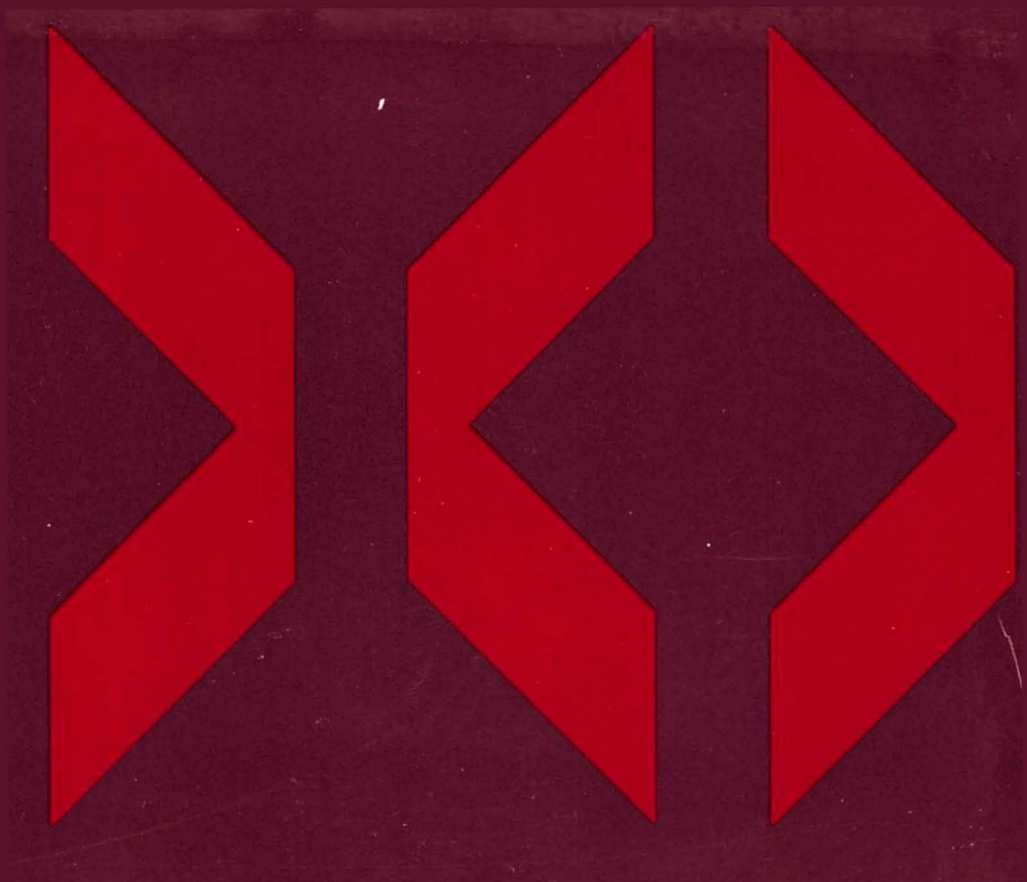
IBM

Data Facility Hierarchical Storage Manager Version 2 Release 4.0

Program Product

System Programmer's Command Reference



Order Number
SH35-0083-3

Program Number
5665-329

Version 2
Release 4.0

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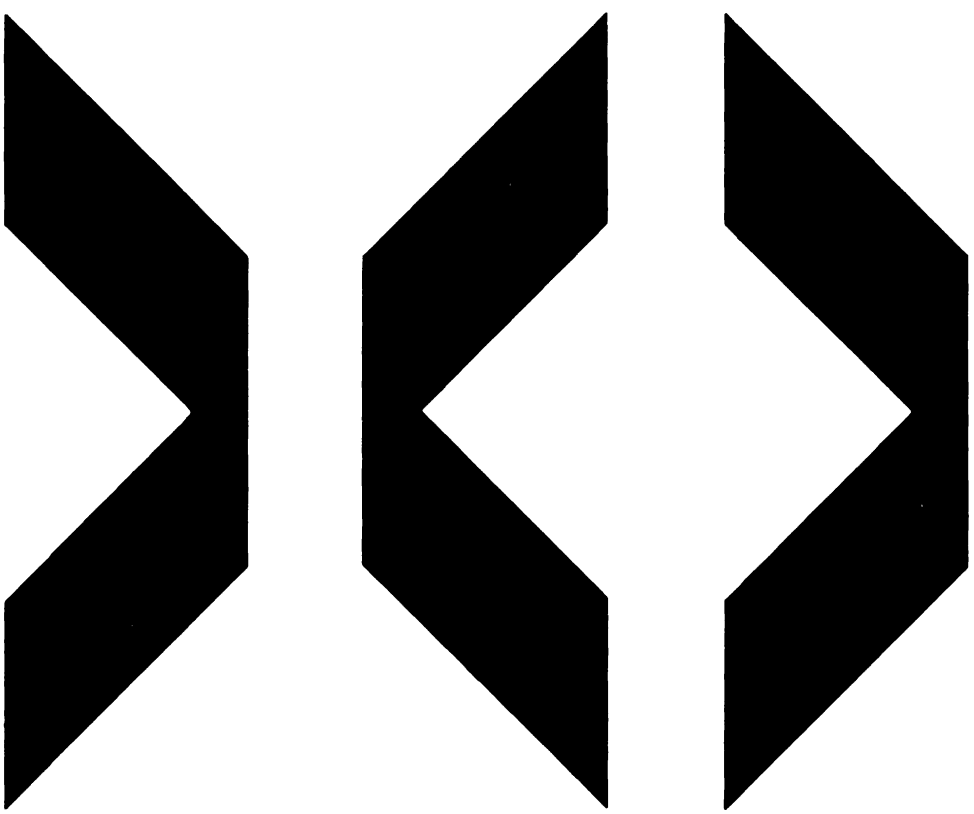

Order Number
SH35-0083-3

Program Number
5665-329

Version 2
Release 4.0

| **Fourth Edition (December 1988)**

| This is a major revision of SH35-0083-2, which is now obsolete. Changes from the previous edition are
| marked with a vertical bar in the left margin. Significant changes are summarized under "Summary of
| Changes." This edition applies to Version 2, Release 4, Modification Level 0 of the Data Facility Hierarchical
| Storage Manager, Licensed Program 5665-329, and subsequent release and modification levels until specified otherwise in new editions or technical newsletters.

Changes are made periodically to the information herein; before using this publication in connection with the operation of IBM systems, consult the latest *IBM System/370 and 4300 Processors Bibliography*, GC20-0001, for the editions that are applicable and current.

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Preface

This book describes the Data Facility Hierarchical Storage Manager (DFHSM) system programmer, storage administrator, and operator commands arranged in alphabetical order. It also contains four appendixes that

- Describe the AUDIT, LIST, and REPORT commands in more detail
- List the messages you receive when you issue the QUERY command.

Changes to this publication are summarized under "Summary of Changes." Technical changes are marked by a vertical bar | in the left margin.

Readers of this publication should have a background in programming, especially programming with TSO and TSO/E commands, and in MVS/SP concepts and terms. This book is written primarily for the system programmer and storage administrator, both of whom must understand the information in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 General Information* before they use this book.

Major Divisions of This Book

This book is arranged in alphabetical order by command name followed by four appendixes. The four appendixes are:

- Appendix A, "Using the AUDIT Command" on page 373 describes what happens when you issue the AUDIT command with any one of its parameters. This includes the following information:
  - Type of information DFHSM reports
  - Errors DFHSM detects during the audit
  - Errors DFHSM corrects during the audit.

  This appendix explains what the output headings mean for each parameter you specify with the AUDIT command. It also gives examples of the printer output and the terminal output for each parameter you specify. Finally, it mentions some items you should consider if you are in a multiple-host processor environment and tells how to print the information you receive from the audit process.
- Appendix B, "Using the LIST Command" on page 407 describes what happens when you issue the LIST command with any one of its parameters. This appendix explains what the output headings mean for each parameter you specify with the LIST command. It also gives examples of the printer output and the terminal output for each parameter you specify.
- Appendix C, "QUERY Command" on page 451 shows the messages you receive when you issue the QUERY command with any one of its parameters.
- Appendix D, "Using the REPORT Command" on page 459 describes what happens when you issue the REPORT command with any one of its parameters. It also gives examples of a daily statistics report and a volume statistics report.

This book also contains a glossary and an index.

Trademarks

The following names have been adopted by IBM for trademark use and are used in this publication.

MVS/DFP™

MVS/ESA™

MVS/SP™

MVS/XA™

Prerequisite Books

Before you use this book, you must understand the concepts and terminology introduced in the following prerequisite publications:

- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 General Information*, GH35-0092, introduces the concepts of DFHSM.
- *OS/VS2 TSO Command Language Reference*, GC28-0646, describes the syntax and function of the commands and subcommands of the TSO command language.

Related Books

Some publications from the MVS/SP Version 3 library are referenced in this book. The *MVS/ESA Library Guide for System Product Version 3*, GC28-1563, contains a complete listing of the MVS/SP Version 3 publications and their counterparts for the prior version.

You should be familiar with the information presented in the following books:

- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide*, SH35-0085, describes in detail the concepts of DFHSM.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide*, SH35-0084, describes the user exits of DFHSM, DFHSM data sets, how to create DFHSM data sets and procedures, and migration and coexistence considerations in changing from an earlier DFHSM release to the current release. This book also contains the Installation Verification Procedure (IVP) for DFHSM and the starter set for new customers.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 User's Guide*, SH35-0093, describes DFHSM user commands, space maintenance and line operators. It also contains the commands that pertain to the unauthorized DFHSM user.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Messages*, SH35-0094, describes the messages issued by DFHSM.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Storage Administrator, Operator, and System Programmer Commands Reference*

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Summary, GX35-5037, summarizes all of the DFHSM commands available to the storage administrator, operator, and system programmer, except the user commands.

- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 User Commands Reference Summary*, GX35-5036, summarizes all of the DFHSM commands available to the unauthorized DFHSM user.
- *OS/VS2 TSO Terminal User's Guide*, GC28-0645, describes how to use TSO under MVS/370.
- *OS/VS2 TSO Extensions: User's Guide*, SC28-1333, describes how to use TSO and TSO extensions when your data processing center has TSO extensions installed.
- *TSO/E Version 2 Command Reference*, SC28-1881, describes how to use the TSO commands.
- *System Programming Library: TSO Extensions Planning and Installation*, SC28-1379, contains information on naming the Authorized Program Facility library.
- *Resource Access Control Facility (RACF) General Information Manual*, GC28-0722, describes the functions and capabilities of the Resource Access Control Facility.
- *MVS Resource Access Control Facility (RACF) Command Language Reference*, SC28-0733, describes the syntax and functions of RACF commands.
- *Resource Access Control Facility (RACF) System Programming Library*, SC28-1343, describes how to install RACF.
- *OS/VS2 MVS System Programming Library: System Management Facilities (SMF)*, GC28-1030, helps installation managers and system programmers plan for, install, and use SMF in an OS/VS2 MVS system.
- *OS/VS2 MVS System Programming Library: Installation and Tuning Guide*, GC28-0681, describes SYS1.PARMLIB parameters and how to use the System Resource Manager, System Activity Measurement Facility, and system performance factors.
- *Data Facility/Data Set Services: User's Guide*, SC26-4388, describes Data Facility/Data Set Services and how to use them.
- *Data Facility/Data Set Services: Reference*, SC26-4389, summarizes all the DFDSS commands and how to use them.

MVS/ESA Books

- *MVS/ESA Library Guide for System Product Version 3*, GC28-1563, contains a complete listing of the MVS/SP Version 3 publications and their counterparts for the prior version.
- *MVS/ESA JCL Reference*, GC28-1829, describes how to code job control language and JES2 and JES3 control statements for MVS/ESA.
- *MVS/ESA Message Library: System Messages, Volume 1*, GC28-1812, and *MVS/ESA Message Library: System Messages, Volume 2*, GC28-1813, provide a complete listing of MVS/ESA messages.
- *MVS/ESA Magnetic Tape Labels and File Structure Administration*, SC26-4511, describes how MVS/ESA processes magnetic tape labels.

- *MVS/ESA System Programming Library: System Management Facilities*, GC28-1819, helps installation managers and system programmers plan for, install, and use System Management Facilities in an MVS/ESA system.
- *MVS/ESA Storage Administration Reference*, SC26-4514, describes how to initialize the MVS/DFP Storage Management Subsystem (SMS), maintain it, and perform storage management tasks with the help of interactive storage management facility (ISMF) panels.

MVS/370 Books

- *MVS/370 JCL*, GC28-1300, describes how to code job control language and JES2 and JES3 control statements for MVS/370.
- *MVS/370 Message Library: System Messages, Volume 1*, GC28-1374, and *MVS/370 Message Library: System Messages, Volume 2*, GC28-1375, provide a complete listing of MVS/370 messages.
- *MVS/370 Magnetic Tape Labels and File Structure Administration*, GC26-4064, describes how MVS/370 processes magnetic tape labels.

Restricted Books

The following publications contain restricted materials of IBM:

- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Reference Volume 1*, LY35-0078, describes the DFHSM design and the logic of the DFHSM routines.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Reference Volume 2*, LY35-0079, describes the DFHSM design and the logic of the DFHSM routines.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Reference Volume 3*, LY35-0080, describes the DFHSM organization and data areas.
- *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Guide*, LY35-0098, describes how program support representatives and system programmers can diagnose failures in DFHSM.

Summary of Changes

Fourth Edition

This edition applies to DFHSM Version 2 Release 4 Modification Level 0.

This release of DFHSM provides the functions necessary to support the MVS/DFP Storage Management Subsystem (SMS) environment. SMS provides an important step toward providing total system-managed storage. The SMS environment separates the domains of the user, the user's data, and the storage media on which the user's data is stored, thereby allowing you to define storage space based on data needs and requirements rather than hardware configurations. Each installation can define its storage management policies within an installation-defined SMS configuration. Within the SMS configuration are *classes* and *groups* which define the characteristics of SMS volumes and data sets.

An SMS configuration contains the following types of groups and classes: storage groups, management classes, storage classes, and data classes.

Storage Group: A storage group is a defined list of volumes that are treated as one entity. All the volumes within a storage group are managed as if they were a single volume.

DFHSM uses the storage group to determine those SMS-managed volumes for which DFHSM automatic functions of interval migration, daily space management, data availability management, or automatic dump will be performed. At the start of the DFHSM automatic functions, DFHSM selects for processing the storage groups that have the attributes of AUTOMIGRATION=YES, AUTOBACKUP=YES, or AUTODUMP=yes, relative to the automatic function being started.

Management Class: A management class is a defined list of management attributes that specify how each data set in a named management class will be managed relative to migration, backup, and retention.

DFHSM uses the management classes to control DFHSM functions at the data set level. Each data set's management class determines whether the data set can be processed during both automatic and command processing, by command processing only, or not at all.

Storage Class: A storage class is a named list of service-level attributes that define different levels of storage-device performance and availability.

DFHSM uses the storage class only as an indication that a data set is SMS managed.

Data Class: A data class defines allocation defaults that are assigned to a data set when it is created. DFHSM does not use the data class.

Automatic Class Selection Services: Automatic Class Selection (ACS) routines provide the means for assigning SMS classes and storage groups to data sets. ACS routines also control the transition of data sets to and from SMS management.

DFHSM recognizes and preserves SMS class names. When a data set is migrated or backed up, the class names are saved and passed to the Automatic Class Selection (ACS) routines to have them redetermine the classes before recalling or recovering the data set. ACS filters the information and then decides to which storage group and volume the data set should be returned. ACS routines also decide if non-SMS data sets should be converted to SMS data sets upon recall or recover. For more information on SMS classes and groups and ACS routines, see *MVS/ESA Storage Administration Reference*. For detailed information and definitions of management class and storage group attributes and DFHSM's support of the SMS environment, see *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide*.

One new command has been added to DFHSM and nineteen existing commands have been modified.

The new command is EXPIREBV. This command is used to delete old, unwanted backup versions from DFHSM-owned storage based on specific management class attributes for SMS-managed data sets and the input parameters for non-SMS-managed data sets.

This edition also includes miscellaneous editorial and technical changes.

Third Edition

This edition applies to DFHSM Version 2 Release 3 Modification Level 0. Two new commands are added and thirteen existing commands are modified.

The two new commands are:

- CANCEL, which enables a user to cancel an existing queued DFHSM request.
- FREEVOL, which allows a user to move all migration copies meeting a specified age criteria from a specified migration level 1 volume to another migration level 1 volume or to a migration level 2 volume, or from a specified migration level 2 DASD volume to other migration level 2 volumes.

The following commands are modified:

- ADDVOL, which is modified to support DFHSM invocation of Data Facility Data Set Services (DFDSS) full volume dump and a new attribute to free migration volumes.
- AUTH, which is modified to limit the extent (scope) of authority.
- BACKVOL, which is modified to support DFHSM invocation of DFDSS full volume dump.
- DEFINE, which is modified to:
  - Support DFHSM invocation of DFDSS full volume dump and restore and physical data set restore processing
  - Do explicit reset of the cycle start date
  - Define volumes for volume pooling.
- DELETE, which is modified to add the purge option for deletion of unexpired, migrated data sets.

- DELVOL, which is modified to support DFHSM invocation of DFDSS full volume dump.
- FIXCDS, which is modified to support DFHSM invocation of DFDSS full volume dump and restore and physical data set restore processing.
- HOLD, which is modified to expand operator control over DFHSM functions.
- HSENDCMD, which is modified to provide return codes that can be used for conditional processing of DFHSM user commands.
- LIST, which is modified to list information pertaining to dump volumes and to list the contents of dump volumes.
- QUERY, which is modified to display a list of current volume pool names and the volumes that comprise the volume pools.
- RECOVER, which is modified to support DFHSM invocation of DFDSS full volume restore and physical data set restore processing.
- RELEASE, which is modified to expand operator control over DFHSM functions.
- SETSYS, which is modified to:
  - Support DFHSM invocation of DFDSS full volume dump and restore and physical data set restore processing
  - Process expired data sets during space maintenance
  - Make DFHSM activity log improvements
  - Define DFHSM authorized users
  - Specify the data set size eligibility limit for small-data-set-packing data sets
  - Provide a migration level 2 data set exit
  - Provide an initialization exit
  - Provide a space management exit and backup data set exit
  - Provide improved cooperation with GRS and JES3 data set reservation
  - Provide data set serialization
  - Specify that DFHSM use its defined optimum block size when writing to DFHSM-owned DASD
  - Erase the space occupied by a DFHSM-owned data set when it is scratched from a DASD device supported by DFP/XA
  - Add a third time value to the start time windows defining the time after which automatic backup, automatic dump, and daily space management will not start processing additional volumes.

This edition also includes miscellaneous editorial and technical changes.

Technical Newsletter to Second Edition

This technical newsletter applies to DFHSM 2.2.0 and includes information on improved control of output volume selection for backup, migration, and recycle. This control is exercised through the following SETSYS parameters:

- BACKUP
- RECYCLEOUTPUT
- SPILL
- TAPEMIGRATION.

This edition also includes miscellaneous editorial and technical modifications.

Second Edition

This edition applies to DFHSM 2.2.0 and includes information associated with the following performance and usability enhancements:

- Optional enhanced 3480 Magnetic Tape Subsystem support
- Reduced BCDS access during incremental volume backup
- Backup and recovery of discrete RACF profiles
- Automatic recall to primary volumes with like or unlike primary volume attributes
- Reblocking during recall or recovery.

This edition also includes miscellaneous editorial and technical changes.

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DFHSM Commands

DFHSM has four groups of commands:

- User
- Operator
- Storage administrator
- System programmer.

The user commands are listed here for your information; however, they are described in detail in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 User's Guide*. The operator, storage administrator, and system programmer command names are listed here. The rest of the book contains detailed explanations of the operator, storage administrator, and system programmer commands, listed in alphabetical order.

User Commands

The user commands are used by the application programmer, the TSO terminal user, and other data processing personnel involved in space management. The user commands are:

HALTERDS	Changing the data set parameters that affect backup
HBACKDS	Backing up a specific data set
HBDELETE	Deleting a backup version of a data set
HCANCEL	Cancelling an existing request
HDELETE	Deleting a migrated data set on a level 1 or level 2 volume
HLIST	Listing information from the migration and backup control data sets
HMIGRATE	Requesting migration of a specific data set
HQUERY	Listing DFHSM requests
HRECALL	Recalling a specific data set
HRECOVER	Recovering a backup version of a data set.

Operator Commands

The operator commands are primarily submitted by a system operator from the system console. The operator commands are:

CANCEL	Cancelling an existing request
HOLD	Suspending all or part of DFHSM functions
LOG	Entering data into the DFHSM log
QUERY	Listing the status of DFHSM parameters, statistics, and pending requests
RELEASE	Releasing for processing all or part of the DFHSM functions

STOP	Shutting down DFHSM
SWAPLOG	Switching between the DFHSM log data sets.

Storage Administrator Commands

The storage administrator commands are primarily submitted by a DFHSM-authorized storage administrator who uses the HSENDCMD command to issue these commands from a TSO terminal. The storage administrator commands are:

ADDVOL	Adding or changing the volumes DFHSM manages or owns
ALTERDS	Changing the data set parameters that affect backup
AUDIT	Auditing DFHSM
AUTH	Identifying authorized DFHSM users
BACKDS	Backing up a specific data set
BACKVOL	Backing up and dumping data sets from a volume
BDELETE	Deleting backup versions of a data set
DEFINE	Defining control structures for use by DFHSM
DELETE	Deleting a migrated data set from a migration volume
DELVOL	Removing a volume from the list of volumes DFHSM manages or owns
EXPIREBV	Deleting unwanted backup versions from DFHSM-owned storage
FREEVOL	Allowing the moving of migration copies
HSENDCMD	Issuing DFHSM authorized-user commands from a TSO terminal
LIST	Listing information from the MCDS, BCDS, and OCDS
MIGRATE	Requesting a space management function
RECALL	Recalling a specific data set
RECOVER	Recovering a backup version or dump copy of a data set or volume
RECYCLE	Consolidating valid data on one tape from other tapes
REPORT	Requesting reports based on daily or volume statistics records
SETMIG	Changing the space management status of data sets or volumes
TAPECOPY	Copying 3480 single-file tape volumes, or equivalent
TAPEREPL	Replacing 3480 single-file tape volumes, or equivalent.

System Programmer Commands

The system programmer commands are primarily submitted by a DFHSM-authorized system programmer who uses the HSENDCMD command to issue these commands from a TSO terminal. The system programmer commands are:

DISPLAY	Displaying DFHSM storage locations
FIXCDS	Displaying or modifying MCDS, BCDS, and OCDS records

PATCH	Modifying storage within DFHSM
SETSYS	Establishing or changing the values of various DFHSM control parameters
TRAP	Requesting a dump when a specified error occurs
UPDATEC	Recovering the control data sets.

Using DFHSM Commands

Before using the DFHSM commands, their parameters, and comments, you should read and understand the following use and notational conventions for DFHSM commands.

A command consists of a command name usually followed by one or more operands. All operands described in this book are called parameters. Parameters provide the specific information required by the command to perform the requested function.

For example, the parameters associated with the BACKDS command specify the name of the data set that you want DFHSM to back up and, optionally, the volume and unit that contains the data set to be backed up. An example of the BACKDS command is:

```
BACKDS TEST.CASES VOLUME(VOL123) UNIT(3380) /*comment*/
```

where:

BACKDS is the command name.

TEST.CASES is the name of the data set you want to back up.

VOLUME(VOL123) is the volume that contains the uncataloged data set to be backed up.

UNIT(3380) is the type of unit where the volume specified with the VOLUME parameter can be allocated.

/*comment*/ is a comment about the command or the parameter or both.

All TSO conventions apply to the syntax of DFHSM commands.

DFHSM commands use positional and keyword parameters.

Positional Parameters: Positional parameters follow the command name in a prescribed sequence. In the command explanations used in this book, the positional parameters are shown in *lowercase italic* characters. There are two types of positional parameters: required and optional. You must specify required positional parameters immediately after the command name. If you use optional positional parameters, you must specify them immediately after any required positional parameters. If the command does not have any required positional parameters, you must specify any optional positional parameters immediately after the command name. If you specify a list of items to replace a positional parameter, you must put parentheses around the list. Otherwise, you do not have to use the parentheses. For example, you can specify a list of data set names with the ALTERDS command. Put parentheses around the list of data set names. If you specify only one data set name, you do not have to use parentheses.

Keyword Parameters: Keyword parameters are specific words or symbols that have a meaning to DFHSM. They follow positional parameters and can occur in any order. In the command explanations used in this book, the keyword parameters are shown in **UPPERCASE BOLDFACE** characters.

You can specify values or variables with some keyword parameters by putting them in parentheses after the keyword parameter. An example of a keyword with a value follows:

VOLUME(*volser*)

Some keyword parameters are separated by a vertical bar, for example, TERMINAL | SYSOUT | OUTDATASET. This bar shows keywords that conflict with one another.

Note: If you enter conflicting parameters in a single command, the last parameter entered in the command overrides all previously entered conflicting parameters and is the only parameter that is processed. All the previous conflicting parameters within the command are ignored.

If you issue commands from the system console, you must enter the DFHSM commands in the following manner:

F DFHSM,*command*

You should replace the **DFHSM** abbreviation with the procedure name in the startup procedure in SYS1.PROCLIB.

Abbreviating Commands and Parameters

The TSO abbreviation convention applies for all DFHSM storage administrator, system programmer, and operator command names and parameters. The TSO abbreviation convention is that you must specify as much of the command name or parameter as is necessary to distinguish it from the other command names or parameters. For example, the VERSIONS parameter of the ALTERDS command can be abbreviated as V (also VE, VER, VERS, VERSI, VERSIO, and VERSION).

Besides, some DFHSM keyword parameters allow unique abbreviations. All unique abbreviations are listed in a table following the command syntax and in the explanation of each keyword parameter.

Delimiters

When you issue a DFHSM command, you must separate the command name from the first parameter by using one or more blanks. You must separate succeeding parameters by using one or more blanks or a comma. Do not use a semicolon as a delimiter because any characters that follow a semicolon are ignored.

Line Continuations

When you continue a command to the next line during batch processing such as from the batch reader or a PARMLIB member, use a plus or minus sign as the last character of all but the last line of the command. If a comment is included on the same line, the plus or minus sign follows the comment. Refer to "Comments" for information about comments. When you use a plus sign, leading delimiters are removed from the continued line.

For commands entered from a TSO terminal, do not use a line continuation character. All command examples in this book are commands entered for batch processing.

The following is an example of a line continuation with a comment and without a comment.

```
SETSYS AUTOBACKUPSTART(1800 2100 2300) /* set start times */ -
       AUTOMIGRATIONSTART(2300 0600 0800) -
       BACKUP BACKUPPREFIX(DFHSM)
```

Data Set Naming Conventions

When you specify a data set name with a DFHSM command, the data set name must conform to TSO data set naming conventions. With DFHSM, you can use the characters $, @, and # as the first character in the data set name. You cannot use the characters hyphen (-) or ampersand-zero (12-0 punch) anywhere in the data set name.

Comments

You can add comments to DFHSM commands anywhere that a blank might appear. To set off your comments, enter them between the symbols /* and */. You can continue a comment to the next line by using a line continuation character (+ or -) at the end of the line following the */ of the comment.

The following is an example of using comments:

```
COMMAND1 PARAMETER1   /* comment */ -
         PARAMETER2   /* comment */ -
                      /* more comments */ -
         PARAMETER3   /* comment */
COMMAND2 PARAMETER1   -
         PARAMETER2   /* comment */
```

Notational Conventions

The following symbols define the format of DFHSM commands.

- Brackets ([ ]) specify an optional field or parameter.
- A vertical bar (|) separates alternative choices. Unless otherwise stated, you can select only one alternative. Do not use the vertical bar when you submit the command.
- If you enter conflicting parameters in a single command, the last parameter entered in the command overrides all previously entered conflicting parameters and is the only parameter that is processed. All the previous conflicting parameters within the command are ignored.
- An ellipsis (...) specifies that multiple entries of the type immediately preceding the ellipsis are allowed. For example, *volser* ... means that you can specify one or more volume serial numbers. Do not use the ellipsis when you submit the command.
- You must enter parentheses, commas, and slashes as they are shown in the book unless the parameter is a positional parameter. If you specify a positional parameter, you do not have to use parentheses if you specify only one item when DFHSM allows you to specify a list of items.

- COURIER type specifies job control language statements and DFHSM statements in examples, messages, and reports.
- **BOLDFACE** type specifies characters that must be entered exactly as shown.
- *Italic* type specifies fields you are to supply to DFHSM.
- You can code numeric parameters three different ways, unless you are specifically restricted in the parameter explanation. The three ways you can code numeric parameters are:
  - Decimal (EBCDIC)
  - Hexadecimal (X'n')
  - Binary (B'n').

Considerations for Command Sequence

In the DFHSM environment, there are certain commands that must follow a particular sequence to be sure the command does not malfunction or fail. The following table lists these sequences:

Issue This Command	Before This Command
Any Command	QUERY
ADDVOL	DEFINE(pool) or DEFINE(volume pool)
DEFINE DUMPCLASS	ADDVOL with either the AUTODUMP or DUMPCLASS parameters.
SETSYS JES2 or JES3	ADDVOL commands
SETSYS SMALLDATASETPACKING	ADDVOL with SDSP
SETSYS SYSOUT	SETSYS ACTLOGTYPE
SETSYS USERUNITTABLE	ADDVOL
	DEFINE with a DUMPCLASS(unit)
	SETSYS BACKUP(tape)
	SETSYS CDSVERSIONBACKUP
	SETSYS MIGUNITNAME
	SETSYS RECYCLEOUTPUT
	SETSYS SPILL
	SETSYS TAPEMIGRATION
	SETSYS UNITNAME

Submitting DFHSM Commands

A DFHSM user with access to the system can submit the operator, storage administrator, and system programmer commands from the system console. If you want to submit the operator, storage administrator, or system programmer commands from a TSO terminal, you must be a DFHSM-authorized user. To issue these commands from a TSO terminal, the DFHSM-authorized user must preface each command with the HSENDCMD command. For example, if you want to submit the HOLD MIGRATION command from a TSO terminal, you specify the following:

```
HSENDCMD HOLD MIGRATION
```

You can use the AUTH command to add another user to the list of users with DFHSM authorization if you are authorized by data base authority control authority. You can submit the AUTH command from a TSO terminal if you are a DFHSM-authorized user. DFHSM checks your TSO identification for DFHSM authorization if you submit a command from a TSO terminal.

In systems with the Resource Access Control Facility (RACF), you can submit the operator, storage administrator, and system programmer commands for processing in batch mode if you are a DFHSM-authorized user. To do this, your TSO identification must be specified on the JOB statement of the MVS/SP JCL (USER=*userid*). RACF scans the *userid* field and builds the control blocks DFHSM uses to confirm the authorization of the person who submitted the command.

If the batch submittal fails because the userid is missing or invalid, DFHSM cannot issue a message to your terminal but notes the exception in the DFHSM log.

The following example shows the MVS/SP JCL for submitting the system programmer REPORT command to request DFHSM daily and volume statistics reports:

```
//REPRTJOB JOB ...,USER=userid,...
//STEP1    EXEC PGM=IKJEFT01,REGION=512K
//SYSPRINT DD SYSOUT=A
//SYSTSPRT DD SYSOUT=A
//SYSTSIN  DD *
  HSENDCMD REPORT DAILY FUNCTION
  HSENDCMD REPORT VOLUME FUNCTION
/*
```

In a system without RACF, you can submit operator, storage administrator, and system programmer commands for batch processing by defining the HSENDCMD (HSEND) to the Terminal Monitor Program (TMP) as authorized commands and by providing a STEPLIB or JOBLIB card to an Authorized Program Facility (APF) authorized version of module ARCMCMD.

Instead of specifying USER=*userid* on the JOB card, add the HSENDCMD command (HSEND) to the authorized commands table in TMP so that this command can be invoked and submitted to DFHSM as an acceptable authorized command.

CSECT IKJEFTE2 within the IKFEFT02 load module must be modified to indicate that HSENDCMD alias HSEND is an authorized command and should be attached with APF authorization. This modification should be done to the first entry in IKJEFTE2 that contains eight blanks. One blank entry must remain in the authorized command table to indicate the end of the table.

Note: In the latest version of TSO/E, the authorized command table has been moved to a CSECT in a separate load module named IKJTABLS.

The DFHSM module ARCMCMD, the HSENDCMD command processor, must be link emitted into an APF authorized library as an authorized program. The job submitting the HSENDCMD (HSEND) command must use a STEPLIB or JOBLIB card to this library. Access to this APF library must be restricted to prevent unauthorized use of the HSEND command. It is the responsibility of the system programmer to ensure that any DFHSM maintenance to module ARCMCMD is also applied to the authorized copy of ARCMCMD. All concatenated STEPLIBs must be authorized. The APF library name must appear either in the system LINKLIST or in the appropriate APF*xx* of the SYS1.PARMLIB. Refer to *OS/VS2 MVS System Programming Library: Installation and Tuning Guide* publication for additional information about the APF*xx*. The following is a sample of job steps to link edit the ARCMCMD module to create an authorized copy of ARCMCMD.

```
//LINKED  EXEC PGM=IEWL,PARM='LIST,LET,NACL,XREF,RENT,REUS'
//SYSPRINT DD  SYSOUT=A
//SYSUT1   DD  UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSLMOD  DD  DISP=SHR,DSN=DFHSM.AUTHLIB
//IN       DD  DISP=SHR,DSN=SYS1.CMDLIB
//SYSLIN   DD  *
 INCLUDE IN(HSENDCMD)
 ALIAS HSEND
 SETCODE AC(1)
 ENTRY ARCMCMD
 NAME HSENDCMD(R)
/*
```

The successful execution of this link edit results in message IEW0461 for ARCWTU2.

There is another method that can be used to allow DFHSM-authorized commands to be executed from a batch TMP on a system without RACF installed. To use this option the user must ensure that the TSO user ID is stored in the protected step control block (PSCB). The user must use the following command:

```
SETSYS ACCEPTPSCBUSERID
```

DFHSM retrieves the user ID for the TSO batch requests from the PSCB and associates it with the user ID with the request. The user ID must have been defined previously as a DFHSM-authorized user using the following command:

```
AUTH userid DATABASEAUTHORITY(USER)
```

This command identifies a DFHSM-authorized user who can issue DFHSM-authorized commands. The AUTH command is submitted as part of the PARMLIB member being processed during DFHSM startup.

Refer to *Systems Programming Library: TSO Extensions Installation and Planning* publication for additional information about adding authorized commands to the TSO/E environment.

ADDVOL: Adding or Changing the Volumes Managed or Owned by DFHSM

The ADDVOL command adds new non-SMS-managed volumes to the list of volumes that DFHSM manages or owns and defines the attributes of those volumes. You must issue the ADDVOL command for each non-SMS-managed volume that you want DFHSM to manage or own.

In a multiple-central-processing-unit environment, ensure that you do not do simultaneous ADDVOL commands for the same volume.

The initialization procedure for DFHSM must issue an ADDVOL command for each primary and migration level 1 volume each time you start DFHSM.

Use of the ADDVOL Command

Use the ADDVOL command for the following purposes:

- To add to DFHSM control, a non-SMS-managed volume that has never been added before.
- To add to DFHSM control, a primary or migration level 1 volume that has been added previously, but not since the current DFHSM startup. You should not respecify migration level 2, or backup, or dump volumes each time you start DFHSM.
- To change the attributes specified for a volume previously added.
- To prevent a volume from being selected for migration output.

Notes:

1. In a JES3 environment, you cannot add a primary volume to DFHSM after initialization.
2. If you try to ADDVOL an SMS-managed volume or a volume whose management cannot be determined, the ADDVOL command is rejected.

Adding volumes to DFHSM control is a straightforward operation. Preventing a volume from being used for migration output employs the DRAIN attribute. You must exercise caution, however, when you change the attributes of a volume that has already been added.

Considerations in Changing Volume Attributes

You can change attributes within each volume category, but you cannot change the volume category. Volume categories are:

- PRIMARY
- BACKUP (DAILY)
- BACKUP (SPILL)
- MIGRATIONLEVEL1
- MIGRATIONLEVEL2
- DUMP.

For example, if a volume has been added to DFHSM as a primary volume, you cannot use the ADDVOL command to change it to a migration or backup volume.

You can change the space management technique to be used for a primary volume. The space management techniques are:

- Migrate
- Delete-by-age
- Delete-if-backed-up.

You must use caution when you change the attributes of a primary volume if the volume is using migration as the space management technique. If you change the primary volume attributes so that no volume has the same attributes that existed when DFHSM migrated a data set from the primary volume, an undirected recall may fail. The undirected recall will fail if all the following are true:

- You are using the LIKE subparameter of the SETSYS RECALL PRIVATEVOLUME or ANYSTORAGEVOLUME command.
- No available volume has a space management technique of MIGRATE and a recall technique of AUTORECALL.
- Pools are not defined.

To avoid the problem, you can specify the UNLIKE subparameter of the SETSYS RECALL command to allow the recall to occur when the attributes do not match. The primary volume attributes of concern are:

- AUTOMIGRATION
- AUTOBACKUP
- NOAUTOMIGRATION
- NOAUTOBACKUP
- BACKUPDEVICECATEGORY.

Syntax of the ADDVOL Command

Command	Required Parameters	Optional Parameters
ADDVOL	*volser* **BACKUP | DUMP | MIGRATION | PRIMARY UNIT(***unittype***)**	**(AUTOBACKUP | NOAUTOBACKUP)** **(AUTODUMP(***class***[,***class***,***class***,***class***,***class***]) | NOAUTODUMP)** **(AUTOMIGRATION | NOAUTOMIGRATION)** **(AUTORECALL | NOAUTORECALL)** **(BACKUPDEVICECATEGORY(TAPE | DASD | NONE))** **(DAILY[(***day***)] | SPILL)** **(DELETEBYAGE(***days***) | DELETEIFBACKEDUP(***days***) | MIGRATE[(***days***)])** **DENSITY(2 | 3 | 4)** **(DRAIN | NODRAIN)** **(DUMPCLASS(***class***))** **(MIGRATIONLEVEL1 | MIGRATIONLEVEL2)** **(SMALLDATASETPACKING | NOSMALLDATASETPACKING)** **THRESHOLD(***thresh1* [*thresh2*])**

Notes:

1. If you specify any subparameter of the BACKUP, DUMP, PRIMARY, or MIGRATION parameter, you must put parentheses around the subparameter or list of subparameters.
2. The ADDVOL command is not allowed with SMS-managed volumes.

The following table shows the DFHSM abbreviations for the parameters of the ADDVOL command:

Parameter	DFHSM Abbreviation
AUTOBACKUP	AB
AUTODUMP	AD
AUTOMIGRATION	AMIG
AUTORECALL	AREC
BACKUPDEVICECATEGORY	BUDEVCAT
DELETEBYAGE	DBA
DELETEIFBACKEDUP	DBU
DUMPCLASS	DCLASS
MIGRATIONLEVEL1	ML1
MIGRATIONLEVEL2	ML2
NOAUTOBACKUP	NOAB
NOAUTODUMP	NOAD
NOAUTOMIGRATION	NOAMIG
NOAUTORECALL	NOAREC
NOSMALLDATASETPACKING	NOSDSP
SMALLDATASETPACKING	SDSP

Summary of Parameters

The following table is a summary of the combination of parameters you *can* specify with the ADDVOL command:

Parameter	Related Subparameters	Related Parameters
BACKUP	(DAILY | SPILL)	*day* DENSITY(2 | 3 | 4) THRESHOLD UNIT *volser*
DUMP	DUMPCLASS	*class* UNIT *volser*
MIGRATION	(MIGRATIONLEVEL1 | MIGRATIONLEVEL2) (NOSMALLDATASETPACKING | SMALLDATASETPACKING) (DRAIN | NODRAIN)	DENSITY (2 | 3 | 4) THRESHOLD UNIT *volser*

Parameter	Related Subparameters	Related Parameters
PRIMARY	(AUTOBACKUP | NOAUTOBACKUP) (AUTODUMP | NOAUTODUMP) (AUTOMIGRATION | NOAUTOMIGRATION) (AUTORECALL | NOAUTORECALL) (BACKUPDEVICECATEGORY) (DELETEBYAGE | DELETEIFBACKEDUP | MIGRATE)	*class* *days* THRESHOLD UNIT *volser*

Required Parameters of the ADDVOL Command

Volser: Specifying the Volume to Be Added or Changed

Explanation: *volser* is a required positional parameter specifying the serial number of a non-SMS-managed volume to be added to DFHSM control or of a volume currently managed or owned by DFHSM.

For *volser*, substitute the serial number of the volume being added or changed.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *volser* is a required positional parameter, you must specify it immediately after the command name.
2. If an attempt is made to ADDVOL an SMS-managed volume, the command is rejected and a message is issued.

BACKUP | DUMP | MIGRATION | PRIMARY: Identifying the Type of Volume

Explanation: **BACKUP | DUMP | MIGRATION | PRIMARY** are mutually exclusive, required parameters that you use to identify to DFHSM the type of volume you are adding or changing.

BACKUP is specified to identify a volume to be used as a backup volume.

DUMP is specified to identify a volume to be used as the output of a full volume dump. DFHSM supports only tape units for the DUMP function. The *unittype* must be a valid tape unit or the ADDVOL command will fail.

MIGRATION is specified to identify a volume to be used as a migration volume. Migration level 1 volumes must be DASD. Migration level 2 volumes can be either DASD or tape.

PRIMARY is specified to identify a volume to be used as a primary volume. Primary volumes must be DASD.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP, DUMP, MIGRATION, and PRIMARY. There are no additional abbreviations.

Defaults: None.

Note: If a volume record already exists for the specified *volser*, you cannot change the type of volume.

UNIT: Specifying the Type of Device

Explanation: UNIT(*unittype*) is a required parameter specifying the type of unit where the volume can be allocated.

For *unittype*, substitute the type of unit on which the volume can be allocated. The valid types of DASD units are:

- 3330
- 3330-1
- 3330V
- 3350
- 3375
- 3380.

The valid types of tape units are:

- 3400-3
- 3400-4
- 3400-5
- 3400-6
- 3400-9
- 3480.

In place of a tape unit, you can substitute an esoteric tape unit specified with the USERUNITTABLE parameter of the SETSYS command. If you specify an esoteric tape unit name that does not exist in the user unit table, the ADDVOL command fails.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNIT. There are no additional abbreviations.

Defaults: None.

Notes:

1. You specify 3400-9 when the 3480 Magnetic Tape Subsystem simulates a 3420 tape drive. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem.
2. If you specify a tape unit for a primary or migration level 1 volume, the ADDVOL command fails.
3. If you specify a DASD unit for a dump volume, the ADDVOL command fails.
4. If a volume record already exists for the specified *volser*, you cannot change the *unittype*.

Optional Parameters of the ADDVOL Command

AUTOBACKUP | NOAUTOBACKUP: Specifying Whether the Primary Volume Is Eligible for Automatic Backup

Explanation: AUTOBACKUP | NOAUTOBACKUP are mutually exclusive, optional subparameters of the PRIMARY parameter specifying whether the data sets on the primary volume are eligible for automatic backup.

AUTOBACKUP specifies that the data sets on the primary volume are eligible for automatic backup.

NOAUTOBACKUP specifies that the data sets on the primary volume are not eligible for automatic backup.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOBACKUP and NOAUTOBACKUP. In addition, you can use the abbreviation AB for AUTOBACKUP and the abbreviation NOAB for NOAUTOBACKUP.

Defaults: If you are adding a primary volume to DFHSM, the default is NOAUTOBACKUP. If you are changing the attributes of a primary volume and do not specify either subparameter, the backup status is not changed.

Note: In a multiple-processing-unit environment, you can add the same volume to different processing units. When you do that, you can also assign to that volume a different automatic backup attribute in each processing unit.

AUTODUMP | NOAUTODUMP: Specifying Whether a Volume Is Eligible for Automatic Dumping to Tape

Explanation: AUTODUMP(*class*[,*class*,*class*,*class*,*class*]) | NOAUTODUMP are mutually exclusive, optional subparameters of the PRIMARY and MIGRATION parameters specifying whether the volume is eligible for a full volume automatic dump.

Note: The migration volume eligibility is only applicable to migration level 1 volumes and is ignored for migration level 2 volumes.

AUTODUMP specifies that the primary or migration volume is eligible for a full volume automatic dump and selects the dump class(es) to contain the dump copy(s). For *class*, substitute one previously defined dump class for each of the output copies wanted for the dump. You must have a minimum of one class selected. You can select a maximum of five classes. Each dump class, *class*, must be predefined using the DUMPCLASS parameter of the DEFINE command before you attempt to use the AUTODUMP parameter of the ADDVOL command.

The FREQUENCY and DAY subparameters of the DUMPCLASS parameter of the DEFINE command determine how often a primary volume is dumped to a given dump class.

NOAUTODUMP specifies that the primary or migration volume is not eligible for a full volume automatic dump.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTODUMP and NOAUTODUMP. In addition, you can use the abbreviation AD for AUTODUMP and the abbreviation NOAD for NOAUTODUMP.

Defaults: If you are adding a primary or migration level 1 volume to DFHSM, the default is NOAUTODUMP.

Note: In a multiple-processing-unit environment, the AUTODUMP parameter can be different in the different processing units. If you add a volume to more than one processing unit with different dump class values, the dump class(es) will be that of the last ADDVOL command processed.

AUTOMIGRATION | NOAUTOMIGRATION: Specifying Whether the Primary Volume Is Eligible for Automatic Volume Space Management

Explanation: **AUTOMIGRATION | NOAUTOMIGRATION** are mutually exclusive, optional subparameters of the PRIMARY parameter specifying whether the data sets on the primary volume are eligible for automatic volume space management.

AUTOMIGRATION specifies that the data sets on the primary volume are eligible for automatic volume space management.

NOAUTOMIGRATION specifies that the data sets on the primary volume are not eligible for automatic volume space management.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOMIGRATION and NOAUTOMIGRATION. In addition, you can use the abbreviation AMIG for AUTOMIGRATION and the abbreviation NOAMIG for NOAUTOMIGRATION.

Defaults: If you are adding a volume to DFHSM, the default is AUTOMIGRATION. If you are changing the attributes of a volume and do not specify either subparameter, the volume space management status is not changed.

Note: In a multiple-processing-unit environment, you can add the same volume to different processing units. When you do that, you can also assign to that volume a different automatic space management attribute in each processing unit.

AUTORECALL | NOAUTORECALL: Specifying Whether the Primary Volume Is Eligible for Automatic Recall

Explanation: **AUTORECALL | NOAUTORECALL** are mutually exclusive, optional subparameters of the PRIMARY parameter specifying whether the primary volume is eligible to receive data sets that are automatically recalled.

AUTORECALL specifies that the primary volume is eligible to receive automatically recalled data sets.

NOAUTORECALL specifies that the primary volume is not eligible to receive automatically recalled data sets.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTORECALL and NOAUTORECALL. In addition, you can use the abbreviation AREC for AUTORECALL and the abbreviation NOAREC for NOAUTORECALL.

Defaults: If you are adding a primary volume to DFHSM, the default is AUTORECALL. If you are changing the attributes of a volume and do not specify either subparameter, the recall status is not changed.

Notes:

1. DFHSM can override the AUTORECALL and NOAUTORECALL subparameter in certain circumstances. If you use the DEFINE command to associate the same volume to a special recall pool, the volume is always eligible to receive automatically recalled data sets with the appropriate set of initial characters of the data set name.
2. If you also specify the DELETEBYAGE or DELETEIFBACKEDUP subparameter, DFHSM ignores the AUTORECALL or NOAUTORECALL subparameter.

BACKUPDEVICECATEGORY: Specifying Where Backup Versions Reside

Explanation: **BACKUPDEVICECATEGORY(TAPE | DASD | NONE)** is an optional subparameter of the PRIMARY parameter specifying the type of device that receives the backup versions of the data sets when DFHSM backs up the primary volume.

TAPE indicates that the backup version of a data set on the primary volume is to reside on a tape daily backup volume.

DASD indicates that the backup version of a data set on the primary volume is to reside on a DASD daily backup volume.

NONE indicates that DFHSM selects the first available, nonfull, tape or DASD daily backup volume where the backup version of a data set is to reside.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPDEVICECATEGORY. In addition, you can use the abbreviation BUDEVCAT for BACKUPDEVICECATEGORY.

Defaults: If you are adding a primary volume to DFHSM and do not specify BACKUPDEVICECATEGORY, the default is NONE. If you are changing the attributes of a volume and do not specify BACKUPDEVICECATEGORY, the previous backup device category remains in effect.

Notes:

1. If you change the backup device category for a volume with a subsequent ADDVOL command, DFHSM could fail an undirected recall of a migrated data set when the LIKE subparameter of the SETSYS RECALL command is in effect. With the LIKE subparameter specified on the SETSYS RECALL command, DFHSM automatically recalls a data set to a volume only if that volume has the same backup device category as the primary volume the data set used to be on. Therefore, if DFHSM cannot find a primary volume with the same backup device category as the original primary volume, DFHSM cannot

automatically recall the migrated data set. To avoid this problem, you can specify the UNLIKE subparameter with the SETSYS RECALL command.

2. In a multiple-processing-unit environment, you can add the same volume to different processing units. When you do that, the backup device category for that volume should be the same in all processing units or the last one specified with the ADDVOL command is the one that is in effect.

DAILY | SPILL: Identifying the Type of Backup Volume

Explanation: **DAILY(*day*) | SPILL** are mutually exclusive, optional subparameters of the BACKUP parameter that you use to specify the use of the backup volume.

DAILY specifies that the volume is to receive backup versions of data sets from primary volumes or migration volumes. For *day*, substitute a decimal number from 1 to 31 to represent the day in the backup cycle that you want this volume assigned to. You define the backup cycle with the DEFINE command.

SPILL specifies that the volume is to receive valid backup versions from DASD daily backup volumes. A tape spill backup volume can also receive all valid backup versions of data sets from a recycled tape backup volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DAILY and SPILL. There are no additional abbreviations.

Defaults: If you are adding a backup volume to DFHSM and do not specify DAILY or SPILL, DFHSM considers the volume to be either a daily or spill backup volume. DFHSM then determines which type of backup volume it needs when it selects a backup volume. If you are changing the attributes of a volume and do not specify either subparameter, the type of backup volume remains in effect.

If you do not specify a day with the DAILY parameter and DFHSM needs another daily backup volume, DFHSM assigns the volume to a day in the backup cycle.

Note: When you specify BACKUP, you can specify DAILY or SPILL, but not both. If you want to use tape for backup for a given day, you must assign at least one tape to that day in the backup cycle or on that day back up a volume whose backup device category is tape. Otherwise, you cannot use tape for that day in the backup cycle.

DELETEBYAGE | DELETEIFBACKEDUP | MIGRATE: Specifying the Type of Space Management on a Primary Volume

Explanation: **DELETEBYAGE(*days*) | DELETEIFBACKEDUP(*days*) | MIGRATE[(*days*)]** are mutually exclusive, optional subparameters of the PRIMARY parameter specifying which type of space management is to be done on the primary volume.

DELETEBYAGE specifies that cataloged and uncataloged data sets that reside on a primary volume are scratched if they have been inactive for a specified number of days and the current expiration date has been reached. If you specify this subparameter, a current backup version of the data sets on the primary volume is not required. For *days*, if you are in a single-processing-unit environment, substitute a decimal number from 1 to 999. In a multiple-processing-unit environment, you can specify a decimal number from 2 to 999. For example, if you specify *days* as 20,

DFHSM scratches those data sets on a primary volume that have been inactive for at least 20 days.

DELETEIFBACKEDUP specifies that the data sets on a primary volume can be scratched if they have been inactive for a specified number of days and if the data sets on the primary volume have current backup versions. For *days*, in a single-processing-unit environment, substitute a decimal number from 1 to 999. In a multiple-processing-unit environment, you can specify a decimal number from 2 to 999. For example, if you specify *days* as 30, DFHSM scratches those data sets that have been inactive for 30 days and that have a current backup version.

MIGRATE specifies that the data sets that reside on a primary volume are migrated according to the number of days they have been inactive.

The meaning of MIGRATE[(*days*)] depends on whether you have defined valid thresholds of occupancy. If you do not define thresholds of occupancy, migration causes all data sets not accessed in the last *days* days to migrate. If thresholds of occupancy are defined, DFHSM migrates data sets until the low threshold of occupancy is met or DFHSM migrates all the data sets inactive for the number of *days* specified. For *days*, you can specify a decimal number from 0 to 999. For example, if *days* is specified as 25, DFHSM migrates those data sets on the primary volume that have been inactive for at least 25 days until the low threshold of occupancy is met (if you have defined thresholds of occupancy) or until all data sets inactive for 25 days or longer have been migrated.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies for DELETEBYAGE, DELETEIFBACKEDUP, and MIGRATE. In addition, you can use the abbreviation DBA for DELETEBYAGE and the abbreviation DBU for DELETEIFBACKEDUP.

Defaults: If you are adding a primary volume to DFHSM, the default is MIGRATE. If you are changing the attributes of a volume and do not respecify a subparameter, the space management technique does not change.

Notes:

1. If you do not specify *days* with the MIGRATE subparameter or you specify a 0, the number of days the data set can remain inactive before it is allowed to migrate is the value specified with the DAYS parameter of the SETSYS command.
2. In a multiple-processing-unit environment, you can add the same volume to different processing units. When you do that, the space management technique for that volume must be the same in all processing units.
3. DFHSM automatically recalls a data set to a primary volume whose space management technique is MIGRATE even if the data set migrated from a volume whose type of space management is DELETEBYAGE or DELETEIFBACKEDUP. This is true even if you specified SETSYS RECALL(LIKE).

DENSITY: Specifying the Tape Density

Explanation: **DENSITY(2 | 3 | 4)** is an optional parameter specifying the density of the tape backup, dump, or migration level 2 volume.

DENSITY Subparameter	Meaning
2	Tape density of 32 bytes per millimeter (800 bytes per inch)
3	Tape density of 63 bytes/mm (1600 BPI)
4	Tape density of 246 bytes/mm (6250 BPI)

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DENSITY. There are no additional abbreviations.

Defaults: If you are adding a tape backup, dump or migration level 2 volume to DFHSM, the default is the highest density the device can support. If you are changing the attributes of a tape backup, dump, or migration level 2 volume and do not specify a subparameter, the density does not change.

Note: If you specify DENSITY and UNIT, the density must match the density capability of that type of unit or the command fails. If you specify a density of 2, 3, or 4 for the 3480 Magnetic Tape Subsystem, DFHSM ignores it.

DRAIN | NODRAIN: Specifying Whether a Volume Should Be Selected for Migration Output

Explanation: **DRAIN | NODRAIN** are mutually exclusive, optional subparameters of the MIGRATION parameter you use to specify whether a volume can be selected for migration output.

DRAIN specifies that the DASD volume is to be emptied. The DRAIN attribute prevents a migration level 1 volume from being selected for migration output. It prevents a migration level 2 volume from being associated with a keyrange.

NODRAIN specifies that a migration level 1 volume can be selected for migration output or that a migration level 2 volume can be associated with a keyrange.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DRAIN and NODRAIN. There are no additional abbreviations.

Defaults: If you are adding a DASD migration volume to DFHSM, the default is NODRAIN.

If you are changing the attributes of a migration volume and do not specify either subparameter, the previous drain status is not changed.

Notes:

1. DRAIN and NODRAIN only pertain to DASD volumes. The ADDVOL command will fail if either parameter is specified for tape volumes.
2. The selection of a migration level 1 volume is performed as each data set is being migrated. If a migration level 1 volume has the DRAIN attribute, it will not be selected for migration output.

3. The selection of a DASD migration level 2 volume differs greatly from that of a migration level 1 volume. Migration level 2 selection is the process of associating the volume with a given keyrange of user data sets. The association of a migration level 2 volume with a particular keyrange is recorded in the migration level 2 control record (L2CR). This association takes place during:
   - Processing of the DEFINE MIGRATIONLEVEL2 command.
   - Migration of a data set whose keyrange is not associated with any volume in the L2CR.
   - Migration of a data set when an out-of-space condition occurs on the volume associated with the keyrange for that data set. In this case, another migration level 2 volume is associated with the appropriate keyrange.

   The presence of the DRAIN attribute will prevent a migration level 2 volume from being associated with a keyrange, thereby preventing the volume from being used for migration output. However, if a migration level 2 volume which is already recorded in the L2CR as being associated with a keyrange is ADDVOLed with the DRAIN attribute, that volume remains eligible to be used for migration output. If you want to prevent such a volume from being used, you must first DELVOL that volume with the UNASSIGN subparameter before ADDVOLing the volume with the DRAIN attribute. To determine which DASD migration level 2 volumes are associated with a keyrange, use the QUERY MIGRATIONLEVEL2 command.
4. A volume can be reassigned or removed at any time and added again with the same or a different DRAIN attribute.

DUMPCLASS: Restricting the Specified Volume to Use a Specific Dump Class

Explanation: DUMPCLASS(*class*) is the subparameter of the DUMP parameter restricting the specified volume to use a specific dump class. For *class*, substitute the name of a previously defined dump class for the output copy wanted for the dump.

If *class* is not specified, the dump volume can be used by any dump class. The FREQUENCY and DAY subparameters of the DUMPCLASS parameter of the DEFINE command determine how often a primary volume is dumped to a given dump class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCLASS. In addition, you can use the abbreviation DCLASS for DUMPCLASS.

Defaults: None.

Note: When you assign a dump volume to a specific dump class, the unit specified by the UNIT parameter of the ADDVOL command is not checked for compatibility with the unit currently defined for the dump class. This allows volumes of multiple unit types to be assigned to the same dump class at the same time. You can switch between using different unit types for the same dump class by redefining the unit for the dump class.

MIGRATIONLEVEL1 | MIGRATIONLEVEL2: Specifying the Migration Level

Explanation: **MIGRATIONLEVEL1 | MIGRATIONLEVEL2** are mutually exclusive, optional subparameters of the MIGRATION parameter that you use to specify the level of the migration volumes.

MIGRATIONLEVEL1 specifies that the migration volume is to receive migrated data sets from primary volumes. A migration volume specified with this subparameter is called a migration level 1 volume. If the migration level 1 volume you are adding or changing is not mounted when you issue the ADDVOL command, DFHSM allocates the volume, which sends a mount request to the operator.

MIGRATIONLEVEL2 specifies that the migration volume is to receive data sets migrating automatically from migration level 1 volumes and by command from primary volumes or migration level 1 volumes. A migration volume specified with this subparameter is called a migration level 2 volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL1 or MIGRATIONLEVEL2. In addition, you can use the abbreviation ML1 for MIGRATIONLEVEL1 and the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: If you are adding a migration volume to DFHSM, the default is MIGRATIONLEVEL1. If you are changing the attributes of a migration volume, it remains at the same level as it was when it was added to the list of volumes owned or managed by DFHSM. If you are changing the attributes of a migration volume and specify the incorrect level, the ADDVOL command fails.

Note: If DFHSM migrates data sets from a primary volume directly to a tape migration level 2 volume, you can decide not to add migration level 1 volumes to this processing unit. However, you need to add a migration level 1 volume to this processing unit: (1) if SMS data sets require migration level 1 volumes as specified by their management class attributes, (2) to process BACKDS or HBACKDS commands, (3) if you want DFHSM to do extent reduction, or (4) if you want DFHSM to do any type of volume backup and volume dump if you are keeping dump VTOC copy data sets, since these data sets are written to ML1 volumes.

SMALLDATASETPACKING | NOSMALLDATASETPACKING: Specifying Small Data Set Packing on the Level 1 Volume

Explanation: **SMALLDATASETPACKING | NOSMALLDATASETPACKING** are mutually exclusive, optional subparameters of the MIGRATION parameter specifying whether small data set packing can be done on the migration level 1 volume.

SMALLDATASETPACKING specifies that small data set packing can be done on the migration level 1 volume.

NOSMALLDATASETPACKING specifies that small data set packing cannot be done on the migration level 1 volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SMALLDATASETPACKING and NOSMALLDATASETPACKING. In addition, you can use the abbreviation

SDSP for SMALLDATASETPACKING and the abbreviation NOSDSP for NOSMALLDATASETPACKING.

Defaults: If you are adding a migration level 1 volume to DFHSM, the default is NOSMALLDATASETPACKING. If you are changing the attributes of a volume and do not specify either subparameter, the small data set packing status does not change.

Notes:

1. The SMALLDATASETPACKING and NOSMALLDATASETPACKING subparameters do not apply to the MIGRATIONLEVEL2 subparameter. If you specify the SMALLDATASETPACKING or NOSMALLDATASETPACKING parameter when it does not apply, DFHSM ignores it.
2. Before small data set packing can be done on a migration level 1 volume, you must define a VSAM key-sequenced data set as the small-data-set-packing data set on the migration level 1 volume. In addition, the SMALLDATASETPACKING parameter must be specified with the SETSYS command. Small-data-set-packing data sets are not required on all migration level 1 volumes.

THRESHOLD: Specifying Thresholds of Occupancy

Explanation: **THRESHOLD**(*thresh1* [*thresh2*]) is an optional parameter specifying the limits for the percentages of space used on the volume.

The values you specify with THRESHOLD are used differently for the primary volumes, the migration level 1 volumes, and the DASD backup volumes that you define with ADDVOL. Primary volumes can have a high and low threshold of occupancy. Migration level 1 volumes and DASD backup volumes only have one threshold. DFHSM does not use threshold values for migration level 2 volumes, for tape backup volumes or for dump volumes.

To be valid, threshold values must be specified from 0 to 100. However, a threshold value of 100 is interpreted to mean the volume has no thresholds defined. For a primary volume, two thresholds of occupancy apply. If the first limit (high threshold) is specified as 100 or if it is not greater than the second limit (low threshold), no thresholds are defined for the volume. For migration level 1 and DASD backup volumes, only one threshold of occupancy applies.

For *thresh1*, substitute the limit (high threshold) for the percentage of occupied space you want on a volume. When *thresh1* is reached or exceeded, it causes one of the following to occur:

- Interval migration of data sets from a primary volume
- Migration of data sets from level 1 volumes to level 2 volumes during automatic volume space management.

DFHSM uses spill or cleanup processing to reduce the amount of occupied space on a full DASD daily backup volume. When the spill process completes on a full DASD daily backup volume or the cleanup process completes on a full DASD spill backup volume and the percent of occupied space is less than or equal to the percentage specified by *thresh1*, DFHSM no longer considers the DASD volume to be full and uses it for further backup or spill processing.

For *thresh2*, substitute the limit (low threshold) for the percentage of space you want to remain occupied on a primary volume after interval migration or volume migration of data sets from the volume is complete.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to THRESHOLD. There are no additional abbreviations.

Defaults: If you are adding a primary volume to DFHSM, the default value for *thresh1* is 100, and the default value for *thresh2* is 0. Therefore, a primary volume has no valid default thresholds. If you are adding a migration level 1 volume to DFHSM, the default value for *thresh1* is 100. Therefore, a migration level 1 volume has no valid default threshold. If you are adding a DASD backup volume to DFHSM, the default value for *thresh1* is 90.

If you are changing the attributes of a volume and do not specify threshold values, the thresholds are not changed. For a primary volume, if you specify only the high threshold, the low threshold is not changed. However, if the new high threshold is less than or equal to the low threshold or is equal to 100, the volume no longer has valid thresholds.

Notes:

1. The THRESHOLD parameter does not apply to migration level 2 volumes, tape backup volumes or dump volumes. If you specify the THRESHOLD parameter when it does not apply, DFHSM ignores it.
2. If you do not define valid thresholds of occupancy for a primary volume, automatic migration occurs only during daily space management (no interval migration occurs) and is based on the minimum migration age.
3. The *thresh1* and *thresh2* values are positional. For a primary volume, you must specify both a high threshold and a low threshold.
4. The *thresh2* value does not apply to migration, backup and dump volumes. If you specify a *thresh2* value when it does not apply, DFHSM ignores it.

Selecting Thresholds for Volumes

When you choose thresholds for your volumes, consider the following:

- Size of data sets
- Rate that users require data space
- Frequency of interval migration.

Follow this guideline when you set the thresholds of occupancy: the larger the data set, the lower the threshold. Set the thresholds so users have space for their data sets but data set thrashing is minimized. *Thrashing* is a condition in which the system can do little useful work because of excessive data movement between primary and migration volumes. Data set thrashing can be caused by any of the following:

- Not enough primary volume space.
- The high threshold is set too low, causing DFHSM to migrate data sets more often than is necessary during interval migration.

- The low threshold is set too low, causing DFHSM to migrate too many data sets from primary volumes.
- DFHSM uses the minimum migration age for daily space management when you do not specify thresholds. If the minimum migration age is too low, daily space management forces the migration of data sets that were recently referred to and are likely to be referred to again soon.

Examples of How to Code the ADDVOL Command

The following examples show different ways to code the ADDVOL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Adding a Primary Volume

In this example, a primary non-SMS-managed volume is added to the control of DFHSM. The volume is added with the characteristics of automatic volume space management, automatic backup, and automatic recall; and thresholds of occupancy are specified.

```
ADDVOL VOL004 UNIT(3380) PRIMARY(AUTOMIGRATION -
       AUTOBACKUP AUTORECALL) THRESHOLD(90 65)
```

Adding a Migration Level 1 Volume

In this example, a migration level 1 volume is added to the control of DFHSM. The volume is added with the characteristics of no small data set packing and a threshold of occupancy is specified.

```
ADDVOL VOL123 UNIT(3380) MIGRATION(MIGRATIONLEVEL1 -
       NOSMALLDATASETPACKING) THRESHOLD(90)
```

Adding a Dump Volume

In this example, a dump volume is added to the control of DFHSM. The volume is specified as a dump volume with a dump class of DAILY.

```
ADDVOL DMP001 UNIT(3480)       -
       DUMP(DUMPCLASS(DAILY))
```

Adding a Tape Spill Backup Volume

In this example, a backup volume is added to the control of DFHSM. The volume is specified as a spill volume, and a threshold of occupancy is specified.

```
ADDVOL BKP002 UNIT(3480) BACKUP(SPILL) -
       THRESHOLD(85)
```

Adding a Tape Daily Backup Volume

In this example, a tape backup volume is added. The volume is specified as a daily backup volume assigned to day 7 in the backup cycle.

```
ADDVOL BKP006 UNIT(3480)  -
       BACKUP(DAILY(7))
```

Adding a Tape Migration Level 2 Volume

In this example, a tape migration level 2 volume is added.

```
ADDVOL M2TP01 UNIT(3480) -
       MIGRATION(MIGRATIONLEVEL2)
```

Changing the Characteristics of a Primary Volume

In this example, the backup characteristics of a primary volume under control of DFHSM are changed from no automatic backup to automatic backup, and from a low threshold of 65% to a low threshold of 75%. Because you are changing the low threshold, you must respecify the high threshold to position correctly the new value for the low threshold. You do not have to respecify any parameter for a characteristic that is not to be changed, but the volume must be specified as being in the same volume category.

```
ADDVOL VOL003 UNIT(3380) PRIMARY(AUTOBACKUP) -
       THRESHOLD(90 75)
```

Assigning the Space Management Attribute to a Primary Volume

In this example, the delete-if-backed-up space management attribute is assigned to a primary volume. A backup device category of tape is specified.

```
ADDVOL VOL005 UNIT(3380) PRIMARY(DELETEIFBACKEDUP(10) -
       BACKUPDEVICECATEGORY(TAPE))
```

Preventing a Volume from Being Selected for Migration Output

In this example, DFHSM is to stop targeting a migration volume for any further migration or backup activity.

```
ADDVOL MIG113 U(3350) MIGRATION(ML1 DRAIN)
```

Specifying a Primary Volume to Be Automatically Dumped

In this example, a primary volume is to be automatically dumped to specified classes (DAILY and WEEKLY) during automatic dump processing.

```
ADDVOL PRIM14 UNIT(3350)       -
       PRIMARY(AUTODUMP(DAILY,WEEKLY))
```

Specifying a Migration Volume to Be Automatically Dumped

In this example, a migration volume is to be automatically dumped to specified classes (WEEKLY and MONTHLY) during automatic dump processing.

```
ADDVOL MIG019 UNIT(3350)       -
       MIGRATION(ML1(AUTODUMP(WEEKLY,MONTHLY)))
```

ALTERDS: Changing the Parameters That Affect Backup of a Non-SMS-Managed Data Set

The ALTERDS command changes the number of backup versions maintained for a non-SMS-managed data set and the frequency of creating the backup versions for the data set.

If an ALTERDS command is issued for an SMS-managed data set, the command fails and a message is issued. The number of versions and frequency of backup for an SMS-managed data set is determined from the data set's management class attributes.

You can either specify new values with the VERSIONS and FREQUENCY parameters or revert to the DFHSM default values with the SYSVERSIONS or SYSFREQUENCY parameters. When you specify a frequency of backup for your data set, the value overrides any frequency value you specified with the BACKVOL command or the current DFHSM value for FREQUENCY. When you specify a value for the VERSIONS parameter for your data set, the value overrides the current DFHSM value for VERSIONS. When you specify SYSVERSIONS or SYSFREQUENCY, DFHSM uses the value you specified with the VERSIONS parameter or the FREQUENCY parameter of the SETSYS command. If you did not use the SETSYS command to specify these values, DFHSM uses the current DFHSM default values for the number of backup versions or the frequency of creation of the backup versions.

You do not have to repeat any of these parameters each time you start DFHSM because the values are stored in the BCDS data set record. If you later use the BDELETE command to delete all backup versions of this data set, DFHSM deletes the BCDS data set record. As a result, the VERSIONS and FREQUENCY values are no longer in effect.

If you specify the ALTERDS command without any parameters, you receive a message that the command completed successfully. However, DFHSM did not change any of the data set parameters that affect backup.

Syntax of the ALTERDS Command

Command	Required Parameters	Optional Parameters
ALTERDS	*dsname ...*	**FREQUENCY(***days***) | SYSFREQUENCY** **VERSIONS(***limit***) | SYSVERSIONS**

Note: You can specify VERSIONS or SYSVERSIONS, FREQUENCY or SYSFREQUENCY, or a combination of these parameters with the ALTERDS command, but you must specify at least one parameter with the ALTERDS command to change the backup parameters.

Required Parameters of the ALTERDS Command

Dsname: Specifying the Name of the Data Set Being Altered

Explanation: *dsname ...* is a required positional parameter specifying the fully qualified data set name or list of fully qualified data set names of the non-SMS-managed data sets whose backup attributes are being changed.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *dsname ...* is a required positional parameter, you must specify it immediately after the command name.
2. DFHSM does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFHSM changes the backup parameters for the entire partitioned data set.

Optional Parameters of the ALTERDS Command

FREQUENCY | SYSFREQUENCY: Specifying the Frequency of Backup Versions

Explanation: **FREQUENCY(*days*) | SYSFREQUENCY** are mutually exclusive, optional parameters specifying the number of days between backup versions of data sets. If the data set was changed since the last time it was backed up and the specified number of days (frequency) has elapsed since the last backup version was created, a new backup version of the data set is created during incremental volume backup. However, if the specified number of days has elapsed but the data set was not changed, a new backup version of the data set is not created during volume backup unless you specified the TOTAL parameter of the BACKVOL command.

FREQUENCY(*days*) is specified to change the number of days between backup versions of the specified data set. For *days*, substitute a decimal number from 0 to 999. For example, if you specify *days* as 5, DFHSM backs up the data set if the data set has changed since the last time DFHSM backed it up and the latest backup version is at least five days old. If you specify 0, DFHSM creates a backup version of a changed data set every day that automatic backup runs.

SYSFREQUENCY is specified to revert to the value you specified with the SETSYS command or to the DFHSM default for the frequency of data set backup.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FREQUENCY and SYSFREQUENCY. There are no additional abbreviations.

Defaults: None.

Note: Specify the SYSFREQUENCY parameter only if a previous ALTERDS command changed the frequency of backup versions for this data set and you want to return to the frequency specified on the SYSFREQUENCY setting. If you specify the FREQUENCY parameter of the BACKVOL command and also specify the SYSFREQUENCY parameter of the ALTERDS command, DFHSM uses the frequency set in the BACKVOL command. So, DFHSM determines the frequency of backup in descending order:

- ALTERDS
- BACKVOL
- SETSYS
- DFHSM default.

VERSIONS | SYSVERSIONS: Specifying the Number of Backup Versions to Maintain

Explanation: **VERSIONS(*limit*) | SYSVERSIONS** are mutually exclusive, optional parameters specifying the maximum number of backup versions to be kept when additional versions are made for the data set.

VERSIONS(*limit*) is specified to change the number of backup versions to be kept for the specified data set. For *limit*, substitute a decimal number from 0 to 13. If you specify 0, DFHSM does not back up the data set. If you specify more than 13, DFHSM sets the limit to 13.

SYSVERSIONS is specified to revert to the value you specified with the SETSYS command or to the DFHSM default for the number of backup versions to be kept for backup data sets.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VERSIONS and SYSVERSIONS. There are no additional abbreviations.

Defaults: None.

Notes:

1. Specify the SYSVERSIONS parameter only if a previous ALTERDS command changed the number of backup versions for this data set and you want to return to the number of backup versions specified on the SYSVERSIONS setting. DFHSM determines the number of backup versions in the following order:
   - ALTERDS
   - SETSYS
   - DFHSM default.
2. If you reduce the number of backup versions with this command, DFHSM does not delete existing backup versions when the ALTERDS command is processed. The EXPIREBV command can be used to delete unwanted backup versions of data sets from the BCDS.
3. DFHSM can keep a maximum of 13 backup versions for one data set name. Some versions may be for a cataloged data set with that name, some versions for uncataloged data set(s) with that name.

The VERSIONS or SYSVERSIONS parameter indicates the number of backup versions kept for (1) the cataloged data set, and (2) the uncataloged data set(s). If LIMIT is greater than 6, then DFHSM gives priority, if necessary, to versions of the cataloged data set. For example, if you specify VERSIONS(7), when the seventh backup version of the cataloged data set is made, no more than 6 versions will be kept for the uncataloged data set(s).

Examples of How to Code the ALTERDS Command

The following examples show different ways to code the ALTERDS command.

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Changing the Number of Elapsed Days between Backup Versions

In this example, the number of elapsed days between creation of backup versions of the specified data set is changed to 3.

```
ALTERDS PAC4485.INPUT.LOAD FREQUENCY(3)
```

Changing the Maximum Number of Backup Versions That Are Kept

In this example, the maximum number of backup versions that can be kept for the specified data set is changed to 5.

```
ALTERDS JAB3364.REPORT.TEXT VERSIONS(5)
```

Specifying Zero Number of Backup Versions to Be Kept

In this example, you do not want DFHSM to keep any backup versions of the specified data set.

```
ALTERDS RTJ2219.REPORT.TEXT VERSIONS(0)
```

AUDIT: Auditing DFHSM

The AUDIT command detects and reports discrepancies about data set information from the following three sources:

- Computing system catalog (master catalog, user catalog, or OS CVOL)
- DFHSM control data set record
- VTOC of the DASD storage volume on which the data set resides.

You can audit one of the following as sources for data set names:

- Specific cataloged data set (DATASETNAMES)
- List of data sets (DATASETNAMES)
- Group of data sets with the same set of initial characters of the data set name (LEVELS)
- List of groups (LEVELS)
- All daily backup volumes (BACKUPTYPE(DAILY))
- Daily backup volumes for a specific day (BACKUPTYPE(DAILY(day)))
- All spill backup volumes (BACKUPTYPE(SPILL))
- All daily and spill backup volumes (BACKUPTYPE(ALL))
- Specific backup volume (BACKUPVOLUMES(*volser*))
- All backup volumes (BACKUPVOLUMES)
- List of backup volumes (BACKUPVOLUMES)
- Specific non-SMS-managed primary or migration volumes (VOLUMES(*volser*))
- All non-SMS-managed primary or migration volumes (VOLUMES)
- List of non-SMS-managed primary or migration volumes (VOLUMES)
- Backup control data set (BACKUPCONTROLDATASET)
- Migration control data set (MIGRATIONCONTROLDATASET)
- Offline control data set (OFFLINECONTROLDATASET)
- All tape daily backup volumes (OFFLINECONTROLDATASET(DAILY))
- Specific tape daily backup volumes (OFFLINECONTROLDATASET(DAILY(day)))
- All spill backup volumes (OFFLINECONTROLDATASET(SPILL))
- All daily and spill backup volumes (OFFLINECONTROLDATASET(ALL))
- All control data sets (ALL)
- Master catalog (MASTERCATALOG)
- User catalog (USERCATALOG).

If you specify more than one required parameter, DFHSM processes the AUDIT command in the following order:

1. Data set name or level
2. Backup volume type (daily or spill), non-SMS-managed primary or migration volumes, or backup volumes
3. Catalogs or control data sets.

For more information about the AUDIT command and its use, see Appendix A, "Using the AUDIT Command" on page 373.

Use the command during periods of low interactive user activity because the audit process can run for a long time. In an emergency situation, such as your system degenerating, you can run the audit process at any time.

DFHSM allows only one AUDIT command to run at a time.

SMS-managed volumes cannot be audited with the AUDIT command. The audit of SMS-managed data sets will be processed similarly to the audit for non-SMS-managed data sets through the use of the other AUDIT parameters.

Syntax of the AUDIT Command

Command	Required Parameters	Optional Parameters
AUDIT	(ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET(DAILY[(*day*)] | ML2 | SPILL | ALL) | MASTERCATALOG | USERCATALOG(*catname*)) BACKUPTYPE(DAILY[(*day*)] | SPILL | ALL) | BACKUPVOLUMES[(*volser* ...)] | VOLUMES[(*volser* ...)] DATASETNAMES(*dsname* ...) | LEVELS(*qualifier* ...)	FIX | NOFIX OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL REPORT(ALL | ERRORS)

Notes:

1. You must specify at least one parameter and you can specify a combination of up to three of the required parameters by using one of DATASETNAMES or LEVELS; one of VOLUMES, BACKUPVOLUMES, or BACKUPTYPE; and one of MASTERCATALOG, USERCATALOG, MIGRATIONCONTROLDATASET, BACKUPCONTROLDATASET, OFFLINECONTROLDATASET, or ALL.
2. You cannot specify certain combinations of parameters. Refer to "Summary of Parameters" on page 35 for a list of the parameter combinations you cannot use.
3. The VOLUMES parameter does not apply to SMS-managed volumes.

If you choose three parameters, DFHSM processes them as if you had specified three AUDIT commands.

The following table shows the DFHSM abbreviations for the parameters of the AUDIT command:

Parameter	DFHSM Abbreviation
BACKUPCONTROLDATASET	BCDS
BACKUPTYPE	BTYPE
BACKUPVOLUMES	BVOL
DATASETNAMES	DSNAME
MASTERCATALOG	MCAT
MIGRATIONCONTROLDATASET	MCDS
OFFLINECONTROLDATASET	OCDS

Parameter	DFHSM Abbreviation
OUTDATASET	ODS
USERCATALOG	UCAT

Summary of Parameters

The following table is a summary of the combination of parameters you *cannot* specify with the AUDIT command:

Parameter	Parameters That Do Not Apply
ALL	DATASETNAMES LEVELS TERMINAL
BACKUPCONTROLDATASET	BACKUPTYPE BACKUPVOLUMES DATASETNAMES LEVELS
BACKUPTYPE	BACKUPCONTROLDATASET DATASETNAMES LEVELS MASTERCATALOG MIGRATIONCONTROLDATASET OFFLINECONTROLDATASET TERMINAL USERCATALOG
BACKUPVOLUMES	BACKUPCONTROLDATASET DATASETNAMES LEVELS MASTERCATALOG MIGRATIONCONTROLDATASET OFFLINECONTROLDATASET USERCATALOG
DATASETNAMES	ALL BACKUPCONTROLDATASET BACKUPTYPE BACKUPVOLUMES FIX MASTERCATALOG MIGRATIONCONTROLDATASET OFFLINECONTROLDATASET REPORT(ERRORS) USERCATALOG

Parameter	Parameters That Do Not Apply
FIX	DATASETNAMES LEVELS MASTERCATALOG USERCATALOG
LEVELS	ALL BACKUPCONTROLDATASET BACKUPTYPE BACKUPVOLUMES FIX MASTERCATALOG MIGRATIONCONTROLDATASET OFFLINECONTROLDATASET USERCATALOG
MASTERCATALOG	BACKUPTYPE BACKUPVOLUMES DATASETNAMES FIX LEVELS TERMINAL
MIGRATIONCONTROLDATASET BACKUPTYPE BACKUPVOLUMES DATASETNAMES LEVELS	None of the parameters apply.
NOFIX	None of the parameters apply.
OFFLINECONTROLDATASET BACKUPTYPE BACKUPVOLUMES DATASETNAMES LEVELS	None of the parameters apply.
OUTDATASET	None of the parameters apply.
REPORT (ERRORS parameter only)	DATASETNAMES
SYSOUT	None of the parameters apply.
TERMINAL	ALL BACKUPTYPE MASTERCATALOG USERCATALOG
USERCATALOG	BACKUPTYPE BACKUPVOLUMES DATASETNAMES FIX LEVELS TERMINAL

Required Parameters of the AUDIT Command

ALL | BACKUPCONTROLDATASET | ... : Requesting an Audit of All Control Data Sets, a Specific Control Data Set, or a Catalog

Explanation: **ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET(DAILY[(*day*)] | ML2 | SPILL | ALL) | MASTERCATALOG | USERCATALOG(*catname*)** are mutually exclusive, required parameters that you use to audit all control data sets, a specific control data set, or a catalog.

ALL is specified to audit the MCDS, BCDS, and OCDS.

BACKUPCONTROLDATASET is specified to audit the DFHSM backup control data set.

MIGRATIONCONTROLDATASET is specified to audit the DFHSM migration control data set.

OFFLINECONTROLDATASET is specified to audit the DFHSM offline control data set. The TTOC records are the source of information to determine which data sets are audited.

DAILY[(*day*)] | ML2 | SPILL | ALL are mutually exclusive, optional subparameters of the OFFLINECONTROLDATASET parameter used to specify which tape volumes to audit.

DAILY(*day*) is specified to audit all tape daily backup volumes. For *day*, substitute a decimal number from 1 to 31 to represent the day in the backup cycle to which the tape daily backup volumes to be audited are assigned. If you do not specify a particular day, the order of the audit output is: all volumes assigned to day 1, all volumes assigned to day 2, and so forth, until all tape daily backup volumes have been audited. For each day, the order of the audit output is in ascending volume serial number sequence.

ML2 is specified to audit all tape migration level 2 volumes. The order of audit output is ascending volume serial number sequence for migration level 2 volumes.

SPILL is specified to audit all tape spill backup volumes. The order of audit output is ascending volume serial number sequence for spill volumes.

ALL is specified to audit all tape volumes. The order of the audit output is:

1. All daily backup volumes. The daily backup volumes are listed for each day and the volumes assigned to each day are listed in ascending volume serial number sequence.
2. All spill backup volumes. The spill backup volumes are listed in ascending volume serial number sequence.
3. All unassigned backup volumes. The unassigned backup volumes are listed in ascending volume serial number sequence.
4. All migration level 2 volumes. The migration level 2 volumes are listed in ascending volume serial number sequence.

MASTERCATALOG is specified to audit the master catalog.

USERCATALOG(*catname*) is specified to audit the specified user catalog. The user catalog must reside on a primary volume, or the command fails. For *catname*, substitute the name of the user catalog you want DFHSM to audit.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL, BACKUPCONTROLDATASET, MIGRATIONCONTROLDATASET, OFFLINECONTROLDATASET, MASTERCATALOG, and USERCATALOG. In addition, you can use the abbreviation MCAT for MASTERCATALOG, the abbreviation UCAT for USERCATALOG, the abbreviation MCDS for MIGRATIONCONTROLDATASET, the abbreviation BCDS for BACKUPCONTROLDATASET, and the abbreviation OCDS for OFFLINECONTROLDATASET.

Defaults: None.

Notes:

1. When you request an audit of the MCDS or BCDS, DFHSM uses the volume table of contents of the primary volumes to be sure that the volume specified in the computing system catalog contains the data set. Therefore, the primary volumes (including those managed by SMS) included in the audit of the MCDS or BCDS must be mounted.
2. If you specify the OFFLINECONTROLDATASET parameter without a subparameter, the AUDIT command fails.
3. If the catalog is on a volume that is not controlled by DFHSM, the AUDIT function will end without notification.
4. Dump volumes are not audited.

BACKUPTYPE | BACKUPVOLUMES | VOLUMES: Requesting an Audit of Primary, Migration, or Backup Volumes

Explanation: BACKUPTYPE(DAILY(*day*) | SPILL | ALL) | BACKUPVOLUMES(*volser...*) | VOLUMES(*volser...*) are mutually exclusive, required parameters that you use to audit one or more backup, non-SMS-managed primary, or migration volumes.

BACKUPTYPE is specified to audit a type of backup volume.

DAILY[(*day*)] | SPILL | ALL are mutually exclusive, optional subparameters of the BACKUPTYPE parameter used to specify the type of backup volume DFHSM is to audit.

DAILY(*day*) is specified to audit all daily backup volumes. For *day*, substitute a decimal number from 1 to 31 to represent the day in the backup cycle. If *day* is specified, DFHSM audits all backup volumes assigned to the specified day in the backup cycle. The order of the audit output is by entries in the daily backup cycle volume record (BVR) for the specified day. If you do not specify a particular day, the order of the audit output is: all volumes assigned to day 1, all volumes assigned to day 2, and so forth, until all tape and DASD daily backup volumes have been audited. For each day, the order of the audit output is by entries in the backup cycle volume record (BVR).

SPILL is specified to audit all spill backup volumes. The order of the audit output is by entries in the spill backup cycle volume record (BVR).

ALL is specified to audit all daily and spill backup volumes. The order of the audit output is all daily backup volumes, then all spill backup volumes.

BACKUPVOLUMES(*volser* ...) is specified to audit specific backup volumes or all backup volumes. For *volser* ..., substitute the volume serial numbers of the backup volumes you want DFHSM to audit. If you specify particular volumes, the order of the audit output is the same as the order of the volumes you specified. If you do not specify a particular volume, the order of the audit output is in ascending volume serial number order.

VOLUMES(*volser* ...) is specified to audit one or more non-SMS-managed volumes. For *volser* ..., substitute a volume serial number or list of volume serial numbers for volumes that you want in the audit. SMS-managed volumes will not be included in the audit. If a volume serial number for an SMS-managed volume is specified, DFHSM will not audit that volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUMES, BACKUPVOLUMES, and BACKUPTYPE. In addition, you can specify the abbreviation BVOL for BACKUPVOLUMES and the abbreviation BTYPE for BACKUPTYPE.

Defaults: If you specify VOLUMES without *volser*, DFHSM audits all non-SMS-managed primary and migration level 1 volumes, and all migration level 2 DASD volumes.

If you specify BACKUPVOLUMES without *volser*, DFHSM audits all backup volumes with a volume record in the BCDS.

There is no default for BACKUPTYPE. If you do not specify a subparameter with the BACKUPTYPE parameter, the AUDIT command fails.

Note: If the AUDIT command audits a migration level 1 volume, be aware of the following:

- DFHSM does not audit data sets in a small-data-set-packing data set.
- When you use the BACKDS command to back up a data set, the backup version temporarily resides on a migration level 1 volume. DFHSM audits these data sets.

DATASETNAMES | LEVELS: Requesting an Audit of Data Sets or Data Set Groups

Explanation: DATASETNAMES(*dsname* ...) | LEVELS(*qualifier* ...) are mutually exclusive, required parameters that you use to audit a data set, list of data sets, data set group, or list of data set groups.

DATASETNAMES(*dsname* ...) is specified to audit a data set or list of data sets. For *dsname* ..., substitute the fully qualified name or a list of fully qualified names for the data sets you want DFHSM to audit. You can specify a data set name of up to 44 characters.

LEVELS(*qualifier* ...) is specified to audit a group or list of groups of data sets with the same set of initial characters of the data set name. If you specify this parameter, DFHSM produces all the BCDS and MCDS entries for the group or groups. For *qualifier* ..., substitute the set of initial characters of the data set name or list of the set of initial characters for the data sets you want DFHSM to audit. You can specify a qualifier of up to 44 characters.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETNAMES and LEVELS. In addition, you can specify the abbreviation DSNAME for DATASETNAMES.

Defaults: None.

Notes:

1. When you specify the DATASETNAMES parameter, DFHSM prints only error information for each audited data set. If you want all information (including error information) about each audited data set, specify the REPORT(ALL) parameter of the AUDIT command.
2. When you specify the LEVELS parameter, DFHSM prints MCDS and BCDS entries for each group.
3. DFHSM does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFHSM audits the entire partitioned data set.

Optional Parameters of the AUDIT Command

FIX | NOFIX: Specifying Whether AUDIT Is to Repair Problems

Explanation: **FIX | NOFIX** are mutually exclusive, optional parameters specifying whether AUDIT is to repair any error it can when DFHSM finds an error.

FIX specifies that AUDIT is to repair any error it can when DFHSM finds an error.

NOFIX specifies that AUDIT is to report errors, not repair them.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FIX and NOFIX. There are no additional abbreviations.

Defaults: The default is NOFIX.

Notes:

1. If you specify the FIX parameter and the parameter applies, DFHSM issues a message indicating whether the fix was successful or unsuccessful.
2. The FIX parameter can cause a degradation in performance. When you specify it with the MASTERCATALOG or USERCATALOG parameter, DFHSM does not fix the audited information.

If you specified the FIX parameter with the MASTERCATALOG or USERCATALOG parameter, DFHSM allows the operator to cancel an audit by replying N to the following message:

```
ARC0803A  WARNING:  AUDIT OF CATALOG MAY DEGRADE PERFORMANCE,
          REPLY 'Y' TO START AUDIT OR 'N' TO CANCEL
          AUDIT COMMAND
```

You must use the FIXCDS command to correct any discrepancies between the computing system catalog and the MCDS.

3. If you specify the FIX parameter when you audit a primary or migration volume, DFHSM scratches and uncatalogs all utility data sets on the volume even if the utility data sets have expiration dates.
4. When you specify the FIX parameter of the AUDIT command in a multiple-processing-unit environment, DFHSM issues the RESERVE macro to keep the other processing units from accessing the three volumes containing the MCDS, BCDS, and OCDS. The reserve applies to the three volumes that contain the control data sets; therefore, no other data sets on those volumes can be accessed from another processing unit.

OUTDATASET | SYSOUT | TERMINAL: Specifying the Output Location for the Report

Explanation: **OUTDATASET(*dsname*) | SYSOUT(*class*) | TERMINAL** are mutually exclusive, optional parameters that specify the output location for the report you are requesting.

OUTDATASET(*dsname*) specifies the name of the data set where DFHSM is to write the output data. For *dsname*, substitute the fully-qualified name of the data set to receive the audit report.

If the data set does not exist, DFHSM dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of fixed-block-architecture (FBA)
- Logical record length of 121
- Data set is system reblockable if DFHSM is executing with DFP 3.1.0 or a subsequent release; otherwise, block size of 1210
- Primary allocation of 20 tracks
- Secondary allocation of 50 tracks
- Unit of SYSALLDA

If the data set already exists:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA and the logical record length must be 121.
- The data set is system reblockable if DFHSM is executing with DFP 3.1.0 or a subsequent release and the block size must be 0; otherwise, the block size must be a multiple of 121 up to a limit of 32K.

- The user can choose the primary space allocation.
- If DFHSM needs additional extents after the primary space allocation, DFHSM uses a secondary space allocation of 50 tracks.
- If the data set does not contain data, DFHSM starts writing output data at the beginning of the data set.
- If the data set contains data, DFHSM writes the output data after the existing data.

SYSOUT(*class*) specifies that the report is to go to the specified output class. For *class*, substitute one alphameric character for the class you want.

TERMINAL specifies that the report is to be printed at the same terminal where the command was issued, and also printed to SYSOUT using only the output class specified with the SYSOUT parameter of the SETSYS command or the DFHSM default for SYSOUT.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OUTDATASET, TERMINAL, and SYSOUT. In addition, you can use the abbreviation ODS for OUTDATASET.

Defaults: The default is SYSOUT, and the default for *class* is the value specified with the SETSYS command. If you also do not use the SYSOUT parameter of the SETSYS command to specify the output location, the default is class A.

Notes:

1. You can specify either TERMINAL, SYSOUT, or OUTDATASET with each AUDIT command.
2. The TERMINAL parameter does not apply to the ALL, BACKUPTYPE, MASTERCATALOG, and USERCATALOG parameters.
3. DFHSM does not handle partitioned data set members individually. If you specify a partitioned data set with a member name as the output data set, the audit report could be written over existing data.

REPORT: Specifying How Much Audit Information to Print

Explanation: REPORT(ALL | ERRORS) is an optional parameter specifying how much audit information you want printed.

ALL is specified to print all audit information, including the error condition information for the specified data sets, volumes, levels, catalogs, or control data sets.

ERRORS is specified to print only the error condition information for the specified volumes, catalogs, or control data sets.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REPORT, ALL, and ERRORS. There are no additional abbreviations.

Defaults: The default is ERRORS, except when using the DATASETNAMES parameter. For DATASETNAMES, the ALL parameter always applies.

Note: The ERRORS subparameter of REPORT does not apply for DATASETNAMES. If you specify ERRORS when it does not apply, DFHSM ignores it and uses the ALL parameter.

Examples of How to Code the AUDIT Command

For examples of the AUDIT command, see Appendix A, "Using the AUDIT Command" on page 373.

AUTH: Identifying Authorized DFHSM Users

The AUTH command identifies a DFHSM-authorized user who can issue authorized DFHSM commands and the DFHSM-authorized user who can issue authorized DFHSM commands and add, delete, and change the authority of other DFHSM users. When DFHSM is installed, the storage administrator with responsibility for DFHSM should be identified as the DFHSM-authorized user who can affect the authority of other DFHSM users.

The AUTH command can be submitted only by users who are already DFHSM authorized users having the data base authority control attribute, or the command must be part of the PARMLIB member being processed during DFHSM startup.

You do not have to repeat the AUTH command each time you start DFHSM. If you do not specify any parameters with the AUTH command, DFHSM accepts the command but does not add or remove any names from the list of authorized users.

Notes:

1. Use the AUTH command carefully because anyone who is a DFHSM-authorized user can issue DFHSM user commands without having RACF check the security of the command issuer.
2. The AUTH command cannot be issued from the system console.

Syntax of the AUTH Command

Command	Required Parameters
AUTH	*userid* **DATABASEAUTHORITY [(USER | CONTROL)] |** **REVOKE**

The following table shows the DFHSM abbreviations for the parameters of the AUTH command:

Parameter	DFHSM Abbreviation
DATABASEAUTHORITY	DBA

Required Parameters of the AUTH Command

Userid: Specifying the User Whose Authorization Is to Be Changed

Explanation: *userid* is a required positional parameter specifying the identification of the user whose authority to issue any DFHSM-authorized command is to be changed. DFHSM authorized-user commands are the storage administrator, operator, and system programmer commands.

For *userid*, substitute a string of one to seven alphameric characters for the identification of the user whose authorization is to be changed. The first character of the character string must be alphabetic or #, $, or @, and the remainder of the string can be alphameric and #, $, or @.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *userid* is a required positional parameter, you must specify it immediately after the command name.
2. The first authorized user, CONTROL or USER (preferably CONTROL), must be authorized by the PARMLIB member.

DATABASEAUTHORITY | REVOKE: Giving Authority to or Revoking Authority from a User

Explanation: **DATABASEAUTHORITY[(USER | CONTROL)] | REVOKE** are mutually exclusive, required parameters giving or revoking DFHSM authorization of the specified user.

DATABASEAUTHORITY(USER | CONTROL) specifies the authorization of the *userid.*

USER specifies that *userid* is authorized to use any DFHSM command except the AUTH command.

CONTROL specifies that *userid* is authorized to use the AUTH command to add, delete, or change the DFHSM authorization of other users.

REVOKE specifies that the *userid* identified is no longer authorized to issue all DFHSM commands. The user can still issue DFHSM user commands. The DFHSM user commands are described in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 User's Guide.*

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATABASEAUTHORITY, REVOKE, USER and CONTROL. In addition, you can use the abbreviation DBA for DATABASEAUTHORITY.

Defaults: If the DATABASEAUTHORITY parameter is specified without a subparameter, the default is USER.

Note: The CONTROL subparameter should be limited to as few *userids* as possible.

Examples of How to Code the AUTH Command

The following examples show different ways to code the AUTH command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Authorizing a User to Issue DFHSM Commands

The following command allows user ID MSS3155 to issue all DFHSM authorized-user commands except the AUTH command.

```
AUTH MSS3155 DATABASEAUTHORITY
```

Authorizing a User to Issue All DFHSM Commands

The following command allows user ID MSS3155 to add, delete, or change the DFHSM authorization of other users.

```
AUTH MSS3155 DATABASEAUTHORITY(CONTROL)
```

Revoking Authority from a User

The following command cancels the authority to issue any DFHSM commands except user commands for user ID MSS3155.

```
AUTH MSS3155 REVOKE
```

BACKDS: Backing Up a Specific Data Set

The BACKDS command creates a backup version of a specific data set. When you issue the BACKDS command, DFHSM does not check whether the data set has been changed or has met the requirement for frequency of backup. When DFHSM processes a BACKDS command, it temporarily stores the backup version on the migration level 1 volume with the most available space.

You can issue a BACKDS command for the following:

- An SMS-managed data set (if allowed by its management class).
- A data set that resides on a level 0 volume.
- A user data set that resides on a migration level 1 or DASD migration level 2 volume. We do not recommend that users directly allocate data sets on migration volumes.
- A migrated data set currently residing on a migration level 1 volume.
- An uncataloged data set.
- An OS CVOL.

Regardless of the status or location of the data set, the volume containing the data set must be mounted and online, or the command will fail.

If you want to back up an uncataloged data set, you must specify the volume serial number of the volume that contains the data set. In addition, you must specify the type of unit where the volume can be allocated.

If you want to back up an OS CVOL, you must specify the volume and unit.

Note: If you specify a data set currently migrated to a migration level 2 volume, DFHSM does not back up the data set.

Syntax of the BACKDS command

Command	Required Parameters	Optional Parameters
BACKDS	*dsname*	**UNIT(***unittype***) VOLUME(***volser***)**

Note: The UNIT and VOLUME parameters do not apply to SMS-managed data sets.

Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the BACKDS command:

Type of Data Set	Required Parameters	Parameters That Do Not Apply
Cataloged	*dsname*	UNIT VOLUME
Uncataloged	*dsname* UNIT VOLUME	None

Required Parameters of the BACKDS Command

dsname: Specifying the Name of the Data Set to Be Backed Up

Explanation: *dsname* is a required positional parameter specifying the fully-qualified name of the data set you want DFHSM to back up. For *dsname*, substitute the fully-qualified name of the data set.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *dsname* is a required positional parameter, you must specify it immediately after the command name.
2. The volume where the data set resides must be mounted before you issue the BACKDS command.
3. DFHSM does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFHSM backs up the entire partitioned data set.

Optional Parameters of the BACKDS Command

UNIT: Specifying the Type of Device

Explanation: UNIT(*unittype*) is an optional parameter specifying the type of unit where the volume containing the uncataloged data set to be backed up can be allocated. For *unittype*, substitute the type of unit. The valid types of units are: 3330, 3330-1, 3330V, 3350, 3375, and 3380.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNIT. There are no additional abbreviations.

Defaults: None.

Note: You must specify the UNIT parameter if you want to back up an uncataloged data set. If you specify UNIT, you must also specify the VOLUME parameter. Do not specify this parameter if you want to back up a cataloged data set.

VOLUME: Specifying the Volume Where the Data Set Resides

Explanation: **VOLUME(*volser*)** is an optional parameter specifying the volume where the uncataloged data set to be backed up resides. For *volser*, substitute the serial number of the volume where the uncataloged data set to be backed up resides.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUME. There are no additional abbreviations.

Defaults: None.

Note: You must specify the VOLUME parameter if you want to back up an uncataloged data set. If you specify VOLUME, you must also specify the UNIT parameter. Do not specify this parameter if you want to back up a cataloged data set.

Examples of How to Code the BACKDS Command

The following examples show how to code the BACKDS command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Backing Up an SMS-Managed Data Set

In this example, DFHSM backs up an SMS-managed data set.

```
BACKDS P234823.PSFB.H39SC230.DS230
```

Backing Up a Cataloged Data Set

In this example, DFHSM backs up a cataloged data set.

```
BACKDS JBH6798.PSFB.F40RC001.DSET01
```

Backing Up an Uncataloged Data Set

In this example, DFHSM backs up an uncataloged data set. You must specify the VOLUME and UNIT parameters to back up an uncataloged data set.

```
BACKDS FMT1315.PROJ53.REV VOLUME(VOL110) UNIT(3380)
```

BACKVOL: Backing Up or Dumping Data Sets from a Volume or Backing Up the Control Data Sets

You can use the BACKVOL command to request that DFHSM:

- Back up eligible data sets or dump all data sets from a specific level 0 volume
- Back up eligible data sets from all primary volumes
- Back up control data sets.

You can specify whether to back up the data sets to tape or DASD daily backup volumes by using the BACKUPDEVICECATEGORY parameter.

You can print backup messages at the system console (TERMINAL). Backup messages are always recorded in the backup activity log.

When you issue the BACKVOL command with the DUMP optional parameter, DFHSM invokes DFDSS to do a full-volume dump of a single DASD volume. The data sets are copied onto dump volumes.

You can decide to print dump messages at the system console (TERMINAL). Dump messages are always recorded in the dump activity log.

Backing Up or Dumping Data Sets from an SMS-Managed Volume

The BACKVOL command can be used to request that DFHSM back up eligible data sets from a specific SMS-managed volume. Only those data sets for which the management class has been defined to allow command backup will be processed. The frequency of backup for an SMS-managed data set is obtained from the data set's management class attribute.

You can specify, on the command, the type of backup to be done. You can choose to back up the following:

- Data sets that have changed since the last backup (INCREMENTAL)
- All data sets on a volume (TOTAL).

The BACKVOL command can be used to request DFHSM to dump all data sets from a specific SMS-managed volume. When a BACKVOL command with the DUMP parameter is issued for an SMS-managed volume, the dump functions performed for the volume are the same as those performed for an automatic dump of that volume.

If dump classes are specified on the BACKVOL command, those dump classes are used to perform the dump function, overriding the dump classes defined for the SMS storage group associated with that volume.

Syntax of the BACKVOL Command with SMS-Managed Volumes

Command	Required Parameters	Optional Backup Parameters	Optional Dump Parameters
BACKVOL	**VOLUME** (*volser*)	**BACKUPDEVICECATEGORY (TAPE | DASD) INCREMENTAL | TOTAL | TERMINAL**	**DUMP[(DUMPCLASS** (*class* [, *class,class,class,class*]) **[RETENTIONPERIOD(***days* **| * | NOLIMIT[, ...,***days* **| * | NOLIMIT])])] TERMINAL**

The following table shows the DFHSM abbreviations for the parameters of the BACKVOL command:

Parameter	DFHSM Abbreviation
DUMPCLASS	DCLASS
RETENTIONPERIOD	RETPD

Summary of Parameters

The following table is a summary of the combination of parameters you can specify to back up eligible data sets with the BACKVOL command:

Parameter	Related Parameters
BACKUPDEVICECATEGORY	None
INCREMENTAL	None
TOTAL	None
TERMINAL	None

The following table is a summary of the combination of parameters you can specify to dump all data sets with the BACKVOL command:

Parameter	Related Parameters
DUMP	VOLUME(*volser*)
DUMPCLASS	DUMP
RETENTIONPERIOD	DUMPCLASS
TERMINAL	None

Required Parameters for SMS-Managed Volumes

VOLUME: Specifying the Volume to Be Backed Up or Dumped

Explanation: VOLUME(*volser*) is a required parameter specifying that DFHSM is to back up the eligible data sets on a particular volume or dump all data sets on a particular volume. For *volser*, substitute the serial number of the volume to be backed up. A message is issued and the backup/dump is not processed if:

- DFHSM is running in a non-SMS environment.
- The SMS-managed volume is in *initial* status (contains both SMS- and non-SMS-managed data sets while in the process of being converted to an SMS-managed volume).
- DFHSM cannot determine if the specified volume is SMS-managed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUME. There are no additional abbreviations.

Defaults: None.

Notes:

1. You can specify only one volser with each BACKVOL command.
2. If you specify VOLUME without a volser, the command will fail.

Optional Parameters for SMS-Managed Volumes

BACKUPDEVICECATEGORY: Specifying Where the Backup Versions Are to Reside

Explanation: **BACKUPDEVICECATEGORY(TAPE | DASD)** is an optional parameter specifying the type of device, tape or DASD, that receives the backup versions of the data sets when they are backed up.

TAPE specifies that the backup versions of the data sets on the volume are to reside on a tape daily backup volume when the data sets are backed up.

DASD specifies that the backup versions of the data sets on the volume are to reside on a DASD daily backup volume when the data sets are backed up.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPDEVICECATEGORY. There are no additional abbreviations.

Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is TAPE.

Notes:

1. BACKUPDEVICECATEGORY is applicable only if either the INCREMENTAL or TOTAL optional parameter is specified.
2. When you specify BACKUPDEVICECATEGORY, you can specify TAPE or DASD, but not both.
3. The BACKUPDEVICECATEGORY parameter does not apply when you specify the DUMP parameter.

DUMP | INCREMENTAL | TOTAL: Specifying Which Data Sets Are Backed Up

Explanation: **DUMP[(DUMPCLASS(*class*[, *class,class,class,class*])**
[RETENTIONPERIOD(*days* | * | NOLIMIT[, ...,*days* | * | NOLIMIT])])]
| INCREMENTAL | TOTAL are mutually exclusive, optional parameters specifying which data sets are to be backed up. A message is issued and the backup/dump is not processed if:

- DFHSM is running in a non-SMS environment.
- The SMS-managed volume is in *initial* status (contains both SMS- and non-SMS-managed data sets while in the process of being converted to an SMS-managed volume).
- DFHSM cannot determine if the specified volume is SMS-managed.

Note: Because of the number of subparameters for the DUMP parameter, each bracketed subparameter is described separately.

DUMP specifies that a DFDSS full volume dump is to be performed for a single volume. All subparameters specified will be used to process the volume, overriding the dump classes defined for the storage group associated with the volume.

INCREMENTAL specifies that only those data sets that have never been backed up or have been changed since their last backup version was created are eligible for

backup. If a data set is a changed data set, the frequency requirement as defined in the data set's management class must be met before DFHSM backs up the data set.

TOTAL specifies that all the data sets on the volume are to be backed up unless excluded by its management class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMP, TOTAL, and INCREMENTAL. There are no additional abbreviations.

Defaults: The default is INCREMENTAL.

DUMPCLASS: Specifying That Each Dump Copy Be Targeted to a Particular Dump Class

Explanation: **DUMPCLASS(***class*[,*class*,*class*,*class*,*class*]) is an optional parameter requesting that each dump copy be targeted to a particular dump class. At least one *class* and no more than five *classes* must be specified if DUMPCLASS is specified. If dump classes are not specified, they will be taken from the storage group definition to which the volume belongs. If none exist for the storage group, and none are specified on the command, the command will fail.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCLASS. In addition, you can use the abbreviation DCLASS for DUMPCLASS. **Defaults:** If the DUMPCLASS parameter is not specified, the dump classes from the storage group definition to which the volume belongs are used.

Notes:

1. DUMPCLASS is applicable only when the DUMP parameter is used.
2. Do not specify the same dump class more than once.

RETENTIONPERIOD: Requesting a Specific Retention Period for the Dump Copy

Explanation: **RETENTIONPERIOD (***days* | * | NOLIMIT[, ...,*days* | * | NOLIMIT]) is an optional subparameter of the DUMP parameter requesting a specific retention period for the dump copy or copies.

The retention periods correspond to the dump classes. The dump copy targeted to the first dump class specified is retained for the number of days specified by the first retention period, and so forth.

For *days*, substitute a decimal number from 1 to 9999 or NOLIMIT. If *days* is specified as 5, DFHSM retains the dump copy for five days before expiring the dump copy. If *days* is specified as NOLIMIT, DFHSM does not expire the dump copy automatically.

You can use '*' as a place holder to denote that the retention period for the corresponding dump class specified with the DUMPCLASS parameter should be taken from the storage group definition to which the volume belongs.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RETENTIONPERIOD. In addition, you can use the abbreviation RETPD for RETENTIONPERIOD.

Defaults: If fewer retention periods are listed than dump classes, the retention period is taken from the storage group definition to which the volume belongs.

Notes:

1. The BACKVOL command fails if the number of retention periods specified for RETENTIONPERIOD is greater than the number of classes specified for DUMPCLASS.
2. If DUMPCLASS is specified without RETENTIONPERIOD, the retention period is taken from the storage group definition to which the volume belongs.
3. RETENTIONPERIOD is only applicable if DUMPCLASS is specified.

TERMINAL: Requesting That Backup or Dump Messages Appear at the Terminal

Explanation: **TERMINAL** is an optional parameter specifying that any data set backup or dump messages are to be sent to the system console, and to either the backup activity log or the dump activity log.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TERMINAL. There are no additional abbreviations.

Defaults: If you do not specify TERMINAL, the backup messages are sent only to the backup activity log and the dump messages are sent to the dump activity log.

Examples of How to Code the BACKVOL Command for SMS-Managed Volumes

The following examples show different ways to code the BACKVOL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Backing Up All the Data Sets on an SMS-Managed Volume

In this example, all the data sets on an SMS-managed volume are backed up if their management class attributes allow command backup. Because you did not specify TERMINAL, the data set backup messages go to the backup activity log only.

```
BACKVOL VOLUME(SMS025) TOTAL
```

Backing Up Eligible Data Sets on an SMS-Managed Volume

In this example, the eligible data sets, as defined by their management class attributes, are backed up.

The backup versions of these data sets will reside on tape. The data set backup messages appear at the system console and in the backup activity log.

```
BACKVOL VOLUME(VOL003) INCREMENTAL TERMINAL-
        BACKUPDEVICECATEGORY(TAPE)
```

Dumping an SMS-Managed Volume to a Specified Dump Class and Retention Period

In this example, an SMS-managed volume, SMS13, is dumped to a specific class, EXTRA, and the dump copy is assigned a retention period of 10 days.

```
BACKVOL VOLUME(SMS13) -
        DUMP(DUMPCLASS(EXTRA) RETENTIONPERIOD(10))
```

Dumping an SMS-Managed Volume to a Dump Class

In this example, the volume SMS13 is dumped to a dump class called OLDCLASS. The retention period is taken from the dump class definition to which the volume belongs.

```
BACKVOL VOLUME(SMS13) DUMP(DUMPCLASS(OLDCLASS))
```

In this example, the volume SMS13 is dumped to the dump classes associated with its storage group definition.

```
BACKVOL VOLUME(SMS13) DUMP
```

In this example, five dump copies are made of volume SMS13. The retention periods for the first three dump copies are the retention periods from the corresponding dump classes. The retention period for the fourth dump copy is 60 days. The fifth dump class has an unlimited retention period.

```
BACKVOL VOLUME(SMS13) -
        DUMP(DCLASS(WK,MNTH,DLY,VITREC,SPEC)  -
             RETPD(*,*,*,60,NOLIM))
```

Backing Up or Dumping Data Sets from a Specific Non-SMS-Managed Volume or All Primary Volumes

The BACKVOL command can be used to request that DFHSM back up eligible data sets from a specific volume or all primary volumes or dump all data sets from a particular volume.

When backing up non-SMS-managed volumes, you can specify, on the command, the type of backup to be done. You can choose to back up the following:

- Data sets that have not been backed up for a specified number of days (FREQUENCY).
- Data sets that have changed since the last backup (INCREMENTAL).
- All data sets on a volume (TOTAL).

Syntax of the BACKVOL Command with Non-SMS-Managed Volumes

Command	Required Parameters	Optional Backup Parameters	Optional Dump Parameters
BACKVOL	PRIMARY | VOLUME (*volser*)	BACKUPDEVICECATEGORY (TAPE | DASD) FREQUENCY INCREMENTAL | TOTAL TERMINAL UNIT	DUMP[(DUMPCLASS (*class* [, *class,class,class,class*]) [RETENTIONPERIOD(*days* | * | NOLIMIT[, ...,*days* | * | NOLIMIT])])] TERMINAL UNIT

The following table shows the DFHSM abbreviations for the parameters of the BACKVOL command:

Parameter	DFHSM Abbreviation
DUMPCLASS	DCLASS
RETENTIONPERIOD	RETPD

Summary of Parameters

The following table is a summary of the combination of parameters you can specify to back up eligible data sets with the BACKVOL command:

Parameter	Related Parameters
BACKUPDEVICECATEGORY	None.
FREQUENCY	INCREMENTAL

Parameter	Related Parameters
INCREMENTAL	None
PRIMARY	None
TOTAL	None
TERMINAL	None
UNIT	VOLUME(*volser*)
VOLUME(*volser*)	UNIT (volume not managed or owned by DFHSM)

The following table is a summary of the combination of parameters you can specify to dump all data sets from a volume using the BACKVOL command:

Parameter	Related Parameters
DUMP	VOLUME(*volser*)
DUMPCLASS	DUMP
RETENTIONPERIOD	DUMPCLASS
TERMINAL	None
UNIT	VOLUME(*volser*)
VOLUME(*volser*)	UNIT (volume not managed or owned by DFHSM)

Required Parameters for Non-SMS-Managed Volumes or All Primary Volume

PRIMARY | VOLUME: Specifying the Volume to Be Backed Up or Dumped

Explanation: **PRIMARY | VOLUME(*volser*)** are mutually exclusive, required parameters specifying whether DFHSM is to back up the eligible data sets on a specified volume or all primary volumes, or dump all data sets on a specific volume.

PRIMARY specifies that DFHSM is to back up the eligible data sets on all primary volumes, not just those with the primary volume attribute of automatic backup.

VOLUME(*volser*) specifies that DFHSM is to back up the eligible data sets on a particular volume or dump all data sets on a particular volume. For *volser*, substitute the serial number of the volume to be backed up. If VOLUME is specified without a *volser*, all primary, non-SMS managed volumes will be processed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PRIMARY and VOLUME. There are no additional abbreviations.

Defaults: None.

The following notes apply if you have not specified the optional parameter DUMP with the BACKVOL command:

Notes:

1. The FREQUENCY and INCREMENTAL parameters set up the eligibility criteria for data sets.
2. You are not required to specify UNIT if you specify a volume managed or owned by DFHSM. However, if you specify a volume not managed by DFHSM, you must also specify the UNIT parameter.
3. If you request that DFHSM back up more than one volume (you specified the PRIMARY parameter or the VOLUME parameter without specifying a *volser*), DFHSM starts a separate volume backup task for each primary volume until it reaches the maximum number of backup tasks specified with the MAXBACKUPTASKS parameter of the SETSYS command.

The following notes apply if you have specified the optional parameter DUMP with the BACKVOL command:

Notes:

1. The DUMP optional parameter is allowed only if you specify VOLUME(*volser*). The *volser* can be for any DASD volume, including DFHSM-owned volumes.
2. You are not required to specify UNIT if you specify a volume managed or owned by DFHSM.

Optional Parameters for Non-SMS-Managed Volumes or All Primary Volume

BACKUPDEVICECATEGORY: Specifying Where the Backup Versions Are to Reside

Explanation: **BACKUPDEVICECATEGORY(TAPE | DASD)** is an optional parameter specifying the type of device, tape or DASD, that receives the backup versions of the data sets when they are backed up.

TAPE specifies that the backup versions of the data sets on the volume are to reside on a tape daily backup volume when the data sets are backed up.

DASD specifies that the backup versions of the data sets on the volume are to reside on a DASD daily backup volume when the data sets are backed up.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPDEVICECATEGORY. There are no additional abbreviations.

Defaults: If you do not specify BACKUPDEVICECATEGORY and the volume has been added with the ADDVOL command, the default is the backup device category specified in the ADDVOL command.

Notes:

1. BACKUPDEVICECATEGORY is applicable only if either the INCREMENTAL or TOTAL optional parameter is specified.
2. When you specify BACKUPDEVICECATEGORY, you can specify TAPE or DASD, but not both.
3. The BACKUPDEVICECATEGORY parameter does not apply when you specify the DUMP parameter.

DUMP | INCREMENTAL | TOTAL: Specifying Which Data Sets Are Backed Up

Explanation: **DUMP|(DUMPCLASS(***class***[, *class,class,class,class*])**
[RETENTIONPERIOD(*days* **| * | NOLIMIT[, ...,***days* **| * | NOLIMIT])])]**
| INCREMENTAL | TOTAL are mutually exclusive, optional parameters specifying which data sets are to be backed up.

Note: Because of the number of subparameters for the DUMP parameter, each bracketed subparameter is described separately.

DUMP specifies that a DFDSS full volume dump is to be performed for a single volume. DUMP is valid only when the VOLUME(*volser*) parameter is specified.

INCREMENTAL specifies that only those data sets that have never been backed up or have been changed since their last backup version was created are eligible for backup, depending on the SETSYS INCREMENTALBACKUP parameter setting. If a data set is a changed data set, the frequency requirement must also be met before DFHSM backs up the data set.

TOTAL specifies that all the data sets on the volume or volumes are to be backed up if DFHSM supports the data set organization. DFHSM backs up all data sets, not just changed data sets and data sets that have met the frequency of backup.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMP, INCREMENTAL, and TOTAL. There are no additional abbreviations.

Defaults: The default is INCREMENTAL.

Note: For VSAM data sets, if the date last updated is the same as the date last backed up, DFHSM cannot determine which occurred first, the update or the backup. If the two dates are the same, DFHSM will back up a VSAM data set. Therefore, if you specify the BACKVOL command multiple times for the same volume on the same date, DFHSM backs up some VSAM data sets multiple times.

DUMPCLASS: Specifying That Each Dump Copy Be Targeted to a Particular Dump Class

Explanation: **DUMPCLASS(***class***[,***class,class,class,class***])** is an optional parameter requesting that each dump copy be targeted to a particular dump class. The dump classes, *class*, must be pre-defined with the DUMPCLASS optional parameter of the DEFINE command.

DUMPCLASS *is required* unless the specified volume is a primary vclume with a dump class specified for it with its ADDVOL command. At least one *class* and no more than five *classes* must be specified if DUMPCLASS is specified.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCLASS. In addition, you can use the abbreviation DCLASS for DUMPCLASS.

Defaults: If the DUMPCLASS parameter is not specified and the volume is a primary volume with DUMPCLASS specified with its ADDVOL command, the dump classes specified with the ADDVOL command are used.

Notes:

1. DUMPCLASS is applicable only when the DUMP parameter is used.
2. Do not specify the same dump class more than once.

RETENTIONPERIOD: Requesting a Specific Retention Period for the Dump Copy

Explanation: **RETENTIONPERIOD** (*days* | * | **NOLIMIT**[, ...,*days* | * | **NOLIMIT**]) is an optional subparameter of the DUMP parameter requesting a specific retention period for the dump copy or copies.

The list of retention periods corresponds to the list of dump classes. The dump copy targeted to the first dump class in the list is retained for the number of days specified by the first retention period in the list, and so forth.

For *days*, substitute a decimal number from 1 to 9999 or NOLIMIT. If *days* is specified as 5, DFHSM retains the dump copy for five days before expiring the dump copies. If *days* is specified as NOLIMIT, DFHSM does not expire the dump copy automatically.

You can use '*' as a place holder to denote that the retention period for the corresponding dump class in the list of dump classes with the DUMPCLASS parameter should be taken from the dump class definition.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RETENTIONPERIOD. In addition, you can use the abbreviation RETPD for RETENTIONPERIOD.

Defaults: If fewer retention periods are listed than dump classes, then the retention period defined for the *class* with the DEFINE command is used.

Notes:

1. The BACKVOL command fails if the number of retention periods specified for RETENTIONPERIOD is greater than the number of classes specified for DUMPCLASS.
2. If DUMPCLASS is specified without RETENTIONPERIOD, the retention period defined for the DUMPCLASS is used.
3. RETENTIONPERIOD is only applicable if DUMPCLASS is specified.

FREQUENCY: Specifying the Frequency of Backup for Data Sets

Explanation: **FREQUENCY**(*days*) is an optional parameter specifying the number of days required between backup versions of a data set. DFHSM does not back up the data set unless the specified number of days have elapsed since DFHSM last backed up the data set. For *days*, substitute a decimal number from 0 to 999. For example, if *days* is specified as 5, only those data sets that have not been backed up in the last

five days are eligible for backup. When you specify 0, DFHSM backs up changed data sets no matter how recently they were backed up.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FREQUENCY. There are no additional abbreviations.

Defaults: If you do not specify the FREQUENCY parameter with the BACKVOL command or have not specified the FREQUENCY parameter with an ALTERDS command, the current DFHSM value for FREQUENCY previously specified on the SETSYS command is used.

Notes:

1. The FREQUENCY parameter does not apply when you specify either the DUMP or TOTAL parameter. If you specify FREQUENCY when it does not apply, DFHSM ignores it.
2. The frequency specified with this command does not override the frequency specified with the ALTERDS command. However, it overrides the frequency specified with the SETSYS command or the DFHSM default. So, DFHSM determines the frequency of backup in the following order:
   - ALTERDS
   - BACKVOL
   - SETSYS
   - DFHSM default.

TERMINAL: Requesting That Backup or Dump Messages Appear at the Terminal

Explanation: TERMINAL is an optional parameter specifying that any data set backup or dump messages are to be sent to the system console, and to either the backup activity log or the dump activity log.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TERMINAL. There are no additional abbreviations.

Defaults: If you do not specify TERMINAL, the backup messages are sent only to the backup activity log and the dump messages are sent to the dump activity log.

UNIT: Specifying the Type of Device

Explanation: UNIT(*unittype*) is an optional parameter specifying the type of unit where the volume being backed up can be allocated.

For *unittype*, substitute the type of unit where the volume can be allocated. The valid types of units are: 3330, 3330-1, 3330V, 3350, 3375, and 3380.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNIT. There are no additional abbreviations.

Defaults: None.

Notes:

1. You are not required to specify UNIT if you specify a volume managed or owned by DFHSM. However, if you specify a volume not managed by DFHSM, you must also specify the UNIT parameter.
2. The UNIT parameter is ignored if you specify the PRIMARY parameter on the BACKVOL command.
3. If you specify the UNIT parameter for a DFHSM owned or managed volume, DFHSM uses that *unittype* rather than the one in its volume record.

Examples of How to Code the BACKVOL Command for Non-SMS-Managed Volumes

The following examples show different ways to code the BACKVOL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Backing Up All the Data Sets on a Volume

In this example, all the data sets on a volume not managed by DFHSM are backed up. Because you did not specify TERMINAL, the data set backup messages go to the backup activity log only.

```
BACKVOL VOLUME(PUB025) UNIT(3380) TOTAL
```

Backing Up Eligible Data Sets on a DFHSM-Managed Volume

In this example, the only data sets backed up are:

- Data sets that have never been backed up
- Data sets that have been changed since the last backup version was created and that meet the specified frequency of two days since the last backup version was created.

The backup versions of these data sets will reside on tape. The data set backup messages appear at the system console and in the backup activity log.

```
BACKVOL VOLUME(VOL003) FREQUENCY(2) INCREMENTAL TERMINAL-
        BACKUPDEVICECATEGORY(TAPE)
```

Dumping a Primary Volume to a Dump Class

In this example, a primary volume, PRIM13, is dumped to a specific class, EXTRA, and assigns the dump copy a retention period of 10 days.

```
BACKVOL VOLUME(PRIM13) -
        DUMP(DUMPCLASS(EXTRA) RETENTIONPERIOD(10))
```

Dumping a Primary Volume to a Dump Class

In this example, the volume PRIM13 is dumped to a dump class called OLDCLASS. The retention period is the retention period of OLDCLASS.

```
BACKVOL VOLUME(PRIM13) DUMP(DUMPCLASS(OLDCLASS))
```

In this example, the volume PRIM13 is a primary volume dumped to the classes associated with it by the previous ADDVOL command with the AUTODUMP parameter.

```
ADDVOL PRIM13 PRIMARY(AD(WEEKLY,MONTHLY))    -
       UNIT(3380)

BACKVOL VOLUME(PRIM13) DUMP
```

In this example, five dump copies are made of volume PRIM13. The retention periods for the first three dump copies are the retention periods for the corresponding dump classes defined by the DEFINE command. The retention period for the fourth dump copy is 60 days. The fifth dump class has an unlimited retention period.

```
BACKVOL VOLUME(PRIM13) -
        DUMP(DCLASS(WK,MNTH,DLY,VITREC,SPEC)  -
             RETPD(*,*,*,60,NOLIM))
```

Backing Up Control Data Sets

You can use the BACKVOL command to back up the control data sets.

Syntax of the BACKVOL Command for Control Data Sets

Command	Required Parameters
BACKVOL	CONTROLDATASETS

The following table shows the DFHSM abbreviations for the parameters of the BACKVOL command:

Parameter	DFHSM Abbreviation
CONTROLDATASETS	CDS

Required Parameters for Control Data Sets

CONTROLDATASETS: Specifying the Control Data Sets Be Backed Up

Explanation: **CONTROLDATASETS** is a required parameter specifying that DFHSM back up the DFHSM control data sets and journal.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CONTROLDATASETS. In addition, you can use the abbreviation CDS for CONTROLDATASETS.

Defaults: None.

Notes:

1. Do not issue the CONTROLDATASETS parameter of the BACKVOL command during a period of high DFHSM activity because the control data sets cannot be changed while this function is running. Most DFHSM functions change the control data sets. The only way to prevent DFHSM from backing up the control data sets after someone issues the BACKVOL command with the CONTROLDATASETS parameter is to stop DFHSM.
2. The backup device category for control data sets is specified with the SETSYS command.

Example of How to Code the BACKVOL Command

The following examples show different ways to code the BACKVOL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Backing Up the Control Data Sets

In this example, DFHSM backs up all defined control data sets.

```
BACKVOL CONTROLDATASETS
```

BDELETE: Deleting Backup Versions of a Data Set

The BDELETE command deletes all the backup versions of a specific data set or deletes specific backup versions by version number. You can specify multiple data set names with the BDELETE command.

If you have cataloged and uncataloged data sets with the same name, DFHSM deletes the backup versions of either the cataloged or uncataloged data sets, not the backup versions of both.

To delete retired versions, you must use the BDELETE command and specify the version number of the retired version.

Syntax of the BDELETE Command

Command	Required Parameters	Optional Parameters
BDELETE	(*dsname* ...)	**FROMVOLUME(***volser***)** **VERSIONS(***bvn* ...**)**

Note: The FROMVOLUME parameter does not apply to SMS-managed data sets.

Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the BDELETE command:

Type of Data Set	Required Parameters	Parameters That Do Not Apply
Cataloged	*dsname*	FROMVOLUME
Uncataloged	*dsname* FROMVOLUME	None

Required Parameters of the BDELETE Command

Dsname: Specifying the Name of the Data Set Whose Backup Versions Are to Be Deleted

Explanation (*dsname* ...) is a required positional parameter specifying the name of the data set or list of data set names whose backup versions you want to delete. Each data set name you specify must be fully qualified. For *dsname*, substitute the fully-qualified name or list of names of the data sets whose backup versions are to be deleted.

Abbreviations: None.

Defaults: None.

Note: Because *dsname* is a required positional parameter, you must specify it immediately after BDELETE.

Optional Parameters of the BDELETE Command

FROMVOLUME: Specifying the Volume Where the Data Set Resided When the Backup Versions Were Created

Explanation: **FROMVOLUME(*volser*)** is an optional parameter specifying the volume where the uncataloged data set or data sets resided when DFHSM backed up the data sets. You specify this parameter only if the data set was uncataloged. For *volser*, substitute the serial number of the volume where the uncataloged data set or data sets resided when the backup versions were created.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FROMVOLUME. There are no additional abbreviations.

Defaults: None.

Notes:

1. The data sets you specified should have been either all cataloged or all uncataloged when DFHSM created the backup versions. If the data sets were all uncataloged, they should have been on the same volume. If the backup versions were not created from the same volume, the backup versions of the data sets are not deleted.
2. If you have cataloged and uncataloged data sets with the same name, DFHSM deletes the backup versions of the cataloged data set unless you specify the FROMVOLUME parameter. If you specify the FROMVOLUME parameter, only the backup version(s) of the uncataloged data set(s) are deleted.
3. FROMVOLUME does not apply to SMS-managed data sets.

VERSIONS: Specifying the Backup Versions to Be Deleted

Explanation: **VERSIONS(*bvn* ...)** is an optional parameter specifying which backup versions of a data set are to be deleted. You can specify multiple version numbers. For *bvn*, substitute the one- to three-digit decimal number of a particular backup version to be deleted. You can get the backup version number by issuing a LIST command and specifying the data set name and the BACKUPCONTROLDATASET parameter.

A list of backup version numbers applies to the backup versions of any data sets you specified. For example, assume you specified the following command:

```
BDELETE (VLS6492.PQR.CLIST, VLS6493.STU.CLIST) -
        VERSIONS(115,118,120)
```

DFHSM deletes backup version numbers 115, 118, and 120 for data sets VLS6492.PQR.CLIST and VLS6493.STU.CLIST.

If you do not specify the VERSIONS parameter, DFHSM deletes all backup versions of the specified data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VERSIONS. There are no additional abbreviations.

Defaults: None.

Note: If you want to delete a retired version, you must specify the version number. A retired version is the backup version DFHSM creates before it scratches a data set during data set retirement. DFHSM does not automatically delete retired versions.

Examples of How to Code the BDELETE Command

The following examples show different ways to code the BDELETE command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Deleting Specific Backup Versions of Two SMS-Managed Data Sets

In this example, the specified backup versions of the two SMS-managed data sets are to be deleted.

```
BDELETE AMS6607.PDS.CLIST VERSIONS(3,8)-
        AMS6609.PDS.CLIST VERSIONS(16,17)
```

Deleting All Backup Versions of Two Cataloged Data Sets

In this example, all the backup versions of the two data sets are to be deleted if the data sets were cataloged prior to backup.

```
BDELETE (AMS6607.A.CLIST, AMS6608.B.CLIST)
```

Deleting Particular Backup Versions of an Uncataloged Data Set

In this example, backup versions numbered 9, 11, 13, and 15 of an uncataloged data set that was backed up from volume VOL001 are to be deleted.

```
BDELETE AMS6607.UNC.CLIST FROMVOLUME(VOL001)-
        VERSIONS(9,11,13,15)
```

CANCEL: Cancelling a Queued DFHSM Request

The CANCEL command cancels an existing queued DFHSM request. You can cancel the following:

- A specific request number
- All requests for a particular user
- All requests for a particular data set.

The QUERY command can be used to determine the request number of the existing queued DFHSM requests. The CANCEL and QUERY commands have the highest processing priority. Therefore, the CANCEL and QUERY commands cannot be cancelled.

Syntax of the CANCEL Command

Command	Optional Parameters
CANCEL	**DATASETNAME(*dsn*) | REQUEST(*num*) | USERID(*userid*)**

Note: Although the CANCEL command has no required parameters, you should specify at least one optional parameter with the CANCEL command.

The following table shows the DFHSM abbreviations for the parameters of the CANCEL command:

Parameter	DFHSM Abbreviation
DATASETNAME	DSNAME

Optional Parameters of the CANCEL Command

DATASETNAME | REQUEST | USERID: Specifying Command Requests

Explanation: DATASETNAME(*dsn*) | REQUEST(*num*) | USERID(*userid*) are mutually exclusive, optional parameters specifying which existing, queued DFHSM requests to cancel.

DATASETNAME specifies all requests for a particular data set name are to be cancelled. For *dsn*, substitute the fully qualified name of the data set for which all requests are to be cancelled.

REQUEST specifies a specific DFHSM request to be cancelled. For *num*, substitute the DFHSM request number of the request you want to cancel. You can issue the following command to determine the current requests and their request numbers:

```
QUERY REQUEST
```

USERID specifies all requests of a particular user are to be cancelled. For *userid*, substitute a one to seven alphameric character string for the identification of the particular user.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REQUEST, USERID, and DATASETNAME. In addition, you can specify the abbreviation DSNAME for DATASETNAME.

Defaults: None.

Notes:

1. No function results if the CANCEL command is issued with no parameters.
2. The CANCEL command can only be used to cancel queued requests that have not yet been selected for processing. Requests that have been selected for processing, even if these requests are later suspended by a HOLD or SETSYS EMERGENCY command, cannot be cancelled with the CANCEL command.

Examples of How to Code the CANCEL Command

The following examples show how to code the CANCEL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Cancelling All Requests for a Specified User ID

In this example, all requests submitted by the specified *userid* are cancelled.

```
CANCEL USERID(L541563)
```

Note: The CANCEL command can only be used to cancel queued requests that have not yet been selected for processing. Requests that have been selected for processing, even if these requests are later suspended by a HOLD or SETSYS EMERGENCY command, cannot be cancelled with the CANCEL command.

Cancelling All Requests for a Specified Data Set Name

In this example, all requests for a specified data set name are cancelled.

```
CANCEL DATASETNAME(L541563.PSU.N.F230EP03.DSET1)
```

Cancelling a Particular Request

In this example, request number 0015 is cancelled.

```
CANCEL REQUEST(15)
```

Cancelling All Requests Issued from the System Console

In this example, all requests submitted from the system console are cancelled. Note that '**OPER*' in the example below is a pseudo *userid* representing the system operator.

```
CANCEL USERID(**OPER*)
```

DEFINE: Defining Control Structures for Use by DFHSM

The DEFINE command defines the following:

- Backup cycle, start date for the backup cycle, and the number of daily backup volumes to be used for each day in the backup cycle
- Dump class attributes
- Dump cycle and start date for the dump cycle
- Migration cleanup cycle and start date for the migration cleanup cycle
- Key ranges for DASD migration level 2 volumes
- Pool of volumes to which data sets with the same set of initial characters are recalled
- Pool of volumes, which together can be used as a target for recalling a data set migrated from one of the volumes.

When you use JES3, you must use the ADDVOL command to add primary volumes to DFHSM before you can specify the volumes with the POOL or the VOLUMEPOOL parameter of the DEFINE command.

If an SMS-managed volume is specified as part of a data set pool, a message is issued indicating that the volume was not added to the data set pool. Processing continues for the DEFINE command. However, if only SMS-managed volumes are specified for the definition of the data set pool, the data set pool definition is rejected, and the DEFINE command is failed.

With the exception of the POOL and VOLUMEPOOL parameters, you do not have to redefine any optional parameters each time you start DFHSM.

Syntax of the DEFINE Command

Command	Optional Parameters
DEFINE	**BACKUP[**(*cycle* [*bvols*] **[CYCLESTARTDATE[**(*yy/mm/dd*)**]])]** **DUMPCLASS(***class* **[AUTOREUSE | NOAUTOREUSE]** **[DATASETRESTORE | NODATASETRESTORE]** **[DAY(***day*)**]** **[DISABLE]** **[DISPOSITION(***'disposition'*)**]** **[FREQUENCY(***days*)**]** **[RESET | NORESET]** **[RETENTIONPERIOD(***days* **| NOLIMIT)]** **[TAPEEXPIRATIONDATE(***yyyyddd* | *yyyddd*)**]** **[UNIT(***unittype*)**]** **[VTOCCOPIES(***copies*)**])** **DUMPCYCLE[**(*cycle* **[CYCLESTARTDATE[**(*yy/mm/dd*)**]])]** **MIGRATIONCLEANUPCYCLE[**(*cycle* **[CYCLESTARTDATE[**(*yy/mm/dd*)**]])]** **MIGRATIONLEVEL2[**([**KEYS(***key* ...)**]** [VOLUMES(*volser* ...)])] **POOL(***poolid***[VOLUMES(***volser* ...)**])** **VOLUMEPOOL** (*poolid***[VOLUMES(***volser* ...)**])**

Note: You must specify at least one of the following optional parameters with each DEFINE command:

- BACKUP
- DUMPCLASS
- DUMPCYCLE
- MIGRATIONCLEANUPCYCLE
- MIGRATIONLEVEL2
- POOL
- VOLUMEPOOL.

The following table shows the DFHSM abbreviations for the parameters of the DEFINE command:

Parameter	DFHSM Abbreviation
AUTOREUSE	ARUSE
DATASETRESTORE	DSRESTORE
DUMPCLASS	DCLASS

Parameter	DFHSM Abbreviation
DUMPCYCLE	DCYCLE
MIGRATIONCLEANUPCYCLE	MIGCC
MIGRATIONLEVEL2	ML2
NOAUTOREUSE	NOARUSE
NODATASETRESTORE	NODSRESTORE
RETENTIONPERIOD	RETPD
VOLUMEPOOL	VOLPOOL

Optional Parameters of the DEFINE Command

BACKUP: Specifying the Backup Cycle

Explanation: **BACKUP[(*cycle* [*bvols*])] [CYCLESTARTDATE[(*yy/mm/dd*)]])]** is an optional parameter specifying the days in a backup cycle when automatic backup is done and the number of backup volumes DFHSM is to use for each day volume backup runs.

For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when you want automatic backup to be done and each N represents a day in the cycle when you do not want automatic backup to be done. You can represent up to 31 days with the Ys and Ns. When you specify BACKUP, the current day is the first day of the cycle unless you specify the cycle start date. Refer to "CYCLESTARTDATE: Specifying the Start Date of a Backup Cycle" on page 80 for information about specifying the start date for a backup cycle.

For *bvols*, substitute a decimal number from 1 to 9999 to represent the number of DASD backup volumes DFHSM is to assign to a given day in the backup cycle before initiating spill or cleanup processing on full DASD daily backup volumes. This value is called the *daily limit*.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP. There are no additional abbreviations.

Defaults: If you specify BACKUP without *cycle*, the backup cycle defaults to a seven-day cycle with automatic backup every day.

If you do not specify a minimum number of backup volumes with *bvol*, the number defaults to one.

Notes:

1. You must specify BACKUP if you want to use DFHSM backup.
2. For DASD backup, the number of backup cycle days should be greater than the number of SETSYS VERSIONS. (For example, if you specify SETSYS VERSIONS(3), then BACKUP cycle days should be 4 or greater.)

CYCLESTARTDATE: Specifying the Start Date of a Backup Cycle

Explanation: **CYCLESTARTDATE[(*yy/mm/dd*)]** is an optional subparameter specifying the start date of a backup cycle. The start date of the cycle can be set or reset.

Unless CYCLESTARTDATE is specified, DFHSM will not reset the cycle start date if a date already exists and the cycle length is unchanged.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CYCLESTARTDATE.

Defaults: If CYCLESTARTDATE is specified without *yy/mm/dd*, the cycle start date is set to the current date.

If CYCLESTARTDATE is not specified, a cycle start date is already stored, and the cycle length is not changed, the cycle start date is not changed.

If CYCLESTARTDATE is not specified and either no cycle date is stored or the cycle length is changed, the cycle start date is set to the current date.

Notes:

1. CYCLESTARTDATE is only valid with the following commands:
   - DEFINE BACKUP
   - DEFINE DUMPCYCLE
   - DEFINE MIGRATIONCLEANUPCYCLE.
2. The date *yy/mm/dd* specified with the CYCLESTARTDATE parameter cannot be a date in the future. It must be a date prior to or equal to the date when the DEFINE command is issued.

DUMPCLASS: Specifying the Addition or Changing of a Volume Dump Class

Explanation: **DUMPCLASS(*class* [AUTOREUSE | NOAUTOREUSE] [DATASETRESTORE | NODATASETRESTORE] [DAY(*day*)] [DISPOSITION('*disposition*')] [FREQUENCY(*days*)] [DISABLE] [RESET | NORESET] [RETENTIONPERIOD(*days* | NOLIMIT] [TAPEEXPIRATIONDATE(*yyyyddd* | *yyyddd*)] [UNIT(*unittype*)] [VTOCCOPIES(*copies*)])** is an optional parameter specifying that a volume dump class is to be added or changed. For *class* substitute from one to eight characters for the class name to be defined. The first character must be an alphabetic or national (# @ $) character. The remaining characters can be alphabetic, national, or numeric characters. Only one class can be specified on a single DEFINE command.

If the class has not been defined previously, a new backup control data set (BCDS) record is created describing the dump class. Unspecified parameters will have their DFHSM defaults supplied.

A previously defined class will have its existing BCDS record describing its dump class updated with only the parameters specified. Unspecified parameters remain unchanged from the previous definition, unless either the DATASETRESTORE or AUTOREUSE subparameters, or both, were specified and the RETENTIONPERIOD was specified as NOLIMIT. In this case, the DATASETRESTORE and AUTOREUSE subparameters are set to NODATASETRESTORE and NOAUTOREUSE.

For SMS-managed volumes, you must use the DUMPCLASS parameter to define dump classes referred to by storage groups.

Because of the large number of subparameters for the DUMPCLASS parameter, each subparameter will be discussed separately.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCLASS. In addition, you can specify the abbreviation DCLASS for DUMPCLASS.

Defaults: None.

AUTOREUSE | NOAUTOREUSE: Specifies Whether DUMP Volumes Are to Be Automatically Available for Reuse When Invalidated

Explanation: AUTOREUSE | NOAUTOREUSE are mutually exclusive optional subparameters of DUMPCLASS specifying whether dump volumes with retention periods in the class being defined are to be automatically available for reuse when automatically invalidated.

AUTOREUSE specifies that when DFHSM initiates the invalidation of a dump copy, the dump volumes are automatically made available for reuse.

NOAUTOREUSE specifies that when DFHSM initiates the invalidation of a dump copy, the dump volumes are marked unavailable for selection by DFHSM. The DELVOL and ADDVOL commands can be used to make the volume available for reuse.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOREUSE and NOAUTOREUSE. In addition, you can specify the abbreviation ARUSE for AUTOREUSE and NOARUSE for NOAUTOREUSE.

Defaults: If neither AUTOREUSE nor NOAUTOREUSE is specified, the default is NOAUTOREUSE when a dump class is being defined for the first time.

If a dump class is already defined and certain characteristics are being changed, and if neither AUTOREUSE nor NOAUTOREUSE is specified, then the previous specification remains unchanged unless the retention period is NOLIMIT. In this case the dump class is set for NOAUTOREUSE.

Notes:

1. You can use the DELVOL command with the PURGE parameter to invalidate the only valid dump copy.
2. NOAUTOREUSE must be specified if volumes for this class are to leave the confines of the data processing center. This prevents mount requests for volumes that are not available. These volumes must be made available for reuse manually, but not until they are returned from their off-site storage location.
3. The disposition of tapes automatically made available for reuse depends on the TAPEDELETION parameter of the SETSYS command.
4. If you use NOLIMIT, you can only use the NOAUTOREUSE subparameter.

DATASETRESTORE | NODATASETRESTORE: Specifies if Data Set Restore Is Allowed from a Full Volume Dump Copy in This Dump Class

Explanation: DATASETRESTORE | NODATASETRESTORE are mutually exclusive, optional subparameters of DUMPCLASS specifying whether or not to allow a physical data set restore from a full volume dump copy in this dump class. This support applies to the RECOVER or HRECOVER commands issued for a single data set.

DATASETRESTORE specifies that physical restores of individual data sets from dump volumes in this class are allowed. The dump volumes must remain available to satisfy mount requests. A physical data set restore will require one or more tapes to be mounted to complete the request. Neither DFHSM nor DFDSS keeps track of exactly where the data set is located on the dump tapes. A dump VTOC copy data set is needed for data set restores.

NODATASETRESTORE specifies that dump volumes in this class are not available to do individual physical data set restores. All data set recoveries will be from incremental backup versions unless a dump volume is explicitly requested on the RECOVER command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETRESTORE and NODATASETRESTORE. In addition, you can specify the abbreviation DSRESTORE for DATASETRESTORE and NODSRESTORE for NODATASETRESTORE.

Defaults: If neither DATASETRESTORE nor NODATASETRESTORE is specified, the default is NODATASETRESTORE when a dump class is being defined for the first time.

If a dump class is already defined and certain characteristics are being changed, and if neither DATASETRESTORE nor NODATASETRESTORE is specified, the previous specification remains unchanged unless the retention period is NOLIMIT in which case the dump class is set for NODATASETRESTORE.

Notes:

1. If DATASETRESTORE is selected and the data set resides or did reside on a volume that was dumped to this class, DFHSM attempts to determine if the most current backup was done by the incremental backup process or by the full volume process. When the most current version is on a dump volume, DFDSS is invoked to perform a physical data set restore from the copy. When the most current version is an incremental backup version or if the backup version could not be determined, DFHSM performs a data set recovery of an incremental version.
2. If NODATASETRESTORE is selected and the request was explicitly from a dump copy (FROMDUMP keyword), DFHSM will fail the recovery request unless the dump volume was specified (DUMPVOLUME(volid).
3. If NODATASETRESTORE is selected and the request was not explicitly from a dump copy, DFHSM always performs a data set recovery of an incremental backup version.
4. A RETENTIONPERIOD(NOLIMIT) for the class overrides the DATASETRESTORE option and prevents physical data set restores from a dump volume in this class.

5. If you use NOLIMIT, you can only use the NODATASETRESTORE subparameter.

DAY: Specifying the Target Day of the Dump Cycle for This Class

Explanation: **DAY(*day*)** is an optional subparameter of DUMPCLASS that you use to specify the target day of the dump cycle for this class. DAY restricts this class to be targeted during automatic dump processing only on the specified day of the cycle. For *day*, substitute a decimal number to specify the target day of the dump cycle. A value of 0 indicates that a previous association with a day in the dump cycle should be removed. Any other numeric value must be from 1 to a value less than or equal to the number of days specified in the dump cycle. *day* must be a 'Y' day specified in the DUMPCYCLE parameter. If a frequency is also specified, the frequency must be satisfied before the class will be chosen.

DAY could be used instead of the FREQUENCY parameter, if it is desired to dump to this class every cycle repeat. DAY allows a subset of the primary volumes to be dumped one day and another subset to be dumped on another day. For example, if the primary volume subsets are defined by two dump classes and the dump classes are identical except for the DAY parameter, one subset of primary volumes can be dumped on one day and the other subset of primary volumes can be dumped on another day. The primary volumes can retain the same frequency and retention characteristics.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DAY. There are no additional abbreviations.

Defaults: None.

DISABLE: Specifying the Volume Dump Class to Be Unavailable as a Target of Any Full Volume Dump

Explanation: **DISABLE** is an optional subparameter of DUMPCLASS that lets you request a dump class be made unavailable as the target of any full volume dumps. When you specify DISABLE, DFHSM automatically unassigns any dump volumes that are empty and currently added to this class. The unassigned dump volumes are available for selection to any other class that uses the same unit type. Information about valid dumps remains in the BCDS, but no further dumps to this class are allowed, and no more dump volumes can be added to this class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DISABLE. There are no additional abbreviations.

Defaults: None.

Notes:

1. You can enable a disabled dump class by issuing a DEFINE command without specifying the DISABLE subparameter.
2. Any other parameters specified on the same command will be ignored.
3. Use the LIST command to find any volumes that are currently assigned to a particular class.

DISPOSITION: Specifying the Disposition of Dump Volumes

Explanation: DISPOSITION('*disposition*') is an optional subparameter of DUMPCLASS that you use to specify the disposition of the dump volumes after they have received part of a dump copy. For *disposition*, substitute a character string from 1 to 20 characters describing the intended disposition of the dump volumes. The *disposition* is inserted into message ARC0637I, which is issued for each dump copy successfully created for a source volume.

Note: The single quotes (' ') are required if *disposition* is more than one word or it contains a special character.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DISPOSITION. There are no additional abbreviations.

Defaults: None.

FREQUENCY: Specifying the Minimum Number of Days That Must Elapse Between Volume Dumps of a Volume to This Class

Explanation: FREQUENCY(*days*) is an optional subparameter of DUMPCLASS that you use to specify the minimum number of days that must elapse from the last volume dump of the volume to this class before the volume can be automatically dumped again. For *days*, substitute a decimal number from 0 to 999.

Automatic full volume dumps are included in the test for satisfying the requirement defined by the FREQUENCY parameter. Full volume dumps requested by command, however, are processed independently of the FREQUENCY specified with the DEFINE command. The frequency for the class is considered to be met if DFHSM has no record of dumping the volume in question to this class. Therefore, the frequency is met for each volume dumped to the class for the first time. DFHSM keeps track of only the last five distinct dump classes a volume has been dumped to.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FREQUENCY. There are no additional abbreviations.

Defaults: If you specify FREQUENCY without specifying *days*, the default is 7.

Note: You should coordinate the FREQUENCY parameter with DUMPCYCLE parameter days to ensure that schedules for automatic dumps do not conflict. The following example shows an apparent conflict:

```
DEFINE DUMPCYCLE(NNNNNNY) CYCLESTARTDATE(84/01/01)  -
       DUMPCLASS( A FREQ(8) )
```

DUMPCYCLE specifies a 7-day cycle, with the dumps taken on a Saturday. The dump frequency, FREQ, specifies an 8-day elapsed time. In this example, the dumps to class A would be performed every other Saturday, beginning with the second Saturday, because the dump frequency would not have elapsed by the time the dump cycle had completed.

A choice of FREQ more consistent with the dump cycle would be FREQ(7). This would always cause the required number of days to elapse before the next 'Y' day in the processing of automatic dump.

RESET | NORESET: Specifying Whether DFDSS Is to Reset the Change Bit for Each Data Set Following a Full Volume Dump

Explanation: **RESET | NORESET** are mutually exclusive, optional subparameters of DUMPCLASS that let you specify whether the change bit for each data set is to be reset by DFDSS after a full volume dump is successfully performed.

RESET specifies the change bit for each data set should be reset.

NORESET specifies the change bit for each data set should not be reset.

The specified option will affect whether DFHSM makes an incremental backup version of the data sets the next time the volume is processed by incremental backup with the BACKVOL command and data sets have not been changed since the full volume dump.

If multiple dump copies are made concurrently, then each copy is associated with a different dump class. If RESET is specified for any of these dump classes, then the RESET option is specified on the command to DFDSS.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RESET and NORESET. There are no additional abbreviations.

Defaults: If neither RESET nor NORESET is specified, the default is NORESET when a dump class is being defined for the first time.

Notes:

1. If a dump class is already defined and certain characteristics are being changed, then if neither RESET nor NORESET is specified, the previous specification remains unchanged.
2. If you use the APPLYINCREMENTAL subparameter with the FROMDUMP parameter of the RECOVER command, you should specify the NORESET subparameter.

RETENTIONPERIOD: Specifying the Enforcement of Retention Periods for the Dump Copies in This Class

Explanation: **RETENTIONPERIOD(*days* | NOLIMIT)** is an optional subparameter of DUMPCLASS that lets you specify whether DFHSM should enforce retention periods for the dump copies in this class.

RETENTIONPERIOD(*days*) lets you specify that DFHSM should enforce retention periods for the dump copies in this class and automatically invalidate them when the retention period has been met. After the number of *days* has elapsed, the dump volumes are automatically reused if the AUTOREUSE subparameter is specified for the class. If AUTOREUSE is not specified, *days* might be used to specify an expected date to delete the volumes. If the maximum number of dump generations is reached, another dump is to be performed, and the oldest generation contains a dump copy with an explicit retention period that has not been reached, DFHSM invalidates the oldest dump generation and issues a message reporting this action. The maximum number of dump generations is 100 generations. For *days*, enter a decimal number between 1 and 9999.

RETENTIONPERIOD(NOLIMIT) specifies that there is no predetermined expiration date for the dump copies in this DUMPCLASS. DFHSM does not

automatically enforce an expiration date. The dump copy can be invalidated only by an explicit request using the DELVOL command, or if the maximum number of dump generations is reached, another dump is to be performed, and the oldest generation contains a dump copy with RETENTIONPERIOD(NOLIMIT). The maximum number of dump generations is 100 generations. If DFHSM must invalidate a dump copy without a retention period, a message is issued reporting this action.

Note: If you use NOLIMIT, the NOAUTOREUSE and the NODATASETRESTORE subparameters should be used. If AUTOREUSE or DATASETRESTORE are used, the values will be overridden by the NOLIMIT parameter and the values will become NOAUTOREUSE and NODATASETRESTORE respectively.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RETENTIONPERIOD. In addition, you can specify the abbreviation RETPD for RETENTIONPERIOD.

Defaults: If you do not specify RETENTIONPERIOD, the default is 30 days.

TAPEEXPIRATIONDATE: Specifying a Unique Expiration Date for Dump Tape Header Labels of All Dump Copies Created in a Dump Class

Explanation: **TAPEEXPIRATIONDATE(***yyyyddd* | *yyddd***)** is an optional subparameter of DUMPCLASS that lets you specify a unique expiration date for the dump tape header labels of all dump copies created in this dump class. *yyyy* and *ddd* are the year and the day of the year for the expiration date of the dump copies. For *yyyyddd*, specify a sequence of seven decimal characters to be used for the expiration date for the tape header labels. For *yyyy*, specify a year between 1900 and 2155 inclusive. For *ddd*, specify a day between 000 and 999 inclusive.

yy and *ddd* are the year and the day of the year for the expiration date of the dump copies. For *yyddd*, specify a sequence of five decimal characters to be used for the expiration date for the tape header labels. For *yy*, specify a value between 00 and 99 inclusive. The *yy* value is added to a default value of 1900 to get the year. For example, if you specify 89 as a value for *yy*, 89 is added to 1900 giving you a year of 1989. For *ddd*, specify a day between 000 and 999 inclusive.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEEXPIRATIONDATE. There are no additional abbreviations.

Defaults: None.

Notes:

1. The security options in effect as established with a SETSYS command must include EXPIRATION or EXPIRATIONINCLUDE for TAPEEXPIRATIONDATE to be effective.
2. DFHSM does not check the specified values to see if they represent a valid date. DFHSM only checks to see if decimal digits are given.
3. If you do not specify TAPEEXPIRATIONDATE for a dump class and a tape security option of EXPIRATION or EXPIRATIONINCLUDE is in effect, DFHSM provides an expiration date of 1999 for 365 days for dump volumes written for this class.

4. You must have MVS/SP 2.2.0 and DFP 2.3.0 or subsequent releases installed to be able to specify a date beyond the year 1999.

UNIT: Specifying a Default Tape Unit Name

Explanation: UNIT(*unittype*) is an optional subparameter of DUMPCLASS specifying the default unit name for allocation when no volumes are added to the class and the class has been selected as the target of a dump copy. For *unittype*, substitute a valid esoteric name or a valid unit type. The valid unit types are:

- 3400-3
- 3400-4
- 3400-5
- 3400-6
- 3400-9
- 3480.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNIT. There are no additional abbreviations.

Defaults: If you do not specify UNIT, the unit type specified with the UNIT parameter on the SETSYS command is the default.

If UNIT is not specified on either the DEFINE or the SETSYS command, the default is a 3400-6 unit type.

VTOCCOPIES: Specifying the Number of Dump VTOC Copy Data Sets to Keep for Dump Copies Created in This Class

Explanation: VTOCCOPIES(*copies*) is an optional subparameter of DUMPCLASS specifying the number of dump VTOC data sets to keep for dump copies created in this class. For *copies*, substitute a number from 0 to 100. The value indicates how many of the existing dump copies of a given volume dumped to this class should have dump VTOC copy data sets kept associated with them. For example, use 3 as a value for *copies*. If there are six generations of dumps for a given volume and generations 0, 2, and 4 have copies in a class with VTOCCOPIES(3), then all of these generations will have VTOC copy data sets kept for them. This is regardless of what other dump copies might exist in the same dump generations, or whether generations 1, 3, and 5 have dump VTOC copies. If a new dump copy is created in the same class for the same volume, the oldest dump copy in this dump class no longer requires the dump VTOC copy data set. The dump VTOC copy data set will be deleted if no other dump copy in the same generation requires it to be kept.

VTOCCOPIES is also used to determine if a dump VTOC copy data set should be created when a volume is dumped. If *copies* is greater than 0, a dump VTOC copy data set will be created. If *copies* is 0, and the volume is not being dumped to multiple dump classes concurrently, a dump VTOC copy data set will not be created. If *copies* is 0, and the volume is being dumped to multiple dump classes concurrently, a dump VTOC copy data set will be created if any of the dump classes being dumped to has VTOCCOPIES(*copies*) greater than 0.

The dump VTOC copy data sets are written to migration level 1 volumes. Space required for these data sets varies with the size of the original VTOC. Only part of the format 1 data set control block for each data set from the original VTOC is contained in the VTOC copy data set. When a dump generation no longer has a

dump VTOC copy data set associated with it or the number of dump VTOC copies kept is zero, DFHSM cannot provide the following:

- Physical data set restore support from the associated dump copies.
- Listing capabilities for the dump copy using the DUMPCONTENTS parameter with the LIST DUMPVOLUME command.

Dump VTOC copy data sets are not created for or maintained for dumps of DFHSM-owned volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VTOCCOPIES. There are no additional abbreviations.

Defaults: If you do not specify VTOCCOPIES when a dump class is being defined for the first time, 2 is the default.

If a dump class is already defined, and certain characteristics are being changed and if VTOCCOPIES is not specified, the previous specification will remain unchanged.

DUMPCYCLE: Specifying the Automatic Dump Cycle

Explanation: **DUMPCYCLE[([*cycle*] [CYCLESTARTDATE[(*yy/mm/dd*)]])]** is an optional parameter specifying the days in a cycle when the automatic dump process is to be run. For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when automatic dump is to run and each N represents a day in the cycle when automatic dump is not to run. You can represent up to 31 days with the Ys and Ns. When you specify *cycle*, the current day is the first day of the cycle unless you specify the cycle start date. Refer to "CYCLESTARTDATE: Specifying the Start Date of a Dump Cycle" for information about specifying the start date for a dump cycle.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCYCLE. In addition, you can specify the abbreviation DCYCLE for DUMPCYCLE.

Defaults: None.

Notes:

1. *Cycle* must be defined sometime before the automatic dump process is permitted to run.
2. *Cycle* is ignored if a volume dump is requested with the BACKVOL command.
3. *Cycle* has no meaning unless the AUTODUMPSTART and BACKUP parameters of the SETSYS command are specified for the DFHSM startup.

CYCLESTARTDATE: Specifying the Start Date of a Dump Cycle

Explanation: **CYCLESTARTDATE[(*yy/mm/dd*)]** is an optional subparameter specifying the start date of a dump cycle. The start date of the cycle can be set or reset.

Unless CYCLESTARTDATE is specified, DFHSM will not reset the cycle start date if a date already exists and the cycle length is unchanged.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CYCLESTARTDATE. In addition, you can specify the abbreviation C for CYCLESTARTDATE.

Defaults: If CYCLESTARTDATE is specified without *yy/mm/dd*, the cycle start date is set to the current date.

If CYCLESTARTDATE is not specified, a cycle start date is already stored, and the cycle length is not changed, the cycle start date is not changed.

If CYCLESTARTDATE is not specified and either no cycle date is stored or the cycle length is changed, the cycle start date is set to the current date.

Notes:

1. CYCLESTARTDATE is only valid with the following commands:
   - DEFINE BACKUP
   - DEFINE DUMPCYCLE
   - DEFINE MIGRATIONCLEANUPCYCLE.
2. The date *yy/mm/dd* specified with the CYCLESTARTDATE parameter cannot be a date in the future. It must be a date prior to or equal to the date when the DEFINE command is issued.

MIGRATIONCLEANUPCYCLE: Specifying the Migration Cleanup Cycle

Explanation: **MIGRATIONCLEANUPCYCLE[((***cycle* **] [CYCLESTARTDATE[(***yy/mm/dd***])]** is an optional parameter that you use to specify the days in a cycle when migration cleanup is to run. For *cycle*, substitute a string of alphabetic Ys and Ns. Each Y represents a day in the cycle when migration cleanup is to run and each N represents a day in the cycle when migration cleanup is not to run. You can represent up to 31 days with the Ys and Ns. When you specify MIGRATIONCLEANUPCYCLE, the current day is the first day of the cycle unless you specify the cycle start date. Refer to "CYCLESTARTDATE: Specifying the Start Date of a Migration Cleanup Cycle" for information about specifying the start date for a migration cleanup cycle.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONCLEANUPCYCLE. In addition, you can specify the abbreviation MIGCC for MIGRATIONCLEANUPCYCLE.

Defaults: If you specify MIGRATIONCLEANUPCYCLE without specifying *cycle*, the migration cleanup cycle defaults to a one-day cycle with cleanup requested.

If you do not specify the MIGRATIONCLEANUPCYCLE parameter, the cycle defaults to one day with cleanup requested. Therefore, migration cleanup runs every day.

CYCLESTARTDATE: Specifying the Start Date of a Migration Cleanup Cycle

Explanation: **CYCLESTARTDATE[(***yy/mm/dd***)]** is an optional subparameter specifying the start date of a migration cleanup cycle. The start date of the cycle can be set or reset.

Unless CYCLESTARTDATE is specified, DFHSM will not reset the cycle start date if a date already exists and the cycle length is unchanged.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CYCLESTARTDATE. In addition, you can specify the abbreviation C for CYCLESTARTDATE.

Defaults: If CYCLESTARTDATE is specified without *yy/mm/dd*, the cycle start date is set to the current date.

If CYCLESTARTDATE is not specified, a cycle start date is already stored, and the cycle length is not changed, the cycle start date is not changed.

If CYCLESTARTDATE is not specified and either no cycle date is stored or the cycle length is changed, the cycle start date is set to the current date.

Notes:

1. CYCLESTARTDATE is only valid with the following commands:
   - DEFINE BACKUP
   - DEFINE DUMPCYCLE
   - DEFINE MIGRATIONCLEANUPCYCLE.
2. The date *yy/mm/dd* specified with the CYCLESTARTDATE parameter cannot be a date in the future. It must be a date prior to or equal to the date when the DEFINE command is issued.

MIGRATIONLEVEL2: Specifying DASD Level 2 Volumes and Their Associated Key Range Structure

Explanation: **MIGRATIONLEVEL2[([KEYS(*key* ...)] [VOLUMES(*volser* ...)])]** is an optional parameter specifying the division of key ranges for DASD migration level 2 volumes. When you specify MIGRATIONLEVEL2, you can also specify KEYS to indicate how data sets are to be assigned to the available DASD migration level 2 volumes.

KEYS specifies an ascending alphameric sequence of lower key-range boundaries, where the set of initial characters of the data set name is compared against the key. Any data set having the set of initial characters within the specified alphameric range migrates to the volume associated with that range. You specify only the lower boundary of the key range for a volume. The maximum number of key ranges you can define is 61.

You specify one key less than the number of key ranges being defined because the lower boundary for the first key range defaults to the lowest key possible. For example, KEYS(L T) identifies three key ranges: the first key range begins with A and ends with K9999999, the second key range begins with L and ends with S9999999, and the third key range begins with T and ends with Z9999999.

For *key* ..., substitute one or more strings of one to eight characters starting with an alphabetic or $, #, or @. The remaining characters can be alphameric and $, #, or @.

VOLUMES is an optional subparameter specifying a list of DASD migration level 2 volumes to be assigned to the specified key ranges. If you specify fewer volumes than key ranges, DFHSM assigns an available DASD migration level 2 volume to the key range when it needs another volume. An available DASD migration level 2 volume is one that is not associated with a key range and has not been associated with a key range since the last ADDVOL or DELVOL command was issued. If you

specify more volumes than key ranges, the extra volumes are not associated with any key range. Before you can specify any DASD migration level 2 volumes with the DEFINE command, you must add the volumes to DFHSM control by using the ADDVOL command.

For *volser* ..., substitute the serial numbers of the DASD migration level 2 volumes to be assigned to the corresponding specified key ranges. Only one volume is associated with each key range at a time.

When the specified volume for a key range is full, DFHSM assigns an available DASD migration level 2 volume to that key range. To cover all specified key ranges, you must specify one more volume than you specify keys.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL2, KEYS, and VOLUMES. In addition, you can specify the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: If you do not specify KEYS, DFHSM assumes that you are defining one key range for all possible keys.

Notes:

1. You must issue a DEFINE command with the MIGRATIONLEVEL2 parameter before DFHSM can process level 1 to level 2 migration.
2. If you want to reuse the DASD migration level 2 volume after it is removed from a key range, you must use the DELVOL command with the UNASSIGN parameter.
3. DFHSM does not process a change to the key range definition while migration to DASD migration level 2 volumes is occurring.

POOL: Identifying the Non-SMS-Managed Volumes Where the Data Sets with the Same First Qualifier Are Recalled

Explanation: **POOL(***poolid* **[VOLUMES(***volser* ...)]) is an optional parameter specifying the set of initial characters of the data set name for a group of data sets and the set of non-SMS-managed volumes where the group of data sets is to be recalled. Each *poolid* and associated volume list is a user-defined pool. When recall occurs, the set of initial characters of the data set name forces the recall of those data sets to one of the specific volumes identified with the VOLUMES subparameter. To remove the association between a pool ID and its associated volumes from pool control, you omit the VOLUMES subparameter when you specify POOL.

For *poolid*, substitute the set of initial characters of the data set name of those data sets to be recalled to the specified volume or volumes. The *poolid* can end with a period if POOL is the first keyword on the command.

VOLUMES specifies the volumes where the data sets with the set of initial characters specified with the POOL parameter are to be recalled. When you specify multiple volumes for a pool ID, DFHSM tries to recall data sets to the volume with the most space. If there is not enough space on the volume, DFHSM can try recalling the data set to up to four different volumes from the same pool.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to POOL and VOLUMES. There are no additional abbreviations.

Defaults: None.

Notes:

1. When DFHSM checks whether a data set belongs to a pool, it checks the pools in the order you defined them and chooses a pool whose ID matches the initial characters of the data set name. If you define pools so one is a subset of the other, such as MYDSN and MYDSNAME, define the more restrictive pool first (in this case, MYDSNAME) as shown in the following example:

   ```
   DEFINE POOL(MYDSNAME VOLUMES(VOL001))
   DEFINE POOL(MYDSN VOLUMES(VOL002 VOL004))
   ```

   If you do not define the pools in the order shown in the example, as soon as DFHSM sees the MYDSN part of MYDSNAME, it finds a match, and chooses VOL002 even if you wanted to use VOL001.

2. The *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide* contains detailed information about defining pools in a JES3 environment.

3. There is a limit of 140 volumes that can be specified.

4. If an SMS-managed volume is specified as part of a data set pool, a message is issued indicating that the volume was not added to the data set pool. Processing continues for the DEFINE command. However, if only SMS-managed volumes are specified for the definition of the data set pool, the data set pool definition is rejected and the DEFINE command is failed.

VOLUMEPOOL: Identifying Groups of Volumes Where Data Sets Are Recalled

Explanation: **VOLUMEPOOL(***poolid* **[VOLUMES(***volser* ...)**])** is an optional parameter specifying a set of volumes where a data set is to be recalled based on the volume from which the data set migrated. A data set that migrates from a volume in the volume pool will be recalled to a volume in the volume pool.

For *poolid*, substitute from one to eight alphanumeric characters for the name of the volume pool.

VOLUMES specifies the volumes belonging to the volume pool where the data sets are to be recalled. When you specify multiple volumes for a pool ID, DFHSM tries to recall data sets to the volume with the most space. If there is not enough space on the volume, DFHSM can try recalling the data set to up to four different volumes in the volume pool.

Notes:

1. For *volser*, substitute the serial number of the primary volume or volumes making up the volume pool where data sets are to be recalled.

2. In a JES3 environment, at least one of the volumes in the volume pool must be added by the ADDVOL command. This JES3 requirement is to prevent the user from defining a volume pool that cannot be changed and will fail the recall every time it is selected. It will fail the recall because a volume cannot be selected for recall unless it has been added by the ADDVOL command. It

cannot be changed, except at DFHSM startup, because the DEFINE and ADDVOL commands can only be used at DFHSM startup.

3. In a JES2 environment, no volume in the volume pool needs to be added with the ADDVOL command or mounted for the DEFINE command. However, the RECALL still requires a volume to be added by the ADDVOL command before the volume can be selected for the recall. After DFHSM startup, the ADDVOL command can be issued to add a volume or the DEFINE command can be re-issued with a new combination of volumes for the purposes of changing the association between volumes within a volume pool.
4. No checking is done to see if a volume is SMS managed. A data set migrated from a volume that was converted to SMS will be recalled (if it is to be recalled as non-SMS) to a non-SMS-managed volume in the volume pool. The pool is not used for data sets recalled as SMS.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUMEPOOL and VOLUMES. In addition, you can specify the abbreviation VOLPOOL for VOLUMEPOOL.

Defaults: None.

Notes:

1. If *poolid* is specified without VOLUMES being specified, the volume pool becomes empty.
2. The hierarchy of selecting a candidate volume for recall is as follows:
   - If a data set being recalled is associated with a data set pool, the candidate volumes are selected from the data set pool.
   - If the volume from which the data set migrated is part of a volume pool, the candidate volume is selected from the volume pool.
   - If the volume from which the data set migrated is not part of a volume pool, the candidate volumes are selected based upon the SETSYS RECALL values of ANYSTORAGEVOLUME or PRIVATEVOLUME.
   - There is a limit of 140 volumes defined to a VOLUMEPOOL.

Examples of How to Code the DEFINE Command

The following examples show different ways to code the DEFINE command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Specifying Key Ranges for DASD Migration Level 2 Volumes

In this example, key ranges are assigned to the specified migration level 2 volumes. Data sets with the set of initial characters of the data set name within key range A through F9999999 migrate to the level 2 volume with volume serial number VOL002. Data sets with the set of initial characters of the data set name within key range G through L9999999 migrate to the level 2 volume with volume serial number VOL005. Data sets with the set of initial characters of the data set name within key range M through R9999999 migrate to the level 2 volume with volume serial number VOL007. Data sets with the set of initial characters of the data set name within key

range S through Z9999999 migrate to the level 2 volume with volume serial number VOL009.

```
DEFINE MIGRATIONLEVEL2(KEYS(G M S) VOLUMES(VOL002 VOL005-
       VOL007 VOL009))
```

Specifying a Pool of Volumes

In this example, two volumes are specified as a pool to be used when data sets with the pool ID FE.T3322 are recalled.

```
DEFINE POOL(FE.T3322 VOLUMES(FET001 FET002))
```

Specifying a Migration Cleanup Cycle

In this example, a migration cleanup cycle of seven days is defined. The example specifies that migration cleanup is processed on the seventh day of the cycle. CYCLESTARTDATE without a date specified is redefined to today's date.

```
DEFINE MIGRATIONCLEANUPCYCLE(NNNNNNY CYCLESTARTDATE)
```

Specifying a Backup Cycle

In this example, a backup cycle of seven days is defined, with two volumes used for each day in the cycle when volume backup is processed. The example specifies that the automatic backup function is processed on the second and fifth days of the cycle. The starting date for the backup cycle is October 1, 1986.

```
DEFINE BACKUP(NYNNYNN 2 CYCLESTARTDATE(86/10/01))
```

Specifying a Dump Cycle

In this example, a dump cycle of seven days is defined, with a cycle start date of 85/12/29. If the cycle start date is a Sunday, the specified dump cycle results in the automatic dump function running Monday through Friday, but not running on Saturday or Sunday.

```
DEFINE DUMPCYCLE(NYYYYYN          -
       CYCLESTARTDATE(85/12/29))
```

Specifying the Number of VTOC Copy Data Sets to Keep for Each Volume Dumped

In this example, 12 copies of the VTOC copy data sets are to be kept for a dumped volume.

```
DEFINE DUMPCLASS(class VTOCCOPIES(12))
```

Specifying a Dump Class for a Volume

In this example, a dump class for a 3400-6 type volume with a class name of *weekly* is defined. The command performs as follows:

- DFDSS resets the change bit for each data set.
- A physical data set restore is allowed.
- The volume can be automatically reused when invalidated by the retention period of 15 days.
- The target day of the dump for this dump class is the sixth day of the dump cycle.
- The dump volume is to be dumped every Friday night.

```
DEFINE DUMPCLASS(WEEKLY UNIT(3400-6)          -
       RESET DATASETRESTORE AUTOREUSE         -
       RETENTIONPERIOD(15) DAY(6)             -
       DISPOSITION('DUMP EVERY FRI NITE.'))
```

DELETE: Deleting a Migrated Data Set from a Migration Volume

The DELETE command deletes a migrated data set without recalling the data set. When you specify the DELETE command, DFHSM deletes the MCDS data set record and the migrated data set. DFHSM does not delete backup versions of the data set. If you want to delete the backup versions of a deleted data set, you must use the BDELETE command. See "BDELETE: Deleting Backup Versions of a Data Set" on page 71 for information about the BDELETE command.

Syntax of the DELETE Command

Command	Required Parameters	Optional Parameters
DELETE	*dsname*	PURGE

Required Parameters of the DELETE Command

Dsname: Specifying the Data Set to Delete

Explanation: *dsname* is a required parameter specifying the fully qualified name of the migrated data set that you want to delete. DFHSM deletes the data set without recalling it. For *dsname*, substitute the fully qualified name of the migrated data set you want to delete.

Abbreviations: None.

Defaults: None.

Notes:

1. DFHSM fails any DFHSM delete command that specifies a member name of a partitioned data set.
2. DFHSM will not uncatalog an original data set unless the cataloged volume serial is MIGRAT. This prevents DFHSM from inadvertently scratching a newly cataloged data set of the same name.
3. If the *dsname* specified on the command is determined by DFHSM to be:
   - An associated part of a VSAM data set (for example, a data component name, index component name, path name), rather than the base cluster name, or
   - The name of a migration copy data set,

   the command fails for both SMS-managed and non-SMS-managed data sets.

Optional Parameters of the DELETE Command

PURGE: Specifying to Delete a Data Set

Explanation: **PURGE** is an optional parameter specifying to delete the data set *dsname* even if the data set is still within its retention period.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PURGE. There are no additional abbreviations.

Defaults: If PURGE is not specified, DFHSM will delete data set *dsname* only if it has exceeded its retention period.

Examples of How to Code the DELETE Command

The following examples show how to code the DELETE command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Deleting a Migrated Data Set

In this example, a migrated data set (SMS or non-SMS) is deleted from a migration volume without recalling the data set.

```
DELETE WIN3357.PLAN.PLI
```

Deleting a Migrated Data Set within Its Retention Period

In this example, a migrated data set (SMS or non-SMS) is deleted from a migration volume even if it is within its retention period.

```
DELETE L541563.PSF.N.F230EP03.DSET1 PURGE
```

DELVOL: Removing a Volume from the List of Volumes Managed or Owned by DFHSM

The DELVOL command reassigns the volume as not managed or owned by DFHSM. You can remove a primary volume (in this instance only, PRIMARY includes both ADDVOLed volumes and SMS-managed volumes), migration volume, dump volume, or backup volume from the list by specifying the serial number and the category of the volume you want to remove. If a DELVOL command is entered for an SMS-managed volume, the MCV record for the volume, if it exists, will be deleted. You can remove only one volume each time you issue the DELVOL command unless the volume specified is part of a valid dump copy, then all volumes containing part of the same dump copy are removed from DFHSM.

Although you can respecify a deleted non-SMS-managed volume with the ADDVOL command, historical information about the deleted volume is lost. This information is included in the MCDS and BCDS volume records. If you use ADDVOL to respecify the volume, DFHSM re-creates the volume record without the historical information.

Syntax of the DELVOL Command

Command	Required Parameters	Optional Subparameters
DELVOL	*volser* **BACKUP | DUMP |** **MIGRATION | PRIMARY**	**([PURGE | REASSIGN |** **UNASSIGN] [LASTCOPY])**

If you specify the PURGE, REASSIGN, UNASSIGN, or LASTCOPY subparameter of the BACKUP, DUMP, or MIGRATION parameter, you must put parentheses around the subparameter.

Note: When the volser is for an SMS-managed volume, only the PRIMARY parameter applies.

Required Parameters of the DELVOL Command

volser: Specifying the Volume You Are Deleting

Explanation: *volser* is a required positional parameter for which you substitute the serial number of the volume you want to delete.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *volser* is a required positional parameter, you must specify it immediately after the command name.
2. Intermittent DELVOLs of active SMS-managed volumes will have little effect, since the list of volumes is obtained prior to each automatic function, and MVT and MCV records for the volumes are built at that time.

BACKUP | DUMP | MIGRATION | PRIMARY: Specifying the Type of Volume

Explanation: **BACKUP | DUMP | MIGRATION | PRIMARY** are mutually exclusive, required parameters specifying what type of volume to delete.

BACKUP specifies that a backup volume is to be reassigned as an unassigned volume or, if the PURGE subparameter is specified, deleted from DFHSM control.

DUMP specifies that a dump volume is to be disassociated from the dump class to which it is currently assigned and all knowledge of its contents is to be discarded. In addition, the PURGE or REASSIGN subparameters can be specified to remove the volume from the control of DFHSM or to retain the associated dump class respectively. If the volume specified is part of a valid dump copy, all volumes containing part of the same dump copy are treated similarly.

MIGRATION specifies that a migration volume is to be changed as follows:

- In the case of a migration level 1 volume, the volume is to be deleted from DFHSM control.
- In the case of a DASD migration level 2 volume, the volume is no longer associated with its key range and is available to be selected. If the optional PURGE subparameter is specified, the volume is removed from the control of DFHSM.
- In the case of a tape migration level 2 volume, the volume is marked as not selected and is therefore available unless full. If the optional PURGE subparameter is specified, the volume is removed from the control of DFHSM if no valid data exists on the volume.

Note: In the preceding cases, DFHSM determines from the serial number whether the volume you have identified with the *volser* positional parameter is a migration level 1 volume or a migration level 2 volume.

PRIMARY specifies that a primary volume (an ADDVOLed volume or an SMS-managed volume) is to be deleted from DFHSM control. DFHSM removes the record of the deleted volume from the MCDS.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP, DUMP, MIGRATION, or PRIMARY. There are no additional abbreviations.

Defaults: None.

Notes:

1. If you issue the BACKUP parameter of the DELVOL command while the backup volume is in use, the command fails.
2. If you issue the MIGRATION parameter of the DELVOL command while automatic space management is running, the command fails.
3. If you issue the PRIMARY parameter of the DELVOL command while automatic space management, automatic backup, or automatic dump is running, the command fails.
4. If you issue the DUMP parameter of the DELVOL command while automatic dump is running, the command fails.

Optional Subparameters of the DELVOL Command

PURGE | REASSIGN | UNASSIGN: Specifying the Options for Deleting a Backup, Dump, or Migration Level 2 Volume

Explanation: **PURGE | REASSIGN | UNASSIGN** are mutually exclusive, optional subparameters of the BACKUP, DUMP, and MIGRATION parameters specifying whether the volume information is deleted or reassigned.

These subparameters do not apply to primary or migration level 1 volumes.

When you specify PURGE with the BACKUP parameter, PURGE specifies that DFHSM is to delete all volume information, including the tape table of contents (TTOC) for a tape backup volume. DFHSM removes the record of the deleted volume from the BCDS. In addition, DFHSM deletes any association to a day in the backup cycle or to a set of spill backup volumes.

If the volume is a tape volume, all valid backup versions that existed on the tape volume are deleted and the data on the tape is no longer usable. If an error occurs in deleting a valid backup version, DFHSM continues deleting all other backup versions but does not delete the backup volume in which the error occurred.

When you specify PURGE with the DUMP parameter, PURGE specifies that DFHSM is to delete all volume information for a dump volume. DFHSM removes the record of the deleted volume from the BCDS. In addition, DFHSM deletes any association to the day in the dump cycle or to the dump class. DFHSM also deletes any valid dump copies. The dump volume then becomes a scratch tape.

Depending upon the tape security option used for protection by DFHSM, the volume may have to be reinitialized before being reused by another user or job.

When you specify PURGE with the MIGRATION parameter, PURGE specifies that DFHSM is to delete all volume information for a migration level 2 volume, including the TTOC for a tape migration level 2 volume. Before DFHSM removes a tape migration level 2 volume from its control, DFHSM checks whether the volume still contains valid data. If it does, DFHSM fails the DELVOL command and issues message ARC0260I. If the volume is DASD or if the volume is a tape which does not contain valid data, DFHSM removes the record of the deleted volume from the MCDS.

When you specify REASSIGN with the dump parameters, REASSIGN specifies that the contents of that volume are to be discarded. The volume is also made available and is associated with its original dump class. DFHSM can reuse the reassigned volume without reinitialization. REASSIGN is applicable only for dump volumes.

When you specify UNASSIGN with the BACKUP parameter, UNASSIGN specifies that the volume is no longer associated to the day in the backup cycle or with the set of spill volumes. The volume becomes an unassigned backup volume. All volume and data set information is kept in the BCDS and, for tape backup volumes, in the OCDS. The unassigned volume can be selected as a daily or spill backup volume.

When you specify UNASSIGN with the DUMP parameter, UNASSIGN specifies that the volume is to remain known to DFHSM but it is to be removed from its current use. The volume is also disassociated from the dump class to which it is currently assigned. All knowledge of the volume's contents is to be discarded. DFHSM can reuse the volume without reinitialization. If the volume is available for reuse, it is available to any dump class requiring a volume of the same unit type.

When you specify UNASSIGN with the MIGRATION parameter, UNASSIGN specifies that the DASD migration level 2 volume is no longer associated with its key range and is available to be selected. If the volume is a tape migration level 2 volume, DFHSM marks the volume as not selected. Therefore, the tape migration level 2 volume is available unless it is full.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PURGE, REASSIGN, and UNASSIGN. There are no additional abbreviations.

Defaults: If you do not specify PURGE, REASSIGN, or UNASSIGN, the default is UNASSIGN.

Notes:

1. You can delete valid data from a tape backup volume or dump volume if you specify the PURGE parameter. DFHSM deletes all control data set information associated with each valid backup version dump copy on the purged tape backup volume or dump volume. As a result, DFHSM can no longer recover backup versions from the tape volume.
2. You specify only a migration level 2 volume when you use the PURGE or UNASSIGN subparameter with the MIGRATION parameter. If you specify a migration level 1 volume, DFHSM ignores the parameter and a purge is performed.
3. If you use the PURGE parameter to remove a tape volume from control of DFHSM and the tape volume is protected by a password or expiration date, reinitialize the tape volume. You reinitialize the tape volume with the

IEHINITT utility. If you do not reinitialize the purged tape volume and another program tries to write on the tape volume, message IEC512I is issued and the tape volume is unloaded.

4. If you do not reinitialize the purged tape volume, DFHSM protected the tape volume with an expiration date, and another program tried to write on the tape volume, the following occurs:
   - Message IEC507D is issued.
   - The operator is prompted to approve or disapprove the attempt to write over an expiration date-protected data set whose expiration date has not been reached. If the operator disapproves the use of the tape volume, the tape volume is unloaded and removed from the inventory of backup or migration volumes.
5. Messages IEC512I and IEC507D occur only if the program trying to write on the tape volume is not using the volume verification exit to override the password or expiration date protection on the first file on the tape volume.
6. If you use the ADDVOL command to add a purged tape volume to the list of tape volumes owned by DFHSM and the purged tape volume was previously protected by a password or expiration date, reinitialize the tape volume. If you do not reinitialize the purged tape volume and another program tries to write on the tape volume, message IEC512I is issued, the tape volume is unloaded, and the tape volume is removed from the inventory of backup, dump, and migration volumes.

LASTCOPY: Invalidating the Only Valid Dump Copy of a Source Volume

Explanation: LASTCOPY is an optional subparameter that must be specified to delete a dump volume that is part of the only valid dump copy of a source volume. LASTCOPY is ignored if it is not part of the only copy.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to LASTCOPY. There are no additional abbreviations.

Defaults: None.

Examples of How to Code the DELVOL Command

The following examples show different ways to code the DELVOL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Deleting a Primary (ADDVOLed or SMS-Managed) Volume

In this example, a primary (ADDVOLed or SMS-managed) volume is deleted from DFHSM control.

```
DELVOL VOL005 PRIMARY
```

Deleting a Migration Level 1 Volume

In this example, a migration level 1 volume is deleted from DFHSM control.

```
DELVOL MIG003 MIGRATION
```

Deleting a Backup Volume

In this example, a backup volume becomes an unassigned backup volume of DFHSM.

```
DELVOL BAC001 BACKUP(UNASSIGN)
```

Deleting a Tape Migration Level 2 Volume

In this example, a tape migration level 2 volume is purged from DFHSM if it does not contain any valid data.

```
DELVOL TML203 MIGRATION(PURGE)
```

Deleting a DASD Migration Level 2 Volume

In this example, a DASD migration level 2 volume is purged from DFHSM.

```
DELVOL DML201 MIGRATION(PURGE)
```

Deleting a Tape Backup Volume

In this example, a tape backup volume is deleted from DFHSM's control and all record of any valid backup versions on the tape is also deleted.

```
DELVOL TAPE01 BACKUP(PURGE)
```

Deleting a Dump Volume

In this example, a dump volume is deleted and its contents are discarded. The volume is made available and is associated with its original dump class.

```
DELVOL DUPT01 DUMP(REASSIGN)
```

In this example, a dump volume is part of the only valid dump copy of a source volume. The volume is made available but is not associated with any dump class.

```
DELVOL DUPT02 DUMP(UNASSIGN LASTCOPY)
```

DISPLAY: Displaying DFHSM Storage Locations

The DISPLAY command displays locations within the DFHSM address space.

When you issue the DISPLAY command, you can display a storage location by specifying an absolute address, a relative address, or a qualified address. You can also specify the number of bytes you want displayed.

DFHSM lists all DISPLAY commands and their output at the terminal where you issue the command and in a SYSOUT data set. You can request a printout of this SYSOUT data set. If you issue more DISPLAY commands after DFHSM prints the SYSOUT data set, DFHSM creates another SYSOUT data set.

Syntax of the DISPLAY Command

Command	Required Parameters	Optional Parameters
DISPLAY	(*address* [*:address*] ...)	**CLOSE** **LENGTHS**(*bytes* ...) **LOGONLY**

Note: If you specify a list of addresses, you must enclose it in parentheses.

Required Parameters of the DISPLAY Command

Address: Specifying the Location to Display

Explanation: *address* [*:address*] is a required positional parameter specifying which locations in the DFHSM address space should be displayed. You can specify one address, an address range, a list of separate addresses, or a list of address ranges.

For *address*, substitute the absolute address, qualified address, or relative address of the location you want to display. You specify these addresses in the following manner:

- An absolute address is one to six hexadecimal digits followed by a period (*hhhhhh.*).
- A qualified address is a DFHSM load module name, followed sequentially by a period, a CSECT name, a period, a plus sign and one to six hexadecimal digits (*loadmodulename.csectname.+hhhhhh*). Because ARCCTL is the only load module that can be displayed, the load name of ARCCTL is always the load module name if you supply only the CSECT name and offset (*.csectname.+hhhhhh*). Note that the leading period is still required.
- A relative address is entered as a plus sign followed by one to six hexadecimal digits (*+hhhhhh*). You must specify a qualified address identifying the CSECT in a DISPLAY or PATCH command before you specify a relative address because DFHSM considers the relative address to be the offset in the CSECT you or any other user last specified.

You can specify a range of addresses by specifying the optional second address [*:address*]. You must specify the colon (:) preceding the second *address* to show that you want to display a range of addresses. If you want to specify a list of separate addresses, do not use colons.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *address* is a required positional parameter, you must specify it immediately after the command name.
2. You cannot substitute indirect addressing, registers, expressions, and variable names for *address*.

Optional Parameters of the DISPLAY Command

CLOSE: Printing the SYSOUT Data Set

Explanation: **CLOSE** is an optional parameter specifying that the SYSOUT data set be printed. The DISPLAY command completes the processing you requested and then prints the SYSOUT data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CLOSE. There are no additional abbreviations.

Defaults: None.

LENGTHS: Specifying How Much Data to Display

Explanation: **LENGTHS(***bytes* ...**)** is an optional parameter specifying the number of bytes to be displayed. For *bytes*, substitute a decimal number from 1 to 999999 for the length of the data you want to display.

You can specify a list of bytes that match the specified addresses. For example, the first length you specify applies to the first address, the second length applies to the second address, and so forth. If you specify fewer lengths than addresses, the last length you specify applies to the remaining addresses. The LENGTH parameter does not specify how much data to display for an address range. If you specify a length with an address range, DFHSM pairs the length and address range, but it only uses the address range to determine how much to display.

For example, if you specify the addresses as:

```
8EC.,.ARCZWRIT.+4,+8:+12,.ARCBACK.+0
```

where:

8EC. is a separate absolute address

.ARCZWRIT.+4 is a separate qualified address

+8:+12 is the range of relative addresses in CSECT ARCZWRIT

.ARCBACK.+0 is another separate qualified address

and you specify the lengths as:

```
LEN(2,4,5,3)
```

then:

- 2 bytes of data, starting at absolute address 8EC, are displayed.
- 4 bytes of data, starting at qualified address .ARCZWRIT.+4, are displayed.
- 5, which corresponds to the address range +8:+12 of the relative addresses in CSECT ARCZWRIT, could be any number. This number just aligns the remaining length values with the address you specified.
- 3 bytes of data, starting at qualified address .ARCBACK.+0, are displayed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to LENGTHS. There are no additional abbreviations.

Defaults: If you do not specify LENGTHS, the default is four bytes.

LOGONLY: Specifying Only SYSOUT Data Set Output

Explanation: LOGONLY is an optional parameter specifying that the output from the DISPLAY command goes only to the SYSOUT data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to LOGONLY. There are no additional abbreviations.

Defaults: If you do not specify LOGONLY, the output from the DISPLAY command goes to the SYSOUT data set and to the terminal where you issued the command.

Examples of How to Code the DISPLAY Command

The following examples show different ways to code the DISPLAY command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Displaying the Contents of a Range of Absolute Addresses

In this example, the contents of a range of DFHSM absolute addresses is displayed, and the output is printed only in the SYSOUT data set.

```
DISPLAY 82C1FF.:8C45FF. LOGONLY
```

Displaying the Contents at a Relative Address

In this example, 80 bytes of DFHSM address space are displayed starting at a relative address (offset 6D into the last CSECT specified with either the DISPLAY or PATCH command). The output goes to the terminal that issued the command and to the SYSOUT data set, and the SYSOUT data set is printed.

```
DISPLAY +6D LENGTHS(80) CLOSE
```

Displaying the Contents at a Qualified Address

In this example, 120 bytes at each of two places in the DFHSM address space are displayed. The output goes to the terminal that issued the command and to the SYSOUT data set, and the SYSOUT data set is printed.

```
DISPLAY (.ARCALVOL.+3D2,+7A) LENGTHS(120) CLOSE
```

Displaying the Last Date Daily Space Management Ran

In this example, the last date daily space management ran to completion is displayed.

```
DISPLAY .MCR.+98 LENGTHS(4)
```

Displaying the Last Date Migration Cleanup Ran

In this example, the last date migration cleanup ran is displayed.

```
DISPLAY .MCR.+48 LENGTHS(4)
```

Displaying the Last Date Automatic Backup Ran

In this example, the last date automatic backup ran is displayed.

```
DISPLAY .BCR.+50 LENGTHS(4)
```

Displaying the Last Date Level 1 Functions Ran

In this example, the last date the level 1 functions of moving backup versions and backing up migrated data sets ran is displayed.

```
DISPLAY .BCR.+5C LENGTHS(4)
```

Displaying the Last Date Automatic Dump Functions Ran

In this example, the last date the automatic dump functions ran is displayed.

```
DISPLAY .DCR.+5A LENGTHS(4)
```

EXPIREBV: Deleting Unwanted Backup Versions of Data Sets

The EXPIREBV command is used to delete old unwanted backup versions from DFHSM-owned storage, based on the input parameters for non-SMS-managed data sets, and specific management class attributes for SMS-managed data sets. (If a data set is cataloged, the management class is the one currently associated with the data set. If a data set has been deleted, the management class is the one associated with the data set when it was last backed up.)

DFHSM allows only one EXPIREBV command to run at a time.

Syntax of the EXPIREBV Command

Command	Required Parameters	Optional Parameters
EXPIREBV	**DISPLAY | EXECUTE**	**[NONSMSVERSIONS([DELETEIFBACKEDUP[(*days*)]]** **[CATALOGEDDATA [(*days*)]]** **[UNCATALOGEDDATA(*days*)])]** **[STARTKEY (*lowkey*) | RESUME]** **[ENDKEY (*highkey*)]** **[OUTDATASET(*dsname*) | SYSOUT[(*class*)]]**

Note: The NONSMSVERSIONS parameter does not apply to SMS-managed data sets.

The following table shows the DFHSM abbreviations for the parameters of the EXPIREBV command:

Parameter	DFHSM Abbreviation
DELETEIFBACKEDUP	DBU
OUTDATASET	ODS

Required Parameters of the EXPIREBV Command

DISPLAY|EXECUTE: Specifying Whether to Delete the Backup Versions

Explanation: DISPLAY | EXECUTE are mutually exclusive, required parameters specifying whether to delete the backup versions or just produce a listing of the backup versions eligible for deletion.

DISPLAY produces a line in the listing for every backup version eligible for deletion based on the appropriate input parameters or management class attributes. The listing is written to a SYSOUT or DASD data set, depending on the value of the OUTDATASET | SYSOUT parameter. If a data set has been deleted but has no date of deletion, DISPLAY sets the current date as the deletion date for that data set.

EXECUTE specifies that the backup versions should be deleted based on the input parameters and management class attributes. The output consists of an ARC0734I message for each backup version eligible for deletion. The messages are written to the backup activity log, depending on the values specified by SETSYS ACTLOGMSGLVL:

- FULL specifies that all ARC0734I messages will be produced.
- EXCEPTIONONLY specifies that an ARC0734I message will be produced only when there is a failure.
- REDUCED has the same effect as EXCEPTIONONLY.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DISPLAY and EXECUTE. There are no additional abbreviations.

Defaults: None. You must specify either DISPLAY or EXECUTE.

Optional Parameters of the EXPIREBV Command

NONSMSVERSIONS: Specifying Expiration Criteria for Backup Versions of Data Sets Not Managed by SMS

Explanation: NONSMSVERSIONS([DELETEIFBACKEDUP[(*days*)]] [CATALOGEDDATA [(*days*)]] [UNCATALOGEDDATA(*days*)]) is an optional parameter you use to specify that you want backup versions of non-SMS-managed data sets processed during this execution of the EXPIREBV command.

DELETEIFBACKEDUP(*days*) is an optional subparameter that specifies that retired versions that are over *days* old are to be deleted. For *days,* specify the number of days (0-9999) that a retired version should be kept. When a retired version's age exceeds *days,* it will be deleted, along with all other backup versions that were made for the same cataloged data set.

CATALOGEDDATA[(*days*)] is an optional subparameter that specifies the number of *days* (0-9999) that ALL backup versions for a cataloged, non-SMS-managed data set (except the retired version) should be kept after the EXPIREBV command determines the data set is deleted. When the number of days since EXPIREBV determined that the data set was deleted has exceeded *days,* all such backup versions will be deleted.

UNCATALOGEDDATA(*days*) is an optional subparameter that specifies the number of *days* (0-9999) that EACH backup version of an uncataloged, non-SMS-managed data sets should be kept since it was created. When a version becomes over *days* old, it is deleted.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to NONSMSVERSIONS, DELETEIFBACKEDUP, CATALOGEDDATA, and UNCATALOGEDDATA. In addition, you can specify DBU for DELETEIFBACKEDUP.

Defaults: If you do not specify NONSMSVERSIONS on the command, backup versions of non-SMS-managed data sets will not be processed.

If you specify DELETEIFBACKEDUP with no days value, the DFHSM default is 150 days. If you do not specify DELETEIFBACKEDUP on the command, retired versions will not be processed.

If you specify CATALOGEDDATA with no days value, the default for days is 60. If you do not specify CATALOGEDDATA on the command, backup versions of cataloged, non-SMS-managed data sets will not be processed.

If you specify UNCATALOGEDDATA, you must specify *days*. If you do not specify UNCATALOGEDDATA on the command, backup versions of uncataloged, non-SMS-managed data sets will not be processed.

Notes:

1. At least one of the optional subparameters of NONSMSVERSIONS must be specified.
2. The EXPIREBV command examines only the latest backup version for a data set name to determine the existence of a retired version, and treats all backup versions older than the latest version (and all versions of data sets uncataloged at the time of backup) as non-retired versions.

STARTKEY | RESUME: Determining the Starting Point for BCDS Processing during Command Execution

Explanation: **STARTKEY(***lowkey***) | RESUME** are mutually exclusive, optional parameters that you specify to control from which BCDS record the processing is started during command execution. You must specify *lowkey* if STARTKEY is specified.

Lowkey is entered to provide a starting point for processing in the BCDS. The value can be up to 44 alphanumeric characters that identify the data set for which you want the deletion of backup versions to begin. Numbers are higher in the range (they follow Z) than letters. The value specified cannot end in a period. If fewer than 44 characters are entered, the value specified is appended with X'00' to make 44 characters.

RESUME is entered if you want to start processing at the point the EXPIREBV command left off the last time an EXPIREBV command was processed on this host.

Note: During processing of the EXPIREBV command, the current key (data set name) is saved periodically.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to STARTKEY and RESUME. There are no additional abbreviations.

Defaults: If you do not specify STARTKEY or RESUME, processing will begin at the beginning of the BCDS. If you specify RESUME and the most recent EXPIREBV command processed on this host did not terminate early, then processing will begin at the beginning of the BCDS.

ENDKEY: Determining the Ending Point for BCDS Processing during Command Execution

Explanation: ENDKEY(*highkey*) is an optional parameter that you specify to control on which BCDS record the processing is completed during command execution. You must specify *highkey* if ENDKEY is specified.

Highkey is entered to provide an ending point for processing in the BCDS. The value can be up to 44 alphanumeric characters that identify the data set for which you want the deletion of backup versions to end. Numbers are higher in the range (they follow Z) than letters. The value specified cannot end in a period. If fewer than 44 characters are entered, the value specified is appended with X'FF' to make 44 characters.

Note: When processing is started for the EXPIREBV command, the planned ending key is saved.

If *highkey* is equal to *lowkey*, DFHSM attempts to process only the data set (MCB) record(s) with those initial characters. If *highkey* is less than *lowkey*, DFHSM fails the command with an error message.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ENDKEY. There are no additional abbreviations.

Defaults: If ENDKEY is not specified, the planned end key is different depending upon whether or not you specify RESUME. If RESUME is specified without ENDKEY, processing continues until the last specified planned end key, which was saved from the last EXPIREBV command issued for this host. If RESUME is specified without ENDKEY and the most recent EXPIREBV command processed in this host did not terminate early, processing continues to the end of the BCDS. If neither RESUME nor ENDKEY is specified, processing continues to the end of the BCDS.

OUTDATASET|SYSOUT: Specifying Output Location for Listing

Explanation: OUTDATASET(*dsname*) | SYSOUT[(*class*)] are mutually exclusive, optional parameters that specify the output location for the listing produced while running the EXPIREBV command with the DISPLAY option.

OUTDATASET(*dsname*) specifies the name of the data set where DFHSM is to write the output data. For *dsname*, substitute the fully-qualified name of the data set to receive the list of the backup versions eligible for expiration.

If the data set does not exist, DFHSM dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of FBA
- Logical record length of 121
- Data set is system reblockable if DFHSM is executing with DFP 3.1.0 or a subsequent release; otherwise, block size of 1210
- Primary allocation of 20 tracks

- Secondary allocation of 50 tracks
- Unit of SYSALLDA

If the data set already exists:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA and the logical record length must be 121.
- The data set is system reblockable if DFHSM is executing with DFP 3.1.0 or a subsequent release and the block size must be 0; otherwise, the block size must be a multiple of 121 up to a limit of 32K.
- The user can choose the primary space allocation.
- If DFHSM needs additional extents after the primary space allocation, DFHSM uses a secondary space allocation of 50 tracks.
- If the data set does not contain data, DFHSM starts writing output data at the beginning of the data set.
- If the data set contains data, DFHSM writes the output data after the existing data.

For *dsname*, substitute the fully qualified name of the data set that is to receive the EXPIREBV output.

SYSOUT(*class*) specifies that the output is to go to the specified output class.

For *class*, substitute one alphanumeric character.

OUTDATASET|SYSOUT do not apply when the EXECUTE option is specified. If either of these parameters is entered when it does not apply, it is ignored.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OUTDATASET and SYSOUT. In addition, you can specify ODS for OUTDATASET.

Default: The default is SYSOUT, and the default for *class* is the value specified with the SETSYS command. If you do not use the SYSOUT parameter of the SETSYS command to specify the output location, the default is class A.

Examples of How to Specify the EXPIREBV Command

The following examples show different ways to code the EXPIREBV command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Displaying Backup Versions within a Key Range That Qualify for Deletion

In this example, a starting message will be issued to the user. An output line will be directed to SYSOUT class H for every SMS backup version that qualifies for deletion. All SMS backup versions with keyranges from A000 to L888 will be processed. Deletion qualification will be determined by the SMS management class attributes for each data set as they are defined for that data set.

No deletions will be performed and no non-SMS processing will be done. An ending message will be issued to the user.

```
EXPIREBV DISPLAY STARTKEY(A000) ENDKEY(L888) SYSOUT(H)
```

Deleting SMS Backup Versions That Qualify and Specific Non-SMS Versions

In this example, a starting message will be directed to the backup activity log and to the user.

DFHSM will attempt to delete all SMS backup versions that qualify for deletion. An ARC0734I message will be directed to the backup activity log under the control of the SETSYS ACTLOGMSGLVL. Deletion will be determined by the SMS management class attributes as they are defined for each data set.

DFHSM will process all retired versions of non-SMS data sets. DFHSM will attempt to delete all retired versions and associated cataloged backup versions which are over 100 days old. An ARC0734I message will be written to the backup activity log under control of the SETSYS ACTLOGMSGLVL command.

An ending message will be directed to the backup activity log and to the user.

```
EXPIREBV EXECUTE NONSMSVERSIONS(DBU(100))
```

Displaying SMS Backup Versions and Non-SMS Cataloged Versions That Qualify for Deletion

In this example, a starting message will be directed to the user.

DFHSM will process all SMS backup versions. An output line will be directed to SYSOUT class A for each backup version that qualifies for deletion. Deletion will be determined by the SMS management class attributes as they are defined for each data set.

An output line will be directed to SYSOUT class A for all non-SMS backup versions of deleted data sets which were cataloged and more than 5 days have elapsed since EXPIREBV determined that the data set was deleted.

DFHSM will not perform any deletions.

An ending message will be directed to the user.

```
EXPIREBV DISPLAY NONSMSVERSIONS(CATALOGEDDATA(5))
```

Displaying in an Outdataset, the SMS Backup Versions and Non-SMS Uncataloged Versions That Qualify for Deletion

In this example, a starting message will be directed to the user.

DFHSM will process all SMS backup versions. An output line will be directed to the outdataset for each backup version that qualifies for deletion. Deletion will be determined by the SMS management class attributes as they are defined for each data set.

DFHSM will process all uncataloged backup versions, and an output line will be directed to the outdataset for each uncataloged backup version that is over 10 days old, thereby qualifying for deletion.

DFHSM will not perform any deletions.

An ending message will be directed to the user.

```
EXPIREBV DISPLAY NONSMSVERSIONS(UNCATALOGEDDATA(10)) ODS(DSNAME)
```

Resuming Deletion of SMS Backup Versions that Qualify Following Release of a Previously Held EXPIREBV Command

In this example, EXPIREBV processing was held, via the HOLD EXPIREBV command, before a prior EXPIREBV had finished. Later, EXPIREBV processing was released via the RELEASE EXPIREBV commands.

A starting message will be directed to the backup activity log and the user. Processing will begin where the prior EXPIREBV command left off and will continue to the ENDKEY specified in the prior command. If no ENDKEY was specified, processing will continue to the end of the BCDS.

DFHSM will attempt to delete all SMS backup versions that qualify for deletion. An ARC0734I message will be directed to the backup activity log under the control of the SETSYS ACTLOGMSGLVL. Deletion will be determined by the SMS management class attributes as they are defined for each data set.

No non-SMS backup versions will be processed.

An ending message will be directed to the backup activity log and the user.

```
EXPIREBV RESUME EXECUTE
```

Sample of a Printer Listing When You Specify EXPIREBV with the DISPLAY Parameter

Figure 1 is a sample of a printer listing when you specify EXPIREBV with the DISPLAY parameter. Each data set listed would be deleted if the same EXPIREBV command were issued with the EXECUTE parameter. AGE is the number of days between the creation of the backup version, and the execution of the EXPIREBV command.

```
DISPLAY OF BACKUP VERSIONS ELIGIBLE FOR EXPIRATION AT 05:44:14 on 1988/01/07 for SYSTEM=3081

COMMAND INPUT:  STARTKEY(M734413.F240BV09.N02.NAME44.XXX.NAMEIS44.BYT) ENDKEY(M734413.F240BV09.N04.NAME44.XXX.NAMEIS44.BYT)

DSNAME = M734413.F240BV09.N02.NAME44.XXX.NAMEIS44.BYT NOW CATALOGED, AS SMS
MANAGEMENT CLASS USED = DEFAULT1

BACKUP VERSION DSNAME                        SYS  GEN       RET  BACK
                                             CAT  NMBR AGE  VERS PROF
DFHSM.BACK.T074205.M734413.F240BV09.H7001    YES  003  006  NO   NO
DFHSM.BACK.T214205.M734413.F240BV09.H7001    YES  002  006  NO   NO
DFHSM.BACK.T534105.M734413.F240BV09.H7001    YES  004  006  NO   NO
DFHSM.BACK.T464205.M734413.F240BV09.H7003    YES  001  004  NO   NO

DSNAME = M734413.F240BV09.N03.NAME44.XXX.NAMEIS44.BYT NOW CATALOGED, AS SMS
MANAGEMENT CLASS USED = DEFAULT1

BACKUP VERSION DSNAME                        SYS  GEN       RET  BACK
                                             CAT  NMBR AGE  VERS PROF
DFHSM.BACK.T094205.M734413.F240BV09.H7001    YES  003  006  NO   NO
DFHSM.BACK.T234205.M734413.F240BV09.H7001    YES  002  006  NO   NO
DFHSM.BACK.T554105.M734413.F240BV09.H7001    YES  004  006  NO   NO
DFHSM.BACK.T474205.M734413.F240BV09.H7003    YES  001  004  NO   NO

DSNAME = M734413.F240BV09.N04.NAME44.XXX.NAMEIS44.BYT NOW CATALOGED, AS SMS
MANAGEMENT CLASS USED = DEFAULT1

BACKUP VERSION DSNAME                        SYS  GEN       RET  BACK
                                             CAT  NMBR AGE  VERS PROF
DFHSM.BACK.T104205.M734413.F240BV09.H7001    YES  003  006  NO   NO
DFHSM.BACK.T244205.M734413.F240BV09.H7001    YES  002  006  NO   NO
DFHSM.BACK.T564105.M734413.F240BV09.H7001    YES  004  006  NO   NO
DFHSM.BACK.T494205.M734413.F240BV09.H7003    YES  001  004  NO   NO
     END OF DISPLAY - 00000012 BACKUP VERSIONS ELIGIBLE FOR EXPIRATION
```

Figure 1. Sample Printer List of Data Sets When You Specify EXPIREBV and DISPLAY

FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS

The FIXCDS command displays or modifies records in the MCDS, BCDS, or OCDS. You can display a record in one of the control data sets with FIXCDS, and then issue FIXCDS again to make changes to that record. A record consists of a key field (44 bytes), followed by a header field (20 bytes), followed by variable data. The formats of the records are shown in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Reference Volume 3*.

You use the FIXCDS command to fix minor problems that occur in the control data sets. For example, you can use the FIXCDS command when the audit process finds a discrepancy between the computing system catalog and the MCDS.

You can use the DISPLAY parameter of the FIXCDS command to display the data before you change it. Then, after you change a control data set record, verify that the change was successful by specifying the DISPLAY parameter of the FIXCDS command.

Although DFHSM keeps copies of the following records in working storage, the changes you specify with the FIXCDS command for these types of records are made only to the DASD copy of these records:

- Backup control record (BCR)
- Daily statistics record (DSR)
- Migration level 2 control record (L2CR)
- Management control record (MCR)
- JES3 volume activity count record (VAC)
- Volume statistics record (VSR).

If you want the virtual storage copy of the above records to keep the changes you make to the records, use the PATCH command. Otherwise, when you stop DFHSM, the changes you made to the control data set records with the FIXCDS command are replaced with the unchanged records from the virtual storage copy.

Use the FIXCDS command to make the following changes to the MCDS, BCDS, and OCDS:

- Delete a control data set record (DELETE).
- Expand a control data set record by a specified number of bytes (EXPAND).
- Rename a control data set record by specifying a new key (NEWKEY).
- Change existing data at the specified offset in a control data set record (PATCH).
- Create a new record in one of the control data sets (CREATE).

Use the FIXCDS command to make the following changes only to the MCDS:

- Add a new MCDS data set record for a migrated data set residing on the volume that you specify (ADDMIGRATEDDATASET).
- Turn the assigned bit on or off in the MCDS for a migrated data set record to show the migration status of a data set (ASSIGNEDBIT).

DFHSM lists all FIXCDS commands and their output in the SYSOUT data set. You can request a printout of this SYSOUT data set.

Syntax of the FIXCDS Command

Command	Required Parameters	Optional Parameters
FIXCDS	*type* *key*	**[ADDMIGRATEDDATASET(***volser***) |** **ASSIGNEDBIT[(ON | OFF)] |** **CREATE(***offset* **[***data***]) |** **DELETE |** **DISPLAY[(***offset***[LOGONLY])] |** **EXPAND(***bytes***) |** **NEWKEY(***keyname***) |** **PATCH(***offset data***)]** **CLOSE** **LENGTH(***bytes***)**

Note: You can specify one of ADDMIGRATEDDATASET, ASSIGNEDBIT, CREATE, DELETE, DISPLAY, EXPAND, NEWKEY, or PATCH with each FIXCDS command.

Required Parameters of the FIXCDS Command

Type: Specifying the Type of Control Data Set Record

Explanation: *type* is a required positional parameter for which you substitute the alphameric 1-character record type identification for the control data set record you want to fix or display.

The following table shows the record types in the MCDS, BCDS, and OCDS:

1-Character Record Type	3 or 4 Character Record Type	Record Type Name
A	MCA	MCDS alias entry record
B	MCB	BCDS data set record
C	MCC	BCDS backup version record
D	MCD	MCDS data set record
G	DGN	BCDS dump generation record
L	MCL	BCDS backup migrated data set record
M	MCM	BCDS move backup version record
N	VAC	MCDS JES3 volume activity count record
O	MCO	MCDS VSAM association record
P	MCP	BCDS eligible volume record
R	BCR BVR DCR	BCDS backup control record BCDS backup cycle volume record subdivided into spill, unassigned, day of backup cycle (daily) BCDS dump control record
S	DSR L2CR MCR MHCR VSR	MCDS daily statistics record MCDS migration level 2 control record MCDS management control record MCDS multiple-processing-unit control record MCDS volume statistics record
T	TTC	OCDS tape table of contents record subdivided into spill, unassigned, day of backup cycle (daily), and migration level 2
U	MCU	MCDS user record
V	MCV	MCDS volume record
W	DCL	BCDS dump class record
X	MCT	BCDS backup volume record
Y	DVL	BCDS dump volume record
1	MC1	MCDS migration level 1 free space record

Figure 2. Records of the Control Data Sets

Abbreviations: None.

Defaults: None.

Note: Because *type* is a required positional parameter, you must specify it immediately after the command name.

Key: Specifying the Control Record Key

Explanation: *key* is the required positional parameter specifying the control record key for the control data set record you want to fix or display. The key can be specified in EBCDIC or hexadecimal characters.

Note: Record types G, L, M, N, O, P, R, S, T, U, V, W, X, Y, and 1 have a 1-byte hexadecimal identification as an internal first byte. Do not include the 1-byte hexadecimal identification in the *key* field.

The key for types A, B, C, and D records are:

Record Type	Key
A	Migrated data set name (non-VSAM) created when DFHSM migrates the data set or the name of a VSAM component of a migrated data set eligible for automatic recall.
B	Data set name of a user data set.
C	Backup version data set name created when DFHSM backs up the data set.
D	Data set name of a user data set.

A, B, C, and D data set records: The following are examples of the key used with A, B, C, and D data set records:

```
FIXCDS A DFHSM.HMIG.T231510.USER.DATA.H4060
FIXCDS A VSAM.PATHNAME
FIXCDS B USER.DATA.NAME
FIXCDS C DFHSM.BACK.T352016.DATA.NAME.H4323
FIXCDS D USER.DATA.NAME
```

G dump generation record: The key for the type G dump generation record is the volume serial number followed by the time of the day (*hhmmssth*) in packed decimal format. The time of day is followed by the year and day (*00yyddd*F) in packed decimal format. Because the time and date are in packed decimal format, you must specify the key in hexadecimal. An example of the key used for a dump generation record on volume DUMP01 created at 12:55 p.m. on day 135 of the year 1986 is:

```
FIXCDS G X'C4E4D4D7F0F1125519490086135F'
```

L backup migrated data set record: The key for a type L backup migrated data set record is the first 43 characters of the data set name. Under certain circumstances, DFHSM changes the 44th byte of the key, which corresponds to the 43rd character of the data set name, so the key to the record might not correspond exactly with the first 43 characters of the data set name. The true 43rd character and the 44th character of the data set name are stored in the data portion of the record. An example of the key used with a type L backup migrated data set record is:

```
FIXCDS L USER.DATA.NAME
```

M move backup version record: The key for a type M move backup version record is 43 characters of the backup version name. DFHSM uses all characters except the fourth character of the second qualifier. The fourth character of the second qualifier is always a K. An example of the key used with an M move backup version record is:

```
FIXCDS M USER.BAC.T280112.JCL.CNTL.H4104
```

N volume activity count record: The key for a type N volume activity count record is the constant VOLCNT followed by a dash (-) and *n*, where *n* is a decimal number that indicates the sequence number of the record. The N record is an internal record used to maintain activity counts on primary volumes in a JES3 environment. An example of the key used with an N data set record is:

```
FIXCDS N VOLCNT-4
```

O VSAM data set record: The key for a type O VSAM data set record is the migrated data set name created by DFHSM when it migrates a VSAM data set. An example of the key used with an O data set record is:

```
FIXCDS O DFHSM.HMIG.T231510.USER.DATA.H4079
```

P, V, X, and Y volume records: The key for types P, V, X, and Y volume records is the volume serial number. Examples of the key used with P, V, X, and Y volume records are:

```
FIXCDS P TSO456
FIXCDS V TSO123
FIXCDS X TSO789
FIXCDS Y TSO444
```

R backup control record: The key for a type R backup control record is the constant BCR and the processing unit identification in a multiple-processing-unit environment. The processing unit identification is a 1-digit alphameric character. If you omit the processing unit identification, DFHSM defaults to the ID of the issuing processing unit. An example of the key used with an R backup control record is:

```
FIXCDS R BCR3
```

R backup cycle volume record: The key for a type R backup cycle volume record is the constant BVR followed by two characters representing the type of record (01-31 for daily, SP for spill, and UN for unassigned), a dash (-), and a four-character sequence number. An example of the key used with an R backup cycle volume record for day 1 of the backup cycle is:

```
FIXCDS R BVR01-0000
```

R dump control record: The key for the type R dump control record is the constant DCR and the processing unit identification in a multiple-processing-unit environment. The processing unit identification is a 1-digit alphameric character. If you omit the processing unit identification, DFHSM defaults to the identification of the issuing processing unit. An example of the key used with an R dump control record is:

```
FIXCDS R DCR2
```

S level 2 control record: The key for a type S level 2 control record is the constant L2CR. An example of the key used with an S level 2 control record is:

```
FIXCDS S L2CR
```

S management control record: The key for a type S management control record is the constant MCR and the processing unit identification in a multiple-processing-unit environment. The processing unit identification is a 1-digit alphameric character. If you omit the processing unit identification, DFHSM defaults to the ID of the issuing processing unit. An example of the key used with an S management control record is:

```
FIXCDS S MCR2
```

S daily statistics record: The key for a type S daily statistics record is the constant X'C4E2D9' (DSR) followed by the year and day in packed decimal format. The sign code is F. Because the date is in packed decimal format, you must specify the key in hexadecimal. An example of the key used with an S daily statistics record for day 76 of 1984 is:

```
FIXCDS S X'C4E2D984076F'
```

S volume statistics record: The key for a type S volume statistics record is the constant X'E5E2D9' (VSR) followed by the volume serial number, which is followed by the year and day in packed decimal format. The sign code is F. Because the date is in packed decimal format, you must specify the key in hexadecimal. An example of the key used for volume 123400 for its use on day 121 of 1984 with an S volume statistics record is:

```
FIXCDS S X'E5E2D9F1F2F3F4F0F084121F'
```

T tape table of contents record (migration level 2 volume): The key for a type T tape table of contents record for a tape migration level 2 volume is the constant L2 followed by a dash (-), the volume serial number, a dash (-), and a four-character sequence number. An example of the key used with a T tape table of contents record for the migration level 2 volume TML205 is:

```
FIXCDS T L2-TML205-0000
```

T tape table of contents record (backup volume): The key for a type T tape table of contents record for a tape backup volume is a two-character representation of the volume assignment (01-31 for daily, SP for spill, and UN for unassigned), followed by a dash (-), the volume serial number, a dash (-), and a four-character sequence number. An example of the key used with a T tape table of contents record for spill volume TAPE01 is:

```
FIXCDS T SP-TAPE01-0000
```

U user record: The key for a type U user record is the user identification. An example of the key used with a U user record is:

```
FIXCDS U SLJ2345
```

W dump class record: The key for the type W dump class record is the one to eight alphameric character dump class name. An example of the key used with a W dump class record is:

```
FIXCDS W DCLASS01
```

Type 1 record: The key for a type 1 record is the constant L1VOL a dash (-), and a two-character sequence number representing the record sequence. The record sequence number for the first record is 00, the number for the second record is 01, and so forth. The type 1 records are always created sequentially. An example of the key used with a type 1 migration level 1 free space record is:

```
FIXCDS 1 L1VOL-00
```

Abbreviations: None.

Defaults: None.

Notes:

1. Because *key* is a required positional parameter, you must specify it immediately after the *type* parameter.
2. When you specify the key as hexadecimal, use an even number of hexadecimal digits. If you specify an odd number of hexadecimal digits, DFHSM inserts a 0 to the left of the value to make it an even number of hexadecimal digits. Hexadecimal characters must be in the form X'*n*'.

Optional Parameters of the FIXCDS Command

ADDMIGRATEDDATASET: Adding an MCDS Record for a Migrated Data Set

Explanation: **ADDMIGRATEDDATASET**(*volser*) is an optional parameter specifying that a new type D MCDS record is to be added for a migrated data set residing on the specified volume. The record contains only the minimum information about the data set. To make the data set eligible for recall, you must issue the PATCH parameter of the FIXCDS command to patch the data set's fully-qualified migration name (MCDMCANM) padded to the right with blanks.

If the data set is migrated to tape and the data set spans more than one tape, the following fields must be filled in:

Field Name	Explanation
MCDNVSN The FIXCDS offset is 212 (X'D4').	A 2-byte binary number of tape volumes after the tape volume where the data set started.
MCDNVSNO The FIXCDS offset is 214 (X'D6').	A binary number representing the offset from the MCDVSN field to the MCDAVSN field. This value can be calculated by issuing the DISPLAY parameter of the FIXCDS command and using the offsets displayed on the screen.

To add the extra volumes to the record, you must first use the EXPAND parameter of the FIXCDS command to increase the length of the D record. The D record must increase 6 bytes for each additional volume serial number that needs to be included. Enter the volume serial numbers of the other tape volumes in the expanded area.

The first volume serial number starts at offset +0 in the expanded area, the second at offset +6, and so on. Pad the volume serial number with blanks to the right.

For *volser*, substitute the volume serial number of the migration level 1 or DASD migration level 2 volume where the migrated data set resides. For tape migration level 2 volumes, substitute the volume serial number of the volume where the migrated data set starts.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ADDMIGRATEDDATASET. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

Notes:

1. You can specify the ADDMIGRATEDDATASET parameter only for a type D record. The command fails if you issue it for another record type.
2. To recall the migrated data set after you add the new type D MCDS record, add MCDMCANM, padded by blanks, to the D record.

ASSIGNEDBIT: Turning the Assigned Bit On or Off

Explanation: **ASSIGNEDBIT(ON | OFF)** is an optional parameter specifying whether to turn the assigned bit on or off in an MCDS type D record. The assigned bit indicates whether the data set has migrated.

ON specifies that you want to turn the assigned bit on in the type D record. This indicates that the data set has migrated.

OFF specifies that you want to turn the assigned bit off in the type D record. This specifies that DFHSM has recalled the data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ASSIGNEDBIT, ON, and OFF. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

If you do not specify ON or OFF with the ASSIGNEDBIT parameter, the default is OFF.

Notes:

1. You can specify the ASSIGNEDBIT parameter only for a type D record. The command fails if you issue it for another record type.
2. You can specify either ON or OFF, but not both.

CREATE: Creating a New Control Data Set Record

Explanation: CREATE(*offset*[*data*]) is an optional parameter specifying that a new control data set record is to be created. The LENGTH parameter controls the size of the record to be created.

For *offset*, substitute a decimal number from 0 to 1975 for the offset where you want the data to be inserted into the variable portion of the record. You specify the data for the variable portion of the record. The FIXCDS command automatically creates the key and header portions of the record.

For *data*, substitute hexadecimal characters, or alphameric characters and $, #, or @ to be inserted into the new record. Do not specify more than 256 bytes (512 hexadecimal digits), and specify an even number of hexadecimal digits. If you specify an odd number of hexadecimal digits, DFHSM inserts a 0 to the left of the value to make it an even number. Hexadecimal characters must be in the form X'*n*'. The new record contains all zeros after the header field unless you supply data.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CREATE. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

Notes:

1. The offset of the first byte of the variable data of the record is zero. The offset of the last byte of the variable data of the record is one less than the length of the variable data.
2. If you are creating a Tape Table of Contents (TTOC) extension record, be sure to update the TTCNUM field for the TTOC base record for the volume. This halfword field is the total count of the base and the extension records for the volume.

   If you are creating a Migration Level 1 Free Space (MC1) or JES3 Volume Activity Count (VAC) continuation record, be sure to patch the continuation flag in the appropriate lower-level record to binary '1'.

DELETE: Deleting a Control Data Set Record

Explanation: **DELETE** is an optional parameter specifying that a control data set record is to be deleted.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DELETE. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

Notes:

1. The four-character sequence number specified on the delete of a Tape Table of Contents (TTOC) record determines how the record is to be deleted. If the sequence number is zero, the entire record, including all of the extensions and the base of the TTOC, is deleted. If the sequence number is not zero, only the indicated TTOC extension is deleted. See "T tape table of contents record (migration level 2 volume)" on page 122, for further explanation.
2. When a type X backup volume record is deleted from the BCDS, the BVR entry for the volume and the entire TTOC record for a tape backup volume are also deleted.
3. When a type T base TTOC and all extension records are deleted from the BCDS, the BVR entry for the volume and the MCT backup volume record are also deleted.

   If you are deleting a Migration Level 1 Free Space (MC1) or JES3 Volume Activity Count (VAC) continuation record, be sure to patch the continuation flag in the appropriate lower-level record to binary '0'.

   If you delete a lower-level MC1 or VAC record, any upper-level continuation records will remain in the MCDS but will not be usable by DFHSM.

DISPLAY: Requesting a Display of the Data from the Control Data Sets

Explanation: **DISPLAY[(*offset*[LOGONLY])]** is an optional parameter you specify to display the data from the specified record. A record consists of a key field (44 bytes), followed by a header field (20 bytes), followed by variable data depending on the record type. For each request, you always see the header field but never see the key field.

For *offset*, substitute a decimal value from 0 to 1975 for the offset into the variable data portion of the record that you want to display or specify a hexadecimal value for the offset. The LENGTH parameter controls how much record data you want to display. Hexadecimal characters must be in the form X'*n*'.

LOGONLY is an optional subparameter specifying that you want the displayed data to go only to the SYSOUT data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DISPLAY and LOGONLY. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

If you do not specify LOGONLY, the displayed data goes both to the SYSOUT data set and to the terminal where the command was issued.

If you specify DISPLAY without specifying *offset*, the display starts from offset 0 of the variable data portion of the record.

Notes:

1. If you specify an offset that goes beyond the end of the record you are referring to, the FIXCDS command fails.
2. When you display the D record for a migrated VSAM data set, the password field is blanked out.
3. The offset of the first byte of the variable data of the record is zero. The offset of the last byte of the variable data of the record is one less than the length of the variable data.

EXPAND: Expanding a Control Data Set Record

Explanation: **EXPAND(*bytes*)** is an optional parameter specifying that a control data set record is to be expanded by the specified number of bytes. The new portion of the record is set to binary zeros. For *bytes*, substitute a decimal number for the number of bytes by which you want the record to be expanded.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXPAND. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

Notes:

1. If the expanded record length is more than 2040 bytes, the FIXCDS command fails.
2. If a Backup Cycle Volume Record (BVR) is being expanded, the specified length must be an even multiple of 12 bytes, the length of the volume entry in the BVR.
3. If a BVR is being expanded, the resultant record length must not be able to contain more than the maximum number of volume entries. If the maximum record length is 1016 bytes in length, 78 entries can be put in each BVR. If the maximum record length is 2040 bytes in length, 164 entries can be put in each BVR.
4. When a BVR is expanded, the number of volume entries is incremented to reflect the new number of volume entries. If you subsequently update these new volume entries with volume serial numbers, you must insure that the volume full flag is turned off in the BVR by using the appropriate FIXCDS PATCH command.

NEWKEY: Renaming a Control Data Set Record

Explanation: **NEWKEY(*keyname*)** is an optional parameter specifying that a control data set record is to be renamed. For *keyname*, substitute 1 to 44 EBCDIC characters or specify the new key as hexadecimal. Do not include the 1-byte hexadecimal identification in the *keyname*. The 1-byte hexadecimal ID is the first byte of the internal format of keys for types G, L, M, N, O, P, R, S, T, U, V, W, X, Y, and 1 records.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to NEWKEY. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

Notes:

1. You must specify the same record type as the one you specified with the *type* parameter. The record with the new key is the same as the record with the old key.
2. When you specify the key as hexadecimal, specify an even number of hexadecimal digits. If you specify an odd number of hexadecimal digits, DFHSM inserts a 0 to the left of the value to make it an even number. Hexadecimal characters must be in the form X'*n*'.
3. If the FIXCDS NEWKEY parameter is performed on a DFHSM record and the new data set name (DSN) that is specified by the NEWKEY parameter differs from the original data set name, then any subsequent function which references this key will fail.

PATCH: Changing a Control Data Set Record

Explanation: PATCH(*offset data*) is an optional parameter you specify to change a control data set record.

For *offset*, substitute a decimal number from 0 to 1975 for the offset into the variable data portion of the record you want to change, or specify a hexadecimal value for the offset. Hexadecimal characters must be in the form X'*n*'.

For *data*, substitute the changes you want made to the data. You can enter the data as hexadecimal characters or alphameric characters and $, #, or @. You can change up to 256 bytes of data.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PATCH. There are no additional abbreviations.

Defaults: If you do not specify one of the optional parameters of FIXCDS, the default is DISPLAY.

Note: The offset of the first byte of the variable data of the record is zero. The offset of the last byte of the variable data of the record is one less than the length of the variable data.

CLOSE: Printing the SYSOUT Data Set

Explanation: CLOSE is an optional parameter specifying that the SYSOUT data set is to be printed. The FIXCDS command completes the processing you requested and then prints the SYSOUT data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CLOSE. There are no additional abbreviations.

Defaults: None.

LENGTH: Specifying the Length of the Data or of a New Control Data Set Record

Explanation: LENGTH(*bytes*) is an optional parameter specifying the length of the data to be displayed or the length of a new control data set record. LENGTH applies to only the variable portion of a record. For a display, the record header is always displayed with the number of bytes you specified with this parameter. For a new record, FIXCDS always creates the first 64 bytes that are the key and header fields.

For *bytes*, substitute a decimal number from 1 through 1976 for the number of bytes you want to display or create for the variable portion of the record.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to LENGTH. There are no additional abbreviations.

Defaults: If you do not specify LENGTH or you specify LENGTH without *bytes*, the default length to be displayed is the remaining length of the current record, or the default length to be created is the minimum valid length for the variable data portion of the type of record being created.

Notes:

1. The LENGTH parameter applies only with the DISPLAY and CREATE parameters. If you specify LENGTH when it does not apply, DFHSM ignores it.
2. If you specify LENGTH with CREATE, the number of bytes you specify must be at least the minimum length allowed for the variable data portion of the record you are creating.

Examples of How to Code the FIXCDS Command

The following examples show different ways to code the FIXCDS command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Displaying a Backup Control Record from the BCDS

In this example, the type R backup control record from the issuing processing unit is displayed from variable data offset 15 to the end of the record. The output goes only to the SYSOUT data set.

```
FIXCDS R BCR DISPLAY(15 LOGONLY)
```

Adding a Migrated Data Set Record to the MCDS

In this example, a type D data set record for a data set that has migrated is added to the MCDS.

```
FIXCDS D PAC1234.DUMMY.ASM ADDMIGRATEDDATASET(VOL006)
```

Deleting a Backup Volume Record from the BCDS

In this example, a type X backup volume record is deleted from the BCDS.

```
FIXCDS X BAK123 DELETE
```

Expanding a Backup Data Set Record in the BCDS

In this example, a type B backup data set record in the BCDS is expanded by 256 bytes.

```
FIXCDS B JLT7652.REPORT.DATA EXPAND(256)
```

Creating a Management Control Record in the MCDS

In this example, the type S management control record for processing unit 1, having variable data 512 bytes in length, is created with data supplied for offset locations 64 and 65 in the variable data portion of the new record.

```
FIXCDS S MCR1 CREATE(64 X'8010') LENGTH(512)
```

Turning On the Assigned Bit in the MCD Record

In this example, you turn on the assigned bit in the MCD record to indicate that the data set has migrated.

```
FIXCDS D VLS325.REPORT.ASM ASSIGNEDBIT(ON)
```

Renaming a Migration Volume Record in the MCDS

In this example, a type V migration volume record is renamed to a new key.

```
FIXCDS V MIG011 NEWKEY(SCR002)
```

Modifying a Volume Statistics Record in the MCDS

In this example, a type S volume statistics record is modified at offset locations 64 and 65 of the variable data. The SYSOUT data set is printed.

```
FIXCDS S X'E5E2D9C2C1D2E5D6D377133F' PATCH(64 X'0700') -
       CLOSE
```

Deleting a Tape Volume Record from the OCDS

In this example, all type T tape volume records (backup and migration level 2) are deleted from the OCDS.

```
FIXCDS T 01-OFF456-0000 DELETE
```

Changing the Version Number of the Multiple Backup Data Set

In this example, you back up the control data sets to multiple backup data sets and have reached the limit of V9999999. You change the last final qualifier to V0000001:

```
FIXCDS S MHCR PATCH(X'B0' X'E5F0F0F0F0F0F0F1')
```

Displaying Part of the Type R Dump Control Record

In this example, part of the type R dump control record for a processing unit is displayed. The dump cycle (bit string) is at offset 12. The length of the dump cycle is at offset 16. The cycle start date (Julian date in packed decimal format) is at offset 18.

```
FIXCDS R DCR DISPLAY(12) LENGTH(12)
```

Displaying the Array of Dump Generation Keys in the Type P BCDS Volume Record

In this example, the array of dump generation keys in the type P BCDS volume record for volume PRIM01 is displayed. The array begins at offset X'138'. Each key is 14 bytes long. There are a maximum of 100 dump generations.

```
FIXCDS P PRIM01 DISPLAY(X'138') LENGTH(1400)
```

Displaying a Type G Dump Generation Record

In this example, the dump generation record for a dump that was done of user volume PRIM01 (EBCDIC 'D7D9C9D4F0F1') at midnight on Julian date 86209 is displayed.

```
FIXCDS G X'D7D9C9D4F0F1000000000086209F' DISPLAY
```

Displaying a Type Y Dump Volume Record

In this example, the type Y dump volume record for volume D00001 is displayed.

```
FIXCDS Y D00001 DISPLAY
```

Displaying a Type W Dump Class Record

In this example, the type W dump class record for class WEEKLY is displayed.

```
FIXCDS W WEEKLY DISPLAY
```

FREEVOL: Moving DFHSM Migration Copies

The FREEVOL command moves migration copies of SMS-managed data sets from:

- A migration level 1 volume based on each data set's management class attribute values
- A migration level 2 volume based on the age specified on the AGE parameter of the FREEVOL command.

The FREEVOL command moves all migration copies of non-SMS-managed data sets meeting a specified age criterion from DFHSM migration volumes. Migration copies meeting the specified age criterion are moved from a specified migration level 1 volume to other migration level 1 or level 2 volumes, or from a specified migration level 2 DASD volume to other migration level 2 volumes.

Notes:

1. FREEVOL can be used to move migration copies from one unit type to another unit type.
2. FREEVOL does not move backup copies from migration level 1 volumes. Each time automatic backup processing runs, backup copies are moved off migration level 1 volumes.
3. FREEVOL does not move user data sets, SYS1.VVDS, the VTOC index data set, or any kind of catalog.
4. FREEVOL of a migration level 1 volume moves VTOC copy data sets on the freed volume to other migration level 1 volumes regardless of the target level of the FREEVOL command.
5. Unless you want DFHSM to continue to use the freed volume as a target for migration, you should either delete the volume or add it again with the DRAIN attribute.
6. For migrated SMS data sets, the values specified for the management class attribute of *COMMAND-OR-AUTO-MIGRATE* will be ignored.

Syntax of the FREEVOL Command

Command	Required Parameters	Optional Parameters
FREEVOL	**MIGRATIONVOLUME(*volser*)**	**AGE(*days-since-referred-to*)** **TARGETLEVEL** **(MIGRATIONLEVEL1 |** **MIGRATIONLEVEL2(TAPE | DASD))**

The following table shows the DFHSM abbreviations for the parameters of the FREEVOL command.

Parameter	DFHSM Abbreviation
MIGRATIONLEVEL1	ML1
MIGRATIONLEVEL2	ML2
MIGRATIONVOLUME	MVOL

Required Parameters of the FREEVOL Command

MIGRATIONVOLUME: Specifying the DASD Migration Volume

Explanation: MIGRATIONVOLUME(*volser*) is a required parameter specifying a DASD migration volume. For *volser*, substitute the serial number of the volume being selected as the migration volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONVOLUME. In addition, you can use the abbreviation MVOL for MIGRATIONVOLUME.

Defaults: None.

Note: Because MIGRATIONVOLUME(*volser*) is a required parameter, you must specify it immediately after the command name.

Optional Parameters of the FREEVOL Command

AGE: Specifying Data Set Use

Explanation: AGE(*days-since-referred-to*) is an optional parameter specifying the age criterion for migrating data sets. For *days-since-referred-to*, substitute a decimal value from 0 to 999 for the number of days since data sets were last referred to.

For SMS-Managed Data Sets: If AGE(0) is entered for a migration level 1 volume, all SMS-managed data sets will be moved from the volume and placed on other migration level 1 volumes or migration level 2 volumes depending on the data set's management class. If the management class has a value specified for the LEVEL-1-DAYS-NON USAGE and the age is met, the data set migrates to a migration level 2 volume. If the management class has a value specified for LEVEL-1-DAYS-NON-USAGE and the data set age does not meet the criterion, or if the data set has an attribute of NOLIMIT, the data set migrates to another migration level 1 volume.

If an AGE other than zero is specified for SMS data sets on migration level 1 volumes, the command fails and a message is issued.

If AGE(1-999) is entered for a migration level 2 volume, the age specified applies to all of the data sets on the volume, since there are no management class attributes that apply to SMS data sets on migration level 2 volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AGE. There are no additional abbreviations.

Defaults: If you do not specify AGE, the default is zero, which means to clear the volume of migrated data.

TARGETLEVEL: Specifying the Target to Which Migration Copies Will Be Moved

Explanation: **TARGETLEVEL(MIGRATIONLEVEL1 | MIGRATIONLEVEL2(TAPE | DASD))** specifies the level and the unit type for migration copies eligible to be moved.

For SMS-Managed Data Sets: The target levels of MIGRATIONLEVEL1 and MIGRATIONLEVEL2 do not apply to SMS data sets, since their target levels are determined by management class as described in the AGE parameter description.

The device category applies only to those SMS-managed data sets migrating to ML2.

DASD specifies that you want the eligible data sets to migrate from MIGRATIONVOLUME(*volser*) to DASD migration level 2 volumes.

TAPE specifies that you want the eligible data sets to migrate from MIGRATIONVOLUME(*volser*) to tape migration level 2 volumes.

For Non-SMS-Managed Data Sets: MIGRATIONLEVEL1 specifies that volumes defined for migration level 1 receive migrated data sets from MIGRATIONVOLUME(*volser*).

MIGRATIONLEVEL2 specifies that volumes defined for migration level 2 receive migrated data sets from MIGRATIONVOLUME(*volser*).

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TARGETLEVEL, MIGRATIONLEVEL1, MIGRATIONLEVEL2, TAPE, and DASD. In addition, you can use the abbreviation ML1 for MIGRATIONLEVEL1 and the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: If you do not specify either DASD or TAPE, the default is the type of migration set up by the TAPEMIGRATION parameter of the SETSYS command.

Notes:

1. If MIGRATIONVOLUME and TARGETLEVEL are the same level, the current source volume, MIGRATIONVOLUME(*volser*), is excluded from the target volume selection process.
2. If the source volume you specified is a migration level 2 volume, the specification of a target level migration level 1 volume is invalid.
3. If you do not specify TARGETLEVEL, migration copies of non-SMS-managed data sets are moved to migration level 2 volumes.

4. If you specify either DASD or TAPE, the one selected will override the environment specified with the SETSYS TAPEMIGRATION command.
5. After a FREEVOL command has been processed against a ML2 volume with an associated key range, that volume must be further processed by a DELVOL and an ADDVOL command to become eligible as a target volume for that key range again.

Examples of How to Code the FREEVOL Command

The following examples shows how to code the FREEVOL command.

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Moving Migration Copies from One Migration Volume to Other Migration Volumes

In this example, migration copies of SMS-managed data sets are moved from a specific migration volume to migration level 1 or migration level 2 DASD volumes based on their management class attributes. Non-SMS-managed data sets are moved from a specific migration volume to migration level 2 DASD volumes.

```
FREEVOL MIGRATIONVOL(MIG113) TARGETLEVEL(ML2(DASD)
```

Moving All Migration Copies from One Migration Level 2 Volume to Other Migration Level 2 Volumes

In this example, migration copies not referred to for at least 1 day are moved from a specific migration level 2 volume to other migration level 2 DASD volumes.

```
FREEVOL MIGRATIONVOL(MIG113) TARGETLEVEL(ML2(DASD)) AGE(1)
```

HOLD: Preventing All or Some of DFHSM Functions

The HOLD command prevents all or part of DFHSM functions from running. For example, you specify HOLD when a temporary software or hardware problem occurs that can be compounded if data movement continues in DFHSM.

Migration, backup, dump, recovery, and restore have an optional keyword related to stopping volume processing after the current data set (EOD) or delaying until the end of processing the user volume (EOV).

When you issue the HOLD command, you can prevent processing of all or part of these DFHSM functions:

- Command and daily space management
- Daily space management only
- Recall and deletion of a migrated data set
- Command backup and automatic backup
- Automatic backup only
- Command dump and automatic dump
- Automatic dump only
- Audit
- List
- Report
- Recovery and restore
- Recycle
- Logging
- Tape copy
- Tape replace
- Expiring backup versions.

The WAIT and NOWAIT keywords have implications to HOLD command processing that are function specific. Refer to the specific processing function for an explanation.

All non-WAIT type requests remain on the processing queue when the appropriate HOLD command is in effect.

If the HOLD command is issued while the TAPECOPY or TAPEREPL commands are processing more than one volume, either from a volume list from the command or an input data set, processing stops after the current volume.

You can issue the RELEASE command to release for processing all or part of the DFHSM functions held with the HOLD command.

Functions held from processing by the HOLD command are no longer prevented from processing if DFHSM is reinitialized.

Syntax of the HOLD Command

Command	Optional Parameters
HOLD	ALL AUDIT AUTOMIGRATION BACKUP[(AUTO)] DUMP[(AUTO)] ENDOFDATASET | ENDOFVOLUME EXPIREBV LIST LOG MIGRATION[(AUTO)] RECALL[(TAPE[(TSO)])] RECOVER[(TAPEDATASET)] RECYCLE REPORT TAPECOPY TAPEREPL

Notes:

1. Although the HOLD command has no required parameters, you must specify at least one optional parameter if you want to prevent a DFHSM function from processing.
2. The following optional parameters are affected by the ENDOFDATASET and ENDOFVOLUME optional parameters:
   - AUTOMIGRATION
   - BACKUP[(AUTO)]
   - DUMP[(AUTO)]
   - MIGRATION[(AUTO)]
   - RECOVER[(TAPEDATASET)]

The following table shows the DFHSM abbreviations for the parameters of the HOLD command:

Parameter	DFHSM Abbreviation
AUTOMIGRATION	AMIG
ENDOFDATASET	EOD
ENDOFVOLUME	EOV

Optional Parameters of the HOLD Command

ALL: Preventing All DFHSM Functions

Explanation: ALL is an optional parameter specifying that all functions controlled by this command except logging are prevented. If EOD or EOV is specified, then all functions are held using that parameter. If neither EOD nor EOV is specified, then each function is held according to its default: BACKUP, MIGRATION, and RECOVER are held EOD, and DUMP is held EOV.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL. There are no additional abbreviations.

Defaults: None.

AUDIT: Ending the Audit Function

Explanation: AUDIT is an optional parameter specifying that DFHSM is to stop the audit function after it finishes processing the current data set. All AUDIT commands (WAIT and NOWAIT) not processed remain queued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUDIT. There are no additional abbreviations.

Defaults: None.

Note: When you issue the HOLD command, you lose any part of the AUDIT command that did not finish running.

AUTOMIGRATION: Preventing Only Daily Space Management

Explanation: AUTOMIGRATION is an optional parameter specifying that daily space management is prevented. If daily space management is running when you issue the HOLD command, daily space management stops. The point at which processing stops is controlled by the ENDOFDATASET and ENDOFVOLUME parameters.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOMIGRATION. In addition, you can use the abbreviation AMIG for AUTOMIGRATION.

Defaults: None.

Notes:

1. When you specify AUTOMIGRATION, DFHSM does not prevent any command space management.
2. HOLD AUTOMIGRATION has the same meaning as HOLD MIGRATION(AUTO).

BACKUP: Preventing Backups

Explanation: **BACKUP[(AUTO)]** is an optional parameter specifying whether DFHSM should prevent all backup processing (command and automatic) or prevent only automatic backup processing.

AUTO specifies that automatic backup processing is prevented. No more automatic backup processing tasks will be started. You can still perform command backup processing tasks.

BACKUP by itself specifies all backup processing tasks are prevented. No more backup processing tasks are started. Also, any command requests that specified the WAIT keyword are failed.

The point at which DFHSM stops backup processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP and AUTO. There are no additional abbreviations.

Defaults: If AUTO is not specified, command backup and automatic backup processing are prevented.

DUMP: Preventing Dumps

Explanation: **DUMP[(AUTO)]** is an optional parameter specifying whether DFHSM should prevent all dump processing (command and automatic) or prevent only automatic dump processing.

AUTO specifies that automatic dump processing is prevented. No more automatic dump processing tasks will be started. You can still perform command dump processing tasks.

DUMP by itself specifies all dump processing tasks are prevented. No more dump processing tasks are started. Also, any command requests that specified the WAIT keyword are failed.

The point at which DFHSM stops dump processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMP and AUTO. There are no additional abbreviations.

Defaults: If AUTO is not specified, command dump and automatic dump processing are prevented.

ENDOFDATASET | ENDOFVOLUME: Specifying When Volume Processing Should Stop

Explanation: **ENDOFDATASET | ENDOFVOLUME** are optional parameters specifying when to stop volume processing of one of the following:

- Space management - (automatic or command)
- Backup - (automatic or command)

- Dump - (automatic or command)
- Recover
- Restore.

ENDOFDATASET specifies that currently processing volume tasks stop after the current data set finishes processing.

Note: If you hold dump processing with the ENDOFDATASET parameter while DFHSM is automatically deleting expired dump copies or deleting excess dump VTOC copy data sets, processing is ended after DFHSM finishes processing the current dump generation.

ENDOFVOLUME specifies that volume tasks stop after the current user volume finishes processing.

When the processing unit functions are running at the time a HOLD EOV command is issued, the command is interpreted to mean that particular function runs to completion before the stop occurs. For example, if a HOLD EOV is entered while the movement of backup versions is running, the movement of the backup versions is allowed to complete all of its requests but the backup of migrated data sets does not start. In other words, HOLD EOV means stop processing a specific function at the end of a volume, or at the end of the movement of backup versions from a migration volume to a daily backup volume, or at the end of the movement of backup versions from one volume to another volume.

Both parameters prevent processing another user volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ENDOFDATASET and ENDOFVOLUME. In addition, you can use the abbreviation EOD for ENDOFDATASET and EOV for ENDOFVOLUME.

Defaults: If neither ENDOFDATASET nor ENDOFVOLUME is specified, the default is ENDOFDATASET. If the function being held is DUMP, the default is ENDOFVOLUME.

EXPIREBV: Ending the Expire Backup Function

Explanation: EXPIREBV is an optional parameter specifying that DFHSM is to stop the process of deleting old, unwanted backup versions from the BCDS at the end of the current data set and does not allow an EXPIREBV command to be started. If the expire backup function is running at the time the HOLD is entered, the key of the last data set processed is saved to allow processing to continue from that point if the RESUME parameter is specified on the next EXPIREBV command that is processed by this host.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXPIREBV. There are no additional abbreviations.

Defaults: None.

LIST: Ending the List Function

Explanation: **LIST** is an optional parameter specifying that DFHSM is to stop the list function after it finishes processing the control data set record of the current request. All LIST commands (WAIT and NOWAIT) not processed remain queued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to LIST. There are no additional abbreviations.

Defaults: None.

Note: When you issue the HOLD command, you lose any part of the LIST command that did not finish running.

LOG: Preventing Logging

Explanation: **LOG** is an optional parameter specifying that DFHSM is to stop recording in the DFHSM log. No records are written in the DFHSM log for those DFHSM functions that continue to run. DFHSM continues recording information in the activity logs.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to LOG. There are no additional abbreviations.

Defaults: None.

MIGRATION: Preventing Space Management

Explanation: **MIGRATION[(AUTO)]** is an optional parameter specifying whether DFHSM should prevent all space management processing or prevent only automatic space management processing.

AUTO specifies that automatic space management processing is prevented. No more automatic space management processing tasks are started. You can still perform command space management.

MIGRATION by itself specifies that all space management functions are prevented. No more space management tasks are started.

The point at which DFHSM stops space management processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters. WAIT type command requests are failed and NOWAIT command requests remain queued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATION and AUTO. There are no additional abbreviations.

Defaults: If AUTO is not specified, automatic space management and daily and command space management are prevented.

RECALL: Preventing Recall and Deletion

Explanation: **RECALL[(TAPE[(TSO)])]** is an optional parameter specifying which recalls (automatic and command) and deletions of a migrated data set are prevented.

RECALL(TAPE(TSO)) specifies that TSO recall requests from migration level 2 tapes are prevented. Recall requests from tape submitted from a batch job and all non-tape volumes are still processed.

RECALL(TAPE) specifies that recall requests from all tape volumes are prevented.

RECALL by itself specifies that all recall and data set deletion tasks from all volumes are prevented. No more recall or data set deletion tasks are started.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECALL, TAPE, and TSO. There are no additional abbreviations.

Defaults: None.

Notes:

1. All non-WAIT requests remain queued when the appropriate function is held.
2. If TSO tape recalls are held, a WAIT type recall from tape that was submitted via TSO is changed to a non-WAIT type request. The user is told that the request remains on the queue to be processed when the function is released.
3. All WAIT recall or deletion requests from batch or from the storage administrator will be failed when RECALL is held.
4. All WAIT recall requests from tape from batch or from the storage administrator will be failed when tape recall is held.

RECYCLE: Ending the Recycle Function

Explanation: **RECYCLE** is an optional parameter specifying that the recycle function ends after DFHSM processes the current backup version or migration copy on the volume being recycled. All RECYCLE commands (WAIT and NOWAIT) not processed remain queued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECYCLE. There are no additional abbreviations.

Defaults: None.

Note: When you issue the HOLD command, you lose any part of the RECYCLE command that did not finish running.

RECOVER: Preventing Recovery and Restore

Explanation: **RECOVER[(TAPEDATASET)]** is an optional parameter specifying whether DFHSM should prevent all recovery and restore processing or prevent only tape recovery processing.

TAPEDATASET specifies that tape recover and restore processing is prevented. No more tape data set processing tasks are started. You can still perform recover processing tasks from DASD.

RECOVER by itself specifies that all recover and restore processing tasks are prevented. No more recovery and restore processing tasks are started.

The point at which DFHSM stops recovery processing is controlled by the ENDOFDATASET and ENDOFVOLUME parameters. WAIT type command requests fail and non-WAIT type command requests remain queued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECOVER and TAPEDATASET. There are no additional abbreviations.

Defaults: If TAPEDATASET is not specified, command recovery for both data sets and volumes is prevented.

REPORT: Ending the Report Function

Explanation: **REPORT** is an optional parameter specifying that DFHSM is to stop the report function after it finishes processing the control data set record for the current request. All REPORT commands not processed remain queued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REPORT. There are no additional abbreviations.

Defaults: None.

Note: When you issue the HOLD command, you lose any part of the REPORT command that did not finish running.

TAPECOPY: Preventing DFHSM from Copying a Tape

Explanation: **TAPECOPY** is an optional parameter specifying that DFHSM should hold all tape copy processes.

If DFHSM was processing an explicit volume list when the HOLD command was issued, the remaining volumes in the list may not process when the TAPECOPY command is released.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPECOPY. There are no additional abbreviations.

Defaults: None.

TAPEREPL: Preventing DFHSM from Replacing an Original Tape Volume With an Alternate

Explanation: **TAPEREPL** is an optional parameter specifying that DFHSM should hold all tape replacement processes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEREPL. There are no additional abbreviations.

Defaults: None.

Examples of How to Code the HOLD Command

The following examples show different ways to code the HOLD command:

Preventing Space Management and Recall

In this example, processing of daily space management, space management by command, and recall and deletion of migrated data sets are prevented from running.

```
HOLD MIGRATION RECALL
```

Preventing All DFHSM Functions and Logging

In this example, processing of all DFHSM functions, including logging, is prevented from running.

```
HOLD ALL LOG
```

Ending the Report Function

In this example, the report function is stopped at the end of the current unit of work. No more REPORT commands are started.

```
HOLD REPORT
```

Ending All Recalls from Tape

In this example, all recalls from tape are stopped.

```
HOLD RECALL(TAPE)
```

Ending All Recalls from Tape Submitted by an Interactive TSO User

In this example, all recalls from tape submitted by an interactive TSO user are stopped. Recalls from tape that are submitted from a batch job are allowed to process.

```
HOLD RECALL(TAPE(TSO))
```

Ending All Tape Copying

In this example, all tape copying is stopped.

```
HOLD TAPECOPY
```

Ending All Tape Replacement

In this example, all tape replacement is stopped.

```
HOLD TAPEREPL
```

Preventing Backup Function from Running

In this example, the backup function is prevented from running.

```
HOLD BACKUP
```

Preventing the Automatic Migration Function from Running

In this example, the automatic migration function is prevented from running. Command migration can still run.

```
HOLD MIGRATION(AUTO)
```

Preventing Processing of a Specific Function at the End of the Data Set

In this example, backup processing is stopped at the end of the data set currently being processed.

```
HOLD BACKUP ENDOFDATASET
```

Preventing Dump Processing

In this example, the dump function is prevented from running. Dumps currently in progress will complete.

```
HOLD DUMP
```

Note: This is equivalent to HOLD DUMP ENDOFVOLUME.

Ending Dump Processing

In this example, all dumps will stop processing the next time Data Facility Data Set Services (DFDSS) reads or writes a record. Dumps in progress are stopped and invalidated.

```
HOLD DUMP ENDOFDATASET
```

Preventing Automatic Dump Processing

In this example, the automatic dump function is prevented from running. Any automatic dumps currently in progress complete, but no new automatic dumps are started. Command dumps can still run.

```
HOLD DUMP(AUTO)
```

Preventing the Expire Backup Versions Function from Running

In this example, deleting backup versions is stopped at the end of the current data set.

```
HOLD EXPIREBV
```

HSENDCMD: Issuing DFHSM Authorized-User Commands from a TSO Terminal

If you are a DFHSM-authorized user, you can use the HSENDCMD command to issue any DFHSM operator, storage administrator, or system programmer commands from a TSO terminal, instead of from the system console.

DFHSM will allow an unauthorized user to use the HSENDCMD to issue the ALTERDS, BDELETE, and the QUERY commands. The subcommands ALTERDS and BDELETE will be processed in the same manner as the HALTERDS and HBDELETE. Refer to "Operator Commands" on page 1 for a list of the operator commands, to "Storage Administrator Commands" on page 2 for a list of the storage administrator commands, and to "System Programmer Commands" on page 2 for a list of the system programmer commands.

Syntax of the HSENDCMD Command

Command	Optional Parameters	Required Parameters
HSENDCMD	WAIT | NOWAIT	*command*

Required Parameters of the HSENDCMD Command

Command: Specifying DFHSM Authorized Command

Explanation: *command* is a required positional parameter specifying the DFHSM authorized command from a TSO terminal. For *command*, substitute the DFHSM command you want and its associated parameters. You cannot use more than 1024 characters. The command and its associated parameters are treated as a group of parameters.

Optional Parameters of the HSENDCMD Command

WAIT | NOWAIT: Specifying Whether to Wait for Command Completion

Explanation: WAIT | NOWAIT are mutually exclusive, optional parameters you use to specify whether you want to wait for the HSENDCMD requested function *command* to complete before control is returned to the user. If WAIT | NOWAIT is used, it must follow immediately after HSENDCMD and precede *command*.

WAIT specifies that you want to wait for the HSENDCMD requested function *command* to complete before control is returned to the user.

Note: Some DFHSM commands, (when used with the HSENDCMD WAIT), cannot assure that the action will have been completed at the time control is returned to the requestor.

This is because the processing of the command only sets a flag or builds a request which is subsequently processed by another task.

The following is a list of these commands:

- LOG
- QUERY
- SPACE
- STOP
- SWAPLOG.

When you use the WAIT parameter with the MIGRATE, RECALL, DELETE, BACKUP, and RECOVER commands, an ARC1000I message is issued if DFHSM successfully completes the processing of these commands. If the above commands do not complete successfully, an ARC1001I message is issued. Any other command issued in conjunction with the WAIT parameter does not receive an ARC1000I message. If you press the TSO Attention key, an ARC1800I message is issued and the ARC1000I is not. If the request is for recalling or recovering a data set, a volume mount request (ARC0612I) message is issued.

NOWAIT specifies that you do not want to wait for the HSENDCMD requested function *command* to complete before control is returned to the user. The completion message will not occur until the requested function is complete.

When you issue the NOWAIT parameter with the MIGRATE, RECALL, DELETE, BACKUP, and RECOVER commands, an ARC1007 message is issued when DFHSM successfully receives the request. After DFHSM successfully completes the above commands, an ARC1000I message is issued. If the above commands do not complete successfully, an ARC1001I message is issued. If the request is for recalling or recovering a data set, a volume mount request (ARC0612I) message is issued.

The return codes issued are as follows:

Return Code	Meaning
0	For the WAIT parameter, the SVC and the function worked. For the NOWAIT parameter, the SVC was successfully sent and the request was sent to the user.
4	For the WAIT parameter, there was a functional error.
8	For the WAIT and NOWAIT parameters, the SVC failed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to WAIT and NOWAIT. There are no additional abbreviations.

Defaults: The default is NOWAIT.

Restrictions: You can specify either WAIT or NOWAIT, but not both.

Notes:

1. The HSENDCMD command name must precede each DFHSM-authorized command you issue from a TSO terminal.
2. Functional errors are reported for the specific data set commands. These commands are BACKDS, DELETE, MIGRATE, RECALL, and RECOVER. The other DFHSM authorized commands do not have a specific functional Return Code for each error; they issue an error message. Use Return Code 4 only in conjunction with the five commands as presented above. A Return Code 4 will be set with commands other than these five if DFHSM cannot recognize the command or any of the command's parameters.
3. These Return Codes are set in Register 15. They can be tested in a CLIST using as variables &LASTCC or &MAXCC. They can also be tested with the COND parameter within JCL when the commands are issued in the TSO batch environment.

Examples of How to Code the HSENDCMD Command

The following examples show how to code the HSENDCMD command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Sending an Authorized Command with WAIT from a TSO Terminal

In this example, the ADDVOL command is issued from a TSO terminal. Control will return to the user when the command is completed. The syntax of the ADDVOL command does not change when it is used with the HSENDCMD command.

```
HSENDCMD WAIT ADDVOL VOL004 UNIT(3330V) +
         PRIMARY(NOAUTOMIGRATION AUTOBACKUP NOAUTORECALL)
```

Sending an Authorized Command from a TSO Terminal

In this example, the ADDVOL command is issued from a TSO terminal. Control is returned to the user before the command completes. The syntax of the ADDVOL command does not change when it is used with the HSENDCMD command.

```
HSENDCMD ADDVOL VOL004 UNIT(3330V) +
         PRIMARY(NOAUTOMIGRATION AUTOBACKUP NOAUTORECALL)
```

LIST: Listing Information from the MCDS, BCDS, and OCDS

The LIST command lists selected data set, user, processing unit serialization, and volume information from the MCDS, BCDS, and OCDS. There are nine categories of information you can list:

- Backup volume information
- Data set information
- Dump class information
- Dump volume information
- Processing unit serialization information
- Migration and primary volume information
- Primary volume information
- Tape volume information
- User authorization information.

For more information about the LIST command and samples of the output, see Appendix B, "Using the LIST Command" on page 407.

Each LIST command can process only one of the nine categories. If you specify more than one category with the LIST command, DFHSM processes the category with the highest priority. The order of priority is:

- MIGRATIONVOLUME, MIGRATIONLEVEL1, MIGRATIONLEVEL2, PRIMARYVOLUME, or VOLUME
- PRIMARYVOLUME(*volser*)
- BACKUPVOLUME
- USER
- DATASETNAME or LEVEL
- TAPETABLEOFCONTENTS
- HOST
- DUMPVOLUME
- DUMPCLASS.

DFHSM allows only one LIST command to run at a time.

Syntax of the LIST Command

The syntax of the LIST command is divided into the nine categories you can specify. Although no parameters are required, you must specify at least one of the nine categories with the LIST command. These nine categories are shown in the following tables:

Command	If You Use	Then You Can Use
LIST	BACKUPVOLUME[(*volser*)]	OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL SELECT(EMPTY)

Command	If You Use	Then You Can Use
LIST	DATASETNAME[(*dsname*)] | LEVEL(*levelid*)	BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH INCLUDEPRIMARY OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL SELECT([AGE(*mindays*[*maxdays*])] | [MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME(*volser*)] [SMALLDATASETPACKING | NOSMALLDATASETPACKING] [VSAM]) SUMMARY

Command	If You Use	Then You Can Use
LIST	HOST(*hostid*)	RESET OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL

Command	If You Use	Then You Can Use
LIST	MIGRATIONVOLUME | MIGRATIONLEVEL1 | MIGRATIONLEVEL2[(DASD | TAPE)] | VOLUME[(*volser*)]	BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH ALLDUMPS OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL SELECT(EMPTY)

Command	If You Use	Then You Can Use
LIST	PRIMARYVOLUME[(*volser*)]	ALLDUMPS | BACKUPCONTENTS(*nn*) BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL SELECT([MULTIPLEVOLUME] [VSAM])

Command	If You Use	Then You Can Use
LIST	DUMPCLASS[(*class*)]	BACKUPCONTROLDATASET OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL

Command	If You Use	Then You Can Use
LIST	DUMPVOLUME[(*volser*)]	BACKUPCONTROLDATASET DUMPCONTENTS SELECT([AVAILABLE] [UNAVAILABLE] [EXPIRED] [UNEXPIRED] [NORETENTIONLIMIT] [DUMPCLASS(*class*)]) OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL

Command	If You Use	Then You Can Use
LIST	TAPETABLEOFCONTENTS(*volser*)	OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL

Command	If You Use	Then You Can Use
LIST	USER[(*userid*)]	OUTDATASET(*dsname*) | SYSOUT[(*class*)] | TERMINAL

Notes:

1. You must specify one of the nine categories with each LIST command. If you specify more than one category, DFHSM processes the category with the highest priority.
2. The following categories are not related to SMS-managed volumes and/or data sets: BACKUPVOLUME, MIGRATIONVOLUME, MIGRATIONLEVEL1, MIGRATIONLEVEL2, DUMPVOLUME, TAPETABLEOFCONTENTS, or USER.

The following table shows the DFHSM abbreviations for the parameters of the LIST command.

Parameter	DFHSM Abbreviation
BACKUPCONTENTS	BCONTENTS
BACKUPCONTROLDATASET	BCDS
BACKUPVOLUME	BVOL
DATASETNAME	DSNAME
DUMPCLASS	DCLASS
DUMPCONTENTS	DCONTENTS
DUMPVOLUME	DVOL
MIGRATIONCONTROLDATASET	MCDS
MIGRATIONLEVEL1	ML1
MIGRATIONLEVEL2	ML2
MIGRATIONVOLUME	MVOL
NORETENTIONLIMIT	NORETLIMIT
NOSMALLDATASETPACKING	NOSDSP
OUTDATASET	ODS
PRIMARYVOLUME	PVOL
SMALLDATASETPACKING	SDSP
TAPETABLEOFCONTENTS	TTOC

Required Parameters of the LIST Command

None.

Note: Although no parameters are required, you must specify at least one of nine categories with the LIST command.

Optional Parameters of the LIST Command

ALLDUMPS | BACKUPCONTENTS: Determining Existence of Dumps or Listing Incremental Backup Contents

Explanation: ALLDUMPS | BACKUPCONTENTS(*nn*) are optional parameters you specify to determine the existence of all full volume dumps and to determine the contents of the user volume at the time of incremental backup.

ALLDUMPS is specified to determine the existence of all volume dumps, and on what dump volumes the dumps exist for a single level 0 or migration level 1 volume. The following information is provided for each selected dump:

- Source volser
- Dump class
- Dump date
- Dump time
- Dump relative generation number
- Dump expiration date
- Volume serial numbers of the set of volumes containing the dump.

BACKUPCONTENTS(*nn*), when used with the PRIMARYVOLUME(*volser*) parameter, is specified to list the contents of the user volume when the latest or next-to-latest backup of *volser* was made. For *nn*, substitute a 0 or 1 to indicate whether the latest or the next to latest backup volume table of contents (VTOC) is listed. A 0 indicates the latest. A 1 indicates the next latest.

The listing is from the latest incremental volume VTOC data set. The listing represents the contents of the user volume at the time when the last incremental backup was done.

BACKUPCONTENTS, when used with the PRIMARYVOLUME(*volser*) parameter, is not processed for volumes that have not been incrementally backed up by DFHSM 2.3.0 or a subsequent release. This is because the VTOC copy data set is not on a migration level 1 volume for incremental volume backups performed by previous releases of DFHSM.

With the PRIMARYVOLUME, the listing can include data sets that are not eligible for incremental backup by DFHSM. In addition to information provided for this variation of the command, the following information is provided:

- Data set name
- Data set organization
- Date of last reference to data set
- Data set creation date.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALLDUMPS and BACKUPCONTENTS. In addition, you can use the abbreviation BCONTENTS for BACKUPCONTENTS.

Defaults: If you do not specify a 0 or 1 for *nn*, the default is 0, list the latest backup VTOC copy data set. If you specify any value other than 0 or 1, the default is 0, list the latest backup VTOC copy data set.

Notes:

1. BACKUPCONTENTS is only meaningful when *volser* is specified with the PRIMARYVOLUME parameter.
2. The BACKUPCONTENTS parameter is not equivalent to the DUMPCONTENTS parameter.
3. BACKUPCONTENTS is ignored when DUMPVOLUME is specified.
4. ALLDUMPS is valid with PRIMARYVOLUME and VOLUME when specified with *volser* and with BCDS.
5. DFHSM does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFHSM lists the entire partitioned data set.

BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH: Controlling the Source of Information

Explanation: **BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | BOTH** are mutually exclusive, optional parameters you specify to control where DFHSM gets the information to be listed when the information can exist in the MCDS and BCDS. These parameters apply to data set entries, primary volume entries, migration volume, and dump volume entries.

BACKUPCONTROLDATASET is specified to request a list of only the BCDS entries for the specified data sets or primary and migration volumes.

MIGRATIONCONTROLDATASET is specified to request a list of only the MCDS entries for the specified data sets or primary and migration volumes.

BOTH is specified to request a list of the MCDS and BCDS data set entries for the specified data sets or primary and migration volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPCONTROLDATASET, MIGRATIONCONTROLDATASET, and BOTH. In addition, you can use the abbreviation BCDS for BACKUPCONTROLDATASET and the abbreviation MCDS for MIGRATIONCONTROLDATASET.

Defaults: The default is MIGRATIONCONTROLDATASET.

Note: These parameters apply only to PRIMARYVOLUME, MIGRATIONVOLUME, MIGRATIONLEVEL1, MIGRATIONLEVEL2, VOLUME, DATASETNAME, or LEVEL. If you do not specify one of the applicable parameters, DFHSM ignores the BACKUPCONTROLDATASET, MIGRATIONCONTROLDATASET, or BOTH parameter.

BACKUPVOLUME: Listing of Backup Volume Entries

Explanation: **BACKUPVOLUME[(*volser*)]** is an optional parameter you specify to request a list of selected information from backup volume entries contained in the BCDS.

BACKUPVOLUME specifies that you want a list of all backup volumes.

For *volser*, substitute the serial number of the specific backup volume you want listed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPVOLUME. In addition, you can use the abbreviation BVOL for BACKUPVOLUME.

Defaults: If you specify BACKUPVOLUME without *volser*, DFHSM lists all backup volume entries contained in the BCDS.

Note: If you specify this parameter, you do not get any information about the data sets on the backup volume.

DATASETNAME | LEVEL: Listing of Data Set Entries

Explanation: DATASETNAME[(*dsname*)] | LEVEL(*levelid*) are mutually exclusive, optional parameters you specify to request a list of data set entries.

DATASETNAME[(*dsname*)] is specified to request a list of all data set entries. For *dsname*, substitute the fully qualified name of the particular data set you want listed. You can specify a data set name of up to 44 characters.

LEVEL(*levelid*) is specified to request a list of all data set entries that have the same set of initial characters of the data set name. For *levelid*, substitute the set of initial characters of the data set name for the data sets you want listed. The set of initial characters can contain imbedded periods. The *levelid* can end with a period if LEVEL is the first keyword on the command. You can specify a *levelid* of up to 44 characters.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETNAME and LEVEL. In addition, you can use the abbreviation DSNAME for DATASETNAME.

Defaults: If you specify DATASETNAME without *dsname*, DFHSM lists all data set entries.

Notes:

1. You can specify DATASETNAME or LEVEL with a LIST command but not both. If you specify both parameters, the last parameter specified overrides the previous one.
2. If you used the SETMIG command to prevent a data set from migrating, DFHSM does not list the data set.
3. DFHSM does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFHSM lists the entire partitioned data set.

DUMPCLASS: Listing Dump Class Profile

Explanation: DUMPCLASS[(*class*)] is an optional parameter you specify to request a list of the dump class profile specified on the DEFINE command. For *class*, substitute from one to eight alphanumeric characters for the class to be listed.

The following information will be listed for each dump class:

- Class name
- Class disposition

- Retention period
- Frequency and/or day
- Automatic reuse option (Y/N)
- Data set restore option (Y/N)
- Change bit reset option (Y/N)
- Unit type
- Class disable (Y/N).

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCLASS. In addition, you can use the abbreviation DCLASS for DUMPCLASS.

Defaults: If you specify DUMPCLASS without *class*, DFHSM lists the profiles for all dump classes.

DUMPCONTENTS: Listing Contents of a Set of Dump Volumes

Explanation: **DUMPCONTENTS** is an optional parameter you specify to request a list of the contents of a set of dump volumes. The listing is from a full volume dump VTOC copy data set, and represents the contents of the user volume at the time the dump was done.

The following information will be listed for each data set on the source volume:

- Source volume serial number
- Dump class
- Dump volume serial numbers
- Dump volume unit type
- Dump creation date and time
- Status of the dump copy
- Dump expiration date
- Data set name
- Data set organization
- Date data set was last referred to
- Data set creation date.
- Multi or single volume
- RACF indicated
- Password protected
- Change indicated.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPCONTENTS. In addition, you can use the abbreviation DCONTENTS for DUMPCONTENTS.

Defaults: None.

Notes:

1. DUMPCONTENTS is only meaningful when *volser* is specified with the DUMPVOLUME parameter.
2. The DUMPCONTENTS parameter is not equivalent to the BACKUPCONTENTS parameter.
3. DUMPCONTENTS is ignored when PRIMARYVOLUME is specified.

DUMPVOLUME: Listing Information about a Single Dump Volume or a Set of Dump Volumes

Explanation: DUMPVOLUME[(*volser*)] is an optional parameter you specify to request a list of information about a single dump volume or a set of dump volumes. For *volser*, substitute any volser from a set of volumes that collectively represent a dump of a user volume.

The following information will be listed:

- Source volume serial number
- Dump class
- Dump volume serial numbers
- Dump volume unit type
- Dump creation date and time
- Status of the dump copy
- Dump expiration date
- Set of dump volsers.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPVOLUME. In addition, you can use the abbreviation DVOL for DUMPVOLUME.

Defaults: None.

Note: If the *volser* specified is not part of a valid dump copy, only the dump class, volume serial, and volume unit type of the specified *volser* will be listed.

HOST: Listing of All Control Data Sets Serialized by the Processing Unit

Explanation: HOST(*hostid*) is the optional parameter you use in a multiple-processing-unit environment to request a list of all control data set records currently serialized by the specified processing unit. The serialized control data set records are:

- Backup cycle volume record (BVR)
- MCDS data set record (MCD)
- MCDS volume record (MCV)
- Tape table of contents record (TTOC).

You can issue the LIST HOST command to receive information about SMS-managed volumes that have an MCV record serialized with a host-ID.

For *hostid*, substitute the identification character of the processing unit whose serialization information you want listed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to HOST. There are no additional abbreviations.

Defaults: None.

INCLUDEPRIMARY: Listing of Entries for Any Data Set That Has Migrated

Explanation: **INCLUDEPRIMARY** is an optional parameter requesting that a list of data set entries include data set entries from the MCDS even though DFHSM might have already recalled the data sets. A recalled data set can still have an entry in the MCDS.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to INCLUDEPRIMARY. There are no additional abbreviations.

Defaults: If you do not specify INCLUDEPRIMARY, DFHSM does not list entries for recalled data sets.

Note: The INCLUDEPRIMARY parameter applies only to the DATASETNAME and LEVEL parameters and only when DFHSM lists information from the MCDS. If you specify INCLUDEPRIMARY when it does not apply, DFHSM ignores it.

MIGRATIONVOLUME | MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | PRIMARYVOLUME | VOLUME: Listing Primary and Migration Volumes

Explanation: **MIGRATIONVOLUME | MIGRATIONLEVEL1 | MIGRATIONLEVEL2[(DASD | TAPE)] | PRIMARYVOLUME(*volser*) | VOLUME[(*volser*)]** are mutually exclusive, optional parameters you specify to request a list of selected information for primary or migration volumes.

MIGRATIONVOLUME specifies that you want a list of the volume entries for all migration volumes.

MIGRATIONLEVEL1 specifies that you want a list of the volume entries for all migration level 1 volumes.

MIGRATIONLEVEL2 specifies that you want a list of the volume entries for all migration level 2 volumes.

DASD specifies that you want a list of the volume entries for all DASD migration level 2 volumes.

TAPE specifies that you want a list of the volume entries for all tape migration level 2 volumes.

PRIMARYVOLUME specifies that you want a list of the volume entries for all primary volumes. PRIMARYVOLUME (*volser*) specifies that you want a list for a particular primary volume. For *volser*, substitute the serial number of the specific volume you want listed. Both SMS and non-SMS volumes can be listed.

VOLUME specifies that you want a list of all primary and migration volumes. VOLUME(*volser*) specifies that you want a list of a particular primary or migration volume. For *volser*, substitute the serial number of the specific volume you want listed. Both SMS and non-SMS volumes can be listed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PRIMARYVOLUME, MIGRATIONVOLUME, MIGRATIONLEVEL1, MIGRATIONLEVEL2, and VOLUME. In addition, you can use the abbreviation PVOL for

PRIMARYVOLUME, the abbreviation MVOL for MIGRATIONVOLUME, the abbreviation ML1 for MIGRATIONLEVEL1, and the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: If you specify VOLUME without *volser*, DFHSM lists all the primary and migration volumes it owns or manages. If you specify PRIMARYVOLUME without *volser*, DFHSM lists all primary volumes it owns or manages.

Notes:

1. You can specify only one of PRIMARYVOLUME, MIGRATIONVOLUME, MIGRATIONLEVEL1, MIGRATIONLEVEL2, or VOLUME with a LIST command. If you specify more than one parameter, the last parameter you enter overrides the previous parameters.
2. When you specify any of these parameters, DFHSM does not list information about the data sets on the primary or migration volume. Also, DFHSM does not give you any information about the amount of space left on the volume. To find out how much space is left on a primary or migration level 1 volume, use the SPACE parameter of the QUERY command.

OUTDATASET | SYSOUT | TERMINAL: Specifying the Location of Output for the List

Explanation: **OUTDATASET(*dsname*) | *SYSOUT*[(*class*)] | TERMINAL** are mutually exclusive, optional parameters specifying the output location for the list.

OUTDATASET(*dsname*) specifies the name of the data set where DFHSM is to write the output data. For *dsname*, substitute the fully-qualified name of the data set to receive the LIST command output.

If the data set does not exist, DFHSM dynamically allocates and catalogs an output data set with the following characteristics:

- Data set name specified (*dsname*)
- Record format of FBA
- Logical record length of 121
- Data set is system reblockable if DFHSM is executing with DFP 3.1.0 or a subsequent release; otherwise, block size of 1210
- Primary allocation of 20 tracks
- Secondary allocation of 50 tracks
- Unit of SYSALLDA.

If the data set already exists:

- The data set must be cataloged and on DASD.
- The data set record format must be FBA and the logical record length must be 121.
- The data set is system reblockable if DFHSM is executing with DFP 3.1.0 or a subsequent release and the block size must be 0; otherwise, the block size must be a multiple of 121 up to a limit of 32K.
- The user can choose the primary space allocation.

- If DFHSM needs additional extents after the primary space allocation, DFHSM uses a secondary space allocation of 50 tracks.
- If the data set does not contain data, DFHSM starts writing output data at the beginning of the data set.
- If the data set contains data, DFHSM writes the output data after the existing data.

SYSOUT(*class*) specifies that the list is to be printed to the specified system output class. For *class*, substitute the alphanumeric character for the system output class you want.

TERMINAL specifies that the list is to be printed at your terminal.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OUTDATASET, SYSOUT, and TERMINAL. In addition, you can use the abbreviation ODS for OUTDATASET.

Default: The default is SYSOUT, and *class* defaults to the class specified with the SETSYS command. If you did not specify the type of class with the SETSYS command, the default is class A.

Notes:

1. DFHSM does not handle partitioned data set members individually. If you specify a partitioned data set with a member name as the output data set, the list could be written over existing data.
2. If you specify an output data set that does not have the required characteristics, I/O errors could occur in your output data set.

RESET: Requesting That the Host ID Field Indicate No Serialization

Explanation: **RESET** is an optional parameter specifying that DFHSM reset the host ID field in the records to indicate no serialization by the processing unit specified on the command. You use this parameter in a multiple-processing-unit environment. Then, if one of the processing units becomes inoperative, the serialization done by that processing unit remains in the control data set records. No other processing unit can access the serialized resource. DFHSM issues message ARC0817I to show whether the record is reset successfully.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RESET. There are no additional abbreviations.

Defaults: None.

Note: The RESET parameter applies only to the HOST parameter. If you do not specify HOST, DFHSM ignores the RESET parameter.

SELECT: Listing of Only Those Data Set or Volume Entries That Meet Selection Criteria

Explanation: SELECT ([AGE(*mindays [maxdays]*)] [AVAILABLE] [DUMPCLASS(*class*)] [EMPTY] [EXPIRED] [MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME(*volser*)] [MULTIPLEVOLUME] [NORETENTIONLIMIT] [SMALLDATASETPACKING | NOSMALLDATASETPACKING] [UNAVAILABLE] [UNEXPIRED] [VSAM]) is an optional parameter set to specify that only selected data set entries are to be listed. When you use the DATASETNAME or LEVEL parameter to identify multiple data sets, you use SELECT to choose a subset of data set entries to be listed.

Note: Because of the number of subparameters of the SELECT parameter, each bracketed subparameter is described separately.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SELECT. There are no additional abbreviations.

Defaults: None.

Note: The SELECT parameter applies only to the DATASETNAME, BACKUPCONTENTS, DUMPVOLUME, and LEVEL parameters. If you do not specify DATASETNAME, BACKUPCONTENTS, DUMPVOLUME, or LEVEL, DFHSM ignores the SELECT parameter.

AGE: Specifying Data Set Use

Explanation: AGE(*mindays* [*maxdays*]) is an optional subparameter of the SELECT parameter specifying a list of entries for those data sets in the MCDS that were last referred to within the specified range of days or for those data sets in the BCDS that were last backed up within the specified range of days.

For *mindays*, substitute a decimal number from 0 to 999999 for the minimum number of days since the data sets were last referred to or backed up.

For *maxdays*, substitute a decimal number from 0 to 999999 for the maximum number of days since the data sets were last referred to or backed up. Specify a *maxdays* value that is greater than or equal to the *mindays* value.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AGE. There are no additional abbreviations.

Defaults: The default for *mindays* is 0, and the default for *maxdays* is 999999. The default range causes entries to be listed for all data sets that meet the data set or volume selection criteria. If *maxdays* is less than *mindays*, *maxdays* defaults to the same value as *mindays*.

Note: This subparameter applies to information from the MCDS and BCDS.

AVAILABLE: Specifying to List Available Dump Volumes for Dump Output

Explanation: AVAILABLE is an optional subparameter of the SELECT parameter specifying a list of each dump volume that is available for dump output use. An available volume is one that has been added to but never used or that has been used but has since been invalidated for reuse and remains under DFHSM ownership. The following is provided for each available dump volume:

- Volume serial number
- Unit type
- Dump class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AVAILABLE. There are no additional abbreviations.

Defaults: None.

Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The AVAILABLE subparameter of the SELECT parameter is only relevant when *volser* is not specified with the DUMPVOLUME parameter. The AVAILABLE subparameter can be used in combination with the subparameters DUMPCLASS, EXPIRED, NORETENTIONLIMIT, UNAVAILABLE, or UNEXPIRED to get a list of volumes that satisfy all the selection criteria.

EMPTY: Specifying Whether to List Only Empty Tape Backup Volumes or Tape Level 2 Migration Volumes

Explanation: EMPTY is an optional subparameter of the SELECT parameter specifying to list only empty tape backup volumes or empty tape level 2 migration volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EMPTY. There are no additional abbreviations.

Defaults: None.

Notes:

1. This subparameter applies only when the BACKUPVOLUME parameter is specified without a volume serial number or when the MIGRATIONLEVEL2(TAPE) parameters are specified.
2. When EMPTY is specified with the BACKUPVOLUME parameter, DASD backup volumes are not listed. When EMPTY is specified with MIGRATIONLEVEL2(DASD), EMPTY is ignored.
3. See Appendix A for the changes to the output produced by a LIST BACKUPVOLUME command.

EXPIRED: Specifying to List Expired Dump Volumes

Explanation: **EXPIRED** is an optional subparameter of the SELECT parameter specifying a list of each dump volume that is part of a valid dump copy and has reached or passed its expiration date. The following is provided for each such dump volume:

- Source volume serial number
- Dump volume serial number
- Unit type
- Expiration date
- Dump class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXPIRED. There are no additional abbreviations.

Defaults: None.

Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The EXPIRED subparameter of the SELECT parameter is only relevant when *volser* is not specified with the DUMPVOLUME parameter. The EXPIRED subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, NORETENTIONLIMIT, UNAVAILABLE, or UNEXPIRED to get a list of volumes that satisfies all the selection criteria.

MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME: Specifying the Volume Where the Data Set Resides

Explanation: **MIGRATIONLEVEL1 | MIGRATIONLEVEL2 | VOLUME(*volser*)** are mutually exclusive, optional subparameters of the SELECT parameter specifying the volume or the level of migration volumes where the data sets must reside if the data set entries are to be included in the list.

MIGRATIONLEVEL1 is specified to request a list of the entries for data sets that reside only on migration level 1 volumes.

MIGRATIONLEVEL2 is specified to request a list of the entries for data sets that reside only on migration level 2 volumes.

VOLUME(*volser*) is specified to request a list of data sets that reside only on the specified volume. For *volser*, substitute the serial number of the volume that contains the data sets you want listed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUME, MIGRATIONLEVEL1, and MIGRATIONLEVEL2. In addition, you can use the abbreviation ML1 for MIGRATIONLEVEL1 and the abbreviation ML2 for MIGRATIONLEVEL2.

DEFAULTS: None.

Notes:

1. You must also specify INCLUDEPRIMARY to list data set entries on a specific primary volume.
2. The INCLUDEPRIMARY parameter only applies to information in the MCDS.

MULTIPLEVOLUME: Specifying to List Multiple-Volume Non-VSAM Data Sets from Backup or Dump VTOC Copy Data Sets

Explanation: MULTIPLEVOLUME is an optional subparameter of the SELECT parameter specifying a list of only multiple-volume non-VSAM data sets. DFHSM treats a non-VSAM data set as multiple-volume if the Format 1 DSCB indicates that the data resides on more than one volume. DFHSM does not use the catalog in determining if a non-VSAM data set resides on multiple volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MULTIPLEVOLUME. There are no additional abbreviations.

Defaults: None.

Note: If both the MULTIPLEVOLUME subparameter and the VSAM subparameter are specified as SELECT options, all VSAM data sets and all multiple-volume non-VSAM data sets are listed.

NORETENTIONLIMIT: Specifying Whether to List Dump Volumes with No Retention Period

Explanation: NORETENTIONLIMIT is an optional subparameter of the SELECT parameter specifying a list of each dump volume that is part of a valid dump copy and has no retention date. These dump volumes contain dump copies that DFHSM will invalidate automatically only if the dump copy is the 100th generation and a new dump is being performed. The following is provided for each such dump volume:

- Source volume serial number
- Dump volume serial number
- Unit type
- Dump class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to NORETENTIONLIMIT. In addition, you can use the abbreviation NORETLIMIT for NORETENTIONLIMIT.

Defaults: None.

Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The NORETENTIONLIMIT subparameter of the SELECT parameter is only relevant when *volser* is not specified with the DUMPVOLUME parameter. The NORETENTIONLIMIT subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, EXPIRED, UNAVAILABLE, or UNEXPIRED to get a list of volumes that satisfy all the selection criteria.

SMALLDATASETPACKING | NOSMALLDATASETPACKING: Specifying Whether Data Sets Have Migrated to Small-Data-Set-Packing Data Sets

Explanation: SMALLDATASETPACKING | NOSMALLDATASETPACKING are mutually exclusive, optional subparameters of the SELECT parameter specifying a list of those data sets that have migrated to small-data-set-packing data sets or a list of those data sets that have not migrated to small-data-set-packing data sets. If you do not specify either subparameter, the list contains entries for all migrated data sets.

SMALLDATASETPACKING specifies a list of entries for those data sets that have migrated to small-data-set-packing data sets.

NOSMALLDATASETPACKING specifies a list of entries for those data sets that have not migrated to small-data-set-packing data sets.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SMALLDATASETPACKING and NOSMALLDATASETPACKING. In addition, you can use the abbreviation SDSP for SMALLDATASETPACKING and the abbreviation NOSDSP for NOSMALLDATASETPACKING.

Defaults: None.

Notes:

1. Small-data-set-packing data sets can only exist on migration level 1 volumes. You can specify the MIGRATIONLEVEL1 subparameter of the SELECT parameter and the SMALLDATASETPACKING or NOSMALLDATASETPACKING subparameter of the SELECT parameter in the same LIST command. Do not specify MIGRATIONLEVEL2 and SMALLDATASETPACKING in the same LIST command. Also, do not specify a migration level 1 volume (VOLUME) and SMALLDATASETPACKING in the same LIST command.
2. These parameters only apply to information in the MCDS.

UNAVAILABLE: Specifying to List Dump Volumes with Invalid Contents

Explanation: UNAVAILABLE is an optional subparameter of the SELECT parameter specifying a list of each dump volume that has had its contents invalidated, but was not eligible to be automatically reused. The following is provided for each such dump volume:

- Dump volume serial number
- Unit type
- Dump class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNAVAILABLE. There are no additional abbreviations.

Defaults: None.

Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The UNAVAILABLE subparameter of the SELECT parameter is only relevant when *volser* is not specified with the DUMPVOLUME parameter. The UNAVAILABLE subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, EXPIRED, NORETENTIONLIMIT, or UNEXPIRED to get a list of volumes that satisfy all the selection criteria.

UNEXPIRED: Specifying to List Dump Volumes That Have Not Reached Their Expiration Dates

Explanation: **UNEXPIRED** is an optional subparameter of the SELECT parameter specifying a list of each dump volume that is part of a valid dump copy and has not reached or passed its expiration date. Dump volumes with a retention period of NONE are not included. The following is provided for each such dump volume:

- Source volume serial number
- Dump volume serial number
- Unit type
- Expiration date
- Dump class.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNEXPIRED. There are no additional abbreviations.

Defaults: None.

Notes:

1. If DUMPCLASS(*class*) is also specified in the set of SELECT options, only dump volumes assigned to the specified *class* are listed.
2. The UNEXPIRED subparameter of the SELECT parameter is only relevant when *volser* is not specified with the DUMPVOLUME parameter. The UNEXPIRED subparameter can be used in combination with the subparameters AVAILABLE, DUMPCLASS, EXPIRED, NORETENTIONLIMIT, or UNAVAILABLE to get a list of volumes that satisfy all the selection criteria.

VSAM: Specifying the Data Set Organization

Explanation: **VSAM** is an optional subparameter of the SELECT parameter specifying a list of only migrated VSAM data sets. The list contains standard data set information for the MCDS data set records and any VSAM object names that you can use to automatically recall the data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VSAM. There are no additional abbreviations.

Defaults: None.

Note: The VSAM subparameter applies only to data set information from the MCDS.

SUMMARY: Requesting Only a Summary

Explanation: **SUMMARY** is an optional parameter specifying a count of data sets, tracks, and bytes of the selected data sets.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SUMMARY. There are no additional abbreviations.

Defaults: None.

Notes:

1. When you specify this parameter, DFHSM does not list information about each data set. Also, this parameter applies only to information from the MCDS.
2. The SUMMARY parameter applies only to the DATASETNAME or LEVEL parameter.

TAPETABLEOFCONTENTS: Listing of the Tape Table of Contents (TTOC)

Explanation: **TAPETABLEOFCONTENTS(*volser*)** is the parameter you specify to request a list of the tape table of contents (TTOC) information from an OCDS tape volume entry. The list includes some information about each valid data set on the tape volume. For *volser*, substitute the serial number of the specific tape volume you want listed. If you specify a *volser* that is shorter than six characters, you must enclose it in quotes and pad it to the right with blanks.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPETABLEOFCONTENTS. In addition, you can use the abbreviation TTOC for TAPETABLEOFCONTENTS.

Defaults: None.

Notes:

1. If you do not specify a *volser*, DFHSM fails the command.
2. This keyword does not apply to dump volume.

USER: Listing of User Entries

Explanation: **USER[(*userid*)]** is the parameter you specify to request a list of the DFHSM authorization status of users. For *userid*, substitute a string of one to seven alphanumeric characters for the identification of the user whom you want listed.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to USER. There are no additional abbreviations.

Defaults: If you specify USER without *userid*, all user entries are listed from the MCDS.

Note: This list does not include any information about data sets associated with the specified users.

Examples of How to Code Commonly Used List Requests

The examples as presented below show how to use the LIST command to request various types of more commonly desired information.

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

- To list the migrated data sets contained in the SDSP data set on a particular ML1 volume and write the results of the request to an output dataset

```
LIST DATASETNAME MIGRATIONCONTROLDATASET SELECT(VOLUME(L1VOLA) SDSP)
 OUTDATASET(fully.qualified.dsn)
```

or, by standard abbreviations,

```
LIST DSN MCDS SEL(VOL(L1VOLA) SDSP) ODS(fully.qualified.dsn)
```

- To list the number and total space of the migrated data sets contained in the SDSP data set on a particular ML1 volume

```
LIST DATASETNAME MIGRATIONCONTROLDATASET SELECT(VOLUME(L1VOLA) SDSP) SUMMARY
```

- To list the migrated data sets on an ML1 volume that have not been referenced in 180 days

```
LIST DSN MCDS SEL(VOL(L1VOLA) AGE(180))
```

or, conversely,

- To list the migrated data sets on an ML1 volume that have been referenced within the last 179 days

```
LIST DSN MCDS SEL(VOL(L1VOLA) AGE(0 179))
```

- To list the migrated data sets on ML1 volumes having a common high-level-qualifier that have not been referenced in 180 days

```
LIST LEVEL(L364204) MCDS SELECT(ML1 AGE(180))
```

or, to request a specific ML1 volume,

```
LIST LEVEL(L364204) MCDS SELECT(VOLUME(L1VOLB) AGE(180))
```

- To list the migrated data sets on an ML1 volume with a common high-level-qualifier and a common secondary qualifier.

  LIST LEVEL(L364204.TEST) MCDS SELECT(VOLUME(L1VOLB))

LOG: Entering Data into the DFHSM Log

The LOG command enters information into the DFHSM log. This information could be a message or an explanation that the storage administrator or system programmer wants to write into the DFHSM log. The information could also be automatically generated DFHSM log data.

Syntax of the LOG Command

Command	Required Parameter
LOG	*data*

Required Parameters of the LOG Command

Data: Specifying the Data for the Log

Explanation: *data* is a required positional parameter specifying the information to enter into the DFHSM log. For *data*, substitute any character string consisting of alphameric characters, special characters, and $, #, or @.

Abbreviations: None.

Defaults: None.

An Example of How to Code the LOG Command

The following example shows how to code the LOG command to enter data into the DFHSM log:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Sending a Message to the Log

In this example, a message concerning the DFHSM functions is sent to the DFHSM log.

```
LOG ALL MIGRATION FUNCTIONS HELD AT 3:15 AM
```

MIGRATE: Requesting a Space Management Function

The MIGRATE command requests the type of space management you want DFHSM to do: migration, data set deletion, or data set retirement. You can issue the MIGRATE command to cause space management for:

- All eligible data sets from a specific level 0 volume. A level 0 volume is: an SMS volume in a storage group, a DFHSM primary volume, or a non-managed user volume.
- All eligible data sets from all primary volumes (PRIMARY).

You can issue the MIGRATE command to cause migration for:

- A specific data set from a level 0 volume to a migration level 1 volume or a migration level 2 volume (DATASETNAME)
- A specific data set from a DASD migration level 2 volume to a tape migration level 2 volume (DATASETNAME and MIGRATIONLEVEL2)
- A specific data set from a migration level 1 volume to a migration level 2 volume (DATASETNAME and MIGRATIONLEVEL2)
- All eligible data sets from all migration level 1 volumes to migration level 2 volumes (MIGRATIONLEVEL1).

Notes:

1. If you want to move data sets from one tape migration level 2 volume to another tape migration 2 volume, you must recycle the tape migration level 2 volume. "RECYCLE: Consolidating Valid Data on One Tape from Other Tapes" on page 219 contains information about recycling tape volumes.
2. If you want to move all eligible data sets from a specific migration level 1 volume or a specific migration level 2 DASD volume to other migration level 2 volumes, you must use the FREEVOL command. See "FREEVOL: Moving DFHSM Migration Copies" on page 133.

Requesting a Space Management Function for SMS-Managed Data Sets

The functions performed for SMS data sets are determined by each data set's management class attributes. COMMAND migration must be allowed by the management class to which the data set belongs.

Note: If a management class cannot be obtained for an SMS-managed data set, the data set will not be migrated, and an error message will be issued.

Syntax of the MIGRATE Command

Command	Required Parameters	Optional Parameters
MIGRATE	DATASETNAME(*dsname*) | MIGRATIONLEVEL1 | VOLUME(*volser1* [MIGRATE[(*days*)]])	CONVERT[(*volser2*[*unittype*])] DAYS(*days*) MIGRATIONLEVEL2 TERMINAL

Note: You must specify one of DATASETNAME, MIGRATIONLEVEL1, or VOLUME with each MIGRATE command.

The following table shows the DFHSM abbreviations for the parameters of the MIGRATE command:

Parameter	DFHSM Abbreviation
DATASETNAME	DSNAME
MIGRATIONLEVEL1	ML1
MIGRATIONLEVEL2	ML2

Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the MIGRATE command:

Parameter	Related Parameters
CONVERT	VOLUME (MIGRATE)
DATASETNAME	CONVERT MIGRATIONLEVEL2
DAYS	MIGRATIONLEVEL1 VOLUME (MIGRATE)
MIGRATIONLEVEL1	DAYS TERMINAL
MIGRATIONLEVEL2	DATASETNAME
TERMINAL	MIGRATIONLEVEL1 VOLUME

Required Parameters of the MIGRATE Command for SMS-Managed Data Sets

DATASETNAME: Specifying Migration of a Specific Data Set

Explanation: DATASETNAME(*dsname*) is the required parameter to migrate a specific data set. For *dsname*, substitute the fully qualified name of the data set you want to migrate. The MIGRATE command overrides the data set's PRIMARY-DAYS-NON-USAGE management class attribute. However, the data set will not be migrated if the data set's management class specifically prevents migration.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETNAME. In addition, you can specify the abbreviation DSNAME for DATASETNAME.

Defaults: None.

Notes:

1. The volume where the data set resides must be mounted before you issue the MIGRATE command.
2. A data set that is eligible to be migrated with the target device of TAPE, that is also eligible to be backed up, will not be migrated and an error message will be issued.
3. If a management class cannot be obtained for a data set, the data set will not be migrated, and an error message will be issued.
4. DFHSM does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFHSM processes the entire partitioned data set.

MIGRATIONLEVEL1: Specifying Migration of Data Sets from Level 1 to Level 2 Volumes

Explanation: MIGRATIONLEVEL1 is the required parameter to migrate eligible data sets from all migration level 1 volumes to migration level 2 volumes.

Each migrated SMS data set will be processed according to its management class attribute value for LEVEL-1-DAYS-NON-USAGE.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL1. In addition, you can use the abbreviation ML1 for MIGRATIONLEVEL1.

Defaults: None.

Note: If you specify this parameter in a direct-to-tape environment, the command fails.

VOLUME: Specifying the Space Management Attribute for the Eligible Data Sets on a Volume

Explanation: VOLUME(*volser1*[MIGRATE[(*days*)]]) is the required parameter to specify migration for eligible data sets on one volume. Information for any migration is printed in the migration activity log.

For *volser1*, substitute the serial number of the level 0 volume from which you want to migrate or expire eligible data sets.

If the MIGRATE command is specified with only the volume parameter, eligibility for migration is determined by the data set's management class attributes. The MIGRATE subparameter may be specified only if the *days* value is specified as zero (0). The zero value removes all eligible data sets from the specified volume. Eligibility is determined by each data set's management class attribute value. If a value other than zero is specified for *days*, or if no value is specified with the MIGRATE subparameter, the command will fail and a message indicating the error will be issued.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUME and MIGRATE. There are no other abbreviations.

Defaults: None.

Note: The management class attribute COMMAND-OR-AUTO-MIGRATE=BOTH must be specified for an SMS-managed data set to be eligible for migration.

Optional Parameters of the MIGRATE Command for SMS-Managed Data Sets

CONVERT: Specifying Movement of Data Sets from One Volume to Another

Explanation: CONVERT [(*volser2*)[*unittype2*])] is an optional parameter that you use to migrate all data sets, or a specific data set from a level 0 volume to a migration level 1 volume and then immediately recall those data sets to another level 0 volume. You can use this parameter when you want to remove a volume from the system. The automatic class selection routines will select the volume to which the data sets should be recalled.

The management class attribute PRIMARY-DAYS-NON-USAGE is not used for a MIGRATE CONVERT request--all migratable SMS data sets will be migrated to a migration level 1 volume. In this case, before an SMS-managed data set is migrated, determination will be made whether the data is eligible to be expired.

Note: In a JES3 system, two jobs could use the same data set at the same time if you submit one job before the conversion is done and you submit the second job after the conversion. Therefore, be sure that no jobs are waiting to run if those jobs will use the data sets on the volume being converted.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CONVERT. There are no additional abbreviations.

Defaults: Automatic class selection routines chooses the volume and type of unit to which SMS data set are recalled.

Notes:

1. The management class attribute, LEVEL-1-DAYS-NON-USAGE, will not be used when processing a MIGRATE CONVERT request. All eligible data sets will be migrated to a migration level 1 volume.
2. You cannot specify the CONVERT parameter if you have also specified the MIGRATIONLEVEL1 or MIGRATIONLEVEL2 parameter.
3. The space management technique must be migration. You can specify the MIGRATE subparameter of the VOLUME parameter.

DAYS: Specifying Migration Eligibility of Data Sets

Explanation: DAYS(*days*) is an optional parameter specifying how many consecutive days data sets on level 0 volumes are to remain inactive before they are eligible for migration. Use only a value of zero for *days* for SMS data sets or your command fails. Each data set's management class attribute value for PRIMARY-DAYS-NON-USAGE determines whether the data set is eligible for migration.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DAYS. There are no additional abbreviations.

Defaults: None.

MIGRATIONLEVEL2: Specifying Migration of a Data Set Directly to a Level 2 Volume

Explanation: MIGRATIONLEVEL2 is an optional parameter specifying that a specific data set migrate from an SMS volume directly to a migration level 2 volume. You must specify the data set name with the DATASETNAME parameter to cause DFHSM to migrate a specific data set directly to a migration level 2 volume.

An SMS-managed data set residing on an SMS volume or a migrated SMS-managed data set residing on a migration volume will be migrated to a migration level 2 volume, regardless of the data set's management class attributes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL2. In addition, you can specify the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: None.

Notes:

1. DFHSM ignores the MIGRATIONLEVEL2 parameter if you also specify the MIGRATIONLEVEL1, VOLUME, or CONVERT parameter.
2. You must specify the MIGRATIONLEVEL2 parameter when you request that DFHSM migrate a data set on a migration level 1 volume. DFHSM migrates the data set to the type of migration level 2 volume that is consistent with your environment. For example, if you are in a tape migration environment, DFHSM migrates the data set to a tape migration level 2 volume rather than a DASD migration level 2 volume. You specify the type of migration environment with the TAPEMIGRATION parameter of the SETSYS command.
3. The MIGRATIONLEVEL2 parameter is not necessary in a direct-to-tape environment.

4. The MIGRATIONLEVEL2 parameter can be used to override the management class attribute, LEVEL-1-DAYS-NON-USAGE.

TERMINAL: Requesting That Volume Space Management Messages Appear at the Terminal

Explanation: **TERMINAL** is an optional parameter specifying that all space management messages associated with the space management of a volume be sent to the system console and to the migration activity log.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TERMINAL. There are no additional abbreviations.

Defaults: If you do not specify TERMINAL when you specify MIGRATIONLEVEL1 or VOLUME, volume space management messages go only to the migration activity log.

Note: TERMINAL does not apply when you specify the DATASETNAME parameter. If you specify TERMINAL when it does not apply, DFHSM ignores it.

Examples of How to Code the MIGRATE Command for SMS-Managed Data Sets

The following examples show different ways to code the MIGRATE command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Migration of Eligible Data Sets from a Specified Volume

In this example, migration is requested for all eligible data sets on the specified volume. Eligibility is determined by each data set's management class.

```
MIGRATE VOLUME(SMS003)
```

Migration of Eligible Data Sets from an SMS-Managed Level 0 Volume

The following command migrates all eligible data sets from the specified volume: Those data sets meeting their management class expiration attribute values are expired.

```
MIGRATE VOLUME(SMS003 MIGRATE(0)) CONVERT
```

Requesting a Space Management Function for Non-SMS-Managed Data Sets

Syntax of the MIGRATE Command

Command	Required Parameters	Optional Parameters
MIGRATE	**DATASETNAME(***dsname***) |** **MIGRATIONLEVEL1 |** **PRIMARY |** **VOLUME(***volser1* **[DELETEBYAGE(***days***) |** **DELETEIFBACKEDUP(***days***) |** **MIGRATE[(***days***)])]**	**CONVERT[(***volser2***[** ***unittype***])]** **DAYS(***days***)** **MIGRATIONLEVEL2** **TERMINAL** **UNIT(***unittype***)**

Note: You must specify one of DATASETNAME, PRIMARY, MIGRATIONLEVEL1, or VOLUME with each MIGRATE command.

The following table shows the DFHSM abbreviations for the parameters of the MIGRATE command:

Parameter	DFHSM Abbreviation
DATASETNAME	DSNAME
DELETEBYAGE	DBA
DELETEIFBACKEDUP	DBU
MIGRATIONLEVEL1	ML1
MIGRATIONLEVEL2	ML2

Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the MIGRATE command:

Parameter	Related Parameters
CONVERT	UNIT VOLUME MIGRATE
DATASETNAME	CONVERT MIGRATIONLEVEL2
DAYS	MIGRATIONLEVEL1 VOLUME MIGRATE
MIGRATIONLEVEL1	DAYS TERMINAL
MIGRATIONLEVEL2	DATASETNAME
PRIMARY	TERMINAL
TERMINAL	MIGRATIONLEVEL1 VOLUME
UNIT	CONVERT VOLUME
VOLUME	UNIT

Required Parameters of the MIGRATE Command

DATASETNAME: Specifying Migration of a Specific Data Set

Explanation: DATASETNAME(*dsname*) is the required parameter to migrate a specific cataloged data set. When you specify this parameter, DFHSM migrates the cataloged data set without checking whether the data set has met the requirements for migration (such as minimum migration age). For *dsname*, substitute the fully qualified name of the data set you want to migrate.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETNAME. In addition, you can specify the abbreviation DSNAME for DATASETNAME.

Defaults: None.

Notes:

1. DFHSM does not handle partitioned data set members individually. If you specify a member name of a partitioned data set, DFHSM processes the entire partitioned data set.
2. The volume where the data set resides must be mounted before you issue the MIGRATE command.

MIGRATIONLEVEL1: Specifying Migration of Data Sets from Level 1 to Level 2 Volumes

Explanation: MIGRATIONLEVEL1 is the required parameter to migrate eligible data sets from all migration level 1 volumes to migration level 2 volumes.

When you specify MIGRATIONLEVEL1 for non-SMS-managed data sets, two conditions apply:

- If you also specify DAYS(*days*), DFHSM migrates non-SMS-managed data sets based on the *days* value.
- If you do not specify DAYS(*days*), DFHSM migrates non-SMS-managed data sets based on the current DFHSM value for the MIGRATIONLEVEL1DAYS parameter of the SETSYS command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL1. In addition, you can use the abbreviation ML1 for MIGRATIONLEVEL1.

Defaults: None.

Note: If you specify this parameter in a direct-to-tape environment, the command fails.

PRIMARY: Specifying Space Management of Eligible Data Sets on All Primary Volumes

Explanation: **PRIMARY** is the required parameter to migrate or delete eligible data sets on all primary volumes, depending on the space management technique for each volume. You specify the space management technique with the ADDVOL command. When you specify this parameter, DFHSM processes all primary volumes, not just primary volumes with the primary volume attribute of automatic space management. You specify the primary volume attributes with the ADDVOL command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PRIMARY. There are no additional abbreviations.

Defaults: None.

VOLUME: Specifying the Space Management Attribute for the Eligible Data Sets on a Volume

Explanation: **VOLUME(*volser1*|DELETEBYAGE(*days*) | DELETEIFBACKEDUP(*days*) | MIGRATE|(*days*)||)** is the required parameter to specify migration, data set deletion, or data set retirement for eligible data sets on one volume. Eligible data sets on a volume not managed by DFHSM or SMS can migrate or be scratched if you specify the UNIT parameter. Information for any volume migration or data set deletion is printed in the migration activity log. Eligible data sets on a volume can be scratched after they have been inactive for the number of days you specified.

For *volser1*, substitute the serial number of the level 0 volume from which you want to migrate or delete eligible data sets.

The MIGRATE command fails if the command is specified with a single migration level 1 or migration level 2 volume and the MIGRATE optional parameter is either specified on the command or is the default. This function is allowed only by using the FREEVOL command.

DELETEBYAGE(*days*) specifies that the data sets on the volume are to be scratched if they have been inactive for the number of days you specified. If you specify DELETEBYAGE, the eligible data sets are scratched even if they do not have backup versions. However, if the expiration date of the data set has not been reached, DFHSM does not delete the data set. For *days*, substitute a decimal number from 0 to 999. For example, if you substitute 10 for *days*, DFHSM scratches those data sets on the volume that have not been referred to for 10 days.

DELETEIFBACKEDUP(*days*) specifies that the data sets on the volume are to be scratched if they have been inactive for the number of days you specified. However, the data set must have a current backup version before DFHSM can scratch it from the volume. A backup version is current if it was created on a date after the data set was last updated. For *days*, substitute a decimal number from 1 to 999. For example, if you substitute 25 for *days*, DFHSM scratches those data sets on a volume that have not been referred to for at least 25 days and that have current backup versions.

DFHSM can do data set deletion or data set retirement on any primary or migration volume. The migration level 2 volume can be tape or DASD.

MIGRATE[(*days*)] specifies that all eligible data sets migrate from the specified level 0 volume to a migration level 1 volume or tape migration level 2 volume. For *days*, substitute a decimal number from 0 to 999. For example, if you substitute a 5, DFHSM migrates those data sets on the specified volume that have not been referred to for 5 days. This value is called the minimum migration age.

When you request migration from a primary volume, the following conditions apply:

- If you specify the MIGRATE(*days*) subparameter, DFHSM migrates the data sets based on the minimum migration age you specify with *days*. DFHSM ignores any thresholds of occupancy for the volume.
- If you do not specify the MIGRATE(*days*) subparameter, two conditions apply:
  - If you defined thresholds of occupancy with the ADDVOL command, DFHSM migrates the data sets (starting with the oldest) until the low threshold of occupancy is reached or DFHSM finds a data set whose inactive age is less than the minimum migration age. You specified this minimum migration age with the ADDVOL or SETSYS command.
  - If you did not define thresholds of occupancy, DFHSM migrates the data sets based on the minimum migration age specified with the MIGRATE(*days*) parameter of the ADDVOL command. If you did not specify the minimum migration age with the ADDVOL command, DFHSM uses the current minimum migration age from the DAYS parameter of the SETSYS command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUME, MIGRATE, DELETEBYAGE, and DELETEIFBACKEDUP. In addition, you can specify the abbreviation DBA for DELETEBYAGE and the abbreviation DBU for DELETEIFBACKEDUP.

Defaults: If you do not specify one of the MIGRATE, DELETEIFBACKEDUP, or DELETEBYAGE subparameters, DFHSM uses the space management technique you specified in the ADDVOL command.

Notes:

1. If you specify a volume that you have not added to DFHSM with the ADDVOL command, you must also specify the UNIT parameter.
2. If you specify a tape migration level 2 volume and the MIGRATE subparameter, the command fails. To move data sets from a tape migration level 2 volume to another tape migration level 2 volume, use the RECYCLE command.
3. If the MIGRATE subparameter of the VOLUME parameter is specified on the MIGRATE command for a DASD migration level 1 volume, the command will fail and an error message issued. The migrate space management function for a DFHSM migration level 1 DASD volume is supported only by using the FREEVOL command.

Optional Parameters of the MIGRATE COMMAND

CONVERT: Specifying Movement of Data Sets from One Volume to Another

Explanation: CONVERT[(*volser2* [*unittype2*])] is an optional parameter that you use to migrate all data sets, only aged data sets, or a specific data set from a level 0 volume to a migration level 1 volume and then immediately recall those data sets to another level 0 volume. You can use this parameter when you want to remove a volume from the system. For example, you can use this parameter to move data sets from a 3350 volume to a 3380 volume.

For *volser2*, specify the volume where DFHSM is to recall the data set. For *unittype2*, specify the type of unit where DFHSM is to mount the target volume. If you do not specify *volser2*, DFHSM selects the target volume the same way it normally selects target volumes during recall. If you use the *volser2* subparameter to specify a volume not managed by DFHSM, you must also specify the *unittype2* subparameter.

In addition, when you specify MIGRATE(0), DFHSM can process types of data sets that it does not normally process during migration. These are:

- Cataloged list and utility data sets that cannot be scratched because they have been referred to too recently.
- Data sets that have temporarily been marked as not able to be migrated because a job in a JES3 system planned to use them.

Note: In a JES3 system, two jobs could use the same data set at the same time if you submit one job before the conversion is done and you submit the second job after the conversion. Therefore, be sure that no jobs are waiting to run if those jobs will use the data sets on the volume being converted.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CONVERT. There are no additional abbreviations.

Defaults: For cataloged data sets, you do not have to specify *volser2* or *unittype2*. If you do not specify these values, DFHSM chooses the volume and type of unit.

Notes:

1. You cannot specify the CONVERT parameter if you have also specified the MIGRATIONLEVEL1 or MIGRATIONLEVEL2 parameter.
2. The space management technique must be migration. You can specify the MIGRATE subparameter of the VOLUME parameter, the MIGRATE parameter of the ADDVOL command, or use the default of migration on the ADDVOL command.
3. To prevent the source volume from being selected as the target volume for recall, specify the NOAUTORECALL parameter of the ADDVOL command for the source volume until the migration finishes.
4. If you want DFHSM to convert all data sets on a level 0 volume, you must also specify the MIGRATE(0) subparameter of the MIGRATE command. However, if you used the SETMIG command to specify the DATASETNAME, LEVEL, or VOLUME parameter with the NOMIGRATION parameter, DFHSM will not migrate the specified entry when you specify the CONVERT parameter even if you also specified the MIGRATE(0) parameter. For example, if you specified

SETMIG LEVEL(USER) NOMIGRATION, those data sets with the first qualifier of USER do not migrate from the primary volume.

5. If you specify the CONVERT parameter in a direct-to-tape environment, the command fails.
6. You can use the CONVERT parameter with the UNIT parameter if you want to convert non-SMS-managed volumes not managed by DFHSM to volumes managed by DFHSM.
7. VSAM data sets created on the same day that the MIGRATE VOLUME (MIGRATE(0)) CONVERT command was issued will not be migrated because of a data integrity exposure.

DAYS: Specifying Migration Eligibility of Data Sets

Explanation: **DAYS(*days*)** is an optional parameter specifying how many consecutive days that data sets on migration level 1 volumes are to remain inactive before they are eligible for migration. For *days*, substitute a decimal number from 0 to 999.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DAYS. There are no additional abbreviations.

Defaults: If you do not specify DAYS(*days*,), DFHSM migrates the data sets from the volume based on the current DFHSM value for the MIGRATIONLEVEL1DAYS parameter of the SETSYS command.

MIGRATIONLEVEL2: Specifying Migration of a Data Set Directly to a Level 2 Volume

Explanation: **MIGRATIONLEVEL2** is an optional parameter specifying that a specific data set migrate from a primary volume directly to a migration level 2 volume. You must specify the data set name with the DATASETNAME parameter to cause DFHSM to migrate a specific data set directly to a migration level 2 volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4applies to MIGRATIONLEVEL2. In addition, you can specify the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: None.

Notes:

1. DFHSM ignores the MIGRATIONLEVEL2 parameter if you also specify the MIGRATIONLEVEL1, PRIMARY, VOLUME, or CONVERT parameter.
2. You must specify the MIGRATIONLEVEL2 parameter when you request that DFHSM migrate a data set on a migration level 1 volume. DFHSM migrates the data set to the type of migration level 2 volume that is consistent with your environment. For example, if you are in a tape migration environment, DFHSM migrates the data set to a tape migration level 2 volume rather than a DASD migration level 2 volume. You specify the type of migration environment with the TAPEMIGRATION parameter of the SETSYS command.
3. The MIGRATIONLEVEL2 parameter is not necessary in a direct-to-tape environment.

TERMINAL: Requesting That Volume Space Management Messages Appear at the Terminal

Explanation: TERMINAL is an optional parameter specifying that all space management messages associated with the space management of a volume be sent to the system console and to the migration activity log.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TERMINAL. There are no additional abbreviations.

Defaults: If you do not specify TERMINAL when you specify MIGRATIONLEVEL1, PRIMARY, or VOLUME, volume space management messages go only to the migration activity log.

Note: TERMINAL does not apply when you specify the DATASETNAME parameter. If you specify TERMINAL when it does not apply, DFHSM ignores it.

UNIT: Specifying the Type of Device

Explanation: UNIT(*unittype*) is an optional parameter specifying the type of unit where DFHSM can allocate the non-managed source volume.

For *unittype*, substitute the type of unit where DFHSM can allocate the volume. The valid types of units are: 3330, 3330-1, 3330V, 3350, 3375, and 3380.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNIT. There are no additional abbreviations.

Defaults: None.

Notes:

1. You must specify the UNIT parameter if the volume you specify is not managed by DFHSM.
2. DFHSM ignores the UNIT parameter if you specify the MIGRATIONLEVEL1 or DATASETNAME parameters.

Examples of How to Code the MIGRATE Command for Non-SMS-Managed Data Sets

The following examples show different ways to code the MIGRATE command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Migration of All the Data Sets from a Volume

In this example, migration is requested for all the data sets on the primary volume.

```
MIGRATE VOLUME(PRIM03 MIGRATE(0))
```

The following command also migrates all data sets from a primary volume:

```
MIGRATE VOLUME(PRIM01) DAYS(0)
```

Migration of Data Sets Based on the Number of Elapsed Days Since the Data Set Was Last Referred To

In this example, migration is requested for data sets that reside on the primary volume and have not been referred to for at least five days.

```
MIGRATE VOLUME(PRIM01 MIGRATE(5))
```

Direct Migration of a Data Set to a Level 2 Volume

In this example, the specified data set migrates directly to a migration level 2 volume.

```
MIGRATE DATASETNAME(FET7603.JOB33.LOAD) MIGRATIONLEVEL2
```

Migration of Data Sets from a Volume Not Managed by DFHSM

In this example, migration is attempted for all the data sets that meet the DAYS criterion of the SETSYS command and reside on a volume not managed by DFHSM.

```
MIGRATE VOLUME(MSS004) UNIT(3330V)
```

Data Set Deletion of Eligible Data Sets on a Volume

In this example, all eligible data sets on the primary volume that have not been referred to for at least 20 days and whose expiration dates have been reached are scratched.

```
MIGRATE VOLUME(VOL005 DELETEBYAGE(20))
```

Moving All Data Sets from a Volume Not Managed by DFHSM to Primary Volumes

In this example, all DFHSM-supported data sets on a volume not managed by DFHSM move to primary volumes that allow automatic recall.

```
MIGRATE VOLUME(VOL081 MIG(0)) UNIT(3330-1) CONVERT
```

Moving All Data Sets from a Primary Volume

In this example, you want to remove all data sets from a primary volume.

```
MIGRATE VOLUME(ONVOL MIG(0)) CONVERT
```

Moving Data Sets from a Primary Volume to Another Primary Volume

In this example, the volume was added to control of DFHSM with the space management technique of MIGRATE. The target volume is a volume managed by DFHSM. All supported data sets that have not been referred to in the last five days are moved from 3350 volume, (USER50), to the target 3380 volume, (NEW80).

```
MIGRATE VOLUME(USER50 MIGRATE(5)) CONVERT(NEW80)
```

Moving One Data Set from One Primary Volume to Another Primary Volume

In this example, one data set is moved from a volume to another primary volume without setting up an IEHMOVE utility job.

```
MIGRATE DATASETNAME(MYDS) CONVERT
```

You could issue this command to cause extent reduction or to move this data set from a full volume to another volume whose free space is in less demand.

Migration of Data Sets from a Migration Level 1 Volume

In this example, migration is requested for the data sets on migration level 1 volumes that have not been referred to for at least two days.

```
MIGRATE MIGRATIONLEVEL1 DAYS(2)
```

Data Set Deletion of a Tape Migration Level 2 Volume

In this example, data set deletion is requested for the data sets on a tape migration level 2 volume that have not been referred to for 30 days and whose expiration dates have been reached.

```
MIGRATE VOLUME(M2TP04 DELETEBYAGE(30))
```

Data Set Retirement of a Migration Level 1 Volume

In this example, data set retirement is requested for the data sets on a migration level 1 volume that have not been referred to for 45 days and that have a current backup version.

```
MIGRATE VOLUME(ML1003 DELETEIFBACKEDUP(45))
```

PATCH: Changing Storage in the Address Space of DFHSM

The PATCH command changes storage within the DFHSM address space under the protect key of the DFHSM problem program. You can identify the storage location to be changed with an absolute address, a relative address, or a qualified address.

Note: The PATCH command has a VERIFY parameter that you can specify to be sure that you have correctly identified the location where you want to make a change.

DFHSM lists all PATCH commands and their output in a SYSOUT data set. You can request a printout of this SYSOUT data set along with the storage location you are changing.

Syntax of the PATCH Command

Command	Required Parameters	Optional Parameters
PATCH	*address* *data*	CLOSE VERIFY(*address data*)

Required Parameters of the PATCH Command

Address: Specifying the Location to Change

Explanation: *address* is a required positional parameter specifying where the DFHSM address space is to be changed.

For *address*, substitute the absolute address, the qualified address, or the relative address of the location you want to change. Although the addresses contain hexadecimal digits, you do not represent them in the form X'*nn*'. Instead, you enter them in the following manner:

- Enter an absolute address as one to six hexadecimal digits followed by a period (*hhhhhh.*).
- Enter a qualified address as a DFHSM load module name, followed by a period, a CSECT name, a period, a plus sign, and one to six hexadecimal digits (*loadmodulename.csectname.+hhhhhh*). Because ARCCTL is the only load module that can be displayed, the load name of ARCCTL is always used as the load module name if you supply only the CSECT name and offset (*.csectname.+hhhhhh*). The leading period is still required.
- Enter a relative address as a plus sign followed by one to six hexadecimal digits (*+hhhhhh*). You must have specified a qualified address identifying the CSECT in a previous PATCH or DISPLAY command before you specify the relative address. The relative address is the offset into the last CSECT you or any other user specified.

Abbreviations: None.

Defaults: None.

Notes:

1. Because *address* is a required positional parameter, you must specify it immediately after the command name.
2. You cannot use indirect addressing, registers, expressions, and variable names with the PATCH command.

Data: Specifying the Data

Explanation: *data* is a required positional parameter specifying the data to be entered at the specified address.

For *data*, substitute hexadecimal data in the form X'*data*' or substitute character data. If the data contains special characters, put single quotation marks around it. You cannot specify more than 256 bytes (512 hexadecimal digits), and you should specify an even number of hexadecimal digits. If you specify an odd number of hexadecimal digits, DFHSM inserts a 0 to the left of the value to make it an even number of hexadecimal digits.

Abbreviations: None.

Defaults: None.

Note: Because *data* is a required positional parameter, you must specify it immediately after *address*.

Optional Parameters of the PATCH Command

CLOSE: Printing the SYSOUT Data Set

Explanation: **CLOSE** is an optional parameter requesting that the SYSOUT data set be printed. The PATCH command completes the processing you requested and then prints the SYSOUT data set.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CLOSE. There are no additional abbreviations.

Defaults: None.

VERIFY: Verifying Data before Changing It

Explanation: **VERIFY**(*address data*) is an optional parameter requesting that DFHSM verify the current data before it makes the change. If the data does not match, DFHSM rejects the change.

For *address*, specify the address (absolute, qualifier, or relative) of the data you want to verify.

For *data*, specify the data that you want DFHSM to verify.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VERIFY. There are no additional abbreviations.

Defaults: None.

Note: You cannot use indirect addressing, registers, and variable names with the PATCH command.

Examples of How to Code the PATCH Command

The following examples show different ways to code the PATCH command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Changing the Data at an Absolute Address and Verifying the Change

In this example, the data is modified at an absolute address and verified before processing. The SYSOUT data set is printed when the command completes processing.

```
PATCH B7A341. X'ABCD' VERIFY(B7A341. X'0000') CLOSE
```

Changing the Data at a Qualified Address

In this example, the data is modified at a qualified address without verification.

```
PATCH .ARCCPFC.+4FA X'0700'
```

Changing the Date Fields

In this example, you want to change the last date the following functions ran. This permits the functions to be run again on the current day.

- Automatic backup
- Moving backup versions and backing up migrated data sets (level 1 functions).

To cause the functions to be run again, you can zero the appropriate date field and issue the SETSYS command with the AUTOBACKUPSTART parameters, specifying the appropriate times.

```
PATCH .BCR.+50 X'00000000' /* automatic backup */
PATCH .BCR.+5C X'00000000' /* move backup versions and */
                           /* back up migrated data/sets */
```

Allowing Migration of Password-Protected Generation Data Sets

In this example, the bit MCVTFPW in the MCVT is set to 1 to select a design alternative which allows password-protected generation data sets to be migrated and allows DFHSM to ignore the password at the time a generation is rolled off.

```
PATCH .MCVT.+53 X'40' /* allow migrate of password-protected data set */
```

Scratching Generation Data Sets Regardless of Expiration Date at Roll-Off Time

In this example, the bit MCVTFGDG in the MCVT is set to 1 to select a design alternative which allows DFHSM to scratch a generation data set regardless of its expiration date when it is rolled off.

```
PATCH .MCVT.+53 X'80' /* allow scratch of date-protected data set */
                      /* at time of roll-off */
```

QUERY: Displaying the Status of DFHSM Parameters, Statistics, and Pending Requests

The QUERY command can do the following:

- Determine the DFHSM control parameters (SETSYS)
- Request a list of DFHSM statistics (STATISTICS)
- Determine the status of pending DFHSM requests (WAITING)
- Request volume space-use information (SPACE)
- Request control data set space-use information (CONTROLDATASETS)
- Determine whether multiple backup data set support is enabled (CDSVERSIONBACKUP)
- Request the common service area storage limits (CSALIMITS)
- Request the status of each DFHSM volume and data set subtask, each long-running command; and what each active one is doing (ACTIVE)
- Request a list of recall pools (POOL)
- Request a list of the backup parameters and backup volumes (BACKUP)
- Request a list of selected DFHSM requests (DATASETNAME|REQUEST|USER)
- Request a list of key ranges and associated DASD migration level 2 volumes (MIGRATIONLEVEL2)
- Request a list of the first qualifiers of data sets excluded from space management (RETAIN)
- Determine the parameters specified when DFHSM was started (STARTUP)
- Request a list of trap requests specified with the TRAP command (TRAPS)
- Request a list of current volume pools (VOLUMEPOOL).

For more information about the QUERY command and its use, see Appendix C, "QUERY Command" on page 451.

Syntax of the QUERY command

Command	Optional Parameters
QUERY	ACTIVE BACKUP[(ALL | DAILY[(*day*)] | SPILL | UNASSIGNED)] CDSVERSIONBACKUP CONTROLDATASETS CSALIMITS DATASETNAME(*dsname*) | REQUEST[(*reqnum*)] | USER[(*userid*)] MIGRATIONLEVEL2 POOL RETAIN SETSYS SPACE[(*volser* ...)] STARTUP STATISTICS TRAPS VOLUMEPOOL WAITING

Notes:

1. You must specify at least one of the optional parameters to have anything displayed.
2. Any QUERY command issued within the startup procedure may not always produce correct data because DFHSM is not yet completely initialized.
3. The SPACE parameter is not supported for SMS-managed volumes.

The following table shows the DFHSM abbreviations for the parameters of the QUERY command:

Parameter	DFHSM Abbreviation
CONTROLDATASETS	CDS
MIGRATIONLEVEL2	ML2
VOLUMEPOOL	VOLPOOL

Optional Parameters of the QUERY Command

ACTIVE: Displaying All Active Requests

Explanation: ACTIVE is an optional parameter requesting the status of each DFHSM volume, data set subtask, and long-running command; and what each active one is doing.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ACTIVE. There are no additional abbreviations.

Defaults: None.

BACKUP: Displaying Backup Parameters and Backup Volumes

Explanation: **BACKUP[(ALL | DAILY[(*day*)] | SPILL | UNASSIGNED)]** is an optional parameter set requesting a list of the backup and dump parameters and backup volumes.

ALL specifies a list of all backup volumes.

DAILY[(*day*] specifies a list of all daily backup volumes. For *day*, substitute a decimal number from 1 to 31 for a list of the daily backup volumes associated with the specified day in the backup cycle.

SPILL specifies a list of all spill backup volumes.

UNASSIGNED specifies a list of all unassigned backup volumes. There are two types of unassigned volumes:

- Unassigned backup volumes are those you specified with the ADDVOL command without specifying the DAILY or SPILL subparameter (ADDVOL *volser* BACKUP).
- Unassigned daily backup volumes are those you specified as daily backup volumes with the ADDVOL command, but you did not associate them with any day in the backup cycle (ADDVOL *volser*) BACKUP(DAILY)).

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP, ALL, DAILY, SPILL, and UNASSIGNED. There are no additional abbreviations.

Defaults: If you specify DAILY without *day*, DFHSM lists all daily backup volumes.

CDSVERSIONBACKUP: Displaying the Control Data Set Multiple Backup Support Parameters

Explanation: **CDSVERSIONBACKUP** is an optional parameter requesting a list of the parameters related to the multiple backup copies of the control data sets and journal data set. When you specify this parameter, DFHSM lists the values you specified with the CDSVERSIONBACKUP parameter of the SETSYS command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CDSVERSIONBACKUP. There are no additional abbreviations.

Defaults: None.

CONTROLDATASETS: Displaying Control Data Set Space Use Information

Explanation: **CONTROLDATASETS** is an optional parameter requesting a list of the space-use information for the MCDS, BCDS, OCDS, and journal data set. The information in the list consists of:

- The total space in each data set.
- The percentage of the total occupied space in each data set to the extent that DFHSM can determine it.
- The number of extents included in the total space. The calculation for the total number of bytes available for the control data sets is based on the assumption that the primary allocation is only one extent.
- The threshold percentage value currently assigned for each data set. When this threshold is exceeded, DFHSM sends warning messages to the operator.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CONTROLDATASETS. In addition, you can use the abbreviation CDS for CONTROLDATASETS.

Defaults: None.

CSALIMITS: Displaying the Common Service Area Storage Limits

Explanation: **CSALIMITS** is an optional parameter requesting a list of the common service area (CSA) storage limits. You specify the CSA storage limits with the SETSYS command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CSALIMITS. There are no additional abbreviations.

Defaults: None.

DATASETNAME | REQUEST | USER: Displaying Selected Requests

Explanation: **DATASETNAME(*dsname*) | REQUEST[(*reqnum*)] | USER[(*userid*)]** are mutually exclusive, optional parameters requesting a list of selected DFHSM requests.

DATASETNAME(*dsname*) specifies a list of the requests associated with the specified data set name. For *dsname*, substitute the fully qualified name of the data set for which you want the list of requests.

REQUEST[(*reqnum*)] specifies a list of the specified request number for all requests. For *reqnum*, substitute the DFHSM request number.

USER[(*userid*)] specifies a list of the requests associated with a specified user. For *userid*, substitute a one to seven alphameric character string for the identification of the particular user.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETNAME, REQUEST, and USER. There are no additional abbreviations.

Defaults: If you specify USER without *userid*, DFHSM lists requests for all users.

If you specify REQUEST without *reqnum*, DFHSM lists information for all requests.

Note: DFHSM does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFHSM displays the entire partitioned data set.

MIGRATIONLEVEL2: Displaying Key Ranges and Migration Level 2 Volumes

Explanation: **MIGRATIONLEVEL2** is an optional parameter requesting a list of key ranges and the DASD migration level 2 volume associated with each key range as specified with the DEFINE command. This parameter also displays the tape migration level 2 volumes currently selected for use by the migration functions that output to tape if migration tapes are used in the requesting processing unit.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL2. In addition, you can specify the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: None.

POOL: Displaying Recall Pools

Explanation: **POOL** is an optional parameter requesting a list of the recall pools as specified with the DEFINE command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to POOL. There are no additional abbreviations.

Defaults: None.

Note: An SMS-managed volume may be displayed on the output listing if the volume was converted from non-SMS managed to SMS-managed since the last time the pool was defined.

RETAIN: Displaying Data Set Levels Prevented from Space Management

Explanation: **RETAIN** is an optional parameter requesting a list of the first qualifiers of data sets prevented from space management with the SETMIG command. Data set names and volumes prevented from migrating with the DATASETNAME or VOLUME parameters of the SETMIG command are not listed.

REPLACE: Specifying That the Recovered Backup Version or Dump Copy Is to Replace Any Existing Data Set of the Same Name

Explanation: REPLACE is an optional parameter specifying that the recovered backup version or a dump copy of the uncataloged data set replaces any existing uncataloged data set with the same data set name on the target volume. If the data set is cataloged, DFHSM scratches it and recatalogs the data set with the same data set name. If you specify the NEWNAME parameter and the new name is the same as the name of an existing data set, you must specify the REPLACE parameter. If you don't, DFHSM fails the RECOVER command.

For more information about this parameter, see the *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide.*

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REPLACE. There are no additional abbreviations.

Defaults: When DFHSM recovers a volume, it always replaces data sets with the same name on the target volume.

Notes:

1. If you do not specify the REPLACE or NEWNAME parameter for an existing data set, DFHSM does not recover the data set. For cataloged data sets, the old copy remains cataloged. For uncataloged data sets, the data set by the same name remains on the target volume.
2. The data set to be replaced must have the same data set organization as the data set from which the backup version or a dump copy was created.

TERMINAL: Requesting That Volume Recovery Messages Appear at the Terminal

Explanation: TERMINAL is an optional parameter requesting volume recovery messages be sent to the system console and to the backup activity log when DFHSM recovers a volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TERMINAL. There are no additional abbreviations.

Defaults: If you do not specify TERMINAL when you want to recover a volume, DFHSM sends the output only to the backup activity log.

Note: TERMINAL applies only to volume recovery. In addition, you must issue the TERMINAL parameter of the RECOVER command from the system console. If you specify TERMINAL when it does not apply, DFHSM ignores it.

TOVOLUME: Specifying the Volume to Receive the Recovered Data Set

Explanation: When recovering a data set, **TOVOLUME***(volser)* is an optional parameter specifying which volume should receive the recovered data set. For *volser*, substitute the serial number of the volume that is to receive one or more recovered data sets.

When recovering a volume, **TOVOLUME***(volser)* is a required parameter specifying which volume you want to recover. For *volser*, substitute the serial number of the volume that is to be recovered. The volser that is to be recovered must be the same as the source volser of the volume that was backed up or dumped.

If you specify TOVOLUME when recovering an SMS-managed data set, the *volser* will be passed to the Automatic Class Selection (ACS) Services. However, ACS will ultimately determine to which volume the data set will be recovered. The TOVOLUME parameter is ignored if an existing SMS data set is recovered as SMS.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TOVOLUME. There are no additional abbreviations.

Defaults: If you are recovering from a backup version of a cataloged data set and do not specify TOVOLUME, DFHSM recovers the backup version to the volume where the catalog entry shows the data set currently exists. If no catalog entry exists, DFHSM recovers the backup version to the volume where the data set resided when it was backed up unless the backup version was created from a data set on a migration volume. If the data set was backed up while residing on a migration volume and you do not specify the TOVOLUME parameter, DFHSM recovers the backup version to the volume from which the data set last migrated.

If you are recovering from a backup version of an uncataloged data set and do not specify TOVOLUME, DFHSM recovers the backup version to the volume where the data set resided when it was backed up, unless it is recovered as SMS.

Notes:

1. If you specify TOVOLUME, you must also specify the UNIT parameter.
2. If DFHSM is recovering a VSAM data set not cataloged in an Integrated Catalog Facility catalog, TOVOLUME can only specify a volume owned by the catalog where the data set being recovered is cataloged or will be cataloged.
3. The TOVOLUME parameter is passed to the ACS routines when processing a data set that will be recovered to an SMS-managed volume.
4. If a data set that was SMS managed when backed up has been deleted, and ACS determines that data set is now non-SMS, TOVOLUME is required to recover that data set to a non-SMS-managed volume. If TOVOLUME is not specified, the recovery will fail with message ARC1170I and reason code 13.

UNIT: Specifying the Type of Device

Explanation: **UNIT(***unittype***)** is an optional parameter specifying the type of unit where DFHSM can mount the target volume. You use this parameter with the TOVOLUME parameter.

If you specify the type of unit when recovering an SMS-managed data set, that unit type will be passed to the Automatic Class Selection (ACS) Services. However, ACS will ultimately determine to which unit type the data set will be recovered. For

unittype, substitute the type of unit where DFHSM is to mount the target volume. The valid types of units are: 3330, 3330-1, 3330V, 3350, 3375, and 3380.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNIT. There are no additional abbreviations.

Defaults: None.

Notes:

1. If you specify UNIT, you must also specify the TOVOLUME parameter.
2. If the block size of the data set is greater than the track capacity of the target volume, track overflow must be supported in both the software and the hardware. This applies to devices whose track size is less than 32K.

Examples of How to Code the RECOVER Command

The following examples show different ways to code the RECOVER command.

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Recovering a Cataloged Data Set to a Specific Volume

In this example, a backup version or dump copy of a cataloged data set is recovered to the TOVOLUME specified.

```
RECOVER PAC3105.PROJECT.LOAD TOVOLUME(VOL005) UNIT(3330-1)
```

Recovering an Uncataloged Data Set to a Specific Volume

In this example, a data set that was uncataloged when it was backed up or dumped is recovered to the TOVOLUME specified.

```
RECOVER JAB1234.ANALYSIS.TEXT TOVOLUME(VOL001) UNIT(3330)-
        FROMVOLUME(JAB456)
```

Recovering a Next-to-Latest Backup Version of a Cataloged Data Set

In this example, a next-to-latest backup version of a cataloged data set is recovered.

```
RECOVER MIL9876.SETUP.ASM GENERATION(1)
```

Recovering a Data Set to Replace an Existing Data Set with the Same Name

In this example, a data set is recovered to the volume the data set is currently cataloged on, and replaces a data set having the same name. DFHSM scratches the original data set.

```
RECOVER PAC5432.REPORT.CNTL REPLACE
```

Recovering and Renaming a Data Set

In this example, the recovered data set is given a different name. The original data set remains unchanged.

```
RECOVER MIL3210.INPUT.LIST NEWNAME(MIL3210.FINAL.LIST)
```

Recovering an Entire Volume

In this example, an entire volume is recovered. It is assumed that the volume is current as of the date specified. For example, the volume has been restored with a Data Facility Data Set Services dump tape made on that date. Data sets are recovered to the volume only if a backup version was created on or after the specified date.

```
RECOVER * TOVOLUME(SAR005) UNIT(3330V) DATE(10/3/84)
```

Recovering the Most Recent Dumped Version of a Data Set of a Specific Dump Class and Renaming the Data Set

In this example, the most recently dumped version of a specific data set that was dumped to a specific dump class (EXTRA) is recovered and given a different name.

```
RECOVER B110066.POF.N.F230EP06.DSET3 -
        NEWNAME(B110066.POFNEW.NRECOV.F230EP06.DSET3) -
        FROMDUMP(DUMPCLASS(EXTRA))
```

Recovering a Non-Most Recent Dumped Version of a Volume

In this example, the second-most recent dumped version is used to do a full-volume restore of volume P1. Immediately following the restore, the data sets which were incrementally backed up since the dump occurred are recovered.

```
RECOVER * TOVOLUME(P1)  -
        FROMDUMP(DUMPGENERATION(1) APPLYINCREMENTAL)  -
        UNIT(3350)
```

Example of Recovery Using FORCENONSMS

In this example, a data set that was SMS managed when it was backed up or dumped, is being forced to a non-SMS-managed volume during recovery.

```
RECOVER SMS.REPT.CNTL FORCENONSMS -
  TOVOLUME(VOL006) UNIT(3380)
```

RECYCLE: Consolidating Valid Data on One Tape from Other Tapes

The RECYCLE command consolidates data on any migration or backup tape volume (except an unassigned backup volume) that contains a small percentage of valid data. This lets you reuse your nearly empty tape volumes. Tape volumes that may have data checks or invalid file block identifiers can also be recycled.

When you issue the RECYCLE command, DFHSM moves valid backup versions or valid migration copies from several tapes to one tape volume. For example, if you specify RECYCLE SPILL, DFHSM moves the valid data from all eligible tape spill backup volumes to one tape spill backup volume until that spill backup volume becomes full. DFHSM then selects another available tape spill backup volume to receive the valid data sets. If you specified SETSYS TAPEDELETION(SCRATCHTAPE), the recycled tapes become scratch tapes. If you specified SETSYS TAPEDELETION(HSMTAPE), the recycled tapes become unassigned tapes.

When you recycle a tape backup volume (daily or spill), DFHSM copies the valid data on the tape volume to an available tape spill backup volume. When you recycle a tape migration level 2 volume, DFHSM copies the valid data on the tape volume to an available tape migration level 2 volume.

DFHSM allows only one RECYCLE command to run at a time.

Syntax of the RECYCLE Command

Command	Required Parameters	Optional Parameters
RECYCLE	ALL | DAILY[(*day*)] | ML2 | SPILL | VOLUME(*volser*) DISPLAY | EXECUTE	FORCE PERCENTVALID(*pct*)

Required Parameters of the RECYCLE Command

ALL | DAILY | ML2 | SPILL | VOLUME: Specifying the Tape Volumes to Be Recycled

Explanation: **ALL | DAILY[(*day*)] | ML2 | SPILL | VOLUME(*volser*)** are mutually exclusive, required parameters specifying the types of tape volumes to be recycled.

ALL specifies that DFHSM should recycle all eligible tape volumes.

DAILY[(*day*)] specifies that DFHSM should recycle all eligible tape daily backup volumes. For *day*, substitute a decimal number to represent the day in the backup cycle assigned to the tape daily backup volume. DAILY(*day*) specifies that DFHSM should recycle all eligible tape volumes assigned to that day in the backup cycle. You used the DEFINE BACKUP command to define the backup cycle.

ML2 specifies that DFHSM should recycle all eligible tape migration level 2 volumes.

SPILL specifies that DFHSM should recycle all eligible tape spill backup volumes.

VOLUME(*volser*) specifies the volume to be recycled. For *volser*, substitute the serial number of the volume to be recycled. When you specify a volume serial number, DFHSM does not check whether the specific tape volume is eligible for recycling. This allows you to recycle tapes that are not full.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL, DAILY, ML2, SPILL, and VOLUME. There are no additional abbreviations.

Defaults: None.

Notes:

1. If you do not specify *volser*, a volume is eligible for recycling only if the following conditions are met:
   - The tape volume is a migration level 2 tape or a backup tape, but not an unassigned backup tape.
   - The volume is full.
   - The percent of valid data is equal to or less than the value you specified with the PERCENTVALID parameter, the RECYCLEPERCENT parameter of the SETSYS command (for tape backup volumes), or the ML2RECYCLEPERCENT parameter of the SETSYS command (for tape migration level 2 volumes).
   - The volume has not previously failed recycle processing.
   - The volume does not contain part of a large data set. A large data set is a data set that spans four or more tape volumes.
2. Dump volumes are not recycled.

DISPLAY | EXECUTE: Specifying Whether to List or Recycle Tape Volumes

Explanation: **DISPLAY | EXECUTE** are mutually exclusive, required parameters specifying whether to recycle or list the volumes that meet the eligibility criteria for recycling.

DISPLAY gives you a formatted list of the tape volumes eligible for recycling and recycle eligibility information about each volume when you do not specify only one volume. This list includes one of the following:

- All eligible tape daily backup volumes
- All eligible tape daily backup volumes assigned to a particular day in the backup cycle
- All eligible tape spill backup volumes
- All eligible tape migration level 2 volumes
- All eligible tape daily backup, spill backup, and migration level 2 volumes.

You can also request information for a specific tape backup volume. If you do, DFHSM sends a message containing the information to your terminal. DFHSM does not print a list.

EXECUTE specifies that DFHSM should recycle a specific tape volume, a category of backup volumes, or tape migration level 2 volumes. If you specify one tape volume, DFHSM does not check whether the tape volume is eligible for recycling.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXECUTE and DISPLAY. There are no additional abbreviations.

Defaults: None.

Note: If you do not specify the VOLUME(*volser*) parameter, DFHSM does not recycle a tape volume unless the volume meets the eligibility criteria described on the previous page.

Optional Parameters of the RECYCLE Command

FORCE: Forcing DFHSM to Permit a Tape Recycle

Explanation: FORCE is a parameter specifying whether to permit the specified 3480 single-file tape or equivalent to be recycled even though the tape contains data checks or invalid file block identifiers. The FORCE optional parameter is valid only when the VOLUME(*volser*) parameter is specified.

When the FORCE parameter is in effect, RECYCLE works the same as when FORCE is not specified, except when a data check or an invalid file block identifier is encountered. DFHSM then invalidates the data set being processed before continuing with the next data set on the tape. Migrated data sets are deleted including, the catalog entry. In this case, it is the storage administrator's task to recover the data set from another source. For backup copies, the version with the error is invalidated. Because the records necessary to access the data will be lost when using the FORCE parameter, it should only be specified when no alternate volume previously generated via the TAPECOPY command is available to use.

When processing tape volumes with known errors, we recommend using the following steps:

- If an alternate tape volume exists, use the tape replace function (see "TAPEREPL: Replacing 3480 Tape Volumes with Their Alternate Volumes" on page 361) instead of recycling the volume.
- If you do not have an alternate volume, the following steps are recommended to reduce the exposure of deleting accessible data when an error occurs—such as a hardware malfunction:
  1. Use the RECYCLE command without the FORCE parameter to move all data without errors to another tape volume.
  2. Now use the RECYCLE command with the FORCE parameter to effectively remove all references to any data that is still inaccessible. After this process, the tape volume will be deleted.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FORCE. There are no additional abbreviations.

Defaults: None.

PERCENTVALID: Specifying the Percent Valid Criteria for Recycle Eligibility

Explanation: **PERCENTVALID(*pct*)** is an optional parameter specifying the maximum percentage of valid data that a volume can have and still be eligible for recycling. DFHSM ignores this parameter if you specified the volume to be recycled. For *pct*, substitute a decimal number from 1 to 100. For example, if you specify *pct* as 30, a volume that contains 30% or less valid data is eligible for recycling.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PERCENTVALID. There are no additional abbreviations.

Defaults: If you do not specify PERCENTVALID(*pct*) for tape backup volumes, DFHSM uses the value you specified with the RECYCLEPERCENT parameter of the SETSYS command. If you do not specify PERCENTVALID(*pct*) for tape migration level 2 volumes, DFHSM uses the value you specified with the ML2RECYCLEPERCENT parameter of the SETSYS command. If you do not specify the ML2RECYCLEPERCENT parameter of the SETSYS command for tape migration level 2 volumes, DFHSM uses the value you specified with the RECYCLEPERCENT parameter of the SETSYS command.

Notes:

1. If you specify a *pct* of 0, DFHSM fails the command.
2. During RECYCLE execution, a DELVOL will be performed for any volume found to be marked full and having 0 percent valid data.

Examples of How to Code the RECYCLE Command

The following examples show different ways to code the RECYCLE command. Each example also shows sample output from the command.

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

When DFHSM prints a list of volumes eligible for recycling, this list contains the following information for each volume:

Output Heading	Field Description
VOLSER	This field contains the volume serial number of the eligible tape volume.
PERCENT VALID	This field contains the percent of valid data on the volume.
VOLUME TYPE	SPILL indicates that the volume is a spill backup volume. DAILY(*nn*) indicates that the volume is a daily backup volume assigned to day *nn* in the backup cycle. ML2 indicates that the volume is a migration level 2 volume.
INHIBITED	YES indicates that the first data set on the volume, the last data set on the volume, or both the first and last data sets on the volume are valid and span four or more tape volumes including this tape volume. Therefore, you cannot recycle the volume unless you specify the VOLUME(*volser*) parameter.
FAILED RECYCLE	YES indicates that a previous attempt to recycle this tape volume has failed.

Figure 3. Headings of Output When Requesting List of Tape Volumes Eligible for Recycling

Displaying a List of All Eligible Tape Daily Backup Volumes

In this example, a formatted list is printed of all tape daily backup volumes that contain 85% or less valid data and are otherwise eligible for recycling.

```
RECYCLE DISPLAY DAILY PERCENTVALID(85)
```

Recycling All Tape Spill Volumes

In this example, DFHSM recycles all tape spill backup volumes that contain 55% or less valid data and are otherwise eligible for recycling.

```
RECYCLE EXECUTE SPILL PERCENTVALID(55)
```

Recycling All Tape Migration Level 2 Volumes

In this example, DFHSM recycles all tape migration level 2 volumes that are eligible for recycling. DFHSM uses the ML2RECYCLEPERCENT parameter of the SETSYS command to determine the percent valid criteria.

```
RECYCLE EXECUTE ML2
```

Recycling a Specific Tape Volume

In this example, a specific tape volume is recycled. DFHSM does not check the percentage of valid data on the volume or whether the volume is full before it recycles the volume.

```
RECYCLE EXECUTE VOLUME(BATP01)
```

The recycle command log records all data movement activity that results from processing the RECYCLE command. Any error messages that the RECYCLE command processor issues are also written in this log. The recycle command log is automatically printed after recycle processing.

Recycling a Tape Volume with Known Errors

In this example, a specific tape volume with known errors is recycled. See "FORCE: Forcing DFHSM to Permit a Tape Recycle" on page 221 for precautions you might take before using the FORCE parameter.

```
RECYCLE VOLUME(TAP230) FORCE EXECUTE
```

RELEASE: Releasing for Processing All or Some of DFHSM Functions

The RELEASE command releases for processing all or part of the DFHSM functions that have been held. You cannot release the processing of a subfunction while the processing of its main function is being held. As an example, you cannot release the subfunction BACKUP(AUTO) if the main function BACKUP is held. When you release a main function, the held main function processing and its associated subfunctions processing are released. DFHSM does not restart any commands that it failed after you issued the HOLD command.

The RELEASE command allows migration target levels (ML1 or ML2 tape) that have become unavailable as targets, due to some error condition, to become available for retry. For further explanation, see *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide.*

You can release for processing all or part of the following DFHSM functions:

- Audit [AUDIT]
- Daily space management only [AUTOMIGRATION]
- Command backup and automatic backup [BACKUP[(AUTO)]]
- Command dump and automatic dump [DUMP[(AUTO)]]
- Expiring backup versions (EXPIREBV)
- List [LIST]
- Recording in the DFHSM log [LOG]
- Command and daily space management [MIGRATION[(AUTO)]]
- Recall and deletion of a migrated data set [RECALL[(TAPE[(TSO)])]]
- Recovery and restore [RECOVER[(TAPEDATASET)]]
- Recycle [RECYCLE]
- Report [REPORT]
- Tape copy [TAPECOPY]
- Tape replace [TAPEREPL].

In addition, you can also decide to print the activity logs (HARDCOPY).

Syntax of the RELEASE Command

Command	Optional Parameters
RELEASE	ALL AUDIT AUTOMIGRATION BACKUP[(AUTO)] DUMP[(AUTO)] EXPIREBV HARDCOPY LIST LOG MIGRATION(AUTO) RECALL[(TAPE[(TSO)])] RECOVER[(TAPEDATASET)] RECYCLE REPORT TAPECOPY TAPEREPL

Note: Although the RELEASE command has no required parameters, you must specify at least one parameter to release a DFHSM function for processing.

Optional Parameters of the RELEASE Command

ALL: Releasing All DFHSM Functions

Explanation: ALL is an optional parameter specifying that DFHSM release all functions controlled by this command, except writing in the DFHSM log and printing the activity logs.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL. There are no additional abbreviations.

Defaults: None.

Note: If you want DFHSM to begin recording in the DFHSM log, you must specify the LOG parameter. If you want DFHSM to print the activity logs, you must specify the HARDCOPY parameter.

AUDIT: Releasing the Audit Function

Explanation: AUDIT is an optional parameter specifying that the audit function is released. DFHSM starts processing any queued AUDIT commands.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUDIT. There are no additional abbreviations.

Defaults: None.

AUTOMIGRATION: Releasing Only Daily Space Management

Explanation: AUTOMIGRATION is an optional parameter specifying that DFHSM release daily space management.

If tape migration has been terminated while DASD migration continues, or if DASD migration has been terminated while tape migration continues, this parameter allows both DASD and tape to resume their acceptability as migration targets.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOMIGRATION. In addition, you can use the abbreviation AMIG for AUTOMIGRATION.

Defaults: None.

Note: You cannot release the AUTOMIGRATION if MIGRATION is held.

BACKUP: Releasing Backup

Explanation: BACKUP(AUTO) is an optional parameter specifying whether DFHSM should release automatic backup and command backup, or only automatic backup.

AUTO is a subparameter specifying that DFHSM release only the automatic backup processing.

BACKUP by itself specifies that DFHSM release automatic backup processing and command backup processing.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP. There are no additional abbreviations.

Defaults: None.

Note: You cannot release the subfunction BACKUP(AUTO) if the main function BACKUP is held.

DUMP: Releasing Dump

Explanation: DUMP(AUTO) is an optional parameter specifying whether DFHSM should release automatic dump and command dump, or only automatic dump.

AUTO is a subparameter specifying that DFHSM release only the automatic dump processing.

DUMP by itself specifies that DFHSM release automatic dump processing and command dump processing.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMP. There are no additional abbreviations.

Defaults: None.

Note: You cannot release the subfunction DUMP(AUTO) if the main function DUMP is held.

Defaults: If you specify RECYCLE and do not specify a subparameter, the default is ALL.

RECOVER: Requesting Statistics of the Recovery Function

Explanation: **RECOVER** is an optional subparameter of the FUNCTION parameter requesting a statistics report of the data sets that have been recovered from backup volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECOVER. There are no additional abbreviations.

Defaults: None.

SPILL: Requesting Statistics of the Spill Function

Explanation: **SPILL** is an optional subparameter of the FUNCTION parameter requesting a statistics report of the data sets that have been moved from daily backup volumes to spill backup volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SPILL. There are no additional abbreviations.

Defaults: None.

SUMMARY: Requesting Only the Totals of the Statistics

Explanation: **SUMMARY** is an optional parameter requesting that DFHSM print a summary of statistics for the days you specified with the FROMDATE and TODATE parameters.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SUMMARY. There are no additional abbreviations.

Defaults: None.

Notes:

1. You specify REPORT DAILY FUNCTION SUMMARY to get the summary totals for the daily statistics for all functions. You specify REPORT VOLUME FUNCTION SUMMARY to get the summary totals for the volume statistics for all volumes and for all functions. You specify the VOLUMES parameter with a volume serial number to get summary statistics for only one volume. If you request a summary of specified functions, the summary contains the statistics totals for only the specified functions.
2. When you specify SUMMARY you get the summary report only. If you do not specify SUMMARY, you get the statistics report you requested, and a summary at the end of the report if DFHSM reported the statistics for more than one day.

TODATE: Requesting Statistics of Activity on or before the Specified Date

Explanation: TODATE(*date*) is an optional parameter you use with FROMDATE to limit statistics reports to activity that occurred during that range of time. For *date*, substitute the last date you want statistics reported. You can enter a date in the form *mm/dd/yy* or *yy/mm/dd*. A leading 0 is not required for a one-digit month or day. For example, if you specify FROMDATE(1/3/84) TODATE(1/10/84), DFHSM prints a statistics report of the activity that occurred starting with January 3rd and ending with January 10th.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TODATE. There are no additional abbreviations.

Defaults: If you do not specify TODATE, the date defaults to the current date.

If you enter the date in the form *mm/dd/yy* and do not specify the year (*yy*), the year defaults to the current year.

Note: If you specify that DFHSM report the statistics for the current day, DFHSM does not give you the latest statistics. The statistics records are kept in storage and accumulated with a control data set copy of the record only once an hour. Also, each processing unit uses the same control data set record. New records are created each day for the DFHSM activities that occurred today. Therefore, use today's statistics report as an indication of trends of DFHSM activity.

VOLUMES: Requesting Volume Statistics

Explanation: VOLUMES(*volser* ...) is an optional parameter requesting a volume statistics report for specified volumes or for all volumes with statistics records in the MCDS. For *volser*, substitute the serial number of the volume or a list of serial numbers of the volumes whose statistics you want reported.

You specify REPORT VOLUMES FUNCTION to get a list of the volume statistics for all functions for all volumes managed by DFHSM. You specify VOLUMES with a volume serial number to get a statistics report for a specific volume. If you do not specify the FROMDATE and TODATE parameters, you receive a statistics report only for the current date.

The volume statistics report for all the functions includes the following information:

- The date for which the volume statistics are reported and the volume serial number of the volume whose statistics are being reported.
- The type of unit the volume is on and the type of DFHSM volume.
- The total number of data sets that migrated as a result of volume or data set requests, and the number of non-VSAM data sets that DFHSM has processed. This field contains N/A if the report is for primary volumes.
- The number of days that elapsed since a data set migrated from the volume, total number of tracks used by VSAM and non-VSAM data sets, number of tracks available for data sets, and fragmentation index for the volume.

- The final disposition of volume dumps and restores that were attempted against the volume, as well as the numbers of VTOC copies and data set restores that were requested and failed.
- The name of the function, number of data sets processed by the function, number of tracks and bytes read and written, number of requests that failed, and number of requests initiated by the users and DFHSM.
- The average age of the data sets: for daily space management, age since last referred to; for recall, age since last migrated; and for backup and recovery, age since the backup version was made. For recycle, the average age field does not apply.
- The average time in seconds that each data set request waited to be processed, time spent allocating and opening each data set, time spent processing the data set request, and the average total time taken to process each data set request.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUMES. There are no additional abbreviations.

Defaults: If you specify VOLUMES without *volser*, DFHSM reports statistics for all volumes that have statistics records.

Note: Any data sets that existed on a volume before you used the ADDVOL command to add the volume to DFHSM control are not included in the report unless DFHSM audited the volume just before the report and no other data sets have been allocated to the volume since the audit.

The volume report information is obtained from the volume statistics record (VSR) in the MCDS. These records are written to the MCDS each hour. Any activity that has occurred since the last update of the VSR will not be reported.

Examples of How to Code the REPORT Command

For examples of the REPORT command, see Appendix D, "Using the REPORT Command" on page 459.

SETMIG: Changing the Space Management Status of Non-SMS-Managed Data Sets or Volumes

The SETMIG command changes the space management status of a specific data set or group of data sets on level 0 volumes. It can also change the space management status of a specific primary volume. You use this command to change temporarily the type of space management for specific cases.

You can change the space management status in three ways:

- Data set migration by command only
- Command and automatic space management
- No command or automatic space management.

If you specify a value for DATASETNAME(*dsname*), you do not have to repeat the SETMIG command each time you start DFHSM. However, if you specify a value for LEVEL(*qualifier*) or VOLUME(*volser*), you must repeat the SETMIG command each time you start DFHSM.

SETMIG is not supported for SMS-managed volumes or data sets. If an SMS-managed volume is specified, an error message will be issued and no function will be performed. The SETMIG command will be processed for an SMS-managed data set, but will have no effect on the processing of the data set, since the space management status is determined by a data set's management class attribute.

Syntax of the SETMIG Command

Command	Required Parameters	Optional Parameters
SETMIG	DATASETNAME(*dsname*) | LEVEL(*qualifier*) | VOLUME(*volser*)	COMMANDMIGRATION | MIGRATION | NOMIGRATION

Notes:

1. An optional parameter should be specified to change space management status.
2. The SETMIG command is not supported for SMS-managed volumes or data sets.

The following table shows the DFHSM abbreviations for the parameters of the SETMIG command:

Parameter	DFHSM Abbreviation
DATASETNAME	DSNAME

Summary of Parameters

The following table is a summary of the combination of parameters you can specify with the SETMIG command:

Parameter	Related Parameters
DATASETNAME	MIGRATION NOMIGRATION
LEVEL	COMMANDMIGRATION MIGRATION NOMIGRATION
VOLUME	MIGRATION NOMIGRATION

Required Parameters of the SETMIG Command

DATASETNAME | LEVEL | VOLUME: Changing the Space Management Status

Explanation: **DATASETNAME(*dsname*) | LEVEL(*qualifier*) | VOLUME(*volser*)** are mutually exclusive, required parameters to change the space management status of a data set, group of data sets, or volume.

DATASETNAME(*dsname*) is the parameter to change the space management status of a data set on a level 0 volume. For *dsname*, substitute the fully qualified name of the data set whose space management status is changing.

LEVEL(*qualifier*) is the parameter to change the space management status of a group of data sets that have the same set of initial characters of the data set name. The data sets are on level 0 volumes. For *qualifier*, substitute the first qualifier of the data set name or any number of contiguous characters beginning with the first character of the data set name for a group of data sets whose space management status is changing. In other words, any number of leading characters of a data set name can be specified and the last set of characters can be a partial qualifier. The *qualifier* cannot end in a period.

VOLUME(*volser*) is the parameter to change the space management status of the primary volume. For *volser*, substitute the serial number of the volume. If you specified the AUTOMIGRATION parameter of the ADDVOL command for this volume, you can use the VOLUME parameter of the SETMIG command to temporarily exclude the volume from daily space management. Even if you temporarily exclude the volume from daily space management, you can still issue commands to migrate a specific data set on the volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DATASETNAME, LEVEL, and VOLUME. In addition, you can use the abbreviation DSNAME for DATASETNAME.

Defaults: None.

Note: DFHSM does not handle partitioned data set members individually. If you specify a partitioned data set with a member name, DFHSM changes the status of the entire partitioned data set.

Optional Parameters of the SETMIG Command

COMMANDMIGRATION | MIGRATION | NOMIGRATION: Specifying the Way Space Management Is Controlled

Explanation: COMMANDMIGRATION | MIGRATION | NOMIGRATION are mutually exclusive, optional parameters specifying how space management is controlled for a data set, a group of data sets, or all data sets on a volume.

COMMANDMIGRATION, valid only with the LEVEL parameter, specifies that DFHSM will allow space management by data set command for any of a group of data sets you identified with the LEVEL parameter. DFHSM will not manage these data sets when it processes a volume.

MIGRATION specifies that DFHSM will do space management automatically or by command for a data set, a group of data sets, or all data sets on a volume. You specify the MIGRATION parameter only if you previously specified the COMMANDMIGRATION or NOMIGRATION parameter with the SETMIG command.

NOMIGRATION specifies that DFHSM will not do space management for the data set, group of data sets, or the volume; however, DFHSM will do space management by data set command for data sets when this parameter is specified with the VOLUME parameter. When NOMIGRATION is specified with the data set name or LEVEL parameter, DFHSM will not do space management by data set command.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATION, NOMIGRATION, and COMMANDMIGRATION. There are no additional abbreviations.

Defaults: None.

Note: The COMMANDMIGRATION parameter applies only when you specify the LEVEL parameter. If you specify COMMANDMIGRATION when it does not apply, DFHSM ignores it.

Examples of How to Code the SETMIG Command

The following examples show different ways to code the SETMIG command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Changing the Space Management Status of a Specific Data Set

In this example, the space management status of a particular data set is changed to prevent space management by volume processing or data set command.

```
SETMIG DATASETNAME(FST1234.COMPARE.LIST) NOMIGRATION
```

Changing the Space Management Status of a Group of Data Sets

In this example, the space management status of a group of data sets with the same first qualifier of the data set name is changed to prevent space management by volume processing or by command.

```
SETMIG LEVEL(JJT2143) NOMIGRATION
```

Changing the Space Management Status of a Volume

In this example, the space management status of an DFHSM-managed volume is changed to allow automatic and command space management, which was previously restricted, to occur from the volume.

```
SETMIG VOLUME(VOL123) MIGRATION
```

Changing the Space Management Status of a Group of Data Sets to Allow Space Management Only by Command

In this example, the space management status of a group of data sets is changed to allow space management of a data set only when requested by a command.

```
SETMIG LEVEL(MIL3691.REV3) COMMANDMIGRATION
```

This command would apply to all the data sets listed here:

- MIL3691.REV3
- MIL3691.REV3VER2.LISTING
- MIL3691.REV3456.TEST
- MIL3691.REV3TST.EXAM.LIST

SETSYS: Establishing or Changing the Values of DFHSM Control Parameters

When you start DFHSM, a subset of DFHSM CONTROL PARAMETERS IS ESTABLISHED BY DEFAULT. You can override DFHSM defaults by specifying one or more SETSYS commands in the ARCCMD*xx* PARMLIB member used when you start DFHSM. You could then issue the SETSYS command, with specific parameter values after DFHSM is started, to change the current defaults which will remain in effect until you restart DFHSM. See the DFHSM Installation Verification Procedure in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* for an example of how to set up the ARCMD*xx* PARMLIB member.

If you do not specify the SETSYS command, DFHSM will not do any automatic space management, backup, or dump. Therefore, if you want to take advantage of the automatic functions of DFHSM, use the SETSYS command.

Do not confuse DFHSM defaults with the SETSYS command defaults. Except for certain values, there are no SETSYS command defaults. A SETSYS command has no required parameters, so unless you indicate a specific parameter value for the SETSYS command, the DFHSM control parameter is the default.

Syntax of the SETSYS Command

A column has been included in the following table to indicate the parameters' relationships to SMS-managed volumes and SMS-managed data sets. The abbreviations used in the table and their meanings are:

APP Applicable: Parameter used when processing SMS-managed volumes and/or data sets

CAPP Conditionally applicable: Parameter conditionally used when processing SMS-managed volumes and/or data sets

NAPP Not applicable: Parameter not used when processing SMS-managed volumes and/or data sets

NR Not related: Parameter not directly related to functions performed for SMS-managed volumes or data sets

Command	SMS Relationship	Optional Parameters
SETSYS	NR	ACCEPTPSCBUSERID | NOACCEPTPSCBUSERID
	NR	ACTLOGMSGLVL(FULL | EXCEPTIONONLY | REDUCED)
	NR	ACTLOGTYPE(SYSOUT[(*class*)] | DASD)
	NR	AUTOBACKUPSTART(*hhmm1* [*hhmm2*[*hhmm3*]])
	NR	AUTODUMPSTART(*hhmm1* [*hhmm2*[*hhmm3*]])
	NR	AUTOMIGRATIONSTART(*hhmm1* [*hhmm2*[*hhmm3*]])
	APP	BACKUP[(ANY | DASD | TAPE[(*unit*)])] | NOBACKUP
	NR	BACKUPPREFIX(*prefix*)
	NR	CDSVERSIONBACKUP ([BACKUPCOPIES(*backupcopies*)] [BACKUPDEVICECATEGORY ([DASD | TAPE[([DENSITY(*density*)] [EXPIRATIONDATE(*expirationdate*) | RETENTIONPERIOD(*retentionperiod*)] [UNITNAME(*unitname*)])]])] [BCDSBACKUPDSN(*dsname*)] [JRNLBACKUPDSN(*dsname*)] [MCDSBACKUPDSN(*dsname*)] [OCDSBACKUPDSN(*dsname*)]) | NOCDSVERSIONBACKUP
	APP	COMPACT ([ALL | NONE] | [DASDBACKUP | NODASDBACKUP] [DASDMIGRATE | NODASDMIGRATE] [TAPEBACKUP | NOTAPEBACKUP] [TAPEMIGRATE | NOTAPEMIGRATE])
	APP	COMPACTPERCENT(*pct*)
	CAPP	CONVERSION[(REBLOCKBASE | REBLOCKTOANY | REBLOCKTOUNLIKE)] | NOCONVERSION
	NR	CSALIMITS ([ACTIVE(*percent1*)] [INACTIVE(*percent2*)] [MAXIMUM(*Kbytes*)] [MWE(*#mwes*)]) | NOCSALIMITS
	NAPP	DAYS(*days*)
	APP	DEBUG | NODEBUG
	NR	DEFERMOUNT | NODEFERMOUNT
	NR	DENSITY(2 | 3 | 4)
	APP	DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION
	NR	DUMPIO(1 | 2 | 3 | 4)
	APP	EMERGENCY | NOEMERGENCY
	APP	ERASEONSCRATCH | NOERASEONSCRATCH
	APP	EXITOFF(*modname,modname, ...*)
	APP	EXITON(*modname,modname, ...*)
	APP	EXITS(*abcdefghi*)

Command	SMS Relationship	Optional Parameters
SETSYS (Cont'd)	CAPP	**EXPIREDDATASETS[(SCRATCH | NOSCRATCH)]**
	APP	**EXPORTESDS (CIMODE | RECORDMODE)**
	NAPP	**FREQUENCY(*days*)**
	APP	**INCREMENTALBACKUP[(CHANGEDONLY | ORIGINAL)]**
	NR	**INPUTTAPEALLOCATION(WAIT | NOWAIT)**
	APP	**INTERVALMIGRATION | NOINTERVALMIGRATION**
	NR	**JES2 | JES3**
	NR	**JOURNAL[(RECOVERY | SPEED)] | NOJOURNAL**
	NR	**MAXBACKUPTASKS(*tasks*)**
	NR	**MAXDUMPTASKS(*tasks*)**
	APP	**MAXEXTENTS(*extents*)**
	NR	**MAXRECALLTASKS(*tasks*)**
	NR	**MAXSINGLEFILEBLOCKS(*blocks*)**
	NR	**MIGDENSITY(2 | 3 | 4)**
	NR	**MIGRATEPREFIX(*prefix*)**
	APP	**MIGRATIONCLEANUPDAYS(*recalldays statdays*)**
	NAPP	**MIGRATIONLEVEL1DAYS(*days*)**
	NR	**MIGUNITNAME(*unit*)**
	NR	**ML2RECYCLEPERCENT(*pct*)**
	NR	**MONITOR** **(BACKUPCONTROLDATASET(*thresh extents* [NEWCOPY])** **JOURNAL(*thresh extents*)** **MIGRATIONCONTROLDATASET(*thresh extents* [NEWCOPY])** **OFFLINECONTROLDATASET(*thresh extents* [NEWCOPY])** **SPACE | NOSPACE** **STARTUP | NOSTARTUP** **VOLUME | NOVOLUME)**
	NR	**MOUNTWAITTIME(*minutes*)**
	APP	**OBJECTNAMES(*name1, name2,...*)**
	NR	**OPTIMUMDASDBLOCKING | NOOPTIMUMDASDBLOCKING**
	NR	**OUTPUTTAPEALLOCATION([WAIT | NOWAIT])**
	NR	**PARTIALTAPE(MARKFULL | REUSE)**
	NR	**PDA(NONE | ON | OFF)**
	APP	**PROFILEBACKUP | NOPROFILEBACKUP**
	APP	**RACFIND | NORACFIND**
	NAPP	**RECALL[(ANYSTORAGEVOLUME[(LIKE | UNLIKE)] |** **PRIVATEVOLUME[(LIKE | UNLIKE)])]**
	NR	**RECYCLEOUTPUT(BACKUP[(*unit*)], MIGRATION[(*unit*)])**
	NR	**RECYCLEPERCENT(*pct*)**
	NR	**RECYCLETAPEALLOCATION([WAIT | NOWAIT])**
	APP	**REMOVECOMPACTNAMES(*name1,name2,...*)**
	NR	**REQUEST | NOREQUEST**
	NAPP	**SCRATCHFREQUENCY(*days*)**
	NR	**SELECTVOLUME(SCRATCH | SPECIFIC)**
	APP	**SKIPABPRIMARY | NOSKIPABPRIMARY**
	NR	**SMALLDATASETPACKING[([*tracks*] | [KB(*kilobytes*)])] |** **NOSMALLDATASETPACKING**

Command	SMS Relationship	Optional Parameters
SETSYS (Cont'd)	APP	**SMF(*smfid*) | NOSMF**
	NR	**SOURCENAMES(*name1,name2,...*)**
	NR	**SPILL[(ANY | DASD | TAPE[(*unit*)]) | NOSPILL**
	NR	**SWAP | NOSWAP**
	NR	**SYSOUT(*class* [*copies*] [*forms*])**
	NR	**SYS1DUMP | NOSYS1DUMP**
	NR	**TAPEDELETION(HSMTAPE | SCRATCHTAPE)**
	NR	**TAPEFORMAT[(SINGLEFILE | MULTIFILE)]**
	NR	**TAPEMAXRECALLTASKS(*tasks*)**
	CAPP	**TAPEMIGRATION(DIRECT[(TAPE(ANY | *unit*))] | ML2TAPE[(TAPE(ANY | *unit*))] | NONE[(ROUTETOTAPE[(ANY | *unit*)])])**
	NR	**TAPESECURITY([EXPIRATION | EXPIRATIONINCLUDE] [PASSWORD] [RACF | RACFINCLUDE])**
	NR	**TRACE | NOTRACE**
	NR	**UNITNAME(*unit*)**
	NR	**UNLOAD | NOUNLOAD**
	APP	**USERUNITTABLE(*unit* ...) | NOUSERUNITTABLE**
	NAPP	**VERSIONS(*limit*)**

Note: Although the SETSYS command has no required parameters, you must specify at least one of the optional parameters to change any system parameters or default values.

The following table shows the DFHSM abbreviations for the parameters of the SETSYS command:

Parameter	DFHSM Abbreviation
ACTLOGMSGLVL	ALMSGLVL
ACTLOGTYPE	ALTYPE
AUTOBACKUPSTART	ABSTART
AUTODUMPSTART	ADSTART
AUTOMIGRATIONSTART	AMSTART
BACKUPCONTROLDATASET	BCDS
BACKUPPREFIX	BPFX
BCDSBACKUPDSN	BBDSN
DFHSMDATASETSERIALIZATION	HSERIALIZATION
EXPIRATION	E
EXPIRATIONDATE	EXPDT
EXPIRATIONINCLUDE	EI

Parameter	DFHSM Abbreviation
EXPIREDDATASETS	EXPDS
JRNLBACKUPDSN	JBDSN
MCDSBACKUPDSN	MBDSN
MIGRATIONCONTROLDATASET	MCDS
MIGRATIONLEVEL1DAYS	ML1DAYS
MIGRATEPREFIX	MPFX
NOOPTIMUMDASDBLOCKING	NOOPTDBLOCKING
NOSMALLDATASETPACKING	NOSDSP
OBJECTNAMES	OBJNAME
OCDSBACKUPDSN	OBDSN
OFFLINECONTROLDATASET	OCDS
OPTIMUMDASDBLOCKING	OPTDBLOCKING
OWNEDBLOCKING	OBLOCKING
PASSWORD	P
RACF	R
REBLOCKBASE	RBBASE
REBLOCKTOANY	RBTOANY
REBLOCKTOUNLIKE	RBTOUNLIKE
REMOVECOMPACTNAMES	REMNAME
RETENTIONPERIOD	RETPD
ROUTETOTAPE	TAPE
SMALLDATASETPACKING	SDSP
SOURCENAMES	SRCNAME
USERDATASETSERIALIZATION	USERIALIZATION

Summary of Parameters by Function

Figure 4 is a summary of the space management parameters you can specify with the SETSYS command. Space management includes migration, data set deletion, data set retirement, and recall.

Space Management Parameters	Purpose
AUTOMIGRATIONSTART	Specifies the start, late start, and quiesce times when daily space management can start.
DAYS	Specifies the minimum migration age if not specified on the ADDVOL or MIGRATE command.
EXPIREDDATASETS	Specifies whether DFHSM should scratch data sets with expired expiration dates when performing space maintenance and migration cleanup.
INTERVALMIGRATION | NOINTERVALMIGRATION	Specifies whether DFHSM should run interval migration.
MAXEXTENTS	Specifies that DFHSM is to release unused space, reduce the number of extents, and compress partitioned data sets.
MAXRECALLTASKS	Specifies how many recall tasks DFHSM can concurrently process.
MIGDENSITY	Specifies the density of scratch tapes initially mounted during migration.
MIGRATEPREFIX	Specifies the prefix for the migration copy name.
MIGRATIONCLEANUPDAYS	Specifies the number of days DFHSM keeps records for recalled data sets and statistics records.
MIGRATIONLEVEL1DAYS	Specifies the inactive age of data sets before DFHSM can migrate them from a migration level 1 volume to a migration level 2 volume.
MIGUNITNAME	Specifies the unit for initially mounting scratch tapes during migration.
ML2RECYCLEPERCENT	Specifies the percentage of valid data on a tape migration level 2 volume if someone does not specify the PERCENTVALID parameter of the RECYCLE command.
RECALL[(ANYSTORAGEVOLUME[(LIKE | UNLIKE)] | PRIVATEVOLUME[(LIKE | UNLIKE)])]	Specifies where DFHSM is to recall nonpooled data sets. If you specify the UNLIKE subparameter, pooled data sets are also affected.
SCRATCHFREQUENCY	Specifies the number of days to keep a list data set.

Figure 4 (Part 1 of 2). Space Management Parameters of DFHSM

Space Management Parameters	Purpose
SMALLDATASETPACKING | NOSMALLDATASETPACKING	Specifies whether DFHSM is to pack sequential, small data sets into a small-data-set-packing data set on a migration level 1 volume.
TAPEMAXRECALLTASKS	If DFHSM migrates data to tape migration level 2 volumes, the number of active recall tasks from tape migration level 2 volumes. This parameter is a subset of the MAXRECALLTASKS parameter.
TAPEMIGRATION(DIRECT [(TAPE(ANY | *unit*))] | ML2TAPE[(TAPE(ANY | *unit*))] | NONE[(ROUTETOTAPE(ANY | UNIT))]	Specifies the type of migration to tape that is in effect and limits the type of tapes that can be selected for output.

Figure 4 (Part 2 of 2). Space Management Parameters of DFHSM

Figure 5 is a summary of the backup parameters you can specify with the SETSYS command.

Backup Parameters	Purpose
AUTOBACKUPSTART	Specifies the start, late start, and quiesce times when automatic backup can start.
BACKUP[(ANY | DASD | TAPE[(*unit*)])] | NOBACKUP	Specifies whether DFHSM is to back up and recover data sets. This also can be used to limit the kind of output volume used as a daily backup volume.
BACKUPPREFIX	Specifies the prefix for the backup version name.
CDSVERSIONBACKUP|NOCDSVERSIONBACKUP BACKUPCOPIES BACKUPDEVICECATEGORY DASD | TAPE DENSITY EXPIRATIONDATE | RETENTIONPERIOD UNITNAME BCDSBACKUPDSN MCDSBACKUPDSN JRNLBACKUPDSN OCDSBACKUPDSN	Specifies whether DFHSM does multiple backup of the control data set and journal data set. If so, also specifies the parameters for multiple backup of the control data sets and journal data set.
DENSITY	Specifies the density for scratch tapes initially mounted during backup.
FREQUENCY	Specifies how often DFHSM backs up data sets.
INCREMENTALBACKUP(CHANGEDONLY | ORIGINAL)	Specifies whether DFHSM will back up only changed data sets during incremental volume backup.
MAXBACKUPTASKS	Specifies the maximum number of concurrent volume backup tasks.
PROFILEBACKUP | NOPROFILEBACKUP	Specifies whether DFHSM is to create a backup RACF discrete profile for each cataloged RACF-indicated data set that it backs up.
RECYCLEPERCENT	Specifies the percentage of valid data on a tape for a category of volumes (for example, SPILL) if someone does not specify the PERCENTVALID parameter of the RECYCLE command.
SKIPABPRIMARY | NOSKIPABPRIMARY	Specifies whether DFHSM is to back up automatically data sets on primary volumes.

Figure 5 (Part 1 of 2). Backup Parameters of DFHSM

Backup Parameters	Purpose
SPILL[(ANY | DASD | TAPE[(*unit*)])] | NOSPILL	Specifies whether DFHSM is to do spill processing on full DASD daily backup volumes. This can also be used to limit the kind of output volume used as a daily spill backup volume.
UNITNAME	Specifies the unit for allocating scratch tapes during backup.
VERSIONS	Specifies number of backup versions DFHSM is to keep of each data set.

Figure 5 (Part 2 of 2). Backup Parameters of DFHSM

Figure 6 is a summary of the general parameters you can specify with the SETSYS command. General parameters apply to all DFHSM functions.

General Parameters	Purpose
ACCEPTPSCBUSERID | NOACCEPTPSCBUSERID	Specifies whether to give DFHSM installations without RACF a way to enter authorized DFHSM commands using TSO batch requests.
ACTLOGMSGLVL(EXCEPTIONONLY | FULL | REDUCED)	Specifies the message log level for recording data sets processed by volume and level functions.
ACTLOGTYPE(SYSOUT[(*class*)] | DASD)	Specifies the type of output data set that receives the messages specified by ACTLOGMSGLVL.
COMPACT ALL | NONE DASDBACKUP | NODASDBACKUP DASDMIGRATE | NODASDMIGRATE TAPEBACKUP | NOTAPEBACKUP TAPEMIGRATE | NOTAPEMIGRATE	Specify what type of compaction DFHSM should do, if any.
CONVERSION[(REBLOCKBASE | REBLOCKTOANY | REBLOCKTOUNLIKE)] | NOCONVERSION	Specifies whether and how DFHSM is to reblock data sets during recall and recovery.
CSALIMITS | NOCSALIMITS ACTIVE INACTIVE MAXIMUM MWE	Specifies whether to use common service area (CSA) limiting for management work element (MWE) allocation. If CSA limiting is in effect, also specifies the values for the four limits.
COMPACTPERCENT	If DFHSM is to compact data sets, specifies the minimum amount of space saved.
DEBUG | NODEBUG	Specifies whether DFHSM should actually process volumes and data sets.

Figure 6 (Part 1 of 4). General Parameters of DFHSM

General Parameters	Purpose
DEFERMOUNT | NODEFERMOUNT	Specifies whether DFHSM should defer mounting of tape volumes.
DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION	Specifies whether data set serialization of system resources is provided by system facilities.
ERASEONSCRATCH | NOERASEONSCRATCH	Specifies whether DFHSM will check the erase status and requests DFP/XA erase of the data set space of DFHSM owned data sets.
EMERGENCY | NOEMERGENCY	Specifies whether DFHSM stops all data set processing.
EXITOFF	Specifies inactive user exits.
EXITON	Specifies active user exits.
EXITS	Specifies which user exits are active.
EXPORTESDS(CIMODE | RECORDMODE)	Specifies whether DFHSM should export VSAM entry-sequenced data sets with no alternate index by control interval or by record.
INPUTTAPEALLOCATION	Specifies whether DFHSM is to wait for an input tape unit to be allocated.
JES2 | JES3	Specifies the job entry subsystem to use with DFHSM.
JOURNAL | NOJOURNAL	Specifies whether DFHSM is to record updates to the control data sets in the journal data set.
MAXSINGLEFILEBLOCKS	Specifies the maximum number of 16K blocks that DFHSM will write to a 3480 backup or migration volume in single-file format.
MONITOR BACKUPCONTROLDATASET JOURNAL MIGRATIONCONTROLDATASET OFFLINECONTROLDATASET SPACE | NOSPACE STARTUP | NOSTARTUP VOLUME | NOVOLUME	Specifies which messages are to be displayed at the system console and how full the control data sets and journal data set must be before DFHSM sends warning messages to the operator.
MOUNTWAITTIME	Specifies how long DFHSM waits for a tape to be mounted.
OBJECTNAMES	Specifies that DFHSM is to use the compaction table for object data sets.

Figure 6 (Part 2 of 4). General Parameters of DFHSM

General Parameters	Purpose
OPTIMUMDASDBLOCKING | NOOPTIMUMDASDBLOCKING	Specifies whether DFHSM should use its defined optimum block size when putting data to owned DASD.
OUTPUTTAPEALLOCATION	Specifies whether DFHSM is to wait for an output tape unit to be allocated.
PARTIALTAPE(MARKFULL | REUSE)	Specifies to automatically mark a 3480 tape volume full, even though it may not be physically full, when the 3480 tape is deallocated after output processing.
PDA(NONE | ON | OFF)	Specifies whether the Problem Determination Aid facility is to be enabled.
RACFIND | NORACFIND	Specifies whether DFHSM marks migration copies and backup versions as RACF-indicated.
RECYCLEOUTPUT	Specifies the selection and allocation of an output volume during recycle processing.
RECYCLETAPEALLOCATION	Specifies whether DFHSM is to wait for a recycle tape unit to be allocated.
REMOVECOMPACTNAMES	Specifies that DFHSM is to use the general compaction table to compact the source or object data set.
REQUEST | NOREQUEST	Specifies whether the operator should give permission to start daily space management, interval migration, or backup.
SELECTVOLUME(SPECIFIC | SCRATCH)	Specifies whether DFHSM is to select a specific tape or a scratch tape when it reaches EOV on the tape volume it is using.
SMF | NOSMF	Specifies whether to write SMF records.
SOURCENAMES	Specifies that DFHSM is to use the compaction table for source data sets.
SWAP | NOSWAP	Specifies whether the system resource manager is to swap the DFHSM address space.
SYSOUT	Specifies where DFHSM is to direct its output.
SYS1DUMP | NOSYS1DUMP	Specifies whether DFHSM is to write DFHSM dumps in a system dump data set.
TAPEDELETION(HSMTAPE | SCRATCHTAPE)	Specifies whether the recycled tape volumes become unassigned volumes or scratch tapes.
TAPEFORMAT(SINGLEFILE | MULTIFILE)	Specifies the format for DFHSM to write data to all 3480 migration and backup volumes.

Figure 6 (Part 3 of 4). General Parameters of DFHSM

General Parameters	Purpose
TAPESECURITY EXPIRATION | EXPIRATIONINCLUDE PASSWORD RACF | RACFINCLUDE	Specifies the type of security for the tape volumes.
TRACE | NOTRACE	Specifies whether changes to the control data sets should be written in the DFHSM log.
UNLOAD | NOUNLOAD	Specifies whether DFHSM is to unload virtual volumes.
USERUNITTABLE | NOUSERUNITTABLE	Specifies esoteric unit names to DFHSM if you want to use them.

Figure 6 (Part 4 of 4). General Parameters of DFHSM

Figure 7 is a summary of the dump parameters you can specify with the SETSYS command.

Dump Parameters	Purpose
AUTODUMPSTART	Specifies the start, late start, and quiesce times when automatic backup can start.
DUMPIO	Specifies the buffering technique for DFDSS DASD I/O.
MAXDUMPTASKS	Specifies the maximum number of volume dump tasks to be processed concurrently.

Figure 7. Dump Parameters of DFHSM

If DFHSM is running in an SMS environment, the storage management functions defined in the management class and storage group control the SMS-managed data sets instead of parameter or command definitions within DFHSM. Many of the parameters used on the DFHSM SETSYS command do not apply to the SMS-managed data sets. The following table shows some of these changes:

DFHSM Parameter non-SMS	SMS Class Equivalent
DAYS	PRIMARY-DAYS-SINCE-LAST-USE
MIGRATIONLEVEL1DAYS	LEVEL-1-DAYS-NON-USAGE
DELETEBYAGE(vol)	EXPIRE-AFTER-DAYS-NON-USAGE
N/A	PARTIAL-RELEASE
SETMIG..COMMAND	COMMAND-OR-AUTO-MIGRATE
N/A	ADMIN-OR-USER-COMMAND BACKUP
N/A	#-GDG-ELEMENTS-ON-PRIMARY

DFHSM Parameter non-SMS	SMS Class Equivalent
N/A	ROLLED-OFF-GDS-ACTION
N/A	NUMBER-OF-BACKUPS when data set deleted
N/A	RETAIN-DAYS-ONLY-BACKUP when data set deleted
N/A	RETAIN-DAYS-EXTRA-BACKUPS
N/A	MAX-RETENTION-PERIOD
N/A	EXPIRE-AFTER-DATE/DAYS

Optional Parameters of the SETSYS Command

References to "all" data sets in the descriptions of the SETSYS parameters mean *both SMS and non-SMS managed data sets* for those parameters that are applicable to SMS.

ACCEPTPSCBUSERID | NOACCEPTPSCBUSERID: Allowing Non-RACF Installations to Issue Authorized DFHSM Commands in a TMP Environment

Explanation: **ACCEPTPSCBUSERID | NOACCEPTPSCBUSERID** are mutually, exclusive optional parameters that you use to specify whether DFHSM should have a way of issuing authorized DFHSM commands in a TSO batch environment in installations not having RACF. When RACF is not installed, authorized DFHSM commands issued in a pure batch environment will be failed because of a lack of authorization.

ACCEPTPSCBUSERID specifies that an installation not having RACF will have DFHSM retrieve the user ID for TSO batch requests from the protected step control block (PSCB) and associate the user ID with the request, thus the current authorization checking for commands, can be used to determine if the user ID is an authorized DFHSM user ID. An installation must ensure the user ID is placed in the PSCB if ACCEPTPSCBUSERID is specified. If an installation does not issue the SETSYS ACCEPTPSCBUSERID command and RACF is not installed, DFHSM will not attempt to retrieve the user ID for TSO batch requests and all DFHSM authorized-user commands will fail.

NOACCEPTPSCBUSERID specifies that DFHSM will not attempt to retrieve the user ID for TSO batch requests, when RACF is not installed.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ACCEPTPSCBUSERID and NOACCEPTPSCBUSERID. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is NOACCEPTPSCBUSERID.

Note: The SETSYS ACCEPTPSCBUSERID command only applies to TSO batch requests on systems where RACF is not installed.

When SETSYS SYS1DUMP is entered in the DFHSM startup command member in a PARMLIB, there is a possibility of an ABEND occurring during DFHSM initialization prior to this command being processed. If an ABEND occurs in this window and a dump listing is desired, include a SYSUDUMP DD card in the DFHSM startup procedure.

ACTLOGMSGLVL: Specifying Message Level for Recording Data Sets

Explanation: ACTLOGMSGLVL(FULL | EXCEPTIONONLY | REDUCED) is an optional parameter specifying the message log level for the activity log required for recording data sets processed by volume and level functions. Specifically, this parameter determines which ARC0734I data set movement messages will be written to the activity log. No other messages are effected.

FULL specifies that messages will be generated and logged for all activities.

EXCEPTIONONLY specifies that messages will be generated and logged for activities with a non-zero return code. A non-zero return code indicates an error in processing the data set.

REDUCED specifies that the original space management message or backup message is generated, but messages for subsequent movement and cleanup are suppressed.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ACTLOGMSGLVL, EXCEPTIONONLY, FULL, and REDUCED. In addition, you can use the abbreviation ALMSGLVL for ACTLOGMSGLVL.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify any of the subparameters with the ACTLOGMSGLVL parameter, the DFHSM default is FULL.

ACTLOGTYPE: Specifying the Type of Output Data Set to Receive Messages

Explanation: ACTLOGTYPE([SYSOUT[(*class*)] | DASD]) is an optional parameter specifying the type of output data set that the activity log should be for receiving messages specified by ACTLOGMSGLVL.

SYSOUT(*class*) specifies that messages will be written out to a spool data set. For *class*, substitute an alphameric character for the class DFHSM is to use for output.

DASD specifies that an output data set will be dynamically allocated and cataloged. The format of the data set name is as follows:

```
HSMACT.Hhostid.xxxLOG.Dyyddd.Thhmmss

    where:

Hhostid = DFHSM hostid from the PROC statement, preceded by H
   xxx = CMD, MIG, BAK, or DMP to identify log type
 yyddd = year and day of allocation
hhmmss = hour, minute, and second of allocation
```

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4applies to ACTLOGTYPE, DASD, and SYSOUT. In addition, you can use the abbreviation ALTYPE for ACTLOGTYPE.

SETSYS Defaults: The SYSOUT class established by the SETSYS SYSOUT command.

DFHSM Defaults: If you do not specify *class* for SYSOUT, the DFHSM default is A, one copy, and no special forms.

Note: If the SYSOUT class is modified with the SETSYS ACTLOGTYPE command, existing open SYSOUT activity logs will be closed and new SYSOUT activity logs will be opened using the output class specified with the command.

AUTOBACKUPSTART: Specifying When Automatic Backup Is to Start

Explanation: **AUTOBACKUPSTART(***hhmm1* **[***hhmm2***[***hhmm3***]])** is an optional parameter specifying the time when automatic backup can start. The first time you specify (*hhmm1*) is the time you plan for DFHSM to start automatic backup. The second time you specify (*hhmm2*) is the latest time DFHSM can start automatic backup. The third time you specify (*hhmm3*) is the time after which DFHSM will not start automatic backup on additional volumes.

If DFHSM does not start automatic backup between the planned start time and the latest start time, no automatic backup is run that day.

For *hhmm1*, substitute the planned start time for DFHSM to start automatic backup. Base this number on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. For example, 1315 is 1:15 p.m., and 2400 is midnight. If you specify *hhmm1* as zero, DFHSM cannot start automatic backup.

For *hhmm2*, substitute the latest start time DFHSM can start automatic backup. Base this number on the 24-hour clock. The time is expressed as a four-digit number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. If you want automatic backup to begin after midnight, the value for the latest start time can be smaller than the planned start time. For example, you can specify 2330 for *hhmm1* and 0100 for *hhmm2*.

For *hhmm3*, substitute the time after which DFHSM will not start automatic backup of additional volumes. Base this number on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. For example, 1315 is 1:15 p.m., and 2400 is midnight. If you do not specify *hhmm3*, DFHSM runs automatic backup processing to completion of backing up all volumes.

If you want automatic backup to begin after midnight, *hhmm2*, the latest start time, can be smaller than *hhmm1*, the planned start time. As an example, you can specify 2330 for *hhmm1*, 0100 for *hhmm2*, and 0330 for *hhmm3*. DFHSM assumes that *hhmm2* is a later time than *hhmm1* and *hhmm3* is a later time than *hhmm2*.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOBACKUPSTART. In addition, you can use the abbreviation ABSTART for AUTOBACKUPSTART.

SETSYS Defaults: If you specify only one time, the SETSYS default for the second time is 2400.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is no automatic backup.

Notes:

1. If you do not specify a nonzero value for *hhmm1* during this start up of DFHSM, DFHSM does not do automatic backup.
2. The maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm1*, *hhmm2*, or *hhmm3* is 2400.
3. You use the BACKUP parameter of the DEFINE command to specify on which days DFHSM is to run automatic backup. The AUTOBACKUPSTART parameter specifies the time when automatic backup can start. If automatic backup does not start before the latest start time, DFHSM does not start automatic backup until the next day in the cycle that automatic backup is scheduled to run. If automatic backup did not start today, you can use AUTOBACKUPSTART to change the planned and latest start times.

AUTODUMPSTART: Specifying When Automatic Dump Is to Start

Explanation: AUTODUMPSTART(*hhmm1* [*hhmm2*[*hhmm3*]]) is an optional parameter specifying the time when automatic dump can start. The first time you specify (*hhmm1*) is the time you plan for DFHSM to start automatic dump. The second time you specify (*hhmm2*) is the latest time DFHSM can start automatic dump. The third time you specify (*hhmm3*) is the time after which DFHSM will not start automatic dump on additional volumes.

If DFHSM does not start automatic dump on volumes by the *hhmm2* time, no automatic dumping is performed that day. Volumes being processed when the *hhmm3* time is reached are not affected.

For *hhmm1*, substitute the planned start time for DFHSM to start automatic dump. Base this number on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. For example, 1315 is 1:15 p.m., and 2400 is midnight. If you specify *hhmm1* as zero, DFHSM will not start automatic dump.

For *hhmm2*, substitute the latest start time DFHSM can start automatic dump. Base this number on the 24-hour clock. The time is expressed as a four-digit number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. If you want automatic dump to begin after midnight, the value for the latest start time can be smaller than the planned start time. For example, you can specify 2330 for *hhmm1* and 0100 for *hhmm2*.

For *hhmm3*, substitute the time after which DFHSM will not start the automatic dumping of additional volumes. Base this number on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. For example, 1315 is 1:15 p.m., and 2400 is midnight. If you do not specify *hhmm3*, DFHSM runs automatic dump processing to completion of dumping all volumes.

If you want automatic dumping to begin after midnight, *hhmm2*, the latest start time, can be smaller than *hhmm1*, the planned start time. As an example, you can specify 2330 for *hhmm1*, 0100 for *hhmm2*, and 0330 for *hhmm3*. DFHSM assumes that *hhmm2* is a later time than *hhmm1* and *hhmm3* is a later time than *hhmm2*.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTODUMPSTART. In addition, you can use the abbreviation ADSTART for AUTODUMPSTART.

SETSYS Defaults: If you do not specify a value for *hhmm2*, the SETSYS default is 2400.

If you do not specify a value for *hhmm3*, DFHSM will run automatic dump processing to completion of all volumes.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is no automatic dump processing being performed.

Notes:

1. If you do not specify a nonzero value for *hhmm1* during this start up of DFHSM, DFHSM does not do automatic dumping.
2. The maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm1*, *hhmm2*, or *hhmm3* is 2400.
3. You use the DUMPCYCLE parameter of the DEFINE command to specify on which days DFHSM is to run automatic dump. The AUTODUMPSTART parameter specifies the time when automatic dump can start. If automatic dump does not start before the latest start time, DFHSM does not start automatic dump until the next day in the cycle that automatic dump is scheduled to run. If automatic dump did not start today, you can use AUTODUMPSTART to change the planned and latest start times.
4. AUTODUMPSTART affects only the starting of automatic dump processing. It does not prevent starting a volume dump with the BACKVOL command.
5. AUTODUMPSTART has no meaning unless the BACKUP parameter is specified on a SETSYS command during this DFHSM startup.
6. An explicit command must be issued to halt the automatic dump process before normal completion.
7. If you want the operator to decide whether DFHSM should start automatic dump, specify the REQUEST parameter and the AUTODUMPSTART parameter.
8. As with automatic backup, DFHSM serializes access to data sets and volumes for a short period of time. Therefore, select a time for daily space management when the computing system is not very active and there is not much interactive user activity (usually at night).
9. Automatic dump usually starts at the planned start time. However, assume DFHSM is not running at the planned start time or the operating system is lost while automatic dump is running. When DFHSM restarts, it checks whether the latest start time has passed. If it has not passed, DFHSM restarts automatic dump. If the time has passed and you want automatic dump to run today, you can use this parameter to respecify the time when automatic dump can start.
10. If you specify *hhmm3* as zero, automatic dump will process all eligible primary volumes.
11. The SETSYS command will fail if *hhmm1* and *hhmm2* are equal.
12. DFHSM can run automatic dump multiple times a day in a test environment. If automatic dump ran to completion and you want to start automatic dump again, use the following procedure:
    - Issue the SETSYS AUTODUMPSTART command to define a new start window. Specify a start window that has a planned start time after the time that automatic dump last ended. Do not confuse the time that automatic dump last ended with the specified latest start time.
    - Automatic dump starts immediately if the current time is in the new start window.

      If the current time is not in the new start window, automatic dump will start automatically when the planned start time occurs.

AUTOMIGRATIONSTART: Specifying the Starting Time for Daily Space Management

Explanation: AUTOMIGRATIONSTART(*hhmm1* [*hhmm2*|*hhmm3*]]) is an optional parameter specifying the time when daily space management should start. The purpose of daily space management is to prepare your primary volumes for data every day. The first time you specify (*hhmm1*) is the time you plan for DFHSM to start daily space management. The second time you specify (*hhmm2*) is the latest time daily space management can start. The third time you specify (*hhmm3*) is the time after which DFHSM will not start daily space management on additional volumes.

If DFHSM does not start daily space management between the planned start time and the latest start time, daily space management is not done for that day.

For *hhmm1*, substitute the planned start time for daily space management based on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. For example, 1315 is 1:15 p.m., and 2400 is midnight. If you specify *hhmm1* as zero, DFHSM cannot start daily space management.

For *hhmm2*, substitute the latest start time that daily space management can begin based on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and the minutes by *mm*. Leading zeros are not required.

For *hhmm3*, substitute the time after which DFHSM daily space management will not start processing additional volumes. Base this number on the 24-hour clock. The time is expressed as a four-digit decimal number in the format *hhmm*. The hour is represented by *hh* and minutes by *mm*. Leading zeros are not required. For example, 1315 is 1:15 p.m., and 2400 is midnight. If you do not specify *hhmm3*, DFHSM runs automatic migration processing to completion of migrating all volumes.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to AUTOMIGRATIONSTART. In addition, you can use the abbreviation AMSTART for AUTOMIGRATIONSTART.

SETSYS Defaults: If you specify only one time, the SETSYS default for the second time is 2400.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is no daily space management.

Notes:

1. If you do not specify a nonzero value for *hhmm1* during this start up of DFHSM, DFHSM does not do daily space management.
2. The maximum value you can specify for *mm* is 59, and the maximum value you can specify for *hhmm1*, *hhmm2*, or *hhmm3* is 2400.
3. The type of daily space management DFHSM does on a particular volume (data

set deletion, data set retirement, or migration) depends on the parameter you specified with the ADDVOL command.

4. If you want the operator to decide whether to start daily space management, specify the REQUEST parameter and the AUTOMIGRATIONSTART parameter.
5. As with automatic backup, DFHSM serializes access to data sets and volumes for a short period of time. Therefore, select a time for daily space management when the computing system is not very active and there is not much interactive user activity (usually at night).
6. Daily space management usually starts at the planned start time. However, assume DFHSM is not running at the planned start time or the operating system is lost while daily space management is running. When DFHSM restarts, it checks whether the latest start time has passed. If it has not passed, DFHSM restarts daily space management. If the time has passed and you want daily space management to run today, you can use this parameter to respecify the time when daily space management can start.
7. If you specify *hhmm3* as zero, automatic migration will process all eligible primary volumes.
8. The SETSYS command will fail if *hhmm1* and *hhmm2* are equal.
9. DFHSM can run daily space management multiple times a day in a test environment. If daily space management ran to completion and you want to start daily space management again, use the following procedure:
   - Issue the SETSYS AUTOMIGRATIONSTART command to define a new start window. Specify a start window that has a planned start time after the time that daily space management last ended. Do not confuse the time that daily space management last ended with the specified latest start time.
   - Daily space management starts immediately if the current time is in the new start window.

     If the current time is not in the new start window, daily space management will start automatically when the planned start time occurs.

BACKUP | NOBACKUP: Specifying Whether You Intend to Use DFHSM Backup, Recovery and Dump

Explanation: **BACKUP[(ANY | DASD | TAPE[(*unit*)])] | NOBACKUP** are mutually exclusive optional parameters specifying whether you intend to use DFHSM backup, dump, recovery, and expiring backup versions, and specifying restrictions as to what kind of volumes are allowed to be used for daily backup.

BACKUP specifies that you intend to use DFHSM backup, dump, recovery, and expire backup versions. You must specify this parameter if you intend to run automatic backup or dump, or issue commands to do backup, dump, recovery, or to expire backup versions. The commands to do backup are HBACKDS, BACKDS, or BACKVOL. The command to do a dump is BACKVOL. The commands to do recovery are HRECOVER or RECOVER. The command to expire backup versions is EXPIREBV.

ANY specifies that during backup processing for a primary volume with a BACKUPDEVICECATEGORY of NONE, any type of daily backup volume can be used for output.

DASD specifies that during backup processing for a primary volume with a BACKUPDEVICECATEGORY of NONE, only DASD daily backup volumes should be used for output.

TAPE specifies that during backup processing for a primary volume with a BACKUPDEVICECATEGORY of NONE, only tape daily backup volumes should be used for output.

TAPE(*unit*) specifies that during backup processing for a primary volume with a BACKUPDEVICECATEGORY of NONE or TAPE, only tape daily backup volumes that can be mounted and written on the specified type of *unit* should be used for output. In addition, when a tape daily backup volume is allocated during backup processing, the volume is allocated using the unit name specified with the TAPE subparameter of the BACKUP parameter, overriding the unit name specified on the ADDVOL command for the tape daily backup volume.

For *unit*, a generic or esoteric unit name can be specified. The following generic unit names are acceptable: 3400-3, 3400-4, 3400-5, 3400-6, 3400-9 and 3480. If an esoteric unit name is specified, it must have been previously defined to DFHSM using the USERUNITTABLE parameter of the SETSYS command. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem.

NOBACKUP specifies that you do not intend to use DFHSM backup, dump, recovery, or expire backup versions. If you specify this parameter, automatic backup and automatic dump are not run and DFHSM fails any backup, dump, recovery, or expire backup versions commands. If you specify NOBACKUP while volume backup is running, the volume backup operation ends after the data set currently being processed is backed up. If you specify NOBACKUP while volume dump is running, the volume dump operation ends after the volume currently being processed is dumped. If you specify NOBACKUP while automatic backup is running, automatic backup prematurely ends after all volume backup operations in process end. If you specify NOBACKUP while automatic dump is running, automatic dump prematurely ends after all volume dump operations in process end. If you specify NOBACKUP while EXPIREBV is running, EXPIREBV prematurely ends after all expire-backup-versions operations in process end.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP and NOBACKUP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is NOBACKUP.

Note: You must specify BACKUP if you want to use backup, dump, recovery, and expire backup versions.

BACKUPPREFIX: Specifying the Prefix for the Backup Version Name

Explanation: **BACKUPPREFIX[(*prefix*)]** is an optional parameter specifying the prefix of the data set name DFHSM generates when it backs up the data set. For *prefix*, substitute from 1 to 7 alphameric characters.

The backup version name has the following format:

prefix.BACK.T*ssmmhh.user1.user2..Xyddd*

prefix is replaced with the prefix you specify with this command.

BACK indicates that this is a backup version.

T*ssmmhh* is the time when DFHSM backed up the data set. *ss* is the second, *mm* is the minute, and *hh* is the hour. If a duplicate exists after this name is generated, DFHSM changes the first character of the time stamp.

user1 and *user2* are replaced with the first two qualifiers of the data set name. The data set name can be 44 characters long.

Xyddd is the date when DFHSM backed up the data set. DFHSM replaces the X with a letter that represents the decade. A-J have the following numeric values:

A—1	F—6
B—2	G—7
C—3	H—8
D—4	I—9
E—5	J—0.

For example, you specify BACKUPPREFIX(HSMBAK). Your data set name is JONES.CLIST.TEXT. DFHSM backs up the data set on 30 December 1983 at 9:15 a.m. The backup version name is:

```
HSMBAK.BACK.T001509.JONES.CLIST.H3364
```

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPPREFIX. In addition, you can use the abbreviation BPFX for BACKUPPREFIX.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is the UID parameter you specified in the DFHSM startup procedure. *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* explains the UID and the DFHSM startup procedure.

Because DFHSM uses a different backup version name than HSM used, see *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* for migration and coexistence considerations.

CDSVERSIONBACKUP | NOCDSVERSIONBACKUP: Specifying Whether the Control Data Sets Should Be Backed Up to Multiple Data Sets

Explanation: **CDSVERSIONBACKUP | NOCDSVERSIONBACKUP** are mutually exclusive, optional parameters that you use to specify whether DFHSM should back up the control data sets to multiple data sets. The multiple backup copies give you a history of the control data sets and the journal data set. The number of backup copies kept is determined by the BACKUPCOPIES subparameter.

Note: Because of the number of subparameters of the CDSVERSIONBACKUP parameter, each bracketed pair of subparameters is described separately.

CDSVERSIONBACKUP specifies that DFHSM should back up the existing DFHSM control data sets and the journal data set to multiple backup data sets.

NOCDSVERSIONBACKUP specifies that DFHSM should back up the control data sets to the backup data sets identified with DD statements in the DFHSM startup procedure.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CDSVERSIONBACKUP and NOCDSVERSIONBACKUP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is CDSVERSIONBACKUP.

If you specify CDSVERSIONBACKUP or NOCDSVERSIONBACKUP while DFHSM is backing up the control data sets and journal data set, the parameter does not take effect until after DFHSM finishes backing up the control data sets and journal data set.

BACKUPCOPIES: Specifying the Number of Backup Copies to Keep for Each Control Data Set and Journal Data Set

Explanation: **BACKUPCOPIES(*backupcopies*)** is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the number of backup copies to be maintained for each of the control data sets and the journal data set. For *backupcopies*, specify a decimal number from 1 to 9999 indicating the number of backup copies to be maintained.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPCOPIES. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this subparameter on any SETSYS command, the DFHSM default is 4.

BACKUPDEVICECATEGORY: Specifying the Backup Device to Which the Control Data Sets and Journal Will Be Backed Up

Explanation: **BACKUPDEVICECATEGORY([DASD | TAPE[([DENSITY(*density*)] [UNITNAME(*unitname*)] [EXPIRATIONDATE(*expirationdate*) | RETENTIONPERIOD(*retentionperiod*)])]])** is an optional parameter set that specifies the type of device that receives the backup copies of the DFHSM control data sets and the journal data set when DFHSM backs them up.

DASD is an optional subparameter specifying that DFHSM is to place the backup copies on DASD.

TAPE is an optional subparameter specifying that DFHSM is to place the backup copies on scratch tapes.

DENSITY(*density*) is an optional subparameter specifying the density of the scratch tape that DFHSM is to mount when it backs up the control data sets and the journal data set. For *density*, specify a value of 2, 3, or 4. The decimal number 2 indicates a tape density of 32 bytes/mm (800 BPI); 3 represents a density of 63 bytes/mm (1600 BPI), and 4 represents a density of 246 bytes/mm (6250 BPI). If you specify a density of 2, 3, or 4 for the 3480 Magnetic Tape Subsystem, DFHSM ignores it.

EXPIRATIONDATE(*expirationdate*) | RETENTIONPERIOD(*retentionperiod*) are mutually exclusive, optional subparameters specifying when the backup copy is no longer required. For *expirationdate*, specify a 5-digit number in the format *yyddd*, where *yy* is the year and *ddd* is the day (Julian date) when DFHSM can delete the backup copy. For *retentionperiod*, specify a 1 to 4-digit number representing the number of days DFHSM must keep the backup copy before DFHSM can delete it.

UNITNAME(*unitname*) is an optional subparameter specifying the type of unit where DFHSM is to allocate the scratch tape when DFHSM backs up the control data sets and the journal data set. For *unitname*, the types of units you can request for allocating the scratch tape are 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, 3480, or an esoteric name you specify in the USERUNITTABLE parameter of the SETSYS command. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPDEVICECATEGORY, DASD, TAPE, UNITNAME, DENSITY, RETENTIONPERIOD, and EXPIRATIONDATE. In addition, you can use the abbreviation RETPD for RETENTIONPERIOD and EXPDT for EXPIRATIONDATE.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is read from the multi-host processor control (MHCR) data set record. This record is updated everytime SETSYS CDSVERSIONBACKUP parameter is specified. If the MHCR record does not exist, the DFHSM default is TAPE. In addition, if you do not specify the UNITNAME and DENSITY subparameters of the CDSVERSIONBACKUP parameter, the defaults are the unit

name and density you specified with the UNITNAME and DENSITY parameters of the SETSYS command. If you do not specify EXPIRATIONDATE or RETENTIONPERIOD, the default is RETENTIONPERIOD(7).

Notes:

1. If you specify DENSITY and UNITNAME, the density must match the density capabilities for that type of unit.
2. If you specify an esoteric unit name with the UNITNAME parameter, you must also have identified the esoteric unit name to DFHSM. You identify the esoteric unit name to DFHSM with the USERUNITTABLE parameter of the SETSYS command.

BCDSBACKUPDSN: Specifying the Initial Characters of the Backup Data Set Name for the Backup Control Data Set

Explanation: **BCDSBACKUPDSN(*dsname*)** is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name to be used when allocating the backup data set for the BCDS. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.). However, the 35 initial characters cannot end with a period. DFHSM appends a final qualifier of .Vnnnnnnn to the backup name you choose. DFHSM uses the total name to allocate the backup data set for the BCDS.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BCDSBACKUPDSN. In addition, you can use the abbreviation BBDSN for BCDSBACKUPDSN.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is *uid*.BCDS.BACKUP. *uid* is the UID parameter you specified on the DFHSM startup procedure.

JRNLBACKUPDSN: Specifying the Initial Characters of the Backup Data Set Name for the Journal Data Set

Explanation: **JRNLBACKUPDSN(*dsname*)** is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name to be used when allocating the backup data set for the journal data set. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.). However, the 35 initial characters cannot end with a period. DFHSM appends a final qualifier of .Vnnnnnnn to the backup name you choose. DFHSM uses the total name to allocate the backup data set for the journal data set.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to JRNLBACKUPDSN. In addition, you can use the abbreviation JBDSN for JRNLBACKUPDSN.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is *uid*.JRNL.BACKUP. *uid* is the UID parameter you specified on the DFHSM startup procedure.

MCDSBACKUPDSN: Specifying the Initial Characters of the Backup Data Set Name for the Migration Control Data Set

Explanation: MCDSBACKUPDSN(*dsname*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name to be used when allocating the backup data set for the MCDS. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.). However, the 35 initial characters cannot end with a period. DFHSM appends a final qualifier of .Vnnnnnnn to the backup name you choose. DFHSM uses the total name to allocate the backup data set for the MCDS.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MCDSBACKUPDSN. In addition, you can use the abbreviation MBDSN for MCDSBACKUPDSN.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is *uid*.MCDS.BACKUP. *uid* is the UID parameter you specified on the DFHSM startup procedure.

OCDSBACKUPDSN: Specifying the Initial Characters of the Backup Data Set Name for the Offline Control Data Set

Explanation: OCDSBACKUPDSN(*dsname*) is an optional subparameter of the CDSVERSIONBACKUP parameter specifying the initial characters of the data set name to be used when allocating the backup data set for the OCDS. For *dsname*, specify the initial characters of the data set name. You can use up to 35 initial characters, including the periods (.). However, the 35 initial characters cannot end with a period. DFHSM appends a final qualifier of .Vnnnnnnn to the backup name you choose. DFHSM uses the total name to allocate the backup data set for the OCDS.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OCDSBACKUPDSN. In addition, you can use the abbreviation OBDSN for OCDSBACKUPDSN.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is *uid*.OCDS.BACKUP. *uid* is the UID parameter you specified on the DFHSM startup procedure.

COMPACT: Specifying When Compaction Should Be Done

Explanation: **COMPACT ([ALL | NONE] | [DASDBACKUP | NODASDBACKUP] [DASDMIGRATE | NODASDMIGRATE] [TAPEBACKUP | NOTAPEBACKUP] [TAPEMIGRATE | NOTAPEMIGRATE])** is an optional parameter set that you use to specify the type of compaction during migration or backup for all data sets.

Note: Because of the number of subparameters of the COMPACT parameter, each bracketed pair of subparameters is described separately.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to COMPACT. There are no additional abbreviations.

SETSYS Defaults: If you specify the COMPACT parameter without specifying any subparameters, the SETSYS default is no compaction.

DFHSM Defaults: If you do not specify a subparameter with this parameter on any SETSYS command, the DFHSM default is no compaction.

ALL | NONE: Specifying Whether to Compact Data Sets

Explanation: **ALL | NONE** are mutually exclusive, optional subparameters of the COMPACT parameter that specify whether to compact a data set during migration or backup.

ALL specifies that DFHSM can compact a data set during migration to DASD, migration to tape, backup to tape, and backup to DASD.

NONE specifies that DFHSM does not compact a data set during migration or backup.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL and NONE. There are no additional abbreviations.

SETSYS Defaults: None (no defaults).

DFHSM Defaults: If you do not specify any subparameter of the COMPACT parameter on any SETSYS command, the DFHSM default is NONE.

Notes:

1. When you specify the ALL or NONE subparameter with the COMPACT parameter, DFHSM ignores all other subparameters.
2. DFHSM compacts cataloged and uncataloged data sets.

DASDBACKUP | NODASDBACKUP: Specifying Whether to Compact Data Sets during Backup to DASD

Explanation: **DASDBACKUP | NODASDBACKUP** are mutually exclusive, optional subparameters of the COMPACT parameter that specify whether to compact a data set when DFHSM backs it up to DASD.

DASDBACKUP specifies that DFHSM can compact a data set when DFHSM backs it up to DASD.

NODASDBACKUP specifies that DFHSM does not compact a data set when DFHSM backs it up to DASD.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DASDBACKUP and NODASDBACKUP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NODASDBACKUP.

Note: If you do not want a specific data set to be compacted during volume backup, use the data set backup exit (ARCBDEXT) to prevent compaction.

DASDMIGRATE | NODASDMIGRATE: Specifying Whether to Compact Data Sets during Migration to DASD

Explanation: **DASDMIGRATE | NODASDMIGRATE** are mutually exclusive, optional subparameters of the COMPACT parameter that specify whether to compact a data set during migration to DASD.

DASDMIGRATE specifies that DFHSM can compact a data set during migration to DASD.

NODASDMIGRATE specifies that DFHSM does not compact a data set during migration to DASD.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DASDMIGRATE and NODASDMIGRATE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NODASDMIGRATE.

Notes:

1. If you do not want a specific data set to be compacted during volume migration to DASD, use the data set migration exit (ARCMDEXT) to prevent compaction.
2. If you specified the TAPEDELETION(DIRECT) parameter of the SETSYS command, DFHSM ignores the DASDMIGRATE or NODASDMIGRATE subparameter if you specify one of them.
3. Although the MIGRATE and NOMIGRATE subparameters no longer exist, DFHSM does not fail the command if you specify them. Instead, MIGRATE and NOMIGRATE will have the same meaning as DASDMIGRATE and NODASDMIGRATE.

TAPEBACKUP | NOTAPEBACKUP: Specifying Whether to Compact Data Sets during Backup to Tape

Explanation: **TAPEBACKUP | NOTAPEBACKUP** are mutually exclusive, optional subparameters of the COMPACT parameter that specify whether to compact a data set when DFHSM is backing it up to tape.

TAPEBACKUP specifies that DFHSM can compact a data set when DFHSM backs it up to tape.

NOTAPEBACKUP specifies that DFHSM does not compact a data set when DFHSM backs it up to tape.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEBACKUP and NOTAPEBACKUP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOTAPEBACKUP.

Note: If you do not want a specific data set to be compacted during volume backup, use the data set backup exit (ARCBDEXT) to prevent compaction.

TAPEMIGRATE | NOTAPEMIGRATE: Specifying Whether to Compact Data Sets during Migration to Tape

Explanation: **TAPEMIGRATE | NOTAPEMIGRATE** are mutually exclusive, optional subparameters of the COMPACT parameter that specify whether to compact a data set when DFHSM is migrating it to a tape migration level 2 volume.

TAPEMIGRATE specifies that DFHSM can compact a data set when DFHSM migrates it to a tape migration level 2 volume.

NOTAPEMIGRATE specifies that DFHSM does not compact a data set when DFHSM migrates it to a tape migration level 2 volume.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEMIGRATE and NOTAPEMIGRATE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOTAPEMIGRATE.

Note: If you do not want a specific data set to be compacted during volume migration, use the data set migration exit (ARCMDEXT) to prevent compaction.

COMPACTPERCENT: Specifying the Percentage of Space Saved for Compaction

Explanation: **COMPACTPERCENT**(*pct*) is an optional parameter specifying the percentage of space saved if DFHSM is to compact all data sets. For *pct*, substitute a decimal number from 0 to 99 to specify the least amount of space you want saved if DFHSM is to compact a data set.

If you request compaction, DFHSM compacts a data set when it migrates or backs up the data set for the first time. DFHSM then compares the number of bytes written to the total bytes of the original data set and computes the percentage of bytes saved. If the percentage saved is not greater than or equal to *pct*, DFHSM will not compact the data set during subsequent migrations or backups. DFHSM does not check whether the data set was compacted during migration if DFHSM is currently backing up the data set. Similarly, DFHSM does not check whether the data set was compacted during backup if DFHSM is currently migrating the data set.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to COMPACTPERCENT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 40.

Notes:

1. DFHSM makes this comparison only for cataloged data sets.
2. DFHSM compacts a data set only if it can save at least one track on DASD or the data set migrated to an SDSP data set.

CONVERSION | NOCONVERSION: Specifying Whether Reblocking Is to Occur

Explanation: CONVERSION[(REBLOCKBASE | REBLOCKTOANY | REBLOCKTOUNLIKE)] | NOCONVERSION are mutually exclusive, optional parameters specifying whether DFHSM should reblock eligible data sets during recall or recovery. This parameter is not applicable to system-reblockable data sets, whether they are SMS or non-SMS.

CONVERSION specifies that DFHSM can reblock the data sets during recall or recovery.

REBLOCKBASE | REBLOCKTOANY | REBLOCKTOUNLIKE are mutually exclusive, optional subparameters of the CONVERSION parameter that you use to specify the type of reblocking during recall or recovery.

REBLOCKBASE specifies reblocking during recall or recovery to a target DASD device other than a 3330, 3330-1, 3350, and a 3330V when the target DASD volume is different from the source volume.

REBLOCKTOANY specifies reblocking to any DASD device type supported by DFHSM during recall or recovery.

REBLOCKTOUNLIKE specifies reblocking during recall or recovery to any DASD device type supported by DFHSM but only when the source and target volumes are different device types.

NOCONVERSION specifies that DFHSM cannot reblock the data sets even if you specified the data set reblock exit.

SMS Relationship: Conditionally applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CONVERSION and NOCONVERSION. There are no additional abbreviations.

The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REBLOCKBASE, REBLOCKTOANY, and REBLOCKTOUNLIKE. In addition, the DFHSM abbreviations are RBBASE, RBTOANY, and RBTOUNLIKE.

SETSYS Defaults: If you specify the SETSYS command with the CONVERSION parameter and do not specify any subparameter, the SETSYS default is REBLOCKBASE.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is NOCONVERSION.

Notes:

1. DFHSM reblocks only nonkeyed, physical sequential data sets with the following record organizations: fixed-blocked, fixed-blocked-standard, variable-blocked, or variable-blocked-spanned. If a data set specified LRECL=X, DFHSM does not support reblocking.
2. You must specify the CONVERSION parameter if you want to use the data set reblock exit (ARCCDEXT). You can prevent DFHSM from reblocking user-selected data sets by using the data set reblock exit.

CSALIMITS | NOCSALIMITS: Specifying Whether to Use CSA Limiting for MWE Allocation

Explanation: CSALIMITS[(MWE(*#mwes*)] [MAXIMUM(*Kbytes*)] [ACTIVE(*percent1*)] [INACTIVE(*percent2*)]) | NOCSALIMITS are mutually exclusive, optional parameters that you use to specify whether common service area (CSA) limiting of management work element (MWE) storage allocation is to be used during DFHSM processing. The MWE describes a requested function to be performed by DFHSM.

Note: Because of the number of subparameters of the CSALIMITS parameter, each bracketed subparameter is described separately.

CSALIMITS specifies the values for CSA storage allocation to be used during DFHSM processing.

NOCSALIMITS specifies that CSA limiting should not be done during DFHSM processing.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to CSALIMITS and NOCSALIMITS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is CSALIMITS.

MWE: Specifying Maximum Number of NOWAIT MWEs Per Address Space

Explanation: MWE(*#mwes*) is an optional subparameter of the CSALIMITS parameter that you use to specify the maximum number of NOWAIT MWEs submitted by a single address space that are to be kept on the CSA queue until completed. NOWAIT MWEs in excess of the maximum number will be removed from the CSA queue as soon as they are copied into the DFHSM address space. For *#mwes*, specify a 1 to 4-digit decimal number indicating how many NOWAIT MWEs per address space are to be kept on the CSA queue until completed. To limit the number of NOWAIT MWEs to be kept on the CSA queue, specify a number between 0 and 8191. If you specify 0, all NOWAIT MWEs are removed from the CSA queue as soon as they are copied into the address space of DFHSM. If you specify 8192 or higher, the number of MWEs to keep on the CSA queue per address space is limited only by the amount of CSA available, as specified in the MAXIMUM subparameter.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MWE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this subparameter on any SETSYS command, the DFHSM default is 4.

Note: If DFHSM is inactive, the NOWAIT MWEs will not be removed from the CSA queue. In that case, the number of NOWAIT MWEs submitted by all address spaces that will be added to the CSA queue is controlled by the INACTIVE subparameter.

MAXIMUM: Specifying the Maximum Number of CSA Bytes Allocated to All Types of MWEs

Explanation: MAXIMUM(*Kbytes*) is an optional subparameter of the CSALIMITS parameter that you use to specify the maximum number of bytes of CSA storage (K bytes) to be allocated to MWEs. For *Kbytes*, specify a 2 to 5-character decimal number indicating the number of bytes of CSA storage to be allocated to MWEs for DFHSM processing. You can specify a value from 10 to 16383. If you specify 16384 or higher, no limiting of the number of bytes allocated in CSA is done. If the value for MAXIMUM is exceeded, DFHSM fails all new requests until CSA usage drops below the maximum limit or you change the value for MAXIMUM.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MAXIMUM. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this subparameter on any SETSYS command, the DFHSM default is 100.

ACTIVE: Specifying the Percentage of the Maximum Limit to Be Allocated to Any Type of MWE

Explanation: ACTIVE(*percent1*) is an optional subparameter of the CSALIMITS parameter that you use to specify the percent of CSA storage that DFHSM can allocate to all types of MWEs when DFHSM is active. After the percentage is reached, only batch WAIT MWEs are added to the CSA queue. All other requests are failed until CSA storage usage drops below the limit or you change the limit. For *percent1*, specify a 1 to 3-character number indicating the percentage of CSA storage to be allocated to all types of MWEs. The number can range from 0 to 100.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ACTIVE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this subparameter on any SETSYS command, the DFHSM default is 90.

INACTIVE: Specifying the Percentage of the Maximum Limit to Be Allocated to NOWAIT MWEs

Explanation: INACTIVE(*percent2*) is an optional subparameter of the CSALIMITS parameter that you use to specify the percent of CSA storage that DFHSM can allocate to NOWAIT MWEs while DFHSM is inactive. After the percentage is reached, all requests are failed until DFHSM is started or you change the limit. For *percent2*, specify a 1 to 3-character number indicating the percentage of CSA storage to be allocated to NOWAIT MWEs while DFHSM is inactive. The number can range from 0 to 100.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to INACTIVE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this subparameter on any SETSYS command, the DFHSM default is 30.

DAYS: Specifying the Minimum Migration Age of a Data Set

Explanation: DAYS(*days*) is an optional parameter specifying the number of contiguous days a data set must remain unreferenced before the data set is eligible for migration. DFHSM uses this parameter to migrate data sets from primary volumes to migration level 1 volumes under the following conditions:

- The primary volume does not already have a minimum migration age.
  - For automatic migration, DFHSM checks the minimum migration age you specified with the ADDVOL command. If you did not specify the MIGRATE(*days*) parameter of the ADDVOL command, DFHSM uses the minimum migration age you specify with this parameter.
  - For command migration, DFHSM checks the minimum migration age you specified with the MIGRATE command. If you did not specify a value for *days* with the MIGRATE command, DFHSM checks whether you specified the minimum migration age with the ADDVOL command. If you also did not specify the MIGRATE(*days*) parameter of the ADDVOL command, DFHSM uses the minimum migration age you specify with this parameter.
- For non-managed volumes, DFHSM checks whether you used the MIGRATE command to specify the minimum migration age. If you did not, DFHSM uses the age you specify with this parameter.

The value you specify for *days* depends on your environment. If you are running in a single-processing-unit environment, substitute a decimal number from 1 to 999. If you are running in a multiple-processing-unit environment, substitute a decimal number from 2 to 999.

SMS Relationship: Not applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DAYS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 1 if DFHSM is running in a single-processing-unit environment or 2 if DFHSM is running in a multiple-processing-unit environment.

Note: DFHSM uses the DAYS value when you have not defined thresholds of occupancy for a volume. If you have defined thresholds of occupancy for the volume, the DAYS parameter is another way to set a lower limit for migration.

DEBUG | NODEBUG: Specifying Debug Mode

Explanation: DEBUG | NODEBUG are mutually exclusive, optional parameters specifying whether DFHSM is to operate in debug mode.

DEBUG specifies that DFHSM is to operate in debug mode. A command to process only one data set is not affected by the DEBUG parameter. You use DEBUG to monitor the effect of DFHSM on your computing system. DFHSM does all automatic and command volume space management, backup, dump, and command expiration of backup versions functions without moving or deleting any data sets. DFHSM prints messages about volume processing in the appropriate activity log and, if you want, at the console. In a system with MVS/SP 1.3.1 or an earlier release, DFHSM also displays tape mount messages for those data sets that would be migrated or backed up to tape. Because you can monitor the data sets and volumes that DFHSM would have managed, you can decide which data sets you do not want DFHSM to process.

NODEBUG specifies that DFHSM is not to operate in debug mode.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DEBUG and NODEBUG. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is NODEBUG.

Note: To use the debug mode, decide which volumes you want DFHSM to manage. Then, run DFHSM in debug mode. When you are satisfied that the volumes are being managed as you want, specify NODEBUG. DFHSM will then process the data sets. You can use this gradual conversion procedure when you add more volumes to DFHSM control.

DEFERMOUNT | NODEFERMOUNT: Specifying Defer Mounting of Tapes

Explanation: DEFERMOUNT | NODEFERMOUNT are mutually exclusive, optional parameters specifying whether DFHSM is to defer mounting of tape volumes.

DEFERMOUNT specifies that DFHSM is to defer mounting of tape volumes. When DFHSM dynamically allocates a tape volume, dynamic allocation does not issue a mount message. Instead, open processing issues the mount message (IEC501A).

NODEFERMOUNT specifies that DFHSM will not defer mounting of tape volumes. When DFHSM dynamically allocates a tape volume, dynamic allocation will issue the mount message.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DEFERMOUNT and NODEFERMOUNT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is DEFERMOUNT.

DENSITY: Specifying the Tape Density When Allocating Scratch Tapes during Backup

Explanation: **DENSITY(2 | 3 | 4)** is an optional parameter identifying which tape density to specify the first time DFHSM requests that a scratch tape be mounted during backup.

The decimal number 2 indicates a tape density of 32 bytes/mm (800 BPI); 3 represents a density of 63 bytes/mm (1600 BPI), and 4 represents a density of 246 bytes/mm (6250 BPI). If you specify a density of 2, 3, or 4 for the 3480 Magnetic Tape Subsystem, DFHSM ignores it.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DENSITY. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is the highest density for the specified unit.

Note: If you specify DENSITY and UNITNAME, the density must match the density capabilities for that type of unit.

DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION: Specifying Data Set Serialization

Explanation: **DFHSMDATASETSERIALIZATION | USERDATASETSERIALIZATION** are mutually exclusive, optional parameters that apply to volume migration and volume backup in a multiple-processing-unit environment. These parameters specify whether data set serialization of system resources is provided for all data sets by system facilities.

DFHSMDATASETSERIALIZATION specifies that data set serialization of system resources during volume migration and volume backup in a multiple-processing-unit environment is not provided by system facilities and that DFHSM should implement its requirements for resource serialization.

USERDATASETSERIALIZATION specifies that data set serialization of system resources during volume migration and volume backup in a multiple-system environment is provided by system facilities. Examples of such system facilities in multiple processing units are Global Resource Serialization and JES3 data set reservation. In a single processing unit, data set enqueue is provided. Also, DFHSM should optimize its requirements for resource serialization with those facilities.

Warning: Do not specify USERDATASETSERIALIZATION unless you have a data set serialization facility installed and enabled on your system. Otherwise, serious data integrity problems can occur.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DFHSMDATASETSERIALIZATION and USERDATASETSERIALIZATION. In addition, you can use the abbreviation HSERIALIZATION for DFHSMDATASETSERIALIZATION and USERIALIZATION for USERDATASETSERIALIZATION.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is DFHSMDATASETSERIALIZATION.

DUMPIO: Specifying the DFDSS DASD I/O Buffering Technique

Explanation: **DUMPIO(1 | 2 | 3 | 4)** is an optional parameter identifying which DFDSS DASD I/O buffering technique, the number of tracks read for each EXCP, to use.

The values and their meanings are as follows:

Value	Meaning
1	DFDSS reads 1 track at a time
2	DFDSS reads 2 tracks at a time
3	DFDSS reads 5 tracks at a time
4	DFDSS reads 1 cylinder at a time

Note: Exercise caution when using the DUMPIO parameter, as it can have a severe impact on virtual and real storage requirements in an MVS/370 system. The higher the level of optimization that is used, the more real storage that will be required for I/O buffers which are page-fixed. This could result in a limit to the number of concurrent DFHSM tasks, require that DFHSM address space be expanded, or cause overall system degradation. In an MVS/XA environment, the default is to place the necessary I/O buffers above the 16 megabyte line. Refer to *Data Facility Data Set Services: User's Guide*, SC26-4388 for restrictions and storage requirements.

SMS Relationship: Not Related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMPIO. There are no additional abbreviations.

SETSYS Defaults: If you specify DUMPIO without a value, the SETSYS default is 1.

DFHSM Defaults: None.

EMERGENCY | NOEMERGENCY: Specifying No Data Set Movement

Explanation: **EMERGENCY | NOEMERGENCY** are mutually exclusive, optional parameters specifying whether emergency mode is in effect. Emergency mode stops all DFHSM automatic and command data set processing in both SMS and non-SMS environments. For example, the EMERGENCY parameter could be used if the level 1 volumes become unusable for migration.

EMERGENCY specifies that emergency mode is in effect and no DFHSM data set processing is performed. DFHSM allows any operation in process to finish the currently selected data set.

NOEMERGENCY specifies that emergency mode is not in effect and all DFHSM data set processing runs normally.

Note: You can start DFHSM in emergency mode by specifying EMERG=YES on the START command.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EMERGENCY and NOEMERGENCY. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is NOEMERGENCY.

ERASEONSCRATCH | NOERASEONSCRATCH: Specifying to Check for Erase of DFHSM-Owned Data Sets

Explanation: **ERASEONSCRATCH | NOERASEONSCRATCH** are mutually exclusive, optional parameters specifying whether DFHSM should check for erase of DFHSM owned data sets which have migrated or been backed up to DFHSM-owned volumes.

ERASEONSCRATCH specifies that DFHSM will ask RACF for the erase status of the user's data set when backup versions and migration copies are scratched from DFHSM owned DASD volumes. The data set is deleted and if RACF indicates erase-on-scratch, the DASD residual data is overwritten by data management.

NOERASEONSCRATCH specifies that DFHSM will not ask RACF for the erase status of the user's data set when backup versions and migration copies are scratched from DFHSM owned DASD volumes. The data set is deleted but the DASD residual data is not overwritten by data management.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ERASEONSCRATCH and NOERASEONSCRATCH. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is NOERASEONSCRATCH.

Notes:

1. DFHSM always allows data management to perform erase-on-scratch functions for user owned data sets.
2. ERASEONSCRATCH and NOERASEONSCRATCH affect only backup versions and migration copies of data sets.

EXITOFF: Specifying Inactive Exits

Explanation: **EXITOFF(***modname,modname, ...*) is an optional parameter specifying inactive DFHSM exits. For *modname*, substitute the module name of the exit you want to be inactive. Refer to *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* for additional information about user exits. Valid exit module names and their meanings are as follows:

Module Name	Meaning
ARCADEXT	Data set deletion exit
ARCBDEXT	Data set backup exit
ARCCBEXT	Control data set backup exit
ARCCDEXT	Data set reblock exit
ARCINEXT	Initialization exit
ARCMDEXT	Data set migration exit
ARCMMEXT	Second level migration data set exit
ARCMVEXT	Space management volume exit
ARCRDEXT	Data set recall exit
ARCSAEXT	Space management and backup exit
ARCTDEXT	Tape data set exit
ARCTVEXT	Tape volume exit

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXITOFF. In addition, you can use the following abbreviations for the exit module names:

AD	ARCADEXT
BD	ARCBDEXT
CB	ARCCBEXT
CD	ARCCDEXT
IN	ARCINEXT
MD	ARCMDEXT
MM	ARCMMEXT
MV	ARCMVEXT

RD	ARCRDEXT
SA	ARCSAEXT
TD	ARCTDEXT
TV	ARCTVEXT

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify an exit *modname* on a SETSYS command, the DFHSM default is that exits will remain in their current state from a previous SETSYS command.

Notes:

1. You can delete user exits while DFHSM is running. If you want to delete user exits, you must specify the exits to be deleted with the EXITOFF parameter.
2. Exits ARCINEXT, ARCMMEXT, and ARCSAEXT are not supported on the EXITS parameter.
3. All existing user exits are supported on the EXITOFF parameter.
4. The *modnames* are not positional. Exits not specified will remain in their current state.
5. If the EXITS parameter and either the EXITOFF or EXITON parameter both specify the same exit on a SETSYS command, the status specified with the EXITOFF or EXITON parameter has precedence over the status specified with the EXITS parameter.
6. If the same exit is specified in both the EXITOFF and EXITON parameters on a SETSYS command, DFHSM will leave that exit inactive.
7. The recall exit (ARCRDEXT) and data set deletion exit (ARCADEXT) will not be invoked for SMS-managed data sets.

EXITON: Specifying Active Exits

Explanation: **EXITON(***modname,modname, ...* **)** is an optional parameter specifying active DFHSM exits. For *modname*, substitute the module name of the exit you want to be active. Refer to *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* for additional information about user exits. Valid exit module names and their meanings are as follows:

Module Name	**Meaning**
ARCADEXT	Data set deletion exit
ARCBDEXT	Data set backup exit
ARCCBEXT	Control data set backup exit
ARCCDEXT	Data set reblock exit
ARCINEXT	Initialization exit
ARCMDEXT	Data set migration exit
ARCMMEXT	Second level migrate data set exit
ARCMVEXT	Space management volume exit
ARCRDEXT	Data set recall exit
ARCSAEXT	Space management and backup exit
ARCTDEXT	Tape data set exit
ARCTVEXT	Tape volume exit

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXITON. In addition, you can use the following abbreviations for the exit module names:

AD	ARCADEXT
BD	ARCBDEXT
CB	ARCCBEXT
CD	ARCCDEXT
IN	ARCINEXT
MD	ARCMDEXT
MM	ARCMMEXT
MV	ARCMVEXT
RD	ARCRDEXT
SA	ARCSAEXT
TD	ARCTDEXT
TV	ARCTVEXT

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify an exit *modname* on any SETSYS command, the DFHSM default is that no exits are active.

Notes:

1. You can dynamically load user exits while DFHSM is running. If you want to load user exits, you must specify the exits to be loaded with the EXITON parameter.
2. Exits ARCINEXT, ARCMMEXT, and ARCSAEXT are not supported on the EXITS parameter.
3. All existing user exits are supported on the EXITON parameter.
4. The *modnames* are not positional. Exits not specified will remain in their current state.
5. If the EXITS parameter and either the EXITOFF or EXITON parameter both specify the same exits on the same SETSYS command, the status specified with the EXITOFF or EXITON parameter has precedence over the status specified with the EXITS parameter.
6. If the same exit is specified in the both the EXITOFF and EXITON parameters on a SETSYS command, DFHSM will leave that exit inactive.
7. If an exit is specified with that EXITON and the that exit is already active, DFHSM does not load a new copy of the exit.
8. The recall exit (ARCRDEXT) and data set deletion exit (ARCADEXT) will not be invoked for SMS-managed data sets.

EXITS: Specifying the User Exits to Be Taken

Explanation: **EXITS(abcdefghi)** is an optional parameter indicating which of the optional user exits are active. For *abcdefghi*, substitute a string of alphabetic Ys and Ns. The Ys indicate which exits are active, and the Ns indicate which exits are inactive. If you specify a Y for an exit during startup, you can later use a SETSYS command to inactivate the exit. The recall exit (ARCRDEXT) and data-set-deletion exit (ARCADEXT) do not apply and will not be invoked for SMS-managed data

sets. Refer to *Data Facility Hierarchical Storage Manager: Installation and Customization Guide* for additional information about user exits. The following list shows the correlation between the string of Ys and Ns and the optional user exits:

a ARCMVEXT (space management volume exit)
b ARCMDEXT (data set migration exit)
c ARCADEXT (data set deletion exit)
d ARCRDEXT (recall exit)
e ARCBDEXT (data set backup exit)
f ARCCDEXT (data set reblock exit)
g ARCTDEXT (tape data set exit)
h ARCTVEXT (tape volume exit)
i ARCCBEXT (control data set backup exit).

For example, if you wish to invoke ARCMVEXT, the space management volume exit, and ARCBDEXT, the data set backup exit, you would specify YNNNYNNNN.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXITS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is that no exits are active.

Notes:

1. You can dynamically load user exits while DFHSM is running. If you want to request user exits, you must specify a Y for each requested exit with the EXITS parameter. In addition, you must specify a Y or N for each available exit each time you specify the EXITS parameter.
2. Exits ARCINEXT, ARCMMEXT, and ARCSAEXT are not supported on the EXITS parameter.
3. If the EXITS parameter and either the EXITOFF or EXITON parameter both specify the same exit on a SETSYS command, the status specified with the EXITOFF or EXITON parameter has precedence over the status specified with the EXITS parameter.
4. If you specify an exit to be active, and it is already active, DFHSM does not load a new copy of the exit.
5. The recall exit (ARCRDEXT) and data set deletion exit (ARCADEXT) will not be invoked for SMS-managed data sets.

EXPIREDDATASETS: Specifying Whether to Scratch Data Sets with Expired Expiration Dates

Explanation: **EXPIREDDATASETS(SCRATCH | NOSCRATCH)** is an optional parameter specifying whether DFHSM should scratch non-SMS data sets with expired expiration dates. SMS data sets are expired when they have exceeded their specified expiration date.

SCRATCH specifies that DFHSM scratch data sets having an expired expiration date when it performs space management and migration cleanup.

NOSCRATCH specifies that DFHSM ignore the expiration date. DFHSM will process the data set as if the expiration date were not reached.

SMS Relationship: Conditionally applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXPIREDDATASETS. In addition, you can use the abbreviation EXPDS for EXPIREDDATASETS.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is not to scratch the expired data sets.

EXPORTESDS: Specifying Whether to EXPORT VSAM ESDS Data Sets Using CIMODE Processing

Explanation: **EXPORTESDS(CIMODE | RECORDMODE)** is an optional parameter that you use to specify whether all VSAM entry-sequenced data sets with no alternate index are to be processed by control interval or by record.

CIMODE specifies that DFHSM process VSAM entry-sequenced data sets with no alternate index by control interval.

RECORDMODE specifies that DFHSM process VSAM entry-sequenced data sets with no alternate index by record.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to EXPORTESDS. There are no additional abbreviations.

SETSYS Defaults: If you specify the EXPORTESDS parameter without specifying any subparameters, the default is RECORDMODE.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is EXPORTESDS(RECORDMODE).

Note: VSAM entry-sequenced data sets can only be processed by control interval when MVS/XA Data Facility Product (DFP) Version 2 Release 1 (FMID HDP2210) is installed with PTFs UZ90276, UZ51258, and UZ48417. In a multiple-processing-unit environment with a different level of DFP installed on another processor, do not specify the CIMODE subparameter on any processing unit. The processing unit that does not have the proper DFP installed cannot recall or recover a VSAM entry-sequenced data set that DFHSM migrated or backed up when the CIMODE subparameter was in effect.

FREQUENCY: Specifying the Number of Days between Backup Versions of a Data Set

Explanation: FREQUENCY(*days*) is an optional parameter specifying the number of days that must have elapsed since the last time DFHSM backed up a data set before DFHSM will back up the data set again. For *days*, substitute a decimal number from 0 to 999. A value of 0 allows DFHSM to back up data sets every time volume backup runs unless you use the FREQUENCY parameter of the ALTERDS or BACKVOL command to change the frequency.

SMS Relationship: Not applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to FREQUENCY. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is zero.

INCREMENTALBACKUP: Specifying Whether to Back Up Only Changed Data Sets during Incremental Volume Backup

Explanation: INCREMENTALBACKUP(CHANGEDONLY | ORIGINAL) is an optional parameter specifying whether DFHSM should back up only changed data sets during incremental volume backup.

CHANGEDONLY specifies that DFHSM backs up the following data sets only if their change bit is on in the format 1 DSCB:

- Non-VSAM data sets
- VSAM data sets cataloged in an Integrated Catalog Facility catalog.

ORIGINAL specifies that DFHSM creates an initial backup version (if one does not exist) for all non-VSAM and Integrated Catalog Facility VSAM data sets on a primary volume when incremental backup takes place, regardless of the setting of the change bit in the format 1 DSCB.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to INCREMENTALBACKUP, CHANGEDONLY, and ORIGINAL. There are no additional abbreviations.

SETSYS Defaults: If you do not specify either subparameter on any SETSYS command, the SETSYS default is ORIGINAL.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is ORIGINAL.

Notes:

1. VSAM data sets not cataloged in an Integrated Catalog Facility Catalog are backed up during incremental backup by comparing the date of the last update from the catalog record to the date of the last backup from the BCDS.
2. If you specify CHANGEDONLY, you should occasionally specify ORIGINAL because a backup version might not always exist for all data sets.
   - When DFHSM is first installed at a facility using VSAM data sets cataloged in an Integrated Catalog Facility catalog, the existing Integrated Catalog Facility VSAM data sets do not have their change flags on. Data management does not support the change flag for these data sets until DFHSM is installed. For that reason, DFHSM does not automatically back them up.
   - DFDSS or a similar product backed up the volume and reset the change flags before DFHSM backed up the data set.
   - The user deleted the backup version that DFHSM created and the data set was not changed again.
   - The INCREMENTALBACKUP parameter only affects data sets residing on a primary volume when incremental backup is performed. This means that even if you have specified ORIGINAL, no backup copy will be created for a migrated data set for which the change bit in the format 1 DSCB is off. These data sets will have to be backed up individually using the BACKDS command.

INPUTTAPEALLOCATION: Specifying Whether to Wait for the Input Tape to Be Allocated

Explanation: INPUTTAPEALLOCATION(WAIT | NOWAIT) is an optional parameter specifying whether DFHSM should wait until the tape unit is allocated for the input tape for recall, recovery, or restore.

WAIT specifies that DFHSM waits until the input tape unit is allocated. All DFHSM functions requesting allocations stop until this allocation request is satisfied.

NOWAIT specifies that DFHSM does not wait until the input tape unit is allocated. Instead, DFHSM re-issues the request every 10 seconds up to six times. If the input tape unit is still not allocated after seven tries, DFHSM asks the operator whether DFHSM should cancel the request or repeat the allocation sequence.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to INPUTTAPEALLOCATION, WAIT, and NOWAIT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOWAIT.

INTERVALMIGRATION | NOINTERVALMIGRATION: Specifying Whether Interval Migration Is to Be Done

Explanation: INTERVALMIGRATION | NOINTERVALMIGRATION are mutually exclusive, optional parameters specifying whether DFHSM should do interval migration. The purpose of interval migration is to prevent the DFHSM-managed volumes from running out of space during the day. DFHSM normally does a space check every hour. Therefore, if you request interval migration, DFHSM uses this hourly space check to determine on which volumes interval migration is done.

INTERVALMIGRATION specifies that interval migration is done.

NOINTERVALMIGRATION specifies that interval migration is not done.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to INTERVALMIGRATION and NOINTERVALMIGRATION. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is INTERVALMIGRATION.

Note: If you want the operator to decide whether interval migration should be allowed after DFHSM decides it is necessary, specify the INTERVALMIGRATION parameter and the REQUEST parameter. Interval migration does not occur during the DFHSM startup process.

JES2 | JES3: Specifying the Job Entry Subsystem

Explanation: JES2 | JES3 are mutually exclusive, optional parameters specifying the job entry subsystem that is used with DFHSM.

If you want to use JES3, you must specify the JES3 parameter before you specify the first ADDVOL command. If you do not, DFHSM defaults to JES2. When DFHSM is started in an operating system that has JES3 and you do not specify JES3 during DFHSM initialization, an error message is written when DFHSM receives the first superlocate request from JES3 converter/interpreter. If you specify JES3, but the operating system uses JES2, DFHSM is not notified of the error. However, DFHSM uses the rules that govern pool configuration for JES3, and one or both of the following situations can occur:

- Some ADDVOL, SETSYS, and DEFINE commands fail if they are issued when it is unacceptable in a JES3 system.
- Volumes eligible for recall in a JES2 system might not qualify for the DFHSM general pool and, in some cases, are not available for recall in the JES3 system.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to JES2 and JES3. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is JES2.

JOURNAL | NOJOURNAL: Specifying Whether to Write Updated Control Data Set Records in the Journal Data Set

Explanation: **JOURNAL[(RECOVERY | SPEED)] | NOJOURNAL** are mutually exclusive, optional parameters specifying whether MCDS data set records, BCDS data set records, and OCDS data set records are written in the journal data set when DFHSM updates the control data sets. If the MCDS, BCDS, or OCDS is lost or damaged, you can use the journal data set with a backup copy of the control data set to re-create the affected control data set.

JOURNAL specifies that DFHSM write the BCDS, MCDS, and OCDS data set records in the journal data set when DFHSM updates them.

SPEED specifies that the module making the change should wait only until the journaling request has been added to the journaling queue. When you use SPEED, DFHSM does not wait long because of the following reasons:

- The journal task has the highest dispatching priority among all DFHSM tasks.
- The journal entries are not blocked.
- In each processing unit, the journal entries are written in the order they were created.

The task probably does not lose more than one entry if the system fails unless you allocate the journal data set on a volume that is used often.

RECOVERY specifies that the module making the change should wait until the journal entry has been written in the journal data set. DFHSM writes each record as it receives the record. Therefore, not more than one entry can be lost if DFHSM abnormally ends. After DFHSM updates the affected control data set and writes each journal data set entry, DFHSM continues processing.

Note: If the SETSYS TRACE and JOURNAL (RECOVERY) options are both requested, DFHSM operates as though JOURNAL SPEED was requested.

NOJOURNAL specifies that DFHSM is not to write the updated BCDS, MCDS, and OCDS records in the journal data set.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to JOURNAL, SPEED, RECOVERY, and NOJOURNAL. There are no additional abbreviations.

SETSYS Defaults: If you specify JOURNAL without a subparameter, the SETSYS default is SPEED.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is JOURNAL(SPEED).

Notes:

1. DFHSM does not write updated entries from the BCDS, MCDS, and OCDS unless you include a DD statement for the journal data set in the OS/VS2 JCL in the DFHSM startup procedure.
2. DFHSM nulls the journal data set every time DFHSM successfully backs up the control data sets.

MAXBACKUPTASKS: Specifying the Maximum Number of Concurrent Volume Backup Tasks

Explanation: MAXBACKUPTASKS(*tasks*) is an optional parameter specifying the maximum number of volume backup tasks DFHSM can concurrently process. For *tasks*, substitute a decimal number from 1 to 15 to represent the number of volume backup tasks to be run concurrently.

To decide how many concurrent volume backup tasks DFHSM should run, consider how many tape units are available if you use tape backup volumes. Also, consider how many backup volumes you have available and the system work load when volume backup will be running. Because each volume backup task chooses a unique daily backup volume, it is impractical to specify more volume backup tasks than available daily backup volumes because a volume backup task will wait until a daily backup volume is available.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MAXBACKUPTASKS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is two tasks.

MAXDUMPTASKS: Specifying the Maximum Number of Concurrent Volume Dump Tasks

Explanation: MAXDUMPTASKS(*tasks*) is an optional parameter specifying the maximum number of volume dump tasks DFHSM can concurrently process. For *tasks*, substitute a decimal number from 1 to 15 to represent the number of dump tasks to be run concurrently.

Because multiple classes can be requested for each input volume, MAXDUMPTASKS does not explicitly limit the number of output copies. To decide how many concurrent volume dump tasks DFHSM should run, consider how many tape units are available. Multiple dump classes for an input volume require a separate tape drive for a tape in each class. To determine the required number of tape drives for the volume dump process, multiply the number of classes per volume by the number of dump tasks *tasks*. This number should not exceed the number of tape drives expected to be available during the volume dump process.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MAXDUMPTASKS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is two tasks.

MAXEXTENTS: Specifying the Number of Extents to Cause Extent Reduction

Explanation: MAXEXTENTS(*extents*) is an optional parameter specifying the number of extents that, if equaled or exceeded, causes DFHSM to reallocate all non-VSAM data sets. For *extents*, substitute a decimal number from 0 to 16 specifying the number of extents to allow before DFHSM does extent reduction. If you specify 0, DFHSM does not do extent reduction.

Any time volume migration occurs for volumes containing a non-VSAM data set that cannot migrate because the data set was referred to too recently but has reached or exceeded its maximum extents, DFHSM migrates and then immediately recalls the data set. This process is called extent reduction. Extent reduction releases unused space, reduces the number of extents, and compresses partitioned data sets.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MAXEXTENTS. There are no additional abbreviations.

SETSYS Defaults: If you specify a value larger than 16, the SETSYS default for *extents* is 16.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 0.

Notes:

1. The MAXEXTENTS parameter does not apply to VSAM data sets or to data set organizations not supported by DFHSM.
2. You use this parameter for active, non-VSAM data sets.
3. DFHSM will not do extent reduction unless the data set is more than one day old in a single-processing-unit environment or two days old in a multiple-processing-unit environment.

MAXRECALLTASKS: Specifying the Maximum Number of Active Recall Tasks

Explanation: MAXRECALLTASKS(*tasks*) is an optional parameter specifying the number of active recall tasks DFHSM can concurrently process. For *tasks*, substitute a decimal number from 1 to 15 for the number of concurrent recall tasks DFHSM can process.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MAXRECALLTASKS. There are no additional abbreviations.

SETSYS Defaults: If you specify a value larger than 15, the SETSYS default for *tasks* is 15.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default for *tasks* is 5.

MAXSINGLEFILEBLOCKS: Specifying the Maximum Number of 16K-Byte Blocks to Be Written to a 3480 Volume in Single-File Format

Explanation: MAXSINGLEFILEBLOCKS (*blocks*) is an optional parameter specifying the maximum number of 16K-byte blocks that DFHSM will write to a 3480 backup or migration volume in single-file format. For *blocks*, substitute a decimal from 0 to 99,999.

When DFHSM has written the number of blocks specified, it performs a forced end-of-volume on that 3480 volume. This allows the system programmer to limit the amount of media used if a volume is to be copied. If the DFHSM default value of 11,421 blocks is used, there is a very high probability that the 3480 volume can be copied to a single 3480 volume. The total capacity of each 3480 single-file format volume is reduced by approximately 5% to 10% so that it can be copied to another 3480 volume. If you do not plan to copy 3480 volumes in single-file format, specify MAXSINGLEFILEBLOCKS (0) to use the entire 3480 volume.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MAXSINGLEFILEBLOCKS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default for *blocks* is 11,421.

Note: This default value includes four blocks of header and trailer labels.

MIGDENSITY: Specifying the Tape Density When Allocating Scratch Tapes for Migration

Explanation: MIGDENSITY(2 | 3 | 4) is an optional parameter identifying which tape density to specify the first time DFHSM requests that a scratch tape be mounted when DFHSM migrates a data set to a tape migration level 2 volume.

The decimal number 2 indicates a tape density of 32 bytes/mm (800 BPI); 3 represents a density of 63 bytes/mm (1600 BPI), and 4 represents a density of 246 bytes/mm (6250 BPI). If you specify a density of 2, 3, or 4 for the 3480 Magnetic Tape Subsystem, DFHSM ignores it.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGDENSITY. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is the highest density for the specified unit.

Note: If you specify MIGDENSITY and MIGUNITNAME, the density must match the density capabilities for that type of unit.

MIGRATEPREFIX: Specifying the Prefix for the Migration Copy Name

Explanation: **MIGRATEPREFIX(*prefix*)** is an optional parameter specifying the prefix of the data set name DFHSM generates when it migrates the data set. For *prefix*, substitute from 1 to 7 alphameric characters.

The migration copy name has the following format:

prefix.HMIG.T*ssmmhh.user1.user2.Xyddd*

prefix is replaced with the prefix you specify with this command.

HMIG indicates that this is a migrated data set.

T*ssmmhh* is the time when DFHSM migrated the data set. *ss* is the second, *mm* is the minute, and *hh* is the hour. If a duplicate exists after this name is generated, DFHSM changes the first character of the time stamp.

user1 and *user2* are replaced with the first two qualifiers of the data set name. The data set name can be 44 characters long.

Xyddd is the date when DFHSM migrated the data set. DFHSM replaces the X with a letter that represents the decade. A-J have the following meaning:

A—1	F—6
B—2	G—7
C—3	H—8
D—4	I—9
E—5	J—0.

For example, you specify MIGRATEPREFIX(HSMMIG). Your data set name is JONES.CLIST.TEXT. DFHSM migrates the data set on 15 July 1984 at 5:33 p.m. The migration copy name is:

```
HSMMIG.HMIG.T003317.JONES.CLIST.H4198
```

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATEPREFIX. In addition, you can use the abbreviation MPFX for MIGRATEPREFIX.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is the UID you specified in the DFHSM startup procedure. *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* explains the UID and the DFHSM startup procedure.

MIGRATIONCLEANUPDAYS: Specifying the Number of Days to Keep MCDS Data Set Records and Statistics Records

Explanation: MIGRATIONCLEANUPDAYS(*recalldays statdays*) is an optional parameter specifying the number of days that DFHSM keeps MCDS records for all recalled data sets or daily and volume statistics records before it deletes them during migration cleanup. For *recalldays*, substitute a decimal number from 0 to 999 for the number of days DFHSM keeps MCDS data set records for recalled data sets. For *statdays*, substitute a decimal number from 1 to 999 for the number of days DFHSM keeps the daily and volume statistics records.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONCLEANUPDAYS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default for *recalldays* is 10, and for *statdays* is 30.

MIGRATIONLEVEL1DAYS: Specifying the Inactive Age for Data Sets Migrating from Level 1 Volumes

Explanation: MIGRATIONLEVEL1DAYS(*days*) is an optional parameter specifying the number of contiguous days a data set must remain unreferenced before the data set is eligible for migration from a level 1 volume to a level 2 volume. For *days*, substitute a decimal number from 0 to 999. This value includes the time the unreferenced data set was on a primary volume. For example, if you specified MIGRATIONLEVEL1DAYS(15) and the minimum migration age is 5, the unreferenced data set remains on the primary volume for 5 days and on the migration level 1 volume for 10 days before DFHSM migrates it to a migration level 2 volume.

SMS Relationship: Not applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL1DAYS. In addition, you can use the abbreviation ML1DAYS for MIGRATIONLEVEL1DAYS.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter with any SETSYS command, the DFHSM default is 60 calendar days.

Note: MIGRATIONLEVEL1DAYS only applies to migration from level 1 volumes to level 2 volumes.

MIGUNITNAME: Specifying the Type of Unit for Allocating a Scratch Tape during Migration

Explanation: MIGUNITNAME(*name*) is an optional parameter identifying the type of unit that should be specified the first time DFHSM requests that a scratch tape be allocated during migration. For *name*, the types of units you can request for allocating the scratch tape are 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, 3480, or an esoteric name you specify in the USERUNITTABLE parameter of the SETSYS command. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGUNITNAME. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 3400-6.

Notes:

1. You cannot specify an esoteric unit name that represents DASD; it must represent tape.
2. DFHSM does not use MIGUNITNAME when it requests that a scratch volume be allocated while continuing from another volume. Instead, DFHSM uses the same unit the volume was allocated on.
3. If you specify MIGDENSITY and MIGUNITNAME, the density must match the density capabilities for that type of unit. If you specify MIGUNITNAME and do not specify MIGDENSITY, DFHSM uses the highest density for the specified unit.
4. If you specify an esoteric unit name with the MIGUNITNAME parameter, you must also have identified the esoteric unit name to DFHSM with the USERUNITTABLE parameter.
5. You can specify the USERUNITTABLE parameter when you specify the MIGUNITNAME parameter or you could have specified USERUNITTABLE with a previous SETSYS command during this startup.

ML2RECYCLEPERCENT: Specifying the Maximum Percentage of Valid Data on a Migration Tape

Explanation: ML2RECYCLEPERCENT(*pct*) is an optional parameter specifying the percent valid criteria DFHSM uses to recycle tape migration level 2 volumes if you do not specify the PERCENTVALID parameter of the RECYCLE command. For *pct*, substitute a decimal number from 0 to 99. When DFHSM invalidates a data set entry for a full volume and the percent of valid data on the migration level 2 tape volume becomes less than or equal to *pct*, DFHSM writes message ARC0365I in the command activity log.

When using single-file tape format, the percentage of valid blocks is calculated by dividing the number of valid blocks on the tape by the number of blocks defined by

the SETSYS MAXSINGLEFILEBLOCKS parameter rather than the total blocks written. This is due to the fact that a system failure can cause a tape to not be completely filled when using the single-file format.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ML2RECYCLEPERCENT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 0.

Note: DFHSM ignores the ML2RECYCLEPERCENT parameter of this command or the PERCENTVALID parameter of the RECYCLE command when you use the RECYCLE command to recycle specific tape migration level 2 volumes.

MONITOR: Specifying Which Informational Messages to Print at the System Console

Explanation: **MONITOR ([BACKUPCONTROLDATASET(***thresh extents***[NEWCOPY]) JOURNAL(***thresh extents***) MIGRATIONCONTROLDATASET(***thresh extents***[NEWCOPY]) OFFLINECONTROLDATASET[***thresh extents***[NEWCOPY]]) [SPACE | NOSPACE] [STARTUP | NOSTARTUP] [VOLUME | NOVOLUME]** is an optional parameter set that specifies which informational messages DFHSM is to print at the system console, and the values DFHSM is to use for monitoring space in the journal and control data sets.

Note: Because of the number of subparameters of the MONITOR parameter, each bracketed pair of subparameters is described separately.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MONITOR. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 80%, one extent, and no messages are printed about space use, startup, or data sets processed during volume processing.

Note: If you specify MONITOR, the specified level of activity logging controls which messages are written to the system console. For example, if you specify ACTLOGMSGLVL(EXCEPTIONONLY), DFHSM does not write the successful execution messages to the system console.

BACKUPCONTROLDATASET: Monitoring the Space Used in the BCDS

Explanation: **BACKUPCONTROLDATASET(*thresh extents* [NEWCOPY])** is an optional subparameter of the MONITOR parameter that specifies when DFHSM issues warning messages about the amount of space used in the BCDS.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the BCDS exceeds this percentage value, DFHSM warns the system operator that the data set is getting full.

For *extents*, substitute a decimal number that specifies the number of data set extents (primary and secondary) that DFHSM should use when computing the total available space in the BCDS. A value of 1 specifies that only the primary extent allocation is to be considered available. If you specify a value that is greater than the VSAM data set maximum number of 123 extents, DFHSM uses 123 extents. If you specify a value less than 1, DFHSM uses 1.

Note: The calculation for the total number of bytes available for the control data set is based on the assumption that the primary allocation is satisfied in one extent.

NEWCOPY is an optional parameter specifying that DFHSM obtain new data about the current amount of space used from the catalog to replace the space data in the DFHSM multiple-processing-unit control record. Specify NEWCOPY under the following conditions:

- The BCDS is allocated for the first time.
- The BCDS is reallocated.
- The BCDS is copied.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUPCONTROLDATASET. In addition, you can use the abbreviation BCDS for BACKUPCONTROLDATASET.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify a threshold on any SETSYS command, the DFHSM default is 80% and one extent.

Note: In a multiple-processing-unit environment, the BCDS must be one extent.

JOURNAL: Monitoring the Space Used in the Journal Data Set

Explanation: **JOURNAL(*thresh extents*)** is an optional subparameter of the MONITOR parameter that specifies when DFHSM issues warning messages about the amount of space used in the journal data set.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the journal data set exceeds this percentage value, DFHSM warns the system operator that the data set is getting full.

For *extents*, substitute a decimal number that specifies the number of data set extents (primary and secondary) DFHSM should use when computing the total available space in the journal data set. A value of 1 specifies that only the primary

extent allocation is to be considered available. If you specify more than 16 extents, DFHSM uses 16. If you specify fewer than 1 extent, DFHSM uses 1.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to JOURNAL. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this subparameter on any SETSYS command, the DFHSM default is 80% and one extent.

MIGRATIONCONTROLDATASET: Monitoring the Space Used in the MCDS

Explanation: MIGRATIONCONTROLDATASET(*thresh extents* [NEWCOPY]) is an optional subparameter of the MONITOR parameter that specifies when DFHSM issues warning messages about the amount of space used in the MCDS.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the MCDS exceeds this percentage value, DFHSM warns the system operator that the data set is getting full.

For *extents*, substitute a decimal number that specifies the number of data set extents (primary and secondary) that DFHSM should use when computing the total available space in the MCDS. A value of 1 specifies that only the primary extent allocation is to be considered available. If you specify a value that is greater than the VSAM data set maximum number of 123 extents, DFHSM uses 123 extents. If you specify a value less than 1, DFHSM uses 1.

Note: The calculation for the total number of bytes available for the control data set is based on the assumption that the primary allocation is satisfied in one extent.

NEWCOPY is an optional parameter specifying that DFHSM obtain new data about the current amount of space used from the catalog to replace the space data in the DFHSM multiple-processing-unit control record. Specify NEWCOPY under the following conditions:

- The MCDS is allocated for the first time.
- The MCDS is reallocated.
- The MCDS is copied.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONCONTROLDATASET. In addition, you can use the abbreviation MCDS for MIGRATIONCONTROLDATASET.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify a threshold on any SETSYS command, the DFHSM default is 80% and one extent.

Note: In a multiple-processing-unit environment, the MCDS must be one extent.

OFFLINECONTROLDATASET: Monitoring the Space Used in the OCDS

Explanation: **OFFLINECONTROLDATASET(***thresh extents* **[NEWCOPY])** is an optional subparameter of the MONITOR parameter that specifies when DFHSM issues warning messages about the amount of space used in the OCDS.

For *thresh*, substitute a decimal number from 0 to 100 that specifies a percentage value. When the occupied space in the OCDS exceeds this percentage value, DFHSM warns the system operator that the data set is getting full.

For *extents*, substitute a decimal number that specifies the number of data set extents (primary and secondary) that DFHSM should use when computing the total available space in the OCDS. A value of 1 specifies that only the primary extent allocation is to be considered available. If you specify a value that is greater than the VSAM data set maximum number of 123 extents, DFHSM uses 123 extents. If you specify a value less than 1, DFHSM uses 1.

Note: The calculation for the total number of bytes available for the control data set is based on the assumption that the primary allocation is satisfied in one extent.

NEWCOPY is an optional parameter specifying that DFHSM obtain new data about the current amount of space used from the catalog to replace the space data in the DFHSM multiple-processing-unit control record. Specify NEWCOPY under the following conditions:

- The OCDS is allocated for the first time.
- The OCDS is reallocated.
- The OCDS is copied.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OFFLINECONTROLDATASET. In addition, you can use the abbreviation OCDS for OFFLINECONTROLDATASET.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify a threshold on any SETSYS command, the DFHSM default is 80% and one extent.

Note: In a multiple-processing-unit environment, the OCDS must be one extent.

SPACE | NOSPACE: Printing Volume Space Use Messages

Explanation: **SPACE | NOSPACE** are mutually exclusive, optional subparameters of the MONITOR parameter that specify whether to print volume space-use messages at the system console when DFHSM periodically checks space for interval migration or when you issue a QUERY SPACE command. The three messages that are printed are: ARC0400I, ARC0401I, and ARC0402I.

SPACE specifies that volume space-use messages are to print at the system console, DFHSM log, and the appropriate activity log.

NOSPACE specifies that volume space-use messages are to be printed only in the DFHSM log and the appropriate activity log.

NOSPACE specifies that volume space-use messages are to be printed only in the DFHSM log and the appropriate activity log.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SPACE and NOSPACE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOSPACE.

STARTUP | NOSTARTUP: Printing DFHSM Startup Informational Messages

Explanation: **STARTUP | NOSTARTUP** are mutually exclusive, optional subparameters of the MONITOR parameter that specify whether to print DFHSM startup informational messages at the system console. The messages result from DFHSM commands that are read from the PARMLIB member during DFHSM initialization. You could also specify the STARTUP option on the EXEC PARM options of the DFHSM startup procedure to direct the startup informational messages to the system console.

STARTUP specifies that DFHSM startup informational messages are to print at the system console and in the DFHSM log.

NOSTARTUP specifies that DFHSM startup informational messages are to print only in the DFHSM log.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to STARTUP and NOSTARTUP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOSTARTUP.

VOLUME | NOVOLUME: Printing Data Set Messages during Volume Processing

Explanation: **VOLUME | NOVOLUME** are mutually exclusive, optional subparameters of the MONITOR parameter that specify whether to print data set (ARC0734I) messages at the system console.

VOLUME specifies that messages are to print at the system console, DFHSM log, and appropriate activity log. DFHSM prints messages about data sets on volumes processed by space management, backup, and recovery.

NOVOLUME specifies that messages relating to the data sets on the volumes processed by space management, backup, and recovery are to be printed only in the DFHSM log and the appropriate activity log.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VOLUME and NOVOLUME. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOVOLUME.

MOUNTWAITTIME: Specifying the Amount of Time DFHSM Waits for a Tape Mount and Open

Explanation: MOUNTWAITTIME(*minutes*) is an optional parameter specifying the time, in minutes, that DFHSM waits for the tape volume to be mounted and opened. For *minutes*, substitute a decimal number from 1 to 120 to represent how long DFHSM should wait for a tape to be mounted and opened. If the first time period expires, DFHSM sends message ARC0310A to the operator asking whether the tape volume can be mounted. If the operator answers Y to message ARC0310A, DFHSM resets the timer to *minutes*. The maximum amount of time you can specify for *minutes* is 120. If the input volume has not been mounted and opened when the second time period expires, DFHSM automatically ends the task. If the output volume has not been mounted and opened when the second time period expires, DFHSM marks this volume as unavailable and selects another tape volume.

If you have not mounted an output tape dump volume when the second time period expires, DFHSM automatically ends the dump task.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MOUNTWAITTIME. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 15 minutes.

Note: If your system is MVS/SP 1.3.1 or a previous release, this parameter only applies if the operator mounts the wrong tape volume.

OBJECTNAMES: Specifying the Compaction Control Qualifier of the Object Data Set

Explanation: OBJECTNAMES(*name1,name2,...*) is an optional parameter specifying the compaction control qualifier of all data sets that should be compacted with the compaction table for object data sets. For generation data group data sets, this compaction control qualifier is the next to the last qualifier of the data set name. For all other data sets, this compaction control qualifier is the last qualifier of the data set name.

For *name1,[name2],...*, specify the compaction control qualifiers of the data set names of those data sets you wish to compact with the compaction table for data sets that contain object code. For example, you could specify LINKLIB as a compaction control qualifier.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OBJECTNAMES. In addition, you can use the abbreviation OBJNAME.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is that the general compaction table will be used to compact the object data sets.

OPTIMUMDASDBLOCKING | NOOPTIMUMDASDBLOCKING: Specifying Whether DFHSM Should Use Its Defined Optimum Block Size

Explanation: **OPTIMUMDASDBLOCKING | NOOPTIMUMDASDBLOCKING** are mutually exclusive, optional parameters specifying whether DFHSM should use its defined optimum block size when outputting to DFHSM owned DASD. Optimum blocking refers to DFHSM blocking its output in multiple 2K-bytes determined by the device's track size for data being written to DFHSM owned DASD. This permits better utilization of space on DFHSM owned DASD devices.

OPTIMUMDASDBLOCKING specifies that DFHSM should use its defined optimum block size when writing to DFHSM owned DASD.

Note: OPTIMUMDASDBLOCKING does not pertain to small-data-set-packing data sets, dump VTOC copy data sets, or backup VTOC copy data sets.

NOOPTIMUMDASDBLOCKING specifies that DFHSM should not use its defined optimum block size when writing to DFHSM owned DASD. DFHSM writes to DFHSM owned DASD in 2K-byte blocks.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OPTIMUMDASDBLOCKING and NOOPTIMUMDASDBLOCKING. In addition, you can use the abbreviation OPTDBLOCKING for OPTIMUMDASDBLOCKING and NOOPTDBLOCKING for NOOPTIMUMDASDBLOCKING.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify the OPTIMUMDASDBLOCKING parameter on any SETSYS command, the DFHSM default is to write to DFHSM owned DASD in 2K-byte blocks. This default allows coexistence with previous releases.

Notes:

1. Do not specify OPTIMUMDASDBLOCKING in a multiple-processing-unit environment unless all systems sharing the control data sets are using Version 2 Release 3 Level 0 or subsequent releases of DFHSM. Previous releases of DFHSM cannot read data that is written in blocks larger than 2K-bytes.
2. You can change this parameter while DFHSM is running. The change will take

effect when the next data set destined for DFHSM owned DASD is opened for output.

OUTPUTTAPEALLOCATION: Specifying Whether to Wait for the Output Tape to Be Allocated

Explanation: OUTPUTTAPEALLOCATION ([WAIT | NOWAIT]) is an optional parameter specifying whether the DFHSM should wait until the tape unit is allocated for the output tape for migration or backup.

WAIT specifies that DFHSM waits until the output tape unit is allocated. All DFHSM functions requesting allocations stop until this allocation request is satisfied.

When using the WAIT option, caution must be exercised to limit the number of DFHSM tasks that require tape. If more tasks run than available tape devices, a deadlock condition will occur because of the exclusive enqueue that MVS allocation will put on the task input/output table (SYSZTIOT) while awaiting the tape device. This condition can only be resolved if another job (not DFHSM) releases a tape device, or by cancelling DFHSM.

NOWAIT specifies that DFHSM does not wait until the output tape unit is allocated. Instead, DFHSM re-issues the request every 10 seconds up to 6 times. If the output tape unit is still not allocated after seven tries, DFHSM asks the operator whether DFHSM should cancel the request or repeat the allocation sequence.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to OUTPUTTAPEALLOCATION, WAIT, and NOWAIT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOWAIT.

PARTIALTAPE: Specifying Whether to Reuse Partially Full Tapes

Explanation: PARTIALTAPE(MARKFULL | REUSE) is an optional parameter specifying that DFHSM is to mark a 3480 single-file formatted, or equivalent, tape volume full when the volume is demounted.

MARKFULL | REUSE are mutually exclusive sub-parameters of the PARTIALTAPE parameter. One or the other subparameter must be specified if the PARTIALTAPE parameter is specified. If not, an error message is issued.

MARKFULL specifies to automatically mark a single-file formatted tape volume full independent of the block count when DFHSM demounts the tape. These volumes can be marked as full even though the volume is only partially used.

When the MARKFULL subparameter is in effect and after the volume is demounted, any alternate volume reference in the TTOC record is removed. The reference is removed even though an explicit copy of the tape volume was made while the volume was not marked as full.

REUSE specifies to use the normal DFHSM process of marking a single-file formatted tape full only when the maximum block count (specified with the SETSYS MAXSINGLEFILEBLOCKS parameter) is reached.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PARTIALTAPE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: The default is REUSE, meaning that DFHSM will mark the tape volume full only when the volume reaches the maximum block count specified with the SETSYS MAXSINGLEFILEBLOCKS parameter.

PDA: Specifying Whether the Problem Determination Aid Is Initiated

Explanation: **PDA(NONE | ON | OFF)** is an optional subparameter that specifies whether the Problem Determination Aid is to be enabled. The PDA facility gathers diagnostic information and records the information in a storage buffer and in DASD data sets.

NONE specifies (at DFHSM startup) not to start the PDA facility. No space for the storage buffer is requested and the trace output data sets are not opened.

Note: This keyword is effective only at DFHSM startup. If issued after DFHSM startup, NONE has the same results as issuing the OFF keyword.

ON requests storage for the trace buffer and opens the trace output data sets. If the trace data sets are not allocated, the Problem Determination Aid function continues to trace in internal storage.

OFF specifies to suspend the trace facilities but leaves the primary module active. The trace buffer storage area remains allocated and the output data sets remain open but the bit to allow tracing is turned off.

SMS Relationship: Not related.

Abbreviations: There are no abbreviations for PDA.

SETSYS Defaults: If you do not specify either the ON or OFF keyword, the default is ON.

DFHSM Defaults: If you do not specify either the ON or OFF keywords, the default is ON.

PROFILEBACKUP | NOPROFILEBACKUP: Specifying Whether to Create Backup RACF Discrete Profiles for Cataloged Data Sets

Explanation: **PROFILEBACKUP | NOPROFILEBACKUP** are mutually exclusive, optional parameters that you use to specify whether DFHSM is to create a backup RACF discrete profile for all cataloged RACF-indicated data sets during backup.

PROFILEBACKUP specifies that DFHSM creates a backup RACF discrete profile for the cataloged RACF-indicated data set when it backs up the data set. This backup profile applies to all backup versions of the cataloged RACF-indicated data set.

NOPROFILEBACKUP specifies that DFHSM does not create a backup RACF discrete profile when it backs up a cataloged RACF-indicated data set.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to PROFILEBACKUP and NOPROFILEBACKUP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the default is PROFILEBACKUP.

Note: Failure to use PROFILEBACKUP allows unauthorized users to have access to data sets. Refer to chapter "Security and Protection" in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide* for more information about backing up RACF discrete profiles for cataloged data sets.

RACFIND | NORACFIND: Specifying Whether to Put RACF-Indication on Migration Copies and Backup Versions

Explanation: RACFIND | NORACFIND are mutually exclusive, optional parameters that you use to specify whether DFHSM is to put RACF-indication on all migration copies and backup versions.

RACFIND specifies that DFHSM puts RACF-indication on migration copies and backup versions.

NORACFIND specifies that a RACF always-call environment is in effect. Therefore, migration copies and backup versions are not RACF-indicated, including those data sets that are password-protected. Specify this parameter only if the following conditions are met:

- A RACF always-call environment is in effect in all processing units.
- Generic profile checking is activated and generic profiles are defined for migration and backup qualifiers in all processing units.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RACFIND and NORACFIND. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is RACFIND.

RECALL: Specifying the Target Volume to Receive Recalled Data Sets

Explanation: **RECALL[(ANYSTORAGEVOLUME|(LIKE | UNLIKE)] | PRIVATEVOLUME|(LIKE | UNLIKE)])]** is an optional parameter specifying where DFHSM is to put the non-SMS-managed recalled data sets.

ANYSTORAGEVOLUME specifies that DFHSM recall a data set to an online primary volume with the use attribute of storage and the primary volume attribute of automatic recall. You specify the primary volume attribute with the ADDVOL command.

PRIVATEVOLUME specifies that DFHSM recall a data set to any online primary volume with the use attribute of public, storage, or private and the primary volume attribute of automatic recall. You specify the primary volume attribute with the ADDVOL command.

LIKE | UNLIKE are mutually exclusive, optional subparameters of the ANYSTORAGEVOLUME or PRIVATEVOLUME subparameters.

LIKE specifies that during undirected recall, only primary volumes whose primary volume attributes match the attributes of the primary volume that the data set migrated from will be considered as possible target volumes for the recall.

UNLIKE specifies that during undirected recall, volumes whose currently-specified primary volume attributes do not match those of the source primary volume are eligible for selection. DFHSM selects the volume for recall from one of three groups of volumes. The groups of volumes and how they are ordered are:

1. Volumes with like recall attributes
2. Volumes with unlike recall attributes in autobackup and backup device category
3. Volumes with unlike recall attributes in automigration.

The volumes in each group are ordered according to most available free space. For more information, refer to "DFHSM User Exits" and "Coexistence of DFHSM 2.4.0 and Previous Releases" in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide.*

SMS Relationship: Not applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECALL, ANYSTORAGEVOLUME, PRIVATEVOLUME, LIKE, and UNLIKE. There are no additional abbreviations.

SETSYS Defaults: If you specify RECALL without a subparameter, the SETSYS default is ANYSTORAGEVOLUME.

If you do not specify the LIKE or UNLIKE subparameter with the ANYSTORAGEVOLUME or PRIVATEVOLUME subparameter, the SETSYS default is LIKE.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default for data sets is RECALL(ANYSTORAGEVOLUME).

Notes:

1. The LIKE/UNLIKE subparameter does not apply if a data set is SMS managed when migrated, and later recalled as a non-SMS-managed data set.
2. For BDAM data sets, DFHSM selects only devices that are the same device type as the one the data sets migrated from.
3. In a JES3 environment, specify the same subparameter for processing units that set up jobs and processing units that run the jobs.

RECYCLEOUTPUT: Limiting the Selection and Allocation of an Output Volume during Recycle Processing

Explanation: **RECYCLEOUTPUT(BACKUP[(*unit*)] MIGRATION[(*unit*)])** is an optional parameter that you use to limit the selection and allocation of an output volume during recycle processing.

BACKUP(*unit*) specifies that during recycle processing of a tape backup volume, only tape spill backup volumes that can be mounted and written on the specified type of unit will be used for output. In addition, when the tape spill backup volume is allocated for output during recycle processing, the volume is allocated using the unit name specified with the BACKUP subparameter of the RECYCLEOUTPUT parameter, overriding the unit name specified on the ADDVOL command for the tape spill backup volume.

MIGRATION(*unit*) specifies that during recycle processing of a tape level 2 migration volume, only tape level 2 migration volumes that can be mounted and written on the specified type of unit will be used for output. In addition, the tape level 2 migration volume is allocated for output during recycle processing, the volume is allocated for output during recycle processing, the volume is allocated using the unit name specified with the MIGRATION subparameter of the RECYCLEOUTPUT parameter, overriding the unit name specified on the ADDVOL command for the tape level 2 migration volume.

For *unit*, specify a generic or esoteric unit name. The following generic unit names are acceptable: 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, and 3480. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem. If an esoteric unit name is specified, it must have been previously defined to DFHSM using the USERUNITTABLE parameter of the SETSYS command.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECYCLEOUTPUT. In addition, you can specify RO for RECYCLEOUTPUT.

SETSYS Defaults: If *unit* is not specified with the BACKUP parameter, there is no restriction on the type of tape spill backup volume that can be selected for output during the recycle processing of a tape backup volume.

If *unit* is not specified with the MIGRATION parameter, there is no restriction on the type of tape level 2 migration volume that can be selected for output during the recycle processing of a tape level 2 migration volume.

If the RECYCLEOUTPUT parameter is specified without any subparameters, no changes are made to the current DFHSM values.

DFHSM Defaults: None.

RECYCLEPERCENT: Specifying the Maximum Percentage of Valid Data on a Backup Tape

Explanation: **RECYCLEPERCENT(*pct*)** is an optional parameter specifying the percent valid criteria DFHSM uses to recycle tape backup volumes if you do not specify the PERCENTVALID parameter of the RECYCLE command. For *pct*, substitute a decimal number from 0 to 99.

When DFHSM invalidates a data set entry for a full backup volume and the percent of valid data on the tape backup volume becomes less than or equal to *pct*, DFHSM writes message ARC0365I in the command activity log. You then use the RECYCLE command to recycle all eligible tape backup volumes.

When using single-file tape format, the percentage of valid blocks is calculated by dividing the number of valid blocks on the tape by the number of blocks defined by the SETSYS MAXSINGLEFILEBLOCKS parameter rather than the total blocks written. This is due to the fact that a system failure can cause a tape to not be completely filled when using the single-file format.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECYCLEPERCENT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 0.

Notes:

1. DFHSM ignores the RECYCLEPERCENT parameter of this command or the PERCENTVALID parameter of the RECYCLE command when you use the RECYCLE command to recycle specific backup volumes.
2. DFHSM also uses this value for migration level 2 tape volumes when you specify the ALL parameter of the RECYCLE command.

RECYCLETAPEALLOCATION: Specifying Whether to Wait for the Recycle Tape to Be Allocated

Explanation: **RECYCLETAPEALLOCATION ([WAIT | NOWAIT])** is an optional parameter specifying whether DFHSM should wait until the tape unit is allocated for the source and target tape volumes.

WAIT specifies that DFHSM waits until the recycle tape unit is allocated. All DFHSM functions requesting allocations stop until this allocation request is satisfied.

When using the WAIT option, caution must be exercised to limit the number of DFHSM tasks that require tape. If more tasks run than there are available tape devices, a deadlock condition will occur because of the exclusive enqueue that MVS allocation will put on the task input/output table (SYSZTIOT) while awaiting the tape device. This condition can only be resolved if another job (not DFHSM) releases a tape device, or by cancelling DFHSM.

NOWAIT specifies that DFHSM does not wait until the recycle tape unit is allocated. Instead, DFHSM re-issues the request every 10 seconds up to 6 times. If the recycle tape unit is still not allocated after seven tries, DFHSM asks the operator whether DFHSM should cancel the request or repeat the allocation sequence.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to RECYCLETAPEALLOCATION, WAIT, and NOWAIT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOWAIT.

REMOVECOMPACTNAMES: Removing the Compaction Control Qualifier for Source or Object Data Sets

Explanation: **REMOVECOMPACTNAMES(***name1,name2,...***)** is an optional parameter specifying the compaction control qualifier of all data sets to be removed from the SOURCENAMES or OBJECTNAMES table. For *name1,[name2],...*, specify the compaction control qualifiers of those data sets you no longer wish to be compacted by the source or object compaction table.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REMOVECOMPACTNAMES. In addition, you can use the abbreviation REMNAME.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, there is no DFHSM default.

REQUEST | NOREQUEST: Specifying Whether the Operator's Permission Is Required

Explanation: **REQUEST | NOREQUEST** are mutually exclusive, optional parameters specifying whether the operator's permission is required before DFHSM starts daily space management, interval migration, automatic backup, or automatic dump.

REQUEST specifies that the operator's permission is required before DFHSM starts daily space management, interval migration, automatic backup, or automatic dump.

NOREQUEST specifies that the operator's permission is not required before DFHSM starts daily space management, interval migration, automatic backup, or automatic dump.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to REQUEST and NOREQUEST. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is NOREQUEST.

SCRATCHFREQUENCY: Specifying How Long to Retain List Data Sets

Explanation: SCRATCHFREQUENCY(*days*) is an optional parameter specifying the number of days DFHSM should keep list data sets. For *days*, substitute a decimal number from 0 to 9999 specifying how long DFHSM should keep an unused list data set. If you specify 0, DFHSM scratches list data sets during the next space management of the volume. If the last qualifier in a data set name is .LIST, .OUTLIST, or .LINKLIST, the data set is a list data set. DFHSM scratches list data sets during volume space management after the specified number of days have passed since anyone used the data sets.

SMS Relationship: Not applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SCRATCHFREQUENCY. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 9999 days.

SELECTVOLUME: Specifying Whether DFHSM Should Select a Scratch Tape Volume or a DFHSM Tape Volume

Explanation: SELECTVOLUME(SCRATCH | SPECIFIC) is an optional parameter specifying whether DFHSM should choose a tape volume owned by DFHSM or a scratch tape volume when an end-of-volume (EOV) condition occurs while DFHSM is writing on a tape volume. SELECTVOLUME(SCRATCH | SPECIFIC) applies to the initial selection for dump tape volumes as well as when the EOV condition occurs.

SCRATCH specifies that a PRIVAT mount request is always sent to the operator when an EOV condition occurs on a tape backup volume, tape migration level 2 volume, or dump tape volume. The operator should mount a private scratch tape volume.

SPECIFIC specifies that DFHSM choose another tape volume when an EOV condition occurs on a tape backup volume, tape migration level 2 volume, or dump tape volume. DFHSM chooses a tape volume you have already defined to DFHSM

with the ADDVOL command. If the EOV condition occurs on a tape backup volume, DFHSM chooses another tape backup volume. If the EOV condition occurs on a tape migration level 2 volume, DFHSM chooses another tape migration level 2 volume. If the EOV condition occurs on a dump tape volume, DFHSM chooses another dump tape volume. DFHSM first attempts to select a dump tape volume that is assigned to the same class as is currently being dumped to. If a dump tape volume with the same class cannot be found, then DFHSM looks for a dump tape volume that is not assigned to any class. When DFHSM chooses the tape volume, the operator receives a message specifying which tape to mount. If DFHSM cannot find an acceptable tape volume, the operator receives a PRIVAT mount request.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SELECTVOLUME, SPECIFIC, and SCRATCH. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is SCRATCH.

Notes:

1. It is suggested that you use the SCRATCH subparameter if you have the Automatic Cartridge Loader feature (which we will call the cartridge loader) of the 3480 Magnetic Tape Subsystem. The cartridge loader provides the operator with the capability to preload multiple tapes to be used as migration, backup, or dump tapes. The system then writes migration data sets, backup data sets, or dump copies to these tapes without operator intervention. Refer to chapter "Tape Considerations" in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide* for additional information about the cartridge loader.
2. If you have a sufficient level of DFP installed, the volume verification exit can reinitialize a tape volume if the tape remains under control of DFHSM. Therefore, to use the volume verification exit effectively, specify SPECIFIC and TAPEDELETION(HSMTAPE).

SKIPABPRIMARY | NOSKIPABPRIMARY: Specifying Whether to Skip Automatic Backup of Primary Volumes

Explanation: **SKIPABPRIMARY | NOSKIPABPRIMARY** are mutually exclusive, optional parameters specifying whether to back up data sets on DFHSM-managed volumes with:

- The primary volume attribute of automatic backup, specified with the PRIMARY(AUTOBACKUP) parameter of the ADDVOL command
- The storage group attribute for automatic backup, specified with the AUTOBACKUP=YES for the storage group.

SKIPABPRIMARY specifies that during automatic backup, DFHSM should skip the backup of DFHSM-managed volumes with

- The primary volume attribute of automatic backup
- The storage group attribute of AUTOBACKUP=YES.

Therefore, all users must back up their data sets on the DFHSM-managed volumes. However, DFHSM backs up data sets while the data sets are on migration volumes that migrated from a volume with the primary volume attribute of automatic backup or storage group with the attribute of AUTOBACKUP=YES.

NOSKIPABPRIMARY specifies that during automatic backup, DFHSM backs up primary volumes with the automatic backup attribute and storage groups with the attribute of AUTOBACKUP=YES.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SKIPABPRIMARY and NOSKIPABPRIMARY. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is NOSKIPABPRIMARY.

SMALLDATASETPACKING | NOSMALLDATASETPACKING: Specifying Whether DFHSM Should Use Small Data Set Packing

Explanation: **SMALLDATASETPACKING[([*tracks*][KB(*kilobytes*)])] | NOSMALLDATASETPACKING** are mutually exclusive, optional parameters specifying whether to pack small physical sequential data sets into predefined VSAM key-sequenced small-data-set-packing data sets on migration level 1 volumes.

SMALLDATASETPACKING specifies that when a small data set migrates, it is eligible to be packed into a predefined VSAM key-sequenced small-data-set-packing data set on a migration level 1 volume.

For *tracks*, substitute a decimal number from 1 to 18 specifying that DFHSM is to consider any data set using that number of tracks or fewer as a candidate for migration to a small-data-set-packing data set. DFHSM converts the *tracks* value to kilobytes with an assumed track size of 44 kilobytes. This is the amount of data that can fit on a track of a 3380 volume with two 22 kilobyte blocks.

KB(*kilobytes*) specifies the source size of a data set to be considered as a candidate for migration to a small-data-set-packing data set. For *kilobytes*, substitute a decimal number from 1 to 800.

The source size of a DFHSM data set in kilobytes is calculated by multiplying the number of bytes per track for the device type times the number of tracks used by the data set. A candidate data set is eligible for migration to a small-data-set-packing data set if its known or estimated size, after compaction, is equal to or less than 400 kilobytes.

A data set's compaction size is determined by its source size and the estimated degree of compaction it will accrue, when compaction is relevant, or by its source size alone when compaction is not relevant.

In DFHSM, a data set's source size in kilobytes is calculated as the number of bytes per track for the device times the number of tracks used by the data set. The number of bytes per track for each DFHSM device type are as follows:

- 3330 - 13,030 bytes per track
- 3350 - 19,069 bytes per track
- 3375 - 35,616 bytes per track
- 3380 - 47,476 bytes per track.

The compaction size of a DFHSM data set is determined in one of three ways:

1. If compaction during migration is not active, the source size equals the migration size. The maximum data set size allowed in the small-data-set-packing data set by DFHSM with compaction off is 400 kilobytes.
2. If a data set has been successfully compacted during a previous migration and compaction is on, the previous compaction history data from the MCDS record is used to establish the estimated compaction size. The maximum estimated compacted data set size allowed in the small-data-set-packing data set by DFHSM is 400 kilobytes.
3. If compaction is on and compaction history for the data set does not exist, an internal default of 50% is used in establishing the estimated compaction size. The maximum estimated compacted data set size allowed in the small-data-set-packing data set by DFHSM is 400 kilobytes.

NOSMALLDATASETPACKING specifies that when small data sets migrate, they are not packed into predefined VSAM key-sequenced small-data-set-packing data sets on a level 1 volume, even if you specified the MIGRATION(SMALLDATASETPACKING) parameter of the ADDVOL command for the volume DFHSM selects.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SMALLDATASETPACKING and NOSMALLDATASETPACKING. In addition, you can use the abbreviation SDSP for SMALLDATASETPACKING and the abbreviation NOSDSP for NOSMALLDATASETPACKING.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify *tracks* or KB(*kilobytes*) with the SMALLDATASETPACKING parameter on any SETSYS command, the DFHSM default is 120 kilobytes for KB.

If you do not specify either SMALLDATASETPACKING or NOSMALLDATASETPACKING, the DFHSM default is NOSMALLDATASETPACKING.

Notes:

1. This parameter applies only to data sets that migrate from primary volumes to migration level 1 volumes.
2. If both *tracks* and *kilobytes* are specified, only the *kilobyte* value is honored.

3. Small-data-set-packing data sets have the following advantages:
   - The volume table of contents of the migration level 1 volumes are not filled with DSCBs for small data sets.
   - Small data sets become records in the small-data-set-packing data sets, so they do not have to start on track boundaries. This gives you better use of space on the migration level 1 volumes.
   - You get reduced volume fragmentation on the migration level 1 volumes.
4. Specify both primary and secondary extents for the small-data-set-packing data sets. If you want to use small data set packing, you must specify the SMALLDATASETPACKING parameter of the ADDVOL command for at least one migration level 1 volume. You do not have to specify SMALLDATASETPACKING for each migration level 1 volume. If a data set is eligible for small data set packing, DFHSM selects the volume that has been added to DFHSM with the SMALLDATASETPACKING parameter.
5. The names of small-data-set-packing data sets have the following format:

   `uid.SMALLDS.Vvolser`

   DFHSM replaces *uid* with the UID you specified in the DFHSM startup procedure. *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* explains the UID and the DFHSM startup procedure. *Data Facility Hierarchical Storage Manager: Installation and Customization Guide* also describes the small-data-set-packing data sets and shows how to create them.

SMF | NOSMF: Specifying Whether SMF Records Are Written

Explanation: **SMF(*smfid*) | NOSMF** are mutually exclusive, optional parameters specifying whether DFHSM should write SMF records that contain DFHSM statistics.

SMF(*smfid*) specifies that DFHSM is to write SMF records in the SYS1.MANX or SYS1.MANY system data sets. For *smfid*, substitute a record identification. Use SMF user codes for the record identification.

If you specify *smfid*, DFHSM writes records with SMF identifications of *smfid* and *smfid*+1. Records with an identification of *smfid* contain daily statistics and volume statistics. Records with an identification of *smfid*+1 contain function statistics.

NOSMF specifies that no SMF records are to be written.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SMF and NOSMF. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is NOSMF.

Note: The first 18 bytes of each SMF record consist of a four-byte record descriptor word followed by the standard 14-byte SMF record header. The other three SMF records are shown in Figure 8. For the SMF identification (*smfid*) in Figure 8, choose a record identification for your computing system. This record identification is the SMF record type and is written at offset 5 of the SMF record header. The functional data areas in Figure 8 are described in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Reference Volume 3.*

SMF Record For:	Type in SMF Header	Offset	Length	Contents
Daily Statistics (1036 bytes)	(smfid)	0 (0) 18 (12) 19 (13) 20 (14) 204 (CC) 908 (38C)	18 1 1 184 64 128	SMF Header Binary 1 Reserved Base data Eleven functional data areas. Each is 64 bytes long. Reserved
Volume Statistics (1036 bytes)	(smfid)	0 (0) 18 (12) 19 (13) 20 (14) 164 (A4) 868 (364)	18 1 1 144 64 168	SMF Header Binary 2 Reserved Base data Eleven functional data areas. Each is 64 bytes long. Reserved
Functional Statistics (Variable)	(smfid+1)	0 (0) 18 (12)	18 250-1210	SMF header. The first 18 bytes of the functional statistics record are replaced with the 18-byte SMF header. Data

Figure 8. DFHSM SMF Records

SOURCENAMES: Specifying the Compaction Control Qualifier of the Source Data Set

Explanation: SOURCENAMES(*name1,name2,...*) is an optional parameter specifying the compaction control qualifier of data sets that should be compacted with the table for source data sets. For *name1,[name2]...*, specify the compaction control qualifiers of the data set names of those data sets you wish to compact with the table for data sets that contain source code for programming languages. For example, you could specify BAS and ASM as qualifiers. For generation data group data sets, this compaction control qualifier is the next to the last qualifier of the data set name. For all other data sets, this compaction control qualifier is the last qualifier of the data set name.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SOURCENAMES. In addition, you can use the abbreviation SRCNAME.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is that the general compaction table can compact the source data sets.

SPILL | NOSPILL: Specifying Whether DFHSM Is to Do Spill or Cleanup Processing on Full DASD Daily Backup Volumes

Explanation: **SPILL[(ANY | DASD | TAPE[(*unit*)])] | NOSPILL** are mutually exclusive optional parameters specifying whether DFHSM can do spill or cleanup processing on full DASD daily backup volumes during backup volume selection and limiting the selection and allocation of an output volume during spill processing.

SPILL specifies that DFHSM will spill full DASD daily backup volumes when a DASD daily backup volume is needed and none is available. Spill processing moves all but the latest backup version of each data set from the daily backup volumes to the spill backup volumes.

ANY specifies that any type of spill backup volume can be used for output during spill processing.

DASD specifies that only DASD spill backup volumes should be used for output during spill processing.

TAPE specifies that only tape spill backup volumes should be used for output during spill processing. In addition, when a tape spill backup volume is allocated during spill or recycle processing, the volume is allocated using the unit name specified on the ADDVOL command for the volume.

TAPE(*unit*) specifies that only tape spill backup volumes that can be mounted and written on the specified *unit* should be used during spill processing. In addition, when the tape spill backup volume is allocated during spill processing, the volume is allocated using the unit name specified with the TAPE subparameter of the SPILL parameter, overriding the unit name specified on the ADDVOL command for the tape spill backup volume. For *unit*, specify a generic or esoteric unit name. The following generic unit names are acceptable: 3400-3, 3400-4, 3400-5, 3400-6, 3400-9 and 3480. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem. If an esoteric unit name is specified, it must have been previously defined to DFHSM using the USERUNITTABLE parameter of the SETSYS command.

NOSPILL specifies that DFHSM never spills full DASD daily backup volumes. Instead, DFHSM cleans up full DASD daily backup volumes when one is needed and none is available. During cleanup processing, DFHSM scratches the following data sets from the full unallocated DASD daily backup volume that DFHSM has not cleaned up in the longest period of time:

- Unneeded VTOC copy data sets
- Unneeded VCAT copy data sets
- Backup version without a backup version record (MCC).

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SPILL and NOSPILL. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is SPILL.

Note: During spill, DFHSM does not keep the association of a primary volume and a particular backup device category. You specify this association with the PRIMARY(BACKUPDEVICECATEGORY) parameter of the ADDVOL command. For example, if you specify ADDVOL PRIMARY(BACKUPDEVICECATEGORY(DASD)), the backup version can be moved to a tape spill backup volume. However, the latest backup version of each data set on the primary volume remains on a DASD daily backup volume.

SWAP | NOSWAP: Specifying Whether the DFHSM Address Space Can Be Swapped

Explanation: **SWAP | NOSWAP** are mutually exclusive, optional parameters specifying that the DFHSM address space can be swapped.

SWAP specifies that the DFHSM address space can be swapped by the MVS system resource manager.

NOSWAP specifies that the DFHSM address space cannot be swapped by the MVS system resource manager.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SWAP and NOSWAP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either parameter on any SETSYS command, the DFHSM default is whatever your computing system would normally do with the DFHSM address space.

Note: For more information, see the chapter "Preparing DFHSM" in *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide*.

SYSOUT: Directing DFHSM Output

Explanation: **SYSOUT(***class* [*copies* [*forms*]]) is an optional parameter specifying the class, number of copies, and any special forms used to print output from DFHSM. For *class*, substitute an alphameric character for the class DFHSM is to use when it prints output. For *copies*, substitute a decimal number from 1 to 99 for the number of copies to print of DFHSM output. For *forms*, substitute up to eight alphameric characters for the special forms to use when printing DFHSM output.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SYSOUT. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM defaults are class A, one copy, and no special form.

SYS1DUMP | NOSYS1DUMP: Specifying Where DFHSM Dumps Should Be Written

Explanation: **SYS1DUMP | NOSYS1DUMP** are mutually exclusive, optional parameters specifying whether DFHSM dumps resulting from an abnormal end or error condition are to be written in a system dump data set.

SYS1DUMP specifies that DFHSM dumps are to be written in a system dump data set. This format is required if using the Interactive Problem Control System (IPCS).

NOSYS1DUMP specifies that DFHSM dumps are not to be written in a system dump data set. They are to be directed to where you specified with the SYSABEND, SYSMDUMP, or SYSUDUMP DD statement in the DFHSM startup procedure.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to SYS1DUMP and NOSYS1DUMP. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is NOSYS1DUMP.

TAPEDELETION(HSMTAPE | SCRATCHTAPE): Specifying What to Do with Tapes That No Longer Contain Valid Data

Explanation: **TAPEDELETION(HSMTAPE | SCRATCHTAPE)** is an optional parameter specifying whether recycled tape volumes are to be deleted from DFHSM control and become scratch tapes, or to remain under DFHSM control as unassigned, available tape backup or migration level 2 volumes.

HSMTAPE specifies that the recycled volumes remain under DFHSM control and become either unassigned backup volumes or available migration level 2 volumes, based on the previous definition of the volume. The tape volume is now available to be selected as a daily or spill backup volume, or as a target volume for data set migration, volume migration, or recycle of tape migration level 2 volumes.

SCRATCHTAPE specifies that recycled tape volumes are deleted from DFHSM control and become scratch tapes after DFHSM recycles them. The tape volumes are not selected as tape backup or migration level 2 volumes, but an operator can mount them in response to a mount PRIVAT request for a tape backup or migration level 2 volume.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEDELETION, SCRATCHTAPE, and HSMTAPE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is SCRATCHTAPE.

Notes:

1. Although the HSMBACKUPTAPE parameter has been changed to HSMTAPE, if you specify HSMBACKUPTAPE, it has the same meaning as HSMTAPE. The command will not fail.
2. If you choose SCRATCHTAPE and the tape security DFHSM used was password or expiration date, you must use the IEHINITT utility to reinitialize the tape before DFHSM or any other user tries to reuse the tape volume.
3. If you choose HSMTAPE and a sufficient level of Data Facility Product is installed in your system, you do not need to reinitialize the tapes that remain under DFHSM control before you reuse them as tape backup or migration level 2 volumes.
4. The disposition of tapes automatically made available for reuse depends on the TAPEDELETION parameter of the SETSYS command. TAPEDELETION(HSMTAPE) is equivalent to issuing a DELVOL UNASSIGN for the tapes. TAPEDELETION(SCRATCHTAPE) is equivalent to issuing a DELVOL PURGE.

TAPEFORMAT: Specifying the Type of Format for Writing Data to 3480 Migration and Backup Volumes

Explanation: TAPEFORMAT(SINGLEFILE | MULTIFILE) is an optional parameter identifying the type of format that DFHSM uses to write data to all 3480 migration and backup volumes.

SINGLEFILE specifies that DFHSM writes data to all 3480 migration and backup volumes as a single tape data set containing multiple user data sets.

MULTIFILE specifies that DFHSM writes one tape data set for every user data set to each 3480 migration and backup volume.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEFORMAT, SINGLEFILE, and MULTIFILE. There are no additional abbreviations.

SETSYS Defaults: If you specify TAPEFORMAT without a subparameter, the SETSYS default is MULTIFILE.

DFHSM Defaults: If you do not specify TAPEFORMAT on any SETSYS command, the DFHSM default is MULTIFILE.

Note: You can change this parameter at any time but the change does not take effect until DFHSM initially selects a new target volume for migration, backup, or recycle.

TAPEMAXRECALLTASKS: Specifying the Maximum Number of Concurrent Tape Recall Tasks

Explanation: TAPEMAXRECALLTASKS(*tasks*) is an optional parameter specifying the maximum number of tape recall tasks that can concurrently request tape mounts. For *tasks*, specify a decimal number from 1 to 15. The value you specify must be greater than 0 and less than or equal to the value you specify with the MAXRECALLTASKS parameter.

TAPEMAXRECALLTASKS is a subset of the MAXRECALLTASKS parameter. For example, if you specify MAXRECALLTASKS(10) and TAPEMAXRECALLTASKS(6), DFHSM will process up to ten recall tasks concurrently, but only six can be recalls from tape migration level 2 volumes. You cannot specify a value for TAPEMAXRECALLTASKS that is greater than MAXRECALLTASKS; for example, MAXRECALLTASKS(10) and TAPEMAXRECALLTASKS(11).

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEMAXRECALLTASKS. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 1 tape recall task.

Note: DFHSM allows only a maximum of 15 recall tasks concurrently. Also, all recall tasks can process recalls from DASD migration volumes. For example, if you specify TAPEMAXRECALLTASKS(6) and fewer than six tape recall tasks are active, DFHSM can process DASD recall tasks instead.

TAPEMIGRATION: Specifying the Type of Migration to Tape

Explanation: TAPEMIGRATION(DIRECT|(TAPE(ANY | *unit*))| | ML2TAPE|(TAPE(ANY | *unit*))| | NONE |(ROUTETOTAPE(ANY | *unit*))| is an optional parameter specifying whether DFHSM uses tape migration level 2 volumes and limiting the selection and allocation of an output volume during tape migration processing. SMS-managed data sets with the LEVEL-1-DAYS-NON-USAGE = NOLIMIT management class attribute are specifically prohibited from migrating to tape.

DIRECT specifies that DFHSM migrate the data sets on DFHSM-managed volumes directly to tape migration level 2 volumes. If the primary volume has the AUTOBACKUP attribute, data sets on the primary volume with the change flag set to 1 will not be migrated to tape migration level 2 volumes.

ML2TAPE specifies that DFHSM migrate the data sets on DASD migration level 1 volumes to tape migration level 2 volumes.

ANY | *unit* are mutually exclusive optional parameters of the TAPE subparameters of DIRECT or ML2TAPE subparameters.

When ANY is specified for DIRECT or ML2TAPE, DFHSM selects any tape, depending on availability. If no tapes are available, then the SETSYS values for MIGUNITNAME and MIGDENSITY are used to allocate a scratch tape.

For *unit*, specify a generic or esoteric unit name. The following generic unit names are acceptable: 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, and 3480. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem. If an esoteric unit name is specified, it must have been previously defined to DFHSM using the USERUNITTABLE parameter of the SETSYS command. When *unit* is specified, DFHSM only selects *unit* tapes. If none are available, DFHSM selects a *unit* scratch tape. If the SETSYS values for MIGUNITNAME and MIGDENSITY are compatible with *unit*, they are used to allocate the *unit* scratch tape. If not, DFHSM uses the MIGUNITNAME and MIGDENSITY DFHSM default values to allocate the scratch tape.

NONE specifies that DFHSM never migrate data sets to tape migration level 2 volumes.

ROUTETOTAPE specifies a tape unit name in an environment where migration level 2 tape is selected only by an external-to-DFHSM factor. In this environment, DFHSM will not choose tape as the migration level 2 device type unless one of the two following events takes place:

- The selection of tape migration level 2 by the ARCMDEXT exit, which is taken when performing migration on a level 0 volume
- The migration of an SMS-managed data set that belongs to a management class indicating that the data set is to be migrated directly to migration level 2 tape.

  ANY | *unit* are mutually exclusive optional parameters of the TAPE subparameters of DIRECT or ML2TAPE subparameters.

  When ANY is specified for DIRECT or ML2TAPE, DFHSM selects any tape, depending on availability. If no tapes are available, then the SETSYS values for MIGUNITNAME and MIGDENSITY are used to allocate a scratch tape.

  For *unit*, specify a generic or esoteric unit name. The following generic unit names are acceptable: 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, and 3480. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem. If an esoteric unit name is specified, it must have been previously defined to DFHSM using the USERUNITTABLE parameter of the SETSYS command. When *unit* is specified, DFHSM only selects *unit* tapes. If none are available, DFHSM selects a *unit* scratch tape. If the SETSYS values for MIGUNITNAME and MIGDENSITY are compatible with *unit*, they are used to allocate the *unit* scratch tape. If not, DFHSM uses the MIGUNITNAME and MIGDENSITY DFHSM default values to allocate the scratch tape.

SMS Relationship: Conditionally applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPEMIGRATION, DIRECT,

ML2TAPE, ANY, NONE and ROUTETOTAPE. In addition, you can specify TAPE for ROUTETOTAPE.

SETSYS Defaults: If you specify DIRECT or ML2TAPE with no subparameters, the SETSYS default is TAPE(ANY). If you specify DIRECT or ML2TAPE with TAPE but no subparameter, the SETSYS default is ANY.

If you specify NONE with no subparameters, the SETSYS default is ROUTETOTAPE(ANY). If you specify NONE with ROUTETOTAPE but no subparameter, the SETSYS default is ANY.

DFHSM Defaults: If you do not specify the TAPEMIGRATION parameter on any SETSYS command, the DFHSM default is NONE(ROUTETOTAPE(ANY)). If a unitname has not been specified on any SETSYS command with the NONE(ROUTETOTAPE) parameter or NONE(ROUTETOTAPE(ANY)) has been specified or is used as the default, DFHSM will select the first available migration tape when a tape migration level 2 volume is required. If no tapes are available, DFHSM will select a scratch tape with the unit name specified or defaulted from the MIGUNITNAME parameter of the SETSYS command.

Note: A unit name of 3420 was accepted with the TAPE subparameter of the DIRECT or ML2TAPE parameters by DFHSM before Version 2 Release 2 Level 0. If a unit name of 3420 is specified with the TAPE subparameter of the DIRECT or ML2TAPE parameters, and if 3420 is not an esoteric unit name in your installation using the USERUNITTABLE, it will be translated to 3400-6.

TAPESECURITY: Specifying the Type of Security for Tape Volumes

Explanation: TAPESECURITY([EXPIRATION | EXPIRATIONINCLUDE] [PASSWORD] [RACF | RACFINCLUDE]) is an optional parameter that you use to specify the type of security for your tape backup, migration level 2, and dump volumes. You can choose more than one tape security option.

EXPIRATION specifies that DFHSM is to protect each tape backup, migration level 2, and dump volume with an expiration date. Each backup version, migration copy, or dump copy on the tape volume is protected by an expiration date by placing an expiration date of 99365 in the IBM Standard Data Set Label 1 (HDR1, EOV1, and EOF1). However, for backup or migration, you can use the tape data set exit, ARCTDEXT, to change the expiration date. You can change the expiration date of a dump tape volume using the TAPEEXPDT optional parameter of the DEFINE command.

DFHSM will not place a backup version or migration copy of a password-protected data set on a tape volume that is not password-protected unless you specify the EXPIRATIONINCLUDE or RACFINCLUDE subparameter. Therefore, if the only tape security subparameter you specify is EXPIRATION, DFHSM fails the backup or migration of a password-protected data set to a tape backup or migration level 2 volume.

EXPIRATIONINCLUDE specifies that DFHSM is to protect each tape backup, migration level 2, and dump volume with an expiration date. In addition, DFHSM backs up or migrates a password-protected data set to a tape volume that is not password-protected.

PASSWORD specifies that DFHSM is to protect with a password each tape backup, migration level 2, and dump volume. Each backup version, migration copy, or dump copy on the tape volume is password-protected by placing a X'F1' in the data set security byte in the IBM Standard Data Set Label (HDR1, EOV1, and EOF1).

RACF specifies that DFHSM is to protect with RACF each tape backup, migration level 2, and dump volume. DFHSM protects the tape volume with RACF by adding it to a RACF tape volume set of DFHSM (HSMHSM or DFHSMx). The *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Installation and Customization Guide* contains information about how to define a RACF tape volume set of DFHSM.

DFHSM does not place a backup version or migration copy of a password-protected data set on a tape volume that is not password-protected unless you specified the RACFINCLUDE or EXPIRATIONINCLUDE subparameter. Therefore, if you only specify the RACF subparameter, DFHSM fails the backup or migration of a password-protected data set to a tape backup or migration level 2 volume.

RACFINCLUDE specifies that DFHSM is to protect with RACF each tape backup, migration level 2, and dump volume. In addition, DFHSM backs up or migrates a password-protected data set to a tape volume that is not password-protected.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TAPESECURITY. In addition, you can specify the following abbreviations:

Parameter	Abbreviation
PASSWORD	P
EXPIRATION	E or D
EXPIRATIONINCLUDE	EI or DI
RACF	R
RACFINCLUDE	RI

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the default is PASSWORD.

Notes:

1. Although the D parameter has been changed to EXPIRATION, if you specify D, it has the same meaning as EXPIRATION. If you specify DI, it has the same meaning as EXPIRATIONINCLUDE. If you specify the PD or PE parameter, it has the same meaning as if you specify both the PASSWORD parameter and the EXPIRATION parameter.
2. If you want to specify RACF or RACFINCLUDE, your computing system must meet the following conditions:
   - A sufficient level of Data Facility Product must be installed, or you must specify the PASSWORD tape security option.

- RACF must be installed.
- The RACF TAPEVOL resource class must be defined in the RACF class descriptor table (CDT).
- If you do not have a sufficient level of DFP installed and you want to RACF-protect your tape, you must specify PASSWORD with RACF in the TAPESECURITY parameter of the SETSYS command.

3. If RACF is inactive or the RACF TAPEVOL resource class is inactive, DFHSM issues a warning message (ARC0099I).
4. The restriction about putting password-protected data sets on non password-protected tape volumes does not apply to dump volumes. Therefore, EXPIRATION and EXPIRATIONINCLUDE are equivalent options for dump processing as are RACF and RACFINCLUDE.

TRACE | NOTRACE: Specifying Whether to Trace Control Data Set Changes

Explanation: **TRACE | NOTRACE** are mutually exclusive, optional parameters specifying whether all changes to the MCDS, BCDS, OCDS, and all type 8 MWEs (control data set read and JES3 CI) are to be written in the DFHSM log.

TRACE specifies that changes to the MCDS, BCDS, OCDS, and all type 8 MWEs (control data set read and JES3 CI) are to be written in the DFHSM log and causes the SETSYS JOURNAL (RECOVERY) option to operate as though SPEED was requested.

NOTRACE specifies that changes to the MCDS, BCDS, OCDS and all type 8 MWEs (control data set read and JES3 CI) are not to be written in the DFHSM log.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to TRACE and NOTRACE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify either subparameter on any SETSYS command, the DFHSM default is NOTRACE.

UNITNAME: Specifying the Type of Unit for Mounting a Scratch Tape during Backup or Dump

Explanation: **UNITNAME(*name*)** is an optional parameter identifying the type of unit that should be specified the first time DFHSM requests that a scratch tape be mounted during backup or dump. For *name*, the types of units you can request for allocating the scratch tape are 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, 3480, or an esoteric name you specified with USERUNITTABLE parameter of the SETSYS command. You specify 3400-9 when your 3480 Magnetic Tape Subsystem simulates your 3420 tape drives. You specify 3480 when you use all the functions of the 3480 Magnetic Tape Subsystem. If you specify an esoteric unit name with the UNITNAME parameter, you must also have identified the esoteric unit name to DFHSM with the USERUNITTABLE parameter.

You can specify the USERUNITTABLE parameter when you specify the UNITNAME parameter or you could have specified USERUNITTABLE with a previous SETSYS command during this startup.

SMS Relationship: Not related.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNITNAME. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is 3400-6.

Notes:

1. You cannot specify an esoteric unit name that represents DASD; it must represent tape.
2. DFHSM does not use UNITNAME when it requests that a scratch volume be mounted while continuing from another volume. Instead, DFHSM uses the same unit the volume was mounted on.
3. If you specify DENSITY and UNITNAME, the density must match the density capabilities for that type of unit. If you specify UNITNAME and do not specify DENSITY, DFHSM uses the highest density for the specified unit.

UNLOAD | NOUNLOAD: Specifying Whether to Unload Virtual Volumes

Explanation: **UNLOAD | NOUNLOAD** are mutually exclusive, optional parameters specifying whether DFHSM should unload virtual backup and migration level 2 volumes.

UNLOAD specifies that DFHSM should unload the virtual backup or migration level 2 volume. After DFHSM has finished using the volume, an MVS UNLOAD command is issued, which makes the unit control block available to MVS.

NOUNLOAD specifies that DFHSM should not unload the virtual backup or migration level 2 volume after DFHSM has finished using that volume.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to UNLOAD and NOUNLOAD. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is NOUNLOAD.

Note: These parameters apply only during volume backup and spill processing to virtual backup volumes, and during volume and data set migration to virtual migration level 2 volumes.

USERUNITTABLE | NOUSERUNITTABLE: Specifying Esoteric Tape Unit Names to DFHSM

Explanation: **USERUNITTABLE(*unit...*) | NOUSERUNITTABLE** are mutually exclusive, optional parameters specifying esoteric tape unit names to DFHSM.

USERUNITTABLE(*unit...*) specifies all the esoteric tape unit names to be identified to DFHSM. For *unit...*, specify the esoteric names of all the tape unit groups you wish to use. If you specify this parameter, you must specify at least one unit.

NOUSERUNITTABLE specifies that no esoteric tape unit names are to be identified to DFHSM. Any previously defined esoteric names are no longer in effect.

SMS Relationship: Applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to USERUNITTABLE and NOUSERUNITTABLE. There are no additional abbreviations.

SETSYS Defaults: None.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default is NOUSERUNITTABLE.

Notes:

1. You must make sure that each tape unit belonging to the esoteric group you specify can read and write on any tape written by any other tape unit that belongs to the same esoteric group. DFHSM will not verify this for you. You must define all esoteric tape unit names during system I/O generation. Do not remove from a subsequent system I/O generation those esoteric unit names DFHSM already used during its tape processing. If you do, DFHSM cannot allocate the tape volume whose esoteric unit name you specified when you issued the ADDVOL command.
2. Do not change your existing 3420 tape esoteric unit names to include the 3480 tape devices even if your 3480 Magnetic Tape Subsystem simulates a 3420 Magnetic Tape Unit because DFHSM rejects mixed esoteric unit names. If DFHSM rejects an esoteric unit name, it does not reject the rest of the user unit table. Each time you specify USERUNITTABLE, the valid esoteric tape unit names identified with this parameter replace any esoteric tape unit names identified with a previous USERUNITTABLE parameter of the SETSYS command. In other words, the user unit table is rebuilt. However, if a failure occurred in acquiring virtual storage, the previous user unit table is still valid because DFHSM does not replace the user unit table until it has verified all the esoteric unit names in the new user unit table.

VERSIONS: Specifying the Maximum Number of Backup Versions to Keep for Any Data Set

Explanation: **VERSIONS(*limit*)** is an optional parameter specifying the maximum number of backup versions DFHSM is to keep for a data set. For *limit*, substitute a decimal number from 0 to 13. A 0 specifies that DFHSM does not create backup versions for any non-SMS-managed data set unless you specify the ALTERDS VERSIONS command.

SMS Relationship: Not applicable.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to VERSIONS. There are no additional abbreviations.

SETSYS Defaults: If you specify a value larger than 13, the SETSYS default for *limit* is 13.

DFHSM Defaults: If you do not specify this parameter on any SETSYS command, the DFHSM default for *limit* is 2.

Notes:

1. You use the VERSIONS parameter of the SETSYS command to specify the number of backup versions for all your non-SMS-managed data sets. However, a DFHSM-authorized user can specify the VERSIONS parameter of the ALTERDS command to change that number of backup versions for a specific data set. An unauthorized user can specify the VERSIONS parameter of the HALTERDS command to change that number of backup versions for a specific data set with the same high-level qualifier as the unauthorized user.
2. DFHSM can keep a maximum of 13 backup versions for one data set name. Some versions may be for a cataloged data set with that name, some versions for uncataloged data set(s) with that name. The VERSIONS parameter indicates the number of backup versions kept for (1) the cataloged data set, and (2) the uncataloged data set(s). If LIMIT is greater than six, then DFHSM gives priority, if necessary, to versions of the cataloged data set. For example, if you specify VERSIONS(7), when the seventh backup version of the cataloged data set is made, no more than six versions will be kept for the uncataloged data set(s).

Summary of DFHSM Defaults

Figure 9 is a summary of the defaults DFHSM uses if you never specify a SETSYS command during or after startup.

DFHSM Defaults	Result
NOACCEPTPSCBUSERID	DFHSM does not attempt to retrieve the user ID for TSO batch requests.
ACTLOGMSGLVL(FULL)	Messages will be generated and logged for all activities.
ACTLOGTYPE(SYSOUT(A))	If you specified SYSOUT without a class, the output is class A, one copy, no special forms.
AUTOBACKUPSTART(0)	DFHSM does not run automatic backup.
AUTODUMPSTART(0)	DFHSM does not run automatic dump.
AUTOMIGRATIONSTART(0)	DFHSM does not do daily space management.

Figure 9 (Part 1 of 6). Summary of DFHSM Defaults

DFHSM Defaults	Result
NOBACKUP	DFHSM does not back up or recover any data sets.
BACKUPDEVICECATEGORY(TAPE)	If you specified CDSVERSIONBACKUP and did not specify any subparameters, DFHSM backs up the control data sets to tape.
BACKUPPREFIX	DFHSM uses the UID you specified in the DFHSM startup procedure.
BCDSBACKUPDSN(*uid*.BCDS.BACKUP)	If you specify CDSVERSIONBACKUP without subparameters, the backup data set name for the backup control data set is *uid*.BCDS.BACKUP.
CDSVERSIONBACKUP	DFHSM makes multiple backup versions of the control data sets and the journal data set.
COMPACT (NONE)	DFHSM does not compact any data sets.
COMPACTPERCENT(40)	If you specify that DFHSM compact data sets, DFHSM uses a default of 40% to determine whether a data set will be compacted in the future. Otherwise, DFHSM ignores this parameter.
NOCONVERSION	DFHSM does not reblock data sets when it recalls or recovers them.
CSALIMITS MWE(4) MAXIMUM(100) ACTIVE(90) INACTIVE(30)	DFHSM limits the common service area storage for MWE allocation. The NOWAIT MWE limit is 4, the maximum limit is 100K, the active limit is 90K, and the inactive limit is 30K.
DAYS(1 | 2)	In a single-processing-unit environment, the data sets must be at least one day old. In a multiple-processing-unit environment, the data sets must be at least two days old.
NODEBUG	DFHSM processes all data sets and volumes.
DEFERMOUNT	In a system with MVS/SP 1.3.2 or a later release, DFHSM defers the mounting of tape volumes.
DENSITY(4)	DFHSM uses a density of 246 bytes/mm (6250 BPI) for scratch tapes.
DFHSMDATASETSERIALIZATION	Data set serialization of system resources is not provided by system facilities.
DUMPIO(1)	DFDSS reads one track at a time.
NOEMERGENCY	DFHSM processes all data sets normally.
NOERASEONSCRATCH	DFHSM does not check for erase of DFHSM owned data sets.
EXITOFF	User exits remain in their current state.

Figure 9 (Part 2 of 6). Summary of DFHSM Defaults

DFHSM Defaults	Result
EXITON	No user exits are active.
EXITS(NNNNNNNNN)	No user exits are active.
EXPORTESDS(RECORDMODE)	DFHSM exports VSAM entry-sequenced data sets with no alternate index by record instead of by control interval.
EXPIREDDATASETS(NOSCRATCH)	DFHSM ignores the expiration date of a data set and processes it as if the expiration date was not reached.
FREQUENCY(0)	DFHSM backs up data sets every time volume backup runs.
INCREMENTALBACKUP(ORIGINAL)	DFHSM creates an initial backup version (if one does not exist) for all non-VSAM and Integrated Catalog Facility VSAM data sets regardless of the change bit in the format 1 DSCB.
INPUTTAPEALLOCATION(NOWAIT)	DFHSM does not ask dynamic allocation to wait for an input tape unit to be allocated. Recall and recovery use input tape units.
INTERVALMIGRATION	DFHSM does interval migration.
JES2	DFHSM uses job entry subsystem 2.
JOURNAL(SPEED)	DFHSM puts the journal entries on a queue but does not wait for the record to be written before DFHSM continues processing.
JRNLBACKUPDSN(*uid*.JRNL.BACKUP)	If you specify CDSVERSIONBACKUP without subparameters, the backup data set name for the journal control data set is *uid*.JRNL.BACKUP.
MAXBACKUPTASKS(2)	DFHSM concurrently runs two volume backup tasks.
MAXDUMPTASKS(2)	DFHSM concurrently runs two volume dump tasks.
MAXEXTENTS(0)	DFHSM does not do extent reduction for active non-VSAM data sets.
MAXRECALLTASKS(5)	DFHSM concurrently processes five recall tasks.
MAXSINGLEFILEBLOCKS(11421)	DFHSM will force an end-of-volume after writing 11,421 16K blocks in single-file format to a 3480 backup or migration volume.
MCDSBACKUPDSN(*uid*.MCDS.BACKUP)	If you specify CDSVERSIONBACKUP without subparameters, the backup data set name for the migration control data set is *uid*.MCDS.BACKUP.
MIGRATEPREFIX	DFHSM uses the UID you specified in the DFHSM startup procedure.
MIGDENSITY(4)	DFHSM uses a density of 246 bytes/mm (6250 BPI) for scratch tapes during migration processing.

Figure 9 (Part 3 of 6). Summary of DFHSM Defaults

DFHSM Defaults	Result
MIGRATIONCLEANUPDAYS(10 30)	DFHSM keeps MCDS data set records for recalled data sets for 10 days. DFHSM keeps daily and volume statistics records for 30 days.
MIGRATIONLEVEL1DAYS(60)	DFHSM does not migrate the data set from a migration level 1 volume to a migration level 2 volume if someone has recalled the data set within the last 60 days.
MIGUNITNAME(3400-6)	DFHSM uses a unit of 3400-6 to mount scratch tapes during migration.
ML2RECYCLEPERCENT(0)	The tape migration level 2 volume cannot contain any valid data when DFHSM automatically recycles a category of volumes.
MONITOR BACKUPCONTROLDATASET(80 1) JOURNAL(80 1) MIGRATIONCONTROLDATASET(80 1) OFFLINECONTROLDATASET(80 1) NOSPACE NOSTARTUP NOVOLUME	DFHSM prints space and volume information only in the DFHSM log. DFHSM sends warning messages to the operator when the journal data set or any control data set is 80% full. The control data sets and journal data set use one extent.
MOUNTWAITTIME(15)	DFHSM waits 15 minutes for an operator to mount the tape before it issues another message asking if the tapes can be mounted.
NOOPTIMUMDASDBLOCKING	DFHSM writes to DFHSM owned DASD in 2K-byte blocks.
OBJECTNAMES	DFHSM uses the general compaction table.
OCDSBACKUPDSN(*uid*.OCDS.BACKUP)	If you specify CDSVERSIONBACKUP without subparameters, the backup data set name for the offline control data set is *uid*.OCDS.BACKUP.
OUTPUTTAPEALLOCATION(NOWAIT)	DFHSM does not ask dynamic allocation to wait for an output tape unit to be allocated. Migration and backup use output tape units.
PARTIALTAPE(REUSE)	DFHSM marks the tape volume full only when the volume reaches the maximum block count specified with the SETSYS MAXSINGLEFILEBLOCKS parameter.
PDA(ON)	DFHSM defaults to ON if the subparameters NONE or OFF are not specified. Tracing begins at DFHSM startup and continues until the OFF subparameter is specified or DFHSM is stopped or ABENDs.
PROFILEBACKUP	DFHSM creates a backup RACF discrete profile for every cataloged RACF-indicated data set that it backs up.

Figure 9 (Part 4 of 6). Summary of DFHSM Defaults

DFHSM Defaults	Result
RACFIND	DFHSM puts RACF-indication on migration copies and backup versions.
RECALL(ANYSTORAGEVOLUME)	DFHSM recalls nonpooled data sets to the volume the catalog is on.
RECYCLEOUTPUT(BACKUP MIGRATION)	DFHSM uses any available tape.
RECYCLETAPEALLOCATION(NOWAIT)	DFHSM does not ask dynamic allocation to wait for a tape unit to be allocated during recycle processing.
REMOVECOMPACTNAMES	None.
NOREQUEST	DFHSM does not ask operator permission when starting daily space management, interval migration, and automatic backup at the requested time.
RETENTIONPERIOD(7)	If you specified CDSVERSIONBACKUP and did not specify any subparameters, DFHSM keeps the backup copies of the DFHSM control data sets for seven days.
SCRATCHFREQUENCY(9999)	DFHSM keeps list data sets for 9,999 days before it scratches them.
SELECTVOLUME(SCRATCH)	DFHSM chooses scratch tapes when an end-of-volume occurs on a tape volume while DFHSM is using it.
NOSKIPABPRIMARY	DFHSM automatically backs up data sets on primary volumes.
NOSMALLDATASETPACKING	DFHSM does not pack small data sets into SDSP data sets on migration level 1 volumes.
NOSMF	DFHSM does not write SMF records.
SOURCENAMES	DFHSM uses the general compaction table.
SPILL	DFHSM does spill processing on full DASD daily backup volumes.
SWAP | NOSWAP	The system resource manager decides whether to make the DFHSM address space able to be swapped.
SYSOUT(A 1)	DFHSM prints to class A, makes one copy, and uses no special form.
NOSYS1DUMP	DFHSM uses the SYSABEND, SYSMDUMP, or SYSUDUMP DD statement in the startup procedure to direct the output of an DFHSM dump.
TAPEDELETION(SCRATCHTAPE)	Tapes become scratch tapes after DFHSM recycles them.
TAPEFORMAT(MULTIFILE)	DFHSM writes one tape data set for every user data set to all 3480 migration and backup volumes.
TAPEMAXRECALLTASKS(1)	DFHSM cannot process more than 1 tape recall task. The rest are DASD recall tasks. This parameter is a subset of the MAXRECALLTASKS parameter.

Figure 9 (Part 5 of 6). Summary of DFHSM Defaults

DFHSM Defaults	Result
TAPEMIGRATION(NONE (ROUTETOTAPE(ANY))	DFHSM selects the first available migration tape when a tape migration level 2 volume is required. If no tapes are available, DFHSM will select a scratch tape with the unit name specified or defaulted from the MIGUNITNAME parameter of the SETSYS command.
TAPESECURITY(PASSWORD)	DFHSM uses password protection for its tape volumes.
NOTRACE	DFHSM does not write changes to the control data sets in the DFHSM log.
UNITNAME(3400-6)	DFHSM uses a unit of 3400-6 to allocate scratch tapes during backup.
NOUNLOAD	DFHSM does not unload your virtual volumes.
NOUSERUNITTABLE	DFHSM does not use esoteric tape unit names.
VERSIONS(2)	DFHSM keeps two backup versions of each data set.

Figure 9 (Part 6 of 6). Summary of DFHSM Defaults

Examples of How to Code the SETSYS Command

The following examples show different ways to code the SETSYS command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Specifying DFHSM Attributes for Automatic Space Management

In this example, the parameters associated with automatic space management are specified. These attributes are in effect until another SETSYS command is issued to change them. The attributes specified are:

- Daily space management begins if DFHSM is running between 0100 (1:00 a.m.) and 0600 (6:00 a.m.) hours. DFHSM will not begin daily space management on additional volumes after 0730 (7:30 a.m.) hours.
- DFHSM reblocks data sets during recall and recovery to a target device other than a 3330, 3330-1, 3350, or 3330V DASD when the target volume is different from the source volume.
- Data sets that have not been used for five days are eligible for automatic migration from primary to level 1 volumes.
- DFHSM deletes data sets having an expired expiration date when performing space maintenance and migration cleanup.
- DFHSM does interval migration if the occupied space on a primary volume is equal to or exceeds its high threshold when the periodic space check is performed.
- A maximum of seven recall tasks can process concurrently.
- Migration cleanup deletes the MCDS data set records for data sets recalled more than 10 days ago and deletes daily and volume statistics records that were created more than 30 days ago.

- Data sets are eligible to migrate from level 1 volumes 30 days after being last referred to.
- The 3480 Magnetic Tape Subsystem is allocated to initially-selected scratch tapes.
- DFHSM uses a percent valid criteria of 25% if someone does not specify the PERCENTVALID parameter of the RECYCLE command for tape migration level 2 volumes.
- Automatically recalled, nonpooled data sets are written on the volume where the user catalog resides.
- The operator's permission is required before daily space management or interval migration can start.
- Data sets containing two tracks or fewer of data migrate to a small-data-set-packing data set on migration level 1 volumes.
- DFHSM writes data to all 3480 migration and backup volumes as a single tape data set containing multiple user data sets.
- Three of the seven recall tasks that can process concurrently can be tape recall tasks.
- DFHSM migrates data sets from migration level 1 volumes to tape migration level 2 volumes.
- DFHSM unloads virtual backup and migration level 2 volumes after using them.

```
SETSYS AUTOMIGRATIONSTART(0100 0600 0730) +
       CONVERSION(REBLOCKBASE) +
       DAYS(5) +
       EXPIREDDATASETS(SCRATCH) +
       INTERVALMIGRATION +
       MAXEXTENTS(10) +
       MAXRECALLTASKS(7) +
       MIGRATIONCLEANUPDAYS(10 30) +
       MIGRATIONLEVEL1DAYS(30) +
       MIGUNITNAME(3480) +
       ML2RECYCLEPERCENT(25) +
       RECALL(ANYSTORAGEVOLUME) REQUEST +
       SMALLDATASETPACKING(2) +
       TAPEFORMAT(SINGLEFILE) +
       TAPEMAXRECALLTASKS(3) +
       TAPEMIGRATION(ML2TAPE) +
       UNLOAD
```

Specifying DFHSM Attributes for Backup

In this example, parameters associated with backup are specified. These attributes are in effect until another SETSYS command is issued to change them. The attributes specified are:

- Automatic backup can start between 0030 (12:30 a.m.) and 0400 (4 a.m.) hours. DFHSM will not begin automatic backup processing on additional volumes after 0730 (7:30 a.m.) hours.
- Creation of backup versions is allowed.
- DFHSM backs up the control data sets and journal data set to multiple tape backup data sets.

- A changed data set is eligible for backup if six days have elapsed since the data set was last backed up.
- DFHSM backs up the following data sets only if their change bits are on in the format 1 DSCBs:
  - Non-VSAM data sets
  - VSAM data sets cataloged in an Integrated Catalog Facility catalog.
- A maximum of five backup tasks can process concurrently.
- DFHSM waits 15 minutes for a tape to be mounted.
- DFHSM creates a backup RACF discrete profile for every cataloged RACF-indicated data set that it backs up.
- DFHSM issues a message when the percentage of valid data on a full tape volume decreases to 25%.
- DFHSM does cleanup processing on full DASD daily backup volumes.
- DFHSM writes one tape data set for every user data set to all 3480 migration and backup volumes.
- The 3480 tape unit is allocated to initially selected scratch tapes.
- DFHSM unloads the virtual backup volumes after using them.
- A maximum of four backup versions of a data set are kept.

```
SETSYS AUTOBACKUPSTART(0030 0400 0730) +
       BACKUP CDSVERSIONBACKUP +
       FREQUENCY(6) +
       INCREMENTALBACKUP(CHANGEDONLY) +
       MAXBACKUPTASKS(5) +
       MOUNTWAITTIME(15) +
       PROFILEBACKUP +
       RECYCLEPERCENT(25) +
       NOSPILL +
       TAPEFORMAT(MULTIFILE) +
       UNITNAME(3480) UNLOAD +
       VERSIONS (4)
```

Specifying DFHSM Attributes for Dump

In this example, parameters associated with dump are specified. These attributes are in effect until another SETSYS command is issued to change them. The attributes specified are:

- Automatic dump can start between 0100 (1 a.m.) and 0400 (4 a.m.) hours. DFHSM will not begin automatic dump processing on additional volumes after 0630 (6:30 a.m.) hours.
- Creation of backup versions is allowed.
- The DFDSS DASD I/O buffering technique is DFDSS will read two tracks at a time.
- DFHSM can concurrently process seven volume dump tasks.
- DFHSM waits 10 minutes for a tape to be mounted before it prompts the operator again.

- DFHSM waits for an output tape to be allocated.
- DFHSM selects specific tape volumes when an end-of-volume condition occurs on a tape volume.
- The recycled tape volumes are deleted from DFHSM control and become scratch tapes.
- Tapes are protected by RACF. In addition, a password-protected data set can be written on the tape.
- The 3480 tape unit is allocated to initially select dump tapes.

```
SETSYS AUTODUMPSTART(0100 0400 0630) +
       BACKUP +
       DUMPIO(2) +
       MAXDUMPTASKS(7) +
       MOUNTWAITTIME(10) +
       OUTPUTTAPEALLOCATION(WAIT) +
       SELECTVOLUME(SPECIFIC) +
       TAPEDELETION(SCRATCHTAPE) +
       TAPESECURITY(RACFINCLUDE) +
       UNITNAME(3480)
```

Specifying DFHSM Attributes With All the Optional Parameters

In these examples, all the optional parameters are specified. The attributes specified are in effect until the next startup of DFHSM or until another SETSYS command is issued to change them. The attributes specified are:

- An installation not having RACF will have DFHSM try to retrieve the userid for TSO batch requests.
- DFHSM will generate and log messages for all activities.
- The output data set receiving the messages is class A, one copy, and no special forms.
- Automatic backup can start between 1800 (6 p.m.) and 2100 (9 p.m.) hours on days that automatic backup is requested to run. DFHSM will not begin automatic backup processing on additional volumes after 2300 (11 p.m.).
- Daily space management begins if DFHSM is running between 2300 (11 p.m.) and 0600 (6 a.m.) hours. DFHSM will run automatic migration processing to completion of all volumes because the *hhmm3* time is not specified on the AUTOMIGRATION parameter.
- Creation of backup versions is allowed.
- DFHSM uses a backup prefix name of DFHSM.

```
SETSYS ACCEPTPSCBUSERID +
       ACTLOGMSGLVL(FULL) +
       ACTLOGTYPE(SYSOUT) +
       AUTOBACKUPSTART(1800 2100 2300) +
       AUTOMIGRATIONSTART(2300 0600) +
       BACKUP BACKUPPREFIX(DFHSM)
```

- DFHSM backs up six successive versions of the control data sets and the journal data set. Because you are using the 3480 Magnetic Tape Subsystem, you do not specify a density.

```
SETSYS CDSVERSIONBACKUP(BACKUPCOPIES(6) +
       BACKUPDEVICECATEGORY(TAPE (RETENTIONPERIOD(14) +
       UNITNAME(3480))) +
       BCDSBACKUPDSN(DFHSM.BCDS.BACKUP) +
       JRNLBACKUPDSN(DFHSM.JRNL.BACKUP) +
       MCDSBACKUPDSN(DFHSM.MCDS.BACKUP) +
       OCDSBACKUPDSN(DFHSM.OCDS.BACKUP))
```

- DFHSM compacts data sets during migration and backup.
- DFHSM does not compact a data set unless 40% of the total space is saved.
- DFHSM reblocks data sets during all recalls and recoveries.
- DFHSM uses CSA limiting.

```
SETSYS COMPACT(ALL) COMPACTPERCENT(40) +
       CONVERSION(REBLOCKTOANY) +
       CSALIMITS(ACTIVE(90) INACTIVE(30) +
       MAXIMUM(100) MWE(4))
```

- Data sets that have not been used for 15 days are eligible for migration from primary to level 1 volumes.
- DFHSM implements its requirements for resource for data set serialization.
- DFHSM defers mounting of tape volumes.
- DFHSM is not operating in debug mode.
- DFHSM is not operating in emergency mode.
- DFHSM asks RACF for the erase status of a user's data set when backup versions and migration copies are scratched from DFHSM owned DASD volumes.
- The following DFHSM exits are active:
  - Data set deletion
  - Data set backup
  - Control data set backup
  - Data set reblock
  - Data set migration
  - Space management volume
  - Data set recall
  - Tape data set
  - Tape volume.
- The following DFHSM exits are inactive:
  - Initialization
  - Second level migrate data set
  - Space management and backup.
- DFHSM exports VSAM entry-sequenced data sets with no alternate index by record instead of by control interval.

- A changed data set is eligible for backup if five days have elapsed since the data set was last backed up.
- DFHSM backs up the following data sets only if their change bits are on in the format 1 DSCBs:
  - Non-VSAM data sets
  - VSAM data sets cataloged in an Integrated Catalog Facility catalog.
- DFHSM does not wait for an input tape unit to be allocated.
- DFHSM does interval migration if the occupied space on a primary volume is equal to or exceeds its high threshold value when the periodic space check is performed.
- JES3 is the job entry subsystem used with DFHSM.

```
SETSYS DAYS(15) DFHSMDATASETSERIALIZATION +
       DEFERMOUNT NODEBUG NOEMERGENCY +
       ERASEONSCRATCH +
       EXITON(AD BD CB CD MD MV RD TD TV) +
       EXITOFF(IN MM SA) +
       EXPORTESDS(RECORDMODE) +
       FREQUENCY(5) INCREMENTALBACKUP(CHANGEDONLY) +
       INPUTTAPEALLOCATION(NOWAIT) +
       INTERVALMIGRATION JES3
```

- Updated records of the MCDS, BCDS, and OCDS are written to the journal data set asynchronously.
- A maximum of five volume backup tasks can process concurrently.
- Data sets with six or more extents are migrated and recalled to cause extent reduction during volume migration.
- A maximum of 10 recall tasks can process concurrently.
- DFHSM uses a migration copy prefix name of DFHSM.
- Migration cleanup deletes MCDS data set records for data sets recalled more than 10 days ago and also deletes daily and volume statistics records that were created more than 30 days ago.
- Data sets are eligible to migrate from level 1 volumes 30 days after being last referenced.
- DFHSM initially mounts scratch tapes during migration on the 3480 Magnetic Tape Subsystem.
- DFHSM issues a message when the percentage of valid data on a full tape migration level 2 volume decreases to 35%.

```
SETSYS JOURNAL(SPEED) MAXBACKUPTASKS(5) +
       MAXEXTENTS(6) MAXRECALLTASKS(10) +
       MIGRATEPREFIX(DFHSM) +
       MIGRATIONCLEANUPDAYS(10 30) +
       MIGRATIONLEVEL1DAYS(30) +
       MIGUNITNAME(3480) +
       ML2RECYCLEPERCENT(35)
```

- No startup, space use, or data set messages appear at the system console; the MCDS has a threshold of 90%, is expected to have five data set extents, and should use the catalog for new space use data; the BCDS has a threshold of 90% and is expected to have five data set extents; the OCDS has a threshold of 80%

and is expected to have five data set extents; the journal data set has a threshold of 80% and is expected to have 16 extents.

```
SETSYS MONITOR(NOSTARTUP NOSPACE NOVOLUME +
       BACKUPCONTROLDATASET(90,5) +
       MIGRATIONCONTROLDATASET(90,5,NEWCOPY) +
       OFFLINECONTROLDATASET(80,5) JOURNAL(80,16))
```

- DFHSM waits 10 minutes for a tape to be mounted before it prompts the operator again.
- DFHSM uses its defined optimum block size when writing to DFHSM owned DASD.
- DFHSM uses the general compaction table, so OBJECTNAMES and SOURCENAMES are not specified.
- DFHSM does not wait for an output tape unit to be allocated.
- DFHSM creates a backup RACF discrete profile for every cataloged RACF-indicated data set that it backs up.
- DFHSM RACF-indicates backup versions and migration copies.
- DFHSM recalls nonpooled data sets to any primary volume with the use attribute of storage and the volume attribute of automatic recall that has sufficient allocatable space. The target volume does not need to have the same volume attributes as the primary volume where the data set migrated from.
- DFHSM issues a message when the percentage of valid data on a full tape backup volume decreases to 20%.
- DFHSM does not wait for the recycle tape to be allocated.
- The operator's permission is not required before daily space management, automatic backup, or migration cleanup can start.

```
SETSYS MOUNTWAITTIME(10) +
       OPTIMUMDASDBLOCKING +
       OUTPUTTAPEALLOCATION(NOWAIT) +
       PROFILEBACKUP +
       RACFIND +
       RECALL(ANYSTORAGEVOLUME(UNLIKE)) +
       RECYCLEPERCENT(20) +
       NOREQUEST
```

- List data sets are deleted during volume space management if two days have elapsed since their last use.
- DFHSM selects specific tape volumes when an end-of-volume condition occurs on a tape volume. A sufficient level of Data Facility Product is installed.
- DFHSM does not skip automatic backup of primary volumes.
- Data sets containing three tracks or fewer of data migrate to a small-data-set-packing data set on migration level 1 volumes.
- SMF records are to be written on the SYS1.MANX and SYS1.MANY system data sets and will have identifications of 128 and 129.
- Spill processing is done on full DASD daily backup volumes.
- The DFHSM address space can be swapped by the system resource manager.

- The output from DFHSM processing goes to system output class A, with one copy printed on a form identified by 8LPI.
- DFHSM dumps are written to a system dump data set.

```
SETSYS SCRATCHFREQUENCY(2) +
       SELECTVOLUME(SPECIFIC) +
       NOSKIPABPRIMARY +
       SMALLDATASETPACKING(3) +
       SMF(128) SPILL +
       SWAP SYSOUT(A,1,8LPI) +
       SYS1DUMP
```

- The recycled tapes become unassigned volumes.
- DFHSM writes data to each 3480 migration and backup volume as a single tape data set containing multiple user data sets.
- Five of the 10 concurrent recall tasks can be tape recall tasks.
- DFHSM migrates data sets to tape migration level 2 volumes.
- Tapes are protected by RACF. In addition, a password-protected data set can be written on the tape.
- Changes to the MCDS, BCDS, and OCDS are not written to the DFHSM log.

```
SETSYS TAPEDELETION(HSMTAPE) +
       TAPEFORMAT(SINGLEFILE) +
       TAPEMAXRECALLTASKS(5) +
       TAPEMIGRATION(ML2TAPE) +
       TAPESECURITY(RACFINCLUDE) +
       NOTRACE
```

- The 3480 tape unit is allocated to initially selected scratch tapes.
- DFHSM unloads the virtual backup and migration level 2 volumes after using them.
- The user specifies an esoteric tape unit name of TAPE62.
- A maximum of six backup versions of a data set is kept.

```
SETSYS UNITNAME(3480) UNLOAD +
       USERUNITTABLE(TAPE62) +
       VERSIONS(6)
```

Monitoring Volume Space-Use Information

In this example, the volume space-use information messages appear at the system console, the appropriate activity log, and the DFHSM log.

```
SETSYS MONITOR(SPACE)
```

Writing Records to the Journal Data Set Synchronously

In this example, updated records of the MCDS, BCDS, and OCDS are written to the journal data set synchronously.

```
SETSYS JOURNAL(RECOVERY)
```

Changing the System Output Class for DFHSM

In this example, the output from DFHSM goes to system output class D, with one copy printed on a form identified by 6LPI.

```
SETSYS SYSOUT(D 1 6LPI)
```

Operating in Debug Mode with No SMF Records Written

In this example, DFHSM is operating in debug mode, and no SMF records are written.

```
SETSYS DEBUG NOSMF
```

Changing the Starting Time for Automatic Backup and Requiring the Operator's Permission

In this example, automatic backup can start between 1400 (2 p.m.) and 1800 (6 p.m.) hours but after 2000 (8 p.m.) automatic backup will not start processing additional volumes, and the operator's permission is required before automatic backup can start.

```
SETSYS AUTOBACKUPSTART(1400 1800 2000) REQUEST
```

Specifying DFHSM to Scratch Data Sets Having Expired Expiration Dates

In this example, DFHSM will scratch data sets that have expired expiration dates; then DFHSM performs cleanup.

```
SETSYS EXPIREDDATASETS(SCRATCH)
```

Preventing the Displaying of Messages for Subsequent Movement and Clean Up

In this example, messages for subsequent movement and clean up are not displayed.

```
SETSYS ACTLOGMSGLVL(REDUCED)
```

Activating an Exit

In this example, the exit ARCMMEXT is activated.

```
SETSYS EXITON(ARCMMEXT)
```

Specifying That Data Set Serialization Will Be Provided by System Facilities

In this example, system facilities will provide data set serialization.

```
SETSYS USERDATASETSERIALIZATION
```

Specifying DFHSM Use Its Defined Optimum Block Size When Outputting to DFHSM-Owned DASD

In this example, DFHSM should use its defined optimum block size when outputting to DFHSM owned DASD.

```
SETSYS OPTIMUMDASDBLOCKING
```

Specifying the DFDSS DASD I/O Buffering Technique

In this example, DFHSM specifies to DFDSS the second (2) buffering technique is to be used for DFDSS DASD I/O. The second buffering technique is DFDSS reads two tracks at a time.

```
SETSYS DUMPIO(2)
```

Establishing the Maximum Number of Dump Tasks Allowed to Run Concurrently

In this example, DFHSM can run a maximum of five dump tasks concurrently.

```
SETSYS MAXDUMPTASKS(5)
```

Activating Erase-On-Scratch for DFHSM Backup Version and Migration Copy Data Sets

In this example, DFHSM asks RACF for the erase status of the user's data set when backup versions and migration copies are scratched from DFHSM owned DASD volumes.

```
SETSYS ERASEONSCRATCH
```

Specifying Small-Data-Set-Packing Data Set Eligibility Limit

In this example, all physical sequential data sets with a data set source size of 200 kilobytes or less are considered as candidates for migration to a small-data-set-packing data set.

```
SETSYS SMALLDATASETPACKING(KB(200))
```

STOP: Shutting Down DFHSM

The STOP command causes an orderly shutdown of DFHSM. You can also request a dump of the DFHSM address space. An orderly shutdown is when DFHSM ends each attached subtask. Because many DFHSM commands and automatic functions can run for a long time, DFHSM periodically checks whether you issued a STOP command. This allows DFHSM to shut down as soon as possible. After DFHSM detaches all subtasks, DFHSM issues a message indicating that shutdown is complete. DFHSM then returns control to the system. The STOP command should be entered only once.

Another way to shut down DFHSM is to use the MVS STOP command.

Syntax of the STOP command

Command	Optional Parameter
STOP	DUMP

Optional Parameters of the STOP Command

DUMP: Requesting a Dump of the DFHSM Address Space

Explanation: DUMP is an optional parameter requesting a dump of the DFHSM address space before DFHSM stops processing. The SYSUDUMP, SYSMDUMP, or SYSABEND DD statement you specify in the DFHSM startup procedure determines where DFHSM sends the dump.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to DUMP. There are no additional abbreviations.

Defaults: None.

An Example of How to Code the STOP Command

The following example shows how to code the STOP command:

Stopping DFHSM with a Dump

In this example, DFHSM is stopped, and a dump is printed.

```
STOP DUMP
```

SWAPLOG: Switching between the DFHSM Log Data Sets

The two DFHSM log data sets are called the LOGX data set and LOGY data set. The names of the data sets are specified in the procedure used to start DFHSM and in the procedure used to print the LOGY data set.

DFHSM always writes information in the LOGX data set. When the LOGX data set becomes full, DFHSM automatically swaps the two log data sets. You can use the SWAPLOG command to swap the two log data sets. In addition, you can specify the LOGSW=YES parameter on the START DFHSM command to cause DFHSM to swap the log data sets during DFHSM initialization. When the log data sets are swapped, DFHSM does the following:

1. Stops writing information in the LOGX data set
2. Closes the LOGX data set
3. Renames the LOGX data set to a temporary name
4. Renames the LOGY data set to LOGX
5. Renames the temporary data set name to LOGY
6. Opens the new LOGX data set
7. Resumes writing information in the new LOGX data set.

After the DFHSM log data sets have been swapped, start the HSMLOG procedure that is supplied with the DFHSM licensed program. This procedure normally resides in PARMLIB. The HSMLOG procedure runs the ARCPRLOG program to do an initial formatting of the information in the LOGY data set and to print the log data set. After running the ARCPRLOG program, the HSMLOG procedure deletes the old LOGY data set and reallocates a new LOGY data set. The ARCPRLOG program is also supplied with the DFHSM licensed program.

If you do not print the information in the LOGY data set after the log data sets are swapped and a later swap occurs, you do not have a copy of that information because DFHSM writes over the old information in the LOGY data set.

Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide contains detailed information about the contents of the DFHSM log data sets and how to print information in the DFHSM log.

Syntax of the SWAPLOG Command

Command	Required Parameters	Optional Parameters
SWAPLOG		

Note: The SWAPLOG command does not have any parameters.

An Example of How to Code the SWAPLOG Command.

The following example shows how to code the SWAPLOG command:

Swapping the DFHSM LOGX and LOGY Data Sets

In this example, the DFHSM log data sets are swapped.

```
SWAPLOG
```

TAPECOPY: Making Copies of Selected 3480 Tapes Volumes

The TAPECOPY command provides a way of copying migration level 2 and backup 3480 single-file tape volumes that are marked as full and do not have an alternate tape volume reference in the original volumes in the offline control data set (OCDS) TTOC record.

Syntax of the TAPECOPY Command

Command	Required Parameters	Optional Parameters
TAPECOPY	**ALL | MIGRATIONLEVEL2 | BACKUP | ORIGINALVOLUMES(***ovol1* **[,***ovol2...ovoln* **]) | INDATASET(***volcopy.list.dsname***)**	**ALTERNATEVOLUMES(***avol1* **[,***avol2...avoln* **]) EXPDT([***cc***]***yyddd* **) | RETPD(** *nnnn* **)**

Note: The optional parameters EXPDT and RETPD are mutually exclusive.

The following table shows the DFHSM abbreviations for the parameters of the TAPECOPY command:

Parameter	DFHSM Abbreviation
ALTERNATEVOLUMES	AVOLS
MIGRATIONLEVEL2	ML2
ORIGINALVOLUMES	OVOLS

Required Parameters of the TAPECOPY Command

ALL: Specifying to Copy All Eligible 3480 Single-File Tape Volumes

Explanation: ALL specifies that all 3480 single-file tape volumes that are marked as full in the OCDS TTOC record and do not have an alternate volume are to be copied.

When ALL is specified, DFHSM uses scratch tapes for the output or target volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL. There are no additional abbreviations.

Defaults: None.

MIGRATIONLEVEL2: Specifying to Create Copies of All Eligible Migration Level 2 Volumes

Explanation: MIGRATIONLEVEL2 specifies that all 3480 single-file migration level 2 tape volumes that are marked as full in the OCDS TTOC record and do not have an alternate volume are to be copied.

When MIGRATIONLEVEL2 is specified, DFHSM uses scratch tapes for the output or target volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to MIGRATIONLEVEL2. In addition, you can use the abbreviation ML2 for MIGRATIONLEVEL2.

Defaults: None.

BACKUP: Specifying to Create Copies of All Eligible Backup Tape Volumes

Explanation: BACKUP specifies that all 3480 single-file backup tape volumes that are marked as full in the OCDS TTOC record and do not have an alternate volume are to be copied.

When BACKUP is specified, DFHSM uses scratch tapes for the output or target volumes.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to BACKUP. There are no additional abbreviations.

Defaults: None.

ORIGINALVOLUMES: Copying Specified Volumes

Explanation: ORIGINALVOLUMES(*ovol1...ovoln*) is a required parameter (if you are specifying which volumes are to be copied) requesting that an alternate tape volume copy be created. The volumes to be copied are specified by their volume serial numbers (*ovol*). The alternate tape volumes are made even though the original volumes may not be marked full or already have an alternate tape volume reference in the OCDS TTOC record.

The optional parameter ALTERNATEVOLUMES may be used to specify which output volumes are to be used in place of using scratch tapes. If specified, the number of entries in ORIGINALVOLUMES and ALTERNATEVOLUMES must match. The TAPECOPY function will maintain a one-for-one correspondence between the two sets of entries.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ORIGINALVOLUMES. In addition, you can use the abbreviation OVOLS for ORIGINALVOLUMES.

Defaults: None.

INDATASET: Specifying to Use a Data Set Containing a Volume List

Explanation: INDATASET(*volcopy.list.dsname*) is a required parameter specifying to use a list of original tape volumes contained in the data set supplied and create an alternate tape volume copy of them. The alternate tape volumes are made even though the original volumes may not be marked as full.

volcopy.list.dsname is the data set name of the cataloged data set. This data set must *not* be a migrated data set when the command is issued.

When allocating the volume list data set, use the following parameters for:

RECFM specify F, FB, FS, or FBS
LRECL specify 80
BLKSIZE specify a multiple of LRECL
DSORG use physical sequential (PS) organization.

When building the volume list contents, use the following entry format:

Columns	Contents
1-6	Original volume source to be copied. Specify this volume by its volume serial number.
8-13	Alternate volume target specified by its volume serial number. You can also use a volume serial number of PRIVAT meaning that DFHSM is to use a scratch tape for the target. If a volume serial number is not specified, the default is the value found in the alternate volume field of the OCDS TTOC record.
15-21	This field is used to specify an alternate tape volume expiration date. The date is placed in the tape label but has no relation to when DFHSM will remove the tape from its inventory. The alternate tape is deleted by DFHSM at the same time the original tape is deleted. Use the format as *[cc]yyddd* and right justify the date within the field. If no expiration date is specified in this field, the DFHSM default (99365) is used. The date is checked for validity and the entire command is rejected if the test fails. Limits on the expiration date are determined by the level of MVS and Data Facilities Product installed on the system. If "year 2000" support is available, the date limits are January 1st, 1987 to December 31, 2155. If not, the limits are January 1st, 1987 to December 31, 1999. **CC** This is an optional field used to specify the first two digits of the year or can be left blank to default to the current year's first two digits. For example: use 20 for the first two digits for the years 2000 through 2099; use 21 for the first two digits for the years 2100 through 2155. **YY** This field specifies the last two digits of the year. **DDD** This field specifies the Julian day in the year.

Notes:

1. If an expiration date is supplied, it is processed as described under the EXPDT parameter. The exception is that if an expiration date is invalid, only the tape listed in the input record is failed.
2. If the expiration date is not supplied in an input record, the EXPDT parameter on the TAPECOPY command is used.

TAPEREPL: Replacing 3480 Tape Volumes with Their Alternate Volumes

Syntax of the TAPEREPL Command

Command	Required Parameters	Optional Parameters
TAPEREPL	ALL | ORIGINALVOLUMES(*ovol1* [,*ovol2...ovoln*]) | INDATASET(*volrepl.list.dsname*)	ALTERNATEVOLUMES(*avol1* [,*avol2...avoln*])

The following table shows the DFHSM abbreviations for the parameters of the TAPEREPL command:

Parameter	DFHSM Abbreviation
ALTERNATEVOLUMES	AVOLS
ORIGINALVOLUMES	OVOLS

Required Parameters of the TAPEREPL Command

ALL: Specifying to Replace All 3480 Single-File Tape Volumes

Explanation: ALL is a required parameter specifying to replace all 3480 single-file tape volumes that have an alternate tape volume reference in their OCDS TTOC records.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL. There are no additional abbreviations.

Defaults: None.

ORIGINALVOLUMES: Specifying Volumes to be Replaced

Explanation: ORIGINALVOLUMES is a required parameter specifying to replace all references to the original tape volume with references to the alternate tape volume. The alternate tape volume can be specified using the ALTERNATE VOLUME parameter or, in its absence, the one found in the original volume's OCDS TTOC record is used.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ORIGINALVOLUMES. In addition, you can use the abbreviation OVOLS for ORIGINALVOLUMES.

Defaults: None.

INDATASET: Specifying to Use a Data Set Containing a Volume List

Explanation: INDATASET is a required parameter specifying to use a list of original tape volumes contained in the data set supplied and replace the original tape volume references with alternate tape volume references.

volrepl.list.dsname is the data set name of the cataloged data set. This data set must *not* be a migrated data set when the command is issued.

When allocating the volume list data set, use the following parameters for:

RECFM specify F, FB, FS, or FBS
LRECL specify 80
BLKSIZE specify a multiple of LRECL
DSORG use physical sequential (PS) organization.

When building the volume list contents, use the following entry format:

Columns	Contents
1-6	Original tape volume serial number to be replaced.
8-13	Alternate tape volume serial number to use. If an alternate tape volume serial number is not specified, the value found in the alternate volume field of the original volume's OCDS TTOC record is used.

INDATASET Example: The following is an example of the format for the input volume list data set:

```
Columns:  1----6 8---13
Content:  orig.  alt.
          volser volser

          * * * Top of Data * * *
Line 1:   ML1100 DBK070
Line 2:   ML2101
          * * * End of Data * * *
```

Legend:

Line 1 specifies to replace the original tape volume labeled ML1100 with the alternate tape volume DBK070.
Line 2 specifies to replace the original tape volume labeled ML2101 with the alternate tape volume specified in the OCDS TTOC record for volume ML2101.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to INDATASET. There are no additional abbreviations.

Defaults: None.

Optional Parameters of the TAPEREPL Command

ALTERNATEVOLUMES: Specifying the Replacement Volumes to Use

Explanation: ALTERNATEVOLUMES is an optional parameter that identifies specific alternate tape volumes to substitute for the original tape volumes. The alternate tape volumes are selected by their volume serial numbers *avol*. If specified, the number of entries in ORIGINALVOLUMES and ALTERNATEVOLUMES must match. The TAPEREPL function will maintain a one-for-one correspondence between the two sets of entries.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALTERNATEVOLUMES. In addition, you can use the abbreviation AVOLS for alternatevolumes.

Defaults: None.

Examples of How to Code the TAPEREPL Command

The following examples show different ways to code the TAPEREPL command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Specifying to Replace a Damaged Tape

The following example illustrates how to replace a damaged tape by its alternate, which is identified in the OCDS TTOC record for the damaged tape:

```
TAPEREPL ORIGINALVOLUMES(HB0123)
```

Specifying to Replace a Set of Tape Volumes

The following example illustrates how to replace more than one original tape volume with respective alternate volumes:

```
TAPEREPL ORIGINALVOLUMES(JHG191,JHG195,JHG198)   -
         ALTERNATEVOLUMES(DBK001,DBK005,DBK008)
```

Specifying to Replace a List of Original Volumes

This example illustrates using a data set containing a list of volumes to process.

```
TAPEREPL INDATASET(G737495.VOLIST.DATA)
```

TRAP: Requesting a Dump When a Specified Error Occurs

The TRAP command specifies what DFHSM should do if an error occurs. DFHSM can do one of the following:

- Abnormally end the task when the error occurs. After the abnormal end, DFHSM produces an abnormal end dump (ABEND).
- Write the error in a SYSOUT data set (LOG).
- Remove a previous trap (OFF).
- Take a snap dump (SNAP).

Note: DFHSM automatically shuts down because of recurring trap conditions. DFHSM automatically shuts down after 200 occurrences of the same error code in the same module under one of the following conditions:

- Automatic traps - when 200 occurrences of the same error code with an option of ABEND or SNAP.
- TRAP command issued with the SNAP option - when 200 occurrences of the same error code with an option of ABEND or SNAP.
- TRAP command issued with the ABEND option - when 200 occurrences of the same error code with any option except FATAL.

Refer to *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Guide* for additional information about errors and error codes.

Automatic shutdown can be avoided by issuing a TRAP command for the selected error code with the LOG optional parameter.

Syntax of the TRAP Command

Command	Required Parameters	Optional Parameters
TRAP	**ALL** | *module*	*error code* **ABEND[(ALWAYS | NEVER | ONCE)] |** **LOG | OFF |** **SNAP[(ALWAYS | NEVER | ONCE)]**

Required Parameters of the TRAP Command

ALL | Module: Specifying the Location of the Trap

Explanation: **ALL** | *module* are mutually exclusive, required positional parameters that specify the location of the trap.

ALL specifies that all DFHSM modules are to be tested for errors.

For *module*, substitute the name of the DFHSM module that you want to test for errors. A list of modules and codes that DFHSM can trap are described in the *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Diagnosis Guide.*

Abbreviations: None.

Defaults: None.

Note: Because *module* is a required positional parameter, you must specify it immediately after the command name.

Optional Parameters of the TRAP Command

Error Code: Specifying the Error Code to Test For

Explanation: *error code* is an optional positional parameter specifying the error return code to be tested when it is returned by the module you specified. For example, if you specify TRAP ARCGODS 13, DFHSM checks for return code 13 from module ARCGODS. For *error code*, substitute a code number. If you substitute a 0 for the error code, DFHSM tests for any error in the specified module.

Abbreviations: None.

Defaults: When you do not substitute an error code, *error code* defaults to 0. This means that DFHSM tests for any error in the module you specified.

Note: Because *error code* is an optional positional parameter, you must specify it immediately after *module*.

ABEND | LOG | OFF | SNAP: Specifying What DFHSM Should Do if an Error Occurs

Explanation: **ABEND[(ALWAYS | NEVER | ONCE)] | LOG | OFF | SNAP[(ALWAYS | NEVER | ONCE)]** are mutually exclusive, optional parameters specifying what DFHSM should do and how many times it should do it when the specified error occurs in the specified module.

ABEND specifies that DFHSM abnormally ends the task when the specified error condition occurs in the specified module. DFHSM abnormally ends the task by issuing an ABEND macro. DFHSM almost always tries to restart the task that abnormally ended. During the abnormal end, DFHSM produces an abnormal end dump.

ALWAYS | NEVER | ONCE are mutually exclusive, optional subparameters of the ABEND parameter specifying how many times DFHSM should abnormally end the task when the specified error condition occurs in the specified module.

ALWAYS specifies that DFHSM abnormally end the task every time the specified error condition occurs in the specified module.

NEVER specifies that DFHSM should never abnormally end the task when the specified error condition occurs in the specified module.

ONCE specifies that DFHSM should abnormally end the task the first time the specified error condition occurs in the specified module.

LOG specifies that DFHSM is to write an entry in the DFHSM log when the specified error condition occurs in the specified module.

OFF specifies that DFHSM remove a trap you specified with a previous TRAP command. For example, you specified TRAP ARCGODS 13 SNAP(ONCE) to cause DFHSM to produce a snap dump the first time error condition 13 occurs in module ARCGODS. To prevent DFHSM from checking for that error condition any more, you specify TRAP ARCGODS 13 OFF.

SNAP specifies that DFHSM is to produce a snap dump when the specified error condition occurs in the specified module. DFHSM produces a snap dump by issuing a SNAP macro. If you specified the SYS1DUMP parameter of the SETSYS command, the dump is written to a system dump data set. If you specified the NOSYS1DUMP parameter on the SETSYS command, the dump is written to the data set identified with the SYSABEND, SYSUDUMP, or SYSMDUMP statement in the procedure used to start DFHSM. DFHSM continues processing after producing a snap dump.

ALWAYS | NEVER | ONCE are mutually exclusive, optional subparameters of the SNAP parameter specifying how many times DFHSM should produce a snap dump when the specified error condition occurs in the specified module.

ALWAYS specifies that DFHSM produce a snap dump every time the specified error condition occurs in the specified module.

NEVER specifies that DFHSM never produce a snap dump when the specified error condition occurs in the specified module.

ONCE specifies that DFHSM produce a snap dump the first time the specified error condition occurs in the specified module.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ABEND, ALWAYS, LOG, NEVER, OFF, ONCE, and SNAP. There are no additional abbreviations.

Defaults: If you do not specify ABEND, LOG, OFF, or SNAP, the default is SNAP. If you do not specify ALWAYS, NEVER, or ONCE, the default is ONCE.

Examples of How to Code the TRAP Command

The following examples show different ways to code the TRAP command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Trapping an Error Condition with a Snap Dump

In this example, all the error conditions in module ARCACREL are trapped, and a snap dump is taken any first time the error occurs.

```
TRAP ARCACREL 0 SNAP
```

Trapping an Error Condition with an Abnormal End Dump

In this example, a trap is set for error condition 1 in module ARCCPOP, and an abnormal end dump is printed the first time the error occurs.

```
TRAP ARCCPOP 1 ABEND
```

Trapping an Error Condition with a Log Entry

In this example, all the error conditions in module ARCBELIG are entered in the DFHSM log.

```
TRAP ARCBELIG 0 LOG
```

Removing a Previous Trap

In this example, a trap is removed that was previously specified for error condition 3 in module ARCPROPN.

```
TRAP ARCPROPN 3 OFF
```

UPDATEC: Recovering the Control Data Sets

The UPDATEC command rebuilds an updated control data set. The UPDATEC command combines the entries in the specified journal data set with the restored backup copy of the BCDS, MCDS, or OCDS. You use the UPDATEC command to fix any major problems that occur in the control data sets.

When you issue the UPDATEC command, DFHSM places itself in emergency mode and does not write in the journal data set.

Syntax of the UPDATEC Command

Command	Required Parameters	Optional Parameters
UPDATEC	ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET	JOURNAL(*dsname*)

The following table shows the DFHSM abbreviations for the parameters of the UPDATEC command:

Parameter	DFHSM Abbreviation
BACKUPCONTROLDATASET	BCDS
MIGRATIONCONTROLDATASET	MCDS
OFFLINECONTROLDATASET	OCDS

Required Parameters of the UPDATEC Command

ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET: Specifying Which Control Data Set to Update

Explanation: ALL | BACKUPCONTROLDATASET | MIGRATIONCONTROLDATASET | OFFLINECONTROLDATASET are mutually exclusive, required parameters that specify which control data sets DFHSM should update.

ALL specifies that DFHSM should combine the entries from the journal data set with the restored copies of all three control data sets.

BACKUPCONTROLDATASET specifies that DFHSM combine the entries from the specified journal data set with a restored backup copy of the BCDS.

MIGRATIONCONTROLDATASET specifies that DFHSM combine the entries from the specified journal data set with a restored backup copy of the MCDS.

OFFLINECONTROLDATASET specifies that DFHSM combine the entries from the specified journal data set with a restored backup copy of the OCDS.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to ALL, BACKUPCONTROLDATASET, MIGRATIONCONTROLDATASET, and OFFLINECONTROLDATASET. In addition, you can use the abbreviation BCDS for BACKUPCONTROLDATASET, MCDS for MIGRATIONCONTROLDATASET, and OCDS for OFFLINECONTROLDATASET.

Defaults: None.

Optional Parameters of the UPDATEC Command

JOURNAL: Specifying the Journal Data Set to Use

Explanation: JOURNAL(*dsname*) is an optional parameter specifying the fully qualified name of the journal data set to use with UPDATEC. For *dsname*, substitute the fully qualified name of the journal data set that DFHSM should use when it updates the BCDS, MCDS, and OCDS. You specify JOURNAL only if you do not want to use the journal data set identified with the JOURNAL DD statement in the DFHSM startup procedure.

Abbreviations: The TSO abbreviation convention described in "Abbreviating Commands and Parameters" on page 4 applies to JOURNAL. There are no additional abbreviations.

Defaults: If you do not specify JOURNAL, DFHSM uses the journal data set identified with the JOURNAL DD statement of the DFHSM startup procedure.

Note: If the journal data set identified with the JOURNAL DD statement in the DFHSM startup procedure is not the journal data set you want to use for recovery, you must specify JOURNAL.

If a journal is used other than the one currently identified in the journal DD statement (a journal other than the current journal means a backup journal), and if that journal is on tape, the following procedure is required:

1. The tape must be mounted without the write protect ring.
2. After mounting the tape, a message (IEC510D) is received stating that the program is attempting to write on the tape, but the write protection ring is not inserted. Reply to this message with Rnn,'F' which rewinds the tape. After the tape rewinds, insert the write protect ring and remount the tape. After the tape is remounted, ready the device.

Examples of How to Code the UPDATEC Command

The following examples show different ways to code the UPDATEC command:

Note: Any values specified here are examples only and should not be interpreted as the values to be used for your system.

Updating the MCDS, BCDS, and OCDS with a Specified Journal Data Set

In this example, the MCDS, BCDS, and OCDS are updated by using a specified journal data set.

```
UPDATEC ALL JOURNAL(ALT.JRNL)
```

Updating the MCDS

In this example, the MCDS is updated using the journal data set identified by the journal DD statement in the DFHSM startup procedure.

```
UPDATEC MIGRATIONCONTROLDATASET
```

Appendix A. Using the AUDIT Command

The purpose of the audit process is to detect and report discrepancies among the data set information from the following sources:

- Master catalog and any associated user catalogs (including OS CVOL catalogs)
- Control data set records
- VTOC of the DASD volume on which the data set resides.

Certain detected errors can be corrected by AUDIT processing if the FIX parameter is specified.

Audit information is written in a SYSOUT or user-specified data set and you can, in most cases, request that the audit output be sent to the terminal from which the AUDIT command was issued.

The parameters specified in the AUDIT command determine which data sets are audited. SMS-managed data sets will be processed similarly to the audit of non-SMS-managed data sets. You can audit:

- A specific cataloged data set
- All cataloged data sets that have the same set of initial characters of the data set name
- All data sets that reside on a specified non-SMS-managed volume
- All data sets that reside on backup volumes of a specified backup type
- All data sets cataloged in a specified computing system catalog
- All data sets that have a data set record in the MCDS
- All data sets that have a data set record in the BCDS
- All data sets that have an entry in an OCDS TTOC record of a specified type.

The AUDIT command is described in four sections. These sections are: data sets, volumes, catalog, and control data sets. SMS-managed volumes will not be included. Commands requesting audit of specific SMS-managed volumes will fail. In each section, the items described are:

- Audited information
- Information included in the report
- Errors detected by the AUDIT command
- Errors corrected by the AUDIT command.

Although there is inherent repetition in this approach to the description of the AUDIT command, the repetition is provided for your convenience.

When you specify AUDIT FIX in a single-processing-unit environment, there is an exclusive enqueue for the MCDS, BCDS, and OCDS. In this processing unit, DFHSM does not process any command that can modify the control data sets.

When you specify AUDIT FIX in a multiple-processing-unit environment, DFHSM issues the RESERVE macro to keep the other processing units from accessing the MCDS, BCDS, and OCDS. The reserve applies to the three volumes that contain the control data sets; therefore, no other data sets on those volumes can be accessed from another processing unit.

There are two types of audits when DFHSM audits the OCDS for tape migration level 2 volumes: TTOC-driven and non-TTOC-driven. These are important if you

receive *ERR 16 and *ERR 17, which are explained in "Errors Detected When Auditing Data Sets" on page 376.

TTOC-Driven Audits: If you specify one of the following commands, the audit is TTOC-driven:

- AUDIT VOLUMES
- AUDIT VOLUMES(*volser*) where *volser* is the volume serial number of a tape migration level 2 volume.
- AUDIT OCDS(ALL)
- AUDIT OCDS(ML2).

When the audit is TTOC-driven, DFHSM checks the MCDS data set record of the data set being audited for the following conditions:

- Whether the volume serial number of the TTOC containing this data set is in the MCDS data set record.
- Whether there is a valid data set entry in the TTOC of each spanned volume if the MCDS data set record indicates that the data set spans more than one volume.

Non-TTOC-Driven Audits: If you specify one of the following commands, the audit is not driven by the TTOC:

- AUDIT DSN(*dsname*)
- AUDIT BCDS
- AUDIT MCDS
- AUDIT MCAT
- AUDIT UCAT.

When the audit is not driven by the TTOC, DFHSM checks the MCDS data set record of the data set being audited to see if the data set is migrated to a tape migration volume and if it spans more than one volume. Then, DFHSM will verify the TTOC records of each tape migration level 2 volume to be sure the data set is on the specified volume.

Auditing Data Sets

You specify AUDIT DATASETNAMES to get an audit of a data set or data sets. You specify the LEVELS parameter to get an audit of all data sets having the same set of initial characters of their data set names. If you specify LEVELS, only those data sets for which MCDS data set records exist can be audited.

Data Sets Audited

The information for auditing a data set on a DASD volume is obtained from the computing system catalog entry for the data set and the VTOC of the volume where the data set resides according to the computing system catalog.

The information for auditing a data set on a tape volume is obtained from the computing system catalog entry for the data set and the TTOC of the volume where the data set resides according to the computing system catalog.

Information Reported When Auditing Data Sets

When you specify the DATASETNAMES parameter, the audit information is reported for each data set audited even if there is no audit error. When you specify the LEVELS parameter, you can request that audit information be reported for all the data sets audited or for only those data sets for which audit errors are detected.

The top line of the printed audit report for data sets shows that a data set audit was done and the time and date of the audit. The information in the report is listed in the following order for each data set audited:

Note: In the description of what is included in the lists from the AUDIT command, the headings enclosed in parentheses are on the terminal output from AUDIT if you specify the TERMINAL parameter.

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the specified data set. *ERR *nn* under this heading specifies the error number detected for the data set. For an explanation of error types, see "Errors Detected When Auditing Data Sets" on page 376.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- DATA SET ON VOLUME (DSN ON VOL):

  A serial number under this heading is the serial number of the primary or migration level 2 volume that contains the data set being audited with the AUDIT command. In addition, when a volume serial number is included under this heading, it indicates that the data set being audited is cataloged in the computing system catalog. ?????? under this heading indicates that the existence of the data set on the volume indicated by the computing system catalog could not be verified. If *ERR 16 or *ERR 17 occurs, this field can contain additional diagnostic information. For a description of these errors, see "Errors Detected When Auditing Data Sets" on page 376.

- CATALOGED TO VOLUME (CTLG VOL):

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. MIGRAT under this heading indicates that the data set being audited is on a migration volume. -NONE- under this heading indicates that no record of the data set being audited exists in the computing system catalog.

- MIGRATED TO VOLUME (MIG VOL):

  A serial number under this heading is the serial number of the migration volume that contains the data set being audited as recorded in the MCDS. RECALLED under this heading indicates that the data set being audited is on a mounted primary volume as indicated in the MCDS. DELETED indicates that the data set has been deleted as indicated in the MCDS. -NONE- under this heading specifies that no record of the data set being audited exists in the MCDS.

- BACKED UP TO VOLUME (BACK VOL):

  A serial number under this heading is the serial number of the backup volume that contains the most recent backup version of the data set being audited as recorded in the BCDS.

Figure 11 on page 376 is a sample of the printer output when auditing data sets.

```
-- DFHSM AUDIT -       DATASET -- LISTING - AT 18:09:53 ON 84/01/24

  ERROR                  DATA SET NAME                    DATA SET ON    CATALOGED      MIGRATED      BACKED UP
  TYPE                                                       VOLUME      TO VOLUME      TO VOLUME     TO VOLUME

  **NONE           H952762.PSFB.F40AU001.DSET01              PRIM01       PRIM01         -NONE-        BATP01
  *ERR 10          H952762.PSFB.F40AU001.DSET02              ??????       MIGRAT         -NONE-        BATP01
  - END OF -           DATASET - LISTING -
```

Figure 11. Sample List of the Printer Output When You Audit Data Sets

Figure 12 is a sample of the terminal output when auditing data sets.

```
AUD=DS      DSN=H952762.PSFB.F40AU001.DSET01                ERROR TYPE= **NONE
DSN ON VOL=PRIM01    CTLG VOL=PRIM01  MIG VOL= -NONE-    BACK VOL=BATP01

AUD=DS      DSN=H952762.PSFB.F40AU001.DSET02                ERROR TYPE= *ERR 10
DSN ON VOL=??????    CTLG VOL=MIGRAT  MIG VOL= -NONE-    BACK VOL=BATP01
ARC0802I DFHSM AUDIT ENDING
```

Figure 12. Sample Terminal List When You Audit Data Sets

Errors Detected When Auditing Data Sets

The AUDIT command can detect the following errors.

*ERR 01: Neither the computing system catalog nor the MCDS has a record of the data set being audited.

This error can also be caused by the user catalog being offline.

*ERR 02: The computing system catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a primary volume.

*ERR 03: The computing system catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a migration volume.

*ERR 04: The computing system catalog record of the data set being audited indicates that the data set is on a level 0 volume, but this could not be verified. No MCDS record of the data set exists for this error condition. This may or may not be an error.

*ERR 06: The computing system catalog and the MCDS records for the data set being audited indicate that the data set is on a primary volume. However, the data set is not on the volume recorded in the computing system catalog, and the volume where the data set does reside cannot be determined.

*ERR 07: The serial number of the volume containing the data set being audited as recorded in the computing system catalog does not agree with the serial number of the primary volume containing the data set as recorded in the MCDS. The two conflicting volume serial numbers are on the lists under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings respectively.

*ERR 09: The computing system catalog record of the data set being audited indicates that the data set is on a primary volume or a volume not managed by DFHSM, but the MCDS indicates that the data set is on a migration volume.

*ERR 10: The computing system catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS has no record of the data set.

*ERR 11: The computing system catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS record indicates that the data set is on a primary volume.

*ERR 15: Either the computing system catalog entry for this data set indicates that the type of data set is not supported by the AUDIT command or the entry did not indicate a volume for the data set.

*ERR 16: The TTOC records do not coincide with the computing system catalog and the MCDS data set record. One of two conditions could have occurred:

- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC does not have a data set entry for the data set. The audit report will say NO ENT.
- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC has an invalid data set entry for the data set. The audit report will say INVALD.

*ERR 17: A catastrophic error occurred. This error overrides any other error condition. Figure 13 shows the error conditions DFHSM reports and their meaning.

Error Condition Reported	Meaning
NO TTC	The TTOC record of the migration volume as indicated in the MCDS data set record does not exist. The TTOC record can be either the base TTOC record or the extension TTOC record.
-SEQ1-	The first data set file sequence number in the base TTOC record is greater than the data set file sequence number indicated in the MCDS data set record.
-SEQ1-	The last data set file sequence number in the base TTOC record is less than the data set file sequence number indicated in the MCDS data set record for a non-VSAM data set.

Figure 13 (Part 1 of 2). Meaning of *ERR 17

Error Condition Reported	Meaning
-SEQ1-	The last data set file sequence number in the base TTOC record plus one is less than the data set file sequence number indicated in the MCDS record for a VSAM data set.
-SEQ2-	The TTOC record shows a data set name based on the data set file sequence number found in the MCDS data set record. This data set name in the TTOC does not match the data set name in the MCDS data set record.

Figure 13 (Part 2 of 2). Meaning of *ERR 17

Errors Corrected When Auditing Data Sets

No error can be fixed while auditing data set information. However, you could use the FIXCDS command to correct the errors in the MCDS. For more information about FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Auditing Volumes

You specify AUDIT VOLUMES to request an audit of the data sets on one or more non-SMS-managed primary volumes or migration volumes. You specify AUDIT BACKUPVOLUMES to request an audit of the data sets on one or more backup volumes, and you specify AUDIT BACKUPTYPE to request an audit of daily backup and spill backup volumes.

Auditing Primary or Migration Volumes

When you specify AUDIT VOLUMES to request an audit of the data sets on a non-SMS-managed primary volume or DASD migration volume, the sources of information are the volume table of contents (VTOC) of the primary or migration volume you are auditing, the master catalog and associated user catalogs (including OS CVOL catalogs), and the MCDS. For tape migration level 2 volumes, the sources of information are the tape table of contents (TTOC) of the volume you are auditing, the master catalog, associated user catalogs, and the MCDS. Hereafter, when describing the primary or migration volume information audited with the AUDIT command, the master catalog and any associated user catalogs are called the computing system catalog.

When you specify AUDIT VOLUMES and do not include a volume serial number with the VOLUMES parameter, all the non-SMS-managed primary volumes and migration volumes that have a volume record in the MCDS are audited.

If you specify the FIX parameter when auditing a non-SMS-managed primary volume or migration volume, all utility data sets on the volume are scratched and uncataloged.

When a utility data set is scratched and uncataloged, AUDIT issues a message that identifies the utility data set that was scratched. For a list of the data set name formats that the AUDIT command recognizes when scratching and uncataloging utility data sets, see *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 System Programmer's Guide*.

The AUDIT command overrides any expiration dates for the utility data sets that it scratches and uncatalogs on the primary or migration volume being audited.

The data sets that are audited must:

- Have a Format 1 DSCB for DASD
- Have a valid TTOC entry for tape
- Be VSAM and cataloged in the Integrated Catalog Facility catalog or be non-VSAM
- Be nonutility data sets.

When you specify the AUDIT command to audit a migration level 1 volume, be aware of the following:

- Data sets in a small-data-set-packing data set are not audited.
- Data sets that have been backed up with the BACKDS command and temporarily reside on migration level 1 volumes are audited.

Information Reported When Auditing Primary or Migration Volumes

The top line of the audit report for non-SMS-managed primary volumes or migration volumes shows that a volume was audited and the time and date of the audit. This report includes a second header line that gives the type of volume and its serial number. PRIMARY indicates a primary volume and MIGRATE indicates a migration volume.

When you request an audit of a primary or migration volume, the information in the report is listed in the following order for each data set that is audited:

- ERROR TYPE:

  **NONE under this heading indicates that no error was found for the specified data set. *ERR *nn* under this heading is the error number detected for the indicated data set. For an explanation of error types, see "Errors Detected When Auditing Primary or Migration Volumes" on page 380.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- AUDITED VOLUME (AUDITED VOL):

  The serial number under this heading is the serial number of the primary or migration volume being audited. If *ERR 16 or *ERR 17 occurs, this field can contain diagnostic information. For information about these errors, see "Errors Detected When Auditing Primary or Migration Volumes" on page 380.

- CATALOGED TO VOLUME (CTLG VOL):

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. MIGRAT under this heading indicates that the data set being audited is on a

migration volume. -NONE- under this heading indicates that no record of the data set could be found in the computing system catalog.

- MIGRATED TO VOLUME (MIG VOL):

  A serial number under this heading is the serial number of the migration volume that contains the data set being audited as recorded in the MCDS. RECALLED under this heading indicates that the data set is on a primary volume as recorded in the MCDS. DELETED indicates that the data set has been deleted as recorded in the MCDS. -NONE- under this heading specifies that no record of the data set being audited exists in the MCDS.

- DUPLICATE DSN ON VOLUME (DUP DSN ON VOL):

  If the computing system catalog indicates that a data set of the same name resides on a volume other than the one being audited and that fact is verified, the serial number of the other volume is listed under this heading.

Figure 14 is a sample of the printer output when auditing primary or migration volume information.

```
-- DFHSM AUDIT -          VOLUME      -- LISTING - AT 10:21:20 ON 84/02/02

AUDITING PRIMARY VOLUME, VOLSER = PRIM02

 ERROR                   DATA SET NAME                  AUDITED       CATALOGED      MIGRATED      DUPLICATE DSN
 TYPE                                                    VOLUME       TO VOLUME      TO VOLUME       ON VOLUME

 *ERR 02            H952762.PSFB.F40AU001.DSET03         PRIM02        -NONE-        RECALLED
 - END OF -            VOLUME  - LISTING -
```

Figure 14. Sample List of the Printer Output When You Audit a Volume

Figure 15 is a sample of the terminal output when auditing a primary or migration volume.

```
ARC0801I DFHSM AUDIT STARTING

AUDITING VOLUMES, VOLSER = PRIM02

AUD=VL   DSN=H952762.PSFB.F40AU001.DSET03                    ERROR TYPE= *ERR 02
AUDITED  VOL=PRIM02     CTLG VOL= -NONE-    MIG VOL=RECALLED DUP DSN ON VOL=
```

Figure 15. Sample Terminal List When You Audit a Primary or Migration Volume

Errors Detected When Auditing Primary or Migration Volumes

The AUDIT command can detect the following errors:

*ERR 01: Neither the computing system catalog nor the MCDS has a record of the data set being audited.

This error can also be caused by the user catalog being offline.

*ERR 02: The computing system catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a primary volume.

*ERR 03: The computing system catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a migration volume.

*ERR 05: The data set is cataloged on a volume other than the volume being audited. No MCDS record exists for the data set.

*ERR 07: The serial number of the volume containing the data set being audited as recorded in the computing system catalog does not agree with the serial number of the volume containing the data set as recorded in the MCDS. The two conflicting volume serial numbers are on the list under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings respectively.

*ERR 08: The computing system catalog indicates that a data set of the same name resides on a volume other than the one being audited. The MCDS record indicates a primary volume.

*ERR 09: The computing system catalog record of the data set being audited indicates that the data set is on a primary volume or a volume not managed by DFHSM, but the MCDS indicates that the data set is on a migration volume.

*ERR 10: The computing system catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS has no record for the data set.

*ERR 11: The computing system catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS record indicates that the data set is on a primary volume.

*ERR 12: The computing system catalog and MCDS records of the data set being audited indicate that the data set is on a migration volume, but the mounted volume table entry indicates that the volume is not a migration volume.

*ERR 15: Either the computing system catalog entry for this data set indicates that the type of data set is not supported by the AUDIT command or the entry did not indicate a volume for the data set.

*ERR 16: The TTOC records do not coincide with the computing system catalog and the MCDS data set record. One of two conditions could have occurred:

- The computing system catalog and the MCDS data set record say that the data set is migrated. However, the volume serial number in the TTOC does not match the volume serial number in the MCDS data set record. Also, the volume serial number of the TTOC does not match the volume serial number of any volumes the data set might span (as indicated in the MCDS data set record).
- The computing system catalog and the MCDS data set record indicate that the data set is on a specific primary volume. However, the TTOC contains a valid data set entry for that data set, which means the data set is migrated.

*ERR 17: A catastrophic error occurred. This error overrides any other error condition. Figure 13 on page 377 shows the error conditions DFHSM reports and their meaning.

In addition to the error conditions already described for primary or migration volumes, the following errors can occur when primary or migration volumes are being audited:

- If the volume is a primary or migration level 1 volume that is not mounted, the AUDIT command issues an error message and processing is ended for the unmounted volume. The error message contains the serial number of the unmounted volume and indicates that the volume was not found.
- If the primary or DASD migration volume cannot be allocated, the AUDIT command issues an error message and processing is ended for the volume. The error message contains the volume serial number and dynamic allocation return code, and indicates that the volume could not be allocated.
- If an error occurs during the attempt to read the job file control block (JFCB) when opening the VTOC, the AUDIT command sends the identification of the module with the error to the DFHSM log and to the operator, and abnormally ends processing with a dump.
- If an I/O error occurs during the reading of the VTOC of a primary or migration volume, the AUDIT command issues an error message and processing is ended for the volume. The error message indicates that an I/O error occurred during the reading of the VTOC of the volume identified by the serial number in the message.
- If the AUDIT command is scratching and uncataloging a utility data set, uncataloging is done only after scratching is successful. If the scratch fails, the AUDIT command issues an error message and continues processing with the next format 1 DSCB on the volume. If the scratch succeeds, but the uncataloging fails for a reason other than that an entry for the data set was not found, the AUDIT command issues an error message and continues processing with the next format 1 DSCB on the volume. The same error message is issued if either scratching or uncataloging fails.

Errors Corrected When Auditing Primary or Migration Volumes

You specify AUDIT FIX to fix an error condition that AUDIT detects during the audit of a nonutility data set on a primary or migration volume. When the AUDIT command attempts to correct an error, AUDIT issues a message that describes the type of correction attempted and whether or not the fix was successful. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

The AUDIT command attempts to fix only error conditions *ERR 01, *ERR 02, and *ERR 03 described in "Errors Detected When Auditing Primary or Migration Volumes" on page 380.

To correct *ERR 01 when the volume being audited is a primary volume, the non-VSAM data set is cataloged.

To correct *ERR 02 when the volume being audited is a primary volume and the MCDS data set record indicates that the data set is on that volume, the non-VSAM data set is cataloged.

To correct *ERR 03 when the volume being audited is a migration volume, the data set is cataloged under its original name, not its migrated name, on a volume whose volume serial number is MIGRAT. If any MCDS intercept records for VSAM

object names are associated with this data set, those names are cataloged on a volume whose serial number is MIGRAT.

A GDG with the NOSCRATCH parameter specified that has rolled off will give an ERR 03. If AUDIT FIX is issued, the rolled-off GDG is recataloged. This causes the oldest not rolled-off version to roll off. If the GDG is at max versions allowed, AUDIT FIX processing continues. If the generation rolled off due to the recatalog issued by AUDIT FIX is migrated, it will be recataloged. This causes the originally rolled off GDG to roll off again and still appear as an ERR 03 by AUDIT.

For all errors detected by AUDIT, you can use the FIXCDS command to add or change records in the MCDS. For more information on FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Auditing Backup Volumes

When you specify AUDIT BACKUPVOLUMES to request an audit of the data sets on a DASD backup volume, the sources of information are the VTOC of the backup volume and the BCDS. If the backup volume being audited is a tape volume, the sources of information are the TTOC of the backup volume and the BCDS. Thus, for each nonutility data set with a format 1 DSCB in the VTOC of the DASD backup volume or for each valid data set with an entry in the TTOC of the tape backup volume, the AUDIT command compares the data set information recorded in the VTOC or the TTOC with the information in the BCDS.

Similarly, when you specify AUDIT BACKUPTYPE to request an audit of daily backup volumes, spill backup volumes, or all daily and spill backup volumes, the sources of information are the VTOC of the DASD backup volume and the BCDS, or the TTOC of the tape backup volume and the BCDS.

Whether the AUDIT command compares the data set information recorded in the VTOC or TTOC with the information recorded in the BCDS, the comparison results in two types of status: a BCDS backup version record exists for the data set or a BCDS backup version record does not exist for the data set. The AUDIT command ignores data set organizations not supported by DFHSM.

The AUDIT command also recognizes a utility data set by the format of its name on each backup volume you are auditing. If you specify the FIX parameter, AUDIT scratches each utility data set on a backup volume and issues a message identifying the data set that was scratched.

The utility data set names detected on primary and migration volumes should not occur on a backup volume.

When you specify AUDIT BACKUPVOLUMES or AUDIT BACKUPTYPE, the order of the output for the different requests is as follows:

- If you audit all of the backup volumes, the output is ordered according to the sequence of the volume serial numbers in the BCDS.
- If you specify a list of backup volumes, the order is the order you specify.
- If you audit all spill backup volumes, the order is that of the entries in the spill backup cycle volume record (BVR).

- If you audit the daily backup volumes for a particular day, the order is that of the entries in the daily BVR for the specified day.
- If you audit all daily backup volumes, the order is for all volumes for day 1, then all for day 2, and so forth, until all of the daily backup volumes have been audited. In addition, for each day, the order of the output is that of the entries in the BVR for that particular day.
- If you specify AUDIT BACKUPTYPE (ALL), the order is all daily backup volumes, then all spill backup volumes.

The AUDIT command overrides any expiration dates for data sets that it scratches on the backup volume you are auditing.

Information Reported When Auditing Backup Volumes

The top line of the audit report for backup volumes shows the type of volume that was audited (it can be DASD, tape, or mass storage volumes) and the time and date of the audit. This report includes a second header line that gives the type of volume and volume serial number of each backup volume being audited.

When you request an audit of a backup volume, the information in the report is listed in the following order for each nonutility data set being audited:

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the data set on the backup volume being audited. *ERR *nn* under this heading is the error number detected for the data set on the backup volume being audited. For an explanation of error types, see "Errors Detected When Auditing Backup Volumes" on page 386.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- AUDITED VOLUME (AUDITED VOL):

  The serial number under this heading is the serial number of the backup volume that contains the data sets being audited.

- BACKED UP VOLUME (BACK VOL):

  A serial number under this heading is the serial number of the backup volume that contains the data set being audited as recorded in the BCDS. An entry of -NONE- under this heading indicates that a BCDS backup version record was not found for the data set. This is not an error if the data set being audited is a VTOC copy data set or a VCAT copy data set, or if the data set being audited resides on a DASD backup volume.

Figure 16 on page 385 is a sample of a list of printer output you can request when auditing a backup volume.

```
-- DFHSM AUDIT -                    BACKUP VOLUME -- LISTING - AT 10:13:08 ON 84/02/02

AUDITING BACKUP TAPE VOLUME, VOLSER = BATP01

  ERROR                      DATA SET NAME                    AUDITED       BACKED UP
  TYPE                                                        VOLUME        TO VOLUME

**NONE          HSM40.VTOC.VPRIM01.D84033.T100500             BATP01          -NONE-
**NONE          HSM40.BACK.G834921.RRDS.H4033.T100644         BATP01          BATP01
**NONE          HSM40.BACK.G834921.RRDS.H4033.T100720         BATP01          BATP01
*ERR 13         HSM40.BACK.H952762.PSF.H4033.T100746          BATP01.         -NONE-
**NONE          HSM40.BACK.H952762.PSF.H4033.T100802          BATP01          BATP01
**NONE          HSM40.BACK.H952762.PSF.H4033.T100817          BATP01          BATP01
*ERR 13         HSM40.BACK.H952762.PSF.H4033.T100833          BATP01          -NONE-
**NONE          HSM40.BACK.H952762.PSF.H4033.T100847          BATP01          BATP01
**NONE          HSM40.BACK.H952762.PSF.H4033.T100903          BATP01          BATP01
**NONE          HSM40.BACK.H952762.PSF.H4033.T100916          BATP01          BATP01
- END OF -          BACKUP VOLUME - LISTING -
```

Figure 16. Sample List of Printer Output When You Audit Backup Volumes

Figure 17 is a sample of a terminal list you can request when auditing a backup volume.

```
AUDITING VOLUMES, VOLSER = BATP01

AUD=TV    DSN=HSM40.VTOC.VPRIM01.D84033.T100500              ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL -NONE-

AUD=TV    DSN=HSM40.BACK.G834921.RRDS.H4033.T100644          ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01

AUD=TV    DSN=HSM40.BACK.G834921.RRDS.H4033.T100720          ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100746           ERROR TYPE   *ERR 13
AUDITED  VOL BATP01       BACKUP VOL -NONE-

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100802           ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100817           ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100833           ERROR TYPE   *ERR 13
AUDITED  VOL BATP01       BACKUP VOL -NONE-

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100847           ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100903           ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01

AUD=TV    DSN=HSM40.BACK.H952762.PSF.H4033.T100916           ERROR TYPE   **NONE
AUDITED  VOL BATP01       BACKUP VOL BATP01
ARC0802I  DFHSM  AUDIT  ENDING
```

Figure 17. Sample Terminal List When You Audit Backup Volumes

Errors Detected When Auditing Backup Volumes

The AUDIT command can detect two errors based on the information in the VTOC of the DASD backup volume and the BCDS, or the TTOC of the tape backup volume and the BCDS of the data set being audited:

*ERR 13: The data set was found in the TTOC of the tape volume, but there is no BCDS backup version record of the data set. This is not detected if the data set being audited is a VTOC copy data set or a VSAM catalog copy data set.

*ERR 14: The BCDS backup version record of the data set being audited specifies a serial number that does not match the serial number of the backup volume being audited. If the data set resides on a tape volume, this error is detected only if the volume is also not spanned by the data set being audited.

In addition to these error conditions already described for backup volumes, the following errors can occur when backup volumes are being audited:

- If the volume has not been identified as a backup volume with the ADDVOL command, the AUDIT command issues an error message and ends processing for the unassigned volume. The error message contains the serial number of the unassigned volume and specifies that the volume was not found.
- If a DASD backup volume cannot be allocated, the AUDIT command issues an error message and processing is ended for the backup volume. The error message contains the serial number of the backup volume and the dynamic allocation return code and specifies that the backup volume could not be allocated.
- If an error occurs during the attempt to read the job file control block (JFCB) when opening the VTOC for a DASD backup volume, the AUDIT command sends the identity of the module with the error to the log data set and to the operator and abnormally ends processing with a dump.
- If an I/O error occurs during the reading of the VTOC or TTOC of a backup volume, the AUDIT command issues an error message and processing is ended for the backup volume. The error message specifies that an I/O error occurred during the reading of the VTOC or TTOC of the backup volume identified by the volume serial number in the message.
- If the AUDIT command is scratching a utility data set and the scratch fails, the AUDIT command issues an error message and continues processing with the next format 1 DSCB on the DASD volume. The error message contains the data set name and return code from scratch and specifies that the scratch failed.

Errors Corrected When Auditing Backup Volumes

You specify AUDIT FIX to fix an error condition that AUDIT detects during audit processing of a data set. When the AUDIT command attempts to correct an error, a message is issued that describes the type of correction attempted and whether or not the fix was successful. The type of correction involves correcting the record of a data set in the OCDS. When a fix is successful, the message shows a successful completion. When a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

The AUDIT command attempts to fix only error *ERR 14 of the error conditions described in "Errors Detected When Auditing Backup Volumes." The fix also is only attempted if the backup volume being audited is a tape volume. To correct *ERR

14 when the BCDS backup version record of the data set specifies a serial number that does not match the serial number of the backup volume being audited and the data set does not span the volume being audited, the data set is marked invalid in the TTOC of the tape volume being audited as well as in the TTOC of any volumes that the data set might span.

For all errors detected by AUDIT, you can use the FIXCDS command to add a record of the backup copy to the BCDS or OCDS. For more information on FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Auditing Catalogs

You can request the following catalog audits with the AUDIT command:

- An audit of the master catalog by specifying the MASTERCATALOG parameter
- An audit of a user catalog by specifying the USERCATALOG parameter.

Notes:

1. You cannot specify the TERMINAL parameter with the MASTERCATALOG or USERCATALOG parameters.
2. If the catalog is on a volume that is not controlled by DFHSM, the AUDIT function will end without notification.

Auditing Computing System Catalogs

When you specify AUDIT MASTERCATALOG to request an audit of the master catalog, the sources of information are the master catalog, the MCDS, and the VTOC or TTOC of the volume where the data set resides.

When you specify AUDIT USERCATALOG, the sources of information are the master catalog, the specified user catalog (including OS CVOLs), the MCDS, and the VTOC or TTOC of the volume where the data set resides.

The data sets audited are those that have a cluster (VSAM) or alien (non-VSAM) entry in the catalog being audited.

Information Reported When Auditing Computing System Catalogs

The top line of the audit report for the computing system catalog shows a catalog was audited and the time and date of the audit. This report includes a second header line that contains the name of the computing system catalog being audited.

When you request an audit of the computing system catalog, the information for the VSAM data sets with base cluster entries and for non-VSAM data sets with entries in the computing system catalog are listed in the following order:

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the specified data set. *ERR *nn* under this heading is the error number detected for the specified data set. For an explanation of error types, see "Errors Detected When Auditing Computing System Catalogs" on page 389.

- DATA SET NAME:

  The entry under this heading is the name of the data set being audited.

- DATA SET ON VOLUME:

  A serial number under this heading is the serial number of the volume that contains the data set being audited. ?????? under this heading specifies that the data set is not on the volume recorded in the catalog or the volume recorded in the catalog is not mounted. If *ERR 16 or *ERR 17 occurs, this field can contain diagnostic information. For information about these errors, see "Errors Detected When Auditing Computing System Catalogs" on page 389.

- CATALOGED TO VOLUME:

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. MIGRAT under this heading specifies that the data set being audited has migrated.

- MIGRATED TO VOLUME:

  A serial number under this heading is the serial number of the migration volume that contains the data set being audited as recorded in the MCDS.

- BACKED UP TO VOLUME:

  There are no entries under this heading.

When you request an audit of the computing system catalog with the FIX parameter, AUDIT issues the following message:
ARC0803A WARNING: AUDIT OF CATALOG MAY DEGRADE PERFORMANCE, REPLY 'Y' TO START AUDIT OR 'N' TO CANCEL AUDIT COMMAND.

If the system operator does not reply with a Y, a message is sent to the system console stating that the operator cancelled the audit of the catalog.

Figure 18 is a sample of a list of printer output you can request when auditing master catalog information.

```
  -- DFHSM AUDIT -              CATALOG -- LISTING - AT 18:37:05 ON 84/01/24

ERROR       DATA SET NAME       DATA SET    CATALOGED   MIGRATED     BACKED UP
TYPE                            ON VOLUME   TO VOLUME   TO VOLUME    TO VOLUME

*ERR 04     TTL.IMS.STAGE2       ??????      P3282B       -NONE-
*ERR 04     TTL.ISPF.PROFILE     ??????      P3282B       -NONE-
**NONE      TTL.JCL.CNTL         P3282B      P3282B       -NONE-
*ERR 04     TTL.SPFEDITA         ??????      P3282B       -NONE-
*ERR 04     TTL.SPFEDITB         ??????      P3282B       -NONE-
**NONE      TTL.SPFLOG1.LIST     P3282B      P3282B       -NONE-
**NONE      TTL.SPFTEMP1.CNTL    P3282B      P3282B       -NONE-
**NONE      VTAM.CNTL            P3282B      P3282B       -NONE-

- END OF -      CATALOG - LISTING -
```

Figure 18. Sample List of Printer Output When You Audit a Master Catalog

Figure 19 on page 389 is a sample of a list of printer output you can request when auditing user catalog information.

```
-- DFHSM AUDIT -                    CATALOG -- LISTING - AT 10:13:51 ON 84/02/02

AUDITING NEWVSAM.CAT

ERROR              DATA SET NAME                          DATA SET ON     CATALOGED      MIGRATED       BACKED UP
TYPE                                                      VOLUME          TO VOLUME      TO VOLUME      TO VOLUME

*ERR 10        D324711.POFB.N.F40CM012.DSET01             ??????          MIGRAT         -NONE-
*ERR 04        D324711.POFB.N.F40CM013.DSET01             ??????          PRIM01         -NONE-
*ERR 04        D324711.POFB.N.F40CM013.DSET02             ??????          PRIM01         -NONE-
*ERR 10        D324711.PSF.N.F40CM012.VSPRIMER            ??????          MIGRAT         -NONE-
*ERR 04        D324711.PSF.N.VSPRIMER                     ??????          PRIM01         -NONE-
*ERR 10        D324711.PSFB.N.F40CM012.DSET02             ??????          MIGRAT         -NONE-
*ERR 04        D324711.PSFB.N.F40CM013.DSET01             ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.N.F40CM013.DSET02             ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.N.F40CM029.DSET04             ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.N.F40CM029.DSET08             ??????          PRIM02         -NONE-
*ERR 04        D324711.PSFB.N.F40CM029.DSET09             ??????          PRIM02         -NONE-
*ERR 04        D324711.PSFB.N.F40EM013.DSET01             ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.N.F40HM007.FILL.UP            ??????          MIG101         -NONE-
*ERR 04        D324711.PSFB.N.TEST                        ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.N.TEST.DSET01                 ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.R.F40FP058.DSET02             ??????          PRIM01         -NONE-
*ERR 04        D324711.PSFB.RP.F40RP023.DSET06            ??????          PRIM02         -NONE-
*ERR 04        D324711.PSFB.RP.F40RP045.DSET04            ??????          PRIM01         -NONE-
**NONE         G834921.ISPF.PROFILE                       P3282B          P3282B         -NONE-
**NONE         G834921.RRDS.N.F40EX001.CLUSTER3           PRIM01          PRIM01         -NONE-
**NONE         G834921.RRDS.N.F40EX001.CLUSTER4           PRIM01          PRIM01         -NONE-
- END OF -          CATALOG - LISTING
```

Figure 19. Sample List of Printer Output When You Audit a User Catalog

Errors Detected When Auditing Computing System Catalogs

The AUDIT command can detect the following errors for the data set with a record in the computing system catalog being audited:

*ERR 04: The computing system catalog record of the data set being audited specifies that the data set is on a level 0 volume, but this could not be verified. This may or may not be an error.

*ERR 06: The computing system catalog and the MCDS records of the data set being audited indicate that the data set is on a primary volume. However, the data set is not on the volume recorded in the computing system catalog, and the volume where the data set does reside cannot be determined.

*ERR 07: The serial number of the volume containing the data set being audited as recorded in the computing system catalog does not agree with the serial number of the primary volume containing the data set as recorded in the MCDS. The two conflicting volume serial numbers are on the list under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings respectively.

*ERR 09: The computing system catalog record for the data set being audited indicates that the data set is on a level 0 volume, but the MCDS specifies that the data set is on a migration volume.

*ERR 10: The computing system catalog record for the data set being audited indicates that the data set is on a migration volume, but the MCDS has no record for the data set.

*ERR 11: The computing system catalog record for the data set being audited indicates that the data set is on a migration volume, but the MCDS indicates that the data set is on a primary volume.

*ERR 16: The TTOC records do not coincide with the computing system catalog and the MCDS data set record. One of two conditions could have occurred:

- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC does not have a data set entry for the data set. The audit report will say NO ENT.
- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC has an invalid data set entry for the data set. The audit report will say INVALD.

*ERR 17: A catastrophic error occurred. This error overrides any other error condition. Figure 13 on page 377 shows the error conditions DFHSM reports and their meaning. In addition to the error conditions already described, three abnormal situations can occur when a user catalog is being audited.

An abnormal situation arises if you specify a data set name of the user catalog that you want to compare and one of the following error conditions occur. However, the AUDIT command ends processing normally without issuing an error message for any of these following conditions. The only indication that anything abnormal has occurred is that the entry is blank in the header line containing the name of the user catalog on the audit report. The error conditions are:

- When the name of the user catalog you specify with the AUDIT command does not appear in the master catalog.
- When the serial number of the volume containing the user catalog cannot be obtained from the master catalog.
- When the volume containing the user catalog that you specified with the AUDIT command is not a primary volume.
- When the user catalog that you specified with the AUDIT command is a CVOL catalog, but the volume named for that CVOL catalog in the master catalog does not contain a data set named SYSCTLG.

An abnormal situation arises if the AUDIT command is processing a user catalog that is a CVOL catalog and one of the following error conditions occur. When any of these error conditions occur, the AUDIT command issues an appropriate error message. In all of the following error conditions, processing of the CVOL user catalog with the error ends. The error conditions are:

- When dynamic allocation fails for a CVOL catalog, AUDIT issues an error message identifying the name of the CVOL catalog and the return code from dynamic allocation.
- When an I/O error occurs reading a CVOL catalog, AUDIT issues an error message identifying the user catalog.
- When a block of unknown type is encountered in a CVOL catalog, AUDIT issues an error message identifying the CVOL catalog.

Errors Corrected When Auditing Computing System Catalogs

If you specify AUDIT FIX when you are auditing computing system catalog information, the FIX parameter is ignored.

However, you could use the FIXCDS command to add or change a record of a data set in the MCDS to make the computing system catalog and the MCDS agree. For more information about FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Auditing Control Data Sets

You can request the following control data set audits with the AUDIT command:

- An audit of the MCDS by specifying the MIGRATIONCONTROLDATASET parameter
- An audit of the BCDS by specifying the BACKUPCONTROLDATASET parameter
- An audit of the OCDS by specifying the OFFLINECONTROLDATASET parameter
- An audit of the MCDS, BCDS, and OCDS by specifying the ALL parameter.

Note: You cannot specify the TERMINAL parameter with the ALL parameter.

Auditing the Migration Control Data Set

When you specify AUDIT MIGRATIONCONTROLDATASET, the sources of information are the computing system catalog, and the MCDS. The secondary sources of information are the VTOC of the primary volumes or TTOC of the migration level 2 volumes. The AUDIT command uses the VTOC to ensure that the volume specified in the computing system catalog contains the data set. When you request an audit and the VTOC of a primary volume is used as a source of information, the primary volume must be mounted.

Information Reported When Auditing the Migration Control Data Set

The top line of the audit report for the MCDS shows that a control data set was audited and the time and date of the audit. This report includes a second header line that identifies the control data set being audited as the MCDS.

When you request an audit of the MCDS, the information in the report for the data sets with records in the MCDS is listed in the following order:

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the specified data set. *ERR *nn* under this heading is the error number detected for the specified data set. For an explanation of error types, see "Errors Detected When Auditing the Migration Control Data Set" on page 394.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- DATA SET ON VOLUME (DSN ON VOL):

  A serial number under this heading is the serial number of the primary volume or migration volume that contains the data set being audited. When a volume

serial number is included under this heading, it also specifies that the data set being audited is cataloged in the computing system catalog. ????? under this heading specifies that the data set is not on the volume recorded in the computing system catalog, the data set is not cataloged, or that the data set is cataloged but the volume containing the data set cannot be verified. If *ERR 16 or *ERR 17 occurs, this field can contain diagnostic information. For information about these errors, see "Errors Detected When Auditing the Migration Control Data Set" on page 394.

- CATALOGED TO VOLUME (CTLG VOL):

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. MIGRAT under this heading specifies that the data set being audited is on a migration volume. -NONE- under this heading specifies that no record of the data set being audited exists in the computing system catalog.

- MIGRATED TO VOLUME (MIG VOL):

  A serial number under this heading is the serial number of the migration volume that contains the data set being audited as recorded in the MCDS. RECALLED under this heading specifies that the data set being audited is on a mounted primary volume as recorded in the MCDS record for the data set. -NONE- under this heading specifies that no record of the data set being audited exists in the MCDS.

- BACKED UP TO VOLUME (BACK VOL):

  This field is always blank.

Figure 20 on page 393 is a sample of a list of printer output that you can request when auditing the MCDS.

```
-- DFHSM AUDIT -              DFHSM CONTROL DATASET -- LISTING - AT 18:48:21 ON 84/01/24

AUDITING THE MIGRATION CONTROL DATASET

ERROR              DATA SET NAME                                DATA SET ON    CATALOGED    MIGRATED    BACKED UP
TYPE                                                               VOLUME      TO VOLUME    TO VOLUME   TO VOLUME

*ERR 02      D324711.ESDS.R.F40RP123.CLUSTER2                      ??????        -NONE-      RECALLED
*ERR 02      D324711.PSF.N.F40RL016.DSET01                         ??????        -NONE-      RECALLED
*ERR 02      D324711.PSF.N.F40RL055.DSET02                         ??????        -NONE-      RECALLED
*ERR 02      D324711.PSF.R.F40RP123.DSET02                         ??????        -NONE-      RECALLED
**NONE       D324711.PSFB.N.F40EM009.DSET01                        ??????        -NONE-      RECALLED
**NONE       D324711.PSFB.N.F40EM037.DSET01                        ??????        -NONE-      RECALLED
**NONE       D324711.PSFB.TEST.DATASET                             ??????        -NONE-      RECALLED
*ERR 02      G834921.KSDS.N.F40TM479.CLUSTER1                      ??????        -NONE-      RECALLED
**NONE       G834921.PSF.N.F40TM434.DSET02                         ??????        -NONE-      RECALLED
*ERR 02      G834921.PSF.N.F40TM479.DSET03                         ??????        -NONE-      RECALLED
*ERR 02      H952762.PSFB.F40AU001.DSET03                          ??????        -NONE-      RECALLED
*ERR 03      H952762.PSFB.F40AU001.DSET04                          ??????        -NONE-       M2TP01
*ERR 02      M059259.BDAM.N.F40RL025.DSET01                        ??????        -NONE-      RECALLED
**NONE       M059259.KSDS.N.F40RL038.CLUSTER1                      ??????        -NONE-      RECALLED
**NONE       M059259.POFB.N.F40RL049.DSET01                        ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET01                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET02                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET03                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET04                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET05                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET06                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET07                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET08                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL016.DSET09                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL035.DSET01                         ??????        -NONE-      RECALLED
**NONE       M059259.PSF.N.F40RL050.DSET01                         ??????        -NONE-      RECALLED
*ERR 06      M059259.PSF.N.F40RL050.DSET02                         ??????        PRIM01      RECALLED
**NONE       M059259.PSF.N.F40RL050.DSET03                         ??????        -NONE-      RECALLED
*ERR 02      M059259.PSF.N.F40RL056.DSET12                         ??????        -NONE-      RECALLED
**NONE       M059259.PSFB.N.F40RL018.DSET01                        ??????        -NONE-      DELETED
**NONE       M059259.PSFB.N.F40RL030.DSET01                        ??????        -NONE-      RECALLED
*ERR 02      M100222.GDG.N.F40RP123.DSET03.G0002V00                ??????        -NONE-      RECALLED
*ERR 02      M100222.KSDS.R.F40RP123.CLUSTER1                      ??????        -NONE-      RECALLED
*ERR 02      M100222.PSFB.N.F40RP124.DSET01                        ??????        -NONE-      RECALLED
*ERR 02      M100222.PSFB.N.F40RP124.DSET02                        ??????        -NONE-      RECALLED
*ERR 02      M100222.PSFB.N.F40RP124.DSET03                        ??????        -NONE-      RECALLED
*ERR 02      M100222.PSFB.N.F40RP124.DSET04                        ??????        -NONE-      RECALLED
*ERR 02      M100222.PSFB.R.F40RP123.DSET01                        ??????        -NONE-      RECALLED
*ERR 02      S469193.KSDS.N.F40BR015.CLUSTER1                      ??????        -NONE-      RECALLED
**NONE       Z9999999999999999999999999999999999999999999          ??????        -NONE-      RECALLED
- END OF -          CATALOG - LISTING -
```

Figure 20. Sample List of Printer Output When You Audit the MCDS

Figure 21 on page 394 is a sample of a terminal list that you can request when auditing the MCDS.

```
AUD=MC      DSN=D324711.ESDS.R.F40RP123.CLUSTER2              ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=D324711.PSF.N.F40RL016.DSET01                 ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=D324711.PSF.N.F40RL055.DSET02                 ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=D324711.PSF.R.F40RP123.DSET02                 ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=G834921.KSDS.N.F40TM479.CLUSTER1              ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=G834921.PSF.N.F40TM479.DSET03                 ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=H952762.PSFB.F40AU001.DSET03                  ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=H952762.PSFB.F40AU001.DSET04                  ERROR TYPE= *ERR 03
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=M2TP01      BACK VOL=

AUD=MC      DSN=M059259.BDAM.N.F40RL025.DSET01                ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=M059259.PSF.N.F40RL050.DSET02                 ERROR TYPE= *ERR 06
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=M059259.PSF.N.F40RL056.DSET12                 ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=M100222.GDG.N.F40RP123.DSET03.G0002V00        ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=M100222.KSDS.R.F40RP123.CLUSTER1              ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=

AUD=MC      DSN=M100222.PSFB.N.F40RP124.DSET01                ERROR TYPE= *ERR 02
DSN ON VOL=??????     CTLG VOL=-NONE-   MIG VOL=RECALLED   BACK VOL=
```

Figure 21. Sample Terminal List When You Audit the MCDS

Errors Detected When Auditing the Migration Control Data Set

The AUDIT command can detect the following errors based on the information in the computing system catalog and the MCDS for each data set with a record in the MCDS:

*ERR 02: The computing system catalog has no record of the data set being audited, but the MCDS record specifies that the data set is on a primary volume.

*ERR 03: The computing system catalog has no record of the data set being audited, but the MCDS record specifies that the data set is on a migration volume.

*ERR 06: The computing system catalog and the MCDS records of the data set being audited specify that the data set is on a primary volume. However, the data set is not on the volume recorded in the computing system catalog, and the volume where the data set resides cannot be determined.

*ERR 07: The serial number of the primary volume containing the data set being audited as recorded in the computing system catalog does not agree with the serial

number of the primary volume containing the data set as recorded in the MCDS. The two conflicting volume serial numbers are on the list under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings respectively.

*ERR 08: The computing system catalog record of the data set being audited specifies a volume serial number different from the one specified in the MCDS record. However, the data set is not on the volume recorded in the computing system catalog, and the volume where the data set resides cannot be determined.

*ERR 09: The computing system catalog record of the data set being audited specifies that the data set is on a primary volume or a volume not managed by DFHSM, but the MCDS specifies that the data set is on a migration volume.

*ERR 11: The computing system catalog record of the data set being audited specifies that the data set is on a migration volume, but the MCDS record specifies that the data set is on a primary volume.

*ERR 15: Either the computing system catalog entry for this data set indicates that the type of data set is not supported by the AUDIT command or the entry did not indicate a volume for the data set.

*ERR 16: The TTOC records do not coincide with the computing system catalog and the MCDS data set record. One of two conditions could have occurred:

- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC does not have a data set entry for the data set. The audit report will say NO ENT.
- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC has an invalid data set entry for the data set. The audit report will say INVALD.

*ERR 17: A catastrophic error occurred. This error overrides any other error condition. Figure 13 on page 377 shows the error conditions DFHSM reports and their meaning.

Errors Corrected When Auditing the Migration Control Data Set

You specify AUDIT FIX to fix an error condition that AUDIT detects while auditing a data set with a record in the MCDS. When the AUDIT command attempts to correct an error, AUDIT issues a message that describes the type of correction attempted and whether or not the fix was successful. The type of correction involves correcting the record of a data set in the computing system catalog. When a fix is successful, the message specifies a successful completion, and when a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

The AUDIT command attempts to fix only error condition *ERR 03 of the error conditions described in "Errors Detected When Auditing the Migration Control Data Set" on page 394. To correct *ERR 03 when the computing system catalog has no record of the data set being audited but the MCDS record specifies that the data set is on a migration volume, the AUDIT command catalogs the data set with a volume serial number of MIGRAT.

A GDG with the NOSCRATCH parameter specified that has rolled off will give an ERR 03. If AUDIT FIX is issued, the rolled-off GDG is recataloged. This causes the oldest not rolled-off version to roll off. If the GDG is at max versions allowed,

AUDIT FIX processing continues. If the generation rolled off due to the recatalog issued by AUDIT FIX is migrated, it will be recataloged. This causes the originally rolled off GDG to roll off again and still appear as an ERR 03 by AUDIT.

However, you could use the FIXCDS command to correct the errors in the MCDS. For more information about FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Auditing the Backup Control Data Set

When you specify AUDIT BACKUPCONTROLDATASET, the sources of information are the computing system catalog, the MCDS, and the BCDS. The secondary sources of information are the VTOC of the primary volumes managed by DFHSM, or the TTOC if the data set resides on a tape migration level 2 volume. The AUDIT command uses the VTOC to ensure that the volume specified in the computing system catalog contains the data set. When you request an audit and the VTOC of a primary volume is used as a source of information, the primary volume must be mounted.

Information Reported When Auditing the Backup Control Data Set

The top line of the audit report for the BCDS shows that a BCDS audit was done and the time and date of the audit. This report includes a second header line that identifies the BCDS as the control data set being audited.

When you request an audit of the BCDS, the information in the report for a data set with a record in the BCDS is listed in the following order:

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the specified data set. *ERR *nn* under this heading is the error number detected for the specified data set. For an explanation of error types, see "Errors Detected When Auditing the Backup Control Data Set" on page 398.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- DATA SET ON VOLUME (DSN ON VOL):

  A serial number under this heading is the serial number of the primary volume that contains the original data set from which the backup version was made. When a volume serial number is included under this heading, it also specifies that the data set being audited is cataloged in the computing system catalog. ?????? under this heading specifies that the data set is not on the volume recorded in the computing system catalog, the data set is not cataloged, or the data set is cataloged but the volume containing the data set cannot be verified. If *ERR 16 or *ERR 17 occurs, this field can contain additional diagnostic information. For a description of these errors, see "Errors Detected When Auditing the Backup Control Data Set" on page 398.

- CATALOGED TO VOLUME (CTLG VOL):

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. MIGRAT under this heading specifies that the data set being audited is on a migration volume. -NONE- under this heading specifies that no record exists in the computing system catalog of the data set being audited.

- MIGRATED TO VOLUME (MIG VOL):

  A serial number under this heading is the serial number of the migration volume that contains the data set being audited as recorded in the MCDS.
  RECALLED under this heading specifies that the data set being audited is on a mounted primary volume as recorded in the MCDS record for the data set.
  -NONE- under this heading specifies that no record exists in the MCDS of the data set being audited.

- BACKED UP TO VOLUME (BACK VOL):

  A serial number under this heading is the backup volume that contains the most recent backup version as recorded in the BCDS record of the data set being audited.

Figure 22 is a sample of a list of printer output that you can request when auditing the BCDS.

```
-- DFHSM AUDIT -                    DFHSM CONTROL DATASET -- LISTING - AT 18:52:05 ON 84/01/24

AUDITING THE BACK UP CONTROL DATASET

  ERROR            DATA SET NAME                          DATA SET ON     CATALOGED     MIGRATED      BACKED UP
  TYPE                                                     VOLUME         TO VOLUME     TO VOLUME     TO VOLUME

**NONE         H952762.PSFB.F40AU001.DSET01               PRIM01          PRIM01        -NONE-        BATP01
*ERR 02        H952762.PSFB.F40AU001.DSET03               ??????          -NONE-        RECALLED      BATP01
*ERR 03        H952762.PSFB.F40AU001.DSET04               ??????          -NONE-        M2TP01        BATP02
*ERR 15        ICFVSM1.TEMPCAT.ONE                        ??????          -NONE-        -NONE-        BACK01
*ERR 01        M059259.PSF.N.F40RL031.DSET02              ??????          -NONE-        -NONE-        BACK01
*ERR 01        M059259.PSF.N.F40RL031.DSET03              ??????          -NONE-        -NONE-        BACK01
*ERR 01        M059259.PSF.N.F40RL031.DSET04              ??????          -NONE-        -NONE-        BACK01
**NONE         M059259.PSF.N.F40RL035.DSET01              ??????          -NONE-        RECALLED      BACK01
*ERR 01        M059259.PSF.N.F40RL036.DSET01              ??????          -NONE-        -NONE-        BACK01
**NONE         M059259.PSF.N.F40RL050.DSET03              ??????          -NONE-        RECALLED      BACK01
**NONE         M100222.KSDS.R.F40RP125.DSET01             PRIM01          PRIM01        -NONE-        BACK01
- END OF -          CATALOG - LISTING -
```

Figure 22. Sample List of Printer Output When You Audit the BCDS

Figure 23 on page 398 is a sample of a terminal list that you can request when auditing the BCDS.

```
AUD=BC     DSN=H952762.PSFB.F40AU001.DSET01                    ERROR TYPE= **NONE
DSN ON VOL=PRIM01    CTLG VOL=PRIM01    MIG VOL= -NONE-    BACK VOL=BATP01

AUD=BC     DSN=H952762.PSFB.F40AU001.DSET03                    ERROR TYPE= *ERR 02
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=RECALLED   BACK VOL=BATP01

AUD=BC     DSN=H952762.PSFB.F40AU001.DSET04                    ERROR TYPE= *ERR 03
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=M2TP01     BACK VOL=BATP02

AUD=BC     DSN=ICFVSM1.TEMPCAT.ONE                             ERROR TYPE= *ERR 15
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=-NONE-     BACK VOL=BACK01

AUD=BC     DSN=M059259.PSF.N.F40RL031.DSET02                   ERROR TYPE= *ERR 01
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=-NONE-     BACK VOL=BACK01

AUD=BC     DSN=M059259.PSF.N.F40RL031.DSET03                   ERROR TYPE= *ERR 01
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=-NONE-     BACK VOL=BACK01

AUD=BC     DSN=M059259.PSF.N.F40RL031.DSET04                   ERROR TYPE= *ERR 01
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=-NONE-     BACK VOL=BACK01

AUD=BC     DSN=M059259.PSF.N.F40RL035.DSET01                   ERROR TYPE= **NONE
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=RECALLED   BACK VOL=BACK01

AUD=BC     DSN=M059259.PSF.N.F40RL036.DSET01                   ERROR TYPE= *ERR 01
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=-NONE-     BACK VOL=BACK01

AUD=BC     DSN=M059259.PSF.N.F40RL050.DSET03                   ERROR TYPE= **NONE
DSN ON VOL=??????    CTLG VOL=-NONE-    MIG VOL=RECALLED   BACK VOL=BACK01

AUD=BC     DSN=M100222.KSDS.R.F40RP125.DSET01                  ERROR TYPE= **NONE
DSN ON VOL=PRIM01    CTLG VOL=PRIM01    MIG VOL=-NONE-     BACK VOL=BACK01
ARC0802I   DFHSM  AUDIT  ENDING
```

Figure 23. Sample Terminal List When You Audit the BCDS

Errors Detected When Auditing the Backup Control Data Set

The AUDIT command can detect the following errors based on the information in the computing system catalog and the MCDS for each data set with a record in the BCDS:

*ERR 01: Neither the computing system catalog nor the MCDS has a record of the data set being audited.

This error can also be caused by the user catalog being offline.

*ERR 02: The computing system catalog has no record of the data set being audited, but the MCDS record specifies that the data set is on a primary volume.

*ERR 03: The computing system catalog has no record of the data set being audited, but the MCDS record specifies that the data set is on a migration volume.

*ERR 04: The computing system catalog record of the data set being audited specifies that the data set is on a level 0 volume, but this could not be verified. This may or may not be an error.

*ERR 06: The computing system catalog and the MCDS records of the data set being audited specify that the data set is on a primary volume. However, the data set is not on the volume recorded in the computing system catalog, and the volume where the data set does reside cannot be determined.

*ERR 07: The serial number of the primary volume containing the data set being audited as recorded in the computing system catalog does not agree with the serial number of the primary volume containing the data set being audited as recorded in the MCDS. The two conflicting volume serial numbers are on the list under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings respectively.

*ERR 09: The computing system catalog record of the data set being audited specifies that the data set is on a level 0 volume, but the MCDS specifies that the data set is on a migration volume.

*ERR 10: The computing system catalog record of the data set being audited specifies that the data set is on a migration volume, but the MCDS has no record of the data set.

*ERR 11: The computing system catalog record of the data set being audited specifies that the data set is on a migration volume, but the MCDS record of the data set specifies that the data set is on a primary volume.

*ERR 15: Either the computing system catalog entry for this data set indicates that the type of data set is not supported by the AUDIT command or the entry did not indicate a volume for the data set.

*ERR 16: The TTOC records do not coincide with the computing system catalog and the MCDS data set record. One of two conditions could have occurred:

- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC does not have a data set entry for the data set. The audit report will say NO ENT.
- The computing system catalog and the MCDS data set record indicate that the data set is migrated but the TTOC has an invalid data set entry for the data set. The audit report will say INVALD.

*ERR 17: A catastrophic error occurred. This error overrides any other error condition. Figure 13 on page 377 shows the error conditions DFHSM reports and their meaning.

Errors Corrected When Auditing the Backup Control Data Set

You specify AUDIT FIX to fix an error that AUDIT detects during audit processing of a data set. When the AUDIT command attempts to correct an error, AUDIT issues a message that describes the type of correction attempted and whether or not the fix was successful. The type of correction involves correcting the record of a data set in the computing system catalog. When a fix is successful, the message specifies successful completion, and when a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

The AUDIT command tries to fix only error condition *ERR 02 and *ERR 03 described in "Errors Detected When Auditing the Backup Control Data Set" on page 398.

To correct *ERR 02 when the computing system catalog has no record of the data set being audited but the MCDS record of the data set specifies that the data set is on a primary volume, the AUDIT command catalogs the data set in the computing system catalog.

To correct *ERR 03 when the computing system catalog has no record of the data set being audited but the MCDS record specifies that the data set is on a migration volume, the AUDIT command catalogs the data set with a volume serial number of MIGRAT. However, you could use the FIXCDS command to correct the errors in the MCDS. For more information about FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Auditing the Offline Control Data Set

When you specify AUDIT OFFLINECONTROLDATASET, the sources of information are the MCDS or BCDS and OCDS. If DFHSM is auditing a tape backup volume, the AUDIT command compares the data set information recorded in the TTOC for the current volume being audited with the information recorded in the BCDS. The comparison results in two types of status: a backup version record exists or a backup version record does not exist. If DFHSM is auditing a tape migration level 2 volume, the AUDIT command compares the data set information recorded in the TTOC for the current volume being audited with the information in the MCDS. The AUDIT command ignores data set organizations not supported by DFHSM.

The order of output for the different requests for auditing the OCDS is as follows:

- AUDIT OFFLINECONTROLDATASET(DAILY(*day*)):

  The output is in ascending volume serial number order for tape daily backup volumes assigned to the day you specify.

- AUDIT OFFLINECONTROLDATASET(DAILY):

  The output is ordered by all volumes assigned to day 1, then all volumes assigned to day 2, and so forth, until DFHSM has audited all tape daily backup volumes in the OCDS.

- AUDIT OFFLINECONTROLDATASET(SPILL):

  The output is in ascending volume serial number order for tape spill volumes in the OCDS.

- AUDIT OFFLINECONTROLDATASET(ML2):

  The output is in ascending volume serial number order for tape migration level 2 volumes in the OCDS.

- AUDIT OFFLINECONTROLDATASET(ALL):

  1. All tape daily backup volumes. These are ordered by day, with the volumes for each day in ascending volume serial number order.
  2. All tape spill backup volumes. These are in ascending volume serial number order.
  3. Unassigned tape backup volumes. These are in ascending volume serial number order.
  4. Migration level 2 volumes. These are in ascending volume serial number order.

Information Reported When Auditing the Offline Control Data Set

The top line of the audit report for the OCDS shows that an OCDS audit was done and the time and date of the audit. This report includes a second header line that identifies the OCDS as the control data set being audited and the serial number of the volume being audited.

When you request an audit of the OCDS, the information in the report for the data set with a record in the OCDS is listed in the following order for backup volumes:

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the specified data set. *ERR *nn* under this heading is the error number that was detected for the specified data set. For an explanation of error types, see "Errors Detected When Auditing the Offline Control Data Set" on page 403.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- AUDITED VOLUME (AUDITED VOL):

  The serial number under this heading is the serial number of the backup volume that contains the data set being audited.

- CATALOGED TO VOLUME (CTLG VOL):

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. -NONE- indicates that DFHSM could not find a record of the data set in the computing system catalog.

- BACKED UP TO VOLUME (BACK VOL):

  A serial number under this heading is the serial number of the backup volume that contains the data set being audited as recorded in the BCDS backup version record for the data set. If a backup version record of the data set is not found, -NONE- appears under this heading. This is not an error if the data set being audited is a VTOC copy data set or a VSAM catalog copy data set.

- DUPLICATE DSN ON VOLUME(DUP DSN ON VOL):

  If the computing system catalog indicates that a data set of the same name is on a volume other than the one being audited and DFHSM verifies that the computing system catalog is accurate, the serial number of the other volume is listed under this heading.

When you request an audit of the OCDS, the information in the report for the data set with a record in the OCDS is listed in the following order for migration level 2 volumes:

- ERROR TYPE:

  **NONE under this heading specifies that no error was found for the specified data set. *ERR *nn* under this heading is the error number that was detected for the specified data set. For an explanation of error types, see "Errors Detected When Auditing the Offline Control Data Set" on page 403.

- DATA SET NAME (DSN):

  The entry under this heading is the name of the data set being audited.

- AUDITED VOLUME (AUDITED VOL):

  The serial number under this heading is the serial number of the migration level 2 volume that contains the data set being audited. If *ERR 16 or *ERR 17 occurs, this field can contain additional diagnostic information. For a description of these errors, see "Errors Detected When Auditing the Offline Control Data Set" on page 403.

- CATALOGED TO VOLUME (CTLG VOL):

  A serial number under this heading is the serial number of the volume where the data set being audited resides as recorded in the computing system catalog. MIGRAT under this heading indicates that the data set being audited is on a migration level 2 volume. -NONE- indicates that DFHSM could not find a record of the data set in the computing system catalog.

- MIGRATED TO VOLUME (MIG VOL):

  A serial number under this heading is the serial number of the migration volume that contains the data set being audited as recorded in the MCDS. RECALLED means that the data set is on a primary volume. DELETED means that the data set has been deleted. -NONE- means that no record exists in the MCDS for the data set being audited.

- DUPLICATE DSN ON VOLUME(DUP DSN ON VOL):

  If the computing system catalog indicates that a data set of the same name is on a volume other than the one being audited and DFHSM verifies that the computing system catalog is accurate, the serial number of the other volume is listed under this heading.

Figure 24 is a sample of a list of printer output you can request when auditing OCDS information for all tape migration level 2 volumes.

```
-- DFHSM AUDIT -            DFHSM CONTROL DATASET -- LISTING - AT 18:36:38 ON 84/01/24

AUDITING THE OFFLINE CONTROL DATASET

 ERROR                  DATA SET NAME                          AUDITED       BACKED UP
 TYPE                                                          VOLUME        TO VOLUME

**NONE           HSM40.VTOC.VPRIM01.D84024.T180240             BATP01          -NONE-
**NONE           HSM40.BACK.H952762.PSFB.H4024.T180339         BATP01          BATP01
**NONE           HSM40.BACK.H952762.PSFB.H4024.T180412         BATP01          BATP01
**NONE           HSM40.BACK.H952762.PSFB.H4024.T180432         BATP01          BATP01
*ERR 14          HSM40.BACK.H952762.PSFB.H4024.T180458         BATP01          BATP02
AUDITING THE OFFLINE CONTROL DATASET, MIGRATION VOLUME = M2TP01

  ERROR                  DATA SET NAME                          AUDITED       CATALOGED     MIGRATED    DUPLICATE DSN
  TYPE                                                          VOLUME        TO VOLUME     TO VOLUME     ON VOLUME

*ERR 03          H952762.PSFB.F40AU001.DSET04                  M2TP01          -NONE-       M2TP01
- END OF -            CATALOG - LISTING -
```

Figure 24. Sample List of Printer Output When You Audit the OCDS

Figure 25 on page 403 is a sample of a terminal list you can request when auditing OCDS information for all tape migration level 2 volumes.

```
AUDITING OCDS, MIGRATION VOL=M2TP01

AUD=L2    DSN=H952762.PSFB.F40AU001.DSET04                    ERROR TYPE= *ERR 03
AUDITED VOL=M2TP01    CTLG VOL=-NONE-   MIG VOL= M2TP01   DUP DSN ON VOL=
ARC0802I  DFHSM  AUDIT  ENDING
```

Figure 25. Sample Terminal List When You Audit the OCDS

Errors Detected When Auditing the Offline Control Data Set

The AUDIT command can detect the following errors based on the information in the OCDS for the data set being audited. These errors apply to data sets on migration level 2 volumes:

*ERR 01: Neither the computing system catalog nor the MCDS has a record of the data set being audited.

This error can also be caused by the user catalog being offline.

*ERR 02: The computing system catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a primary volume.

*ERR 03: The computing system catalog has no record of the data set being audited, but the MCDS record indicates that the data set is on a migration volume.

*ERR 04: The computing system catalog record of the data set being audited specifies that the data set is on a level 0 volume, but this could not be verified. This may or may not be an error.

*ERR 05: The data set is cataloged on a volume that is not the volume being audited.

*ERR 07: The serial number of the volume containing the data set being audited as recorded in the computing system catalog does not agree with the serial number of the volume containing the data set as recorded in the MCDS. The two conflicting volume serial numbers are on the list under the CATALOGED TO VOLUME and MIGRATED TO VOLUME headings respectively.

*ERR 08: The computing system catalog indicates that a data set of the same name resides on a volume other than the one being audited.

*ERR 09: The computing system catalog record of the data set being audited indicates that the data set is on a level 0 volume, but the MCDS indicates that the data set is on a migration volume.

*ERR 10: The computing system catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS has no record for the data set.

*ERR 11: The computing system catalog record of the data set being audited indicates that the data set is on a migration volume, but the MCDS record indicates that the data set is on a primary volume.

*ERR 12: The computing system catalog and MCDS records of the data set being audited indicate that the data set is on a migration volume, but the mounted volume table entry indicates that the volume is not a migration volume.

*ERR 15: Either the computing system catalog entry for this data set indicates that the type of data set is not supported by the AUDIT command or the entry did not indicate a volume for the data set.

*ERR 16: The TTOC records do not coincide with the computing system catalog and the MCDS data set record. One of two conditions could have occurred:

- The computing system catalog and the MCDS data set record say that the data set is migrated. However, the volume serial number in the TTOC does not match the volume serial number in the MCDS data set record. Also, the volume serial number of the TTOC does not match the volume serial number of any volumes the data set might span (as indicated in the MCDS data set record).
- The computing system catalog and the MCDS data set record indicate that the data set is on a specific primary volume. However, the TTOC contains a valid data set entry for that data set, which means the data set is migrated.

*ERR 17: A catastrophic error occurred. This error overrides any other error condition. Figure 13 on page 377 shows the error conditions DFHSM reports and their meaning.

The AUDIT command can detect the following errors based on the information in the OCDS and the BCDS for the data set being audited. These errors apply to data sets on backup volumes:

*ERR 13: The data set was found in the OCDS, but there is no backup version record in the BCDS.

*ERR 14: The BCDS backup version record for the data set being audited specifies a serial number that does not match the serial number of the backup volume being audited. The serial number of the backup volume being audited also does not match the serial number of any volumes the data set might span.

Errors Corrected When Auditing the Offline Control Data Set

You specify AUDIT FIX to fix an error condition that AUDIT detects during audit processing of the data set. When the AUDIT command tries to correct an error, DFHSM issues a message that describes the type of correction and whether or not the fix was successful. In this case, DFHSM tries to correct the record of a data set in the OCDS. When a fix is successful, the message shows a successful completion, and when a fix is unsuccessful, the message contains the return code from the routine attempting the fix.

The AUDIT command tries to fix *ERR 03 and *ERR 14 of the error conditions described in "Errors Detected When Auditing the Offline Control Data Set" on page 403. The AUDIT FIX command does the following processing when it detects the two errors it can correct:

- *ERR 03. When the volume being audited is a migration volume, the data set is cataloged under its original name, not its migrated name, on a volume whose volume serial number is MIGRAT. If any MCDS intercept records for VSAM object names are associated with this data set, those names are cataloged on a volume whose serial number is MIGRAT.

A GDG with the NOSCRATCH parameter specified that has rolled off will give an ERR 03. If AUDIT FIX is issued, the rolled-off GDG is recataloged. This causes the oldest not rolled-off version to roll off. If the GDG is at max versions allowed, AUDIT FIX processing continues. If the generation rolled off due to the recatalog issued by AUDIT FIX is migrated, it will be recataloged. This causes the originally rolled off GDG to roll off again and still appear as an ERR 03 by AUDIT.

- *ERR 14. The data set being audited is marked invalid in the TTOC of the tape volume being audited as well as in the TTOC of any tape volumes that the data set might span.

You could use the FIXCDS command to correct the errors in the OCDS. For more information about FIXCDS, see "FIXCDS: Displaying, Creating, or Modifying a Record in the MCDS, BCDS, or OCDS" on page 117.

Summary of Errors Detected by the AUDIT Command

Figure 26 summarizes the errors detected and corrected by the nine audits that you can request using the AUDIT command. In this figure, a D specifies that the error is detected, and a C specifies that the error is corrected when you specify the FIX parameter.

Error Number	Data Set Audit	Primary Volume Audit	Migration Volume Audit	Backup Volume Audit	Master Catalog Audit	User Catalog Audit	Migration Control Data Set Audit	Backup Control Data Set Audit	Offline Control Data Set Audit
*ERR 01	D	C	D					D	D
*ERR 02	D	C	D				D	C	D
*ERR 03	D	D	C				C	C	C
*ERR 04	D				D	D		D	
*ERR 05		D	D						D
*ERR 06	D				D	D	D	D	
*ERR 07	D	D	D		D	D	D	D	D
*ERR 08		D	D				D		
*ERR 09	D	D	D		D	D	D	D	D
*ERR 10	D	D	D		D	D		D	D
*ERR 11	D	D	D		D	D	D	D	D
*ERR 12		D	D						D
*ERR 13				D					D
*ERR 14				C					C
*ERR 15	D	D	D				D	D	D
*ERR 16	D		D		D	D	D	D	D
*ERR 17	D		D		D	D	D	D	D

Figure 26. Summary of Errors Detected by the AUDIT Command

Multiple-Processing Unit Considerations with the AUDIT Command

When you use DFHSM in a multiple-processing-unit environment, issue the AUDIT command from one processing unit after you have stopped DFHSM in the other processing units in your computing system. If you do not stop DFHSM in the other processing units, discrepancies in the output from the AUDIT command can be caused by DFHSM's running in the other processing units. When you issue AUDIT FIX however, you do not need to stop DFHSM in the other processing units. DFHSM issues the RESERVE macro to keep the other processing units from accessing the three volumes containing the MCDS, BCDS, and OCDS.

Printing Information from the AUDIT Command

When you have decided what to audit, you can specify whether you want to audit information for data sets with error conditions only or all data sets. You can also specify if you want the AUDIT command to try to fix automatically the error condition.

When you issue the AUDIT command, printer output is always produced and sent to the SYSOUT data set or an alternative output data set. When you issue AUDIT TERMINAL, output is printed at the terminal from which the command was issued in addition to the printer output. You cannot specify the TERMINAL parameter of the AUDIT command when you audit a computing system catalog or all three control data sets.

If you have the output sent to an alternative output data set, you identify the data set name with the OUTDATASET parameter.

Appendix B. Using the LIST Command

You use the LIST command to determine the status of DFHSM and SMS-managed volumes and data sets. This chapter describes the categories of information you can list, explains the output of the LIST command, and contains sample lists.

All references to primary volumes in this appendix include the SMS-managed volumes that have been internally ADDVOLed to DFHSM, thereby becoming eligible for DFHSM automatic processing.

You can list nine categories of information:

- Primary and migration volume
- Primary volume
- Dump class
- Backup volume
- Dump volume
- Tape volume
- Data set
- User authorization
- Processing unit serialization.

When you list primary volume migration volume, or data set information, you can decide whether DFHSM should list the information from the MCDS, BCDS, or both. You can also decide whether DFHSM should print the output from the LIST command at your terminal, send it to a SYSOUT data set, or send it to an alternative output data set. This chapter contains sample printer output and sample terminal output for all categories of information.

Requesting Information for Primary or Migration Volumes

You use the VOLUME, PRIMARYVOLUME, or MIGRATIONVOLUME parameter to get a list of information for primary or migration volumes. Each parameter gives you the following results:

VOLUME	All primary and migration volumes
VOLUME(*volser*)	Specific primary or migration volume
PRIMARYVOLUME	All primary volumes
PRIMARYVOLUME(*volser*)	Specific primary volume
MIGRATIONVOLUME	All migration volumes
MIGRATIONLEVEL1	All migration level 1 volumes
MIGRATIONLEVEL2	All migration level 2 volumes
MIGRATIONLEVEL2(DASD)	All DASD migration level 2 volumes
MIGRATIONLEVEL2(TAPE)	All tape migration level 2 volumes

When you request information for primary or migration volumes, you can also request whether information should be listed from the MCDS, BCDS, or both control data sets. When you specify MIGRATIONCONTROLDATASET, DFHSM lists information for primary and migration volumes. When you specify BACKUPCONTROLDATASET, DFHSM lists information about primary volumes that DFHSM backed up.

Requesting Primary and Migration Volume Information from the MCDS

When you specify LIST VOLUME, DFHSM prints the list in the following order:

1. Primary volumes
2. Migration level 1 volumes
3. Migration level 2 DASD volumes
4. Migration level 2 tape volumes.

When you specify LIST MIGRATIONVOLUME, DFHSM prints the list in the following order:

1. Migration level 1 volumes
2. Migration level 2 DASD volumes
3. Migration level 2 tape volumes.

Figure 27 shows the headings of the output when DFHSM lists information from the MCDS for primary or DASD migration volumes.

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the primary or migration volume.
DEVICE TYPE	DEVTYP	This field contains the name of the unit where this volume can be allocated.
VOLUME TYPE	VOLTYPE	PRIM: The volume has been added as a primary volume. P SMS: The volume is known as an SMS-managed volume. LEV 1: The volume has been added as a migration level 1 volume. L2-AV: The volume has been added as a DASD migration level 2 volume and is still available to be assigned to a key range. L2-UN: The volume has been added as a DASD migration level 2 volume and has already been assigned a key range.

Figure 27 (Part 1 of 3). Headings of Output When You Request Information from the MCDS for Primary or DASD Migration Volumes

Printer Output Heading	Terminal Label	Description
THRESHOLD HI---LOW	HI-THRESH LO-THRESH	This field contains the high and low threshold of occupancy defined for this volume. The low threshold of occupancy applies only to primary volumes. SMS-managed volumes' values are from storage group attributes that DFHSM last retrieved from SMS and are not necessarily the most current values.
FRAG INDEX	FRAG	The number under this heading is a qualitative measure of the scattered free space on a volume. The values of the index can range from 0 to 1. The higher the value, the more fragmented the free space on the volume.
HOSTID AUTO MIG---BACK---DUMP	AUTO-HOST MIG	The character listed is the ID of the processing unit that assigned the primary volume attribute of automatic space management. A NONE indicates that no processing unit has assigned the primary volume attribute of space management to the volume. This field applies only to DFHSM primary volumes. SMS-managed volumes are excluded with asterisks (*).
	BACK	The character listed is the ID of the processing unit that assigned the primary volume attribute of automatic backup to the volume. A NONE indicates that no processing unit has assigned the primary volume attribute of automatic backup to the volume. This field applies only to DFHSM primary volumes. SMS-managed volumes are excluded with asterisks (*).
	DUMP	The character listed is the ID of the processing unit that assigned the primary volume attribute of automatic dump to the volume. A NONE indicates that no processing unit has assigned the primary volume attribute of automatic dump to the volume. This field applies only to DFHSM primary volumes. SMS-managed volumes are excluded with asterisks (*).
AUTO RECL	AUTO-RECALL	A YES or Y indicates that the volume is eligible to receive data sets that have the primary volume attribute of automatic recall. This field applies only to DFHSM primary volumes. SMS-managed volumes are excluded with asterisks (*).
SDSP AVAIL	SDSP	YES or Y indicates that this volume contains a small-data-set-packing data set and is an eligible target volume for user data sets that are eligible to migrate into small-data-set-packing data sets. This field applies only to migration level 1 volumes.

Figure 27 (Part 2 of 3). Headings of Output When You Request Information from the MCDS for Primary or DASD Migration Volumes

Printer Output Heading	Terminal Label	Description
MIN AGE	MIN-AGE	This field contains the inactive age of the data set that most recently migrated from the volume during the last volume space management. SMS-managed volumes are excluded with asterisks (*).
MIGRATED DS--TRKS	MIGDS MIGTRKS	This is the number of data sets that was migrated or deleted from the volume during the last volume space management. Tracks are not applicable and are excluded with asterisks (*).
DATE---TIME LAST MIGRATED	MIGDATE-TIME	This is the date and time of the last migration from this volume if primary, or to this volume if Level 2 DASD. This field is invalid for Level 1 volumes.
SPACE-MGMT TYPE/AGE	SPACE-MGMT	This is the space management technique assigned to this volume. MIG indicates migration, DBA indicates data set deletion, and DBU indicates data set retirement. SMS-managed volumes' values are from storage group attributes that DFHSM last retrieved from SMS and are not necessarily the most current values.
	AGE	This field applies only to DFHSM primary volumes. SMS-managed volumes are excluded with asterisks (*). This is the number of days a data set on this volume must be inactive before it is eligible for the type of space management indicated under SPACE-MGMT. DEFAULT or DEF indicates that the age criteria is not specified for the volume in the ADDVOL command. In this case, the age criteria is the larger of SETSYS days value and integrity value, which is based on whether DFHSM is running in a single-processing-unit environment, or in a multiple-processing-unit environment.
BUDEV CATGY	BACKUP-DEVICE-CATEGORY	This field indicates the backup device category, tape or DASD, assigned to this volume. If no category has been assigned, the field contains ANY. This field applies only to DFHSM primary volumes. SMS-managed volumes are excluded with asterisks (*).
DUMP CLASS	DUMPCLASS	This is the dump class of the primary or migration volume. SMS-managed volumes' values are from storage group attributes that DFHSM last retrieved from SMS and are not necessarily the most current values.

Figure 27 (Part 3 of 3). Headings of Output When You Request Information from the MCDS for Primary or DASD Migration Volumes

Note: A field containing only **** is not applicable to this volume (see individual field descriptions in the sample lists.)

Figure 28 is a sample of a printer list of primary volumes when you specify the PRIMARYVOLUME and MIGRATIONCONTROLDATASET parameters.

```
---- DFHSM CONTROL DATASET -PRIMARY VOLUME-MCDS--- LISTING ----- AT 13:31:36 ON 87/12/31 FOR SYSTEM=SYSA

VOLSER   DEVICE VOLUME THRESHOLD FRAG     HOSTID AUTO   AUTO  SDSP  MIN MIGRATED   DATE---TIME  SPACE-MGMT BUDEV DUMP
          TYPE   TYPE   HI---LO  INDEX  MIG--BACK-DUMP  RECL  AVAIL AGE DS--TRKS  LAST MIGRATED  TYPE/AGE  CATGY CLASS

PRIM01    3380  PRIM    020 010  .000    1   NONE NONE   YES    ***  000 0000 **** 00/00/00 00:00   MIG 001  ANY   DCLASS01
SMS001    3380  P SMS   020 010  .045  **** **** ****   ***    ***  *** 0000 **** 00/00/00 00:00   MIG ***  ****  ********
SMS002    3380  P SMS   020 010  .000  **** **** ****   ***    ***  *** 0000 **** 00/00/00 00:00   MIG ***  ****  ********
SMS003    3380  P SMS   020 010  .303  **** **** ****   ***    ***  *** 0001 **** 87/06/25 12:01   MIG ***  ****  ********
SMS004    3380  P SMS   020 010  .045  **** **** ****   ***    ***  *** 0001 **** 87/06/25 12:01   MIG ***  ****  ********
SMS005    3380  P SMS   020 010  .045  **** **** ****   ***    ***  *** 0001 **** 87/06/25 12:01   MIG ***  ****  ********
```

Figure 28. Sample Printer List of Primary Volumes from the MCDS When You Specify PRIMARYVOLUME and MIGRATIONCONTROLDATASET

Figure 29 is a sample of a printer list of DASD migration level 1 volumes when you specify the MIGRATIONLEVEL1 and MIGRATIONCONTROLDATASET parameters. The format of the printer list for a specific primary or DASD migration volume, for all primary and DASD migration volumes, or for all primary volumes or all DASD migration volumes has the same format as that shown in Figure 28 and Figure 29. If you requested information for more than one volume, the list has multiple entries.

```
----DFHSM CONTROL DATASET -MIGRATE VOLUME-MCDS--- LISTING ----- AT 13:19:45 ON 87/07/08 FOR SYSTEM=3081
VOLSER  DEVICE   VOLUME  THRESHOLD   FRAG  HOSTID AUTO-    AUTO  SDSP  MIN  MIGRATED    DATE---TIME  SPACE-MGMT  BUDEV  DUMP
         TYPE     TYPE    HI---LO   INDEX  MIG--BACK-DUMP  RECL  AVAIL AGE  DS--TRKS   LAST MIGRATED  TYPE-AGE   CATGY  CLASS

MIG005  3330V     LEV1    090 ***    .160  **** **** NONE   ***   NO    ***  0000 0000  00/00/00 00:00  *** ***   ****   ********
MIG009  3330V     LEV1    100 ***    .158  **** **** NONE   ***   NO    ***  0000 0000  00/00/00 00:00  *** ***   ****   ********
```

Figure 29. Sample Printer List of Migration Volumes from the MCDS When You Specify MIGRATIONLEVEL1 and MIGRATIONCONTROLDATASET

Figure 30 is a sample of a terminal list for a primary volume when you specify the VOLUME, MIGRATIONCONTROLDATASET, and TERMINAL parameters. The format of the terminal list for a specific primary volume or DASD migration volume or for all primary volumes or all DASD migration volumes has the same format as that shown in Figure 30 except that the third line is not produced for migration level 1 volumes. If you requested information for only one volume, the list has only one entry.

```
VOL=PRIM13  DEVTYP=3350     VOLTYPE=P SMS  MIGDS=0000  MIGTRKS=****
   MIGDATE-TIME=00/00/00 00:00  FRAG=.037  HI-THRESH=100  LO-THRESH=***
   MIN-AGE=***  BACKUP-DEVICE-CATEGORY=****  AUTO-RECALL=*
   SDSP=***  SPACE-MGMT=MIG  AGE=***  AUTO-HOST MIG=**  BACK=**  DUMP=**
   DUMPCLASS = DCLASS01 DCLASS02 DCLASS03 DCLASS04 DCLASS05
```

Figure 30. Sample Terminal List of a Volume from the MCDS When You Specify VOLUME MIGRATIONCONTROLDATASET and TERMINAL

Figure 31 shows the headings of the output when DFHSM lists information from the MCDS for tape migration level 2 volumes.

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the tape migration level 2 volume.
DEVICE TYPE	DEVTYP	This field contains the name of the unit where this volume can be allocated.
MIGRATE TYPE	MIGTYP	L2-TP: The tape volume has been added as a tape migration level 2 volume.
VOL FULL	VOL FULL	A YES or Y indicates that an end-of-tape marker was reached or a data movement error occurred while DFHSM was writing on the tape volume.
DATE VOL LAST SP MANAGED	SP-MGT-DATE	This is the date that DBA/DBU was last performed on this volume.
VOL EMPTY	VOL EMPTY	A YES or Y indicates that the volume is empty.
DELETED DS	DELDS	This is the number of data sets that were deleted from the volume during the last volume space management.
PSWD	PSWD	A YES or Y indicates that the tape volume is password-protected.
EXP	EXP	A YES or Y indicates that this tape volume is protected by an expiration date.
RACF	RACF	A YES or Y indicates that the tape volume is RACF-protected.
AVAILABLE	AVAIL	A YES or Y indicates that the tape volume is available.

Figure 31 (Part 1 of 2). Headings of Output When You Request Information from the MCDS for Tape Migration Level 2 Volumes

Printer Output Heading	Terminal Label	Description
IN USE	IN USE	NO: The tape volume is not being used. MIGD: Data set migration is using the tape volume. MIGV: Volume migration is using the tape volume. RECL: Recall is using the tape volume. RCYS: The tape volume is a recycle source volume. RCYT: The tape volume is a recycle target volume. DBAU: Data set deletion or data set retirement is using the tape volume.
SELECTED	SELD	A YES or Y indicates that the volume is selected.

Figure 31 (Part 2 of 2). Headings of Output When You Request Information from the MCDS for Tape Migration Level 2 Volumes

Figure 32 is a sample of the printer list of tape migration level 2 volumes when you specify the MIGRATIONLEVEL2(TAPE) and MIGRATIONCONTROLDATASET parameters.

```
-----DFHSM CONTROL DATASET - MIGRATE VOLUME-MCDS--- LISTING ----- AT 14:57:19 on 87/07/24 FOR SYSTEM=381A

VOLSER    DEVICE  MIGRATE   VOL     DATE VOL LAST  VOL      DELETED  PSWD  EXP  RACF  AVAILABLE  IN USE   SELECTED
           TYPE     TYPE    FULL    SP MANAGED     EMPTY      DS

M2TP01    3480     L2-TP     NO       00/00/00      NO        0000    YES   NO   NO      YES      -NO-      YES
M2TP02    3480     L2-TP     NO       00/00/00      YES       0000    NO    NO   NO      YES      -NO-      NO

----- END OF - MIGRATE VOLUME - LISTING -----
```

Figure 32. Sample Printer List of Tape Migration Level 2 Volumes When You Specify MIGRATIONLEVEL2(TAPE) and MIGRATIONCONTROLDATASET

Figure 33 is a sample of a terminal list for all tape migration level 2 volumes when you specify the MIGRATIONLEVEL2(TAPE), MIGRATIONCONTROLDATASET, and TERMINAL parameters.

```
VOL=M2TP01   DEVTYP=3480      MIGTYP=L2-TP  VOL FULL=N   VOL  EMPTY=N    DELDS=0000
   SP-MGT-DATE=00/00/00   PSWD=Y   EXP=N  RACF=N AVAIL=Y  IN   USE=-NO-    SELD=Y

VOL=M2TP02   DEVTYP=3480      MIGTYP=L2-TP  VOL FULL=N   VOL  EMPTY=Y    DELDS=0000
   SP-MGT-DATE=00/00/00   PSWD=N   EXP=N  RACF=N AVAIL=Y  IN   USE=-NO-    SELD=N

ARC0140I LIST COMPLETED,
ARC0140I(CONT.)          4 LINE(S) OF DATA OUTPUT
```

Figure 33. Sample Terminal List of Tape Migration Level 2 Volumes When You Specify MIGRATIONLEVEL2(TAPE) MCDS and TERMINAL

Requesting Primary Volume Information from the Backup Control Data Set

As shown in Figure 34, the list for primary volumes includes the following information from the BCDS:

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the volume.
SMS	SMS	This field indicates whether a volume is SMS managed. **Value** **Meaning** Yes Identifies the volume as SMS-managed No Identifies the volume as non-SMS-managed.
OWNED BY VSAM CATALOG	VSAM CTLG	This field contains the data set name of the VSAM catalog that currently controls the volume. If the volume is not owned by a VSAM catalog, this field contains NOT OWNED BY VSAM CATALOG. If the controlling catalog is the master catalog, this field contains **MASTER CATALOG**.
CATALOG ON VOLSER	CTLG VOL	This field contains the volume serial number of the volume on which the catalog resides, SYSRES, or blanks.
LAST BACKED UP DATE TIME	LAST BACKED UP ON	This field contains the date and time of the last volume backup for the volume.
DUMPCLASS	LAST DUMPED TO CLASS	This is the dump class of the primary or migration volume.
DUMPED	ON	This field contains the date of the latest dump in the class.
TIME	AT	This field contains the time of the latest dump in the class.

Figure 34 (Part 1 of 2). Headings of Output When You Request Information from the BCDS for Primary Volumes

Printer Output Heading	Terminal Label	Description
EXP DATE	EXP DATE	This field contains the expiration date of the latest dump in the class. If RETENTIONPERIOD(NOLIMIT) was specified with the DEFINE DUMPCLASS or BACKVOL command the value stored will be zero (0), and the value displayed will be *NOLIMIT.

Figure 34 (Part 2 of 2). Headings of Output When You Request Information from the BCDS for Primary Volumes

Note: A field containing only *** is not applicable to this volume (see individual field descriptions in the sample lists).

Figure 35 is a sample of a printer list from the BCDS for a specific primary volume when you specify PRIMARYVOLUME(volser) and BACKUPCONTROLDATASET parameters. The format of the printer list for all primary volumes has the same format as that shown in Figure 35. Similar output is produced for migration level 1 volumes if requested, using the VOLUME, MIGRATIONVOLUME, or MIGRATIONLEVEL1 parameters. If you request information for only one volume, the list has only one entry.

```
---- DFHSM CONTROL DATASET -PRIMARY VOLUME-BCDS--- LISTING ----- AT 13:31:36 ON 86/12/31 FOR SYSTEM=SYSA

                                                 CATALOG     LAST BACKED UP
VOLSER  SMS  OWNED BY VSAM CATALOG              ON VOLSER     DATE     TIME   DUMPCLASS  DUMPED   TIME   EXP DATE

PRIM01  YES  VSAM.CATALOG.PRIM01                  PRIM01    85/01/15   00:59  DCLASS01  87/01/31  01:59  *NOLIMIT
                                                                              DCLASS02  87/01/31  01:59  87/12/31
                                                                              DCLASS03  87/01/31  01:59  87/12/31
                                                                              DCLASS04  87/01/31  01:59  87/12/31
                                                                              DCLASS05  87/01/31  01:59  87/12/31
```

Figure 35. Sample Printer List from the BCDS When You Specify PRIMARYVOLUME(volser) and BACKUPCONTROLDATASET

Figure 36 is a sample of a terminal list from the BCDS for primary volumes when you specify the VOLUME, BACKUPCONTROLDATASET, and TERMINAL parameters. The second line is not produced when the volume is a migration level 1 volume. The format of the terminal list for a specific backup volume is the same as the format shown in Figure 36. If you requested information for only one volume, the list has only one entry.

```
VOL=PRIM01, SMS=YES  VSAM CTLG=USERCAT.PRIM01
CTLG VOL=PRIM01, LAST BACKED-UP ON 84/04/24 AT 20:49
LAST DUMPED TO CLASS DCLASS01 ON 85/01/31 AT 01:59 (EXP DATE *NOLIMIT)

VOL=PRIM02, SMS=NO   VSAM CTLG=USERCAT.PRIM02
CTLG VOL=PRIM02, LAST BACKED-UP ON 84/04/24 AT 20:49
LAST DUMPED TO CLASS DCLASS01 ON 85/01/31 AT 01:59 (EXP DATE *NOLIMIT)
```

Figure 36. Sample Terminal List from the BCDS When You Specify VOLUME BACKUPCONTROLDATASET and TERMINAL

Requesting Primary Volume Dump Information from the Backup Control Data Set

As shown in Figure 37, the list of dump information for primary volumes includes the following information from the BCDS:

Printer Output Heading	Terminal Label	Description
SOURCE VOLSER	SOURCEVOL	This field contains the volume serial number of the source volume.
GEN	GEN	This field contains relative generation number of the dump for the volume.
SMS	SMS	This field indicates whether a volume is SMS managed. **Value** **Meaning** Yes Identifies the volume as SMS-managed No Identifies the volume as non-SMS-managed.
DUMPED	DATE	This field contains the date of the dump for the volume.
TIME	TIME	This field contains the time of the dump for the volume. the volume.
CLASS	DUMPCLASS	This field contains the dump class of the primary volume.
EXP DATE	EXPDATE	This field contains the expiration date of the dump. This may be *NOLIMIT on both the printer listing and on the terminal.
SET OF DUMP VOLSERS	DUMPVOLS	This field contains a list of volume serial numbers of each tape volume used for this dump.

Figure 37. Headings of Output When You Request Dump Information from the BCDS for Primary Volumes

Figure 38 is a sample of a printer list of the dump information for a specific primary volume.

```
---- DFHSM CONTROL DATASET -PRIMARY VOLUME-BCDS--- ALLDUMPS ---- AT 13:31:36 ON 86/12/31 FOR SYSTEM=SYSA

SOURCE                                          SET OF DUMP
VOLSER  GEN   SMS  DUMPED   TIME   CLASS     EXP DATE  VOLSERS

PRIM01   00   YES  85/01/31 01:59  DCLASS01  *NOLIMIT  TAP011 TAP012 TAP013 TAP014 TAP015 TAP016 TAP017 TAP018 TAP019
                                                       TAP01B TAP01C TAP01D TAP01E TAP01F ****** ****** ****** ******
                                   DCLASS02  85/12/31  TAP021 TAP022 TAP023 TAP024 TAP025 TAP026 TAP027 TAP028 TAP029
         01    NO  84/12/31  00:59 DCLASS01  85/11/30  TAP001 TAP002 TAP003 TAP004 TAP005 TAP006 TAP007 TAP008 TAP009
```

Figure 38. Sample Printer List from the BCDS When You Specify ALLDUMPS with PRIMARYVOLUME(volser) and BACKUPCONTROLDATASET

Figure 39 is a sample of a terminal list for the dump information for a specific primary volume.

```
SOURCEVOL=PRIM01  GEN=00  SMS=YES DATE=85/01/31  TIME=01:59
   DUMPCLASS=DCLASS01  EXPDATE=*NOLIMIT
DUMPVOLS = TAP011 TAP012 TAP013 TAP014 TAP015 TAP016 TAP017 TAP018 TAP019 TAP01A
DUMPVOLS = TAP01B TAP01C TAP01D TAP01E TAP01F
```

Figure 39. Sample Terminal List from the BCDS When You Specify PRIMARYVOLUME(volser) BCDS ALLDUMPS and TERMINAL

Requesting Contents of Backup VTOC for a Primary Volume

As shown in Figure 40, the list of contents of backup VTOC information for primary volumes includes the following information from the BCDS:

Printer Output Heading	Terminal Label	Description
VTOC COPY	VTOCCOPY	This field contains the VTOC copy number.
PRIMARY VOLUME	SOURCEVOL	This field contains the volume serial number of the source volume.
DATASET NAME	DSN	This field contains the data set name on the primary volume.

Figure 40 (Part 1 of 2). Headings of Output When You Request Contents of Backup VTOC Information from the BCDS for Primary Volumes

Printer Output Heading	Terminal Label	Description
ORG	ORG	This field contains the data set organization on the primary volume. Possible values are: **Value** **Meaning** DA BDAM PO Partitioned organization PS Physical sequential VS VSAM ** Unknown data set organization.
MULTI	MULTI	This field contains the non-VSAM indicator for determining if a data set is a multi-volume data set. Possible values are: **Value** **Meaning** Yes Data resides on multiple volumes No Data resides on a single volume. *** VSAM data sets whether multi-volume or single volume or VTOC index.
CREATED	CREATE	This field contains the creation date of the data set on the primary volume.
REFERENCED	REF	This field contains the date the data set was last referred to.
EXP DATE	EXP	This field contains the expiration date of the data set. This may be **NONE**.
RACF	RACF	This field contains the indication whether the data set is RACF protected.
PSWD	PSWD	This field contains the indication whether the data set is password protected.
CHANGED	CHANGED	This field contains the indication whether the data set has been opened for something other than input since the last backup copy was made. *** Is presented for a VTOC index.

Figure 40 (Part 2 of 2). Headings of Output When You Request Contents of Backup VTOC Information from the BCDS for Primary Volumes

Note: The list data is obtained from the Format-1 label. For some VTOC entry types, not all of the above fields are maintained.

Figure 41 is a sample of a printer list of the contents of a backup VTOC for a specific primary volume.

```
---- DFHSM CONTROL DATASET -PRIMARY VOLUME-BCDS--- BCONTENTS --- AT 13:31:36 ON 86/07/31 FOR SYSTEM=SYSA

CONTENTS OF BACKUP VTOC COPY # 01 FOR PRIMARY VOLUME PRIM01

DATASET NAME                                ORG  MULTI  CREATED   REFERENCED  EXP DATE  RACF  PSWD  CHANGED

NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN  PO    YES   86/03/31  86/05/24    86/12/31  YES   NO    YES
```

Figure 41. Sample Printer List from the BCDS When You Specify PRIMARYVOLUME(volser) DUMPCONTENTS and BACKUPCONTROLDATASET

Figure 42 is a sample of a terminal list for the contents of a backup VTOC for a specific primary volume.

```
SOURCEVOL=PRIM01  DSN=NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN
   VTOCCOPY=01  ORG=PO  MULTI=Y  CREATE=86/03/31  REF=86/05/24
   EXP=86/12/31  RACF=Y  PSWD=N  CHANGED=Y
```

Figure 42. Sample Terminal List from the BCDS When You Specify PRIMARYVOLUME(volser) BCDS BACKUPCONTENTS(nn) and TERMINAL

Requesting Information for Backup Volumes

You specify LIST BACKUPVOLUME to get a list of the information for all the backup volumes managed by DFHSM. The command lists the volumes in alphameric sequence by volume serial number. You specify LIST BACKUPVOLUME(volser) to get a list of the information for a specific backup volume managed by DFHSM.

The list for any backup volume includes the following information:

Printer Output Heading	Terminal Label	Description
VOLSER	VOL	This field contains the volume serial number of the backup volume.
DEVICE TYPE	DEVTYP	This field contains the name of the unit where this volume can be allocated.
BACKUP TYPE	BACKTYP	DAILY or SPILL under this heading is the DFHSM volume category of the backup volume. AVAIL indicates that the backup category has not been assigned and the volume is available to be used as a daily or spill backup volume when DFHSM uses the volume for the first time.
VOL FULL	FULL	For a DASD backup volume, a YES under this heading indicates that DFHSM failed to back up a data set because the backup volume did not have enough space. For a tape backup volume, a YES under this heading indicates that, while DFHSM was writing to the tape, the end-of-tape marker was reached or a data movement error occurred. The volume was marked full to prevent further use.
TOTAL TRACKS	TOTAL TRKS	This field contains the total track capacity of the DASD volume. This field does not apply to tape.
FREE TRACKS	FREE TRKS	This field contains the number of tracks on the DASD volume available for data sets. This field does not apply to tape.

Figure 43 (Part 1 of 2). Headings of Output When You Request Information for Backup Volumes

Requesting Data Set Information from the Migration Control Data Set

As shown in Figure 46, the list for all data sets, all data sets that have the same first qualifier, or a specific data set contains the following information for each data set listed:

Printer Output Heading	Terminal Label	Description
DATASET NAME	DSN	This field contains the name of the user data set.
MIGRATED ON VOLUME	MIGVOL	This field contains the volume serial number of the migration volume the data set is on if the data set is currently migrated. If the data set is on more than one tape migration level 2 volume, this field contains the volume serial number of the first volume the data set is on. The field contains ONLINE if the data set has been recalled.
LAST REF DATE	LAST REF	This field contains the date of the most recent reference of the data set.
MIGRATED DATE	MIG	This field contains the date that the data set was last migrated.
TRKS ALLOC	TRKS	If the data set is currently migrated, this field contains the number of tracks allocated for the data set on the primary volume from which the data set migrated. If the data set is recalled, this field is the number of tracks allocated for the recalled data set.
QTY 2K BLKS	2K BLKS	This field contains the size, in 2K blocks, of the data set on the migration volume. This field does not apply to tape.
TIMES MIG	TIMES MIG	This field contains the number of times DFHSM has migrated the data set. If migration cleanup has deleted the data set record, this is the number of times DFHSM has migrated the data set since the record was deleted.

Figure 46 (Part 1 of 2). Headings of Output When You Request MCDS Information for Data Sets

Printer Output Heading	Terminal Label	Description
DS ORG	DSO	This field contains the type of data set organization: PS (physical sequential), PO (partitioned), DA (BDAM), VS (VSAM), or *** if the data set organization is unknown.
SDSP DS	SDSP	A YES under this heading indicates that the data set resides in a small-data-set-packing data set.
QTY 16K BLOCKS	16K BLOCKS	This field contains the size, in 16K blocks, of the data set on the tape migration level 2 volume. This field does not apply to DASD migration volumes.
LAST MIG VOLUME	LAST MIGVOL	This field contains the volume serial number of the last tape migration level 2 volume if the data set spans more than one tape volume. *NONE* indicates that the data set does not span more than one tape volume. This field does not apply to DASD.

Figure 46 (Part 2 of 2). Headings of Output When You Request MCDS Information for Data Sets

Note: A field containing only **** is not applicable (see individual field descriptions in the sample lists.)

Figure 47 is a sample of a printer list from the MCDS for all data sets. If you request information for a specific data set, the list contains only the entry for that data set.

```
-----DFHSM CONTROL DATASET - MIGRATED DATA SET-- LISTING ----- AT 10:24:20 ON 84/06/02 FOR SYSTEM=381A

DATASET NAME                          MIGRATED   LAST REF  MIGRATED  TRKS    QTY     TIMES  DS  SDSP   QTY     LAST MIG
                                      ON VOLUME  DATE      DATE      ALLOC   2K BLKS MIG    ORG DS     16K BLKS VOLUME

G834921.RRDS.N.F40EX001.CLUSTER3      MIG101     87/04/02  87/02/02  0020    000006  01     VS  NO     ******   ******
G834921.RRDS.N.F40EX001.CLUSTER4      MIG101     87/04/02  87/02/02  0020    000006  01     VS  NO     ******   ******
H952762.PSF.N.F40EX001.DSET01         MIG101     87/04/02  87/02/02  0019    000048  01     VS  NO     ******   ******
H952762.PSF.N.F40EX001.DSET03         MIG101     87/04/02  87/02/02  0019    000048  01     VS  NO     ******   ******
H952762.PSF.N.F40EX001.DSET05         MIG101     87/04/02  87/02/02  0019    000048  01     VS  NO     ******   ******
H952762.PSF.N.F40EX001.DSET06         MIG101     87/04/02  87/02/02  0019    000048  01     VS  NO     ******   ******
H952762.PSF.N.F40EX001.VSPRIMER       MIG101     87/04/02  87/02/02  0012    000005  01     VS  NO     ******   ******
```

Figure 47. Sample Printer List When You Specify DATASETNAME and MIGRATIONCONTROLDATASET

Figure 48 is a sample of a terminal list of the MCDS when you specify the DATASETNAME, MIGRATIONCONTROLDATASET, and TERMINAL parameters.

```
DSN=M059259.PSF.N.F40R1011.DSET02                MIGVOL=MIG101  DSO=PS    SDSP=NO
   LAST REF=84/03/13 MIG=84/03/13 TRKS=000019    2K BLKS=000005 TIMES MIG=01
   16K BLKS=******  LAST MIGVOL=******

DSN=M059259.PSF.N.F40RL011.DSET03                MIGVOL=MIG101 DSO=PS     SDSP=NO
   LAST REF=84/03/13 MIG=84/03/13 TRKS=000019    2K BLKS=000005 TIMES MIG=01
   16K BLKS=******  LAST MIGVOL=******

DSN=M059259.PSF.N.F40RL011.DSET03                MIGVOL=MIG101 DSO=PS     SDSP=NO
   LAST REF=84/03/13 MIG=84/03/13 TRKS=000019    2K BLKS=000005 TIMES MIG=01
   16K BLKS=******  LAST MIGVOL=******
```

Figure 48. Sample Terminal List When You Specify DATASETNAME MIGRATIONCONTROLDATASET and TERMINAL

You specify LIST DATASETNAME SELECT(VSAM) to get a list of the VSAM data sets from the MCDS. The list of VSAM data sets contains the same information as shown in Figure 46 and a list of object names by which you can automatically recall the data set.

Figure 49 is a sample of a printer list from the MCDS for VSAM data sets when you specify the DATASETNAME SELECT(VSAM) and MIGRATIONCONTROLDATASET parameters.

```
----- DFHSM CONTROL DATASET - MIGRATED DATA SET-- LISTING ----- AT 10:22:08 ON 84/05/02 FOR SYSTEM=381A

DATASET NAME                                  MIGRATED  LAST REF  MIGRATED   TRKS    QTY   TIMES  DS  SDSP   QTY    LAST MIG
                                              ON VOLUME   DATE      DATE     ALLOC  2K BLKS  MIG  ORG  DS  16K BLKS  VOLUME

G834921.KSDS.N.F40EX001.CLUSTER3               MIG101   84/02/02  84/03/02   0020  000006    01   VS   NO  ******   ******
  BASE D OBJECT NAME = G834921.KSDS.N.F40EX001.DATA3
  BASE I OBJECT NAME = G834921.KSDS.N.F40EX001.INDX3

G834921.KSDS.N.F40EX001.CLUSTER4               MIG101   84/02/02  84/03/02   0020  000006    01   VS   NO  ******   ******
  BASE D OBJECT NAME = G834921.KSDS.N.F40EX001.DATA4
  BASE I OBJECT NAME = G834921.KSDS.N.F40EX001.INDX4
```

Figure 49. Sample Printer List of VSAM Data Sets When You Specify DATASETNAME SELECT(VSAM) and MIGRATIONCONTROLDATASET

Figure 50 is a sample of a terminal list of the MCDS for VSAM data sets when you specify the DATASETNAME, SELECT(VSAM), MIGRATIONCONTROLDATASET, and TERMINAL parameters.

```
DSN=G834921.KSDS.N.F40EX001.CLUSTER4              MIGVOL=MIG101 DSO=VS  SDSP=NO
  LAST REF=84/02/02 MIG=84/03/02 TRKS=0020  2K BLKS=000006 TIMES MIG=01
  16K BLKS=******  LAST MIGVOL=******

  BASE D OBJECT NAME = G834921.KSDS.N.F40EX001.DATA4
  BASE I OBJECT NAME = G834921.KSDS.N.F40EX001.INDX4

MIGRATED DATA SETS = 00001    TRACKS = 000040   K-BYTES = 00000019

ARC0140I LIST COMPLETED,
ARC0140I (CONT.)       5 LINES(S) OF DATA OUTPUT
```

Figure 50. Sample Terminal List When You Specify DATASETNAME SELECT (VSAM) MIGRATIONCONTROLDATASET and TERMINAL

As shown in Figure 51, if you specified DATASETNAME or LEVEL(*qualifier*), that list is followed by a summary list. If you want only a summary list, specify the SUMMARY parameter of the LIST command. The information given in the summary list includes the following:

Printer Output Heading	Terminal Label	Description
MIGRATED DATA SETS	MIGRATED DATA SETS	This field contains the number of data sets listed.
TRACKS MIGRATED	TRACKS	This field contains the sum of the tracks allocated for all the data sets listed (see TRKS ALLOC in Figure 46 on page 423).
K-BYTES MIGRATED	K-BYTES	This field contains the sum of the number of user bytes of data that migrated. It is in units of 1024 bytes.

Figure 51. Headings of Output When You Request a Summary of the Data Sets in the Migration Control Data Set

Figure 52 is a sample of a printer list of data sets when you specify DATASETNAME and SUMMARY.

```
----- DFHSM CONTROL DATASET - SUMMARY-- LISTING ----- AT 10:22:08 ON 84/05/02 FOR SYSTEM=381A

                                  MIGRATED    TRACKS    K-BYTES
                                  DATA SETS   MIGRATED  MIGRATED

                                    00002     0000012   00000104

----- END OF - MIGRATED DATASET - LISTING -----
```

Figure 52. Sample Printer List When You Specify DATASETNAME and SUMMARY

Figure 53 is a sample of a terminal list of data sets when you specify LEVEL and SUMMARY.

```
MIGRATED DATA SETS = 000002 TRACKS = 0000012  K-BYTES = 00000104
```

Figure 53. Sample Terminal List of Data Sets When You Specify LEVEL SUMMARY and TERMINAL

Requesting Data Set Information from the Backup Control Data Set

As shown in Figure 54, the list for all data sets, all data sets that have the same first qualifier, or a specific data set contains the following information for the listed data set and each of its backup versions:

Printer Output Heading	Terminal Label	Description
DSNAME	DSN	This field contains the data set name of the data set that was backed up.
BACKUP FREQ	BACK FREQ	This field contains the number of days that must elapse after DFHSM backs up a data set before DFHSM can automatically back up the data set again. *** indicates that the data set is SMS-managed.
MAX BACKUP VERSIONS	MAX VERS	This field contains the maximum number of backup versions of the data set that DFHSM is to keep. If more than one data set has backup versions with the same data set name, DFHSM can list more than the maximum number of backup versions. ** indicates that the data set is SMS-managed.
BACKUP VERSION DATA SET NAME	BDSN	This field contains the data set name of the backup version.
BACKUP VOLUME	BACKVOL	This field contains the volume serial number of the volume the backup version is on. The volume can be a backup volume or a migration level 1 volume.

Figure 54 (Part 1 of 2). Headings of Output for All Data Sets When You Request Information from the BCDS

Printer Output Heading	Terminal Label	Description
FROM VOLUME	FRVOL	This field contains the volume serial number of the primary volume where the data set was when DFHSM made the backup version. If the data set was migrated at the time of backup, this field contains the volume serial number of the primary volume from which the data set migrated.
BACKUP DATE	BACKDATE	This field contains the date the backup version was created.
SYS CAT	CAT	YES indicates that the backup version was made from a cataloged data set.
GEN NMBR	GEN	This field contains the generation number of the backup version. The most recent backup version is 0, the next most recent is 1, and so forth.
VERS NMBR	VER	This field contains the version number of the backup version. This is an absolute number that uniquely identifies this backup version during its life span. The numbering begins at 1 for the first backup version of the data set.
RET VERS	RET VER	YES indicates that the version being listed is a retired version. NO indicates that the version is not a retired version.
RACF IND	RAC IND	YES indicates that the RACF indicator was on at the time of backup. NO indicates that the RACF indicator was not on at the time of backup.
BACKUP PROF	BACK PRO	YES indicates that a RACF discrete backup profile exists. NO indicates that a RACF discrete backup profile does not exist.

Figure 54 (Part 2 of 2). Headings of Output for All Data Sets When You Request Information from the BCDS

Figure 55 is a sample of a printer list of all data sets when you specify the DATASETNAME and BACKUPCONTROLDATASET parameters. If you request information for a specific data set, the list contains only the entries for that data set.

```
---DFHSM CONTROL DATASET - BACK-UP DATASET-- LISTING ----- AT 20:34:53 ON 85/01/16 FOR SYSTEM=381A

DSNAME = M100222.PSFB.R.F211RP26.DSET03            BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 01

   BACKUP VERSION DATA SET NAME              BACKUP   FROM   BACKUP    SYS   GEN   VERS  RET   RACF  BACKUP
                                             VOLUME   VOLUME  DATE     CAT   NMBR  NMBR  VERS  IND   PROF

   DFHSM.BACK.T203012.M100222.PSFB.H5016     BACK13   PRIM14  85/01/16 YES   000   001   NO    YES   NO

----- END OF - BACKUP DATASET - LISTING -----
```

Figure 55. Sample Printer List of All Data Sets When You Specify DATASETNAME and BACKUPCONTROLDATASET

Figure 56 is a sample of a terminal list for all data sets when you specify the DATASETNAME, BACKUPCONTROLDATASET, and TERMINAL parameters. If you requested information for a specific data set, the list contains only the entries for that data set.

```
DSN=M100222.PSFB.R.F211RP26.DSET03              BACK FREQ = 000   MAX VERS=01

 BDSN=DFHSM.BACK.T203012.M100222.PSFB.H5016      BACKVOL=BACK13    FRVOL=PRIM14
 BACKDATE=85/01/16 CAT=YES GEN=000 VER=001 RET VER=NO RAC IND=YES BACK PRO=NO

 ARC0140I LIST COMPLETED,
 ARC01401(CONT)          3 LINE(S) OF DATA OUTPUT
```

Figure 56. Sample Terminal List of All Data Sets When You Specify DATASETNAME BACKUPCONTROLDATASET and TERMINAL

Figure 57 is a sample of a printer list for all data sets when you specify the BACKUPCONTROLDATASET and LEVEL parameters.

```
--- DFHSM CONTROL DATASET - BACKUP DATASET-- LISTING ----- AT 20:37:14 ON 85/01/16 FOR SYSTEM=381A

DSNAME = M100222.KSDS.R.E211RP39                    BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 04

    BACKUP VERSION DATA SET NAME              BACKUP   FROM    BACKUP   SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME   VOLUME   DATE    CAT  NMBR  NMBR  VERS  IND   PROF

    DFHSM.BACK.T070528.M100222.KSDS.H5014     BACK13   PRIM13  85/01/14  YES  000   012   NO    NO    NO
    DFHSM.BACK.T070333.M100222.KSDS.H5014     BACK13   PRIM13  85/01/14  YES  001   011   NO    NO    NO
    DFHSM.BACK.T061222.M100222.KSDS.H5014     BACK13   PRIM13  85/01/14  YES  002   008   NO    NO    NO
    DFHSM.BACK.T153448.M100222.KSDS.H5012     BACK14   PRIM13  85/01/12  YES  003   007   NO    NO    NO
    DFHSM.BACK.T150320.M100222.KSDS.H5012     BACK14   PRIM13  85/01/12  YES  004   006   NO    NO    NO

DSNAME = M100222.NEWKSDS.R.F211RP11.CLUSTER3        BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 01

    BACKUP VERSION DATA SET NAME              BACKUP   FROM    BACKUP   SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME   VOLUME   DATE    CAT  NMBR  NMBR  VERS  IND   PROF

    DFHSM.BACK.T235839.M100222.NEWKSDS.H5015  BACK15   PRIM13  85/01/15  YES  000   013   NO    YES   NO

DSNAME = M100222.NEWKSDS.R.F211RP11.CLUSTER5        BACKUP FREQ = 000, MAX  BACKUP VERSIONS = 01

    BACKUP VERSION DATA SET NAME              BACKUP   FROM    BACKUP   SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME   VOLUME   DATE    CAT  NMBR  NMBR  VERS  IND   PROF

    DFHSM.BACK.T220350.M100222.NEWKSDS.H5015  BACK15   PRIM13  85/01/15  YES  000   002   NO    YES   YES

DSNAME = M100222.NEWKSDS.R.F211RP13.CLUSTER3        BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 01

    BACKUP VERSION DATA SET NAME              BACKUP   FROM    BACKUP   SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME   VOLUME   DATE    CAT  NMBR  NMBR  VERS  IND   PROF

    DFHSM.BACK.T222307.M100222.NEWKSDS.H5009  BACK14   PRIM13  85/01/09  YES  000   003   NO    YES   NO

DSNAME = M100222.NEWKSDS.R.F211RP13.CLUSTER5        BACKUP FREQ = ***,  MAX BACKUP VERSIONS = **

    BACKUP VERSION DATA SET NAME              BACKUP   FROM    BACKUP   SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME   VOLUME   DATE    CAT  NMBR  NMBR  VERS  IND   PROF

    DFHSM.BACK.T194055.M100222.NEWKSDS.H5009  BACK13   PRIM13  85/01/09  YES  000   001   NO    YES   YES
```

Figure 57. Sample Printer List of All Data Sets When You Specify BACKUPCONTROLDATASET and LEVEL

Figure 58 is a sample of a terminal list for all data sets when you specify the BACKUPCONTROLDATASET, LEVEL, and TERMINAL parameters.

```
DSN=M100222.KSDS.R.F211RP39.CLUSTER2                BACK FREQ = 000  MAX VERS=04

 BDSN=DFHSM.BACK.T070528.M100222.KSDS.H5014         BACKVOL=BACK13    FRVOL=PRIM13
 BACKDATE=85/01/14 CAT=YES GEN=000 VER=012 RET VER=NO  RAC IND=NO     BACK PRO=NO

 BDSN=DFHSM.BACK.T070333.M100222.KSDS.H5014         BACKVOL=BACK13    FRVOL=PRIM13
 BACKDATE=85/01/14 CAT=YES GEN=001 VER=011 RET VER=NO  RAC IND=NO     BACK PRO=NO

 BDSN=DFHSM.BACK.T061222.M100222.KSDS.H5014         BACKVOL=BACK13    FRVOL=PRIM13
 BACKDATE=85/01/14 CAT=YES GEN=002 VER=008 RET VER=NO  RAC IND=NO     BACK PRO=NO

 BDSN=DFHSM.BACK.T153448.M100222.KSDS.H5011         BACKVOL=BACK14    FRVOL=PRIM13
 BACKDATE=85/01/12 CAT=YES GEN=003 VER=007 RET VER=NO  RAC IND=NO     BACK PRO=NO

 BDSN=DFHSM.BACK.T150320.M100222.KSDS.H5012         BACKVOL=BACK14    FRVOL=PRIM13
 BACKDATE=85/01/12 CAT=YES GEN=004 VER=006 RET VER=NO  RAC IND=NO     BACK PRO=NO


DSN=M100222.KSDS.R.F211RP39.CLUSTER3                BACK FREQ = 000  MAX VERS=01

 BDSN=DFHSM.BACK.T235839.M100222.NEWKSDS.H5015      BACKVOL=BACK15    FRVOL=PRIM13
 BACKDATE=85/01/15 CAT=YES GEN=000 VER=013 RET VER=NO RAC IND=YES     BACK PRO=NO

DSN=M100222.KSDS.R.F211RP39.CLUSTER5                BACK FREQ = 000  MAX VERS=01

 BDSN=DFHSM.BACK.T220350.M100222.KSDS.H5015         BACKVOL=BACK15    FRVOL=PRIM13
 BACKDATE=85/01/15 CAT=YES GEN=000 VER=002 RET VER=NO  RAC IND=YES    BACK PRO=YES


DSN=M100222.KSDS.R.F211RP39.CLUSTER3                BACK FREQ = 000  MAX VERS=01

 BDSN=DFHSM.BACK.T222307.M100222.NEWKSDS.H5009      BACKVOL=BACK14    FRVOL=PRIM13
 BACKDATE=85/01/09 CAT=YES GEN=000 VER=003 RET VER=NO  RAC IND=YES    BACK PRO=NO


DSN=M100222.NEWKSDS.R.F211RP13.CLUSTER5             BACK FREQ = ***  MAX VERS=**

 BDSN=DFHSM.BACK.T194055.M100222.NEWKSDS.H5009      BACKVOL=BACK13    FRVOL=PRIM13
 BACKDATE=85/01/09 CAT=YES GEN=000 VER=003 RET VER=NO  RAC IND=YES    BACK PRO=NO
```

Figure 58. Sample Terminal List of All Data Sets When You Specify BACKUPCONTROLDATASET LEVEL and TERMINAL

Requesting Data Set Information from the MCDS and BCDS

You specify LIST DATASETNAME BOTH to get a list of data set information from the MCDS and BCDS. You specify LIST DATASETNAME(*dsname*) BOTH to get a list of the information from the MCDS and BCDS for a specific data set.

The information is provided in separate lists. In each list, the data sets are in alphameric sequence by data set name.

Figure 59 is a sample of a printer list of all data sets when you specify the DATASETNAME, BOTH, and INCLUDEPRIMARY parameters. If you request information for a specific data set, the list contains only the entries for that data set.

```
----- DFHSM CONTROL DATASET - MIGRATED DATASET-- LISTING ----- AT 15:29:14 ON 84/01/24 FOR SYSTEM=381A

DATASET NAME                          MIGRATED    LAST REF  MIGRATED  TRKS    QTY      TIMES  DS   SDSP   QTY      LAST MIG
                                      ON VOLUME     DATE      DATE    ALLOC  2K BLKS    MIG   ORG   DS   16K BLKS   VOLUME

D324711.ESDS.R.F40RP123.CLUSTER2       ONLINE     84/01/20  84/01/20  000001  000000     01    VS   NO   ******   ******
D324711.PSF.N.F40RL016.DSET01          ONLINE     84/01/16  84/01/16  000019  000000     01    PS   NO   ******   ******
D324711.PSF.N.F40RL055.DSET02          ONLINE     84/01/18  84/01/18  000019  000000     03    PS   NO   ******   ******
D324711.PSF.N.F40RL123.DSET02          ONLINE     84/01/20  84/01/20  000002  000000     02    PS   YES  ******   ******
D324711.PSFB.N.F40EM009.DSET01         ONLINE     00/00/00  00/00/00  000000  000000     00    ***  NO   ******   ******
D324711.PSFB.N.F40EM037.DSET01         ONLINE     83/12/30  83/12/30  000001  000000     12    PS   NO   ******   ******
D324711.PSFB.TEST.DATASET              ONLINE     83/01/01  83/01/01  000001  000000     01    PS   NO   ******   ******
•
•
•
•
----- DFHSM CONTROL DATASET - SUMMARY-- LISTING -----AT 15:29:40 ON 84/01/24 FOR SYSTEM=381A


                                    MIGRATED       TRACKS      K-BYTES
                                    DATA SETS      MIGRATED    MIGRATED

                                      00002        0000012     00000104

-----END OF - MIGRATED DATASET - LISTING -----

DSNAME = H952762.PSFB.F40LI001.DSET01                  BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 02

     BACKUP VERSION DATA SET NAME             BACKUP    FROM   BACKUP    SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME    VOLUME  DATE     CAT  NMBR  NMBR  VERS  IND   PROF

     HSM40.BACK.T143448.H952762.PSFB.H4024    MIG101    PRIM01  84/01/24 YES  000   002   NO    NO    NO
     HSM40.BACK.T142908.H957262.PSFB.H4024    BATP01    PRIM01  84/01/24 YES  001   001   NO    NO    NO
•
•
•
•
DSNAME = M059259.PSFB.N.F40RL022.DSET02                BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 02

    BACKUP VERSION DATA SET NAME              BACKUP    FROM   BACKUP    SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME    VOLUME  DATE     CAT  NMBR  NMBR  VERS  IND   PROF

    HSM40.BACK.T184829.M059259.PSFB.H3333     BACK01    PRIM02  83/11/29 NO   000   001   NO    NO    NO

DSNAME = M100222.KSDS.R.F40RP125.DSET01                BACKUP FREQ = 000,  MAX BACKUP VERSIONS = 02

    BACKUP VERSION DATA SET NAME              BACKUP    FROM   BACKUP    SYS  GEN   VERS  RET   RACF  BACKUP
                                              VOLUME    VOLUME  DATE     CAT  NMBR  NMBR  VERS  IND   PROF

    HSM40.BACK.T214703.M100222.KSDS.H3023     BACK01    PRIM01  83/01/23 YES  000   001   NO    NO    NO
    HSM40.BACK.T212857.M100222.KSDS.H3024     BACK01    PRIM01  83/01/24 YES  001   002   NO    NO    NO
    HSM40.BACK.T211229.M100222.KSDS.H3025     BACK01    PRIM01  83/01/25 YES  002   003   NO    NO    NO

-----END OF - BACK-UP DATASET - LISTING -----
```

Figure 59. Sample Printer List of All Data Sets When You Specify DATASETNAME BOTH and INCLUDEPRIMARY

Figure 60 is a sample of a terminal list for all data sets when you specify the DATASETNAME, BOTH, INCLUDEPRIMARY, and TERMINAL parameters. If you requested information for a specific data set, the list contains only the entries for that data set.

```
DSN=D324711.PSF.N.F40RL055.DSET02                    MIGVOL=ONLINE DSO=PS   SDSP=NO
  LAST REF=84/01/18 MIG=84/01/18 TRKS=000019 2K BLKS=000000 TIMES MIG=03
  16K BLKS=******   LAST MIGVOL=******

DSN=D324711.PSF.R.F40RP123.DSET                      MIGVOL=ONLINE DSO=PS   SDSP=YES
  LAST REF=84/01/20 MIG=84/01/20 TRKS=000002 2K BLKS=000000 TIMES MIG=02
  16K BLKS=******   LAST MIGVOL=******

DSN=D324711.PSFB.N.F40EM009.DSET01                   MIGVOL=ONLINE DSO=***  SDSP=NO
  LAST REF=00/00/00 MIG=00/00/00 TRKS=000000 2K BLKS=000000 TIMES MIG=00
  16K BLKS=******   LAST MIGVOL=******

DSN=D324711.PSFB.N.F40EM037.DSET01                   MIGVOL=ONLINE DSO=PS   SDSP=NO
  LAST REF=83/12/30 MIG=83/12/30 TRKS=000001 2K BLKS=000000 TIMES MIG=12
  16K BLKS=******   LAST MIGVOL=******

DSN=D324711.PSFB.TEST.DATASET                        MIGVOL=ONLINE DSO=PS   SDSP=NO
  LAST REF=83/01/01 MIG=83/01/01 TRKS=000001 2K BLKS=000000 TIMES MIG=01
  16K BLKS=****   LAST MIGVOL=******
•
•
•
•
•
•
•
•
•
DSN=S469193.KSDS.N.F40BR015.CLUSTER1                 MIGVOL=ONLINE  DSO=VS  SDSP=NO
  LAST REF=84/01/18 MIG=84/01/18  TRKS=000003 2K BLKS=000000 TIMES MIG=01
  16K BLKS=******  LAST MIGVOL=******

MIGRATED DATA SETS = 00002  TRACKS = 000012  K-BYTES = 00000104

DSN=H952762.PSFB.F40LI001.DSET01                     BACK FREQ = 000  MAX VERS=02

  BDSN=DFHSM.BACK.T143908.H952762.PSFB.H4024            BACKVOL=MIG101  FRVOL=PRIM01
  BACKDATE=84/01/24  CAT=YES  GEN=000  VER=002  RET VER=NO  RAC IND=NO  BACK PRO=NO

  BDSN=DFHSM.BACK.T143448.H952762.PSFB.H4024            BACKVOL=MIG101  FRVOL=PRIM01
  BACKDATE=84/01/24  CAT=YES  GEN=001  VER=001  RET VER=NO  RAC IND=NO  BACK PRO=NO
•
•
•
•
DSN=M059259.PSFB.N.F40RL022.DSET02                   BACK FREQ = 000  MAX VERS=02

  BDSN=DFHSM.BACK.T184829.M059259.PSFB.H3333            BACKVOL=BACK01  FRVOL=PRIM02
  BACKDATE=83/11/29  CAT= NO  GEN=000  VER=001  RET VER=NO  RAC IND=NO  BACK PRO=NO

DSN=M100222.KSDS.R.F40RP125.DSET01                   BACK FREQ = 000  MAX VERS=02

  BDSN=DFHSM.BACK.T214703.M100222.KSDS.H4023            BACKVOL=BACK01  FRVOL=PRIM01
  BACKDATE=84/01/23  CAT=YES  GEN=000  VER=003  RET VER=NO  RAC IND=NO  BACK PRO=NO

  BDSN=DFHSM.BACK.T212857.M100222.KSDS.H4024            BACKVOL=BACK01  FRVOL=PRIM01
  BACKDATE=84/01/24  CAT=YES  GEN=001  VER=002  RET VER=NO  RAC IND=NO  BACK PRO=NO

  BDSN=DFHSM.BACK.T219229.M100222.KSDS.H4025            BACKVOL=BACK01  FRVOL=PRIM01
  BACKDATE=84/01/25  CAT=YES  GEN=002  VER=001  RET VER=NO  RAC IND=NO  BACK PRO=NO
```

Figure 60. Sample Terminal List of All Data Sets When You Specify DATASETNAME BOTH INCLUDEPRIMARY and TERMINAL

Requesting Information for All User Entries or a Specific User Entry

You specify LIST USER to get a list of the information for all user entries. User entries exist only for those users who have been, or are currently authorized. The output is in alphameric sequence by user identification. You specify LIST USER(*userid*) to get a list of the information for a specific user entry. The list for all the users or a specific user includes the user identification and whether the user is currently authorized.

Figure 61 is a sample of a printer list of user entries when you specify the USER parameter.

```
----- DFHSM CONTROL DATASET - USER-- LISTING ----- AT 15:24:51 ON 84/01/24 FOR SYSTEM=381A

 USERID     AUTH

D324711      USER
GB34921      USER
H952762      CNTL
M059259      USER
M100222      CNTL
S369193      CNTL
S469193      CNTL
TMPUSRI      USER

-----END OF - USER - LISTING -----
```

Figure 61. Sample Printer List of User Entries When You Specify USER

Figure 62 is a sample of a terminal list for a user entry when you specify the USER(*userid*) parameter and the TERMINAL parameter.

```
USERID = D324711      AUTH = USER
```

Figure 62. Sample Terminal List When You Specify USER(userid) and TERMINAL

Requesting Information from the Tape Table of Contents (TTOC)

You specify LIST TAPETABLEOFCONTENTS(volser) to get a list of the information contained in the TTOC for a tape backup or migration level 2 volume managed by DFHSM.

As shown in Figure 63, the TTOC list contains the following information for the tape volume and the data sets on the tape volume:

Printer Output Heading	Terminal Label	Description
VOLSER	VSN	This field contains the volume serial number of the tape volume.
UNIT NAME	UNIT	This field contains the name of the unit where this volume can be allocated.
VOL TYPE	VOLTYPE	This field contains the DFHSM volume category of the tape volume. SPILL indicates a spill backup volume. D(*nn*) indicates a backup volume assigned to day *nn* in the backup cycle. UNASS indicates that the volume has not been assigned as a daily or spill backup volume, or that it has been assigned as a daily backup volume but not to a specific day in the backup cycle. ML2 indicates that the volume is a tape migration level 2 volume.
TOTAL 16KBLKS	TOT-16KBLKS	This field contains the number of 16K blocks of data that have been written to the tape volume.
VALID 16KBLKS	VAL-16KBLKS	This field contains the number of 16K blocks of data on the tape volume that are still valid.
PCT VALID	%VALID	This field contains the percentage of valid blocks of data on the tape volume. This field does not apply to a volume that is not full.
FULL	FULL	YES or Y under this heading indicates that, while DFHSM was writing to tape, either an end-of-tape marker was reached or a data movement error occurred, and the volume was marked full to prevent further use.
RACF	RACF	YES or Y indicates that a RACF-indicated backup version or migration copy is on this tape volume. The backup version or migration copy might have become invalid.

Figure 63 (Part 1 of 4). Headings of Output When You Request Information from the Tape Table of Contents

Printer Output Heading	Terminal Label	Description
USER RACF	USERACF	YES or Y indicates that this tape volume was RACF-indicated before DFHSM attempted to establish RACF protection for the volume.
PASS WORD	UPWD	YES or Y indicates that a password-protected backup version is on this tape backup volume or a password-protected migration copy is on this tape migration level 2 volume. The backup version or migration copy might have become invalid.
RCY MSG	YMSG	YES or Y indicates that a volume-eligible-for-recycle message regarding this tape volume was written to the command activity log.
RCY FAIL	YFAIL	YES or Y indicates that an attempt to recycle this tape volume has failed.
LARGE-DS 1ST LAST	LRG-1ST-DS LRG-LAST-DS	YES or Y indicates that the first or last data set on this volume is valid and spans four or more volumes.
PREV VOL	PREVOL	If this field contains a volume serial number, the first data set on this tape volume is valid and does not begin on this volume, but is a continuation of the last data set on the indicated previous volume. If the field contains NONE, either the first data set is not valid or it begins on this volume.
SUCC VOL	SUCVOL	If this field contains a volume serial number, the last data set on this tape volume is valid and does not end on this volume. The data set is continued on the indicated succeeding volume as the first data set on that volume. If the field contains NONE, either the last data set is not valid or it ends on this volume.

Figure 63 (Part 2 of 4). Headings of Output When You Request Information from the Tape Table of Contents

Printer Output Heading	Terminal Label	Description
NUM REC	#RECS	This field contains the number of offline control data set T records, including the base and extension records, used to contain this TTOC.
CUR HID	HID	This field contains the processing unit identification character of the processing unit that serialized this TTOC if the TTOC is currently serialized. Otherwise this field contains NONE.
RACF SEC	RACF SEC	A YES or Y indicates that the tape security includes RACF.
ONE FILE	ONE FILE	A YES or Y indicates that the tape volume has a single file containing the user data sets. A NO or N indicates that each user data set on the tape volume is in a separate tape data set. An *** indicates the ONE FILE is irrelevant because DFHSM has not written on the volume.
ALTERNATE VOLUME	ALTERNATE VOLUME	Volume serial number of duplicate 3480 tape copy created by DFHSM TAPECOPY command; *NONE* if duplicate 3480 not so created; ****** indicating irrelevance because tape volume is not a 3480.
DATA SET NAME	DSN	This field contains the name of the data sets on the volume. If the data set is on a tape backup volume, this name is the DFHSM-generated backup version name. If a data set is on a tape migration level 2 volume, this name is the original data set name, not the migrated data set name that DFHSM generates.
16K BLOCKS	16K BLKS	This field contains the number of 16K blocks used on this volume for this data set.

Figure 63 (Part 3 of 4). Headings of Output When You Request Information from the Tape Table of Contents

Printer Output Heading	Terminal Label	Description
RELATIVE FBID	REL FBID	This field contains the file sequence number of this data set or the set of blocks relative to the beginning of the tape volume. For example, the first data set or data set segment on the tape volume has a relative FBID of 1.
VSAM	VSAM	YES or Y indicates that the data set is a backup version or a migration copy of a VSAM data set.
RACF	RACF	YES or Y indicates that the data set is discretely RACF protected.
LAST REF DATE	LAST REF	This field contains the last date when the migrated data set was referred to. This field does not apply to backup versions.
EXP DATE	EXP	This field contains the expiration date of the user's data set. This field does not apply to backup versions.

Figure 63 (Part 4 of 4). Headings of Output When You Request Information from the Tape Table of Contents

Note: A field containing only **** is not applicable to this volume (see individual field descriptions in the sample lists.)

Figure 64 is a sample of a printer list of a specific tape backup volume when you specify the TAPETABLEOFCONTENTS(volser) parameter.

```
----- DFHSM CONTROL DATASET - TAPE VOLUME TTOC - LISTING - AT 23:06:33 ON 85/01/22 FOR SYSTEM=381A

VOLSER    UNIT   VOL     TOTAL    VALID    PCT     FULL  RACF  USER PASS  RCY   RCY    LARGE-DS  PREV   SUCC   NUM  CUR   RACF
          NAME   TYPE    16KBLKS  16KBLKS  VALID                RACF WORD  MSG   FAIL   1ST LAST  VOL    VOL    REC  HID   SEC

BATP01    3480   D(01)   00009    00009    ***     NO    NO    NO   NO    NO    NO     NO   NO  *NONE* *NONE*  001  NONE  NO

ONE   ALTERNATE
FILE  VOLUME

YES   *NONE*

            DATA SET NAME                                  16K BLOCKS   RELATIVE FBID  VSAM  RACF  LAST REF DATE   EXP DATE

    DFHSM.BACK.T225520.H952762.PSFB.H5022                    00004          0001       NO    NO     ********       ********
    DFHSM.BACK.T225540.H952762.PSFB.H5022                    00004          0002       NO    NO     ********       ********

-----END OF - TAPE VOLUME TTOC - LISTING --- --
```

Figure 64. Sample Printer List When You Specify TAPETABLEOFCONTENTS(volser) for a Tape Backup Volume

Figure 65 is a sample of a terminal list for a specific tape backup volume when you specify the TAPETABLEOFCONTENTS(volser) and TERMINAL parameters.

```
VSN=BATP01 UNIT=3480    VOLTYPE=D(01)  TOT-16KBLKS=00009  VAL-16KBLKS=00009
%VALID=*** RACF=N USERACF=N UPWD=N YMSG=N YFAIL=N  LRG-1ST-DS=N  LRG-LAST-DS=N
FULL=N PREVOL=*NONE* SUCVOL=*NONE* #RECS=001 HID=NONE RACF SEC=NO  ONE FILE=YES
ALTERNATE VOLUME=*NONE*

DSN=DFHSM.BACK.T225520.H952762.PSFB.H5022
  16K BLKS=00004 REL FBID=0001 VSAM=NO  RACF=NO LAST REF=******** EXP=********

DSN=DFHSM.BACK.T225540.H952762.PSFB.H5022
  16K BLKS=00004 REL FBID=0002 VSAM=NO  RACF=NO LAST REF=******** EXP=********
```

Figure 65. Sample Terminal List When You Specify TAPETABLEOFCONTENTS(volser) and TERMINAL for a Backup Volume

Figure 66 is a sample of a printer list of a specific tape migration level 2 volume when you specify the TAPETABLEOFCONTENTS(volser) parameter.

```
----- DFHSM CONTROL DATASET - TAPE VOLUME TTOC - LISTING - AT 23:06:33 ON 85/01/22 FOR SYSTEM=381A

VOLSER   UNIT   VOL     TOTAL     VALID     PCT   FULL  RACF  USER  PASS  RCY  RCY   LARGE-DS   PREV     SUCC     NUM  CUR   RACF
         NAME   TYPE   16KBLKS   16KBLKS   VALID             RACF  WORD  MSG  FAIL  1ST LAST   VOL      VOL      REC  HID   SEC

M2TP01   3480    ML2    00008     00008     ***   NO    NO    NO    NO    NO   NO    NO   NO    *NONE*   *NONE*   001  NONE  NO

ONE   ALTERNATE
FILE  VOLUME

YES   *NONE*

          DATA SET NAME                                  16K BLOCKS  RELATIVE FBID  VSAM  RACF  LAST REF DATE  EXP DATE

   H952762.PSFB.F211LI01.DSET02                            00004         0001       NO    NO      85/01/22     85/06/15
   H952762.PSFB.F211LI01.DSET01                            00004         0002       NO    NO      85/01/22     85/08/24

-----END OF - TAPE VOLUME TTOC - LISTING --- --
```

Figure 66. Sample Printer List When You Specify TAPETABLEOFCONTENTS(volser) for a Tape Migration Level 2 Volume

Figure 67 is a sample of a terminal list for a specific tape migration level 2 volume when you specify the TAPETABLEOFCONTENTS(volser) and TERMINAL parameters.

```
VSN=M2TP01   UNIT=3480     VOLTYPE= ML2   TOT-16KBLKS=00008  VAL-16KBLKS=00008
%VALID=***  RACF=N USERACF=N  UPWD=N  YMSG=N  YFAIL=N   LRG-1ST-DS=N   LRG-LAST-DS=N
FULL=N PREVOL=*NONE* SUCVOL=*NONE* #RECS=001 HID=NONE RACF SEC=NO  ONE FILE=YES
ALTERNATE VOLUME=*NONE*

DSN=NH952762.PSFB.F211LI01.DSET02
  16K BLKS=00004 REL FBID-0001 VSAM=NO  RACF=NO  LAST REF=85/01/22 EXP=85/06/15

DSN=NH952762.PSFB.F211LI01.DSET01
  16K BLKS=00004 REL FBID-0002 VSAM=NO  RACF=NO  LAST REF=85/01/22 EXP=85/08/24

ARC0140I LIST COMPLETED,
ARC0140I(CONT.)        7 LINE(S) OF DATA OUTPUT
```

Figure 67. Sample Terminal List When You Specify TAPETABLEOFCONTENTS(volser) and TERMINAL for a Migration Level 2 Volume

Requesting a List of Records Serialized by Processing Unit ID

You specify LIST HOST(*hostid*) to get a list of all MCDS, BCDS, and OCDS records currently serialized by the specified processing unit ID.

As shown in Figure 68, the list of records serialized by processing unit ID contains the following information:

Printer Output Heading	Terminal Label	Description
HOSTID	HOSTID	This field contains the processing unit ID of the processing unit that serialized the record.
TYPE	TYPE	This field contains the type of control data set record.
KEY	KEY	This field contains the record key.

Figure 68. Headings of Output When You Request Information about Records Serialized by Processing Unit Processor ID

Figure 69 is a sample of a printer list of records serialized by a specific processing unit when you specify the HOST(*hostid*) parameter. If you also specify RESET, the HOSTID field in each serialized record is set to X'00'.

```
ARC0817I HOSTID=3 FOUND IN DFHSM CONTROL DATA SET RECORD,
 TYPE=V KEY=M2TP01, RESET SUCCESSFUL
ARC0817I HOSTID=3 FOUND IN DFHSM CONTROL DATA SET RECORD,
 TYPE=R, KEY=BVR01-0000, RESET SUCCESSFUL
ARC0817I HOSTID=3 FOUND IN DFHSM CONTROL DATA SET RECORD,
 TYPE=T, KEY=L2-M2TP01-0000, RESET SUCCESSFUL
```

Figure 69. Sample Printer List When You Specify HOST(hostid) and RESET

Figure 70 is a sample of a terminal list of records serialized by a specific processing unit when you specify the HOST(*hostid*) and TERMINAL parameters.

```
ARC0817I HOSTID=3 FOUND IN DFHSM CONTROL DATA SET RECORD,
ARC0817I(CONT.) TYPE=V, KEY=M2TP01, RESET SUCCESSFUL
ARC0817I HOSTID=3 FOUND IN DFHSM CONTROL DATA SET RECORD,
ARC0817I(CONT.) TYPE=R, KEY=BVR01-0000, RESET SUCCESSFUL
ARC0817I HOSTID=3 FOUND IN DFHSM CONTROL DATA SET RECORD,
ARC0817I(CONT.) TYPE=T, KEY=L2-M2TP01-0000, RESET SUCCESSFUL
ARC0140I LIST COMPLETED,
ARC0140I(CONT.)         3 LINE(S) OF DATA OUTPUT
```

Figure 70. Sample Terminal List When You Specify HOST RESET and TERMINAL

Requesting Information for Dump Volumes

You specify LIST DUMPVOLUME(volser) to get a list of the information for a specific dump volume managed by DFHSM. You specify LIST DUMPVOLUME without the volser and with a status parameter (AVAILABLE, UNAVAILABLE, EXPIRED, UNEXPIRED, or NORETENTIONLIMIT) to get a list of the information for the dump volumes of the requested status managed by DFHSM. The command lists the volumes in alphameric sequence by volume serial number.

The list for any dump volume includes the following information:

Printer Output Heading	Terminal Label	Description
DUMP VOLSER	DUMPVOL	This field contains the volume serial number of the dump volume.
STATUS	STAT	This field contains the status of the dump volume. Possible values are: **Value** **Meaning** AVAIL Available UNAVA Unavailable EXPIR Expired UNEXP Unexpired NORET No retention limit
UNIT TYPE	UNIT	This field contains the unit type of the dump volume.
SOURCE VOLSER	SOURCEVOL	This field contains the volume serial number of the source volume.
SMS	SMS	This field indicates whether a volume is SMS-managed. **Value** **Meaning** Yes Identifies the volume as SMS-managed No Identifies the volume as non-SMS-managed.
CLASS	CLASS	This field contains the dump class of the dump volume.
DUMPED	DATE	This field contains the date of the volume dump.
TIME	TIME	This field contains the time of the volume dump.

Figure 71 (Part 1 of 2). Headings of Output When You Request Information for Dump Volumes

Printer Output Heading	Terminal Label	Description
EXP DATE	EXPDATE	This field contains the expiration date of the dump volume.
SET OF DUMP VOLSERS	DUMPVOLS	This field contains a list of volume serial numbers for the tape volumes used to dump the source volume.

Figure 71 (Part 2 of 2). Headings of Output When You Request Information for Dump Volumes

Figure 72 is a sample of a printer list of the specified dump volume when you specify the DUMPVOLUME(volser) and BACKUPCONTROLDATASET parameters.

```
---- DFHSM CONTROL DATASET -DUMP VOLUME-BCDS--- LISTING ----- AT 13:31:36 ON 85/10/31 FOR SYSTEM=SYSA

DUMP           UNIT      SOURCE                                          SET OF DUMP
VOLSER  STATUS TYPE      VOLSER  SMS  CLASS     DUMPED    TIME   EXP DATE  VOLSERS

TAP001  UNEXP  3480      PRIM01  YES  DCLASS01  84/12/31  00:59  85/11/31  TAP001 TAP002 TAP003 TAP004 TAP005 TAP006 TAP007
                                                                           TAP008 TAP009 TAP00A ****** ****** ****** ******
TAP002  AVAIL  3480      ******   NO  ********  ********  *****  ********  ****** ****** ****** ****** ****** ****** ******
```

Figure 72. Sample Printer List of the Specified Dump Volume When You Specify DUMPVOLUME(volser) and BACKUPCONTROLDATASET

Figure 73 is a sample of a printer list for all the dump volumes when you specify DUMPVOLUME without (volser) and BACKUPCONTROLDATASET.

```
---- DFHSM CONTROL DATASET -DUMP VOLUME-BCDS--- LISTING ----- AT 13:31:36 ON 85/10/31 FOR SYSTEM=SYSA
DUMP           UNIT      SOURCE                                          SET OF DUMP
VOLSER  STATUS TYPE      VOLSER  SMS  CLASS     DUMPED    TIME   EXP DATE  VOLSERS

TAP001  AVAIL  3480      ******  YES  *****     ********  *****  ********  ****** ****** ****** ****** ****** ****** ******
TAP002  EXPIR  3480      PRIM01  YES  DCLASS01  84/12/31  00:59  85/06/31  TAP201 TAP202 TAP203 TAP204 TAP205 TAP206 TAP207
                                                                           TAP208 TAP209 TAP20A ****** ****** ****** ******
TAP003  UNEXP  3480      PRIM01  YES  DCLASS02  85/01/31  00:59  85/07/31  TAP301 TAP302 TAP003 TAP304 TAP305 TAP306 TAP307
                                                                           TAP308 TAP309 TAP30A ****** ****** ****** ******
TAP004  UNAVA  3480      ******  NO   ********  ********  *****  ********  ****** ****** ****** ****** ****** ****** ******
TAP005  AVAIL  3480      ******  YES  DCLASS01  ********  *****  ********  ****** ****** ****** ****** ****** ****** ******
TAP006  NORET  3480      PRIM01  YES  DCLASS01  85/01/31  01:59  *NOLIMIT  TAP601 TAP602 TAP603 TAP604 TAP605 TAP006 TAP607
                                                                           TAP608 TAP609 TAP60A TAP60B TAP60C TAP60D TAP60E
                                                                           TAP60F ****** ****** ****** ****** ****** *****
```

Figure 73. Sample Printer List of all Dump Volumes When You Specify DUMPVOLUME without (volser) and BACKUPCONTROLDATASET

Figure 74 is a sample of a terminal list for a dump volume when you specify the DUMPVOLUME(volser), BACKUPCONTROLDATASET, and TERMINAL parameters. The format of the terminal list for all dump volumes is the same format as that shown in Figure 74 except a list will be displayed for each dump volume.

```
DUMPVOL=TAP001  STAT=EXPIR  UNIT=3480     SOURCEVOL=PRIM01  SMS=YES
   CLASS=DCLASS01  DATE=84/12/31  TIME=00:59  EXPDATE=85/06/31
      DUMPVOLS = TAP201 TAP202 TAP203 TAP204 TAP205 TAP206 TAP207 TAP208
      DUMPVOLS = TAP209 TAP20A

DUMPVOL=TAP002  STAT=EXPIR  UNIT=3480     SOURCEVOL=PRIM02  SMS=NO
   CLASS=DCLASS01  DATE=84/12/31  TIME=00:59  EXPDATE=85/06/31
      DUMPVOLS = TAP301 TAP302 TAP303 TAP304 TAP305 TAP306 TAP307 TAP308
      DUMPVOLS = TAP309 TAP30A
```

Figure 74. Sample Terminal List of a Dump Volume When You Specify DUMPVOLUME(volser) BACKUPCONTROLDATASET and TERMINAL

Requesting Dump Volume Information from the Backup Control Data Set

As shown in Figure 75, the list for dump volumes includes the following information from the BCDS:

Printer Output Heading	Terminal Label	Description
DUMP VOLSER	DUMPVOL	This field contains the volume serial number of the dump volume.
STATUS	STAT	This field contains the status of the dump volume. Possible values are: **Value** **Meaning** AVAIL Available UNAVA Unavailable EXPIR Expired UNEXP Unexpired NORET No retention limit
UNIT TYPE	UNIT	This field contains the unit type of the dump volume.
SOURCE VOLSER	SOURCEVOL	This field contains the volume serial number of the source volume.
SMS	SMS	This field indicates whether a volume is SMS-managed. **Value** **Meaning** Yes Identifies the volume as SMS-managed No Identifies the volume as non-SMS-managed.

Figure 75 (Part 1 of 3). Headings of Output When You Request Information from the BCDS for Dump Volumes

Printer Output Heading	Terminal Label	Description
CLASS	CLASS	This field contains the dump class of the dump volume.
DUMPED	DATE	This field contains the date of the volume dump.
TIME	TIME	This field contains the time of the volume dump.
EXP DATE	EXPDATE	This field contains the expiration date of the dump volume.
SET OF DUMP VOLSERS	DUMPVOLS	This field contains a list of volume serial numbers for the tape volumes used to dump the source volume.
Note: Only one VTOC copy data set is kept for a given dump volume. The above entries are given for a single volser. The following entries will be repeated once for each data set that was dumped to the dump volume. The values shown represent the dataset names as they appear in the VTOC entry for the datasets.		
DUMP VOLUME	DUMPVOL	This field contains the volume serial number of the dump volume.
DATASET NAME	DSN	This field contains the data set name on the dump volume.
ORG	ORG	This field contains the data set organization on the dump volume. Possible values are: **Value** **Meaning** DA BDAM PO Partitioned organization PS Physical sequential VS VSAM ** Unknown data set organization
MULTI	MULTI	This field contains the non-VSAM indicator for determining if a data set is a multi-volume data set. Possible values are: **Value** **Meaning** Yes Data resides on multiple volumes No Data resides on a single volume *** VSAM data sets whether multi-volume or single volume or VTOC index.

Figure 75 (Part 2 of 3). Headings of Output When You Request Information from the BCDS for Dump Volumes

Printer Output Heading	Terminal Label	Description
CREATED	CREATE	This field contains the creation date of the data set on the dump volume.
REFERENCED	REF	This field contains the date the data set was last referred to.
EXP DATE	EXP	This field contains the expiration date of the of the data set. This may be **NONE**.
RACF	RACF	This field contains the indication whether the data set is RACF indicated.
Note: If the data set is protected with a generic profile, this field indicates NO. It is an indication of VTOC information only.		
PSWD	PSWD	This field contains the indication whether the data set is password protected.
CHANGED	CHANGED	This field contains the indication whether the data set has been opened for something other than input since the last backup copy was made. *** Is presented for a VTOC index.

Figure 75 (Part 3 of 3). Headings of Output When You Request Information from the BCDS for Dump Volumes

Note: The list data is obtained from the Format-1 label. For some VTOC entry types, not all of the above fields are maintained.

Figure 76 is a sample of a printer list from the BCDS for information from a specific dump volume when you specify the DUMPVOLUME(volser), BACKUPCONTROLDATASET, and DUMPCONTENTS parameters.

```
---- DFHSM CONTROL DATASET -DUMP VOLUME-BCDS--- DCONTENTS --- AT 13:31:36 ON 85/04/20 FOR SYSTEM=SYSA

DUMP           UNIT  SOURCE                                          SET OF DUMP
VOLSER  STATUS TYPE  VOLSER  SMS  CLASS     DUMPED    TIME   EXP DATE  VOLSERS

TAP001  UNEXP  3480  PRIM01  YES  DCLASS01  84/12/31  00:59  85/11/31  TAP001 TAP002 TAP003 TAP004 TAP005 TAP006 TAP007
                                                                       TAP008 TAP009 TAP00A ****** ****** ****** ******

CONTENTS OF VTOC COPY FOR DUMP VOLUME TAP001

DATASET NAME                              ORG  MULTI  CREATED   REFERENCED  EXP DATE  RACF  PSWD  CHANGED

NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN  PO    YES   84/01/31  84/10/31    85/12/31  YES   NO    YES
```

Figure 76. Sample Printer List from the BCDS When You Specify DUMPVOLUME(volser) BACKUPCONTROLDATASET and DUMPCONTENTS

Figure 77 is a sample of a terminal list from the BCDS for information from a specific dump volume when you specify the DUMPVOLUME(volser), BACKUPCONTROLDATASET, DUMPCONTENTS, and TERMINAL parameters.

```
DUMPVOL=TAP001  STAT=UNEXP  UNIT=3480     SOURCEVOL=PRIM01  SMS=YES
   CLASS=DCLASS01  DATE=84/12/31  TIME=00:59  EXPDATE=85/11/31
      DUMPVOLS = TAP001 TAP002 TAP003 TAP004 TAP005 TAP006 TAP007 TAP008
      DUMPVOLS = TAP009 TAP00A

Note: This general display will be followed by the following display
      for each of the datasets on the dump volume:

DUMPVOL=TAP001  DSN=NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN.NNNNNNNN
   ORG=PO  MULTI=Y  CREATE=85/01/31  REF=85/01/31
   EXP=85/12/31  RACF=Y  PSWD=N  CHANGED=Y
```

Figure 77. Sample Terminal List from the BCDS When You Specify DUMPVOLUME (volser) BCDS DUMPCONTENTS and TERMINAL

Requesting Dump Class Information

You specify LIST DUMPCLASS(*class*) to get a list of the dump class information for a specific type of volume managed by DFHSM.

The list for dump class information includes the following:

Printer Output Heading	Terminal Label	Description
DUMP CLASS	CLASS	This field contains the type of dump class for the unit type.
UNIT TYPE	UNIT	This field contains the type of unit.
AUTO REUSE	REUSE	This field contains the indication (YES or Y) or (NO or N) of whether the volume for this dump class is automatically available for reuse.
DATASET RESTORE	RESTORE	This field contains the indication (YES or Y) or (NO or N) of whether to allow a physical data set restore from a full volume dump copy for this dump class.
RESET CHANGE	RESET	This field contains the indication (YES or Y) or (NO or N) of whether the change bit for each data set were to be reset by DFDSS following a successful full volume dump.

Figure 78 (Part 1 of 2). Headings of Output When You Request Dump Class Information

Printer Output Heading	Terminal Label	Description
CLASS DISABLE	DISABLE	This field contains the indication (YES or Y) or (NO or N) of whether the dump class is disabled.
DAY	DAY	This field contains the day in the dump cycle. This may be **.
FREQ	FREQ	This field contains the minimum number of days that must elapse since the last volume dump to this class can be automatically dumped again.
RETPD	RETPD	This field contains the number of days dump copies for this dump class must be retained. This may be *NOLIM.
TAPE EXPDT	TAPEEXPDT	This field contains the expiration date for the dump copies created in this dump class. This may be *******.
VTOC COPIES	VTOCCOPIES	This field contains the number of VTOC copies.
DISPOSITION	DISP	This field contains the disposition of the dump volume of this unit type. This may be **********.

Figure 78 (Part 2 of 2). Headings of Output When You Request Dump Class Information

Figure 79 is a sample of a printer list of the dump classes of a specified unit type when you specify the DUMPCLASS and BACKUPCONTROLDATASET parameters. If you specify the parameter DUMPCLASS(*class*), only dump volumes of *class* will be listed.

```
---- DFHSM CONTROL DATASET -DUMP CLASS-BCDS--- LISTING ----- AT 13:31:36 ON 86/12/31 FOR SYSTEM=SYSA

DUMP      UNIT     AUTO   DATASET  RESET   CLASS                          TAPE    VTOC
CLASS     TYPE     REUSE  RESTORE  CHANGE  DISABLE  DAY  FREQ  RETPD     EXPDT   COPIES  DISPOSITION

DISASTER  3480      NO     NO       NO      YES      **   030   *NOLIM    1999365 001     OFFSITE AT CAVERNS
WEEKLY    3480      YES    YES      YES     NO       01   007   000029    ******* 000     ********************
```

Figure 79. Sample Printer List of Dump Classes of Dump Volumes When You Specify DUMPCLASS(class) and BACKUPCONTROLDATASET

Figure 80 is a sample of a terminal list of the dump classes of a specified unit type when you specify the DUMPCLASS, BACKUPCONTROLDATASET, and TERMINAL parameters. If you specify the parameter DUMPCLASS(*class*), only dump volumes of *class* will be listed.

```
CLASS=DISASTER  UNIT=3480     REUSE=N  RESTORE=N  RESET=N  DISABLE=Y
DAY=**  FREQ=030  RETPD=*NOLIM  TAPEEXPDT=1999365  VTOCCOPIES=001
DISP=OFFSITE AT CAVERNS

CLASS=WEEKLY    UNIT=3480     REUSE=Y  RESTORE=Y  RESET=Y  DISABLE=N
DAY=01  FREQ=007  RETPD=000029  TAPEEXPDT=********  VTOCCOPIES=004
DISP=********************
```

Figure 80. Sample Terminal List of Dump Classes of Dump Volumes When You Specify DUMPCLASS(class) BACKUPCONTROLDATASET and TERMINAL

Appendix C. QUERY Command

You use the QUERY command to determine what values you specified with the DFHSM commands, to list DFHSM statistics, or to list the status of pending requests.

When you issue the QUERY command, the information you have requested is printed as a message at your terminal and sent to the DFHSM log. Figure 81 on page 452 shows the messages, arranged by parameter name, associated with the QUERY command.

Parameter Name	Message ID	Message Text
ACTIVE	ARC0142I	{BACKUP OF MCDS | BACKUP OF BCDS | BACKUP OF OCDS | BACKUP OF JRNL | MOVEMENT OF BACKUP VERSIONS | BACKUP OF MIGRATED DATA SETS | MIGRATION CLEANUP | LEVEL 1 TO LEVEL 2 MIGRATION} CURRENTLY IN PROCESS
	ARC0144I	AUDIT={HELD | NOT HELD} AND {ACTIVE | INACTIVE}, LIST={HELD | NOT HELD} AND {ACTIVE | INACTIVE}, RECYCLE={HELD | NOT HELD} AND {ACTIVE | INACTIVE}, REPORT={HELD | NOT HELD} AND {ACTIVE | INACTIVE}
	ARC0160I	MIGRATION={NOT HELD | HELD AT END OF VOLUME | HELD}, AUTOMIGRATION={NOT HELD | HELD AT END OF VOLUME | HELD}, RECALL={TOTALLY HELD | PARTIALLY HELD | NOT HELD}, TAPERECALL={TOTALLY HELD | TSO HELD | NOT HELD}, DATA SET MIGRATION={ACTIVE | INACTIVE}, VOLUME MIGRATION={ACTIVE | INACTIVE}, DATA SET RECALL={ACTIVE | INACTIVE}
	ARC0161I	{MIGRATING | BACKING UP | RECOVERING | RECYCLING | AUDITING | DUMPING | RESTORING} VOLUME *volser* FOR USER {*userid* | **AUTO**} REQUEST { *request* | NONE}
	ARC0162I	{MIGRATING | BACKING UP | RECALLING | RECOVERING | DELETING | RESTORING} DATA SET *dsname* FOR USER *userid*,REQUEST *request*
	ARC0163I	BACKUP={NOT HELD | HELD AT END OF VOLUME | HELD}, AUTOBACKUP={NOT HELD | HELD AT END OF VOLUME | HELD}, RECOVERY={NOT HELD | HELD AT END OF VOLUME | HELD}, TAPEDATASETRECOVERY={HELD | NOT HELD}, DATA SET BACKUP={ACTIVE | INACTIVE}, VOLUME BACKUP={ACTIVE | INACTIVE}, DATA SET RECOVERY={ACTIVE | INACTIVE}, VOLUME RECOVERY={ACTIVE | INACTIVE}
	ARC0415I	EXPIREBV={HELD | NOT HELD} AND {ACTIVE | INACTIVE}, LAST STORED BCDS KEY= *bcds-key*, LAST PLANNED END KEY= *last-planned-end-key*
	ARC0437I	{TAPECOPY | TAPEREPL} {HELD | NOT HELD} AND {ACTIVE | INACTIVE }
	ARC0642I	VOLUME DUMP={ACTIVE | INACTIVE}, DUMP={NOT HELD | HELD AT END OF VOLUME | HELD}, AUTODUMP={NOT HELD | HELD AT END OF VOLUME | HELD}, VOLUME RESTORE={ACTIVE | INACTIVE}, DATA SET RESTORE={ACTIVE | INACTIVE} EXPIREBV={ACTIVE | INACTIVE}

Figure 81 (Part 1 of 6). Messages Associated with the QUERY Command by Parameter Name

Parameter Name	Message ID	Message Text
BACKUP	ARC0154I	MAXBACKUPTASKS=*tasks*, ABSTART=(*time1 time2 time3*), VERSIONS=*versions*, FREQUENCY=*days*, SKIPABPRIMARY={YES | NO}, BACKUP PREFIX=*bprefix*, INCREMENTALBACKUP={CHANGEDONLY | ORIGINAL}, PROFILEBACKUP={YES | NO}
	ARC0164I	DAY=*day* | SPILL | UNASSIGNED VOLS=*volser-flag, ...*
	ARC0271I	BACKUP CYCLE LENGTH=*nday(s)*, CYCLE={*NONE* | *string*}, TODAY IS DAY={** | *n*}, CYCLE START DATE=*yy/mm/dd*, VOLUME LIMIT/DAY=*limit*, TOTAL BACKUP VOLUMES=*total*
	ARC0273I	DUMP CYCLE LENGTH=*ndays* DAYS, CYCLE={*NONE* | *string*}, TODAY IS DAY=*n*, CYCLE START DATE=*yy/mm/dd*
	ARC0274I	BACKUP={YES({ANY | DASD | TAPE {(*unit*)}}) | NO}, SPILL={YES({ANY | DASD | TAPE {(*unit*)}}) | NO}
	ARC0375I	CDSVERSIONBACKUP={NO | YES, MCDSBACKUPDSN=*dsname1*, BCDSBACKUPDSN=*dsname2*, OCDSBACKUPDSN=*dsname3*, JRNLBACKUPDSN=*dsname4*}
	ARC0376I	BACKUPCOPIES=*backupcopies*, BACKUPDEVICECATEGORY={DASD | TAPE (UNITNAME=*unitname*, DENSITY=*density*, {RETPD=*retentionperiod* | EXPDT=*expirationdate*)}, LATESTFINALQUALIFIER=V*nnnnnnn*
	ARC0638I	MAXDUMPTASKS=*dtasks*, ADSTART=(*time1d time2d time3d*), DUMPIO={1 | 2 | 3 | 4}
CDSVERSIONBACKUP	ARC0375I	CDSVERSIONBACKUP={NO | YES, MCDSBACKUPDSN=*dsname1*, BCDSBACKUPDSN=*dsname2*, OCDSBACKUPDSN=*dsname3*, JRNLBACKUPDSN=*dsname4*}
	ARC0376I	BACKUPCOPIES=*backupcopies*, BACKUPDEVICECATEGORY={DASD | TAPE (UNITNAME=*unitname*, DENSITY=*density*, {RETPD=*retentionperiod* | EXPDT=*expirationdate*)}, LATESTFINALQUALIFIER=V*nnnnnnn*
CONTROLDATASETS	ARC0148I	{MCDS | BCDS | OCDS | JOURNAL} TOTAL SPACE = *k-bytes* K-BYTES BASED ON *exts* EXTENTS, CURRENTLY ABOUT *percent*% FULL, WARNING THRESHOLD = *thresh*%
	ARC0860I	{MCDS | BCDS | OCDS | JOURNAL} SPACE MONITORING DISABLED - RC=*retcode*
CSALIMITS	ARC0203I	CSALIMITS={NO | YES}, CSA CURRENTLY USED=*nnnnnn* BYTES, MWE=*wwww*. MAXIMUM=*xxxxxx*K BYTES, ACTIVE=*yyy*%, INACTIVE=*zzz*%

Figure 81 (Part 2 of 6). Messages Associated with the QUERY Command by Parameter Name

Parameter Name	Message ID	Message Text
DATASETNAME USER REQUEST	ARC0161I	{MIGRATING | BACKING UP | RECOVERING | RECYCLING | AUDITING | DUMPING | RESTORING } VOLUME *volser* FOR USER {*userid* | **AUTO**} REQUEST {*request* | NONE}
	ARC0162I	{MIGRATING | BACKING UP | RECALLING | RECOVERING | DELETING | RESTORING } DATA SET *dsname* FOR USER *userid*, REQUEST *request*
	ARC0165I	USER NOT AUTHORIZED TO QUERY REQUESTS FOR OTHER USERIDS OR REQNUM MISSING
	ARC0166I	NO DFHSM REQUEST FOUND FOR QUERY
	ARC0167I	*type* MWE FOR {VOLUME | DATA SET | COMMAND} *name* FOR USER *userid* REQUEST *reqnum* WAITING TO BE PROCESSED, *nmwe* MWES AHEAD OF THIS ONE
MIGRATIONLEVEL2	ARC0224I	LOW KEY HIGH KEY VOLSER
	ARC0225I	*lowkey highkey* {*volser* | *NONE*}
	ARC0226I	MIGRATION LEVEL 2 UNDEFINED
	ARC0227I	ML2 TAPE TARGET VOLS: DSMIG=*volser1* or *NONE*, VOLMIG=*volser2* or *NONE*, RECYCLE=*volser3* or *NONE*
POOL VOLUMEPOOL	ARC0230I	NO {DATA SET | VOLUME} POOLS DEFINED
	ARC0232I	{DATA SET | VOLUME} POOLS={*char* | *poolid*} VOLS=*volser* {*volser* ... *volser*}
RETAIN	ARC0174I	NO RETAIN LEVEL ENTRIES
	ARC0175I	LEVEL QUALIFIER AND MIGRATION RESTRICTION TYPE
	ARC0176I	QUALIFIER=*qualifier* RESTRICTION TYPE=*type*

Figure 81 (Part 3 of 6). Messages Associated with the QUERY Command by Parameter Name

Parameter Name	Message ID	Message Text
SETSYS	ARC0147I	BUDENSITY=*density*, BUUNIT=*unit*, BU RECYCLE PERCENTAGE=*percent%*, MOUNT WAIT TIME=*min* MINUTE(S), TAPEDELETION={SCRATCHTAPE | HSMTAPE} PARTIALTAPE={MARKFULL | REUSE}
	ARC0149I	MONITOR({STARTUP | NOSTARTUP}, {SPACE | NOSPACE}, {VOLUME | NOVOLUME}), MCDS(*thresh extents*), BCDS(*thresh extents*), OCDS(*thresh extents*), JOURNAL(*thresh extents*)
	ARC0150I	JOURNAL={NONE | SPEED | RECOVERY}, LOG={YES | NO | HELD}, TRACE={YES | NO}, SMFID={*smfid* | NONE}, DEBUG={YES | NO}, EMERG={YES | NO}, JES={2 | 3}, SYS1DUMP={YES | NO}, RACFIND={YES | NO}, ERASEONSCRATCH (YES | NO)
	ARC0151I	DAYS=*days1*, ML1DAYS=*days2*, AMSTART=(*time1 time2 time3*), INTERVALMIGRATION={YES | NO}, MIGRATIONCLEANUPDAYS(*days3,days4*), SDSP={*number*KB | NONE}, MIGRATION PREFIX=*mprefix*, SCRATCH EXPIRED DATA SETS={YES | NO}
	ARC0152I	MAXRECALLTASKS=*tasks*, RECALL={CATALOGVOLUME | ANYSTORAGEVOLUME(LIKE | UNLIKE) | PRIVATEVOLUME(LIKE | UNLIKE)}, MAXEXTENTS=*extents*, CONVERSION={NO | REBLOCKBASE | REBLOCKTOANY | REBLOCKTOUNLIKE}, EXPORTESDS={RECORDMODE | CIMODE}
	ARC0153I	SCRATCHFREQ=*days*, SYSOUT(CLASS=*class*, COPIES=*number*, SPECIAL FORMS=[*form* | NONE]), SWAP={YES | NO}, PERMISSION={YES | NO}, EXITS={NONE | *exits*}, UNLOAD={YES | NO}, DATASETSERIALIZATION={USER | DFHSM}
	ARC0154I	MAXBACKUPTASKS=*tasks*, ABSTART=(*time1 time2 time3*), VERSIONS=*versions*, FREQUENCY=*days*, SKIPABPRIMARY={YES | NO}, BACKUP PREFIX=*bprefix*, INCREMENTALBACKUP={CHANGEDONLY | ORIGINAL}, PROFILEBACKUP={YES | NO}
	ARC0169I	USER UNIT NAMES=*unitname(s)*
	ARC0203I	CSALIMITS={NO | YES}, CSA CURRENTLY USED=*nnnnnn* BYTES, MWE=*wwww*. MAXIMUM=*xxxxxx*K BYTES, ACTIVE=*yyy*%, INACTIVE=*zzz*%
	ARC0272I	MIGRATION CLEANUP CYCLE LENGTH=*ndays* DAYS, CYCLE={*NONE* | *string*}, TODAY IS DAY=*n*, CYCLE START DATE=*yy/mm/dd*,
	ARC0274I	BACKUP=YES[(ANY | DASD | TAPE [(*unit*)])] | NO, SPILL=YES[(ANY | DASD | TAPE [(*unit*)])] | NO

Figure 81 (Part 4 of 6). Messages Associated with the QUERY Command by Parameter Name

Parameter Name	Message ID	Message Text
SETSYS (Cont'd)	ARC0339I	OPTIMUMDASDBLOCKING={2KB | OPTIMAL}, LOGGING LEVEL= {FULL | REDUCED | EXCEPIONONLY}, LOG TYPE= {SYSOUT(*sysout-class*) | DASD}
	ARC0340I	COMPACTION OPTIONS ARE: TAPEMIGRATION={YES | NO}, DASDMIGRATION={YES | NO}, TAPEBACKUP={YES | NO}, DASDBACKUP={YES | NO}
	ARC0341I	COMPACT PERCENT IS *percent%*
	ARC0342I	{SOURCENAMES | OBJECTNAMES}: *name(s)*
	ARC0374I	ACCEPTPSCBUSERID={YES | NO}
	ARC0375I	CDSVERSIONBACKUP={NO | YES, MCDSBACKUPDSN=*dsname1*, BCDSBACKUPDSN=*dsname2*, OCDSBACKUPDSN=*dsname3*, JRNLBACKUPDSN=*dsname4*}
	ARC0376I	BACKUPCOPIES=*backupcopies*, BACKUPDEVICECATEGORY={DASD | TAPE (UNITNAME=*unitname*, DENSITY=*density*, {RETPD=*retentionperiod* | EXPDT=*expirationdate*})}, LATESTFINALQUALIFIER=V*nnnnnnn*
	ARC0408I	INPUT TAPE ALLOCATION=(WAIT | NOWAIT), OUTPUT TAPE ALLOCATION=(WAIT | NOWAIT), RECYCLE TAPE ALLOCATION=(WAIT | NOWAIT), TAPEFORMAT={SINGLEFILE, MAXSINGLEFILEBLOCKS=*blocks* | MULTIFILE}
|	ARC0410I	TAPEMIGRATION={DIRECT(TAPE(ANY | *unitname*)) | ML2TAPE(TAPE(ANY | *unitname*)) | NONE{(ROUTETOTAPE[(ANY | *unit*)])}) MIGDENSITY=*density*, MIGUNIT=*unit*, ML2 RECYCLE PERCENTAGE=*percent%* TAPEMAXRECALLTASKS=*tasks*
	ARC0411I	TAPESECURITY={RACF | RACFINCLUDE} {PASSWORD} {EXPIRATION | EXPIRATIONINCLUDE}, SELECTVOLUME={SCRATCH | SPECIFIC}, {DEFERMOUNT | NODEFERMOUNT}
	ARC0412I	RECYCLEOUTPUT BACKUP={*unit* | **NONE**},MIGRATION={*unit* | **NONE**}
	ARC0638I	MAXDUMPTASKS=*dtasks*, ADSTART=(*time1 time2 time3*), DUMPIO= {1 | 2 | 3 | 4}, [DUMPVTOCCOPIES= *dvtocs*]
	ARC0860I	{MCDS | BCDS | OCDS | JOURNAL} SPACE MONITORING DISABLED - RC=*retcode*

Figure 81 (Part 5 of 6). Messages Associated with the QUERY Command by Parameter Name

Parameter Name	Message ID	Message Text
SPACE	ARC0400I	VOLUME *volser* IS *percent%* FREE, *tracks* FREE TRACKS, *cylinders* FREE CYLS, FRAG *fragx*
	ARC0401I	LARGEST EXTENTS ARE CYLINDERS *cylinders*, TRACKS *tracks*
	ARC0402I	VTOC IS *tracks* TRACKS(*totdscbs* DSCBS), *free* FREE DSCBS(*percent%* OF TOTAL), *format5* FORMAT 5 DSCBS
	ARC0406I	SPACE PARAMETER ON QUERY COMMAND ONLY VALID WHEN ENTERED BY CONSOLE OPERATOR OR AUTHORIZED USER
	ARC0407I	QUERY SPACE FAILED, {VOLUME *volser* NOT | NO PRIMARY OR MIGRATION LEVEL 1 VOLUMES} CURRENTLY MANAGED BY DFHSM SMS INFO
	ARC0413I	QUERY SPACE FOR VOLUME *volser* ALREADY ACTIVE - RETRY THIS VOLUME AGAIN
STARTUP	ARC0143I	PARMLIB MEMBER=ARCCMDxx, DFHSM AUTHORIZED USERID=*uid*, HOSTID=*hostid*, PRIMARY HOST={YES | NO}, LOGSW={YES | NO}, STARTUP={YES | NO}, EMERGENCY={YES | NO}
STATISTICS	ARC0145I	DS DELETED BY AGE=*datasets*, DS DELETE FAILED=*fails*
	ARC0146I	RECYCLED {BACKUP | MIGRATION} VOLUMES=*volumes*, DS=*datasets*, BLOCKS=*blocks*
	ARC0155I	DFHSM STATISTICS FOR *date*
	ARC0156I	STARTUPS=*starts*, SHUTDOWNS=*stops*, ABENDS=*abends*, MWES=*requests*, CPU TIME=*time* SECONDS
	ARC0157I	DS MIGRATE L1=*nlev1*, DS MIGRATE L2=*nlev2*, DS MIGRATE FAIL=*fails*, TRKS MIGRATE=*tracks*, {KBYTES | MBYTES | GBYTES|TBYTES}, MIGRATE=*nbytes*
	ARC0158I	DS RECALL L1=*ndatasets1*, DS RECALL L2=*ndatasets2*, DS RECALL FAIL=*fails*,{KBYTES | MBYTES | GBYTES | TBYTES}, RECALL=*nbytes*
	ARC0159I	DS BACKUP=*ndatasets1*, DS BACKUP FAIL=*fails1*, DS RECOVER=*ndatasets2*, DS RECOVER FAIL=*fails2*
	ARC0641I	VOL DUMP=*nvols1*, VOL DUMP FAIL=*fails3*, VOL RESTORE=*nvols2*, VOL RESTORE FAIL=*fails4*, DS RESTORE=*ndatasets*, DS RESTORE FAIL=*fails5*,
TRAPS	ARC0204I	NO ACTIVE TRAP ENTRIES
	ARC0205I	TRAP IN MODULE *modname* FOR CODE *errcode*, TIMES=*errtimes*, TYPE=[LOG ALWAYS | BY OCCURRENCE | SNAP [ALWAYS | ONCE | NEVER] | ABEND [ALWAYS | ONCE | NEVER]]
WAITING	ARC0168I	WAITING MWES: MIGRATE=*nmigrate*, RECALL=*nrecall*, DELETE=*ndelete*, BACKUP=*nbackup*, RECOVER=*nrecover*, COMMAND=*ncmd*, TOTAL=*ntotal*

Figure 81 (Part 6 of 6). Messages Associated with the QUERY Command by Parameter Name

For more information about the messages you receive when you use QUERY command, see *Data Facility Hierarchical Storage Manager: Version 2 Release 4.0 Messages.*

Appendix D. Using the REPORT Command

You use the REPORT command to generate reports based on the DFHSM statistics records in the MCDS. Figure 8 on page 321 shows the format of the statistics records.

When you request a statistics report, you can specify the DELETE parameter to scratch the statistics records used as input to the report after the REPORT command finishes its processing. This parameter is not related to the DELETE subparameter of the FUNCTION parameter. You can also have the output from the REPORT command sent to either the SYSOUT class or to an alternative output data set.

Requesting a Report of the Daily Statistics for All Functions

You specify REPORT DAILY to get a report of the daily statistics. The daily statistics report includes the following information:

Note: You will get line 4 of the Daily Statistics Report only when one of the following commands is issued:

```
REPORT DAILY FUNCTION BACKUP
REPORT DAILY FUNCTION RECOVER
```

Line Number	Daily Statistics Output Heading	Description
1	DAILY STATISTICS REPORT FOR YY/MM/DD	When you specify REPORT DAILY, this line contains today's date. When you specify REPORT DAILY FROMDATE(*date*) TODATE(*date*), this line contains the first date you specify. DFHSM reports all statistics for the first date, then reports the daily statistics for the second day, and so forth.
2	STARTUPS=*xx*	This field shows how many times DFHSM was started on the specified day.
	SHUTDOWNS=*xx*	This field shows how many times DFHSM was stopped on the specified day.
	ABENDS=*xx*	This field shows how many times DFHSM abnormally ended for the specified day.

Figure 82 (Part 1 of 5). Headings of Output When You Request a Daily Statistics Report

Line Number	Daily Statistics Output Heading	Description
2 (Cont'd)	WORK ELEMENTS PROCESSED	This field shows how many management work elements DFHSM processed for the specified day. If DFHSM is reporting daily statistics for all functions, this field means how many management work elements DFHSM processed.
	BACKUP VOL RECYCLED = *xxxx*	This field shows how many tape backup volumes DFHSM recycled for the specified day.
	MIG VOL RECYCLED = *xxxx*	This field shows how many tape migration level 2 volumes DFHSM recycled for the specified day.
3	DATA SET MIGRATIONS BY VOLUME REQUEST = *xxxx*	This field shows how many data sets were processed during automatic and command volume migration.
	DATA SET MIGRATIONS BY DATA SET REQUEST = *xxxx*	This field shows how many data sets were processed by the DATASETNAME parameter of the MIGRATE command
	BACKUP REQUESTS = *xxxxx*	This field shows how many data sets were backed up during automatic and command backup processing.
4	FULL VOLUME DUMPS = *xxxxxx* REQUESTED	This field shows how many full volume dumps were requested.
	xxxxxx FAILED	This field shows how many of the full volume dumps failed.
	DUMP COPIES = *xxxxxx* REQUESTED	This field shows how many dump copies were requested.
	xxxxxx FAILED	This field shows how many of the dump copies failed. **Note:** You get this version of line 4 only when you issue the command REPORT DAILY FUNCTION BACKUP.

Figure 82 (Part 2 of 5). Headings of Output When You Request a Daily Statistics Report

Line Number	Daily Statistics Output Heading	Description
5	FULL VOLUME RESTORES = *xxxxxx* REQUESTED	This field shows how many full volume restores were requested.
	xxxxxx FAILED	This field shows how many of the full volume restores failed.
	DATASET RESTORES = *xxxxxx* REQUESTED	This field shows how many data set restores were requested.
	xxxxxx FAILED	This field shows how many of the data set restores failed. **Note:** You get this version of line 4 only when you issue the command REPORT DAILY FUNCTION RECOVER.
6 and 7	HSM FUNCTION	This field contains the names of the functions DFHSM processed. When you specify REPORT DAILY FUNCTION, DFHSM reports the daily statistics in the following order: 1. MIGRATION 2. RECALL 3. DELETE 4. BACKUP 5. SPILL 6. DUPLEX DUPLEX results from command backup and daily backup processing and is the combined total of the following: • Data sets moved from backup volumes to spill volumes • Data sets moved from migration level 1 volumes to backup volumes. 7. RECOVER 8. RECYCLE You can also choose to ask DFHSM to report statistics for specific DFHSM functions. For example, when you specify REPORT DAILY FUNCTION RECYCLE(ALL), DFHSM prints a daily statistics report of the number of tape backup and migration level 2 volumes DFHSM recycled during the time period you specified.

Figure 82 (Part 3 of 5). Headings of Output When You Request a Daily Statistics Report

Line Number	Daily Statistics Output Heading	Description
6 and 7 (Cont'd)	NUMBER DATASETS	This field shows how many data sets DFHSM processed for each function.
	------READ------ *TRK/BLK BYTES	This field shows how many tracks or blocks DFHSM read when processing the specific function. It also contains the number of kilobytes DFHSM read when processing the specific function.
	-----WRITTEN----- *TRK/BLK BYTES	This field shows how many tracks or blocks DFHSM wrote when processing the specific DFHSM function. It also contains the number of kilobytes DFHSM wrote when processing the specific function.
	-----REQUESTS----- SYSTEM USER FAILED	This field shows how many requests came from DFHSM during its automatic processing, how many came from the user, and how many of the total requests failed.
	AVERAGE AGE	This field contains the average age of the data sets that each function processed. For the MIGRATION and DELETE functions, this is the age of the average data set since it was last referred to. It is calculated by subtracting the date last referred to from the age of migration and dividing the result by the total number of data sets processed. For the RECALL function, this age is how long the average data set has been migrated. For the BACKUP, SPILL, and RECOVER functions, this age is the last time DFHSM made a backup version of the data set. The average age does not apply to the RECYCLE function.
	AVERAGE TIME QUEUED WAIT PROCESS TOTAL	This field shows the average time in seconds that the request for each data set was waiting to be processed, the time spent allocating and opening each data set, and the time spent processing each data set. TOTAL shows the average time it took DFHSM to process each data set request.

Figure 82 (Part 4 of 5). Headings of Output When You Request a Daily Statistics Report

Line Number	Daily Statistics Output Heading	Description
*If the letter M, G, or T follows any field, then the number reported is represented to the nearest MEGABYTE, GIGABYTE, or TERABYTE, respectively. All output will be reported to the smallest possible unit measure.		

Figure 82 (Part 5 of 5). Headings of Output When You Request a Daily Statistics Report

If you specify the FROMDATE and TODATE parameters, DFHSM prints a summary of all the daily statistics after it prints the daily statistics for each day you specified. If you have requested statistics for specific functions, the report contains statistics for only those functions.

Figure 83 is a sample of a daily statistics report you get when you specify REPORT DAILY FUNCTION FROMDATE(87/02/01) TODATE(87/02/05). Therefore, you have the daily statistics for each day from 01 Feb 1987 to 05 Feb 1987, and then you have a summary report for the five days.

Note:

1 KILOBYTE = 1024 bytes

1 MEGABYTE = 1,048,576 bytes

1 GIGABYTE = 1,073,741,824 bytes

1 TERABYTE = 1,099,511,627,776 bytes.

```
999,945,993,123 will be represented as 976509759K.
103,999,945,993,123 will be represented as 99182077M.
112,103,999,945,993,123 will be represented as 104404986G.
4,112,103,999,945,993,123 will be represented as 3739937T.
```

The maximum (reportable number is 4,611,686,018,427,387,904 or 4194304T. After this value is exceeded, the output reported resets and begins at 0. If it is suspected that this condition exists, re-run the report with a closer FROMDATE/TODATE specified.

```
----DFHSM STATISTICS REPORT -------- AT 08:12:48 ON 87/02/01 FOR SYSTEM=383A


DAILY STATISTICS REPORT FOR 87/02/01

STARTUPS=000, SHUTDOWNS=000, ABENDS=000, WORK ELEMENTS PROCESSED=000002, BACKUP VOL RECYCLED=0000, MIG VOL RECYCLED=0000
DATA SET MIGRATIONS BY VOLUME REQUEST = 00000, DATA SET MIGRATIONS BY DATA SET REQUEST = 00002, BACKUP REQUESTS = 00000
FULL VOLUME DUMPS = 00000 REQUESTED, 00000 FAILED; DUMP COPIES = 00000 REQUESTED, 00000 FAILED
FULL VOLUME RESTORES = 00000 REQUESTED, 00000 FAILED; DATASET RESTORES = 00000 REQUESTED, 00000 FAILED

                  NUMBER  ------READ--------  -----WRITTEN------  ------REQUESTS---- AVERAGE ------AVERAGE TIME-------
   HSM FUNCTION  DATASETS TRK/BLK   K-BYTES  TRK/BLK   K-BYTES  SYSTEM USER FAILED   AGE   QUEUED WAIT PROCESS TOTAL

MIGRATION
 PRIMARY - LEVEL 1  000002  0000004  000000000  0000002  000000004  00000  0002  00000  00014  0002  00003  00007  00012
 LEVEL 1 - LEVEL 2  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
 PRIMARY - LEVEL 2  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
RECALL
 LEVEL 1 - PRIMARY  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
 LEVEL 2 - PRIMARY  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
DELETE
 MIGRATE DATA SETS  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
 PRIMARY DATA SETS  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
BACKUP
 DAILY BACKUP       000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
SPILL
 BACKUP - SPILL     000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
    DUPLEX
RECOVER
 BACKUP - PRIMARY   000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
RECYCLE
 BACKUP - SPILL     000000  0000000             0000000             00000  0000  00000  00000  0000  00000  00000  00000
 MIG L2 - MIG L2    000000  0000000             0000000             00000  0000  00000  00000  0000  00000  00000  00000


DAILY STATISTICS REPORT FOR 87/02/05

STARTUPS=000, SHUTDOWNS=000, ABENDS=000, WORK ELEMENTS PROCESSED=000002, BACKUP VOL RECYCLED=0000, MIG VOL RECYCLED=0000
DATA SET MIGRATIONS BY VOLUME REQUEST = 00000, DATA SET MIGRATIONS BY DATA SET REQUEST = 00000, BACKUP REQUESTS = 00000
FULL VOLUME DUMPS = 00000 REQUESTED, 00000 FAILED; DUMP COPIES = 00000 REQUESTED, 00000 FAILED
FULL VOLUME RESTORES = 00000 REQUESTED, 00000 FAILED; DATASET RESTORES = 00000 REQUESTED, 00000 FAILED

                  NUMBER  ------READ--------  -----WRITTEN------  ------REQUESTS---- AVERAGE ------AVERAGE TIME-------
   HSM FUNCTION  DATASETS TRK/BLK   K-BYTES  TRK/BLK   K-BYTES  SYSTEM USER FAILED   AGE   QUEUED WAIT PROCESS TOTAL

MIGRATION
 PRIMARY - LEVEL 1  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
 LEVEL 1 - LEVEL 2  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
 PRIMARY - LEVEL 2  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
RECALL
 LEVEL 1 - PRIMARY  000002  0000000  000000000  0000000  000000000  00000  0002  00000  00003  0000  00004  00009  00013
 LEVEL 2 - PRIMARY  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
DELETE
 MIGRATE DATA SETS  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
 PRIMARY DATA SETS  000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
BACKUP
 DAILY BACKUP       000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
SPILL
 BACKUP - SPILL     000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
    DUPLEX
RECOVER
 BACKUP - PRIMARY   000000  0000000  000000000  0000000  000000000  00000  0000  00000  00000  0000  00000  00000  00000
RECYCLE
 BACKUP - SPILL     000000  0000000             0000000             00000  0000  00000  00000  0000  00000  00000  00000
 MIG L2 - MIG L2    000000  0000000             0000000             00000  0000  00000  00000  0000  00000  00000  00000
```

Figure 83. Sample Report of Daily Statistics by Function

Requesting a Report of the Volume Statistics for All Functions

You specify REPORT VOLUMES to get a report of the volume statistics for all volumes managed by DFHSM. You specify VOLUMES with a volume serial number to get a statistics report for a specific volume.

Note: REPORT VOLUMES shows only the last full volume dump and full volume restore of each source volume for each day. It will not show multiple dumps or restores of a given source volume on a given day. To find out the total number of full volume dumps and full volume restores on a given day, issue the REPORT DAILY command.

The volume statistics report for all the functions includes the following information:

Line Number	Volume Statistics Output Heading	Description
1	VOLUME STATISTICS REPORT FOR VOLUME *volser* FOR YY/MM/DD	When you specify REPORT VOLUMES, this line contains today's date. When you specify REPORT VOLUMES FROMDATE(*date*) TODATE(*date*), this line contains the first date you specify. DFHSM reports all volume statistics for the first date, then reports the volume statistics for the second day, and so forth. This line also shows the volume serial number of the volume whose statistics are being reported.
2	UNIT TYPE= *unit*	This field shows the type of unit where the volume is mounted. The types of units are: 3330, 3330-1, 3330V, 3350, 3375, 3380, 3400-3, 3400-4, 3400-5, 3400-6, 3400-9, 3480, or an esoteric unit name. **Note:** These fields will have 'U' to represent an L0 non-DFHSM volume.
	HSM VOLUME TYPE= *voltype*	This field shows the type of volume whose statistics are being reported. The types of volumes are: PRIMARY, ML1, ML2, DAILY, SPILL and BACKUP.
3	MIGRATED DATA SETS BY VOLUME REQUEST= *xxxx*	This field shows how many data sets were processed during automatic and command volume migration.

Figure 84 (Part 1 of 5). Headings of Output When You Request a Volume Statistics Report

Line Number	Volume Statistics Output Heading	Description
7 and 8	HSM FUNCTION	This field contains the names of the functions DFHSM processed. When you specify REPORT VOLUMES FUNCTION, DFHSM reports the volume statistics in the following order: 1. MIGRATION 2. RECALL 3. DELETE 4. BACKUP 5. SPILL 6. DUPLEX DUPLEX results from command backup and daily backup processing and is the combined total of the following: • Data sets moved from backup volumes to spill volumes • Data sets moved from migration level 1 volumes to backup volumes. 7. RECOVER 8. RECYCLE You can also choose to ask DFHSM to report statistics for specific DFHSM functions. For example, when you specify REPORT VOLUME FUNCTION RECOVER, DFHSM prints a volume statistics report of the number of data sets DFHSM recovered during the time period you specified.
	NUMBER DATASETS	This field shows how many data sets DFHSM processed for each function.
	-----READ----- TRK/BLK K-BYTES	This field is not applicable.
	----WRITTEN---- TRK/BLK K-BYTES	This field is not applicable.

Figure 84 (Part 4 of 5). Headings of Output When You Request a Volume Statistics Report

Line Number	Volume Statistics Output Heading	Description
7 and 8 (Cont'd)	----REQUESTS---- SYSTEM USER FAILED	This field shows how many requests came from DFHSM during its automatic processing, how many came from the user, and how many of the total requests failed.
	AVERAGE AGE	This field contains the average age of the data sets that each function processed. For the MIGRATION and DELETE functions, this age of the average data set since it was last referred to. It is calculated by subtracting the date last referred to from the age of migration and dividing the result by the total amount of data sets processed. For the RECALL function, this age is how long the average data set has been migrated. For the BACKUP, SPILL, and RECOVER functions, this age is the last time DFHSM made a backup version of the data set. The average age does not apply to the RECYCLE function.
	AVERAGE TIME QUEUED WAIT PROCESS TOTAL	This field shows the average time in seconds that the request for each data set was waiting to be processed, the time spent allocating and opening each data set, and the time spent processing each data set. TOTAL shows the average time it took DFHSM to process each data set request.

Figure 84 (Part 5 of 5). Headings of Output When You Request a Volume Statistics Report

If you specify the FROMDATE and TODATE parameters, DFHSM prints a summary of all the volume statistics after it prints the volume statistics for each day you specified. If you have requested statistics for specified functions, the report contains statistics for only those functions.

Figure 85 is a sample of a volume statistics report you get when you specify REPORT VOLUMES FUNCTION FROMDATE(87/03/15) TODATE(87/03/19). Therefore, you have the volume statistics for all volumes for each day from 15 Mar 1987 to 19 Mar 1987 and you have a summary report for the 5 days.

```
----- DFHSM STATISTICS REPORT -------- AT 14:06:24 ON 87/03/15 FOR SYSTEM=381A

VOLUME STATISTICS REPORT FOR VOLUME HSMA01 FOR 87/03/15

UNIT TYPE = 3330V    ,  HSM VOLUME TYPE = PRIMARY
MIGRATED DATA SETS BY VOLUME REQUEST = 00001, DATA SET MIGRATIONS BY DATA SET REQUEST = 0000, DATA SETS ON VOLUME =
        MINIMUM AGE = 003, TOTAL TRACKS = 00001649, FREE TRACKS = 00000000, FRAGMENT INDEX = .059
VOLUME DUMP = NOT DONE;  DUMP COPIES = 00000  REQUESTED, FAILED = 00000
VOLUME RESTORE = NOT DONE;  DATASET RESTORES = 00000  REQUESTED, FAILED = 00000

                  NUMBER     ------READ--------      -----WRITTEN------     -----REQUESTS------- AVERAGE ------AVERAGE TIME-------
    HSM FUNCTION  DATASETS   TRK/BLK    K-BYTES      TRK/BLK    K-BYTES    SYSTEM  USER  FAILED   AGE   QUEUED WAIT PROCESS TOTAL

MIGRATION
 PRIMARY - LEVEL 1   000000      N/A       N/A          N/A       N/A       00001  0000   00001  00003  0000  00001  00045  00046
 LEVEL 1 - LEVEL 2   000000   0000000  000000000     0000000  000000000    00000  0000   00000  00000  0000  00000  00000  00000
 PRIMARY - LEVEL 2   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
RECALL
 LEVEL 1 - PRIMARY   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
 LEVEL 2 - PRIMARY   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
DELETE
 MIGRATE DATA SETS   000000   0000000  000000000     0000000  000000000    00000  0000   00000  00000  0000  00000  00000  00000
 PRIMARY DATA SETS   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
BACKUP
 DAILY BACKUP        000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
SPILL
 BACKUP - SPILL      000000   0000000  000000000     0000000  000000000    00000  0000   00000  00000  0000  00000  00000  00000
    DUPLEX
RECOVER
 BACKUP - PRIMARY    000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
RECYCLE
 BACKUP - SPILL      000000   0000000                0000000               00000  0000   00000  00000  0000  00000  00000  00000
 MIG L2 - MIG L2     000000   0000000                0000000               00000  0000   00000  00000  0000  00000  00000  00000


VOLUME STATISTICS REPORT FOR VOLUME HSMA01 87/03/19

UNIT TYPE = 3330V    ,  HSM VOLUME TYPE = PRIMARY
MIGRATED DATA SETS BY VOLUME REQUEST = 0001, DATA SET MIGRATIONS BY DATA SET REQUEST = 0000, DATA SETS ON VOLUME =
        MINIMUM AGE = 003, TOTAL TRACKS = 00002330, FREE TRACKS = 00000000, FRAGMENT INDEX = .055
VOLUME DUMP = NOT DONE;  DUMP COPIES = 00000  REQUESTED, FAILED = 00000
VOLUME RESTORE = NOT DONE;  DATASET RESTORES = 00000  REQUESTED, FAILED = 00000

                  NUMBER     ------READ--------      -----WRITTEN------     -----REQUESTS------- AVERAGE ------AVERAGE TIME-------
    HSM FUNCTION  DATASETS   TRK/BLK    K-BYTES      TRK/BLK    K-BYTES    SYSTEM  USER  FAILED   AGE   QUEUED WAIT PROCESS TOTAL

MIGRATION
 PRIMARY - LEVEL 1   000000      N/A       N/A          N/A       N/A       00001  0000   00001  00003  0000  00001  00034  00035
 LEVEL 1 - LEVEL 2   000000   0000000  000000000     0000000  000000000    00000  0000   00000  00000  0000  00000  00000  00000
 PRIMARY - LEVEL 2   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
RECALL
 LEVEL 1 - PRIMARY   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
 LEVEL 2 - PRIMARY   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
DELETE
 MIGRATE DATA SETS   000000   0000000  000000000     0000000  000000000    00000  0000   00000  00000  0000  00000  00000  00000
 PRIMARY DATA SETS   000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
BACKUP
 DAILY BACKUP        000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
SPILL
 BACKUP - SPILL      000000   0000000  000000000     0000000  00000000     00000  0000   00000  00000  0000  00000  00000  00000
    DUPLEX
RECOVER
 BACKUP - PRIMARY    000000      N/A       N/A          N/A       N/A       00000  0000   00000  00000  0000  00000  00000  00000
RECYCLE
 BACKUP - SPILL      000000   0000000  000000000     0000000  00000000     00000  0000   00000  00000  0000  00000  00000  00000
 MIG L2 - MIG L2     000000   0000000  000000000     0000000  00000000     00000  0000   00000  00000  0000  00000  00000  00000
```

Figure 85. Sample Report of Volume Statistics by Function

Requesting a Summary of the Daily or Volume Statistics

You specify REPORT DAILY FUNCTION SUMMARY to get the summary totals of the daily statistics for all functions. You specify REPORT VOLUME FUNCTION SUMMARY to get the summary totals of the volume statistics for all volumes and for all functions. You specify the VOLUMES parameter with a volume serial number to get summary statistics for only one volume. If you request a summary of specified functions, the summary contains the statistics totals for only the specified functions.

When you specify SUMMARY you get the summary report only. If you do not specify SUMMARY, you get the statistics report you requested and a summary at the end of the report if DFHSM reports the statistics for more than one day. A sample of the summary statistics report is not shown because the information is in the same format as the summary information shown in Figure 83 on page 464 and Figure 85 on page 470.

Glossary of Terms and Abbreviations

This glossary includes definitions of some terms found in this document. Some of the terms defined below are from:

- The *American National Dictionary for Information Processing Systems*, copyright 1982 by the Computer and Business Equipment Manufacturers Association. Copies may be purchased from the American National Standards Institute at 1430 Broadway, New York, New York 10018. These definitions are identified by an asterisk.
- The *ISO Vocabulary - Information Processing*, and the *ISO Vocabulary - Office Machines*, developed by the International Standards Organization, Technical Committee 97, Subcommittee 1. Definitions from published sections of this vocabulary are identified by the symbol "(ISO)" preceding the definition. Definitions from draft proposals and working papers under development by the ISO/TC97 vocabulary subcommittee are identified by the symbol "(TC97)," indicating that final agreement has not yet been reached among its participating members.

A

ACEE. Access control environment element.

ACS. See automatic class selection.

active data. Data that is frequently accessed by users and that resides on level 0 volumes.

activity log. In DFHSM, a SYSOUT or DASD-type data set used to record activity and errors that occurred during DFHSM processing.

AIX. See alternate index.

alternate index. In systems with VSAM, a collection of index entries related to a given base cluster and organized by an alternate key, that is, a key other than the prime key of the associated base cluster data records. Its function is to provide an alternate directory for locating records in the data component of a base cluster. See also path.

alternate index cluster. In VSAM, the data and index components of an alternate index.

alternate tape volumes. In DFHSM, copies of original tape volumes created during tape copy processing. The volumes can either be stored on-site or off-site for use later in the event of a disaster. During the tape replace processing, these volumes can replace the original volumes that may be lost.

alternate tape volume reference. In DFHSM, additional fields in the TTOC record that record information about the alternate tape volume. These fields provide DFHSM with the necessary information to refer to the alternate tape volume.

AMS. access method services.

audit. A DFHSM process that detects discrepancies between data set information in the VTOCs, the computing system catalog, the MCDS, BCDS, and OCDS.

AUTH. The DFHSM command used to identify an authorized user who can issue DFHSM system programmer and storage administrator commands.

authorized user. In DFHSM, the person or persons who are authorized through the DFHSM AUTH command to issue DFHSM system programmer, storage administrator, and operator commands.

automatic backup. In DFHSM, the process of automatically copying eligible data sets from primary volumes or migration volumes to backup volumes during a specified backup cycle.

automatic cartridge loader feature. A feature of the 3480 Magnetic Tape Subsystem providing the operator with the capability of preloading multiple tapes to be used as migration, backup, or dump tapes.

automatic class selection (ACS). A mechanism for assigning SMS classes and storage groups.

automatic dump. In DFHSM, the process of using DFDSS to automatically do a full volume dump of all allocated space on primary volumes to designated tape dump volumes.

automatic migration. In DFHSM, the process of automatically moving eligible data sets from user volumes to migration level 1 or level 2 volumes, or from migration level 1 volumes to migration level 2 volumes, without a specific request for each data set moved. See interval migration.

availability management. In DFHSM, the process of ensuring that a current version (backup copy) of the installation's data sets resides on tape or DASD.

B

backup. In DFHSM, the process of copying a data set residing on a level 0 volume, level 1 volume, or a volume not managed by DFHSM to a backup volume. See automatic backup, incremental backup.

backup control data set (BCDS). A VSAM, key-sequenced data set that contains information about backup versions of data sets, backup volumes, dump volumes, and volumes under control of the backup and dump functions of DFHSM.

backup copy. In DFHSM, a copy of a data set that is kept for reference in case the original data set is destroyed.

backup cycle. In DFHSM, a period of days for which a pattern is used to specify the days in the cycle on which automatic backup is scheduled to take place.

backup frequency. In DFHSM, the number of days that must elapse since the last backup version of a data set was made until a changed data set is again eligible for backup.

backup profile. In DFHSM, a RACF discrete data set profile associated with the backup version of a cataloged data set that is protected by a RACF discrete data set profile.

backup version. See backup copy.

backup volume. A volume managed by DFHSM to which backup versions of data sets are written.

backup volume cleanup process. A DFHSM process that scratches data set backup versions on DASD that are no longer needed.

backup VTOC copy data set. In DFHSM, a copy of the VTOC of a volume that was backed up by DFHSM. This VTOC data set contains only part of the Format 1 DSCB for each data set from the original data set. This data set is written on a migration level 1 volume.

base cluster. In systems with VSAM, a key-sequenced or entry-sequenced file over which one or more alternate indexes are built. See also cluster.

BCDS. See backup control data set.

base data component. In VSAM, a component of the base cluster containing data of a data set.

BDAM. Basic direct access method.

BVR. Backup cycle volume record.

C

catalog. (1) * (ISO) A directory of files and libraries, with reference to their locations. A catalog may contain other information such as the types of devices in which the files are stored, passwords, blocking factors. (2) * (ISO) To enter information about a file or a library into a catalog. (3) The collection of all data set indexes that are used by the control program to locate a volume containing a specific data set. (4) To include the volume identification of a data set in the catalog. (5) See VSAM master catalog, VSAM user catalog.

CDD. See common data set descriptor record

CDT. Class descriptor table.

changed data set. In DFHSM, a data set that has been opened for other than read-only access.

CLIST. See command list.

cluster. In systems with VSAM, a named structure consisting of a group of related components, for example, a data component with its index component. See also base cluster.

command list. A command procedure containing executable sequences of TSO commands, subcommands, and command procedure statements.

command procedure. In TSO, a data set or a member of a partitioned data set containing TSO commands to be performed sequentially by the EXEC command. See also CLIST.

Common data set descriptor record.. A record which precedes a user's data set on a DFHSM-owned volume.

common filter services. A subcomponent of DFP common services. Common filter services compares data items with filter keys and indicates which data items match the keys and how many matches have been found.

common service area (CSA). In OS/VS2, a part of the common area that contains data areas addressable by all address spaces, but protected during its use by the key of the requester.

compaction. In DFHSM, a method of compressing and encoding data that is migrated or backed up.

compress. In DFHSM, to release unused space in a partitioned data set during the migrate/recall and backup/recovery processes.

computing system catalog. In DFHSM, the master catalog and any associated user catalogs used as sources during the audit process.

contiguous space. An unbroken consecutive series of storage locations.

control data set. In DFHSM, one of three data sets (BCDS, MCDS, and OCDS) that contain records used in DFHSM processing.

converter/interpreter processing. The job segment that converts and interprets JCL for MVS.

CSA. See common service area.

current backup version. In DFHSM, a backup copy of the data set that was created on a date after the data set was last updated.

cycle start date. In DFHSM, the date a backup cycle, dump cycle, or migration cleanup cycle is started.

D

daily backup volume. In DFHSM, a volume associated with a given day in the backup cycle and assigned to contain backup versions created on that cycle day.

daily space management. In DFHSM, the automatic space management of data sets that occurs once every 24 hours.

DASD. See direct access storage device.

DASD calculation services (DCS). A subcomponent of DFP common services. DCS retrieves and calculates data set information for both VSAM and non-VSAM data sets based on the user's input request.

data class. A list of allocation attributes that the system uses for the creation of data sets.

data control block (DCB). A control block used by access method routines in storing and retrieving data.

Data Facility Data Set Services (DFDSS). An IBM licensed program used to copy, move, dump, and restore data sets and volumes.

Data Facility Hierarchical Storage Manager (DFHSM). An IBM licensed program used to manage volumes and data sets.

Data Facility Product (DFP). An IBM licensed program used to manage programs, devices, and data in an MVS operating environment.

data migration. See migration.

data set change indicator. A bit in the DSCB that indicates whether the data set was opened for output. This is bit 6 of the DS1DSIND field in the Format 1 DSCB. This indicator is supported on MVS systems that have data-set-changed flag support installed.

data set deletion. In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been used for a specified number of days and that do not have expiration date protection.

data set group. Data sets that have the same set of initial characters in their names.

data set organization. The type of arrangement of data in a data set. Examples are sequential organization or partitioned organization.

data set pool. One or more volumes managed by DFHSM to which data sets that have migrated can be recalled, depending on the set of initial characters of the data set name.

data set retirement. In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been referred to for a specified number of days, and that have a backup version.

date last referred to. In DFHSM, the last date when a data set was opened.

DBA. See delete-by-age.

DBU. See delete-if-backed-up.

DCB. See data control block.

DCS. See DASD calculation services.

debug mode. In DFHSM, the method of operation that projects the changes that would occur in normal operation but in which no user data moves.

decompaction. In DFHSM, the process of decoding and expanding data that was compacted during daily space management or backup.

delete-by-age (DBA). In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been opened for a specified number of days.

delete-if-backed-up (DBU). In DFHSM, the space management technique of deleting non-SMS-managed data sets that have not been opened for a specified number of days, and that have a current backup version.

DFDSS. See Data Facility Data Set Services.

DFHSM. See Data Facility Hierarchical Storage Manager.

DFHSM-authorized user. In DFHSM, the person or persons who are authorized through the DFHSM AUTH command to issue system programmer and storage administrator commands.

DFHSM log. In DFHSM, a pair of sequential data sets, X and Y, containing a chronological list of transactions and statistics occurring in DFHSM.

DFHSM-managed volume. A volume managed by DFHSM containing data sets that are directly accessible to the user.

DFP. See Data Facility Product.

DFP common services. A component of DFP that contains three subcomponents: common filter services (CFS), DASD calculation services (DCS), and device information services (DIS).

direct access storage device (DASD). A device in which the access time is effectively independent of the location of data.

directed recall. Moving a migrated data set from a level 1 or a level 2 volume to a level 0 volume and specifying the target volume and unit name where the data set can be allocated.

disaster. An unplanned occurrence that keeps a company or organization from conducting its normal business for some time period.

disaster backup. A means to protect a computing system complex against data loss in the event of a disaster. In DFHSM, the copying of all data on 3480 single-file tape volumes, or the equivalent, for storage at another location. The copied tape volumes can be used at another location to replace tape volumes that may be lost in a disaster.

disaster recovery. A means to replace lost data at another location with sufficient resources in order to resume operation. In DFHSM, the replacement of lost data that was contained on 3480 single-file tape volumes, or the equivalent, in the event of a disaster.

discrete backup profile. A RACF profile created when DFHSM backs up a cataloged, RACF-indicated data set.

discrete profile. A RACF profile that contains security information about a specific data set on a particular volume.

disposition processing. In OS/VS, a function performed by the initiator at the end of a job step to keep, delete, catalog, or uncatalog data sets, or pass them to a subsequent job step, depending on the data set status of the disposition specified in the DISP parameter of the DD statement.

DSCB. Data set control block. See also Format 1 DSCB.

DSLO. Distributed Systems License Option.

dump. See full volume dump.

dump class. A DFHSM-named set of characteristics that describe how volume dumps are managed.

dump copy. In DFHSM, a copy of the volume image produced by the DFDSS full volume dump function.

dump cycle. In DFHSM, a period of days for which a pattern is used to specify the days in the cycle on which automatic full volume dump is scheduled to take place.

dump generation. A successful full volume dump of a volume that may contain one to five identical dump copies.

dump VTOC copy data set. In DFHSM, a copy of the VTOC of a volume dumped by DFHSM. This VTOC data set contains only part of the Format 1 DSCB for each data set from the original data set. This data set is written on a migration level 1 volume.

E

eligibility age. The number of days since a data set met its criteria to be migrated.

emergency mode. In DFHSM, the method of operation that prevents data set movement and deletion in space management, backup, and recovery processes.

encode. (TC97) To convert data by the use of a code in such a manner that reconversion to the original form is possible.

erase-on-scratch. A RACF and DFP/XA function that overwrites the space occupied by a data set when the data set is scratched from a DASD device supported by MVS/XA.

ESDS. Entry-sequenced data set.

esoteric unit names. The names a user assigns to I/O devices that have the same device type.

expiration. The removal of a user data set from either a user (non-DFHSM-owned) volume, or from a DFHSM-owned volume when the user data set has been migrated. If there is an explicit expiration date, it is found in the Format 1 DSCB for a non-migrated data set, or in the MCD record for a migrated data set. If there is no explicit expiration date, the management class attributes are checked to determine an implicit expiration date.

extents. A continuous space on a direct access storage volume, occupied by or reserved for a particular data set, data space, or file.

extent reduction. In DFHSM, the releasing of unused space, reducing the number of extents, and compressing partitioned data sets.

F

FBA. See fixed-block architecture.

fixed-block architecture. Data stored in blocks of fixed size; these blocks are addressed by block number relative to the beginning of the particular file.

FMID. Function modification identifier.

Format 1 DSCB. An identifier DSCB that describes a data set or VSAM data space and its first three extents. Refer to the appropriate system data areas manual.

fragmentation index. The qualitative measure of the scattered free space on a volume.

full volume dump. In DFHSM, the process of using a DFDSS function that backs up the entire allocated space on a volume.

full volume restore. In DFHSM, the process of using a DFDSS function that restores the entire volume image.

G

general pool. In a DFHSM environment with JES3, the collection of all DFHSM primary volumes added to that processor that have a mount status of permanently-resident or reserved, that have the automatic recall attribute, and that have a mount attribute of storage or private.

generic profile. A RACF profile that contains security information about multiple data sets, users, or resources that may have similar characteristics and require a similar level of protection.

H

high threshold of occupancy. In DFHSM, the upper limit of space to be occupied on a primary volume managed by DFHSM. Contrast with low threshold of occupancy.

I

inactive age. In DFHSM, the number of days since the data set was last referred to.

inactive data. Copies of active or low-activity data that reside on DFHSM-owned dump and incremental backup volumes. See also low-activity data.

incremental backup. In DFHSM, the process of copying a data set that has been opened for other than read-only access since the last backup version was created, and that has met the backup frequency criteria.

incremental recovery. Recovery of the latest backup copy of a data set or data sets made by incremental backup.

installation verification procedure (IVP). A procedure distributed with the MVS system that tests the newly generated system to verify that the basic facilities of MVS are functioning correctly.

interactive storage management facility (ISMF). The interactive access method of MVS/XA DFP that allows users and storage administrators access to the storage management functions of DFDSS and DFHSM.

Interactive System Productivity Facility (ISPF). An IBM licensed program used to develop, test, and run application programs interactively. ISPF is the interactive access method for all storage management functions.

interval migration. In DFHSM, automatic migration that occurs when the high threshold of occupancy is reached or exceeded on a primary volume during a specified time interval. Data sets are moved from the volume, oldest first, until the low threshold of occupancy is reached.

ISMF. See interactive storage management facility.

ISPF. See Interactive System Productivity Facility.

ISPF/PDF. Interactive System Productivity Facility/Program Development Facility.

IVP. See installation verification procedure.

J

JCL. Job control language.

JES2. Job entry subsystem 2.

JES3. Job entry subsystem 3.

JFCB. Job file control block.

journal data set. In DFHSM, a sequential data set used by DFHSM for recovery of the MCDS, BCDS, and OCDS. The journal contains a duplicate of each record in the control data sets that has changed since the MCDS, BCDS, and OCDS were last backed up.

K

KSDS. Key-sequenced data set.

L

LDS. See linear data set.

level 0 volume. A volume that contains data sets directly accessible by the user. The volume may be either DFHSM managed (a primary volume), or not.

level 1 volume. A volume owned by DFHSM containing data sets that migrated from a level 0 volume.

level 2 volume. A volume under control of DFHSM containing data sets that migrated from a level 0 volume, from a level 1 volume, or from a volume not managed by DFHSM.

like device. Pertaining to (DASD) devices with identical geometry: that is, the same number of bytes per track, the same number of tracks per cylinder, and the same number of cylinders per actuator.

linear data set. A named linear string of data, stored in such a way that it can be retrieved or updated in 4096 byte units. An LDS object is essentially a VSAM entry-sequenced data set that is processed as a control interval. However, unlike a control interval, an LDS contains data only; that is, it contains no record definition fields (RDFs) or control interval definition fields (CIDFs).

low-activity data. Data that is infrequently accessed by users and is eligible to be moved or has been moved to DFHSM-owned migration volumes.

low threshold of occupancy. The lower limit of space to be occupied on a primary volume managed by DFHSM. Contrast with high threshold of occupancy.

M

management class. A list of data set migration, backup, and retention attributes that DFHSM uses to manage storage at the data set level.

management work element (MWE). A control block containing the necessary information to direct DFHSM functions.

managed volume. See primary volume.

MCB. BCDS data set record.

MCC. Backup version record.

MCD. MCDS data set record.

MCDS. See migration control data set.

MCP. Eligible volume record.

MCT. Backup volume record.

MCV. Primary and migration volume record.

MCVT. Management communication vector table.

migration. In DFHSM, the process of moving a cataloged data set from a primary volume to a migration level 1 or migration level 2 volume, from a migration level 1 volume to a migration level 2, or from a volume not managed by DFHSM to a migration level 1 or migration level 2 volume.

migration cleanup. In DFHSM, the first phase of daily space management. This process deletes unnecessary records or migration copies.

migration control data set (MCDS). A VSAM, key-sequenced data set that contains statistics records, control records, user records, records for data sets that have migrated, and records for volumes under migration control of DFHSM.

migration level 1 volume. See level 1 volume.

migration level 2 volume. See level 2 volume.

migration volume. A volume under control of DFHSM that contains migrated data sets.

minimal discrete profile. A profile with no access list or model profile. The minimal discrete profile is used when recovering a RACF-indicated data set whose original profile or backup profile no longer exists.

minimum migration age. In DFHSM, the number of days a data set must remain unopened before DFHSM can select it to migrate from a volume.

ML1. Migration level 1. See level 1 volume.

ML2. Migration level 2. See level 2 volume.

multiple-file format. In DFHSM, a 3480 tape format, or the equivalent, that requires a unique standard label data set for each user data set written. When DFHSM writes in multiple-file format it writes one tape data set for every user data set to all 3480 migration and backup volumes.

mutually exclusive parameters. A set of parameters of which only one can be used. If more than one parameter is specified, only the last parameter specified is used.

MVS/Extended Architecture (MVS/XA). An MVS operating system environment that supports 31-bit real and virtual storage addressing, increasing the size of addressable real and virtual storage from 16 megabytes to 2 gigabytes.

MVS/System Product (MVS/SP). An IBM licensed program used to control the MVS operating system and establish a base for a MVS/XA or MVS/370 environment.

MVT. Mounted volume table.

MWE. See management work element.

N

non-DFHSM-managed volume. A volume not defined to DFHSM containing data sets that are directly accessible to users.

O

OCDS. See offline control data set.

offline control data set (OCDS). In DFHSM, a VSAM, key-sequenced data set that contains information about tape backup volumes and tape migration level 2 volumes.

online. (1) * (ISO) Pertaining to the operation of a functional unit when under the direct control of a computer. (2) * Pertaining to a user's ability to interact with a computer. (3) * Pertaining to a user's access to a computer via a terminal. (4) Controlled by, or communicating with, a computer.

original tape volume. In DFHSM, a 3480 single-file tape volume, or the equivalent, used to store data during migration or backup processing, and from which a copy (called the alternate volume) is made for disaster recovery.

OS/VS2. A virtual storage operating system that is an extension of OS/MVT.

owned space. The storage space on a set of volumes to which DFHSM allocates migrated data sets and backup versions, but to which user jobs should not allocate. Included in this set are migration level 1, migration level 2, and backup volumes.

owned volume. A volume on which DFHSM writes dump, migration, or backup data sets.

P

partitioned data set (PDS). A data set in DASD that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

path. (1) (TC97) In a network, any route between any two nodes. (2) In a data base, a sequence of segment occurrences from the root segment to an individual segment. (3) In VSAM, a named, logical entity providing access to the records of a base cluster either directly or through an alternate index. (4) In an online IMS/VS system, the route a message takes from the time it is originated through processing; in a multisystem environment, the route can include more than one IMS/VS system.

PDF. Program Development Facility.

physical data set restore. In DFHSM, the process of using a DFDSS function to restore one data set from a dump copy created by using the DFHSM full volume dump function.

pool of volumes. See data set pool, general pool, and volume pool.

PSP. Preventive services planning.

primary processing unit. In a multiple processing-unit environment, the processing unit assigned to do level functions (such as backing up migrated data sets).

primary volume. A non-SMS volume managed by DFHSM containing data sets that are directly accessible to the user.

PSCB. Protected step control block.

PTF. Program temporary fix.

Q

quiesce time. A time of day after which an automatic function does not start processing any more volumes.

R

RACF. See resource access control facility.

recall. The process of moving a migrated data set from a level 1 or level 2 volume to a primary volume or to a volume not managed by DFHSM.

recovery. In DFHSM, the process of copying a backup version of a data set from a backup volume to a specified volume or to the volume from which the backup version was created.

recycle process. A DFHSM process that, based on the percentage of valid data on a tape backup or migration level 2 volume, copies all valid data on the tape to a tape spill backup or migration level 2 volume.

resource access control facility (RACF). An IBM-licensed program that provides access control by identifying and verifying users to the system. RACF authorizes access to resources, logs unauthorized access attempts, and logs accesses to protected data sets.

restore. In DFHSM, restore is the process of invoking DFDSS to perform the program's recover function. In general, it is to return to an original value or image, for example, to restore data in main storage from auxiliary storage.

retired version. In DFHSM, a specially marked backup version that DFHSM created before it deleted the non-SMS-managed original data set during data set retirement.

retirement. See data set retirement.

RRDS. Relative record data set.

S

SAF. System authorization facility.

SCP. System control programming.

SDSP. See small data set packing.

sequential data set. A data set whose records are organized on the basis of their successive physical positions, such as on magnetic tape.

similar device. A (DASD) device with the same number of bytes per track and tracks per cylinder.

single-file format. In DFHSM, a 3480 format, or the equivalent, consisting of one standard-label data set that spans up to 255 tape volumes.

small data set packing (SDSP). In DFHSM, the process used when data sets migrate that are equal to or fewer than a specified number of tracks of actual data. The data sets are written as one or more records into a VSAM data set on a migration level 1 volume.

small-data-set-packing data set. In DFHSM, a VSAM key-sequenced data set allocated on a migration level 1 volume and containing small data sets that have migrated.

SMP. System Modification Program.

SMP/E. System Modification Program/Extended.

SMS. See Storage Management Subsystem.

SMS class. A list of attributes that SMS applies to data sets having similar allocation (data class), performance (storage class), or availability (management class) needs.

SMS-managed data set. A data set that has been assigned a storage class.

space manager. See storage administrator.

space management. In DFHSM, the process of managing aged data sets on primary and migration volumes. The three types of space management are: migration, delete-by-age, and delete-if-backed-up.

spill backup volume. A volume owned by DFHSM to which all but the latest backup version of a data set are moved when more space is needed on a DASD daily backup volume or all valid versions are moved when a tape backup volume is recycled.

spill process. A DFHSM process that moves all but the latest backup version of a data set from a DASD daily backup volume to a spill backup volume.

SSI. See subsystem interface.

storage administrator. In DFHSM, the person or persons who are authorized through the DFHSM AUTH command to issue DFHSM system programmer and storage administrator commands, who can affect the authority of other DFHSM users, and who control the ways DFHSM manages DASD space.

storage class. A list of storage performance and availability service requests.

storage group. A list of real DASD volumes, or a list of serial numbers of volumes that no longer reside on a system but that end users continue to refer to in their JCL.

storage hierarchy. An arrangement in which data may be stored in several types of storage devices that have different characteristics such as capacity and speed of access.

Storage Management Subsystem (SMS). 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 ACS routine definitions.

suballocated file. A VSAM file that occupies a portion of an already defined data space. The data space may contain other files. Contrast with unique file.

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.

system-managed storage. An approach to storage management in which the system determines data placement and an automatic data manager handles data backup, movement, space, and security.

T

threshold of occupancy. A limit of occupied space on a volume managed by DFHSM.

Time sharing option (TSO). An option on the operating system for a System/370 that provides interactive time sharing from remote terminals.

TIOT. Terminal input/output task.

trace. (1) A record of the execution of a computer program that exhibits the sequence in which the instructions were executed. (2) To record a series of events as they occur. (3) In MSS, a monitor in the mass storage control that records data about the system's activity, staging, and destaging. The data describes completed 3850 Mass Storage System functions from the activity schedule queues plus time stamps.

TSO. See time sharing option.

TSO/E. Time sharing option/extended.

TTOC. Tape table of contents record.

U

undirected recall. In DFHSM, moving a migrated data set from a level 1 or level 2 volume to a level 0 volume without specifying the target volume or unit where the volume can be allocated. Undirected recall can be automatic or by command.

unique file. A VSAM file that occupies a data space of its own. The data space is defined at the same time as the file and cannot contain any other file. Contrast with suballocated file.

unlike device. DASD devices with different numbers of bytes per track and tracks per cylinder, or both.

V

virtual DASD. In DFHSM, this refers to the 3850 Mass Storage System (MSS).

Virtual storage access method (VSAM). An access method for indexed or sequential processing of fixed and variable-length records on direct access devices. The records in a VSAM data set or file can be organized in logical sequence by a key field (key sequence), in the physical sequence in which they are written on the data set or file (entry-sequence), or by relative-record number.

virtual storage constraint relief (VSCR). A function that increases the amount of storage available for the user's application program.

volume. (1) (ISO) A certain portion of data, together with its data carrier, that can be handled conveniently as a unit. (2) (ISO) A data carrier that is mounted and demounted as a unit, for example, a reel of magnetic tape, a disk pack. (3) That portion of a single unit of storage that is accessible to a single read/write mechanism, for example, a drum, a disk pack, or part of a disk storage module. (4) A storage medium that is mounted and demounted as a unit; for example, magnetic tape or diskette.

volume pool. In DFHSM, a set of related primary volumes. When a data set is recalled, if the original volume that it was on is in a defined volume pool, the data set can be recalled to one of the volumes in the pool.

volume serial number. An identification number in a volume label that is assigned when a volume is prepared for use in the system.

Volume table of contents (VTOC). (1) A table on a direct access volume that describes each data set on the volume. (2) An area on a disk or diskette that describes the location, size, and other characteristics of each file and library on the disk or diskette.

VSAM. See virtual storage access method.

VSAM master catalog. A key-sequenced data set or file with an index containing extensive data set and volume information that VSAM requires to locate data sets or files, to allocate and deallocate storage space, to verify the authorization of a program or operator to gain access to a data set or file, and to accumulate usage statistics for data sets or files.

VSAM sphere. A VSAM sphere contains the following eight components: base cluster, base data object, base index object, base path, alternate index, alternate index data object, alternate index index object, and alternate index path.

VSAM user catalog. An optional VSAM catalog used in the same way as the master catalog and pointed to by the master catalog. Use of user catalogs lessens the contention for the master catalog and facilitates volume portability.

| **VSCR.** See virtual storage constraint relief.

VTOC. See volume table of contents.

VVDS. VSAM volume data set.

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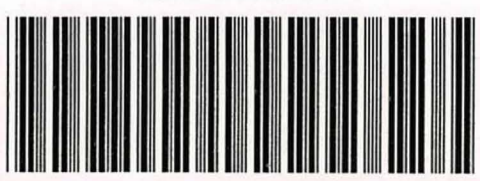

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