry is shown.

The X'60' trace entry

TRACE ID = X'60'

```

word 0 - byte 1 - X'60' OSAM START I/O
         byte 2 - Zero (no PST number)
         bytes 3-4 - Trace sequence number
word 1 - IOSB address
word 2 - START I/O - DECB address
word 3 - START I/O - RBN/M
word 4 - Buffer address
word 5 - Buffer data (offset X'40' into buffer)
word 6 - byte 1 - Request type
         - byte 2 - not used
         - byte 3 - 'M' DCBFDAD seek value (MBBCCHHR)
         - byte 4 - 'C' DCBFDAD seek value (MBBCCHHR)
word 7 - CHHR DCBFDAD seek value (MBBCCHHR)

```

X'61' trace entry

The X'61' trace entry is shown.

The X'61' trace entry

TRACE ID = X'61'

```

word 0 - byte 1 - X'61' OSAM POST
         byte 2 - Zero (no PST number)
         bytes 3-4 - Trace sequence number
word 1 - IOSB address
word 2 - DCB address
word 3 - byte 1 - DFSAOS70 INTERNAL TRACE BYTE
         byte 2 - TOTAL I/O COUNT FOR THIS STARTIO
         bytes 3-4 - Sequence number of associated X'60' entry
word 4 - Buffer address
word 5 - Buffer data (offset X'40' into buffer)
word 6 - byte 1 - POST code
         byte 2 - not used
         byte 3 - 'M' DCBFDAD seek value (MBBCCHHR)
         byte 4 - 'C' DCBFDAD seek value (MBBCCHHR)
word 7 - CHHR DCBFDAD seek value (MBBCCHHR)

```

X'62' trace entry

The X'62' trace entry is shown.

The X'62' trace entry

TRACE ID = X'62'

```

word 0 - byte 1 - X'62' OSAM trace entry for OPEN/CLOSE/E0V

```

- byte 2 - Zero (no PST number)
- bytes 3-4 - Trace sequence number
- word 1 - Not used
- word 2 - DCB address
- word 3 - DCBRELA
- word 4 - byte 1 - Not used
 - byte 2 - R15 return code
 - bytes 3-4 - Not used
- word 5 - OPEN/CLOSE/EOV error code (same as in message DFS07301)
- word 6 - byte 1 - Caller's function
 - byte 2 - Not used
 - byte 3 - 'M' value from DCBFDAD
- word 7 - byte 1 - 'CHHR' from DCBFDAD

X'69' trace entry

The X'69' trace entry is shown.

The X'69' trace entry

TRACE ID = X'69'

- word 0 - byte 1 - X'69' - Sequential Buffering buffer invalidation trace entry
 - byte 2 - PST number
 - bytes 3-4 - Trace sequence number
- word 1 - bytes 1-2 - DMB number
 - byte 3 - DCB number
 - byte 4 - Function code at entry to DFSSBCI0 (see note 1 below)
- word 2 - bytes 1-2 - Number of processed DCBs
 - bytes 3-4 - Number of invalidated SBH buffers
- word 3 - DSG address of owner of the last invalidated SBH buffer or zero
- word 4 - byte 1 - SBPSTGS - Global serialization trace (see note 2 below)
 - byte 2-4 - Not used
- word 5 - Not used
- word 6 - SBH buffer CB address of last invalidated SBH buffer or zero
- word 7 - Block number in call or zero

Notes:

1.

- X'00'** Sequential Buffering buffer invalidation trace entry.
- X'01'** Sequential Buffering buffer invalidation trace entry.
- X'02'** Invalidate specific according to OSAM buffer prefix.

2.

- X'80'** Global serialization entered (SBH search started).
- X'40'** Waiting for PST to be posted.

X'6A' trace entry

The X'6A' trace entry is shown.

The X'6A' trace entry

TRACE ID = X'6A'

- word 0 - byte 1 - X'6A' - Sequential Buffering buffer evaluation trace entry
 - byte 2 - PST number
 - bytes 3-4 - Trace sequence number
- word 1 - bytes 1-2 - DMB number

- byte 3 - DCB number
- byte 4 - Not used
- word 2 - byte 1 - Type of evaluation (see note 1)
- byte 2 - Not used
- byte 3 - Result of evaluation of sequentially (see note 2)
- byte 4 - Result of evaluation of I/O rate (see note 2)
- word 3 - DSG address
- word 4 - SBPSTCNB (=SBH CALL NUMBER THIS PST)
- word 5 - byte 1 - Not used
- bytes 2-4 - Threshold cost for SB logic
- word 6 - byte 1 - Not used
- bytes 2-4 - Current cost of SB logic
- word 7 - bytes 1-2 - Threshold value for I/O rate
- bytes 3-4 - Current value of I/O rate

Notes:

1.

C'P' Periodical evaluation

C'E' Early evaluation

2.

C'P' Evaluation is positive

C'N' Evaluation is negative

X'6B' trace entry

The X'6B' trace entry is shown.

The X'6B' trace entry

TRACE ID = X'6B'

- word 0 - byte 1 - X'6B' - Indicates why SB was or was not used
- byte 2 - PST number
- bytes 3-4 - Trace sequence number
- word 1 - C'TERM'
- word 2 - byte 1 - SCDSBFL - Sequential buffering flag (see note 1)
- byte 2 - Resource allocation failure (see note 2)
- byte 3 - Info from user exit routine (see note 3)
- byte 4 - SBPSTITR - Termination trace flag (see note 4)
- word 3 - Not used
- words 4-5 - Job name
- words 6-7 - PSB name

Notes:

1.

X'80' ...SCDSBNSB: DON'T LOAD SB MODULES

X'20' ...SCDSBLER: ERROR WHILE LOADING SB MODULES SB

X'10' ...SCDSBOER: OTHER SB ERRORS

2.

X'80' ...SBPSTGM1: GM ERROR FOR CB OR WORKAREA

X'40' ...SBPSTGM2: GM ERROR FOR SBH BUFFERS

X'20' ...SBPSTGM3: MAXSB= LIMIT EXHAUSTED

X'10' ...SBPSTGM4: MAX NBR OF IOSB EXHAUSTED

X'08' ...SBPSTGM5: GETIOSB FAILURE

X'04' ...SBPSTGM6: PAGE-FIX ERROR
 X'02' ...SBPSTGM7: I/O-ITASK INIT FAILURE
 X'01' ...SBPSTGM8: GM ERROR FOR CB OR WORKAREA

3.

X'80' ...SBPRMPDI: DISALLOW USAGE OF SB
 X'40' ...SBPRMPAD: CONDITIONAL ACTIV BY DEFAULT

4.

X'80' ...SBPSTITP: USER PROVIDED SB= KEYW IN PSBGEN
 X'40' ...SBPSTITC: SBPARM CARD PROCESSED
 X'01' ...SBPSTITs: /STOP SB ISSUED BY MTO

X'6C' trace entry

The X'6C' trace entry is shown.

The X'6C' trace entry

TRACE ID = X'6C'

word 0 – byte 1 - X'6C' - Indicates if Sequential buffering was used trace entry
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 word 1 – bytes 1-2 - DMB number
 - byte 3 - DCB number
 - byte 4 - Not used
 word 2 – bytes 1-2 - Number of refreshed SBH buffers
 - bytes 3-4 - Number of invalidated SBH buffers
 word 3 – DSG address of owner of the last touched SBH buffer or zero
 word 4 – byte 1 - SBPSTTGS – Global serialization trace (see note below)
 - bytes 2-4 - Not used
 word 5 – OSAM BH prefix address
 word 6 – SBH buffer CB address of last touched buffer or zero
 word 7 – Block number

Notes:

X'80' Global serialization entered (SBH search started).

X'40' Waiting PST was posted.

X'6F' trace entry

The X'6F' trace entry is shown.

The X'6F' trace entry

TRACE ID = X'6F'

word 0 – byte 1 - X'6F' - Sequential Buffering search by RBA issued by OSAM BH trace entry
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 word 1 – bytes 1-2 - DMB number
 - byte 3 - DCB number
 - byte 4 - Last byte of return code from OSAM BH
 word 2 – First trace word within SDSG
 word 3 – DSG address

word 4 – Second trace word within SDSG
word 5 – OSAM BH prefix address
word 6 – SBH buffer CB address
word 7 – Block number

X'80', X'81', X'82' trace entries

The 'X'80', X'81', and X'82' trace entries are shown.

The X'80', X'81', X'82' trace entry

TRACE ID = X'80', X'81', X'82'

word 0 – byte 1 - X'80', X'81', X'82' - Database authorization, change-authorization, and re-authorization request
byte 2 - PST number
bytes 3-4 - Trace sequence number
words 1-2 – AURDBDNM - database name
word 3 – byte 1 - AURACC – database access
- byte 2 - AURECD – authorized encoded state
- byte 3 - AURSLV – database share level
- byte 4 - AURWRKC – authorization work field
word 4 – bytes 1-2 - AURDMBNO – Global DMB number
- bytes 3-4 - AURERRCD – DBRC error reason code
word 5 - AURSYSID - IMS online subsystem id
word 6 - AURDDIRA – DDIR address
word 7 - AURDSGCH – DSG address of last in DSG chain
or
word 7 - TCB number for restart authorization by DFSRDA00

X'AA' trace entry

The X'AA' trace entry is shown.

The X'AA' trace entry

TRACE ID = X'AA'

word 0 – byte 1 - X'AA' - Analyzer entry - This entry is created for each call passed to DFSDLA00. All entries are the internal activities in IMS that take place as a result of the user call. Be sure to use only the entries with the same PST number as the one identified as the failing PST.
byte 2 - PST number (see note 1 below)
bytes 3-4 - Trace sequence number
word 1 – Address of user parameter list (this list consists of all entries up to and including the entry with a X'80' in the high-order byte of a word.
word 2 – Call function for current call (GU, GN and so on - see note 2 below)
word 3 – PCB address for current call
words 4-5 – If DB PBC, LEVLEV thru LEVSEGOFF (first 10 bytes of level table for level of segment returned on prior call) IF TP PCB, character string is TP CALL
word 6 – bytes 1-2 - If DB PBC, LEVLEV thru LEVSEGOFF (first 10 bytes of level table for level of segment returned on prior call) IF TP PCB, character string is TP CALL
bytes 3-4 - Status code in PCB from prior call (see note 3 below)
word 7 – LEVSDB - SDB address for level of segment returned on prior call

Notes:

1. Use only the trace entries for the PST that had the failure.
2. Determine the current call.
3. Shows how the prior call for this PCB completed.

X'AB' trace entry

The X'AB' trace entry is shown, with data set information, caller information, VSAM request option 1, and VSAM request option 2 listed.

The X'AB' trace entry

TRACE ID = X'AB'

word 0 – byte 1 - X'AB' - ABEND U0427 trace entry
 byte 2 - PST number
 bytes 3-4 - X'0427'

word 1 – byte 1 - PSTFNCTN - Buffer handler function code
 - byte 2 - RPLREQ
 - bytes 3-4 - Trace sequence number

word 2 – bytes 1-2 - Offset to abend within DFSDVSM0
 - byte 3 - DSGINDA - data set information (see note 1)
 - byte 4 - DSGINDB - caller information (see note 2)

word 3 - RPLI address (Register 8)

word 4 - RPLARG - VSAM argument

word 5 - RPLAREA - VSAM area pointer

word 6 - byte 1 - RPLERREG - VSAM return code
 - byte 2 - RPLERRCD - VSAM error code
 - byte 3 - RPLOPT1 - VSAM request option (see note 3)
 - byte 4 - RPLOPT2 - VSAM request option (see note 4)

word 7 - AMP address

Notes:

1. See the following table for data set information.

Table 20. Data set information

Code (hex)	DSGINDA	Definition
X'80'	DSGDSOLS	This is the last DSG in JCB.
X'44'	DSGDSORI	Data set group is root in index.
X'20'	DSGDSOHD	Data set group is HDAM.
X'10'	DSGDSOHI	Data set group is HDAM.
X'08'	DSGDSOH2	Data set group is HISAM case 2.
X'04'	DSGDSOH1	Data set group is HISAM.
X'02'	DSGDSOHS	Data set group is HSAM or SSAM.
X'01'	DSGVSAM	Data set group is VSAM.

2. See the following table for caller information.

Table 21. Caller information

Code (hex)	DSGINDB	Description
X'80'	DSGSETLR	From SETL routine for SYNAD routine.
X'40'	DSGGETR	From GET routine for SYNAD routine.
X'20'	DSGBATIS	Record returned is batch, DSGIRECA is actual address.
X'10'	DSGNXTIS	Next sequential root is current keyed record.
X'08'	DSGSETL2	Second SETL has been issued.
	DSGSETK2	Move key to DSG high key area.

Table 21. Caller information (continued)

Code (hex)	DSGINDB	Description
X'04'	DSGGETGT	A GET in BISAM being done using a SETL GT.
X'02'	DSGKEYSR	Buffer pool has been searched for key.
X'01'	DSGSTLIS	This is STL for INSERT.

3. See the following table for VSAM request option 1.

Table 22. VSAM request option

Code (hex)	RPLOPT1	Description
X'80'	RPLLOC	Locate mode.
X'40'	RPLDIR	Direct processing.
X'20'	XRPLSEQ	Sequential.
X'10'	RPLSKP	Skip SEQ access.
X'08'	RPLASY	Asynchronous.
X'04'	RPLKGE	Search key GT/EQ.
X'02'	RPLGEN	Generic key request.
X'01'	RPLECBSW	External ECB.

4. See the following table for VSAM request option 2.

Table 23. VSAM request option 2

Code (hex)	RPLOPT2	Description
X'80'	RPLKEY	Keyed access.
X'40'	RPLADR	Addressed access.
	RPLADD	Addressed access.
X'20'	RPLCNV	CINV access (by RBA).
X'10'	RPLBWD	FWD=0/BWD=1
X'08'	RPLLRD	ARD=0/LRD=1
X'04'	RPLWAITX	SYN processing wait exit.
X'02'	RPLUPD	Update.
X'01'	RPLNSP	Note string position.

X'AC' trace entry

The X'AC' trace entry is shown.

The X'AC' trace entry

TRACE ID = X'AC'

word 0 – byte 1 – X'AC' – Database call analyzer entry (only present in a DBCTL environment)
 byte 2 – PST number
 bytes 3-4 – Trace sequence number
 word 1 – Eye -catcher RTKN
 word 2 – Not used

word 3 – Not used
words 4-7 – This 16-byte CCTL recovery token is used to correlate
DL/I activity on other subsystems

X'C4' trace entry

The X'C4' trace entry is shown.

The X'C4' trace entry

TRACE ID = X'C4'

word 0 – byte 1 - X'C4' - DELETE/REPLACE used to provide diagnosis
information for error conditions. This entry is
written when an error is detected.
byte 2 - PST number
bytes 3-4 - Trace sequence number
word 1 – byte 1 - ID invoking subroutine (see note 2 below; see note 3 below)
byte 2 - ID of originating subroutine (see note 3 below)
byte 3 - Subcode (set by originating subroutine - see note 3 below)
byte 4 - Internal code for status code or pseudoabend (see
note 3 below)
word 2 – SDB for replace operation. DLTWS for delete operation.
Register value 7.
word 3 – Level table for replace operation. DLTWA address for
delete operation.
Register value 8.
word 4 – Usually the PSDB address for segment. Register value 6.
word 5 – byte 2 - DELETE/REPLACE return code
byte 2 - Return offset from caller's CSECT
word 6 – PSTDSGA - DSG address
word 7 – Information local to the subroutine that might be useful in
problem resolution

Notes:

1. Use only the entries for the PST that abended.
2. When a DELETE/REPLACE failure occurs, you need the X'C4' entries to solve the problem. You can usually find several X'C4' entries in a row in the trace table. Scan up the trace table to the first (lowest trace sequence number) entry. This entry is usually the key to why the failure occurred. Level 2 needs this information to resolve the problem.
3. These 4 bytes, in word 2, in a DELETE/RELEASE error are documented in the *IMS Messages and Codes, Volume 3: IMS Abend Codes* for the various abends. This is ENTRY1 field referred to in the DELETE/REPLACE module.

Related concepts:

“Using the DL/I trace facility” on page 161

X'C6' trace entry

The X'C6' trace entry is shown.

The X'C6' trace entry

TRACE ID = X'C6'

word 0 – byte 1 - X'C6' - Special promote lock trace entry
byte 2 - PST number (see note 1 below)
bytes 3-4 - Trace sequence number
word 1 – byte 1-2 - Not used
byte 3 - Special lock/unlock call (see note 1)
byte 4 - Level of this lock
words 2-3 - C'PROMOTE '

word 4 - REQ address
word 5 - QCB address
words 6-7 - Resource id (see note 2)

Notes:

1. See the following table for special lock or unlock calls.

Table 24. Special lock or unlock calls

Code (hex)	Special lock or unlock call	Description
X'08'	PROENQ	Lock call
X'10'	PRODEQ	Unlock call

2. Resource id is an 8-byte field:

bytes 1-4 - Complement of original RBA
bytes 5-6 - DMB number
byte 7 - DCB number
byte 8 - C'Z' id suffix

X'C7' trace entry not using IRLM

The X'C7' trace entry is shown when not using the IRLM.

The X'C7' trace entry (when not using the IRLM)

TRACE ID = X'C7'

word 0 - byte 1 - X'C7' - Exclusive control deadlock detection trace entry (Written only when a conflict causes an abend.).
byte 2 - PST number (see note 1 below)
bytes 3-4 - Trace sequence number
word 1 - byte 1 - PST number (see note 1 below)
bytes 2-4 - Address of PST to be backed out (gets ABENDU0777 - see note 3 below)
words 2-3 (see note 2 below) - byte 1 - PST number
bytes 2-4 - Conflicting PST address
words 4-5 (see note 4 below) - PSB name
words 6-7 (see note 4 below) - DMB name

Notes:

1. The entry for the PST number that received abend U0777.
2. The addresses of the two conflicting PSTs.
3. The address of the PST that got received abend U0777.
4. The PSB and DMB name of the cause for the contention.

X'C7' trace entry using IRLM

The X'C7' trace entry is shown when using the IRLM.

The X'C7' trace entry (when using the IRLM)

TRACE ID = X'C7'

word 0 - byte 1 - X'C7'
byte 2 - 00
bytes 3-4 - Trace sequence number
word 1 - Not used
words 2-5 (see note 1 below) - byte 1 - PST number
bytes 2-4 - PST address
words 6-7 (see note 2 below) - Resource ID

Notes:

1. PST number and address of PSTs in deadlock net. If number of PSTs in deadlock net is greater than 4, only 4 are shown.
2. Resource ID that is the cause of the deadlock.

X'C8' trace entry

The following figure shows the X'C8' trace entry.

The X'C8' trace entry

TRACE ID = X'C8'

word 0 – byte 1 - X'C8' - Lock request manager entry (DFSMLGR0)
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 word 1 – byte 1 - Function - See macro DFSLMD for mapping of
 each byte in this word
 byte 2 - State (see note below)
 byte 3 - Class - the class is the relative PST number
 byte 4 - Flags
 word 2 – byte 1 - Return code from IRLM
 bytes 2-4 - Can be PST, CLB, or SRB address
 word 3 – Can be resource name address, token, or altered
 buffer mask
 word 4 – bytes 1-2 - Lock manager subcode (2 bytes). These bytes
 along with the return code from IRLM define the
 problem.
 bytes 3-4 - This is a feedback area from the RLPL and is used
 primarily by the IBM Support Center, if needed.
 words 5-7 - This is a feedback area from the RLPL and is used primarily
 by the IBM Support Center, if needed.

Notes: The possible state settings and their meaning:

X'00' Unconditional release

X'02' Read

X'04' Share

X'06' Update

X'08' Exclusive

X'C9' trace entry

The X'C9' trace entry is shown.

The X'C9' trace entry

TRACE ID = X'C9'

word 0 – byte 1 - X'C9' - Lock request manager entry (DFSMLGR0) exit
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 word 1 – byte 1 - Function - See macro DFSLMD for mapping of
 each byte in this word.
 byte 2 - State (see note below)
 byte 3 - Class - the class is the relative PST number
 byte 4 - Flags
 word 2 – byte 1 - Return code from IRLM
 bytes 2-4 - Can be PST, CLB, or SRB address
 word 3 – Can be resource name address, token, or altered
 buffer mask
 word 4 – bytes 1-2 - Lock manager subcode (2 bytes). These bytes
 along with the return code from IRLM define the
 problem.
 bytes 3-4 - This is a feedback area from the RLPL and is used

primarily by the IBM Support Center, if needed.
 words 5-7 - This is a feedback area from the RLPL and is used primarily
 by the IBM Support Center, if needed.

Notes: The possible state settings and their meanings:

X'00' Unconditional release

X'02' Read

X'04' Share

X'06 ' Update

X'08' Exclusive

X'CA' trace entry

The X'CA' trace entry is shown.

The X'CA' trace entry

TRACE ID = X'CA'

word 0 - byte 1 - X'CA' - Exclusive control ENQ/DEQ (PI - Program
 Isolation) trace entry
 byte 2 - PST number (see note 1 below)
 bytes 3-4 - Trace sequence number
 word 1 - byte 1 - Record type (see note 8 below)
 byte 2 - Class for Q command operation
 byte 3 - Requested function (Use PRM DSECT (PRMFUNCTN) - see
 note 2 below)
 byte 4 - PRMLEVEL - Level of control requested
 (1 =Read only, 2=Share, 3=Update,
 4=Exclusive - see note 3 below)
 word 2 - bytes 1-2 - Wait count (how many times this task had to
 wait - see note 7 below)
 bytes 2-4 - Waited for count (number of tasks waiting for this
 resource)
 word 3 - PITIME relative to 00:00:00 on PIDATE (SCDPITIME)
 word 4 - bytes 1-2 - Feedback from DFSFXC10 (Use PRM DSECT, PRMFBK
 field. See note 5 below)
 byte 3 - Return code from DFSFXC10 (see note 6 below)
 byte 4 - PSFUNCT (function codes DSECT)
 word 5 - Token from DFSFXC10 (pointer to control block enqueued resource)
 word 6 - RBA or RBN (see note 4 below)
 word 7 - bytes 1-2 - DMB number
 byte 3 - DCB number
 byte 4 - Not used

Notes:

1. Use the entries for the PST in question. If you are checking a PI problem, you might have to find this entry and then scan up the trace table using the field in note 4 (below) as a search field to find the other PST that is using the resources.
2. The requested PI function.
3. The level at which the resource was requested.
4. The RBA or RBN of the resource requested by PI (relates to X'04' in the X'CC' trace entry).
5. The 2 bytes of feedback from DFSFXC10 (X'0C' and X'0D' in PRM DSECT).
6. The return code. DFSFXC10 RETURN CODES: 0 - Successful 4 - Wait required - usually has CB trace related to it 8 - Pseudoabend, either lost deadlock (U0777) or out of ENQ/DEQ space (U0775) C - Invalid call
7. If a resource (RBA or RBN) is currently owned and the task (PST) must wait, the "wait count" (2 bytes) is incremented in a X'CA' trace entry for the task

(PST) that owns the resource. The “waited for count” (2 bytes) is incremented to show that another task is waiting for the resource. This wait should also cause a X'CA', X'CB' pair of trace entries to show the wait occurred. (See the X'CB' trace entry for more details on PI waits.)

8. This shows the type of X'CA' record this is. (X'CA-08' trace entry follows.)

X'00' Standard trace PI record

X'01' Timing ACT/ENQ wait - may have CB trace entry associated with it

X'04' Lock MGR trace record

X'08' DL/I call record - see X'CA' - X'08' trace entry

X'CA' trace entry, subtype X'08'

The X'CA' trace entry, subtype X'08' is shown.

TRACE ID = X'CA'-X'08'

word 0 – byte 1 - X'CA'-X'08' - PI-DL/I call trace entry
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 word 1 – byte 1 - X'08' = DL/I call record
 bytes 2-4 - Not used
 word 2 – bytes 1-2 - Wait count (how many times this task
 had to wait)
 bytes 2-4 - Waited for count (number of tasks waiting
 for this resource)
 word 2 (alternate) - bytes 1-4 - name of module writing the trace record
 word 3 - PI time
 word 4 - PST account field for function (count of
 the time of calls)
 word 5 - DL/I call (GNP, ISRT, and so on)
 words 6-7 - Not used

The content of word 2 depends on the module that wrote the trace record. Word 2 either contains DLA0 or the wait counts for the task.

X'C4' trace entry

The X'CA' trace entry for Fast Path calls is shown.

The X'CA' trace entry for Fast Path calls

TRACE ID = X'CA'

word 0 – byte 1 - X'CA' - Exclusive control ENQ/DEQ (PI -
 Program Isolation) trace entry
 byte 2 - PST number (1)
 bytes 3-4 - Trace sequence number
 word 1 – IRC1, indicating a Fast Path call
 word 2 - Call Function (GU, GN, and so on)
 word 3 - PROCOPT
 word 4 - PI time (also in reg 5 in Fast Path trace,
 if active)
 word 5 - A(PBC)
 word 6 - A(EPCB)
 word 7 - Not used

X'CB' trace entry

The X'CB' trace entry is shown.

The X'CB' trace entry

TRACE ID = X'CB'

word 0 – byte 1 - X'CB' - PI - (Program Isolation) trace lock

elapsed time
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 words 1-2 - DMB Name for which the wait was performed
 word 3 - Same as PITIME IN X'CA' record
 word 4 - byte 1 - First byte of feedback from enqueue request
 byte 2 - PST owning resource at the time of wait
 bytes 3-4 - Trace sequence number on X'CA' record
 word 5 - Elapsed time for enqueue wait
 word 6 bytes 1-4 - word 8 bytes 1-3 - 7 bytes of resource ID
 word 7 - byte 4 - Post code

X'CC' trace entry

The X'CC' trace entry is shown.

The X'CC' trace entry

TRACE ID = X'CC'

word 0 - byte 1 - X'CC' - Lock request handler (DFSLRH00) entry
 byte 2 - PST number (see note 1 below)
 bytes 3-4 - Trace sequence number
 word 1 - Block number on RBA (see note 2 below)
 word 2 - PSTTOKEN - The object of the request
 word 3 - PSTLRPRM - These bytes are described in the PSTLRPRM chart below. The first byte equates to byte 0, the second to byte 1, and so on (see note 3 below).
 word 4 - bytes 1-2 - Subcode from lock manager (IRLM) or PRMFBK feedback for DFSFXC10.
 byte 3 - Register 15 return code
 byte 4 - Return code from lock manager or DFSFXC10 (Use DFSFXC10 return codes from the X'CA' trace entry, note 6) (See note 5 below)
 word 5 - byte 1 - PSTLRSUB-DFSLRH00 abend subcode (see note 7 below)
 bytes 2-4 - PSTABTRM - System abend code (see note 6 below)
 word 6 - PSTDSGA - Address of the DSG used by this PST
 word 7 - byte 1 - Return register
 bytes 2-4 - Address within module where DFSLRH00 was called

Notes:

1. The PST number for the task (PST).
2. The RBA or RBN of the resource for which a request was issued in a X'CA' trace entry. When some of the problem types occur, you can find the same field or the beginning RBA of the block in the traces for a different PST number.
3. Shows what the request was.
4. For PI, these 2 bytes are in the PRM DSECT at X'0C' and X'0D'.
5. For PI, follow the above. The DFSFXC10 return code is usually also placed in the register 15 return code field.
6. A key field when DFSLRH00 issues an abend (such as U0855, U03301, U03302). The abend is in hexadecimal, not in decimal (for example, 855= X'0357', 3302= X'0CE6'). Ignore the field if an abend was not issued from DFSLRH00.
7. For abends issued by DFSLRH00, this field contains the Lock Request Handler abend subcode.

You might need the X'CC' trace entry for several problem types including:

- Task was allowed to process even though a wait was requested.
- DFSLRH00 abends (such as U0855, U03302).
- Request not satisfied. These problems might indicate an internal IMS error.

The following table shows the PSTLRPRM chart (bytes 0 through 3).

Table 25. PSTLRPRM chart (bytes 0 through 3)

Byte 0 (hex)	Meaning
11	Get local segment lock
12	Get local data set busy lock
13	Get local buffer update lock
14	Get local Q command lock
22	Get global buffer update lock
23	Get global data set busy lock
24	Get global data set extend lock
25	Get global data set reference lock
26	Get global command lock
27	Get global command lock (CLB)
30	Get local and global root locks
31	Get local segment and global buffer update locks
32	Get local-global data set busy locks
33	Get local-global buffer update locks
34	Get local Q command and global buffer update locks
41	Release local segment lock
42	Release local data set busy lock
43	Release local buffer update lock
44	Release local Q command lock
52	Release global buffer update lock
53	Release global data set busy lock
54	Release global data set extend lock
55	Release global data set reference lock
56	Release global command lock
57	Release global command lock (CLB)
60	Release local and global root locks
61	Release local and global data set busy locks
62	Release local and global buffer update locks
63	Release local segment and global buffer update locks
70	Test local lock share or update state
71	Test global lock share or update state
72	Test local and global lock share or update
73	Test feedback for local lock
74	Test feedback for global lock
75	Test feedback for local and global locks
80	LRHGIRDY new root, LRHRRIDY old root
81	Release alternate local and global root locks
82	Get local segment and local and global buffer update locks

Table 25. PSTLRPRM chart (bytes 0 through 3) (continued)

Byte 0 (hex)	Meaning
83	Release all subsystem global busy locks
84	Release all subsystem locks
90	Get Fast Path lock
91	Release Fast Path lock
92	Change ownership of Fast Path lock
93	Force known locks for Fast Path
94	Change locks to retain locks for Fast Path
95	Change ownership of Fast Path UOW lock from release lock ITASK to PST dependent region (HSSP only)
96	Change locks to retain locks for DL/I
97	Invalid call if function is equal to or greater than 97
Byte 1 (hex)	Meaning
80	MODE=COND
40	MODE=UNCOND
10	Owning WU given on RRIDX
00	Mode not applicable
Byte 2 (Hex)	Meaning
01	STATE=READ
02	STATE=SHARE
03	STATE=UPDATE
04	STATE=EXCL
F0	STATE PRESET (Fast Path)
00	STATE not applicable
Byte 3 (hex)	Meaning
80	CLB call if LRHPRMFL=X'80'
C0	Fast Path request
68	Root lock request
40	'Single' request
20	'Local' request
10	'Get' request
08	'P-Lock' request
07	'Combined' request if <= X'07'
01	LRHTTLKX, LRHTIBDX
02	LRHGRIDU, LRHRRIDW
03	LRHGSEGX, LRHRSEGX
04	LRHGBIDX, -RBIDX, -GBIDA
05	LRHGZIDX, LRHRZIDX

Byte 0 (hex)	Meaning
06	LRHGQCMX
00	LRHRZIDA, LRHRALLX

The X'CF' trace entry is shown.

TRACE ID = X'CF'

1. See the following table for I/O toleration function codes.

Code (hex)	TORFUNC	Description
X'01'	TORCEQE	Create EEQE.
X'02'	TORDEQE	Delete EEQE.
X'04'	TORFEQE	Find I/O toleration EEQE.
X'08'	TORMEQE	Copy/Move to I/O toleration buffer.
X'10'	TORNEQE	Send notifies on I/O toleration EEQE's.
X'20'	TORPURG	Close I/O toleration mode.
X'40'	TORDUI	Process DBRC DUI call EEQE list.
X'80'	TORDBCL	DB close I/O error write retry.
X'C0'	TORCHKPT	Do system checkpoint logging.

Code (hex)	TORFLG1	Description
X'80'	TOR1FP	<ul style="list-style-type: none"> • If on, Fast Path. • If off, DL/I.

Table 27. I/O toleration flag 1 (continued)

Code (hex)	TORFLG1	Description
X'40'	TOR1NOT	Creator is notify.
X'20'	TOR1PST	<ul style="list-style-type: none"> If on, then R0 has PST address. If off, then R0 has SCD address.
X'10'	TOR1RST	Caller is restart log read.
X'01'	TOR1FPIR	DBFMIOS0: FP IDT resolution.
X'90'	TOR1FPRS	Caller is FP restart log read.

3. See the following table for I/O toleration flag 2.

Table 28. I/O toleration flag 2

Code (hex)	TORFLG2	Description
X'80'	TOR2IOT	Creator is I/O toleration.
X'40'	TOR2RD	Creator is read error.
X'20'	TOR2WRT	Creator is write error.
X'10'	TOR2USER	Creator is DBRC command.
X'08'	TOR2PERM	Creator is permanent.
X'04'	TOR2IDT	Creator is indoubt process.
X'01'	TOR2NDX	EEQEFLG2:EEQENDX KSDS INDEX CI

X'D0' trace entry

The X'D0' trace entry is shown.

The X'D0' trace entry

Words 0 and 1 are common to all X'D0' trace entries. The format of words 2 through 7 depends on the content of the trace entry.

Word 0

Byte 1 X'D0' - IRLM notify sent trace entry

Byte 2 PST number

Bytes 3 and 4

Trace sequence number

Word 1

Byte 1 Sub-route code:

4 VSAM buffer invalidation

8 VSAM write I/O error

12 or 40

VSAM data set extension

16 OSAM buffer invalidation

20 OSAM write I/O error

24 or 44

OSAM data set extension

28 Force snap

|		32 or 36
|		Extended error queue element add or delete
|		48 Added RSR sharing partner
|		Bytes 2 and 3
|		DMB number or PID for partition
|		Byte 4 DCB number

Format for buffer invalidation or write error notify: Words 2 - 7 use the following format in a trace record for a buffer invalidation or write error notification:

|	Word 2	
|		RBN/RBA of buffer
|	Word 3	
|		Not used
|	Word 4	
|		Not used
|	Word 5	
|		Not used
|	Word 6	
|		Bytes 1 to 3
|		Not used
|		Byte 4 NCBFLAG
|	Word 7	
|		Not used

Format for OSAM data set extend: Words 2 - 7 use the following format in a trace record for an OSAM data set extension:

|	Word 2	
|		DCBHIBLK
|	Word 3	
|		DCBRLBLK
|	Word 4	
|		DCBRBASN
|	Word 5	
|		Volume serial number
|	Word 6	
|		Bytes 1 and 2
|		Volume serial number (continued)
|		Byte 3 Not used
|		Byte 4 NCBFLAG
|	Byte 7	Not used

Words 2 - 7 use the following format in a trace record for a VSAM data set extension:

|	Word 2	
|		VSILVL - VSI level number (current)

Word 3
 VSIHRBA - Highest-used relative byte address (current)

Word 4
 VSIERBA - Highest-allocated relative byte address (current)

Word 5
 VSILVL - VSI level number (extent)

Word 6
 VSIHRBA - Highest-used relative byte address (extent)

Word 7
 VSIERBA - Highest-allocated relative byte address (extent)

X'D1' trace entry

The X'D1' trace entry contains information about buffer invalidations or write errors.

Words 0 and 1 are common to all X'D1' trace entries. The format of words 2 through 7 depends on the content of the trace entry.

Word 0

Byte 1 Trace entry code X'D1'

Byte 2 Not used (no PST number)

Bytes 3 and 4
 Trace sequence number

Word 1

Byte 1 Sub-route code from the DFSNCB macro

Bytes 2 and 3
 DMB number or PID for partition

Byte 4 DCB number

Words 2 - 7 for a buffer invalidation or write error notification record use the following format:

Word 2

RBN/RBA of buffer

Word 3

Buffer prefix address

Word 4

Byte 1 SB global serialization trace field:

X'80' Global serialization entered (SBH search started)

X'40' Waiting PST was posted.

Byte 2 Not used

Bytes 3 and 4
 Number of invalidated buffers

Word 5

Last invalidated buffer address

Word 6

|	Bytes 1, 2, and 3
|	Not used
|	Byte 4 NCBFLAG
|	Word 7
|	Subsystem ID
|	Words 2 - 7 for an OSAM data set extent record use the following format:
|	Word 2
|	DCBHIBLK
|	Word 3
|	DCBRLBLK
|	Word 4
|	DCBRBASN
|	Word 5
|	Volume serial number
|	Word 6
|	Bytes 1 and 2
|	Volume serial number
|	Byte 3 Not used
|	Byte 4 NCBFLAG
|	Word 7
|	Subsystem ID
|	Words 2 - 7 for a VSAM data set extent record use the following format:
|	Word 2
|	VSILVL - VSI level number (current)
|	Word 3
|	VSIMRBA - Highest relative byte address (current)
|	Word 4
|	VSILVL - VSI level number (extent)
|	Word 5
|	VSIMRBA - Highest relative byte address (extent)
|	Word 6
|	AMP address
|	Word 7
|	Subsystem ID

X'D9' trace entry

The X'D9' trace entry is shown.

The X'D9' trace entry - words 0 through 2

Most X'D9' trace entries have the following information in the first three words, except for OLR command processing. The following figure shows words 0 through 2 of the X'D9' trace entry.

TRACE ID = X'D9'

word 0 – byte 1 - x'D9' - Online Reorganization (OLR) trace

```

        entry.
        byte 2 - PST number.
        bytes 3-4 - Trace sequence number.
word 1 - byte 1 - Module ID.
        byte 2 - Module subcode.
        bytes 3-4 - Local DMB number.
word 2 - bytes 1-2 - Global DMB number.
        bytes 3-4 - Partition ID.

```

X'D9' trace entry: OLR output data set validation or creation and inactive data set deletion

The following figure shows words that are specific to the OLR output data set validation or creation and inactive data set deletion.

TRACE ID = X'D9'

```

word 3 - bytes 1-2 - Error message number as four packed
                decimal digits or as binary 0 if there
                is no error.
        byte 3 - Reserved, 0.
        byte 4 - DCB number for the data set involved.
                The x'80' bit is on if the data set is
                one of the M through V and Y data sets
                (see notes 1 and 2 below).
word 4 - bytes 1-4 - DDIR address.

```

Notes:

1. When no error has occurred, the error message number in word 3 has a value of binary zero, and there is no further information in the trace entry beyond word 4.
2. For the following error message numbers, there is information that is specific to the particular error:

Unexpected error from system macro instruction:

```

words 5-6 - Macro name.
word 7 - bytes 1-2 - Return code.
        bytes 3-4 - Reason Code.

```

2991 - Output data set validation error:

```

word 5 - Reason code from DFS2991I message text.

```

2992 - Unexpected error from CSI or catalog management, form 1:

```

word 5 - Reason area from CSI or catalog management
word 6 - byte 1 - Reason area type:
        'C' catalog error
        'D' data set error
        'I' CSI call

```

2992 - Unexpected return code from CSI, form 2:

```

word 5 - Return code from CSI call.
word 6 - byte 1 - X'00'
        bytes 2-4 - Reason code from CSI call.

```

2993 - Unexpected device class:

```

word 5 - byte 1 - UCB device class.

```

2994 - Unexpected IDCAMS return code creating a data set:

```

word 5 - Return code from IDCAMS.

```

2995 - Unexpected IDCAMS return code deleting a data set:

```

word 5 - Return code from IDCAMS.

```

2996 - Insufficient DASD space to create a data set:

word 5 - bytes 1-2 - SVC 99 error reason
code.
bytes 3-4 - Reserved.
word 6 - SMS error reason code.
word 7 - Number of blocks wanted.

2998 - Miscellaneous SVC 99 errors creating a data set:

word 5 - SVC 99 error reason
code.
bytes 3-4 - Reserved.
word 6 - SMS error reason code.
word 7 - Number of blocks wanted.

The following table shows the module ID and module subcode values for the X'D9' trace entries that represent the OLR output data set validation or creation process and the inactive data set deletion process.

Table 29. Module and subcode ID for X'D9'

Module ID	Module	Subcode	Meaning
A	DFSORA00	X'10'	Data set creation successful
A	DFSORA00	X'11'	Data set creation successful
A	DFSORA00	X'12'	Data set creation successful
A	DFSORA00	X'13'	Data set creation successful
A	DFSORA00	X'14'	Data set validation successful
A	DFSORA00	X'15'	Data set validation successful
A	DFSORA00	X'16'	Data set validation successful
A	DFSORA00	X'20'	Primary index was not a VSAM KSDS
A	DFSORA00	X'21'	VSAM data set did not have REUSE attribute
A	DFSORA00	X'22'	VSAM record length did not match input
A	DFSORA00	X'23'	VSAM control interval size did not match input
A	DFSORA00	X'24'	KSDS key offset or length size did not match input
A	DFSORA00	X'25'	Miscellaneous errors; another trace entry precedes this one
A	DFSORA00	X'C1'	Internal error: invalid DFSORA00 call
A	DFSORA00	X'C2'	Internal error: No data set in X'2930' log record
A	DFSORA00	X'C3'	Invalid input data set
A	DFSORA00	X'C4'	Multi-volume input, but no output data set
A	DFSORA00	X'C5'	Non-DASD data set
A	DFSORA00	X'C6'	Multi-volume data set to be recovered
A	DFSORA00	X'C7'	Non-DASD data set
A	DFSORA00	X'C8'	Data set not usable for OSAM
A	DFSORA00	X'C9'	Data set is a PDS or PDSE

Table 29. Module and subcode ID for X'D9' (continued)

Module ID	Module	Subcode	Meaning
A	DFSORA00	X'D1'	Data set is not VSAM
A	DFSORA00	X'D2'	Data set is not a VSAM KSDS
A	DFSORA00	X'D3'	VSAM data set did not have REUSE attribute
A	DFSORA00	X'D4'	VSAM record length did not match input
A	DFSORA00	X'D5'	VSAM control interval size did not match input
A	DFSORA00	X'D6'	KSDS key offset or length size did not match input
A	DFSORA00	X'D7'	Data set not usable for OSAM
A	DFSORA00	X'D8'	Data set is a PDS or PDSE
A	DFSORA00	X'D9'	Data set is not VSAM
A	DFSORA00	X'E2'	Data set is not a VSAM KSDS
A	DFSORA00	X'E3'	VSAM data set did not have REUSE attribute
A	DFSORA00	X'E4'	VSAM record length did not match input
A	DFSORA00	X'E5'	VSAM control interval size did not match input
A	DFSORA00	X'E6'	KSDS key offset or length size did not match input
A	DFSORA00	X'E7'	Data set not usable for OSAM
A	DFSORA00	X'E8'	Data set is a PDS or PDSE
A	DFSORA00	X'E9'	Data set is not VSAM
B	DFSORA10	X'C1'	Data set error reported by CSI
B	DFSORA10	X'C2'	No error information available from CSI
B	DFSORA10	X'C3'	Catalog error reported by CSI
B	DFSORA10	X'C4'	Unexpected return code 4 from CSI
B	DFSORA10	X'C5'	Unexpected return code 4 from CSI
B	DFSORA10	X'C6'	Unexpected return code from CSI
B	DFSORA10	X'C7'	Unexpected return code from DEVTYPE
B	DFSORA10	X'C8'	Data set not on volume
B	DFSORA10	X'C9'	Unexpected return code from OBTAIN
B	DFSORA10	X'D1'	Unexpected return code from OBTAIN
B	DFSORA10	X'D2'	Unexpected return code from TRKCALC

Table 29. Module and subcode ID for X'D9' (continued)

Module ID	Module	Subcode	Meaning
B	DFSORA10	X'D3'	Unexpected return code 12 from GETDSAB
B	DFSORA10	X'D4'	Unexpected return code from GETDSAB
B	DFSORA10	X'D5'	Unexpected return code from SWAREQ
B	DFSORA10	X'D6'	Invalid data set name
D	DFSORA20	X'C1'	SVC 99 information reason returned
D	DFSORA20	X'C2'	Insufficient space on volume
D	DFSORA20	X'C3'	Data set in use
D	DFSORA20	X'C4'	Insufficient space, SMS
D	DFSORA20	X'C5'	SVC 99 error and SMS reason returned
D	DFSORA20	X'C6'	SVC 99 error code returned
D	DFSORA20	X'C7'	SVC 99 error code returned
D	DFSORA20	X'C8'	Unexpected return code from SVC 99
D	DFSORA20	X'C9'	SVC 99 information reason returned
D	DFSORA20	X'D1'	SVC 99 error code
D	DFSORA20	X'D2'	Unexpected return code from SVC 99
D	DFSORA20	X'D3'	Unexpected return code from IDCAMS
E	DFSORA30	X'C1'	Unexpected return code from IDCAMS
G	DFSORA40	X'C1'	GETMAIN failure

X'D9' trace entry: fence value before an OLR IPOST/IWAIT

The following figure shows the remaining words of the X'D9' trace entries that are specific to the fence value before an OLR IPOST/IWAIT:

```
TRACE ID   = X'D9'

      word 3 - Can contain the address of the PST
                to be posted.
      words 4-5 - Contains DMBORFEN.
      words 6-7 - Contains DMBAMFEN.
```

The following table shows the module ID and module subcode values for the X'D9' trace entries that represent the fence value before an OLR IPOST/IWAIT.

Table 30. Module and subcode ID for X'D9': fence value before an OLR IPOST/IWAIT

Module ID	Module	Subcode	Meaning
J	DFSORP70	X'01'	IPOST for the OLR I/O fence

Table 30. Module and subcode ID for X'D9': fence value before an OLR IPOST/
WAIT (continued)

Module ID	Module	Subcode	Meaning
J	DFSORP70	X'02'	IWAIT for the OLR action module fence
J	DFSORP70	X'03'	IPOST for the OLR I/O fence
J	DFSORP70	X'04'	IWAIT for the OLR action module fence
L	DFSORP40	X'01'	IWAIT for the OLR action module fence
L	DFSORP40	X'02'	IPOST for the OLR action module fence
M	DFSPCSH0	X'01'	IWAIT for the OLR action module fence
M	DFSPCSH0	X'02'	IPOST for the OLR action module fence
M	DFSPCSH0	X'03'	IWAIT for the OLR action module fence
M	DFSPCSH0	X'04'	IPOST for the OLR action module fence
O	DFSDLOC0	X'01'	IPOST for the OLR I/O fence
O	DFSDLOC0	X'02'	IWAIT for the OLR I/O fence
R	DFSDLR00	X'01'	IPOST for the OLR action module fence
R	DFSDLR00	X'02'	IPOST for the OLR action module fence
R	DFSDLR00	X'03'	IWAIT for the OLR action module fence
R	DFSDLR00	X'04'	IPOST for the OLR action module fence
R	DFSDLR00	X'05'	IPOST for the OLR action module fence
R	DFSDLR00	X'06'	IWAIT for the OLR action module fence
R	DFSDLR00	X'07'	IWAIT for the OLR action module fence
R	DFSDLR00	X'08'	IWAIT for the OLR action module fence
S	DFSDVBH0	X'01'	IWAIT for the OLR I/O fence
S	DFSDVBH0	X'02'	IPOST for the OLR I/O fence
V	DFSDVSM0	X'01'	IPOST for the OLR I/O fence
V	DFSDVSM0	X'02'	IPOST for the OLR I/O fence

X'D9' trace entry : next UOR determination

The following figure shows the remaining words of the X'D9' trace entries that are specific to the next UOR determination.

TRACE ID = X'D9'

word 3 - The total number of UORs performed.
word 4 - The execution span for this UOR.
word 5 - The proposed size for the next UOR.
word 6 - The total bytes moved during this UOR.
word 7 - The total locks held during this UOR.

X'D9' trace entry: OLR command processing

The following figure shows the X'D9' trace entry definitions used by the Online Reorganization (OLR) command processing:

TRACE ID = X'D9'

word 0 - byte 1 - X'D9' Online Reorganization (OLR) trace entry.
byte 2 - Zero - not used.
bytes 3-4 - Trace sequence number.
word 1 - byte 1 - Module ID.
byte 2 - Module subcode.
byte 3 - Module function.
byte 4 - FREESTOR error return code.
word 2 - Last 4 bytes of the IMS ID (SCDIMSNM+4) processing the command.
words 3-4 - Command VERB (INIT, UPD, TERM, and QRY if an type-2 command)
words 5-6 - Operation Manager name ('NONOMCMD' if OLR type-1 command.
word 7 - Address of storage not freed if FREESTOR failure.

For all X'D9' trace entries, the module ID, and usually the module subcode as well, indicate both the meaning of the trace entry and the format of the rest of the trace entry.

The following table shows the module ID values in X'D9' trace entries that represent OLR command processing.

Table 31. Module and subcode ID for X'D9': OLR command processing

Module ID	Module	Subcode	Meaning
C	DFSORC00	X'00'	OLR type-2 command issued
C	DFSORC00	X'01'	FREESTOR error during INIT error processing
C	DFSORC00	X'02'	FREESTOR error after sending command response
P	DFSORC10	X'00'	OLR type-1 command issued
P	DFSORC10	X'01'	FREESTOR error during INIT processing cleanup

X'D9' trace entry: OLR start

The following figure shows the remaining words of the X'D9' trace entries that are specific to the OLR start.

X'D9' trace entry - words specific to OLR start

TRACE ID = X'D9'

word 3 - The RBA of the cursor in the second CI

or block.
word 4 - Unused.
word 5 - Unused.
word 6 - Unused.
word 7 - Unused.

X'D9' trace entry: start of a UOR

The following figure shows the remaining words of the X'D9' trace entries that are specific to the start of a UOR.

X'9D' trace entry - words specific to start of UOR

TRACE ID = X'D9'

word 3 - The first four bytes of the last committed cursor.
word 4 - The start time of this UOR.
word 5 - The execution span for this UOR.
word 6 - The time that was waited before this UOR started.
word 7 - Unused.

X'D9' trace entry: UOR wait for timer

The following figure shows the X'D9' trace entries that are specific to the UOR wait for timer.

X'9D' trace entry - words specific to UOR wait for timer

TRACE ID = X'D9'

word 3 - Unused
word 4 - The start time of this UOR.
word 5 - The execution span for this UOR.
word 6 - The time that will be waited before the next UOR starts.
word 7 - Unused.

X'D9' Trace Entry: OLR Full-Block Logging

TRACE ID = X'D9'

Word 3 - Not used
Word 4 - AMP
Word 5 - Buffer prefix (IBFPRF for OSAM or IDABUFC for VSAM)
Word 6 - Block number for OSAM or RBA for VSAM

The following table shows the module ID and module subcode values for the X'D9' trace entries that represent the OLR logging of a full-block of database changes in a single X'5050' log record rather than the logging of individual database changes in separate log records.

Table 32. Module and subcode ID for X'D9': OLR full-block logging

Module ID	Module	Subcode	Meaning
F	DFSDBH20	X'00'	After full-block logging during OSAM buffer steal
H	DFSDBH30	X'00'	After full-block logging during OSAM buffer purge
S	DFSDBVH0	X'03'	After full-block logging by DL/I buffer handler router before purge

Table 32. Module and subcode ID for X'D9': OLR full-block logging (continued)

Module ID	Module	Subcode	Meaning
V	DFSDVSM0	X'03'	Before full-block logging during VSAM buffer purge
V	DFSDVSM0	X'04'	After full-block logging during VSAM buffer purge

X'D9' Trace Entry: OLRK PNDX Store

TRACE ID = X'D9'

Word 3 - OLRK entry address
 Word 4 - Root RBA of the primary index entry.
 Word 5 byte 1 - x'80' entry for primary index entry or VSAM)
 byte 2 - x'80' queued onto chain by OLR

X'D9' Trace entry: OLRK ILE Store

TRACE ID = X'D9'

Word 3 - OLRK entry address
 Words 4,5 - Key of ILDS record
 Word 6 byte 1 - segment code
 byte 2 - x'40' entry for ILDS entry
 byte 3 - x'80' queued onto chain by OLR

X'D9' Trace entry: OLRK ILE Write

TRACE ID = X'D9'

Word 3 - OLRK entry address
 Word 4,5 - Key of ILDS record
 Word 6 byte 1 - segment code
 byte 2 - x'40' entry for ILDS entry
 byte 3 - x'40' written to KSDS by VSAM interface
 x'20' deleted off chain by OLR

X'FB' Trace entry: PSTSTLOR.

INSERT LOGICAL RECORDS (KSDS) to the primary index database or INSERT LOGICAL RECORDS (KSDS) to the ILDS database for HALDB integrated online reorganization. See the previous OLRK ILE/ILDS Store/Write trace entries that are associated with this trace entry.

TRACE ID = X'FB'

Word 3 - Unused
 Word 4 - Unused
 Word 5 - Unused
 Word 6 - Unused
 Word 7 - Unused

X'DA' trace entry

The X'DA' trace entry is shown.

X'DA' trace entry

TRACE ID = X'DA'

word 0 - byte 1 - X'DA' - VSAM JRNAD or UPAD exit
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
 word 1 - Word 3 of JRNAD or UPAD parameter list

word 2 - Word 4 of JRNAD or UPAD parameter list
word 3 - Word 5 of JRNAD or UPAD parameter list
word 4 - byte 1 - JRNAD or UPAD code (For an explanation of these codes, see note 3 below)
word 4 bytes 2-4 - AMB address
word 5 - PLH STACK or VSAM FOOTSTEPS
(see notes 1 - 4 below)
word 6 - PLH STACK or VSAM FOOTSTEPS
(see notes 1 - 4 below)
word 7 - PLH STACK or VSAM FOOTSTEPS
(see notes 1 - 4 below)

Notes:

1. If the trace contains the PLH stack entries, these entries are the module addresses of the last five VSAM record management modules that had control. If the trace contains the VSAM footsteps, each VSAM footstep is a 1 byte entry which contains VSAM diagnostic information.
2. The PLH footsteps contain 1 byte of VSAM diagnostic data and is passed back to IMS in order from last to first footstep.
3. This information might be valuable to the VSAM support representatives if you need their assistance.
4. For an explanation of these codes, see the following table.

Table 33. JRNAD and UPAD codes for X'DA' trace entry

Code	Code (hexadecimal)	Meaning
JRNAD	0C	Logical records to be shifted in a KSDS
JRNAD	10	Cannot occur
JRNAD	14	Cannot occur
JRNAD	20	Control area split starting in a KSDS
JRNAD	24	Control interval read error
JRNAD	28	Control interval write error
JRNAD	2C	Control interval to be written
JRNAD	30	Control interval to be read and marked exclusive
JRNAD	34	Control interval ownership to be established
JRNAD	38	Control interval to be marked exclusive
JRNAD	3C	Create a new control interval
JRNAD	40	Release exclusive use of control interval
JRNAD	44	Mark control interval prefix invalid
JRNAD	48	Control interval read completed
JRNAD	4C	Control interval write completed
JRNAD	50	CI or CA split
JRNAD	54	Control area reclaim start
JRNAD	58	Control area reclaim end
JRNAD	5C	Control area reclaim interrupted
JRNAD	60	Control area reclaim recovery start
JRNAD	64	Control area reclaim recovery end
JRNAD	68	Start of reuse reclaimed control area
JRNAD	6C	End of reuse reclaimed control area

Table 33. JRNAD and UPAD codes for X'DA' trace entry (continued)

Code	Code (hexadecimal)	Meaning
UPAD	00	Wait requested on I/O or defer
UPAD	04	Post ECB (XMEM only)

X'DB' through X'FA' trace entry

The X'DB' through X'FA' trace entries are shown.

The X'DB' through X'FA' trace entries

TRACE ID = X'DB' - X'FA'

word 0 - byte 1 - X'DB' through X'FA'PSTFNCTN - Buffer handler trace -
This is the function
from X'DB' thru X'FA' for which the trace
was written (see note 1 below).
byte 2 - PST number (see note 2 below)
bytes 3-4 - Trace sequence number
word 1 - bytes 1-2 - PSTDMBNM - DMB number. This field
indicates which DMB is being used.
The DMB directory (DDIR) gives the
first DMB.
byte 3 - PSTDCBNM - DCB number
byte 4 - PSTRTCDE - Usually
indicates an error if nonzero. If an error,
PSTDATA may contain residual data from the
last call (see note 3 below)
word 2 - byte 1 - PSTTRMID - ID of the module calling the buffer
handler
byte 2 - PSTTRMSC - Subcode of the module calling the
buffer handler
byte 3 - PSTBHFLG - DL/I buffer handler flags
byte 4 - PSTSUBCD - Buffer handler internal work byte
word 3 - PSTDSGA - Address of the DSG
word 4 - PSTDATA - Address in real storage of the requested data.
May point to the last retrieved data address in a call
(failed abend) (see note 4 below).
word 5 - PSTBUFFA - Address of buffer header. OSAM uses IBFPRF
DSECT. VSAM uses IDABUFC DSECT.
word 6 - PSTISAMW - Work area
word 7 - PSTBYTNM - Relative byte number of data or
block number (see note 5 below).

Notes:

1. The IMS internal function that was being performed.
2. Use only the trace entries with the correct PST number.
3. Shows how the call completed. (X'00' means successful completion.)
4. Shows where the requested data is located in core only if the call completed successfully.
5. The RBA or block number that the call requested.

If the call failed, the PSTDATA field might contain the address of the last segment successfully retrieved.

Example: PSTRTCDE = X'04' (RBA past end of data set).

Related reference:

“Space management and buffer handler module trace IDs” on page 196

“Buffer handler trace entries at the database tracker” on page 436

Database function codes

The DL/I function codes are shown.

Buffer handler function codes

PSTFNCTN is located at PST + X'1C4'.

The following table shows the buffer handler function codes.

Table 34. Buffer handler function codes

Code (hex)	PSTFNCTN	Caller's request function
DB	PSTSRCHP	Search pool for record in range
DD	PSTRELLR	Release record ownership
DE	PSTRSTAT	Retrieve buffer pool statistics
DF	PSTVERFY	Verify VSAM data set
E0	PSTVPUT	Put record to VSAM data set
E1	PSTBKLCT	Block Locate
E2	PSTBYLCT	Byte Locate
E3	PSTISRCH	Not used
E4	PSTIESDS	Create new ESDS/OSAM LRECL
E5	PSTPGUSR	Write LRECLS for user (PURGE)
E6	PSTBFALT	Mark record altered
E9	PSTFBSPC	Free space in buffer pool (BFPL)
EA	PSTOWTCK	Perform background write function
EB	PSTBYALT	Byte locate and mark altered
EC	PSTBFMPT	Mark buffers empty (BFPL)
ED	PSTCHKPT	Checkpoint
EE	PSTSTAPG	Batch STAE purge at ABEND
EF	PSTERRPG	Purge user for I/O error check
EF	PSTFRWRT	OSAM buffer forced write
F0	PSTSTLBG	Retrieve first LRECL by key
F1	PSTERASE	Erase logical record
F2	PSTSTLEQ	Retrieve by key EQ or GT
F3	PSTSTLCI	Retrieve key EQ or GT - repair CI
F4	PSTSTLIS	Retrieve by key REC to chain from insert logical record (KSDS)
F5	PSTBXFER	RSR DTT BQEL transfer
F6	PSTBPURG	RSR DTT Purge/Release BQEL
F7	PSTRSIAB	Reset invalidate all buffers trigger
F9	PSTCPYGU	Position by key for Image Copy
FA	PSTCPYGN	Get next record for Image Copy

The following table shows the space management function codes.

Table 35. Space management function codes

Code (hex)	PSTFNCTN	Caller's request function
31	PSTGTSPC	Get space for the segment
32	PSTFRSPC	Free space for the segment
34	PSTGTRAP	Get space close to root anchor PSTBYTNM. Request to turn off bit map bit. Refer to label PSTBTMPF.
35	PSTGZIDL	Get local serialization as a service to LRH00 during /ERE when IRLM as SLM is not there.
36	PSTRZIDL	Release local serialization
B1	PSTGTSPH	Request for space at BLOCK and OFFS B2-B5 are reserved for tracing PSTDATA. PSTOFFSET must point to the location requested.

The following table shows the Open/Close function codes.

Table 36. Open/Close function codes

Code (hex)	PSTFNCTN	Caller's request function
00	PSTOCCLS	This is a close call. This is the absence of PSTOCOPN (X'08') or PSTOCOPN is reset.
01	PSTOCDMB	The DDIR address is in register 2
02	PSTOCPCB	The PCB address is loaded from PSTDBPCB to registers 1
04	PSTOCALL	OPEN/CLOSE all DMBs in the system
08	PSTOCOPN	This is an OPEN call
0C		Combine X'04' and X'08'
10	PSTOCDCB	OPEN/CLOSE DCB PSTDSCGA = DSG
20	PSTOCLD	Open for load
21	PSTOCDMA	CLOSE and UNAUTHORIZE DMB address of DDIR in register 2
40	PSTOCDSG	OPEN/CLOSE DSG PSTDSCGA = DSG
80	PSTOCBAD	The PSTOCBAD (X'80') is set to indicate to the caller that the requested function failed

The following table shows the index maintenance function codes.

Table 37. Index maintenance function codes

Code (hex)	PSTFNCTN	Caller's request function
A0	PSTXMDLT	Index maintenance for segment to be deleted
A1	PSTXMRPL	Index maintenance for segment to be replaced
A2	PSTXMISR	Index maintenance for segment to be inserted
A3	PSTXMUNL	Index maintenance for segment to be unloaded

The following table shows the block loader function codes.

Table 38. Block loader function codes

Code (hex)	PSTFNCTN	Caller's request function
00	PSTRSVDB	Reserve database resources
01	PSTDMBRD	Read DMB from ACBLIB
02	PSTPSBRD	Read PSB from ACBLIB
03	PSTINTRD	READ INTENT and DMB name lists from ACBLIB
04	PSTENQ	PI Processing is required
40	PSTEREFF	Free DB resources (SCHED failed)
80	PSTFREDB	Free DB resources (termination)

Buffer handler return codes

The buffer handler return codes, subcodes, and definitions are listed and defined.

Buffer handler return codes

The following table describes the buffer handler return codes.

Table 39. Buffer handler return codes

Return code	Subcode	Definition
PSTCLOK	X'00'	Everything correct
PSTGTDS	X'04'	RBN beyond data set
PSTRDERR	X'08'	Permanent read error
PSTNOSPC	X'0C'	No more space in data set
PSTBDCAL	X'10'	Illegal call
PSTENDDA	X'14'	End of data set encountered — no record returned
PSTNDTFD	X'18'	Requested record cannot be found
PSTNWBLK	X'1C'	New block created in buffer pool
PSTNPLSP	X'20'	Insufficient space in pool.
PSTTRMNT	X'24'	User must terminate, no space in pool.
PSTDUPLR	X'28'	Logical record already in KSDS.
PSTWRERR	X'2C'	Permanent write error.

Table 39. Buffer handler return codes (continued)

Return code	Subcode	Definition
PSTBUFIN	X'30'	Buffer invalidate.
PSTBIDIN	X'34'	Unable to acquire BID lock.
PSTPDERR	X'38'	Unable to locate DDIR/PDIR entry.
PSTNOSTO	X'3C'	Storage not available.
PSTRRERR	X'40'	CF read and register error.
PSTCURER	X'44'	Space management OLR cursor error.
PSTCLSDS	X'48'	Attempt to access a closed data set.

Space management and buffer handler module trace IDs

In space management and DL/I buffer handler trace entries, a 1-byte module ID identifies the calling module. A 1-byte subcode identifies the specific call within the module.

Space management and DL/I buffer handler trace entries

The calling module places the module ID in field PSTTRMID and the subcode in field PSTTRMSC before making the call. The DL/I buffer handler and space management then move these PST fields to the appropriate traces.

The PSTTRMSC module subcodes are 0 through 9 and A through Z. If you need to find the point in the module where the call was made, look for the TIDSCx label that corresponds to the module subcode. Subcode 0 corresponds to label TIDSC0, subcode 1 to label TIDSC1, subcode A to TIDSCA, and so on.

The following table describes the ID, the calling module, and the module function

Table 40. Space management and DL/I buffer handler module trace IDs

ID label	Module ID	Calling module	Module function
TIDDLA00	A	DFSDLA00	Call analyzer
TIDDLAS0	A	DFSDLAS0	Call analyzer SSA
TIDORA00	A	DFSORA00	OLR data set creation/deletion
TIDZDC00	A	DFSZDC00	GSAM Controller
TIDORA10	B	DFSORA10	OLR data set information
TIDZDI00	B	DFSZDI00	GSAM Initialization
TIDORC00	C	DFSORC00	OLR OM command processor
TIDZDI20	C	DFSZDI20	GSAM Initialize GB
TIDDLDC0	D	DFSDLDC0	DELETE/REPLACE
TIDORA20	D	DFSORA20	Create data sets for OLR
TIDZDI30	D	DFSZDI30	GSAM Buffering Initialization
TIDFLST0	E	DFSFLST0	Batch STAE exit
TIDORA30	E	DFSORA30	Delete data sets for OLR
TIDZD110	E	DFSZD110	GSAM BSAM OPEN / CLOSE
TIDLRH00	F	DFSLRH00	LOCK request handler
TIDZD150	F	DFSZD150	GSAM VSAM OPEN / CLOSE

Table 40. Space management and DL/I buffer handler module trace IDs (continued)

ID label	Module ID	Calling module	Module function
TIDORA40	G	DFSORA40	Performs OLR IDCAMS
TIDSDLB0	G	DFSSDLB0	IRLM status routine
TIDZD210	G	DFSZD210	GSAM BSAM I/O
TIDFXC50	H	DFSFXC50	DB SYNC point
TIDZD250	H	DFSZD250	GSAM VSAM I/O
TIDDT400	I	DFSDT400	RSR DB Tracking
TIDORP60	I	DFSORP60	OLR interfaces to DBRC
TIDZD310	I	DFSZD310	GSAM Buffer I/O
TIDDT500	J	DFSDT500	RSR DB MILESTONE PURGE
TIDDDLE1	K	DFSDDLE0	LOAD INSERT function
TIDZSR00	K	DFSZSR00	GSAM Extended checkpoint
TIDDDLE0	L	DFSDDLE0	LOAD INSERT function
TIDORP40	L	DFSORP40	OLR termination and cleanup
TIDZSR10	L	DFSZSR10	GSAM Restart positioned
TIDPCSH0	M	DFSPCSH0	Partitioning Common Services Handler
TIDORP20	N	DFSORP20	OLR cursor and commit manager
TIDDLOC0	O	DFSDLOC0	OPEN/CLOSE
TIDDLOV0	O	DFSDLOV0	LOGICAL/VIRTUAL OPEN
TIDDCAP0	P	DFSDCAP0	Full-Function Data capture
TIDORC10	P	DFSORC10	OLR type-1 command processor
TIDDDUI0	Q	DFSDDUI0	DUI processor
TIDDLR00	R	DFSDLR00	RETRIEVE function
TIDDHD00	S	DFSDHD00	Space Manager (INIT procedure)
TIDDVBH0	S	DFSDVBH0	Buffer handler router
TIDFRSP0	S	DFSFRSP0	Space Manager (free space)
TIDGGSP0	S	DFSGGSP0	Space Manager (GET space)
TIDMMUD0	S	DFSMUD0	Space Manager (bit map update)
TIDRCHB0	S	DFSARCHB0	Space Manager (SEARCH block)
TIDRRHM0	S	DFSRRHM0	Space Manager (SEARCH bit map)
TIDRRHP0	S	DFSRRHP0	Space Manager (buffer pool)
TIDTOBH0	T	DFSTOBH0	I/O toleration buffer handler caller
TIDTOCL0	T	DFSTOCL0	I/O toleration DB close
TIDDPSB0	U	DFSDPSB0	PSB generator module
TIDURDB0	U	DFSURDB0	Database Recovery utility
TIDURGP0	U	DFSURGP0	Database Prefix Update utility
TIDURGS0	U	DFSURGS0	Database Scan utility
TIDBACK0	V	DFSBBO00	BATCH backout utility
TIDDVSM0	V	DFSDVSM0	VSAM interface
TIDURRL0	V	DFSURRL0	HISAM Reorganization Reload utility

Table 40. Space management and DL/I buffer handler module trace IDs (continued)

ID label	Module		Module function
	ID	Calling module	
TIDURUL0	V	DFSURUL0	HISAM Reorganization Unload utility
TIDUCPD0	W	DFSUCPD0	UCF DB ZAP processor utility
TIDUCPE0	W	DFSUCPE0	UCF subroutines utility
TIDUICC0	W	DFSUICP0	Online Image Copy utility
TIDDXMT0	X	DFSDXMT0	Index maintenance
TIDRBOI0	Y	DFSRBOI0	Backout RESTART/DYN/BATCH
TIDRDBC0	Z	DFSRDBC0	Database backout control
TIDPSEL0	M	DFSDBH20 DFSDBH30 DFSDVSM0	Partition Selection Handler

Example of a DL/I trace

The following example shows a DL/I trace. The trace entries show two GHU calls. All calls use Program Specification Table (PST) 01. When activities for different PSTs are intermixed in the trace table, you need to examine only the entries for the PST that you are interested in.

FUNCTION	WORD 0	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6	WORD 7	PAGE 0001
* DL1 TRACE TABLE -	DATE 89039	TIME 17450600	SKIP 0000	TOTAL SKIP 00000000	RECORD NUMBER 00000007				
ANALYZE CALL	AA01008A	00008DE0	GHU	0A0D60	03080800	00004892	00004000	0008F200	.....GHU ...-.....K... ..2.
VSAM EXIT	DA01008B	0272FA60	06000000	00002400	34B95982	B96E24B9	BCE6BA6E	50B9AE68	.....B.>...W.>&...
PSTBYLCT	E201008C	00040100	D2014400	000A101C	0273720C	0272FA60	0274E45E	0000260C	S.....K.....-...U;...
VSAM EXIT	DA01008D	0272FAB0	06000000	00004800	34B95982	B96E24B9	BCE6BA6E	50B9AE68	.....B.>...W.>&...
PSTBYLCT	E201008E	00030100	D2014400	000A205C	02739092	0272FAB0	0274E45E	00004892	S.....K.....*.K.....U;...K
VSAM EXIT	DA01008F	0272FB50	06000000	00002400	34B95982	B96E24B9	BCE6BA6E	50B9AE68	.....&.....B.>...W.>&...
PSTBYLCT	E2010090	00030100	D2014400	000A205C	0273D354	0272FB50	0274E45E	00002754	S.....K.....*.L.....&..U;...
PSTBYLCT	E2010091	00030100	D2014400	000A205C	0273D11C	0272FB50	0274E45E	0000251C	S..J.....K.....*.J.....&..U;...
PSTBYLCT	E2010092	00030100	D2014400	000A205C	0273D354	0272FB50	0274E45E	00002754	S..K.....K.....*.L.....&..U;...
PSTBYLCT	E2010093	00030100	D2014400	000A205C	0273D11C	0272FB50	0274E45E	0000251C	S..L.....K.....*.J.....&..U;...
PSTBYLCT	E2010094	00030100	D2014400	000A205C	0273D020	0272FB50	0274E45E	00002420	S..M.....K.....*.L.....&..U;...
VSAM EXIT	DA010095	0272FAB0	06000000	00004800	34B95982	B96E24B9	BCE6BA6E	50B9AE68	...N.....B.>...W.>&...
PSTBYLCT	E2010096	00030100	D2014400	000A205C	02739092	0272FAB0	0274E45E	00004892	S..O.....K.....*.K.....U;...K
VSAM EXIT	DA010097	0272FB50	06000000	00002400	34B95982	B96E24B9	BCE6BA6E	50B9AE68	...P...&.....B.>...W.>&...
PSTBYLCT	E2010098	00030100	D2014400	000A205C	0273D354	0272FB50	0274E45E	00002754	S..Q.....K.....*.L.....&..U;...
ANALYZE CALL	AA010099	00008DE0	GHU	0A0D60	03280800	00004892	00004000	0008F200	...R.....GHU ...-.....K... ..2.
FUNCTION	WORD 0	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6	WORD 7	PAGE 0004
VSAM EXIT	DA01009A	0272FA60	06000000	00002400	34B95982	B96E24B9	BCE6BA6E	50B9AE68	.....B.>...W.>&...
PSTBYLCT	E201009B	00040100	D2014400	000A101C	0273720C	0272FA60	0274E45E	0000260C	S.....K.....-...U;...
VSAM EXIT	DA01009C	0272FAB0	06000000	00004800	34B95982	B96E24B9	BCE6BA6E	50B9AE68	.....B.>...W.>&...
PSTBYLCT	E201009D	00030100	D2014400	000A205C	02739092	0272FAB0	0274E45E	00004892	S.....K.....*.K.....U;...K
VSAM EXIT	DA01009E	0272FB50	06000000	00002400	34B95982	B96E24B9	BCE6BA6E	50B9AE68	.....&.....B.>...W.>&...
PSTBYLCT	E201009F	00030100	D2014400	000A205C	0273D354	0272FB50	0274E45E	00002754	S.....K.....*.L.....&..U;...
PSTBYLCT	E20100A0	00030100	D2014400	000A205C	0273D11C	0272FB50	0274E45E	0000251C	S.....K.....*.J.....&..U;...
PSTBYLCT	E20100A1	00030100	D2014400	000A205C	0273D354	0272FB50	0274E45E	00002754	S.....K.....*.L.....&..U;...
PSTBYLCT	E20100A2	00030100	D2014400	000A205C	0273D11C	0272FB50	0274E45E	0000251C	S..S.....K.....*.J.....&..U;...
PSTBYLCT	E20100A3	00030100	D2014400	000A205C	0273D020	0272FB50	0274E45E	00002420	S..T.....K.....*.L.....&..U;...
VSAM EXIT	DA0100A4	0272FAB0	06000000	00004800	34B95982	B96E24B9	BCE6BA6E	50B9AE68	...U.....B.>...W.>&...
PSTBYLCT	E20100A5	00030100	D2014400	000A205C	02739092	0272FAB0	0274E45E	00004892	S..V.....K.....*.K.....U;...K
VSAM EXIT	DA0100A6	0272FB50	06000000	00002400	34B95982	B96E24B9	BCE6BA6E	50B9AE68	...W...&.....B.>...W.>&...
PSTBYLCT	E20100A7	00030100	D2014400	000A205C	0273D354	0272FB50	0274E45E	00002754	S..X.....K.....*.L.....&..U;...

Related reference:

"X'DB' through X'FA' trace entry" on page 192

Delete/Replace - DL/I trace information

The DELETE/REPLACE module provides meaningful information when abnormal conditions arise leading directly to errors detected by Delete/Replace. This information can be found in the Delete/Replace work area (DLTWA).

Abends initiated by the Delete/Replace module (780, 796, 797, 798, 799, 802, 803, 804, 806, 807, 808, and 811) are traced in the DL/I trace table in a series of entries identified by an X'C4' in the first byte (TRACE FUNCTION CODE).

The first X'C4' entry in the series is provided by the routine that encountered the problem. Each additional entry is provided by the routine that called the routine which in turn wrote the prior entry in the table. Examining these entries in reverse sequence reveals the order in which control was passed from one routine to another.

You can obtain a complete description of the trace table entry for Delete/Replace by assembling the following lines of code:

```
DSECTS  CSECT
        DFSDLDC FUNC=DSECTS
        END
```

The second word in the Delete/Replace trace entry (called Entry1) uniquely identifies a Delete/Replace abend, and should be used by IBM and customers when submitting APARs for better problem description. In some cases, the Entry1 word from the next trace entry along with the first Entry1 word uniquely identifies the abend. The Entry1 format is:

```
BYTE 0   ID of routine supplying this entry
      1   ID of routine that encountered error
      2   Subcode number of abend if multiples
      3   Internal code for abend
```

Each routine within the Delete/Replace module has a unique 1-byte identification number. The IDs can be obtained from the assembly listings of each of the four source modules which make up the Delete/Replace call. In general they are:

```
X'01' to X'1F'—control and common subroutines (DFSDLDC0)
X'20' to X'3F'—delete routines (DFSDLDD0)
X'40' to X'5F'—replace routines (DFSDLDR0)
X'60' to X'7F'—DLTWA build routines (DFSDLDW0)
```

Use the Entry1 word (the second word in the trace entry) when relating to a Delete/Replace problem in IMS with IBM Software Support.

Retrieve trace

When an application program executes and a problem occurs (such as damaged data or unexpected results), you can use the Retrieve trace records to see how IMS responded to various calls in the application.

To set the Retrieve trace

To set the Retrieve trace on, use either of the following methods:

- At initialization time, IMS always turns the Retrieve trace on, except for batch.
- For DB/DC and DBCTL environments, use the /TRACE SET ON TABLE RETR command. If you start the DL/I trace by using the /TRACE SET ON TABLE DLI command, the Retrieve trace is not automatically turned on.

Note: The Retrieve trace cannot be turned on if the DL/I trace is not active.

To determine if the trace is in the dump, check field PSTDLR1 in the PST.

X'0700'

Indicates the trace is on.

X'07FC'

Indicates the trace is off.

Field PSTRTVTR of the PST contains the address of the trace table. The byte at PSTRTNDX contains the offset to the next entry in the table.

Every time an application issues a get or insert call, the retrieve module (DFSDLR00) is called. This module is very large and contains many subroutines. By looking at the Retrieve trace, you can see the flow of control through the various subroutines of the retrieve module. As each subroutine calls another, a 2-byte hexadecimal entry is inserted into the trace table. (Byte 1 of the trace entry is the ID of the calling subroutine; byte 2 is the ID of the subroutine that is called.)

The Retrieve trace table is filled from beginning to end. When the table becomes full, tracing starts at the beginning of the table, overlaying each old entry with the new entry.

The first entry in the trace table for a call is X'F1', which is paired with entries: X'2F' (UNQL), X'30' (ROOTISRT), or X'31' (QUAL). The presence of any of these entries indicates the beginning of a trace entry for a retrieve call.

Field JCBRTVTR in the JCB also contains Retrieve trace information. JDBRTVTR contains the offsets to the initial entries in the trace table for the previous four DL/I calls that are associated with a database. The offset to the last call is in the low-order byte, and all offsets are shifted left at the start of each new call.

Example of Retrieve Trace

The execution of an application results in an error message that indicates damaged data. You can refer to the Retrieve trace table and interpret the entries in order to determine if the problem is caused by:

- An application error
- A database design error
- An internal IMS DB problem
- An IMS system problem related to pointers

If you determine that the problem was caused by an application or database design error, you can use the Retrieve trace to debug and resolve the problem. Otherwise, you can do a keyword search. If the search results in a large number of problems, you can reduce the number of problems by including the name of the subroutine (listed in the following table) that you found in the Retrieve trace table.

Table 41. The subroutines of the retrieve module (DFSDLR00)

Hex ID	Subroutine title	Subroutine description
01	BLDVKEY	Builds alternate parent's concatenated key in work area.
02	CSIIGEXT	Reads root based on SSA qualification. If found, GE at level one. If not found, GE at level 0.
03	DIVRSETU	Position (DIV) was not found at this level. Sets off EOC and sets on not posted first child and siblings.
04	ENQDQ	Handles all enqueue and dequeue for retrieve.
05	FNDLPNQ	Final physical root of LP SDB and enqueue it.
06	FORTHISL	Tries to get a segment that satisfies the call at this level or higher.

Table 41. The subroutines of the retrieve module (DFSCLR00) (continued)

Hex ID	Subroutine title	Subroutine description
07	GEEXIT	Publishes GE status code or GB (if root SDBEOC on).
08	GETPSDB	Gets the PSDB of the segment pointed to by JCBACSC.
09	GETPRIME	Issues request for SETL to retrieve next higher root in database.
0A	STLALTPS	Processes request for data by key when an alternate processing sequence is used.
0B	ISRTMPOS	While positioning for insert, a matching segment was found; checks if permissible.
0C	ISRTPOS	Checks for LC insert to locate alternate parent, validate insert, or establish position on alternate twin chain.
0D	ISRTVER	Verifies segment in POSP points to segment in SDBPOSN for HDAM and HIDAM organizations.
0E	KDTEST	Compares value in SSA to value in segment or to key feedback for requalification.
0F	LCPTRTST	Used by CC=L processing to use PCL pointer, if any.
10	LTW	Main driver for requalification to determine the acceptability of current position.
11	LTWLRTN	Used by CC=L processing to see if on last or should use PCL pointer or continue trying (HS).
12	LTWLTST	Used by CC=L processing to find the last segment.
13	MOVEKEY	Moves key from segment to PCB key feedback.
14	MVSEGUSE	Moves the requested segment from the I/O area to the user area.
15	POSTCHLD	Captures child RBNs from input SDB prefix and places in SDBPOSN of dependent SDBs.
16	POSTME	Places search starting position for segment in SDB.
17	POSTTRY	Unqualified GN has found a segment. Posts the position and key.
18	POSTCURP	Moves position from JCB work words into SDB and sets post code.
19	POSTSDBN	Stores location of next segment on chain in JCB work words.
1A	READCUR	Locates current entry in passes SDB.
1B	RDLPCONK	Locates logical parent using its key.
1C	READNXT	Locates next segment from passes SDB.
1D	RDPHYPR	Locates physical pair of segments when passed SDB address of its pair.
1E	RESETMP	Initializes for unqualified call.
1F	RESETQMP	Compares previous call position in level table to current qualification where POS=M.
20	SCDCRSCK	Not first LR crossed and concatenated segment ISRT, builds concatenated key of LC physical parent.
21	SETEOC	Sets EOC in requested SDB. If logical parent enqueues outstanding, locates each and dequeues.
22	SETL	Provides interface to buffer handler for all external data requests.

Table 41. The subroutines of the retrieve module (DFSDLR00) (continued)

Hex ID	Subroutine title	Subroutine description
23	SETLBG	Issues request for SETL to get first root in database.
24	SETPVEOC	Sets EOC on previous SDBs in the hierarchy having the same parent as the passed SDB.
25	SSAEVAL	Examines a segment to see if it satisfies the qualification.
26	SETCHEOC	Sets on SDBEOC of dependent SDBs.
27	STECHISB	Sets SDBEOC on for input SDB and siblings having same physical parent.
28	SETLMIKY	SETL to find key equal to or greater than key determined as minimum value for SSA.
29	STNPHISB	Sets EOC (if in use) and not posted for siblings of input SDB.
2A	THISLVOK	Found one at this level that satisfies the call. Uses it and checks for more levels in call.
2B	UNQGN	Gets next sensitive segment without violating parentage.
2C	VLEXP	Processes variable length segment and user data compaction.
2D	WIPEDN	Clears level table below level passed to bottom of table or below entry currently cleared.
2E	XDFTEST	Qualification is secondary index. Checks index entries to validate the position.
2F	UNQL	Master driver for calls without SSAs.
30	ROOTISRT	Routine for positioning to insert at physical root of database.
31	QUAL	Driver for qualified retrievals.
32	HSAMRTN	HSAM I/O interface routine.
33	RETRY	Retry routine for processing option GOT.
34	ISRTCHCK	Use two keys in DSG for root insert.
35	VALIDATE	Validate an EPS.
36	PARTCKRC	Check results of the validate.
37	HDTARGET	PHDAM/HDAM get a key equal or greater.
38	HDNEXT	PHDAM/HDAM get next.
39	HDTARGET	PHDAM/HDAM get a first.
3A	OLRTRACE	Trace IWAIT/IPOST for OLR fence.
F1	INIT	Initialization.

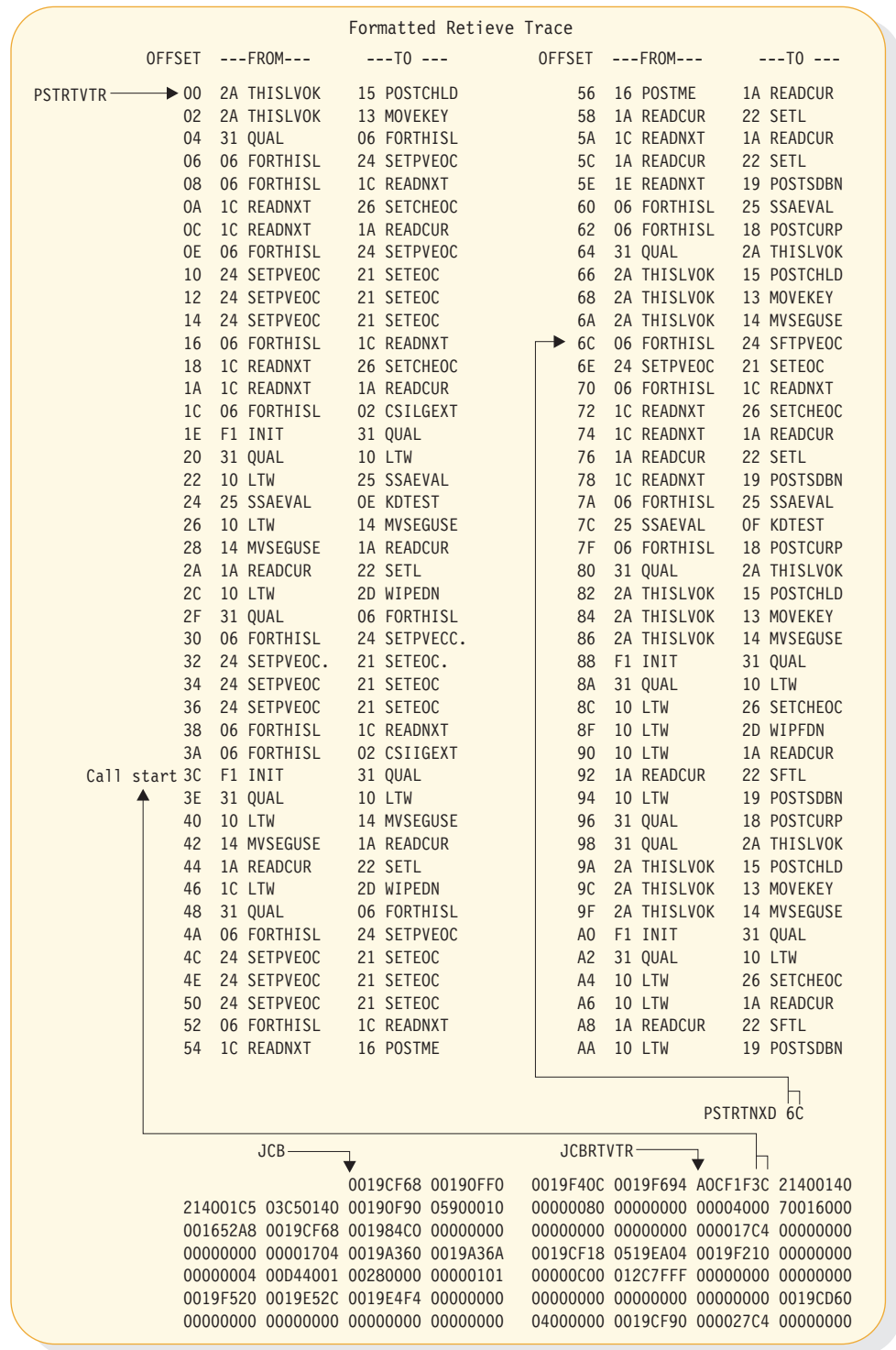


Figure 62. Example of a retrieve trace

Online Recovery Manager trace

The Online Recovery Manager trace (ORTT) records the control flow that is related to /RECOVER command processing.

Starting the Online Recovery Manager trace

The /TRACE SET ON TABLE ORTT command activates the trace and sends the entries to an internal table.

You can format the table using the Offline Dump Formatter under IPCS, using either the VERBX command or the IMS Dump Formatter panels.

If a SNAP dump is taken, the table is formatted as part of the IMS dump.

If you add the OPTION LOG parameter to the /TRACE command, IMS sends the output to an external data set. You can use the File Select and Formatting utility (DFSERA10) with exit DFSERA60 to format the trace entries.

Related concepts:

“Formatting IMS dumps offline” on page 509

Format of the Online Recovery Manager Trace

The Online Recovery Manager trace format, including record, module, explanation and trace subcode are shown.

Trace Entry: Online Recovery Service Request

Table 42. Trace Entry: Online Recovery Service Request

Record	Module	Explanation	Trace subcode
A001	DFSRWM00 - Database Recovery Manager Master ITASK	Record cut when AWE request is received by DFSRWM00	RWM00 Request

Trace record 3702 - create data set routine invoke DYA

The format of A001 is shown in the following table.

Table 43. Trace record 3702 - create data set routine invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)
6	Bit	2	RWGB_Flags
	1...		rwgb_startup_complete
	.1..		rwgb_startup_failure
	..1.		rwgb_dlisas
	...1		rwgb_fp_allowed
	.... 1...		*
	.... .1..		rwgb_terminating
	.... .1.		rwgb_record_pipe_alloc
	.... ...1		rwgb_drm_init_complete
	1...		rwgb_ORs_installed
	.1..		rwgb_DRF_installed
	..11 1111		*
8	Address	4	Request AWE address
12	Address	4	Next AWE address
16	Address	4	awrwcecb
20	Fixed	4	Awrwcecb->c_ecb

Table 43. Trace record 3702 - create data set routine invoke DYA (continued)

Offset	Type	Length	Description
24	Bit	4	Rwgb_init_flags
	1...		rwgb_init_load_1
	.1..		rwgb_init_rwsp
	..1.		rwgb_init_load_2
	...1		*
	.... 1...		rwgb_init_ascre
	.... .1..		rwgb_init_route
	.... ..1.		rwgb_init_write
	.... ...1		rwgb_init_read
	1...		rwgb_init_cmd
	.1..		rwgb_init_rtb
	..1.		rwgb_init_fp
	...1		rwgb_init_dli
	.... 1111		*
	1111 1111		*
	1111 1111		*

Trace Entry: Online Recovery Service Request Processed

Table 44. Trace Entry: Online Recovery Service Request Processed

Record	Module	Explanation	Trace subcode
A002	DFSRWM00 - Database Recovery Manager Master ITASK	Record is cut when DFSRWM00 completes processing of request	RWM00 Return

Trace Entry: Online Recovery Service Request Processed

The format of A002 is shown in the following table.

Table 45. Trace record 3702 - create data set routine invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)
6	Bit	2	RWGB_Flags
	1...		rwgb_startup_complete
	.1..		rwgb_startup_failure
	..1.		rwgb_dlisas
	...1		rwgb_fp_allowed
	.... 1...		*
	.... .1..		rwgb_terminating
	.... ..1.		rwgb_record_pipe_alloc
	.... ...1		rwgb_drm_init_complete
	1...		rwgb_ORS_installed
	.1..		rwgb_DRF_installed
	..11 1111		*
8	Fixed	4	Request feedback (awrwfdbk)
12	Address	4	Rwgb_hold_queue
16	Address	4	Awrrwcecb
20	Fixed	4	Awrrwcecb->c_ecb

Table 45. Trace record 3702 - create data set routine invoke DYA (continued)

Offset	Type	Length	Description
24	Bit	4	Rwgb_init_flags
	1...		rwgb_init_load_1
	.1..		rwgb_init_rwsp
	..1.		rwgb_init_load_2
	...1		*
	.... 1...		rwgb_init_ascre
	.... .1..		rwgb_init_route
	.... ..1.		rwgb_init_write
	.... ...1		rwgb_init_read
	1...		rwgb_init_cmd
	.1..		rwgb_init_rtb
	..1.		rwgb_init_fp
	...1		rwgb_init_dli
	.... 1111		*
	1111 1111		*
	1111 1111		

Trace Entry: Online Recovery Service Request Processor Termination

Table 46. Trace Entry: Online Recovery Service Request Processor Termination

Record	Module	Explanation	Trace subcode
A003	DFSRWM00 - Database Recovery Manager Master ITASK	Record is cut when DFSRWM00 is terminating	RWM00 Exit

Trace record 3702 - create data set routine invoke DYA

The format of A003 is shown in the following table.

Table 47. Trace record 3702 - create data set routine invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)
6	Bit	2	RWGB_Flags
	1...		rwgb_startup_complete
	.1..		rwgb_startup_failure
	..1.		rwgb_dlisas
	...1		rwgb_fp_allowed
	.... 1...		*
	.... .1..		rwgb_terminating
	.... ..1.		rwgb_record_pipe_alloc
	.... ...1		rwgb_drm_init_complete
	1...		rwgb_ORs_installed
	.1..		rwgb_DRF_installed
	..11 1111		*
8	Fixed	4	Request feedback (awrwfdbk)
12	Address	4	Rwgb_hold_queue
16	Address	4	Awrrwcecb
20	Fixed	4	Awrrwcecb->c_ecb

Table 47. Trace record 3702 - create data set routine invoke DYA (continued)

Offset	Type	Length	Description
24	Bit	4	Rwgb_init_flags
	1...		rwgb_init_load_1
	.1..		rwgb_init_rwsp
	...1.		rwgb_init_load_2
	...1		*
	.... 1...		rwgb_init_ascre
	.... .1..		rwgb_init_route
	.... ..1.		rwgb_init_write
	.... ...1		rwgb_init_read
	1...		rwgb_init_cmd
	.1..		rwgb_init_rtb
	..1.		rwgb_init_fp
	...1		rwgb_init_dli
	.... 1111		*
	1111 1111		*
	1111 1111		*

Trace Entry: Online Recovery Pipe Receive Entry

Table 48. Trace Entry: Online Recovery Pipe Receive Entry

Record	Module	Explanation	Trace subcode
A040	DFSRWM00 - Database Recovery Manager Record Receive Processor	Record is cut when DFSRWM00 is entered	RWPR0 Entry

The format of A040 is shown in the following table.

Table 49. Trace record 3702 - create data set routine invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)
6	Bit	2	RWGB_Flags
	1...		rwgb_startup_complete
	.1..		rwgb_startup_failure
	..1.		rwgb_dlisas
	...1		rwgb_fp_allowed
	.... 1...		*
	.... .1..		rwgb_terminating
	.... ..1.		rwgb_record_pipe_alloc
	.... ...1		rwgb_drm_init_complete
	1...		rwgb_ORs_installed
	.1..		rwgb_DRF_installed
	..11 1111		*

Table 49. Trace record 3702 - create data set routine invoke DYA (continued)

Offset	Type	Length	Description
8	Bit	4	Rwgb_init_flags
	1...		rwgb_init_load_1
	.1..		rwgb_init_rwsp
	..1.		rwgb_init_load_2
	...1		*
	.... 1...		rwgb_init_ascre
	.... .1..		rwgb_init_route
	.... ..1.		rwgb_init_write
	.... ...1		rwgb_init_read
	1...		rwgb_init_cmd
	.1..		rwgb_init_rtb
	..1.		rwgb_init_fp
	...1		rwgb_init_dli
	.... 1111		*
	1111 1111		*
	1111 1111		*
12	Bit	4	Rwgb_read_flags
	1...		rwgb_read_terminating
	.1..		rwgb_read_abend
	..1.		rwg_read_EODAD
	...1		rwgb_read_open
	.... 1111		*
	1111 1111		*
	1111 1111		*
	1111 1111		*
16	Address	4	Rwgb_read_pipe
20	Address	4	Rwgb_read_buffer

Trace Entry: Online Recovery Pipe Received Record

Table 50. Trace Entry: Online Recovery Pipe Received Record

Record	Module	Explanation	Trace subcode
A041	DFSRWM00 - Database Recovery Manager Record Receive Processor	Record is cut when DFSRWM00 receives record from recovery product	RWPR0 Record

The format of A041 is shown in the following table.

Table 51. Trace record 3702 - create data set routine invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)

Table 51. Trace record 3702 - create data set routine invoke DYA (continued)

Offset	Type	Length	Description
6	Bit	2	RWGB_Flags
	1...		rwgb_startup_complete
	.1..		rwgb_startup_failure
	..1.		rwgb_dlisas
	...1		rwgb_fp_allowed
	.... 1...		*
	.... .1..		rwgb_terminating
	.... .1.		rwgb_record_pipe_alloc
	.... ...1		rwgb_drm_init_complete
	1...		rwgb_ORs_installed
	.1..		rwgb_DRF_installed
	..11 1111		*
8	Bit	4	Rwgb_init_flags
	1...		rwgb_init_load_1
	.1..		rwgb_init_rwsp
	..1.		rwgb_init_load_2
	...1		*
	.... 1...		rwgb_init_ascre
	.... .1..		rwgb_init_route
	.... .1.		rwgb_init_write
	.... ...1		rwgb_init_read
	1...		rwgb_init_cmd
	.1..		rwgb_init_rtb
	..1.		rwgb_init_fp
	...1		rwgb_init_dli
	.... 1111		*
	1111 1111		*
	1111 1111		*
12	Bit	4	Rwgb_read_flags
	1...		rwgb_read_terminating
	.1..		rwgb_read_abend
	..1.		rwg_read_EODAD
	...1		rwgb_read_open
	.... 1111		*
	1111 1111		*
	1111 1111		*
	1111 1111		*
16	Address	4	Address of record received
20	Fixed	2	Record type (logrc_type)
22	Fixed	2	Record subtype (logrc_subtype)

Online Recovery Manager trace example

An example of the Online Recovery Manager trace output is shown.

Online Recovery Manager trace example

```
OPTION PRINT 0=5,V=67FA,EXITR=DFSERA60
END
```

```

FUNCTION      WORD 0      WORD 1      WORD 2      WORD 3      WORD 4      WORD 5      WORD 6      WORD 7
* ORI TRACE TABLE - DATE 2004209 TIME 212317790537 OFFSET 028D SKIP 0000 TOTAL SKIP 00000000 RECORD NUMBER 000022B9
RWM00 Request A0019700 00A63040 0B7143F8 00000000 00000000 040C0000 00000000 09B18BAA
RWPR0 Entry   A040978A 00A13040 E7000000 00000000 00000000 00000000 40404040 09FB93AC
RWM00 Return  A00297A8 00A6B040 00000000 0B7143F8 00000000 00000000 EF000000 0A081EA6
RWPR0 Entry   A04097AD 00BDB040 EF000000 00000000 0C666B78 0CC74FD8 40404040 0A082039
RWPR0 Record  A04197AE 00BDB040 EF000000 00000000 0C666B78 0CC74FD8 40404040 0DD65C41
```

RWM00 Request	A00197B3	00A6B040	0B7143F8	0B7143B0	00000000	040C0000	EF000000	0DD65E3C
RWM00 Return	A00297B4	00A6B040	00000000	0B7143F8	00000000	00000000	EF000000	0DD65E63
RWM00 Request	A00197B5	00B4B040	0B7143B0	00000000	00000000	040C0000	EF000000	0DD65E6E
RWM00 Return	A00297B9	00B4B040	00000000	0B7143F8	00000000	040C0000	EF000000	0DD65EDB
RWM00 Request	A00197BA	00A6B040	0B7143F8	0B714518	00000000	040C0000	EF000000	0DD65EE7
RWM00 Return	A00297BB	00A6B040	00000000	00000000	00000000	040C0000	EF000000	0DD65F28
RWM00 Request	A00197BC	00BEB040	0B714518	00000000	00000000	040C0000	EF000000	0DD65F34
RWM00 Return	A00297BD	00BEB040	00000000	00000000	00000000	040C0000	EF000000	0DD65F40
RWPR0 Record	A04197C5	00BDB040	EF000000	00000000	0C666B78	0CC74FD8	40404040	0EAF4E7B
RWPR0 Record	A04197C9	00BDB040	EF000000	00000000	0C666B78	0CC74FD8	40404040	0EAF549C
RWPR0 Record	A0419843	00BDB040	EF000000	00000000	0C666B78	0CC74FD8	40404040	0EAF96C7
RWPR0 Record	A0419844	00BDB040	EF000000	00000000	0C666B78	0CC74FD8	40404040	0EAF9AE2
RWM00 Request	A0019849	00C4B040	0B7143B0	00000000	00000000	040C0000	EF000000	0EAF1AA
RWM00 Return	A002984A	00C4B040	00000000	00000000	00000000	040C0000	EF000000	0EAF1E2
RWM00 Request	A001984B	00BEB040	0B7144D0	00000000	00000000	040C0000	EF000000	0EAF1F0
RWM00 Return	A002984C	00BEB040	00000000	00000000	00000000	040C0000	EF000000	0EAF201
RWM00 Request	A0019AE6	00A8B040	0B7144D0	00000000	00000000	040C0000	EF000000	20A9CABE
RWM00 Return	A0029AEA	00A8B040	00000000	00000000	00000000	040C0000	EF000000	20A9CDC0
RWPR0 Record	A0419B84	00BDB040	EF000000	00000000	0C666B78	0CC74FD8	40404040	210B71FC
RWPR0 Record	A0419B88	00BDB040	EF000000	00000000	0C666B78	0CC74FD8	40404040	210B7947

Program isolation-related problem analysis

When invalid segment data is retrieved, or an unexpected user abend occurs during concurrent updates to a single database by more than one processing region under the protection of program isolation, improper enqueue or dequeue logic has been followed in IMS. Tools are available to properly document this occurrence. Correct and adequate documentation might depend on the ability to reproduce the error condition and on the availability of IBM Software Support.

Limiting locking resources used by an application program

In order to avoid resource problems that can be caused by runaway applications, you can limit the number of locks an application can have by using the LOCKMAX parameter.

LOCKMAX parameter

The LOCKMAX parameter can be specified on the PSBGEN statement or at execution time. The parameter has the following format: LOCKMAX=*n*, where *n* is a number between 0 and 255. 0 is the default and specifies no maximum lock limit.

Using the LOCKMAX parameter

The number that is specified indicates units of 1000; for example, a specification of LOCKMAX=5 means that the application cannot have more than 5000 locks at one time.

Assemble the current DSECT describing the log record for the correct field offset because the offset for a field might change. For type X'37' log records, use the DFSXFER DSECT and select records that contain X'30' in the subtype field (such as type X'3778').

Restriction: Although the LOCKMAX parameter allows you to limit the amount of resources that are used by an application, it cannot be used to initially specify the amount of resources to be used by an application. Use traditional methods for specifying these resources through the PSB.

Determining a value for the LOCKMAX parameter

To decide what value to use for the LOCKMAX parameter, analyze over a period of time the X'37', X'41', and X'5937' commit log records to determine the maximum number of locks being held per unit of work by the application.

Each of these log records contains a "high water lock count" or maximum lock count, which is the maximum number of locks held by the application. The X'41' log record shows a zero for the number of locks held, except in DL/I and DBB batch cases involved in block-level data sharing.

Related reference:

"Log records" on page 477

Exceeding the LOCKMAX parameter value

When an application exceeds the value specified for the LOCKMAX parameter, a pseudoabend of type U3301 results. Modules DFSLRHOO and DBFLRHOO set this pseudoabend when the return codes and feedback from either PI or IRLM indicate that the lock request failed because granting the lock would exceed the LOCKMAX parameter value.

Program isolation trace

The program isolation (PI) trace traces all calls to the IMS enqueue/dequeue module (DFSFXC10) and writes the trace entries to the system log as type X'67FA' records.

Entries with IDs X'C7', X'C8', X'C9', X'CA', X'CB', and X'CC' are PI entries.

In a DB/DC environment, you start the trace by entering the /TRACE command at the master terminal operator's console. For batch or DB/DC environments, you specify LOCK=OUT on the OPTIONS statement at system initialization time.

Save the log tape and submit it as APAR documentation. If you cannot ship the log tape with the APAR, you can use the File Select and Formatting Print utility (DFSERA10) with exit DFSERA40 to select and format records related to the problem from the log tape.

You can find the layout of PI trace log record X'67FA' by assembling macro ILOGREC.

In analyzing the trace output, you see not only PI trace information but also lock manager trace information.

Related concepts:

"DL/I trace formats" on page 161

Related reference:

"Format of X'67' log record" on page 503

DL/I call image capture program

The DFSDLTR0 program, which operates independently, traces and records all DL/I calls issued by an application or multiple applications. The output is in a format acceptable as input to the DL/I test program DFSDDLTO.

This allows you to create the scenario that might have caused the problem. By inserting compare statements requesting SNAP documentation of DL/I control blocks before and after the suspected failure, the information collected helps in diagnosing the problem.

Related tasks:

“DL/I call image capture” on page 153

Log analysis (database related)

The IMS log is one of the most useful of all IMS service aids. Understanding log records and what information they contain can be very beneficial.

Log record analysis

For all changes, write a copy of the segment before it is changed as well as a copy of the segment after it is changed, if applicable. This process not only facilitates backout and recovery, but it also is useful for diagnosis.

Analyzing log records is helpful whenever you suspect bad data or a pointer problem. Determine where the error is by referring to error messages or to the contents of the dump. When you identify the location of the problem, use the File Select and Formatting utility (DFSERA10) to print the log records for the block in error. Refer to the following table to interpret the contents of the log records. You can determine what changes to the data have been made, and in what sequence the changes were made. This information is helpful in identifying the source of the error.

Sometimes, the error is caused by an internal IMS problem; other times, the error results from incorrect data that is entered by a user or by an application.

To obtain a complete listing of all control blocks, DB, DC, and log records, assemble module DFSADSCT.

CICS puts a header on log records. To obtain the log records when running with CICS, the DD statement pointing to the CICS journal must specify DCB=RECFM=VB. This allows the File Select and Formatting utility to remove the header.

Example of log analysis

An abend is issued against a database. You have used other diagnostic tools to analyze the call. Now you must look at the database. Follow these steps when looking at the database:

1. Analyze the buffer to identify what seems to be wrong. (See the following figure.) The first indication that something is wrong is usually found in the buffer.
2. Look at the changes to that buffer (block) on the log.
3. Determine if the bad data is actually on the database.
4. If required, determine if the image copy is propagating the bad block.

The following figure shows the general areas of database analysis: Application, Buffer, Database, Image Copy, and Log.

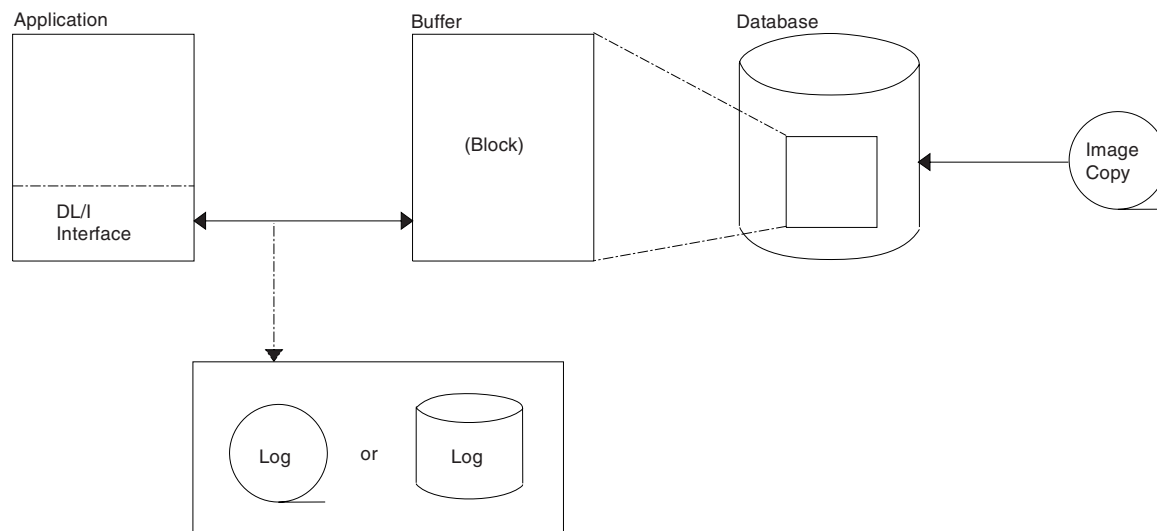


Figure 63. General areas of database (DB) analysis

Database change log record DSECT

You can use the following table to assist you in the analysis of output from log record type X'50'.

If any differences are detected in the mapping of the DSECT, you can obtain a current copy by assembling the macro ILOGREC.

Table 52. Database change log record DSECT.

Offset	Field	Length	Description
DLOGB	DSECT		
00	DLENGTH	2	Length of log record
02	DLOGZZ	2	Zeros for QSAM
04	DLOGCODE	1	Log record type
05	DLOGSCDE	1	Log record subrecord (X'50' X'51' X'52')
06	DLOGPSTN	2	PST number
08	DLOGRTKN	16	Recovery token
18	DLOGSTCK	8	CPU store clock (STCK)
20	DLOGVIMS	1	DLOG IMS Version/Release: X'82' Version 8 or later

Table 52. Database change log record DSECT (continued).

Offset	Field	Length	Description
28	DLOGDBF1	1	Flag 1 X'80' Record written during backout X'40' Record from DB/DC X'20' Record from batch region X'10' New date/time from DFSFTIM0 X'08' Commit each GU call (Mode=SNGL) X'04' First log record this sync interval X'02' First log record of a segment X'01' Last log record of a segment
29	DLOGDBF2	1	Flag 2 X'80' Database is nonrecoverable X'40' KSDS ERASE prohibited X'20' Bit map update for lock tracking X'10' Database is covered by RSR X'08' PHIDAM primary index; no REDO X'04' DLOGSEQ has update sequence number X'02' OLR non-backoutable; cursor not active yet X'01' OLR ITASK
2A	DLOGDBOR	1	Database organization X'70' DEDB direct organization X'40' DL/I HDAM database X'20' DL/I HIDAM database X'10' Data entry database (DEDB) X'08' Primary or secondary index database X'04' HISAM or SHISAM database
2B	DLOGDSOR	1	Data set organization X'80' VSAM access method X'40' OSAM access method X'08' Entry sequenced data set X'04' Key sequenced data set
2C	DPGMNAME	8	PSB name
34	DDBDNAME	8	Database name
3C	DDSID	1	Data set ID (DCB number) X'80' <ul style="list-style-type: none"> When this high order bit is on, then this DCB number represents one of the M-through-V or Y data sets. When this high order bit is off, then this DCB number represents one of the A-through-J or X data sets.
3D	DDSID2	1	For ARID
3E	DLOGSLVL	1	Database share level (for DBRC-registered databases)
3F	DLOGCALL	1	Describe DL/I call issued by application program X'80' ISRT call X'40' REPL call X'20' DLET call X'10' ROLL/ROLB/ROLS call (backout)

Table 52. Database change log record DSECT (continued).

Offset	Field	Length	Description
40	DLOGRBA	4	OSAM RBN or VSAM RBA (LRECL)
44	DLOGBLK0	2	Offset of RBA within block
48	DLOGSEQ	4	Update the sequence number when X'04' flag is on in DLOGDBF2
4C	DLOGXTOF	2	Database extension section offset (not used) ¹
4E	DLOGDSOF	2	Data sharing section offset ¹
50	DLOGIDOF	2	RACF userid offset ¹
52	DLOGTKOF	2	Tracking (XRF) section offset ¹
54	DLOGDLOF	2	DL/I call section offset (not used) ¹
56	DLOGKYOF	2	Key data section offset ¹
58	DLOGSPOF	2	Space management section offset ¹
5A	DLOGUNOF	2	UNDO data offset ¹
5C	DLOGREOF	2	REDO data offset ¹
60	DDATE	4	Date in the format YYYYDDDF
64	DTIME	6	Time in the format HHMMSSTHMIJU
6A	DZONE	2	Offset to local time
Data sharing section (DLOGDSHUR DSECT)			
00	DLOGDSSN	4	Data set sequence number (DSSN)
04	DLOGLSN	6	Lock sequence number (LSN)
0A	DLOGUSID	4	Update Set ID (USID)
RACF/SIGNON userid (DLOGID DSECT)			
00	DLOGUSER	8	RACF userid
Buffer and lock tracking for DL/I in XRF-capable systems (DLOGTRCK DSECT)			
00	DLOGPOOL	2	Pool size for buffer tracking

Table 52. Database change log record DSECT (continued).

Offset	Field	Length	Description
02	DLOGBUFF	2	Buffer number for buffer tracking
04	DLOGHASH	4	Root hash value
08	DLOGLOCK	4	Lock value
0C	DLOGLFL1	1	Change logger lock flag X'80' Log record is for root segment X'40' Log record is for dependent segment X'20' Bypass reacquiring restart locks X'10' Get bid lock on DDATAID X'08' Function is erase X'04' Index maintenance X'02' Organization is SHISAM X'01' Hash is for logical parent
0D	DLOGLFL2	1	Reserved
0E	DLOGDBDN	8	DBD name
16	DLOGSKID	4	Task ID
KSDS key data section (DLOGKEY DSECT)			
00	DLOGKYF1	1	X'40' KSDS key X'20' Key is being erased
02	DLOGKLEN	2	Length of key
04	DLOGKDAT	variable	Key data
Space management section for HD inserts and deletes (DLOGSPCE DSECT)			
00	DLOGSPF1	1	Space management flags X'40' Demand space request X'20' Get free space request (ISRT) X'10' Free space request (DLET)
02	DLOGSOFF	2	Offset of space management request
04	DLOGSLEN	2	Length of space management request
UNDO/REDO data section (DLOGDATA DSECT)			
00	DLOGDFLG	1	X'80' Last data element in this section X'40' Data is compressed using z/OS services

Table 52. Database change log record DSECT (continued).

Offset	Field	Length	Description
01	DLOGDFUN	1	Describe physical function being logged by this request X'80' Physical insert X'40' Physical replace X'20' Physical delete X'10' Space management create X'08' Free space element
02	DLOGDOFF	2	Offset of data in buffer
04	DLOGDLEN	2	Length of data (DLOGDDAT)
06	DLOGDDAT	variable	Variable length data
00		2 variable	Compressed data format in DLOGDDAT Expanded data length Compressed data
	DBCKCHN	6	Back chain ²
	DBLGSEG	8	Logical logger sequence number ²

Notes:

1. To find each section, add the offset to the beginning of the log record.
2. The log back chain and logical logger sequence number are at the end of the log record.

Sequential buffering service aids

When you receive a message or abend that indicates a problem with sequential buffering (SB), several diagnostic tools are available. Some of these tools are useful for diagnosing other IMS database-related problems.

Useful tools for diagnosing IMS data-related problems

- DL/I trace table entries
- Dump formatting of IMS control blocks
- SNAPs of IMS control blocks during pseudoabends

The //DFSSTAT statistics report is also a useful tool for evaluating a potential sequential buffering problem.

SB provides additional problem determination tools, which are described in this section:

- SBSNAP and SBESNAP options
- SB IMAGE CAPTURE option and the SB Test program (DFSSBHD0 utility)
- The SB COMPARE option

For most invocations of SB pseudoabend buffer handler functions, entries in the DL/I trace tables are provided. The SB trace table entries are:

X'6F' Search/read by RBN

- X'6C' Refresh SB buffer after a write
- X'69' Invalidate SB buffers
- X'6A' Evaluate SB buffering
- X'6B' Describe why SB was or was not used for the application

In addition, the X'D1' DL/I trace table entry created by DFSNOTB0 contains some information about invalidation of SB buffers.

Related concepts:

"DL/I trace" on page 160

Chapter 18, "SYS - System service aids," on page 477

"Dump formatting options" on page 549

"SNAPs on exceptional conditions" on page 152

SBSNAP option

The SBSNAP option generates a SNAP of the relevant control blocks and areas involved in the calls of the OSAM buffer handler to the SB buffer handler.

Use the SBSNAP option when you receive a message saying that either Sequential Buffering:

- Has been activated when you do not expect it to be
- Has not been activated when you expect it to be activated

IMS monitors the physical I/O being done by individual applications and then uses SB I/O reference pattern-analysis algorithms to select the most efficient method of data access. When you suspect a problem with these algorithms, the SBSNAP option provides diagnostic output you can analyze. The information that is provided in the SNAPs provides an indication of why SB chose between issuing a random read of one single block and a sequential read of multiple consecutive blocks.

As a result of analyzing SBSNAP output, you might realize you need to reorganize the database, redesign the database, or set different thresholds for the SB definition. The SBSNAP option is also useful when you are tuning your usage of SB after you've installed IMS or migrated to a new version.

To activate the SBSNAP option, provide a SBSNAP control statement in the //DFSCTL file. (See *IMS Version 12 System Definition* for detailed information.)

SNAPs are written to the IMS log as type X'67EE' records. You can format and print these records by using the File Select and Formatting Print utility (DFSERA10) with exit routine DFSERA30.

The SBSNAP option often creates a very large amount of SNAP output. You might therefore decide to limit the SNAP to a specific short period of the application execution. To limit the SBSNAP option to one period of the application execution, use the START and STOP keywords on the SBSNAP control statement. The syntax for these keywords is:

START=*n* STOP=

where *n* and *m* are the numbers of calls made to the SB buffer handler by the executing application.

To determine what values to use for n and m , look at the SPBSTCNB fields in the DL/I trace table and, if available, SNAP dumps (created by SBESNAP option). For each application, IMS maintains these call numbers in the SBPST, in the SBPSTCNB field. This field is periodically written to:

- The X'6A' DL/I trace table entry
- SNAPs that are created by the optional SBESNAP facility

Specifying `START= n` activates the SBSNAP option during the n the call to the SB buffer handler; specifying `STOP= m` deactivates the SBSNAP option during the m the call to the SB buffer handler.

SBESNAP option

You activate the SBESNAP option by providing a SBESNAP control statement in the `//DFSCTL` file.

The SBESNAP option SNAPs the control blocks that are necessary for understanding the reason the SB evaluation logic did or did not recommend use of SB.

SNAPs are written to the IMS log as type X'67FD' records. You can format and print these records by using the File Select and Formatting Print utility (DFSERA10) with exit DFSERA30.

Testing algorithms using the SB Test utility (DFSSBHD0)

When you run the SB IMAGE CAPTURE option of the DFSSBHD0 utility, the same sequential buffering (SB) handler call sequence (which is issued during the processing of a specific application) captures on the IMS log all internal IMS calls to the SB buffer handler. You can use this utility to investigate and test behaviors of various algorithms.

The DFSSBHD0 utility with the SB IMAGE CAPTURE option is useful for investigating:

- The SB I/O reference pattern analysis algorithms
- The impact of changes to user-specifiable SB parameter values (the BUFSETS parameter value)

Running the same SB buffer handler call sequence multiple times is useful in the following situations:

- You need to use the SBSNAP option but do not know when to Start or Stop the SBSNAP option.
- You want to experiment with different SB algorithm parameters and observe the impact of these changes on the `//DFSSTAT` statistics.
- You want to test changes to the SB I/O reference pattern analysis algorithms and observe the impact of these changes on the `//DFSSTAT` statistics.

You activate the SB IMAGE CAPTURE option by providing a SBIC control statement in the `//DFSCTL` file.

SB COMPARE option

You activate the SB COMPARE option when you suspect that the SB buffer handler returns incorrect block images into the buffers of the OSAM buffer handler. When you activate the SB COMPARE option, the SB buffer handler performs a self-check

to see whether this suspicion is correct and provide problem determination information when the SB buffer handler really returns incorrect data.

When the SB COMPARE option is active, the SB buffer handler compares each block image that is returned to the OSAM buffer handler with the corresponding block image that is stored on DASD. When the comparison detects a mismatch between the two block images, the SB buffer handler invokes the SNAP-specific function, which produces a SNAP that describes the mismatch and contains:

- Relevant buffers and control blocks of DL/I
- The OSAM buffer handler
- The SB buffer handler

Module DFSSBSN0 then issues an abend (for batch) or a pseudoabend (for DB/DC, DBCTL, and CICS).

Exception: In a data-sharing environment, the SB buffer handler sometimes returns a back-level block image to the OSAM buffer handler. Therefore, in data sharing, the SB COMPARE option does not issue abends or pseudoabends.

You activate the SB COMPARE option by providing a SBCO control statement in the //DFSCTL file. Refer to *IMS Version 12 System Definition* for more information on the SBCO control statement in the //DFSCTL file.

SNAPs are written to the IMS log as type X'67EF' records. You can format and print these records by using the File Select and Formatting Print utility (DFSERA10) with exit DFSERA30.

GSAM control block dump - DFSZD510

When a GSAM error occurs or when a DUMP or SNAP call is issued to a GSAM PCB, a formatted dump of the GSAM control blocks is written to the file that is defined as DDNAME IMSERR or SYSPRINT. You can use this GSAM control block dump (named DFSZD510) to diagnose GSAM problems.

Example of when to use a GSAM control block dump

Some situations in which you would use a GSAM control block dump are when you receive a message identifying a GSAM error, or when you are having problems repositioning a GSAM data set when you are trying to restart an application that previously failed.

The following control blocks are included in the dump:

- GSAM pointer table (GPT)
- GSAM load table (GLT)
- GSAM data set control block (GB)
- GSAM queue control block (GQCB)
- GSAM buffer control block (GBCB)
- IMS program communication block (PCB)
- Data event control block (DECB)
- Request parameter list (RPL)

To produce a DSECT that shows the layout of the GSAM control blocks, assemble macro IGLI.

Example of a formatted GSAM control block dump

In this example, key eye catchers are shown (in bold text) so that those sections of the dump are easier to find. Each problem is different, but diagnosing almost all GSAM problems involve at least these key areas of the dump.

```

* * * GSAM CONTROL BLOCKS DUMP * * *

07A010 GSAM POINTER TABLE
GPTCNTRL 800271D8 GPTERROR 00 GPTFC GHU GPTF1 0007A220 GPTF2 0004D50C
GPTF3 00000000 GPTF4 00000000 GPTGB 0007A0C0 GPTGLT 0007A060 GPTHSEVC 08
GPTMAIN 00001350 GPTMODE 00 GPTPCB 0007A090 GPTPMBLK 00009C90 GPTPSBL 00005540
GPTRS1 00009C58 GPTSAVE 00079000 GPTSZS 0800 GPTSZW 0800 GPTRACE 00009D0F
GPTTYPE 00 GPTWORK 00079800

07A060 GSAM LOAD TABLE
GLTBSAM 8007B0C0 GLTBUFIO 00000000 GLTCBDM 8007CCB0 GLTCNTRL 800271D8 GLTGPT 0007A010
GLTOPENB 80032118 GLTOPENV 00000000 GLTVSAM 00000000

07A090 IMS PGM CONTROL BLK
DBPCBDBD DBD37877 DBPCBFLG 02 DBPCBGB 0207A0C0 DBPCBLEV 0000 DBPCBMKL 0000000C
DBPCBNSS 0000FFFF DBPCBPRO L DBPCBSFD DBPCBSTC AM DBPCBURL 00000000
DBPCBRRA 00000000 00000000

07A0C0 GSAM BLOCK
GBBFPORT 0000 GBLKLEN 0000 GBLKOH1 0001 GBLKOH2 FFE0 GBLKREF 00000401
GBBLKSI 01C2 GBBQCB 00000000 GBBUFFER 00064CA0 GBBUFFSW 08 GBBUFNO 01
GBCDISP 0000 GBCHAIN 0007A220 GBCRTNCD 0028 GBCSEVCD 08 GBCTRS 0000
GBDCBPTR 8007A178 GBDDNAME GS378770 GBDECB 0007A1D4 GBDEVTP 208E GBDSORG 81
GBERRSW 00 GBEXLST 8607BEA2 GBGPTPTR 0007A010 GBGSAMSW 50 GBIOAREA 00093000
GBLENLEN 0000 GBLRECL 0096 GBMAXTR 8B60 GBMINRCL 0000 GBNVOL 0001
GBOPENSW D1 GBPCBPTR 0007A090 GBPRTNCD 0000 GBRECFM 90 GBRECPTR 00064D36
GBREQC 6201 GBREQP 0020 GBREQU 6201 GBRPLPTR 0007A1D4 GBRRAPTR 00091B88
GBSERA 0000 GBSERR 0600 GBSUPVR 00 GBTRCALC 8B60 GBTRECL 0096
GBURTNCD AM GBVLSQ 0001

07A178 DATA CONTROL BLOCK (DCB)
DCBBFTEK 06 DCBBLKCT 04FDBEBC DCBBLKSI 01C2 DCBBUFCB 01064C98 DCBBUFL 01C2
DCBBUFNO 01 DCBBUFOF 00 DCBCECHK 00C894B0 DCBCIND1 00 DCBCIND2 00
DCBCNTRL 00D57F48 DCBDDNAM 009D1554 DCBDEN AD DCBDEVT 2E
DCBDSORG 4000 DCBDVTBA FDBEBC DCBOBR 01D57650 DCBOBW 00D57650 DCBEODA 07BEBA
DCBEODAD 0607BEBA DCBEXLST 9007A110 DCBFDAD1 00000000 DCBFDAD2 05000104 DCBFUNC A0
DCBIFLG C8 DCBIFLGS 00 DCBIOBA 410050F0 DCBIOBAD 00005088 DCBIOBL 09
DCBKEYCN 00 DCBKEYLE 00 DCBLRECL 0096 DCBMACR 97D8 DCBMACRF 2424
DCBMODE 00 DCBNCP 01 DCBODEB 00005088 DCBOFFSR 30 DCBOFFSW 30
DCBOFLGS 92 DCBOPTCD 00 DCBPRTOV AD DCBPRTSP 00 DCBREAD 92C897D8
DCBRECFC 90 DCBREL 2EADA0 DCBRELAD 00000000 DCBREL 002EADA0 DCBSTACK 00
DCBSVCXL 00005088 DCBSYNA 07BF68 DCBSYNAD 0907BF68 DCBTIOT 007C DCBTRBAL ADA0
DCBTRTCH 00 DCBWCPL 01 DCBWCPO 30 DCBWRITE 92C897D8

07A1D4 DECB
7F000000 00200000 B007A178 00064CA0 000050F8 00000000
064CA0 GB BUFFER
064CA0 D7C1D9E3 D5E4D460 F0F0F0F0 F0F0F940 40404040 40404040 40404040 40404040 *PARTNUM.0000009 *
064CC0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064CE0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064D00 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064D20 40404040 40404040 40404040 40404040 40404040 4040D7C1 D9E3D5E4 D460F0F0 * PARTNUM.00 *
064D40 F0F0F0F1 F0404040 40404040 40404040 40404040 40404040 40404040 *00010 *
064D60 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064D80 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064DA0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064DC0 40404040 40404040 40404040 D7C1D9E3 D5E4D460 F0F0F0F0 F0F0F840 40404040 * PARTNUM.0000008 *
064DE0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064E00 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064E20 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064E40 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
064E60 4040 * .....*

07A1F0 IMS PGM CONTROL BLK
DBPCBDBD DBD3787X DBPCBFLG 02 DBPCBGB 0207A220 DBPCBLEV 0000 DBPCBMKL 0000000C
DBPCBNSS 0000FFFF DBPCBPRO G DBPCBSFD DBPCBSTC DBPCBURL 00000000
DBPCBRRA 00000000 00000000

07A220 GSAM BLOCK
GBBFPORT 0000 GBLKLEN 0000 GBLKOH1 0001 GBLKOH2 FFE0 GBLKREF 00000000
GBBLKSI 01C2 GBBQCB 00000000 GBBUFFER 00000000 GBBUFFSW 00 GBBUFNO 01
GBCDISP 0000 GBCHAIN 0007A0C0 GBCRTNCD 0000 GBCSEVCD 00 GBCTRS 0000
GBDCBPTR 8007A2D8 GBDDNAME GS378770 GBDECB 0007A334 GBDEVTP 208E GBDSORG 81
GBERRSW 00 GBEXLST 00000000 GBGPTPTR 0007A010 GBGSAMSW 00 GBIOAREA 00000000
GBLENLEN 0000 GBLRECL 0096 GBMAXTR 8B60 GBMINRCL 0000 GBNVOL 0001
GBOPENSW C0 GBPCBPTR 0007A1F0 GBPRTNCD 0000 GBRECFM 90 GBRECPTR 00000000
GBREQC 0020 GBREQP 0020 GBREQU 0020 GBRPLPTR 0007A334 GBRRAPTR 00000000
GBSERA 0000 GBSERR C200 GBSUPVR 00 GBTRCALC 8B60 GBTRECL 0000
GBURTNCD GBVLSQ 0000

07A2D8 DATA CONTROL BLOCK (DCB)
DCBBFTEK 00 DCBBLKCT 00000000 DCBBLKSI 01C2 DCBBUFCB 00000000 DCBBUFL 01C2
DCBBUFNO 00 DCBBUFOF 00 DCBCECHK 00000001 DCBCIND1 00 DCBCIND2 00
DCBCNTRL 00000001 DCBDDNAM GS378770 DCBDEBAD F8F7F7D6 DCBDEN 00 DCBDEVT 00
DCBDSORG 4000 DCBDVTBA 000000 DCBOBR 01000001 DCBOBW 00000001 DCBEODA 000001
DCBEODAD 00000001 DCBEXLST 90000000 DCBFDAD1 00000000 DCBFDAD2 00000000 DCBFUNC 00
DCBIFLG 00 DCBIFLGS F8 DCBIOBA 00000001 DCBIOBAD 00000001 DCBIOBL 00
DCBKEYCN 00 DCBKEYLE 00 DCBLRECL 0096 DCBMACR 2424 DCBMACRF F3F7
DCBMODE 00 DCBNCP 01 DCBODEB 00000001 DCBOFFSR 00 DCBOFFSW 00

```

```

DCBOFLGS      02  DCBOPTCD      00  DCBPRTOV      00  DCBPRTSP      00  DCBREAD  02002424
DCBREFCM      90  DCBREL      000000  DCBRELAD 00000000  DCBREL  00000000  DCBSTACK      00
DCBSVCXL 00000001  DCBSYNA      000001  DCBSYNAD 00000001  DCBTIOT      C7E2  DCBTRBAL      0000
DCBTRTCH      00  DCBWCPL      00  DCBWCP0      00  DCBWRITE  02002424

07A334 DEC8
00000000 00800000 00000000 00000000 00000000 00000000
***END OF DUMP***

```

Example of an unformatted GSAM control block dump

In this example, an unformatted GSAM control block dump is shown without key eye catchers.

```

0007A000 C7E2C1D4 40C2D3D6 C3D2E240 C8C5D9C5 800271D8 00000000 0007A060 00005540 *GSAM BLOCKS HERE...Q..... *
0007A020 00009C90 00009DF0 0007A1F0 0007A220 D7E4D9C7 0007A0C0 00000000 00079800 *.....0...0....PURG..... *
0007A040 00079000 08000800 00001350 00009C58 0007A0C0 00005180 00000000 00000000 *..... *
0007A060 800271D8 0007A010 00000000 80032118 8007B0C0 00000000 00000000 00000000 *...Q..... *
0007A080 00000000 8007CCB0 00000000 00000000 C4C2C4F3 F7F8F7F7 00004040 D3404040 *.....DBD37877.. L *
0007A0A0 0207A0C0 40404040 40404040 0000000C 0000FFFF 00000000 00000000 00000000 *.... *
0007A0C0 0007A220 00000401 00010000 00010096 00000096 01C20000 0000208E 0001FFE0 *.....B..... *
0007A0E0 40400000 00289081 06000000 02830283 12020000 5008D101 00000000 00000000 * .....J..... *
0007A100 0007A010 0007A090 B007A178 0007A1D4 8607BEA2 00093000 00091B88 00000000 *.....M..... *
0007A120 00064CA0 00064D36 B860BB60 00000000 C7E2F3F7 F8F7F7D6 00000000 00000000 *.....GS378770..... *
0007A140 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *

LINE 0007A160 SAME AS ABOVE
0007A180 00050001 04FDBEBC 002EADA0 01064C98 01C24000 00005088 0607BEBA 9007A110 *.....B..... *
0007A1A0 007C2424 009D1554 92C897D8 00C894B0 0907BF68 000001C2 30013030 410050F0 *.....H.Q.H.....B.....0 *
0007A1C0 01D57650 00D57650 00000096 00D57F48 00000000 7F000000 00200000 B007A178 *..N...N.....N..... *
0007A1E0 00064CA0 000050F8 00000000 00000000 C4C2C4F3 F7F8F7E7 00004040 C7404040 *.....8.....DBD3787X.. G *
0007A200 0207A220 40404040 40404040 0000000C 0000FFFF 00000000 00000000 00000000 *.... *
0007A220 0007A0C0 00000000 00000000 00010096 00000000 01C20000 0000208E 0001FFE0 *.....B..... *
0007A240 40400000 00009081 C2000000 02830283 00200000 0000C001 00000000 00000000 * .....B..... *
0007A260 0007A010 0007A1F0 8007A2D8 0007A334 00000000 00000000 00000000 00000000 *.....0...Q..... *
0007A280 00000000 00000000 B860BB60 00000000 C7E2F3F7 F8F7F7D6 00000000 00000000 *.....GS378770..... *
0007A2A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *

LINE 0007A2C0 SAME AS ABOVE
0007A2E0 00000000 00000000 00000000 00000000 01C24000 00000001 00000001 90000000 *.....B..... *
0007A300 C7E2F3F7 F8F7F7D6 02002424 00000001 00000001 000001C2 00000000 00000001 *GS378770.....B..... *
0007A320 01000001 00000001 00000096 00000001 00000000 00000000 00800000 00000000 *..... *
0007A340 00000000 00000000 00000000 00000000 *..... *
0007A700 84000000 18800000 000300CC FFFB26B4 00000000 00000000 00000000 00000000 *..... *
0007A720 0004D0A8 00080008 0004D0B0 00100010 0004D0B2 00020002 0004D0B4 0004D0B8 *..... *
0007A740 0004D0BC 0004D0C0 00080008 0004D0C8 00080008 00000000 40404040 40404040 *.....H..... *
0007A760 10004040 40404040 40404040 40404040 40404040 40404040 40404040 *.. *
0007A780 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007A7A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....J.....0 *
0007A7C0 009B6020 00000000 00000000 00093000 0004D054 00000000 00000000 00029E50 *..... *
0007A7E0 00000000 00000000 00000000 00000000 C4C4D3E3 F0F1F340 D3D6C1C4 40404040 *.....DDLTO13 LOAD *
0007A800 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *

LINES 0007A820-0007A860 SAME AS ABOVE
0007A880 00000000 00008500 0004D0A8 00000000 00000000 080073E8 00000000 00000000 *.....Y..... *
0007A8A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007A8C0 00000000 080073E8 0004D050 00000000 00000000 00000000 00026B70 000641D8 *.....Y.....Q *
0007A8E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00053040 *..... *
0007A900 00000000 00000000 000300CC 00000000 00000000 00000000 00000000 00000000 *..... *
0007A920 00000000 00000000 0004D94C 00000000 00000000 00000000 00000000 00000000 *.....R..... *
0007A940 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007A960 00000000 00000000 00000000 00000000 00009DA0 00000000 00010C00 0004D350 *.....L *
0007A980 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *

LINE 0007A9A0 SAME AS ABOVE
0007A9C0 84000000 00000000 00000000 00000000 00000000 00000000 0088266F 11173205 02000000 *..... *
0007A9E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007AA00 0004D050 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007AA20 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007AA40 00060040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.... *
0007AA60 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0007AA80 00000000 00000000 00000000 00000000 00000000 00000000 0002CEE6 *.....W *
0007AA0 00000000 00000000 00000000 0005713F 00057040 00000000 07FC4040 40404040 *..... *
0007AAC0 00000000 00000000 00000000 00057340 00000000 00057140 00000000 00000000 *.....GS..... *
0007AAE0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *

LINE 0007AB00 SAME AS ABOVE
0007AB20 00000000 00000000 0004DD64 00000000 00000000 00000000 0004DD90 00000000 *..... *
0007AB40 00000000 00000000 00000000 00000000 00000000 00000000 000C0000 00000000 *..... *
0007AB60 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *

LINE 0007AB80 SAME AS ABOVE
0007ABA0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 80049040 *..... *
0007ABC0 00009DA8 0004D554 4003AAE2 0002AF6C 00009DA0 00009DF0 00009C90 00009DF0 *.....N...S.....0.....0 *

```

0007ABE0	0008FD64	00009DF8	00093000	00000000	00093000	00090548	00000004	0004D050	*.....8.....*
0007AC00	0003A7A0	00000000	0004D50C	0004D59C	FF02AFD2	0002BCEC	00009DA0	0004D050	*.....N...N...K.....*
0007AC20	00009C90	0004D50C	00009E38	00009D90	00093000	00000000	00093000	080073E8	*.....N.....Y*
0007AC40	00000004	0004D050	0002AF6C	00000000	0004D554	0004D5E4	FF02D5C6	00034100	*.....N...NU..NF...*
0007AC60	000073E8	0004D050	0002D9D0	00009DF0	0002CCD8	00029E50	080073E8	00005500	*...Y.....R....0...Q.....Y....*
0007AC80	00093000	00000000	0004D0A8	0004D050	0002BCD8	00000000	0004D59C	0004D62C	*.....Q.....N...O.*
0007ACA0	FF034196	00034BD4	000073E8	0004D050	0002D9D0	00009DF0	0002CCD8	00029E50	*.....M...Y.....R....0...Q....*
0007AC00	080073E8	00005500	00093000	0004D050	0004D0A8	080073E8	00034100	00000000	*...Y.....R.....Y.....*
0007ACE0	0004D5E4	0004D674	FF034E7A	0003C8B8	00000000	0004D050	0002D9D0	00009DF0	*..NU..O.....H.....R....0*
0007AD00	0002CCD8	00029E50	080073E8	00005500	00093000	0004D050	00000000	080073E8	*...Q.....Y.....Y....*
0007AD20	00034BD4	00000000	0004D62C	0004D6BC	00000000	00000000	00000000	00000000	*...M.....O...O.....*
0007AD40	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AD60	00000000	00000000	00000000	00000000	0004D674	0004D704	00000000	00000000	*.....O...P.....*
0007AD80	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007ADA0	00000000	00000000	00000000	00000000	00000000	00000000	0004D6BC	0004D74C	*.....O...P.*
0007ADC0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
LINE 0007ADE0 SAME AS ABOVE									
0007AE00	0004D704	0004D794	00000000	00000000	00000000	00000000	00000000	00000000	*..P...P.....*
0007AE20	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AE40	00000000	00000000	0004D74C	0004D7DC	00000000	00000000	00000000	00000000	*.....P...P.....*
0007AE60	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AE80	00000000	00000000	00000000	00000000	0004D794	0004D824	00000000	00000000	*.....P...Q.....*
0007AEA0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AEC0	00000000	00000000	00000000	00000000	00000000	00000000	0004D7DC	0004D86C	*.....P...Q.*
0007AEE0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
LINE 0007AF00 SAME AS ABOVE									
0007AF20	0004D824	0008BD98	00000000	00000000	00000000	00000000	00000000	00000000	*..Q.....*
0007AF40	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AF60	00000000	00000000	0004D86C	0004D8FC	00000000	00000000	00000000	00000000	*.....Q...Q.....*
0007AF80	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AFA0	00000000	00000000	00000000	00000000	0004D8B4	00000000	00000000	00000000	*.....Q.....*
0007AFC0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0007AFE0	00000000	00000000	00000000	00000000	00000002	00000000	D3C7E6C1	00518000	*.....LGWA...*
00081560		47F0F034	2FC4C6E2		C6D3D3C7	F060F1F3	F060D3D6	C7C9C3C1	*.....00..DFSLLG0.130.LOGICA*

Recovering from Sx37 abends on GSAM data sets

When an application program is inserting records into a GSAM DASD data set and space on the data set is exceeded, an Sx37 abend occurs. The proper restart procedure depends on the physical characteristics of the GSAM data set and how IMS checkpointed the position in the data set.

Recovering non-SMS-managed data sets

When an Sx37 abend occurs in a non-SMS-managed data set, you typically solve the problem by copying the data set and allocating more space for the copy.

You can copy the data set with the IEBGENER utility or another utility that reads and writes logical records. Do not do this for blocked GSAM BSAM DASD data sets if you plan to restart by using the copy. You must copy the physical records, not only the logical records. You can use the IEBGENER utility for this task, but you must specify different DCB parameters. A blocked data set has a record format of FB or VB.

To recover from an Sx37 abend on a blocked non-SMS-managed GSAM data set:

1. Copy the file to a larger data set by using the IEBGENER utility.
2. Specify RECFM=U for the record format for both the input and output data sets. This parameter copies the physical records as they exist. No reblocking is done. The copy must be to a like device type with the same track size. If the data set resides on multiple volumes, only the last volumes of data can be copied. GSAM keeps position by relative volume, by relative track within the volume, and by relative physical block within the track.
3. Change the RECFM parameter for the copied file to its original value: FB or VB. You can change the parameter by using any program that opens the data set, including the IEBGENER utility. Execute the IEBGENER utility with a SYSUT1 DD statement with DISP=SHR and a SYSUT2 DD statement with DISP=MOD. The SYSUT2 DD statement must specify RECFM=xx, where xx is

the original GSAM data set record format value. This value causes the IEBGENER utility to open the data set for output. The IEBGENER utility does not copy any records to the data set, but it rewrites the DSCB with the updated RECFM value at close time.

You can now use the copy to restart the program from a checkpoint.

Example JCL for copying a multivolume GSAM data set after an Sx37 abend

The following JCL describes how to copy a multivolume GSAM data set after an Sx37 abend occurs, which includes the following basic steps:

1. Uncatalog the data set that received the Sx37 abend.
2. Allocate a temporary data set for the last volume portion of the data set by using the original LRECL and BLOCKSIZE values, RECFM=U, and the new space allocation.
3. Copy the portion of the original data set from the last volume into the newly allocated temporary data set.
4. Delete the portion of the original data set that resides on the last volume.
5. Rename the temporary data set to the original name.
6. Catalog the data set again, using the new volume label if the data set has moved, and reset the RECFM keyword to its original value. The IEBGENER utility is recommended for this step because the data set has to be opened for the RECFM reset to take effect.
7. Submit the XRST job.

```
//B37COPY JOB (IMS,xxxxxxx),'GSAM TEST',
//          REGION=0M,
//          CLASS=A,MSGCLASS=A,MSGLEVEL=(1,1)
//*****
//* 1. Uncatalog multivolume data set.
//* The data set needs to be uncataloged before we can copy the
//* the last volume of a multivolume data set
//*****
//UNCALG EXEC PGM=IEFBR14
//DD1 DD DSN=DBDC.IMS.GSAMTEST,DISP=(OLD,UNCATLG),UNIT=SYSDA
/*
//*****
//* 2. Allocate a new temporary data set with a bigger space allocation
//* for the last volume portion of a multivolume data set.
//*****
//ALLOC EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=A
//DD2 DD DSN=DBDC.IMS.GSAMTEMP,DISP=(NEW,KEEP),UNIT=SYSDA,
//      VOL=SER=SCR03,
//      DCB=(RECFM=FB,LRECL=80,BLKSIZE=80),
//      SPACE=(CYL,(5,1))
/*
//*****
//* 3. Copy current (smaller) GSAM/BSAM data set into a
//* new (bigger) GSAM/BSAM data set by using DCB=(RECFM=U)
//*****
//COPY1 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=DBDC.IMS.GSAMTEST,DISP=(OLD),
//        UNIT=SYSDA,VOL=SER=SCR03,DCB=(RECFM=U)
//SYSUT2 DD DSN=DBDC.IMS.GSAMTEMP,DISP=OLD,
//        UNIT=SYSDA,VOL=SER=SCR03,DCB=(RECFM=U)
//SYSIN DD DUMMY
/*
//*****
```

```

/* 4. Delete the smaller (original) of the data set that resides on
/* the last volume
/******
//BR14D EXEC PGM=IEFBRI4
//SYSPRINT DD SYSOUT=A
//GSAMDS1 DD UNIT=SYSDA,DISP=(OLD,DELETE),VOL=SER=SCR03,
// DSN=DBDC.IMS.GSAMTEST
/*
/******
/* 5. Rename the new (copied to) data set to the original (copied
/* from) data set name
/******
//RENAME1 EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//GSAMDS1 DD UNIT=SYSDA,DISP=OLD,VOL=SER=SCR03
//SYSIN DD *
        RENAME DSN=DBDC.IMS.GSAMTEMP,VOL=DISK=SCR03,
                NEWNAME=DBDC.IMS.GSAMTEST
/*
/******
/* 6. Re-catalog the multivolume data set using the new volume for
/* last volume of the data set, and change the RECFM
/* from RECFM=U back to its original RECFM=.
/* IEBGENER utility is recommended because the data set has to
/* be opened for the RECFM reset to take effect
/******
/*
//CATALG EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=DBDC.IMS.GSAMTEST,DISP=SHR,UNIT=SYSDA,
// VOL=SER=(222222,333333,000000,SCR03)
//SYSUT2 DD DSN=DBDC.IMS.GSAMTEST,DISP=(MOD,CATLG),UNIT=SYSDA,
// VOL=SER=(222222,333333,000000,SCR03),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=80)
//SYSIN DD DUMMY
/*
//

```

Recovering SMS-managed data sets

When the GSAM data set resides on SMS-managed volumes and is a non-striped data set, you can extend the existing data set if the maximum number of volumes (59) is not exceeded.

Extending an SMS-managed, non-striped GSAM data set:

When you convert GSAM data sets to SMS-managed data sets, consider converting to SMS-managed striped data sets, or at minimum, converting to striped data sets, before the maximum number of volumes (59) for a data set is reached.

Attention: If the installation must use non-striped data sets for GSAM databases, and a data set full condition forces you to add a new volume to the data set, be aware that the maximum number of volumes for a data set is 59 volumes. As you approach this limit, copy the data set by using a larger space allocation value before the data set volume limit is reached. If the volume limit is reached and an abend occurs, you will be unable to perform a GSAM XRST. The copy of the data set using the larger space allocation must be completed after a job that has ended normally. After the data set is copied, GSAM XRST cannot be done using checkpoints taken before the data set was copied.

To extend an SMS-managed, non-striped GSAM data set:

1. Under SMS, add extra volumes to the storage group, if necessary, and increase the number of volumes allowed for the DATACLAS keyword.

2. Using IDCAMS, enter the command `ALTER dsn ADVOL(*)` to indicate that additional volumes are available to the data set.

Converting an SMS-managed, non-striped data set to a striped data set:

Convert SMS-managed, non-striped data sets to SMS-managed, striped data sets before you execute jobs that might abend with Sx37 abends because they exceed the maximum number of volumes (59).

If an Sx37 abend occurs for an SMS-managed, non-striped data set due to the number of volumes for the data set exceeding 59 volumes, the data set cannot be recovered and an XRST cannot be completed.

The recovery cannot be completed because the SMS-managed, non-striped data set must be copied to an SMS-managed, striped data set with a larger primary and secondary allocation space parameter. When copying SMS-managed data sets, the copy process uses all the new space that is defined, starting with the first volume, which results in the checkpointed data record being moved not only to a different volume, but also having a different relative track and record (TTRZ, or TTTRZ for large format data sets). The copy process thus invalidates the restart position saved in the X'18' log record.

Migration from GSAM/BSAM non-striped data sets, which use TTRZ (or TTTRZ for large format data sets) for repositioning, to striped data sets, which use relative block number (RBN), results in an XRST failure or possibly an XRST reposition on the wrong data record. You cannot process a GSAM/BSAM non-striped data set, have an error condition occur, copy the data set to a striped data set, and then attempt to perform an XRST command. You must convert GSAM/BSAM non-striped data sets to striped data sets when you learn that your GSAM/BSAM databases are SMS-managed data sets and there is any chance that a job accessing that database might abend with an Sx37 number of volumes exceeded condition and that an XRST command is required.

To convert to an SMS-managed, non-striped data set to a striped data set:

1. Copy the non-striped data set to a new striped data set and use the same block size and device type.
2. Specify the RECFM=U record format for both the input and the output data set to avoid any reblocking.
3. When using DFSMS striped data sets, the restriction regarding maintaining the same number of records on the copied from and copied to volumes does not apply because with striped data sets, GSAM uses the RBN for NOTE/POINT, not the TTRZ (or TTTRZ for large format data sets).

In addition, GSAM supports DFSMS striped (extended format) data sets for both VSAM and BSAM.

Related concepts:

 Processing GSAM databases (Application Programming)

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Chapter 9. DBRC - Database Recovery Control service aids

Diagnostic service aids, including RECON record types, DBRC internal trace, DBRC external trace are described.

Diagnosing from a RECON list

You can use the LIST command to list the contents of all or part of the RECON data set.

You can list:

- The copy1 RECON data set
- RECON records for a particular change-accumulation group or for all change accumulation groups
- RECON records for a particular log data set or for all log data sets
- RECON records for a particular database data set or for DBDS groups
- Databases
- Subsystems
- Interim log records

Because some information is not printed when you issue the LIST.RECON command, you can issue the access method services PRINT command to list all information in hexadecimal format.

RECON record types

The records in the RECON data set store information about logging activity and events that can affect the recovery of the database.

Content description of the keys in RECON records

To view the layout of the entire RECON record, see the following table. Consider these points as you examine the records:

- The RECON key size is 32 bytes.
- The last three bytes of the key contain either of the following values:
 - Reserved, and contain zeros.
 - First byte=0 and the last 2 bytes=key segment number.
- Time stamps have the following characteristics:
 - Time stamps are 12 bytes.
 - The symbolic UTC format is:
YYYYDDDFHHMMSSTHMIJUAQQS
An example of the UTC format is: 2004006F211432800000032D
 - DSPTIMES (DFSTIMES) contains time stamp structure information.

The following table shows the RECON record types.

Table 53. RECON record types

Common name	Part name	List ID	Release	Key fields
RECON Header	DSPRCNRC	RECON	R-1	DBD: hex zeros DDN: hex zeros Type: X'01' Time: hex zeros
RECON Header Extension	DSPRCR1	*****	R-3	DBD: hex zeros DDN: hex zeros Type: X'01' Time: X'00000000008'
Audit Trail Record	DSPMUPHD	****	2.1	DBD: hex zeros DDN: hex zeros Type: X'02' Time: sequence number
RECON DMB Table Record	DSPRDTRC	*****	9.1	DBD: hex zeros DDN: hex zeros Type: X'03' Time: hex zeros Note: Not listed in RECON Listing. An IDCAMS print will show the record if it exists.
PRILOG	DSPLOGRC	PRILOG	R-1	DBD: hex zeros DDN: hex zeros Type: X'05' Time: time stamp
Interim PRILOG	DSPLOGRC	IPRI	R-2	DBD: hex zeros DDN: hex zeros Type: X'06' Time: time stamp
LOGALL	DSPLGARC	LOGALL	R-1	DBD: hex zeros DDN: hex zeros Type: X'07' Time: time stamp
SECLOG	DSPLOGRC	SECLOG	R-1	DBD: hex zeros DDN: hex zeros Type: X'09' Time: time stamp
Interim SECLOG	DSPLOGRC	ISEC	R-2	DBD: hex zeros DDN: hex zeros Type: X'0A' Time: time stamp

Table 53. RECON record types (continued)

Common name	Part name	List ID	Release	Key fields
PRISLDS	DSPLOGRC	PRISLD	R-3	DBD: X'FFFFFFFF00000043' DDN: subsystem name Type: X'43' Time: time stamp
PRITSLDS	DSPLOGRC	PRITSLDS	5.0	DBD: X'FFFFFFFF00000044' DDN: subsystem name Type: X'44' Time: time stamp
Interim PRISLDS	DSPLOGRC	IPRISL	R-3	DBD: X'FFFFFFFF00000045' DDN: subsystem name Type: X'45' Time: time stamp
Interim PRITSLDS	DSPLOGRC	IPRITSLD	5.0	DBD: X'FFFFFFFF00000046' DDN: subsystem name Type: X'46' Time: time stamp
SECSLDS	DSPLOGRC	SECSLD	R-3	DBD: X'FFFFFFFF00000047' DDN: subsystem name Type: X'47' Time: time stamp
SECTSLDS	DSPLOGRC	SECTSLDS	5.0	DBD: X'FFFFFFFF00000048' DDN: subsystem name Type: X'48' Time: time stamp
Interim SECSLDS	DSPLOGRC	ISECSL	R-3	DBD: X'FFFFFFFF00000049' DDN: subsystem name Type: X'49' Time: time stamp
Interim SECTSLDS	DSPLOGRC	ISECTSLD	5.0	DBD: X'FFFFFFFF00000050' DDN: subsystem name Type: X'50' Time: time stamp
Change Accum Group	DSPCAGRC	CAGRP	R-1	DBD: hex zeros DDN: CA group name Type: X'0F' Time: hex zeros
Change Accum Execution	DSPCHGRC	CA	R-1	DBD: hex zeros DDN: CA group name Type: X'11' Time: time stamp

Table 53. RECON record types (continued)

Common name	Part name	List ID	Release	Key fields
DBDS Group	DSPDGRC	DBDSGRP	2.1	DBD: X'0000000000000007' DDN: DBDS group name Type: X'16' Time: hex zeros
Database Header	DSPDBHRC	DB	R-2	DBD: DBD name DDN: hex zeros Type: X'18' Time: hex zeros
Partition	DSPPTNRC	DB	7.1	DBD: DBD name DDN: Partition name Type: X'19' Time: hex zeros
Database Data Set	DSPDSHRC	DBDS	R-1	DBD: DBD name DDN: DDN name Type: X'20' Time: hex zeros
Area Recovery	DSPDSHRC	DBDS	R-3	DBD: DBD name DDN: area name Type: X'20' Time: hex zeros
Area Auth	DSPDBHRC	DBDS	R-3	DBD: DBD name DDN: area name Type: X'21' Time: hex zeros
ALLOC	DSPALLRC	ALLOC	R-1	DBD: DBD name DDN: DDN or area name Type: X'28' Time: time stamp
Image Copy	DSPIMGRC	IMAGE	R-1	DBD: DBD name DDN: DDN or area name Type: X'2D' Time: time stamp
Reorg	DSPRRGRC	REORG	R-2	DBD: DBD name DDN: DDN or area name Type: X'32' Time: time stamp
Recovery	DSPRCVRC	RECOV	R-1	DBD: DBD name DDN: DDN or area name Type: X'37' Time: time stamp

Table 53. RECON record types (continued)

Common name	Part name	List ID	Release	Key fields
Backout	DSPBKORC	BACKOUT	4.1	DBD: X'FFFFFFFFF00000035' DDN: subsystem name Type: X'35' Time: hex zeros
Global Service Group	DSPGSGRC	GSG	5.0	DBD: X'FFFFFFFFFFFFFFF0000' DDN: global service group name Type: X'3A' Time: hex zeros
Tracking Subsystem	DSPSSRC	SSYS	5.0	DBD: X'FFFFFFFFF0000003E' DDN: subsystem name Type: X'3E' Time: hex zeros
Subsystem	DSPSSRC	SSYS	R-2	DBD: X'FFFFFFFFFFFFFFF'
Available CA Execution	DSPCHGRC	CA	R-1	DDN: subsystem name Type: X'3F' Time: hex zeros
PRIOLDS	DSPOLDRC	PRIOLD	R-3	DBD: hex zeros DDN: hex zeros Type: X'51' Time: time stamp
				DBD: X'FFFFFFFFF00000053' DDN: subsystem name Type: X'53' Time: hex zeros
Interim PRIOLDS	DSPOLDRC	IPRIOL	R-3	DBD: X'FFFFFFFFF00000055' DDN: subsystem name Type: X'55' Time: hex zeros
				DBD: X'FFFFFFFFF00000057' DDN: subsystem name Type: X'57' Time: hex zeros
SECOLDS	DSPOLDRC	SECOLD	R-3	DBD: X'FFFFFFFFF00000059' DDN: subsystem name Type: X'59' Time: hex zeros
Interim SECOLDS	DSPOLDRC	ISECOL	R-3	DBD: DBD name DDN: DDN or area name Type: X'6D' Time: hex zeros
Available Image Copy	DSPIMGRC	IMAGE	R-1	

DBRC internal trace

DBRC internal trace is a useful tool for diagnosing problems that are possibly related to DBRC. The trace is always enabled.

Types of problems DBRC internal trace can diagnose

The DBRC internal trace can help diagnose many different types of problems, such as:

- RECON data set contention
- RECON data set errors that are indicated by messages
- System abends in which the PSW is pointing to DBRC
- DBRC abends
- Whether DBRC or some other IMS component is causing the problem

Sometimes a problem occurs as a result of the interaction between two different modules performing different tasks. Interpreting trace entries is the best way to determine what each module was doing and when. For example, for RECON data set errors, it is important to know which DBRC modules manipulated the RECON data set and when.

You generally look at the DBRC trace output under the direction of an IBM Software Support representative, who will guide you in collecting data in specific trace fields and in interpreting that data. The DBRC trace entries that follow help you interpret trace data.

Example of DBRC internal trace

A user receives abend code xxx. The PSW is pointing to DBRC. The user reports the problem to an IBM support representative. Some of the steps that the user diagnostician might take under the guidance of the IBM representative are:

1. Locate the DBRC trace in the trace using the TRACETBL eye catcher.
2. Use the sample trace to verify that you have found the trace and to help you navigate through the trace table entries.
3. Find DBRC and IMS control blocks and data areas by using addresses from selected trace table entries.
4. Determine the events that occurred before the abend.
5. Use the information in the trace and data areas to understand what caused the abend.

Some DBRC functions have the capability of generating additional trace entries that can aid in problem analysis. An IBM representative can assist you in enabling one or more of these expanded trace options through the use of the CHANGE.RECON command.

The CHANGE.RECON command supports a TRACEOPT parameter that allows you, under the direction of an IBM representative, to select expanded DBRC trace options.

CHANGE.RECON

►►—TRACEOPT—┐
└(n(,m...))┘◄◄

n,m,... DBRC TRACEOPT options

TRACEOPT is an optional parameter that you use only under the direction of an IBM Software Support representative for the purpose of gathering documentation for problem analysis. The IBM Software Support will provide the sub-options for the TRACEOPT parameter.

DBRC trace input

When called, DSPTRACE receives a 16-byte parameter list.

Contents of the parameter list

- An 8-character identifier that becomes the first 8 characters of the trace entry.
- A 4-byte control block pointer that points to a DFSBRLSB or the DSPRQB.
- A 4-byte block area pointer. 64 bytes of data from the block area are inserted in the trace entry. If the pointer is 0, the trace entry is 64 bytes long. Otherwise, the trace entry is 128 bytes long.

Locating the DBRC trace

The DBRC trace is in the IMS-formatted portion of an IMS-formatted dump. There are four ways you can locate the DBRC trace.

Method 1

Find the trace in the DBRC section of the IMS offline formatted dump.

Method 2

Find any DSPxxxxx module in the Save Area trace of the dump. For most DSPxxxxx modules marked ENTERED VIA[®] CALL, register 5 contains the address of the request level control block (RQB). Offset X'38' in the RQB contains the address of router storage. Offset X'1C' in router storage contains the address of the DBRC trace.

In certain situations, register 5 does not point to the RQB. If this is the case, use method 3 or method 4.

Method 3

The trace is in subpool 0. If the dump has an index, look in the index to locate subpool 0. Scan this portion of the dump for eye catcher "TRACETBL," which identifies the beginning of the trace.

Method 4

If you are looking at a dump online, search for eye catcher TRACETBL or GETFEED. If you search for the GETFEED eye catcher, you might first find it within DBRC modules. Search until you find the GETFEED eye catcher in the DBRC trace. Scroll to the beginning of the trace.

Related reference:

“Unformatted DBRC internal trace example” on page 244

DBRC trace output

Trace output normally resides in subpool 0 storage, but you can direct output to a Generalized Trace Facility (GTF) data set.

The DBRC internal trace is a wraparound trace. That is, after the trace table is full, tracing starts at the beginning of the table, and each new entry overlays an old entry.

An entry with the identifier “TRACENXT” marks the next entry to be used, which is the logical end of the trace table.

Related reference:

“DBRC external trace” on page 248

DBRC trace header record

The DBRC trace header record is shown.

words 0-1 – Identifier TRACETBL
word 2 – Length of the trace
word 3 – Count of trace calls made
word 4 – Beginning of trace table
word 5 – End of trace table
word 6 – Next entry to update
word 7 – Double word alignment

Module call, module return, and DSPSTACK trace entries

With few exceptions, DBRC modules call module DSPSTGET to obtain initial work space and additional temporary work space (with the DSPGFSTK macro). Upon exit, DSPSTFRE releases the space obtained for the module. This centralized temporary storage management allows DBRC to track the flow of modules, starting with the first call out of DSPCRTR0 (entry point to DBRC).

Three trace entries accomplish this:

- Words 1 and 2 show the following items:
 - An arrow indicating whether the module is being called or is returning.
 - The nesting level of the module being called or returned to. Nesting levels are shown in one or two decimal digits, up to 99. (Nesting level 0 is DSPUIN00)
 - The last five characters of the module name being called or returning.
- DSPSTACK—additional work space trace entry (the result of the currently active module issuing the DSPGFSTK macro that calls DSPSTGET).

The following figure illustrates this processing flow:

1. Module A calls module B, which in turn calls DSPSTGET to obtain initial work space.
2. Module B issues macro DSPGFSTK to obtain additional work space.
3. Module B calls DSPSTFRE to release all temporary storage.
4. Module B returns control to module A.

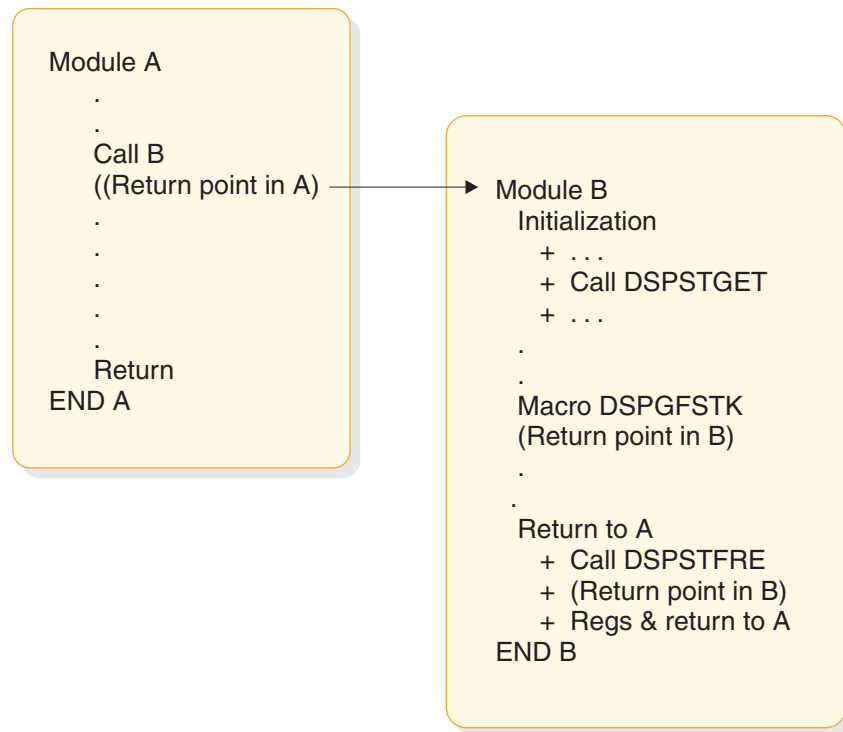


Figure 64. DBRC trace processing flow

“DBRC internal trace” on page 232 illustrates the format of the trace entries associated with this module flow. Each entry occupies one line (8 words) in the DBRC internal trace table. References to specific addresses and locations in modules A and B refer to the diagram above.

One-line trace entry produced when module A calls module B

The following figure shows a one-line trace entry that is produced when module A calls module B. A one-line trace entry that is produced when module B calls DSPSTGET to obtain initial work space storage after being called by module A.

words 0-1 – Identifier which consists of:

- An arrow (") indicating that the module is being called.
- The nesting level of module B. Nesting levels are shown in one or two decimal digits up to 99 (nesting level 0 is DSPUIN00).
- The last five characters of the module name being called.

word 2 – Address in module A of call to module B

word 3 – Entry point address of module B

word 4 – Save area address of the calling module (A)

word 5 – Beginning address of the temporary storage obtained for module B (B's save area address)

words 6-7 – Trace time stamp

One-line trace entry produced when module B returns to module A

The following figure shows a one-line trace entry that is produced when module B calls DSPSTFRE to release all of its temporary storage before returning to module A.

words 0-1 – Identifier which consists of:

- The nesting level of module A. Nesting levels are shown in one or two decimal digits up to
- A left arrow (") indicating that the module is returning.

99 (nesting level 0 is DSPUI00).

- The last five characters of the module name returning.

word 2 – Address in module A to which module B returns

word 3 – Offset in module B where it returns to module A

word 4 – Save area address of module A that called module B

word 5 – Beginning address of the temporary storage being released for module B by module DSPSTFRE

words 6-7 – Trace time stamp

DSPSTACK trace entry

The following figure shows a one-line trace entry that is produced when module B issues macro DSPGFSTK, which calls DSPSTGET to obtain additional temporary storage.

words 0-1 – Identifier DSPSTACK

word 2 – Return point address in the module B to which DSPSTGET returns after acquiring additional temporary storage for the module.

word 3 – Entry point address of module B

word 4 – Save area address of the module (B)

word 5 – Beginning address of the additional temporary storage obtained for module B

words 6-7 – Trace time stamp

BGNCABN0, DSPCABN0, BGNRETRY, DSPCRTR0, and CRTR0XIT trace entries

DBRC internal trace is a useful tool for diagnosing problems that are possibly related to DBRC. The trace is always enabled.

In DBRC, the following modules have specific trace calls inserted in their processing flow:

- DSPCABN0
- DSPCRTR0
- DSPURI00

The following figures show the layout of the entries issued from BGNCABN0, DSPCABN0, and DSPCRTR0.

words 0-1 – Identifier BGNCABN0
word 2 – A(DSPRQB)
words 3-5 – Zeros
words 6-7 – Time stamp

This is normally followed by either DSPCABN0 or a BGNRETRY entry.

The following figure shows that DBRC terminated because of an unrecoverable error.

words 0-1 – Identifier DSPCABN0
word 2 – A(DSPRQB)
words 3-5 – Zeros
words 6-7 – Time stamp

This is the last logical entry in the trace table.

The following figure shows that DBRC recovered from an abend condition and is beginning to execute a retry sequence of code.

words 0-1 – Identifier BGNRETRY
word 2 – A(DSPRQB)
words 3-5 – Zeros
words 6-7 – Time stamp

The following figure shows that the router made a trace call before passing control to the next DBRC routine that is scheduled to process the request identified by a DFSBRLSB.

Line 1:

words 0-1 – Identifier DSPCRTR0
word 2 – A(DFSBRLSB)
words 3-5 – Data from DFSBRLSB: function flags, exit flags, address of DSPGDB (These fields are the same as the fields that are displayed in the DSPCRTR0 entry, but they might have been modified by the request.)
words 6-7 – Time stamp

Line 2:

word 0 – Address of BRLBPRNT field in DFSBRLSB
words 2-7 – Data from DFSBRLSB (next 60 bytes after field BRLBPRNT)

Line 3:

words 0-7 – Data from DFSBRLSB (continued from previous line)

The following figure shows the function requested in the DSPCRTR0 trace entry completed.

```

Line 1:
    words 0-1 – Identifier CRTR0XIT

    word 2 – A(DFSBRLSB)

    words 3-5 – Data from DFSBRLSB: function flags,
                exit flags, address of DSPGDB. (These
                are the same fields displayed in the
                DSPCRTR0 entry, but they might have been
                modified by the request.)

    words 6-7 – Time stamp
Line 2:
    words 0-4 – DFSBRLSB prefix

    words 5-7 – First 12 bytes of DFSBRLSB
Line 3:
    words 0-7 – DFSBRLSB (continued from previous line)

```

DSPURI00 trace entries

A trace entry with the identifier DSPURI00 indicates the beginning of a series of trace calls that show what occurs as DSPURI00 processes an I/O request.

All trace calls from DSPURI00 result in 96-byte trace entries. There are nine separate calls to the trace routine in DSPURI00. The pointer to the DSPRQB follows the trace identifier. The following table shows the 8-character identifier and block-area pointer for each call.

Table 54. Calls to the trace routine in DSPURI00

8-character identifier	Block-area pointer	Explanation
DSPURI00	MODIRCAR	DSPURI00 receives control and the function-code value from DSPIRCAR indicates the type of call. (See “DSPURI00 entry trace entry” on page 239.)
OPENER1	FILRESLT(I)	DSPURI00 starts a physical open of a RECON data set.
OPENER2	FILRESLT(I)	DSPURI00 completes a physical open of a RECON data set.
OPENXA8	FILRESLT(I)	DSPURI00 encountered a VSAM OPEN failure with reason code X'A8'.
GETFEED	FILRESLT(I)	After DSPURI00 issues an I/O request, the GETFEED procedure is called to trace specific information related to the I/O operation. Some of this information comes from DSPVFILE, some from the VSAM RPL, some from the record key and some from the I/O parameter block, DSPIOPAR. In addition, the RPL request is translated into a character printable code that describes the I/O operation. See “GETFEED trace entry for one RECON” on page 240.
CLOSER1	FILRESLT(I)	DSPURI00 starts a true close of the RECON data set.
CLOSER2	FILRESLT(I)	DSPURI00 completes a true close of the RECON data set.

Table 54. Calls to the trace routine in DSPURI00 (continued)

8-character identifier	Block-area pointer	Explanation
VSAMERR	FILRESLT(I)	A VSAM error occurred and the routine to print a VSAM error message was entered.
RDOPTERR	RILRESLT(I)	An invalid read integrity option was specified. An error message was issued.
DSPURI00	ENDIRCAR	DSPURI00 returns to its caller. Relevant exit condition information, if applicable, is traced. (See "DSPURI00 exit trace entry" on page 242.)

The sequence of trace entries identified by DSPURI00, OPENER1, OPENER2, and GETFEED shows DSPURI00 receiving control and doing a physical open of one RECON data set. When DSPURI00 opens the second RECON data set, another sequence of OPENER1, OPENER2, and GETFEED entries follow the entries for the first RECON data set.

The DSPIRCAR data area includes a 1-byte function code and a 3-byte flag field. The function codes are alphabetic characters that identify what operation DSPURI00 does. The flag bytes further identify the type of operation. Pertinent information is extracted from the DSPIRCAR data area and placed in a modified IRCAR area, along with other processing information, to produce both the entry and exit traces within DSPURI00.

The GETFEED trace entry maps 64 bytes of information about the I/O operation. The last two lines of the entry contain this data.

The exit trace entry is similar to the entry trace. It is written upon return from DSPURI00, but only if one or more of the following conditions is true:

- This was a request to locate a specific RECON record.
- The request did not complete successfully (RC greater than 0 was returned).
- The copy 1 or 2 RECON status changed on this entry to DSPURI00.

DSPURI00 entry trace entry

Line 1:

words 0-1 – DSPURI00
word 2 – RQB address
words 3-5 – Binary zeros
words 6-7 – Time stamp

Line 2:

words 0-1 – MODIRCAR
word 2 – c1c2
word 3 – Func
words 4-7 – 16-byte entry message

Line 3:

words 0-5 – Key, blank, or repl ddname (key area)
word 6 – addr
word 7 – leng

time stamp

Trace time stamp.

c1c2 The DD statement number (1-3) of the copy 1 and copy 2 RECON, if any, on entry to DSPURI00.

func Function and option bits received from caller in DSPIRCAR.

16-byte entry message

EBCDIC message readable at the right end of the trace entry, such as LOGICAL OPEN, END MULT, UPDATE, and others. Class and sequential locate requests and configuration requests have a modifier at the end of their message:

F Locate first
L Locate last
NX Locate next
P Locate previous
NG Locate not-greater-than
DSNS Supply dsnames of RECONs in DSPIRCAR
STAT Supply status of all RECONs in DSPIRCAR
DUAL Enter dual mode
REPL Replace RECON x with spare (where $x = 1-3$, see key area)

key area

For all locate, change, insert, and delete requests, contains the 32-byte key of the record involved. For replace requests, contains the ddname of the RECON to be replaced.

addr Address of a record to be changed or inserted.

leng Length of a record to be changed or inserted.

GETFEED trace entry for one RECON

Line 1:

words 0-1 - GETFEED
word 2 - DSPRQBA
words 3-5 - Binary zeros
words 6-7 - Time stamp

Line 2:

word 0 - RPLFDBWD
word 1 - FILLRECL
word 2 - FILNEWCA
word 3 - FILNEWEX
word 4 - FILCICNT
word 5 - FILCACNT
word 6 - FILEXCNT
word 7 - FILMAX

Line 3:

word 0 - FILCISZ
word 1 - bytes 1-2 - FILFLAGS
 bytes 3-4 - FILOPERR
word 2 - FILBUFPT
word 3 - FILRCDPT
word 4 - FILRCDLN
word 5 - bytes 1-2 - SEGMENT NUMBER
 byte 3 - RECON NUMBER
 byte 4 - RPLREQ
word 6 bytes 1-4 and word 7 bytes 1-2 - PRINTABLE
 RPLREQ
word 7 - bytes 3-4 - NOT USED

dsprqba

Address of the DSPRQB.

time stamp
Trace time stamp.

RPLFDBWD
RPL feedback word.

FILLRECL
Logical record length.

FILNEWCA
Starting high-used relative byte address (RBA).

FILNEWEX
Starting high-allocated RBA.

FILCICNT
RECON changed counter value.

FILCACNT
Current high-used RBA.

FILEXCNT
Current high-allocated RBA.

FILMAX
VSAM maximum record size.

FILCISZ
Data control interval (CI) size.

FILFLAGS
RECON processing status flags (open, reserved, empty).

FILOPERR
Open SVC reason code if RC is not 0.

FILBUFPT
Pointer to header record buffer.

FILRCDPT
Pointer to the record in the VSAM I/O buffer or user area.

FILRCDLN
Length of record.

SEGMENT NUMBER
Record segment number.

RECON COPY NUMBER
Recon number used in this request.

RPLREQ
RPL request type.

RPL REQUEST PRINTABLE CODE
English word that is later translated into a printable code used to make a request to VSAM.

RPL REQ PRINTABLE CODE
This is translation of the RPLREQ field into a printable code that is close to being the English word for the request made to VSAM. The following table shows the translated RPLREQ printable codes.

Table 55. Translated RPLREQ printable codes

Printable code	Hexadecimal	RPLEQ	RPL request
GET	00	GET	Retrieve a record
PUT	01	PUT	Write a record
CHECK	02	CHECK	Wait for completion
POINT	03	POINT	Position for access
ENDREQ	04	ENDREQ	Terminate a request
ERASE	05	ERASE	Delete a record
VERIFY	06	VERIFY	Synchronize end of data
*****	07	Not used	Not used
DATPRE	08	DATA PREFORMAT	
IDXPRES	09	INDEX PREFORMAT	
FORCIO	0A	Force I/O	
GETIX	0B	GET INDEX	
PUTIX	0C	PUT INDEX	
SCHBFR	0D	SCHBFR	Search Buffer
MRKBFR	0E	MRKBFR	Mark Buffer
WRTBFR	0F	WRTBFR	Write Buffer
CNVTAD	10	CNVTAD	
MNTACQ	11	MNTACQ	
ACQRNG	12	ACQRANGE	
TRMRPL	13	TERMRPL	
VERREF	14	VERIFY REFRESH	

DSPURI00 exit trace entry

Line 1:

words 0-1 – DSPURI00
word 2 – RQB address
words 3-5 – Binary zeros
words 6-7 – Time stamp

Line 2:

words 0-1 – ENDICAR
word 2 – c1c2
word 3 – Func
words 4-7 – 16-byte entry message

Line 3:

words 0-5 – Key, blank, or repl ddname (key area)
word 6 – addr
word 7 – lncrc

time stamp

Trace time stamp.

c1c2 The DD statement number (1-3) of the copy 1 and copy 2 RECON, if any, on exit from DSPURI00.

func Function and option bits received from caller in DSPIRCAR.

16-byte exit message

For locate requests, contains either the message RECORD WAS FOUND or

RECORD NOT FOUND, depending on the outcome of the search.
Otherwise, contains a repeat of MODIRCAR contents.

key area

For a successful locate request, contains the 32-byte key of the RECON record returned to caller. Otherwise, contains a repeat of MODIRCAR contents.

addr Address of the record found for a successful locate. Otherwise, 0.

lnrc Length of the record found for a successful locate, or the return code to be passed back to the module that called DSPURI00.

Trace entries related to parallel RECON access

When parallel RECON access is enabled, trace entries that are related to parallel access processing are created. Trace calls are made when unexpected conditions occur during processing.

Layout of the DSPURI80 trace entry:

The trace entry is created when DBRC detects that VSAM has shunted data for a RECON data set.

Line 1:

words 0-1 – Identifier DSPURI80
word 2 – A(DSPRQB)
words 3-5 – Zeros
words 6-7 – Time stamp

Line 2:

word 0 – Index into FILE data for data set with shunted I/O data
words 1-2 – DDNAME of RECON data set with shunted I/O data
words 3-7 – Zeros

Line 3:

words 0-7 – Zeros

Layout of the DSPRSYNC trace entry:

The trace entry is created when a non-zero return code is returned by an z/OS Resource Recovery Services ATRCMIT request or ATRBACK request.

Line 1:

words 0-1 – Identifier DSPRSYNC
word 2 – A (DSPRQB)
words 3-5 – Zeros
words 6-7 – Time stamp

Line 2:

word 0 – Requested RRS request (1=commit, 2=backout)
word 1 – Return code from ATRCMIT request or ATRBACK request
words 2-7 – Zeros

Line 3:

words 0-7 – Zeros

DBRC group services entries

When DBRC is registered with SCI, module DSPRLX10 makes trace calls in response to group services requests. These calls can be requests to send notifications to other DBRC instances, event notifications, or requests or messages from other DBRC instances.

Requests without an accompanying message are traced in the DSPRLX10 trace entry. Entries with messages are traced in the DSPRLX1M trace entry.

Layout of the DSPRLX10 trace entry:

Line 1:

words 0-1 – Identifier DSPRLX10
word 2 – A(DFSBRLSB)
words 3-5 – Data from DFSBRLSB: function flags, exit flags, address of DSPGDB.
(These fields are the same as the fields that are
displayed in the DSPCRTR0 entry, but they might have been modified by
the request.)
words 6-7 – Time stamp

Layout of the DSPRLX1M trace entry:

Line 1:

words 0-1 – Identifier DSPRLX1M
word 2 – A(DFSBRLSB)
words 3-5 – Data from DFSBRLSB: function flags, exit flags, address of DSPGDB.
(These fields are the same as the fields that are
displayed in the DSPCRTR0 entry, but they might have been modified by
the request.)
words 6-7 – Time stamp

Line 2:

words 0-1 – 'DSPRLMSG'
word 3 – Message type
word 4 – message subtype
words 5-7 – Zeros

Line 3:

words 0-3 – Message sender ID
word 4 – Message sequence number
word 5 – Message ID that is being responded to
words 6-7 – First two words of message specific data

Unformatted DBRC internal trace example

The module-call entries, module return entries, DSPURI00 trace entries, and other entries (such as GETFEED, DSPCRTR0, and CRTR0XIT) are shown in this trace example.

```
*** DBRC TRACE TABLE ***
0B9A4700 E3D9C1C3 C5E3C2D3 00025900 00000DDA 0B9A4720 0B9C9F20 0B9C9B60 0B9C9FA0 *TRACETBL.....-....*
0B9C9B60 E3D9C1C3 C5D5E7E3 40404040 40404040 40404040 40404040 40404040 *TRACENXT *
0B9C9B80 40404040 40404040 40404040 40404040 40404040 40404040 40404040 *
      LINES 0B9C9BA0-0B9C9F1F SAME AS THE ABOVE
0B9A4720 606EF1E3 C9D4C5F0 8B99D3EC 0B939928 0B901E48 0B9A2010 BF9A6FDB F82B9987 *->1TIME0.rL..l.....?.8.rg*
0B9A4740 F04C60E3 C9D4C5F0 0B99D3EC 0000113A 0B901E48 0B9A2010 BF9A6FDB F82CA047 *0<-TIME0.rL.....?.8...*
0B9A4760 606EF1E4 D9C9F0F0 8B99D5B4 0B94F9C8 0B901E48 0B9A2010 BF9A6FDB F82EF547 *->1URI00.rN..m9H.....?.8.5.*
0B9A4780 C4E2D7E4 D9C9F0F0 0B99E480 00000000 00000000 00000000 BF9A6FDB F82F0F47 *DSPURI00.rU.....?.8...*
0B9A47A0 D4D6C4C9 D9C3C1D9 404001D8 D6000600 D7C8E8E2 C9C3C1D3 40D6D7C5 D5404040 *MODIRCAR .Q0...PHYSICAL OPEN *
0B9A47C0 40404040 40404040 40404040 40404040 40404040 00000000 00000000 *
0B9A47E0 606EF2E4 D9C9F0F1 000007A4 0B954A98 0B9A2010 0B9A2780 BF9A6FDB F82F4047 *->2URI01...u.n.q.....?.8..*
0B9A4800 606EF3E4 C3D7F4F0 00000446 0B99A518 0B9A2780 0B9A2F50 BF9A6FDB F8301F07 *->3UCP40....rv.....&..?.8...*
0B9A4820 F24C60E4 C3D7F4F0 0B954EDE 000001BE 0B9A2780 0B9A2F50 BF9A6FDB F8328D07 *2<-UCP40.n+.....&..?.8...*
0B9A4840 606EF3D9 E3E7C4F0 00000556 0B929418 0B9A2780 0B9A2F50 BF9A6FDB F832A547 *->3RTXD0...km.....&..?.8.v.*
0B9A4860 F24C60D9 E3E7C4F0 0B954FEE 000002AE 0B9A2780 0B9A2F50 BF9A6FDB FF6A2270 *2<-RTXD0.n|.....&..?.8...*
0B9A4880 606EF3E4 D9C9F1F0 00000AC0 0B95C958 0B9A2780 0B9A2F50 BF9A6FDB FF6C1030 *->3URI10....nI.....&..?.%.**
0B9A48A0 606EF4E4 D9C9F2F0 00000524 0B95FDA8 0B9A2F50 0B9A3628 BF9A6FDB FF6C4DB0 *->4URI20....n.y...&.....?..%(*
0B9A48C0 606EF5E4 C1D3D3F0 000002F8 0B999BD0 0B9A3628 0B9A3A08 BF9A6FDB FF6CF070 *->5UALL0...8.r.....?..%.0.*
0B9A48E0 F44C60E4 C1D3D3F0 0B9600A0 000001DC 0B9A3628 0B9A3A08 BF9A6FDC 010B7535 *4<-UALL0.o.....?.....*
0B9A4900 606EF5E4 C1D3D3F0 000002F8 0B999BD0 0B9A3628 0B9A3A08 BF9A6FDC 010B98F5 *->5UALL0...8.r.....?..q5*
0B9A4920 F44C60E4 C1D3D3F0 0B9600A0 000001DC 0B9A3628 0B9A3A08 BF9A6FDC 0281DA47 *4<-UALL0.o.....?..a.*
0B9A4940 606EF5E4 C1D3D3F0 000002F8 0B999BD0 0B9A3628 0B9A3A08 BF9A6FDC 02820387 *->5UALL0...8.r.....?..b.g*
0B9A4960 F44C60E4 C1D3D3F0 0B9600A0 000001DC 0B9A3628 0B9A3A08 BF9A6FDC 042CF50A *4<-UALL0.o.....?..5.*
0B9A4980 F34C60E4 D9C9F2F0 0B95CE7C 000002C2 0B9A2F50 0B9A3628 BF9A6FDC 042D294A *3<-URI20.n.@...B...&.....?..*
0B9A49A0 606EF4D9 D3C9F0F0 00000750 0B923570 0B9A2F50 0B9A3628 BF9A6FDC 042D7D4A *->4RLI00...&.k.....&.....?..*
0B9A49C0 606EF5D9 D3C1E4F0 0000035E 0B922FC0 0B9A3628 0B9A3C20 BF9A6FDC 042E038A *->5RLAU0...;k.....?.....*
0B9A49E0 F44C60D9 D3C1E4F0 0B9238CE 0000047C 0B9A3628 0B9A3C20 BF9A6FDC 05C0B1B2 *4<-RLAU0.k.....@.....?.....*
0B9A4A00 F34C60D9 D3C9F0F0 0B95D0A8 00000C8C 0B9A2F50 0B9A3628 BF9A6FDC 05C0D9F2 *3<-RLI00.n.y.....&.....?..R2*
0B9A4A20 606EF4E4 D9C9F1F5 00000784 0B95F648 0B9A2F50 0B9A3628 BF9A6FDC 05C0F572 *->4URI15...d.n6....&.....?..5.*
0B9A4A40 F34C60E4 D9C9F1F5 0B95D0DC 0000030E 0B9A2F50 0B9A3628 BF9A6FDC 094FABB2 *3<-URI15.n.....&.....?..*
0B9A4A60 606EF4D9 E2E5F0F0 00000796 0B998AE8 0B9A2F50 0B9A3628 BF9A6FDC 094FD6B2 *->4RSV00...o.r.Y...&.....?..0.*
0B9A4A80 F34C60D9 E2E5F0F0 0B95D0EE 00000234 0B9A2F50 0B9A3628 BF9A6FDC 09523432 *3<-RSV00.n.....&.....?.....*
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0B9A4AA0	606EF4E4	D9C9F1D7	000007F4	0B95AC48	0B9A2F50	0B9A3628	BF9A6FDC	09525272	*->4URI1P...4.n....&.....?.....*
0B9A4AC0	D6D7C5D5	C5D9F140	0B99E480	00000000	00000000	00000000	BF9A6FDC	09525BF2	*OPENER1 .rU.....?.....\$2*
0B9A4AE0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
LINES 0B9A4B00-0B9A4B1F SAME AS THE ABOVE									
0B9A4B20	C4E2D7E2	E3C1C3D2	8B95AEBE	0B95AC48	0B9A3628	0B9A3980	BF9A6FDC	09526932	*DSPSTACK.n...n.....?.....*
0B9A4B40	606EF5E4	D9C9F1D7	000008D0	0B95AC6E	0B9A3628	0B9A39D0	BF9A6FDC	174A3EF5	*->5URI1P...n.>.....?.....5*
0B9A4B60	C4E2D7E2	E3C1C3D2	8B95B7BC	0B95AC6E	0B9A39D0	0B9A3D28	BF9A6FDC	174A58B5	*DSPSTACK.n...n.>.....?.....*
0B9A4B80	F44C60E4	D9C9F1D7	0B95B518	00000CE0	0B9A3628	0B9A39D0	BF9A6FDC	1808143C	*4<-URI1P.n.....?.....*
0B9A4BA0	D6D7C5D5	C5D9F240	0B99E480	00000000	00000000	00000000	BF9A6FDC	1808233C	*OPENER2 .rU.....?.....*
0B9A4BC0	00000000	00000000	00000000	00000000	00000000	00024000	00024000	00023000	*.....?.....*
0B9A4BE0	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A4C00	F34C60E4	D9C9F1D7	0B95D14C	00000B30	0B9A2F50	0B9A3628	BF9A6FDC	1809373C	*3<-URI1P.nJ<.....&.....?.....*
0B9A4C20	606EF4E4	D9C9F1D7	000007F4	0B95AC48	0B9A2F50	0B9A3628	BF9A6FDC	180957FC	*->4URI1P...4.n....&.....?.....*
0B9A4C40	D6D7C5D5	C5D9F140	0B99E480	00000000	00000000	00000000	BF9A6FDC	1809603C	*OPENER1 .rU.....?.....*
0B9A4C60	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
LINES 0B9A4C80-0B9A4C9F SAME AS THE ABOVE									
0B9A4CA0	C4E2D7E2	E3C1C3D2	8B95AEBE	0B95AC48	0B9A3628	0B9A3980	BF9A6FDC	1809667C	*DSPSTACK.n...n.....?.....@*
0B9A4CC0	606EF5E4	D9C9F1D7	000008D0	0B95AC6E	0B9A3628	0B9A39D0	BF9A6FDC	1E95B4FE	*->5URI1P...n.>.....?.....n.*
0B9A4CE0	C4E2D7E2	E3C1C3D2	8B95B7BC	0B95AC6E	0B9A39D0	0B9A3D28	BF9A6FDC	1E95CDBE	*DSPSTACK.n...n.>.....?.....n.*
0B9A4D00	F44C60E4	D9C9F1D7	0B95B518	00000CE0	0B9A3628	0B9A39D0	BF9A6FDC	1F48747E	*4<-URI1P.n.....?.....?..*
0B9A4D20	D6D7C5D5	C5D9F240	0B99E480	00000000	00000000	00000000	BF9A6FDC	1F487FBE	*OPENER2 .rU.....?.....".*
0B9A4D40	00000000	00000000	00000000	00000000	00000000	00024000	00024000	00023000	*.....?.....*
0B9A4D60	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A4D80	F34C60E4	D9C9F1D7	0B95D14C	00000B30	0B9A2F50	0B9A3628	BF9A6FDC	1F4A063E	*3<-URI1P.nJ<.....&.....?.....*
0B9A4DA0	606EF4E4	D9C9F1D7	000007F4	0B95AC48	0B9A2F50	0B9A3628	BF9A6FDC	1F4A1E7E	*->4URI1P...4.n....&.....?.....*
0B9A4DC0	D6D7C5D5	C5D9F140	0B99E480	00000000	00000000	00000000	BF9A6FDC	1F4A267E	*OPENER1 .rU.....?.....?..*
LINES 0B9A4DE0-0B9A4E1F SAME AS THE ABOVE									
0B9A4DE0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A4E20	C4E2D7E2	E3C1C3D2	8B95AEBE	0B95AC48	0B9A3628	0B9A3980	BF9A6FDC	1F4A2EFE	*DSPSTACK.n...n.....?.....?..*
0B9A4E40	D6D7C5D5	C5D9F240	0B99E480	00000000	00000000	00000000	BF9A6FDC	2576658C	*OPENER2 .rU.....?.....?..*
0B9A4E60	00000000	00000000	00000000	00000000	00000000	00000000	00024000	00023000	*.....?.....*
0B9A4E80	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A4EA0	F34C60E4	D9C9F1D7	0B95D14C	00000B30	0B9A2F50	0B9A3628	BF9A6FDC	2577744C	*3<-URI1P.nJ<.....&.....?.....<*
0B9A4EC0	606EF4E4	D9C9F2F0	00000B6E	0B95FDCE	0B9A2F50	0B9A3628	BF9A6FDC	26B6A8B8	*->4URI20...>.n....&.....?.....y.*
0B9A4EE0	606EF5E4	C1D3D3F0	000005A6	0B999B8D	0B9A3628	0B9A3A08	BF9A6FDC	2B69DC8F	*->5UALL0...w.r.....?.....8*
0B9A4F00	F44C60E4	C1D3D3F0	0B960374	000002AE	0B9A3628	0B9A3A08	BF9A6FDC	2B8387F8	*4<-UALL0.o.....?.....xT.*
0B9A4F20	F34C60E4	D9C9F2F0	0B95D4C6	000005D4	0B9A2F50	0B9A3628	BF9A6FDC	2B8397B8	*3<-URI20.nMF...M...&.....?.....cp.*
0B9A4F40	606EF4C4	C5D8F0F0	00000B8E	0B90DE68	0B9A2F50	0B9A3628	BF9A6FDC	2B83B078	*->4DEQ00.....&.....?.....c.c.*
0B9A4F60	F34C60C4	C5D8F0F0	0B95D4E6	000007DC	0B9A2F50	0B9A3628	BF9A6FDC	2B842AF8	*3<-DEQ00.nMW.....&.....?.....d.8*
0B9A4F80	606EF4E4	D9C9F1D7	00001FE6	0B95AC48	0B9A2F50	0B9A3628	BF9A6FDC	30A7E3BA	*->4URI1P...W.n....&.....?.....xT.*
0B9A4FA0	D6D7C5D5	C5D9F140	0B99E480	00000000	00000000	00000000	BF9A6FDC	30A7FD3A	*OPENER1 .rU.....?.....x..*
0B9A4FC0	00000000	00000000	00024000	00024000	0000000C	00024000	00024000	00023000	*.....?.....*
0B9A4FE0	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A5000	C4E2D7E2	E3C1C3D2	8B95AEBE	0B95AC48	0B9A3628	0B9A3980	BF9A6FDC	30A80DBA	*DSPSTACK.n...n.....?.....y..*
0B9A5020	606EF5E4	D9C9F1D7	000008D0	0B95AC6E	0B9A3628	0B9A39D0	BF9A6FDC	37330F38	*->5URI1P...n.>.....?.....?..*
0B9A5040	C4E2D7E2	E3C1C3D2	8B95B7BC	0B95AC6E	0B9A39D0	0B9A3D28	BF9A6FDC	373324B8	*DSPSTACK.n...n.>.....?.....?..*
0B9A5060	F44C60E4	D9C9F1D7	0B95B518	00000CE0	0B9A3628	0B9A39D0	BF9A6FDC	37EE8FB8	*4<-URI1P.n.....?.....?..*
0B9A5080	D6D7C5D5	C5D9F240	0B99E480	00000000	00000000	00000000	BF9A6FDC	37EE9BB8	*OPENER2 .rU.....?.....?..*
0B9A50A0	00000000	00000000	00024000	00024000	0000000C	00024000	00024000	00023000	*.....?.....*
0B9A50C0	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A50E0	F34C60E4	D9C9F1D7	0B95E93E	00000B30	0B9A2F50	0B9A3628	BF9A6FDC	37EEA778	*3<-URI1P.nZ.....&.....?.....x.*
0B9A5100	606EF4E4	D9C9F1D7	00001FE6	0B95AC48	0B9A2F50	0B9A3628	BF9A6FDC	3C754CF5	*->4URI1P...W.n....&.....?.....<5*
0B9A5120	D6D7C5D5	C5D9F140	0B99E480	00000000	00000000	00000000	BF9A6FDC	3C7560B5	*OPENER1 .rU.....?.....?..*
0B9A5140	00000000	00000000	00024000	00024000	0000000C	00024000	00024000	00023000	*.....?.....*
0B9A5160	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A5180	C4E2D7E2	E3C1C3D2	8B95AEBE	0B95AC48	0B9A3628	0B9A3980	BF9A6FDC	3C756AF5	*DSPSTACK.n...n.....?.....?..5*
0B9A51A0	606EF5E4	D9C9F1D7	000008D0	0B95AC6E	0B9A3628	0B9A39D0	BF9A6FDC	42F77137	*->5URI1P...n.>.....?.....?..7.*
0B9A51C0	C4E2D7E2	E3C1C3D2	8B95B7BC	0B95AC6E	0B9A39D0	0B9A3D28	BF9A6FDC	42F78477	*DSPSTACK.n...n.>.....?.....?..7d.*
0B9A51E0	F44C60E4	D9C9F1D7	0B95B518	00000CE0	0B9A3628	0B9A39D0	BF9A6FDC	43AB3B78	*4<-URI1P.n.....?.....?..*
0B9A5200	D6D7C5D5	C5D9F240	0B99E480	00000000	00000000	00000000	BF9A6FDC	43AB4A78	*OPENER2 .rU.....?.....?..*
0B9A5220	00000000	00000000	00024000	00024000	0000000C	00024000	00024000	00023000	*.....?.....*
0B9A5240	00002000	00000020	00000000	00000000	00000000	00000000	00000000	00000000	*.....?.....*
0B9A5260	F34C60E4	D9C9F1D7	0B95E93E	00000B30	0B9A2F50	0B9A3628	BF9A6FDC	43AB5678	*3<-URI1P.nZ.....&.....?.....?..*
0B9A5280	606EF4E4	D9C9F3F0	00000D1E	0B961C46	0B9A2F50	0B9A3628	BF9A6FDC	43AB8B38	*->4URI30....o....&.....?.....?..*
0B9A52A0	F34C60E4	D9C9F3F0	0B95D676	00000F0E	0B9A2F50	0B9A3628	BF9A6FDC	45367C7E	*3<-URI30.nO.....&.....?.....@==*
0B9A52C0	F24C60E4	D9C9F1F0	0B955558	00000458	0B9A2780	0B9A2F50	BF9A6FDC	4536B13E	*2<-URI10.n.....&.....?.....?..*
0B9A52E0	D6D7C3E4	D9C9F5F0	00002938	0B969170	0B9A2780	0B9A2F50	BF9A6FDC	4537053E	*->3URI50....oj.....&.....?.....?..*
0B9A5300	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A2F50	0B9A35A8	BF9A6FDC	45370F3E	*DSPSTACK.ol..oj.....&.....?.....?..*
0B9A5320	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FDC	4537967E	*GETFEED .rU.....?.....?..0==*
0B9A5340	00000000	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*.....?.....*
0B9A5360	00002000	00000020	00000000	00000000	00000280	00000100	C7C5E340	40400000	*.....&.....D.....GET ..*
0B9A5380	F24C60E4	D9C9F5F0	0B9573D0	000002CE	0B9A2780	0B9A2F50	BF9A6FDC	45379EBE	*2<-URI50.n.....&.....?.....?..*
0B9A53A0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FDC	4537B47E	*GETFEED .rU.....?.....?..==*
0B9A53C0	00000000	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*.....?.....*
0B9A53E0	00002000	80500000	00000000	0BB88000	00000280	00000100	C7C5E340	40400000	*.....&.....D.....GET ..*
0B9A5400	606EF3C4	C5D8F0F0	0000249A	0B90DE68	0B9A2780	0B9A2F50	BF9A6FDC	4539897E	*->3DEQ00.....&.....?.....?..i==*
0B9A5420	F24C60C4	C5D8F0F0	0B956F32	000007DC	0B9A2780	0B9A2F50	BF9A6FDC	453AD3BE	*2<-DEQ00.n?.....&.....?.....L.*
0B9A5440	F14C60E4	D9C9F0F1	0B95016C	0000022E	0B9A2010	0B9A2780	BF9A6FDC	453B1E7E	*1<-URI01.n.%.....?.....?..==*

0B9A5460	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FDC	453B377E	*DSPURI00.rU.....?.....*
0B9A5480	C5D5C4C9	D9C3C1D9	F1F201D8	D6000600	D7C8E8E2	C9C3C1D3	40D6D7C5	D5404040	*ENDIRCAR12.Q0...PHYSICAL OPEN *
0B9A54A0	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	*
0B9A54C0	F04C60E4	D9C9F0F0	0B99D5B4	00000B9E	0B901E48	0B9A2010	BF9A6FDC	453B42BE	*0<-URI00.rN.....?.....*
0B9A54E0	C4E2D7C3	D9E3D9F0	0A7EFCB4	17172002	00000000	0B99E480	BF9A6FF2	C2EBE40E	*DSPCTR0.=.....rU...?2B.U.*
0B9A5500	00000000	00000000	00C8B3D28	00000001	0B99E480	00000000	00000000	00000000	*.....rU.....*
0B9A5520	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0B9A5540	606EF1E2	E2C9C7D5	8000C4D4	0B936468	000067B8	0B9A2010	BF9A6FF2	C2EC458E	*->1SSIGN..DM.1.....?2B...*
0B9A5560	606EF2E4	D9C9F0F0	00000258	0B94F9C8	0B9A2010	0B9A2220	BF9A6FF2	C2EC834E	*->2URI00....m9H.....?2B.c**
0B9A5580	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C2ECAFCF	*DSPURI00.rU.....?2B...*
0B9A55A0	D4D6C4C9	D9C3C1D9	F1F201D8	D6000000	40D3D6C7	C9C3C1D3	40D6D7C5	D5404040	*MODIRCAR12.Q0... LOGICAL OPEN *
0B9A55C0	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	*
0B9A55E0	606EF3E4	D9C9F0F1	000007A4	0B954A98	0B9A2220	0B9A2990	BF9A6FF2	C2ED55CE	*->3URI01...u.n.q.....?2B...*
0B9A5600	606EF4D9	E2E5F0F0	00000EC0	0B998AE8	0B9A2990	0B9A3160	BF9A6FF2	C2ED828E	*->4RSV00....r.Y.....?2B.b.*
0B9A5620	F34C60D9	E2E5F0F0	0B955958	00000234	0B9A2990	0B9A3160	BF9A6FF2	C2F2958E	*3<-RSV00.n.....?2B2n.*
0B9A5640	606EF4E4	D9C9F3F0	00000F76	0B961C4C	0B9A2990	0B9A3160	BF9A6FF2	C2F2D40E	*->4URI30....o.<.....?2B2M.*
0B9A5660	606EF5E4	D9C9F2F0	00001610	0B95FDDA	0B9A3160	0B9A3AF8	BF9A6FF2	C3FE36FC	*->5URI20.....n.....?2C...*
0B9A5680	F44C60E4	D9C9F2F0	0B96325C	00000A10	0B9A3160	0B9A3AF8	BF9A6FF2	C3FE683C	*4<-URI20.o.*.....-...8...?2C...*
0B9A56A0	F34C60E4	D9C9F3F0	0B955A0E	00001648	0B9A2990	0B9A3160	BF9A6FF2	C3FE703C	*3<-URI30.n!.....?2C...*
0B9A56C0	606EF4E4	D9C9F5F0	00002938	0B969170	0B9A2990	0B9A3160	BF9A6FF2	C3FF047C	*->4URI50....oj.....?2C..@*
0B9A56E0	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A3160	0B9A37B8	BF9A6FF2	C3FF11BC	*DSPSTACK.ol..oj.....?2C...*
0B9A5700	C7C5E3C6	C5C5C440	00000000	00000000	00000000	00000000	BF9A6FF2	C3FFBC3C	*GETFEED .rU.....?2C...*
0B9A5720	00000000	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*.....*
0B9A5740	00002000	80500000	0B9D4878	0B9012C4	00000280	00000100	C7C5E340	40400000	*.....&.....D.....GET ..*
0B9A5760	F34C60E4	D9C9F5F0	0B9573D0	000002CE	0B9A2990	0B9A3160	BF9A6FF2	C3FFC6FC	*3<-URI50.n.....?2C.F.*
0B9A5780	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C3FFDBFC	*GETFEED .rU.....?2C...*
0B9A57A0	00000000	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*.....*
0B9A57C0	00002000	80500000	0B9D4878	0B884000	00000280	00000100	C7C5E340	40400000	*.....&.....D.....GET ..*
0B9A57E0	F24C60E4	D9C9F0F1	0B95016C	0000022E	0B9A2220	0B9A2990	BF9A6FF2	C400423C	*2<-URI01.n.%.....?2D...*
0B9A5800	F14C60E4	D9C9F0F0	0B9366C0	00000B9E	0B9A2010	0B9A2220	BF9A6FF2	C4005CBC	*1<-URI00.l.....?2D...*
0B9A5820	606EF2E4	D9C9F0F0	000003F8	0B94F9C8	0B9A2010	0B9A2220	BF9A6FF2	C40084BC	*->2URI00....8.m9H.....?2D.d.*
0B9A5840	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C40093BC	*DSPURI00.rU.....?2D.l.*
0B9A5860	D4D6C4C9	D9C3C1D9	F1F201D8	D3002000	C4C9D9C5	C3E340D3	D6C31E3	C5404040	*MODIRCAR12.QL...DIRECT LOCATE *
0B9A5880	FFFFFFF	FFFFFFF	C9D4E2F1	40404040	3F000000	00000000	00000000	00000000	*.....IMS1
0B9A58A0	606EF3E4	D9C9F5F0	000038E6	0B969170	0B9A2220	0B9A2990	BF9A6FF2	C400C9BC	*->3URI50....W.oj.....?2D.I.*
0B9A58C0	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A2990	0B9A2FE8	BF9A6FF2	C400CFFC	*DSPSTACK.ol..oj.....Y...?2D...*
0B9A58E0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C40155BC	*GETFEED .rU.....?2D...*
0B9A5900	A9080010	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*z.....*
0B9A5920	00002000	80500000	0B9D4878	0B9012C4	00000280	00000100	C7C5E340	40400000	*.....&.....D.....GET ..*
0B9A5940	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C401F87C	*GETFEED .rU.....?2D.8@*
0B9A5960	04080004	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*.....*
0B9A5980	00002000	80500000	0B9D4878	0B901828	00000280	00000103	D7D6C9D5	E3400000	*.....&.....D.....POINT **
0B9A59A0	F24C60E4	D9C9F5F0	0B9532AE	000002CE	0B9A2220	0B9A2990	BF9A6FF2	C401FD7C	*2<-URI50.n.....?2D..@*
0B9A59C0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4020DFC	*GETFEED .rU.....?2D...*
0B9A59E0	04080004	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*.....*
0B9A5A00	00002000	80500000	0B9D4878	0B884000	00000280	00000103	D7D6C9D5	E3400000	*.....&.....D.....POINT **
0B9A5A20	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4021A7C	*DSPURI00.rU.....?2D..@*
0B9A5A40	C5D5C4C9	D9C3C1D9	F1F20004	D3002000	D9C5C3D6	D9C440D5	D6E340C6	D6E4D5C4	*ENDIRCAR12..L...RECORD NOT FOUND*
0B9A5A60	FFFFFFF	FFFFFFF	C9D4E2F1	40404040	3F000000	00000000	00000000	00000000	*.....IMS1
0B9A5A80	F14C60E4	D9C9F0F0	0B936860	00000B9E	0B9A2010	0B9A2220	BF9A6FF2	C4021E7C	*1<-URI00.l.....?2D..@*
0B9A5AA0	606EF2E4	D9E3F0F0	00000512	0B971360	0B9A2010	0B9A2220	BF9A6FF2	C40237BC	*->2URT00....p.-.....?2D...*
0B9A5AC0	606EF3C3	C8D2E6C4	00000278	0B90A010	0B9A2220	0B9A2858	BF9A6FF2	C40248BC	*->3CHKWD.....?2D...*
0B9A5AE0	F24C60C3	C8D2E6C4	0B9715D8	0000017C	0B9A2220	0B9A2858	BF9A6FF2	C4025FBC	*2<-CHKWD.p.Q...@.....?2D.^.*
0B9A5B00	606EF3E4	D9C9F0F0	0000037A	0B94F9C8	0B9A2220	0B9A2858	BF9A6FF2	C4026F3C	*->3URI00....m9H.....?2D.?.*
0B9A5B20	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C402753C	*DSPURI00.rU.....?2D...*
0B9A5B40	D4D6C4C9	D9C3C1D9	F1F201D8	D6002000	40D3D6C7	C9C3C1D3	40D6D7C5	D5404040	*MODIRCAR12.Q0... LOGICAL OPEN *
0B9A5B60	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	*
0B9A5B80	606EF4E4	D9C9F0F1	000007A4	0B954A98	0B9A2858	0B9A2FC8	BF9A6FF2	C40291BC	*->4URI01...u.n.q.....H...?2D.j.*
0B9A5BA0	F34C60E4	D9C9F0F1	0B95016C	0000022E	0B9A2858	0B9A2FC8	BF9A6FF2	C402A07C	*3<-URI01.n.%.....H...?2D..@*
0B9A5BC0	F24C60E4	D9C9F0F0	0B9716DA	00000B9E	0B9A2220	0B9A2858	BF9A6FF2	C402A63C	*2<-URI00.p.....?2D.W.*
0B9A5BE0	606EF3E4	D9E3F7F0	000030C0	0B97F450	0B9A2220	0B9A2858	BF9A6FF2	C402C4BC	*->3URT70....p4&.....?2D.D.*
0B9A5C00	606EF4E4	D9C9F0F0	0000023E	0B94F9C8	0B9A2858	0B9A2948	BF9A6FF2	C402D7BC	*->4URI00....m9H.....?2D.P.*
0B9A5C20	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C402E07C	*DSPURI00.rU.....?2D..@*
0B9A5C40	D4D6C4C9	D9C3C1D9	F1F201D8	C2002000	C2C5C740	D4E4D3E3	40E4D7C4	C1E3C540	*MODIRCAR12.QB...BEG MULT UPDATE *
0B9A5C60	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	*
0B9A5C80	606EF5E4	D9C9F4F0	00000968	0B96688E	0B9A2948	0B9A30B8	BF9A6FF2	C402FD7C	*->5URI40....o.f.....?2D..@*
0B9A5CA0	606EF6E4	D9C9F3F0	00000236	0B961C46	0B9A30B8	0B9A34C0	BF9A6FF2	C4030EFC	*->6URI30....o.....?2D...*
0B9A5CC0	F54C60E4	D9C9F3F0	0B966ABC	00000F0E	0B9A30B8	0B9A34C0	BF9A6FF2	C483E738	*5<-URI30.o.....?2DcX.*
0B9A5CE0	F44C60E4	D9C9F4F0	0B950330	00000256	0B9A2948	0B9A30B8	BF9A6FF2	C483FA78	*4<-URI40.n.....?2Dc...*
0B9A5D00	F34C60E4	D9C9F0F0	0B97F68E	00000B9E	0B9A2858	0B9A2948	BF9A6FF2	C48408F8	*3<-URI00.p6.....?2Dd.8.*
0B9A5D20	606EF4E4	D9C9F0F0	000002B8	0B94F9C8	0B9A2858	0B9A2948	BF9A6FF2	C4842138	*->4URI00....m9H.....?2Dd...*
0B9A5D40	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4842A38	*DSPURI00.rU.....?2Dd...*
0B9A5D60	D4D6C4C9	D9C3C1D9	F1F201D8	D3002000	C4C9D9C5	C3E340D3	D6C31E3	C5404040	*MODIRCAR12.QL...DIRECT LOCATE *
0B9A5D80	FFFFFFF	FFFFFFF	C9D4E2F1	40404040	3F000000	00000000	00000000	00000000	*.....IMS1
0B9A5DA0	606EF5E4	D9C9F5F0	000038E6	0B969170	0B9A2948	0B9A30B8	BF9A6FF2	C4846A78	*->5URI50....W.oj.....?2Dd...*
0B9A5DC0	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A30B8	0B9A3710	BF9A6FF2	C48471B8	*DSPSTACK.ol..oj.....?2Dd...*
0B9A5DE0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C484FB78	*GETFEED .rU.....?2Dd...*
0B9A5E00	00000010	00000280	00024000	00024000	0000000C	00024000	00024000	00023000	*z.....*

0B9A5E20	00002000	80500000	0B9D4878	0B9012C4	00000280	00000100	C7C5E340	40400000
0B9A5E40	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4856138
0B9A5E60	04080004	00000280	00024000	00024000	0000000C	00024000	00024000	00023000
0B9A5E80	00002000	80500000	0B9D4878	0B901828	00000280	00000103	D7D6C9D5	E3400000
0B9A5EA0	F44C60E4	D9C9F5F0	0B9532AE	000002CE	0B9A2948	0B9A30B8	BF9A6FF2	C4856638
0B9A5EC0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4856DB8
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0B9A5F20	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4857778
0B9A5F40	C5D5C4C9	D9C3C1D9	F1F20004	D3002000	D9C5C3D6	D9C440D5	D6E340C6	D6E4D5C4
0B9A5F60	FFFFFFF	FFFFFFF	C9D4E2F1	40404040	3F000000	00000000	00000000	00000000
0B9A5F80	F34C60E4	D9C9F0F0	0B97F708	00000B9E	0B9A2858	0B9A2948	BF9A6FF2	C4857B78
0B9A5FA0	606EF4E4	D9C9F0F0	000003C0	0B94F9C8	0B9A2858	0B9A2948	BF9A6FF2	C4858B38
0B9A5FC0	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4859238
0B9A5FE0	D4D6C4C9	D9C3C1D9	F1F20070	E6082000	C9D5E2C5	D9E340D5	C5E640D9	C5C3D9C4
0B9A6000	FFFFFFF	FFFFFFF	C9D4E2F1	40404040	3F000000	00000000	00000000	00000000
0B9A6020	606EF5E4	D9C9F4F0	000020D2	0B966892	0B9A2948	0B9A30B8	BF9A6FF2	C485C538
0B9A6040	606EF6E4	D9C9F5F0	00000E64	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C485E0B8
0B9A6060	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C485E6B8
0B9A6080	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C48631B8
0B9A60A0	A9080010	00000000	00024000	00024000	0000000C	00024000	00024000	00023000
0B9A60C0	00002000	80500000	0B9D4878	0B9A3444	00000000	00000100	C7C5E340	40400000
0B9A60E0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4868EB8
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0B9A6160	606EF6E4	D9C9F5F0	00000CA0	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C48739B8
0B9A6180	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C4873FB8
0B9A61A0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C4D7B4C5
0B9A61C0	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000
0B9A61E0	00002000	80500000	0B9D4878	0B9E5FA0	00000084	00000101	D7E4E340	40400000
0B9A6200	F54C60E4	D9C9F5F0	0B967532	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C4D7E585
0B9A6220	606EF6E4	D9C9F5F0	00000CA0	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C4D81D85
0B9A6240	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C4D82A45
0B9A6260	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C51C2985
0B9A6280	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000
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0B9A62C0	F54C60E4	D9C9F5F0	0B967532	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C51C3745
0B9A62E0	F44C60E4	D9C9F4F0	0B951A9A	000004C2	0B9A2948	0B9A30B8	BF9A6FF2	C51CB9C5
0B9A6300	606EF5E4	D9C9F5F0	00002184	0B969170	0B9A2948	0B9A30B8	BF9A6FF2	C51CD645
0B9A6320	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A30B8	0B9A3710	BF9A6FF2	C51CDD45
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0B9A6440	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A30B8	0B9A3710	BF9A6FF2	C56828FA
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0B9A6580	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C5AA567C
0B9A65A0	D4D6C4C9	D9C3C1D9	F1F201D8	C5082000	C5D5C440	D4E4D3E3	40E4D7C4	C1E3C540
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0B9A6600	606EF6E4	D9C9F3F0	000002B0	0B961C46	0B9A30B8	0B9A34C0	BF9A6FF2	C5AA867C
0B9A6620	F54C60E4	D9C9F3F0	0B966B3C	00000F0E	0B9A30B8	0B9A34C0	BF9A6FF2	C62B48F8
0B9A6640	606EF6E4	D9C9F5F0	00000E6A	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C62C8C38
0B9A6660	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C62C94B8
0B9A6680	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C62D06F8
0B9A66A0	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000
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0B9A66E0	F54C60E4	D9C9F5F0	0B9676F6	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C62D2D38
0B9A6700	606EF6E4	D9C9F5F0	000012E6	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C62D3F78
0B9A6720	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C62D4578
0B9A6740	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C62D9B38
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0B9A6780	00002000	80500000	0B9D4878	0B9A36A0	00000084	00000100	C7C5E340	40400000

```

*....&.....D.....GET  ..*
*GETFEED .rU.....?2De/. *
*.....  ..*
*....&.....POINT  ..*
*4<-URI50.n.....?2De..*
*GETFEED .rU.....?2De_.*
*.....  ..*
*....&.....POINT  ..*
*DSPURI00.rU.....?2De..*
*ENDIRCAR12.L...RECORD NOT FOUND*
*.....IMS1  ..*
*3<-URI00.p7.....?2De#.*
*->4URI00....m9H.....?2De..*
*DSPURI00.rU.....?2DeK.*
*MODIRCAR12.W...INSERT NEW RECRD*
*.....IMS1  ..*
*->5URI40...K.o.k.....?2DeE.*
*->6URI50....oj.....?2De..*
*DSPSTACK.ol..oj.....?2DeW.*
*GETFEED .rU.....?2Df..*
*Z.....  ..*
*....&.....GET  ..*
*GETFEED .rU.....?2Df..*
*.....  ..*
*....&.....POINT  ..*
*5<-URI50.o.6.....?2Df1.*
*->6URI50....oj.....?2Dg..*
*DSPSTACK.ol..oj.....?2Dg..*
*GETFEED .rU.....?2DP.E*
*.....d.....  ..*
*....&.....^.....PUT  ..*
*5<-URI50.o.....?2DPVe*
*->6URI50....oj.....?2DQ.e*
*DSPSTACK.ol..oj.....?2DQ..*
*GETFEED .rU.....?2E..e*
*.....d.....  ..*
*....&.....8.....d.....PUT  ..*
*5<-URI50.o.....?2E...*
*4<-URI40.n....B.....?2E..*
*->5URI50....d.oj.....?2E.O.*
*DSPSTACK.ol..oj.....?2E...*
*GETFEED .rU.....?2E.D.*
*.....  ..*
*....&.....^.....PUT  ..*
*4<-URI50.n.<.....?2E.U.*
*GETFEED .rU.....?2E...*
*.....  ..*
*....&.....PUT  ..*
*->5URI50...d.oj.....?2E...*
*DSPSTACK.ol..oj.....?2E...*
*GETFEED .rU.....?2E..@*
*.....  ..*
*....&.....8.....PUT  ..*
*4<-URI50.n.<.....?2E...*
*GETFEED .rU.....?2E...*
*.....  ..*
*....&.....8.....PUT  ..*
*3<-URI00.p8.....?2E...*
*->4URI00....m9H.....?2E.(.*
*DSPURI00.rU.....?2E..@*
*MODIRCAR12.QE...END MULT UPDATE *
*.....  ..*
*->5URI40...m.o.....?2E...*
*->6URI30....o.....?2E.f@*
*5<-URI30.o.....?2F..8*
*->6URI50....oj.....?2F...*
*DSPSTACK.ol..oj.....?2F.m.*
*GETFEED .rU.....?2F..8*
*.....d.....  ..*
*....&.....G8...d.....GET  ..*
*5<-URI50.o.6.....?2F...*
*->6URI50...W.oj.....?2F...*
*DSPSTACK.ol..oj.....?2F...*
*GETFEED .rU.....?2F...*
*.....d.....  ..*
*....&.....d.....GET  ..*

```

0B9A67A0	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C66CAE78	*GETFEED .rU.....?2F%..*
0B9A67C0	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000	*.....d..
0B9A67E0	00002000	80500000	0B9D4878	0B9A36A0	00000084	00000105	C5D9C1E2	C5400000	*.....&.....d....ERASE ...
0B9A6800	F54C60E4	D9C9F5F0	0B967B72	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C66CCD78	*5<-URI50.o#.....?2F%..*
0B9A6820	606EF6E4	D9C9F5F0	00000E6A	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C66CE0B8	*->6URI50.....oj.....?2F%..*
0B9A6840	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C66CE7B8	*DSPSTACK.ol..oj.....?2F%..*
0B9A6860	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C66D5138	*GETFEED .rU.....?2F_..*
0B9A6880	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000	*.....d..
0B9A68A0	00002000	80500000	0B9D4AF8	0B88C7F8	00000084	00000200	C7C5E340	40400000	*.....&.....8...G8...d....GET ...*
0B9A68C0	F54C60E4	D9C9F5F0	0B9676F6	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C66D67F8	*5<-URI50.o.6.....?2F_..8*
0B9A68E0	606EF6E4	D9C9F5F0	000012E6	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C66D7738	*->6URI50...W.oj.....?2F_..*
0B9A6900	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C66D7D38	*DSPSTACK.ol..oj.....?2F_..*
0B9A6920	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C66DC238	*GETFEED .rU.....?2F_B..*
0B9A6940	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000	*.....d..
0B9A6960	00002000	80500000	0B9D4AF8	0B9A36A0	00000084	00000200	C7C5E340	40400000	*.....&.....8...d....GET ...*
0B9A6980	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C6AA75F8	*GETFEED .rU.....?2F_..8*
0B9A69A0	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000	*.....d..
0B9A69C0	00002000	80500000	0B9D4AF8	0B9A36A0	00000084	00000205	C5D9C1E2	C5400000	*.....&.....8...d....ERASE ...*
0B9A69E0	F54C60E4	D9C9F5F0	0B967B72	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C6AA84F8	*5<-URI50.o#.....?2F.d8*
0B9A6A00	606EF6E4	D9C9F5F0	00000E6A	0B969170	0B9A30B8	0B9A34C0	BF9A6FF2	C6AA9338	*->6URI50.....oj.....?2F_..1*
0B9A6A20	C4E2D7E2	E3C1C3D2	8B96930A	0B969170	0B9A34C0	0B9A3B18	BF9A6FF2	C6AA99B8	*DSPSTACK.ol..oj.....?2F_r..*
0B9A6A40	C7C5E3C6	C5C5C440	0B99E480	00000000	00000000	00000000	BF9A6FF2	C6AAF3B8	*GETFEED .rU.....?2F_3..*
0B9A6A60	00000000	00000084	00024000	00024000	0000000C	00024000	00024000	00023000	*.....d..
0B9A6A80	00002000	80500000	0B9D4878	0B88C7F8	00000084	00000100	C7C5E340	40400000	*.....&.....G8.....GET ...*
0B9A6AA0	F54C60E4	D9C9F5F0	0B9676F6	000002CE	0B9A30B8	0B9A34C0	BF9A6FF2	C6AB0878	*5<-URI50.o.6.....?2F_..*
0B9A6AC0	606EF6E4	D9C9F3F0	000002CE	0B961C46	0B9A30B8	0B9A34C0	BF9A6FF2	C6AC60F8	*->6URI30.....o.....?2F_..8*
0B9A6AE0	F54C60E4	D9C9F3F0	0B966B5A	00000F0E	0B9A30B8	0B9A34C0	BF9A6FF2	C72A23F8	*5<-URI30.o,!.....?2G_..8*
0B9A6B00	F44C60E4	D9C9F4F0	0B95035C	00000340	0B9A2948	0B9A30B8	BF9A6FF2	C72A30B8	*4<-URI40.n.*.....?2G_..*
0B9A6B20	F34C60E4	D9C9F0F0	0B97F898	00000B9E	0B9A2858	0B9A2948	BF9A6FF2	C72A3DB8	*3<-URI00.p8q.....?2G_..*
0B9A6B40	F24C60E4	D9E3F7F0	0B974420	000004A0	0B9A2220	0B9A2858	BF9A6FF2	C72A44B8	*2<-URT70.p.....?2G_..*
0B9A6B60	606EF3E4	D9C9F0F0	000003CC	0B94F9C8	0B9A2220	0B9A2858	BF9A6FF2	C72A59B8	*->3URI00.....m9H.....?2G_..*
0B9A6B80	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C72A61F8	*DSPURI00.rU.....?2G_/8*
0B9A6BA0	D4D6C4C9	D9C3C1D9	F1F201D8	C3082000	40D3D6C7	C9C3C1D3	40C3D3D6	E2C54040	*MODIRCAR12.QC... LOGICAL CLOSE *
0B9A6BC0	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	*
0B9A6BE0	606EF4E4	D9C9F0F1	000007BA	0B954A98	0B9A2858	0B9A2FC8	BF9A6FF2	C72A7A38	*->4URI01.....n.q.....?2G_..*
0B9A6C00	F34C60E4	D9C9F0F1	0B950182	0000022E	0B9A2858	0B9A2FC8	BF9A6FF2	C72A8C78	*3<-URI01.n.b.....H.....?2G_..*
0B9A6C20	F24C60E4	D9C9F0F0	0B97172C	00000B9E	0B9A2220	0B9A2858	BF9A6FF2	C72A9278	*2<-URI00.p.....?2G_k..*
0B9A6C40	F14C60E4	D9E3F0F0	0B93697A	000003F6	0B9A2010	0B9A2220	BF9A6FF2	C72A9A38	*1<-URT00.l.:...6.....?2G_..*
0B9A6C60	606EF2E4	D9C9F0F0	00000318	0B94F9C8	0B9A2010	0B9A2220	BF9A6FF2	C72ABD78	*->2URI00.....m9H.....?2G_..*
0B9A6C80	C4E2D7E4	D9C9F0F0	0B99E480	00000000	00000000	00000000	BF9A6FF2	C72AC378	*DSPURI00.rU.....?2G_C..*
0B9A6CA0	D4D6C4C9	D9C3C1D9	F1F201D8	C3082000	40D3D6C7	C9C3C1D3	40C3D3D6	E2C54040	*MODIRCAR12.QC... LOGICAL CLOSE *
0B9A6CC0	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	*
0B9A6CE0	606EF3E4	D9C9F0F1	000007BA	0B954A98	0B9A2220	0B9A2990	BF9A6FF2	C72AD4B8	*->3URI01.....n.q.....?2G_M..*
0B9A6D00	606EF4C4	C5D8F0F0	0000249A	0B90DE68	0B9A2990	0B9A3160	BF9A6FF2	C72C6D78	*->4DEQ00.....-...?2G_..*
0B9A6D20	F34C60C4	C5D8F0F0	0B956F32	000007DC	0B9A2990	0B9A3160	BF9A6FF2	C72F0878	*3<-DEQ00.n?.....-...?2G_..*
0B9A6D40	F24C60E4	D9C9F0F1	0B950182	0000022E	0B9A2220	0B9A2990	BF9A6FF2	C72F0E38	*2<-URI01.n.b.....?2G_..*
0B9A6D60	F14C60E4	D9C9F0F0	0B936780	00000B9E	0B9A2010	0B9A2220	BF9A6FF2	C72F13B8	*1<-URI00.l.....?2G_..*
0B9A6D80	F04C60E2	E2C9C7D5	0000C4D4	0000033E	000067B8	0B9A2010	BF9A6FF2	C72F1F38	*0<-SSIGN..DM.....?2G_..*
0B9A6DA0	C3D9E3D9	F0E7C9E3	0A7EFCB4	17172002	00000000	0B99E480	BF9A6FF2	C72F36F8	*CRTR0XIT.=.....rU.....?2G_..8*
0B9A6DC0	00000000	0A7D94A0	0A7EFCB4	0A807CB8	00000000	C4C6E2C2	D9D3E2C2	00000100	*.....'m..=...@....DFSBRLSB....*
0B9A6DE0	17172002	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....

Related tasks:

“Locating the DBRC trace” on page 233

DBRC external trace

If you start the Generalized Trace Facility (GTF) and issue the CHANGE.RECON TRACEON command, the DBRC trace (DSPTRACE) creates an external trace record and issues the GTRACE macro to invoke GTF.

DBRC external trace records

The GTRACE macro passes the address and length of a DBRC external trace record to GTF. A DBRC external trace record is put in the user data area of a GTF trace record.

If more than two DBRC jobs run concurrently, the GTF data set or buffer can contain multiple trace records. Therefore, DBRC external trace records contain either the IMS subsystem ID or a job name. In a DB/DC or DBCTL environment, the SSID is added to the trace record. In other IMS environments, a job name is

added to the trace record. The following table shows the format of these records.

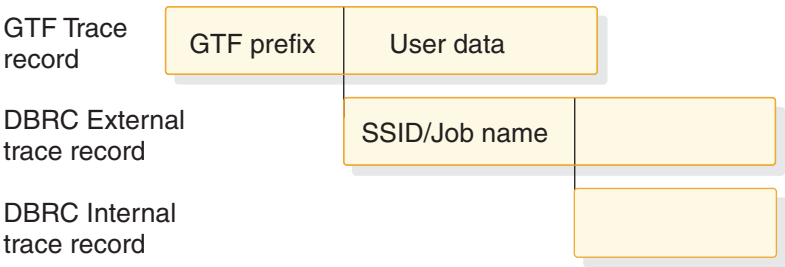


Figure 65. Format of DBRC external trace records

The GTF cataloged procedure is supplied in SYS1.PROCLIB with member name GTF or GRFSNP. If you want the DBRC trace records to be put in the GTF data set, specify MODE=EXT on the EXEC parameter and USR on the GTF option in the cataloged procedure. For detailed information about invoking GTF and its cataloged procedure, see *z/OS MVS Diagnosis: Tools and Service Aids*.

You can format and print DBRC trace records in the GTF data set by using the GTFTRACE subcommand of IPCS. You must specify the exit AMDUSRF2 on this subcommand. For detailed information about using IPCS, see *z/OS MVS Interactive Problem Control System (IPCS) User's Guide*.

Related concepts:

“DBRC trace output” on page 234

Examples of DBRC router processing and RECON I/O error processing output

Formatted and unformatted output for DBRC router processing and RECON I/O error processing are shown.

DBRC external trace output

The following two examples show the unformatted and formatted output for DBRC router processing and RECON I/O error processing.

In the following figure:

- DBRCJOB1 is the job name.
- TIME is the time stamp of the trace entry.
- DSPCRTR0 passed control to the next routine to process the request identified by the DFSBRLSB.
- RQB is the address of the request level control block.
- LSB is the address of the DFSBRLSB.
- FUNC indicates the function flags (from the BRLBFFLG field of the DFSBRLSB).
- EXIT indicates the exit flags (from the BRLBEFLG field of the DFSBRLSB).

```
GTF USR Record containing DBRC Unformatted Trace Record Data
HEXFORMAT AID FF FID F2 EID EFAD
+0010 00000000 C4E2D7C3 D9E3D9F0 05F79C94 3 ....DSPCRTR0.7.m 3
+0020 17172002 00000000 00012D78 99085F22 3 .....r... 3
+0030 48397685 00000000 00000000 00D4C080 3 ..e.....M{. 3
+0040 00000001 00012D78 00000000 00000000 3 ..... 3
+0050 00000000 00000000 00000000 00000000 3 ..... 3
+0060 00000000 00000000 00000000 00000000 3 ..... 3
+0070 00000000 3 .... 3
```



```
..... TIME=99085F2248397685 DSPCRTR0 RQB=00012D78 LSB=05F79C94 FUNC=17172002 EXIT=00000000
00000000 00000000 00D4C080 00000001 00012D78 00000000 00000000 00000000 *.....M.....*
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
```

- IMS1 is the SYSID.
- TIME is the time stamp of the trace entry.
- DSPURI00 has control.
- RQB is the address of the request level control block.
- A locate was done. For a locate, a flag and record key are also shown in the trace record.
- RSCD is the VSAM reason code.

HEXFORMAT	AID	F2	EID	EFAD	
+0000	00FA2980	C4C2D9D6	C3E3C1D4	C9D4E2F1	....DBROCTAMIMS1
+0010	40404040	C4C2D7E4	D9C9F0F0	00012D78	DSPUR100....
+0020	00000000	00000000	00000000	99085F22	.....F.7.
+0030	48398254	C4C2D7C9	D9C3C1D9	000000190	...b.DSPIRCAR....
+0040	D3002000	00000000	00000000	FFFFFFF	L.....
+0050	FFFFFFF	C9D4E2F1	40404040	3F000000	....IMS1
+0060	00000000	00000000	00000000	00000000	.....
+0070	00000000				.....

DBRCJOB01 TIME=99085F2248398254 DSPURI00 RQB=00012D78 FUNC=LOCATE FLAG=0020
RECKEY=FFFFFFFFFFFFFFC9D4E2F1404040403F00000000000000000000000000000

An example of a job that was used to create unformatted `USR(FAD)` trace output is shown.

```
//PARTUSRF2 JOB IMSCVT8,MSGLEVEL=1,CLASS=K,MSGCLASS=A,REGION=4096K
/*****
/* JOB NAME: PRINTGTF JCL
/* JOB DEPENDENCIES: The GTF data set named below must exist.
/* JOB Source: See the IPCS User's Guide, Appendix B.
/* JOB DESCRIPTION: This job prints the specified GTF data set using
/* the Batch IPCS feature.
/*****
/*ROUTE PRINT THISCPU/IMSM3405
/**OBLIB DD DSN=IMSTESTL.TNUC0,DISP=SHR
/* DD DISP=SHR,DSN=IMSB LD.I710TS25.CRESLIB
/* DD DISP=SHR,DSN=IMSTESTG.IMS710.TSTRES
/* DD DISP=SHR,DSN=IMSTESTG.IMSQA.ACPLIB
/* DD DISP=SHR,DSN=IMSTESTG.IMSQA.PGMLIB
//JOB CAT DD DISP=SHR,DSN=VCATQAV
// DD DISP=SHR,DSN=VCATDCL
/*****
/* Print the SYS1.TRACE data set.
/* Member BLSCDDIR resides in SYS1.SBLSCLI0, an IPCS system proclib.
/* IT ISSUES THE DEFINE CLUSTER FOR 'DBRX06.IPCS.DDIR' ON USER01 AND
/* catalogs it in SYS1.ECTEST.MASTER.CATALOG.
/*****
//IPCS EXEC PGM=IKJEFT01,DYNAMNBR=20,REGION=1500K
//TRACE DD DSN=SYS1.TRACE,DISP=SHR,
// UNIT=SYSDA,VOL=SER=000000
//SYSPROC DD DSN=SYS1.SBLSCLI0,DISP=SHR
//SYSTSPRT DD SYSOUT=A
//IPCSPRNT DD SYSOUT=A
//IPCSTOC DD SYSOUT=A
//SYSUDUMP DD SYSOUT=A
//SYSTSIN DD *
// PROFILE MSGID
```

```

%BLSCDDIR DSN= (DBRX06.IPCS.DDIR) VOLUME (USER01)
IPCS NOPARM
SETDEF DDNAME (TRACE) NOCONFIRM
GTFTRACE USR (FAD)
END
/*
//*****
//* Delete the IPCS dump directory created by the previous step *
//* so that the re-IPL of the ec machine will not orphan the data *
//* set. *
//*****
//AMS01 EXEC PGM=IDCAMS,COND=EVEN
//SYSPRINT DD SYSOUT=A
//DD1 DD UNIT=SYSDA,VOL=SER=USER01,DISP=SHR
//SYSIN DD *
DELETE DBRX06.IPCS.DDIR FILE (DD1)
/*

```

The following example is of a job that was used to create the DBRC formatted output:

```

//PRINTHMD JOB IMSCVT8,MSGLEVEL=1,CLASS=K,MSGCLASS=A,REGION=4096K
//*****
//* JOB NAME: PRINTHMD JCL *
//* JOB DEPENDENCIES: The GTF data set named below must exist. *
//* JOB Source: See the IPCS User's Guide, Appendix B. *
//* JOB DESCRIPTION: This job prints the specified GTF data set using *
//* the Batch IPCS feature. *
//*****
/*ROUTE PRINT THISCPU/IMSM3405
//JOB LIB DD DSN=IMSTESTL.TNUC0,DISP=SHR
// DD DISP=SHR,DSN=IMSB LD.I710TS25.CRESLIB
// DD DISP=SHR,DSN=IMSTESTG.IMS710.TSTRES
// DD DISP=SHR,DSN=IMSTESTG.IMSQA.ACPLIB
// DD DISP=SHR,DSN=IMSTESTG.IMSQA.PGMLIB
//JOB CAT DD DISP=SHR,DSN=VCATQAV
// DD DISP=SHR,DSN=VCATDCL
//*****
//* Print the SYS1.TRACE data set. *
//* Member BLSCDDIR resides in SYS1.SBLSC LI0, an IPCS system proclib. *
//* IT ISSUES THE DEFINE CLUSTER FOR 'DBRX06.IPCS.DDIR' ON USER01 AND *
//* catalogs it in SYS1.ECTEST.MASTER.CATALOG. *
//*****
//IPCS EXEC PGM=IKJEFT01,DYNAMNBR=20,REGION=1500K
//TRACE DD DSN=SYS1.TRACE,DISP=SHR,
// UNIT=SYSDA,VOL=SER=000000
//SYSPROC DD DSN=SYS1.SBLSC LI0,DISP=SHR
//SYSTSPRT DD SYSOUT=A
//IPCS PRNT DD SYSOUT=A
//IPCSTOC DD SYSOUT=A
//SYSUDUMP DD SYSOUT=A
//SYSTSIN DD *
PROFILE MSGID
%BLSCDDIR DSN= (DBRX06.IPCS.DDIR) VOLUME (USER01)
IPCS NOPARM
SETDEF DDNAME (TRACE) NOCONFIRM
GTFTRACE EXIT (DSPUSRF2)
END
/*
//*****
//* Delete the IPCS dump directory created by the previous step *
//* so that the re-IPL of the ec machine will not orphan the data *
//* set. *
//*****
//AMS01 EXEC PGM=IDCAMS,COND=EVEN
//SYSPRINT DD SYSOUT=A

```

```
//DD1      DD  UNIT=SYSDA,VOL=SER=USER01,DISP=SHR
//SYSIN    DD  *
          DELETE DBRX06.IPCS.DDIR FILE(DD1)
/*
```


Chapter 10. BPE-based DBRC service aids

BPE-based DBRC service aids help you analyze problems in BPE-based DBRC.

BPE-based DBRC trace records

BPE-based DBRC trace records are written to one or more trace tables, and provide information that can help you determine the source of errors.

Trace record eye catchers in a formatted dump provide information about which function resulted in an error. You might be able to correct environmental problems immediately. Refer internal problems to IBM Software Support with appropriate documentation, such as system console logs and dumps.

BPE-based DBRC trace records are written to one or more of the trace tables shown in the following table.

Table 56. Trace tables for BPE-based DBRC trace records

Table name	Number of tables	Table description
ERR	1	Used to trace errors that occur within the DBRC address space. Specify as TRCLEV=(ERR,level,DBRC,PAGES=num_pages). The default number of pages for this table is 2. The ERR trace entry is 32-bytes long.
GRPS	1	Used for DBRC group services messages and notification tracing. Specify as TRCLEV=(GRPS,level,DBRC,PAGES=num_pages). The default number of pages for this table is 8.
MODF	$N = 1 - 256$	Used for DBRC module flow tracing. Specify as TRCLEV=(MODF,level,DBRC,PAGES=num_pages). The default number of pages for this table is 8.
RQST	$N = 1 - 256$	Used for general DBRC request processing. Specify as TRCLEV=(RQST,level,DBRC,PAGES=num_pages). The default number of pages for this table is 8.

Trace entries have the following general format:

```
0 1 2 3 4 (WD1) 8 (WD2) C (WD3) 10 LL-B LL-1
+-----+
|CD|SC| THD | DTRCALLER | client ID | user data | STCK |
+-----+
```

Field name

Represents

- CD** 1-byte trace code field that indicates the function that wrote the trace record.
- SC** 1-byte trace subcode field that indicates the category of the trace record.
- THD** 2-byte thread sequence number.
- WD1 - WD2** 2-word trace identifier (DTRCALLR).
- WD3** The client ID.

STCK 2-word system clock (STCK) that indicates the time when the trace entry was created.

The first four words and the last two words are common fields, and the rest of the information is specific to each entry.

DBRC address space trace records are mapped by macro DSPBDTR.

Trace record mapping is based on the trace subcode, which identifies the category of trace record. One particular trace subcode can apply to many trace codes. Each trace record mapping also includes a pictorial representation in a comment block.

Use the trace subcode to locate the trace record mapping in the DSPBDTR macro. The DSPBCODE macro includes 2-byte module identifier codes that are used in trace records when it is necessary to identify a DBRC module. The module identifier represents the module that wrote the trace record. The DBRC module identifiers are defined in macro DSPBCODE.

The following example shows the format of a 64-byte trace entry (MODF or GRPS trace table):

0	1	2	3	4	8	C	10	14	18	1C	1F
+-----+											
|CD|	SC|	THD|	WD1|	WD2|	WD3|	WD4|	WD5|	WD6|	WD7|		
+-----+											
|	WD8|	WD9|	WD10|	WD11|	WD12|	WD13|	STCK				
+-----+											
20		24		28	2C	30	34	38			3F

The following example shows the format of a 128-byte trace entry (RQST trace table):

0	1	2	3	4	8	C	10	14	18	1C	1F
+-----+											
|CD|	SC|	THD|	WD1|	WD2|	WD3|	WD4|	WD5|	WD6|	WD7|		
+-----+											
|	WD8|	WD9|	WD10|	WD11|	WD12|	WD13|					
+-----+											
+-----+											
|									STCK		
+-----+											

Trace record examples for BPE-based DBRC

These examples show formatted BPE-based DBRC trace record examples.

DBRC I/O services trace

In the following example, the trace code is in the first byte (X'72'), which the DSPBDTR macro documents as I/O services. The eye catcher is IOSRV. The trace subcode is in the second byte (X'02'), which the DSPBDTR macro documents as RECON data set true open start. The eye catcher is True OPEN start. The 8-byte identifier in the right eye catcher for corresponding subcode is in word 1 - 2.

Important: An asterisk at the beginning of a subcode eye catcher indicates an error.

Code	Subcode	Trace Entry	Trace Data

IOSRV:	True OPEN start	72020000 D6D7C5D5 C5D9F140 C9D4E2F1 0BD61000 00000000 00000000 00000000	OPENER1

```

00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000 C1C4D082 D9525260

```

When the identifier is DSPURI00, the block-area pointer eye catcher follows the eye catcher for subcode in the left eye catcher. In the following example, the trace subcode is in the second byte (X'01'), which the DSPBDTR macro documents as "Enter DSPURI00." The eye catcher is Enter URI00. The block-area pointer eye catcher that follows is MODIRCAR. The 16-byte entry message for DSPURI00 is in word 12 - 15. The eye catcher is LOGICAL CLOSE.

Code	Subcode	Trace Entry	Trace Data
IOSRV:	Enter URI00 MODIRCAR	72010000 C4E2D7E4 D9C9F0F0 C9D4E2F1 0BDC0000 00000000 00000000 00000000 D4D6C4C9 D9C3C1D9 F1F201D8 C3082000 40D3D6C7 C9C3C1D3 40C3D3D6 E2C54040 40404040 40404040 40404040 40404040 40404040 40404040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 C248B54C F0FE19A0	LOGICAL CLOSE

DBRC module flow trace

The following example shows a DBRC module flow trace.

Important: An asterisk at the beginning of a subcode eye catcher indicates an error.

Module A calls module B: The following two-line trace entry is produced when module A calls module B. A two-line trace entry is produced when module B calls DSPSTGET to obtain initial workspace storage after being called by module A. The trace code is in the first byte (X'77'), which the DSPBDTR macro documents as "Request processing." The eye catcher is RQST. The trace subcode is in the second byte (X'1A'), which the DSPBDTR macro documents as Process Flow. The eye catcher is Module entry. The 8-byte identifier in the right eye catcher for the corresponding subcode is in word 1 - 2. Word 3 represents the client ID, which is IMS1 in this example.

Code	Subcode	Trace Entry	Trace Data
RQST :	Module entry	771A0000 606EF1C4 E2E2F0F1 C9D4E2F1 8BD8C38C 0BDF5258 0BE97370 0BE97518 00000000 00000000 00000000 00000000 00000000 00000000 C3D772C3 AC3CE200	->1DSS01

- words 1-2 Identifier that consists of:
- An arrow (->) indicating that the module is being called.
 - The nesting level of module B. Nesting levels are shown in one or two decimal digits, up to 99 (nesting level 0 is DSPUIN00).
 - Last five characters of the module name being called.
- word 3 Client ID.
- word 4 Offset in module A of call to module B.
- word 5 Entry point address of module B.
- word 6 Save area address of the calling module (A).
- word 7 Beginning address of the temporary storage obtained for module B (save area address of module B).
- words 14-15 Trace time stamp.

Module B calls module A: The following two-line trace entry is produced when module B calls DSPSTFRE to release all of its temporary storage before returning to module A. The trace code is in the first byte (X'77'), which the DSPBDTR macro documents as Request processing. The eye catcher is RQST. The trace subcode is in the second byte (X'1B'), which the DSPBDTR macro documents as Process Flow. The eye catcher is Module exit. The 8-byte identifier in the right eye catcher for corresponding subcode is in word 1 - 2.

Code	Subcode	Trace Entry	Trace Data
RQST	: Module exit	771B0000 F04C60C4 E2E2F0F1 C9D4E2F1 0BD8C38C 00000236 0BE97370 0BE97518 00000000 00000000 00000000 00000000 00000000 00000000 C3D772D5 50228DC0	<-DSS01
		words 1-2 Identifier that consists of: - An arrow (->) indicating that the module is returning. - The nesting level of module A. Nesting levels are shown in one or two decimal digits, up to 99 (nesting level 0 is DSPUIN00). - Last five characters of the module name returning.	
		word 3 Client ID.	
		word 4 Offset in module A to which module B returns.	
		word 5 Offset in module B where it returns to module A.	
		word 6 Save area address of module A that called module B.	
		word 7 Beginning address of the temporary storage being released for module B by module DSPSTFRE.	
		words 14-15 Trace time stamp.	

DSPSTACK trace entry: The following example shows a two-line trace entry that is produced when module B issues macro DSPGFSTK, which calls DSPSTGET to obtain additional temporary storage. The trace code is in the first byte (X'78'), which the DSPBDTR macro documents as System related. The eye catcher is SYS. The trace subcode is in the second byte (X'15'), which the DSPBDTR macro documents as Additional work space. The eye catcher is DBRC stack rqst. The 8-byte identifier in the right eye catcher for corresponding subcode is in word 1 - 2.

Code	Subcode	Trace Entry	Trace Data
SYS	: DBRC stack rqst	78150000 C4E2D7E2 E3C1C3D2 C9D4E2F1 8BE0B9AE 0BE0B710 0BF4D7C8 0BE98910 00000000 00000000 00000000 00000000 00000000 00000000 C3D772D5 2A1BA7C0	DSPSTACK
		words 1-2 Identifier DSPSTACK.	
		word 3 Client ID.	
		word 4 Return point address in the module B to which DSPSTGET returns after acquiring additional temporary storage for the module.	
		word 5 Entry point address of module B.	
		word 6 Save area address of module B.	
		word 7 Beginning address of the additional temporary storage obtained for module B.	
		words 14-15 Trace time stamp.	

DBRC request user exit trace

The following example shows a trace taken before the DBRC request user exit routine is called. The trace subcode is in the second byte of the trace (X'1C'). which the DSPBDTR macro documents as "Before calling user exit," as indicated in the left eye catcher field. The "BRQ0" that follows refers to the module name (DSPBRQ00) that issues the trace call. The 1-byte BRQX_Flags field is located in the first byte of the second word of the trace. The eye catcher field on the right contains "DBRC IS BYPASSED," corresponding to the flag code (X'80' in this trace). The "END" that follows is the user exit function (BRQX_Func), which is located in the first byte of the first word (X'02' in this trace).

Important: An asterisk at the beginning of a subcode eye catcher indicates an error.

Code	Subcode	Trace Entry	Trace Data
RQST:	Before exit call BRQ0	771C0000 02030010 80000000 C9D4E2F1 0A8B0558 07142002 00001000 0C083000 00000000 0A8FDE40 0A8B056C 0A91A798 00000008 C4C6E2C2 D9D3E2C2 00000100 07142002 00001000 00000000 00000000 00000000 00000000 00000000 00000000 00C57B78 00000001 0C083000 00000000 00000000 00000000 C4BC1081 98B16660	DBRC IS BYPASSED END

DBRC group services trace

DBRC group services generates trace entries of two types: group services request or group services send. This type of entry means that global services is requested to do something by either its own DBRC or one of the other DBRC instances in the same IMSplex. The 8-byte identifier in the right eye catcher for corresponding request type is in word 5-6, which represents the DBRC job name.

Group services request

The following example shows a group services request entry.

Code	Subcode	Trace Entry	Trace Data
GRPSV:REQ	- DBRCUP	73270000 00000058 00800000 12248000 00000000 C4C2D9F8 C3E2C2C2 F4F70038 1197A6B8 C4D5465B BC96000D 00000000 00000000 00000000 C4D5465B C5AFF4C0	DBR8CSBB

The following tables describes useful fields and their possible values:

Table 57. Word 1 eye catchers for the group services request

Word 1	Eye catcher	Request type
X'50'	INIT	Initialize global services.
X'51'	NOTQUIESCE	Another DBRC is telling this DBRC that RECON data set access is allowed.
X'52'	QUIESCE	This DBRC wants exclusive RECON data set access.
X'53'	QUACK	Another DBRC acknowledges this DBRC's request for exclusive RECON data set access.
X'54'	ENDQUIESCE	This DBRC releases RECON data sets to other DBRCs again.
X'55'	ENDQUACK	Another DBRC acknowledges renewed RECON data set access.
X'56'	GOTQUIESCE	Another DBRC wants exclusive RECON data set access.
X'57'	GOTENDQUIES	Another DBRC releases its exclusive RECON data set access.
X'58'	DBRCUP	A new DBRC joined the IMSplex.
X'59'	DBRCDOWN	A DBRC left the IMSplex.
X'5A'	SCIUP	Local SCI is active.
X'5B'	SCIDOWN	Local SCI is down.
X'5C'	RCNLOSS	This DBRC wants to notify other DBRCs of a RECON loss.
X'5D'	RESEND	Another DBRC wants this DBRC to resend its last request.
X'5E'	GRP2DONE	Local processing complete for request types 56 or 57.
X'5F'	GOTRCNLOSS	RECON loss notification from another DBRC.
X'60'	ID	Another DBRC informs this DBRC of its SSID.

Table 58. Words 4 -10 request types for the group services request

Word	Request type
Word 4	Message sequence number. Meaningful only for requests from other DBRCs (request types 51, 53, 55, 56, 5D, 5F, 60). Each DBRC assigns a sequence number to every new request that it sends. If a request is resent, it contains the same sequence number that was originally assigned to it.
Words 5-6	For requests from other DBRCs, the job name of the other DBRC.

Table 58. Words 4 -10 request types for the group services request (continued)

Word	Request type
Words 7-10	The SCI token associated with the request. Can be used to distinguish between DBRCs if the job name is not unique.

Group services send

The following example shows a group services send entry. This type of entry means that group services is sending a message to another DBRC.

Code	Subcode	Trace Entry	Trace Data
GRPSV:SEND	NOTQUIESCE	73280000 00000001 00000000 00000002 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 C4D5465B C5B11020	

The following list describes useful fields and their possible values:

Table 59. Word 1 eye catchers for the group services request

Word 1	Eye catcher	Message type
X'01'	NOTQUIESCE	RECON access is allowed.
X'02'	RCNLOSS	RECON loss notification.
X'03'	QUIESCE	Request for exclusive RECON access.
X'04'	QUIESCECLS	Request for exclusive RECON access and that the recipient close the RECON data sets.
X'05'	QUACK	Acknowledge the request for exclusive RECON access.
X'06'	ENDQUIESCE	Release exclusive RECON access by this DBRC.
X'07'	ENDQUACK	Acknowledge release of exclusive RECON access.
X'08'	RESEND	Request resend of another DBRC's last request.
X'09'	ID	Send SSID to another DBRC.

Table 60. Words 3 and 4 message types for the group services request

Word	Request type
Word 3	Message sequence number.
Word 4	If the message is a response to a message from another DBRC, this is the sequence number of the other DBRC's message.

Related concepts:

 Planning for recovery (System Administration)

Unformatted BPE-based DBRC internal trace example

The module-call entries, module return entries, DSPURI00 trace entries, and other entries (such as GETFEED, DSPCRTR0, and CRTR0XIT) are shown in this trace example.

In this example, client ID is 5 for all requests.

```
0B9A5440 20010016 C4E2D7C3 D9E3D9F0 00000005 0A315CB4 17172002 00000000 0B99E480 |....DSPCRTR0.....*.rU|
0B9A5460 00000000 00000000 00C4CD28 00000001 0B99E480 00000000 00000000 00000000 |.....D.....rU.....|
0B9A5480 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 |.....|
0B9A54A0 00000000 00000000 00000000 00000000 00000000 00000000 BF3069CF 6EDECA87 |.....>...|
0B9A54C0 06010016 606EF1E2 E2C9C7D5 00000005 8000C4E4 0B93A950 000067B8 0B9A2010 |....->1SSIGN.....DU.lz&.....|
0B9A54E0 00000000 00000000 00000000 00000000 00000000 00000000 BF3069CF 6EDF13B7 |.....>...|
0B9A5500 20010018 C4E2D7C3 D9E3D9F0 00000005 0A315CB4 17172002 00000000 0B99E480 |....DSPCRTR0.....*.rU|
```

0B9A5520	00000000	00000000	00C4CD28	00000001	0B99E480	00000000	00000000	00000000	.....D.....rU.....
0B9A5540	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000>.....
0B9A5560	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDECAB7	.....->2URI00.....n.....>.....
0B9A5580	20080016	606EF2E4	D9C9F0F0	00000005	00000258	0B953A20	0B9A2010	0B9A2220	.....->1SIGN.....DU.1z&.....
0B9A55A0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDF4577	.....->2URI00.....n.....>.....
0B9A55C0	06010018	606EF1E2	E2C9C7D5	00000005	8000C4E4	0B93A950	000067B8	0B9A2010	.....DSPURI00.....rU.....
0B9A55E0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDF13B7	MODIRCARI2.QO... LOGICAL OPEN
0B9A5600	20080018	606EF2E4	D9C9F0F0	00000005	40D3D6C7	C9C3C1D3	40D6D7C5	D5404040>.....
0B9A5620	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDF4577	.....->3URI01.....u.....h.....>.....
0B9A5640	06010018	C4E2D7E4	D9C9F0F0	00000005	0B99E480	00000000	00000000	00000000	.....DSPURI00.....rU.....
0B9A5660	D4D6C9C4	D9C3C1D9	F1F201D8	D6000000	40D3D6C7	C9C3C1D3	40D6D7C5	D5404040	MODIRCARI2.QO... LOGICAL OPEN
0B9A5680	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000>.....
0B9A56A0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDF6E37	.....->3URI01.....u.....h.....>.....
0B9A56C0	20020018	606EF3E4	D9C9F0F1	00000005	000007A4	0B903088	0B9A2220	0B9A2990	.....DSPURI00.....rU.....
0B9A56E0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDFCE77	MODIRCARI2.QO... LOGICAL OPEN
0B9A5700	06010016	C4E2D7E4	D9C9F0F0	00000005	0B99E480	00000000	00000000	00000000>.....
0B9A5720	D4D6C9C4	D9C3C1D9	F1F201D8	D6000000	40D3D6C7	C9C3C1D3	40D6D7C5	D5404040	.....->3URI01.....u.....h.....>.....
0B9A5740	40404040	40404040	40404040	40404040	40404040	40404040	00000000	00000000	.....DSPURI00.....rU.....
0B9A5760	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDF6E37	MODIRCARI2.QO... LOGICAL OPEN
0B9A5780	20020016	606EF3E4	D9C9F0F1	00000005	000007A4	0B903088	0B9A2220	0B9A2990>.....
0B9A57A0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDFCE77	.....->3URI01.....u.....h.....>.....
0B9A57C0	20060018	606EF4D9	E2E5F0F0	00000005	00000EE6	0B998AE8	0B9A2990	0B9A3170	.....->4RSV00.....W.r.Y.....>.....
0B9A57E0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDFF577	.....->4RSV00.....W.r.Y.....>.....
0B9A5800	20060016	606EF4D9	E2E5F0F0	00000005	00000EE6	0B998AE8	0B9A2990	0B9A3170	.....->4RSV00.....W.r.Y.....>.....
0B9A5820	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EDFF577	.....3<-RSV00.....>.....>.....
0B9A5840	20060018	F34C60D9	E2E5F0F0	00000005	0B903F6E	00000234	0B9A2990	0B9A3170	.....3<-RSV00.....>.....>.....
0B9A5860	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE005F7	.....->4URI30.....o.....>.....
0B9A5880	20060016	F34C60D9	E2E5F0F0	00000005	0B903F6E	00000234	0B9A2990	0B9A3170	.....->5URI20.....S.n.B.....>.....
0B9A58A0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE005F7	.....4<-URI20.....o.....>.....
0B9A58C0	20040018	606EF4E4	D9C9F3F0	00000005	00000F9C	0B961D24	0B9A2990	0B9A3170	.....->4URI30.....o.....>.....
0B9A58E0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE036B7	.....->5URI20.....S.n.B.....>.....
0B9A5900	20030018	606EF5E4	D9C9F2F0	00000005	000010E2	0B95FEC2	0B9A3170	0B9A3B08	.....4<-URI20.....o.....>.....
0B9A5920	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE058B7	.....->5URI20.....S.n.B.....>.....
0B9A5940	20030018	F44C60E4	D9C9F2F0	00000005	0B962E06	00000A10	0B9A3170	0B9A3B08	.....3<-URI30.....%.....>.....
0B9A5960	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE06E77	.....->5URI20.....S.n.B.....>.....
0B9A5980	20040016	606EF4E4	D9C9F3F0	00000005	00000F9C	0B961D24	0B9A2990	0B9A3170	.....3<-URI30.....%.....>.....
0B9A59A0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE036B7	.....DSPSTACK.....oIS.ok.....H
0B9A59C0	20030016	606EF5E4	D9C9F2F0	00000005	000010E2	0B95FEC2	0B9A3170	0B9A3B08	.....->5RTXD0.....kRh.....>.....
0B9A59E0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE058B7	.....4<-RTXD0.....oo.....>.....
0B9A5A00	20030016	F44C60E4	D9C9F2F0	00000005	0B962E06	00000A10	0B9A3170	0B9A3B08	.....->5RTXD0.....kRh.....>.....
0B9A5A20	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE06E77	.....4<-RTXD0.....oo.....>.....
0B9A5A40	20030018	606EF5E4	D9C9F2F0	00000005	000010E2	0B95FEC2	0B9A3170	0B9A3B08	.....GETFEED.....rU.....
0B9A5A60	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE058B7	.....Q.....v@.....GET ..
0B9A5A80	20040018	F34C60E4	D9C9F3F0	00000005	0B904024	0000106C	0B9A2990	0B9A3170	.....->4URI50.....ok.....>.....
0B9A5AA0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE07637	.....->5URI20.....S.n.B.....>.....
0B9A5AC0	20050018	606EF4E4	D9C9F5F0	00000005	000029AA	0B969248	0B9A2990	0B9A3170	.....DSPSTACK.....oIS.ok.....H
0B9A5AE0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE0F1B7	.....->5RTXD0.....kRh.....>.....
0B9A5B00	20030016	606EF5E4	D9C9F2F0	00000005	000010E2	0B95FEC2	0B9A3170	0B9A3B08	.....4<-RTXD0.....oo.....>.....
0B9A5B20	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE058B7	.....->5RTXD0.....kRh.....>.....
0B9A5B40	20040016	F34C60E4	D9C9F3F0	00000005	0B904024	0000106C	0B9A2990	0B9A3170	.....3<-URI30.....%.....>.....
0B9A5B60	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE07637	.....DSPSTACK.....oIS.ok.....H
0B9A5B80	060A0018	C4E2D7E2	E3C1C3D2	00000005	8B9693E2	0B969248	0B9A3170	0B9A37C8	.....->5RTXD0.....kRh.....>.....
0B9A5BA0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE0FAB7	.....4<-RTXD0.....oo.....>.....
0B9A5BC0	20070018	606EF5D9	E3E7C4F0	00000005	00000430	0B92D988	0B9A3170	0B9A3870	.....GETFEED.....rU.....
0B9A5BE0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE11037	.....Q.....v@.....GET ..
0B9A5C00	20070018	F44C60D9	E3E7C4F0	00000005	0B969678	000002AE	0B9A3170	0B9A3870	.....->4URI50.....ok.....>.....
0B9A5C20	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE15CF7	.....DSPSTACK.....oIS.ok.....H
0B9A5C40	060A0018	C7C5E3C6	C5C5C440	00000005	0B99E480	00000000	00000000	00000000	.....->5RTXD0.....kRh.....>.....
0B9A5C60	00000000	00000280	00000000	00000000	00000001	00020000	00020000	00007FF8	.....4<-RTXD0.....oo.....>.....
0B9A5C80	00000080	80100000	0B9CD878	0B9CA57C	00000280	00000100	C7C5E340	40400000	.....GETFEED.....rU.....
0B9A5CA0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6F11A877	.....Q.....v@.....GET ..
0B9A5CC0	20050016	606EF4E4	D9C9F5F0	00000005	000029AA	0B969248	0B9A2990	0B9A3170	.....->4URI50.....ok.....>.....
0B9A5CE0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE0F1B7	.....DSPSTACK.....oIS.ok.....H
0B9A5D00	060A0016	C4E2D7E2	E3C1C3D2	00000005	8B9693E2	0B969248	0B9A3170	0B9A37C8	.....->5RTXD0.....kRh.....>.....
0B9A5D20	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE0FAB7	.....4<-RTXD0.....oo.....>.....
0B9A5D40	20070016	606EF5D9	E3E7C4F0	00000005	00000430	0B92D988	0B9A3170	0B9A3870	.....GETFEED.....rU.....
0B9A5D60	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE11037	.....Q.....v@.....GET ..
0B9A5D80	20070016	F44C60D9	E3E7C4F0	00000005	0B969678	000002AE	0B9A3170	0B9A3870	.....->4URI50.....ok.....>.....
0B9A5DA0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6EE15CF7	.....DSPSTACK.....oIS.ok.....H
0B9A5DC0	060A0016	C7C5E3C6	C5C5C440	00000005	0B99E480	00000000	00000000	00000000	.....->5RTXD0.....kRh.....>.....
0B9A5DE0	00000000	00000280	00000000	00000000	00000001	00020000	00020000	00007FF8	.....4<-RTXD0.....oo.....>.....
0B9A5E00	00000080	80100000	0B9CD878	0B9CA57C	00000280	00000100	C7C5E340	40400000	.....GETFEED.....rU.....
0B9A5E20	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6F11A877	.....Q.....v@.....GET ..
0B9A5E40	20070018	606EF5D9	E3E7C4F0	00000005	00000876	0B92D988	0B9A3170	0B9A3870	.....->4URI50.....ok.....>.....
0B9A5E60	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6F11BAF7	.....DSPSTACK.....oIS.ok.....H
0B9A5E80	20070018	F44C60D9	E3E7C4F0	00000005	0B969ABE	000002AE	0B9A3170	0B9A3870	.....->5RTXD0.....kRh.....>.....
0B9A5EA0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6F120B77	.....4<-RTXD0.....oo.....>.....
0B9A5EC0	20070016	606EF5D9	E3E7C4F0	00000005	00000876	0B92D988	0B9A3170	0B9A3870	.....GETFEED.....rU.....

0B9A5EE0	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6F11BAF7	|.....?..7|
0B9A5F00	20070016	F44C60D9	E3E7C4F0	00000005	0B969ABE	000002AE	0B9A3170	0B9A3870	|....4<-RTXD0.....o.....|
0B9A5F20	00000000	00000000	00000000	00000000	00000000	00000000	BF3069CF	6F120B77	|.....

Chapter 11. Data communication service aids

Data communication service aids, such as Terminal communication task trace and DC Trace are described.

Terminal communication task trace

When an output device (such as a terminal, line, or node) hangs, you can use the terminal communication task trace to diagnose the problem.

You can use information you find in the terminal communication task trace to build keywords for your search string, or you can use the information when you are reviewing existing APAR descriptions to determine whether they describe the problem you are experiencing.

All IMS terminal communication tasks are dispatched by the IMS communication analyzer (module DFSICIO0). This module traces its own flow, as well as the flow through device-dependent modules, by using register 0 of the save area of the communication analyzer. (For this reason, this trace is often referred to as the REG0 trace.) The communication analyzer uses the high-order 2 bytes of register 0 to trace the analyzer entry point, and uses the low-order 2 bytes to trace the device-dependent module entry point.

In the DC section of the IMS dump, find the save area sets that hold data about the various IMS processes that were executing prior to the dump. If one of these save areas sets is for DFSICIO0, you can then look at the corresponding register 0 to find the communication task trace entries.

Related reference:

“Log records” on page 477

Analyzer entry points

The high-order 2 bytes of register 0 (for module DFSICIO0) identify the analyzer entry points.

Entry points

Analyzer entry point (hex)

Processing description

- | | |
|---|---|
| 1 | Process an input segment from a terminal. |
| 2 | Perform a logical read operation to the terminal. |
| 3 | Determine which system function is to be performed next for this line and terminal (or node). |
| 4 | Issue a GET NEXT call to message queue. |
| 5 | Perform a logical write operation to the terminal. |
| 6 | WRITE successful; dequeue message or call the device-dependent module at DD1. |
| 7 | Notify master terminal of I/O error; cancel input; return output message to queue. |
| 8 | Return output message to queue; cancel input. |

- | | |
|---|--|
| 9 | Generate an error message; cancel input; return output message to queue. |
| A | Idle the line; cancel output; return output message to queue. |
| B | Resend the last message sent from a given logical terminal (LTERM). |
| C | Idle the line. |

The low-order 2 bytes of register 0 identify the entry points for the device-dependent modules (DDMs), as listed below:

DDM entry point (hex)

Processing description

- ```

1 WRITE/SEND setup: Set up output buffer to write current buffer.
2 WRITE/SEND interruption: Error check last output operation.
3 READ/RECEIVE setup: Set up to perform a poll or read.
4 READ/RECEIVE interruption: Error check, determine terminal responding
 and deblock input segment.
5 Cleanup: Restore control blocks after DFSICI00 error.
6 Build: Move output message from a queue buffer (MFS buffer) to a line
 buffer.
7 Logon: VTAM OPNDST/CLSDST processing.
8 Prepare for output: VTAM
F MFS output format control (DFSCOF0) was entered.

```

## Trace records

Example trace records for the terminal communication task trace are described.

The entries in the first 2 bytes indicate the processing that the analyzer (DFSICIO0) has completed. The entries in the last 2 bytes indicate the processing that the device-dependent modules (DDMs) have completed. As new entries are added, existing entries shift to the left. When the 2-byte area fills, the oldest entry is overwritten by the next-oldest entry. Therefore, the right-most entry of each 2-byte portion of register 0 identifies the most recent analyzer or device-dependent module activity.

The following figure shows the format of a sample terminal communications task trace record.

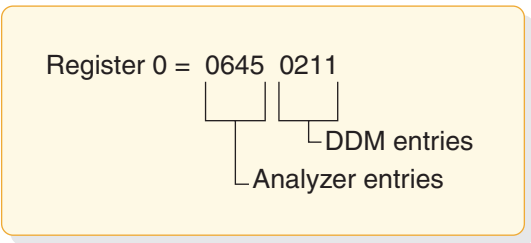


Figure 66. Example of a terminal communication task trace entry

The sample terminal communication task trace entry in the figure indicates that the analyzer entries are 6, 4, and 5; DDM entries are 2, 1, and 1. An analysis of this trace data would yield the flow information shown in the following table.

*Table 61. Example processing flow for a terminal communication task trace entry*

| Entry point | Trace ID | Processing description                                                                                                 |
|-------------|----------|------------------------------------------------------------------------------------------------------------------------|
| 2           | DDM2     | A write interrupt occurred.                                                                                            |
| 6           | A06      | A write completed successfully.                                                                                        |
| 1           | DDM1     | Another buffer was required.                                                                                           |
| 4           | A04      | Room in the buffer is allowed for another message segment. (GN was issued to the message queue.)                       |
| 1           | DDM1     | This segment was placed in the buffer, filling it or an EOM was detected. Setup for the write operation was completed. |
| 5           | A05      | An output operation was requested.                                                                                     |

## Trace output

You can find the terminal communication task trace in any IMS dump, either in register 0 (corresponding to module DFSICIO0) or in the CLB section of the dump for the terminal involved in the problem.

If you look at the CLB section of the dump, the information in field CLBTEMP1 is the same as what is in register 0. Fields CLBTEMP4 and CLBTEMP5 contain the Julian date and time at which the IMS task (ITASK) associated with the line or node returned to the IMS dispatcher (module DFSIDSP0). This information is useful when diagnosing a hung or lost terminal. In an IMS control region dump, you can determine when the last activity occurred on the line or node and what processing path was taken.

## DC trace

The data communication (DC) trace enables you to obtain information about the program flow within the communications analyzer and between the analyzer and the device dependent modules (DDMs).

### Related reference:

“Diagnosing Message Format Service problems” on page 302

## Starting the trace

To start the DC trace for any terminal in the IMS network, enter one of the /TRACE commands from the master terminal or the z/OS console.

Specify at least level 3 in the command because buffer contents are usually required for complete diagnosis. If you specify level 4, the trace writes a save area set for certain entries (C00-C12, D05, AER1, and AER2).

- For VTAM terminals:  
/TRACE SET ON NODE P1 LEVEL 1|2|3|4 MODULE DDM|MFS|ALL
- For ISC links:  
/TRACE SET ON NODE P1 LEVEL=1|2|3|4 MODULE DDM|MFS|ALL  
or  
/TRACE SET ON NODE P1 USER P2
- For logical LINKs:  
/TRACE SET ON LINK P1,...,Pn|ALL LEVEL 1|2|3|4 MODULE DDM|MFS|ALL

- For UNITTYPE:  

```
/TRACE SET ON UNITTYPE P1,...,Pn LEVEL 1|2|3|4 MODULE DDM|MFS|ALL
UPDATE MSLINK NAME(linkname|linkname*|*) START(TRACE)
```

**Note:** The type-2 command UPDATE MSLINK NAME(*linkname*) START(TRACE) uses the same level and module settings that were used the last time the /TRACE SET (ON) LINK command was issued. If a /TRACE SET (ON) LINK command has not been issued since the last cold start, this command defaults to MODULE=ALL and LEVEL=4.

- For an XRF environment:  

```
/TRACE SET ON NODE xxx TAKEOVER

/TRACE SET ON LINE xxx TAKEOVER

/TRACE SET ON LINK xxx TAKEOVER

UPDATE MSLINK NAME(linkname) START(TRACE) SET(TKOTRC((Y))
```

**Tip:**

- The /TRACE SET ON NODExxx TAKEOVER command starts the trace for the specified terminals during takeover only.
- You can enter this command only from the active system in an XRF environment.
- After a terminal has switched successfully, the trace is automatically turned off for that terminal.
- Because this command is recovered across restart and takeover, you need to enter it only once. After a cold start, you must enter the command again.
- Tracing occurs only if the session was active at the time of the takeover.
- If you enter a /TRACE command with and without the TAKEOVER keyword, the last command you entered is in effect.
- You can issue this command for VTAM nodes and MSC links during takeover.
- The /TRACE SET OFF NODE xxx TAKEOVER, /TRACE SET OFF LINE xxx TAKEOVER, /TRACE SET OFF LINK xxx TAKEOVER or UPDATE MSLINK NAME (*linkname*) STOP(TRACE) SET(TKOTRC(N)) command turns off the trace anytime before takeover.

## Stopping the trace

To stop the DC trace, enter one of the /TRACE SET OFF commands from the master terminal or the z/OS console.

- For VTAM terminals:  

```
/TRACE SET OFF NODE P1
```
- For ISC links:  

```
/TRACE SET OFF NODE P1
or
/TRACE SET OFF NODE P1 USER P2
```
- For logical LINKs:  

```
/TRACE SET OFF LINK P1,...,Pn|ALL
```
- For UNITTYPE:  

```
/TRACE SET OFF UNITTYPE P1,...,Pn
UPDATE MSLINK NAME(linkname|linkname*|*) START(TRACE)
```
- For an XRF environment:

```

/TRACE SET OFF NODE xxx TAKEOVER

/TRACE SET OFF LINE xxx TAKEOVER

/TRACE SET OFF LINK xxx TAKEOVER
UPDATE MSLINK NAME(linkname) STOP(TKOTRC)

```

## Printing the trace records

To format and print the trace records, use the File Select and Formatting Print utility (DFSERA10).

The DC trace snaps DC control blocks and I/O buffers to the OLDS/WADS as X'6701' log records. These records are archived to the system log data set (SLDS).

To format and print the trace records, use the following method:

- **File Select and Formatting Print utility (DFSERA10)**

To use the File Select and Formatting Print utility (DFSERA10), specify E=DFSERA30 to format the records before printing. The following example shows the JCL you might use to print DC trace records.

```

// JOB jobname
//S EXEC PGM=DFSERA10
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=DSN of SLDS,.....
//SYSIN DD *
CONTROL CNTL
OPTION PRINT O=5,V=6701,L=2,T=X,E=DFSERA30
//

```

where

```

O = Offset
L = Length
V = Value
T = Type
E = Exit

```

Even if the DC trace was started for many terminals, you can print trace entries for a specific terminal by using the following OPTION statement.

```

CONTROL CNTL DDNAME=...
OPTION PRINT O=5,T=X,L=1,V=67,C=M
OPTION PRINT O=89,T=C,L=8,V=xxxxxxx,C=E,E=DFSERA30

```

where xxxxxxxx = terminal (node) name

A trace record might span several X'6701' log records. If you use the OPTIONS statements, only the first log record is printed.

**Related reference:**

“Content of the trace records”

## Content of the trace records

You can evaluate DC trace records while debugging errors, building keywords, or evaluating APAR descriptions.

You can evaluate DC trace records during any of the following tasks:

- Debugging user errors in exit routines or user modifications relating to communications

- Debugging errors in other entities in the communication network (such as programmable terminals or other host processors)
- Building a keyword string to search for known problems
- Evaluating existing APAR descriptions to isolate problems that are most like the one you are experiencing

The first line of each trace record shows the ID:

ID= xxx    SEGNO= mm RECNO= nnnnnnnn TIME HH.MM.SS.TT DATE YY.DDD

xxx can be any of the following trace record identifiers (IDs):<sup>1</sup>

| ID   | Description                                                                                                                                           |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| A xx | Communication analyzer activity (DFSICIO0)                                                                                                            |
| AERx | Access method error                                                                                                                                   |
| C xx | Communication analyzer activity (DFSCIOC0 in DFSICIO0)                                                                                                |
| CI04 | TM shared queues re-read error detected                                                                                                               |
| CIO2 | Device-dependent module (DDM) SDC read for output                                                                                                     |
| CIO3 | Device-dependent module (DDM) conditional SDC <i>wash</i> output                                                                                      |
| CMEA | Before calling Message Control/Error exit DFSCMUX0                                                                                                    |
| CMEB | After calling Message Control/Error exit DFSCMUX0                                                                                                     |
| CMEI | Message Control/Error exit interface processing                                                                                                       |
| COFC | Entry to the output format control, MFS-supported devices (DFSCOFC0)                                                                                  |
| CRTU | Output User Creation user exit routine failure                                                                                                        |
| CVCT | VTAM trace. This log record is written even though DC trace is not active on the terminal/link.                                                       |
| CVCV | XRF class 2 takeover trace. This log record is written for XRF class 2 terminals during takeover, even though DC trace is not active on the terminal. |
| D xx | Device-dependent module (DDM) activity                                                                                                                |
| DDxx | Output processing by DFSCOFC0                                                                                                                         |
| DSIM | SIMLOGON attempt of a dynamic terminal                                                                                                                |
| ESIM | SIMLOGON error for a dynamic terminal                                                                                                                 |
| FERR | MFS-block fetch error                                                                                                                                 |
| FESx | Front-end switch user exit routine activity                                                                                                           |
| FEXT | Before field edit exit routine                                                                                                                        |
| FMTx | Message Format Service activity (MFS)                                                                                                                 |
| HCSW | XRF class 1 takeover trace. This log record is written for XRF class 1 terminals during takeover, even though DC trace is not active on the terminal. |
| ICLR | Message router activity                                                                                                                               |

1. An asterisk (\*) in this list is a wildcard character, meaning that any character can replace the asterisk.

**MTRP** Block verification error  
**SDC1** Device-dependent module (DDM) SDC output read error  
**SDC2** Device-dependent module (DDM) SDC message reread error  
**SEXT** Before segment edit exit routine  
**SGNX** Signon user exit routine failure  
**SPCL** Close spool data set  
**SPOP** Open spool data set  
**SPRE** Read spool data set  
**SPWR** Write spool data set  
**TRCE** Non-SNA 3270 error  
**VTPO** Non-posting of ECB trace (DFSVTPO0)

**Exception:** MSC has its own analyzer module and entry types.

The table below shows the types of data communication (DC) trace records and what each trace record contains. Some of the acronyms used in the table are:

**SEG** Segment (DECAREA buffer)  
**MFS** MFS input work/MFS output work  
**QBUF** Queue buffer  
**IOPUF** TP buffer  
**S25** Save area 2-5  
**SALL** Save area all

Table 62. DC trace records.

| Trace ID | Function                              | Traced by             | When traced or /TRACE option | What is traced                                                                 |
|----------|---------------------------------------|-----------------------|------------------------------|--------------------------------------------------------------------------------|
| A01      | Process input. <sup>1</sup>           | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CXB, CRB, CIB, CCB, QBUF, IOBUF, INPCNTS, OUTCNTS, EMHB <sup>2</sup> |
| A02      | Do read. <sup>1</sup>                 | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CXB, CRB, IOBUF, EMHB <sup>2</sup>                                   |
| A03      | What is next.                         | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CRB, CTT                                                             |
| A04      | Get Next segment.                     | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CNT                                                                  |
| A05      | Do write. <sup>1</sup>                | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CXB, CRB, CCB, IOBUF, EMHB <sup>2</sup>                              |
| A06      | After good write.                     | DFSICIO0 <sup>9</sup> | ALL, DDM                     | IOB, CTB, CLB, CXB, CRB, CCB                                                   |
| A07      | After bad write. <sup>1</sup>         | DFSICIO0 <sup>9</sup> | ALL, DDM                     | IOB, CTB, CLB, CRB, CCB, IOBUF, EMHB <sup>2</sup>                              |
| A08      | Cancel message, do not DEQ.           | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CRB                                                                  |
| A09      | Generate system message. <sup>1</sup> | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CRB, MFS                                                             |
| A10      | Quiesce without stopping.             | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CRB, CCB                                                             |

Table 62. DC trace records (continued).

| Trace ID | Function                                             | Traced by             | When traced or /TRACE option | What is traced                                                                                                               |
|----------|------------------------------------------------------|-----------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| A11      | Retrieve last DEQD message.                          | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CNT, CRB                                                                                                           |
| A12      | Wait for ASYNC I/O or output ENQ.                    | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CRB, CCB, IOBUF, EMHB <sup>2</sup>                                                                                 |
| AER1     | Access method error.                                 | DFSICIO0 <sup>9</sup> | Always                       | CTB, CLB, CNT, QBUF, SALL, CTT, PCB                                                                                          |
| AER2     | Access method error. <sup>3, 1</sup>                 | DFSICIO0 <sup>9</sup> | Always                       | IOB, CTB, CLB, CNT, CXB, CRB, CIB, CCB, QBUF, IOBUF, SALL, CTT, PCB, EMHB <sup>2</sup>                                       |
| C00      | Get queue buffer.                                    | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C01      | Reposition queue buffer.                             | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C02      | Get Next.                                            | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C03      | DEQ output.                                          | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C04      | Place output back in queue.                          | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C05      | Find output.                                         | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C06      | Get new output message or QMGR call.                 | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C07      | Free input buffer.                                   | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C08      | Get output buffer.                                   | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C09      | User output edit.                                    | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C10      | Call queue MGR.                                      | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C11      | Get device-dependent module (DDM) work buffer.       | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C12      | Free device-dependent module (DDM) work buffer.      | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| C13      | Free receive-any buffer.                             | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CNT, CIB, SALL                                                                                                          |
| CIO2     | Device-dependent module (DDM) SDC read output        | DFSCIO20              | ALL DDM                      | copy ctl blk list from CVCT entry                                                                                            |
| CIO3     | Device-dependent module (DDM) SDC <i>wash</i> output | DFSCIO30              | ALL DDM                      | copy ctl blk list from CVCT entry                                                                                            |
| CMEA     | Before call MSG CTRL Error exit.                     | DFSCMEI0              | Before call DFSCMUX0         | If ITASK is a CLB or LLB: CTB, CLB, CRB, QBUF, IOBUF, INP/OUTP CNTS, DDM, MSNB                                               |
| CMEB     | After call MSG CTRL Error exit.                      | DFSCMEI0              | After call DFSCMUX0          | If ITASK is a CLB or LLB: CTB, CLB, CRB, QBUF, IOBUF, INP/OUTP CNTS, DDM, MSNB<br>If ITASK is a PST: PST, MSGPRFX, SMB, MSNB |



Table 62. DC trace records (continued).

| Trace ID          | Function                                   | Traced by             | When traced or /TRACE option | What is traced                                                                                                            |
|-------------------|--------------------------------------------|-----------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| CMEI              | Error procedure in DFSCMEI0.               | DFSCMEI0              | On some errors               | If ITASK is a CLB or LLB: CTB, CLB, CRB, QBUF, IOBUF, INP/OUTP CNTS, DDM, MSNB If ITASK is a PST: PST, MSGPRFX, SMB, MSNB |
| COFC              | Let MFS edit output.                       | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CNT, CRB, CIB, IOBUF, EMHB <sup>2</sup>                                                                         |
| CRTU              | Output User Creation exit routine failure. | DFSCRTU0              | Always                       | See notes <sup>10</sup>                                                                                                   |
| CVCT              | VTAM TRACE/ABORT. <sup>1</sup>             | DFSCVCT0              | ALL, DDM                     | CTB, CLB, CNT, CRB, IOBUF, CTT, INPCNTS, EMHB <sup>2</sup>                                                                |
| CVCV              | XRF class 2 takeover. <sup>1</sup>         | DFSCVCV0              | Always                       | CLB, CTB, CTT, LLB, LTB, LXB, LU6WA, CNT, CRB, SPQB, CTC, MSNB, EMHB, IOBUF, DDM                                          |
| D01               | Write setup.                               | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CNT, CRB, CIB, QBUF, S25                                                                                        |
| D02               | Write interrupt. <sup>1</sup>              | DFSICIO0 <sup>9</sup> | ALL, DDM                     | IOB, CTB, CLB, CRB, IOBUF, S25, EMHB <sup>2</sup>                                                                         |
| D03               | Read setup.                                | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CNT, CRB                                                                                                        |
| D04               | Read interrupt. <sup>1</sup>               | DFSICIO0 <sup>9</sup> | ALL, DDM                     | IOB, CTB, CLB, CRB, IOBUF, S25, EMHB <sup>2</sup>                                                                         |
| D05               | Cleanup.                                   | DFSICIO0 <sup>9</sup> | ALL, DDM                     | IOB, CTB, CLB, CNT, CXB, CRB, CIB, CCB, MFS, QBUF, IOBUF, SALL, EMHB <sup>2</sup>                                         |
| D07               | LOGON. <sup>1</sup>                        | DFSICIO0 <sup>9</sup> | ALL, DDM                     | CTB, CLB, CNT, CRB                                                                                                        |
| DD6M              | Output build (MFS).                        | DFSCOF0C0             | ALL, DDM                     | CTB, CLB, CNT, CRB, CIB, SEG, MFS, IOBUF, S25, EMHB <sup>2</sup>                                                          |
| DD6S              | Output build (Non-MFS).                    | DFSCOF0C0             | ALL, DDM                     | CTB, CLB, CNT, CRB, CIB, IOBUF, S25, EMHB <sup>2</sup>                                                                    |
| DD8               | Prepare for output.                        | DFSCOF0C0             | ALL, DDM                     | CTB, CLB, CNT, CRB, CIB, IOBUF, S25, EMHB <sup>2</sup>                                                                    |
| DDM1              | Write set up through COFC.                 | DFSCOF0C0             | ALL, DDM                     | CTB, CLB, CNT, CRB, CIB, MFS, IOBUF, S25, EMHB <sup>2</sup>                                                               |
| FERR              | MFS block fetch error. <sup>3</sup>        | DFSCFEO0              | Always                       | CIB, CTT, MFSBPCA, MFSTRACE <sup>4</sup>                                                                                  |
| FES1              | Entry to front end switch user exit.       | DFSICIO0 <sup>9</sup> |                              | CTB, CLB, CNT, QBUF, S25                                                                                                  |
| FES2              | Exit from front end switch user exit.      | DFSICIO0 <sup>9</sup> |                              | CTB, CLB, CNT, QBUF, S25                                                                                                  |
| FEXT <sup>5</sup> | Before field edit exit.                    | DFSCFEI0              | MFS                          | CTB, CIB                                                                                                                  |
| FMT1              | Return from DFSFEIO or unformatted input.  | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CLB, CIB, IOBUF, EMHB <sup>2</sup>                                                                                   |
| FMT2              | MFS go to DFSFEIO formatted input.         | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CLB, CIB, IOBUF, EMHB <sup>2</sup>                                                                                   |
| FMT3              | MFS complete process MSG segment.          | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CLB, CIB, MFS, QBUF                                                                                                  |
| FMT4              | Get next input.                            | DFSICIO0 <sup>9</sup> | ALL, MFS                     | CTB, CLB, CIB                                                                                                             |

Table 62. DC trace records (continued).

| Trace ID          | Function                                       | Traced by                          | When traced or /TRACE option | What is traced                    |
|-------------------|------------------------------------------------|------------------------------------|------------------------------|-----------------------------------|
| FMT6              | Clean up resources.                            | DFSICIO0 <sup>9</sup>              | ALL, MFS                     | CTB, CLB, CIB                     |
| HCSW              | XRF class 1 takeover. <sup>1</sup>             | DFSHCSW0                           | Always                       | IOBUF, CNT, CRB, CTT, CTB, CLB    |
| ICLR              | Message router.                                | DFSICLR0                           | Always                       | CTB, CLB, CTT, PCB                |
| MTRP <sup>8</sup> | Block verification error.                      | DFSCFEO0                           |                              | CLB, CIB, MFS, CTT                |
| MTRP <sup>7</sup> | Block verification error.                      | DFSCFEI0                           |                              | CLB, CIB, MFS, CTT                |
| SDC1              | Device-dependent module (DDM) SDC read error   | DFSCIO20                           | ALL DDM                      | copy ctl blk list from CVCT entry |
| SDC2              | Device-dependent module (DDM) SDC reread error | DFSICIO4                           | ALL DDM                      | copy ctl blk list from CVCT entry |
| SEXT <sup>6</sup> | Before segment edit exit.                      | DFSCFEI0                           | MFS                          | CTB, CIB                          |
| TRCE              | Non-SNA 3270 error.                            | DFSDN130,<br>DFSDN140,<br>DFSDS060 | Always                       | IOB, CTB, CLB, S25, CTT           |
| VTPO              | Rejected posting of ECB.                       | DFSVTPO0                           | ALL, DDM                     | See notes <sup>11</sup>           |

Table 62. DC trace records (continued).

| Trace ID | Function | Traced by | When traced or /TRACE option | What is traced |
|----------|----------|-----------|------------------------------|----------------|
|----------|----------|-----------|------------------------------|----------------|

**Notes:**

1. See “Diagnosing line and terminal problems” on page 272 for more information on this trace code.
2. Fast Path EMHB buff traces (if present) with I/O buffers
3. Module return code saved in CLBTEMP4
4. Return codes from DFSFFRH0 (block fetch), MFSTRACE (when in MFSTEST) or MFSBPCA (when not in MFSTEST); MFSTRACE=MFSTEST trace parameters, MFSBPCA=MFS Buffer Pool Control Area:
 

**Offset in hex**

|    |                                  |
|----|----------------------------------|
| 0  | Current pool space in use        |
| 4  | Maximum space used               |
| 5  | Status flag                      |
|    | X'80' I/O active for a task      |
|    | X'40' Task(s) queued for I/O     |
|    | X'20' A task dequeued and posted |
| 9  | Error status                     |
|    | X'BB' BLDL error                 |
|    | X'FF' READ error                 |
| A  | Block name for BLDL error        |
| 10 | BLDL return code on error        |
| 12 | Sense from read error            |
| 14 | CSW status from read error       |
| 16 | Block name for read error        |
| 20 | List for BLDL macro              |
5. Besides CIB and CTB:
 

**PARMLIST**  
Parameter list to be passed to EXIT

**FIELD** Field data before exit
6. Besides CIB and CTB:
 

**PARMLIST**  
Parameter list to be passed to EXIT

**SEGMENT**  
Segment data before exit
7. SEXT is logged if TRAP 1 is set by /TRACE and a buffer overwrite occurs.
8. MTRP is logged if TRAP 1 is set by /TRACE and a buffer overwrite occurs. In addition to the blocks, the DIF/DOF, MID/MOD, MFBP, and FRE are traced. If in output, R9 is also traced.
9. The MSNB control block content is traced by DFSICIO0 if the /DEQ LTERM, /DEQ NODE, or the /DEQ MSNAME command is entered with the PURGE or PURGE1 keywords.
10. The CRTU trace entry is mapped in “Format of 6701 log record with CRTU identifier” on page 273.
11. The VTPO trace entry is mapped in “Format of the 6701 log record with VTPO identifier” on page 274.

**Related tasks:**

"Printing the trace records" on page 265

## Diagnosing line and terminal problems

Use trace record identifiers to help in diagnosing line and terminal problems.

The trace records with the following identifier are useful in diagnosing line and terminal problems:

**A01**    **TERMINAL INPUT READY FOR IMS PROCESSING**

**I TP BUF**

Contains input device segment 6 to 36 bytes from the beginning of the buffer. The data is preceded by a 2-byte length and 2 bytes of zeros.

**A02**    **PRIOR TO ISSUING VTAM I/O REQUEST. (LOGICAL READ)**

**CLB**    For remote 3270:

**X'0001'**

Special poll (read sense/status)

**X'0401'**

Read initial (general poll)

**X'0082'**

Write initial

**X'0084'**

Write continue

Offset X'0C' contains the address in TP BUF to read into or write from.

**I TP BUF**

The input TP buffer contains data to be written if this is an output operation. For VTAM nodes, the RPL begins at offset X'08'.

**A05**    **PRIOR TO ISSUING VTAM I/O REQUEST. (LOGICAL WRITE)**

**CLB**    Refer to the information for record A02.

**O TP BUF**

The output TP buffer contains data to be written if this is an output operation. For VTAM nodes, the RPL begins at offset X'08'.

**A07**    **GENERATE 'UNABLE TO RECEIVE/OUTPUT' MESSAGE**

See the preceding D02 or D04 record for the cause.

**A09**    **GENERATE ERROR MESSAGE**

See the preceding D02, D04, or D07 record for the cause.

**AER2**    **SHOULD NOT OCCUR ERROR HAS OCCURRED**

**CLB**    Offset X'3E' contains the error message number in hexadecimal. All available control blocks and buffers are logged. This record is produced even if the trace is not set on.

**CRTU**    **OUTPUT USER CREATION EXIT ROUTINE FAILURE**

**CVCT**    **VTAM DEVICE SUPPORT TRACE**

**CLB**    Normally offset X'1C' contains the complemented IMS message key

of an IMS master terminal message. All available control blocks and buffers are logged. This record is produced even if the trace is not set on.

#### **I TP BUF of O BUF**

The VTAM RPL begins at offset X'08'.

#### **CVCV XRF CLASS 2 TAKEOVER TRACE**

This log record is written for XRF class 2 terminals during takeover, even though DC trace is not active on the terminal. This record can be used to diagnose subsequent session failures when used in conjunction with CVCT records.

#### **D02 VTAM HAS POSTED I/O COMPLETE. (LOGICAL WRITE INTERRUPT)**

##### **CLB**

**Offset X'00' =**

Post code

- X'40' for VTAM = normal completion

Other key fields are DECFLAGS and DECERRST. For VTAM, key fields are CLBVFLAG and CLBLOST.

#### **O TP BUF**

For VTAM nodes, the VTAM RPL begins at offset X'08'.

#### **D04 VTAM HAS POSTED I/O COMPLETE. (LOGICAL READ INTERRUPT)**

**CLB** Refer to the information for record D02.

**IOB** Refer to the information for record D02.

#### **I TP BUF**

The input TP buffer contains data read from the terminal if the last operation was a read or poll. For VTAM nodes, the RPL begins at offset X'08'.

#### **D07 DEVICE DEPENDENT INITIALIZATION/TERMINATION**

**CLB** Refer to information for record D02.

#### **O TP BUF**

The VTAM RPL begins at offset X'08'.

#### **HCSW**

##### **XRF CLASS 1 TAKEOVER TRACE**

This log record is written for XRF class 1 terminals during takeover, even though DC trace is not active on the terminal. This record can be used to diagnose subsequent session failures when used in conjunction with CVCT records.

#### **VTPO REJECTED POSTING OF ECB**

### **Format of 6701 log record with CRTU identifier**

A map of the formatted CRTU log record, including offset, hex code, and a description is shown.

*Table 63. Map of formatted CRTU log record*

| Offset | Hex code | Description      |
|--------|----------|------------------|
| +0     | H        | Length of buffer |
| +2     | XL5      | Internal use     |

Table 63. Map of formatted CRTU log record (continued)

| Offset | Hex code | Description                      |
|--------|----------|----------------------------------|
| +7     | X        | DFSCRTU0 return code (see below) |
| +8     | XL68     | Internal use                     |
| +4C    | CL8      | Input Lterm name                 |
| +54    | XL52     | Internal use                     |

#### DFSCRTU0 return codes (decimal):

The DFSCRTU0 return codes and their meanings are listed.

```

4 'ENVIRONMENT' INCORRECT (for example, NO ETO,
 NO DFSINSX0 WITH SHARED QUEUES).
16 DUPLICATE LTERM/SMB NAME.
20 NO USER DESCRIPTOR COULD BE LOCATED
 FOR USE IN CREATING USER STRUCTURE.
24 INVALID INPUT LTERM NAME.
28 DFSINSX0 REJECTED USER-CREATION REQUEST.
32 STORAGE COULD NOT BE OBTAINED TO CREATE
 USER STRUCTURE.
36 STATIC USER ALREADY EXISTS.
40 INSERT EXIT PRAMETER ERROR: INVALID LTERM
 NAME, BAD FORMAT.
48 AVAILABLE.
52 LATCHING ERROR OCCURRED.
56 STORAGE MANAGER ERROR - DFSPPOOL.
60 ERROR IN ADDING DYNAMIC SMB TO HASH TABLE.
64 INSERT EXIT (DFSINSX0) PARAMETER ERROR:
 INVALID DYNAMIC TRANSACTION DATA.
68 LOCAL CNT FOUND, BUT DESTINATION REGISTERED
 TO RESOURCE MANAGER AS A TRANSACTION.
72 LOCAL SMB FOUND, BUT DESTINATION REGISTERED
 TO RESOURCE MANAGER AS AN LTERM.
76 DESTINATION REGISTERED TO RESOURCE MANAGER AS
 A CPIC TRANSACTION, APPC DESCRIPTOR, OR MSNAME.
80 DESTINATION COULD NOT BE VALIDATED IN RESOURCE
 MANAGER DUE TO AN RM INTERFACE ERROR.
84 SMB CREATION REQUESTED, BUT DESTINATION WAS ALREADY
 REGISTERED TO RESOURCE MANAGER AS AN LTERM, CPIC
 TRANSACTION, APPC DESCRIPTOR, OR MSNAME.
88 SMB CREATION REQUESTED, BUT SHARED QUEUES IS NOT
 ACTIVE.
```

#### Format of the 6701 log record with VTPO identifier

If an APPC or OTMA message is discarded because of a send type error, IMS does not log a type 6701–CMEA/CMEB record for the error.

The lack of type 6701–CMEA/CMEB records makes debugging for the Message Control/Error exit routine (DFSCMUX0) difficult. It does log type 6701–CMEA/CMEB records for errors related to other devices, however. The following table shows the VTCB posting in DFSVTPO0.

Table 64. VTCB posting in DFSVTPO0.

| Offset | Hex code | Description                                                                     |
|--------|----------|---------------------------------------------------------------------------------|
| +0     | X        | Function code                                                                   |
|        | X'00'    | VTCTB is to be posted                                                           |
|        | X'04'    | VTCTB is to be released                                                         |
|        | X'08'    | Check if ACB can be closed                                                      |
|        | X'0C'    | Delete a VTCTB                                                                  |
|        | X'10'    | Stacked logon for static CLB                                                    |
|        | X'14'    | NSEXIT for static CLB                                                           |
|        | X'18'    | NSEXIT for dynamic CLB                                                          |
|        | X'1C'    | LOSTERM for static CLB                                                          |
|        | X'20'    | LOSTERM for dynamic CLB                                                         |
| +1     | X        | Type of checking RQD for post                                                   |
|        | X'04'    | Post if node is active                                                          |
|        | X'08'    | Post if node not active                                                         |
|        | X'0C'    | Post if idle and not active                                                     |
|        | X'10'    | Hard post the node                                                              |
|        | X'14'    | Post an MSC LLB                                                                 |
| +2     | X        | Conditional data for posting                                                    |
|        | X'80'    | Type is ISC parallel session                                                    |
|        | X'40'    | Type is MSC LLB                                                                 |
|        | X'20'    | Z-NET cancel in progress                                                        |
|        |          | On detection of an error, this byte contains one of the following reject codes: |
|        | X'01'    | VTCTB not specified                                                             |
|        | X'02'    | Inspection failed—check subcode                                                 |
|        | X'03'    | Node not idle                                                                   |
|        | X'04'    | RQR failed—check subcode                                                        |
|        | X'05'    | Node active—check subcode                                                       |
|        | X'06'    | Node not alive—check subcode                                                    |
|        | X'07'    | Invalid request                                                                 |
|        | X'08'    | MSC link already posted                                                         |
|        | X'09'    | MSC send outstanding                                                            |
|        | X'0A'    | Node already dispatched                                                         |
|        | X'20'    | No VTCTB to delete                                                              |
|        | X'30'    | CINIT rejected by PLU (NSX)                                                     |
|        | X'31'    | VTAM error (NSX)                                                                |
|        | X'40'    | Stacked logon procedure failure                                                 |

Table 64. VTCB posting in DFSVTPO0 (continued).

| Offset | Hex code | Description                            |
|--------|----------|----------------------------------------|
| +3     | X        | Posting-rejection subcode <sup>1</sup> |
|        | X'01'    | Node already dispatched (RQR)          |
|        | X'02'    | Node already posted (RQR)              |
|        | X'03'    | Unpostable I/O (RQR)                   |
|        | X'04'    | Clear issued (RQR)                     |
|        | X'05'    | Inact performed (RQR)                  |
|        | X'01'    | SPQB not found (INSPECT)               |
|        | X'02'    | No match on CLB ADDR (INSPECT)         |
|        | X'03'    | VOPEN not on (INSPECT)                 |
|        | X'04'    | VTCB not found by scan (INSPECT)       |
|        | X'05'    | No match on VTCBs (INSPECT)            |
|        | X'06'    | CIDs do not match (INSPECT)            |
|        | X'07'    | VOPEN not set (INSPECT)                |
|        | X'08'    | Temporary VTCB (INSPECT)               |
|        | X'01'    | No /idle node CMD (POSTRTN)            |
|        | X'02'    | Node inoperable (POSTRTN)              |
|        | X'03'    | Node dispatched (POSTRTN)              |
|        | X'04'    | Line already posted (POSTRTN)          |
|        | X'05'    | V2SND is set (POSTRTN)                 |
|        | X'06'    | Not XRF sync mode (POSTRTN)            |
|        | X'07'    | Not SCIP exit with clear (POSTRTN)     |
|        | X'08'    | SCIP exit bindrace done (POSTRTN)      |
| +4     | 0F       | Post code                              |
| +4     | X        | NSEXIT flag                            |
|        | X'80'    | Cleanup RU                             |
|        | X'40'    | Notify RU                              |
| +5     | X        | NSEXIT type for CLBLOST                |
| +6     | X        | Reason code for CTBRTERM               |
| +7     | X        | Notify reason code                     |
| +8     | F        | VTCB address                           |
| +C     | CL8      | VTAM node name                         |
| +14    | F        | CID                                    |
| +18    | CL8>     | SPQB name if parallel session          |
| +20    | 0F       | CLBNCID for a stacked logon            |
| +20    | F        | Sense data (NSEXIT)                    |

**Note:**

1. This byte contains an additional qualifier subcode.



## Example of DC trace output

An example of a Data Communication (DC) trace record is shown. This example shows part of a normal VTAM terminal logon flow.

```
INTERNAL TRACE RECORD ID = D 07 SEGNO=00 RECNO = 0000013B TIME 08.40.59.68 DATE 88.047
CLB
02248078 000000 40D6D7D5 00000000 00000000 00000000 00000000 00000000 00000000 * OPN.....*
02248098 000020 00000000 00000000 C2F0D7F0 F6404040 00000100 022480FC 00000000 00000000 *.....B0P06*
022480B8 000040 00000000 00000000 00010000 00000000 022480FC 80000000 00000000 *.....*
022480D8 000060 00000000 00000000 00000000 00040000 00000000 00000000 40000000 00000000 *.....*
022480F8 000080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
CTB
022480FC 000000 00038CC8 02248078 00000000 000B2000 00000000 082A0000 0000FFFF 0003614C *...H...../<*
0224811C 000020 00000000 00000000 022481C4 00004040 40404040 40400000 00000000 00000000 *.....AD..*
0224813C 000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0224815C 000060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
INP CNTS
0003614C 000000 00000000 00000000 00000000 00000000 00000000 00820084 00000000 C2F0D7F0 *.....B.D...B0P0*
0003616C 000020 F6404040 00000001 022480FC 000371F0 FFFF0909 00000000 00000000 00000000 *60.....*
NEXT CNT
000371F0 000000 00000000 00000000 00000000 00000000 00000000 00820084 00000000 D4E3D6D4 *.....B.D...MTOM*
00037210 000020 C1E2E340 00000001 022480FC 00000000 FFFF0909 00000000 00000000 00000000 *AST*
INTERNAL TRACE RECORD ID = C 08 SEGNO=00 RECNO = 0000013C TIME 08.40.59.84 DATE 88.047
CLB
02248078 000000 40D6D7D5 00000000 00000000 00000000 00000000 00000000 00000000 * OPN.....*
02248098 000020 00000000 00000000 C2F0D7F0 F6404040 00000100 022480FC 00000000 00000000 *.....B0P06*
022480B8 000040 00000000 00000000 00010000 00000000 022480FC 80000000 00000000 *.....*
022480D8 000060 00000000 00000000 00000000 00040000 00000000 00000000 40000000 00000000 *.....*
022480F8 000080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
CTB
022480FC 000000 00038CC8 02248078 00000000 000B2000 00000000 082A0000 0000FFFF 0003614C *...H...../<*
0224811C 000020 00000000 00000000 022481C4 00004040 40404040 40400000 00000000 00000000 *.....AD..*
0224813C 000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0224815C 000060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
CIB
022481C4 000000 40404040 40404040 00000000 00004040 40404040 00000000 00000000 00000000 **
022481E4 000020 00000000 00000000 00000000 00000000 00004040 40404040 40400000 40404040 *.....G.....*
02248204 000040 40404040 00004040 40404040 00000000 00000000 00180050 00000000 00000000 * ..&.....*
02248224 000060 40404040 40404040 00000000 00000000 00000000 00000000 00000000 00000000 **
INTERNAL TRACE RECORD ID = A 05 SEGNO=00 RECNO = 0000013D TIME 08.40.59.86 DATE 88.047
CLB
02248078 000000 00000000 00000000 00000000 02235008 00000000 00000000 00000000 00000000 *.....&.....*
02248098 000020 00000000 00000000 C2F0D7F0 F6404040 10000100 022480FC 00000000 00000000 *.....B0P06*
022480B8 000040 01C80000 00000000 00010000 00000000 022480FC 80000000 00000000 00000000 *..H.....*
022480D8 000060 00000000 02235000 00000000 00000000 00000000 00000000 40000000 00000000 *.....&.....*
022480F8 000080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
CTB
022480FC 000000 00038CC8 02248078 00000000 000B2000 00000000 082A0000 0000FFFF 0003614C *...H...../<*
DFSERA30 - FORMATTED LOG PRINT PAGE 009
0224811C 000020 00000000 00000000 022481C4 00004040 40404040 40400000 00000000 00000000 *.....AD..*
0224813C 000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0224815C 000060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
O TP BUF
02235000 000000 01C80088 00000000 00201670 00000000 00000000 00000000 00001000 00800000 *..H.H.....*
02235020 000020 0002FD14 00000000 00000000 02235088 20800000 00000000 00000000 00000000 *.....&H.....*
02235040 000040 10308050 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....&.....*
02235060 000060 00000000 00000000 80008010 00000000 00000000 00000000 00000000 00000000 *.....*
02235080 000080 00000000 00000000 00000000 00440000 00000000 02248078 C2F0D7F0 F6404040 D9C5C3D6 *.....B0P06 RECO*
022350A0 0000A0 D9C44040 00000000 00000000 41080002 00000001 00000000 00000000 00000000 *RD*
022350C0 0000C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
022350E0 0000E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
02235180 000180 00000000 00000000 00000000 00000000 FF00403F C181AA55 01900000 00000000 *.....AA.....*
022351A0 0001A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
022351C0 0001C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
INTERNAL TRACE RECORD ID = D 07 SEGNO=00 RECNO = 0000013E TIME 08.41.00.43 DATE 88.047
CLB
02248078 000000 40000000 00000000 00000000 02235008 00000000 00000000 00000000 00000000 *&.....*
02248098 000020 00000000 00000000 C2F0D7F0 F6404040 10020100 022480FC 00000000 00050007 *.....B0P06*
022480B8 000040 0840598F 0088047F 00010000 00000000 022480FC 80000000 00000000 00000000 *..H..H.....*
022480D8 000060 00000000 02235000 00000000 00000000 00000000 00000000 40000000 00000000 *.....&.....*
022480F8 000080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
CTB
022480FC 000000 00038CC8 02248078 00000000 000B2000 00000000 082A0000 0000FFFF 0003614C *...H...../<*
0224811C 000020 00000000 00000000 022481C4 00004040 40404040 40400000 00000000 00000000 *.....AD..*
0224813C 000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0224815C 000060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
INP CNTS
0003614C 000000 00000000 00000000 00000000 00000000 00000000 00820084 00000000 C2F0D7F0 *.....B.D...B0P0*
0003616C 000020 F6404040 00000001 022480FC 000371F0 FFFF0909 00000000 00000000 00000000 *60.....*
NEXT CNT
000371F0 000000 00000000 00000000 00000000 00000000 00000000 00820084 00000000 D4E3D6D4 *.....B.D...MTOM*
00037210 000020 C1E2E340 00000001 022480FC 00000000 FFFF0909 00000000 00000000 00000000 *AST*
```

---

## Diagnosing problems in the Queue Control Facility Message Requeuer

The Queue Control Facility Message Requeuer (MRQ) processor module (DFSQMRQ0), which is part of the IMS Transaction Manager, provides diagnostic information for diagnosing errors while running the IBM IMS Queue Control Facility for z/OS (QCF).

Although problems can be diagnosed separately in the QCF product by using SCRAPLOG records and in the Queue Control Facility processor module by using 6701-MRQE diagnostic records, QCF and the Queue Control Facility processor work together to allow inserting and loading, querying, recovering, deleting and unloading, recovering, and viewing messages on the IMS message queue data sets and shared message queue structures.

In this topic, the information about SCRAPLOG records also applies to SCRAPSEL and SCRAPCAN records. The SCRAPSEL, SCRAPCAN, and SCRAPLOG data sets are generated by the IQCSELECT, IQCCANCL, and IQCINSRT modules of QCF, respectively, and are identical in both format and function.

- QCF functions help you accomplish the following tasks:
  - Message queue recovery when you want to return messages to the IMS queue for reprocessing.
  - Application recovery when you want to return messages to the IMS queue for reprocessing.
  - IMS queue maintenance (you can query, browse, unload, and load IMS nonshared queue environments).
  - Message queue migration and fallback.
  - Stress, regression, and application testing when transaction data is needed to simulate production loads or application input.
- A queue overflow protection function monitors queue usage and takes action to prevent queue utilization from reaching critical thresholds (non-shared queues environment).
- An ISPF front-end enables you to select QCF functions and selection criteria to complete the following tasks:
  - Query messages (or IMS status) on the queue
  - Unload (delete) messages from the queue
  - Load messages onto the IMS message queues
  - Release or terminate waiting tasks (nonshared queue environment)
  - Maintain the tables associated with queue overflow protection (nonshared queue environment)

### IBM IMS Queue Control Facility for z/OS interface

You can invoke the IBM IMS Queue Control Facility for z/OS functions through either a user control card input or a TSO/ISPF interface. The functions are Browse, Query, Load/Insert, Queue Overflow Protection, Recover, and Unload.

The following figure describes the IMS Queue Control Facility interface to IMS.



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After the error is reported and logged, IMS Queue Control Facility and IMS skip to the next message, function, or terminate the BMP, depending on the error. The IMS Queue Control Facility routines in IMS do not abend. To diagnose the error, the 6701-MRQE log records should be printed and analyzed. The API calls may also be traced by IMS Queue Control Facility (Trace control card), or within IMS by issuing the /TRACE SET ON PROGRAM MRQPSB. The IMS Queue Control Facility trace sends output to the QCFPRINT DD data set. The IMS trace logs type 6701 records to the OLDS.

#### Related reference:

"6701-MRQE diagnostic records" on page 282

## SCRAPLOG diagnostic records

By analyzing SCRAPLOG records, you can sometimes determine that a logical terminal (LTERM) to which messages are to be requeued does not exist. In this case, you can fix the problem and run the job again so that the messages are requeued.

As part of diagnosing problems with the Queue Control Facility/Message Requeuer, you use SCRAPLOG records. The SCRAPLOG record consists of a X'100' or X'140' MRQ prefix that is mapped by DFSMRQPF, followed by the actual message that is being inserted. The message is either a 4002 record (a message from a DUMPQ or SNAPQ checkpoint) or a 01 (input) or 03 (output) message record. IMS messages are mapped by the QLOGMSGP macro.

### Sample QCF record from scraplog data set

An example showing a message that is scrapped by QCF and written to the SCRAPLOG data set is shown.

The first X'140' byte is the QCF prefix, mapped by the DFSMRQPF macro. Offset X'88' into DFSMRQPF is the AIBREASN code = 00001084 = message is nonrecoverable (in other words, INQUIRY=NORECOV on the IMS TRANSACT macro TRAN31B0).

The rest of the data is the message (offset 04 = X'03' = type 03 output message), mapped by macro QLOGMSGP.

### QCF prefix mapped by DFSMRQPF

```
5B RECORD
QCF prefix mapped by DFSMRQPF
00000000 000000 04610000 5BD8C3C6 D4E2C700 08100102 01400000 00000000 00000000 00000000 *./..$QCFMSG.....*
00000020 000020 00000000 02000100 2001304F 22581647 4184032D E2E8E2F3 40404040 B6AB6C0E *.....|.....D..SYS3 ..%.*
00000040 000040 26E03901 E2E8E2F3 40404040 B6AB6C0E 26E03901 00000000 00000000 00000000 *....SYS3 ..%.....*
00000060 000060 0001004C 00000000 08000002 40404040 40404040 E3D9C1D5 F3F1C2F0 D3F6F2D4 *...<..... TRAN31B0L62M*
00000080 000080 E5E2F140 00000000 00000000 81000000 0000D4D9 000000F0 00001084 000A000A *VS1A....MR...0...D....*
000000A0 0000A0 E3D9C1D5 F3F1C2F0 40404040 40404040 00000000 00000000 D8C3C6E5 F1D9F240 *TRAN31B0QCFV1R2 *
000000C0 0000C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000000E0 0000E0 TO 00000120 000120 SAME AS ABOVE

IMS message mapped by QLOGMSGP
00000140 000140 03110000 01D18194 08000002 08000002 02E40000 E2E8E2F3 40404040 B6AB6C0E *....JAM.....U..SYS3 ..%.*
00000160 000160 26E03901 E2E8E2F3 40404040 B6AB6C0E 26E03901 00000000 00000000 00000000 *....SYS3 ..%.....*
00000180 000180 00408100 C8000000 00000000 00000000 00010000 00000000 00000000 00000001 *..A.H.....*
000001A0 0001A0 F0FFFFFF 0C027700 E3D9C1D5 F3F1C2F0 00000000 00000000 40404040 40404040 *.....TRAN31B0.....*
000001C0 0001C0 00108600 0264FC00 00000000 00000000 011E8700 00C2D588 8000D600 C9D4E2D5 *..F.....G..BNH..O..IMS*
000001E0 0001E0 C5E34040 D3F6F2D4 E5E2F140 D3F6F2D4 C4C5F0F1 40404040 40404040 00000000 *ET L62MVS1 L62MDE01*
00000200 000200 00000000 0C027700 40404040 40404040 40404040 40404040 0C505A70 00000002 *.....&.....*
00000220 000220 E3D9C1D5 F3F1C2F0 D3F6F2D4 E5E2F140 00000000 B6AB6C0E 24746405 00000000 *TRAN31B0L62MVS1%.....*
00000240 000240 00000000 00000000 00000000 00000000 00000000 00000000 00000008 E3D9C1D5 *.....TRAN*
00000260 000260 F3F1C2F0 50018046 15519555 55555555 55555555 55555555 55555555 55555555 *31B0&.....N.....*
00000280 000280 55555555 55555555 55555555 55555555 55555555 55555555 55555555 55555555 *.....FTXA..U.....*
000002A0 0002A0 55555555 09151515 15151515 15151515 15151515 00000000 00000000 00000000 *.....*
000002C0 0002C0 00000000 00E2E8E2 F3404040 40000000 00000000 00000000 00000000 00000000 *....SYS3*
000002E0 0002E0 00000000 00000000 00000000 00000016 88004040 40404040 40404040 40404040 *.....H.*
00000200 000200 00000000 00000000 00000000 00000016 88004040 40404040 40404040 40404040 *.....H.*
00000300 000300 4040D600 00108900 00018000 B6AB6C0E 26E49E81 00188A00 2001304F 22581647 * O...I.....%..U.A.....|....*
00000320 000320 4184032D 00000000 00000000 00688B00 00000000 00000000 00000000 00000080 *.D.....*
00000340 000340 00000000 00000000 00000000 00000000 00000000 00000000 0000000A 00000000 *.....*
```

```

00000360 000360 00000000 00000000 0000000A 000A000A E2E8E2F3 40404040 B6AB6C0E 26E03901 *.....SYS3 ..%....*
00000380 000380 00000000 00000000 00000000 00000000 00000000 00908C00 0000000A 00000000 *.....*
000003A0 0003A0 00000003 E3D9C1D5 F3F1C2F0 FFFFFFFF 0C027700 0A0A014C 40080000 00000000 *....TRAN31B0.....<*
000003C0 0003C0 00000000 00000000 00000000 00000000 00000000 00000000 08100000 00000000 *.....*
000003E0 0003E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
00000400 000400 00000000 00000810 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
00000420 000420 00000000 002D0300 E3D9C1D5 F3F1C2F0 40D6E4E3 C2D6E4D5 C440D4C5 E2E2C1C7 *.....TRAN31B0 OUTBOUND MESSAGE*
00000440 000440 E5 40E3D9C1 D5F3F1C2 F0404040 40B6AB6C 0E26E5DF 01000000 00000001 *E TO TRAN31B0 ..%.V.....*
00000460 000460

```

## Key fields of SCRAPLOG records and their offsets

Key fields of SCRAPLOG records, including offset, label, length, value and a description will help you in diagnosing problems.

The following table shows key fields of the QCF records and their offsets.

Table 65. Key fields in QCF records and their offsets

| Offset | Label    | Length | Value    | Description                                                                  |
|--------|----------|--------|----------|------------------------------------------------------------------------------|
| 04     | MSGMRQID | 08     | \$QCFMSG | Prefix ID (First character is 5B, which causes DFSERA30 to print as 5B rec.) |
| 74     | MRPREDST | 08     | TRAN31B0 | Destination name                                                             |
| 94     | MRPRETRN | 04     | 000000F0 | AIBRETRN code, always this value for QCF errors                              |
| 98     | MRPREASN | 04     | 00001084 | AIBREASN code = message non recoverable                                      |

The following table shows the key fields in messages.

Table 66. Key fields in messages (offset 0140=offset 00 into message)

| Offset | Label    | Length | Value    | Description                                                         |
|--------|----------|--------|----------|---------------------------------------------------------------------|
| 0140   | MSGLRLL  | 02     | 0361     | Length of message                                                   |
| 0144   | MSGLCODE | 01     | 01       | Log code, 01=input message, 03=output message                       |
| 0150   | MSGPRFLL | 02     |          | Length of total message prefix (user segments start at this offset) |
| 01A8   | MSGODSTN | 08     | TRAN31B0 | Message destination name                                            |

## Sample JCL for printing SCRAPLOG records

Use SCRAPLOG records in combination with 6701-MRQE records to effectively diagnose QCF problems.

The following figure shows sample JCL for printing SCRAPLOG records.

## Sample JCL for printing SCRAPLOG records

```

//SCRAPPRT JOB
//* PRINT IQCSELCT SCRAPSEL
//JOB LIB DD DISP=SHR,DSN=IMS610.RESLIB
//SELECT EXEC PGM=DFSERA10,REGION=512K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=QCF.SCRAPSEL,DISP=SHR
//SYSIN DD *
CONTROL CNTL
OPTION PRINT E=DFSERA30
END
/*
//CANCEL EXEC PGM=DFSERA10,COND=EVEN,REGION=256K
//* PRINT IQCCANCL SCRAPCAN
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=QCF.SCRAPCAN,DISP=SHR

```

```

//SYSIN DD *
CONTROL CNTL
OPTION PRINT E=DFSERA30
END
//INSERT EXEC PGM=DFSERA10,COND=EVEN,REGION=256K
//* PRINT IQCINSRT SCRAPLOG
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=MRQ.SCRAPLOG,DISP=SHR
//SYSIN DD *
CONTROL CNTL
OPTION PRINT E=DFSERA30
END
/*

```

## 6701-MRQE diagnostic records

An IMS error detected while QCF is requesting messages results in the logging of a 6701-MRQE diagnostic record.

The message that is being requested is then discarded (and written to the SCRAPLOG), and the QCF BMP (IQCINSRT) proceeds to the next message. Each type of error is accompanied by a unique reason code that is set in the application interface block reason code field (AIBREASN).

When the IQCINSRT step completes, a report of messages scrapped and grouped by reason code is produced. A report of messages scrapped and grouped by destination name is also produced.

### Related reference:

"IBM IMS Queue Control Facility for z/OS interface" on page 278

## Sample JCL for printing the 6701-MRQE diagnostic records

The following figure shows sample JCL for printing 6701-MRQE records.

### Sample JCL for printing 6701-MRQE records

```

//LOGPRNT JOB
//JOB LIB DD DISP=SHR,DSN=IMS610.RESLIB
//IMSLOG00 EXEC PGM=DFSERA10,REGION=512K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=IMS610.OLDSP0,DISP=SHR
//SYSIN DD *
CONTROL CNTL
OPTION PRINT O=5,V=6701,L=2,C=M,E=DFSERA30
OPTION PRINT O=9,V=MRQE,L=4,T=C,C=E,E=DFSERA30
END
/*

```

## Control blocks logged at time of error (and their mapping macros)

The following table shows the 6701-MRQE diagnostic record control blocks and data areas that are logged if they are available at the time of the error.

*Table 67. Control blocks and data areas logged at time of error for 6701-MRQE records*

| Block   | Description                                                                  | Mapping macro   |
|---------|------------------------------------------------------------------------------|-----------------|
| AIB     | Application interface block                                                  | DFS AIB         |
|         | AIBRETRN, AIBREASN codes                                                     | DFS MRAEQ       |
| CMDMSGP | Command call buffer for browse, load, QSN, query, recover, or unload command | DFS MRQCW (OCO) |

Table 67. Control blocks and data areas logged at time of error for 6701-MRQE records (continued)

| Block     | Description                                                                  | Mapping macro                                                                          |
|-----------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| DFSSQQRY  | Query buffer                                                                 | CQSQRQYT                                                                               |
| I/O AREA  | Input/Output area                                                            | QLOGMSGP                                                                               |
| MRQCMDWK  | Command call buffer for browse, load, QSN, query, recover, or unload command | DFSMRQCW (OCO)                                                                         |
| MRQPREFIX | QCF prefix buffer                                                            | DFSMRQPF                                                                               |
| MRQWORK   | MRQ/QCF work area                                                            | Mapping macro                                                                          |
| MRSELROW  | Include/Exclude work area                                                    | DFSMRQCT (OCO)                                                                         |
| MRSELWK   | Select work buffer                                                           | DFSMRQSW (OCO)                                                                         |
| PCB       | Program communication block                                                  | IDLI TPCBBASE=0,CALLER=IMS                                                             |
| PST/EOB   | Partition specification table / end of block                                 | IDLI PSTBASE=0                                                                         |
| PSTDCA    | DL/I call parameter area                                                     | No DSECT                                                                               |
| QMBA      | Queue manager buffer area                                                    | DFSQMGR FUNC=QDSECT                                                                    |
| QSAPWKAD  | Queue manager work area                                                      | QSAPWKAD                                                                               |
| QTPDST    | Queue manager destination block                                              | ICLI CNTBASE=0, or IAPS<br>SMBASE=0 (CNT/LNB or SMB)<br>DSECT for QAB/TIB not provided |
| REG14-12  | Registers 14 through 12                                                      | No DSECT                                                                               |
| WORKMSG   | Work message buffer                                                          | QLOGMSGP                                                                               |

## Normal errors and their AIBREASN codes

Some errors might be normal. It is important to determine the AIBREASN code, destination name, and other characteristics of the message to determine whether or not the error is normal.

For example, the following AIBREASN codes are considered normal:

### AIBREASN

#### Explanation

#### 00001080

Message destination is an LU 6.2 synchronous logical unit (LU) name and as such is considered nonrecoverable.

#### 00001084

Message destination is nonrecoverable either because the destination transaction code name was defined as NORECOV or the message was received from a LU 6.2 LU in synchronous conversation mode, which implies nonrecoverable.

#### 00001088

Message was already canceled by IMS. Most likely the cause of this is an output message that was canceled when the application program abended or issued a ROLL or ROLB call.

#### 000010A4

The message being passed by IQCINSRT is an internal IMS message that is not recoverable.



00002014

The message is being purged (enqueued to a temporary destination) and the temporary destination name of the message is an inquiry type LTERM.

### **Abnormal errors that can be expected**

Some errors might be expected. It is important to determine the AIBREASN code, destination name, and other characteristics of the message to determine whether or not the error is expected.

For example, when a source or destination name is not found, an error might occur if the system was redefined and the resource name was deleted.

## **Obtaining diagnostics in addition to SCRAPLOG and 6701-MRQE**

When the 6701-MRQE diagnostic records and the SCRAPLOG records do not provide enough diagnostic detail to adequately diagnose a problem, you can obtain additional diagnostic details by issuing the /TRACE SET ON PROGRAM command. /TRACE SET ON *pgmname* causes the logging of additional 6701-MRQB records when the QCF BMP is processing.

When the 6701-MRQE diagnostic records and the SCRAPLOG records do not provide enough diagnostic detail to adequately diagnose a problem, you can obtain additional diagnostic details by issuing the following command:

```
/TRACE SET ON PROGRAM pgmname
```

where *pgmname* is the name of the appropriate MRQPSB.

6701-MRQB diagnostic records are almost identical to 6701-MRQE records, with the exception of MRQB appearing where MRQE normally does. The *pgmname* value is the default QCF PSBNAME. This value might have been overridden on the MSGQUEUE MRQPSBN parameter at system definition. To determine if your installation has overridden the name, either consult with your IMS system administrator or issue the IMS command /DISPLAY PROGRAM MRQPSB.

If PROGRAM MRQPSB displays as an invalid name, your installation has overridden the default MRQPSB. Consult with your system administrator for the correct name for your installation.

The records that are contained in this program are in addition to the existing program trace records logged by DFSDLA30. Records logged by DFSDLA30 are types 6701-LA3A and 6701-LA3B, which contain the TPCB, I/O AREA (64 bytes), and PST control blocks.

With the program trace set on, for each ISRT call to insert a message (or segment of a message), there is an LA3A, MRQB, and LA3B record. For each PURG call (which completes and enqueues a message) there is one LA3A and LA3B log record. If an error is detected while processing either call, an additional MRQE record is logged. The MRQE records are logged regardless of whether the program trace is on when an error is detected.



### Related tasks:

“IMS transaction trace” on page 297

## Determining when messages are successfully queued

Messages that are successfully queued by the Queue Control Facility/Message Requeuer are logged to the OLDS with an identical 01 (input) or 03 (output) log record as the original, except when MSGCFLG3=MSGC3MRQ (that is, message+19=45) is set to indicate that this message was queued by the Queue Control Facility/Message Requeuer.

This flag is propagated to other messages that originate from this message. (That is, if the message is an input transaction message the flag is propagated to the output response messages when the transaction message is processed. Or, if the message is an MSC message, it is propagated to messages in other IMS/MSD systems when the message is sent across the MSC link.)

The following figure shows an input transaction to TRANCODE=TRAN31V0 from LTERM=IMSUS02 that was queued by QCF.

### Sample log record showing successfully queued message

```
01 RECORD
00000000 000000 01EE0000 01C18110 08000055 08000055 01CE1000 E2E8E2F3 40404040 B6AB6CBC *....AA.....SYS3 ..%.*
00000020 000020 C4E84B83 C9D4E2F1 40404040 B7BD992F E30E2241 80000100 00000000 00000000 *DY.CIMS1 ..R.T.....*
00000040 000040 00408100 C8400000 C4E3E2D3 E4F2F0F2 00020000 00000000 00000000 00000001 *. A.H ..DTSLU202.....*
00000060 000060 C9D4E2E4 E2F0F240 E3D9C1D5 F3F1E5F0 00000000 00000000 C4C6E2D4 D6F24040 *IMSUS02 TRAN31V0.....DFSM02 *
00000080 000080 00108600 014E7C00 00000000 00000000 00168800 C9D4E2E4 E2F0F240 40404040 *..F..+.....H.IMSUS02 *
000000A0 0000A0 40404040 E4000018 89000000 000086AB 6CBCC4EA CD030000 00000000 00000018 * U...I.....%D.....*
000000C0 0000C0 8A002001 304F2301 19573676 032D0000 80000000 00000068 8B000000 00000000 *.....|.....*
000000E0 0000E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
00000100 000100 00000000 000A0000 00000000 00000000 00000000 000A0024 000AE2E8 E2F34040 *.....SYS3 *
00000120 000120 4040B6AB 6CBCC4E8 4B830000 00000000 00000000 00000000 00000000 00000090 * ..%.DY.C.....*
00000140 000140 8C000000 000A0000 00000000 0003E3D9 C1D5F3F1 E5F0C9D4 E2E4E2F0 F240240A *.....TRAN31V0IMSUS02 ..*
00000160 000160 014C0008 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.<.....*
00000180 000180 00000810 00000000 00000000 00000000 00000000 01E3D9C1 D5F3F1E5 F0404040 *.....TRAN31V0 *
000001A0 0001A0 40404040 00000000 00000000 00000000 00100000 00000000 00000000 00000000 **
000001C0 0001C0 00000000 00000000 00000000 00000010 0301E3D9 C1D5F3F1 E5F040C8 C94BB7BD *.....TRAN31V0 HI...*
000001E0 0001E0 992FE30F C9610000 00000000 021B *R.T.I/.....*
```

## Diagnosing message routing problems

User exits are consolidated into user exit DFSMSCE0. Several traces, messages, and information fields in the message prefix area can be used to diagnose message routing problems in the user exits and in IMS.

### DFS070 UNABLE TO ROUTE MESSAGE RSN=xxxy

Message DFS070 is issued when any one of three conditions occur.

- IMS attempts to enqueue a message.
- These TM/MSD exits attempt to reroute a message:
  - DFSMSCE0–Message Routing.
  - DFSMSTR0–Terminal Routing.
- A /FORMAT command is entered and an error is encountered while routing a message.

### DFS070 diagnostic message

Diagnostic messages from DFS070 are described.

Here is an example of the DFS070 diagnostic message:

DFS070 UNABLE TO ROUTE MESSAGE RSN=0104

The RSN code identifies the module that issued the message (01 = DFSICIO0) and the reason for the error (04 = Prefix buffer length is too large).

In this case DFSICIO0 called the message generator (DFSCLMR0) with R1 = 00680046.

Where x'00680046' = module identifier, reason code,message key  
                           x'0068' = 0104 (decimal)  
                                   01 = Module that issued message = DFSICIO0  
                                   04 = Prefix buffer length is too large  
                           x'0046 = 70 (decimal) = DFS070 MESSAGE KEY

The following table shows:

- The label used for the module identifier
- The module identifier
- The module function or name

The labels shown in the following table can be used to scan the module source code to locate where the message was issued from.

*Table 68. DFS070 module identifier table*

| Label  | Default module identifier | Function (module name)               |
|--------|---------------------------|--------------------------------------|
| MSUK   | 00                        | Unknown module or DFSMSCEC requestor |
| MSTR   | 01                        | DC Communication Manager (DFSICIO0)  |
| MSTRAP | 02                        | LU 6.2 Receive LU Manager (DFSRLM10) |
| MSTROT | 03                        | OTMA Receive LU Manager (DFSYTIB0)   |
| MSPR   | 04                        | DC Call Handler (DFSDLA30)           |
| MSLR   | 05                        | MSC Analyzer (DFSCMS00)              |
| MSFM   | 06                        | /FORMAT Command Processor (DFSICLK0) |
| MSTE   | 08                        | IMS Termination (DFSTRM00)           |
| MSINIT | 10                        | IMS Initialization (DFSINB0)         |

The following table shows:

- The label used for the reason code
- The reason code value
- The description of the error

The labels shown in the following table can be used to scan the module source code to locate where the message was issued from.

Table 69. DFS070 reason (RSN) codes table

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PFXUPRER | 02/02                                  | <p>User requested 2 user prefix segments (code 8E).</p> <p>Programmer response: The routine that was setting up to call the DFSMSCE0 user exit determined that a user prefix segment had already been obtained. The programmer may need to turn on the DFSMSCE0 trace to determine which routine is setting the field, MSCEUPR (DFSMSCEP) or the flag MSCEB2RET (DFSMSCEB).</p>             |
| PFXIPRER | 03/03                                  | <p>User requested two Workload router prefix segments (code 8F).</p> <p>Programmer response: The routine that was setting up to call the DFSMSCE0 user exit determined that a user prefix segment had already been obtained. The programmer may need to turn on the DFSMSCE0 trace to determine which routine is setting the field MSCEUPR (DFSMSCEP) or the flag MSCEB2RET (DFSMSCEB).</p> |
| PFTOOBIG | 04/04                                  | <p>Prefix buffer length is too large.</p> <p>Programmer response: The user prefix segment size field MSCEUPRL (DFSMSCEP) or the workload router prefix segment size field MSCEIPRL (DFSMSCEP) is greater than 512. The programmer may need to turn on the DFSMSCE0 trace to determine which routine is setting the field MSCEUPR or MSCEIPR (DFSMSCEP) to a value larger than 512.</p>      |
| GBPFER   | 05/05                                  | <p>DFSPOOL error on get prefix buffer.</p> <p>Programmer response: Failure to get storage for the user prefix segment or the workload router prefix segment through the DFSPOOL macro from the HIOP pool.</p>                                                                                                                                                                               |
| URCERR1  | 06/06                                  | <p>User exit return code negative.</p> <p>Programmer response: User exit DFSMSCE0 returned a negative return code.</p>                                                                                                                                                                                                                                                                      |
| URCERR2  | 07/07                                  | <p>DFSBCB error getting BCB block.</p> <p>Programmer response: User exit DFSMSCE0 returned a negative return code returned an invalid return code.</p>                                                                                                                                                                                                                                      |
| GMSBERR  | 08/08                                  | <p>DFSBCB error getting BCB block.</p> <p>Programmer response: Failure to get storage for the MSEB block through the DFSBCB macro.</p>                                                                                                                                                                                                                                                      |
| LRBADSID | 09/09                                  | <p>Bad SYSID detected.</p> <p>Programmer response: In getting the address for the LNB that is associated with either the origin SID or the SID that is specified by the caller, a bad SYSID was detected.</p>                                                                                                                                                                               |

Table 69. DFS070 reason (RSN) codes table (continued)

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IPFX     | 10/0A                                  | Queue Manager insert prefix error.<br><br>Programmer response: In an effort to update the MESSAGE PREFIX (01/03) log record, a prefix update call was made (DFSQMGR0) to add the user prefix segment or the workload router segment, or both. The prefix update routine was unable to add the segment.                                                                                                                                                                                                                |
| ICLR1ERR | 11/0B                                  | Non zero return code from DFSICLR1 (DFSICLR0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| AVMLKERR | 12/0C                                  | Destination is an invalid type for AVM/ISC link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| MSCEFL1E | 15/0F                                  | DFSMSCEC user exit routing flag is in error.<br><br>Programmer response: An invalid option was requested for the user routing exit flag 1 (MSTRFL1/MSLRFL1/MSPRFL1). Refer to the DFSMSCEP macro for valid options. Check the user exit parameter in the 6701-MSCE record to determine which option was requested. These options are usually set by IMS code.                                                                                                                                                         |
| USRXIFER | 16/10                                  | DFSUSRX interface error.<br><br>Programmer response: The macro DFSMSCEC invoking DFSUSRX0 through the DFSUSRX macro received a non-zero return code. The value is in field MSCEBRC in the DFSMSCEB block. Possible values returned are:<br><ol style="list-style-type: none"> <li>04 the user exit routine specified has not been defined (the address in UXDT is zero)</li> <li>Unable to get an interface block using the DFSBCB macro. DFSBCB return code is in field, MSCEBSSRC in the DFSMSCEB block.</li> </ol> |
| IONAMCHG | 18/12                                  | User exit changed the destination name of the I/O PCB message.<br><br>Programmer response: The user exit (DFSMSCE0) set flag MSPR2CHG in field MSPRFL2 to request that the destination name MSPRDEST be changed. The PCB is the I/O PCB that cannot be changed. Check the user exit parameter in the 6701-MSCE record to determine which option was requested.                                                                                                                                                        |
| IOROUTE  | 19/13                                  | User exit requested reroute I/O PCB message.<br><br>Programmer response: The user exit DFSMSCE0 requested a routing option of MSPR2RMT, /MSPR2LSQ, /MSPR2SRC, /MSPR2NDR in field MSPRFL2. This is invalid if the PCB is the I/O PCB.<br><br>Refer to the user exit parameter in the 6701-MSCE record to determine which command was requested.                                                                                                                                                                        |

Table 69. DFS070 reason (RSN) codes table (continued)

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CMDINV   | 20/14                                  | <p>User exit changed the destination name to a command (such as: /CMDVERB).</p> <p>Programmer response: The user exit DFSMSCE0 changed the destination name to a command.</p> <p>Refer to the user exit parameter in the 6701-MSCE record to determine which command was requested.</p>                                                                                                                                     |
| SQGINV   | 21/15                                  | <p>User Link receive exit override MSNAME in segment because destination is not an MSNAME.</p> <p>Programmer response: User exit DFSMSCE0 in a shared queues group link receive exit failed due to the destination not being an MSNAME.</p>                                                                                                                                                                                 |
| REGFAIL  | 22/16                                  | <p>Local shared queue registration (DFSSQIF FUNC=INFRM) failed for the transaction when the user exit requested MSLR2LSQ=1 or MSTR2LSQ=1.</p>                                                                                                                                                                                                                                                                               |
| NOTRANCD | 23/17                                  | <p>Terminal routing exit routed the message to a remote IMS (MSTR2RMT=1) but the destination type at MSTRDEST is an unsupported TRANCODE (such as remote routing is not allowed for LTERM or FAST PATH exclusive TRANCODE).</p>                                                                                                                                                                                             |
| DSIDINV  | 24/18                                  | <p>The Terminal, Link Receive or the Program Routing exit returned an invalid destination SYSID (for example, either field MSTRDSID, MSLRDSID, or MSPRDSID is invalid).</p>                                                                                                                                                                                                                                                 |
| DMSNINV  | 25/19                                  | <p>The Terminal, Link Receive, or Program routing exit returned an invalid destination MSNAME (for example: either field, MSTRDMSN, MSLRDMSN, or MSPRDMSN is invalid).</p>                                                                                                                                                                                                                                                  |
| SSIDINV  | 26/1A                                  | <p>The Link Receive exit rerouted an intermediate message (MSLR1INT=1) to this local IMS by setting MSLR2LOC=1, but the message had an invalid return (source) SYSID so this IMS could not accept it locally.</p>                                                                                                                                                                                                           |
| RMT2INV  | 27/1B                                  | <p>The Terminal, Link Receive, or Program routing exit indicated routing the message to a remote MSC link by setting MSTR2RMT, MSLR2RMT, or MSPR2RMT; however, the exit did not set either of the corresponding destination SYSID or MSNAME fields (for example, either MSTRDSID, MSLRDSID, or MSPRDSID was left set to zero, or MSTRDMSN, MSLRDMSN, or MSPRDMSN was left set to blanks).</p>                               |
| SRC2INV  | 28/1C                                  | <p>The Program routing exit requested the message be routed to the source MSC system by setting MSPR2SRC=1 however the message cannot be routed because either:</p> <ul style="list-style-type: none"> <li>• MSC is not available.</li> <li>• Or the source SYSID is not valid because the application program has not issued a get unique (GU).</li> <li>• The application program is a non-message driven BMP.</li> </ul> |

Table 69. DFS070 reason (RSN) codes table (continued)

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                                                                                                                                                                                                                                                                                                              |
|----------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NDR2INV  | 29/1D                                  | <p>The Program Routing exit requested a direct routing message be overridden by setting MSPR2NDR=1; however, either:</p> <ul style="list-style-type: none"> <li>• MSC is not available.</li> <li>• This is not a direct routed message with a MSNAME destination.</li> <li>• The overriding name in the front of the I/O area is not valid.</li> </ul>                                   |
| RMT2FSR  | 30/1E                                  | <p>The Terminal routing exit indicated to route the message to a remote MSC link by setting MSTR2RMT=1, but the input ISC node was set to process the message as a Front End Switch message by the user Front End Switch exit (DFSFEBJ0). Front End Switch messages cannot be routed to MSC links.</p>                                                                                   |
| RSPROUTE | 31/1F                                  | <p>The Link receive exit requested that a response message (MSLR1RSP=1) be rerouted by either setting one of the MSLRFL2 reroute flags. Response messages may not be rerouted.</p>                                                                                                                                                                                                       |
| INBCHGID | 33/21                                  | <p>CHANGEID not supported.</p> <p>Programmer response: The user exit (DFSMSCE0) did not use the DFSMSCSV macro or generate module entry code. IMS initialization expects a branch instruction around the character information of entry code.</p> <p>Refer to the sample version of the provided user exit DFSMSCE0's use of DFSMSCSV for more information.</p>                          |
| INBIDLNG | 35/23                                  | <p>Character string 'VECTOR' not present.</p> <p>Programmer response: The user exit (DFSMSCE0) did not use the DFSMSCSV macro or generate module entry code. IMS initialization expects the entry code to contain a length of the module entry code at a given offset.</p> <p>Refer to the sample version of the provided user exit DFSMSCE0's use of DFSMSCSV for more information.</p> |
| INBNVECT | 35/23                                  | <p>Character string 'VECTOR' not present.</p> <p>Programmer response: The user exit DFSMSCE0 did not use the DFSMSCSV macro or module entry code to provide the character string "VECTOR" in its entry code.</p> <p>Refer to the sample version of the user exit DFSMSCE0's use of DFSMSCSV for more information.</p>                                                                    |

Table 69. DFS070 reason (RSN) codes table (continued)

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PFXUINVA | 36/24                                  | <p>Upon return from the user exit IMS detected that the user prefix at MSCEUPR is invalid.</p> <p>Possible causes are:</p> <ul style="list-style-type: none"> <li>Length not in range of 5 to 512 bytes.</li> <li>Address of prefix is invalid. Must be address obtained by IMS or within HIOP pool.</li> <li>Length has been changed (MSCEBUPRL).</li> <li>Address of user exit prefix has changed (MSCEBUPR).</li> <li>Prefix code not 8E.</li> </ul> <p>The programmer may need to turn on the DFSMSCE0 trace to trace the fields MSCEBUPR and MSCEBUPRL within the DFSMSCEB block.</p>                 |
| PFXIINVA | 37/25                                  | <p>Upon return from the user exit, IMS detected the Workload Router prefix at MSCEIPR is invalid.</p> <p>Programmer response:</p> <ul style="list-style-type: none"> <li>Length not in range of 5 to 512 bytes.</li> <li>Address of prefix is invalid. Must be address obtained by IMS or within HIOP pool.</li> <li>Length has been changed (MSCEBIPRL).</li> <li>Address of workload router prefix has changed (MSCEBIPR).</li> <li>Prefix code is not 8F.</li> </ul> <p>The programmer may need to turn on the DFSMSCE0 trace to trace the fields MSCEBIPR and MSCEBIPRL within the DFSMSCEB block.</p> |
| EXIOVLAY | 38/26                                  | <p>User exit overlaid the 512 byte user work area buffer.</p> <p>Programmer response: The user exit DFSMSCE0 appears to have overlaid the 512 byte workarea.</p> <p>The overlay character string SCDSMCON is inserted at the end of the 512 byte workarea MSEBIBOV before calling the user exit DFSMSCE0 and is checked on return.</p> <p>Refer to the user exit DFSMSCEB in the 6701-MSCE record to help determine the overlay.</p>                                                                                                                                                                       |
| EXBOVLAY | 39/27                                  | <p>User exit overlaid the MSEB BCB block name (Overlay Check).</p> <p>Programmer response: The user exit (DFSMSCE0) appears to have overlaid the DFSMSCEB block. The DFSBCB system service inserts a character string (MSEB) at the end of the DFSMSCEB block. IMS will abend when the DFSMSCEB block is returned by way of a DFSBCB release request. The DFS070 message will assist in determining when the overlay occurred.</p> <p>Refer to the user exit parameter in the 6701-MSCE record to help determine the overlay.</p>                                                                          |

Table 69. DFS070 reason (RSN) codes table (continued)

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXPOVLAY | 40/28                                  | <p>User exit overlaid the parameter list (Overlay Check).</p> <p>Programmer response: The user exit DFSMSCE0 appears to have overlaid the user exit parameter list (DFSMSCEP). The overlay character string SCDSMCON is inserted at the end of the parameter list DFSMSCEP before calling the user exit DFSMSCE0 and is checked on return.</p> <p>Refer to the user exit parameter in the 6701-MSCE record to help determine the overlay.</p> |

Codes 41 thru 52, shown in the following table, apply to the /FORMAT command.

Table 70. DFS070 reason (RSN) codes table for the /FORMAT command

| Label    | Reason code<br>decimal/<br>hexadecimal | Description                                                                                   |
|----------|----------------------------------------|-----------------------------------------------------------------------------------------------|
| FMFND    | 41/29                                  | The CNT for the terminal to be formatted was not found.                                       |
| FMRCNT   | 42/2A                                  | The specified terminal is a remote LTERM.                                                     |
| FMDLNB   | 43/2B                                  | The specified terminal is a dynamic MSNAME (LNB).                                             |
| FMMFST   | 44/2C                                  | The destination terminal (different from the input terminal) is not MFS-formatted.            |
| FMLRESMD | 45/2D                                  | The destination terminal is in line response mode.                                            |
| FMTRESMD | 46/2E                                  | The destination terminal is in terminal response mode.                                        |
| FMCONV   | 47/2F                                  | Conversation is active on the destination terminal (when LTERM was specified in the command). |
| FMINP    | 48/30                                  | The terminal is in input mode only.                                                           |
| FMEXCL   | 49/31                                  | The terminal was in exclusive mode (when LTERM was specified in the command).                 |
| FMQBUF   | 50/32                                  | The call to Queue Manager failed for a PUT LOCATE call.                                       |
| FMIPREF  | 51/33                                  | The INSERT PREFIX call to Queue Manager failed.                                               |
| FMMSGNR  | 52/34                                  | The call to enqueue the message failed.                                                       |

## DFSMSCE0 TM/MSCE Message Routing exit trace

The DFSMSCE0 TM/MSCE Message Routing exit trace can be activated individually for each exit entry point that processes a message routing request. This trace is useful for diagnosing problems in both the user exit and in IMS.

The DFSMSCE0 TM/MSCE Message Routing Exit trace writes a 6701-MSEA log record when the exit is entered, and a 6701-MSEB log record when the exit returns to IMS to process the reroute request. The following information is traced:

- Exit parameter area, DFSMSCEP
- 512 byte work area
- Message



- Message prefix
- Message segment being inserted
- Other work area storage

## Displaying DFSMSCE0 trace status

Use the /DISPLAY TRACE EXIT command to display the DFSMSCE0 trace status.

To display the DFSMSCE0 trace status, issue the following command:

```
/DISPLAY TRACE EXIT
```

The display will show ON, OFF, or N/A for each DFSMSCE0 trace entry point.

## Starting and stopping the DFSMSCE0 trace

To start or stop the DFSMSCE0 trace, issue one of the /TRACE commands.

```
/TRACE SET (ON|OFF) EXIT (DFSMSCE0) (ALL|TRBT|TRVT|TR62|
 TROT|LRTR|LRLT|LRIN|
 LRDI|PRCH|PRIS)
```

Any combination of TRBT, TRVT, TR62, TROT, LRTR, LRLT, LRIN, LRDI, PRCH, and PRIS is valid.

## DFS081 trace exit command unsuccessful RSN=xyxy message

Message DFS081 is issued for a variety of reasons. The module identifier and function name are listed as well as the reason codes and descriptions.

This message is issued when one or more of the following scenarios occurs:

- IMS attempts to enqueue a message.
- The following user exits attempt to reroute a message:
  - The TM/MSC message routing exit, DFSMSCE0.
  - The Terminal Routing exit, DFSMSTR0.
- A /FORMAT command was entered.
- An error was encountered while routing the message.

Table 71. DFS081 module identifier table

| Label | Module identifier<br>(decimal) | Function (module name)             |
|-------|--------------------------------|------------------------------------|
| ICLN  | 01                             | Trace Command Processor (DFSICLN5) |

The following table shows:

- The label used for the reason code
- The reason code value
- The description of the error

The labels shown in the following table can be used to scan the module source code to locate where the message was issued from.

Table 72. DFS081 reason (RSN) codes table

| Label  | Reason code<br>decimal/<br>hexadecimal | Description                                    |
|--------|----------------------------------------|------------------------------------------------|
| EXTIKW | 01/01                                  | Invalid keyword for trace exit                 |
| EXTIPT | 02/02                                  | Invalid parameter type for trace exit command. |

Table 72. DFS081 reason (RSN) codes table (continued)

| Label  | Reason code<br>decimal/<br>hexadecimal | Description                                                        |
|--------|----------------------------------------|--------------------------------------------------------------------|
| EXTNPT | 03/03                                  | No parameter type was specified for trace exit command.            |
| EXTMPT | 04/04                                  | Multiple parameter types for trace exit command.                   |
| EXTMCB | 05/05                                  | Missing DFSMSCB control block for the trace exit DFSMSCE0 command. |
| EXTIPS | 06/06                                  | Invalid parameter subtype for the trace exit command.              |
| EXTENS | 07/07                                  | Trace exit is not supported for this environment.                  |
| EXTENL | 09/09                                  | Required exit is not loaded for start trace command.               |
| EXTSCF | 10/0A                                  | System command failure.                                            |
| EXTIPL | 11/0B                                  | Invalid parameter length.                                          |

### DFS070 diagnostic message:

This is an example of the DFS070 diagnostic message.

DFS070 UNABLE TO ROUTE MESSAGE RSN=0104

The RSN code identifies the module that issued the message (01 = DFSICIO0) and the reason for the error (04 = Prefix buffer length is too large).

In this case DFSICIO0 called the message generator (DFSCLMR0) with R1 = 00680046.

Where x'00680046' = module identifier, reason code,message key  
                           x'0068' = 0104 (decimal)  
                                   01 = Module that issued message = DFSICIO0  
                                   04 = Prefix buffer length is too large  
                           x'0046' = 70 (decimal) = DFS070 MESSAGE KEY

The following table shows:

- The label used for the module identifier
- The identifier
- The module function or name

The labels shown in the following table can be used to scan the module source code to locate where the message was issued from.

### Contents of the DFSMSCE0 trace records

DFSMSCE0 records are type X'6701' with a trace ID of MSEA (entry) or MSEB (exit).

Refer to the DFSMSCEB macro for contents of the MSCEB block.

#### PROGRAM ROUTING

- MSCEB (Message routing exit interface block)  
(CHNG/ISRT call)
- PCB (CHNG/ISRT call)
- MESSAGE PREFIX (CHNG/ISRT call)
- MESSAGE SEGMENT (ISRT call) maximum of 256 bytes

#### LINK RECEIVE

- MSCEB (Message routing exit interface block)
- MESSAGE PREFIX

#### TERMINAL ROUTING

- MSCEB (Message routing exit interface block)
- MESSAGE SEGMENT maximum of 256 bytes

**Important:** To assist in diagnosing DFSMSCE0 exit problems, the MSCEB block will maintain the following information:

- 8-byte eye catcher 'DFSMSCEB'
- 4-byte Routing exit type:  
TRTB|TRVT|TR62|TROT|LRTR|LRLT|LRIN|LRDI|PRCH|PRIS
- 4 byte Address of ECB
- 4 byte Address of interface block
- 4 byte Address of DFSMSCE0 exit parameter list

## Diagnosing routing errors by using the transaction trace or program trace

The transaction trace or program trace can be used to diagnose routing error problems that are related to the user program routing exit DFSMSCE0.

By setting this trace on for a transaction or program, IMS logs a 6701-LA3A record at entry to DFSDLA30, and a 6701-LA3B when DFSDLA30 returns to the application program. In addition IMS logs a 6701-MSEA record when the exit is entered, and a 6701-MSEB when the exit returns to IMS. IMS also logs a 6701-MSCE error record, for each DFSMSCE0 related routing error.

Module DFSDLA30 receives control for every user application program call to a TPPCB (such as an I/O TPPCB or an alternate TPPCB). The DFSMSCE0 routing exit can be tailored to receive control for the first ISRT call of each new message to an I/O TPPCB or alternate TPPCB, or for each CHNG call to a alternate modifiable TPPCB.

For example, if the transaction trace is active for TRANA, and a TRANA message is processed and the user application program issues a ISRT to an alternate TPPCB, and the DFSMSCE0 exit is being used to route ISRT calls, IMS traces the following records with this command:

```
/TRACE SET ON TRANSACTION transaction_name
6701-LA3A - DFSDLA30 called to process ISRT call
6701-MSEA - DFSMSCE0 called to process ISRT route
6701-MSEB - DFSMSCE0 returns
6701-MSCE - Logged if routing error detected, even if tran/prog trace
 is not active
6701-LA3B - DFSDLA30 returns (ISRT/route processed)
```

To trace the DL/I portion of data communication for a specific program, issue the following command:

```
/TRACE SET ON PROGRAM program_name
```

For program routing exit (DFSMSCE0) call errors, TPPCB status, AIBRETRN, and AIBREASN codes are set.

#### Related tasks:

"IMS transaction trace" on page 297

### TPCB STATUS, AIBRETRN, and AIBREASN codes for DFSDLA30 routing errors

The TPCB STATUS, AIBRETRN, and AIBREASN codes for DFSDLA30 routing errors are listed and described.

TPCB STATUS, AIBRETRN, and AIBREASN codes for DFSDLA30 routing errors are given in the following format:

| TPCBSTAT | AIBRETRN | AIBREASN       | COMMENTS                              |
|----------|----------|----------------|---------------------------------------|
| A1       | 00000104 | MSERQINV(0560) | EXIT ROUTE REQUEST INVALID (DFSMSCE0) |

The complete list of return and reason codes is available in the DFSAIBEQ macro.

## Diagnosing routing problems by using the DC LINE/NODE/LINK TRACE

The DC trace traces line, node, and MSC link activity. It can be used in conjunction with the DFSMSCE0 exit trace to diagnose message routing problems in the terminal routing, input message routing, and link receive exits.

These traces log 6701 log records with a variety of trace IDs (such as: 6701-A01). If any of these traces is active, IMS logs a 6701-MSEA record when the message routing exit is called and a 6701-MSEB log record when the exit returns. For example, if the node trace is active, the following trace records are logged:

6701-A01 - DC analyzer (DFSICI00) is called to process the message  
LINK the DFSMSCE0 trace will log X'6701' records with a  
trace ID of MSEA (entry) or MSEB (exit) for terminal  
routing or link receive. Refer to DFSMSCEB macro for  
the contents of the MSCEB block.

6701-MSEA - DFSMSCE0 called to process the message

6701-MSEB - DFSMSCE0 returns

6701-MSCE - Logged if routing error detected, even if the line, node,  
or link trace is not active

6701-A03 - DC Analyzer determines what to do next

## Using 01/03 log record trace

The 01/03 log record trace reflects the user exit routines called and the user options requested by the various user exits.

A double word trace to reflect the user routing request is included in the Transaction Management Router Segment of the 01/03 log records. The trace reflects:

BYTE 1 - user parameter list (DFSMSCEP) flag 1  
indicates the user routing exits called.

BYTE 2-3 - User Terminal Routing flags 2 and 3  
(DFSMSCEP MSTRFL2 and MSTRFL3) indicates  
the user Terminal Routing options.

BYTE 4-5 - User Link Receive Routing flags 2 and 3  
(DFSMSCEP MSLRFL2 and MSLRFL3) indicates  
the user LINK Routing options.

BYTE 6-7 - User Program Routing flags 2 and 3  
(DFSMSCEP MSPRFL2 and MSPRFL3) indicates  
the user Program Routing options.

BYTE 8 - Currently unused

---

## IMS transaction trace

The IMS transaction trace writes entries to the IMS log at entry to and exit from the DC call analyzer (DFSCLA30).

### Starting the trace

To start the trace, issue one of the two following /TRACE commands.

To trace the DL/I portion of data communication for a specific transaction:

/TRACE SET ON TRAN transaction name

To trace the DL/I portion of data communication for a specific program:

/TRACE SET ON PROGRAM program name

### Content of the trace records

DFSCLA30 records are type X'6701' with a trace ID of LA3A (entry) or LA3B (exit). They contain:

- PCB
- Maximum of 64 bytes of the I/O area
- MODNAME
- PST
- SMB of the transaction (if the program in the IMS control region is an MPP or a message driven BMP)

The PCB and PST areas are always logged. The I/O area, MODNAME, and SMB are additional areas that are logged when available and applicable to the call type:

- The I/O area can be logged only on entry or exit. For example, a GN call logs the I/O area on exit, while an ISRT call logs the I/O area on entry. Depending on the call type, the I/O area can be logged on both entry and exit.
- The MODNAME is logged only on an entry trace.
- The SMB is logged on both the entry and exit traces.

Field PSTSYNFC in the PST contains the following calls:

|    |                                            |
|----|--------------------------------------------|
| 04 | ABTERM IN PROGRESS                         |
| 08 | SYNC POINT PHASE 1                         |
| 0C | SYNC POINT PHASE 2                         |
| 10 | PURGE TP PCBS                              |
| 14 | PHASE 1 SYNC POINT ENQ OUTPUT TO TEMP DEST |
| 18 | ROLB CALL                                  |
| 1C | INVALID ABENDU0820                         |
| 20 | ABORT                                      |

Field PSTFUNCT in the PST contains the following calls:

|    |    |
|----|----|
| 01 | GU |
|----|----|

03 GN  
41 ISRT  
50 SETO  
67 INQY  
83 CHNG  
85 CHKP  
87 CMD  
88 GCMD  
89 ROLB  
8A ROLS  
8C SETS  
8F AUTH  
90 PURG

The following figure is an example of a IMS transaction trace.

### Example of IMS transaction trace records

```
INTERNAL TRACE RECORD ID = LA3A SEGNO=00 RECNO = 0000009A TIME 07.45.06.42 DATE 93.014
PCB
0271B084 000000 00300038 00010018 40404040 40404040 006DD054 00000000 00009F58 C9D6D7C3 *....._.....IOPC*
0271B0A4 000020 C2404040 00000000 00000000 00000000 00000000 0271B084 E6E3D6D9 40404040 *BDWTOR *
0271B0C4 000040 12004040 0093014F 0745063F 00000006 40404040 40404040 40404040 *..L..... *
0271B0E4 000060 40404040 40404040 * *
I/O AREA
02825000 000000 00340000 C3E4E2E3 D6D4C5D9 40D9C5D8 E4C5E2E3 E240C9D5 C6D6D9D4 C1E3C9D6 *....CUSTOMER REQUESTS INFORMATIO*
02825020 000020 D540D6D5 40D7C1F2 F860F1F6 F140D4D6 C4C5D3E2 00000000 00000000 00000000 *N ON PA28-161 MODELS.....*
MODNAME
82825850 000000 D4D6C4F4 F0F0F4F2 *MOD40042 *
SMB
027CA754 000000 00000000 00000000 00000000 00000000 00000000 00810075 00020002 D7C1D9E3 *.....A.....PART*
027CA774 000020 40404040 41416000 0700A704 FFFFFFFF 00000002 FFFFFFFF 00001D1D 027D5410 *..X.....'...' *
027CA794 000040 00000000 0100FFFF 0000FFFF 00000000 027CA7C8 00000000 C4C6E2E2 C1D4F0F2 *.....@XH....DFSSAM02*
027CA7B4 000060 40404040 40404040 00000000 * *
PST
0271B060 000000 00000000 82801A39 02978C04 02CB51DC 00000000 00000000 00000000 00000000 *...B...P.....*
0271B080 000020 02819040 00300038 00010018 40404040 40404040 006DD054 00000000 00009F58 *..A....._.....IOPC*
0271B0A0 000040 C9D6D7C3 C2404040 00000000 00000000 00000000 00000000 0271B084 E6E3D6D9 *IOPCBDWTOR*
0271B0C0 000060 40404040 12004040 0093014F 0745063F 00000006 40404040 40404040 40404040 *..L..... *
0271B0E0 000080 40404040 40404040 40404040 00000000 00000000 00000000 02C5A758 00000000 *.....EX..... *
0271B100 0000A0 00000000 00000000 04000002 02CB5148 00000000 027CA754 0094000E 01420080 *.....@X..M..... *
0271B120 0000C0 02CB5138 04000002 00000000 00000001 00000001 00000000 02825840 0280E610 *.....B...W... *
0271B140 0000E0 006D3D08 00000000 00000000 00000000 0275DC40 00000000 00000080 00000000 *.....B&;..... *
0271B160 000100 00000000 028BB020 01020304 00000000 00000000 00000000 D4D7D740 40404040 *.....MPP *
0271B180 000120 D4D7D740 40404040 00000000 00000000 00000000 00000000 00000000 00000000 *MPP *
0271B1A0 000140 00000000 00000000 00000000 00000001 00000000 00000000 00000001 00000000 *..... *
0271B1C0 000160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0271B1E0 000180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 028258A8 *.....B.Y*
0271B200 0001A0 00000000 00000000 C5C0FFFF 8A000000 C9E2D9E3 4140BA07 0271B084 00000000 *.....E.....ISRT...D... *
0271B220 0001C0 00000002 00C53D20 00000000 00000000 00000000 00000000 00000000 00000000 *.....E..... *
0271B240 0001E0 00000000 00000000 000000A0 02000000 00000000 00000000 00000000 00000000 *..... *
0271B260 000200 00000000 00000000 8299C762 00000000 00000000 00000000 00000000 00000000 *.....BRG..... *
0271B280 000220 00000000 00000000 00000000 0290B210 00000000 00000000 00000000 00000000 *..... *
0271B2A0 000240 00000000 00000000 00000000 00000000 00000000 00000002 000E0300 02825000 *.....B&; *
0271B2C0 000260 00000000 00000000 027573A4 00000000 00000000 00000000 00000000 00000000 *.....U..... *
0271B2E0 000280 C9E2D9E3 *ISRT *
INTERNAL TRACE RECORD ID = LA3A SEGNO=01 RECNO = 0000009B TIME 07.45.06.42 DATE 93.014
CONTINUE
0271B2E4 000284 00000000 00000000 00000000 0271B084 00000000 00000000 00000000 00000000 *.....D..... *
0271B304 0002A4 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0271B324 0002C4 00000000 00000000 00000000 00000004 00F76180 00000000 00000840 00000000 *.....7/..... *
0271B344 0002E4 00011C00 0271B3D8 10000000 00000000 00000000 00008000 C0808000 24008000 *.....Q..... *
0271B364 000304 00000000 00000000 00000000 0275DC54 00000000 00000000 00000000 00000000 *..... *
0271B384 000324 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0271B3A4 000344 SAME AS ABOVE
0271B3C4 000364 00000000 00000000 00000000 00000BC8 08000000 0271B060 00000000 00000000 *.....H.....-..... *
0271B3E4 000384 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0271B404 0003A4 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....B.Y..... *
0271B424 0003C4 00000000 00000000 026DE040 00004B00 000E15E6 00196FF2 00000000 00000000 *....._.....W..72..... *
0271B444 0003E4 00000000 00000000 00000000 00000000 00000000 00000000 028BB000 00000000 *..... *
0271B464 000404 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *..... *
0271B484 000424 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0275D83B *.....Q..... *
```

|          |        |          |          |          |          |          |          |          |          |                                    |
|----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|------------------------------------|
| 0271B4A4 | 000444 | 0275D73C | 00000000 | 07004040 | 40404040 | 00000000 | 00000000 | 00000000 | 0275DA3C | *..P.....*                         |
| 0271B4C4 | 000464 | 00000000 | 0275D83C | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....Q.....*                      |
| 0271B4E4 | 000484 | 00000000 | 028FCA40 | 02759040 | 00000000 | 00C16190 | 00000000 | 0271BC28 | 00000000 | *.....A.....*                      |
| 0271B504 | 0004A4 | 00000000 | 00000000 | 00000000 | 0280E450 | 0280E714 | A6E4A497 | 78F98705 | 00F741B0 | *.....U&..X.WUUP.9G..7.*           |
| 0271B524 | 0004C4 | 026EB048 | 006DD000 | 00340000 | 00000000 | 00800000 | 00000000 | 00000000 | 02CD2469 | *..>.....*                         |
| 0271B544 | 0004E4 | AD2CD246 | 0275DD0C | 00000000 | 00000001 | 00000000 | 00000000 | 0275DD38 | 0271BD18 | *..K.....*                         |
| 0271B564 | 000504 | 00000000 | C4C6E2E2 | C1D4F0F2 | 0280E610 | 00000000 | 00000000 | 000C4040 | 00000000 | *....DFSSAM02..W.....*             |
| 0271B584 | 000524 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*                            |
| 0271B5A4 | 000544 | 00000000 | 00000000 | 02757040 | 00000000 | 00000000 | 00000000 | 569ABC9A | 1D1D014C | *.....*                            |
| 0271B5C4 | 000564 | 00000000 | 00001D1D | 0271B0BC | 00000000 | 014C0000 | E6E3D6D9 | 40404040 | 00000000 | *.....<..WTOR.....*                |
| 0271B5E4 | 000584 | 000056E0 | 00000000 | 00196D3D | 0280E524 | 00000000 | 00000001 | 0000FFFF | 827BEC70 | *.....V.....B#..*                  |
| 0271B604 | 0005A4 | 80000000 | 0271B648 | 829B8A1E | 82978630 | 00000000 | 0271B060 | 827BEC70 | 028BB068 | *.....B...BPF.....-B#..*           |
| 0271B624 | 0005C4 | 0271B060 | 0280E610 | 02825840 | 829B891C | 02825000 | 026EB048 | 00000064 | 00C53D20 | *...-W..B. B.I..B&;>.....E..*      |
| 0271B644 | 0005E4 | 029B81E8 | 00000000 | 0271B600 | 0271B690 | 82978774 | 0297C2FE | 00000000 | 02707540 | *..AY.....BPG..PB.....*            |
| 0271B664 | 000604 | 02825840 | 0271B084 | 02825000 | 82825850 | 02825840 | 829B891C | 82978630 | 0271B060 | *.B. ...D.B&;BB.&;B. B.I.BPF.....* |
| 0271B684 | 000624 | 82978698 | 00C53D20 | 82978630 | 00000000 | 0271B648 | 0271B608 | 8297C424 | 02C45B80 | *BPFQ.E..BPF.....QBPD..D\$.*       |
| 0271B6A4 | 000644 | 00000004 | 02707540 | 0000000C | 0271B084 | 02825000 | 02707554 | 82707598 | 829B891C | *.....D.B&;.....QB.I.*             |

INTERNAL TRACE RECORD ID = LA3A SEGNO=02 RECNO = 0000009C TIME 07.45.06.42 DATE 93.014

CONTINUE

|          |        |               |          |          |           |           |           |          |          |                                   |
|----------|--------|---------------|----------|----------|-----------|-----------|-----------|----------|----------|-----------------------------------|
| 0271B6C4 | 000664 | 0297C488      | 0271B060 | 0297C4A0 | 00C53D20  | 0297C2FE  | 00000000  | 0271B690 | 0271B720 | *.PDH...-PD..E...PB.....*         |
| 0271B6E4 | 000684 | 82C45D79      | 82999060 | 00C53D20 | 0271B060  | 00000410  | 00000584  | 0272E61C | 02707598 | *BD).BR.-.E.....D.W...Q*          |
| 0271B704 | 0006A4 | 02707554      | 0271B6C4 | 0272E5A4 | 0271B060  | 82C45E38  | 00C53D20  | 02C45B80 | 00000000 | *.....D..VU...-BD;..E..D\$.*      |
| 0271B724 | 0006C4 | 0271B6D8      | 0271B768 | 8299B341 | 0299B8AEC | 000E3E8D  | 00003E8D  | 0299AD60 | 000E3E8D | *...Q...BR...R.....R.....*        |
| 0271B744 | 0006E4 | 00000000      | 00000410 | 0271B068 | 8299A28A  | 00C19E00  | 0271B060  | 00C19000 | 00C53D20 | *.....BRS..A.....A..E..*          |
| 0271B764 | 000704 | 82999060      | 00000000 | 0271B720 | 0271B780  | 8299B341  | 0299B8AEC | 00C53D20 | 027BED10 | *BR.-.....BR...R..E...#..*        |
| 0271B784 | 000724 | 0299AD60      | 00C53D20 | 00000000 | 02707540  | 0272E594  | 829B891C  | 0272E078 | 0271B060 | *.R.-.E.....VMB.I.....*           |
| 0271B7A4 | 000744 | 00C19000      | 00C53D20 | 82999060 | 00000000  | 0271B768  | 0271B7F8  | 8299BD25 | 829CE580 | *.A..E..BR.-.....8BR..B.V..*      |
| 0271B7C4 | 000764 | 00C53D20      | 027BED10 | 00000004 | 02707540  | 00000004  | 02707540  | 0272E594 | 829B891C | *.E...#.....VMB.I..*              |
| 0271B7E4 | 000784 | 0272E078      | 0271B060 | 00C19000 | 00C53D20  | 0299B8C2C | 00000000  | 0271B7B0 | 0271B840 | *.....A..E..R.....*               |
| 0271B804 | 0007A4 | 8299B8F7      | 829CA578 | 00C53D20 | 027BED10  | 027BED10  | 00000028  | 0272E604 | 02707588 | *BR..B.V..E...#.....W...H*        |
| 0271B824 | 0007C4 | 02707550      | 0271B848 | 0272E5A4 | 0271B060  | 00C19000  | 00C53D20  | 0299BE12 | 00000000 | *...&;...VU...-A..E..R.....*      |
| 0271B844 | 0007E4 | 0271B7F8      | 0271B888 | 8299BD25 | 829CE580  | 00C53D20  | 027BED10  | 027BED10 | 00000024 | *...8...HBR..B.V..E...#.....*     |
| 0271B864 | 000804 | 00000004      | 02707540 | 0272E594 | 00000832  | 0272E078  | 0271B060  | 00C19000 | 00C53D20 | *.....VM.....A..E..*              |
| 0271B884 | 000824 | 0299B8C2C     | 0271B060 | 0271B840 | 0271B8D0  | 82957237  | 829A19C8  | 00000000 | 0275F260 | *.R.....BN..B..H.....2*           |
| 0271B8A4 | 000844 | C3D5E340      | 000001FF | 02C5A758 | 02C5A758  | 00000000  | 00C34200  | 00C2A1C8 | 0271B060 | *CNT.....EX..EX.....C..B.H.....*  |
| 0271B8C4 | 000864 | 0271B060      | 00C53D20 | 0295703E | 00000000  | 0271B888  | 0271B918  | 829A1AC8 | 029A248E | *...-E...N.....H...B.....*        |
| 0271B8E4 | 000884 | 00000000      | 00F76180 | C3D5E340 | 000001FF  | 02C5A758  | 02C5A758  | 0271B04C | 00000000 | *.....7/.CNT.....EX..EX...<.....* |
| 0271B904 | 0008A4 | 027BEC70      | 0271B060 | 0275F260 | 00C53D20  | 829A19C8  | 00000000  | 0271B8D0 | 0271B960 | *.#.....-2-E..B..H.....*          |
| 0271B924 | 0008C4 | 829A2579      | 829554F8 | 00C53D20 | 00C2A238  | C3D5E340  | 000001FF  | 02C5A758 | 02C5A758 | *B...BN.8.E...BS.CNT.....EX..EX.* |
| 0271B944 | 0008E4 | 00C2A238      | 00000000 | 027BEC70 | 0271B060  | 0275F260  | 00C53D20  | 029A248E | 00000000 | *.BS.....#.....-2-E.....*         |
| 0271B964 | 000904 | 0271B918      | 0271B9A8 | 80115668 | 829CA578  | 000053E8  | 02766910  | 00000000 | 02B54000 | *.....Y...B.V.....Y.....*         |
| 0271B984 | 000924 | 000053E8      | 02766900 | 00000000 | 02766910  | 0271B0EC  | 0271B060  | 02B56260 | 00C53D20 | *...Y.....-.....E..*              |
| 0271B9A4 | 000944 | 00115588      | 00000000 | 0271B960 | 0271B9F0  | 80115668  | 829CA578  | 02B541D8 | 02766910 | *...H.....0...B.V...Q....*        |
| 0271B9C4 | 000964 | 02B541D0      | 00000000 | 02B541D8 | 02766900  | 02B54000  | 02766910  | 0271B0EC | 0271B060 | *.....Q.....*                     |
| 0271B9E4 | 000984 | 00053CE0      | 00C53D20 | 00115588 | 00000000  | 0271B9A8  | 0271BA38  | 80115668 | 829CA578 | *.....E.....H.....Y...B.V..*      |
| 0271BA04 | 0009A4 | 02B541D8      | 02766910 | 02B541D0 | 00000000  | 02B541D8  | 02766900  | 02B54000 | 02766910 | *...Q.....Q.....*                 |
| 0271BA24 | 0009C4 | 0271B0EC      | 0271B060 | 00053CE0 | 00C53D20  | 00115502  | 00000000  | 0271B9F0 | 0271BA80 | *.....-.....E.....0....*          |
| 0271BA44 | 0009E4 | 00000000      | 00000000 | 00000000 | 00000000  | 00000000  | 00000000  | 00000000 | 00000000 | *.....*                           |
| 0271BA64 | 000A04 | SAME AS ABOVE |          |          |           |           |           |          |          |                                   |
| 0271BA84 | 000A24 | 0271BA38      | 0271BAC8 | 00000000 | 00000000  | 00000000  | 00000000  | 00000000 | 00000000 | *.....H.....*                     |

INTERNAL TRACE RECORD

ID = LA3A SEGNO=03 RECNO = 0000009D TIME 07.45.06.42 DATE 93.014

CONTINUE

|          |        |               |          |          |          |          |          |          |          |                   |
|----------|--------|---------------|----------|----------|----------|----------|----------|----------|----------|-------------------|
| 0271BAA4 | 000A44 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BAC4 | 000A64 | 00000000      | 00000000 | 0271BA80 | 0271BB10 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BAE4 | 000A84 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BB04 | 000AA4 | 00000000      | 00000000 | 00000000 | 00000000 | 0271BAC8 | 028041A8 | 00000000 | 00000000 | *.....H...Y.....* |
| 0271BB24 | 000AC4 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BB44 | 000AE4 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 028042C8 | 027579C8 | *.....H...H*      |
| 0271BB64 | 000B04 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BB84 | 000B24 | SAME AS ABOVE |          |          |          |          |          |          |          |                   |
| 0271BBA4 | 000B44 | C4C6E2E2      | C1D4F0F2 | 00000000 | 00000000 | 80000000 | 00000000 | 00000000 | 80801000 | *DFSSAM02.....*   |
| 0271BBC4 | 000B64 | 002A2A00      | 00410000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 0093014F | *.....L.\|.* |
| 0271BBE4 | 000B84 | 0743506F      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *..&?;.....*      |
| 0271BC04 | 000BA4 | 00000000      | 00000000 | 00000000 | 02707540 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BC24 | 000BC4 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 | *.....*           |
| 0271BC44 | 000BE4 | 00000000      |          |          |          |          |          |          |          | *....*            |

## Related concepts:

“Diagnosing routing errors by using the transaction trace or program trace” on page 295

## Related tasks:

“Obtaining diagnostics in addition to SCRAPLOG and 6701-MRQE” on page 284

# Receive-any buffer analysis

While talking with level 1 or level 2 IBM Software Support representatives, you might need to determine if you are out of receive-any (RECANY) buffers. Use either the IMS IPCS panel interface or the manual procedure to help you determine if this is the case. As you proceed through the steps, write down the information you gather.

## IMS IPCS Dump Formatter panel

The IMS IPCS Dump Formatter provides a panel-driven interface to perform analysis.

Using this IMS IPCS Dump Formatter panel, choose the RECANY (receive any) selection in the EDA/TM (Enhanced Dump Analysis/Transaction Manager) option, shown in the following figure, to create an output that contains the RECANY information.

```
----- RECEIVE ANY BUFFERS FORMATTING OPTIONS -- Row 1 to 3 of 3
COMMAND ==> Scroll ==> PAGE

The Receive Any Buffer contains input data that IMS receives from
VTAM terminals.

S = SELECT Select choice plus required ARGument
M = SELECT (minimum data) and hit enter to process. Use UP/DOWN
X = SELECT (maximum data) to scroll.

Cmd Option Type ARG Argument description
v-----vvvvvvvv-----
_ RECANY TYPE All Receive Any Buffers (leave ARG blank)
_ RECANY FILTER Receive Any Buffer filtering option
_ RECANY FILTER ALLOCATE Filter for allocated buffers

***** Bottom of data *****
```

Figure 68. IPCS Dump Formatter EDA/TM option

### Related tasks:

“Manual process to determine receive-any buffers space issues”

## Manual process to determine receive-any buffers space issues

While talking with level 1 or level 2 IBM Software Support representatives, you might need to determine if you are out of receive-any (RECANY) buffers. As you proceed through the steps, write down the information you gather.

1. Find the address of the first RECANY buffer.
  - a. SCD+X'91C' = pointer to the first RECANY buffer (SCDRECPT)
  - b. SCD+X'920' = size of each RECANY buffer (SCDRCSIZ)
  - c. SCD+X'922' = number of RECANY buffers (SCDRCANY)
2. Offset X'04' in the RECANY buffer points to the next RECANY buffer. You can follow the chain of RECANY buffers using the pointer at offset X'04'.
3. Examine offset X'90' in each RECANY buffer (4 bytes). This field contains either an address of a CLB or zeros. If it contains a CLB address, the buffer is in use. If it contains zeros, in most cases the buffer is available.



4. If the buffer is tied to a CLB, the data you find in the following fields in the CLB is helpful in problem diagnosis.
  - a. CLB+X'00'-> Event Control Block (ECB) (4 bytes)
  - b. CLB+X'20'-> VTAM CID of the session (CLBCID) (4 bytes)
  - c. CLB+X'24'-> QE for queued receive-any buffers (CLBQE) (4 bytes)
  - d. CLB+X'30' = Flag bytes (CLBFLAG1) (4 bytes)
  - e. CLB+X'68'-> Input buffer (CLBINBUF) (4 bytes)
  - f. CLB+X'6C'-> Output buffer (CLBOUTBF) (4 bytes)
  - g. CLB+X'70' = QE for responses (CLBQERES) (4 bytes)
  - h. CLB+X'74' = Flag bytes (CLBVFLAG) (4 bytes)

**Related tasks:**

“IMS IPCS Dump Formatter panel” on page 300

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## Finding the active save set

To analyze data communication (DC) problems, you need to find the active save set at the time of abend.

Use the following steps to locate the active save set.

1. Locate the registers at entry to abend (error registers). Register 13 points to the address of the active save set.
2. The active save sets begin under eye catcher \*\*\* SAVE AREA SET\*\*\*.
3. Find the save area (SA) address that matches the address in error register 13.

### Example of a Save Area Set

If error register 13 contains 320548, you would analyze the save set flow as shown the following figure. The registers in this save set are the registers that are saved on entry to each module.

\*\*\*SAVE AREA SET\*\*\*

EP DFSICI00  
SA 22FE930

EP DFSCFEI0  
SA 22E930

EP DFSCFEP0  
SA 22E990

EP DFSCIOC0  
SA 229490

EP DFSQMGR0  
SA 22D990

EP DFSAOS80  
SA 320548

---

## IMS VTAM interface

The basic functions of an IMS DC operation are establishing communications, sending and receiving messages, and terminating communications. The execution of these functions is shared among the elements that make up the network: the terminal, the controller, the VTAM system, the IMS system, and the application.

The communications analyzer (DFSICI00) uses the request parameter list (RPL) block to communicate with VTAM, and VTAM returns its status to IMS in the RPL. Therefore, it is important to analyze the RPL.

---

## IBM 3270 error recovery analysis

When the IBM 3270 detects an error, it sends the processor one of four sense-status messages.

- Intervention required, such as printer out of paper
- DEVICE END, which indicates the end of an operation
- DEVICE BUSY, normally caused by an operational error
- Hardware I/O error within the 3270 complex, such as a data check, control check, or equipment check

If IMS receives a sense-status message other than a DEVICE END, it issues message DFS973I.

---

## Diagnosing Message Format Service problems

The number of physical terminals traced and the number of lines traced can affect completeness of trace records and sequence of trace entries.

- Completeness of the trace record, (that is, whether or not all module activity related to a particular I/O action is traced), is affected if only one physical terminal (PTERM) is traced. The device-dependent module occasionally can change the current PTERM pointer before returning to the analyzer. Because the trace switch is kept in the CTB and is checked upon entry of a particular code, some module trace entries might be missing if the current CTB is not always maintained.
- Sequence of entries can be broken if more than one line is traced at a time. In this case, entries for a particular line have to be related by CLB.

Trace records with the following identifiers are useful in diagnosing MFS problems.

### DD6M

EDIT SEGMENT INTO TP BUFFER

**CIB** MOD/DOF name

### MFS SEG

SEGMENT created by MFS from output message and MOD/DOF

### D01/DDM1

PREPARE TO WRITE TO TERMINAL

**CIB** Offset X'00' contains 8-byte MOD name.

Offset X'0C' contains 8-byte DOF name.

**A05** PRIOR TO ISSUING VTAM I/O REQUEST (NORMALLY A WRITE)

### O TP BUF

Contains the data to be written to the terminal and the RPL for VTAM devices. Refer to the previous A05 record.

**A01** TERMINAL INPUT READY FOR IMS PROCESSING

### **I TP BUF**

Contains input “device segment” 6 to 36 bytes from the beginning of the buffer. The data is preceded by a 2-byte length and 2 bytes of zeros.

### **FMT2 ENTRY TO MFS INPUT PROCESSING**

**CIB** Offset X'00' contains MID name.

Offset X'22' indicates if PFK or PA key is used.

**X'80'** PA key

**X'40'** PFK key

**X'21'** PA or PFK number

### **FMT1 MESSAGE TO BE EDITED BY BASIC EDIT, NOT MFS**

### **FMT3 MFS HAS COMPLETED A MESSAGE SEGMENT**

#### **MFS SEG**

Shows input segment created by MFS.

#### **MFS I WK**

Shows complete input message (all segments) and internal segment control information used by DFSCFEI0.

**ICLR** A message satisfied MSGDEL=NONIOBCB for its destination PTERM and was deleted. The relevant control blocks are traced:

- Destination CTT
- Telecommunication program communication block (TP PCB)
- Destination CLB
- Destination CTB

This trace record is produced when any trace level is active for the destination PTERM.

**Note:** To examine the segments placed in the message queue, see X'01' and X'03' log records. X'01' log records contain input message segments. X'03' log records contain output message segments.

#### **Related tasks:**

“DC trace” on page 263

---

## **Message Format Service module traces**

The Communications Interface Block (CIB) contains two module traces: CIBSTRAC and CIBTRACE.

### **CIBSTRAC trace**

CIBSTRAC is located in the CIB + X'50'. This 4-byte trace entry contains information indicating which MFS modules received control and in what order. The following figure shows the format.

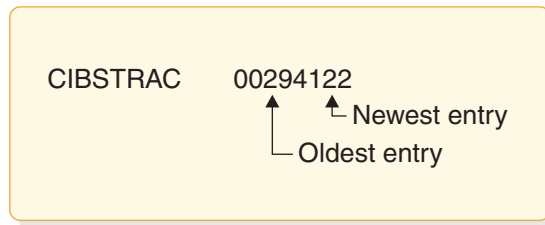


Figure 69. Example of CIBSTRAC trace

The leftmost nonzero digit shows the oldest entry and the high-order 4 bits of the rightmost byte show the newest. You can ignore the rightmost digit because it is always the same as the digit to its left. The trace entries are described in the following list.

**Value (hex)**

**Meaning**

- |   |                                                                                                                                                                                                                                                                                                             |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Entry to DFSCFEQ0 (MFS resource cleanup).                                                                                                                                                                                                                                                                   |
| 2 | Entry to DFSCFEI0 (MFS input editing occurred).                                                                                                                                                                                                                                                             |
| 3 | See value 8. Value 3 usually follows value 8 and is obtained by ORing 1 and 2.                                                                                                                                                                                                                              |
| 4 | INIT or DDFIN entry to DFSCFEO0 (either initial entry or after DDM6 finished current segment).                                                                                                                                                                                                              |
| 5 | CONT entry to DFSCFEO0 (4 ORed with 1; after successful WRITE, next output segment was requested).                                                                                                                                                                                                          |
| 6 | PAGEPOS entry to DFSCFEO0 (4 ORed with 2; entry after paging request).                                                                                                                                                                                                                                      |
| 7 | DDNEXT entry to DFSCFEO0 (4 ORed with 3; DDM6 wanted next segment).                                                                                                                                                                                                                                         |
| 8 | Entry to DFSCFEP0 (3 in the next slot; DFSCFEP0 flushed input message by calling DFSCFEQ0. After returning to DFSCFEP0, page position was established and exit to analyzer D was made. (Entry 8 was shifted left by DFSCFEQ0 entry and entry 1 was written. After returning to DFSCFEP0 1 was ORed with 2.) |
|   | 5 in the next slot; DFSCFEP0 flushed input message by calling DFSCFEQ0. After returning to DFSCFEP0, message dequeue routine was entered. Entry 8 was shifted and entry 1 was written by calling DFSCFEQ0. After returning to DFSCFEP0, DEQ routines ORed 1 with 4 resulting in 5.                          |
| 9 | Entry to DFSCFEP0 and exit to analyzer 3 entry. (8 ORed with 1).                                                                                                                                                                                                                                            |
| A | Entry to DFSCFEP0 (page position established) (8 ORed with 2).                                                                                                                                                                                                                                              |
| C | Entry to DFSCFEP0 and message dequeue requested. (8 ORed with 4).                                                                                                                                                                                                                                           |
| F | Noninitial entry to DFSCFEI0                                                                                                                                                                                                                                                                                |

**CIBTRACE trace**

CIBTRACE is located in the extended CIB at CIB+X'70'. If the CIBSEXT flag is on (X'80'), an extended CIB exists. The following figure shows the format.

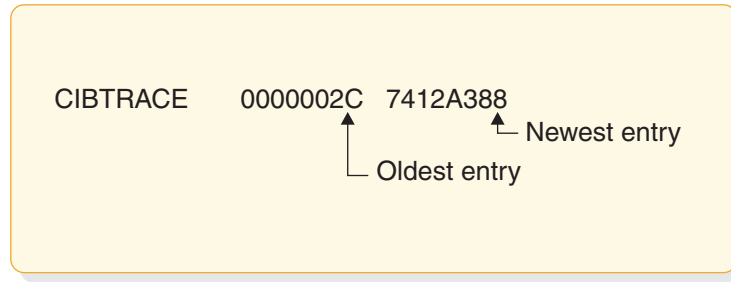


Figure 70. Example of CIBTRACE trace

The leftmost nonzero digit shows the oldest entry and high-order 4 bits of the rightmost byte show the newest. You can ignore the rightmost digit since it is always the same as the digit to its left. The trace entries are described in the following list.

**Value (hex)**

**Meaning**

- 0      ENDMSG entry to DFSCFEI0 (Tests for EOT and spanned operation). If spanned, ENQWORK; if not, set EOM and setup for spanned operation.
- 1      CPP100 entry to DFSCFEI0. Data was moved to message field.
- 2      CPP10 entry to DFSCFEI0. Field was padded with fill character or literal has been moved into field.
- 3      GETLBUF entry to DFSCFEI0. Acquire next line buffer. Return at entry GETLBUF2 with address of line buffer segment in register 1.
- 4      NOFIT entry to DFSCFEI0. Sets up for spanned operation.
- 7      GETWORK entry to DFSCFEI0. Acquire work buffer and initialize work buffer header. Moved data from QBUF to work buffer.
- 8      REFRESH2 entry to DFSCFEI0. DIF table was cleared and setup.
- 9      ENQWORK entry to DFSCFEI0. Segment in work buffer was moved to QBUF for processing.
- A      FINQBUF entry to DFSCFEI0. Compress nulls out of segmenting work buffer.
- B      NULLFDE entry to DFSCFEI0. Process all NULLFDEs.
- C      PROCQBUF entry to DFSCFEI0. Return to analyzer to process QBUF.
- D      GETQBUF entry to DFSCFEI0. Branches to analyzer entry C0 to acquire a QBUFFER.
- F      ISRTNULL entry to DFSCFEI0. Inserts all null segments and processes them for move data.

## Tracing errors in module DFSCNXA0

DFSCNXA0 is the interface module between IMS and VTAM for all logon processing and abnormal session termination processing. It is often the first module to be notified when a failure occurs on a session and is always the first to get control when a node connects to IMS.

The session attributes are verified and the IMS session control blocks are built before the connection request is passed on to signon processing in IMS. The module consists exclusively of calls to VTAM exit routines.

## Location codes for DFSCNXA0 error messages

Message DFS3672I contains the location codes of the DFSCNXA0 error messages and the message also identifies the exit routine in which the error occurred.

Message DFS3672I contains the location codes listed in the following table.

Session failures might occur that do not cause any DFS messages to be issued by DFSCNXA0. In these cases, only message DFS3672 appears.

The format of the DFS3672I message is as follows:

DFS3672I SESSION ERROR. TYPE=*aaa* CODE=*bb* QUAL.=*cc* MSG=*dddd*

where

*aaa* is the VTAM exit which was driven when the error occurred.

*bb* is the location code of the error.

*cc* is the location qualifier of the error.

*Table 73. Location codes for DFSCNXA0 error messages*

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                       |
|-------------------------|-----------------------------|------------|------|-------------------------------------------------------------------|
| 19                      | 13                          | 3862       | LOG  | Non-master terminal initiating a session on the alternate system. |
| 20                      | 14                          | 3100       | LOG  | Node in FP input mode.                                            |
| 21                      | 15                          | 3645       | LOG  | Generic Resource name used but VGR for ISC was disabled.          |
| 147                     | 93                          | 3645       | LOG  | Parsing for userdata failed for AUTOSIGN terminal                 |
| 151                     | 97                          | 3644       | LOG  | Could not get SOPB storage for AUTOSIGN terminal                  |
| 22                      | 16                          | 3645       | SCIP | Generic Resource name used but VGR for ISC was disabled.          |
| 1                       | 1                           | N/A        | LOST | No CID in VTAM parameter list.                                    |
| 2                       | 2                           | N/A        | LOST | CLB not found.                                                    |
| 3                       | 3                           | N/A        | LOST | Stacked logon chaining error.                                     |
| 4                       | 4                           | N/A        | LOST | CLBs do not match (stacked logon situation).                      |
| 5                       | 5                           | N/A        | LOST | CLBs do not match (nonstacked situation).                         |
| 1                       | 1                           | N/A        | NSXT | No CLB in USERFLD of NIB (Cleanup RU).                            |
| 2                       | 2                           | N/A        | NSXT | No CID.                                                           |
| 3                       | 3                           | N/A        | NSXT | CLB not found (Cleanup RU).                                       |
| 4                       | 4                           | N/A        | NSXT | CLB addresses do not match.                                       |

Table 73. Location codes for DFSCNXA0 error messages (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                                      |
|-------------------------|-----------------------------|------------|------|----------------------------------------------------------------------------------|
| 5                       | 5                           | N/A        | NSXT | IMS APPLID not found in resolve in-doubt vector list.                            |
| 7                       | 7                           | N/A        | NSXT | Polarity mismatch on MSC link.                                                   |
| 8                       | 8                           | N/A        | NSXT | Polarity mismatch on MSC link.                                                   |
| 10                      | A                           | N/A        | NSXT | Not Cleanup, NSPE, or Notify—RU is invalid.                                      |
| 11                      | B                           | N/A        | NSXT | Invalid session key for NSPE.                                                    |
| 12                      | C                           | N/A        | NSXT | Invalid vector key for NOTIFY.                                                   |
| 13                      | D                           | N/A        | NSXT | Invalid session key for NOTIFY.                                                  |
| 21                      | 15                          | 2061       | NSXT | NSPE/NOTIFY processed.                                                           |
| 22                      | 16                          | 2061       | NSXT | NSPE/NOTIFY processed, AHDR not cleaned up.                                      |
| 23                      | 17                          | 2061       | NSXT | CLB not found (NOTIFY RU).                                                       |
| 1                       | 1                           | N/A        | RELQ | VTCTB not found.                                                                 |
| 2                       | 2                           | N/A        | RELQ | Terminal defined with NORELQ option.                                             |
| 3                       | 3                           | N/A        | RELQ | No CID in nonparallel-session VTCTB.                                             |
| 4                       | 4                           | N/A        | RELQ | No CID in any parallel-session VTCTBs.                                           |
| 1                       | 1                           | 1915       | SCIP | No pointer to RPL.                                                               |
| 2                       | 2                           | 1917       | SCIP | Node not found.                                                                  |
| 3                       | 3                           | 3862       | SCIP | VTCTB not found (XRF Alt.).                                                      |
| 4                       | 4                           | 3862       | SCIP | Invalid temporary VTCTB (XRF Alt.).                                              |
| 5                       | 5                           | 3862       | SCIP | BIND not on surveillance link (XRF Alt.).                                        |
| 6                       | 6                           | 3101       | SCIP | BIND not from same APPLID.                                                       |
| 7                       | 7                           | 3101       | SCIP | BIND rejected after setting VLGFF.                                               |
| 8                       | 8                           | 2104       | SCIP | Non-LU 6.1 node.                                                                 |
| 9                       | 9                           | 3111       | SCIP | Node stopped.                                                                    |
| 10                      | A                           | 3101       | SCIP | Logoff requested.                                                                |
| 11                      | B                           | 3101       | SCIP | SPQB already allocated. Another 3672 (code=2D) is sent, after the -resp is sent. |
| 12                      | C                           | 3101       | SCIP | BIND not from same APPLID.                                                       |
| 13                      | D                           | 3101       | SCIP | BIND rejected after setting CLBVLGFF flag.                                       |
| 14                      | E                           | 2104       | SCIP | CLEAR for non-ISC node.                                                          |
| 15                      | F                           | 970        | SCIP | UNBIND entry message sent (after posting).                                       |
| 16                      | 10                          | 1931       | SCIP | ASR processing begins.                                                           |

Table 73. Location codes for DFSCNXA0 error messages (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation             |
|-------------------------|-----------------------------|------------|------|-------------------------|
| 17                      | 11                          | 2104       | SCIP | SDT for non-ISC node.   |
| 18                      | 12                          | 1915       | SCIP | Invalid command in RPL. |
| 22                      | 16                          | 79         | SCIP | Queues not available.   |

## Codes related to ISC processing

The codes in the following table relate to ISC processing—either as a result of LOGON or SCIP exits being driven. This is reflected in the DFS3672 message with 'T' appended to the exit type.

Table 74. Codes related to ISC processing

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                |
|-------------------------|-----------------------------|------------|------|--------------------------------------------|
| 1                       | 1                           | 79         | ISC  | IMS shutting down.                         |
| 2                       | 2                           | 1914       | ISC  | Bad INQUIRE return code.                   |
| 3                       | 3                           | 1914       | ISC  | Bad INQUIRE feedback.                      |
| 4                       | 4                           | 2066       | ISC  | USERFLD is zeros.                          |
| 5                       | 5                           | 2066       | ISC  | First structured field not 0.              |
| 6                       | 6                           | 2066       | ISC  | User field length = 0.                     |
| 7                       | 7                           | 2066       | ISC  | Primary Session Qualifier length = 0.      |
| 8                       | 8                           | 2066       | ISC  | Primary Session Qualifier length > 8.      |
| 9                       | 9                           | 2066       | ISC  | Secondary Session Qualifier length = 0.    |
| 10                      | A                           | 2066       | ISC  | Secondary Session Qualifier length > 8.    |
| 11                      | B                           | 3107       | ISC  | SPQB found but allocated.                  |
| 12                      | C                           | 3107       | ISC  | SPQB CRB pointer <> 0.                     |
| 13                      | D                           | 2049       | ISC  | VTCB not found and no dynamic terminals.   |
| 14                      | E                           | 3101       | ISC  | No available VTCBs.                        |
| 15                      | F                           | 3107       | ISC  | Session initialization already begun.      |
| 16                      | 10                          | 3101       | ISC  | Second SCIP entry for same session.        |
| 17                      | 11                          | 3105       | ISC  | No CNTs on SPQB.                           |
| 18                      | 12                          | 3107       | ISC  | Nonzero CID for existing session.          |
| 19                      | 13                          | 3111       | ISC  | Session blocked (3STOP).                   |
| 20                      | 14                          | 3111       | ISC  | Session stopped.                           |
| 21                      | 15                          | 3107       | ISC  | Ran out of CLBs.                           |
| 22                      | 16                          | 3101       | ISC  | SPQB CRB pointer = 0.                      |
| 23                      | 17                          | 1916       | ISC  | LOGON, but previous session was secondary. |
| 24                      | 18                          | 1916       | ISC  | SCIP, but previous session was primary.    |



Table 74. Codes related to ISC processing (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                          |
|-------------------------|-----------------------------|------------|------|--------------------------------------|
| 25                      | 19                          | 2066       | ISC  | User data length from INQUIRE = 0.   |
| 26                      | 1A                          | 3663       | ISC  | LU type in BIND = '0602' (LU 6.2)    |
| 27                      | 1B                          | 3107       | ISC  | SPQB found but allocated.            |
| 28                      | 1C                          | 3107       | ISC  | SPQB CRB pointer <> 0.               |
| 29                      | 1D                          | 3101       | ISC  | Second logon entry for same session. |

The codes in the following table might occur during ISC BINDRACE processing.

Table 75. Codes related to ISC BINDRACE processing

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                             |
|-------------------------|-----------------------------|------------|------|-----------------------------------------|
| 41                      | 29                          | N/A        | ISC  | SESSIONC not issuable—VTAM terminating. |
| 42                      | 2A                          | N/A        | ISC  | SESSIONC issued.                        |
| 43                      | 2B                          | N/A        | ISC  | SESSIONC not issuable—VTAM terminating. |
| 44                      | 2C                          | N/A        | ISC  | BIND not received.                      |
| 45                      | 2D                          | N/A        | ISC  | SESSIONC issued.                        |

## Codes related to MSC errors

Codes related to MSC and MSC SCIP errors are listed, including their location codes, DFS message number, exit, and an explanation.

The codes in the following table relate to MSC errors.

Table 76. Codes related to MSC errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                   |
|-------------------------|-----------------------------|------------|------|-------------------------------|
| 51                      | 33                          | 3101       | MSC  | CID already present.          |
| 52                      | 34                          | 3213       | MSC  | 3213 message issued. Code=4.  |
| 53                      | 35                          | 3213       | MSC  | 3213 message issued. Code=8.  |
| 54                      | 36                          | 3213       | MSC  | 3213 message issued. Code=24. |
| 55                      | 37                          | 3213       | MSC  | 3213 message issued. Code=32. |

The codes in the following table relate to MSC SCIP errors.

Table 77. Codes related to MSC SCIP errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation          |
|-------------------------|-----------------------------|------------|------|----------------------|
| 71                      | 47                          | N/A        | MSC  | CID already present. |
| 72                      | 48                          | N/A        | MSC  | No USERFLD provided. |

Table 77. Codes related to MSC SCIP errors (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation          |
|-------------------------|-----------------------------|------------|------|----------------------|
| 73                      | 49                          | N/A        | MSC  | RPL not initialized. |

## Codes related to dynamic logon

Dynamic login codes, their locations, DFS message number, exit and explanation are listed.

Table 78. Codes related to dynamic logon errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                           |
|-------------------------|-----------------------------|------------|------|-------------------------------------------------------|
| 81                      | 51                          | 2264       | LOG  | Do not accept logons.                                 |
| 82                      | 52                          | 3862       | LOG  | Nonexistent VTCB trying to logon to alternate system. |
| 83                      | 53                          | 2037       | LOG  | /STA DC not done.                                     |
| 84                      | 54                          | 2104       | LOG  | Invalid temporary VTCB exists.                        |
| 85                      | 55                          | 3862       | LOG  | Invalid temporary VTCB exists.                        |
| 86                      | 56                          | 3862       | LOG  | Logon not for XRF link.                               |
| 87                      | 57                          | 3111       | LOG  | Node stopped.                                         |
| 88                      | 58                          | 2264       | LOG  | Logons not accepted and SIMLOG not in effect.         |
| 89                      | 59                          | 3862       | LOG  | In backup but not preopen.                            |
| 90                      | 5A                          | 3862       | LOG  | In backup preopen but backup session not allowed.     |
| 91                      | 5B                          | 2037       | LOG  | /STA DC not done.                                     |
| 92                      | 5C                          | 79         | LOG  | Queues not available.                                 |
| 93                      | 5D                          | 3111       | LOG  | Node not started.                                     |
| 94                      | 5E                          | 79         | LOG  | Shutting down and MTO logging not on.                 |
| 95                      | 5F                          | 3111       | LOG  | Node stopped.                                         |
| 96                      | 60                          | 3101       | LOG  | Node logging off.                                     |
| 97                      | 61                          | 3101       | LOG  | Session terminating.                                  |
| 98                      | 62                          | 3101       | LOG  | CID already exists.                                   |
| 99                      | 63                          | 3111       | ISC  | Node stopped on temporary VTCB.                       |

## Codes related to existing ISC session errors

ISC session error codes are listed, including their location, DFS message number, exit, and explanation.

Table 79. Codes related to existing ISC session errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                |
|-------------------------|-----------------------------|------------|------|----------------------------|
| 111                     | 6F                          | 3645       | ISC  | QSAVE could not be gotten. |

Table 79. Codes related to existing ISC session errors (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                    |
|-------------------------|-----------------------------|------------|------|--------------------------------|
| 112                     | 70                          | 3645       | ISC  | Parsing failed.                |
| 113                     | 71                          | 3645       | ISC  | Dynamic terminals not allowed. |

### Codes related to user-logon-exit routine processing

User-logon-exit routine processing codes are listed, including their location, DFS message number, exit, and explanation.

Table 80. Codes related to user-logon exit routine processing

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                     |
|-------------------------|-----------------------------|------------|------|-----------------------------------------------------------------|
| 121                     | 79                          | 3645       | LOG  | Could not get QSAVE for signon parameters.                      |
| 122                     | 7A                          | 3645       | LOG  | Parsing failed.                                                 |
| 123                     | 7B                          | 3645       | LOG  | User logon exit rejected logon.                                 |
| 124                     | 7C                          | 3645       | LOG  | User logon exit rejected logon.                                 |
| 125                     | 7D                          | 3645       | LOG  | Invalid ALOT or ASOT value from user logon exit routine         |
| 126                     | 7E                          | 3645       | N/A  | User logon exit routine erased all descriptors.                 |
| 127                     | 7F                          | 3645       | LOG  | A dynamically created logging-on STSN VCTB must have user data. |
| 128                     | 80                          | 3645       | LOG  | Existing dynamic logging-on STSN VTCB must have user data.      |

### Codes related to logon errors

Logon error codes are listed, with their locations, DFS message number, exit, and explanation.

Table 81. Codes related to logon errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                                                          |
|-------------------------|-----------------------------|------------|------|------------------------------------------------------------------------------------------------------|
| 141                     | 8D                          | 3645       | N/A  | Dynamic terminals not allowed.                                                                       |
| 142                     | 8E                          | 3646       | N/A  | Inconsistent attributes.                                                                             |
| 143                     | 8F                          | 3646       | N/A  | Inconsistent attributes.                                                                             |
| 144                     | 90                          | 3645       | N/A  | Could not get SOPB storage.                                                                          |
| 145                     | 91                          | 3645       | N/A  | Parsing of userdata failed.                                                                          |
| 146                     | 92                          | 3645       | N/A  | Terminal is the primary or secondary master terminal for the alternate system in an XRF environment. |
| 148                     | 94                          | 3644       | N/A  | Could not get SOPB storage.                                                                          |
| 149                     | 95                          | 3644       | N/A  | Could not get SOPB storage.                                                                          |

Table 81. Codes related to logon errors (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                      |
|-------------------------|-----------------------------|------------|------|------------------------------------------------------------------|
| 150                     | 96                          | 2066       | LOG  | The LUTYPE in BIND/CINIT conflicts with static ISC block LUTYPE. |
| 161                     | A1                          | 3671       | N/A  | Invalid descriptor specified in userdata.                        |
| 162                     | A2                          | 3651       | N/A  | No default descriptor found.                                     |
| 163                     | A3                          | 3671       | N/A  | User logon exit routine returned invalid descriptor.             |
| 164                     | A4                          | 3644       | N/A  | Could not get SOPB storage.                                      |
| 165                     | A5                          | 3651       | N/A  | No default descriptor found.                                     |

Related reference:

“Qualifier codes” on page 313

### Codes related to logon descriptor processing

Logon descriptor processing codes are listed along with their location, DFS message number, exit, and explanation.

Table 82. Codes related to logon descriptor processing

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                                                            |
|-------------------------|-----------------------------|------------|------|--------------------------------------------------------------------------------------------------------|
| 181                     | B5                          | 3663       | LOG  | LU type must be < 7.                                                                                   |
| 182                     | B6                          | 3663       | LOG  | LU type must be >= 0.                                                                                  |
| 183                     | B7                          | 3663       | LOG  | Invalid LU type specified.                                                                             |
| 184                     | B8                          | 3663       | LOG  | Invalidly-specified non-SNA 3270 VTAM device. Make sure mode-table is properly defined and referenced. |
| 185                     | B9                          | 3663       | LOG  | Invalid LU 1 or NTO device type.                                                                       |

### Codes related to logging-on device characteristics

Logging-on device characteristic codes are listed along with their location, DFS message number, exit and explanation.

Table 83. Codes related to logging-on device characteristics

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                           |
|-------------------------|-----------------------------|------------|------|-----------------------------------------------------------------------|
| 191                     | BF                          | 3646       | LOG  | Invalid SLU 1 device logging on.                                      |
| 192                     | C0                          | 3646       | LOG  | Device LU type does not match descriptor.                             |
| 193                     | C1                          | 3646       | LOG  | Non-SNA 3270 VTAM logon descriptor invalid for the logging-on device. |
| 194                     | C2                          | 3646       | LOG  | Invalid SLU P or 3600 type device mismatch with the logon descriptor. |

Table 83. Codes related to logging-on device characteristics (continued)

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                  |
|-------------------------|-----------------------------|------------|------|------------------------------|
| 195                     | C3                          | 3646       | LOG  | TS type or LU type mismatch. |

## Qualifier codes

Qualifier codes for ETO parsing errors, VTCB creation errors, screen-attribute errors, are listed with their location codes, DFS message number, exit, and explanation.

### Codes related to ETO parsing errors

#### Codes related to ETO parsing errors

The Qualifier codes in the following table relate to ETO parsing errors that are associated with message DFS3645I.

Table 84. Qualifier codes related to ETO parsing errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                      |
|-------------------------|-----------------------------|------------|------|------------------------------------------------------------------|
| 1                       | 1                           | N/A        | N/A  | Invalid logon descriptor name—no name specified.                 |
| 2                       | 2                           | N/A        | N/A  | Invalid logon descriptor name—name is greater than 8 characters. |
| 3                       | 3                           | N/A        | N/A  | Invalid logon descriptor name—no name specified.                 |

### Codes related to VTCB creation errors

#### Codes related to VTCB creation errors

The Qualifier codes in the following table relate to VTCB creation errors that are associated with a DFS3644 message.

Table 85. Qualifier codes related to VTCB creation errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                         |
|-------------------------|-----------------------------|------------|------|-------------------------------------|
| 1                       | 1                           | N/A        | N/A  | QSAVE not gotten.                   |
| 2                       | 2                           | N/A        | N/A  | VTCB could not be created.          |
| 3                       | 3                           | N/A        | N/A  | Could not put VTCB into hash table. |

### Codes related to screen-attribute errors

#### Codes related to screen-attribute errors

The Qualifier codes in the following table relate to screen-attribute errors (associated with a DFS3646I message).

Table 86. Qualifier codes related to screen-attribute errors

| Location code (decimal) | Location code (hexadecimal) | Msg# (DFS) | Exit | Explanation                                                                                                                                               |
|-------------------------|-----------------------------|------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                       | 1                           | N/A        | N/A  | No Device Characteristics Table. Run the MFS DCT (DFSUTB00) utility.                                                                                      |
| 2                       | 2                           | N/A        | N/A  | No match for screen size and feature. Update MFS DCT (DFSUTB00) for the missing entry.                                                                    |
| 3                       | 3                           | N/A        | N/A  | Screen size control byte incorrectly specified. The byte itself might be invalid. If X'7F' is specified, then a valid screen size must also be specified. |

**Related reference:**

“Codes related to logon errors” on page 311

## IDC0 trace table entries

IDC0 trace table entries, including error messages issued by DFSCNXA0 are listed along with the codes and DFS message number.

### Error messages issued by DFSCNXA0

**Error messages issued by DFSCNXA0**

The following table shows codes that identify error messages that are issued by DFSCNXA0. The code is placed in the MsgID field of an IDC0 trace entry.

Table 87. Codes that identify error messages issued by DFSCNXA0

| Code (decimal) | Code (hexadecimal) | Msg# (DFS) |
|----------------|--------------------|------------|
| 0              | 00                 | 2104       |
| 4              | 04                 | 3111       |
| 8              | 08                 | 2037       |
| 12             | 0C                 | 79         |
| 16             | 10                 | 1915       |
| 20             | 14                 | 1917       |
| 24             | 18                 | 1931       |
| 28             | 1C                 | 3862       |
| 32             | 20                 | 970        |
| 36             | 24                 | 1916       |
| 40             | 28                 | 1914       |
| 44             | 2C                 | 2066       |
| 48             | 30                 | 3107       |
| 52             | 34                 | 3105       |
| 56             | 38                 | 3101       |
| 60             | 3C                 | N/A        |
| 64             | 40                 | 2049       |

Table 87. Codes that identify error messages issued by DFSCNXA0 (continued)

| Code (decimal) | Code (hexadecimal) | Msg# (DFS) |
|----------------|--------------------|------------|
| 68             | 44                 | 3213       |
| 72             | 48                 | 2264       |
| 76             | 4C                 | 3644       |
| 80             | 50                 | 3645       |
| 84             | 54                 | 3646       |
| 88             | 58                 | 3651       |
| 92             | 5C                 | 3663       |
| 96             | 60                 | N/A        |
| 100            | 64                 | 3671       |
| 104            | 68                 | 2061       |

The following internal trace formats map IDC0 trace table entries:

**Format 1 (IDC0)**

**XL1** Function Code = X'B8' (set by 'DFSTRACE')  
**XL1** Subcode  
**XL2** Unusable  
**XL1** RPLRTNCD - RPL return code  
**XL1** RPLFDB2 - RPL feedback  
**XL1** Reserved  
**XL1**  
Error type  
X'80' = 2061 error  
X'40' = 2062 error  
X'20' = 970 error  
**CL8** Nodename  
**CL8** Mode-table entry name  
**CL8**  
Applid (if applicable)  
or  
**CL8** Time stamp

**Format 2 (CNXA)**

One event can span two entries.

**First Entry**

**XL1** Function Code = X'B9' (set by 'DFSTRACE')  
**XL1** Subcode  
**XL2** Unusable  
**XL1** VTAM-exit indicator

|     |                                           |
|-----|-------------------------------------------|
|     | 00 --> You are looking at the '2nd' entry |
|     | 04 --> LOGON EXIT ENTERED                 |
|     | 08 --> SCIP EXIT ENTERED                  |
|     | 0C --> NSEXIT EXIT ENTERED                |
|     | 10 --> LOSTERM EXIT ENTERED               |
|     | 14 --> RELREQ EXIT ENTERED                |
| XL1 | Error location code                       |
| XL1 | Location code qualifier                   |
| XL1 | Processing flag at error time             |
|     | 80 VTCB LATCH HELD                        |
|     | 40 LOGON DESCRIPTOR NAME IN CINIT/BIND    |
|     | 20 VTCB DOES NOT YET EXIST                |
|     | 10 VTCB ATTEMPTING CONNECTION FOUND       |
|     | 08 SPQB FOUND                             |
|     | 04 IMS CORRELATION ID IN USERDATA         |
|     | 02 ISC PROCESSING ENTERED                 |
|     | 01 EXISTING VTCB IN LOGOFF PROCESS        |
| CL8 | Nodename                                  |
| XL4 | LOSTERM reason code                       |
| XL4 | CLB address                               |
| XL4 | CID                                       |
| XL1 | LU type                                   |
| XL1 | TS profile                                |
| XL1 | MSG ID of error message                   |
| XL1 | Reserved                                  |

**2nd entry (in the case of LOGON or SCIP exits being driven)**

|     |                                           |
|-----|-------------------------------------------|
| XL1 | Function Code = X'B9' (set by 'DFSTRACE') |
| XL1 | Subcode                                   |
| XL2 | Unusable                                  |
| XL4 | Reserved                                  |
| CL8 | Nodename                                  |
| CL8 | Descriptor name or subpool name           |
| XL8 | Time stamp                                |

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## APPC/IMS diagnostic aids

APPC/IMS diagnostic aids include LU manager trace, LU 6.2 module-to-code cross references, APPC/MVS verb-to-code cross references, DDFS1959e message information, diagnostic information for APP and OTMA with shared queues, and information on SNAPs and dumps.

### LU manager trace

The LU manager trace records the flow of control through the IMS LU 6.2 components. Analyzing the trace entries together with the MVS/ESA APPC trace entries is useful in determining the problem.



## Starting the LU manager trace

The /TRACE SET ON TABLE LUMI command activates the trace and sends the entries to an internal table.

You can format the table using the Offline Dump Formatter under IPCS, using either the VERBX command or the IMS Dump Formatter panels.

If a SNAP dump is taken, the table is formatted as part of the IMS dump.

If you add the OPTION LOG parameter to the /TRACE command, IMS sends the output to an external data set. You can use the File Select and Formatting utility (DFSERA10) with exit DFSERA60 to format the trace entries.

### Related concepts:

“Formatting IMS dumps offline” on page 509

## Formatting the LU manager trace

The general format of an LU manager trace record is shown. Each record is 8 words long. Word 0 holds standard information for each record.

### LU manager trace record format

Table 88. LU manager trace record format.

| WORD 0 |            | WORD 1 | WORD 2 | WORD 3 | WORD 4 | WORD 5 | WORD 6 | WORD 7 |
|--------|------------|--------|--------|--------|--------|--------|--------|--------|
| ID     | SEQ<br>NUM |        |        |        |        |        |        |        |

where represents

**ID** Two-byte trace ID.

**SEQ NUM**

Two-byte trace sequence number assigned by the IMS trace component.

Words 1 thru 7 contain data specific to each trace entry, as described below:

**TRACE ID = X'7B01'** LUM module entry

**Word 1**

**byte 0:**Module number **bytes 1-3:** Reserved

**Word 2**

A(ECB)

**Word 3**

Register 1

**Words 4-5**

Optional user data

**Words 6-7**

Time stamp (STCK)

**TRACE ID = X'7B02'** LUM module exit

**Word 1**

**byte 0:**Module number **bytes 1-3:** Reserved

**Word 2**

A(ECB)

**Word 3**  
Return code

**Words 4-5**  
Optional user data

**Words 6-7**  
Time stamp (STCK)

**TRACE ID = X'7B03'** IMS internal LUM error

**Word 1**  
byte 0: Module number bytes 1-3: 0

**Word 2**  
Error code

**Word 3**  
TIB address

**Word 4**  
TIB prefix address

**Word 5**  
0

**Words 6-7**  
Time stamp (STCK)

**TRACE ID = X'7B04'** IMS APPC Status Change

**Word 1**

- **byte 0:** Module number
- **byte 1:** AWE function requested code
  - X'01': Initialization request
  - X'02': Dependent region connected
  - X'03': Start APPC
  - X'04': Stop APPC
  - X'05': Purge APPC
  - X'06': Cancel APPC
  - X'07': Terminate APPC
  - X'08': Attach request
  - X'09': APPC initialized
  - X'0A': APPC stopped
  - X'0B': LU activated
  - X'0C': LU deactivated
  - X'0D': XRF takeover
  - X'0E': Clear TIBs
  - X'0F': Build LU6.2 descriptors
- **byte 2:** Current APPC status
  - X'C1': Starting
  - X'C3': Cancelled
  - X'C4': Disabled
  - X'C5': Enabled
  - X'C6': Failed

- X'D6':Outbound
- X'D7':Purging
- X'E2':Stopped
- **byte 3:** Desired/requested APPC status
  - X'C1':Starting
  - X'C3':Cancelled
  - X'C4':Disabled
  - X'C5':Enabled
  - X'C6':Failed
  - X'D6':Outbound
  - X'D7':Purging
  - X'E2':Stopped

**Word 2**

A(ECB)

**Word 3**

- **byte 0:** Last APPC status
  - X'C1':Starting
  - X'C3':Cancelled
  - X'C4':Disabled
  - X'C5':Enabled
  - X'C6':Failed
  - X'D6':Outbound
  - X'D7':Purging
  - X'E2':Stopped
- **byte 1:** Last Desired/requested APPC status
  - X'C1':Starting
  - X'C3':Cancelled
  - X'C4':Disabled
  - X'C5':Enabled
  - X'C6':Failed
  - X'D6':Outbound
  - X'D7':Purging
  - X'E2':Stopped
- **bytes 2-3:** 0

**Word 4**

0

**Word 5**

0

**Words 6-7**

Time stamp (STCK)

**TRACE ID = X'7B05'** LUM module IWAIT

**Word 1**

**byte 0:**Module number **bytes 1-3:** Reserved

**Word 2**

A(ECB)

**Word 3**

TIB\_SYNC\_PTR

**Words 4**

A(TIB)

**Words 5**

0

**Words 6–7**

Time stamp (STCK)

**TRACE ID = X'7B06' LUM module IPOST**

**Word 1**

byte 0: Module number bytes 1-3: 0

**Word 2**

A(ECB)

**Word 3**

TIB\_SYNC\_PTR

**Words 4**

A(TIB)

**Words 5**

0

**Words 6–7**

Time stamp (STCK)

**TRACE ID = X'7B07' z/OS cross-system coupling facility sendmsg**

**Word 1**

- **Byte 0:** Module number - see Table 89 on page 326
- **Bytes 2-3:** Function Return Code

**Word 2**

A(TIB)

**Words 3-6**

TIB MSG PREFIX URTOKEN

**Word 7**

Time stamp (STCK)

**TRACE ID = X'7B08' AWE server TIB POST**

**Word 1**

- **Byte 0:** Module number - see Table 89 on page 326
- **Bytes 2-3:** Return code

**Word 2**

A(ECB)

**Word 3**

AOS POST CODE

**Word 4**

A(TIB)

**TRACE ID = X'7B09'** Request sent to z/OS Resource Recovery Services AWE server

**Word 1**

- **Byte 0:** Module number - see Table 89 on page 326
- **Bytes 2-3:** AWRRFUNC

**Word 2**

A(ECB)

**Word 3**

AOS POST CODE

**Words 4-7**

MSG PREFIX URTOKEN

**TRACE ID = X'7C01'** Normal return from APPC/MVS

**Word 1**

- **byte 0:** Module number - See Table 89 on page 326.
- **byte 1:** ATB call number - See Table 90 on page 327.
- **byte 2:** ATB flags
  - **bit 0:** Verb issued for asynchronous processing
  - **bit 1:** Return code is from asynchronous processing
  - **bit 2:** CID given and all zeros
  - **bit 3:** TPID field has user data
  - **bit 4:** CID field has user data
- **byte 3:** Optional user data

**Words 2-3**

TPID or user data

**Words 4-5**

CID or user data

**Word 6**

Return code

**Word 7**

A(ECB)

**TRACE ID = X'7C02'** Unexpected return code from APPC/MVS

**Word 1**

- **byte 0:** Module number
- **byte 1:** ATB call number
- **byte 2:** ATB flags
  - **bit 0:** Verb issued for asynchronous processing
  - **bit 1:** Return code is from asynchronous processing
  - **bit 2:** CID given and all zeros
  - **bit 3:** TPID field has user data
  - **bit 4:** CID field has user data
- **byte 3:** Optional user data

**Words 2-3**

TPID or user data

**Words 4-5**

CID or user data

**Word 6**

Return code

**Word 7**

A(ECB)

**TRACE ID = X'7C03'** APPC/MVS asynchronous verb entry

**Word 1**

- **byte 0:** Module number
- **byte 1:** ATB call number
- **byte 2:** ATB flags
  - **bit 0:** Verb issued for asynchronous processing
  - **bit 1:** Return code is from asynchronous processing
  - **bit 2:** CID given and all zeros
  - **bit 3:** TPID field has user data
  - **bit 4:** CID field has user data
- **byte 3:** Optional user data

**Words 2-3**

TPID or user data

**Words 4-5**

CID or user data

**Word 6**

Reserved (FFFFFFFF)

**Word 7**

A(ECB)

**TRACE ID = X'7F01'** APPC Attach from APPC/MVS

**Word 1**

Reserved

**Word 2**

XCF message type

**Words 3-4**

TPID for XCF message

**Words 5-6**

Local LU to which ATTACH request was directed

**Word 7**

Time stamp (STCK)

**TRACE ID = X'7F02'** IMS LU activating or deactivating

**Word 1**

Reserved

**Word 2**

XCF message type

**Word 3**

XCF message LU flags **bit 0:** LU is base LU

**Words 4-5**

LU name

**Word 6**

0

**Word 7**

Time stamp (STCK)

**TRACE ID = X'7F03'** APPC/MVS starting or stopping

**Word 1**

Reserved

**Word 2**

XCF message type

**Words 3-6**

0

**Word 7**

Time stamp (STCK)

**TRACE ID = X'7F04'** CPOOL storage shortage

**Word 1**

Reserved

**Word 2**

XCF message type

**Word 3**

XCF message length

**Words 4-5**

TPID from XCF message

**Word 6**

0

**Word 7**

Time stamp (STCK)

**TRACE ID = X'7F05'** CPOOL block too small for XCF message

**Word 1**

Reserved

**Word 2**

XCF message type

**Word 3**

XCF message length

**Word 4**

Cell size

**Words 4-5**

TPID from XCF message

**Word 6**

0

**Word 7**  
Time stamp (STCK)

**TRACE ID = X'7F06'** Invalid request from XCF

**Word 1**  
Reserved

**Word 2**  
XCF message type

**Word 3**  
0

**Words 4-5**  
MEPLSRCE map

**Word 6**  
0

**Word 7**  
Time stamp (STCK)

**TRACE ID = X'7F07'** APPC/MVS not enabled for Attach

**Word 1**  
Reserved

**Word 2**  
XCF message type

**Word 3**

- **byte 0:** LSCD status (disabled, failed, stopped)
- **byte 1:** LSCD IN flags (LSCD - APPC/IMS global control block)
- **byte 2:** LSCD OUT flags
- **byte 3:** LSCD flags

**Word 4**  
0

**Words 5-6**  
TPID from XCF message

**Word 7**  
Time stamp (STCK)

**TRACE ID = X'7F09'** TP deallocate failed

**Word 1**  
Reserved

**Word 2**  
XCF message type

**Word 3**  
Return code

**Words 4-6**  
0

**Word 7**  
Time stamp (STCK)



## LU manager trace example

The following LU manager trace example shows calls to DFS62FD0 caused by /DISPLAY commands, a clean address space caused by a non-LU 6.2 transaction ending, and a synchronous LU 6.2 transaction being executed.

## LU manager trace example

The trace has been formatted by the File Select and Formatting utility (DFSERA10) with exit DFSERA60, which places the module number after word 7.

OPTION PRINT 0=5,V=67FA,EXITR=DFSERA60

END

| FUNCTION                 | WORD 0   | WORD 1   | WORD 2   | WORD 3   | WORD 4   | WORD 5     | WORD 6   | WORD 7                 |
|--------------------------|----------|----------|----------|----------|----------|------------|----------|------------------------|
| * LU1 TRACE TABLE - DATE | 91323    | TIME     | 11323667 | SKIP     | 0000     | TOTAL SKIP | 00000000 | RECORD NUMBER 00000167 |
| Module Exit              | 7B023DD8 | 20000000 | 03080330 | 00000004 | 10800000 | 00000000   | A4D224D2 | 27C7AB05 32            |
| Module Exit              | 7B023E22 | 20000000 | 03080330 | 00000004 | 10800000 | 00000000   | A4D224D2 | 34020504 32            |
| Module Exit              | 7B023E2B | 20000000 | 03080330 | 00000004 | 10400000 | 00000000   | A4D224D2 | 340ACC04 32            |
| Module Entry             | 7B01554C | 0B000000 | 028E0060 | 02942244 | 00020080 | 00000000   | A4D22B41 | 9C54DB04 11            |
| APPC/MVS Exit            | 7C01554F | 0B120000 | FFFFFFFF | FFFFFFFF | FFFFFFFF | FFFFFFFF   | 00000004 | 028E0060 11-ATBCMAS    |
| Module Exit              | 7B025552 | 0B000000 | 028E0060 | 00000000 | 00000000 | 00000000   | A4D22B41 | 9C5EEA04 11            |
| APPC ATTACH              | 7F01AC63 | 00000000 | 00000001 | 037AE648 | 00000002 | D3F6F2C9   | D4E2F140 | 48CE0D51               |
| Module Exit              | 7B02AC8D | 20000000 | 02D02020 | 00000000 | 40100000 | 0310E2B0   | A4D24448 | CEE7BE05 32            |
| Module Entry             | 7B01AC97 | 06000000 | 0310E2B0 | 0294D538 | 00000000 | 00000000   | A4D24448 | CEF77405 06            |
| Module Entry             | 7B01AC9C | 10000000 | 0310E2B0 | 03036334 | 01000000 | 0310E5B2   | A4D24448 | CF163105 16            |
| Module Exit              | 7B02AC9D | 10000000 | 0310E2B0 | 00000000 | 404008C1 | 00000000   | A4D24448 | CF169505 16            |
| Module Entry             | 7B01ACA2 | 10000000 | 0310E2B0 | 03036334 | 04020000 | 0310E5B2   | A4D24448 | CF1AA305 16            |
| Module Exit              | 7B02ACA3 | 10000000 | 0310E2B0 | 00000000 | 404008C1 | 00000000   | A4D24448 | CF1B0905 16            |
| APPC/MVS Entry           | 7C03ACA8 | 060D8040 | 037AE648 | 00000002 | 037B6018 | 00000002   | FFFFFFFF | 0310E2B0 06-ATBRCVW    |
| APPC/MVS Exit            | 7C01ACB0 | 060DC000 | 037AE648 | 00000002 | 037B6018 | 00000002   | 00000000 | 0310E2B0 06-ATBRCVW    |
| APPC/MVS Entry           | 7C03ACB7 | 060D8040 | 037AE648 | 00000002 | 037B6018 | 00000002   | FFFFFFFF | 0310E2B0 06-ATBRCVW    |
| APPC/MVS Exit            | 7C01ACBF | 060DC001 | 037AE648 | 00000002 | 037B6018 | 00000002   | 00000000 | 0310E2B0 06-ATBRCVW    |
| Module Entry             | 7B01ACC4 | 22000000 | 0310E2B0 | 03035E98 | C1D7D6D3 | F1F14040   | A4D24448 | E8BD6C05 34            |
| Module Exit              | 7B02ACC5 | 22000000 | 0310E2B0 | 00000000 | 00000000 | 00140014   | A4D24448 | E8C11D05 34            |
| Module Exit              | 7B02ACEF | 06000000 | 0310E2B0 | 00000000 | 00000000 | 00000000   | A4D24448 | E9427C05 06            |
| Module Entry             | 7B01AD41 | 0A000000 | 028E0060 | 02942C78 | 80000080 | 028E00F8   | A4D24448 | F43CDC04 10            |
| Module Exit              | 7B02AD48 | 20000000 | 028E0060 | 00000000 | 00100000 | 0310E2B0   | A4D24448 | F44ABE04 32            |
| Module Exit              | 7B02AD4B | 0A000000 | 028E0060 | 00000000 | 028E00F8 | 028E00AC   | A4D24448 | F44D9404 10            |
| APPC/MVS Exit            | 7C01AD59 | 3E110000 | 037AE648 | 00000002 | 00000000 | 00000000   | 00000000 | 028E0060 62-ATBASOC    |
| Module Entry             | 7B01AD5B | 10000000 | 028E0060 | 02938040 | 01000000 | 02CF9AFE   | A4D24448 | F9BF9F04 16            |
| Module Exit              | 7B02AD5C | 10000000 | 028E0060 | 00000000 | 00000000 | 00000000   | A4D24448 | F9C01704 16            |
| Module Entry             | 7B01AD78 | 0A000000 | 028E0060 | 02942240 | 00800080 | 028E00F8   | A4D24449 | 5C418704 10            |
| Module Entry             | 7B01AD7B | 01000000 | 028E0060 | 02B921A8 | 80000000 | 028E00EC   | A4D24449 | 5C4E4D04 01            |
| Module Entry             | 7B01AD9A | 22000000 | 028E0060 | 02B929C0 | C1D7D6D3 | F1F14040   | A4D24449 | 5D101404 34            |
| Module Exit              | 7B02AD9B | 22000000 | 028E0060 | 00000000 | 04000000 | 00270027   | A4D24449 | 5D10D104 34            |
| APPC/MVS Entry           | 7C03ADA0 | 010F8000 | 037AE648 | 00000002 | 037B6018 | 00000002   | FFFFFFFF | 028E0060 01-ATBSEND    |
| APPC/MVS Exit            | 7C01ADA8 | 010FC000 | 037AE648 | 00000002 | 037B6018 | 00000002   | 00000000 | 028E0060 01-ATBSEND    |
| Module Entry             | 7B01ADAD | 22000000 | 028E0060 | 02B929C0 | C1D7D6D3 | F1F14040   | A4D24449 | 5E1F7B04 34            |
| Module Exit              | 7B02ADAE | 22000000 | 028E0060 | 00000000 | 04000000 | 00260026   | A4D24449 | 5E202704 34            |
| APPC/MVS Entry           | 7C03ADB3 | 010F8000 | 037AE648 | 00000002 | 037B6018 | 00000002   | FFFFFFFF | 028E0060 01-ATBSEND    |
| APPC/MVS Exit            | 7C01ADBB | 010FC000 | 037AE648 | 00000002 | 037B6018 | 00000002   | 00000000 | 028E0060 01-ATBSEND    |
| APPC/MVS Entry           | 7C03ADC0 | 01068000 | 037AE648 | 00000002 | 037B6018 | 00000002   | FFFFFFFF | 028E0060 01-ATBFLUS    |
| APPC/MVS Exit            | 7C01ADC8 | 0106C000 | 037AE648 | 00000002 | 037B6018 | 00000002   | 00000000 | 028E0060 01-ATBFLUS    |
| Module Exit              | 7B02ADDB | 01000000 | 028E0060 | 00000000 | 00010000 | 00000000   | A4D24449 | 5E828004 01            |
| Module Exit              | 7B02ADDE | 0A000000 | 028E0060 | 00000000 | 028E00F8 | 00000000   | A4D24449 | 5E855A04 10            |
| Module Entry             | 7B01ADEC | 0B000000 | 028E0060 | 02942240 | 00400080 | 028E00F8   | A4D24449 | 5E9D0E04 11            |
| Module Exit              | 7B02ADED | 0B000000 | 028E0060 | 00000000 | 028E00F8 | 00000000   | A4D24449 | 5E9E4C04 11            |
| Module Entry             | 7B01ADF8 | 0A000000 | 028E0060 | 02942240 | 00040080 | 00000000   | A4D24449 | 5EAAA104 10            |
| Module Exit              | 7B02ADF9 | 0A000000 | 028E0060 | 00000000 | 00000000 | 028E00AC   | A4D24449 | 5EABB204 10            |
| Module Entry             | 7B01AE09 | 0A000000 | 028E0060 | 02942240 | 00200080 | 028E00F8   | A4D24449 | 5EB48D04 10            |
| APPC/MVS Entry           | 7C03AE0C | 0A048000 | 037AE648 | 00000002 | 037B6018 | 00000002   | FFFFFFFF | 028E0060 10-ATBDEAL    |
| APPC/MVS Exit            | 7C01AE14 | 0A04E000 | 037AE648 | 00000002 | 037B6018 | 00000002   | 00000000 | 028E0060 10-ATBDEAL    |
| Module Exit              | 7B02AE19 | 20000000 | 028E0060 | 00000000 | 80100000 | 00000000   | A4D24449 | 5EF81604 32            |
| Module Exit              | 7B02AE1C | 0A000000 | 028E0060 | 00000000 | 028E00F8 | 00000000   | A4D24449 | 5F104504 10            |
| Module Entry             | 7B01AE3F | 0B000000 | 028E0060 | 02942244 | 00020080 | 00000000   | A4D24449 | 5F2BD704 11            |
| APPC/MVS Exit            | 7C01AE42 | 0B150000 | 037AE648 | 00000002 | FFFFFFFF | FFFFFFFF   | 00000004 | 028E0060 11-ATBCMTP    |
| Module Exit              | 7B02AE45 | 0B000000 | 028E0060 | 00000000 | 00000000 | 00000000   | A4D24449 | D2E40205 11            |

```

Module Entry 7B01AE5A 0B000000 028E0060 02942244 00020080 00000000 A4D24449 D5D0AD05 11
APPC/MVS Exit 7C01AE5D 0B120000 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF 00000004 028E0060 11-ATBCMAS
Module Exit 7B02AE60 0B000000 028E0060 00000000 00000000 00000000 A4D24449 D5DB1205 11
DFS707I END OF FILE ON INPUT
DFS708I OPTION COMPLETE
DFS703I END OF JOB

```

## LU 6.2 module-to-code cross-reference table

You can use the module number, module name, and description to associate code *xx* in message DFS1959E and the module number in trace records X'7Bxx' and X'7Cxx' with a module.

*Table 89. LU 6.2 module-to-code cross-reference table*

| Module number (decimal) | Module number (hexadecimal) | Module   | Description                                                  |
|-------------------------|-----------------------------|----------|--------------------------------------------------------------|
| 01                      | 01                          | DFSSLUM0 | Synchronous output LU manager                                |
| 02                      | 02                          | DFSAPPC0 | DFSAPPC message switch processor                             |
| 03                      | 03                          | DFSCMD00 | LU 6.2 command interface                                     |
| 04                      | 04                          | DFSALM00 | Asynchronous output LU manager                               |
| 05                      | 05                          | DFSRLM00 | Receive LU manager server                                    |
| 06                      | 06                          | DFSRLM10 | Receive LU manager receiver                                  |
| 08                      | 08                          | DFSAPP10 | DFSAPPC keyword parser                                       |
| 09                      | 09                          | DFSATB00 | APPC/MVS verb execution/trace                                |
| 10                      | 0A                          | DFS6LUS0 | LU 6.2 services interface 1                                  |
| 11                      | 0B                          | DFS6LUS1 | LU 6.2 services interface 2                                  |
| 12                      | 0C                          | DFS6LUS2 | LU 6.2 services interface 3                                  |
| 16                      | 10                          | DFSRAC60 | RACF interface module                                        |
| 21                      | 15                          | DFS6RST0 | LU 6.2 restart processor                                     |
| 22                      | 16                          | DFS6CKP0 | LU 6.2 checkpoint processor                                  |
| 24                      | 18                          | DFSGIDC0 | Read and build LU 6.2 descriptors                            |
| 31                      | 1F                          | DFS6ECT0 | LU 6.2 z/OS cross-system coupling facility message processor |
| 32                      | 20                          | DFS62FD0 | LU 6.2 Find destination routine (QABs/TIBs)                  |
| 33                      | 21                          | DFSLUDI0 | LU 6.2 User Destination exit                                 |
| 34                      | 22                          | DFSLIEE0 | LU 6.2 User Data Edit exit                                   |
| 35                      | 23                          | DFSHCI00 | XRF takeover processing                                      |
| 36                      | 24                          | DFS6QFX0 | LU 6.2 Nonrecoverable message cleanup                        |
| 37                      | 25                          | DFSHAV70 | XRF termination/takeover                                     |
| 38                      | 26                          | DFS62FD1 | LU 6.2 Find destination routine (LUBs/DESCs)                 |
| 40                      | 28                          | DFSCMLC0 | MSC SQ APPC/OTMA Message Router                              |
| 41                      | 29                          | DFSCMS00 | MS Analyzer                                                  |
| 50                      | 32                          | DFSXLUM0 | LUM TCB Initialization routine                               |
| 51                      | 33                          | DFSYIOE0 | OTMA Input and Output user exit                              |
| 52                      | 34                          | DFSXXCF0 | XCF TCB initialization                                       |
| 53                      | 35                          | DFSXRM00 | RLUM TCB initialization                                      |

Table 89. LU 6.2 module-to-code cross-reference table (continued)

| Module number (decimal) | Module number (hexadecimal) | Module   | Description                                                     |
|-------------------------|-----------------------------|----------|-----------------------------------------------------------------|
| 54                      | 36                          | DFSXALM0 | ALUM TCB initialization                                         |
| 55                      | 37                          | DFSXALC0 | ALUM allocate TCB initialization                                |
| 56                      | 38                          | DFSFLUM0 | LUM TCB ESTAE routine                                           |
| 60                      | 3C                          | DFSICM20 | LU 6.2 command processor                                        |
| 61                      | 3D                          | DFSTMR00 | TM ABEND retry eligibility module                               |
| 62                      | 3E                          | DFSTMAS0 | TM ASSOCIATE TPI and create accessor environment element (ACEE) |
| 63                      | 3F                          | DFSTMCD0 | CONNECT/DISCONNECT support                                      |
| 71                      | 47                          | DFSXOSW0 | APPC/OTMA SMQ AWE server                                        |
| 72                      | 48                          | DFSXGFS0 | z/OS Resource Recovery Services Server, AWE PROCESSOR           |
| 90                      | 5A                          | DFSXAOS0 | DFSXAOS0 APPC/OTMA SMQ Enablement Initialization                |

**Related reference:**

“DFS1959E message information” on page 328

## APPC/MVS verb-to-code cross-reference table

You can use the verb number, verb name, and verb description to associate the ATB call number in trace records X'7Cxx' with an APPC/MVS verb.

Table 90. APPC/MVS verb-to-code cross-reference table

| Verb number (hexadecimal) | Verb name | Verb description                 |
|---------------------------|-----------|----------------------------------|
| 01                        | ATBALLC   | Allocate a conversation          |
| 02                        | ATBCFM    | Send a confirmation request      |
| 03                        | ATBCFMD   | Send a confirmation reply        |
| 04                        | ATBDEAL   | Deallocate a conversation.       |
| 05                        | ATBDFTP   | Define TPID                      |
| 06                        | ATBFLUS   | Empty the local LU's send buffer |
| 07                        | ATBGTA2   | Get conversation attributes      |
| 08                        | ATBGETC   | Accept conversation              |
| 09                        | ATBGETP   | Get TP properties                |
| 0A                        | ATBGETT   | Get conversation type            |
| 0B                        | ATBPTR    | Enter receive state              |
| 0C                        | ATBRCVI   | Receive data, if available       |
| 0D                        | ATBRCVW   | Wait to receive data             |
| 0E                        | ATBRTS    | Enter send state                 |
| 0F                        | ATBSEND   | Send data                        |
| 10                        | ATBSERR   | Send error                       |
| 11                        | ATBASOC   | Associate TPID                   |
| 12                        | ATBCMAS   | Clean address space              |

Table 90. APPC/MVS verb-to-code cross-reference table (continued)

| Verb number<br>(hexadecimal) | Verb name | Verb description                                       |
|------------------------------|-----------|--------------------------------------------------------|
| 13                           | ATBMIGRP  | Join z/OS cross-system coupling facility message group |
| 14                           | ATBSASA   | Set address space attributes                           |
| 15                           | ATBCMTP   | Clean TPID                                             |
| 16                           | ATBCNTL   | APPC/MVS control call                                  |
| 17                           | ATBCONN   | Connect address space to scheduler                     |
| 18                           | ATBDCON   | Disconnect address space from scheduler                |
| 19                           | ATBEXAI   | Extract conversation information                       |
| 1A                           | ATBIDEN   | Identify scheduler to APPC/MVS                         |
| 1B                           | ATBUNID   | Unidentify scheduler from APPC/MVS                     |
| 1C                           | ATBIDN4   | Identify scheduler to APPC/MVS                         |
| 1D                           | ATBUID4   | Unidentify scheduler from APPC/MVS                     |
| 1E                           | ATBVERS   | Version service                                        |
| 1F                           | ATBALC5   | Allocate a conversation                                |
| 20                           | ATBSTO5   | Set timeout value                                      |
| 21                           | ATBLEAVE  | Leave XCF message group                                |

## DFS1959E message information

APPC/IMS issues message DFS1959E when a severe internal error occurs.

The message format is:

DFS1959E SEVERE IMS INTERNAL FAILURE, REASON CODE=xxyy

Variable *xx* is a decimal number that identifies the module. . Variable *yy* is an internal reason code.

If you receive this message, contact IBM Software Support with the module number and reason code supplied in the message, and, if requested, output from the LU manager trace.

The following lists provide an explanation of the reason codes listed in the DFS1959E message. Contact IBM Software Support for actions to take in response to these IMS internal failures.

The following two reason codes are module INDEPENDENT. *xx* denotes the specific IMS module performing the macro call:

| RC   | Description                                                                          |
|------|--------------------------------------------------------------------------------------|
| xx98 | Failure in DFSPPOOL to acquire storage for PL/AS variables using the DFSLUMGT macro. |
| xx99 | Failure in DFSPPOOL to release storage for PL/AS variables using the DFSLUMRL macro. |

**Related reference:**

"LU 6.2 module-to-code cross-reference table" on page 326

**DFSALM00**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSALM00 are given. The DFSALM00 reason code is module dependent.

**RC Description**

- |             |                                                                                                           |
|-------------|-----------------------------------------------------------------------------------------------------------|
| <b>0401</b> | Failure to clear asynchronous control block work pending bit.                                             |
| <b>0402</b> | Failure to get LUMP pool buffer using DFSPOOL macro.                                                      |
| <b>0403</b> | Failure to free LUMP pool buffer using DFSPOOL macro.                                                     |
| <b>0408</b> | Missing LUNAME from LU 6.2 message prefix.                                                                |
| <b>0409</b> | Missing TPNAME from LU 6.2 message prefix.                                                                |
| <b>0410</b> | Unsupported sync level specified in asynchronous control block or LU 6.2 message prefix.                  |
| <b>0411</b> | Invalid conversation type specified in asynchronous control block or LU 6.2 message prefix.               |
| <b>0412</b> | Invalid control data in message segment from GU call.                                                     |
| <b>0413</b> | Invalid control data in message segment from GN call.                                                     |
| <b>0414</b> | No data, redundant DFSQMGR Get Next call. RC=4.                                                           |
| <b>0415</b> | Unknown return code on DFSQMGR Get Next call.                                                             |
| <b>0416</b> | Missing LU 6.2 prefix on DFSQMGR Get Unique call.                                                         |
| <b>0417</b> | Queue already in read status on DFSQMGR Get Unique call. RC >= X'C'.                                      |
| <b>0418</b> | Failure to dequeue output message. "No message on queue status" is indicated. DFSQMGR Dequeue call, RC=8. |
| <b>0419</b> | Unknown return code from dequeue call. DFSQMGR Dequeue call, RC is other than 0 or 8.                     |
| <b>0421</b> | Unknown return code from DFSLIEE0 LU 6.2 user edit exit. RC is other than 0, 4, or 8.                     |

**DFSAOSW0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSAOSW0 are given.

**RC Description**

- |             |                                                |
|-------------|------------------------------------------------|
| <b>7101</b> | Unknown request code.                          |
| <b>7109</b> | Zero TIB address for send output.              |
| <b>7110</b> | Failure in QUERY of DFSXCF macro.              |
| <b>7116</b> | Zero header address for send output.           |
| <b>7121</b> | Failure to get AWE storage using DFSBCB macro. |
| <b>7133</b> | Transaction not found for notify.              |

- 7134 Other than transaction found for notify.
- 7136 Wrong message number in SEND DFS MESSAGE function.
- 7144 z/OS cross-system coupling facility parameter length too large.
- 7144 Unknown subfunction for Common XCF Communications.
- 7150 Failure to get LUMP storage using DFSPOOL macro.
- 7190 Failure in QUERY in DFSXCF macro.

### **DFSAPPC0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSAPPC0 are given.

#### **RC Description**

- 0201 DFSQMGR Get Unique call failure, RC not 0.
- 0202 DFSQMGR Get Next call failure, RC not 0 and QTP1EOM=0.
- 0203 DFSQMGR Enqueue call failure, RC not 0.
- 0204 DFSQMGR Dequeue call failure, RC not 0.
- 0205 DFSQMGR Insert Move call failure, RC not 0.
- 0206 DFSQMGR Insert Move call failure, RC not 0.
- 0207 DFSQMGR Cancel Input call failure, RC not 0.
- 0208 Failure to read DFSAPPC message from shared queues.
- 0209 DFSQMGR Insert Move without LU62 MSG PREFIX call failure, RC not 0.
- 0210 DFSQMGR Get Next call failure, RC not 0 and QTP1EOM=0.
- 0211 DFSQMGR Get Next call failure, RC not 0.
- 0212 DFSQMGR Get Unique call failure, RC not 0.
- 0250 Failure to find or create asynchronous control block.
- 0260 Router call failure. DFSICLR0 call, RC not 0.
- 0270 DFSUSE FUNC=NOUSE call failure, RC not 0.

### **DFSATB00**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSATB00 are given.

#### **RC Description**

- 0901 Calling module requesting unsupported APPC/MVS verb name.

### **DFSCMD00**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSCMD00 are given.

#### **RC Description**

- 0301 DFSQMGR Get Unique call failure, RC not 0.

- 0302 DFSQMGR Get Next call failure, RC not 0.
- 0304 DFSQMGR Dequeue call failure, RC not 0.
- 0306 DFSQMGR Insert Locate call failure, RC not 0.
- 0321 Failure to get LUMP pool buffer using DFSPPOOL macro.
- 0322 Failure to free LUMP pool buffer using DFSPPOOL macro.

### **DFSCMLC0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSCMLC0 are given.

|           |                    |
|-----------|--------------------|
| <b>RC</b> | <b>Description</b> |
|-----------|--------------------|

- |      |                                                                                                                                                                                           |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4001 | Failure in LUMIF GU call through DFSCMAP0. Type 6701-MSS1/MSS2 records were logged.                                                                                                       |
| 4002 | Failure in processing a remote keyed message. Type 6701-MSS1/MSS2 records were logged.                                                                                                    |
| 4003 | Failure in an INSERT call. Type 6701-MSS1/MSS2 records were logged.                                                                                                                       |
| 4004 | Failure in DFSICLR0 message router. Type 6701-MSS1/MSS2 records were logged.                                                                                                              |
| 4005 | DFSCOND0 was called to process an error scratchpad area segment for a APPC or OTMA client in conversation mode and an error (RC=08) was returned. Type 6701-MSS1/MSS records were logged. |
| 4006 | Conversation scratch pad (SPA) message did not have the correct SPA message flags in the message prefix MSGMSFL1 and MSGMSFL2 flags. Type 6701-MSS1/MSS2 records were logged.             |
| 4007 | DFSCONM0 was called to process a normal scratch pad segment for a APPC or OTMA client in conversation mode and an error (RC=0C) was returned. Type 6701-MSS1/MSS2 records were logged.    |

### **DFSCMS00**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSCMS00 are given.

|           |                    |
|-----------|--------------------|
| <b>RC</b> | <b>Description</b> |
|-----------|--------------------|

- |      |                                          |
|------|------------------------------------------|
| 4101 | Failure in LUMIF GU call using DFSCMAP0. |
| 4102 | Failure in LUMIF GU call using DFSCMAP0. |
| 4103 | Failure in LUMIF GU call using DFSCMAP0. |

### **DFSHCI00**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSHCI00 are given.

|           |                    |
|-----------|--------------------|
| <b>RC</b> | <b>Description</b> |
|-----------|--------------------|

- |      |                                          |
|------|------------------------------------------|
| 3501 | Failure to get AWE storage using DFSBCB. |
|------|------------------------------------------|



## DFSRLM00

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSRLM00 are given.

| RC | Description |
|----|-------------|
|----|-------------|

- |      |                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------|
| 0501 | AWE extension not a FMH5 Attach request.                                                            |
| 0502 | Synchronous control block creation failure using DFS62DST FUNC=FIND. This could be storage related. |
| 0503 | Error freeing XAWE. Unknown storage pool.                                                           |
| 0504 | Error freeing XAWE using STORAGE macro.                                                             |
| 0505 | AWE not an FMH5 Attach request.                                                                     |
| 0506 | Error posting DFSRLM10 using DFSSERVER macro.                                                       |
| 0507 | Failure in Identify Protected Conversation Context.                                                 |
| 0508 | Blank or zero LUNAME received                                                                       |

## DFSRLM10

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSRLM10 are given.

| RC | Description |
|----|-------------|
|----|-------------|

- |      |                                                                                                  |
|------|--------------------------------------------------------------------------------------------------|
| 0601 | Failure in DFS62FD0 releasing a synchronous control block (DFS62DST FUNC=RELEASE).               |
| 0602 | Failure in DFSICLF0 FindDest routine looking up trancode. RC >= X'10'.                           |
| 0603 | Failure in DFSRAC60. DFSRAC6 FUNC=RACINIT RC not 0.                                              |
| 0604 | Failure in DFSRAC60. DFSRAC6 FUNC=FRACHECK RC>= X'44'.                                           |
| 0605 | Failure in DFSTM0 building a CPI-C dynamic SMB RC not 0.                                         |
| 0606 | Failure in DFSICLR0 message router. Enqueue to SMB RC not 0.                                     |
| 0607 | Failure to get LUMP pool buffer using DFSPPOOL macro.                                            |
| 0608 | Failure to free LUMP pool buffer using DFSPPOOL macro.                                           |
| 0609 | Failure in DFSQMGR updating message to nonrecoverable RC not 0.                                  |
| 0610 | Failure in DFSTM0 to ENQ prefix to CPIC dynamic SMB RC not 0.                                    |
| 0611 | Failure in DFSQMGR to insert Data for SMB or DFSAPPC DFSQMGR Insert Move call failure, RC not 0. |
| 0612 | Failure in DFSCMD00 processing IMS command. RC not 0.                                            |
| 0613 | Failure in DFSAPPC0 processing Message Switch RC not 0.                                          |
| 0614 | Failure in DFSQMGR to cancel a message in progress. RC not 0.                                    |
| 0615 | Failure in DFSQMGR to enqueue message for Cmd or DFSAPPC. RC not 0.                              |
| 0616 | Failure in DFSQMGR to update APPC Message Prefix. RC not 0.                                      |
| 0617 | Failure in DFSHEIL0 unrecognized return code from Fast Path RC other than 0, 4, 8, or 12.        |



- 0618 Failure in DFSBCB to free AWE.
- 0619 Failure in DFS6LUS0 RLUM reposted and not running conversational transaction.
- 0620 Failure in DFSQMGR to update modname RC not 0.
- 0621 Failure in DFSQMGR to update a message to response mode.
- 0622 Failure in DFSQMGR to cancel a message, RC not 0.
- 0623 Failure in DFSQMGR to delete a message, RC not 0.
- 0624 Failure in DFS62FD0 getting an asynchronous control block (DFS62DST FUNC=FUNC).

### **DFSSLUM0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSSLUM0 are given.

- | <b>RC</b> | <b>Description</b>                                                                                                                  |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------|
| 0101      | Failure in DFSQMGR Get Unique or GN call. RC not 0 and QTP1EOM=0.                                                                   |
| 0103      | Failure in DFSQMGR Dequeue or Cancel call. RC not 0.                                                                                |
| 0107      | Failure to get AWE using DFSBCB macro.                                                                                              |
| 0108      | QMGR GU call failed with RC08.                                                                                                      |
| 0111      | DFSSLUM0 has been called to deliver a message with zero length to the front-end IMS system. A DFS2224 message will be sent instead. |
| 0121      | Failure to get LUMP pool buffer using DFSPPOOL macro.                                                                               |
| 0122      | Failure to free LUMP pool buffer using DFSPPOOL macro.                                                                              |

### **DFS6CKP0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6CKP0 are given.

- | <b>RC</b> | <b>Description</b>                                                            |
|-----------|-------------------------------------------------------------------------------|
| 2201      | Invalid checkpoint type specified in parameter list. Should be ALL or STATUS. |
| 2202      | Data block too large for log record.                                          |

### **DFS6ECT0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6ECT0 are given.

- | <b>RC</b> | <b>Description</b>                                              |
|-----------|-----------------------------------------------------------------|
| 3101      | Error freeing XAWE using DFSBCB macro.                          |
| 3102      | Error freeing XAWE using STORAGE macro.                         |
| 3104      | Invalid AWE request.                                            |
| 3105      | Failure in DFSTM0 to connect all dependent regions FUNC=CONALL. |

- 3107 Failure in DFSBCB to get AWE storage
- 3109 Error detected in DFS6IDC0 building user descriptors.
- 3110 Error getting CIOP storage using DFSPPOOL macro.
- 3111 Error freeing CIOP storage using DFSPPOOL macro.
- 3112 VTAM MODIFY USERVAR failed during activation of XRF alternate.
- 3113 VTAM VARY NET TERM failed for termination of primary system.
- 3114 Error Posting asynchronous control block using DFSSERVER macro.
- 3115 Error Checking synchronous control block using DFSSERVER macro.
- 3116 VTAM MODIFY USERVAR failed for activation of primary system.

### **DFS6IDC0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6IDC0 are given.

- | <b>RC</b> | <b>Description</b>                                             |
|-----------|----------------------------------------------------------------|
| 2401      | Unable to obtain storage for BPAM buffer using STORAGE macro.  |
| 2402      | Unable to release storage for BPAM buffer using STORAGE macro. |
| 2403      | Unknown DFS warning message number.                            |
| 2404      | Failure to get LUMP pool buffer using DFSPPOOL macro.          |
| 2405      | Failure to free LUMP pool buffer using DFSPPOOL macro.         |

### **DFS6LUS0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6LUS0 are given.

- | <b>RC</b> | <b>Description</b>                                                                                          |
|-----------|-------------------------------------------------------------------------------------------------------------|
| 1004      | No synchronous control block given in SEND service call.                                                    |
| 1007      | TIB was released while the task was waiting to synchronize.                                                 |
| 1008      | TIB_SYNC_PTR was changed, but not to zero.                                                                  |
| 1010      | Unknown service call in main program.                                                                       |
| 1012      | Unable to get storage for LU 6.2 message prefix using DFSBCB macro.                                         |
| 1013      | Unable to create an asynchronous control block using DFS62DST<br>FUNC=FUNC.                                 |
| 1015      | No LUM block given in BLDPRE service call.                                                                  |
| 1016      | Unable to find asynchronous control block or create a new one in CHNG<br>service call. DFS62DST FUNC(FIND). |
| 1018      | Conversation-id zero at send time.                                                                          |
| 1020      | Return Code X'1C' from Queue Manager Get Unique call.                                                       |
| 1022      | Unable to free storage for LU 6.2 message prefix using DFSBCB macro.                                        |
| 1027      | Expect input LU 6.2 msg prefix in COPYPF62 service call.                                                    |

- 1029 Expect input synchronous/asynchronous control block in COPYPF62 service call.
- 1031 Invalid TPN=DFSSIDE in CHNG service call.
- 1032 Unable to find LU 6.2 descriptor entry in BLDPRE service call using DFS62DST macro.
- 1060 Failure in DFSBCB to get AWE.
- 1061 Failure in DFSBCB to free AWE.
- 1062 Failure to get LUMP pool buffer using DFSPPOOL macro.
- 1063 Failure in SENDMSG using DFSXCF macro.
- 1064 Failure to free LUMP pool buffer using DFSPPOOL macro.

### DFS6LUS1

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6LUS1 are given.

| RC   | Description                                                                                     |
|------|-------------------------------------------------------------------------------------------------|
| 1110 | Unknown service call in main program.                                                           |
| 1117 | No message prefix or synchronous/asynchronous control block given in INQY service call.         |
| 1123 | Unable to clean up TP.                                                                          |
| 1124 | Unable to clean up in the address space.                                                        |
| 1125 | No synchronous control block is given in TIBINFO service call                                   |
| 1126 | Unable to find the asynchronous or restart synchronous control block in GETQABTIB service call. |
| 1127 | DFS6LUS1 cannot find TIB/QAB.                                                                   |
| 1130 | Unable to post RLM back in CONVCONT service call.                                               |
| 1133 | Unable to find LU 6.2 descriptor entry in INQY service call.                                    |
| 1134 | No message prefix supplied in GETQABTIB service call.                                           |
| 1140 | DFSQMGR Get Unique or Insert Move call failed in MSGROUTE service call.                         |
| 1142 | Unable to find or to create a synchronous control block in FPGU service call.                   |
| 1143 | Unable to free a synchronous control block (DFS62DST FUNC=RELEASE).                             |
| 1150 | Return code from ATBRCVW in PH1 service call (abort synchpoint).                                |
| 1151 | Return code from ATBGTA2 in PH1 service call (abort synchpoint).                                |

### DFS6LUS2

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6LUS2 are given.

| RC   | Description                     |
|------|---------------------------------|
| 1201 | No PCB given in READSQ service. |

- 1202 No control block given in READSQ service.
- 1203 Invalid control block type in READSQ service.
- 1204 DFSQMGR Get Unique failure in READSQ service.
- 1205 DFSQMGR Enqueue failure in READSQ service.
- 1206 DFSQMGR Dequeue failure in READSQ service.
- 1207 Failure to get LUMP pool buffer using DFSPOOL macro.
- 1208 Failure to free LUMP pool buffer using DFSPOOL macro.
- 1209 Failure to get MSEB storage using DFSBCB macro.
- 1210 Failure to free MSEB storage using DFSBCB macro.
- 1211 Failure to get HIOP storage using DFSPOOL macro.
- 1212 Failure to free HIOP storage using DFSPOOL macro.
- 1224 CQS not available in READSQ service.

### **DFS6QFX0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6QFX0 are given.

|           |                    |
|-----------|--------------------|
| <b>RC</b> | <b>Description</b> |
|-----------|--------------------|

- |      |                                                                |
|------|----------------------------------------------------------------|
| 3601 | Failure in creating a restart control block.                   |
| 3602 | Failure in DFSCIR to create restart ITASK.                     |
| 3603 | Failure in IXCTL to run under restart ITASK.                   |
| 3604 | Failure in DFSCIR to delete restart ITASK.                     |
| 3682 | Issue /STO APPC if APPC/IMS was started; then issue /STA APPC. |

### **DFS6RST0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS6RST0 are given.

|           |                    |
|-----------|--------------------|
| <b>RC</b> | <b>Description</b> |
|-----------|--------------------|

- |      |                                             |
|------|---------------------------------------------|
| 2101 | Log record type not X'22', X'23', or X'24'. |
| 2102 | Log record code not X'40'.                  |

### **DFS62FD0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS62FD0 are given.

|           |                    |
|-----------|--------------------|
| <b>RC</b> | <b>Description</b> |
|-----------|--------------------|

- |      |                                                          |
|------|----------------------------------------------------------|
| 3201 | Failure in DFSBCB to release LU block.                   |
| 3202 | Failure in DFSBCB to release asynchronous control block. |
| 3203 | Failure in DFSBCB to get asynchronous control block.     |

- 3204 Failure in DFSBCB to release asynchronous control block. (Second location within module.)
- 3205 Failure in DFSTCBTB FUNC=LOCATE.
- 3206 Failure in DFSCIR to create ITASK.
- 3207 Failure in DFSBCB to get synchronous control block.
- 3208 Failure in DFSCIR to delete ITASK for asynchronous message.
- 3209 Failure in DFSCIR FUNC=DTASK to release duplicate ITASK for asynchronous message.
- 3210 Synchronous control block to be released not found in chain.
- 3211 Input parameter list is invalid, unknown type.
- 3213 DFSCS failed adding synchronous control block to chain.
- 3216 IMODULE DELETE failed while releasing asynchronous control block.
- 3217 Blank LUNAME or nonblank SIDENAME with TPNAME='DFSSIDE'.
- 3220 Invalid parameters on module entry.
- 3221 Invalid parameters on module entry.
- 3222 Failure to free HIOP storage using DFSPOOL macro.
- 3223 Failure to free HIOP storage using DFSPOOL macro.
- 3224 Failure to free MSEB storage using DFSBCB macro.

### **DFS62FD1**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFS62FD1 are given.

#### **RC      Description**

- 3801 Input parameter list is invalid, unknown type.
- 3802 Failure in DFSBCB FUNC=GET to get LU block.
- 3803 Failure in DFSBCB FUNC=REL to release LU block.
- 3804 Failure in DFSBCB FUNC=GET to get descriptor.
- 3805 Failure in DFSCS for inserting descriptor into table.
- 3806 IMODULE DELETE failed for delete of restart synchronous control block hash table.
- 3807 Failure in DFSBCB FUNC=GET to get synchronous control block.
- 3808 Failure in DFSBCB FUNC=REL to release restart asynchronous control block.

### **DFSLUM00**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSLUM00 are given.

#### **RC      Description**

- 5101 Failure in DFSQMGR Get Unique for notify message.

- 5102 Failure in DFS62FD0 finding an asynchronous control block for notify message.
- 5109 Unknown return code from z/OS clean address space call.
- 5110 Unknown return code from z/OS unidentify call.
- 5111 IXCLEAVE unsuccessful.

### **DFSHAV70**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSHAV70 are given.

#### **RC Description**

- 3709 Unknown return code from z/OS clean address space call.
- 3710 Unknown return code from z/OS unidentify call.
- 3711 IXCLEAVE unsuccessful.

### **DFSXLUM0**

APPC/IMS issues message DFS1959E when a severe internal error occurs. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message. Reason codes for message DFSXLUM0 are given.

#### **RC Description**

- 5009 Unknown return code from z/OS clean address space call.
- 5010 Unknown return code from z/OS unidentify call.
- 5011 IXCLEAVE unsuccessful.

## **DFS1965E APPC/MVS call failures**

The APPC/IMS diagnostic aids include DFS1965E APPC/MVS call failures. If you receive this message, contact IBM® Software Support with the module number and reason code supplied in the message.

A call to APPC/MVS had an unexpected return code. The call for FUNCTION=aaaaaaa was issued, and a return code xx from APPC/MVS was the result. Return code xx denotes the specific IMS module performing the APPC call. Error return codes that represent anticipated conditions are handled by IMS, and do not result in this message. This message is produced when an unexpected result is encountered, which might represent an abnormal condition in some system component.

#### **RC Description**

- xx90 Synchronous call failure
- xx91 Asynchronous call failure

## **Diagnostics for use with synchronous APPC and OTMA with shared queues**

Synchronous APPC and OTMA message processing in the shared queues environment introduces additional diagnostic considerations for the message flow.

In addition to the APPC and OTMA traces already used, other facilities include:

- IMS Resource Recovery Trace
- z/OS Resource Recovery Trace
- z/OS APPC Trace
- Console memory dumps of the z/OS Resource Recovery Services and APPC address and data spaces.

If IMS is using z/OS cross-system coupling facility for communication, a memory dump of the RRS address space is unavailable.

**Related tasks:**

“Resource Recovery Services trace” on page 612

## SNAPs and dumps

For errors that do not result in an abend, IMS writes a X'67D0' log record or produces an SDUMP, depending on the error. The minimum data dumped for LU 6.2 problems are the control blocks that are associated with the task in error and the appropriate trace tables.

## OTMA diagnostic aids

OTMA diagnostic aids include OTMA trace, module-to-code cross references, verb-to-code cross references, DFS1296E message information, log records, and SNAPs and dumps.

## OTMA trace

The OTMA trace records the flow of control through IMS OTMA. Turn on the OTMA trace only if the IBM support representative requests it.

### Starting the OTMA trace

The /TRACE SET ON TABLE OTMT command activates the trace and sends the entries to an internal table.

You can format the table using the Offline Dump Formatter under IPCS, using either the VERBX command or the IMS Dump Formatter panels.

If a SNAP dump is taken, the table is formatted as part of the IMS dump. If you add the OPTION LOG parameter to the /TRACE command, IMS sends the output to an external data set. You can use the File Select and Format utility (DFSERA10) with exit routine DFSERA60 to format trace entries.

**Related concepts:**

“Formatting IMS dumps offline” on page 509

### Format of OTMA trace records

Each record of the OTMA trace record format is eight words long, and word 0 holds standard information.

*Table 91. OTMA trace record format.*

| WORD 0 |            | WORD 1 | WORD 2 | WORD 3 | WORD 4 | WORD 5 | WORD 6 | WORD 7 |
|--------|------------|--------|--------|--------|--------|--------|--------|--------|
| ID     | SEQ<br>NUM |        |        |        |        |        |        |        |

where **represents**

**ID** 2-byte trace ID

## SEQ NUM

2-byte trace sequence number assigned by the IMS trace component

Words 1 through 7 contain data specific to each trace entry, as described below:

Trace ID = X'5A01' OTMA module entry

### Word 1

Byte 0: Module number

Bytes 1-3: Reserved

### Word 2

A(ECB)

### Word 3

Register 1

### Words 4-5

Optional user data

### Words 6-7

Time stamp (STCK)

TRACE ID = X'5A02' OTMA module exit

### Word 1

Byte 0: Module number

Bytes 1-3: Reserved

### Word 2

A(ECB)

### Word 3

Return code

### Words 4-5

Optional user data

### Words 6-7

Time stamp (STCK)

TRACE ID = X'5A03' IMS internal OTMA error

### Word 1

Byte 0: Module number

Bytes 1-3: 0

### Word 2

A(ECB)

### Word 3

Error code

### Word 4

Optional user data

### Word 5

0

### Words 6-7

Time stamp (STCK)



TRACE ID = X'5B01' XCF/z/OS entry

**Word 1**

Byte 0: Module number

Byte 1: XCF call number

**Words 2-7**

Control message

TRACE ID = X'5B02' XCF/z/OS exit

**Word 1**

Byte 0: Module number

Byte 1: XCF call number

**Word 2**

A(ECB)

**Word 3-4**

XCF token

**Word 5**

Return code

**Word 6**

Reason code

**Word 7**

Time stamp (short)

TRACE ID = X'5CX' OTMA AWE function

**Word 1**

Byte 0: Module number

**Words 2-6**

Reserved

**Word 7**

Time stamp (short)

TRACE ID = X'5C71' OTMA DFSYPSI0 input trace entry

**Word 1**

Byte 0: module number X'25'

Byte 1:

**X'01'** an input transaction with reroute name specified

**X'02'** a NAK with reroute request

**X'03'** a NAK with purge request

Byte 2-3: 0

**Word 2**

Addr(ECB)

**Word 3**

Addr(YQAB) if byte 1 of word 1 is X'01'. Otherwise, it will be Addr(YTQAB).

**Word 4**

0

**Word 5**  
Bytes 0-3 of reroute tpipe name

**Word 6**  
Bytes 4-7 of reroute tpipe name

**Word 7**  
Time stamp (short)

TRACE ID = X'5C72' OTMA DFSYQAB0 output trace entry

**Word 1**  
Byte 0: module number X'29'  
Byte 1: X'03' reroute on SendOnly output  
Byte 2-3: 0

**Word 2**  
Addr(ECB)

**Word 3**  
Addr(YQAB)

**Word 4**  
0

**Word 5**  
Bytes 0-3 of reroute tpipe name

**Word 6**  
Bytes 4-7 of reroute tpipe name

**Word 7**  
Time stamp (short)

## OTMA trace entry for user exits

Trace IDs and their words are listed for the user exits.

TRACE ID = X'5A05' User exit DFSYIOE0 module exit

**Word 1**  
Byte 0: module number X'33'  
Byte 1-3: 0

**Word 2**  
A(ECB)

**Word 3**  
0

**Word 4**  
0

**Word 5**  
0

**Word 6-7**  
Time stamp (STCK)

TRACE ID = X'5A06' User exit DFSYIOE0 module exit

**Word 1**  
Byte 0: module number X'33'

Byte 1-3: 0

**Word 2**

A(ECB)

**Word 3**

Exit RC set by the module

**Word 4**

0

**Word 5**

0

**Word 6-7**

Time stamp (STCK)

TRACE ID = X'5A07' User exit DFSYPRX0 module entry

**Word 1**

Byte 0: module number X'31'

Byte 1-3: 0

**Word 2**

A(ECB)

**Word 3**

0

**Word 4**

0

**Word 5**

0

**Word 6-7**

Time stamp (STCK)

TRACE ID = X'5A08' User exit DFSYPRX0 module entry

**Word 1**

Byte 0: module number X'31'

Byte 1-3: 0

**Word 2**

A(ECB)

**Word 3**

Exit RC set by the module

**Word 4**

0

**Word 5**

IMS internal processing code

**Word 6-7**

Time stamp (STCK)

TRACE ID = X'5A09' User exit DFSYDRU0 module entry

**Word 1**

Byte 0: module number X'32'

Byte 1-3: 0

**Word 2**  
A(ECB)

**Word 3**  
0

**Word 4**  
0

**Word 5**  
0

**Word 6-7**  
Time stamp (STCK)

TRACE ID = X'5A0A'User exit DFSYDRU0 module exit

**Word 1**  
Byte 0: module number X'32'  
Byte 1-3: 0

**Word 2**  
A(ECB)

**Word 3**  
Exit RC set by the module

**Word 4**  
0

**Word 5**  
IMS internal processing code

**Word 6-7**  
Time stamp (STCK)

## OTMA trace entry for synchronous callout

OTMA trace entries for synchronous callout have the trace ID X'5A04'.

### Trace entries in module DFSYSCP0

Byte 0 of word 1 is the module identifier X'10'. Byte 1 of word 1 is a location ID that identifies the trace event.

Table 92. Contents of words 1 - 7 for trace entries in module DFSYSCP0.

| Word   | Byte                                               | Contents                                       |
|--------|----------------------------------------------------|------------------------------------------------|
| Word 1 | Byte 0                                             | Module ID: X'10'                               |
|        | Byte 1                                             | Location ID:                                   |
|        |                                                    | X'11' Ready to chain the ICAL AWE to DFSYQAB0  |
|        |                                                    | X'12' Failed to activate DFSYQAB0              |
|        |                                                    | X'13' Post back by DFSYSCS0 for ICAL           |
|        |                                                    | X'14' Post back by DFSYSCS0 for ICAL           |
|        |                                                    | X'15' ICAL was rejected by an IMS command      |
|        |                                                    | X'16' Processing a response                    |
|        |                                                    | X'17' Processing a timeout                     |
|        |                                                    | X'18' Processing an invalid post from DFSYSCS0 |
|        |                                                    | X'19' OTMA ACK timeout occurred                |
| Word 1 | Byte 2                                             | PSTFLAG2                                       |
|        | Byte 3                                             | 0                                              |
| Word 2 | PST address of the ICAL                            |                                                |
| Word 3 | YQAB address                                       |                                                |
| Word 4 | AWORNAME (1:4)                                     |                                                |
|        | <b>Note:</b> This identifier is the unique ICAL ID |                                                |
| Word 5 | AWORNAME (5:8)                                     |                                                |
|        | <b>Note:</b> This identifier is the unique ICAL ID |                                                |
| Word 6 | First half of STCK                                 |                                                |
| Word 7 | Second half of STCK                                |                                                |

## Trace entries in module DFSYQAB0

Byte 0 of word 1 is the module identifier X'29'. Byte 1 of word 1 is a location ID that identifies the trace event.

Table 93. Contents of words 1 - 7 for trace entries in module DFSYQAB0.

| Word   | Contents                                                             |                  |                                      |
|--------|----------------------------------------------------------------------|------------------|--------------------------------------|
| Word 1 | Byte 0                                                               | Module ID: X'29' |                                      |
|        | Byte 1                                                               | Location ID:     |                                      |
|        |                                                                      | X'11'            | Pre-call to the Edit_N_Send for ICAL |
|        |                                                                      | X'12'            | Waking up to process an ACK or NAK   |
|        |                                                                      | X'13'            | Late ACK received after response     |
|        |                                                                      | X'14'            | Getting an ACK for ICAL              |
|        |                                                                      | X'15'            | Getting a NAK for ICAL               |
|        | Byte 2                                                               | PSTFLAG2         |                                      |
| Byte 3 | 0                                                                    |                  |                                      |
| Word 2 | State of this ICAL: AWOSTATE                                         |                  |                                      |
| Word 3 | YQAB address                                                         |                  |                                      |
| Word 4 | AWORNAME (1:4)<br><b>Note:</b> This identifier is the unique ICAL ID |                  |                                      |
| Word 5 | AWORNAME (5:8)<br><b>Note:</b> This identifier is the unique ICAL ID |                  |                                      |
| Word 6 | First half of STCK                                                   |                  |                                      |
| Word 7 | Second half of STCK                                                  |                  |                                      |

## Trace entries in module DFSYMEM0

Trace entries in this module have the module ID X'23' and are organized in one of two formats. If the location identifier is X'10', words 2 - 5 are 0 as shown in the following table.

Table 94. Contents of words 1 - 7 for trace entries in module DFSYMEM0 for location ID X'10'.

| Word   | Contents            |                    |
|--------|---------------------|--------------------|
| Word 1 | Byte 0              | Module ID: X'23'   |
|        | Byte 1              | Location ID: X'10' |
|        |                     | X'10'              |
|        |                     |                    |
|        | Byte 2              | PSTFLAG2           |
|        | Byte 3              | 0                  |
| Word 2 | 0                   |                    |
| Word 3 | 0                   |                    |
| Word 4 | 0                   |                    |
| Word 5 | 0                   |                    |
| Word 6 | First half of STCK  |                    |
| Word 7 | Second half of STCK |                    |

The following table shows the trace entry format for all other location identifiers in module DFSYMEM0.

*Table 95. Contents of words 1 - 7 for trace entries in module DFSYMEM0 for location IDs other than X'10'.*

| Word   | Contents                                                             |                                                          |
|--------|----------------------------------------------------------------------|----------------------------------------------------------|
| Word 1 | Byte 0                                                               | Module ID: X'23'                                         |
|        | Byte 1                                                               | Location ID:                                             |
|        |                                                                      | X'11'    Getting a response message from the client      |
|        |                                                                      | X'12'    An invalid AWE state was detected for ICAL      |
|        |                                                                      | X'13'    An internal post error was reported by DFSYSCS0 |
|        |                                                                      | X'14'    The AWE of the ICAL has an unknown state        |
|        | Byte 2                                                               | PSTFLAG2                                                 |
|        | Byte 3                                                               | 0                                                        |
| Word 2 | State of this ICAL: AWOSTATE                                         |                                                          |
| Word 3 | YQAB address                                                         |                                                          |
| Word 4 | AWORNAME (1:4)<br><b>Note:</b> This identifier is the unique ICAL ID |                                                          |
| Word 5 | AWORNAME (5:8)<br><b>Note:</b> This identifier is the unique ICAL ID |                                                          |
| Word 6 | First half of STCK                                                   |                                                          |
| Word 7 | Second half of STCK                                                  |                                                          |


## Trace entries in module DFSYMOM0

Byte 0 of word 1 is the module identifier X'22'. Byte 1 of word 1 is a location ID that identifies the trace event.

*Table 96. Contents of words 1 - 7 for trace entries in module DFSYMOM0.*

| Word   | Contents                                                             |                                 |
|--------|----------------------------------------------------------------------|---------------------------------|
| Word 1 | Byte 0                                                               | Module ID: X'22'                |
|        | Byte 1                                                               | Location ID:                    |
|        |                                                                      | X'11'    The ICAL has timed out |
|        | Byte 2                                                               | PSTFLAG2                        |
|        | Byte 3                                                               | 0                               |
| Word 2 | State of this ICAL: AWOSTATE                                         |                                 |
| Word 3 | YQAB address                                                         |                                 |
| Word 4 | AWORNAME (1:4)<br><b>Note:</b> This identifier is the unique ICAL ID |                                 |
| Word 5 | AWORNAME (5:8)<br><b>Note:</b> This identifier is the unique ICAL ID |                                 |
| Word 6 | First half of STCK                                                   |                                 |
| Word 7 | Second half of STCK                                                  |                                 |

## Related concepts:

 Synchronous callout requests (Communications and Connections)

## OTMA module-to-code cross-reference table

The OTMA module-to-code cross-reference table consists of module numbers, module name, and a description. You can use this information to associate code *xx* in message DFS1269E and the module number in trace records X'5A'*xx*, X'5B'*xx* and X'5C'*xx* with a module.

Table 97. OTMA module-to-code cross-reference table

| Module number (decimal) | Module number (hexadecimal) | Module/User exit type | Description                                           |
|-------------------------|-----------------------------|-----------------------|-------------------------------------------------------|
| 19                      | 13                          | DFSYLUS0              | OTMA fast services                                    |
| 20                      | 14                          | DFSYSTO0              | OTMA storage manager                                  |
| 21                      | 15                          | DFSYRR00              | OTMA destination reroute setup routine                |
| 22                      | 16                          | DFSYIO00              | OTMA input/output setup routine                       |
| 23                      | 17                          | DFSYCM20              | OTMA command processor                                |
| 24                      | 18                          | DFS6DC0               | Read and build LU 6.2 descriptors                     |
| 25                      | 19                          | DFSYCLH0              | OTMA /TRA services                                    |
| 26                      | 1A                          | DFSYRAC0              | OTMA security                                         |
| 27                      | 1B                          | DFSYMGX0              | OTMA z/OS cross-system coupling facility message exit |
| 28                      | 1C                          | DFSYGRX0              | OTMA XCF group exit                                   |
| 29                      | 1D                          | DFSYXMO0              | OTMA attach member OIM TCB                            |
| 30                      | 1E                          | DFSYC480              | OTMA STA/ST0 (join/leave) interface                   |
| 31                      | 1F                          | DFSYFND0              | OTMA FINDDEST processor                               |
| 32                      | 20                          | DFSYFD00              | OTMA control block processor                          |
| 33                      | 21                          | DFSYFD10              | OTMA control block processor                          |
| 34                      | 22                          | DFSYMOM0              | OTMA AWE server DFSYMOM0                              |
| 35                      | 23                          | DFSYMEM0              | OTMA member AWE server DFSYMEM0                       |
| 36                      | 24                          | DFSYIMI0              | OTMA getting storage for new member                   |
| 37                      | 25                          | DFSYPIS0              | TPIPE input AWE server DFSYPIS0                       |
| 38                      | 26                          | DFSYPSO0              | TPIPE output AWE server DFSYPSO0                      |
| 39                      | 27                          | DFSYSND0              | OTMA XCF interface                                    |
| 40                      | 28                          | DFSYTIB0              | OTMA synchronous processor DFSYTIB0                   |
| 41                      | 29                          | DFSYQAB0              | OTMA asynchronous processor DFSYQAB0                  |
| 42                      | 2A                          | DFSYLUS0              | OTMA service module number 0                          |
| 43                      | 2B                          | DFSYCMD0              | OTMA command service                                  |
| 44                      | 2C                          | DFSYCKP0              | OTMA check point                                      |
| 45                      | 2D                          | DFSYSLM0              | OTMA synchronous send module                          |
| 46                      | 2E                          | DFSYRST0              | OTMA restart                                          |
| 47                      | 2F                          | DFSYIDC0              | OTMA descriptor builder                               |
| 48                      | 30                          | DFSYQFX0              | OTMA queue fixer                                      |



Table 97. OTMA module-to-code cross-reference table (continued)

| Module number (decimal) | Module number (hexadecimal) | Module/User exit type | Description                            |
|-------------------------|-----------------------------|-----------------------|----------------------------------------|
| 49                      | 31                          | DFSYPXR0              | OTMA pre-routing exit routine DFSYPXR0 |
| 50                      | 32                          | DFSYDRU0              | OTMA default DRU exit routine DFSYDRU0 |
| 51                      | 33                          | DFSYIOE0              | OTMA input/output edit exit routine    |

## OTMA verb-to-code cross-reference table

The OTMA verb-to-code cross-reference table consists of verb numbers, verb name, and a description. You can use this information to associate the z/OS cross-system coupling facility call number in trace record X'5B' *xx* with a z/OS XCF verb.

Table 98. z/OS XCF verb-to-code cross-reference table

| Verb number (hexadecimal) | Verb name | Verb description                            |
|---------------------------|-----------|---------------------------------------------|
| 01                        | IXCCREAT  | Defines a member to XCF                     |
| 02                        | IXCJOIN   | Enables a member to join a group            |
| 03                        | IXCQUERY  | Return information about groups and members |
| 04                        | IXCMSGO   | Sends a message to another active member    |
| 05                        | IXCMSGI   | Receives a message on an active member      |
| 06                        | IXCLEAVE  | Disassociates a member from XCF             |

## DFS1269E message information

OTMA issues message DFS1269E when a severe internal error occurs. If you receive this message, contact the IBM Support Center with the module number and reason code supplied in the message, and, if requested, output from the OTMA trace.

The message format is:

DFS1269E SEVERE IMS INTERNAL FAILURE, REASON CODE=*xxyy*

Variable *xx* is a decimal number that identifies the module. To determine the module associated with the code, see Table 97 on page 348. Variable *yy* is an internal reason code.

The following two reason codes are module independent. Variable *xx* represents the specific IMS module issuing the macro call.

### Reason code

|              | Description                                                                   |
|--------------|-------------------------------------------------------------------------------|
| <i>xx</i> 98 | Failure in DFSPOOL to acquire storage for a variable with the DFSYMGAT macro. |
| <i>xx</i> 99 | Failure in DFSPOOL to release storage for a variable with the DFSYMARL macro. |

Other reason codes are module dependent.

## OTMA log records

To activate OTMA logging, use one of the /TRA SET ON commands.

To activate OTMA logging, enter one of the following trace commands from the master terminal or the z/OS console.

```
/TRA SET ON tmember client1.
/TRA SET ON tmember client1 tpipe tpipe1.
```

## SNAPs and dumps

For errors that do not result in an abend, IMS writes log record X'67D0', or produces an SDUMP, depending on the error. The minimum data dumped for OTMA problems are the control blocks that are associated with the task in error and the appropriate trace tables.

---

## Diagnosing Fast Path problems related to print data set options: IMS Spool API support

IMS provides an expansion of the DL/I application program interface that allows applications to interface directly to JES and create print data sets on the JES spool. These print data sets can then be made available to print managers and spool servers to serve the needs of the application.

## Understanding parsing errors

The IMS Spool API support provides feedback to the application program when IMS detects errors in the print data set options included on either the CHNG calls or SETO calls. This section describes the high-level processing of the parameters associated with the CHNG and SETO calls, including some examples of errors and the types of feedback information that can be expected.

Error codes provides a summary of the error codes that can be expected to be returned if the application provides a feedback area. It might be useful for the application to develop ways to display these errors by sending a message to an IMS printer or some other technique that allows examination of the parameter lists and feedback area without having to look at a dump. This section discusses each error code and provides some examples of when the error code might be expected. This discussion applies to these calls when used with the IMS Spool API support.

When diagnosing multiple parsing error return codes, the first code returned should be the most meaningful. Errors detected with incorrect length fields or previously invalid keywords can result in valid keywords being reported as errors.

### Keywords

The parameter lists used with CHNG and SETO calls contain two types of keywords. The two types are those keywords valid for the calls (that is, IAFP, PRTO, TXTU, and OUTN), and the keywords provided as operands of the PRTO keyword (for example, CLASS, FORMS).

This separation of keywords is used to determine what type of keyword validation IMS should perform. When looking for valid keywords on the calls, one set of keywords is valid, and when looking at keywords following the PRTO keyword, another set of keywords are valid. For this reason, incorrectly specified length fields may cause one scan to terminate prematurely and keywords to be invalid because they are incorrectly positioned in the call list.

## Status codes

We can deduct what might be the source of the error code by looking at the status code returned for the call. As a general rule, a status code of AR is given when the keyword is associated with the call and a status code of AS is given when the keyword is invalid as a PRT0 option. There might be exceptions to this rule, but in general this will hold true.

## Error code examples

These examples describe errors and the resulting error codes.

Some length fields are omitted from the examples when they are unnecessary to the example. Feedback and options lists that are shown on multiple lines are contiguous, as they are in the working storage of an application.

Subsections:

- "Error code (0002)"
- "Error code (0004)" on page 352
- "Error code (0006)" on page 352
- "Error code (0008)" on page 352
- "Error code (000A)" on page 353
- "Error code (000C)" on page 353
- "Error code (000E)" on page 353

### Error code (0002)

This code indicates that an invalid keyword was discovered within the call options. The error code of (0002) indicates that the keyword scan being performed is associated with keywords that are valid for the call. For example:

```
CALL = SET0
 01
OPTIONS LIST = PRT0=04DEST(018),CLASS(A),TXTU=SET1

FEEDBACK = TXTU(0002)

STATUS CODE = AR
```

In this example, the options list contains both the keywords PRT0 and TXTU. The TXTU keyword is not valid for the SET0 call.

Another example of an error code of (0002) in the feedback is created when the length field that represents the PRT0 options is specified as shorter than the actual length of the options. For example:

```
CALL = CHNG
 01
OPTIONS LIST = IAFF=N0M,PRT0=0FDEST(018),LINECT(200),CLASS(A),
 COPIES(80),FORMS(ANS)

FEEDBACK = COPIES(0002),FORMS(0002)

STATUS CODE = AR
```

In this example, the length field of the PRT0 options (001F) is too short to contain all the options. As a result, IMS finds the keywords COPIES and FORMS outside the PRT0 options list area and indicates that these keywords are not allowed as keywords on the CHNG call.

### Error code (0004)

This error code indicates that an option variable that follows a keyword in the options list for the CALL is not within the length limits for the option. An example of this type of error is the OUTN keyword. The name of the OUTPUT JCL statement must be from 1- to 8-characters. For example:

```
CALL = CHNG

OPTIONS LIST = IAFP=NOM,OUTN=OUTPUTDD1

FEEDBACK = OUTN(0004)

STATUS CODE = AR
```

The operand for the OUTN keyword is 9 bytes and exceeds the maximum value.

### Error code (0006)

This error occurs when IMS is scanning for valid keywords that are associated with the call and encounters the PRTO keyword. On interrogation of the length field associated with the PRTO keyword, IMS discovers that the total length of the options list for the call is too short to contain all of the operands within the PRTO keyword. For example:

```
CALL = CHNG
 0400 05
OPTIONS LIST = 0800IAFP=NOM,PRTO=0ADEST(018),LINECT(200),CLASS(A),
 COPIES(3),FORMS(ANS)

FEEDBACK = PRTO(0006),LINECT(0002),CLASS(0002),COPIES(0002),
 FORMS(0002)

STATUS CODE = AR
```

This example provides an options list that is hexadecimal, 48 (decimal 72) bytes long and the correct length for the options list. The length field of the PRTO keyword incorrectly indicates a length of hexadecimal 5A. The length of the PRTO options exceeds the length of the entire options list so the PRTO keyword is ignored and the rest of the options list scanned for valid keywords. The feedback area contains the PRTO(0006) as we would expect to indicate a length error for this keyword, but we also find that the PRTO keywords are reported to be in error (0002). This is because the keywords beyond the first PRTO keyword, up to the length specified in the options list length field have been scanned in search of valid keywords for the call. The status code of AR tells us that the keywords are considered invalid for the call and not the PRTO keyword.

### Error code (0008)

This error is returned when IMS finds that one of the options for the IAFP keyword has not been specified correctly. For example:

```
CALL = CHNG
 00
OPTIONS LIST = IAFP=N0Z,PRTO=0BDEST(018)

FEEDBACK = IAFP(0008) INVALID VARIABLE

STATUS CODE = AR
```

The message option of the IAFP keyword has been incorrectly specified as 'Z'. This results in the error code (0008).

### Error code (000A)

This error indicates that not all of the necessary keywords have been specified for this call. For example:

```
CALL = CHNG

OPTIONS LIST = TXTU=SET1

FEEDBACK = TXTU(000A)

STATUS CODE = AR
```

For this call, a valid keyword of TXTU was specified but the call also requires that the IAFP keyword be specified if the TXTU keyword is used. Since the IAFP keyword is missing, the error code of (000A) is returned when the TXTU keyword is found.

### Error code (000C)

The error code is reporting a condition in which a set of mutually exclusive keywords are used in the same call options list. A clue to the problem being with the call options and not the PRTO options is given by issuing of the status code of AR and not the status code of AS. For example:

```
CALL = CHNG

 00
OPTIONS LIST = IAFP=A00,PRTO=0BCOPIES(3),TXTU=SET1

FEEDBACK = TXTU(000C)

STATUS CODE = AR
```

In this case, the call options list contains both the keywords of PRTO and TXTU. These options are mutually exclusive and cannot be used in the same options call list. The result is error code of (000C) returned along with status code of AR.

### Error code (000E)

This error code indicates that while parsing the actual print data set descriptors, an error was detected with one or more of the operands. For the most part, IMS does not do any checking for these print descriptors. Instead IMS uses z/OS services (SJF) to do the validation of the print descriptors. When SJF is called, the validation requested is the same as for the TSO OUTDES command. For this reason, IMS is insensitive to changes in output descriptors and the valid descriptors for your system are a function of the z/OS release level.

You can obtain a list of the valid descriptors and the proper syntax by using the TSO HELP OUTDES command.

IMS must first establish that the format of the PRTO options is in a format such that SJF services can be requested. If not, IMS returns status code AS and error code of (000E) and a descriptive error message. If the error has been detected during the SJF process, the error message from SJF includes information of the form, (R.C.=xxxx,REAS.=yyyyyyyy) and an error message indicating the error. The return codes and reason are further identified in the *z/OS MVS Programming: Authorized Assembler Services Reference Vol 1*.

The range of some variables are controlled by the JES initialization parameters. Values for the maximum number of copies, allowable remote destination, classes, and form names are examples of variables influenced by the JES initialization parameters.

The following examples show parsing errors and the resulting error messages:

```
CALL = CHNG
 01
OPTIONS LIST = IAFP=A00,PRTO=0BCOPIES((3),(8,RG,18,80))

FEEDBACK = PRTO(000E) (R.C.=0004,REAS.=00000204) COPIES/RG VALUE
 MUST BE NUMERIC CHARACTERS

STATUS CODE = AS
```

For this example, the COPIES parameter has the incorrect value 'RG' specified as one of its operands. The error message indicates that the values for these operands must be numeric.

```
CALL = CHNG
 00
OPTIONS LIST = IAFP=A00,PRTO=0AXYZ(018)

FEEDBACK = PRTO(000E) (R.C.=0004,REAS.=000000D0) XYZ

STATUS CODE = AS
```

This example includes an invalid PRTO operand. The resulting reason code of X'000000D0' indicates that the operand shown (XYZ) is invalid.

## Debugging and diagnostic aids provided by IMS Spool API

In addition to providing feedback related to parsing errors, the IMS Spool API also provides other aids you can use in your diagnosis.

While debugging suspected problems with either the IMS Spool API or the application using the support, keep in mind that multiple services are involved in providing the total environment. Certain JES specifications might affect which options and specifications can be used by the IMS Spool API on behalf of an application program.

### Internal trace table

Each dependent region that uses the IMS Spool API creates a trace table that is used to trace module flow and significant events during IMS Spool API processing. This trace table is of the internal wrap around type, is always active for IMS Spool API functions, and cannot be written to an external device. It appears in any dumps that are produced by the dependent region. The first four words of the trace table are the header and contain the following information.

#### Word one

This is the trace table eye catcher. The eye catcher is **IWB**.

#### Word two

This is the offset from the beginning of the trace table (that is, trace table header) to the last entry traced. Since the entry is an offset, relocation of the trace table does not affect the use of this word to obtain the address of the last trace entry. The offset value is added to the relocated trace table address to obtain the last trace entry. If the value is zero, no entries have been traced.

**Word three**

This is the offset from the beginning of the trace table (the header) to the last trace entry in the table.

**Word four**

Reserved.

**Log records produced by the IMS Spool API**

The IMS Spool API produces log records to record the significant events during IMS Spool API processing. A log record of the type X'68' is written for each data set that is opened. This log record contains the information necessary for identification of the data set. If any significant event occurs during spool processing, a diagnostic log record, 67D0 is produced to record diagnostic information about the error or event. The writing of the 67D0 records is normally associated with the DFS0013E message sent to the IMS MTO for these errors.

**Special abend processing**

The IMS Spool API places control blocks in both extended common storage area (ECSA) and dependent region private storage. When a dependent region dump is produced, and IMS abnormal termination routines are allowed to execute, the following control block relocation is performed to provide diagnostic information in the dependent region dump.

The master control block for the dependent region and any active data set control blocks in ECSA are copied to the dependent region. These control blocks are copied without modification and the ECSA address of each print data set control block, IAFPCB, is appended to the front of each relocated block.

A dummy module, DFSIAFD0, is loaded into the dependent region to serve as a place holder for the addresses of the relocated IMS Spool API control blocks. Obtain the address of module DFSIAFD0 by checking the dependent regions Job Pack Queue for the Contents Directory Entry (CDE) that represents module DFSIAFD0. The first three words of this dummy module contain the address of the relocated control blocks as follows.

**Word one**

This is the address of the relocated master control block (IAFPCB) for the dependent region. The ECSA address of the master control block is appended in front of the relocated control block area. The eye catcher for the block is **IAFPCB**.

**Word two**

This is the address of the first relocated IMS Spool API data set control block for a print data set (IAFPCB). When this block is copied to the dependent region, the ECSA address of the original block is appended to the front of the relocated block. This is so that the chaining of the blocks can be verified. Any additional IAFPCB control blocks are relocated following the first relocated block with the ECSA address of each block appended to the front of each relocated block. The eye catcher for the block is **IAFPCB**.

**Word three**

This is the address of the trace table for the IMS Spool API. The eye catcher for the trace table is **IWB**.

## Service error log record 67D0

The IMS Spool API creates Service Error log records, log record type 67D0, whenever a service error or unexpected condition is encountered. The 67D0 log record contains the service in error and detailed information about the system status at the time the error is detected. When problem determination is being attempted for suspected IMS Spool API errors, obtain the 67D0 log records from the IMS systems log. If the IMS Spool API issues message DFS0013E, a service error log record is also written.

In addition to the errors reported through message DFS0013E, service error log records are written if the IMS Spool API code encounters inconsistent control block structures or is unable to properly process print data sets during abend processing. These service error log records are printed using the File Select and Formatting Print utility (DFSERA10).

Some examples of events that cause service error log records 67D0 to be produced are:

- Error during storage obtain/free
- Open or Close errors
- Allocation or deallocation errors
- Errors during Output Descriptor processing
- BSAM write errors
- Invalid IAFP Control Block encountered
- Unable to process print data sets due to abending dependent region
- OTMA experiences a severe internal error or rejects a synchronous callout ICAL call from an IMS application

The writing of these service error log records occurs automatically.



---

## Chapter 12. DRA - Database Resource Adapter service aids

In a Database Control (DBCTL) environment, if you think the coordinator controller (CCTL) did not cause the problem, then start your analysis here.

This section provides service aids and tips that can help you analyze problems in a Database Control (DBCTL) environment.

The DRA is the interface between DBCTL and the CCTL. The functions of the DRA are to:

- Request connection to and disconnection from DBCTL.
- Tell the CCTL when DBCTL has failed or when the operator has requested a shutdown.
- Manage threads.

---

### DRA dumps

The DRA creates a dump when a DRA request fails or when DRA processing fails. A DRA request failure produces either a system abend or an IMS pseudoabend. A DRA processing failure produces a system abend.

For either type of failure, the DRA first tries to create a z/OS SDUMP. If that fails, the DRA creates a SNAP dump. In some situations, the DRA creates a SNAP dump without attempting to create an SDUMP. For certain types of pseudoabends, the DRA creates neither an SDUMP nor a SNAP dump.

To determine what type of dump the DRA created, check field PAPLRETC in the DFSPAPL (the parameter list that passes information between the CCTL and the DBCTL). The field PAPLRETC has the format *hhsssuuu*, where *hh* indicates the type of dump.

The following table shows the values for *hh* and indicates which dumps the DRA creates for different types of failures.

*Table 99. Determining the type of dump created by the DRA*

| hh    | Type of dump  | Failures                                                                                                                                                                                                                                                             |
|-------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'80' | SDUMP or SNAP | An SDUMP is created for all IMS abend codes not listed in this table, and for all z/OS abend codes that can be retried. If the SDUMP fails, a SNAP dump is created.                                                                                                  |
| X'84' | SNAP          | A SNAP dump is created for IMS abend codes U0260, U0261, and U0263.                                                                                                                                                                                                  |
| X'88' | No            | No SDUMP or SNAP dump is created for the following codes: <ul style="list-style-type: none"><li>• IMS abend codes U0775, U0777, U2478, U2479, U3303</li><li>• z/OS abend codes that can be retried (for example, S222 and S13E)</li><li>• DRA return codes</li></ul> |

## DRA SDUMP output

The DRA creates a dump when a DRA request fails or when DRA processing fails. The DRA first tries to create a z/OS SDUMP.

DRA SDUMP output contains:

- IMS control region
- DLISAS address space
- Key 0 and key 7 CSA
- Selected parts of DRA private storage, including the address space control block (ASCB), task control block (TCB), and request blocks (RBs)

A DRA SDUMP has its own SDUMP option list. To add to the SDUMP option list of a DRA, you can use the CHNGDUMP parameter. However, you cannot use the CHNGDUMP parameter to delete areas from the list.

You can format the IMS control blocks by using the Offline Dump Formatter (ODF). The ODF does not format DRA storage. You can use IPCS to format the z/OS blocks in the private storage of the CCTL.

## SNAP dump output

The SNAP dump data sets are dynamically allocated whenever a SNAP dump is needed. A parameter in the DRA startup table defines the SYSOUT class.

SNAP dump output contains:

- Selected parts of DRA private storage, including the address space control block (ASCB), task control block (TCB), and request blocks (RBs)
- Thread blocks of the DBCTL

## Recovery tokens

In a DBCTL environment, you need to correlate the information that is produced by the CCTL with information that is produced by the DBCTL. The link between the CCTL and DBCTL is the recovery token, which uniquely identifies each unit of recovery (UOR).

### Recovery token details

The recovery token appears in the DRA dump (both SDUMPs and SNAP dumps) and in the dump title. The recovery token contains a mixture of EBCDIC and hexadecimal data as shown:

**CCTL subsystem ID 8 bytes (EBCDIC)**

Unique UOR ID (created by the CCTL) 8 bytes (hexadecimal)

---

## Analyzing DRA problems

To analyze DRA problems, first investigate any external conditions that might have caused the problem. If you can eliminate external causes, an unexpected DBCTL return code or another IMS function might have caused the problem.

Follow these steps to analyze the problem.

1. Did external conditions cause the problem?
  - For CCTL external problems, check the status of applications or transactions. DBCTL and the DRA do not control these resources.

- For DBCTL external problems, check the status of databases, PSBs, and dependent regions (BMPs and CCTLs) by using the /DISPLAY commands.
  - For DRA external problems:
    - Make sure you are using the correct DRA startup table for this DBCTL/CCTL session. Values such as Fast Path buffer allocations and minimum/maximum thread specifications can cause scheduling and resource problems.
    - Become familiar with the CCTL control exit.  
The DRA calls the control exit to notify the CCTL of certain events, such as a DRA failure, an identify failure, a DBCTL failure, and so on. The DRA passes this information in a parameter list (DFSPAPL). The CCTL responds by passing back a return code in field PAPLRETC to tell the DRA what action to perform. Understanding which actions the CCTL is allowed to request can help you distinguish between valid actions and failures.
    - The DRA does not issue any messages that report the actions it performed.
  - If an external condition caused the problem, stop here and fix the problem. Otherwise, continue with the next step.
2. You reach this point by eliminating external reasons as the cause of the problem. Determine if DBCTL returned a nonzero return code, indicating that the request from the CCTL was not successfully completed.
- If yes, take a z/OS online dump of the CCTL and contact IBM Software Support.
  - If no, then other functions might be involved in the problem. Use the appropriate section in this information to analyze the problem. Keyword procedures are useful in narrowing the problem to a specific cause.

To determine the source of problems in a DBCTL environment, create a dump of the CCTL address space. Dumps that are produced by SDUMP and by specifying the DUMP option on the CCTL /SHUTDOWN command are acceptable for problem diagnosis. If IBM Software Support needs to analyze the CCTL dump, send the unformatted dump so that they can obtain DBCTL DRA storage.

**Related concepts:**

“Selecting the keywords” on page 32



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## Chapter 13. FP - Fast Path service aids

Service aids for Fast Path include diagnosis, control interval, external trace, and locating control blocks.

---

### Diagnosing Fast Path problems

Before diagnosing problems in Fast Path, you must understand the structure of its dumps, especially the dependent region dumps.

When a dependent region abends, the structure of the dump varies, depending on a number of conditions. For example, if you requested and were able to perform offline dump formatting, the structure of the dump is different than if you had not requested offline dump formatting. Furthermore, if the dependent region that abends is an MPP executing in mixed mode, the structure of the dump might be different from that of an IFP region. The recommended approach is to request and use the offline dump formatting option.

### ABENDU1026 analysis

To analyze ABENDU1026 failures, you determine the documentation to obtain, and how to find and interpret diagnostic data from the documentation. Gather the necessary data before searching an IBM Software Support database or calling the IBM Software Support.

Several modules issue ABENDU1026 to indicate conditions that should not occur. The dependent region abends, but the IMS control region continues processing. Message DFS2712I accompanies ABENDU1026.

This analysis is based on using a dump that you can format with the Offline Dump Formatter (ODF). The following tables describes where to find ODF information.

*Table 100. Locating information about the Offline Dump Formatter (ODF)*

| For information about                                  | Refer to                                               |
|--------------------------------------------------------|--------------------------------------------------------|
| Obtaining dumps that are suitable for input to the ODF | "Input for the IMS Offline Dump Formatter" on page 510 |
| Running the ODF                                        | <i>IMS Version 12 Database Utilities</i>               |
| Using the ODF to solve problems                        | "Formatting IMS dumps offline" on page 509             |

Before beginning the analysis, you need the following information:

- A copy of the DFS2712I message
- A dump formatted by the ODF
- A copy of *IMS Messages and Codes, Volume 3: IMS Abend Codes*

If an authorized program analysis report (APAR) is necessary, you might also need the following information:

- The last successful image copy of the database encountering the problem
- The IMS logs from the time of the last successful image copy to the point of failure

- A copy of the Fast Path trace, if Transaction Retry was invoked

### Procedure

The following example takes you through the analysis of an actual ABENDU1026 until you have collected enough data to search an IBM software support database or call the IBM Support Center.

This example uses the sample message DFS2712I in the following figure. Message DFS2712I is sent to the console. Save a printed copy of the message.

```
DFS2712I MODULE NAME: DBFMRCU0
DFS2712I ABEND SUBCODE: 0053
DFS2712I AREA NAME: DB21AR0

DFS2712I MLTE:
DFS2712I 02A923BC 02919E60 00000000 00000000 00001008
DFS2712I 02A923CC 02903310 00005A08 00001008 00040400
DFS2712I 02A923DC 03018000 001C0008 029328B4 00060000
DFS2712I 02A923EC 00000000 00000000 00000000 02A92178
DFS2712I 02A923FC 02A92470 0072F70A 00000000 40800000
DFS2712I 02A9240C 00000000 00000000 00000000 00000000
DFS2712I 02A9241C 00000000 00000000 00060000 00000000
DFS2712I 02A9242C 00000000

DFS2712I BUFFER CONTENTS:
DFS2712I 02919E58 016C0802 40000000 99000000 5C08015E
DFS2712I 02919E68 C1C140E3 C8C9E240 C9E240E3 C8C540C6
DFS2712I 02919E78 C9D9E2E3 40F3D9C4 40D3C5E5 C5D340E2
DFS2712I 02919E88 C5C7D4C5 D5E34040 40404040 40404040
DFS2712I 02919E98 40404040 40404040 40404040 40404040
DFS2712I
DFS2712I R0-R3 00000008 00000053 02919E60 02A92010
DFS2712I R4-R7 02A923BC 008138D4 00000008 00005A00
DFS2712I R8-R11 00000004 02903310 0070B040 0086DF20
DFS2712I R12-R15 00818BA0 0070767C 80818C62 00000018
```

Use the following steps to analyze ABENDU1026:

1. Locate the module name and subcode associated with the abend. This information appears in the first few lines of message DFS2712I.  
In the previous example in, the module name is DBFMRCU0 and the subcode is 0053.
2. To find the meaning of the subcode, look up ABENDU1026 in *IMS Messages and Codes, Volume 3: IMS Abend Codes*. Find module DBFMRCU0 and subcode 0053.  
The description of subcode 0053 is: MLTE segment code (Reg4 + X'1E') is not equal to the DSEGCODE of the segment pointed to by register 2.  
This means that the segment code in field MLTESGCD in MLTE (a Fast Path control block) does not match the segment code of the segment in the buffer (DSEGCODE). Therefore, your next step is to determine what the mismatched values are.
3. Check *IMS Messages and Codes, Volume 3: IMS Abend Codes* again to determine which registers you must examine.

The important registers are:

Register 8 = MLTESGCD

Register 2 = Address of the segment; DSEGCODE is the first byte

In the previous example, the register contents appear at the bottom of message DFS2712I.

4. Use the registers and the buffer contents in the message to compare the segment code in the segment in the buffer (DSEGCODE) with the segment code in field MLTESGCD in the MLTE. These codes must match.

- Register 8 contains the segment code from field MLTESGCD in the MLTE. In the example, register 8 has a value of 00000004.
- Register 2 contains the address of the segment in the buffer. The first byte of the segment is the segment code (DSEGCODE). In the example, DSEGCODE has a value of 99.
- Because the segment code from the MLTE (04) does not match the segment code of the segment (99), ABENDU1026 occurred.

There are several ways to find this data. To find the segment code in field MLTESGCD in MLTE, you can also use register 4 + X'1E'. To find the DSEGCODE, you can also use register 6 (00000008), which is the offset in the buffer to the DSEGCODE.

5. Look at the module save area set to determine the module flow leading to the abend. You can use the Offline Dump Formatter (ODF) to format the save area set in a dump by specifying FMTIMS DB,MIN.
- Register 13 in message DFS2712I contains the address of the save area for the PST that suffered the abend.
  - In the example message in the previous example, register 13 contains the address 0070767C.
  - In the \*\*DPST section of the formatted dump in the following example, search for a save area (SA) with address 0070767C. If you are searching online, the second occurrence you find is the save area.

\*\*\*SAVE AREA SET\*\*\*

|    |                                    |              |              |              |              |              |               |
|----|------------------------------------|--------------|--------------|--------------|--------------|--------------|---------------|
| EP | DBFMCLX005/06/8804.27PL24768 ABCD  |              |              |              |              |              |               |
| SA | 0070755C                           | WD1 8071B310 | HSA 80000000 | LSA 007075A4 | RET 8088070E | EPA 00812FE0 | R0 00000519   |
|    |                                    | R1 8071B310  | R2 C7D5D740  | R3 02A92010  | R4 0001A000  | R5 00707050  | R6 00000000   |
|    |                                    | R7 8072F624  | R8 00707050  | R9 0072F6CC  | R10 0070B040 | R11 0086DF20 | R12 00880042  |
| EP | DBFMGNX003/03/8820.09PL22770 AB    |              |              |              |              |              |               |
| SA | 007075A4                           | WD1 00000000 | HSA 0070755C | LSA 007075EC | RET 808131A0 | EPA 00814528 | R0 00000519   |
|    |                                    | R1 8071B3AB  | R2 C7D5D740  | R3 02A92010  | R4 02A92090  | R5 008138D4  | R6 FFFFFFFD80 |
|    |                                    | R7 FEE06FD4  | R8 00707050  | R9 0072F6CC  | R10 0070B040 | R11 0086DF20 | R12 00812FE0  |
| EP | DBFMPUG005/11/8800.59PL26682 ABCDE |              |              |              |              |              |               |
| SA | 007075EC                           | WD1 00000000 | HSA 007075A4 | LSA 00707634 | RET 8081466A | EPA 00816900 | R0 00000519   |
|    |                                    | R1 8071B3AB  | R2 00000000  | R3 02A92010  | R4 02A92178  | R5 008138D4  | R6 FFFFFFFD80 |
|    |                                    | R7 FEE06FD4  | R8 00707050  | R9 0072F6CC  | R10 0070B040 | R11 0086DF20 | R12 00814528  |
| EP | DBFMRCU003/21/8618.02PT01119 0     |              |              |              |              |              |               |
| SA | 00707634                           | WD1 00000000 | HSA 007075EC | LSA 0070767C | RET 80816ABE | EPA 00818BA0 | R0 00000519   |
|    |                                    | R1 8071B3AB  | R2 02A92178  | R3 02A92010  | R4 02A923BC  | R5 008138D4  | R6 FFFFFFFD80 |
|    |                                    | R7 00005A08  | R8 0291AE66  | R9 0072F6CC  | R10 0070B040 | R11 0086DF20 | R12 00816900  |
| EP | DBFMPG002/04/8617.58PP35272 1B     |              |              |              |              |              |               |
| SA | 0070767C                           | WD1 00000000 | HSA 00707634 | LSA 007076C4 | RET 80818C62 | EPA 00818FD8 | R0 00000008   |
|    |                                    | R1 8071B3AB  | R2 02919E60  | R3 02A92010  | R4 02A923BC  | R5 008138D4  | R6 00000008   |
|    |                                    | R7 00005A00  | R8 00000004  | R9 02903310  | R10 0070B040 | R11 0086DF20 | R12 00818BA0  |
| EP | DBFMSRB002/13/8716.56PP58251 AB    |              |              |              |              |              |               |
| SA | 007076C4                           | WD1 00000000 | HSA 0070767C | LSA 0070770C | RET 80822377 | EPA 008285F0 | R0 FFFF4040   |
|    |                                    | R1 02903310  | R2 02932A08  | R3 02903278  | R4 808222E0  | R5 00822638  | R6 00005A00   |
|    |                                    | R7 00BBCF78  | R8 02932A08  | R9 02903310  | R10 0070B040 | R11 0086DF20 | R12 00822188  |
| EP | DBFXSL3007/08/8819.02PL28384 AB    |              |              |              |              |              |               |
| SA | 0070770C                           | WD1 00000000 | HSA 007076C4 | LSA 00707754 | RET 808286D7 | EPA 00823D38 | R0 00000000   |
|    |                                    | R1 0070B040  | R2 02932A70  | R3 02903278  | R4 02903310  | R5 0071A250  | R6 00005A00   |
|    |                                    | R7 00BBCF78  | R8 02932A08  | R9 02903310  | R10 0070B040 | R11 0086DF20 | R12 008285F0  |

6. In the example above, the module flow, reading from the top down, is DBFMCLX0, DBFMGNX0, DBFMPUG0, and DBFMRCU0, which is where the abend occurred. Notice that other modules follow DBFMRCU0 in the flow. You can ignore these modules now. However, they might be important later in the problem analysis.
7. Information from other sources might help you while searching the IBM software support database or talking with the IBM Support Center representative.

If an MPP or an IFP received the ABENDU1026, the Transaction Retry function should have retried the transaction.

Look in your MTO log for messages DFS0663I, DFS0784I, DFS0785I, DFS0787I, and other messages associated with a retry to find out what happened.

After you complete these steps, you have most of the following information:

- The abend code (ABENDU1026).
- The subcode (SUBCODE053).
- The module name (DBFMRCU0).
- The save area flow leading to the abend.
- The field in error (MLTESEGCD or DSEGCODE). You might not be sure which field is incorrect.
- Any messages produced by a transaction retry (for example, MSGDFS0663I).

With this information you are ready to search the database or contact IBM Software Support.

**Related concepts:**

“Input for the IMS Offline Dump Formatter” on page 510

“Formatting IMS dumps offline” on page 509

## Fast Path Transaction Retry

Fast Path Transaction Retry (FPTR) is designed for IMS Fast Path users who cannot run the Fast Path trace permanently on their system because of its impact on performance, but want to have the trace turned on when Fast Path failures occur.

Fast Path problems can be resolved much faster when trace information is available to show the logic flow of a call or transaction.

FPTR is activated only when certain Fast Path failures occur. FPTR automatically allocates a trace data set, turns on the trace, and retries the transaction. If no abend occurs on the retry, FPTR issues a message, turns off the trace, and the system continues processing. If an abend does occur on the retry of the transaction, Fast Path trace writes the trace data, FPTR turns off the trace, and the system continues with Fast Path trace inactive. FPTR is not invoked for abends in BMP regions.

When you report certain IMS Fast Path problems to the IBM Support Center, you will be asked if the Transaction Retry function failed. The following topics will help you determine what information to report.

### Processing flow

A summary of the processing flow of FPTR follows:

- The ESTAE exit of the dependent region controller receives control for abends U1026 and U1027, and all system abends except 122 and 222.
- The ESTAE exit provides debugging information including:
  - Name of abending module
  - Last applied APAR of the abending module
  - Date and time of assembly of module

If the failing module cannot be identified, a message informs the operator.



- The ESTAE exit decides if the transaction can be retried. If so, the ESTAE requeues the failing input message for retry and produces a dump of the first abend.
- Message DFS554A is sent to the master terminal.
- The retry process starts in an eligible dependent region.
  - FPTR dynamically allocates a trace data set and starts Fast Path trace.
  - FPTR writes message DFS0785A to the master terminal and the JES2 job log.
- When the retry of the transaction is complete, FPTR deallocates the trace data set and spools the contents of the trace data set to the SYSOUT class specified in the MSGCLASS parameter on the JOB statement of the dependent region.

## System programmer tasks

The system programmer should:

- Print the job log.
- Print the spooled trace data set information.
- Save and analyze the above information.
- Contact IBM Software Support for assistance, if needed.

---

## DEDB control interval (CI) problem assistance aids

When you print portions of the DEDB, the control intervals (CIs) have these identifying characteristics.

After you have performed the analysis described in “ABENDU1026 analysis” on page 361, review the contents of the various control blocks. Included in message DFS2712I is a dump of the control block that is related to the logical inconsistency. This control block is in the format of one of the control intervals (CIs). You can (possibly with help from IBM Software Support) obtain the RBA of the affected CI from the buffer. You can then use this RBA:

- When you extract the CI from the image copy of the DEDB
- When you choose the criteria for selecting and printing the IMS log records (with DFSERA10)

The acronyms used in this topic are:

**DOVF** Dependent overflow

**IOVF** Independent overflow

**RAP BLOCK**

Root-anchor point block

**SDEP** Sequential dependent

## CI type identification

Each CI has an identifier at X'02' in the CI, with the exception of the first and second CIs. The first is the IMS control CI and the second contains the DMAC control block for this area.

**CI Type**

**Identifier**

**REORG CI**

00

RAP 01  
DOVF 02  
IOVF (SPACE MAP) 04  
IOVF 08  
SDEP 10

## DEDB CI formats

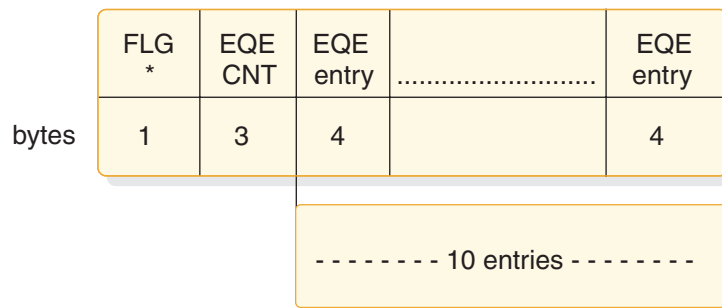
These are the CI types and the data that is common to all CIs (except the SDEP CI).

**CI 0** The IMS control CI.

| 0         | 8         | 10        | 18      | 1C         | 20     | 28  | 32 |
|-----------|-----------|-----------|---------|------------|--------|-----|----|
| Creation  | Restart   | ERestart  | RBA of  | Characters | Cisize | Org |    |
| Date/Time | Date/Time | Date/Time | Last CI | DBF1.000   | - 7    | "D" |    |

**CI 1** The DMAC control block for this area is located here.

The Error Queue Element (EQE) list is also located in this CI. This list is 44 bytes long and immediately precedes the trailer information, (for example, CUSN, RBA, RDF and CIDF). The following figure shows the EQE list format: FLG (1 byte), EQE CNT (3 bytes), 10 available EQE entries (40 bytes).



\* A flag setting of X'80' indicates that there are more than 10 EQEs or an error in the second CI.

Figure 71. EQE list in CI 1

## RAP CI

The following figure shows the RAP CI.

| 0     | 2    | 4              | 8                         |
|-------|------|----------------|---------------------------|
| FSEAP | 0203 | RBA of current | Segments, FSEs and Scraps |
|       |      | overflow CI    |                           |

(02) - Indicates CUSN is in this CI.

## First DOVF CI

The first DOVF CI has the format shown in the following figure.

| 0     | 2    | 4              | 8                         |
|-------|------|----------------|---------------------------|
| FSEAP | 0203 | RBA of current | Segments, FSEs and Scraps |
|       |      | overflow CI    |                           |

(02) - Same as RAP CI -- these two bits combined

(01) - Look here for space -- make the 03 in byte 3.

**Exception:** From here on, the key bits are shown, but byte 3 is not shown.

#### Other DOVF CIs

All DOVF CIs except the first one have the format shown in the following figure.

|       |    |                                                     |                           |
|-------|----|-----------------------------------------------------|---------------------------|
| 0     | 2  | 4                                                   | 8                         |
| FSEAP | 02 | RBA of next DOVF CI with space, last contains zeros | Segments, FSEs and Scraps |

#### First IOVF CI

The CI shown in the following figure is a space map and is the first in each group of 120 CIs. The 119 CIs that follow are data CIs.

|      |    |          |                                    |                                       |
|------|----|----------|------------------------------------|---------------------------------------|
| 0    | 2  | 4        | 6                                  | 8 (119 words mapping next 119 CIs)    |
| 0000 | 04 | 8000xxxx | offset to 1st free                 | 8000xxxx free and offset to next free |
|      |    |          | 4000uow# allocated                 |                                       |
|      |    |          | 2000uow# used by reorg             |                                       |
|      |    | 40000000 | no free space in this space map CI |                                       |

#### Other IOVF CIs

The following figure is a data CI - 119 data CIs follow each space map CI.

|       |      |          |                                                                           |
|-------|------|----------|---------------------------------------------------------------------------|
| 0     | 2    | 4        | 8                                                                         |
| FSEAP | 0802 | 4000uow# | Segments, FSEs and Scraps (allocated, to UOW number; 0 is the first UOW). |
| 0008  | 0802 | 80000000 | FSE (CI not allocated).                                                   |

(02) indicates CUSN is in this CI

#### SDEP CI

**Exception:** SDEP CIs do not contain FSEs and have no FSEAP or CUSN. User segments have a time stamp added at the end. The following figure shows the SDEP CI.

|      |      |              |                                                      |
|------|------|--------------|------------------------------------------------------|
| 0    | 2 3  | 4            | 8                                                    |
| 0000 | 1000 | Partner name | Segments inserted sequentially and cannot be updated |

(01) - Time stamp exists

(01) - SDEP CI is full.

#### FSEAP

FSEAP is the offset of the first FSE in the CI. Fast Path FSEs are chained from the highest RBA, in order, to the lowest RBA in the CI.

FSE---X'8offssss' off=offset of next FSE in CI  
ssss=size (length) of the free space including the FSE.

X'8000ssss' indicates this is the last FSE on the chain in this CI.

If the CI is empty, the FSE is X'15' bytes less than the CI size, or X'13' less than the CI size if no CUSN exists. The RDF and CIDF are X'7' bytes less than the CI size. Here are some examples:

|      |          |        |          |        |          |        |          |         |
|------|----------|--------|----------|--------|----------|--------|----------|---------|
| CI   | 512      | X'200' | 1024     | X'400' | 2048     | X'800' | 4096     | X'1000' |
| FSE  | 800001EB |        | 800003EB |        | 800007EB |        | 80000FEB |         |
| RDF  | 0001F9   |        | 0003F9   |        | 0007F9   |        | 000FF9   |         |
| CIDF | 01F90000 |        | 03F90000 |        | 07F90000 |        | 0FF90000 |         |

**Scraps** Scraps are less than 4 bytes. They begin with X'7n' if less than 8 segment types, or X'Fn' if more than 8. For example,

1 byte-X'71' or X'F1'  
 2 bytes-X'72' or X'F2'  
 3 bytes-X'73' or X'F3'

### Data Common to All CIs

The last X'0D' bytes of a CI all have the same use. The last line of a CI looks like this in a dump.

```
data data data data data
-D -C-B-A-9 -8-7-6-5 -4-3-2-1
x-x x-x x-x x-x xxxxxxxx xxxxxxxx xxbbbbbb bbbbbbbb
```

The bytes with bbbbbb do not print and will show as blanks in the dump. The fields from -D to -1 are:

CUSN -D,C These 2 bytes represent updates to the CI. The 02 bit in byte 3 of a CI indicates a CUSN exists in the CI.

RBA -B,A,9,8 These 4 bytes are the beginning RBA of the CI.

RDF -7,6,5

CIDF -4,3,2,1

**Recommendation:** Use the RBA of the CI when you select log records to format and print with the DFSERA10 utility.

SDEP CIs do not contain FSEs and do not have a CUSN. SDEP CIs end at -B (the RBA). Data can occupy the space up to that location.

### Analyzing control interval (CI) contention

When CI contention occurs in a DEDB, Fast Path passes both lock requests to program isolation (PI) modules. The PI trace, if active, traces the locks. To format the PI trace records (log record type X'67FA'), use the File Select and Formatting Print utility (DFSER10) with exit DFSERA40. For information about running this utility, see *IMS Version 12 System Utilities*.

Using the trace records, find the RBA field of the CI. The digits in the CI RBA field are shifted right 8 bits. For example, an RBA of 00468000 is displayed as 00004680.

You must translate the value in the DMB field to a relative DMAC number. (DMAC numbers are relative to the DATABASE definitions.)

For example, if the first DMAC is X'FFFE', the second DMAC is X'FFFD', the third DMAC is X'FFFC', and so on. Because databases are chained alphabetically in the DDIR, if the DMB field is X'FFF6', you calculate the relative DMAC number as follows:

$X'FFFF' - X'FFF6' = X'19' = 25$  (decimal)

This calculation means that X'FFE6' is the 25th area relative to the first area of the first DEDB in the DDIR.

### Related reference:

"Log records" on page 477

---

## Locating Fast Path control blocks and tables

Many of the Fast Path control blocks are extensions of IMS full-function control blocks. The names of these Fast Path control blocks are the same as in full-function.

The acronyms for these Fast Path control blocks start with "E."

**Example:****SCD** System Contents Directory (full-function IMS)**ESCD** Extended System Contents Directory (Fast Path)

To view the layout of the Fast Path control blocks for your system, assemble DFSADSCT from IMS.ADFSSMPL and use XREF(FULL).

The following table shows the Fast Path control blocks and work areas that appear as a load list in an IMS dump. This information is relevant when you are working on an abend U1011 in module DBFINI20. Message DFS2703A generally accompanies the abend. Abend U1011 results from either a GEN problem or a storage fragmentation problem.

*Table 101. Fast Path control blocks and work areas that appear in IMS dumps*

| Load list name | Fast Path block/work area        | Appearance in dump |
|----------------|----------------------------------|--------------------|
| DFSEPnnn       | Fast Path EPSTs<br>(nnn=000-999) | IMS STM task       |
| DBFCONT1       | ECNTs/MSDBs                      | IMS STM task       |
| DBFCONT3       | DMHRs/buffers                    | IMS STM task       |
| DBFCONT4       | DEDB blocks                      | IMS STM task       |
| DBFCONT5       | OTHRs                            | IMS STM task       |
| DBFCONT6       | BALGs                            | IMS STM task       |
| DBFCONT7       | Miscellaneous buffers            | IMS STM task       |
| AREALIST       | AREA list                        | IMS STM task       |

At Fast Path initialization, modules DBFINI21, DBFINI23, DBFINI24, DBFINI25, DBFINI26, and DBFINI27 calculate the amount of contiguous ECSA storage that is needed to load the buffers, buffer headers, MSDBs, and other related control blocks into separate work areas named DBFCONTx.

If module DBFINI2x cannot obtain a large enough contiguous block of storage, abend U1011 is issued, along with an error message. When this abend occurs, you can restart IMS, or you can stop other jobs that might prevent module DBFINI2x from obtaining the necessary storage.

The following table describes the control block structures that are defined during IMS startup. This table can help you determine which control blocks are needed in your Fast Path environment.

*Table 102. Control blocks that are allocated during IMS startup*

| Control block/table | With MSDB/DEDB | Without DEDB | Without MSDB | Without MSDB/DEDB |
|---------------------|----------------|--------------|--------------|-------------------|
| ECNT DBFCONT1       | X              | X            | X            | X                 |
| BHDR DBFCONT1       | X              | X            |              |                   |
| MSDB DBFCONT1       | X              | X            |              |                   |
| DMHR DBFCONT3       | X              | X            | X            |                   |
| BUFF DBFCONT3       | X              | X            | X            |                   |

Table 102. Control blocks that are allocated during IMS startup (continued)

| Control block/table                                                       | With MSDB/DEDB | Without DEDB | Without MSDB | Without MSDB/DEDB |
|---------------------------------------------------------------------------|----------------|--------------|--------------|-------------------|
| DEDB blocks (DMCBs, DMACs, MRMBs, segment names, and field names) DBFCNT4 | X              |              | X            |                   |
| OTHR DBFCNT5                                                              | X              |              | X            |                   |
| BALG DBFCNT6                                                              | X              | X            | X            | X                 |
| LBUF DBFCNT7                                                              | X              | X            | X            | X                 |
| FPAL AREALIST                                                             | X              |              | X            |                   |

## Locating IMS blocks and work areas by using load list elements

IMS loads IMS blocks and work areas using the IMS IMODULE facility. IMS generates a load list element from which you can obtain the unique name and location of each work area.

### Load list areas

Load list areas are areas that appear formatted as the load list in an IMS control region dump. Global areas are in the common storage area (CSA).

Table 103. Load list areas.

| Load list name | IMS block/work area                                                             | Pool type           |
|----------------|---------------------------------------------------------------------------------|---------------------|
| DFSABSxx       | Abend Diagnostic Area, xx=PST number                                            | Global              |
| DFSBFSP        | DL/I Buffer Handler Pool                                                        | Global              |
| DFSBLK0x       | SCD, x=same as nucleus suffix                                                   | Global              |
| DFSBWLOG       | BG Write Log Work Area                                                          | Local               |
| DFSCBTHD       | Control block table header that points to the storage pools defined in DFSCBT00 | Global <sup>1</sup> |
| DFSCBT10       | Storage pool headers for the pools defined in DFSCBT00                          | Global <sup>1</sup> |
| DFSDLWxx       | Retrieve Work Area, xx=PST number                                               | Global              |
| DFSDMBRS       | Resident DMBs                                                                   | Global              |
| DFSDSET        | OLDS Data Set Entry Table                                                       | Local               |
| DFSEOVOS       | OSAM DCB Work Area                                                              | Global              |
| DFS01FXL       | Fixlist for OSAM I/O Driver                                                     | Local               |
| DFSINTRS       | Resident Intent Lists                                                           | Global              |
| DFSIPB         | Initialization Parameter Block                                                  | Local               |
| DFSISIT        | Ident Table and ISI Storage                                                     | Global              |
| DFSLCD         | Logger LCD                                                                      | Global <sup>2</sup> |
| DFSLCDST       | IMS Monitor Logger LCD                                                          | Global              |
| DFSLLOG        | X'06' and X'42' Log Records                                                     | Local               |
| DFSLOCP        | Storage Management Local Pool                                                   | Local               |
| DFSLOGxx       | Log Work Area, xx=PST number                                                    | Global              |

Table 103. Load list areas (continued).

| Load list name | IMS block/work area                                     | Pool type           |
|----------------|---------------------------------------------------------|---------------------|
| DFSLXBC        | Link Extension Blocks for MSC CTC                       | Global              |
| DFSLXBM        | Link Extension Blocks and I/O Buffers for MSC MTM links | Global              |
| DFSMFDDH       | MFS Pool Dynamic Directory Hash Table                   | Local <sup>4</sup>  |
| DFSMFDDP       | MFS Pool Dynamic Directory Prime Area                   | Local <sup>4</sup>  |
| DFSMFDD0       | MFS Pool Dynamic Directory Entry Area                   | Local <sup>4</sup>  |
| DFSMFPDS       | MFS Pool PDS Directory Indexes                          | Local <sup>4</sup>  |
| DFSMFSTG       | MFS Pool Staging Buffers                                | Local <sup>4</sup>  |
| DFSMTCLB       | CLB (ECB) for DFSCMTIO                                  | Global              |
| DFSMTIOT       | Monitor TIOT Table                                      | Global              |
| DFSMTMH        | MSC Main Storage-to-Main Storage Queue Header           | Local <sup>3</sup>  |
| DFSMTMW        | MSC Main Storage-to-Main Storage Window                 | Local <sup>3</sup>  |
| DFSOFBPL       | OSAM Buffer Pool                                        | Global <sup>2</sup> |
| DFSOFWA        | OSAM Buffer Pool Work Area                              | Local               |
| DFSOLRnn       | OLDS Read DCB where nn must be numeric                  | Local               |
| DFSOSDEB       | OS/VS2 “Fake” OSAM DEB                                  | Global              |
| DFSPCWAP       | Communications Work Pool                                | Local               |
| DFSPDBWP       | Database Work Pool                                      | Global              |
| DFSPDMB        | DMB Pool                                                | Global              |
| DFSPFBP        | MFS Pool                                                | Local               |
| DFSPFWA        | Prefetch Work Area, ECB and Save Sets                   | Local               |
| DFSPPSBW       | PSB and PSB Work Pool                                   | Global              |
| DFSPQBUF       | Queue Manager Buffers                                   | Local               |
| DFSPSBRs       | Resident PSBs                                           | Global              |
| DFSPSTQE       | Scheduler Sequence Queue                                | Global              |
| DFSPSTxx       | SAP Work Area, xx=PST number                            | Global              |
| DFSPTPDB       | Communications Pool                                     | Local               |
| DFSPWKAP       | Working Storage General Pool                            | Global <sup>2</sup> |
| DFSRSTEB       | Restart ECB and Save Sets                               | Local               |
| DFSRSTWA       | Restart Work Area                                       | Local               |
| DFSSBBUF       | Sequential buffering: SBUF                              | Local               |
| DFSSBCA1       | Sequential buffering: SCAR                              | Global              |
| DFSSBDCB       | Sequential buffering: SDCB                              | Local               |
| DFSSBDSE       | Sequential buffering: EDSG                              | Local               |
| DFSSBDSCG      | Sequential buffering: SDSCG                             | Local               |
| DFSSBITA       | Sequential buffering: ITASK storage for overlapped I/O  | Global              |
| DFSSBPSS       | Sequential buffering: SBPSS                             | Global              |
| DFSSBPST       | Sequential buffering: SBPST                             | Local               |
| DFSSBRAN       | Sequential buffering: SRAN                              | Local               |

Table 103. Load list areas (continued).

| Load list name | IMS block/work area                                   | Pool type           |
|----------------|-------------------------------------------------------|---------------------|
| DFSSBSBU       | Sequential buffering buffers                          | Local               |
| DFSSBSCD       | Sequential buffering: SBSCD                           | Global              |
| DFSSBWO        | Sequential buffering: DFSSBWO                         | Local               |
| DFSSLX         | SCD Latch Extension                                   | Global              |
| DFSSSCT        | Subsystem Control Table                               | Local <sup>3</sup>  |
| DFSSTAEB       | STAE Work Area                                        | Local               |
| DFSSTPEB       | Stop Region ECB, Save Sets and Work Area              | Local               |
| DFSSTPWA       | Stop Region Message Work Area                         | Local               |
| DFSTRMWK       | Modify/Terminate Task Save Sets, ECB and Work Area    | Local               |
| DFSTSAV        | Temporary Save Sets                                   | Local               |
| DFSVRFXL       | Fixlist for EXCPVR                                    | Local               |
| DFSXCWxx       | Exclusive Control Enqueue/Dequeue Work Area, xx=01-99 | Global <sup>2</sup> |
| DFSZIBxx       | ZIB/FAQE Pool, xx=01-99                               | Global              |

**Notes:**

1. A large number of storage pools are defined in module DFSCBT00. The contents directory element (CDE) name for storage in a given control block table (CBT) pool is #xxxxyyy, where xxxx is the pool name, and yyy is a number from 001 to 999. See Table 104 for a description of the CBT pools.
2. When you use the local storage option (LSO), all these areas are obtained from local storage. When you use Fast Path and LSO, DFSLCD, DFSDBUFF, and DFSXCWxx remain in global storage. When you select LSO = S, DFSLCD and DFSPWKAP remain in global storage.
3. IMS constructs these areas at abend time. They consist of copies of the subject areas preceded by one word containing the original address of the area.
4. IMS builds these areas in extended private storage.

## Control block table pools

Modules DFSBCB00, DFSBCB30, and DFSBCB90 support get/release requests for blocks in specific storage pools, referred to as 'CBT' pools.

Table 104. CBT pool names and descriptions

| CBT pool | Description                                              |
|----------|----------------------------------------------------------|
| AHDR     | Autologon LU headers                                     |
| ADSC     | Fast Path DEDB area data set control block               |
| AESL     | Fast Path DBRC parameter area                            |
| AWE      | Work-to-do element for task communication                |
| BCPT     | Checkpoint ID table                                      |
| BQEL     | Used when a buffer is altered and released at sync point |
| BXQE     | Storage manager queue elements                           |
| CBLK     | LU 6.2 CPI communications driven control block           |
| CCB      | Conversational control block                             |
| CLLE     | Common latch list element                                |



Table 104. CBT pool names and descriptions (continued)

| CBT pool | Description                                                                                                                                                                         |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CMWU     | Save sets/ECB for ITASKs which do not require a PST                                                                                                                                 |
| CSAG     | Callable services anchor block (ECSA storage)                                                                                                                                       |
| CSAL     | Callable services anchor block (E-private storage)                                                                                                                                  |
| DBPB     | Database purge block                                                                                                                                                                |
| DBRC     | DBRC work area                                                                                                                                                                      |
| DDIR     | Database directories                                                                                                                                                                |
| DDRE     | DMB directory extension                                                                                                                                                             |
| DESC     | LU 6.2 descriptor block                                                                                                                                                             |
| DG2W     | Dispatcher work area section 2 (global storage)                                                                                                                                     |
| DL2W     | Dispatcher work area section 2 (local storage)                                                                                                                                      |
| DPST     | Dependent region PST: The following blocks are associated with the dependent region structure:<br>D1WA, DG2W, EPST, FSRB, GQMW, IDT, IOSB, IRLM, KLSD, LCRE, SAP, SLOG, STTR, XPST. |
| D1WA     | Dispatcher work area section 1                                                                                                                                                      |
| EPST     | Fast Path PST extension                                                                                                                                                             |
| EQEL     | Recoverable in doubt structure queue elements                                                                                                                                       |
| EZS      | External subsystem storage                                                                                                                                                          |
| FEIB     | Front-end message switch interface block                                                                                                                                            |
| FNCB     | Used by Fast Path for global command notifies                                                                                                                                       |
| FPB6     | Fast Path 64-bit buffer manager pool                                                                                                                                                |
| FPCP     | Used by Fast Path for local commands                                                                                                                                                |
| FSRB     | Fast Path wake up/sleep SRBs                                                                                                                                                        |
| GESE     | Represents a defined external subsystem                                                                                                                                             |
| GIOB     | IOB for batch                                                                                                                                                                       |
| GOWA     | OSAM channel programs for batch                                                                                                                                                     |
| GQMW     | Global queue manager work area                                                                                                                                                      |
| GS24     | Global 24-bit save area                                                                                                                                                             |
| GSAV     | Global save area                                                                                                                                                                    |
| IAFP     | IMS advanced future print block                                                                                                                                                     |
| IDT      | Block used to keep track of identified regions                                                                                                                                      |
| IEQE     | In-flight/in-doubt data buffers                                                                                                                                                     |
| IOSB     | I/O supervisor block for OSAM                                                                                                                                                       |
| IRLM     | Dependent region block, if IRLM is used                                                                                                                                             |
| KLSD     | LSO=X,Y block for each dependent region                                                                                                                                             |
| LCLL     | Local common latch list element (E-private storage)                                                                                                                                 |
| LCRE     | Local Recovery element (persists across restart)                                                                                                                                    |
| LG24     | Below the 16MB line dynamic SAP save sets                                                                                                                                           |
| LGND     | Block used to hold logon descriptor representations                                                                                                                                 |
| LGWA     | Log work area                                                                                                                                                                       |
| LGWX     | Log work area extension (private)                                                                                                                                                   |

Table 104. CBT pool names and descriptions (continued)

| CBT pool | Description                                                                  |
|----------|------------------------------------------------------------------------------|
| LPST     | PSTs for IMS internal use in local storage                                   |
| LQB      | Local queue block (SPQBs and CNTs)                                           |
| LQMW     | Local queue manager work area                                                |
| LS24     | Local 24-bit save area                                                       |
| LSAV     | Dynamic SAP save sets                                                        |
| LUB      | LU 6.2 LU block                                                              |
| L56X     | Fast Path database control log record                                        |
| MSGP     | Message buffers in global storage                                            |
| OLRK     | OLR database block                                                           |
| OSWA     | OSAM channel program areas                                                   |
| PCIB     | MFS Partition CIB                                                            |
| PDIR     | Program directories                                                          |
| PF62     | LU 6.2 message prefix block                                                  |
| PST      | PSTs for IMS internal use in global storage                                  |
| QAB      | LU 6.2 queue anchor block                                                    |
| QMBA     | Queue manager global buffer area                                             |
| QSAV     | Save sets with AWEs                                                          |
| RACW     | RACF workarea                                                                |
| RCNT     | Remote communication name table                                              |
| RCTE     | Fast Path routing codes                                                      |
| RECA     | VTAM receive any buffers                                                     |
| RPST     | Restart PST                                                                  |
| RRE      | Represents an active thread to an external subsystem                         |
| SAP      | Save area prefix – Includes fixed and dynamic SAPs                           |
| SIDX     | One for each identified external subsystem                                   |
| SLOG     | IMS Monitor parameter area block                                             |
| SMB      | Scheduler message blocks                                                     |
| SOPB     | Sign-on parameter list block                                                 |
| SRBC     | Common SRBs used for data sharing asynchronous NOTIFYs                       |
| STAT     | Database Control (DBCTL) and Database Resource Adapter (DRA) statistics area |
| STTR     | Retrieve trace area                                                          |
| SVPG     | System service parameter list block (global-ECSA)                            |
| SVPL     | System service parameter list block (local-private)                          |
| TCBT     | TCB table                                                                    |
| TIB      | LU 6.2 transaction instance block                                            |
| TTAB     | Trace table (31-bit storage)                                                 |
| TT24     | Trace table (24-bit storage)                                                 |
| USMU     | Security block                                                               |
| USRD     | Blocks used to represent user control block structure                        |

Table 104. CBT pool names and descriptions (continued)

| CBT pool | Description                                   |
|----------|-----------------------------------------------|
| UXIC     | User exit instance blocks in common storage   |
| UXIP     | User exit instance blocks in private storage  |
| UXSC     | User exit static work area in common storage  |
| UXSP     | User exit static work area in private storage |
| VRPL     | VSAM RPL with two save areas                  |
| VTGB     | VTAM terminal control blocks                  |
| VWA      | Volatile work area                            |
| XMCI     | Cross memory ITASK block                      |
| XPST     | Dependent region PST extension                |
| X124     | DL/I pool below the 16MB line for MVS/ESA     |

## Fast Path external trace

The Fast Path external trace is a tool for diagnosing problems with Fast Path DL/I calls.

Unexpected DL/I status codes or abends such as U1026 are examples of problems with Fast Path DL/I calls. Fast Path external trace is best suited for diagnosing problems that can be easily recreated, and is not intended to be run routinely because the overhead and output volume of the trace can be large. Fast Path external trace is intended for use primarily by IBM Software Support, but users might also find it useful. IBM Software Support specialists might ask you to capture Fast Path external trace data for analysis by IBM specialists.

Fast Path external trace traces only dependent region activity; you cannot use it to collect data on control region processes. Because most Fast Path DL/I call flow is normally processed in the dependent region, this limitation is not serious. However, if you specify the PARDLI=1 option, DL/I processing is performed under the CTL TCB, which limits the usefulness of Fast Path external trace.

**Recommendation:** Do not trace PARDLI=1 execution. Create the problem again, if possible, without specifying the PARDLI=1 option.

The Fast Path trace entries are documented in “Fast Path trace entries” on page 640.

## Trace activation

You can activate trace using the Fast Path Transaction Retry, the CCTL DRA thread, or using the /TRA SET ON TABLE FAST command.

- The Fast Path Transaction Retry function normally attempts to activate Fast Path external trace when a transaction is retried in an MPP or IFP region after an abend in Fast Path code. In this case, the trace is activated internally for the dependent region that is executing the retry and not for other dependent regions. The trace is deactivated after one retry attempt. The Fast Path Transaction Retry function dynamically allocates an FPTRACE DD statement as a JES SPOOL file and closes and deallocates an FPTRACE DD statement when the trace is deactivated at the end of the retry operation. The intent of the Fast Path Transaction Retry function is to provide first-failure data capture.

- A CCTL DRA thread can also request that Fast Path external trace be activated for a particular thread during the create thread process.
- The trace can also be activated with a `/TRA SET ON TABLE FAST` command. The Fast Path external trace writes diagnostic data to a FPTRACE DD statement in the dependent region JCL. After the trace is activated, the presence or absence of the FPTRACE DD statement determines whether data is traced for each active dependent region, including CCTL DRA threads. A spool file (`SYSOUT=x`) can be used for a FPTRACE DD statement, or a DASD file can be used. DCB attributes are forced to `LRECL=133,BLKSIZE=133,RECFM=FA` by IMS when the DCB is opened.

#### **Recommendations:**

- Use a spool file (`SYSOUT=x`) rather than a disk file. A certain amount of data related to the trace activation itself is traced (written to FPTRACE) before the determination is made that the trace is active or inactive.
- Do not include an FPTRACE DD statement in your standard dependent region JCL. Add it only as required and then remove it after the trace data is collected.

## **Trace deactivation**

The trace is deactivated with a `/TRA SET OFF TABLE FAST` command.

## **Diagnostic data**

Data is formatted as it is written. No offline formatting of the trace data is required.

### *Trace point identifiers*

The FP trace captures module flows, and at certain points, logic flows within modules. In most cases, there is a trace point at entry to a module and another at exit from the module. There might be additional trace points within the module. Each trace point has a unique 4-character identifier. To indicate nesting within call flows, using this unique 4-character identifier, the identifier is shifted right at each level. Each trace entry is prefixed by the identifier located in columns 1-13. The relative position of the identifier within columns 1-13 indicates nesting level, for example:

```
IRC1.....
.MCL0.....
```

Because the identifier has 4-characters and 13 positions are available, 9 levels of nesting are possible. Output lines with no identifier in columns 1-13 are continuations of the previous entry. The module entry and exit trace entries differ by only one character. Usually, the module exit identifier is the same as the module entry identifier, except for one character. Normally, the first character of the identifier is shifted up one alphabetically, for example:

```
.MCL0.....
.NCL0.....
```

### *Trace point time stamps*

Trace point time stamps are labeled with `TOD=xxxxxxx`. The hexadecimal digits are the middle 4-bytes of an 8-byte STCK time stamp. The high order digit is approximately 1 second.

**Note:** Fields that are labeled TIME and DATE within trace entries refer to the compile date and time of the module involved, and are not related to trace time.

### *Trace initialization entries*

Entries COT1 to TRAN at the beginning of the trace file refer to FP Trace initialization and can be ignored. These entries are produced if a FPTRACE DD statement is specified, even if the trace is not enabled.

### *Key trace point data items*

The data that is traced for each trace point varies. However, each field has a label to make it easier to determine the contents of the entry. Some of the common and useful labels include:

**Ra#b,Rab,**

Registers a-b follow.

**CALL** DL/I call function.

**TOKN**

UOR recovery token.

**MODU**

Module entry point address.

**EPST** EPST address of the dependent region.

**SSA** The first 30 bytes of the call SSA. Might contain residual data for short SSAs.

## **Fast Path external trace examples**

The following examples show the Fast Path external trace.

### **Trace entries from COT1 to SIEX are tracing the initialization of FPTRACE**

```
COT1.....TOD=B6B46252 WKAR=0A6FCC94 R0#F=00000031 007BF6B0 8AD8D6D8 00004700 8A6FC634 00000001 00CC4B20 7ABC7570 8AD8D6D8 007F6A
.....D8
BLTE.....TOD=B6B46259 R15=8AE1A060 DATE=01/0310.3 0#10=00004700 007AE900 8AD8D6C4 00004700 8A6FC634 0A6FCC94 00CC4B20 7ABC7570 8
.....AD8D6D8 007F6AD8 0A6FC040
BLTX.....R0#F=000000DD 007AE900 000000DC 007AF360 8A6FC634 0000000C 000000DD 007AE91C 00000001 007F6AD8 0A6FC040 007AE91C 8AE1A0
.....60 0A5BE738 000000DE 00000000 EPST=0A6FC040 TFTD=007AE900C4C2C6E3C6E3D6D400000000 TSTD=00000000000000000000000000000000
.....XTOM=00000000
COT2.....R0#F=00004700 007AE900 007AE900 00004700 8A6FC634 0A6FCC94 00CC4B20 7ABC7570 8AD8D6D8 007F6AD8 0A6FC040 00CC5B78 8ADC00
.....D0 0A5BE6F0 8ADC033E 00000000 EPST=0A6FC040 TFTD=007AE900C4C2C6E3C6E3D6D400000000 TSTD=00000000000000000000000000000000
.....XTOM=00000000
COT3.....R0#F=00004700 007AE900 007AE900 00004700 8A6FC634 0A6FCC94 00CC4B20 7ABC7570 8AD8D6D8 007F6AD8 0A6FC040 00CC5B78 8ADC00
.....D0 0A5BE6F0 8ADC033E 00000000 EPST=0A6FC040 TFTD=007AE900C4C2C6E3C6E3D6D400000000 TSTD=00000000000000000000000000000000
.....XTOM=00000000
COTX.....TOD=B6B465B8 WKAR=0A6FCC94 R0#F=00004700 007AE900 007AE900 00004700 8A6FC634 0A6FCC94 00CC4B20 7ABC7570 8AD8D6D8 007F6A
.....D8 0A6FC040 00CC5B78 8ADC00D0 0A5BE6F0 8ADC033E 00000000 MODU=8ADC00D0 DATE=08/01/031 TIME=10.32U LCHA=UP9HCT011
COTE.....TOD=B6B465B9 WKAR=0A6FCC94 R0#F=00000032 007BF6B0 000063AC 8ADC00D0 8A6FC624 00000001 00CC4B20 7ABC7570 00CC5B78 007F6A
.....D8 0A6FC040 00CC5B78 8ADC00D0 0A5BE6F0 8ADC010C 00000000 MODU=8ADC00D0 DATE=08/01/031 TIME=10.32U LCHA=UP9HCT011
COTY.....TOD=B6B465BA WKAR=0A6FCC94 R0#F=00000030 007BF6B0 8AD91DD8 8ADC00D0 8A6FC624 00000001 00CC4B20 7ABC7570 00CC5B78 007F6A
.....D8 0A6FC040 00CC5B78 8ADC00D0 0A5BE6F0 8ADC019E 00000000 MODU=8ADC00D0 DATE=08/01/031 TIME=10.32U LCHA=UP9HCT011
STS9.....TOD=B6B46614 R15=8ADDC410 DATE=01/0310.3 0#10=00000950 007BF6B0 000063AC 8ADDC410 8A6FC624 00000001 00CC4B20 7ABC7570 0
.....0CC5B78 007F6AD8 0A6FC040
STSX.....TOD=B6B4664D R15=00000000 DATE=01/0310.3 0#10=00000002 0A5BE060 007AE900 8ADDC410 8A6FC624 00000001 00CC4B20 7ABC7570 0
.....0CC5B78 007F6AD8 0A6FC040
SIEX.....TOD=B6B4664E R15=00000000 DATE=01/0310.3 0#10=00000950 007BF6B0 000063AC 8ADDC410 8A6FC624 00000001 00CC4B20 7ABC7570 0
.....0CC5B78 007F6AD8 0A6FC040
```

### **End of trace initialization**

```
FPR3.....TOD=B6B60ECA WKAR=0A6FCC94 R0#F=000121F8 0A69602C C7C8E440 00000000 00000001 0A5BE060 0BC14F5B C4C5D7C1 D9E3D4E3 4D0060
.....18 0A6FC040 00010000 8ADBA272 0001EE48 0001EC80 0E48B350 MODU=8ADBA272 DATE=08/05/03P TIME=PQ6040 LCHA=01 11AB
```

## Call is GHU - first 30 bytes of SSA are traced

```

..SAGE.....TOD=86860ED0 R09=00000000 00000C17 C7C8E440 0A69602C 0BC04F54 0AD4B67C FFFFFE20 FEE02D87 00CC4B20 000000FF R14=8AD4AF9
..0 R15=0AD728C8 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0BC04F54 POPT=00 SGLS=00 CLOC=00000000 DMHR=00000000 P
..RBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XABA=00000000 SGCD=00 PROF=0000 LEVEL=00 KEYL=00 FLGA=00 FLGB=00
..ACK=0000 KEYO=0000 SDBS=00000000 MLTE=0BC04F54 SFRX=00 SFSX=00 SFWX=00 SFXZ=00 SFXM=00 PREF=0000 SCNT=00000000 SWC1=00
..SWC2=00 SWC3=00 LOPR=00 SNAP=00000000 EPST=0A6FC040 SCVL=00 REOP=00 FDLN=00 FDOF=0000 DEDB=00 COMP=00000000 STAT=
..WCH=00 MODU=0AD728C8 DATE=08/01/031 TIME=10.28E LCHA=[E]
f}}

```

```

...SAGI.....TOD=B6B60EDB R0#9=00000000 00000C17 C7C8E440 0A69602C 00000000 0A6F588 FFFFFE20 FEE02D87 00CC4B20 000000FF R14=8AD7208
...6 R15=0AD72030 EPCB=0A69602C FLGM=00 DMCA=00000000 ARBA=00000000 UWOM=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=00000000 POPT=80 SGLS=CE CLOC=040C0000 DMHR=00FC7B38 P
...RBA=076C2000 CRBA=00000000 NRBA=814171C0 GRBA=00000000 XRBAS=00000000 SGCD=9E PROF=0008 LEVEL=07 KEYL=0C FLGA=10 FLGB=00
...ACKC=80CE KEYD=B594 SDBS=078D2000 MLTE=00000000 SFRX=00 SFSX=00 SFWX=04 SFZX=0C SFMX=00 PREF=8002 SCNT=00000000 SWC1=00
...SWC2=00 SWC3=04 LOPR=00 SNAP=00000000 EPST=0A6FC040 SCVL=00 REOP=00 FDLN=00 FDOF=0000 DEDB=00 COMP=00000000 STAT=
...WCH=00 MODU=0AD72030 DATE=08/01/031 TIME=10.28E LCHA=E}
f }}}
...VSNA.....TOD=B6B60EDF R0#9=00000000 00000C17 C7C8E440 0A69602C 00000000 0A6F588 8BC14F5B FEE02D87 00CC4B20 000000FF R14=8AD7208
...6 R15=0AD74478 EPCB=0A69602C FLGM=00 DMCA=00000000 ARBA=00000000 UWOM=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=00000000 POPT=80 SGLS=CE CLOC=040C0000 DMHR=00FC7B38 P
...RBA=076C2000 CRBA=00000000 NRBA=814171C0 GRBA=00000000 XRBAS=00000000 SGCD=9E PROF=0008 LEVEL=07 KEYL=0C FLGA=10 FLGB=00
...ACKC=80CE KEYD=B594 SDBS=078D2000 MLTE=00000000 SFRX=00 SFSX=00 SFWX=04 SFZX=0C SFMX=00 PREF=8002 SCNT=00000000 SWC1=00
...SWC2=00 SWC3=04 LOPR=00 SNAP=00000000 EPST=0A6FC040 SCVL=00 REOP=00 FDLN=00 FDOF=0000 DEDB=00 COMP=00000000 STAT=
...WCH=00 MODU=0AD74478 DATE=08/01/031 TIME=10.28E LCHA=E}
f }}}

```

```

.....VSNA.....TOD=B6B60EE3 R0#9=00000000 00000C17 C7C8E440 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 0A696168 000000FF R14=0000001
.....3 R15=00000000 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UWOW=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=00000000 DMHR=00000000 P
.....RBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XRB=00000000 SGCD=01 PROF=0000 LEVEL=01 KEYL=0B FLGA=88 FLGB=0
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A69602C SFRX=00 SF5X=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000001 SWC1=00
.....SWC2=00 SWC3=00 LOPR=80 SNAP=0A696168 EPST=0A6FC040 SCVL=00 REOP=00 FDLN=00 FDOF=0000 DEDB=00 COMP=00000000 STAT=
.....WCH=00 MODU=0AD74478 DATE=08/01/031 TIME=10.28E LCHA=E}
f }}
.....SFIT.....TOD=B6B60EE6 R0#9=00000000 00000C17 C7C8E440 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 0A696168 0A6960EC R14=8AD721E
.....4 R15=0AD6D3F0 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UWOW=00000000 CCID=8C CCNT=00000001 UBLK=00000000 DEDB
.....=10 MLTE=0A6960EC LEVL=01 SDBS=0AD09210 EPST=0A6FC040 SWAR=DEPTKEY =
.....7E LCHA=E}
f }}

```

[illegible]

## SSA analysis complete

```
...MRQC.....TOD=B6B60EF6 R0#9=00000000 00000C17 C7C8E440 0A69602C 0A6960EC 0AD4B67C FFFFE20 FEE02D87 00CC4B20 0A5BE060 R14=8AD4B01
.....2 R15=0AD6B640 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=00000000 DMHR=00000000 P
.....RBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XRBA=00000000 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000001 SWC1=00
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD6B640 DATE=08/01/031 TIME=10.27P LCHA=PQ69789 A
```

## Retrieve by qualified call

```
...MCTL.....R0#F=00000000 00000C17 C7C8E440 0A69602C 0A6960EC 00000001 FFFFE20 FEE02D87 00CC4B20 0A5BE060 0A6FC040 00CC5B78 0AD4C4
.....98 0A5BE6F0 8AD6BDE0 0AD4C498 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBL
.....K=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC DBPC=0A52F35C STC= A LEV=00 SFD=DEDB
.....FD=D9F1F2F1F0F0F5F1F0F0F3C14040404040404040404040400000E2D7C3C20000000001000301 MLTE=0A6960EC POPT=00 SGLS=01 CLOC=
.....00000000 DMHR=00000000 PRBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XRBA=00000000 SGCD=01 PROF=0000 LEVL=01
.....KEYL=0B FLGA=88 FLGB=00 ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=00
.....06 SCNT=00000001 SWC1=00 SWC2=02 SWC3=00 LOPR=82 SNMT=0A696168 NAME=DEPARTMTY EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDO
.....SSA9.....TOD=B6B613F3 R0#9=00000004 00000000 C7C8E440 0A69602C 0A6960EC 00000001 FEE02D87 00CC4B20 00000000 R14=8AD4C7A
.....4 R15=0AD712D0 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=00000000 DMHR=00000000 P
.....RBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XRBA=00000000 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000001 SWC1=00
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD712D0 DATE=08/01/031 TIME=10.28P LCHA=PQ73448 A
```

## Search SSA for data

```
....BACK.....TOD=B6B613F6 R15=00000000 DATE=01/0310.2 0#10=00000004 00000000 C7C8E440 0A69602C 0A6960EC 00000001 00000001 FEE02D87 0
.....0CC4B20 00000000 0A6FC040
.....MDRA.....TOD=B6B613F7 R0#9=00000004 00000000 00000000 0A69602C 0A6960EC 00000001 00000001 FEE02D87 00000001 00000000 R14=8AD7186
.....6 R15=0AD4E428 EPCB=0A69602C FLGM=04 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=00000000 DMHR=00000000 P
.....RBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XRBA=00000000 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000001 SWC1=00
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD4E428 DATE=08/01/031 TIME=10.26E LCHA=E}
i"}}
```

## Determine the possibility of randomizing

```
.....MD03.....TOD=B6B613FB WKAR=0A6FCC94 R0#F=00000004 0A4998C0 0A4998C6 0A69602C 0A6960EC 00000010 00000001 FEE02D87 00000001 000000
.....01 0A6FC040 00CC5B78 0AD4E428 0A5BE780 8AD71866 00000000 MODU=0AD4E428 DATE=08/01/031 TIME=10.26E LCHA=E}
i"}}
```

## No position

```
.....MD49.....TOD=B6B613FC WKAR=0A6FCC94 R0#F=00000004 0A4998C0 0A4998C6 0A69602C 0A6960EC 00000010 00000001 FEE02D87 00000001 000000
.....01 0A6FC040 00CC5B78 0AD4E428 0A5BE780 8AD71866 0A4998D0 MODU=0AD4E428 DATE=08/01/031 TIME=10.26E LCHA=E}
i"}}
```

## Use randomizer

```
.....MDRA.....TOD=B6B613FD R0#9=00000004 0A4998C0 0A4998C6 0A69602C 0A6960EC 00000010 00000001 FEE02D87 00000001 00000001 R14=8AD7186
.....6 R15=0A4998D0 EPCB=0A69602C FLGM=04 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=00000000 DMHR=00000000 P
.....RBA=00000000 CRBA=00000000 NRBA=00000000 GRBA=00000000 XRBA=00000000 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000001 SWC1=00
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD4E428 DATE=08/01/031 TIME=10.26E LCHA=E}
i"}}
```

```
.....MGAP.....TOD=B6B61416 R0#F=00000004 00000000 00000004 0A69602C 0A6960EC 00000001 00000001 FEE02D87 0AD091C0 0A69602C 0A6FC040 00
.....CC5B78 0AD54858 0A5BE780 8AD71906 0AD54858
```

## Get root anchor point

```
.....ERAN.....TOD=B6B61417 R0#F=00000006 0AD0923C 0000000C 0A4998D0 0000000C 00000078 0A6FC140 FEE02D87 0AD091C0 0A69602C 0A6FC040 00
.....CC5B78 0AD54858 0A5BE780 8AD71906 8B6900E8 TOD=B6B61417 R0#9=00000006 0AD0923C 0000000C 0A4998D0 0000000C 00000078 0A6F
.....C140 FEE02D87 0AD091C0 0A69602C R14=8AD71906 R15=8B6900E8 EPCB=0A4998D0 FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=000000
.....00 CCID=00 CCNT=00000000 UBLK=00000000 DEDB=00 MLTE=0000000C LEVL=80 SDBS=00000000 EPST=0A6FC040 SWAR=DEPTKEY =
.....
```

## Entry to randomizer

```
.....XRAN.....TOD=B6B61419 WKAR=0A6FCC94 R0#F=00000000 0AD09288 0000000C 0A4998D0 0000000C 00000078 0A6FC140 FEE02D87 0AD091C0 0A6960
.....2C 0A6FC040 00CC5B78 0AD54858 0A5BE780 8AD54982 00000000 MODU=0AD54858 DATE=08/01/03P TIME=PQ7029 LCHA=96 ABCE}
```



## Entry to randomizer

```
.....NGAP....TOD=B6B6141A R0#F=00000000 0AD09288 00000000 00001004 00000004 00000000 0A6FC140 FEE02D87 0AD091C0 0A69602C 0A6FC040 00
.....CC5B78 0AD54858 0A5BE780 D9C1D5C4 00000000
.....MGRF....TOD=B6B6141B WKAR=0A6FCC94 R0#F=00000000 00000000 0000000A 0A69602C 0A6960EC 00000001 00000001 FEE02D87 0AD09288 000000
.....00 0A6FC040 00CC5B78 0AD56F70 0A5BE780 8AD71912 0AD56F70 MODU=0AD56F70 DATE=08/01/031 TIME=10.26E LCHA=E}
{ " }
```

## Get root

```
.....MBED...TOD=B6B6141C AREA=DEPTAR0
.....0AD09288 00000000 RE#F=8AD5730A 8A71C580
```

## Get control (CI RBA X'1000')

```
.....EXXC...TOD=B6B6141D WKAR=0A6FCC94 R0#F=00000000 00000000 0A6FC284 0A69602C 0A6960EC 8AD56FC4 00001000 00001000 0AD09288 000000
.....00 0A6FC040 00CC5B78 0AD5AB48 0A5BE810 8AD486BA 0AD5AB48 MODU=0AD5AB48 DATE=I=VELOCK08 TIME=8/05/0 LCHA=03E}
{ " }
```

## Get EXCL CI lock (CI RBA X'1000')

```
.....NGXC..TOD=B6B6141F R0#9=0000D800 0A5BE060 00000000 09E6A040 00000008 00001000 00001000 0A960CB0 0AD09288 00000000 RE#F=00 00
.....XCRB=0A960CB0 NEXT=00000000 SHDC=00000000 OPST=0A6FC040 UOWN=00001000 FLGS=80 DMHR=00000000
.....MSRB..R0#F=FFFF4040 0AA922C0 0AD09288 0A69602C 8AD48710 0AD3FA20 00001000 0A960CB0 0AD09288 0AA922C0 0A6FC040 00CC5B78 0AD6E8
.....30 0A5BE858 8AD48B1E 0AD6E830 EPST=0A6FC040 WKAR=0A6FCC94 MODU=0AD6E830 DATE=08/05/031 TIME=13.58P LCHA=PQ71804 0
```

## Synchronous read of CI

```
.....VSOR.TOD=B6B61424 WKAR=0A6FCC94 R0#F=FFFF4040 00000000 0AD09288 0A69602C 0AA922C0 0AD3FA20 00001000 0A960CB0 0AD09288 0AA922
.....C0 0A6FC040 00CC5B78 0AD98E88 0A5BE8A0 8AD6E902 0AD98E88 MODU=0AD98E88 DATE=08/05/031 TIME=14.00K LCHA=KX20294 0
.....VSOR.TOD=B6B61426 WKAR=0A6FCC94 R0#F=0AB38800 00000000 0AD09288 00000001 00000000 0A95B268 00001000 00000000 0AD09288 0AA922
.....C0 0A6FC040 00CC5B78 0AD98E88 0A5BE8A0 0009A800 00000000 MODU=0AD98E88 DATE=08/05/031 TIME=14.00K LCHA=KX20294 0
```

## CI in VSO data space

```
.....NSRB..R0#F=FFFF4040 00000000 0AD09288 0A69602C 0AA922C0 0AD3FA20 00001000 0A960CB0 0AD09288 0AA922C0 0A6FC040 00CC5B78 0AD6E8
.....30 0A5BE858 8AD6E902 00000000 EPST=0A6FC040 WKAR=0A6FCC94 MODU=0AD6E830 DATE=08/05/031 TIME=13.58P LCHA=PQ71804 0
.....NBED...TOD=B6B61428 R0#9=FFFFF0D8 0AA922C0 FFFF0D07 0A69602C 8AD48710 0AD3FA20 00001000 0A960CB0 0AD09288 0AA922C0 RE#F=7A 00
.....XCRB=0A960CB0 NEXT=00000000 SHDC=00000000 OPST=0A6FC040 UOWN=00001000 FLGS=80 DMHR=0AA922C0
.....MGR9...TOD=B6B6142C WKAR=0A6FCC94 R0#F=00000004 0000000B 00000000 0A69602C 0A6960EC 8AD5703C 0AB38008 00001000 0AD09288 0AA922
.....C0 0A6FC040 00CC5B78 0AD56F70 0A5BE780 0AB38010 00000000 MODU=0AD56F70 DATE=08/01/031 TIME=10.26E LCHA=E}
{ " }
```

## Found the root

```
.....NGRF....TOD=B6B6142D WKAR=0A6FCC94 R0#F=00000004 0000000B 00000000 0A69602C 0A6960EC 8AD5703C 0AB38008 00001000 0AD09288 0AA922
.....C0 0A6FC040 00CC5B78 0AD56F70 0A5BE780 0AB38010 00000000 MODU=0AD56F70 DATE=08/01/031 TIME=10.26E LCHA=E}
{ " }
.....FOND....TOD=B6B6142E WKAR=0A6FCC94 R0#F=00000004 00000000 00000004 0A69602C 0A6960EC 00000001 00000001 FEE02D87 00000010 000000
.....00 0A6FC040 00CC5B78 0AD712D0 0A5BE738 0000000C 00000000 MODU=0AD712D0 DATE=08/01/031 TIME=10.28P LCHA=PQ73448 A
.....SSA9....TOD=B6B6142F R0#9=00000004 00000000 00000004 0A69602C 0A6960EC 00000001 00000001 FEE02D87 00001004 00000000 R14=0000126
.....8 R15=00000000 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=8C CCNT=00000002 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=0AB38008 DMHR=0AA922C0 P
.....RBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000001 SWC1=20
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=10 MODU=0AD712D0 DATE=08/01/031 TIME=10.28P LCHA=PQ73448 A
.....MCT3...TOD=B6B61432 WKAR=0A6FCC94 R0#F=00000004 00000000 C7C8E440 0A69602C 0A6960EC 00000001 00000010 FEE02D87 00CC4B20 000000
.....00 0A6FC040 00CC5B78 0AD4C498 0A5BE6F0 8AD4C7A4 00000000 MODU=0AD4C498 DATE=08/01/031 TIME=10.26E LCHA=E}
{ " }
.....MCTL....R0#F=00000004 0000000C 0000000C 0A69602C 0A6960EC 00000001 0AB38010 FEE02D87 0000000B 00000000 0A6FC040 00CC5B78 0AD4C4
.....98 0A5BE6F0 0A52F35C 00000000 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=8C CCNT=00000003 UBL
.....K=00000000 DEDB=10 LKFP=00000000 PRGP=00000000 CLEV=0A6960EC DBPC=0A52F35C STC= A LEV=01 SFD=DEPARTMT
.....FD=D9F1F2F1F0F0F0F0F0F0F1C1404040404040404040404040400000E2D7C3C20000000001000301 MLTE=0A6960EC POPT=00 SGLS=01 CLOC=
.....0AB38008 DMHR=0AA922C0 PRBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01
.....KEYL=0B FLGA=88 FLGB=00 ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=00
.....06 SCNT=00000002 SWC1=20 SWC2=02 SWC3=00 LOPR=82 SNMT=0A696168 NAME=DEPARTMTY EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDO
.....RC04...TOD=B6B61437 R0#F=00000004 00000C17 C7C8E440 0A69602C 0A6960EC 00000004 FFFFFE20 FEE02D87 00CC4B20 0A5BE060 0A6FC040 00
.....CC5B78 0AD6B640 0A5BE6A8 0000000C 00000000
```

## Found the root; moved from current position

```
....TOGH....TOD=B6B61438 R15=00000000 DATE=01/0310.2 0#10=00000000 00000010 C7C8E440 0A69602C 0A6960EC 00000004 FFFFFE20 FEE02D87 0
.....0CC4B20 0A5BE060 0A6FC040
.....NOPA....TOD=B6B61438 WKAR=0A6FCC94 R0#F=00000000 00000000 0A6960EC 0A69602C 0A6960EC 00000004 FFFFFE20 FEE02D87 00CC4B20 0A5BE0
.....60 0A6FC040 00CC5B78 0AD6B640 0A5BE6A8 0000000C 00000000 MODU=0AD6B640 DATE=08/01/031 TIME=10.27P LCHA=PQ69789 A
.....MRQC....TOD=B6B6143B R0#9=00000000 0AB3800E 0A6960EC 0A69602C 0A6960EC 00000004 00000000 FEE02D87 00CC4B20 0A5BE060 R14=8AD6C27
.....2 R15=00000000 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=8C CCNT=00000003 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=0A6960EC PRGP=0A6960EC CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=0AB38008 DMHR=0AA922C0 P
.....RBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000002 SWC1=60
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=18 MODU=0AD6B640 DATE=08/01/031 TIME=10.27P LCHA=PQ69789 A
....SEG4....TOD=B6B61443 R15=00000000 DATE=01/0310.2 0#10=00000000 00000C17 0A52F35C 0A69602C 0A6960EC 0AD4B67C FFFFFE20 FEE02D87 0
```



```

.....0CC4B20 0A5BE060 0A6FC040
...NCL0.....R0#F=00000000 00000C17 0A52F35C 0A69602C 0A6960EC 8BC14F5B FFFFFE20 FEE02D87 00CC4B20 0A52F35C 0A6FC040 00CC5B78 0AD4AD
.....80 0A5BE660 00000030 00000000 EPCB=0A69602C CCID=8C LCID=8C PRGP=0A6960EC LKFP=0A6960EC DBPC=0A52F35C STC= A LEV=01 S
.....FD=DEPARTMT
.....0080000100400010100010B8800000C00080AD0 STAS=

```

## Call ends

```

..OPMV.....TOD=B6B61447 R0#F=00000000 00000000 C7C8E440 0A69602C 0BC04F54 0A5BE060 8A6FC491 00000000 00CC4B20 0BC04F54 0A6FC040 00
.....CC5B78 0ADBA930 0A5BE618 0BC04F54 00000000 IOAR=8A6FC491 IOAL=0000 IOAD=808A6FC491000000000A71C58000000000000000 EPST=0
.....A6FC040 MOV=8A6FC491 GETL=0000

```

## Move data back to application I/O area

```

FPR3.....TOD=B6B6146E WKAR=0A6FCC94 R0#F=000121F8 0A69602C D9C5D7D3 00000000 00000001 0A5BE060 0BC14F5B C4C5D7C1 D9E3D4E3 400060
.....18 0A6FC040 0001D9F1 8ADBA272 0001EE48 0001EC80 0E48B3AA MODU=8ADBA272 DATE=08/05/03P TIME=PQ6040 LCHA=01 1IAB

```

## REPL call starts

```

IRC1.....TOD=B6B61471 R015=00000000 00000C18 D9C5D7D3 0A69602C 0BC04F54 0A5BE060 00000000 8A71C580 D9E3D4E3 0A9F1048 0A6FC040 00
.....CC5B78 8ADBA272 0A5BE618 0A6FC9FC 00000001 LCRE=0A9F1048 T0KN=E2E8E2F34040404000000000600000000 EPCB=0A69602C PCBA=0A52F
.....35C PCBD=000121F8 ESCD=00CC5B78 MADR=8AD477B0 EPST=0A6FC040 WKAR=0A6FCC94 SVIO=0BC04F54 SVIL=D9F1 SVSN=0001
.MCL0.....TOD=B6B61472 CALL=REPL EPST=0A6FC040 WKAR=0A6FCC94 EPCB=0A69602C CCID=8C LCID=8C PRGP=0A6960EC LKFP=0A6960EC PCB=0A52F3
.....5C SSA=DEPARTMT MODU=0AD4AD80 DATE=08/01/031 TIME=10.25E LCHA=E}
i } }

```

## SSA traced

```

..SSAX.....SSA=DEPARTMT

```

## First SSA

```

..SSR9.....TOD=B6B61474 R15=0AD72D18 DATE=01/0310.2 0#10=00000000 00000C18 D9C5D7D3 0A69602C 0BC04F54 0AD4B68C FFFFFE10 FF3C46E1 0
.....0CC4B20 000000EE 0A6FC040
...VSNA.....TOD=B6B61475 R0#9=00000000 00000C18 D9C5D7D3 0A69602C 0A6960EC 0A6FC588 8BC14F5B FF3C46E1 00CC4B20 000000EE R14=8AD72DD
.....A R15=0AD74478 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=E0 CCNT=00000003 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=0A6960EC PRGP=0A6960EC CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=0AB38008 DMHR=0AA922C0 P
.....RBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000002 SWC1=60
.....SWC2=02 SWC3=00 LOPR=82 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD74478 DATE=08/01/031 TIME=10.28E LCHA=E}
i } }
...VSNA.....TOD=B6B61478 R0#9=00000000 00000C18 D9C5D7D3 0A69602C 0A6960EC 0A6FC588 8BC14F5B 00000000 00CC4B20 000000EE R14=0A69616
.....8 R15=00000000 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=E0 CCNT=00000003 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=0A6960EC PRGP=0A6960EC CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=0AB38008 DMHR=0AA922C0 P
.....RBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000002 SWC1=40
.....SWC2=00 SWC3=00 LOPR=00 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD74478 DATE=08/01/031 TIME=10.28E LCHA=E}
i } }

```

## Validating segment name

```

..SSR9.....TOD=B6B6147D R15=00000000 DATE=01/0310.2 0#10=00000000 00000C18 D9C5D7D3 0A69602C 0A6960EC 0A6FC588 8BC14F5B 00000000 0
.....0CC4B20 000000EE 0A6FC040
..MRPL.....TOD=B6B6147D R0#9=00000000 00000C18 D9C5D7D3 0A69602C 0A6960EC 0AD4B68C 8BC14F5B 00000000 00CC4B20 0A5BE060 R14=8AD4B01
.....2 R15=0AD6AD40 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=E0 CCNT=00000003 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=0A6960EC PRGP=0A6960EC CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLOC=0AB38008 DMHR=0AA922C0 P
.....RBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000002 SWC1=40
.....SWC2=00 SWC3=00 LOPR=80 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD6AD40 DATE=08/01/03P TIME=PQ7304 LCHA=49 AE}

```

## Replace call handler

```

...PI09.....TOD=B6B61482 WKAR=0A6FCC94 R0#F=00000000 0BC04F54 0AB38008 0A69602C 0A6960EC 0AD4B68C 0A6960EC 00000000 00CC4B20 0A5BE0
.....60 0A6FC040 00CC5B78 0AD678C0 0A5BE6F0 8AD6AE8A 0AD678C0 MODU=0AD678C0 DATE=08/01/03
...PI09.....TOD=B6B61483 WKAR=0A6FCC94 R0#F=0A499672 00000000 0AB38008 0A69602C 0A6960EC 00000000 0A499666 00000000 0000025A 0A5BE0
.....60 0A6FC040 00CC5B78 0AD678C0 0A5BE6F0 0A115556 00000000 MODU=0AD678C0 DATE=08/01/03

```

## Process I/O area for replace

```

...MUH1.....TOD=B6B61484 WKAR=0A6FCC94 R0#F=00000260 00000008 0000000B 0A69602C 0A6960EC 0AD4B68C 00000008 00000000 00000260 0AA922
.....C0 0A6FC040 00CC5B78 0AD737A8 0A5BE6F0 8AD6B0A2 0AD737A8 MODU=0AD737A8 DATE=08/01/031 TIME=10.28E LCHA=E}
i } }
...MUHE.....TOD=B6B61485 WKAR=0A6FCC94 R0#F=00000018 00000025 0A1150C9 0000022B 0AB3803D 0000022B 00000008 00000025 0AB38025 0AA922
.....C0 0A6FC040 00CC5B78 0AD73158 0A5BE738 8AD73850 0AD73158 MODU=0AD73158 DATE=08/01/031 TIME=10.28E LCHA=E}
i } }
...NUHE.....TOD=B6B61486 WKAR=0A6FCC94 R0#F=00000018 00000025 0000001C 0000022B 00000000 00000004 0000003C 00000001 0AB38025 0AA922
.....C0 0A6FC040 00CC5B78 0AD73158 0A5BE738 8AD73850 0AD73158 MODU=0AD73158 DATE=08/01/031 TIME=10.28E LCHA=E}

```

```
i"}}
...MUH1.....TOD=B6B61487 WKAR=0A6FCC94 R0#F=00000018 00000025 0A1152F4 00000000 0AB38268 00000000 00000008 00000025 0AB38025 0AA922
.....C0 0A6FC040 00CC5B78 0AD737A8 0A5BE6F0 8AD73850 00000000 MODU=0AD737A8 DATE=08/01/031 TIME=10.28E LCHA=E}
i"}}
```

## Record changes to buffer

```
..MRPL.....TOD=B6B61488 R0#9=00000260 00000008 0000000B 0A69602C 0A6960EC 0AD4B68C 00000008 00000000 00000260 0AA922C0 R14=8AD6B0A
.....2 R15=00000000 EPCB=0A69602C FLGM=E0 DMAC=0AD09288 ARBA=00001004 UOWO=00000000 CCID=E0 CCNT=00000003 UBLK=00000000 KUBL
.....=00000000 DEDB=10 LKFP=0A6960EC PRGP=0A6960EC CLEV=0A6960EC MLTE=0A6960EC POPT=00 SGLS=01 CLQC=0AB38008 DMHR=0AA922C0 P
.....RBA=00001004 CRBA=00001008 NRBA=00001268 GRBA=00001268 XRBA=00001004 SGCD=01 PROF=0000 LEVL=01 KEYL=0B FLGA=88 FLGB=00
.....ACCK=000C KEYO=0008 SDBS=0AD09210 MLTE=0A6960EC SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=00 PREF=0006 SCNT=00000002 SWC1=40
.....SWC2=00 SWC3=00 LOPR=80 SNAP=0A696168 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.....WCH=00 MODU=0AD6AD40 DATE=08/01/03P TIME=PQ7304 LCHA=49 AE}

..SEG4.....TOD=B6B6148D R15=00000000 DATE=01/0310.2 0#10=00000000 00000C18 0A52F35C 0A69602C 0A6960EC 0AD4B68C 8BC14F5B 00000000 0
.....0CC4B20 0A5BE060 0A6FC040
.....R0#F=00000000 00000C18 0A52F35C 0A69602C 0A6960EC 8BC14F5B 8BC14F5B 00000000 00CC4B20 0A52F35C 0A6FC040 00CC5B78 0AD4AD
.....80 0A5BE660 00000030 00000000 EPCB=0A69602C CCID=E0 LCID=8C PRGP=0A6960EC LKFP=0A6960EC DBPC=0A52F35C STC= A LEV=01 S
.....FD=DEPARTMT
.....0080000100400010100010B8800000C00080AD0 STAS=
```

## REPL call ends

```
OPMV.....TOD=B6B61490 R0#F=00000000 00000000 D9C5D7D3 0A69602C 0BC04F54 0A5BE060 0A6FC491 00000000 00CC4B20 0BC04F54 0A6FC040 00
.....CC5B78 0ADBA930 0A5BE618 0BC04F54 00000000 IOAR=0A6FC491 IOAL=0000 IOAD=800A6FC4910A1155560A71C58000000000000000 EPST=0
.....A6FC040 MOV=0A6FC491 GETL=0000
SYN1.....TOD=B6B6149B R15=0AD35F68 DATE=05/0314.0 0#10=00CC4B20 0A5BE060 8A390E8E 0AE1EA34 0A5BE060 0A358698 0A9F1048 00000003 0
.....A35879C 0A5BE060 0A6FC040
```

## Begin synchronization point

```
..SLOG.....TOD=B6B6149C R0#F=0A6FC040 00000001 00000000 0AE1EA34 0A5BE060 00000000 0A9F1048 00000003 0A35879C 0A5BE060 0A6FC040 00
.....CC5B78 0AD34168 0A5BE738 8AD3617E 0AD34168 MODU=0AD34168 DATE=08/05/03U TIME=UP9BDN LCHA=N0112
```

## Log 5950 CI updates

```
..SLGE.....TOD=B6B6149F R15=000007B4 DATE=05/0313.5 0#10=00000004 00001530 0A6FC040 00000010 00CC6EF0 00000070 0A6FC7F4 00CC4B20 0
.....A369920 0A5BE060 0A6FC040
..SLGE.....TOD=B6B614A0 R15=00000004 DATE=05/0313.5 0#10=3A53400A 000014C0 0A6FC040 0AB38000 0A6FD044 00000000 00000002 00CC4B20 0
.....AD09288 0AD091C0 0A6FC040
..SLGE.....TOD=B6B614A1 R15=000007B4 DATE=05/0313.5 0#10=00000000 00001498 0A6FC040 00007E99 0A88F31E 00000088 0A6FC7F4 00CC4B20 0
.....A369920 0A5BE060 0A6FC040
..SLGE.....TOD=B6B614A2 R15=00000000 DATE=05/0313.5 0#10=00000000 00001498 0A6FC040 00007E99 0A88F31E 00000088 0A6FC7F4 00CC4B20 0
.....A369920 00000000 0A6FC040
```

## Logger calls Fast Path logger exit

```
..TLOG.....TOD=B6B614A3 R0#F=001D431E 0A5BE060 00000000 0A6FC27C 00000090 00000000 0A6FC7DC 0A6FC7DC 00000000 00CC4B20 0A6FC040 00
.....CC5B78 0AD34168 0A5BE738 8AD3486C 00000000 MODU=0AD34168 DATE=08/05/03U TIME=UP9BDN LCHA=N0112
TYN1.....TOD=B6B614A4 R15=00000000 DATE=05/0314.0 0#10=0A6FC040 00800001 00000000 0AE1EA34 305BE060 8A71C580 0A9F1048 00000003 0
.....A35879C 0A5BE060 0A6FC040
```

## End phase I

```
..SYN2.....TOD=B6B614A4 R15=0AD36748 DATE=05/0314.0 0#10=00000000 0A5BE060 8A390E8E 00000000 0A5BE060 0A358698 00CC4B20 00000003 0
.....A35879C 0A5BE060 0A6FC040
```

## Start phase II

```
..SLG2.....TOD=B6B614A5 R15=00000000 DATE=05/0314.0 0#10=00800001 00000000 0A5BE060 00000000 00000000 00000000 00CC4B20 00000003 0
.....A35879C 0A5BE060 0A6FC040
..SYP2.....TOD=B6B614A7 R0#F=00000000 00000000 00000000 00000000 0A5BE060 0A358698 00CC4B20 00000003 0A35879C 0A5BE060 0A6FC040 00
.....CC5B78 0AD370D0 0A5BE738 8AD36938 0AD370D0 MODU=0AD370D0 DATE=08/05/03P TIME=PQ6949 LCHA=94 AE}

....SPIX....TOD=B6B614A8 R15=0AD35920 DATE=01/03
.....AD09288 00000000 0A6FC040
....XPIX....TOD=B6B614A9 WKAR=0A6FCC94 R0#F=00000001 0A960CB0 00000000 0A6FC264 00000000 00000000 00CC4B20 0A960CB0 00000000 000000
.....00 0A6FC040 00CC5B78 0ADA6668 0A5BE810 8AD35AA2 0ADA6668 MODU=0ADA6668 DATE=08/05/03K TIME=KZC007 LCHA=77 0E}

....NPIX....TOD=B6B614AE WKAR=0A6FCC94 R0#F=0A6FC040 00000000 8ADA7284 0ADA4C78 09E6A03C 00001000 FFFFFE90 00000000 0AD09288 000000
.....00 0A6FC040 00CC5B78 0ADA6668 0A5BE810 8ADA4D58 00000000 MODU=0ADA6668 DATE=08/05/03K TIME=KZC007 LCHA=77 0E}

....NPIX....TOD=B6B614AF WKAR=0A6FCC94 R0#F=00000001 00000000 00000000 0A6FC264 00000000 00000000 00CC4B20 00000000 00000000 000000
.....00 0A6FC040 00CC5B78 0AD35920 0A5BE7C8 8AD35AA2 0ADA6668 MODU=0AD35920 DATE=08/01/03
```

## Release locks

```
...TYP2.....TOD=B6B614B0 R0#F=00000000 00000000 00000000 00000000 0A5BE060 0A358698 00000000 00000003 0A35879C 0A5BE060 0A6FC040 00
.....CC5B78 0AD370D0 0A5BE738 8AD37168 00000000 MODU=0AD370D0 DATE=08/05/03P TIME=PQ6949 LCHA=94 AE}

...SHDQ.....TOD=B6B614B1 R15=0AD30B50 DATE=/01/03PQ7 0#10=00000000 00000000 00000000 00000000 0A5BE060 0A358698 00CC4B20 00000003 0
.....A35879C 0A5BE060 0A6FC040
```

```

...SHDX.....TOD=B6B614B2 R15=00000000 DATE=/01/03PQ7 0#10=00000000 00000000 00000000 0A6966A8 00000000 00000000 00CC4B20 00000003 0
.....A696018 0A5BE060 0A6FC040
...SDEQ.....TOD=B6B614B2 R0#F=00000000 00000000 00000000 0A5BE060 0A358698 00CC4B20 00000003 0A35879C 0A5BE060 0A6FC040 00
.....CC5B78 0AD2F3B8 0A5BE738 8AD369BC 0AD2F3B8 MODU=0AD2F3B8 DATE=08/01/031 TIME=10.31K LCHA=KZC0077 1
...BENQ.....TOD=B6B614B3 DATE=01/0310.1 FC=08 UDNA=00000000 UDSR=0000 QBLK=00000000000000000000000000000000 PARM=2003225F0002292773
.....
...RENQ.....TOD=B6B614B4 R0#F=0A6FC040 0A6FC040 0A6FC4EC 00000000 0A5BE060 0A358698 00CC4B20 00000003 0A35879C 00000000 0A6FC040 00
.....CC5B78 0AD2DB78 0A5BE780 8AD2F582 00000000 MODU=0AD2DB78 DATE=08/01/031 TIME=10.10K LCHA=KZC0077 0
...TDEQ.....TOD=B6B614B5 R15=00000000 DATE=01/0310.3 0#10=0A6FC040 00000000 00000008 0A6966A8 00000000 00000001 00000000 00000003 0
.....A696018 00000000 0A6FC040

```

## Dequeue other resources

```

..TYN2.....TOD=B6B614B6 R15=8A71C580 DATE=05/0314.0 0#10=00000000 00800001 00000000 00000000 0A5BE060 0A358698 00CC4B20 00000003 0
.....A35879C 0A5BE060 0A6FC040

```

## End phase II

```

..SYN2.....TOD=B6B614B7 R15=0AD36748 DATE=05/0314.0 0#10=00000000 8A5BE060 00000000 0AE1EA34 0A5BE060 0A358698 00CC4B20 00000003 0
.....A35879C 0A5BE060 0A6FC040
..TYN2.....TOD=B6B614B8 R15=0AD36748 DATE=05/0314.0 0#10=00000000 8A5BE060 00000000 0AE1EA34 0A5BE060 0A358698 00CC4B20 00000003 0
.....A35879C 0A5BE060 0A6FC040

```



---

## Chapter 14. IMS Connect service aids

The service aids for IMS Connect include the IMS Connect Dump Formatter and trace options.

### Related tasks:

“Collecting data about IMS Connect problems” on page 19

---

### IMS Connect Dump Formatter

An IBM Software Support representative might ask you to use the IMS Offline Dump Formatter to diagnose an IMS Connect problem. The IMS Connect Dump Formatter enables you to format various IMS Connect internal control blocks under the ISPF IPCS environment.

### Accessing the IMS Connect Dump Formatter

You access the IMS Connect Dump Formatter from the IMS Offline Dump Formatter ISPF panels.

To access the IMS Connect Dump Formatter:

1. On the IPCS Component Analysis panel, select DFSAAMPR. The IMS Dump Formatting Primary Menu panel opens.

```
DFSAAMPR ----- IMS DUMP FORMATTING PRIMARY MENU -----
OPTION ===>

0 INIT - IMS formatting initialization and content summary
1 BROWSE - Browse Dump data set (IPCS norm) *****
2 HI-LEVEL - IMS Component level formatting *USERID - IMSDUMP
3 LOW-LEVEL - IMS ITASK level formatting *DATE - 00/08/23
4 ANALYSIS - IMS dump analysis *JULIAN - 00.236
5 USER - IMS user formatting routines *TIME - 16:06
6 OTHER COMP - Other IMS components (BPE, CQS...) *PREFIX - IMSDUMP
7 OTHER PROD - Other IMS-related products *TERMINAL- 3278
E EDA - IMS Enhanced Dump Analysis *PF KEYS -
T TUTORIAL - IMS dump formatting tutorial *****
X EXIT - Exit IMS dump formatting

Enter END or RETURN command to terminate IMS component formatting.

Use PFKeys to scroll up and down if needed.
```

Figure 72. IMS Dump Formatting Primary Menu panel

2. On the IMS Dump Formatting Menu panel, type 6 for Other Components and press **Enter**.
3. On the Other Components panel, type 6 for IMS Connect and press **Enter**.

### Initializing a dump by using the IMS Connect Dump Formatter

Before you can format a dump, you must initialize it. After you initialize a dump, you can use the options on the IMS Connect Dump Formatting Menu to browse the dump data set, perform high-level or low-level IMS Connect formatting, or perform IMS Connect BPE formatting.

To initialize a dump:

1. Open the IMS Connect Dump Formatting Menu panel, as shown in the following figure.

```

----- IMS CONNECT DUMP FORMATTING MENU -----
OPTION ==>

 0 INIT - Show BPE status and initialize dump
 1 BROWSE - Browse dump data set (IPCS norm)
 2 HI-LEVEL - IMS Connect component level formatting
 3 LOW-LEVEL- IMS Connect level formatting
 4 EXT TRACE- BPE external trace formatting
 X EXIT - Exit IMS dump formatting

*USERID - IMSDUMP
*DATE - 00/08/23
*JULIAN - 00.236
*TIME - 16:08
*PREFIX - IMSDUMP
*TERMINAL- 3278
*PF KEYS - 24

Enter END or RETURN command to terminate IMS Connect formatting.

```

Figure 73. IMS Connect Dump Formatting Menu panel

2. Type 0 for Show BPE status and initialize dump, and press **Enter**. The IMS Connect Dump Initialization panel opens, as shown in the following figure, along with the message that the symbol HWSCSCD was not found.

```

----- IMS CONNECT DUMP CONTENT STATUS AND CONTROL -----
COMMAND ==>
SYMBOL HWSCSCD NOT FOUND
Enter the IMS Connect jobname or ASID to cause the IMS
Connect IPCS symbols to be set for this dump. Press
ENTER with blank jobname and ASID fields to list all
IMS Connect address spaces in the dump.

JOBNAME ASID A.S. TYPE DUMPED?

IMS Connect ??? NO

SDWA Address: BPE Release:
CSCD Address: ??? Release:
??? Sys Name: ??? Product:

```

Figure 74. IMS Connect Dump Initialization panel

3. Specify either the job name or the address space ID (ASID) of the IMS Connect address you want to format and press **Enter**. After you specify a job name or ASID, the remaining fields are completed in the initialization panel, as shown in the following figure.

```

----- IMS CONNECT DUMP CONTENT STATUS AND CONTROL -----
COMMAND ===>

Enter the IMS Connect jobname or ASID to cause the IMS
Connect IPCS symbols to be set for this dump. Press
ENTER with blank jobname and ASID fields to list all
IMS Connect address spaces in the dump.

JOBNAME ASID A.S. TYPE DUMPED?

IMS Connect HWS71R 0042 HWS YES

BP SDWA Address: 00000000 BPE Release: 010600
BPE CSCD Address: 450015A0 HWS Release: 0A0100
HWS Sys Name: HWS Product: 5635-A01

```

Figure 75. IMS Connect Dump Initialization panel after initialization

4. To obtain a list of all dumped IMS Connect address spaces, leave the job name and ASID fields blank.
5. Press **F3** to return to the IMS Connect Dump Formatting Menu.

## IMS Connect traces

You can trace two types of information about IMS Connect: information about the messages that are processed by IMS Connect and information about the IMS Connect subsystem.

The information about the messages that are processed by IMS Connect is captured by the IMS Connect Recorder Trace facility. Information about the IMS Connect subsystem is captured by the Base Primitive Environment (BPE) tracing services. The information that is captured by both types of traces is stored in BPE trace tables.

**Recommendation:** Use the BPE trace tables to store information that is captured by the IMS Connect Recorder Trace facility. The IMS Connect Recorder Trace facility can store information in either a BPE trace table or in an IMS Connect-managed Recorder Trace data set (HWSRCDR).

### IMS Connect Recorder Trace facility

When the IMS Connect Recorder Trace facility is active, IMS Connect takes a snapshot of the first 670 bytes of messages at key points during IMS Connect processing. The first 670 bytes of most messages include the message header and the message data. Included in the information that is captured by the IMS Connect Recorder Trace facility are elements such as:

- Time stamps
- The client ID
- The user message exit routine

When the BPE trace level is set to MEDIUM, or when the HWSRCDR trace data set is used to capture the trace data, IMS Connect takes a snapshot of each input and output message at the following points:

- Immediately before a message is passed to a user message exit routine by IMS Connect

- Immediately after a message is returned to IMS Connect by a user message exit routine

When the BPE trace level is set to HIGH, the eye-catcher ICON is followed by a caller ID and a snapshot of the complete message. IMS Connect takes a snapshot of each complete message, including the message prefixes, at the following points:

- When a TCP/IP message is received by IMS Connect. The caller ID is TR.
- When a TCP/IP message is sent by IMS Connect. The caller ID is TS.
- When a message is received by IMS Connect from OTMA via XCF. The caller ID is IR.
- When a message is sent by IMS Connect to OTMA via XCF. The caller ID is IS.

**Recommendation:** Setting the trace level to HIGH can cause a significant impact to IMS Connect performance. Do not set the trace level to HIGH except when troubleshooting connectivity problems.

If you use the BPE External Trace facility for the IMS Connect Recorder Trace, BPE manages the trace data sets. You must perform certain setup tasks, such as defining the GDG base and specifying the EXTTRACE parameter in the BPE configuration member in the IMS.PROCLIB data set. You can then start the IMS Connect Recorder Trace facility by issuing the BPE command UPDATE TRACETABLE NAME(RCTR) OWNER(HWS) LEVEL(MEDIUM) EXTERNAL(YES) or by specifying TRCLEV=(RCTR,MEDIUM,HWS) in the BPECFG member of the IMS.PROCLIB data set and restarting IMS Connect. To view the results of the trace, you can use the BPE Dump Formatter.

If you use a data set that is managed by IMS Connect, it must be a single, fixed-block data set with a fixed logical record length. The data set must be identified by an HWSRCORD DD statement in the IMS Connect startup JCL. When this data set fills, the IMS Connect Recorder Trace facility is disabled. Starting a new trace overwrites any existing trace data in the data set. To change the data set, you must shut down IMS Connect. From an IMS perspective, you can manage this trace data set in the same way as the IMS Monitor Trace (IMSMON) data set.

## IMS Connect subsystem traces

The IMS Connect subsystem traces are captured by using BPE services. Subsystem traces trace events that occur within the IMS Connect address space and write them to BPE-managed trace tables. Specific types of events are captured in specific trace table types by IMS Connect or BPE. For example, TCP/IP activity is captured in the IMS Connect TCPI trace table type and BPE dispatcher events are captured in the BPE DISP trace table type.

BPE traces of the IMS Connect are enabled either by issuing the UPDATE TRACETABLE command or by including a TRCLEV parameter for IMS Connect in the BPECFG configuration member and restarting IMS Connect support.

For more information about configuring BPE and preparing for IMS Connect diagnosis, see *IMS Version 12 System Definition*.

## Enabling and starting all IMS Connect traces at the same time

You can enable tracing for all trace table types, excluding the Recorder Trace facility trace table (RCTR), by specifying an asterisk in the first position of the TRCLEV parameter in the BPECFG file member, for example TRCLEV=(\*,HIGH,HWS).



When the TRCLEV parameter is specified in the BPECFG file, the IMS Connect traces run continuously and resume every time IMS Connect starts.

**Recommendation:** Do not run IMS Connect Recorder trace facility continuously. The IMS Connect Recorder Trace facility can affect performance and should be used only when detailed information is needed about a specific problem with IMS Connect message handling. Remember to disable the IMS Connect Recorder Trace after the problem is resolved.

To enable all traces except the Recorder Trace facility, specify the following parameters:

```
TRCLEV=(*,HIGH,HWS)
```

BPE exempts the Recorder trace (RCTR) from wildcard arguments, so it must be enabled with the following trace level configuration statement:

```
TRCLEV=(RCTR,MEDIUM,HWS)
```

**Recommendation:** Start the IMS Connect Recorder Trace with the command, rather than with the TRCLEV parameter. Only use the TRCLEV parameter when you are diagnosing problems that prevent you from issuing commands.

BPE traces can be started and stopped by using BPE commands. If you start a trace by using the UPDATE TRACETABLE command, the traces are only active for the current execution of IMS Connect. The trace tables that are used by BPE to store the trace information, such as the RCTR trace table, are also managed by using BPE commands.

#### Related tasks:

“Formatting a BPE trace entry” on page 11

## Configuring BPE for an external trace of IMS Connect

Before you can start a BPE external trace for IMS Connect, you must first configure BPE and the external trace data set.

The following steps configure the external trace data sets and BPE for an external BPE trace of IMS Connect.

1. Define the generation data group (GDG) base.

```
//STEP1 EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
 DEFINE GENERATIONDATAGROUP -
 (NAME(IMSTESTL.RCTR.GDG01) -
 NOEMPTY -
 SCRATCH -
 LIMIT(255))
//
```

2. In the BPECFGxx member of the IMS.PROCLIB data set, specify the following parameters for IMS Connect:

- EXTTRACE
- TRCLEV

In the EXTTRACE statement, specify the data set name of the generation data set group that you created in Step 1 and specify HWS in the COMP() parameter to identify IMS Connect as the BPE component to which this EXTTRACE statement applies.

```
EXTTRACE(GDGDEF(DSN(IMSTESTL.RCTR.GDG01)
 UNIT(SYSDA) VOLSER(000000)
 SPACE(1) SPACEUNIT(CYL)
 BLKSIZE(32760)) COMP(HWS))
```

When the Recorder Trace (TRCLEV type parameter RCTR) trace level is set to MEDIUM, message data is recorded before a message is sent to a user message exit and after the exit returns a message.

You can set the trace level to HIGH to enable additional trace points. When these trace points are enabled, a trace record is also written when IMS Connect sends a message to or receives a message from a TCP/IP endpoint or OTMA. These records are not collected when the trace level is set to any value other than HIGH or when IMS Connect uses internal tracing.

**Recommendation:** Use the BPE External Trace with the TRCLEV parameter HIGH only when troubleshooting IMS Connect client or OTMA-related problems. A large amount of trace data is recorded when the trace level is set to HIGH.

In the TRCLEV parameter, you must specify EXTERNAL=YES to enable the External Trace facility:

```
TRCLEV=(RCTR,MEDIUM,HWS,EXTERNAL=YES)
```

**Tip:** If TRCLEV=(RCTR,MEDIUM,HWS,EXTERNAL=YES) is specified in the BPECFG member, the Recorder trace resumes every time IMS Connect restarts. If you do not want the Recorder trace to resume when IMS Connect restarts, issue the BPE command F hwsjobname,UPD TRTAB NAME(RCTR) LEVEL(MEDIUM) EXTERNAL(YES)


If BPE is correctly configured for an external IMS Connect Recorder trace, BPE issues message BPE0044I BPE EXTERNAL TRACE FUNCTION NOT ACTIVE. You can now start the trace.

#### Related tasks:

 Tracing BPE components (System Administration)

 Setting up tracing for BPE-managed address spaces (System Definition)

#### Related reference:

 BPE configuration parameter member of the IMS PROCLIB data set (System Definition)

## Starting an external trace for IMS Connect

You can start an external trace of IMS Connect by modifying the IMS Connect startup procedure or by issuing the BPE UPDATE TRACETABLE command.

Before you can start a BPE external trace for IMS Connect, you must first define a generation data group (GDG) base and code an EXTTRACE statement for IMS Connect in the BPECFGxx member of the IMS.PROCLIB data set.

Start the IMS Connect Recorder Trace by using one of the following methods.

- Include BPECFG=BPECFGxx in the IMS Connect startup procedure, where BPECFGxx is the BPE PROCLIB member that contains the EXTTRACE statement for IMS Connect, and restart IMS Connect. The BPE external trace starts when IMS Connect is started and BPE issues the following message:

```
BPE0046I EXTERNAL TRACE DATA SET
IMSTESTL.RCTR.GDG01.G0001V00 OPENED ON VOL=000000
```

- While IMS Connect is running, issue the BPE command UPDATE TRACETABLE. For example:

```
F HWS1,UPDATE TRACETABLE NAME(RCTR) OWNER(HWS) LEVEL(MEDIUM)
EXTERNAL(YES).
```

When the command completes successfully, the following messages are issued:

```
BPE0032I UPDATE TRACETABLE COMMAND COMPLETED
BPE0046I EXTERNAL TRACE DATA SET
IMSTESTL.RCTR.GDG01.G0003V00 OPENED ON VOL=000000
```


**Note:** If EXTERNAL(NO) is specified on either the UPDATE TRACETABLE command or in the TRCLEV parameter in the BPECFGxx PROCLIB member, IMS Connect writes the Recorder Trace data to the in-core trace tables. IMS Connect writes to the in-core trace tables by default.

**Recommendation:** Use the BPE Trace facility. If the BPE Trace facility is in use, setting the trace level to HIGH captures records when messages are passed to and from TCP/IP clients and OTMA in addition to the normal trace records. If the HWSRCDR trace data set is used, these additional trace records are not captured.

#### Related tasks:

 Starting and stopping BPE external tracing (System Administration)

#### Related reference:

 BPE configuration parameter member of the IMS PROCLIB data set (System Definition)

## Stopping an external BPE trace of IMS Connect

Stop an external BPE trace of IMS Connect by issuing the BPE command UPDATE TRACETABLE.

For example, F HWS1,UPDATE TRACETABLE NAME(RCTR) OWNER(HWS) LEVEL(NONE) EXTERNAL(NO).

**Note:** To deallocate the GDG data set, you must specify EXTERNAL(NO) on the UPDATE TRACETABLE command.

After the successful execution of the UPDATE TRACETABLE command, BPE issues the following messages.

```
BPE0032I UPDATE TRACETABLE COMMAND COMPLETED
BPE0046I EXTERNAL TRACE DATA SET
IMSTESTL.RCTR.GDG01.G0001V00 CLOSED ON VOL=000000
BPE0044I BPE EXTERNAL TRACE FUNCTION NOT ACTIVE
```

#### Related tasks:

 Starting and stopping BPE external tracing (System Administration)

## Displaying the status of an external trace of IMS Connect

Display the status of an external BPE trace of IMS Connect by issuing the BPE command DISPLAY TRACETABLE.

For example, F HWS1,DISPLAY TRACETABLE NAME(RCTR).

If the BPE external trace of IMS Connect is active, BPE displays the following messages:

```

BPE0030I TABLE OWNER LEVEL #PAGES EXT #ENTRIES #CYCLES
BPE0000I RCTR HWS MEDIUM 300 YES 4 0
BPE0032I DISPLAY TRACETABLE COMMAND COMPLETED

```

If the BPE external trace of IMS Connect is inactive, BPE displays the following messages:

```

BPE0030I TABLE OWNER LEVEL #PAGES EXT #ENTRIES #CYCLES
BPE0000I RCTR HWS NONE 300 NO 0 0
BPE0032I DISPLAY TRACETABLE COMMAND COMPLETED

```

## Formatting the trace data from an external trace of IMS Connect

The following example shows the JCL that can be used to format the trace data from an external trace of IMS Connect.

```

//STEP01 EXEC PGM=IKJEFT01,REGION=0M,COND=(0,LT)
//STEPLIB DD DISP=SHR,DSN=IMSB LD.I11RTS19.CRESLIB
//SYSTSPRT DD SYSOUT=*
//IPCSPRNT DD SYSOUT=*
//IPCSPARM DD DISP=SHR,DSN=SYS1.PARMLIB
//SYSTSIN DD *
 ALLOC F(IPCSDDIR) DA('IMSTESTL.DDIR') SHR REUSE
 ALLOC F(INFILE) DA('IMSTESTL.RCTR.GDG01.G0001V00') SHR REUSE
 IPCS NOPARM
 SETDEF DSN('IMSTESTL.RCTR.GDG01.G0001V00')
 SETDEF NOPROBLEM PRINT NOTERMINAL
 VERBX BPETRFM0 'TRACE(TYPE(ALL))'
 END
//

```

### Related tasks:

“Formatting a BPE trace entry” on page 11

## Tracing to the HWSRCDR data set

If you are not using BPE to manage the output of the IMS Connect Recorder Trace facility, you can enable and start a recorder trace that is managed by IMS Connect.

To trace to the HWSRCDR data set:

1. Allocate an HWSRCDR data set.
2. Include an HWSRCORD DD statement in the IMS Connect startup JCL.
3. Issue one of the following commands:
  - IMS Connect WTOR command RECORDER OPEN
  - IMS Connect z/OS command UPDATE MEMBER TYPE(IMSCON) START(TRACE)
  - IMS Connect type-2 command UPDATE IMSCON TYPE(CONFIG) START(RECORDER)

### Related reference:

 RECORDER command (Commands)

## Recorder log record mapping

When the IMS Connect line trace facility is activated by the IMS Connect WTOR command *nn*RECORDER OPEN, the IMS Connect type-2 command UPDATE IMSCON TYPE(CONFIG) START(RECORDER), or the z/OS modify command UPDATE MEMBER TYPE(IMSCON) START(TRACE), IMS Connect writes the log records to the HWSRCDR data set. If the trace facility is activated with a BPE data set, these records are written to the specified BPE data set instead.

The following examples provide mapping information to help you navigate and interpret the contents of the HWSRCDR data set.

**This topic contains Diagnosis, Modification, and Tuning information.**

```

* COMMON SECTION 32_BYTES

USTAT_NEXT DS F NEXT POINTER
USTAT_EYE DS CL4'ICON' EYECATCHER
USTAT_CALLID DS CL2 CALLER ID
* CHARS "AE" - ADAPTER MSG ERROR
* CHARS "AR" - ADAPTER MSG RECEIVE
* CHARS "AX" - ADAPTER MSG SEND
* CHARS "ER" - IMS TM MSG READ ERROR
* CHARS "ME" = MSC ERROR
* CHARS "MR" = MSC RECEIVE
* CHARS "MS" = MSC SEND
* CHARS "OE" - IMS DB MSG READ ERROR
* CHARS "OR" - IMS DB MSG RECEIVE
* CHARS "OX" - IMS DB MSG SEND
* CHARS "RC" - IMS TM MSG RECEIVE
* CHARS "RE" = OTMA REMOTE ALTPCB
* ERROR
* CHARS "RR" = OTMA REMOTE ALTPCB
* RECEIVE
* CHARS "RS" = OTMA ALTPCB IMS to IMS
* SEND
* CHARS "SN" - IMS TM MSG SEND
* CHARS "TO" = TIMEOUT EVENT
*
USTAT_SMFHDR DS 0C SMF HEADER
SMFITOCLEN DS CL2 SMF LENGTH
SMFITOCSEG DS CL2 INTERNAL WORK
SMFITOCFLG DS X INTERNAL FLAG
SMFITOCRTY DS X RECORD TYPE
SMFITOCTME DS CL4 TIME OF TRACE
SMFITOCDTE DS CL4 SEQUENCE NUMBER
SMFITOCSID DS CL4 RESERVED
* DS CL4 RESERVED

* UOW PROGRESSION TIME STAMP SECTION

SMFITOCCID DS CL8 CLIENT NAME
USTAT_TSMREC DS D TIME HWSW MSG RECEIVED
USTAT_TSMNQ DS D TIME HWSW MSG ENQUEUED
USTAT_TDMDQ DS D TIME 1ST DST MSG DEQUEUED
USTAT_TCLRDQ DS D TIME DST CLR DENQUEUED
USTAT_TERROR DS D TIME ERROR OCCURRED
USTAT_NMSGX DS H NUMBER OF MSGS TRANSMITTED
USTAT_NMSGR DS H NUMBER OF MSGS RECEIVED
* DS CL8 RESERVED
USTAT_SMFITOCL EQU *-USTAT_SMFHDR LENGTH OF SMF

* INPUT MSG

USTAT_IN_EYE DS CL4'*IPB' EYECATCHER
* *IPB IS THE INPUT TO THE EXIT
* FOR EITHER RECEIVE OR SEND
* USTAT_CALLID = AE - ADAPTER ERROR
* AR - ADAPTER RECEIVE
* AX - ADAPTER SEND
* ER - TM READ ERROR
* ME - MSC ERROR
* MR - MSC RECIEVE
* MS - MSC SEND
```



```

* USTAT_CALLID = AE - ADAPTER ERROR
* AR - ADAPTER RECEIVE
* AX - ADAPTER SEND
* ER - TM READ ERROR
* ME - MSC ERROR
* MR - MSC RECIEVE
* MS - MSC SEND
* OE - DB ERROR
* OR - DB RECIEVE
* OX - DB SEND
* RC - TM RECEIVE
* RE - OTMA REMOTE
* ALTPCB ERROR
* RR - OTMA REMOTE
* ALTPCB RECIEVE
* RS - OTMA REMOTE
* ALTPCB SEND
* SN - TM SEND
*
* for ICONRC and *OPB
* (USTAT_CALLID = "RC")
*
* THE LOGGED DATA STARTING AT OFFSET X'300' IS AS FOLLOWS:
* (OUTPUT FROM USER EXIT OF CLIENT INPUT DATA)
* OTMA CONTROL HEADER followed by
* OTMA STATE DATA HEADER (if present) followed by
* OTMA SECURITY DATA HEADER (if present) followed by
* OTMA USER DATA HEADER (if present) followed by
* APPLICATION DATA TO BE SENT
* 11zzTRANCODEDATA

* FOR ICONSN AND *OPB
* (USTAT_CALLID = "SN")
*
* THE LOGGED DATA STARTING AT OFFSET X'300' IS AS FOLLOWS:
* (OUTPUT FROM USER EXIT OF APPLICATION OUTPUT DATA)
* OTMA CONTROL HEADER followed by
* OTMA STATE DATA HEADER (if present) followed by
* OTMA SECURITY DATA HEADER (if present) followed by
* OTMA USER DATA HEADER (if present) followed by
* DATA TO BE SENT (ONE OF THE FOLLOWING STRUCTURES
* 'RMM'LLZZDATA.....'CSM'
* LLZZDATA.....'CSM'
* 'RSM'
*
* RMM is the *REQMOD* structure
* CSM is the *CSMOKY* structure
* RSM is the *REQSTS* structure
*

* FOR ICONAR AND *OPB
* (USTAT_CALLID = "AR")
*
* THE LOGGED DATA STARTING AT OFFSET X'300' IS AS FOLLOWS:
* (OUTPUT FROM USER EXIT OF CLIENT INPUT DATA)
* 1111
* IRM
* 11zzTRANCODEDATA
* X'00040000'
*

* FOR ICONAX AND *OPB
* (USTAT_CALLID = "AX")
*
* THE LOGGED DATA STARTING AT OFFSET X'300' IS AS FOLLOWS:
* (OUTPUT FROM USER EXIT OF APPLICATION OUTPUT DATA)
* 1111
* XML

```

```
| * CSM
| *
| USTAT_END_EYE DS CL4'*END' EYECATCHER
```



---

## Chapter 15. IRLM - Internal resource lock manager service aids

Several service aids can help you analyze internal resource lock manager (IRLM) problems. Additionally, IRLM generates diagnostic messages that begin with the prefix DXR.

---

### IRLM dumps

IRLM uses the SDUMP system services of z/OS when failures occur.

IRLM uses the SDUMP system services of z/OS in the following situations:

- Within the IRLM address space
- While executing IRLM code or IMS code within the IMS address space
- While executing IRLM code for exits from SLM within the IMS address space

SDUMP dumps the IRLM address space to a SYS1.DUMPxx data set without formatting it. When dump processing completes, you can format the dump offline by specifying IRLM on the VERBEXIT subcommand in IPCS. If more than one IRLM is active in the system at the time the dump was taken, you must also specify the z/OS subsystem name (IRLMNM in the IRLM procedure). IRLM dump formatters that are shipped with a particular release of IRLM are specific to that release. If multiple IRLM releases are active, IPCS must be configured to have access to the appropriate IRLM PDS. The release of the IRLM in the dump must match the release of the IRLM in the IPCS STEPLIB.

To access z/OS component trace entries for IRLM, use the IPCS CTRACE or VERBX command. To see the syntax of the VERBX command for displaying traces, enter: `IPCS VERBX IRLM 'help'`.

#### Examples:

- If only one IRLM is in the dump, this command formats the IRLM address space:

```
VERBX IRLM 'SUBsys=IRLM'
or
VERBX IRLM
or
VERBX IRLM 'SUB=IRLM'
```

- If more than one IRLM is in the dump, this command formats the KRLM address space:

```
VERBX IRLM 'SUBsys=KRLM'
or
VERBX IRLM 'SUB=KRLM'
```

If you want to format dumps online during the abnormal termination process, you must change the FMTO parameter to request a SNAP dump.

**Tip:** Under the direction of IBM Software Support, you can use the Modify DIAG command to take diagnostic dumps.

---

## SYS1.LOGREC records

The internal resource lock manager (IRLM) generates a software LOGREC record when the IRLM detects a program error.

You can use the z/OS IFCEREP1 service aid to obtain a listing of the SYS1.LOGREC data set that contains the LOGREC entries for the IRLM.

---

## z/OS component trace

Use the z/OS TRACE CT command to start, stop, or modify an internal resource lock manager (IRLM) diagnostic trace.

IRLM does not support all the options that are available on the TRACE command.

You can use the TRACE CT command to trace interactions with a DBMS, member and group events, z/OS locking components, and so on.

The following example shows trace output for a lock request using the DBM and SLM sublevel traces.

The z/OS Interactive Problem Control System (IPCS) subcommand that produced this output is: CTRACE COMP(IRLE) SUB((DBM)) FULL

### COMPONENT TRACE FULL FORMAT COMP (IRLE) SUBNAME ((DBM))

```
COMPONENT TRACE FULL FORMAT
COMP(IRLE) SUBNAME((DBM))
**** 02/10/09
MNEMONIC ENTRY ID TIME STAMP DESCRIPTION

DBM 00000002 18:42:05.816178 RLPL format
+0000 ID..... DXRRL100-01: START A REQUEST
+0020 TLA1..... 000100C8 07166220
+0028 RLPL..... 00000000 06545768 00000000 80000000 00000000
+003C 00000000 006B12C8 008FBBC0 0090B000 00906048
+0050 00316545 06545060 00000000 00316545 06545060
+0064 00000000 00000000 00000000 0423AD20 09000058
+0078 C8806D01 D7000000 00000000 00000000 00000000
+008C 00000000 00000000 80000000 00000000 00000000
+00A0 006B12C8 008FBBC0 02060000 8A000000 00000000
+00B4 00000000 006B5BE4 00000000 00000000 00000000
+00C8 00000000 00000000 00000000 00000000 00000000
+00DC 00000000 00000000 00000000 00000000 00000000
DBM 00000002 18:42:05.816406 RLPL format
+0000 ID..... DXRRL100-02: REQUEST COMPLETED
+0020 TLA1..... 000100C8 07166220
+0028 RLPL..... 00000000 06545768 00000000 80000000 00000000
+003C 00000000 006B12C8 008FBBC0 0090B000 00906048
+0050 00316545 06545060 00000000 00316545 06545060
+0064 00000000 00000000 00000000 0423AD20 09000058
+0078 C8806D01 D7000000 00000000 00000000 00000000
+008C 00000000 00000000 80000000 00000003 00000000
+00A0 006B12C8 008FBBC0 02060000 8A000000 00000000
+00B4 00000000 006B5BE4 00000000 00000000 00000000
+00C8 00000000 00000000 00000000 0067027C A743B4E5
+00DC 09010080 00000000 00080000 00000000 00000000
```

The z/OS IPCS subcommand that produced this output is: CTRACE COMP(IRLE) SUB((SLM)) FULL

### COMPONENT TRACE FULL FORMAT COMP (IRLE) SUBNAME ((SLM))

```

COMPONENT TRACE FULL FORMAT
COMP(IRLE) SUBNAME((SLM))
**** 02/10/09
MNEMONIC ENTRY ID TIME STAMP DESCRIPTION

SLM 00000010 18:42:05.816193 RNA, RTE and UDB format
+0000 ID..... DXRRL120-01: IXLLOCK OBTAIN
+0020 TLA1..... 00060020 00670238
+0028 RNA..... 09000058 C8806D01 D7000000 00000000 00000000
+003C 00000000 00000000 00000000
+0048 TLA2..... 000C0040 07166418
+0050 RTE..... 0423AD20 09000058 C8806D01 D7000000 00000000
+0064 00000000 00000000 00000000 00000000 00000008
+0078 C9D4E2C5 40404040 0423AD20 00000000 00000000
+008C 00000000
+0090 TLA3..... 000B0040 071663D8
+0098 UDB..... C9D4E2C5 40404040 00000000 00000000 00080000
+00AC 00000000 00000000 00000000 00000000 40000000
+00C0 08000000 00000000 A8D1A743 B4D7B281 A8D1A743
+00D4 B4D7B281
SLM 00000020 18:42:05.816397 RNA and reason code
+0000 ID..... DXRRL120-03: IXLLOCK RETURN
+0020 TLA1..... 00060020 00670238
+0028 RNA..... 09000058 C8806D01 D7000000 00000000 00000000
+003C 00000000 00000000 00000000
+0048 TLA2..... 00060004 0716637C
+0050 REAS..... 00000000

```

**Related reference:**

- ➞ MVS interactive problem control system (IPCS) CTRACE subcommand
- ➞ TRACE CT command (Commands)



---

## Chapter 16. MSC - Multiple Systems Coupling service aids

Various types of traces are available to help you diagnose Multiple Systems Coupling (MSC) problem in a non-Database Control (DBCTL) environment.

---

### Multiple Systems Coupling communication task trace

The flow through an MSC communication task is similar to that through the terminal communication task. The register 0 trace is read in the same manner, and most of the MSC analyzer and MSC DDM entry points provide the same functions as the terminal communications analyzer and DDMs.

The entry points for the MSC analyzer and device-dependent modules (DDMs) are:

#### **DDM entry point** **Analyzer**

- AM01** Process input from a link
- AM02** Perform read or read of the link
- AM03** Determine what to do next on the link
- AM04** Not used
- AM05** Perform write or send to the link
- AM06** Dequeue the message after a good write or send
- AM07** Not used
- AM08** Return a message to the message queues for later transmission
- AM09** Generate an error message
- AM10** Quiesce the link
- AM11** Not used
- AM12** Wait for the completion of asynchronous I/O or the enqueue of a message

---

### Multiple Systems Coupling device-dependent module

A Multiple Systems Coupling (MSC) device-dependent module performs all of the functions unique to a type of link.

The functions the device-dependent module performs at each entry point are:

#### **DDM entry point** **MSC**

- DM01** Setup output buffer for a write or send operation
- DM02** Error check last output operation
- DM03** Setup to obtain input from the link
- DM04** Error check an input operation
- DM05** Not used
- DM06** Not used

**DM07** Connect or disconnect the link

**DM0I** An access method is entered from the device-dependent module

Several entry points are not used to preserve a commonality between coupling communication and terminal communication functions.

The following table summarizes the MSC communication task trace.

*Table 105. Multiple Systems Coupling communication task trace*

| Traced by | Entry point | Function                                              | Trace indent |
|-----------|-------------|-------------------------------------------------------|--------------|
| DFSCMS00  | DFSCMA01    | Process Input                                         | AM01         |
| DFSCMS00  | DFSCMA02    |                                                       | AM02         |
| DFSCMS00  | DFSCMA03    | What's Next?                                          | AM03         |
| DFSCMS00  | DFSCMA05    |                                                       | AM05         |
| DFSCMS00  | DFSCMA06    | After Good Write                                      | AM06         |
| DFSCMS00  | DFSCMA08    | Wash Message                                          | AM08         |
| DFSCMS00  | DFSCMA09    | Generate Message                                      | AM09         |
| DFSCMS00  | DFSCIO10    | Quiesce Link                                          | AM10         |
| DFSCMS00  | DFSCIO12    | Wait for I/O or Message Enqueue                       | AM12         |
| DFSCMS00  | DFSCIOC0    | Get Work Buffer                                       | CM00         |
| DFSCMS00  | DFSCIOC0    | Reposition Queue Buffer                               | CM01         |
| DFSCMS00  | DFSCIOC0    | Get Next                                              | CM02         |
| DFSCMS00  | DFSCIOC0    | Dequeue Message                                       | CM03         |
| DFSCMS00  | DFSCIOC0    | Wash Output                                           | CM04         |
| DFSCMS00  | DFSCIOC0    | Find Output                                           | CM05         |
| DFSCMS00  | DFSCIOC0    | Get New Output                                        | CM06         |
| DFSCMS00  | DFSCIOC0    | Free Input Queue Buffer                               | CM07         |
| DFSCMS00  | DFSCIOC0    | Free Work Buffer                                      | CM08         |
| DFSCMS80  | DFSCMS80    | Abort Processing (First LTB)                          | MSS1         |
| DFSCMS80  | DFSCMS80    | Abort Processing (Second LTB)                         | MSS2         |
| DFSCMS81  | DFSCMS81    | Prior to DDM I/O                                      | DM0I         |
| DFSCMS00  | DFSCIO03;06 | Write Setup                                           | DM01         |
| DFSCMS00  | DFSCIO00    | Write Interrupt                                       | DM02         |
| DFSCMS00  | DFSCIO01;03 | Read Setup                                            | DM03         |
| DFSCMS00  | DFSCIO00    | Read Interrupt                                        | DM04         |
| DFSCMS00  | DFSCIO00;03 | Connect/Disconnect I/O Interrupt                      | DM07         |
| DFSCMEI0  | DFSCMEI0    | Message Control/Error exit processing                 | CMEI         |
| DFSCMEI0  | DFSCMEI0    | Before calling Message Control/Error exit<br>DFSCMUX0 | CMEA         |
| DFSCMEI0  | DFSCMEI0    | After calling Message Control/Error exit<br>DFSCMUX0  | CMEB         |

---

## Multiple Systems Coupling traces

Multiple Systems Coupling traces include MSC Message Processing trace, Main storage-to-main storage access method trace, and Main storage-to-main storage save set trace.

### MSC Message Processing Trace—BUFMSTRA

The MSC message processing trace records the SYSIDs of the last four IMS systems that processed the MSC message (that is, a BMP or MPP issued a GET UNIQUE to the message queue). The trace is located in the MSC message prefix at label BUFMSTRA within the BUFMS DSECT. The trace contains up to four 1-byte SYSID entries. The low-order byte contains the most recent entry. The initial entry contains the SYSID of the system to which the inputting terminal is attached. Each additional entry results in a shift left (the high-order byte is shifted out).

The SYSID is increased to 2 bytes and it is traced in field MSGMETRA of the MSC extension in DSECT MSGMSCE. If the SYSID is less than 256, it is traced both in field BUFMSTRA and MSGMETRA for compatibility. If the SYSID is greater than 255, it is only traced in MSGMETRA; field BUFMSTRA contains zeros.

### Main storage-to-main storage access method trace

The main storage-to-main storage access method trace records information related to the main storage-to-main storage access method, DFSMTMA0, and the main storage-to-main storage device-dependent module, DFSDN540. The trace is located in global storage pointed to by the “MTMWINDOW” and copied to module DFSMTMTR during abend processing. The following locates the trace:

- TTOP—Table beginning
- TPTR—Next entry to be used
- TBOT—Table end

The trace is a wraparound trace. Each entry is 192 bytes long and contains information such as function, return code, and control blocks. The TRACEMAP DSECT contains further details on entry contents. TRACEMAP is embedded in macro INTFMTMA. Trace operation is controlled by a global SETC labeled within DFSMTMA0. The default assembly value is ON.

### Main storage-to-main storage save set trace

DSECT SAVWORK describes a key work area used by DFSMTMA0. This work area is chained into the standard IMS save set chain with a SAVE ID of MTMWORKAREA. The trace appears in the save set chain even when the trace is set. The SAVWORK DSECT is embedded within macro INTFMTMA.

---

## Diagnosing link problems

Turn traces on for the appropriate lines from either the IMS master terminal or, if you are using type-2 commands, from the Operations Manager (OM) API. Trace all terminals on a line.

For example, use either of the following commands:

- /TRACE SET ON LEVEL 4 MODULE ALL LINK or UPDATE MSLINK  
NAME(linkname|linkname\*|\*) START(TRACE)

**Note:** The type-2 command UPDATE MSLINK NAME(*linkname*) START(TRACE) uses the same level and module settings that were used the last time the /TRACE SET (ON) LINK command was issued. If a /TRACE SET (ON) LINK command has not been issued since the last cold start, this command defaults to MODULE=ALL and LEVEL=4.

- /TRACE SET OFF LINK x or UPDATE MSLINK NAME(*linkname*) STOP(TRACE)

Two report types are generated:

**Summary**

Contains the average response time, in milliseconds (msec), of the total number of send and receive data values for each link trace.

**Detail** Contains the individual response times, in milliseconds (msec), for every send and receive data value for each MSC link that has been traced.

The formatting of this record is available only if the IMS input log contains X'6701' records that are generated by the /TRACE SET ON LINK command or the type-2 command UPDATE MSLINK NAME(*linkname*).

For diagnosing link problems, the trace records with the following identifiers are helpful.

*AM01 RECEIPT OF DATA FROM PARTNER SYSTEM*

This entry is invoked because the link is stopped (using either the /PSTOP command, the UPDATE MSLINK *linkname* STOP command, or because of an I/O error).

Assemble a copy of DFSADSCT and refer to the BUFMS DSECT in the listing.

**I TP BUF**

Contains the segments received.

**BUFTFLAG**

Indicates more about what was received (that is, first segment).

**O TP BUF**

Contains the data set last sent to the partner.

**Q BUF**

Contains the segments received so far.

**I WP BUF**

Contains the MSC prefix/work buffer.

**O WP BUF**

Contains the MSC prefix/work buffer.

*AM02 ERROR - CHECK LAST OUTPUT OPERATION*

**I WP BUF**

Contains the MSC prefix/work buffer.

**O WP BUF**

Contains the MSC prefix/work buffer.

*AM03 MSC ANALYZER 'WHAT NEXT'*

If this entry is invoked from a device-dependent module, it is because the device-dependent module has nothing else to do.



Example: EOT received to ACK. Neither side sending; therefore, let the analyzer decide what to do.

Example: A data block containing only the message prefix was received (no segment could fit in the remaining buffer space). The device-dependent module goes to AM03 because there might be output that can be sent. Data response to data is okay.

If this entry is invoked from another analyzer entry point, it is because that function is complete.

Example: After the dequeue of an output message, ENTRY 6 goes to AM03 to see if more output can be initiated.

**CLBCNTQB**

Is a QCB for a destination that has messages queued to be sent across the link.

**CLB3INP and/or CTBAINP**

Indicates that the device-dependent module is not able to send any output data.

**CTBAERR**

Indicates that an error message is to be sent to the partner.

**I WP BUF**

Contains the MSC prefix/work buffer.

**O WP BUF**

Contains the MSC prefix/work buffer.

*AM05 MSC ANALYZER ENTRY 5*

This entry is invoked from the device-dependent module to send a message.

**O TP BUF**

Contains the data last sent to the partner.

**I WP BUF**

Contains the MSC prefix/work buffer.

**O WP BUF**

Contains the MSC prefix/work buffer.

*AM06 LAST OUTPUT OPERATION SUCCESSFUL*

This entry is invoked from the device-dependent module when the previous output was successful.

**CTBAEOM=1**

Indicates that the previous output included the last piece of the message, and that the message is to be dequeued.

**CTBAEOM=0**

Indicates that the last piece of the message has not been sent. No dequeue is to take place. The device-dependent module is dispatched at DM01 to attempt to continue transmitting.

*AM08 CANCEL MESSAGE ENQUEUE OPERATION*

There is a probable contention situation, and this partner must yield. The output message in progress is returned ("washed back") to the queues to be sent later.

**O TP BUF**

Contains the data that the device-dependent module was attempting to transmit.

*AM09 GENERATE AN ERROR MESSAGE***I WP BUF**

Contains the MSC prefix/work buffer.

**O WP BUF**

Contains the MSC prefix/work buffer.

*AM10 LINK SHUTDOWN: OPERATOR INTERVENTION REQUIRED*

This entry is invoked because the link is PSTOPPED (either using the /PSTOP command, the UPDATE MSLINK NAME(*linkname*) STOP(COMM) command, or because of an I/O error). Find the previous device-dependent module interrupt entry (DM02, DM04 or DM07) to determine why the device-dependent module went to AM10.

General cleanup is performed: Queue buffers and I/O buffers are released.

*AM12 NORMAL 'LINK IDLE' CONDITION*

This entry is invoked when the device-dependent module has nothing else to do under normal conditions.

Example: MTM link is attention driven. There is no outstanding READ as with BSC. When the device-dependent module has no more data to send and no pending acknowledgment, it becomes idle to wait for a POST by either the enqueue of output or an attention from the partner. This entry is different from AM10 because the analyzer does not complete a general cleanup.

*CM00 GET A WORK BUFFER*

This analyzer entry is called when the device-dependent module needs additional space to perform message editing. An example is the collecting of all pieces of a SPA.

*CM01 REPOSITION QUEUE BUFFER*

This analyzer entry is called when the device-dependent module wants to ensure that the queue buffer is in storage. This entry is currently not used.

*CM02 GET NEXT*

This analyzer entry is called when the device-dependent module needs the next output segment of a message.

*CM03 DEQUEUE MESSAGE*

This analyzer entry is called when the device-dependent module wants to dequeue a message (rather than let the analyzer do it). An example is the emergency restart of a link. The device-dependent modules exchange message sequence numbers. If one device-dependent module determines that a message in its queues has already been received by the partner, the message is dequeued to prevent it from being sent twice.

#### *CM04 WASH OUTPUT MESSAGE*

This analyzer entry is called when the device-dependent module wants to return an in-process message to the queues. An example is a permanent I/O error. The device-dependent module washes any output in progress and is sent again after the error recovery sequence completes.

#### *CM05 DETERMINE IF QUEUED OUTPUT IS PRESENT ON A LINK*

This analyzer entry is called when it must be determined if there is any (more) queued output to be sent across the link emergency restart processing. If one device-dependent module determines that a message in its queue has already been received by the partner, the device-dependent module issues a get unique (GU) call (for positioning) followed by a DEQUEUE (CM03) to get rid of the message.

#### *CM06 GET NEW MESSAGE*

The system issues a get unique (GU) call to get a new output message.

#### *CM07 FREE INPUT QUEUE BUFFER*

This analyzer entry is called when the device-dependent module wants to cancel an input queue buffer. An example is permanent I/O error. The device-dependent module discards all input segments that, up to the point of failure, have been collected in queue buffers. The message is lost on this system, and the ABORT sequence sent to the partner tells the partner that the message must be sent again later.

#### *CM08 FREE A WORK BUFFER*

This analyzer entry is called when the device-dependent module wants to free an extra work buffer. This entry is currently not used because the buffer mentioned in the CM00 description is automatically freed by the analyzer.

#### *CM09 GET A PREFIX/WORK BUFFER*

The system obtains a prefix or work buffer.

#### *CM10 FREE A PREFIX/WORK BUFFER*

The system frees a prefix or work buffer.

#### *CM11 QUEUE ERROR*

The system processes a QMGR message queue error and issues message DFS082.

#### *CM12 GLOBAL WASH*

The system issues a CANCEL OUTPUT call to clear the global queue in a shared-queues environment.

#### *CM13 INSERT MESSAGE*

The system inserts an input message to the message queue.

#### *CM14 ENQUEUE A MESSAGE*

The system enqueues an input message to the message queue.

#### *CM15 REREAD MESSAGE*

The system reads an output message from the shared queues again.

#### *CM16 GET MESSAGE BY DRRN*

The system gets the message with the specified device relative record number (DRRN).

#### *CM17 GET LINK INPUT/OUTPUT BUFFERS*

The system obtains link I/O buffers.

#### *CM18 FREE LINK INPUT/OUTPUT BUFFERS*

The system frees link I/O buffers.

#### *DM01 WRITE SETUP*

The device-dependent module is entered here when the MSC analyzer finds output to be sent and the link is available (CLB3INP off).

Assemble a copy of DFSADSCT and refer to the BUFMS DSECT in the listing.

#### **Q BUF**

Contains the segments to be sent.

#### **O TP BUF**

Contains the data stream ready to be sent.

#### **I TP BUF**

Contains any data received from the partner.

#### *DM02 WRITE INTERRUPT*

The device-dependent module is entered here at the completion of a logical write operation.

#### **DECSDECB**

Contains the completion code.

#### **BUFTYPE**

Contains more information about the type of completion (MTM).

#### **O TP BUF**

Contains the data stream sent to the partner.

#### **I TP BUF**

Contains any data received from the partner.

#### **I WP BUF**

Contains the MSC prefix/work buffer.

#### **O WP BUF**

Contains the MSC prefix/work buffer.

#### *DM03 READ SETUP*

The device-dependent module is entered here when the MSC analyzer determines there is no output that can be sent. MTM and CTC are attention driven, and no I/O is initiated here.

#### *DM04 READ INTERRUPT*

The device-dependent module is entered here at the completion of a logical read operation.

##### **DECSDECB**

Contains completion code.

##### **BUFTYPE**

Contains more information about the type of completion (MTM).

##### **DECTYPE**

Indicates the type of the last operation.

##### **I TP BUF**

Contains the data just read.

##### **O TP BUF**

Contains any data sent to the partner in response to a previous read completion.

##### **I WP BUF**

Contains the MSC prefix/work buffer.

##### **O WP BUF**

Contains the MSC prefix/work buffer.

#### *DM07 RESTART*

The device-dependent module is entered here from the MSC analyzer whenever the link is not active (CRB1ACT is not equal to X'11').

##### **DECTYPE**

Indicates the type of the last operation attempted.

##### **DECSDECB**

If I/O is completed, this indicates status.

##### **I TP BUF**

Contains the last data read.

##### **O TP BUF**

Contains the data to write or the data last written.

##### **I WP BUF**

Contains the MSC prefix/work buffer.

##### **O WP BUF**

Contains the MSC prefix/work buffer.

#### *DM0I ENTRY TO ACCESS METHOD*

This record is traced at entry to the access method from the device-dependent module.

##### **DECTYPE**

Indicates the type of operation.

## O TP BUF

If output, contains data to be written.

## Diagnosing link problems by using MSC link statistics

You can use MSC link statistics to diagnose link performance problems; determine the message sizes that are sent and received on an MSC link and use this information to determine the link and message queue buffer sizes to use; run benchmarks to determine how many parallel MSC links are needed, and to provide comparisons to use for diagnosing performance problems; and determine the amount of MSC work (such as messages and I/Os) and resources that are being used.

MSC link statistics are kept in the MSC work area, and are pointed to by field CLBMSCWA of the link LLB. This work area is called the DFSMSCWA area. Link statistics from the DFSMSCWA area are logged at checkpoint with type X'4513' log records. Each X'4513' log record is for a separate link. To assemble DSECTs of these three areas (the LLB, the DFSMSCWA work area, and the X'4513' log records), assemble the following source:

```
CSECT
ICLI CLBBASE=0 Map CLB/LLB
DFSMSCWA FUNC=DSECT MAP DFSMSCWA work area
DFSLL4513 FUNC=DSECT Map 4513 log record
END
```

The DFSMSCWA area contains two areas for statistics:

### MAIN statistics area

A continuous record of link statistics for logging. Statistics start recording at IMS restart (cold or warm). This area is not reset unless a statistics field overflows. When a statistics field overflows, the field is reset to zero, and a flag is set to indicate that the counter overflowed. The flag remains on until the next IMS checkpoint (and statistics records are logged) and then is reset.

### COPY area

A mirror of the main area. This area is for the QUERY MSLINK SHOW STATISTICS command. The copy area is copied from the main area whenever the query statistics are reset. Query statistics are reset at IMS checkpoints if the reset mode is RESET,CHKPT, or by the command UPDATE MSLINK NAME() START(STATISTICS OPTION(RESET)). The QUERY command always uses the difference of the MAIN statistics area minus the COPY area, so copying MAIN to COPY resets the QUERY (COPY) statistics without affecting the logging (main area).

The following table shows the key labels for statistics in the DFSMSCWA area.

Table 106. Descriptions of key labels for statistics in the DFSMSCWA area

| Area                                          | Label          | Description                        |
|-----------------------------------------------|----------------|------------------------------------|
| LLB - Logical link control block              | CLBMSCWA       | Points to DFSMSCWA                 |
|                                               | CLBNAME2       | Logical link name                  |
| DFSMSCWA - MSC work area for the logical link | MSCWA_ID       | Beginning, = characters = DFSMSCWA |
|                                               | STAT_FLAG1     | Start of main statistics           |
|                                               | MSCWA_STARTTIM | Start main general statistics      |
|                                               | MSCWA_SEND#    | Start main send statistics         |

Table 106. Descriptions of key labels for statistics in the DFSMSCWA area (continued)

| Area                        | Label           | Description                                                   |
|-----------------------------|-----------------|---------------------------------------------------------------|
|                             | MSCWA_REC#      | Start main receive statistics                                 |
|                             | MSCPY_STARTTIM  | Start copy general statistics                                 |
|                             | MSCPY_SEND#     | Start copy send statistics                                    |
|                             | MSCPY_REC#      | Start copy receive statistics                                 |
| DFSL4513 - Log X'4513' area | ST4513          | Beginning                                                     |
|                             | ST4513_TYPE     | Log record code = X'4513'                                     |
|                             | ST4513_LNKNAME  | Logical link name                                             |
|                             | ST4513_LNKNUM   | Logical link number                                           |
|                             | ST4513_FLAG1    | Main statistics reset flags from DFSMSCWA<br>STAT_FLAG1       |
|                             | ST4513_STARTTIM | Start main general statistics from DFSMSCWA<br>MSCWA_STARTTIM |
|                             | ST4513_SEND#    | Start main send statistics from DFSMSCWA<br>MSCWA_SEND#       |
|                             | ST4513_REC#     | Start main receive statistics from DFSMSCWA<br>MSCWA_REC#     |
|                             |                 |                                                               |

Three categories of link statistics are kept for each logical link:

- General statistics, such as statistics start time, ITASK dispatch counts, ITASK processing times, and the rate and number of logger check writes.
- Send statistics, such as messages sent, byte count sent, send message sizes, Queue Manager get counts and times, and send I/O times.
- Receive statistics, such as messages received, byte count received, receive message sizes, Queue Manager insert counts and times, and receive I/O times.

## MSS1 and MSS2 records

MSS1 and MSS2 records are created as a result of ABORT processing when an I/O error (correctable or not) occurs. All available control blocks are snapped, regardless of any trace options in effect on the link involved.

These records are followed by a type X'03' record containing the message that was sent to the master terminal as a result of the error.

The following table shows the significant control blocks snapped in MSS1 and MSS2 records.

Table 107. Significant fields in MSS1 and MSS2 records

| Link type | Control blocks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTC       | <p>POST code (first word of LLB)<br/> DECTYPE<br/> LLB, LTB(S), LCB, LXB, CRB, CTT, LNB control blocks<br/> IOSB<br/> MSCWA (MSC work area)<br/> I_WP_BUF, O_WP_BUF</p> <p>I/O buffers (input and output). In non-bandwidth mode, the I/O buffers include I_TP_BUF and O_TP_BUF. In bandwidth mode, the input and output I/O buffers include:</p> <ul style="list-style-type: none"> <li>• I_BUFHDR, O_BUFHDR Send and receive buffer headers</li> <li>• BUFRSP Response data</li> <li>• BUFMSG Message data</li> <li>• BUFERR Error message data</li> <li>• BUFRST Restart data</li> <li>• BUFQUI Shutdown data</li> <li>• BUFUNK Unknown data</li> </ul> |
| MTM       | <p>POST code (first word of LLB)<br/> DECTYPE<br/> LLB, LTB(S), LCB, LXB, CRB, CTT, LNB control blocks<br/> MSCWA (MSC work area)<br/> I_WP_BUF, O_WP_BUF</p> <p>I/O buffers (input and output). In non-bandwidth mode, the I/O buffers include I_TP_BUF and O_TP_BUF. In bandwidth mode, the input and output I/O buffers include:</p> <ul style="list-style-type: none"> <li>• I_BUFHDR, O_BUFHDR Send and receive buffer headers</li> <li>• BUFRSP Response data</li> <li>• BUFMSG Message data</li> <li>• BUFERR Error message data</li> <li>• BUFRST Restart data</li> <li>• BUFQUI Shutdown data</li> <li>• BUFUNK Unknown data</li> </ul>           |



Table 107. Significant fields in MSS1 and MSS2 records (continued)

| Link type | Control blocks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TCP/IP    | <p>POST code (first word of LLB)<br/> LLB, LTB(S), LCB, LXB, CRB, CTT, LNB control blocks<br/> MSCWA (MSC work area)<br/> I_WP_BUF, O_WP_BUF<br/> SCIWORK (SCI work area)</p> <p>I/O buffers (input and output). In non-bandwidth mode, the I/O buffers include I_TP_BUF and O_TP_BUF. In bandwidth mode, the input and output I/O buffers include:</p> <ul style="list-style-type: none"> <li>• I_BUFHDR, O_BUFHDR Send and receive buffer headers</li> <li>• BUFRSP Response data</li> <li>• BUFMSG Message data</li> <li>• BUFERR Error message data</li> <li>• BUFRST Restart data</li> <li>• BUFQUI Shutdown data</li> <li>• BUFUNK Unknown data</li> </ul> <p>DFSAWE, the input AWE from the CSL SCI Input message exit. This AWE chain is initially queued to the LXBAWEHDR, then moved over to CLBQE by the TCP/IP post handler DFSTCP20 for processing by the DDM. The AWE is mapped by the DFSAWEXI macro. The AWXI_MBRPLPTR field contains the DFSMSDIR parameter list from SCI.</p> <p>DFSMSDIR, the parameter list of doubleword parameters, containing the length and address of the parameters that are passed between MSC and IMS Connect through the SCI interface.</p> <p>ICONDATA, the data from IMS Connect, pointed to by the DFSMSDIR parameter MDIR_ICONMSGPTR. This data is mapped by the BUFMS macro, starting at BUFMSHDR.</p> |
| VTAM      | <p>POST code (first word of LLB)<br/> LLB, LTB(S), LCB, LXB, CRB, CTT, LNB control blocks<br/> MSCWA (MSC work area)<br/> I_WP_BUF, O_WP_BUF<br/> RPLs (request parameter list)</p> <p>I/O buffers (input and output). In non-bandwidth mode, the I/O buffers include I_TP_BUF and O_TP_BUF. In bandwidth mode, the input and output I/O buffers include:</p> <ul style="list-style-type: none"> <li>• I_BUFHDR, O_BUFHDR Send and receive buffer headers</li> <li>• BUFRSP Response data</li> <li>• BUFMSG Message data</li> <li>• BUFERR Error message data</li> <li>• BUFRST Restart data</li> <li>• BUFQUI Shutdown data</li> <li>• BUFUNK Unknown data</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Related reference:**

“MSS3 and MSS4 records”

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## **MSS3 and MSS4 records**

The MSS3 and MSS4 records capture link control blocks when links are started and stopped. MSS3 captures information when links are stopped. MSS4 captures information when the links are started.

MSC always logs the MSS3 and MSS4 records for diagnostics, even when a link trace is not active.

### **MSS3**

The MSS3 record is a snapshot of the MSC link incore trace buffer for CTC, VTAM, and TCP/IP links taken each time a link stops, either normally or due to an error.

The MSC link incore trace buffer, which is a wrap-around type buffer, contains data from selected fields in the link and I/O control blocks. MSC writes the data to the buffer each time a link is dispatched to do work and each time the link exits after completing the work. When the buffer is full, MSC wraps around and overwrites the oldest data in the buffer. Module DFSCMS80 contains the DSECTS of the selected fields that are written to the MSC link incore trace buffer.

The MSS3 record captures data from the following control blocks:

- LLB (logical link block)
- LTBs (link terminal blocks), input and output
- CRB (communication restart block)
- LXB (link extension block)
- I/O control blocks:
  - For CTC-type links: IOSB, IOB, and IEDB
  - For TCP/IP type links: SCIWORK
  - For VTAM type-links: input and output RPLs (request parameter lists)
- R0 trace word

### **MSS4**

The MSS4 record is a snapshot of link control blocks taken each time a link is started. The MSS4 record captures the following control blocks:

- LLB
- MSCWA
- LTBs, input and output
- I/O buffers, input and output
- LXB
- CRB
- I/O control blocks:
  - For CTC-type links: IOSB
  - For TCP/IP type links: SCIWORK
  - For VTAM type-links: RPLs, input and output
- LNB (link name block for the MSNAME)

- CTT (communication terminal table block)

**Related reference:**

“MSS1 and MSS2 records” on page 411

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## Channel-to-channel access method trace stack (LXB trace)

The LXB trace stack is designed to be used in conjunction with the module listings to provide a detailed trace of instruction flow through the channel-to-channel (CTC) access method.

The trace stack is located in the LXB at label LXBCTRAC, 288 (X'E4') bytes into the LXB, and is 50 bytes long. The only modules that manipulate the LXB trace stack are the CTC access method modules, DFSCMC00, DFSCMC10, DFSCMC40, and DFSCMC50. The code that manipulates the LXB trace stack is unconditionally operative. (That is, it is not conditionally assembled and the function is not controlled by the operator command.) If level 3 or 4 of the IMS trace command is in effect, the LXB is included among the areas traced to the log.

Most LXB trace stack entries are 2 bytes long; a few are 1 byte long. Usually, each invocation of one of the access method modules causes a trace entry to be placed in the LXB trace stack. In order to create a trace entry, the module first moves (pushes) the trace stack 2 (or 1) bytes backward (toward low storage), thereby deleting the oldest portions of the trace stack. The module then inserts the new entry at the high (storage address) end of the trace stack. In rare instances, when the asynchronous modules DFSCMC40 and DFSCMC10 interrupt execution of another CTC access method module, the trace entries might overlap and thus might not be meaningful.

The format and meaning of the possible LXB trace entries follow:

**Byte 1, bit 0**

If on, this is a 2-byte entry; otherwise it is a 1-byte entry.

**Byte 1, bits 1-3**

This identifies the module and, if applicable, the routine within the module that made the entry in the LXB.

**Value    Meaning**

|   |                                       |
|---|---------------------------------------|
| 1 | DFSCMC40, attention DIE routine       |
| 2 | DFSCMC10, channel-end appendage       |
| 3 | DFSCMC10, abnormal-end appendage      |
| 4 | DFSCMC40, I/O request DIE routine     |
| 5 | DFSCMC10, shutdown appendage          |
| 6 | DFSCMC50, shutdown processing routine |
| 7 | DFSCMC00, MSC analyzer                |

**Byte 1, bits 4-7**

This identifies what processing was performed. The meaning of the bits, as shown below, is dependent on the routine that made the entry in the LXB.

**Byte 2**

This is an input byte that the routine keys on. This is also dependent on the routine and is described below.

## DFSCMC00 (MSC analyzer)

The DFSCMC00 module manipulates the LXB trace stack.

### Byte 1, bits 4-7

| Value | Meaning |
|-------|---------|
|-------|---------|

- |   |                                                                               |
|---|-------------------------------------------------------------------------------|
| 0 | No I/O operation was queued; contention exists for the CTC adapter            |
| 1 | WRITE channel program was queued                                              |
| 2 | ACK channel program was queued                                                |
| 3 | WRACK channel program was queued                                              |
| 4 | READ channel program was queued; contention exists for use of the CTC adapter |
| 5 | STARTUP channel program was modified to be a WRITE channel program            |
| 6 | Old STARTUP channel program was modified to be a WRITE channel program        |
| 7 | WRITE channel program was not queued; write-pending switch was set            |
| 8 | Error return was given                                                        |

### Byte 2

This contains the operation code (found in DECTYPE+1).

## DFSCMC50 (shutdown processing routine)

The module DFSCMC50 manipulates the LXB trace stack.

### Byte 1, bits 4-7

| Value | Meaning |
|-------|---------|
|-------|---------|

- |   |                                         |
|---|-----------------------------------------|
| 1 | Normal STACK operation was performed    |
| 2 | Normal SHUTDOWN operation was performed |
| 3 | Abnormal SHUTDOWN occurred              |

### Byte 2

This contains the operation code (found in DECTYPE+1).

## DFSCMC40 (attention DIE routine)

The only modules that manipulate the LXB trace stack are the CTC access method modules, DFSCMC00, DFSCMC10, DFSCMC40, and DFSCMC50. The values and meaning of DFSCMC40 are listed.

### Byte 1, bits 4-7

IOSB was passed to IOS to perform a read.

| Value | Meaning |
|-------|---------|
|-------|---------|

- |   |                                              |
|---|----------------------------------------------|
| 0 | Error was previously posted                  |
| 1 | IOSB was passed to IOS                       |
| 2 | IOSB on queue was modified to perform a read |
| 3 | LLB was posted with ACK received             |

- 4 LXB was posted with STARTUP complete; the link is available for a WRITE operation
- 5 LXB was posted with an error
- 6 LLB was posted with an error
- 7 During STARTUP processing, a control command was received after this routine used a no-operation command
- 8 Attention interrupt was received during SHUTDOWN processing; UCB was already cleared
- 9 Attention interrupt was received during SHUTDOWN processing; this routine did not reset UCBQISCE switch
- A Attention interrupt was received during SHUTDOWN processing; this routine did not reset UCBQISCE switch
- B Attention interrupt was received during SHUTDOWN processing; this routine scheduled an IOSB
- C Attention interrupt was received during SHUTDOWN processing; this routine set LXBC2XS switch
- D LXBC2SD switch was set after an attention interrupt because a WRITE command was received; READ operation was not done
- E Read-pending or response-received switch was set
- F Attention interrupt was received during SHUTDOWN processing; SHUTDOWN channel program was aborted

#### Byte 2

The command byte is sensed from the channel-to-channel adapter (found at IOSCTCMD), except when an I/O error prevented retrieval of the command byte, in which case byte 2 is absent.

### DFSCNC40 (I/O request DIE routine)

The only modules that manipulate the LXB trace stack are the CTC access method modules, DFSCMC00, DFSCMC10, DFSCMC40, and DFSCMC50. The values and meaning of DFSCNC40 are listed.

#### Byte 1, bits 4-7

##### Value Meaning

- 0 Second entry into this routine was taken; nothing was done
- 1 LXBCLIB switch was reset
- 2 IOSB on queue was modified to perform a WRITE operation (this is always a 1-byte entry)

### DFSCMC10 (channel-end appendage)

The only modules that manipulate the LXB trace stack are the CTC access method modules, DFSCMC00, DFSCMC10, DFSCMC40, and DFSCMC50. The values and meaning of DFSCMC100 are listed.

#### Byte 1, bits 4-7

##### Value Meaning

- 0 Nothing was done

- 1 LXB was posted with STARTUP complete; the link is available for a WRITE operation
- 2 LXB was posted with STARTUP complete; STARTUP message was received
- 3 During STARTUP processing, no-operation command was scheduled
- 5 LXB was posted; message received
- 6 LLB was posted; message received
- 8 During STARTUP processing, control command was scheduled
- 9 LLB was posted; an error occurred on message that was written
- A LLB was posted; an error occurred on message that was received
- B LXB was posted; an error occurred on message that was received

**Byte 2**

This contains the first command code in the just-completed channel program (pointed to by IOSVST).

## DFSCMC10 (abnormal-end appendage)

The only modules that manipulate the LXB trace stack are the CTC access method modules, DFSCMC00, DFSCMC10, DFSCMC40, and DFSCMC50. The abnormal values and meaning of DFSCMC100 are listed.

**Byte 1, bits 4-7**

| Value | Meaning                                           |
|-------|---------------------------------------------------|
| 2     | Not a permanent error; control is given to an ERP |
| 3     | Error was declared permanent                      |
| 4     | Serial channel error                              |
| 5     | MIH detected error before retry                   |



**Byte 2**

This contains the value in IOSCOD.

## DFSCMC10 (shutdown appendage)

The only modules that manipulate the LXB trace stack are the CTC access method modules, DFSCMC00, DFSCMC10, DFSCMC40, and DFSCMC50. The shutdown values and meaning of DFSCMC100 are listed.

**Byte 1, bits 4-7**

| Value | Meaning                                                              |
|-------|----------------------------------------------------------------------|
| 1     | Completion was normal; a new I/O operation was scheduled             |
| 2     | Completion was normal; LLB was posted                                |
| 3     | Completion was abnormal; UCB was already cleared                     |
| 4     | Completion was abnormal; this routine has cleared UCB and posted LLB |
| 5     | Completion was abnormal; this routine will restart I/O               |
| 6     | Completion was abnormal; this routine has restarted I/O              |
| 7     | Completion was normal; UCB was already cleared                       |

## Byte 2

This contains the first command code in the just-completed channel program (pointed by IOSVST).

## LXB trace stack example

This example shows a printout of the LXB portion of an internal trace record.

The LXB trace stack begins at AE90E8 and contains 29 entries. Following the figure is a list of the meanings of the routines that made each entry.

## Printout of the LXB trace stack

DFSERA30 — FORMATTED LOG PRINT

⋮

INTERNAL TRACE RECORD

⋮

LXB

|        |        |           |          |               |          |          |          |          |          |
|--------|--------|-----------|----------|---------------|----------|----------|----------|----------|----------|
| AE9004 | 000000 | 807F0BC9  | 00093660 | 00AE9350      | 00AE92B0 | 00091E90 | 00AE991C | 17000000 | 7F0C0000 |
| AE9024 | 000020 | 80000000  | 520821CE | 0008229C      | 000820C6 | 80082194 | 012141CE | 60000054 | 0A000000 |
| AE9044 | 000040 | 30000005  | 022140C6 | 600000CE      | 09000000 | 30000005 | 47000000 | 20000001 | 00000000 |
| AE9064 | 000060 | 00000000  | 00000000 | 00000000      | 00000000 | 00000000 | 00000000 | 00000000 | 00000000 |
| AE9084 | 000080 | TO AE90C4 | 0000C0   | SAME AS ABOVE |          |          |          |          |          |
| AE90E4 | 0000E0 | 00000000  | 0C419317 | F1044193      | 17F10441 | 9337E218 | D243F510 | A314A8C3 | 419101A2 |
| AE9104 | 000100 | 02F30C41  | 93179101 | A502F004      | F30C4193 | 17F10441 | 93170000 | 00000000 | 00B66218 |

### Entry Meaning

**X'OC'** The first byte of this entry, the oldest entry in the trace stack, has been pushed off the trace stack. Ignore this entry.

**X'41'** DFSCMC40 (I/O request DIE). LXBCLIB was reset.

**X'9317'**

DFSCMC40 (attention DIE). Operation code X'17' (ACK) was received from the other system. The LLB was posted X'7F1C0000' (ACK received).

**X'F104'**

DFSCMC00. Operation code X'04' (WRITE) was received. The WRITE channel program was queued.

**X'41'** DFSCMC40. (I/O request DIE). LXBCLIB was reset. WRITE operation was completed.

**X'9317'**

DFSCMC40 (attention DIE). Operation code X'17' (ACK) was received from the other system. The LLB was posted X'7F1C0000' (ACK received).

**X'F104'**

DFSCMC00. Operation code X'04' (WRITE was received). The WRITE channel program was queued.

**X'41'** DFSCMC40 (I/O request DIE). LXBCLIB was reset. WRITE operation was completed.

**X'9337'**

DFSCMC40 (attention DIE). Operation code X'37' (STACK) was received from the other system. The LLB was posted X'7F1C0000' (ACK received).

**X'E218'**

DFSCMC50 (SHUTDOWN processing). Operation code X'18' (SHUTDOWN) was received. Normal SHUTDOWN was performed.

**X'D243'**

DFSCMC10 (SHUTDOWN appendage). Channel command X'43' (enable compatibility) completed normally. The LLB was posted.

- X'F510'**  
DFSCMC00. Operation code X'10' (STARTUP) was received. The start-link channel program was queued.
- X'A314'**  
DFSCMC10 (channel-end appendage). Channel command X'14' (sense command byte) of the start-link channel program completed normally. The disable compatibility no-operation command was scheduled.
- X'A8C3'**  
DFSCMC10 (channel-end appendage). Channel command C'X3' (disable compatibility no-operation) completed normally. The startup control command was scheduled.
- X'41'**  
DFSCMC40 (I/O request DIE). LXBCLIB was reset. Channel end was received from the startup control.
- X'9101'**  
DFSCMC10 (attention DIE). Operation code X'01' (WRITE) was received from the other system. The IOSB was passed to IOS to initiate a READ.
- X'A202'**  
DFSCMC10 (channel-end appendage). Channel command X'02' (read) completed normally. The LXB was posted X'7F080000'(startup complete, startup message received).
- X'F30C'**  
DFSCMC00. Operation code X'0C' (WRACK) was received. ACK with data (WRACK) channel program was queued.
- X'41'**  
DFSCMC40 (I/O request DIE). LXBCLIB was reset. WRACK operation has completed.
- X'9317'**  
DFSCMC40 (attention DIE). Operation code X'17' (ACK) was received from the other system. The LLB was posted X'7F0C0000' (ACK received).
- X'9101'**  
DFSCMC40 (attention DIE). Operation code X'01' (WRITE) was received from the other system. The IOSB was passed to IOS to initiate a READ operation.
- X'A502'**  
DFSCMC10 (channel-end appendage). Channel command X'02' (read) was completed. The LXB was posted X'7F0C0000' (message received).
- X'F004'**  
DFSCMC00. Operation code X'04' (WRITE) was received. No I/O was scheduled. Contention exists between this WRITE operation and the WRITE operation received from the other system in the preceding 9101 entry. The device-dependent module has not yet received control in response to the LXB post traced by the preceding A502 entry.
- X'F30C'**  
DFSCMC00. Operation code X'0C' (WRACK) was received. ACK with data (WRACK) channel program was queued.  
  
The ACK acknowledges the data received from the other system in the preceding 9101 entry. The data is the data that was not sent in the preceding F004 entry.
- X'41'**  
DFSCMC40 (I/O request DIE). LXBCLIB was reset.



**X'9317'**

DFSCMC40 (attention DIE). Operation code X'17' (ACK) was received from the other system. The LLB was posted X'7F1C0000' (ACK received).

**X'F104'**

DFSCMC00. Operation code X'04' (WRITE) was received. The WRITE channel program was queued.

**X'41'**

DFSCMC40 (I/O request DIE). LXBCLIB was reset. WRITE operation was completed.

**X'9317'**

DFSCMC40 (attention DIE). Operation code X'17' (ACK) was received from the other system. The LLB was posted X'7F1C0000' (ACK received).

## **MSC routing trace - BUFMSVID**

The MSC routing trace is located in the MSC message prefix at label BUFMSVID within the BUFMS DSECT. The low-order byte in the trace contains the most recent entry, and each additional entry results in a shift left (the high-order byte is shifted out).

This trace records the MSVID (as specified in the IMSCTRL macro during system definition) of the last eight IMS systems through which messages were routed. It is initialized when a terminal sends a message or when an application program does an ISRT of a message, and it is updated for each intermediate system and the destination system.

This trace records the primary MTO's local SYSID of the last eight IMS systems through which messages were routed. It is initialized when a terminal sends a message or when an application program does an ISRT of a message, and it is updated for each intermediate system and the destination system. The MSC routing trace is located in the MSC message prefix extension at label MSGMEVID in DSECT MSGMSCE. The low-order byte in the trace contains the most recent entry, and each additional entry results in a shift left (the high-order byte is shifted out). If the SYSID is equal to or greater than 255, it is traced both in field BUFMEVID and MSGMEVID. If the SYSID is less than 255, it is only traced in MSGMEVID; BUFMEVID contains zeros.



---

## Chapter 17. RSR - Remote Site Recovery service aids

The RSR tracking process creates a local log that mirrors the activity at the currently active system.

These topics describe the Fast Path tracker trace Entries that can help you analyze problems in a Remote Site Recovery (RSR) environment.

In some cases, however, the tracking system might not receive copies of all log records before takeover. This might happen if there is a tracking session failure before takeover occurs while the active system is still processing transactions normally. If there is a tracking session failure before takeover, subsequent attempts to start Finance, SLU P, and ISC sessions or MSC links might result in resynchronization errors.

The MTO is notified of both non-MSC errors and MSC errors, as follows:

- Message DFS2948 notifies the MTO of non-MSC errors.
- Either message DFS3211 or message DFS3212 notifies the MTO of MSC errors.

Use the remote takeover message information in conjunction with the received log data to determine the last terminal or MSC message recorded by the tracking process. Then input or output any messages that were lost.

---

### Determining the last recorded non-MSC message

You can determine the last input or output non-MSC or non-Fast Path message recorded using RSR tracking and its status within the new active IMS following takeover.

1. Print these log records for information:
  - X'01'
  - X'03'
  - X'31'
  - X'35'
  - X'36'
  - X'37'
  - X'63'
  - X'66'
2. Determine the last input or output message. First look for the last X'66' or X'63' log record for the terminal.

ISC parallel sessions qualify the node name in the log record with user ID.

If a X'63' log record is last, that log record indicates whether the session was started cold (without message numbers) or warm (with last input/output message numbers).

If a X'66' log record is last, that log record indicates the message sequence number and whether the message was input or output. The X'66' log record marks an attempt to commit the message for recovery and restart, if necessary. Additional log records will indicate the exact status of the message.
3. Determine the last committed input message by inspecting the last X'66' log record marked as input for the specific terminal. It is followed by X'01' and

X'35' log records for the input message. The X'35' log record considers the input message (log record X'66') committed, or made recoverable, for input processing on nonresponse mode transactions.

**Restriction:** Nonconversational response mode transactions are not restartable. That is, they must be submitted again to IMS if any failure occurs prior to completion of transaction processing. Therefore, the input is not considered committed until the transaction processing is complete and output is available to send to the terminal (see output process that follows).

4. Before the terminal begins the output process, completion of the input transaction processing results in X'03', ending with X'3730'. The X'3730' commits the transaction changes, including making the output message available for the terminal. The X'3730' also commits the associated nonconversational response mode input transaction, as described previously.

To determine the last committed output message sent to the terminal, begin with the last X'66' marked as output. This output message is committed, that is dequeued, with the X'36' log record that follows, reflecting successful receipt by the terminal.

For Fast Path messages, use the following procedure to determine the last input or output message recorded using RSR tracking.

1. Print these log records for information:
  - X'5901'
  - X'5903'
  - X'5936'
  - X'5937'
  - X'63'
  - X'66'
2. Determine the last input or output message. First look for the last X'66' or X'63' log record for the terminal.

ISC parallel sessions qualify the node name in the log record with user ID.

If a X'63' log record is last, that indicates whether the session was started cold (without message numbers) or warm (with last input/output message numbers).

If a X'66' log record is last, that log record will indicate the message sequence number and whether the message was input or output. The X'66' log record marks an attempt to commit the message for recovery and restart, if necessary. Additional log records will indicate the exact status of the message.
3. Fast Path input is always considered nonrestartable and must be resubmitted to IMS if any failure occurs before transaction input processing is complete and the output message is made available to the terminal output process.
4. To determine the last Fast Path input transaction received and committed, begin with the last X'66' log record that is marked as input for the specific terminal. It is followed by a X'5901' log record with the input message and a X'5937' log record indicating input transaction processing complete. The input and all changes have been committed.
5. To determine the last committed output message to the terminal, begin with the X'5903' log record for the output message followed by the X'5937', which makes it available for the terminal output process. This is the same X'5937' log record that also commits the input above. This is followed by a X'66' log record indicating an attempt to deliver output to the terminal. This output is committed (dequeued) when also followed by the X'5936' log record.

---

## Determining the last recorded MSC message

MSC links keep track of the sending and receiving of data on a message by message basis.

Each message block sent across an MSC link is appended with a sequence number. The IMS receiving system updates its receive count with each message block received, and records (logs) each message successfully received and enqueued to the message queue. Similarly, the sending system updates its sending count with each message block sent and logs the sequence number of the last message successfully sent and dequeued.

Across link restarts, RSR takeovers, or IMS failures, these sequence numbers are exchanged and used to resynchronize the message traffic, to continue sending and receiving messages at the same point. Therefore, messages are not lost or duplicated.

The key to the success of this concept is the logging of the messages that were sent and received across the link, and enqueued on the receiving side and dequeued from the sending side. There are primarily five log records used to resynchronize this message traffic:

- 01 - Input message to IMS - input transaction or message switch
- 03 - Transaction Output, program-to-program switch or error message (DFSxxxx)
- 35 - Enqueue message
- 36 - Dequeue message
- 66 - Message sequence recovery

If log records are lost and not processed by the tracking system prior to a remote takeover, message resynchronization can result in the loss or duplication of messages. This can be evidenced by error messages that are issued by IMS when the links are restarted, such as DFS3211 and DFS3212, DFS2145, and DFS2948.

Should link resynchronization fail after an RSR takeover, it might be possible to analyze which messages were lost or duplicated, from the information in the DFS error message issued by IMS at the time of error, and from the 01, 03, 35, 36, and 66 log records.

---

## Fast Path tracker trace entries

Use Trace record 9E01 - DBFDT210 redo record processor module entry through Trace record 9F74 - DBFDT400 write to analyze the Fast Path tracker trace entries.

**Trace entry: Fast Path tracker log router interface (9E)**

9E01

**Module:**

DBFDT210 Redo Record Processor Module Entry

**Explanation:**

Record cut at entry to DBFDT210 (Level - Medium)

**Trace Subcode:**

DT210 Entry

Table 108. Trace record 9E01 - DBFDT210 redo record processor module entry

| Offset | Type      | Length | Description     |
|--------|-----------|--------|-----------------|
| 0      | Character | 4      | Log Id          |
| 4      | Character | 4      | CI RBA          |
| 8      | Character | 2      | Offset in CI    |
| 10     | Character | 2      | Data Length     |
| 12     | Fixed     | 1      | Stream Id       |
| 13     | Fixed     | 1      | OFR Id          |
| 14     | Fixed     | 2      | Milestone Index |
| 16     | Character | 8      | Prilog Time     |

**Example:**

|             |           |             |          |          |
|-------------|-----------|-------------|----------|----------|
|             |           | LSN         | streamID | OFRID    |
| DT210 Entry | 9E018A65  | 000023AB    | 00000001 | 00000000 |
|             | 00000090  | 0094122F    | 1141138F | 8613CD64 |
|             |           |             |          |          |
|             | milestone | prilog time |          |          |
|             | index     |             |          |          |

## 9E02

**Module:**

## DBFDT220 Redo Record Processor Module Entry

**Explanation:**

Record cut at entry to DBFDT220 (Level - Medium)

## Trace Subcode:

DT210 Entry

Table 109. Trace record 9E02 - DBFDT220 redo record processor module entry

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
| 0      | Character | 4      | Log Id              |
| 4      | Fixed     | 4      | Stream Type         |
| 8      | Fixed     | 1      | Log Record Type     |
| 8      | Fixed     | 1      | Log Record Sub Type |
| 10     | Fixed     | 2      | Stream Id           |
| 12     | Fixed     | 2      | OFR Id              |
| 14     | Fixed     | 2      | Milestone Index     |
| 16     | Character | 8      | Prilog Time         |

**Trace entry: Fast Path tracker log router interface (9F)**

## 9F22

**Module:**

DBFDT300 Fast Path/Fast Path TCB AWE Queue Server  
Module Entry

**Explanation:**

Record cut at entry to DBFDT300 (Level - High)

**Trace Subcode:**  
DT300 Entry

Table 110. Trace record 9F22 - DBFDT300 Fast Path/Fast Path TCB AWE queue server module entry

| Offset | Type      | Length | Description       |
|--------|-----------|--------|-------------------|
| 0      | Address   | 4      | AWE enqueueer     |
| 4      | Character | 4      | AWE function code |
| 8      | Character | 16     | AWE contents      |

**Example:**

```

DT300 Entry 9F22B879 enqueueer open area EMAC
 00000001 04F9E5E2 00000003 0476A3C0
 | | | |
 streamID USID 00000000 A0AFD862

```

**Trace Entry: Fast Path tracker log router interface (9F)**

**Module:**

DBFDT300 Fast Path/Fast Path TCB AWE Queue Server Module Entry

**Explanation:**

Record cut at entry to DBFDT300 (Level - High)

**Trace Subcode:**

DT300 Entry

9F22

Table 111. Trace record 9F22 - DBFDT300 Fast Path/Fast Path TCB AWE queue server module entry

| Offset | Type      | Length | Description       |
|--------|-----------|--------|-------------------|
| 0      | Address   | 4      | AWE enqueueer     |
| 4      | Character | 4      | AWE function code |
| 8      | Character | 16     | AWE contents      |

**Example:**

```

DT300 Entry 9F22B879 enqueueer open area EMAC
 00000001 04F9E5E2 00000003 0476A3C0
 | | | |
 streamID USID 00000000 A0AFD862

```

9F41

**Module:**

DBFDT180 Area Status Change Module Entry

**Explanation:**

Record cut at entry to DBFDT180 (Level - High)

**Trace Subcode:**

DT180 Entry

Table 112. Trace record 9F41 - DBFDT180 area status change module entry

| Offset | Type  | Length | Description   |
|--------|-------|--------|---------------|
| 0      | Fixed | 4      | Function code |

Table 112. Trace record 9F41 - DBFDT180 area status change module entry (continued)

| Offset | Type    | Length | Description  |
|--------|---------|--------|--------------|
| 4      | Fixed   | 4      | Reason code  |
| 8      | Address | 4      | Address EMAC |
| 12     | Address | 4      | Address PST  |

**Example:**

```

DT180 Entry 9F41D6C0 00000001 00000007 041843C0
 00B3C060 00000000 00000000 AC97BB2C
 |
 PST

```

stop\_req    ndtrk\_fail  
           |           |  
           |           |

**9F44**

**Module:**

DBFROFR0 OFR Module Entry

**Explanation:**

Record cut at entry to DBFROFR0 (Level - High)

**Trace Subcode:**

ROFR0 Entry

Table 113. Trace record 9F44 - DBFROFR0 OFR module entry

| Offset | Type  | Length | Description   |
|--------|-------|--------|---------------|
| 0      | Fixed | 4      | Function code |
| 4      | Fixed | 4      | Area count    |

**Module:**

DBFROFR0 OFR Module Entry

**Explanation:**

Record cut at entry to DBFROFR0 (Level - High)

**Trace Subcode:**

ROFR0 Entry

Table 114. Trace record 9F44 - DBFROFR0 OFR module entry

| Offset | Type    | Length | Description     |
|--------|---------|--------|-----------------|
| 0      | Fixed   | 4      | Function code   |
| 4      | Address | 4      | Address of DMAC |

**Module:**

DBFROFR0 OFR Module Entry

**Explanation:**

Record cut at entry to DBFROFR0 (Level - High)

**Trace Subcode:**

ROFR0 Entry





Table 118. Trace record 9F52 - DBFDT350 GETEMAC

| Offset | Type    | Length | Description         |
|--------|---------|--------|---------------------|
| 0      | Address | 4      | Address EMAC        |
| 4      | Address | 4      | EMACEMAC_WAQ        |
| 8      | Address | 4      | EMACERQE_WAQ        |
| 12     | Address | 4      | EMACERQE_WIOQ       |
| 16     | Fixed   | 4      | EMACERQE_WIOQ count |

**Example:**

```

 EMAC EMACEMAC_WAQ EMACERQE_WAQ
 | | |
DT350 GETEMAC 9F528A98 02E85E40 0329B1E4 0000A740
 00006000 0000000E 00000000 8613ED6C
 | |
 EMACERQE_WIOQ count
 EMACERQE_WIOQ

```

**9F53****Module:**

DBFDT350 GETERQE

**Explanation:**

Record cut at ERQE in DBFDT350 (Level - Medium)

**Trace Subcode:**

DT350 ERQE

Table 119. Trace record 9F53 - DBFDT350 GETERQE

| Offset | Type      | Length | Description    |
|--------|-----------|--------|----------------|
| 0      | Address   | 4      | Address ERQE   |
| 4      | Address   | 4      | ERQEEMAC       |
| 8      | Fixed     | 1      | ERQE Type      |
| 9      | Fixed     | 1      | ERQEF          |
| 10     | Fixed     | 1      | ERQEF2         |
| 12     | Fixed     | 4      | ERQEMILE Index |
| 16     | Character | 8      | Log Record Id  |

**Example:**

```

 ERQE ERQEEMAC type
 | | |
DT350 GETERQE 9F538A9A 0000B180 02E85E40 01080000
 00000000 00000000 00000090 8613EDE9
 |
 milestone index

```

**9F54****Module:**

DBFDT350 EMAC2

**Explanation:**

Record cut at EMAC in DBFDT350 (Level - High)

**Trace Subcode:**  
DT350 EMAC2

Table 120. Trace record 9F54 - DBFDT350 EMAC2

| Offset | Type      | Length | Description |
|--------|-----------|--------|-------------|
| 0      | Character | 8      | Area name   |

**Example:**

```

DT350 EMAC2 9F548A99 C4C4F0F1 C1D9F040 00000000
 00000000 00000000 00000000 8613ED9D

```

9F70

**Module:**  
DBFDT400 IPOST

**Explanation:**  
Record cut at IPOST in DBFDT400 (Level - High)

**Trace Subcode:**  
DT400 IPOST

Table 121. Trace record 9F70 - DBFDT400 IPOST

| Offset | Type      | Length | Description  |
|--------|-----------|--------|--------------|
| 0      | Address   | 4      | Address IOTI |
| 4      | Character | 4      | Post code    |

9F71

**Module:**  
DBFDT400 IWAIT

**Explanation:**  
Record cut at IWAIT in DBFDT400 (Level - High)

**Trace Subcode:**  
DT400 IWAIT

Table 122. Trace record 9F71 - DBFDT400 IWAIT

| Offset | Type    | Length | Description  |
|--------|---------|--------|--------------|
| 0      | Address | 4      | Address IOTI |

9F72

**Module:**  
DBFDT400 EMAC

**Explanation:**  
Record cut for EMAC in DBFDT400 (Level - High)

**Trace Subcode:**  
DT400 EMAC

Table 123. Trace record 9F72 - DBFDT400 EMAC

| Offset | Type    | Length | Description  |
|--------|---------|--------|--------------|
| 0      | Address | 4      | Address IOTI |

Table 123. Trace record 9F72 - DBFDT400 EMAC (continued)

| Offset | Type    | Length | Description              |
|--------|---------|--------|--------------------------|
| 4      | Address | 4      | Address EMAC             |
| 8      | Fixed   | 4      | EDBT Milestone IOTI Done |

### 9F73

**Module:**

DBFDT400 Read

**Explanation:**

Record cut at Read in DBFDT400 (Level - High)

**Trace Subcode:**

DT400 Read

Table 124. Trace record 9F73 - DBFDT400 read

| Offset | Type    | Length | Description    |
|--------|---------|--------|----------------|
| 0      | Address | 4      | Address IOTI   |
| 4      | Address | 4      | Address DMHR   |
| 8      | Fixed   | 4      | DMHRSRBA       |
| 12     | Address | 4      | DMHRDMAC       |
| 16     | Fixed   | 4      | IOTIERQE Count |
| 20     | Address | 4      | IOTIEMAC       |

**Example:**

|            |          |          |          |          |
|------------|----------|----------|----------|----------|
|            |          | IOTI     | DMHR     | DMHRSRBA |
|            |          |          |          |          |
| DT400 Read | 9F7374E5 | 02F553A0 | 0316A860 | 00014000 |
|            | 028F7E28 | 00000002 | 02867040 | 8FA4571B |
|            |          |          |          |          |
|            | DMAC     |          | EMAC     |          |
|            |          | IOTIERQE | count    |          |

### 9F74

**Module:**

DBFDT400 Write

**Explanation:**

Record cut at Write in DBFDT400 (Level - High)

**Trace Subcode:**

DT400 Write

Table 125. Trace record 9F74 - DBFDT400 write

| Offset | Type    | Length | Description  |
|--------|---------|--------|--------------|
| 0      | Address | 4      | Address IOTI |
| 4      | Address | 4      | Address DMHR |
| 8      | Fixed   | 4      | DMHRSRBA     |
| 12     | Address | 4      | DMHRDMAC     |
| 16     | Address | 4      | IOTIEMAC     |

**Example:**

|             |          |          |          |          |
|-------------|----------|----------|----------|----------|
|             |          | IOTI     | DMHR     | DMHRSRBA |
| DT400 Write | 9F7474DC | 02F553A0 | 0316AD38 | 00013000 |
|             | 028F7E28 | 02867040 | 00000000 | 8FA06CE5 |
|             | DMAC     | EMAC     |          |          |

**Related reference:**

“IMS trace function codes” on page 578

## X'D4': database tracker trace entries (D4)

The following table shows the database tracking trace entries for the X'D4' trace entry.

Table 126. Database tracking trace entries for X'D4' trace entry

| Word 1, first half                   | Word 1, second half            | Word 2    | Word 3    | Word 4      | Word 5                                     | Word 6                                            | Word 7 |
|--------------------------------------|--------------------------------|-----------|-----------|-------------|--------------------------------------------|---------------------------------------------------|--------|
| X'0001': DRQE queued on DRWQ         | Stream ID                      | TDBC      | DRQE      | DRWQ        | Log sequence number (LSN), right half only | Prilog start time. In the format: yyyydddFhhmsstt |        |
| X'0002': DRQE queued on TDBC         | Stream ID                      | TDBC      | DRQE      | DRWQ        | Log sequence number (LSN), right half only | Prilog start time. Format: yyyydddFhhmsstt        |        |
| X'0003': DRQE freed without tracking | Stream ID                      | TDBC      | DRQE      |             | Log sequence number (LSN), right half only | Prilog start time. Format: yyyydddFhhmsstt        |        |
| X'0004': DBTI                        | X'0001': Dispatched for work   | PST       | DTT       | DTTPCTL     |                                            |                                                   |        |
| X'0005': DFSDT240 AWE                | AWE function <sup>1</sup>      | TDBC      | AWE       |             |                                            |                                                   |        |
| X'0006': DFSDT300 AWE                | AWE function <sup>2</sup>      | TDBC      | AWE       | Return code |                                            |                                                   |        |
| X'0007': Shutdown                    | X'0030': DFSDT300              |           |           |             |                                            |                                                   |        |
|                                      | X'0040': DFSDT400              | PST       | DTT       |             |                                            |                                                   |        |
|                                      | X'0050': DFSDT500              | PST       |           |             |                                            |                                                   |        |
| X'0008': DB stop                     | Function <sup>3</sup>          | Reason    | TDBC      | ECB         |                                            |                                                   |        |
| X'0009': Milestone                   | X'0000': Prepare for milestone | Type code | New index |             |                                            |                                                   |        |
|                                      | X'0001': Begin milestone       | Type code | New index |             |                                            |                                                   |        |
|                                      | X'0002': End milestone         | Type code |           |             |                                            |                                                   |        |

Table 126. Database tracking trace entries for X'D4' trace entry (continued)

| Word 1, first half                          | Word 1, second half            | Word 2               | Word 3             | Word 4                      | Word 5                                  | Word 6                                      | Word 7 |
|---------------------------------------------|--------------------------------|----------------------|--------------------|-----------------------------|-----------------------------------------|---------------------------------------------|--------|
|                                             | X'0003': BQEL transfer done    | PST                  | PSTFNCTN           | Milestone index transferred |                                         |                                             |        |
|                                             | X'0004': Buffer purge done     | PST                  | PSTFNCTN           | Milestone index purged      |                                         |                                             |        |
| X'0010': Record already hardened            | Stream ID                      | TDBC                 | Hardened STCK time |                             | Right half of log sequence number (LSN) | Prilog start time. Format: yyyydddFhhmmsstt |        |
| X'000A': End stream                         | Stream type                    | Stream id            | Milestone index    |                             |                                         |                                             |        |
| X'000B': Load balance                       | X'0000': DTT statistics        | DTT                  | Busy percent       | DTTWAIT                     | DTTWORK                                 | DTTPCTL                                     |        |
|                                             | X'0001': Summary               | Average busy percent | Active DBTIs       | Backlog                     |                                         |                                             |        |
|                                             | X'0002': DRWQ assign           | New DTT              | DRWQ               | Q busy percent              | Old DTT                                 |                                             |        |
|                                             | X'0003': DRWQ assigns complete | Old DTT              |                    |                             |                                         |                                             |        |
| X'000C': OFR                                | X'0000': DFSLROFR called       | OFR id               | OFRL               | DB count                    |                                         |                                             |        |
|                                             | X'0001': Restart OFR           | OFR id               | TDBC               | TDBCT                       | Flags                                   |                                             |        |
|                                             | X'0002': Begin OFR             | OFR id               | TDBC               | TDBCT                       | Flags                                   |                                             |        |
|                                             | X'0003': End OFR               | OFR id               | TDBC               | TDBCT                       | Flags                                   |                                             |        |
|                                             | X'0004': Begin OFR ignored     | OFR id               | TDBC               | TDBCT                       | Flags                                   |                                             |        |
|                                             | X'0005': Restart OFR ignored   | OFR id               | TDBC               | TDBCT                       | Flags                                   |                                             |        |
| X'000F': Wait/post/resume for routed record | Event <sup>4</sup>             | TDBC                 | ECB                |                             |                                         |                                             |        |

Notes to Table 126 on page 433:

1. AWE functions for DFSDT240 (trace code X'0005'):

**X'0015'**

Open/authorize/NUSID for database succeeded

**X'0017'**

Stream does not apply (open/authorize/NUSID failed)

**X'0018'**

Process TDBC queue

- X'001A'**  
Add DDIR through online change
  - X'001E'**  
Database might need OFR
  - X'0020'**  
OLR output data set creation succeeded
  - X'0021'**  
OLR output data set creation failed
2. AWE functions for DFSDT300 (trace code X'0006'):
- X'0001'**  
Initialize DLI/SAS queue server
  - X'0002'**  
Terminate DLI/SAS queue server
  - X'0003'**  
Open/authorize/NUSID for database
  - X'0004'**  
Close database
  - X'0005'**  
End database tracking, written to disk
  - X'0006'**  
End database tracking, initial call
  - X'0007'**  
Stream complete, initial call
  - X'0008'**  
Stream complete, written to disk
  - X'0009'**  
Load balancing
  - X'000A'**  
OFR needed
  - X'000B'**  
OFR complete, initial call
  - X'0010'**  
OFR complete, written to disk
  - X'001F'**  
Create OLR output data sets
  - X'0020'**  
OLR cursor active, written to disk
  - X'0021'**  
OLR cursor inactive
3. Functions for DFSDT180, database stop (trace code X'0008'):
- X'0000'**  
Initiate database stop
  - X'0001'**  
Database stop complete

X'0002'  
Database might need OFR

X'0003'  
Log the TDBC state

X'0004'  
Call DFSLRETR to record tracking suspend point

X'0005'  
Database started

4. Events for wait/post/resume for routed record (X'000F):

X'0000'  
Wait because of OFR-pending.

X'0001'  
Posted because database is up to date already; OFR not needed.

X'0002'  
Posted because OFR was started.

X'0003'  
Posted because stop is complete.

X'0004'  
Posted at end-OFR (should not occur).

X'0005'  
Posted because database is up to date at restart (should not occur).

X'0006'  
Posted for unknown reason when starting database (should not occur).

X'0007'  
Posted because of error starting OFR.

X'0008'  
Posted because the log router reported an exceptional condition that prevented OFR from starting.

X'0009'  
Resumption after being posted.

**Related concepts:**

“DL/I trace” on page 160

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## Buffer handler trace entries at the database tracker

Trace entries are written for buffer handler calls at the database tracker just as they are at the active site.

These entries are described in “X'DB' through X'FA' trace entry” on page 192. However, there are differences in these trace entries when they are written by the database tracker:

- Word 3 contains the RBA or RBN of the data in the CI or block rather than PSTDSGA.
- Word 6 contains the right half of the log sequence number (LSN) rather than PSTISAMW.



**Related reference:**

“X'DB' through X'FA' trace entry” on page 192

## Log router trace data

The log router (LRTT) trace entries are documented in Trace record 3701 - data set services control routine entry through Trace record 3788 - create active stream begin takeover. Field lengths are in bytes.

**3701****Module:**

DFSLRDSS Data Set Services Control ITASK Routine

**Explanation:**

Record cut at entry to DFSLRDSS (Level - Low)

**Trace Subcode:**

LRDSS Entry

Table 127. Trace record 3701 - data set services control routine entry

| Offset | Type                                                                                                                                        | Length | Description                                                                                                                                                                                                                                        |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4      | Fixed                                                                                                                                       | 1      | AWLGFUNC (AWE Function)                                                                                                                                                                                                                            |
| 5      | Fixed                                                                                                                                       | 1      | AWLGDSFL (DSS Request Code)                                                                                                                                                                                                                        |
| 6      | Fixed                                                                                                                                       | 1      | AWLGDSTP (Data Set Type)                                                                                                                                                                                                                           |
|        | 1... ....<br>.1.. ....<br>.1. ....<br>...1 1111                                                                                             | 1      | Tracking_SLDS (AWLGDTRK)<br>Archive_SLDS (AWLGDARC)<br>Archive_RLDS (AWLGDRLD)                                                                                                                                                                     |
| 7      | Fixed                                                                                                                                       | 1      | Request Priority (AWLGDPRI)                                                                                                                                                                                                                        |
| 8      | Address                                                                                                                                     | 4      | LTDCB address (AWLGDLTID)                                                                                                                                                                                                                          |
| 12     | Address                                                                                                                                     | 4      | LDSD address (AWLGDLDSD)                                                                                                                                                                                                                           |
| 16     | Bit                                                                                                                                         | 4      | DSS Flags (LGBDSSFLAGS)                                                                                                                                                                                                                            |
|        | 1... ....<br>.1.. ....<br>..1. ....<br>...1 ....<br>.... 1...<br>.... .1..<br>.... ..1.<br>.... ...1<br>1... ....<br>.1.. ....<br>..11 1111 | 1      | LGB_CBTE_ALTERED<br>LGBDSS_DUAL_TRACKING_SLDS<br>LGBDSS_DUAL_ARCHIVE_SLDS<br>LGBDSS_DUAL_ARCHIVE_RLDS<br>LGB_ARCHIVE_SLDS<br>LGB_ARCHIVE_RLDS<br>LGB_INITIALIZEDSS<br>LGB_TERMINATINGDSS<br>LGB_DSS_DATASETS_RETURNED<br>LGB_DSS_RESTART_INIT<br>* |
| 20     | Fixed                                                                                                                                       | 4      | LGB_DATASET_NUMBER                                                                                                                                                                                                                                 |
| 24     | Bit                                                                                                                                         | 2      | Data set Action Flags (AWLGDSAC)                                                                                                                                                                                                                   |

Table 127. Trace record 3701 - data set services control routine entry (continued)

| Offset | Type      | Length | Description                         |
|--------|-----------|--------|-------------------------------------|
|        | 1... .... |        | Delete data set (AWLGDSDE)          |
|        | .1.. .... |        | Input/Output (AWLGDSIO)             |
|        | .1. ....  |        | Last active data set (AWLGDLST)     |
|        | ...1 .... |        | Allocate for restart (AWLGDARS)     |
|        | .... 1... |        | 4906 delete record (AWLGD4906)      |
|        | .... .1.. |        | Delete for restart (AWLGDRST)       |
|        | .... .1.  |        | End stream notification (AWLGDEST)  |
|        | .... ...1 |        | Create prealloc data set (AWLGDLAG) |
| 25     | Bit       | 2      | LTDCB_FLAGS                         |
|        | 1... .... |        | LTDCB_DBRC_OPEN                     |
|        | .1.. .... |        | LTDCB_DBRC_CLOSED                   |
|        | .1. ....  |        | LTDCB_LAST_BUFFER_WRITTEN           |
|        | ...1 .... |        | LTDCB_EODAD                         |
|        | .... 1... |        | LTDCB_DELETE_DATASET                |
|        | .... .1.. |        | LTDCB_OPEN_ERROR_1                  |
|        | .... .1.  |        | LTDCB_OPEN_ERROR_2                  |
|        | .... ...1 |        | LTDCB_MOUNTABLE                     |

### 3702

**Module:**

DFSLRDCR Data Set Create Routine

**Explanation:**

Invoke DYA from DFSLRDCR (Level - Medium)

**Trace Subcode:**

LRDCR Create

Table 128. Trace record 3702 - create data set routine invoke DYA

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
| 4      | Character | 8      | DD Name (LTDCB_DDNAME) |
| 12     | Character | 8      | DS Type (from DS Name) |
| 20     | Character | 8      | DS Name (LTDCB_DSN)    |
| 28     | Address   | 4      | LDS address (AWLGDLD)  |

### 3703

**Module:**

DFSLRDCR Data Set Create Routine

**Explanation:**

Record cut at exit from DFSLRDCR (Level - Medium)

**Trace Subcode:**

LRDCR Exit

Table 129. Trace record 3703 - create data set routine exit

| Offset | Type  | Length | Description                 |
|--------|-------|--------|-----------------------------|
| 4      | Fixed | 1      | AWLGFUNC (AWE Function)     |
| 5      | Fixed | 1      | AWLGDSFL (DSS Request Code) |
| 6      | Fixed | 1      | AWLGDSTP (Data Set Type)    |

Table 129. Trace record 3703 - create data set routine exit (continued)

| Offset | Type      | Length | Description                   |
|--------|-----------|--------|-------------------------------|
|        | 1... .... |        | Tracking SLDS (AWLGDTRK)      |
|        | .1.. .... |        | Archive SLDS (AWLGDARC)       |
|        | ..1. .... |        | Archive RLDS (AWLGDRLD)       |
|        | ...1 1111 |        |                               |
| 7      | Fixed     | 1      | Request Priority (AWLGDPRI)   |
| 8      | Fixed     | 4      | Return Code                   |
| 12     | Fixed     | 2      | Return Code from Data Set One |
| 14     | Fixed     | 2      | Reason Code from Data Set One |
| 16     | Fixed     | 2      | Return Code from Data Set Two |
| 18     | Fixed     | 2      | Reason Code from Data Set Two |
| 20     | Address   | 4      | LTDCB address (AWLGDLTD)      |
| 24     | Address   | 4      | LDSD address (AWLGDLDS)       |

### 3704

**Module:**

DFSLRDAL Data Set Allocate Routine

**Explanation:**

Record cut at exit from DFSLRDAL (Level - Medium)

**Trace Subcode:**

LRDAL Exit

Table 130. Trace record 3704 - allocate data set routine exit

| Offset | Type    | Length | Description                   |
|--------|---------|--------|-------------------------------|
| 4      | Fixed   | 4      | Return Code                   |
| 8      | Fixed   | 2      | Return Code from Data Set One |
| 10     | Fixed   | 2      | Reason Code from Data Set One |
| 12     | Fixed   | 2      | Return Code from Data Set Two |
| 14     | Fixed   | 2      | Reason Code from Data Set Two |
| 16     | Address | 4      | LTDCB Address (AWLGDLTD)      |
| 20     | Address | 4      | LDSD address (AWLGDLDS)       |
| 24     | Address | 4      | R13                           |

### 3705

**Module:**

DFSLRDOP Data Set Open Routine

**Explanation:**

Record cut at exit from DFSLRDOP (Level - Medium)

**Trace Subcode:**

LRDOP Exit

Table 131. Trace record 3705 - open data set routine exit

| Offset | Type  | Length | Description                      |
|--------|-------|--------|----------------------------------|
| 4      | Fixed | 1      | AWLGDSFL (DSS Request Code)      |
| 5      | Bit   | 1      | Data set Action Flags (AWLGDSAC) |

Table 131. Trace record 3705 - open data set routine exit (continued)

| Offset | Type      | Length | Description                                  |
|--------|-----------|--------|----------------------------------------------|
|        | 1... .... |        | Delete data set (AWLGDSDE)                   |
|        | .1.. .... |        | Input/Output (AWLGDSIO)                      |
|        | ..1. .... |        | Last active data set (AWLGDLST)              |
|        | ...1 .... |        | Allocate for restart (AWLGDARS)              |
|        | .... 1... |        | 4906 delete record (AWLGD4906)               |
|        | .... .1.. |        | Delete for restart (AWLGDRST)                |
|        | .... ..1. |        | End stream notification (AWLGDEST)           |
|        | .... ...1 |        | Create prealloc data set (AWLGDGGB)          |
| 6      | Fixed     | 2      | Reason Code from Open Routine                |
| 8      | Fixed     | 2      | Return Code from Open Macro for Data Set One |
| 10     | Fixed     | 2      | Return Code from Open Macro for Data Set Two |
| 12     | Address   | 3      | LTDCB address (AWLGDLTG)                     |
| 16     | Address   | 4      | LDSD address (AWLGDGDS)                      |
| 20     | Address   | 4      | AWE address                                  |
| 24     | Address   | 4      | R13                                          |

### 3707

#### Module:

DFSLRDDE Data Set Deallocate/Delete Routine

#### Explanation:

Record cut at exit from DFSLRDDE (Level - Medium)

#### Trace Subcode:

LRDDE Exit

Table 132. Trace record 3707 - deallocate/delete data set routine exit

| Offset | Type      | Length | Description                      |
|--------|-----------|--------|----------------------------------|
| 4      | Fixed     | 1      | AWLGFUNC (AWE Function)          |
| 5      | Fixed     | 1      | AWLGDSFL (DSS Request Code)      |
| 6      | Fixed     | 1      | AWLGDSTP (Data Set Type)         |
|        | 1... .... |        | Tracking_SLDS (AWLGDTRK)         |
|        | .1.. .... |        | Archive SLDS (AWLGDARC)          |
|        | ..1. .... |        | Archive RLDS (AWLGDRLD)          |
|        | ...1 1111 |        |                                  |
| 7      | Fixed     | 1      | Request Priority (AWLGDPR)       |
| 8      | Address   | 4      | LTDCB address (AWLGDLTG)         |
| 12     | Address   | 4      | LDSD address (AWLGDGDS)          |
| 16     | Fixed     | 2      | Return Code from Data Set One    |
| 18     | Fixed     | 2      | Reason Code from Data Set One    |
| 20     | Fixed     | 2      | Return Code from Data Set Two    |
| 22     | Fixed     | 2      | Reason Code from Data Set Two    |
| 24     | Bit       | 1      | Data set Action Flags (AWLGDSAC) |

Table 132. Trace record 3707 - deallocate/delete data set routine exit (continued)

| Offset | Type      | Length | Description                          |
|--------|-----------|--------|--------------------------------------|
|        | 1... ..   |        | Delete data set (AWLGDSDE)           |
|        | .1.. ..   |        | Input/Output (AWLGDSIO)              |
|        | ..1. .... |        | Last active data set (AWLGDLST)      |
|        | ...1 .... |        | Allocate for restart (AWLGDARS)      |
|        | .... 1... |        | 4906 delete record (AWLGD4906)       |
|        | .... .1.. |        | Delete for restart (AWLGDRST)        |
|        | .... ..1. |        | End stream notification (AWLGDEST)   |
|        | .... ...1 |        | Create prealloc data set (AWLGDLAGB) |
| 25     | Bit       | 2      | LTDCB_flags                          |
|        | 1... ..   |        | LTDCB_DBRC_OPEN                      |
|        | .1.. ..   |        | LTDCB_DBRC_CLOSED                    |
|        | ..1. .... |        | LTDCB_LAST_BUFFER_WRITTEN            |
|        | ...1 .... |        | LTDCB_EODAD                          |
|        | .... 1... |        | LTDCB_DELETE_DATASET                 |
|        | .... .1.. |        | LTDCB_OPEN_ERROR_1                   |
|        | .... ..1. |        | LTDCB_OPEN_ERROR_2                   |
|        | .... ...1 |        | LTDCB_MOUNTABLE                      |

**Module:**

DFSLRMRG Log Router Log Merge

**Explanation:**

Record is cut when a stream is removed from a merge (Level - Low)

**Trace Subcode:**

LRMRG End Mrg

Table 133. Trace record 3709 - end of merge

| Offset | Type      | Length | Description                      |
|--------|-----------|--------|----------------------------------|
| 4      | Character | 8      | Stream subsystem ID              |
| 12     | Character | 1      | mrbs_status                      |
| 13     | Character | 1      | Spare                            |
| 14     | Fixed     | 2      | Number of remaining merge blocks |
| 16     | Fixed     | 4      | Stream ID                        |
| 20     | Character | 4      | stb_last_routed_LSN(5-8)         |

**370E**

**Module:**

DFSLRRR0 Log Record Router

**Explanation:**

Record cut at End Buffer (Level - Low)

**Trace Subcode:**

LRRR0 End Strm

Table 134. Trace record 370E - received last buffer of the active stream

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
| 4      | Fixed     | 4      | stb_routing_prilog_token |
| 8      | Character | 8      | stb_last_routed_LSN      |
| 2      | Bit       | 16     | stb_flags                |

Table 134. Trace record 370E - received last buffer of the active stream (continued)

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
|        | 1... .... |        | STB_DATASHARING          |
|        | .1.. .... |        | STB_TERMINATED           |
|        | .1.. .... |        | STB_BATCH                |
|        | ...1 .... |        | STB_OFR_CACHING          |
|        | ... 1...  |        | STB_TERMINATING          |
|        | ... .1..  |        | STB_CONV_WITH_LOGGER     |
|        | ... ..1.  |        | STB_ACTIVE_ABENDED       |
|        | ... ...1  |        | STB_SHUTDOWN_IN_PROGRESS |
|        | 1... .... |        | STB_RESTARTING           |
|        | .1.. .... |        | STB_READ_IN_PROGRESS     |
|        | .1.. .... |        | STB_READ_ERROR           |
|        | ...1 .... |        | STB_ROUTING_SUSPENDED    |
|        | ... 1...  |        | STB_END_OF_STREAM        |
|        | ... .1..  |        | STB_UNABLE_TO_ROUTE      |
|        | ... ..1.  |        | STB_SHUTDOWN_REQUESTED   |
|        | ... ...1  |        | STB_SHUTDOWN_COMPLETE    |
| 18     | Bit       | 2      | LRB_BUFFER_flags         |
|        | 1... .... |        | LRB_BUFFER_DS_FULL       |
|        | 1... .... |        | LRB_BUFFER_EODAD         |
|        | .1.. .... |        | STB_BUFFER_IO_ABEND      |
|        | ..11 1111 |        | *                        |
|        | 1... .... |        | LRB_READ_COMPLETE        |
|        | .1.. .... |        | LRB_BUFFER_LAST          |
|        | .1.. .... |        | LRB_BUFFER_ENDDS         |
|        | ...1 .... |        | LRB_BUFFER_RESTART       |
|        | ... 11..  |        | LRB_BUFFER_ORIGIN        |
|        | 00        |        | LRB_FROM_LOGGER          |
|        | 01        |        | LRB_FROM_ILS             |
|        | 10        |        | LRB_FROM_READER          |
|        | 11        |        | LRB_FROM_ARCH            |
|        | ... ..1.  |        | LRB_ACTIVE_ABEND         |
|        | ... ...1  |        | LRB_BEGIN_OFR_CACHING    |
| 20     | Fixed     | 4      | stb_streamID             |
| 24     | Character | 4      | stb_routing_prilog_token |
| 28     | Fixed     | 2      | lpd_feedback             |

### 370F

#### Module:

DFSLRRBF Route Buffer Routine

#### Explanation:

Record cut at exit from DFSLRRBF (Level - High)

#### Trace Subcode:

LRRBF Route

Table 135. Trace record 370F - routed log records from buffer to trackers

| Offset | Type      | Length | Description        |
|--------|-----------|--------|--------------------|
| 4      | Character | 4      | lrb_record_id(5-8) |
| 8      | Character | 4      | First routed LSN   |
| 12     | Character | 4      | Last routed LSN    |

Table 135. Trace record 370F - routed log records from buffer to trackers (continued)

| Offset | Type    | Length | Description                |
|--------|---------|--------|----------------------------|
| 16     | Fixed   | 4      | offset to first LSN routed |
| 20     | Fixed   | 4      | lpd_stream_type            |
| 24     | Fixed   | 4      | lpd_stream_id              |
| 28     | Address | 4      | R13 value                  |

### 3710

**Module:**

DFSLRAST Active Stream Tracker Routine

**Explanation:**

Record cut at received 0401 log (Level - Low)

**Trace Subcode:**

LRAST PTKO Req

Table 136. Trace record 3710 - active stream tracker RSR04\_PTKO

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
| 4      | Character | 1      | rsr04code              |
| 5      | Character | 1      | rsr04sub               |
| 7      | Character | 1      | lpd_flags              |
|        |           |        | stream is being merged |
|        | 1... .... |        |                        |
| 8      | Character | 4      | lpd_feedback           |
| 12     | Character | 4      | lrb_record_ID(5-8)     |
| 16     | Character | 8      | r04_stck               |
| 24     | Fixed     | 4      | lpd_stream_id          |

### 3712

**Module:**

DFSLRAST Active Stream Tracker Routine

**Explanation:**

Record cut at received 0402 through 0407 log (Level - Low)

**Trace Subcode:**

LRAST DataShr

Table 137. Trace record 3712 - active stream tracker RSR04SUB

| Offset | Type      | Length | Description        |
|--------|-----------|--------|--------------------|
| 4      | Character | 1      | rsr04code          |
| 5      | Character | 1      | rsr04sub           |
| 8      | Character | 4      | r04_hipritoken     |
| 12     | Character | 4      | lrb_record_ID(5-8) |
| 16     | Character | 8      | r04_prilgts(1-8)   |
| 24     | Fixed     | 31     | lpd_stream_id      |

### 3731

**Module:**

DFSLRSAR Stream Archiver Controller ITASK Routine

**Explanation:**

Record cut on entry to DFSLRSAR for all requests except for write (awlgfwrt) and return buffer from reader during truncation (awlgfrtb) (Level - High)

**Trace Subcode:**

LRSAR Entry

Table 138. Trace record 3731 - stream archiver controller entry

| Offset | Type      | Length | Description                |
|--------|-----------|--------|----------------------------|
| 4      | Address   | 4      | SAA Address                |
| 8      | Bit       | 4      | SAA_flags                  |
|        | 1... .... |        | SAA_NEW_STREAM             |
|        | .1.. .... |        | SAA_LAST_BUFFER_WRITTEN    |
|        | .1. ....  |        | SAA_ARCHIVER_WAITING       |
|        | ...1 .... |        | SAA_DUAL_LOGGING           |
|        | .... 1... |        | SAA_SETUPFORARCHIVE        |
|        | .... .1.. |        | SAA_CLOSE_FAILED (to DBRC) |
|        | .... .1.  |        | SAA_SHUTDOWN               |
|        | .... ...1 |        | SAA_IS_ACTIVE              |
|        | 1... .... |        | SAA_WAIT_FOR_ALL_ITASKS    |
|        | .1.. .... |        | SAA_BEGIN_OFR_CACHING      |
|        | .1. ....  |        | SAA_WRITE_IN_PROGRESS      |
|        | ...1 .... |        |                            |
|        | .... 1... |        | SAA_CREATEDITASKS          |
|        | .... .1.. |        | SAA_NO_WRITE_DONE          |
|        | .... .1.  |        | *                          |
|        | .... ...1 |        | SAA_TERM_MSG_SENT          |
|        |           |        | *                          |
|        | 1... .... |        | SAA_BAD_BUFFER_DETECTED    |
|        | .1.. .... |        | SAA_TERMINATING            |
|        | .1. ....  |        | SAA_ERROR_DETECTED         |
|        | ...1 .... |        | SAA_EXIT_NO_BUFFER         |
|        | .... 1... |        | SAA_DO_NOT_ROUTE           |
|        | .... .1.. |        | SAA_TRACKS_MATCH           |
|        | .... .1.  |        | SAA_HANDLE_IO_ERROR        |
|        | .... ...1 |        | SAA_GAP_FILLED             |
|        | 1... .... |        | SAA_COLDSTART              |
|        | .1.. .... |        | SAA_NOBMP                  |
|        | .1. ....  |        | SAA_XRF_TAKEOVER           |
|        | ...1 .... |        | SAA_1ST_BFR_CK_INPROG      |
|        | .... 1... |        | SAA_1ST_BUFR_CK_OK         |
|        | .... .111 |        |                            |
| 12     | Bit       | 2      | AWLGFUNC                   |
| 14     | Bit       | 1      | SAA_ITASK_CONTROL_flags    |
|        | .1.. .... |        | SAA_DS_FULL                |
|        | .1.. .... |        | *                          |
|        | .1. ....  |        | SAA_IO_ERROR_1             |
|        | ...1 .... |        | SAA_IO_ERROR_2             |
|        | .... 1111 |        | *                          |
| 15     | Bit       | 1      | SAA_DS_type                |



Table 138. Trace record 3731 - stream archiver controller entry (continued)

| Offset | Type      | Length | Description           |
|--------|-----------|--------|-----------------------|
|        | .1.. .... |        | SAA_TRACKING_SLDS     |
|        | .1.. .... |        | SAA_ARCHIVE_SLDS      |
|        | .1.. .... |        | SAA_ARCHIVE_RLDS      |
|        | ...1 1111 |        | *                     |
| 16     | Bit       | 2      | SAA_NUM_ITASKS        |
| 18     | Bit       | 2      | SAA_LOG_COPIES        |
| 20     | Bit       | 2      | SAA_AVAIL_ITASK       |
| 22     | Bit       | 2      | SAA_OLDEST_BUSY_ITASK |
| 24     | Character | 8      | SAA_PRILOG_TIME       |

### 3732

#### Module:

DFSLRSAR Stream Archiver Controller ITASK Routine

#### Explanation:

Record cut on exit from DFSLRSAR (Level - Medium)

#### Trace Subcode:

LRSAR Exit

Table 139. Trace record 3732 - stream archiver controller exit

| Offset | Type      | Length | Description                |
|--------|-----------|--------|----------------------------|
| 4      | Address   | 4      | SAA Address                |
| 8      | Bit       | 4      | SAA_flags                  |
|        | 1... .... |        | SAA_NEW_STREAM             |
|        | .1.. .... |        | SAA_LAST_BUFFER_WRITTEN    |
|        | .1.. .... |        | SAA_ARCHIVER_WAITING       |
|        | ...1 .... |        | SAA_DUAL_LOGGING           |
|        | .... 1... |        | SAA_SETUPFORARCHIVE        |
|        | .... .1.. |        | SAA_CLOSE_FAILED (to DBRC) |
|        | .... .1.. |        | SAA_SHUTDOWN               |
|        | .... ...1 |        | SAA_IS_ACTIVE              |
|        | 1... .... |        | SAA_WAIT_FOR_ALL_ITASKS    |
|        | .1.. .... |        | SAA_BEGIN_OFR_CACHING      |
|        | .1.. .... |        | SAA_WRITE_IN_PROGRESS      |
|        | ...1 .... |        | SAA_CREATEDITASKS          |
|        | .... 1... |        | SAA_NO_WRITE_DONE          |
|        | .... .1.. |        | *                          |
|        | .... .1.. |        | SAA_TERM_MSG_SENT          |
|        | .... ...1 |        | *                          |
|        | 1... .... |        | SAA_BAD_BUFFER_DETECTED    |
|        | .1.. .... |        | SAA_TERMINATING            |
|        | .1.. .... |        | SAA_ERROR_DETECTED         |
|        | ...1 .... |        | SAA_EXIT_NO_BUFFER         |
|        | .... 1... |        | SAA_DO_NOT_ROUTE           |
|        | .... .1.. |        | SAA_TRACKS_MATCH           |
|        | .... .1.. |        | SAA_HANDLE_IO_ERROR        |
|        | .... ...1 |        | SAA_GAP_FILLED             |

Table 139. Trace record 3732 - stream archiver controller exit (continued)

| Offset | Type      | Length | Description             |
|--------|-----------|--------|-------------------------|
|        | 1... .... |        | SAA_COLDSTART           |
|        | .1.. .... |        | SAA_NOBMP               |
|        | .1.. .... |        | SAA_XRF_TAKEOVER        |
|        | ...1 .... |        | SAA_1ST_BFR_CK_INPROG   |
|        | .... 1... |        | SAA_1ST_BUFR_CK_OK      |
|        | .... .111 |        |                         |
| 12     | Bit       | 2      | AWLGFUNC                |
| 14     | Bit       | 2      | SAA_ITASK_CONTROL_flags |
|        | .1.. .... |        | SAA_DS_FULL             |
|        | .1.. .... |        | *                       |
|        | .1.. .... |        | SAA_IO_ERROR_1          |
|        | ...1 .... |        | SAA_IO_ERROR_2          |
|        | .... 1111 |        | *                       |
| 15     | Bit       | 1      | SAA_DS_type             |
|        | .1.. .... |        | SAA_TRACKING_SLDS       |
|        | .1.. .... |        | SAA_ARCHIVE_SLDS        |
|        | .1.. .... |        | SAA_ARCHIVE_RLDS        |
|        | ...1 1111 |        | *                       |
| 16     | Fixed     | 4      | Feedback Code           |
| 18     | Bit       | 2      | SAA_AVAIL_ITASK         |
| 20     | Bit       | 2      | SAA_OLDEST_BUSY_ITASK   |
| 24     | Character | 8      | SAA_PRILOG_TIME         |

### 3733

#### Module:

DFSLRWRT Stream Archiver WRITE Routine

#### Explanation:

Record cut just prior to invocation of the WRITE macro in DFSLRWRT (Level - High)

#### Trace Subcode:

LRWRT Write

Table 140. Trace record 3733 - stream archiver WRITE invocation

| Offset | Type    | Length | Description                                                            |
|--------|---------|--------|------------------------------------------------------------------------|
| 4      | Address | 4      | SAA Address                                                            |
| 8      | Address | 4      | SAA_CURRENT_DATA_WRITTEN                                               |
| 12     | Address | 4      | LTDCB_DCB_PTR(*)                                                       |
| 16     | Address | 4      | SAA_ITASK_BUFFER(*)                                                    |
| 20     | Fixed   | 4      | LRB_BUFFER_HARD last 4 bytes of the last committed log sequence number |
| 24     | Fixed   | 4      | LRB_RECORD_ID                                                          |
| 28     | Fixed   | 4      | LRB_BUFFER_LLSN number in buffer being written (lower half word)       |

### 3734

#### Module:

DFSLRSDS Stream Archiver Switch Data Set Routine

**Explanation:**

Record cut just prior to switching data sets when a data set full or other error condition is recognized (Level - High)

**Trace Subcode:**

LRSDS Switch

Table 141. Trace record 3734 - stream archiver switch data set

| Offset | Type       | Length | Description                |
|--------|------------|--------|----------------------------|
| 4      | Address    | 4      | SAA address                |
| 8      | Bit        | 4      | SAA_flags                  |
|        | 1... ....  |        | SAA_NEW_STREAM             |
|        | ..1.. .... |        | SAA_LAST_BUFFER_WRITTEN    |
|        | ..1. ....  |        | SAA_ARCHIVER_WAITING       |
|        | ...1 ....  |        | SAA_DUAL_LOGGING           |
|        | .... 1...  |        | SAA_SETUPFORARCHIVE        |
|        | .... ..1.. |        | SAA_CLOSE_FAILED (to DBRC) |
|        | .... ..1.  |        | SAA_SHUTDOWN               |
|        | .... ...1  |        | SAA_IS_ACTIVE              |
|        | 1... ....  |        | SAA_WAIT_FOR_ALL_ITASKS    |
|        | ..1.. .... |        | SAA_BEGIN_OFR_CACHING      |
|        | ..1. ....  |        | SAA_WRITE_IN_PROGRESS      |
|        | ...1 ....  |        | SAA_CREATEDITASKS          |
|        | .... 1...  |        | SAA_NO_WRITE_DONE          |
|        | .... ..1.. |        | *                          |
|        | .... ..1.  |        | SAA_TERM_MSG_SENT          |
|        | .... ...1  |        | *                          |
|        | 1... ....  |        | SAA_BAD_BUFFER_DETECTED    |
|        | ..1.. .... |        | SAA_TERMINATING            |
|        | ..1. ....  |        | SAA_ERROR_DETECTED         |
|        | ...1 ....  |        | SAA_EXIT_NO_BUFFER         |
|        | .... 1...  |        | SAA_DO_NOT_ROUTE           |
|        | .... ..1.. |        | SAA_TRACKS_MATCH           |
|        | .... ..1.  |        | SAA_HANDLE_IO_ERROR        |
|        | .... ...1  |        | SAA_GAP_FILLED             |
|        | 1... ....  |        | SAA_COLDSTART              |
|        | ..1.. .... |        | SAA_NOBMP                  |
|        | ..1. ....  |        | SAA_XRF_TAKEOVER           |
|        | ...1 ....  |        | SAA_1ST_BFR_CK_INPROG      |
|        | .... 1...  |        | SAA_1ST_BUFR_CK_OK         |
|        | .... .111  |        |                            |
| 12     | Address    | 4      | SAA_LDSD                   |
| 16     | Address    | 4      | SAA_LTDCB                  |
| 20     | Character  | 4      | AWLG_CSW_LSN               |
| 24     | Character  | 4      | LRB_RECORD_ID              |
| 28     | Fixed      | 4      | Switch feedback            |

3736

**Module:**

DFSLRLTS Log Truncation Start Routine

**Explanation:**

Record cut at exit from DFSLRLTS (Level - Low)

**Trace Subcode:**  
LRLTS Exit

*Table 142. Trace record 3736 - stream archiver log truncation start exit*

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
| 4      | Character | 8      | SAA_TRUNC_LSN_POINT      |
| 12     | Address   | 4      | SAA Address              |
| 16     | Address   | 4      | SAA_LDSO                 |
| 20     | Character | 8      | SAA_PRILOG_TIME          |
| 28     | Bit       | 2      | SAA_TRUNC_flags          |
|        | 1... ..   |        | SAA_TRUNCATION           |
|        | .1.. ..   |        | SAA_TRUNC_READ_COMPLETE  |
|        | ..1. .... |        | SAA_TRUNC_WRITE_COMPLETE |
|        | ...1 .... |        | SAA_TRUNC_NO_DATASET     |
|        | .... 1... |        | SAA_TRUNC_RESTART_WRITE  |
|        | .... .1.. |        | SAA_RETRY                |
|        | .... ..1. |        | SAA_PRIOR_RDR_ERR        |
|        | .... ...1 |        | SAA_RETRY_SENT           |
|        | 1... ..   |        | SAA_TRUNC_NONE_DONE      |
|        | .111 1111 |        | *                        |
| 30     | Fixed     | 16     | SAA_TRUNC_STAGE          |

**3737**

**Module:**  
DFSLRLTR Log Truncation Routine

**Explanation:**  
Record cut at exit from DFSLRLTR (Level - Low)

**Trace Subcode:**  
LRLTR Exit

*Table 143. Trace record 3737 - log router log truncation exit*

| Offset | Type      | Length | Description                |
|--------|-----------|--------|----------------------------|
| 4      | Address   | 4      | SAA address                |
| 8      | Bit       | 4      | SAA_flags                  |
|        | 1... ..   |        | SAA_NEW_STREAM             |
|        | .1.. ..   |        | SAA_LAST_BUFFER_WRITTEN    |
|        | ..1. .... |        | SAA_ARCHIVER_WAITING       |
|        | ...1 .... |        | SAA_DUAL_LOGGING           |
|        | .... 1... |        | SAA_SETUPFORARCHIVE        |
|        | .... .1.. |        | SAA_CLOSE_FAILED (to DBRC) |
|        | .... ..1. |        | SAA_SHUTDOWN               |
|        | .... ...1 |        | SAA_IS_ACTIVE              |
|        | 1... ..   |        | SAA_WAIT_FOR_ALL_ITASKS    |
|        | .1.. ..   |        | SAA_BEGIN_OFR_CACHING      |
|        | ..1. .... |        | SAA_WRITE_IN_PROGRESS      |
|        | ...1 .... |        | SAA_CREATEDITASKS          |
|        | .... 1... |        | SAA_NO_WRITE_DONE          |
|        | .... .1.. |        | *                          |
|        | .... ..1. |        | SAA_TERM_MSG_SENT          |
|        | .... ...1 |        | *                          |

Table 143. Trace record 3737 - log router log truncation exit (continued)

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
|        | 1... .... |        | SAA_BAD_BUFFER_DETECTED  |
|        | .1.. .... |        | SAA_TERMINATING          |
|        | .1.. .... |        | SAA_ERROR_DETECTED       |
|        | ...1 .... |        | SAA_EXIT_NO_BUFFER       |
|        | .... 1... |        | SAA_DO_NOT_ROUTE         |
|        | .... .1.. |        | SAA_TRACKS_MATCH         |
|        | .... .1.. |        | SAA_HANDLE_IO_ERROR      |
|        | .... ...1 |        | SAA_GAP_FILLED           |
|        | 1... .... |        | SAA_COLDSTART            |
|        | .1.. .... |        | SAA_NOBMP                |
|        | .1.. .... |        | SAA_XRF_TAKEOVER         |
|        | ...1 .... |        | SAA_1ST_BFR_CK_INPROG    |
|        | .... 1... |        | SAA_1ST_BUFR_CK_OK       |
|        | .... .111 |        |                          |
| 12     | Bit       | 2      | SAA_TRUNC_flags          |
|        | 1... .... |        | SAA_TRUNCATION           |
|        | .1.. .... |        | SAA_TRUNC_READ_COMPLETE  |
|        | .1.. .... |        | SAA_TRUNC_WRITE_COMPLETE |
|        | ...1 .... |        | SAA_TRUNC_NO_DATASET     |
|        | .... 1... |        | SAA_TRUNC_RESTART_WRITE  |
|        | .... .1.. |        | SAA_RETRY                |
|        | .... .1.. |        | SAA_PRIOR_RDR_ERR        |
|        | .... ...1 |        | SAA_RETRY_SENT           |
|        |           | 1      |                          |
|        | 1... .... |        | SAA_TRUNC_NONE_DONE      |
|        | .111 1111 |        | *                        |
| 14     | Fixed     | 2      | SAA_TRUNC_ID             |
| 16     | Bit       | 1      | SAA_DS_flags             |
|        | .1.. .... |        | SAA_TRACKING_SLDS        |
|        | .1.. .... |        | SAA_ARCHIVE_SLDS         |
|        | .1.. .... |        | SAA_ARCHIVE_RLDS         |
|        | ...1 1111 |        | *                        |
| 18     | Bit       | 2      | SAA_ITASK_CONTROL_flags  |
|        | .1.. .... |        | SAA_DS_FULL              |
|        | .1.. .... |        | *                        |
|        | .1.. .... |        | SAA_IO_ERROR_1           |
|        | ...1 .... |        | SAA_IO_ERROR_2           |
|        | .... 1111 |        | *                        |
| 20     | Address   | 4      | SAA_LTDCB                |
| 24     | Character | 4      | SAA_TRUNC_LSN_POINT      |

3738

**Module:**

DFSLRRDC Log Read Controller ITASK Routine

**Explanation:**

Record cut on exit from DFSLRRDC (Level - Low)

**Trace Subcode:**

LRRDC Entry

Table 144. Trace record 3738 - log router log read controller exit

| Offset | Type      | Length | Description                                                     |
|--------|-----------|--------|-----------------------------------------------------------------|
| 4      | Fixed     | 1      | AWLGFUNC                                                        |
| 8      | Address   | 4      | LDSD (if func=CRD), GFR (if func=RCU),<br>LRA (if func=TRD)     |
| 12     | Address   | 4      | LRB Buffer Chain Address or<br>AWLG_TRD_RDR_TOKEN (if func=TRD) |
| 16     | Address   | 4      | Requester Routine Address                                       |
| 20     | Character | 4      | First LSN of read interval                                      |
| 24     | Character | 4      | Last LSN of read interval                                       |
| 28     | Address   | 4      | AWEENQER                                                        |

### 373A

#### Module:

DFSLRRDR Log Reader

#### Explanation:

Record cut upon the initial entry to a log reader (Level - Low)

#### Trace Subcode:

LRRDR 1st Read

Table 145. Trace record 373A - log router log reader first read request

| Offset | Type      | Length | Description                   |
|--------|-----------|--------|-------------------------------|
| 4      | Address   | 4      | LRA Address                   |
| 8      | Bit       | 4      | LRA_flags                     |
|        | 1... .... |        | LRA_LOGREADER_WAITING         |
|        | .1.. .... |        | LRA_WAIT_FOR_ALL_ITASKS       |
|        | ..1. .... |        | LRA_CURRENT_DATASET_ALLOCATED |
|        | ...1 .... |        | LRA_READ_COMPLETE             |
|        | .... 1... |        | LRA_THROTTLE_ENABLED          |
|        | .... .1.. |        | LRA_DEALLOCATE_ENABLED        |
|        | .... ..1. |        | LRA_HIT_EODAD                 |
|        | .... ...1 |        | LRA_ALLOC_DS_ERROR            |
|        | 1... .... |        | LRA_RESTART                   |
|        | .1.. .... |        | LRA_CATCHUP_RDR               |
|        | ..1. .... |        | LRA_SENT_DONE                 |
|        | ...1 .... |        | LRA_READ_STARTED              |
|        | .... 1... |        | LRA_ONE_DATASET               |
|        | .... .1.. |        | LRA_CURRENT_DUAL              |
|        | .... ..1. |        | LRA_ALLOCATED_SECOND          |
|        | .... ...1 |        | LRA_EODADHANDLER_IN_PROGRESS  |
|        | 1... .... |        | LRA_ALLOCATE_IN_PROGRESS      |
|        | .1.. .... |        | LRA_TERM_CALLER               |
|        | ..1. .... |        | LRA_CHECK_IPOST               |
|        | ...1 .... |        | LRA_IPOSTED_READER            |
|        | .... 1... |        | LRA_CLOSE_ONLY                |
|        | .... .1.. |        | LRA_CLOSE_LAST                |
|        | .... ..1. |        | LRA_BIR_PROCESSING            |
|        | .... ...1 |        | LRA_BUFFER_LAST               |

Table 145. Trace record 373A - log router log reader first read request (continued)

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
|        | 1... .... |        | LRA_CLOSE_PRIOR_DS     |
|        | .1.. .... |        | LRA_AUTOARCH           |
|        | ..1. .... |        | LRA_DO_NOT_IPOST       |
|        | ...1 1111 |        |                        |
| 12     | Address   | 4      | LRA_LDSD_LIST          |
| 16     | Address   | 4      | LRA_LRB_PTR            |
| 20     | Address   | 4      | LRA_FIRST_LSN interval |
| 24     | Address   | 4      | LRA_LAST_LSN           |
| 28     | Address   | 4      | Feedback Code          |

### 373B

#### Module:

DFSLRBIR Log Reader BSAM Buffer ITASK

#### Explanation:

Record cut when returning a buffer to requester (Level - Medium)

#### Trace Subcode:

LRBIR Ret Buf

Table 146. Trace record 373B - log router log reader buffer return

| Offset | Type      | Length | Description                   |
|--------|-----------|--------|-------------------------------|
| 4      | Address   | 4      | LRA Address                   |
| 8      | Bit       | 4      | LRA_flags                     |
|        | 1... .... |        | LRA_LOGREADER_WAITING         |
|        | .1.. .... |        | LRA_WAIT_FOR_ALL_ITASKS       |
|        | ..1. .... |        | LRA_CURRENT_DATASET_ALLOCATED |
|        | ...1 .... |        | LRA_READ_COMPLETE             |
|        | .... 1... |        | LRA_THROTTLE_ENABLED          |
|        | .... .1.. |        | LRA_DEALLOCATE_ENABLED        |
|        | .... ..1. |        | LRA_HIT_EODAD                 |
|        | .... ...1 |        | LRA_ALLOC_DS_ERROR            |
|        | 1... .... |        | LRA_RESTART                   |
|        | .1.. .... |        | LRA_CATCHUP_RDR               |
|        | ..1. .... |        | LRA_SENT_DONE                 |
|        | ...1 .... |        | LRA_READ_STARTED              |
|        | .... 1... |        | LRA_ONE_DATASET               |
|        | .... .1.. |        | LRA_CURRENT_DUAL              |
|        | .... ..1. |        | LRA_ALLOCATED_SECOND          |
|        | .... ...1 |        | LRA_EODADHANDLER_IN_PROGRESS  |
|        | 1... .... |        | LRA_ALLOCATE_IN_PROGRESS      |
|        | .1.. .... |        | LRA_TERM_CALLER               |
|        | ..1. .... |        | LRA_CHECK_IPOST               |
|        | ...1 .... |        | LRA_IPOSTED_READER            |
|        | .... 1... |        | LRA_CLOSE_ONLY                |
|        | .... .1.. |        | LRA_CLOSE_LAST                |
|        | .... ..1. |        | LRA_BIR_PROCESSING            |
|        | .... ...1 |        | LRA_BUFFER_LAST               |

Table 146. Trace record 373B - log router log reader buffer return (continued)

| Offset | Type      | Length | Description           |
|--------|-----------|--------|-----------------------|
|        | 1... ..   |        | LRA_CLOSE_PRIOR_DS    |
|        | .1.. ..   |        | LRA_AUTOARCH          |
|        | ..1. .... |        | LRA_DO_NOT_IPOST      |
|        | ...1 1111 |        |                       |
| 12     | Fixed     | 4      | LRA_USER_token        |
| 16     | Address   | 4      | LRB address           |
| 20     | Fixed     | 2      | ITASK index           |
| 22     | Fixed     | 2      | LRA_OLDEST_BUSY_ITASK |
| 24     | Character | 4      | LRB_RECORD_ID         |
| 28     | Character | 4      | LRB_BUFFER_LLSN       |

### 373C

#### Module:

DFSLRRDR Log Read Controller ITASK Routine

#### Explanation:

Record cut when an error occurred on first copy of a data set and an attempt is being made to read the dual copy (Level - Low)

#### Trace Subcode:

LRRDR ReRead

Table 147. Trace record 373C - log router log reader reread data set request

| Offset | Type      | Length | Description                   |
|--------|-----------|--------|-------------------------------|
| 4      | Address   | 4      | LRA Address                   |
| 8      | Bit       | 4      | LRA_flags                     |
|        | 1... ..   |        | LRA_LOGREADER_WAITING         |
|        | .1.. ..   |        | LRA_WAIT_FOR_ALL_ITASKS       |
|        | ..1. .... |        | LRA_CURRENT_DATASET_ALLOCATED |
|        | ...1 .... |        | LRA_READ_COMPLETE             |
|        | .... 1... |        | LRA_THROTTLE_ENABLED          |
|        | .... .1.. |        | LRA_DEALLOCATE_ENABLED        |
|        | .... ..1. |        | LRA_HIT_EODAD                 |
|        | .... ...1 |        | LRA_ALLOC_DS_ERROR            |
|        | 1... ..   |        | LRA_RESTART                   |
|        | .1.. ..   |        | LRA_CATCHUP_RDR               |
|        | ..1. .... |        | LRA_SENT_DONE                 |
|        | ...1 .... |        | LRA_READ_STARTED              |
|        | .... 1... |        | LRA_ONE_DATASET               |
|        | .... .1.. |        | LRA_CURRENT_DUAL              |
|        | .... ..1. |        | LRA_ALLOCATED_SECOND          |
|        | .... ...1 |        | LRA_EODADHANDLER_IN_PROGRESS  |
|        | 1... ..   |        | LRA_ALLOCATE_IN_PROGRESS      |
|        | .1.. ..   |        | LRA_TERM_CALLER               |
|        | ..1. .... |        | LRA_CHECK_IPOST               |
|        | ...1 .... |        | LRA_IPOSTED_READER            |
|        | .... 1... |        | LRA_CLOSE_ONLY                |
|        | .... .1.. |        | LRA_CLOSE_LAST                |
|        | .... ..1. |        | LRA_BIR_PROCESSING            |
|        | .... ...1 |        | LRA_BUFFER_LAST               |



Table 147. Trace record 373C - log router log reader reread data set request (continued)

| Offset | Type      | Length | Description        |
|--------|-----------|--------|--------------------|
|        | 1... .... |        | LRA_CLOSE_PRIOR_DS |
|        | .1.. .... |        | LRA_AUTOARCH       |
|        | ..1. .... |        | LRA_DO_NOT_IPOST   |
|        | ...1 1111 |        |                    |
| 12     | Fixed     | 4      | LRA_REREAD_ITASK   |
| 16     | Character | 8      | LRA_DS_LSN         |
| 20     | Character | 8      | LRA_FIRST_LSN      |
| 24     | Character | 8      | LRA_LAST_LSN       |
| 28     | Address   | 4      | Feedback Code      |

### 373D

#### Module:

DFSLRRDR Log Reader

#### Explanation:

Record cut on exit from DFSLRRDR (Level - Low)

#### Trace Subcode:

LRRDR Exit

Table 148. Trace record 373D - log router log reader exit

| Offset | Type      | Length | Description                   |
|--------|-----------|--------|-------------------------------|
| 4      | Address   | 4      | LRA Address                   |
| 8      | Bit       | 4      | LRA flags                     |
|        | 1... .... |        | LRA_LOGREADER_WAITING         |
|        | .1.. .... |        | LRA_WAIT_FOR_ALL_ITASKS       |
|        | ..1. .... |        | LRA_CURRENT_DATASET_ALLOCATED |
|        | ...1 .... |        | LRA_READ_COMPLETE             |
|        | .... 1... |        | LRA_THROTTLE_ENABLED          |
|        | .... .1.. |        | LRA_DEALLOCATE_ENABLED        |
|        | .... ..1. |        | LRA_HIT_EODAD                 |
|        | .... ...1 |        | LRA_ALLOC_DS_ERROR            |
|        | 1... .... |        | LRA_RESTART                   |
|        | .1.. .... |        | LRA_CATCHUP_RDR               |
|        | ..1. .... |        | LRA_SENT_DONE                 |
|        | ...1 .... |        | LRA_READ_STARTED              |
|        | .... 1... |        | LRA_ONE_DATASET               |
|        | .... .1.. |        | LRA_CURRENT_DUAL              |
|        | .... ..1. |        | LRA_ALLOCATED_SECOND          |
|        | .... ...1 |        | LRA_EODADHANDLER_IN_PROGRESS  |
|        | 1... .... |        | LRA_ALLOCATE_IN_PROGRESS      |
|        | .1.. .... |        | LRA_TERM_CALLER               |
|        | ..1. .... |        | LRA_CHECK_IPOST               |
|        | ...1 .... |        | LRA_IPOSTED_READER            |
|        | .... 1... |        | LRA_CLOSE_ONLY                |
|        | .... .1.. |        | LRA_CLOSE_LAST                |
|        | .... ..1. |        | LRA_BIR_PROCESSING            |
|        | .... ...1 |        | LRA_BUFFER_LAST               |

Table 148. Trace record 373D - log router log reader exit (continued)

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
|        | 1... ..   |        | LRA_CLOSE_PRIOR_DS     |
|        | .1.. ..   |        | LRA_AUTOARCH           |
|        | ..1. .... |        | LRA_DO_NOT_IPOST       |
|        | ...1 1111 |        |                        |
| 12     | Fixed     | 2      | LRA_AVAIL_ITASK        |
| 14     | Fixed     | 2      | LRA_OLDEST_BUSY_ITASK  |
| 16     | Address   | 4      | LRA_GOOD_LSN           |
| 20     | Address   | 4      | LRA_FIRST_LSN interval |
| 24     | Address   | 4      | LRA_LAST_LSN           |
| 28     | Address   | 4      | Feedback Code          |

### 373E

#### Module:

DFSLRRDS Start Log Reader

#### Explanation:

Record cut on entry to DFSLRRDS (Level - Low)

#### Trace Subcode:

LRRDS Entry

Table 149. Trace record 373E - log router start log reader entry

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
| 4      | Address   | 1      | AWE function Code      |
| 5      | Fixed     | 3      | Number of GDS          |
| 8      | Address   | 4      | LDSD or GDS address    |
| 12     | Address   | 2      | LRB chain address      |
| 16     | Address   | 4      | User's routine Address |
| 20     | Fixed     | 4      | User's token interval  |
| 24     | Character | 4      | First LSN (bytes 5:8)  |
| 28     | Character | 4      | Last LSN (bytes 5:8)   |

### 3740

#### Module:

DFSLRCAS Create Active Stream Routine

#### Explanation:

Record cut on create new Stream to DFSLRCAS (Level - Low)

#### Trace Subcode:

LRCAS New Strm

Table 150. Trace record 3740 - DFSLRCAS create active stream new stream

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
| 4      | Fixed     | 4      | Addr of STB block        |
| 8      | Character | 8      | Instance name            |
| 16     | Fixed     | 4      | Conversation token       |
| 20     | Fixed     | 4      | Initial Routing Position |

### 3741

**Module:**

DFSLRCAS Create Active Stream Allocate Conversation

**Explanation:**

Record cut on allocate conversation to exist stream (Level - Low)

**Trace Subcode:**

LRCAS All Conv

*Table 151. Trace record 3741 - DFSLRCAS create active stream allocate conversation*

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
| 4      | Fixed     | 4      | Addr of STB block        |
| 8      | Character | 8      | STB active Instance name |
| 16     | Fixed     | 4      | Conversation token       |
| 20     | Fixed     | 4      | Routing Position         |

**3742****Module:**

DFSLRCAS Create Active Stream Set Position

**Explanation:**

Record cut on set the current position (Level - Low)

**Trace Subcode:**

LRCAS Set Pos

*Table 152. Trace record 3742 - DFSLRCAS create active stream set position*

| Offset | Type      | Length | Description              |
|--------|-----------|--------|--------------------------|
| 4      | Fixed     | 4      | Addr of STB block        |
| 8      | Fixed     | 4      | STB routing prilog token |
| 12     | Character | 8      | STB last routed LSN      |

**374F****Module:**

DFSLRASC Active Stream Control Routine

**Explanation:**

Record cut on entry to DFSLRASC (Level - Medium)

**Trace Subcode:**

LRASC Entry

*Table 153. Trace record 374F - DFSLRASC active stream control entry*

| Offset | Type      | Length | Description          |
|--------|-----------|--------|----------------------|
| 4      | Fixed     | 1      | Entry Function       |
| 5      | Character | 3      | Spares               |
| 8      | Address   | 4      | STB Address          |
| 12     | Address   | 4      | SAA Address          |
| 16     | Address   | 4      | SRA Address          |
| 20     | Character | 8      | Active Instance Name |

**3750****Module:**

DFSLRORH Online Forward Recovery Request Handler

**Explanation:**

Record cut on entry to and exit from DFSLRORH (Level - Low)

**Trace Subcode:**

LRORH Request

*Table 154. Trace record 3750 - initiate online forward recovery (OFR)*

| Offset | Type    | Length | Description      |
|--------|---------|--------|------------------|
| 4      | Address | 4      | OFB address      |
| 8      | Address | 4      | OFRL address     |
| 12     | Fixed   | 4      | OFR identifier   |
| 16     | Fixed   | 4      | Return code      |
| 20     | Fixed   | 4      | DBRC return code |

**3751****Module:**

DFSLROIC Online Forward Recovery Controller

**Explanation:**

Record cut after OFR ITASK created (Level - Low)

**Trace Subcode:**

LROIC Start

*Table 155. Trace record 3751 - create the OFR ITASK*

| Offset | Type    | Length | Description       |
|--------|---------|--------|-------------------|
| 4      | Address | 4      | OFB address       |
| 8      | Address | 4      | OFRL address      |
| 12     | Fixed   | 4      | OFR identifier    |
| 16     | Address | 4      | ECB address       |
| 20     | Fixed   | 4      | Current OFR count |

**3752****Module:**

DFSLROPR Online Forward Recovery Processor

**Explanation:**

Record cut at entry to DFSLROPR (Level - Low)

**Trace Subcode:**

LROPR Request

*Table 156. Trace record 3752 - OFR processor request*

| Offset | Type    | Length | Description                                            |
|--------|---------|--------|--------------------------------------------------------|
| 4      | Address | 4      | OFB address                                            |
| 8      | Address | 4      | OFRL address                                           |
| 12     | Address | 4      | Buffer address if AWLGFUNC=002E, AWE address otherwise |
| 16     | Fixed   | 2      | AWLGFUNC                                               |
| 18     | Bit     | 1      | OFB_FLAGS -----                                        |

Table 156. Trace record 3752 - OFR processor request (continued)

| Offset | Type      | Length | Description                                            |
|--------|-----------|--------|--------------------------------------------------------|
|        |           | 1      |                                                        |
|        | 1... .... |        | ofb_started                                            |
|        | .1.. .... |        | ofb_in_merge                                           |
|        | .1. ....  |        | ofb_terminated                                         |
|        | ...1 .... |        | ofb_restarted                                          |
|        | .... 1... |        | ofb_pending                                            |
|        | .... .1.. |        | ofb_terminating                                        |
|        | .... ..11 |        | * -----                                                |
| 20     | Fixed     | 2      | Index to POS_SS entry if AWLGFUNC=002E,<br>0 otherwise |

### 3753

**Module:**

DFSLROPR Online Forward Recovery Processor

**Explanation:**

Record cut at exit from DFSLROPR (Level - Low)

**Trace Subcode:**

LROPR Exit

Table 157. Trace record 3753 - OFR processor exit

| Offset | Type    | Length | Description                                               |
|--------|---------|--------|-----------------------------------------------------------|
| 4      | Address | 4      | OFB address                                               |
| 8      | Address | 4      | OFRL address                                              |
| 12     | Address | 4      | Buffer address if AWLGFUNC=002E, AWE<br>address otherwise |
| 16     | Fixed   | 2      | AWLGFUNC                                                  |
| 18     | Bit     | 2      | OFB_flags                                                 |
| 20     | Fixed   | 4      | OFR identifier                                            |

### 3754

**Module:**

DFSLRORH Online Forward Recovery Request Handler

**Explanation:**

Record cut for each log descriptor (LDSD) (Level - Low)

**Trace Subcode:**

LRORH Log Desc

Table 158. Trace record 3754 - log descriptors obtained from DBRC

| Offset | Type      | Length | Description           |
|--------|-----------|--------|-----------------------|
| 4      | Address   | 4      | OFR identifier        |
| 8      | Character | 8      | LDSD_ssid             |
| 16     | Character | 4      | LDSD_first_LSN(5:8)   |
| 20     | Character | 4      | LDSD_last_LSN(5:8)    |
| 24     | Bit       | 1      | LDSD_flags            |
| 26     | Fixed     | 2      | LDSD_mergeID          |
| 28     | Character | 4      | LDSD_prilog_time(5:8) |

### 3756

**Module:**

DFSLRORM Online Forward Recovery Read Next Data set

**Explanation:**

Record cut for each log descriptor (LDSO) (Level - Low)

**Trace Subcode:**

LRORM Log Desc

*Table 159. Trace record 3756 - log descriptors obtained from DBRC*

| Offset | Type      | Length | Description           |
|--------|-----------|--------|-----------------------|
| 4      | Address   | 4      | OFR identifier        |
| 8      | Character | 8      | LDSO_ssid             |
| 16     | Character | 4      | LDSO_first_LSN(5:8)   |
| 20     | Character | 4      | LDSO_last_LSN(5:8)    |
| 24     | Bit       | 1      | LDSO_flags            |
| 26     | Fixed     | 2      | LDSO_mergeID          |
| 28     | Character | 4      | LDSO_prilog_time(5:8) |

**3757****Module:**

DFSLRORM - Online Forward Recovery Read Next Data Set

**Explanation:**

During OFR, DBRC returned a start point for a stream that was earlier than the stream's current routed position. (Level - Low)

**Trace Subcode:**

LRORM Startpoint Error

*Table 160. Trace record 3757 - log descriptors obtained from DBRC*

| Offset | Type      | Length | Description          |
|--------|-----------|--------|----------------------|
| 4      | Fixed     | 4      | pos_old_ptoken       |
| 8      | Character | 4      | pos_old_LSN(5:8)     |
| 12     | Fixed     | 4      | pos_new_ptoken       |
| 16     | Character | 4      | pos_new_LSN(5:8)     |
| 20     | Fixed     | 2      | ofb_flags(0-15)      |
| 22     | Fixed     | 2      | index to OFRL_entity |
| 28     | Character | 8      | DB/Area name         |

**3758****Module:**

DFSLROPR - Log Router Online Forward Recovery Processor

**Explanation:**

During OFR, the record ID (first LSN in buffer) of the next buffer to process is after the start LSN in the startpoints list (ofrsp\_start\_lsn) and the process has not yet reached this start LSN. (Level - Low)

**Trace Subcode:**

LRORM Startpoint Missed

*Table 161. Trace record 3758 - start points list error detected*

| Offset | Type  | Length | Description |
|--------|-------|--------|-------------|
| 4      | Fixed | 4      | pos_ptoken  |

Table 161. Trace record 3758 - start points list error detected (continued)

| Offset | Type      | Length | Description          |
|--------|-----------|--------|----------------------|
| 8      | Character | 8      | pos_LSN              |
| 16     | Fixed     | 4      | index to OFRL_entity |
| 20     | Character | 4      | ofrsp_start_lsn(5:8) |
| 24     | Character | 4      | lgb_record_ID(5:8)   |

### 3760

**Module:**

DFSLRARC Auto Archive Controller

**Explanation:**

Record cut on entry to DFSLRARC for archive request (Level - Medium)

**Trace Subcode:**

LRARC Request

Table 162. Trace record 3760 - DFSLRARC auto archive controller entry

| Offset | Type      | Length | Description    |
|--------|-----------|--------|----------------|
| 4      | Fixed     | 2      | AWLGFUNC='3E'x |
| 6      | Character | 1      | *              |
| 7      | Character | 1      | AWLGAtype      |
| 8      | Character | 8      | AWLGASSID      |
| 16     | Character | 8      | AWLGATIME      |
| 24     | Character | 8      | AWLGRTIME      |

**Module:**

DFSLRARC Auto Archive Controller

**Explanation:**

Record cut on entry to DFSLRARC for available request (Level - Medium)

**Trace Subcode:**

LRARC Request

Table 163. Trace record 3760 - DFSLRARC auto archive controller entry

| Offset | Type      | Length | Description      |
|--------|-----------|--------|------------------|
| 4      | Fixed     | 2      | AWLGFUNC='3F'x   |
| 6      | Character | 2      | *                |
| 8      | Fixed     | 4      | AAB address      |
| 12     | Bit       | 16     | AAB_flags        |
|        |           | 1      |                  |
|        | 1... .... |        | AAB_START        |
|        | .1.. .... |        | AAB_INIT_ERROR   |
|        | ..1. .... |        | AAB_TERMINATE    |
|        | ...1 .... |        | AAB_BATCH        |
|        | .... 1... |        | AAB_READER_EXIST |
|        | .... .1.. |        | AAB_SAR_EXIST    |
|        | .... ..1. |        | AAB_LDSD_LAST    |
|        | .... ...1 |        | *                |

Table 163. Trace record 3760 - DFSLRARC auto archive controller entry (continued)

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
|        |           | 1      |                     |
|        | 1... ..   |        | AAB_READ_COMPLETED  |
|        | .1.. ..   |        | AAB_XBUF_ENQD       |
|        | .1. ....  |        | AAB_ALL_RB_RETURNED |
|        | ...1 ...  |        | AAB_RDR_INALLOC     |
|        | .... 1..  |        | AAB_READ_ERROR      |
|        | .... .1.. |        | *                   |
|        | .... ..1. |        | AAB_READ_DCB        |
|        | .... ...1 |        | AAB_TS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_TAP             |
|        | .1.. .... |        | AAB_EOV             |
|        | .1. ....  |        | AAB_WRITE_ERROR     |
|        | ...1 ...  |        | *                   |
|        | .... 1..  |        | AAB_ARC_SLDS_DONE   |
|        | .... .1.. |        | AAB_AS_LAST_WRITE   |
|        | .... ..1. |        | AAB_AS_DCB          |
|        | .... ...1 |        | AAB_AS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_RLDS_REQD       |
|        | .1.. .... |        | AAB_ARC_RLDS_DELETE |
|        | ..11 .... |        | *                   |
|        | .... 1..  |        | AAB_ARC_RLDS_DONE   |
|        | .... .1.. |        | AAB_AR_LAST_WRITE   |
|        | .... ..1. |        | AAB_AR_DCB          |
|        | .... .... |        | AAB_AR_DUAL         |

### 3761

**Module:**

DFSLRARC Auto Archive Controller

**Explanation:**

Record cut on exit from DFSLRARC (Level - Medium)

**Trace Subcode:**

LRARC Exit

Table 164. Trace record 3761 - DFSLRARC auto archive controller exit

| Offset | Type  | Length | Description   |
|--------|-------|--------|---------------|
| 4      | Fixed | 2      | Feedback code |

### 3762

**Module:**

DFSLRARP Auto Archive Processor

**Explanation:**

Record cut on entry to DFSLRARP for archive request (Level - Medium)

**Trace Subcode:**

LRARP Request



Table 165. Trace record 3762 - DFSLRARP auto archive processor entry

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
| 4      | Fixed     | 2      | AWLGFUNC='3E'x      |
| 6      | Character | 2      | *                   |
| 8      | Fixed     | 4      | AAB address         |
| 12     | Character | 4      | LDSD_FLRID          |
| 16     | Fixed     | 4      | AAB_LDSD_LIST       |
| 20     | Character | 4      | LDSD_LLRID          |
| 24     | Character | 4      | *                   |
| 28     | Bit       | 16     | AAB_flags           |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_START           |
|        | .1.. .... |        | AAB_INIT_ERROR      |
|        | ..1. .... |        | AAB_TERMINATE       |
|        | ...1 .... |        | AAB_BATCH           |
|        | .... 1... |        | AAB_READER_EXIST    |
|        | .... .1.. |        | AAB_SAR_EXIST       |
|        | .... ..1. |        | AAB_LDSD_LAST       |
|        | .... ...1 |        | *                   |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_READ_COMPLETED  |
|        | .1.. .... |        | AAB_XBUF_ENQD       |
|        | ..1. .... |        | AAB_ALL_RB_RETURNED |
|        | ...1 .... |        | AAB_RDR_INALLOC     |
|        | .... 1... |        | AAB_READ_ERROR      |
|        | .... .1.. |        | *                   |
|        | .... ..1. |        | AAB_READ_DCB        |
|        | .... ...1 |        | AAB_TS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_TAP             |
|        | .1.. .... |        | AAB_EOV             |
|        | ..1. .... |        | AAB_WRITE_ERROR     |
|        | ...1 .... |        | *                   |
|        | .... 1... |        | AAB_ARC_SLDS_DONE   |
|        | .... .1.. |        | AAB_AS_LAST_WRITE   |
|        | .... ..1. |        | AAB_AS_DCB          |
|        | .... ...1 |        | AAB_AS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_RLDS_REQD       |
|        | .1.. .... |        | AAB_ARC_RLDS_DELETE |
|        | ..11 .... |        | *                   |
|        | .... 1... |        | AAB_ARC_RLDS_DONE   |
|        | .... .1.. |        | AAB_AR_LAST_WRITE   |
|        | .... ..1. |        | AAB_AR_DCB          |
|        | .... ...1 |        | AAB_AR_DUAL         |

**Module:**

DFSLRARP Auto Archive Processor

**Explanation:**

Record cut on entry to DFSLRARP for return read buffer (Level - Medium)

**Trace Subcode:**

LRARP Entry

Table 166. Trace record 3762 - DFSLRARP auto archive processor entry

| Offset | Type      | Length | Description           |
|--------|-----------|--------|-----------------------|
| 4      | Fixed     | 2      | AWLGFUNC='2E'x        |
| 6      | Character | 2      | *                     |
| 8      | Fixed     | 4      | AAB address           |
| 12     | Character | 4      | LRB_RECORD_ID         |
| 16     | Fixed     | 4      | AWLG_RBF_LRB          |
| 20     | Character | 4      | LRB_LLSN              |
| 24     | Bit       | 4      | AWE's flags           |
|        |           |        | AWLG_RBF_READ_COMPLET |
|        | 1... .... |        |                       |
|        |           |        | AWLG_RBF_IO_ERROR     |
|        | .1.. .... |        |                       |
|        |           |        | AWLG_RBF_DATASET_OPEN |
|        | .1. ....  |        |                       |
|        |           |        | LRB_BUFFER_DS_FULL    |
|        | ...1 .... |        |                       |
|        |           |        | LRB_BUFFER_IO_ABEND   |
|        | .... 1... |        |                       |
|        |           |        | LRB_READ_COMPLETE     |
|        | .... .1.. |        |                       |
|        |           |        | LRB_BUFFER_ENDDS      |
|        | .... .1.  |        |                       |
|        |           |        | LRB_AA_LAST_RETURN    |
|        | .... ...1 |        |                       |
| 25     |           |        | AWLG_RBF_NODATA       |
|        | 1... .... |        |                       |
| 26     | Character | 2      | *                     |
| 28     | Bit       | 16     | AAB_flags             |
|        |           | 1      |                       |
|        | 1... .... |        | AAB_START             |
|        | .1.. .... |        | AAB_INIT_ERROR        |
|        | .1. ....  |        | AAB_TERMINATE         |
|        | ...1 .... |        | AAB_BATCH             |
|        | .... 1... |        | AAB_READER_EXIST      |
|        | .... .1.. |        | AAB_SAR_EXIST         |
|        | .... .1.  |        | AAB_LDSD_LAST         |
|        | .... ...1 |        | *                     |
|        |           | 1      |                       |
|        | 1... .... |        | AAB_READ_COMPLETED    |
|        | .1.. .... |        | AAB_XBUF_ENQD         |
|        | .1. ....  |        | AAB_ALL_RB_RETURNED   |
|        | ...1 .... |        | AAB_RDR_INALLOC       |
|        | .... 1... |        | AAB_READ_ERROR        |
|        | .... .1.. |        | *                     |
|        | .... .1.  |        | AAB_READ_DCB          |
|        | .... ...1 |        | AAB_TS_DUAL           |
|        |           | 1      |                       |
|        | 1... .... |        | AAB_TAP               |
|        | .1.. .... |        | AAB_EOV               |
|        | .1. ....  |        | AAB_WRITE_ERROR       |
|        | ...1 .... |        | *                     |
|        | .... 1... |        | AAB_ARC_SLDS_DONE     |
|        | .... .1.. |        | AAB_AS_LAST_WRITE     |
|        | .... .1.  |        | AAB_AS_DCB            |
|        | .... ...1 |        | AAB_AS_DUAL           |

Table 166. Trace record 3762 - DFSLRARP auto archive processor entry (continued)

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
|        |           | 1      |                     |
|        | 1... .... |        | AAB_RLDS_REQD       |
|        | .1.. .... |        | AAB_ARC_RLDS_DELETE |
|        | ..11 .... |        | *                   |
|        | .... 1... |        | AAB_ARC_RLDS_DONE   |
|        | .... .1.. |        | AAB_AR_LAST_WRITE   |
|        | .... ..1. |        | AAB_AR_DCB          |
|        | .... ...1 |        | AAB_AR_DUAL         |

**Module:**

DFSLRARP Auto Archive Processor

**Explanation:**

Record cut on entry to DFSLRARP for return write Buffer (Level - Medium)

**Trace Subcode:**

LRARP Entry

Table 167. Trace record 3762 - DFSLRARP auto archive processor entry

| Offset | Type      | Length | Description           |
|--------|-----------|--------|-----------------------|
| 4      | Fixed     | 2      | AWLGFUNC='08'x        |
| 6      | Character | 2      | *                     |
| 8      | Fixed     | 4      | AAB address           |
| 12     | Fixed     | 4      | *                     |
| 16     | Address   | 4      | AWLG_RTBBUFP          |
| 20     | Character | 4      | *                     |
| 24     | Bit       | 4      | AWE's flags           |
|        |           |        | AWLG_RTB_TRK          |
|        | 1... .... |        |                       |
|        |           |        | AWLG_RTB_ARC          |
|        | .1.. .... |        |                       |
|        |           |        | AWLG_RTB_RLD          |
|        | ..1. .... |        |                       |
|        |           |        | AWLG_RTB_WRITE_COMPLE |
|        | ...1 .... |        |                       |
|        |           |        | AWLG_RTB_IO_ERROR     |
|        | .... 1... |        |                       |
|        |           |        | AWLG_RTB_EOV          |
|        | .... .1.. |        |                       |
|        |           |        | *                     |
|        | .... .111 |        |                       |
| 26     | Character | 2      | *                     |
| 28     | Bit       | 4      | AAB flags             |
|        |           | 1      |                       |
|        | 1... .... |        | AAB_START             |
|        | .1.. .... |        | AAB_INIT_ERROR        |
|        | ..1. .... |        | AAB_TERMINATE         |
|        | ...1 .... |        | AAB_BATCH             |
|        | .... 1... |        | AAB_READER_EXIST      |
|        | .... .1.. |        | AAB_SAR_EXIST         |
|        | .... ..1. |        | AAB_LDSD_LAST         |
|        | .... ...1 |        | *                     |

Table 167. Trace record 3762 - DFSLRARP auto archive processor entry (continued)

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
|        |           | 1      |                     |
|        | 1... .... |        | AAB_READ_COMPLETED  |
|        | .1.. .... |        | AAB_XBUF_ENQD       |
|        | .1.. .... |        | AAB_ALL_RB_RETURNED |
|        | ...1 .... |        | AAB_RDR_INALLOC     |
|        | ... 1...  |        | AAB_READ_ERROR      |
|        | ... .1..  |        | *                   |
|        | ... .1..  |        | AAB_READ_DCB        |
|        | ... ..1   |        | AAB_TS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_TAP             |
|        | .1.. .... |        | AAB_EOV             |
|        | .1.. .... |        | AAB_WRITE_ERROR     |
|        | ...1 .... |        | *                   |
|        | ... 1...  |        | AAB_ARC_SLDS_DONE   |
|        | ... .1..  |        | AAB_AS_LAST_WRITE   |
|        | ... .1..  |        | AAB_AS_DCB          |
|        | ... ..1   |        | AAB_AS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_RLDS_REQD       |
|        | .1.. .... |        | AAB_ARC_RLDS_DELETE |
|        | ..11 .... |        | *                   |
|        | ... 1...  |        | AAB_ARC_RLDS_DONE   |
|        | ... .1..  |        | AAB_AR_LAST_WRITE   |
|        | ... .1..  |        | AAB_AR_DCB          |
|        | ... ..1   |        | AAB_AR_DUAL         |

**Module:**

DFSLRARP Auto Archive Processor

**Explanation:**

Record cut on entry to DFSLRARP for Auto Archive Data set  
(Level - Medium)

**Trace Subcode:**

LRARP Entry

Table 168. Trace record 3762 - DFSLRARP auto archive processor entry

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
| 4      | Fixed     | 2      | AWLGFUNC='47'x         |
| 6      | Character | 2      | AAB_TRK_LDSD_NUM       |
| 8      | Fixed     | 4      | AAB address            |
| 12     | Fixed     | 2      | *                      |
| 14     | Fixed     | 2      | AAB_TRK_ADS_IN         |
| 16     | Address   | 4      | AWLG_ADS_LTDCB         |
| 18     | Address   | 4      | AWLG_ADS_NUM_DATASETS  |
| 20     | Character | 4      | *                      |
| 24     | Bit       | 2      | AWLG_ADS_DSTYPE_flags  |
|        |           |        | AWLG_ADS_TRACKING_SLDS |
|        | 1... .... |        |                        |
|        |           |        | AWLG_ADS_ARCHIVE_SLDS  |
|        | .1.. .... |        |                        |
|        |           |        | AWLG_ADS_ARCHIVE_RLDS  |
|        | .1.. .... |        |                        |

Table 168. Trace record 3762 - DFSLRARP auto archive processor entry (continued)

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
|        |           |        | *                   |
| 26     | Character | 2      | *                   |
| 28     | Bit       | 4      | AAB flags           |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_START           |
|        | .1.. .... |        | AAB_INIT_ERROR      |
|        | .1. ....  |        | AAB_TERMINATE       |
|        | ...1 .... |        | AAB_BATCH           |
|        | ... 1...  |        | AAB_READER_EXIST    |
|        | ... .1..  |        | AAB_SAR_EXIST       |
|        | ... .1.   |        | AAB_LDSD_LAST       |
|        | ... ...1  |        | *                   |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_READ_COMPLETED  |
|        | .1.. .... |        | AAB_XBUF_ENQD       |
|        | .1. ....  |        | AAB_ALL_RB_RETURNED |
|        | ...1 .... |        | AAB_RDR_INALLOC     |
|        | ... 1...  |        | AAB_READ_ERROR      |
|        | ... .1..  |        | *                   |
|        | ... .1.   |        | AAB_READ_DCB        |
|        | ... ...1  |        | AAB_TS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_TAP             |
|        | .1.. .... |        | AAB_EOV             |
|        | .1. ....  |        | AAB_WRITE_ERROR     |
|        | ...1 .... |        | *                   |
|        | ... 1...  |        | AAB_ARC_SLDS_DONE   |
|        | ... .1..  |        | AAB_AS_LAST_WRITE   |
|        | ... .1.   |        | AAB_AS_DCB          |
|        | ... ...1  |        | AAB_AS_DUAL         |
|        |           | 1      |                     |
|        | 1... .... |        | AAB_RLDS_REQD       |
|        | .1.. .... |        | AAB_ARC_RLDS_DELETE |
|        | .11 ....  |        | *                   |
|        | ... 1...  |        | AAB_ARC_RLDS_DONE   |
|        | ... .1..  |        | AAB_AR_LAST_WRITE   |
|        | ... .1.   |        | AAB_AR_DCB          |
|        | ... ...1  |        | AAB_AR_DUAL         |

3763

**Module:**

DFSLRARC Auto Archive Controller

**Explanation:**

Record cut after back from DBRC (Level - Medium)

**Trace Subcode:**

LRARP To DBRC

Table 169. Trace record 3763 - DFSLRARC get LDSD list from DBRC

| Offset | Type      | Length | Description      |
|--------|-----------|--------|------------------|
| 4      | Character | 4      | *                |
| 8      | Fixed     | 4      | AAB address      |
| 12     | Fixed     | 4      | AAB_PRILOG_STIME |

Table 169. Trace record 3763 - DFSLRARC get LDSD list from DBRC (continued)

| Offset | Type      | Length | Description   |
|--------|-----------|--------|---------------|
| 20     | Fixed     | 4      | LDSD_FLRID    |
| 24     | Fixed     | 4      | LDSD_LLRIID   |
| 28     | Character | 8      | AAB_LDSD_LIST |

### 3764

**Module:**

DFSLRARP Auto Archive Processor

**Explanation:**

Record cut after back from create Log Reader (Level - Medium)

**Trace Subcode:**

LRARP To Rdr

Table 170. Trace record 3764 - DFSLRARP after create log reader

| Offset | Type      | Length | Description      |
|--------|-----------|--------|------------------|
| 4      | Fixed     | 4      | Return code      |
| 8      | Fixed     | 4      | AAB address      |
| 12     | Fixed     | 4      | AAB_LDSD_LIST    |
| 16     | Fixed     | 4      | AAB_READ_RETQ    |
| 20     | Character | 4      | LDSD_FLRID       |
| 24     | Character | 4      | LDSD_LLRIID      |
| 28     | Fixed     | 4      | AAB_READ_Routine |

### 3765

**Module:**

DFSLRARP Auto Archive Processor

**Explanation:**

Record cut at enqueue buffer to write (Level - Medium)

**Trace Subcode:**

LRARP To SAR

Table 171. Trace record 3765 - DFSLRARP enqueue buffer to write

| Offset | Type      | Length | Description      |
|--------|-----------|--------|------------------|
| 4      | Fixed     | 4      | SAA address      |
| 8      | Fixed     | 4      | AAB address      |
| 12     | Character | 4      | First LSN        |
| 16     | Fixed     | 4      | LRB address      |
| 20     | Character | 4      | Last LSN         |
| 28     | Bit       | 16     | AAB_flags        |
|        |           | 1      |                  |
|        | 1... ..   |        | AAB_START        |
|        | .1.. ..   |        | AAB_INIT_ERROR   |
|        | ..1. .... |        | AAB_TERMINATE    |
|        | ...1 .... |        | AAB_BATCH        |
|        | .... 1... |        | AAB_READER_EXIST |
|        | .... .1.. |        | AAB_SAR_EXIST    |
|        | .... ..1. |        | AAB_LDSD_LAST    |
|        | .... ...1 |        | *                |

Table 171. Trace record 3765 - DFSLRARP enqueue buffer to write (continued)

| Offset | Type      | Length | Description         |
|--------|-----------|--------|---------------------|
|        |           | 1      |                     |
|        | 1... ..   |        | AAB_READ_COMPLETED  |
|        | .1.. ..   |        | AAB_XBUF_ENQD       |
|        | .1. ....  |        | AAB_ALL_RB_RETURNED |
|        | ...1 ...  |        | AAB_RDR_INALLOC     |
|        | ... 1...  |        | AAB_READ_ERROR      |
|        | ... .1..  |        | *                   |
|        | ... .1.   |        | AAB_READ_DCB        |
|        | ... ..1   |        | AAB_TS_DUAL         |
|        |           | 1      |                     |
|        | 1... ..   |        | AAB_TAP             |
|        | .1.. ..   |        | AAB_EOV             |
|        | .1. ....  |        | AAB_WRITE_ERROR     |
|        | ...1 ...  |        | *                   |
|        | ... 1...  |        | AAB_ARC_SLDS_DONE   |
|        | ... .1..  |        | AAB_AS_LAST_WRITE   |
|        | ... .1.   |        | AAB_AS_DCB          |
|        | ... ..1   |        | AAB_AS_DUAL         |
|        |           | 1      |                     |
|        | 1... ..   |        | AAB_RLDS_REQD       |
|        | .1.. .... |        | AAB_ARC_RLDS_DELETE |
|        | ..11 .... |        | *                   |
|        | ... 1...  |        | AAB_ARC_RLDS_DONE   |
|        | ... .1..  |        | AAB_AR_LAST_WRITE   |
|        | ... .1.   |        | AAB_AR_DCB          |
|        | ... ..1   |        | AAB_AR_DUAL         |

3770

**Module:**

DFSLRILT Isolated Log Control Routine

**Explanation:**

Record cut at entry to DFSLRILT (Level - Low)

**Trace Subcode:**

LRILT Request

Table 172. Trace record 3770 - isolated log transport control routine entry

| Offset | Type      | Length | Description            |
|--------|-----------|--------|------------------------|
| 4      | Fixed     | 4      | Log router AWE address |
| 8      | Fixed     | 2      | Reserved               |
| 10     | Fixed     | 2      | Isolated log request   |
| 12     | Character | 16     | AWE parameters         |

3771

**Module:**

DFSLRILT Isolated Log Control Routine

**Explanation:**

Record cut at exit from DFSLRILT (Level - Low)

**Trace Subcode:**

LRILT Exit

Table 173. Trace record 3771 - isolated log transport control routine exit

| Offset | Type  | Length | Description            |
|--------|-------|--------|------------------------|
| 4      | Fixed | 4      | Log router AWE address |
| 8      | Fixed | 2      | Isolated log request   |
| 10     | Fixed | 2      | Feedback code          |
| 12     | Fixed | 4      | Return code            |

### 3772

**Module:**

DFSLRSCM Isolated Log Send Routine

**Explanation:**

Record cut at entry to DFSLRSCM (Level - Low)

**Trace Subcode:**

LRSCM Send

Table 174. Trace record 3772 - isolated log transport send routine entry

| Offset | Type  | Length | Description     |
|--------|-------|--------|-----------------|
| 4      | Fixed | 2      | ILTR length     |
| 6      | Fixed | 2      | ILTR type       |
| 8      | Fixed | 4      | ILTR Sequence # |
| 12     | Fixed | 16     | Trace Data      |

### 3773

**Module:**

DFSLRICM Isolated Log Schedule Control Message Routine

**Explanation:**

Record cut at entry to DFSLRICM (Level - Low)

**Trace Subcode:**

LRICM Receive

Table 175. Trace record 3773 - isolated log transport schedule control message

| Offset | Type      | Length | Description |
|--------|-----------|--------|-------------|
| 4      | Character | 24     | Trace data  |

### 3774

**Module:**

DFSLRICM Isolated Log Schedule Control Message Routine

**Explanation:**

Record cut at entry to DFSLRICM Gap Fill Response (Level - Low)

**Trace Subcode:**

LRICM Gap Fill

Table 176. Trace record 3774 - isolated log transport gap fill

| Offset | Type  | Length | Description    |
|--------|-------|--------|----------------|
| 4      | Fixed | 2      | Request ID     |
| 6      | Fixed | 2      | Request status |
| 8      | Fixed | 4      | Num data sets  |
| 10     | Fixed | 4      | PRILOG token   |



Table 176. Trace record 3774 - isolated log transport gap fill (continued)

| Offset | Type      | Length | Description |
|--------|-----------|--------|-------------|
| 16     | Character | 8      | PRILOG time |

3775

**Module:**

DFSLRICM Isolated Log Schedule Control Message Routine

**Explanation:**

Record cut at entry to DFSLRICM Query Response (Level - Low)

**Trace Subcode:**

LRICM Query

Table 177. Trace record 3775 - isolated log transport query response

| Offset | Type  | Length | Description       |
|--------|-------|--------|-------------------|
| 4      | Fixed | 4      | PRILOG token      |
| 8      | Fixed | 4      | High PRILOG token |
| 12     | Fixed | 4      | DBRC return code  |

3776

**Module:**

DFSLRICM Isolated Log Schedule Control Message Routine

**Explanation:**

Record cut at entry to DFSLRICM DS Abort (Level - Low)

**Trace Subcode:**

LRICM DS Abort

Table 178. Trace record 3776 - isolated log transport DS abort

| Offset | Type      | Length | Description  |
|--------|-----------|--------|--------------|
| 4      | Fixed     | 2      | Request ID   |
| 6      | Fixed     | 1      | Reserved     |
| 7      | Fixed     | 1      | Flags        |
| 8      | Character | 8      | First LSN    |
| 15     | Character | 4      | Last LSN     |
| 18     | Character | 4      | End data set |

3777

**Module:**

DFSLRIDS Isolated Log DS Processor Routine

**Explanation:**

Record cut at entry to DFSLRIDS Receive DS (Level - Low)

**Trace Subcode:**

LRIDS Receive

Table 179. Trace record 3777 - isolated log transport receive DS

| Offset | Type      | Length | Description |
|--------|-----------|--------|-------------|
| 4      | Fixed     | 2      | Request ID  |
| 5      | Fixed     | 2      | Reserved    |
| 8      | Character | 4      | First LSN   |

Table 179. Trace record 3777 - isolated log transport receive DS (continued)

| Offset | Type      | Length | Description |
|--------|-----------|--------|-------------|
| 12     | Character | 4      | Last LSN    |
| 16     | Fixed     | 4      | gds address |
| 20     | Fixed     | 4      | sra address |
| 24     | Fixed     | 4      | stb address |

### 3778

**Module:**

DFSLRIDS Isolated Log DS Processor Routine

**Explanation:**

Record cut at entry to DFSLRIDS Send OK (Level - Low)

**Trace Subcode:**

LRIDS Send OK

Table 180. Trace record 3778 - isolated log transport send OK

| Offset | Type  | Length | Description     |
|--------|-------|--------|-----------------|
| 4      | Fixed | 2      | ILTR type       |
| 6      | Fixed | 2      | Reserved        |
| 8      | Fixed | 4      | ILTR Sequence # |

### 3779

**Module:**

DFSLRIDS Isolated Log DS Processor Routine

**Explanation:**

Record cut at entry to DFSLRIDS DS Received (Level - Low)

**Trace Subcode:**

LRIDS Received

Table 181. Trace record 3779 - isolated log transport DS received

| Offset | Type  | Length | Description |
|--------|-------|--------|-------------|
| 4      | Fixed | 2      | Request ID  |
| 6      | Fixed | 2      | Reserved    |
| 8      | Fixed | 4      | SRA address |
| 12     | Fixed | 4      | STB address |

### 377A

**Module:**

DFSLRIDS Isolated Log DS Processor Routine

**Explanation:**

Record cut at entry to DFSLRIDS DS Abort (Level - Low)

**Trace Subcode:**

LRIDS DS Abort

Table 182. Trace record 377A - isolated log transport DS abort

| Offset | Type  | Length | Description |
|--------|-------|--------|-------------|
| 4      | Fixed | 2      | Request ID  |
| 6      | Fixed | 1      | Reserved    |

Table 182. Trace record 377A - isolated log transport DS abort (continued)

| Offset | Type      | Length | Description                                          |
|--------|-----------|--------|------------------------------------------------------|
| 7      | Fixed     | 1      | Flags                                                |
|        | 1.....    |        | Data set temporarily unavailable, immediate retry ok |
|        | .1.....   |        | Data set temporarily unavailable, defer retry        |
|        | ..1.....  |        | Begin data set not sent                              |
| 8      | Character | 8      | First LSN                                            |
| 16     | Character | 4      | Last LSN                                             |
| 20     | Character | 4      | End DS LSN                                           |

### Trace Entry: Log router miscellaneous trace codes (378x)

#### Module:

DFSLRMIL Milestone Processor Routine

#### Explanation:

Record cut at entry to DFSLRMIL (Level - Low)

#### Trace Subcode:

LRMIL entry

3780

Table 183. Trace record 3780 - milestone request entry

| Offset | Type      | Length | Description                 |
|--------|-----------|--------|-----------------------------|
| 4      | Fixed     | 4      | Milestone index             |
| 8      | Fixed     | 4      | LGB current milestone index |
| 12     | Character | 1      | Flags                       |
|        | 1.....    |        | Shutdown milestone          |
|        | .1.....   |        | Takeover milestone          |
|        | ..1.....  |        | Timer pop                   |
| 24     | Character | 8      | Time stamp                  |

3781

#### Module:

DFSLRMIL Milestone Processor Routine

#### Explanation:

Record cut at exit to DFSLRMIL (Level - Medium)

#### Trace Subcode:

LRMIL entry

Table 184. Trace record 3781 - milestone complete

| Offset | Type      | Length | Description                 |
|--------|-----------|--------|-----------------------------|
| 4      | Fixed     | 4      | Milestone index             |
| 8      | Fixed     | 4      | LGB current milestone index |
| 12     | Character | 1      | Flags                       |
|        | 1.....    |        | Shutdown milestone          |

Table 184. Trace record 3781 - milestone complete (continued)

| Offset | Type      | Length | Description                 |
|--------|-----------|--------|-----------------------------|
|        |           |        | Takeover milestone          |
|        | .1.....   |        | Timer pop                   |
|        | ..1.....  |        |                             |
| 13     | Character | 3      | Spares                      |
| 16     | Fixed     | 4      | LGB restart milestone index |
| 24     | Character | 8      | Time stamp                  |

### 3782

#### Module:

DFSLRTK0 Unplan Takeover Process Routine

#### Explanation:

Record cut at entry to unplan takeover phase 1 (Level - Low)

#### Trace Subcode:

LRTK0 entry

Table 185. Trace record 3782 - unplanned takeover process phase 1 entry

| Offset | Type           | Length | Description                                                    |
|--------|----------------|--------|----------------------------------------------------------------|
| 4      | Bit            | 16     | lgb_takeover_flags                                             |
|        |                |        | On if planned takeover requested                               |
|        | 1..... ..      |        | On if planned takeover in progress                             |
|        | .1..... ..     |        | On if unplanned takeover requested                             |
|        | ..1..... ..    |        | On if unplanned takeover in progress                           |
|        | ...1.... ..    |        | On if takeover reversed                                        |
|        | ....1... ..    |        | On if unplanned takeover is pending                            |
|        | .....1.. ..    |        | On if planned takeover is pending                              |
|        | .....1. ....   |        | On if 'takeover start' notify to DBRC has been done            |
|        | .....1 .....   |        | On if log truncation is complete                               |
|        | ..... 1.....   |        | On if NOREVERSE was specified on the /RTA UNPLAN command       |
|        | ..... .1.....  |        | On if unhardened buffers were processed for unplanned takeover |
|        | ..... ..1..... |        | Spares (last 5 bits reserved)                                  |
|        | ..... ...11111 |        |                                                                |
| 8      | Fixed          | 4      | LGB current milestone index                                    |
| 24     | Character      | 8      | Time stamp                                                     |

### 3783

#### Module:

DFSLRTK0 Unplan Takeover Process Routine

**Explanation:**

Record cut at entry to unplan takeover phase 2 (Level - Low)

**Trace Subcode:**

LRTK0 entry

*Table 186. Trace record 3783 - unplanned takeover process phase 2 entry*

| Offset | Type      | Length | Description                 |
|--------|-----------|--------|-----------------------------|
| 4      | Fixed     | 4      | LGB current milestone index |
| 24     | Character | 8      | Time stamp                  |

**3784****Module:**

DFSLRMST Master ITASK process Routine

**Explanation:**

Record cut at entry to DFSLRMST (Level - Low)

**Trace Subcode**

LRTK0 entry

*Table 187. Trace record 3784 - log router master ITASK request*

| Offset | Type  | Length | Description                            |
|--------|-------|--------|----------------------------------------|
| 4      | Fixed | 4      | Function code                          |
| 8      | Fixed | 4      | Request AWE's AWLGCECB                 |
| 12     | Fixed | 4      | Data pointed by request AWE's AWLGCECB |

**3785****Module:**

DFSLRMST Master ITASK process Routine

**Explanation:**

Record cut after done the request to DFSLRMST (Level - Low)

**Trace Subcode:**

LRTK0 entry

*Table 188. Trace record 3785 - log router master ITASK request done*

| Offset | Type      | Length | Description   |
|--------|-----------|--------|---------------|
| 4      | Fixed     | 4      | Function code |
| 24     | Character | 8      | Time stamp    |

**3786****Module:**

DFSLRMST Master ITASK process Routine

**Explanation:**

Record cut at exit to DFSLRMST (Level - Low)

**Trace Subcode:**

LRTK0 entry

*Table 189. Trace record 3786 - log router master ITASK exit*

| Offset | Type      | Length | Description |
|--------|-----------|--------|-------------|
| 24     | Character | 8      | Time stamp  |

3787

**Module:**

DFSLREDT End Database/Area Tracking Routine

**Explanation:**

Record cut at entry to DFSLREDT (Level - Low)

**Trace Subcode:**

LRTK0 entry

Table 190. Trace record 3787 - log router end database tracking

| Offset | Type      | Length | Description     |
|--------|-----------|--------|-----------------|
| 4      | Character | 8      | Database name   |
| 14     | Character | 8      | Area name       |
| 20     | Fixed     | 4      | Milestone index |

3788

**Module:**

DFSLRCAS Create Active Stream Routine

**Explanation:**

Record cut at begin planned takeover (Level - Low)

**Trace Subcode:**

LRTK0 entry

Table 191. Trace record 3788 - create active stream begin takeover

| Offset | Type           | Length | Description                                |
|--------|----------------|--------|--------------------------------------------|
| 4      | Fixed          | 4      | LGB current mile index                     |
| 8      | Fixed          | 4      | LGB plan tko token                         |
| 12     | Bit            | 16     | lgb_flags                                  |
|        |                |        | On if we are terminating                   |
|        | 1.....         |        |                                            |
|        |                |        | Transport Manager Subsystem (TMS)          |
|        | .1.....        |        | has terminated                             |
|        |                |        | On if we are identified to TM              |
|        | ..1.....       |        |                                            |
|        |                |        | On if /ST0 SERVGRP entered                 |
|        | ...1....       |        |                                            |
|        |                |        | On if /STA SERVGRP entered                 |
|        | ....1...       |        |                                            |
|        |                |        | On during log router restart               |
|        | .....1..       |        |                                            |
|        |                |        | On if LR termination is waiting for OFR    |
|        | .....1.        |        | to shutdown                                |
|        |                |        | On if initialization is complete           |
|        | .....1         |        |                                            |
|        |                |        | On if no restart mpb from log              |
|        | ..... 1.....   |        |                                            |
|        |                |        | On if quiesce itasks for ptk               |
|        | ..... .1.....  |        |                                            |
|        |                |        | On if this is the restart after a takeover |
|        | ..... ..1..... |        |                                            |
|        |                |        | Position set from ds                       |
|        | ..... ...1.... |        |                                            |

Table 191. Trace record 3788 - create active stream begin takeover (continued)

| Offset | Type      | Length | Description                                                    |
|--------|-----------|--------|----------------------------------------------------------------|
| 14     | Bit       | 16     | On if set from 51 pos                                          |
|        |           |        | On if xrc tracking requested                                   |
|        |           |        | Spares (last 2 bits reserved)                                  |
|        |           |        | lgb_takeover_flags                                             |
|        |           |        | On if planned takeover requested                               |
|        |           |        | On if planned takeover in progress                             |
|        |           |        | On if unplanned takeover requested                             |
|        |           |        | On if unplanned takeover in progress                           |
|        |           |        | On if takeover reversed                                        |
|        |           |        | On if unplanned takeover is pending                            |
|        |           |        | On if planned takeover is pending                              |
|        |           |        | On if 'takeover start' notify to DBRC has been done            |
|        |           |        | On if log truncation is complete                               |
|        |           |        | On if NOREVERSE was specified on the /RTA UNPLAN command       |
|        |           |        | On if unhardened buffers were processed for unplanned takeover |
|        |           |        | Spares (last 5 bits reserved)                                  |
| 24     | Character | 8      | Time stamp                                                     |

## X'4930': database tracker FSE error log record format

The log record layout for X'4930' is described with offset and length.

Table 192. X'4930' log record layout

| Offset (hex) | Length | Description           |
|--------------|--------|-----------------------|
| 00           | 2      | Record length         |
| 02           | 2      | X'0000'               |
| 04           | 1      | X'49' record type     |
| 05           | 1      | X'30' record sub-type |
| 06           | 2      | Not used              |
| 08           | 8      | DBD name              |
| 10           | 8      | DD name               |
| 18           | 4      | RBA/RBN               |
| 1C           | 8      | Log sequence number   |
| 24           | 8      | Subsystem ID          |

*Table 192. X'4930' log record layout (continued)*

| Offset (hex) | Length | Description                  |
|--------------|--------|------------------------------|
| 2C           | 12     | Prilog time                  |
| 38           | 4      | Update sequence number (USN) |

**Related reference:**

“Log records” on page 477



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## Chapter 18. SYS - System service aids

Various tools, utilities, and traces can help you analyze IMS system problems.

**Related reference:**

“Sequential buffering service aids” on page 217

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### Log records

To diagnose some problems, you need to examine the content of log records to determine what was going on in the system before the problem occurred. By knowing the layout of the log records, you can set up a DFSERA10 job that will produce the specific log records that you need to examine.

In addition, the content of the log records frequently contains information that you can use in your keyword string or when reviewing existing APAR descriptions and comparing them to your own situation.

You can obtain individual log record DSECTs by assembling the ILOGREC macro, and including a RECID format statement for the log record that you want. For example:

- ILOGREC RECID=01 - to format the DSECT for an IMS TYPE01 log record
- ILOGREC RECID=56 - to format the DSECT for an IMS TYPE56 log record

For Fast Path log record formats, you can assemble mapping macros DBFLSRT, DBFLGRQ, DBFLGRIM, DBFLGROM, DBFLGRSD, DBFLGSYN, and DBFBMSDB.

The following table describes the IMS log records, including the conditions that cause the records to be written.

*Table 193. IMS log records used to analyze IMS problems.*

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                             |
|-------|--------------------|------------|----------------------------------------------------------------------------------------------------------|
| X'01' | QLOGMSGP           | QLOGMSGP   | Data was put in a message queue buffer. Caller is data communication. (DFSQLOG0)                         |
| X'02' | DFSLOG02           | CMLOG      | A /LOG command or a command that alters data required for restart was successfully completed. (DFSICLP0) |
| X'03' | QLOGMSGP           | QLOGMSGP   | Data was put in a message queue buffer. Caller is DL/I. (DFSQLOG0)                                       |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type    | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------|--------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'04'   | DFSLOG04           | DFSLOG04   | Relays information to the RSR tracking site for one of the following conditions:<br>X'01' Start planned takeover (DFSICM30, DFSRST00)<br>X'02 Sharing started (DFSRDBS0)<br>X'03' Subsystem recovery complete (DFSBACK0, DFSFDR00, DFSRLP00)<br>X'04' Subsystem stopped sharing (DBFLBEV0)<br>X'05' Invalidate all buffers (DFSRDBS0)<br>X'06' Sharing needs to be reevaluated (DFSRDBS0)<br>X'07' Merge other logs (DBFLBEV0)<br>X'08' Batch backout update UOR (DFSBACK0, DFSDBDR0, DFSRBLB0, DFSRBOI0)<br>X'09' Log buffers purged (DFSTRM00)<br>X'FF' Idling record (DFSLLRI0) |
| X'06'   | DFSLOG06           | ACLOGREC   | IMS was started or stopped, or FEOV was issued. The VTAM TPEND exit routine was entered or the IRLM failed in an IMS XRF complex. A /SWITCH command was processed in an IMS XRF complex. A /START command connected IMS to VTAM. Data sharing capability was quiesced. (DFSFLG0, DFSFDLM0, DFSICA20, DFSICL40, DFSRDSH0)                                                                                                                                                                                                                                                           |
| X'07'   | DFSLOG07           | DLREC      | An application program terminated. (DFSRBLB0, DFSRBOI0, DFSSABN0, DFSDABN0, DFSDLA30, DFSTMAD0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| X'08'   | DFSLOG08           | LINTREC    | An application program was scheduled. (DFSSMSC0, DFSSBMP0, DFSDASP0, DFSDLA30, DFSTMAD0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| X'09'   | SBLOGREC           | SBLOGREC   | An application potentially using sequential buffering terminated. The following subcodes, contained within the log record, identify the type of statistics written in the log record. (DFSSBTD0)<br>X'01' Sequential buffering summary statistic for the PST.<br>X'02' Sequential buffering detailed statistics for each SDSG.                                                                                                                                                                                                                                                     |
| X'0A07' | DFSLOG0A           | L0AREC     | A CPI-communications driven application program terminated. (DFSSABN0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| X'0A08' | DFSLOG0A           | L0AREC     | A CPI-communications driven application program was scheduled. (DFSSMSC0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| X'10'   | DFSLOG10           | SCREC      | A security violation occurred. (DFSICIO0, DFSCMD30, DFSICLZ0, DFSTMAD0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| X'11'   | LCONVERS           | LCONVERS   | A conversational program started. (DFSCON00)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| X'12'   | LCONVERS           | LCONVERS   | A conversational program terminated. (DFSCON20)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| X'13'   | DFSLOG13           | LOG13      | This log record contains conversational CCBs at logon for static non-ISC terminal, signon for ETO user, or static ISC allocation. (DFSRMD00)                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| X'14'   | DFSLOG14           | LNREC      | A dial line was disconnected. (DFSICIO0, DFSICLA0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| X'15'   | DFSLOG14           | LNREC      | A dial line was connected. (DFSICA10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| X'16'   | DFSLOG16           | LOG16      | A /SIGN command successfully completed. (DFSICLZ0, DFSCBDL0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------|--------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'18' | DFSLOG18           | XLOG18     | A user program established intent to use extended checkpoint and then issued a CHKP call. The user program issued a CHKP by issuing an XRST call with eight blank characters as a checkpoint ID value. (DFSZSC00)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| X'20' | DFSLOG20           | ILRDOC     | A database was opened. (DFSDLOC0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| X'21' | DFSLOG20           | ILRDOC     | A database was closed. (DFSDLOC0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| X'22' | DFSLOG22           | DFSLOG22   | A type-2 command completed successfully and is recoverable across a restart. (DBFCPRC0, DBFRTS00, DFSCPDD0, DFSCPSM0, DFSDBS00, DFSIC160, DFSIU160, DFSID160, DFSIU070, DFSIU090, DFSIU100, DFSIU110, DFSIU120, DFSPGS00, DFSTRS00)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| X'23' | DFSLOG23           | LOG23DSC   | The listed databases were open when a batch application requested a checkpoint. (DFSRLBL0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| X'24' | DFSLOG24           | ERLGDSC    | The buffer handler detected an I/O error. (DFSDVSM0, DBFMER00)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| X'25' | DFSLOG25           | EEQLOG     | An EEQE was created or deleted. (DFSTOLG0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| X'26' | DFSLOG26           | IOTBUF     | An I/O toleration buffer was created. (DFSTOLG0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| X'27' | DFSLOG27           | DBXLOG     | A data set was extended, according to these subcodes:<br>X'01' Data set extend phase 1. (DFSDVSM0)<br>X'02' Data set extend phase 2. (DFSDBHI0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| X'28' | DFSLOG28           | PH1DC      | The IMS restart facility updated the sequence numbers of input messages for response mode non-Fast Path transactions from STSN devices. (DFSFXC40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| X'29' | DFSLOG29           | DFSLOG29   | The progress of a HALDB online reorganization is represented in the following subcodes:<br>X'00' The OLR command was received. (DFSORC00, DFSORC10)<br>X'10' Ownership of the reorganization for a partition was established through DBRC. (DFSORP60)<br>X'11' Conditional ownership established. An attempt to establish ownership will be made. (DFSORP60)<br>X'20' The UPDATE OLREORG command updated either the RATE option or the [NO]DEL option for a HALDB partition. (DFSORC00, DFSORC10)<br>X'30' The output data sets were successfully validated or created. One record includes all output data sets. (DFSORA00, DFSRDL0)<br>X'40' Cursor active. Initialization of the reorganization of the partition was completed successfully, two sets of data sets exist, and copying is about to begin. The partition is now in cursor-active status. (DFSORP60, DFSORP70)<br>X'50' The cursor was updated, but the unit of reorganization was not committed. (DFSORP20)<br>X'70' Cursor inactive. Copying from the input to the output data sets has completed. The output data sets become active, and the input data sets become inactive. (DFSORP60, DFSORP70)<br>X'71' Conditional cursor inactivate. An attempt to reset the cursor will be made. (DFSORP60)<br>X'90' Ownership of the reorganization for a partition was relinquished. This is followed by the X'07' log record for OLR ITASK termination. (DFSORP60) |
| X'30' | QLOGMSGI           | QLOGMSGI   | A message prefix was changed. (DFSQLOG0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| X'31' | QLOGGETU           | QLOGGETU   | A GU was issued for a message. (DFSQLOG0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name  | DSECT name          | Why written (issuing module)                                                                                                                                                                                                                          |
|-------|---------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'32' | QLOGREJE            | QLOGREJE            | A message was rejected. It was presumed to have been the cause of an application program abend. (DFSQLOG0)                                                                                                                                            |
| X'33' | QLOGFREE            | QLOGFREE            | The queue manager released a record. (DFSQLOG0)                                                                                                                                                                                                       |
| X'34' | QLOGCANC            | QLOGCANC            | A message was canceled. (DFSQLOG0)                                                                                                                                                                                                                    |
| X'35' | QLOGENQU            | QLOGENQU            | A message was enqueued or re-enqueued. (DFSQLOG0)                                                                                                                                                                                                     |
| X'36' | QLOGDEQS            | QLOGDEQS            | A message was dequeued or saved or deleted. (DFSQLOG0)                                                                                                                                                                                                |
| X'37' | DFSXFER<br>QLOGXFER | DFSXFER<br>QLOGXFER | Records marked as NO INPUT and NO OUTPUT are written by the sync point coordinator when all resource managers have completed Phase 1. (DFSFXC30, DBFSLG20)                                                                                            |
|       |                     |                     | Records marked as NO INPUT and NO OUTPUT (for example, X'3730') are also written by the DBCTL sync point processor after receiving a phase 2 commit request. (DFSDSC00)                                                                               |
|       |                     |                     | Phase 2 DC processing. One or more output messages were transferred from a queue block anchored off the PST temporary output queue to a permanent destination. There is a X'37' record for each destination that has messages transferred. (DFSQLOG0) |
| X'38' | QLOGRELI            | QLOGRELI            | An input message was put back on the input queue when the application abnormally terminated. (DFSQLOG0)                                                                                                                                               |
|       |                     |                     | Records marked as "Release with no input message" (for example, X'3801') are written by the DBCTL sync point processor (DFSDSC00) after receiving an abort request.                                                                                   |
|       |                     |                     | A Protected Conversation has been put in doubt, and the input message has been moved to an RRE until the unit of work is aborted or committed.                                                                                                        |
| X'39' | QLOGRELO            | QLOGRELO            | This record is logged for each message returned to its original anchor block (SMB or CNT) after QCF has abnormally terminated.                                                                                                                        |
|       |                     |                     | The output queue was freed during cleanup processing of a RELEASE call. (DFSQLOG0)                                                                                                                                                                    |
|       |                     |                     |                                                                                                                                                                                                                                                       |
| X'3A' | QLFXFREE            | QLFXFREE            | A bitmap record was replaced after a queue record was freed at the end of DFSQFIX0 processing. (DFSQFIX0)                                                                                                                                             |
| X'3B' | QLFXRERR            | QLFXRERR            | An invalid message record or a nonrecoverable message response was detected during queue validation. (DFSQFIX0)                                                                                                                                       |
| X'3C' | QLFXBERR            | QLFXBERR            | A control block was changed during validation by DFSQFIX0. (DFSQFIX0)                                                                                                                                                                                 |
| X'3D' | QLFXQBLK            | QLFXQBLK            | A QBLK record was altered during DFSQFIX0 processing. (DFSQFIX0)                                                                                                                                                                                      |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type              | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|--------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'40'             | DFSCHKPT           | LOG01      | <p>A checkpoint was taken. The following subcodes in the log record precede and identify each type of information written in the log record.</p> <p>X'01' Checkpoint information begins here. (DFSRCPP00)</p> <p>X'02' Message queue checkpoint record. (DFSQCP00)</p> <p>X'03' CNTs or LNTs, or both, follow. (DFSRCPP30)</p> <p>X'04' SMBs follow. (DFSRCPP30)</p> <p>X'05' Non-VTAM CTBs follow. (DFSRCPP30)</p> <p>X'06' DMBs follow. (DFSRCPP40)</p> <p>X'07' PSB follows. (DFSRCPP40)</p> <p>X'08' Non-VTAM CLB, LLB, or both, follow. (DFSRCPP30)</p> <p>X'0C' CVB follows. (DFSRCPP30)</p> <p>X'0D' CCBs follow. (DFSRCPP30)</p> <p>X'0F' Message queues TTR and LCB follow. (DFSRCPP30)</p> <p>X'10' Non-VTAM CRBs follow. (DFSRCPP30)</p> <p>X'12' Tran input edit routine table. (DFSRCPP30)</p> <p>X'14' SPQBs and related CNTs follow. (DFSRCPP30)</p> <p>X'20' Non-VTAM CIBs follow. (DFSRCPP30)</p> <p>X'21' VTAM VTCBs follow. (DFSRCPP30)</p> <p>X'22' Subcode for Queue Anchor Block (QAB). (DFS6CKP0)</p> <p>X'23' Subcode for LU 6.2 descriptors modified by /CHANGE DESCRIPTOR command. (DFS6CKP0)</p> <p>X'24' Subcode for LU 6.2 TIB. (DFS6CKP0)</p> <p>X'25' EEQE follows. (DFSTOLG0)</p> <p>X'26' I/O toleration buffer follows. (DFSTOLG0)</p> <p>X'27' Contains database updates for an in-doubt unit of recovery. (DFSRCPP40)</p> <p>X'28' Error queue elements (EQEL) for recovery in-doubt structure (RIS). (DFSRCPP40)</p> <p>X'30' RREs follow. (DFSRCPP50)</p> <p>X'31' SIDXs follow. (DFSRCPP50)</p> <p>X'32' TPIPE/YQAB follow. (DFSYCKP0)</p> <p>X'33' MTE follow. (DFSYCKP0)</p> <p>X'34' TIB follow. (DFSYCKP0)</p> <p>X'35' OTMA (DFSYCKP0)</p> <p>X'40' UOWEs follow. (DFSRCPP30)</p> |
| X'40'<br>(cont'd) | DFSCHKPT           | LOG01      | <p>X'70' MSDB record follows. (DBFHDMPO)</p> <p>X'71' ECNT follows. (DBFHDMPO)</p> <p>X'72' MSDB header follows. (DBFHDMPO)</p> <p>X'73' Page fixed MSDBs follow. (DBFHDMPO)</p> <p>X'74' Pageable MSDBs follow. (DBFHDMPO)</p> <p>X'79' MSDB record ends. (DBFHDMPO)</p> <p>X'80' Fast Path checkpoint information begins here. (DBFCHKP0)</p> <p>X'81' Snaps the current subpool information for use during warm and emergency restart.</p> <p>X'82' EMHB follows. (DBFCHKP0)</p> <p>X'83' RCTE follows. (DBFCHKP0)</p> <p>X'84' DMCB and DMAC follow. (DBFCHKP0)</p> <p>X'85' MTO buffer follows. (DBFCHKP0)</p> <p>X'86' DMHR and DEDB buffers follow. (DBFCHKP0)</p> <p>X'87' ADSC follows. (DBFCHKP0)</p> <p>X'88' Fast Path IEEQEs. (DBFCHKP0)</p> <p>X'89' Fast Path checkpoint information ends here. (DBFCHKP0)</p> <p>X'98' Checkpoint information ends here. (DFSRCPP10)</p> <p>X'99' The message queue checkpoint information ends here. (DFSQCP00)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|--------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'41' | DFSLOG41           | LOG41DSC   | A batch program or BMP program issued a checkpoint. (DFSRLBL0)                                                                                                                                                                                                                                                                                                                                                     |
| X'42' | DFSLOG42           | ATLOGREC   | IMS switched from one OLDS to another, or a checkpoint was taken, or a shutdown checkpoint was taken. (DFSFDLS0, DFSRDS00, DFSRCP00)                                                                                                                                                                                                                                                                               |
| X'43' | DFSLOG43           | ADSETLOG   | <p>The log manager or the Log Archive utility created this log record. The following subcodes identify each type of record:</p> <p><b>X'01'</b> Record contains status of current online log data set. (DFSFDLS0)</p> <p><b>X'02'</b> Dummy record created by Log Archive utility. This record is created as a substitute for a record that is omitted because of control statement specifications. (DFSUARP0)</p> |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|--------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'45' | DFSLOG45           | STLOGREC   | <p>Checkpoint statistics were gathered, including statistics from the 64-bit storage pool. The following subcodes within the log record mark the start of various types of statistics written in the log record (DFSSTAT0).</p> <p>X'01' Dynamic database log statistics.</p> <p>X'02' Queue buffer statistics.</p> <p>X'03' Format pool statistics.</p> <p>X'04' DL/I buffer pool statistics.</p> <p>X'05' Variable storage pool statistics.</p> <p>X'06' Application scheduling statistics.</p> <p>X'07' Logging statistics.</p> <p>X'08' VSAM buffer pool statistics.</p> <p>X'09' Program isolation statistics.</p> <p>X'0A' Latch management statistics.</p> <p>X'0B' Selected dispatcher statistics.</p> <p>X'0C' Storage pool statistics. (DFSCBT00)</p> <p>X'0D' Receive Any (RECA) Buffer statistics.</p> <p>X'0E' Fixed storage pool usage statistics.</p> <p>X'0F' Dispatcher statistics.</p> <p>X'10' RCF multi-TCB statistics.</p> <p>X'11' General storage statistics.</p> <p>X'12' IMS Storage Manager (DFSMODU0) statistics.</p> <p>X'15' 64-bit Storage Manager statistics.</p> <p>X'16' Statistics for the storage pool of the 64-bit Storage Manager. Four control blocks contain information about the Fast Path 64-bit buffer manager. The information about data bound in these control blocks is documented in the control blocks. Each control block has a starting eye catcher to identify the control blocks in the log record.</p> <ul style="list-style-type: none"> <li>• <b>DBFBPNO2:</b> Contains general information about Fast Path 64-bit buffer manager.</li> <li>• <b>DBFBPNO3:</b> Contains information about a subpool.</li> <li>• <b>DBFBPNO4:</b> Contains information about a subpool extent. The DBFBPNO4 (extent) blocks for a subpool follow the subpool block (DBFBPNO3) until the next subpool block is found.</li> <li>• <b>DBFBPNO9:</b> Contains information about all buffers of the same buffer size. All buffers for a specific buffer size are chained off this block.</li> </ul> <p>X'17' Information about user exit routines defined in the DFSDFxxx member of the IMS.PROCLIB data set. Mapped by macro DFSL4517.</p> <p>X'21' IRLM subsystem statistics. (DXRRSTAT)</p> <p>X'22' IRLM system statistics. (DXRRSTAT)</p> <p>X'FF' End of statistics records.</p> |
| X'47' | DFSLOG47           | CAPLOG     | A checkpoint was just taken. This log record contains all the PSTs that were in the system. (DFSRCPI0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| X'48' | DFSPALOG           | PALOGREC   | <p>This is a variable-length padding log record. A X'48' log record at the end of a block contains log block descriptive information. (DFSFLLG0)</p> <p>X'00' OLDS padding X'48' record.</p> <p>X'01' X'4301' record space holder.</p> <p>X'02' Archived OLDS X'48' record.</p> <p>X'03' Batch SLDS padding X'48' record.</p> <p>X'04' Archived batch SLDS X'48' record.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|--------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'49' | DFSLOG49           | DFSLOG49   | <p>This log record is written by the log router and the full-function database tracker at the RSR tracking site when an updated block has an invalid free space element (FSE) or free space element anchor point (FSEAP).</p> <p>X'00' Definition.</p> <p>X'01' Begin stream record.</p> <p>X'02' Begin OFR record.</p> <p>X'03' OFR milestone record.</p> <p>X'04' Log truncation start record.</p> <p>X'05' XRC tracking record.</p> <p>X'06' Data set services create data set record.</p> <p>X'07' Takeover record.</p> <p>X'08' Auto Archive Init Request record.</p> <p>X'0A' Last LSN of prilog record.</p> <p>X'0B' Data set sequence number record.</p> <p>X'0C' Open data set record.</p> <p>X'0D' DBRC hash table state record.</p> <p>X'0E' FF DB Tracker Update Sequence Number (USN).</p> <p>X'20' FP DB Tracker statistics record.</p> <p>X'30' FF DB Tracker FSE Error record.</p> <p>X'31' FF DB Tracker statistics record.</p> <p>X'50' OFR Stream Processing Time.</p> |
| X'4C' | DFSLOG4C           | STDBLOG    | <p>Activity related to database processing, according to these subcodes:</p> <p>X'01' A backout for token was done. (DFSRBOI0)</p> <p>X'02' A backout error occurred. (DFSRBOI0)</p> <p>X'04' First update flag was reset. (DFSDBDR0)</p> <p>X'08' A share level or held state was changed. (DFSDBAU0, DFSDBLOC0)</p> <p>X'10' A write error occurred. (DFSDBH40, DFSDVSM0)</p> <p>X'20' A program was stopped. (DFSRBOI0)</p> <p>X'40' A database was started. (DFSDBDR0)</p> <p>X'80' A database was stopped. (DFSDBDR0)</p> <p>X'82' A database backout failure occurred. (DFSRESP0)</p>                                                                                                                                                                                                                                                                                                                                                                                               |
| X'4E' | DFSLOG4E           | DFSLOG4E   | <p>An event occurred during monitoring. This record is in the monitor log and contains statistical information about the system. (DFS MNTR0)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| X'50' | DFSDLOG            | DLOGDB     | <p>The database was updated. This log record contains the new data on an insert and update call as well as the old data and FSE updates on a delete call. (DFS RDBL0)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| X'52' | DFSDLOG            | DLOGDB     | <p>IMS is about to do an ISRT operation for a new root in a key sequence data set. This record contains a copy of the data before it was changed. (DFS RDBL0)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| X'53' | DFSLOG53           | SPLLOG     | <p>Bitmap is written for a log record for an alternate IMS that is tracking a CI split on an active IMS. (DFS RCHB0, DFS GCGSP0, DFS FRSP0, DFS DVSM0)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| X'55' | DFSETPCP           | DFSETPCP   | <p>Record reserved for external subsystem information. (DFS ESS30)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



Table 193. IMS log records used to analyze IMS problems (continued).

| Type           | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|--------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'56'          | DFSETPCP           | DFSETPCP   | <p>IMS external subsystem support recovery log record ID. The following subcodes, contained within the record, precede information in the log record. X'56' records are written by three IMS components. These components can represent the status of IMS external subsystem transactions, the status of the connection between IMS and the CCTL, or the stages of IMS sync point processing. The subcodes listed below represent the X'56' record components and their purposes. The subcodes are contained in the record and precede data in the log record.</p> <p><b>X'000001'</b><br/>IMS began the commit process. (DFSESP10)</p> <p><b>X'000002'</b><br/>IMS finished the commit process. (DFSESP20)</p> <p><b>X'000003'</b><br/>IMS signed on to an external subsystem. (DFSESS00)</p> <p><b>X'000004'</b><br/>IMS created a thread for external subsystem. (DFSESC00)</p> <p><b>X'000005'</b><br/>IMS resolved an in-doubt transaction. (DFSESI60)</p> <p><b>X'000006'</b><br/>An IMS dependent region abended. (DFSFP00)</p> <p><b>X'000007'</b><br/>IMS deleted a residual recovery element (RRE) through the /CHA command. (DFSESI70)</p> <p><b>X'000008'</b><br/>IMS deleted a residual recovery element (RRE) by a restart or start command. (DFSIESI0)</p> <p><b>X'000009'</b><br/>An external subsystem disconnected. (DFSESI30)</p> <p><b>X'00000A'</b><br/>Commit found no work to do.</p> <p><b>X'08'</b><br/>A CCTL connected to DBCTL. (DFSDASI0) Mapping macro is DFSETPCP.</p> |
| X'56' (cont'd) | DFSETPCP           | DFSETPCP   | <p><b>X'09'</b><br/>A CCTL disconnected from DBCTL. (DFSDASD0) Mapping macro is DFSGTPCP.</p> <p><b>X'10'</b><br/>Phase 1 commit processing started. (DFSDSC00, DFSTMS00)</p> <p><b>X'11'</b><br/>Phase 1 commit processing ended. (DFSDSC00, DFSTMS00)</p> <p><b>X'12'</b><br/>Phase 2 commit processing ended. (DFSDSC00, DFSFXC30, DFSSMSC0, DFSTMS00)</p> <p><b>X'13'</b><br/>Recoverable in-doubt structure (RIS) created. (DFSDRIS0)</p> <p><b>X'14'</b><br/>Recoverable in-doubt structure (RIS) deleted. (DFSDRID0)</p> <p><b>X'15'</b><br/>IMS restarted with z/OS Resource Recovery Services. (DFSRRSI0)</p> <p><b>X'16'</b><br/>Interest has been registered with RRS for this UOW. (DFSRRSI0)</p> <p><b>X'37'</b><br/>Phase 2 commit processing started by a resynchronization request. (DFSDRID0)</p> <p><b>X'38'</b><br/>Phase 2 abort processing started by a resynchronization request. (DFSDRID0)</p> <p><b>X'FA'</b><br/>Transaction-level statistics. (DFSDSC00, DFSFXC30, DFSTMS00)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| X'57'          | DFSDBUR            | DFSDBUR    | <p>Database updates in an RSR environment:</p> <p><b>X'01'</b><br/>Begin database update. (DFSRRDBL0)</p> <p><b>X'02'</b><br/>End database update. (DFSRRDBL0)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type                                                                                                                                                   | Mapping macro name | DSECT name | Why written (issuing module) |                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|------------------------------|--------------------------------------------------------------------------------------------------------------|
| X'59'                                                                                                                                                  | DBFL59X            | L59X       | X'10'                        | I/O from a data space has started (DBFVXOC0, DBFVOCIO)                                                       |
|                                                                                                                                                        |                    |            | X'12'                        | A group of CIs (control intervals) from a data space has been written to DASD (DBFVXOC0, DBFVOCIO, DBFERS21) |
|                                                                                                                                                        |                    |            | X'45'                        | Contains information about buffer use and buffer waits (using FP 64 bit buffer manager) for each UOW).       |
|                                                                                                                                                        |                    |            | X'60'                        | Records all creations, expansions, and compressions of the subpools.                                         |
| X'59'                                                                                                                                                  | DBFLS9FF           | L59FF      | X'51'                        | To indicate that nonrecoverable suppression has taken place.                                                 |
|                                                                                                                                                        |                    |            | X'FF'                        | To track internal IMS FP information in various modules.                                                     |
| <b>Mapping Macro</b><br>This is a Fast Path log record.<br>The following subcodes, contained within the record, precede information in the log record: |                    |            |                              |                                                                                                              |
|                                                                                                                                                        | DBFLGRIM           | FLIM       | X'01'                        | An input message was received. (DBFSHSP0)                                                                    |
|                                                                                                                                                        | DBFLGROM           | FLOM       | X'03'                        | An output message was sent. (DBFSHSP0)                                                                       |
|                                                                                                                                                        | DBFSQRIM           | DBFSQRIM   | X'11'                        | An input message was inserted on an EMHQ structure. (DBFHIEL0, DBFSYN20)                                     |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type              | Mapping macro name | DSECT name | Why written (issuing module) |                                                                                                                                                                                         |
|-------------------|--------------------|------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'59'<br>(cont'd) | DBFSQROM           | DBFSQROM   | X'16'                        | An output message was inserted on an EMHQ structure. (DBFATRM0, DBFHCTR0, DBFHCAS0, DBFERMG0, DBFSYN20)                                                                                 |
|                   | DBFBMSDB           | MSUPLOG    | X'20'                        | An MSDB was updated. (DBFSLOG0, DBFBMSDB)                                                                                                                                               |
|                   | DBFDOCL            | DOCL       | X'21'                        | DEDB area data set was opened. (DBFMOCL0)                                                                                                                                               |
|                   |                    |            | X'22'                        | DEDB area data set was closed. (DBFMOCL0)                                                                                                                                               |
|                   |                    |            | X'23'                        | DEDB area data set status was changed. (DBFMOCL0)                                                                                                                                       |
|                   | DBFEQE             | EQE        | X'24'                        | An ADS error queue element (EQE) was created. (DBFMEQE0)                                                                                                                                |
|                   | DBFLGRDQ           | FLDQ       | X'36'                        | An output message was dequeued. This log record also contains information that is necessary to run the Fast Path Log Analysis utility in a shared EMH environment. (DBFHQMI0, DBFHTMG0) |
|                   | DBFLGSYN           | SYNC       | X'37'                        | A synchronization point operation completed. (DBFSLG20)                                                                                                                                 |
|                   |                    |            | X'38'                        | A synchronization point operation was unsuccessful. (DBFSLG20)                                                                                                                          |
|                   | DBFLGRIC           | HICL5947   | X'47'                        | Contains a bit map of CIs that have updates in an HSSP image copy data set. (DBFSLGE1)                                                                                                  |
|                   | DBFLSRT            | LSRT       | X'50'                        | A DEDB was updated—DMAC status log record for DMACOCNT or DMACNXTS. (DBFSLOG0, DBFARDB0, DBFMLOP0)                                                                                      |
|                   |                    |            | X'53'                        | An online utility updated a DEDB. (DBFUMAL0, DBFUMAI0)                                                                                                                                  |
|                   |                    |            | X'54'                        | A log record is created each time an area containing sequential dependent buffers was opened. (DBFMLOG0)                                                                                |
|                   | DBFLFRSD           | FLSD       | X'55'                        | A new buffer for sequential dependent segments was obtained. (DBFSYP20)                                                                                                                 |
| X'5E'             | DBFLSRT            | LSRT       | X'56'                        | Indoubt SDEP buffer from the resynchronization process. (DBFMLOG0) (DBFSYP20)                                                                                                           |
|                   |                    |            | X'57'                        | Local/Global portion of DMAC logged. (DBFARDB0, DBFUMAL0)                                                                                                                               |
|                   | DBFL56X            | L56X       | X'58'                        | An SDEP buffer was successfully written. (DBFSYP20)                                                                                                                                     |
|                   | DBFLGRRE           | FLRE       | X'70'                        | The MSDB relocation factor for XRF is shown. (DFSRLP00)                                                                                                                                 |
|                   | DFSLOG5E           | SBLI       |                              | Sequential buffer image capture record. A sequential buffer-handler function has been called, according to these subcodes (DFSSBIC0):                                                   |
|                   |                    |            | X'00'                        | Application start record.                                                                                                                                                               |
|                   |                    |            | X'04'                        | Search/Read.                                                                                                                                                                            |
|                   |                    |            | X'0C'                        | OSAM buffer-handler crossed a buffer boundary.                                                                                                                                          |
|                   |                    |            | X'18'                        | New logical position.                                                                                                                                                                   |
|                   |                    |            | X'1C'                        | Application stop record.                                                                                                                                                                |
|                   | DFSLOG5F           | DLTRLOGR   |                              | A DL/I call was completed. This record contains DL/I call image capture trace data. (DFSDDL0)                                                                                           |
| X'63'             | LOGCSQ             | S3REC63    |                              | Log session initiation and termination. When X'02' is on in the second byte, the X'63' record represents only the deletion of a VTCB. (DFSCVLG0)                                        |
| X'64'             | DFSMSREC           | SMREC      |                              | An inconsistency was found in processing associated with MSC. (DFSCMS00)                                                                                                                |
| X'65'             | DFSLOG65           | SSREC      |                              | A message is about to be enqueued. (DFSCRSV0)                                                                                                                                           |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|--------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'66' | LOG3600            | SXREC      | A message is about to be enqueued or dequeued (applicable for 3614, FINANCE, and SLU P nodes, MSC links, or ISC sessions). (DFSCVFD0, DFSCVFI0, DFSCVFN0, DFSCVLG0, DFSCMSV0, DFSCMSF0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| X'67' | DFSL6701           | CTLDESC    | <p>This log record is a service trace record. The following subcodes, contained within it, identify what conditions caused a particular part of the log record to be written:</p> <p><b>X'01'</b> There are three situations in which X'6701' is written:</p> <ul style="list-style-type: none"> <li>• A /TRACE command was issued. This record can also indicate that error blocks were written unconditionally by device-dependent code when a major error condition was detected (DFSCFEZ0).</li> <li>• Errors were detected in AOI module DFSAOUE0.</li> <li>• Errors were detected in AOI module DFSAOE00.</li> </ul> <p><b>X'03'</b> A 3270 error was detected. More information about this condition is contained in "Terminal communication task trace" on page 261. (DFSCFEZ0)</p> <p><b>X'04'</b> An IMS notification exit failed to obtain an AWE for restart processing. IMS was unable to post the deferred unit of recovery with z/OS Resource Recovery Services.</p> <p><b>X'06'</b> A normal record that is generated when a Fast Path region ends abnormally.</p> |
| X'67' |                    |            | <p><b>X'05'</b> A thread terminated abnormally. The data portion of the log record contains diagnostic information for dependent regions. (Note that data that is contained in the DTRM work area of the XPST block, such as the abend code, might be residual data from a previous abnormal termination in the same region.) All blocks logged have eye catchers preceding them. Normal IMS DSECTs map the logged information. (DFSASK00, DFSDTTA0, DFSSDA20)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| X'67' | DFSL6701           | CTREC      | <p><b>X'07'</b> An HSSP PCB is repositioned backward rather than to the next UOW. The control blocks EPST, EPCB, and SPCB are snapped in this log record for diagnostic purposes. (DBFSHDQ0)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| X'67' | DFSL6740           | DFS6740    | <p><b>X'40'</b> This log record represents an IMS UOW that was placed on the Common Queue Server's (CQS) cold queue because CQS found UOWs on its private queues on a cold start of either TM (COLDSYS or COLDCOMM) or CQS. CQS moves these UOWs to the CQS cold queue and passes the UOW values to IMS. IMS logs these UOWs in the type X'6740' log record for audit purposes. The customer can then process these log records to determine what action to take for these UOWs. (DFSSQ030, DBFSQ030)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|--------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'67' | DFS67D0            | DFS67D0    | <p><b>X'D0'</b> Indicates the diagnostic record of a failed service request.</p> <p><b>X'01'</b> Failure during a DB DL/I call.</p> <p><b>X'02'</b> Failure during a DC DL/I call. (DFSCPY00, DFSDLA30, DBFHGU10, DFSTMAP0)</p> <p><b>X'03'</b> Failure during a SYS DL/I call.</p> <p><b>X'04'</b> An exit failure occurred. (DFSRRSI0)</p> <p><b>X'05'</b> Failure during SPOOL API processing. (DFSIAFP0)</p> <p><b>X'06'</b> Failure during Transaction Manager schedule processing. (DFSTMAS0, DFSTMCD0)</p> <p><b>X'07'</b> Failure during Service Logical Unit Manager (SLUM) processing.</p> <p><b>X'08'</b> Failure during Asynchronous Logical Unit Manager (ALUM) processing.</p> <p><b>X'09'</b> Failure during coupling facility processing. (DFSDCFR0, DFSDMAW0)</p> <p><b>X'0A'</b> Failure during queue manager processing.</p> <p><b>X'0B'</b> Failure during shared queues interface processing. (DBFIPQS0, DFSITQS0, DBFILQS0, DFSILQS0)</p> <p><b>X'0C'</b> Failure during NDM user exit interface processing. (DFSNDMI0)</p> <p><b>X'0D'</b> Failure during shared queues CQSINFRM processing.</p> <p><b>X'0E'</b> Failure during shared queues request processing. (DBFHCAS0, DBFHGU10, DBFHSQS0)</p> <p><b>X'0F'</b> Failure during UOWE resync processing. (DBFHGU10, DBFHCAS0)</p> <p><b>X'10'</b> Shared EMH z/OS cross-system coupling facility communication error. (DBFHXC00)</p> <p><b>X'11'</b> An unsolicited output message was detected. (DBFHSQS0)</p> <p><b>X'12'</b> In-flight input message deleted. (DBFHCAS0)</p> <p><b>X'13'</b> Fast Path Queue Manager Diagnostics. (DBFHQMI0)</p> <p><b>X'14'</b> System Termination Diagnostics. (DFSSDA20, DFSTRM00)</p> <p><b>X'15'</b> System Service Error. (DFSOCMD0)</p> <p><b>X'16'</b> Unexpected return or reason code from RM, OM, SCI, or CQS request.</p> <p><b>X'17'</b> Failure during RM update, query, or delete processing.</p> <p><b>X'19'</b> VSAM JRNAD ERROR. (DFSDEVSM0)</p> <p><b>X'1A'</b> Sysplex Serial Program Manager (SSPM) encountered an error.</p> <p><b>X'1B'</b> Abend U3310 or statusBD caused by an IRLM long lock timeout</p> |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type  | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                |
|-------|--------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'67' | DFSL67FD           | SNELDESC   | <b>X'ED'</b> Sequential buffering SNAP, created during a periodic evaluation of the sequential buffering process by the SBESNAP option. (DFSSBSN0)                                                                                                                                          |
|       |                    |            | <b>X'EE'</b> SNAP of a call to the sequential buffering buffer-handler created by the SBSNAP option. (DFSSBSN0)                                                                                                                                                                             |
|       |                    |            | <b>X'EF'</b> SNAP created when the sequential buffering COMPARE option detects a mismatch between the results of a call to the buffer handler and the DASD block as stored on DASD. (DFSSBSN0)                                                                                              |
|       |                    |            | <b>X'FB'</b> An invalid AWE was detected. Some of the possible causes of the invalid AWE include conflicting parameters, missing addresses or bad pointers. The log record indicates which of the processing modules detected the invalid AWE.                                              |
|       |                    |            | <b>X'FD'</b> A SNAP call was issued. (DFSERA20)                                                                                                                                                                                                                                             |
|       |                    |            | <b>X'FF'</b> A pseudoabend or dependent region abnormal termination occurred. Further information of this condition is contained in "SNAP call facility" on page 572. (DFSERA20)                                                                                                            |
| X'67' | DFSL67FA           | DFSTRHD    | <b>X'FA'</b> Contains images of the in memory trace tables. These tables are written to the log when requested by the OPTIONS statement in the VSPEC=parameter member or the /TRACE command. (DFSTRA20)                                                                                     |
| X'69' | DFSLOG69           | JM         | An unauthorized 3275 terminal dialed into a line specified as VERIFY=YES. (DFSDS060)                                                                                                                                                                                                        |
| X'6C' | DFSMSCRC           | CMSCREC    | MSC partner systems were started. (DFSCMSW0)                                                                                                                                                                                                                                                |
| X'6D' | DFSLOG6D           | SURVLOG    | This log record is used in an XRF environment when:                                                                                                                                                                                                                                         |
|       |                    |            | <ul style="list-style-type: none"> <li>• XRF surveillance was started or stopped.</li> <li>• A write error occurred on the active subsystem.</li> <li>• The interval or timeout values on the active subsystem were changed by a /CHANGE command. (DFSHIC40, DFSHSRV0, DFSISL60)</li> </ul> |
|       |                    |            | <b>X'04'</b> Fast DB recovery creates this log record to indicate which TASK or ITASK received a TIMEOUT or is in a wait or loop for more than one second.                                                                                                                                  |
|       |                    |            | <b>X'40'</b> Diagnostic information for FDR. This record is written without any data in a one-second interval to the log.                                                                                                                                                                   |
| X'6E' | DFSLOG6E           | LUMLOG     | One of the following SNA commands was processed: QEC, QC, RELQ, RSHUT, SHUTD, SHUTC, LUS. (DFSHCLG0)                                                                                                                                                                                        |

Table 193. IMS log records used to analyze IMS problems (continued).

| Type                                                                                                               | Mapping macro name | DSECT name | Why written (issuing module)                                                                                                                                                                                                                                                                         |          |
|--------------------------------------------------------------------------------------------------------------------|--------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| X'70'                                                                                                              | DFSLOG70           | OLCREC     | <b>X'00'</b> An online change /MODIFY command sequence completed successfully. The IMS.MODSTAT data set is being updated. (DFSICV80)                                                                                                                                                                 |          |
|                                                                                                                    |                    |            | <b>X'01'</b> Allows the XRF primary to signal the alternate that the transaction has been stopped (PSTOP) by module DFSSMSC0. (DFSICV90)                                                                                                                                                             |          |
|                                                                                                                    |                    |            | <b>X'02'</b> Begin write of the new versions of the updated members log record. The log records will contain the names of all the members that are affected by the member online change. If more member names exist than can fit in one X'7002' log record, multiple X'7002' log records are logged. |          |
|                                                                                                                    |                    |            | <b>X'03'</b> Write complete ACB library member online change log record.                                                                                                                                                                                                                             |          |
|                                                                                                                    |                    |            | <b>X'04'</b> Commit start ACB library member online change log record.                                                                                                                                                                                                                               |          |
|                                                                                                                    |                    |            | <b>X'05'</b> Commit complete ACB library member online change log record.                                                                                                                                                                                                                            |          |
|                                                                                                                    |                    |            | <b>X'06'</b> Restart abort ACB library member online change record.                                                                                                                                                                                                                                  |          |
|                                                                                                                    |                    |            | <b>X'10'</b> Terminate ACB library member online change process log record.                                                                                                                                                                                                                          |          |
|                                                                                                                    |                    |            | X'72'                                                                                                                                                                                                                                                                                                | DFSLOG72 | USRREC | Used by dynamic terminals during sign on create, sign off delete, and sign on modification. The following subcodes identify the conditions that caused a particular log record to be written and the content of the log record: |
| <b>X'01'</b> ETO user structure dynamically created. Contains the SPQB name and one or more CNTs.                  |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| <b>X'02'</b> ETO user structure dynamically deleted. Contains only the SPQB name.                                  |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| <b>X'03'</b> ETO user structure modified. Contains the SPQB name and one or more CNTs.                             |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| <b>X'04'</b> One or more CNTs added to an ETO user structure. Contains the SPQB name and the CNTs that were added. |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| <b>X'06'</b> Dynamic logical link block (LNB) created.                                                             |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| <b>X'07'</b> Transaction SMB changed by shared queues SID exchange.                                                |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| <b>X'08'</b> TPIPE for OTMA in an XRF environment deleted.                                                         |                    |            |                                                                                                                                                                                                                                                                                                      |          |
| X'99'                                                                                                              | DFSDXBLK           | DFSDXBLK |  |  |  | Created by the logging option on the EXIT= parameter on the DBDGEN. This allows a user to capture database changes that can then be propagated to another environment (for example, DB2 for z/OS). The subcodes indicate the type of record being logged: |
|                                                                                                                    |                    |            | <b>X'04'</b> Changed data                                                                                                                                                                                                                                                                            |          |
|                                                                                                                    |                    |            | <b>X'28'</b> End of job (EOJ)                                                                                                                                                                                                                                                                        |          |
|                                                                                                                    |                    |            | <b>X'30'</b> SETS call                                                                                                                                                                                                                                                                               |          |
|                                                                                                                    |                    |            | <b>X'34'</b> ROLS call                                                                                                                                                                                                                                                                               |          |
|                                                                                                                    |                    |            | This log record is mapped by the macro, DFSDXBLK, which is not shipped.                                                                                                                                                                                                                              |          |

**Related concepts:**

“Repository Server audit log records” on page 21

“Determining a value for the LOCKMAX parameter” on page 210

**Related reference:**

“DEDB control interval (CI) problem assistance aids” on page 365

“X'4930': database tracker FSE error log record format” on page 475

“Terminal communication task trace” on page 261

“SNAP call facility” on page 572

**Format of X'29' log record**

The format of the X'29' log records, including offset (ex.), length, field name, and field description are listed.

**X'2900': OLR command received**

A X'2900' log record is written to indicate the receipt of a HALDB OLR command.

Only one X'2900' log record is written for each command. The following table describes the layout of the X'2900' log record.

Table 194. X'2900' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                   |
|---------------|------------------|------------|---------------------------------------------------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number                                          |
| 02            | 2                | HORRSV1    | X'0000' Reserved                                                                                                    |
| 04            | 1                | HORTYPE    | X'29' Record type                                                                                                   |
| 05            | 1                | HORSTYPE   | X'00' Record sub-type                                                                                               |
| 06            | 2                | HORRSV2    | X'0000' Reserved                                                                                                    |
| 08            | 8                | HORSENEM   | RSE name or IMS ID                                                                                                  |
| 10            | 16               | HOROMCT    | OM command token if from a type-2 command, or zeros if from a type-1 command                                        |
| 20            | 1                | HORCTYPE   | Command type flags:<br><br>"1000 ...." INITIATE<br>"0100 ...." UPDATE<br>"0010 ...." QUERY<br>"0001 ...." TERMINATE |
| 21            |                  | HOROCMD    | OM command instance block (OCMD) if from a type-2 command, or zeros if from a type-1 command                        |

**X'2910': ownership established**

Ownership of the online reorganization for a partition was established through DBRC.

The following table describes the X'2910' log record layout.



Table 195. X'2910' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                          |
|---------------|------------------|------------|----------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number |
| 02            | 2                | HORRSV1    | X'0000' Reserved                                                           |
| 04            | 1                | HORTYPE    | X'29' Record type                                                          |
| 05            | 1                | HORSTYPE   | X'10' Record sub-type                                                      |
| 06            | 2                | HORPSTNO   | PST number                                                                 |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                         |
| 10            | 8                | HORDBD     | DBD name                                                                   |
| 18            | 8                | HORPSB     | PSB name                                                                   |
| 18            | 1                | HORPSB0    | C'0'                                                                       |
| 19            | 7                | HORPART    | Partition name                                                             |
| 20            | 1                | HOROFLG1   | Flag bit definitions:                                                      |
| \| |  |  | <b>B'10.. ....'</b>                                                        |
| \| |  |  | The INITIATE OLREORG command was issued with                               |
| \| |  |  | OPTION(NODEL)                                                              |
| \| |  |  | <b>B'01.. ....'</b>                                                        |
| \| |  |  | The INITIATE OLREORG command was issued with or                            |
| \| |  |  | defaulted to OPTION(DEL)                                                   |
| \| |  |  | <b>B'..1. ....'</b>                                                        |
| \| |  |  | The INITIATE OLREORG command was issued with the                           |
| \| |  |  | RATE option                                                                |
| \| |  |  | <b>B'...0 ....'</b>                                                        |
| \| |  |  | A new reorganization started                                               |
| \| |  |  | <b>B'...1 ....'</b>                                                        |
| \| |  |  | The reorganization restarted                                               |
| \| |  |  | <b>B'.... .0..'</b>                                                        |
| \| |  |  | The database is not covered by RSR                                         |
| \| |  |  | <b>B'.... .1..'</b>                                                        |
| \| |  |  | The database is covered by RSR                                             |
| \| |  |  | <b>B'.... ..1.'</b>                                                        |
| \| |  |  | The INITIATE OLREORG command was issued with or                            |
| \| |  |  | defaulted to OPTION(NOREL)                                                 |
| \| |  |  | <b>B'.... ...1'</b>                                                        |
| \| |  |  | The INITIATE OLREORG command was issued with                               |
| \| |  |  | OPTION(REL)                                                                |
| 21            | 1                | HORORATEV  | RATE value (1 through 100 percent)                                         |

### X'2911': conditional ownership established

An attempt to establish ownership of OLR in the RECON will be made. The ownership may or may not be recorded in the RECON for this partition. When OLR has established ownership, this log record contains the data set retention (DEL/NODEL/REL/NOREL) and rate options specified on the INIT OLREORG command.

The following table describes the X'2911' log record layout.

Table 196. X'2911' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                                                                                                                                                                                                                                                                                             |
|---------------|------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number                                                                                                                                                                                                                                                                                                                    |
| 02            | 2                | HORRSV1    | X'0000'                                                                                                                                                                                                                                                                                                                                                                                       |
| 04            | 1                | HORTYPE    | X'29' Record type                                                                                                                                                                                                                                                                                                                                                                             |
| 05            | 1                | HORSTYPE   | X'10' Record sub-type                                                                                                                                                                                                                                                                                                                                                                         |
| 06            | 2                | HORPSTNO   | PST number                                                                                                                                                                                                                                                                                                                                                                                    |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                                                                                                                                                                                                                                                                                                                                            |
| 10            | 8                | HORDBD     | DBD name                                                                                                                                                                                                                                                                                                                                                                                      |
| 18            | 8                | HORPSB     | PSB name                                                                                                                                                                                                                                                                                                                                                                                      |
| 18            | 1                | HORPSB0    | C'0'                                                                                                                                                                                                                                                                                                                                                                                          |
| 19            | 7                | HORPART    | Partition name                                                                                                                                                                                                                                                                                                                                                                                |
| 20            | 1                | HORCOFLG1  | Flag bit definitions:<br><br><b>B'10.. ....'</b><br>The INTIATE OLREORG command was issued with<br>OPTION(NODEL)<br><br><b>B'01.. ....'</b><br>The INTIATE OLREORG command was issued with<br>OPTION(DEL)<br><br><b>B'..1. ....'</b><br>The INTIATE OLREORG command was issued with<br>OPTION(NOREL)<br><br><b>B'...1 ....'</b><br>The INTIATE OLREORG command was issued with<br>OPTION(REL) |
| 21            | 1                | HORCORATEV | RATE value                                                                                                                                                                                                                                                                                                                                                                                    |

### X'2920': UPDATE OLREORG command

The UPDATE OLREORG command was processed. The X'2920' log record is written once for each HALDB partition affected by the UPDATE OLREORG command.

The following table describes the X'2920' log record layout.

Table 197. X'2920' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                           |
|---------------|------------------|------------|-----------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number. |
| 02            | 2                | HORRSV1    | X'0000' Reserved.                                                           |
| 04            | 1                | HORTYPE    | X'29' Record type.                                                          |
| 05            | 1                | HORSTYPE   | X'20' Record sub-type.                                                      |
| 06            | 2                | HORPSTNO   | PST number.                                                                 |
| 08            | 8                | HORRSENM   | RSE name or IMS ID.                                                         |
| 10            | 8                | HORDBD     | DBD name.                                                                   |

Table 197. X'2920' log record layout (continued)

| Offset (hex.) | Length<br>(decimal) | Field name | Field description                                                                                                                                                                                                                          |
|---------------|---------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18            | 8                   | HORPSB     | PSB name.                                                                                                                                                                                                                                  |
| 18            | 1                   | HORPSB0    | C'0'                                                                                                                                                                                                                                       |
| 19            | 7                   | HORPART    | Partition name                                                                                                                                                                                                                             |
| 20            | 1                   | HORUFLG1   | Flags:<br><br>B'10.. ....'<br>The NODEL option is now in effect.<br><br>B'01.. ....'<br>The DEL option is now in effect.<br><br>B'..1. ....'<br>The NOREL option is now in effect.<br><br>B'...1 ....'<br>The REL option is now in effect. |
| 21            | 1                   | HORURATEV  | RATE value (1 through 100 percent) that is now in effect.                                                                                                                                                                                  |

### X'2930': output data set information

The output data sets have been successfully validated or created. This X'2930' log record contains various characteristics of all of the output data sets, both those that were preexisting and those that were automatically created.

There is enough information to recreate any of these output data sets. The following table describes the X'2930' log record layout.

Table 198. X'2930' log record layout

| Offset (hex.) | Length<br>(decimal) | Field name | Field description                                                           |
|---------------|---------------------|------------|-----------------------------------------------------------------------------|
| 00            | 2                   | HORLENG    | Length of this record, including this length field and the sequence number. |
| 02            | 2                   | HORRSV1    | X'0000' Reserved.                                                           |
| 04            | 1                   | HORTYPE    | X'29' Record type.                                                          |
| 05            | 1                   | HORSTYPE   | X'30' Record sub-type.                                                      |
| 06            | 2                   | HORPSTNO   | PST number.                                                                 |
| 08            | 8                   | HORRSENM1  | RSE name or IMS ID.                                                         |
| 10            | 8                   | HORDBD     | DBD name.                                                                   |
| 18            | 8                   | HORPSB     | PSB name.                                                                   |
| 18            | 1                   | HORPSB0    | C'0'                                                                        |
| 19            | 7                   | HORPART    | Partition name                                                              |
| 20            | 4                   | HORDUSN    | Update sequence number (USN).                                               |
| 24            | 4                   | HORDUSID   | Update set ID (USID).                                                       |

Table 198. X'2930' log record layout (continued)

| Offset (hex.) | Length<br>(decimal) | Field name | Field description                                                                                                                                                                                                                                                                                                                              |
|---------------|---------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 28            | 1                   | HORDFLG1   | Flags:<br>". . . . .0 ."<br>The database is not RSR covered.<br>". . . . .1 ."<br>The database is RSR covered.<br>". . . . .0 ."<br>The A-thru-J and X data sets are the output data sets.<br>". . . . .1 ."<br>The M-thru-V and Y data sets are the output data sets.<br>". . . . .0"<br>PHIDAM database.<br>". . . . .1"<br>PHIDAM database. |
| 29            | 1                   | HORDDSECT  | Number of following entries.                                                                                                                                                                                                                                                                                                                   |
| 2A            |                     | HORDDSE    | The group of fields shown in Table 199 is repeated for each output data set. There are two entries for the primary index data set of a PHIDAM database.                                                                                                                                                                                        |

The group of fields shown in the following table is repeated for each output data set. There are two entries for the primary index data set of a PHIDAM database.

Table 199. X'2930' log record layout — repeated data set fields

| Offset (hex.) | Length<br>(decimal) | Field name | Field description                                                                                                                                                                                          |
|---------------|---------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00            | 2                   | HORDENTL   | Entry length, including this length field.                                                                                                                                                                 |
| 04            | 1                   | HORDUCBDCL | UCB device class.                                                                                                                                                                                          |
| 05            | 1                   | HORDUCBDCC | UCB device class.                                                                                                                                                                                          |
| 06            | 1                   | HORDDCBN   | DCB number, with A-thru-J, X or M-thru-V, Y indicator:<br>". . . . .0 ."<br>One of the A-thru-J or X data sets.<br>". . . . .1 ."<br>One of the M-thru-V or Y data sets.<br>". . . . .nnnn"<br>DCB number. |
| 07            | 8                   | HORDDDNAM  | The DD name used for allocation.                                                                                                                                                                           |

Table 199. X'2930' log record layout — repeated data set fields (continued)

| Offset (hex.) | Length<br>(decimal) | Field name | Field description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------|---------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0F            | 1                   | HORDDFL1   | <p>Data set flags:</p> <p>"0... .."<br/>OSAM data set.</p> <p>"1... .."<br/>VSAM data set.</p> <p>".0.. .."<br/>Data set existed before INITIATE OLREORG command.</p> <p>".1.. .."<br/>Data set was created automatically.</p> <p>"..0. ...."<br/>Non-SMS-managed data set.</p> <p>"..1. ...."<br/>SMS-managed data set.</p> <p>"1..0 ...."<br/>VSAM ESDS.</p> <p>"1..1 0..."<br/>VSAM KSDS data component (DCB number X'05' or X'85').</p> <p>"1..1 1..."<br/>VSAM KSDS index component (DCB number X'04' or X'84').</p> <p>".... .0.."<br/>NOREPLICATE. Do not replicate index records (or replication not applicable).</p> |
| 10            | 1                   | HORDDFL2   | <p>Data set space allocation flags for Input data set primary space allocation unit</p> <p>"1000 ...."<br/>Records (VSAM) or blocks (OSAM).</p> <p>"0100 ...."<br/>Bytes</p> <p>"0010 ...."<br/>Kilobytes.</p> <p>"....0001"<br/>Megabytes.</p> <p>".... 1000"<br/>Cylinders</p> <p>".... 0100"<br/>Tracks</p>                                                                                                                                                                                                                                                                                                                |

Table 199. X'2930' log record layout — repeated data set fields (continued)

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                                                                                                                                                                     |
|---------------|------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11            | 1                | HORDDFL3   | Data set space allocation flags for Input data set secondary space allocation unit:<br>"1000...."<br>Records (VSAM) or blocks (OSAM)<br>"0100...."<br>Bytes<br>"0010...."<br>Kilobytes<br>"....00001"<br>Megabytes<br>"....1000"<br>Cylinders<br>"....0100"<br>Tracks |
| 12            | 4                | HORDRCSZ   | VSAM record size or OSAM block size.                                                                                                                                                                                                                                  |
| 16            | 4                | HORDCISZ   | For VSAM, control interval size. For OSAM: 0.                                                                                                                                                                                                                         |
| 1A            | 8                | HORDDATC   | For SMS-managed, data class if present. Otherwise, blanks.                                                                                                                                                                                                            |
| 22            | 8                | HORDSTGC   | For SMS-managed, storage class. Otherwise, blanks.                                                                                                                                                                                                                    |
| 2A            | 8                | HORDMGTC   | For SMS-managed, management class if present. Otherwise, blanks.                                                                                                                                                                                                      |
| 32            | 4                | HORDPRIA   | Primary allocation amount. See HORDDFL2.                                                                                                                                                                                                                              |
| 36            | 4                | HORDPRIACV | Primary space converted amount in blocks/records/megabytes.                                                                                                                                                                                                           |
| 3A            | 4                | HORDSECA   | Secondary allocation amount. See HORDDFL2.                                                                                                                                                                                                                            |
| 3E            | 4                | HORDSECACV | Secondary space converted amount in blocks/records/megabytes.                                                                                                                                                                                                         |
| 42            | 1                | HORDFSCI   | For VSAM KSDS data component, free space percentage in each control interval.                                                                                                                                                                                         |
| 43            | 1                | HORDFSCA   | For VSAM KSDS data component, free space percentage in each control area.                                                                                                                                                                                             |
| 44            | 1                | HORDKYLN   | For VSAM KSDS data component, key length.                                                                                                                                                                                                                             |
| 45            | 2                | HORDKYOF   | For VSAM KSDS data component, key offset.                                                                                                                                                                                                                             |
| 47            | 1                | HORDSHRR   | For VSAM, SHAREOPTIONS value, cross-region.                                                                                                                                                                                                                           |
| 48            | 1                | HORDSHRS   | For VSAM, SHAREOPTIONS value, cross-system.                                                                                                                                                                                                                           |
| 49            | 1                | HORDVOLR   | Number of existing or requested DASD volumes.                                                                                                                                                                                                                         |
| 4A            | 1                | HORDVOLC   | Number of volume serial numbers following.                                                                                                                                                                                                                            |
| 4B            | <i>n</i>         | HORDVOLS   | Volume serial numbers.                                                                                                                                                                                                                                                |
| 4C            | 6                | HORDVOL    | Volume serial number (repeated). HORDVOLC contains the number of these volume serial number entries.                                                                                                                                                                  |

### X'2940': cursor-active status set

The cursor is active. Initialization of the reorganization of the partition was completed successfully, two sets of data sets exist, and copying is about to begin. The reorganization was recorded through DBRC as being in a cursor-active status.

The following table describes the X'2940' log record layout.

Table 200. X'2940' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 02            | 2                | HORRSV1    | X'0000' Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 04            | 1                | HORTYPE    | X'29' Record type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 05            | 1                | HORSTYPE   | X'40' Record sub-type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 06            | 2                | HORPSTNO   | PST number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10            | 8                | HORDBD     | DBD name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 18            | 8                | HORPSB     | PSB name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 18            | 1                | HORPSB0    | C'0'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 19            | 7                | HORPART    | Partition name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 20            | 4                | HORDUSN    | Update sequence number (USN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 24            | 4                | HORDUSID   | Update set ID (USID)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 28            | 1                | HORAFLG1   | Flags:<br>". . . . 0 . . ."<br>This log record was created at the IMS doing the HALDB Online Reorganization.<br>". . . . 1 . . ."<br>This log record was created by an IMS doing data sharing with the IMS doing the HALDB Online Reorganization.<br>". . . . .0 . . ."<br>The database is not RSR covered.<br>". . . . .1 . . ."<br>The database is RSR covered.<br>". . . . ..0 . . ."<br>The A-thru-J and X data sets are the input data sets.<br>". . . . ..1 . . ."<br>The M-thru-V and Y data sets are the input data sets.<br>". . . . ...0"<br>PHDAM database.<br>". . . . ...1"<br>PHIDAM database. |
| 29            | 12               | HORARATIM  | Time stamp of reorganization active. This is the time of the DBRC ALLOC for the first output data set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### X'2950': cursor movement

The cursor was updated. The X'2950' log record appears before the X'3730' log record that indicates that a unit of reorganization was committed.

The following table describes the X'2950' log record layout.

Table 201. X'2950' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                                                                                                                               |
|---------------|------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number                                                                                                                                                      |
| 02            | 2                | HORRSV1    | X'0000' Reserved                                                                                                                                                                                                                |
| 04            | 1                | HORTYPE    | X'29' Record type                                                                                                                                                                                                               |
| 05            | 1                | HORSTYPE   | X'50' Record sub-type                                                                                                                                                                                                           |
| 06            | 2                | HORPSTNO   | PST number                                                                                                                                                                                                                      |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                                                                                                                                                                              |
| 10            | 8                | HORDBD     | DBD name                                                                                                                                                                                                                        |
| 18            | 8                | HORPSB     | PSB name                                                                                                                                                                                                                        |
| 18            | 1                | HORPSB0    | C'0'                                                                                                                                                                                                                            |
| 19            | 7                | HORPART    | Partition name                                                                                                                                                                                                                  |
| 20            | 8                | HORMUORS   | Segments moved in this UOR                                                                                                                                                                                                      |
| 28            | 8                | HORMUORZ   | Size moved in this UOR                                                                                                                                                                                                          |
| 30            | 8                | HORMRSEG   | Total segments moved before this UOR                                                                                                                                                                                            |
| 38            | 8                | HORMRSZE   | Total size moved before this UOR                                                                                                                                                                                                |
| 40            | 4                | HORMORSA   | Number of roots moved this UOR                                                                                                                                                                                                  |
| 44            | 4                | HORMLOCK   | Lock count for this OLR                                                                                                                                                                                                         |
| 48            | 4                | HORMSTT    | UOR start time, in unsigned binary format                                                                                                                                                                                       |
| 4C            | 12               | HORMUTST   | UOR start time, in UTC format                                                                                                                                                                                                   |
| 58            | 4                | HORMTIME   | Execution time                                                                                                                                                                                                                  |
| 5C            | 4                | HORMWAIT   | Wait time                                                                                                                                                                                                                       |
| 60            | 4                | HORMORSZ   | UOR size calculated                                                                                                                                                                                                             |
| 64            | 4                | HORMORW1   | Not used                                                                                                                                                                                                                        |
| 68            | 4                | HORMORW2   | Not used                                                                                                                                                                                                                        |
| 6C            | 8                | HORMCHNG   | DFSORP20 CHANGEID                                                                                                                                                                                                               |
| 74            | 1                | HORMFLG1   | Flags:<br>". . . . . 0."<br>The A-thru-J or X data sets are the input data sets<br>". . . . . 1."<br>The M-thru-V or Y data sets are the input data sets<br>". . . . . 0"<br>PHDAM database<br>". . . . . 1"<br>PHIDAM database |
| 75            | 4                | HORMRBA    | PHDAM cursor RBA                                                                                                                                                                                                                |
| 75            | 1                | HORMKLN    | Length of root key for PHIDAM                                                                                                                                                                                                   |
| 76            | <i>n</i>         | HORMKEY    | PHIDAM cursor root key. The length <i>n</i> is the length of the root key.                                                                                                                                                      |



## X'2970': cursor-active status reset

The cursor is inactive. Copying from the input to the output data sets has completed. The reorganization was recorded through DBRC as no longer being in a cursor-active status.

The following table describes the X'2970' log record layout.

Table 202. X'2970' log record layout

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 02            | 2                | HORRSV1    | X'0000' Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 04            | 1                | HORTYPE    | X'29' Record type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 05            | 1                | HORSTYPE   | X'70' Record sub-type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 06            | 2                | HORPSTNO   | PST number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 10            | 8                | HORDBD     | DBD name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 18            | 8                | HORPSB     | PSB name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 18            | 1                | HORPSB0    | C'0'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 19            | 7                | HORPART    | Partition name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 20            | 4                | HOREUSN    | Update sequence number (USN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 24            | 4                | HOREUSID   | Update set ID (USID)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 28            | 1                | HOREFLG1   | Flags:<br><br>B'10.. ....'<br>The NODEL option is now in effect.<br><br>B'01.. ....'<br>The DEL option is now in effect.<br><br>B'.... 0...'<br>This log record was created at the IMS doing the HALDB Online Reorganization.<br><br>B'.... 1...'<br>This log record was created by an IMS doing data sharing with the IMS doing the HALDB Online Reorganization.<br><br>B'.... .0..'<br>The database is not RSR covered.<br><br>B'.... .1..'<br>The database is RSR covered.<br><br>B'.... ..0..'<br>The A-thru-J or X data sets are the input data sets.<br><br>B'.... ..1..'<br>The M-thru-V or Y data sets are the input data sets.<br><br>B'..1. ....'<br>The NOREL option is now in effect.<br><br>B'...1 ....'<br>The REL option is now in effect. |
| 29            | 12               | HORCITIM   | Time stamp of cursor inactive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

### **X'2971': conditional reset of the cursor active**

OLR has completed copying all data from the input data sets to the output data sets. Following this log record an attempt to reset cursor active in the RECON will be made.

The following table describes the X'2971' log record layout.

*Table 203. X'2990' log record layout*

| Offset (hex.) | Length (decimal) | Field name | Field description                                                          |
|---------------|------------------|------------|----------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number |
| 02            | 2                | HORRSV1    | X'0000'                                                                    |
| 04            | 1                | HORTYPE    | X'29' Record type                                                          |
| 05            | 1                | HORSTYPE   | X'71' Record sub-type                                                      |
| 06            | 2                | HORPSTNO   | PST number                                                                 |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                         |
| 10            | 8                | HORDBD     | DBD name                                                                   |
| 18            | 8                | HORPSB     | PSB name                                                                   |
| 18            | 1                | HORPSB0    | C'0'                                                                       |
| 19            | 7                | HORPART    | Partition name                                                             |

### **X'2990': ownership relinquished**

Ownership of the reorganization for a partition was relinquished through DBRC.

See Table 203 for X'2990' log record layout.

*Table 204. X'2990' log record layout*

| Offset (hex.) | Length (decimal) | Field name | Field description                                                                                                                                                                                                               |
|---------------|------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00            | 2                | HORLENG    | Length of this record, including this length field and the sequence number                                                                                                                                                      |
| 02            | 2                | HORRSV1    | X'0000' Reserved                                                                                                                                                                                                                |
| 04            | 1                | HORTYPE    | X'29' Record type                                                                                                                                                                                                               |
| 05            | 1                | HORSTYPE   | X'90' Record sub-type                                                                                                                                                                                                           |
| 06            | 2                | HORPSTNO   | PST number                                                                                                                                                                                                                      |
| 08            | 8                | HORRSENM   | RSE name or IMS ID                                                                                                                                                                                                              |
| 10            | 8                | HORDBD     | DBD name                                                                                                                                                                                                                        |
| 18            | 8                | HORPSB     | PSB name                                                                                                                                                                                                                        |
| 18            | 1                | HORPSB0    | C'0'                                                                                                                                                                                                                            |
| 19            | 7                | HORPART    | Partition name                                                                                                                                                                                                                  |
| 22            | 1                | HORREAS    | Reason for relinquishing ownership:<br><b>X'80'</b> Normal completion of the online reorganization.<br><b>X'40'</b> Pseudo-abend during an online reorganization.<br><b>X'20'</b> TERM command during an online reorganization. |
| 21            | 4                | HORABTRM   | Pseudo-abend code                                                                                                                                                                                                               |

Table 204. X'2990' log record layout (continued)

| Offset (hex.) | Length (decimal) | Field name | Field description         |
|---------------|------------------|------------|---------------------------|
| 25            | 8                | HORSEGCT   | Number of segments copied |

## Format of X'67' log record

A physical log record consists of one or more subrecords. Each subrecord is followed by its associated data.

The following figure shows the layout of the X'67' log record.

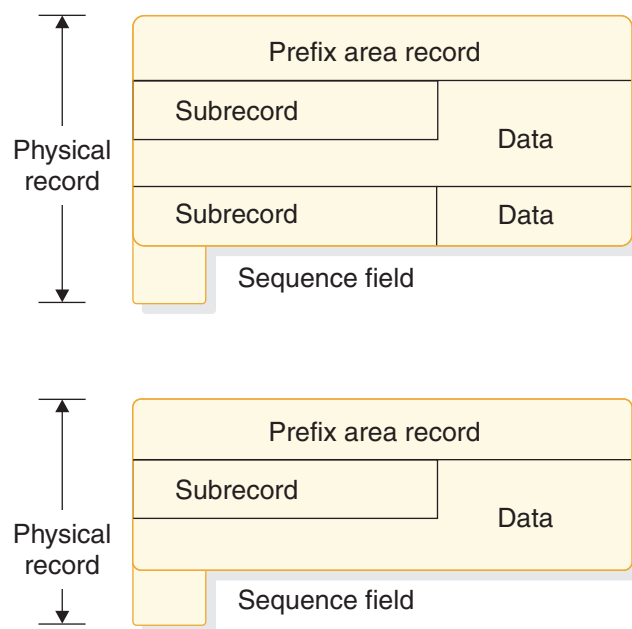


Figure 76. X'67' log record layout

### Related tasks:

"Program isolation trace" on page 211

### Log record prefix area format

The log record prefix area formats for X'67' and X'67FA' records are shown, including the offset, length, and a brief description.

Table 205. Log record prefix area format for X'67'

| Offset (hexadecimal) | Length (decimal) | Description                                 |
|----------------------|------------------|---------------------------------------------|
| 00                   | 2                | Length of record, including sequence number |
| 02                   | 2                | Reserved                                    |
| 04                   | 1                | X'67' record type                           |
| 05                   | 1                | X'FB' X'FD' X'FF'                           |
| 06                   | 2                | Reserved                                    |
| 08                   | 4                | Requestor identification                    |
| 0C                   | 2                | Record segment number                       |

Table 205. Log record prefix area format for X'67' (continued)

| Offset (hexadecimal) | Length (decimal) | Description         |
|----------------------|------------------|---------------------|
| 0E                   | 2                | Reserved            |
| 10                   | 4                | Time                |
| 14                   | 4                | Date                |
| 18                   | 4                | Reserved            |
| 1C                   | 4                | Condition indicator |

For X'67FA' records, the order of the fields from offset X'08' through X'14' is shown in the following table.

Table 206. Log record prefix area format for X'67FA' records

| Offset (hexadecimal) | Length (decimal) | Description          |
|----------------------|------------------|----------------------|
| 08                   | 4                | Date                 |
| 0C                   | 4                | Time                 |
| 10                   | 2                | Table identification |
| 12                   | 2                | Flag bytes           |

## Log subrecord and data area

The X'67' log subrecord uses the data format given in the following table.

Table 207. Log subrecord area format

| Offset (hexadecimal) | Length (decimal) | Description                                                                         |
|----------------------|------------------|-------------------------------------------------------------------------------------|
| 00                   | 8                | Element identification                                                              |
| 08                   | 2                | Reserved                                                                            |
| 0A                   | 2                | Element data length, excluding descriptor                                           |
| 0C                   | 4                | Main storage address of data when logged; zero when continued from previous element |

Table 208. Log data area format

| Offset (hexadecimal) | Length   | Description |
|----------------------|----------|-------------|
| 10                   | variable | Logged data |

## Log sequence field format

The log sequence field format is described in the following table.

Table 209. Log sequence field format

| Offset (hexadecimal) | Length (decimal) | Description                                                                                                             |
|----------------------|------------------|-------------------------------------------------------------------------------------------------------------------------|
| n                    | 8                | STCK time stamp representing the time the log record was written. The time stamp is not necessarily on a word boundary. |
| n+8                  | 8                | Sequence number within the IMS control region.                                                                          |

## Format of synchronous callout messages

Synchronous callout messages are non-recoverable OTMA messages that are initiated by an AIBTDLI call. These messages do not go through the IMS message queue structure.

For every synchronous callout message and its response message, a simplified OTMA X'6701' log record is written with the OTMA message prefix information and the data. Four IDs are used in different situations, each of which returns a simplified X'6701' log record. Examples are shown for each of the following IDs:

- ID = YOUT
- ID = YACK
- ID = YRSP
- ID = YNAK
- ID = TIB3

### Example of a formatted X'6701' log record with ID = YOUT

The following X'6701' log record with ID = YOUT is written when a synchronous callout message is sent to an OTMA client, such as IMS Connect:

```
INTERNAL TRACE RECORD ID = YOUT SEGNO=00 RECNO = 0000082F TIME 12:48:22.189 DATE 2008.234?
MCI PREF
0992D84E 000000 0180 20000020 E3D7C9D7 C5F14040 A0F00000 * TPIPE1 .0..*
0992D860 000012 00030000 00000000 00000001 0000 *.....STATE 0 ..*
STATE
0C29F040 000000 00482048 01004040 40404040 40400000 00000000 00B60000 00000000 00000000 *.....*
0C29F060 000020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C29F080 000040 00000000 00000000 00000000 00000000 00000000 *.....SECURITY.....0H.....FP*
SECURITY
0C29F088 000000 000E0000 0902C6D7 C5F0F0F0 F140 * FPE0001 USER SGM..*
USER SGM
0C29F096 000000 0100 00000000 00000000 00000000 00000000 00000000 * *
0C29F0A0 00000A 0000E3D7 C9D7C5F1 40400000 00000000 00000000 00000000 00000000 00000000 *..TPIPE1 *
0C29F0C0 00002A 00000000 00000000 00000000 00000000 00000000 40000000 00000000 00000000 *.....*
0C29F0E0 00004A 00000000 00000100 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C29F100 00006A 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C29F120 00008A SAME AS ABOVE
0C29F140 0000AA 00000000 00000000 00000000 00280000 C9D4E2F1 01000017 00220002 C2E0DE33 *.....IMS1.....B...*
0C29F160 0000CA 9B08FE7C E3D7C9D7 C5F14040 C6D7C5F0 F0F0F140 00000000 00000000 00000000 *...@TPIPE1 FPE0001 *
0C29F180 0000EA 00000000 00000000 00000000 00000000 00000000 0000 *.....APPL SGM...*
APPL SGM
0C29F196 000000 0068 0000C6C9 D9E2E340 * FIRST *
0C29F1A0 00000A D4C5E2E2 C1C7C540 C9E240E2 C5D5E340 E3D640C3 D3C9C5D5 E3404040 40404040 *MESSAGE IS SENT TO CLIENT *
0C29F1C0 00002A 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
0C29F1E0 00004A 40404040 40404040 40404040 40404040 40404040 40404040 4040 * B.*
```

### Example of a formatted X'6701' log record with ID = YACK

After a synchronous callout message is received and an acknowledgment is sent back to OTMA, OTMA writes the following X'6701' log record with ID = YACK:

```
INTERNAL TRACE RECORD ID = YACK SEGNO=00 RECNO = 00000830 TIME 12:48:22.303 DATE 2008.234?
MCI PREF
7F2D8E28 000000 01208000 0000E3D7 C9D7C5F1 4040A0E0 0000000F 00000000 * TPIPE1 *
7F2D8E40 000018 00000000 00010000 *.....STATE ".....*
STATE
7F2D8E48 000000 00482040 01000000 00000000 00000000 00000000 00B60000 * *
7F2D8E60 000018 00000000 00000000 00000000 0000C2E0 DE2137C9 6A780000 00000000 00000000 *.....B....I.....*
7F2D8E80 000038 00000000 0000E3C5 E2E3D3E3 D9D40000 *.....TESTLTRM..SECURITY...."....*
SECURITY
7F2D8E90 000000 006AC614 0902E4E2 D9E3F0F0 F1400903 * ..F...USRT001 ..*
7F2D8EA0 000010 40404040 40404040 00000000 00000000 00000000 00000000 00000000 00000000 * *
7F2D8EC0 000030 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F2D8EE0 000050 00000000 00000000 00000000 00000000 00000000 0000 * USER S*
USER SGM
7F2D8EFA 000000 0100 0000C9D4 * IM*
7F2D8F00 000006 E2F14040 4040E3D7 C9D7C5F1 4040F9F9 F9F94040 4040C2E0 DE2137C8 E2B80000 *S1 TPIPE1 9999 B....HS...*
7F2D8F20 000026 00000000 00000000 000008B7 ED480000 00000000 00001000 40640000 00004040 *.....*
7F2D8F40 000046 40404040 40400000 00000200 00000000 00000000 00004040 40404040 40400000 * *
7F2D8F60 000066 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F2D8F80 000086 TO 7F2D8FC0 0000C6 SAME AS ABOVE
7F2D8FE0 0000E6 00000000 00000000 00000000 00000000 00000000 0000 * B.....*
```

## Example of a formatted X'6701' log record with ID = YRSP

After OTMA receives a response for a synchronous callout message, the following X'6701' log record with ID = YRSP is written:

```
INTERNAL TRACE RECORD ID = YRSP SEGNO=00 RECNO = 00000831 TIME 12:48:22.305 DATE 2008.234? PAGE 0002
MCI PREF - FORMATTED LOG PRINT
7F2D8E10 000000 01800800 0000E2E8 D5C3D9C5 E2D7A0F0 *SYNCRESP.0*
7F2D8E20 000010 00000010 00000000 00000000 00010000 *.....STATE*
STATE
7F2D8E30 000000 00480040 01000000 00000000 00000000 **
7F2D8E40 000010 00000000 00B60000 00000000 00000000 *.....B.....*
7F2D8E60 000030 00000000 00000000 00000000 0000E3C5 E2E3D3E3 D9D40000 *.....TESTLTRM..SECURITY*
SECURITY
7F2D8E78 000000 006AC614 0902C7D6 * ..F...GO*
7F2D8E80 000008 C6C9E2C8 C9D50903 40404040 40404040 00000000 00000000 *FISHIN..*
7F2D8EA0 000028 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F2D8EC0 000048 SAME AS ABOVE
7F2D8EE0 000068 0000 *..USER SGM....".S....IMS1 SY*
USER SGM
7F2D8EE2 000000 0100 0000C9D4 E2F14040 4040E2E8 D5C3D9C5 E2D7F9F9 F9F94040 4040C2E0 * ...IMS1 SYNCRESP9999 B.*
7F2D8F00 00001E DE33B713 C5BA0000 00000000 00000000 00000BB7 EAB00000 00000000 00000000 *...E.....*
7F2D8F20 00003E 40E90000 00004040 40404040 40400000 00000200 00000000 00000000 00004040 * Z....*
7F2D8F40 00005E 40404040 40400000 00000000 00000000 00000000 00000000 00000000 00000000 **
7F2D8F60 00007E 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F2D8F80 00009E 00000000 00000000 00000000 00000000 00000000 00000000 00280000 C9D4E2F1 *.....IMS1*
7F2D8FA0 0000BE 01000017 00220002 C2E0DE33 9B08FE7C E3D7C9D7 C5F14040 C6D7C5F0 F0F0F140 *.....B.....@TPIPE1 FPE0001 *
7F2D8FC0 0000DE 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F2D8FE0 0000FE 0000 *..APPL SGM....".S....RESPONSE T*
APPL SGM
7F2D8FE2 000000 001E 0000D9C5 E2D7D6D5 E2C540E3 D640E2E8 D5C3C840 C3C1D3D3 D6E4E340 *RESPONSE TO SYNCH CALLOUT *
```

## Example of a formatted X'6701' log record with ID = YNAK

If OTMA receives a negative acknowledgment (NAK) for the synchronous callout message from its client, the following X'6701' log record with ID = YNAK is written:

```
INTERNAL TRACE RECORD ID = YNAK SEGNO=00 RECNO = 000008AC TIME 12:50:52.645 DATE 2008.234? PAGE 0006
MCI PREF - FORMATTED LOG PRINT
7F363E28 000000 01204000 0000E3D7 C9D7C5F1 4040A0E0 00000014 00000DAC *TPIPE1*
7F363E40 000018 00000000 00010000 *.....STATE*
STATE
7F363E48 000000 00482040 01000000 00000000 00000000 00000000 00B60000 **
7F363E60 000018 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F363E80 000038 00000000 0000E3C5 E2E3D3E3 D9D40000 *.....TESTLTRM..SECURITY.....*
SECURITY
DFSER30 - FORMATTED LOG PRINT
7F363E90 000000 006AC614 0902E4E2 D9E3F0F0 F1400903 * ..F...USRT001 ..*
7F363EA0 000010 40404040 40404040 00000000 00000000 00000000 00000000 **
7F363EC0 000030 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F363EE0 000050 00000000 00000000 00000000 00000000 0000 *.....USER S*
USER SGM
7F363EFA 000000 0100 0000C9D4 *IM*
7F363F00 000006 E2F14040 4040E3D7 C9D7C5F1 4040F9F9 F9F94040 4040C2E0 DEB11E60 BEB50000 *S1 TPIPE1 9999 B....*
7F363F20 000026 00000000 00000000 00000BB7 ED480000 00000000 00001000 40640000 00004040 *.....*
7F363F40 000046 40404040 40400000 00000200 00000000 00000000 00004040 40404040 40400000 **
7F363F60 000066 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
7F363F80 000086 TO 7F363FC0 0000C6 SAME AS ABOVE
7F363FE0 0000E6 00000000 00000000 00000000 00000000 0000 *.....B..C..*
```

## Example of a formatted X'6701' log record with ID = YOUT

The following X'6701' log record with ID = YOUT is written when a synchronous callout message is sent to an OTMA client, such as IMS Connect:

```
INTERNAL TRACE RECORD ID = YOUT SEGNO=00 RECNO = 0000082F TIME 12:48:22.189 DATE 2008.234?
MCI PREF
0992D84E 000000 0180 20000020 E3D7C9D7 C5F14040 A0F00000 *TPIPE1 .0..*
0992D860 000012 00030000 00000000 00000001 0000 *.....STATE*
STATE
0C29F040 000000 00482048 01004040 40404040 40400000 00000000 00B60000 00000000 00000000 *.....*
0C29F060 000020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C29F080 000040 00000000 00000000 *.....SECURITY.....0H.....FP*
SECURITY
0C29F088 000000 000E0000 0902C6D7 C5F0F0F0 F140 *FPE0001 USER SGM..*
USER SGM
0C29F096 000000 0100 00000000 00000000 **
0C29F0A0 00000A 0000E3D7 C9D7C5F1 40400000 00000000 00000000 00000000 00000000 *..TPIPE1*
0C29F0C0 00002A 00000000 00000000 00000000 00000000 00000000 40000000 00000000 00000000 *.....*
0C29F0E0 00004A 00000000 00000100 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
```

```

0C29F100 00006A 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C29F120 00008A SAME AS ABOVE
0C29F140 0000AA 00000000 00000000 00000000 00280000 C9D4E2F1 01000017 00220002 C2E0DE33 *.....IMS1.....B...*
0C29F160 0000CA 9B08FE7C E3D7C9D7 C5F14040 C6D7C5F0 F0F0F140 00000000 00000000 *...@TPIPE1 FPE0001*
0C29F180 0000EA 00000000 00000000 00000000 00000000 00000000 0000 *.....APPL SGM...*
APPL SGM
0C29F196 000000 0068 0000C6C9 D9E2E340 * FIRST *
0C29F1A0 00000A D4C5E2E2 C1C7C540 C9E240E2 C5D5E340 E3D640C3 D3C9C5D5 E3404040 40404040 *MESSAGE IS SENT TO CLIENT *
0C29F1C0 00002A 40404040 40404040 40404040 40404040 40404040 40404040 * *
0C29F1E0 00004A 40404040 40404040 40404040 40404040 40404040 4040 * B.*

```

## Example of a formatted X'6701' log record with ID = TIB3

The following X'6701' log record with ID = TIB3 is written when a synchronous callout message is sent from the z/OS cross-system coupling facility for transactions with synchronization levels of NONE, CONFIRM, and SYNCPT if AOSLOG logging is enabled:

```

INTERNAL TRACE RECORD ID = TIB3 SEGNO=00 RECNO = 0000077D TIME 19:44:57.509 DATE 2010.1200
MSG PREF
0C6DF040 000000 027A0000 0040D581 85D50000 F9F9F9F9 40404040 C1D7D6D3 F1F14040 C5E8FA11 *.... NAEN..9999 APOL11 EY...
DFSERA30 - FORMATTED LOG PRINT PAGE 0002
0C6DF060 000020 E47F3023 C0000000 0C1AB060 C8E6E2F1 40404040 40404040 40404040 C9D4E2F1 *U".....HWS1 IMS1*
0C6DF080 000040 40404040 C5E8FA11 E4759D23 121000A8 C5E8FA11 E47F3023 00000000 00000000 * EY..U.....YEY..U".....*
0C6DF0A0 000060 00000000 00000000 0C1AB060 00000000 00000000 C9D4E2F1 00000000 00000000 *.....IMS1.....*
0C6DF0C0 000080 00000000 00000000 00000000 C5E8FA11 E45D4C63 00000000 00000000 *.....EY..U)<.....*
0C6DF0E0 0000A0 00000000 00000000 *.....*
MCI PREF
0C6DF0E8 000000 01400000 0000F9F9 F9F94040 4040A0F0 0000000A 00000000 *9999 .0.....*
0C6DF100 000018 00000000 00010000 *.....*
STATE
0C6DF108 000000 00481020 00000000 00000000 00000000 00000000 00000000 * *
0C6DF120 000018 00000000 00000000 00000000 0000C5E8 FA11E452 72630000 00000000 00000000 *.....EY..U.....*
0C6DF140 000038 00000000 00004040 40404040 40400000 *.....*
SECURITY
0C6DF150 000000 006AC614 0902E4E2 D9E3F0F0 F3400903 * ..F...USRT003 ..*
0C6DF160 000010 E2E8E2F1 40404040 00000000 00000000 00000000 00000000 *SYS1*
0C6DF180 000030 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C6DF1A0 000050 00000000 00000000 00000000 00000000 00000000 0000 *.....*
USER SGM
0C6DF1BA 000000 0100 0000C9D4 * IM*
0C6DF1C0 000006 E2F14040 4040C3D3 C9C5D5E3 F0F1F9F9 F9F94040 4040C5E8 FA0FC71D 20EB0000 *S1 CLIENT019999 EY..G.....*
0C6DF1E0 000026 00000000 00000000 00000C67 FC300000 00000000 00001010 20280000 00004040 *.....*
0C6DF200 000046 40404040 40400000 000000203 00000000 00000000 00004040 40400000 * ..*
0C6DF220 000066 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0C6DF240 000086 TO 0C6DF280 0000C6 SAME AS ABOVE 00000000 00000000 00000000 00000000 *.....*
0C6DF2A0 0000E6 00000000 00000000 00000000 00000000 00000000 0000 *.....*
APPL SGM
0C070500 000000 002A0300 E3C8C1E3 E240C1D3 D340C6D6 D3D2E240 D4C5E2E2 C1C7C540 F1406BE2 *....THATS ALL FOLKS MESSAGE 1 ,S*
0C070520 000020 C5C7D4C5 D5E340F1 404B *EGMENT 1 . *
UDATA
0C5F8D1C 000000 003E0000 * *
0C5F8D20 000004 0C1AB060 0C1AC330 C9D4E2F2 40404040 0000000D 00000000 C9D4E2F1 40404040 *...-.C. IMS2IMS1 *
0C5F8D40 000024 C5E8FA11 E48FC3A3 C9D4E2F1 40404040 C5E8FA11 E48FC3A3 4000 *EY..U.CT IMS1 EY..U.CT *
YTIB
0C1AB330 000000 E8E3C9C2 E8E3C9C2 00000000 0C1AB060 * YTIBYTIB.....*
0C1AB340 000010 0C6D90A0 F9F9F9F9 40404040 0A5398D0 00000000 00000000 E4E2D9E3 F0F0F340 *...9999 ..Q.....USRT003 *
0C1AB360 000030 E2E8E2F1 40404040 00000000 00000000 00000000 00000000 *SYS1*
0C1AB380 000050 00000000 00400100 004A0023 00010100 006A0023 00024840 D5810000 00000000 *.....NA.....*
0C1AB3A0 000070 00000000 C5E8FA11 E47F3023 0C6DF040 0C66F048 C1D7D6D3 F1F14040 0000 *....EY..U"..._0 ..0.APOL11 ..*
INTERNAL TRACE RECORD ID = TIB3 SEGNO=01 RECNO = 0000077E TIME 19:44:57.509 DATE 2010.1200
CONTINUE
0C1AB3BE 00008E 0000 * ..*
0C1AB3C0 000090 00000000 00000000 00000000 00000000 00000000 C0000000 *.....*
0C1AB3E0 0000B0 00000000 00000000 00000000 00000000 0000037A 0C070448 0C6DF0E8 0C6DF108 *....._0Y..1.*
0C1AB400 0000D0 0C6DF150 0C6DF1BA 7F2BBFEA 00000000 00028000 00000000 00000000 00000000 *.._1&.._1".....*
0C1AB420 0000F0 00000000 00000000 000100EF 00000000 C9D4E2F2 40404040 00000000 00000000 *.....IMS2*
0C1AB440 000110 40404040 40404040 00000168 20000000 00000000 00000000 C5E8FA11 E4527263 * EY..U.....*
0C1AB460 000130 C9D4E2F2 40404040 0000000D 00000000 00000000 00000000 00000000 *IMS2*

```

## Related concepts:



Synchronous callout requests (Communications and Connections)

## Printing log records and trace table entries

You can use the File Select and Formatting Print utility (DFSERA10) to print both log records from the IMS log data set and the externalized trace table entries that are recorded in the DFSTRAXx data set.





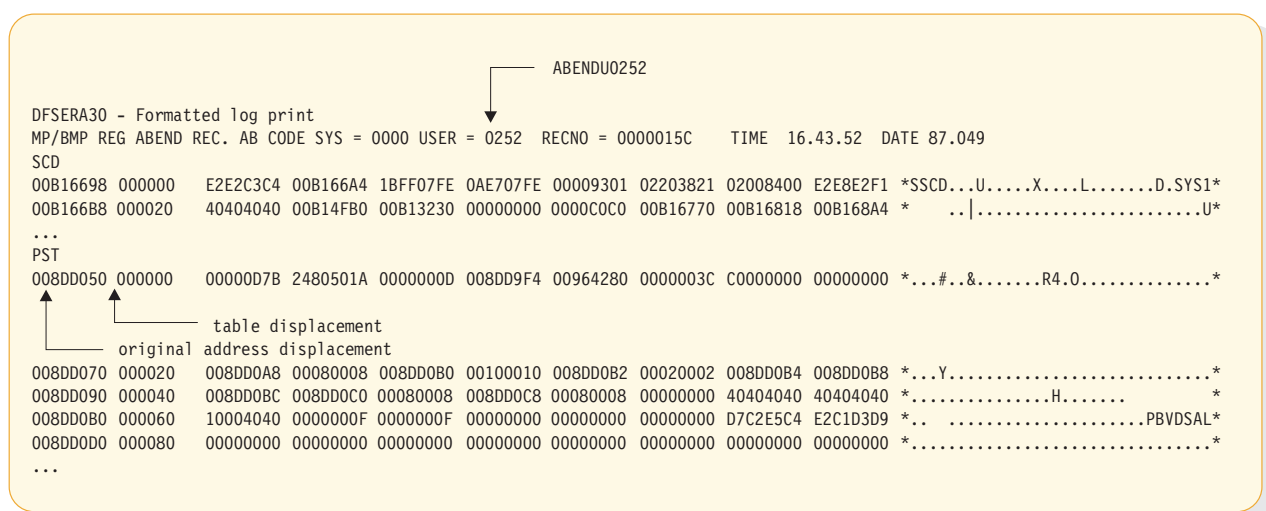


Figure 78. Formatted output using DFSERA10 with option statement, Exit=DFSERA30

#### Related concepts:

“SNAPs on exceptional conditions” on page 152

## Log Merge utility

The Log Merge utility can merge up to nine IMS system logs. Each log is the output of a uniquely identified IMS system that is running during the same time span.

The Log Merge utility (DFSMTMG0) produces one data set that is used as input to the Log Transaction Analysis utility by merging the system log data sets (SLDS) from two or more IMS systems.

## Formatting IMS dumps offline

Two methods are available for formatting IMS dumps offline: interactive formatting, performed through a series of panels which provide formatting choices, and formatting by using JCL.

#### Related concepts:

“Starting the OTMA trace” on page 339

#### Related tasks:

“Starting the Online Recovery Manager trace” on page 204

“Starting the LU manager trace” on page 317

“ABENDU1026 analysis” on page 361

#### Related reference:

“Storage manager trace” on page 628

## Overview of the IMS Offline Dump Formatter

The IMS Offline Dump Formatter (ODF) is a formatting option that reduces IMS control region abnormal termination processing.

During abend processing, IMS calls the SDUMP system service of z/OS to create a dump data set. Because SDUMP dumps the requested address spaces without formatting them, the processing time of an abnormal termination is shortened.

After abend processing finishes, you can use the IMS Offline Dump Formatter to format (and print) either the complete dump or only those sections needed to analyze the problem.

One advantage of the IMS ODF is that you can make multiple formatting passes at the dump. This means you can first format a summary and then go back one or more times to format the control blocks that will help you most to analyze the problem IMS encountered.

Other advantages of the Offline Dump Formatter include:

- An integrated IMS dump that contains the address spaces of the IMS control region, DBRC, DL/I, and IRLM address spaces.  
Also, the formatting modules are included in the dump data set. This ensures that the modules used for formatting the dump match the level of the dumped IMS control blocks. If you specify the REFRESH parameter on the user control statement for IPCS, you will get a new copy of the modules from the program library.
- You can use a z/OS stand-alone dump, SVC dump, or SYSMDUMP to produce the dump data set for the ODF to format.
- After formatting, you can either print the dump or use interactive aids such as IPCS and ISPF browse to view the dump.

Formatting dumps offline is the recommended option. If you want to format dumps online during abnormal termination, you must change the FMTO parameter to request a SNAP dump.

You cannot use the ODF to format z/OS trace and control block areas, the IRLM control blocks, or the VSAM modules.

### **Input for the IMS Offline Dump Formatter**

The dump data set you use for input to the IMS Offline Dump Formatter must include Key 0 and Key 7 CSA, the CVT, and SQA. CSA is not required for batch or CICS-local DL/I. The dump must be machine readable.

The most common input data sets are taken by SDUMPs, because the IMS control region automatically takes an SDUMP when one of its address spaces fails.

Even if a primary SDUMP request fails, the data dumped to the point of failure can still allow successful dump formatting. Some of this information might not be included in the data sets from a secondary SDUMP request, because on the secondary request only the address space that abends is dumped.

SYSMDUMPs, stand-alone dumps (SADMP), and sumps that are taken by the z/OS DUMP command usually produce acceptable input data sets.

For details of the SDUMP support job stream, refer to *IMS Version 12 System Definition*.

#### **Related tasks:**

“ABENDU1026 analysis” on page 361

### **Invoking the IMS Offline Dump Formatter**

To use the IMS Offline Dump Formatter, you must have an acceptable dump in a data set, a proper IMSDUMP entry in the IPCS exit control table and the IMS execution library with the dump formatting modules needed to be allocated to IPCS with the ddname ISPLLIB.

You then invoke the IMS Offline Dump Formatter by executing a VERBX control statement from IPCS, or through the interactive panels.

## **Solving IMS problems by using the IMS Offline Dump Formatter**

You can learn about how to approach IMS problems using IPCS and the IMS Offline Dump Formatter and how to choose FMTIMS parameters to format a system dump.

### **Approaching the problem**

The recommended diagnostic approach with the IMS Offline Dump Formatter is:

1. Use IEBGENER or IPCS COPYDMP to transfer the dump from the SYS1.DUMPxx data set to your own data set.
2. Get an overview of the problem by formatting the dump with the subset option SUMMARY.
3. Use the abend code or reason for abnormal termination, the CALLER=id, and the TCB=id from the dump title to determine the needed subset options.
4. Format the dump again with the subset options you determined in the previous step. Use the MIN qualifier (where possible) to reduce the output size. You can always format the data again if you need more information.

You might also need to format the z/OS trace and control block areas, the IRLM control blocks, or the VSAM modules. These blocks cannot be formatted with the IMS Offline Dump Formatter.

5. The formatted output is spooled. You can either print the output or use ISPF to browse it.
6. Do additional IMS subset formatting on following jobs if necessary.
7. If you still cannot locate or fix the problem, keep the dump data set because you need it when discussing the problem with an IBM Software Support representative.

### **Using IPCS and the IMS offline dump formatter**

You can interactively format IMS dumps offline by using a series of panels that provide formatting choices.

#### **Method 1**

Run the IMS Offline Dump Formatter as an IPCS verb exit to format and print the dump. You can then use IPCS to view unformatted dump storage referenced in your printed dump.

#### **Method 2**

Format, but do not print the dump. Invoke split screen mode on your terminal. On one half of the screen, use ISPF browse to view the formatted control blocks. On the other half, use IPCS to view any unformatted storage referenced in the formatted control blocks.

### **Choosing FMTIMS parameters**

Identify the general problem area before you attempt to choose FMTIMS parameters. If you are unsure of the problem area, format the dump with the SUMMARY option.

The following table shows the FMTIMS parameters that are recommended for general types of problems. For example, if you suspect the problem is with your logger, specify the DISPATCH, LOG, and SYSTEM parameters on the FMTIMS statement.

To use the following table, locate your problem area in the top row. Then read that column to find the suggested formatting options (marked with an X) for that problem.

*Table 210. FMTIMS parameters for general problems*

| Parameters            | Problem area           |    |    |    |     |              |              |      |
|-----------------------|------------------------|----|----|----|-----|--------------|--------------|------|
|                       | Checkpoint/<br>Restart | DB | DC | FP | Log | System/other | Batch        | CICS |
| CBT                   |                        | X  | X  |    |     | X            | X            | X    |
| CBTE                  |                        |    | X  |    |     |              |              |      |
| DB                    |                        | X  |    |    |     |              | X            | X    |
| DBRC                  |                        | X  |    |    |     | X            | X            | X    |
| DC                    |                        |    | X  |    |     |              | <sup>2</sup> |      |
| DEADB                 |                        | X  |    | X  |     |              |              |      |
| DISPATCH              | X                      | X  | X  | X  | X   | X            | <sup>3</sup> |      |
| EMH                   |                        | X  | X  | X  |     |              |              |      |
| LOG                   |                        |    |    |    | X   |              | X            |      |
| MSDB                  |                        | X  |    | X  |     |              |              |      |
| QM                    |                        |    | X  |    |     |              | <sup>2</sup> |      |
| RESTART               | X                      |    |    |    |     |              | <sup>2</sup> |      |
| SAP                   |                        |    | X  |    |     |              |              |      |
| SAVEAREA <sup>1</sup> | X                      | X  | X  | X  | X   | X            | <sup>2</sup> |      |
| SB                    |                        | X  |    |    |     | X            | X            | X    |
| SCD <sup>1</sup>      | X                      | X  | X  | X  | X   | X            | X            | X    |
| SPST                  | X                      |    |    | X  |     |              | <sup>2</sup> |      |
| SUBS                  |                        |    |    |    |     | X            | <sup>2</sup> |      |
| SUMMARY <sup>1</sup>  | X                      | X  | X  | X  | X   | X            | X            | X    |
| UTIL                  |                        |    | X  | X  |     |              | <sup>2</sup> |      |

Table 210. FMTIMS parameters for general problems (continued)

| Parameters                                                                                    | Problem area           |    |    |    |     |              |       |      |
|-----------------------------------------------------------------------------------------------|------------------------|----|----|----|-----|--------------|-------|------|
|                                                                                               | Checkpoint/<br>Restart | DB | DC | FP | Log | System/other | Batch | CICS |
| <b>Notes:</b>                                                                                 |                        |    |    |    |     |              |       |      |
| 1. You can use the single parameter (SYSTEM) to get the three areas (SAVEAREA, SCD, SUMMARY). |                        |    |    |    |     |              |       |      |
| 2. This parameter is ignored for batch.                                                       |                        |    |    |    |     |              |       |      |
| 3. (DISPATCH, MIN) is ignored for batch.                                                      |                        |    |    |    |     |              |       |      |

See “Solving IMS problems by using the IMS Offline Dump Formatter” on page 511 for a list of the modules formatted with each of the parameters. See “Syntax restrictions on the FMTIMS statement” on page 528 to understand the syntax rules for FMTIMS statements.

### Using the dump title to choose FMTIMS parameters

When you are deciding which areas to format for your problem, you can use the CALLER and TCB fields of the dump title (described in “Dump title” on page 539) as a guide. Unless one or both of these fields specify “unknown,” they should indicate why a dump was taken.

The following table shows the options you can choose based on valid CALLER and TCB information in the dump title.

Table 211. FMTIMS parameters based on CALLER and TCB fields

| CALLER=           | TCB=                                      | Recommended FMTIMS options <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTL               | CTL LOG ESS<br>LSD LSM RDS<br>RST STC STM | DC <sup>2</sup> Dispatch <sup>2</sup> QM <sup>2</sup> Summary, System <sup>2</sup> Dispatch <sup>2</sup><br>SPST, System <sup>2</sup> SUBS, Summary Dispatch, Log,<br>Restart, Summary, System Dispatch <sup>2</sup> MSDB,<br>Savearea, SCD <sup>2</sup> Summary Dispatch <sup>2</sup> MSDB,<br>Savearea, SCD <sup>2</sup> Summary Restart, Savearea, SCD <sup>2</sup><br>Summary Restart, Savearea, SCD <sup>2</sup> Summary CBT,<br>Dispatch <sup>2</sup> Savearea, SCD <sup>2</sup> Summary CBT, Dispatch <sup>2</sup><br>Savearea, SCD <sup>2</sup> Summary |
| CURR <sup>3</sup> | DYA                                       | Dispatch <sup>2</sup> System <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| DBRC              | DBR                                       | DBRC <sup>2</sup> System <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| DL/I              | DLI STC                                   | DB <sup>2</sup> Dispatch <sup>2</sup> SB <sup>2</sup> System <sup>2</sup> CBT, Dispatch <sup>2</sup><br>Savearea, SCD <sup>2</sup> Summary                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DP                | BMP DEP                                   | DB <sup>2</sup> System <sup>2</sup> DB <sup>2</sup> System <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FP                | BMP DEP <sup>4</sup><br>XFP               | DB <sup>2</sup> DEDB, MSDB, System <sup>2</sup> DB <sup>2</sup> DEDB, MSDB,<br>System <sup>2</sup> DB <sup>2</sup> SPST, System <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| LOG               | LOG                                       | Log <sup>2</sup> System <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Notes:**

1. When you have a WAIT or LOOP problem, add SAVEAREA to your list of FMTIMS options.
2. Use the MIN qualifier for these options.
3. Normally dynamic allocation.
4. Can be either the MPP or the BMP region.

If CALLER=CURR, the current address space and IMS control region are dumped. This occurs when no CALLER parameter is provided or no IMSDUMP parameter list is passed and DFSFDMP0 cannot match the caller's TCB address and address space ID (ASID) with the TCBs in the IMS TCB table. You can still format the dump data set using the abend number and PSW as a guide in solving the problem. Dynamic allocation also causes CURR to be placed in the CALLER= field. In this case, format the areas listed in the above table.

If CALLER=DP, the abend occurred under the task of a dependent region address space.

If CALLER=IRLM, you need to use the IRLM Offline Dump Formatter to format the IRLM modules.

If CALLER=TRAP, a diagnostic trap for an address space abended.

### **Offline Dump Formatter parameters**

The Offline Dump Formatter provides the option of choosing an 80-column output format in addition to the default value of 120/132 columns. This option allows viewing of formatter output on an 80-column-width screen without needing to shift left or right.

The 80-column format mode is normally selected when the IMS Offline Dump Formatter is run under IPCS and the IPCS default is set to TERMINAL NOPRINT or TERMINAL PRINT. This allows dump and z/OS formatting to be similar under IPCS. To select the 80-column format mode, add an "H" to the IMSDUMP formatter verb parameter string between the IMS job name and the FMTIMS keyword. The following are examples of 80-column format option requests under IPCS.

```
VERBX IMSDUMP 'imsname,R,H,D'
VERBX IMSDUMP 'imsname,H,FMTIMS SCD'
VERBX IMSDUMP 'imsname,D,H,R,FMTIMS (AUTO,MIN)'
```

### **Sample FMTIMS statements**

You might be able to identify a problem area more precisely by using the CALLER= and TCB= identification from the dump title along with the abend number and explanation. For example, you might see CALLER=CTL in the dump title and have an abend code that shows an error in the checkpoint restart processing. In this case, you can try specifying the statement:

```
FMTIMS (RESTART,SAVEAREA,(SCD,MIN),SUMMARY)
```

Following is a list of possible subsets you could format for specific error situations. This list is not exhaustive and is not meant to represent every possible error situation.

### **IMS control region problems (CALLER=CTL)**

An IMS control region address space task abended. A common definition is SYS—System Services.

#### **SYS/CHKPT**

System Service Checkpoint Restart Processing

```
FMTIMS (SUMMARY,SAVEAREA,(SCD,MIN),RESTART)
```

## **SYS/CNTRL**

System Service Control

FMTIMS (SUMMARY,SAVEAREA,(SCD,MIN),(DISPA,MIN))

## **SYS/ESS**

System Service External Subsystem Support

FMTIMS ((SYSTEM,MIN),SPST,(DISPA,MIN),SUBS)

## **SYS/INIT**

System Service Initialization

FMTIMS (SUMMARY,SAVEAREA,(SCD,MIN))

## **SYS/QMGR**

System Service Message Queue Management

FMTIMS (SUMMARY,SAVEAREA,(SCD,MIN),(DISPA,MIN),QM)

## **SYS/SCHD**

System Service Scheduling

FMTIMS ((SYSTEM,MIN),SPST,(DISPA,MIN))

## **SYS/SMGR**

System Service Storage Management

FMTIMS ((SYSTEM,MIN),SPST,CBT)

## **DBRC problems (CALLER=DBRC)**

A DBRC address space task abended. You would use the same FMTIMS statement for all of the following problems with Database Recovery Control:

### **DBRC/CMD**

Database Recovery Control Command Processing

### **DBRC/CNTRL**

Database Recovery Control Processor

### **DBRC/EXIT**

Database Recovery Control Exit Processing

### **DBRC/SER**

Database Recovery Control Services

FMTIMS ((SYSTEM,MIN),(DBRC,MIN))

## **Data communication problems (CALLER=CTL)**

An IMS data communication task abended under the CTL TCB.

### **DC/CMD**

Data Communication Command Processing

FMTIMS ((SYSTEM,MIN),DC)

### **DC/CNTRL**

Data Communication Control

FMTIMS ((SYSTEM,MIN),(DC,MIN),(DISPA,MIN),(QM,MIN))

### **DC/CONV**

Data Communication Conversational Processing

```

| FMTIMS ((SYSTEM,MIN),(DC,MIN))
|
| DC/LMGR
| Data Communication Line Manager
|
| FMTIMS ((SYSTEM,MIN),(DC,MIN))
|
| DC/MFS
| Data Communication Message Format Services
|
| FMTIMS ((SYSTEM,MIN),(DC,MIN))
|
| DC/TPCALL
| Data Communication DL/I Telecommunications
| Call Processing
|
| FMTIMS ((SYSTEM,MIN),(DC,MIN),(DB,MIN))
|
| DL/I problems (CALLER=DL/I or CALLER=DP)
|
| A DL/I address space task abended.
|
| DB/ACSMTH
| Database Access Method Interface
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN))
|
| DB/ANAL
| Database Call Analyzer
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN))
|
| DB/CMGR
| Database Call Resource Management
|
| FMTIMS ((SYST,MIN),(DB,MIN),(DISPA,MIN),(SB,MIN))
|
| DB/DBCALL
| Database Call Action Processing
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN))
|
| DB/INTRF
| Database Application/Scheduling Interface
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN),(DISPATCH,MIN))
|
| Fast Path problems (CALLER=FP)
|
| A Fast Path task abended.
|
| FP/CNTRL
| Fast Path Control
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN),SPST)
|
| FP/DEDB
| Fast Path Data Entry Database Processing
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN),(DEDB,MIN))
|
| FP/EMH
| Fast Path Expedited Message Handling Call Analyzer
|
| FMTIMS ((SYSTEM,MIN),(DB,MIN),(EMH,MIN))

```



## FP/MSDB

Fast Path Main Storage Database Call Analyzer

FMTIMS ((SYSTEM,MIN),(DB,MIN),(MSDB,MIN))

## Log problems (CALLER=LOG)

An IMS control region address space log TCB task abended. Log is part of SYS—System Services.

## SYS/LOG

System Service Logging

FMTIMS ((SYSTEM,MIN),(LOG,MIN))

## Other problems

If you suspect that the failure was in VSAM, you do not need to run AMBLIST to secure a listing of VSAM modules IDA019L1 and IDA0192A of the failing system. Data Facility Products (DFP) formats the entry points for these modules. IMS includes LPA modules in offline dump data sets only if LPALIB is listed in the SDUMP options for your system. However, this is not recommended because the LPA modules occupy so much space in the dump data sets.

*z/OS MVS Diagnosis: Tools and Service Aids* describes how to generate a z/OS trace.

## Dump contents returned for different FMTIMS options

You can specify different FMTIMS options to add different types of information to a formatted IMS system dump.

The options are listed in alphabetical order. FMTIMS options can be specified on the FMTIMS statement in any order. The requested options are printed in the order stated under “Formatted dump output order” on page 543.

Some options state they “are ignored for batch.” If the dump was taken because batch processing (IMS DB or CICS) failed, the control blocks for these options are either meaningless or not included in the dump data set. Therefore, the control blocks are not formatted even if you specify that option on the FMTIMS statement.

Most options can be specified with the MIN qualifier. Whenever possible, specify this qualifier to reduce the number of control blocks formatted. You can always format the dump data set again if you need the additional information.

### ALL

Causes a full, formatted dump.

(ALL,MIN) formats the dump as if each option were specified with the MIN qualifier.

### A0I

Formats the storage for the Type 2 Automated Operator Control blocks.

### AUTO

Provides an optimal subset of the IMS dump formatting options without having to first analyze the dump and without having to understand the content or use of all of the IMS dump formatting options.

This option uses the failing ITASK type information to choose one of the formatter's functional areas, and selects the appropriate dump formatter options.

## CBT

Formats storage management area control blocks, including:

- Control Block Table Header
- Individual Control Block Table entries

Output is the same if (CBT,MIN) is specified.

## CBTE,cbteid

Formats all the IPAGEs for the identified CBTE type (cbteid), including:

- Individual Control Block Table entries
- All IPAGE storage of the requested CBTE type

For example, if you specify (CBTE,DPST), all DPST IPAGEs are formatted.

This option can be repeated as needed and has no defaults. The requested IPAGEs must be part of the dump data set. MIN is not valid for the CBTE option.

## CLB/LLB

Permits formatting of an individual Communication Line Block or Link Line Block and its subordinate blocks. Select this option by the following:

- Address
- Node name
- LTERM name
- Communication ID

Select the LLB by address or link number.

The CLB/LLB format creates eye catchers and index entries similar to the following:

```
**CLB/LLB REQUESTED CLB/LLB
```

**DB** Formats areas and control blocks used for IMS Database functions. The following table shows the areas formatted under the (DB) and (DB,MIN) FMTIMS options.

Table 212. Formatted areas under the FMTIMS options DB and DB,MIN

| (DB)                                                                                                                                                                              | (DB,MIN)                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| PSB Directory                                                                                                                                                                     | same                                                                                                       |
| DMB Directory                                                                                                                                                                     | same                                                                                                       |
| Intent List                                                                                                                                                                       | not formatted                                                                                              |
| BFSP                                                                                                                                                                              | same                                                                                                       |
| DL/I Trace                                                                                                                                                                        | same                                                                                                       |
| Fast Path Trace (if Fast Path is active)                                                                                                                                          | same                                                                                                       |
| OSAM Pool Control Blocks and buffers                                                                                                                                              | OSAM Pool Control Blocks only                                                                              |
| Program Isolation blocks                                                                                                                                                          | same                                                                                                       |
| All PSTs and related control blocks, including PCBs, SDBs, Savearea set, alternate DL/I DECB, DSGLRKEY, hierarchical holder, delete work area, RPLI, VSAM PLH, and retrieve trace | Active PSTs, with the same related control blocks                                                          |
| If Fast Path is present: EPSTs and related control blocks, including EPCBs, ESRTs, EMHBs, message buffers, XCRBs, DMHRs, and DEDB buffers                                         | If Fast Path is present: EPSTs and related control blocks, including EPCBs, ESRTs, EMHBs, XCRBs, and DMHRs |

Table 212. Formatted areas under the FMTIMS options DB and DB,MIN (continued)

| (DB)                            | (DB,MIN) |
|---------------------------------|----------|
| VSAM buffer pool control blocks | same     |
| RLPL for IRLM requests          | same     |

In a DL/I-SAS environment, DPST formatting does not format related control blocks if the DL/I address space was not included in the dump data set.

#### DBRC

Formats records used by DBRC in its processing, including:

- DFSRCWKB block
- DFSBRLSB block
- Dump Router storage
- Global Data block
- GDBDLTAR block
- GDBDSAAR block
- GDBRECAR block
- GDBLISAR block
- DSPEXIAG block
- DSPEXOPM block
- VFYWSPAC block
- DSPOCPAG block
- DSPJCLAR block
- GDBGPDAR block
- GDBRUPAR block
- GDBOLCAR block
- GDBMNPTR block
- GDBESAVE block
- GDBISAVE block
- GDBCSAVE block
- GDBRSAVE block
- DSPCMPAG block
- DSPVFILE block
- DBRC Internal Trace

Output is the same if (DBRC,MIN) is specified. DBRC blocks must be present in the dump data set to be formatted.

**DC** Formats the data communication areas listed in the following table. This option is skipped if the CTL address space is not included in the dump data set.

Table 213. Data communication areas formatted by DC and DC,MIN

| (DC)                                                                                                                        | (DC,MIN) <sup>1</sup>                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| All CLBs, LXBs, and LCBs, with subordinate control blocks:                                                                  | Active CLBs, LXBs, and LCBs, with the same subordinate control blocks except that current CTB or LTB and CNT are not formatted. |
| • Current CTB or LTB, and CNT                                                                                               |                                                                                                                                 |
| • Allocated I/O buffers                                                                                                     |                                                                                                                                 |
| • CIB, if using MFS processing                                                                                              |                                                                                                                                 |
| • CCB, if using conversational processing                                                                                   |                                                                                                                                 |
| • MFS work buffers                                                                                                          |                                                                                                                                 |
| • ECNT, EMHB, and message buffer, if the CTB shows a Fast Path terminal                                                     |                                                                                                                                 |
| SMB table                                                                                                                   | not formatted                                                                                                                   |
| CTT table                                                                                                                   | not formatted                                                                                                                   |
| SPQBs and the CNTs chained off unallocated SPQBs                                                                            | not formatted                                                                                                                   |
| <b>Note:</b>                                                                                                                |                                                                                                                                 |
| 1. (DC,MIN) formats control blocks only for those lines, nodes, and links that meet at least one of the following criteria: |                                                                                                                                 |
| a. MSC links                                                                                                                |                                                                                                                                 |
| b. Nodes in OPNDST or CLSDST processing                                                                                     |                                                                                                                                 |
| c. Lines or nodes with allocated input, output, or receive any buffers                                                      |                                                                                                                                 |
| d. CLBs that have an active SAP                                                                                             |                                                                                                                                 |

Both DC options are ignored for batch.

#### DEDB

Formats the DEDB control blocks and areas. The areas included are listed in the following table.

Table 214. DEDB control block areas formatted by DEDB and DEDB,MIN

| (DEDB)                                      | (DEDB,MIN)           |
|---------------------------------------------|----------------------|
| ALDS                                        | same                 |
| DMCBs, SGTs, FDTs, and MRMBs for open DEDBs | same                 |
| DMACs and ADSC for open DEDB areas          | same                 |
| XCRBs, DMHRs, and buffers                   | XCRBs and DMHRs only |
| SRBs and ESRBs                              | same                 |

#### DISPATCH

Formats areas relating to the IMS Dispatcher and its functions. The following table shows the areas formatted under this FMTIMS option.

Table 215. Areas formatted by DISPATCH and DISPATCH,MIN

| (DISPATCH)            | (DISPATCH,MIN) |
|-----------------------|----------------|
| Dispatcher work areas | not formatted  |
| Dispatcher Trace      | same           |
| Scheduler Trace       | not formatted  |
| Latch Trace           | same           |

(DISPATCH,MIN) is ignored for batch.

**DPST,jobname**

**DPST,N,dependent region number**

**DPST,A,address**

Permits formatting of an individual Dependent Region Partition Specification Table and its subordinate blocks for PSTs related to MPPs, BMPs, IFPs, and batch DL/I. You can specify one of the following choices:

- job name
- Dependent region number
- DPST address

Output follows the DB formatting output in the dump formatter. The eye catchers and index entries appear as follows:

\*\*DPSTS                      REQUESTED DPSTS

#### **EMH**

Formats the Expedited Message Handler areas that are used by IMS Fast Path, as shown in the following table. The CTL address space must be included in the dump data set for this option to be formatted.

*Table 216. Areas formatted by EMH and EMH,MIN*

| <b>EMH</b>                        | <b>EMH,MIN</b>       |
|-----------------------------------|----------------------|
| RCTEs                             | same                 |
| BALGs, EMHBs, and message buffers | BALGs and EMHBs only |

#### **LOG**

Formats control blocks and areas used by the IMS logger. The areas included shown in the following table. These areas, except for the WADS and the DLOG trace, are repeated in the dump when the IMS Monitor is active.

*Table 217. Areas formatted by LOG and LOG,MIN*

| <b>LOG</b>                                                   | <b>LOG,MIN</b>   |
|--------------------------------------------------------------|------------------|
| LCD                                                          | same             |
| Restart Log Work Area                                        | same             |
| WADS and the data necessary to manage it                     | WADS only        |
| OLDS prefix and the buffer associated with it                | OLDS prefix only |
| Log DSET, which defines all OLDS currently available for use | same             |
| Message work areas and Logger message areas                  | same             |
| DLOG trace                                                   | same             |

#### **MSDB**

Formats the Main Storage Databases used by IMS Fast Path. The areas included are listed in the following table.

*Table 218. Main storage databases formatted by MSDB and MSDB,MIN*

| <b>MSDB</b>  | <b>MSDB,MIN</b> |
|--------------|-----------------|
| MSDB headers | same            |
| all MSDBs    | not formatted   |

**POOL, NAME, poolid**

Invokes formatting of the storage manager control blocks and the pool storage for any of the following pools:

- ALL
- CESS
- CIOP
- DBWP
- DLDP
- DLMP
- DPSB
- EMHB
- EPCB
- FPWP
- HIOP
- MFBP
- PSBW
- QBFL
- QBUF
- SPAP
- LUMC
- LUMP

NAME is an optional keyword indicating the pool name parameter. If NAME is omitted, the first parameter is assumed to be the pool name.

The poolid is a required 4-character pool name of an existing storage manager pool or the keyword ALL. If ALL is specified, the following storage pools are formatted:

- HIOP
- CIOP
- CESS
- SPAP
- EMHB
- FPWP
- QBUF
- QBFL
- DLMP
- DPSB
- DBWP
- MFBP
- EPCB
- LUMP
- LUMC

ALL triggers the formatting of any storage manager trace table entries along with the storage manager control blocks and pool storage.

MIN is an optional keyword. If MIN is specified for one of the dynamic pools (HIOP, CIOP, EMHB, FPWP, CESS, SPAP, LUMC, LUMP) only the storage

manager pool header and block headers are formatted. If MIN is omitted, the pool header control block is formatted along with the blocks and block headers representing the dynamic storage pool.

**QM** Formats the control blocks and areas of the IMS queue manager. The formatter skips this option if the CTL address space is not included in the dump data set. The areas included are shown in the following table.

*Table 219. Areas formatted by QM and QM,MIN*

| QM                  | QM,MIN        |
|---------------------|---------------|
| Qpool Prefix        | same          |
| Qpool Buffer Prefix | same          |
| Qpool Buffer        | not formatted |

Both QM options are ignored for batch.

#### **RESTART**

Formats the IMS restart control blocks and related areas, including:

- Checkpoint ID table
- SIDXs and their subordinate blocks:
  - All LCREs for the SIDX entry being processed
  - All RREs for the SIDX entry being processed
- All RPSTs for the SIDX entry being processed
- FRB, if present

Output is the same if (RESTART,MIN) is specified. Both RESTART options are ignored for batch.

#### **SAP, ECBADR, ecbaddr**

#### **SAP, ADDRESS, sapaddr**

The SAP option can be invoked using either the SAP address or the SAP's ECB address (providing that the ECB is a valid ITASK and has a prefix pointing to a SAP). The SAP option request can be placed either on the IMSDUMP verb line after FMTIMS or in the DFSFRMAT data set. The following examples show SAP option requests:

```
VERBX IMSDUMP'imsjname,II,N,FMTIMS (SAP,ADDRESS,20864C0)'
VERBX IMSDUMP'imsjname,FMTIMS SCD,(SAP,ECBADR,3064250)'
```

For compatibility reasons, the MIN qualifier is allowed, but the output is the same. Individual SAP option formatting is also available on the IMS Low Level panel of the IMS IMS Dump Formatter dialog. The ADDRESS parameter can be omitted because ADDRESS is the default TYPE for the SAP option.

Individual SAP/save area formatting allows complete formatting of SAP/save areas when additional information is required. The output from individual SAP formatting is the same as the SAVEAREA option output. Individual SAP formatting provides the following eye catcher/index entry:

```
**SAPS REQUESTED SAPS
```

#### **SAVEAREA**

Formats the save area information, including:

- Formatted SAPs and any UEHBs anchored off the SAPs.

**Restriction:** The UEHBs cannot be formatted if the CTL address space is not included in the dump data set.

- Formatted Save Area Sets associated with each SAP.

- Unformatted dump of the IPAGES containing the SAPs.

If the DL/I address space is not in the data set, then the DL/I SAPs are not formatted. If the CTL address space is not in the data set, then the non-DL/I SAPs are not formatted. Output is the same if (SAVEAREA,MIN) is specified. Both SAVEAREA options are ignored for batch.

The SAVEAREA also comes with a summary option that allows a faster overview scan of the IMS ITASK status within a dump. The SAVEAREA SUMmary output reduces the SAP/Savearea formatting to minimal data while adding keyword scan capability and automatic computation of the exit offsets. This reduces keystroke resources required to overview the ITASK status and ITASK module flow. The SAVEAREA SUMmary and individual SAP formatting provides the following eye catcher/index entry:

```
**SSS SAP/SAVE CONDENSED SUMMARY
```

SAVEAREA SUMmary formatting contains the following scannable keywords with their associated meanings:

**RUN** ITASKs that are active are given a RUN indicator. Abend and loop analysis is usually concerned only with running ITASKs.

#### **LATCHREQ**

ITASKs that are waiting for an IMS SLX latch (not checkpoint restart LATE latches) are given a LATCHREQ indicator. Enabled wait problem analysis often requires analyzing ITASKs that are waiting for latches.

#### **LATCHOWN**

ITASKs that own an IMS SLX latch (not checkpoint restart LATE latches) are given a LATCHOWN indicator. Enabled wait problem analysis often requires analyzing ITASKs that own SLX latches.

#### **ITASK type**

The ITASK type is in the summary and is scannable. The ITASK type names are not at the end of the scan list, however. The ITASK type is preceded by the label "type". The possible type names can be gotten from the DFSCIR macro prolog.

**SB** Formats the control blocks, areas, and buffers of the Sequential Buffering function (SB) of IMS. This option also formats those DL/I control blocks which are important for debugging the SB function.

The SB information is divided into four sections. The following table shows which sections are formatted with the SB and SB,MIN options. .

*Table 220. Sections formatted by SB and SB,MIN*

| <b>SB</b>                   | <b>SB,MIN</b>     |
|-----------------------------|-------------------|
| Subsystem overview          | same              |
| PST overview <sup>1</sup>   | same <sup>2</sup> |
| Sorted blocks <sup>1</sup>  | same <sup>2</sup> |
| Sorted buffers <sup>1</sup> | not formatted     |

#### **Note:**

1. The DL/I address space must be included in the dump data set for these areas to be formatted.
2. Formatted only if you requested a conditional SB activation for that application or PST.

The SB information is divided into the following sections:



1. Subsystem Overview of SB—provides an overview of SB control blocks from an IMS subsystem point-of-view. The SDCBs appear in the order in which they are anchored in the SBSCD. Each SDCB is followed by its SDSGs. The section contains the following information:
  - SB section of the SCD
  - SBSCD, including the SBHE blocks
  - SDCBs
  - SDSGs
2. PST Overview of SB—formats the SB control blocks (and other IMS control blocks significant to SB) for each active PST. These blocks are sorted in hierarchical order. For example, the first DBPCB and its JCB, DSGs, EDSGs, and SDSGs; then the second DBPCB with its subordinate blocks, and so on. The section contains the following information:
  - SB and buffer-handler sections of the PST
  - PST DECB prefix
  - SB extensions to the PST
  - SB work area
  - SBPARMS
  - DBPCBs and their JCBs, DSGs, ESDGs, and SDSGs
3. Sorted SB Blocks—contains SB control blocks (and other IMS control blocks significant to SB) sorted according to their virtual storage address. The section contains the following information:
  - DBPCBs
  - DCB with its OSAM extensions
  - DSGs
  - ESDGs
  - JCBs
  - OV-IO DECB prefix
  - PST DECB prefix
  - SB extensions to DCBs
  - SB extensions to DSGs
  - SB extensions to the PST
  - SB work area
  - SBPARMS
  - SBUFs
  - SCARs
  - SRANs
4. Sorted SB Buffers—contains the SB buffers of each SB buffer pool. The SB buffers of one SB buffer pool are contiguous in storage and are formatted as one entity. The buffer pools are then sorted by virtual storage address.

#### SCD

Formats the IMS SCD and related areas. The areas included are listed in the following table.

*Table 221. Areas formatted by SCD and SCD,MIN*

| (SCD) | (SCD,MIN) |
|-------|-----------|
| SCD   | same      |

Table 221. Areas formatted by SCD and SCD,MIN (continued)

| (SCD)                                                    | (SCD,MIN)     |
|----------------------------------------------------------|---------------|
| Latch Extensions                                         | same          |
| Scheduler Sequence Queues                                | not formatted |
| Synchronous APPC/OTMA Shared Message Queue SCD Extension | same          |
| Fast Path SCD Extension, if Fast Path is active          | same          |
| Formatted dumps of the batch key 7 SCD                   | same          |
| LU 6.2 SCD extension                                     | same          |

### SPST

Formats the system PSTs, which are ITASKs used by IMS. This includes:

- Global system PSTs
- Local control region address space PSTs
- Local DL/I address space PSTs
- Areas related to the above PSTs, including LWA and IRLMA

Some SPSTs are not formatted if the CTL address space is not in the dump data set. Output is the same if (SPST,MIN) is specified. Both SPST options are ignored for batch.

### SUBS

Formats the areas and control blocks that IMS uses to manage subsystems, including:

- Subsystem trace
- Global ESET block

Output is the same if (SUBS,MIN) is specified. Both SUBS options are ignored for batch.

### SUMMARY

Formats the current diagnostic section.

The SUMMARY data areas are not formatted if the SDWA address space is not part of the dump data set. (For abends and batch processing, the SDWA address is saved by the ESTAE module. For online processing, the dump must be taken by DFSOFMD0, and the SDWA parameter must be passed at DFSDUMP time.)

The areas formatted with this option include:

- Failing PSW
- Abend code
- Module name
- Registers at time of abend
- 256 byte instruction area—128 bytes above and below the failing PSW
- 16 register storage areas—512 bytes above and 256 bytes below the registers at time of abend
- SDWA address space of IMS
- Failing SAP and its UEHB
- Failing ITASK when the ITASK is a DPST, system PST, CLB, or LLB (dependent region errors, some systems services errors, terminal process errors, and MSC errors)

The SUMMARY option names the ITASK type when it is determined, even if it is not one of the ITASK types that provide for additional formatting. The ITASK type name is two to four characters. If it is unknown, the type name is "UNKN".

Output is the same if (SUMMARY,MIN) is specified.

#### **SYSPST**

Permits formatting of an individual system partition specification table and some of its subordinate blocks. Select this option by address or system PST name. This option creates eye catchers and index entries similar to the following:

```
**SYSPSTS REQUESTED SYSTEM PSTS
```

#### **SYSTEM**

Formats the SUMMARY, SAVEAREA, and SCD areas as one group. The areas and control blocks formatted are the same as if each of the options were invoked separately.

(SYSTEM,MIN) is formatted as though each of the options were specified with MIN.

See the individual options for a list of the areas formatted.

#### **TRACE, NAME, table-id**

Gets a new search module that invokes the normal trace format control module (DFSATRA0) to format trace tables separately. This option enables viewing of trace table data without having to format the entire option that usually includes the formatted trace table. The TRACE option request uses the 2-character trace table EBCDIC ID code from the Trace Selection panel. The IMS Dump Formatter ISPF panels also accept an option of "ALL" to format all IMS trace table traces. The IMS Dump Formatter dialog TRACE SELECTION panel provides a selectable list of IMS trace tables with the trace name, internal ID, and description. The following examples are TRACE format requests, followed by comments for each. In each case, the NAME keyword can be omitted because NAME is the default TYPE parameter. The following example is a request for the DL/I trace table.

```
FMTIMS...(TRACE,NAME,DL),...
```

The following is a request for the dispatcher trace table and the DL/I trace table with a MIN option that is ignored.

```
FMTIMS..., (TRACE,NAME,DL,MIN), (TRACE,NAME,DS)...
```

#### **UTIL**

Formats the control blocks for the IMS Partial Database Reorganization utility, including:

- Common area
- Database table
- Segment table
- Action table

The output is the same if (UTIL,MIN) is specified. Both UTIL options are ignored for batch.

**Related concepts:**

“Dump formatting options” on page 549

## **Invoking the IMS Offline Dump Formatter under IPCS**

You can invoke the Offline Dump Formatter under IPCS by using a VERBX command or by using menus.

### *Using a VERBX command*

Enter FMTIMS and the valid IMS format options after the job name and any refresh, debug, half line, and nonheader options. The following is an example.

```
VERBX IMSDUMP, 'imsname,D,H,R,FMTIMS (SAP,ADDRESS,1234580) '
```

## **Syntax restrictions on the FMTIMS statement**

The format control data set requires adherence to ten syntax rules, but the sequence in which you apply the rules does not matter.

The control statements in the format control data set must follow the following syntax rules:

- The first record must contain “FMTIMS”.
- A comma (,) must separate parameters from their qualifiers (MIN or cbteid).
- The number of leading blanks on both the initial record and on subsequent records is not limited.
- The last 8 bytes of all records are ignored by the formatter; you can use them for sequence numbers or any other purpose.
- A comma after the last parameter on any record indicates continuation to the next record. You can split a parameter and its qualifier, but you cannot split the spelling of a parameter over two records. For example:

```
FMTIMS ((SYSTEM,MIN),(LOG,
MIN))
```

is acceptable, but the following is not:

```
FMTIMS ((SYS
TEM,MIN),(LOG,MIN))
```

Notice that you can insert blanks between the last parameter in a record and the end of that record.

- The order in which the options are specified in the control statement data set has no effect on the dump formatting output order.
- Blanks imbedded within the parameters on a given record cause the formatter to assume the control statement is ended.
- The options can be uppercase or lowercase EBCDIC; they are translated to uppercase before being processed.
- Options can be specified by any unique number of the option's lead characters. If a non-unique abbreviation is passed, the first matching option is chosen. The FMTIMS verb cannot be abbreviated.
- Enclose an option that has a qualifier in parentheses.

## **Contents formatted for FMTIMS options**

FMTIMS options can be specified on the FMTIMS statement in any order.

### **Contents formatted for FMTIMS options**

The options are listed in alphabetical order.

Some options state they “are ignored for batch.” If the dump was taken because batch processing (IMS DB or CICS) failed, the control blocks for these options are either meaningless or not included in the dump data set. Therefore, the control blocks are not formatted even if you specify that option on the FMTIMS statement.

Most options can be specified with the MIN qualifier. Whenever possible, specify this qualifier to reduce the number of control blocks formatted. You can always format the dump data set again if you need the additional information.

#### **ALL**

Causes a full, formatted dump.

(ALL,MIN) formats the dump as if each option were specified with the MIN qualifier.

#### **AOI**

Formats the storage for the Type 2 Automated Operator Control blocks.

#### **AUTO**

Provides an optimal subset of the IMS dump formatting options without having to first analyze the dump and without having to understand the content or use of all of the IMS dump formatting options.

This option uses the failing ITASK type information to choose one of the formatter's functional areas, and selects the appropriate dump formatter options.

#### **CBT**

Formats storage management area control blocks, including:

- Control Block Table Header
- Individual Control Block Table entries

Output is the same if (CBT,MIN) is specified.

#### **CBTE,cbteid**

Formats all the IPAGEs for the identified CBTE type (cbteid), including:

- Individual Control Block Table entries
- All IPAGE storage of the requested CBTE type

For example, if you specify (CBTE,DPST), all DPST IPAGEs are formatted.

This option can be repeated as needed and has no defaults. The requested IPAGEs must be part of the dump data set. MIN is not valid for the CBTE option.

#### **CLB/LLB**

Permits formatting of an individual Communication Line Block or Link Line Block and its subordinate blocks. Select this option by the following:

- Address
- Node name
- LTERM name
- Communication ID

Select the LLB by address or link number.

The CLB/LLB format creates eye catchers and index entries similar to the following:

```
**CLB/LLB REQUESTED CLB/LLB
```

**DB** Formats areas and control blocks used for IMS Database functions. The following table shows the areas formatted under the (DB) and (DB,MIN) FMTIMS options.

*Table 222. Formatted areas under the FMTIMS options DB and DB,MIN*

| (DB)                                                                                                                                                                              | (DB,MIN)                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Data Base Tracker Blocks                                                                                                                                                          | same                                                                                                       |
| Coupling Facility Block                                                                                                                                                           | same                                                                                                       |
| PSB Directory                                                                                                                                                                     | same                                                                                                       |
| DMB Directory                                                                                                                                                                     | same                                                                                                       |
| Intent List                                                                                                                                                                       | not formatted                                                                                              |
| BFSP                                                                                                                                                                              | same                                                                                                       |
| DL/I Trace                                                                                                                                                                        | same                                                                                                       |
| Fast Path Trace (if Fast Path is active)                                                                                                                                          | same                                                                                                       |
| OSAM Pool Control Blocks and buffers                                                                                                                                              | OSAM Pool Control Blocks only                                                                              |
| Program Isolation blocks                                                                                                                                                          | same                                                                                                       |
| All PSTs and related control blocks, including PCBs, SDBs, Savearea set, alternate DL/I DECB, DSGLRKEY, hierarchical holder, delete work area, RPLI, VSAM PLH, and retrieve trace | Active PSTs, with the same related control blocks                                                          |
| If Fast Path is present: EPSTs and related control blocks, including EPCBs, ESRTs, EMHBs, message buffers, XCRBs, DMHRs, and DEDB buffers                                         | If Fast Path is present: EPSTs and related control blocks, including EPCBs, ESRTs, EMHBs, XCRBs, and DMHRs |
| VSAM buffer pool control blocks                                                                                                                                                   | same                                                                                                       |
| RLPL for IRLM requests                                                                                                                                                            | same                                                                                                       |

In a DL/I-SAS environment, DPST formatting does not format related control blocks if the DL/I address space was not included in the dump data set.

#### **DBRC**

Formats records used by DBRC in its processing, including:

- DFSRCWKB block
- DFSBRLSB block
- Dump Router storage
- Global Data block
- GDBDLTAR block
- GDBDSAAR block
- GDBRECAR block
- GDBLISAR block
- DSPEXIAG block
- DSPEXOPM block
- VFYWSPAC block
- DSPOCPAG block
- DSPJCLAR block
- GDBGPDAR block
- GDBRUPAR block

- GDBOLCAR block
- GDBMNPTR block
- GDBESAVE block
- GDBISAVE block
- GDBCSAVE block
- GDBRSAVE block
- DSPCMPAG block
- DSPVFILE block
- DBRC Internal Trace

Output is the same if (DBRC,MIN) is specified. DBRC blocks must be present in the dump data set to be formatted.

**DC** Formats the data communication areas listed in the following table. This option is skipped if the CTL address space is not included in the dump data set.

*Table 223. Data communication areas formatted by DC and DC,MIN*

| (DC)                                                                    | (DC,MIN) <sup>1</sup>                                                                                                           |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| All CLBs, LXBs, and LCBs, with subordinate control blocks:              | Active CLBs, LXBs, and LCBs, with the same subordinate control blocks except that current CTB or LTB and CNT are not formatted. |
| • Current CTB or LTB, and CNT                                           |                                                                                                                                 |
| • Allocated I/O buffers                                                 |                                                                                                                                 |
| • CIB, if using MFS processing                                          |                                                                                                                                 |
| • CCB, if using conversational processing                               |                                                                                                                                 |
| • MFS work buffers                                                      |                                                                                                                                 |
| • ECNT, EMHB, and message buffer, if the CTB shows a Fast Path terminal |                                                                                                                                 |
| SMB table                                                               | not formatted                                                                                                                   |
| CTT table                                                               | not formatted                                                                                                                   |
| SPQBs and the CNTs chained off unallocated SPQBs                        | not formatted                                                                                                                   |

**Note:**

1. (DC,MIN) formats control blocks only for those lines, nodes, and links that meet at least one of the following criteria:
  - a. MSC links
  - b. Nodes in OPNDST or CLSDST processing
  - c. Lines or nodes with allocated input, output, or receive any buffers
  - d. CLBs that have an active SAP

Both DC options are ignored for batch.

**DEDB**

Formats the DEDB control blocks and areas. The areas included are listed in the following table.

*Table 224. DEDB control block areas formatted by DEDB and DEDB,MIN*

| (DEDB)                                      | (DEDB,MIN) |
|---------------------------------------------|------------|
| ALDS                                        | same       |
| DMCBs, SGTs, FDTs, and MRMBs for open DEDBs | same       |
| DMACs and ADSC for open DEDB areas          | same       |

Table 224. DEDB control block areas formatted by DEDB and DEDB,MIN (continued)

| (DEDB)                    | (DEDB,MIN)           |
|---------------------------|----------------------|
| XCRBs, DMHRs, and buffers | XCRBs and DMHRs only |
| SRBs and ESRBs            | same                 |

## DISPATCH

Formats areas relating to the IMS Dispatcher and its functions. The following table shows the areas formatted under this FMTIMS option.

Table 225. Areas formatted by DISPATCH and DISPATCH,MIN

| (DISPATCH)            | (DISPATCH,MIN) |
|-----------------------|----------------|
| Dispatcher work areas | not formatted  |
| Dispatcher Trace      | same           |
| Scheduler Trace       | not formatted  |
| Latch Trace           | same           |

(DISPATCH,MIN) is ignored for batch.

**DPST,jobname**

**DPST,N,dependent region number**

**DPST,A,address**

Permits formatting of an individual Dependent Region Partition Specification Table and its subordinate blocks for PSTs related to MPPs, BMPs, IFPs, and batch DL/I. You can specify one of the following choices:

- job name
- Dependent region number
- DPST address

Output follows the DB formatting output in the dump formatter. The eye catchers and index entries appear as follows:

```
**DPSTS REQUESTED DPSTS
```

## EMH

Formats the Expedited Message Handler areas that are used by IMS Fast Path, as shown in the following table. The CTL address space must be included in the dump data set for this option to be formatted.

Table 226. Areas formatted by EMH and EMH,MIN

| EMH                               | EMH,MIN              |
|-----------------------------------|----------------------|
| RCTEs                             | same                 |
| BALGs, EMHBs, and message buffers | BALGs and EMHBs only |

## LOG

Formats control blocks and areas used by the IMS logger. The areas included shown in the following table. These areas, except for the WADS and the DLOG trace, are repeated in the dump when the IMS Monitor is active.

Table 227. Areas formatted by LOG and LOG,MIN

| LOG                   | LOG,MIN |
|-----------------------|---------|
| LCD                   | same    |
| Restart Log Work Area | same    |



Table 227. Areas formatted by LOG and LOG,MIN (continued)

| LOG                                                          | LOG,MIN          |
|--------------------------------------------------------------|------------------|
| WADS and the data necessary to manage it                     | WADS only        |
| OLDS prefix and the buffer associated with it                | OLDS prefix only |
| Log DSET, which defines all OLDS currently available for use | same             |
| Message work areas and Logger message areas                  | same             |
| DLOG trace                                                   | same             |

#### MSDB

Formats the Main Storage Databases used by IMS Fast Path. The areas included are listed in the following table.

Table 228. Main storage databases formatted by MSDB and MSDB,MIN

| MSDB         | MSDB,MIN      |
|--------------|---------------|
| MSDB headers | same          |
| all MSDBs    | not formatted |

#### POOL, NAME, poolid

Invokes formatting of the storage manager control blocks and the pool storage for any of the following pools:

- AIOP
- ALL
- CESS
- CIOP
- CMDP
- DBWP
- DLDP
- DLMP
- DPSB
- DYNP
- EMHB
- EPCB
- FPWP
- HIOP
- MFBP
- PSBW
- QBFL
- QBUF
- SPAP
- LUMC
- LUMP

NAME is an optional keyword indicating the pool name parameter. If NAME is omitted, the first parameter is assumed to be the pool name.

The poolid is a required 4-character pool name of an existing storage manager pool or the keyword ALL. If ALL is specified, the following storage pools are formatted:

- AIOP
- HIOP
- CIOP
- CMDP
- CESS
- DYNP
- SPAP
- EMHB
- FPWP
- QBUF
- QBFL
- DLMP
- DPSB
- DBWP
- MFBP
- EPCB
- LUMP
- LUMC

ALL triggers the formatting of any storage manager trace table entries along with the storage manager control blocks and pool storage.

MIN is an optional keyword. If MIN is specified for one of the dynamic pools (AOIP, CESS, CIOP, CMDP, DYNP, EMHB, FPWP, HIOP, LUMC, LUMP, or SPAP) only the storage manager pool header and block headers are formatted. If MIN is omitted, the pool header control block is formatted, along with the blocks and block headers that represent the dynamic storage pool.

**QM** Formats the control blocks and areas of the IMS queue manager. The formatter skips this option if the CTL address space is not included in the dump data set. The areas included are shown in the following table.

*Table 229. Areas formatted by QM and QM,MIN*

| QM                  | QM,MIN        |
|---------------------|---------------|
| Qpool Prefix        | same          |
| Qpool Buffer Prefix | same          |
| Qpool Buffer        | not formatted |

Both QM options are ignored for batch.

#### **RESTART**

Formats the IMS restart control blocks and related areas, including:

- Checkpoint ID table
- SIDXs and their subordinate blocks:
  - All LCREs for the SIDX entry being processed
  - All RREs for the SIDX entry being processed
- All RPSTs for the SIDX entry being processed
- FRB, if present

Output is the same if (RESTART,MIN) is specified. Both RESTART options are ignored for batch.

#### **SAP, ECBADR, ecbaddr**

#### **SAP, ADDRESS, sapaddr**

The SAP option can be invoked using either the SAP address or the SAP's ECB address (providing that the ECB is a valid ITASK and has a prefix pointing to a SAP). The SAP option request can be placed either on the IMSDUMP verb line after FMTIMS or in the DFSFRMAT data set. The following examples show SAP option requests:

```
VERBX IMSDUMP 'imsjname,II,N,FMTIMS (SAP,ADDRESS,20864C0) '
```

```
VERBX IMSDUMP 'imsjname,FMTIMS SCD,(SAP,ECBADR,3064250) '
```

For compatibility reasons, the MIN qualifier is allowed, but the output is the same. Individual SAP option formatting is also available on the IMS Low Level panel of the IMS IMS Dump Formatter dialog. The ADDRESS parameter can be omitted because ADDRESS is the default TYPE for the SAP option.

Individual SAP/save area formatting allows complete formatting of SAP/save areas when additional information is required. The output from individual SAP formatting is the same as the SAVEAREA option output. Individual SAP formatting provides the following eye catcher/index entry:

```
**SAPS REQUESTED SAPS
```

#### **SAVEAREA**

Formats the save area information, including:

- Formatted SAPs and any UEHBs anchored off the SAPs.

**Restriction:** The UEHBs cannot be formatted if the CTL address space is not included in the dump data set.

- Formatted Save Area Sets associated with each SAP.
- Unformatted dump of the IPAGEs containing the SAPs.

If the DL/I address space is not in the data set, then the DL/I SAPs are not formatted. If the CTL address space is not in the data set, then the non-DL/I SAPs are not formatted. Output is the same if (SAVEAREA,MIN) is specified. Both SAVEAREA options are ignored for batch.

The SAVEAREA also comes with a summary option that allows a faster overview scan of the IMS ITASK status within a dump. The SAVEAREA SUMmary output reduces the SAP/Savearea formatting to minimal data while adding keyword scan capability and automatic computation of the exit offsets. This reduces keystroke resources required to overview the ITASK status and ITASK module flow. The SAVEAREA SUMmary and individual SAP formatting provides the following eye catcher/index entry:

```
**SSS SAP/SAVE CONDENSED SUMMARY
```

SAVEAREA Summary formatting contains the following scannable keywords with their associated meanings:

**RUN** ITASKs that are active are given a RUN indicator. Abend and loop analysis is usually concerned only with running ITASKs.

#### **LATCHREQ**

ITASKs that are waiting for an IMS SLX latch (not checkpoint restart LATE latches) are given a LATCHREQ indicator. Enabled wait problem analysis often requires analyzing ITASKs that are waiting for latches.

## LATCHOWN

ITASKs that own an IMS SLX latch (not checkpoint restart LATE latches) are given a LATCHOWN indicator. Enabled wait problem analysis often requires analyzing ITASKs that own SLX latches.

## ITASK type

The ITASK type is in the summary and is scannable. The ITASK type names are not at the end of the scan list, however. The ITASK type is preceded by the label “type”. The possible type names can be gotten from the DFSCIR macro prolog.

- SB** Formats the control blocks, areas, and buffers of the Sequential Buffering function (SB) of IMS. This option also formats those DL/I control blocks which are important for debugging the SB function.

The SB information is divided into four sections. The following table shows which sections are formatted with the SB and SB,MIN options.

*Table 230. Sections formatted by SB and SB,MIN*

| SB                          | SB,MIN            |
|-----------------------------|-------------------|
| Subsystem overview          | same              |
| PST overview <sup>1</sup>   | same <sup>2</sup> |
| Sorted blocks <sup>1</sup>  | same <sup>2</sup> |
| Sorted buffers <sup>1</sup> | not formatted     |

### Note:

1. The DL/I address space must be included in the dump data set for these areas to be formatted.
2. Formatted only if you requested a conditional SB activation for that application or PST.

The SB information is divided into the following sections:

1. Subsystem Overview of SB—provides an overview of SB control blocks from an IMS subsystem point-of-view. The SDCBs appear in the order in which they are anchored in the SBSCD. Each SDCB is followed by its SDSGs. The section contains the following information:
  - SB section of the SCD
  - SBSCD, including the SBHE blocks
  - SDCBs
  - SDSGs
2. PST Overview of SB—formats the SB control blocks (and other IMS control blocks significant to SB) for each active PST. These blocks are sorted in hierarchical order. For example, the first DBPCB and its JCB, DSGs, EDSGs, and SDSGs; then the second DBPCB with its subordinate blocks, and so on. The section contains the following information:
  - SB and buffer-handler sections of the PST
  - PST DECB prefix
  - SB extensions to the PST
  - SB work area
  - SBPARMS
  - DBPCBs and their JCBs, DSGs, EDSGs, and SDSGs
3. Sorted SB Blocks—contains SB control blocks (and other IMS control blocks significant to SB) sorted according to their virtual storage address. The section contains the following information:

- DBPCBs
  - DCB with its OSAM extensions
  - DSGs
  - ESDGs
  - JCBs
  - OV-IO DECB prefix
  - PST DECB prefix
  - SB extensions to DCBs
  - SB extensions to DSGs
  - SB extensions to the PST
  - SB work area
  - SBPARMS
  - SBUFs
  - SCARs
  - SRANs
4. Sorted SB Buffers—contains the SB buffers of each SB buffer pool. The SB buffers of one SB buffer pool are contiguous in storage and are formatted as one entity. The buffer pools are then sorted by virtual storage address.

#### SCD

Formats the IMS SCD and related areas. The areas included are listed in the following table.

*Table 231. Areas formatted by SCD and SCD,MIN*

| (SCD)                                                    | (SCD,MIN)     |
|----------------------------------------------------------|---------------|
| SCD                                                      | same          |
| Latch Extensions                                         | same          |
| Scheduler Sequence Queues                                | not formatted |
| Synchronous APPC/OTMA Shared Message Queue SCD Extension | same          |
| Fast Path SCD Extension, if Fast Path is active          | same          |
| Formatted dumps of the batch key 7 SCD                   | same          |
| LU 6.2 SCD extension                                     | same          |

#### SPST

Formats the system PSTs, which are ITASKs used by IMS. This includes:

- Global system PSTs
- Local control region address space PSTs
- Local DL/I address space PSTs
- Areas related to the above PSTs, including LWA and IRLMA

Some SPSTs are not formatted if the CTL address space is not in the dump data set. Output is the same if (SPST,MIN) is specified. Both SPST options are ignored for batch.

#### SUBS

Formats the areas and control blocks that IMS uses to manage subsystems, including:

- Subsystem trace

- Global ESET block

Output is the same if (SUBS,MIN) is specified. Both SUBS options are ignored for batch.

#### **SUMMARY**

Formats the current diagnostic section.

The SUMMARY data areas are not formatted if the SDWA address space is not part of the dump data set. (For abends and batch processing, the SDWA address is saved by the ESTAE module. For online processing, the dump must be taken by DFSOFMD0, and the SDWA parameter must be passed at DFSDUMP time.)

The areas formatted with this option include:

- Failing PSW
- Abend code
- Module name
- Registers at time of abend
- 256 byte instruction area—128 bytes above and below the failing PSW
- 16 register storage areas—512 bytes above and 256 bytes below the registers at time of abend
- SDWA address space of IMS
- Failing SAP and its UEHB
- Failing ITASK when the ITASK is a DPST, system PST, CLB, or LLB (dependent region errors, some systems services errors, terminal process errors, and MSC errors)

The SUMMARY option names the ITASK type when it is determined, even if it is not one of the ITASK types that provide for additional formatting. The ITASK type name is two to four characters. If it is unknown, the type name is "UNKN".

Output is the same if (SUMMARY,MIN) is specified.

#### **SYSPST**

Permits formatting of an individual system partition specification table and some of its subordinate blocks. Select this option by address or system PST name. This option creates eye catchers and index entries similar to the following:

```
**SYSPSTS REQUESTED SYSTEM PSTS
```

#### **SYSTEM**

Formats the SUMMARY, SAVEAREA, and SCD areas as one group. The areas and control blocks formatted are the same as if each of the options were invoked separately.

(SYSTEM,MIN) is formatted as though each of the options were specified with MIN.

See the individual options for a list of the areas formatted.

#### **TRACE, NAME, table-id**

Gets a new search module that invokes the normal trace format control module (DFSATRA0) to format trace tables separately. This option enables viewing of trace table data without having to format the entire option that usually includes the formatted trace table. The TRACE option request uses the 2-character trace table EBCDIC ID code from the Trace Selection panel. The IMS Dump Formatter ISPF panels also accept an option of "ALL" to format all

IMS trace table traces. The IMS Dump Formatter dialog TRACE SELECTION panel provides a selectable list of IMS trace tables with the trace name, internal ID, and description. The following examples are TRACE format requests, followed by comments for each. In each case, the NAME keyword can be omitted because NAME is the default TYPE parameter. The following example is a request for the DL/I trace table.

```
FMTIMS...(TRACE,NAME,DL),...
```

The following is a request for the dispatcher trace table and the DL/I trace table with a MIN option that is ignored.

```
FMTIMS...,(TRACE,NAME,DL,MIN),(TRACE,NAME,DS)...
```

## UTIL

Formats the control blocks for the IMS Partial Database Reorganization utility, including:

- Common area
- Database table
- Segment table
- Action table

The output is the same if (UTIL,MIN) is specified. Both UTIL options are ignored for batch.

### Related reference:

“Formatted dump contents”

“Table of control block definitions” on page 73

## Formatted dump contents

The title for a formatted dump varies, depending on the parameters provided. The output includes eye catchers and an index to help you locate individual control blocks.

### Dump title

The contents of the dump titles that are created by the dump assist module (DFSFDMP0) and the initialization routines vary, depending on the internal DFSDUMP parameters provided and the SDUMP errors met.

The following examples show five possible dump title formats.

### Title format 1

DFSFDMP0 issued the SDUMP and passed the SDWA parameter. The CALLER parameter was either passed to DFSFDMP0 or the routine generated the parameter using the IMS TCB table.

```
ljjjjjjj ABEND SYS sss USER uuuu-rrr, DATE.TIME: ddd.tttttt,
 CALLER=cccc, TCB=xxx, MODULE=mmmmmmmmmm,i
```

*l*            Length of title in hexadecimal - here 91 decimal.

*jjjjjjjj*    Job name.

*sss*        System abend code.

*uuuu*       User abend code.

*rrr*        Optional user abend reason code.





*mmm...m*

Message text (up to 40 characters) that describes the error. See the possible error messages following this example.

*RTKN=*

16-byte recovery token (present only for DRA thread abends).

*rrr...r*

First 8 bytes of the recovery token in characters. It identifies the ID of the CCTL region.

*xxx...x*

Second 8 bytes of the recovery token in hexadecimal.

The possible error messages for *mmm...m* follow. The issuing module precedes the message text.

**DFSPRA0,**

DBCTL FAILURE DURING DRA TERM

**DFSPRA10,**

DBCTL FAILURE DURING IDENTIFY

**DFSPRA20,**

DBCTL FAILURE DURING RESYNC

**DFSPRA50,**

DBCTL FAILURE DURING PURGE

**DFSPIN0,**

FAILURE ESTABLISHING ESTAE

**DFSPAT00,**

GETMAIN FAILURE

**DFSPIN0,**

SSI FAILURE DURING SONCRT

**DFSPIN0,**

DBCTL FAILURE DURING SONCRT

**DFSPSCH0,**

SSI FAILURE DURING SCHED

**DFSPSCH0,**

DBCTL FAILURE DURING SCHED

**DFSPUSC0,**

SSI FAILURE DURING UNSCHED

**DFSPUSC0,**

DBCTL FAILURE DURING UNSCHED

**DFSPSYN0,**

DBCTL FAILURE DURING SYNC

**DFSPDLI0,**

DBCTL FAILURE DURING DLI

**DFSPPTK0,**

DBCTL FAILURE DURING PRIME

**DFSPTTH0,**

SSI FAILURE DURING TERMTHD

**DFSPTTH0,**

DBCTL FAILURE DURING TERMTHD

DFSPRA40,  
PQE CANNOT BE PROCESSED

DFSPRA0,  
PQE OR PAPL IS INVALID

DFSFPRA0,  
CONTROL TCB ESTAE INVOKED

DFSFPAT0,  
THREAD TCB ESTAE INVOKED

DFSFPRA0,  
DRA ESTAE FAILED TO ESTABLISH ESTAE

NO OTHER DRA MESSAGE

#### Title format 4

The SNAP call facility identifies calling routines that generate snap dumps. Supervisor call (SVC) dumps are generated only for the intended abend codes or status codes, and for unknown calling routines.

This dump is created by DFSERA20 when a SNAP dump is requested. The title is the format:

*nnnnnnnn* IMS USER ABEND *uuuu*, DATE.TIME: *ddd.tttttt,i*

*nnnnnnnnnn*

IMS name.

*uuuu* The user abend code or UNK if a SNAP was requested, but there was no abend set.

*ddd* Julian day of year.

*tttttt* Time, in the form HHMMSS

*i* Indicator if primary (P) or secondary (S) requested.

#### Title format 5

This dump is created by DFSERA20 when a SNAP dump is requested. The format is generated for dumps that are taken when an unexpected DL/I status code is returned during HALDB Online Reorganization. The title is the format:

*nnnnnnnn* UNEXPECTED STATUS CODE *cc*, DATE.TIME: *ddd.tttttt,i*

*nnnnnnnnnn*

IMS name.

*cc* The unexpected status code returned during HALDB Online Reorganization.

*ddd* Julian day of year.

*tttttt* Time in the form HHMMSS.

*i* Indicator if primary (P) or secondary (S) requested.

*cc* is the unexpected status code returned during HALDB Online Reorganization.

## Eye catchers

To help you locate areas that are dumped, eye catchers are printed near the major control blocks in the formatted dump. Eye catchers are also useful when you are using IPCS to view the formatted dump. Examples of eye catchers are:

**\*\*SCD**

System Contents Directory Area

**\*\*SSA** SAP and Save Area

**\*\*SB-1** Subsystem Overview for Sequential Buffering

Eye catchers are also listed at the top of the formatted dump.

## Index

The formatted dump also contains an index at the end that is created by the z/OS Index Service routine. Index entries are created each time an eye catcher is processed during formatting, and after the Offline Dump Formatter finishes processing.

Entry length is limited to 40 decimal characters.

## Formatted dump output order

The following list shows the order in which the Offline Dump Formatter prints control blocks. If you specify **FMTIMS ALL** and all necessary data is available to the formatter, you get all of the areas listed. The order does not change when you specify subset options, but only the areas you specify are formatted. Descriptive information has been added for some control blocks where it is useful.

### ODF Initialization Messages

These messages appear when the formatter is unable to find particular address spaces in the dump data set.

### Eye catchers

Eye catchers of the areas that you requested to be formatted on this pass of the formatter.

An eye catcher could be included in this list even if the Offline Dump Formatter was unable to format the control block, because the list is built from the parameters you include in the FMTIMS statement.

### Diagnostic Area

Contains the PSW, system and user completion codes, save area ID of the module that was executing, and registers in use when abnormal termination occurred.

### Instruction Area

Contains the area of storage from 128 bytes before to 128 bytes after the address of the failing instruction in the PSW.

### Register Area

This area contains 512 bytes above and 256 bytes below each register value in the passed SDWA. The address space ID (ASID) used is the one passed in the SDWA.

### System Diagnostic Work Area

The mapping DSECT is IHASDWA.

**Referenced SAP**

The mapping DSECT is ISAP.

**System Contents Directory**

The mapping DSECT is ISCD.

**SCD Latch Extension**

The mapping DSECT is ISCD.

**Scheduler Sequence Queues**

Controls the status of each region. The mapping DSECT is ISCD.

**Synchronous APPC/OTMA Shared Message Queue SCD Extension**

The mapping DSECT is DFSCSCD.

**FP ESCD**

The mapping DSECT is DBFESCD.

**Control Block Table**

Contains entries of control blocks that macro DFSCBTS uses for tracking. The mapping DSECT is DFSCBTS.

**Control Block Table Pools**

All IPAGEs for CBTE types requested with the (CBTE,cbteid) option.

**Save Area Trace****SAPs with their Active UEHBs****Save Area Prefix**

All SAPs are SNAPed. Each SAP is followed by its save area set. At the end of this section, all of the SAP IPAGEs are dumped.

**IMS Task Dispatch Work Area**

The mapping DSECT is IDSPWRK.

**DBRC Task Dispatch Work Area**

If present in the system, it is mapped.

**IMS Control Task Dispatch Work Area**

Contains the same information as the IMS log task dispatch work area.

**Dependent Region Dispatch Work Area**

For every dependent region in IMS, the dispatcher work area is mapped.

**Dispatcher Trace Data**

DSECT IDSPWRK contains the function codes associated with the dispatcher and an explanation of each code.

**Scheduler Trace Data**

Scheduler trace data is mapped by DFSSCHED. The trace entries contain scheduler function codes.

**Latch Trace Data**

The trace entries contain latch and unlatch function codes. The mapping DSECT is IDLIVSAM TRACENT.

**Timer Work Areas**

These are control blocks used by the internal IMS timers.

**System PSTs**

These are system work areas for any online or batch region. The mapping DSECT is IPST.

**Restart Work Areas**

See RESTART “Solving IMS problems by using the IMS Offline Dump Formatter” on page 511 for a list of these areas.

**Log Control Directory**

Contains information about the IMS log. The mapping DSECT is LCDSECT.

**Log Work Areas****Log Buffers**

Each log buffer contains buffer information and the log control DECB. The mapping DSECT is LCDSECT.

**Open Record**

Contains the type 06 log record. The mapping DSECT is ILOGREC.

**Control Record**

Contains the type 42 log record. The mapping DSECT is ILOGREC.

**Monitor Log Directory**

Contains the same information as the log control directory.

**DLOG Trace Data**

Trace table used to show IMS logging activity. The mapping DSECT is ILOGREC (67FA).

**Subsystem Control Table****Attach Work Areas****PSB Directory**

A SNAP of the PSB directory. The mapping DSECT is PDIR.

**DMB Directory**

A SNAP of the DMB directory. The mapping DSECT is DDIR.

**Intent List**

The DL/I address space must be in the dump data set for this list to be formatted.

**Fast Path Trace****Dependent Region PST formatting**

For each DPST:

- PST
- Savearea
- PDIR
- Intent List
- PSB prefix
- PSB Index Maintenance, Index I/O, I/O, SSA, and User Parms work areas
- SMB
- DB PCB blocks
- Delete work area
- Retrieve Trace
- HD Space Trace
- FLDS

- RPL
- IRLM area
- PST log work area
- Fast Path EPST and chain addresses, ECNTs, EMH message, EPCBs, XCRBs, and DMHR

#### **BFSP**

Formats the buffer pool prefix. The mapping DSECT is BFSP.

#### **BFUS**

Formats the subpool prefix. The mapping DSECT is BFUS. The mapping DSECT is RPLI.

#### **DL/I Data**

A dump of the DL/I lock activity and program isolation trace table. The mapping DSECT is IDLIVSAM TRACENT.

#### **Lock Activity Trace Data**

See DL/I Data.

#### **Program Isolation Data**

Includes the QEL, QCB and REQ areas. The mapping DSECT is XC00.

#### **OSAM Control Blocks**

The system attempts to follow the main pool, the subpool header, and the buffer prefix, and to dump the buffer. However, if an error is encountered during formatting, the entire buffer pool is SNAPed from the last valid subpool address.

#### **DL/I Trace Table**

#### **Sequential Buffering Blocks**

Sequential Buffering information is grouped into the following four sections. (See the explanation of the (SB) FMTIMS option “Solving IMS problems by using the IMS Offline Dump Formatter” on page 511 for a complete list of the blocks dumped in each section.)

1. Subsystem Overview for Sequential Buffering
2. PST Overview of Sequential Buffering control blocks
3. Formatted Sequential Buffering control blocks
4. Sequential Buffering buffers

#### **DEDB Formatting**

#### **Fast Path EMH Formatting**

#### **Fast Path MDSB Formatting**

#### **Communication Line Blocks and Subordinate Blocks <sup>2</sup>**

For each CLB line, all the control blocks associated with that line are formatted.

#### **CTB <sup>2</sup>**

The mapping DSECT is ICLI CTBBASE=0.

#### **Input Buffer <sup>2</sup>**

A SNAP of the input buffer, if input is active.

**Output Buffer <sup>2</sup>**

A SNAP of the output buffer, if output is active.

**CCB <sup>2</sup>**

Present if a conversation is active or held. The mapping DSECT is ICLI CCBBASE=0.

**CIB <sup>2</sup>**

Present if MFS is in use. The mapping DSECT is ICLI CIBBASE=0.

**Communication Terminal Table <sup>2</sup>**

Defines terminal characteristics. The mapping DSECT is ICLI CTTBASE=0.

**SPQB Entries <sup>2</sup>**

Entries on the subpool queue block chain. Unallocated CNTs are also formatted here.

**SMB Table <sup>2</sup>**

This table defines transaction characteristics in the IMS system. The mapping DSECT is IAPS SMBBASE=0.

**Queue Manager Pool Prefix and Buffers <sup>2</sup>**

The mapping DSECTs are ICLI POOLBASE=0, ICLI BFRBASE=0, and QPOOL. The buffer prefix list contains the address of each buffer's prefix, status byte, and first and last pending and current device relative record number (DRRN).

**Batch Utility Areas****DBRC Work Areas****LUM Trace**

Allows LU 6.2 activities to be analyzed with the MVS/ESA APPC trace entries by the LU manager.

**Related reference:**

"Contents formatted for FMTIMS options" on page 528

---

## Edited command buffer format

The edited command buffer is logged in the X'02' log record and is passed to the AOI user exit. You can use the edited command buffer to determine if any recoverable commands were issued for the resource you are analyzing.

**Edited command buffer examples**

For example, if you are analyzing a hung terminal problem, look at any log records, including X'02' records, that apply to that terminal.

However, finding the applicable log records might be difficult. If the problem is repeatable, you can use the /LOG command to mark the log when certain activities are started or stopped. The /LOG command writes a comment to a X'02' log record. This narrows the range of log records you need to examine.

**Example:** If transaction XYZ results in a hung terminal, use the /LOG command to write a comment to a X'02' log record before the transaction is started and after the terminal is hung, as follows:

---

2. These areas are not dumped in a DBCTL environment.

```
/LOG START XYZ TRAN THAT RESULTED IN HUNG TERMINAL.
/LOG TERMINAL IS NOW HUNG.
```

Look for these comments in the X'02' log record edited command buffers to determine the range of log records to examine.

The following figure shows the layout of the edited command.

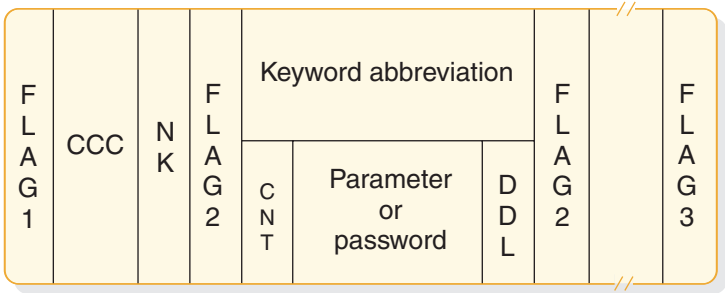


Figure 79. Edited command layout

**Figure Number**  
**Description**

**FLAG1** X'FE' to denote the beginning of the edited command. If any parameter contains an error, the command action modules set this byte to X'FC'. An exception is DFSICL40 processing of "ALL" expanded parameters.

**CCC** First 3 characters of entered command.

**NK** Hexadecimal value of number of keywords in the condensed buffer.

**FLAG2** One of the following:  
X'FC' Parameter that follows found in error.  
X'FF' 3-byte keyword abbreviation follows.  
X'FE' Count (CNT) field and parameter follow.  
C'(' Count (CNT) field and password follow.

**Keyword Abbreviation** First 3 characters of entered command. Consult DFSCKWDO to obtain the abbreviation; it is sometimes the first 3 characters of any keyword.

**CNT** Count of number of characters in parameter or password immediately following the CNT. It can be a comma, period, blank, or left parenthesis.

**Parameter or Password** Exists exactly as entered from the terminal.

**DDL** The delimiter entered after the parameter or password. It may be X'80' if the keyword "ALL" was expanded to individual parameters.

**FLAG3** Period indicating end of command.

**Exception:** Only parameter passwords (as in the /IAM command) are present in the condensed buffer; command passwords are not present.



---

## IMS Dump Formatter

The IMS Dump Formatter provides ISPF dialog support for IMS Offline Dump Formatter requests, and simplifies the process of making requests by providing menus for format option selection, help members for online options, automatic terminal and spool output control, and a configuration panel to provide interactive assistance in defining the IMS environment.

The IMS Dump Formatter menu is available from the component analysis section of the IPCS dialogs (IPCS ISPF selection 2.6).

### Dump formatting options

General formatting options are available for IMS and z/OS memory dumps.

- Offline IMS or z/OS formatting from a SYS1.DUMPxx (SDUMP) data set
- Offline IMS or z/OS formatting from a SYSMDUMP data set
- Online IMS or z/OS formatting directed to either a SYSABEND or SYSUDUMP SYSOUT class
- Online z/OS formatting directed to either a SYSABEND or SYSUDUMP spinoff dump SYSOUT class

The dumping options that are in effect in an IMS environment depend on:

- Whether execution is online or batch.
- Whether the error might terminate IMS.
- The FMTO EXEC parameter that is specified.
- The SOD EXEC parameter that is specified (online execution only).
- Whether a SYSABEND, SYSUDUMP, or SYSMDUMP is chosen.
- The z/OS dump options chosen for SDUMP, SYSABEND, SYSUDUMP, and SYSMDUMP.
- Whether the Dump Override Table (DFSFDOT0) contains any entries. DFSFDOT0, and its relationship to the various dumps, is explained in *IMS Version 12 Exit Routines*.

### FMTO options

The FMTO options and their effect on the dumps produced are summarized in the following table, and the following codes are used:

#### Option Effect on dump produced

|      |                                        |
|------|----------------------------------------|
| TE   | Error would terminate IMS.             |
| NT   | Error would not terminate IMS.         |
| FDDL | Formatted dump delete list processing. |
| Y    | Yes                                    |
| S    | Yes, but only if SDUMP fails.          |
| N    | No                                     |
| —    | Not applicable, or not attempted.      |

In the following table:

- The default is FMTO=D.
- SYSABEND, SYSUDUMP, and SYSMDUMP are mutually exclusive.

- z/OS formatting always accompanies IMS online formatting.
- Spinoff dumps can occur in addition to SDUMPs.

Table 232. FMTO options and their effect on memory dumps produced.

| FMTO value | IMS online formatting<br>SYSABEND<br>SYSUDUMP |    |      | z/OS online formatting<br>SYSABEND<br>SYSUDUMP |    | IMS offline formatting<br>SDUMP |    | IMS offline formatting<br>SYSMDUMP |    | IMS spinoff dump<br>SYSABEND<br>SYSUDUMP |    |
|------------|-----------------------------------------------|----|------|------------------------------------------------|----|---------------------------------|----|------------------------------------|----|------------------------------------------|----|
|            | TE                                            | NT | FDDL | TE                                             | NT | TE                              | NT | TE                                 | NT | TE                                       | NT |
| D          | S                                             | —  | S    | S                                              | —  | Y                               | Y  | S                                  | —  | —                                        | Y  |
| X          | S                                             | —  | S    | S                                              | —  | Y                               | N  | S                                  | —  | —                                        | Y  |
| M          | N                                             | —  | N    | S                                              | —  | Y                               | Y  | S                                  | —  | —                                        | Y  |
| R          | N                                             | —  | N    | S                                              | —  | Y                               | N  | S                                  | —  | —                                        | Y  |
| T          | Y                                             | —  | Y    | Y                                              | —  | N                               | Y  | Y                                  | —  | —                                        | Y  |
| P          | Y                                             | —  | N    | Y                                              | —  | N                               | Y  | Y                                  | —  | —                                        | Y  |
| F          | Y                                             | —  | N    | Y                                              | —  | N                               | N  | Y                                  | —  | —                                        | Y  |
| N          | N                                             | —  | N    | Y                                              | —  | N                               | Y  | Y                                  | —  | —                                        | Y  |
| Z          | N                                             | —  | N    | Y                                              | —  | N                               | N  | Y                                  | —  | —                                        | Y  |

## SDUMPs

If SDUMP is used, be aware of these additional considerations:

- If SDUMP is requested by the FMTO option, it is attempted first. If SDUMP is successful, no other dump (except a spinoff dump) is generated.
- If SDUMP fails, if IMS online formatting is requested, and if a SYSABEND or SYSUDUMP DD statement is present, a dump with IMS and z/OS online formatting is generated for terminating errors.

The formatted dump delete list (FDDL) consists of IMS module and control block names, and a dump or delete action indicator. For a module, the delete process removes storage occupied by the module. This causes the module to be omitted from the storage image portion of the dump. However, the module/save ID is printed in the dump. For a control block, the delete process similarly removes storage and storage image output if the block was successfully formatted.

- If SDUMP fails, IMS online formatting is not requested, and a SYSABEND or SYSUDUMP DD statement is present, a dump with z/OS online formatting is generated for terminating errors.
- If SDUMP fails and a SYSMDUMP DD statement is present, a machine readable dump is generated for terminating errors.

## SYSMDUMPs

If SYSMDUMP is used, be aware of these additional considerations:

- SYSMDUMP DD statements should be present in the IMS, DBRC, and DLISAS procedures.
- The SYSMDUMP DD statement must specify DISP=MOD, because it is possible for multiple tasks to generate dumps during the processing of an error.

- The SYSMDUMP data set must be refreshed (for example, scratched and reallocated) before it can be reused. If this is not done, new dumps are appended to the end of the data set and may not be accessible to the Offline Dump Formatting utility.
- Do not use SYSMDUMP in place of SYSABEND or SYSUDUMP.

## Spinoff dumps

If spinoff dumps are used, be aware of these additional considerations:

- If a spinoff dump SYSOUT class is specified (SOD EXEC parameter in the IMS control region), a spinoff dump is generated for nonterminating errors.
- Spinoff dumps allow the dump data set to be released to JES for immediate printing. (This can be useful when external subsystems are supported.)
- Spinoff dumps are only generated for those tasks that do not terminate IMS.
- If a SYSABEND or SYSUDUMP DD statement is not provided, the first dump is not printed. For subsequent dumps, the dump data set is dynamically allocated using the spinoff dump class.
- The spinoff dump class (SOD execute parameter) should be the same as the SYSABEND or SYSUDUMP SYSOUT class.

If the classes are different, the first dump goes to the class specified on the SYSABEND or SYSUDUMP DD statement. The dump data set is then dynamically deallocated to free the dump for printing and then dynamically reallocated using the spinoff dump class. Therefore, all subsequent dumps go to the spinoff dump class.

- The only valid SYSABEND or SYSUDUMP DD statement parameter used for spinoff dump is the SYSOUT class. Other parameters are ignored.
- Spinoff dumps use the default output limit established during JES definition. Incomplete spinoff dumps can result if the limit specified is too low.

## z/OS dump options

To create IMS dumps that are useful in diagnosing problems, specify the proper dump options for each type of z/OS dump used for IMS.

Use the z/OS operator command DISPLAY DUMP, OPTIONS to determine the dump options currently in effect on your system.

If the current dump options do not include the options listed in this section, the defaults that are obtained from SYS1.PARMLIB (members IEAABD00, IEADMP00, and IEADMR00) must be altered. Use the z/OS operator command CHNGDUMP to change dump options.

Table 233. z/OS dump options

| Type of dump                  | z/OS dump options                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| SDUMP                         | SDUMP=(CSA,PSA,RGN,SQA,SUM,TRT,GRSQ)                                                                                                                    |
| SYSABEND                      | <ul style="list-style-type: none"> <li>• SYSABEND,SDATA=(CB,DM,ENQ,ERR,IO,LSQA,SUM,TRT)</li> <li>• SYSABEND,PDATA=(JPA,LPA,PSW,REGS,SA,SPLS)</li> </ul> |
| SYSUDUMP                      | <ul style="list-style-type: none"> <li>• SYSUDUMP,SDATA=(CB,ERR,SUM)</li> <li>• SYSUDUMP,PDATA=(JPA,LPA,PSW,REGS,SA,SPLS)</li> </ul>                    |
| SYSMDUMP (online system only) | SYSMDUMP=(CSA,LSQA,RGN,SQA,SUM,SWA,TRT)                                                                                                                 |

Table 233. z/OS dump options (continued)

| Type of dump                 | z/OS dump options                   |
|------------------------------|-------------------------------------|
| SYSMDUMP (batch system only) | SYSMDUMP=(LSQA,RGN,SQA,SUM,SWA,TRT) |

## IMS online system dump options

In an online IMS environment, the following dumps are possible:

- SDUMP to a SYS1.DUMPxx data set. SDUMP can then be formatted using the Offline Dump Formatter utility.  
This dump can be generated both for errors that cause IMS to terminate (*terminating errors*) and for errors that do not cause IMS to terminate (*nonterminating errors*).
- SYSABEND or SYSUDUMP with IMS or z/OS formatting performed online.  
This dump is generated for terminating errors only if SDUMP fails or was not requested.
- SYSMDUMP to a data set. SYSMDUMP can then be formatted using the Offline Dump Formatting utility.  
This dump is generated for terminating errors only if SDUMP fails or was not requested.
- Spinoff dump to SYSABEND or SYSUDUMP with z/OS formatting performed.  
This dump is generated for nonterminating errors and can be generated in addition to SDUMP.

## Online system dependent region dump options

Except for SDUMPs, the dumping options for the dependent regions are controlled by the following:

- The spinoff dump SYSOUT class (SOD EXEC parameter in the DFSMPR and IMSFP procedures)
- The presence or absence of a SYSABEND or SYSUDUMP DD statement in the dependent region JCL. These DD statements are mutually exclusive; provide only one.

Do not use SYSMDUMP in IMS dependent regions.

## MPP, IFP, and BMP dependent regions

In the online IMS environment, the following dumps are useful for MPP, IFP, and BMP dependent regions:

- SYSABEND or SYSUDUMP (with z/OS formatting performed online).
- Spinoff dump to SYSABEND or SYSUDUMP (with z/OS formatting). This dump is available only for MPP and IFP dependent regions.
- SDUMP to a SYS1.DUMPxx data set. (SDUMP can then be formatted using the Offline Dump Formatter utility.) An SDUMP is produced in the dependent region for certain IMS system errors involving DL/I or Fast Path. In this instance, the SDUMP is controlled by the FMTO specification for the control region.

## Spinoff dumps in dependent regions

If spinoff dumps are used, some additional considerations are necessary:

- Spinoff dumps allow the dump data set to be released to JES for immediate printing. (This can be useful for “never-ending” MPP or IFP regions.)
- If a SYSABEND or SYSUDUMP DD statement is not provided, the first dump is not be printed. For subsequent dumps the dump data set is dynamically allocated using the spinoff dump class.
- The spinoff dump class (SOD EXEC parameter) should be the same as the SYSABEND or SYSUDUMP SYSOUT class.

If the classes are different, the first dump goes to the class specified on the SYSABEND or SYSUDUMP DD statement. The dump data set is then dynamically deallocated to free the dump for printing and then dynamically reallocated using the spinoff dump class. Therefore, all subsequent dumps go to the spinoff dump class.

- The only valid SYSABEND or SYSUDUMP DD statement parameter used for a spinoff dump is the SYSOUT class. Other parameters are ignored after the first dump.
- Spinoff dumps use the default output limit established during JES definition. Incomplete spinoff dumps can result if the limit specified is too low.
- If the COBOL DEBUG option is used, dumps cannot be generated.

## Batch system dumps

In the batch IMS environment, the following dumps are possible:

- SYSMDUMP to a data set. (SYSMDUMP can then be formatted using the Offline Dump Formatting utility.) This dump is only generated for terminating errors.
- SYSABEND or SYSUDUMP (with IMS or z/OS formatting performed online). This dump is only generated for terminating errors.

## FMTO options for batch dumps

The FMTO options for batch dumps, and their effect on the dumps produced, are different from the FMTO options described in “FMTO options” on page 549. The FMTO options for batch dumps are summarized in Table 232 on page 550.

When using Batch FMTO options, remember the following:

- If a SYSMDUMP DD statement is present, a machine readable dump is generated for terminating errors.
- If IMS online formatting is requested and a SYSABEND or SYSUDUMP DD statement is present, an IMS online formatted dump is generated for terminating errors.
- If IMS online formatting is not requested and a SYSABEND or SYSUDUMP DD statement is present, a z/OS online formatted dump is generated for terminating errors.
- The default is FMTO=D.
- SYSABEND, SYSUDUMP, and SYSMDUMP are mutually exclusive.
- z/OS formatting always accompanies IMS online formatting.

In the following table, the following codes are used:

### Option Effect on dump produced

TE Error would terminate IMS.  
 NT Error would not terminate IMS.  
 FDDL Formatted dump delete list processing.  
 Y Yes  
 N No  
 — Not applicable, or not attempted.

Table 234. Batch FMTO options

| FMTO Value | IMS Online Formatting<br>SYSABEND SYSUDUMP |    |      | z/OS Online Formatting<br>SYSABEND<br>SYSUDUMP |    | IMS Offline Formatting<br>SYSMDUMP |    |
|------------|--------------------------------------------|----|------|------------------------------------------------|----|------------------------------------|----|
|            | TE                                         | NT | FDDL | TE                                             | NT | TE                                 | NT |
| D          | Y                                          | —  | Y    | Y                                              | —  | Y                                  | —  |
| X          | Y                                          | —  | Y    | Y                                              | —  | Y                                  | —  |
| M          | N                                          | —  | N    | Y                                              | —  | Y                                  | —  |
| R          | N                                          | —  | N    | Y                                              | —  | Y                                  | —  |
| T          | Y                                          | —  | Y    | Y                                              | —  | Y                                  | —  |
| P          | Y                                          | —  | N    | Y                                              | —  | Y                                  | —  |
| F          | Y                                          | —  | N    | Y                                              | —  | Y                                  | —  |
| N          | N                                          | —  | N    | Y                                              | —  | Y                                  | —  |
| Z          | N                                          | —  | N    | Y                                              | —  | Y                                  | —  |

If SYSMDUMP is used, be aware of these additional considerations:

- The SYSMDUMP DD statement should specify DISP=MOD.
- If DISP=MOD is used, then the SYSMDUMP data set must be refreshed (for example, scratched and reallocated) before it can be reused. If this is not done, new dumps are appended to the end of the data set and might not be accessible to the Offline Dump Formatting utility.

**Related concepts:**

“Dump contents returned for different FMTIMS options” on page 517

**Related reference:**

“Sequential buffering service aids” on page 217

## IMS Dump Formatter menus

You can use the options on the IMS Dump Formatting Menu to browse the dump data set, and perform high-level or low-level IMS formatting.

To use the menus:

1. Go to the IPCS Component Analysis panel.
2. Select DFSAAMPR. The IMS Dump Formatting Primary Menu panel appears.

```

DFSAAMPR ----- IMS DUMP FORMATTING PRIMARY MENU -----
OPTION ==>

 0 INIT - IMS formatting initialization and content summary
 1 BROWSE - Browse dump data set (IPCS norm) *****
 2 HI-LEVEL - IMS Component level formatting *USERID - SKONO
 3 LOW-LEVEL - IMS ITASK level formatting *DATE - 00/01/06
 4 ANALYSIS - IMS dump analysis *JULIAN - 00.006
 5 USER - IMS user formatting routines *TIME - 15:00
 6 OTHER COMP - Other IMS components (BPE, CQS...) *PREFIX - SKONO
 7 OTHER PROD - Other IMS-related products *TERMINAL- 3278
 E EDA - IMS Enhanced Dump Analysis *PF KEYS - 24
 T TUTORIAL - IMS dump formatting tutorial
 X EXIT - Exit IMS dump formatting

Enter END command to terminate IMS component formatting

```

Figure 80. IMS Dump Formatting Primary Menu panel

3. If this is the first time you are reading the dump, select 0 (Initialization). The IMS Dump Content Status panel opens.

```

DFSAAEIO ----- IMS DUMP CONTENT STATUS -----
COMMAND ==>

Enter the IMS CTL/BATCH or DL/I jobname to cause the IMS symbols to
be set for this dump. Request subsystem list for possible IMS names.

IMS SUBSYSTEM LIST DESIRED? (Y or N)===> N

 JOBNAME ID ASID DUMPED?

CTL
DL/I
DBRC
IRLM

ABEND CODE = SYS USER
MODULE =

IMS SDWA ADDRESS - 00672918 IMS RELEASE - 1010
IMS SCD ADDRESS - 00C449E8 IRLM LEVEL - N/A
ABENDED ASID - 0027

```

Figure 81. IMS dump formatting initialization/content panel - inactive

4. Type the IMS job name in the row marked CTL, or the DL/I job name in the row marked DL/I, and press Enter. If you do not know the job name, type Y next to the IMS SUBSYSTEM LIST DESIRED prompt to scan for dumped IMS address spaces. When valid information has been supplied, several fields are filled in the panel, as shown in the following figure. Press PF3 to return to the primary menu.

Enter the IMS CTL/BATCH or DL/I jobname to cause the IMS symbols to be set for this dump. Request subsystem list for possible IMS names.

N <==== IMS SUBSYSTEM LIST DESIRED? (Y or N)  
N <==== FORMATTER REFRESH? (Y or N)

|                                                | JOBNAME  | ID   | ASID | DUMPED? |
|------------------------------------------------|----------|------|------|---------|
| CTL                                            | IMS1     | IMS1 | 0041 | YES     |
| DL/I                                           | HPCICSAK |      | 003F | YES     |
| DBRC                                           | DBRICSAK |      | 0029 | YES     |
| IRLM                                           | IRLME2N  | IRLM | 003D | YES     |
| TMS                                            |          |      |      |         |
| ABEND CODE = SYS 0C4 USER 0                    |          |      |      |         |
| MODULE = UNKNOWN                               |          |      |      |         |
| IMS SDWA ADDRESS - 006728D0 IMS RELEASE - 1110 |          |      |      |         |
| IMS SCD ADDRESS - 00C549B8 IRLM LEVEL - IRLM22 |          |      |      |         |
| ABENDED ASID - 0041                            |          |      |      |         |

Figure 82. IMS dump formatting initialization/content panel - active

5. IMS formatting is invoked from the high-level, low-level, and analysis option menus. Each menu contains a list of selectable entries. Type S or M next to an entry to request formatting, and press Enter to process your selections. Examples of the high-level and low-level options menus are shown in the following panels.



## IMS High-Level Dump Formatting panel

```

----- IMS HIGH LEVEL DUMP FORMATTING OPTIONS ----- ROW 1 OF 23
Command ==> Scroll ==> PAGE

N <====SPOOL OUTPUT? (Y or N) N <====REFRESH FORMATTER? (Y or N)
 S = select M = select,min select choices and hit enter
 to process or UP/DOWN to scroll

Additional IMS format requests==>

Cmd Option Description

- AUTO Internally determined options (by failing ITASK type)
- ALL All high level IMS dump formatting options
- SUMMARY PSW, regs, SAP, failing ITASK blocks at time of abend
- SCD SCD, SLX, FP ESCD, scheduler sequence queues
- SAVEAREA SAP, savearea, ECB prefix, UEHB (sorted by DSPNO)
- DISPATCH Dispatcher work areas, Dispatcher and Latch traces
- SPST System PSTs and subordinate blocks
- RESTART CHKPT ID table, SIDX, LCRE, RPST, RRE, EQEL, IEEQE, FRB
- LOG LCD, log buffer prefixes, log buffers (OLDS and MON)
- DB DDIRs, PDIRs, intent list, DLI and LOCK traces, DPSTs
- DEDB ALDS, DMCB, DMAC, XCRB, SRB, ESRB
- MSDB BHDR, Main storage databases
- DC CLB, LLB, VTCB, CTB, CNT, CTT, SMB, SPQB, LGND, USRD
- EMH RCTE, BALG, EMHB
- QM QPOOL, QSCD, QMGR hash table, QBFPFRF, Queue buffers
- UTIL Partial reorg blocks
- SUBS External subsystem blocks and trace
- CBT Control block table
- SDE Storage Descriptor Element Blocks and Storage
- SB Sequential buffering control block formatting
- DBRC DBRC control blocks and trace
- IRLM IRLM control block formatting
- LUM LUM trace and control blocks
- LR Log router trace and control blocks
- TMS Transport manager control blocks
- TMSC Transport manager component dump formatting
- AOI Automated Operator Interface (Directed Message Manager)
- OTMA Open TM Access
- DBRM Database Recovery Manager
- SMBS All SMBS
***** Bottom of data *****

```

The IMS high-level formatter request panel facilitates the selection of IMS formatting areas. The MIN qualifier and spooling and terminal outputs can be selected as well.

## IMS Low-Level Formatting selection panel

DFSALL0 ----- IMS LOW LEVEL DUMP FORMATTING OPTIONS ----- ROW 1 OF 17  
COMMAND ==> Scroll ==> PAGE

N <==== SPOOL OUTPUT? (Y or N) N <==== REFRESH FORMATTER? (Y or N)  
S or M at left plus required ARGument value to select option.  
(Items marked \*P\* will prompt if ARG blank). UP/DOWN to scroll

Additional IMS formatter requests==>

| Cmd | Option | Type    | ARG      | Argument description                       |
|-----|--------|---------|----------|--------------------------------------------|
| v   |        |         | vvvvvvvv |                                            |
| -   | CLB    | ADDRESS |          | CLB/LLB address (hexadecimal)              |
| -   | CLB    | NODE    |          | VTAM node name                             |
| -   | CLB    | LTERM   |          | IMS logical terminal name (CNT)            |
| -   | CLB    | CID     |          | VTAM communication ID (hexadecimal)        |
| -   | LLB    | LINK    |          | MSC link number (decimal)                  |
| -   | DPST   | ADDRESS |          | Dependent region PST address (hexadecimal) |
| -   | DPST   | NUMBER  |          | Dependent region PST number (hexadecimal)  |
| -   | DPST   | NAME    |          | Dependent region PST jobname               |
| -   | SYPST  | ADDRESS |          | System PST address                         |
| -   | SYPST  | NAME    | *P*      | System PST name                            |
| -   | TRACE  | NAME    | *P*      | Trace table ID (2 characters)              |
| -   | SAP    | ADDRESS |          | Savearea block address (hexadecimal)       |
| -   | SAP    | ECBADR  |          | SAP's ECB address (hexadecimal)            |
| -   | POOL   | NAME    | *P*      | IMS storage pool name                      |
| -   | CBTE   | NAME    |          | Control Block Table name                   |
| -   | LUB    | NAME    |          | LU name                                    |
| -   | DTT    | ADDRESS |          | DTT address                                |
| -   | SMB    | NAME    |          | SMB by transaction name                    |
| -   | SMB    | ADDRESS |          | SMB address                                |

\*\*\*\*\* Bottom of data \*\*\*\*\*

## IMS Dump Analysis selection panel

DFSALL0 ----- IMS DUMP ANALYSIS -----  
COMMAND ==>

N <====SPOOL OUTPUT? (Y or N) N <====REFRESH FORMATTER? (Y or N)

Put an S left of desired option to select. Additional FMTIMS  
strings may be entered after "ADDITIONAL REQUESTS". Press Enter to  
process.

Additional formatting requests ==>

|     | analysis | output                         |
|-----|----------|--------------------------------|
| CMD | option   | description                    |
| v   |          |                                |
| -   | SAPS     | savearea set overview analysis |

## IMS components formatting panels

| The IMS components Common Queue Server (CQS), Database Recovery Facility  
| (DBRC), IMS Connect, Open Database Manager (ODBM), Operations Manager  
| (OM), Repository Server (REPO), Resource Manager (RM), and Structured Call  
| Interface (SCI), run under the Base Primitive Environment (BPE) system services,  
| rather than the IMS system services. These components use the BPE formatter, and  
| their format options are selected separately from the IMS Dump Formatter.

BPE direct external trace lets any component that is running under the BPE system services write ad hoc data of variable length directly to the BPE data set. To use BPE direct external trace, you must enable it when you create the trace table definition. See “Setting up IMS for diagnostics” in *IMS Version 12 System Definition*.

### To access the BPE External Trace Formatting panels:

1. Select Other IMS components formatting from the IMS Dump Formatting Primary menu panel, type 6 and press **Enter**. The IMS Components panel appears.
2. Select the component that you are formatting or select B for the BPE formatting panel, and press **Enter**.
3. Type 4 to access the BPE external trace formatting panel, and press **Enter**. The BPE External Trace Formatting panel opens. From this panel, you can select the specific component formatting to be done (for example, BPE or CQS). Dump initialization for these components is done through the BPE status and initialization panel under option 0 after step 2.

```
-- IMS BPE EXTERNAL TRACE FORMATTING MENU --
OPTION ==>

Input BPE trace DSN _____
Specify any BPE component. (component type or ALL)
Specify any BPE trace type (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Asynchronous work element (AWE) (Y/N)
Control block storage/services (CBS) (Y/N)
Commands trace (CMD) (Y/N)
Dispatcher trace (DISP) (Y/N)
Error trace table (ERR) (Y/N)
Hash table services (HASH) (Y/N)
Latch management and serialization (LATC) (Y/N)
System service calls (SSRV) (Y/N)
Storage service requests (STG) (Y/N)
Activity related to exit routines (USRX) (Y/N)

Optional parameters:
Start Date/Time (Example 2002190 133500)
Stop Date/Time (Example 2002190 133500)
UTC or Local (U/L) Convert trace STCK. (Y/N)
```

Figure 83. BPE External Trace Formatting panel

```
-- CQS BPE EXTERNAL TRACE FORMATTING MENU --

Input BPE trace DSN _____
Specify any CQS trace type (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Common Queue Server Trace (CQS) (Y/N)
CQS Error Trace (ERR) (Y/N)
CQS Interface Trace (INTF) (Y/N)
CQS Overflow Trace (OFLW) (Y/N)
CQS Structure Event Trace (SEVT) (Y/N)
CQS Structure Trace (STR) (Y/N)

Optional parameters:
Start Date/Time (Example 2002190 133500)
Stop Date/Time (Example 2002190 133500)
UTC or Local (U/L) Convert trace STCK. (Y/N)
```

Figure 84. CQS BPE External Trace Formatting panel

```

----- DBRC BPE EXTERNAL TRACE FORMATTING MENU -----
OPTION ==> _____

Input BPE trace DSN _____
Specify any DBRC trace type _____ (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Error Trace (ERR) _ (Y/N)
DBRC Request Trace (RQST) _ (Y/N)
DBRC Module Flow Trace (MODF) _ (Y/N)
DBRC Group Service Trace (GRPS) _ (Y/N)

Optional parameters:
Start Date/Time . . . _____ (Example 2002190 133500)
Stop Date/Time. . . _____ (Example 2002190 133500)
UTC or Local. . . . _ (U/L) Convert trace STCK. . . Y (Y/N)

```

Figure 85. DBRC BPE External Trace Formatting panel

```

----- ODBM BPE EXTERNAL TRACE FORMATTING MENU -----
OPTION ==> _____

Input BPE trace DSN _____
Specify any ODBM trace type _____ (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Open Database Manager (ODBM) _ (Y/N)

Optional parameters:
Start Date/Time . . . _____ (Example 2002190 133500)
Stop Date/Time. . . _____ (Example 2002190 133500)
UTC or Local. . . . _ (U/L) Convert trace STCK. . . Y (Y/N)

```

Figure 86. ODBM BPE External Trace Formatting panel

```

-- OM BPE EXTERNAL TRACE FORMATTING MENU --
OPTION ==> _____

Input BPE trace DSN _____
Specify any OM trace type _____ (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Common Service Layer (CSL) _ (Y/N)
Error Trace (ERR) _ (Y/N)
Trace (OM) _ (Y/N)
IMSpIex Trace for OM (PLEX) _ (Y/N)

Optional parameters:
Start Date/Time . . . _____ (Example 2002190 133500)
Stop Date/Time. . . _____ (Example 2002190 133500)
UTC or Local. . . . _ (U/L) Convert trace STCK. . . _ (Y/N)

```

Figure 87. OM BPE External Trace Formatting panel

```
-- RM BPE EXTERNAL TRACE FORMATTING MENU --
OPTION ==>

Input BPE trace DSN _____
Specify any RM trace type _____ (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Common Service Layer (CSL). _ (Y/N)
Error Trace (ERR). _ (Y/N)
Trace (RM). _ (Y/N)
IMSpIex Trace for RM (PLEX). _ (Y/N)

Optional parameters:
Start Date/Time . . . _____ (Example 2002190 133500)
Stop Date/Time. . . _____ (Example 2002190 133500)
UTC or Local. . . . _ (U/L) Convert trace STCK. . . _ (Y/N)
```

Figure 88. RM BPE External Trace Formatting panel

```
-- SCI BPE EXTERNAL TRACE FORMATTING MENU --
OPTION ==>

Input BPE trace DSN _____
Specify any SCI trace type _____ (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Common Service Layer (CSL). _ (Y/N)
Error Parameter List (ERPL). _ (Y/N)
Error (ERR). _ (Y/N)
Interface (INTF). _ (Y/N)
Interface Parameter (INTP). _ (Y/N)
Structured Call Interface (SCI). . . _ (Y/N)
IMSpIex Trace for SCI (PLEX). _ (Y/N)

Optional parameters:
Start Date/Time . . . _____ (Example 2002190 133500)
Stop Date/Time. . . _____ (Example 2002190 133500)
UTC or Local. . . . _ (U/L) Convert trace STCK. . . _ (Y/N)
```

Figure 89. SCI BPE External Trace Formatting panel

```
-- IMS CONNECT BPE EXTERNAL TRACE FORMATTING MENU --
OPTION ==>

Input BPE trace DSN _____
Specify any IMS Connect trace type . . _____ (trace type or ALL)

Select the BPE external trace record types to format or type ALL above:
Common Trace (CMDT). _ (Y/N)
Interface (ENVT). _ (Y/N)
IMS Connect to OTMA driver (HWSI). _ (Y/N)
IMS Connect to local option driver (HWSN). . . _ (Y/N)
IMSpIex driver and IMS Connect events (HWSO). . _ (Y/N)
IMS Connect to TCP/IP driver (HWSW). _ (Y/N)
SCI calls activity (OMDR). _ (Y/N)
OTMA Communication driver (OTMA). _ (Y/N)
Local option driver (PCDR). _ (Y/N)
TCP/IP communication driver (TCPI). _ (Y/N)

Optional parameters:
Start Date/Time . . . _____ (Example 2002190 133500)
Stop Date/Time. . . _____ (Example 2002190 133500)
UTC or Local. . . . _ (U/L) Convert trace STCK. . . _ (Y/N)
```

Figure 90. IMS Connect BPE External Trace Formatting panel

```

----- REPOSITORY SERVER BPE EXTERNAL TRACE FORMATTING MENU -----
OPTION ==>

Input BPE trace DSN
Specify any RS trace type. (trace type or ALL)


Select the BPE external trace record types to format or type ALL above:
Repository Server Diag (DIAG) . . (Y/N)

Optional parameters:
Start Date/Time . . . (Example 2010195 164224)
Stop Date/Time. . . (Example 2010195 164242)
UTC or Local. . . . U (U/L) Convert trace STCK. . . N (Y/N)

```

Figure 91. REPO BPE External Trace Formatting panel

#### Related concepts:

 [Base Primitive Environment overview \(System Administration\)](#)

### Using the other IMS-related products formatting panels

IMS provides a selection for calling the dump formatters for products that are separate from IMS, but are still related to IMS.

Select Other IMS-related products formatting from the IMS dump formatting primary menu panel, type 7, and press **Enter**. You are then presented with a list of all possible products. However, you can only use the formatters of those products that are installed on your system. Each product's formatter will provide a dump initialization panel; you should not use the panel from option 0 on the primary menu.

```

DFSAMPR ----- IMS DUMP FORMATTING PRIMARY MENU -----
OPTION ==>

 0 INIT - IMS formatting initialization and content summary
 1 BROWSE - Browse Dump data set (IPCS norm) *****
 2 HI-LEVEL - IMS Component level formatting *USERID - IMSDUMP
 3 LOW-LEVEL - IMS ITASK level formatting *DATE - 00/08/23
 4 ANALYSIS - IMS dump analysis *JULIAN - 00.236
 5 USER - IMS user formatting routines *TIME - 16:06
 6 OTHER COMP - Other IMS components (BPE, CQS...) *PREFIX - IMSDUMP
 7 OTHER PROD - Other IMS-related products *TERMINAL- 3278
 E EDA - IMS Enhanced Dump Analysis *PF KEYS -
 T TUTORIAL - IMS dump formatting tutorial *****
 X EXIT - Exit IMS dump formatting

Enter END or RETURN command to terminate IMS component formatting.

Use PFKeys to scroll up and down if needed.

```

Figure 92. IMS Dump Formatting Primary Menu panel

## IMS IPCS symbols

IMS offline dump formatting creates IPCS symbols for selected key IMS control blocks. IMS creates and lists the IPCS symbols when the job name of an address space using BPE is supplied in the BPE initialization panel (for example, a CQS, OM, RM, or SCI address space).

The Interactive Formatter helps create these symbols and then uses them to make Offline Dump Formatter requests easier by providing known starting points, including starting points for CLISTs. The dump formatter also sets symbols for the registers (R0-R15) and PSW (DFSPSW) at abend for abend dumps. This allows you to quickly locate areas in storage pointed to by the registers and PSW when you are in IPCS browse mode.

## Using IMS enhanced dump analysis

You use the IMS Enhanced Dump formatting menu to browse and select formatting options for database, Fast Path, Transaction Manager and System dumps. There is also a tutorial available about the formatter and how to use the filtering tool.

1. Select option E from the IMS dump formatting primary menu. The IMS Enhanced Dump Formatting Menu displays, as shown in the following figure.

```
----- IMS ENHANCED DUMP FORMATTING MENU
OPTION ===>

 1 BROWSE - Browse dump dataset (IPCS norm)
 2 DB - Full Function Data Base
 3 FP - Fast Path Data Base
 4 TM - Transaction Management and DC
 5 SYS - Systems
 6 DBRC - Database Recovery Control
 T TUTORIAL - IMS Dump Formatter Tutorial
 X EXIT - Exit EDA dump formatting menu

Enter END or RETURN command to terminate IMS component
```

Figure 93. IMS Enhanced Dump Formatting Menu

In this panel, the control blocks are organized by function for ease of use. For example, EPST (the extended partition specification table) is located under option 3 for Fast Path.

2. To review tutorial information about the formatter and about how to use the filtering tool, type T and press **Enter**.
3. To use a filtering tool to identify filtering criteria, type on of the options 2, 3, 4, or 5 and press **Enter**.

An example of a filtering panel is shown in the following figure.

```

----- Generic Filtering Panel -----
Explanation of the fields:
Offset (required) - Offset of the field in the block.
 (hex)
Length (default = 1) - Length of field in the control
 block. (decimal)
Cond (default = EQ) - Type of compare to be done. (EQ,NE,
 GT,GE,LT,LE)
Bit (default = N) - Should comparison be a bit mask?
 (Y or N)
Type (default = X) - Is the value type decimal, hex, or
 char (D,X,A)?
Value (required) - Value of the field to be compared
 at given offset.
Qual - Qualify filter to search in
 sub-blocks.
AND/OR - How to combine multiple conditions.
 If blank, only the first condition
 will be executed.
 (up to four conditions allowed).

```

Figure 94. Sample filtering panel

4. You can overwrite the generic filtering panel default values. For example, you can select criteria that presents two separate conditions. By selecting AND you indicate that both conditions must be true
  - a. You want all the blocks starting at OFFSET 1C that have a value of X'08.'
  - b. You want all the blocks starting at OFFSET A4 that have a non-zero value.
 These values are shown in the following figure.

```

<===== AND/OR (A/0) QUAL =====>

```

Figure 95. Sample filtering criteria

## Formatting log records for use with log analysis tools

You can use the IMS Dump Formatter to recreate the final part of an IMS log from the information that is available in an IMS dump.

The log records in the log buffers of a dump are copied to a VB file that can be analyzed by the File Select and Formatting Print utility (DFSERA10) or other log analysis tools. Log records can then be put in increasing log sequence number (LSN) order and be manipulated with the DFSERA10 utility.

1. Select option E (EDA - IMS Enhanced Dump Analysis) from the IMS Dump Formatting primary menu.



[illegible]

2. Select option 5 (SYS - Systems) from the IMS Enhanced Dump Formatting menu.

```
.
 OPTION ==> 5 IMS ENHANCED DUMP FORMATTING MENU -----
.
 1 BROWSE - Browse dump dataset (IPCS norm) *****
 2 DB - Full Function Data Base *USERID - BETHRM
 3 FP - Fast Path Data Base *DATE - 08/03/05
 4 TM - Transaction Management and DC *JULIAN - 08.065
 5 SYS - Systems *TIME - 17:05
 6 DBRC - Database Recovery Control *PREFIX - BETHRM
 T TUTORIAL - IMS Dump Formatter Tutorial *TERMINAL- 3278
 X EXIT - Exit EDA dump formatting menu *PF KEYS -
. *****
Enter END or RETURN command to terminate IMS component formatting.
```

3. Select WRITE from the Systems Formatting options menu.

```

----- SYSTEMS FORMATTING OPTIONS ----- Row 1 to 14 of 14

 S = SELECT Select choice and hit enter to process.
 Use UP/DOWN to scroll.

Cmd Type Description
V-----vvvvvvv-----
- BCB BCB statistics summary
- BPECSCD BPE LFS CSCD in the IMS control region
- BPEHASH BPE LFS hash tables in the IMS control region
- CDE CDE/SDE storage List
- CDECOMM CDE/SDE storage list (common only)
- CSLA CSL anchor block formatting
- DFA Definition Anchor Block and sub-blocks
- GRMB Global RESMGR Block, trace table, and SSCTs
- OCMO OM command instance block formatting
- PDIR PSB Directory Formatting
- PST PST formatting menu
- SMB SMB formatting menu
- TRC Trace Control Blocks
S WRITE Write data to output dataset
***** Bottom of data *****

COMMAND ==> Scroll ==> PAGE
```

The WRITE option writes the contents of the log records that are within the buffers of the dump to a data set.

## Formatting a dump for analysis

You can use the IMS Dump Formatter to format a dump for analysis.

To format a dump for analysis:

1. Start IPCS with the IMS Dump Formatter.
2. Select the dump you want to browse.
3. From the IPCS Primary Option Menu, select Option 2.6, ANALYSIS.COMPONENT.
4. From the Component Analysis Panel, select DFSAAMPR.
5. From the IMS Dump Formatting Primary Option Menu, select Option 0, INIT.
6. From the IMS Dump Contents Status Panel, enter the job name of either the IMS control/batch region or the IMS DLISAS region.
7. Press the Enter key and then PF3 to return to the IMS Dump Formatting Primary Option Menu.
8. Select an option from the Primary Option Menu. HILEVEL is a good starting point because it provides a broad diagnostic overview of the problem.

---

## Formatting IMS dumps online

One of the tools available for problem diagnosis is the IMS formatted dump, which formats the control blocks and data areas in an IMS region.

### Abnormal Termination

When an abnormal termination occurs and dumping is to be performed, CSECT DFSABND0 gets control from the SCP and gives control to IMS routines to do the dumping. To assist you in locating areas that are dumped, eye catchers are supplied in the formatted dump. See “Eye catchers” on page 543 for eye catcher examples.

**Exception:** Address spaces using BPE (for example, CQS, OM, RM, and SCI) do not provide any online dump formatting output.

## Formatted dump for the CTL address space

You can use DSECT mapping macros (when applicable) to analyze control address space areas when they are dumped. The various CTL areas are listed and described.

### CTL address space areas

The following is a list of the control address space areas that are dumped (in the order in which they are dumped) and, where applicable, the DSECT mapping macros that are most useful in analyzing them. For a list of the areas dumped when LSO=S, see “Formatted dump for the DL/I address space” on page 570. Descriptive information has been added for some control blocks where it would be useful.

**Diagnostic Area**

Contains the PSW, system and user completion codes, save area ID of the module that was executing, and registers in use when abnormal termination occurred.

**Instruction Area**

Contains the area of storage from 128 bytes before to 128 bytes after the address of the failing instruction in the PSW.

**System Diagnostic Work Area**

The mapping DSECT is IHASDWA.

**U0113 Area**

Present when an abend caused the dump.

**Referenced Sap**

The mapping DSECT is ISAP.

**System Contents Directory**

The mapping DSECT is ISCD.

**SCD Extension**

The mapping DSECT is DBFESCD.

**SCD Latch Extension**

The mapping DSECT is ISCD.

**Scheduler Sequence Queues**

Controls the status of each region. The mapping DSECT is ISCD.

**FP ESCD**

The mapping DSECT is DBFESCD.

**Control Block Table**

Contains entries of control blocks that macro DFSCBTS uses for tracking. The mapping DSECT is DFSCBTS.

**Save Area Prefix**

All SAPs are SNAPed except those owned by the DL/I address space. Each SAP is followed by its save area set. At the end of this section, all of the SAP IPAGES are dumped.

**IMS Task Dispatch Work Area**

The mapping DSECT is IDSPWRK.

**DBRC Task Dispatch Work Area**

If present in the system, it is mapped.

**IMS Control Task Dispatch Work Area**

Contains the same information as the IMS log task dispatch work area.

**Dependent Region Dispatch Work Area**

For every dependent region in IMS, the dispatcher work area is mapped.

**Dispatcher Trace Data**

DSECT IDSPWRK contains the function codes associated with the dispatcher and an explanation of each code.

**Scheduler Trace Data**

Scheduler trace data is mapped by DFSSCHED. The trace entries contain scheduler function codes.

**Latch Trace Data**

The trace entries contain latch and unlatch function codes. The mapping DSECT is IDLIVSAM TRACENT.

**System PSTs**

These are system work areas for any online or batch region. The mapping DSECT is IPST.

**Checkpoint ID Table**

The mapping DSECT is BCPT.

**LCRE**

The mapping DSECT is DFSLCRE.

**SIDX**

The mapping DSECT is DFSSSIE.

**RRE**

The mapping DSECT is DFSRRE.

**Log Control Directory**

Contains information about the IMS log, for example:

- DCB1—the primary log DCB
- DCB2—the secondary log DCB (if dual logs were specified)
- Log ITASK—the status information

The mapping DSECT is LCDSECT.

**Log Buffers**

Each log buffer contains buffer information and the log control DECB. The mapping DSECT is LCDSECT.

**Log Trace**

Contains entries which show IMS internal logging activity if the log trace is active. The trace entries are described by the “IDLIVSAM TRACENT” macro.

**Open Record**

Contains the type 06 log record. The mapping DSECT is ILOGREC.

**Control Record**

Contains the type 42 log record. The mapping DSECT is ILOGREC.

**Monitor Log Directory**

Contains the same information as the log control directory and is used for logging data to the IMS Monitor data set.

**DLOG Trace Data**

Trace table used to show IMS logging activity. The mapping DSECT is ILOGREC (67FA).

**SUBS Trace Data**

Trace table used by IMS to show IMS activity in attaching or detaching subsystems. The mapping DSECT is ILOGREC (67FA).

**Global ESET Block**

The mapping DSECT is DFSGESE.

**PSB Directory**

A SNAP of the PSB directory. The mapping DSECT is PDIR.

**DMB Directory**

A SNAP of the DMB directory. The mapping DSECT is DDIR.

**Fast Path Trace**

**Dependent Region PST**

See Dependent Region PST Formatting “Formatted dump contents” on page 539 for a list of the areas formatted here.

**OSAM I/O Control Blocks**

The system attempts to dump the IOSB and IOMA blocks.

**Sequential Buffering Blocks**

Sequential Buffering information is grouped into the following three sections. (See the explanation of the (SB) FMTIMS option “Solving IMS problems by using the IMS Offline Dump Formatter” on page 511 for a complete list of the blocks dumped in each section.)

1. Subsystem Overview for Sequential Buffering
2. PST Overview of Sequential Buffering control blocks
3. Formatted Sequential Buffering control blocks

**DEDB Formatting****Fast Path EMH Formatting****Fast Path MDSB Formatting****Data Communication Control Blocks**

These areas are noted in a DBCTL environment. For each CLB (line), all the control blocks associated with that line are formatted.

**CLB**

These areas are noted in a DBCTL environment. The mapping DSECT is ICLI CLBBASE=0.

**CTB**

These areas are noted in a DBCTL environment. The mapping DSECT is ICLI CTBBASE=0.

**Input Buffer**

These areas are noted in a DBCTL environment. A SNAP of the input buffer, if input is active.

**Output Buffer**

These areas are noted in a DBCTL environment. A SNAP of the output buffer, if output is active.

**CCB**

These areas are noted in a DBCTL environment. Present if a conversation is active or held. The mapping DSECT is ICLI CCBBASE=0.

**CIB**

These areas are noted in a DBCTL environment. Present if MFS is in use. The mapping DSECT is ICLI CIBBASE=0.

**Communication Terminal Table**

These areas are noted in a DBCTL environment. Defines terminal characteristics. The mapping DSECT is ICLI CTTBASE=0.

**SPQB Entries**

These areas are noted in a DBCTL environment. Entries on the subpool queue block chain. Unallocated CNTs are also formatted here.

**SMB Table**

These areas are noted in a DBCTL environment. This table defines transaction characteristics in the IMS system. The mapping DSECT is IAPS SMBBASE=0.

**Queue Manager Pool Prefix and Buffers**

These areas are noted in a DBCTL environment. The mapping DSECTs are ICLI POOLBASE=0 and ICLI BFRBASE=0.

**Buffer Prefix List**

These areas are noted in a DBCTL environment. Contains the address of each buffer's prefix, status byte, and first and last pending and current device relative record number (DRRN).

**QPOOL Prefix**

These areas are noted in a DBCTL environment. Contains the main QPOOL prefix formatted. The mapping DSECT is QPOOL.

**IRLM Control Blocks**

The IRLM Subsystem RLMCB block are formatted here if the IMS system is running with IRLM.

**Format/Dump/Delete List**

Contains module names, module IDs, and module dump data that are not in the storage dump listing.

## Formatted dump for the DL/I address space

One of the tools available for problem diagnosis is the IMS formatted dump, which formats the control blocks and data areas in an IMS region. Dumped areas within the DL/I address space are listed and descriptive information has been added for some control blocks where it would be useful.

### Dumped areas within the DL/I address space

**System Contents Directory**

The mapping DSECT is ISCD.

**SCD Latch Extension**

The mapping DSECT is ISCD.

**Scheduler Sequence Queues**

Controls the status of each region. The mapping DSECT is ISCD.

**Save Area Trace****Save Area Prefix**

All SAPs belonging to the DL/I address space are SNAPed. A SAP is marked "ACTIVE" if the ITASK associated with it is active. Each SAP is followed by its save area set. At the end of this section, all of the SAP IPAGES are dumped.

**DLS Task Dispatch Work Areas**

The mapping DSECT is IDSPWRK.

**DBRC Task Dispatch Work Area**

If present in the system, it is mapped.

**Dependent Region Dispatch Work Area**

For every dependent region in IMS, the dispatcher work area is mapped.

**Dispatcher Trace Data**

DSECT IDSPWRK contains the function codes associated with the dispatcher and an explanation of each code.

**Latch Trace Data**

The trace entries contain latch and unlatch function codes. The mapping DSECT is IDLIVSAM TRACENT.

**System PSTs**

These are system work areas for any online or batch region. The mapping DSECT is IPST.

**PSB Directory**

A SNAP of the PSB directory. The mapping DSECT is PDIR.

**DMB Directory**

A SNAP of the DMB directory. The mapping DSECT is DDIR.

**Intent List**

This is a SNAP of the intent list.

**Partition Specification Table**

Formats the PST. The mapping DSECT is IPST.

**PDIR**

Formats the PDIR, whose address is in the PST. The mapping DSECT for PDIR is PDIR.

**PSB Prefix**

A SNAP of the PSB prefix, which contains the following:

- Index Maintenance Work Area
- Index I/O Work Area
- Segment Work Area
- I/O Work Area
- SSA Work Area
- User PARMS Area

**Buffer Handler Pool**

The system attempts to format buffer handler blocks in the order in which they are chained on the queue. However, if an error is encountered during the formatting, the entire pool is dumped as is (unchained).

The pool contains the following:

**BFSP** Formats the buffer pool prefix. The mapping DSECT is BFSP.

**BFUS** Formats the subpool prefix. The mapping DSECT is BFUS.

**RPLI** Formats the DL/I RPL block. The mapping DSECT is RPLI.

**DL/I Data**

A dump of the DL/I lock activity and program isolation trace table.  
The mapping DSECT is IDLIVSAM TRACENT.

**Lock Activity Trace Data**

See DL/I DATA.

**Program Isolation Data**

Includes the QEL, QCB, and REQ areas. The mapping DSECT is XC00.

**OSAM Control Blocks**

The system attempts to follow the main pool, the subpool header, and the buffer prefix, and to dump the buffer. However, if an error is encountered during formatting, the entire buffer pool is SNAPed from the last valid subpool address.

The pool contains the following:

**MAINPOOL**

Formats the main pool header. The mapping DSECT is IBPOOL.

**SUBPOOL**

Formats the subpool header. The mapping DSECT is ISUBPL.

**Buffer Prefix**

Formats the buffer prefix. The mapping DSECT is IBFPRE.

**Buffer** Physical data not mapped.

**OSAM I/O Control Blocks**

The system attempts to dump the IOSB and IOMA control blocks. The mapping DSECT is QPOOL.

**Sequential Buffering Blocks**

Sequential Buffering information is grouped into the following three sections. (See the explanation of the (SB) FMTIMS option “Solving IMS problems by using the IMS Offline Dump Formatter” on page 511 for a complete list of the blocks dumped in each section.)

1. Subsystem Overview for Sequential Buffering
2. PST Overview of Sequential Buffering control blocks
3. Formatted Sequential Buffering control blocks

**Fast Path DEDB Formatting****Fast Path EMH Formatting****Fast Path MDSB Formatting****IRLM Control Blocks**

The IRLM Subsystem RLMCB block is formatted here if the IMS system is running with IRLM.

**Format/Dump/Delete List**

Contains module names, module IDs, and module dump data that are not in the storage dump listing.

---

## SNAP call facility

The SNAP call facility (DFSERA20) produces SNAP dumps of DL/I control blocks and identifies calling routines that generate SNAP dumps. Supervisor call (SVC) dumps are generated only for the intended abend codes or status codes, and for unknown calling routines.

The SNAP call facility produces SNAP dumps of DL/I control blocks for the following items:

- External DL/I SNAP calls. The DL/I test program, DFSDDL0, issues SNAP calls when it detects unequal conditions based on compare statements.
- Exceptional conditions, such as pseudoabends in DL/I modules and message or batch region abends.
- Internal SNAP requests from DL/I modules.
- SNAP specific requests from other IMS modules.

GSAM modules issue SNAP calls for GSAM databases. See “GSAM control block dump - DFSZD510” on page 220 for a description of the GSAM SNAP.



When a SNAP call is performed for a Fast Path region abend, module DFSERA20 bypasses some dumps:

- For a Fast Path database (an MSDB or DEDB), module DFSERA20 bypasses the DMB dump.
- For a DB PCB that refers to a Fast Path database, module DFSERA20 bypasses the DMB, DB PCB, JCB, and SDB dumps.

SNAP output consists of buffer pools and all PSB-related control blocks. Optionally, you can request subpools 0-127 in addition to the buffers and blocks.

SNAP output for exceptional conditions is always directed to the IMS log. In all other cases, IMS sends SNAP output to a data set identified on the PRINTDD DD statement. If this data set is not already open, it is opened and closed for each SNAP request. If you do not supply a PRINTDD statement, IMS sends the SNAP output to the IMS log as X'67FD' log records. When neither a SNAP data set nor the IMS log can be used for SNAPS, all SNAP actions are bypassed.

The File Select and Formatting Print utility (DFSERA10) extracts X'67FD' log records, and the exit routine (DFSERA30) formats them.

Status codes are not set for SNAP calls.

**Related reference:**

"Log records" on page 477

---

## /DIAGNOSE command SNAP function

The /DIAGNOSE command SNAP function provides a non-intrusive alternative to creating a console dump. Use of this command can decrease the time that is required to generate problem determination data for IBM Software Support.

The /DIAGNOSE command SNAP function takes a current snapshot of system resources at any time without negatively impacting IMS. This system resource information is displayed on the issuing LTERM. Optionally, the resource information can be sent to either an online data set (OLDS) or trace data sets as type X'6701' log records.

The /DIAGNOSE command SNAP function captures information for the following resources:

- A specific IMS control block. For example, the command /DIAGNOSE SNAP BLOCK(CSCD) captures storage information for the APPC/OTMA SMQ SCD Extension control block.
- One of the following user-defined resources:
  - User-defined database
  - Communication line
  - Logical link
  - Node
  - Program
  - Transaction
  - Logical terminal (LTERM)
  - User
- Primary control blocks for a dependent region.
- Any area of storage within the control region address space (by specifying the address of that storage area).

- Prolog information for an IMS load module. The command /DIAGNOSE SNAP MODULE(*modname*) identifies the entry point address and captures prolog information for the specified IMS module. The prolog information contains the current maintenance level for a module on your system, which can help you to determine whether any maintenance is missing.
- A user-defined shared queues structure. The command /DIAGNOSE SNAP STRUCTURE(*structurename*) captures storage information for the DFSSQS control block storage for the specified shared queues structure.

You might also use the /DIAGNOSE command SNAP function to:

- Show filtered resource information captured by the SNAP function.
- Specify a limit for the number of lines of formatted SNAP data to display in response to the command.
- Specify the control blocks to be captured by the SNAP function.

The /DIAGNOSE command is a standard type-1 command.

**Related reference:**

 /DIAGNOSE SNAP command (Commands)

## Common trace table interface

For each trace, you can learn about the trace identifier, the events that are traced, and, if the trace is documented in this information, the topic where you can find more information. You use the trace identifier as an eye catcher to locate a trace in a dump.

The common trace table interface consists of the traces shown in the following table.

*Table 235. Trace tables in the common trace interface*

| Trace                                  | Table type     | ID  | Traced events                                                                                                                                          | Where described                                          |
|----------------------------------------|----------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
|                                        | ALL            | ALL | All IMS table traces                                                                                                                                   |                                                          |
| Common Service Layer trace             | CSLT           | CS  | The interaction of IMS with the CSL                                                                                                                    | “Common Service Layer trace” on page 582                 |
| DASD log trace                         | DLOG           | DG  | DASD logging                                                                                                                                           | See “DASD log” in “IMS trace function codes” on page 578 |
| Dispatcher trace (online only)         | DISP           | DS  | Dispatcher activities                                                                                                                                  | “Dispatcher trace” on page 587                           |
| DL/I and lock                          | DLI/I and LOCK | DL  | DL/I calls, DL/I buffer handler, DL/I OPEN/CLOSE, Delete/Replace, HD space management, lock activity using PI or IRLM, OSAM, DFP interface, ABENDU0427 | “DL/I trace” on page 160                                 |
| Enhanced Command Trace                 | OCMD           | OC  | Activity related to commands that originate from OM                                                                                                    | Not available                                            |
| External subsystem trace (online only) | SUBS           | SU  | Subsystem activities                                                                                                                                   | “External subsystem trace” on page 596                   |

Table 235. Trace tables in the common trace interface (continued)

| Trace                                 | Table type    | ID | Traced events                                 | Where described                                |
|---------------------------------------|---------------|----|-----------------------------------------------|------------------------------------------------|
| Fast Path Trace                       |               | FT | Fast Path activity                            | "Fast Path trace" on page 638                  |
| Force trace                           | FORCE         | FO | Internal trace for IMS initialization         | Not in use                                     |
| Intercommunications trace             | IDCO          | IC | VTAM exit activity                            | "Starting the trace" on page 263               |
| Latch trace (online only)             | LATC          | LA | Latch activities                              | "Latch trace" on page 629                      |
| Log router trace                      | LRTT          | LR | Log router activity                           | "Log router trace data" on page 437            |
| LU trace                              | LUMI          | LU | LU 6.2 activity                               | "LU manager trace" on page 316                 |
| Multiple Systems Coupling Trace       | MSCT          | MS | MSC activities. Not yet used.                 | Not applicable                                 |
| Online Recovery Manager trace         | ORTT          | OR | ORS activity                                  | "Online Recovery Manager trace" on page 203    |
| Operations Manager (OM) commands      | OCMD          | OC | Activity related to commands received from OM | Not available                                  |
| OTMA trace                            | OTMT          | OA | OTMA activity                                 | "OTMA trace" on page 339                       |
| z/OS Resource Recovery Services (RRS) | RRST          | RR | RRS activity in dependent region(s)           | "Resource Recovery Services trace" on page 612 |
| Queue manager trace                   | QMGR          | QM | Queue manager activity                        | "Queue manager trace" on page 634              |
| Security trace                        | SECT          | SE | Security events                               | Not available                                  |
| Scheduler trace (online only)         | SCHD          | SC | Scheduler activities                          | "Scheduler trace" on page 626                  |
| Shared queues interface trace         | SQTT          | SQ | Shared queues interface activities.           | "Shared queues interface trace" on page 637    |
| Storage Manager trace                 | STRG          | SM | Storage Manager activities                    | "Storage manager trace" on page 628            |
| Transport Manager Subsystem (TMS)     | Not available | TS | TMS activity                                  | Not available                                  |

**Related concepts:**

"DL/I trace" on page 160

## Finding the trace tables in a dump

If you do not write the trace to the log data set, IMS formats trace tables as part of an IMS dump.

## How to locate trace tables

The following figure shows where to find the location of each of the traces in a dump.

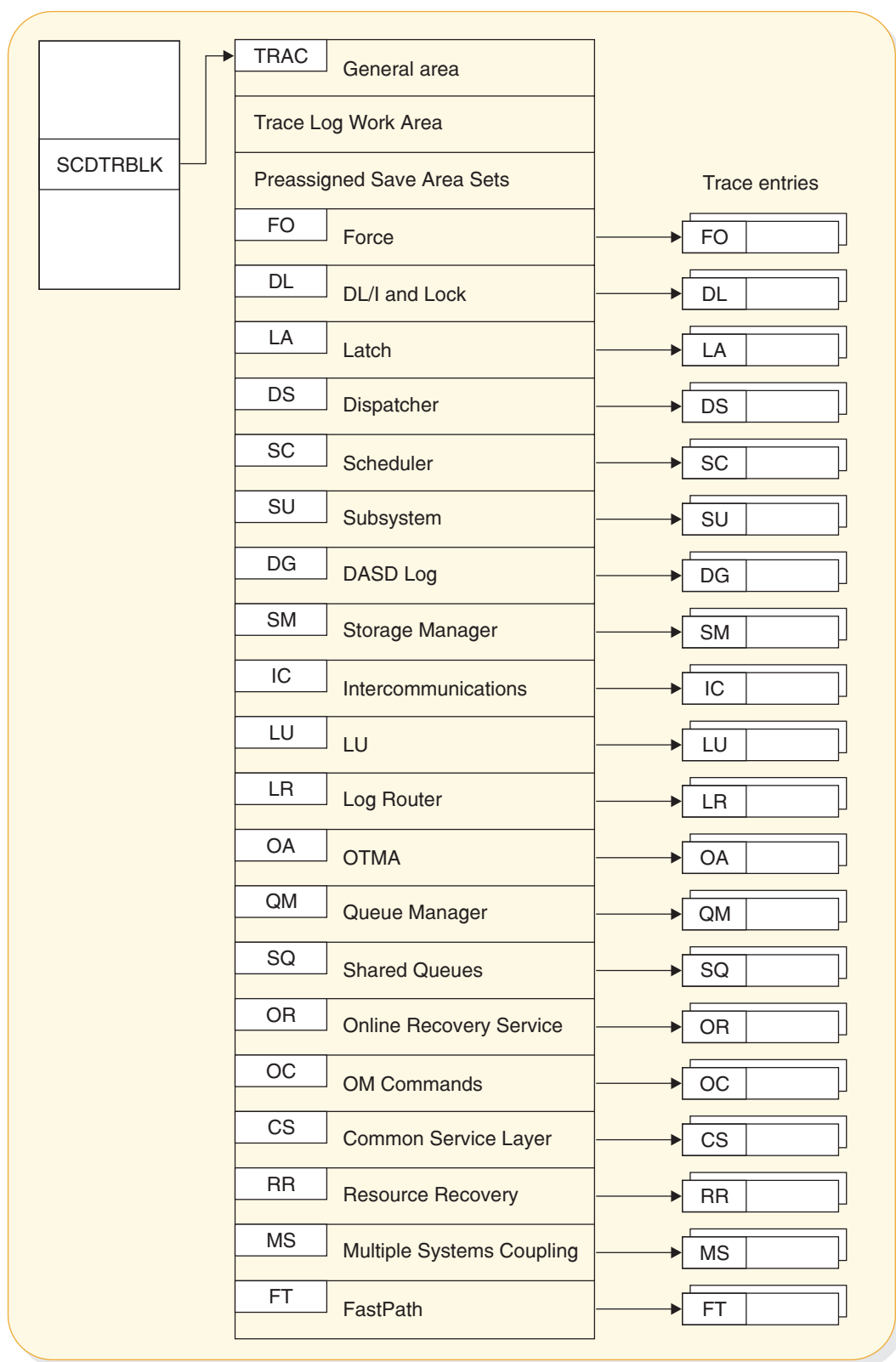


Figure 96. How to locate trace tables

## Format of trace records

By examining the trace records, you can determine the function that was being traced as well as the order in which a series of system operations took place.

In the example trace record in the following figure, the number in the trace sequence field in each entry identifies where that trace entry fits in the sequence of system operations. In addition, each trace entry provides pertinent information about that function.

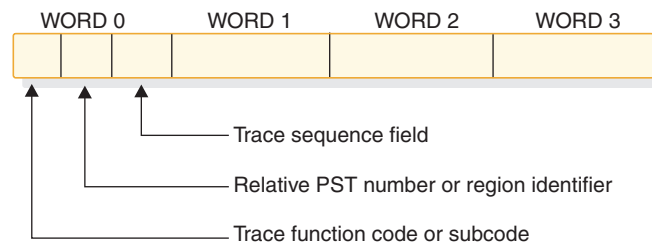


Figure 97. General trace record format

You can find the format of the trace entries by assembling macro IDLIVSAM TRACENT. Assembling IDLIVSAM after each system definition ensures that you have a current mapping of the trace record formats.

## IMS trace function codes

You use trace function codes to help you diagnose performance problems or other problems with IMS.

The following table shows some of the important functions that are traced by the common trace interface and their location in the trace tables. These function codes are a subset of all trace function codes.

You can also find a one-line description of each trace code in macro DFSTRAE0.

Table 236. Trace function codes

| Trace table   | Function code | Description                                               |
|---------------|---------------|-----------------------------------------------------------|
| DL/I and lock | X'0C'         | DL/I OPEN/CLOSE for each data set                         |
|               | X'30'         | IWAIT called with IXCTL=YES option                        |
|               | X'31'         | Get space for the segment                                 |
|               | X'32'         | Free space for the segment                                |
|               | X'34'         | Get space close to root anchor                            |
|               | X'35'         | HD space management GET /ERE local serialization lock     |
|               | X'36'         | HD space management release local serialization lock /ERE |
|               | X'60'         | (OSAM) I/O operation initiated                            |
|               | X'61'         | (OSAM) I/O operation posted                               |
|               | X'62'         | (OSAM) OPEN/CLOSE/EOV complete                            |
|               | X'69'         | Sequential buffering: invalidate SB buffers               |
|               | X'6A'         | Sequential buffering: buffering evaluation                |
|               | X'6B'         | Sequential buffering: description why SB was/was not used |
|               | X'6C'         | Sequential buffering: refresh SB buffers after a write    |

Table 236. Trace function codes (continued)

| Trace table | Function code | Description                                                                        |
|-------------|---------------|------------------------------------------------------------------------------------|
|             | X'6F'         | Sequential buffering: search/read call issued by OSAM Buffer Handler               |
|             | X'80'         | Database authorization request                                                     |
|             | X'81'         | Database change authorization request                                              |
|             | X'82'         | Database re-authorization request                                                  |
|             | X'AA'         | DL/I call analyzer entry for each database call                                    |
|             | X'AB'         | (VSAM) ABEND U0427                                                                 |
|             | X'B1'         | Demand space set by backout or DELETE/REPLACE                                      |
|             | X'B2'         | Free space for backout                                                             |
|             | X'C4'         | DELETE/REPLACE                                                                     |
|             | X'C7'         | (PI) Exclusive control deadlock detection                                          |
|             | X'C8'         | Lock request manager (DFSMLGR0) entry                                              |
|             | X'C9'         | Lock request manager (DFSMLGR0) exit                                               |
|             | X'CA'         | (PI) request trace entry                                                           |
|             | X'CA'—X'08'   | (PI) DL/I call trace entry                                                         |
|             | X'CB'         | (PI) lock elapsed time entry                                                       |
|             | X'CC'         | Lock request handler (DFSRLRH00)                                                   |
|             | X'CF'         | I/O Toleration (DFSTOPR0)                                                          |
|             | X'D0'         | IRLM NOTIFY sent                                                                   |
|             | X'D1'         | IRLM NOTIFY received                                                               |
|             | X'D2'         | IRLM status exit                                                                   |
|             | X'D3'         | IRLM deadlock exit                                                                 |
|             | X'D5'         | Sysplex data sharing                                                               |
|             | X'D9'         | HALDB online reorganization trace entry                                            |
|             | X'DA'         | VSAM JRNAD or UPAD exit                                                            |
|             | X'DB'         | Search pool for record in range (buffer handler)                                   |
|             | X'DD'         | Release record ownership (buffer handler)                                          |
|             | X'DE'         | Retrieve buffer pool statistics (buffer handler)                                   |
|             | X'DF'         | VSAM verify                                                                        |
|             | X'E0'         | VSAM PUT                                                                           |
|             | X'E1'         | Block locate (buffer handler)                                                      |
|             | X'E2'         | Byte locate (buffer handler)                                                       |
|             | X'E4'         | Create new ESDS/OSAM LRECL (buffer handler)                                        |
|             | X'E5'         | Write LRECLs for user (purge) (buffer handler)                                     |
|             | X'E6'         | Mark record altered (buffer handler)                                               |
|             | X'E9'         | Free space in buffer pool (BFPL) (buffer handler)                                  |
|             | X'EA'         | Perform background write function (buffer handler)                                 |
|             | X'EB'         | Byte locate and mark altered (buffer handler)                                      |
|             | X'EC'         | Mark buffers empty (BFPL) (buffer handler)                                         |
|             | X'ED'         | Checkpoint (buffer handler)                                                        |
|             | X'EE'         | Batch STAE purge at ABEND (buffer handler)                                         |
|             | X'EF'         | OSAM buffer forced write (buffer handler)                                          |
|             | X'F0'         | Retrieve first LRECL by key (buffer handler)                                       |
|             | X'F1'         | Erase logical record (buffer handler)                                              |
|             | X'F2'         | Retrieve by key EQ or GT (buffer handler)                                          |
|             | X'F3'         | Retrieve key EQ or GT—Repair CI (buffer handler)                                   |
|             | X'F4'         | Retrieve by key record to chain from insert logical record (KSDS) (buffer handler) |
|             | X'F8'         | Retrieve next sequential root by key (buffer handler)                              |

Table 236. Trace function codes (continued)

| Trace table                           | Function code | Description                                                               |
|---------------------------------------|---------------|---------------------------------------------------------------------------|
| Dispatcher                            | X'F9'         | Position by key for image copy (buffer handler)                           |
|                                       | X'FA'         | Get next record for image copy (buffer handler)                           |
|                                       | X'01'         | FRR driven attempting to SCHEDULE a RESUME SRB in IPOST common (DFSIPOTC) |
|                                       | X'02'         | ITASK started (created)                                                   |
|                                       | X'03'         | ITASK terminated                                                          |
|                                       | X'04'         | IWAIT called                                                              |
|                                       | X'05'         | ITASK reinstated                                                          |
|                                       | X'06'         | IPOST called                                                              |
|                                       | X'07'         | IXCTL called                                                              |
|                                       | X'08'         | ISWITCH 'TO' invoked                                                      |
|                                       | X'09'         | Un-initialize ECB called                                                  |
|                                       | X'0A'         | Dependent region dispatch reattach                                        |
|                                       | X'0B'         | Process IMS TCB signoff                                                   |
|                                       | X'0C'         | Reserved — used by DL/I Open Close                                        |
|                                       | X'0D'         | INITECB called                                                            |
|                                       | X'0E'         | Memory change done using PC/PT                                            |
|                                       | X'0F'         | Dispatcherabend issued                                                    |
|                                       | X'10'         | Cross memory ISWITCH TO=XM or TO=HOME                                     |
|                                       | X'11'         | Cross memory state change                                                 |
|                                       | X'12'         | DFSKPXT store POST code in ECB                                            |
|                                       | X'13'         | DFSKPXT called (z/OS branch-entry local POST)                             |
|                                       | X'14'         | DFSCIR called to create an ITASK                                          |
|                                       | X'15'         | DFSKPXT issued z/OS branch-entry local POST                               |
|                                       | X'16'         | Post exit posted ECB enqueue                                              |
|                                       | X'17'         | Post exit resume target IMS TCB                                           |
|                                       | X'18'         | IPOST common store post code in ECB                                       |
|                                       | X'19'         | IPOST common posted ECB enqueue                                           |
|                                       | X'1A'         | IPOST common resume target IMS TCB                                        |
|                                       | X'1B'         | INITECB ECB store results                                                 |
|                                       | X'1C'         | INITECB posted ECB enqueue                                                |
|                                       | X'1D'         | Suspend back out resume issued                                            |
|                                       | X'1E'         | SRB scheduled for alternate IPOST                                         |
|                                       | X'1F'         | IPOST called ('SAP=')                                                     |
|                                       | X'20'         | Dependent region shutdown ISWITCH                                         |
|                                       | X'21'         | Entry to POST-Exit routine                                                |
|                                       | X'22'         | Reserved                                                                  |
|                                       | X'23'         | ISERWAIT called                                                           |
|                                       | X'24'         | ISWITCH 'TO' with stack invoked                                           |
|                                       | X'25'         | Reserved                                                                  |
|                                       | X'26'         | Branch entry SCP post                                                     |
|                                       | X'27'         | Suspend IMS TCB                                                           |
|                                       | X'28'         | Dependent region open dispatcher — sign on                                |
|                                       | X'29'         | ISWITCH TO=UNSTACK                                                        |
|                                       | X'2A'         | IMS list post called                                                      |
|                                       | X'2B'         | SCP WAIT issued                                                           |
|                                       | X'2C'         | SCP WAIT completed                                                        |
|                                       | X'2D'         | ISWITCH 'RET' invoked                                                     |
|                                       | X'2E'         | Shutdown ISWITCH reinstated                                               |
|                                       | X'2F'         | Dependent region open dispatcher — TCB switch                             |
| z/OS Resource Recovery Services (RRS) | X'A5'         | RRS calls                                                                 |



Table 236. Trace function codes (continued)

| Trace table     | Function code | Description                                                                                                                                             |
|-----------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scheduler       | X'41'         | Scheduling starts                                                                                                                                       |
|                 | X'42'         | Block mover                                                                                                                                             |
|                 | X'43'         | Scheduling ends                                                                                                                                         |
|                 | X'44'         | IRC started                                                                                                                                             |
|                 | X'45'         | TMS00 started                                                                                                                                           |
|                 | X'46'         | TMS00 finished                                                                                                                                          |
|                 | X'47'         | APPC extract call made                                                                                                                                  |
|                 | X'48'         | Scheduling failed                                                                                                                                       |
| Queue Manager   | X'4E'         | Information related to the queue manager                                                                                                                |
| DASD log        | X'50'         | Logical logger trace entry.                                                                                                                             |
|                 | X'51'         | Physical logger master ITASK trace entry                                                                                                                |
|                 | X'52'         | Physical logger buffer ITASK trace entry                                                                                                                |
|                 | X'53'         | Physical logger setup ITASK trace entry                                                                                                                 |
|                 | X'54'         | Physical logger WADS ITASK trace entry                                                                                                                  |
|                 | X'55'         | Physical logger READ ITASK trace entry                                                                                                                  |
| External        | X'57'         | Created by the module that operates in the IMS control region                                                                                           |
| Subsystem       | X'58'         | Created by the module that operates in the IMS dependent region                                                                                         |
| Storage Manager | X'5F'         | Storage Manager trace entry written on pool allocation Buffer Get and Buffer release (AOIP, CESS, CIOP, CMDP, DYNP, EMHB, FPWP, HIOP, SPAP, LUMC, LUMP) |
| Latch           | X'70'         | Information related to the latch manager and the use manager                                                                                            |
|                 | X'76'         | Reserved                                                                                                                                                |
| Fast Path       | X'9C'         | The FP Notify trace code                                                                                                                                |
|                 | X'9D'         | The FP General trace code                                                                                                                               |
|                 | X'9E'         | Fast Path log router interface                                                                                                                          |
|                 | X'9F'         | Fast Path log router interface                                                                                                                          |
| Log Router      | X'38'         | Created by various log router functions                                                                                                                 |

**Related concepts:**

"Dispatcher trace" on page 587

"Latch trace" on page 629

**Related tasks:**

"Resource Recovery Services trace" on page 612

**Related reference:**

"Fast Path tracker trace entries" on page 425

"External subsystem trace" on page 596

"Scheduler trace" on page 626

"Storage manager trace" on page 628

"Queue manager trace" on page 634

"Shared queues interface trace" on page 637

"Fast Path trace" on page 638

## Common Service Layer trace

The Common Service Layer trace (CSLT) provides information about the interactions between IMS and the Common Service Layer, including how IMS interacts with the Operations Manager (OM), the Resource Manager (RM), and the Structured Call Interface (SCI).

You can turn on the Common Service Layer trace during online operation by using the /TRACE command. Each trace entry is X'20' bytes long. You can specify trace output destination and tracing volume on the /TRACE command.

If you send the output to the common trace table, you can format the table using the Offline Dump Formatter under IPCS, using either the VERBX command or the IMS Dump Formatter panels. If you send the output to an external data set, you can use the File Select and Formatting Print utility (DFSERA10) with exit routine DFSERA60 to format the trace entries.

To locate the common service layer trace in a dump, look for eye catcher \*\*CSTR.

### Format of Common Service Layer trace records

The Common Service Layer trace function and subfunction codes are listed, and the trace (low level) record format these functions with these subfunction codes (SC) are shown.

*Table 237. Common Service Layer trace function and subfunction codes*

| Subfunction codes (SC) | Function                        |
|------------------------|---------------------------------|
| X'01'                  | Process flow                    |
| X'02'                  | Storage error                   |
| X'03'                  | Load or delete error            |
| X'05'                  | Parameter validation error      |
| X'09'                  | AWE error                       |
| X'0A'                  | Latch error                     |
| X'0F'                  | Miscellaneous MVS service error |
| X'11'                  | CQS service error               |
| X'12'                  | SCI service error               |
| X'13'                  | RM service error                |

Table 237. Common Service Layer trace function and subfunction codes (continued)

| Subfunction codes (SC) | Function                                     |
|------------------------|----------------------------------------------|
| X'14'                  | OM service error                             |
| X'15'                  | Unknown function                             |
| X'16'                  | Parameter list version error                 |
| X'50'                  | SCI Input exit                               |
| X'51'                  | SCI Notify exit                              |
| X'80'                  | Terminal logon                               |
| X'81'                  | Terminal logoff                              |
| X'82'                  | User signon                                  |
| X'83'                  | User signoff                                 |
| X'84'                  | DFSRMAM0 query interface                     |
| X'85'                  | DFSRMUP0 update interface                    |
| X'86'                  | RM resource entry                            |
| X'90'                  | Miscellaneous RM directive processing errors |

### Subfunction code trace record format

The following diagram shows the format of the trace records for each of the subfunction codes listed above. Each trace record has a trace function code of X'A2' and is X'20' bytes long.

- Word 0
  - byte 1 - Trace function code
  - byte 2 - Trace function subcode
  - byte 3-4 - Trace record sequence number
- Words 1-5 - Contains information about the activity being traced.  
The information recorded in this part of the trace record depends on the trace function subcode of the trace record.
- Words 6-7 - Timestamp (STCK value)

The data in words 1-5, which is specific to each trace entry, is described in the following diagrams:

Trace function subcode = X'01'

Description: Process flow (Begin Process and Normal Process)

- Word 1
  - byte 1 - Service code
  - byte 2 - Object type
  - bytes 3-4 - Module identifier
- Word 2 - Not used
- Word 3 - Not used
- Word 4 - Not used
- Word 5 - Thread ECB address

Trace function subcode = X'01'

Description: Process flow (End Process)

- Word 1
  - byte 1 - Service code
  - byte 2 - Object type
  - bytes 3-4 - Module identifier
- Word 2 - Not used
- Word 3 - Not used
- Word 4 - Return code
- Word 5 - Reason code

Trace function subcode = X'02'

Description: Storage Request Error

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Storage length                |
| Word 4 | - Storage address               |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'03'

Description: Module LOAD/DELETE Error

|        |                                        |
|--------|----------------------------------------|
| Word 1 | - byte 1 - Service code                |
|        | - byte 2 - Object type                 |
|        | - bytes 3-4 - Module identifier        |
| Word 2 | - Return code                          |
| Word 3 | - bytes 1-2 - Target module identifier |
|        | - bytes 3-4 - Not used                 |
| Word 4 | - Not used                             |
| Word 5 | - Thread ECB address                   |

Trace function subcode = X'04'

Description: Proclib/Execute Parameter Error

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Not used                      |
| Word 4 | - Not used                      |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'05'

Description: Parameter Validation Error

|           |                        |
|-----------|------------------------|
| Word 1    | - byte 1 - Not used    |
|           | - byte 2 - Object type |
| Words 2-5 | - Parameter Value      |

Trace function subcode = X'07'

Description: TCB/Thread Error

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Not used                      |
| Word 4 | - Not used                      |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'09'

Description: AWE Error (Create AWE Queue Server, Get AWE, Enq AWE)

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Not used                      |
| Word 4 | - Not used                      |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'09'

Description: AWE Error (Invalid AWE)

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - byte 1 - Function code        |
|        | - bytes 2-4 - Not used          |
| Word 3 | - Address of invalid AWE        |
| Word 4 | - Enqueuer's ECB                |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'0A'

Description: LATCH Error

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Not used                      |
| Word 4 | - Not used                      |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'0F'

Description: Miscellaneous MVS Service Error

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Reason code                   |
| Word 4 | - Not used                      |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'11'

Description: CQS Service Error

|        |                                 |
|--------|---------------------------------|
| Word 1 | - byte 1 - Service code         |
|        | - byte 2 - Object type          |
|        | - bytes 3-4 - Module identifier |
| Word 2 | - Return code                   |
| Word 3 | - Reason code                   |
| Word 4 | - Not used                      |
| Word 5 | - Thread ECB address            |

Trace function subcode = X'12'

Description: SCI Service Error

|           |                                 |
|-----------|---------------------------------|
| Word 1    | - byte 1 - Service code         |
|           | - byte 2 - Object type          |
|           | - bytes 3-4 - Module identifier |
| Word 2    | - Return code                   |
| Word 3    | - Reason code                   |
| Word 4    | - Not used                      |
| Words 4-5 | - Target member name or zero    |

Trace function subcode = X'13'

Description: RM Service Error

|           |                                 |
|-----------|---------------------------------|
| Word 1    | - byte 1 - Service code         |
|           | - byte 2 - Object type          |
|           | - bytes 3-4 - Module identifier |
| Word 2    | - Return code                   |
| Word 3    | - Reason code                   |
| Word 4    | - Not used                      |
| Words 4-5 | - Target member name or zero    |

Trace function subcode = X'14'

Description: OM Service Error

|           |                                 |
|-----------|---------------------------------|
| Word 1    | - byte 1 - Service code         |
|           | - byte 2 - Object type          |
|           | - bytes 3-4 - Module identifier |
| Word 2    | - Return code                   |
| Word 3    | - Reason code                   |
| Word 4    | - Not used                      |
| Words 4-5 | - Target member name or zero    |

There are two formats used for Trace Subcode X'15':

Trace function subcode = X'15'

Description: Unknown Function Exit Errors

|           |                                 |
|-----------|---------------------------------|
| Word 1    | - bytes 1-2 - Function Code     |
|           | - bytes 3-4 - Module identifier |
| Words 2-5 | - SCI Token                     |

Trace function subcode = X'15'

Description: Unknown Function Exit Errors

|           |                                   |
|-----------|-----------------------------------|
| Word 1    | - bytes 1-2 - Function Code       |
|           | - bytes 3-4 - Module identifier   |
| Words 2-3 | - Subject member name             |
| Words 4-5 | - Subject member type and subtype |

Trace function subcode = X'16'

Description: Parameter list version errors

|           |                                 |
|-----------|---------------------------------|
| Word 1    | - byte 1 - Not used             |
|           | - byte 2 - Object type          |
|           | - bytes 3-4 - Module identifier |
| Words 2   | - Parameter version             |
| Words 3-4 | - Member name                   |
| Word 5 -  | - Member version                |

Trace function subcode = X'50'

Description: SCI Input Exit

|           |                                  |
|-----------|----------------------------------|
| Word 1    | - byte 1 - Service code          |
|           | - byte 2 - Flag                  |
|           | - bytes 3-4 - Source member type |
| Word 2    | - Function code                  |
| Word 3    | - Subfunction code               |
| Words 4-5 | - Source member name             |

Trace function subcode = X'51'

Description: SCI Notify Exit

|           |                                  |
|-----------|----------------------------------|
| Word 1    | - byte 1 - Service code          |
|           | - byte 2 - Flag                  |
|           | - bytes 3-4 - Source member type |
| Word 2    | - Source member type             |
| Word 3    | - Event                          |
| Words 4-5 | - Source member name             |

Trace function subcode = X'80'

Description: Logon Process

|           |                           |
|-----------|---------------------------|
| Word 1    | - bytes 1-2 - Return code |
|           | - byte 3 - CLBSRM1        |
|           | - byte 4 - CLBSRM2        |
| Words 2-3 | - Node name               |
| Word 4    | - Not used                |
| Word 5    | - Thread ECB address      |

Trace function subcode = X'81'

Description: Logoff Process

|           |                           |
|-----------|---------------------------|
| Word 1    | - bytes 1-2 - Return code |
|           | - byte 3 - CLBSRM1        |
|           | - byte 4 - CLBSRM2        |
| Words 2-3 | - Node name               |
| Word 4    | - Not used                |
| Word 5    | - Thread ECB address      |

Trace function subcode = X'82'

Description: Signon Process

|        |                           |
|--------|---------------------------|
| Word 1 | - bytes 1-2 - Return code |
|        | - byte 3 - CLBSRM1        |

|           |                       |
|-----------|-----------------------|
|           | - byte 4 - CLBSRM2    |
| Words 2-3 | - User structure name |
| Word 4    | - Not used            |
| Word 5    | - Thread ECB address  |

Trace function subcode = X'83'

Description: Signoff Process

|           |                           |
|-----------|---------------------------|
| Word 1    | - bytes 1-2 - Return code |
|           | - byte 3 - CLBSRM1        |
|           | - byte 4 - CLBSRM2        |
| Words 2-3 | - User structure name     |
| Word 4    | - Not used                |
| Word 5    | - Thread ECB address      |

Trace function subcode = X'84'

Description: DFSRMAM0 query interface

|           |                         |
|-----------|-------------------------|
| Word 1    | - byte 1 - RMAP flag 1  |
|           | - byte 2 - RMAPE flag 1 |
|           | - byte 3 - RMAPE flag 2 |
|           | - byte 4 - RMAPE flag 3 |
| Words 2-3 | - Resource name         |
| Word 4    | - Data pointer          |
| Word 5    | - Return code           |

Trace function subcode = X'85'

Description: DFSRMUP0 update interface

|        |                         |
|--------|-------------------------|
| Word 1 | - byte 1 - RMAP flag 1  |
|        | - byte 2 - RMAPE flag 1 |
|        | - byte 3 - RMAPE flag 2 |
|        | - byte 4 - RMAPE flag 3 |
| Word 2 | - Resource pointer      |
| Word 3 | - Not used              |
| Word 4 | - Data pointer          |
| Word 5 | - Return code           |

Trace function subcode = X'86'

Description: RM Resource Entry trace

|           |                                              |
|-----------|----------------------------------------------|
| Word 1    | - byte 1 - Service code                      |
|           | - byte 2 - Condition code                    |
|           | - bytes 3-4 - Module identifier              |
| Words 2-3 | - Resource name                              |
| Word 4    | - byte 1 - Resource Type                     |
|           | - byte 2 - Not used                          |
|           | - byte 3 - Input version number (last byte)  |
|           | - byte 4 - Output version number (last byte) |
| Word 5    | - Thread ECB address                         |

Trace function subcode = X'90'

Description: Miscellaneous Directive Processing errors

|           |                                 |
|-----------|---------------------------------|
| Word 1    | - byte 1 - Service code         |
|           | - byte 2 - Not used             |
|           | - bytes 3-4 - Module identifier |
| Words 2-3 | - Process name                  |
| Word 4    | - Process type                  |
| Word 5    | - Not used                      |

## Dispatcher trace

When you use the /TRACE SET ON TABLE DISP command, IMS enables the dispatcher trace to an internal table. This internal table is formatted in any dump that is formatted by IMS.

When you use OPTION LOG, IMS sends the entries to the log as type X'67FA' records. You can select and format these log entries by using the utility DFSERA10 with exit DFSERA30.

The following table shows the general format of a dispatcher trace entry.

Table 238. Dispatcher trace record format.

| WORD 0 |   |            | WORD 1 | WORD 2 | WORD 3 | WORD 4 | WORD 5 | WORD 6 | WORD 7        |
|--------|---|------------|--------|--------|--------|--------|--------|--------|---------------|
| I      | T | SEQ<br>NUM |        |        |        |        |        |        | TIME<br>STAMP |

where **represents**

**I** One-byte trace ID field. This byte indicates the type of the trace entry.

**T** One-byte TCB ID. This byte indicates the IMS TCB type which made the trace entry.

The dispatcher trace formatting usually includes the functional area. If you need this information because the trace is in a raw format, the codes can be obtained by assembling the following macro statement DFSKDT  
FUNC=EQUATES.

**SEQ NUM**

Two-byte trace sequence number assigned by the IMS trace component.

**TIME STAMP**

Bytes 3 through 6 of the system clock (STCK) at the time the trace entry was created.

Words 1 through 6 contain data specific to each trace entry, as described below:  
The letter A followed by parentheses () indicates "address of" in all dispatcher trace entries listed below.

**TRACE ID = X'01'**

**DESC = FRR driven attempting to schedule a RESUME SRB  
in IPOST common (DFSIPOTC)**

word 1 – A(Target ECB being IPOSTed). If high X'80' on,  
this indicates recursive FRR entry  
word 2 – SAPCNTRL field from target ECB's SAP  
word 3 – Abend code  
word 4 – A(target dispatcher work area)  
word 5 – IPOST common caller's return address  
word 6 – IPOST common caller's R13

**TRACE ID = X'02'**

**DESC = ECB dispatch – ITASK started (created)**

word 1 – A(ITASK ECB)  
word 2 – ECB contents  
word 3 – A(ITASK SAP)  
word 4 – EPFFLAGS field from ECB prefix  
word 5 – A(CULE) if present in ECB prefix  
word 6 – A(Routine to get control)

**TRACE ID = X'03'**

**DESC = ECB dispatch – ITASK terminated**

word 1 – A(ITASK ECB)  
word 2 – ECB contents  
word 3 – A(ITASK SAP)  
word 4 – EPFFLAGS field from ECB prefix  
word 5 – A(CULE) if present in ECB prefix  
word 6 – 0



**TRACE ID = X'04'**  
**DESC = IWAIT called**

word 1 – A(ITASK ECB)  
word 2 – ECB contents prior to IWAIT  
word 3 – IWAIT return address  
word 4 – 0  
word 5 – 0  
word 6 – SAPCNTRL contents

**TRACE ID = X'05'**  
**DESC = ECB dispatch – ITASK reinstated**

word 1 – A(ITASK ECB)  
word 2 – ECB contents  
word 3 – SAPCNTRL field from ITASK's SAP  
word 4 – EPFFLAGS field from ECB prefix  
word 5 – Reinstated address (return address)  
word 6 – 0

**TRACE ID = X'06'**  
**DESC = IPOST called**

word 1 – A(POSTer's ECB) (A(TCB) if ITASK=NO)  
word 2 – IPOST return  
word 3 – A(ECB to be POSTed)  
word 4 – Contents of ECB before IPOST  
word 5 – POST code at entry to IPOST (may be complimented)  
word 6 – 0

**TRACE ID = X'07'**  
**DESC = IXCTL called**

word 1 – A(Current ITASK ECB)  
word 2 – A(IXCTL target ECB)  
word 3 – IXCTL return address  
word 4 – A(CULE) from current ECB prefix  
word 5 – 0  
word 6 – 0

**TRACE ID = X'08'**  
**DESC = ISWITCH T0= invoked**

word 1 – A(Current ECB)  
word 2 – ISWITCH return address  
word 3 – A(target dispatcher work area)  
word 4 – SAPCNTRL field from ECB's SAP  
word 5 – SAPXFLAG contents  
word 6 – 0

**TRACE ID = X'09'**  
**DESC = UN-INITIALIZE ECB called**

word 1 – A(Target ECB)  
word 2 – UNINIT return address  
word 3 – UNINIT return code  
word 4 – EPFFLAGS from ECB prefix  
word 5 – ECB contents  
word 6 – 0

**TRACE ID = X'0A'**  
**DESC = Dependent region reattach**

word 1 – A(Related PST)  
word 2 – A(Dependent region dispatcher work area)  
word 3 – SAPCNTRL field from PST's SAP  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID = X'0B'**  
**DESC = Process IMS TCB signoff**

word 1 – A(Related PST)  
word 2 – A(Released dispatcher work area)  
word 3 – Signoff return address  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID = X'0D'**  
**DESC = INITECB called**

word 1 – A(Current ECB)  
word 2 – INITECB return address  
word 3 – A(ECB being initialized)  
word 4 – Contents of ECB before being initialized  
word 5 – 0  
word 6 – 0

**TRACE ID = X'0E'**  
**DESC = Memory change done via PC/PT**

word 1 – A(Current ECB) (X'80' on=PC; off=PT)  
word 2 – Old primary ASID | Secondary ASID  
word 3 – If Word 1 indicates PT: PKM ASID for PT  
If Word 1 indicates PC: PC # issued  
word 4 – A(Current dispatcher work area)  
word 5 – 0  
word 6 – 0

**TRACE ID = X'0F'**  
**DESC = Dispatcher ABEND issued ("other diagnostics" dependent on ABEND issuer)**

word 1 – A(Current ECB)  
word 2 – Other diagnostics  
word 3 – ABEND code | reason code  
word 4 – Other diagnostics (usually the dispatcher work area address of the abending TCB)  
word 5 – Other diagnostics  
word 6 – Other diagnostics

**TRACE ID = X'10'**  
**DESC = Cross memory ISWITCH T0=XM or T0=HOME**

word 1 – A(Current ECB)  
word 2 – ISWITCH return address  
word 3 – Target code (00=HOME, 01=CTL, 02=DLI)  
word 4 – SAPCNTRL field from ECB's SAP  
word 5 – Home ASID of target | Primary ASID of target  
word 6 – SAPXFLAG contents

**TRACE ID = X'11'**  
**DESC = Cross memory state change**

word 1 – A(Current ECB)  
word 2 – Old primary ASID | Secondary ASID  
word 3 – New primary ASID | Secondary ASID  
word 4 – A(current dispatcher work area)  
word 5 – 0  
word 6 – 0

**TRACE ID = X'12'**  
**DESC = DFSKPXT-POST code stored in ECB (ECB was not waiting)**

word 1 – A(ECB) to be POSTed  
word 2 – POST code  
word 3 – Contents of ECB on prior to store  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'13'  
**DESC** = DFSKPXT-Special MVS branch-entry POST call

word 1 – A(Caller's TCB) (0 if SRB)  
word 2 – Caller's return address  
word 3 – A(ECB) to be POSTed  
word 4 – Caller's home ASID  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'14'  
**DESC** = DFSCIR called to create an ITASK

word 1 – A(ECB) or -A(ECB list)  
word 2 – ITASK type code  
word 3 – DFSCIR return address  
word 4 – A(ITASK main program)  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'15'  
**DESC** = DFSKPXT issued branch-entry MVS POST (local)

word 1 – A(ECB) to be POSTed  
word 2 – ECB POST code  
word 3 – ECB contents prior to the POST  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'16'  
**DESC** = POST exit POSTed ECB enqueue

word 1 – A(ECB) being POSTed  
word 2 – ECB POST code  
word 3 – Previous POST queue header contents  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'17'  
**DESC** = POST exit RESUME target MVS TCB

word 1 – A(TCB) (SRB=0)  
word 2 – Home ASID | Primary ASID  
word 3 – Target TCB's ASID  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'18'  
**DESC** = IPOST common store POST code in ECB (ECB was not waiting)

word 1 – A(ECB) being IPOSTed  
word 2 – POST code  
word 3 – ECB contents prior to the IPOST  
word 4 – A(ECB's dispatcher work area)  
word 5 – IPOST common caller's return address  
word 6 – 0

**TRACE ID** = X'19'  
**DESC** = IPOST common POSTed ECB enqueue

word 1 – A(ECB) being enqueued  
word 2 – ECB POST code  
word 3 – Previous POSTed queue header contents  
word 4 – A(ECB's dispatcher work area)  
word 5 – IPOST common caller's return address  
word 6 – 0

**TRACE ID** = X'1A'  
**DESC** = IPOST common RESUME target IMS TCB

word 1 – A(current TCB) (0=SRB)  
word 2 – Home ASID or Primary ASID  
word 3 – Target TCB's home ASID  
word 4 – A(resumed TCB's dispatcher work area)  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'1B'  
**DESC** = INITECB ECB store results

word 1 – A(ECB) being initialized  
word 2 – WAIT code being stored into ECB  
word 3 – ECB contents prior to INITECB store  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'1C'  
**DESC** = INITECB POSTed ECB enqueue

word 1 – A(ECB) being initialized  
word 2 – ECB POST code  
word 3 – Previous POSTed queue header contents  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'1D'  
**DESC** = SUSPEND back out RESUME issued

word 1 – POSTed queue header contents  
word 2 – Home ASID | Primary ASID  
word 3 – A(SRB) (0 = no SRB)  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'1E'  
**DESC** = SRB scheduled for alternate IPOST

word 1 – A(ECB) to be IPOSTed  
word 2 – Primary ASID | target ASID  
word 3 – A(IPOST SRB) (0 if MVS branch entry XM-POST)  
word 4 – A(current ASCB)  
word 5 – POST code  
word 6 – 0

**TRACE ID** = X'1F'  
**DESC** = IPOST called with TOSAP= option

word 1 – A(Poster's ECB) (A(TCB) if ITASK=NO)  
word 2 – IPOST return address  
word 3 – A(ECB to be POSTed)  
word 4 – 0  
word 5 – POST code at entry to IPOST (may be complimented)  
word 6 – 0

**TRACE ID** = X'20'  
**DESC** = Dependent region shutdown ISWITCH

word 1 – A(Related PST)  
word 2 – A(Special exit)  
word 3 – SAPCNTRL field from PST's SAP  
word 4 – A(Home dispatcher work area)  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'21'  
**DESC** = **Entry to Post-Exit Routine**

word 1 – A(ECB) being POSTed  
word 2 – ECB Contents  
word 3 – EPFFLAGS from ECB prefix  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'22'  
**DESC** = **ABTERM ISWITCH entered**

word 1 – A(ECB) to be switched  
word 2 – ECB contents  
word 3 – SAPCNTRL contents  
word 4 – SAPCNTRL2 contents  
word 5 – Posted Q contents  
word 6 – SAPCMEM | SAPCFLGS

**TRACE ID** = X'23'  
**DESC** = **ISERWAIT called**

word 1 – A(ITASK ECB)  
word 2 – ECB contents prior to ISERWAIT  
word 3 – ISERWAIT return address  
word 4 – 0  
word 5 – 0  
word 6 – SAPCNTRL contents

**TRACE ID** = X'24'  
**DESC** = **ISWITCH TO=, STACK=YES called**

word 1 – A(Current ECB)  
word 2 – ISWITCH return address  
word 3 – A(Target dispatcher work area)  
word 4 – SAPCNTRL field from ITASK's SAP  
word 5 – SAPXFLAG contents  
word 6 – 0

**TRACE ID** = X'25'  
**DESC** = **POST ABTERM ISWITCH**

word 1 – A(ECB) to be switched  
word 2 – ECB POST code  
word 3 – previous posted Q contents  
word 4 – A(Target dispatcher work area)  
word 5 – IPOTC/IPEXT caller's return  
word 6 – 0

**TRACE ID** = X'26'  
**DESC** = **Branch entry SCP POST**

word 1 – A(ECB) to be POSTed  
word 2 – ECB POST code  
word 3 – A(ASCB) of ECB's address space  
word 4 – A(Current TCB)  
word 5 – A(Current ASCB)  
word 6 – 0

**TRACE ID** = X'27'  
**DESC** = **SUSPEND IMS TCB**

word 1 – A(Related PST) (0 if not a dependent region/LSD)  
word 2 – Home ASID | Primary ASID  
word 3 – A(Suspended dispatcher work area)  
word 4 – A(TCB being suspended)  
word 5 – Low order word of STORE CLOCK (STCK)  
word 6 – High order word of STORE CLOCK (STCK)

**TRACE ID** = X'28'  
**DESC** = **Dependent region open dispatcher–signon**

word 1 – A(Related PST)  
word 2 – Home ASID  
word 3 – A(Current TCB)  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'29'  
**DESC** = **ISWITCH TO=UNSTACK**

word 1 – A(Current ECB)  
word 2 – ISWITCH return address  
word 3 – X'80000000'  
word 4 – SAPCNTRL field from ECB's SAP  
word 5 – SAPXFLAG contents  
word 6 – 0

**TRACE ID** = X'2A'  
**DESC** = **IMS list IPOST called**

word 1 – A(ECB) to be IPOSTed  
word 2 – List IPOST return address  
word 3 – A(POST list)  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'2B'  
**DESC** = **SCP WAIT issued (SVC WAIT)**

word 1 – A(WAIT ECB)  
word 2 – SCP WAIT return address  
word 3 – A(Current TCB)  
word 4 – ECB contents prior to WAIT  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'2C'  
**DESC** = **SCP WAIT complete (SVC WAIT)**

word 1 – A(WAIT ECB)  
word 2 – ECB POST code  
word 3 – A(Current TCB)  
word 4 – 0  
word 5 – 0  
word 6 – 0

**TRACE ID** = X'2D'  
**DESC** = **ISWITCH TO=RET called**

word 1 – A(Current ECB)  
word 2 – ISWITCH return address  
word 3 – 0  
word 4 – SAPCNTRL field from ECB's SAP  
word 5 – SAPXFLAG contents  
word 6 – 0

**TRACE ID** = X'2E'  
**DESC** = **Shutdown ISWITCH reinstate**

word 1 – A(PST)  
word 2 – A(Return save area)  
word 3 – A(Shutdown ECB)  
word 4 – 0  
word 5 – 0  
word 6 – 0

TRACE ID = X'2F'  
DESC = Dependent region open dispatcher-TCB switch

word 1 - A(Related PST)  
word 2 - A(Previous TCB)  
word 3 - A(Current TCB)  
word 4 - 0  
word 5 - 0  
word 6 - 0

TRACE ID = X'30'  
DESC = IWAIT called with IXCTL=YES option

word 1 - A(Current ECB)  
word 2 - ECB Contents prior to IWAIT  
word 3 - IWAIT Return address  
word 4 - A(Target ECB)  
word 5 - Target ECB Contents  
word 6 - 0

## Example of a dispatcher trace

\*\*DTR DISPATCHER TRACE

\*\*\*\*\*  
\*\*\*TRACE PRINTED FROM OLDEST TO MOST CURRENT ENTRY\*\*  
\*\*\*\*\*

| FUNCTION       | WORD 0   | WORD 1   | WORD 2   | WORD 3   | WORD 4   | WORD 5   | WORD 6   | WORD 7   |     |          |
|----------------|----------|----------|----------|----------|----------|----------|----------|----------|-----|----------|
| XM ISWITCH STK | 10035E11 | 05B5A060 | 80BBE2E8 | 80000002 | 00800001 | 001B001B | 00000000 | 9AB7A070 | MPP | TO=XMDLI |
| MEM CHANGE     | 11035E12 | 05B5A060 | 001B001B | 0084001B | 00B16A40 | 00000000 | 00000000 | 9AB7A1B3 | MPP |          |
| IPOST(ECB=)    | 06035E17 | 05B5A060 | 80B8F516 | 00B21140 | 80B48CD7 | 40C1E6C5 | 00000000 | 9AB7A23D | MPP | AWE      |
| IPC ENQ        | 19015E18 | 00B21140 | 40C1E6C5 | FF4B7340 | 00B48CC0 | 80BE4208 | 00000000 | 9AB7A2CB | LOG | AWE      |
| IPC RESUME     | 1A015E19 | 006DEE88 | 001B0084 | 00000082 | 00B48CC0 | 00000000 | 00000000 | 9AB7A3FC | LOG |          |
| ISERWAIT       | 23035E1A | 85B5A060 | 00000000 | 80B8F602 | 00000000 | 00000000 | 00000000 | 9AB7A5AC | MPP |          |
| IECB STORE     | 1B035E1B | 05B5A060 | 80B16A57 | 00000000 | 00000000 | 00000000 | 00000000 | 9AB7A671 | MPP |          |
| SUSPEND        | 27035E1C | 05B5A060 | 001B0084 | 00B16A40 | 00000000 | 00000000 | 00000000 | 9AB7A6CE | MPP |          |
| XM ISWITCH STK | 10035E1E | 05B4B060 | 867851F0 | 80000001 | 00000001 | 00320032 | 00000000 | 9AB7A7F1 | MPP | TO=XMCTL |
| MEM CHANGE     | 11035E1F | 05B4B060 | 00320032 | 00820032 | 00B22E00 | 00000000 | 00000000 | 9AB7A92D | MPP |          |
| IPOST(ECB=)    | 06FE5E25 | 006D77F0 | 80B91FA6 | 00BA156C | 80B48417 | 40E3D9C1 | 00000000 | 9AB7A93D | N/A | TRA      |
| IPC ENQ        | 19025E26 | 00BA156C | 40E3D9C1 | FF4B7C00 | 00B48400 | 80BE4208 | 00000000 | 9AB7A9A1 | CTL | TRA      |
| IPC RESUME     | 1A025E27 | 006D77F0 | 00820082 | 00000082 | 00B48400 | 00000000 | 00000000 | 9AB7A9F2 | CTL |          |
| RE-DISPATCH    | 05015E28 | 00B21140 | 40C1E6C5 | 40000000 | 00000000 | 801504A6 | 00000000 | 9AB7ABA1 | LOG |          |
| IWAIT          | 04015E2C | 00B21140 | 00C1E6C5 | 801504A6 | 00000000 | 00000000 | 00000000 | 9AB7AC31 | LOG | AWE      |
| ISWITCH UNSTK  | 29035E2E | 05B4B060 | 86785246 | 80000000 | 00000041 | 00000000 | 00000000 | 9AB7AD61 | MPP |          |
| IECB STORE     | 1B015E2F | 00B21140 | 80B48CD7 | 00C1E6C5 | 00000000 | 00000000 | 00000000 | 9AB7AF15 | LOG |          |
| SUSPEND        | 27015E30 | 00000000 | 00820082 | 00B48CC0 | 00000000 | 00000000 | 00000000 | 9AB7AF7C | LOG |          |
| RE-DISPATCH    | 05035E31 | 05B4B060 | 00025EE4 | 00000003 | 00000000 | 00B22E00 | 00000000 | 9AB7AF8F | MPP |          |
| MEM CHANGE     | 11035E32 | 05B4B060 | 00820032 | 00320032 | 00B22E00 | 00000000 | 00000000 | 9AB7B04E | MPP |          |
| ITASK START    | 02025E33 | 00BA156C | 40E3D9C1 | 064BC040 | 00000000 | 066C6440 | 00B7E7E0 | 9AB7B171 | CTL | TRA      |
| IPOST(ECB=)    | 06FE5E34 | 00000000 | 8007EAB8 | 05B37060 | 80AF3917 | 801A1D2C | 00000000 | 9AB7B1C7 | N/A | VSM      |
| IPC ENQ        | 19035E35 | 05B37060 | 7FE5E2D4 | FF50C700 | 00AF3900 | 80BE4208 | 00000000 | 9AB7B374 | MPP | VSM      |
| IPC RESUME     | 1A035E36 | 00000000 | 00840084 | 00000052 | 00AF3900 | 00000000 | 00000000 | 9AB7B4EF | MPP |          |
| IPOST(SAP=)    | 1FFE5E37 | 006CFE88 | 80B7E94C | 00167060 | 00000000 | 00000000 | 00000000 | 9AB7B569 | N/A |          |
| IPC ENQ        | 19155E39 | 00167060 | 40E3D9C1 | FF4B7840 | 00B487C0 | 80BE4394 | 00000000 | 9AB7B5BC | TRA | TRA      |
| IPC RESUME     | 1A155E3A | 006CFE88 | 00820082 | 00000082 | 00B487C0 | 00000000 | 00000000 | 9AB7B692 | TRA |          |
| ISERWAIT       | 23025E3D | 00BA156C | 00E3D9C1 | 80B7E956 | 00000000 | 00000000 | 00000000 | 9AB7B843 | CTL | TRA      |
| IECB STORE     | 1B025E3E | 00BA156C | 80B48417 | 00E3D9C1 | 00000000 | 00000000 | 00000000 | 9AB7B88D | CTL |          |
| SUSPEND        | 27025E40 | 00000000 | 00820082 | 00B48400 | 00000000 | 00000000 | 00000000 | 9AB7B8D7 | CTL |          |
| XM ISWITCH STK | 10035E44 | 05B4B060 | 80BBE2E8 | 80000002 | 00000001 | 00320032 | 00000000 | 9AB7B90E | MPP | TO=XMDLI |
| RE-DISPATCH    | 05155E45 | 00167060 | 40E3D9C1 | 40000000 | 00000000 | 8015EC84 | 00000000 | 9AB7B9FB | TRA |          |
| MEM CHANGE     | 11035E46 | 05B4B060 | 00320032 | 00840032 | 00B22E00 | 00000000 | 00000000 | 9AB7BA3B | MPP |          |
| RE-DISPATCH    | 05035E48 | 05B37060 | 7FE5E2D4 | 00000041 | 00000000 | 8007E9FA | 00000000 | 9AB7BA87 | MPP |          |
| KPOST LIST     | 2A155E4A | 00167060 | 8015EC36 | 00167064 | 00000000 | 00000000 | 00000000 | 9AB7BACC | TRA |          |
| IPC ENQ        | 19025E4B | 00BA156C | 40E3D9C1 | FF4B7C00 | 00B48400 | 80BE456E | 00000000 | 9AB7BC79 | CTL | TRA      |
| IPC RESUME     | 1A025E4D | 006CEE88 | 00820082 | 00000082 | 00B48400 | 00000000 | 00000000 | 9AB7BE28 | CTL |          |
| IPOST(ECB=)    | 06035E4F | 05B4B060 | 80B90B8E | 00B21140 | 80B48CD7 | 40C1E6C5 | 00000000 | 9AB7BE86 | MPP | AWE      |
| IPC ENQ        | 19015E50 | 00B21140 | 40C1E6C5 | FF4B7340 | 00B48CC0 | 80BE4208 | 00000000 | 9AB7BF72 | LOG | AWE      |
| IPC RESUME     | 1A015E51 | 006DEE88 | 00320084 | 00000082 | 00B48CC0 | 00000000 | 00000000 | 9AB7C0CB | LOG |          |
| IWAIT          | 04155E52 | 00167060 | 00E3D9C1 | 8015EC84 | 00000000 | 00000000 | 00000000 | 9AB7C1E7 | TRA | TRA      |
| IECB STORE     | 1B155E54 | 00167060 | 80B487D7 | 00E3D9C1 | 00000000 | 00000000 | 00000000 | 9AB7C324 | TRA |          |
| SUSPEND        | 27155E55 | 00000000 | 00820082 | 00B487C0 | 00000000 | 00000000 | 00000000 | 9AB7C4B1 | TRA |          |
| ISERWAIT       | 23035E56 | 85B4B060 | 00000000 | 80B8F602 | 00000000 | 00000000 | 00000000 | 9AB7C661 | MPP |          |
| IECB STORE     | 1B035E57 | 05B4B060 | 80B22E17 | 00000000 | 00000000 | 00000000 | 00000000 | 9AB7C7AE | MPP |          |
| SUSPEND        | 27035E58 | 05B4B060 | 00320084 | 00B22E00 | 00000000 | 00000000 | 00000000 | 9AB7C917 | MPP |          |
| RE-DISPATCH    | 05015E5B | 00B21140 | 40C1E6C5 | 40000000 | 00000000 | 801504A6 | 00000000 | 9AB7CA0E | LOG |          |
| IWAIT          | 04015E5D | 00B21140 | 00C1E6C5 | 801504A6 | 00000000 | 00000000 | 00000000 | 9AB7CBB5 | LOG | AWE      |

**Related reference:**

“IMS trace function codes” on page 578

**ITASK ECB posting**

The post exit routine and the IMS posting routine add all ECBs to the posted queue. When an IMS TCB waits for work, IMS issues a z/OS SUSPEND. This task is reactivated by a RESUME invoked by the post exit posting routine or the IMS posting routine.

**System post codes**

The subset of the system post codes are listed and described.

**System post codes**

The following table lists only a subset of the possible post codes.

*Table 239. System post codes*

| Code          | Description                                                                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X'40', C'BTR' | PST posted by scheduler as a result of BMP termination (Subqueues 4, 5)                                                                                         |
| X'40', C'CHK' | PST posted by checkpoint (Subqueues 3, 4, 5, 6)                                                                                                                 |
| X'40', C'SMB' | PST posted by SMB enqueue when a message is received that can be processed by the PST (Subqueue 3 or 6)                                                         |
| X'40', C'CMD' | PST posted by command processor when /START PGM, /START TRAN, or a similar command is entered (Subqueues 3, 6)                                                  |
| X'40', C'ABD' | PST posted by DFSCPY00 as a result of an abend in a dependent region (Subqueues 3, 4, 5, 6)                                                                     |
| X'40', C'PRG' | PST posted by scheduler to stop region when checkpoint purge (that is, all messages processed) is complete—this is used if MPP issued last message (Subqueue 3) |
| X'40', C'STP' | PST posted by DFSSTOP0 when the region is waiting in scheduler and is to be stopped (Subqueues 3, 4, 5)                                                         |
| X'40', C'DLG' | PST posted by DFSRDLG0 when dynamic log is free (Subqueues 3, 4, 5, 6)                                                                                          |
| X'40', C'CF4' | PST posted by DFSASK00 as a result of an abend in a dependent region (Subqueues 3, 4, 5, 6)                                                                     |
| X'40', C'DEQ' | Terminate control processor ECB posted by DFSRST00 at restart completion                                                                                        |
| X'40', C' TO' | PST posted after ISWITCH to IMS control region TCB                                                                                                              |
| X'40', C'RET' | PST posted after ISWITCH return to dependent region TCB                                                                                                         |

**External subsystem trace**

You enable the external subsystem trace by using the /TRACE SET ON TABLE SUBS command. When you specify OPTION LOG, IMS writes the trace externally as type X'67FA' records.

The External Subsystem (ESS) trace entries help you analyze problems for either:

- A connection problem between the IMS control region and the external subsystem (for example, DB2 for z/OS)



- Any problem between the IMS dependent region and the external subsystem

The following figure illustrates the external subsystem (ESS) trace record format. Each of the sixteen words is 4 bytes long. Words 0 and 1 hold the standard ESS trace record prefix. The Module ID and Sub function (WORD 1) determines what information appears in words 2 through 15.

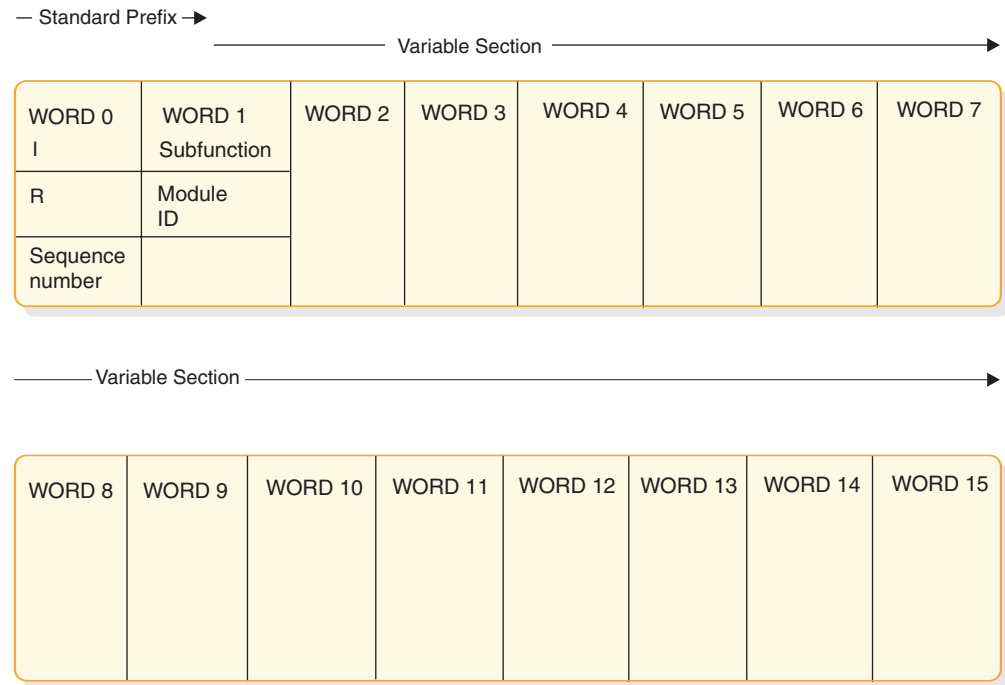


Figure 98. External subsystem (ESS) trace record format

where represents

**I** This 1-byte field contains the hexadecimal trace record ID. Two possible ID values are X'57' and X'58'. The X'57' record ID is created by a module that executes in the IMS control region (for example, the ESS mother task DFSIESI0). The X'58' record ID is created by a module that executes in an IMS dependent region (for example, DFSESC0).

**R** This 1-byte field is reserved.

#### SEQ NUM

This 2-byte field contains the hexadecimal trace record sequence number assigned by the IMS trace component.

#### MOD ID

This 2-byte field contains a hexadecimal value that identifies the module that created the trace record. Each ESS module has an associated module ID. Macro DFSESFC contains the complete list of IDs.

#### SUB FUNC

This 2-byte field contains a hexadecimal value that identifies the subfunction that created the trace record within the module. For example, if a module creates a trace record in each of five internal subroutines, each subroutine has a unique SUB FUNC ID.

The following table shows:

- The ID of the module that created the trace record

- The ID of the subfunction (within the module) that created the record
- The name of the module that created the record
- A description of the event being traced

*Table 240. Module ID and subfunction table*

| Module ID | Subfunction | Module   | Description                                                                |
|-----------|-------------|----------|----------------------------------------------------------------------------|
| X'0015'   | X'0015'     | DFSESS40 | ESS message service exit                                                   |
| X'0016'   | X'0014'     | DFSESS30 | ESS logging exit                                                           |
| X'0017'   |             | DFSESS10 |                                                                            |
|           | X'0011'     |          | IMS control region identify                                                |
|           | X'0012'     |          | Dependent region identify                                                  |
|           | X'0040'     |          | Control region identify error                                              |
|           | X'0041'     |          | Identify error subsystem stopped                                           |
| X'0018'   | X'0013'     | DFSESS20 | ESS termination exit (if X'57')<br>Dependent region ESS term<br>(if X'58') |
| X'0285'   | X'0010'     | DFSESD80 | Dependent region ESS initialization                                        |
| X'0288'   | X'0001'     | DFSESS00 | Dependent region ESS sign on                                               |
| X'0289'   | X'0003'     | DFSESD50 | Dependent region ESS signoff                                               |
| X'0290'   | X'0005'     | DFSEST00 | Dependent region ESS create thread                                         |
| X'0291'   | X'0002'     | DFSESD50 | Dependent region ESS term thread                                           |
|           | X'0003'     |          | Dependent region ESS term thread                                           |
|           | X'0004'     |          | region<br>ESS signoff Dependent region ESS<br>term identify                |
| X'0292'   | X'0004'     | DFSESD50 | Dependent region ESS term identify                                         |
| X'0293'   | X'0007'     | DFSESAB0 | Dependent region ESS ABORT                                                 |
| X'0294'   | X'0008'     | DFSESP10 | Dependent region ESS commit prep                                           |
| X'0295'   | X'0009'     | DFSESP20 | Dependent region ESS commit cont                                           |
| X'0307'   | X'0016'     | DFSFPSP0 |                                                                            |
|           | X'0017'     |          | ESS commit processor entered                                               |
|           | X'0018'     |          | ESS commit processor exited                                                |
|           |             |          | ESS commit processor R-I-D request                                         |
| X'0402'   | X'0020'     | DFSESI30 | IMS control region daughter identify                                       |
|           | X'0021'     |          | IMS control region resolve-in-doubt                                        |
|           | X'0022'     |          | IMS control region ESS CMD                                                 |
|           | X'0023'     |          | IMS control region ESS RRE                                                 |
|           | X'0024'     |          | IMS control region ESS ECHO                                                |
|           | X'0025'     |          | IMS control region terminate identify                                      |
|           | X'0026'     |          | IMS control region terminate subsystem                                     |
|           | X'0027'     |          | IMS control region /STOP CMD                                               |
|           | X'0028'     |          | IMS control region ESS term record                                         |
|           | X'0029'     |          | IMS control region ESS shutdown                                            |
|           | X'0030'     |          | IMS control region ESS termination                                         |
|           | X'0031'     |          | IMS control region ESS AWE error                                           |
| X'0403'   | X'0019'     | DFSESI50 | Control region ESS initialization                                          |
| X'0404'   | X'0042'     | DFSESI60 | Control region ESS R-I-D exit                                              |
| X'0405'   | X'0032'     | DFSESI70 | Control region ESS /CHANGE                                                 |
| X'0409'   | X'0001'     | DFSIESI0 |                                                                            |
|           | X'0002'     |          | Mother ITASK request<br>Control region ESS attach                          |

Table 240. Module ID and subfunction table (continued)

| Module ID | Subfunction | Module   | Description                                           |
|-----------|-------------|----------|-------------------------------------------------------|
| X'0506'   | X'0006'     | DFSESPR0 |                                                       |
|           | X'0019'     |          | Dependent region ESS program request handler          |
|           | X'0020'     |          | Dependent region ESS program request recursive call   |
|           |             |          | Dependent region ESS Subsystem Not Operational (SNOX) |

**Related reference:**

“IMS trace function codes” on page 578

## Layout of the X'57' variable section

The layout of the X'57' variable section is depicted.

### MOD ID = X'0015' SUB FUNC = X'0015' DFSESS40 External SubSys MESSAGE service request record

MOD ID = X'0015'  
SUB FUNC = X'0015' DFSESS40 External SubSys MESSAGE service request record

word 2 -- External SubSystem name  
words 3 through 15 not used

### MOD ID = X'0016' SUB FUNC = X'0014' DFSESS30 External SubSys LOGGING service request record

MOD ID = X'0016'  
SUB FUNC = X'0014' DFSESS30 External SubSys LOGGING service request record

word 2 -- External SubSystem name  
words 3 through 15 not used

### MOD ID = X'0017' SUB FUNC = X'0011' DFSESS10 control region External SubSys IDENTIFY record

MOD ID = X'0017'  
SUB FUNC = X'0011' DFSESS10 control region External SubSys IDENTIFY record

word 2 -- External SubSystem name  
word 3 -- bytes 0-1 not used  
byte 2 GESEGF1 (DFSGESE macro global flag1)  
byte 3 GESEGF2 (DFSGESE macro global flag2)  
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)  
byte 1 not used  
byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)  
byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)  
word 5 -- bytes 0-1 not used  
bytes 2-3 AWQRC (DFS AWE DFSESI30 identify return code)  
words 6 through 15 not used

### SUB FUNC = X'0040' DFSESS10 External SubSys GLOBAL identify error record

SUB FUNC = X'0040' DFSESS10 External SubSys GLOBAL identify error record

word 2 -- External SubSystem name  
word 3 -- bytes 0-1 not used

```

 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

## **SUB FUNC = X'0041' DFSESS10 External SubSys identify with External SubSystem**

**SUB FUNC = X'0041'** DFSESS10 External SubSys identify with External SubSystem

stopped or stopping record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

## **MOD ID = X'0018' SUB FUNC = X'0013' DFSESS20 External SubSys termination record**

**MOD ID = X'0018'**

**SUB FUNC = X'0013'** DFSESS20 External SubSys termination record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

## **MOD ID = X'0402' SUB FUNC = X'0020' DFSESI30 External SubSys IDENTIFY exit record**

**MOD ID = X'0402'**

**SUB FUNC = X'0020'** DFSESI30 External SubSys IDENTIFY exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 15 not used

```

## **SUB FUNC = X'0021' DFSESI30 External SubSys RESOLVE IN DOUBT record**

**SUB FUNC = X'0021'** DFSESI30 External SubSys RESOLVE IN DOUBT record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)

```

```

 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 AWQRC (DFSARE return code, see DFSESSEC)
words 6 through 7 not used
words 8 through 11 RRETOKEN (DFSRRE UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRE commit indicator)
 bytes 2-3 not used
words 13 through 15 not used

```

## **SUB FUNC = X'0022' DFSESI30 External SubSys /SSR COMMAND exit record**

**SUB FUNC = X'0022'** DFSESI30 External SubSys /SSR COMMAND exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 15 not used

```

## **SUB FUNC = X'0023' DFSESI30 External SubSys specific RRE request record**

**SUB FUNC = X'0023'** DFSESI30 External SubSys specific RRE request record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 7 not used
words 8 through 11 RRETOKEN (DFSRRE UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRE commit indicator)
 bytes 2-3 not used
words 13 through 15 not used

```

## **SUB FUNC = X'0024' DFSESI30 External SubSys ECHO exit record**

**SUB FUNC = X'0024'** DFSESI30 External SubSys ECHO exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used

```

```

words 8 through 11 RRETOKEN (DFSRRE UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRE commit indicator)
 bytes 2-3 not used
words 13 through 15 not used

```

## **SUB FUNC = X'0025' DFSESI30 External SubSys TERMINATE IDENTIFY exit**

**SUB FUNC = X'0025'** DFSESI30 External SubSys TERMINATE IDENTIFY exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 15 not used

```

## **SUB FUNC = X'0026' DFSESI30 External SubSys TERMINATE SUBSYSTEM record**

**SUB FUNC = X'0026'** DFSESI30 External SubSys TERMINATE SUBSYSTEM record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

## **SUB FUNC = X'0027' DFSESI30 External SubSys /STOP command record**

**SUB FUNC = X'0027'** DFSESI30 External SubSys /STOP command record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

## **SUB FUNC = X'0028' DFSESI30 External SubSys IMS termination record**

**SUB FUNC = X'0028'** DFSESI30 External SubSys IMS termination record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

## **SUB FUNC = X'0029' DFSESI30 External SubSys IMS shutdown record**

**SUB FUNC = X'0029'** DFSESI30 External SubSys IMS shutdown record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used
```

## **SUB FUNC = X'0030' DFSESI30 External SubSys TERMINATION exit record**

**SUB FUNC = X'0030'** DFSESI30 External SubSys TERMINATION exit record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 15 not used
```

## **SUB FUNC = X'0031' DFSESI30 AWE error record**

**SUB FUNC = X'0031'** DFSESI30 AWE error record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 ESSTERRC (External SubSys termination reason)
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 AWQRC (DFS AWE return code)
words 6 through 15 not used
```

## **MOD ID = X'0403' SUB FUNC = X'0019' DFSESI50 External SubSys INITIALIZATION exit record**

**MOD ID = X'0403'**

**SUB FUNC = X'0019'** DFSESI50 External SubSys INITIALIZATION exit record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 15 not used
```

## **MOD ID = X'0404' SUB FUNC = X'0042' DFSESI60 External SubSys RESOLVE IN DOUBT exit record**

**MOD ID** = X'0404'

**SUB FUNC** = X'0042' DFSESI60 External SubSys RESOLVE IN DOUBT exit record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 RRETOKEN (DFSRRE UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRE commit indicator)
 bytes 2-3 not used
words 13 through 15 not used
```

## **MOD ID = X'0405' SUB FUNC = X'0032' DFSESI70 External SubSys /CHANGE command record**

**MOD ID** = X'0405'

**SUB FUNC** = X'0032' DFSESI70 External SubSys /CHANGE command record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used
```

## **MOD ID = X'0409' SUB FUNC = X'0001' DFSIESI0 mother ITASK request record**

**MOD ID** = X'0409'

**SUB FUNC** = X'0001' DFSIESI0 mother ITASK request record

```
word 2 -- not used
word 3 -- bytes 0-1 function requested
 Function requested:
 X'0002' terminate the mother ITASK TCB
 X'0003' build / merge subsystem definitions
 X'0004' SSM JCL parameter
 X'0005' attach external subsystem ITASK TCB
 X'0007' /START command
 X'0008' sync request
 bytes 2-3 not used
word 4 -- not used
word 5 -- bytes 0-1 not used
 bytes 2-3 AWQRC (DFSASE DFSIESI0 return code)
words 6 through 15 not used
```

## **SUB FUNC = X'0002' DFSIESI0 External Subsys ATTACH record**

**SUB FUNC** = X'0002' DFSIESI0 External Subsys ATTACH record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 function requested
 Function requested:
 X'0005' attach external subsystem ITASK TCB
 X'0007' /START command
```



```

 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 AWQRC (DFSAWE attach process return code)
words 6 through 15 not used

```

## Layout of the X'58' variable section

The layout of the X'58' variable section is depicted.

### **MOD ID = X'0015' SUB FUNC = X'0015' DFSESS40 External SubSys MESSAGE service request record**

**MOD ID** = X'0015'

**SUB FUNC** = X'0015' DFSESS40 External SubSys MESSAGE service request record

```

word 2 -- External SubSystem name
words 3 through 15 not used

```

### **MOD ID = X'0016' SUB FUNC = X'0014' DFSESS30 External SubSys LOGGING service request record**

**MOD ID** = X'0016'

**SUB FUNC** = X'0014' DFSESS30 External SubSys LOGGING service request record

```

word 2 -- External SubSystem name
words 3 through 15 not used

```

### **MOD ID = X'0017' SUB FUNC = X'0011' DFSESS10 control region External SubSys IDENTIFY record**

**MOD ID** = X'0017'

**SUB FUNC** = X'0011' DFSESS10 control region External SubSys IDENTIFY record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
word 5 -- bytes 0-1 not used
 bytes 2-3 AWQRC (DFSAWE DFSESI30 identify return code)
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **SUB FUNC = X'0012' DFSESS10 dependent region External SubSys IDENTIFY record**

**SUB FUNC** = X'0012' DFSESS10 dependent region External SubSys IDENTIFY record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)

```

```

 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 AWQRC (DFSAWE DFSESI30 identify return code)
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **SUB FUNC = X'0040' DFSESS10 IMS detected External SubSys IDENTIFY error record**

**SUB FUNC = X'0040'** DFSESS10 IMS detected External SubSys IDENTIFY error record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (SSIDX subsys status flag1)
 byte 3 SSIDFLG2 (SSIDX subsys status flag2)
words 5 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **SUB FUNC = X'0041' DFSESS10 IMS detected External SubSys IDENTIFY with External SubSystem stopped or stopping record**

**SUB FUNC = X'0041'** DFSESS10 IMS detected External SubSys IDENTIFY with External SubSystem stopped or stopping record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (SSIDX subsys status flag1)
 byte 3 SSIDFLG2 (SSIDX subsys status flag2)
words 5 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0018' SUB FUNC = X'0013' DFSESS20 External SubSys termination record**

**MOD ID = X'0018'**

**SUB FUNC = X'0013'** DFSESS20 External SubSys termination record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 not used
 byte 2 GESEGF1 (DFSGESE macro global flag1)
 byte 3 GESEGF2 (DFSGESE macro global flag2)
word 4 -- byte 0 GESEGF3 (DFSGESE macro global flag3)
 byte 1 not used
 byte 2 SSIDFLG1 (DFSSSIE subsys status flag1)
 byte 3 SSIDFLG2 (DFSSSIE subsys status flag2)
words 5 through 15 not used

```

### **MOD ID = X'0285' SUB FUNC = X'0010' DFSESD80 dep region External SubSys INITIALIZATION exit**

**MOD ID = X'0285'**

**SUB FUNC = X'0010'** DFSESD80 dep region External SubSys INITIALIZATION exit record

```

word 2 -- External SubSystem name

```

```

word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0288' SUB FUNC = X'0001' DFSESS00 External SubSys SIGNON exit record**

**MOD ID** = X'0288'

**SUB FUNC** = X'0001' DFSESS00 External SubSys SIGNON exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0290' SUB FUNC = X'0005' DFSESD50 External SubSys CREATE THREAD exit record**

**MOD ID** = X'0289'

**SUB FUNC** = X'0003' DFSESD50 External SubSys SIGNOFF exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0290' SUB FUNC = X'0005' DFSESD50 External SubSys CREATE THREAD exit record**

**MOD ID** = X'0290'

**SUB FUNC** = X'0005' DFSESD50 External SubSys SIGNOFF exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)

```

```

word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0291' SUB FUNC = X'0002' DFSESD50 External SubSys TERMINATE THREAD exit record**

**MOD ID** = X'0291'  
**SUB FUNC** = X'0002' DFSESD50 External SubSys TERMINATE THREAD exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0292' SUB FUNC = X'0004' DFSESD50 External SubSys TERMINATE IDENTIFY exit**

**MOD ID** = X'0292'  
**SUB FUNC** = X'0004' DFSESD50 External SubSys TERMINATE IDENTIFY exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

### **MOD ID = X'0293' SUB FUNC = X'0007' DFSESAB0 External SubSys ABORT exit record**

**MOD ID** = X'0293'  
**SUB FUNC** = X'0007' DFSESAB0 External SubSys ABORT exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

## **MOD ID = X'0294' SUB FUNC = X'0008' DFSESP10 External SubSys COMMIT PREPARE exit record**

**MOD ID** = X'0294'

**SUB FUNC** = X'0008' DFSESP10 External SubSys COMMIT PREPARE exit record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used
```

## **MOD ID = X'0295' SUB FUNC = X'0009' DFSESP20 External SubSys COMMIT CONTINUE exit record**

**MOD ID** = X'0295'

**SUB FUNC** = X'0009' DFSESP20 External SubSys COMMIT CONTINUE exit record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used
```

## **MOD ID = X'0297' SUB FUNC = X'000A' DFSESP30 External SubSys COMMIT VERIFY exit record**

**MOD ID** = X'0297'

**SUB FUNC** = X'000A' DFSESP30 External SubSys COMMIT VERIFY exit record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used
```

## **MOD ID = X'0307' SUB FUNC = X'0016' DFSFESP0 External SubSys commit processor entry record**

**MOD ID** = X'0307'

**SUB FUNC** = X'0016' DFSFESP0 External SubSys commit processor entry record

```
word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
```

```

 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- byte 0 PSTFUNCT (IDLI function code)
 byte 1 PSTSYNFC (sync function code)
 byte 2 SSTTFGT1 (DFSSSOB termination flag)
 byte 3 not used
word 6 -- bytes 0-1 SSTTCOMP (DFSSSOB user completion bytes 2,3)
 byte 2 LCREFL1 (DFSLCRE status indicators)
 byte 3 LCREFL2 (DFSLCRE region connection status)
word 7 -- byte 0 LCREFL3 (DFSLCRE thread status)
 byte 1 LCREFL4 (DFSLCRE internal resource manager status)
 byte 2 LCREESST (DFSLCRE ESS resource manager status byte1)
 byte 3 LCREESF (DFSLCRE ESS resource manager status byte2)
words 8 through 11 RRETOKEN (DFSRRE UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRE commit indicator)
 bytes 2-3 not used
words 13 through 15 not used

```

## SUB FUNC = X'0017' DFSFESP0 External SubSys commit processor exit record

SUB FUNC = X'0017' DFSFESP0 External SubSys commit processor exit record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- byte 0 PSTFUNCT (IDLI function code)
 byte 1 PSTSYNFC (sync function code)
 byte 2 SSTTFGT1 (DFSSSOB termination flag)
 byte 3 not used
word 6 -- bytes 0-1 SSTTCOMP (DFSSSOB user completion bytes 2,3)
 byte 2 LCREFL1 (DFSLCRE status indicators)
 byte 3 LCREFL2 (DFSLCRE region connection status)
word 7 -- byte 0 LCREFL3 (DFSLCRE thread status)
 byte 1 LCREFL4 (DFSLCRE internal resource manager status)
 byte 2 LCREESST (DFSLCRE ESS resource manager status byte1)
 byte 3 LCREESF (DFSLCRE ESS resource manager status byte2)
words 8 through 11 RRETOKEN (DFSRRE UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRE commit indicator)
 bytes 2-3 not used
words 13 through 15 not used

```

## SUB FUNC = X'0018' DFSFESP0 External SubSys commit processor Resolve

SUB FUNC = X'0018' DFSFESP0 External SubSys commit processor Resolve  
In Doubt requested record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- byte 0 PSTFUNCT (IDLI function code)
 byte 1 PSTSYNFC (sync function code)

```

```

 byte 2 SSTFTGT1 (DFSSSOB termination flag)
 byte 3 not used
word 6 -- bytes 0-1 SSTTCOMP (DFSSSOB user completion bytes 2,3)
 byte 2 LCREF1 (DFSLCRE status indicators)
 byte 3 LCREF2 (DFSLCRE region connection status)
word 7 -- byte 0 LCREF3 (DFSLCRE thread status)
 byte 1 LCREF4 (DFSLCRE internal resource manager status)
 byte 2 LCREEST (DFSLCRE ESS resource manager status byte1)
 byte 3 LCREESF (DFSLCRE ESS resource manager status byte2)
words 8 through 11 RREToken (DFSRRR UOW recovery token)
word 12 -- bytes 0-1 RRECI (DFSRRR commit indicator)
 bytes 2-3 not used
words 13 through 15 not used

```

## **MOD ID = X'0506' SUB FUNC = X'0006' DFSESPR0 External SubSys PROGRAM REQUEST HANDLER**

**MOD ID** = X'0506'

**SUB FUNC** = X'0006' DFSESPR0 External SubSys PROGRAM REQUEST HANDLER  
record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

## **SUB FUNC = X'0019' DFSESPR0 External SubSys PROGRAM REQUEST recursive**

**SUB FUNC** = X'0019' DFSESPR0 External SubSys PROGRAM REQUEST recursive  
call record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)
 byte 2 EZSEFL3 (DFSEZS thread termination status)
 byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
 bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

## **SUB FUNC = X'0020' DFSESPR0 External SubSys NOT OPERATIONAL (SNOX) exit**

**SUB FUNC** = X'0020' DFSESPR0 External SubSys NOT OPERATIONAL (SNOX) exit  
record

```

word 2 -- External SubSystem name
word 3 -- bytes 0-1 PSTID (IMS dependent region ID)
 byte 2 EZSGFL (DFSEZS connection status byte1)
 byte 3 EZSLFL (DFSEZS connection status byte2)
word 4 -- byte 0 EZSEFL1 (DFSEZS thread startup status)
 byte 1 EZSEFL2 (DFSEZS thread commit status)

```



```

byte 2 EZSEFL3 (DFSEZS thread termination status)
byte 3 EZSEFL4 (DFSEZS termination flag)
word 5 -- bytes 0-1 not used
bytes 2-3 External SubSys exit routine return code
words 6 through 7 not used
words 8 through 11 LCRETOKN (DFSLCRE UOW recovery token)
words 12 through 15 not used

```

“Common trace table interface” on page 574 shows an example of an external subsystem trace with both X'57' and X'58' record IDs. The ESS trace is called the subsystem (SST) trace in a dump.

## Example of an external subsystem trace (SST)

```

***TRACE PRINTED FROM OLDEST TO MOST CURRENT ENTRY**

FUNCTION WORD 0 WORD 1 WORD 2 WORD 3 WORD 4 WORD 5 WORD 6 WORD 7
ESI5 CTL INIT 5700198F 04030019 F1F0F0F1 00000000 00000000 00000000 00000000
ESI3 IDENT 570019B8 04020020 F1F0F0F1 00000800 00000000 00000000 00000000
ESS4 MESSAGE 570019BD 00150015 F1F0F0F1 00000000 00000000 00000000 00000000
ESI3 R-I-D 570019C6 04020021 F1F0F0F1 00002C00 00000000 00000000 00000000
ESS3 LOGGING 570019CF 00160014 F1F0F0F1 00000000 00000000 00000000 00000000
ESCT CRT THRD 58003165 02900005 F1F0F0F1 0001CC0C 81000000 00000000 00000000
FESP SYNC STA 580035D0 03070016 F1F0F0F1 0001CC0C 8C100000 42048000 03F00000
ESI3 RRE REQ 570035EC 04020023 F1F0F0F1 00008C00 00000000 00000000 00000000
ESI3 XS ECHO 570035F1 04020024 F1F0F0F1 00008C00 00000000 00000000 00000000
ESI3 R-I-D 570035F6 04020021 F1F0F0F1 00008C00 00000000 00000000 00000000
ESS3 LOGGING 57003608 00160014 F1F0F0F1 00000000 00000000 00000000 00000000
ESCT CRT THRD 58003A8F 02900005 F1F0F0F1 0001CC0C 81000000 00000000 00000000
FESP SYNC STA 58003AA1 03070016 F1F0F0F1 0001CC0C 8C100000 01080000 00000000
ESP1 COM PREP 58003AC8 02940008 F1F0F0F1 0001CC0C 8C500000 00000000 00000000
FESP SYNC END 58003ACB 03070017 F1F0F0F1 0001CC0C 8CD00000 01080000 00000000
FESP SYNC STA 58003B1A 03070016 F1F0F0F1 0001CC0C 8CD00000 010C0000 00002080
ESP2 COM CONT 58003B3D 02950009 F1F0F0F1 0001CC0C 8CD40000 00000000 00000000
FESP SYNC END 58003B44 03070017 F1F0F0F1 0001CC0C 9CCC0000 010C0000 000020C0
FESP SYNC STA 58003BA3 03070016 F1F0F0F1 0001CC0C 9CCC0000 42080000 00000000
FESP SYNC END 58003BA4 03070017 F1F0F0F1 0001CC0C 9CCC0000 42080000 00000000
FESP SYNC STA 58003BDF 03070016 F1F0F0F1 0001CC0C 9CCC0000 420C0000 00002080
ESD5 TRM THRD 58003BE7 02910002 F1F0F0F1 0001CC0C 9CCC0000 00000000 00000000
FESP SYNC END 58003BF1 03070017 F1F0F0F1 0001CC0C 95000C00 420C0000 00002080

GLOBAL ESET PREFIX
BLOCK AT 00BED480
PGES 00BED4A4 PLES 00000000 SCDAD 00BEA2B0 PCPE 00000000 ESGL
PICT 00000001 POCT 00000001 00000000

*** GLOBAL ESET BLOCK ***
00BED4A4 00000000 0059E9C0 00BED480 F1F0F0F1 40404040 E2E8E2F1 C4E2D5D4 C9D5F1F0
00BED4C4 40404040 40404040 D9F14040 0FC4E2D7 00B4DB40 001547C0 00A0C4C0 80B4DB57
00BED4E4 0FC4E2D7 00B4DB40 00153868 80A0C550 80B4DB57 108021DE 00000022 0059F9C8
00BED504 00000000 00000000 00000000 00000000 00005628 005B85A0 FF412B0C 00000000
00BED524 8C000000 009DC078 0059F998

```

## Resource Recovery Services trace

The Resource Recovery Services trace (RRST) provides information about relevant z/OS Resource Recovery Services (RRS) events in the IMS dependent region. Use the trace under direction of IBM Software Support when problems are suspected in the RRS area.

You enable the Resource Recovery Services trace by using the /TRACE SET ON TABLE RRST command. When you specify OPTION LOG, IMS writes the trace externally as type X'67FA' records.



**Related concepts:**

“Diagnostics for use with synchronous APPC and OTMA with shared queues” on page 338

**Related reference:**

“IMS trace function codes” on page 578

**Format of Resource Recovery Services trace records**

z/OS Resource Recovery Services trace (RRST) records contain standard fields, and all RRS calls are associated with subfunction codes.

Word 0 -- byte 1 One-byte trace ID field. This byte indicates the type of the trace entry.  
                   byte 2 One-byte trace sub function code.  
                   byte 3-4 Two-byte trace sequence number assigned by the IMS trace component.

Word 1 -- byte 1 One-byte numeric Resource Recovery Service call code (see the RRS call table below).  
                   byte 2 One-byte LCREGFLG.  
                   byte 3-4 Two-byte RRS return code.

Word 2 -- byte 1-2 Two-byte PST number - PSTPSTNR.  
                   byte 3-4 Not used.

Word 3 -- byte 1-4 Four-byte LCRERRSF.

Word 4 -- Not used.

Word 5 -- Not used.

Word 6 -- Not used.

Word 7 -- byte 1-4 Bytes 3 through 6 of the system clock (STCK) at the time the trace entry was created.

The following table shows the RRS calls that are associated with the subfunction codes:

*Table 241. Resource Recovery Services calls associated with the subfunction codes*

| Subfunction code | Function |
|------------------|----------|
| X'00'            | ATRBACK  |
| X'01'            | ATRCMIT  |
| X'02'            | ATRDINT  |
| X'03'            | ATREINT  |
| X'04'            | ATREINT5 |
| X'05'            | ATREND   |
| X'06'            | ATRIBRS  |
| X'07'            | ATRIERS  |
| X'08'            | ATRIRLN  |
| X'09'            | ATRIRNI  |
| X'0A'            | ATRIRRI  |
| X'0B'            | ATRISLN  |
| X'0C'            | ATRPDUE  |
| X'0D'            | ATRREIC  |
| X'0E'            | ATRRURD  |
| X'0F'            | ATRRWID  |
| X'10'            | ATRSROI  |
| X'11'            | ATRSIT   |
| X'12'            | ATRSPID  |
| X'13'            | ATRSUSI2 |
| X'14'            | CRGDRM   |
| X'15'            | CRGGRM   |
| X'16'            | CRGSEIF  |
| X'17'            | CRXSEIF  |

*Table 241. Resource Recovery Services calls associated with the subfunction codes (continued)*

| <b>Subfunction code</b> | <b>Function</b> |
|-------------------------|-----------------|
| X'18'                   | CTXBEGC         |
| X'19'                   | CTXEINT1        |
| X'1A'                   | CTXDINT         |
| X'1B'                   | CTXENDC         |
| X'1C'                   | CTXSWCH         |
| X'1D'                   | CTXSCID         |
| X'1E'                   | CTXSDTA         |
| X'1F'                   | IEANTCR         |
| X'20'                   | IEANTCT         |

The following table shows the RRS function routines that are associated with the DFSRRSI function routine codes (FRCs).

*Table 242. Resource Recovery Services function routines associated with DFSRRSI function routine codes*

| <b>Function routine codes</b> | <b>Function routine</b>       |
|-------------------------------|-------------------------------|
| X'01'                         | Register                      |
| X'02'                         | Restart                       |
| X'03'                         | End_Restart                   |
| X'04'                         | Unregister                    |
| X'05'                         | Switch_Context                |
| X'06'                         | Determine_Syncpt_Coord        |
| X'07'                         | Initiate_Syncpt               |
| X'08'                         | End_Context                   |
| X'09'                         | Retain_Interest               |
| X'0A'                         | Post_Deferred_UR              |
| X'0B'                         | Disassociate_Context          |
| X'0C'                         | Coordinate_Backout            |
| X'0D'                         | Perform_Syncpt                |
| X'0E'                         | Identify_Context              |
| X'0F'                         | Post_Deferred_Backout         |
| X'10'                         | Unhook_for_Phase2             |
| X'11'                         | RRS_Validation                |
| X'12'                         | Delete_UR_Interest            |
| X'13'                         | Retrieve_XID                  |
| X'14'                         | Determine_Batch_Coord         |
| X'15'                         | Create_Context                |
| X'16'                         | Set_Side_Information          |
| X'17'                         | Create_Cascaded_UR            |
| X'18'                         | Express_UR_Interest           |
| X'19'                         | Commit_UR                     |
| X'1A'                         | Backout_UR                    |
| X'1B'                         | Associate_Context             |
| X'1C'                         | Application_Abend             |
| X'A6'                         | Enter Commit (DFSRGFS0)       |
| X'A7'                         | Exit Commit (DFSRGFS0)        |
| X'A8'                         | RRS Error Occurred (DFSRGFS0) |
| X'A9'                         | RRS Abend Occurred (DFSRGFS0) |
| X'AA'                         | Token Trace                   |

The following diagrams show the format of the trace records. Each trace record has a trace function code of X'A5' and is X'20' bytes long.

|                  |                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------|
| Subfunction Code | = X'00'                                                                                                 |
| Description      | = Resource Recovery Services - ATRBACK                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - LCURIDNT                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'01'                                                                                                 |
| Description      | = Resource Recovery Services - ATRCMIT                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - LCURIDNT                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'02'                                                                                                 |
| Description      | = Resource Recovery Services - ATRDINT                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - LCURIDNT                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'03'                                                                                                 |
| Description      | = Resource Recovery Services - ATREINT                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - LCURIDNT                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'04'                                                                                                 |
| Description      | = Resource Recovery Services - ATREINT5                                                                 |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - LCURIDNT                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |

|                  |                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------|
| Subfunction Code | = X'05'                                                                                                 |
| Description      | = Resource Recovery Services - ATREND                                                                   |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'06'                                                                                                 |
| Description      | = Resource Recovery Services - ATRIBRS                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'07'                                                                                                 |
| Description      | = Resource Recovery Services - ATRIERS                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'08'                                                                                                 |
| Description      | = Resource Recovery Services - ATRIRLN                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'09'                                                                                                 |
| Description      | = Resource Recovery Services - ATRIRNI                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |

|                  |                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------|
| Subfunction Code | = X'0A'                                                                                                 |
| Description      | = Resource Recovery Services - ATRIRRI                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'0B'                                                                                                 |
| Description      | = Resource Recovery Services - ATRISLN                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'0C'                                                                                                 |
| Description      | = Resource Recovery Services - ATRPDUE                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - byte 1-2 - ATRPDUEEXITNUMBER<br>- byte 3-4 - ATRPDUECOMPLETION                                        |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'0D'                                                                                                 |
| Description      | = Resource Recovery Services - ATRREIC                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - LCURCNTX                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'0E'                                                                                                 |
| Description      | = Resource Recovery Services - ATRRURD                                                                  |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Words 5-6        | - IMS_PCTASK_URI_TOKEN                                                                                  |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |

|                  |                                                                                |
|------------------|--------------------------------------------------------------------------------|
| Subfunction Code | = X'0F'                                                                        |
| Description      | = Resource Recovery Services - ATRRWID                                         |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG        |
| Word 2           | - byte 3-4 - RRS return code<br>- byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used |
| Word 3           | - LCRERRSF                                                                     |
| Word 4           | - Not used                                                                     |
| Words 5-6        | - URI_Token                                                                    |
| Word 7           | - Low 4 byte time stamp (STCK)                                                 |
| Subfunction Code | = X'10'                                                                        |
| Description      | = Resource Recovery Services - ATRSR0I                                         |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG        |
| Word 2           | - byte 3-4 - RRS return code<br>- byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used |
| Word 3           | - LCRERRSF                                                                     |
| Word 4           | - Not used                                                                     |
| Word 5           | - Not used                                                                     |
| Word 6           | - URID                                                                         |
| Word 7           | - Low 4 byte time stamp (STCK)                                                 |
| Subfunction Code | = X'11'                                                                        |
| Description      | = Resource Recovery Services - ATRSIIT                                         |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG        |
| Word 2           | - byte 3-4 - RRS return code<br>- byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used |
| Word 3           | - LCRERRSF                                                                     |
| Word 4           | - Not used                                                                     |
| Word 5           | - Not used                                                                     |
| Word 6           | - Not used                                                                     |
| Word 7           | - Low 4 byte time stamp (STCK)                                                 |
| Subfunction Code | = X'12'                                                                        |
| Description      | = Resource Recovery Services - ATRSPID                                         |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 0 - LCREGFLG      |
| Word 2           | - byte 3-4 - RRS return code<br>- byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used |
| Word 3           | - LCRERRSF                                                                     |
| Word 4           | - Not used                                                                     |
| Words 5-6        | - IMS_PCTASK_URI_TOKEN                                                         |
| Word 7           | - Low 4 byte time stamp (STCK)                                                 |
| Subfunction Code | = X'13'                                                                        |
| Description      | = Resource Recovery Services - ATRSI2                                          |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG        |
| Word 2           | - byte 3-4 - RRS return code<br>- byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used |
| Word 3           | - LCRERRSF                                                                     |
| Word 4           | - Not used                                                                     |
| Words 5-6        | - IMS_PCTASK_RUI_TOKEN                                                         |
| Word 7           | - Low 4 byte time stamp (STCK)                                                 |
| Subfunction Code | = X'14'                                                                        |
| Description      | = RRMS Registration Services - CRGDRM                                          |

|                  |                                                  |
|------------------|--------------------------------------------------|
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code |
|                  | - byte 2 - LCREGFLG                              |
|                  | - byte 3-4 - RRS return code                     |
| Word 2           | - byte 1-2 - PSTPSTNR                            |
|                  | - byte 3-4 - Not used                            |
| Word 3           | - LCRERRSF                                       |
| Word 4           | - Not used                                       |
| Word 5           | - Not used                                       |
| Word 6           | - Not used                                       |
| Word 7           | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'15'                                          |
| Description      | = RRMS Registration Services - CRGGRM            |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code |
|                  | - byte 2 - LCREGFLG                              |
|                  | - byte 3-4 - RRS return code                     |
| Word 2           | - byte 1-2 - PSTPSTNR                            |
|                  | - byte 3-4 - Not used                            |
| Word 3           | - LCRERRSF                                       |
| Word 4           | - Not used                                       |
| Word 5           | - Not used                                       |
| Word 6           | - Not used                                       |
| Word 7           | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'16'                                          |
| Description      | = RRMS Registration Services - CRGSEIF           |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code |
|                  | - byte 2 - LCREGFLG                              |
|                  | - byte 3-4 - RRS return code                     |
| Word 2           | - byte 1-2 - PSTPSTNR                            |
|                  | - byte 3-4 - Not used                            |
| Word 3           | - LCRERRSF                                       |
| Word 4           | - Not used                                       |
| Word 5           | - Not used                                       |
| Word 6           | - Not used                                       |
| Word 7           | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'17'                                          |
| Description      | = RRMS Registration Services - CRXSEIF           |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code |
|                  | - byte 2 - LCREGFLG                              |
|                  | - byte 3-4 - RRS return code                     |
| Word 2           | - byte 1-2 - PSTPSTNR                            |
|                  | - byte 3-4 - Not used                            |
| Word 3           | - LCRERRSF                                       |
| Word 4           | - Not used                                       |
| Word 5           | - Not used                                       |
| Word 6           | - Not used                                       |
| Word 7           | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'18'                                          |
| Description      | = RRMS Registration Services - CTXBEGC           |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code |
|                  | - byte 2 - LCREGFLG                              |
|                  | - byte 3-4 - RRS return code                     |
| Word 2           | - byte 1-2 - PSTPSTNR                            |
|                  | - byte 3-4 - Not used                            |
| Word 3           | - LCRERRSF                                       |
| Word 4           | - Not used                                       |
| Words 5-6        | - LCURCNTX                                       |
| Word 7           | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'19'                                          |
| Description      | = RRMS Context Services - CTXEINT1               |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code |

|                  |                                   |                                                  |
|------------------|-----------------------------------|--------------------------------------------------|
|                  |                                   | - byte 2 - LCREGFLG                              |
|                  |                                   | - byte 3-4 - RRS return code                     |
| Word 2           |                                   | - byte 1-2 - PSTPSTNR                            |
|                  |                                   | - byte 3-4 - Not used                            |
| Word 3           |                                   | - LCRERRSF                                       |
| Word 4           |                                   | - Address(LCRE)                                  |
| Word 5           |                                   | - Not used                                       |
| Word 6           |                                   | - Not used                                       |
| Word 7           |                                   | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'1A'                           |                                                  |
| Description      | = RRMS Context Services - CTXDINT |                                                  |
| Word 1           |                                   | - byte 1 - Numeric DFSRRSI function routine code |
|                  |                                   | - byte 2 - LCREGFLG                              |
|                  |                                   | - byte 3-4 - RRS return code                     |
| Word 2           |                                   | - byte 1-2 - PSTPSTNR                            |
|                  |                                   | - byte 3-4 - Not used                            |
| Word 3           |                                   | - LCRERRSF                                       |
| Word 4           |                                   | - Address(IMS_PC_CI_Token)                       |
| Word 5           |                                   | - Not used                                       |
| Word 6           |                                   | - Not used                                       |
| Word 7           |                                   | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'1B'                           |                                                  |
| Description      | = RRMS Context Services - CTXENDC |                                                  |
| Word 1           |                                   | - byte 1 - Numeric DFSRRSI function routine code |
|                  |                                   | - byte 2 - LCREGFLG                              |
|                  |                                   | - byte 3-4 -RRS return code                      |
| Word 2           |                                   | - byte 1-2 -PSTPSTNR                             |
|                  |                                   | - byte 3-4 - Not used                            |
| Word 3           |                                   | - LCRERRSF                                       |
| Word 4           |                                   | - Not used                                       |
| Words 5-6        |                                   | - LCURCNTX                                       |
| Word 7           |                                   | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'1C'                           |                                                  |
| Description      | = RRMS Context Services - CTXSWCH |                                                  |
| Word 1           |                                   | - byte 1 - Numeric DFSRRSI function routine code |
|                  |                                   | - byte 2 - LCREGFLG                              |
|                  |                                   | - byte 3-4 - RRS return code                     |
| Word 2           |                                   | - byte 1-2 - PSTPSTNR                            |
|                  |                                   | - byte 3-4 - Not used                            |
| Word 3           |                                   | - LCRERRSF                                       |
| Word 4           |                                   | - Not used                                       |
| Words 5-6        |                                   | - LCURCNTX                                       |
| Word 7           |                                   | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'1D'                           |                                                  |
| Description      | = RRMS Context Services - CTXSCID |                                                  |
| Word 1           |                                   | - byte 1 - Numeric DFSRRSI function routine code |
|                  |                                   | - byte 2 - LCREGFLG                              |
|                  |                                   | - byte 3-4 - RRS return code                     |
| Word 2           |                                   | - byte 1-2 - PSTPSTNR                            |
|                  |                                   | - byte 3-4 - Not used                            |
| Word 3           |                                   | - LCRERRSF                                       |
| Word 4           |                                   | - Address(LCRE)                                  |
| Word 5           |                                   | - Not used                                       |
| Word 6           |                                   | - Not used                                       |
| Word 7           |                                   | - Low 4 byte time stamp (STCK)                   |
| Subfunction Code | = X'1E'                           |                                                  |
| Description      | = ODBA Set Context Data - CTXSDTA |                                                  |
| Word 1           |                                   | - byte 1 - Numeric DFSRRSI function routine code |
|                  |                                   | - byte 2 - LCREGFLG                              |
|                  |                                   | - byte 3-4 - RRS return code                     |



|                  |                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------|
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'1F'                                                                                                 |
| Description      | = MVS Name/Token Services - IEANTCR                                                                     |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |
| Subfunction Code | = X'20'                                                                                                 |
| Description      | = MVS Name/Token Services - IEANTRT                                                                     |
| Word 1           | - byte 1 - Numeric DFSRRSI function routine code<br>- byte 2 - LCREGFLG<br>- byte 3-4 - RRS return code |
| Word 2           | - byte 1-2 - PSTPSTNR<br>- byte 3-4 - Not used                                                          |
| Word 3           | - LCRERRSF                                                                                              |
| Word 4           | - Not used                                                                                              |
| Word 5           | - Not used                                                                                              |
| Word 6           | - Not used                                                                                              |
| Word 7           | - Low 4 byte time stamp (STCK)                                                                          |

## RRST trace examples

The RRST trace in an OTMA and an APPC environment are depicted. The traces were gathered with tracing volume set to HIGH.

### RRST trace in an OTMA environment

```
CONTROL CNTL STOPAFT=EOF

* INPUT LOG DATA SET NAME(S): *
* DARIO.IMS1.OLDSP0.OTMU01.DECKS2

*
* SELECTION FOR INTERNAL TRACE LOG RECORD(S) *
*
OPTION PRINT 0=5,V=67FA,L=2,E=DFSERA60,C=E
1 FUNCTION WORD 0 WORD 1 WORD 2 WORD 3 WORD 4 WORD 5 WORD 6 WORD 7 PAGE 0001
0* RR1 TRACE TABLE - DATE 2004173 TIME 224754462929 OFFSET 028D SKIP 0000 TOTAL SKIP 00000000 RECORD NUMBER 0000028F
-DFSRLM0 Exit 7B027F86 01C90000 00000000 00000000 00000000 00000000 BB676D0D B53E27A0 SYNCHRONOUS OUTPUT LU MANAGER
DFSRLM0 Exit 7B0281E8 06400000 C9D4E2F2 40404040 00000000 00000000 BB676D7A 2B82CF89 RECEIVE LU MANAGER RECEIVER
DFSRLM0 Exit 7B0282FD 01C90000 00000000 00000000 00000000 00000000 BB676DBE 97EF7323 SYNCHRONOUS OUTPUT LU MANAGER
DFSRLM0 Exit 7B02856E 06400000 C9D4E2F3 40404040 00000000 00000000 BB676E36 DD321202 RECEIVE LU MANAGER RECEIVER
DFSRGFS0 (RRS) A0A68972 480005A6 0CB252F8 0CB25060 00010000 00010000 BB676EB9 17C56A2A ENTER COMMIT
CTXEINT1 (RRS) A5188973 15000000 00010000 00000000 00000000 00000000 B917C5DD 00000000 CREATE CONTEXT NO LCRE FLAGS
ATREINT5 (RRS) A5048974 18000000 00010000 04000000 00000000 BB676EB9 7E71E000 B917C977 EXPRESS UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A78975 480005A7 0CB252F8 0CB25060 00000001 00000000 BB676EB9 17ED934A EXIT COMMIT
DFSRGFS0 (RRS) A0AA8976 480005AA 0001E4D9 7E71E000 7E71E000 01000000 01000001E 17ED934A TKN TRACE (A0A7)
DFSYTIB0 (RRS) 5A00897D 28010084 0CB25060 7E71E000 7E71E000 01000000 01000001E B917EEAD INPT MSG ENQUEUED(UR TOKEN WORD3-6)
CTXDINT (RRS) A5198C04 05000000 00010000 00000000 0AFBA048 19070000 00000000 BEB54D12 SWITCH_CONTEXT NO LCRE FLAGS
ATREINT (RRS) A5038C05 05000000 00010000 40000000 00000000 BB676EBE 7E71E374 BEB54EDC SWITCH_CONTEXT NO LCRE FLAGS
ATTRRUD (RRS) A50D8C88 06400000 00010000 60000000 00000000 BB676EBE B54E530B BF5AF676 DETRMN_SYNC_COORD OUTPUT SENT
DFSRGFS0 (RRS) A0A68CF7 480003A6 0CB252F8 0AFF5060 00010000 00010001 BB676EBF 5BACC466 ENTER COMMIT
ATRDINT (RRS) A5028CF8 12000000 00010000 20000000 00000000 00000000 00000000 BF5BAD3B DELETE UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A78CF9 480003A7 0CB252F8 0AFF5060 00000001 00000000 BB676EBF 5BB19926 EXIT COMMIT
DFSRGFS0 (RRS) A0AA8CFA 480003AA 0001C3E7 BB676EB9 17C86FAA 01000000 022A4060 5BB19926 TKN TRACE (A0A7)
DFSRGFS0 (RRS) A0A68D0A 480001A6 0CB252F8 0AFF5060 00010000 00010002 BB676EBF 5BB30B26 ENTER COMMIT
CTXSCID (RRS) A51C8D0B 19000000 00010000 00000000 00000000 BB676EB9 17C86FAA BF5BB31D COMMIT_UR NO LCRE FLAGS
ATRCMIT (RRS) A5018D0C 19000000 00010000 00080000 00000000 00000000 00000000 BF5BB422 COMMIT_UR NO LCRE FLAGS
DFSRGFS0 (RRS) A0A78D0D 480001A7 0CB252F8 0AFF5060 00000001 00000000 BB676EBF 5BF1C26E EXIT COMMIT
DFSRGFS0 (RRS) A0AA8D0E 480001AA 0001C3E7 BB676EB9 17C86FAA 01000000 022A4060 5BF1C26E TKN TRACE (A0A7)
ATRDINT (RRS) A5028D5E 08400000 00010000 62002001 00000000 BB676EBE 7E71E374 BF5C4396 END_CONTEXT OUTPUT SENT
CTXENDC (RRS) A51A8D5F 08400000 00010000 62002001 00000000 BB676EBE B54E9F6B BF5C4602 END_CONTEXT OUTPUT SENT
```

```

DFSRGFS0 (RRS) A0A68F9F 480005A6 0CB252F8 0CB25060 00010000 00010003 BB676ED7 2204448D ENTER COMMIT
CTXEINT1 (RRS) A5188FA0 15000000 00010000 00000000 00000000 00000000 D72204AF CREATE_CONTEXT NO LCRE FLAGS
ATREINT5 (RRS) A5048FA1 18000000 00010000 00000000 00000000 BB676ED7 7E71E000 D72206A2 EXPRESS_UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A78FA2 480005A7 0CB252F8 0CB25060 00000001 00000000 BB676ED7 220DB20D EXIT_COMMIT
DFSRGFS0 (RRS) A0A08FA3 480005AA 0001E4D9 7E71E000 7E71E000 01000002 0100001E 220DB20D TKN_TRACE (A0A7)
DFSytiB0 (RRS) 5A008FAA 28010084 0CB25060 7E71E000 7E71E000 01000002 0100001E D7223231 INPT_MSG_ENQUEUED(UR_TOKEN_WORD3-6)
DFAOSW0 (RRS) 7B0890AB 47000000 0B27C060 40C1D6E2 0CB252F8 00000000 BB676ED8 D8D3326F APPC/OTMA_SMQ_AWE_server
DFSAPPC0 Exit 7B0290AC 02400000 00000000 0CB25060 00000000 00000000 BB676ED8 D8D3630F DFSAPPC_MSG_SWITCH_PROCESSOR
DFASSLUM0 Exit 7B0290AD 01800000 00000002 00000000 00000000 00000000 BB676ED8 D8DD6EAF SYNCHRONOUS_OUTPUT_LU_MANAGER
DFSytiB0 (RRS) 5A0090B5 2802A084 0CB25060 7E71E000 7E71E000 01000002 0100001E D8D8E13F BE_RESPONSE_RECVD(UR_TOKEN_WORD3-6)
DFSYLUS0 (RRS) 5A0091F1 2A060002 0CB25060 7E71E000 7E71E000 01000002 0100001E D8F4361F OTMA_SERVICE:UNK_FUNC
DFSRGFS0 (RRS) A0A691FA 480001A6 0CB252F8 0CB25060 00020000 00010000 BB676ED8 F4376881 ENTER_COMMIT
CTXSCID (RRS) A51C91FB 19000000 00020000 00000000 00000000 BB676ED7 22060A4D D8F437D0 COMMIT_UR NO LCRE FLAGS
ATRCMIT (RRS) A50191FC 19000000 00020000 00080000 00000000 00000000 D8F439BA COMMIT_UR NO LCRE FLAGS
DFSRGFS0 (RRS) A0A791FD 480001A7 0CB252F8 0CB25060 00000001 00000000 BB676ED8 FC093A68 EXIT_COMMIT
DFSRGFS0 (RRS) A0AA91FE 480001AA 0002E4D9 7E71E000 7E71E000 01000002 0100001E FC093A68 TKN_TRACE (A0A7)
DFSRGFS0 (RRS) A0A69401 480005A6 0CB252F8 0CB25060 00010000 00010004 BB676EFE B7210502 ENTER_COMMIT
CTXEINT1 (RRS) A5189402 15000000 00010000 00000000 00000000 00000000 FEB72191 CREATE_CONTEXT NO LCRE FLAGS
ATREINT5 (RRS) A5049403 18000000 00010000 00000000 00000000 BB676EFE FEB7242F EXPRESS_UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A79404 480005A7 0CB252F8 0CB25060 00000001 00000000 BB676EFE B72C3502 EXIT_COMMIT
DFSRGFS0 (RRS) A0AA9405 480005AA 0001E4D9 7E71E000 7E71E000 01000004 0100001E B72C3502 TKN_TRACE (A0A7)
DFSytiB0 (RRS) 5A00940C 28010084 0CB25060 7E71E000 7E71E000 01000004 0100001E FEB7314C INPT_MSG_ENQUEUED(UR_TOKEN_WORD3-6)
DFAOSW0 (RRS) 7B0895E1 47000000 0B27C060 40C1D6E2 0CB252F8 00000000 BB676F0A 3B00B4A3 APPC/OTMA_SMQ_AWE_server
DFSAPPC0 Exit 7B0295E2 02400000 00000000 0CB25060 00000000 00000000 BB676F0A 3B00E323 DFSAPPC_MSG_SWITCH_PROCESSOR
DFASSLUM0 Exit 7B0295E3 01800000 00000003 00000000 00000000 00000000 BB676F0A 3B0ABC23 SYNCHRONOUS_OUTPUT_LU_MANAGER
DFSytiB0 (RRS) 5A0095EB 2802A084 0CB25060 7E71E000 7E71E000 01000004 0100001E 0A3B0E44 BE_RESPONSE_RECVD(UR_TOKEN_WORD3-6)
DFSYLUS0 (RRS) 5A0096BC 2A060002 0CB25060 7E71E000 7E71E000 01000004 0100001E 0A7AD931 OTMA_SERVICE:UNK_FUNC
DFSRGFS0 (RRS) A0A696C5 480001A6 0CB252F8 0CB25060 00020000 00010000 BB676F0A 7ADED120 ENTER_COMMIT
1 FUNCTION WORD 0 WORD 1 WORD 2 WORD 3 WORD 4 WORD 5 WORD 6 PAGE 0002
-CTXSCID (RRS) A51C9C6 19000000 00020000 00000000 00000000 BB67EFE B7236902 0A7ADF43 COMMIT_UR NO LCRE FLAGS
ATRCMIT (RRS) A50196C7 19000000 00020000 00080000 00000000 00000000 00000000 0A7AE4B4 COMMIT_UR NO LCRE FLAGS
DFSRGFS0 (RRS) A0A79739 480001A7 0CB252F8 0CB25060 00000001 00000000 BB676F0A D26D5C0E EXIT_COMMIT
DFSRGFS0 (RRS) A0AA973A 480001AA 0002E4D9 7E71E000 7E71E000 01000004 0100001E D26D5C0E TKN_TRACE (A0A7)
DFSRGFS0 (RRS) A0A698B1 480005A6 0CB252F8 0CB25060 00010000 00010005 BB676F22 71395349 ENTER_COMMIT
CTXEINT1 (RRS) A51898B2 15000000 00010000 00000000 00000000 00000000 00000000 227139DC CREATE_CONTEXT NO LCRE FLAGS
ATREINT5 (RRS) A50498B3 18000000 00010000 00000000 00000000 BB676F22 7E71E000 22713C07 EXPRESS_UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A798B4 480005A7 0CB252F8 0CB25060 00000001 00000000 BB676F22 71439009 EXIT_COMMIT
DFSRGFS0 (RRS) A0AA98B5 480005AA 0001E4D9 7E71E000 7E71E000 01000006 0100001E 71439009 TKN_TRACE (A0A7)
DFSytiB0 (RRS) 5A0098BC 28010084 0CB25060 7E71E000 7E71E000 01000006 0100001E 22714D7A INPT_MSG_ENQUEUED(UR_TOKEN_WORD3-6)
DFAOSW0 (RRS) 7B08999C 47000000 0B27C060 40C1D6E2 0CB252F8 00000000 BB676F22 F5CA6326 APPC/OTMA_SMQ_AWE_server
DFSAPPC0 Exit 7B02999D 02400000 00000000 0CB25060 00000000 00000000 BB676F22 F5CA8E46 DFSAPPC_MSG_SWITCH_PROCESSOR
DFASSLUM0 Exit 7B02999E 01800000 00000004 00000000 00000000 00000000 BB676F22 F5D4A386 SYNCHRONOUS_OUTPUT_LU_MANAGER
DFSytiB0 (RRS) 5A0099A6 2802C080 0CB25060 7E71E000 7E71E000 01000006 0100001E 22F5D812 BE_RESPONSE_RECVD(UR_TOKEN_WORD3-6)
DFSYLUS0 (RRS) 5A0099B9 2A060002 0CB25060 7E71E000 7E71E000 01000006 0100001E 22F5DEAF OTMA_SERVICE:UNK_FUNC
DFSRGFS0 (RRS) A0A699C5 480001A6 0CB252F8 0CB25060 00030000 00010000 BB676F22 F5F4C026 ENTER_COMMIT
CTXSCID (RRS) A51C9C6 19000000 00030000 00000000 00000000 BB676F22 713B6A69 22F5F53D COMMIT_UR NO LCRE FLAGS
ATRCMIT (RRS) A50199C7 19000000 00030000 00080000 00000000 00000000 00000000 22F5F72B COMMIT_UR NO LCRE FLAGS
DFSRGFS0 (RRS) A0A799CA 480001A7 0CB252F8 0CB25060 00000001 00000000 BB676F22 FBF8A107 EXIT_COMMIT
DFSRGFS0 (RRS) A0AA99CB 480001AA 0003E4D9 7E71E000 7E71E000 01000006 0100001E FBF8A107 TKN_TRACE (A0A7)
DFSRGFS0 (RRS) A0A69C13 480005A6 0CB252F8 0CB25060 00010000 00010006 BB676F52 B618084F ENTER_COMMIT
CTXEINT1 (RRS) A5189C14 15000000 00010000 00000000 00000000 00000000 00000000 52B6187C CREATE_CONTEXT NO LCRE FLAGS
ATREINT5 (RRS) A5049C15 18000000 00010000 00000000 00000000 BB676F52 7E71E000 52B61858 EXPRESS_UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A79C16 480005A7 0CB252F8 0CB25060 00000001 00000000 BB676F52 B6230D2F EXIT_COMMIT
DFSRGFS0 (RRS) A0AA9C17 480005AA 0001E4D9 7E71E000 7E71E000 01000008 0100001E B6230D2F TKN_TRACE (A0A7)
DFSytiB0 (RRS) 5A009C1E 28010084 0CB25060 7E71E000 7E71E000 01000008 0100001E 52B62C94 INPT_MSG_ENQUEUED(UR_TOKEN_WORD3-6)
DFAOSW0 (RRS) 7B089E2A 47000000 0B27C060 40C1D6E2 0CB252F8 00000000 BB676F5C AB73B56C APPC/OTMA_SMQ_AWE_server
DFSAPPC0 Exit 7B029E2B 02400000 00000000 0CB25060 00000000 00000000 BB676F5C AB73E68C DFSAPPC_MSG_SWITCH_PROCESSOR
DFASSLUM0 Exit 7B029E2C 01800000 00000005 00000000 00000000 00000000 BB676F5C AB7BB62C SYNCHRONOUS_OUTPUT_LU_MANAGER
DFSytiB0 (RRS) 5A009E34 2802A084 0CB25060 7E71E000 7E71E000 01000008 0100001E 5CAB7F1D BE_RESPONSE_RECVD(UR_TOKEN_WORD3-6)
DFSYLUS0 (RRS) 5A009F94 2A060002 0CB25060 7E71E000 7E71E000 01000008 0100001E 5CD77072 OTMA_SERVICE:UNK_FUNC
DFSRGFS0 (RRS) A0A69F9D 480001A6 0CB252F8 0CB25060 00020000 00010000 BB676F5C D771B08A ENTER_COMMIT
CTXSCID (RRS) A51C9F9E 19000000 00020000 00000000 00000000 BB676F52 B61A728F COMMIT_UR NO LCRE FLAGS
ATRCMIT (RRS) A5019F9F 19000000 00020000 00080000 00000000 00000000 00000000 5CD773D6 COMMIT_UR NO LCRE FLAGS
DFSRGFS0 (RRS) A0A79FA0 480001A7 0CB252F8 0CB25060 00000001 00000000 BB676F5D 26DB750C EXIT_COMMIT
DFSRGFS0 (RRS) A0AA9FA1 480001AA 0002E4D9 7E71E000 7E71E000 01000008 0100001E 26DB750C TKN_TRACE (A0A7)
DFS707I END OF FILE ON INPUT
DFS708I OPTION COMPLETE
DFS703I END OF JOB

```

## RRST trace in an APPC environment

```

CONTROL CNTL STOPAFT=EOF

* INPUT LOG DATA SET NAME(S): *
* DARIO.IMS1.OLDSP0.ASQA01.DECKS2

*
* SELECTION FOR INTERNAL TRACE LOG RECORD(S) *
*
OPTION PRINT 0=5,V=67FA,L=2,E=DFSERA60,C=E
1 FUNCTION WORD 0 WORD 1 WORD 2 WORD 3 WORD 4 WORD 5 WORD 6 WORD 7 PAGE 0001
0* RR1 TRACE TABLE - DATE 2004173 TIME 232543999620 OFFSET 028D SKIP 0000 TOTAL SKIP 00000000 RECORD NUMBER 0000025E
-DFASSLUM0 Exit 7B027EE 01C90000 00000000 00000000 00000000 00000000 BB677710 C2AE8A08 SYNCHRONOUS_OUTPUT_LU_MANAGER
DFSRLM10 Exit 7B028133 06400000 C9D4E2F2 40404040 00000000 00000000 BB677781 0AE6512D RECEIVE_LU_MANAGER_RECEIVER
DFSRGFS0 (RRS) A0A684E2 480005A6 0CB25998 0CB25700 00010000 00010000 BB6777BB CE2AFD09 ENTER_COMMIT
CTXEINT1 (RRS) A51884E3 15000000 00010000 00000000 00000000 00000000 BB6777BB B8CE2B81 CREATE_CONTEXT NO LCRE FLAGS
ATREINT5 (RRS) A50484E4 18000000 00010000 00000000 00000000 BB6777BB 7E71E000 B8CE2F49 EXPRESS_UR_INTRST NO LCRE FLAGS
DFSRGFS0 (RRS) A0A784E5 480005A7 0CB25998 0CB25700 00000001 00000000 BB6777BB D2E7E905 EXIT_COMMIT
DFSRGFS0 (RRS) A0AA84E6 480005AA 0001E4D9 7E71E000 7E71E000 01000000 0100001E D2E7E905 TKN_TRACE (A0A7)

```

|                                                                              |          |          |          |          |          |          |          |          |                               |               |
|------------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|-------------------------------|---------------|
| DFSRLM10 (RRS)                                                               | 7B0084ED | 06000000 | 0CB25700 | 7E71E000 | 7E71E000 | 01000000 | 0100001E | 00000000 | RECEIVE LU MANAGER RECEIVER   |               |
| DFSASOW0 (RRS)                                                               | 7B0085AB | 47000000 | 0BB80060 | 40C1D6E2 | 0CB25998 | 00000000 | BB6777BD | 4A2DBA20 | APPC/OTMA SMQ AWE server      |               |
| DFSAPPC0 Exit                                                                | 7B0285AC | 02400000 | 00000000 | 00000000 | 00000000 | 00000000 | BB6777BD | 4A2DEE60 | DFSAPPC MSG SWITCH PROCESSOR  |               |
| DFSSSLUM0 Exit                                                               | 7B0285AD | 01800000 | 00000002 | 00000000 | 00000000 | 00000000 | BB6777BD | 4A37C900 | SYNCHRONOUS OUTPUT LU MANAGER |               |
| DFS6LUS0 (RRS)                                                               | 7B0985FD | 0A000001 | 0CB25700 | 7E71E000 | 7E71E000 | 01000000 | 0100001E | 00000000 | LU62 SERVICES INTERFACE 1     |               |
| DFSRRGFS0 (RRS)                                                              | 0AA68656 | 480001A6 | 0CB25998 | 0CB25700 | 00020000 | 00010000 | BB6777BD | 598FF9AD | ENTER COMMIT                  |               |
| CTXSCID (RRS)                                                                | A51C8657 | 19000000 | 00020000 | 00000000 | 00000000 | BB6777BB | CE2E8E89 | BD5990AC | COMMIT_UR                     | NO LCRE FLAGS |
| ATRCMIT (RRS)                                                                | A5018658 | 19000000 | 00020000 | 00080000 | 00000000 | 00000000 | 00000000 | BD599426 | COMMIT_UR                     | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A78659 | 480001A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777BE | 761A1648 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA865A | 480001AA | 0002E4D9 | 7E71E000 | 7E71E000 | 01000000 | 0100001E | 761A1648 | TKN TRACE (A0A7)              |               |
| DFSRRGFS0 (RRS)                                                              | A0A686C2 | 480005A6 | 0CB25998 | 0CB25700 | 00010000 | 00010001 | BB6777C3 | E18B4D00 | ENTER COMMIT                  |               |
| CTXEINT1 (RRS)                                                               | A51886C3 | 15000000 | 00010000 | 00000000 | 00000000 | 00000000 | 00000000 | C3E18BC9 | CREATE_CONTEXT                | NO LCRE FLAGS |
| ATREINT5 (RRS)                                                               | A50486C4 | 18000000 | 00010000 | 04000000 | 00000000 | BB6777C3 | 7E71E000 | C3E18BE8 | EXPRESS_UR_INTRST             | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A786C5 | 480005A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777C3 | E1973CA0 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA86C6 | 480005AA | 0001E4D9 | 7E71E000 | 7E71E000 | 01000002 | 0100001E | E1973CA0 | TKN TRACE (A0A7)              |               |
| DFSRLM10 (RRS)                                                               | 7B0086CD | 06000000 | 0CB25700 | 7E71E000 | 7E71E000 | 01000002 | 0100001E | 00000000 | RECEIVE LU MANAGER RECEIVER   |               |
| DFSASOW0 (RRS)                                                               | 7B008777 | 47000000 | 0BB80060 | 40C1D6E2 | 0CB25998 | 00000000 | BB6777C4 | 701B928E | APPC/OTMA SMQ AWE server      |               |
| DFSAPPC0 Exit                                                                | 7B028778 | 02400000 | 00000000 | 00000000 | 00000000 | 00000000 | BB6777C4 | 701BC82E | DFSAPPC MSG SWITCH PROCESSOR  |               |
| DFSSSLUM0 Exit                                                               | 7B028779 | 01800000 | 00000003 | 00000000 | 00000000 | 00000000 | BB6777C4 | 70263B6E | SYNCHRONOUS OUTPUT LU MANAGER |               |
| DFS6LUS0 (RRS)                                                               | 7B0987C9 | 0A000001 | 0CB25700 | 7E71E000 | 7E71E000 | 01000002 | 0100001E | 00000000 | LU62 SERVICES INTERFACE 1     |               |
| DFSRRGFS0 (RRS)                                                              | A0A687D2 | 480001A6 | 0CB25998 | 0CB25700 | 00020000 | 00010000 | BB6777C4 | 711B1201 | ENTER COMMIT                  |               |
| CTXSCID (RRS)                                                                | A51C87D3 | 19000000 | 00020000 | 00000000 | 00000000 | BB6777C3 | E18DEC00 | C4711B7B | COMMIT_UR                     | NO LCRE FLAGS |
| ATRCMIT (RRS)                                                                | A50187D4 | 19000000 | 00020000 | 00080000 | 00000000 | 00000000 | 00000000 | C4711D30 | COMMIT_UR                     | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A787D5 | 480001A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777C4 | 869FA88D | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA87D6 | 480001AA | 0002E4D9 | 7E71E000 | 7E71E000 | 01000002 | 0100001E | 869FA88D | TKN TRACE (A0A7)              |               |
| CTXDINT (RRS)                                                                | A519888E | 0E000000 | 00000000 | 00000000 | 0C1833D8 | 19070000 | 00000000 | C9D80F9E | IDENTIFY_CONTEXT              | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A688D8 | 480004A6 | 0CB25998 | 0CB25700 | 00010000 | 00010002 | BB6777C9 | D867E74F | ENTER COMMIT                  |               |
| ATREINT5 (RRS)                                                               | A50488D9 | 18000000 | 00010000 | 04000000 | 00000000 | BB6777C9 | 7E71E374 | C9D86849 | EXPRESS_UR_INTRST             | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A788DA | 480004A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777C9 | D86CE76F | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA88DB | 480004AA | 0001E4D9 | 7E71E374 | 7E71E374 | 01000000 | 0100001E | D86CE76F | TKN TRACE (A0A7)              |               |
| DFSRLM10 (RRS)                                                               | 7B0088E2 | 06000000 | 0CB25700 | 7E71E374 | 7E71E374 | 01000000 | 0100001E | 00000000 | RECEIVE LU MANAGER RECEIVER   |               |
| DFSASOW0 (RRS)                                                               | 7B008976 | 47000000 | 0BB80060 | 40C1D6E2 | 0CB25998 | 00000000 | BB6777CA | 80475262 | APPC/OTMA SMQ AWE server      |               |
| DFSAPPC0 Exit                                                                | 7B028977 | 02400000 | 00000000 | 00000000 | 00000000 | 00000000 | BB6777CA | 80479342 | DFSAPPC MSG SWITCH PROCESSOR  |               |
| DFSSSLUM0 Exit                                                               | 7B028978 | 01800000 | 00000004 | 00000000 | 00000000 | 00000000 | BB6777CA | 8052CE22 | SYNCHRONOUS OUTPUT LU MANAGER |               |
| DFS6LUS0 (RRS)                                                               | 7B0989D0 | 0A000001 | 0CB25700 | 7E71E374 | 7E71E374 | 01000000 | 0100001E | 00000000 | LU62 SERVICES INTERFACE 1     |               |
| DFSRRGFS0 (RRS)                                                              | A0A689E4 | 480001A6 | 0CB25998 | 0CB25700 | 00020000 | 00010000 | BB6777CA | 85F8B84C | ENTER COMMIT                  |               |
| CTXSCID (RRS)                                                                | A51C89E5 | 19000000 | 00020000 | 00000000 | 00000000 | BB6777C9 | D6DD9446 | CA85F91D | COMMIT_UR                     | NO LCRE FLAGS |
| ATRCMIT (RRS)                                                                | A50189E6 | 19000000 | 00020000 | 00080000 | 00000000 | 00000000 | 00000000 | CA85F434 | COMMIT_UR                     | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A78A4B | 480001A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777CA | AA554045 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA8A4C | 480001AA | 0002E4D9 | 7E71E374 | 7E71E374 | 01000000 | 0100001E | AA554045 | TKN TRACE (A0A7)              |               |
| CTXSWCH (RRS)                                                                | A518BA72 | 08000000 | 00000000 | 00002000 | 00000000 | BB6777C9 | D6DD9446 | CABA1624 | END_CONTEXT                   | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A68AD6 | 480005A6 | 0CB25998 | 0CB25700 | 00010000 | 00010003 | BB6777D2 | 3170EE6A | ENTER COMMIT                  |               |
| CTXEINT1 (RRS)                                                               | A5188AD7 | 15000000 | 00010000 | 00000000 | 00000000 | 00000000 | 00000000 | D231717F | CREATE_CONTEXT                | NO LCRE FLAGS |
| ATREINT5 (RRS)                                                               | A5048AD8 | 18000000 | 00010000 | 04000000 | 00000000 | BB6777D2 | 7E71E000 | D2317557 | EXPRESS_UR_INTRST             | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A78AD9 | 480005A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777D2 | 317D3C2A | EXIT COMMIT                   |               |
| 1 FUNCTION WORD 0 WORD 1 WORD 2 WORD 3 WORD 4 WORD 5 WORD 6 WORD 7 PAGE 0002 |          |          |          |          |          |          |          |          |                               |               |
| -DFSRRGFS0 (RRS)                                                             | A0AA8ADA | 480005AA | 0001E4D9 | 7E71E000 | 7E71E000 | 01000006 | 0100001E | 317D3C2A | TKN TRACE (A0A7)              |               |
| DFSRLM10 (RRS)                                                               | 7B008AE1 | 06000000 | 0CB25700 | 7E71E000 | 7E71E000 | 01000006 | 0100001E | 00000000 | RECEIVE LU MANAGER RECEIVER   |               |
| DFSASOW0 (RRS)                                                               | 7B008C59 | 47000000 | 0BB80060 | 40C1D6E2 | 0CB25998 | 00000000 | BB6777D2 | E44C1303 | APPC/OTMA SMQ AWE server      |               |
| DFSAPPC0 Exit                                                                | 7B028C5A | 02400000 | 00000000 | 00000000 | 00000000 | 00000000 | BB6777D2 | E44C6D43 | DFSAPPC MSG SWITCH PROCESSOR  |               |
| DFSSSLUM0 Exit                                                               | 7B028C5B | 01800000 | 00000005 | 00000000 | 00000000 | 00000000 | BB6777D2 | E4567063 | SYNCHRONOUS OUTPUT LU MANAGER |               |
| DFS6LUS0 (RRS)                                                               | 7B098CD8 | 0A000001 | 0CB25700 | 7E71E000 | 7E71E000 | 01000006 | 0100001E | 00000000 | LU62 SERVICES INTERFACE 1     |               |
| DFSRRGFS0 (RRS)                                                              | A0A68C96 | 480001A6 | 0CB25998 | 0CB25700 | 00030000 | 00010000 | BB6777D2 | E4A89B69 | ENTER COMMIT                  |               |
| CTXSCID (RRS)                                                                | A51C8C97 | 19000000 | 00030000 | 00000000 | 00000000 | BB6777D2 | 31746F2A | D2E4A90C | COMMIT_UR                     | NO LCRE FLAGS |
| ATRCMIT (RRS)                                                                | A5018C98 | 19000000 | 00030000 | 00080000 | 00000000 | 00000000 | 00000000 | D2E4BD92 | COMMIT_UR                     | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A78C99 | 480001A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777D2 | EF0C5785 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA8C9A | 480001AA | 0003E4D9 | 7E71E000 | 7E71E000 | 01000006 | 0100001E | EF0C5785 | TKN TRACE (A0A7)              |               |
| DFSRRGFS0 (RRS)                                                              | A0A68D66 | 480005A6 | 0CB25998 | 0CB25700 | 00010000 | 00010004 | BB6777D7 | 0AB06B68 | ENTER COMMIT                  |               |
| CTXEINT1 (RRS)                                                               | A518D6D7 | 15000000 | 00010000 | 00000000 | 00000000 | 00000000 | 00000000 | D70AB0E6 | CREATE_CONTEXT                | NO LCRE FLAGS |
| ATREINT5 (RRS)                                                               | A5048D68 | 18000000 | 00010000 | 04000000 | 00000000 | BB6777D7 | 7E71E000 | D70AB49F | EXPRESS_UR_INTRST             | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A78D69 | 480005A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777D7 | 0ABC5A28 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA8D6A | 480005AA | 0001E4D9 | 7E71E000 | 7E71E000 | 01000008 | 0100001E | 0ABC5A28 | TKN TRACE (A0A7)              |               |
| DFSRLM10 (RRS)                                                               | 7B008D71 | 06000000 | 0CB25700 | 7E71E000 | 7E71E000 | 01000008 | 0100001E | 00000000 | RECEIVE LU MANAGER RECEIVER   |               |
| DFSASOW0 (RRS)                                                               | 7B008EE9 | 47000000 | 0BB80060 | 40C1D6E2 | 0CB25998 | 00000000 | BB6777D7 | A738EA6F | APPC/OTMA SMQ AWE server      |               |
| DFSAPPC0 Exit                                                                | 7B028EEA | 02400000 | 00000000 | 00000000 | 00000000 | 00000000 | BB6777D7 | A739192F | DFSAPPC MSG SWITCH PROCESSOR  |               |
| DFSSSLUM0 Exit                                                               | 7B028EEB | 01800000 | 00000006 | 00000000 | 00000000 | 00000000 | BB6777D7 | A744892F | SYNCHRONOUS OUTPUT LU MANAGER |               |
| DFS6LUS0 (RRS)                                                               | 7B098FD1 | 0A000001 | 0CB25700 | 7E71E000 | 7E71E000 | 01000008 | 0100001E | 00000000 | LU62 SERVICES INTERFACE 1     |               |
| DFSRRGFS0 (RRS)                                                              | A0A68F26 | 480001A6 | 0CB25998 | 0CB25700 | 00020000 | 00010000 | BB6777D7 | A7D2356F | ENTER COMMIT                  |               |
| CTXSCID (RRS)                                                                | A51C8F27 | 19000000 | 00020000 | 00000000 | 00000000 | BB6777D7 | 0AB3A848 | D7A7D2B2 | COMMIT_UR                     | NO LCRE FLAGS |
| ATRCMIT (RRS)                                                                | A5018F28 | 19000000 | 00020000 | 00080000 | 00000000 | 00000000 | 00000000 | D7A7D4D7 | COMMIT_UR                     | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A78F29 | 480001A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777D7 | B160BD29 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA8F2A | 480001AA | 0002E4D9 | 7E71E000 | 7E71E000 | 01000008 | 0100001E | B160BD29 | TKN TRACE (A0A7)              |               |
| CTXDINT (RRS)                                                                | A5198FD5 | 0E000000 | 00000000 | 00000000 | 0C1833D8 | 19070000 | 00000000 | DD59F8EF | IDENTIFY_CONTEXT              | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A6901F | 480004A6 | 0CB25998 | 0CB25700 | 00010000 | 00010005 | BB6777D0 | 5B634549 | ENTER COMMIT                  |               |
| ATREINT5 (RRS)                                                               | A5049020 | 18000000 | 00010000 | 04000000 | 00000000 | BB6777D0 | 7E71E374 | DD5B63AD | EXPRESS_UR_INTRST             | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A79021 | 480004A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777D0 | 5B699BA9 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA9022 | 480004AA | 0001E4D9 | 7E71E374 | 7E71E374 | 01000002 | 0100001E | 5B699BA9 | TKN TRACE (A0A7)              |               |
| DFSRLM10 (RRS)                                                               | 7B009029 | 06000000 | 0CB25700 | 7E71E374 | 7E71E374 | 01000002 | 0100001E | 00000000 | RECEIVE LU MANAGER RECEIVER   |               |
| DFSASOW0 (RRS)                                                               | 7B0091A1 | 47000000 | 0BB80060 | 40C1D6E2 | 0CB25998 | 00000000 | BB6777D0 | E519D12A | APPC/OTMA SMQ AWE server      |               |
| DFSAPPC0 Exit                                                                | 7B0291A2 | 02400000 | 00000000 | 00000000 | 00000000 | 00000000 | BB6777D0 | E519FD2A | DFSAPPC MSG SWITCH PROCESSOR  |               |
| DFSSSLUM0 Exit                                                               | 7B0291A3 | 01800000 | 00000007 | 00000000 | 00000000 | 00000000 | BB6777D0 | E5241B2A | SYNCHRONOUS OUTPUT LU MANAGER |               |
| DFS6LUS0 (RRS)                                                               | 7B0991E8 | 0A000001 | 0CB25700 | 7E71E374 | 7E71E374 | 01000002 | 0100001E | 00000000 | LU62 SERVICES INTERFACE 1     |               |
| DFSRRGFS0 (RRS)                                                              | A0A691F1 | 480001A6 | 0CB25998 | 0CB25700 | 00050000 | 00010000 | BB6777D0 | E935F58C | ENTER COMMIT                  |               |
| CTXSCID (RRS)                                                                | A51C91F2 | 19000000 | 00050000 | 00000000 | 00000000 | BB6777D0 | 591A1C0A | DDE93669 | COMMIT_UR                     | NO LCRE FLAGS |
| ATRCMIT (RRS)                                                                | A50191F3 | 19000000 | 00050000 | 00080000 | 00000000 | 00000000 | 00000000 | DDE93885 | COMMIT_UR                     | NO LCRE FLAGS |
| DFSRRGFS0 (RRS)                                                              | A0A79272 | 480001A7 | 0CB25998 | 0CB25700 | 00000001 | 00000000 | BB6777D0 | FC906981 | EXIT COMMIT                   |               |
| DFSRRGFS0 (RRS)                                                              | A0AA9273 | 480001AA | 0005E4D9 | 7E71E374 | 7E71E374 | 01000002 | 0100001E | FC906981 | TKN TRACE (A0A7)              |               |

```

CTXSWCH (RRS) A51B9299 08000000 00000000 00002000 00000000 BB6777DD 591A1C0A DE02A604 END_CONTEXT |NO LCRE FLAGS
DFS707I END OF FILE ON INPUT
DFS708I OPTION COMPLETE
DFS703I END OF JOB

```

## RRST entries for OTMA modules

The formats of OTMA trace entries for z/OS Resource Recovery Services related events are shown in the following diagrams.

### *TRACE ID = X'5A00'*

```

TRACE ID = X'5A00'
 Word 1 - byte 0 - 2A, module number for DFSYLUS0
 - byte 1 - 01, OTMA GU was invoked
 - byte 2 - DLAFLAG1
 - byte 3 - DLAFLAG4
 Word 2 - Back-end YTIB CLB address
 Words 3-6 - RRS parent UR token
 Word 7 - Time stamp (short)

```

### *TRACE ID = X'5A00'*

```

TRACE ID = X'5A00'
 Word 1 - byte 0 - 2A, module number for DFSYLUS0
 - byte 1 - 02, Fastpaht GU was invoked
 - byte 2 - DLAFLAG1
 - byte 3 - DLAFLAG4
 Word 2 - Front-end IMS YTIB CNT address
 Words 3-6 - RRS parent UR token
 Word 7 - Time stamp (short)

```

### *TRACE ID = X'5A00'*

```

TRACE ID = X'5A00'
 Word 1 - byte 0 - 2A, module number for DFSYLUS0
 - byte 1 - 03, Back-end IMS issued a DFS2224 message
 - byte 2 - DLAFLAG1
 - byte 3 - DLAFLAG4
 Word 2 - Front-end IMS YTIB CLB address (CNT address for
 fastpath transaction)
 Words 3-6 - RRS parent UR token
 Word 7 - Time stamp (short)

```

### *TRACE ID = X'5A00'*

```

TRACE ID = X'5A00'
 Word 1 - byte 0 - 2D, module number for DFSYSLM0
 - byte 1 - 01, back-end XCF send succeed
 - byte 2 - AOS_FLAGS
 - byte 3 - 0
 Word 2 - Back-end YTIB address
 Words 3-6 - RRS parent UR token
 Word 7 - Time stamp (short)

```

### *TRACE ID = X'5A00'*

```

TRACE ID = X'5A00'
 Word 1 - byte 0 - 2D, module number for DFSYSLM0
 - byte 1 - 02, back-end XCF send failed
 - byte 2 - AOS_FLAGS
 - byte 3 - 0
 Word 2 - Back-end YTIB address
 Words 3-6 - RRS parent UR token
 Word 7 - Time stamp (short)

```

### *TRACE ID = X'5A00'*

TRACE ID = X'5A00'

- Word 1
  - byte 0 - 25, module number for DFSYPSI0
  - byte 1 - 01, OTMA Protected Trans was submitted
  - byte 2 - 0
  - byte 3 - 0
- Word 2
  - Front-end YTIB CLB address
- Words 3-6
  - Context token
- Word 7
  - Time stamp (short)

**TRACE ID = X'5A00'**

TRACE ID = X'5A00'

- Word 1
  - byte 0 - 28, module number for DFSYTIB0
  - byte 1 - 01, OTMA input message is about to enqueue
  - byte 2 - 0
  - byte 3 - YTIB\_MSG\_TYPE
- Word 2
  - Front-end YTIB CLB address
- Words 3-6
  - RRS parent UR token
- Word 7
  - Time stamp (short)

**TRACE ID = X'5A00'**

TRACE ID = X'5A00'

- Word 1
  - byte 0 - 28, module number for DFSYTIB0
  - byte 1 - 02, response from back-end is received
  - byte 2 - YTIB\_MSG\_STATUS\_3
  - byte 3 - YTIB\_MSG\_TYPE
- Word 2
  - Front-end YTIB CLB address
- Words 3-6
  - RRS parent UR token
- Word 7
  - Time stamp (short)

## **z/OS Resource Recovery Services entries logged by OTMA modules**

RRS entries logged by OTMA modules are depicted.

**TRACE ID = X'5A00'**

TRACE ID = X'5A00'

- Word 1
  - byte 0 - 2A, module number for DFSYLUS0
  - byte 1 - 06, XCF\_good\_Send or - 05, XCF\_bad\_Send
- Word 2
  - A(ECB)
- Words 3-6
  - LUP\_UR\_TOKEN (AWRRURTK)
- Word 7
  - Time stamp (short)

## **Trace entries logged by z/OS Resource Recovery Services related modules**

Trace entry records for DFSRGSF0 and TOKEN Tracing are depicted.

### **TRACE ID = X'A0A6' DFSRGSF0 Entry record**

TRACE ID = X'A0A6' DFSRGSF0 Entry record

- Word 1
  - byte 0 - 72, module number for DFSRGFS0
  - bytes 1-2 - Function, SEE AWRRFUNC
  - byte 3 - A6 Module entry
- Word 2
  - A(TIB)
- Word 3
  - A(ECB) - from AWRRECB
- Word 4
  - bytes 0-2 - PST number
- Word 5
  - Number of queued AWEs
- Word 7
  - Time stamp (STCK)

### **TRACE ID = X'A0A7' DFSRGSF0 Exit record**

TRACE ID = X'A0A7' DFSRGSF0 Exit record

- Word 1
  - byte 0 - 72, module number for DFSRGFS0
  - bytes 1-2 - Function, SEE AWRRFUNC
  - byte 3 - A7 Module exit
- Word 2
  - A(TIB)

```

Word 3 - A(ECB) - from AWRRECB
Word 4 - bytes 0-1 - Highest number of AWEs
 - bytes 2-3 - Number greater of AWEs than TCBs
Word 5 - Trace return code (AWRRETCOD)
Word 7 - Time stamp (STCK)
TRACE ID = X'A0A8' DFSRGSF0 Error Occurred
TRACE ID = X'A0A9' DFSRGSF0 ABEND Occurred

```

### TRACE ID = X'A0AA' TOKEN Tracing record

```

TRACE ID = X'A0AA' TOKEN Tracing record
Word 1 - byte 0 - 72, module number for DFSRGSF0
 - bytes 1-2 - Function, SEE AWRRFUNC
 - byte 3 - AA - Token trace record
Word 2 - bytes 0-1 - PST Number
 - bytes 2-3 - Token id (CX=Context,IN=Interest,
 UR=Unit of recovery)
Words 4-7 - TOKEN

```

## Scheduler trace

When you use the /TRACE SET ON TABLE SCHD command, IMS enables the scheduler trace. When you specify OPTION LOG, IMS sends these entries to the log as type X'67FA' records.

### Scheduler trace record formats

The following code samples show the formats of the scheduler trace records for function codes X'41' through X'48'.

#### Scheduler trace record format for function code X'41'

```

TRACE ID = X'41'
word 0 - byte 1 - X'41' Scheduling starts, traced by DFSSBMP0
 byte 2 - PST number
 bytes 3-4 - Trace sequence number
word 1 - SCHD must be addressable by caller
word 2 - Reserved
word 3 - SAPCNTRL
words 4-5 - Reserved
word 6 - Module identifier
word 7 - Store clock value

```

#### Scheduler trace record format for function code X'42'

```

| TRACE ID = X'42'
| word 0 - byte 1 - X'42' Block mover, traced by DFSSBMP0,
| DFSSBMP0, DFSSMSC0
| byte 2 - PST number
| bytes 3-4 - Trace sequence number
| word 1 - byte 1 - PDIRCODE
| byte 2 - PDIROPTC
| byte 3 - PSTSCHDF
| byte 4 - PSTCODE1
| word 2 - PSTPSB
| word 3 - PSTSMB
| words 4-5 - Reserved
| word 6 - Module identifier
| word 7 - Store clock value
|

```

#### Scheduler trace record format for function code X'43'

```

TRACE ID = X'43'
word 0 - byte 1 - X'43' Scheduling ends
 byte 2 - PST number
 bytes 3-4 - Trace sequence number

```



word 1 – PSTABTRM  
word 2 – PSTPSB  
word 3 – SAPCNTRL  
words 4-5 – Reserved  
word 6 – Module identifier  
word 7 – Store clock value

### **Scheduler trace record format for function code X'44'**

TRACE ID = X'44'  
word 0 – byte 1 - X'44' IRC started  
          byte 2 - PST number  
          bytes 3-4 - Trace sequence number  
word 1 – SSIMCOMP  
word 2 – Reserved  
word 3 – SAPCNTRL  
words 4-5 – Reserved  
word 6 – Module identifier  
word 7 – Store clock value

### **Scheduler trace record format for function code X'45'**

TRACE ID = X'45'  
word 0 – byte 1 - X'45' TMS00 started  
          byte 2 - PST number  
          bytes 3-4 - Trace sequence number  
word 1 – A(PST)  
word 2 – Sync point function code (COMMIT/P1/P2/BACKOUT)  
word 3 – Caller of TMS00  
word 4 – TPI (first four bytes)  
word 5 – TPI (last four bytes)  
word 6 – Module identifier  
word 7 – Store clock value

### **Scheduler trace record format for function code X'46'**

TRACE ID = X'46'  
word 0 – byte 1 - X'46' TMS00 finished  
          byte 2 - PST number  
          bytes 3-4 - Trace sequence number  
word 1 – A(PST)  
word 2 – Sync point function code (COMMIT/P1/P2/BACKOUT)  
word 3 – Return code  
word 4 – TPI (first four bytes)  
word 5 – TPI (last four bytes)  
word 6 – Module identifier  
word 7 – Store clock value

### **Scheduler trace record format for function code X'47'**

TRACE ID = X'47'  
word 0 – byte 1 - X'47' APPC extract call made  
          byte 2 - PST number  
          bytes 3-4 - Trace sequence number  
word 1 – Function code (FPRETRY/PUSER)  
word 2 – Abend code (PSTABTRM)  
word 3 – Return code from DFSTMR00  
word 4 – Return code from APPC extract call  
word 5 – Reserved  
word 6 – Module identifier  
word 7 – Store clock value

### **Scheduler trace record format for function code X'48'**

TRACE ID = X'48'  
word 0 – byte 1 - X'48' Scheduling failed  
          byte 2 - PST number  
          bytes 3-4 - Trace sequence number

word 1 – byte 1 - PDIRCODE  
 byte 2 - PDIROPTC  
 byte 3 - PSTSCHDF  
 byte 4 - PSTCODE1  
 word 2 – PSTPSB  
 word 3 – PSTSMB  
 words 4-5 - Reserved  
 word 6 – Module identifier  
 word 7 – Store clock value

### Example of a scheduler trace

```

***TRACE PRINTED FROM OLDEST TO MOST CURRENT ENTRY**

 FUNCTION WORD 0 WORD 1 WORD 2 WORD 3
 WORD 4 WORD 5 WORD 6 WORD 7
BLOCK MOVER 4207E98A 44060000 16F90598 00800041
 00000000 00000000 00000000 F89569D5
SCHED END 4307E994 00000000 16F90598 00800001
 00000000 00000000 00000000 F8956BD3
SCHED START 4156F4D0 E2C3C8C4 16920060 00800001
 00000000 00000000 00000000 F89973E5
BLOCK MOVER 4256F4DE 44060000 170305E8 00800041
 00000000 00000000 00000000 F89979DA
SCHED END 4356F4E8 00000000 170305E8 00800001
 00000000 00000000 00000000 F8997B43
IRC START 44560737 00000000 00000000 00800001
 00000000 00000000 16CAF7A0 F8A95716
IRC START 4407077F 00000000 00000000 00800001
 00000000 00000000 16CAF7A0 F8A9CA44
SCHED START 4107078C E2C3C8C4 15AB5060 00800001
 00000000 00000000 00000000 F8A9D45F
BLOCK MOVER 4207079A 44060000 16F90598 00800041
 00000000 00000000 00000000 F8A9DF19
SCHED END 430707A4 00000000 16F90598 00800001
 00000000 00000000 00000000 F8A9E0C4
SCHED START 417007B5 E2C3C8C4 15A48060 00800001
 00000000 00000000 00000000 F8AA4B87
BLOCK MOVER 42700804 44060000 16F91740 00800041
 00000000 00000000 00000000 F8AB0631
SCHED END 4370080E 00000000 16F91740 00800001
 00000000 00000000 00000000 F8AB07C2
IRC START 447008CE 00000000 00000000 00800001
 00000000 00000000 16CAF7A0 F8ABC593
SCHED START 417008DB E2C3C8C4 15A48060 00800001
 00000000 00000000 00000000 F8ABDCD0
BLOCK MOVER 427008E9 44060000 16F91740 00800041
 00000000 00000000 00000000 F8ABD209
SCHED END 437008F3 00000000 16F91740 00800001
```

#### Related reference:

“IMS trace function codes” on page 578

### Storage manager trace

The storage manager trace writes a record each time it is called to allocate a pool, get a buffer, or release a buffer. The storage manager traces requests from the following pools: AOIP, CESS, CIOP, CMDP, DYNP, EMHB, FWP, HIOP, LUMC, LUMP, and SPAP.

You can enable the storage manager trace during IMS initialization with the STRG= option in the DFSVSMxx PROCLIB member, or online using the /TRACE command. The /TRACE SET ON TABLE STRG command activates the trace and



sends the output to an internal trace table. When you specify OPTION LOG on the /TRACE command, IMS sends the output to the system log or external trace data set.

You can format the internal trace table using the Offline Dump Formatter under IPCS with either the VERBX command or the IMS Dump Formatter panels. To format the trace records, any storage manager control blocks, and pool storage, you can specify ALL as the POOL ID, as shown in the following example.

FMTIMS ...(POOL,NAME,ALL),...or you can specify FMTIMS (TRACE, NAME, SM).

To locate the storage manager trace in a formatted dump, look for eye catcher \*\*SMTR.

To locate the trace tables in an unformatted dump, look for the trace identifier SM in the trace table header record.

The following tables show the format of each storage manager trace record.

Table 243. TRACE ID = X'5F03' (get trace record)

| WORD 0              | WORD 1    | WORD 2             | WORD 3                                       | WORD 4 | WORD 5                  | WORD 6      | WORD 7 |
|---------------------|-----------|--------------------|----------------------------------------------|--------|-------------------------|-------------|--------|
| Control Information | Pool Name | Variable Pool Size | Variable Pool Address Fixed Pool Upper Limit | 0      | Caller's Return Address | Return Code | 0      |

Table 244. TRACE ID = X'5F04' (get trace record)

| WORD 0              | WORD 1    | WORD 2              | WORD 3         | WORD 4                  | WORD 5                  | WORD 6      | WORD 7            |
|---------------------|-----------|---------------------|----------------|-------------------------|-------------------------|-------------|-------------------|
| Control Information | Pool Name | Buffer Request Size | Buffer Address | Address of Caller's ECB | Caller's Return Address | Return Code | Current Pool Size |

Table 245. TRACE ID = X'5F05' (release trace record)

| WORD 0              | WORD 1    | WORD 2 | WORD 3         | WORD 4                  | WORD 5                  | WORD 6      | WORD 7            |
|---------------------|-----------|--------|----------------|-------------------------|-------------------------|-------------|-------------------|
| Control Information | Pool Name | 0      | Buffer Address | Address of Caller's ECB | Caller's Return Address | Return Code | Current Pool Size |

#### Related concepts:

"Formatting IMS dumps offline" on page 509

#### Related reference:

"IMS trace function codes" on page 578

## Latch trace

When you use the /TRACE SET ON TABLE LATC command, IMS traces events related to its internal serialization services (latch manager, use manager, and system locate control function) to an internal table.

The following table shows the general format of a latch trace entry.

Table 246. Format of a latch trace entry.

| WORD 0             | WORD 1        | WORD 2 | WORD 3 | WORD 4 | WORD 5 | WORD 6 | WORD 7 |
|--------------------|---------------|--------|--------|--------|--------|--------|--------|
| I \| S \| SEQ<br>NUM | ENTRY<br>TYPE |        |        |        |        |        |        |

where:

- I** One-byte trace ID field. This byte indicates the type of the trace entry. It is always X'70' for latch trace entries.
- S** One-byte trace subtype field. This field is used for latch manager trace entries to denote the latch function being traced. It is not currently used for Use Manager trace entries.

**SEQ NUM**

Two-byte trace sequence number assigned by the IMS trace component.

**ENTRY TYPE**

For Use Manager trace entries only: 4-byte printable character string, indicating the type of entry.

Words 2 through 6 contain data specific to each trace entry.

**Related reference:**

"IMS trace function codes" on page 578

**Latch manager trace entries**

The sub functions GET, GETU, REL, and RCOV are listed.

***Sub Function: X'01' Get latch (GET)***

Sub Function: X'01' Get latch (GET)

Description: Get a latch

```
word 1 -- Caller's SAP address
word 2 -- Latch name
word 3 -- Caller's return address
word 4 -- Resource header address
word 5 -- 1st halfword = latch level;
 2nd halfword = flags from latch manager parmlist
word 6/7 -- 8-byte STCK value
```

***Sub Function: X'02' - Upgrade latch (GETU)***

Sub Function: X'02' - Upgrade latch (GETU)

Description: Upgrade a latch from shared to exclusive

```
word 1 -- Caller's SAP address
word 2 -- Latch name
word 3 -- Caller's return address
word 4 -- Resource header address
word 5 -- 1st halfword = latch level;
 2nd halfword = flags from latch manager parmlist
word 6/7 -- 8-byte STCK value
```

***Sub Function: X'03' - Release latch (REL)***

Sub Function: X'03' - Release latch (REL)

Description: Release a latch

```
word 1 -- Caller's SAP address
word 2 -- Latch name
word 3 -- Caller's return address
word 4 -- Resource header address
word 5 -- 1st halfword = latch level;
 2nd halfword = flags from latch manager parmlist
word 6/7 -- 8-byte STCK value
```

***Sub Function: X'04' - Recover latch (RCOV)***

Sub Function: X'04' - Recover latch (RCOV)  
 Description: Recover a latch

|      |     |                                                                                    |
|------|-----|------------------------------------------------------------------------------------|
| word | 1   | -- SAP, TCB, or ASCB address                                                       |
| word | 2   | -- Latch name                                                                      |
| word | 3   | -- Caller's return address                                                         |
| word | 4   | -- 0                                                                               |
| word | 5   | -- 1st halfword = latch level;<br>2nd halfword = flags from latch manager parmlist |
| word | 6/7 | -- 8-byte STCK value                                                               |

## Use manager trace entries

Eleven entry types are listed and described.

### Entry Type: USE

Entry Type: USE  
 Description: Inuse request trace entry

|      |   |                            |
|------|---|----------------------------|
| word | 1 | -- 'USE'                   |
| word | 2 | -- Block type              |
| word | 3 | -- Call ID                 |
| word | 4 | -- Work ID                 |
| word | 5 | -- Block address           |
| word | 6 | -- SAP address             |
| word | 7 | -- Caller's return address |

### Entry Type: LOK

Entry Type: LOK  
 Description: Lock request trace entry

|      |   |                            |
|------|---|----------------------------|
| word | 1 | -- 'LOK'                   |
| word | 2 | -- Block type              |
| word | 3 | -- Call ID                 |
| word | 4 | -- Work ID                 |
| word | 5 | -- Block address           |
| word | 6 | -- SAP address             |
| word | 7 | -- Caller's return address |

### Entry Type: CON

Entry Type: CON  
 Description: Connect request trace entry

|      |   |                            |
|------|---|----------------------------|
| word | 1 | -- 'CON'                   |
| word | 2 | -- Block type              |
| word | 3 | -- Call ID                 |
| word | 4 | -- Work ID                 |
| word | 5 | -- Block address           |
| word | 6 | -- SAP address             |
| word | 7 | -- Caller's return address |

### Entry Type: MRG

Entry Type: MRG  
 Description: Merge request trace entry

|      |   |                            |
|------|---|----------------------------|
| word | 1 | -- 'MRG'                   |
| word | 2 | -- Block type              |
| word | 3 | -- Call ID                 |
| word | 4 | -- Work ID                 |
| word | 5 | -- Block address           |
| word | 6 | -- SAP address             |
| word | 7 | -- Caller's return address |

### Entry Type: INQ

Entry Type: INQ

Description: Inquiry request trace entry

```
word 1 -- 'INQ'
word 2 -- Block type
word 3 -- Call ID
word 4 -- Work ID
word 5 -- Block address
word 6 -- SAP address
word 7 -- Caller's return address
```

### Entry Type: NUSE

Entry Type: NUSE

Description: Nouse request trace entry

```
word 1 -- 'NUSE'
word 2 -- Block type
word 3 -- Call ID
word 4 -- Work ID
word 5 -- Block address
word 6 -- SAP address
word 7 -- Caller's return address
```

### Entry Type: NLOK

Entry Type: NLOK

Description: Unlock request trace entry

```
word 1 -- 'NLOK'
word 2 -- Block type
word 3 -- Call ID
word 4 -- Work ID
word 5 -- Block address
word 6 -- SAP address
word 7 -- Caller's return address
```

### Entry Type: NCON

Entry Type: NCON

Description: Disconnect request trace entry

```
word 1 -- 'NCON'
word 2 -- Block type
word 3 -- Call ID
word 4 -- Work ID
word 5 -- Block address
word 6 -- SAP address
word 7 -- Caller's return address
```

### Entry Type: RCOV (SAP level)

Entry Type: RCOV (SAP level)

Description: Use recovery performed at the SAP (ITASK) level trace entry

```
word 1 -- 'RCOV'
word 2 -- 'SAP'
word 3 -- Block Type
word 4 -- SAP address
word 5 -- Ø
word 6 -- Ø
word 7 -- Caller's return address
```

## Entry Type: RCOV (TCB level)

Entry Type: RCOV (TCB level)

Description: Use recovery performed at the TCB level trace entry

```
word 1 -- 'RCOV'
word 2 -- 'TCB'
word 3 -- Block Type
word 4 -- 0
word 5 -- TCB address
word 6 -- 0
word 7 -- Caller's return address
```

## Entry Type: RCOV (address space level)

Entry Type: RCOV (address space level)

Description: Use recovery performed at the address space level trace entry

```
word 1 -- 'RCOV'
word 2 -- 'MEM'
word 3 -- Block Type
word 4 -- 0
word 5 -- ASCB address
word 6 -- 0
word 7 -- Caller's return address
```

## System locate control function entries

Entry types for SLCO, SLC1, and a latch trace example are depicted.

### Entry Type: SLCO

Entry Type: SLCO

Description: Locate a block and issue a use manager inuse call against it

```
word 1 -- 'SLCO'
word 2 -- Block Type
word 3 -- Work ID
word 4 -- Call ID
word 5 -- ''
word 6 -- SAP address
word 7 -- Caller's return address
```

### Entry Type: SLC1

Entry Type: SLC1

Description: Locate a block and issue a use manager nouse call against it

```
word 1 -- 'SLC1'
word 2 -- Block Type
word 3 -- Work ID
word 4 -- Call ID
word 5 -- ''
word 6 -- SAP address
word 7 -- Caller's return address
```

## Latch trace example

```
**LTR LATCH TRACE
```

```

```

```
***TRACE PRINTED FROM OLDEST TO MOST CURRENT ENTRY**
```

```

```

| FUNCTION     | WORD 0   | WORD 1 | WORD 2 | WORD 3 | WORD 4   | WORD 5   | WORD 6   | WORD 7   |
|--------------|----------|--------|--------|--------|----------|----------|----------|----------|
| COMMON LATCH | 70006A98 | GET    | QMGR   | SHR    | 00005F28 | 00290000 | 065975F0 | 8004BABA |
| COMMON LATCH | 70006A99 | REL    | QMGR   | ANY    | 00005F28 | 00290000 | 065975F0 | 800EAA62 |
| COMMON LATCH | 70006A9A | GET    | QMGR   | SHR    | 00005F28 | 00290000 | 065975F0 | 8004BABA |
| COMMON LATCH | 70006A9B | REL    | QMGR   | ANY    | 00005F28 | 00290000 | 065975F0 | 800EAA62 |
| COMMON LATCH | 70006A9C | GET    | DCSL   | SHR    | 05B581B0 | 00030000 | 065975F0 | 8004F2C4 |
| COMMON LATCH | 70006A9E | GET    | LOGL   | EXCL   | 05B58F70 | 002F0000 | 065975F0 | 85B0EED4 |
| COMMON LATCH | 70006A9F | REL    | LOGL   | EXCL   | 05B58F70 | 002F0000 | 065975F0 | 85B0E53C |
| COMMON LATCH | 70006AA1 | GET    | QMGR   | SHR    | 00005F28 | 00290000 | 065975F0 | 8004BABA |
| COMMON LATCH | 70006AA2 | REL    | QMGR   | ANY    | 00005F28 | 00290000 | 065975F0 | 800EAA62 |
| COMMON LATCH | 70006AA3 | REL    | DCSL   | SHR    | 05B581B0 | 00030000 | 065975F0 | 80046012 |

|              |          |      |      |      |          |          |          |          |
|--------------|----------|------|------|------|----------|----------|----------|----------|
| COMMON LATCH | 70006AA4 | NUSE | ALLW | .... | 05F66060 | 00000000 | 065975F0 | 06D2CCC2 |
| COMMON LATCH | 70006AA6 | GET  | LOGL | EXCL | 05B58F70 | 002F0000 | 065975F0 | 85B0EED4 |
| COMMON LATCH | 70006AA7 | REL  | LOGL | EXCL | 05B58F70 | 002F0000 | 065975F0 | 85B0E53C |
| COMMON LATCH | 70006AAD | GET  | LOGL | EXCL | 05B58F70 | 002F0000 | 065975F0 | 85B0EED4 |
| COMMON LATCH | 70006AB2 | REL  | LOGL | EXCL | 05B58F70 | 002F0000 | 065975F0 | 85B0E53C |
| COMMON LATCH | 70006AB4 | GET  | TCTB | EXCL | 05B71858 | 00130000 | 065975F0 | 85B5CB3A |
| COMMON LATCH | 70006AB5 | REL  | TCTB | EXCL | 05B71858 | 00130000 | 065975F0 | 85B5CD78 |
| COMMON LATCH | 70006AB6 | GET  | SMGT | EXCL | 05C47288 | 002B0000 | 065975F0 | 85B0BAEA |
| COMMON LATCH | 70006AB7 | REL  | SMGT | EXCL | 05C47288 | 002B0000 | 065975F0 | 85B0BBB6 |
| COMMON LATCH | 70006AB8 | GET  | PDRB | EXCL | 05BA9E90 | 00150000 | 065975F0 | 85B5AB26 |
| COMMON LATCH | 70006AB9 | GET  | PSBP | SHR  | 05B587A0 | 00160000 | 065975F0 | 85B5ABE6 |
| COMMON LATCH | 70006ABA | REL  | PDRB | EXCL | 05BA9E90 | 00150000 | 065975F0 | 85B5AED4 |
| COMMON LATCH | 70006ABB | REL  | PSBP | ANY  | 05B587A0 | 00160000 | 065975F0 | 85B5AF90 |
| COMMON LATCH | 70006ABC | GET  | SUBQ | SHR  | 05B71418 | 00200000 | 065975F0 | 85B4291E |
| COMMON LATCH | 70006ABD | REL  | SUBQ | SHR  | 05B71418 | 00200000 | 065975F0 | 85B42A60 |
| COMMON LATCH | 70006ABE | GET  | SUBQ | SHR  | 05B71430 | 00200000 | 065975F0 | 85B4291E |
| COMMON LATCH | 70006ABF | REL  | SUBQ | SHR  | 05B71430 | 00200000 | 065975F0 | 85B42A60 |
| COMMON LATCH | 70006AC7 | GET  | QMGR | SHR  | 00005F28 | 00290000 | 06597790 | 8004BABE |
| COMMON LATCH | 70006AC8 | REL  | QMGR | ANY  | 00005F28 | 00290000 | 06597790 | 800EAA62 |
| COMMON LATCH | 70006ACA | SLC0 | LNQB | .. - | C4D3C1F3 | 40404040 | 06597790 | 05B7BD2A |
| COMMON LATCH | 70006ACB | GET  | VLQB | SHR  | 00BD2230 | 00260000 | 06597790 | 800511A4 |
| COMMON LATCH | 70016ACC | USE  | CNT  | DLA3 | 05FB4060 | 07926568 | 06597790 | 05B312AE |
| COMMON LATCH | 70006ACD | REL  | VLQB | ANY  | 00BD2230 | 00260000 | 06597790 | 800511A4 |
| COMMON LATCH | 70006ACE | REL  | SCHD | ANY  | 05B58660 | 00120000 | 06597790 | 85B60CB4 |

## Queue manager trace

The queue manager trace provides information about relevant queue manager functional and exceptional events. Use the trace under the direction of IBM support personnel when problems are suspected in the queue manager area.

### Turning on the queue manager trace

You can turn on the queue manager trace in two ways:

- During IMS online initialization with the QMGR parameter in the DFSVSMxx IMS.PROCLIB member.
- During online operation, with the /TRACE command.

You can specify trace output destination and tracing volume on both the QMGR parameter and the /TRACE command.

If you send output to the common trace table, you can format the table using the Offline Dump Formatter under IPCS, using either the VERBX command or the IMS Dump Formatter panels. If you send the output to an external data set, you can use the File Select and Formatting Print utility (DFSERA10) with exit routine DFSERA60 to format the trace entries.

To locate the queue manager trace in a formatted dump, look for eye catcher \*\*QMGR. To locate the trace table in an unformatted dump, look for the trace identifier QM in the trace table header record.

#### Related reference:

"IMS trace function codes" on page 578

### Format of trace records

The following diagrams show the format of the trace records. Each trace record has a trace function code of X'4E' and is X'20' bytes long.

#### Subfunction codes

SC      FUNCTION

|       |                            |
|-------|----------------------------|
| X'00' | GET PREFIX                 |
| X'01' | CANCEL INPUT               |
| X'02' | GET UNIQUE                 |
| X'03' | GET NEXT                   |
| X'04' | DEQUEUE                    |
| X'05' | SAVE                       |
| X'06' | REJECT                     |
| X'07' | DELETE                     |
| X'08' | CANCEL OUTPUT (LOG)        |
| X'09' | CANCEL OUTPUT (NOLOG)      |
| X'0C' | ENQUEUE (FIFO)             |
| X'0D' | ENQUEUE (LIFO)             |
| X'0E' | REENQUEUE (FIFO)           |
| X'0F' | REENQUEUE (LIFO)           |
| X'10' | REPOSITION                 |
| X'11' | AOI COMMAND INPUT          |
| X'12' | AOI MESSAGE TO MASTER      |
| X'13' | AOI CANCEL UEHB            |
| X'14' | AOI TERMINATION            |
| X'17' | UNUSED OP CODE             |
| X'18' | UNUSED OP CODE             |
| X'19' | UNUSED OP CODE             |
| X'1A' | INSERT PREFIX              |
| X'1C' | CONDITIONAL ENQUEUE (FIFO) |
| X'1D' | CONDITIONAL ENQUEUE (LIFO) |
| X'1E' | TRANSFER                   |
| X'1F' | NOTE/POINT                 |

### Low level trace record format

**FUNCTION:** See above listing

Subfunction Code: See above listing

|      |   |                               |
|------|---|-------------------------------|
| word | 0 | -- Control information        |
| word | 1 | -- A(ECB)                     |
| word | 2 | -- A(QTPPCB)                  |
| word | 3 | -- byte 1 - Current call type |
|      |   | byte 2 - Prior call type      |
|      |   | byte 3 - (unused)             |
|      |   | byte 4 - (unused)             |
| word | 4 | -- Caller's ID (WORD 1)       |
| word | 5 | -- Caller's ID (WORD 2)       |
| word | 6 | -- Unused (zero)              |
| word | 7 | -- Time stamp                 |

### Medium level trace record format - X'21'

"Medium level trace record format - X'21'" depicts the trace (medium level) record format of the following function with subfunction code X'21':

**FUNCTION: EXIT FROM QUEUE MANAGER**

Subfunction Code: X'21'

```
word 0 -- Control information
word 1 -- PCB Contents (WORD 1)
word 2 -- A(QTPPCB)
word 3 -- Return code
word 4 -- PCB contents (WORD 4)
word 5 -- PCB contents (WORD 5)
word 6 -- PCB contents (WORD 6)
word 7 -- Time stamp
```

### Medium level trace record format - X'20"

"Medium level trace record format - X'20'" depicts the trace (medium level) record format of the following function with subfunction code X'20':

**FUNCTION: ENTRY TO QUEUE MANAGER**

Subfunction Code: X'20'

```
word 0 -- Control information
word 1 -- PCB Contents (WORD 1)
word 2 -- A(QTPPCB)
word 3 -- PCB contents (WORD 3)
word 4 -- PCB contents (WORD 4)
word 5 -- PCB contents (WORD 5)
word 6 -- PCB contents (WORD 6)
word 7 -- Time stamp
```

### Medium level trace record format - X'22'

This figure depicts the trace (medium level) record format of the following function with subfunction code X'22':

**FUNCTION: Special- Not Applicable**

Subfunction Code: X'22'

```
word 0 -- Control information
word 1 -- Varies by use
word 2 -- Varies by use
word 3 -- Varies by use
word 4 -- Varies by use
word 5 -- Varies by use
word 6 -- Varies by use
word 7 -- Time stamp
```

### Low level trace record format - X'08', X'15', X'1B'

"Low level trace record format - X'08', X'15', X'1B'" depicts the trace (low level) record format of the following functions with these subfunction codes (SC):

**SC      FUNCTION**

**X'08'**

**X'15'    MESSAGE REROUTE**

**X'1B'    INSERT MOVE SPANNABLE**

**FUNCTION:** See above list

**Subfunction Code:** See above list



```

word 0 -- Control information
word 1 -- A(ECB)
word 2 -- A(QTPPCB)
word 3 -- byte 1 - Current call type
 byte 2 - Prior call type
 byte 3 - (unused)
 byte 4 - (unused)
word 4 -- Caller's ID (WORD 1)
word 5 -- Caller's ID (WORD 2)
word 6 -- byte 1 - Length of user segment
 byte 2 - Length of user segment
 byte 3 - (unused)
 byte 4 - (unused)
word 7 -- Time stamp

```

### Low level trace record format - X'0A'

"Low level trace record format - X'0A'" depicts the trace (low level) record format of the following function with subfunction code X'0A':

**FUNCTION:** INSERT LOCATE  
**Subfunction Code:** X'0A'

```

word 0 -- Control information
word 1 -- A(ECB)
word 2 -- A(QTPPCB)
word 3 -- byte 1 - Current call type
 byte 2 - Prior call type
 byte 3 - (unused)
 byte 4 - (unused)
word 4 -- Caller's ID (WORD 4)
word 5 -- Caller's ID (WORD 2)
word 6 -- Length of requested message area
word 7 -- Time stamp

```

### Low level trace record format - X'16'

"Low level trace record format - X'16'" depicts the trace (low level) record format of the following function with subfunction code X'16':

**FUNCTION:** RELEASE  
**Subfunction Code:** X'16'

```

word 0 -- Control information
word 1 -- A(ECB)
word 2 -- A(QTPPCB)
word 3 -- byte 1 - Current call type
 byte 2 - Prior call type
 byte 3 - (unused)
 byte 4 - (unused)
word 4 -- Caller's ID (WORD 1)
word 5 -- Caller's ID (WORD 2)
word 6 -- Contents of DECAREA
word 7 -- Time stamp

```

## Shared queues interface trace

The shared queues interface trace provides information about errors associated with the interface between IMS and CQS.

Examples of errors that are traced are:

- CQS Request errors
- CQS Inform errors
- Service errors

- Storage errors

Use this trace under the direction of IBM Software Support when problems are suspected in the interface between IMS and CQS.

You can turn on the shared queues interface trace in two ways:

- During IMS online initialization, with the SQTT parameter in the DFSVSMxx IMS.PROCLIB member.
- During online operation, with the /TRACE command.

Each trace entry is X'20' bytes long.

You can specify trace output destination and tracing volume on both the SQTT parameter and the /TRACE command.

The /TRACE SET ON TABLE SQTT command activates the trace and sends the output to an internal trace table that consists of 126 entries. If you specify OPTION LOG on the /TRACE command, IMS sends the output to the system log or an external trace data set in groups of 126. Other parameters control the volume of output.

You can format trace table entries with the Offline Dump Formatter under IPCS, using either the VERBX parameter or the IMS Dump Formatter panels. You can use the File Select and Formatting Print utility (DFSERA10) with exit routine DFSERA60 to format the trace entries written to an external data set.

To locate the shared queues interface trace in a dump, look for eye catcher \*\*SQTT.

To display the status of the trace, use the /DISPLAY TRACE command.

**Related reference:**

"IMS trace function codes" on page 578

## Fast Path trace

When you use the /TRACE SET ON TABLE FPTT command, IMS enables the Fast Path trace. The Fast Path trace resides in the internal IMS trace tables, with the OPTION LOG parameter causing the trace to also be written to the IMS logs.

If the OPTION LOG parameter is not specified (or the OPTION NOLOG parameter is specified), the trace resides only in the IMS internal trace tables and is formatted through the IMS Dump Formatter. If the OPTION LOG parameter is specified, the trace will also reside on the logs and can be formatted with DFSERA60 for log type X'67FA' or through the IMS Dump Formatter.

### Trace formats

Fast Path reserves X'9C' and X'9D' trace entries. X'9C' is reserved for tracing notifies and X'9D' is reserved for all other Fast Path traces.

### X'9C' trace format

The following table shows the format of the X'9C' trace entry. Following the table are the trace IDs and descriptions of content of trace entry.

Table 247. Format of the Fast Path X'9C' trace entry

| Word 0   | Word 1   | Word 2   | Word 3   | Word 4   | Word 5   | Word 6   | Word 7   |
|----------|----------|----------|----------|----------|----------|----------|----------|
| aabbcccc | dddddddd | dddddddd | dddddddd | dddddddd | dddddddd | dddddddd | dddddddd |

#### Trace ID

#### Description of Content of Trace Entry

|                 |                                                                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>aa</b>       | The FP Notify trace code, X'9C'                                                                                                       |
| <b>bb</b>       | The trace subcode, used so that each IMSFP trace entry has a unique code or subcode, avoiding duplication of the same trace function. |
| <b>X'01'</b>    | DBFNOTM0 Entry                                                                                                                        |
| <b>X'02'</b>    | NCB contents at entry to DBFNOTM0                                                                                                     |
| <b>X'03'</b>    | DBFNOTM0 NOTEXC (DFSML->IRLM)                                                                                                         |
| <b>X'04'</b>    | DBFNOTM0 IWAIT                                                                                                                        |
| <b>X'05'</b>    | DBFNOTM0 after IWAIT                                                                                                                  |
| <b>X'06'</b>    | DBFICLI0 Entry                                                                                                                        |
| <b>X'07'</b>    | NCB contents at entry to DBFICLI0                                                                                                     |
| <b>X'08'</b>    | DBFICLI0 Response decrement EPSTNCTR                                                                                                  |
| <b>X'09'</b>    | DBFICLI0 IPOST                                                                                                                        |
| <b>X'0A'</b>    | DBFCSTS2 EPST Timeout Candidate                                                                                                       |
| <b>X'0B'</b>    | DBFCSTS2 EPST Timeout IPOST                                                                                                           |
| <b>cccc</b>     | The Trace Sequence Number                                                                                                             |
| <b>dddddddd</b> | Data, specific for each trace entry.                                                                                                  |

#### X'9D' trace format

The following table shows the format of the X'9D' trace entry. Following the table are the trace IDs and descriptions of content of trace entry.

Table 248. Format of the Fast Path X'9D' trace entry

| Word 0   | Word 1   | Word 2   | Word 3   | Word 4   | Word 5   | Word 6   | Word 7   |
|----------|----------|----------|----------|----------|----------|----------|----------|
| aabbcccc | dddddddd | dddddddd | dddddddd | dddddddd | dddddddd | dddddddd | dddddddd |

#### Trace ID

#### Description of Content of Trace Entry

|              |                                  |
|--------------|----------------------------------|
| <b>aa</b>    | The FP General trace code, X'9D' |
| <b>bb</b>    | The FP latch trace subcodes      |
| <b>X'01'</b> | DBFELOCK DMAC                    |
| <b>X'02'</b> | DBFELOCK DMCB                    |
| <b>X'03'</b> | DBFELOCK DSM                     |
| <b>X'04'</b> | DBFELOCK FLD                     |
| <b>X'05'</b> | DBFELOCK FNCB                    |
| <b>X'06'</b> | DBFELOCK MSDB                    |

**X'07'** DBFELOCK TRAT  
**X'08'** DBFELOCK VSO  
**X'09'** DBFELOCK VSTR  
**X'0A'** DBFELOCK XCRB  
**X'10'** Resource Latch  
**X'11'** DBFSYNL Latch  
**X'12'** DBFBUFL Latch  
**X'13'** DBFEMHBL Latch  
**X'14'** DBFLATCH Latch  
**X'15'** DBFALOCK Latch  
**X'16'** DBFHLOCK Latch  
**X'17'** DBFPLOCK Latch  
**cccc** The Trace Sequence Number  
**dddddddd**  
Data, specific for each trace entry  
**Related reference:**  
"IMS trace function codes" on page 578

## Fast Path trace entries

Fast Path trace entries are listed, including Trace ID, Module name, and Trace point.

### Trace entries for Fast Path

The following table describes the Fast Path trace entries.

*Table 249. Fast Path trace entries*

| Trace ID | Module   | Trace point                          | Comments                     |
|----------|----------|--------------------------------------|------------------------------|
| ALOC     | DBFALOC0 | Entry                                | FP trace data set allocation |
| ALOX     | DBFALOC0 | Exit                                 | FP trace data set allocation |
| RTYE     | DBFALOC0 | EMHB Present                         | FP trace data set allocation |
| RTYS     | DBFALOC0 | No EMHB Present                      | FP trace data set allocation |
| ALOP     | DBFALOC0 | Trace data set already allocated     | FP trace data set allocation |
| BBIN     | DBFBBIN0 | Entry, Exit (Shift)                  | MSDB Binary Search           |
| OFSE     | DBFBBIN0 | Binary Search                        | MSDB Binary Search           |
| BIN1     | DBFBBIN0 | Binary Search<br>Entry, Exit (Shift) | MSDB Binary Search           |
| BCHG     | DBFBCHG0 | Entry                                | MSDB FLD Call Change         |
| RCHG     | DBFBCHG0 | Exit                                 | MSDB FLD Call Change         |
| BOFL     | DBFBCHG0 | Overflow                             | MSDB FLD Call Change         |
| BCL0     | DBFBCL10 | Entry                                | MSDB Call Handler            |
| RCL0     | DBFBCL10 | Exit                                 | MSDB Call Handler            |
| IRC2     | DBFBCL10 | Copy Call Data                       | MSDB Call Handler            |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                        | Comments                                     |
|----------|----------|------------------------------------|----------------------------------------------|
| BDLT     | DBFBDLT0 | Entry                              | MSDB Delete Call                             |
| CDLT     | DBFBDLT0 | Delete OK                          | MSDB Delete Call                             |
| RDLT     | DBFBDLT0 | Exit                               | MSDB Delete Call                             |
| BENQ     | DBFBENQ0 | Entry                              | MSDB Resource Locking                        |
| NQ16     | DBFBENQ0 | Function 16 = Enqueue              | MSDB Resource Locking                        |
| ENQ1     | DBFBENQ0 | Resource Locked, call Lock Manger  | MSDB Resource Locking                        |
| ENQ2     | DBFBENQ0 | Resource Locked                    | MSDB Resource Locking                        |
| RENQ     | DBFBENQ0 | Exit                               | MSDB Resource Locking                        |
| BDEQ     | DBFBENQ0 | Dequeue                            | MSDB Resource Locking                        |
| BFLD     | DBFBFLD0 | Entry                              | MSDB FLD Call Processor                      |
| RFLD     | DBFBFLD0 | Exit                               | MSDB FLD Call Processor                      |
| BGET     | DBFBGET0 | Entry                              | MSDB Get Processor                           |
| RGET     | DBFBGET0 | Exit                               | MSDB Get Processor                           |
| BINC     | DBFBINC0 | Entry, Exit (Shift)                | MSDB Decimal Field Verify                    |
| BNXT     | DBFBNXT0 | Entry                              | MSDB Get Next                                |
| RNXT     | DBFBNXT0 | Exit                               | MSDB Get Next                                |
| BRPL     | DBFBRPL0 | Entry                              | MSDB Replace                                 |
| RRPL     | DBFBRPL0 | Exit                               | MSDB Replace                                 |
| BSEQ     | DBFBSEQ0 | Entry, Exit (Shift)                | MSDB Sequential Search                       |
| SEQ1     | DBFBSEQ0 | ECNT Search Entry,Exit (Shift)     | MSDB Sequential Search                       |
| SEQI     | DBFBSEQ0 | ECNT Scan                          | MSDB Sequential Search                       |
| SEQ2     | DBFBSEQ0 | Segment Search Entry, Exit (Shift) | MSDB Sequential Search                       |
| SEQ3     | DBFBSEQ0 | Search Forward Entry, Exit (Shift) | MSDB Sequential Search                       |
| BSRT     | DBFBSRT0 | Entry                              | MSDB Insert Processor                        |
| CSRT     | DBFBSRT0 | Count Free Segments                | MSDB Insert Processor                        |
| DSRT     | DBFBSRT0 | Insert Complete                    | MSDB Insert Processor                        |
| RSRT     | DBFBSRT0 | Exit                               | MSDB Insert Processor                        |
| BUPB     | DBFBUPB0 | Entry                              | MSDB Update Buffer Space Handler             |
| RUPB     | DBFBUPB0 | Exit                               | MSDB Update Buffer Space Handler             |
| BVAL     | DBFBVAL0 | Entry,Exit (Shift)                 | MSDB Decimal Segment Validate                |
| BVfy     | DBFBVfy0 | Entry                              | MSDB Field Verify Processor                  |
| RVfy     | DBFBVfy0 | Exit                               | MSDB Field Verify Processor                  |
| BXTR     | DBFBXTR0 | Entry,Exit (Shift)                 | MSDB Hex Field Translator                    |
| CBHL     | DBFCBHL0 | Entry                              | DEDB Hard Luck Buffer Handler (Buffer Steal) |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                          | Comments                                     |
|----------|----------|--------------------------------------|----------------------------------------------|
| YBHL     | DBFCBHL0 | Exit to caller or to wait for buffer | DEDB Hard Luck Buffer Handler (Buffer Steal) |
| ZBHL     | DBFCBHL0 | OBA required                         | DEDB Hard Luck Buffer Handler (Buffer Steal) |
| BDU0     | DBFDBDU0 | Entry                                | MSDB Log Update Processor                    |
| CHGA     | DBFDBDU0 | Change - Before                      | MSDB Log Update Processor                    |
| CHGB     | DBFDBDU0 | Change - After                       | MSDB Log Update Processor                    |
| DECA     | DBFDBDU0 | Decimal Operation - Before           | MSDB Log Update Processor                    |
| DECB     | DBFDBDU0 | Decimal Operation - After            | MSDB Log Update Processor                    |
| DLTA     | DBFDBDU0 | Delete - Before                      | MSDB Log Update Processor                    |
| DLBT     | DBFDBDU0 | Delete - After                       | MSDB Log Update Processor                    |
| SRTA     | DBFDBDU0 | Insert - Before                      | MSDB Log Update Processor                    |
| SRTB     | DBFDBDU0 | Insert - After                       | MSDB Log Update Processor                    |
| RDU0     | DBFDBDU0 | Exit                                 | MSDB Log Update Processor                    |
| DCAP     | DBFDCAP0 | Entry                                | DEDB Change Data Capture                     |
| CAPD     | DBFDCAP0 | Build CAPD Block                     | DEDB Change Data Capture                     |
| DATA     | DBFDCAP0 | Build CAPD_DATA Blocks               | DEDB Change Data Capture                     |
| READ     | DBFDCAP0 | Read DEDB CI                         | DEDB Change Data Capture                     |
| DCAX     | DBFDCAP0 | Should not occur, invalid call type  | DEDB Change Data Capture                     |
| SLG2     | DBFDLG20 | Good Sync                            | FP Resync Commit/Abort Log Processor         |
| SLOG     | DBFDLG20 | Bad Sync                             | FP Resync Commit/Abort Log Processor         |
| TLG2     | DBFDLG20 | Exit                                 | FP Resync Commit/Abort Log Processor         |
| DRSC     | DBFDRSC0 | Entry                                | FP Resync Controller                         |
| DSRP     | DBFDSRP0 | Entry                                | DEDB SDEP Resync Processor                   |
| DSRN     | DBFDSRP0 | Exit                                 | DEDB SDEP Resync Processor                   |
| HCHG     | DBFHCHG0 | Entry                                | EMH Alt PCB CHNG Call Processor              |
| NCHG     | DBFHCHG0 | Exit                                 | EMH Alt PCB CHNG Call Processor              |
| HCL0     | DBFHCL00 | Entry                                | EMH and FP Utility Call Analyzer             |
| NCL0     | DBFHCL00 | Exit                                 | EMH and FP Utility Call Analyzer             |
| HGN0     | DBFHGN00 | Entry                                | EMH Get Next Call Processor                  |
| NGN0     | DBFHGN00 | Exit                                 | EMH Get Next Call Processor                  |
| HGU1     | DBFHGU10 | Entry                                | EMH Get Unique + Sync Control Processor      |
| NGU1     | DBFHGU10 | Exit                                 | EMH Get Unique + Sync Control Processor      |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                          | Comments                                |
|----------|----------|--------------------------------------|-----------------------------------------|
| EOTR     | DBFHGU10 | End of Thread                        | EMH Get Unique + Sync Control Processor |
| RTRY     | DBFHGU10 | Retried Transaction                  | EMH Get Unique + Sync Control Processor |
| BOTR     | DBFHGU10 | Start of Thread                      | EMH Get Unique + Sync Control Processor |
| HRLB     | DBFHRLB0 | Entry                                | EMH ROLB Processor                      |
| NRLB     | DBFHRLB0 | Exit                                 | EMH ROLB Processor                      |
| HSRT     | DBFHSRT0 | Entry                                | EMH TP PCB ISRT Processor               |
| NSRT     | DBFHSRT0 | Exit                                 | EMH TP PCB ISRT Processor               |
| FPR3     | DBFIRC10 | DL/I Call Start                      | FP Inter-Region Communication           |
| IRC1     | DBFIRC10 | DL/I Call                            | FP Inter-Region Communication           |
| IR09     | DBFIRC10 | Post Call, DEDB<br>FLD, or MSDB      | FP Inter-Region Communication           |
| OPMV     | DBFIRC10 | Post Call, Move<br>Data to Dependent | FP Inter-Region Communication           |
| IRCZ     | DBFIRC10 | Post Call, Pseudo<br>Abend Set       | FP Inter-Region Communication           |
| MBED     | DBFMBED0 | Entry                                | DEDB Get CI                             |
| MBE2     | DBFMBED0 | HSSP Async Read<br>Ahead Wait        | DEDB Get CI                             |
| MBEH     | DBFMBED0 | HSSP, found CI in<br>Private Buffer  | DEDB Get CI                             |
| GPRS     | DBFMBED0 | Exit without XCRB                    | DEDB Get CI                             |
| NBED     | DBFMBED0 | Exit                                 | DEDB Get CI                             |
| BFL9     | DBFMBFL9 | Entry                                | Build FLDC for ISRT                     |
| BFLX     | DBFMBFL9 | Exit                                 | Build FLDC for ISRT                     |
| MBMM     | DBFMBMM9 | Entry                                | Build SSAs, set Minimum \| Maximum       |
| MB02     | DBFMBMM9 | GT Operator no<br>Minimum            | Build SSAs, set Minimum \| Maximum       |
| MB03     | DBFMBMM9 | GT Operator<br>Minimum               | Build SSAs, set Minimum \| Maximum       |
| MB04     | DBFMBMM9 | GE Operator no<br>Minimum            | Build SSAs, set Minimum \| Maximum       |
| MB05     | DBFMBMM9 | GE Operator<br>Minimum               | Build SSAs, set Minimum \| Maximum       |
| MB06     | DBFMBMM9 | LT Operator no<br>Maximum            | Build SSAs, set Minimum \| Maximum       |
| MB07     | DBFMBMM9 | LT Operator<br>Maximum               | Build SSAs, set Minimum \| Maximum       |
| MB08     | DBFMBMM9 | LE Operator no<br>Maximum            | Build SSAs, set Minimum \| Maximum       |
| MB09     | DBFMBMM9 | Invalid Boolean<br>Operator          | Build SSAs, set Minimum \| Maximum       |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                     | Comments                          |
|----------|----------|---------------------------------|-----------------------------------|
| MB10     | DBFMBMM9 | EQ Operator set Maximum         | Build SSAs, set Minimum \| Maximum |
| MB11     | DBFMBMM9 | EQ Operator Maximum already set | Build SSAs, set Minimum \| Maximum |
| MB12     | DBFMBMM9 | Set Minimum                     | Build SSAs, set Minimum \| Maximum |
| MB13     | DBFMBMM9 | Minimum already set             | Build SSAs, set Minimum \| Maximum |
| MB14     | DBFMBMM9 | NE Operator                     | Build SSAs, set Minimum \| Maximum |
| MB15     | DBFMBMM9 | No Key Fields                   | Build SSAs, set Minimum \| Maximum |
| MB16     | DBFMBMM9 | Error in Maximum or Minimum     | Build SSAs, set Minimum \| Maximum |
| MB17     | DBFMBMM9 | Set Maximum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB18     | DBFMBMM9 | Set Maximum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB19     | DBFMBMM9 | Set Maximum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB20     | DBFMBMM9 | Maximum zero                    | Build SSAs, set Minimum \| Maximum |
| MB21     | DBFMBMM9 | Set Minimum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB22     | DBFMBMM9 | Set Minimum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB23     | DBFMBMM9 | Set Minimum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB25     | DBFMBMM9 | Set Minimum into SSA            | Build SSAs, set Minimum \| Maximum |
| MB26     | DBFMBMM9 | Minimum zero                    | Build SSAs, set Minimum \| Maximum |
| MBMM     | DBFMBMM9 | Exit                            | Build SSAs, set Minimum \| Maximum |
| CVAL     | DBFMCCV9 | Entry, Exit (Shift)             | Check Command Code Validity       |
| SSP1     | DBFMCCV9 | Subset Pointer                  | Check Command Code Validity       |
| SSR1     | DBFMCCV9 | Command Code R                  | Check Command Code Validity       |
| SSP2     | DBFMCCV9 | Other Subset Command            | Check Command Code Validity       |
| SSP3     | DBFMCCV9 | Check for Conflicts             | Check Command Code Validity       |
| SSPX     | DBFMCCV9 | Check Subset Pointer Conflict   | Check Command Code Validity       |
| SSP4     | DBFMCCV9 | Set Pointers                    | Check Command Code Validity       |
| SSP5     | DBFMCCV9 | Not Command Code C              | Check Command Code Validity       |
| SSP6     | DBFMCCV9 | Command Code C                  | Check Command Code Validity       |
| SSP7     | DBFMCCV9 | Command Code F or R             | Check Command Code Validity       |
| SSP8     | DBFMCCV9 | F, R, or L not at ISRT Level    | Check Command Code Validity       |



Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                         | Comments                             |
|----------|----------|-------------------------------------|--------------------------------------|
| LOPP     | DBFMCCV9 | Loop checking position              | Check Command Code Validity          |
| ELOP     | DBFMCCV9 | End of loop checking position       | Check Command Code Validity          |
| SSP9     | DBFMCCV9 | F, R, or L at ISRT level            | Check Command Code Validity          |
| SSPA     | DBFMCCV9 | Command Code U                      | Check Command Code Validity          |
| LOPU     | DBFMCCV9 | Loop checking position back to root | Check Command Code Validity          |
| SSPB     | DBFMCCV9 | Command Code V                      | Check Command Code Validity          |
| AMST     | DBFMCCV9 | Status Code AM set                  | Check Command Code Validity          |
| AJST     | DBFMCCV9 | Status Code AJ set                  | Check Command Code Validity          |
| MCHG     | DBFMCHG0 | Entry                               | DEDB FLD Call Processor              |
| XCHG     | DBFMCHG0 | Exit                                | DEDB FLD Call Processor              |
| MOFL     | DBFMCHG0 | Overflow                            | DEDB FLD Call Processor              |
| MCL0     | DBFMCLX0 | Entry                               | DEDB Call Analyzer                   |
| SSAX     | DBFMCLX0 | Count SSAs                          | DEDB Call Analyzer                   |
| SEG4     | DBFMCLX0 | Good RC, Trace Segment              | DEDB Call Analyzer                   |
| PARP     | DBFMCLX0 | Trace Parent                        | DEDB Call Analyzer                   |
| NCL0     | DBFMCLX0 | Exit                                | DEDB Call Analyzer                   |
| CRP9     | DBFMCRP9 | Entry                               | Check for Subset Pointer             |
| PPRE     | DBFMCRP9 | Trace Parent Prefix                 | Check for Subset Pointer             |
| CRPX     | DBFMCRP9 | Exit                                | Check for Subset Pointer             |
| MCSS     | DBFMCSS9 | Entry                               | Compare Current Segment Field to SSA |
| CALL     | DBFMCSS9 | Entry, Trace Call Argument          | Compare Current Segment Field to SSA |
| MC01     | DBFMCSS9 | Key SSA + Key Value                 | Compare Current Segment Field to SSA |
| MC02     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC03     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC04     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC05     | DBFMCSS9 | Not Satisfied RC=8                  | Compare Current Segment Field to SSA |
| MC06     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC07     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC08     | DBFMCSS9 | Not Satisfied RC=12                 | Not Satisfied RC=12                  |
| MC09     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC10     | DBFMCSS9 | Compare Key                         | Compare Current Segment Field to SSA |
| MC11     | DBFMCSS9 | Compare                             | Compare Current Segment Field to SSA |
| MC12     | DBFMCSS9 | Compare                             | Compare Current Segment Field to SSA |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                       | Comments                                        |
|----------|----------|-----------------------------------|-------------------------------------------------|
| MC13     | DBFMCSS9 | Compare                           | Compare Current Segment Field to SSA            |
| MC14     | DBFMCSS9 | Compare                           | Compare Current Segment Field to SSA            |
| MC1A     | DBFMCSS9 | No Match                          | Compare Current Segment Field to SSA            |
| MC1B     | DBFMCSS9 | Compare                           | Compare Current Segment Field to SSA            |
| CSSF     | DBFMCSS9 | Compare, no Boolean               | Compare Current Segment Field to SSA            |
| MCS2     | DBFMCSS9 | Relational Operator Satisfied     | Compare Current Segment Field to SSA            |
| MCS1     | DBFMCSS9 | Relational Operator Not Satisfied | Compare Current Segment Field to SSA            |
| CSS9     | DBFMCSS9 | Exit                              | Compare Current Segment Field to SSA            |
| CSL9     | DBFMCSS9 | Entry,Exit (Shift)                | Compare Current Segment Field to SSA            |
| CALL     | DBFMCSS9 | Entry, Trace Call Argument        | Compare Current Segment Field to SSA            |
| LOPC     | DBFMCSS9 | Compare Loop                      | Compare Current Segment Field to SSA            |
| NEXT     | DBFMCSS9 | Read Next Buffer                  | Compare Current Segment Field to SSA            |
| MCTL     | DBFMCTL0 | Entry, Exit (Shift)               | Check this Level                                |
| COML     | DBFMCTL0 | Command Code L                    | Check this Level                                |
| FRST     | DBFMCTL0 | Command Code F, R, or unqualified | Check this Level                                |
| GETN     | DBFMCTL0 | Get Next                          | Check this Level                                |
| ISRT     | DBFMCTL0 | ISRT Here                         | Check this Level                                |
| MCT3     | DBFMCTL0 | Trace Process Return Code         | Check this Level                                |
| MDEQ     | DBFMDEQ0 | Entry                             | DEDB DEQ Command Processor                      |
| XDEQ     | DBFMDEQ0 | Exit                              | DEDB DEQ Command Processor                      |
| MDLT     | DBFMDLT0 | Entry                             | DEDB Direct Delete                              |
| EPCB     | DBFMDLT0 | Check for other PCBs              | DEDB Direct Delete                              |
| PRBA     | DBFMDLT0 | Update other PCB PRBA             | DEDB Direct Delete                              |
| CRBA     | DBFMDLT0 | Clear other PCB CRBA              | DEDB Direct Delete                              |
| KILL     | DBFMDLT0 | Reset Parentage other PCB         | DEDB Direct Delete                              |
| NRBA     | DBFMDLT0 | Update other PCB NRBA             | DEDB Direct Delete                              |
| XRBA     | DBFMDLT0 | Update other PCB XRBA             | DEDB Direct Delete                              |
| GRBA     | DBFMDLT0 | Update other PCB GRBA             | DEDB Direct Delete                              |
| DPTE     | DBFMDPT9 | Entry                             | Delete PCL and Subset Pointers in Parent Prefix |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                       | Comments                                        |
|----------|----------|-----------------------------------|-------------------------------------------------|
| DPTX     | DBFMDPT9 | Exit                              | Delete PCL and Subset Pointers in Parent Prefix |
| MDRA     | DBFMDRA9 | Entry,Exit (Shift)                | Determine possibility of randomizing            |
| MD01     | DBFMDRA9 | Read First Root                   | Determine possibility of randomizing            |
| MD02     | DBFMDRA9 | Use Current Position              | Determine possibility of randomizing            |
| MD03     | DBFMDRA9 | Cannot use CP, randomize          | Determine possibility of randomizing            |
| MD04     | DBFMDRA9 | Current key LT SSA min, randomize | Determine possibility of randomizing            |
| MD05     | DBFMDRA9 | Must Move this Level              | Determine possibility of randomizing            |
| MD06     | DBFMDRA9 | Current Key GT SSA min            | Determine possibility of randomizing            |
| MD07     | DBFMDRA9 | Current Key GT SSA min            | Determine possibility of randomizing            |
| MD08     | DBFMDRA9 | Current Key GT SSA max            | Determine possibility of randomizing            |
| MD09     | DBFMDRA9 | Must Move this Level              | Determine possibility of randomizing            |
| MD10     | DBFMDRA9 | Level Acceptable                  | Determine possibility of randomizing            |
| MD11     | DBFMDRA9 | Current Key LT SSA max            | Determine possibility of randomizing            |
| MD12     | DBFMDRA9 | Current Key GT SSA max            | Determine possibility of randomizing            |
| MD13     | DBFMDRA9 | Current Key LT SSA max            | Determine possibility of randomizing            |
| MD14     | DBFMDRA9 | Must Move this Level              | Determine possibility of randomizing            |
| MD15     | DBFMDRA9 | Level Acceptable                  | Determine possibility of randomizing            |
| MA13     | DBFMDRA9 | SSA Min = SSA Max, randomizer     | Determine possibility of randomizing            |
| MD19     | DBFMDRA9 | Set SSA Min, Max                  | Determine possibility of randomizing            |
| MD20     | DBFMDRA9 | No Low Boundary                   | Determine possibility of randomizing            |
| MD21     | DBFMDRA9 | Current Key LT SSA Max            | Determine possibility of randomizing            |
| MD22     | DBFMDRA9 | Must Move this Level              | Determine possibility of randomizing            |
| MD23     | DBFMDRA9 | Do Nothing                        | Determine possibility of randomizing            |
| MD24     | DBFMDRA9 | Current Key GT SSA Max            | Determine possibility of randomizing            |
| MD26     | DBFMDRA9 | Do Sequential Read                | Determine possibility of randomizing            |
| MD27     | DBFMDRA9 | Do Sequential Read                | Determine possibility of randomizing            |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                              | Comments                             |
|----------|----------|------------------------------------------|--------------------------------------|
| MD28     | DBFMDRA9 | Do Nothing                               | Determine possibility of randomizing |
| MD29     | DBFMDRA9 | Current Key LT<br>SSA Max                | Determine possibility of randomizing |
| MD31     | DBFMDRA9 | Current Key GT<br>FDLC Low Key           | Determine possibility of randomizing |
| MD32     | DBFMDRA9 | Current Key GT<br>FDLC Low Key           | Determine possibility of randomizing |
| MD33     | DBFMDRA9 | Do Nothing                               | Determine possibility of randomizing |
| MD34     | DBFMDRA9 | Do Sequential<br>Read                    | Determine possibility of randomizing |
| MD35     | DBFMDRA9 | Do Nothing                               | Determine possibility of randomizing |
| MD36     | DBFMDRA9 | Do Sequential<br>Read                    | Determine possibility of randomizing |
| MD37     | DBFMDRA9 | Do Nothing                               | Determine possibility of randomizing |
| MD38     | DBFMDRA9 | Go to Next Set<br>Process                | Determine possibility of randomizing |
| MD41     | DBFMDRA9 | Search for Lowest<br>Min GT Current      | Determine possibility of randomizing |
| MD42     | DBFMDRA9 | Search for Next<br>Higher Set<br>Minimum | Determine possibility of randomizing |
| MD43     | DBFMDRA9 | Address next Set                         | Determine possibility of randomizing |
| MD44     | DBFMDRA9 | Set Min Found,<br>Randomize              | Determine possibility of randomizing |
| MD45     | DBFMDRA9 | Goto NOUSE                               | Determine possibility of randomizing |
| MD46     | DBFMDRA9 | Read First Root                          | Determine possibility of randomizing |
| MD47     | DBFMDRA9 | Do Nothing -<br>current position<br>good | Determine possibility of randomizing |
| MD48     | DBFMDRA9 | Clear current<br>position                | Determine possibility of randomizing |
| MD49     | DBFMDRA9 | Call Randomizer                          | Determine possibility of randomizing |
| MD50     | DBFMDRA9 | Continue<br>Sequential Read              | Determine possibility of randomizing |
| MDRB     | DBFMDRB0 | Entry                                    | Delete, get root backwards           |
| MDRT     | DBFMDRX0 | Entry, Exit<br>DDEP,SDEP (Shift)         | DEDB Insert                          |
| DSG9     | DBFMDSG9 | Entry                                    | DEDB Delete Direct Dependent         |
| RECU     | DBFMDSG9 | Recursive Call<br>Stack Information      | DEDB Delete Direct Dependent         |
| DSG1     | DBFMDSG9 | Trace Segment to<br>be processed         | DEDB Delete Direct Dependent         |
| LOP1     | DBFMDSG9 | Twin Chain Loop                          | DEDB Delete Direct Dependent         |
| SIBL     | DBFMDSG9 | First Child                              | DEDB Delete Direct Dependent         |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                      | Comments                                                               |
|----------|----------|----------------------------------|------------------------------------------------------------------------|
| LO1X     | DBFMDSG9 | Loop over Parent Prefix Complete | DEDB Delete Direct Dependent                                           |
| FRE1     | DBFMDSG9 | Call DBFMFSE0 to free space      | DEDB Delete Direct Dependent                                           |
| LOP2     | DBFMDSG9 | Twin Chain Loop                  | DEDB Delete Direct Dependent                                           |
| FRE2     | DBFMDSG9 | Call DBFMFSE0 to free space      | DEDB Delete Direct Dependent                                           |
| DSGX     | DBFMDSG9 | Exit                             | DEDB Delete Direct Dependent                                           |
| DS14     | DBFMDSG9 | Return after Recursive Call      | DEDB Delete Direct Dependent                                           |
| MFL0     | DBFMFL00 | Entry                            | DEDB FLD Call Processor                                                |
| XMFL     | DBFMFL00 | Exit                             | DEDB FLD Call Processor                                                |
| MFLD     | DBFMFL10 | Entry                            | DEDB FSA Processor                                                     |
| XFLD     | DBFMFL10 | Exit                             | DEDB FSA Processor                                                     |
| MFSE     | DBFMFSE0 | Entry                            | DEDB Space Manager                                                     |
| MFSS     | DBFMFSE0 | Scrap Handling                   | DEDB Space Manager                                                     |
| NFSE     | DBFMFSE0 | Exit                             | DEDB Space Manager                                                     |
| OFSE     | DBFMFSE0 | Read AP or Root CI to find space | DEDB Space Manager                                                     |
| PFSE     | DBFMFSE0 | Read 1st DOVF CI                 | DEDB Space Manager                                                     |
| GPDS     | DBFMFSE0 | Got Conditional Lock IOVF SM CI  | DEDB Space Manager                                                     |
| GPDN     | DBFMFSE0 | Bad Conditional Lock IOVF SM CI  | DEDB Space Manager                                                     |
| MGAP     | DBFMGAP0 | Entry                            | DEDB Get Anchor Point                                                  |
| ERAN     | DBFMGAP0 | Entry to Randomizer              | DEDB Get Anchor Point                                                  |
| XRAN     | DBFMGAP0 | Exit from Randomizer             | DEDB Get Anchor Point                                                  |
| MGA1     | DBFMGAP0 | PROCOPT=P UOW BDY crossed        | DEDB Get Anchor Point                                                  |
| MGA2     | DBFMGAP0 | PROCOPT=P UOW Set GC status      | DEDB Get Anchor Point                                                  |
| MGA3     | DBFMGAP0 | PROCOPT=H Save Position          | DEDB Get Anchor Point                                                  |
| NGAP     | DBFMGAP0 | Exit                             | DEDB Get Anchor Point                                                  |
| MGFD     | DBFMGFD0 | Entry                            | DEDB Initialize Level Table                                            |
| NGFD     | DBFMGFD0 | Exit                             | DEDB Initialize Level Table                                            |
| MGL9     | DBFMGLA9 | Entry, Exit (Shift)              | DEDB Get Last Occurrence of Segment Under Parent                       |
| CLA9     | DBFMGLA9 | Enter, Exit(shift) EP DBFMCLA9   | DEDB Check if Another Occurrence of Segment under Parent satisfies SSA |
| MGNR     | DBFMGNR0 | Entry                            | DEDB Get Next Root                                                     |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                               | Comments                                      |
|----------|----------|-------------------------------------------|-----------------------------------------------|
| NGNR     | DBFMGNR0 | Exit                                      | DEDB Get Next Root                            |
| EXAP     | DBFMGNR0 | Get Next RAP<br>with a root start<br>loop | DEDB Get Next Root                            |
| EXA1     | DBFMGNR0 | Get Next RAP<br>with a root block#        | DEDB Get Next Root                            |
| EOC1     | DBFMGNR0 | Out of Area Range                         | DEDB Get Next Root                            |
| EXA2     | DBFMGNR0 | Read CI                                   | DEDB Get Next Root                            |
| XXAP     | DBFMGNR0 | Return the RAP                            | DEDB Get Next Root                            |
| ECAL     | DBFMGNR0 | Calc UOW#,<br>DMAC from BLK#              | DEDB Get Next Root                            |
| ECA1     | DBFMGNR0 | PROCOPT=P set<br>GC status                | DEDB Get Next Root                            |
| ECA2     | DBFMGNR0 | PROCOPT=P set<br>GC status                | DEDB Get Next Root                            |
| XCAL     | DBFMGNR0 | Rerun UOW#,<br>DMAC                       | DEDB Get Next Root                            |
| MGN0     | DBFMGNX0 | Entry, Exit(Shift)                        | DEDB Get Next Root                            |
| GPDE     | DBFMGPD0 | Entry                                     | DEDB Retrieve Sequential Dependent<br>Segment |
| GPD1     | DBFMGPD0 | Scan Segment<br>Chain                     | DEDB Retrieve Sequential Dependent<br>Segment |
| GPD2     | DBFMGPD0 | SDEP Pointer -><br>uncommitted seg        | DEDB Retrieve Sequential Dependent<br>Segment |
| GPD3     | DBFMGPD0 | SDEP Pointer -><br>normal seg             | DEDB Retrieve Sequential Dependent<br>Segment |
| GPD4     | DBFMGPD0 | Must Read CI                              | DEDB Retrieve Sequential Dependent<br>Segment |
| GPDS     | DBFMGPD0 | IRLM Notify to<br>Partner                 | DEDB Retrieve Sequential Dependent<br>Segment |
| GDPN     | DBFMGPD0 | SDEP CI found to<br>be locked             | DEDB Retrieve Sequential Dependent<br>Segment |
| GDP7     | DBFMGPD0 | Re-read CI                                | DEDB Retrieve Sequential Dependent<br>Segment |
| GDPC     | DBFMGPD0 | Compare Segment<br>to SSA                 | DEDB Retrieve Sequential Dependent<br>Segment |
| GPD5     | DBFMGPD0 | SSA does not<br>match this<br>segment     | DEDB Retrieve Sequential Dependent<br>Segment |
| GPD6     | DBFMGPD0 | Copy segment                              | DEDB Retrieve Sequential Dependent<br>Segment |
| GDPX     | DBFMGPD0 | Exit                                      | DEDB Retrieve Sequential Dependent<br>Segment |
| MGPF     | DBFMGPF0 | Entry                                     | Get Page of Common Storage                    |
| NGPF     | DBFMGPF0 | Exit                                      | Get Page of Common Storage                    |
| MGRF     | DBFMGRF0 | Entry                                     | Get Root Forward Search                       |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                            | Comments                                       |
|----------|----------|----------------------------------------|------------------------------------------------|
| MGR1     | DBFMGRF0 | Run Chain in RAP CI                    | Get Root Forward Search                        |
| MGR2     | DBFMGRF0 | Scan RAP CI                            | Get Root Forward Search                        |
| MGR3     | DBFMGRF0 | Run Chain next CI                      | Get Root Forward Search                        |
| MGR4     | DBFMGRF0 | Scan next CI                           | Get Root Forward Search                        |
| MGR5     | DBFMGRF0 | Root does not exist (status GE)        | Get Root Forward Search                        |
| MGR6     | DBFMGRF0 | Root does not exist, other roots found | Get Root Forward Search                        |
| MGR8     | DBFMGRF0 | Root found during a scan               | Get Root Forward Search                        |
| MGR9     | DBFMGRF0 | Root found by Run Chain                | Get Root Forward Search                        |
| NGRF     | DBFMGRF0 | Exit                                   | Get Root Forward Search                        |
| MGRG     | DBFMGRF0 | Anchor Point Scan routine              | Get Root Forward Search                        |
| MGRL     | DBFMGRF0 | CI Scan routine                        | Get Root Forward Search                        |
| MGRM     | DBFMGRF0 | Nextitem routine                       | Get Root Forward Search                        |
| MGRC     | DBFMGRF0 | Call DBFMPGO0 check PROCOPT            | Get Root Forward Search                        |
| MGRD     | DBFMGRF0 | Return from DBFMPGO0                   | Get Root Forward Search                        |
| MGU0     | DBFMGUX0 | Entry, Exit(Shift)                     | Get Unique, Unqualified                        |
| MGXC     | DBFMGXC0 | Entry, Entry SEGLOCK                   | Get Control of Resource                        |
| NGXC     | DBFMGXC0 | Exit, Entry SEGLOCK, Exit CI EXCL      | Get Control of Resource                        |
| ENQR     | DBFMGXC0 | Lock Resource for this caller          | Get Control of Resource                        |
| ENQO     | DBFMGXC0 | Lock Resource on behalf of other       | Get Control of Resource                        |
| SHXC     | DBFMGXC0 | Just CI SHR Lock, Entry/Exit           | Get Control of Resource                        |
| EXXC     | DBFMGXC0 | Just CI Lock Exclusive, Entry          | Get Control of Resource                        |
| VLOC     | DBFMGXC0 | DBFVLOCK Entry                         | Get Control of Resource                        |
| NLOC     | DBFMGXC0 | DBFVLOCK Exit                          | Get Control of Resource                        |
| MINC     | DBFMINC0 | Entry                                  | DEDB Included Decimal FLD Call                 |
| XINC     | DBFMINC0 | Exit                                   | DEDB Included Decimal FLD Call                 |
| IRC9     | DBFMIRC9 | Entry, Exit(Shift)                     | DEDB Retrieve Previous Parent, Set MLTE Fields |
| MIRT     | DBFMIRT0 | Entry, Exit(Shift)                     | DEDB Insert                                    |
| MIR1     | DBFMIRT0 | Trace CI RBA                           | DEDB Insert                                    |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                             | Comments                                                   |
|----------|----------|-----------------------------------------|------------------------------------------------------------|
| MIR2     | DBFMIRT0 | Previous Root<br>Twin not in Same<br>CI | DEDB Insert                                                |
| MIR3     | DBFMIRT0 | Trace after reading<br>CI               | DEDB Insert                                                |
| MIR4     | DBFMIRT0 | Previous Segment<br>not in Same CI      | DEDB Insert                                                |
| MIR5     | DBFMIRT0 | Previous Segment<br>not Parent          | DEDB Insert                                                |
| MIRB     | DBFMIRT0 | Set PCF Pointer in<br>Parent            | DEDB Insert                                                |
| MIR6     | DBFMIRT0 | Previous Segment<br>in Same CI          | DEDB Insert                                                |
| MIR7     | DBFMIRT0 | Update RAP -><br>new segment            | DEDB Insert                                                |
| MIR8     | DBFMIRT0 | Previous is not a<br>RAP                | DEDB Insert                                                |
| MIR9     | DBFMIRT0 | Previous Segment<br>is Twin             | DEDB Insert                                                |
| MIRA     | DBFMIRT0 | Set Log Data                            | DEDB Insert                                                |
| ISLL     | DBFMISL9 | Entry, Exit(Shift)                      | DEDB Process Insert Last Level                             |
| MLCS     | DBFMLCL0 | Entry                                   | DEDB Logical Close Area                                    |
| MLCE     | DBFMLCL0 | Exit                                    | DEDB Logical Close Area                                    |
| MLEV     | DBFMLEV0 | Entry                                   | DEDB Adjust MLTE Sequence Numbers                          |
| NLEV     | DBFMLEV0 | Exit                                    | DEDB Adjust MLTE Sequence Numbers                          |
| MLOG     | DBFMLOG0 | Entry                                   | DEDB SDEP CI Logging                                       |
| NLOG     | DBFMLOG0 | Exit                                    | DEDB SDEP CI Logging                                       |
| MLOS     | DBFMLOP0 | Entry                                   | DEDB Logical Open Area                                     |
| MLOE     | DBFMLOP0 | Exit                                    | DEDB Logical Open Area                                     |
| MMIT     | DBFMMIT0 | Entry                                   | DEDB Media Manager<br>Connect/Disconnect                   |
| MMIE     | DBFMMIT0 | Exit                                    | DEDB Media Manager<br>Connect/Disconnect                   |
| MOCI     | DBFMOCI0 | Entry                                   | DEDB DMAC Update                                           |
| NOCI     | DBFMOCI0 | Exit                                    | DEDB DMAC Update                                           |
| PCC9     | DBFMPCC9 | Entry, Exit(Shift)                      | DEDB Process 'C' Command Code                              |
| MCLS     | DBFMPCL0 | Entry                                   | DEDB Physical Area Close                                   |
| MCLE     | DBFMPCL0 | Exit                                    | DEDB Physical Area Close                                   |
| PED9     | DBFMPED9 | Entry,Exit (Shift)                      | DEDB Process Position Fields in Parallel<br>EPCBs - DELETE |
| PEI9     | DBFMPEI9 | Entry, Exit (Shift)                     | DEDB Process Position Fields in Parallel<br>EPCBs - INSERT |
| LOP1     | DBFMPEI9 | Loop through<br>EPCBs                   | DEDB Process Position Fields in Parallel<br>EPCBs - INSERT |



Table 249. Fast Path trace entries (continued)

| Trace ID | Module    | Trace point                        | Comments                                                |
|----------|-----------|------------------------------------|---------------------------------------------------------|
| LOP2     | DBFMPEI9  | Loop through MLTEs                 | DEDB Process Position Fields in Parallel EPCBs - INSERT |
| FRGU     | DBFMPEI9  | Update before EPCB GU Position     | DEDB Process Position Fields in Parallel EPCBs - INSERT |
| FGRN     | DBFMPEI9  | Update before EPCB GN Position     | DEDB Process Position Fields in Parallel EPCBs - INSERT |
| AFGU     | DBFMPEI9  | Update after EPCB GU Position      | DEDB Process Position Fields in Parallel EPCBs - INSERT |
| DPTE     | DBFMPEI9  | Entry                              | DEDB Relocate PCL or SSPT in Parent                     |
| DPTX     | DBFMPEI9  | Exit                               | DEDB Relocate PCL or SSPT in Parent                     |
| MPGO     | DBFMPIGO0 | Entry, Exit(Shift)                 | DEDB Process PROCOPT GOX, GON                           |
| PIO9     | DBFMPIO9  | Entry, Exit(Shift)                 | DEDB Process I/O Area for REPLACE                       |
| MOPS     | DBFMPOP0  | Entry                              | DEDB Physical Area Open                                 |
| MOPE     | DBFMPOP0  | Exit                               | DEDB Physical Area Open                                 |
| MPOS     | DBFMPOS0  | Entry                              | DEDB POS Call                                           |
| NPOS     | DBFMPOS0  | Exit                               | DEDB POS Call                                           |
| MGUP     | DBFMPOS0  | Entry to Find Root Segment         | DEDB POS Call                                           |
| MGNP     | DBFMPOS0  | Entry to find next SDEP Segment    | DEDB POS Call                                           |
| NGN0     | DBFMPOS0  | Exit from find next SDEP Segment   | DEDB POS Call                                           |
| MPO2     | DBFMPOS0  | Notify Partners to Harden SDEP Cis | DEDB POS Call                                           |
| VMAI     | DBFMPOS0  | Exit from Notify Partners          | DEDB POS Call                                           |
| MPSG     | DBFMPSG9  | Entry, Exit(Shift)                 | DEDB Process Subset Pointer Commands S W Z M            |
| SSPL     | DBFMPSG9  | Loop down through MLTEs            | DEDB Process Subset Pointer Commands S W Z M            |
| LOPC     | DBFMPSG9  | Loop over SSPTRs                   | DEDB Process Subset Pointer Commands S W Z M            |
| SCOM     | DBFMPSG9  | Command Code S                     | DEDB Process Subset Pointer Commands S W Z M            |
| WCOM     | DBFMPSG9  | Command Code W                     | DEDB Process Subset Pointer Commands S W Z M            |
| ZCOM     | DBFMPSG9  | Command Code Z                     | DEDB Process Subset Pointer Commands S W Z M            |
| MPUG     | DBFMPUG0  | Entry, Exit(Shift)                 | DEDB Process Unqualified GN                             |
| FCHL     | DBFMPUG0  | First Child                        | DEDB Process Unqualified GN                             |
| MUP1     | DBFMPUG0  | Move Up A Level                    | DEDB Process Unqualified GN                             |
| VIO1     | DBFMPUG0  | Violation 1                        | DEDB Process Unqualified GN                             |
| VIO2     | DBFMPUG0  | Violation 2                        | DEDB Process Unqualified GN                             |
| GSBL     | DBFMPUG0  | Get Sibling                        | DEDB Process Unqualified GN                             |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                          | Comments                                 |
|----------|----------|--------------------------------------|------------------------------------------|
| MPU2     | DBFMPUG0 | Sibling Located                      | DEDB Process Unqualified GN              |
| MRCU     | DBFMRCU0 | Entry, Exit(Shift)                   | DEDB Read Current Dependent Segment      |
| MRPU     | DBFMRPU0 | Entry, Exit(Shift)                   | DEDB Reset Position after Unqualified GN |
| LMLT     | DBFMRPU0 | Loop through MLTEs                   | DEDB Reset Position after Unqualified GN |
| MRPL     | DBFMRPX0 | Entry, Exit(Shift)                   | DEDB REPLACE                             |
| AMST     | DBFMRPX0 | Return AM status code                | DEDB REPLACE                             |
| SPR9     | DBFMRPX0 | Update PRBA in MLTE of children      | DEDB REPLACE                             |
| SPR1     | DBFMRPX0 | Loop through siblings                | DEDB REPLACE                             |
| SPR2     | DBFMRPX0 | End loop through siblings            | DEDB REPLACE                             |
| PED9     | DBFMRPX0 | End child PRBA updates               | DEDB REPLACE                             |
| MRQC     | DBFMRQC0 | Entry, Exit(Shift)                   | DEDB Retrieve by Qualified Call          |
| MRQU     | DBFMRQC0 | Check current position               | DEDB Retrieve by Qualified Call          |
| MRUU     | DBFMRQC0 | MLTE not qualified                   | DEDB Retrieve by Qualified Call          |
| MRNQ     | DBFMRQC0 | Get Next Loop                        | DEDB Retrieve by Qualified Call          |
| MRNU     | DBFMRQC0 | Not qualified SSA                    | DEDB Retrieve by Qualified Call          |
| MRUF     | DBFMRQC0 | At Least Root Satisfies              | DEDB Retrieve by Qualified Call          |
| REQ1     | DBFMRQC0 | Diverge U or GN *F                   | DEDB Retrieve by Qualified Call          |
| REQL     | DBFMRQC0 | MLTE downward loop qualification     | DEDB Retrieve by Qualified Call          |
| RC04     | DBFMRQC0 | Found, moved off current position    | DEDB Retrieve by Qualified Call          |
| RC08     | DBFMRQC0 | Not found at that level              | DEDB Retrieve by Qualified Call          |
| LROT     | DBFMRQC0 | Loop up to root                      | DEDB Retrieve by Qualified Call          |
| TOGH     | DBFMRQC0 | GU, all levels satisfied current pos | DEDB Retrieve by Qualified Call          |
| DIVE     | DBFMRQC0 | MLTE Loop to clear DIVERGE flag      | DEDB Retrieve by Qualified Call          |
| NOPA     | DBFMRQC0 | Not a PATH call                      | DEDB Retrieve by Qualified Call          |
| PMVE     | DBFMRQC0 | Data to be moved                     | DEDB Retrieve by Qualified Call          |
| PHIL     | DBFMRQC0 | Path call Highest Level to move      | DEDB Retrieve by Qualified Call          |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module    | Trace point                    | Comments                                    |
|----------|-----------|--------------------------------|---------------------------------------------|
| PCOM     | DBFMRQC0  | Path call complete             | DEDB Retrieve by Qualified Call             |
| PLOP     | DBFMRQC0  | Loop for P command up in MLTEs | DEDB Retrieve by Qualified Call             |
| MRUC     | DBFMRUC0  | Entry, Exit(Shift)             | DEDB Reset U Command at Current/Lower Level |
| SFIT     | DBFMFSI9  | Entry, Exit(Shift)             | DEDB Search Field Name                      |
| SFLP     | DBFMFSI9  | Loop over Fields in Segment    | DEDB Search Field Name                      |
| SFTP     | DBFMFSI9  | Verify Relational Operator     | DEDB Search Field Name                      |
| CALL     | DBFMFSI9  | Trace SSA and Fields           | DEDB Search Field Name                      |
| SFO9     | DBFMSFO9  | Entry, Exit(Shift)             | DEDB Set First Position of Segment Type     |
| PPRE     | DBFMSFO9  | Trace Parent Prefix            | DEDB Set First Position of Segment Type     |
| SFOT     | DBFMSFO9  | No Floating Pointer in Call    | DEDB Set First Position of Segment Type     |
| SIMP     | DBFMSIM9  | Entry, Exit(Shift)             | DEDB Set Implied for Upper Levels of Call   |
| MSPC     | DBFMSPC0  | Entry                          | DEDB IOVF Free Space Calculator             |
| NSPC     | DBFMSPC0  | Exit                           | DEDB IOVF Free Space Calculator             |
| MSRB     | DBFMSTRB0 | Entry                          | DEDB Schedule DBFMIOS0 SRB routine          |
| NSRB     | DBFMSTRB0 | Exit                           | DEDB Schedule DBFMIOS0 SRB routine          |
| MSRT     | DBFMSRT0  | Entry                          | DEDB Insert SDEP Segment to LSRT            |
| NSRT     | DBFMSRT0  | Exit                           | DEDB Insert SDEP Segment to LSRT            |
| MSR1     | DBFMSRT0  | MSRTCIAL entry                 | DEDB Preallocate SDEP Cis                   |
| MSR2     | DBFMSRT0  | After Recheck #1 still need PA | DEDB Preallocate SDEP Cis                   |
| MSR3     | DBFMSRT0  | After Recheck #2 still need PA | DEDB Preallocate SDEP Cis                   |
| MSR4     | DBFMSRT0  | DMAC Read Error                | DEDB Preallocate SDEP Cis                   |
| MSR5     | DBFMSRT0  | DMAC Read Successful           | DEDB Preallocate SDEP Cis                   |
| MSR6     | DBFMSRT0  | SDEP Part full after DMAC Read | DEDB Preallocate SDEP Cis                   |
| MSR7     | DBFMSRT0  | Allocate an RBAT               | DEDB Preallocate SDEP Cis                   |
| MSR8     | DBFMSRT0  | DMACLBTS was zero, set here    | DEDB Preallocate SDEP Cis                   |
| MSR9     | DBFMSRT0  | Trace ACCUM_LEN                | DEDB Preallocate SDEP Cis                   |
| MSRA     | DBFMSRT0  | Trace RBAT, #Cis to allocate   | DEDB Preallocate SDEP Cis                   |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                        | Comments                               |
|----------|----------|------------------------------------|----------------------------------------|
| MSRB     | DBFMSRT0 | Trace RBAT, min #<br>Cis           | DEDB Preallocate SDEP Cis              |
| MSRD     | DBFMSRT0 | SDEP Part now<br>full              | DEDB Preallocate SDEP Cis              |
| MSRE     | DBFMSRT0 | SDEP Part now<br>full              | DEDB Preallocate SDEP Cis              |
| MSRF     | DBFMSRT0 | Lock failure on<br>SDEP PACI       | DEDB Preallocate SDEP Cis              |
| MSRG     | DBFMSRT0 | Add SDEP CI<br>XCRBs to RBAT       | DEDB Preallocate SDEP Cis              |
| MSRH     | DBFMSRT0 | Trace<br>ACCUM_LENG                | DEDB Preallocate SDEP Cis              |
| MLOG     | DBFMSRT0 | Log 5953 Record -<br>entry         | DEDB Preallocate SDEP Cis              |
| NLOG     | DBFMSRT0 | Log 5953 Record -<br>exit          | DEDB Preallocate SDEP Cis              |
| SSA9     | DBFMSSA9 | Entry, Exit(Shift)                 | DEDB Search SSA for Data               |
| MMOV     | DBFMSSA9 | Must Move                          | DEDB Search SSA for Data               |
| BACK     | DBFMSSA9 | Must Move Back                     | DEDB Search SSA for Data               |
| STAY     | DBFMSSA9 | Stay at this Level                 | DEDB Search SSA for Data               |
| FOND     | DBFMSSA9 | Found                              | DEDB Search SSA for Data               |
| COML     | DBFMSSA9 | Command Code L                     | DEDB Search SSA for Data               |
| TWLF     | DBFMSSA9 | Not found - higher<br>key found    | DEDB Search SSA for Data               |
| EIGH     | DBFMSSA9 | Not found, no<br>higher key found  | DEDB Search SSA for Data               |
| SAGI     | DBFMSSC9 | Entry, Exit(Shift)                 | DEDB SSA Handler for GET and<br>INSERT |
| ACST     | DBFMCSS9 | Count SSAs                         | DEDB SSA Handler for GET and<br>INSERT |
| NAMF     | DBFMCSS9 | Segment Name<br>Found              | DEDB SSA Handler for GET and<br>INSERT |
| DESC     | DBFMCSS9 | Level Descending                   | DEDB SSA Handler for GET and<br>INSERT |
| NDES     | DBFMCSS9 | Level Not<br>Descending            | DEDB SSA Handler for GET and<br>INSERT |
| NOTN     | DBFMCSS9 | Segment Name<br>Not Found          | DEDB SSA Handler for GET and<br>INSERT |
| NOSG     | DBFMCSS9 | No Segment Name<br>Found           | DEDB SSA Handler for GET and<br>INSERT |
| ENAC     | DBFMCSS9 | Hierarchy Error in<br>Segment Name | DEDB SSA Handler for GET and<br>INSERT |
| SSD9     | DBFMSSD9 | Entry, Exit(Shift)                 | DEDB SSA Handler for DELETE            |
| SAGE     | DBFMSSG9 | Entry,Exit (Shift)                 | DEDB SSA Handler for GET               |
| SAIN     | DBFMSSI9 | Entry,Exit (Shift)                 | DEDB SSA Handler for INSERT            |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                | Comments                                               |
|----------|----------|----------------------------|--------------------------------------------------------|
| SSP9     | DBFMSSP9 | Entry,Exit (Shift)         | DEDB SSA Handler for POS                               |
| SSR9     | DBFMSSR9 | Entry,Exit (Shift)         | DEDB SSA Handler for REPLACE                           |
| MSTP     | DBFMSTP0 | Entry                      | DEDB I/O substitute routine when ADS is closing/closed |
| NSTP     | DBFMSTP0 | Exit                       | DEDB I/O substitute routine when ADS is closing/closed |
| SVC9     | DBFMSVC9 | Entry, Exit(Shift)         | DEDB set V Command as U command in MLTE                |
| MUHE     | DBFMUHE0 | Entry                      | DEDB Update Log Entry in DMHR                          |
| NUHE     | DBFMUHE0 | Exit                       | DEDB Update Log Entry in DMHR                          |
| MUH1     | DBFMUHE1 | Entry, Exit(Shift)         | DEDB Front End/Back End Elimination                    |
| MUPB     | DBFMUPB0 | Entry                      | DEDB View=MSDB Update Buffer handler                   |
| XUPB     | DBFMUPB0 | Exit                       | DEDB View=MSDB Update Buffer handler                   |
| MVFY     | DBFMVFY0 | Entry                      | DEDB FLD Call Verify Processor                         |
| XVFY     | DBFMVFY0 | Exit                       | DEDB FLD Call Verify Processor                         |
| VSNA     | DBFMVSN9 | Entry, Exit(Shift)         | DEDB Call Handler Verify Segment Name                  |
| FOND     | DBFMVSN9 | Segment Name Found         | DEDB Call Handler Verify Segment Name                  |
| NOTM     | DBFNOTM0 | Entry                      | Intersystem NOTIFY processor                           |
| EOTM     | DBFNOTM0 | Exit                       | Intersystem NOTIFY processor                           |
| PDNA     | DBFPDNA0 | Entry                      | DEDB SETR Positioning                                  |
| PGA5     | DBFPDNA0 | Exit                       | DEDB SETR Positioning                                  |
| PENQ     | DBFPENQ0 | Entry                      | DEDB UOW Resource Enqueue                              |
| NENQ     | DBFPENQ0 | Exit                       | DEDB UOW Resource Enqueue                              |
| PFDS     | DBFPFDS0 | Entry                      | DEDB Unallocate, Unchain, and release ADSC             |
| PGAB     | DBFPGAB0 | Entry                      | DEDB Get Private Buffer or Buffers                     |
| NGAB     | DBFPGAB0 | Exit                       | DEDB Get Private Buffer or Buffers                     |
| PGAP     | DBFPGAP0 | Entry                      | DEDB HSSP Positioning                                  |
| PGAE     | DBFPGAP0 | Exit                       | DEDB HSSP Positioning                                  |
| PGA1     | DBFPGAP0 | New AREA                   | DEDB HSSP Positioning                                  |
| PGA2     | DBFPGAP0 | Previous AREA still active | DEDB HSSP Positioning                                  |
| PGA3     | DBFPGAP0 | Same AREA                  | DEDB HSSP Positioning                                  |
| PGDS     | DBFPGDS0 | Entry                      | DEDB Allocate and Chain ADSC                           |
| PHST     | DBFPHST0 | Entry                      | DEDB HSSP/Utility Process Termination                  |
| PICS     | DBFPICS0 | Entry                      | DEDB HSSP Image Copy Process Setup                     |
| NICS     | DBFPICS0 | Exit                       | DEDB HSSP Image Copy Process Setup                     |
| PIOS     | DBFPIOS0 | Entry                      | DEDB HSSP Image Copy I/O Routine                       |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                          | Comments                                   |
|----------|----------|--------------------------------------|--------------------------------------------|
| IOSH     | DBFPIOS0 | Imac_IC_cursor<br>GT req uow 1st CI  | DEDB HSSP Image Copy I/O Routine           |
| IOSL     | DBFPIOS0 | Imac_IC_cursor LT<br>req uow 1st CI  | DEDB H DEDB HSSP Image Copy I/O<br>Routine |
| IOSE     | DBFPIOS0 | Imac_IC_cursor<br>EQ req uow 1st CI  | DEDB HSSP Image Copy I/O Routine           |
| NIOS     | DBFPIOS0 | Exit                                 | DEDB HSSP Image Copy I/O Routine           |
| PRAB     | DBFPBAB0 | Entry                                | DEDB Release Current UOW Resources         |
| NRAB     | DBFPBAB0 | Exit                                 | DEDB Release Current UOW Resources         |
| PSET     | DBFPSET0 | Entry, Exit(Shift)                   | DEDB HSSP Process Setup                    |
| PULI     | DBFPULI0 | Entry                                | DEDB UOW Lock Mode Initiation              |
| NULI     | DBFPULI0 | Exit                                 | DEDB UOW Lock Mode Initiation              |
| PUL1     | DBFPULI0 | Wait for CI locks<br>to be released  | DEDB UOW Lock Mode Initiation              |
| PUXC     | DBFPUXC0 | Entry                                | DEDB UOW Resource Handler                  |
| NUXC     | DBFPUXC0 | Exit                                 | DEDB UOW Resource Handler                  |
| LUXC     | DBFPUXC0 | Lock Subroutine<br>Entry             | DEDB UOW Resource Handler                  |
| PUXR     | DBFPUXR0 | Entry                                | DEDB Release UXRBS                         |
| NUXR     | DBFPUXR0 | Exit                                 | DEDB Release UXRBS                         |
| BSBP     | DBFSBP10 | Entry                                | MSDB Syncpoint Phase I                     |
| RSBP     | DBFSBP10 | Exit                                 | MSDB Syncpoint Phase I                     |
| BACC     | DBFSBP10 | Use MSDB data<br>for operation       | MSDB Syncpoint Phase I                     |
| RACC     | DBFSBP10 | Use Record data<br>for operation     | MSDB Syncpoint Phase I                     |
| CACC     | DBFSBP10 | Trace Segment to<br>be processed     | MSDB Syncpoint Phase I                     |
| DACC     | DBFSBP10 | After move to<br>EPST work area      | MSDB Syncpoint Phase I                     |
| EACC     | DBFSBP10 | Move MSDB Data                       | MSDB Syncpoint Phase I                     |
| FACC     | DBFSBP10 | Move MSDB Data                       | MSDB Syncpoint Phase I                     |
| BMSG     | DBFSBP10 | Setup Arithmetic<br>Overflow message | MSDB Syncpoint Phase I                     |
| SDEQ     | DBFSDEQ0 | Entry                                | FP Resource Dequeue                        |
| TDEQ     | DBFSDEQ0 | Exit                                 | FP Resource Dequeue                        |
| UOWX     | DBFSDEQ0 | Change UOW<br>Lock Ownership         | FP Resource Dequeue                        |
| SFLD     | DBFSFLD0 | Entry                                | DEDB Syncpoint Phase I FLD Call            |
| RSFL     | DBFSFLD0 | Exit                                 | DEDB Syncpoint Phase I FLD Call            |
| SGAB     | DBFSGAB0 | Entry                                | DEDB Get Buffer from Shared Pool           |
| ZGAB     | DBFSGAB0 | Exit                                 | DEDB Get Buffer from Shared Pool           |
| SHQD     | DBFSHDQ0 | Entry                                | DEDB HSSP Resource Dequeue Phase II        |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                       | Comments                                     |
|----------|----------|-----------------------------------|----------------------------------------------|
| SHDX     | DBFSHDQ0 | Exit                              | DEDB HSSP Resource Dequeue Phase II          |
| HPRE     | DBFSHDQ0 | Trace DMAC                        | DEDB HSSP Resource Dequeue Phase II          |
| HPR1     | DBFSHDQ0 | Application got GC status         | DEDB HSSP Resource Dequeue Phase II          |
| HPR3     | DBFSHDQ0 | Application did not get GC status | DEDB HSSP Resource Dequeue Phase II          |
| HPRA     | DBFSHDQ0 | Sync Abort Flow                   | DEDB HSSP Resource Dequeue Phase II          |
| SIC1     | DBFSIC10 | Entry DBFSIC10                    | DEDB HSSP Image Copy Phase I and Phase II    |
| NIC1     | DBFSIC10 | Exit DBFSIC10                     | DEDB HSSP Image Copy Phase I and Phase II    |
| SIC2     | DBFSIC10 | Entry DBFSIC20                    | DEDB HSSP Image Copy Phase I and Phase II    |
| NIC2     | DBFSIC10 | Exit DBFSIC10                     | DEDB HSSP Image Copy Phase I and Phase II    |
| SICC     | DBFSIC10 | Good Sync, enqueue DMHRSET        | DEDB HSSP Image Copy Phase I and Phase II    |
| SICE     | DBFSIC10 | Last UOW, enqueue TERM AWE        | DEDB HSSP Image Copy Phase I and Phase II    |
| SLGE     | DBFSLGE0 | Entry, Exit(Shift)                | DEDB Sync Log Exit                           |
| SLGE2S   | DBFSLGE2 | Entry                             | DEDB Sync Log Exit for Segment Level Locking |
| SLGE20E  | DBFSLGE2 | Exit                              | DEDB Sync Log Exit for Segment Level Locking |
| SLG2     | DBFSLG20 | Entry, Exit(Shift)                | DEDB Sync/Abort Log Processor                |
| SLOG     | DBFSLOG0 | Entry,Bad Sync(Shift)             | FP Log Processor                             |
| TLOG     | DBFSLOG0 | Exit                              | FP Log Processor                             |
| MP10     | DBFSMP10 | Entry                             | DEDB SDEP Syncpoint Phase I                  |
| SYPB     | DBFSMP10 | New current SDEP Buffer           | DEDB SDEP Syncpoint Phase I                  |
| MP11     | DBFSMP10 | Trace #PA Cis, #required Cis      | DEDB SDEP Syncpoint Phase I                  |
| MP12     | DBFSMP10 | Trace needed CI Space             | DEDB SDEP Syncpoint Phase I                  |
| MP13     | DBFSMP10 | Trace new CI space                | DEDB SDEP Syncpoint Phase I                  |
| NP10     | DBFSMP10 | Exit                              | DEDB SDEP Syncpoint Phase I                  |
| SPIX     | DBFSPIX0 | Entry                             | DEDB Process unused XCRB/DMHR at Sync        |
| XPIX     | DBFSPIX0 | Exit                              | DEDB Process unused XCRB/DMHR at Sync        |
| BSY0     | DBFSYN00 | Entry                             | Pure FP Sync Point Controller                |
| SYN1     | DBFSYN10 | Entry                             | FP Syncpoint Phase I Controller              |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point               | Comments                                          |
|----------|----------|---------------------------|---------------------------------------------------|
| TYN1     | DBFSYN10 | Exit                      | FP Syncpoint Phase I Controller                   |
| SYN2     | DBFSYN20 | Entry, Entry 2nd Call     | FP Syncpoint Phase II Controller                  |
| TYN2     | DBFSYN20 | Exit                      | FP Syncpoint Phase II Controller                  |
| SYP2     | DBFSYP20 | Entry                     | FP Syncpoint Phase II                             |
| TYP2     | DBFSYP20 | Exit                      | FP Syncpoint Phase II                             |
| SYPB     | DBFSYP20 | New current SDEP Buffer   | FP Syncpoint Phase II                             |
| AFCE     | DBFTAFC9 | Entry                     | Analyze FPTCNTRL control cards                    |
| AFCX     | DBFTAFC9 | Exit                      | Analyze FPTCNTRL control cards                    |
| ATCE     | DBFTATC9 | Entry                     | Analyze Trace Calls                               |
| TON0     | DBFTATC9 | Trace ON                  | Analyze Trace Calls                               |
| TOFF     | DBFTATC9 | Trace OFF                 | Analyze Trace Calls                               |
| TSEL     | DBFTATC9 | TOM Table built           | Analyze Trace Calls                               |
| TDAT     | DBFTATC9 | Deactivate Trace          | Analyze Trace Calls                               |
| TACT     | DBFTATC9 | Activate Trace            | Analyze Trace Calls                               |
| ATCX     | DBFTATC9 | Exit without error        | Analyze Trace Calls                               |
| ATCY     | DBFTATC9 | Error Exit                | Analyze Trace Calls                               |
| BLTE     | DBFTBLT9 | Entry                     | Build TOM Table Structure                         |
| BLTX     | DBFTBLT9 | Exit                      | Build TOM Table Structure                         |
| BMIE     | DBFTBMI9 | Entry                     | Build Trace Message In I/O Area                   |
| BMIX     | DBFTBMI9 | Exit                      | Build Trace Message In I/O Area                   |
| COTE     | DBFTCOT9 | Entry                     | Construct Trace Option Table                      |
| COT1     | DBFTCOT9 | Trace before IMODULE LOAD | Construct Trace Option Table                      |
| COT2     | DBFTCOT9 | After call to DBFTBLT9    | Construct Trace Option Table                      |
| ILAR     | DBFTCOT9 | After GETMAIN             | Construct Trace Option Table                      |
| COT3     | DBFTCOT9 | After GETMAIN             | Construct Trace Option Table                      |
| COT4     | DBFTCOT9 | Delete TOM                | Construct Trace Option Table                      |
| COTX     | DBFTCOT9 | Exit without error        | Construct Trace Option Table                      |
| COTY     | DBFTCOT9 | Error Exit                | Construct Trace Option Table                      |
| ABN2     | DBFTDEB9 | Trace without SDWA        | Provide Debugging Information for Abending Module |
| ABN1     | DBFTDEB9 | Trace with SDWA           | Provide Debugging Information for Abending Module |
| FTOE     | DBFTDEB9 | Entry                     | Free Previous TOM                                 |
| FTOX     | DBFTDEB9 | Exit                      | Free Previous TOM                                 |
| TRAF     | DBFTIR1S | Trace OFF                 | DBFIRC10 Connection to FP Trace                   |
| TRAN     | DBFTIR1S | Trace ON                  | DBFIRC10 Connection to FP Trace                   |
| SIEE     | DBFTSIE9 | Entry                     | Setup Initial Environment for FP Trace            |
| SIEX     | DBFTSIE9 | Exit                      | Setup Initial Environment for FP Trace            |



Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                        | Comments                                       |
|----------|----------|------------------------------------|------------------------------------------------|
| STS9     | DBFTSTS9 | Entry                              | Set Trace Suppress Flag                        |
| STSX     | DBFTSTS9 | Exit                               | Set Trace Suppress Flag                        |
| VIAE     | DBFTVIA9 | Entry                              | Verify I/O Area of Trace Call                  |
| TCAL     | DBFTVIA9 | Trace I/O Area                     | Verify I/O Area of Trace Call                  |
| TC01     | DBFTVIA9 | Call is TON or TOFF                | Verify I/O Area of Trace Call                  |
| TC02     | DBFTVIA9 | Call is TSEL                       | Verify I/O Area of Trace Call                  |
| TC03     | DBFTVIA9 | Trace 1st ID in I/O Area           | Verify I/O Area of Trace Call                  |
| VIAX     | DBFTVIA9 | Exit without error                 | Verify I/O Area of Trace Call                  |
| VIAY     | DBFTVIA9 | Error Exit                         | Verify I/O Area of Trace Call                  |
| 24BE     | DBFT24B0 | Entry                              | Trace Get/Put Routines in 24-bit mode          |
| 24BX     | DBFT24B0 | Exit                               | Trace Get/Put Routines in 24-bit mode          |
| UHAC     | DBFUHAC7 | Entry                              | DEDB HSRE Access segment in non reorganized CI |
| UHAX     | DBFUHAC7 | Exit                               | DEDB HSRE Access segment in non reorganized CI |
| UHAR     | DBFUHAR0 | Entry                              | DEDB HS Utility Async Read-Ahead               |
| HAR2     | DBFUHAR0 | Wait for inflight async read ahead | DEDB HS Utility Async Read-Ahead               |
| HAR1     | DBFUHAR0 | Setup SRB for async read ahead     | DEDB HS Utility Async Read-Ahead               |
| UHAX     | DBFUHAR0 | Exit                               | DEDB HS Utility Async Read-Ahead               |
| PCH0     | DBFUHAR0 | Entry to routine UHARPCH0          | DEDB HS Utility Async Read-Ahead               |
| PCH1     | DBFUHAR0 | Found non-HSSP XCRB in UOW         | DEDB HS Utility Async Read-Ahead               |
| PCH2     | DBFUHAR0 | XCRB has DMHR                      | DEDB HS Utility Async Read-Ahead               |
| PCH3     | DBFUHAR0 | Data copied to HSSP buffer         | DEDB HS Utility Async Read-Ahead               |
| PCH4     | DBFUHAR0 | Release DMHR and XCRB              | DEDB HS Utility Async Read-Ahead               |
| PCHX     | DBFUHAR0 | Exit from routine UHARPCH0         | DEDB HS Utility Async Read-Ahead               |
| UHDA     | DBFUHDA0 | Entry                              | DEDB HSRE Process Alloc/Dealloc of IOVF Cis    |
| UHDX     | DBFUHDA0 | Exit                               | DEDB HSRE Process Alloc/Dealloc of IOVF Cis    |
| UHDS     | DBFUHDS0 | Entry                              | DMAC Sync                                      |
| UHDX     | DBFUHDS0 | Exit                               | DMAC Sync                                      |
| UHGS     | DBFUHGS7 | Entry                              | DEDB HSRE Get Space to Copy Segment            |
| UHGX     | DBFUHGS7 | Exit                               | DEDB HSRE Get Space to Copy Segment            |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point                           | Comments                                       |
|----------|----------|---------------------------------------|------------------------------------------------|
| UHIO     | DBFUHIO0 | Entry                                 | DEDB HSRE Read a specified CI                  |
| UHIX     | DBFUHIX0 | Exit                                  | DEDB HSRE Read a specified CI                  |
| UHPR     | DBFUHPR7 | Entry                                 | DEDB HSRE Process Root Chain of RAP CI         |
| UHPX     | DBFUHPR7 | Exit                                  | DEDB HSRE Process Root Chain of RAP CI         |
| UHRD     | DBFUHRD7 | Entry                                 | DEDB HSRE Read Database Record                 |
| UHRX     | DBFUHRD7 | Exit                                  | DEDB HSRE Read Database Record                 |
| UHRE     | DBFUHRE0 | Entry                                 | DEDB HSRE UOW Reorg Mainline                   |
| UHRX     | DBFUHRE0 | Exit                                  | DEDB HSRE UOW Reorg Mainline                   |
| UHSR     | DBFUHSR0 | Entry                                 | DEDB HSRE Mainline                             |
| UHSX     | DBFUHSR0 | Exit                                  | DEDB HSRE Mainline                             |
| UHSS     | DBFUHSS0 | Entry                                 | DEDB High Speed Utility Services               |
| UHS1     | DBFUHSS0 | Wait for inflight<br>async read ahead | DEDB High Speed Utility Services               |
| NHSS     | DBFUHSS0 | Exit                                  | DEDB High Speed Utility Services               |
| UHSI     | DBFUHSS0 | HSSP Image Copy<br>Termination        | DEDB High Speed Utility Services               |
| UMAF     | DBFUMAF0 | Entry                                 | DEDB Utility Page Fix Services                 |
| VMAF     | DBFUMAF0 | Exit                                  | DEDB Utility Page Fix Services                 |
| UMAI     | DBFUMAI0 | Entry                                 | DEDB Utility I/O Services                      |
| ENQR     | DBFUMAI0 | Test for SDEP CI<br>Lock              | DEDB Utility I/O Services                      |
| VMAI     | DBFUMAI0 | Exit                                  | DEDB Utility I/O Services                      |
| UMAL     | DBFUMAL0 | Entry                                 | DEDB Utility Logging                           |
| VMAL     | DBFUMAL0 | Exit                                  | DEDB Utility Logging                           |
| UMAN     | DBFUMAN0 | Entry                                 | DEDB Utility Services                          |
| VMAN     | DBFUMAN0 | Exit                                  | DEDB Utility Services                          |
| UMAV     | DBFUMAV0 | Entry                                 | DEDB Utility Set ADS Available                 |
| VMAC     | DBFUMAV0 | Exit                                  | DEDB Utility Set ADS Available                 |
| UMDS     | DBFUMDS0 | Entry                                 | DEDB Utility DMAC Sync<br>(CONNECT/DISCONNECT) |
| VMDS     | DBFUMDS0 | Exit                                  | DEDB Utility DMAC Sync<br>(CONNECT/DISCONNECT) |
| UMFT     | DBFUMFT0 | Entry                                 | DEDB ADS Format                                |
| VMFT     | DBFUMFT0 | Exit                                  | DEDB ADS Format                                |
| UMMT     | DBFUMMT0 | Entry                                 | DEDB Utility MTO Message Services              |
| UNMT     | DBFUMMT0 | Exit                                  | DEDB Utility MTO Message Services              |
| UMNO     | DBFUMNO0 | Entry                                 | DEDB Utility Notify Partners to Open<br>ADS    |
| VMNO     | DBFUMNO0 | Exit                                  | DEDB Utility Notify Partners to Open<br>ADS    |
| VSCL     | DBFVSCL0 | Entry                                 | DEDB VSO Area Close                            |

Table 249. Fast Path trace entries (continued)

| Trace ID | Module   | Trace point | Comments                    |
|----------|----------|-------------|-----------------------------|
| VSCE     | DBFVSCL0 | Exit        | DEDB VSO Area Close         |
| VSOP     | DBFVSOP0 | Entry       | DEDB VSO Area Open          |
| VSOE     | DBFVSOP0 | Exit        | DEDB VSO Area Open          |
| XPIX     | DBFXPIX0 | Entry       | Free a chain of XCRBs/UXRBS |
| NPIX     | DBFXPIX0 | Exit        | Free a chain of XCRBs/UXRBS |

## IMS shutdown trace table

When IMS begins shutdown processing, IMS populates a trace table for the shutdown activity. The shutdown trace table is included in a dump of the IMS control region, and can help you determine which module is preventing IMS shutdown from completing.

The shutdown trace table is written to memory and contains 64 one-byte entries.

You can find the IMS shutdown trace table in a formatted dump from the pointer to DGA\_SDTT in the Diagnostic Anchor Block (DGA), which is pointed to by SCDDGA in the System Contents Directory (SCD) control block. Each entry is one byte and contains the ID of the module entry or exit point. The table structure is defined in the DFSSDTT macro. Entries are written to the shutdown trace table in the same sequence in which they arrived. When the end of the table is reached, new entries are wrapped to the start of the table and overwrite the oldest existing entries.

The following table shows the trace value for each module entry or exit point. Unused shutdown trace table entries contain zeroes.

Table 250. Trace-to-code-module-name cross reference for the IMS shutdown trace table

| Module name  | Entry | Exit: RC=0 |
|--------------|-------|------------|
| DBFTERM0     | X'40' | X'80'      |
| DBFTERM1(EP) | X'41' | X'81'      |
| DFSCPCP0     | X'42' | X'82'      |
| DFSCST00     | X'43' | X'83'      |
| DFSDLOC0     | X'44' | X'84'      |
| DFSICIO0     | X'45' | X'85'      |
| DFSICLX0     | X'46' | X'86'      |
| DFSICL20     | X'47' | X'87'      |
| DFSIPCP0     | X'48' | X'88'      |
| DFSRCP00     | X'49' | X'89'      |
| DFSRCRT0     | X'4A' | X'8A'      |
| DFSSDL40     | X'4B' | X'8B'      |
| DFSTERM0     | X'4C' | X'8C'      |
| DFSTRM00     | X'4D' | X'8D'      |
| UNLOCK00     | X'4E' | X'8E'      |
| ESSSHUT0     | X'4F' | X'8F'      |

Table 250. Trace-to-code-module-name cross reference for the IMS shutdown trace table (continued)

| Module name | Entry | Exit: RC=0 |
|-------------|-------|------------|
| DFSIPCP1    | X'50' | X'90'      |
| DFSIPCP2    | X'51' | X'91'      |
| DFSIPCP3    | X'52' | X'92'      |
| DFSICM30    | X'53' | X'93'      |
| DFSQC010    | X'54' | X'94'      |
| OTMAPHA1    | X'55' | X'95'      |
| OTMAPHA2    | X'56' | X'96'      |
| OTMAPHA3    | X'57' | X'97'      |
| DFS6ECT0    | X'58' | X'98'      |

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## Bibliography

This bibliography lists all of the publications in the IMS Version 12 library, supplemental publications, publication collections, and accessibility titles cited in the IMS Version 12 library.

For information about the locally installable version of the Information Management Software for z/OS Solutions Information Center, see <http://pic.dhe.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.dzic.doc/installabledzic.htm>.

### IMS Version 12 library

| Title                                                                     | Acronym | Order number |
|---------------------------------------------------------------------------|---------|--------------|
| <i>IMS Version 12 Application Programming</i>                             | APG     | SC19-3007    |
| <i>IMS Version 12 Application Programming APIs</i>                        | APR     | SC19-3008    |
| <i>IMS Version 12 Commands, Volume 1: IMS Commands A-M</i>                | CR1     | SC19-3009    |
| <i>IMS Version 12 Commands, Volume 2: IMS Commands N-V</i>                | CR2     | SC19-3010    |
| <i>IMS Version 12 Commands, Volume 3: IMS Component and z/OS Commands</i> | CR3     | SC19-3011    |
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| <i>IMS Messages and Codes, Volume 2: Non-DFS Messages</i>                 | MC2     | GC18-9713    |
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| <i>IMS Messages and Codes, Volume 4: IMS Component Codes</i>              | MC4     | GC18-9715    |
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### Supplementary publications

| Title                                                                                                                         | Order number |
|-------------------------------------------------------------------------------------------------------------------------------|--------------|
| <i>Program Directory for Information Management System Transaction and Database Servers V12.0</i>                             | GI10-8843    |
| <i>Program Directory for Information Management System Transaction and Database Servers V12.0 Database Value Unit Edition</i> | GI10-8943    |
| <i>IRLM Messages and Codes</i>                                                                                                | GC19-2666    |

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| IMS Version 12 Product Kit | CD     | SK5T-7394    |

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| Title                                  | Order number |
|----------------------------------------|--------------|
| <i>z/OS TSO/E Primer</i>               | SA22-7787    |
| <i>z/OS TSO/E User's Guide</i>         | SA22-7794    |
| <i>z/OS ISPF User's Guide Volume 1</i> | SC34-4822    |

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