IMS

Diagnosis Guide and Reference

Version 9

LY37-3203-02

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Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 615.

Third Edition (December 2006)

This edition replaces or makes obsolete the previous edition, LY37-3203-01. The technical changes for this version are summarized under “Summary of Changes” on page xxi.

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About This Book

This information is available as part of the Information Management Software for z/OS® Solutions Information Center. To view the information within the Information Management Software for z/OS Solutions Information Center, go to http://publib.boulder.ibm.com/infocenter/imzic. This information is also available in PDF and BookManager® formats. To get the most current versions of the PDF and BookManager formats, go to the IMS™ Library page at www.ibm.com/software/data/ims/library.html. To view or download the PDF of this information on the web, you must enter a valid IMS customer number in the Web form that appears after you click the PDF icon for this book.

This book helps system programmers and other diagnostic technicians diagnose internal problems in IMS. It also provides instructions for reporting these problems to IBM®.

Summary of Contents

This book has three sections and several appendixes. Basic concepts presented in each section are outlined below.

Part 1, “Identifying System Problems,” on page 1, guides you in systematically setting up your system so that you can properly collect data about problems that might occur. You then use a set of keywords to search an IBM software support database to determine if the failure has been previously reported and corrected. If it has not, you can use the keyword string when communicating with IBM support representatives.

Part 2, “Data Areas and Record Formats,” on page 63, contains diagrams that show the interrelationships of control blocks for some major IMS functions. This section also includes the layout of various types of records useful in diagnosis.

Part 3, “Diagnostic Aids,” on page 121, describes service aids and other techniques used to detect, trace, and document failures in IMS functions. You will probably want to use this section when your keyword search has been unsuccessful and you need to gather additional information to resolve the problem.

“IMS Keyword Dictionary” on page 543, contains information that you might need while following the procedures in Chapter 4, “Selecting the Keywords,” on page 31 or while analyzing program failures.

All information is valid for a Database Control (DBCTL) environment except where specifically noted. CICS® information is intended only for CICS local-DL/I users.

For a list of all non-IMS publications cited in this book, see the “Bibliography” on page 619.

With IMS Version 9, you can reorganize HALDB partitions online, either by using the integrated *HALDB Online Reorganization* function or by using an external product. In this information, the term HALDB Online Reorganization refers to the integrated HALDB Online Reorganization function that is part of IMS Version 9, unless otherwise indicated.

IMS Version 9 provides an integrated IMS Connect function, which offers a functional replacement for the IMS Connect tool (program number 5655-K52). In this information, the term *IMS Connect* refers to the integrated IMS Connect function that is part of IMS Version 9, unless otherwise indicated.

Prerequisite Knowledge

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

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

IBM Product Names Used in This Information

In this information, the licensed programs shown in Table 1 are referred to by their short names.

Table 1. Licensed Program Full Names and Short Names

Licensed program full name	Licensed program short name
IBM Application Recovery Tool for IMS and DB2®	Application Recovery Tool
IBM CICS Transaction Server for OS/390®	CICS
IBM CICS Transaction Server for z/OS	CICS
IBM DB2 Universal Database™	DB2 Universal Database
IBM DB2 Universal Database for z/OS	DB2 UDB for z/OS
IBM Enterprise COBOL for z/OS and OS/390	Enterprise COBOL
IBM Enterprise PL/I for z/OS and OS/390	Enterprise PL/I
IBM High Level Assembler for MVS™ & VM & VSE	High Level Assembler
IBM IMS Advanced ACB Generator	IMS Advanced ACB Generator
IBM IMS Batch Backout Manager	IMS Batch Backout Manager
IBM IMS Batch Terminal Simulator	IMS Batch Terminal Simulator
IBM IMS Buffer Pool Analyzer	IMS Buffer Pool Analyzer
IBM IMS Command Control Facility for z/OS	IMS Command Control Facility
IBM IMS Connect for z/OS	IMS Connect
IBM IMS Connector for Java™	IMS Connector for Java
IBM IMS Database Control Suite	IMS Database Control Suite
IBM IMS Database Recovery Facility for z/OS	IMS Database Recovery Facility
IBM IMS Database Repair Facility	IMS Database Repair Facility
IBM IMS DataPropagator™ for z/OS	IMS DataPropagator
IBM IMS DEDB Fast Recovery	IMS DEDB Fast Recovery
IBM IMS Extended Terminal Option Support	IMS ETO Support
IBM IMS Fast Path Basic Tools	IMS Fast Path Basic Tools
IBM IMS Fast Path Online Tools	IMS Fast Path Online Tools
IBM IMS Hardware Data Compression-Extended	IMS Hardware Data Compression-Extended
IBM IMS High Availability Large Database (HALDB) Conversion Aid for z/OS	IBM IMS HALDB Conversion Aid
IBM IMS High Performance Change Accumulation Utility for z/OS	IMS High Performance Change Accumulation Utility
IBM IMS High Performance Load for z/OS	IMS HP Load

Table 1. Licensed Program Full Names and Short Names (continued)

Licensed program full name	Licensed program short name
IBM IMS High Performance Pointer Checker for OS/390	IMS HP Pointer Checker
IBM IMS High Performance Prefix Resolution for z/OS	IMS HP Prefix Resolution
IBM z/OS Language Environment	Language Environment
IBM Tivoli® NetView® for z/OS	Tivoli NetView for z/OS
IBM WebSphere® Application Server for z/OS and OS/390	WebSphere Application Server for z/OS
IBM WebSphere MQ for z/OS	WebSphere MQ
IBM WebSphere Studio Application Developer Integration Edition	WebSphere Studio
IBM z/OS	z/OS
IBM z/OS C/C++	C/C++

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:

- Click the Feedback link located at the bottom of every page in the Information Management Software for z/OS Solutions Information Center. The information center can be found at publib.boulder.ibm.com/infocenter/dzichelp/index.jsp.
- Go to the IMS Library page at www.ibm.com/software/data/ims/library.html and click the Library Feedback link, where you can enter and submit comments.
- 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).

Summary of Changes

Changes to the Current Edition of This Book for Version 9

This edition includes technical and editorial changes.

The following information has changed significantly:

- Chapter 7, “SYS—System Service Aids,” on page 127
- Chapter 8, “DB—Database Service Aids,” on page 255
- Chapter 9, “DC—Data Communication Service Aids,” on page 325
- Chapter 15, “RSR—Remote Site Recovery Service Aids,” on page 481
- “IMS Keyword Dictionary” on page 543

Changes to This Book for IMS Version 9

New information on the following enhancements is included:

- /DIAGNOSE Command for Serviceability: “/DIAGNOSE Command SNAP Function” on page 191.
- DBRC Enhancements: Table 115 on page 448.
- FP Serviceability/Usability:
  - “Fast Path Trace” on page 252.
  - Table 36 on page 195.
- HALDB Online Reorganization Support:
  - Table 8 on page 127.
  - “Format of X’29’ Log Record” on page 142.
- OTMA Serviceability and Usability Enhancements: “OTMA Diagnostic Aids” on page 399.

New chapters and appendixes added:

- Chapter 17, “CSL Diagnosis,” on page 537
- “Fast Path Trace Entries” on page 593

Significant changes to Chapter 1, “Setting Up Your System,” on page 3, including:

- “Setup Recommendations for z/OS” on page 3
- “Setup Recommendations for IMS” on page 5
- “Management of Standard Documentation” on page 11

Significant changes to Chapter 2, “Collecting Data about Problems,” on page 17, including:

- “Diagnosing a DBRC Related Problem” on page 21
- “Diagnosing CQS-Related Problems” on page 24
- “Diagnosing ESAF Interface Problems” on page 25
- “Diagnosing Database Problems” on page 25
- “Diagnosing RRS Problems” on page 26
- “Diagnosing MSC-Related Problems” on page 27

Significant changes to Chapter 6, “Data Areas and Record Formats,” on page 65, including:

- “DL/I Record Formats” on page 113

Significant changes toChapter 7, “SYS—System Service Aids,” on page 127, including:

- “Common Trace Table Interface” on page 191

- "Online Recovery Manager Trace" on page 307
- "Common Service Layer Trace" on page 198

Significant changes to Chapter 8, "DB—Database Service Aids," on page 255, including:

- "DL/I Trace" on page 265

Significant changes to Chapter 16, "CQS Diagnosis," on page 523, including:

- "CQS Structure Rebuild Problems" on page 527

In addition to the changes mentioned above, this book has undergone a major upgrade since IMS Version 8, with all chapters being reviewed, upgraded, or changed accordingly.

Library Changes for IMS Version 9

Changes to the IMS Library for IMS Version 9 include the addition of one title, a change of one title, organizational changes, and a major terminology change. Changes are indicated by a vertical bar (|) to the left of the changed text.

The IMS Version 9 information is now available in the Information Management Software for z/OS Solutions Information Center, which is available at publib.boulder.ibm.com/infocenter/dzichelp/index.jsp. The Information Management Software for z/OS Solutions Information Center provides a graphical user interface for centralized access to the product information for IMS, IMS Tools, DB2 Universal Database (UDB) for z/OS, DB2 Tools, and DB2 Query Management Facility (QMF™).

New and Revised Titles

The following list details the major changes to the IMS Version 9 library:

- *IMS Version 9: IMS Connect Guide and Reference*

  The library includes new information: *IMS Version 9: IMS Connect Guide and Reference*. This information is available in softcopy format only, as part of the Information Management Software for z/OS Solutions Information Center, and in PDF and BookManager formats.

  IMS Version 9 provides an integrated IMS Connect function, which offers a functional replacement for the IMS Connect tool (program number 5655-K52). In this information, the term *IMS Connect* refers to the integrated IMS Connect function that is part of IMS Version 9, unless otherwise indicated.
- The information formerly titled *IMS Version 8: IMS Java User's Guide* is now titled *IMS Version 9: IMS Java Guide and Reference*. This information is available in softcopy format only, as part of the Information Management Software for z/OS Solutions Information Center, and in PDF and BookManager formats.
- To complement the IMS Version 9 library, a retail book, *An Introduction to IMS* by Dean H. Meltz, Rick Long, Mark Harrington, Robert Hain, and Geoff Nicholls (ISBN # 0-13-185671-5), is available from IBM Press. Go to the IMS Web site at www.ibm.com/ims for details.

Organizational Changes

Organization changes to the IMS Version 9 library include changes to:

- *IMS Version 9: Customization Guide*
- *IMS Version 9: IMS Java Guide and Reference*
- *IMS Version 9: Messages and Codes, Volume 1*
- *IMS Version 9: Utilities Reference: System*

I A new appendix has been added to the *IMS Version 9: Customization Guide* that describes the contents of
I the ADFSSMPL (also known as SDFSSMPL) data set.

The chapter titled ″DLIModel Utility″ has moved from *IMS Version 9: IMS Java Guide and Reference* to *IMS Version 9: Utilities Reference: System*.

The DLIModel utility messages that were in *IMS Version 9: IMS Java Guide and Reference* have moved to *IMS Version 9: Messages and Codes, Volume 1*.

Terminology Changes

IMS Version 9 introduces new terminology for IMS commands:

type-1 command
A command, generally preceded by a leading slash character, that can be entered from any valid IMS command source. In IMS Version 8, these commands were called *classic* commands.

type-2 command
A command that is entered only through the OM API. Type-2 commands are more flexible than type-2 commands and can have a broader scope. In IMS Version 8, these commands were called *IMSplex* commands or *enhanced* commands.

Accessibility features for IMS

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 IMS. These features support:

- Keyboard-only operation.
- Interfaces that are commonly used by screen readers.

Note: The Information Management Software for z/OS Solutions Information Center, which is available at publib.boulder.ibm.com/infocenter/dzichelp/index.jsp, and its related publications are accessibility-enabled for the IBM Home Page Reader. You can operate all features using the keyboard instead of the mouse.

Keyboard navigation

You can access the information center and IMS ISPF panel functions by using a keyboard or keyboard shortcut keys.

You can find information about navigating the information center using a keyboard in the information center home at publib.boulder.ibm.com/infocenter/dzichelp/index.jsp.

For information about navigating the IMS ISPF panels using TSO/E or ISPF, refer to the *z/OS V1R1.0 TSO/E Primer*, the *z/OS V1R5.0 TSO/E User's Guide*, and the *z/OS V1R5.0 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.

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.

Part 1. Identifying System Problems

Chapter 1. Setting Up Your System

IMS can process large amounts of work efficiently; it is a very complex product. As a result of this complexity, IMS can experience problems that need to be diagnosed and corrected. The following are examples of problems that you might encounter while running IMS:

- 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.
- 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 will need to be sure your system is set up correctly. To ensure that you have gathered all of the correct data to diagnose a problem, set up your system according to the recommendations in the following:

Setup Recommendations for z/OS

This topic gives specific recommendations on how to optimally set up your z/OS system:

System Trace Table

Set z/OS system trace table size to 999 KB:

- The default size is only 64 KB.
- You can specify the z/OS command `TRACE ST,999K` in the z/OS COMMNDxx member of the SYS1.PARMLIB data set. See the *z/OS MVS System Commands* manual for more information.
- Advantages:
  - The z/OS system trace table is extremely valuable for a large variety of problem types.
- Considerations:
  - The system trace table is page-fixed storage.
  - You must ensure that there are enough real page frames for this specification.

Set z/OS Master Trace Table size to 500 KB:

- Default size is only 24 KB, which allows approximately 336 messages. A 500K specification allows approximately 7000 messages.

- You can specify `TRACE MT,500K` in the SCHEDxx member of the SYS1.PARMLIB data set. See the *z/OS MVS Diagnosis: Tools and Service Aids*, *z/OS MVS Initialization and Tuning Guide*, and *z/OS MVS System Commands* manuals for complete details.
- Advantages:
  - The master trace maintains a table of the most recently issued operator messages.
  - The master trace allows view of external events at the time of failure.
- Considerations:
  - Ensure that the master trace table is large enough to span most error time frames.
  - The master trace uses Subpool 229 Key 0 High Private Pageable Storage of the master scheduler address space.

Common Storage Tracker

To track ownership of the Common Service Area (CSA) and the Extended Common Service Area (ECSA), turn on the z/OS common storage tracking function.

- Use the DIAGxx member of the SYS1.PARMLIB data set to contain the request. Specify `DIAG=xx` in the IPL system parameters or use the `SET DIAG=xx` operator command.
  - For example, in the DIAGxx member:

    ```
    VSM TRACK CSA(ON)
    ```

    See the *z/OS MVS Diagnosis: Tools and Service Aids*, *z/OS MVS Initialization and Tuning Guide*, and *z/OS MVS System Commands* manuals for complete details.
- Advantages:
  - Supervisor call (SVC) dumps (or RMF™ reports) provide CSA/ECSA ownership information with job name, time, and requesting module information.
- Considerations:
  - Performance can be degraded and extended system queue area (ESQA) is used proportionally to the CSA workload.

CHNGDUMP MAXSPACE

Ensure that an adequate `CHNGDUMP MAXSPACE` value is specified to hold the internal supervisor call (SVC) dump.

- Use the COMMNDxx member of the SYS1.PARMLIB data set to issue the appropriate `CHNGDUMP` command during IPL.
  - For example: `CD SET,SDUMP,MAXSPACE=1000M`
    - Default size is 500 MB
    - 2500 MB is standard for large multi-address space SVC Dumps.
  - See the *z/OS MVS Diagnosis: Tools and Service Aids*, *z/OS MVS Initialization and Tuning Guide*, and *z/OS MVS System Commands* manuals for complete details.
- Advantages:
  - Higher likelihood that SVC dumps are captured in their entirety without worry of partial dump.
- Considerations:
  - Ensure that local page data sets are large enough to contain their normal peak load, plus additional SVC dumps.
  - See the *z/OS MVS Initialization and Tuning Guide* for more information.

Automatic Dump Data Set Allocation

Ensure that automatic dump data set allocation is in place.

- Use the COMMNDxx member of the SYS1.PARMLIB data set to issue the appropriate DUMPDS commands to set up dump data set allocations:

- DUMPDS NAME=, DUMPDS ADD, and DUMPDS ALLOC=ACTIVE.
- See the *z/OS MVS Diagnosis: Tools and Service Aids* and *z/OS MVS System Commands* manuals for complete details.

- Advantages:
  - SVC dumps are allocated to the correct size without worry of partial dump.
- Considerations:
  - Ensure that the assigned storage class has enough space for the SVC dump storage requirements.

Ensuring That the Sizes of SYS1.DUMPxx Data Sets Are Correct

The SYS1.DUMPxx data sets should be large enough to contain up to 7 IMS regions in one dump data set. IMS attempts to dump the CTL, DL/I, DBRC, IRLM, and possibly one dependent region, into the SYS1.DUMP data set. IMS also attempts to dump the CQS or SCI regions, or both, if they are being used. For some large installations, the required size can be more than 500 cylinders of 3390 DASD. The mixture of IMS specifications, z/OS specifications, and IMS processing requirements produce different usage of storage, and therefore, different sizes of IMS dumps.

Follow these recommendations to find a safe SYS1.DUMPxx data set size:

- Allocate a SYS1.DUMP data set using the following z/OS DUMP command to obtain an IMS dump for estimation purposes:

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

  This will produce a very large dump. 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 Large IMS dependent region job name

  j4 is the IRLM region job name (If IRLM DB Locking used)

  j5 is the DBRC region job name

  j6 is the CQS region name (if IMS is using CQS for shared queues or shared expedited message handling (EMH))

  j7 is the SCI region (if IMS is using structured call interface (SCI))

  The SYS1.DUMPxx data sets can be dynamically allocated.
- Take the dump of these regions during a period of high workload, if possible.

After the dump completes, its size can be referenced as a *minimum* size and increased, with an acceptable buffer allowance, for peak periods.

Setup Recommendations for IMS

The following topics provide specific recommendations on how to optimally set up your IMS system:

- "FMTO Option"
- "SYSMDUMP DD" on page 6
- "Table Traces" on page 6
- "Interactive Dump Formatter" on page 7
- "External Trace Environment" on page 7

FMTO Option

Specify the FMTO=D IMS control region EXEC parameter value.

- This parameter produces a system dump (SDUMP) for terminating and non-terminating errors, specifically, DB2 and dynamic-allocation abends. Non-terminating errors include:
  - IMS dynamic allocation failures.
  - Some external subsystem attach facility (ESAF) failures.

A SYSMDUMP, SYSABEND, or SYSUDUMP is produced only if SDUMP fails.

SYSMDUMP DD

- Specify the SYSMDUMP DD statement in JCL of the following IMS regions:
  - IMS CTL (control)
  - IMS DLI (data language interface)/SAS (separate address space)
  - IMS DBRC (Database Recovery Control)
- The SYSMDUMP specification is used by IMS if SDUMP processing fails.
- You should specify the following dump options in the SYS1.PARMLIB(IEADMR00) member to ensure that adequate areas of z/OS storage are dumped to diagnose the problem under most circumstances:

  ```
  SDATA=(CSA,LSQA,RGN,SQA,SUM,SWA,TRT)
  ```

- Specify the SYSUDUMP DD statement in JCL of IMS Dependent Regions. The SYSUDUMP specification is used by IMS dependent regions for failure events.
- You should specify the following dump options in the z/OS SYS1.PARMLIB(IEADMP00) member to ensure that adequate areas of z/OS storage are dumped:

  ```
  SDATA=(CB,ERR,SUM) PDATA=(JPA,LPA,PSW,REGS,SA,SPLS)
  ```

Table Traces

- Set the IMS Dispatcher, Scheduler, DL/I, and Lock traces on. Perform one of the following:
  - The DL/I and LOCK traces are set on by default when IMS initializes.
  - To set the DISP and SCHED traces on, specify the following options in the DFSVSMxx member of the IMS.PROCLIB data set:

    ```
    DISP=ON, SCHD=ON
    ```

  - Use the IMS `/TRA SET ON TABLE` *nnnn* command, where *nnnn* is alternately = DISP, SCHD, DLI, or LOCK.
- You should turn on the LATCH trace only in non-production environments.

  The LATCH trace can carry a large amount of overhead, so it is not recommended as a default in a production environment.

Recommendation: Use the IMS LATCH trace for all test systems. Your system might experience measurable performance reduction if the LATCH trace is active in production. To set the LATCH trace on, specify `LATC=ON` for the LATCH trace in the DFSVSM*xx* member of the IMS.PROCLIB data set. See the section “Member DFSVSM*xx*” in *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.

Setting the z/OS System Trace Table Size

The z/OS system trace is useful for many types of z/OS problems. At times, it is the only means of reconstructing a problem. The larger you can specify the size of the trace table, the better the chance of diagnosing some of the more intricate problems encountered while running IMS. Specify the z/OS command `TRACE ST,999K` in the z/OS COMMNDxx member of the SYS1.PARMLIB data set so that the trace table size is in effect during IPL. If you do not specify a trace table size, the default size is 64 KB. If your installation has a limited number of real page frames, remember that the system trace table is page fixed. If you specify the dump option `SDATA=(TRT)`, the dump size will increase.

Setting the z/OS Master Trace Table Size

The z/OS master trace table contains a buffer of messages from the z/OS master console. These messages are saved in the SDUMP data set and can be viewed using IPCS to aid in problem diagnosis.

Specify the z/OS command `TRACE MT,100K` in the z/OS SCHEDxx member of the SYS1.PARMLIB data set so that the trace table size is in effect during IPL. If you do not specify a trace table size, the default size is 64 KB.

Interactive Dump Formatter

Install the IMS Interactive Dump Formatter:

- The Interactive Dump Formatter provides IPCS (Interactive Problem Control System) menu driven dump analysis.
- The Interactive Dump Formatter is highly effective for RSV (Remote Screen Viewing) users.

For more information about using the interactive dump formatter, see “Interactive Dump Formatter” on page 179.

External Trace Environment

- IMS external tracing allows for IMS trace table output to be placed on IMS trace data sets rather than on the IMS OLDS (online data set) when:
  - The DISP=OUT option is used in the DFSVSMxx member of the PROCLIB data set.
  - The LOG option is used with the IMS TRACE commands.
- Using external trace can increase IMS system throughput.
- External trace data sets are allocated in the following order:
  1. DASD JCL: DFSTRA01 and DFSTRA02 DD statement.
  2. DASD MDA: DFSTRA01 and DFSTRA02 Dynamic Allocation Members.
  3. TAPE MDA: DFSTRA0T Dynamic Allocation Member.
  4. IMS OLDS: If none of the above are found.

For more information, see “Setting Up the External Trace Environment” on page 8.

CQS Trace Setup Recommendations

This topic gives specific recommendations on how to optimally set up your CQS (Common Queue Server) system:

- “Trace Environment - Conservative”
- “Trace Environment - More Aggressive”

Trace Environment - Conservative

Specify the CQS execution parameter BPECFG=*nnnnnnnn*:

- Specify the following trace entries within the BPECFG=*nnnnnnnn* Proclib member:

```
--DEFINITIONS FOR BPE SYSTEM TRACES
TRCLEV=(AWE,LOW,BPE) /* AWE SERVER TRACE *
TRCLEV=(CBS,LOW,BPE) /* CONTROL BLK SRVCS TRACE *
TRCLEV=(DISP,LOW,BPE) /* DISPATCHER TRACE *
TRCLEV=(LATC,LOW,BPE) /* LATCH TRACE *
TRCLEV=(SSRV,LOW,BPE) /* GEN SYS SERVICES TRACE *
TRCLEV=(STG,LOW,BPE) /* STORAGE TRACE *
TRCLEV=(USRX,LOW,BPE) /* USER EXIT TRACE *
--DEFINITIONS FOR CQS TRACES
TRCLEV=(CQS,LOW,CQS) /* CQS GENERAL TRACE *
TRCLEV=(STR,LOW,CQS) /* CQS STRUCTURE TRACE *
TRCLEV=(INTF,LOW,CQS) /* CQS INTERFACE TRACE *
```

Trace Environment - More Aggressive

Specify the CQS execution parameter BPECFG=*nnnnnnnn*:

- Specify the following trace entries within the BPECFG=*nnnnnnnn* proclib member:

```
--DEFINITIONS FOR BPE SYSTEM TRACES
TRCLEV=(AWE,HIGH,BPE,PAGES=24)/*AWE SERVER TRACE */
TRCLEV=(CBS,MEDIUM,BPE,PAGES=12)/*CONTROL BLK SRVCS TRACE */
TRCLEV=(DISP,HIGH,BPE,PAGES=36)/*DISPATCHER TRACE */
TRCLEV=(LATC,HIGH,BPE,PAGES=72)/*LATCH TRACE */
TRCLEV=(SSRV,HIGH,BPE,PAGES=6)/*GEN SYS SERVICES TRACE */
TRCLEV=(STG,LOW,BPE,PAGES=12)/*STORAGE TRACE */
TRCLEV=(USRX,MEDIUM,BPE,PAGES=12)/*USER EXIT TRACE */
--DEFINITIONS FOR CQS TRACES */
TRCLEV=(CQS,HIGH,CQS,PAGES=12)/*CQS GENERAL TRACE */
TRCLEV=(STR,MEDIUM,CQS,PAGES=24)/*CQS STRUCTURE TRACE */
TRCLEV=(INTF,HIGH,CQS,PAGES=24)/*CQS INTERFACE TRACE*/
```

Installing the IMS Dump Formatter

Install the IMS interactive dump formatter. For more information on installing the IMS Dump Formatter, see the section titled “IMS Dumping and Dump Formatting Options” in *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.

The IMS dump formatter can be used to format either the complete IMS dump, or only those sections needed to analyze the problem. The interactive dump formatter is IPCS-based and uses an ISPF (Interactive Systems Productivity Facility) dialogue to allow you to view a specific control block.

See “Interactive Dump Formatter” on page 179 for more information about using the interactive dump formatter.

Setting Up the External Trace Environment

You can request external tracing by starting traces with the `OUT` option, or by entering the `/TRACE SET ON TABLE xxxxx OPTION LOG` command to start the trace with the LOG option.

You can start certain traces at IMS initialization with these methods:

- For online systems, specify the appropriate trace keywords on the `OPTIONS` statement in IMS.PROCLIB member DFSVSMxx.
- For a batch environment, specify the appropriate trace keywords on the `DFSVSAMP DD` statement.

You can also turn tracing off or on by using the `/TRACE` command.

See section “Member DFSVSM*xx*” in *IMS Version 9: Installation Volume 2: System Definition and Tailoring* for more information.

The following topics provide additional information:

- “Control the Volume of Traces”
- “Activate Fast Path Traces” on page 9
- “Write Trace Tables Externally” on page 9
- “Create Output Data Sets with Correct Attributes” on page 10
-

Control the Volume of Traces

Control the volume of the traces using the trace volume. It can be set to *High, Medium*, or *Low*, where *High* generates the largest volume of trace entries, and *Low* generates the smallest volume of trace entries.

For details about the `/TRACE` command parameters, refer to *IMS Version 9: Command Reference*. For details about the `OPTIONS` statement in the DFSVSAMP or DFSVSMxx data set, see *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.

Recommendation: Ensure that your IMS environment is running with the following traces on at all times:

- Dispatcher
- DL/I
- Lock
- Scheduler

None of these traces causes a noticeable performance impact, and each of these can be extremely helpful to you in diagnosing a variety of problems that might occur in your environment.

Note: The DL/I and LOCK traces are set on as a default at IMS initialization.

Activate Fast Path Traces

In a Database Control (DBCTL) environment, you can trace DL/I and Fast Path activity. You turn on the DL/I trace in the same way as in a DB/DC environment. The trace records for coordinator controller (CCTL) threads contain the recovery token that can help you correlate CCTL tasks with DBCTL threads.

Activate Fast Path tracing in one of the following ways:

- The DBCTL operator can enter the `/TRACE SET ON TABLE FAST` command. This is the same way you activate the trace in a DB/DC environment. In both DBCTL and DB/DC environments you must also specify the FPTRACE DD statement in the IMSFP procedure, which is described in *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.
- The CCTL decides which transactions to trace and directs DBCTL to activate the trace for those transactions. After the transaction completes, the trace output file is closed and sent to the SYSOUT data set, class A. However, when certain transactions fail in Fast Path processing and the trace is not already active, the Database Resource Adapter (DRA) recommends to the CCTL that Fast Path tracing be activated. The failures for which tracing is recommended are based on the list that IMS uses for Fast Path Transaction Retry. The CCTL can then direct DBCTL (through the DRA) to activate Fast Path tracing the next time that transaction is scheduled.

Write Trace Tables Externally

You can write the in memory trace tables to an external device, tape data set, or to the OLDS (online data set).

When the IMS MTO starts IMS trace table traces with the `LOG` option, the following selection order determines where the external traces are written.

DASD JCL DD statements are checked to verify that DFSTRA01 or DFSTRA02 are present. If either or both are present, the JCL specified DASD external trace data sets are used if possible.

DASD MDA An attempt is made to dynamically allocate and open DFSTRA01 and DFSTRA02 using dynamic allocation members. If either or both dynamic allocations succeed, the DASD external trace data sets are used if possible.

TAPE MDA An attempt is made to dynamically allocate and open member DFSTRA0T. If the dynamic allocation succeeds, the external trace tapes are used if possible.

IMS log data set
The IMS log data set is used for external trace. Because of the performance effects of logging trace data to the online log data set, the operator is asked to approve tracing to the online log data set when external trace data sets cannot be used.

To print the X'67FA' records, use the File Select and Formatting Print utility (DFSERA10), and specify exit DFSERA60 to format the trace entries.

DFSTRA01 and DFSTRA02 are the external trace data sets used by the IMS online systems. The trace data sets are used when the trace table `OUT` parameter is used in the DFSVSMxx options statement, or

when the /TRACE START ON TABLE *nnn* option log command is used. The trace data sets are used in a wrap-around fashion. For example, when DFSTRA01 fills, DFSTRA02 is used; when DFSTRA02 fills, DFSTRA01 is used.

Recommendation: You must remember to offload the trace data set before it is reused. Use the IEBGENER utility to offload the data set.

Create Output Data Sets with Correct Attributes

Create the DFSTRA01 and DFSTRA02 trace data sets with the following attributes, in order for you to use them to hold your trace data:

| **DSORG** PS (Physical Sequential)

RECFM VB

LRECL 4004

BLKSIZE A formula of: (LRECL*N)+4. The block size must be a multiple of the LRECL (4004), with the additional 4 bytes for the block descriptor word. IBM recommends a BLKSIZE of 20024, which is 5 logical records in length (4004 bytes, multiplied by 5), plus the block descriptor word (4 bytes). The BLKSIZE of 20024 is recommended for current DASD because it is equal to one-half track.

Recommendation: These data sets must be allocated as a single extent, meaning contiguous tracks. Do not specify secondary allocation.

In order to use a tape to hold the external trace data set, you must use the DFSTRA0T data set. DFSTRA0T must be dynamically allocated with the following attributes:

| **DSORG** PS (Physical Sequential)

RECFM VB

LRECL 4004

BLKSIZE A formula of: (LRECL*N)+4. The block size must be a multiple of the LRECL (4004), with the additional 4 bytes for the block descriptor word.

In order to dynamically create these data sets, use the following JCL example.

```
/STEP    EXEC IMSDALOC
//SYSIN     DD  *
DFSMDA TYPE=INITIAL
DFSMDA TYPE=TRACE,DDNAME=DFSTRA01,DSNAME=IMS41.DFSTRA01
DFSMDA TYPE=TRACE,DDNAME=DFSTRA02,DSNAME=IMS41.DFSTRA02
DFSMDA TYPE=TRACE,DDNAME=DFSTRAT2,DSNAME=IMS41.DFSTRA0T
DFSMDA TYPE=FINAL
END
```

Setting Up CQS, OM, RM, and SCI Tracing

The PROCLIB member that you specify using the BPECFG= parameter in the CQS (common queue server), OM (Operations Manager), RM (Resource Manager), and SCI (Structured Call Interface) execution parameters defines configuration parameters to BPE. The TRCLEV= parameter is used in the BPE configuration PROCLIB member to specify the trace level for a trace table and, optionally, the number of pages of storage allocated for the trace table. You can specify one TRCLEV= parameter for each trace table type that BPE, CQS, OM, RM, and SCI support. These trace tables are internal in memory tables only. Trace records are not written to any external data sets.

| Specify the following trace entries within the BPECFG=*nnnnnnnn* Proclib member:

```
--DEFINITIONS FOR BPE, CQS, OM, RM AND SCI SYSTEM TRACES
TRCLEV=(*,HIGH,BPE) /*DEFAULT ALL BPE TRACES TO HIGH*/
TRCLEV=(*,HIGH,CQS) /*DEFAULT ALL CQS TRACES TO HIGH*/
TRCLEV=(*,HIGH,OM)  /*DEFAULT ALL OM  TRACES TO HIGH*/
TRCLEV=(*,HIGH,RM)  /*DEFAULT ALL RM  TRACES TO HIGH*/
TRCLEV=(*,HIGH,SCI) /*DEFAULT ALL SCI TRACES TO HIGH*/
```

Related Reading: For more information see the section titled ″BPE Definition and Tailoring″ in the *IMS Version 9: Base Primitive Environment Guide and Reference* and “CQS Trace Setup Recommendations” on page 7.

Management of Standard Documentation

This topic discusses how to preserve documentation that can be helpful near the time of error. Consider implementing normal operating procedures for the following tasks:

- “z/OS Console (Syslog) Preservation”
- “JES JOBLOG Preservation”
- “IMS Master Console Log Preservation” on page 12
- “SYS1.LOGREC Preservation” on page 12
- “Dump Preservation” on page 12
- “IMS OLDS and SLDS Preservation” on page 12

z/OS Console (Syslog) Preservation

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

JES JOBLOG Preservation

The JES JOBLOG should be saved 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

IMS Master Console Log Preservation

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

SYS1.LOGREC Preservation

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

Dump Preservation

All associated IMS dumps should be retained:

- 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.

IMS OLDS and SLDS Preservation

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
- Structure Call Interface
- Troublesome IMS dependent regions
- CCTL regions
- ODBA
- IXGLOGRC
- RRS
- APPC
- VTAM®
- WLM
- TCPIP
- WebSphere
- ESAF - DB2, MQSeries®, others
- Other regions
- Other IMSplex members with all their related regions

Dumps are discussed in the following sections:

- "Deciding When to Dump"
- "IMS Dump Techniques"
- "IEADMCxx, z/OS SYS1.PARMLIB" on page 14
- "IMS Sysplex Dump Considerations" on page 14

Deciding When to 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.

IMS Dump Techniques

IMS SVC dumps can be requested using various techniques:

- z/OS SYS1.PARMLIB IEADMCxx
  - DUMP command parmlib member available with OS/390 V2R6.0 and later
- 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

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

- DUMP command parmlib member (for OS/390 operating systems V2R6.0 and later).
- Can be used to customize IMS dumps prior to error event.
- Simple operator interface.
- Create SYS1.PARMLIB members called IEADMCxx for each customized dump command. See *z/OS MVS Initialization and Tuning Guide* and *z/OS MVS System Commands* for more detailed information.

IEADMCxx Example for IMS

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

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)
```

Two dump data sets are created on the z/OS image from which the dump command was entered.

IMS Sysplex Dump Considerations

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

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

| 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 Problems

When you report a problem to the IBM Support Center, it is very important that you collect the problem information to help document what went wrong at your installation. Having this information available when you call IBM can save you time because you might not need to recreate the problem. When you decide you need to document a system problem, follow these steps:

1. When the problem occurs, collect the symptom data and determine what type of problem it is.
2. Once you determine the type of problem, use the procedures recommended to diagnose the problem. This will help you determine if the problem is an IMS problem or a user problem.
3. If it 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. Perform the search. You might have 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.

In this section:

Collecting Data about General Problems

Depending on the complexity of the problem, you might need to gather the following information:

- SYSLOG

  Save the SYSLOG from time of IMS start up. The SYSLOG is useful when the dumped MTRACE buffer is not large enough to contain all necessary error messages.
- LOGREC data set

  Save the LOGREC data set from IMS start up time. z/OS failures are logged internally.
- IMS master console log

  Save the master console log from IMS start up time. The master console log provides a different message set than the SYSLOG.
- IMS log data sets

  Save the IMS online data sets active at the time of the error.
  - IMS system log data sets (SLDS)

    Save the SLDS from IMS start up time.

  The IMS log data sets enable you to track IMS transaction and database activity; the tracking is critical for proper diagnosis of many IMS problems.
- JES job log of jobs related to failure

  Save the JES job log from IMS start up time. The JES job log provides JCL start up parameters and isolated system messages.
- Any dumps produced

  Multiple SYS1.DUMP data sets are sometimes produced. Examine SYSMDUMPs if there is a primary SYS1.DUMP failure. Also, examine SYSUDUMPs for IMS dependent regions or ABENDU0002 SYSUDUMPs for wait or hang problems.
- z/OS log data sets produced

  Save the current z/OS log data sets for the failing CQS jobstream. The z/OS log data sets provide information for structure rebuild and checkpoint related problems.

Collecting Data about Specific Problems

Occasionally, there are problems in specific environments, or for certain problem types, that require special handling. These types of problems are discussed in the following:

Diagnosing a Control Region Wait or Hang

When an IMS control region waits or hangs, IMS can take on various appearances from being completely frozen, to losing a partial function. The most critical piece of information 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 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

Also, consider dumping related regions:

- IMS Control region
- IMS DLI/SAS region
- DBRC region
- IRLM region
- CQS
- Operations Manager
- Resource Manager

- Structure Call Interface
- Troublesome IMS dependent regions
- CCTL regions
- ODBA
- IXGLOGRC
- RRS
- APPC
- VTAM
- WLM
- TCPIP
- WebSphere
- ESAF - DB2, MQSeries, others
- Other Regions
- Other IMSplex members with all their related regions

Most likely, a dump of the IMS CTL, DL/I, and suspicious dependent region or CCTL is sufficient to solve wait or hang problems. Occasionally, the DBRC and IRLM (if used for DB locking) regions can become a factor. So, DBRC and IRLM should also be included.

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.

Diagnosing a Control or DL/I Region Loop

If IMS 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 in a separate `/TRA` command.
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. 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.

Diagnosing an IMS Dependent Region Wait or Loop

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
   ```

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

   j5 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.

Diagnosing a DB2 ESS Interface Problem

IMS DB2 ESS interface problems are fairly rare, and therefore, can be difficult to diagnose. The IMS ESS trace is costly (it impacts performance) so it is unwise to activate it on a regular basis. Turn on the trace when you notice a problem or if you need to recreate a problem. If you are diagnosing a problem involving the DB2 ESS interface, follow these steps:

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

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

   The SUBS trace is more complete if a successful ESS call is performed before the failure, and activates tracing at a lower level.
2. Obtain dumps of the IMS CTL and involved dependent regions, before and after the failure, 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
   ```
3. Obtain a z/OS SVC dump of DB2 MSTR and DBM1 regions with 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 modules and their contents are explained in *DB2 UDB for OS/390 and z/OS Diagnosis Guide and Reference*. 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, use the following command to monitor the IMS data set:

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

Diagnosing a DBRC Related Problem

DBRC related problems can manifest themselves in a variety of symptoms, including waits and loops. If you need to recreate the problem, copies of the RECON listing, before and after the problem occurred, are most useful. To diagnose a DBRC related problem you will need the following information:

- Obtain a listing of the DBRC RECONs for the time frame that is as close as possible to failure time.
  - Use the Recovery Control Utility (DSPURX00) `LIST.RECON` command to obtain the listing.
- Obtain a subsystem listing if you cannot obtain a RECON listing because of its size.
  - Use the Recovery Control Utility (DSPURX00) `LIST.SUBSYS ALL` command to obtain a subsystem listing.
- If recreates are possible, obtain them before and after copies of the RECONs.
- Use the `D GRS,CONTENTION` command on each system sharing the RECON to determine if the RECON is held at the exclusion of other waiters. If so, dump the owning address space:

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

Diagnosing a DBCTL Related Problem

DBCTL related problems can be centered in either the CCTL region or in one of the IMS regions (CTL, DL/I, DBRC, or IRLM). So, it is important to obtain dumps relating to all these regions.

1. Use the following IMS commands to aid in problem diagnosis because they include region ID numbers and recovery tokens in their various display output:

   ```
   /DISPLAY ACTIVE
   ```

   and

   ```
   /DISPLAY CCTL
   ```

   The information from these commands will greatly increase the accuracy and speed 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 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

5. Save the IMS online log data set that was active during the failure.

Diagnosing a DC Related Problem

IMS DC related problems are mainly associated with VTAM. 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. It is important to obtain this information while you are experiencing the problem.

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)

Start the recreate attempt after issuing an IMS `/SWITCH OLDS` command to have the related data placed on a new OLDS.

1. Issue the IMS `DISPLAY NODE x` command and save the IMS console output. Here is the syntax:

   ```
   /DIS NODE nodename
   ```

2. Turn on the IMS NODE trace with the following command. 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 or the Knowledge-Based Log Analysis (KBLA) program.

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

3. Consider turning on the VTAM Buffer Trace and VTAM Internal Trace to complement the IMS NODE trace with this series of commands:

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

   Note: GTF must be active with the USR option to capture these trace entries.

4. Obtain a z/OS 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

5. Obtain a dump of the VTAM address space with 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.

Diagnosing an APPC Related DC Problem

APPC problems originating from IMS dependent regions that make calls explicitly, rely heavily on the dependent region dumps. Follow these steps to diagnose an APPC-related IMS problem:

1. Turn on the IMS LUMI trace, for the external trace data set, using 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 XXXXXXX INPUT
   TRACE SET ON LUNAME XXXXXXX OUTPUT
   ```

   where *XXXXXXX* is the partner LU
2. Turn on the VTAM Buffer Trace and VTAM internal trace to complement the IMS LUMI trace with these commands:

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

   GTF must be active with the USR option specified to capture these trace entries.
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 with this command:

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

   where *pppppppp* is the program name of the application.
4. Turn on the z/OS APPC component trace with this 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 very 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

Diagnosing CQS-Related Problems

CQS problems can take on various appearances and, like the IMS control region, they can manifest themselves in the form of WAITs, HANGs, LOOPs, or some other kind of internal error that results in an SDUMP being taken. These dumps are then found 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 the IBM Support Center might request additional CQS-trace level settings for the various trace types. See “CQS Trace Setup Recommendations” on page 7 and “Setting Up CQS, OM, RM, and SCI Tracing” on page 10 for more information about the traces.

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.

Related Reading: See Chapter 16, “CQS Diagnosis,” on page 523 for diagnostic information to help analyze the CQS problem itself. Also, see this section for more information on specific CQS problems and steps to follow so that appropriate documentation can be gathered to capture relevant diagnostic information which can enable the IBM Support Center to perform problem determination.

Diagnosing CSL-Related Problems

The Common Service Layer address spaces, Operations Manager, Structured Call Interface, and Resource Manager produce SDUMPs for internal errors. The CSL dumps can be found 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:

1. **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”:

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

2. **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.

3. **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=(om1,rm1,sci1)
SDATA=(CSA,PSA,RGN,SQA,SUM,TRT),END
```

   In the previous example:

   om1 An OM address space.

   rm1 An RM address space.

   sci1 An SCI address space.

   For some CSL problems, the IBM Support Center might request additional trace level settings for the various trace types. See “Setting Up CQS, OM, RM, and SCI Tracing” on page 10 for information about trace descriptions.

   Related Reading: See Chapter 17, “CSL Diagnosis,” on page 537 for additional details on diagnosing CSL related problems.

Diagnosing ESAF Interface Problems

This topic discusses problems involving the ESAF (External Subsystem Attach Facility). To begin troubleshooting:

- Turn on the subsystem trace to the external trace data set:
  - IMS command: /TRA SET ON TABLE SUBS OLDS
- Take an SVC dump of the related regions before and after the recreate attempt.
  - Ensure that pertinent regions for the affected subsystem (dbtmstr, db2dbm1, mqseries) are included with the other related IMS regions.

Note: IMSplex partner dumps are probably not required for ESAF problems, unless they are also experiencing the problem.

Diagnosing Database Problems

This topic discusses database problems. 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.

Diagnosing RRS Problems

If you use RRS (Recovery Resource Services) with your IMS system, diagnostics can be enhanced by the following steps:

- 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 above 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(8M)
OPTIONS('EVENTS(ALL)')
```

  - 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 ABENDU0711s.
    - Print these records by using the IMS utility programs DFSERA10 and DFSERA30.
  - Other RRS related records that are produced:
    - TYPE4098 - Checkpoint for RRS/MVS 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/MVS 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/MVS recovery platform.
  - The RRS-URID provided by RRS and the IMS recovery token are displayed.

Diagnosing MSC-Related Problems

This topic discusses IMS Multiple Systems Coupling (MSC) related problems. If you use IMS MSC and experience a related problem, do the following tasks:

- Take 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. Do this as close to the time of the problem as possible, prior to attempting to fix the problem.
- Save the IMS OLDS for both coupled systems from the time of the message creation.
- Issue the `DISPLAY LINK ALL` and `DISPLAY LINK ALL MODE` commands to show the status and queue counts for the logical link and physical link information for the partner.
- 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)
```

  - You should turn on the MSC LINK trace for both coupled systems:

```
TRACE SET ON LINK link# LEVEL 3 MODULE ALL
```

    - This trace creates IMS TYPE67 records that contain TM control blocks for each message at key points.
- KBLA (Knowledge-Based Log Analysis) provides MSC link performance analysis through an ISPF driven interface. KBLA uses IMS MSC log records to calculate the overall performance of each link that is subject to data traffic in the system.

  There are two different report types that are generated:

  Summary
  : A report that contains the average response time, in milliseconds (msec), of the total number of send and receive data values for each link trace.

  Detail
  : A report that 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 only available if the IMS input log contains X'6701' records that are generated via the `/TRACE SET ON LINK link#` command.

  For more information, see the “MSC Link Performance Formatting Utility (DFSKMSC0)” section in the *IMS Version 9: Utilities Reference: System*.

Chapter 3. Searching Problem Reporting Databases

After you have obtained information about the problem you are diagnosing, you can 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 software support database, such as the Software Support Facility (SSF). SSF is an online database containing information about the resolution of reported problems called Authorized Program Analysis Reports (APARs). If the search is successful, you will find a similar problem description, and usually a correction, or fix. If the failure is one that is known, you will use the keywords to describe the failure when contacting the IBM Support Center for assistance, or when documenting a possible APAR.

Some optional search tools might require keywords in a structured database (SDB) format. Follow the procedures described here to build your keyword string. Then, if necessary, translate these keywords into the SDB format by using “IMS Keyword Dictionary” on page 543. Each search argument example in the procedures shows a free-form example followed by an SDB example.

In this section:

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 547 for a list.

Creating a Search Argument

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” on page 31 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. Then go to “Searching the Database” on page 59, to learn how to search the IBM software support database with your completed string.
4. If your search is unsuccessful, go to “Preparing an APAR” on page 61.

You might also want to refer to these sections:

- “IMS Keyword Dictionary” on page 543 provides guidance on translating free-form keywords into structured database (SDB) format.
- “Dependency Keywords” on page 547 lists words used as search techniques to narrow search arguments.

Chapter 4. Selecting the Keywords

This section shows you how to 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 occurs.

In this section:

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 Table 2.

Table 2. IMS Component Identification Numbers

Identification Number	Description
5655J3800	IMS Services Database Manager Transaction Manager Extended Terminal Option (ETO) Recovery-level Tracking Database-level Tracking
569516401	Internal Resource Lock Manager (IRLM) 2.1 or 2.2

To determine the type of IMS program failure that is occurring, go to "Type-of-Failure Keyword."

Some of the procedures on the following pages 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 found in the IMS.ADFSSMPL library.

Type-of-Failure Keyword

From the following seven types, select the one that best describes the program failure. Then go to the procedure for that type of failure.

ABENDxxx Use this procedure when the system terminates abnormally with a system abend completion code. An abend produces an SVCDUMP, SYSABEND dump, or SYSUDUMP.

See "ABENDxxx Procedure" on page 32 for more information.

ABENDUxxxx Use this procedure when an IMS application program terminates abnormally with an abend completion code. An abend produces a SYSABEND dump, SVCDUMP, or SYSUDUMP.

See "ABENDUxxxx Procedure" on page 33 for more information.

DOC Use this procedure if a deficiency is found in documentation through omission or inaccuracy.

See "DOC Procedure" on page 35 for more information.

PERFM Use this procedure if performance is other than what is expected.

	See “PERFM Procedure” on page 36 for more information.
MSGx	Use this procedure if a problem involves an IMS message.
	See “MSG Procedure” on page 37 for more information.
INCORROUT	Use this procedure when output is missing or incorrect.
	See “INCORROUT Procedure” on page 37 for more information.
WAIT/LOOP	Use the WAIT/LOOP procedure when there is no response from IMS functions.
	See “WAIT/LOOP Procedure” on page 40 for more information.

ABENDxxx Procedure

Use this procedure when the system terminates abnormally with a system abend completion code. For user abends, go to “ABENDUxxxx Procedure” on page 33.

After you have developed a search argument, refer to Chapter 5, “Procedures and Techniques,” on page 59 for detailed information on how to use the search argument.

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 they 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 *MVS/ESA™ System Codes*.

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 abending module.
- 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 Keywords

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.

  Use *System/390® Reference Summary* to determine the instruction mnemonic.
- **Register in Error:** Examine the code near the failure to determine the register that is invalid or in error, if possible.

  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.

Search Argument Example

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

```
5655J3800 ABEND0C4 DFSFXC30
```

For a structured database search, use this search argument:

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

With this search argument, you might receive numerous hits, which would most likely include the APAR describing your problem. You can add keywords from “Module-Specific Keywords” on page 32 to narrow the field of hits received. It is a good idea to 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 this search argument:

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

ABENDUxxxx Procedure

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

A message usually precedes a user abend. First, look up the message and then the abend code in *IMS Version 9: Messages and Codes, Volume 1* or *IMS Version 9: Messages and Codes, Volume 2*. Then, if further diagnostic information (such as return codes) that you can use to build the search argument is needed, refer to the *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*. The FAST also explains why the abend was issued, and often provides useful information for problem analysis.

If you cannot solve the problem by using the FAST, develop a search argument.

After you have developed a search argument, refer to Chapter 5, “Procedures and Techniques,” on page 59 for detailed information on how to use the search argument.

Keyword: ABENDUxxxx

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 abending module.
- 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 Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis* indicates whether the abend is a pseudoabend or a standard abend.

Abend-Specific Keywords

By examining the information in *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*, 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 *xxxxxxx* part of keyword MSG*xxxxxxx* with the actual message identifier (for example, the keyword for message `DFS053I` is `MSGDFS053I`).
- Return codes

  Replace the *xx* part of keyword RC*xx* 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 “Abend-Specific Keywords” 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

The IBM support center might ask you to obtain certain information to determine and resolve the problem. At times you might need to re-create the problem in order to gather this documentation.

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

- 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 DFSADSCT 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.

Example: 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
```

DOC Procedure

To report problems for a specific IBM IMS manual, use one of the following methods:

- Go to the IMS home page at www.ibm.com/ims. There you will find an online feedback page where you can enter and submit comments.
- Send your comment by e-mail to imspubs@us.ibm.com. Be sure to include the name of the book, the part number of the book, the version of IMS, and, if applicable, the specific location of the text you are commenting on (for example, a page number or table number).

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 the IBM Support Center 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. You can search for changes to information using the procedure detailed in "Keyword: Order-number."

Keyword: Order-number

Use this keyword to search for all changes to a specific manual. The format for the order-number is *ppnnnnnnee*, 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 Version 9: Messages and Codes, Volume 1* is GC26-9433-00. Replace *ppnnnnnnee* with GC26943300. The edition number is optional. To broaden the search to include all editions of a manual, 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 Version 9: Messages and Codes, Volume 1*:

```
5655J3800 GC269433**
```

For a structured database search, use this search argument:

```
PIDS/5655J3800 PUBS/GC269433**
```

You can add more keywords to narrow the search. For example, if you cannot find message DFS3007 in *IMS Version 9: Messages and Codes, Volume 1*, 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, use one of the methods listed on the form for readers' comments in *IMS Version 9: Messages and Codes, Volume 1* to report the omission to IBM.

PERFM Procedure

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

After you have developed a search argument, refer to Chapter 5, "Procedures and Techniques," on page 59 for detailed information on how to use the search argument.

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.

Search Argument Example

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 as described in "Component Identification Keyword Procedure" on page 31. 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 the IBM support center.

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

MSG Procedure

IMS Version 9: Messages and Codes, Volume 1 and *IMS Version 9: Messages and Codes, Volume 2* describe IMS messages. If, after analyzing the message, you feel the message should not have been issued or describes an error condition, use the MSGxxxxxxxx keyword.

After you have developed a search argument, refer to Chapter 5, “Procedures and Techniques,” on page 59 for detailed information on how to use the search argument.

Keyword: MSGxxxxxxxx

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

Search Argument Example

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 defined as a condition when either of the following occurs:

- Output was expected, but not received (missing).
- Output was different from expected (incorrect).

Use the following procedure to determine the appropriate search argument. After you have developed a search argument, refer to Chapter 5, “Procedures and Techniques,” on page 59 for detailed information on how to use the search argument.

Keyword: INCORROUT

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. (See "Keywords: Columns, Headings, Fields.")

Keywords: Columns, Headings, Fields

Whenever possible, you can add additional keywords to narrow the field of hits. 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/DFSURT20
PCSS/DEADLOCK PCSS/DMB
```

If you receive too many hits, 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 on page 39.
   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 on page 39.
   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 on page 39.
   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 on page 39.
   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 40 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. Use the following procedure to determine the type of WAIT or LOOP occurring, and to find the appropriate keywords for the problem.

Be aware that 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 53.
   - If IMS is not being shutdown, 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 “SAP Analysis Procedure” on page 43. 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 on page 41 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 “SAP Analysis Procedure” on page 43.
   - If no, the problem might be data communication related. If IMS is still running, do the following:
     - 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/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 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 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. Therefore, you should also include them.

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 dumps in smaller combinations to accommodate the smaller SYS1.DUMP data set size.

– Go to the “SAP Analysis Procedure” on page 43. If SAP analysis does not yield any unusual flows, go to “Receive-Any Buffer Analysis” on page 361.

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, RST RDS, 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 is true:
      - IMS is in an IMS WAIT (IWAIT) state. Go to “SAP Analysis Procedure” on page 43 now.
      - If at least one Dispatch Work Area has the high-order bit off, this is a LOOP or operating system WAIT. Continue with the next step.
6. Query the TCB/RB chain.
   a. Find the current ECB, 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 on page 41. 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 *xxxxxxx* 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'000020033'. If the RB prior to the RB containing WLIC=X'00020033' contains WLIC=X'0002000C, it might be necessary to examine the RB prior to the RB containing WLIC=X'00002000C'.

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 = X'00'**, this usually indicates that the task is looping. Do the following:
  - 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 on page 41. 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`, respectively. 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 on page 41. 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', X'02', and so on), this usually indicates that a system WAIT occurred. Do the following:
  - 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 for contact with the owning component's IBM Support Center representatives.
  - Use the CECB field obtained in step 6a on page 41 to find the related SAP save area by scanning for the SAPECB match in the IMS formatted dump **SSA section.

SAP Analysis Procedure

1. Find the formatted SAP AND SAVE AREA section in the IMS formatted dump.

   Choose 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`.

   Table 3 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 `**** W A I T I N G ****` or `**** A C T I V E ****`. To find waiting or active SAPs, use the following find command: `F '  **** ' PREV`.

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

4. Skip over 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 as 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 example below. Be sure that register 08 contains a value of X'00000003' for any of the first four save area sets, as shown below. Otherwise, it is abnormal and indicates an intent conflict as described in the “Intent Conflict” on page 50. 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-WFITEST  --> EP DFSIWAIT
  EP DFSVTP00 --> EP VTPOWORK --> 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 listed below. Be sure 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 50. 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 on page 44 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 **** A C T I V E **** (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" on page 40. 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 **** W A I T I N G ****:

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 43 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 address

   If 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.

   Table 4 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 on page 44 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 on page 44 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 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 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 “SAP Analysis Procedure” on page 43.

   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:

- `SSQ# × X'18' − X'8' = offset of header for SSQ#`
- `Offset of header for SSQ# + SCDTAB address = 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 six subqueues. All subqueues are formatted in a dump, but subqueues 1 and 2 are unused.

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 49.

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 50.

   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 51.

   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'C8A') 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 46.

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 "SAP Analysis Procedure" on page 43. 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 on page 46.

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 40, 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 40, 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 there are PSTs on subqueue 3.

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(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' = *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 51 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 on page 49.

    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 on page 49.
    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 on page 51.
   b. Otherwise, go to step 5 on page 51.

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 46, 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 9: Utilities Reference: Database and Transaction Manager*. 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 48.
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 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 on page 41. 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

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.

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

Search Argument Example

Consider the 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).") 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 "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'll 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'C00') = X'34' and then Set SCDSTOP1(X'C02') = X'80'
    - If not PURGE, then:
      - If DUMPQ, set SCDCKCTL(X'C00') = X'1C'
      - If FREEZE, set SCDCKCTL(X'C00') = 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'C00') = X'20' (PURGE):
  - Set SCDSTOP1(X'C02') = X'10'
  - Set SCDSTOP1(X'C02') = X'02'
- If SCDFTFLG(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'C00') 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'C00') = 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 SCDCPCTL(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'C00') = 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"
- "Lock Request Not Granted Because Holder Did Not Release Lock"
- "IRLM Latch Unavailable" on page 58

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.

Chapter 5. Procedures and Techniques

This section details procedures and techniques for the following tasks:

- "Searching the Database" provides information about searching the IBM Software Support Facility (SSF) to find out whether a problem like yours is already known to IBM.
- "Searching for APARs Closed within a Specific Time Period" on page 60 provides information about searching RETAIN® for APARs closed within a specific time period.
- "Preparing an APAR" on page 61 provides information about preparing an APAR.

Searching the Database

You have completed your search argument. You now want to know whether a problem like yours has already been reported to IBM. To find out, you can use your newly developed keyword string in searching an IBM software support database, such as SSF (Software Support Facility), provided you have the necessary access. 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.
2. Search SSF, using the keyword string developed by following procedures from Chapter 4, "Selecting the Keywords." 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 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 547.

     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. For IMS Version 9 these are:

AR900	IMS Services
AR901	Database Manager
AR902	Transaction Manager
AR903	ETO
AR904	Recovery Level Tracker
AR905	Database Level Tracker
AR906	Database recovery service
AR907	IMS Connect
R101	To search all entries for Internal Resource Lock Manager (IRLM) 2.1 **Note:** To search only the APAR entries, use AR101 for IRLM 2.1.
R220	To search all entries for Internal Resource Lock Manager (IRLM) 2.2

Note: To search only the APAR entries, use AR220 for IRLM 2.2.

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

LVLS/900 IMS Services

LVLS/901 Database Manager

LVLS/902 Transaction Manager

LVLS/903 ETO

LVLS/904 Recovery-level Tracking

LVLS/905 Database-level Tracking

LVLS/906 Database recovery service

LVLS/907 IMS Connect

LVLS/101 Internal Resource Lock Manager 2.1

An example is: **5655J3800 AR901** for the Database Manager

For a structured database search, an example is: **PIDS/5655J3800 LVLS/901**

Recommendation: 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 you're reviewing. Frequently APAR descriptions include some information about the traces that were run for those problems.
5. If you find an appropriate APAR, see if it has been closed. If it has been closed, you can correct the problem by applying the fix associated with the APAR. If it has not been closed, contact your IBM Support Center for instructions on 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 the IBM Support Center for assistance.

Searching for APARs Closed within a Specific Time Period

The following searches refer to the use of RETAIN and are therefore directed at IBM support personnel. RETAIN can be searched for high-impact pervasive (HIPER) or performance APARs that were closed within a specific time period. For example, to search for HIPER APARs closed between 10/02 and 04/04, use this search argument:

```
P;CL02/10-04/4. HIPER
```

If you want to search only for HIPER APARs for a specific release, add the component ID to the search argument. For example, to search only for IMS Version 9 APARs, use this search argument:

```
P;CL02/10-04/4. HIPER  5655J3800
```

For a structured database search, use this search argument:

```
P;CL02/10-04/4. HIPER  PIDS/5655J3800
```

Preparing an APAR

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

Table 5. Preparing an APAR

Procedure	What to Do
Reporting a problem	To report a problem, contact your IBM Support Center. Be prepared to supply such information as: • Customer number • Release level • Current maintenance level (from PTF list) • The keyword string or strings used to search the IBM software support database
Gathering APAR documentation	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. • 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 • Link-edit 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 DFSDDLT0 • 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	When submitting material for an APAR to IBM, carefully pack and clearly label all materials sent to IBM with the following information:
	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:
	  • 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

Part 2. Data Areas and Record Formats

Chapter 6. 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. This section includes:

Getting 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.

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.

Figure 1 on page 66 gives an overview of the linkage of the major control blocks used for diagnosis.

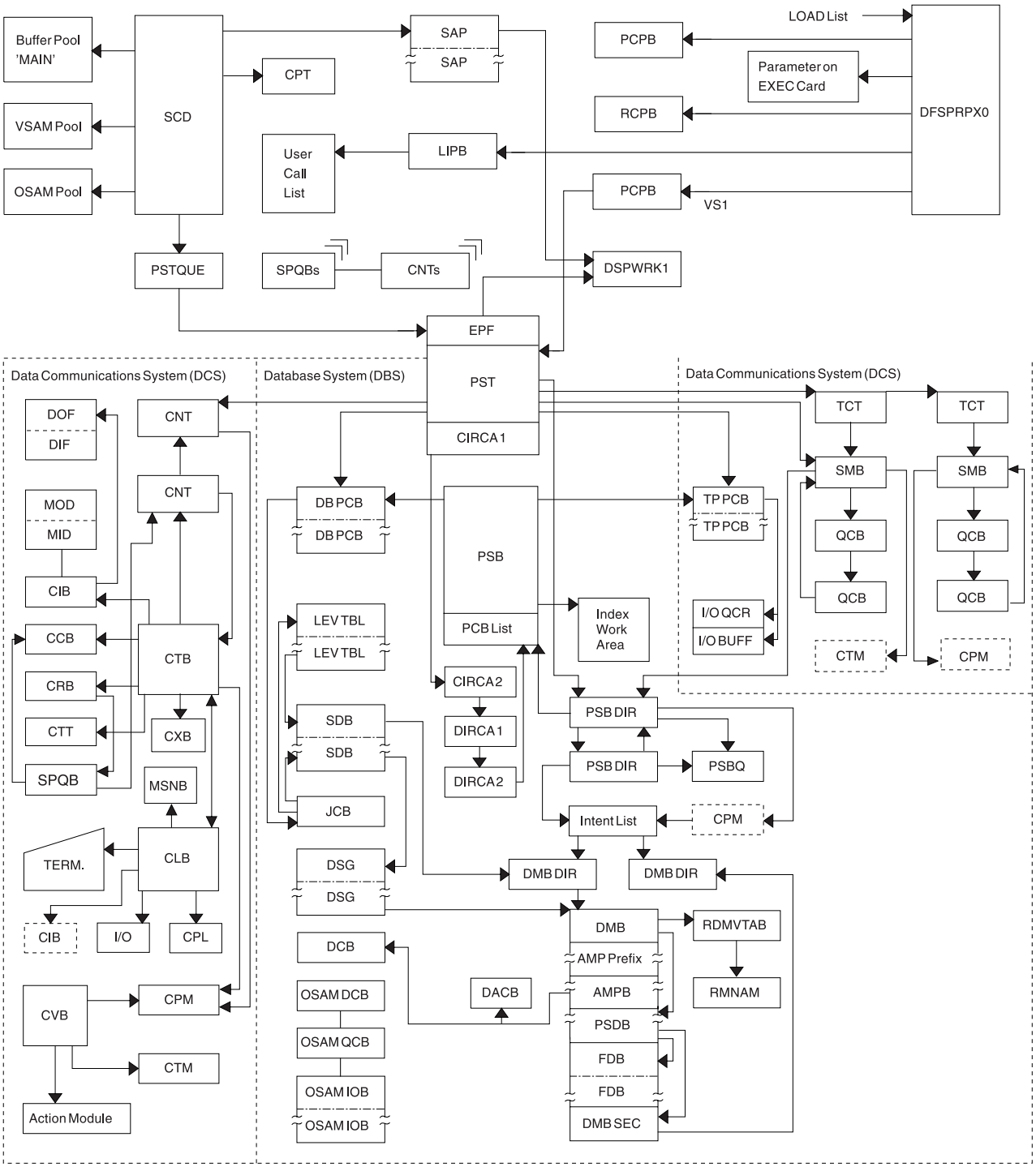


Figure 1. IMS Control Block Linkage for a Static DB/DC Environment

Table of Control Block Definitions

Table 6 lists:

- The acronyms of the control blocks described in this manual
- The macro that generates the block
- A brief description of the block

Table 6. Table of Control Block Definitions

Control Block Acronym	Mapping Macro	Description
ADSC	DBFADSC	Area data set control block.
ALDS	DBFAREA	Area list data set.
AMPB	IDLI DMBBASE=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 DFSPOOL 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 actual buffers.
BUFENTRY	DFSSPBLK	Used by DFSPOOL 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 CCBBASE=0	Conversational control block. Controls resources for conversational tasks.
CIB	ICLI CIBBASE=0	Communication interface block. Contains information the DDM 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	DFSCLLE	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.

Table 6. Table of Control Block Definitions (continued)

Control Block Acronym	Mapping Macro	Description
CTB	ICLI CTBBASE=0	Communication terminal block. One exists for each terminal and for each subpool in the system.
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. Is the dump formatter CBTE request definition block.
DFSDPBFH	DFSDBPFH	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)

Table 6. Table of Control Block Definitions (continued)

Control Block Acronym	Mapping Macro	Description
EIB	DFSPCA	Partition Exit Interface Block Prefix.
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	DBFEPST	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 6. Table of 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 ISDC 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 6. Table of Control Block Definitions (continued)

Control Block Acronym	Mapping Macro	Description
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	DFSSPBLK	Storage pool header used by the DFSPOOL 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	DXRRLPL	IRLM request parameter list. This is the parameter list for all functional requests for the resource lock manager.
RLQD	DXRRLQD	IRLM query mapping macro. Maps IRLM control blocks/structures returned to the IMS invoker of QUERY.
RPL	IDLIVSAM	Request parameter list. Contains parameters passed to VSAM from IMS and the status returned to IMS from VSAM.

Table 6. Table of Control Block Definitions (continued)

Control Block Acronym	Mapping Macro	Description
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 each Database 2™ (DB2) 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 PXPARMS.
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 SBPARM control statement in the //DFSCTL file.
SCA1	DFSSBCAR	Control block containing the uninterpreted data of one SBPARM control statement in the //DFSCTL file.
SCD	ISCD	System contents directory. Produced at system generation 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.
SMB	IAPS	Scheduler message block. Related to a transaction.

Table 6. Table of Control Block Definitions (continued)

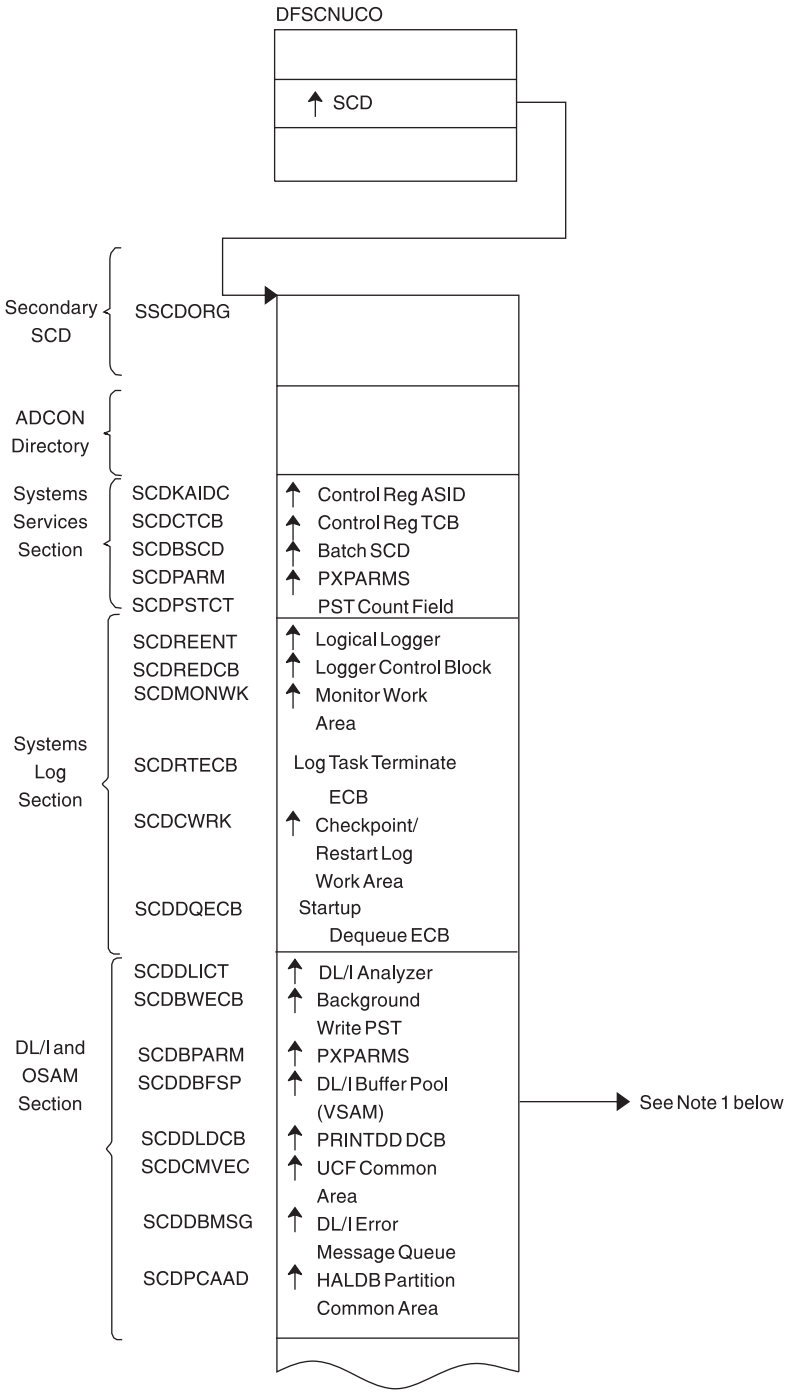
Control Block Acronym	Mapping Macro	Description
SPQB	ICLI SPQBASE=0	Subpool queue block. The SPQB represents the dynamic user for an ETO terminal and represents a set of static queues (CNTs) for a static ISC parallel session terminal.
SQPST	ISQPST	PST queue. Associated with the scheduler sequence queue.
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.

Control Block Interrelationship Diagrams

This topic contains diagrams that show the interrelationships of major control blocks in an IMS environment. Descriptions of the figures in this topic are listed in Table 7.

Table 7. Description of Control Block Interrelationship Diagrams

Figure	Description
Figure 2 on page 75	Online system contents directory (SCD)
Figure 3 on page 81	DFSPRPX0 parameter blocks
Figure 4 on page 82	OSAM buffer pool
Figure 5 on page 83	Sequential buffering control blocks
Figure 6 on page 84	VSAM buffer handler pool
Figure 7 on page 85	OSAM DECB with IOB in use
Figure 8 on page 86	OSAM IOB pool showing available IOBs
Figure 9 on page 87	Storage management control block relationships created by the ICREATE facility
Figure 10 on page 88	Storage management control block relationships for preallocated storage blocks
Figure 11 on page 90	Storage management control block relationships for DFSPOOL pools
Figure 12 on page 91	Storage management control block relationships for DFSCBT00 pools
Figure 13 on page 92	
Figure 14 on page 94	Database control blocks
Figure 15 on page 96	Diagram of a data management block (DMB)
Figure 16 on page 97	Fast Path control block overview
Figure 17 on page 98	Relationships between buffer control blocks for Fast Path databases
Figure 18 on page 99	GSAM control block overview
Figure 19 on page 100	GSAM control blocks
Figure 20 on page 101	Relationships between DL/I control blocks
Figure 21 on page 102	IMS Transaction Manager control blocks
Figure 22 on page 102	Intersystem communication control block structure
Figure 23 on page 103	VTCB load module
Figure 24 on page 105	Multiple systems coupling (MSC) control block overview
Figure 25 on page 106	Multiple systems coupling (MSC) main storage-to-main storage control block overview
Figure 26 on page 107	z/OS storage map of interrelationships of IMS to IRLM
Figure 27 on page 108	IRLM overall control block structure
Figure 28 on page 109	IRLM storage manager pools
Figure 29 on page 109	IRLM lock request examples
Figure 30 on page 110	Control block overview of database recovery control (DBRC)
Figure 31 on page 111	Organization and basic linkages for DOF (device output format) and MOD (message output descriptor)
Figure 32 on page 112	Organization and basic linkages for DIF (device input format) and MID (message input descriptor)



- Note 1: See Figure 4 on page 82. and Figure 6 on page 84.

Figure 2. Online System Contents Directory (SCD) (Part 1 of 6)

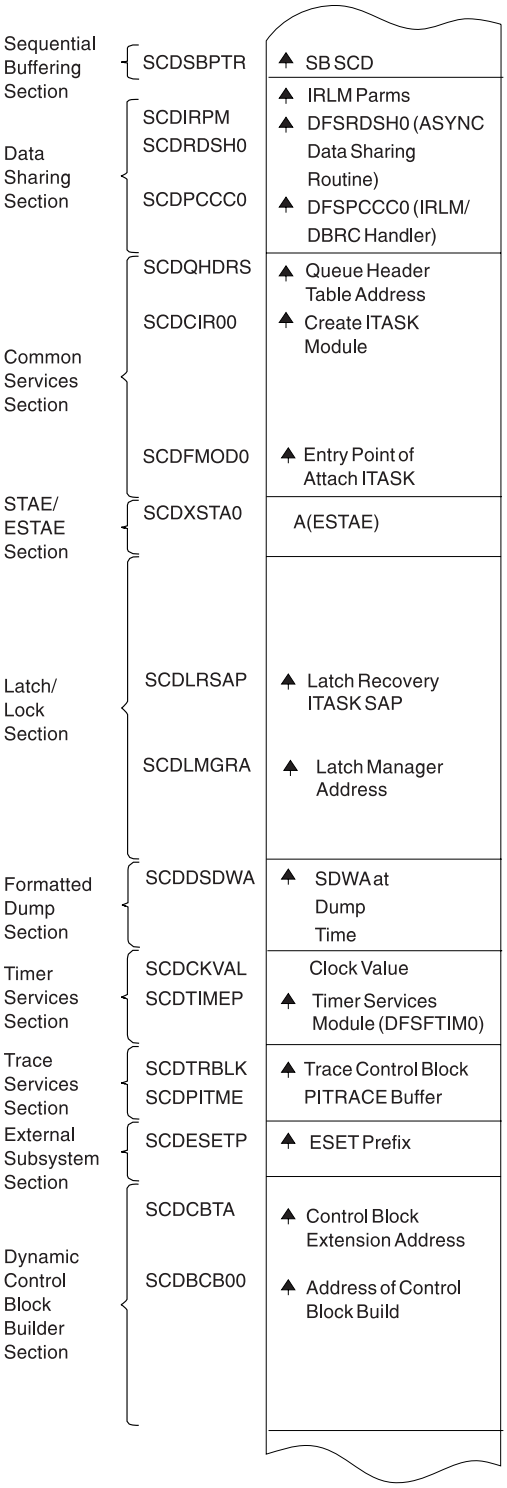
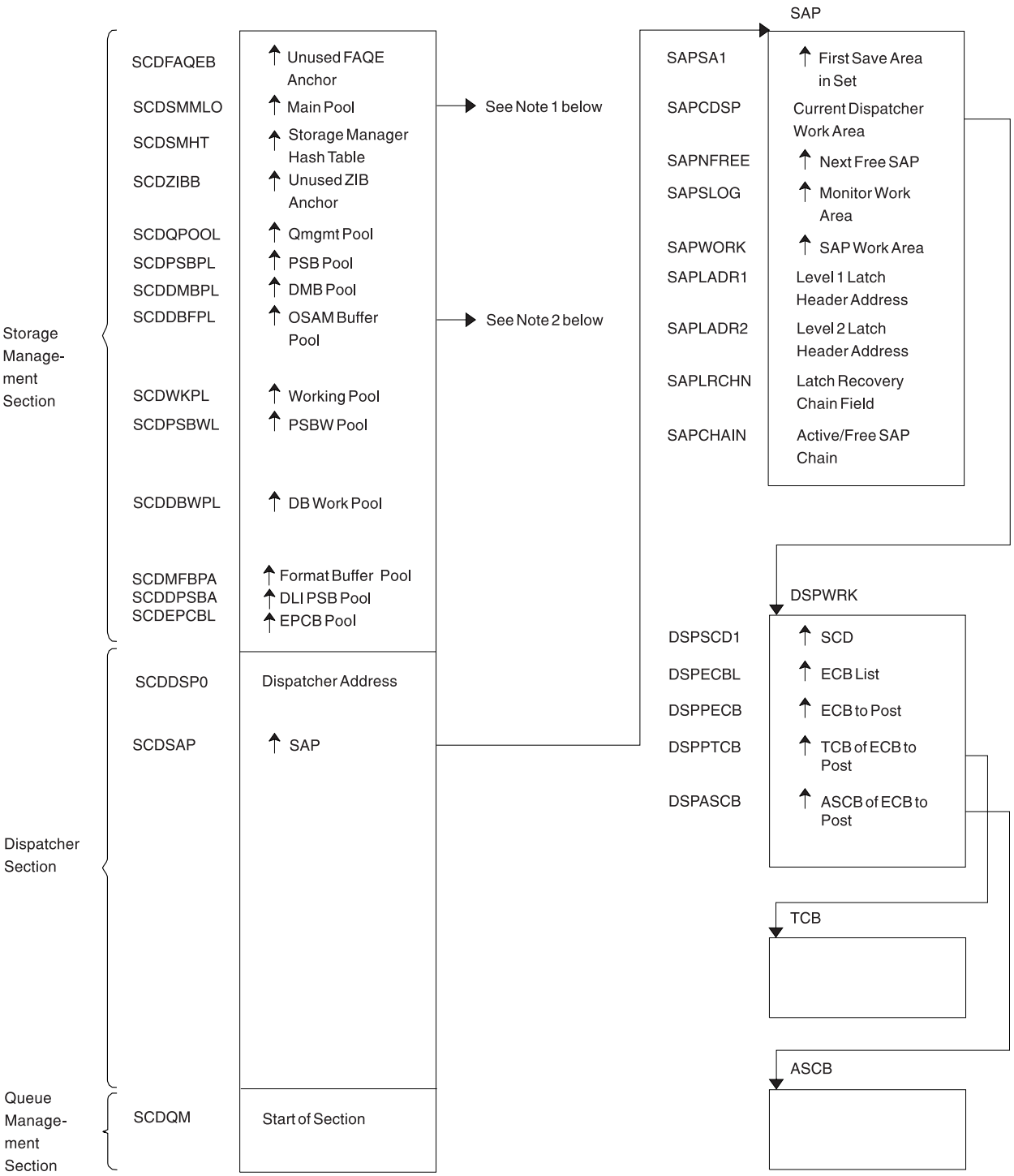


Figure 2. Online System Contents Directory (SCD) (Part 2 of 6)



- Note 1: See Figure 9 on page 87.
- Note 2: See Figure 4 on page 82.

Figure 2. Online System Contents Directory (SCD) (Part 3 of 6)

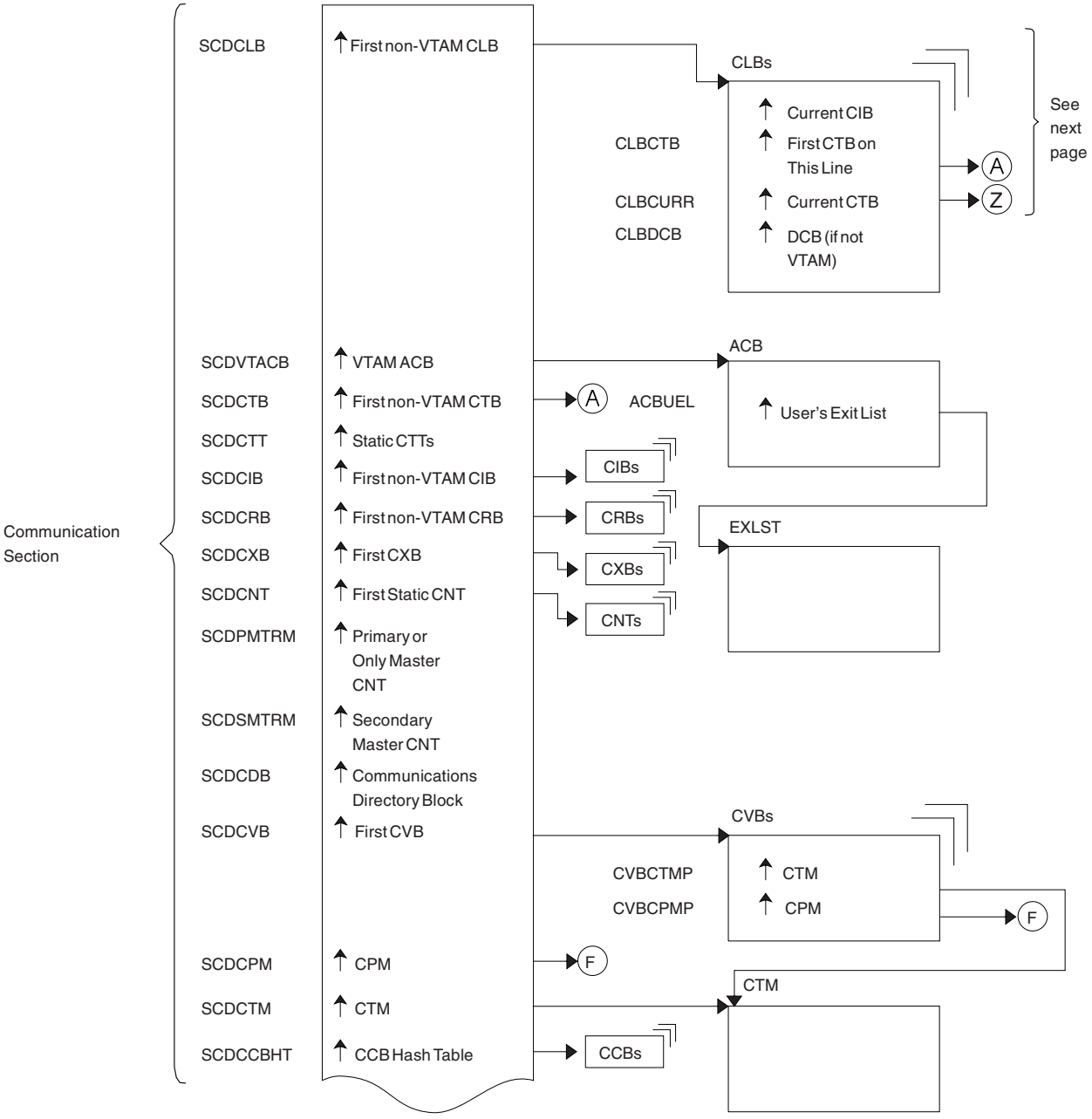


Figure 2. Online System Contents Directory (SCD) (Part 4 of 6)

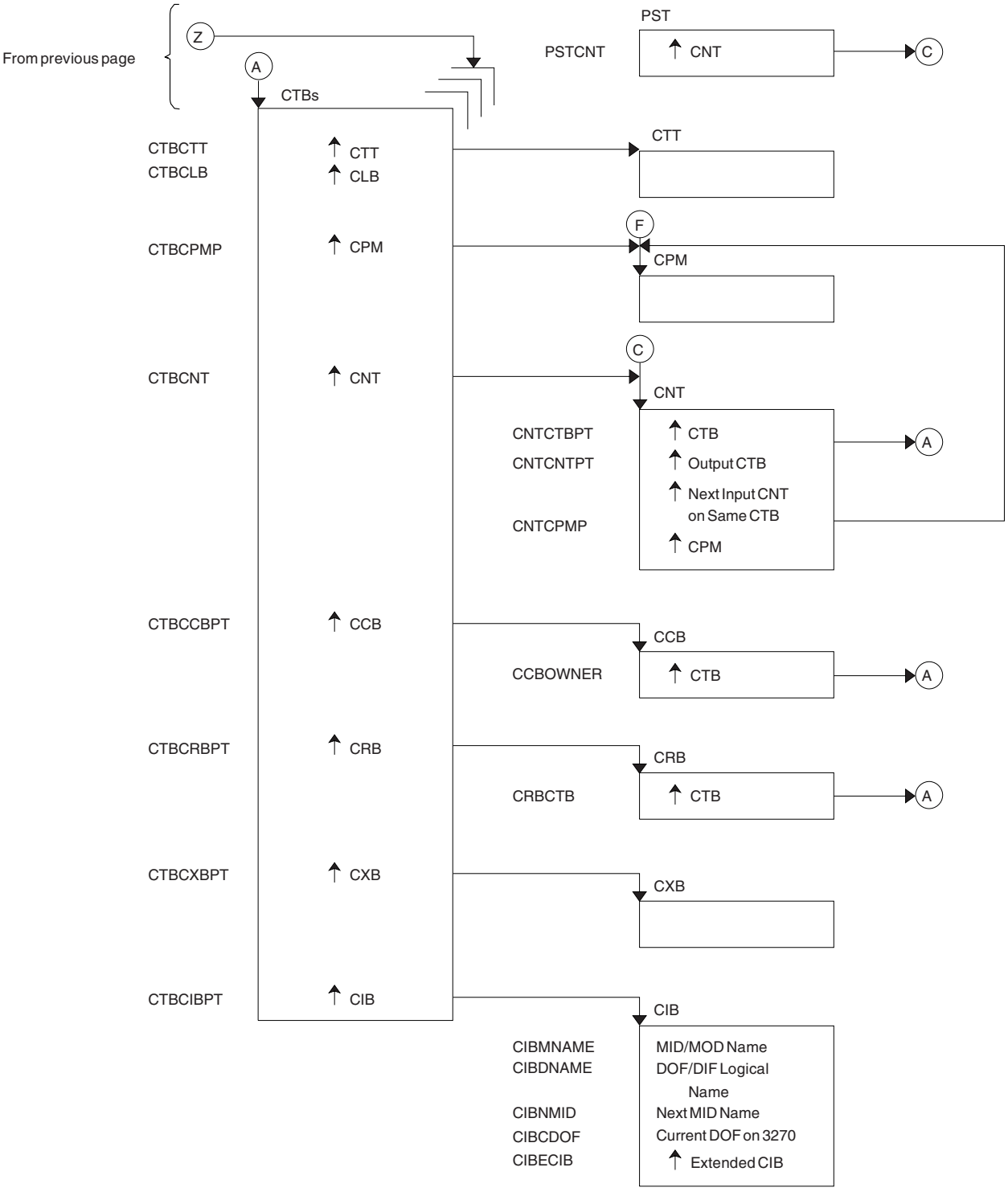


Figure 2. Online System Contents Directory (SCD) (Part 5 of 6)

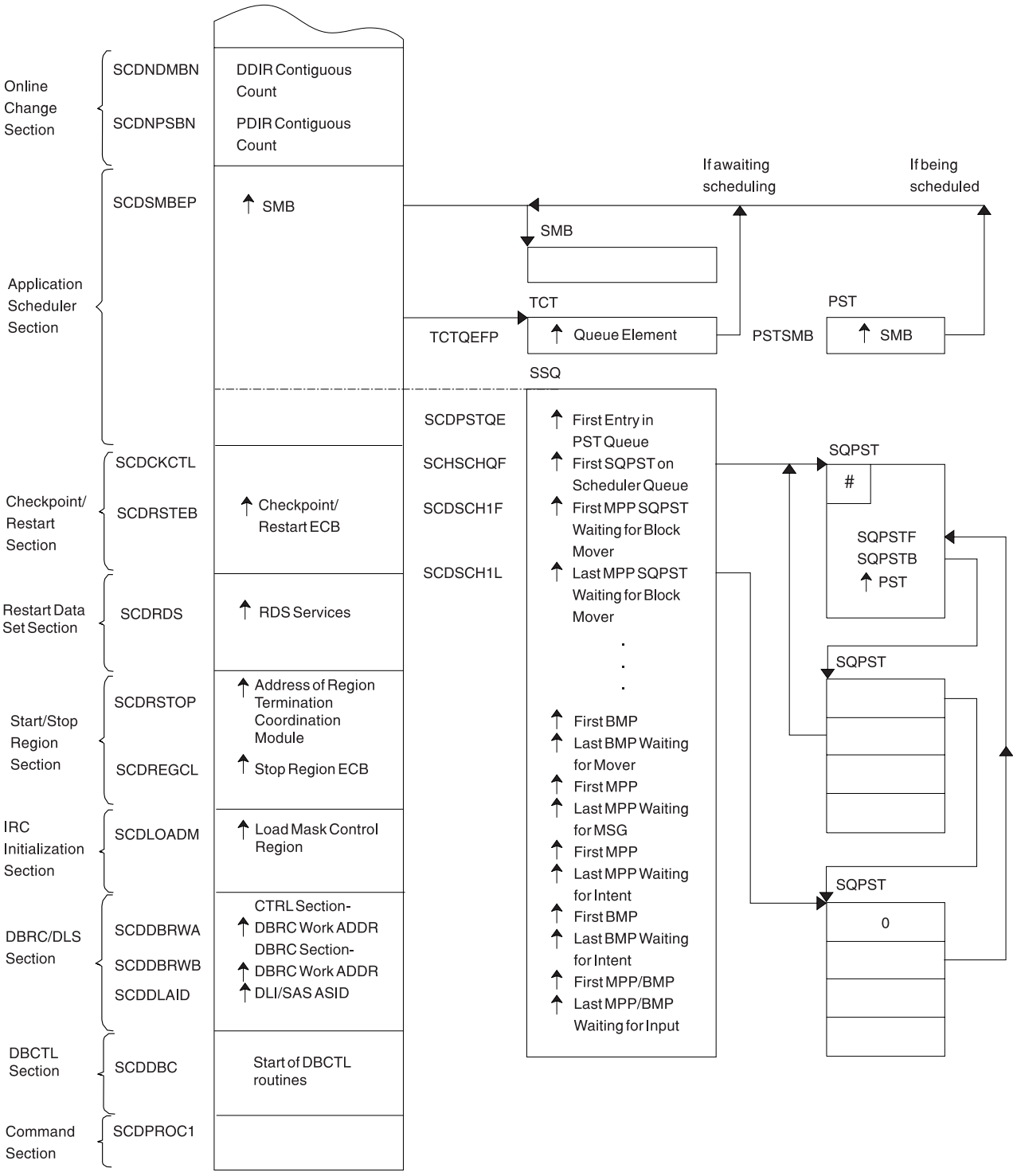
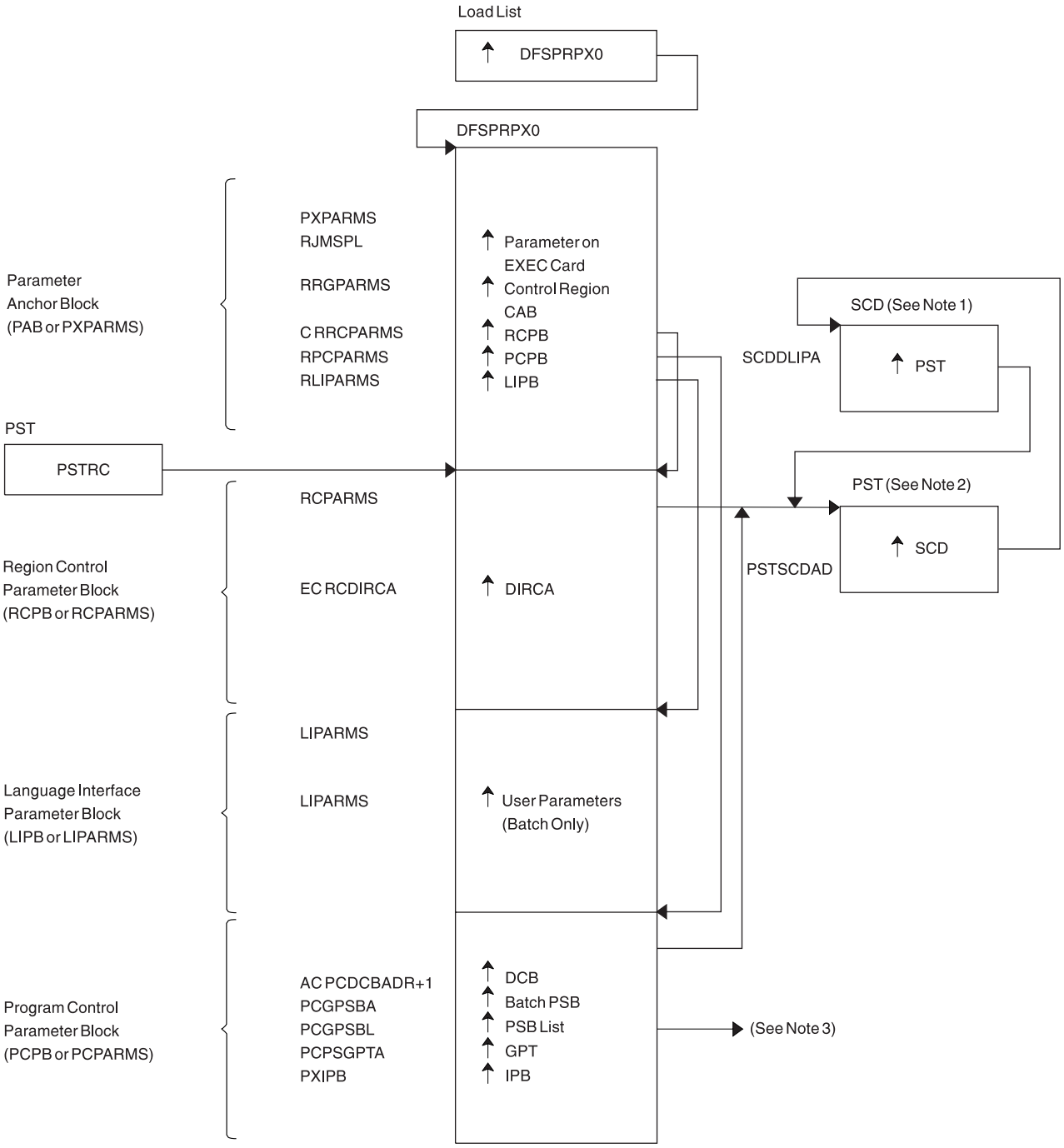


Figure 2. Online System Contents Directory (SCD) (Part 6 of 6)



- Note 1: See Figure 2 on page 75
- Note 2: See Figure 14 on page 94
- Note 3: See Figure 18 on page 99

Figure 3. DFSPRPX0–Parameter Blocks

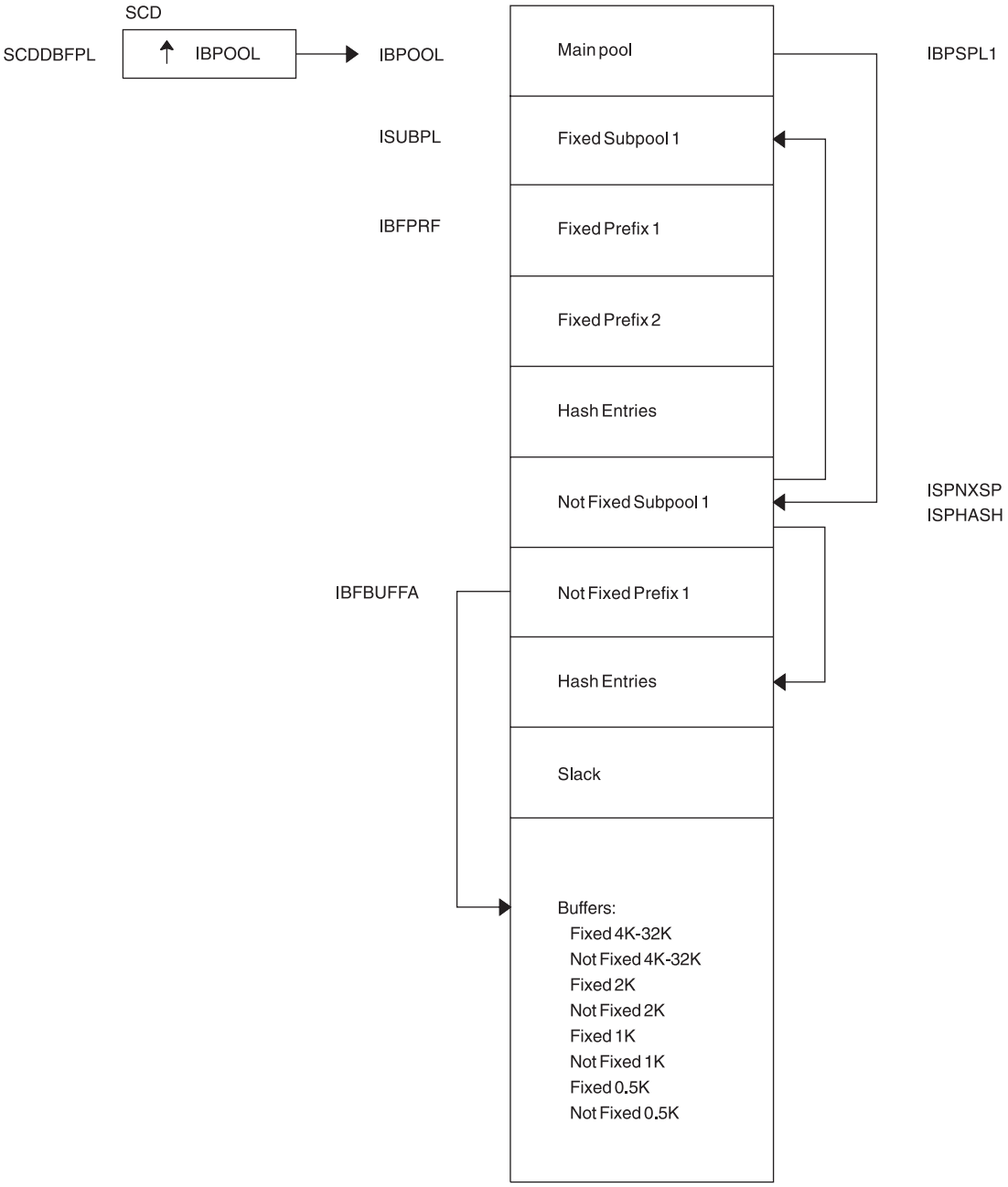


Figure 4. DL/I OSAM Buffer Pool

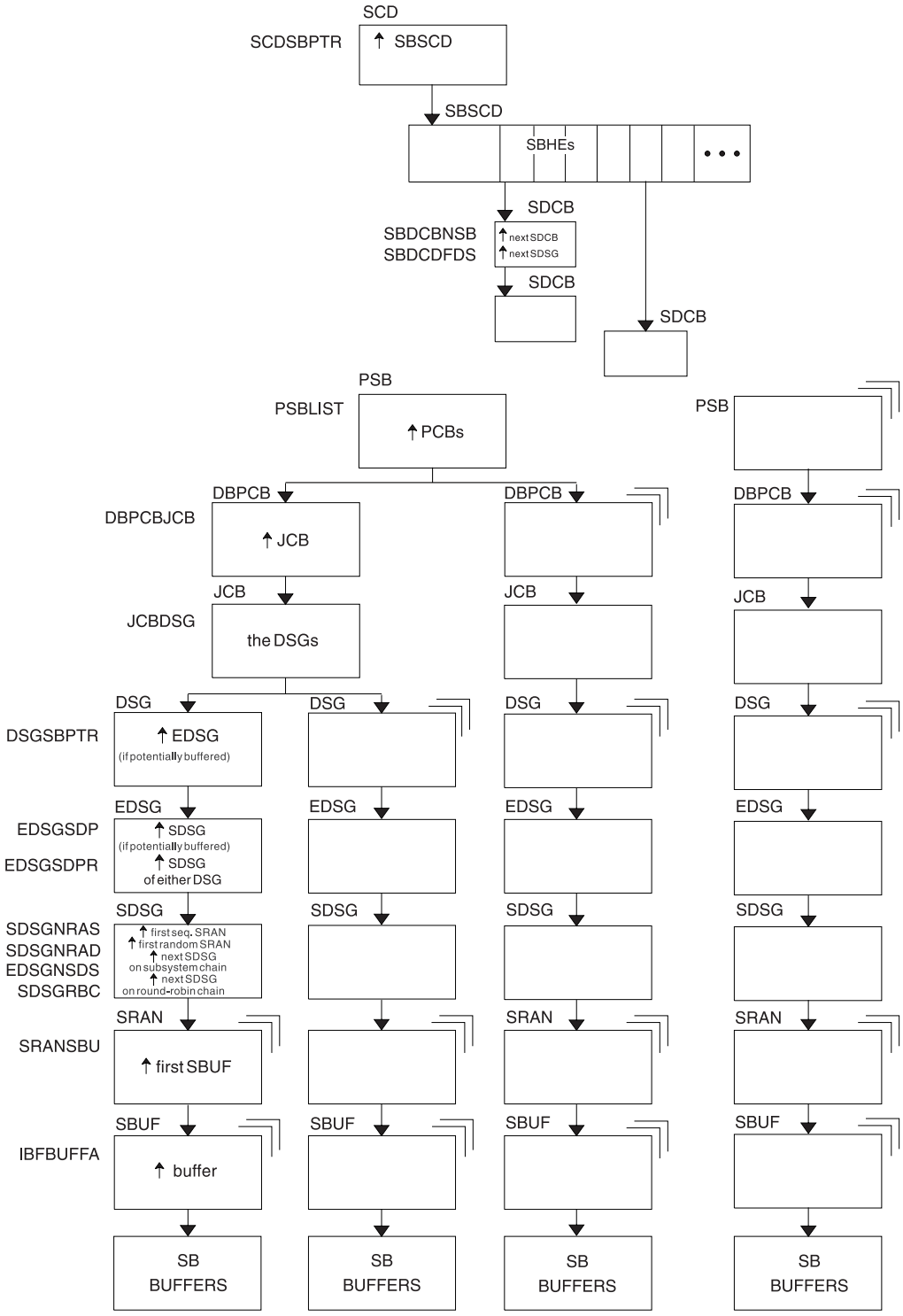


Figure 5. Sequential Buffering Control Blocks

Notes to Figure 5:

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.

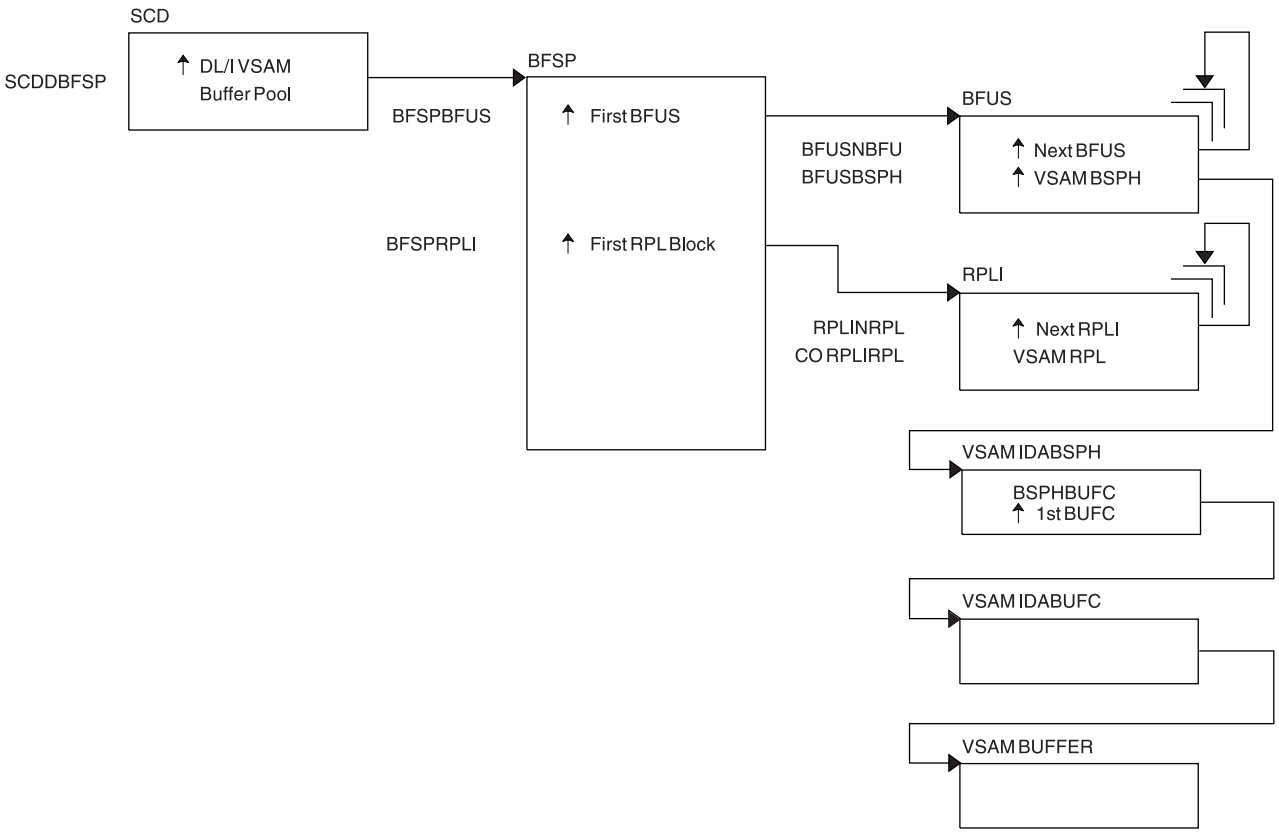


Figure 6. Buffer Handler Pool (VSAM)

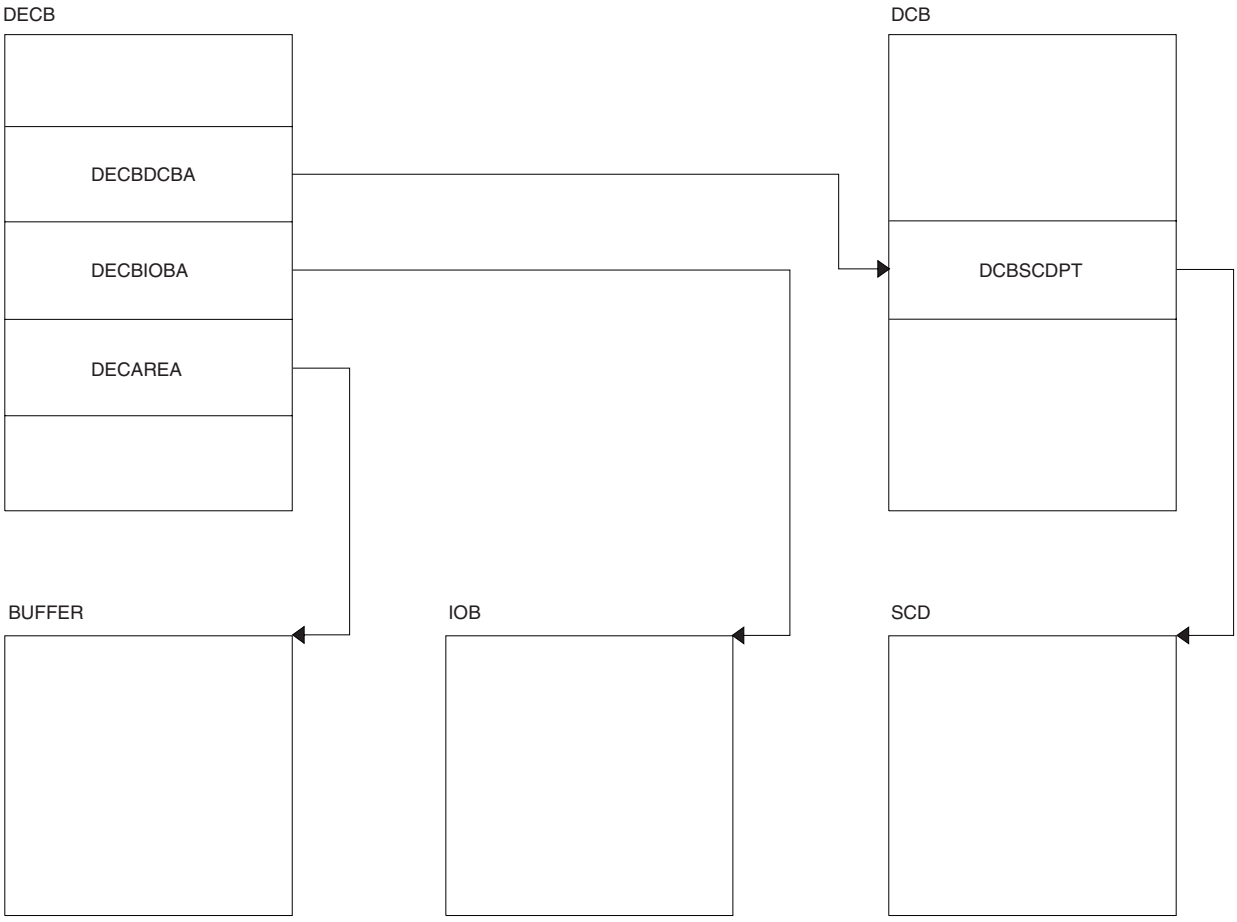


Figure 7. OSAM DECB with IOB in Use

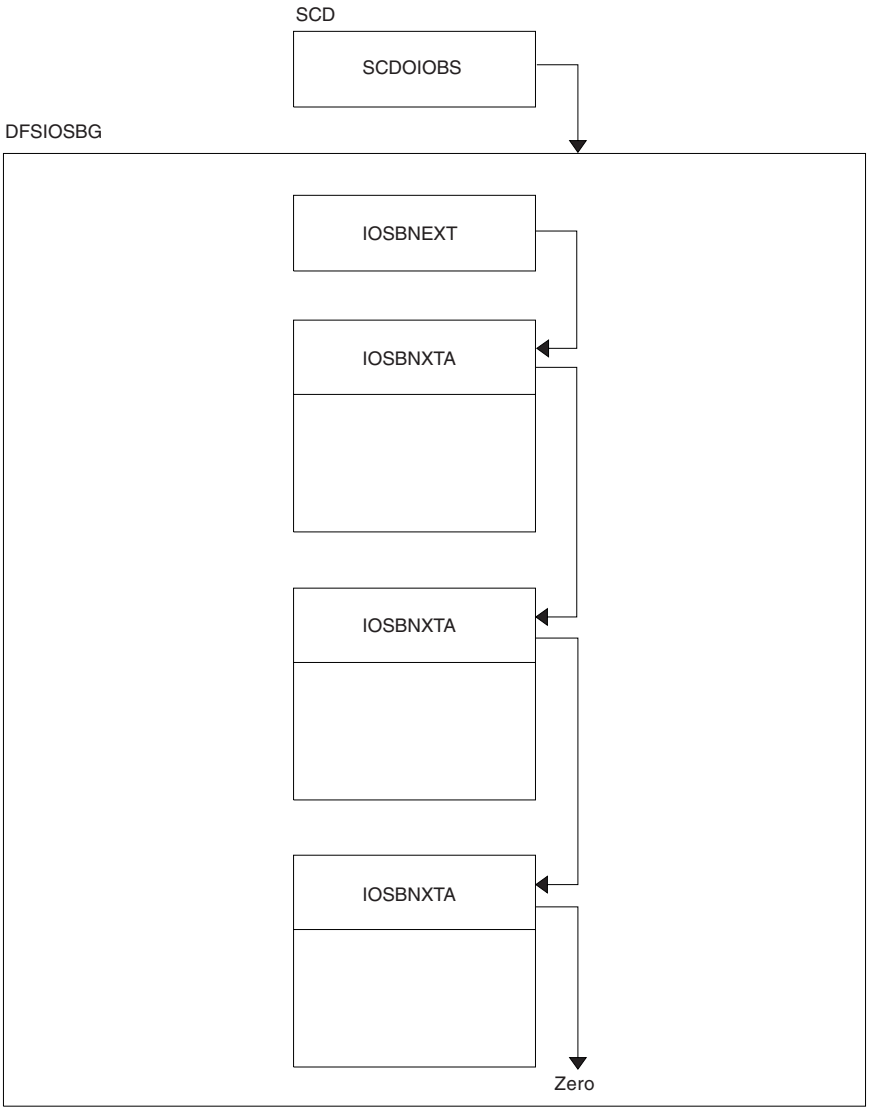


Figure 8. OSAM IOB Pool Showing Available IOBs

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 9 on page 87.

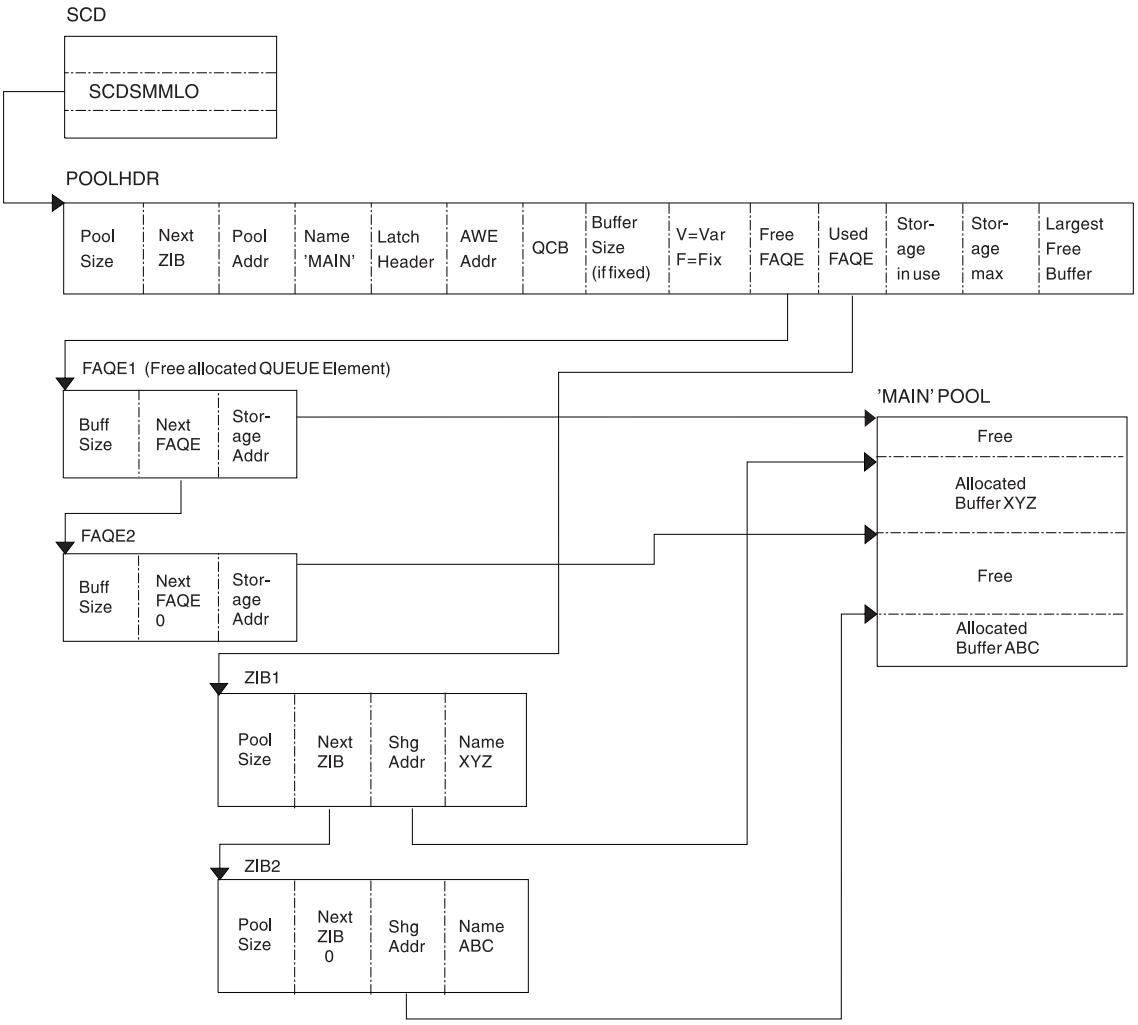


Figure 9. Storage Management Control Block Relationships Created for the MAIN Pool

Figure 10 on page 88 shows the control block relationships for those pools managed by the DFSISMN0 Storage Manager.

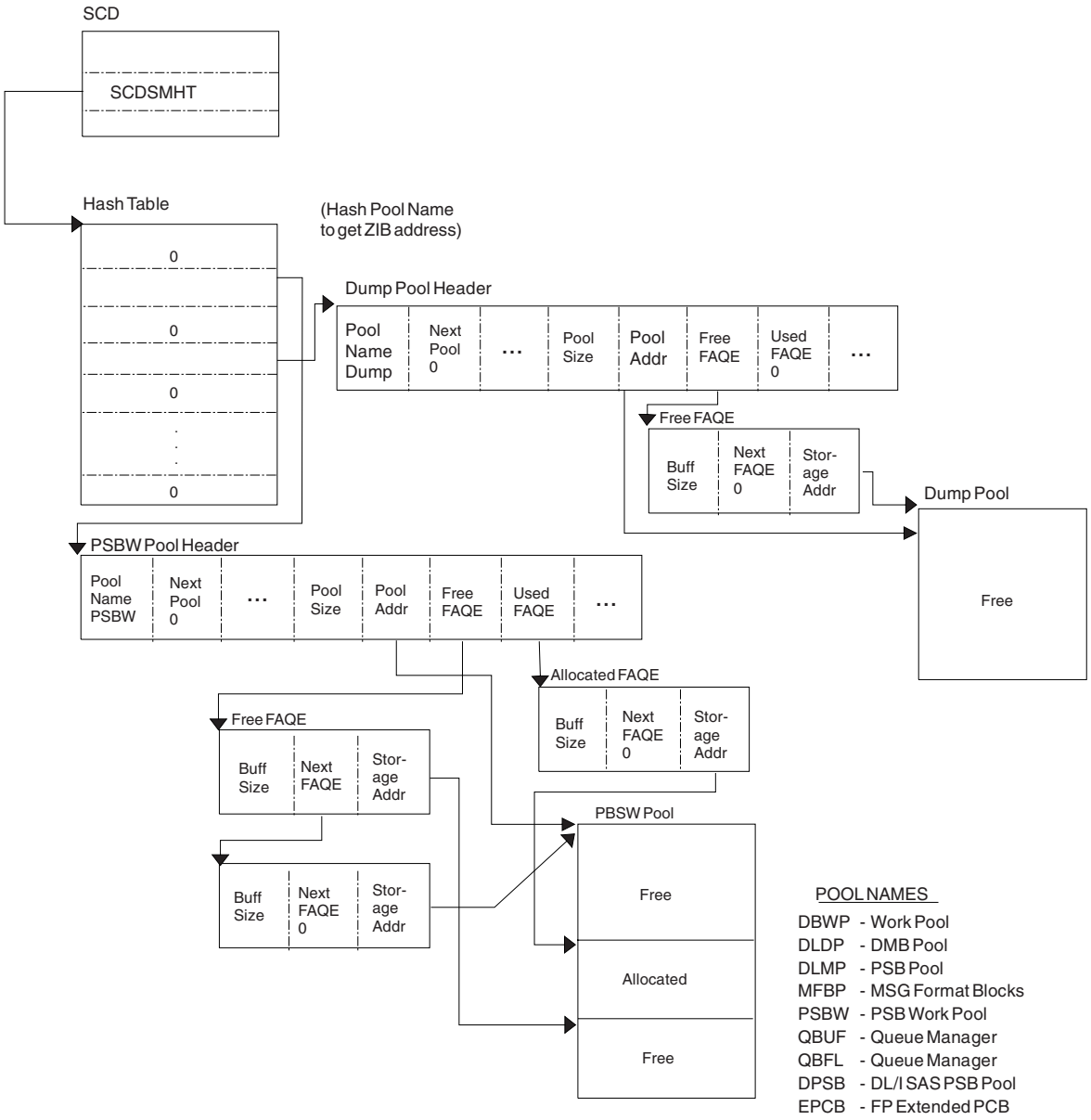


Figure 10. Storage Management Control Block Relationships for Preallocated Storage Blocks

Figure 11 on page 90 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: CIOP, HIOP, SPAP, EMHB, LUMC, and LUMP. 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 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.

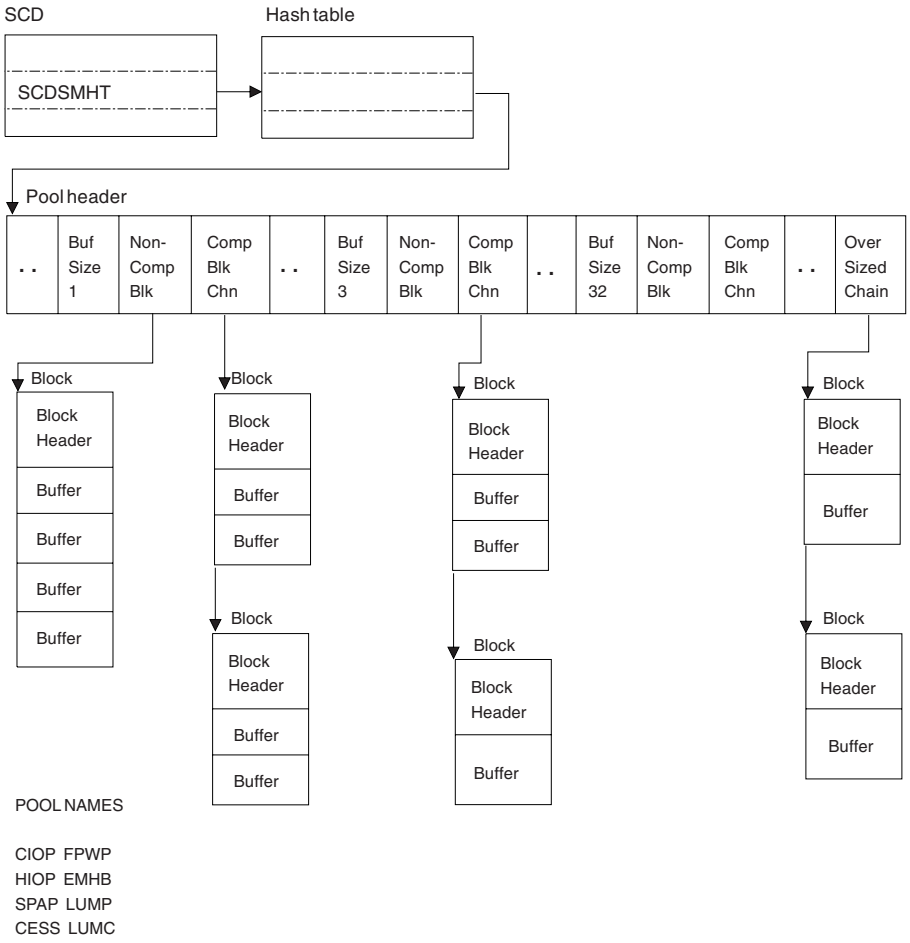


Figure 11. Storage Management Control Block Relationships (DFSPOOL Pools)

Figure 12 on page 91 shows the Storage Management (DFSCBT00 Pools) control blocks relationships.

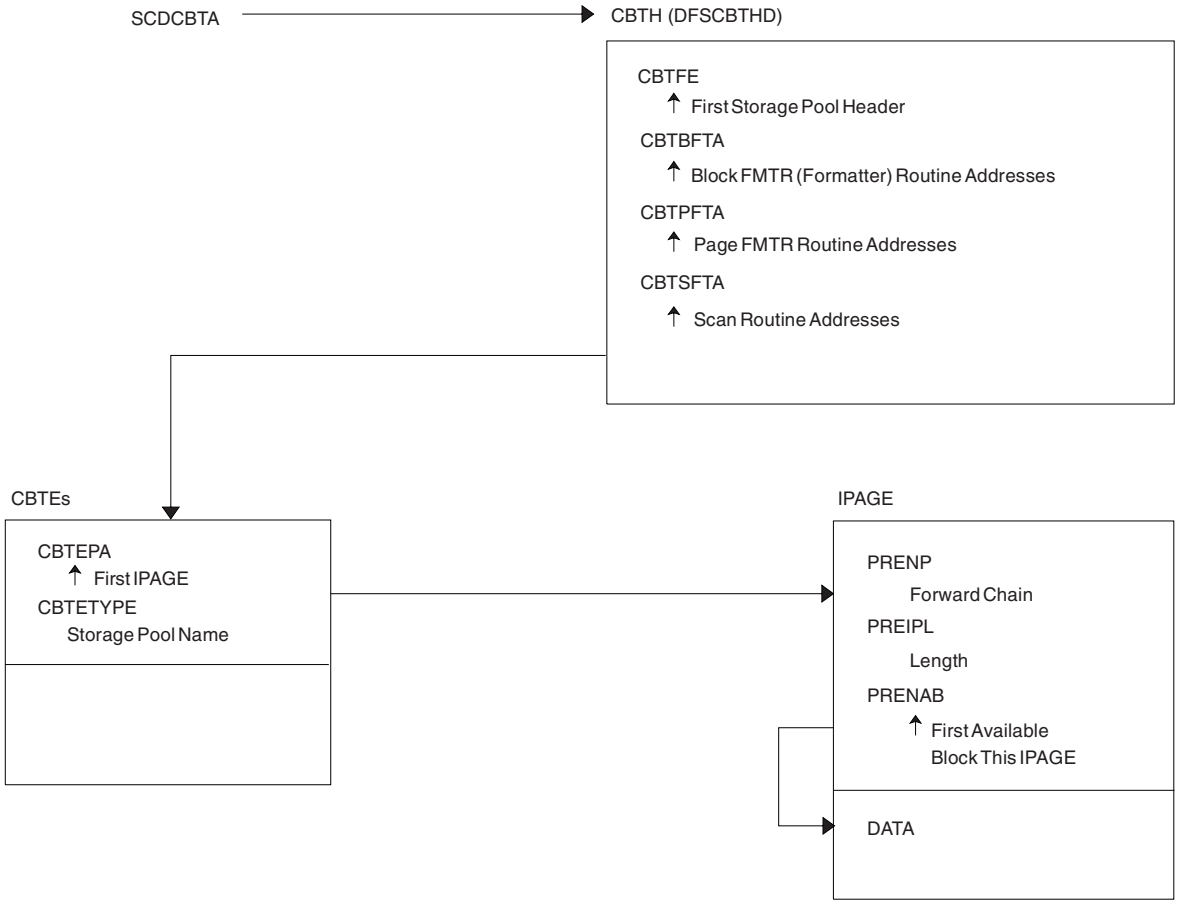


Figure 12. Storage Management Control Block Relationships (DFSCBT00 Pools)

Figure 13 on page 92 shows the Database Manager control blocks for a representative database.

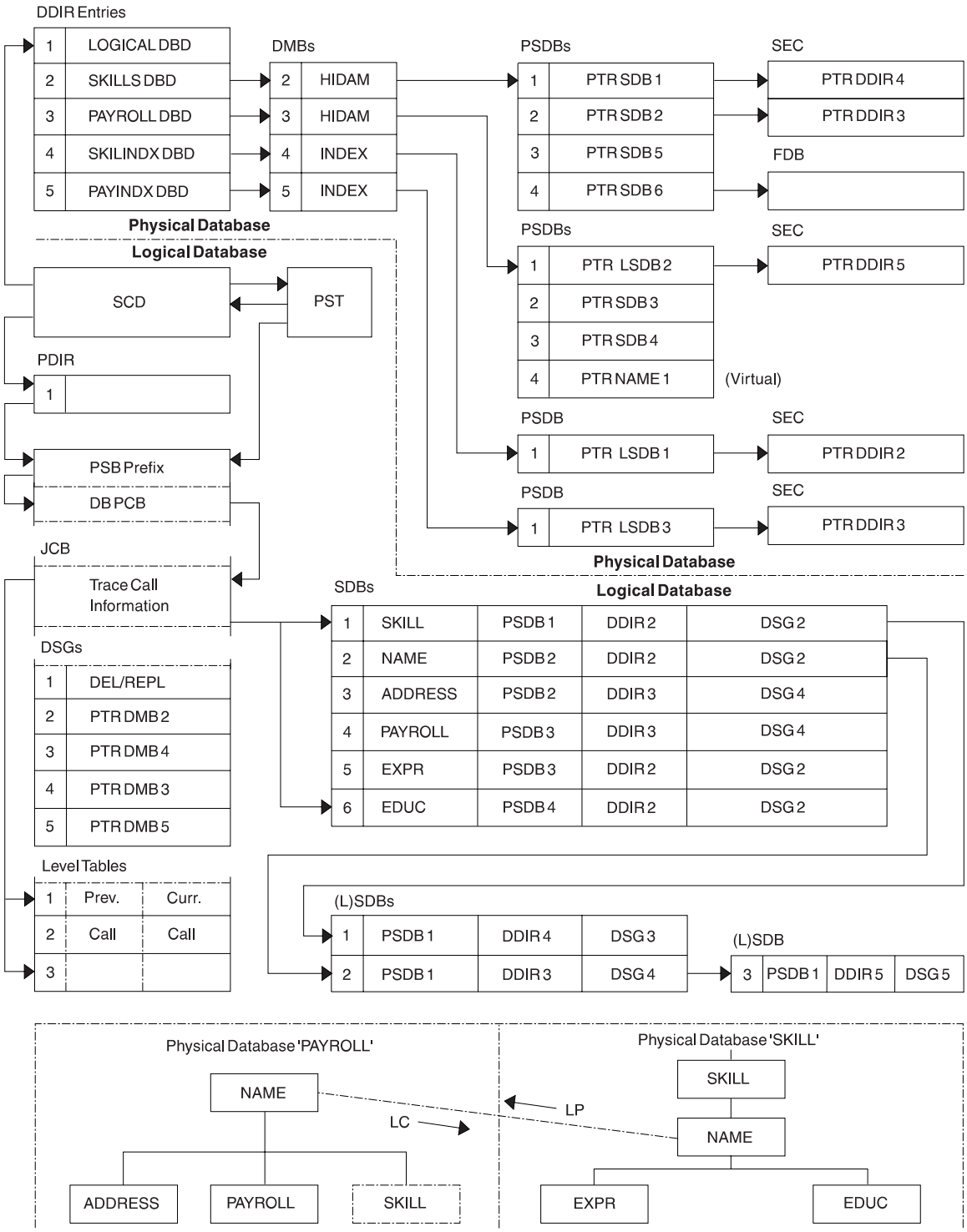


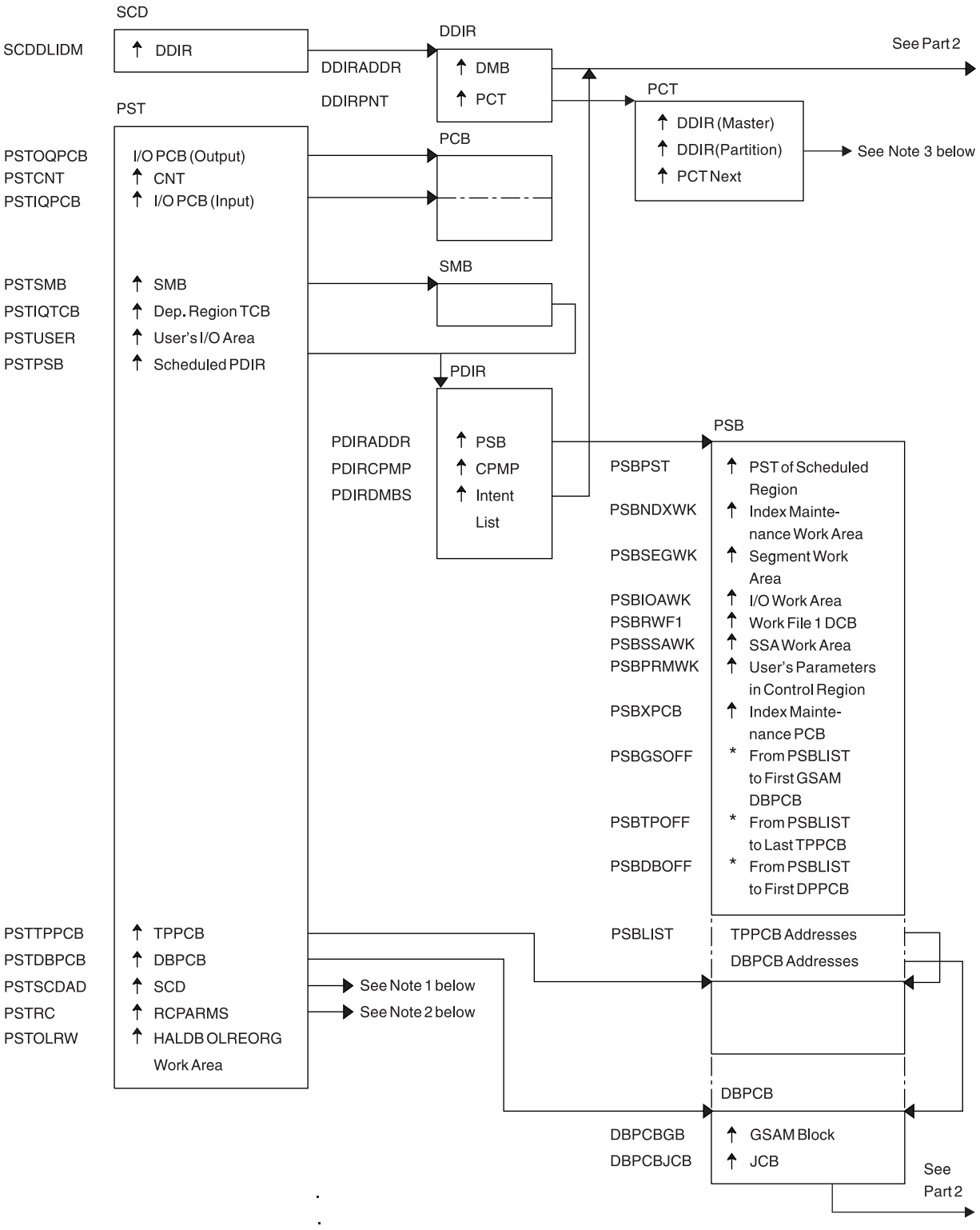
Figure 13. Database Manager Control Blocks for a Representative Database

| **Note the following HALDB differences for Figure 13:**

- 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.

Figure 14 on page 94 shows the relationships between database control blocks.



See the "notes" on page 95 that follow Figure 14.

Figure 14. Database Control Blocks (Part 1 of 2)

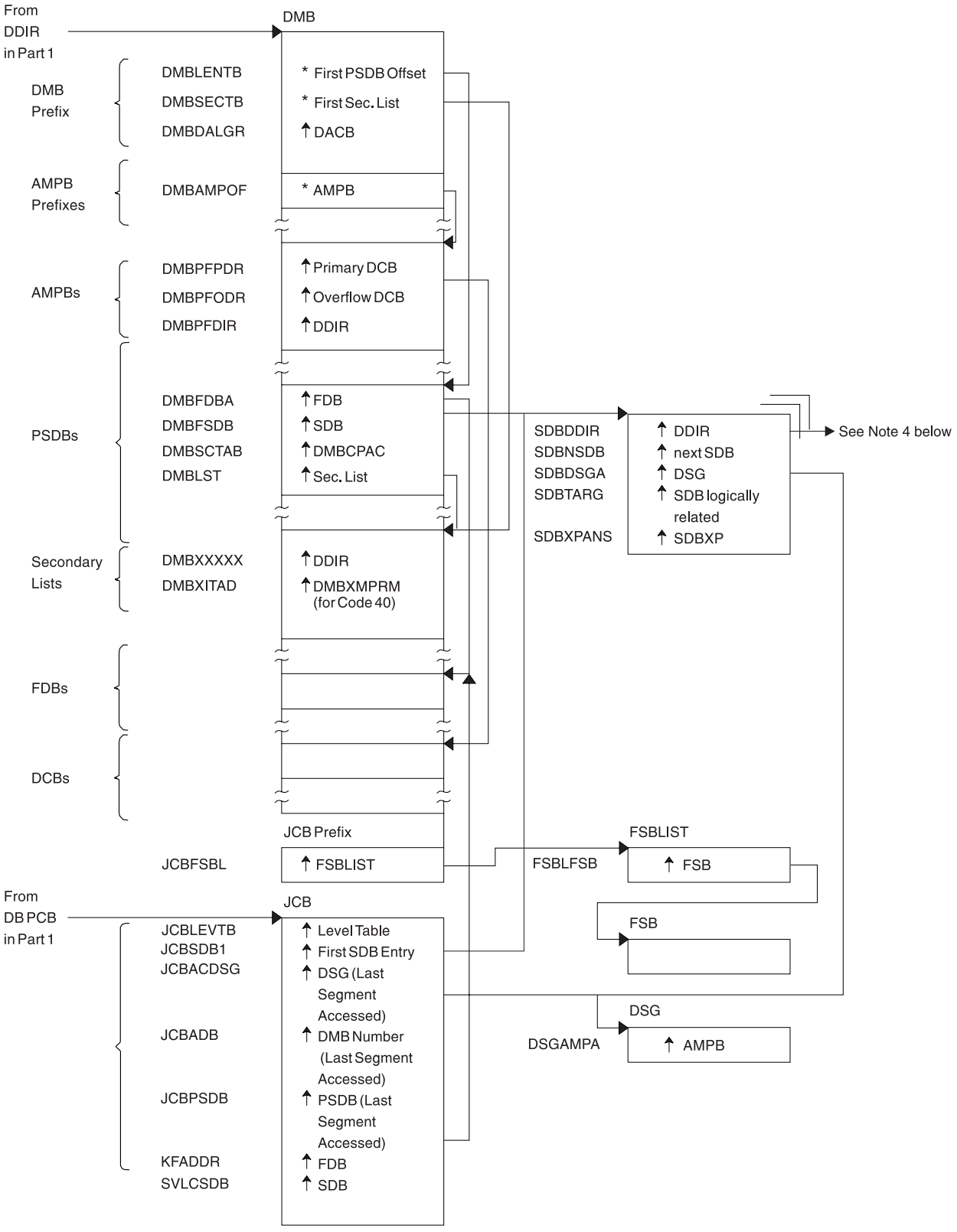


Figure 14. Database Control Blocks (Part 2 of 2)

Notes to Figure 14 on page 94:

1. See Figure 2 on page 75.

2. See Figure 3 on page 81.
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.

Figure 15 shows a diagram of a Data Management Block (DMB).

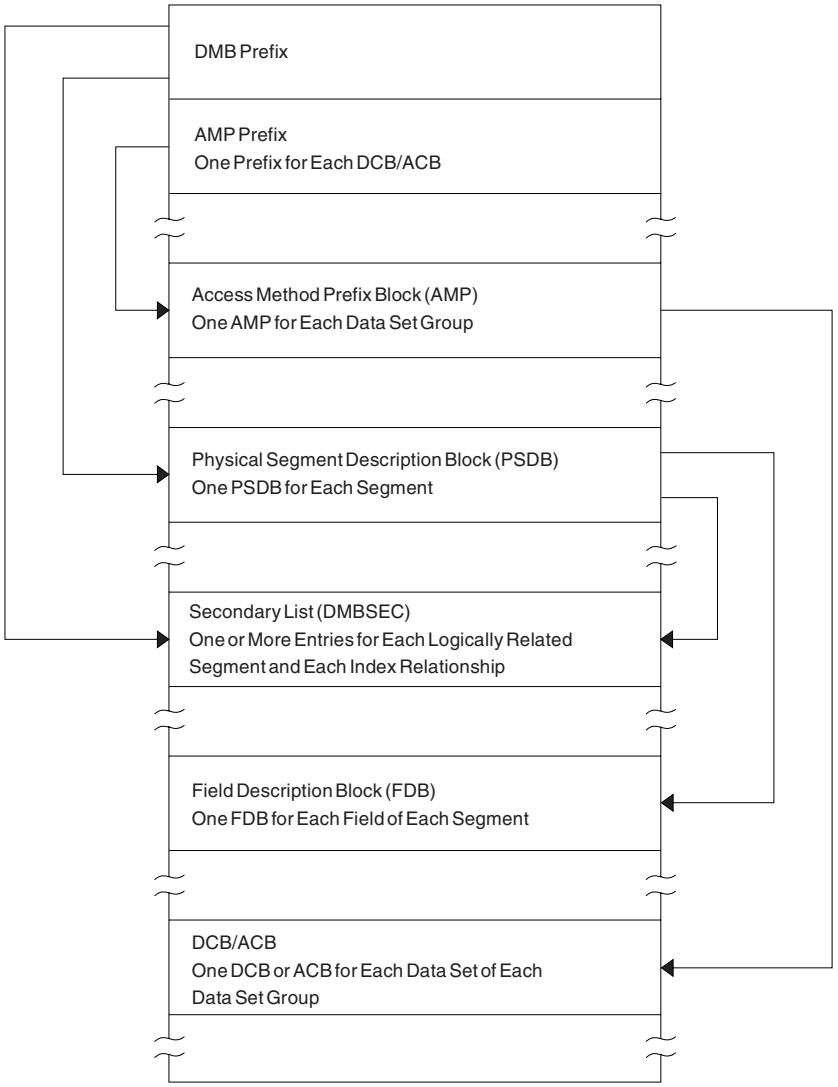


Figure 15. Diagram of a Data Management Block (DMB)

Note to Figure 15: 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.

Figure 16 on page 97 shows an overview of Fast Path Control Blocks.

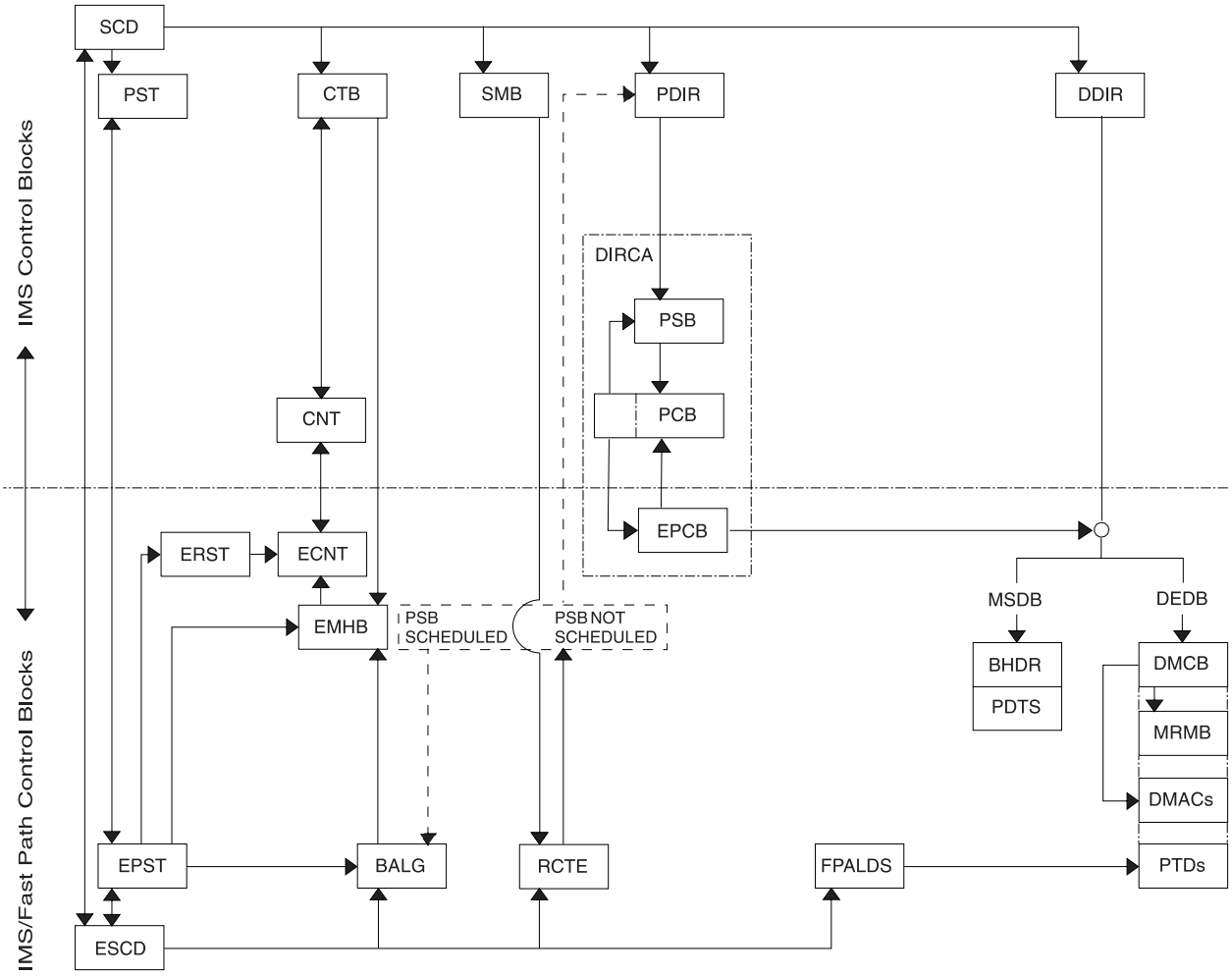
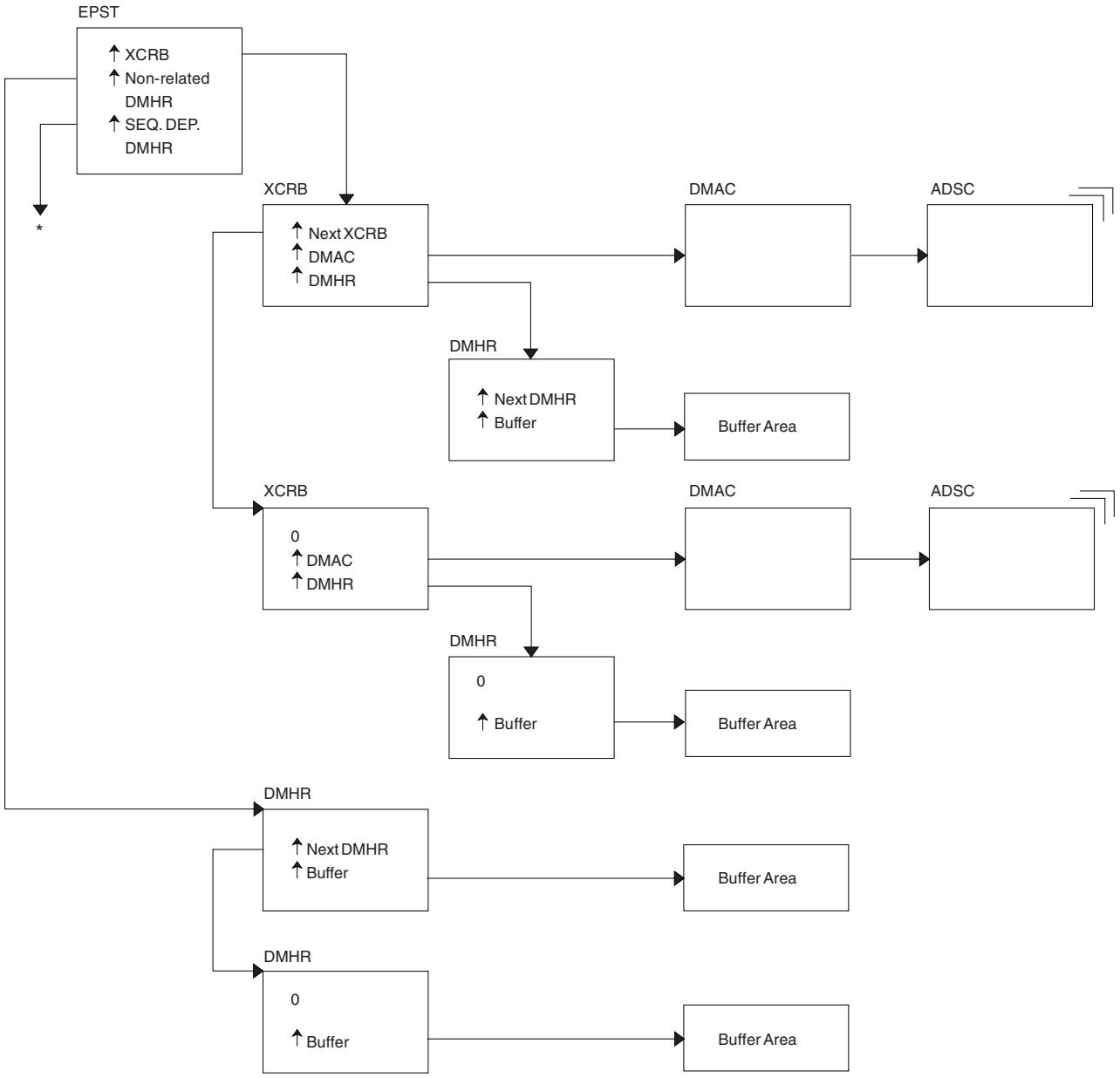


Figure 16. Overview of Fast Path Control Blocks

Figure 17 on page 98 shows the relationships between buffer control blocks for Fast Path databases.



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

Figure 17. Relationships Between Buffer Control Blocks for Fast Path Databases

Figure 18 on page 99 shows a GSAM control block overview.

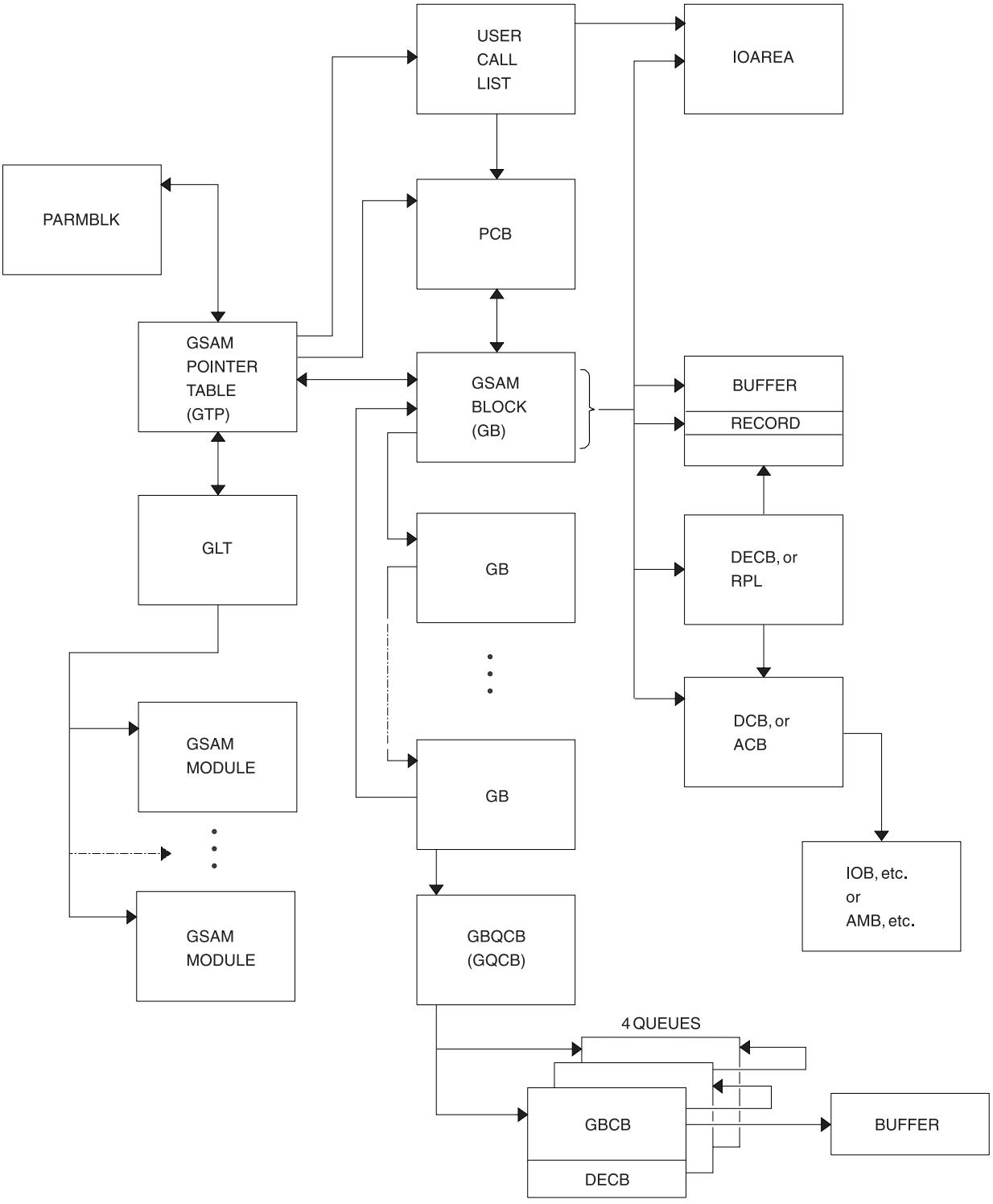


Figure 18. GSAM Control Block Overview

Figure 19 on page 100 shows the GSAM control blocks.

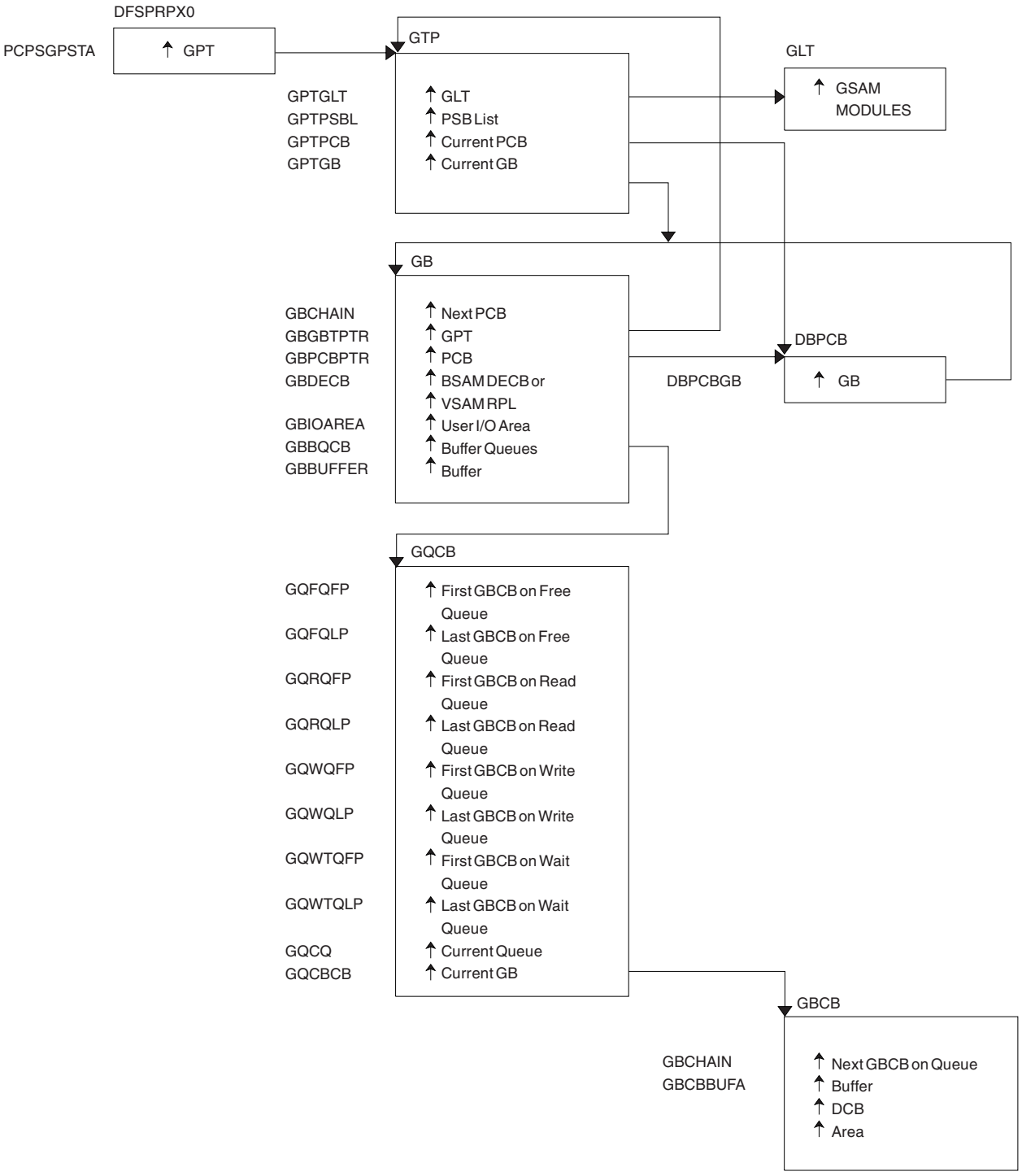


Figure 19. GSAM Control Blocks

Figure 20 on page 101 shows the DL/I control block relationships.

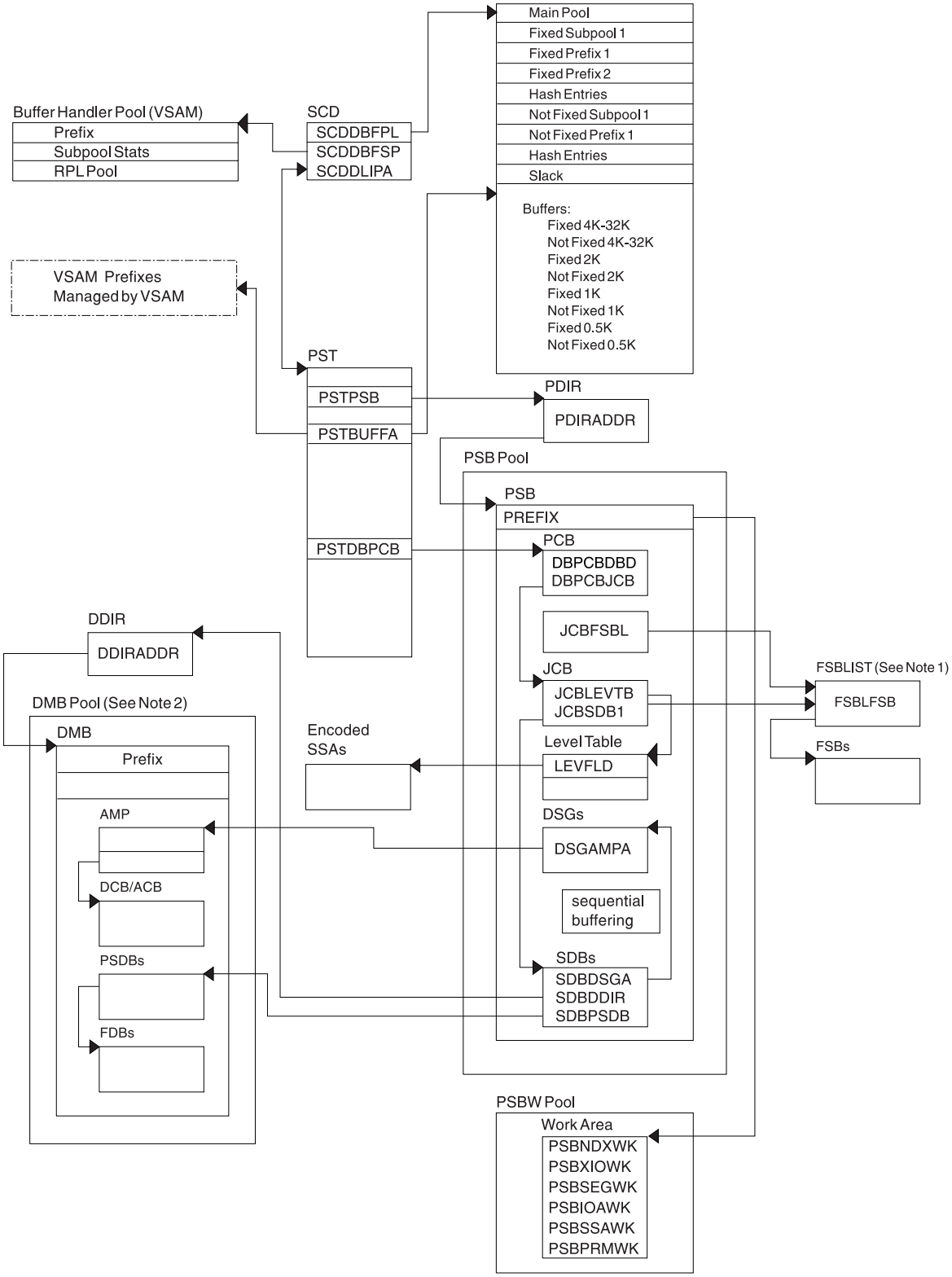


Figure 20. DL/I Control Block Relationships

Notes to Figure 20:

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.

Figure 21 shows the IMS Transaction Manager control blocks.

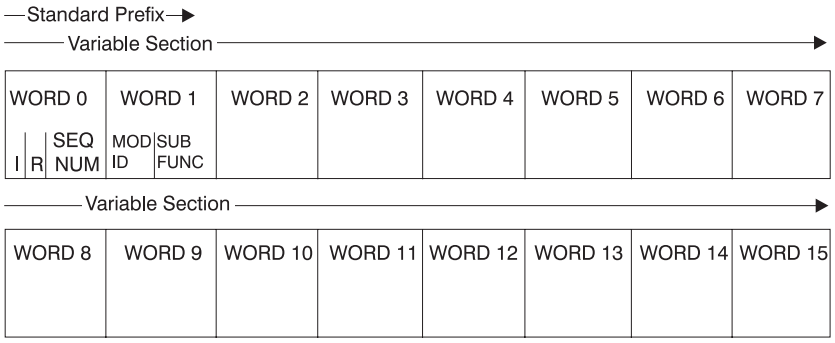
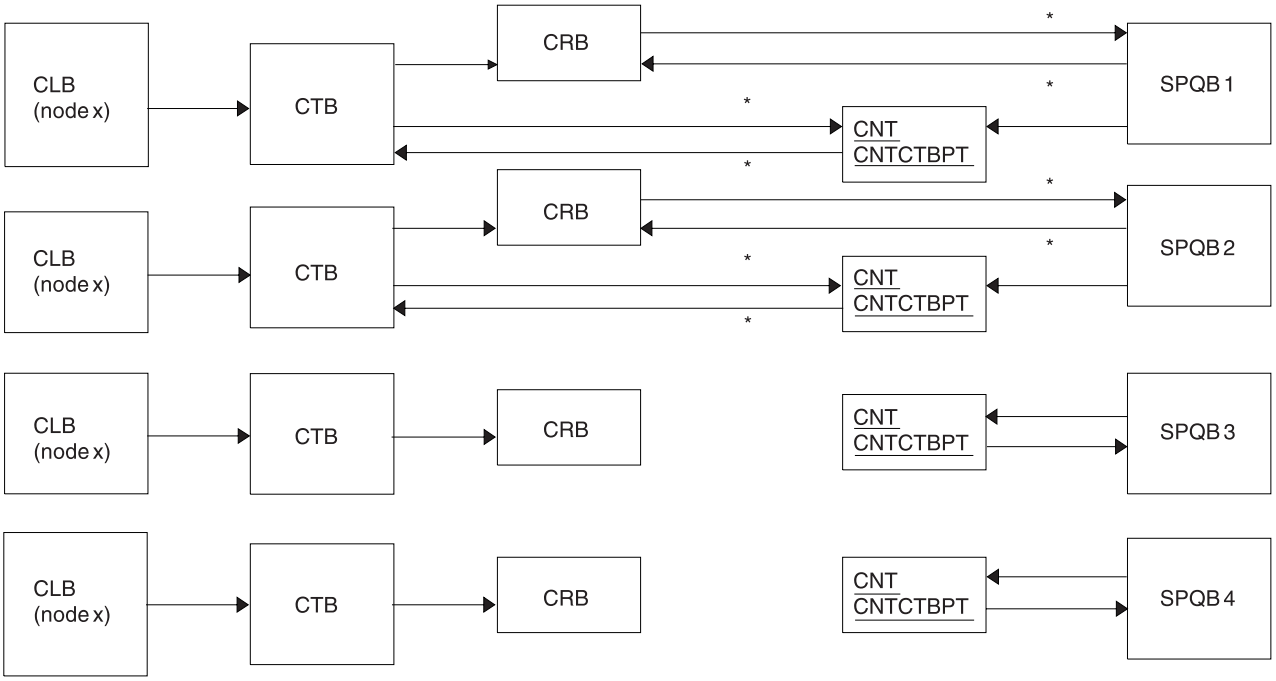


Figure 21. IMS Transaction Manager Control Blocks

Figure 22 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 22. Intersystem Communication Control Block Structure

Figure 23 on page 103 shows the VTCB Load Module.

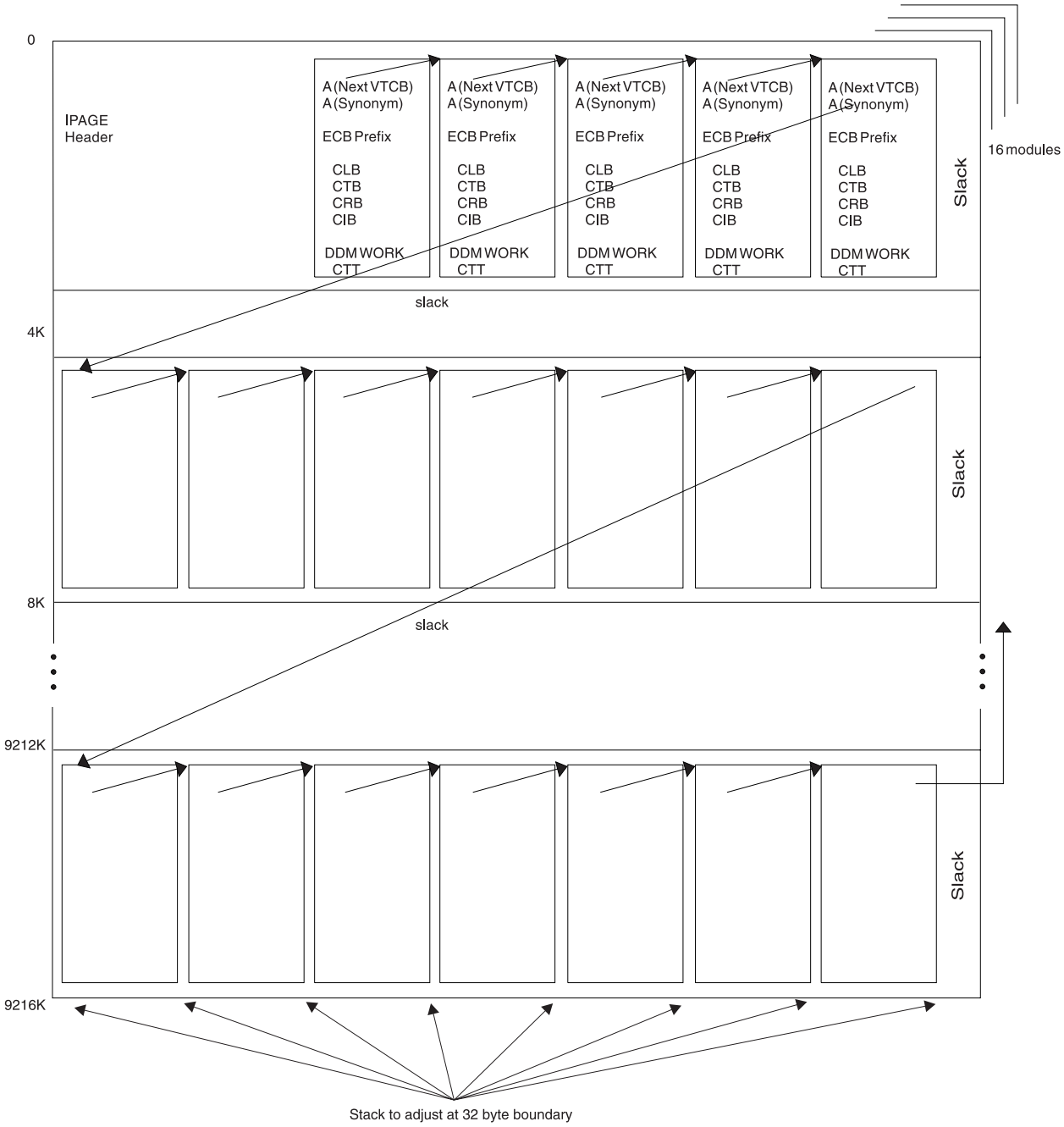


Figure 23. VTCB Load Module

As illustrated in Figure 23, 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 BTAM 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.

Figure 24 on page 105 shows the Multiple Systems Coupling (MSC) control block overview.

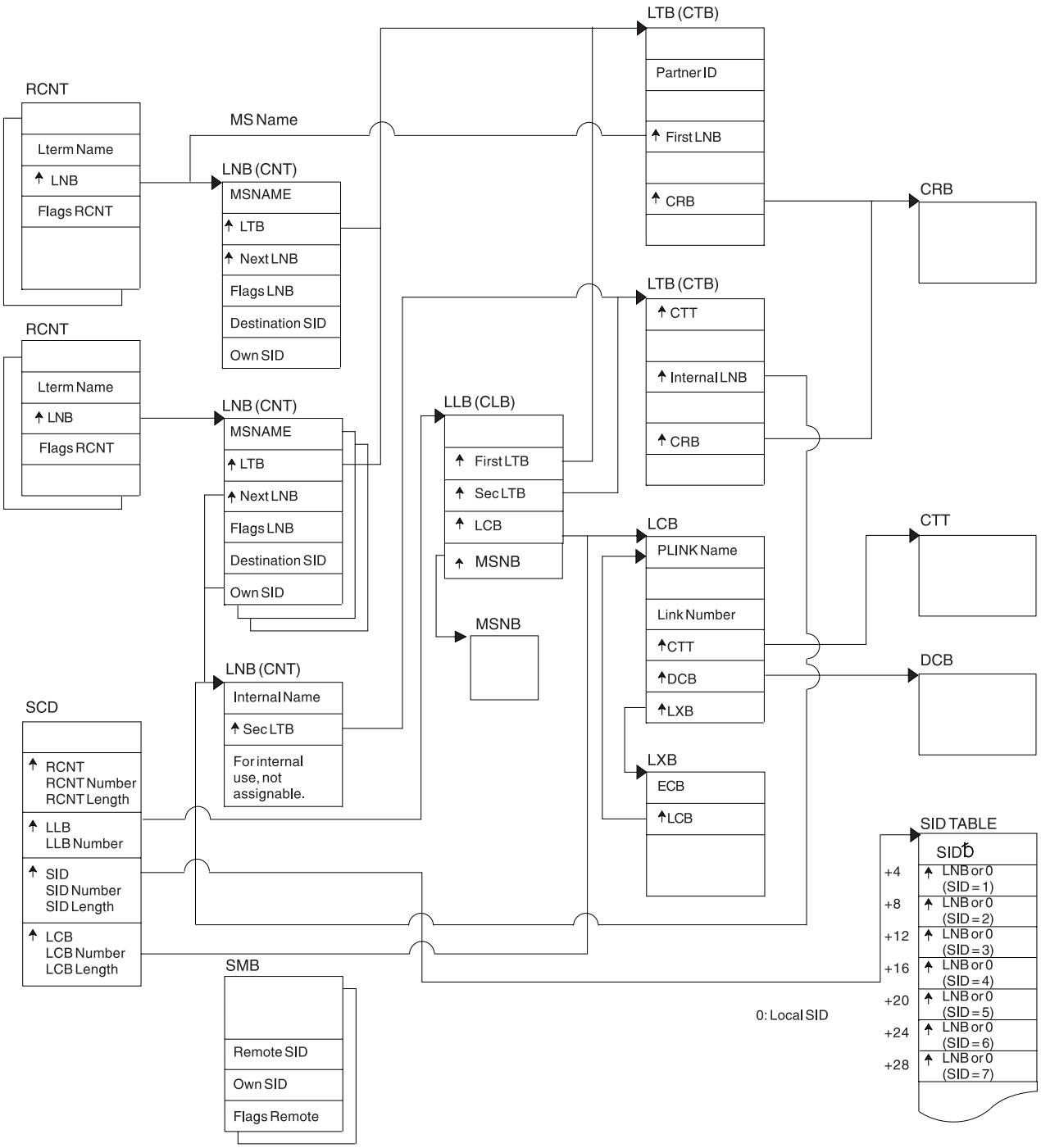


Figure 24. Multiple Systems Coupling (MSC) Control Block Overview

Figure 25 on page 106 shows the Multiple Systems Coupling (MSC) Main Storage-to-Main Storage control block overview.

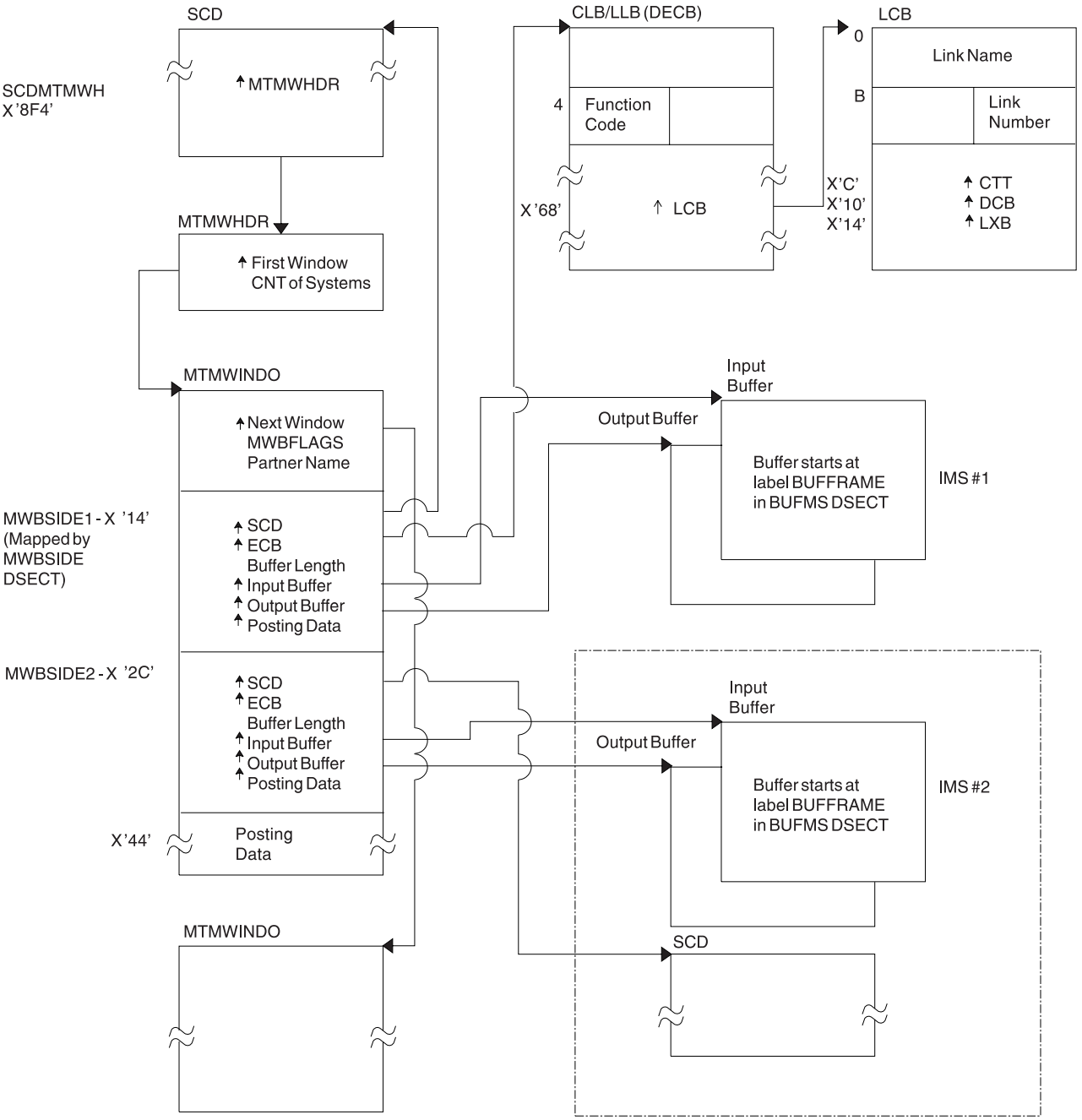


Figure 25. Multiple Systems Coupling (MSC) Main Storage-to-Main Storage Control Block Overview

Figure 26 on page 107 shows a z/OS Storage map displaying IMS-to-IRLM interrelationships.

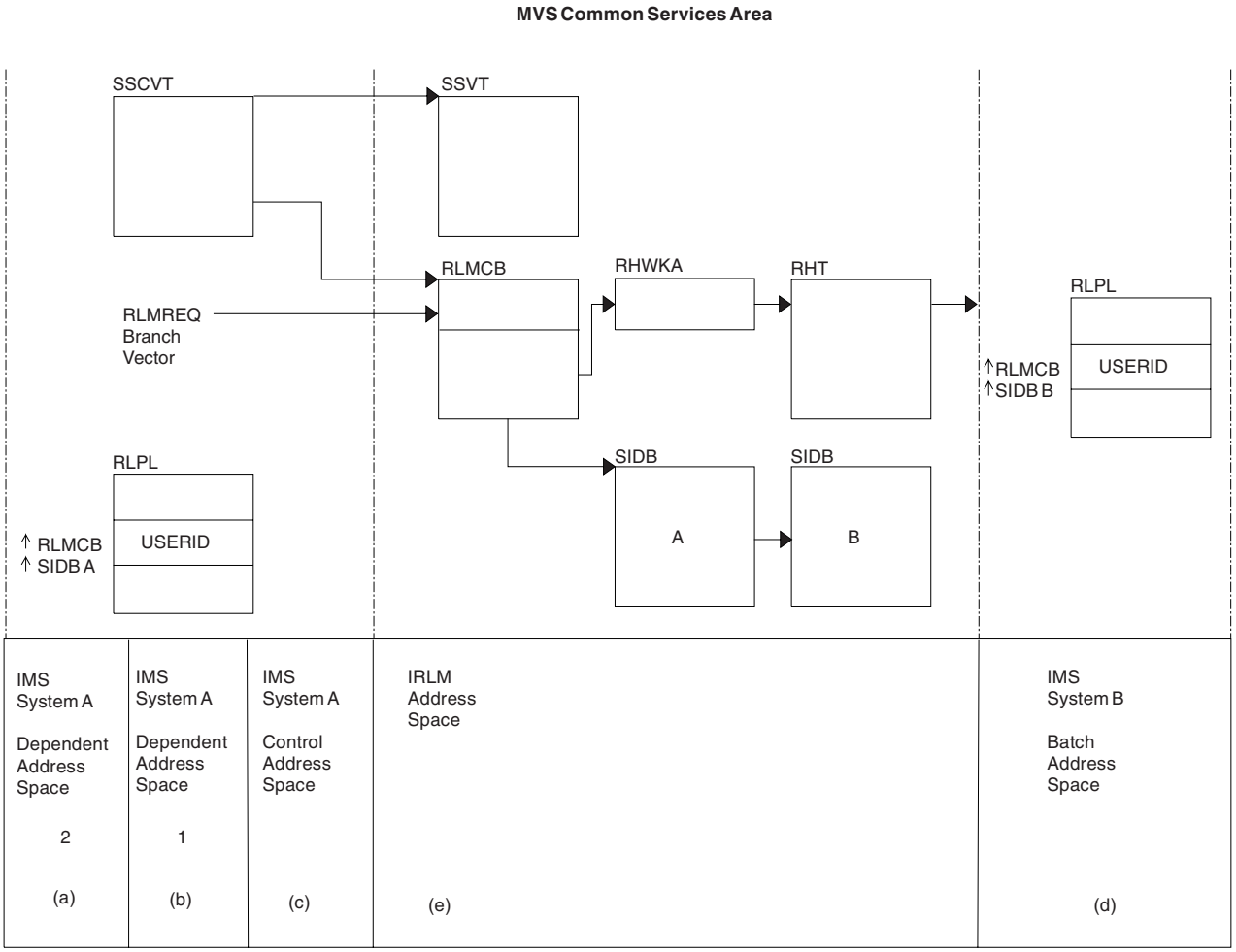


Figure 26. z/OS Storage Map Showing IMS-to-IRLM Interrelationships

Notes to Figure 26:

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.

Figure 27 on page 108 shows the overall control block structure of IRLM.

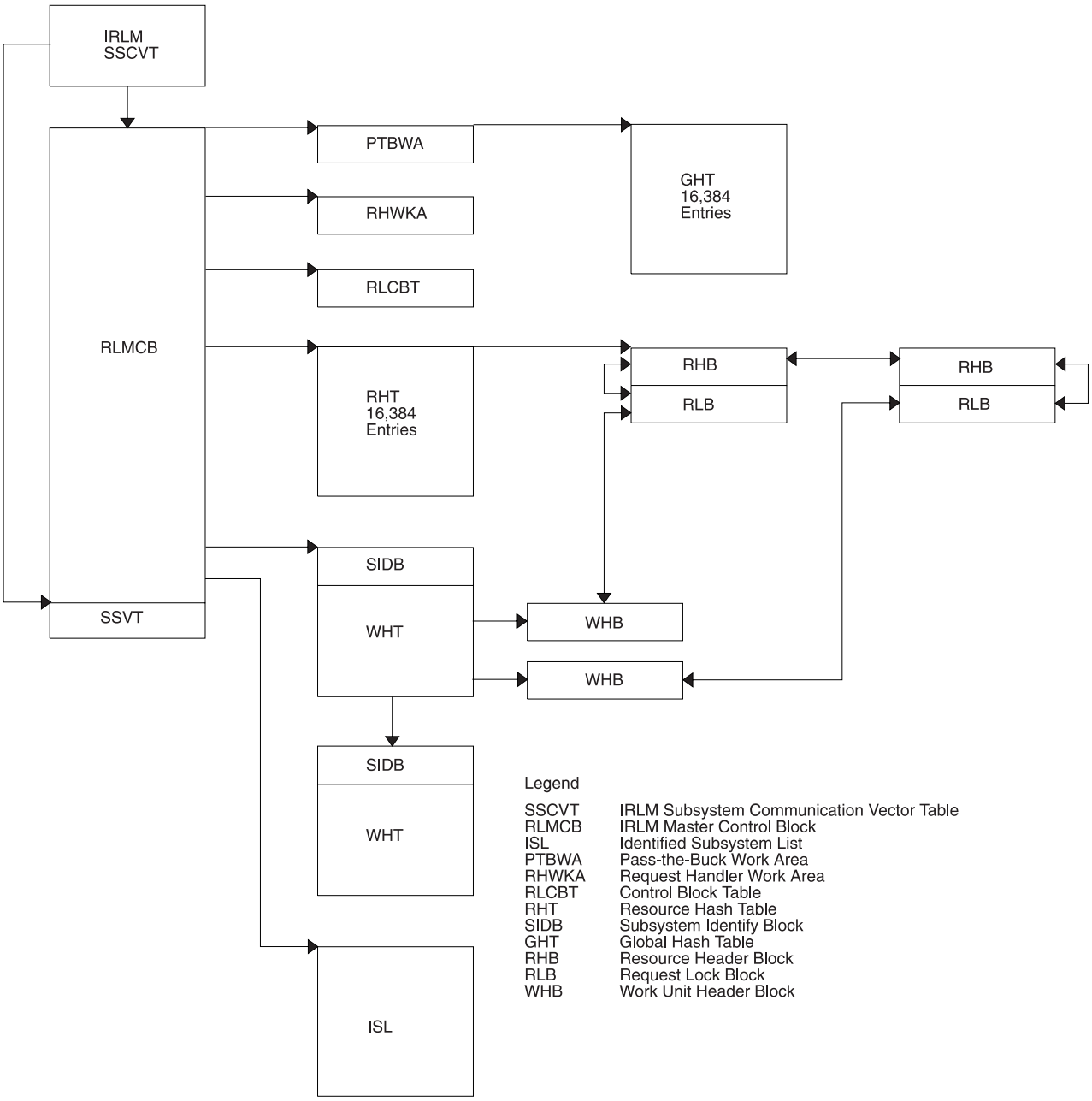


Figure 27. IRLM Overall Control Block Structure

Figure 28 on page 109 shows the IRLM Storage Manager pools.

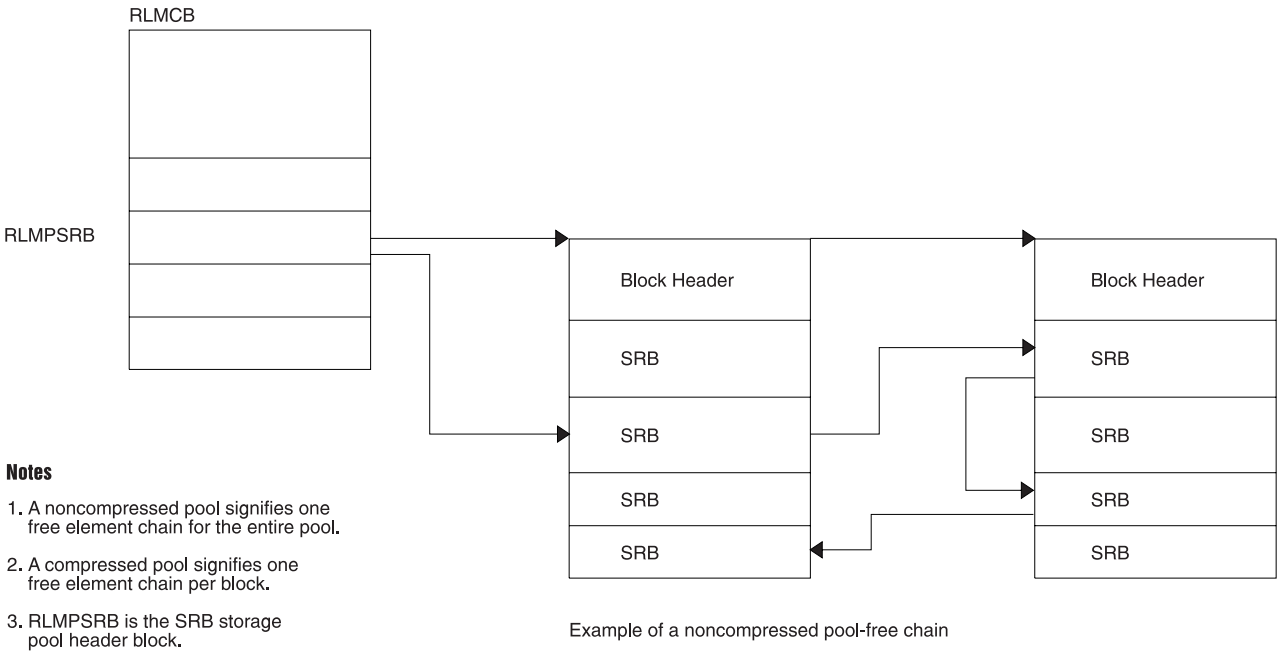
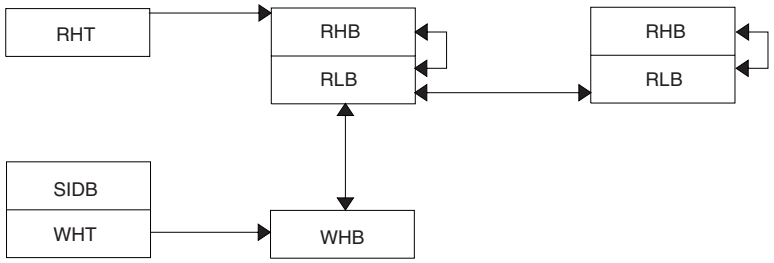
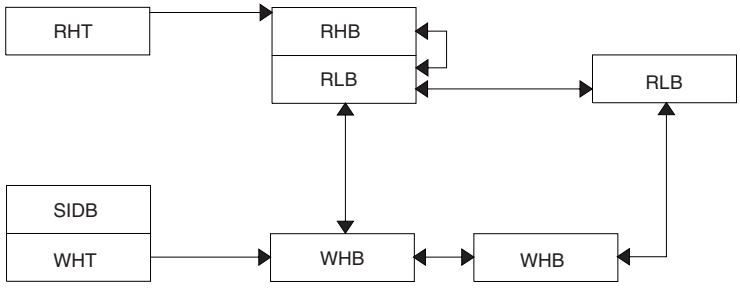


Figure 28. IRLM Storage Manager Pools

Figure 29 shows examples of IRLM lock requests.



(One work unit holds a lock on two resources.)



(Two work units hold a lock on the same resource.)

Figure 29. IRLM Lock Request Examples

Figure 30 on page 110 shows an overview of the Database Recovery Control (DBRC) control blocks.

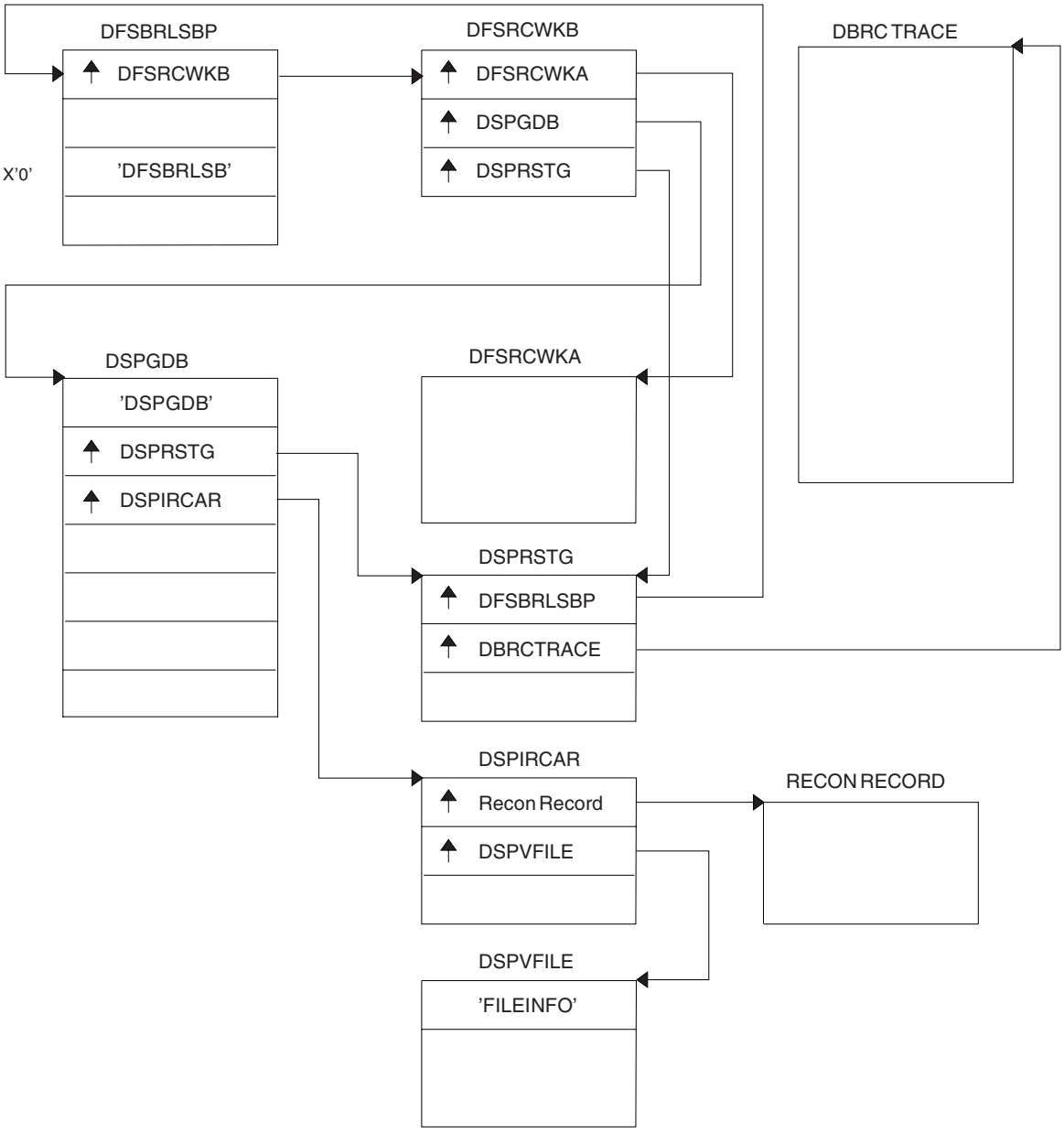


Figure 30. Control Block Overview of Database Recovery Control (DBRC)

Figure 31 on page 111 shows the organization and basic linkages of Description Output Format (DOF) and Message Output Descriptor (MOD).

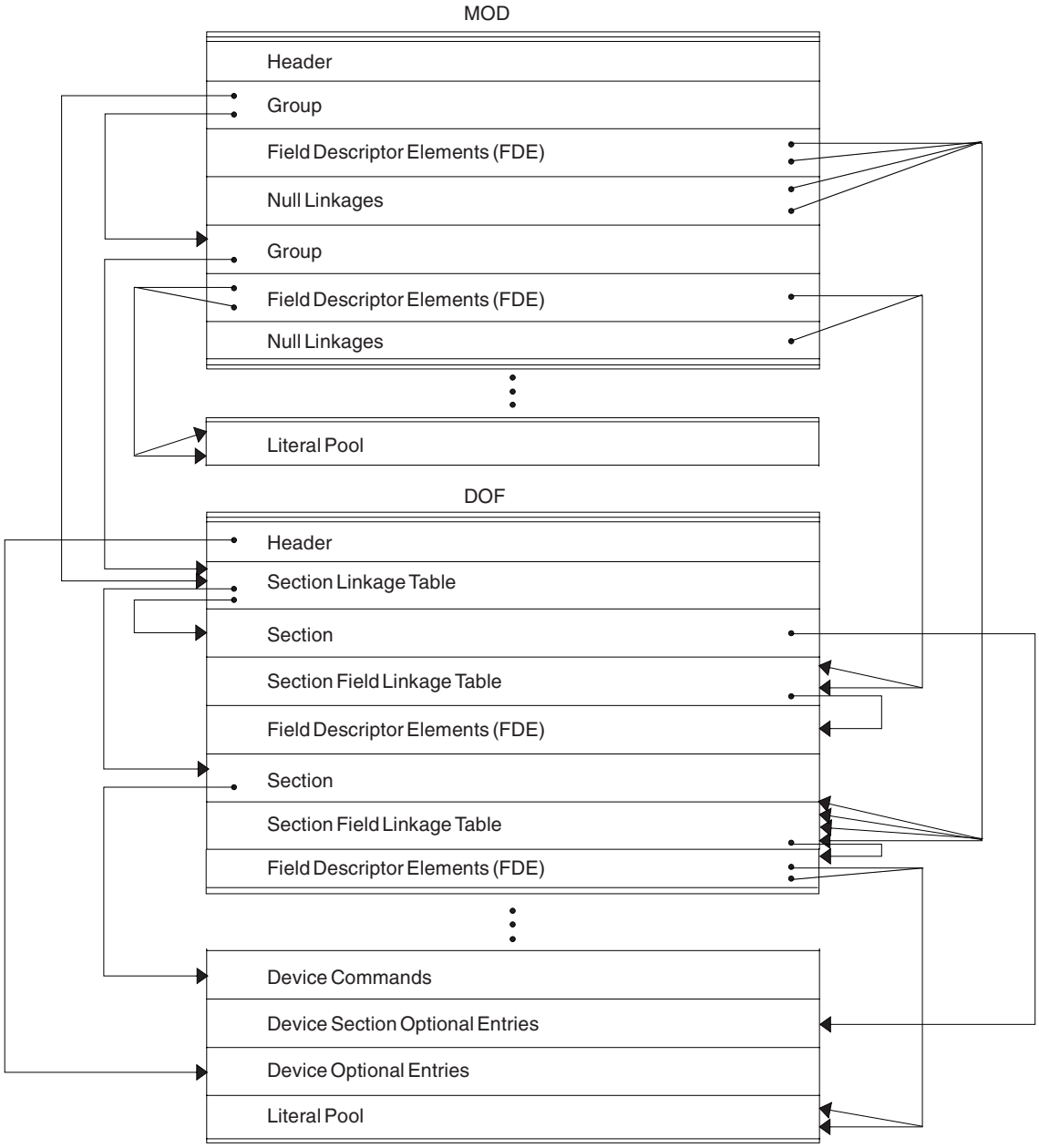


Figure 31. Organization and Basic Linkages: DOF (Device Output Format) and MOD (Message Output Descriptor)

Figure 32 on page 112 shows the organization and basic linkages between Device Input Format (DIT) and Message Input Descriptor (MID).

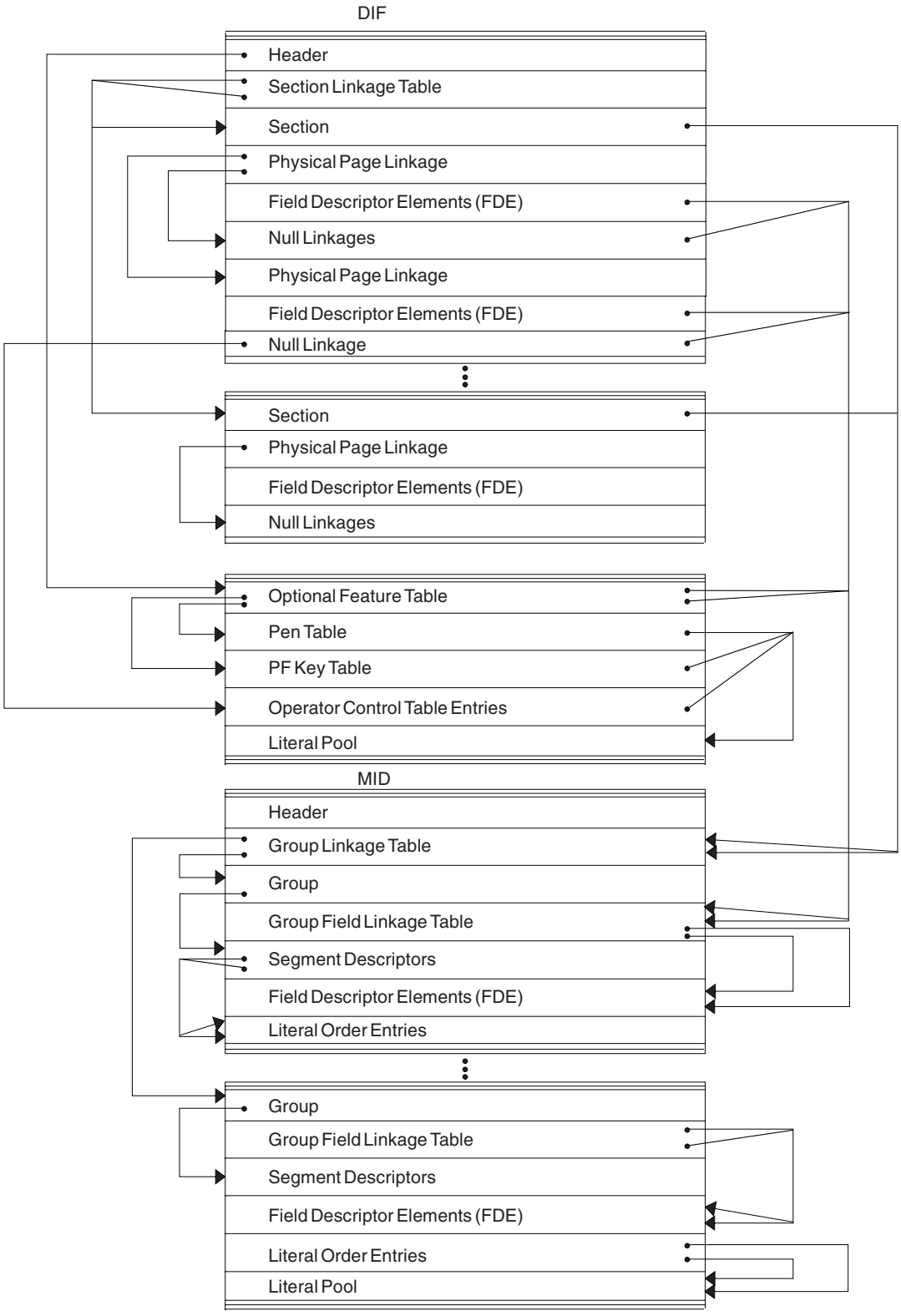


Figure 32. Organization and Basic Linkages: DIF (Device Input Format) and MID (Message Input Descriptor)

DL/I Record Formats

This topic describes these DL/I data record formats:

HSAM and SHSAM Database

Segment Formats

Figure 33 shows the DL/I data record formats for HSAM and SHSAM databases.

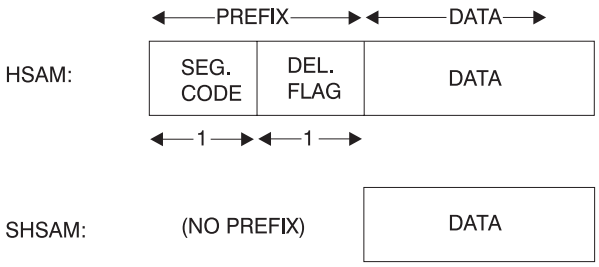


Figure 33. HSAM and SHSAM Segment Format

Delete Byte (Flag) Format

Figure 34 shows the delete byte (flag) format.

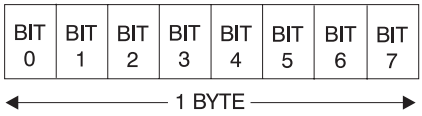


Figure 34. Delete Byte (Flag) Format

Bit	Description
0	Segment deleted (HISAM or index).
1	DB record deleted (HISAM 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

For SHSAM there are no dependent segments. Block size must be a multiple of segment size. Figure 35 on page 114 shows the block format for HSAM and SHSAM.

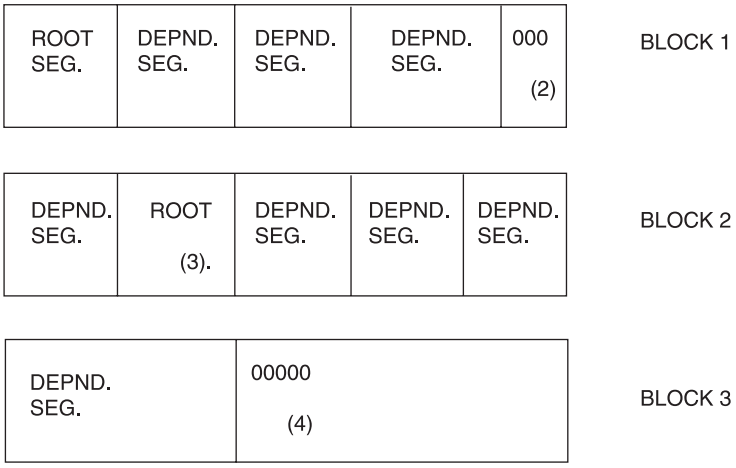


Figure 35. Block Format for HSAM and SHSAM

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

Segment Format

Figure 36 and Figure 37 show the segment format of HISAM and SHISAM.

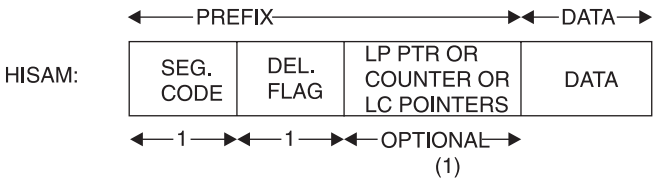


Figure 36. HISAM Segment Format

Note:

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

Figure 37. SHISAM Segment Format

Note: This is a root-only database.

LRECL Format

Figure 38 shows the LRECL format.

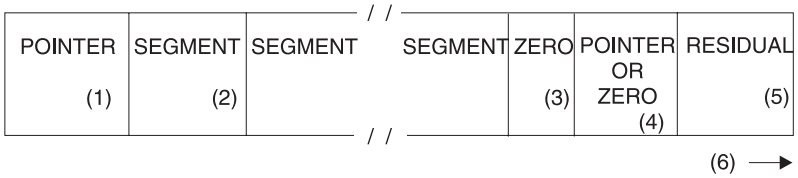


Figure 38. LRECL Format

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 37 on page 114)

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

Figure 39 shows the VSAM block formats.

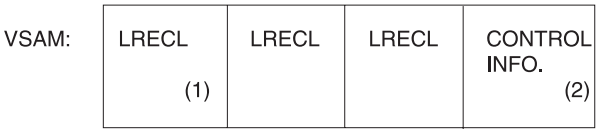


Figure 39. VSAM Block Formats

Notes:

1. LRECL length might change between KSDS and ESDS, depending on user definition.
2. Ten bytes if blocked data set; 7 bytes if unblocked data set.

HDAM, HIDAM, PHDAM, or PHIDAM Database

Segment Format

Figure 40 shows the segment format of HDAM, HIDAM, PHDAM, or PHIDAM.

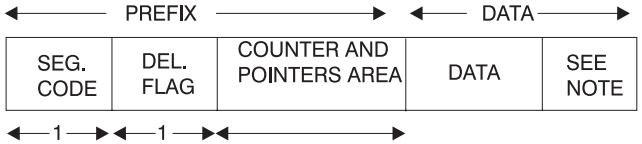


Figure 40. HDAM, HIDAM, PHDAM, or PHIDAM Segment Format

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

Figure 41 maps the prefix of a segment.

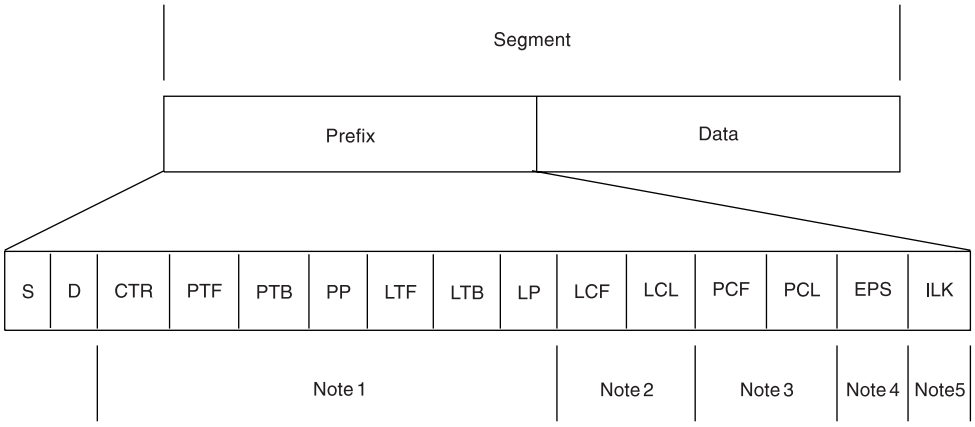


Figure 41. Mapping the Prefix of a Segment

Notes to Figure 41:

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 their parents' prefix which points to the first and last occurrence of them.

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 whose parent's segment code (PSDB+1) 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.

OSAM and VSAM ESDS Block Format

Figure 42 shows the OSAM and VSAM ESDS block format.

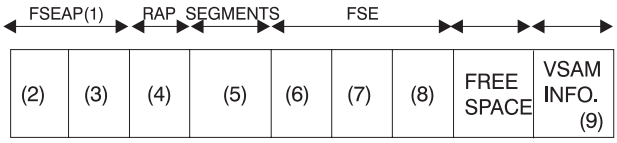


Figure 42. OSAM and VSAM ESDS Block Format

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

On Storage Device and in Buffer Pool

Figure 43 on page 118 shows the format of the on storage device and in buffer pool

Figure 43. 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.

As Returned by Buffer Handler

Figure 44 shows the VSAM LRECL format as returned by buffer handler (1).

Notes:

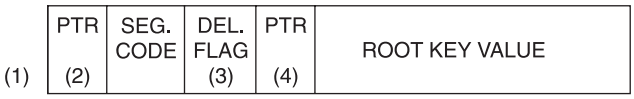


Figure 44. VSAM LRECL Format As Returned by Buffer Handler

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 Device and in Buffer Pool

Figure 45 shows the VSAM block format on device and in buffer pool.

Figure 45. VSAM Block Format on Device and in Buffer Pool

Secondary Index or PSINDEX Database (VSAM Only)

LRECL Format on Device and in Buffer Pool

One segment per LRECL. Figure 46 shows the LRECL Format on Device and in Buffer Pool.

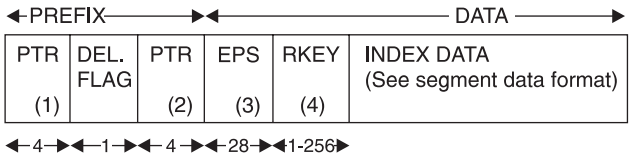


Figure 46. LRECL Format on Device and in Buffer Pool

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

Figure 47 shows LRECL as returned by buffer handler.

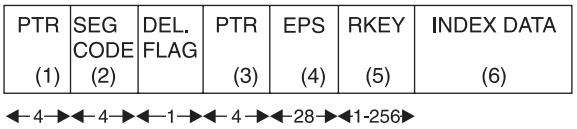


Figure 47. LRECL as Returned by Buffer Handler

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

Figure 48 shows the block format on device and in buffer pool.

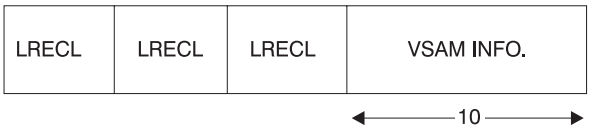


Figure 48. VSAM Block Format on Device and in Buffer Pool

Segment Data Format

Figure 49 shows the segment data format.

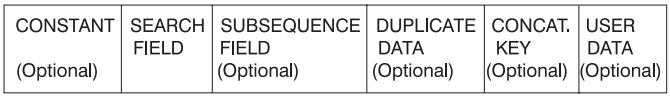


Figure 49. Segment Data Format

Variable-Length Segments

HISAM, HDAM, HIDAM, PHDAM, and PHIDAM Segment Format

Figure 50 on page 120 shows the HISAM, HDAM, HIDAM, PHDAM, and PHIDAM Segment Format.

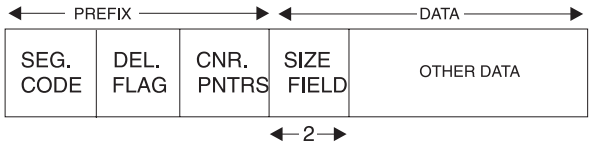


Figure 50. HISAM, HDAM, HIDAM, PHDAM, and PHIDAM Segment Format

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. Figure 51 shows HDAM, HIDAM, PHDAM, and PHIDAM.

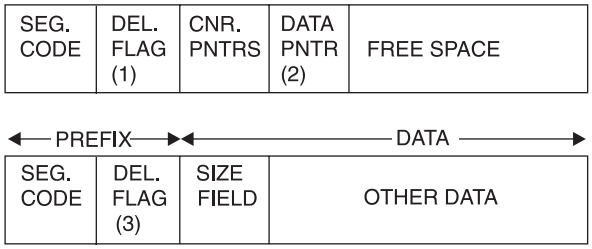


Figure 51. HDAM, HIDAM, PHDAM, and PHIDAM

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'.

Part 3. Diagnostic Aids

Chapter 7. SYS—System Service Aids

This section provides diagnostic hints and describes the service aids that can help you analyze IMS system problems.

In this section:

Log Records

To diagnose some problems, you need to examine the content of log records in order to determine what was going on in the system prior to the problem. By knowing the layout of the log records, you can set up a DFSERA10 job that will produce the specific log records 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.

To view the log records you can assemble log records mapping macro ILOGREC. For Fast Path log record formats, you can assemble mapping macros DBFLSRT, DBFLGRQ, DBFLGRIM, DBFLGROM, DBFLGRSD, DBFLGSYN, and DBFBMSDB.

Table 8 lists each log record and:

- The MACRO or COPY file that maps the record
- The conditions that cause the record to be created
- The module that issues the record

Table 8. 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)
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. (DFSFLLG0, DFSFDLM0, DFSICA20, DFSICL40, DFSRDSH0)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
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) **X'01'** Sequential buffering summary statistic for the PST. **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)
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'24'	DFSLOG24	ERLGDSCT	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: **X'01'** Data set extend phase 1. (DFSDVSM0) **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)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
X'29'	DFSLOG29	DFSLOG29	The progress of a HALDB online reorganization is represented in the following subcodes: **X'00'** The OLR command was received. (DFSORC00, DFSORC10) **X'10'** Ownership of the reorganization for a partition was established through DBRC. (DFSORP60) **X'20'** The `UPDATE OLREORG` command updated either the RATE option or the [NO]DEL option for a HALDB partition. (DFSORC00, DFSORC10) **X'30'** The output data sets were successfully validated or created. One record includes all output data sets. (DFSORA00, DFSRDBL0) **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) **X'50'** The cursor was updated, but the unit of reorganization was not committed. (DFSORP20) **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) **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) **Related Reading:** For more information on X'29' log records, see "Format of X'29' Log Record" on page 142.
X'30'	QLOGMSGI	QLOGMSGI	A message prefix was changed. (DFSQLOG0)
X'31'	QLOGGETU	QLOGGETU	A GU was issued for a message. (DFSQLOG0)
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 QLOGXFER	DFSXFER 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)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
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. This record is logged for each message returned to its original anchor block (SMB or CNT) after QCF has abnormally terminated.
X'39'	QLOGRELO	QLOGRELO	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 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)	
X'40'	DFSCHKPT	LOG01	A checkpoint was taken. The following subcodes, contained within the log record, precede and identify each type of information written in the log record.	
			X'01'	Checkpoint information begins here. (DFSRCP00)
			X'02'	Message queue checkpoint record. (DFSQCP00)
			X'03'	CNTs or LNTs, or both, follow. (DFSRCP30)
			X'04'	SMBs follow. (DFSRCP30)
			X'05'	Non-VTAM CTBs follow. (DFSRCP30)
			X'06'	DMBs follow. (DFSRCP40)
			X'07'	PSB follows. (DFSRCP40)
			X'08'	Non-VTAM CLB, LLB, or both, follow. (DFSRCP30)
			X'09'	Password table and SMUPs follow. (DFSRCP30)
			X'0A'	Password matrix follows. (DFSRCP30)
			X'0B'	CTM matrix follows. (DFSRCP30)
			X'0C'	CVB follows. (DFSRCP30)
			X'0D'	CCBs follow. (DFSRCP30)
			X'0F'	Message queues TTR and LCB follow. (DFSRCP30)
			X'10'	Non-VTAM CRBs follow. (DFSRCP30)
			X'14'	SPQBs and related CNTs follow. (DFSRCP30)
			X'20'	Non-VTAM CIBs follow. (DFSRCP30)
			X'21'	VTAM VTCBs follow. (DFSRCP30)
			X'22'	Subcode for Queue Anchor Block (QAB). (DFS6CKP0)
			X'23'	Subcode for LU 6.2 descriptors modified by `/CHANGE DESCRIPTOR` command. (DFS6CKP0)
			X'24'	Subcode for LU 6.2 TIB. (DFS6CKP0)
			X'25'	EEQE follows. (DFSTOLG0)
			X'26'	I/O toleration buffer follows. (DFSTOLG0)
			X'27'	Contains database updates for an in-doubt unit of recovery. (DFSRCP40)
			X'28'	Error queue elements (EQEL) for recovery in-doubt structure (RIS). (DFSRCP40)
			X'30'	RREs follow. (DFSRCP50)
			X'31'	SIDXs follow. (DFSRCP50)
			X'32'	TPIPE/YQAB follow. (DFSYCKP0)
			X'33'	MTE follow. (DFSYCKP0)
			X'34'	TIB follow. (DFSYCKP0)
			X'40'	UOWEs follow. (DFSRCP30)
			X'70'	MSDB record follows. (DBFHDMP0)
			X'71'	ECNT follows. (DBFHDMP0)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)	
X'40' (cont'd)	DFSCHKPT	LOG01	**X'72'**	MSDB header follows. (DBFHDMP0)
			X'73'	Page fixed MSDBs follow. (DBFHDMP0)
			X'74'	Pageable MSDBs follow. (DBFHDMP0)
			X'79'	MSDB record ends. (DBFHDMP0)
			X'80'	Fast Path checkpoint information begins here. (DBFCHKP0)
			X'82'	EMHB follows. (DBFCHKP0)
			X'83'	RCTE follows. (DBFCHKP0)
			X'84'	DMCB and DMAC follow. (DBFCHKP0)
			X'85'	MTO buffer follows. (DBFCHKP0)
			X'86'	DMHR and DEDB buffers follow. (DBFCHKP0)
			X'87'	ADSC follows. (DBFCHKP0)
			X'88'	Fast Path IEEQEs. (DBFCHKP0)
			X'89'	Fast Path checkpoint information ends here. (DBFCHKP0)
			X'98'	Checkpoint information ends here. (DFSRCP10)
			X'99'	The message queue checkpoint information ends here. (DFSQCP00)
X'41'	DFSLOG41	LOG41DSC	A batch program or BMP program issued a checkpoint. (DFSRDBL0)	
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	The log manager or the Log Archive utility created this log record. The following subcodes identify each type of record:	
			X'01'	Record contains status of current online log data set. (DFSFDLS0)
			X'02'	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)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
X'45'	DFSLOG45	STLOGREC	Checkpoint statistics were gathered. The following subcodes within the log record mark the start of various types of statistics written in the log record (DFSSTAT0).
			X'01' Dynamic database log statistics.
			X'02' Queue buffer statistics.
			X'03' Format pool statistics.
			X'04' DL/I buffer pool statistics.
			X'05' Variable storage pool statistics.
			X'06' Application scheduling statistics.
			X'07' Logging statistics.
			X'08' VSAM buffer pool statistics.
			X'09' Program isolation statistics.
			X'10' RCF multi-TCB statistics.
			X'0A' Latch management statistics.
			X'0B' Selected dispatcher statistics.
			X'0C' Storage pool statistics. (DFSCBT00)
			X'0D' Receive Any (RECA) Buffer statistics.
			X'0E' Fixed storage pool usage statistics.
			X'0F' Dispatcher statistics.
			X'10' RCF Multi-TCB statistics.
			X'21' IRLM subsystem statistics. (DXRRSTAT)
			X'22' IRLM system statistics. (DXRRSTAT)
			X'FF' End of statistics records.
X'47'	DFSLOG47	CAPLOG	A checkpoint was just taken. This log record contains all the PSTs that were in the system. (DFSRCP10)
X'48'	DFSPALOG	PALOGREC	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)
			X'00' OLDS padding X'48' record.
			X'01' X'4301' record space holder.
			X'02' Archived OLDS X'48' record.
			X'03' Batch SLDS padding X'48' record.
			X'04' Archived batch SLDS X'48' record.

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
X'49'	DFSLOG49	DFSLOG49	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).
			X'00' Definition.
			X'01' Begin stream record.
			X'02' Begin OFR record.
			X'03' OFR milestone record.
			X'04' Log truncation start record.
			X'05' XRC tracking record.
			X'06' Data set services create data set record.
			X'07' Takeover record.
			X'08' Auto Archive Init Request record.
			X'0A' Last LSN of prilog record.
			X'0B' Data set sequence number record.
			X'0C' Open data set record.
			X'0D' DBRC hash table state record.
			X'0E' FF DB Tracker Update Sequence Number (USN).
			X'20' FP DB Tracker statistics record.
			X'30' FF DB Tracker FSE Error record. See “X'4930': Database Tracker FSE Error Log Record Format” on page 521 for more information.
			X'31' FF DB Tracker statistics record.
			X'50' OFR Stream Processing Time.
X'4C'	DFSLOG4C	STDBLOG	Activity related to database processing, according to these subcodes:
			X'01' A backout for token was done. (DFSRBOI0)
			X'02' A backout error occurred. (DFSRBOI0)
			X'04' First update flag was reset. (DFSDBDR0)
			X'08' A share level or held state was changed. (DFSDBAU0, DFSDLOC0)
			X'10' A write error occurred. (DFSDBH40, DFSDVSM0)
			X'20' A program was stopped. (DFSRBOI0)
			X'40' A database was started. (DFSDBDR0)
			X'80' A database was stopped. (DFSDBDR0)
			X'82' A database backout failure occurred. (DFSRESP0)
X'4E'	DFSLOG4E	DFSLOG4E	An event occurred during monitoring. This record is in the monitor log and contains statistical information about the system. (DFSMNTR0)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
X'50'	DFSDLOG	DLOGDB	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. (DFSRDBL0) **X'52'** 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. (DFSRDBL0)
X'53'	DFSLOG53	SPLLOG	Bitmap write done for log record for alternate IMS tracking CI split on active IMS. (DFSRCHB0, DFSGGSP0, DFSFRSP0, DFSDVSM0)
X'55'	DFSETPCP	DFSETPCP	Record reserved for external subsystem information. (DFSESS30)
X'56'	DBFLGRIM	DBFLGRIM	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. They are contained in the record and precede data in the log record. **X'000001'** IMS began the commit process. (DFSESP10) **X'000002'** IMS finished the commit process. (DFSESP20) **X'000003'** IMS signed on to an external subsystem. (DFSESSO0) **X'000004'** IMS created a thread for external subsystem. (DFSESCT0) **X'000005'** IMS resolved a RID. (DFSESI60) **X'000006'** An IMS dependent region abended. (DFSFESP0) **X'000007'** IMS deleted a residual recovery element (RRE) through the /CHA command. (DFSESI70) **X'000008'** IMS deleted a residual recovery element (RRE) by a restart or start command. (DFSIESI0) **X'000009'** An external subsystem disconnected. (DFSESI30) **X'00000A'** Commit found no work to do. **X'08'** A CCTL connected to DBCTL. (DFSDASI0) Mapping macro is DFSETPCP.

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)	
X'56' (cont'd)	DBFLGRIM	DBFLGRIM	**X'09'**	A CCTL disconnected from DBCTL. (DFSDASD0) Mapping macro is DFSGTPCP.
			X'10'	Phase 1 commit processing started. (DFSDSC00, DFSTMS00)
			X'11'	Phase 1 commit processing ended. (DFSDSC00, DFSTMS00)
			X'12'	Phase 2 commit processing ended. (DFSDSC00, DFSFXC30, DFSSLOG0, DFSSMSC0, DFSTMS00)
			X'13'	Recoverable in-doubt structure (RIS) created. (DFSDRIS0)
			X'14'	Recoverable in-doubt structure (RIS) deleted. (DFSDRID0)
			X'15'	IMS restarted with RRS. (DFSRRSI0)
			X'16'	Interest has been registered with RRS for this UOW. (DFSRRSI0)
			X'37'	Phase 2 commit processing started by a resynchronization request. (DFSDRID0)
			X'38'	Phase 2 abort processing started by a resynchronization request. (DFSDRID0)
X'57'	DFSDBUR	DFSDBUR	Database updates in an RSR environment:	
			X'01'	Begin database update. (DFSRDBL0)
			X'02'	End database update. (DFSRDBL0)
X'59'	DBFL59X	L59X	**X'10'**	I/O from a data space has started (DBFVXOC0, DBFVOCI0)
			X'12'	A group of CIs (control intervals) from a data space has been written to DASD (DBFVXOC0, DBFVOCI0, DBFERS21)
X'59'	DBFLS9FF	L59FF	**X'FF'**	To track internal IMS FP information in various modules.
			X'51'	To indicate that nonrecoverable suppression has taken place.
			Mapping Macro This is a Fast Path log record. The following subcodes, contained within the record, precede information in the log record:	
X'59'	DBFLGRIM	FLIM	**X'01'**	An input message was received. (DBFSHSP0)
X'59'	DBFLGROM	FLOM	**X'03'**	An output message was sent. (DBFSHSP0)
X'59'	DBFSQRIM	DBFSQRIM	**X'11'**	An input message was inserted on an EMHQ structure. (DBFHIEL0, DBFSYN20)
X'59'	DBFSQROM	DBFSQROM	**X'16'**	An output message was inserted on an EMHQ structure. (DBFATRM0, DBFHCTR0, DBFHCAS0, DBFERMG0, DBFSYN20)
X'59'	DBFBMSDB	MSUPLOG	**X'20'**	An MSDB was updated. (DBFSLOG0, DBFBMSDB)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)	
X'59'	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)
X'59'	DBFEQE	EQE	**X'24'**	An ADS error queue element (EQE) was created. (DBFMEQE0)
X'59'	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)
X'59'	DBFLGSYN	SYNC	**X'37'**	A synchronization point operation completed. (DBFSLG20)
			X'38'	A synchronization point operation was unsuccessful. (DBFSLG20)
X'59'	DBFLGRIC	HICL5947	**X'47'**	Contains a bit map of CIs that have updates in an HSSP image copy data set. (DBFSLGE1)
X'59'	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)
X'59'	DBFLFRSD	FLSD	**X'55'**	A new buffer for sequential dependent segments was obtained. (DBFSYP20)
X'59'	DBFLSRT	LSRT	**X'56'**	Indoubt SDEP buffer from the resynchronization process. (DBFMLOG0) (DBFSYP20)
			X'57'	Local/Global portion of DMAC logged. (DBFARDB0, DBFUMAL0)
X'59'	DBFL56X	L56X	**X'58'**	An SDEP buffer was successfully written. (DBFSYP20)
X'59'	DBFLGRRE	FLRE	**X'70'**	The MSDB relocation factor for XRF is shown. (DFSRLP00)
X'5E'	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.
X'5F'	DFSLOG5F	DLTRLOGR	A DL/I call was completed. This record contains DL/I call image capture trace data. (DFSDDLT0)	

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
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 (applicable for System/3 and System/7 only). (DFSCRSV0)
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	This log record is a service trace record (see Figure 52 on page 151 for log record physical layout). The following subcodes, contained within it, identify what conditions caused a particular part of the log record to be written: **X'01'** There are three situations in which X'6701' is written: • 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. (Applicable to System/3 and System/7, MSC, and VTAM.) (DFSCFEZ0) • Errors were detected in AOI module DFSAOUE0. • Errors were detected in AOI module DFSAOE00. **X'03'** A 3270 error was detected. More information about this condition is contained in "Terminal Communication Task Trace" on page 325. (DFSCFEZ0) **X'04'** An IMS notification exit failed to obtain an AWE for restart processing. IMS was unable to post the deferred unit of recovery with RRS/MVS. **X'06'** An I/O error occurred on a Fast Path area data set. The record prefix format is the same as the X'6701' type. The contents of the data portion is the DMHR associated with the I/O error.
X'67'			**X'05'** A thread terminated abnormally. The data portion of the log record contains diagnostic information for dependent regions. All blocks logged have eye catchers preceding them. Normal IMS DSECTs map the logged information. (DFSASK00, DFSDTTA0, DFSSDA20)
X'67'	DFSL6701	CTREC	**X'07'** An HSSP PCB is repositioned backwards rather than to the next UOW. The control blocks EPST, EPCB, and SPCB will be snapped in this log record for diagnostic purposes. (DBFSHDQ0)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)	
X'67'	DFSL6740	DFS6740	**X'40'**	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)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)		
X'67'	DFS67D0	DFS67D0	**X'D0'**	Indicates the diagnostic record of a failed service request.	
				X'01'	Failure during a DB DL/I call.
				X'02'	Failure during a DC DL/I call. (DFSCPY00, DFSDLA30, DBFHGU10, DFSTMAP0)
				X'03'	Failure during a SYS DL/I call.
				X'04'	An exit failure occurred. (DFSRRSI0)
				X'05'	Failure during SPOOL API processing. (DFSIAFP0)
				X'06'	Failure during Transaction Manager schedule processing. (DFSTMAS0, DFSTMCD0)
				X'07'	Failure during Service Logical Unit Manager (SLUM) processing.
				X'08'	Failure during Asynchronous Logical Unit Manager (ALUM) processing.
				X'09'	Failure during coupling facility processing. (DFSDCFR0, DFSDMAW0)
				X'0A'	Failure during queue manager processing.
				X'0B'	Failure during shared queues interface processing. (DBFIPQS0, DFSITQS0, DBFILQS0, DFSILQS0)
				X'0C'	Failure during NDM user exit interface processing. (DFSNDMI0)
				X'0D'	Failure during shared queues CQSINFRM processing.
				X'0E'	Failure during shared queues request processing. (DBFHCAS0, DBFHGU10, DBFHSQS0)
				X'0F'	Failure during UOWE resync processing. (DBFHGU10, DBFHCAS0)
				X'10'	Shared EMH XCF communication error. (DBFHXCS0)
				X'11'	An unsolicited output message was detected. (DBFHSQS0)
				X'12'	In-flight input message deleted. (DBFHCAS0)
				X'13'	Fast Path Queue Manager Diagnostics. (DBFHQMI0)
				X'14'	System Termination Diagnostics. (DFSSDA20, DFSTRM00)
				X'15'	System Service Error. (DFSOCMD0)
				X'16'	Unexpected return or reason code from RM, OM, SCI, or CQS request.
				X'17'	Failure during RM update, query, or delete processing.
				X'18'	Failure during SVSO Processing. An incompatibility exists between the dual structures for a DEDB area (DBFVXOE0).
				X'19'	VSAM JRNAD Error. (DFSDVSM0).

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
X'67'	DFSL67FD	SNELDESC	**X'ED'** Sequential buffering SNAP, created during a periodic evaluation of the sequential buffering process by the SBESNAP option. (DFSSBSN0) **X'EE'** SNAP of a call to the sequential buffering buffer-handler created by the SBSNAP option. (DFSSBSN0) **X'EF'** 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) **X'FB'** 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. **X'FD'** A SNAP call was issued. (DFSERA20) **X'FF'** A pseudoabend or dependent region abnormal termination occurred. Further information of this condition is contained in “SNAP Call Facility” on page 190. (DFSERA20)
X'67'	DFSL67FA	DFSTRHD	**X'FA'** Contains images of the in memory trace tables. These tables are written to the log when requested by the OPTIONS statement in the VSPEC=parm 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: • XRF surveillance was started or stopped. • A write error occurred on the active subsystem. • The interval or time-out values on the active subsystem were changed by a /CHANGE command. (DFSHIC40, DFSHSRV0, DFSISL60) **X'04'** 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. **X'40'** 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)
X'70'	DFSLOG70	OLCREC	**X'00'** An online change /MODIFY command sequence completed successfully. The IMS.MODSTAT data set is being updated. (DFSICV80) **X'01'** Allows the XRF primary to signal the alternate that the transaction has been stopped (PSTOP) by module DFSSMSC0. (DFSICV90)

Table 8. IMS Log Records Used to Analyze IMS Problems (continued)

Type	Mapping Macro Name	DSECT Name	Why Written (Issuing Module)
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: **X'01'** ETO user structure dynamically created. Contains the SPQB name and one or more CNTs. **X'02'** ETO user structure dynamically deleted. Contains only the SPQB name. **X'03'** ETO user structure modified. Contains the SPQB name and one or more CNTs. **X'04'** One or more CNTs added to an ETO user structure. Contains the SPQB name and the CNTs that were added.
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). The subcodes indicate the type of record being logged: **X'04'** Changed data **X'28'** End of job (EOJ) **X'30'** SETS call **X'34'** ROLS call This log record is mapped by the macro, DFSDXBLK, which is not shipped. The log record layouts are explained in *IMS Version 9: Customization Guide*.

The following topics provide additional information:

- "Format of X'29' Log Record"
- "Format of X'67' Log Record" on page 151

Format of X'29' Log Record

This topic shows the log record formats for:

- "X'2900': OLR Command Received"
- "X'2910': Ownership Established" on page 143
- "X'2920': UPDATE OLREORG Command" on page 144
- "X'2930': Output Data Set Information" on page 144
- "X'2940': Cursor-Active Status Set" on page 147
- "X'2950': Cursor Movement" on page 148
- "X'2970': Cursor-Active Status Reset" on page 149
- "X'2990': Ownership Relinquished" on page 150

X'2900': OLR Command Received

A X'2900' log record is written to indicate the receipt of a HALDB Online Reorganization command. Only one X'2900' log record is written for each command. See Table 9 on page 143 for the X'2900' log record layout.

Table 9. X'2900' Log Record Layout

Offset (Hex.)	Length (Dec.)	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	HORRSENM	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: "1000 ...." INITIATE "0100 ...." UPDATE "0010 ...." QUERY "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. See Table 10 for the X'2910' log record layout.

Table 10. X'2910' Log Record Layout

Offset (Hex.)	Length (Dec.)	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

Table 10. X'2910' Log Record Layout (continued)

Offset (Hex.)	Length (Dec.)	Field Name	Field Description
20	1	HOROFLG1	Flags: "10.. ...." The INITIATE OLREORG command had the NODEL option. "01.. ...." The INITIATE OLREORG command had, or defaulted to, the DEL option. "..1. ...." The INITIATE OLREORG command had the RATE option. "...0 ...." A new reorganization was started. "...1 ...." The reorganization was restarted. ".... .0.." The database is not RSR covered. ".... .1.." The database is RSR covered.
21	1	HORORATEV	RATE value (1 through 100 percent)

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. See Table 11 for the X'2920' log record layout.

Table 11. X'2920' Log Record Layout

Offset (Hex.)	Length (Dec.)	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.
18	8	HORPSB	PSB name.
18	1	HORPSB0	C'0'
19	7	HORPART	Partition name
20	1	HORUFLG1	Flags: **"10.. ...."** The NODEL option is now in effect. **"01.. ...."** The DEL option is now in effect.
21	1	HORORATEV	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. See Table 12 on page 145 for the X'2930' log record layout.

Table 12. X'2930' Log Record Layout

Offset (Hex.)	Length (Dec.)	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	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	HORDFLG1	Flags:
			".... .0.." The database is not RSR covered.
			".... .1.." The database is RSR covered.
			".... ..0." The A-thru-J and X data sets are the output data sets.
			".... ..1." The M-thru-V and Y data sets are the output data sets.
			".... ...0" PHDAM database.
			".... ...1" PHIDAM database.
29	1	HORDDSECT	Number of following entries.
2A		HORDDSE	The group of fields shown in Table 13 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 Table 13 is repeated for each output data set. There are two entries for the primary index data set of a PHIDAM database.

Table 13. X'2930' Log Record Layout — Repeated Data Set Fields

Offset (Hex.)	Length (Dec.)	Field Name	Field Description
00	2	HORDENTL	Entry length, including this length field.
02	1	HORDDCBN	DCB number, with A-thru-J,X or M-thru-V,Y indicator:
			"0... ...." One of the A-thru-J or X data sets.
			"1... ...." One of the M-thru-V or Y data sets.
			".... nnnn" DCB number.
03	8	HORDDDNAM	The DD name used for allocation.

Table 13. X'2930' Log Record Layout — Repeated Data Set Fields (continued)

Offset (Hex.)	Length (Dec.)	Field Name	Field Description	
0B	1	HORDDFL1	Data set flags:	
			"0... ...."	OSAM data set.
			"1... ...."	VSAM data set.
			".0.. ...."	Data set existed before `INITIATE OLREORG` command.
			".1.. ...."	Data set was created automatically.
			"..0. ...."	Non-SMS-managed data set.
			"..1. ...."	SMS-managed data set.
			"1..0 ...."	VSAM ESDS.
			"1..1 0..."	VSAM KSDS data component (DCB number X'05' or X'85').
			"1..1 1..."	VSAM KSDS index component (DCB number X'04' or X'84').
			"1..1 11.."	For VSAM KSDS index component, REPLICATE. Replicate index records.
			".... .0.."	NOREPLICATE. Don't replicate index records (or replication not applicable).
0C	1	HORDDFL2	Data set space allocation type flags:	
			"1000 ...."	Primary amount: number of VSAM records or OSAM blocks.
			"0100 ...."	Primary amount: number of bytes.
			"0010 ...."	Primary amount: number of kilobytes.
			"0001 ...."	Primary amount: number of megabytes.
			".... 1000"	Secondary amount: number of VSAM records or OSAM blocks.
			".... 0100"	Secondary amount: number of bytes.
			".... 0010"	Secondary amount: number of kilobytes.
			".... 0001"	Secondary amount: number of megabytes.
0D	4	HORDRCSZ	VSAM record size or OSAM block size.	
11	4	HORDCISZ	For VSAM, control interval size. For OSAM: 0.	
15	8	HORDDATC	For SMS-managed, data class if present. Otherwise, blanks.	
1D	8	HORDSTGC	For SMS-managed, storage class. Otherwise, blanks.	
25	8	HORDMGTC	For SMS-managed, management class if present. Otherwise, blanks.	
2D	4	HORDPRIA	Primary allocation amount. See HORDDFL2.	
31	4	HORDSECA	Secondary allocation amount. See HORDDFL2.	
35	1	HORDFSCI	For VSAM KSDS data component, freespace percentage in each control interval.	
36	1	HORDFSCA	For VSAM KSDS data component, freespace percentage in each control area.	
37	1	HORDKYLN	For VSAM KSDS data component, key length.	
38	2	HORDKYOF	For VSAM KSDS data component, key offset.	

Table 13. X'2930' Log Record Layout — Repeated Data Set Fields (continued)

Offset (Hex.)	Length (Dec.)	Field Name	Field Description
3A	1	HORDSHRR	For VSAM, SHAREOPTIONS value, cross-region.
3B	1	HORDSHRS	For VSAM, SHAREOPTIONS value, cross-system.
3C	1	HORDVOLR	Number of existing or requested DASD volumes.
3D	1	HORDVOLC	Number of volume serial numbers following.
3E	*n*	HORDVOLS	Volume serial numbers.
3E	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. See Table 14 for X'2940' log record layout.

Table 14. X'2940' Log Record Layout

Offset (Hex.)	Length (Dec.)	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:	
			".... 0..."	This log record was created at the IMS doing the HALDB Online Reorganization.
			".... 1..."	This log record was created by an IMS doing data sharing with the IMS doing the HALDB Online Reorganization.
			".... .0.."	The database is not RSR covered.
			".... .1.."	The database is RSR covered.
			".... ..0."	The A-thru-J and X data sets are the input data sets.
			".... ..1."	The M-thru-V and Y data sets are the input data sets.
			".... ...0"	PHDAM database.
			".... ...1"	PHIDAM database.

Table 14. X'2940' Log Record Layout (continued)

Offset (Hex.)	Length (Dec.)	Field Name	Field Description
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. See Table 15 for X'2950' log record layout.

Table 15. X'2950' Log Record Layout

Offset (Hex.)	Length (Dec.)	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

Table 15. X'2950' Log Record Layout (continued)

Offset (Hex.)	Length (Dec.)	Field Name	Field Description
74	1	HORMFLG1	Flags: **".... ..0."** The A-thru-J or X data sets are the input data sets **".... ..1."** The M-thru-V or Y data sets are the input data sets **".... ...0"** PHDAM database **".... ...1"** PHIDAM database
75	4	HORMRBA	PHDAM cursor RBA
75	1	HORMKLN	Length of root key for PHIDAM
76	*n*	HORMKEY	PHIDAM cursor root key. The length *n* 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. See Table 16 for X'2970' log record layout.

Table 16. X'2970' Log Record Layout

Offset (Hex.)	Length (Dec.)	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)

Table 16. X'2970' Log Record Layout (continued)

Offset (Hex.)	Length (Dec.)	Field Name	Field Description
28	1	HOREFLG1	Flags:
			"10.. ...." The NODEL option is now in effect.
			"01.. ...." The DEL option is now in effect.
			".... 0..." This log record was created at the IMS doing the HALDB Online Reorganization.
			".... 1..." This log record was created by an IMS doing data sharing with the IMS doing the HALDB Online Reorganization.
			".... .0.." The database is not RSR covered.
			".... .1.." The database is RSR covered.
			".... ..0." The A-thru-J or X data sets are the input data sets.
			".... ..1." The M-thru-V or Y data sets are the input data sets.
29	12	HORCITIM	Time stamp of cursor inactive

X'2990': Ownership Relinquished

Ownership of the reorganization for a partition was relinquished through DBRC. See Table 17 for X'2990' log record layout.

Table 17. X'2990' Log Record Layout

Offset (Hex.)	Length (Dec.)	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:
			X'80' Normal completion of the online reorganization.
			X'40' Pseudo-abend during online reorganization.
			X'20' TERM command during online reorganization.
21	4	HORABTRM	Pseudo-abend code
25	8	HORSEGCT	Number of segments copied

Format of X'67' Log Record

Figure 52 shows the layout of the X'67' log record. A physical log record consists of one or more subrecords. Each subrecord is followed by its associated data.

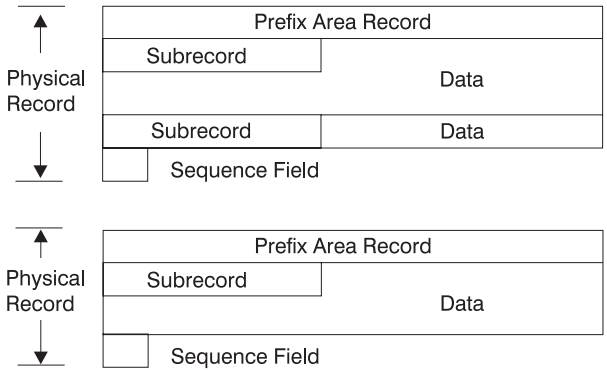


Figure 52. Log Record Layout

Log Record Prefix Area

The format of the X'67FA', X'67FB', X'67FD', and X'67FF' records are shown in Figure 53 and Table 18.. All other X'67' records have individual differences.

Log Record Prefix Area Layout: Figure 53 shows the log record prefix area layout.

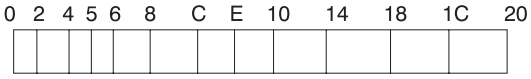


Figure 53. Log Record Prefix Area Layout

Log Record Prefix Area Format:

Table 18. Log Record Prefix Area Format for X'67'

Offset (Hex)	Length	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
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 Table 19.

Table 19. Log Record Prefix Area Format for X'67FA' Records

Offset (Hex)	Length	Description
08	4	Date
0C	4	Time
10	2	Table identification
12	2	Flag bytes

Log Subrecord and Data Area

Log Subrecord and Data Area Layout

Figure 54 shows the log subrecord and data area. Table 20 shows the log subrecord area format.

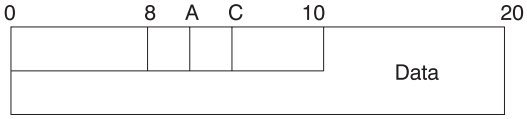


Figure 54. Log Subrecord and Data Area Layout

Log Subrecord Area Format

Table 20. Log Subrecord Area Format

Offset (Hex)	Length	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

Log Data Area Format

Table 21. Log Data Area Format

Offset (Hex)	Length	Description
10	(variable)	Logged data

Log Sequence Field

Log Sequence Field Layout

Figure 55 shows the log sequence field layout and Table 22 on page 153 shows the log sequence field format.

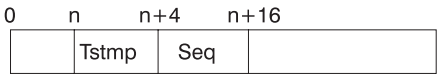


Figure 55. Log Sequence Field Layout

Log Sequence Field Format

Table 22. Log Sequence Field Format

Offset (Hex)	Length	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.

File Select and Formatting Print Utility

The primary function of the File Select and Formatting Print utility (DFSERA10) is to print log records from the IMS log data set and the externalized trace table entries recorded in the DFSTRA*xx* data set. Formatting of the DFSTRA*xx* trace entries is similar to formatting trace records contained on the IMS log, however, the external trace data set will only contain records with an ID of X'67FA'. For more information on the DFSTRA*xx* data sets (DFSTRA01 and DFSTRA02), see the section titled “Data Sets” in the *IMS Version 9: Installation Volume 1: Installation Verification*.

The utility can:

- Print an entire log data set.
- Print from multiple log data sets based on control statement input.
- Select and print log records based on data contained within the record itself, such as the contents of a time, date, or identification field.
- Select and print log records based on sequential position in the data set.
- Temporarily transfer control to exit routines for special processing of selected log records.

Control statements allow you to define input and output options, selection ranges, and various field and record selection criteria.

The File Select and Formatting Print utility (DFSERA10) is also available using the Knowledge-Based Log Analysis (KBLA) panel interface, option 2.3. For more information on KBLA and the File Select and Formatting Print utility (DFSERA10) see the *IMS Version 9: Utilities Reference: System*.

IMS supplies five exit routines for the File Select and Formatting Print utility: DFSERA30, DFSERA40, DFSERA50, DFSERA60, and DFSERA70. A summary of each follows.

DFSERA30 DFSERA30 formats trace records, general purpose records (type X'6701'), and SNAP records (types X'67FD', X'67FF', X'67ED', X'67EE', and X'67EF'). It also formats log records in dump format.

DFSERA40 DFSERA40 formats program isolation (PI) trace records (type X'67FA').

DFSERA50 If DL/I call image capture data is sent to the log data set, DFSERA50 formats these X'675F' log records for input to the IMS DL/I test program.

DFSERA60 If the common trace interface records are written to the log data set or the external trace data sets, DFSERA60 formats the trace entries (X'67FA').

DFSERA70 DFSERA70 selects type X'5x' log records based on search criteria. The selected records can be printed or written to tape or DASD.

DFSERA70 also allows the use of the DATA= parm for all record types. This parameter allows the user to select all records that contain the data substring specified on the DATA= parm.

For a detailed description of each exit, see *IMS Version 9: Utilities Reference: System*.

Figure 56 and Figure 57 show examples of unformatted and formatted log records. Unformatted log records include the prefix area record, the subrecord, data, and a table offset in hexadecimal. The formatted record contains the data area with its actual offset address and the table offsets.

```
DFSERA10 - PRINT PROGRAM
 000000  00540000 67FF0000 C1C2D5C4 00010000 16435280 0087049F 00000000 800000FC *........ABND.........G.........*
 000020  E2D5C1D7 C9C4407E 00000020 000D7000 E2D5C1D7 C9C4407E C1C2D5C4 40D9C5C7 *SNAPID =........SNAPID =ABND REG*
 000040  0107015D 0000010B 00000000 00B18330 0000015C                           *...}..........C....*
 000000  04140000 67FF0000 C1C2D5C4 00020000 16435280 0087049F 00000000 900000FC *........ABND.........G.........*
 000020  E2C3C440 40404040 000003D0 00B16698 E2E2C3C4 00B166A4 1BFF07FE 0AE707FE *SCD     ........QSSCD...U....X..*
 000040  00009301 02203821 02008400 E2E8E2F1 40404040 00B14FB0 00B13230 00000000 *..L.......D..SYS1    ..|........*
     ▲
     └──physical displacement
. . .
         ┌──prefix record       ┌── record sequence for this abend ──┐
         ▼                      ▼                                    ▼
 000000  04140000 67FF0000 C1C2D5C4 00060000 16435280 0087049F 00000000 800000FC *........ABND.........G.........*
                                                                      ▲
                                                          ABENDU0252──┘

         ┌──subrecord           ┌──PST address
         ▼                      ▼
 000020  D7E2E340 40404040 000003E0 008DD050 00000D7B 2480501A 0000000D 008DD9F4 *PST    .......&...#...&.......R4*
 000040  00964280 0000003C C0000000 00000000 008DD0B8 00080008 008DD0B0 00100010 *.O.............Y.............*
 000060  008DD0B2 00020002 008DD0B4 008DD0B8 008DD0BC 008DD0C0 00080008 008DD0C8 *.............................H*
 000080  00080008 00000000 40404040 40404040 10004040 0000000F 0000000F 00000000 *............      .. . ..........*
 0000C0  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *................................*

. . .
         ┌──prefix record
         ▼
 000000  04140000 76FF0000 C1C2D5C4 00007000 16435280 0087049F 00000000 800000FC *........ABND.........G.........*

         ┌──subrecord           ┌──────────────────────  no address on block (PST) continuation
         ▼                      ▼
 000020  D7E2E340 40404040 000003E0 00000000 00000000 00AF9CC6 0000000D 00953B3F *PST   .................F.....N..*
 000040  00953A48 00953B3F 00953A40 00000000 07000000 00000000 00000258 00000000 *.N...N...N. ....................*
 000060  00000000 00953D40 00000000 0095340  00000000 00000000 00000000 00000000 *.....N.  .....N.................*
. . .
```

Figure 56. Unformatted Output Using DFSERA10

```
                                        ┌── ABENDU0252
                                        ▼
DFSERA30 - FORMATTED LOG PRINT
MP/BMP REG ABEND REC. AB CODE SYS = 0000 USER = 0252  RECNO = 0000015C    TIME  16.43.52  DATE 87.049
SCD
00B16698 000000   E2E2C3C4 00B166A4 1BFF07FE 0AE707FE 00009301 02203821 02008400 E2E8E2F1 *SSCD...U.....X....L.......D.SYS1*
00B166B8 000020   40404040 00B14FB0 00B13230 00000000 0000C0C0 00B16770 00B16818 00B168A4 *    ..|.....................U*
...
PST
008DD050 000000   00000D7B 2480501A 0000000D 008DD9F4 00964280 0000003C C0000000 00000000 *...#..&.......R4.O.............*
  ▲      ▲
  │      └──────── table displacement
  └─ original address displacement
008DD070 000020   008DD0A8 00080008 008DD0B0 00100010 008DD0B2 00020002 008DD0B4 008DD0B8 *...Y...........................*
008DD090 000040   008DD0BC 008DD0C0 00080008 008DD0C8 00080008 00000000 40404040 40404040 *............H.......         *
008DD0B0 000060   10004040 0000000F 0000000F 00000000 00000000 00000000 D7C2E5C4 E2C1D3D9 *..  .....................PBVDSAL*
008DD0D0 000080   00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *................................*
...
```

Figure 57. Formatted Output Using DFSERA10 with Option Statement, Exit=DFSERA30

Log Merge Utility

The Log Merge utility (DFSLTMG0) 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.

The Log Merge utility can merge up to nine IMS system logs. Each log is the output of a uniquely identified IMS system running during the same time span. The order of input to the Log Merge utility is LOG01, LOG02, LOG03, ..., LOG09.

DFSLTMG0 is placed in the IMS.SDFSRESL data set during IMS system definition.

The Log Merge Utility is also available using the Knowledge-Based Log Analysis (KBLA) panel interface, option 1.4. For more information on KBLA, see the section titled “Knowledge-Based Log Analysis” in the *IMS Version 9: Utilities Reference: System*.

Related Reading: For more information on the Log Merge Utility, see *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.

Formatting IMS Dumps Offline

This topic discusses the following two methods of formatting IMS dumps offline:

- Interactive formatting, performed through a series of panels which provide formatting choices
- Formatting using JCL

You can also format IMS dumps online. For more information on online formatting, see “Formatting IMS Dumps Online” on page 184.

The topics include:

- “Introduction to the Offline Dump Formatter”
- “Solving IMS Problems with the Dump Formatter” on page 156
- “Using the Formatted Dump” on page 171

Introduction to the Offline Dump Formatter

The IMS Offline Dump Formatter (ODF) is a dump 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. Since 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 if you desire) 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 you think will help you most to analyze the problem IMS encountered. See “Solving IMS Problems with the Dump Formatter” on page 156 for more information on problem solving.

Some other advantages of the Offline Dump Formatter include:

- You get an integrated IMS dump that contains the address spaces of the IMS control region, DBRC, DL/I, and IRLM address spaces. Previously, you got a separate dump for each address space.

  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 fresh 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. See “Using IPCS and the Dump Formatter” on page 157 for more information.

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. See *IMS Version 9: Installation Volume 2: System Definition and Tailoring* for more information.

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 Offline Dump Formatter

The dump data set you use for input to the 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.

Your most common input data sets are taken by SDUMP, 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 abending address space is dumped.

SYSMDUMPs, stand-alone Dumps (SADMP), and dumps 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 9: Installation Volume 2: System Definition and Tailoring*.

Invoking the ODF

To use the Offline Dump Formatter, you must have:

- An acceptable dump in a data set
- A proper IMSDUMP entry in the IPCS Exit Control Table
- The IMS execution library with the dump formatting modules might need to be allocated to IPCS with the ddname ISPLLIB.

You then invoke the dump formatter by executing a VERBX control statement from IPCS, or through the interactive panels. See *IMS Version 9: Utilities Reference: System* for more information on invoking the IMS Offline Dump Formatter.

Solving IMS Problems with the Dump Formatter

This topic outlines how you can use the ODF to help solve IMS problems. The topics “Choosing FMTIMS Parameters” on page 157 and “Sample FMTIMS Statements” on page 159 list the FMTIMS options you could choose for particular problem areas. “Contents Formatted for FMTIMS Options” on page 162 lists the FMTIMS options alphabetically and shows the control blocks and areas formatted for each option.

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. “Sample FMTIMS Statements” on page 159 lists the FMTIMS statements for some specific problems.
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. See “Other Problems” on page 161 for more information.
5. The formatted output is spooled. You can either print the output or use ISPF to browse it. See “Using IPCS and the Dump Formatter” for more information.
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 will need it when discussing the problem with the IBM Support Center representative.

Using IPCS and the Dump Formatter

See *OS/390 MVS IPCS User's Guide* for information on running IPCS.

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, 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.

Invoking the Offline Dump Formatter Under IPCS

There are two methods for invoking 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)'
```

Choosing FMTIMS Parameters

You should know what the general problem is before attempting to choose FMTIMS parameters. If you are unsure of the problem area, format the dump with the SUMMARY option.

Table 23 shows the FMTIMS parameters recommended for general types of problems. For example, if you suspect the problem is with your logger, then give the DISPATCH, LOG, and SYSTEM parameters on the FMTIMS statement.

The control blocks and areas formatted with particular options are listed in “Contents Formatted for FMTIMS Options” on page 162.

To use Table 23, locate your problem area on the top line. Then go down that column to find the suggested formatting options (marked with an X) for that problem.

Table 23. FMTIMS Parameters for General Problems

Parameters	Problem Area							
	Checkpt/ Restart	DB	DC	FP	Log	System/ Other	Batch	CICS
CBT		X	X			X	X	X
CBTE			X					
DB		X					X	X

Table 23. FMTIMS Parameters for General Problems (continued)

Parameters	Problem Area							
	Checkpt/ Restart	DB	DC	FP	Log	System/ Other	Batch	CICS
DBRC		X				X	X	X
DC			X				[2]	
DEDB		X		X				
DISPATCH	X	X	X	X	X	X	[3]	
EMH		X	X	X				
LOG					X		X	
MSDB		X		X				
QM			X				[2]	
RESTART	X						[2]	
SAP			X					
SAVEAREA[1]	X	X	X	X	X	X	[2]	
SB		X				X	X	X
SCD[1]	X	X	X	X	X	X	X	X
SPST	X			X			[2]	
SUBS						X	[2]	
SUMMARY[1]	X	X	X	X	X	X	X	X
UTIL			X	X			[2]	

Notes:

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 “Contents Formatted for FMTIMS Options” on page 162 for a list of the modules formatted with each of the parameters. See “Syntax Restrictions on the FMTIMS Statement” on page 161 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 “Understanding the Dump Title” on page 171) as a guide. Unless one or both of these fields specify “unknown”, they should indicate why a dump was taken.

Table 24 shows the options you could choose based on valid CALLER= and TCB= information in the dump title.

Table 24. FMTIMS Parameters Based on CALLER= and TCB= Fields

CALLER=	TCB=	Recommended FMTIMS Options[1]
CTL	CTL LOG ESS LSD LSM RDS RST STC STM	DC[2,] Dispatch[2,] QM[2,] Summary, System[2] Dispatch[2,] SPST, System[2,] SUBS, Summary Dispatch, Log, Restart, Summary, System Dispatch[2,] MSDB, Savearea, SCD[2,] Summary Dispatch[2,] MSDB, Savearea, SCD[2,] Summary Restart, Savearea, SCD[2,] Summary Restart, Savearea, SCD[2,] Summary CBT, Dispatch[2,] Savearea, SCD[2,] Summary CBT, Dispatch[2,] Savearea, SCD[2,] Summary
CURR[3]	DYA	Dispatch[2,] System[2]
DBRC	DBR	DBRC[2,] System[2]

Table 24. FMTIMS Parameters Based on CALLER= and TCB= Fields (continued)

CALLER=	TCB=	Recommended FMTIMS Options[1]
DL/I	DLI STC	DB[2,] Dispatch[2,] SB[2,] System[2] CBT, Dispatch[2,] Savearea, SCD[2,] Summary
DP	BMP DEP	DB[2,] System[2] DB[2,] System[2]
FP	BMP DEP[4] XFP	DB[2,] DEDB, MSDB, System[2] DB[2,] DEDB, MSDB, System[2] DB[2,] SPST, System[2]
LOG	LOG	Log[2,] System[2]

Notes:

1. Any time 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 happens when no CALLER parameter is provided or no IMS DUMP parameter list is passed and DFSFDMP0 cannot match the caller's TCB address and 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 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 a description of the dump title, see "Understanding the Dump Title" on page 171.) For example, you might see CALLER=CTL in the dump title and have an abend number that shows an error in the checkpoint restart processing. In this case, you can try giving 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.

Refer to *z/OS MVS Diagnosis: Tools and Service Aids* if you need a z/OS trace.

Syntax Restrictions on the FMTIMS Statement

The control statements in the format control data set must abide by 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 upper 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 nonunique 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

The options are listed below in alphabetical order. They 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 174. See “Table of Control Block Definitions” on page 67 for the description and mapping macro of the individual control blocks.

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 decide 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 or Line Number (BTAM only)

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. Table 25 shows the areas formatted under the (DB) and (DB,MIN) FMTIMS options.

Table 25. 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
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 Table 26. This option is skipped if the CTL address space is not included in the dump data set.

Table 26. Data Communication Areas Formatted by DC and DC,MIN

(DC)	(DC,MIN)[1]
All CLBs, LXBs, and LCBs, with subordinate control blocks: • 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	Active CLBs, LXBs, and LCBs, with the same subordinate control blocks except that current CTB or LTB and CNT are not formatted.
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 Table 27.

Table 27. 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. Table 28 on page 165 shows the areas formatted under this FMTIMS option.

Table 28. 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 used by IMS Fast Path, as shown in Table 29. The CTL address space must be included in the dump data set for this option to be formatted.

Table 29. Areas Formatted by EMH and EMH,MIN

(EMH)	(EMH,MIN)
RCTEs	same
BALGs, EMHBs, and message buffers	BALGs and EMHBs only

The CTL address space must be included in the dump data set for this option to be formatted.

LOG

Formats control blocks and areas used by the IMS logger. The areas included are listed in Table 30. These areas, except for the WADS and the DLOG trace, are repeated in the dump when the IMS Monitor is active.

Table 30. Areas Formatted by LOG and LOG,MIN

(LOG)	(LOG,MIN)
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

Table 31.

Table 31. 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:

- 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 IMS queue manager's control blocks and areas. The formatter skips this option if the CTL address space is not included in the dump data set. The areas included are listed in Table 32.

Table 32. 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 are examples of 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 Interactive Dump Formatter dialog. The ADDRESS parameter can be omitted since ADDRESS is the default TYPE for the SAP option.

| Individual SAP or 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 /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 or Save area 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. Table 33 shows which sections are formatted with the SB and SB,MIN options. A description of the sections follows Table 33.

Table 33. Sections Formatted by SB and SB,MIN

(SB)	(SB,MIN)
Subsystem overview	same
PST overview[1]	same[2]
Sorted blocks[1]	same[2]
Sorted buffers[1]	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 Table 34.

Table 34. 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 dump 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
- IMSs SDWA
- 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 dump formatter ISPF panels also accept an option of "ALL" to format all IMS trace table traces. The Interactive Dump Formatter dialog TRACE SELECTION panel provides a selectable list of IMS trace tables with the trace name, internal ID, and description. The following are sample TRACE format requests, followed by comments for each. In each case, the NAME keyword can be omitted since NAME is the default TYPE parameter. The following 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

Output is the same if (UTIL,MIN) is specified. Both UTIL options are ignored for batch.

Using the Formatted Dump

This topic describes the formatted dump's title, how to locate specific control blocks and areas in the formatted dump, and the order in which formatted control blocks are presented. A sample formatted dump is at the end of the topic.

Understanding the Dump Title

The contents of the dump titles created by the dump assist module (DFSFDMP0) and the initialization routines vary, depending on the internal DFSDUMP parameters provided and the SDUMP errors met.

| Following are 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.

```
ljjjjjjjj ABEND SYS sss USER uuuu-rrr, DATE.TIME: ddd.tttttt,
                CALLER=cccc, TCB=xxx, MODULE=mmmmmmmm,i
```

where:

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.

ddd Julian day of year.

tttttt Time, in the form HHMMSS.

cccc DFSDUMP caller parameter or blanks.

xxx Abending TCB or 'UNK'.

mmmmmmmm
Abending module or 'UNKNOWN', using the SDWA.

i Indicator if primary (P) or secondary (S) request.

Title Format 2: DFSFDMP0 issued the SDUMP, but did not have an SDWA. The CALLER parameter was either passed to DFSFDMP0 or the routine generated the parameter using the IMS TCB table.

```
ljjjjjjjj  DATE.TIME: ddd.tttttt, IMS DUMP REQUESTED,
                CALLER=cccc, TCB=xxx, REASON=rrr,i
```

where:

l Length of title in hexadecimal - here 80 decimal.

jjjjjjjj Job name.

ddd Julian day of year.

tttttt Time, in the form HHMMSS.

cccc DFSDUMP caller parameter or blanks.

xxx Abending TCB or 'UNK'.

rrr Optional user reason code.

i Indicator if primary (P) or secondary (S) request.

Title Format 3: This format is generated for a DBCTL Database Resource Adapter (DRA) SDUMP.

```
ljjjjjjjj DRAthd tnnnn mmmm...mmRTKN=rrrrrrrrxxxxxxxxxxxxxxxx
```

where:

l Length of title in hexadecimal - here X'5D'.

jjjjjjjj DBCTL job name.

DRAthd
Abend component of DRA:

DRA DRA control processing abended.

DRATHD
DRA thread abended.

t Abend type:

S System abend.

U User abend.

nnnn Abend code for:

Hex System abend.

Decimal
User abend.

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.

DFSPRRA0, DBCTL FAILURE DURING DRA TERM

DFSPRA10, DBCTL FAILURE DURING IDENTIFY

DFSPRA20, DBCTL FAILURE DURING RESYNC

DFSPRA50, DBCTL FAILURE DURING PURGE

DFSPINI0, FAILURE ESTABLISHING ESTAE

DFSPAT00, GETMAIN FAILURE

DFSPINI0, SSI FAILURE DURING SONCRT

DFSPINI0, 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

DFSPRRA0, 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:*** This dump is created by DFSERA20 when a SNAP dump is requested. The format is generated for some pseudoabend SNAP dumps which were taken to the logs in releases prior to IMS Version 9. The title is the format:

| *nnnnnnnn* `IMS USER ABEND` *uuuu*`, DATE.TIME:` *ddd.tttttt*`,`*i*

| where:

| *nnnnnnnn*
| 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 is 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*

| where:

| *nnnnnnnn*
| 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.

Locating Control Blocks in the Dump

The Offline Dump Formatter output includes eye catchers and an index to help you locate individual control blocks.

Eye catchers: To assist you in rapidly locating 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 front of the formatted dump.

Index: The formatted dump also contains an index created by the z/OS Index Service Routine. Index entries are created at the following points:

- Each time an eye catcher is processed during formatting
- After the Offline Dump Formatter is finished with its processing

Entry length is limited to 40 decimal characters.

The index is located at the end of the formatted dump.

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 would be useful.

ODF Initialization Messages
These messages appear when the formatter is unable to find particular address spaces in the dump data set. For an explanation of individual messages, see *IMS Version 9: Messages and Codes, Volume 1* and *IMS Version 9: Messages and Codes, Volume 2*.

Eye-catchers
Eye-catchers of the areas you requested formatted on this pass of the formatter.

An eye catcher could be included in this list even if the 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 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 on page 167 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 on page 168 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 [1]

Fast Path MDSB Formatting [1]

Communication Line Blocks and Subordinate Blocks [1]
For each CLB line, all the control blocks associated with that line are formatted.

CTB [1]
The mapping DSECT is ICLI CTBBASE=0.

Input Buffer [1]
A SNAP of the input buffer, if input is active.

Output Buffer [1]
A SNAP of the output buffer, if output is active.

CCB [1]
Present if a conversation is active or held. The mapping DSECT is ICLI CCBBASE=0.

CIB [1]
Present if MFS is in use. The mapping DSECT is ICLI CIBBASE=0.

Communication Terminal Table [1]
Defines terminal characteristics. The mapping DSECT is ICLI CTTBASE=0.

SPQB Entries [1]
Entries on the subpool queue block chain. Unallocated CNTs are also formatted here.

SMB Table [1]
This table defines transaction characteristics in the IMS system. The mapping DSECT is IAPS SMBBASE=0.

Queue Manager Pool Prefix and Buffers [2]
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 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.

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. 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:

```
/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.

Figure 58 on page 179 shows the layout of the edited command.

1. These areas are not dumped in a DBCTL environment.
2. These areas are not dumped in a DBCTL environment.

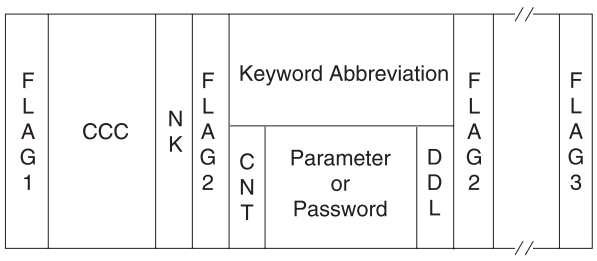


Figure 58. Edited Command Layout

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.

Interactive Dump Formatter

The interactive dump formatter provides ISPF dialog support for offline dump formatter requests. This simplifies the process of making requests by providing menus for format option selection, help members for online option explanation, automatic terminal and spool output control, and a configuration panel to provide interactive assistance in defining the IMS environment.

The IMS Interactive Dump Formatter menu is available from the component analysis section of the IPCS dialogs (IPCS ISPF selection 2.6). The primary menu includes the following entries:

- A configuration and initialization entry for IMS formatting control and initialization
- An IPCS BROWSE entry for speed of use
- A high-level formatting entry for traditional IMS formatting requests of large functional areas
- A low-level entry for ITASK-level and single-element formatting
- An analysis entry for IMS-provided summary or analysis formatting
- A user panel for user-controlled use
- An EDA entry for invoking the IMS enhanced dump analysis menu
- An entry for IMS dump formatting tutorial assistance
- An entry for exiting dump formatting
- An entry for formatting IMS Connect and other IMS component address spaces, such as CQS, OM, RM, and SCI
- An entry for formatting other IMS-related products, such as database recovery service, and their associated BPEs

The following topics provide additional information:

- "Using Interactive Dump Formatter Menus"
- "Using the Other IMS Components Formatting Panels" on page 183
- "Using the Other IMS-Related Products Formatting Panels" on page 183
- "IMS IPCS Symbols" on page 183
- "Using IMS Enhanced Dump Analysis" on page 184

Using Interactive Dump Formatter Menus

To use the menus, do the following:

1. Go to the IPCS Component Analysis panel.
2. Select DFSAAMPR. The panel in Figure 59 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 59. IMS Dump Formatting Primary Menu Panel

3. If this is the first time you are reading the dump, select 0 (Initialization). The panel in Figure 60 on page 181 appears.

```
DFSAAEI0 ----------------  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 -               IMS RELEASE -
  IMS SCD  ADDRESS -
  ABENDED ASID     -
```

Figure 60. IMS Dump Formatting Initialization/Content Panel - Inactive

4. Enter the IMS job name in the row marked CTL, or the DL/I job name in the row marked DL/I, and press enter. Either job name is sufficient. If unknown, enter a `Y` next to the `IMS SUBSYSTEM LIST DESIRED` prompt to scan for dumped IMS address spaces. When valid information has been supplied, the panel has several fields filled in, as shown in Figure 61. Press PF3 to return to the primary menu.

```
DFSAAEI0 ----------------  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     DTSIMSGA      SYS3        0019          YES
  DL/I    NA                        0019          N/A
  DBRC    DTSDBRCA                  001A          YES
  IRLM    N/A           N/A         N/A           N/A
  TMS


  ABEND CODE =  SYS   0C4         USER    0
  MODULE     =   DFSSCBT0

  IMS SDWA ADDRESS -   007BC680    IMS RELEASE -   810
  IMS SCD  ADDRESS -   00BA1E30
  ABENDED ASID     -   0019
```

Figure 61. IMS Dump Formatting Initialization/Content Panel - Active

5. IMS dump formatting is invoked from the high-level, low-level, and analysis option menus. Each menu contains a list of selectable entries. Place an `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 Figure 62 on page 182 and Figure 63 on page 182.

```
-------------------- 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, QBFPRF, 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
```

Figure 62. IMS High-Level Dump Formatting Panel

The IMS high-level formatter request panel allows selection of IMS formatting areas in a quick and easy manner. The MIN qualifier and spooling and terminal outputs can be selected as well.

```
DFSAALL0 ----------  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)
_   CLB      LINE                   BTAM line number (decimal)
_   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
_   SYSPST   ADDRESS                System PST address
_   SYSPST   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
```

Figure 63. IMS Low-Level Dump Formatting Selection Panel

```
DFSAALA0 ---------------------  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
```

Figure 64. IMS Analysis Selection Panel

Using the Other IMS Components Formatting Panels

Some IMS components (for example, the Common Queue Server (CQS), the Operations Manager (OM), the Resource Manager (RM), and the 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 main IMS dump formatter.

Select **Other IMS components** formatting from the IMS dump formatting primary menu panel, option 6. This choice will allow you to further select the specific component formatting to be done (for example, BPE or CQS). Dump initialization for these components is done through the BPE initialization and status panel under option 6, not by option 0 on the primary menu.

For information on using the IMS Connect Dump Formatter (an option under “Other IMS components”), see the “IMS Connect Dump Formatter” section in the *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.

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, option 7. 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.

IMS IPCS Symbols

IMS offline dump formatting creates IPCS symbols for selected key IMS control blocks. The Interactive Dump 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.

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).

Using IMS Enhanced Dump Analysis

If you select option E from the IMS dump formatting primary menu, you see the IMS Enhanced Dump Formatting Menu, shown in Figure 65.

```
--------------- 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
       T  TUTORIAL  - IMS Dump Formatter Tutorial
       X  EXIT      - Exit EDA dump formatting menu
```

Figure 65. 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) would be located under option 3 for Fast Path. To review tutorial information about the dump formatter and about how to use the filtering tool, select option T. When you select options 2, 3, 4, or 5, you can use a filtering tool to identify filtering criteria. An example of a filtering panel is shown in Figure 66.

```
 ------------------ 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 66. Sample Filtering Panel

When you open the generic filtering panel, default values are automatically filled in, as shown in Figure 66; however, you can overwrite them. For example, you can select criteria that presents two separate conditions:

- You want all the blocks starting at OFFSET 1C that have a value of X'08.'
- You want all the blocks starting at OFFSET A4 that have a non-zero value.

By selecting AND, you indicate that both conditions must be true. These values are shown in Figure 67.

```
<=====  AND/OR  (A/0)        QUAL =====>
```

Figure 67. Sample Filtering Criteria

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.

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 rapidly locating areas that are dumped, eye catchers are supplied in the formatted dump. See “Eye catchers” on page 174 for eye catcher examples.

Exception: Address spaces using BPE (for example, CQS, OM, RM, and SCI) do not provide any online dump formatting output.

The following topics provide additional information:

- “Formatted Dump for the CTL Address Space”
- “Formatted Dump for the DL/I Address Space” on page 188

Formatted Dump for the CTL Address Space

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 188. 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 on page 176 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 on page 168 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 [3]
For each CLB (line), all the control blocks associated with that line are formatted.

CLB [3]
The mapping DSECT is ICLI CLBBASE=0.

CTB [3]
The mapping DSECT is ICLI CTBBASE=0.

Input Buffer [3]
A SNAP of the input buffer, if input is active.

Output Buffer [3]
A SNAP of the output buffer, if output is active.

CCB [3]
Present if a conversation is active or held. The mapping DSECT is ICLI CCBBASE=0.

CIB [3]
Present if MFS is in use. The mapping DSECT is ICLI CIBBASE=0.

Communication Terminal Table [3]
Defines terminal characteristics. The mapping DSECT is ICLI CTTBASE=0.

SPQB Entries [3]
Entries on the subpool queue block chain. Unallocated CNTs are also formatted here.

SMB Table [3]
This table defines transaction characteristics in the IMS system. The mapping DSECT is IAPS SMBBASE=0.

Queue Manager Pool Prefix and Buffers [3]
The mapping DSECTs are ICLI POOLBASE=0 and ICLI BFRBASE=0.

Buffer Prefix List [3]
Contains the address of each buffer's prefix, status byte, and first and last pending and current DRRN.

QPOOL Prefix [3]
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

The following is a list of the areas within the DL/I address space that are dumped when the LSO=S option is active. Descriptive information has been added for some control blocks where it would be useful.

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.

---

3. These areas are not dumped in a DBCTL environment.

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 IBFPRF.
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 on page 168 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 SNAPs of DL/I control blocks for:

- External DL/I SNAP calls. The DL/I test program, DFSDDLT0, issues SNAP calls when it detects unequal conditions based on compare statements.
- Exceptional conditions, such as:
  - Pseudoabends in DL/I modules.
  - Message or batch-message 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 320 for a description of the GSAM SNAP.

When a SNAP call is performed for a Fast Path region abend, DFSERA20 bypasses some dumps.

- For a Fast Path database (an MSDB or DEDB), DFSERA20 bypasses the DMB dump.
- For a DB-PCB that refers to a Fast Path database, 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. For information about the File Select and Formatting Print utility, see *IMS Version 9: Utilities Reference: System*.

Status codes are not set for SNAP calls.

/DIAGNOSE Command SNAP Function

The /DIAGNOSE command SNAP function provides a non-intrusive alternative to taking a console dump. The /DIAGNOSE command SNAP function takes a current snapshot of system resources at any time without negatively impacting IMS. It then sends this system resource information to either OLDS or trace data sets as type X'6701' log records. Using this command can significantly decrease the time required to provide problem determination data to IBM service.

The /DIAGNOSE command SNAP function captures information for the following resources:

- A specific IMS control block
- A user-defined node
- A user-defined transaction
- A user-defined LTERM
- A user-defined USER
- Any area of storage within the control region address space by specifying the address of that storage area

The /DIAGNOSE command is a standard type-1 command. See the *IMS Version 9: Command Reference* for more information.

Common Trace Table Interface

The common trace table interface consists of the traces shown in Table 35. For each trace, Table 35 shows the trace identifier, the events traced, and, if the trace is documented in this manual, the page where you can find more information. You use the trace identifier as an eye catcher to locate a trace in a dump.

Table 35. Trace Tables in the Common Trace Interface

Trace	Table Type	ID	What Is Traced	Where Described
	ALL	ALL	All IMS table traces	
Common Service Layer Trace	CSLT	CS	IMS's interaction with the CSL	"Common Service Layer Trace" on page 198
DASD log trace	DLOG	DG	DASD logging	See "DASD log" inTable 36 on page 195
Dispatcher trace (online only)	DISP	DS	Dispatcher activities	"Dispatcher Trace" on page 204
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 265
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 213
Fast Path Trace		FT	Fast Path activity	"Fast Path Trace" on page 252
Force trace	FORCE	FO	Internal trace for IMS initialization	Not in use

Table 35. Trace Tables in the Common Trace Interface (continued)

Trace	Table Type	ID	What Is Traced	Where Described
Intercommunications trace	IDCO	IC	VTAM exit activity	"Starting the Trace" on page 327
Latch trace (online only)	LATC	LA	Latch activities	"Latch Trace" on page 243
Log router trace	LRTT	LR	Log router activity	"Log Router Trace Data" on page 493
LU trace	LUMI	LU	LU 6.2 activity	"LU Manager Trace" on page 381
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 307
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 399
Resource Recovery Service (RRS)	RRST	RR	Resource Recovery Service activity in dependent region(s)	"Resource Recovery Services Trace" on page 226
Queue manager trace	QMGR	QM	Queue manager activity	"Queue Manager Trace" on page 247
Scheduler trace (online only)	SCHD	SC	Scheduler activities	"Scheduler Trace" on page 239
Shared queues interface trace	SQTT	SQ	Shared queues interface activities.	"Shared Queues Interface Trace" on page 251
Storage Manager trace	STRG	SM	Storage Manager activities	"Storage Manager Trace" on page 242
Transport Manager subsystem	Not available	TS	Transport Manager subsystem activity	Not available

The following topics provide additional information:

- "Finding the Trace Tables in a Dump" on page 193
- "Format of Trace Records" on page 195
- "IMS Trace Function Codes" on page 195
- "Dispatcher Trace" on page 204
- "ITASK ECB Posting" on page 212
- "System Post Codes" on page 213
- "External Subsystem Trace" on page 213
- "Layout of the X'57' Variable Section" on page 215
- "Layout of the X'58' Variable Section" on page 220
- "Resource Recovery Services Trace" on page 226
- "Scheduler Trace" on page 239
- "Storage Manager Trace" on page 242
- "Latch Trace" on page 243
- "Queue Manager Trace" on page 247
- "Shared Queues Interface Trace" on page 251

| • “Fast Path Trace” on page 252

Finding the Trace Tables in a Dump

If you do not choose to write the trace to the log data set, IMS formats trace tables as part of an IMS dump.

Figure 68 on page 194 explains how to find the location of each of the traces in a dump.

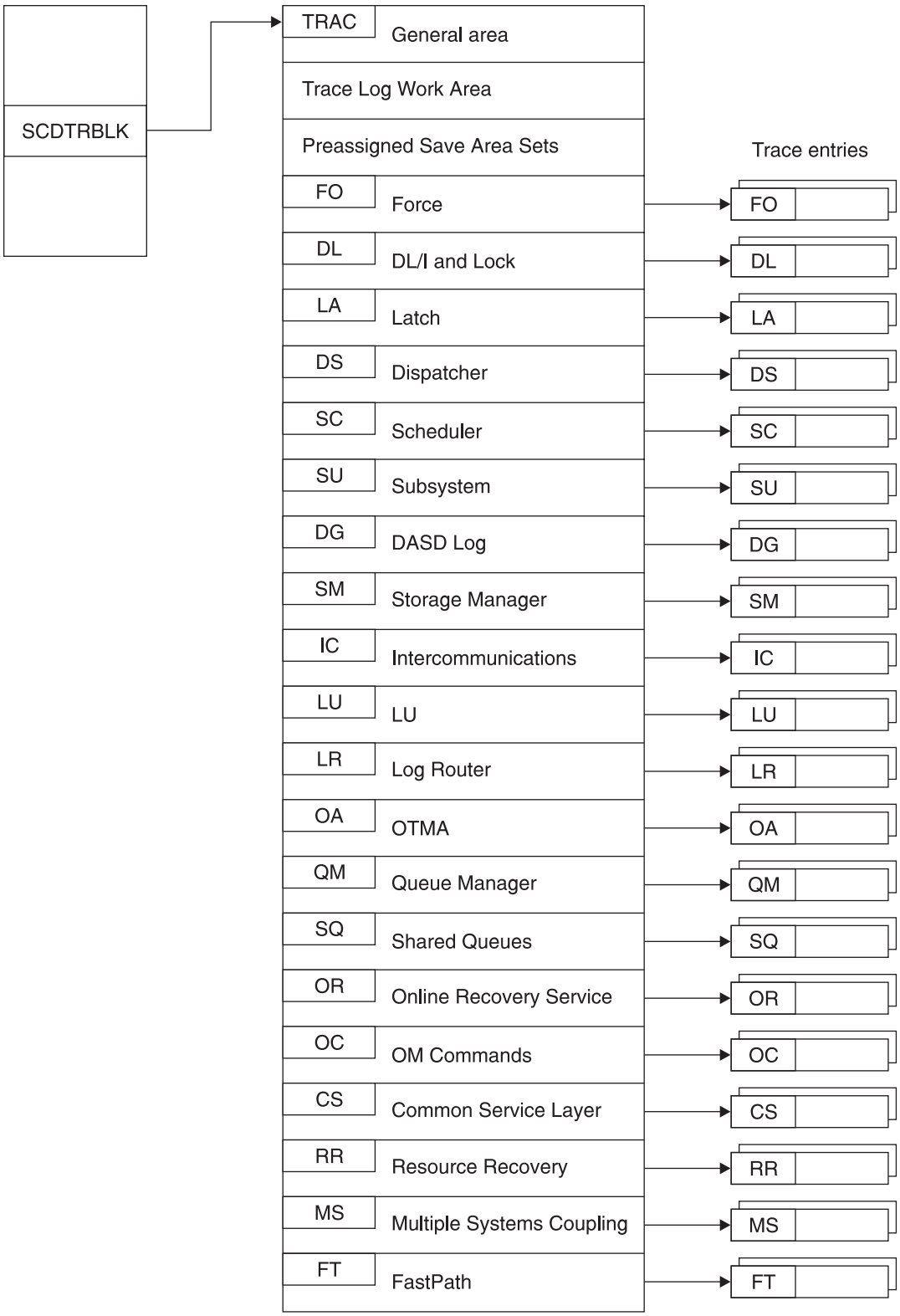


Figure 68. How to Locate Trace Tables

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 Figure 69, 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.

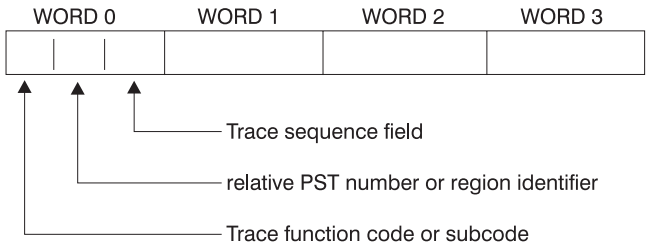


Figure 69. General Trace Record Format

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

The common trace interface captures information for a given trace function code. Table 36 lists some of the important functions traced and their location in trace tables. These function codes are a subset of codes and are listed here only for you to use with the following trace table examples:

- "Dispatcher Trace" on page 204
- "External Subsystem Trace" on page 213
- "Resource Recovery Services Trace" on page 226
- "Scheduler Trace" on page 239
- "Storage Manager Trace" on page 242
- "Latch Trace" on page 243
- "Queue Manager Trace" on page 247
- "Shared Queues Interface Trace" on page 251
- "Fast Path Trace" on page 252

You can also find a one-line description of each trace code in macro DFSTRAE0.

Table 36. 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 36. 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 (DFSLMGR0) entry
	X'C9'	Lock request manager (DFSLMGR0) 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 (DFSLRH00)
	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)
	X'F9'	Position by key for image copy (buffer handler)
	X'FA'	Get next record for image copy (buffer handler)

Table 36. Trace Function Codes (continued)

Trace Table	Function Code	Description
Dispatcher	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'	Dispatcher abend 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
Resource Recovery Services	X'A5'	Resource Recovery Services (RRS) Calls
Scheduler	X'41'	Scheduling starts
	X'42'	Block mover

Table 36. Trace Function Codes (continued)

Trace Table	Function Code	Description
	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 [1]	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 subsystem	X'57'	Created by the module that operates in the IMS control region
	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 (CESS, CIOP, 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 **Note:** For more information, see “Fast Path Tracker Trace Entries” on page 483.
	X'9F'	Fast Path log router interface **Note:** For more information, see “Fast Path Tracker Trace Entries” on page 483.
Log Router	X'38'	Created by various log router functions

Note:

1. For a detailed description of the log trace entries, refer to a listing of the IDLIVSAM TRACENT macro.

Common Service Layer Trace

The Common Service Layer trace (CSLT) provides information about activity related to IMSs interaction with the Common Service Layer. This includes IMSs interaction with OM, RM, and 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 Interactive 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 eyecatcher `**CSTR`.

Related Reading:

- For more information about the CSLT parameter, see “Tailoring the IMS System to Your Environment” in *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.
- For more information about the /TRACE command, see “/TRACE” in *IMS Version 9: Command Reference*.
- For more information about the common trace table interface, see “Common Trace Table Interface” on page 191.
- For more information about the Offline Dump Formatter, see “Formatting IMS Dumps Offline” on page 155 and the “Offline Dump Formatter Utility (DFSOFMD0)” section in *IMS Version 9: Utilities Reference: System*.
- The File Select and Formatting Print Utility, see “File Select and Formatting Print Utility” on page 153 and the “File Select and Formatting Print Utility (DFSERA10)” section in *IMS Version 9: Utilities Reference: System*.

Format of Common Service Layer Trace Records

The diagrams following Table 37 depict the trace (low level) record format of the following functions with these subfunction codes (SC):

Table 37. 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
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

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 IMS-formatted dump. 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.

Table 38 shows the general format of a dispatcher trace entry.

Table 38. Dispatcher Trace Record Format

WORD 0			WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6	WORD 7
I	T	SEQ NUM							TIME 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 – Reinstate 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 TO= 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 TO=XM or TO=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 IMS 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 – SAPCNTL2 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
```

```
**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
```

Figure 70. Example of a Dispatcher Trace

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

Table 39 lists only a subset of the possible post codes.

Table 39. 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

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)
- Any problem between the IMS dependent region and the external subsystem

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.

Figure 71 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.

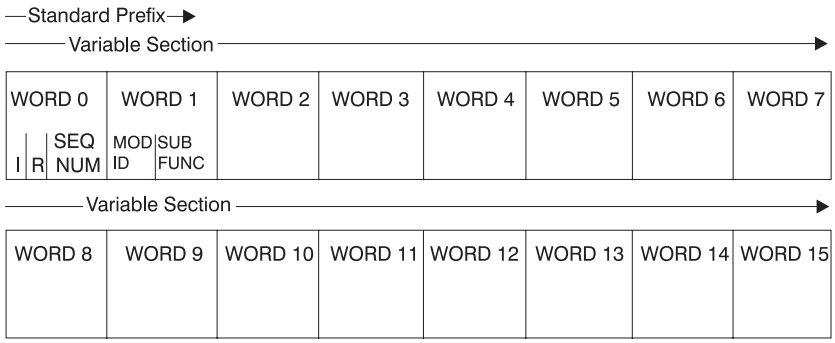


Figure 71. External Subsystem (ESS) Trace Record Format

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, DFSESCT0).

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.

Table 40 lists:

- 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 40. Module ID and Subfunction Table

Module ID	Sub Function	Module	Meaning
X'0015'	X'0015'	DFSESS40	ESS message service exit
X'0016'	X'0014'	DFSESS30	ESS logging exit
X'0017'	X'0011'	DFSESS10	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') Dependent region ESS term (if X'58')
X'0285'	X'0010'	DFSESD80	Dependent region ESS initialization
X'0288'	X'0001'	DFSESSO0	Dependent region ESS sign on
X'0289'	X'0003'	DFSESD50	Dependent region ESS signoff
X'0290'	X'0005'	DFSESCT0	Dependent region ESS create thread
X'0291'	X'0002'	DFSESD50	Dependent region ESS term thread
	X'0003'		Dependent region ESS term thread region
	X'0004'		ESS signoff Dependent region ESS 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'	DFSFESP0	ESS commit processor entered
	X'0017'		ESS commit processor exited
	X'0018'		ESS commit processor R-I-D request

Table 40. Module ID and Subfunction Table (continued)

Module ID	Sub Function	Module	Meaning
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	Mother ITASK request
	X'0002'		Control region ESS attach
X'0506'	X'0006'	DFSESPR0	Dependent region ESS program request handler
	X'0019'		Dependent region ESS program request recursive call
	X'0020'		Dependent region ESS Subsystem Not Operational (SNOX)

Layout of the X'57' Variable Section

```
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

     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


      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    (DFSAWE DFSESI30 identify return code)

      words  6 through 15   not used
```

```
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

                   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

     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

     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

     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    (DFSAWE 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

```
     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

```
     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

```
     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 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

      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

      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

      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

     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

     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

      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    (DFSAWE return code)
     words  6 through 15   not used
```

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

```
    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

```
     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

```
    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    (DFSAWE DFSIESI0 return code)
    words  6 through 15   not used
```

```
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

```
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

     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

     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

     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

     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

     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

     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
                   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' DFSESSO0 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'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' DFSESCT0 External SubSys CREATE 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'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
                   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

```
     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

```
     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

```
     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

```
     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

     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   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   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

     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   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   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
                    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   SSTTFGT1 (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   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
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
                   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
                   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
```

Figure 72 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.

```
************************************************
***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  00000000
ESI3  IDENT       570019B8  04020020  F1F0F0F1  00000800  00000000  00000000  00000000  00000000
ESS4  MESSAGE     570019BD  00150015  F1F0F0F1  00000000  00000000  00000000  00000000  00000000
ESI3  R-I-D       570019C6  04020021  F1F0F0F1  00002C00  00000000  00000000  00000000  00000000
ESS3  LOGGING     570019CF  00160014  F1F0F0F1  00000000  00000000  00000000  00000000  00000000
ESCT  CRT THRD    58003165  02900005  F1F0F0F1  0001CC0C  81000000  00000000  00000000  00000000
FESP  SYNC STA    580035D0  03070016  F1F0F0F1  0001CC0C  8C100000  42048000  03F00000  00000000
ESI3  RRE REQ     570035EC  04020023  F1F0F0F1  00008C00  00000000  00000000  00000000  00000000
ESI3  XS ECHO     570035F1  04020024  F1F0F0F1  00008C00  00000000  00000000  00000000  00000000
ESI3  R-I-D       570035F6  04020021  F1F0F0F1  00008C00  00000000  00000000  00000000  00000000
ESS3  LOGGING     57003608  00160014  F1F0F0F1  00000000  00000000  00000000  00000000  00000000
ESCT  CRT THRD    58003A8F  02900005  F1F0F0F1  0001CC0C  81000000  00000000  00000000  00000000
FESP  SYNC STA    58003AA1  03070016  F1F0F0F1  0001CC0C  8C100000  01080000  00000000  00000000
ESP1  COM PREP    58003AC8  02940008  F1F0F0F1  0001CC0C  8C500000  00000000  00000000  00000000
FESP  SYNC END    58003ACB  03070017  F1F0F0F1  0001CC0C  8CD00000  01080000  00000080  02940000
FESP  SYNC STA    58003B1A  03070016  F1F0F0F1  0001CC0C  8CD00000  010C0000  00002080  00000000
ESP2  COM CONT    58003B3D  02950009  F1F0F0F1  0001CC0C  8CD40000  00000000  00000000  00000000
FESP  SYNC END    58003B44  03070017  F1F0F0F1  0001CC0C  9CCC0000  010C0000  000020C0  02950000
FESP  SYNC STA    58003BA3  03070016  F1F0F0F1  0001CC0C  9CCC0000  42080000  00000000  00000000
FESP  SYNC END    58003BA4  03070017  F1F0F0F1  0001CC0C  9CCC0000  42080000  00000080  02950000
FESP  SYNC STA    58003BDF  03070016  F1F0F0F1  0001CC0C  9CCC0000  420C0000  00002080  00000000
ESD5  TRM THRD    58003BE7  02910002  F1F0F0F1  0001CC0C  9CCC0000  00000000  00000000  00000000
FESP  SYNC END    58003BF1  03070017  F1F0F0F1  0001CC0C  95000C00  420C0000  00002080  00000000

GOBAL 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
```

Figure 72. Example of an External Subsystem Trace (SST)

Resource Recovery Services Trace

The Resource Recovery Service Trace (RRST) provides information about relevant Resource Recovery Service (RRS) events in the IMS dependent REGION. Use the trace under direction of IBM support personnel when problems are suspected in the Resource Recovery Services area.

You can enable the Resource Recovery Service 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.

The following topics provide additional information:

- “Format of Trace Records” on page 227
- “RRST Trace Examples” on page 235
- “RRST Entries for OTMA Modules” on page 238
- “RRS Entries Logged by OTMA Modules” on page 239
- “Trace Entries Logged by RRS Related Modules” on page 239

Format of Trace Records

The diagram below shows the general format of a Resource Recovery Service trace entry. The standard fields trace, present in every trace entry, are described below.

```
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.
```

Table 41 shows the Resource Recovery Services calls associated with the subfunction codes (SC):

Table 41. Resource Recovery Service 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
X'18'	CTXBEGC
X'19'	CTXEINT1
X'1A'	CTXDINT
X'1B'	CTXENDC
X'1C'	CTXSWCH
X'1D'	CTXSCID
X'1E'	CTXSDTA

Table 41. Resource Recovery Service Calls Associated with the Subfunction Codes (continued)

Subfunction Code	Function
X'1F'	IEANTCR
X'20'	IEANTRT

Table 42 shows the Resource Recovery Services (RRS) function routines associated with the DFSRRSI function routine codes (FRC):

Table 42. Resource Recovery Services Function Routines Associated with DFSRRSI Function Routine Codes

Function Routine Codes	Function Routine
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
                    - 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        - 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
                    - 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        - 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
                    - byte 2 - LCREGFL
                    - 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        - 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
                    - 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        - 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
                    - 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        - 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
                    - 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'06'
Description         = Resource Recovery Services - ATRIBRS

   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'07'
Description         = Resource Recovery Services - ATRIERS

   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'08'
Description         = Resource Recovery Services - ATRIRLN

   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'09'
Description         = Resource Recovery Services - ATRIRNI

   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'0A'
Description         = Resource Recovery Services - ATRIRRI

   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'0B'
|  Description         = Resource Recovery Services - ATRISLN
|
|     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'0C'
|  Description         = Resource Recovery Services - ATRPDUE
|
|     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           - byte 1-2 - ATRPDUEEXITNUMBER
|         - 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
|                      - 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'0E'
|  Description         = Resource Recovery Services - ATRRURD
|
|     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        - 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
|                      - 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        - URI_Token
|     Word 7           - Low 4 byte time stamp (STCK)
```

```
|  Subfunction Code    = X'10'
|  Description         = Resource Recovery Services - ATRSROI
|
|     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        - URID
|     Word 7           - Low 4 byte time stamp (STCK)

|  Subfunction Code    = X'11'
|  Description         = Resource Recovery Services - ATRSIT
|
|     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'12'
   Description         = Resource Recovery Services - ATRSPID

      Word 1           - byte 1 -  Numeric DFSRRSI function routine code
                       - byte 2 0 - 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        - IMS_PCTASK_URI_TOKEN
      Word 7           - Low 4 byte time stamp (STCK)

|  Subfunction Code    = X'13'
|  Description         = Resource Recovery Services - ATRSUSI2
|
|     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        - 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
                      - 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
|                     - 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'20'
|  Description         = MVS Name/Token Services - IEANTRT
|
|     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)
```

RRST Trace Examples

The following topic shows examples of the RRST trace in an OTMA and an APPC environment. 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 O=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
|  -DFSSLUM0 Exit   7B027F86  01C90000  00000000  00000000  00000000  00000000  BB676D0D  B53E27A0   SYNCRONOUS OUTPUT LU MANAGER
|   DFSRLM10 Exit   7B0281E8  06400000  C9D4E2F2  40404040  00000000  00000000  BB676D7A  2B82CF89   RECEIVE LU MANAGER RECEIVER
|   DFSSLUM0 Exit   7B0282FD  01C90000  00000000  00000000  00000000  00000000  BB676DBE  97EF7323   SYNCRONOUS OUTPUT LU MANAGER
|   DFSRLM10 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  00000000  B917C5DD   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  0100001E  17ED934A   TKN TRACE (A0A7)
|   DFSYTIB0 (RRS)  5A00897D  28010084  0CB25060  7E71E000  7E71E000  01000000  0100001E  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
|   ATRRURD  (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  5BFA1C26   EXIT COMMIT
|   DFSRGFS0 (RRS)  A0AA8D0E  480001AA  0001C3E7  BB676EB9  17C86FAA  01000000  022A4060  5BFA1C26   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  00000000  D72204AF   CREATE_CONTEXT     |NO LCRE FLAGs
|   ATREINT5 (RRS)  A5048FA1  18000000  00010000  04000000  00000000  BB676ED7  7E71E000  D72206A2   EXPRESS_UR_INTRST  |NO LCRE FLAGs
|   DFSRGFS0 (RRS)  A0A78FA2  480005A7  0CB252F8  0CB25060  00000001  00000000  BB676ED7  220DB20D   EXIT COMMIT
|   DFSRGFS0 (RRS)  A0AA8FA3  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)
|   DFSAOSW0 (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
|   DFSSLUM0 Exit   7B0290AD  01800000  00000002  00000000  00000000  00000000  BB676ED8  D8DD6EAF   SYNCRONOUS 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  F4376B81   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  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  00000000  FEB72191  CREATE_CONTEXT     |NO LCRE FLAGs
 ATREINT5 (RRS)  A5049403  18000000  00010000  04000000  00000000  BB676EFE  7E71E000  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)
 DFSAOSW0 (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
 DFSSLUM0 Exit   7B0295E3  01800000  00000003  00000000  00000000  00000000  BB676F0A  3B0ABC23  SYNCRONOUS 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    WORD 7                          PAGE 0002
-CTXSCID  (RRS)  A51C96C6  19000000  00020000  00000000  00000000  BB676EFE  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)  A0A69881  480005A6  0CB252F8  0CB25060  00010000  00010005  BB676F22  71395349  ENTER COMMIT
 CTXEINT1 (RRS)  A5189882  15000000  00010000  00000000  00000000  00000000  00000000  227139DC  CREATE_CONTEXT     |NO LCRE FLAGs
 ATREINT5 (RRS)  A5049883  18000000  00010000  04000000  00000000  BB676F22  7E71E000  22713C07  EXPRESS_UR_INTRST  |NO LCRE FLAGs
 DFSRGFS0 (RRS)  A0A79884  480005A7  0CB252F8  0CB25060  00000001  00000000  BB676F22  71439009  EXIT COMMIT
 DFSRGFS0 (RRS)  A0AA9885  480005AA  0001E4D9  7E71E000  7E71E000  01000006  0100001E  71439009  TKN TRACE (A0A7)
 DFSYTIB0 (RRS)  5A00988C  28010080  0CB25060  7E71E000  7E71E000  01000006  0100001E  22714D7A  INPT MSG ENQUEUED(UR TOKEN WORD3-6)
 DFSAOSW0 (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
 DFSSLUM0 Exit   7B02999E  01800000  00000004  00000000  00000000  00000000  BB676F22  F5D4A386  SYNCRONOUS 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)  A51C99C6  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  FBFA8107  EXIT COMMIT
 DFSRGFS0 (RRS)  A0AA99CB  480001AA  0003E4D9  7E71E000  7E71E000  01000006  0100001E  FBFA8107  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  04000000  00000000  BB676F52  7E71E000  52B61B58  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)
 DFSAOSW0 (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
 DFSSLUM0 Exit   7B029E2C  01800000  00000005  00000000  00000000  00000000  BB676F5C  AB7BB62C  SYNCRONOUS 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  5CD7720F  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 O=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
-DFSSLUM0 Exit   7B027EEE  01C90000  00000000  00000000  00000000  00000000  BB677710  C2AEA808  SYNCRONOUS 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  00000000  BBCE2B81  CREATE_CONTEXT     |NO LCRE FLAGs
 ATREINT5 (RRS)  A50484E4  18000000  00010000  04000000  00000000  BB6777BB  7E71E000  BBCE2F49  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
 DFSAOSW0 (RRS)  7B0885AB  47000000  0BB80060  40C1D6E2  0CB25998  00000000  BB6777BD  4A2DBA20  APPC/OTMA SMQ AWE server
 DFSAPPC0 Exit   7B0285AC  02400000  00000000  0CB25700  00000000  00000000  BB6777BD  4A2DEE60  DFSAPPC MSG SWITCH PROCESSOR
```

```
  DFSSLUM0 Exit   7B0285AD  01800000  00000002  00000000  00000000  00000000  BB6777BD  4A37C900  SYNCRONOUS OUTPUT LU MANAGER
  DFS6LUS0 (RRS)  7B0985FD  0A000001  0CB25700  7E71E000  7E71E000  01000000  0100001E  00000000  LU62 SERVICES INTERFACE 1
  DFSRGFS0 (RRS)  A0A68656  480001A6  0CB25998  0CB25700  00020000  00010000  BB6777BD  598FF94D  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
  DFSRGFS0 (RRS)  A0A78659  480001A7  0CB25998  0CB25700  00000001  00000000  BB6777BE  761A1648  EXIT COMMIT
  DFSRGFS0 (RRS)  A0AA865A  480001AA  0002E4D9  7E71E000  7E71E000  01000000  0100001E  761A1648  TKN TRACE (A0A7)
  DFSRGFS0 (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  C3E18EBE  EXPRESS_UR_INTRST  |NO LCRE FLAGs
  DFSRGFS0 (RRS)  A0A786C5  480005A7  0CB25998  0CB25700  00000001  00000000  BB6777C3  E1973CA0  EXIT COMMIT
  DFSRGFS0 (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
  DFSAOSW0 (RRS)  7B088777  47000000  0BB80060  40C1D6E2  0CB25998  00000000  BB6777C4  701B928E  APPC/OTMA SMQ AWE server
  DFSAPPC0 Exit   7B028778  02400000  00000000  0CB25700  00000000  00000000  BB6777C4  701BC82E  DFSAPPC MSG SWITCH PROCESSOR
  DFSSLUM0 Exit   7B028779  01800000  00000003  00000000  00000000  00000000  BB6777C4  70263B6E  SYNCRONOUS OUTPUT LU MANAGER
  DFS6LUS0 (RRS)  7B0987C9  0A000001  0CB25700  7E71E000  7E71E000  01000002  0100001E  00000000  LU62 SERVICES INTERFACE 1
  DFSRGFS0 (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
  DFSRGFS0 (RRS)  A0A787D5  480001A7  0CB25998  0CB25700  00000001  00000000  BB6777C4  869FA88D  EXIT COMMIT
  DFSRGFS0 (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
  DFSRGFS0 (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
  DFSRGFS0 (RRS)  A0A788DA  480004A7  0CB25998  0CB25700  00000001  00000000  BB6777C9  D86CE76F  EXIT COMMIT
  DFSRGFS0 (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
  DFSAOSW0 (RRS)  7B088976  47000000  0BB80060  40C1D6E2  0CB25998  00000000  BB6777CA  80475262  APPC/OTMA SMQ AWE server
  DFSAPPC0 Exit   7B028977  02400000  00000000  0CB25700  00000000  00000000  BB6777CA  80479342  DFSAPPC MSG SWITCH PROCESSOR
  DFSSLUM0 Exit   7B028978  01800000  00000004  00000000  00000000  00000000  BB6777CA  8052CE22  SYNCRONOUS OUTPUT LU MANAGER
  DFS6LUS0 (RRS)  7B0989DB  0A000001  0CB25700  7E71E374  7E71E374  01000000  0100001E  00000000  LU62 SERVICES INTERFACE 1
  DFSRGFS0 (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  CA865434  COMMIT_UR          |NO LCRE FLAGs
  DFSRGFS0 (RRS)  A0A78A4B  480001A7  0CB25998  0CB25700  00000001  00000000  BB6777CA  AA554045  EXIT COMMIT
  DFSRGFS0 (RRS)  A0AA8A4C  480001AA  0002E4D9  7E71E374  7E71E374  01000000  0100001E  AA554045  TKN TRACE (A0A7)
  CTXSWCH  (RRS)  A51B8A72  08000000  00000000  00002000  00000000  BB6777C9  D6DD9446  CABA1624  END_CONTEXT        |NO LCRE FLAGs
  DFSRGFS0 (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
  DFSRGFS0 (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
 DFSRGFS0 (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
  DFSAOSW0 (RRS)  7B088C59  47000000  0BB80060  40C1D6E2  0CB25998  00000000  BB6777D2  E44C1303  APPC/OTMA SMQ AWE server
  DFSAPPC0 Exit   7B028C5A  02400000  00000000  0CB25700  00000000  00000000  BB6777D2  E44C6D43  DFSAPPC MSG SWITCH PROCESSOR
  DFSSLUM0 Exit   7B028C5B  01800000  00000005  00000000  00000000  00000000  BB6777D2  E4567063  SYNCRONOUS OUTPUT LU MANAGER
  DFS6LUS0 (RRS)  7B098C8D  0A000001  0CB25700  7E71E000  7E71E000  01000006  0100001E  00000000  LU62 SERVICES INTERFACE 1
  DFSRGFS0 (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
  DFSRGFS0 (RRS)  A0A78C99  480001A7  0CB25998  0CB25700  00000001  00000000  BB6777D2  EF0C5785  EXIT COMMIT
  DFSRGFS0 (RRS)  A0AA8C9A  480001AA  0003E4D9  7E71E000  7E71E000  01000006  0100001E  EF0C5785  TKN TRACE (A0A7)
  DFSRGFS0 (RRS)  A0A68D66  480005A6  0CB25998  0CB25700  00010000  00010004  BB6777D7  0AB06B68  ENTER COMMIT
  CTXEINT1 (RRS)  A5188D67  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
  DFSRGFS0 (RRS)  A0A78D69  480005A7  0CB25998  0CB25700  00000001  00000000  BB6777D7  0ABC5A28  EXIT COMMIT
  DFSRGFS0 (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
  DFSAOSW0 (RRS)  7B088EE9  47000000  0BB80060  40C1D6E2  0CB25998  00000000  BB6777D7  A738EA6F  APPC/OTMA SMQ AWE server
  DFSAPPC0 Exit   7B028EEA  02400000  00000000  0CB25700  00000000  00000000  BB6777D7  A739192F  DFSAPPC MSG SWITCH PROCESSOR
  DFSSLUM0 Exit   7B028EEB  01800000  00000006  00000000  00000000  00000000  BB6777D7  A744892F  SYNCRONOUS OUTPUT LU MANAGER
  DFS6LUS0 (RRS)  7B098F1D  0A000001  0CB25700  7E71E000  7E71E000  01000008  0100001E  00000000  LU62 SERVICES INTERFACE 1
  DFSRGFS0 (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
  DFSRGFS0 (RRS)  A0A78F29  480001A7  0CB25998  0CB25700  00000001  00000000  BB6777D7  B160BD29  EXIT COMMIT
  DFSRGFS0 (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
  DFSRGFS0 (RRS)  A0A6901F  480004A6  0CB25998  0CB25700  00010000  00010005  BB6777DD  5B634549  ENTER COMMIT
  ATREINT5 (RRS)  A5049020  18000000  00010000  04000000  00000000  BB6777DD  7E71E374  DD5B63AD  EXPRESS_UR_INTRST  |NO LCRE FLAGs
  DFSRGFS0 (RRS)  A0A79021  480004A7  0CB25998  0CB25700  00000001  00000000  BB6777DD  5B699BA9  EXIT COMMIT
  DFSRGFS0 (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
  DFSAOSW0 (RRS)  7B0891A1  47000000  0BB80060  40C1D6E2  0CB25998  00000000  BB6777DD  E519D12A  APPC/OTMA SMQ AWE server
  DFSAPPC0 Exit   7B0291A2  02400000  00000000  0CB25700  00000000  00000000  BB6777DD  E519FD2A  DFSAPPC MSG SWITCH PROCESSOR
  DFSSLUM0 Exit   7B0291A3  01800000  00000007  00000000  00000000  00000000  BB6777DD  E5241B2A  SYNCRONOUS OUTPUT LU MANAGER
  DFS6LUS0 (RRS)  7B0991E8  0A000001  0CB25700  7E71E374  7E71E374  01000002  0100001E  00000000  LU62 SERVICES INTERFACE 1
  DFSRGFS0 (RRS)  A0A691F1  480001A6  0CB25998  0CB25700  00050000  00010000  BB6777DD  E935F58C  ENTER COMMIT
  CTXSCID  (RRS)  A51C91F2  19000000  00050000  00000000  00000000  BB6777DD  591A1C0A  DDE93669  COMMIT_UR          |NO LCRE FLAGs
```

```
|   ATRCMIT  (RRS)  A50191F3  19000000  00050000  00080000  00000000  00000000  00000000  DDE93885   COMMIT_UR          |NO LCRE FLAGs
|   DFSRGFS0 (RRS)  A0A79272  480001A7  0CB25998  0CB25700  00000001  00000000  BB6777DD  FC906981   EXIT COMMIT
|   DFSRGFS0 (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 following diagrams show the format of OTMA trace entries for RRS related events:

```
| 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'
|    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'
|    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'
|    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'
|    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'
|    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'
|    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'
|    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)
```

RRS Entries Logged by OTMA Modules

```
| 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 RRS Related Modules

```
| 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
|    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 (AWRRETCD)
|   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
|    Word 1           - byte 0 - 72, module number for DFSRGFS0
|                     - 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.

The diagrams in Figure 73 on page 240 through Figure 80 on page 241 show the formats of the scheduler trace records for function codes X'41' through X'48' that are listed in Table 36 on page 195.

```
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
```

Figure 73. Scheduler Trace Record Format for Function Code X'41'

```
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 - SMBSTATS
               byte 4 - Reserved
      word 2 – PSTPSB
      word 3 – PSTSMB
      words 4-5 – Reserved
      word 6 – Module identifier
      word 7 – Store clock value
```

Figure 74. Scheduler Trace Record Format for Function Code X'42'

```
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
```

Figure 75. Scheduler Trace Record Format for Function Code X'43'

```
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
```

Figure 76. Scheduler Trace Record Format for Function Code X'44'

```
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
```

Figure 77. Scheduler Trace Record Format for Function Code X'45'

```
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
```

Figure 78. Scheduler Trace Record Format for Function Code X'46'

```
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
```

Figure 79. Scheduler Trace Record Format for Function Code X'47'

```
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
```

Figure 80. Scheduler Trace Record Format for Function Code X'48'

Figure 81 on page 242 shows an 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  F8ABCDC0
BLOCK MOVER     427008E9  44060000  16F91740  00800041
                00000000  00000000  00000000  F8ABD209
SCHED END       437008F3  00000000  16F91740  00800001
```

Figure 81. Example of a Scheduler Trace

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: HIOP, CIOP, CESS, SPAP, EMHB, FPWP, LUMP, LUMC.

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. For information about using the `/TRACE` command, see *IMS Version 9: Command Reference*.

You can format the internal trace table using the Offline Dump Formatter under IPCS with either the `VERBX` command or the Interactive Dump Formatter panels. To format the trace records, any storage manager control blocks, and pool storage, you can specify ALL as the poolid as shown in the following example.

```
FMTIMS ...(POOL,NAME,ALL),...or you can specify FMTIMS (TRACE, NAME, SM).
```

For detailed information on formatting the trace table, see “Formatting IMS Dumps Offline” on page 155 or in *IMS Version 9: Utilities Reference: System*.

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.

Table 43, Table 44, and Table 45 show the format of each storage manager trace record.

Table 43. 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 44. 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 45. 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

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. Table 46 shows the general format of a latch trace entry.

Table 46. 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 NUM	ENTRY 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, as described in "Latch Manager Trace Entries" on page 244, "Use Manager Trace Entries" on page 244, and "System Locate Control Function Entries" on page 246.

Latch Manager Trace Entries

```
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)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)
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)
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;
                  2nd halfword = flags from latch manager parmlist
     word  6/7 -- 8-byte STCK value
```

Use Manager Trace Entries

Latch Manager Trace Entries:

```
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
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
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
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
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
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
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
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)
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)
Description: Use recovery performed at the TCB level trace entry
     word   1  -- 'RCOV'
     word   2  -- 'TCB'
     word   3  -- Block Type
     word   4  -- Ø
     word   5  -- TCB address
     word   6  -- Ø
     word   7  -- Caller's return address
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  -- Ø
     word   5  -- ASCB address
     word   6  -- Ø
     word   7  -- Caller's return address
```

System Locate Control Function Entries

```
Entry Type: SLC0
Description: Locate a block and issue a use manager inuse call against it
     word   1  -- 'SLC0'
     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
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
```

Figure 82 on page 247 shows an example of a Latch trace.

```
**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  8004BABE
COMMON LATCH    70006A99  REL     QMGR    ANY     00005F28  00290000  065975F0  800EAA62
COMMON LATCH    70006A9A  GET     QMGR    SHR     00005F28  00290000  065975F0  8004BABE
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  8004BABE
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    LNBQ    .. -    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
```

Figure 82. Example of a Latch Trace

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.

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 Interactive 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 Reading: For information about:

- The QMGR parameter, see *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.
- The /TRACE command, see *IMS Version 9: Command Reference*.
- The common trace table interface, see "Common Trace Table Interface" on page 191.
- The Offline Dump Formatter, see "Formatting IMS Dumps Offline" on page 155.
- The File Select and Formatting Print utility, see *IMS Version 9: Utilities Reference: System*.

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.

Figure 83 on page 249 depicts the trace (low level) record format of the following functions with these subfunction codes (SC):

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

```
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
```

Figure 83. Low Level Trace Record Format

Figure 84 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
```

Figure 84. Medium Level Trace Record Format - X'21'

Figure 85 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
```

Figure 85. Medium Level Trace Record Format - X'20"

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
```

Figure 86. Medium Level Trace Record Format - X'22'

Figure 87 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
```

Figure 87. Low Level Trace Record Format - X'08', X'15', X'1B'

Figure 88 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
```

Figure 88. Low Level Trace Record Format - X'0A'

Figure 89 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
```

Figure 89. Low Level Trace Record Format - X'16'

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 support personnel 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 Interactive 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 Reading: For information about:

- The SQTT parameter, see *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.
- The /TRACE command, see *IMS Version 9: Command Reference*.
- The common trace table interface, see "Common Trace Table Interface" on page 191.

- The Offline Dump Formatter, see “Formatting IMS Dumps Offline” on page 155.
- The File Select and Formatting Print utility, see *IMS Version 9: Utilities Reference: System*.

Fast Path Trace

When you use the /TRACE SET ON TABLE FPTT command, IMS enables the Fast Path trace. The Fast Path trace will reside in the internal IMS trace tables, with the OPTION LOG causing the trace to also be written to the IMS logs. If the OPTION LOG parameter is not specified (or the OPTION NOLOG is specified), the trace will only reside 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”
- “X’9D’ Trace Format”

X’9C’ Trace Format: Table 47 shows the format of the X'9C' trace entry and below the table are the trace IDs and descriptions of content of trace entry.

Table 47. 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
aa	The FP Notify trace code, X'9C'
bb	The trace subcode, used so that each IMSFP trace entry has a unique code or subcode, avoiding duplication of the same trace function.
X'01'	DBFNOTM0 Entry
X'02'	NCB contents at entry to DBFNOTM0
X'03'	DBFNOTM0 NOTEXC (DFSLM->IRLM)
X'04'	DBFNOTM0 IWAIT
X'05'	DBFNOTM0 after IWAIT
X'06'	DBFICLI0 Entry
X'07'	NCB contents at entry to DBFICLI0
X'08'	DBFICLI0 Response decrement EPSTNCTR
X'09'	DBFICLI0 IPOST
X'0A'	DBFCSTS2 EPST Timeout Candidate
X'0B'	DBFCSTS2 EPST Timeout IPOST
cccc	The Trace Sequence Number
dddddddd	Data, specific for each trace entry.

X’9D’ Trace Format: Table 48 on page 253 shows the format of the X'9D' trace entry and below the table are the trace IDs and descriptions of content of trace entry.

Table 48. 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
aa	The FP General trace code, X'9D'
bb	The FP latch trace subcodes
X'01'	DBFELOCK DMAC
X'02'	DBFELOCK DMCB
X'03'	DBFELOCK DSM
X'04'	DBFELOCK FLD
X'05'	DBFELOCK FNCB
X'06'	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

Chapter 8. DB—Database Service Aids

The information contained in this section addresses service aids and diagnostic techniques used to analyze IMS database problems. Specifically, this section addresses the following items:

- "The Job Control Block (JCB) Trace" traces the last few DL/I calls and related status codes for a specific logical database.
- "Data Language/I Test Program—DFSDDLT0" on page 257 is used to test DL/I calls against a given database.[a]
- "COMPARE Statement SNAPs" on page 257 discusses the COMPARE statement SNAP and the output from SNAP calls. [a]
- "SNAPs on Exceptional Conditions" on page 258 discusses SNAPs on exceptional conditions.[a]
- "DL/I Call Image Capture" on page 259 discusses the DL/I call image capture service aid that traces database application activity and generates DL/I test program control statements to simulate that activity.
- "DL/I Analysis" on page 260 discusses a technique for approaching DL/I analysis in a batch environment.
- "Locating Database-Related Traces" on page 264 discusses locating database related traces.
- "DL/I Trace" on page 265 provides a description of the DL/I record formats.
- "Retrieve Trace" on page 302 discusses the Retrieve trace that records the control flow between the retrieve module and other database routines.
- "Program Isolation-Related Problem Analysis" on page 312 discusses program isolation-related problem analysis.
- "Log Analysis (Database Related)" on page 313 discusses IMS log record analysis.
- "Sequential Buffering Service Aids" on page 317 discusses diagnostic tools that are of use when you receive a message or abend that indicates a problem with Sequential Buffering.
- "GSAM Control Block Dump—DFSZD510" on page 320 discusses GSAM control blocks dump. [a]

Note: [a] In a Database Control (DBCTL) environment, this information applies only to Batch Message Processing (BMP) programs, not Coordinator Controller (CCTL) programs.

The Job Control Block (JCB) Trace

The job control block (JCB) trace is one of most useful diagnosis tools for any application problem that may occur. It is an easy way to determine the last five calls that were issued, and what their return codes were.

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 much easier to resolve.

The JCB trace is always on (you don't need to do anything explicit to turn it on), and it 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 (see the "Code" column of Table 49 on page 256). 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 at the time of the abend; this is sometimes useful in determining what had been

going on 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.

Related Reading: The DL/I status codes and return codes are defined in the topic titled "DL/I Codes" in *IMS Version 9: Messages and Codes, Volume 1*.

If one of the 2-byte fields in the JCB trace contains X'0000', this means that no call was made.

Example: 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'.

The following topics provide additional information:

- "Sample JCB Trace"
- "JCB Trace Call Function Codes"

Sample JCB Trace

A sample JCB dump is shown in Figure 90.

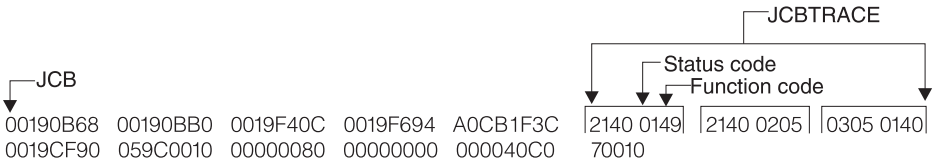


Figure 90. Example of a Job Control Block (JCB) Dump

JCB Trace Call Function Codes

The DL/I user call encoded functions are contained in DFSDLA00, at label FUNCSTRT. They are listed in Table 49.

Table 49. 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

Table 49. DL/I User Call Encoded Functions (continued)

Code	Call	Code	Call
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
60	DEQ		

DL/I status codes and return codes are defined in *IMS Version 9: Application Programming: Database Manager*.

Data Language/I Test Program—DFSDDLT0

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.

Related Reading: For details on the functions of this program and instructions for using it, refer to the section on testing an application program in *IMS Version 9: Application Programming: Database Manager*.

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 Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis* in order 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 you believe is involved in the problem.

For more information about the `COMPARE` statement `SNAP` option, see *IMS Version 9: Application Programming: Database Manager*.

Some control blocks are always dumped. Others are dumped only when you request them in the SNAP options.

These 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 exit routine, DFSERA30. For information about this utility, see *IMS Version 9: Utilities Reference: System*.

SNAPs on Exceptional Conditions

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. For information about this utility, see *IMS Version 9: Utilities Reference: System*.

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 (see “File Select and Formatting Print Utility” on page 153).

DL/I Call Image Capture

DL/I call image capture (module DFSDLTR0) allows 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 DFSDDLT0.

Related Reading: For information about DFSDDLT0, see *IMS Version 9: Application Programming: Design Guide*.

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.

The following topics provide additional information:

- “Batch Environment” on page 260
- “Online Environment” on page 260
- “How to Retrieve DL/I Call Image Capture Data from the Log Data Set” on page 260

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.

Related Reading: For information about:

- Writing the trace table externally to DASD, a tape data set, or the online log data set (OLDS), see the DFSVSMxx procedure in *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.
- Using a call image capture statement to trace DL/I calls, see *IMS Version 9: Application Programming: Database Manager*.

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
```

Related Reading: For information about:

- The /TRACE command, see *IMS Version 9: Command Reference*.
- Writing the trace table externally to DASD, a tape data set, or the online log data set (OLDS), see "Write Trace Tables Externally" on page 9.
- Allocating the external trace data sets (DFSTRA01 and DFSTRA02) used by the IMS online systems, see *IMS Version 9: Installation Volume 1: Installation Verification*.

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.

Related Reading: For information about the File Select and Formatting Print utility, see *IMS Version 9: Utilities Reference: System*.

DL/I Analysis

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?

IMS Abends

In general, there are two causes of abend dumps:

- 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 being 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 just an abend dump.

Dump Analysis—General

The following represents initial considerations for dump analysis:

Note: In a pseudoabend SVC dump generated by DFSERA20, you can find the failing PST by searching the save areas for the caller of DFSERA20. In the save area flow, DFSERA20 is called INTERA20 and register 1 contains the failing PST address.

- The first request block (RB) on the RB chain represents the IMS batch region controller (DFSRRC00); the second RB on the RB chain represents the batch program controller (DFSPCC30). This module (DFSPCC30) always links to the application program 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 abended, then 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. Other areas used to hold the register contents at abend time are the IMS STAE work area (DFSFSWA0) and the RTM work area in z/OS.
- 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; at abend time, ABDUMP prints the save areas 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.

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

The following sequence of steps describes a method of problem analysis. Not all DL/I abends can be diagnosed using this sequence, but you can use it as a guide to DL/I debugging. All numbers are in hexadecimal.

1. The approaches described below are true 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 262 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. (See also Figure 90 on page 256.)
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, LEVSEGOF 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 LEVSEGOF. 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). (See Figure 41 on page 116 to see how the prefix of a segment is mapped.) 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. (See Figure 130 on page 301.) 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. Figure 41 on page 116 shows the mapping of the prefix of a segment.

Locating Database-Related Traces

The importance of the DL/I-related traces and the information that they convey is discussed in “DL/I Analysis” on page 260. Figure 91 on page 265 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.

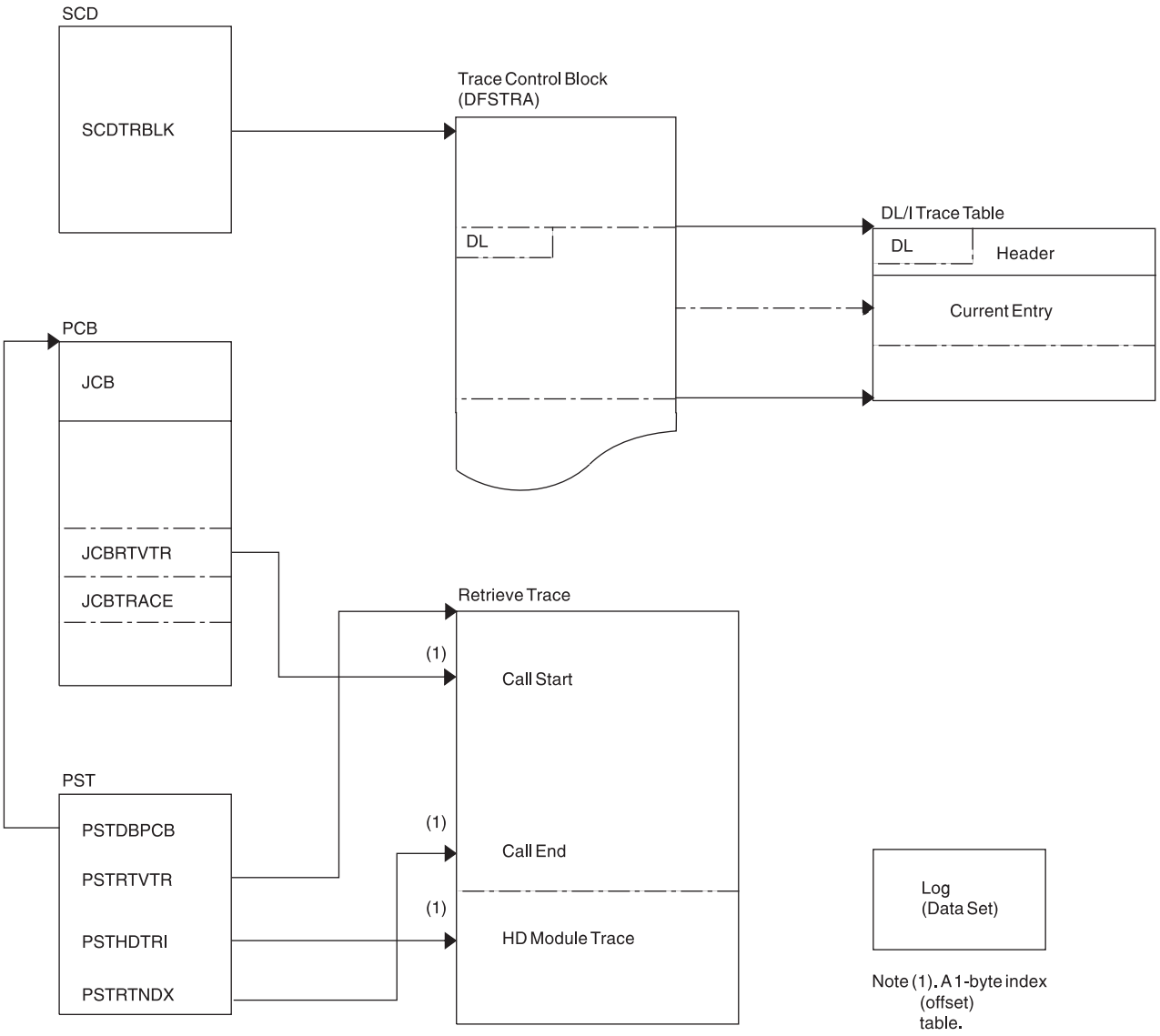


Figure 91. How to Locate the Database Traces

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.

For information about starting and stopping the DL/I trace, writing the trace table to the log, and finding the trace tables in a dump, see “Common Trace Table Interface” on page 191. This section also lists the function codes for the DL/I and lock traces.

Note: IMS always turns on the DL/I and lock trace at initialization. The only exception is for batch where the default for the traces is off. The trace level is set to high and it is written in memory.

Be aware that the DL/I trace and the DL/I Call Image trace are different traces. The DLITRACE statement in IMS.PROCLIB member DFSVSMxx turns on the DL/I Call Image trace, not the DL/I trace.

If the trace was written to the log, you can use either of the following for formatting and processing of the DL/I trace:

- The Knowledge-Based Log Analysis (KBLA) panel interface. For more information, see the section titled "Knowledge-Based Log Analysis" in the *IMS Version 9: Utilities Reference: System*.
- The File Select and Formatting Print utility (DFSERA10) with an exit routine (DFSERA40 or DFSERA60).

The Database Tracking trace entries are described in "X'D4': Database Tracker Trace Entries (D4)" on page 490.

The following topics provide additional information:

- "Using the DL/I Trace"
- "DL/I Trace Formats"
- "DELETE/REPLACE—DL/I Trace Information" on page 301

Using the DL/I Trace

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: 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. Look up the abend code in *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*. This book indicates that the return code is in register 15.
2. Look at register 15 in the dump; it contains a value of X'0D'.

   IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis 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', indicating 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 re-create the problem with DL/I trace 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" (Figure 114 on page 282). This would probably be a good place to start the DL/I trace analysis.

What you learn from the DL/I trace might help you:

- Identify and resolve an application error
- Review APAR descriptions to see if this problem has occurred previously
- Report the problem to IBM

DL/I Trace Formats

The figures in this section show the formats of the most commonly used DL/I trace entries. They 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. The entries that are not described can be obtained by assembling IDLIVSAM TRACENT from IMS.SDFSMAC.

Trace ID	Description of Content of Trace Entry
X'0C'	DL/I OPEN/CLOSE for each data set ("X'0C' Trace Entry" on page 268).

X'31' HD space management: Get space for the segment (“X’31’, X’32’, X’34’, X’B1’, and X’B2’ Trace Entries” on page 268).

X'32' HD space management: Free space for the segment (“X’31’, X’32’, X’34’, X’B1’, and X’B2’ Trace Entries” on page 268).

X'34' HD space management: Get space close to root anchor point (“X’31’, X’32’, X’34’, X’B1’, and X’B2’ Trace Entries” on page 268).

X'60' OSAM I/O initiated trace entry (“X’60’ Trace Entry” on page 269).

X'61' OSAM I/O posted trace entry (“X’61’ Trace Entry” on page 270).

X'62' OSAM trace entry for OPEN/CLOSE/EOV trace entries (“X’62’ Trace Entry” on page 270).

X'69' Sequential Buffering buffer invalidation trace entry (Figure 97 on page 271).

X'6A' Sequential Buffering buffer evaluation trace entry (Figure 98 on page 271).

X'6B' Indicates Sequential Buffering at program termination. (Figure 99 on page 272).

X'6C' Indicates Sequential Buffering refreshing of buffers. (Figure 100 on page 273).

X'6F' Sequential Buffering search by RBA issued by OSAM BH trace entry (Figure 101 on page 273).

X'80' Database authorization request (Figure 102 on page 274).

X'81' Database change authorization request (Figure 102 on page 274).

X'82' Database re-authorization request (Figure 102 on page 274).

X'AA' Analyzer entry (“X’AA’ Trace Entry” on page 274).

X'AB' ABEND U0427 trace entry (Figure 104 on page 275).

X'AC' Database call analyzer entry (DBCTL only) (“X’AC’ Trace Entry” on page 276).

X'B1' HD space management: Get space set by backout or DELETE/REPLACE (“X’31’, X’32’, X’34’, X’B1’, and X’B2’ Trace Entries” on page 268).

X'B2' HD space management: Free space set by backout (“X’31’, X’32’, X’34’, X’B1’, and X’B2’ Trace Entries” on page 268).

X'C4' DELETE/REPLACE (“X’C4’ Trace Entry” on page 276).

X'C6' Special promote lock trace entry. Descriptions available by assembling IDLIVSAM TRACENT.

X'C7' Exclusive control deadlock detection trace entry (with and without IRLM in “X’C7’ Trace Entry Using IRLM” on page 278).

X'C8' Lock request manager entry (DFSLMGR0) (“X’C8’ Trace Entry” on page 278).

X'C9' Lock request manager exit (DFSLMGR0) (“X’C9’ Trace Entry” on page 279).

X'CA' Exclusive control ENQ/DEQ (program isolation) entry (for non-Fast Path and Fast Path, see “X’CA’ Trace Entry” on page 280).

X'CA'- X'08' PI DL/I call trace entry (“X’CA’ through X’08’ Trace Entry” on page 282).

X'CB' PI trace lock elapsed time (“X’CB’ Trace Entry” on page 282).

X'CC' Lock request handler (DFSLRH00) entry (“X’CC’ Trace Entry” on page 283).

X'CF' I/O toleration (DFSTOPR0) entry. Descriptions available by assembling IDLIVSAM TRACENT.

X'D0' IRLM notify sent trace entry (Figure 118 on page 287).

X'D1' IRLM notify received trace entry (Figure 119 on page 288).

| **X'D4'** RSR DTT trace entry. See Table 145 on page 490.

| **X'D9'** HALDB Online Reorganization (OLR) trace entry (“X’D9’ Trace Entry” on page 288).

X'DA' VSAM JRNAD or UPAD exit (“X’DA’ Trace Entry” on page 295).

X'DB'- X'FA' Buffer handler trace (“X’DB’ through X’FA’ Trace Entry” on page 296).

X’0C’ Trace Entry

Figure 92 shows the X'0C' trace entry.

```
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
```

Figure 92. X'0C' Trace Entry

Note to Figure 92: Use the ″Open/Close Function Codes″ section of Table 63 on page 297.

X’31’, X’32’, X’34’, X’B1’, and X’B2’ Trace Entries

Figure 93 on page 269 shows the 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 - PSTRTCDE (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
```

Figure 93. X'31', X'32', X'34', X'B1', and X'B2' Trace Entries

Notes to Figure 93:

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. (Use the FSE chart in the *IMS Version 9: Administration Guide: Database Manager* for an explanation of FSEs.)
4. See Table 69 on page 300 for the module names that correspond to the module IDs.
5. The real storage address of the segment during the time of deletion.
6. 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 following figure shows 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  – DECB address
 word 3 – 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)
```

Figure 94. X'60' trace entry

X’61’ Trace Entry

The following figure shows 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)
```

Figure 95. X'61' trace entry

X’62’ Trace Entry

The following figure shows the X'62' trace entry.

```
TRACE ID   = X'62'

word 0 – byte  1   - X'62' OSAM trace entry for OPEN/CLOSE/EOV
       – 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
```

Figure 96. X'62' trace entry

X’69’ Trace Entry

Figure 97 on page 271 shows 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 - SBPSTTGS - 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
```

Figure 97. X'69' Trace Entry

Note:

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

Figure 98 shows 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
```

Figure 98. X'6A Trace Entry

Note:

1.

C'P' Periodical evaluation

C'E' Early evaluation

2.

C'P' Evaluation is positive

C'N' Evaluation is negative

X'6B' Trace Entry

Figure 99 shows 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
```

Figure 99. X'6B Trace Entry

Note:

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

Figure 100 shows 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
```

Figure 100. X'6C' Trace Entry

Note:

X'80' Global serialization entered (SBH search started).

X'40' Waiting PST was posted.

X’6F’ Trace Entry

Figure 101 shows 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
```

Figure 101. X'6F' Trace Entry

X’80’, X’81’, X’82’ Trace Entries

Figure 102 on page 274 shows the X'80', X'81', and X'82' trace entries.

```
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
```

Figure 102. X'80', X'81', X'82' Trace Entry

X'AA' Trace Entry

Figure 103 shows 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 LEVSEGOF (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 LEVSEGOF (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
```

Figure 103. X'AA' Trace Entry

Notes to Figure 103:

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

Figure 104 on page 275 shows 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
```

Figure 104. X'AB' Trace Entry

Notes to Figure 104:

1. See Table 50 for data set information:

Table 50. 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 Table 51 for caller information:

Table 51. 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.
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 Table 52 for VSAM request option 1:

Table 52. 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 Table 53 for VSAM request option 2:

Table 53. VSAM Request Option

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

Figure 105 shows 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
```

Figure 105. X'AC' Trace Entry

X’C4’ Trace Entry

Figure 106 on page 277 shows 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
```

Figure 106. X'C4' Trace Entry

Notes to Figure 106:

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 Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis* for the various abends. This is ENTRY1 field referred to in the DELETE/REPLACE module.

X'C6' Trace Entry

Figure 107 shows 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)
```

Figure 107. X'C6' Trace Entry

Notes to Figure 107:

1. See Table 54 for special lock or unlock call:

Table 54. Special Lock or Unlock Call

Code (Hex)	Special Lock or Unlock Call	Description
X'08'	PROENQ	Lock call.

Table 54. Special Lock or Unlock Call (continued)

Code (Hex)	Special Lock or Unlock Call	Description
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

Figure 108 shows 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
```

Figure 108. X'C7' Trace Entry (When Not Using the IRLM)

Notes to Figure 108:

1. The entry for the PST number that got the U0777.
2. The addresses of the two conflicting PSTs.
3. The address of the PST that got the U0777.
4. The PSB and DMB name of the cause for the contention.

X'C7' Trace Entry Using IRLM

Figure 109 shows 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
```

Figure 109. X'C7' Trace Entry (When Using the IRLM)

Notes to Figure 109:

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

Figure 110 on page 279 shows the X'C8' trace entry.

```
TRACE ID   = X'C8'

      word 0 – byte 1 - X'C8' - Lock request manager entry (DFSLMGR0)
               byte 2 - PST number
               bytes 3-4 - Trace sequence number
      word 1 – byte 1 - Function - See macro DFLMD 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.  (For a description of IRLM error, return,
                           and reason codes, see IMS Messages and Codes,
                           Volumes 1 and 2.)
               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.
```

Figure 110. X'C8' Trace Entry

Note to Figure 110:
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

Figure 111 on page 280 shows the X'C9' trace entry.

```
TRACE ID   = X'C9'

      word 0 – byte 1 - X'C9' - Lock request manager entry (DFSLMGR0) exit
               byte 2 - PST number
               bytes 3-4 - Trace sequence number
      word 1 – byte 1 - Function - See macro DFLMD 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.  (For a description of IRLM error, return,
                           and reason codes, see IMS Messages and Codes,
                           Volumes 1 and 2.)
               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.
```

Figure 111. X'C9' Trace Entry

Note to Figure 111:
The possible state settings and their meaning:

X'00' Unconditional release

X'02' Read

X'04' Share

X'06' Update

X'08' Exclusive

X’CA’ Trace Entry

Figure 112 on page 281 shows 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 (PRMFNCTN) - 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
```

Figure 112. X'CA' Trace Entry

Notes to Figure 112:

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’ through X’08’ Trace Entry

Figure 113 shows the X'CA' through X'08' trace entry.

```
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 3 - PI time
      word 4 - PST account field for function (count of
               the time of calls)
      word 5 - DL/I call (GNP, ISRT, etc.)
      words 6-7 - Not used
```

Figure 113. X'CA'—X'08' Trace Entry

X’C4’ Trace Entry

Figure 114 shows 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
```

Figure 114. X’CA’ Trace Entry for Fast Path Calls

X’CB’ Trace Entry

Figure 115 shows 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
```

Figure 115. X'CB' Trace Entry

X'CC' Trace Entry

Figure 116 shows 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.  (For a description of IRLM codes, see
               IMS Messages and Codes, Volumes 1 and 2.)
               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
```

Figure 116. X'CC' Trace Entry

Notes to Figure 116:

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. For more information about modules issuing abends, find the abend in *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*.
7. For abends issued by DFSLRH00, this field contains the Lock Request Handler abend subcode. For a description of these subcodes, see *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*.

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 internal IMS error.

Table 55 shows the PSTLRPRM chart (bytes 0 through 3).

Table 55. PSTLRPRM Chart (Bytes 0 through 3)

Byte 0(Hex)	Meaning
11	Get local segment lock
12	Get local data set busy lock

Table 55. PSTLRPRM Chart (Bytes 0 through 3) (continued)

Byte 0(Hex)	Meaning
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	LRHGIRDX new root, LRHRRIDX old root
81	Release alternate local and global root locks
82	Get local segment and local and global buffer update locks
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**

Table 55. PSTLRPRM Chart (Bytes 0 through 3) (continued)

Byte 0(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
06	LRHGQCMX
00	LRHRZIDA, LRHRALLX

X'CF' Trace Entry

Figure 117 shows the X'CF' trace entry.

```
  TRACE ID   = X'CF'

       word 0 – byte 1 - x'CF' - I/O toleration (DFSTOPR0)
                                                  trace entry
                byte 2 - PST number
                bytes 3-4 - Trace sequence number
       word 1 - byte 1 - I/O toleration return code
                - byte 2 - TORFUNC – I/O toleration function
                           code (see note 1)
                - byte 3 - TORFLG1 – I/O toleration flag 1 (see
                           note 2)
                - byte 4 - TORFLG2 – I/O toleration flag 2 (see
                           note 3)
       words 2-3 - EEQEFLCS – EEQE flags
       word 4     - DDIR or DMAC address
       word 5     - RBA or RBN
       word 6     - bytes 1-2 - DMB number
              - byte 3 - DCB number
              - byte 4 - TORWORK+2 when DBRC change of EEQE
       word 7     - EEQE address
```

Figure 117. X'CF' Trace Entry

Note:

1. See Table 56 for I/O toleration function code:

Table 56. I/O Toleration Function Code

Code (Hex)	TORFUNC	Description
X'01'	TORCEQE	Create EEQE.

Table 56. I/O Toleration Function Code (continued)

Code (Hex)	TORFUNC	Description
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.

2. See Table 57 for I/O toleration flag 1:

Table 57. I/O Toleration Flag 1

Code (Hex)	TORFLG1	Description
X'80'	TOR1FP	• If on, Fast Path. • If off, DL/I.
X'40'	TOR1NOT	Creator is notify.
X'20'	TOR1PST	• 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 Table 58 for I/O toleration flag 2:

Table 58. 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

Figure 118 on page 287 shows the X'D0' trace entry.

```
TRACE ID   = X'D0'

      word 0 – byte 1 - x'D0' - IRLM notify sent trace entry
               byte 2 - PST number
               bytes 3-4 - Trace sequence number
      word 1 - byte 1 - Sub-route code
             - bytes 2-3 - DMB number or PID for partition
             - byte  4 - DCB number
```

Format for buffer invalidation or write error notify:

```
      word 2 - RBN/RBA OF BUFFER
      word 3 - Not used
      word 4 - Not used
      word 5 - Not used
      word 6 - bytes 1-3 - Not used
             - byte 4 - NCBFLAG
      word 7 - Not used
```

Format for OSAM data set extend:

```
      word 2 - DCBHIBLK
      word 3 - DCBRLBLK
      word 4 - DCBRBASN
      word 5 - bytes 1-4 - Volume serial number
      word 6 - bytes 1-2 - Volume serial number
             - byte 3 - Not used
             - byte 4 - NCBFLAG
      word 7 - Not used
```

Format for VSAM data set extend:

```
      word 2 - VSILVL – Current VSI level number
      word 3 - VSIHRBA – Current high used RBA
      word 4 - VSIERBA – Current high allocated RBA
      word 5 - VSILVL – Extent VSI level number
      word 6 - VSIHRBA – Extent high used RBA
      word 7 - VSIERBA – Extent high allocated RBA
```

Figure 118. X'D0' Trace Entry

X'D1' Trace Entry

Figure 119 on page 288 shows the X'D1' trace entry.

```
TRACE ID   = X'D1'

      word 0 – byte 1 - x'D1' - IRLM notify received trace entry
               byte 2 - Not used, no PST number
               bytes 3-4 - Trace sequence number
      word 1 - byte 1 - Sub-route code
             - bytes 2-3 - DMB number or PID for partition
             - byte  4 - DCB number
```

Format for buffer invalidation or write error notify:

```
      word 2     - RBN/RBA of buffer
              word 3     - Buffer prefix address
              word 4     - byte 1 - SB Global serialization trace
                                    field (see note below)
                     - byte 2 - Not used
                     - bytes 3-4 - Number of invalidated
                                   buffers
              word 5 - Last invalidated buffer address
              word 6 - bytes 1-3 - Not used
                     - byte 4 - NCBFLAG
              word 7     - Subsystem id
```

Format for OSAM data set extend:

```
      word 2     - DCBHIBLK
              word 3     - DCBRLBLK
              word 4     - DCBRBASN
              word 5 - bytes 1-4 - Volume serial number
              word 6 - bytes 1-2 - Volume serial number
                     - bytes 3 - Not used
                     - byte 4 - NCBFLAG
              word 7     - Subsystem id
```

Format for VSAM data set extend:

```
      word 2     - VSILVL – Current VSI level number
              word 3     - VSIHRBA – Current high used RBA
              word 4     - VSILVL – Extent VSI level number
              word 5 - VSIHRBA – Extent high used RBA
              word 6 - AMP address
              word 7     - Subsystem id
```

Figure 119. X'D1' Trace Entry

Note:

X'80' Global serialization entered (SBH search started)

X'40' Waiting PST was posted.

X'D9' Trace Entry

Most X'D9' trace entries have the following information in the first three words, except for the OLR Command processing (see "X'D9' Trace Entry: OLR Command Processing" on page 294). Figure 120 on page 289 shows words 0-2 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.
```

Figure 120. X'D9' Trace Entry - Words 0 through 2

X'D9' Trace Entry: OLR Output Data Set Validation or Creation and Inactive Data Set Deletion:
Figure 121 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.
```

Figure 121. X'D9' Trace Entry - Words Specific to the Validation or Creation of the OLR Output Data Set and the Deletion of the Inactive Data Set

Notes to Figure 121:

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:

   2990 - 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.
```

Table 59 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 59. Module and Subcode ID for X'D9': Validation or Creation of the OLR Output Data Set and the Deletion of the Inactive Data Set

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

Table 59. Module and Subcode ID for X'D9': Validation or Creation of the OLR Output Data Set and the Deletion of the Inactive Data Set (continued)

Module ID	Module	Subcode	Meaning
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
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

Table 59. Module and Subcode ID for X'D9': Validation or Creation of the OLR Output Data Set and the Deletion of the Inactive Data Set (continued)

Module ID	Module	Subcode	Meaning
B	DFSORA10	X'D1'	Unexpected return code from OBTAIN
B	DFSORA10	X'D2'	Unexpected return code from TRKCALC
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
E	DFSORA40	X'C1'	GETMAIN failure

X'D9' Trace Entry: Fence Value Before an OLR IPOST/IWAIT: Figure 122 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.
```

Figure 122. X'9D' Trace Entry - Words Specific to the Fence Value Before an OLR IPOST/IWAIT

Table 60 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 60. Module and Subcode ID for X'D9': Fence Value Before an OLR IPOST/WAIT

Module ID	Module	Subcode	Meaning
J	DFSORP70	X'01'	IPOST for the OLR I/O fence
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

Table 60. Module and Subcode ID for X'D9': Fence Value Before an OLR IPOST/WAIT (continued)

Module ID	Module	Subcode	Meaning
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: Figure 123 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.
```

Figure 123. X'9D' Trace Entry - Next UOR Determination

X'D9' Trace Entry: OLR Command Processing: Figure 124 shows the X'9D' 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.
```

Figure 124. X'9D' Trace Entry - Words Specific to OLR Command Processing

Note: 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.

Table 61 shows the module ID values in X'D9'trace entries that represent OLR command processing:

Table 61. 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: Figure 125 shows the remaining words of the X'D9' trace entries that are specific to the 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.
```

Figure 125. X'9D' Trace Entry - Words Specific to OLR Start

X'D9' Trace Entry: Start of a UOR: Figure Figure 126 on page 295 shows the remaining words of the X'D9' trace entries that are specific to the start of a 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.
```

Figure 126. X'9D' Trace Entry - Words Specific to Start of UOR

X'D9' Trace Entry: UOR Wait for Timer: Figure Figure 127 shows the X'D9' trace entries that are specific to the 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.
```

Figure 127. X'9D' Trace Entry - Words Specific to UOR Wait for Timer

X'DA' Trace Entry

Figure 128 shows the 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 5 below)
       word 4 bytes 2-4 - AMB address
       word 5 bytes 1-3 - Register 14 from PLH stack
                                          (see notes 1-4 below)
       word 5 byte 4 and word 6 bytes 1-2 - Register 14 from PLH stack
                                          (see notes 1-4 below)
       word 6 bytes 3-4 and word 7 byte 1 - Register 14 from PLH stack
                                          (see notes 1-4 below)
       word 7 - bytes 2-4 - Register 14 from PLH stack
```

Figure 128. X'DA' Trace Entry

Notes to Figure 128:

1. The PLH stack entries are the registers of the last five VSAM record management modules that had control.
2. This information might be valuable to the VSAM support representatives if you need their assistance.
3. The modules are in LPA and are probably not in the dump.
4. An AMBLIST of VSAM module IDA019L1, with OUTPUT=BOTH specified, is needed to determine which CSECTS had control.
5. For an explanation of these codes, see Table 62 on page 296.

Table 62. JRNAD and UPAD Codes for X'DA' Trace Entry

Code	Code (Hex)	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
UPAD	00	Wait requested on I/O or defer
UPAD	04	Post ECB (XMEM only)

X'DB' through X'FA' Trace Entry

Figure 129 shows 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 -
                        See the table entitled "Buffer Handler Function
                        Codes Chart" below.  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 - See the table entitled "Buffer
                        Handler Function Codes Chart" below.  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 (see note 4 below)
               byte 2 - PSTTRMSC - Subcode of the module calling the
                        buffer handler (see note 4 below)
               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 5 below).
      word 5 - PSTBUFFA - Address of buffer header.  OSAM uses IBFTPRF
               DSECT.  VSAM uses IDABUFC DSECT.
      word 6 - PSTISAMW - Work area
      word 7 - PSTBYTNM - Relative byte number of data or
               block number (see note 6 below).
```

Figure 129. X'DB' through X'FA' Trace Entries

Notes to Figure 129 on page 296:

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. See Table 69 on page 300 for the module names which correspond to the module IDs.
5. Shows where the requested data is located in core only if the call completed successfully.
6. 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).

Database Function Codes

PSTFNCTN is located at PST + X'1C4'. The DL/I function codes are shown in the following tables:

- Table 63: Buffer Handler Function Codes
- Table 64 on page 298: Space Management Function Codes
- Table 65 on page 298: Open/Close Function Codes
- Table 66 on page 298: Index Maintenance Function Codes
- Table 67 on page 299: Block Loader Function Codes

Table 63 shows the buffer handler function codes.

Table 63. 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

Table 64 shows the Space Management function codes.

Table 64. 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.

Table 65 shows the Open/Close function codes.

Table 65. 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 PSTDSGA = DSG
20	PSTOCLD	Open for load
21	PSTOCDMA	CLOSE and UNAUTHORIZE DMB address of DDIR in register 2
40	PSTOCDSG	OPEN/CLOSE DSG PSTDSGA = DSG
80	PSTOCBAD	The PSTOCBAD (X'80') is set to indicate to the caller that the requested function failed

Table 66 shows the Index Maintenance function codes.

Table 66. Index Maintenance Function Codes

Code (Hex)	PSTFNCTN	Caller's Request Function
A0	PSTXMDLT	Index maintenance for segment to be deleted

Table 66. Index Maintenance Function Codes (continued)

Code (Hex)	PSTFNCTN	Caller's Request Function
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

Table 67 shows the Block Loader function codes.

Table 67. 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

Table 68 is a chart of the buffer handler return codes.

Table 68. Buffer Handler Return Codes Chart

Return Code		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.
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. The calling module places the

module ID in field PSTTRMID and the subcode in field PSTTRMSC before making the call. The buffer handler and space management then move these PST fields to the appropriate traces. Table 69 identifies the calling module.

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, scan 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 forth.

Table 69. Space Management and 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
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	DFSMMUD0	Space Manager (bit map update)
TIDRCHB0	S	DFSRCHB0	Space Manager (SEARCH block)
TIDRRHM0	S	DFSRRHM0	Space Manager (SEARCH bit map)

Table 69. Space Management and Buffer Handler Module Trace IDs (continued)

ID Label	Module ID	Calling Module	Module Function
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 utility
TIDURDB0	U	DFSURDB0	DB Data Set Recovery utility
TIDURGP0	U	DFSURGP0	REORG/RELOAD, PREFIX update utility
TIDURGS0	U	DFSURGS0	REORG/LOAD, DB scan utility
TIDBACK0	V	DFSBACK0	BATCH backout utility
TIDDVSM0	V	DFSDVSM0	VSAM interface
TIDURRL0	V	DFSURRL0	HISAM REORG/RELOAD utility
TIDURUL0	V	DFSURUL0	HISAM REORG/UNLOAD utility
TIDUCPD0	W	DFSUCPD0	UCF DB ZAP processor utility
TIDUCPE0	W	DFSUCPE0	UCF subroutines utility
TIDUICC0	W	DFSUICC0	Online Image Copy utility
TIDDXMT0	X	DFSDXMT0	Index maintenance
TIDRBOI0	Y	DFSRBOI0	Backout RESTART/DYN/BATCH
TIDRDBC0	Z	DFSRDBC0	Database backout control

Figure 130 shows an example of a DL/I trace. The trace entries show two GHU calls. All calls use PST 01. When activities for different PSTs are intermixed in the trace table, you need to examine only the entries for the PST of interest.

```
 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......*.......&..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......*.......&..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;....
```

Figure 130. Example of a DL/I Trace

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.

A complete description of the trace table entry for Delete/Replace can be obtained by assembling the following lines of code:

```
DSECTS  CSECT
        DFSDLDC FUNC=DSECTS
        END
```

Of great value in the Delete/Replace trace entry is the second word (called Entry1). This word 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 the IBM Support Center.

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 turn on the Retrieve trace, use either of these methods:

- At initialization time, IMS always turns the Retrieve trace on except for batch. The Retrieve trace is turned on automatically. (See *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.)
- 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. (See *IMS Version 9: Command Reference*.)

Note: The Retrieve trace cannot be turned on if the DL/I trace is not active.

To quickly 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. (See Figure 91 on page 265.) The byte at PSTRTNDX contains the offset to the next entry in the table. (See Figure 131 on page 306.)

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.) Table 70 lists the IDs, names, and functions of the various subroutines.

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. For an example of the Retrieve trace, see Figure 131 on page 306.

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: 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 Table 70), which you found in the Retrieve trace table.

Table 70. 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.
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.

Table 70. The Subroutines of the Retrieve Module (DFSDLR00) (continued)

Hex ID	Subroutine Title	Subroutine Description
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.
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.

Table 70. The Subroutines of the Retrieve Module (DFSDLR00) (continued)

Hex ID	Subroutine Title	Subroutine Description
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.

```
                    F O R M A T T E D   R E T R I E V E   T R A C E

            OFFSET  ---FROM---      ---TO ---          OFFSET  ---FROM---      ---TO ---

PSTRTVTR ------>    00  2A THISLVOK    15 POSTCHLD            56  16 POSTME     1A READCUR
                    02  2A THISLVOK    13 MOVEKEY             58  1A READCUR    22 SETL
                    04  31 QUAL        06 FORTHISL            5A  1C READNXT    1A READCUR
                    06  06 FORTHISL    24 SETPVEOC            5C  1A READCUR    22 SETL
                    08  06 FORTHISL    1C READNXT             5E  1E READNXT    19 POSTSDBN
                    0A  1C READNXT     26 SETCHEOC            60  06 FORTHISL   25 SSAEVAL
                    0C  1C READNXT     1A READCUR             62  06 FORTHISL   18 POSTCURP
                    0E  06 FORTHISL    24 SETPVEOC            64  31 QUAL       2A THISLVOK
                    10  24 SETPVEOC    21 SETEOC              66  2A THISLVOK   15 POSTCHLD
                    12  24 SETPVEOC    21 SETEOC              68  2A THISLVOK   13 MOVEKEY
                    14  24 SETPVEOC    21 SETEOC              6A  2A THISLVOK   14 MVSEGUSE
                    16  06 FORTHISL    1C READNXT             6C  06 FORTHISL   24 SFTPVEOC
                    18  1C READNXT     26 SETCHEOC            6E  24 SETPVEOC   21 SETEOC
                    1A  1C READNXT     1A READCUR             70  06 FORTHISL   1C READNXT
                    1C  06 FORTHISL    02 CSILGEXT            72  1C READNXT    26 SETCHEOC
                    1E  F1 INIT        31 QUAL                74  1C READNXT    1A READCUR
                    20  31 QUAL        10 LTW                 76  1A READCUR    22 SETL
                    22  10 LTW         25 SSAEVAL             78  1C READNXT    19 POSTSDBN
                    24  25 SSAEVAL     0E KDTEST              7A  06 FORTHISL   25 SSAEVAL
                    26  10 LTW         14 MVSEGUSE            7C  25 SSAEVAL    0F KDTEST
                    28  14 MVSEGUSE    1A READCUR             7F  06 FORTHISL   18 POSTCURP
                    2A  1A READCUR     22 SETL                80  31 QUAL       2A THISLVOK
                    2C  10 LTW         2D WIPEDN              82  2A THISLVOK   15 POSTCHLD
                    2F  31 QUAL        06 FORTHISL            84  2A THISLVOK   13 MOVEKEY
                    30  06 FORTHISL    24 SETPVECC.           86  2A THISLVOK   14 MVSEGUSE
                    32  24 SETPVEOC.   21 SETEOC.             88  F1 INIT       31 QUAL
                    34  24 SETPVEOC    21 SETEOC              8A  31 QUAL       10 LTW
                    36  24 SETPVEOC    21 SETEOC              8C  10 LTW        26 SETCHEOC
                    38  06 FORTHISL    1C READNXT             8F  10 LTW        2D WIPFDN
                    3A  06 FORTHISL    02 CSIIGEXT            90  10 LTW        1A READCUR
Call start          3C  F1 INIT        31 QUAL                92  1A READCUR    22 SFTL
                    3E  31 QUAL        10 LTW                 94  10 LTW        19 POSTSDBN
                    40  10 LTW         14 MVSEGUSE            96  31 QUAL       18 POSTCURP
                    42  14 MVSEGUSE    1A READCUR             98  31 QUAL       2A THISLVOK
                    44  1A READCUR     22 SETL                9A  2A THISLVOK   15 POSTCHLD
                    46  1C LTW         2D WIPEDN              9C  2A THISLVOK   13 MOVEKEY
                    48  31 QUAL        06 FORTHISL            9F  2A THISLVOK   14 MVSEGUSE
                    4A  06 FORTHISL    24 SETPVEOC            A0  F1 INIT       31 QUAL
                    4C  24 SETPVEOC    21 SETEOC              A2  31 QUAL       10 LTW
                    4E  24 SETPVEOC    21 SETEOC              A4  10 LTW        26 SETCHEOC
                    50  24 SETPVEOC    21 SETEOC              A6  10 LTW        1A READCUR
                    52  06 FORTHISL    1C READNXT             A8  1A READCUR    22 SFTL
                    54  1C READNXT     16 POSTME              AA  10 LTW        19 POSTSDBN

                                                                                 PSTRTNXD 6C

                JCB ------>                                JCBRTVTR ------>
                                    0019CF68 0019OFF0   0019F40C 0019F694 A0CF1F3C 21400140
                214001C5 03C50140 0019OF90 05900010   00000080 00000000 00004000 70016000
                001652A8 0019CF68 001984C0 00000000   00000000 00000000 000017C4 00000000
                00000000 00001704 0019A360 0019A36A   0019CF18 0519EA04 0019F210 00000000
                00000004 00D44001 00280000 00000101   00000C00 012C7FFF 00000000 00000000
                0019F520 0019E52C 0019E4F4 00000000   00000000 00000000 00000000 0019CD60
                00000000 00000000 00000000 00000000   04000000 0019CF90 000027C4 00000000
```

Figure 131. 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.

The following topics provide additional information:

- "Starting the Online Recovery Manager Trace"
- "Format of the Online Recovery Manager Trace"
- "Online Recovery Manager Trace Example" on page 311

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 Interactive Dump Formatter panels. For information about using the Offline Dump Formatter, see "Formatting IMS Dumps Offline" on page 155.

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.

Format of the Online Recovery Manager Trace

Trace Entry: Online Recovery Service Request

A001 The format of A001 is shown in Table 71.

Module: DFSRWM00 - Database Recovery Manager Master ITASK
Explanation: Record cut when AWE request received by DFSRWM00
Trace Subcode: RWM00 Request

Table 71. 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 71. 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

A002 The format of A002 is shown in Table 72.

Module: DFSRWM00 - Database Recovery Manager Master ITASK
Explanation: Record cut when DFSRWM00 completes processing of request
Trace Subcode RWM00 Return

Table 72. 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	Awrwcecb
20	Fixed	4	Awrwcecb->c_ecb
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

A003 The format of A003 is shown in Table 73.

Module: DFSRWM00 - Database Recovery Manager Master ITASK
Explanation: Record cut when DFSRWM00 is terminating
Trace Subcode RWM00 Exit

Table 73. 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	Awrwcecb
20	Fixed	4	Awrwcecb->c_ecb
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

A040 The format of A040 is shown in Table 74.

Module: DFSRWPR0 - Database Recovery Manager Record Receive Processor
Explanation: Record cut when DFSRWPR0 is entered
Trace Subcode RWPR0 Entry

Table 74. Trace Record 3702 - Create Data Set Routine Invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)

Table 74. 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	Rwgb_read_pipe
20	Address	4	Rwgb_read_buffer

Trace Entry: Online Recovery Pipe Received Record

A041 The format of A041 is shown in Table 75.

Module: DFSRWPR0 - Database Recovery Manager Record Receive Processor
Explanation: Record cut when DFSRWPR0 receives record from recovery product
Trace Subcode RWPR0 Record

Table 75. Trace Record 3702 - Create Data Set Routine Invoke DYA

Offset	Type	Length	Description
4	Fixed	2	Requested function(awrwfunc)

Table 75. 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

The following example shows trace output for the Online Recovery Manager trace.

```
OPTION PRINT O=5,V=67FA,EXITR=DFSERA60
END
 FUNCTION        WORD 0    WORD 1    WORD 2    WORD 3    WORD 4    WORD 5    WORD 6    WORD 7
* OR1 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  0EAFA1AA
RWM00 Return    A002984A  00C4B040  00000000  00000000  00000000  040C0000  EF000000  0EAFA1E2
RWM00 Request   A001984B  00BEB040  0B7144D0  00000000  00000000  040C0000  EF000000  0EAFA1F0
RWM00 Return    A002984C  00BEB040  00000000  00000000  00000000  040C0000  EF000000  0EAFA201
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 the IBM Support Center.

The following topics provide additional information:

- "Limiting Locking Resources Used by an Application Program"
- "Program Isolation (PI) Trace" on page 313
- "DL/I Call Image Capture Program" on page 313

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.

The 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 zero and 255. Zero is the default and implies no maximum lock limit.

The number 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.

Restriction: While the LOCKMAX parameter allows you to limit the amount of resources 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.

Choosing a Value for LOCKMAX

To decide what value to use for LOCKMAX, 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.

For a more complete description of the X'37' and X'41' log records, see Table 8 on page 127.

Exceeding the LOCKMAX Value

When the value specified for LOCKMAX is exceeded by an application, 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 value.

For more information about the LOCKMAX parameter and its uses, see *IMS Version 9: Administration Guide: System*.

Program Isolation (PI) Trace

One tool is the program isolation (PI) trace. It 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. For the layout of these trace records, see “DL/I Trace Formats” on page 266.

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. See *IMS Version 9: Utilities Reference: Database and Transaction Manager* for a description of the File Select and Formatting Print utility (DFSERA10).

“Format of X'67' Log Record” on page 151 shows the layout of the X'67' log record. You can also 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.

DL/I Call Image Capture Program

This tool (DFSDLTR0), 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 DFSDDLT0. 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. For details about tracing calls with the DL/I Call Image Capture trace, see “DL/I Call Image Capture” on page 259 or *IMS Version 9: Application Programming: Database Manager*.

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. 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 Table 76 on page 314 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 strip off the header.

Example: An abend is issued against a database. You have used other diagnostic tools to analyze the call. Now you must look at the database itself. Follow these steps when looking at the database:

1. Analyze the buffer to identify what seems to be wrong. (See Figure 132.) 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.

Figure 132 shows the general areas of database analysis: Application, Buffer, Database, Image Copy, and Log.

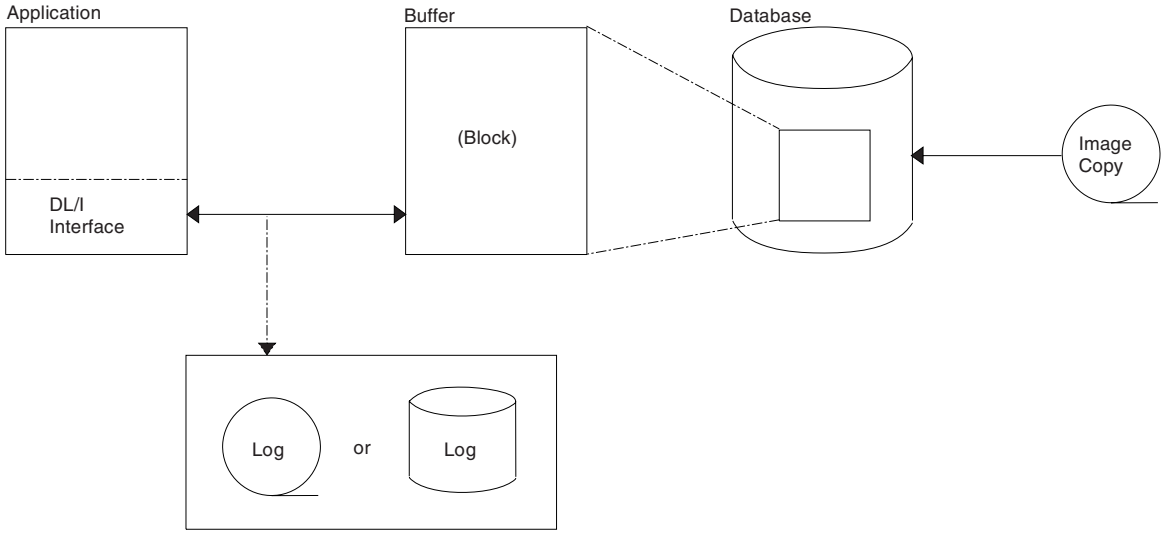


Figure 132. General Areas of Database (DB) Analysis

You can use Table 76 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 76. 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'81' Version 6 or 7 X'82' Version 8 or 9

Table 76. 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' • 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)
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]

Table 76. Database Change Log Record DSECT (continued)

Offset	Field	Length	Description
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
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)			

Table 76. Database Change Log Record DSECT (continued)

Offset	Field	Length	Description
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
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 to you. Some of these tools are useful for diagnosing other IMS database-related problems:

- DL/I trace table entries: “DL/I Trace” on page 265
- Dump formatting of IMS control blocks: “Using Interactive Dump Formatter Menus” on page 180
- SNAPs of IMS control blocks during pseudoabends: “SNAPs on Exceptional Conditions” on page 258

The //DFSSTAT statistics report is also a useful tool for evaluating a potential Sequential Buffering problem. For information about //DFSSTAT, see *IMS Version 9: Utilities Reference: Database and Transaction Manager*.

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.

The following topics provide additional information:

- "SBSNAP Option"
- "SBESNAP Option" on page 319
- "SB IMAGE CAPTURE Option and SB Test Program (DFSSBHD0 Utility)" on page 319
- "SB COMPARE Option" on page 319

SBSNAP Option

Use the SBSNAP option when you receive a message saying that either Sequential Buffering:

- Has been activated when you don't expect it to be
- Has not been activated when you expect it to be activated

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. 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 9: Installation Volume 2: System Definition and Tailoring* 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. For information about this utility, see *IMS Version 9: Utilities Reference: Database and Transaction Manager*.

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=m
```

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 its 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

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. You activate the SBESNAP option by providing a SBESNAP control statement in the //DFSCTL file (see *IMS Version 9: Installation Volume 2: System Definition and Tailoring* for detailed information).

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. For information about this utility, see *IMS Version 9: Utilities Reference: Database and Transaction Manager*.

SB IMAGE CAPTURE Option and SB Test Program (DFSSBHD0 Utility)

The combined use of the SB IMAGE CAPTURE option and of the SB Test program (DFSSBHD0 utility) is useful for:

- Investigations of the SB I/O reference pattern analysis algorithms
- Investigations of the impact of changes to user-specifiable SB parameter values (the BUFSETS parameter value)

The combined use of the SB IMAGE CAPTURE option and the DFSSBHD0 utility allows the same SB buffer handler call sequence (issued during the processing of a specific real-life application with specific real-life DBs) to be run multiple times. Running the same SB buffer handler call sequence multiple times is useful when:

- You need to use the SBSNAP option but do not know exactly 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 (see *IMS Version 9: Installation Volume 2: System Definition and Tailoring* for more information). The SB Test program (DFSSBHD0 utility) is described in the *IMS Version 9: Utilities Reference: Database and Transaction Manager*.

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 9: Installation Volume 2: System Definition and Tailoring* 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. For information about this utility, see *IMS Version 9: Utilities Reference: Database and Transaction Manager*.

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: 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 control blocks that are included in the dump are the:

- 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 control 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.

Figure 133 on page 321 shows an example of a formatted GSAM control block dump, and Figure 134 on page 322 shows an example of an unformatted GSAM control block dump.

The following topics provide additional information:

- "Example of a Formatted GSAM Control Block Dump"
- "Example of an Unformatted GSAM Control Block Dump" on page 322
- "Recovering from Out-of-Space Sx37 Abends on GSAM Data Sets" on page 323

Example of a Formatted GSAM Control Block Dump

In Figure 133 on page 321, key eye catchers are shown in boldface to make these parts of the dump easier for you to find. Each problem is different, but diagnosing almost all GSAM problems will involve at least these key areas of the dump.

```
                                * * * GSAM CONTROL BLOCKS DUMP * * *
07A010 GSAM POINTER TABLE
            GPTCNTLR 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  GPTTRACE 00009DF0
            GPTTYPE        00  GPTWORK  00079800
07A060 GSAM LOAD TABLE
            GLTBSAM  8007B0C0  GLTBUFIO 00000000  GLTCBDMP 8007CCB0  GLTCNTLR 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  GBBLKLEN     0000  GBBLKOH1     0001  GBBLKOH2     FFE0  GBBLKREF 00000401
            GBBLKSI      01C2  GBBQCB   00000000  GBBUFFER 00064CA0  GBBUFFSW       08  GBBUFNO        01
            GBCDISP      0000  GBCHAIN  0007A220  GBCRTNCD     0028  GBCSEVCD       08  GBCTRS       0000
            GBDCBPTR B007A178  GBDDNAME GS37877O  GBDECB   0007A1D4  GBDEVTYP     208E  GBDSORG        81
            GBERRSW        00  GBEXLST  8607BEA2  GBGPTPTR 0007A010  GBGSAMSW       50  GBIOAREA 00093000
            GBLENLEN     0000  GBLRECL      0096  GBMAXTR      BB60  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     BB60  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  DCBCHECK 00C894B0  DCBCIND1       00  DCBCIND2       00
            DCBCNTRL 00D57F48  DCBDDNAM           DCBDEBAD 009D1554  DCBDEN         AD  DCBDEVT        2E
            DCBDSORG     4000  DCBDVTBA   FDBEBC  DCBEOBR  01D57650  DCBEOBW  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
            DCBRECFM       90  DCBREL     2EADA0  DCBRELAD 00000000  DCBRELB  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  40404040   *                               *
    064CE0   40404040  40404040  40404040  40404040  40404040  40404040  40404040  40404040   *                               *
    064D00   40404040  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  40404040   *00010                          *
    064D60   40404040  40404040  40404040  40404040  40404040  40404040  40404040  40404040   *                               *
    064D80   40404040  40404040  40404040  40404040  40404040  40404040  40404040  40404040   *                               *
    064DA0   40404040  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  40404040   *                               *
    064E00   40404040  40404040  40404040  40404040  40404040  40404040  40404040  40404040   *                               *
    064E20   40404040  40404040  40404040  40404040  40404040  40404040  40404040  40404040   *                               *
    064E40   40404040  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  GBBLKLEN     0000  GBBLKOH1     0001  GBBLKOH2     FFE0  GBBLKREF 00000000
            GBBLKSI      01C2  GBBQCB   00000000  GBBUFFER 00000000  GBBUFFSW       00  GBBUFNO        01
            GBCDISP      0000  GBCHAIN  0007A0C0  GBCRTNCD     0000  GBCSEVCD       00  GBCTRS       0000
            GBDCBPTR 8007A2D8  GBDDNAME GS37877O  GBDECB   0007A334  GBDEVTYP     208E  GBDSORG        81
            GBERRSW        00  GBEXLST  00000000  GBGPTPTR 0007A010  GBGSAMSW       00  GBIOAREA 00000000
            GBLENLEN     0000  GBLRECL      0096  GBMAXTR      BB60  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     BB60  GBTRECL      0000
            GBURTNCD           GBVLSQ       0000
```

Figure 133. Formatted GSAM Control Block Dump (Part 1 of 2)

```
07A2D8 DATA CONTROL BLOCK (DCB)
            DCBBFTEK       00  DCBBLKCT 00000000  DCBBLKSI     01C2  DCBBUFCB 00000000  DCBBUFL      01C2
            DCBBUFNO       00  DCBBUFOF       00  DCBCHECK 00000001  DCBCIND1       00  DCBCIND2       00
            DCBCNTRL 00000001  DCBDDNAM GS37877O  DCBDEBAD F8F7F7D6  DCBDEN         00  DCBDEVT        00
            DCBDSORG     4000  DCBDVTBA   000000  DCBEOBR  01000001  DCBEOBW  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
            DCBRECFM       90  DCBREL     000000  DCBRELAD 00000000  DCBRELB  00000000  DCBSTACK       00
            DCBSVCXL 00000001  DCBSYNA    000001  DCBSYNAD 00000001  DCBTIOT      C7E2  DCBTRBAL     0000
            DCBTRTCH       00  DCBWCPL        00  DCBWCPO        00  DCBWRITE 02002424
07A334 DECB
            00000000  00800000  00000000  00000000  00000000  00000000
                                          ***END OF DUMP***
```

Figure 133. Formatted GSAM Control Block Dump (Part 2 of 2)

Example of an Unformatted GSAM Control Block Dump

```
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 BB60BB60 00000000    C7E2F3F7 F8F7F7D6 00000000 00000000   *.............GS37877O........*
0007A140 00000000 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 BB60BB60 00000000    C7E2F3F7 F8F7F7D6 00000000 00000000   *.............GS37877O........*
0007A2A0 00000000 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   *GS37877O..............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 40404040   *..                           *
0007A780 00000000 00000000 00000000 00000000    00000000 00000000 00000000 00000000   *.............................*
0007A7A0 00000000 00000000 00000000 00000000    00000000 00000000 0004D114 00009DF0   *.......................J....0*
0007A7C0 009B6020 00000000 00000000 00093000    0004DD54 00000000 00000000 00029E50   *.............................*
0007A7E0 00000000 00000000 00000000 00000000    C4C4D3E3 F0F1F340 D3D6C1C4 40404040   *.............DDLT013 LOAD    *
0007A800 00000000 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 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   *.............................*
```

Figure 134. Unformatted GSAM Control Block Dump (Part 1 of 2)

```
      LINE 0007A9A0  SAME AS ABOVE
0007A9C0 84000000 00000000 00000000 00000000    00000000 00000000 00000000 00000000   *................................*
0007A9E0 00000000 00000000 00000000 00000000    00000000 0088266F 11173205 02000000   *..........&?.....2.............*
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 00000000 0002CEE6   *............................W*
0007AAA0 00000000 00000000 00000000 0005713F    00057040 00000000 07FC4040 40404040   *..................  .....      *
0007AAC0 00000000 00000000 00000000 00057340    00000000 00057140 00000000 00000000   *..............  ....... ........*
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 08000000    000C0000 00000000 00000000 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 80093000 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....*
0007ACC0 080073E8 00005500 00093000 0004D050    0004D0A8 080073E8 00034100 00000000   *...Y...................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..DFSFLLG0.130.LOGICA*
```

Figure 134. Unformatted GSAM Control Block Dump (Part 2 of 2)

Recovering from Out-of-Space 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 runs out, an Sx37 abend occurs. The proper restart procedure depends on the physical characteristics of the GSAM data set and IMSs method of checkpointing the position in the data set. For information about repositioning GSAM data sets, see the “XRST Call” section in *IMS Version 9: Application Programming: Database Manager*.

When an Sx37 abend occurs, you typically solve the problem by copying the data set and allocating more space for the copy. You can copy the data set with IEBGENER or some other utility that reads and writes logical records. Do not do this for blocked GSAM BSAM DASD data sets if you plan to restart using the copy. You must copy the physical records, not just the logical records. You can use IEBGENER for this, but you must specify different DCB parameters.

You can use the following procedure to recover from an Sx37 abend on a blocked GSAM data set. (A blocked data set has a record format of FB or VB.)

1. Copy the file to a larger data set using IEBGENER, but specify RECFM=U for the record format. You must use RECFM=U for both the input and output data sets. This copies the physical records as they exist. No reblocking is done. The copy must be to a like device type (one 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
2. You must change the RECFM parameter for the copied file back to its original value, FB or VB. You can do this with any program that opens the data set. It is straightforward to do this using IEBGENER. Execute IEBGENER with a SYSUT2 statement referring to the new data set. This DD statement must specify DCB=(RECFM=*xx*), where *xx* is the original GSAM data set record format value. You must also specify DISP=MOD. SYSUT1 must be a dummy data set. This causes IEBGENER to open the data set for output. IEBGENER does not copy any records to the data set, but it will rewrite the DSCB with the updated RECFM value at close time.
3. You can now use the copy to restart the program from a checkpoint.

If the GSAM data set resides on SMS-managed volumes, you can use the following procedure:

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.

Chapter 9. DC—Data Communication Service Aids

This section describes diagnostic aids and techniques used during data communication problem analysis. It does not apply to a Database Control (DBCTL) environment. Included are:

- "Terminal Communication Task Trace" discusses the terminal communication task trace, which shows the last few communications analyzer and device-dependent module interactions.
- "DC Trace" on page 327 discusses the data communication (DC) trace, which accumulates a history of device and line activity on the IMS log data set.
- "Diagnosing Problems in the Queue Control Facility/Message Requeuer" on page 341 discusses the problem diagnosis in the Queue Control Facility/Message Requeuer.
- "Diagnosing Message Routing Problems" on page 348 discusses diagnosis of message routing problems.
- "IMS Transaction Trace" on page 358 discusses the IMS Transaction trace, which is useful in analyzing problems associated with IMS and the application program.
- "Receive-Any Buffer Analysis" on page 361 discusses a procedure to help you determine if any receive-any buffers are left.
- "Finding the Active Save Set" on page 363 discusses a procedure to help you find the active save set.
- "IMS-VTAM Interface" on page 363 provides a description of the IMS-VTAM interface.
- "IBM 3270 Error Recovery Analysis" on page 363 discusses IBM 3270 error recovery analysis.
- "Message Format Service Normal BTAM Path" on page 364 discusses Message Format Service normal logic flow for BTAM activity.
- "Message Format Service Module Traces" on page 370 discusses Message Format Service module traces.
- "Tracing Errors in Module DFSCNXA0" on page 371 discusses tracing errors in module DFSCNXA0.
- "IDC0 Trace Table Entries" on page 378 discusses IDC0 trace table entries.
- "APPC/IMS Diagnostic Aids" on page 381 discusses the APPC/IMS diagnostic aids.
- "OTMA Diagnostic Aids" on page 399 discusses diagnostic information to help you analyze problems in OTMA.
- "Diagnosing Errors Related to Print Data Set Options: IMS Spool API Support" on page 405 discusses diagnosis of errors related to print data set options.

Terminal Communication Task Trace

When you experience a hung output device (such as a terminal, line, or node), 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 (DDMs), by using register 0 of the communication analyzer's save area. (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 it uses the low-order 2 bytes to trace the DDM entry point.

In the DC portion 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.

The following topics provide additional information:

Entry Points

The following list identifies the analyzer entry points. Look at the content of register 0 (for module DFSICIO0); the high-order 2 bytes of register 0 identify the analyzer 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 GET NEXT to message queue.

5 Perform a logical write operation to the terminal.

6 WRITE successful; dequeue message or call DDM 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 LTERM.

C Idle the line.

The low-order 2 bytes of register 0 identifies 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 (DFSCOFC0) was entered.

Trace Records

The entries in the first 2 bytes indicate what processing the analyzer (DFSICIO0) has performed. The entries in the last 2 bytes indicate what processing the DDMs have performed. 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 DDM activity.

Figure 135 shows the format of a sample terminal communications task trace record.

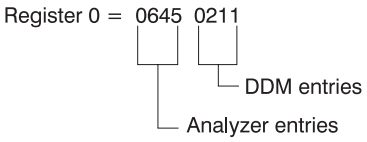


Figure 135. Example of a Terminal Communication Task Trace Entry

The sample terminal communication task trace entry in Figure 135 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 Table 77.

Table 77. Example Processing Flow for a Terminal Communication Task Trace Entry

Entry Point	Trace ID	Processing Description
2	DDM2	A write interrupt occurred.
6	A06	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 EOM was detected. Setup for the write operation was completed.
5	A05	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 (described in “Trace Records” on page 326). 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).

| The following topics provide additional information:

Starting the Trace

To start the DC trace for any terminal in the IMS network, enter one of the following /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 BTAM terminals:

  ```
  /TRACE SET ON LINE 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
  ```

- For an XRF environment:

  ```
  /TRACE SET ON NODE xxx TAKEOVER

  /TRACE SET ON LINE xxx TAKEOVER

  /TRACE SET ON LINK xxx TAKEOVER
  ```

  Note:

  - The `/TRACE SET ON NODE xxx 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, MSC links, and BTAM lines during takeover.
  - The /TRACE SET OFF NODE *xxx* TAKEOVER, /TRACE SET OFF LINE *xxx* TAKEOVER, or /TRACE SET OFF LINK *xxx* TAKEOVER command turns off the trace anytime before takeover.

For a detailed description of the `/TRACE` command, see *IMS Version 9: Command Reference*.

Stopping the Trace

To stop the DC trace, enter one of the following commands from the master terminal or the z/OS console.

- For VTAM terminals:

  ```
  /TRACE SET OFF NODE P1
  ```

- For BTAM terminals:

  ```
  /TRACE SET OFF LINE 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
```

- For an XRF environment:

```
/TRACE SET OFF NODE xxx TAKEOVER

/TRACE SET OFF LINE xxx TAKEOVER

/TRACE SET OFF LINK xxx TAKEOVER
```

Printing the Trace Records

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 either of the following methods:

- **Knowledge-Based Log Analysis (KBLA)**

  The KBLA Basic Record Formatting and Print Module (DFSKBLA3) creates log record header information that describes what the log record identifier represents, the time stamp at which the record was written, and allows the interpretation of the trace entries without using Table 78 on page 331.

  For a high level view of the trace events flow, you can use the KBLA Summary Record Formatting Module (DFSKBLA8) to print only the header descriptions of the entries (no data).

  For more information, see the “KBLA Log Formatting Modules” section in *IMS Version 9: Utilities Reference: System*.

- **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=xxxxxxxx,C=E,E=DFSERA30
```

  where xxxxxxxx = terminal (node) name

  Be aware that a trace record might span several X'6701' log records. If you use the OPTIONS statements above, only the first log record is printed.

  For complete instructions on running the File Select and Formatting Print utility (DFSERA10), see *IMS Version 9: Utilities Reference: System*.

Content of the Trace Records

You can evaluate DC trace records when doing any of the following activities:

- 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):[4]

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	DDM SDC read for output
CIO3	DDM conditional SDC “wash” 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 activity (DDM)
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

4. An asterisk (*) in this list is a wildcard character, meaning that any character can replace the asterisk.

MTRP Block verification error

SDC1 DDM SDC output read error

SDC2 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.

Table 78 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 78. DC Trace Records

Trace ID	Function	Traced by	When Traced or /TRACE Option	What Is Traced
A01	Process input. [1]	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CXB, CRB, CIB, CCB, QBUF, IOBUF, INPCNTS, OUTCNTS, EMHB [2]
A02	Do read. [1]	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CXB, CRB, IOBUF, EMHB [2]
A03	What is next.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CRB, CTT
A04	Get Next segment.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CNT
A05	Do write. [1]	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CXB, CRB, CCB, IOBUF, EMHB [2]
A06	After good write.	DFSICIO0 [9]	ALL, DDM	IOB, CTB, CLB, CXB, CRB, CCB
A07	After bad write. [1]	DFSICIO0 [9]	ALL, DDM	IOB, CTB, CLB, CRB, CCB, IOBUF, EMHB [2]
A08	Cancel message, do not DEQ.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CRB
A09	Generate system message. [1]	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CRB, MFS
A10	Quiesce without stopping.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CRB, CCB
A11	Retrieve last DEQD message.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CNT, CRB

Table 78. DC Trace Records (continued)

Trace ID	Function	Traced by	When Traced or /TRACE Option	What Is Traced
A12	Wait for ASYNC I/O or output ENQ.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CRB, CCB, IOBUF, EMHB [2]
AER1	Access method error.	DFSICIO0 [9]	Always	CTB, CLB, CNT, QBUF, SALL, CTT, PCB
AER2	Access method error. [3, 1]	DFSICIO0 [9]	Always	IOB, CTB, CLB, CNT, CXB, CRB, CIB, CCB, QBUF, IOBUF, SALL, CTT, PCB, EMHB [2]
C00	Get queue buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C01	Reposition queue buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C02	Get Next.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C03	DEQ output.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C04	Place output back in queue.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C05	Find output.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C06	Get new output message or QMGR call.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C07	Free input buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C08	Get output buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C09	User output edit.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C10	Call queue MGR.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C11	Get DDM work buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C12	Free DDM work buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
C13	Free receive-any buffer.	DFSICIO0 [9]	ALL, MFS	CTB, CNT, CIB, SALL
CIO2	DDM SDC read output	DFSCIO20	ALL DDM	copy ctl blk list from CVCT entry
CIO3	DDM SDC 'wash' 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 If ITASK is a PST: PST, MSGPRFX, SMB, MSNB
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 [9]	ALL, DDM	CTB, CLB, CNT, CRB, CIB, IOBUF, EMHB [2]
CRTU	Output User Creation exit routine failure.	DFSCRTU0	Always	See notes[10]
CVCT	VTAM TRACE/ABORT. [1]	DFSCVCT0	ALL, DDM	CTB, CLB, CNT, CRB, IOBUF, CTT, INPCNTS, EMHB [2]
CVCV	XRF class 2 takeover. [1]	DFSCVCV0	Always	CLB, CTB, CTT, LLB, LTB, LXB, LU6WA, CNT, CRB, SPQB, CTC, MSNB, EMHB, IOBUF, DDM
D01	Write setup.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CNT, CRB, CIB, QBUF, S25
D02	Write interrupt. [1]	DFSICIO0 [9]	ALL, DDM	IOB, CTB, CLB, CRB, IOBUF, S25, EMHB [2]

Table 78. DC Trace Records (continued)

Trace ID	Function	Traced by	When Traced or /TRACE Option	What Is Traced
D03	Read setup.	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CNT, CRB
D04	Read interrupt. [1]	DFSICIO0 [9]	ALL, DDM	IOB, CTB, CLB, CRB, IOBUF, S25, EMHB [2]
D05	Cleanup.	DFSICIO0 [9]	ALL, DDM	IOB, CTB, CLB, CNT, CXB, CRB, CIB, CCB, MFS, QBUF, IOBUF, SALL, EMHB [2]
D07	LOGON. [1]	DFSICIO0 [9]	ALL, DDM	CTB, CLB, CNT, CRB
DD6M	Output build (MFS).	DFSCOFC0	ALL, DDM	CTB, CLB, CNT, CRB, CIB, SEG, MFS, IOBUF, S25, EMHB [2]
DD6S	Output build (Non-MFS).	DFSCOFC0	ALL, DDM	CTB, CLB, CNT, CRB, CIB, IOBUF, S25, EMHB [2]
DD8	Prepare for output.	DFSCOFC0	ALL, DDM	CTB, CLB, CNT, CRB, CIB, IOBUF, S25, EMHB [2]
DDM1	Write set up through COFC.	DFSCOFC0	ALL, DDM	CTB, CLB, CNT, CRB, CIB, MFS, IOBUF, S25, EMHB [2]
FERR	MFS block fetch error. [3]	DFSCFEO0	Always	CIB, CTT, MFSBPCA, MFSTRACE 4
FES1	Entry to front end switch user exit.	DFSICIO0 [9]		CTB, CLB, CNT, QBUF, S25
FES2	Exit from front end switch user exit.	DFSICIO0 [9]		CTB, CLB, CNT, QBUF, S25
FEXT [5]	Before field edit exit.	DFSCFEI0	MFS	CTB, CIB
FMT1	Return from DFSFEIO or unformatted input.	DFSICIO0 [9]	ALL, MFS	CTB, CLB, CIB, IOBUF, EMHB [2]
FMT2	MFS go to DFSFEIO formatted input.	DFSICIO0 [9]	ALL, MFS	CTB, CLB, CIB, IOBUF, EMHB [2]
FMT3	MFS complete process MSG segment.	DFSICIO0 [9]	ALL, MFS	CTB, CLB, CIB, MFS, QBUF
FMT4	Get next input.	DFSICIO0 [9]	ALL, MFS	CTB, CLB, CIB
FMT6	Clean up resources.	DFSICIO0 [9]	ALL, MFS	CTB, CLB, CIB
HCSW	XRF class 1 takeover. [1]	DFSHCSW0	Always	IOBUF, CNT, CRB, CTT, CTB, CLB
ICLR	Message router.	DFSICLR0	Always	CTB, CLB, CTT, PCB
MTRP [8]	Block verification error.	DFSCFEO0		CLB, CIB, MFS, CTT
MTRP [7]	Block verification error.	DFSCFEI0		CLB, CIB, MFS, CTT
SDC1	DDM SDC read error	DFSCIO20	ALL DDM	copy ctl blk list from CVCT entry
SDC2	DDM SDC reread error	DFSICIO4	ALL DDM	copy ctl blk list from CVCT entry
SEXT [6]	Before segment edit exit.	DFSCFEI0	MFS	CTB, CIB
TRCE	Non-SNA 3270 error.	DFSDN130, DFSDN140, DFSDS060	Always	IOB, CTB, CLB, S25, CTT
VTPO	Rejected posting of ECB.	DFSVTPO0	ALL, DDM	See notes[11]

Table 78. 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” 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 parms, 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 336.
11. The VTPO trace entry is mapped in “Format of 6701 Log Record with VTPO Identifier” on page 337.

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 OR BTAM I/O REQUEST. (LOGICAL READ)

CLB For BTAM, the first 12 words are the BTAM DECB. See BTAM documentation. The BTAM operation type is at offset X'04'. 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 OR BTAM 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

See section “Format of 6701 Log Record with CRTU Identifier” on page 336.

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 BTAM OR VTAM HAS POSTED I/O COMPLETE. (LOGICAL WRITE INTERRUPT)

CLB For BTAM, the first 12 words are the BTAM DECB. See BTAM documentation.

Offset X'00' =
Post code

- X'7F' for BTAM = normal completion
- X'40' for VTAM = normal completion

Other key fields are DECFLAGS and DECERRST. For VTAM, key fields are CLBVFLAG and CLBLOST.

IOB The BTAM IOB contains CCWs and CSW. Refer to *MVS/ESA Data Areas* for the format of the control blocks.

O TP BUF
The output TP buffer may contain sense/status information for remote 3270 if the last BTAM operation was specific poll. For VTAM nodes, the VTAM RPL begins at offset X'08'.

D04 BTAM OR 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

See section “Format of 6701 Log Record with VTPO Identifier” on page 337.

Format of 6701 Log Record with CRTU Identifier

Table 79 provides a map of the formatted CRTU log record.

Table 79. Map of Formatted CRTU Log Record

Offset	Hex Code	Description
+0	H	Length of Buffer
+2	XL5	Internal use
+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 following are the return codes and their meanings.

```
 4   'ENVIRONMENT' INCORRECT (i.e., 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 - DFSPOOL.
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 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. It does log type 6701–CMEA/CMEB records for errors related to other devices, though. The lack of type 6701–CMEA/CMEB records makes debugging for the User Message Control/Error exit routine (DFSCMUX0) difficult. Table 80 shows the VTCB Posting in DFSVTPO0.

Table 80. VTCB Posting in DFSVTPO0

Offset	Hex Code	Description
+0	X	Function code
	X'00'	VTCB is to be posted
	X'04'	VTCB is to be released
	X'08'	Check if ACB can be closed
	X'0C'	Delete a VTCB
	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

Table 80. VTCB Posting in DFSVTPO0 (continued)

Offset	Hex Code	Description
+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'	VTCB 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 VTCB to delete
	X'30'	CINIT rejected by PLU (NSX)
	X'31'	VTAM error (NSX)
	X'40'	Stacked logon procedure failure
+3	X	Posting-rejection subcode[1]
	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 don't 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

Table 80. VTCB Posting in DFSVTPO0 (continued)

Offset	Hex Code	Description
+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

```
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 00000000   * OPN............................*
 02248098 000020   00000000 00000000  C2F0D7F0 F6404040   00000100 022480FC  00000000 00000000   *........B0P06  ................*
 022480B8 000040   00000000 00000000  00010000 00000000   022480FC 80000000  00000000 00000000   *................................*
 022480D8 000060   00000000 00000000  00000000 00040000   00000000 00000000  40000000 00000000   *...................... .......*
 022480F8 000080   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                     SAME AS ABOVE
INP CNTS
 0003614C 000000   00000000 00000000  00000000 00000000   00000000 00820084  00000000 C2F0D7F0   *.....................B.D....B0P0*
 0003616C 000020   F6404040 00000001  022480FC 000371F0   FFFF0909 00000000  00000000            *6   ...........0............    *
NEXT CNT
 000371F0 000000   00000000 00000000  00000000 00000000   00000000 00820084  00000000 D4E3D6D4   *.....................B.D....MTOM*
 00037210 000020   C1E2E340 00000001  022480FC 00000000   FFFF0909 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 00000000   * OPN............................*
 02248098 000020   00000000 00000000  C2F0D7F0 F6404040   00000100 022480FC  00000000 00000000   *........B0P06  ................*
 022480B8 000040   00000000 00000000  00010000 00000000   022480FC 80000000  00000000 00000000   *................................*
 022480D8 000060   00000000 00000000  00000000 00040000   00000000 00000000  40000000 00000000   *...................... .......*
 022480F8 000080   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                     SAME AS ABOVE
CIB
 022481C4 000000   40404040 40404040  00000000 00004040   40404040 00000000  00000000 00000000   *        ......      ............*
 022481E4 000020   00000000 02C70000  00000000 00000000   00004040 40404040  40400000 40404040   *.....G............         ..    *
 02248204 000040   40404040 00004040  40404040 00000000   00000000 00180050  00000000 00000000   *    ..      ............&;.......*
 02248224 000060   40404040 40404040                                                             *                               *
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                                                                       *....                           *
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                     SAME AS ABOVE
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  80800000 44000000   00000000 00000000  00000000 00000000   *...&;..........................*
 02235060 000060   00000000 00000000  80008010 00000000   00000000 00000000  00000000 00000000   *................................*
 02235080 000080   00000000 00440000  D0000040 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 TO 02235160 000160  SAME AS ABOVE
 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                                                             *........                       *
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."......................*
 022480D8 000060   00000000 02235000  00000000 00000000   00000000 00000000  40000000 00000000   *......&;.................. .......*
 022480F8 000080   00000000                                                                       *....                           *
```

Figure 136. Data Communication (DC) Trace Records (Part 1 of 2)

```
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                     SAME AS ABOVE
INP CNTS
 0003614C 000000   00000000 00000000  00000000 00000000   00000000 00820084  00000000 C2F0D7F0   *.....................B.D....B0P0*
 0003616C 000020   F6404040 00000001  022480FC 000371F0   FFFF0909 00000000  00000000            *6   ...........0............    *
NEXT CNT
 000371F0 000000   00000000 00000000  00000000 00000000   00000000 00820084  00000000 D4E3D6D4   *.....................B.D....MTOM*
 00037210 000020   C1E2E340 00000001  022480FC 00000000   FFFF0909 00000000  00000000            *AST .......................    *
```

Figure 136. Data Communication (DC) Trace Records (Part 2 of 2)

Diagnosing Problems in the Queue Control Facility/Message Requeuer

The queue control facility (QCF)/message requeuer (MRQ) processor module (DFSQMRQ0), which is part of the IMS Transaction Manager (TM) component, provides diagnostics for diagnosing errors while running the IMS Queue Control Facility (QCF) licensed program (5697-099). Although problems can be diagnosed separately in the QCF product using SCRAPLOG records and in the IMS queue control facility processor module using 6701-MRQE diagnostic records, QCF and the queue control facility processor work together to allow inserting/loading, querying, recovering, deleting/unloading, recovering, or viewing messages on the IMS message queue data sets and shared message queue structures. Therefore, this section describes the QCF licensed program and its associated SCRAPLOG diagnostic records, as well as the IMS queue control facility processor module and its associated 6701-MRQE diagnostic records.

In this section, information concerning SCRAPLOG records applies to SCRAPSEL and SCRAPCAN records, as well. The SCRAPSEL, SCRAPCAN, and SCRAPLOG data sets are generated by the IQCSELCT, IQCCANCL, and IQCINSRT modules of QCF, respectively. These data sets are identical in both format and function.

The diagnostics described in this section can help you if you are experiencing problems with a message being processed.

- QCF functions are designed to help you do:
  - Message queue recovery when it is desirable to return messages to the IMS queue for reprocessing
  - Application recovery when it is desirable 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 (nonshared queue environment).
- An ISPF front end lets you select QCF functions and selection criteria to:
  - 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)

| The following topics provide additional information:

| • "The Query Control Facility Interface" on page 342
| • "Using SCRAPLOG Diagnostic Records" on page 343
| • "Using 6701-MRQE Diagnostic Records" on page 345

| • "Obtaining Diagnostics in Addition to SCRAPLOG and 6701-MRQE" on page 347
| • "How to Tell When Messages Have Been Successfully Requeued" on page 348

The Query Control Facility Interface

Figure 137 details the IMS Query Control Facility (QCF 1.2) Interface to IMS. The figure is explained in the paragraphs that follow.

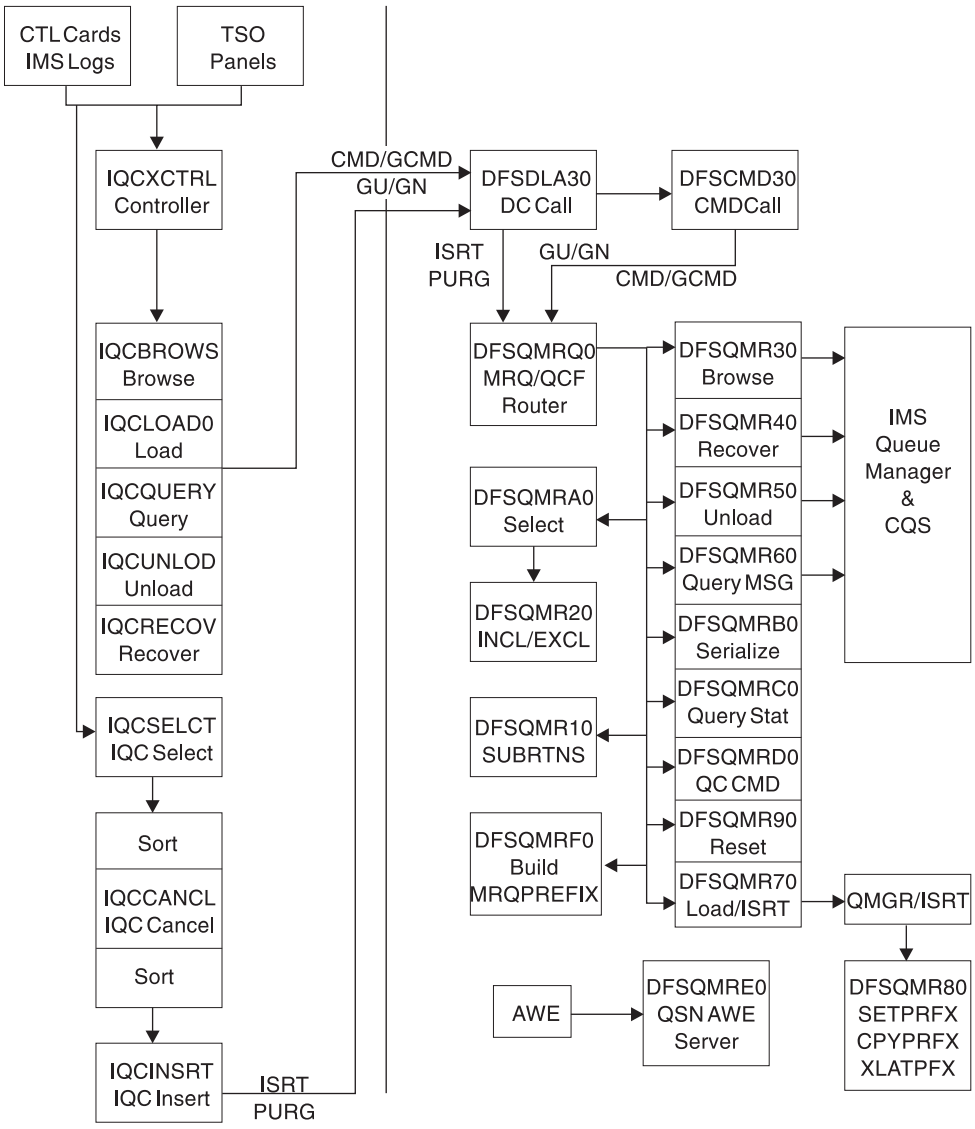


Figure 137. Query Control Facility Interface to IMS

The QCF functions (Figure 137) can be invoked with either user control card input, or a TSO/ISPF interface. The functions are Browse, Query, Load/Insert, Queue Overflow Protection, Recover, and Unload.

The functions are processed by function routines within QCF, and passed to corresponding function routines in IMS through a BMP application program interface (API). GCMD calls are used to invoke the function, and the messages, query, and status data is exchanged through GCMD, ISRT/PURGE, and GU/GN calls.

The IMS QCF function routines interface with the IMS Queue Manager and Common Queue Server (CQS) routines.

By using the standard AIB interface, errors detected are recorded with a QCF AIB return code = 000000F0, a unique AIBREASN code for each error, a TPCBSTAT code of MR, and a 6701-MRQE log record is written to the IMS online log data set (OLDS). The AIBREASN codes are printed in the reports (Browse, Query, Load, Recover, and Unload). They are documented in the DFSMRAEQ macro.

After the error is reported and logged, QCF and IMS skip to the next message, function, or terminate the BMP, depending on the error. The QCF IMS 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 QCF (Trace control card), or within IMS by issuing the /TRACE SET ON PROGRAM MRQPSB. The QCF trace sends output to the QCFPRINT DD data set. The IMS trace logs type 6701 records to the OLDS.

Related Reading: See the *IMS Queue Control Facility for z/OS, User's Guide* for more details about the DFSMRAEQ macro and AIB error codes. For details on 6701-MRQE diagnostic records, see "Using 6701-MRQE Diagnostic Records" on page 345.

Using SCRAPLOG Diagnostic Records

As part of your diagnosis process for problems with the Queue Control Facility/Message Requeuer, you use SCRAPLOG records. This section provides the following details:

- An explanation of SCRAPLOG records
- A sample record
- Information about which key fields are of special interest
- Instructions for printing SCRAPLOG records

By analyzing SCRAPLOG records, you can sometimes determine that an LTERM (to which messages were to be requeued) doesn't exist. In this case, you can fix the problem and rerun the job so the messages are requeued.

SCRAPLOG Records

The SCRAPLOG record consists of a 320-byte (hexadecimal 140) QCF prefix mapped by DFSMRQPR, followed by the actual message being inserted. The actual message is either a 4002 record (that is, a message from a DUMPQ or SNAPQ checkpoint) or a 01 (input) or 03 (output) message record. IMS Messages mapped by QLOGMSGP macro.

Sample QCF record from scraplog data set

The following record (Figure 138 on page 344) represents a message scrapped by QCF/IMS and written to the scraplog data set. The first X'140' bytes is the QCF prefix, mapped by the DFSMRQPF macro. Offset X'88' into DFSMRQPF is the AIBREASN code = 00001084 = message is non-recoverable (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.

```
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   *VS1 ........A.....MR...0...D....*
 000000A0 0000A0   E3D9C1D5 F3F1C2F0  40404040 40404040   00000000 00000000  D8C3C6E5 F1D9F240   *TRAN31B0        ........QCFV1R2 *
 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   FDFFFFFF 0C027700  E3D9C1D5 F3F1C2F0   00000000 00000000  40404040 40404040   *........TRAN31B0........       *
 000001C0 0001C0   00108600 0264FC00  00000000 00000000   011E8700 00C2D588  8000D600 C9D4E2D5   *..F..............G..BNH..O.IMSN*
 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 86A3A781  B0B7A415 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.              *
 000002E0 0002E0   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 FDFFFFFF   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 MESSAG*
 00000440 000440   C540E3D6 40E3D9C1  D5F3F1C2 F0404040   40B6AB6C 0E26E5DF  01000000 00000001   *E TO TRAN31B0    ..%..V.........*
 00000460 000460   E5                                                                          *V                               *
```

Figure 138. QCF Prefix Mapped by DFSMRQPF

Key Fields of SCRAPLOG Records and Their Offsets

Table 81 shows some key fields of the QCF records and their offsets.

Table 81. Key Fields in DFSMRQPF

Offset	Label	Length	Value	Description
04	MSGMRQID	08	$QCFMSG	Prefix ID (First char = 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

Table 82. Key Fields in Message (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

Figure 139 shows sample JCL that you can use to print SCRAPLOG records. You use these SCRAPLOG records to help diagnose problems with the Queue Control Facility (QCF)/Message Requeuer (MRQ).

```
//SCRAPPRT  JOB
//*  PRINT IQCSELCT SCRAPSEL
//JOBLIB  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
/*
```

Figure 139. Sample JCL for Printing SCRAPLOG Records

You need to use your SCRAPLOG records in combination with 6701-MRQE records to effectively diagnose QCF problems.

Using 6701-MRQE Diagnostic Records

This section provides the following details about 6701-MRQE diagnostic records:

- An explanation of 6701-MRQE diagnostic records
- A sample record
- Sample JCL for printing a record
- Control blocks logged at time of error and their mapping macros
- Some key fields to look for when diagnosing using 6701-MRQE records
- Some normal and abnormal errors associated with 6701-MRQE records

6701-MRQE Diagnostic Records

An IMS error detected while QCF is requeuing messages results in the logging of a 6701-MRQE diagnostic record. The message being requeued is then discarded (written to the SCRAPLOG), and the QCF BMP (IQCINSRT) proceeds on 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). For a list and explanations of AIBREASN codes, see the *IMS Queue Control Facility for z/OS User's Guide (SC26-9685)* and macro DFSMRAEQ.

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. See *IMS Queue Control Facility for z/OS User's Guide (SC26-9685)* for an explanation of these reports.

Sample JCL for Printing the 6701-MRQE Diagnostic Records

Figure 140 shows the sample JCL for printing 6701-MRQE records.

```
//LOGPRNT   JOB
//JOBLIB  DD DISP=SHR,DSN=IMS610.RESLIB
//IMSLOG0 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
/*
```

Figure 140. Sample JCL for Printing 6701-MRQE Records

Control Blocks Logged at Time of Error (and Their Mapping Macros)

The 6701-MRQE diagnostic record contains the control blocks and data areas shown in Table 83 which are logged if they are available at the time of the error.

Table 83. Control Blocks and Data Areas Logged at Time of Error for 6701-MRQE Records

Block	Description	Mapping Macro
AIB	Application Interface Block	DFSAIB
	AIBRETRN, AIBREASN codes	DFSMRAEQ
CMDMSGP	Command Call Buffer for Browse, Load, QSN, Query, Recover, or Unload command	DFSMRQCW (OCO)
DFSSQQRY	Query buffer	CQSQRYQT
I/O AREA	Input/Output Area	QLOGMSGP
MRQCMDWK	Command Call Buffer for Browse, Load, QSN, Query, Recover, or Unload command	DFSMRQCW (OCO)
MRQPREFX	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 Control Block	IDLI TPCBBASE=0,CALLER=IMS
PST/EOB	Partition Specification Table	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 SMBBASE=0 (CNT/LNB or SMB) DSECT for QAB/TIB not provided
REG14-12	Registers 14 thru 12	No DSECT
WORKMSG	Work Message Buffer	QLOGMSGP

Normal Errors and Their AIBREASN Codes

Some errors might be 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.

For a list and explanations of other AIBREASN codes, see *IMS Queue Control Facility for z/OS User's Guide (SC26-9685)*.

Abnormal Errors That Can Be Expected

Some errors are not normal but can be expected. An example is when the source or destination name is not found, an error which could occur if the system had been re-GENed and the resource name was deleted. In any case, it is important to determine the AIBREASN code, destination name, and other characteristics of the message to determine whether or not the error can be expected.

Obtaining Diagnostics in Addition to SCRAPLOG and 6701-MRQE

There might be times when the 6701-MRQE diagnostic records and the SCRAPLOG records combined do not provide diagnostic detail adequate to diagnose the problem efficiently. In this case, 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.

`/TRACE SET ON` *pgmname* causes the logging of additional 6701-MRQB records when the QCF BMP is processing. 6701-MRQB diagnostic records are almost identical to 6701-MRQE records, with the exception of MRQB appearing where MRQE normally does. You can use these records to obtain additional diagnostic detail. The *pgmname* value is the default QCF PSBNAME. This value might have been overridden on the MSGQUEUE MRQPSBN= parameter at system generation. To determine if your installation has overridden the name, either consult with your IMS systems 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.

Related Reading: For additional information on the `/TRACE` command, see *IMS Version 9: Command Reference*.

The records 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. See "IMS Transaction Trace" on page 358 for more information and a sample of the LA3A and LA3B records.

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.

How to Tell When Messages Have Been Successfully Requeued

Messages that are successfully requeued 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 with the exception of the following:

MSGCFLG3=MSGC3MRQ (that is, Message + 19 = 45) is set to indicate that this message was requeued 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/MSC systems when the message is sent across the MSC link.)

Figure 141 shows an input transaction to TRANCODE = TRAN31V0 from LTERM = IMSUS02 that was requeued by QCF.

```
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........DFSMO2  *
 00000080 000080   00108600 014E7C00  00000000 00000000   00168800 C9D4E2E4  E2F0F240 40404040   *..F..+@...........H.IMSUS02     *
 000000A0 0000A0   40404040 E4000018  89000000 0000B6AB   6CBCC4EA CD030000  00000000 00000018   *    U...I.......%.D.............*
 000000C0 0000C0   8A002001 304F2301  19573676 032D0000   80000000 00000068  8B000000 00000000   *.....|.........................*
 000000E0 0000E0   00000000 00000000  00800000 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   08100000 00000000  00000000 00000000   *    ..............................*
 000001C0 0001C0   00000000 00000000  00000000 00000010   0301E3D9 C1D5F3F1  E5F040C8 C94BB7BD   *.................TRAN31V0 HI...*
 000001E0 0001E0   992FE30F C9610000  00000000 021B                                               *R.T.I/........                 *
```

Figure 141. Sample Log Record Showing Successfully Requeued Message

Diagnosing Message Routing Problems

In version 7, the user message routing exits DFSCMTR0, DFSNPRT0, DFSCMLR0/DFSCMLR1, and DFSCMPR0 were used to route or control message processing in a Transaction Manager (TM) or TM/Multiple Systems Coupling (MSC) environment. For releases after version 7, these user exits were consolidated into one single user exit, DFSMSCE0. DFSMSCE0 has considerably more routing capabilities.

There are several traces, messages, and information fields in the message prefix area that can be used to diagnose message routing problems in the user exits and in IMS. This information is discussed below.

The following topics provide additional information:

- "DFS070 UNABLE TO ROUTE MESSAGE RSN=xxyy"
- "Using the DFSMSCE0 Routing Exit Trace" on page 354
- "Using the Transaction/Program Trace to Diagnose Routing Errors" on page 357
- "Using the DC LINE/NODE/LINK TRACE to Diagnose Routing Problems" on page 358
- "Using 01/03 Log Record Trace" on page 358

DFS070 UNABLE TO ROUTE MESSAGE RSN=xxyy

Message DFS070 is issued when any one of the following conditions occur:

- IMS attempts to enqueue a message.
- These TM/MSC 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

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
```

Table 84 lists:

- The labels used for the module identifier
- The module identifier
- The module function or name

The labels shown in Table 84 can be used to scan the module source code to locate where the message was issued from.

Table 84. DFS070 Module Identifier Table

LABEL	MODULE IDENTIFIER (decimal)	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 (DFSIINB0)

Table 85 on page 350 lists:

- The label used for the reason code
- The reason code value
- The description of the error

The labels shown in Table 85 on page 350 can be used to scan the module source code to locate where the message was issued from.

Table 85. DFS070 Reason (RSN) Codes Table

LABEL	REASON CODE DEC/HEX	DESCRIPTION
PFXUPRER	02/02	User requested 2 user prefix segments (code 8E). 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).
PFXIPRER	03/03	User requested two Workload router prefix segments (code 8F). 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).
PFTOOBIG	04/04	Prefix buffer length is too large. 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.
GBPFER	05/05	DFSPOOL error on get prefix buffer. 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.
URCERR1	06/06	User exit return code negative. Programmer response: The program routing exit, DFSCMPR0 or the link receive routing exit, DFSCMLR0 returned a negative return code.
URCERR2	07/07	DFSBCB error getting BCB block. Programmer response: The program routing exit (DFSCMPR0) or the link receive routing exit (DFSCMLR0) returned an invalid return code.
GMSBERR	08/08	DFSBCB error getting BCB block. Programmer response: Failure to get storage for the MSEB block through the DFSBCB macro.
LRBADSID	09/09	Bad SYSID detected. 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.
IPFX	10/0A	Queue Manager insert prefix error. 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.

Table 85. DFS070 Reason (RSN) Codes Table (continued)

LABEL	REASON CODE DEC/HEX	DESCRIPTION
MSCEFL1E	15/0F	DFSMSCEC user exit routing flag is in error. 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. 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: 1. 04 the user exit routine specified has not been defined (the address in UXDT is zero) 2. 2) Unable to get an interface block using the DFSBCB macro. DFSBCB return code is in field, MSCEBSSRC in the DFSMSCEB block.
IONAMCHG	18/12	User exit changed the destination name of the I/O PCB message. 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. 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. Refer to the user exit parameter in the 6701-MSCE record to determine which command was requested.
CMDINV	20/14	User exit changed the destination name to a command (such as: `/CMDVERB`). Programmer response: The user exit, DFSMSCE0 changed the destination name to a command. Refer to the user exit parameter in the 6701-MSCE record to determine which command was requested.
SQGINV	21/15	User Link receive exit override MSNAME in segment because destination is not an MSNAME. Programmer response: User exit, DFSMSCE0 in a shared queues group link receive exit failed due to the destination not being an MSNAME.
REGFAIL	22/16	Local shared queue registration (DFSSQIF FUNC=INFRM) failed for the transaction when the user exit requested MSLR2LSQ=1 or MSTR2LSQ=1.
NOTRANCD	23/17	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).

Table 85. DFS070 Reason (RSN) Codes Table (continued)

LABEL	REASON CODE DEC/HEX	DESCRIPTION
DSIDINV	24/18	The Terminal, Link Receive or the Program Routing exit returned an invalid destination SYSID (for example: either field, MSTRDSID, MSLRDSID, or MSPRDSID is invalid).
DMSNINV	25/19	The Terminal, Link Receive, or Program routing exit returned an invalid destination MSNAME (for example: either field, MSTRDMSN, MSLRDMSN, or MSPRDMSN is invalid).
SSIDINV	26/1A	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.
RMT2INV	27/1B	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).
SRC2INV	28/1C	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: • MSC is not available. • Or the source SYSID is not valid because the application program has not issued a get unique (GU). • The application program is a non-message driven BMP.
NDR2INV	29/1D	The Program Routing exit requested a direct routing message be overridden by setting MSPR2NDR=1 however either: • MSC is not available. • This is not a direct routed message with a MSNAME destination. • The overriding name in the front of the I/O area is not valid.
RMT2FSR	30/1E	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.
RSPROUTE	31/1F	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.
INBCHGID	33/21	CHANGEID not supported. 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. Refer to the sample version of the provided user exit DFSMSCE0's use of DFSMSCSV for more information.

Table 85. DFS070 Reason (RSN) Codes Table (continued)

LABEL	REASON CODE DEC/HEX	DESCRIPTION
INBIDLNG	35/23	Character string 'VECTOR' not present. 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. Refer to the sample version of the provided user exit DFSMSCE0's use of DFSMSCSV for more information.
INBNVECT	35/23	Character string 'VECTOR' not present. 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. Refer to the sample version of the user exit DFSMSCE0's use of DFSMSCSVfor more information.
PFXUINVA	36/24	Upon return from the user exit IMS detected that the user prefix at MSCEUPR is invalid. Possible causes are: • Length not in range of 5 to 512 bytes. • Address of prefix is invalid. Must be address obtained by IMS or within HIOP pool. • Length has been changed (MSCEBUPRL). • Address of user exit prefix has changed (MSCEBUPR). • Prefix code not 8E. The programmer may need to turn on the DFSMSCE0 trace to trace the fields, MSCEBUPR and MSCEBUPRL within the DFSMSCEB block.
PFXIINVA	37/25	Upon return from the user exit, IMS detected the Workload Router prefix at MSCEIPR is invalid. Programmer response: • Length not in range of 5 to 512 bytes. • Address of prefix is invalid. Must be address obtained by IMS or within HIOP pool. • Length has been changed (MSCEBIPRL). • Address of workload router prefix has changed (MSCEBIPR). • Prefix code is not 8F. The programmer may need to turn on the DFSMSCE0 trace to trace the fields, MSCEBIPR and MSCEBIPRL within the DFSMSCEB block.
EXIOVLAY	38/26	User exit overlaid the 512 byte user work area buffer. Programmer response: The user exit, DFSMSCE0 appears to have overlaid the 512 byte workarea. 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. Refer to the user exit DFSMSCEB in the 6701-MSCE record to help determine the overlay.

Table 85. DFS070 Reason (RSN) Codes Table (continued)

LABEL	REASON CODE DEC/HEX	DESCRIPTION
EXBOVLAY	39/27	User exit overlaid the MSEB BCB block name (Overlay Check). 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. Refer to the user exit parameter in the 6701-MSCE record to help determine the overlay.
EXPOVLAY	40/28	User exit overlaid the parameter list (Overlay Check). 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. Refer to the user exit parameter in the 6701-MSCE record to help determine the overlay.

Codes 41 thru 52, shown in Table 86, apply to the `/FORMAT` command.

Table 86. DFS070 Reason (RSN) Codes Table for the /FORMAT Command

LABEL	REASON CODE DEC/HEX	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.

Using the DFSMSCE0 Routing Exit Trace

The DFSMSCE0 TM/MSC 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 trace can be activated individually for each exit entry point that processes a message routing 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

This trace is very useful for diagnosing problems in the user exit and in IMS.

The /DISPLAY TRACE EXIT Command

Use the /DISPLAY TRACE EXIT command to display the DFSMSCE0 trace status.

To display the DFSMSCE0 trace status, issue the following /DISPLAY 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 the DFSMSCE0 trace, issue one of the following /TRACE commands.

```
/TRACE SET (ON|OFF) EXIT (DFSMSCE0) (ALL|TRBT|TRVT|TR62|
                                     TROT|LRTR|LRLT|LRIN|
                                     LRDI|PRCH|PRIS)
```

Note: Any combination of TRBT, TRVT, TR62, TROT, LRTR, LRLT, LRIN, LRDI, PRCH, and PRIS is valid.

DFS081 Trace Exit Command Unsuccessful RSN=xxyy Message

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.

The 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
```

Table 87 on page 356 lists:

- The label used for the module identifier
- The identifier
- The module function or name

The labels shown in Table 87 on page 356 can be used to scan the module source code to locate where the message was issued from.

Table 87. DFS081 Module Identifier Table

LABEL	MODULE IDENTIFIER (decimal)	FUNCTION (MODULE NAME)
ICLN	01	Trace Command Processor (DFSICLN0)

Table 88 lists:

- The label used for the reason code
- The reason code value
- The description of the error

The labels shown in Table 88 can be used to scan the module source code to locate where the message was issued from.

Table 88. DFS081 Reason (RSN) Codes Table

LABEL	REASON CODE DEC/HEX	DESCRIPTION
EXTIKW	01/01	Invalid keyword for trace exit.
EXTIPT	02/02	Invalid parameter type for trace exit command.
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.

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

Note: To assist in diagnosing DFSMSCE0 exit problems, the MSCEB block will maintain the following information:

- 8 bytes EYECATCHER 'DFSMSCEB'
- 4 bytes Routing exit type:
  TRTB|TRVT|TR62|TROT|LRTR|LRLT|LRIN|LRDI|PRCH|PRIS
- 4 bytes Address of ECB
- 4 bytes Address of interface block
- 4 bytes Address of DFSMSCE0 exit parameter list

Using the Transaction/Program Trace to Diagnose Routing Errors

The transaction 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 I/O TPPCB or an alternate TPPCB). If the DFSCMPR0 routing exit is being used, DFSDLA30 receives control for every CHNG call to an alternate modifiable TPPCB. The DFSMSCE0 routing exit can be tailored to receive control for the first ISRT call of each new message to a 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 will trace 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, enter this command:

| `/TRACE SET ON PROGRAM` *program_name*

| Refer to "IMS Transaction Trace" on page 358 for samples of the 6701-LA3A/LA3b records and the
| DFSMSCE0 6701-MSEA/MSEB records.

Note: For program routing exit (DFSMSCE0) call errors, TPPCB status, AIBRETRN, and AIBREASN codes are set. For DFSCMPR0, only TPCB status (A1) code is set.

TPCB STATUS, AIBRETRN, and AIBREASN Codes for DFSDLA30 Routing Errors

TPCB STATUS, AIBRETRN, and AIBREASN codes for DFSDLA30 routing errors are as follows:

```
TPCBSTAT AIBRETRN AIBREASN       COMMENTS

A1       00000104 MSERQINV(0560) EXIT ROUTE REQUEST INVALID (DFSCMPR0/DFSMSCE0)

A1       00000104 MSEREJA1(0564) EXIT REJECTED CALL WITH A1 STATUS
                                 (DFSCMPR0/DFSMSCE0)

A1       00000104 MSER3303(0568) EXIT REJECT CALL WITH U3303
                                 ABEND (DFSCMPR0/DFSMSCE0)

A4       00000104 MSEREJA4(056C) EXIT REJECT CALL WITH A4 SECURITY
                                 ERROR (DFSMSCE0)

E1       00000104 MSEREJE1(0570) EXIT REJECT CALL WITH E1 USER
                                 STATUS (DFSMSCE0)
```

```
E2       00000104 MSEREJE2(0574) EXIT REJECT CALL WITH E2 USER
                                 status (DFSMSCE0)

E3       00000104 MSEREJE3(0578) EXIT REJECT CALL WITH E3 USER
                                 STATUS (DFSMSCE0)

QH OR XF 00000104 MSEDIRRO(057C) EXIT DIRRECT ROUTE OVERRIDE ERROR
                                 (DFSCMPR0/DFSMSCE0)
```

Using the DC LINE/NODE/LINK TRACE to Diagnose Routing Problems

The DC trace traces: line, node, and MSC link activity. It can be used in conjunction with (or without) 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, then IMS will log 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 (DFSICIO0) 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

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 the user exit routines called and the user options requested by the varies user exits. 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 (DFSDLA30).

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, enter:

```
/TRACE SET ON TRAN transaction name
```

To trace the DL/I portion of data communication for a specific program, enter:

```
/TRACE SET ON PROGRAM program name
```

Content of the Trace Records

DFSDLA30 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

Figure 142 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   *B   ..................DWTOR    *
 0271B0C4 000040   12004040 0093014F  0745063F 00000006   40404040 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. ........        ._.........*
 0271B0A0 000040   C9D6D7C3 C2404040  00000000 00000000   00000000 00000000  0271B084 E6E3D6D9   *IOPCB   ..................DWTOR*
 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 02825000   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 00000000   00000001 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   02707540 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 028225A8  00000000 00000000   *....................B.Y........*
 0271B424 0003C4   00000000 00000000  026DE040 00004B00   000E15E6 00196FF2  00000000 00000000   *.........._. .......W..?2........*
 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 0271B6D8  8297C424 02C45B80   *BPFQ.E..BPF............QBPD..D$.*
 0271B6A4 000644   00000004 02707540  0000000C 0271B084   02825000 02707554  02707598 829B891C   *.......  .......D.B&;.......QB.I.*
```

Figure 142. IMS Transaction Trace Records (Part 1 of 2)

```
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 82999D60  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 0299BAEC   000E3E8D 00003E8D  0299AD60 000E3E8D   *...Q....BR...R...........R.-....*
 0271B744 0006E4   00000000 00000410  0271B068 8299A28A   00C19E00 0271B060  00C19000 00C53D20   *............BRS..A.....-.A...E..*
 0271B764 000704   82999D60 00000000  0271B720 0271B7B0   8299B341 0299BAEC  00C53D20 027BED10   *BR.-............BR...R...E...#..*
 0271B784 000724   0299AD60 00C53D20  00000000 02707540   0272E594 829B891C  0272E078 0271B060   *.R.-.E........ ..VMB.I........-*
 0271B7A4 000744   00C19000 00C53D20  82999D60 00000000   0271B768 0271B7F8  8299BD25 829CE580   *.A...E..BR.-...........8BR..B.V.*
 0271B7C4 000764   00C53D20 027BED10  027BED10 00000024   00000004 02707540  0272E594 829B891C   *.E...#...#.............. ..VMB.I.*
 0271B7E4 000784   0272E078 0271B060  00C19000 00C53D20   0299BC2C 00000000  0271B7B0 0271B840   *.......-.A...E...R.............. *
 0271B804 0007A4   8299BF17 829CA578  00C53D20 027BED10   027BED10 00000028  0272E604 02707588   *BR..B.V..E...#...#........W....H*
 0271B824 0007C4   02707550 0271BC48  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   0299BC2C 0271B600  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  829A1ACB 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  8011566B 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   8011566B 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  8011566B 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                                                                       *....                           *
```

Figure 142. IMS Transaction Trace Records (Part 2 of 2)

Receive-Any Buffer Analysis

While talking with Level 1 or 2 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 (both shown below) 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 Interface

The IMS IPCS dump formatter provides a panel driven interface to perform analysis. Using this interface, choose the “RECANY” selection in the EDA/TM (Enhanced Dump Analysis/Transaction Manager) option, shown in Figure 143 on page 362, 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 143. IPCS Dump Formatter EDA/TM Option

Manual procedure

1. Find the address of the first RECANY buffer.
   - SCD+X'91C' = pointer to the first RECANY buffer (SCDRECPT)
   - SCD+X'920' = size of each RECANY buffer (SCDRCSIZ)
   - 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.

- CLB+X'00'-> Event Control Block (ECB) (4 bytes)
- CLB+X'20'-> VTAM CID of the session (CLBCID) (4 bytes)
- CLB+X'24'-> QE for queued receive-any buffers (CLBQE) (4 bytes)
- CLB+X'30' = Flag bytes (CLBFLAG1) (4 bytes)
- CLB+X'68'-> Input buffer (CLBINBUF) (4 bytes)
- CLB+X'6C'-> Output buffer (CLBOUTBF) (4 bytes)
- CLB+X'70' = QE for responses (CLBQERES) (4 bytes)
- CLB+X'74' = Flag bytes (CLBVFLAG) (4 bytes)

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 below in Figure 144. The registers in this save set are the registers 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
```

Figure 144. Example of Save Area Set

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. See *VTAM Messages and Codes* for a description of the RPL fields.

IBM 3270 Error Recovery Analysis

When the 3270 detects an error, it sends the processor a sense-status message. There are four categories of 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.

BTAM error recovery handles BTAM errors that result in IEA000I messages on the z/OS console. These message indicate a TIME OUT, DATA CHECK, or lost data. Message DFS251I or DFS253I generally follows this message.

All 3270 BTAM device-dependent modules record errors on the log using log record X'6703' and ID=TRCE. The following blocks are logged: CLB, CTB, DCB, DEB, IOB, CTT, I/O buffers (called I TP BUF and O TP BUF), polling or selection list (remote 3270 only, called T-LIST) and FLAGS (CLBTEMP1). “Format of X'67' Log Record” on page 151 lists all log records and illustrates the format of the X'67' log record.

Message Format Service Normal BTAM Path

The diagrams in Figure 145 show the normal path followed in processing an MFS-BTAM request. You can use these diagrams in your trace analysis of the problem.

The diagrams show only the simplest path. No error handling or paging is considered. IDs, such as A03 and D03, are the same as those in “Content of the Trace Records” on page 330.

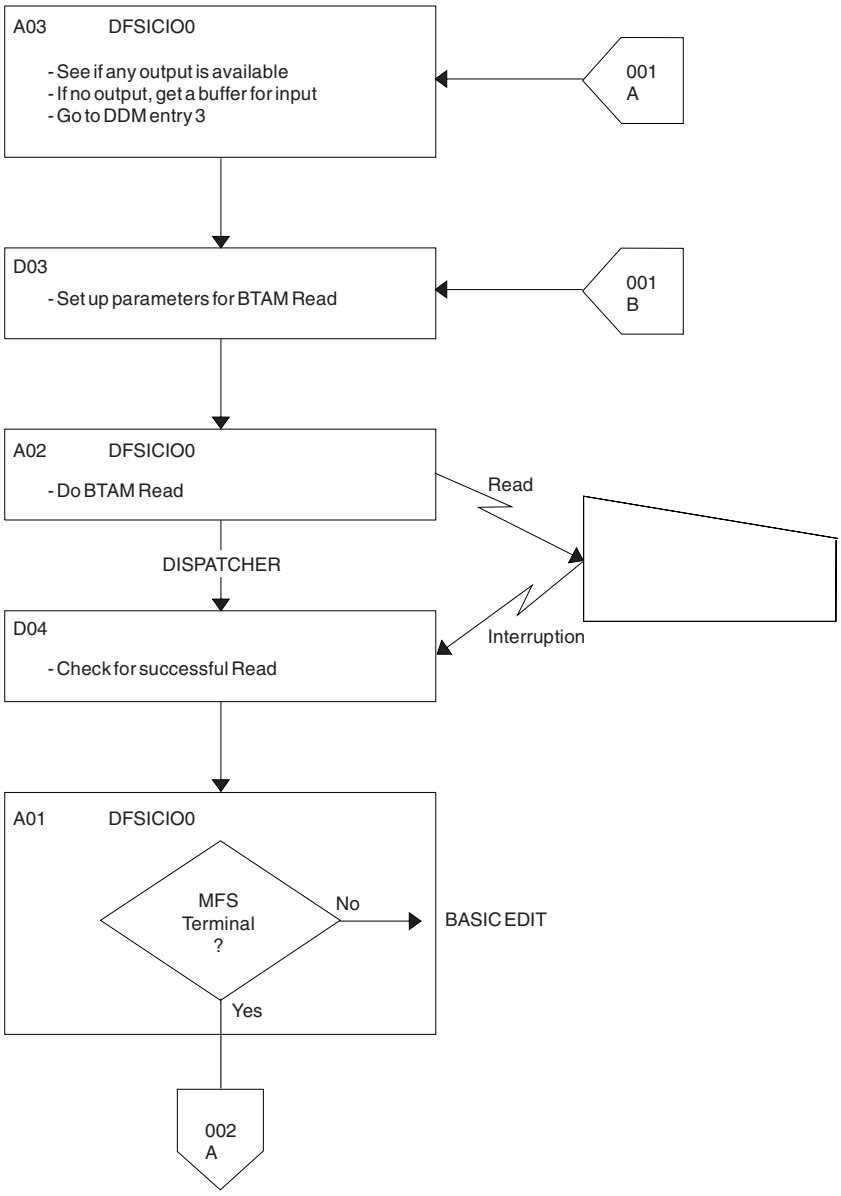


Figure 145. Message Format Service (MFS) Normal BTAM Path (Part 1 of 5)

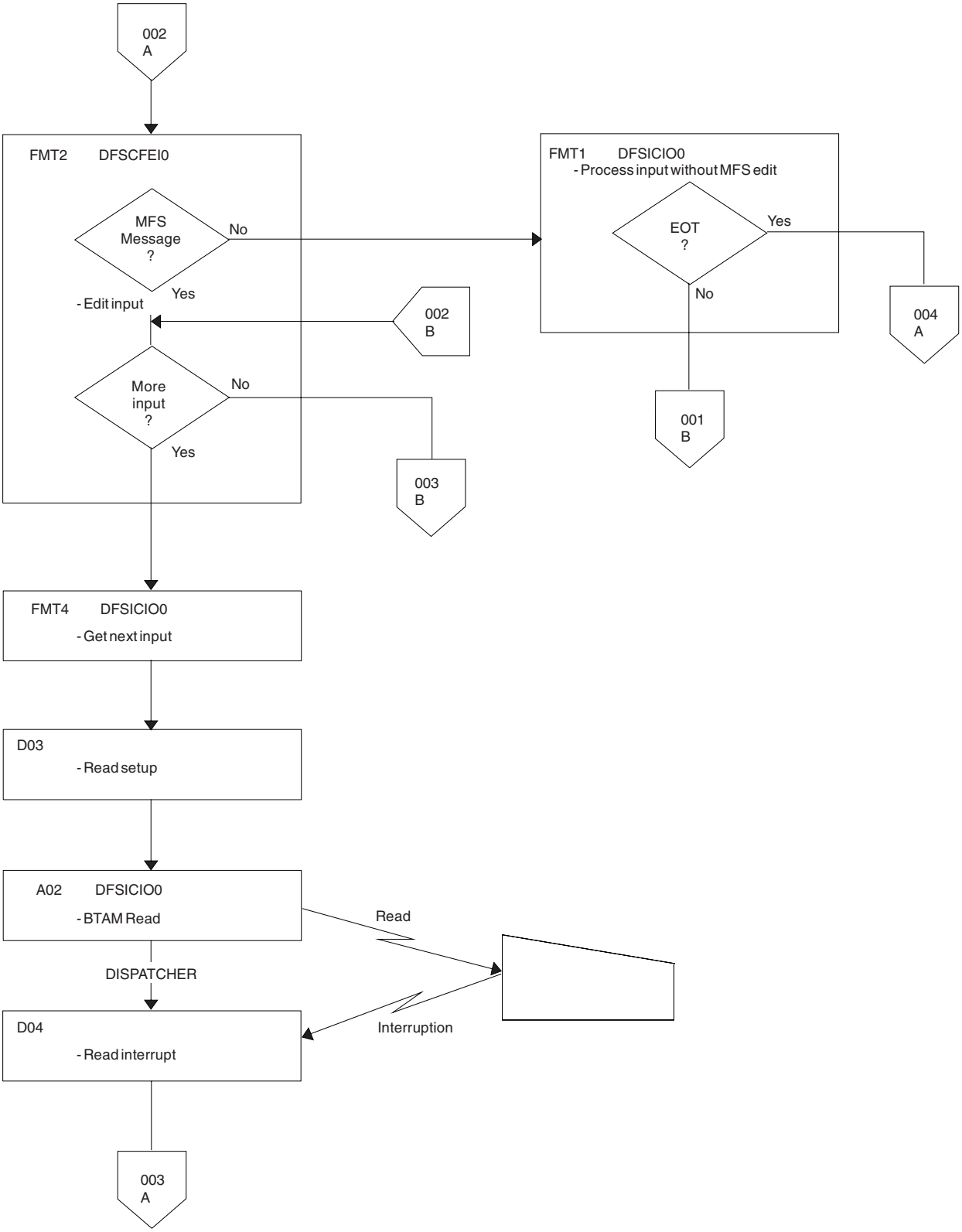


Figure 145. Message Format Service (MFS) Normal BTAM Path (Part 2 of 5)

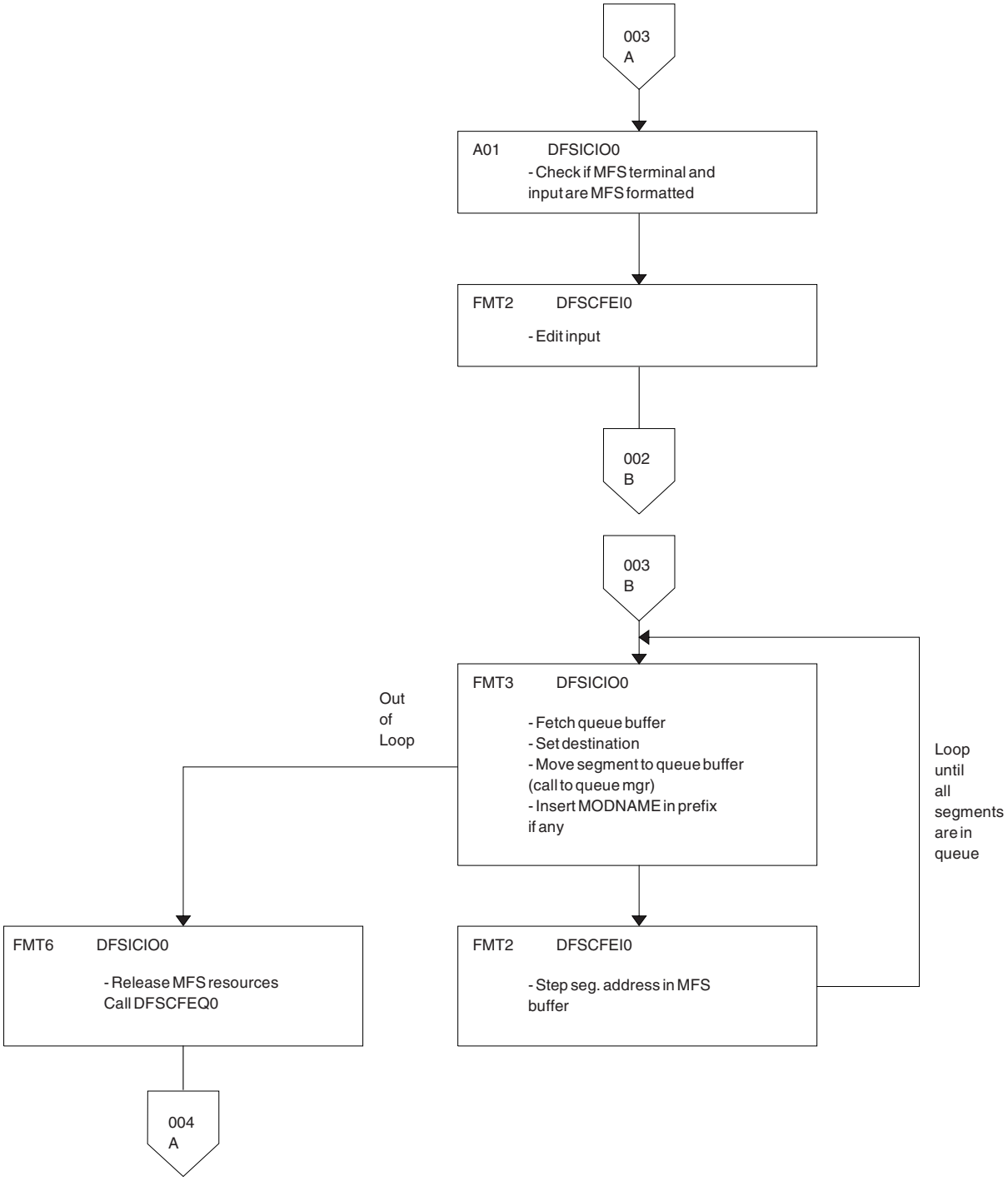


Figure 145. Message Format Service (MFS) Normal BTAM Path (Part 3 of 5)

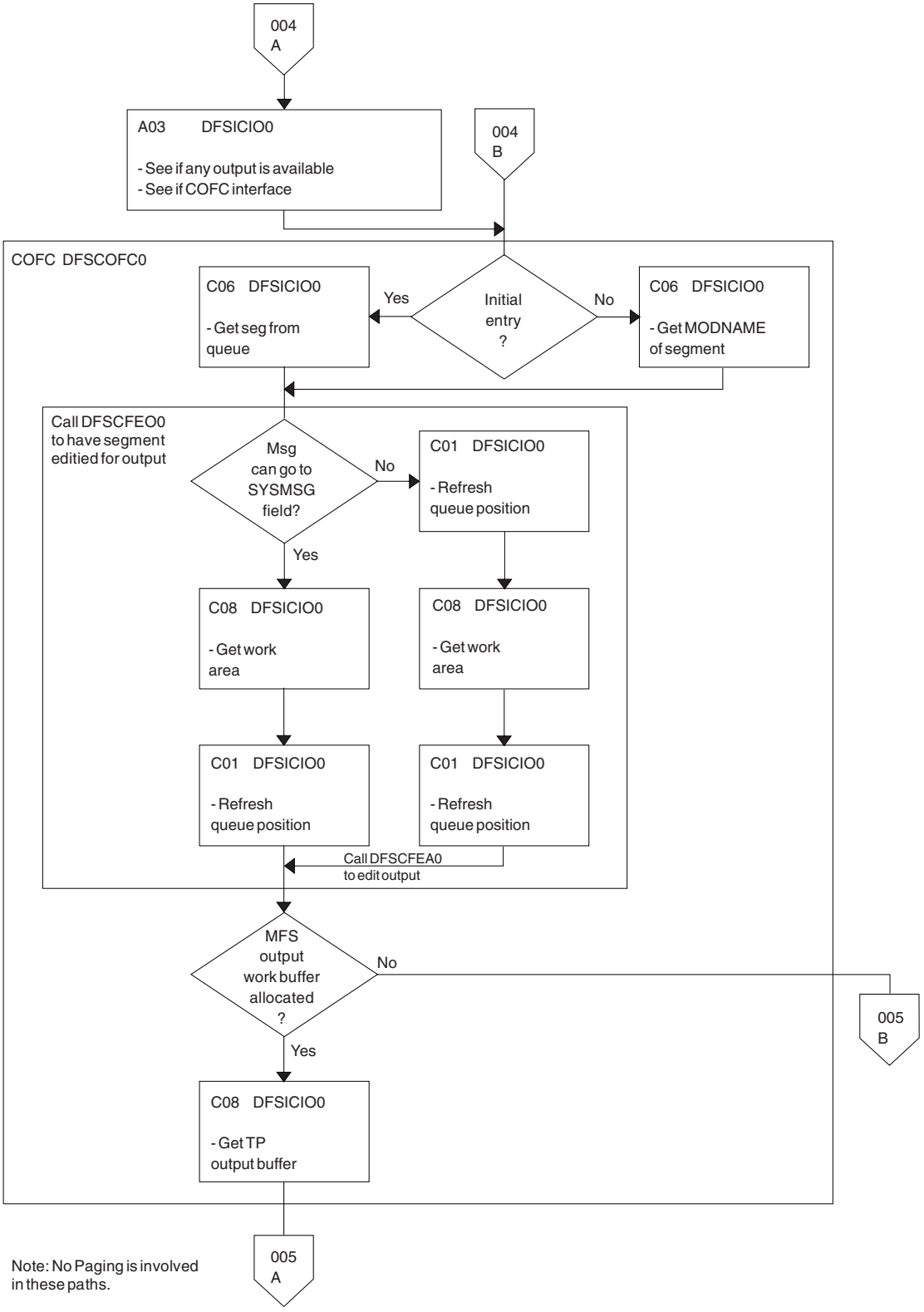


Figure 145. Message Format Service (MFS) Normal BTAM Path (Part 4 of 5)

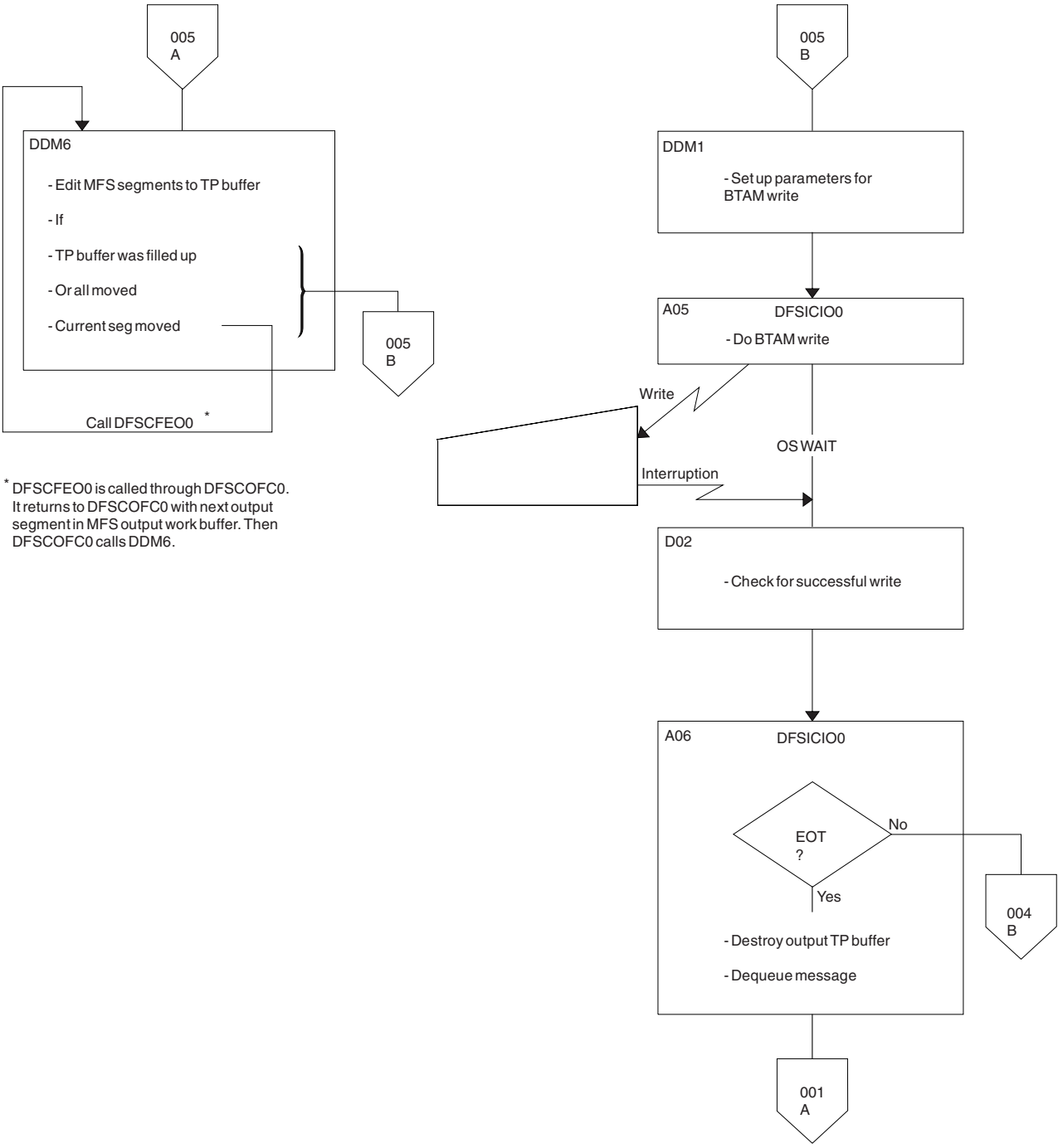


Figure 145. Message Format Service (MFS) Normal BTAM Path (Part 5 of 5)

Diagnosing Message Format Service Problems

For information about starting, stopping, and printing the DC trace, see “DC Trace” on page 327.

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 PTERM is traced. The DDM 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 BTAM OR VTAM I/O REQUEST (NORMALLY A WRITE)

CLB For BTAM

Offset X'04' contains operation type. See BTAM documentation.

Offset X'06' contains the data length.

Offset X'0C' contains the address of the data in the output buffer.

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 processing 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.

Message Format Service Module Traces

The Communications Interface Block (CIB) contains two module traces: CIBSTRAC and CIBTRACE. These are described below.

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. Figure 146 shows the format.

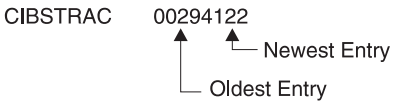


Figure 146. Example of CIBSTRAC Trace

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'), then an extended CIB exists. Figure 147 shows the format.

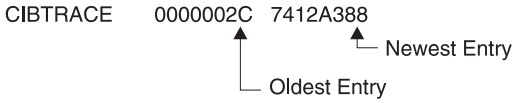


Figure 147. Example of CIBTRACE Trace

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.

The following topics provide additional information:

Location Codes for DFSCNXA0 Error Messages

Message DFS3672I contains the location codes listed in Table 89. The message also identifies the exit routine in which the error occurred.

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 89. Location Codes for DFSCNXA0 Error Messages

Location Code (Dec)	Location Code (Hex)	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.
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.
5	5	N/A	NSXT	IMS APPLID not found in RID 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.

Table 89. Location Codes for DFSCNXA0 Error Messages (continued)

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
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	VTCB not found.
2	2	N/A	RELQ	Terminal defined with NORELRQ option.
3	3	N/A	RELQ	No CID in nonparallel-session VTCB.
4	4	N/A	RELQ	No CID in any parallel-session VTCBs.
1	1	1915	SCIP	No pointer to RPL.
2	2	1917	SCIP	Node not found.
3	3	3862	SCIP	VTCB not found (XRF Alt.).
4	4	3862	SCIP	Invalid temporary VTCB (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.
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 Table 90 deal with ISC processing—either as a result of LOGON or SCIP exits being driven. This is reflected in the DFS3672 message through the appending of 'I' to the exit type.

Table 90. Codes Related to ISC Processing

Location Code (Dec)	Location Code (Hex)	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.

Table 90. Codes Related to ISC Processing (continued)

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
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.
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 Table 91 may occur during ISC BINDRACE processing.

Table 91. Codes Related to ISC BINDRACE Processing

Location Code (Dec)	Location Code (Hex)	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

The codes in Table 92 deal with MSC errors.

Table 92. Codes Related to MSC Errors

Location Code (Dec)	Location Code (Hex)	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 Table 93 deal with MSC SCIP errors.

Table 93. Codes Related to MSC SCIP Errors

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
71	47	N/A	MSC	CID already present.
72	48	N/A	MSC	No USERFLD provided.
73	49	N/A	MSC	RPL not initialized.

Codes Related to Dynamic Logon

The codes in Table 94 deal with dynamic logon errors.

Table 94. Codes Related to Dynamic Logon Errors

Location Code (Dec)	Location Code (Hex)	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.

Table 94. Codes Related to Dynamic Logon Errors (continued)

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
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

The codes in Table 95 deal with existing ISC session errors.

Table 95. Codes Related to Existing ISC Session Errors

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
111	6F	3645	ISC	QSAVE could not be gotten.
112	70	3645	ISC	Parsing failed.
113	71	3645	ISC	Dynamic terminals not allowed.

Codes Related to User-Logon-Exit Routine Processing

The location codes in Table 96 deal with user-logon-exit routineprocessing.

Table 96. Codes Related to User-Logon-Exit Routine Processing

Location Code (Dec)	Location Code (Hex)	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

The codes in Table 97 deal with logon-related errors.

Table 97. Codes Related to Logon Errors

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
141	8D	3645	N/A	Dynamic terminals not allowed.
142	8E	3646	N/A	Inconsistent attributes—see Table 102 on page 378.
143	8F	3646	N/A	Inconsistent attributes—see Table 102 on page 378.
144	90	3645	N/A	Could not get SOPB storage.

Table 97. Codes Related to Logon Errors (continued)

Location Code (Dec)	Location Code (Hex)	Msg# (DFS)	Exit	Explanation
145	91	3645	N/A	Parsing of userdata failed. See Table 100 on page 378.
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.
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.

Codes Related to Logon Descriptor Processing

The location codes in Table 98 deal with logon descriptor processing.

Table 98. Codes Related to Logon Descriptor Processing

Location Code (Dec)	Location Code (Hex)	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

The location codes in Table 99 deal with logging-on device characteristics and their compatibility with the logon descriptor being requested.

Table 99. Codes Related to Logging-on Device Characteristics

Location Code (Dec)	Location Code (Hex)	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.
195	C3	3646	LOG	TS type or LU type mismatch.

Qualifier Codes

Codes Related to ETO Parsing Errors

The QUALIFIER codes in Table 100 deal with ETO-related parsing errors (associated with a DFS3645I message).

Table 100. Qualifier Codes Related to ETO Parsing Errors

Location Code (Dec)	Location Code (Hex)	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

The QUALIFIER codes in Table 101 deal with VTCB-creation errors (associated with a DFS3644 message).

Table 101. Qualifier Codes Related to VTCB-Creation Errors

Location Code (Dec)	Location Code (Hex)	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

The QUALIFIER codes in Table 102 deal with screen-attribute errors (associated with a DFS3646I message).

Table 102. Qualifier Codes Related to Screen-Attribute Errors

Location Code (Dec)	Location Code (Hex)	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.

IDC0 Trace Table Entries

Error Messages Issued by DFSCNXA0

Table 103 lists codes that identify error messages issued by DFSCNXA0. The code is placed in the MsgID field of an IDC0 trace entry.

Table 103. Codes that Identify Error Messages Issued by DFSCNXA0

Code (Dec)	Code (Hex)	Msg# (DFS)
0	00	2104
4	04	3111
8	08	2037

Table 103. Codes that Identify Error Messages Issued by DFSCNXA0 (continued)

Code (Dec)	Code (Hex)	Msg# (DFS)
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
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

APPC/IMS Diagnostic Aids

This topic details the following diagnostic aids:

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 Interactive Dump Formatter panels. For information about using the Offline Dump Formatter, see "Formatting IMS Dumps Offline" on page 155.

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.

Formatting the LU Manager Trace

Table 104 shows the general format of an LU manager trace record. Each record is 8 words long. Word 0 holds standard information for each record.

Table 104. LU Manager Trace Record Format

WORD 0		WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6	WORD 7
ID	SEQ 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 A(ECB)

Word 3 Error code

Word 4 Optional user data

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' XCF sendmsg

Word 1

- **Byte 0:** Module number - see Table 105 on page 389
- **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 105 on page 389
- **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 RRS AWE server

Word 1

- **Byte 0:** Module number - see Table 105 on page 389
- **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 105 on page 389.
- **byte 1:** ATB call number - See Table 106 on page 390.
- **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)

An Example of the LU Manager Trace

The LU Manager trace in Figure 148 on page 388 shows:

- Some calls to DFS62FD0 caused by `/DISPLAY` commands
- A clean address space caused by a non-LU 6.2 transaction ending
- A synchronous LU 6.2 transaction being executed

It has been formatted by the File Select and Formatting utility (DFSERA10) with exit DFSERA60, which places the module number after word 7.

```
OPTION PRINT O=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
```

Figure 148. Example of an LU Manager Trace

LU 6.2 Module-to-Code Cross-Reference Table

You can use Table 105 to associate code xx in message DFS1959E and the module number in trace records X'7Bxx' and X'7Cxx' with a module.

Table 105. LU 6.2 Module-to-Code Cross-Reference Table

Mod Num (Dec)	Mod Num (Hex)	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 XCF 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
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 ACEE
63	3F	DFSTMCD0	CONNECT/DISCONNECT support

Table 105. LU 6.2 Module-to-Code Cross-Reference Table (continued)

Mod Num (Dec)	Mod Num (Hex)	Module	Description
71	47	DFSAOSW0	APPC/OTMA SMQ AWE server
72	48	DFSRGFS0	RRS Server, AWE PROCESSOR
90	5A	DFSXAOS0	DFSXAOS0 APPC/OTMA SMQ Enablement Initialization

APPC/MVS Verb-to-Code Cross-Reference Table

You can use Table 106 to associate the ATB call number in trace records X'7Cxx' with an APPC/MVS verb.

Table 106. APPC/MVS Verb-to-Code Cross-Reference Table

Verb Num (Hex)	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
13	ATBMIGRP	Join XCF 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

Table 106. APPC/MVS Verb-to-Code Cross-Reference Table (continued)

Verb Num (Hex)	Verb Name	Verb Description
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. To determine the module associated with the code, see Table 105 on page 389. Variable yy is an internal reason code.

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 LU manager trace.

The following lists provide an explanation of the reason codes listed in the DFS1959E message. Contact the IBM Support Center for action 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 DFSPOOL to acquire storage for PL/AS variables using the DFSLUMGT macro.

xx99 Failure in DFSPOOL to release storage for PL/AS variables using the DFSLUMRL macro.

The following reason codes are module DEPENDENT.

DFSALM00

RC **Description**

0401 Failure to clear asynchronous control block work pending bit.

0402 Failure to get LUMP pool buffer using DFSPOOL macro.

0403 Failure to free LUMP pool buffer using DFSPOOL macro.

0408 Missing LUNAME from LU 6.2 message prefix.

0409 Missing TPNAME from LU 6.2 message prefix.

0410 Unsupported sync level specified in asynchronous control block or LU 6.2 message prefix.

0411 Invalid conversation type specified in asynchronous control block or LU 6.2 message prefix.

0412 Invalid control data in message segment from GU call.

0413 Invalid control data in message segment from GN call.

0414 No data, redundant DFSQMGR Get Next call. RC=4.

0415 Unknown return code on DFSQMGR Get Next call.

0416 Missing LU 6.2 prefix on DFSQMGR Get Unique call.

0417 Queue already in read status on DFSQMGR Get Unique call. RC >= x'C'.

0418 Failure to dequeue output message. ″No message on queue status″ is indicated. DFSQMGR Dequeue call, RC=8.

0419 Unknown return code from dequeue call. DFSQMGR Dequeue call, RC is other than 0 or 8.

0421 Unknown return code from DFSLIEE0 LU 6.2 user edit exit. RC is other than 0, 4, or 8.

DFSAOSW0

RC	Description
7101	Unknown request code.
7109	Zero TIB address for send output.
7110	Failure in QUERY of DFSXCF macro.
7116	Zero header address for send output.
7121	Failure to get AWE storage using DFSBCB macro.
7133	Transaction not found for notify.
7134	Other than transaction found for notify.
7136	Wrong message number in SEND DFS MESSAGE function.
7144	XCF 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

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

RC	Description
0901	Calling module requesting unsupported APPC/MVS verb name.

DFSCMD00

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 DFSPOOL macro.

0322 Failure to free LUMP pool buffer using DFSPOOL macro.

DFSCMLC0

RC **Description**

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 scratch pad 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

RC **Description**

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

RC **Description**

3501 Failure to get AWE storage using DFSBCB.

DFSRLM00

RC **Description**

0501 AWE extension not a FMH5 Attach request.

0502 Synchronous control block creation failure using DFS62DST FUNC=FIND.

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 DFSSERVR macro.

0507 Failure in Identify Protected Conversation Context.

DFSRLM10

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 DFSPOOL macro.
0608	Failure to free LUMP pool buffer using DFSPOOL macro.
0609	Failure in DFSQMGR updating message to non-recoverable 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=FIND).

DFSSLUM0

RC	Description
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.
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 DFSPOOL macro.
0122	Failure to free LUMP pool buffer using DFSPOOL macro.

DFS6CKP0

RC	Description

2201 Invalid checkpoint type specified in parameter list. Should be ALL or STATUS.

2202 Data block too large for log record.

DFS6ECT0

RC **Description**

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 DFSPOOL macro.

3111 Error freeing CIOP storage using DFSPOOL 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 DFSSERVR macro.

3115 Error Checking synchronous control block using DFSSERVR macro.

3116 VTAM MODIFY USERVAR failed for activation of primary system.

DFS6IDC0

RC **Description**

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 DFSPOOL macro.

2405 Failure to free LUMP pool buffer using DFSPOOL macro.

DFS6LUS0

RC **Description**

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 FUNC=FIND.

1015 No LUM block given in BLDPRE service call.

1016 Unable to find asynchronous control block or create a new one in CHNG 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 DFSPOOL macro.

1063 Failure in SENDMSG using DFSXCF macro.

1064 Failure to free LUMP pool buffer using DFSPOOL macro.

DFS6LUS1

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	DFSLUS1 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

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

RC	Description
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

RC	Description
2101	Log record type not X'22', X'23', or X'24'.
2102	Log record code not X'40'.

DFS62FD0

RC	Description
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

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

RC	Description
5101	Failure in DFSQMGR Get Unigue 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

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

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.

DFS1965 APPC/MVS Call Failure

A call to APPC/MVS had an unexpected return code. The call for FUNCTION=*aaaaaaaa* 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. Refer to the *MVS/ESA Authorized Callable Services* for the meaning of positive values for this return code. 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, some other facilities include:

- IMS Resource Recovery Trace. For more information, see “Resource Recovery Services Trace” on page 226.
- z/OS Resource Recovery Trace. For more information, see the ″Component Trace″ section in *z/OS MVS Diagnosis: Tools and Service Aids*.
- z/OS APPC Trace. For more information, see the ″Component Trace″ section in *z/OS MVS Diagnosis: Tools and Service Aids*.
- Console dumps of the RRS and APPC address and data spaces. For more information, see the ″SVC Dump″ section in *z/OS MVS Diagnosis: Tools and Service Aids*.

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 associated with the task in error and the appropriate trace tables.

OTMA Diagnostic Aids

This topic describes the following diagnostic information to help you analyze problems in OTMA.

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 VERBX command or the interactive dump formatter panels. For information about using the offline dump formatter, see “Formatting IMS Dumps Offline” on page 155.

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.

Format of OTMA Trace Records

Table 107 shows the format of OTMA trace records. Each record is eight words long. Word 0 holds standard information.

Table 107. OTMA Trace Record Format

WORD 0		WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6	WORD 7
ID	SEQ 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'5A04' XCF state change

Word 1	Byte 0: Module number
	Byte 1: XCF call number
Word 2	A(ECB)
Word 7	Time stamp (short)

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 trans 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 ID = X'5A05'User exit DFSYIOE0 module entry

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 exit

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 Module-to-Code Cross-Reference Table

You can use Table 108 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 108. OTMA Module-to-Code Cross-Reference Table

Mod Num (Dec)	Mod Num (Hex)	Module	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 XCF message exit
28	1C	DFSYGRX0	OTMA XCF group exit
29	1D	DFSYXMO0	OTMA attach member OIM TCB
30	1E	DFSYC480	OTMA STA/STO (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	DFSYPSI0	TPIPE input AWE server DFSYPSI0
38	26	DFSYPSOO	TPIPE output AWE server DFSYPSO0
39	27	DFSYSND0	OTMA XCF interface

Table 108. OTMA Module-to-Code Cross-Reference Table (continued)

Mod Num (Dec)	Mod Num (Hex)	Module	Description
40	28	DFSCMLC0	MSC Shared queues APPC/OTMA message router
41	29	DFSCMS00	MSC ANALYZER
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	DFSYQFXO	OTMA queue fixer
49	31	DFSYPRX0	OTMA pre-routing exit routine DFSYPRX0
50	32	DFSYDRU0	OTMA default DRU exit routine DFSYDRU0
51	33	DFSYIOE0	OTMA input/output edit user exit routine

OTMA Verb-to-Code Cross-Reference Table

You can use Table 109 to associate the XCF call number in trace record X'5B'*xx* with a z/OS XCF verb.

Table 109. z/OS XCF Verb-to-Code Cross-Reference Table

Verb Num (Hex)	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. 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 108 on page 403. Variable *yy* is an internal reason code.

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 following two reason codes are module independent. Variable *xx* represents the specific IMS module issuing the macro call.

Reason Code	Description
*xx***98**	Failure in DFSPOOL to acquire storage for a variable with the DFSYMAGT macro.
*xx***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, 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 associated with the task in error and the appropriate trace tables.

Diagnosing Errors 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.

The following topics provide additional information:

- "Understanding Parsing Errors"
- "Debugging and Diagnostic Aids Provided by IMS Spool API" on page 408

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 or SETO calls. The intent of this section is to give a better understanding of 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" on page 406 provides a summary of the error codes that can be expected to be returned if the application provides a feedback area. It might be desirable 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 also obtain some hint as to 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 PRTO option. There might be exceptions to this rule, but in general this will hold true.

Error Codes

The following sections contain examples of mistakes and the resultant error codes provided to the application. Some length fields are omitted from the examples when not necessary to illustrate the example. Consider feedback and options lists that are shown on multiple lines to be contiguous the same way they would be found in the application's working storage.

Error Code (0002): This code indicates an invalid keyword was discovered within the call options. The error code of (0002) tells us that the keyword scan being performed is associated with keywords that are valid for the call. For example,

```
CALL = SETO
                    01
OPTIONS LIST = PRTO=04DEST(018),CLASS(A),TXTU=SET1

FEEDBACK = TXTU(0002)

STATUS CODE = AR
```

In this example, the options list contains both the keywords PRTO and TXTU. The keyword, TXTU, is not valid for the SETO call.

Another example of an error code of (0002) in the feedback is created when the length field representing the PRTO options is specified as shorter than the actual length of the options. For example,

```
CALL = CHNG
                             01
OPTIONS LIST = IAFP=N0M,PRTO=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 PRTO options (that is, 001F) is too short to contain all of the options. The result of this incorrect length is that IMS finds the keywords of COPIES and FORMS outside of the PRTO 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 following 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 long. For example,

```
CALL = CHNG

OPTIONS LIST = IAFP=N0M,OUTN=OUTPUTDD1

FEEDBACK = OUTN(0004)

STATUS CODE = AR
```

The operand for the OUTN keyword is 9 bytes long and exceeds the maximum value.

Error Code (0006): This error occurs when IMS is doing the scan looking for valid keywords associated with the call. IMS has encountered the PRTO keyword. Upon 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=N0M,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 of (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 given when the TXTU keyword is found.

Error Code (000C): The error code is reporting a condition where a set of mutually exclusive keywords have been used in the same call options list. Again, 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
```

Here we have a case where 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 utilizes MVS/ESA 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 MVS/ESA release level.

You can obtain a list of the valid descriptors and the proper syntax by using the TSO HELP OUTDES command or by referring to the appropriate TSO documentation such as the *TSO Command Language Reference*.

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 *Authorized Assembler Programming Guide*.

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 are some examples of 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 the operand shown (that is, XYZ) is invalid.

This section has attempted to provide some examples of all the possible error codes that might be received by an application program. Some length fields are omitted from the examples when not necessary to illustrate the example. Consider feedback and options lists that are shown on multiple lines to be contiguous the same way they would be found in the application's working storage.

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, such as the following:

- "Internal Trace Table" on page 409
- "Log Records Produced" on page 409
- "Special Abend Processing" on page 409
- "Service Error Log Record 67D0" on page 410

These diagnostic aids are explained in this section.

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 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

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, IAFPDCB, 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. Module DFSIAFD0's address is obtained by inspecting 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 (IAFPMCB) 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 **IAFPMCB**.

Word Two This is the address of the first relocated IMS Spool API data set control block for a print data set (IAFPDCB). 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 IAFPDCB 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 **IAFPDCB**.

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). See the *IMS Version 9: Utilities Reference: System*, for more information on this utility program.

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

The writing of these Service Error Log Records occurs automatically.

Chapter 10. IRLM Service Aids

This section describes the service aids that can help you analyze internal resource lock manager (IRLM) problems. These service aids are:

- "IRLM Lock Trace Analysis Using KBLA" discusses IRLM Lock Trace Analysis using Knowledge-Based Log Analysis (KBLA).
- "IRLM Dumps" on page 412 discusses IRLM dumps.
- "SYS1.LOGREC" on page 412 discusses software LOGREC records.
- "z/OS Component Trace" on page 412 discusses the z/OS Component Trace.

In addition, the IRLM generates diagnostic messages that begin with the prefix DXR. These messages are documented in *IMS Version 9: Messages and Codes, Volume 1*.

IRLM Lock Trace Analysis Using KBLA

KBLA (Knowledge-Based Log Analysis) offers an approach for solving IRLM and IMS problems using IMS logs (OLDS/SLDS). This ISPF panel driven interface for the IRLM Lock Trace Analysis program can be accessed from KBLA Option 4.5, as shown in Figure 149.

```
== K.B.L.A. IRLM Lock Trace Analysis ==

COMMAND ===>




Input Trace DSN. USER.IMS1.OLDSP0.OTMU01.DECKS2 Cataloged? Y

IMS Log Version. . . . . 9

COPY1 DSN. . . .


Output DSN Keyword. . . . . PQ88956 The Output DSN will be:

USER.keyword.S.KBLA.*

Create dataset with raw output . . . (Y/N) USER.keyword.R.KBLA.*

Raw output sort selection:

Sorted by Database Name. . . . . (A/D/N)

Sorted by RBA . . . . . (A/D/N)

Sorted by Database Name & RBA. . (A/D/N)

Sorted by PST Number . . . . . (A/D/N)

Sorted by Wait Elapsed Time. . . (A/D/N)


Log DSNs were extracted from RECON .

PDS member containing logs . . . . .
```

Figure 149. IRLM Lock Trace Analysis

For more information, see the "IRLM Lock Trace Analysis Utilities (DFSKTLA0, DFSKTLB0, DFSKTLC0)" section in *IMS Version 9: Utilities Reference: System*.

IRLM Dumps

The IRLM uses the SDUMP system services of z/OS whenever failures occur 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 IRLM 2.1 and 2.2 are specific to their release. If both releases of IRLM 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. For more information about making load libraries available to IPCS, see the "General Information about Writing an IPCS Exit Routine" section in *z/OS MVS Interactive Problem Control System (IPCS) Customization*.

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. For more information about the SDUMP support job stream and the FMTO parameters, see *IMS Version 9: Installation Volume 2: System Definition and Tailoring*.

Note: Under the direction of IBM Service, you can use the Modify DIAG command to take diagnostic dumps.

SYS1.LOGREC

The IRLM generates a software LOGREC record when the IRLM detects a program error. You can use the IFCEREP1 service aid described in *MVS/ESA Diagnosis: Procedures* to obtain a listing of the SYS1.LOGREC data set containing the LOGREC entries for the IRLM.

z/OS Component Trace

Use the z/OS `TRACE CT` command to start, stop, or modify an IRLM diagnostic trace. IRLM does not support all the options available on the TRACE command. The z/OS `TRACE CT` command is described in *IMS Version 9: Command Reference* and *MVS/ESA System Commands*.

This command can only be entered from the master console. The command requires an appropriate level of z/OS authority, as described in *MVS/ESA System Commands*.

The TRACE CT® command lets you run the following types of sublevel traces:

DBM Trace interactions with the identified DBMS.

EXP Trace any exception condition.

INT Trace member and group events other than normal locking activity.

SLM Trace interactions with the z/OS locking component.

XCF Trace all interactions with z/OS cross-system coupling services.

XIT Trace just asynchronous interactions with the z/OS locking component.

For EXP, INT, and XIT sublevel traces, the OFF parameter stops the traces from writing to the external writer. However they continue to write to buffers.

The following example shows trace output for a lock request using the DBM and SLM sublevel traces.

The command that produced this output is: `CTRACE COMP(IRLE) SUB((DBM)) FULL`

```
COMPONENT TRACE FULL FORMAT
COMP(IRLE)    SUBNAME((DBM))
**** 02/10/94
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 command that produced this output is: `CTRACE COMP(IRLE) SUB((SLM)) FULL`

```
COMPONENT TRACE FULL FORMAT
COMP(IRLE)    SUBNAME((SLM))
**** 02/10/94
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
```

Chapter 11. FP—Fast Path Service Aids

This section describes diagnostic information to help you analyze problems in Fast Path. This includes:

- "Diagnosing Fast Path Problems"
- "DEDB Control Interval (CI) Problem Assistance Aids" on page 419
- "Fast Path External Trace" on page 423
- "Locating Fast Path Control Blocks and Tables" on page 422

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 abending dependent region was 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.

The following topics provide additional information:

- "ABENDU1026 Analysis"
- "Fast Path Transaction Retry" on page 418

ABENDU1026 Analysis

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 topic describes an approach to analyzing ABENDU1026 failures. It tells you what documentation to obtain and guides you in finding and interpreting diagnostic data from the documentation. It is important to gather the necessary data before searching an IBM software support database or calling the IBM Support Center.

This analysis is based on using a dump that you can format with the Offline Dump Formatter (ODF). Table 110 shows you where to find ODF information.

Table 110. Locating Information About the Offline Dump Formatter (ODF)

For Information About	Refer to
Obtaining dumps suitable for input to the ODF	"Input for the Offline Dump Formatter" on page 156
Running the ODF	*IMS Version 9: Utilities Reference: Database and Transaction Manager*
Using the ODF to solve problems	"Formatting IMS Dumps Offline" on page 155

Before beginning the analysis, you need:

- A copy of the DFS2712I message
- A dump formatted by the ODF
- A copy of *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*

If an authorized program analysis report (APAR) is necessary, you might also need the following:

- 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 Figure 150. DFS2712I is sent to the console. Be sure to save a hard 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    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
```

Figure 150. Example of Message DFS2712I

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 example in Figure 150, the module name is DBFMRCU0 and the subcode is 0053.

2. To find the meaning of the subcode, look up ABENDU1026 in *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis*. 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. Turn to *IMS Version 9: Failure Analysis Structure Tables (FAST) for Dump Analysis* 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 Figure 150, 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. You must now 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`. Figure 151 shows an example of the save area set formatted by the ODF.
   - Register 13 in message DFS2712I contains the address of the save area for the PST that suffered the abend.
   - In the example message in Figure 150 on page 416, register 13 contains the address 0070767C.
   - In the `**DPST` section of the formatted dump in Figure 151, search for a save area (SA) with address 0070767C. If you are searching online, the second occurrence you find is the actual 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 FFFFFD80
                    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 FFFFFD80
                    R7 FEE06FD4      R8 00707050      R9 0072F6CC     R10 0070B040     R11 0086DF20     R12 00814528
EP   DBFMRCU003/21/8618.02PTO1119 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 FFFFFD80
                    R7 00005A08      R8 0291AE66      R9 0072F6CC     R10 0070B040     R11 0086DF20     R12 00816900
EP   DBFMPGO002/04/8617.58PP35272 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 008221B8
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
```

Figure 151. Example of a Save Area Set

6. In Figure 151, 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. (For information about this function, see “Fast Path Transaction Retry” on page 418.)

   Look in your MTO log for messages DFS0663I, DFS0784I, DFS0785I, DFS0787I, and other messages associated with a retry to find out what happened.

At this point 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 the IBM Support Center.

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. (See *IMS Version 9: Messages and Codes, Volume 2* for an explanation of the message.)
- 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.

What the System Programmer Should Do

The system programmer should:

- Print the job log.
- Print the spooled trace data set information.
- Save and analyze the above information.
- Contact the IBM Support Center for assistance, if needed.

DEDB Control Interval (CI) Problem Assistance Aids

After you have performed the analysis described in “ABENDU1026 Analysis” on page 415, you will need to 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) that are listed in this topic. You can (maybe with help from the IBM Support Center) 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)

Related Reading: For information about choosing which log records to analyze, see “Log Records” on page 127.

This topic describes the structure of various CIs as they appear in a dump. When you print portions of the DEDB, the CIs have the identifying characteristics listed below.

Some of the acronyms used in this topic are:

DOVF	Dependent overflow
IOVF	Independent overflow
RAP BLOCK	Root-anchor point block
SDEP	Sequential dependent

The following topics provide additional information:

- “CI Type Identification”
- “DEDB CI Formats”

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

This topic first discusses the details of the various CI types, and then describes the data common to all CIs (except the SDEP CI).

CI 0 This is 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).

Figure 152 shows the EQE list format: FLG (1 byte), EQE CNT (3 bytes), 10 available EQE entries (40 bytes).

	FLG *	EQE CNT	EQE ENTRY	.....	EQE ENTRY
bytes	1	3	4		4
			- - - - - - - - 10-Entries - - - - - - - -		

* X'80' means more than 10 EQEs or error in 2nd CI.

Figure 152. EQE list in CI 1

RAP CI

Figure 153 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.
```

Figure 153. RAP CI

First DOVF CI

The first DOVF CI has the format shown in Figure 154.

```
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.
```

Figure 154. First DOVF CI

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 Figure 155.

```
0       2     4              8
FSEAP   02    RBA of next    Segments, FSEs and Scraps
              DOVF CI with
              space, last
              contains zeros
```

Figure 155. Other DOVF CIs

First IOVF CI

The CI shown in Figure 156 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  8000xxxx free and offset to next free
                    to 1st   4000uow# allocated
                    free     2000uow# used by reorg
             40000000 no free space in this space map CI
```

Figure 156. First IOVF CI

Other IOVF CIs

Figure 157 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
```

Figure 157. Other IOVF CIs

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. Figure 158 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.
```

Figure 158. SDEP CI

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 bbbbbs 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 (DFSERA10) with exit DFSERA40. For information about running this utility, see *IMS Version 9: Utilities Reference: System*.

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', then the second DMAC is X'FFFD', the third DMAC is X'FFFC', and so forth. Since databases are chained alphabetically in the DDIR, if the DMB field is X'FFF6', you would calculate the relative DMAC number as follows:

```
X'FFFF' – X'FFF6' = X'19' = 25 (decimal)
```

This means that X'FFE6' is the 25th Area relative to the first Area of the first DEDB in the DDIR.

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. Remember to use XREF(FULL).

Table 111 shows the Fast Path control blocks and work areas that appear as a load list in an IMS dump.

This information is especially relevant when you are working on an abend U1011 in module DBFINI20; message DFS2703A generally accompanies the abend. This abend results from either a GEN problem or a storage fragmentation problem.

Table 111. Fast Path Control Blocks and Work Areas that Appear in IMS Dumps

Load List Name	Fast Path Block/Work Area	Appearance in Dump
DBFCONT0	Fast Path Global Control Blocks	IMS STM Task
DFSEPnnn	Fast Path EPSTs (nnn=000-999)	IMS STM task

At Fast Path initialization, module DBFINI20 calculates the amount of contiguous ECSA storage that is needed in order to load DBFCONT0, which contains the buffers, buffer headers, MSDBs, and other related control blocks. If DBFINI20 cannot obtain a large enough contiguous block of storage, abend U1011 is issued.

When this occurs, you can try doing an IPL, or you can stop other jobs and perhaps free up whatever was preventing DBFINI20 from obtaining the necessary storage.

You can look in register 8, which contains the amount of storage DBFINI20 was trying to obtain. This amount is the accumulated total sizes of the blocks needed by Fast Path. If you receive abend U1011 again, you can quickly perform the following calculation:

```
buffers x buffer size + MSDB_size
```

If the amount you calculate is close to the value in register 8, you can be fairly sure that IMS performed the calculations correctly; this means that the problem is with storage fragmentation.

Refer to Table 112 when you are figuring out which specific control blocks are needed in your Fast Path environment.

The possible control block structure of DBFCONT0 appears in Table 112.

Table 112. Control Block Structure of DBFCONT0

Control Block/Table	With MSDB/DEDB	Without DEDB	Without MSDB	Without DEDB/MSDB
ECNT	X	X	X	X
BHDR	X	X		
MSDB	X	X		
DMHR	X	X	X	
BUFF	X	X	X	
DMCB	X		X	
OTHR	X		X	
BALG	X	X	X	X
MBUF	X	X	X	X
LBUF	X	X	X	X
FPAL	X		X	

If you use online formatting, only the first 16 MB of DBFCONT0 are dumped.

Fast Path External Trace

The Fast Path (FP) External Trace, not the same as Fast Path internal trace added in IMS Version 9, is a powerful tool to diagnose problems with Fast Path DL/I calls. Examples of such problems might be unexpected DL/I status codes or abends such as U1026. It is best suited to problems which can be easily recreated, and is not intended to be run routinely. The overhead and output volume of the trace can be very large. It is primarily intended for use by IBM Service specialists, but users might also find it useful. Also, you might be asked by IBM Service to capture Fast Path External trace data for analysis by IBM specialists.

Only dependent region activity is traced. This trace cannot be used to collect data on control region processes. Since most Fast Path DL/I call flow is normally done in the dependent region, this is not a

serious limitation. However, if the PARDLI=1 option is used, 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. Recreate the problem, if possible, without PARDLI=1.

The following topics provide additional information:

- "Trace Activation"
- "Trace Deactivation"
- "Diagnostic Data"
- "Fast Path Trace Entries" on page 425
- "Fast Path External Trace Examples" on page 425

Trace Activation

There are three ways the trace can be activated:

- The Fast Path Transaction Retry function normally attempts to activate FP 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 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, it also closes and deallocates an FPTRACE DD statement when the trace is deactivated at end of retry. The intent of this function is to provide first-failure data capture.
- A CCTL DRA thread can also request that FP External Trace be activated for a particular thread during the Create Thread process. Refer to the documentation for the CCTL for more information.
- 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, 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 FPTRACE DD statement, or a DASD file used. DCB attributes are forced to `LRECL=133,BLKSIZE=133,RECFM=FA` by IMS when the DCB is opened.

Recommendation: Consider using 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 actually active or inactive.

Recommendation: 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 has been 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 Indentifiers

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 rightwards 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 indications 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. It is convention that 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=*xxxxxxxx*. The hexidecimal digits are the middle 4-bytes of an 8-byte STCK time stamp. The high order digit is approximately 1 second.

Note: Fields labeled TIME and DATE within trace entries refer to the compile date and time of the module involved, and have no relation to trace time.

Trace Initialization Entries

Entries COT1 to TRAN at the beginning of the trace file refer to FP Trace initialization and should be ignored. Note that these entries are produced if a FPTRACE DD statement is present, even if the trace is not enabled.

Key Trace Point Data Items

The data traced for each trace point varies. However, each field has a label which makes it simple to determine the contents of the entry. Here are some of the common and useful labels:

Ra#b,Rab, Registers a-b follow.

CALL DL/I call function.

TOKN UOR's 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 Trace Entries

The Fast Path trace entries are documented in "Fast Path Trace Entries" on page 593.

Fast Path External Trace Examples

The Fast Path external trace is shown in the examples below. Each portion of the trace is briefly explained in the text preceding it.

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=00000000000000000000000080000000
.............. 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=00000000000000000000000080000000
.............. 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=00000000000000000000000080000000
.............. 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 1IAB
```

DL/I call start in DBFIRC10:

```
IRC1.........TOD=B6B60ECC R015=00000000 00000C17 C7C8E440 0A69602C 0BC04F54 0A5BE060 00000000 8A71C580 D9E3D4E3 0A9F1048 0A6FC040 00
.............CC5B78 8ADBA272 0A5BE618 0A6FC9F2 00000001 LCRE=0A9F1048 TOKN=E2E8E2F3404040400000000600000000 EPCB=0A69602C PCBA=0A52F
.............35C PCBD=000121F8 ESCD=00CC5B78 MADR=8AD477B0 EPST=0A6FC040 WKAR=0A6FCC94 SVIO=0BC04F54 SVIL=0000 SVSN=0001
.MCL0........TOD=B6B60ECE CALL=GHU  EPST=0A6FC040 WKAR=0A6FCC94 EPCB=0A69602C CCID=00 LCID=00 PRGP=00000000 LKFP=00000000 PCB=0A52F3
.............5C SSA=DEPARTMT(DEPTKEY = R1210000001 MODU=0AD4AD80 DATE=08/01/031 TIME=10.25Œ LCHA=Œ}
ï¨}}
```

Call is GHU - first 30 bytes of SSA are traced:

```
..SAGE.......TOD=B6B60ED0 R0#9=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 XRBA=00000000 SGCD=00 PROF=0000 LEVL=00 KEYL=00 FLGA=00 FLGB=00
.............ACCK=0000 KEYO=0000 SDBS=00000000 MLTE=0BC04F54 SFRX=00 SFSX=00 SFWX=00 SFZX=00 SFMX=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=10.28Œ LCHA=Œ}
ï¨}}
```

SSA handler for GET type calls:

```
...SAGI......TOD=B6B60EDB R0#9=00000000 00000C17 C7C8E440 0A69602C 00000000 0A6FC588 FFFFFE20 FEE02D87 00CC4B20 000000FF R14=8AD7293
.............6 R15=0AD72030 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=00000000 POPT=80 SGLS=CE CLOC=040C0000 DMHR=00FC7B38 P
.............RBA=070C2000 CRBA=00000000 NRBA=814171C0 GRBA=00000000 XRBA=00000000 SGCD=9E PROF=0008 LEVL=07 KEYL=0C FLGA=10 FLGB=00
.............ACCK=80CE KEYO=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=10.28Œ LCHA=Œ}
ï¨}}
....VSNA.....TOD=B6B60EDF R0#9=00000000 00000C17 C7C8E440 0A69602C 00000000 0A6FC588 8BC14F5B FEE02D87 00CC4B20 000000FF R14=8AD7208
.............6 R15=0AD74478 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=00000000 POPT=80 SGLS=CE CLOC=040C0000 DMHR=00FC7B38 P
.............RBA=070C2000 CRBA=00000000 NRBA=814171C0 GRBA=00000000 XRBA=00000000 SGCD=9E PROF=0008 LEVL=07 KEYL=0C FLGA=10 FLGB=00
.............ACCK=80CE KEYO=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=10.28Œ LCHA=Œ}
ï¨}}
```

Verify segment name:

```
....VSNA.....TOD=B6B60EE3 R0#9=00000080 00000C17 C7C8E440 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 0A696168 000000FF R14=0000001
.............3 R15=00000000 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=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=10.28Œ LCHA=Œ}
ï¨}}
....SFIT.....TOD=B6B60EE6 R0#9=00000080 00000C17 C7C8E440 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 0A696168 0A6960EC R14=8AD721E
.............4 R15=0AD6D3F0 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 DEDB
.............=10 MLTE=0A6960EC LEVL=01 SDBS=0AD09210 EPST=0A6FC040 SWAR=DEPTKEY =
.............7Œ LCHA=Œ}
ï¨}}
```

Search field name:

```
....SFLP.....TOD=B6B60EE8 R0#F=00000080 0A4998C6 0AD0ABD8 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 0AD09210 0A6960EC 0A6FC040 00
.............CC5B78 0AD6D3F0 0A5BE738 0AD091C0 00000005 MLTE=0A6960EC LEVL=01 SDBS=0AD09210 FDBF=0AD0ABD8 DNAM=DEPTKEY
.............F0 DATE=08/01/031 TIME=10.27Œ LCHA=Œ}
ï¨}}
....SFTP.....TOD=B6B60EEB R0#9=00000009 0A4998DC 0A4998DC 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 0AD6DA14 00000136 R14=0A4998C
```

```
.............6 R15=0000000D EPST=0A6FC040 REOP=00 FDLN=00 DEDB=00 COMP=00000000 SWAR=DEPTKEY =
.............O=001C SDFO=0000 INDI=79 SARG=R1210000001A)
....CALL.....CALL=0A4998C0 DATA=00100010F0F0000000008079001000010D9F1F2F1F0F0F0F0F0F0F1C15D0000000000000000000000000000000000000000000000
.............0000000000000000000000000000000000000000000000000000000000000000000000
....SFIT.....TOD=B6B60EED R0#9=00000010 0A4998DC 0A4998C0 0A69602C 0A6960EC 0A6FC588 8BC14F6E 0A6FC5E4 00000000 00000136 R14=0A4998C
.............0 R15=00000000 EPCB=0A69602C FLGM=00 DMAC=00000000 ARBA=00000000 UOWO=00000000 CCID=8C CCNT=00000001 UBLK=00000000 DEDB
.............=10 MLTE=0A6960EC LEVL=01 SDBS=0AD09210 EPST=0A6FC040 SWAR=DEPTKEY =
.............7Œ LCHA=Œ}
ï¨}}
...SAGI......TOD=B6B60EEF R0#9=00000010 0A4998DC 0A4998C0 0A69602C 00000000 0A6FC588 8BC14F6E 0A6FC5E4 00000000 0A6960EC R14=8AD721E
.............4 R15=00000000 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=00000000 POPT=80 SGLS=CE CLOC=040C0000 DMHR=00FC7B38 P
.............RBA=070C0000 CRBA=00000000 NRBA=814171C0 GRBA=00000000 XRBA=00000000 SGCD=83 PROF=0008 LEVL=07 KEYL=0C FLGA=10 FLGB=00
.............ACCK=80CE KEYO=B594 SDBS=078C0000 MLTE=00000000 SFRX=00 SFSX=00 SFWX=04 SFZX=0C SFMX=00 PREF=80CE SCNT=00000000 SWC1=00
.............. SWC2=00 SWC3=04 LOPR=00 SNAP=00000000 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.............WCH=00 MODU=0AD72030 DATE=08/01/031 TIME=10.28Œ LCHA=Œ}
ï¨}}
..SAGE.......TOD=B6B60EF3 R0#9=00000010 0A4998DC 0A52F35C 0A69602C 00000000 0A6FC588 8BC14F6E 0A6FC5E4 00000000 0A6960EC R14=0000000
.............0 R15=00000000 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=00000000 POPT=80 SGLS=CE CLOC=040C0000 DMHR=00FC7B38 P
.............RBA=070C0000 CRBA=00000000 NRBA=814171C0 GRBA=00000000 XRBA=00000000 SGCD=83 PROF=0008 LEVL=07 KEYL=0C FLGA=10 FLGB=00
.............ACCK=80CE KEYO=B594 SDBS=078C0000 MLTE=00000000 SFRX=00 SFSX=00 SFWX=04 SFZX=0C SFMX=00 PREF=80CE SCNT=00000000 SWC1=00
.............. SWC2=00 SWC3=04 LOPR=00 SNAP=00000000 EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDOF=0008 DEDB=80 COMP=0A4998D0 STAT=
.............WCH=00 MODU=0AD728C8 DATE=08/01/031 TIME=10.28Œ LCHA=Œ}
ï¨}}
```

SSA analysis complete:

```
..MRQC.......TOD=B6B60EF6 R0#9=00000000 00000C17 C7C8E440 0A69602C 0A6960EC 0AD4B67C FFFFFE20 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 FFFFFE20 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=D9F1F2F1F0F0F5F1F0F0F3C1404040404040404040404040404040400000E2D7C3C20000000001000301 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=DEPARTMTÿ EPST=0A6FC040 SCVL=01 REOP=80 FDLN=0B FDO
....SSA9.....TOD=B6B613F3 R0#9=00000004 00000000 C7C8E440 0A69602C 0A6960EC 00000001 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=10.26Œ LCHA=Œ}
ï¨}}
```

Determine 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=10.26Œ LCHA=Œ}
ï¨}}
```

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=10.26Œ LCHA=Œ}
ï¨}}
```

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=10.26Œ LCHA=Œ}
ï¨}}
.....MGAP....TOD=B6B61416 R0#F=00000004 00000000 0000000A 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 ABCŒ}
```

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=10.26Œ LCHA=Œ}
ï¨}}
```

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=IVELOCK08 TIME=8/05/0 LCHA=03Œ}
ï¨
```

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=FFFFFFD8 0AA922C0 FFFFFFD7 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=10.26Œ LCHA=Œ}
ï¨}}
```

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=10.26Œ LCHA=Œ}
ï¨}}
....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=10.26Œ LCHA=Œ}
ï¨}}
.....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=D9F1F2F1F0F0F0F0F0F0F1C1404040404040404040404040404000000E2D7C3C20000000000001000301 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=DEPARTMTÿ 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
............00800001004000101000010B8800000C00080AD0 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 MOVP=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 TOKN=E2E8E2F3404040400000006000000000 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=10.25Œ LCHA=Œ}
ï¨}}
```

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=10.28Œ LCHA=Œ}
ï¨}}
...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=10.28Œ LCHA=Œ}
ï¨}}
```

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 AŒ}
```

Replace Call Handler:

```
...PIO9......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
...PIO9......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=10.28Œ LCHA=Œ}
ï¨}}
...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=10.28Œ LCHA=Œ}
ï¨}}
...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=10.28Œ LCHA=Œ}
ï¨}}
...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=10.28Œ LCHA=Œ}
ï¨}}
```

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 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 AŒ}

.SEG4........TOD=B6B6148D R15=00000000 DATE=01/0310.2 0#10=00000000 00000C18 0A52F35C 0A69602C 0A6960EC 0AD4B68C 8BC14F5B 00000000 0
.............0CC4B20 0A5BE060 0A6FC040
.NCL0........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
.............00800001004000101000010B8800000C00080AD0 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=800A6FC4910A1155560A71C580000000000000000 EPST=0
.............A6FC040 MOVP=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 syncpoint:

```
.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 FP 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 AŒ}

....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 0Œ}

.....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 0Œ}

....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 AŒ}


...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 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 12. MSC—Multiple Systems Coupling Service Aids

This section includes descriptions and diagnostic hints to help you diagnose multiple systems coupling problems. It does not apply to a Database Control (DBCTL) environment. Included are:

- "Multiple Systems Coupling Communication Task Trace" discusses an MSC communication task trace.
- "Multiple Systems Coupling Device-Dependent Module" provides a description of the various entry points in the device-dependent modules.
- "Multiple Systems Coupling Traces" on page 435 provides a description of MSC coupling traces.
- "Diagnosing Link Problems" on page 435 discusses the diagnosis of link problems.
- "Channel-to-Channel Access Method Trace Stack (LXB Trace)" on page 441 provides a channel-to-channel access method trace stack (LXB trace).

Multiple Systems Coupling Communication Task Trace

The flow through an MSC communication task is very similar to that through the terminal communication task. The register 0 trace is read in exactly 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 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

An MSC device-dependent module (DDM) performs all of the functions unique to a type of link. The functions the DDM 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 DDM

Several entry points are not used to preserve a commonality between coupling communication and terminal communication functions.

Table 113 summarizes the MSC communication task trace.

Table 113. 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 DFSCMUX0	CMEA
DFSCMEI0	DFSCMEI0	After calling Message Control/Error exit DFSCMUX0	CMEB

Multiple Systems Coupling Traces

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

Set TRACE on for appropriate lines from the IMS master terminal. Trace all terminals on a line. For example, use:

```
/TRACE SET ON LEVEL 4 MODULE ALL LINK
/TRACE SET OFF LINK x
```

KBLA (Knowledge-Based Log Analysis) provides MSC link performance analysis through an ISPF driven interface. KBLA uses IMS MSC log records to calculate the overall performance of each link that is subject to data traffic in the system.

There are two different report types that are generated:

Summary

A report that contains the average response time, in milliseconds (msec), of the total number of send and receive data values for each link trace.

Detail A report that 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 only available if the IMS input log contains X'6701' records that are generated via the /TRACE SET ON LINK *link#* command. For more information, see the "MSC Link Performance Formatting Utility (DFSKMSC0)" section in the *IMS Version 9: Utilities Reference: System*.

For diagnosing link problems, the trace records with the following identifiers are helpful.

AM01 RECEIPT OF DATA FROM PARTNER SYSTEM

Entry 1 is invoked when data other than a link level status message (that is, 'LINK STOPPED') is received.

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 DDM, it is because the DDM 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). DDM 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 DDM 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 DDM to send out 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 DDM 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 DDM 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 DDM 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 /PSTOP or I/O error). If the entry is invoked from DDM it is because the DDM has detected a condition that prevents anything more from being done. Find the previous DDM interrupt entry (DM02, DM04 or DM07) to determine why the DDM 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 DDM has nothing else to do under normal conditions.

Example: MTM link is attention driven. There is no outstanding READ as with BSC. When the DDM has no more to do (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 in that the analyzer does not take it upon itself to perform a general cleanup.

CM00 GET A WORK BUFFER

This analyzer entry is called when the DDM 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 DDM 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 DDM needs the next output segment of a message.

CM03 DEQUEUE MESSAGE

This analyzer entry is called when the DDM wishes to dequeue a message (rather than let the analyzer do it). An example is the emergency restart of a link. The DDMs exchange message sequence numbers. If one DDM 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 DDM wants to return an in-process message to the queues. An example is a permanent I/O error. The DDM washes any output in progress and is resent 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 DDM determines that a message in its queue has already been received by the partner, the DDM does a GU (for positioning) followed by a DEQUEUE (CM03) to get rid of the message.

CM07 FREE INPUT QUEUE BUFFER

This analyzer entry is called when the DDM wants to cancel an input queue buffer. An example is permanent I/O error. The DDM throws away 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 DDM 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.

DM01 WRITE SETUP

The DDM 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 DDM 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 DDM 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 DDM 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 DDM 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 DDM.

DECTYPE
Indicates the type of operation.

O TP BUF
If output, contains data to be written.

MSS1 and MSS2 Records

These records are created as a result of ABORT processing when an I/O error (either correctable or not) occurs. All available control blocks are SNAPed, regardless of any /TRACE options in effect on the link involved. These records are followed by a type 03 record containing the message that was sent to the master terminal as a result of the error.

Table 114 shows the significant fields in MSS1 and MSS2 records.

Table 114. Significant Fields in MSS1 and MSS2 Records

Field	Description
BSC	POST code (first byte of LLB) DECTYPE DECFLAGS DECERRST DECRESPN IOB I/O buffers (data and response)
MTM	POST code (first byte of LLB) DECTYPE I/O buffers (data and response)
CTC	POST code (first byte of LLB) DECTYPE IOSB I/O buffers (data and response) LBX

Table 114. Significant Fields in MSS1 and MSS2 Records (continued)

Field	Description
VTAM	POST code (first byte of LLB) DECTYPE I/O buffers (including RPL)

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.

The following topics provide additional information:

- "DFSCMC00 (MSC Analyzer)" on page 442
- "DFSCMC50 (Shutdown Processing Routine)" on page 442

DFSCMC00 (MSC Analyzer)

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)

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)

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)

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)

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)

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)

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

Figure 159 is a printout of the LXB portion of an internal trace record. The LXB trace stack begins at AE90E8, and it contains 29 entries. Following Figure 159 is a list of the meanings of the routines that made each entry.

```
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
```

Figure 159. Printout of the LXB Trace Stack

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' DSFCMC10 (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 DDM 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 Routine Trace—BUFMSVID

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. 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 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 13. DBRC—Database Recovery Control Service Aids

This section describes diagnostic aids that help you analyze problems in DBRC. Included are:

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.

Related Reading: For information about the use of the `LIST.RECON` command and RECON record types, see *IMS Version 9: Database Recovery Control (DBRC) Guide and Reference*.

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. This topic describes the content of the keys in the RECON records. To view the layout of the entire RECON record, see Table 115 on page 448. Consider these points as you examine the records:

- The RECON key size is 32 bytes.
- The last three bytes of the key are one of the following:
  - Reserved, and contain zeros.
  - First byte=0 and the last 2 bytes=key segment number (this one is added for unlimited RECON record).
- 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.

Table 115 on page 448 shows the RECON record types.

Table 115. 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	DSPRDMBT	******	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
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

Table 115. RECON Record Types (continued)

Common Name	Part Name	List ID	Release	Key Fields
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
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: DDN name 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

Table 115. RECON Record Types (continued)

Common Name	Part Name	List ID	Release	Key Fields
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
Backout	DSPBKORC	BACKOUT	4.1	DBD: X'FFFFFFFF00000035' DDN: subsystem name Type: X'35' Time: hex zeros
Global Service Group	DSPGSRC	GSG	5.0	DBD: X'FFFFFFFFFFFFF0000' DDN: subsystem name Type: X'3A' Time: hex zeros
Tracking Subsystem	DSPSSRC	SSYS	5.0	DBD: X'FFFFFFFF0000003E' DDN: subsystem name Type: X'3E' Time: hex zeros
Subsystem	DSPSSRC	SSYS	R-2	DBD: X'FFFFFFFFFFFFFFFF' DDN: subsystem name Type: X'3F' Time: hex zeros
Available CA Execution	DSPCHGRC	CA	R-1	DBD: hex zeros DDN: hex zeros Type: X'51' Time: time stamp
PRIOLDS	DSPOLDRC	PRIOLD	R-3	DBD: X'FFFFFFFF00000053' DDN: subsystem name Type: X'53' Time: hex zeros
Interim PRIOLDS	DSPOLDRC	IPRIOL	R-3	DBD: X'FFFFFFFF00000055' DDN: subsystem name Type: X'55' Time: hex zeros
SECOLDS	DSPOLDRC	SECOLD	R-3	DBD: X'FFFFFFFF00000057' DDN: subsystem name Type: X'57' Time: hex zeros
Interim SECOLDS	DSPOLDRC	ISECOL	R-3	DBD: X'FFFFFFFF00000059' DDN: subsystem name Type: X'59' Time: hex zeros
Available Image Copy	DSPIMGRC	IMAGE	R-1	DBD: DBD name DDN: DDN or area name Type: X'6D' Time: hex zeros

DBRC Internal Trace

The DBRC internal trace is a useful diagnostic tool when problems are suspected in DBRC. It is always enabled.

The DBRC trace can help diagnose many different types of problems, such as:

- RECON data set contention
- RECON 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's important to know which DBRC modules manipulated the RECON and when.

You generally look at the DBRC trace output under the direction of an IBM 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: 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 dump using the TRACETBL eye catcher.
2. Use the sample trace (see "DBRC Internal Unformatted Trace Example" on page 462) 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

n,m,... DBRC TRACEOPT options

TRACEOPT is an optional parameter that you use only under the direction of an IBM representative for the purpose of gathering documentation for problem analysis. The IBM representative will provide the sub-options for the TRACEOPT parameter.

The following topics provide additional information:

- "Trace Input" on page 452
- "Locating the Trace" on page 452
- "Trace Output" on page 452
- "Trace Header Record" on page 452
- "Module Call, Module Return, and DSPSTACK Trace Entries" on page 453
- "BGNCABN0, DSPCABN0, BGNRETRY, DSPCRTR0, and CRTR0XIT Trace Entries" on page 455
- "DSPURI00 Trace Entries" on page 457

Trace Input

When called, DSPTRACE receives a 16-byte parameter list that consists of:

- 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 DSPGDB
- 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 32 bytes long; otherwise it is 96 bytes long.

Locating the Trace

The DBRC trace is in the IMS-formatted portion of an IMS-formatted dump. You can locate the DBRC trace in these ways:

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 Global Data Block (GDB). Offset X'38' in the GDB 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 GDB. If this is the case, use method 3 or 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 either eye catcher “TRACETBL” or “GETFEED”. If you search for “GETFEED”, you might first find it within DBRC modules. Keep searching until you find “GETFEED” within the DBRC trace. Scroll back to the beginning of the trace. To verify that you are looking at the trace, see the trace example in “DBRC Internal Unformatted Trace Example” on page 462.

Trace Output

Trace output normally resides in subpool 0 storage, but you can direct output to a Generalized Trace Facility (GTF) data set. To do this, see “DBRC External Trace” on page 469.

The DBRC internal trace is a wrap-around 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.

The format of the header record and key trace entries are documented in the following:

- “Trace Header Record”
- “Module Call, Module Return, and DSPSTACK Trace Entries” on page 453
- “BGNCABN0, DSPCABN0, BGNRETRY, DSPCRTR0, and CRTR0XIT Trace Entries” on page 455
- “DSPURI00 Trace Entries” on page 457

Trace Header Record

Figure 160 on page 453 shows the DBRC trace header record.

```
|         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
```

Figure 160. DBRC Trace Header Record

Module Call, Module Return, and DSPSTACK Trace Entries

A summary of the DBRC processing that produces the trace entries precedes the layout of the 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 DSPCRTRO (entry point to DBRC). Three trace entries accomplish this:

- Words 1 and 2, which in previous releases only contained DSPSTGET or DSPSTFRE, now show the following things:
  - 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)

Figure 161 on page 454 illustrates the following 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.

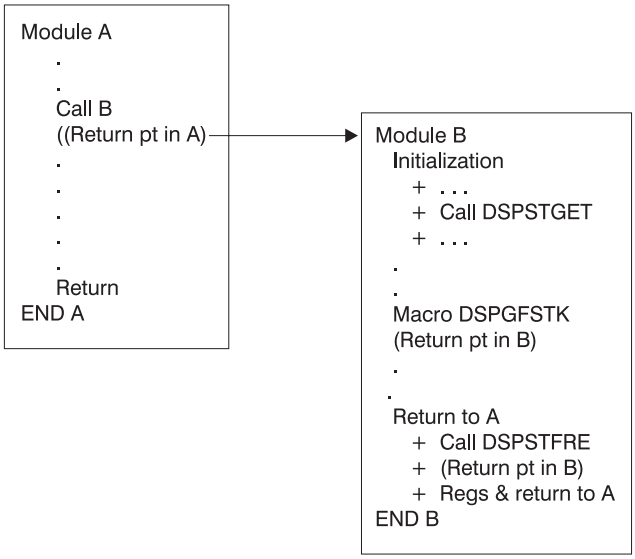


Figure 161. DBRC Trace Processing Flow

Figure 162, Figure 163 on page 455, and Figure 164 on page 455 illustrate 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 in Figure 161.

Figure 162 shows a 1-line trace entry that is produced when module A calls module B. A 1-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 – Offset 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
```

Figure 162. One-Line Trace Entry Produced When Module A Calls Module B

Figure 163 on page 455 shows a 1-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:
|                          - A left 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).
|                     - The last five characters of the module name
|                       returning.
|
|        word 2 – Offset in module A to which module B returns
|
|        word 3 – Offest 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
```

Figure 163. One-Line Trace Entry Produced When Module B Returns to Module A.

Figure 164 shows a 1-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
```

Figure 164. DSPSTACK Trace Entry

BGNCABN0, DSPCABN0, BGNRETRY, DSPCRTR0, and CRTR0XIT Trace Entries

In DBRC, these modules have specific trace calls inserted in their processing flow:

- DSPCABN0
- DSPCRTR0
- DSPURI00

Figure 166, Figure 167, Figure 168 on page 457, and Figure 169 on page 457 show the layout of the entries issued from BGNCABN0, DSPCABN0, and DSPCRTR0.

```
|
|         words 0-1 – Identifier BGNCABN0
|
|         word 2 – A(DSPGDB)
|
|         words 3-5 – Zeros
|
|         words 6-7 - Time stamp
|
|
|  This is normally followed by either DSPCABN0 or a BGNRETRY entry.
```

Figure 165. BGNCABN0 Trace Entry

Figure 166 shows DBRC terminated because of an unrecoverable error.

```
|
|         words 0-1 – Identifier DSPCABN0
|
|         word 2 – A(DSPGDB)
|
|         words 3-5 – Zeros
|
|         words 6-7 - Time stamp
|
|
|  This is the last logical entry in the trace table.
```

Figure 166. DSPCABN0 Trace Entry

Figure 167 shows DBRC recovered from an abend condition and is beginning to execute a retry sequence of code.

```
|
|         words 0-1 – Identifier BGNRETRY
|
|         word 2 – A(DSPGDB)
|
|         words 3-5 – Zeros
|
|         words 6-7 - Time stamp
|
```

Figure 167. BGNRETRY Trace Entry

Figure 168 on page 457 shows the router made a trace call before passing control to the next DBRC routine scheduled to process the request identified by a DFSBRLSB.

```
Line 1:
       words 0-1 – Identifier BGNRETRY

       word 2 – A(DSPGDB)

       words 3-5 – Zeros

       words 6-7 - Time stamp
Line 2:
       word 0 – Address of BLBPRNT 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)
```

Figure 168. DSPCRTR0 Trace Entry

Figure 169 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 4-7 – First 44 bytes of DFSBRLSB
Line 3:
       words 0-7 - DFSBRLSB (continued from previous line)
```

Figure 169. CRTR0XIT Trace Entry

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 DSPGDB follows the trace identifier. Table 116 shows the 8-character identifier and block-area pointer for each call.

Table 116. 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 Figure 170 on page 459.)
OPENER1	FILRESLT(I)	DSPURI00 starts a true open of the RECON data set.
OPENER2	FILRESLT(I)	DSPURI00 completes a true open of the RECON data set.

Table 116. Calls to the Trace Routine in DSPURI00 (continued)

8-Character Identifier	Block-Area Pointer	Explanation
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 Figure 171 on page 460.
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.
VSAMERR	FILRESLT(I)	A VSAM error occurred and the routine to print a VSAM error message was entered.
DSPURI00	ENDIRCAR	DSPURI00 returns to its caller. Relevant exit condition information, if applicable, is traced. (See Figure 172 on page 461.)

Note: The sequence of trace entries identified by DSPURI00, OPENER1, OPENER2, and GETFEED shows DSPURI00 receiving control and doing a true 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.

Figure 170 on page 459, Figure 171 on page 460, and Figure 172 on page 461 show the layout of three of the trace entries from DSPURI00.

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.

```
Line 1:
       words 0-1 – DSPURI00
       word 2 – GDB 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
```

Figure 170. DSPURI00 Entry Trace Entry

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 RECONx 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

```
Line 1:
       words 0-1 – GETFEED
       word 2 – DSPGDBA
       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
```

Figure 171. GETFEED Trace Entry for One RECON

dspgdba Address of the DSPGDB

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.
Table 117 shows the translated RPLREQ printable codes.

Table 117. Translated RPLREQ Printable Codes

Printable Code	HEX	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	
IDXPRE	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	

```
Line 1:
       words 0-1 – DSPURI00
       word 2 – GDB 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 - lnrc
```

Figure 172. DSPURI00 Exit Trace Entry

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

DBRC Internal Unformatted Trace Example

Figure 173 on page 463 shows module-call, module return entries, DSPURI00 trace entries, and other entries (DSPCABN0, BGNCABN0, DSPCRTR0, CRTR0XIT). Toward the end of the trace, the DSPCABN0 trace entry indicates that DBRC was terminated because of an unrecoverable error.

```
0BA8A700  E3D9C1C3 C5E3C2D3 00025900 00000A0A  0BA8A720 0BAAFF20 0BAABAA0 0BAAFFA0    *TRACETBL.........yx.............*
0BA8A720  606EF1E3 C9D4C5F0 8BA85500 0BA35B18  0BA01A30 0BA88010 03274F21 25566338    *->1TIME0.y...t$......y....|.....*
0BA8A740  F04C60E3 C9D4C5F0 0BA85500 000010F4  0BA01A30 0BA88010 03274F21 25566338    *0<-TIME0.y.....4.....y....|.....*
0BA8A760  606EF1E4 D9C9F0F0 8BA85674 0BA4AE18  0BA01A30 0BA88010 03274F21 25566339    *->1URI00.y...u.......y....|.....*
0BA8A780  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 25566339    *DSPURI00.y..............|.....*
0BA8A7A0  D4D6C4C9 D9C3C1D9 404001D8 D6000600  D7C8E8E2 C9C3C1D3 40D6D7C5 D5404040    *MODIRCAR  .QO...PHYSICAL OPEN   *
0BA8A7C0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BA8A7E0  606EF2E4 C3D7F4F0 00000A86 0BA826F8  0BA88010 0BA88958 03274F21 25566340    *->2UCP40...f.y.8.y...yi...|.... *
0BA8A800  F14C60E4 C3D7F4F0 0BA4B89E 00000B4E  0BA88010 0BA88958 03274F21 25566340    *1<-UCP40.u.....+.y...yi...|.... *
0BA8A820  606EF2E4 D9C9F1F0 00000F92 0BA50210  0BA88010 0BA88958 03274F21 25566340    *->2URI10...k.v...y...yi...|.... *
0BA8A840  606EF3E4 D9C9F2F0 0000020A 0BA522A8  0BA88958 0BA88D78 03274F21 25566340    *->3URI20.....v.y.yi..y....|.... *
0BA8A860  606EF4E4 C1D3D3F0 00000260 0BA81E00  0BA88D78 0BA89088 03274F21 25566340    *->4UALL0...-.y...y...y.h..|.... *
0BA8A880  F34C60E4 C1D3D3F0 0BA52508 000001D8  0BA88D78 0BA89088 03274F21 25567076    *3<-UALL0.v.....Q.y...y.h..|.....*
0BA8A8A0  606EF4E4 C1D3D3F0 00000260 0BA81E00  0BA88D78 0BA89088 03274F21 25567077    *->4UALL0...-.y...y...y.h..|.....*
0BA8A8C0  F34C60E4 C1D3D3F0 0BA52508 000001D8  0BA88D78 0BA89088 03274F21 25567837    *3<-UALL0.v.....Q.y...y.h..|.....*
0BA8A8E0  606EF4E4 C1D3D3F0 00000260 0BA81E00  0BA88D78 0BA89088 03274F21 25567837    *->4UALL0...-.y...y...y.h..|.....*
0BA8A900  F34C60E4 C1D3D3F0 0BA52508 000001D8  0BA88D78 0BA89088 03274F21 25568557    *3<-UALL0.v.....Q.y...y.h..|...e.*
0BA8A920  F24C60E4 D9C9F2F0 0BA5041A 00000224  0BA88958 0BA88D78 03274F21 25568557    *2<-URI20.v.......yi..y....|...e.*
0BA8A940  606EF3D9 D3C9F0F0 0000047E 0BA22E18  0BA88958 0BA88D78 03274F21 25568557    *->3RLI00...=.s...yi..y....|...e.*
0BA8A960  606EF4D9 D3C1E4F0 000002FC 0BA22838  0BA88D78 0BA89280 03274F21 25568557    *->4RLAU0.....s...y...yk...|...e.*
0BA8A980  F34C60D9 D3C1E4F0 0BA23114 000004A6  0BA88D78 0BA89280 03274F21 25570461    *3<-RLAU0.s.....w.y...yk...|..../*
0BA8A9A0  F24C60D9 D3C9F0F0 0BA5068E 00000BA8  0BA88958 0BA88D78 03274F21 25570461    *2<-RLI00.v.....y.yi..y....|..../*
0BA8A9C0  606EF3D9 E2E5F0F0 000004CA 0BA80FA0  0BA88958 0BA88D78 03274F21 25570461    *->3RSV00.....y...yi..y....|..../*
0BA8A9E0  F24C60D9 E2E5F0F0 0BA506DA 0000022A  0BA88958 0BA88D78 03274F21 25570462    *2<-RSV00.v.......yi..y....|.....*
0BA8AA00  606EF3E4 D9C9F1F0 0000050A 0BA50234  0BA88958 0BA88D78 03274F21 25570462    *->3URI10.....v...yi..y....|.....*
0BA8AA20  D6D7C5D5 C5D9F140 0BA86728 00000000  00000000 00000000 03274F21 25570462    *OPENER1 .y..............|.....*
0BA8AA40  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *............................*
      LINES   0BA8AA60-0BA8AA7F   SAME AS THE ABOVE
0BA8AA80  606EF4E4 D9C9F1F0 00000D7C 0BA5023A  0BA88D78 0BA89198 03274F21 25570680    *->4URI10...@.v...y...yjq..|.....*
0BA8AAA0  F34C60E4 D9C9F1F0 0BA50FB0 00001162  0BA88D78 0BA89198 03274F21 25570683    *3<-URI10.v.......y...yjq..|....c*
0BA8AAC0  D6D7C5D5 C5D9F240 0BA86728 00000000  00000000 00000000 03274F21 25570684    *OPENER2 .y..............|....d*
0BA8AAE0  00000000 00000000 00000000 00000000  00000000 00024000 00024000 00023000    *.................... ... .....*
0BA8AB00  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *............................*
0BA8AB20  F24C60E4 D9C9F1F0 0BA5071A 00000FF0  0BA88958 0BA88D78 03274F21 25570684    *2<-URI10.v.....0.yi..y....|....d*
0BA8AB40  606EF3E4 D9C9F1F0 0000050A 0BA50234  0BA88958 0BA88D78 03274F21 25570684    *->3URI10.....v...yi..y....|....d*
0BA8AB60  D6D7C5D5 C5D9F140 0BA86728 00000000  00000000 00000000 03274F21 25570684    *OPENER1 .y..............|....d*
0BA8AB80  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *............................*
      LINES   0BA8ABA0-0BA8ABBF   SAME AS THE ABOVE
0BA8ABC0  606EF4E4 D9C9F1F0 00000D7C 0BA5023A  0BA88D78 0BA89198 03274F21 25570911    *->4URI10...@.v...y...yjq..|.....*
0BA8ABE0  F34C60E4 D9C9F1F0 0BA50FB0 00001162  0BA88D78 0BA89198 03274F21 25570915    *3<-URI10.v.......y...yjq..|.....*
0BA8AC00  D6D7C5D5 C5D9F240 0BA86728 00000000  00000000 00000000 03274F21 25570915    *OPENER2 .y..............|.....*
0BA8AC20  00000000 00000000 00000000 00000000  00000000 00024000 00024000 00023000    *.................... ... .....*
0BA8AC40  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *............................*
0BA8AC60  F24C60E4 D9C9F1F0 0BA5071A 00000FF0  0BA88958 0BA88D78 03274F21 25570916    *2<-URI10.v.....0.yi..y....|.....*
0BA8AC80  606EF3E4 D9C9F1F0 0000050A 0BA50234  0BA88958 0BA88D78 03274F21 25570916    *->3URI10.....v...yi..y....|.....*
0BA8ACA0  D6D7C5D5 C5D9F140 0BA86728 00000000  00000000 00000000 03274F21 25570916    *OPENER1 .y..............|.....*
0BA8ACC0  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *............................*
      LINES   0BA8ACE0-0BA8ACFF   SAME AS THE ABOVE
0BA8AD00  D6D7C5D5 C5D9F240 0BA86728 00000000  00000000 00000000 03274F21 25571270    *OPENER2 .y..............|.....*
0BA8AD20  00000000 00000000 00000000 00000000  00000000 00000000 00024000 00023000    *.......................... .....*
0BA8AD40  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *............................*
0BA8AD60  F24C60E4 D9C9F1F0 0BA5071A 00000FF0  0BA88958 0BA88D78 03274F21 25571271    *2<-URI10.v.....0.yi..y....|.....*
0BA8AD80  606EF3E4 D9C9F2F0 000006AE 0BA522CC  0BA88958 0BA88D78 03274F21 25571276    *->3URI20.....v...yi..y....|.....*
0BA8ADA0  606EF4E4 C1D3D3F0 00000520 0BA81E00  0BA88D78 0BA89088 03274F21 25571451    *->4UALL0.....y...y...y.h..|.....*
0BA8ADC0  F34C60E4 C1D3D3F0 0BA527EC 000002AA  0BA88D78 0BA89088 03274F21 25571459    *3<-UALL0.v.....y...y.h..|.....*
0BA8ADE0  F24C60E4 D9C9F2F0 0BA508BE 0000054A  0BA88958 0BA88D78 03274F21 25571459    *2<-URI20.v.......yi..y....|.....*
0BA8AE00  606EF3C4 C5D8F0F0 000006CC 0BA0DA68  0BA88958 0BA88D78 03274F21 25571459    *->3DEQ00.........yi..y....|.....*
0BA8AE20  F24C60C4 C5D8F0F0 0BA508DC 000007EE  0BA88958 0BA88D78 03274F21 25571459    *2<-DEQ00.v.......yi..y....|.....*
0BA8AE40  606EF3E4 D9C9F1F0 00001C16 0BA50234  0BA88958 0BA88D78 03274F21 25571640    *->3URI10.....v...yi..y....|.... *
0BA8AE60  D6D7C5D5 C5D9F140 0BA86728 00000000  00000000 00000000 03274F21 25571640    *OPENER1 .y..............|.... *
0BA8AE80  00000000 00000000 00024000 00024000  20032806 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BA8AEA0  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *............................*
0BA8AEC0  606EF4E4 D9C9F1F0 00000D7C 0BA5023A  0BA88D78 0BA89198 03274F21 25571886    *->4URI10...@.v...y...yjq..|....f*
0BA8AEE0  F34C60E4 D9C9F1F0 0BA50FB0 00001162  0BA88D78 0BA89198 03274F21 25571892    *3<-URI10.v.......y...yjq..|....k*
0BA8AF00  D6D7C5D5 C5D9F240 0BA86728 00000000  00000000 00000000 03274F21 25571892    *OPENER2 .y..............|....k*
0BA8AF20  00000000 00000000 00024000 00024000  20032806 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BA8AF40  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *............................*
0BA8AF60  F24C60E4 D9C9F1F0 0BA51E26 00000FF0  0BA88958 0BA88D78 03274F21 25571892    *2<-URI10.v.....0.yi..y....|....k*
0BA8AF80  606EF3E4 D9C9F1F0 00001C16 0BA50234  0BA88958 0BA88D78 03274F21 25572087    *->3URI10.....v...yi..y....|....g*
```

Figure 173. Example of Internal Trace Table Entries (Part 1 of 7)

```
0BA8AFA0  D6D7C5D5 C5D9F140 0BA86728 00000000  00000000 00000000 03274F21 25572087    *OPENER1 .y.............|....g*
0BA8AFC0  00000000 00000000 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8AFE0  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *.............................*
0BA8B000  606EF4E4 D9C9F1F0 00000D7C 0BA5023A  0BA88D78 0BA89198 03274F21 25572299    *->4URI10...@.v...y...yjq..|....r*
0BA8B020  F34C60E4 D9C9F1F0 0BA50FB0 00001162  0BA88D78 0BA89198 03274F21 25572303    *3<-URI10.v.......y...yjq..|.....*
0BA8B040  D6D7C5D5 C5D9F240 0BA86728 00000000  00000000 00000000 03274F21 25572303    *OPENER2 .y.............|.....*
0BA8B060  00000000 00000000 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8B080  00002000 00000020 00000000 00000000  00000000 00000000 00000000 00000012    *.............................*
0BA8B0A0  F24C60E4 D9C9F1F0 0BA51E26 00000FF0  0BA88958 0BA88D78 03274F21 25572303    *2<-URI10.v.....0.yi..y....|.....*
0BA8B0C0  606EF3E4 D9C9F3F0 000007BE 0BA53474  0BA88958 0BA88D78 03274F21 25572303    *->3URI30.....v...yi..y....|.....*
0BA8B0E0  F24C60E4 D9C9F3F0 0BA509CE 00000EB2  0BA88958 0BA88D78 03274F21 25572341    *2<-URI30.v.......yi..y....|.....*
0BA8B100  F14C60E4 D9C9F1F0 0BA4BDAA 00000942  0BA88010 0BA88958 03274F21 25572341    *1<-URI10.u.......y...yi...|.....*
0BA8B120  606EF2E4 D9C9F5F0 00001C4C 0BA58C68  0BA88010 0BA88958 03274F21 25572341    *->2URI50...<.v...y...yi...|.....*
0BA8B140  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA88958 0BA88C78 03274F21 25572341    *DSPSTACK.v...v...yi..y....|.....*
0BA8B160  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 25572341    *GETFEED .y.............|.....*
0BA8B180  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8B1A0  00002000 80500000 00000000 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8B1C0  F14C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88010 0BA88958 03274F21 25572341    *1<-URI50.u.......y...yi...|.....*
0BA8B1E0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 25572341    *GETFEED .y.............|.....*
0BA8B200  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8B220  00002000 80500000 00000000 0BC72000  00000280 00000100 C7C5E340 40400000    *.....&.......G.........GET   ..*
0BA8B240  606EF2C4 C5D8F0F0 000042F4 0BA0DA68  0BA88010 0BA88958 03274F21 25572342    *->2DEQ00...4.....y...yi...|.....*
0BA8B260  F14C60C4 C5D8F0F0 0BA4F10C 000007EE  0BA88010 0BA88958 03274F21 25572343    *1<-DEQ00.u1......y...yi...|.....*
0BA8B280  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 25572343    *DSPURI00.y.............|.....*
0BA8B2A0  C5D5C4C9 D9C3C1D9 F1F201D8 D6000600  D7C8E8E2 C9C3C1D3 40D6D7C5 D5404040    *ENDIRCAR12.QO...PHYSICAL OPEN   *
0BA8B2C0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BA8B2E0  F04C60E4 D9C9F0F0 0BA85674 0000084E  0BA01A30 0BA88010 03274F21 25572343    *0<-URI00.y.....+.....y....|.....*
0BA8B300  C4E2D7C3 D9E3D9F0 0A30DCB4 20212002  00000000 0BA86728 03274F21 27020292    *DSPCRTR0.............y....|....k*
0BA8B320  00000000 00000000 00CE8E50 00000001  0BA86728 00000000 00000000 00000000    *...........&.....y.............*
0BA8B340  00000000 00000000 00000000 0AEAA008  0A0AC8E0 80000000 00000000 00000000    *.................H.............*
0BA8B360  606EF1E7 C4D3F0F0 80009C6E 0BC76D90  000061C8 0BA88010 03274F21 27042660    *->1XDL00...>.G_.../H.y....|....-*
0BA8B380  606EF2E4 D9C9F0F0 00000240 0BA4AE18  0BA88010 0BA886B8 03274F21 27042696    *->2URI00... .u...y...yf...|....o*
0BA8B3A0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27042696    *DSPURI00.y.............|....o*
0BA8B3C0  D4D6C4C9 D9C3C1D9 F1F201D8 D6000000  40D3D6C7 C9C3C1D3 40D6D7C5 D5404040    *MODIRCAR12.QO... LOGICAL OPEN   *
0BA8B3E0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BA8B400  606EF3D9 E2E5F0F0 00001270 0BA80FA0  0BA886B8 0BA89000 03274F21 27042696    *->3RSV00.....y...yf..y....|....o*
0BA8B420  F24C60D9 E2E5F0F0 0BA4C088 0000022A  0BA886B8 0BA89000 03274F21 27042698    *2<-RSV00.u.h.....yf..y....|....q*
0BA8B440  606EF3E4 D9C9F3F0 00001340 0BA5347A  0BA886B8 0BA89000 03274F21 27042698    *->3URI30... .v.:.yf..y....|....q*
0BA8B460  606EF4E4 D9C9F2F0 00001424 0BA522D8  0BA89000 0BA898A0 03274F21 27042801    *->4URI20.....v.Q.y...yq...|.....*
0BA8B480  F34C60E4 D9C9F2F0 0BA5489E 00000C2A  0BA89000 0BA898A0 03274F21 27042801    *3<-URI20.v.......y...yq...|.....*
0BA8B4A0  F24C60E4 D9C9F3F0 0BA4C158 00000F8E  0BA886B8 0BA89000 03274F21 27042801    *2<-URI30.uA......yf..y....|.....*
0BA8B4C0  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA886B8 0BA89000 03274F21 27042801    *->3URI50...<.v...yf..y....|.....*
0BA8B4E0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA89000 0BA89320 03274F21 27042801    *DSPSTACK.v...v...y...yl...|.....*
0BA8B500  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27042801    *GETFEED .y.............|.....*
0BA8B520  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8B540  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8B560  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA886B8 0BA89000 03274F21 27042801    *2<-URI50.u.......yf..y....|.....*
0BA8B580  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27042801    *GETFEED .y.............|.....*
0BA8B5A0  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8B5C0  00002000 80500000 0BA01138 0BC6E000  00000280 00000100 C7C5E340 40400000    *.....&.......F.........GET   ..*
0BA8B5E0  F14C60E4 D9C9F0F0 0BC76FD0 0000084E  0BA88010 0BA886B8 03274F21 27042802    *1<-URI00.G?....+.y...yf...|.....*
0BA8B600  606EF2E4 D9C9F0F0 00000A84 0BA4AE18  0BA88010 0BA886B8 03274F21 27042802    *->2URI00...d.u...y...yf...|.....*
0BA8B620  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27042802    *DSPURI00.y.............|.....*
0BA8B640  D4D6C4C9 D9C3C1D9 F1F201D8 D3002000  C4C9D9C5 C3E340D3 D6C3C1E3 C5404040    *MODIRCAR12.QL...DIRECT LOCATE   *
0BA8B660  C8C2C8C4 D6D1F0F1 00000000 00000000  18000000 00000000 00000000 00000000    *HBHDOJ01......................*
0BA8B680  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA886B8 0BA89000 03274F21 27042802    *->3URI50...<.v...yf..y....|.....*
0BA8B6A0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA89000 0BA89320 03274F21 27042802    *DSPSTACK.v...v...y...yl...|.....*
0BA8B6C0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27042804    *GETFEED .y.............|.....*
0BA8B6E0  93080010 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *l......... ... ....... ... .....*
0BA8B700  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8B720  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA886B8 0BA89000 03274F21 27042804    *2<-URI50.u.......yf..y....|.....*
0BA8B740  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27042804    *GETFEED .y.............|.....*
0BA8B760  93080010 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *l......... ... ....... ... .....*
0BA8B780  00002000 80500000 0BA01138 0BC6E000  00000280 00000100 C7C5E340 40400000    *.....&.......F.........GET   ..*
0BA8B7A0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27042804    *DSPURI00.y.............|.....*
0BA8B7C0  C5D5C4C9 D9C3C1D9 F1F20004 D3002000  D9C5C3D6 D9C440D5 D6E340C6 D6E4D5C4    *ENDIRCAR12..L...RECORD NOT FOUND*
0BA8B7E0  C8C2C8C4 D6D1F0F1 00000000 00000000  18000000 00000000 00000000 00000000    *HBHDOJ01......................*
0BA8B800  F14C60E4 D9C9F0F0 0BC77814 0000084E  0BA88010 0BA886B8 03274F21 27042804    *1<-URI00.G.....+.y...yf...|.....*
0BA8B820  606EF2E4 D9C9F0F0 00000A84 0BA4AE18  0BA88010 0BA886B8 03274F21 27042804    *->2URI00...d.u...y...yf...|.....*
```

Figure 173. Example of Internal Trace Table Entries (Part 2 of 7)

```
0BA8B840  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27042804    *DSPURI00.y.............|.....*
0BA8B860  D4D6C4C9 D9C3C1D9 F1F201D8 D3002000  C4C9D9C5 C3E340D3 D6C3C1E3 C5404040    *MODIRCAR12.QL...DIRECT LOCATE   *
0BA8B880  C8C2C8C4 D6D2F0F1 00000000 00000000  18000000 00000000 00000000 00000000    *HBHDOK01.......................*
0BA8B8A0  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA886B8 0BA89000 03274F21 27042804    *->3URI50...<.v...yf..y....|.....*
0BA8B8C0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA89000 0BA89320 03274F21 27042804    *DSPSTACK.v...v...y...yl...|.....*
0BA8B8E0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27042804    *GETFEED .y.............|.....*
0BA8B900  93080010 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *l......... ... ....... ... .....*
0BA8B920  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8B940  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA886B8 0BA89000 03274F21 27042804    *2<-URI50.u.......yf..y....|.....*
0BA8B960  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27042804    *GETFEED .y.............|.....*
0BA8B980  93080010 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *l......... ... ....... ... .....*
0BA8B9A0  00002000 80500000 0BA01138 00000000  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8B9C0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27042804    *DSPURI00.y.............|.....*
0BA8B9E0  C5D5C4C9 D9C3C1D9 F1F20004 D3002000  D9C5C3D6 D9C440D5 D6E340C6 D6E4D5C4    *ENDIRCAR12..L...RECORD NOT FOUND*
0BA8BA00  C8C2C8C4 D6D2F0F1 00000000 00000000  18000000 00000000 00000000 00000000    *HBHDOK01.......................*
0BA8BA20  F14C60E4 D9C9F0F0 0BC77814 0000084E  0BA88010 0BA886B8 03274F21 27042804    *1<-URI00.G.....+.y...yf...|.....*
0BA8BA40  606EF2E4 D9C9F0F0 000007C8 0BA4AE18  0BA88010 0BA886B8 03274F21 27042804    *->2URI00...H.u...y...yf...|.....*
0BA8BA60  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27042804    *DSPURI00.y.............|.....*
0BA8BA80  D4D6C4C9 D9C3C1D9 F1F201D8 C3002000  40D3D6C7 C9C3C1D3 40C3D3D6 E2C54040    *MODIRCAR12.QC... LOGICAL CLOSE  *
0BA8BAA0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BA8BAC0  606EF3C4 C5D8F0F0 000042F4 0BA0DA68  0BA886B8 0BA89000 03274F21 27042805    *->3DEQ00...4.....yf..y....|.....*
0BA8BAE0  F24C60C4 C5D8F0F0 0BA4F10C 000007EE  0BA886B8 0BA89000 03274F21 27042805    *2<-DEQ00.u1.....yf..y....|.....*
0BA8BB00  F14C60E4 D9C9F0F0 0BC77558 0000084E  0BA88010 0BA886B8 03274F21 27042805    *1<-URI00.G.....+.y...yf...|.....*
0BA8BB20  F04C60E7 C4D3F0F0 00009C6E 000008B6  000061C8 0BA88010 03274F21 27042805    *0<-XDL00...>....../H.y....|.....*
0BA8BB40  C3D9E3D9 F0E7C9E3 0A30DCB4 20212002  00000000 0BA86728 03274F21 27042805    *CRTR0XIT.............y....|.....*
0BA8BB60  00000000 0A313820 0A30DCB4 0A649490  00000008 C4C6E2C2 D9D3E2C2 00000100    *.............m.....DFSBRLSB....*
0BA8BB80  20212002 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *................................*
0BA8BBA0  C4E2D7C3 D9E3D9F0 0A239B4E 44722002  00000000 0BA86728 03274F21 27050704    *DSPCRTR0...+.........y....|.....*
0BA8BBC0  00000000 00000000 00CE8E50 00000001  0BA86728 00000000 00000000 00000000    *.............&.....y...........*
0BA8BBE0  00000000 00000000 00000000 C9D4E2C7  E2C7F140 00D1C024 00000000 00000000    *.............IMSGSG1 .J.........*
0BA8BC00  606EF16F 6F6F6F6F 800098AC 0BA22010  000061C8 0BA88010 03274F21 27050704    *->1?????..q..s..../H.y....|.....*
0BA8BC20  606EF2E4 D9C9F0F0 0000015A 0BA4AE18  0BA88010 0BA88068 03274F21 27050704    *->2URI00...!.u...y...y....|.....*
0BA8BC40  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27050704    *DSPURI00.y.............|.....*
0BA8BC60  D4D6C4C9 D9C3C1D9 F1F201D8 D6002000  40D3D6C7 C9C3C1D3 40D6D7C5 D5404040    *MODIRCAR12.QO... LOGICAL OPEN   *
0BA8BC80  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BA8BCA0  606EF3D9 E2E5F0F0 00001270 0BA80FA0  0BA88068 0BA889B0 03274F21 27050704    *->3RSV00.....y...y...yi...|.....*
0BA8BCC0  F24C60D9 E2E5F0F0 0BA4C088 0000022A  0BA88068 0BA889B0 03274F21 27050705    *2<-RSV00.u.h.....y...yi...|.....*
0BA8BCE0  606EF3E4 D9C9F3F0 00001340 0BA5347A  0BA88068 0BA889B0 03274F21 27050705    *->3URI30... .v.:.y...yi...|.....*
0BA8BD00  F24C60E4 D9C9F3F0 0BA4C158 00000F8E  0BA88068 0BA889B0 03274F21 27050710    *2<-URI30.uA......y...yi...|.....*
0BA8BD20  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88068 0BA889B0 03274F21 27050710    *->3URI50...<.v...y...yi...|.....*
0BA8BD40  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA889B0 0BA88CD0 03274F21 27050710    *DSPSTACK.v...v...yi..y....|.....*
0BA8BD60  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27050710    *GETFEED .y.............|.....*
0BA8BD80  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8BDA0  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8BDC0  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88068 0BA889B0 03274F21 27050710    *2<-URI50.u.......y...yi...|.....*
0BA8BDE0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27050710    *GETFEED .y.............|.....*
0BA8BE00  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8BE20  00002000 80500000 0BA01138 0BC72000  00000280 00000100 C7C5E340 40400000    *.....&.......G.........GET   ..*
0BA8BE40  F14C60E4 D9C9F0F0 0BA2216A 0000084E  0BA88010 0BA88068 03274F21 27050711    *1<-URI00.s.....+.y...y....|.....*
0BA8BE60  606EF2E4 D9C9F0F0 00000196 0BA4AE18  0BA88010 0BA88068 03274F21 27050711    *->2URI00...o.u...y...y....|.....*
0BA8BE80  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27050711    *DSPURI00.y.............|.....*
0BA8BEA0  D4D6C4C9 D9C3C1D9 F1F201D8 D3002000  C4C9D9C5 C3E340D3 D6C3C1E3 C5404040    *MODIRCAR12.QL...DIRECT LOCATE   *
0BA8BEC0  FFFFFFFF FFFF0000 C9D4E2C7 E2C7F140  3A000000 00000000 00000000 00000000    *........IMSGSG1 ...............*
0BA8BEE0  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88068 0BA889B0 03274F21 27050711    *->3URI50...<.v...y...yi...|.....*
0BA8BF00  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA889B0 0BA88CD0 03274F21 27050711    *DSPSTACK.v...v...yi..y....|.....*
0BA8BF20  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27050712    *GETFEED .y.............|.....*
0BA8BF40  00000000 000000E0 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8BF60  00002000 80500000 0BA01138 0BAB059C  000000E0 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8BF80  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88068 0BA889B0 03274F21 27050712    *2<-URI50.u.......y...yi...|.....*
0BA8BFA0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 27050712    *GETFEED .y.............|.....*
0BA8BFC0  00000000 000000E0 00024000 00024000  20032806 00024000 00024000 00023000    *......... ... ....... ... .....*
0BA8BFE0  00002000 80500000 0BA01138 0BC6DCF0  000000E0 00000100 C7C5E340 40400000    *.....&.......F.0........GET   ..*
0BA8C000  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27050712    *DSPURI00.y.............|.....*
0BA8C020  C5D5C4C9 D9C3C1D9 F1F200E0 D3002000  D9C5C3D6 D9C440E6 C1E240C6 D6E4D5C4    *ENDIRCAR12..L...RECORD WAS FOUND*
0BA8C040  FFFFFFFF FFFF0000 C9D4E2C7 E2C7F140  3A000000 00000000 00000000 00000000    *........IMSGSG1 ...............*
0BA8C060  F14C60E4 D9C9F0F0 0BA221A6 0000084E  0BA88010 0BA88068 03274F21 27050712    *1<-URI00.s.w...+.y...y....|.....*
0BA8C080  606EF2E4 D9C9F0F0 0000024E 0BA4AE18  0BA88010 0BA88068 03274F21 27050712    *->2URI00...+.u...y...y....|.....*
0BA8C0A0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 27050712    *DSPURI00.y.............|.....*
0BA8C0C0  D4D6C4C9 D9C3C1D9 F1F201D8 C3002000  40D3D6C7 C9C3C1D3 40C3D3D6 E2C54040    *MODIRCAR12.QC... LOGICAL CLOSE  *
```

Figure 173. Example of Internal Trace Table Entries (Part 3 of 7)

```
0BA8C0E0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                               ........*
0BA8C100  606EF3C4 C5D8F0F0 000042F4 0BA0DA68  0BA88068 0BA889B0 03274F21 27050712    *->3DEQ00...4.....y...yi...|.....*
0BA8C120  F24C60C4 C5D8F0F0 0BA4F10C 000007EE  0BA88068 0BA889B0 03274F21 27050713    *2<-DEQ00.u1.....y...yi...|.....*
0BA8C140  F14C60E4 D9C9F0F0 0BA2225E 0000084E  0BA88010 0BA88068 03274F21 27050713    *1<-URI00.s.;...+.y...y....|.....*
0BA8C160  F04C606F 6F6F6F6F 000098AC 00000278  000061C8 0BA88010 03274F21 27050713    *0<-?????..q......./H.y....|.....*
0BA8C180  C3D9E3D9 F0E7C9E3 0A239B4E 44722002  00000000 0BA86728 03274F21 27050713    *CRTR0XIT...+.........y....|.....*
0BA8C1A0  00000000 0A115E40 0A239B4E 0A649490  00000000 C4C6E2C2 D9D3E2C2 00000100    *......; ...+..m.....DFSBRLSB....*
0BA8C1C0  44722002 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *................................*
0BA8C1E0  C4E2D7C3 D9E3D9F0 0A23E56C 17172002  00000000 0BA86728 03274F21 29025787    *DSPCRTR0..V%.........y....|....g*
0BA8C200  00000000 00000000 00CE8E50 00000001  0BA86728 00000000 00000000 00000000    *...........&.....y..............*
0BA8C220  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *................................*
0BA8C240  606EF1E2 E2C9C7D5 8000972C 0BA327B8  000061C8 0BA88010 03274F21 29025787    *->1SSIGN..p..t..../H.y....|....g*
0BA8C260  606EF2E4 D9C9F0F0 0000020C 0BA4AE18  0BA88010 0BA88220 03274F21 29025787    *->2URI00.....u...y...yb...|....g*
0BA8C280  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 29025787    *DSPURI00.y.............|....g*
0BA8C2A0  D4D6C4C9 D9C3C1D9 F1F201D8 D6002000  40D3D6C7 C9C3C1D3 40D6D7C5 D5404040    *MODIRCAR12.QO... LOGICAL OPEN   *
0BA8C2C0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                               ........*
0BA8C2E0  606EF3D9 E2E5F0F0 00001270 0BA80FA0  0BA88220 0BA88B68 03274F21 29025788    *->3RSV00.....y...yb..y....|....h*
0BA8C300  F24C60D9 E2E5F0F0 0BA4C088 0000022A  0BA88220 0BA88B68 03274F21 29025792    *2<-RSV00.u.h.....yb..y....|....k*
0BA8C320  606EF3E4 D9C9F3F0 00001340 0BA5347A  0BA88220 0BA88B68 03274F21 29025792    *->3URI30... .v.:.yb..y....|....k*
0BA8C340  F24C60E4 D9C9F3F0 0BA4C158 00000F8E  0BA88220 0BA88B68 03274F21 29025797    *2<-URI30.uA......yb..y....|....p*
0BA8C360  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88220 0BA88B68 03274F21 29025797    *->3URI50...<.v...yb..y....|....p*
0BA8C380  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA88B68 0BA88E88 03274F21 29025797    *DSPSTACK.v...v...y...y.h..|....p*
0BA8C3A0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 29025797    *GETFEED .y.............|....p*
0BA8C3C0  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BA8C3E0  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8C400  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88220 0BA88B68 03274F21 29025797    *2<-URI50.u.......yb..y....|....p*
0BA8C420  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 29025797    *GETFEED .y.............|....p*
0BA8C440  00000000 00000280 00024000 00024000  20032806 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BA8C460  00002000 80500000 0BA01138 0BC6E000  00000280 00000100 C7C5E340 40400000    *.....&.......F.........GET   ..*
0BA8C480  F14C60E4 D9C9F0F0 0BA329C4 0000084E  0BA88010 0BA88220 03274F21 29025797    *1<-URI00.t.D...+.y...yb...|....p*
0BA8C4A0  606EF2E4 D9C9F0F0 00000CA0 0BA4AE18  0BA88010 0BA88220 03274F21 29025797    *->2URI00.....u...y...yb...|....p*
0BA8C4C0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 29025797    *DSPURI00.y.............|....p*
0BA8C4E0  D4D6C4C9 D9C3C1D9 F1F201D8 D3002000  C4C9D9C5 C3E340D3 D6C3C1E3 C5404040    *MODIRCAR12.QL...DIRECT LOCATE   *
0BA8C500  FFFFFFFF FFFF0000 C9D4E2C7 E2C7F140  3A000000 00000000 00000000 00000000    *........IMSGSG1 ................*
0BA8C520  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88220 0BA88B68 03274F21 29025798    *->3URI50...<.v...yb..y....|....q*
0BA8C540  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA88B68 0BA88E88 03274F21 29025798    *DSPSTACK.v...v...y...y.h..|....q*
0BA8C560  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 29025798    *GETFEED .y.............|....q*
0BA8C580  00000000 000000E0 00024000 00024000  20032806 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BA8C5A0  00002000 80500000 0BA01138 0BAB059C  000000E0 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BA8C5C0  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88220 0BA88B68 03274F21 29025798    *2<-URI50.u.......yb..y....|....q*
0BA8C5E0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 29025799    *GETFEED .y.............|....r*
0BA8C600  00000000 000000E0 00024000 00024000  20032806 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BA8C620  00002000 80500000 0BA01138 0BC6DCF0  000000E0 00000100 C7C5E340 40400000    *.....&.......F.0........GET   ..*
0BA8C640  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 29025799    *DSPURI00.y.............|....r*
0BA8C660  C5D5C4C9 D9C3C1D9 F1F200E0 D3002000  D9C5C3D6 D9C440E6 C1E240C6 D6E4D5C4    *ENDIRCAR12..L...RECORD WAS FOUND*
0BA8C680  FFFFFFFF FFFF0000 C9D4E2C7 E2C7F140  3A000000 00000000 00000000 00000000    *........IMSGSG1 ................*
0BA8C6A0  F14C60E4 D9C9F0F0 0BA33458 0000084E  0BA88010 0BA88220 03274F21 29025799    *1<-URI00.t.....+.y...yb...|....r*
0BA8C6C0  606EF2E4 D9C9F0F0 00000E18 0BA4AE18  0BA88010 0BA88220 03274F21 29025799    *->2URI00.....u...y...yb...|....r*
0BAAA240  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34301939    *DSPURI00.y.............|.....*
0BAAA260  D4D6C4C9 D9C3C1D9 F1F200A0 D4002000  C3C8C1D5 C7C540D6 D3C440D9 C5C3D9C4    *MODIRCAR12..M...CHANGE OLD RECRD*
0BAAA280  00000000 00000000 00000000 00000000  07200327 4F212904 50000002 8D000000    *.................|...&.......*
0BAAA2A0  606EF5E4 D9C9F5F0 00001C4C 0BA58C68  0BAD3010 0BAD3958 03274F21 34301939    *->5URI50...<.v.........|.....*
0BAAA2C0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BAD3958 0BAD3C78 03274F21 34301939    *DSPSTACK.v...v.........|.....*
0BAAA2E0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34301939    *GETFEED .y.............|.....*
0BAAA300  00000000 00000080 00024000 00024000  20032816 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BAAA320  00002000 80500000 0BA01138 0BAB059C  00000080 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAA340  F44C60E4 D9C9F5F0 0BA4CA64 000002DE  0BAD3010 0BAD3958 03274F21 34301939    *4<-URI50.u.............|.....*
0BAAA360  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34301939    *GETFEED .y.............|.....*
0BAAA380  00000000 00000080 00024000 00024000  20032816 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BAAA3A0  00002000 80500000 0BA01138 0BC732A0  00000080 00000100 C7C5E340 40400000    *.....&.......G.........GET   ..*
0BAAA3C0  606EF5E4 D9C9F5F0 00003F98 0BA58C68  0BAD3010 0BAD3958 03274F21 34301939    *->5URI50...q.v.........|.....*
0BAAA3E0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BAD3958 0BAD3C78 03274F21 34301939    *DSPSTACK.v...v.........|.....*
0BAAA400  606EF6E4 D9C9F5F0 00001B66 0BA58C68  0BAD3958 0BAD3D20 03274F21 34301939    *->6URI50.....v.........|.....*
0BAAA420  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BAD3D20 0BAD4040 03274F21 34301940    *DSPSTACK.v...v........  ..|.... *
0BAAA440  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34301940    *GETFEED .y.............|.... *
0BAAA460  00000000 00000080 00024000 00024000  20032816 00024000 00024000 00023000    *.......... ... ....... ... .....*
0BAAA480  00002000 80500000 0BA01138 0BAD3ADC  00000080 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAA4A0  F54C60E4 D9C9F5F0 0BA5A7CE 000002DE  0BAD3958 0BAD3D20 03274F21 34301940    *5<-URI50.vx............|.... *
0BAAA4C0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34301972    *GETFEED .y.............|.....*
```

Figure 173. Example of Internal Trace Table Entries (Part 4 of 7)

```
0BAAA4E0  00000000 000000A0 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAA500  00002000 80500000 0BA01138 0BACFFA0  000000A0 00000101 D7E4E340 40400000    *.....&.................PUT   ..*
0BAAA520  606EF6E4 D9C9F5F0 00001B66 0BA58C68  0BAD3958 0BAD3D20 03274F21 34301972    *->6URI50.....v............|.....*
0BAAA540  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BAD3D20 0BAD4040 03274F21 34301972    *DSPSTACK.v...v........  ..|.....*
0BAAA560  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34301973    *GETFEED .y................|.....*
0BAAA580  00000000 00000080 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAA5A0  00002000 80500000 0BA013B8 0BAD3ADC  00000080 00000200 C7C5E340 40400000    *.....&.................GET   ..*
0BAAA5C0  F54C60E4 D9C9F5F0 0BA5A7CE 000002DE  0BAD3958 0BAD3D20 03274F21 34301973    *5<-URI50.vx...............|.....*
0BAAA5E0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302023    *GETFEED .y................|.....*
0BAAA600  00000000 000000A0 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAA620  00002000 80500000 0BA013B8 0BAEDFA0  000000A0 00000201 D7E4E340 40400000    *.....&.................PUT   ..*
0BAAA640  F44C60E4 D9C9F5F0 0BA4EDB0 000002DE  0BAD3010 0BAD3958 03274F21 34302023    *4<-URI50.u................|.....*
0BAAA660  F34C60E4 D9C9F0F0 0BA60F70 0000084E  0BA89560 0BAD3010 03274F21 34302023    *3<-URI00.w.....+.yn-......|.....*
0BAAA680  F24C60E4 D9E3F1F0 0BA5F5E4 000012AA  0BA88C48 0BA89560 03274F21 34302023    *2<-URT10.v5U.....y...yn-..|.....*
0BAAA6A0  606EF3E4 D9C9F0F0 000003D2 0BA4AE18  0BA88C48 0BA89560 03274F21 34302023    *->3URI00...K.u...y...yn-..|.....*
0BAAA6C0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302023    *DSPURI00.y................|.....*
0BAAA6E0  D4D6C4C9 D9C3C1D9 F1F201D8 C3002000  40D3D6C7 C9C3C1D3 40C3D3D6 E2C54040    *MODIRCAR12.QC... LOGICAL CLOSE  *
0BAAA700  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BAAA720  F24C60E4 D9C9F0F0 0BA5CECA 0000084E  0BA88C48 0BA89560 03274F21 34302023    *2<-URI00.v.....+.y...yn-..|.....*
0BAAA740  F14C60E4 D9E3F0F0 0BA0657E 000003FC  0BA88010 0BA88C48 03274F21 34302024    *1<-URT00...=.....y...y....|.....*
0BAAA760  606EF2E4 D9E4D7C4 00000EF0 0BA6F880  0BA88010 0BA88C48 03274F21 34302024    *->2URUPD...0.w8..y...y....|.....*
0BAAA780  606EF3E4 D9C9F0F0 000006CA 0BA4AE18  0BA88C48 0BA892F0 03274F21 34302024    *->3URI00.....u...y...yk0..|.....*
0BAAA7A0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302024    *DSPURI00.y................|.....*
0BAAA7C0  D4D6C4C9 D9C3C1D9 F1F201D8 D3002000  C4C9D9C5 C3E340D3 D6C3C1E3 C5404040    *MODIRCAR12.QL...DIRECT LOCATE   *
0BAAA7E0  00000000 00000000 00000000 00000000  01000000 00000000 00000000 00000000    *................................*
0BAAA800  606EF4E4 D9C9F5F0 00001C4C 0BA58C68  0BA892F0 0BA89C38 03274F21 34302024    *->4URI50...<.v...yk0.y....|.....*
0BAAA820  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA89C38 0BA89F58 03274F21 34302024    *DSPSTACK.v...v...y...y....|.....*
0BAAA840  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302024    *GETFEED .y................|.....*
0BAAA860  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAA880  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAA8A0  F34C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA892F0 0BA89C38 03274F21 34302024    *3<-URI50.u.......yk0.y....|.....*
0BAAA8C0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302024    *GETFEED .y................|.....*
0BAAA8E0  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAA900  00002000 80500000 0BA01138 0BC6A000  00000280 00000100 C7C5E340 40400000    *.....&.......F..........GET   ..*
0BAAA920  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302024    *DSPURI00.y................|.....*
0BAAA940  C5D5C4C9 D9C3C1D9 F1F20280 D3002000  D9C5C3D6 D9C440E6 C1E240C6 D6E4D5C4    *ENDIRCAR12..L...RECORD WAS FOUND*
0BAAA960  00000000 00000000 00000000 00000000  01000000 00000000 00000000 00000000    *................................*
0BAAA980  F24C60E4 D9C9F0F0 0BA6FF4A 0000084E  0BA88C48 0BA892F0 03274F21 34302024    *2<-URI00.w.....+.y...yk0..|.....*
0BAAA9A0  606EF3E4 D9C9F0F0 0000071E 0BA4AE18  0BA88C48 0BA892F0 03274F21 34302024    *->3URI00.....u...y...yk0..|.....*
0BAAA9C0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302024    *DSPURI00.y................|.....*
0BAAA9E0  D4D6C4C9 D9C3C1D9 F1F20280 D4002000  C3C8C1D5 C7C540D6 D3C440D9 C5C3D9C4    *MODIRCAR12..M...CHANGE OLD RECRD*
0BAAAA00  00000000 00000000 00000000 00000000  01000000 00000000 00000000 00000000    *................................*
0BAAAA20  606EF4E4 D9C9F5F0 00001C4C 0BA58C68  0BA892F0 0BA89C38 03274F21 34302024    *->4URI50...<.v...yk0.y....|.....*
0BAAAA40  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA89C38 0BA89F58 03274F21 34302024    *DSPSTACK.v...v...y...y....|.....*
0BAAAA60  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302024    *GETFEED .y................|.....*
0BAAAA80  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAAAA0  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAAAC0  F34C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA892F0 0BA89C38 03274F21 34302025    *3<-URI50.u.......yk0.y....|.....*
0BAAAAE0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302025    *GETFEED .y................|.....*
0BAAAB00  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAAB20  00002000 80500000 0BA01138 0BC6A000  00000280 00000100 C7C5E340 40400000    *.....&.......F..........GET   ..*
0BAAAB40  606EF4E4 D9C9F5F0 00003F98 0BA58C68  0BA892F0 0BA89C38 03274F21 34302025    *->4URI50...q.v...yk0.y....|.....*
0BAAAB60  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA89C38 0BA89F58 03274F21 34302025    *DSPSTACK.v...v...y...y....|.....*
0BAAAB80  606EF5E4 D9C9F5F0 00001B66 0BA58C68  0BA89C38 0BAD3010 03274F21 34302025    *->5URI50.....v...y........|.....*
0BAAABA0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BAD3010 0BAD3330 03274F21 34302025    *DSPSTACK.v...v............|.....*
0BAAABC0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302025    *GETFEED .y................|.....*
0BAAABE0  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAAC00  00002000 80500000 0BA01138 0BA89DBC  00000280 00000100 C7C5E340 40400000    *.....&.......y..........GET   ..*
0BAAAC20  F44C60E4 D9C9F5F0 0BA5A7CE 000002DE  0BA89C38 0BAD3010 03274F21 34302025    *4<-URI50.vx......y........|.....*
0BAAAC40  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302112    *GETFEED .y................|.....*
0BAAAC60  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAAC80  00002000 80500000 0BA01138 0BACFFA0  00000280 00000101 D7E4E340 40400000    *.....&.................PUT   ..*
0BAAACA0  606EF5E4 D9C9F5F0 00001B66 0BA58C68  0BA89C38 0BAD3010 03274F21 34302113    *->5URI50.....v...y........|.....*
0BAAACC0  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BAD3010 0BAD3330 03274F21 34302113    *DSPSTACK.v...v............|.....*
0BAAACE0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302113    *GETFEED .y................|.....*
0BAAAD00  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAAD20  00002000 80500000 0BA013B8 0BA89DBC  00000280 00000200 C7C5E340 40400000    *.....&.......y..........GET   ..*
0BAAAD40  F44C60E4 D9C9F5F0 0BA5A7CE 000002DE  0BA89C38 0BAD3010 03274F21 34302113    *4<-URI50.vx......y........|.....*
0BAAAD60  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302133    *GETFEED .y................|.....*
```

Figure 173. Example of Internal Trace Table Entries (Part 5 of 7)

```
0BAAAD80  00000000 00000280 00024000 00024000  20032816 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAADA0  00002000 80500000 0BA013B8 0BAEDFA0  00000280 00000201 D7E4E340 40400000    *.....&.................PUT   ..*
0BAAADC0  F34C60E4 D9C9F5F0 0BA4EDB0 000002DE  0BA892F0 0BA89C38 03274F21 34302133    *3<-URI50.u.......yk0.y....|.....*
0BAAADE0  F24C60E4 D9C9F0F0 0BA6FF9E 0000084E  0BA88C48 0BA892F0 03274F21 34302133    *2<-URI00.w.....+.y...yk0..|.....*
0BAAAE00  F14C60E4 D9E4D7C4 0BA066C8 00000202  0BA88010 0BA88C48 03274F21 34302133    *1<-URUPD...H.....y...y....|.....*
0BAAAE20  606EF2E4 D9C9F0F0 00000362 0BA4AE18  0BA88010 0BA88C48 03274F21 34302133    *->2URI00.....u...y...y....|.....*
0BAAAE40  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302134    *DSPURI00.y.............|.....*
0BAAAE60  D4D6C4C9 D9C3C1D9 F1F201D8 C3002000  40D3D6C7 C9C3C1D3 40C3D3D6 E2C54040    *MODIRCAR12.QC... LOGICAL CLOSE  *
0BAAAE80  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BAAAEA0  606EF3E4 D9C9F3F0 000020B0 0BA53474  0BA88C48 0BA89590 03274F21 34302134    *->3URI30.....v...y...yn...|.....*
0BAAAEC0  F24C60E4 D9C9F3F0 0BA4CEC8 00000EB2  0BA88C48 0BA89590 03274F21 34302168    *2<-URI30.u.H.....y...yn...|.....*
0BAAAEE0  606EF3C4 C5D8F0F0 000042F4 0BA0DA68  0BA88C48 0BA89590 03274F21 34302168    *->3DEQ00...4.....y...yn...|.....*
0BAAAF00  F24C60C4 C5D8F0F0 0BA4F10C 000007EE  0BA88C48 0BA89590 03274F21 34302170    *2<-DEQ00.u1......y...yn...|.....*
0BAAAF20  F14C60E4 D9C9F0F0 0BA05B3A 0000084E  0BA88010 0BA88C48 03274F21 34302170    *1<-URI00..$....+.y...y....|.....*
0BAAAF40  F04C60C1 D3C4F0F0 000096AA 00000524  000061C8 0BA88010 03274F21 34302170    *0<-ALD00..o......./H.y....|.....*
0BAAAF60  C3D9E3D9 F0E7C9E3 09F8A56C 07052002  00001000 0BA86728 03274F21 34302170    *CRTR0XIT.8v%.........y....|.....*
0BAAAF80  00000000 09FC1900 09F8A56C 0A649490  00000000 C4C6E2C2 D9D3E2C2 00000100    *.........8v%..m.....DFSBRLSB....*
0BAAAFA0  07052002 00001000 00000000 00000000  00000000 00000000 00000000 00000000    *................................*
0BAAAFC0  C4E2D7C3 D9E3D9F0 09F8A56C 070B2002  00001000 0BA86728 03274F21 34302257    *DSPCRTR0.8v%.........y....|.....*
0BAAAFE0  00000000 00000000 00CE8E50 00000001  0BA86728 09F89050 0A6F2038 00000000    *...........&.....y...8.&.?......*
0BAAB000  00000000 00000000 00000000 0A0DF728  09F8905C 09F8906C 00D34748 00000000    *..............7..8.*.8.%.L......*
0BAAB020  606EF1C1 D3C4F0F0 800096C6 0BA057D8  000061C8 0BA88010 03274F21 34302257    *->1ALD00..oF...Q../H.y....|.....*
0BAAB040  606EF2E4 D9C9F0F0 00002A4E 0BA4AE18  0BA88010 0BA88870 03274F21 34302257    *->2URI00...+.u...y...yh...|.....*
0BAAB060  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302257    *DSPURI00.y.............|.....*
0BAAB080  D4D6C4C9 D9C3C1D9 F1F201D8 D6002000  40D3D6C7 C9C3C1D3 40D6D7C5 D5404040    *MODIRCAR12.QO... LOGICAL OPEN   *
0BAAB0A0  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BAAB0C0  606EF3D9 E2E5F0F0 00001270 0BA80FA0  0BA88870 0BA891B8 03274F21 34302257    *->3RSV00.....y...yh..yj...|.....*
0BAAB0E0  F24C60D9 E2E5F0F0 0BA4C088 0000022A  0BA88870 0BA891B8 03274F21 34302310    *2<-RSV00.u.h.....yh..yj...|.....*
0BAAB100  606EF3E4 D9C9F3F0 00001340 0BA5347A  0BA88870 0BA891B8 03274F21 34302310    *->3URI30... .v.:.yh..yj...|.....*
0BAAB120  F24C60E4 D9C9F3F0 0BA4C158 00000F8E  0BA88870 0BA891B8 03274F21 34302317    *2<-URI30.uA......yh..yj...|.....*
0BAAB140  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88870 0BA891B8 03274F21 34302317    *->3URI50...<.v...yh..yj...|.....*
0BAAB160  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA891B8 0BA894D8 03274F21 34302317    *DSPSTACK.v...v...yj..ymQ..|.....*
0BAAB180  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302317    *GETFEED .y.............|.....*
0BAAB1A0  00000000 00000280 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB1C0  00002000 80500000 0BA01138 0BAB059C  00000280 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAB1E0  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88870 0BA891B8 03274F21 34302317    *2<-URI50.u.......yh..yj...|.....*
0BAAB200  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302317    *GETFEED .y.............|.....*
0BAAB220  00000000 00000280 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB240  00002000 80500000 0BA01138 0BC74000  00000280 00000100 C7C5E340 40400000    *.....&.......G .........GET   ..*
0BAAB260  F14C60E4 D9C9F0F0 0BA08226 0000084E  0BA88010 0BA88870 03274F21 34302318    *1<-URI00..b....+.y...yh...|.....*
0BAAB280  606EF2E4 D9C9F0F0 00002B9A 0BA4AE18  0BA88010 0BA88870 03274F21 34302318    *->2URI00.....u...y...yh...|.....*
0BAAB2A0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302318    *DSPURI00.y.............|.....*
0BAAB2C0  D4D6C4C9 D9C3C1D9 F1F201D8 D3011000  C3D3C1E2 E24040D3 D6C3C1E3 C540D5E7    *MODIRCAR12.QL...CLASS  LOCATE NX*
0BAAB2E0  C4C2D6E5 D3C6D7C3 00000000 00000000  20000000 00000000 00000000 00000000    *DBOVLFPC........................*
0BAAB300  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88870 0BA891B8 03274F21 34302318    *->3URI50...<.v...yh..yj...|.....*
0BAAB320  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA891B8 0BA894D8 03274F21 34302318    *DSPSTACK.v...v...yj..ymQ..|.....*
0BAAB340  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302319    *GETFEED .y.............|.....*
0BAAB360  00000000 000000FE 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB380  00002000 80500000 0BA01138 0BAB059C  000000FE 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAB3A0  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88870 0BA891B8 03274F21 34302319    *2<-URI50.u.......yh..yj...|.....*
0BAAB3C0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302319    *GETFEED .y.............|.....*
0BAAB3E0  00000000 000000FE 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB400  00002000 80500000 0BA01138 0BC73420  000000FE 00000100 C7C5E340 40400000    *.....&.......G.........GET   ..*
0BAAB420  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302319    *DSPURI00.y.............|.....*
0BAAB440  C5D5C4C9 D9C3C1D9 F1F200FE D3011000  D9C5C3D6 D9C440E6 C1E240C6 D6E4D5C4    *ENDIRCAR12..L...RECORD WAS FOUND*
0BAAB460  C4C2D6E5 D3C6D7C3 E5D3D6E2 C1D4F0F1  20000000 00000000 00000000 00000000    *DBOVLFPCVLOSAM01................*
0BAAB480  F14C60E4 D9C9F0F0 0BA08372 0000084E  0BA88010 0BA88870 03274F21 34302319    *1<-URI00..c....+.y...yh...|.....*
0BAAB4A0  606EF2E4 D9C9F0F0 00002B9A 0BA4AE18  0BA88010 0BA88870 03274F21 34302319    *->2URI00.....u...y...yh...|.....*
0BAAB4C0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302319    *DSPURI00.y.............|.....*
0BAAB4E0  D4D6C4C9 D9C3C1D9 F1F201D8 D3011000  C3D3C1E2 E24040D3 D6C3C1E3 C540D5E7    *MODIRCAR12.QL...CLASS  LOCATE NX*
0BAAB500  C4C2D6E5 D3C6D7C3 E5D3D6E2 C1D4F0F1  20000000 00000000 00000000 00000000    *DBOVLFPCVLOSAM01................*
0BAAB520  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88870 0BA891B8 03274F21 34302319    *->3URI50...<.v...yh..yj...|.....*
0BAAB540  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA891B8 0BA894D8 03274F21 34302319    *DSPSTACK.v...v...yj..ymQ..|.....*
0BAAB560  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302320    *GETFEED .y.............|.....*
0BAAB580  00000000 000000B0 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB5A0  00002000 80500000 0BA01138 0BAB059C  000000B0 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAB5C0  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88870 0BA891B8 03274F21 34302320    *2<-URI50.u.......yh..yj...|.....*
0BAAB5E0  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302320    *GETFEED .y.............|.....*
0BAAB600  00000000 000000B0 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
```

Figure 173. Example of Internal Trace Table Entries (Part 6 of 7)

```
0BAAB620  00002000 80500000 0BA01138 0BC70000  000000B0 00000100 C7C5E340 40400000    *.....&.......G.........GET   ..*
0BAAB640  606EF3E4 D9C9F5F0 00001C4C 0BA58C68  0BA88870 0BA891B8 03274F21 34302320    *->3URI50...<.v...yh..yj...|.....*
0BAAB660  C4E2D7E2 E3C1C3D2 8BA58E0C 0BA58C68  0BA891B8 0BA894D8 03274F21 34302321    *DSPSTACK.v...v...yj..ymQ..|.....*
0BAAB680  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302321    *GETFEED .y.............|.....*
0BAAB6A0  00000000 00000428 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB6C0  00002000 80500000 0BA01138 0BAB059C  00000428 00000100 C7C5E340 40400000    *.....&.................GET   ..*
0BAAB6E0  F24C60E4 D9C9F5F0 0BA4CA64 000002DE  0BA88870 0BA891B8 03274F21 34302321    *2<-URI50.u.......yh..yj...|.....*
0BAAB700  C7C5E3C6 C5C5C440 0BA86728 00000000  00000000 00000000 03274F21 34302321    *GETFEED .y.............|.....*
0BAAB720  00000000 00000428 00024000 00024000  20032817 00024000 00024000 00023000    *......... ... ....... ... .....*
0BAAB740  00002000 80500000 0BA01138 0BC700B0  00000428 00000100 C7C5E340 40400000    *.....&.......G.........GET   ..*
0BAAB760  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302321    *DSPURI00.y.............|.....*
0BAAB780  C5D5C4C9 D9C3C1D9 F1F20428 D3011000  D9C5C3D6 D9C440E6 C1E240C6 D6E4D5C4    *ENDIRCAR12..L...RECORD WAS FOUND*
0BAAB7A0  C4C5C4C2 C4C4F0F1 C4C4F0F1 C1D9F040  20000000 00000000 00000000 00000000    *DEDBDD01DD01AR0 ..............*
0BAAB7C0  F14C60E4 D9C9F0F0 0BA08372 0000084E  0BA88010 0BA88870 03274F21 34302321    *1<-URI00..c....+.y...yh...|.....*
0BAAB7E0  606EF2E4 D9C9F0F0 00002C98 0BA4AE18  0BA88010 0BA88870 03274F21 34302321    *->2URI00...q.u...y...yh...|.....*
0BAAB800  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 34302321    *DSPURI00.y.............|.....*
0BAAB820  D4D6C4C9 D9C3C1D9 F1F201D8 C3011000  40D3D6C7 C9C3C1D3 40C3D3D6 E2C54040    *MODIRCAR12.QC... LOGICAL CLOSE  *
0BAAB840  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BAAB860  606EF3C4 C5D8F0F0 000042F4 0BA0DA68  0BA88870 0BA891B8 03274F21 34302321    *->3DEQ00...4.....yh..yj...|.....*
0BAAB880  F24C60C4 C5D8F0F0 0BA4F10C 000007EE  0BA88870 0BA891B8 03274F21 34302322    *2<-DEQ00.u1......yh..yj...|.....*
0BAAB8A0  F14C60E4 D9C9F0F0 0BA08470 0000084E  0BA88010 0BA88870 03274F21 34302322    *1<-URI00..d....+.y...yh...|.....*
0BAAB8C0  F04C60C1 D3C4F0F0 000096C6 00000524  000061C8 0BA88010 03274F21 34302322    *0<-ALD00..oF....../H.y....|.....*
0BAAB8E0  C3D9E3D9 F0E7C9E3 09F8A56C 070B2002  00001000 0BA86728 03274F21 34302322    *CRTR0XIT.8v%.........y....|.....*
0BAAB900  00000000 09FC1900 09F8A56C 0A649490  00000000 C4C6E2C2 D9D3E2C2 00000100    *.........8v%..m.....DFSBRLSB....*
0BAAB920  070B2002 00001000 00000000 00000000  00000000 00000000 00000000 00000000    *................................*
0BAAB940  C4E2D7C3 D9E3D9F0 00D26F10 17882002  00000000 0BA86728 03274F21 37275946    *DSPCRTR0.K?..h.......y....|.....*
0BAAB960  00000000 00000000 00000000 00000001  0BA86728 00000000 00000000 00000000    *.................y..............*
0BAAB980  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000    *................................*
0BAAB9A0  606EF1D7 E3D2D6E5 8000997E 0BA1D570  000061C8 0BA88010 03274F21 37275946    *->1PTKOV..r=..N.../H.y....|.....*
0BAAB9C0  606EF2E4 D9C9F0F0 00000218 0BA4AE18  0BA88010 0BA88260 03274F21 37275947    *->2URI00.....u...y...yb-..|.....*
0BAAB9E0  C4E2D7E4 D9C9F0F0 0BA86728 00000000  00000000 00000000 03274F21 37275947    *DSPURI00.y.............|.....*
0BAABA00  D4D6C4C9 D9C3C1D9 F1F201D8 D6011000  40D3D6C7 C9C3C1D3 40D6D7C5 D5404040    *MODIRCAR12.QO... LOGICAL OPEN   *
0BAABA20  40404040 40404040 40404040 40404040  40404040 40404040 00000000 00000000    *                        ........*
0BAABA40  606EF3D9 E2E5F0F0 00001270 0BA80FA0  0BA88260 0BA88BA8 03274F21 37275947    *->3RSV00.....y...yb-.y.y..|.....*
0BAABA60  C2C7D5C3 C1C2D5F0 0BA86728 00000000  00000000 00000000 03274F21 37276626    *BGNCABN0.y.............|.....*
0BAABA80  C4E2D7C3 C1C2D5F0 0BA86728 00000000  00000000 00000000 03274F21 37277116    *DSPCABN0.y.............|.....*
0BAABAA0  E3D9C1C3 C5D5E7E3 40404040 40404040  40404040 40404040 40404040 40404040    *TRACENXT                        *
0BAABAC0  40404040 40404040 40404040 40404040  40404040 40404040 40404040 40404040    *                                *
```

Figure 173. Example of Internal Trace Table Entries (Part 7 of 7)

Note: Lines 0BAABAE0-0BAAFF1F same as the above.

DBRC External Trace

If you start the Generalized Trace Facility (GTF) and enter the CHANGE.RECON TRACEON command, the DBRC trace (DSPTRACE) creates an external trace record and issues the GTRACE macro to invoke GTF. 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. Figure 174 shows the format of these records.

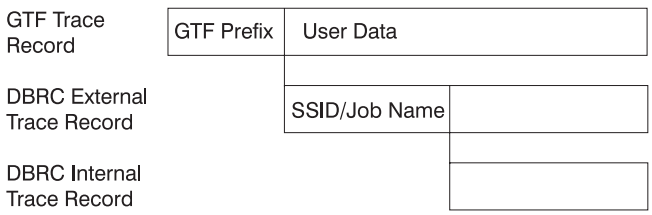


Figure 174. Format of Trace Records

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 *OS/390 MVS IPCS User's Guide*.

The following topics provide additional information:

- "Examples of Output"
- "Samples of JCL to Create Trace Output" on page 471

Examples of Output

The following two examples show the unformatted and then formatted output for DBRC router processing and RECON I/O error processing.

In Figure 175:

- 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.
- GDB is the address of the Global Data 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
Formatted Output
........  TIME=99085F2248397685  DSPCRTR0  GDB=00012D78 LSB=05F79C94 FUNC=17172002 EXIT=00000000
00000000 00000000 00D4C080 00000001   00012D78 00000000 00000000 00000000   *.........M.....................*
00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   *...............................*
```

Figure 175. DBRC External Trace Output for DBRC Router Processing

In Figure 176 on page 471 a SHOWCB macro instruction was executed after the I/O request was issued.

- IMS1 is the SYSID.
- TIME is the time stamp of the trace entry.
- DSPURI00 has control.
- GDB is the address of the Global Data 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.

```
GTF USR Record containing DBRC Unformatted Trace Record Data
 HEXFORMAT AID FF FID F2 EID  EFAD
  +0000  00FA2980  C4C2D9D6  C3E3C1D4  C9D4E2F1  | ....DBROCTAMIMS1 |
  +0010  40404040  C4E2D7E4  D9C9F0F0  00012D78  |     DSPURI00.... |
  +0020  00000000  00000000  00000000  99085F22  | ............r.¬. |
  +0030  48398254  C4E2D7C9  D9C3C1D9  00000190  | ..b.DSPIRCAR.... |
  +0040  D3002000  00000000  00000000  FFFFFFFF  | L............... |
  +0050  FFFFFFFF  C9D4E2F1  40404040  3F000000  | ....IMS1    .... |
  +0060  00000000  00000000  00000000  00000000  | ................ |
  +0070  00000000                               | ....             |
Formatted Output
DBRCJOB1      TIME=99085F2248398254  DSPURI00  GDB=00012D78 FUNC=LOCATE  FLAG=0020
RECKEY=FFFFFFFFFFFFFFFFC9D4E2F1404040403F000000000000000000000000000000000
```

Figure 176. DBRC External Trace Output for RECON I/O Error Processing

Samples of JCL to Create Trace Output

Here is a sample of a job that was used to create unformatted USR(FAD) trace output:

```
//PRTUSRF2 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=IMSBLD.I710TS25.CRESLIB
//*        DD DISP=SHR,DSN=IMSTESTG.IMS710.TSTRES
//*        DD DISP=SHR,DSN=IMSTESTG.IMSQA.ACPLIB
//*        DD DISP=SHR,DSN=IMSTESTG.IMSQA.PGMLIB
//JOBCAT   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 DSNAME(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)
/*
```

Here is a sample 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
//JOBLIB   DD DSN=IMSTESTL.TNUC0,DISP=SHR
//         DD DISP=SHR,DSN=IMSBLD.I710TS25.CRESLIB
//         DD DISP=SHR,DSN=IMSTESTG.IMS710.TSTRES
//         DD DISP=SHR,DSN=IMSTESTG.IMSQA.ACPLIB
//         DD DISP=SHR,DSN=IMSTESTG.IMSQA.PGMLIB
//JOBCAT   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 DSNAME(DBRX06.IPCS.DDIR) VOLUME(USER01)
 IPCS NOPARM
 SETDEF DDNAME(TRACE) NOCONFIRM
 GTFTRACE EXIT(AMDUSRF2)
 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)
/*
```

DBRC API Return and Reason Codes

This topic contains the internal return and reason codes needed to diagnose DBRC API problems.

Return and Reason Codes for the TYPE=BACKOUT Query Request

Table 118 on page 473 contains the return and reason codes for TYPE=BACKOUT query requests.

Table 118. Return and Reason Codes for TYPE=BACKOUT Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8700001'	DBRC internal error. Failure attempting to locate the first or the specified backout record.
X'0000002C'	X'D8700002'	DBRC internal error. Failure attempting to locate the next backout record.

Return and Reason Codes for TYPE=DB Query Requests

Table 119 contains the internal return and reason codes associated with the TYPE=DB query requests.

Table 119. Return and Reason Codes for TYPE=DB Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8200001'	DBRC internal error. DB record locate failure processing DBLIST.
X'0000002C'	X'D8200002'	DBRC internal error. DB record locate failure processing single database request.
X'0000002C'	X'D8210001'	DBRC internal error. Failure attempting to locate the first DBDS record.
X'0000002C'	X'D8210002'	DBRC internal error. Failure attempting to locate the specified DBDS record.
X'0000002C'	X'D8210003'	DBRC internal error. Failure attempting to locate the next DBDS record.
X'0000002C'	X'D8210004'	DBRC internal error. Locate failure attempting to locate the first Area Auth record.
X'0000002C'	X'D8210005'	DBRC internal error. Failure attempting to locate the first ALLOC record.
X'0000002C'	X'D8210006'	DBRC internal error. Failure attempting to locate the next ALLOC record.
X'0000002C'	X'D8210007'	DBRC internal error. Failure attempting to locate the first IC record.
X'0000002C'	X'D8210008'	DBRC internal error. Failure attempting to locate the next IC record.
X'0000002C'	X'D8210009'	DBRC internal error. Failure attempting to locate the first REORG record.
X'0000002C'	X'D821000A'	DBRC internal error. Failure attempting to locate the next REORG record.
X'0000002C'	X'D821000B'	DBRC internal error. Failure attempting to locate the first RECOV record.
X'0000002C'	X'D821000C'	DBRC internal error. Failure attempting to locate the next RECOV record.
X'0000002C'	X'D8220001'	DBRC internal error. Failure attempting to locate the first HALDB partition record.
X'0000002C'	X'D8220002'	DBRC internal error. Failure attempting to locate the DB record associated with the HALDB partition being processed.
X'0000002C'	X'D8220003'	DBRC internal error. Failure attempting to locate the next HALDB partition record.

Return and Reason Codes for the TYPE=xxxxGROUP Query Request

Table 120 contains the return and reason codes for TYPE=xxxxGROUP query requests.

Table 120. Return and Reason Codes for TYPE=xxxxGROUP Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8300001'	DBRC internal error. Failure attempting to locate a specific group record or the first group record of the requested group type.
X'0000002C'	X'D8300002'	DBRC internal error. Failure attempting to locate the next group record of the requested group type.
X'0000002C'	X'D8310001'	DBRC internal error. Failure attempting to locate a CA record.

Return and Reason Codes for the TYPE=LOG Query Request

Table 121 contains the return and reason codes for TYPE=BACKOUT query requests.

Table 121. Return and Reason Codes for TYPE=LOG Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8400001'	DBRC internal error. Failure attempting to locate the previous or next log record of the requested log type - PRILOG or PRITSLDS.
X'0000002C'	X'D8400002'	DBRC internal error. Failure attempting to locate the specified log record of the requested log type - PRILOG or PRITSLDS.
X'0000002C'	X'D8400003'	DBRC internal error. Failure attempting to locate the corresponding SECTSLDS record.
X'0000002C'	X'D8400004'	DBRC internal error. Failure attempting to locate the LOGALL record that corresponds to the PRILOG record.
X'0000002C'	X'D8400005'	DBRC internal error. The LOGALL record that corresponds to the PRILOG record does not exist.
X'0000002C'	X'D8400006'	DBRC internal error. Failure attempting to locate the corresponding SECLOG record.
X'0000002C'	X'D8400007'	DBRC internal error. Failure attempting to locate the corresponding PRISLDS record.
X'0000002C'	X'D8400008'	DBRC internal error. No PRISLDS record exists for the online log.
X'0000002C'	X'D8400009'	DBRC internal error. Failure attempting to locate the corresponding SECSLDS record.

Return and Reason Codes for the TYPE=OLDS Query Request

contains the return and reason codes for TYPE=OLDS query requests.

Table 122. Return and Reason Codes for TYPE=OLDS Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8500001'	DBRC internal error. Failure attempting to locate the first or the specified PRIOLDS record.
X'0000002C'	X'D8500002'	DBRC internal error. Failure attempting to locate the corresponding SECOLDS record.

Table 122. Return and Reason Codes for TYPE=OLDS Query Requests (continued)

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8500003'	DBRC internal error. Failure attempting to locate the next PRIOLDS record.

TYPE=RECON Query Requests

Table 123 contains the internal return and reason codes associated with the TYPE=RECON query requests.

Table 123. Return and Reason Codes for TYPE=RECON Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8100001'	DBRC internal error. Failure attempting to locate the RECON header record.

Return and Reason Codes for the TYPE=SUBSYS Query Request

Table 124 contains the return and reason codes for TYPE=SUBSYS query requests.

Table 124. Return and Reason Codes for TYPE=SUBSYS Query Requests

Return Codes	Reason Codes	Meaning
X'0000002C'	X'D8000001'	DBRC internal error. RECON open failure.
X'0000002C'	X'D8600001'	DBRC internal error. Failure attempting to locate the first or the specified subsystem record of the requested type, active or tracker.
X'0000002C'	X'D8600002'	DBRC internal error. Failure attempting to locate the next subsystem record of the requested type, active or tracker.

Chapter 14. 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. It discusses:

- "DRA Dumps"
- "Analyzing DRA Problems" on page 478

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

For a description of the DRA interface, see the *IMS Version 9: Customization Guide*.

DRA Dumps

The DRA creates a dump when a DRA request fails or when DRA processing fails. A DRA request is a request (such as INIT or TERMINATE) made by the CCTL that has passed through the DRA. 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 take a z/OS SDUMP. If that fails, the DRA takes a SNAP dump. In some situations the DRA takes a SNAP dump without attempting an SDUMP. For certain pseudoabends, the DRA produces neither an SDUMP nor a SNAP.

To determine what type of dump the DRA created, check field PAPLRETC in the DFSPAPL (the parameter list used to pass information between the CCTL and DBCTL). PAPLRETC has the format:

```
hhsssuuu
```

where hh indicates the type of dump.

Table 125 lists the values for *hh* and tells which dump the DRA creates for different types of failures.

Table 125. Determining the Type of Dump the DRA Created

hh	Type of Dump	Failures
X'80'	SDUMP or SNAP	An SDUMP is taken for all IMS abend codes not listed below, and for all z/OS retryable abend codes. If the SDUMP fails, a SNAP is taken.
X'84'	SNAP	A SNAP is taken for IMS abend codes U0260, U0261, and U0263.
X'88'	No dump	No SDUMP or SNAP is taken for: • IMS abend codes U0775, U0777, U2478, U2479, U3303 • z/OS nonretryable abend codes (for example, S222, S13E) • DRA return codes (See *IMS Version 9: Messages and Codes, Volume 1* for DRA return codes and their meanings.)

The following topics provide additional information:

- "SDUMP" on page 478
- "SNAPs" on page 478
- "Recovery Tokens" on page 478

SDUMP

SDUMP output contains:

- IMS control region
- DLISAS address space
- Key 0 and key 7 CSA
- Selected parts of DRA private storage, including the ASCB, TCB, and RBs

A DRA SDUMP has its own SDUMP option list. To add to the DRA's SDUMP option list, you can use the CHNGDUMP parameter. However, you cannot use CHNGDUMP to delete areas from the list.

You can format the IMS control blocks by using the Offline Dump Formatter (ODF) described in "Formatting IMS Dumps Offline" on page 155. The ODF does not format DRA storage. You can use IPCS to format the z/OS blocks in the CCTL's private storage.

SNAPs

The SNAP dump data sets are dynamically allocated whenever a SNAP is needed. A parameter in the DRA Startup Table defines the SYSOUT class.

SNAP output contains:

- Selected parts of DRA private storage, including the ASCB, TCB, and RBs
- DBCTL's thread blocks

Recovery Tokens

In a DBCTL environment, you need to correlate the information produced by the CCTL with information produced by DBCTL. The link between the CCTL and DBCTL is the recovery token, which uniquely identifies each unit of recovery (UOR).

The recovery token appears in the DRA dump (both SDUMPs and SNAPs) and in the dump title. It contains a mixture of EBCDIC and hexadecimal data and is shown in Table 126:

Table 126. Recovery Token Format

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, then an unexpected DBCTL return code or another IMS function might have caused the problem. Follow these steps to analyze the problem.

The following topics provide additional information:

- "Procedure"
- "Notes on Dumping" on page 479

Procedure

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.

    For a detailed description of the control exit, see *IMS Version 9: Customization Guide*. For information about the codes passed between the DRA and the CCTL, see *IMS Version 9: Messages and Codes, Volume 1*.
  - 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. For a description of DBCTL return codes, see *IMS Version 9: Messages and Codes, Volume 1*.
     - If yes, take a z/OS online dump of the CCTL and contact the IBM Support Center.
     - If no, then other functions might be involved in the problem. Use the appropriate section in this manual to analyze the problem. The keyword procedures in Chapter 4, “Selecting the Keywords,” on page 31 are useful in narrowing the problem to a specific cause.

Notes on Dumping

For suspected problems in a DBCTL environment, first take a dump of the CCTL address space. Dumps produced by SDUMP and by specifying the DUMP option on the CCTL `/SHUTDOWN` command are acceptable for problem diagnosis. If IMS service needs to analyze the CCTL dump, send the unformatted dump to enable them to obtain DBCTL DRA storage.

Chapter 15. RSR—Remote Site Recovery Service Aids

This section provides Fast Path Tracker Trace Entries (“Fast Path Tracker Trace Entries” on page 483) and Database Tracker Trace Entries (“X’D4’: Database Tracker Trace Entries (D4)” on page 490) that might help you analyze problems in a Remote Site Recovery (RSR) Environment.

Included in this section are:

- “Determining Last Non-MSC Message Recorded”
- “Determining Last MSC Message Recorded” on page 483
- “Fast Path Tracker Trace Entries” on page 483
- “Log Router Trace Data” on page 493

The RSR tracking process creates a local log that mirrors the activity at the currently active system.

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 Last Non-MSC Message Recorded

Non-MSC, Non-Fast Path Messages

For a non-MSC, non-Fast Path message, use the following procedure to determine the last input or output message recorded using RSR tracking and its status within the new active IMS following takeover.

1. Print all 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 an 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 an 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. Determine the last committed input message by inspecting the last X'66' 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 resubmitted 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 an X'03', ending with an 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 above.

   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 following X'36' log record that follows, reflecting successful receipt by the terminal.

Fast Path Messages

For Fast Path messages, use the following procedure to determine the last input or output message recorded using RSR tracking.

1. Print all 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 an 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 an 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' marked as input for the specific terminal. It is followed by an X'5901' with the input message and an X'5937' 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' for the output message followed by the X'5937', which makes it available for the terminal output process. This is the same X'5937' that also commits the input above. This is followed by an 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 Last MSC Message Recorded

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. They are:

- 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 Table 127 through Table 144 on page 489 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 127. 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

Table 127. Trace Record 9E01 - DBFDT210 Redo Record Processor Module Entry (continued)

Offset	Type	Length	Description
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 Committ/Abort Record Processor Module Entry

Explanation: Record cut at entry to DBFDT220 (Level - Medium)

Trace Subcode: DT220 Entry

Table 128. Trace Record 9E02 - DBFDT220 Commit/Abort Record Processor Module Entry

Offset	Type	Length	Description
0	Character	4	Log Id
4	Fixed	4	Stream Type
8	Fixed	1	Log Record Type
9	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

Example:

```
                          LSN       streamID  OFRID
                          |         |         |
DT220 Entry     9E028A69  000023AD  00000001  00000000
                00000090  0094122F  1141138F  8613CFC0
                |         |
                milestone prilog time
                index
```

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 129. Trace Record 9F22 - DBFDT300 Fast Path/Fast Path TCB AWE Queue Server Module Entry

Offset	Type	Length	Description
0	Address	4	AWE enqueuer
4	Character	4	AWE function code
8	Character	16	AWE contents

Example:

```
                          enqueuer  open area EMAC
                          |         |         |
DT300 Entry      9F22B879 04F9E5E2  00000003  0476A3C0
                 00000001 00000002  00000000  A0AFD862
                 |        |
                 streamID USID
```

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 130. Trace Record 9F22 - DBFDT300 Fast Path/Fast Path TCB AWE Queue Server Module Entry

Offset	Type	Length	Description
0	Address	4	AWE enqueuer
4	Character	4	AWE function code
8	Character	16	AWE contents

Example:

```
                          enqueuer  open area EMAC
                          |         |         |
DT300 Entry      9F22B879 04F9E5E2  00000003  0476A3C0
                 00000001 00000002  00000000  A0AFD862
                 |        |
                 streamID USID
```

9F41

Module: DBFDT180 Area Status Change Module Entry

Explanation: Record cut at entry to DBFDT180 (Level - High)

Trace Subcode: DT180 Entry

Table 131. Trace Record 9F41 - DBFDT180 Area Status Change Module Entry

Offset	Type	Length	Description
0	Fixed	4	Function code
4	Fixed	4	Reason code
8	Address	4	Address EMAC
12	Address	4	Address PST

Example:

```
                                   ndtrk_fail
                          stop_req |         EMAC
                          |        |         |
DT180 Entry      9F41D6C0 00000001 00000007  041843C0
                 00B3C060 00000000 00000000  AC97BB2C
                 |
                 PST
```

9F44

Module: DBFROFR0 OFR Module Entry

Explanation: Record cut at entry to DBFROFR0 (Level - High)

Trace Subcode: ROFR0 Entry

Table 132. 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 133. 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 134. Trace Record 9F44 - DBFROFR0 OFR Module Entry

Offset	Type	Length	Description
0	Fixed	4	Function code

9F50

Module: DBFDT350 IPOST

Explanation: Record cut at IPOST in DBFDT350 (Level - High)

Trace Subcode: DT350 IPOST

Table 135. Trace Record 9F50 - DBFDT350 IPOST

Offset	Type	Length	Description
0	Character	4	Post code
4	Address	4	EDBTWAQ

Example:

```
                                    EDBTWAQ
                           post code |
                           |         |
DT350 IPOSTed   9F508A97  40C6F2F2  02E85E40  00000000
                00000000  00000000  00000000  8613ED2D
```

9F51

Module: DBFDT350 IWAIT

Explanation: Record cut at IWAIT in DBFDT350 (Level - High)

Trace Subcode: DT350 IWAIT

Table 136. Trace Record 9F51 - DBFDT350 IWAIT

Offset	Type	Length	Description
0	Character	4	Post code
4	Address	4	EDBTWAQ contents

Example:

```
                                    EDBTWAQ
                                    |
DT350 IWAIT     9F512DA3  00000000  846761EC  00000000
                00000000  00000000  00000000  32DC4B1C
```

9F52

Module: DBFDT350 GETEMAC

Explanation: Record cut at EMAC in DBFDT350 (Level - High)

Trace Subcode: DT350 EMAC

Table 137. 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:

```
                                EMACEMAC_WAQ
                          EMAC  |          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 138. 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:

```
                                                type
                          ERQE      ERQEEMAC    | flags
                          |         |           | |
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 139. Trace Record 9F54 - DBFDT350 EMAC2

Offset	Type	Length	Description
0	Character	8	Area name

Example:

```
                          Area name
                          |
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 140. 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 141. 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 142. Trace Record 9F72 - DBFDT400 EMAC

Offset	Type	Length	Description
0	Address	4	Address IOTI
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 143. 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 144. 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
```

X'D4': Database Tracker Trace Entries (D4)

Table 145 shows the database tracking trace entries for the X'D4' trace entry.

Table 145. 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: `yyyydddFhhmmsstt`	
X'0002': DRQE queued on TDBC	Stream id	TDBC	DRQE	DRWQ	Log sequence number (LSN), right half only	Prilog start time. Format: `yyyydddFhhmmsstt`	
X'0003': DRQE freed without tracking	Stream id	TDBC	DRQE		Log sequence number (LSN), right half only	Prilog start time. Format: `yyyydddFhhmmsstt`	
X'0004': DBTI	X'0001': Dispatched for work	PST	DTT	DTTPCTL			
X'0005': DFSDT240 AWE	AWE function[1]	TDBC	AWE				
X'0006': DFSDT300 AWE	AWE function[2]	TDBC	AWE	Return code			
X'0007': Shutdown	X'0030': DFSDT300						
	X'0040': DFSDT400	PST	DTT				
	X'0050': DFSDT500	PST					
X'0008': DB stop	Function[3]	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					
	X'0003': BQEL transfer done	PST	PSTFNCTN	Milestone index transferred			
	X'0004': Buffer purge done	PST	PSTFNCTN	Milestone index purged			

Table 145. 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'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[4]	TDBC	ECB				

Notes to Table 145 on page 490:

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 log router reported an exceptional condition that prevented OFR from starting.

X'0009' Resumption after being posted.

Buffer Handler Trace Entries at 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 296. However, there are the following differences in these trace entries 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.

Log Router Trace Data

The log router (LRTT) trace entries are documented in Table 146 through Table 210 on page 520. Field lengths are in bytes.

Trace Entry: Log Router Data Set Services (370x)

3701

Module: DFSLRDSS Data Set Services Control ITASK Routine

Explanation: Record cut at entry to DFSLRDSS (Level - Low)

Trace Subcode: LRDSS Entry

Table 146. 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...	1	Tracking_SLDS (AWLGDTRK)
	.1..		Archive SLDS (AWLGDARC)
	.1.		Archive RLDS (AWLGDRLD)
	...1 1111		
7	Fixed	1	Request Priority (AWLGDPRI)
8	Address	4	LTDCB address (AWLGDLTD)
12	Address	4	LDSD address (AWLGDLDS)
16	Bit	4	DSS Flags (LGBDSSFLAGS)
	1...	1	LGB_CBTE_ALTERED
	.1..		LGBDSS_DUAL_TRACKING_SLDS
	..1.		LGBDSS_DUAL_ARCHIVE_SLDS
	...1		LGBDSS_DUAL_ARCHIVE_RLDS
	.... 1...		LGB_ARCHIVE_SLDS
	.... .1..		LGB_ARCHIVE_RLDS
	.... ..1.		LGB_INITIALIZEDSS
	1		LGB_TERMINATINGDSS
	1...		LGB_DSS_DATASETS_RETURNED
	.1..		LGB_DSS_RESTART_INIT
	..11 1111		*
20	Fixed	4	LGB_DATASET_NUMBER
24	Bit	2	Data set Action Flags (AWLGDSAC)
	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 (AWLGDLGB)
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 147. 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	LDSD address (AWLGDLDS)

3703

Module: DFSLRDCR Data Set Create Routine

Explanation: Record cut at exit from DFSLRDCR (Level - Medium)

Trace Subcode: LRDCR Exit

Table 148. 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)
	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 149. 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 150. 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)
	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 (AWLGDLGB)
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 (AWLGDLTD)
16	Address	4	LDSD address (AWLGDLDS)
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 151. 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 (AWLGDPRI)
8	Address	4	LTDCB address (AWLGDLTD)
12	Address	4	LDSD address (AWLGDLDS)
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)
	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 (AWLGDLGB)
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

Trace Entry: Log Router Record Router (3709/370E/370F/371x)

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

3709

Table 152. Trace Record 3709 - End of Merge

Offset	Type	Length	Description
4	Character	8	Stream subsystem ID
12	Character	1	mrb_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)

Trace Entry: Log Router Record Router (370E/370F/371x)

370E

Module: DFSLRRR0 Log Record Router

Explanation: Record cut at End Buffer (Level - Low)

Trace Subcode: LRRR0 End Strm

Table 153. 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
	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 154. 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
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 155. 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
	1...		stream is being merged
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 156. 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

Trace Entry: Log Router I/O (373x)

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 157. 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
	.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 158. Trace Record 3732 - Stream Archiver Controller Exit

Offset	Type	Length	Description
4	Address	4	SAA Address
8	Bit	4	SAA_flags

Table 158. Trace Record 3732 - Stream Archiver Controller Exit (continued)

Offset	Type	Length	Description
	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	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 159. 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 160. 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 161. 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_LDSD
20	Character	8	SAA_PRILOG_TIME
28	Bit	2	SAA_TRUNC_flags

Table 161. Trace Record 3736 - Stream Archiver Log Truncation Start Exit (continued)

Offset	Type	Length	Description
	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 162. 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		*
	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

Table 162. Trace Record 3737 - Log Router Log Truncation Exit (continued)

Offset	Type	Length	Description
	.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 163. 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), LRA (if func=TRD)
12	Address	4	LRB Buffer Chain Address or 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 164. 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

Table 164. Trace Record 373A - Log Router Log Reader First Read Request (continued)

Offset	Type	Length	Description
	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
	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 165. 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
	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 166. 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
	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 167. 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

Table 167. Trace Record 373D - Log Router Log Reader Exit (continued)

Offset	Type	Length	Description
	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
	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 168. 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)

Trace Entry: Log Router Create Active Stream Support (374x)

3740

Module: DFSLRCAS Create Active Stream Routine

Explanation: Record cut on create new Stream to DFSLRCAS (Level - Low)

Trace Subcode: LRCAS New Strm

Table 169. 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 170. 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 171. 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

Trace Entry: Log Router Active Conversation Support (374x)

374F

Module: DFSLRASC Active Stream Control Routine

Explanation: Record cut on entry to DFSLRASC (Level - Medium)

Trace Subcode: LRASC Entry

Table 172. 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

Trace Entry: Log Router Online Forward Recovery (375x)

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 173. 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

Table 173. Trace Record 3750 - Initiate Online Forward Recovery (OFR) (continued)

Offset	Type	Length	Description
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 174. 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 175. 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 ----------
	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, 0 otherwise

3753

Module: DFSLROPR Online Forward Recovery Processor

Explanation: Record cut at exit from DFSLROPR (Level - Low)

Trace Subcode: LROPR Exit

Table 176. 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 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 177. 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 (LDSD) (Level - Low)

Trace Subcode: LRORM Log Desc

Table 178. Trace Record 3756 - 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)

3757

Module: DFSLRORM - Online Forward RecoveryRead 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 179. 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 180. Trace Record 3758 - Start Points List Error detected

Offset	Type	Length	Description
4	Fixed	4	pos_ptoken
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)

Trace Entry: Log Router Automatic Archive (376x)

3760

Module: DFSLRARC Auto Archive Controller

Explanation: Record cut on entry to DFSLRARC for archive request (Level - Medium)

Trace Subcode: LRARC Request

Table 181. 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 182. 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		*
	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

Table 182. Trace Record 3760 - DFSLRARC Auto Archive Controller Entry (continued)

Offset	Type	Length	Description
	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 183. 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 184. 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

Table 184. Trace Record 3762 - DFSLRARP Auto Archive Processor Entry (continued)

Offset	Type	Length	Description
	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 185. 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
	1...		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
25	1...		AWLG_RBF_NODATA
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

Table 185. Trace Record 3762 - DFSLRARP Auto Archive Processor Entry (continued)

Offset	Type	Length	Description
	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 write Buffer (Level - Medium)

Trace Subcode: LRARP Entry

Table 186. 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
	1...		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
	.... .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		*
	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 186. 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 Auto Archive Data set (Level - Medium)

Trace Subcode: LRARP Entry

Table 187. 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
	1...		AWLG_ADS_TRACKING_SLDS
	.1..		AWLG_ADS_ARCHIVE_SLDS
	..1.		AWLG_ADS_ARCHIVE_RLDS
	...1 1111		*
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 188. 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
20	Fixed	4	LDSD_FLRID
24	Fixed	4	LDSD_LLRID
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 189. 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_LLRID
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 190. 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		*
	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

Table 190. Trace Record 3765 - DFSLRARP Enqueue Buffer to Write (continued)

Offset	Type	Length	Description
	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

Trace Entry: Log Router Isolated Log Transport (377x)

3770

Module: DFSLRILT Isolated Log Control Routine

Explanation: Record cut at entry to DFSLRILT (Level - Low)

Trace Subcode: LRILT Request

Table 191. 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 192. 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 193. 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 194. 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 195. 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
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 196. 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 197. 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 198. 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
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 199. 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 200. 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 201. Trace Record 377A - Isolated Log Transport DS Abort

Offset	Type	Length	Description
4	Fixed	2	Request ID
6	Fixed	1	Reserved
7	Fixed	1	Flags
	1.....		Data set temporarily unavailable, immediate retry ok
	.1.....		Data set temporarily unavailable, defer retry

Table 201. Trace Record 377A - Isolated Log Transport DS Abort (continued)

Offset	Type	Length	Description
	..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 202. 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 203. 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
	.1......		Takeover milestone
	..1.....		Timer pop
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 204. Trace Record 3782 - Unplan Takeover Process Phase 1 Entry

Offset	Type	Length	Description
4	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 205. Trace Record 3783 - Unplan 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 206. 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 207. Trace Record 3785 - Log Router Master ITASK Request Done

Offset	Type	Length	Description
4	Bit	16	lgb_takeover_flags
	1.....		On= plan takeover requested
	.1.....		On= plan takeover progress
	..1.....		On= unplan takeover requested
	...1....		On= unplan takeover progress
	....1...		Takeover reversed
	.....1..		On= unplan takeovr pending
	......1.		On= 'takeover start' notify to dbrc has been done
	.......1		On= truncation complete
	..... 1.....		On= NOREVERSE was specified on /RTA UNPLAN command
	..... .1.....		On= unhardened buffers were on
	....1.....		On if this is the restart after a takeover processed for uptko
	11111		Spares (last 5 bits reserved)
8	Fixed	4	Current milestone index
12	Character	8	Time stamp
16	Fixed	4	Current milestone index
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 208. 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 209. 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 210. 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
	1.......		On if we are terminating
	.1.....		Transport manager has terminated
	..1.....		On if we are identified to TM
	...1....		On if `/STO SERVGRP` entered
	....1...		On if `/STA SERVGRP` entered
	.....1..		On during log router restart
	......1.		On if LR termination is waiting for OFR to shutdown
	.......1		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...		On if set from 51 pos
	....1..		On if xrc tracking requested
	11		Spares (last 2 bits reserved)
14	Bit	16	lgb_takeover_flags
	1.......		On= plan takeover requested
	.1.....		On= plan takeover progress
	..1.....		On= unplan takeover requested
	...1....		On= unplan takeover progress
	....1...	....1...	Takeover reversed
	....1...		
	.....1..		On= unplan takeovr pending
	......1.		On= 'takeover start' notify to dbrc has been done
	.......1		On= truncation complete
	.... 1.......		On= NOREVERSE was specified on /RTA UNPLAN command
	.... .1.....		On= unhardened buffers were
	....1.....		On if this is the restart after ga takeover processed for uptko
	11111		Spares (last 5 bits reserved)

X’4930’: Database Tracker FSE Error Log Record Format

The log record layout for X'4930' is shown in Table 211.

Table 211. 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
2C	12	Prilog time
38	4	Update sequence number (USN)

Chapter 16. CQS Diagnosis

This section describes diagnostic information that helps you analyze problems in CQS.

In this section:

Diagnosing a CQS Related Problem

CQS produces SDUMPs for internal errors. The CQS dumps can be found in the SYS1.DUMP data sets. CQS can also produce LOGREC data set entries for errors.

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 near the time of error:

- Additional manual dump intervention
- z/OS Log Stream (for IMS shared queue related problems)
- 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

There is only one master CQS and, most likely, one error CQS in a sysplex. Thus, the maximum number of CQS dumps and syslogs to be taken is three. If the sysplex contains less 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 have the sysplex information written into the syslog:

```
D CF,CFNAME=cfname
D XCF,CF
D XCF,STRUCTURE,STRNAME=strname
```

For a CQS loop problem, obtain two dumps.

1. Obtain a z/OS SVC dump of the CQS and its associated IMS control region address space using 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

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. The current z/OS log data sets for the CQS log stream can be copied using the IEBGENER utility. There are no archived z/OS log data sets (unlike the IMS logger that does have log archive capability through SLDS).

If an isolated event type within CQS encounters an error, the IBM Support Center might request additional trace level settings for the various trace types. See "Setting Up CQS, OM, RM, and SCI Tracing" on page 10 for information about trace descriptions. 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.

The following topics provide additional information:

- "CQS Additional Manual Intervention for Dump Creation"
- "CQS Structure Dump Contents"
- "CQS - z/OS Log Stream" on page 526
- "CQS Structure Recovery Data Set" on page 526
- "CQS Checkpoint Problems" on page 526

CQS Additional Manual Intervention for Dump Creation

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
- The associated lock entries

CQS Structure Dump Example

Here is an example of 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
The main structure name.

imsmsgq01oflw
The overflow structure name.

When an IMS structure dump is necessary, it is possible that the z/OS Logger function could be involved with the problem. The following example will dump 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'.SYSLOGR0),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

CQS - IEADMCxx Example with Structures

Create three SYS1.PARMLIB members called IEADMCIA, IEADMCIB, IEADMCIC:

```
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 request a dump from the IEADMCIA, IEADDMCIB and IEADMCIC parmlib members, enter 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 entered. Two dump data sets are created on each image in the sysplex matching 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

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.

CQS - z/OS Log Stream, JCL Example

```
//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 dumped. Use the IDCAMS REPRO command if the LRECL is acceptable (less than 32761).

CQS Checkpoint Problems

There are two types of CQS checkpoints: system checkpoint and structure checkpoint. 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 Version 9: Messages and Codes, Volume 1* 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 cqsname 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 Version 9: Messages and Codes, Volume 1* for the details of the failure and the recommended system programmer action.

If message CQS0222E is not displayed and not all five of the normal structure checkpoint messages appeared on the console, then CQS has most likely encountered a WAIT/HANG serious problem.

If CQS encountered a WAIT/HANG problem, refer to "Diagnosing CQS-Related Problems" on page 24 for guidelines about obtaining dumps and syslogs. Also, the CQS log records, the structure dump of the related structure, and the SRDS (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. 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 *cqsname* STARTED STRUCTURE *copy/recovery* FOR STRUCTURE *strname*
    - CQS0241I CQS *cqsname* 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**

  If rebuild failed with an error message such as the CQS0242E message, consult the topic titled "CQS Restart and Rebuild Reason Codes" in the *IMS Version 9: Messages and Codes, Volume 1* for details on the system programmer action to take.

- **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, do the following:

  – Copy the SYSLOG, including the `D XCF,STRUCTURE,STRNAME=strname` output from every LPAR.

  – Dump all the CQS address spaces, especially the rebuild master CQS address space. The CQS0240I message should indicate 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.

  – Take a structure dump if you suspect a rebuild hang. The structure dump might contain important information about structure locks.

  – Call the IBM Support Center for help.

CQS Trace records

You can analyze CQS trace records in a formatted dump to help you determine what function encountered an error, and whether a problem is environmental or internal. Trace record eye catchers in a formatted dump can provide a clue about what function resulted in an error. You might be able to take action to correct environmental problems right away. Internal IBM problems should be referred 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 Table 212.

Table 212. Trace Tables Containing CQS Trace Records

Table Name	Number of Tables	Table Description
ERR	1	Errors
CQS	1	CQS activity, including errors
STR	1 per structure (EMHQ, MSGQ)	Structure activity, including errors

Each CQS trace record contains 32 bytes. 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.

CQS trace records are mapped by macros that use the naming convention CQSTR*xxx*, where *xxx* represents the function 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.

Look up the CQS trace code in Table 213 to locate the CQS macro that maps the trace record. Table 213 lists the CQS trace codes, the macro that maps the trace code, and a description of the trace macro.

Table 213. 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

Table 213. CQS Trace Codes and Mapping Macros (continued)

Trace Code	Macro	Description
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
54	CQSTRDSP	Data space services
55	CQSTRLRR	Log record router
56	CQSTRXCF	XCF 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 a clue about what function encountered an error, such as “overflow”, “rbld”, “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 CQSRR*xxx*, where *xxx* represents the function being traced. For example, CQSRRPUT maps return codes, reason codes, and completion codes associated with the CQSPUT request. Look up the macro that defines the return codes, reason codes, and completion codes for the CQS request in Table 214.

Table 214. CQS Mapping Macros and Request Trace Records

Macro	CQS request macro for return codes, reason codes, 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.

Here is an example of 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 for this 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 for this 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

CQS writes records to the z/OS log stream that contains all CQS log records from all CQSs 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.

For each CQS log record, Table 215 on page 532 lists:
- The log record type and subtype
- The macro that maps the record
- The events that cause the record to be written

Table 215. CQS Log Records

Type	Sub type	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'		CQSREAD system checkpoint record was written.
		CQSLGCHD	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	CQSDEL request: Delete-type 1 (delete by token) completed.
	X'02'		CQSDEL request: Delete-type 2 (delete by queue name) completed.
	X'03'		CQSDEL request: Delete-type 3 (delete by queue name and UOW) completed.
	X'04'		CQSDEL 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.

Table 215. CQS Log Records (continued)

Type	Sub type	Mapping Macro	Conditions for Writing the Log Record
	X'02'		Structure rebuild ended. Statistics about the old structure, the rebuild structure, and rebuild failure are mapped by CQSSSTT6.
	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. 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 32760 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.

Example: 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 32760 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 service will sometimes require 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 service. The copy made by IEBGENER is a binary image of the log records. The following JCL is a job that will copy 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 IEBGENER, be aware of the following:

- 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 32K bytes in length are truncated. The SUBSYS exit supports a maximum of a 32K record size.

Related Reading: For a complete description of the IMS File Select and Formatting Print utility (DFSERA10), see *IMS Version 9: Utilities Reference: System*. For a complete description of the z/OS logger subsystem exit (IXGSEXIT) usage and parameters, see the *MVS Diagnosis: Tools and Service Aids*.

Chapter 17. CSL Diagnosis

This section describes diagnostic information to help you analyze problems in CSL.

In this section:

CSL Trace Records

You can analyze CSL address space trace records (for example OM, RM, or SCI) in a formatted dump to help you determine whether the problem is environmental or internal. Trace record eye catchers in a formatted dump can provide a clue about what function resulted in an error. You might be able to take action to correct environmental problems right away. Internal IBM problems should be referred to IBM with appropriate documentation, such as system console logs and dumps.

OM trace records are written to one or more of the trace tables shown in Table 216.

Table 216. 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 Table 217.

Table 217. 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
RM	1	RM activity, including errors

SCI trace records are written to one or more of the trace tables shown in Table 218.

Table 218. 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	IMSplex 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 Table 219.

Table 219. CSL Address Space Trace Code Mapping Macros

Codes Macro Name	Description
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 Table 220.

Table 220. CSL Address Space Trace Record Mapping Macros

Trace Macro Name	Description
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 Table 221.

Table 221. CSL Request Return, Reason, and Completion Codes Mapping Macros

Macro	Description
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 identifying the trace code, the trace subcode, and the module that wrote the trace record. The EPL and INTF trace tables in SCI contain parm lists, tables, and other data areas going across the SCI interface. These data areas are formatted in the SCI dump.

RM Trace Record Example

Here is an example of an 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').

Part 4. Appendixes

IMS Keyword Dictionary

If you use a database search tool that requires keywords in a structured database (SDB) format, use the IMS keyword dictionary shown in Table 222 to translate free-form keywords into the SDB format.

Free-form searches allow you to retrieve only the RETAIN records that contain all the search keywords you specified. You can use the same keywords as a base from which to conduct a structured database search. An SDB prefix, which ends with a slash, identifies the type of symptom. These prefixes are used by all IBM products and are not exclusive to IMS. Examples of keyword strings that use both freeform and SDB formats are provided throughout the procedures in Chapter 4, "Selecting the Keywords," on page 31.

Related Information: For more information about SDB formats, see *Software Service General Information Manual*.

Table 222. IMS Keyword Dictionary

Category/Keyword Examples	RETAIN Formats Keyword	SDB
Abends:		
System 0C4	ABEND0C4	AB/S00C4
User 0845	ABENDU0845	AB/U0845
Access Methods:		
OSAM	OSAM	RIDS/OSAM
VSAM	VSAM	RIDS/VSAM
Automatic Operator Interface	AOI	RIDS/AOI
APARS	PL12345	PTFS/PL12345
Checkpoint Processing:		
Checkpoint	CHKPT	PCSS/CHKPT
Extended Checkpoint	XCHKPT	PCSS/XCHKPT
CICS Interface	CICSDLI	PCSS/CICSDLI
IMS Commands:[1]		
/ASSIGN	CMDASS	PCSS/ASS
/CHECKPOINT	CMDCHE	PCSS/CHE
/ERESTART	CMDERE	PCSS/ERE
/TRACE	CMDTRA	PCSS/TRA
/STOP	CMDSTO	PCSS/STO
DBRC Commands:[2]		
INIT.RECON	INITRECON	PCSS/INITRECON
CHANGE.PRILOG	CHANGEPRILOG	PCSS/CHANGEPRIL
Condition Code	CC08 (HEX)	PRCS/00000008
Control Blocks:		
Data Control Block	DCB	FLDS/DCB
Database Descriptor	DBD	FLDS/DBD
Database Organization	HDAM	PCSS/HDAM
Database Pre-Open	PRE-OPEN	RIDS/PREOPEN
Data Sharing Environment	DATA SHARING	RIDS/DATASHARE
Devices:		
3270	D/T3270	DEVS/3270
LU TYPE1	SLU1	DEVS/SLU1

5. This is a sample of IMS keywords and is not intended to be a complete list.

Table 222. IMS Keyword Dictionary (continued)

Category/Keyword Examples	RETAIN Formats Keyword	SDB
DL/I Address Space	DLISAS	PCSS/DLISAS
DSECTS	IDSPWRK	FLDS/IDSPWRK
Emergency Restart Processing	ERE	RIDS/ERE
Error Codes (DBRC)	EC0182062	PRCS/00182062
Extended Restart	XRST	PCSS/XRST
Fast Path:	FASTPATH	RIDS/FASTPATH
Fast Path Area	FPAREA	PCSS/FPAREA
Second CI	DMAC	FLDS/DMAC
Main Storage Database	MSDB	PCSS/MSDB
Sequential Dependent	SDEP	PCSS/SDEP
Feedback Code	FDBK0C (HEX)	PRCS/0000000C
Fields:		FLDS/PSTUSID
PSTUSID	PSTUSID	
Function Sub-Function	SYS CHKRT	RIDS/SYS RIDS/CHKRT
Function Codes	FC0291	OPCS/0291
System Definition:		
ACB	ACBGEN	PCSS/ACB
NUCLEUS	NUC	PCSS/NUC
IRLM	IRLM	RIDS/IRLM
Labels:		
LOOPNEXT	LOOPNEXT	RIDS/LOOPNEXT
FREEMAIN	FREEMAIN	RIDS/FREEMAIN
Log Records:		
TYPE 18	TYPE18	PCSS/TYPE18
TYPE 67FF	TYPE67FF	PCSS/TYPE67FF
Macros:		
RWOS	RWOS	PCSS/RWOS
TERMINAL	TERMINAL	PCSS/TERMINAL
Master Terminal Operator	MTO	PCSS/MTO
Messages:		
DFS045I	MSGDFS045I	MS/DFS045I
IEC030I	MSGIEC030I	MS/IEC030I
Modules:		
DFSPCC20	DFSPCC20	RIDS/DFSPCC20
Online Change	OLCHG	PCSS/OLCHG
Online Data Set	OLDS	PCSS/OLDS
Online Image Copy	OLIC	RIDS/OLIC
Parameters:		
ERROPT=ACCEPT	ERROPT=ACCEPT	PCSS/ERROPT PCSS/ACCEPT
Processing Options:		
PROCOPT=GO	PROCOPT=GO	PCSS/PROCOPT PCSS/GO

Table 222. IMS Keyword Dictionary (continued)

Category/Keyword Examples	RETAIN Formats Keyword	SDB
Publication Numbers:		
SY26-3991-2	SY26399102	PUBS/SY26399102
Reason Codes[3]	RSN08 (HEX)	PRCS/00000008
Registers:		
General purpose registers	REG13 (DECIMAL)	REGS/GR13
Control registers	CREG10	REGS/CR10
Floating point registers	FPREG01	REGS/FP01
Restart Processing	RSTRT	RIDS/RSTRT
Release Levels:		
IMS Version 9 Database Manager	AR901	LVLS/901
IMS Version 9 Transaction Manager	AR902	LVLS/902
Return Codes:[4]		
Return code 12 (X'0C')	RC0C	PRCS/0000000C
RSR Environment:		
RSR	IMSRSR	RIDS/IMSRSR
Sense Codes:		
Sense 080B	SNS080B	PRCS/0000080B
Status Codes:		
Status code GE	STATUSGE	PRCS/000000GE
Status blank BLANK	STATUS4040	PRCS/00004040
Subcode	SUBCODE101	PRCS/00000101
SVC Numbers	SVC255 (DECIMAL)	OPCS/SVCFE
Trace Entry Function Code	TRACEE6 (DL/I) TRACE03 (DISP)	PCSS/TRACEE6 PCSS/TRACE03
XRF Environments:		RIDS/IMSXRF
XRF	IMSXRF	PCSS/TAKEOVER
Takeover	TAKEOVER	PCSS/ALTERNATE
Alternate	ALTERNATE	

Notes:

1. IMS commands begin with the special character "/", which is not searchable in RETAIN. Therefore, the convention is the letters "CMD" followed by the first three letters of the command. Please note these keywords are to be used for command processing only.
2. DBRC commands should omit the period (.) because of RETAIN search constraints.
3. Prefix with RSN and use the hexadecimal reason code of any length. Do not include leading zeros.
4. Minimum of 2 digits. If there are more than 2 digits, do not include leading zeros.

Dependency Keywords

Dependency keywords can be used 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 hits and you are almost certain that the program failure occurs only in a specific environment.

Keyword	Environment
D/CICS	CICS
D/CONVPROC	Conversational Processing
D/FP	Fast Path
D/GSAM	GSAM
D/HDAM	HDAM
D/HIDAM	HIDAM
D/HISAM	HISAM
D/HSAM	HSAM
D/IRLM	MS/VS Resource Lock Manager
D/LU6	VTAM LU 6 (Intersystem Communication)
D/MFS	Message Format Services
D/MSC	Multiple System Coupling
D/MVS	z/OS
D/None	No dependencies
D/NTO	Network Terminal Option
D/OSAM	OSAM
D/SB	Sequential Buffering
D/SECINDX	Secondary Index
D/SHISAM	Simple HISAM
D/SLU1	VTAM Type SLU 1
D/SLU2	VTAM Type SLU 2
D/SLU4	VTAM Type SLU 4
D/SLU P	VTAM Type SLU P
D/SYSGEN	PTFs that should be applied prior to SYSGEN
D/SYS3	System/3
D/SYS7	System/7
D/TRKREC	Track Recovery
D/TWX	Teletype
D/UCF	Utility Control Facility
D/VSAM	VSAM
D/VTAM	VTAM
D/1050	1050 Device Type
D/2260	2260 Device Type
D/2740	2740 Device Type
D/2741	2741 Device Type
D/2770	2770 Device Type
D/2780	2780 Device Type
D/2980	2980 Device Type
D/3270	3270 Large Screen
D/3270L	3270 Local
D/3270R	3270 Remote
D/3274	3274 Device Type
D/3275	3275 Device Type
D/3276	3276 Device Type
D/3278	3278 Device Type
D/3279	3279 Device Type
D/3284	3284 Device Type
D/3286	3286 Device Type
D/3287	3287 Device Type
D/3350	3350 Device Type
D/3375	3375 Device Type
D/3380	3380 Device Type
D/3600	3600 Device Types
D/3790	3790 Device Types

AIBREASN Codes for Queue Control Facility (QCF)/Message Requeuer (MRQ) Errors

This topic explains the AIBRETRN code and the AIBREASN codes set by the IMS message requeuer module DFSQMRQ0. These are recorded in both the SCRAPLOG and 6701-MRQE records when an error is detected requeuing messages to the IMS message queue. You use the AIBREASN codes when diagnosing problems with the Message Requeuer.

In this section:

For more information about diagnosing problems with the Message Requeuer or how the Message Requeuer (MRQ) program product communicates with certain functions in the IMS Transaction Manager and System Services, see "Diagnosing Problems in the Queue Control Facility/Message Requeuer" on page 341.

AIBREASN Codes Set by DFSQMRQ0

Table 223 lists the AIBREASN Codes Set by DFSQMRQ0.

Table 223. AIBREASN Codes Set by DFSQMRQ0

Code	Routine	Error Message
X'0004'	ERROR	DEFAULT REASON CODE IF NONE SET
X'0008'	ENTRY	INVALID FUNC PASSED TO QMRQ0 ENTRY
X'000C'	GETLNB	SID PASSED IS ZERO
X'0010'	GETLNB	SID PASSED IS TOO HI VALUE
X'0014'	GETLNB	SID PASSED IS UNDEFINED TO SYSTEM
X'0018'	ENTRY	MSGQ DATA SET INVALID IMS RELEASE
X'001C'	ENTRY	INVALID CMD/GCMD/ISRT CALL
X'0020'	ENTRY	INVALID MRQ FUNCTION
X'0024'	ENTRY	INVALID DFSQMR10 FUNCTION
X'0028'	ENTRY	INVALID SPANNED COMMAND
X'002C'	ENTRY	INVALID BUILD MRQ PREFIX CALL
X'0030'	ENTRY	ERROR DURING INIT QC FUN CALL
X'1000'	INSERT	INSERT PCB NOT MODIFIABLE
X'1004'	INSERT	1ST ISRT NOT 1ST QUEUE BUFFER
X'1008'	INSERT	CAN'T FIND RACF PREFIX SEGMENT
X'100C'	INSERT	MSC NOT GEN BUT MSC SEG PRESENT
X'1010'	INSERT	MSC NOT GEN BUT ISC SEG PRESENT
X'1014'	INSERT	FINDEST ERR FOR SOURCE=MSGIDSTN
X'1018'	INSERT	MSGIDSTN BLOCK NOT CNT/LNB/QAB
X'101C'	INSERT	CAN'T FIND MSC SEGMENT MSGSIPEX
X'1020'	INSERT	FINDEST ERR FOR SOURCE=MSGMSINM
X'1024'	INSERT	FINDEST ERR FOR DEST = MSGODSTN
X'1028'	INSERT	MSGODSTN BLOCK NOT EXPECTED CNT

Table 223. AIBREASN Codes Set by DFSQMRQ0 (continued)

Code	Routine	Error Message
X'102C'	INSERT	MSG DEST FLAG NOT EXPECTED LTERM
X'1030'	INSERT	MSG DEST FLAG NOT EXPECTED TRAN
X'1034'	INSERT	DEST BLOCK NOT EXPECTED SMB
X'1038'	INSERT	ETO NEEDED BUT NOT SUPPORTED
X'103C'	INSERT	DEST LNB SID/DEST MSG SID NOMTCH
X'1040'	INSERT	FINDEST ERROR FOR DEST = MSGMSONM
X'1044'	INSERT	MSC DEST BLOCK NOT EXPECTED CNT
X'1048'	INSERT	MSG DEST NOT EXPECTED TRANSACT
X'104C'	INSERT	DEST SMB SID/DEST MSG SID NOMTCH
X'1050'	INSERT	DEST CONV BUT NO SPA SEG IN MSG
X'1054'	INSERT	DEST NOT CONV BUT MSG HAS SPASEG
X'1058'	INSERT	DEST = BLANKS AT CALL QMGR TIME
X'105C'	INSERT	DEST NAME INVALID AT CALLQMGR TIME
X'1060'	INSERT	NON ZERO RC ON ISRT CALL TO QMGR
X'1064'	INSERT	MSG CONTAINS INVALID QUEUE NUM
X'1068'	INSERT	MSGMSINM BLOCK NOT CNT TYPE
X'106C'	INSERT	DFSSLC CALL ERR FOR DEST MSGMSONM
X'1070'	INSERT	DFSSLC CALL ERR FOR DEST MSGIDSTM
X'1074'	INSERT	DFSSLC CALL ERR FOR DEST MSGMSINM
X'1078'	INSERT	DFSSLC CALL ERR FOR DST MSGODSTN
X'107C'	INSERT	APPC SEG NEEDED BUT NOT SUPPORTED
X'1080'	INSERT	MSG DEST = APPC SYNC = NON RECOV
X'1084'	INSERT	MSG DEST = NON RECOV
X'1088'	INSERT	MSG WAS CANCELED BY IMS
X'108C'	INSERT	ERROR LOCATING APPC ASYNC DEST
X'1090'	INSERT	MSGMRQF1 FLAG INVALID
X'1094'	INSERT	MSC DEST BLOCK NOT EXPECTED LNB
X'1098'	INSERT	SOURCE/DEST = DFSAPPC INVALID
X'109C'	INSERT	LU6.2 SCD EXTEN INVALID/NOTAVAIL
X'10A0'	INSERT	MSG NOT VALID 01/03 TYPE
X'10A4'	INSERT	INTERNAL IMS MESSAGE
X'10A8'	INSERT	SOURCE/DEST NAME CHANGED
X'10AC'	INSERT	DFSLUMIF BLDPRE ERROR
X'10B0'	INIT	ERROR GETTING DFSPOOL STORAGE
X'10B4'	INIT	ERROR GETTING AN AWE
X'10B8'	INSERT	NO EXTENDED PREFIX PRESENT
X'10BC'	INIT	ERROR INIT/ADDRESSING QMRQWORK
X'10C0'	INIT	CAN'T FIND RACF SEGMENT MSGSORAC
X'10C4'	INIT	CAN'T FIND LU6.1 SEGMENT MSGSILU6
X'10C8'	INIT	CAN'T FIND APPC SEGMENT MSGSOAP0

Table 223. AIBREASN Codes Set by DFSQMRQ0 (continued)

Code	Routine	Error Message
X'10CC'	INIT	CAN'T FIND EPH SEGMENT MSGSIEPH
X'10D0'	INIT	CAN'T FIND APPC SEGMENT MSGSIAP0
X'10D4'	INIT	CAN'T FIND SEC SEGMENT MSGSISEC
X'10D8'	INIT	CAN'T FIND WLM SEGMENT MSGSIWLM
X'10DC'	INIT	CAN'T FIND SYS EXT SEGMENT MSGSISEX
X'10E0'	INIT	CAN'T FIND MSC EXT SEGMENT MSGSIMEX
X'10E4'	ISRT	OTMA MESSAGES NOT SUPPORTED
X'10E8'	ISRT	MSC/APPC MESSAGE NOT SUPPORTED
X'10EC'	ISRT	MESSAGE REROUT NOT SUPPORTED
X'10F0'	ISRT	MSC SEG ITEM NOT PRESENT
X'10F4'	ISRT	ERROR CREATING DYNAMIC LNB
X'10F8'	INIT	CAN'T FIND SYS PREFIX SEG MSGSIPEX
X'10FC'	INIT	ERROR LOADING MODULE DFSTSPC0
X'1100'	ISRT	ISRT - /MSV CMD MESSAGE CANCELED
X'1104'	INIT	QMRQWORK SHOULD NOT OCCUR ERROR
X'1108'	MSGPROC	CAN'T FIND TMR PREFIX MSGMSC
X'110C'	MSGPROC	DFSSQQRY INVALID QUEUE TYPE
X'1110'	INIT	INVALID INCLUDE/EXCLUDE ENTRY
X'1114'	INIT	INVALID MRQWORK INIT CALL
X'1118'	ISRT	QBUFF DIDN'T FIT IN DEP RGN COMM AREA
X'111C'	ISRT	DFSRAC6 ERROR GETTING UTOKEN FOR APPC
X'1120'	ISRT	QUEUE BUFFER FLAG ERROR
X'1124'	ISRT	SEGMENT FLAG ERROR
X'1128'	ISRT	INVALID QUEUE BUFFER DETECTED
X'112C'	INIT/CLEANUP	ISWITCH FAILURE
X'1130'	INSERT	ISRT QBUFF THRESHOLD EXCEEDED
X'2000'	PURGE	PURGE PCB NOT MODIFIABLE
X'2004'	PURGE	PURGE PCB DEST INVALID
X'2008'	PURGE	PURGE PCB DEST SET TO BLANKS
X'200C'	PURGE	PURGE DEST CTL BLK ADDR ZERO
X'2010'	PURGE	PURGE DEST NAME = DFS INVALID
X'2014'	PURGE	PURGE INQUIRY DEST NOT SIGNED ON
X'2018'	PURGE	PURGE NON 0 RC ON QMGR ENQ CALL
X'201C'	PURGE	PURGE I/O AREA INVALID
X'2020'	PURGE	PURGE MSGMRQF1 FLAG INVALID
X'2024'	PURGE	DEST BLK=DFSAPPC BUT MSG NOT APPC
X'3000'	SETPRFX	MESSAGE PREFIX SIZE INVALID
X'4000'	CPYPRFX	PREFIX SIZE NOT EXPECTED
X'4004'	CPYPRFX	CAN'T FIND SYS PREFIX MSGSSEGM
X'4008'	CPYPRFX	CAN'T FIND TMR PREFIX MSGMSC

Table 223. AIBREASN Codes Set by DFSQMRQ0 (continued)

Code	Routine	Error Message
X'400C'	CPYPRFX	CAN'T FIND SYS EXT PREFIX MSDMSE
X'4010'	CPYPRFX	CAN'T FIND THE MSC PREFIX MSGMSC
X'5000'	CANCEL	NON ZERO RC ON CANCEL CALL TO QMGR
X'6004'	FMQINSRT	LOGREC TYPE NOT 4002, 01, OR 03
X'6008'	FMQINSRT	NO SECONDARY LOGREC WHEN EXPECTED
X'600C'	FMQINSRT	SECONDARY LOGREC DEST INVALID
X'6010'	MRQ/IMS	QBUF COUNT NOT EXPECTED NUMBER
X'6014'	MSGPROC	MSG WAS CANCELED BY IMS
X'7004'	XLATPFX	CAN'T FIND SYS EXT SEGMENT MSGSISEX
X'7008'	XLATPFX	CAN'T FIND PFX SEG MSGSITMR
X'700C'	XLATPFX	CAN'T FIND PFX SEG MSGMSC
X'7010'	XLATPFX	CAN'T FIND PFX SEG MSGMSCE
X'7014'	XLATPFX	ERROR CONVERTING MESSAGE TIME
X'7018'	XLATPFX	CAN'T FIND PFX MSGEPHDR
X'8004'	QMR30	BROWSE - SYSTEM NOT SHARED QUEUES
X'8008'	QMR30	INVALID FUNCTION PASSED TO BROWSE
X'800C'	QMR30	BROWSE RECEIVED ERROR CODE FROM SELECT
X'8010'	QMR30	BROWSE COMMAND ERROR
X'8014'	QMR30	BROWSE COMMAND ERROR
X'8018'	QMR30	BROWSE COMMAND ERROR
X'801C'	QMR30	BROWSE COMMAND ERROR
X'8020'	QMR30	BROWSE COMMAND ERROR
X'8024'	QMR30	BROWSE COMMAND ERROR
X'8028'	QMR30	BROWSE COMMAND ERROR
X'802C'	QMR30	BROWSE COMMAND ERROR
X'8030'	QMR30	BROWSE COMMAND ERROR
X'8034'	QMR30	BROWSE COMMAND ERROR
X'8038'	QMR30	BROWSE COMMAND ERROR
X'803C'	QMR30	BROWSE COMMAND ERROR
X'8040'	QMR30	BROWSE INVALID DESTINATION
X'8044'	QMR30	BROWSE LOCAL QUEUES CONTROL BLOCK ERROR
X'8048'	QMR30	BROWSE LOCAL QUEUES DESTINATION TYPE ERROR ON A MULTI-RECORD MESSAGE
X'804C'	QMR30	BROWSE LOCAL QUEUES CONTINUATION TYPE ERROR ON A MULTI-RECORD MESSAGE
X'8050'	QMR30	QSN BLOCK ADDRESS IS ZERO
X'8054'	QMR30	BROWSE AREA PARM NOT SET
X'9004'	QMR60	QUERY - SYSTEM NOT SHARED QUEUES
X'9008'	QMR60	INVALID FUNCTION PASSED TO QUERY
X'900C'	QMR60	QUERY RECEIVED ERROR CODE FROM SELECT

Table 223. AIBREASN Codes Set by DFSQMRQ0 (continued)

Code	Routine	Error Message
X'9010'	QMR60	QUERY - CMD QUEUE TYPE INVALID
X'9014'	QMR60	QUERY - NO MESSAGE RETURNED ON INTERNAL CALL TO BROWSE
X'9018'	QMR60	QUERY - RETURN CODE ERROR ON INTERNAL CALL TO BROWSE
X'901C'	QMR60	QUERY - ERROR LOCATING APPC/OTMA PFX
X'9020'	QMR60	QUERY - ERROR LOCATING TMR PREFIX
X'9024'	QMR60	QUERY - SHOULD NOT OCCUR ERROR
X'9028'	QMR60	ERROR FREEING BUFFER DURING CLEANUP
X'902C'	QMR60	QUERY - QUERY CALLED BROWSE WITH A GET COMMAND
X'9030'	QMR30	BROWSE - QUERY CALLED BROWSE WITH AN DESTINATION OF ZERO
X'9034'	QMR30	BROWSE COMMAND ERROR
X'9038'	QMR60	QUERY - QUERY CALLED BROWSE WITH AN INVALID QNAME
X'903C'	QMR60	QUERY - QUERY CALLED BROWSE WITH AN INVALID QUEUE SPACE NOTIFICATION BLOCK
X'A004'	QMR50	UNLOAD - SELECT QUEUE NAME ERROR
X'A008'	QMR50	UNLOAD - Reserved
X'A00C'	QMR50	UNLOAD - GU CALL ERROR
X'A010'	QMR50	UNLOAD - GN CALL ERROR
X'A014'	QMR50	UNLOAD - REJECT CALL ERROR
X'A018'	QMR50	UNLOAD - RELEASE CALL ERROR
X'A01C'	QMR50	UNLOAD - INVALID CALL TYPE RECEIVED
X'A020'	QMR50	UNLOAD - INVALID CALL SEQUEUCE
X'A024'	QMR50	UNLOAD - SELECT MESSAGE ERROR
X'A028'	QMR50	UNLOAD - SYSTEM NOT SHARE QUEUES
X'A02C'	QMR50	UNLOAD - CMD QUEUE TYPE INVALID
X'A030'	QMR50	UNLOAD - QUEUENAME INVALID
X'A034'	QMR50	UNLOAD - DESTINATION IS INVALID
X'A038'	QMR50	UNLOAD - CONFLICT BETWEEN QDFLG1 AND QDQCBDQ
X'A03C'	QMR50	UNLOAD - 1ST RECORD RETURNED NOT 1ST OF MESSAGEQ
X'A040'	QMR50	UNLOAD - MESSAGE CHAIN IS BROKEN
X'A044'	QMR50	UNLOAD - ERROR GET/REL DFSBCB STORAGE
X'A048'	QMR50	UNLOAD - QDQCBDQ DOES NOT POINT TO A QUEUE BLOCK
X'A04C'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE ERROR PRIOR UNLOAD CALL WAS IN ERROR
X'A050'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB SUSPEND QUEUE WAS DRAINED DURING THE PROCESS OF BEING UNLOADED
X'A054'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB SUSPEND QUEUE WAS MODIFIED DURING THE PROCESS OF BEING UNLOADED
X'A058'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE CNT QUEUE WAS DRAINED DURING THE PROCESS OF BEING UNLOADED

Table 223. AIBREASN Codes Set by DFSQMRQ0 (continued)

Code	Routine	Error Message
X'A05C'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE CNT DEQUEUE POINTER WAS MODIFIED DURING THE PROCESS OF BEING UNLOADED
X'A060'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB QUEUE WAS DRAINED DURING THE PROCESS OF BEING UNLOADED
X'A064'	QMR50	UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB DEQUEUE POINTER WAS MODIFIED DURING THE PROCESS OF BEING UNLOADED
X'A068'	QMR50	UNLOAD LOCAL QUEUES, REQUESTED DESTINATION IS BEING READ BY ANOTHER TASK
X'A06C'	QMR50	ERROR TERMINATING IMS CONVERSATION
X'A070'	QMR50	COMMAND RESPONSE MESSAGE CAN'T BE DELETED
X'B004'	QMR40	RECOVER COMMAND ERROR
X'B008'	QMR40	RECOVER COMMAND ERROR
X'B00C'	QMR40	RECOVER COMMAND ERROR
X'B010'	QMR40	RECOVER COMMAND ERROR
X'B014'	QMR40	RECOVER COMMAND ERROR
X'B018'	QMR40	RECOVER COMMAND ERROR
X'B01C'	QMR40	RECOVER COMMAND ERROR
X'B020'	QMR40	RECOVER COMMAND ERROR
X'B024'	QMR40	RECOVER COMMAND ERROR
X'B028'	QMR40	RECOVER COMMAND ERROR
X'B02C'	QMR40	RECOVER COMMAND ERROR
X'B030'	QMR40	RECOVER COMMAND ERROR
X'B034'	QMR40	RECOVER COMMAND ERROR
X'B038'	QMR40	RECOVER COMMAND ERROR
X'B03C'	QMR40	RECOVER COMMAND ERROR
X'B040'	QMR40	RECOVER COMMAND ERROR
X'B044'	QMR40	RECOVER COMMAND ERROR
X'B048'	QMR40	RECOVER COMMAND ERROR
X'B04C'	QMR40	RECOVER COMMAND ERROR
X'C000'	QMR20	SELECT SHOULD NOT OCCUR ERROR
X'C004'	QMRA0	SELECT CRITERIA DFSSQQRY ERROR
X'C008'	QMRA0	SELECT CRITERIA DFSPOOL ERROR
X'C00C'	QMRA0	INVALID CMD CALL
X'C010'	QMRA0	DFSCBTS SCAN/FIND ERROR
X'D004'	QMR70	LOAD/INSERT - INVALID CALL TYPE REC
X'D008'	QMR70	LOAD - ERROR CANCELING MESSAGE
X'D00C'	QMR70	XFER - ERROR TRANSFERING MESSAGE
X'E000'	DFSQMR00	QSN exit started too many BMPs
X'E004'	DFSQMRD0	QC/QSN INVALID CMD CALL

Table 223. AIBREASN Codes Set by DFSQMRQ0 (continued)

Code	Routine	Error Message
X'E008'	DFSQMRD0	QC/QSN SUPPORTED ONLY IN QCF ENVIRONMENT
X'E00C'	DFSQMRD0	QC/QSN CMD CALL NO QQSN BLOCK
X'E010'	DFSQMRD0	QC/QSN COMMAND ACTION INVALID
X'E014'	DFSQMRD0	QC/QSN CMD CALL INVALID ITASK
X'E018'	DFSQMRD0	ERROR GET/REL AN AWE
X'E01C'	DFSQMRD0	QC/QSN CMD CALL RECEIVED ERROR CODE FROM SELECT
X'E020'	QMRG0	INVALID FUNCTION PASSED TO QC LOAD AND QUERY QUEUE SPACE BNOTIFICATION TABLE
X'E024'	DFSQMRG0	QC LOAD CMD CALL RECEIVED ERROR GET/REL DFSPOOL STORAGE SERVICES
X'E028'	DFSQMRG0	QC LOAD CMD PROCESSING - the value for QUOTNOTF is invalid
X'E02C'	DFSQMRG0	INVALID CMD CALL RECEIVED, ONLY /QC-LTBL IS CURRENTLY SUPPORTED
X'E030'	DFSQMRG0	INVALID QUEUE UPPER AND/OR LOWER THRESHOLD PERCENT
X'E034'	DFSQMRG0	ERROR GET/REL AN AWE
X'E038'	DFSQMRG0	/QC-LTBL AND /QC-QTBL NOT ACTIVE
X'E03C'	DFSQMRD0	QC/QSN COMMAND IS INVALID
X'F000'		RESERVED
X'F004'	QMRC0	INVALID FUNCTION PASSED TO ENVIRONMENT STATISTICS ROUTINE
X'F008'	QMRC0	IMS IS IN THE PROCESS OF SHUTDOWN OR QUIESCING
X'F00C'	QMRC0	SHARED QUEUES ENVIRONMENT, NO SHARED QUEUES MASTER CONTROL BLOCK (SCDSQM)
X'F010'	QMRC0	SHARED QUEUES ENVIRONMENT, NO STRUCTURE BLOCK (SQMSQSM)
X'F014'	QMRC0	IMS INTERNAL ERROR
X'F018'	QMRC0	CQS NOT AVAILABLE TO PROCESS THE CQS QUERY REQUEST
X'F01C'	QMRC0	CQS RETURNED AN UNSUCCESSFUL RETURN CODE FOR THE CQS QUERY REQUEST
X'F020'	QMRC0	IN PROCESSING THE QCF ENVIRONMENT STATISTICS REQUEST STORAGE WAS NOT OBTAINED
X'F024'	QMRC0	IN PROCESSING THE QCF ENVIRONMENT STATISTICS THE LIST PASSED TO CQS CONTAINED AN INVALID STRUCTURE NAME
X'F028'	QMRC0	IN PROCESSING THE QCF ENVIRONMENT STATISTICS REQWUEST THE DFSSQQRY RETURNED A NON-ZERO RETURN CODE

AIB Return Codes Set by DFSQMRQ0

X'000000F0' is a unique AIB return code assigned to the message queue manager message requeuer processor (DFSQMRQ0). It is set in the AIBRETRN field of the AIB by DFSQMRQ0 when an error is detected while requeuing a message to the message queue. DFSQMRQ0 also sets the AIBREASN field in the AIB to a code indicating the type of error detected. These codes are passed back to the MRQ FMQINSRT BMP program. FMQINSRT stores the codes in the MRQ prefix segment that is appended in front of the message record that caused the error. FMQINSRT writes this record to the SCRAPLOG data set. IMS logs a corresponding 6701-MRQE record to the online log data set (OLDS).

AIB return codes other than X'000000F0' indicate IMS errors that are not specific to message requeuing. To analyze these return codes and their associated reason codes, see *IMS Version 9: Messages and Codes, Volume 1*.

Each AIBREASN code associated with AIB return code X'000000F0' is described in the following list. Locate the unique AIBREASN code and analyze the error as described. Each AIBREASN code falls into one of three categories:

1. Error is a normal condition and AIBREASN is set for informational purposes. The message is discarded according to protocol. There are five AIBREASN codes in this category:

   1080 Message is an APPC synchronous conversation type.

   1084 Message is a nonrecoverable type.

   1088 Message was flagged to be canceled.

   10A4 Message is an internal IMS message that is not recoverable.

   2014 Destination is an inquiry LTERM not signed on.
2. Error is most likely due to unsupported or changed IMS features or destination or source resource names. An example is a transaction that was deleted from the SYSGEN and the MRQ tried to requeue a message destined for the deleted transaction. The MRQ processor would detect that the destination no longer exists and set an AIBREASN code of 1024 or 1040. The IMS system programmer should analyze these errors (by following the explanations and programmer response guidelines found in the following AIBREASN code list) and verify if the resource has been deleted or altered.
3. Error is an IMS or MRQ internal error and should be reported to your IBM support personnel for resolution.

The following list describes all of the AIB reason codes associated with the AIB return code X'000000F0'.

X'0004' ERROR - DEFAULT REASON CODE IF NONE SET

Explanation: AIBREASN code in R0 = 0 when ERROR routine called.

Programmer response: Trace back to caller of ERROR routine. This is an IMS internal error.

X'0008' ENTRY - INVLID FUNC PASSED TO QMRQ0 ENTRY

Explanation: DFSQMRQ0 was called with an invalid function code in R1.

Programmer response: This is an internal error. Trace back to caller of DFSQMRQ0.

X'000C' GETLNB - SID PASSED IS ZERO

Explanation: Destination system identification (SYSID) or source SYSID of message being processed is zero.

Programmer response: Locate destination SYSID (MSGMSOID) or source SYSID (MSGMSIID) in message. SYSIDs are extracted from the control block representing the resource (CNT for LTERMS, SMB for transactions) when the message was created. Verify resource was not changed across restart. Except for some internal system messages, SYSID=0 is invalid and should not occur. Possible IMS internal error.

X'0010' GETLNB - SID PASSED IS TOO HI VALUE

Explanation: Destination system identification (SYSID) or source SYSID of message being processed is higher than maximum SYSID defined on MSNAME macros at SYSGEN and stored in SCD at SCDSIDN.

Programmer response: Locate destination SYSID (MSGMSOID) or source SYSID (MSGMSIID) in message. SYSIDs are extracted from the control block representing the resource (CNT for LTERMS, SMB for transactions) when the message was created. Max SYSID is determined from max SYSID in MSNAME macros at system generation and stored in the SCD at SCDSIDN. Verify that MSNAMES were not removed at system generation and SCDSIDN is correct.

X'0014' GETLNB - SID PASSED IS UNDEFINED TO SYSTEM

Explanation: Destination system identification (SYSID) or source SYSID of message being processed is not defined to system.

Programmer response: Locate destination SYSID (MSGMSOID) or source SYSID (MSGMSIID) in message. SYSIDs are extracted from the control block representing the resource (CNT for LTERMS, SMB for transactions) when the message was created. To be

valid, SYSID must be defined in an MSNAME macro at system generation.

X'0018' ENTRY - MSGQ DATA SET INVALID IMS RELEASE

Explanation: The message being inserted is from an IMS release not supported by this IMS release.

Programmer response: Locate the I/O AREA. THE MRQ prefix is the first 24 bytes and contains the character string $MRQMSG at offset X'04'. The IMS release of the message is at offset X'0C' for 2 bytes (0310, 0410, and so on). This value is obtained from the type X'4001' checkpoint record by FMQSELCT. FMQSELCT locates the checkpoint ID record from the CHKPT input control statement. This data is passed to FMQINSRT and compared to the current IMS release at SSCDIMSR. The SCD address is in register 11.

Programmer response: Verify that the message is being requeued from a supported IMS release. This is probably a user error.

X'001C' ENTRY - INVALID CMD/GCMD/ISRT CALL

Explanation: DFSQMRQ0 was called with an invalid CMD, GCMD, or ISRT call, or invalid sequence of these calls. The very first MRQ/QCF call to IMS must be a CMD or ISRT call. CMD calls must pass a valid command work area. ISRT calls must pass a valid MRQ prefix and IMS message.

Programmer response: If the caller is the MRQ or QCF BMP, then this is either a MRQ, QCF, or IMS error. If the caller is a user BMP using the MRQPSB, this is a user error. The MRQPSB is for the exclusive use of MRQ/QCF. This problem can also occur if the release of MRQ or QCF is not supported on the IMS release. Verify that this is a valid MRQ/QCF release for this release of IMS.

X'0020' ENTRY - INVALID MRQ FUNCTION

Explanation: DFSQMR10 did not recognize the MRQ function code.

Programmer response: This is an internal error. Trace back to caller of DFSQMR10. Function code is stored in QMRWFCN.

X'0024' ENTRY - INVALID DFSQMR10 FUNCTION

Explanation: Function not supported by DFSQMR10.

Programmer response: This is an internal error. Trace back to caller of DFSQMR10. DFSQMR10 function is stored in QMRWFCN2.

X'0028' ENTRY - INVALID SPANNED COMMAND

Explanation: Invalid spanned command data was received from the MRQ BMP.

Programmer response: This is an internal error. Either the command segment first or last flags, or both, or the workarea spanned flags are incorrect. The command data is in the I/O area pointed to by either Reg6 or QMRWIO in MRQWORK. The first/last flags are at flag2 (MRZZ2). The MRQ spanned flags are in MRQWORK (whose address is in REG5) flag QMRCFLG2.

X'002C' ENTRY - INVALID BUILD MRQ PREFIX CALL

Explanation: The Build MRQ prefix routine in DFSQMR10 was called to build a MRQ prefix, but the current function either did not have a prefix buffer or a message to build the prefix from.

Programmer response: This is an internal error.

X'0030' ENTRY - ERROR DURING INIT QC FUN CALL

Explanation: DFSQMR10 encountered an error during initialization of the Queue Control (QC) function call.

Programmer response: Locate the QC command buffer pointed to by QCMRQCMDP and verify it is a valid QC command. If QC-LTBL command, locate the QSN table being loaded and verify it has a valid length.

X'1000' INSERT - INSERT PCB NOT MODIFIABLE

Explanation: Alternate PCB defined in MRQ PSB is not modifiable type.

Programmer response: Verify that MODIFY=YES was coded on the PCB named ALTPCB01 for the MRQPSB.

MRQPSB is the default MRQ PSBNAME and might have been changed on the MRQPSBN= parameter of the MSGQUEUE macro at system generation.

X'1004' INSERT - 1ST ISRT NOT 1ST QUEUE BUFFER

Explanation: A new message is being inserted and the first queue buffer message flag (MSGFFRST) is not set on.

Programmer response: Locate the message flags in the message prefix. If message is a first buffer then MSGFFRST should be set. Verify original message on log and input to FMQSELCT was correct. If not, this is an internal IMS error. If OK, message may have been

handled incorrectly by FMQSELCT, FMQCANCL, or FMQINSRT.

X'1008' INSERT - CAN'T FIND RACF PREFIX SEGMENT

Explanation: Message was created with a RACF prefix, but RACF is not initialized.

Programmer response: If the flag MSGC1RAC is set on and a RACF prefix segment with a code = 83 is not present, this is an internal IMS error.

X'100C' INSERT - MSC NOT GEN BUT MSC SEG PRESENT

Explanation: Message was created with an MSC prefix but MSC is not initialized.

Programmer response: Locate the message and verify the MSC prefix is present and flag MSGC2MSC is set on. If so, MSC was invoked at system generation when message was created but is not available now. Flag SCDPDMUL is set on at system generation if MSC is invoked at system generation. Regenerate the system with MSC.

X'1010' INSERT - MSC NOT GEN BUT ISC SEG PRESENT

Explanation: Message was created with an ISC prefix but MSC is not initialized.

Programmer response: Locate the message and verify the ISC prefix is present and flag MSGC2LU6 is set on. The ISC prefix segment item has a MSSSID code of 84. If so, MSC was invoked at system generation when the message was created but is not available now. Flag SCDPDMUL is set on at system generation if MSC is invoked at system generation. Regenerate the system with MSC.

X'1014' INSERT - FINDEST ERR FOR SOURCE=MSGIDSTN

Explanation: The local source name in the message at MSGIDSTN could not be found by the FINDEST routine.

Programmer response: Locate the MSGIDSTN name in the message and verify that it is a valid local LTERM or MSNAME. If it is ETO, is invoked at system generation and name is a dynamic LTERM, verify that ETO is enabled. FINDEST parameter list used to locate the name is at PSTDCA.

X'1018' INSERT - MSGIDSTN BLOCK NOT CNT/LNB/QAB

Explanation: The control block returned by FINDEST, representing the source name at MSGIDSTN is not a CNT (LTERM), LNB (MSNAME), or QAB (LU 6.2 node).

Programmer response: Locate the MSGIDSTN name in the message and verify that it is a valid LTERM, MSNAME, or LU 6.2 node. If it is an LU 6.2 node, then MSGIDSTN begins with FEFFFFFF and the NODE name is in the LU 6.2 prefix. Control block address is in REG1 in the REG14-12 area and the block is at QTPDST.

X'101C' INSERT - CAN'T FIND MSC SEGMENT MSGSIPEX

Explanation: Message flag indicates MSC prefix segment is present but segment cannot be located.

Programmer response: Locate the message and verify the flag MSGC2MSC is set. If set, then MSC prefix segment with a code = 82 must be present. This is an internal IMS error.

X'1020' INSERT - FINDEST ERR FOR SOURCE=MSGMSINM

Explanation: The MSC source name in the message at MSGMSINM could not be found by the FINDEST routine.

Programmer response: Locate the MSGMSINM name in the message and verify that it is a valid local LTERM. If ETO is invoked at system generation and name is a dynamic LTERM, verify that ETO is enabled.

The MSC LTERM name is only verified if the source SYSID in the message at MSGMSIID is local. Verify that the source SYSID was not changed from a remote SYSID to a local (check MSNAME macros).

X'1024' INSERT - FINDEST ERR FOR DEST = MSGODSTN

Explanation: The local destination name in the message at MSGODSTN could not found by the FINDEST routine.

Programmer response: Locate the MSGODSTN name in the message and verify that it is a valid local LTERM, MSNAME, or local or remote TRANSACTION CODE. If it is ETO, is invoked at system generation and name is a dynamic LTERM, verify that ETO is enabled. FINDEST parameter list used to locate the name is at PSTDCA.

X'1028' INSERT - MSGODSTN BLOCK NOT EXPECTED CNT

Explanation: The control block returned by FINDEST, representing the destination name at MSGODSTN is not a CNT (LTERM) or MSC LNB (MSNAME).

Programmer response: Locate the MSGODSTN name in the message and verify that it is a valid LTERM or MSNAME. The control block address is in REG1 in the REG14-12 area and the control block is at QTPDST.

X'102C' **INSERT - MSG DEST FLAG NOT EXPECTED LTERM**

Explanation: The message destination control block is a CNT type (either an LTERM or MSC MSNAME). However, the destination type flag in the message is not a CNT type.

Programmer response: Locate the message destination type flag (MSGDFLG2) of the message and it should be a CNT type (X'82'=CNT type, X'81'=SMB type). If flag is X'81' then destination name at MSGODSTN in the message prefix was an SMB type when the message was originally created but now the resource name is a CNT type. The destination control block address is in REG1 in the REG14-12 area and the block is at QTPDST.

X'1030' **INSERT - MSG DEST FLAG NOT EXPECTED TRAN**

Explanation: The message destination type flag is expected to be an SMB type because the destination control block is an SMB.

Programmer response: Locate the message destination type flag (MSGDFLG2) of the message and it should be an SMB type (X'81'=SMB type, X'82'=CNT type). If flag is X'82' then destination name at MSGODSTN in the message prefix was a CNT type (either a LTERM or MSNAME) when the message was created but now the resource name is an SMB type. The destination control block address is in REG1 in the REG14-12 area and the block is at QTPDST.

X'1034' **INSERT - DEST BLOCK NOT EXPECTED SMB**

Explanation: The control block returned by FINDEST, representing the source name at MSGODSTN is not an SMB (either a local or remote transaction code block).

Programmer response: Locate the MSGODSTN name in the message and verify that it is a valid local or remote transaction code name. The control block address is in REG1 in the REG14-12 area and the block is at QTPDST.

X'1038' **INSERT - ETO NEEDED BUT NOT SUPPORTED**

Explanation: ETO was needed but was not available.

Programmer response: This error is not currently set.

X'103C' **INSERT - DEST LNB SID/DEST MSG SID NOMTCH**

Explanation: The message is enqueued to an MSC logical link MSNAME and the destination SYSID of the message does not match the destination SYSID of the MSNAME.

Programmer response: Locate the MSC destination name in the message (MSGMSONM in the MSC prefix). It should be an MSC MSNAME. The LNB control block that represents this MSNAME has a different destination SYSID than the message destination SYSID at MSGMSOID. Most probable cause is the MSNAME destination SYSID has been changed. The LNB control block address is in REG15 in the REG14-12 area and the block is at QTPDST.

X'1040' **INSERT - FINDEST ERROR FOR DEST = MSGMSONM**

Explanation: The MSC destination name in the message at MSGMSONM could not be found by the FINDEST routine.

Programmer response: Locate the MSGMSONM name in the message and verify that it is a valid local LTERM, MSNAME, or local or remote TRANSACTION CODE. If it is ETO, it is invoked at system generation and name is a dynamic LTERM, verify that ETO is enabled. FINDEST parameter list used to locate the name is at PSTDCA.

X'1044' **INSERT - MSC DEST BLOCK NOT EXPECTED CNT**

Explanation: The control block returned by FINDEST, representing the source name at MSGMSONM is not an LTERM CNT.

Programmer response: Locate the MSGMSONM name in the message prefix and verify it is a valid local LTERM. The CNT control block address returned by FINDEST is in REG1 in the REG14-12 area and the block is at QTPDST.

X'1048' **INSERT - MSG DEST NOT EXPECTED TRANSACT**

Explanation: The message destination type flag associated with the MSGODSTN name is expected to be an SMB type because the destination control block is an SMB.

Programmer response: Locate the message destination type flag (MSGDFLG2) of the message and it is a 82. This indicates the MSGODSTN destination name was a CNT type when the original message was created. However, the resource control block returned by FINDEST returned an SMB type control block. Most likely cause is the destination was changed from an LTERM or MSNAME type to a transaction code type. The control block address is in REG1 in the REG14-12 area and the block is at QTPDST. The parameter list passed to FINDEST is in the PSTDCA area.

X'104C' INSERT - DEST SMB SID/DEST MSG SID NOMTCH

Explanation: The message is enqueued to a transaction code SMB and the destination SYSID of the message does not match the destination SYSID of the SMB.

Programmer response: This error is not currently set.

X'1050' INSERT - DEST CONV BUT NO SPA SEG IN MSG

Explanation: The message destination is an IMS conversational transaction code but the message does not contain a scratch pad (SPA) segment.

Programmer response: Locate the message destination name in the MSC prefix at MSGMSONM. This name is a conversational transaction code. The SMB address for the transaction code is in REG1 in the REG14-12 area and the SMB block is at QTPDST. The MSG2SPA flag in the MSC prefix should be set on to indicate the message contains a SPA; however, it is not set. Most likely cause is the transaction code was changed from nonconversational to conversational.

X'1054' INSERT - DEST NOT CONV BUT MSG HAS SPASEG

Explanation: The message flag MSG2SPA is set indicating a conversation SPA segment is included in the message and the destination transaction code is not an IMS conversation transaction code.

Programmer response: Locate the MSG2SPA flag in the MSC prefix of the message and it should be set on. The transaction code is in the MSC prefix at MSGMSONM. REG1 in the REG14-12 area is the SMB address for the transaction code and it is a not an IMS conversational transaction code. The SMB block is at QTPDST. Most likely cause is the transaction code was changed from conversational to nonconversational.

X'1058' INSERT - DEST = BLANKS AT CALL QMGR TIME

Explanation: The destination in the modifiable TPPCB was not set.

Programmer response: The message queue manager is being called to insert the message to a queue manager buffer and the destination name in the TPCB at TPCBTSYM has not been set. This is an IMS internal error.

X'105C' INSERT - DEST NAME INVALID AT CALLQMGR TIME

Explanation: The destination invalid flag in the TPPCB has not been reset.

Programmer response: The message queue manager is being called to insert the message to a queue manager buffer and the destination invalid flag (TPCBSMBN) is still set on. This is an IMS internal error.

X'1060' INSERT - NON ZERO RC ON ISRT CALL TO QMGR

Explanation: The message queue manager was called to insert the message to a queue manager buffer and a nonzero return code was returned.

Programmer response: The queue manager return code is in REG15 of the REG14-12 area. Most likely cause is the message queue buffer is too small to hold the message prefix and segment. Check the large message queue data set block size and determine if it has been reduced from the size when the message was originally created. The length of the message prefix and segment is contained in the first 2 bytes of the message in the I/O area. If the message queue block size is large enough, the message length is correct, and the message queue data sets are not full, then this is probably an IMS internal error.

X'1064' INSERT - MSG CONTAINS INVALID QUEUE NUM

Explanation: The queue number of the message is invalid.

Programmer response: Locate the message queue number in the message prefix at MSGFLAGS (low order 4 bits of flag). A queue number greater than 5 is invalid. The queue number source will need to be determined. Some rules are:

- If the MRQ recovery mode is RECOVERDM or RECOVERAB and the source of the message is a 4002 DUMPQ or SNAPQ record, the queue number is obtained from the 4002 record by FMQSELCT.
- If the MRQ recovery mode is RECOVERDM or RECOVERAB and the source of the message is a 01 or 03 record, the queue number is obtained from the type 35 enqueue record by FMQSELCT.
- If the MRQ recover mode is REPROCESS, the queue number is 0 in the 01 or 03 record and should have been set by DFSQMRQ0 to 1 if destination is a transaction code or 4 for all other destination types.
- This is either an IMS or MRQ internal error.

X'1068' INSERT - MSGMSINM BLOCK NOT CNT TYPE

Explanation: The control block returned by FINDEST, representing the source name at MSGMSINM is not an LTERM CNT.

Programmer response: Locate the MSGMSINM name in the message prefix and verify it is a valid local LTERM. The CNT control block address returned by

FINDEST is in REG1 in the REG14-12 area and the block is at QTPDST.

X'106C' **INSERT - DFSSLC CALL ERR FOR DST MSGMSONM**

Explanation: An error was detected when attempting to locate the resource control block for the resource name at MSGMSONM in the message prefix.

Programmer response: This is most likely an IMS internal error. The return code returned by the locate call is in REG15 of the REG14-12 area. The locate parameter list is in PSTDCA area.

X'1070' **INSERT - DFSSLC CALL ERR FOR DST MSGIDSTM**

Explanation: An error was detected when attempting to locate the resource control block for the resource name at MSGIDSTN in the message prefix.

Programmer response: This is most likely an IMS internal error. The return code returned by the locate call is in REG15 of the REG14-12 area. The locate parameter list is in PSTDCA area.

X'1074' **INSERT - DFSSLC CALL ERR FOR DST MSGMSINM**

Explanation: An error was detected when attempting to locate the resource control block for the resource name at MSGMSINM in the message prefix.

Programmer response: This is most likely an IMS internal error. The return code returned by the locate call is in REG15 of the REG14-12 area. The locate parameter list is in PSTDCA area.

X'1078' **INSERT - DFSSLC CALL ERR FOR DST MSGODSTN**

Explanation: An error was detected when attempting to locate the resource control block for the resource name at MSGODSTN in the message prefix.

Programmer response: This is most likely an IMS internal error. The return code returned by the locate call is in REG15 of the REG14-12 area. The locate parameter list is in PSTDCA area.

X'107C' **INSERT - APPC NEEDED BUT NOT SUPPORTED**

Explanation: The message was determined to be an LU 6.2 APPC type; however, the APPC message prefix segment was not present or could not be located.

Programmer response: Locate the message. The MSGC2APP flag should be set on indicating the message is an APPC type. The APPC prefix segment with a segment type flag (MSGSIID) of 85 should be present in the message prefix. This is most likely an IMS internal error.

X'1080' **INSERT - MSG DEST = APPC SYNC = NON RECOV**

Explanation: Message destination is an LU 6.2 synchronous logical unit (LU) name and is considered nonrecoverable.

Programmer response: Locate the MSGODSTN name field in the message prefix and it should start with an FDFFFFFF indicating the destination of the message is an LU 6.2 (APPC) logical unit in LU 6.2 synchronous conversation mode. This message is nonrecoverable according to LU 6.2 protocol and is discarded by the MRQ processor (DFSQMRQ0). The LUNAME destination is in the APPC message prefix segment and is extracted and reported in the FMQINSRT messages discarded by destination report. This is a normal condition and is not considered to be an error.

X'1084' **INSERT - MSG DEST = NON RECOV**

Explanation: Message destination is nonrecoverable either because the destination transaction code name was defined as NORECOV or the message was received from an LU 6.2 LU in synchronous conversation mode (which implies nonrecoverable).

Programmer response: Locate the MSGFLAGS byte in the message prefix of the message. MSGFNRQU should be set indicating the message is nonrecoverable. Some possible reasons are:

- If the message destination is local (system is not MSC or it is MSC and the destination SYSID at MSGMSOID in the MSC segment item is local) then check to see if destination name at MSGODSTN is a nonrecoverable transaction code.
- If the message destination is remote (system is MSC and the destination SYSID at MSGMSOID in the MSC segment item is remote) then check to see if destination name at MSGMSONM in the MSC prefix segment item is a nonrecoverable transaction code.
- If the source name in the message prefix at MSGIDSTN starts with an FDFFFFFF then the source of the message is an LU 6.2 (APPC) logical unit in LU 6.2 synchronous conversation mode. This message is nonrecoverable according to LU 6.2 protocol. The LUNAME destination is in the APPC message prefix segment and is extracted and reported in the FMQINSRT messages discarded by destination report.

This is a normal condition and is not considered to be an error.

X'1088' INSERT - MSG WAS CANCELED BY IMS

Explanation: The original message was canceled by IMS and was logged for accounting or message queue recovery purposes. The message text itself is not recovered.

Programmer response: Locate the MSGFLAGS byte in the message prefix and MSGFCANC should be set on indicating the message had been canceled. The MSGODSTN field is the destination name of the canceled message. If MSC is invoked at system generation and an MSC segment item is present and the SYSID at MSGMSOID in the MSC prefix segment item is a remote SYSID, then MSGMSONM in the MSC prefix segment item is the remote destination name. One possible cause is an application program inserted the message and then abended or issued a ROLL or ROLB call. This is a normal condition and is not considered to be an error.

X'108C' INSERT - ERROR LOCATING APPC ASYNC DEST

Explanation: The destination name of the message was determined to be a LU 6.2 (APPC) asynchronous destination and a call to the IMS LU 6.2 interface routine encountered an error locating the LU destination.

Programmer response: Locate the MSGODSTN destination name in the message prefix and it should start with an FEFFFFFF indicating the destination type is an LU 6.2 (APPC) asynchronous destination. The return code returned by the LU 6.2 interface is in REG15 in the REG14-12 area. The parameter list passed is in the PSTDCA area. The message should contain an LU 6.2 prefix item with a type code of 85 (MSGSIID=85). The LU 6.2 destination name is stored in the LU 6.2 prefix item. Check to see if APPC is correctly installed and enabled and the destination name is a LU 6.2 logical unit. Correct if not. Otherwise, this is most likely an IMS internal error.

X'1090' INSERT - MSGMRQF1 FLAG INVALID

Explanation: The MSGMRQF1 flag in the MRQ prefix passed to the IMS message requeuer processor (DFSQMRQ0) by the MRQ BMP routine (FMQINSRT) is invalid.

Programmer response: The MSGMRQF1 flag byte is in the MRQ prefix segment (MSGMRQPF) and is in front of the prefix of the message being inserted. The flag byte should be zero or a multiple of X'4'. This is either an IMS or MRQ internal error.

X'1094' INSERT - MSC DEST BLOCK NOT EXPECTED LNB

Explanation: The destination of the message was determined to be an MSC MSNAME resource. However, the destination control block found by FINDEST was not an LNB.

Programmer response: Locate the message and it should have an MSC prefix segment item with a segment code of 82 (MSGSIID=82) and the destination SYSID in MSGMSOID in the MSC segment item should be remote. MSGODSTN is the MSNAME of the message destination and it should be an LNB control block. REG15 in the REG14-12 area is the address of the expected LNB and the LNB is at QTPDST. Most likely cause is the destination MSNAME was changed to an LTERM name or transaction code.

X'1098' INSERT - SOURCE/DEST = DFSAPPC INVALID

Explanation: Destination name of DFSAPPC is invalid.

Programmer response: This error is currently not being set.

X'109C' INSERT - LU6.2 SCD EXTEN INVALID/NOTAVAIL

Explanation: The message was determined to be an LU 6.2 (APPC) type. However, the APPC SCD extension could not be located.

Programmer response: Locate the message and MSGCFLG2 byte of the message prefix segment should be set on indicating an LU 6.2 segment is present (MSGC2APP is set on), or the destination name at MSGODSTN or MSGMSONM is DFSAPPC. Field SCDLSCD in the SCD was zero. This is either an IMS internal error or APPC is not correctly installed.

X'10A0' INSERT - MSG NOT VALID 01/03 TYPE

Explanation: The message being passed by FMQINSRT is not a valid type 01 or 03 message.

Programmer response: Locate the message and verify the MSGLCODE byte is either a 01 or a 03, and the message prefix includes at least a basic segment prefix item (first hex 14 bytes) and a system segment prefix item (prefix segment item following the basic prefix segment, MSGSIID = 81), and the MSGDFLG2 flag byte is either an 81 (transaction code type destination), or a 82 (LTERM, MSNAME, or USERID type of destination). This is most likely an IMS or MRQ internal error. The original message input to FMQSELCT should be located and examined.

X'10A4' INSERT - INTERNAL IMS MESSAGE

Explanation: The message being passed by FMQINSRT is an internal IMS message that is not recoverable.

Programmer response: Locate the message in the I/O area and verify the destination name at MSGODSTN or MSGMSONM is an internal IMS destination. Current internal destination messages are: MSVERIFY system LNB. MSGODSTN/MSGOMSNM begins with the characters MSN and the destination control block at QTPDST is a system LNB (CNT3QSYS flag is set on). REG15 or REG1 in the REG14-12 area is the address of the LNB. This is normal and is not considered to be an error.

X'10A8' INSERT - SOURCE/DEST NAME CHANGED

Explanation: The name in the control block representing the source name of the message (LTERM name) or the destination name of the message (LTERM or TRANCODE name) does not match the name in the message.

Programmer response: The control block representing either the source LTERM or destination LTERM or TRANCODE is pointed to by register 14 in the register save area. The message is in the I/O area and is also pointed to by register 6. The name in the control block at offset X'1C' does not match either the source field (MSGIDSTN) or destination field (MSGODSTN) of the message. This is an internal IMS failure.

X'10AC' INSERT - DFSLUMIF BLDPRE ERROR

Explanation: A nonzero return code was returned by the IMS APPC LUM services routine while trying to build a new APPC prefix for an APPC message.

Programmer response: The APPC message being processed is in the I/O area and is also pointed to by register 6 in the register save area. The nonzero return code from the LUM services routine is in register 15. This is an internal IMS failure.

X'10B0' INIT - ERROR GETTING DFSPOOL STORAGE

Explanation: A DFSPOOL call received a nonzero return code attempting to get storage from the HIOP storage pool for the QMRQWORK area.

Programmer response: Register 15 contains the return code from the DFSPOOL call. This is either an internal error, or there is not enough storage in the IMS control region private area.

X'10B4' INIT - ERROR GETTING AN AWE

Explanation: A DFSBCB GET for an AWE block received a nonzero return code.

Programmer response: Register 15 contains the return code from the DFSBCB GET call. This is either an internal error, or there is not enough storage in the IMS control region private area.

X'10B8' INSERT - NO EXTENDED PREFIX PRESENT

Explanation: The message being requeued was expected to contain an extended prefix segment (MSGC2EPH=1), but none existed (QMRWEPHP=0).

Programmer response: Analyze the message and its prefix segments. The address of QMRQWORK is in register 5; the message address is in register 6. If the message being processed is from IMS release 510 or a later release, this prefix segment should exist. If it is from a release earlier than 510, this prefix segment should not exist. This is most likely an IMS internal error.

X'10BC' INIT - ERROR INIT/ADDRESSING QMRQWORK

Explanation: An error occurred while getting the QMRQWORK area and initializing it with the current message information.

Programmer response: Look for a previous type X'6701'-MRQE error record that indicates another more specific error. This error is logged when the caller (INSERT) receives control back from QMRQINIT and register 15 is nonzero. QMRQINIT logs a X'6701'-MRQE record when the specific error is detected.

X'10C0' INIT - CAN'T FIND RACF SEGMENT MSGSORAC

Explanation: The message flag indicates a RACF prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, a RACF prefix segment with a code of X'83' must be present. This is an internal IMS error.

X'10C4' INIT - CAN'T FIND LU6.1 SEGMENT MSGSILU6

Explanation: The message flag indicates an LU6.1 prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, an LU6.1 prefix

segment with a code of X'84' must be present. This is an internal IMS error.

X'10C8' **INIT - CAN'T FIND APPC SEGMENT MSGSOAP0**

Explanation: The message flag indicates an APPC prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, an APPC prefix segment with a code of X'85' must be present. This is an internal IMS error.

X'10CC' **INIT - CAN'T FIND EPH SEGMENT MSGSIEPH**

Explanation: The message flag indicates an EPH prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, an EPH prefix segment with a code of X'86' must be present. This is an internal IMS error.

X'10D0' **INIT - CAN'T FIND APPC SEGMENT MSGSIAP0**

Explanation: The message flag indicates an APPC prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, an APPC prefix segment with a code of X'87' must be present. This is an internal IMS error.

X'10D4' **INIT - CAN'T FIND SEC SEGMENT MSGSISEC**

Explanation: The message flag indicates a SEC prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, a SEC prefix segment with a code of X'88' must be present. This is an internal IMS error.

X'10D8' **INIT - CAN'T FIND WLM SEGMENT MSGSIWLM**

Explanation: The message flag indicates a WLM prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, a WLM prefix segment with a code of X'88' must be present. This is an internal IMS error.

X'10DC' **INIT - CAN'T FIND SYS EXT SEGMENT MSGSISEX**

Explanation: The message flag indicates a SYS EXT prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, a SYS EXT prefix segment with a code of X'88' must be present. This is an internal IMS error.

X'10E0' **INIT - CAN'T FIND MSC EXT SEGMENT MSGSIMEX**

Explanation: The message flag indicates an MSC EXT prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGxxxx is set. If set, an MSC EXT prefix segment with a code of X'88' must be present. This is an internal IMS error.

X'10E4' **ISRT - OTMA MESSAGES NOT SUPPORTED**

Explanation: The IMS release message that is being requeued either does not support OTMA messages, or the OTMA feature is not defined.

Programmer response: Locate flag MSGFLAGA in the QMRQWORK area to determine the release of the IMS systems that are the source and destination of the message. The IMS release must be 510 or a later release.

X'10E8' **ISRT - MSC/APPC MESSAGE NOT SUPPORTED**

Explanation: The message is a remote MSC message that originated from an APPC LU6.2 session and is not supported on this release.

Programmer response: Locate flag QMRWFLGA in the QMRQWORK area and determine the release of the IMS system that is the destination of the message. It must be release 510 or a later release. The destination SID in the message prefix (message prefix pointed to by register 6) is remote, as indicated by QMRWFLG6 in the QMRQWORK area. The problem is probably caused by the destination of the message changing from local to remote, or by requeuing a MSC/APPC message from an IMS release that is 510 or a later release. The IMS release originating the message is also set in QMRWLAGA. The address of QMRQWORK is in register 5.

X'10EC' **ISRT - MESSAGE REROUT NOT SUPPORTED**

Explanation: DFSQMRQ0 is being called with a reroute function that is not supported in this IMS release.

Programmer response: This is an internal IMS error. Trace back to the caller of DFSQMRQ0.

X'10F0' **ISRT - MSC SEG ITEM NOT PRESENT**

Explanation: The destination is a remote transaction, but the message does not have an MSC segment item.

Programmer response: The transaction changed from local to remote after the original message was built.

X'10F4' **ISRT - ERROR CREATING DYNAMIC LNB**

Explanation: DFSQMRQ0 called the create dynamic LNB routine but the create was unsuccessful.

Programmer response: Locate the message and verify that the destination name at MSGODSTN is a valid MSNAME and is unique name in the IMS system.

X'10F8' **INIT - CAN'T FIND SYS PREFIX SEG MSGSIPEX**

Explanation: The system prefix segment could not be located. Segment cannot be located.

Programmer response: Locate the message and verify the system prefix is present following the basic prefix. The system prefix code is 81. This is an internal error. Message is not valid without a system prefix.

X'10FC' **INIT - ERROR LOADING MODULE DFSTSPC0**

Explanation: The UTC to LOCAL time conversion routine could not be loaded.

Programmer response: Verify module DFSTSPC0 is in the IMS RESLIB and can be loaded.

X'1100' **ISRT - /MSV CMD MESSAGE CANCELED**

Explanation: Message was a `/MSVERIFY` command message and was canceled.

Programmer response: Messages containing `/MSVERIFY` data are canceled by MRQ because the data may no longer be valid. This is a normal condition.

X'1104' **INIT - QMRQWORK SHOULD NOT OCCUR ERROR**

Explanation: Either the QMRQWORK area could not be located, was determined to be invalid, or existed when it shouldn't have. In other words, prior use not freed or cleaned up.

Programmer response: QMRQWORK is pointed to by QSAPWKAD. It should either be zero or an address in the HIOP pool. Usage varies by function (QMRWFCN, QMRWFCN2) being performed. This is an internal IMS error.

X'1108' **MSGPROC - CAN'T FIND TMR PREFIX MSGMSC**

Explanation: Message flag indicates TMR prefix segment is present but segment cannot be located.

Programmer response: Locate the message and verify the prefix segment exists. The TMR prefix segment code is 8C. This is an internal IMS error.

X'110C' **MSGPROC - DFSSQQRY INVALID QUEUE TYPE**

Explanation: DFSQMR20 was called to query a queue type, but the type requested was invalid.

Programmer response: MRQTYPE in the DFSMRCMD data passed from the MRQ BMP is not a valid shared queues queue type. This is an IMS or MRQ error.

X'1110' **INIT - INVALID INCLUDE/EXCLUDE ENTRY**

Explanation: DFSQMR10 received an invalid include or exclude entry type from the MRQ BMP.

Programmer response: MRQSELCT pointer in MRQWORK points to the include or exclude table. R4 in QMRWESAV in MRQWORK contains the address of the entry (MRSELROW) in error. This is an IMS or MRQ error.

X'1114' **INIT - INVALID MRQWORK INIT CALL**

Explanation: DFSQMR10 QMRQINIT call was made to reinitialize the workarea (MRQWORK) and the call request was determined to be invalid.

Programmer response: Currently, MRQWORK is reinitialized at each new insert or command call. R10, byte 2, in the REG0-15 savearea, contains the call type which should be MRQISRT (04) or MRQCMD (38). See macro DFSQMGR for list of MRQ function codes (QMRWFCN). R10, byte 3, is the QMRQINIT code (1C). Trace the call back to the caller of DFSQMR1/ QMRQINIT. This is an internal IMS/MRQ error.

X'1118' ISRT - QBUFF DIDN'T FIT IN DEP RGN COMM AREA

Explanation: A message queue buffer was received from the MRQ BMP for a Load/Insert request, and the PSTVS0 flag was set to indicate it did not fit in the BMP to IMS region communications area.

Programmer response: The dependent region communications area (DIRCA or also called PSBNDXSZ) size is supposed to be sufficient to handle the largest QBUF. If this condition is set, this is an internal IMS error.

X'111C' ISRT - DFSRAC6 ERROR GETTING UTOKEN FOR APPC

Explanation: A message is being inserted and is being converted to APPC. RACF was called to and issued a RACROUTE REQUEST=VERIFYX to obtain a UTOKEN for the APPC prefix of the message. The RACF call returned a non zero return code.

Programmer response: The return code from the call to the IMS RACF interface routine (DFSRAC60) is in R15 in the REG0-15 save area. R1 is the PARMLIST address which is the QMRWLWA2 area within MRQWORK. PARMLIST+1C = USERID, PARMLIST+20 = GROUPNAME, PARMLIST+48 = APPC PLUNAME.

X'1120' ISRT - QUEUE BUFFER FLAG ERROR

Explanation: Error detected in either the MRQ prefix Z2 flag (MRPREZZ2) or queue buffer flag2 (MSGCFLG2) passed by the MRQ insert/load BMP.

Programmer response: The MRQ Prefix that precedes the Qbuffer/Message being loaded or inserted, did not have the correct first or last flags (for example: Flags MRPZZFST or MRPZZLST of flag MRPREZZ2). See macro DFSMRQPF for MRQ prefix mapping. MRQ prefix address is in R4 of the REG0-15 area. Or, the message Qbuffer, MSGPRFX, did not have the correct first or last flags, (for example: Flags MSGFFRST or MSGFLAST of flag MSGFLAGS). See macro QLOGMSGP for the mapping of this prefix. The Qbuffer prefix address is in R6 of the REG0-15 area.

If a spanned buffer is being passed, then the prior buffer inserted might be the one with incorrect flags. The prior buffer flags and status is saved in fields QMRWBF1 and QMRWBF2 of the MRQWORK area. MRQWORK area is in R5 of the REG0-15 area and is mapped by the DFSMRQWK macro.

This is either an MRQ or IMS internal error, or the data being passed to IMS using the MRQ insert/load function is invalid.

X'1124' ISRT - SEGMENT FLAG ERROR

Explanation: Error detected in the segment Z1 flag (MSGXFLG1) in the queue buffer passed by the MRQ insert/load BMP.

Programmer response: The segment of the message about to be inserted to the message queue was determined to have an invalid first or last flag (for example: Flags MSGX1FST or MSGX1LST of flag MSGXFLG1). The segment address is in R4 of the REG0-15 area and is mapped by the QLOGMSGP macro. If this is a spanned segment, the incorrect flag setting might be in the prior segment of the message being inserted. The prior segment flag and status is saved in fields QMRWSG1 and QMRWSG2 of the MRQWORK area. MRQWORK address is in R5 of the REG0-15 area and is mapped by the DFSMRQWK macro.

This is either an MRQ or IMS internal error, or the data being passed to IMS using the MRQ insert/load function is invalid.

X'1128' ISRT - INVALID QUEUE BUFFER DETECTED

Explanation: An invalid queue buffer was passed by the MRQ BMP on either a load or insert function.

Programmer response: The QBUFFER received by INSERT/LOAD is validated by adding up the prefix length and the segment lengths and comparing them to the qbuffer length. If the two are not equal, the buffer is considered to be invalid. The buffer address is in REG6 in the REG0-15 save area. The buffer is mapped by the QLOGMSGP macro.

This error is either an MRQ or IMS internal error, or the data being passed to IMS by the MRQ INSERT/LOAD function is invalid.

X'112C' INIT/CLEANUP - ISWITCH FAILURE

Explanation: Either an ISWITCH to the CTL region or an ISWITCH RETURN to the MRQ/QCF dependent region failed.

Programmer response: Save area QMRWESAV in MRQWORK contains the registers at time of error (R0 - R15). R15 is the ISWITCH error code. R1 is the module ID that was issuing the ISWITCH:

- QMR1 = DFSQMR10
- QMR7 = DFSQMR70
- QMR9 = DFSQMR90

Flag QMRWFLG9=QMRW9SWI, if off, indicates this is a ISWITCH to CTL failure. If on, this is an ISWITCH RETURN to DEP failure. This is an internal IMS error.

X'1130' INSERT - ISRT QBUFF THRESHOLD EXCEEDED

Explanation: The ISRT Queue buffer threshold count was exceeded.

Programmer response: This condition is detected by either a user queue space notification exit (DFSQSPC0) or the QCF queue space notification exit (DFSQMRI0 which is activated by link editing IQCQMRH0 to IMS RESLIB as DFSQMRH0). If the QCF exit is being used, refer to the section "Preventing Message Queue Overflow (Nonshared Queues)" in the *IMS Queue Control Facility for z/OS User's Guide*. In either case, user or QCF exit, the exit set flag (see note below) caused the qbuffer threshold to be exceeded. The count of long and short Q-buffers being inserted by this message is at fields QMRLBCNT/QMRSBCNT in DFSMRQWK work area.

Note: The exit set flag, QMGROFL3=QMGRO3NO, located in the DFSQMGR parameter list, that was built in the PSTDCA area as a result of detecting the current message being inserted.

These messages will need to be reinserted at a time when the queue usage is not as high, or the queue data sets will need to be increased, or the value for the threshold exceeded will need to be increased.

X'2000' PURGE - PURGE PCB NOT MODIFIABLE

Explanation: Alternate PCB defined in MRQ PSB is not modifiable type.

Programmer response: Verify that MODIFY=YES was coded on the PCB named ALTPCB01 for the MRQPSB.

MRQPSB is the default MRQ PSBNAME and may have been changed on the MRQPSBN= parameter of the MSGQUEUE macro at system generation.

X'2004' PURGE - PURGE PCB DEST INVALID

Explanation: The message is being purged (enqueued to a temporary destination) and the temporary destination name has not been set to valid.

Programmer response: The destination invalid flag (TPCBSMBN) in flag byte TPCBCODE is set on. This flag should have been reset during insert processing. If a queue manager buffer (QMBA) is allocated, the message being processed should be in this buffer. Otherwise, the message might have to be located on the SCRAPLOG data set where it is discarded by FMQINSRT. The time stamp (date/time) of the message being processed is stored in the PST at PSTPRE1 and can be used to locate the message on the SCRAPLOG or the original message input to FMQSELCT. This is an internal IMS or MRQ error.

X'2008' PURGE - PURGE PCB DEST SET TO BLANKS

Explanation: The message is being purged (enqueued to a temporary destination) and the temporary destination name is blanks.

Programmer response: The destination name in the TPCB at TPCBTSYM is blanks (hex 40s). This field should have been set to the destination name of the message during insert processing. If a queue manager buffer (QMBA) is allocated, the message being processed should be in this buffer. Otherwise, the message might have to be located on the SCRAPLOG data set where it is discarded by FMQINSRT. The time stamp (date/time) of the message being processed is stored in the PST at PSTPRE1 and can be used to locate the message on the SCRAPLOG or the original message input to FMQSELCT. This is an internal IMS or MRQ error.

X'200C' PURGE - PURGE DEST CTL BLK ADDR ZERO

Explanation: The message is being purged (enqueued to a temporary destination) and the temporary destination control block address in the TPPCB is zero.

Programmer response: The destination name control block address is in the TPCB at TPCBCNT and is referred to as the QTPDST address. This field should have been set to the address of destination name control block (address of either the CNT, LNB, or SMB) during insert processing. If a queue manager buffer (QMBA) is allocated, the message being processed should be in this buffer. Otherwise, the message may have to be located on the SCRAPLOG data set where it is discarded by FMQINSRT. The time stamp (date/time) of the message being processed is stored in the PST at PSTPRE1 and can be used to locate the message on the SCRAPLOG or the original message input to FMQSELCT. This is an internal IMS or MRQ error.

X'2010' PURGE - PURGE DEST NAME = DFS INVALID

Explanation: The message is being purged (enqueued to a temporary destination) and the temporary destination name of the message starts with the reserved characters DFS.

Programmer response: The destination name in the TPCB at TPCBTSYM starts with the characters DFS and is not a DFSAPPC destination message or other internal IMS destination. This is invalid. If a queue manager buffer (QMBA) is allocated, the message being processed should be in this buffer. Otherwise the message may have to be located on the SCRAPLOG data set where it is discarded by FMQINSRT. The time stamp (date/time) of the message being processed is stored in the PST at PSTPRE1 and can be used to

locate the message on the SCRAPLOG or the original message input to FMQSELCT. This is most likely an internal IMS error.

X'2014' **PURGE - PURGE INQUIRY DEST NOT SIGNED ON**

Explanation: The message is being purged (enqueued to a temporary destination) and the temporary destination name of the message is an inquiry type LTERM.

Programmer response: The destination name in the TPCBTSYM is an inquiry type LTERM destination and is not signed on. The destination control block CNT is in REG6 in the REG14-12 area and the CNT2INQ flag is set on (destination is inquiry type). The CNT control block is at QTPDST. The CTB is in REG7 of the REG14-12 area and CTB1DIAL and CTB1SIGN are set off (terminal is not signed on).

Messages destined to an inquiry LTERM that is not signed on are discarded according to protocol. This is considered to be normal operation.

X'2018' **PURGE - PURGE NON 0 RC ON QMGR ENQ CALL**

Explanation: The message is being purged (enqueued to a temporary destination) and a nonzero return code was received from the message queue manager on the enqueue call.

Programmer response: The message queue manager return code is in REG15 of the REG14-12 area. The message queue buffer is in the QMBA area. This is most likely an internal IMS error.

X'201C' **PURGE - PURGE I/O AREA INVALID**

Explanation: The I/O area passed to the IMS MRQ processor by FMQINSRT on the PURG call is invalid.

Programmer response: The I/O area passed on the PURG call does not begin with a valid MRQ prefix segment (MSGMRQPF). This is an internal MRQ FMQINSRT error.

X'2020' **PURGE - PURGE MSGMRQF1 FLAG INVALID**

Explanation: The MSGMRQF1 flag in the MRQ prefix passed to the IMS message requeuer processor (DFSQMRQ0) by the MRQ BMP routine (FMQINSRT) is invalid.

Programmer response: The MSGMRQF1 flag byte is in the MRQ prefix segment (MSGMRQPF). MSGMRQPF segment starts at the beginning of the I/O area. The flag byte should be a multiple of X'4'. This is either an IMS or MRQ internal error.

X'2024' **PURGE - DEST BLK=DFSAPPC BUT MSG NOT APPC**

Explanation: The message is being purged (enqueued to a temporary destination) and the destination name is DFSAPPC. However, the destination resource type is not an LU 6.2 (APPC) destination.

Programmer response: The resource name control block in REG6 in the REG14-12 area contains a name of DFSAPPC but the resource type flag in the TPPCB at flag byte TPPCBFLG was not set to type = APPC (TPPCB62 is not set on). The DFSAPPC CNT block is at QTPDST. This is an internal IMS error.

X'3000' **SETPRFX - MESSAGE PREFIX SIZE INVALID**

Explanation: Either the total prefix or one or more of the prefix segments has an invalid length.

Programmer response: Locate the message being inserted in the I/O area. The segment address is in REG1 of the REG14-12 area. The total prefix size is at offset 10 in the message. The current prefix segment address of the prefix segment being checked is in REG7 of the REG14-12 area. The prefix segment length is in the first 2 bytes. The prefix ID (MSGSIID) is in the third byte. Locate this ID in the QLOGMSG DSECT and verify the size.

If the message is from a supported IMS release, this is probably an internal IMS error.

X'3004' **SETPRFX ERROR REASON CODE**

Explanation: Reserved for future use.

X'3008' **SETPRFX ERROR REASON CODE**

Explanation: Reserved for future use.

X'4000' **CPYPRFX - PREFIX SIZE NOT SIZE EXPECT**

Explanation: The message queue manager failed to obtain a message prefix the same size as that of the original message.

Programmer response: Locate the message being inserted in the I/O area. Field MSGPRFLL in the message prefix is the length of the original message prefix. Field QSAPPLTH in the QSAPWKAD area contains the length of the new message prefix. They should be equal. This is an internal IMS error.

X'4004' **CPYPRFX - CAN'T FIND SYS PREFIX MSGSSEGM**

Explanation: The message prefix should contain a system prefix segment but one could not be located.

Programmer response: Locate the message and verify the system prefix segment exists. The system prefix code is 81. REG1 in the REG0-15 area is the address of the prefix being copied. This is an internal IMS error.

X'4008' CPYPRFX - CAN'T FIND TMR PREFIX MSGMSC

Explanation: Message flag indicates TMR prefix segment is present but segment cannot be located.

Programmer response: Locate the message and verify the prefix segment exists. The TMR prefix segment code is 8C. REG1 in the REG0-15 area is the address of the prefix being copied. This is an internal IMS error.

X'400C' CPYPRFX - CAN'T FIND SYS EXT PREFIX MSDMSE

Explanation: Extended prefix area should contain an extended system segment, but one could not be located.

Programmer response: Locate the message and verify that the prefix segment exists. The system extension prefix segment code is X'8A'. REG1 in the REG0-15 area is the address of the prefix being copied. This is an internal IMS error.

X'4010' CPYPRFX - CAN'T FIND THE MSC PREFIX MSGMSC

Explanation: Message flag indicates MSC prefix segment is present but segment cannot be located.

Programmer response: Locate the message and verify the prefix segment exists. The MSC prefix segment code is 82. REG1 in the REG0-15 area is the address of the prefix being copied. This is an internal IMS error.

X'5000' CANCEL - NON ZERO RC ON CANCEL CALL TO QMGR

Explanation: A nonzero return code was returned by the message queue manager while attempting to cancel a message queue buffer that is being discarded (message is being scrapped).

Programmer response: An error was detected while inserting a message to the message queue and cleanup processing is being performed. The original error has already been logged in a prior type 6701-MRQE log record and the queue buffer area is being released (canceled). The queue manager return code on the cancel call is in REG15 of the REG14-12 area. This is an internal IMS error.

X'5004' CANCEL ERROR REASON CODE

Explanation: Reserved for future use.

X'5008' CANCEL ERROR REASON CODE

Explanation: Reserved for future use.

X'500C' CANCEL ERROR REASON CODE

Explanation: Reserved for future use.

X'6000' LOGIC ERROR REASON CODE

Explanation: Reserved for future use.

X'6004' FMQINSRT - LOGREC TYPE NOT 4002, 01, OR 03

Explanation: The FMQINSRT BMP program read a log record that was not a valid type 4002 (DUMPQ or SNAPQ), 01 (input), or 03 (output) record, and discarded the record to the SCRAPLOG data set.

Programmer response: This error is detected by the FMQINSRT routine and is passed to the message requeuer processor to perform cleanup and log the error in a 6701-MRQE record. The SCRAPLOG record written by FMQINSRT will need to be located to determine its validity. The record may need to be traced back to the log data set input to FMQSELCT. The QMBA area may contain part or all of the message being inserted when the invalid record was detected. This is either an IMS or MRQ internal error.

X'6008' FMQINSRT - NO SECONDARY LOGREC WHEN EXPECTED

Explanation: A message was being inserted that spanned multiple message queue buffers and one of the secondary buffers could not be located.

Programmer response: This error is detected by the FMQINSRT routine and is passed to the message requeuer processor to perform cleanup and log the error in a 6701-MRQE record. The SCRAPLOG record written by FMQINSRT needs to be located to reconstruct the chain of message buffers. The record may need to be traced back to the log data set input to FMQSELCT. The QMBA area may contain part or all of the message being inserted. This is either an IMS or MRQ internal error.

X'600C' FMQINSRT - SECONDARY LOGREC DEST INVALID

Explanation: A message was being inserted that spanned multiple message queue buffers and one of the secondary buffers in the chain being processed by FMQINSRT did not have the same destination name.

Programmer response: This error is detected by the

FMQINSRT routine and is passed to the message requeuer processor to perform cleanup and log the error in a 6701-MRQE record. The SCRAPLOG record written by FMQINSRT will need to be located to determine its validity and reconstruct the message buffer chain. The record may need to be traced back to the log data set input to FMQSELCT. This is either an IMS or MRQ internal error.

X'6010' MRQ/IMS - QBUF COUNT NOT EXPECTED NUMBER

Explanation: During transfer of a qbuffer between the MRQ BMP and IMS, the count of buffers transferred (MRPCOUNT) was in error.

Programmer response: This error is detected by either IMS or the MRQ BMP when transferring messages (QBUFs) during the INSERT, LOAD, BROWSE, RECOVER, and UNLOAD functions. The QBUF transfer count is incremented in the MRQ prefix count field (MRPCOUNT in DFSMRQPF) and checked for one greater than the previous. If this is not the case, the error is issued and the QBUF transfer is rejected. This is either an IMS or MRQ internal error.

X'6014' MSGPROC - MSG WAS CANCELED BY IMS

Explanation: The original message was canceled by IMS and was logged for accounting or message queue recovery purposes. This error is similar to AIBREASN = X'1088', the difference is this is a multi-buffer message and part of the message was inserted to IMS by MRQ, when MRQ detected it was canceled. MRQ issues a PURG DL/I call, requesting IMS purge the message with a AIBREASN = X'6014'.

Programmer response: Locate the MSGFLAGS byte in the message prefix and MSGFCANC should be set on indicating the message had been canceled. The MSGODSTN field is the destination name of the cancelled message. If MSC is sysgened and a MSC segment item is present and the SYSID at MSGMSOID in the MSC prefix segment item is a remote SYSID, then MSGMSONM in the MSC prefix segment item is the remote destination name.

One possible cause is an application program inserted the message and then abended or issued a ROLL or ROLB call. This is a normal condition and is not considered to be an error, message is being inserted (requeued) and was gotten off the log. If processing a BROWSE, UNLOAD, or RECOVER, the message was gotten off the message queue and this condition should not occur.

X'6018' FMQINSRT ERROR REASON CODE

Explanation: Reserved for future use.

X'7004' XLATPFX - CAN'T FIND SYS EXT SEGMENT MSGSISEX

Explanation: The message flag indicates that the system EXT prefix segment is present, but the segment cannot be located.

Programmer response: Locate the message and verify that flag MSGESEX is set. If set, an MSC EXT prefix segment with a code of X'8A' must be present. The message being built that caused the error is pointed to by register 6. This is an internal IMS error.

X'7008' XLATPFX - CAN'T FIND PFX SEG MSGSITMR

Explanation: Message flag indicates TMR prefix segment is present but segment cannot be located.

Programmer response: Locate the message and verify the PREFIX SEGMENT EXISTS. The TMR prefix segment code is 8C. REG1 in the REG0-15 area is the address of the prefix being copied. This is an internal IMS error.

X'700C' XLATPFX - CAN'T FIND PFX SEG MSGMSC

Explanation: Message flag indicates MSC prefix segment is present but segment cannot be located.

Programmer response: Locate the message and verify the PREFIX SEGMENT EXISTS. The MSC prefix segment code is 82. This is an internal IMS error.

X'7010' XLATPFX - CAN'T FIND PFX SEG MSGMSCE

Explanation: Message flag indicates MSC prefix EXTENSION segment is present but segment cannot be located.

Programmer response: Locate the message and verify the PREFIX SEGMENT EXISTS. The MSC prefix extension segment code is 8B. This is an internal IMS error.

X'7014' XLATPFX - ERROR CONVERTING MESSAGE TIME

Explanation: A non zero return code was returned from the time conversion routine while converting local time to UTC or UTC time to local.

Programmer response: The probable cause is an incorrect time field in one of the message prefixes. Locate the time conversion work area in QMRQWORK at label QMRDSTWK. If error occurred converting local time to UTC, the return code is in QMRCVTM1. If error

occurred converting UTC to local time, it's in QMRCVTM2. Return codes are from either DFSCVTM or DFSTSPC. Local time being converted is at QMRWLOCL. UTC time is at QMRDSUTC. Local time fields in the message are at MSGTMFAP, MSGMSCTS. UTC time fields in the message are at MSGUTC, MSGMSCEX, MSGMSCTS.

X'7018' XLATPFX - CAN'T FIND PFX MSGEPHDR

Explanation: Message flag indicates HEADER prefix extension segment is present, but segment cannot be located.

Programmer response: Locate the message and verify that flag MSGC2EPH is set and the header prefix (type 86) exists. All messages from IMS 5.1 and up should contain this flag and prefix segment. This is an IMS error.

X'8004' QMR30 - BROWSE - SYSTEM NOT SHARED QUEUES

Explanation: Command `BROWSE` was issued in a non-shared queues IMS system.

Programmer response: Make appropriate change.

X'8008' QMR30 - INVALID FUNCTION PASSED TO BROWSE

Explanation: Invalid call to DFSQMR30. Register 0 did not contain X'28' (MRQCLEAN) or X'34' (MRQCMD) or X'38' (MRQGCMD).

Programmer response: REG0 in REG0-REG15 area contains the function code. REG14 is the address of the caller of DFSQMR30 (BALR reg). Trace the call back to the caller of DFSQMR30.

X'800C' QMR30 - BROWSE RECEIVED ERROR CODE FROM SELECT

Explanation: DFSQMR20 returned with RC = X'08' in QNAME selection call.

Programmer response: Trace back to DFSQMR20 to determine the cause.

X'8010' QMR30 - BROWSE COMMAND ERROR

Explanation: CQS BROWSE the READY Q returned partial data. The data object size was larger than 32K.

Programmer response: Locate the message and find out where this message came from. REG8 in REG0-REG15 area contained the message address.

X'8014' QMR30 - BROWSE COMMAND ERROR

Explanation: No data objects returned while CQS BROWSE the READY Q.

Programmer response: Dump the associated queue to verify if any message exists. If so, it is an internal error.

X'8018' QMR30 - BROWSE COMMAND ERROR

Explanation: CQS BROWSE the READY Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause.

X'801C' QMR30 - BROWSE COMMAND ERROR

Explanation: DFSQMR20 returned with RC = X'08' in message selection call.

Programmer response: Trace back to DFSQMR20 to determine the cause.

X'8020' QMR30 - BROWSE COMMAND ERROR

Explanation: The message segment form the READY Q was not the first segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'8024' QMR30 - BROWSE COMMAND ERROR

Explanation: The TMR prefix segment could not be located.

Programmer response: Locate the message and verify the prefix segment exists. The TMR prefix segment code is X'8C'. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'8028' QMR30 - BROWSE COMMAND ERROR

Explanation: CQS BROWSE the STAGING Q returned partial data. The data object size was larger than 32K.

Programmer response: Locate the message and find out where the message came from. REG8 in REG0-REG15 area contained the message address.

X'802C' QMR30 - BROWSE COMMAND ERROR

Explanation: No data objects returned while CQS BROWSE the STAGING Q.

Programmer response: Dump the associated queue to verify if any message exists. If so, it is an internal error.

X'8030' QMR30 - BROWSE COMMAND ERROR

Explanation: CQS BROWSE the STAGING Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause.

X'8034' QMR30 - BROWSE COMMAND ERROR

Explanation: The message segment from the STAGING Q was not the middle segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'8038' QMR30 - BROWSE COMMAND ERROR

Explanation: The message segment from the STAGING Q was not the last segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'803C' QMR30 - BROWSE COMMAND ERROR

Explanation: The request was terminated because the RESYNC was not done between IMS and CQS.

Programmer response: Reissue the request after the RESYNC was done.

X'8040' QMR30 - BROWSE INVALID DESTINATION

Explanation: The BROWSE request found the destination field (BCURLNAM) to be zero.

Programmer response: The destination is a required field for the browse of the local queues. This is an IMS error.

X'8044' QMR30 - BROWSE LOCAL QUEUES CONTROL BLOCK ERROR

Explanation: The BROWSE request found the QDEST block to be in error. One of the following conditions was found:

- QDFLG1 indicated that there were messages on this control block and QDQCBDQ was zero.
- QDFLG1 indicated that there were messages on this control block and QDQCBDQ did not point to a queue block if the destination was a cnt type block.

Programmer response: This is an IMS error.

X'8048' QMR30 - BROWSE LOCAL QUEUES DESTINATION TYPE ERROR ON A MULTI-RECORD MESSAGE

Explanation: The BROWSE request found, during the processing of the second through the nth record of a multi-record message, that the destination address in field (BCURLNAM) and the destination address in the current PCB were not the same.

Programmer response: This is an IMS error.

X'804C' QMR30 - BROWSE LOCAL QUEUES CONTINUATION TYPE ERROR ON A MULTI-RECORD MESSAGE

Explanation: The BROWSE request found during the processing of the second through the nth record of a multi-record message that the field pointed to by (BMRQQPCB) did not contain a valid token in field (QTPRRN).

Programmer response: This is an IMS error.

X'8050' QMR30 - QSN BLOCK ADDRESS IS ZERO

Explanation: The BROWSE was called to process the Queue Space Notification (QSN) Queue and was passed an invalid or zero QSN block address in field MRCURQQSN.

Programmer response: If MRCURQQSN is zero, this is probably an internal Browse or select error. Trace back to where the field was set. If invalid, this is probably a bad QQSN block on the QQSN chain or an overlaid QQSN block. Verify this chain and the blocks on it.

This is an IMS internal error.

X'8054' QMR30 - BROWSE AREA PARM NOT SET

Explanation: The BROWSE request could not find a valid area to process. Valid areas are LOCAL, GLOBAL, OVERFLOW, and QUEUE SPACE NOTIFICATION (QSN). Global and Overflow are valid for Shared Queues only.

Programmer response: Verify that a valid AREA = LOCAL, GLOBAL, OVERFLOW, or QSN was specified on the function control card passed to QCF. If valid, then verify that IMS is processing a valid area, as indicated by flag BMRQFLG2, if a BROWSE function was requested; or in flag QMRQFLG2, if a QUERY function was requested and QUERY called BROWSE internally. This is either a QCF or IMS error.

X'9004' QMR60 - QUERY - SYSTEM NOT SHARED QUEUES

Explanation: QUERY Command was issued in a non-shared queues IMS system.

Programmer response: The MRQ Query function is only supported in a shared queues environment.

X'9008' QMR60 - INVALID FUNCTION PASSED TO QUERY

Explanation: Invalid call to DFSQMR60. Register 0 did not contain either X'28' (MRQCLEAN), X'34' (MRQCMD), or X'38' (MRQGCMD).

Programmer response: REG0 in REG0-REG15 area contains the function code. REG14 is the address of the caller of DFSQMR60 (BALR reg). Trace the call back to the caller of DFSQMR60.

X'900C' QMR60 - QUERY RECEIVED ERROR CODE FROM SELECT

Explanation: Call to DFSQMR20 to select a message queuename resulted in a error return code of eight or greater.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed or the last queue name successfully processed. Trace the error back to DFSQMR20.

X'9010' QMR60 - QUERY - CMD QUEUE TYPE INVALID

Explanation: An invalid or no queue type was passed on the QUERY command call from the MRQ BMP.

Programmer response: MQTYPQUE in MRQCMDWK contains either zero or invalid queue type or types. The cold queue is an invalid QUERY queue type. REG8 in the REG0-REG15 save area contains the MRQCMDWK address which contains the QUERY command from the MRQ BMP.

X'9014' QMR60 - QUERY - NO MESSAGE RETURNED ON INTERNAL CALL TO BROWSE

Explanation: While querying either the APPC, OTMA, or Cold queues, the query processor called browse internally to get the message and extract information for the CQSQRYQT entry for the queue name. Browse returned no messages for the queue name.

Programmer response: REG15 in the REG0-15 save area contains the BROWSE return code of 4. REG6 is the address of the DFSSQQRY buffer with queue names that have messages. REG7 is the current queue name entry that encountered the error. REG2 has the queue type from MQCURQNM in the MRSELWK area; the queue type is one of the following:

- 01 = APPC
- 02 = COLD
- 08=OTMA

This is most likely either a IMS or CQS error.

X'9018' QMR60 - QUERY - RETURN CODE ERROR ON INTERNAL CALL TO BROWSE

Explanation: While querying either the APPC, OTMA, or Cold queues, the query processor called browse internally to get the message and extract information for the CQSQRYQT entry for the queue name. Browse returned an error code for the query queue name.

Programmer response: REG15 in the REG0-15 save area contains the BROWSE return code. REG6 is the address of the DFSSQQRY buffer with queue names that have messages. REG7 is the current queue name entry that encountered the error. REG2 has the queue type from MQCURQNM in the MRSELWK area which is one of the following:

- 01 = APPC
- 02 = COLD
- 08=OTMA

This is probably either a IMS or CQS error.

X'901C' QMR60 - QUERY - ERROR LOCATING APPC/OTMA PFX

Explanation: While querying either the APPC or OTMA queues, a message was returned by an internal BROWSE call; A DFSMGPL request was issued to locate either the APPC or OTMA prefix of the message, to extract information from the prefix for the CQSQRYQT entry for the queuename. The DFSMGPL call encountered an error while trying to locate the prefix.

Programmer response: REG1 in the REG0-15 save area is the address of the message, which is in the BROWSE buffer MRQBROMC. REG6 is the address of DFSSQQRY buffer with queue names that have messages. REG7 is the current queue name entry that encountered the error. The APPC/OTMA prefix is in the extended prefix area of the message and is a type X'87'. The message prefixes are mapped by macro QLOGMSGP. The message needs to be analyzed to determine the error. This is an IMS error.

X'9020' QMR60 - QUERY - ERROR LOCATING TMR PREFIX

Explanation: While querying either the APPC or OTMA queues, a message was returned by an internal BROWSE call; A DFSMGPL request was issued to locate the Transaction Manager Routing (TMR) prefix in the message to extract information from the prefix for

the CQSQRYQT entry for the queue name. The DFSMGPL call encountered an error while trying to locate the prefix.

Programmer response: REG1 in the REG0-15 save area is the address of the message which is in the BROWSE buffer MRQBROMC. REG6 is the address of the DFSSQQRY buffer with queue names that have messages. REG7 is the current queue name entry that encountered the error. The TMR prefix is in the extended prefix area of the message and is a type X'8C'. The message prefixes are mapped by macro QLOGMSGP. The message needs to be analyzed to determine the error. This is an IMS error.

X'9024' QMR60 - QUERY - SHOULD NOT OCCUR ERROR

Explanation: Query called the select processor (DFSQMR20) to select a queue to query. Select detected there are queues to process but did not return a query buffer or the COLDQ to process.

Programmer response: This condition should not occur. The select processor will need to be analyzed to determine the error.

X'9028' QMR60 - QUERY - ERROR FREEING BUFFER DURING CLEANUP

Explanation: During clean up of a QUERY request at termination of the MRQ BMP, the query buffer obtained by the DFSSQQRY call was freed with a DFSPOOL request. A nonzero return code was returned on the call.

Programmer response: The query buffer address is in REG3 of the REG0-15 save area. The return code is in REG15. This is an IMS error.

X'902C' QMR60 - QUERY - QUERY CALLED BROWSE WITH A GET COMMAND

Explanation: QUERY (DFSQMR60) called BROWSE (DFSQMR30) with a GET command. Browse is not setup to handle this call.

Programmer response: This condition should not occur. The query routine or browse routine, or both, will need to be analyzed to determine the error. This is an IMS error.

X'9030' QMR30 - BROWSE - QUERY CALLED BROWSE WITH AN DESTINATION OF ZERO

Explanation: QUERY (DFSQMR60) called BROWSE (DFSQMR30) with a destination of zero. Destination is required for LOCAL queue.

Programmer response: This condition should not occur. The query routine or browse routine, or both, will need to be analyzed to determine the error. This is an IMS error.

X'9034' QMR30 - BROWSE COMMAND ERROR

Explanation: The APPC/OTMA prefix segment could not be located.

Programmer response: Locate the message and verify the prefix segment exists. The APPC/OTMA segment code is X'87'. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'9038' QMR60 - QUERY - QUERY CALLED BROWSE WITH AN INVALID QNAME

Explanation: Query called browse with a request to retrieve either an APPC/OTMA with an invalid queue name.

Programmer response: Locate the select work area (QMRQSETP) and validate that the queue name is invalid. This is an internal IMS error.

X'903C' QMR60 - QUERY - QUERY CALLED BROWSE WITH AN INVALID QUEUE SPACE NOTIFICATION BLOCK

Explanation: QUERY (DFSQMR60) called BROWSE (DFSQMR30) with a queue space notification block address of zero. Queue space notification block address (MRCURQQSN) is required for query of QSN.

Programmer response: This condition should not occur. The query routine and browse routine will need to be analyzed to determine the error. This is an IMS error.

X'A004' QMR50 - UNLOAD - SELECT QUEUE NAME ERROR

Explanation: Call to DFSQMR20 to select a message queuename resulted in a error return code of eight or greater.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed or the last queue name successfully processed. Trace the error back to DFSQMR20.

X'A008' QMR50 - UNLOAD - Reserved

Explanation: Reserved for future use.

X'A00C' QMR50 - UNLOAD - GU CALL ERROR

Explanation: GET UNIQUE (GU) call to QMGR returned an error return code.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed. QMRWLWA in MRQWORK contains the QMGR parameter list. Trace the error to QMGR GU processing.

X'A010' QMR50 - UNLOAD - GN CALL ERROR

Explanation: GET NEXT (GN) call to QMGR returned an error code.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed. QMRWLWA in MRQWORK contains the QMGR parameter list. REG4 is the address of the QTPPCB passed to QMGR. The first two words of the QTPPCB contain the DRRN and buffer address of the message being processed. Trace the error to QMGR GN processing.

X'A014' QMR50 - UNLOAD - REJECT CALL ERROR

Explanation: REJECT (REJ) call to QMGR returned an error return code.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed. QMRWLWA in MRQWORK contains the QMGR parameter list. REG4 is the address of the QTPPCB passed to QMGR. The first two words of the QTPPCB contain the DRRN and buffer address of the message being rejected. The message may or may not have been successfully rejected (deleted). Trace the error to QMGR reject processing.

X'A018' QMR50 - UNLOAD - RELEASE CALL ERROR

Explanation: RELEASE (REL) call to QMGR returned an error code.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed. QMRWLWA in MRQWORK contains the QMGR parameter list. PSTQIMSG will contain the DRRN of the message or message chain being released. Some of the messages may have remained locked on the shared queue (for example, not released). Trace the error to QMGR REL processing.

X'A01C' QMR50 - UNLOAD - INVALID CALL TYPE RECEIVED

Explanation: Invalid call to DFSQMR50. REG0 did not contain either X'28' (CLEANUP), X'2C' (GU), X'30' (GN), or X'34' (CMD) call.

Programmer response: REG1 in the REG0-REG15 save area contains the call type. Trace the problem to the caller of DFSQMR50.

X'A020' QMR50 - UNLOAD - INVALID CALL SEQUEUCE

Explanation: Invalid sequence of calls to DFSQMR50. Error is currently set if a GN call is issued for the next message buffer and no message is in progress of being processed (GU).

Programmer response: REG1 in the REG0-REG15 contains the call type. REG6 or MRQUNLMC in MRQWORK points to the Unload buffer. The first two bytes are zero if no message is in progress. The prior message returned on Unload may still be in the buffer. Cause may be the last message contains incorrect first and last flags or logic error between MRQ and IMS.

X'A024' QMR50 - UNLOAD - SELECT MESSAGE ERROR

Explanation: Call to DFSQMR20 to select a message resulted in a error return code of eight or greater.

Programmer response: REG15 in the REG0-REG15 save area contains the return code. CMDQNAME in MRQWORK is the queue name being processed. MRQUNLMC in MRQWORK points to the Unload message being selected. Trace the problem to the select routine DFSQMR20.

X'A028' QMR50 - UNLOAD - SYSTEM NOT SHARE QUEUES

Explanation: Unload could not process the request because the system is not shared queues.

Programmer response: Function is only valid for Shared Queues.

X'A02C' QMR50 - UNLOAD - CMD QUEUE TYPE INVALID

Explanation: An invalid or no queue type was passed on the UNLOAD command call from the MRQ BMP.

Programmer response: MQTYPQUE in MRQCMDWK contains either zero or invalid queue types. The cold queue is an invalid Unload queue type. REG8 in the REG0-REG15 save area contains the MRQCMDWK address which contains the UNLOAD command from the MRQ BMP.

X'A030' QMR50 - UNLOAD - QUEUENAME INVALID

Explanation: An invalid queue name was detected while making a call to the queue manager.

Programmer response: MRQNAME in MRQCMDWK contains either zero or invalid queue name.

X'A034' QMR50 - UNLOAD - DESTINATION IS INVALID

Explanation: An invalid destination address was detected while making an Unload request for the local queues.

Programmer response: UCURLNAM in MRQCMDWK contains either zero or invalid destination address.

X'A038' QMR50 - UNLOAD - CONFLICT BETWEEN QDFLG1 AND QDQCBDQ

Explanation: A conflict between QDFLG1 and QDQCBDQ while making an Unload request for the local queues. QDFLG1 indicated that messages were on the destination, but QDQCBDQ did not point to a DRRN of a Queue Block or a message.

Programmer response: UMRQQBLK in MRQCMDWK contains the work area that detected this condition. This is an internal IMS error.

X'A03C' QMR50 - UNLOAD - 1ST RECORD RETURNED NOT 1ST OF MESSAGEQ

Explanation: A message is being retrieved from the local queues and message flag (MSGFFRST) is not set on.

Programmer response: Locate the message flags in the message prefix. If message is a first buffer then MSGFFRST should be set. If not this is an internal IMS error.

X'A040' QMR50 - UNLOAD - MESSAGE CHAIN IS BROKEN

Explanation: A message is being retrieved from the local queues and the chain of messages is broken.

Programmer response: This is an internal IMS error.

X'A044' QMR50 - UNLOAD - ERROR GET/REL DFSBCB STORAGE

Explanation: DFSBCB call received a non zero return code attempting to get or release storage from the storage pool for a work area.

Programmer response: R15 = return code from DFSBCB call. This is either an internal error or insufficient storage available in the control region private area.

X'A048' QMR50 - UNLOAD - QDQCBDQ DOES NOT POINT TO A QUEUE BLOCK

Explanation: A message is being retrieved from the local queues and the field (QDQCBDQ) does not point to a Queue Block.

Programmer response: This is an internal IMS error.

X'A04C' QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE ERROR PRIOR UNLOAD CALL WAS IN ERROR

Explanation: A message is being unloaded from the local queues and the prior unload request was terminated with an error.

Programmer response: This is an internal IMS error.

X'A050' QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB SUSPEND QUEUE WAS DRAINED DURING THE PROCESS OF BEING UNLOADED

Explanation: A message is being unloaded from the local queues SMB suspend queue. The queue was drained during the unload request. The queue should be empty and no action is required.

Programmer response: This is an information type warning.

X'A054' QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB SUSPEND QUEUE WAS MODIFIED DURING THE PROCESS OF BEING UNLOADED

Explanation: A message is being unloaded from the local queues SMB suspend queue. The queue was modified during the unload request. The unload request must be resubmitted if the SMB suspend queue is to unloaded.

Programmer response: This is an information type warning.

X'A058' QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE CNT QUEUE WAS DRAINED DURING THE PROCESS OF BEING UNLOADED

Explanation: A message is being unloaded from the local queues CNT QUEUE. The queue was drained during the unload request. The queue should be empty and no action is required.

Programmer response: This is an information type warning.

X'A05C' QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE CNT DEQUEUE POINTER WAS MODIFIED DURING THE PROCESS OF BEING UNLOADED

Explanation: A message is being unloaded from the local queues CNT QUEUE. The queue was modified during the unload request. The unload request must be resubmitted if the CNT QUEUE is to be unloaded.

Programmer response: This is an information type warning.

X'A060' **QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB QUEUE WAS DRAINED DURING THE PROCESS OF BEING UNLOADED**

Explanation: A message is being unloaded from the local queues SMB QUEUE. The queue was drained during the unload request. The queue should be empty and no action is required.

Programmer response: This is an information type warning.

X'A064' **QMR50 - UNLOAD LOCAL QUEUES CONTINUATION TYPE REQUEST, THE SMB DEQUEUE POINTER WAS MODIFIED DURING THE PROCESS OF BEING UNLOADED**

Explanation: A message is being unloaded from the local queues SMB QUEUE. The queue was modified during the unload request. The unload request must be resubmitted if the SMB QUEUE is to be unloaded.

Programmer response: This is an information type warning.

X'A068' **QMR50 - UNLOAD LOCAL QUEUES, REQUESTED DESTINATION IS BEING READ BY ANOTHER TASK**

Explanation: A message is being unloaded from the local queues CNT QUEUE. The queue is currently being read by another task. The unload request must be resubmitted if the CNT QUEUE is to be unloaded.

Programmer response: This is an information type warning.

X'A06C' **QMR50 - ERROR TERMINATING IMS CONVERSATION**

Explanation: During unload (delete) of a message associated with a IMS conversation transaction, an error was encountered while trying to terminate the conversation. The message is deleted but the conversation may not have been terminated.

Programmer response: This is probably an IMS internal error. Get the 6701-MRQE log record with the AIBREASN=0000A06C error. Fields QCFDIAG1 and QCFDIAG2 will indicate the type of error that was detected in the conversation termination routine (DFSCON20) and QMRWLWA3 will contain the DFSCON20 registers R0 - R15.

X'A070' **QMR50 - COMMAND RESPONSE MESSAGE CAN'T BE DELETED**

Explanation: The messages being unloaded (deleted) are an AOI command response message for an active application program that issued the AOI command (Flag MSGFPADL=MSGSACMD is set). These messages cannot be deleted.

Programmer response: This is a normal condition. The message was not unloaded (deleted) by QCF. The message is deleted by IMS when the AOI application program completes processing the response, or reaches a SYNC point, or is terminated. IMS logged a type 6701-MRQE record for this condition and skips to the next destination. The message can be found in the 6701-MRQE record, in the buffer labeled UMRQMSG.

X'B004' **QMR40 - RECOVER COMMAND ERROR**

Explanation: Command `/RECOVER` was issued in a non-shared queues IMS system.

Programmer response: Make appropriate change.

X'B008' **QMR40 - RECOVER COMMAND ERROR**

Explanation: Invalid call to DFSQMR40. Register 0 did not contain either X'28' (MRQCLEAN) or X'34' (MRQCMD) or X'38' (MRQGCMD).

Programmer response: Correct and reissue the command.

X'B00C' **QMR40 - RECOVER COMMAND ERROR**

Explanation: CQS BROWSE the COLD Q returned partial data. The data object size was larger than 32K.

Programmer response: Locate the message and find out from where this message came. REG8 in REG0-REG15 area contained the message address.

X'B010' **QMR40 - RECOVER COMMAND ERROR**

Explanation: CQS BROWSE the COLD Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause. If reason code = NO DATA OBJECTS RETURNED, dump the COLD Q to verify if any message exists. If so, it is an internal error.

X'B014' **QMR40 - RECOVER COMMAND ERROR**

Explanation: DFSQMR20 returned with RC = X'08' for message selection.

Programmer response: Trace back to DFSQMR20 to determine the cause.

X'B018' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4DELET detected that the message segment from the COLD Q was not the first segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B01C' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4DELET detected that the TMR prefix segment could not be located.

Programmer response: Locate the message and verify the prefix segment exists. The TMR prefix segment code is X'8C'. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B020' QMR40 - RECOVER COMMAND ERROR

Explanation: CQSRECVR FUNC=DELETE a message from the COLD Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause.

X'B024' QMR40 - RECOVER COMMAND ERROR

Explanation: CQS DELETE a message from the STAGING Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause.

X'B028' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4UNLCK detected that the message segment from the COLD Q was not the first segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B02C' QMR40 - RECOVER COMMAND ERROR

Explanation: CQSRECVR FUNC=UNLOCK a message from the COLD Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause.

X'B030' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4READ detected that the message segment from the COLD Q was not the first segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B034' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4READ detected that the TMR prefix segment cannot be located.

Programmer response: Locate the message and verify the prefix segment exists. The TMR prefix segment code is X'8C'. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B038' QMR40 - RECOVER COMMAND ERROR

Explanation: CQS BROWSE the STAGING Q returned partial data. The data object size was larger than 32K.

Programmer response: Locate the message and find out from where this message came. REG8 in REG0-REG15 area contained the message address.

X'B03C' QMR40 - RECOVER COMMAND ERROR

Explanation: No data objects for QNAME while CQS BROWSE the STAGING Q for a multi buffer message.

Programmer response: The message may be deleted by other requestor while being browsed. All previously returned segments of this message should be discarded.

X'B040' QMR40 - RECOVER COMMAND ERROR

Explanation: CQS BROWSE the STAGING Q failed.

Programmer response: This is an internal error. Locate the CQS reason code (CQSRSNCD) in the parameter list (QMRWLWA) to determine the cause.

X'B044' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4READ detected that the message segment from the STAGING Q was not a middle segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B048' QMR40 - RECOVER COMMAND ERROR

Explanation: Subroutine MR4READ detected that the message segment from the STAGING Q was not the last segment.

Programmer response: Locate the message and verify the contents. REG8 in REG0-REG15 area contained the message address. This is an internal IMS error.

X'B04C' QMR40 - RECOVER COMMAND ERROR

Explanation: The request was terminated because the RESYNC was not done between IMS and CQS.

Programmer response: Reissue the request after the RESYNC was done.

X'C000' QMR20 - SELECT SHOULD NOT OCCUR ERROR

Explanation: The selection criteria routine (DFSQMR20) was called and detected include or exclude processing was to be performed but did not find any rows (INCL/EXCL) to process.

Programmer response: Error is detected at label MRSEL500 in DFSQMR20. Select routine reached this routine and the INCL/EXCL register (R6) was zero. R6 should be the address of one of the INCL/EXCL rows mapped by DFSMRQCT. R7 is the select work area (DFSMRQSW) that anchors the rows. MRINCTTR in DFSMRQSW is the number of include entries and MREXCCTR is the number of exclude entries. Flag SMRQ0INC=1 in MRQWORK (R5) means the include chain is being processed, if 0, the exclude chain is being processed. This is a IMS/QCF This is an internal error.

X'C004' QMRA0 - SELECT CRITERIA DFSSQQRY ERROR

Explanation: The selection criteria routine (DFSQMRA0) was called by either BROWSE, QUERY, RECOVER, or UNLOAD, and issued a DFSSQQRY call to query the shared queues to determine which queue names have messages. DFSSQQRY returned a nonzero return code.

Programmer response: REG1 in the REG0-15 save area, and the CMDCQSRC field in the MRQWORK (macro DFSMRQWK) contain the DFSSQQRY return code. REG4 is the address of the parameter list passed to DFSSQQRY. DFSSQQRY return codes are also listed in the DFSSQQRY macro. Table 224 lists the DFSSQQRY return codes:

Table 224. DFSQQRY Return Codes

Shared Queues Message Return Code	Decimal	Meaning
SQQRRC_OK	0	CALL SUCCESSFUL
SQQRRC_SOME	4	SUCCESSFUL ONLY FOR SOME RESOURCES
SQQRRC_NONE	8	SUCCESSFUL FOR NO RESOURCES
SQQRRC_CQS_NOT_AVAIL	12	CQS IS NOT AVAILABLE
SQQRRC_IMS_STG_ERR	16	IMS STORAGE ERROR
SQQRRC_CQS_ERR	20	CALL UNSUCCESSFUL - CQS ERROR
SQQRRC_IMS_ERR	24	CALL UNSUCCESSFUL - IMS ERROR
SQQRRC_QTP_NOMSG	28	NO MSGS FOR QTYPE

X'C008' QMRA0 - SELECT CRITERIA DFSPOOL ERROR

Explanation: The selection criteria routine (DFSQMRA0) was called by either BROWSE, QUERY, RECOVER, or UNLOAD, and issued a DFSPOOL call to free storage. DFSQMRA0 received a nonzero return code.

Programmer response: REG15 in the REG0-15 save area contains the DFSPOOL return code. REG3 is the address of the storage being freed, and REG4 is the address of the parmlist passed to DFSPOOL. This storage being freed is the DFSSQQRY buffer obtained on a DFSSQQRY call. This is an IMS internal error.

X'C00C' QMRA0 - INVALID CMD CALL

Explanation: DFSQMR20 or DFSQMRA0 was called with an invalid command call.

Programmer response: Check QMRWFLG0 in DFSMRQWK for the command in progress. It should be BROWSE, QUERY, RECOVER, or UNLOAD.

X'C010' QMRA0 - DFSCBTS SCAN/FIND ERROR

Explanation: DFSCBTS call resulted in a return code greater than 4.

Programmer response: If the return code is 8, then

the error is due to CBTE not found. Otherwise, if the return code is 12, then the error is because no scan routine exists (set it DFSCBT40).

X'D004' **QMR70 - LOAD/INSERT - INVALID CALL TYPE REC**

Explanation: Invalid call to DFSQMR70. REG0 did not contain either X'04' (INSERT), X'08' (PURG), X'0C' (CANCEL), X'1C' (REROUTE) X'24' (REROUTE PURG), X'28' (CLEANUP), OR X'34' (COMAND).

Programmer response: REG1 in the REG0-REG15 save area contains the call type. Trace the problem to the caller of DFSQMR70. Function being processed should be either a load or insert and call should be one of the above.

X'D008' **QMR70 - LOAD - ERROR CANCELING MESSAGE**

Explanation: At cleanup time when the MRQ BMP ended, the load/insert routine detected a message or partial message that had not been enqueued and attempted to cancel it. A nonzero return code was returned on the QMGR cancel call. Because the BMP was ending, this AIBREASN code will not be returned to the MRQ BMP.

Programmer response: REG15 in the REG0-REG15 save area contains the QMGR return code from the cancel. REG2 contains the QTPPCB used for the cancel call. The nonzero cancel return code is a MRQ/QMGR This is an internal error. The MRQ BMP terminating with a insert message in progress may be a MRQ BMP This is an internal error.

X'D00C' **QMR70 - XFER - ERROR TRANSFERING MESSAGE**

Explanation: While processing a RESET or CLEANUP command from the QCF BMP, a Transfer call was issued to transfer inserted messages from the temporary to the permanent destination. A nonzero return code was returned on the XFER call.

Programmer response: REG15 in the REG0-REG15 save area contains the QMGR return code from the XFER. REG2 contains the QTPPCB used for the XFER call. The nonzero XFER return code is a QCF or QMGR This is an internal error.

X'E000' **DFSQMR00 - QSN exit started too many BMPs**

Explanation: The QCF QSN exit (DFSQMRI0) started more than one concurrent BMP.

Programmer response: The QSN exit routine DFSQMRI0 detected the message queue threshold was reached and started a BMP to process the message queue, however, a previous started BMP had not yet completed. The BMP that is processing the lowest threshold (for example: threshold A to B, or B to C, or C to D) is returned this AIBREASN code to cause it to terminate. To eliminate message queue thrashing, only one BMP processing the highest threshold is allowed to run. This is not considered an error unless the lower threshold BMP (for example: the one that receives this code) is stalled for some reason and isn't completing. Note if the BMP that scheduled for a higher threshold completes OK. R5 is the address of MRQWORK and MRQWORK flag QMRWFL02 = QM2BMPAB or QM2BMPBC, or QM2BMPCD indicates which threshold exceeded condition this BMP was processing.

X'E004' **DFSQMRD0 - QC/QSN INVALID CMD CALL**

Explanation: DFSQMRD0 was called with an invalid command call.

Programmer response: Check QMRWFL00 in DFSMRQWK for the command in progress. It should be QC-ABE, QC-REL, QC-SND or QC-SUS. This is an IMS or QCF internal error.

X'E008' **DFSQMRD0 - QC/QSN SUPPORTED ONLY IN QCF ENVIRONMENT**

Explanation: DFSQMRD0 was called in an non QCF environment.

Programmer response: This is an IMS or QCF internal error.

X'E00C' **DFSQMRD0 - QC/QSN CMD CALL NO QQSN BLOCK**

Explanation: DFSQMRD0 was called with an QC/QSN CMD CALL but no QQSN block.

Programmer response: This is an IMS or QCF internal error.

X'E010' **DFSQMRD0 - QC/QSN COMMAND ACTION INVALID**

Explanation: QC/QSN command action is invalid.

Programmer response: Check QCMRQFL0 in DFSMRQWK for the command in progress. It should be QC-ABE, QC-REL, QC-SND or QC-SUS. This is an IMS or QCF This is an internal error.

X'E014' **DFSQMRD0 - QC/QSN CMD CALL INVALID ITASK**

Explanation: QC/QSN command call ITASK type is invalid.

Programmer response: Check MRPTASK1 and MRPTASK2 in DFSMRQPF for the valid ITASK types. This is an IMS or QCF internal error.

X'E018' DFSQMRD0 - ERROR GET/REL AN AWE

Explanation: DFSBCB GET or REL for an AWE block received a nonzero return code.

Programmer response: R15 = return code from DFBCB GET call. This is either an internal error or insufficient storage available in the control regION PRIVATE AREA.

X'E01C' DFSQMRD0 - QC/QSN CMD CALL RECEIVED ERROR CODE FROM SELECT

Explanation: DFSQMRA0 returned with RC = X'08' in QQSN selection call.

Programmer response: Trace back to DFSQMRA0 to determine the cause.

X'E020' QMRG0 - INVALID FUNCTION PASSED TO QC LOAD AND QUERY QUEUE SPACE BNOTIFICATION TABLE

Explanation: Invalid call to DFSQMRG0. Register 0 did not contain either X'28' (MRQCLEAN), X'34' (MRQCMD), or X'38' (MRQGCMD).

Programmer response: REG0 in REG0-REG15 area contains the function code. REG14 is the address of the caller of DFSQMRG0 (BALR REG). Trace the call back to the caller of DFSQMRG0.

X'E024' DFSQMRG0 - QC LOAD CMD CALL RECEIVED ERROR GET/REL DFSPOOL STORAGE SERVICES

Explanation: DFSPOOL call received a nonzero return code attempting to get or release storage from the HIOP STORAGE POOL for a DFSMRQTB work area.

Programmer response: R15 = return code from DFSPOOL call. This is either an internal error or insufficient storage available in the control region private area.

X'E028' DFSQMRG0 - QC LOAD CMD PROCESSING - the value for QUOTNOTF is invalid

Explanation: The percentage for QUOFNOTF passed to IMS on a QC LOAD CMD call was invalid.

Programmer response: This is either an internal QCF or IMS error.

X'E02C' DFSQMRG0 - INVALID CMD CALL RECEIVED, ONLY /QC-LTBL IS CURRENTLY SUPPORTED

Explanation: Invalid call to DFSQMRG0. The flag(QCMRQFL0) in DFSMRQWK did not indicate that the CMD was /QC-LTBL.

Programmer response: Check QCMRQFL0 in DFSMRQWK for the command in progress. It should be QC-LTBL. This is an IMS or QCF internal error.

X'E030' DFSQMRG0 - INVALID QUEUE UPPER AND/OR LOWER THRESHOLD PERCENT

Explanation: Invalid queue upper, lower, or both, threshold percents were detected. DFSMRQTB work table was constructed using default values of upper(75%) lower(60%).

Programmer response: Check QUOFQTU and QUOTQTL in DFSMRQQO for the command in progress.

X'E034' DFSQMRG0 - ERROR GET/REL AN AWE

Explanation: DFSBCB GET or REL for an AWE block received a nonzero return code.

Programmer response: R15 = return code from DFBCB GET call. This is either an internal error or insufficient storage available in the control region private area.

X'E038' DFSQMRG0 - /QC-LTBL AND /QC-QTBL NOT ACTIVE

Explanation: The required function is not active for the current active IMS system.

Programmer response: If the function is required the module IQCQMRH0 must be linked into the IMS reslib (replacing IMS module DFSQMRH0) or linked into a user reslib as DFSQMRH0. The function is not currently supported for shared queues environment.

X'E03C' DFSQMRD0 - QC/QSN COMMAND IS INVALID

Explanation: The required function is not active or not supported for the current active IMS system.

Programmer response: If the function is required, the module IQCQMRH0 must be linked into THE IMS RESLIB (replacing IMS module DFSQMRH0) or linked into a user RESLIB as DFSQMRH0. The function is not currently supported for shared queues environment.

X'F000'

Explanation: Reserved for future use.

Programmer response:

X'F004' QMRC0 - INVALID FUNCTION PASSED TO ENVIRORMENT STATISTICS ROUTINE

Explanation: Invalid call to DFSQMRC0. Register 0 did not contain either X'28' (MRQCLEAN), X'34' (MRQCMD), or X'38' (MRQGCMD).

Programmer response: REG0 in REG0-REG15 area contains the function code. REG14 is the address of the caller of DFSQMRC0 (BALR REG). Trace the call back to the caller of DFSQMRC0.

X'F008' QMRC0 - IMS IS IN THE PROCESS OF SHUTDOWN OR QUIESCING

Explanation: IMS is in the process of shutdown or quiescing and the CQS QUERY command is not allowed at this time.

Programmer response: This is an IMS information AIBREASN code.

X'F00C' QMRC0 - SHARED QUEUES ENVIRORMENT, NO SHARED QUEUES MASTER CONTROL BLOCK (SCDSQM)

Explanation: IMS is running in a shared queues environment, the pointer to the shared queues MASTER CONTROL BLOCK is zero.

Programmer response: This is an IMS internal error.

X'F010' QMRC0 - SHARED QUEUES ENVIRORMENT, NO STRUCTURE BLOCK (SQMSQSM)

Explanation: IMS is running in a shared queues environment. The pointer to the shared queues structure block is zero.

Programmer response: This is an IMS internal error.

X'F014' QMRC0 - IMS This is an internal error

Explanation: DFSSQI30 has returned an unsupported return code.

Programmer response: This is an IMS internal error.

X'F018' QMRC0 - CQS NOT AVAILABLE TO PROCESS THE CQS QUERY REQUEST

Explanation: CQS is not available to process the CQS QUERY request.

Programmer response: This is an IMS information AIBREASN code.

X'F01C' QMRC0 - CQS RETURNED AN UNSUCCESSFUL RETURN CODE FOR THE CQS QUERY REQUEST

Explanation: CQS returned an unsuccessful return code on the CQS QUERY request. Refer to CQSRRQRY for return codes.

Programmer response: This is an IMS internal error.

X'F020' QMRC0 - IN PROCESSING THE QCF ENVIRORMENT STATISTICS REQUEST STORAGE WAS NOT OBTAINED

Explanation: DFSPOOL call received a nonzero return code attempting to get or release storage from the HIOP storage pool for a work area or buffer.

Programmer response: R15 = return code from DFSPOOL call. This is either an internal error or insufficient storage available in the control region private area.

X'F024' QMRC0 - IN PROCESSING THE QCF ENVIRORMENT STATISTICS THE LIST PASSED TO CQS CONTAINED AN INVALID STRUCTURE NAME

Explanation: The DFSSQQRY list contained an invalid CQS structure name.

Programmer response: This is an internal IMS problem.

X'F028' QMRC0 - IN PROCESSING THE QCF ENVIRORMENT STATISTICS REQWUEST THE DFSSQQRY RETURNED A NON-ZERO RETURN CODE

Explanation: The DFSSQQRY returned a nonzero return code.

Programmer response: This is an internal IMS problem.

Locating IMS Blocks and Work Areas 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.

In this section:

Load List Areas

Table 225 is a list of the areas that appear formatted as the load list in an IMS control region dump. Global areas are in the common storage area (CSA).

Table 225. Load List Areas

Load List Name	IMS Block/Work Area	Pool Type
DFSABSxx	Abend Diagnostic Area, xx=PST number	Global
DFSBFSPP	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[1]
DFSCBT10	Storage pool headers for the pools defined in DFSCBT00	Global[1]
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[2]
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
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[4]
DFSMFDDP	MFS Pool Dynamic Directory Prime Area	Local[4]
DFSMFDD0	MFS Pool Dynamic Directory Entry Area	Local[4]
DFSMFPDS	MFS Pool PDS Directory Indexes	Local[4]
DFSMFSTG	MFS Pool Staging Buffers	Local[4]

Table 225. Load List Areas (continued)

Load List Name	IMS Block/Work Area	Pool Type
DFSMTCLB	CLB (ECB) for DFSCMTIO	Global
DFSMTIOT	Monitor TIOT Table	Global
DFSMTMH	MSC Main Storage-to-Main Storage Queue Header	Local[3]
DFSMTMW	MSC Main Storage-to-Main Storage Window	Local[3]
DFSOBFPL	OSAM Buffer Pool	Global[2]
DFSOBFWA	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[2]
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
DFSSBDSG	Sequential buffering: SDSG	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
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[3]
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

Table 225. Load List Areas (continued)

Load List Name	IMS Block/Work Area	Pool Type
DFSTSAV	Temporary Save Sets	Local
DFSVRFXL	Fixlist for EXCPVR	Local
DFSXCWxx	Exclusive Control Enqueue/Dequeue Work Area, xx=01-99	Global[2]
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 226 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 (CBT) Pools

Table 226. 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
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)

Table 226. CBT Pool Names and Descriptions (continued)

CBT Pool	Description
DPST	Dependent region PST: The following blocks are associated with the dependent region structure: `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
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 savearea
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)
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 savearea
LSAV	Dynamic SAP save sets
LUB	LU 6.2 LU block
L56X	Fast Path database control log record
MSGP	Message buffers in global storage
OSWA	OSAM channel program areas
PCIB	MFS Partition CIB
PDIR	Program directories

Table 226. CBT Pool Names and Descriptions (continued)

CBT Pool	Description
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
VRPL	VSAM RPL with two save areas
VTCB	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

Acronyms and Abbreviations Used in This Section

For a complete listing of acronyms and abbreviations in the IMS library, see the *IMS Version 9: Master Index and Glossary*.

ACB access method control block

AIB application interface block

AMP access method prefix block

APAR authorized program analysis report

BMP batch message processing

BSAM Basic Sequential Access Method

CBT control block table

CCB conversational control block

CCTL coordinator controller

CDE contents directory element

CIB communication interface block

CICS Customer Information Control System

CLB communication line block

CNT communication name table

CQS Common Queue Server

CRB communication restart block

CTB communication terminal block

CTL control

CTRL IMS control region

CTT communication translate table

DBCTL Database Control

DBRC Database Recovery Control

DB Database function

DCB data control block

DC data communication function

DDIR data management block directory

DEDB Data entry database

DMAC data management area control block

DMB data management block

DMCB data management control block

DRA Database Resource Adapter

DSG data set group

DSP IMS dispatcher

DSPWRK IMS dispatcher work area

ECB event control block
ECNT extended communication name table
EEVT external entry vector table
EEVTP external entry vector table prefix
EPST extended partition specification table
ES extended security support
ESCD extended system contents directory
ESETP external subsystem entry table prefix
ESS external subsystem
EWS Early Warning System
EZS external connection status element
FP Fast Path
FTSC Field Technical Support Center
GESE global external subsystem entry
HALDB High Availability Large Database
ID identification
ILS isolated log send
IMS Information Management System
I/O input/output
IOB input/output block
IRLM Internal Resource Lock Manager
ISC Intersystem Communication
ISI resource access security
ISL IRLM identified subsystem list
ITASK IMS task
IWALE internal work area list elements
IXRF IMS-related XRF complex
LCB link control block
LCRE local current recovery entry
LESE local external subsystem entry
LLB logical link block
LNB logical link name block
LTERM logical terminal
MFS Message Format Service
MNOTE macro note
MPP message processing program
MRMB randomizing module block

MRQ	Message Requeuer
MSC	Multiple Systems Coupling
MSDB	main storage database
MVS	Multiple Virtual System
NM	notify message
OLR	Online Reorganization
OM	Operations Manager
OSAM	Overflow Sequential Access Method
PCB	program communication block
PCIB	Partition CIB
PDIR	PSB directory
PSB	program specification block
PST	partition specification table
PSW	program status word
PTERM	physical terminal
PTF	program temporary fix
QCB	queue control block
QSAM	Queued Sequential Access Method
RCTE	routing code table entry
RHB	IRLM resource header block
RLB	IRLM request lock block
RLMCB	IRLM master control block
RPL	request parameter list
RRE	residual recovery element
RSR	Remote Site Recovery
SAP	save area prefix
SB	sequential buffering
SCD	system contents directory
SCP	system control program
SE	system engineer
SMB	scheduler message block
SMP	System Modification Program
SPA	scratch pad area
SQ	shared queues
SSCD	secondary system contents directory
SSF	Software Support Facility
SSIE	subsystem status index block

SSQ	schedule sequence queue
SUR	Database Surveyor utility feature
SYS	systems
TCB	task control block
TCT	transaction class table
TKO	takeover
TPPCB	telecommunication program PCB
TRK	tracking
UTIL	utility
VTCB	VTAM terminal control block
XRF	Extended Recovery Facility

Fast Path Trace Entries

Table 227 shows the Fast Path trace entries. For more information, see Chapter 11, "FP—Fast Path Service Aids," on page 415.

Table 227. 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 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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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)
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
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 FLD, or MSDB	FP Inter-Region Communication
OPMV	DBFIRC10	Post Call, Move Data to Dependent	FP Inter-Region Communication
IRCZ	DBFIRC10	Post Call, Pseudo Abend Set	FP Inter-Region Communication
MBED	DBFMBED0	Entry	DEDB Get CI
MBE2	DBFMBED0	HSSP Async Read Ahead Wait	DEDB Get CI
MBEH	DBFMBED0	HSSP, found CI in 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 Minimum	Build SSAs, set Minimum | Maximum
MB03	DBFMBMM9	GT Operator Minimum	Build SSAs, set Minimum | Maximum
MB04	DBFMBMM9	GE Operator no Minimum	Build SSAs, set Minimum | Maximum

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
MB05	DBFMBMM9	GE Operator Minimum	Build SSAs, set Minimum | Maximum
MB06	DBFMBMM9	LT Operator no Maximum	Build SSAs, set Minimum | Maximum
MB07	DBFMBMM9	LT Operator Maximum	Build SSAs, set Minimum | Maximum
MB08	DBFMBMM9	LE Operator no Maximum	Build SSAs, set Minimum | Maximum
MB09	DBFMBMM9	Invalid Boolean Operator	Build SSAs, set Minimum | Maximum
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
LOPP	DBFMCCV9	Loop checking position	Check Command Code Validity

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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	DBFMCSL9	Entry,Exit (Shift)	Compare Current Segment Field to SSA
CALL	DBFMCSL9	Entry, Trace Call Argument	Compare Current Segment Field to SSA
LOPC	DBFMCSL9	Compare Loop	Compare Current Segment Field to SSA
NEXT	DBFMCSL9	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
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	Can't 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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
MD28	DBFMDRA9	Do Nothing	Determine possibility of randomizing
MD29	DBFMDRA9	Current Key LT SSA Max	Determine possibility of randomizing
MD31	DBFMDRA9	Current Key GT FDLC Low Key	Determine possibility of randomizing
MD32	DBFMDRA9	Current Key GT FDLC Low Key	Determine possibility of randomizing
MD33	DBFMDRA9	Do Nothing	Determine possibility of randomizing
MD34	DBFMDRA9	Do Sequential Read	Determine possibility of randomizing
MD35	DBFMDRA9	Do Nothing	Determine possibility of randomizing
MD36	DBFMDRA9	Do Sequential Read	Determine possibility of randomizing
MD37	DBFMDRA9	Do Nothing	Determine possibility of randomizing
MD38	DBFMDRA9	Go to Next Set Process	Determine possibility of randomizing
MD41	DBFMDRA9	Search for Lowest Min GT Current	Determine possibility of randomizing

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
MD42	DBFMDRA9	Search for Next Higher Set Minimum	Determine possibility of randomizing
MD43	DBFMDRA9	Address next Set	Determine possibility of randomizing
MD44	DBFMDRA9	Set Min Found, 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 - current position good	Determine possibility of randomizing
MD48	DBFMDRA9	Clear current position	Determine possibility of randomizing
MD49	DBFMDRA9	Call Randomizer	Determine possibility of randomizing
MD50	DBFMDRA9	Continue Sequential Read	Determine possibility of randomizing
MDRB	DBFMDRB0	Entry	Delete, get root backwards
MDRT	DBFMDRX0	Entry, Exit DDEP,SDEP (Shift)	DEDB Insert
DSG9	DBFMDSG9	Entry	DEDB Delete Direct Dependent
RECU	DBFMDSG9	Recursive Call Stack Information	DEDB Delete Direct Dependent
DSG1	DBFMDSG9	Trace Segment to be processed	DEDB Delete Direct Dependent
LOP1	DBFMDSG9	Twin Chain Loop	DEDB Delete Direct Dependent
SIBL	DBFMDSG9	First Child	DEDB Delete Direct Dependent
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
NGNR	DBFMGNR0	Exit	DEDB Get Next Root
EXAP	DBFMGNR0	Get Next RAP with a root start loop	DEDB Get Next Root
EXA1	DBFMGNR0	Get Next RAP 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#, DMAC from BLK#	DEDB Get Next Root
ECA1	DBFMGNR0	PROCOPT=P set GC status	DEDB Get Next Root
ECA2	DBFMGNR0	PROCOPT=P set GC status	DEDB Get Next Root
XCAL	DBFMGNR0	Rerun UOW#, DMAC	DEDB Get Next Root
MGN0	DBFMGNX0	Entry, Exit(Shift)	DEDB Get Next Root
GPDE	DBFMGPD0	Entry	DEDB Retrieve Sequential Dependent Segment
GPD1	DBFMGPD0	Scan Segment Chain	DEDB Retrieve Sequential Dependent Segment
GPD2	DBFMGPD0	SDEP Pointer -> uncommitted seg	DEDB Retrieve Sequential Dependent Segment
GPD3	DBFMGPD0	SDEP Pointer -> normal seg	DEDB Retrieve Sequential Dependent Segment
GPD4	DBFMGPD0	Must Read CI	DEDB Retrieve Sequential Dependent Segment

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
GPDS	DBFMGPD0	IRLM Notify to Partner	DEDB Retrieve Sequential Dependent Segment
GDPN	DBFMGPD0	SDEP CI found to be locked	DEDB Retrieve Sequential Dependent Segment
GDP7	DBFMGPD0	Re-read CI	DEDB Retrieve Sequential Dependent Segment
GDPC	DBFMGPD0	Compare Segment to SSA	DEDB Retrieve Sequential Dependent Segment
GPD5	DBFMGPD0	SSA does not match this segment	DEDB Retrieve Sequential Dependent Segment
GPD6	DBFMGPD0	Copy segment	DEDB Retrieve Sequential Dependent Segment
GDPX	DBFMGPD0	Exit	DEDB Retrieve Sequential Dependent Segment
MGPF	DBFMGPF0	Entry	Get Page of Common Storage
NGPF	DBFMGPF0	Exit	Get Page of Common Storage
MGRF	DBFMGRF0	Entry	Get Root Forward Search
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
MIR2	DBFMIRT0	Previous Root Twin not in Same CI	DEDB Insert
MIR3	DBFMIRT0	Trace after reading CI	DEDB Insert
MIR4	DBFMIRT0	Previous Segment not in Same CI	DEDB Insert
MIR5	DBFMIRT0	Previous Segment not Parent	DEDB Insert
MIRB	DBFMIRT0	Set PCF Pointer in Parent	DEDB Insert
MIR6	DBFMIRT0	Previous Segment in Same CI	DEDB Insert
MIR7	DBFMIRT0	Update RAP -> new segment	DEDB Insert
MIR8	DBFMIRT0	Previous is not a RAP	DEDB Insert
MIR9	DBFMIRT0	Previous Segment 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 Connect/Disconnect
MMIE	DBFMMIT0	Exit	DEDB Media Manager 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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
PED9	DBFMPED9	Entry,Exit (Shift)	DEDB Process Position Fields in Parallel EPCBs - DELETE
PEI9	DBFMPEI9	Entry, Exit (Shift)	DEDB Process Position Fields in Parallel EPCBs - INSERT
LOP1	DBFMPEI9	Loop through EPCBs	DEDB Process Position Fields in Parallel EPCBs - INSERT
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	DBFMPER9	Entry	DEDB Relocate PCL or SSPT in Parent
DPTX	DBFMPER9	Exit	DEDB Relocate PCL or SSPT in Parent
MPGO	DBFMPGO0	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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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	DBFMSRB0	Entry	DEDB Schedule DBFMIOS0 SRB routine
NSRB	DBFMSRB0	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_LENG	DEDB Preallocate SDEP Cis
MSRA	DBFMSRT0	Trace RBAT, #Cis to allocate	DEDB Preallocate SDEP Cis
MSRB	DBFMSRT0	Trace RBAT, min # Cis	DEDB Preallocate SDEP Cis
MSRD	DBFMSRT0	SDEP Part now full	DEDB Preallocate SDEP Cis
MSRE	DBFMSRT0	SDEP Part now full	DEDB Preallocate SDEP Cis
MSRF	DBFMSRT0	Lock failure on SDEP PACI	DEDB Preallocate SDEP Cis
MSRG	DBFMSRT0	Add SDEP CI XCRBs to RBAT	DEDB Preallocate SDEP Cis
MSRH	DBFMSRT0	Trace ACCUM_LENG	DEDB Preallocate SDEP Cis
MLOG	DBFMSRT0	Log 5953 Record - entry	DEDB Preallocate SDEP Cis
NLOG	DBFMSRT0	Log 5953 Record - exit	DEDB Preallocate SDEP Cis
SSA9	DBFMSSA9	Entry, Exit(Shift)	DEDB Search SSA for Data
MMOV	DBFMSSA9	Must Move	DEDB Search SSA for Data

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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 key found	DEDB Search SSA for Data
EIGH	DBFMSSA9	Not found, no higher key found	DEDB Search SSA for Data
SAGI	DBFMSSC9	Entry, Exit(Shift)	DEDB SSA Handler for GET and INSERT
ACST	DBFMCSS9	Count SSAs	DEDB SSA Handler for GET and INSERT
NAMF	DBFMCSS9	Segment Name Found	DEDB SSA Handler for GET and INSERT
DESC	DBFMCSS9	Level Descending	DEDB SSA Handler for GET and INSERT
NDES	DBFMCSS9	Level Not Descending	DEDB SSA Handler for GET and INSERT
NOTN	DBFMCSS9	Segment Name Not Found	DEDB SSA Handler for GET and INSERT
NOSG	DBFMCSS9	No Segment Name Found	DEDB SSA Handler for GET and INSERT
ENAC	DBFMCSS9	Hierarchy Error in Segment Name	DEDB SSA Handler for GET and 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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
IOSH	DBFPIOS0	Imac_IC_cursor GT req uow 1st CI	DEDB HSSP Image Copy I/O Routine
IOSL	DBFPIOS0	Imac_IC_cursor LT req uow 1st CI	DEDB H DEDB HSSP Image Copy I/O Routine
IOSE	DBFPIOS0	Imac_IC_cursor EQ req uow 1st CI	DEDB HSSP Image Copy I/O Routine
NIOS	DBFPIOS0	Exit	DEDB HSSP Image Copy I/O Routine
PRAB	DBFPRAB0	Entry	DEDB Release Current UOW Resources
NRAB	DBFPRAB0	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 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 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 for operation	MSDB Syncpoint Phase I
RACC	DBFSBP10	Use Record data for operation	MSDB Syncpoint Phase I

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
CACC	DBFSBP10	Trace Segment to be processed	MSDB Syncpoint Phase I
DACC	DBFSBP10	After move to 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 Overflow message	MSDB Syncpoint Phase I
SDEQ	DBFSDEQ0	Entry	FP Resource Dequeue
TDEQ	DBFSDEQ0	Exit	FP Resource Dequeue
UOWX	DBFSDEQ0	Change UOW 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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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
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

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
UHGX	DBFUHGS7	Exit	DEDB HSRE Get Space to Copy Segment
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 async read ahead	DEDB High Speed Utility Services
NHSS	DBFUHSS0	Exit	DEDB High Speed Utility Services
UHSI	DBFUHSS0	HSSP Image Copy 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 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 (CONNECT/ DISCONNECT)
VMDS	DBFUMDS0	Exit	DEDB Utility DMAC Sync (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 ADS
VMNO	DBFUMNO0	Exit	DEDB Utility Notify Partners to Open ADS
VSCL	DBFVSCL0	Entry	DEDB VSO Area Close
VSCE	DBFVSCL0	Exit	DEDB VSO Area Close
VSOP	DBFVSOP0	Entry	DEDB VSO Area Open

Table 227. Fast Path Trace Entries (continued)

Trace ID	Module	Trace Point	Comments
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

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IMS Version 9: Release Planning Guide	RPG	GC17-7831

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Supplementary Publications

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IMS Connector for Java 2.2.2 and 9.1.0.1 Online Documentation for WebSphere Studio Application Developer Integration Edition 5.1.1	SC09-7869
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z/OS V1R1.0 TSO Primer	SA22-7787
z/OS V1R5.0 TSO/E User's Guide	SA22-7794
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