z/OS



DFSMSrmm Diagnosis Guide

GY27-7619-03

z/OS



DFSMSrmm Diagnosis Guide

GY27-7619-03

Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 79.

Fourth Edition, March 2004

This edition applies to Version 1 Release 5 of z/OS® (5694-A01), Version 1 Release 5 of z/OS.e (5655-G52), and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces GY27-7619-02.

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About This Document

This document is intended for system programmers who must report and resolve failures in DFSMSrmm. It contains information to help you:

- Obtain information to diagnose DFSMSrmm problems
- Resolve problems you encounter while running DFSMSrmm
- Use the Problem Determination Aid (PDA) facility
- Build keyword strings that describe DFSMSrmm failures as precisely as possible
- Search IBM Software Support databases to determine:
  - Whether an authorized program analysis report (APAR) already exists for the problem
  - Whether a solution for the problem is available

You can contact the IBM Support Center to perform the search for you or to help you:

- Develop a more effective keyword string
- Gather additional failure-related information
- Submit adequate information with an APAR, if necessary

For information about accessibility features of z/OS and z/OS.e, for users who have a physical disability, see Appendix E, “Accessibility,” on page 77.

Required product knowledge

To use this document effectively, you should be familiar with:

- IBM® support and how it is structured
- Basic dump analysis
- Diagnostic techniques

Referenced documents

The following documents have additional information about DFSMSrmm:

Document Title	Order Number
z/OS DFSMSrmm Application Programming Interface	SC26-7403
z/OS DFSMSrmm Command Reference Summary	SX26-6022
z/OS DFSMSrmm Guide and Reference	SC26-7404
z/OS DFSMSrmm Implementation and Customization Guide	SC26-7405
z/OS DFSMSrmm Reporting	SC26-7406

This document refers to the following publications:

Document Title	Order Number
Environmental Record Editing and Printing Program Version 3 Release 5 User’s Guide	GC35-0151
z/OS DFSMSdfp Diagnosis Guide	GY27-7617
z/OS DFSMShsm Diagnosis Guide	LY35-0114
z/OS ISPF Messages and Codes	SC34-4815

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Document Title	Order Number
z/OS MVS Diagnosis: Procedures	GA22-7587
z/OS MVS Diagnosis: Tools and Service Aids	GA22-7589
z/OS MVS IPCS Commands	SA22-7594
z/OS MVS IPCS User's Guide	SA22-7596
z/OS MVS System Messages, Vol 1 (ABA-AOM)	SA22-7631
z/OS MVS System Messages, Vol 2 (ARC-ASA)	SA22-7632
z/OS MVS System Messages, Vol 3 (ASB-BPX)	SA22-7633
z/OS MVS System Messages, Vol 4 (CBD-DMO)	SA22-7634
z/OS MVS System Messages, Vol 5 (EDG-GFS)	SA22-7635
z/OS MVS System Messages, Vol 6 (GOS-IEA)	SA22-7636
z/OS MVS System Messages, Vol 7 (IEB-IEE)	SA22-7637
z/OS MVS System Messages, Vol 8 (IEF-IGD)	SA22-7638
z/OS MVS System Messages, Vol 9 (IGF-IWM)	SA22-7639
z/OS MVS System Messages, Vol 10 (IXC-IZP)	SA22-7640

Accessing z/OS DFSMS documents on the Internet

In addition to making softcopy documents available on CD-ROM, IBM provides access to unlicensed z/OS softcopy documents on the Internet. To view, search, and print z/OS documents, go to the z/OS Internet Library: http://www.ibm.com/eserver/zseries/zos/bkserv/

Using LookAt to look up message explanations

LookAt is an online facility that lets you look up explanations for most of the IBM messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can use LookAt from the following locations to find IBM message explanations for z/OS® elements and features, z/VM®, and VSE:

- The Internet. You can access IBM message explanations directly from the LookAt Web site at http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/.
- Your z/OS TSO/E host system. You can install code on your z/OS or z/OS.e systems to access IBM message explanations, using LookAt from a TSO/E command line (for example, TSO/E prompt, ISPF, or z/OS UNIX® System Services running OMVS).
- Your Windows® workstation. You can install code to access IBM message explanations on the *z/OS Collection* (SK3T-4269), using LookAt from a Windows DOS command line.
- Your wireless handheld device. You can use the LookAt Mobile Edition with a handheld device that has wireless access and an Internet browser (for example, Internet Explorer for Pocket PCs, Blazer, or Eudora for Palm OS, or Opera for Linux handheld devices). Link to the LookAt Mobile Edition from the LookAt Web site.

You can obtain code to install LookAt on your host system or Windows workstation from a disk on your *z/OS Collection* (SK3T-4269), or from the LookAt Web site

(click **Download**, and select the platform, release, collection, and location that suit your needs). More information is available in the LOOKAT.ME files available during the download process.

Accessing z/OS licensed documents on the Internet

z/OS licensed documentation is available on the Internet in PDF format at the IBM Resource Link™ Web site at:

`http://www.ibm.com/servers/resourcelink`

Licensed documents are available only to customers with a z/OS license. Access to these documents requires an IBM Resource Link user ID and password, and a key code. With your z/OS order you received a Memo to Licensees, (GI10-0671), that includes this key code. [1]

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Notational Conventions

This section explains the notational conventions used in this document.

How to Read Syntax Diagrams

Throughout this library, diagrams are used to illustrate the programming syntax. Keyword parameters are parameters that follow the positional parameters. Unless otherwise stated, keyword parameters can be coded in any order. The following list tells you how to interpret the syntax diagrams:

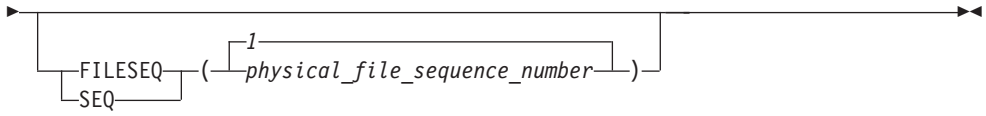
- Read the diagrams from left-to-right, top-to-bottom, following the main path line. Each diagram begins on the left with double arrowheads and ends on the right with two arrowheads facing each other.



- If a diagram is longer than one line, each line to be continued ends with a single arrowhead and the next line begins with a single arrowhead.



1. z/OS.e customers received a Memo to Licensees, (GI10-0684) that includes this key code.



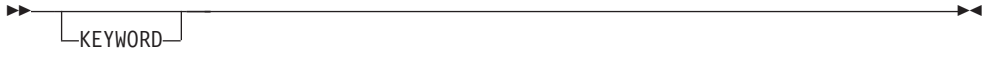
- Required keywords and values appear on the main path line. You must code required keywords and values.



  If several mutually exclusive required keywords or values exist, they are stacked vertically in alphanumeric order.



- Optional keywords and values appear below the main path line. You can choose not to code optional keywords and values.



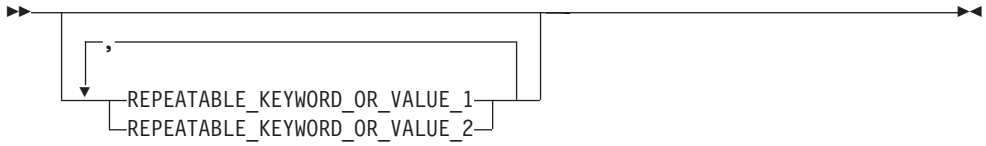
  If several mutually exclusive optional keywords or values exist, they are stacked vertically in alphanumeric order below the main path line.



- An arrow returning to the left above a keyword or value on the main path line means that the keyword or value can be repeated. The comma means that each keyword or value must be separated from the next by a comma.



- An arrow returning to the left above a group of keywords or values means more than one can be selected, or a single one can be repeated.



- A word in all uppercase is a keyword or value you must spell exactly as shown. In this example, you must code ***KEYWORD***.



  If a keyword or value can be abbreviated, the abbreviation is discussed in the text associated with the syntax diagram.

- If a diagram shows a character that is not alphanumeric (such as parentheses, periods, commas, and equal signs), you must code the character as part of the syntax. In this example, you must code ***KEYWORD=(001,0.001)***.



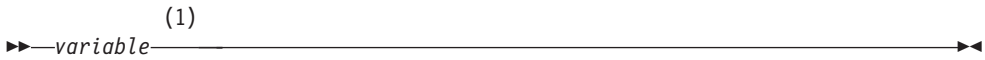
- If a diagram shows a blank space, you must code the blank space as part of the syntax. In this example, you must code ***KEYWORD=(001 FIXED)***.



- Default keywords and values appear above the main path line. If you omit the keyword or value entirely, the default is used.



- A word in all lowercase italics is a *variable*. Where you see a variable in the syntax, you must replace it with one of its allowable names or values, as defined in the text.



Notes:

1 An example of a syntax note.

- References to syntax notes appear as numbers enclosed in parentheses above the line. Do not code the parentheses or the number.



- Some diagrams contain *syntax fragments*, which serve to break up diagrams that are too long, too complex, or too repetitious. Syntax fragment names are in mixed case and are shown in the diagram and in the heading of the fragment. The fragment is placed below the main diagram.



Syntax Fragment:



The following is an example of a syntax diagram.



newowner

```
                          (1)
├──NEWOWNER(new_owner_ID)──────────────────────────────────────────────────┤
```

Notes:

1 Must be specified if the owner owns one or more volumes.

The possible valid versions of the RMM DELETEOWNER command are:

```
RMM DELETEOWNER owner
RMM DO          owner
RMM DELETEOWNER owner NEWOWNER(new_owner)
RMM DO          owner NEWOWNER(new_owner)
```

How to Abbreviate Commands and Operands

The TSO abbreviation convention applies for all DFSMSrmm commands and operands. The TSO abbreviation convention requires you to specify as much of the command name or operand as is necessary to distinguish it from the other command names or operands.

Some DFSMSrmm keyword operands allow unique abbreviations. All unique abbreviations are shown in the command syntax diagrams.

How to Use Continuation Characters

The symbol **-** is used as the continuation character in this document. You can use either **-** or **+**.

- Do not ignore leading blanks on the continuation statement

+ Ignore leading blanks on the continuation statement

Delimiters

When you type a command, you must separate the command name from the first operand by one or more blanks. You must separate operands by one or more blanks or a comma. Do not use a semicolon as a delimiter because any character you enter after a semicolon is ignored.

Character Sets

To code job control statements, use characters from the character sets in Table 1. Table 2 on page xvii lists the special characters that have syntactical functions in job control statements.

Table 1. Character Sets

Character Set	Contents	
Alphanumeric	Alphabetic Numeric	Capital A through Z 0 through 9
National (See note)	“At” sign Dollar sign Pound sign	@ (Characters that can be $ represented by hexadecimal # values X'7C', X'5B', and X'7B')

Table 1. Character Sets (continued)

Character Set	Contents	
Special	Comma Period Slash Apostrophe Left parenthesis Right parenthesis Asterisk Ampersand Plus sign Hyphen Equal sign Blank	, . / ' ( ) * & + - =
EBCDIC text	EBCDIC printable character set	Characters that can be represented by hexadecimal X'40' through X'FE'
Note: The system recognizes the following hexadecimal representations of the U.S. National characters; @ as X'7C'; $ as X'5B'; and # as X'7B'. In countries other than the U.S., the U.S. National characters represented on terminal keyboards might generate a different hexadecimal representation and cause an error. For example, in some countries the $ character may generate a X'4A'.		

Table 2. Special Characters Used in Syntax

Character	Syntactical Function
,	To separate parameters and subparameters
=	To separate a keyword from its value, for example, BURST=YES
(b)	To enclose subparameter list or the member name of a PDS or PDSE
&	To identify a symbolic parameter, for example, &LIB
&&	To identify a temporary data set name, for example, &&TEMPDS, and, to identify an in-stream or sysout data set name, for example, &&PAYOUT
.	To separate parts of a qualified data set name, for example, A.B.C., or parts of certain parameters or subparameters, for example, nodename.userid
*	To refer to an earlier statement, for example, OUTPUT=*.name, or, in certain statements, to indicate special functions: //label CNTL * //ddname DD * RESTART=* on the JOB statement
’	To enclose specified parameter values which contain special characters
(blank)	To delimit fields

Summary of Changes

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

You might notice changes in the style and structure of some content in this document--for example, headings that are more task-oriented, notes with headings that are more specific and clear in their intent, additional index entries for easier information retrieval, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

Summary of Changes for GY27-7619-03 z/OS Version 1 Release 5

This document contains information previously presented in *z/OS Version 1 Release 3 DFSMSrmm Diagnosis Guide* (GY27-7619-02).

The following sections summarize the changes to that information.

Changed Information

The following information was changed in this edition:

- The release level keyword has been updated to reflect the latest release of the product.

Summary of Changes for GY27-7619-02 z/OS Version 1 Release 3

This document contains information previously presented in *z/OS Version 1 Release 3 DFSMSrmm Diagnosis Guide* (GY27-7619-01).

The following sections summarize the changes to that information.

New Information

This edition includes the addition of the DUPVOL function modifier keyword.

Changed Information

The following information was changed in this edition:

- The release level keyword has been updated to reflect the latest release of the product.
- The RMM LISTVOLUME output has been updated.

Summary of Changes for GY27-7619-01 z/OS Version 1 Release 3

This document contains information previously presented in *z/OS Version 1 Release 1 DFSMSrmm Diagnosis Guide* (GY27-7619-00).

The following sections summarize the changes to that information.

New Information

This edition includes the following new information:

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- DFSMSrmm Report Generator is an ISPF application that you can use to produce reports for DFSMSrmm. New trace command suffixes have been added to support this function.
- DFSMSrmm minimal bin assignment allows you to manage volumes in storage locations. New function modifier keywords have been added to support this function.
- DFSMSrmm system codes and user codes have been added to this document.

Changed Information

The following information was changed in this edition:

- The release level keyword has been updated to reflect the latest release of the product.
- The RMM LISTVOLUME output has been updated.

Chapter 1. Obtaining Diagnostic Information

DFSMSrmm™ is a z/OS™ feature. This chapter helps you obtain information to diagnose DFSMSrmm problems as described in the following topics.

- "How the DFSMSrmm ISPF Dialog Provides Help When Errors Occur"
- "Obtaining TRACE Command Output" on page 2
- "Capturing Log Data to Diagnose Errors" on page 7
- "Obtaining Dumps to Help You Analyze and Diagnose Problems" on page 9
- "Using Messages and Codes to Diagnose DFSMSrmm Errors" on page 11

How the DFSMSrmm ISPF Dialog Provides Help When Errors Occur

When an error occurs while you are using the DFSMSrmm Interactive System Productivity Facility (ISPF) dialog, a short message describing the error appears at the top right corner of the current panel, as shown in Figure 1.

```
  Panel  Help  Scroll
------------------------------------------------------------------------------
 EDGPT010                   DFSMSrmm Volume Search             Incorrect Volser
 Command ===>

                                                                  More:     +
 Volume  . . . .            May be generic.  Leave blank for all volumes.

 Owner . . . . .            Owned by a specific user. Default is your userid

 .
 .
 .
```

Figure 1. How a Short Message Appears on an ISPF Panel

Press **PF1** or enter the **HELP** command. DFSMSrmm displays a long message that provides additional information describing the error as shown in Figure 2.

```
  Panel  Help  Scroll
------------------------------------------------------------------------------
 EDGPT010                   DFSMSrmm Volume Search             Incorrect Volser
 Command ===>
 Enter 1 to 6 alphanumeric, national, or special characters.

                                                                  More:     +
 Volume  . . . .            May be generic.  Leave blank for all volumes.

 Owner . . . . .            Owned by a specific user. Default is your userid

 .
 .
 .
```

Figure 2. How a Long Message Appears on an ISPF Panel

If you need more information about the error, press **PF1** or enter the **HELP** command. DFSMSrmm displays the dialog help panel associated with the currently displayed dialog panel, as shown in Figure 3 on page 2.

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```
EDGHT010 ------------------ DFSMSrmm VOLUME SEARCH -----------------------HELP
COMMAND ===>

   Use the DFSMSrmm Volume Search panel to generate a list of volumes defined
   to DFSMSrmm that match the criteria you specify.

   Use ENTER to see the following topics in sequence or choose them by number.

     1    Volume search - Overview      15    Label
     2    Volume                        16    Label version
     3    Owner                         17    VOL1 volser
     4    Media name                    18    Density
     5    Pool                          19    Format
     6    Status                        20    Compaction
     7    Since                         21    Attributes
     8    Retention                     22    Destination
     9    Limit                         23    Required
    10    Home                          24    Move mode
    11    Location                      25    Intransit
    12    In container                  26    Line commands
    13    Volume type                   27    Volume list
    14    Media type                    28    Volume list sort order

  Use ENTER to continue, END to exit Help.
```

Figure 3. Sample DFSMSrmm ISPF Dialog Help Panel

While you are in the DFSMSrmm ISPF dialog, you might see ISPF messages that begin with prefixes ISP or ISR. Refer to *z/OS ISPF Messages and Codes* for information about the ISPF error.

Obtaining TRACE Command Output

When reporting problems to the IBM® Support Center, you might be asked to provide trace output for all or part of the DFSMSrmm ISPF dialog. With tracing on, you see the REXX procedure statements as they are processed and the RMM TSO subcommands that the DFSMSrmm ISPF dialog is building. Use the trace output to help determine if the error occurred within the REXX procedure or as a result of an error in the RMM TSO subcommand issued by the DFSMSrmm ISPF dialog.

You can trace the processing of a DFSMSrmm function by using the TRACE command as described in Figure 4 on page 3. You specify the TRACE command by coding it in the DFSMSrmm ISPF dialog. You can use ALL to request both function and EXEC tracing. Specify DATASET to trace DFSMSrmm data set related processing. You can trace the processing of the RMMISPF EXEC by using the TRACE command with an EXEC name suffix. See Appendix B, “DFSMSrmm Trace Command Suffixes,” on page 55 for a list of EXEC name suffixes you can use with the trace command.

Figure 4 shows the TRACE command and the keywords you can use with the command.

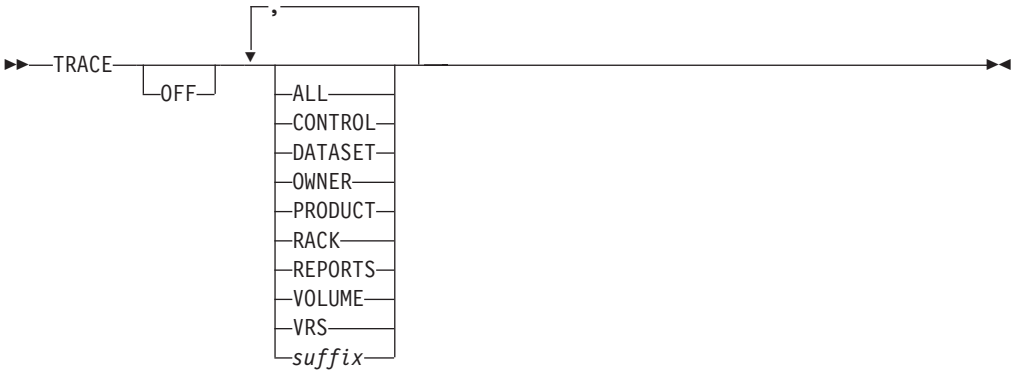

Figure 4. TRACE Command Syntax Diagram

TRACE
Use with any operand to turn tracing on. Use it without an operand to display the active trace options.

OFF This turns tracing off.

You can use OFF with a keyword or suffix to selectively turn off tracing. The trace command function keywords describe DFSMSrmm functions. You can specify any of the following: CONTROL, DATASET, OWNER, PRODUCT, RACK, VOLUME, and VRS. To turn off tracing for a DFSMSrmm EXEC, use a suffix.

ALL This traces all DFSMSrmm function and DFSMSrmm EXEC processing.

CONTROL
To trace LISTCONTROL information about DFSMSrmm installation options.

DATASET
To trace data set related processing within DFSMSrmm.

OWNER
To trace owner information related processing within DFSMSrmm.

PRODUCT
To trace product information related processing within DFSMSrmm.

RACK To trace rack number or bin number related processing within DFSMSrmm.

VOLUME
To trace volume related processing within DFSMSrmm.

VRS To trace vital record specification related processing within DFSMSrmm.

suffix Specify a *suffix* which is a DFSMSrmm EXEC name without the EDGR prefix. *Suffix* can be up to four alphanumeric characters.

Related Reading: For a list of DFSMSrmm EXECs and the suffixes you can use with the TRACE command, see Appendix B, “DFSMSrmm Trace Command Suffixes,” on page 55.

Ways in Which You can Activate Tracing

You can activate tracing when you are starting the DFSMSrmm ISPF dialog using the RMMISPF EXEC or while you are in the DFSMSrmm ISPF dialog.

Activating Tracing When You Are Starting the DFSMSrmm ISPF Dialog

You can use any of the TRACE command operands described in “Obtaining TRACE Command Output” on page 2 to trace processing of the RMMISPF EXEC. When you start the DFSMSrmm ISPF dialog, enter the TRACE command as shown in Figure 5.

```
  Menu  Utilities  Compilers  Options  Status  Help
--------------------------------------------------------------------------------
ISR@PRIM                   ISPF Primary Option Menu
Option ===> TSO %RMMISPF TRACE(ISPF)

0  Settings      Terminal and user parameters            User ID . : MAZTST1
1  View          Display source data or listings         Time. . . : 01:56
2  Edit          Create or change source data            Terminal. : 3278
3  Utilities     Perform utility functions               Screen. . : 1
4  Foreground    Interactive language processing         Language. : ENGLISH
5  Batch         Submit job for language processing      Appl ID . : ISR
6  Command       Enter TSO or Workstation commands       TSO logon : IEFPROC
7  Dialog Test   Perform dialog testing                  TSO prefix: MAZTST1
8  LM Facility   Library administrator functions         System ID : SYSTEM1
9  IBM Products  IBM program development products        MVS acct. : *
10 SCLM          SW Configuration Library Manager        Release . : ISPF 4.2



Enter X to Terminate using log/list defaults
```

Figure 5. Activating Trace with the RMMISPF EXEC

Tracing from within the DFSMSrmm ISPF Dialog

You can activate tracing when you are in the DFSMSrmm ISPF dialog from the command line of any DFSMSrmm ISPF dialog panel. Enter the TRACE command as shown in Figure 6 on page 5.

```
  Panel  Help
------------------------------------------------------------------------------
EDGP@OPT                DFSMSrmm Dialog Options Menu
Option ===>   TRACE

1  USER      - Specify processing options
2  SORT      - Specify list sort options
3  DISPLAY   - Specify panel color and emphasis

Enter selected option or END command.  For more info., enter HELP or PF1.









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```

Figure 6. Requesting Tracing within the DFSMSrmm ISPF Dialog

Setting Specific TRACE Options Within the DFSMSrmm ISPF Dialog

To obtain a trace of all activities for volumes, enter the TRACE command with the VOLUME option as shown in Figure 7.

```
  Panel  Help
------------------------------------------------------------------------------
EDGP@OPT                DFSMSrmm Dialog Options Menu
Option ===>   TRACE VOLUME

1  USER      - Specify processing options
2  SORT      - Specify list sort options
3  DISPLAY   - Specify panel color and emphasis

Enter selected option or END command.  For more info., enter HELP or PF1.









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```

Figure 7. Requesting a Trace of Volume Processing

You can use multiple operands to activate tracing for more than one function or EXEC. For example, Figure 8 shows how you can trace:

- All data set activities
- Volume activities
- A DFSMSrmm EXEC named EDGRPDIS
- Owner activities

```
  Panel  Help
------------------------------------------------------------------------------
EDGP@OPT                DFSMSrmm Dialog Options Menu
Option ===>   TRACE DATASET VOLUME PDIS OWNER
```

Figure 8. Specifying Multiple Operands with the Trace Command

Displaying TRACE Options

To display active TRACE options, enter the TRACE command as shown in Figure 9.

```
  Panel  Help
------------------------------------------------------------------------------
EDGP@OPT                DFSMSrmm Dialog Options Menu
Option ===>   TRACE

1  USER      - Specify processing options
2  SORT      - Specify list sort options
3  DISPLAY   - Specify panel color and emphasis

Enter selected option or END command.  For more info., enter HELP or PF1.









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```

Figure 9. Requesting a Display of Active TRACE Options

Figure 10 on page 7 shows the items traced by the command `TRACE DATASET VOLUME PDSI OWNER`.

- EDGRD* - All data set related processing
- EDGRT* - All volume related processing
- EDGRPDIS - The EDGRPDIS EXEC
- EDGROWNR - All owner related processing

```
DFSMSrmm Current TRACE settings:
  EDGRD*
  EDGRT*
  EDGRPDIS
  EDGROWNR
***
```

Figure 10. Sample Trace Settings

Capturing Log Data to Diagnose Errors

ISPF adds entries to the ISPF log to record when certain functions are called and when TSO commands are issued. You can use information in the ISPF log to diagnose errors in DFSMSrmm.

If the ISPF log is empty, your user profile is not set for logging error data, inter-module trace data, or trace-point trace data. Use the ISPF PARMS application to change your log defaults. Then attempt to re-create the failure.

Steps for Using the TRACE Command and the ISPF Log to Diagnose Errors

This sample procedure describes how to use the TRACE command and the ISPF log to diagnose an error that occurred while DFSMSrmm was processing a volume search request.

1. Ensure that ISPF is logging data by following these steps.
   a. In the ISPF Primary Option Menu, go to Settings.
   b. Click the **Log/List action bar** to display several choices.
   c. Select **Log Data set** defaults.
   d. Set the size of the LOG data set's primary and secondary pages to be 1 or greater. This ensures that you will run with an ISPF log data set.
   e. Exit ISPF.
2. Start DFSMSrmm by using the RMMISPF EXEC. Enter `%RMMISPF` at the TSO ready prompt.

3. DFSMSrmm displays the DFSMSrmm primary option menu as shown in Figure 11. Enter the command `TRACE VOLUME` on the ISPF command line.

```
  Panel  Help
------------------------------------------------------------------------------
EDG@PRIM             REMOVABLE MEDIA MANAGER (DFSMSrmm)
Option ===>  TRACE VOLUME
```

Figure 11. Entering the TRACE Command

4. You know you are done when youl see trace messages displayed on your terminal as your request is processing, as shown in Figure 12. Inspect the return codes and reason codes that are displayed, as well as the REXX error messages that are issued when the error occurred, to help you determine the cause of the error.

```
   71 *-*     sysauth.edgdate = edgdfmt
      >>>       "JULIAN"
   72 *-*     command
      >>>   "RMM SEARCHVOLUME VOLUME(*)"
+++ RC(12) +++
   73 *-*     svrc = rc
      >>>       "12"
   74 *-*     Select
   76 *-*     When svrc = 0
      >>>       "0"
   79 *-*     When svrc = 4
      >>>       "0"
   95 *-*     When svrc = 8
      >>>       "0"
   98 *-*     When svrc = 12
      >>>       "1"
      *-*      then
   99 *-*      Select
  101 *-* When edg@rc = 8
      >>>        "0"
  104 *-*      When edg@rc = 10
      >>>        "0"
  107 *-*      When edg@rc = 12
***
```

Figure 12. Sample Trace Output for a SEARCHVOLUME Request

Steps for Saving the Contents of the Log Data Set

When your request has been processed, use the following sample procedure to save the contents of the ISPF log data set for problem determination.

1. After you have entered the ISPF dialog, enter 0 from the Option line on the ISPF Primary Option Menu. The ISPF Settings panel appears.
2. Use the Log/List action bar on the ISPF Settings panel to display several choices.
3. Select 1 to display the Log Data Set Defaults panel.
4. Select 4 (Keep data set and allocate new data set) option on the Log Data Set Defaults panel.
5. You can then save or rename the ISPF LOG data set you have created.

Result: Figure 13 shows an ISPF LOG with DFSMSrmm data.

```
TIME               *** ISPF TRANSACTION LOG ***                      USERID: STSGGT    DATE: 99/03/14   PAGE: 1
  01:47   START OF ISPF LOG - - -  - SESSION # 2004 ------------------------------------------------------------
  01:51      EDIT    - SAVE        - STSGGT.RMMRPT.EXEC(MAIN) - MEMBER SAVED
  01:52      TSO     - COMMAND  -  - RMMISPF
  01:52      TSO     - COMMAND  -  - %EDGRTVOL SEARCH
  01:52      TSO     - COMMAND  -  - %EDGRTSCH VOLUME(111*)
  01:53      TSO     - COMMAND  -  - %EDGRTSCH OWNER(*) VOLUME(111*)
  01:53    END OF ISPF LOG - - - - - SESSION # 2004 ------------------------------------------------------------
```

Figure 13. ISPF LOG with DFSMSrmm Data

Keep the ISPF LOG and trace output containing return and reason codes and messages. Refer to this information when contacting your IBM Support Center.

Obtaining Dumps to Help You Analyze and Diagnose Problems

This section describes how to obtain dumps for various situations and use them to diagnose problems in DFSMSrmm.

For information on dump documentation and analysis, refer to the following documents:

Publication Title	Order Number
z/OS MVS Diagnosis: Tools and Service Aids	GA22-7589
z/OS MVS IPCS Commands	SA22-7594
z/OS MVS IPCS User's Guide	SA22-7596

Obtaining Abend Dumps for a DFSMSrmm Utility Error

If an abend occurs when you are running a DFSMSrmm utility, obtain a dump to help with problem determination. To capture pertinent information, include a SYSUDUMP DD statement in your JCL. For example, the following JCL statement routes the dump output to the SYSOUT class specified on the JOB statement:

```
//SYSUDUMP DD SYSOUT=*
```

Obtaining Abend Dumps for a DFSMSrmm ISPF Dialog Error

If an abend occurs while you are running the DFSMSrmm ISPF dialog, you can obtain further diagnostic information using the following techniques:

- Run with write-to-programmer message turned on in your TSO/E profile. This allows you to see the message identifier and an online symptom dump for error messages issued from components other than the DFSMSrmm ISPF dialog.

  To run with write-to-programmer message turned on in your TSO/E profile, issue the command:

  ```
  TSO PROFILE WTPMSG
  ```

  To turn off the write-to-programmer message in your TSO/E profile, issue the command:

  ```
  TSO PROFILE NOWTPMSG
  ```

- Allocate a SYSUDUMP data set on TSO before invoking the DFSMSrmm ISPF dialog. For example, to dump to a new data set called UDUMP, specify:

  ```
  ALLOC DD(SYSUDUMP) DS(UDUMP) MOD SPACE(5,5) CYLINDERS CATALOG
  ```

Obtaining Dumps to Analyze DFSMSrmm Waits or Loops

If the problem you encounter is with a specific user, obtain a supervisor call (SVC) dump of both the user and the DFSMSrmm address spaces.

Related Reading: For information on obtaining dumps to analyze waits and loops, see *z/OS MVS Diagnosis: Procedures*.

Finding the Module Name in a Dump

You can use a dump to identify the name of the module in control when a failure occurred.

1. Find the program status word (PSW) in the dump. The instruction address is the last 31 bits of the PSW. In Figure 14 the last 31 bits of the PSW, 000085C4, are the instruction address.

```
JOB S1REP001         STEP AUDREPT         TIME 123515   DATE 92281    ID = 000    CPUID = FF0158243090   PAGE 00000001
COMPLETION CODE      SYSTEM = 0C4      REASON CODE = 00000010

  PSW AT ENTRY TO ABEND   078D2000  000085C4  ILC  04  INTC  0010

PSW LOAD MODULE = EDGAUD    ADDRESS = 000085C4  OFFSET = 00000214

 ASCB: 00F97280
         +0000  ASCB..... ASCB      FWDP..... 00FBBD00  BWDP..... 00FBDB00  CMSF..... 00F51180  SVRB..... 008FF960
         +0014  SYNC..... 000036F9  IOSP..... 00000000  TNEW..... 008E3D90  CPUS..... 00000001  ASID..... 0010
         +0026  R026..... 0000      LL5...... 00        HLHI..... 01        DPHI..... 00        DP....... 85
         +002C  TRQP..... 80FD51E1  LDA...... 7FF15EB0  RSMF..... 00        R035..... 0000      TRQI..... 41
         +0038  CSCB..... 05395960  TSB...... 00000000  EJST..... 0000000A  50995600
         +0048  EWST..... A6686CCD  5A1FFD11            JSTL..... 000007D3  ECB...... 808FFE58  UBET..... A6684BE2
         +005C  TLCH..... 00000000  DUMP..... 008FF418  AFFN..... FFFF      RCTF..... 00        FLG1..... 00
         +0068  TMCH..... 00000000  ASXB..... 008FE038  SWCT..... A8D6      DSP1..... 00        FLG2..... 00
         +0074  RSV...... 0000      SRBS..... 0000      LLSQ..... 00000000  RCTP..... 008FE240  LOCK..... 00000000
         +0084  LSQH..... 00000000  QECB..... 00000000  MECB..... 40000000  OUCB..... 01C746F8  OUXB..... 01C70C28
         +0098  FMCT..... 0000      LEVL..... 03        FL2A..... 00        XMPQ..... 00000000  IQEA..... 00000000
         +00A4  RTMC..... 00000000  MCC...... 00000000  JBNI..... 00FA0DC4  JBNS..... 00FA0B18  SRQ1..... 00
```

Figure 14. Finding the Address of the Error

2. Obtain the abend address by subtracting the instruction length code (ILC) from the instruction address.

```
000085C4       instruction address
-      4       instruction length code

--------
000085C0       abend address
```

3. Go to the abend address and scan backward until you find the module name in the comment section or eyecatcher of the dump. The module name is EDG*name* where EDG is the DFSMSrmm identifier and *name* is the module name suffix. In Figure 15, the module name is EDGAUD.

```
000083A0 00000000 00000000 00000000 00000000 47F0F138 2BC5C4C7 C1E4C440 4040F1F0   *.................01..EDGAUD   10*
000083C0 61F0F561 F9F2E5F0 F1D9F0F1 D4F0F040 D1C4E9F1 F1F5F040 D5D6D5C5 40404040   */05/92V01R02M00 JDZ11B4 NONE    *
000083E0 C1D3D340 D9C9C7C8 E3E240D9 C5E2C5D9 E5C5C440 40404040 40404040 40404040   *ALL RIGHTS RESERVED             *
00008400 40404040 40404040 40404040 F5F6F9F5 60C4C6F1 404DC35D 40C3D6D7 E8D9C9C7   *           5647-A01 (C) COPYRIG*
00008420 C8E340C9 C2D440C3 D6D9D74B 40F1F9F7 F96B40F1 F9F9F340 D3C9C3C5 D5E2C5C4   *HT IBM CORP. 1979, 2000 LICENSED*
00008440 40D4C1E3 C5D9C9C1 D3406040 D7D9D6C7 D9C1D440 D7D9D6D7 C5D9E3E8 40D6C640   * MATERIAL - PROGRAM PROPERTY OF *
00008460 C9C2D440 E4E240C7 96A58599 95948595 A340E4A2 8599A240 D985A2A3 998983A3   *IBM US GOVERNMENT USERS RESTRICT*
00008480 858440D9 898788A3 A2406040 40404040 E4A28540 84A49793 898381A3 89969540   *ED RIGHTS -     USE DUPLICATION *
000084A0 96994084 89A28393 96A2A499 85409985 A2A39989 83A38584 4082A840 C7E2C140   *OR DISCLOSURE RESTRICTED BY GSA *
000084C0 C1C4D740 E2838885 84A49385 40C39695 A3998183 A340A689 A38840C9 C2D440C3   *ADP SCHEDULE CONTRACT WITH IBM C*
000084E0 9699974B 40000000 90ECD00C 18CF41AC 0FA04120 A4105020 D00850D0 200418D2   *ORP. .....}.........U.&}.&}...K*
00008500 58910000 4510C15C 8F0097F0 0A139110 A4D04780 A1400700 4510C170 8F009850   *.J....A*..P0..J.U}... ....A...Q.*
00008520 0A139110 A5304780 A1740700 4100C184 47F0C18C 40404040 40404040 1B110A08   *..J.V.........AD.0A........ ....*
00008540 5000A3E0 4100C19C 47F0C1A4 4040404  40404040 1B110A08 5000A3E4 4100C1B4   *&T\..A..0AU....... ....&TU..A.*
00008560 47F0C1BC 40404040 40404040 1B110A08 5000A3E8 4100C1CC 47F0C1D4 40404040   *.0A........ ....&TY..A..0AM....*
00008580 C1D9E240 1B110A08 5000A3EC 4100C1E4 47F0C1EC 40404040 40404040 1B110A08   *... ....&T...AU.0A........ ....*
000085A0 5000A3F0 4100C1FC 47F0C204 E2D6D9E3 40404040 1B110A08 5000A3F4 4110A73A   *&T0..A..0B.SORT    ....&T4..X.*
000085C0 4100A748 0A1812FF 4770C29C D407A748 A7484780 C29C0700 4510C230 800098B0   *..X.......B.M.X.X...B.....B...Q.*
000085E0 0A139110 A5904780 A1E44130 00044140 A9504110 A56058F1 00300CEF D2474000   *..J.V....U..... Z&.V-.1....K. .*
```

Figure 15. Finding the Module Name

If your dump is in one of the system dump data sets, display the titles of the dump data sets to find the dump number.

1. Enter the system command:

```
DISPLAY DUMP,TITLE
```

2. Then enter the system command:

```
DISPLAY DUMP,ERRDATA,DSN=xx
```

where xx is the dump number to display this output as shown in Figure 16:

```
DUMP03 TITLE=EDGQMGR TRAPPED ABEND S0C4 U0000 AT 82C48534 IN
           MODULE EDGQMGR , OFFSET 00029C.
   DUMP TAKEN TIME=08.36.51 DATE=02/02/93
   ERRORID=SEQ00196 CPU0000 ASID002A TIME=08.36.51
   SYSTEM ABEND CODE=0C4  REASON CODE=0010
   MODULE=EDGQMGR  CSECT=********
   PSW AT TIME OF ERROR=070C0000 82C48534 ILC=6 INT=10
   TRANSLATION EXCEPTION ADDR=C3C5C542
   ABENDING PROGRAM ADDR=02C48298 RECOVERY ROUTINE=********
   GPR 0-3   00000000  00000002  00004080  02BD7008
   GPR 4-7   02CAC000  02C12EA0  02C287F8  02CB9FE8
   GPR 8-11  02C00A98  00008540  00008540  00F97678
   GPR12-15  82C48298  02C12EA0  0000002A  C3C5C540
```

Figure 16. Sample Dump Output

3. Inspect the title to obtain the module name, CSECT name, PSW, and, in some cases the offset.

You can also use IPCS output to obtain the module and offset. In Figure 17, the module name is EDGBKUP and the offset is +0560.

```
CPU STATUS:

 PSW=078C2000 84FD2830 (RUNNING IN PRIMARY, KEY 8, AMODE 31, DAT ON)
     DISABLED FOR PER
   ASID(X'0407') 04FD2830. EDGBKUP+0560 IN EXTENDED CSA
  ASCB1031 AT FBB380, JOB(DFRMM), FOR THE HOME ASID
  ASXB1031 AT 8FE038 FOR THE HOME ASID. NO BLOCK IS DISPATCHED
  HOME ASID: 0407 PRIMARY ASID: 0407 SECONDARY ASID: 0407
```

Figure 17. Sample IPCS Output

Using Messages and Codes to Diagnose DFSMSrmm Errors

DFSMSrmm can issue several types of messages when a problem occurs. Other system components also issue messages that can help you diagnose a problem affecting DFSMSrmm. For example, if you encounter errors while opening a data set, you might see messages with the prefixes IEC or ICH, depending on the component detecting the error, as well as a DFSMSrmm message informing you that the open request failed.

See Appendix C, “DFSMSrmm System and User Completion Codes,” on page 57 for system completion codes and user completion codes issued during DFSMSrmm processing.

DFSMSrmm Message Format

The DFSMSrmm error message is displayed using the following format:

EDG*cnnnx*

where:

- EDG is the DFSMSrmm identifier.
- *c* is an alphanumeric identifier assigned to a component of DFSMSrmm. The message component identifiers are assigned as follows:

C value	Component
0	Subsystem initialization
1	Subsystem interface
2	Subsystem main task
3	TSO subcommands
4	Open/Close/End-of-Volume exits
5	Report programs
6	Batch programs and utilities
7	Conversion programs
8	DFSMShsm interface
9	Common routines, such as PARSE

- *nnn* is a 3 digit message number.
- *x* indicates the severity of the error. *x* can be:

Severity Identifier	Explanation
A	**Action**: The operator must perform a specific action.
D	**Decision**: The operator must choose between alternatives.
E	**Eventual action**: The operator must perform an action when time is available.
I	**Informational**: No operator action required. Information for the system programmer.
S	**Severe error**: Information for a system programmer.
W	**Warning**: The system enters a wait state until the operator performs a required action.

Example: The following is an example of a message issued by DFSMSrmm.

EDG0103D DFSMSrmm SUBSYSTEM INTERFACE IS INACTIVE - ENTER ″IGNORE″, ″CANCEL″ OR ″RETRY″

Explanation: During initialization, the subsystem interface was not activated. The operator can reply to ignore the message and continue without tape mount validation and recording, cancel the DFSMSrmm subsystem, or retry subsystem interface initialization.

System Action: If the reply is ″IGNORE″, DFSMSrmm initialization continues. No automatic recording or validation of tapes is performed, but RMM TSO subcommands and other subsystem functions operate. If the reply is ″CANCEL″, DFSMSrmm ends and no DFSMSrmm subsystem functions are operable. If the reply is ″RETRY″, subsystem interface initialization is retried.

Operator Response: Reply as directed by the installation documentation or the system programmer.

System Programmer Response: Determine the cause of the initialization failure. Tape volume security and integrity might be compromised if tape volumes are mounted without DFSMSrmm being active.

Message Types

There are several types of messages you can receive that can help you to identify a problem. Check each of the following types of messages.

- Batch messages

  These messages are in the batch job's SYSMSG output at the beginning of the message file which is produced by the system each time a job is initiated.

- Batch utility messages

  These are DFSMSrmm messages that have been directed to a DFSMSrmm message file such as the SYSPRINT or MESSAGE data set.

  Related Reading: For information on which message file you should check for diagnostic information, see *z/OS DFSMSrmm Implementation and Customization Guide*.

- Console messages

  These messages are seen on a console by an operator or a terminal user. These are also recorded in the SYSLOG file.

- DFSMSrmm ISPF dialog messages

  These messages are issued by ISPF from the DFSMSrmm ISPF dialog and are displayed as short or long messages.

  The DFSMSrmm ISPF dialog message is displayed using the following format.

  EDG*fidn*

  where:

  – EDG is the DFSMSrmm identifier.
  – *f* is a character selected by DFSMSrmm.
  – *id* is an ISPF message member identifier.
  – *n* is a numeric suffix from 0 to 9.

- SYSLOG messages

  These are a history of the messages directed to consoles or to the logs on the system for problem determination. The SYSLOG is a data set maintained by the job entry subsystem that can be closed, spooled for printing, or archived as necessary. You can view the SYSLOG online, using a product like Spool Display and Search Facility (SDSF).

Chapter 2. Eliminating Common Sources of Error

This chapter provides suggestions to help you eliminate common sources of error you might encounter while using DFSMSrmm.

- "When DFSMSrmm Messages Do Not Appear"
- "When Inventory Management Fails"
- "When Response Time is Too Long" on page 16
- "When You Run Out of Scratch Volumes" on page 16
- "When Volumes Expire Prematurely" on page 20
- "When Volumes Move to the Wrong Storage Location" on page 20
- "When Volumes Do Not Move to Storage Locations" on page 22
- "When You Lose a Volume" on page 23
- "When Users Are Not Notified Automatically" on page 23
- "When Errors Occur in the DFSMSrmm Control Data Set" on page 23
- "When There is Not Enough Available Storage to List All the Volumes" on page 24
- "When Common System Abends Occur" on page 25

If you cannot resolve a problem, see Chapter 5, "Building a Keyword String," on page 35 for instructions on building a keyword string that you can use to search the IBM Software Support database.

When DFSMSrmm Messages Do Not Appear

If you have customized the DFSMSrmm messages table, check the message table to make sure that your changes do not prevent messages from being issued.

Related Reading: For information about customizing messages to help you determine where an error might have occurred, see the *z/OS DFSMSrmm Implementation and Customization Guide*.

When Inventory Management Fails

If you are experiencing problems during inventory management, you can perform one of the following tasks:

- Determine if the data sets used by inventory management are Resource Access Control Facility (RACF®, a component of the Security Server for z/OS) protected. If so, ensure that the RACF user ID that runs inventory management has the authority to write to the data sets.
- Preallocate data sets as described in the *z/OS DFSMSrmm Implementation and Customization Guide* before you use the inventory management functions. For example, if you want to obtain an extract report and retain messages issued during inventory management, you must preallocate a REPTEXT file and a MESSAGE file, as shown in Figure 18:

```
//HSKP      EXEC PGM=EDGHSKP,PARM='RPTEXT'
//SYSPRINT  DD   SYSOUT=*
//MESSAGE   DD   DSN=DFSMSRMM.MESSAGE.DATASET,DISP=SHR
//REPTEXT   DD   DSN=DFSMSRMM.EXTRACT.DATASET,DISP=SHR
```

Figure 18. Sample JCL for EDGHSKP

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- Check the system log for error messages when the job message log or DFSMSrmm MESSAGE file does not contain enough information to identify the error. Because DFSMSrmm inventory management runs in the DFSMSrmm subsystem address space, error messages might have been written to the system log.

When Response Time is Too Long

If you experience long DFSMSrmm command response time when DFSMSrmm is performing a search, check the MAXHOLD operand in PARMLIB member EDGRMMxx. The MAXHOLD operand defines the number of records the subsystem scans while holding a reserve on the DFSMSrmm control data set.

Recommendation: Use the default MAXHOLD value described in *z/OS DFSMSrmm Implementation and Customization Guide*.

It might take DFSMSrmm longer to respond when you issue DFSMSrmm subcommands if DFSMSrmm inventory management is in process, or if the DFSMSrmm control data set is being backed up. You can minimize impact on your users by scheduling inventory management processing during non-peak hours.

When You Run Out of Scratch Volumes

If you are running out of scratch volumes, you can perform any of the following tasks to solve the problem:

- Check the default retention period set for volumes. If it is too high, change the retention period so volumes are available for reuse sooner. Check your vital record specifications to make sure that the retention policies you have defined are acceptable. Change your retention policies as needed.
- DFSMSrmm does not make volumes available until you have confirmed that release actions have taken place. If the release actions are not confirmed, DFSMSrmm does not process volumes.

  Create a list of all volumes that are pending release by issuing the following RMM SEARCHVOLUME subcommand.

  ```
  RMM SEARCHVOLUME VOLUME(*) LIMIT(*) STATUS(RELEASE) OWNER(*)
  ```

  Perform the release actions as required and confirm to DFSMSrmm that the actions have taken place. Volumes that have no pending release actions can be released in a single run of expiration processing.
- Check that volumes residing in system-managed tape libraries are returning to scratch status in a timely manner. “Changing Actions for Volumes in System-Managed Tape Libraries” on page 19 provides information about returning volumes in system-managed tape libraries to scratch status.
- Confirm that volumes were returned from loan locations. DFSMSrmm does not automatically manage the movement of these volumes. Use the DFSMSrmm ISPF dialog or the RMM CHANGEVOLUME TSO subcommand to clear the LOANLOCATION field. Use the RMM SEARCHVOLUME TSO subcommand with the LOANLOC operand to create a list of volumes in loan locations.
- List your vital record specifications, using the DFSMSrmm ISPF dialog or the RMM LISTVRS TSO subcommand, and delete any unnecessary vital record specifications.
- Check your installation’s requirements for scratch volumes. Add more volumes, if needed, to your inventory to satisfy the demand.

Obtaining Volume Information

To determine if a volume has returned to scratch status, obtain volume information using the DFSMSrmm ISPF dialog or DFSMSrmm TSO subcommands. For example, to request information for the volume with serial number HSM001, issue the command:

```
RMM LISTVOLUME HSM001 ALL
```

Figure 19 shows the type of volume information that DFSMSrmm displays.

```
Volume Information:
Volume = HSM001   VOL1  = INT001   Rack  =             Owner   =
  Type = PHYSICAL         Stacked count  = 0           Jobname =
Creation:  Date = 07/10/2001  Time = 00:51:11  System ID = UNCM0064
Assign:    Date = 07/10/2001  Time = 00:51:11  System ID = UNCM0064
Expiration Date = 07/15/2001 Original      =
Retention Date  =
Data set name = HSM.COPY.HMIGTAPE.DATASET
Volume Status:
Status = MASTER    Availability =                   Label = SL
Current label version =            Required label version =
Media Information:
Density = *     Type = CST       Format = 18TRACK   Compaction = *
Special attributes   = NONE
Action on Release:
Scratch immediate  = N  Expiry date ignore = N
Scratch = Y  Replace = N  Return = N  Init = N  Erase = N  Notify = N
Actions pending:
Scratch = N  Replace = N  Return = N  Init = N  Erase = N  Notify = N
Storage group  =
Loan location  =           Account =
Description    =
Security class =           Description =
Access information:
Owner access = ALTER   Volume access = NONE    Last change = WOODMW
VM use = N   MVS use = Y
Access list:
Statistics:
Number of data sets = 1       Data set recording= ON
Volume Usage(Kb)= 0           Use Count         = 0
Volume capacity = 0
Date last read  =             Date last written =
Drive last used =
Volume sequence = 1           Media name        = 3480
Previous volume =             Next volume       =
Product Number  =             Level             = V  R  M
Feature code    =
Error counts:
Temporary read = 0      Temporary write = 0
Permanent read = 0      Permanent write = 0

Store Information:
Movement tracking date =               Intransit    = N
In container           =               Move mode    = AUTO

Location:   Current     Destination   Old       Required   Home
Name           =
Type           =
Bin number     =
Media name     =
```

Figure 19. Obtaining Volume Status Information

Checking Volume Status

Check the Status field in the volume information as shown in Figure 19 on page 17. If the Status field is scratch, then DFSMSrmm has released the volume.

Checking Volume Availability

Check the Availability field as shown in Figure 19 on page 17.

If Availability Field is Blank:

- Check the DFSMSrmm EDGHSKP inventory management utility. DFSMSrmm does not mark a volume pending release when the last change date is more recent than the time of the last VRSEL processing. The last change date might have changed for one of the following reasons.
  - The volume is used or updated outside of EDGHSKP processing
  - A move is confirmed since the last VRSEL processing
- Check the volume expiration date and if you have specified that DFSMSrmm should ignore the expiration date for the volume. If the expiration date is not ignored based on the retention policies you defined, DFSMSrmm keeps the volume until the expiration date is reached, even though the volume is no longer covered by a vital record specification.

  The default expiration date set by DFSMSrmm is the creation date plus the EDGRMMxx PARMLIB member RETPD value. You can override the default by using the RMM CHANGEVOLUME subcommand with the EXPDT or RETPD operands.

  A very common error occurs when you are using expiration dates that have special meaning. Examples of these dates include EXPDT=99000 and EXPDT=98001. DFSMSrmm requires the use of the DFSMSrmm EDGUX100 exit to clear JFCBXPDT and assign a vital record specification management value for these dates.

  With the DFSMSrmm EDGUX100 exit, the volume expiration date is set to the creation date plus the EDGRMMxx parmlib member RETPD operand value. If EDGUX100 does not clear JFCBXPDT, the date is passed to DFSMSrmm. DFSMSrmm translates EXPDT=99000 to an expiration date of 1999/000. DFSMSrmm retains the volume until its expiration date is reached in 1999. If EXPDT=98001 is used, DFSMSrmm retains the volume until 1998/001. Use the RMM CHANGEVOLUME subcommand to specify the correct expiration date.

  Related Reading: Check the EDGUX100 exit to ensure that it correctly clears the expiration date field described in the *z/OS DFSMSrmm Implementation and Customization Guide*.

If the Value Vital Record is Displayed in the Availability Field: The volume has not been returned to scratch because a data set on the volume is still retained by a vital record specification. A volume with multiple data sets can be covered by more than one vital record specification. Use the Vital Records Retention Report produced by EDGHSKP VRSEL processing to determine which data set and vital record specification are involved. You can also use the RMM LISTDATASET command or the DFSMSrmm ISPF dialog to obtain this information.

If the Value Pending Release is Displayed in the Availability Field:

1. Check the Actions pending field for any actions marked `Y`. DFSMSrmm cannot return the volume to scratch status until all other release actions have been completed.
2. Check the Store Information Intransit field. If Intransit is `Y`, the volume is moving from one location to another. The volume must return to a library location or its home location before DFSMSrmm can return the volume to scratch status.

3. Use the RMM CHANGEVOLUME CONFIRMMOVE command when the pending volume move has been completed.
4. Run DFSMSrmm inventory management to complete the volume's move to its home location.

If Intransit is N, the destination field is blank and the volume is in a library location or its home location, then the volume should return to scratch during the next EDGHSKP EXPROC processing.

If Intransit is N, and the volume that is in an automated tape library dataserver and has a destination to a location outside the automated tape library dataserver, you can either cancel the move, or eject the volume and confirm the movement.

If the volume is system-managed, DFSMSrmm will not change the status of the volume from master to scratch if the update to the TCDB fails. The system running inventory management processing must have access to the TCDB. Check for error messages in the DFSMSrmm MESSAGE file.

If your installation uses the DFSMSrmm EDGUX200 exit, check this exit because it could prevent the volume from returning to scratch.

If the Value Open is Displayed in the Availability Field: A data set on the volume was open during vital record processing. DFSMSrmm retains the volume under the OPEN vital record specification or to a vital record specification that matches the data set name mask. The data set might have been open because a job was in progress or it was left open because the job failed.

For information on determining the status of the volume, see "If the Value Vital Record is Displayed in the Availability Field" on page 18 and "If Availability Field is Blank" on page 18.

If the Value On Loan is Displayed in the Availability Field: The volume is in a loan location and cannot be returned to scratch status until it returns to its home location.

Changing Actions for Volumes in System-Managed Tape Libraries

DFSMSrmm allows you to return volumes to scratch status in any library location or in the volume's home location, as long as the volumes are not to be moved. If you have volumes that are in a system-managed tape library that are marked to be moved, you can return the volume to scratch status without moving the volume. For these volumes that reside in a system-managed tape library, cancel the move.

1. To identify volumes in a system-managed tape library that must be moved before returning to scratch status, issue the command:

```
RMM SEARCHVOLUME VOLUME(*) LIMIT(*) LOCATION(ATL1) -
      STATUS(RELEASE) DESTINATION(*) OWNER(*)
```

2. To cancel the volume move and change the home location, issue the command:

```
RMM CHANGEVOLUME volser LOCATION(ATL1)
```

3. Run expiration processing to return the volumes to scratch status. You cannot return volumes in loan locations directly to scratch.

Related Reading: For information about returning volumes to scratch status, see *z/OS DFSMSrmm Implementation and Customization Guide*.

When Volumes Expire Prematurely

If your volumes are expiring and being returned to scratch status sooner than you expect, perform the following tasks.

- Ensure that the default retention period is not too low.
- Ensure that vital record specifications are correctly specified and that you have defined all necessary ones.
- List the data sets and the vital record specifications that DFSMSrmm matches to the data sets.

Recommendation: You might have to define additional vital record specifications with more specific data set names to ensure that the volumes are correctly retained.

Create an ACTIVITY report using the EDGHSKP utility to determine why a data set is not retained by a vital record specification. If you cannot resolve the problem after checking the retention period and vital record specifications, run the EDGAUD utility to produce a report on the history of volume movement.

Related Reading: For information about the ACTIVITY report and how to obtain an audit trail report using EDGAUD, see the *z/OS DFSMSrmm Reporting* document.

When Volumes Move to the Wrong Storage Location

Use Table 3 on page 21 to determine why DFSMSrmm applied a vital record specification to a data set.

Table 3. How DFSMSrmm Matches Data Set Names to Data Set Masks

Order (OLD)	(NEW)	Description	Command Example
1	1	A reserved name, ABEND or OPEN matches a data set before any other data set mask.	`RMM ADDVRS DSNAME('ABEND') - LASTREFERENCEDAYS COUNT(1)` `RMM ADDVRS DSNAME('OPEN') - LASTREFERENCEDAYS COUNT(2)`
2	7	A management class name matches the management class value after ABEND or OPEN and before any other data set mask. The management class value is set using the RMM EDGUX100 installation exit and matches management calls names set using ACS routines.	`RMM ADDVRS DSNAME('M99000') WHILECATALOG`
3	2	A fully qualified data set name matches a data set name before any mask containing %, ¬, or *.	`RMM ADDVRS DSNAME('PRITCHAR.BACKUP.DATA')`
4	3	Any data set name mask that includes a % or a ¬ matches a data set name before masks containing an *. % and ¬ are treated equally.	`RMM ADDVRS DSNAME('PRITCHAR.%.DATA')` `RMM ADDVRS DSNAME('PRITCHAR.¬.DATA')`
5	4	Any data set name mask that includes single *'s preceded or followed by any character is the next best match.	`RMM ADDVRS DSNAME('PRITCHAR.*BACK.DATA')`
6	5	Any data set name mask that includes an * is the next best match.	`RMM ADDVRS DSNAME('PRITCHAR.*.DATA')`

7	6	A data set name mask that includes ** anywhere in the mask is the next best match. When matching the data set mask to the data set name, the mask where the non-generic characters occur earlier in the mask is most specific.	`RMM ADDVRS DSNAME('PRITCHAR.**')`
			`RMM ADDVRS DSNAME('**.PRITCHAR')`
			`RMM ADDVRS DSNAME('*.**')`

8	8	A vital record specification management value set by using the DFSMSrmm EDGUX100 exit.	`RMM ADDVRS DSNAME('D99000') WHILECATALOG`
9	9	A data set name mask of ** indicates the policy applies to all data sets not managed by any other vital record specification.	`RMM ADDVRS DSNAME('**')`

If volumes are moving to the wrong storage location, check the vital record specifications that you have defined. For example, if you expected volumes to move to the LOCAL storage location, but DFSMSrmm moves them to the REMOTE storage location, check the following conditions:

- A vital record specification was defined with the wrong location. For example, LOCATION(LOCAL) is specified with the RMM ADDVRS subcommand instead of LOCATION(REMOTE).
- More than one vital record specification was defined for a volume or a data set. Use the EDGHSKP VRSEL report in the REPORT file, the DFSMSrmm ISPF dialog, or the RMM LISTDATASET subcommand to identify the vital record specification that is retaining a data set.

  Possible solutions include:

  – Deleting a matching vital record specification so a less specific vital record specification is used
  – Changing LOCDEF priority so that one vital record specification is dominant and is used before others

To resolve any movement conflicts that arise when a volume matches more than one vital record specification, DFSMSrmm uses the location priority value. Priority values are purely relative and do not have any further significance. If there are two or more vital record specifications with conflicting move requirements that apply to a volume, DFSMSrmm uses the location priority to resolve any conflict. The lower priority numbers take precedence. For example, a volume would move to a location with a priority value 100 before moving to a location with a priority value of 200.

You can set a priority value with the PRIORITY operand of the LOCDEF command to define the relative importance of locations.

You can define the PRIORITY operand on RMM ADDVRS subcommand to override default or assigned priorities at the data set level. When you do not set a priority value, DFSMSrmm uses the priority shown in Table 4.

Table 4. DFSMSrmm Movement Priority Default Values

Priority Number	Location Name or Location Type
100	REMOTE DFSMSrmm built-in storage location name
200	DISTANT DFSMSrmm built-in storage location name
300	LOCAL DFSMSrmm built-in storage location
2000	Installation defined storage locations
4800	AUTO automated tape libraries
4900	MANUAL manual tape libraries
5000	SHELF location name

Use the RMM LISTVRS subcommand to list the details for vital record specifications that need to be changed. If volumes have already moved to incorrect locations, delete the existing vital record specification and add a vital record specification that contains the correct location information.

Related Reading: For information on using the RMM DELETEVRS TSO subcommand and the RMM ADDVRS TSO subcommand to make the changes, see the *z/OS DFSMSrmm Guide and Reference* document.

When Volumes Do Not Move to Storage Locations

If volumes are not moving to the storage locations, follow these recommendations: locations:

- Define vital record specifications for the data set or volume.
- Check for the LOCATION(HOME) operand value on the RMM ADDVRS subcommand. The volume is returned to a shelf location, automated tape library, or manual tape library based on the operand value.
- Use the DFSMSrmm ISPF dialog or RMM ADDRACK subcommand to add them. There could be insufficient shelf locations defined in the storage location.

  ```
  RMM ADDRACK * COUNT(1000) LOCATION(REMOTE)
  ```

  You can also check the inventory management MESSAGE file for messages indicating that there is a shortage of empty bins in a storage location.

When You Lose a Volume

If you physically lose a volume or remove a volume from the DFSMSrmm control data set by using the wrong command, use the utility EDGAUD to create an audit trail report. The report shows the locations where a volume has been moved and its last known location. The report also identifies the user ID that issued a command that might have changed the status of the volume.

Related Reading: For information on how to obtain an audit trail report using EDGAUD, see the *z/OS DFSMSrmm Reporting* document.

When Users Are Not Notified Automatically

If users are not being notified when their volumes have reached their expiration date, ensure that the following tasks were completed.

- You specified `NOTIFY(Y)` in the EDGRMMxx PARMLIB member.
- You specified owner information that contains a valid user ID and node name.
- You specified Notify Owner as a release action.
- You are running DFSMSrmm under the JES2 or JES3 subsystem and not the master subsystem.

Related Reading: For information on how to set up notification to users, see the *z/OS DFSMSrmm Implementation and Customization Guide*.

When Errors Occur in the DFSMSrmm Control Data Set

If you are running multiple MVS™ systems and sharing the control data set and journal, ensure that you have specified a unique SYSID for each system.

If you suspect that there is an error in the DFSMSrmm control data set, you can use the DFSMSrmm EDGUTIL utility to verify the contents of the DFSMSrmm control data set. Then use the DFSMSrmm ISPF dialog or the RMM TSO subcommands to correct the control data set. To find and correct errors in the control data set, perform the following steps:

1. Run the utility EDGUTIL with the VERIFY parameter to check the contents of the control data set. For example, EDGUTIL checks to see that a volume is associated with a rack number and that the rack number exists. If the rack number does not exist, then EDGUTIL writes a message to the SYSPRINT data set.
2. Inspect the SYSPRINT data set to determine which records you need to correct.
3. Correct DFSMSrmm control data set records using the RMM TSO subcommands by deleting incorrect information and adding correct information.

Related Reading: For information on the RMM TSO subcommands, see the *z/OS DFSMSrmm Guide and Reference* document.

For example, if the EDGUTIL utility detects that a volume resides in a rack number but the rack number does not exist, you can follow these steps to correct the problem.

1. Use the RMM SEARCHDATASET subcommand with the CLIST operand to create a list of data sets.

   ```
   RMM SEARCHDATASET VOLUME(volser) CLIST('RMM LISTDATASET ')
   ```

   Save the output from the request to use when you issue the RMM ADDDATASET subcommands as described in step 5.
2. Use the RMM DELETEVOLUME subcommand to remove the volume from DFSMSrmm. Use the REMOVE operand to delete a scratch volume from the control data set. Use the RMM DELETEVOLUME subcommand with the FORCE operand to delete a master volume from the control data set.

   You can also change volume information by using the RMM CHANGEVOLUME FORCE command. To use the FORCE operand, you must have CONTROL access to STGADMIN.EDG.MASTER security resource and UPDATE access to STGADMIN.EDG.FORCE security resource.
3. Before adding the volume to DFSMSrmm, use the RMM ADDRACK subcommand to add the rack number.
4. Use the RMM ADDVOLUME subcommand to add the volume to the DFSMSrmm control data set with the correct rack number.
5. If the volume had any data sets on it, you should issue one RMM ADDDATASET subcommand for each data set.

If you still have a problem with your control data set, report the problem and all the messages produced by EDGUTIL to the IBM Support Center.

You can also restore your DFSMSrmm control data set with a backup copy of the control data set and journal.

Related Reading: Before attempting the restore, see the *z/OS DFSMSrmm Implementation and Customization Guide* document.

When There is Not Enough Available Storage to List All the Volumes

When you request information using the DFSMSrmm commands using REXX EXECs or using the DFSMSrmm ISPF dialog, there might not be enough storage available to list all the volumes that match your criteria. This problem can occur when you use any SEARCH command, but is most likely to occur when you use the RMM SEARCHVOLUME subcommand.

For example, if you want to obtain information about all the volumes in MASTER status for any owner, issue the following command to obtain a list of volumes:

```
RMM SEARCHVOLUME VOLUME(*) LIMIT(*) STATUS(MASTER) OWNER(*)
```

You can also use the SEARCHVOLUME dialog to obtain the information. If you issued the request using the DFSMSrmm ISPF dialog, DFSMSrmm issues the message:

```
"More volumes may exist".
```

When you press PF1 for more help, DFSMSrmm issues the message:

```
"There is not enough storage available to list all the volumes".
```

In this example, DFSMSrmm cannot list all the volumes and issues return code 4 and reason code 10 due to a TSO restriction resulting from the use of storage below 16 MB. The actual number of records that DFSMSrmm returns is dependent on the amount of storage, below 16 MB that is available to TSO when you issue the RMM SEARCH subcommands.

If you experience this situation, you can issue RMM SEARCHVOLUME requests using the END operand or the LIMIT operand to keep the number of returned volumes within the storage restriction. After you issue the first request, issue another request to obtain the volumes a range at a time, staying within the storage limits. For example, you can obtain the next range by noting that the last volume serial number returned. Then issue a new SEARCHVOLUME request starting with the last volume serial number returned.

```
RMM SEARCHVOLUME VOLUME(lastvolser) END(zzzzzz) STATUS(MASTER) OWNER(*)
```

Repeat this until all volumes are returned.

Related Reading: For information about using the RMM TSO subcommands and the DFSMSrmm ISPF dialog, see the *z/OS DFSMSrmm Guide and Reference* document.

When Common System Abends Occur

There are abends or performance problems not caused by failures in DFSMSrmm. For example, your batch job might end abnormally because of system errors beyond your control. Abends can also result from using inadequate or incorrect storage parameters. See your system programmer for assistance in diagnosing these errors.

This section lists abends you might encounter when running DFSMSrmm, and suggests ways of correcting the problem. Not every possible problem can be listed, but the list includes those most commonly reported to IBM personnel.

These are common system abend codes that might appear when abends result from errors in storage parameters.

106 Sufficient storage was unavailable to load a module. Ensure that the value for REGION is sufficient.

804 The amount of storage requested exceeded that available. Ensure that the value for REGION is sufficient.

878 The amount of storage requested exceeded that available. Ensure that the value for REGION is sufficient.

80A This abend occurs when a DFSMSrmm job requires more storage than has been allocated. Ensure that the value for REGION is sufficient.

D37 An output data set is specified with insufficient primary SPACE allocation and no secondary allocation. If this abend occurs during inventory management for the temporary data set allocated with the *ddname* SRTINOUT, the DFSMSrmm control data set control record might be incorrect. Run the EDGUTIL utility with the VERIFY parameter to check the consistency of the control data set and control record. Increase the primary allocation or include a value for secondary allocation.

E37 An output data set is allocated on a primary volume that has either insufficient storage or excessive fragmentation, and no secondary volume is specified. Allocate the data set on a volume with more space or perform space management on the primary volume.

Chapter 3. Diagnosing Errors Using the Problem Determination Aid Facility

During DFSMSrmm processing, the problem determination aid (PDA) facility gathers diagnostic information about DFSMSrmm's processing, stores this information in a circular file within storage, and periodically writes it to a circular file on DASD.

A circular file appends data until full; then, starting at the beginning of the file, subsequent incoming data overwrites the data already there. The circular DASD file consists of two data sets, EDGPDOX and EDGPDOY. EDGPDOX is the active data set.

Related Reading: For detailed information on using the problem determination aid or calculating the PDA log data set sizes, refer to *z/OS DFSMSrmm Implementation and Customization Guide*.

There are several reasons why you will at times want to collect and save PDA trace data. The following reasons are most common:

- A trace showing DFSMSrmm's operating history can pinpoint the activity at the time the problem first occurs. This information can be helpful because the time difference between when a problem first occurs and when it is first detected.
- A trace can locate points of contention when two separate tasks conflict with one another.
- A trace can help you to determine if a suspected DFSMSrmm problem really exists, or if it is an operational error.
- You can use traces to supplement dumps when you contact your IBM support group.

Two very useful functions can help you to extract the exact information you need from the PDA files. By using either or both of the ISPF browse function and DFSMShsm™ ARCPRPDO (PDA trace formatter) program, you might be able to solve your problem without assistance from IBM support.

Viewing PDA Data with the ISPF Browse Function

Use the ISPF browse function to perform the following tasks:

- Browse large amounts of raw data
- Prepare IDCAMS (access method services) print output
- Look at PDA trace data within a dump

Formatting PDA Data with the DFSMShsm ARCPRPDO (PDA Trace Formatter) Program

The DFSMShsm ARCPRPDO trace formatter facility takes the raw trace data and organizes, reduces, and prints user-selected trace information. This is especially useful when you need specific data. You are authorized to use ARCPRPDO even if you are not licensed to use DFSMShsm.

Related Reading: For details about ARCPRPDO, see *z/OS DFSMShsm Diagnosis Guide*.

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Use the trace formatter facility to perform the following tasks:

- Translate trace records into a readable format
- Edit raw trace data
- Select records based on your specific criteria

The ARCPRPDO (PDA trace formatter) program has a number of options that can assist you in collecting data from the DFSMSrmm log data sets EDGPDOY, EDGPDOX, or a copy of either. To process the most recent PDA log entries, issue the command:

```
F DFRMM,PDALOG=SWAP
```

Then process the data that was placed in the EDGPDOY data set.

You can browse EDGPDOX while DFSMSrmm is running (disposition of the data set must be in shared mode).

If you need to format EDGPDOX while DFSMSrmm is running, turn PDA tracing off with the MODIFY command:

```
F DFRMM,PDA=OFF
```

Format the data in EDGPDOX with ARCPRPDO or copy the data for later processing, and then restore PDA tracing by issuing the MODIFY command

```
F DFRMM,PDA=ON
```

The formatter can be used to collect and print data based on your criteria.

Example: The sample job shown in Figure 20 prints and formats trace records for CSECT EDGMFIO as shown in Figure 21 on page 29.

```
//STEP0001 EXEC PGM=ARCPRPDO
//SYSPRINT   DD SYSOUT=*
//ARCMSG     DD SYSOUT=*
//ARCPDO     DD DSN=?UID..?HOSTID..RMMPDOY,DISP=SHR
//ARCPRINT   DD SYSOUT=*
//SYSIN      DD *
 COMPACT
 FORMAT
 MODULE(MFIO)
```

Figure 20. JCL for Printing and Formatting Trace Records

```
TIME   USECS   ID AS/TCB         MOD   LOGIC CALLER  ARCPRPDO LEVEL=        -OW1
96319----------------------------------------------------------------------------
121050.389472  03 008E15         MFIO  ENTR   AMGR
   +R13ADDR=      06447000                              *. ..................*
   DATA=          D3D6C3D260                            *LOCK-..............*
96319----------------------------------------------------------------------------
121050.395888  03 008E15         MFIO  ENTR   AMGR
  +R13ADDR=      06447000                              *. ..................*
  DATA=          E4C3E3D360                            *UCTL-..............*
96319----------------------------------------------------------------------------
121050.395904  03 008E15         MFIO  ENTR   AMGR
  +R13ADDR=      06447000                              *. ..................*
  DATA=          E4D5D3D260                            *UNLK-..............*
96319----------------------------------------------------------------------------
121103.927600  01 008BBB         MFIO  ENTR   MTSO
  +R13ADDR=      065731C4                              *...D...............*
  DATA=          E2D9C3C860                            *SRCH-..............*
  DATA=          C4C9C2D4E4E2C5D94BD9C1E34BD9D4D4F1F4D7C4*DIBMUSER.RAT.RMM14PD*
                 4BE3C5E2E3C4C1E3C14BE3C5E2E34BD3D6D5C74B*.TESTDATA.TEST.LONG.*
                 C5D5E3D9E8                            *ENTRY..............*
96319---------------------------------------------------------------------- ------
121103.935264  02 008BBB         MFIO  EXIT
  *RETURNCODE=   00000004                              *.............. ......*
  *REASONCODE=   00000004                              *.............. ......*
```

Figure 21. Trace Record Output

Related Reading: For additional information on options and examples, see *z/OS DFSMShsm Diagnosis Guide*.

Specifying Formatting Options

The trace formatting options tell ARCPRPDO what to do with the collected data. All the formatting options are optional. The formatting options are:



COPY This option routes trace data that matches your selection criteria to the data set specified for your ARCOUT DD. This new data set may now act as the raw data for subsequent search runs.

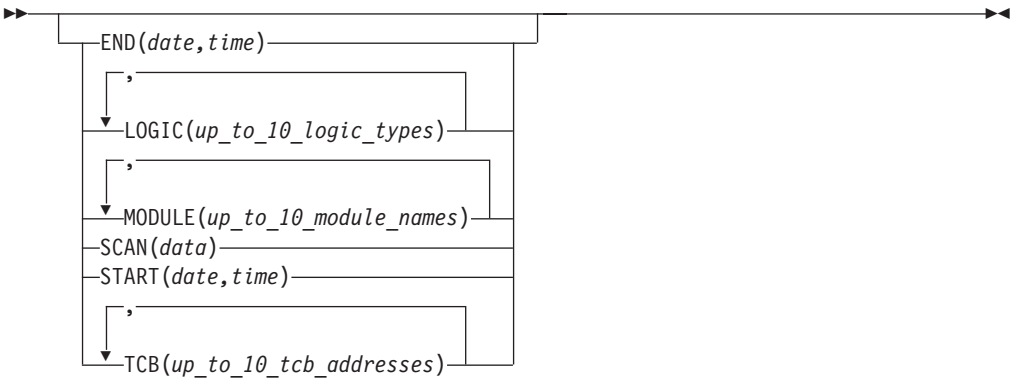
COMPACT This option formats the trace entries into single-line output, if possible. The compact option is the default option and does not need to be specified.

FORMAT This option formats each trace keyword on a separate line. The keyword itself is printed at the start of each line.

NOPRINT This option prevents any selected records from being written to the ARCPRINT DD. NOPRINT is intended to be used with the copy option. An ARCPRINT DD statement is still required when you select the NOPRINT option, as it contains messages and other information.

Specifying Selection Options

Use the following selection options to define and narrow your trace data search for DFSMSrmm. You specify the options using JCL as shown in Figure 22 on page 32.



END(*date,time***)**

END is specified as *yyddd,hhmmss*) and selects records until the date, and optionally time, are reached. A comma separates the date and time. The end date must be the same as, or after, the start date. If the start and end dates are the same, the end time must be the same as, or after, the start time. If the END option is not specified, the default end date is 99366. If an end time is not specified, the default is 235959.

With both START and END options:

yy Must be a number from 00 through 99

ddd Must be a number from 001 through 366

hh Must be a number from 00 though 23

mm Must be a number from 00 through 59

ss Must be a number from 00 through 59

LOGIC(*up_to_10_logic_types***)**

The LOGIC option looks at the logic fields of the trace entries and selects only those that match one of the logic types you select. You can specify up to 10 logic types in this option. Each type must contain four characters, with each type separated by a comma in the case of multiple entries. Three especially useful ones are MESG, TIME, and ENTR. Logic types are displayed under the LOGIC column in the trace output display.

MODULE(*up_to_10_module_names***)**

The MODULE option selects all trace records that have been requested by the module you specify. For example, if you specify MODULE(MAIN), all the trace records requested by EDGMAIN are selected. You can specify up to ten module names for this option. Each name can contain up to five characters, with each name separated by a comma. Whenever you specify a module name of less than five characters, DFSMSrmm pads the name to equal five characters.

Example: The module name DFSMSrmm traces actually starts on the fourth character of the true name as illustrated in the following example.

```
ACTUAL MODULE NAME = EDGMAIN
TRACED MODULE NAME = MAIN
```

SCAN(*data***)**

The SCAN option selects records that contain any reference to data you specify

in the data field. The data can match parameters, such as data set names or a key to a data set record. When you specify SCAN(DSN), for example, you get all of the DSN records plus any other records where the DSN has been traced as another type of parameter.

START(*date,time***)**
START is specified as *yyddd,hhmmss*) and allows you to select records for output starting from the specified date until the end of the data, or until an end date is reached, as specified by the END option. *yyddd* is in Julian date format. You can also specify a start time separated from the date by a comma. If the START option is not specified, the default start date is 00001. If a start time in not specified, the default is 000000.

TCB(*up_to_10_tcb_addresses***)**
The TCB option selects records that match any of the TCB addresses you select. Up to 10 TCB addresses can be specified in this option. The TCB addresses are identified under the AS/TCB column in the trace output display.

Each address must contain six characters, and each address must be separated by a comma. Actually, only bytes two and three of the actual TCB address are used in the trace address field, and these are placed in byte positions one and two.

Example: Byte zero of the TCB trace entry is used for address space identification. X'00' is used for the DFSMSrmm primary address space.as illustrated in the following example.

```
ACTUAL TCB ADDRESS = 00F823C0
TRACED TCB ADDRESS = xxF823  (xx is an address space identifier)
```

Recommendations for Using PDA Formatter

Use these techniques to collect data from trace data sets.

- Use COMPACT LOGIC(MESG) options to get an initial sense of the messages issued at the time of the error. This action can help you to locate TCB or module information for subsequent searches. Logic types are listed in the output display under the LOGIC column.
- Use FORMAT TCB(*tcb_address*) for task-specific errors such as migration or backup.
- Use COMPACT SCAN(*dsn*) with the actual data set name for errors related to single data set processing, such as a missing data set.
- Use FORMAT START(*date, time*) END(*date, time*) for deadlocks or problems involving multiple processing units.
- Use COMPACT MODULE(*module_name*) for EDG0200I or EDG0208I errors, abends, or related problems.

Copying PDA Trace Data Sets to Tape

The JCL examples in this section show how to copy certain data sets onto a tape so that they can be submitted to IBM as Authorized Program Analysis Report (APAR) documentation. The tapes that you use for this purpose must be standard label tapes. Because of numerous variations in hardware and software, these JCL jobs are shown only as examples; they might not work in all environments. Replace the data set names, relative file numbers, tape volume serial number, and unit types that are consistent with your naming conventions.

When you create your JCL, do not use the high-level qualifiers SYS1, RMM, or DFRMM in the data set names specified in the SYSUT2 DD cards because these are reserved names in the system where your tape is read.

Recommendation: Use the APAR number as the high-level qualifier, followed by a qualifier that describes the content of the data set.

Example: Figure 22 shows the JCL for copying the PDA trace data set to tape.

```
//PDACOPY JOB MSGCLASS=A
//S1 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSIN DD DUMMY
//SYSUT1 DD DSN=RMM.PDOY,DISP=SHR
//SYSUT2 DD DSN=OY99999.PDOY,LABEL=(1,SL),VOL=SER=TAPE01,
//          DISP=(NEW,KEEP),UNIT=TAPE
```

Figure 22. Copying PDA Trace Data Set to Tape

Example: Frequently, only several minutes or an hour of the PDA trace is required. To reduce the amount of data to be copied, use the DFSMSrmm trace formatter program, ARCPRPDO, to copy all trace entries that were created during the time span of interest. Figure 23 shows an example to copy the trace records created from Julian date 92.277 at 23:50:05 (5 seconds and 50 minutes past 11 p.m.) through 92.278 at 00:10:00 (10 minutes past midnight). Also, if the required time span is included in several PDA data sets, the data sets can be concatenated in chronological order in the JCL.

```
//PDACOPY  JOB  MSGCLASS=A
//S1       EXEC PGM=ARCPRPDO
//ARCMSG   DD   SYSOUT=*
//ARCPRINT DD   SYSOUT=*
//ARCPDO   DD   DSN=RMM.PDOY,DISP=SHR
//ARCOUT   DD   DSN=OY99999.PDOY,LABEL=(1,SL),VOL=SER=TAPE01,
//     DISP=(NEW,KEEP),UNIT=TAPE
//SYSIN    DD   *
   COPY
   NOPRINT
   START(92277,235005)
     END(92278,001000)
```

Figure 23. Copying Trace Records from Multiple PDA Data Sets

Chapter 4. Using the DFSMSrmm IPCS Verb Exit Routine

You can invoke the DFSMSrmm IPCS verb exit routine by using the IPCS VERBEXIT subcommand to obtain diagnostic information. The DFSMSrmm verb exit routine dumps or interprets most DFSMSrmm control blocks including VSAM and buffer-related information. Full DFSMSrmm diagnostic information is available only when an SVC dump includes the DFSMSrmm address space. If the dump does not include the DFSMSrmm address space, the DFSMSrmm verb exit routine interprets only limited information.

Related Reading: See *z/OS MVS IPCS Commands* for more information about using IPCS.

DFSMSrmm IPCS Verb Exit EXEC Parameters

The DFSMSrmm IPCS Verb exit routine supports these EXEC parameters:

HELP Specify to produce the help information available in the verb exit.

MINOPT
Specify to produce minimum information which includes startup information. No information about any requests is produced.

The DFSMSrmm IPCS verb exit routine can be used to override IPCS session parameters like PRINT and TERMINAL. You can override the session parameters by appending them to the IPCS VERBEXIT subcommand.

PRINT | NOPRINT
Specify to control the production of the IPCSPRNT PRINT file.

TERMINAL | NOTERMINAL
Specify to control the production of the IPCS terminal output.

Example: Use the following subcommand to request minimum IPCS output that is displayed at the terminal and is also printed.

```
VERBX RMMDATA 'MINOPT' TERM PRINT
```

Figure 24. Invoking the DFSMSrmm RMMDATA Verb Exit Routine

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Chapter 5. Building a Keyword String

This chapter provides you with the tasks you need to build a keyword string. A keyword describes a part of a failure. You use a completed keyword string to search the IBM Software Support database for a possible resolution to the failure. When you perform a software database search or contact the IBM Support Center for help, identify the failure using all keywords that apply. See Appendix A, "Keyword Worksheet," on page 53 for a worksheet you can use to document problem related information including the keyword string.

The tasks you perform are described in these topics.

- "Finding the Component Identification Keyword" on page 36
- "Finding the Release Level" on page 36
- "Determining the Type-of-Failure" on page 37
- "Building Keywords for Module-related Errors" on page 46
- "Building Modifier Keyword Strings" on page 47

These keywords are required for every keyword string you build:

- Component identification
- Release level
- Type-of-failure

The following keywords are optional. However, you should include them in your keyword string whenever possible:

- Module keyword or control section (CSECT)
- Modifier keywords
  - Function (when possible)
  - Subfunction (if applicable)
  - Other significant failure-related modifiers

Each keyword you add makes the search argument more specific. The more precise the keyword string, the more selective the search, yielding fewer matches in the Software Support database. If you do not find a similar problem in the database, you can broaden the scope of the search by deleting keywords, beginning at the end of the string.

Here is a sample completed keyword string for an abend:

Sample keyword string

```
5695DF186 R1H0 ABEND001 EDGRDSN
```

where:

5695DF186	Is the component keyword.
R1H0	Is the release level keyword.
ABEND001	Is the type-of-failure keyword with the abend code appended.
EDGRDSN	Is the module keyword.

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Finding the Component Identification Keyword

The DFSMSrmm component identifier is the first keyword in the search argument. The number identifies DFSMSrmm within the IBM Software Support database.

1. The component identification keyword is nine characters long. For DFSMSrmm, the keyword is 5695DF186.

   Keyword string so far

   5695DF186

2. Continue with "Finding the Release Level" to determine the current release level keyword for DFSMSrmm.

Finding the Release Level

The release level keyword, used with the component identification keyword, narrows the search. The release level keyword consists of the prefix **R**, followed by the last three characters of the Function Modification Identifier (FMID) indicated at the start of a module. The FMID used in the following examples is the DFSMS V1R5 DFSMSrmm FMID HDZ11H0. The English FMID is JDZ11HB and the Kanji FMID is JDZ11HC.

1. Use one of the following techniques to obtain the DFSMSrmm release level keyword:
   - Find the FMID that identifies a release of DFSMSrmm listed in the *DFSMS/MVS Program Directory* that is shipped with the product tape.
   - Use SMP/E to obtain the release level keyword:
     a. List the consolidated software inventory, using the following SMP/E control statements. Be sure to include the period at the end of the control statements.

        ```
        SET BDY (tgtzone).
        LIST MOD (name) XREF.
        ```

     b. In the NAME column of the consolidated software inventory, locate the name of the module causing the problem.
     c. In the entry for the module, find the FMID field. Append the three low-order digits in the FMID field to the keyword prefix R.
   - Locate the module in the dump by scanning the comment or eyecatcher portion in the address range that is associated with the failure-related module. The first part of the module contains the components:
     – Copyright statement
     – Module name
     – FMID
     – Service level, which is the program temporary fix (PTF) number or Authorized Program Analysis Report (APAR) number of the module

     In the copyright area, find the FMID field. Append the three low order digits in the FMID field to the keyword prefix R.

2. Add the release level to your keyword string:

Keyword string so far
5695DF186 R1H0

3. Continue with “Determining the Type-of-Failure” to determine the type of failure.

Determining the Type-of-Failure

The type-of-failure keyword is used to identify an external symptom of a failure. This is a required keyword. Use Table 5 to determine the type-of-failure keyword that best describes your problem.

Table 5. Type-of-failure Keywords

Keyword	Description	Procedure
Abend	Abnormal termination indicated by: • An ISPF abend panel • A system message identifying an abend • SYS1.LOGREC messages	Go to “Building an Abend Keyword.”
Wait/Loop	Program unexpectedly suspended: • No program response • Repeating messages • Repeating sequence of DFSMSrmm ISPF panels	Go to “Building Keywords for Wait/Loop Problems” on page 41.
Message	Error indicated by: • System message • DFSMSrmm ISPF dialog message	Go to “Developing the Message Keyword” on page 43.
Incorrect Output	Error indicated by: • Incorrect or missing output • Incorrect DFSMSrmm ISPF panel flow or information	Go to “Developing Keywords for Incorrect Output” on page 44.
Performance	Performance is less than what is expected	Go to “Defining Keywords for Performance Problems” on page 45.
Documentation	Incorrect or incomplete documentation	Go to “Forming Keywords for Documentation Problems” on page 45.

Building an Abend Keyword

This section describes how to build an abend keyword for an abend occurring while you are using the DFSMSrmm ISPF dialog, or when you are running DFSMSrmm outside the dialog by using the RMM TSO subcommands.

You can identify an abend using any one of these methods:
- A program’s printed system output
- A system message’s text
- An ISPF abend panel
- A TSO message identifying an abend condition
- A SYS1.LOGREC record

Also, when DFSMSrmm abnormally ends, the system produces one or more of these outputs:

- DFSMSrmm ISPF dialog abend panel
- SVC Dump
- SYSABEND, SYSMDUMP, or SYSUDUMP

This section explains how to gather the information to add to your keyword string as follows:

- For the DFSMSrmm ISPF dialog:
  ABENDXXX (required)
  RC (optional)
- For the rest of DFSMSrmm:
  ABENDXXX (required)
  MODULE (optional)
  OFFSET (optional)

DFSMSrmm ISPF Dialog Abends

This section describes how to build the abend keyword using information from an ISPF abend panel or a TSO message.

ISPF Abend Panel

Figure 25 shows a sample ISPF abend panel, which is displayed when an abend occurs in ISPF or in the DFSMSrmm ISPF dialog.

```
----------------------ERROR RECOVERY------------------------------

COMMAND ===>

    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    * *                                                         * *
    * *      ISPF PROCESSOR ENDED ABNORMALLY                    * *
    * *                                                         * *
    * *                                                         * *
    * *                                                         * *
    * *                                                         * *
    * *           Task ABEND code 0C1                           * *
    * *                                                         * *
    * *                                                         * *
    * *                                                         * *
    * *                                                         * *
    * *   Press ENTER to display primary option menu.           * *
    * *   Enter HELP command for list of common ABEND CODES.    * *
    * *                                                         * *
    * *                                                         * *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Figure 25. Sample ISPF Abend Panel

When an ISPF abend panel appears, follow these steps to build the abend keyword:

1. Record the abend code in this format:

   ABENDnnn

   where:

   nnn Is the task abend code.

   For example, if the ISPF abend panel contains information as shown in “ISPF Abend Panel” on page 38:

   ```
   Task ABEND code 0C1
   ```

   your keyword string would look include the following information.

   Keyword string so far

   ```
   5695DF186 R1H0 ABEND0C1
   ```

2. If a return code accompanies the message, include the return code in your keyword string as a modifier keyword. Append the code to the keyword prefix **RC**. For example, if the return code is 04, your keyword string would look like this:

   Keyword string so far

   ```
   5695DF186 R1H0 ABEND0C1  RC4
   ```

3. Go to “Building Keywords for Module-related Errors” on page 46 to build the next keyword in the string. Otherwise, continue to “TSO Messages.”

TSO Messages

When the DFSMSrmm ISPF dialog ends abnormally and ISPF is in TEST/TRACE mode, the system issues a TSO message to indicate the failure. This is not a DFSMSrmm ISPF dialog message. Figure 26 shows a sample TSO message that identifies an abend condition:

```
* SPF  SUBTASK ABEND *
ISPF      ENDED DUE TO ERROR+
READY
```

Figure 26. Sample TSO Abend Message

A plus sign at the end of the message indicates that additional information is available. Enter a question mark for more information about the error. The question mark must be the next command entered from the terminal, or the supplemental information is lost. Figure 27 shows the additional of information that appears when the plus sign is present at the end of the message.

```
SYSTEM ABEND CODE 0C4 REASON CODE 0004
```

Figure 27. Sample TSO Abend Message Additional Information

1. Record the abend code in this format:

   ABENDnnn

   where:

   nnn Is the program interruption code related to the abend message.

   For example, if the abend occurred because of a protection exception, your keyword string would look like this:

   Keyword string so far

   ```
   5695DF186 R1H0 ABEND0C4
   ```

2. Go to "Building Keywords for Module-related Errors" on page 46 to build the next keyword.

Building Keywords for DFSMSrmm Abends Outside the DFSMSrmm ISPF Dialog

Use this section when you suspect that an abend has occurred somewhere other than the DFSMSrmm ISPF dialog.

Follow these steps to build the abend keyword:

1. Obtain a system dump.
   - Use the SUMDUMP printed from the SYS1.DUMPxx data set.
   - Obtain a system storage dump that contains the Link Pack Area(LPA), the nucleus and the user's program. Determine the system abend code by using either the symptom dump summary information in the system job log or the system storage dump.

Related Reading: For information about obtaining and using symptom dump summary information, see *z/OS DFSMSdfp Diagnosis Guide*.

2. Record the abend code in this format:

   ABENDnnn

   where:

   nnn Is the program interrupt code.

   For example, if the abend output contains this:

   ```
   Program interrupt code 00000001
   ```

   your keyword string would look like this:

   Keyword string so far

   ```
   5695DF186 R1H0 ABEND0C1
   ```

3. Record the module name that appears in the abend output, along with the offsets indicated. Record the offset using this format:

   OFFSET X'nnnn'

   where:

   nnnn Is 1 to 4 hex digits containing no leading zeros.

   For example, if the abend output contains information as shown in Figure 28, add the module name EDGINERS and offset X'1400' to the keyword string:

```
SYSTEM COMPLETION CODE=0C7  REASON CODE=00000007
 TIME=09.48.34  SEQ=00065  CPU=0000  ASID=0020
 PSW AT TIME OF ERROR  078D1000   85494740  ILC 6  INTC 07
   ACTIVE LOAD MODULE           ADDRESS=05493340  OFFSET=00001400
   NAME=EDGINERS
   DATA AT PSW  0549473A - F9335000  CB6C4780  A850D208
   GPR  0-3  00000E15  00000008  0000000A  05496BB0
   GPR  4-7  05496BB0  0548A080  000580F8  00000004
   GPR  8-11 854962AA  0548A008  05493F08  00FBE2C0
   GPR 12-15 85493340  00057CF0  854962E4  05494730
 END OF SYMPTOM DUMP
```

Figure 28. Sample Abend Output

Completed keyword string

```
5695DF186 R1H0 ABEND0C7 EDGINERS OFFSET X'1400'
```

4. Go to Chapter 6, "Searching the IBM Software Support Database," on page 49.

Building Keywords for Wait/Loop Problems

Use this section to develop the WAIT or LOOP keyword in your keyword string. The following conditions are symptoms of a wait or loop:

- Suspended activity while waiting for some condition to be satisfied
- Endless instruction loop
- Repeating messages
- Repeating sequence of panels
- No system response
- System abends

In DFSMSrmm, no program response indicates a wait condition. For example, a DFSMSrmm ISPF dialog panel might remain on the screen indefinitely after you have requested processing.

Recommendations: If you think that DFSMSrmm is not responding because it is processing a large amount of data, check the following conditions:

- Ensure the MAXHOLD value has been correctly entered. You use the MAXHOLD value to specify the number of records the subsystem scans while holding a reserve on the DFSMSrmm control data set. If you use a large MAXHOLD number, the subsystem could hold a reserve of the control data set for a long time which impacts performance.
- Limit the number of list entries when you request a search by making your selection criteria more specific.

You can view the ISPF log to check for symptoms of a module loop if you are in the DFSMSrmm ISPF dialog. In your DFSMSrmm ISPF dialog user profile, specify that you want the DFSMSrmm ISPF dialog to record inter-module trace data.

This topic explains how to gather the information you need to add to your keyword string:

- For DFSMSrmm ISPF dialog:
  WAIT/LOOP (required)
- For the rest of the DFSMSrmm components:
  WAIT/LOOP (required)
  MODULE (optional)
  OFFSET (optional)

If you have obtained a dump, you can locate the following information:

1. Find the program status word (PSW) in the dump as shown in Figure 29.

```
JOB S1REP001         STEP AUDREPT         TIME 123515   DATE 93281    ID = 000    CPUID = FF0158243090   PAGE 00000001
COMPLETION CODE      SYSTEM = 0C4      REASON CODE = 00000010

  PSW AT ENTRY TO ABEND   078D2000  000085C4  ILC  04  INTC  0010
```

Figure 29. Finding the PSW in the SYSUDUMP

2. Check whether the WAIT state bit (bit 14) of the PSW is on or off. In Figure 30, the WAIT state bit is off.

```
  PSW AT ENTRY TO ABEND   078D2000  000085C4

  Bits                 12 13 14 15
                        1  1  0  1
```

Figure 30. Identifying a Wait State

3. Determine which keyword you should use, **LOOP** or **WAIT**. If the WAIT state bit is off, use the keyword **LOOP**.

Keyword string so far

```
5695DF186 R1H0 LOOP
```

If you have identified the failure as a wait condition, use **WAIT** as your type-of-failure keyword:

Keyword string so far

```
5695DF186 R1H0 WAIT
```

4. Go to "Building Modifier Keyword Strings" on page 47 to build the next keyword in the string if the wait or loop occurred in the DFSMSrmm ISPF dialog.
5. Go to "Building Keywords for Module-related Errors" on page 46 for information on adding the module and offset keywords to your string.

Developing the Message Keyword

This section explains how to develop the message keyword in your keyword string. A message can indicate these types of failures:

A program or operation failure
Missing data or incorrect data
A data failure (catalog, user data)

You can add the message number and associated return and reason codes to your keyword string as follows:

MSGXXXXXXXX (required)
RC (optional for return code)
RC (optional for reason code)

To develop the message keyword for your keyword string, follow these steps:

1. Use **MSG** as your type-of-failure keyword, followed by the message identifier. For example, if the message identifier is EDG6646I, your keyword string would look like this:

Keyword string so far

```
5695DF186 R1H0 MSGEDG6646I
```

2. If the message has a return code and reason code associated with it, append the return code to the keyword prefix **RC** and the reason code to the prefix **RC**. For example, if the return code is 12 and the reason code is 183, your keyword string would look like this:

Completed keyword string

```
5695DF186 R1H0 MSGEDG6646I  RC12  RC183
```

3. Go to Chapter 6, "Searching the IBM Software Support Database," on page 49.

Developing Keywords for Incorrect Output

Use this section to develop the INCORROUT keyword when any of the following conditions occur:

Expected output is not produced
Output is different than expected
Output should not be generated
DFSMSrmm ISPF dialog panel information or flow is erroneous

This topic explains how to gather the information you need in order to add to your keyword string:

INCORROUT (required)
MSG (optional)

Incorrect output can be the result of an earlier failure. This can be difficult to analyze because the component affected might not be the one that caused the problem. Review previous messages, abend codes, console logs, or other program responses. They might indicate the source of the failure.

Accumulate as much of the following information as possible. The information can help you isolate or resolve your problem, and the IBM Support Center will request this information if you need to provide trap or trace information.:

- When did you first notice the problem?
- How did you identify the problem?
- Were any system changes or maintenance recently applied, for example, a new device, software product, APAR, or PTF?
- Does the problem occur with a specific data set or device, at a particular time of day, or with any other unique condition?
- Does the problem occur in batch or TSO mode?
- Is the problem continuous or intermittent?
- Can you re-create the problem?

Before reporting a DFSMSrmm ISPF dialog panel problem, be sure that the incorrect output is not the result of a customized panel or message. If the panel was customized, retry the operation using the IBM-supplied copy. If the failure still occurs, continue with the following steps.

To build the incorrect output keyword, perform the following steps:

1. Use **INCORROUT** for your type-of-failure keyword.

Keyword string so far

```
5695DF186 R1H0 INCORROUT
```

2. If a message accompanied the failure, append the message identifier to the prefix **MSG**, and add that keyword to the keyword string. For example:

Keyword string so far

```
5695DF186 R1H0 INCORROUT MSGEDG7017I
```

3. For problems related to the DFSMSrmm ISPF dialog go to “Building Modifier Keyword Strings” on page 47. Otherwise, go to Chapter 6, “Searching the IBM Software Support Database,” on page 49.

Defining Keywords for Performance Problems

Performance is largely determined by a combination of throughput, response time, and availability. This section helps you to define the performance keyword when you suspect that a DFSMSrmm component is causing poor system performance. It explains how to gather the information for all components to add to your keyword string:

PERFM (required).

Many performance problems are related to system tuning. Modifications to your system or its environment can also affect system performance.

Use the performance keyword only when you cannot correct the performance problem by system tuning.

1. Record this information:
   Actual performance
   Expected performance
   Source of the expected performance criteria, and the order number and page number of the source document
2. Use **PERFM** as your type-of-failure keyword. Your keyword string would look like this:

Keyword string so far

```
5695DF186 R1H0 PERFM
```

3. For problems related to the DFSMSrmm ISPF dialog, go to "Building Modifier Keyword Strings" on page 47. Otherwise, go to Chapter 6, "Searching the IBM Software Support Database," on page 49.

Forming Keywords for Documentation Problems

Use this section when you encounter incorrect or missing information in a DFSMSrmm publication.

This topic explains how to gather the information for all components to add to your keyword string.

DOC (required)
Document Number (optional)
Message Number (optional)

For a minor publication error, submit a Reader's Comment Form from the back of the publication in error. If the error is serious and of general concern to other users:

1. Record the document page in error. You should describe the error and the problem it caused.
2. Use **DOC** as your type-of-failure keyword, followed by the order number of the publication. Omit the hyphen and level number.

   For example, if the order number is SC26-7333-00, your keyword string would look like this:

Keyword string so far

```
5695DF186 R1H0 DOC SC267333
```

3. For documentation problems related to a message, append the message identifier to the keyword prefix **MSG**, and add it to the keyword string as a modifier keyword.

   For example, if the message is EDG5306E, your keyword string would look like this:

   Keyword string so far

   ```
   5695DF186 R1H0 DOC SC267333 MSGEDG5306E
   ```

4. For problems related to the DFSMSrmm ISPF dialog, go to "Building Modifier Keyword Strings" on page 47. Otherwise, go to Chapter 6, "Searching the IBM Software Support Database," on page 49.

Building Keywords for Module-related Errors

Use this section to build the module keyword for your keyword string. The module keyword identifies the failure-related control section (CSECT). A load module has one or more individually replaceable CSECTs.

The CSECT name describes the area of suspected failure more precisely than does the load module name. However, you can specify either or both names to vary the keyword string when you search the IBM Software Support database.

If ABEND is the type of failure, follow one of these procedures to find the module name.

Using the ISPF Log to Find the Module Name

If the problem is in the DFSMSrmm ISPF dialog, use the ISPF log to determine the failing module name by performing the following steps:

1. Examine the ISPF log to locate an entry that indicates the abend.
2. If the entry contains a module name, for example EDGRDDIS, record the module name for your module keyword and continue with "Building Modifier Keyword Strings" on page 47. Your keyword string would look like this:

   Keyword string so far

   ```
   5695DF186 R1H0 ABEND0C1  EDGRDDIS
   ```

   If you cannot determine the module name from the ISPF log, continue with "Building Modifier Keyword Strings" on page 47.

Finding the Failing Module Name for an Abend Type-of-Failure

To find the failing module name for an abend type-of-failure, perform the following steps:

1. If the system issued a message identifying an abend condition, the module name might appear in the message text. If it does, use the entire module name as the module keyword. Go to "Building Modifier Keyword Strings" on page 47.
2. If an environmental error record editing and printing program (EREP) software record exists for the failure, use it to identify the failing module name and offset information. Give the entire module name as the module keyword. Go to

"Building Modifier Keyword Strings." See *EREP User's Guide* for information about EREP software records.

3. Scan the dump as shown in Figure 31 for the failing module name.

```
SYSTEM COMPLETION CODE=0C7  REASON CODE=00000007
 TIME=09.48.34  SEQ=00065  CPU=0000  ASID=0020
 PSW AT TIME OF ERROR  078D1000   85494740  ILC 6  INTC 07
   ACTIVE LOAD MODULE           ADDRESS=05493340  OFFSET=00001400
   NAME=EDGINERS
   DATA AT PSW  0549473A - F9335000  CB6C4780  A850D208
   GPR  0-3  00000E15  00000008  0000000A  05496BB0
   GPR  4-7  05496BB0  0548A080  000580F8  00000004
   GPR  8-11 854962AA  0548A008  05493F08  00FBE2C0
   GPR 12-15 85493340  00057CF0  854962E4  05494730
 END OF SYMPTOM DUMP
```

Figure 31. Sample Dump Containing a Module Name

4. Use the entire module name as the module keyword. In Figure 31, the module name is EDGINERS.
5. Use Interactive Problem Control System (IPCS) to format any dumps written as described in Chapter 4, "Using the DFSMSrmm IPCS Verb Exit Routine," on page 33.
6. See *z/OS MVS IPCS User's Guide* for more information.
7. Go to "Building Modifier Keyword Strings."

Building Keywords for Wait and Loop Types-of-Failure

To obtain a system dump that includes the system trace table, perform the following steps:

1. Use the system trace table to get the name of the module. If the problem is a loop, you might need a generalized trace facility (GTF) trace.
2. Go to "Building Modifier Keyword Strings."

Building Keywords for Message Types-of-Failure

If the message was issued at the wrong time or under the wrong conditions, specify the name of the detecting module as the module keyword.

Go to "Building Modifier Keyword Strings."

Building Modifier Keyword Strings

Use this section to help you build modifier keywords to add to your keyword string. The modifier keywords are optional, but can help restrict the scope of a software database search to a manageable number of matches. You can specify modifier keywords in any order.

You can often identify the failing function when you determine the type of failure. You might find a failure-related general register or a control block that contains incorrect data every time the failure occurs. You can identify the probable failing component from a failure-related indication, such as a message or unique abend code. Select a modifier keyword that describes a failure-related function from Table 7 on page 75.

1. Examine the list of function modifier keywords to see if any modifier keywords describe an aspect of the failure. Add appropriate modifier keywords to your keyword string.
2. For incorrect output or performance types of failure, the system might not provide enough information to identify a failure-related module. If, however, you can identify a failure-related function or other modifier, use it as the modifier keyword.
3. After completing your keyword string, go to Chapter 6, "Searching the IBM Software Support Database," on page 49 for information on searching the IBM Software Support Database.
4. If you cannot relate an ISPF log entry to the failure (incorrect output, wait or loop type of failures), choose the appropriate modifier keyword from Table 7 on page 75. For example, if the failure is related to a problem with the DFSMSrmm control data set, add CDS to your keyword string.

   Complete your keyword string.

   Completed keyword string

   ```
   5695DF186 R1H0 CDS
   ```

   You might also find it helpful to use the HIPER/Y or P/E keywords in your keyword string. Use HIPER/Y when you want to search for all HIPER APARs which are high impact or pervasive APARs. Use P/E in your keyword string when you want to search for all P/E APARs. You can also add a data range in your keyword string to narrow the search based on the date. The following example shows a keyword string example that will display HIPER DFSMSrmm 1.4.0 APARs that closed between January 1st 1997 and a current date in October 1998.

   ```
   HIPER/Y 5695DF186 R1D0 CL97/01/.-CL98/10/.
   ```
5. Go to Chapter 6, "Searching the IBM Software Support Database," on page 49.

Chapter 6. Searching the IBM Software Support Database

You are now ready to search the IBM Software Support database, using the keyword string you compiled earlier as a search argument:

1. Search the IBM Software Support database by using a search tool, such as Info Access, or by calling the IBM Support Center for help.

   The IBM Support Center might have the correction if the problem has been reported before. This correction could be a PTF, an APAR fix, or a bypass of the problem.
2. If you find a set of APAR closing descriptions in the IBM Software Support database, compare them with your problem.
3. If you find an APAR that matches your problem, apply the PTF, the APAR fix, or the bypass described in the APAR to correct your problem.
4. If you cannot find an appropriate APAR, try varying your search argument. For example:
   - Drop one keyword at a time, starting at the end of your keyword string.
   - If your type-of-failure keyword is LOOP, WAIT, or PERFM, try searching with one or two of the other three keywords. Sometimes what seems like a WAIT state might actually be a loop or a performance problem.
   - Try dropping the release level keyword from your keyword string. The problem might have been reported for an earlier release.
   - If more than one type-of-failure keyword applies (for example, an abend and a message both occur), try all combinations of those keywords.
5. If you were unable to find the solution to your problem, see Chapter 7, “Contacting the IBM Software Support Center,” on page 51.

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Chapter 7. Contacting the IBM Software Support Center

If you need to contact the IBM Software Support Center for help, you should supply this information:

- Customer number
- Processor number (type, model, serial)
- Component ID (DFSMSrmm)
- Current release level
- Current service level (list of APARs and PTFs applied)
- The keyword string or strings that you have built

If you need to submit an APAR, the IBM Software Support Center will give you assistance in completing it. The IBM Software Support Center will ask you to describe your DFSMSrmm environment. Include applicable items from the following list:

- JCL listings
- Storage dump (at time of failure)
- Link-edit map
- Console printout
- Other relevant supporting material

DFSMSrmm includes the EDGIPDA utility that is provided for IBM Software Support problem determination use only.

When you submit any of the requested documentation on tape, write it on a standard label tape. Also provide a hardcopy of the DCB information for each data set and the JCL used to create the tape.

Here is some additional information you can provide to help in problem determination:

Symptom	Information
Volume record not updated	Was the volume being read or written? Was the volume defined through the DFSMSrmm ISPF dialog or TSO subcommands? Which file on the tape was not updated?
Problems with one of the DFSMSrmm SEARCH commands	What search parameters did you specify? Were you using the DFSMSrmm ISPF dialog or TSO subcommands?
Problems with conversion	Be prepared to send all the files used in the conversion.
EDGUTIL VERIFY produces errors	Send a list of all the messages produced by EDGUTIL.
Abends that occur in batch jobs	Rerun the job with a SYSUDUMP DD statement and send the dump output.
Problems encountered in the DFSMSrmm ISPF dialog	Provide the panel ID where the message appeared. You can obtain the panel ID by issuing the ISPF MSGID command.

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Appendix A. Keyword Worksheet

DATE:	TIME:	IBM PROBLEM NUMBER:

Problem Description (including symptoms not described by keywords)

IBM Licensed Program Information

PRODUCT NAME:	FMID:		
Modification:	Feature:	Order Number:	PUT Tape Level:

Base MVS System Information

NAME:	FMID:	PUT TAPE LEVEL:

Keywords

TYPE-OF-FAILURE:	COMPONENT ID:
Module Name:	Modifiers:
Release Level:	

Search Arguments Used

Information Provided by IBM Support Center

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Appendix B. DFSMSrmm Trace Command Suffixes

Table 6 lists the trace command suffixes that you can specify to obtain information while you are in the DFSMSrmm ISPF dialog.

Table 6. DFSMSrmm Trace Command Suffixes

To Trace	Specify Suffix
Input verification functions	ADDQ
All control functions	CNTL
Dataset, adding functions	DADD
Date functions	DATE
Dataset, changing functions	DCHA
Dataset, deleting functions	DDEL
Dataset, listing functions	DDIS
Dataset, searching	DSCH
All dataset functions	DSN
Exit functions	EXIT
Report definition and tool criteria management functions	GCON
ICETOOL Report Generator functions	GICE
Report definition functions	GRD
Report management functions	GREP
Report tool functions	GRT
Report type functions	GRTD
Access functions	ISPF
Option functions	OPT
All owner functions	OWNR
Product, adding functions	PADD
Product, volume adding functions	PADV
Product, changing functions	PCHA
Product, deleting functions	PDEL
Product, listing functions	PDIS
Product, volume deleting functions	PDLV
All product functions	PP
Product, searching functions	PSCH
All rack and bin functions	RACK
Rack and bin, adding functions	RADD
Rack and bin, deleting functions	RDEL
Rack and bin, listing functions	RDIS
Rack and bin, searching functions	RSCH
Save functions	SAVE
Volume, adding functions	TADD
Volume, changing functions	TCHA

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Table 6. DFSMSrmm Trace Command Suffixes (continued)

To Trace	Specify Suffix
Volume, confirmation functions	TCON
Volume, listing functions	TDIS
Volume, releasing functions	TREL
Volume, requesting functions	TREQ
Volume, searching functions	TSCH
All volume functions	TVOL
VRS, adding functions	VADD
VRS, changing functions	VCHA
VRS, deleting functions	VDEL
VRS, listing functions	VDIS
All VRS functions	VRS
VRS, searching functions	VSCH

Appendix C. DFSMSrmm System and User Completion Codes

System Completion Codes

These are the system completion codes issued during DFSMSrmm processing.

F13

Explanation: At OPEN time for tape data sets, DFSMSrmm fails to update the DFSMSrmm control data set with information about tape usage or the operator mounted a volume that is not acceptable to DFSMSrmm. DFSMSrmm issues an error message describing the reason why the volume cannot be used.

DFSMSrmm issues this code for one of the following reasons:

- An error occurred performing I/O to the DFSMSrmm control data set and the operator replied CANCEL to message EDG4001D.
- The DFSMSrmm journal file is locked and the operator replied CANCEL to message EDG4000D.
- The DFSMSrmm subsystem is not active and the operator replied CANCEL to message EDG4012D.

The current volume was not acceptable to DFSMSrmm and DFSMSrmm could find no other acceptable volume. If DFSMSrmm returns a reason code or user completion code, this is an indication that a DFSMSrmm subsystem routine failed.

Module: EDGOECK, EDGOECM, EDGOEMD

System Action: The current OPEN request fails because no volume is available to satisfy the request.

Operator Response: None.

Programmer Response: When DFSMSrmm issues message EDG4000D or EDG4001D, refer to the suggested actions for the messages. When DFSMSrmm issues message EDG4012D, ensure that the DFRMM procedure is active and specify the correct volume and tape data set information for specific tape mount request.

F14

Explanation: DFSMSrmm fails to update the DFSMSrmm control data set with information about tape usage because the DFSMSrmm subsystem is not active. DFSMSrmm issues an error message to describe the problem. If a reason code or user completion code is provided, this is an indication that the DFSMSrmm subsystem routine failed.

Module: EDGCLEV

System Action: The CLOSE or End-Of-Volume processing fails. Processing depends on the application error recovery processing.

Operator Response: Refer to the action described for the associated error message.

System Programmer Response: Refer to the action described for the associated error message.

F37

Explanation: An error occurred during validation of a tape volume, or during updating of the DFSMSrmm control data set. DFSMSrmm issues an error message describing the error. DFSMSrmm issues F37 at End-Of-Volume, when validating the new volume for a multivolume tape data set or when recording the use of the previous volume.

DFSMSrmm issues F37 for one of these reasons:

- An error occurred performing I/O to the DFSMSrmm control data set and the operator replied CANCEL to message EDG4001D.
- The DFSMSrmm journal file is locked and the operator replied CANCEL to message EDG4000D.
- The DFSMSrmm subsystem is not active and the operator replied CANCEL to message EDG4012D.
- The current volume was not acceptable to DFSMSrmm and DFSMSrmm could find no other acceptable volume.

If a reason code or user completion code is provided, this indicates that the DFSMSrmm subsystem routine failed. DFSMSrmm issues this code because either the DFSMSrmm subsystem is not active and the operator replied CANCEL to message EDG4012D or because the current volume was not acceptable to DFSMSrmm and DFSMSrmm could find no other acceptable volume.

Module: EDGCLEV, EDGOECK, EDGOECM, EDGOEMD

System Action: The current EOV request fails.

Operator Response: None.

Programmer Response: When DFSMSrmm issues message EDG4000D or EDG4001D, refer to the suggested actions described for the messages. When DFSMSrmm issues message EDG4012D, ensure that the DFRMM procedure is active and specify the correct volume and tape data set information for specific tape mount requests. If a tape volume is rejected because it violates DFSMSrmm tape usage rules, correct your JCL and rerun the job.

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User Completion Codes

These are the user completion codes issued during DFSMSrmm processing.

U0001

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET DIRECT request.

Module: EDGMTSO, EDGSOCE

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0002

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET DIRECT request.

Module: EDGSOCE

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0003

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET KEY GREATER THAN request.

Module: EDGMTSO

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0004

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a GET KEY GREATER OR EQUAL request.

Module: EDGMTSO

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0005

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a request to gain exclusive use of the control data set.

Module: EDGMTSO, EDGSOCE

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: An associated error message is issued with details of the error. Refer to that message for corrective actions.

U0006

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a LOGICAL ADD request.

Module: EDGMTSO, EDGSOCE

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0007

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a CHANGE request.

Module: EDGMTSO, EDGSOCE

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0008

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a LOGICAL DELETE request.

Module: EDGMTSO, EDGSOCE

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0009

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a SEARCH request.

Module: EDGMTSO

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0010

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a SEARCH NEXT request.

Module: EDGMTSO

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0011

Explanation: An error occurred processing OWNER information in the DFSMSrmm control data set.

Module: EDGMTSO

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0012

Explanation: An error occurred processing PRODUCT information in the DFSMSrmm control data set.

Module: EDGMTSO

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A possible error exists in the logic of the DFSMSrmm control data set. Use the utility EDGUTIL to verify the contents of the DFSMSrmm control data set.

U0013

Explanation: An error occurred performing I/O to the DFSMSrmm control data set during a request to release exclusive use of the control data set.

Module: EDGMTSO

System Action: The current processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: DFSMSrmm issues an error message describing the error. Refer to that message for corrective actions.

U0014

Explanation: A search request specifying a generic name fails.

Module: EDGMTSO

System Action: The current request fails. The reason code is the return code from an internal DFSMSrmm service routine.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0015

Explanation: A volume is being added or changed and information about it should be in the volume catalog. The DFSMSrmm request to retrieve information from the volume catalog has failed.

Module: EDGMTSO

System Action: The current request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0016

Explanation: A volume is being added or changed that has outstanding actions or moves against it. DFSMSrmm was unable to update the control data set with the specified actions.

Module: EDGMTSO

System Action: The current request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0093

Explanation: An error occurred in TPUT handling while parsing parameters.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0100

Explanation: An error occurred establishing a recovery environment for a DFSMSrmm program. At the time of the abend, Register 15 contains the ESTAE macro return code.

Module: EDGINERS, EDGPARM

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0100

Explanation: An error occurred performing RACROUTE RACHECK.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0100

Explanation: During subsystem interface initialization, a system function failed to complete successfully.

Module: EDGSSSI

System Action: Initialization stops. The reason code is the return code from the system function that failed.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U01nn

Explanation: The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. *nn* in the completion code is the code returned from the failing service routine used.

Module: EDGQMGR

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report this error to the system programmer.

System Programmer Response: Determine the cause of the error and correct it if possible. If the error cannot be corrected, report this error to the IBM Support Center.

U0101

Explanation: The DFSMSrmm subsystem inventory management processing encounters an error and cannot continue. A request to perform I/O to the DFSMSrmm control data set has failed. The abend reason code is the return code from the DFSMSrmm I/O request.

Module: EDGMHKP

System Action: The DFSMSrmm inventory management request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Determine the cause of the error and correct it if possible. If the error cannot be corrected, report this error to the IBM Support Center.

U0110

Explanation: An error occurred performing a RACROUTE RACDEF-DELETE.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0111

Explanation: An error occurred performing a RACROUTE RACDEF-DELETE when a related delete had already been successful.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0120

Explanation: An error occurred performing a RACROUTE RACDEF-ADDVOL.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0124

Explanation: An error occurred when attaching the DFSMSrmm subtasks. The completion code is accompanied by a reason code, which is the return code from the ATTACH macro.

Module: EDGAMGR

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report this error to the system programmer.

System Programmer Response: If recovery is not possible, report this error to the IBM Support Center.

U0125

Module: EDGAMGR

Explanation: An error occurred while checking the device type of the data set allocated during inventory management. The completion code is accompanied by a reason code, which is the return code from the DEVTYPE macro.

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report the error to the system programmer.

System Programmer Response: If recovery is not possible, report this error to the IBM Support Center.

U0126

Module: EDGAMGR

Explanation: An error occurred when deallocating the data set allocated during inventory management. The completion code is accompanied by a reason code, which is the return code from SVC 99.

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report the error to the system programmer.

System Programmer Response: If recovery is not possible, report this error to the IBM Support Center.

U0130

Explanation: An error occurred performing a RACROUTE RACDEF-DEFINE.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0150

Explanation: An error occurred performing a RACROUTE RACXTRT - EXTRACT.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0160

Explanation: An error occurred performing an ICHEINTY DELETE ACCESS LIST.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0170

Explanation: An error occurred performing a RACROUTE RACXTRT - REPLACE.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0180

Explanation: A logic error occurred in DFSMSrmm RACF processing.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0200

Explanation: An error occurred performing a RACROUTE RACHECK.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0200

Explanation: The DEVTYPE macro returned an unacceptable return code when checking for the PARMLIB DD.

Module: EDGPARM

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0200

Explanation: During subsystem interface initialization, a system function failed to complete successfully.

Module: EDGSSSI

System Action: Initialization stops. The reason code is the return code from the system function that failed.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U02nn

Explanation: The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. *nn* in the completion code is the code returned from the failing service routine used.

Module: EDGQMGR

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report this error to the system programmer.

System Programmer Response: Determine the cause of the error and correct it if possible. If it is not possible to correct the error, contact the IBM Support Center.

U0220

Explanation: An error occurred performing a RACROUTE RACDEF - ADDVOL.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0230

Explanation: An error occurred performing a RACROUTE RACDEF - DEFINE.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0300

Explanation: An error occurred performing a RACROUTE RACHECK.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0300

Explanation: The PARMLIB DD is allocated to a non-DASD device type.

Module: EDGPARM

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Provide a parmlib data set to DFSMSrmm that resides on a DASD device.

U0300

Explanation: During subsystem interface initialization, DFSMSrmm could not issue a message. The DFSMSrmm message processing routine returned an error indication.

Module: EDGSSSI

System Action: Initialization stops. The reason code is the return code from the DFSMSrmm message routine that failed. An error message is issued by the message routine.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U03nn

Explanation: The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. *nn* in the completion code is the code returned from the failing service routine used.

Module: EDGQMGR

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report this error to the system programmer.

System Programmer Response: Determine the cause of the error and correct it if possible. If it is not possible to correct the error, contact the IBM Support Center.

U0301

Explanation: An error occurred while issuing a message to the TSO terminal.

Module: EDGTSO

System Action: Processing ends.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0302

Explanation: The DFSMSrmm subsystem issued an unexpected return code and reason code.

Module: EDGTSO

System Action: Processing ends.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0303

Explanation: An error occurred while using the TSO service routine IKJCT441 to set the variable that contains the command failure reason code.

Module: EDGTSO

System Action: Processing ends.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0304

Explanation: An error occurred while using the TSO service routine IKJCT441 to set the variable that contains the command error information message text.

Module: EDGTSO

System Action: Processing ends.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0305

Explanation: An error occurred determining the validity of an SMS location or DFSMS Storage Group.

Module: EDGTSO

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0306

Explanation: An error occurred determining if the SMS subsystem was active.

Module: EDGTSO

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0307

Explanation: An error occurred during CLIST processing.

Module: EDGTSOCL

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0350

Explanation: An error occurred performing a RACROUTE RACXTRT - EXTRACT.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0360

Explanation: An error occurred performing an ICHEINTY DELETE ACCESS LIST.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0370

Explanation: An error occurred performing a RACROUTE RACXTRT - REPLACE.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0380

Explanation: An error occurred performing a RACROUTE DEFINE for a tape data set. DFSMSrmm tried to create the first entry in the TVTOC for a tape volume. TAPEVOL class and TAPEDSN option are in use and neither ADSP nor PROTECT=YES is specified in the JCL.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0400

Explanation: An error occurred performing a RACROUTE RACHECK.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0400

Explanation: An attempt to obtain the Job File Control Block (JFCB) for the PARMLIB DD failed.

Module: EDGPARM

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U04nn

Explanation: The DFSMSrmm subsystem encounters an error and cannot recover. DFSMSrmm issues an error message to describe the failure. *nn* in the completion code is the code returned from the failing service routine used.

Module: EDGQMGR

System Action: The DFSMSrmm subsystem stops.

Operator Response: Report this error to the system programmer.

System Programmer Response: Determine the cause of the error and correct it if possible. If it is not possible to correct the error, report this error to the IBM Support Center.

U0410

Explanation: An error occurred performing a RACROUTE RACDEF - DELETE.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0500

Explanation: An error occurred performing a catalog LOCATE request.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0500

Explanation: DFSMSrmm failed to open the data set referred to by the PARMLIB DD.

Module: EDGPARM

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0510

Explanation: An error occurred performing a catalog DELETE request.

Module: EDGRACF

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0600

Explanation: The DFSMSrmm subsystem did not find the parmlib member to be used for the PARMLIB DD.

Module: EDGPARM

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0650

Explanation: An error occurred determining if the SMS subsystem was active. You have tried to use the VOLCAT processing option for the EDGUTIL utility and SMS must be active if that option is used.

Module: EDGUTIL

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0651

Explanation: An error occurred determining if a volume location name is valid on the current system. You are using the VOLCAT processing option for the EDGUTIL utility and for each volume that is in a system-managed tape library. DFSMSrmm validates the location name prior to checking that the DFSMSrmm location name value matches that recorded in the volume catalog.

Module: EDGUTIL

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0652

Explanation: The utility, EDGUTIL, failed to add a message to the SYSPRINT file.

Module: EDGUTIL

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0653

Explanation: An error occurred releasing a control data set record.

Module: EDGUTIL

System Action: Processing fails. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0654

Explanation: An error occurred updating the control data set control record.

Module: EDGUTIL

System Action: Processing fails. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0655

Explanation: An error occurred sorting data set records.

Module: EDGUTIL

System Action: Processing fails. The system writes a dump.

Operator Response: Report the error to the system programmer.

System Programmer Response: Correct the error that caused the SORT program to fail. Use the //SORTDIAG DD statement to trigger sort messages to the //SYSOUT file. These DD statements must be added to the job step executing the EDGUTIL utility.

If the failure is not sort related, report the problem to the IBM Support Center. Provide the system dump written as a result of the ABEND U0655.

U0656

Explanation: An error occurred locating the UCB address of the control data set.

Module: EDGUTIL

System Action: Processing fails. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0700

Explanation: The DFSMSrmm subsystem could not issue a message because of an error in the message processing routine.

Module: EDGPARM

System Action: DFSMSrmm issues a WTO message and subsystem processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0800

Explanation: An error occurred during LOCDEF validation.

Module: EDGPARM

System Action: Processing ends. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0801

Explanation: An error occurred in dynamic allocation of a temporary data set. The reason code is the return code from the DYNALLOC macro.

Module: EDGCNVRP

System Action: DFSMSrmm writes a dump and recovery processing begins.

Operator Response: Report this error to the system programmer.

System Programmer Response: Review the return codes from DYNALLOC and take appropriate actions.

U0802

Explanation: An error occurred obtaining information from the Job File Control Block (JFCB) of a temporary data set. The reason code is the return code from the RDJFCB macro.

Module: EDGCNVRP

System Action: DFSMSrmm writes a dump and recovery processing begins.

Operator Response: Report this error to the system programmer.

System Programmer Response: Review the return codes from RDJFCB and take appropriate actions.

U0803

Explanation: An error occurred in dynamic allocation of a temporary data set when attempting to deallocate the data set. The reason code is the return code from the DYNALLOC macro.

Module: EDGCNVRP

System Action: DFSMSrmm writes a dump and recovery processing begins.

Operator Response: Report this error to the system programmer.

System Programmer Response: Review the return codes from DYNALLOC and take appropriate actions.

U0810

Explanation: An error occurred processing a request from an OAM installation exit. The error is a result of processing in DFSMSrmm, not in the data passed to EDGLCSUX.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0811

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected Register 15 value on return from a subsystem request.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0812

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected Register 0 value on return from a subsystem request.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0813

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the DFSMSrmm common message routine.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Programmer Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0841

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the IDENTIFY macro.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0842

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the ATTACH macro.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0862

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the DETACH macro.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0879

Explanation: An error occurred processing a request from an OAM installation exit. The error is an unexpected return code from the STATUS macro.

Module: EDGLCSUX

System Action: Processing ends. The system writes a dump.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0901

Explanation: The message EDG9001E was not found in the DFSMSrmm message table. EDG9001E is required to issue information for an error in message processing. The number of the message that was issued at the time of the abend is in Register 0.

Module: EDGCMSG

System Action: The current message processing fails. Each DFSMSrmm task schedules error recovery processing that can involve stopping the subsystem if the error is severe.

Operator Response: Report this error to the system programmer.

System Programmer Response: This error is probably an error in EDGMTAB, the DFSMSrmm message table. Ensure that any updates to EDGMTAB have been made correctly.

U0950

Explanation: An attempt to issue a message by the DFSMSrmm subsystem failed because of an error in the message processing routine. The associated message is either EDG2050I or EDG2051I.

Module: EDGLOCV

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U0998

Explanation: An attempt to release control of the DFSMSrmm control data set failed. Previous error messages explain the error that was encountered.

System Action: The DFSMSrmm error recovery routines are run. The most probable result is that the DFSMSrmm subsystem will shut down until the error can be corrected.

Module: EDGMFIO

Operator Response: Report this error to the system programmer.

System Programmer Response: Correct the error and restart the DFSMSrmm subsystem. To correct the error, refer to the explanations and actions for the messages that have been issued.

U0999

Explanation: This code can be issued by both EDGVRECR and EDGDFHSM.

Explanation: When the code is issued by EDGVRECR, an error is encountered in issuing a message.

Module: EDGVRECR

System Action: The current VRSEL inventory management requests fails.

Programmer Response: Ensure that the EDGMTAB

message table is correctly installed. If EDGMTAB is correctly installed contact IBM for program support.

Operator Response: None.

Explanation: When the code is issued by EDGDFHSM, an unexpected return code was received in response to a DFSMSrmm subsystem request.

Module: EDGDFHSM

System Action: DFSMSrmm writes a dump and current processing fails.

Operator Response: Report this error to the system programmer.

Programmer Response: The volume being returned to DFSMSrmm from DFSMShsm might not have been correctly processed. If necessary, use the DFSMSrmm ISPF dialog or RMM TSO subcommand to correctly process information about the volume.

System Programmer Response: Report this error to the IBM Support Center.

U1000

Explanation: An error occurred in cross memory communication from the DFSMSrmm subsystem. DFSMSrmm could not issue a message because of an error in the DFSMSrmm message routine.

Module: EDGSXMC

System Action: Processing continues

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U10nn

Explanation: An error occurred in STACK processing while parsing parameters for a request to set up an outfile file for the terminal. *nn* in the completion code is the return code from IKJSTCK.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U1097

Explanation: An internal VSAM control block error was detected during DFSMSrmm VSAM buffer processing.

Module: EDGMVSM

System Action: The current request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Save any dumps written as a result of the abend. Report this error to the IBM Support Center. If the problem persists, restart the DFSMSrmm procedure to attempt recovery.

U11nn

Explanation: An error occurred in STACK processing while parsing parameters for a request to close all input and output files used during parsing. *nn* in the completion code is the return code from IKJSTCK.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U12nn

Explanation: An error occurred in STACK processing while parsing parameters when opening the PARMLIB member. *nn* in the completion code is the return code from IKJSTCK.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: If the DFSMSrmm parmlib data set is defined correctly, report this error to the IBM Support Center.

U13nn

Explanation: An error occurred in STACK processing while parsing parameters when opening the PARMLIB sequential file. *nn* in the completion code is the return code from IKJSTCK.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: If the DFSMSrmm parmlib data set is defined correctly, report this error to the IBM Support Center.

U14nn

Explanation: An error occurred in GETLINE processing while parsing parameters. *nn* in the completion code is the return code from GETLINE.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U15nn

Explanation: An error occurred in PUTLINE processing while parsing parameters. *nn* in the completion code is the return code from PUTLINE.

Module: EDGPARS

System Action: The current parse request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U1600

Explanation: DFSMSrmm is processing a call to the installation exit, EDGUX100. The volume currently being opened should not be controlled by DFSMSrmm. DFSMSrmm checks that the request is valid, but some part of the validity checking process fails.

Module: EDGIX100

System Action: The current open request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U1601

Explanation: DFSMSrmm is processing a call to the installation exit, EDGUX100. Prior to calling the installation exit, DFSMSrmm tries to retrieve existing information it has for the mounted or requested volume. The call to the module that retrieves the information fails.

Module: EDGIX100

System Action: The current open request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U1602

Explanation: DFSMSrmm is processing a call to the installation exit EDGUX100. Prior to calling the installation exit, DFSMSrmm attempts to retrieve existing information it has for the mounted or requested volume. The UCBSCAN macro it uses to find information in UCBs has failed.

Module: EDGBLDUX

System Action: The current request fails.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center. From the summary dump, have available the general purpose registers which are required for problem determination.

U2100

Explanation: Initialization must be performed prior to accessing the DFSMSrmm control data set.

Module: EDGMFIO

System Action: The request fails. The function being tried is indicated in the abend reason code.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U2101

Explanation: RACF tape-related security profiles could not be created, updated, or deleted as a result of an update to the DFSMSrmm control data set and the current settings for installation options. DFSMSrmm issues a message to identify the error.

Module: EDGMFIO

System Action: Processing ends. The abend reason code is the RACROUTE reason code.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U2130

Explanation: The DFSMSrmm subsystem could not issue a message because of an error in the message processing routine. The associated message is EDG2130I.

Module: EDGMFCNV

System Action: Processing ends.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U2200

Explanation: An unexpected return code was received while performing I/O to the control data set. The subtask is unable to continue processing. Message EDG2201E has been issued to give error information.

Module: EDGVRECI

System Action: DFSMSrmm detects the abend and requests an SVC dump. The current inventory management request fails.

Operator Response: Report this error to the system programmer.

Programmer Response: Follow the actions identified for EDG2201E.

System Programmer Response: If no other diagnostic information is available to resolve the problem, report this error to the IBM Support Center.

U2201

Explanation: An error is encountered in vital record processing. The error can be one of the following:

- The SORT program return code is greater than 0. DFSMSrmm also issues message EDG2220E to the MESSAGE file.
- Location and library name validation failed with a return code greater than 8. DFSMSrmm also issues message EDG2222E to the MESSAGE file.

System Action: The current VRSEL inventory management requests fails.

Module: EDGVRECM

Operator Response: None.

System Programmer Response: If the problem occurred performing a sort, correct the error that caused the SORT program to fail. Use the //SORTDIAG DD statement to trigger sort messages to the //SYSOUT file. These DD statements must be added to the DFRMM started procedure.

If the failure occurred during location and library name validation, follow the actions described for message EDG2222E. If the problem cannot be resolved by following the message actions report the problem to the IBM Support Center. Provide the system dump written as a result of the ABEND U2201.

U2220

Explanation: An error is encountered dynamically allocating a required file. DFSMSrmm issues message EDG2223E which contains the DYNALLOC return and reason code. Message EDG2223E is found in the message data set.

System Action: The current VRSEL inventory management requests fails.

Module: EDGVRECI

Programmer Response: Follow the actions identified for EDG2223E. For an explanation of the DYNALLOC codes, refer to *z/OS MVS Programming: Authorized Assembler Services Guide*.

Operator Response: None.

U2222

Explanation: An internal error occurred in DFSMSrmm.

System Action: The current requests fails.

Module: None.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U2410

Explanation: An unexpected return code was received while performing I/O to the control data set. The subtask is unable to continue processing.

Module: EDGMUPD

System Action: An explanatory message, EDG2440I, is issued. DFSMSrmm detects the abend and the system writes an SVC dump. Expiration processing and any other requested inventory management functions end.

Operator Response: Report this error to the system programmer.

System Programmer Response: If you are unable to resolve the problem using the available diagnostic information, report this error to the IBM Support Center.

U2420

Module: EDGMUPD

Explanation: An unexpected return code was received from the installation exit common processing routine.

System Action: DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

Operator Response: Report this error to the system programmer.

System Programmer Response: Report this error to the IBM Support Center.

U2430

Explanation: An unexpected return code was received performing a function for a volume in a volume catalog. The subtask is unable to continue processing.

Module: EDGMUPD

System Action: An explanatory message, number EDG2433I, is issued. DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

Operator Response: Report this error to the system programmer.

System Programmer Response: Refer to the actions for message EDG2433I.

U2440

Explanation: An unexpected return code was received while updating action status information for a volume in the DFSMSrmm control data set. The subtask is unable to continue processing.

Module: EDGMUPD

System Action: An explanatory message, one of EDG2430I, EDG2431I, or EDG2432I is issued. DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

Operator Response: Report this error to the system programmer.

System Programmer Response: Refer to the actions for any accompanying message. If reporting the problem to the IBM Support Center, have available the summary dump information.

U2450

Explanation: An unexpected return code was received while validating software level, location name for a volume, or obtaining volume information from the volume catalog. The subtask is unable to continue processing.

Module: EDGMUPD

System Action: An explanatory message, number EDG2441I, is issued. DFSMSrmm detects the abend and writes an SVC dump. Expiration processing and any other requested inventory management functions end.

Operator Response: Report this error to the system programmer.

System Programmer Response: Refer to the actions for message EDG2441I.

U2460

Explanation: An unexpected return code was received while performing storage location management processing. The subtask is unable to continue processing.

Module: EDGMUPD

System Action: DFSMSrmm issues message EDG2442E. DFSMSrmm detects the abend and writes an SVC dump. Storage location management processing and any other requested inventory management functions end.

Operator Response: Report this error to the system programmer.

System Programmer Response: If no other diagnostic information is available to resolve the problem, then inform the Software Support Center.

U2603

Explanation: An unexpected return code was received from the external sort. The subtask is unable to continue processing.

Module: EDGXRPTX

System Action: DFSMSrmm detects the abnormal end (abend) and writes an SVC dump. All inventory management functions end.

Operator Response: None.

Programmer Response: Correct the error that caused the SORT program to fail and resubmit the job. If the problem occurs again, report this error to the system programmer.

System Programmer Response: When your external SORT program is DFSORT, use the SORTDIAG DD statement to trigger sort messages to the SYSOUT file. These DD statements must be added to the DFRMM started procedure and should be coded as follows:

```
//SORTDIAG DD DUMMY
//SYSOUT   DD SYSOUT=*
```

Refer to *z/OS DFSORT Messages, Codes and Diagnosis Guide* for information about using the SORTDIAG DD and *z/OS DFSORT Application Programming Guide* for information about obtaining DFSORT messages.

To resolve the problem, change DFSORT options using the DFSPARM DD statement. Refer to *z/OS DFSORT Application Programming Guide* for details about DFSORT options and how to use the DFSPARM DD. If

| the problem can not be resolved and no other
| diagnostic information is available to resolve the
| problem, report the error to the IBM Support Center.

U3000

Explanation: A DFSMSrmm OPEN/CLOSE/EOV routine was invoked for an undetermined OPEN/CLOSE/EOV exit.

Module: EDGOCEXT or EDGOCEOV

System Action: Processing fails.

Operator Response: None

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3001

Explanation: A DFSMSrmm OPEN/CLOSE/EOV routine was invoked for an undetermined OPEN/CLOSE/EOV exit.

Module: EDGOCEOV

System Action: The current request fails.

Operator Response: None.

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3002

Explanation: DFSMSrmm returned an unsupported return code value to the module for label anomaly processing.

Module: EDGOCEOV

System Action: The current request fails.

Operator Response: None.

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3003

Explanation: DFSMSrmm returned an unsupported return code value to the module for file validation processing.

Module: EDGOCEOV

System Action: The current request fails.

Operator Response: None.

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3004

Explanation: An error occurred during O/C/EOV processing.

Module: EDGOCEOV

System Action: The current request fails.

Operator Response: None.

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3005

Explanation: DFSMSrmm does not support the request.

Module: EDGOCEOV

System Action: The current request fails.

Operator Response: None.

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

U3006

Explanation: DFSMSrmm issues a message but message processing fails. DFSMSrmm returns the return code and reason code from the message processing routine in register 2 and register 3.

Module: EDGOCEXT

System Action: DFSMSrmm writes a system dump and fails the current request.

Operator Response: None.

Programmer Response: Report this error to the system programmer.

System Programmer Response: A logic error occurred during OPEN/CLOSE/EOV processing. Report this error to the IBM Support Center.

Appendix D. Modifier Keywords

Use this topic to help you build modifier keywords to add to your keyword string. The modifier keywords are optional, but can help restrict the scope of a software database search to a manageable number of matches. You can specify modifier keywords in any order. Select a modifier keyword that describes a failure-related function from Table 7.

Table 7. Function Modifier Keywords

Keyword	Failing Function
API	DFSMSrmm application programming interface
AUDIT	Audit function of EDGAUD
BACKUP	Control data set backup performed by the DFSMSrmm EDGBKUP utility
CATSYNCH	Catalog synchronize
CATSYNCHVERIFY	Catalog synchronize verify processing performed by the DFSMSrmm inventory management EDGHSKP utility
CDS	DFSMSrmm control data set
DIALOG	DFSMSrmm dialog
DSTORE	Storage location management processing performed by the DFSMSrmm inventory management EDGHSKP utility
DSTOREBYLOC	Storage location management processing only for defined locations
DUPVOL	Duplicate volume support
EDGTVEXT	DFSMShsm interface
EXPROC	Expiration processing performed by the DFSMSrmm inventory management EDGHSKP utility
EXTENDEDBIN	Extended bin support
EXTRACT	Report extract data set
HSKPBACKUP	Control data set backup performed by the DFSMSrmm inventory management EDGHSKP utility
INERSERASE	Erase function of EDGINERS
INERSINIT	Initialize function of EDGINERS
INSEQUENCE	Assigning volumes to bins in sequence during storage location management processing
JOURNAL	DFSMSrmm journal data set
MOVEBY	Moving volumes by set or volume
REASSIGN	Reassign locations and bins for moving volumes during storage location management processing
REPORTGENERATOR	Report Generator functions
RETAINBY	Retaining volumes by set or volume

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Table 7. Function Modifier Keywords (continued)

Keyword	Failing Function
REUSEBIN	Reusing bins when a volume move is started or after the volume move is confirmed
RPTEXT	Report extract creation performed by the DFSMSrmm inventory management EDGHSKP utility
SECURE	Security report function of EDGAUD
SMSTAPE	Audit of system-managed volumes performed by the DFSMSrmm EDGUTIL utility
TSOCOMMAND	DFSMSrmm TSO commands
UTILCHANGE	Change function of EDGUTIL
UTILCREATE	Create function of EDGUTIL
UTILMEND	Mend function of EDGUTIL
UTILVERIFY	Verify function of EDGUTIL
VRSEL	Vital record processing by EDGHSKP
VRSELNEW	VRS enhancements
VRSELVERIFY	Vital record VERIFY processing by EDGHSKP
VTS	DFSMSrmm virtual tape server support

Appendix E. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Volume I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, 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.

z/OS Information

z/OS information is accessible using screen readers with the BookServer/Library Server versions of z/OS books in the Internet library at:

`http://www.ibm.com/servers/eserver/zseries/zos/bkserv/`

One exception is command syntax that is published in railroad track format; screen-readable copies of z/OS books with that syntax information are separately available in HTML zipfile form upon request to mhvrcfs@us.ibm.com.

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Glossary

This glossary defines technical terms and abbreviations used in DFSMS documentation. If you do not find the term you are looking for, refer to the index of the appropriate DFSMS manual or view the *Glossary of Computing Terms* located at:

http://www.ibm.com/ibm/terminology/

This glossary includes terms and definitions from:

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- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.

The following cross-reference is used in this glossary:

See: This refers the reader to (a) a related term, (b) a term that is the expanded form of an abbreviation or acronym, or (c) a synonym or more preferred term.

A

abend. Abnormal end of task.

AL. American National Standards Label.

AMODE. Addressing mode.

ANDVRS. An RMM ADDVRS TSO subcommand operand. See also *Using AND*.

ANSI. American National Standards Institute.

APAR. Authorized program analysis report.

API. Application Programming interface.

ASA. American Standards Association.

assigned date. The date that the volume is assigned to the current owner. Assigned date is not meaningful for a scratch volume.

AUL. ANSI and user header or trailer label.

automated tape library data server. A device consisting of robotic components, cartridge storage areas, tape subsystems, and controlling hardware and software, together with the set of tape volumes that reside in the library and can be mounted on the library tape drives. Contrast with *manual tape library*. See also *tape library*.

automatic cartridge loader. An optional feature of the 3480 Magnetic Tape Subsystem that allows preloading of multiple tape cartridges. This feature is standard in the 3490 Magnetic Tape Subsystem.

automatic recording. In DFSMSrmm, the process of recording information about a volume and the data sets on the volume in the DFSMSrmm control data set at open or close time.

availability. For a storage subsystem, the degree to which a data set or object can be accessed when requested by a user.

B

backup. The process of creating a copy of a data set or object to be used in case of accidental loss.

basic catalog structure (BCS). The name of the catalog structure in the catalog environment.

BCS. Basic catalog structure.

bin number. The specific shelf location where a volume resides in a storage location; equivalent to a rack number in the removable media library. See also *shelf location*.

BLP. Bypass label processing.

BTLS. Basic Tape Library Support.

built-in storage location. One of the Removable Media Manager defined storage locations: LOCAL, DISTANT, and REMOTE.

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C

cache fast write. A storage control capability in which the data is written directly to cache without using nonvolatile storage. Cache fast write is useful for temporary data or data that is readily recreated, such as the sort work files created by DFSORT. Contrast with *DASD fast write.*

cartridge eject. For an IBM Total Storage Enterprise Automated Tape Library (3494), IBM TotalStorage Enterprise Automated Tape Library (3495), or a manual tape library, the act of physically removing a tape cartridge, usually under robot control, by placing it in an output station. The software logically removes the cartridge by deleting or updating the tape volume record in the tape configuration database. For a manual tape library, the act of logically removing a tape cartridge from the manual tape library by deleting or updating the tape volume record in the tape configuration database.

cartridge entry. For either an IBM Total Storage Enterprise Automated Tape Library (3494), IBM TotalStorage Enterprise Automated Tape Library (3495), or a manual tape library, the process of logically adding a tape cartridge to the library by creating or updating the tape volume record in the tape configuration database. The cartridge entry process includes the assignment of the cartridge to scratch or private category in the library.

Cartridge System Tape. The base tape cartridge media used with 3480 or 3490 Magnetic Tape Subsystems. Contrast with *Enhanced Capacity Cartridge System Tape*.

cell. A single cartridge location within an automated tape library dataserver. See also *rack number.*

circular file. A type of file that appends data until full. Then, starting at the beginning of the file, subsequent incoming data overwrites the data already there.

command line. On a display screen, a display line usually at the bottom of the screen in which only commands can be entered.

concurrent copy. A function to increase the accessibility of data by enabling you to make a consistent backup or copy of data concurrent with the usual application program processing.

confirmation panel. A DFSMSrmm panel that lets you tell DFSMSrmm to continue or stop a delete or release action. You specify whether or not you want to confirm delete or release requests in your dialog user options.

container. A receptacle in which one or more exported logical volumes can be stored. A stacked volume containing one or more logical volumes and residing outside a virtual tape server library is considered to be the container for those volumes.

container volume. See *container*.

control data set. A VSAM key-sequenced data set that contains the complete inventory of your removable media library, as well as the movement and retention policies you define. In the control data set DFSMSrmm records all changes made to the inventory, such as adding or deleting volumes.

control data set ID. A one-to-eight character identifier for the DFSMSrmm control data set used to ensure that, in a multi-system, multi-complex environment, the correct management functions are performed.

convenience input. The process of adding a small number of tape cartridges to the IBM TotalStorage Enterprise Automated Tape Library (3494) and the IBM TotalStorage Enterprise Automated Tape Library (3495) without interrupting operations, by inserting the cartridges directly into cells in a convenience input station.

convenience input/output station. A transfer station with combined tape cartridge input and output functions in the IBM TotalStorage Enterprise Automated Tape Libraries (3494) only.

convenience output. The process of removing a small number of tape cartridges from the IBM TotalStorage Enterprise Automated Tape Library (3494) or the IBM TotalStorage Enterprise Automated Tape Library (3495) without interrupting operations, by removing the cartridges directly from cells in a convenience input station.

convenience output station. A transfer station, used by the operator to remove tape cartridges from the automated tape library dataserver, which is accessible from outside the enclosure area.

conversion. In DFSMSrmm, the process of moving your removable media library inventory from another media management system to DFSMSrmm. DFSMSrmm manages the inventory and policies once you have converted it.

create date. Create date for a data set is the date that the data set is written to tape. Create date can also be the date a data set was read if it was created before DFSMSrmm is in use. Create date is updated each time a data set is replaced and not extended. Create date for volumes and other resources defined to DFSMSrmm is the date the resource is defined to DFSMSrmm or the date specified on the command as the create date.

D

DASD. Direct access storage device.

DASD fast write. An extended function of some models of the IBM 3990 Storage Control in which data is written concurrently to cache and nonvolatile storage

and automatically scheduled for destaging to DASD. Both copies are retained in the storage control until the data is completely written to the DASD, providing data integrity equivalent to writing directly to the DASD. Use of DASD fast write for system-managed data sets is controlled by storage class attributes to improve performance. See also *dynamic cache management*. Contrast with *cache fast write*.

DASD volume. A DASD space identified by a common label and accessed by a set of related addresses. See also *volume, primary storage, migration level 1, migration level 2*.

data column. A vertical arrangement of identical data items, used on list panels to display an attribute, characteristic, or value of one or more objects.

data control block (DCB). A control block used by access method routines in storing and retrieving data.

data entry panel. A panel in which the user communicates with the system by filling in one or more fields.

Data Facility Storage Management Subsystem (DFSMS). An operating environment that helps automate and centralize the management of storage. To manage storage, SMS provides the storage administrator with control over data class, storage class, management class, storage group, and automatic class selection routine definitions.

Data Facility Sort. An IBM licensed program that is a high-speed data processing utility. DFSORT provides an efficient and flexible way to handle sorting, merging, and copying operations, as well as providing versatile data manipulation at the record, field, and bit level.

DCB. Data control block.

device. This term is used interchangeably with unit. You mount a tape on a unit or device, such as a 3490.

DFSMSdfp. A DFSMS functional component or base element of z/OS, that provides functions for storage management, data management, program management, device management, and distributed data access.

DFSMSdss. A DFSMS functional component or base element of z/OS, used to copy, move, dump, and restore data sets and volumes.

DFSMShsm. A DFSMS functional component or base element of z/OS, used for backing up and recovering data, and managing space on volumes in the storage hierarchy.

DFSMShsm-managed volume. (1) A primary storage volume, which is defined to DFSMShsm but which does not belong to a storage group. (2) A volume in a storage group, which is using DFSMShsm automatic dump, migration, or backup services. Contrast with *system-managed volume, DFSMSrmm-managed volume*.

DFSMShsm-owned volume. A storage volume on which DFSMShsm stores backup versions, dump copies, or migrated data sets.

DFSMSrmm. A DFSMS functional component or base element of z/OS, that manages removable media.

DFSMSrmm control data set. See *control data set*.

DFSMSrmm-managed volume. A tape volume that is defined to DFSMSrmm. Contrast with *system-managed volume, DFSMShsm-managed volume*.

disaster recovery. A procedure for copying and storing an installation's essential business data in a secure location, and for recovering that data in the event of a catastrophic problem. Compare with *vital records*.

DISTANT. A DFSMSrmm built-in storage location ID. See *built-in storage location*.

dual copy. A high availability function made possible by nonvolatile storage in some models of the IBM 3990 Storage Control. Dual copy maintains two functionally identical copies of designated DASD volumes in the logical 3990 subsystem, and automatically updates both copies every time a write operation is issued to the dual copy logical volume.

dump class. A set of characteristics that describes how volume dumps are managed by DFSMShsm.

duplexing. The process of writing two sets of identical records in order to create a second copy of data.

dynamic cache management. A function that automatically determines which data sets will be cached based on the 3990 subsystem load, the characteristics of the data set, and the performance requirements defined by the storage administrator.

E

EHPCT. Extended High Performance Cartridge Tape.

eject. The process used to remove a tape volume from a system-managed library. For an automated tape library dataserver, the volume is removed from its cell location and moved to the output station. For a manual tape library, the volume is not moved, but the tape configuration database is updated to show that the volume no longer resides in the manual tape library.

empty bin. A bin that can accept a volume.

Enhanced Capacity Cartridge System Tape. Cartridge system tape with increased capacity that can only be used with 3490E Magnetic Tape Subsystems. Contrast with *Cartridge System Tape*.

entry panel. See *data entry panel*.

EREP. Environmental Record Editing and Printing program.

expanded output. The output produced by the DFSMSrmm application programming interface when you specify OUTPUT=FIELDS and EXPAND=YES. For those subcommands for which expanded output applies, your application program receives more variable data than for standard output.

expiration. The process by which data sets and volumes are identified as available for reuse. In DFSMSrmm, all volumes have an expiration date or retention period set for them either by vital record specification policy, by user-specified JCL when writing a data set to the volume, or by an installation default. When a volume reaches its expiration date or retention period, it becomes eligible for release.

expiration date. The date at which a file is no longer protected against automatic deletion by the system.

expiration processing. The process of inventory management that ensures expired volumes are released and carries out required release actions on those volumes.

export. The operation to remove one or more logical volumes from a virtual tape server library. First, the list of logical volumes to export must be written on an export list volume and then, the export operation itself must be initiated.

exported logical volume. A logical volume that has gone through the export process and now resides on a stacked volume outside a virtual tape server library.

export list volume. A virtual tape server logical volume containing the list of logical volumes to export.

extended bin support. Enhanced options for managing shelf locations in a storage location including optimized use of the number of bins.

extended extract data set file. A data set created using the DFSMSrmm EDGJRPT exec. The records within the data set combine data set and volume information into single records.

extended record. A record in the DFSMSrmm extract data set that is mapped by the EDGXREXT mapping macro. The record contains both data set and volume information.

external label. A label attached to the outside of a tape cartridge that is to be stored in an IBM 3494 Tape Library Dataserver or IBM 3495 Tape Library Dataserver. The label might contain the DFSMSrmm rack number of the tape volume.

extract data set. A data set that you use to generate reports.

extract data set record. A record in an extract data set that is mapped by a DFSMSrmm mapping macro.

F

field format. Field format is where the output consists of Structured Field Introducers and variable data rather than output in line format.

filtering. The process of selecting data sets based on specified criteria. These criteria consist of fully or partially-qualified data set names or of certain data set characteristics.

FIPS. Federal Information Processing Standard.

FMID. Function modification identifier.

FRR. Functional recovery routines.

G

generation data group (GDG). A collection of data sets kept in chronological order. Each data set is a generation data set.

generation data set (GDS). One generation of a generation data group.

generation number. The number of a generation within a generation data group. A zero represents the most current generation of the group, a negative integer (-1) represents an older generation and, a positive integer (+1) represents a new generation that has not yet been cataloged.

GDG. Generation data group.

GDS. Generation data set.

giga (G). The information-industry meaning depends upon the context:

1. G = 1 073 741 824(2^{30}) for real and virtual storage.
2. G = 1 000 000 000 for disk storage capacity (for example, a 4 GB fixed disk).
3. G = 1 000 000 000 for transmission rates.

global resource serialization (GRS). A component of z/OS used for serializing use of system resources and for converting hardware reserves on DASD volumes to data set enqueues.

GPR. General purpose register.

GRS. Global resource serialization.

grouping. When creating a report, grouping sorts report output contents into separate groups (and separate pages) based upon field contents.

guaranteed space. A storage class attribute indicating the space is to be preallocated when a data set is created. If you specify explicit volume serial numbers, SMS honors them. If space to satisfy the allocation is not available on the user-specified volumes, the allocation fails.

H

hardware configuration definition (HCD). An interactive interface in MVS that enables an installation to define hardware configurations from a single point of control.

HCD. Hardware configuration definition.

high-capacity input station. A transfer station, used by the operator to add tape cartridges to the IBM TotalStorage Enterprise Automated Tape Library (3494) or the IBM TotalStorage Enterprise Automated Tape Library (3495), which is inside the enclosure area.

high capacity output station. A transfer station, used by the operator to remove tape cartridges from the automated tape library dataserver, which is inside the enclosure area.

home. See *home location*.

home location. For DFSMSrmm, the place where DFSMSrmm normally returns a volume when the volume is no longer retained by vital records processing.

HPCT. High Performance Cartridge Tape.

I

ICETOOL. The DFSORT multipurpose data processing and reporting utility.

ID. Identifier.

IDRC. Improved data recording capability.

import. The operation to enter previously exported logical volumes residing on a stacked volume into a virtual tape server library. First, the list of logical volumes to import must be written on an import list volume and the stacked volumes must be entered, and then, the import operation itself must be initiated.

import list volume. A virtual tape server logical volume containing the list of logical volumes to import. This list can contain individual logical volumes to import and/or it can contain a list of stacked volumes in which all logical volumes on the stacked volume are imported.

imported logical volume. An exported logical volume that has gone through the import process and can be referenced as a tape volume within a virtual tape server library. An imported logical volume originates from a stacked volume that went through the export process.

improved data recording capability (IDRC). A recording mode that can increase the effective cartridge data capacity and the effective data rate when enabled and used. IDRC is always enabled on the 3490E Magnetic Tape Subsystem.

installation defined storage location. A storage location defined using the LOCDEF command in the EDGRMMxx parmlib member.

Interactive Storage Management Facility (ISMF). The interactive interface of DFSMS that allows users and storage administrators access to the storage management functions.

Interactive Problem Control System (IPCS). A system facility that allows interactive problem analysis.

Interactive System Productivity Facility (ISPF). An IBM licensed program used to develop, test, and run interactive, panel-driven dialogs.

internal label. The internal label for standard label tapes is recorded in the VOL1 header label, magnetically recorded on the tape media.

in transit. A volume state where a volume must be moved from one location to another and DFSMSrmm believes that the move has started, but has not yet received confirmation that the move is complete. For a volume moving from a system-managed library, the move starts when the volume is ejected.

inuse bin. A bin that is occupied by a volume and into which no volume can be assigned.

inventory management. The regular tasks that need to be performed to maintain the control data set. See also *expiration processing*, *storage location management processing*, and *vital record processing*.

IPCS. Interactive Problem Control System.

IPL. Initial program load.

ISPF. Interactive System Productivity Facility.

ISMF. Interactive Storage Management Facility.

ISO. International Organization for Standardization.

J

JCL. Job control language.

JES2. Job entry subsystem 2.

JES3. Job entry subsystem 3.

JFCB. Job file control block.

journal. A sequential data set that contains a chronological record of changes made to the DFSMSrmm control data set. You use the journal when you need to reconstruct the DFSMSrmm control data set.

K

keyword. A predefined word that is used as an identifier.

kilo (K). The information-industry meaning depends upon the context:

1. K = 1024(2^{10}) for real and virtual storage.
2. K = 1000 for disk storage capacity (for example, a 4 KB fixed disk).
3. K = 1000 for transmission rates.

L

Library Control System. The Object Access Method component that controls optical and tape library operations and maintains configuration information.

line format. Line format is where text and variable data are formatted into lines suitable for displaying at a terminal or printing as printed documentation.

LOCAL. A DFSMSrmm built-in storage location ID. See *built-in storage location*.

location name. A name given to a place for removable media that DFSMSrmm manages. A location name can be the name of a system-managed library, a storage location name, or the location *SHELF*, identifying shelf space outside a system-managed library or storage locations.

logical volume. Logical volumes have a many-to-one association with physical tape media and are used indirectly by MVS applications. They reside in a Virtual Tape Server or on exported stacked volumes. Applications can access the data on these volumes only when they reside in a Virtual Tape Server which makes the data available via its tape volume cache or after the data has been copied to a physical volume through the use of special utilities.

low-on-scratch management. The process by which DFSMSrmm replenishes scratch volumes in a system-managed library when it detects that there are not enough available scratch volumes.

LSR. Local shared resource.

M

management class. (1) A named collection of management attributes describing the retention and backup characteristics for a group of data sets, or for a group of objects in an object storage hierarchy. For objects, the described characteristics also include class transition. (2) In DFSMSrmm, if assigned by ACS routine to system-managed tape volumes, management class can be used to identify a DFSMSrmm vital record specification.

manual cartridge entry processing. The process by which a volume is added to the tape configuration database when it is added to a manual tape library. DFSMSrmm can initiate this process.

manual mode. An operational mode where DFSMSrmm runs without recording volume usage or validating volumes. The DFSMSrmm TSO commands, ISPF dialog, and inventory management functions are all available in manual mode.

manual tape library. An installation-defined set of stand-alone tape drives and the set of tape volumes that can be mounted on those drives.

master system. The MVS system where the master DFSMSrmm control data set resides.

master volume. A private volume that contains data that is available for write processing based on the DFSMSrmm EDGRMMxx parmlib MASTEROVERWRITE operand.

media format. The type of volume, recording format and techniques used to create the data on the volume.

media library. Removable media library.

media management system. A program that helps you manage removable media. DFSMSrmm is a media management system.

media name. An up to 8 character value that describes the shape or type of removable media stored in a storage location. Examples of media name are: SQUARE, ROUND, CARTRDGE, 3480.

media type. A value that specifies the volume's media type. Media type can be specified as *, CST, ECCST, HPCT, or EHPCT.

MEDIA 1. Cartridge system tape.

MEDIA 2. Enhanced capacity cartridge system tape.

MEDIA 3. High performance cartridge tape.

MEDIA 4. Extended high performance cartridge tape

mega (M). The information-industry meaning depends upon the context:

1. M = 1 048 576(2^{20}) for real and virtual storage.
2. M = 1 000 000 for disk storage capacity (for example, a 4 MB fixed disk).
3. M = 1 000 000 for transmission rates.

migration. The process of moving unused data to lower cost storage in order to make space for high-availability data. If you wish to use the data set, it must be recalled. See also *migration level 1, migration level 2*.

migration level 1. DFSMShsm-owned DASD volumes that contain data sets migrated from primary storage volumes. The data can be compressed. See also *storage hierarchy*. Contrast with *primary storage, migration level 2*.

migration level 2. DFSMShsm-owned tape or DASD volumes that contain data sets migrated from primary storage volumes or from migration level 1 volumes. The data can be compressed. See also *storage hierarchy*. Contrast with *primary storage, migration level 1*.

moving-in volume. A volume for which a move into a bin has been started, but not yet confirmed.

moving-out volume. A volume for which a move out of a bin has been started, but not yet confirmed.

MVS image. A single occurrence of the MVS/ESA operating system that has the ability to process work.

N

name vital record specification. A vital record specification used to define additional retention and movement policy information for data sets or volumes.

NEXTVRS. An RMM ADDVRS TSO subcommand operand. See also *Using Next*.

NL. No label.

nonscratch volume. A volume that is not scratch, which means it has valid or unexpired data on it. Contrast with *scratch*.

NSL. Nonstandard label.

O

OAM. Object access method.

object. A named byte stream having no specific format or record orientation.

object access method (OAM). An access method that provides storage, retrieval, and storage hierarchy management for objects and provides storage and retrieval management for tape volumes contained in system-managed libraries.

OPC/ESA. Operations Planning and Control/Enterprise Systems Architecture.

optical volume. Storage space on an optical disk, identified by a volume label. See also *volume*.

optical disk. A disk that uses laser technology for data storage and retrieval.

option line. Command line.

owner. In DFSMSrmm, a person or group of persons defined as a DFSMSrmm user owning volumes. An owner is defined to DFSMSrmm through an owner ID.

owner ID. In DFSMSrmm, an identifier for DFSMSrmm users who own volumes.

P

parallel. During conversion, when you install DFSMSrmm concurrently with an existing media management system, it is called running in parallel.

partitioned data set (PDS). A data set on direct access storage that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

PDS. Partitioned data set.

permanent data set. A user-named data set that is normally retained for longer than the duration of a job or interactive session. Contrast with *temporary data set*.

PF. Program function key.

physical stacked volume. See *stacked volume*.

physical volume. A volume that has a one-to-one association with physical tape media and which is used directly by MVS applications. It may reside in an automated tape library dataserver or be kept on shelf storage either at vault sites or within the data center where it can be mounted on stand-alone tape drives.

pool. A group of shelf locations in the removable media library whose rack numbers share a common prefix. The shelf locations are logically grouped so that the volumes stored there are easier to find and use.

pool ID. The identifier for a pool. You define pool IDs in parmlib member EDGRMMxx.

pooling. The process of arranging shelf locations in the removable media library into logical groups.

pool storage group. A type of storage group that contains system-managed DASD volumes. Pool storage groups allow groups of volumes to be managed as a single entity. See also *storage group*.

primary space allocation. Amount of space requested by a user for a data set when it is created. Contrast with *secondary space allocation*.

primary storage. A DASD volume available to users for data allocation. The volumes in primary storage are called primary volumes. See also *storage hierarchy*. Contrast with *migration level 1, migration level 2*.

primary vital record specification. The first retention and movement policy that DFSMSrmm matches to a data set and volume used for disaster recovery and vital record purposes. See also vital record specification and secondary vital record specification.

private tape volume. A volume assigned to specific individuals or functions.

protect mode. In protect mode, DFSMSrmm validates all volume requests.

pseudo-generation data group. A collection of data sets, using the same data set name pattern, to be managed like a generation data group. The ¬ masking character is used in DFSMSrmm to identify the characters in the pattern that change with each generation.

PSW. Program status word.

PTF. Program temporary fix.

pull list. A list of scratch volumes to be pulled from the library for use.

PUT. Program update tape.

R

RACF. Resource Access Control Facility.

rack number. A six-character identifier that corresponds to a specific volume's shelf location in the installation's removable media library, and is the identifier used on the external label of the volume to identify it. The rack number identifies the pool and the external volume serial number for a volume residing in an automated tape library dataserver. The rack number identifies the pool, the external volume serial, and shelf location number for a volume not residing in an automated tape library dataserver. The rack number is not written by the tape drive. It exists as an entry in the DFSMSrmm control data set and on the external label of the tape. See also *shelf location.*

rack pool. A group of shelves that contains volumes that are generally read-only.

ready to scratch. This describes the condition where a volume is eligible for scratch processing while it resides in a storage location. Since no other release actions are required, the volume can be returned to scratch directly from the storage location.

recording format. For a tape volume, the format of the data on the tape; for example, 18 tracks or 36 tracks.

record-only mode. The operating mode where DFSMSrmm records information about volumes as you use them, but does not validate or reject volumes.

recovery. The process of rebuilding data after it has been damaged or destroyed, often by using a backup copy of the data or by reapplying transactions recorded in a journal.

relative start generation. Relative start generation zero is the latest generation of a tape. Relative start generation -1 is the previous generation of that tape. Relative start generation -2 is the generation before the previous one.

REMOTE. A DFSMSrmm built-in storage location ID. See also *built-in storage location*.

removable media. See also *volume*.

removable media library. The volumes that are available for immediate use, and the shelves where they could reside.

report. Data that has been selected and extracted according to the reporting tool, the type of report desired, and the formatting criteria.

reporting tool. A REXX exec that builds control statements to enable you to create reports using a reporting utility.

report type. A data source and how it is mapped.

Resource Access Control Facility (RACF). An IBM licensed program that provides for access control by identifying and verifying the users to the system; authorizing access to protected resources; logging the detected unauthorized attempts to enter the system; and logging the detected accesses to protected resources.

Resource Group. A collection of structured fields that describe the attributes of a resource such as a volume.

Restructured Extended Executor (REXX) Language. A general-purpose, high-level programming language, particularly suitable for EXEC procedures or programs for personal computing.

retention date. Retention date can be the date that a data set or volume is retained by a vital record specification or the date of the inventory management run when the data set or volume is no longer retained by a vital record specification.

retention period. The time for which DFSMSrmm retains a volume or data set before considering it for release. You can retain a data set or volume as part of disaster recovery or vital records management. You set

a retention period through a vital record specification that overrides a data set's expiration date.

retention type. The types of retention for which DFSMSrmm retains a volume or data set before considering it for release. The retention types for data sets are BYDAYSCYCLE, CYCLES, DAYS, EXTRADAYS, LASTREFERENCEDAYS, UNTILEXPIRED, and WHILECATALOG. The retention types for volumes are DAYS and CYCLE.

REXX. Restructured Extended Executor Language.

RMF. Resource Measurement Facility.

RMM complex (RMMplex). One or more MVS images that share a common DFSMSrmm control data set.

RMODE. Residence mode.

S

SAF. System Authorization Facility.

scratch. The status of a tape volume that is available for general use, because the data on it is incorrect or is no longer needed. You request a scratch volume when you omit the volume serial number on a request for a tape volume mount.

scratch pool. The collection of tape volumes from which requests for scratch tapes can be satisfied. Contrast with *rack pool*.

scratch processing. The process for returning a volume to scratch status once it is no longer in use and has no outstanding release actions pending.

scratch tape. See *scratch volume*.

scratch volume. A tape volume that contains expired data only. See *scratch*.

SDB. Structured database.

SDSF. Spool display and search facility.

secondary space allocation. Amount of additional space requested by the user for a data set when primary space is full. Contrast with *primary space allocation*.

secondary vital record specification. The second retention and movement policy that DFSMSrmm matches to a data set and volume used for disaster recovery and vital records purposes. See also vital record specification and primary vital record specification.

SFI. Structured field introducer.

shelf. A place for storing removable media, such as tape and optical volumes, when they are not being written to or read.

shelf location. A single space on a shelf for storage of removable media. DFSMSrmm defines a shelf location in the removable media library by a rack number, and a shelf location in a storage location by a bin number. See also *rack number* and *bin number.*

shelf-management. Is the function provided to manage the placement of volumes in individual slots in a location. Shelf-management is provided for the removable media library using rack numbers. For storage locations it is optional as defined by the LOCDEF options in parmlib and uses bin numbers.

shelf-resident volume. A volume that resides in a non-system-managed tape library.

shelf space. See *shelf*.

SL. Standard label.

slot. See *shelf location*.

SMF. System management facility.

SMP/E. System Modification Program Extended.

SSI. Subsystem interface.

stacked volume. A volume that has a one-to-one association with physical tape media and which is used in a virtual tape server to store logical volumes. A stacked volume is not used by MVS applications but by the virtual tape server and its associated utilities. It may be removed from a virtual tape server to allow transportation of logical volumes to a vault or to another virtual tape server.

standard label. An IBM standard tape label.

standard output. The output produced by the DFSMSrmm application programming interface when you specify OUTPUT=LINES or EXPAND=NO with OUTPUT=FIELDS.

storage administrator. A person in the data processing center who is responsible for defining, implementing, and maintaining storage management policies.

storage class. A collection of storage attributes that identify performance goals and availability requirements, defined by the storage administrator, used to select a device that can meet those goals and requirements.

storage group. A collection of storage volumes and attributes, defined by the storage administrator. The collections can be a group of DASD volumes or tape volumes, or a group of DASD volumes and optical volumes treated as a single object storage hierarchy.

storage location. A location physically separate from the removable media library where volumes are stored for disaster recovery, backup, and vital records management.

(storage) location dominance. The priority used by DFSMSrmm to decide where to move a volume within the removable media library during vital record specification processing. It covers all the locations; SHELF, storage locations, and system-managed tape libraries.

storage location management processing. The process of inventory management that assigns a shelf location to volumes that have moved as a result of vital record processing. See also *vital record processing.*

stripe. In DFSMS, the portion of a striped data set, such as an extended format data set, that resides on one volume. The records in that portion are not always logically consecutive. The system distributes records among the stripes such that the volumes can be read from or written to simultaneously to gain better performance. Whether it is striped is not apparent to the application program.

striping. A software implementation of a disk array that distributes a data set across multiple volumes to improve performance.

structured field. Output from the DFSMSrmm application programming interface consisting of a Structured Field Introducer and output data.

structured field introducer (SFI). An 8-byte entity that either introduces the beginning of a group of data or introduces output data that immediately follows the introducer.

subsystem. A special MVS task that provides services and functions to other MVS users. Requests for service are made to the subsystem through a standard MVS facility known as the subsystem interface (SSI). Standard MVS subsystems are the master subsystem and the job entry subsystems JES2 and JES3.

subsystem interface (SSI). The means by which system routines request services of the master subsystem, a job entry subsystem, or other subsystems defined to the subsystem interface.

SUL. IBM standard and user header or trailer label.

SVC. Supervisor call.

system-managed storage. Storage managed by the Storage Management Subsystem. SMS attempts to deliver required services for availability, performance, and space to applications. See also *system-managed storage environment*.

DFSMS environment. An environment that helps automate and centralize the management of storage. This is achieved through a combination of hardware, software, and policies. In the DFSMS environment for MVS, this function is provided by DFSMS, DFSORT, and RACF. See also *system-managed storage*.

system-managed tape library. A collection of tape volumes and tape devices, defined in the tape configuration database. A system-managed tape library can be automated or manual. See also *tape library.*

system-managed volume. A DASD, optical, or tape volume that belongs to a storage group. Contrast with *DFSMShsm-managed volume, DFSMSrmm-managed volume*.

system programmer. A programmer who plans, generates, maintains, extends, and controls the use of an operating system and applications with the aim of improving overall productivity of an installation.

T

tape configuration database (TCDB). One or more volume catalogs used to maintain records of system-managed tape libraries and tape volumes.

tape librarian. The person who manages the tape library. This person is a specialized storage administrator.

tape library. A set of equipment and facilities that support an installation's tape environment. This can include tape storage racks, a set of tape drives, and a set of related tape volumes mounted on those drives. See also *system-managed tape library, automated tape library data server*.

Tape Library Control System (TLCS). IBM program offering 5785-EAW. DFSMSrmm replaces TLCS.

tape library dataserver. A hardware device that maintains the tape inventory that is associated with a set of tape drives. An automated tape library dataserver also manages the mounting, removal, and storage of tapes. An automated tape library dataserver that supports system-managed storage of tape volumes. The IBM automated tape library dataservers include the IBM 3494 Tape Library Dataserver and the IBM 3495 Tape Library Dataserver.

tape storage group. A type of storage group that contains system-managed private tape volumes. The tape storage group definition specifies the system-managed tape libraries that can contain tape volumes. See also *storage group*.

tape subsystem. A magnetic tape subsystem consisting of a controller and devices, which allows for the storage of user data on tape cartridges. Examples of tape subsystems include the IBM 3490 and 3490E Magnetic Tape Subsystems.

tape volume. A tape volume is the recording space on a single tape cartridge or reel. See also *volume*.

TCDB. Tape configuration database.

temporary data set. An uncataloged data set whose name begins with & or &&, that is normally used only for the duration of a job or interactive session. Contrast with *permanent data set*.

tera (T). The information-industry meaning depends upon the context:

1. T = 1 099 511 627 776(2^{40}) for real and virtual storage.
2. T = 1 000 000 000 000 for disk storage capacity (for example, 4 TB of DASD storage).
3. T = 1 000 000 000 000 for transmission rates.

TLCS. Tape Library Control System.

TSO. Time Sharing Option.

U

Until Expired. Allows the use of vital record specification policies for managing retention in a location as long as the volume expiration date has not been reached.

use attribute. (1) The attribute assigned to a DAD volume that controls when the volume can be used to allocate new data sets; use attributes are *public*, *private*, and *storage*. (2) For system-managed tape volumes, use attributes are *scratch* and *private*.

user volume. A volume assigned to a user, that can contain any data and can be rewritten as many times as the user wishes until the volume expires.

using AND. A method for linking DFSMSrmm vital record specifications to create chains of vital record specifications. DFSMSrmm applies policies in chains using AND only when all the retention criteria are true.

using NEXT. A method for linking DFSMSrmm vital record specifications to create chains of vital record specifications. DFSMSrmm applies policies in chains using NEXT one vital record at a time.

V

virtual export. A method of exporting a volume by marking a volume as exported by using the DFSMSrmm subcommands.

virtual input/output (VIO) storage group. A type of storage group that allocates data sets to paging storage, which simulates a DASD volume. VIO storage groups do not contain any actual DASD volumes. See also *storage group*.

virtual tape server (VTS). This subsystem, integrated into the IBM TotalStorage Enterprise Automated Tape Library (3494) or the IBM TotalStorage Enterprise Automated Tape Library (3495), combines the random access and high performance characteristics of DASD with outboard hierarchical storage management and virtual tape devices and tape volumes.

vital record group. A set of data sets with the same name that matches to the same DFSMSrmm vital record specification.

vital record processing. The process of inventory management that determines which data sets and volumes DFSMSrmm should retain and whether a volume needs to move. These volumes and data sets have been assigned a vital record specification.

vital records. A data set or volume maintained for meeting an externally-imposed retention requirement, such as a legal requirement. Compare with *disaster recovery*.

vital record specification. Policies defined to manage the retention and movement of data sets and volumes used for disaster recovery and vital records purposes.

vital record specification management value. A one-to-eight character name defined by your installation and used to assign management and retention values to tape data sets. The vital record management value can be any value you chose to create a match between a vital record specification and data sets and volumes in your installation. By matching the vital record specifications to the data set or volumes, DFSMSrmm applies the retention and movement policies you define in the vital record specifications. During inventory management VRSEL processing, DFSMSrmm selects the correct, best matching vital record specification for a tape data set or volume.

VOLSER. Volume serial number.

volume. The storage space on DASD, tape, or optical devices, which is identified by a volume label. See also *DASD volume*, *logical volume*, *optical volume*, *stacked volume*, and *tape volume*.

volume catalog. See *tape configuration database.*.

volume expiration date. The date the volume should expire based on the highest expiration date of the data sets that reside on the volume.

volume serial number (VOLSER). (1) An identification number in a volume label that is assigned when a volume is prepared for use on the system. For standard label volumes, the volume serial number is the VOL1 label of the volume. For no label volumes, the volume serial number is the name the user assigns to the volume. (2) In DFSMSrmm, volume serial numbers do not have to match rack numbers.

VTS. Virtual tape server.

W

warning mode. The operating mode in which DFSMSrmm validates volumes as you use them, but issues warning messages when it discovers errors instead of rejecting volumes.

write-to-operator (WTO). An optional user-coded service that allows a message to be written to the system console operator informing the operator of errors and unusual system conditions that may need to be corrected.

WTO. Write-to-operator.

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