

z/OS
3.2

Remote Pair FlashCopy for XRC



Note

Before using this information and the product it supports, read the information in [“Notices” on page 201.](#)

This edition applies to IBM® z/OS® 3.2 (5655-ZOS) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Figures.....	v
Tables.....	vii
About this information.....	ix
How to provide feedback to IBM.....	xi
Chapter 1. What is Remote Pair FlashCopy for XRC?.....	1
Getting started with RPFC for XRC.....	2
Requirements for RPFC for XRC.....	2
XRC requirements.....	3
FlashCopy requirements.....	3
Chapter 2. Setting up RPFC for XRC.....	5
DEVSUPxx member of parmlib.....	5
Syntax format of DEVSUPxx.....	5
Statements and parameters for DEVSUPxx.....	5
MVS system commands and RPFC for XRC.....	23
Communicating with the device manager address space.....	23
ANTXIN00 parmlib parameters.....	30
Chapter 3. Using RPFC for XRC.....	53
XRECOVER—Recovering data on the recovery system.....	53
XSET—Changing session parameters.....	54
XSET command syntax.....	55
XQUERY storage control XFEATURES report.....	61
XQUERY ENVIRONMENT(PARM) report.....	61
Syntax for ILK=ESSRVCS.....	62
Subparameters for REQUEST=FCESTABLISH.....	71
ANTQFRVL macro.....	79
Volume capability and reason codes.....	79
DFSMSdss and RPFC for XRC.....	85
COPY command for DFSMSdss.....	86
Protecting DFSMSdss functions with RACF FACILITY class profiles.....	100
How to determine DFSMSdss version, release, and modification level.....	102
DFSMSHsm and RPFC for XRC.....	103
Space management of SMS-managed storage.....	103
FRRECOV command: Requesting a fast replication recovery.....	107
Using the XRC primary volume during fast replication backup.....	110
Using the XRC primary volume during fast replication recovery.....	110
DFSMSdfp and RPFC for XRC.....	110
Steps for defining a copy pool.....	111
Defining class transition attributes.....	114
Chapter 4. Overview of FlashCopy.....	117
Understanding how FlashCopy works.....	117

Chapter 5. Overview of extended remote copy (XRC).....	121
Overview of installing and configuring XRC.....	122
Chapter 6. DFSMS installation exits and RPFC for XRC.....	123
ADRUFO Parameter List.....	123
Chapter 7. DFSMS access method services commands and RPFC for XRC.....	131
DCOLLECT Output Record Structure.....	131
Chapter 8. MVS system messages	179
MVS system messages and RPFC for XRC: ADR and ANT.....	179
MVS system messages and RPFC for XRC: IGD	191
SDM return codes RPFC for XRC.....	194
Chapter 9. MVS system codes and RPFC for XRC.....	197
Appendix A. Accessibility.....	199
Notices.....	201
Terms and conditions for product documentation.....	202
IBM Online Privacy Statement.....	203
Policy for unsupported hardware.....	203
Minimum supported hardware.....	203
Trademarks.....	204
Index.....	205

Figures

- 1. Remote Pair FlashCopy for XRC..... 2
- 2. A full-volume copy, only one FlashCopy relationship active on a volume.....119
- 3. Multiple FlashCopy relationships active on a volume.....120
- 4. Extended remote copy overview..... 121

Tables

1. Without the RETRY(STAT011) DEVSUP keyword.....	19
2. With the RETRY(STAT011) DEVSUP keyword.....	20
3. ANTXIN00 parmlib parameters.....	31
4. RACF FACILITY Class Profile Names for DFSMSdss Keywords.....	100
5. Data Set Allocation Command Examples.....	122
6. DCOLLECT Output Record Structure.....	131
7. DCOLLECT Data Class Definition (Record Type 'DC').....	145
8. DCOLLECT Storage Class Definition (Record Type 'SC').....	151
9. DCOLLECT Management Class Definition (Record Type 'MC').....	153
10. DCOLLECT Storage Group Definition (Record Type 'SG').....	158
11. DCOLLECT SMS Volume Information (Record Type 'VL').....	161
12. DCOLLECT Base Configuration Information (Record Type 'BC').....	163
13. DCOLLECT Aggregate Group Definition (Record Type 'AG').....	164
14. DCOLLECT Optical Drive Information (Record Type 'DR').....	166
15. DCOLLECT Optical Library Information (Record Type 'LB').....	167
16. DCOLLECT Cache Names (Record Type 'CN').....	168
17. DCOLLECT Accounting Information (Record Type 'AI').....	169
18. DCOLLECT Output Listing: CONSTANTS.....	170
19. SDM return codes.....	194

About this information

Purpose of this information: This is a collection of all of the information that you need to understand and exploit Remote Pair FlashCopy for XRC. Some of the information also exists elsewhere in the z/OS library.

Who should read this information: To use this information effectively, you should be familiar with current disaster recovery and workload migration procedures at your location.

Related information

To find the complete z/OS library, go to [IBM Documentation \(www.ibm.com/docs/en/zos\)](http://www.ibm.com/docs/en/zos).

How to provide feedback to IBM

We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information. For more information, see [How to send feedback to IBM](#).

Chapter 1. What is Remote Pair FlashCopy for XRC?

Remote Pair FlashCopy for XRC is a form of FlashCopy for the Extended Remote Copy (XRC) environment. FlashCopy and XRC are some of the Advanced Copy Services that provide solutions to the complex challenges of disaster recover, data migration, data duplication, and business continuance. For more information about Advanced Copy Services, see [z/OS DFSMS Advanced Copy Services](#). The introductions to FlashCopy and Extended Remote Copy from that book have been included here. See [Chapter 5, “Overview of extended remote copy \(XRC\),” on page 121](#) and [Overview of FlashCopy](#).

About XRC

Extended remote copy (XRC) is a combined hardware and software solution to the problem of accurate and rapid disaster recovery. XRC also provides a DASD and workload migration solution. XRC addresses the problem of unrecoverable data that occurs between the last, safe backup of a primary system to a recovery system and the time when the primary system fails.

XRC provides an asynchronous copy operation, over distance, with minimal performance impact to primary system DASD I/O write operations.

For more information, see [Chapter 5, “Overview of extended remote copy \(XRC\),” on page 121](#).

About FlashCopy

FlashCopy® enables you to make copies of a set of tracks, with the copies immediately available for read or write access. This set of tracks can consist of an entire volume, a data set, or just a selected set of tracks.

FlashCopy provides both source volume to target volumes support and source data set level to target data set level support.

For more information, see [Chapter 4, “Overview of FlashCopy,” on page 117](#).

About RPFC for XRC

Remote Pair FlashCopy® (RPFC) is a solution for mirroring the results of a point-in-time copy (FlashCopy) from the primary volumes to the secondary volumes in a remote mirror configuration, without disrupting the mirror or consistency at the remote site. RPFC captures the parameters of a FlashCopy and sends those parameters to the secondary volumes, replicating the operation.

Remote Pair FlashCopy® for zGlobal Mirror (zGM or XRC) allows you to perform a FlashCopy between primary volumes at the application site which then get mirrored at the remote (D/R) site. This initiates a FlashCopy between secondary volumes without disrupting the mirror or consistency at the remote site.

See [Figure 1 on page 2](#) for an illustration of RPFC for XRC.

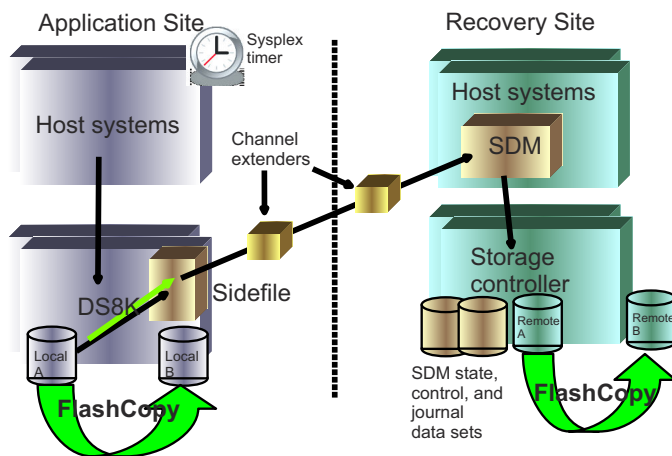


Figure 1. Remote Pair FlashCopy for XRC

Getting started with RPFC for XRC

To implement RPFC for XRC, you:

1. Enable RPFC for XRC either with `FLASHCOPYTOXRC=YES` in the `DEVSUPxx` member of `parmlib` or with the `MODIFY DEVMAN` command. See [“DEVSUPxx member of parmlib” on page 5](#) and [“MVS system commands and RPFC for XRC” on page 23](#).
2. Indicate that an XRC session can use RPFC for XRC, with the `RemotePairFlashCopy` parameter in the `ANTXIN00` member of `parmlib`.
3. Request that the application (`DFSMSdss`, `DFSMSHsm`, or `Db2`) use RPFC for XRC. See [Chapter 3, “Using RPFC for XRC,” on page 53](#).

At the local site, you enable RPFC for XRC by:

- Specifying the `FCTOXRCPrimary` keyword on the `DFSMSdss COPY` command. It is supported on all `COPY` commands, including `FULL`, `TRACKS`, and `DATASET`, for logical and physical data sets. Do not use the `FastReplication(NONE)`, `COPYVolid`, or `FCFastReverseRestore` keywords with the `FCTOXRCPrimary` keyword.
- Specifying `FLASHCOPYTOXRC=YES` in the `DEVSUPxx` member of `parmlib` and activating the parameters

At the remote site, you enable RPFC by:

- Specifying `RemotePairFlashCopy(YES)` in the `ANTXIN00` member of `parmlib`. This parameter takes effect only during `XSTART`. It cannot be changed using `XSET` while the session is active.

When defining a copy pool, you can specify whether an XRC primary volume is eligible to become a FlashCopy target volume for `FRBACKUP` or `FRRECOV`. In ISMF, you use these fields: `FRBACKUP to XRC Primary Volumes allowed` and `FRRECOV to XRC Primary Volumes allowed`.

You can invoke RPFC on an `FCESTABLISH` request of the `ANTRQST` macro, with the new `TGTXRCPRI` keyword.

`XQUERY` reports include new values related to RPFC. `XQUERY ENV(PARM)` shows the values for the new `PARMLIB` settings. `XQUERY XFEATURES` shows the microcode and software enablement status for RPFC for XRC.

Requirements for RPFC for XRC

The requirements for RPFC for XRC are as follows:

- DS8K R8.5 and higher
- z/OS V2R2 and higher.

In order to use RPFC for XRC, the primary volumes must be in an active XRC session. When the FlashCopy is initiated at the application site, the primary pair may be in full duplex, copy, or pending state.

For information about the requirements for XRC and FlashCopy, see [“XRC requirements” on page 3](#) and [“FlashCopy requirements” on page 3](#).

XRC requirements

You must meet the software and hardware requirements below in order to plan for and successfully install XRC.

XRC software requirements

The system data mover (SDM) function works with any supported z/OS releases.

XRC hardware requirements

The following topics describe hardware requirements for XRC:

- ESA/390 hardware.
- Your ES/9000 environment must be compatible. The XRC primary system builds on the existing sysplex concept to ensure sequence consistency. You must have a sysplex timer if multiple processing units update XRC primary volumes. The system clock is sufficient in a single processor or virtual server environment.
- The system data mover must have access to the control, state, and journal data sets, and to the primary and secondary copy volumes. If you are going to configure a coupled environment, all SDM hosts must have access to a shared volume that contains the master data set.
- All host primary systems must have a common time reference. This is necessary so that XRC can provide data consistency for all volume updates across all attached host systems. Host system MVS/DFP software performs timestamping of all application I/O write operations to active XRC volumes. Therefore, all channel programs issued to XRC-managed volumes are timestamped with a common time reference.

Examples: The following are examples of common time references:

- The system time-of-day clock provides the common time reference for environments with either a single processor, or with multiple virtual servers defined.
- In an environment with multiple processing units, the sysplex timer, or equivalent, provides the common time reference for application programs. XRC and application programs both require a common time reference.
- Although the primary application systems require a common timer reference so XRC can properly order dependent application I/Os, the XRC system itself does not need to be attached a sysplex timer.
- A compatible secondary volume must be available for each primary volume you wish to copy. The secondary volume must have the identical track capacity and number of tracks per cylinder and either the same or larger volume capacity.

XRC supported devices

For the primary subsystem, XRC supports all storage controls that have XRC-capable licensed internal code (LIC).

Recommendation: The secondary subsystem should be equivalent to the primary system storage control, with similar cache and NVS sizes, for the best XRC system performance and recoverability.

FlashCopy requirements

There are both software and hardware prerequisites for using FlashCopy.

Determining FlashCopy software requirements

All supported releases of z/OS provide FlashCopy support. FlashCopy V1 is enabled on the ESS. FlashCopy V2 is an advanced feature and requires an additional license before it can be enabled on the ESS.

Determining FlashCopy hardware requirements

FlashCopy is a feature on IBM TotalStorage ESS storage subsystems. FlashCopy operates with 3390 devices, and includes 3390 devices that are in 3380 track-compatible mode. The source and target volumes must have the same track format.

FlashCopy support for open system volumes

Open System (Fixed block) devices can be specified in a FlashCopy relationship as long as a CKD volume is available (online with a UCB) and is located in the same cluster of the subsystem as the Open System device specified as the source volume. When open system volumes are managed by z/OS using FlashCopy commands, avoid using other device management methods, such as the TotalStorage ESS Copy Services Web interface, that might result in a conflict.

Making cache available

To use FlashCopy with an ESS storage subsystem, both the subsystem cache and NVS with battery backup must be active. The statuses of cache and DASD fast write have no effect on whether you can use FlashCopy. Their statuses can; however, affect the overall performance of volumes with active FlashCopy sessions.

Chapter 2. Setting up RPFC for XRC

This topic describes the use of the:

- FLASHCOPYTOXRC parameter of the DEVSUPxx member of parmlib, to enable or disable RPFC for XRC. See [“DEVSUPxx member of parmlib” on page 5](#). See [“MVS system commands and RPFC for XRC” on page 23](#).
- DEVSUP(FLASHCOPYTOXRC) with the MODIFY DEVNAME command, to enable or disable RPFC for XRC. See [“MVS system commands and RPFC for XRC” on page 23](#).
- FLASHCOPYTOXRC with the MODIFY DEVMAN,ENABLE and MODIFY DEVMAN,DISABLE commands, to enable or disable RPFC for XRC. See [“MVS system commands and RPFC for XRC” on page 23](#).
- RemotePairFlashCopy parameter in the ANTGIN00 member of parmlib, to indicate if RPFC for XRC should be enabled for the specified XRC session. See [“ANTGIN00 parmlib parameters” on page 30](#).

DEVSUPxx member of parmlib

Use the FLASHCOPYTOXRC parameter of the DEVSUPxx member of parmlib to enable or disable RPFC for XRC.

Syntax format of DEVSUPxx

```
ALVERSION={3|4|FORCE3|FORCE4},
COMPACT={YES|NO},
COPYSDB={YES|SMALL|LARGE|INPUT|NO},
DDRSIZELIM={xxxx|xxxxM|1000M},
{ENABLE | DISABLE} feature,
ENFORCE_DC_MEDIA={ALLMEDIATY|MEDIA5PLUS},
EOSV2 {YES|NO},
ERROR=xxxx,
EXPIRATION_MESSAGE={NEVER|ALWAYS},
FLASHCOPYTOXRC={YES|NO},
GREATER_253={YES|NO},
ICKDSF_NODSEXIST={YES|NO},

ICKDSF_VERIFYOFFLINE={YES|NO},
JES3_ALLOC_ASSIST={YES|NO},
LRECCW_PER_EOSCP=xNN
MEDIAn=xxxx,
MTL_NO_DC_WORM_OK,

MULTINCRFLC={YES|NO},
NON_VSAM_XTIOT={YES|NO},
OCE_ABEND_DESCRIP={YES|NO},
PPRCSYMCNFG = {YES|NO},
PRIVATE=xxxx,
REFUCB_FAIL={NONE|VARYOFF_RDEV}
SMF98_DATASET_ACTIVITY={YES|NO},
STAT011_PRESERVE_INDEX={YES|NO},
SUPPR_SMF19_DUMPCOND={YES|NO},
TAPEAUTHDSN = {YES|NO },
TAPEAUTHF1 = {YES|NO },
TAPEAUTHRC4 = {ALLOW|FAIL },
TAPEAUTHRC8 = {FAIL|WARN },
TAPEBLKSZLIM={nnnnn|nnnnnK|nnnnnM|nG},
TAPE_MULTI_VOLUME_ANOMALY={ALLOW|FAIL },
VOLNSNS={ [YES|NO] }
```

Statements and parameters for DEVSUPxx

ALVERSION=

Specifies whether AL tapes are created that use Version 3 or Version 4 standards. In all cases, the Volume Mount (VOLMT) exit can override the version that is specified by ALVERSION.

Restriction: ALVERSION is valid only if the AL tape data set is being opened for output processing to the first file of the first or only volume of the data set.

3

Specifies that new AL labels are written as ISO/ANSI/FIPS Version 3. The Version 3 and 4 labels that are current are preserved.

4

Specifies that new AL labels are written as ISO/ANSI Version 4. The Version 3 and 4 labels that are current are preserved.

FORCE3

Specifies that all AL labels are forced as ISO/ANSI/FIPS Version 3, including any current version 3 and 4 labels.

FORCE4

Specifies that all AL labels are forced as ISO/ANSI Version 4, including any current version 3 and 4 labels.

COMPACT=

NO

Specifies that data is not to be stored in a compacted format on each 3480, 3490 or 359x tape subsystem, unless overridden by the user. If no installation default is provided through the DEVSUPxx member, and storing data in a compacted format is not explicitly requested on a DD statement, dynamic allocation request, the MOD=parameter on the JES3 *CALL, DJ command, or DCB macro, then the system uses the compaction default for the device. For example, the compaction default for a 3480 is NOCOMP. To determine the compaction default for a particular device, see the planning or migration documentation that accompanies the device.

YES

Specifies that data is to be stored in a compacted format on each 3480, 3490, or 359x tape subsystem, unless overridden by the user.

COPYSDB=

Supplies the system-level default for the SDB keyword for IEBGENER. The system uses this value to set a code in the data facilities area (DFA) that any application program can use. See [z/OS DFSMSdfp Advanced Services](#). The keyword is designed for use by assembler language programs that copy data sets.

The meanings for the keyword values are described in [z/OS DFSMSdfp Utilities](#). The default is no code in the DFA, which means that IEBGENER assumes SDB=INPUT.

Note: The DFSORT ICEGENER function uses the DFSORT SDB installation value as its default. The IBM-supplied default is SDB=INPUT. See [z/OS DFSORT Installation and Customization](#) for details.

DDRSIZELIM=

Specifies the limit on storage usage for Tape DDR swap. The value xxxx is a number from 1 to 1000 and specifies the number of megabytes of main storage that is allowed to be used in a Tape DDR swap. The system stores this value in the data facilities area (DFA), for use by the system and by application programs. Tape DDR swap checks this value to make sure that the total amount of storage that is required in swap processing does not exceed the specified limit. If it does, DDR terminates the swap and prints an error message. The default value for this parameter is 1000 megabytes if there is a DEVSUPxx parmlib member found and either DDSIZELIM is not specified or it is specified with no value. If there is no DEVSUPxx parmlib member found at IPL time, DDSIZELIM is set to 0 MB.

{ENABLE | DISABLE}(feature)

Enables or disables a particular feature, where *feature* can be any one of the following choices:

{HPF_FMTWRITE|HPF_IMBEDDEDLR|HPF_TTEDCW}

Enables or disables a zHPF feature. Use the option to disable a zHPF feature only at the direction of the system programmer or IBM service support.

DISABLE(HPF_FMTWRITE)

Disable the zHPF Format Writes support.

ENABLE(HPF_FMTWRITE)

Enable the zHPF Format Writes support.

DISABLE(HPF_IMBEDDEDLR)

Disable the zHPF Embedded Locate Record support.

ENABLE(HPF_IMBEDDEDLR)

Enable the zHPF Embedded Locate Record support.

DISABLE(HPF_TTEDCW)

Disable the zHPF TCA Extension support.

ENABLE(HPF_TTEDCW)

Enable the zHPF TCA Extension support.

Default: ENABLE(HPF_FMTWRITE|HPF_IMBEDDEDLR|HPF_TTEDCW)

TCTCOMPRESSION

Enables or disables the transparent cloud tiering compression feature.

ENABLE(TCTCOMPRESSION)

Enables the transparent cloud tiering compression feature.

DISABLE(TCTCOMPRESSION)

Disables the transparent cloud tiering compression feature.

Default: DISABLE(TCTCOMPRESSION)

AOM496I

Enables or disables the issuing of the AOM496I status message on the console for transparent cloud tiering operations.

ENABLE(AOM496I)

When the AOM496I feature is enabled, the AOM496I status message for transparent cloud tiering operations is issued to the console.

DISABLE(AOM496I)

When the AOM496I feature is disabled, the AOM496I status message for transparent cloud tiering operation is not issued to the console.

Default: DISABLE(AOM496I)

PPRCMT

Enables or disables the Multi-Target PPRC support.

DISABLE(PPRCMT)

When the PPRCMT feature is disabled, functionality is in single target mode.

ENABLE(PPRCMT)

When the PPRCMT feature is enabled, support is available to allow a device to be the primary of more than one PPRC pair.

Default: DISABLE(PPRCMT)

PPRCSUM

Enables or disables the PPRCSUM feature of the Device Manager.

- If the PPRCSUM feature is enabled or disabled after IPL, one device in every control unit must be varied online to activate the feature.
- If Cascaded Incremental Resynchronization (CIR) is enabled in a cascaded PPRC relationship with PPRCSUM feature enabled, PPRCMT feature must also be enabled.

DISABLE(PPRCSUM)

When the PPRCSUM feature is disabled, PPRC suspends notification for individual devices is displayed in message IEA494I.

ENABLE(PPRCSUM)

Enables the PPRCSUM feature of the Device Manager. Message IEA075I is used instead of IEA494I to report devices that transition to PPRC suspended state. The PPRCSUM feature

significantly reduces the volume of messages that are written to the console when devices in a PPRC relationship are suspended. If you enable PPRCSUM, the system issues an IEA075I message every five seconds or when the last device in the control unit was suspended to summarize the PPRC state for all devices in the control unit. This continues until all PPRC state transitions have completed.

If GDPS or other PPRC monitoring software is active, make sure that the appropriate version of this software is installed before you enable PPRCSUM.

Default: DISABLE(PPRCSUM)

Restriction: PPRCSUM is not supported for an MVS guest running under VM.

REFUCB

Enables or disables the automatic REFUCB function of the Device Manager:

DISABLE(REFUCB)

The system does not refresh the UCB when a DSS COPY, RESTORE, or ICKDSF FLASHCPY, INIT, or REFORMAT operation has changed either the volume serial number (VOLSER) or the volume table of contents (VTOC) location.

ENABLE(REFUCB)

The system automatically updates the UCB when the device support software detects that a DSS COPY, RESTORE, or ICKDSF FLASHCPY, INIT, or REFORMAT operation has changed either the VOLSER or VTOC location. The DEVMAN REFUCB service is invoked on each system in the sysplex that has REFUCB enabled.

- If the device is ONLINE, REFUCB issues a VARY ONLINE, UNCONDITIONAL command, which updates both the VOLSER or VTOC location in the UCB.
- If the device is OFFLINE, no action is taken.

Default: ENABLE(REFUCB)

REFUCB_FAIL = {NONE|VARYOFF_RODEV}

Specifies action to be taken when a failure occurs when refreshing the UCB.

NONE

If REFUCB_FAIL=NONE is specified in the DEVSUP member, message IEA253I is displayed and no action is taken if the REFUCB failed to update the UCB. IEA253I DEVSUP REFUCB_FAIL=NONE ACTION IS SET

VARYOFF_RODEV

If REFUCB_FAIL=VARYOFF_RODEV is specified, message IEA253I message is displayed and the device is varied offline by REFUCB issuing the VARY OFFLINE command to the device. If the device cannot be varied offline, it is changed to a read-only volume.

Default: NONE.

REFVTOC

Enables or disables the automatic REFVTOC function of the Device Manager:

DISABLE(REFVTOC)

When the REFVTOC feature is disabled and the system detects a volume expansion, the system issues message IEA019I, but the VTOC is not rebuilt. An ICKDSF Batch job must be submitted to rebuild the VTOC before the newly added space on the volume can be used.

ENABLE(REFVTOC)

When the REFVTOC feature is enabled and the system detects a volume expansion, the system issues message IEA019I. If the volume is online, the Device Manager causes the volume VTOC to be rebuilt. This allows the newly added space on the volume to be used by the system.

Default: ENABLE(REFVTOC)

SMF98_DATASET_ACTIVITY

Enables or disables the generation of SMF type 98 subtype 5, 6, 7 and 8 records.

YES

Allows the generation of SMF type 98 subtype 5, 6, 7 and 8 records.

Note: Generating SMF type 98 subtypes 5-8 also requires that the Workload Interaction Correlator feature be enabled and SMF configured to collect SMF type 98 subtypes 5-8. For more information, see [Data Set Activity](#) in *z/OS DFSMS Using Data Sets*.

NO

Suppresses the generation of SMF type 98 subtype 5, 6, 7 and 8 records.

If SMF98_DATASET_ACTIVITY=YES is specified, the following message is logged:

```
IEA253I DEVSUP SMF TYPE(98(5:8)) RECORDS ARE GENERATED
```

If SMF98_DATASET_ACTIVITY=NO is specified, the following message is logged:

```
IEA253I DEVSUP SMF TYPE(98(5:8)) RECORDS ARE SUPPRESSED
```

If the keyword is not specified, no message is logged.

Default: NO.

SSR

Enables or disables the secondary space reduction support of the Device Manager.

DISABLE(SSR)

Disables the secondary space reduction support.

ENABLE(SSR)

Enables the secondary space reduction support.

Default: ENABLE(SSR)

SUPPR_SMF19_DUMPCOND=

Enables or disables the secondary space reduction support of the Device Manager.

YES

Suppresses the generation of SMF type 19 records for the LSPACE command on dump conditioned volumes.

NO

Allows the generation of SMF type 19 records for the LSPACE command on dump conditioned volumes.

If SUPPR_SMF19_DUMPCOND=YES is specified, the following message is logged:

```
IEA253I SMF SUBTYPE 19 RECORDS ARE SUPPRESSED FOR LSPACE ON DUMP CONDITIONED VOLUMES
```

If SUPPR_SMF19_DUMPCOND=NO is specified, the following message is logged:

```
IEA253I SMF SUBTYPE 19 RECORDS ARE GENERATED FOR LSPACE ON DUMP CONDITIONED VOLUMES
```

If the keyword is not specified, no message is logged.

Default: NO

TCTCOMPRESSION

Enables or disables the transparent cloud tiering compression feature.

ENABLE(TCTCOMPRESSION)

Enables the transparent cloud tiering compression feature.

DISABLE(TCTCOMPRESSION)

Disables the transparent cloud tiering compression feature.

Default: DISABLE(TCTCOMPRESSION)

ZERO_DIR_PDS

Enables or fails the allocation of a PDS with zero directory block that is defined in the JCL. If the ZERO_DIR_PDS keyword is not specified, no message is logged during IPL.

ENABLE(ZERO_DIR_PDS)

Allow the allocation of PDS with zero directory block that is specified in the JCL explicitly or implicitly.

This option applies only to PDSs, and not to PDSEs.

You might want to allow creation of a PDS with no directory blocks even though you cannot use it as a PDS. You can cause a new data set to be a PDS by either:

- Coding DSORG=PO on the DD statement
- Coding a value for the number of directory blocks with the SPACE keyword on the DD statement even if the value is 0

Since the directory has no directory blocks, it begins with a file mark that serves as an end-of-file marker. If you now read it as a sequential data set, your program will successfully read nothing instead of getting an unpredictable result. This technique used to be a common way to read a sequential data set that had not been written in. If a program writes to this data set with BSAM or QSAM or with EXCP with DSORG=PS coded, then the system converts the data set from being a PDS to being a basic format sequential data set. This technique still works but it no longer is necessary because when you create a sequential data set and the DD statement has DSORG=PS or has no DSORG value or VSAM option, the system writes a file mark at the beginning. This ensures that you can read this null data set without error. The system programmer might disable this function by issuing this command: F DEVMAN,TRAPON(DONOTWRITEEOF).

There is another technique to get this ability of reading before anything is written. You can specify a nonzero secondary space amount with a zero primary space amount. If you specify DISABLE(ZERO_DIR_PDS) or F DEVMAN,TRAPON(DONOTWRITEEOF), you might be interfering with someone that is using this function to create a null sequential data set. You can advise that person that it no longer is beneficial to specify a PDS with no directory blocks.

A user might accidentally try to create a PDS with no directory blocks by coding DSORG=PO but forgetting to specify a number of directory blocks. If you specify DISABLE(ZERO_DIR_PDS), then it will be good that the system will catch this user error before wasting the user's time in diagnosing this PDS problem.

DISABLE(ZERO_DIR_PDS)

Fail the allocation of PDS with zero directory block that is specified in the JCL explicitly or implicitly.

Default: ENABLE(ZERO_DIR_PDS)

VTOCPROT

Enables or disables the VTOCPROT diagnostic function of the Device Manager.

DISABLE(VTOCPROT)

Disables the VTOCPROT diagnostic function.

ENABLE(VTOCPROT)

Enables the VTOCPROT diagnostic function. When the VTOCPROT feature is enabled, common channel programs driven by the EXCP driver are examined for format type commands targeting tracks within the VTOC. Only DSCB control blocks are allowed to be formatted to this area. If the format of the Key and Data are not the required size, the function forces a state save, and issues an ABEND xA1C, Reason Code = 7.

Default: DISABLE(VTOCPROT)

VTOC_USE_ZHPF

Specifies that you want the system to read or write VTOC DSCB records, using zHPF when it is available. You must have already specified ZHPF=YES on the ZHPF statement in the IECIOSxx parmlib member.

ENABLE(VTOC_USE_ZHPF)

Specifies that you want the system to read or write VTOC DSCB records, using zHPF when it is available and enabled. If you specify ENABLE(VTOC_USE_ZHPF) in either DEVSUPxx or by using the MODIFY DEVMAN command, the DFAVTOCHPF bit in the DFA control block is set on.

DISABLE(VTOC_USE_ZHPF)

Specifies that the system should not use zHPF to access the VTOC. If you specify or default to DISABLE(VTOC_USE_ZHPF) in either DEVSUPxx or by using the MODIFY DEVMAN command, the DFAVTOCHPF bit in the DFA control block is set off. CVAF will not use zHPF to access the VTOC.

ENFORCE_DC_MEDIA

Specifies whether data class media policies are enforced for stand-alone, non-specific mounts.

ALLMEDIATY

Enforces data class media policies for all stand-alone, non-specific mounts.

MEDIA5PLUS

Enforces data class media policies for all stand-alone, non-specific mounts for any of the 3592 tape cartridge media types.

EOSV2=**NO**

For a device in PPRC relationship, Erase-On-Scratch issued a one-channel program to erase one track at a time until all tracks are erased.

YES

Erase-On-Scratch can erase up to 12,240 tracks in a single channel program, if the PPRC primary and secondary devices are maintained on the same level of microcode fix as shown in the following table.

Machine type	Microcode level
DS8100/DS8300	64.36.89.0
DS8700	76.31.70.0
DS8800	86.31.86.0

Default: NO

Note: There is no IEA253I message logged for this option.

EASYTIERHINTS=**NO**

Disables the Easy-Tier Copy Temperature function for software-defined storage. This option disables Query/Set Temperature functions that are used to direct data placement in the Disk Controller. NO is the default.

YES

Enables the Easy-Tier Copy Temperature function for software-defined storage. This option enables Query/Set Temperature functions that are used to direct data placement in the Disk Controller.

If the Easy-Tier Copy Temperature function for software-defined storage is enabled by setting EASYTIERHINTS=YES in the DEVSUPxx member of SYS1.PARMLIB, an IEA253I message is logged.

```
IEA253I  DEVSUP  EASY-TIER FOR SOFTWARE DEFINED STORAGE
```

If EASYTIERHINTS=NO is specified followed by issuing the SET DEVSUP=xx command to refresh the PARMLIB member, the IEA253I message is not logged.

If the Easy-Tier Copy Temperature function for software-defined storage is enabled by setting EASYTIERHINTS=YES in the DEVSUPxx member of the PARMLIB followed by an IPL of the system, the EASY-TIER FOR SOFTWARE DEFINED STORAGE status will be seen in the output of the F

DEVMAN,REPORT console command. Refer to *z/OS MVS System Commands* for usage of the F DEVMAN,REPORT console command.

If the Easy-Tier Copy Temperature function for software-defined storage is disabled by issuing SET DEVSUP=XX with EASYTIERHINTS=NO in the PARMLIB member, the EASY-TIER FOR SOFTWARE DEFINED STORAGE status will not be seen in the output of the F DEVMAN,REPORT command.

EXPIRATION_MESSAGE=

ALWAYS

Normal expiration date processing occurs when opening a non-VSAM data set on DASD. ALWAYS allows OPEN to process expiration date processing as it normally does. That is, OPEN issues message IEC507D and the optional associated TSO/E message IEC108I when any attempt is made to open for output a data set on DASD for which the expiration date has not yet occurred.

Note: This keyword does not affect data sets on magnetic tape even if you specify NEVER.

NEVER

Disables expiration date processing when a non-VSAM data set on DASD is opened. Set the parameter to NEVER if you want OPEN to disable expiration date processing when opening all non-VSAM data sets on DASD for output processing. Specifying NEVER eliminates the message IEC507D and the optional associated message IEC108I for all non-VSAM data sets on DASD. Therefore, any authorized user can open an expiration date protected non-VSAM DASD data set for output without requiring the operator to allow access.

Default: ALWAYS

FLASHCOPYTOGM

Enables or disables ANTRQST QFRVOLS, or similar APIs, reporting Global Mirror primary volumes as being FLASHCOPY capable.

ENABLE(FLASHCOPYTOGM)

For applications using the ANTRQST QFRVOLS, or similar APIs, to determine if Flashcopy can be used, the system will consider it acceptable to return Global Mirror primary volumes as FlashCopy capable.

DISABLE(FLASHCOPYTOGM)

For applications using the ANTRQST QFRVOLS, or similar APIs, to determine if FlashCopy can be used, the system will consider it unacceptable to return Global Mirror primary volumes as FlashCopy capable.

Default: DISABLE(FLASHCOPYTOGM)

FLASHCOPYTOXRC

NO

Disables support for Remote Pair FlashCopy for XRC environments.

YES

Enables support for Remote Pair FlashCopy for XRC environments.

At IPL, or when the SET DEVSUP=xx command is issued with FLASHCOPYTOXRC=YES in DEVSUPxx, this message is displayed:

```
IEA253I  DEVSUP  ALLOW  REMOTE  PAIR  FLASHCOPY  TO  XRC
```

If FLASHCOPYTOXRC is not specified at all in DEVSUPxx, no messages are issued.

GREATER_253=

NO

Specifies that in a system-managed tape environment, SMS on a scratch allocation request will retain its current tape subsystem (device pool) limit of 253.

YES

Specifies that in a system-managed tape environment, SMS on a scratch allocation request can return more than 253 tape subsystems (device pools) to MVS Allocation. Before enabling this support, ensure that all systems in the sysplex can support the increased limit (z/OS V2R2 or later or z/OS V1R13 and V2R1 with SMS APAR OA44354), otherwise jobs could incur abends.

For more information about tape subsystem limitations, see [Tape subsystem limitation](#) in *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*.

Default: NO

ICKDSF_NODSEXIST=**NO**

Disables the ICKDSF NODSEXIST parameter as the default for the ICKDSF INIT command. If the NODSEXIST parameter is disabled and the device contains data sets, the ICKDSF INIT command is not terminated because data sets exist.

If ICKDSF NODSEXIST=NO is specified, an IEA253I message is logged at IPL or after a SET DEVSUP=xx command is issued.

YES

Enables the ICKDSF NODSEXIST parameter to be the default for the ICKDSF INIT command. If the NODSEXIST parameter is the default and the device contains data sets other than the VTOC index data set or VVDS, the command terminates and message ICK32179I is in the job output. See [Device Support Facilities \(ICKDSF\) User's Guide and Reference](#) for more details.

If ICKDSF_NODSEXIST=YES is specified, an IEA253I message is logged at IPL or after a SET DEVSUP=xx command is issued.

Default: NO

Note: If an online INIT is attempted on a volume that has been initialized as an SMS-managed volume and data sets other than the VTOC index data set or VVDS exist, the command terminates and message ICK32177I is in the job output. See [Device Support Facilities \(ICKDSF\) User's Guide and Reference](#) for more details.

ICKDSF_VERIFYOFFLINE=**NO**

Disables the ICKDSF VERIFYOFFLINE parameter as default. If you want to make sure that the device is offline to all host systems, you must specify the VERIFYOFFLINE parameter.

YES

Enables the ICKDSF VERIFYOFFLINE parameter to be defaulted if all the following are true:

1. UNIT parameter is specified.
2. Storage control microcode support exists.
3. z/OS software support exists.
4. Device is not a minidisk.

If ICKDSF_VERIFYOFFLINE=YES is specified, an IEAV253I DEVSUP ENABLED ICKDSF VERIFYOFFLINE PARAMETER DEFAULT message is also logged. If the keyword is not specified, no message is logged.

Default: YES

JES3_ALLOC_ASSIST=**NO**

Specifies that the allocation assistance support (available with the TS7700 Virtualization Engine) is not to be used by JES3. JES3 scratch and specific allocation requests will continue to be directed to the single library image referred to as the composite library with no knowledge of the underlying clusters (distributed libraries).

YES

Specifies that the allocation assist support (available with the TS7700 Virtualization Engine) is being enabled for usage with JES3. With this support enabled, scratch allocations can be directed (through TS7700's management class policies) to specific clusters (distributed libraries) and specific allocations are directed to a preferred list of clusters (distributed libraries) returned by the library.

Before enabling this support refer to the setup steps in the “JES3 Considerations” section in *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Tape Libraries*. If you do not perform the setup before enabling this support, jobs might incur abends.

Default: NO

LRECCW_PER_EOSCP=xNN**xNN**

A number from x01 - x030 equivalent to decimal 1 - 48 that indicates how many Locate Record Erase channel command words (CCWs) can be chained per channel program for the Erase-On-Scratch function. Each Locate Record Erase CCW can erase up to 255 tracks.

Default: LRECCW_PER_EOSCP=x30 or 48

If XRC is active on the device, the number of Logical Record Erase CCW per EOS channel program is fixed at 5 and cannot be changed.

MTL_NO_DC_WORM_OK

Specifies that you can use WORM tape in an MTL environment without a Dataclass specification for WORM. After the specification has taken effect, the only way to reverse it is to re-IPL the system without this keyword set.

MULTINCRFLC(NO|YES)**NO**

Disables the Multiple Incremental FlashCopy or the Change Recording Version 2 function.

YES

Enables the Multiple Incremental FlashCopy or the Change Recording Version 2 function.

Default: YES.

If Multiple Incremental FlashCopy is enabled by installing the enablement OA45412 PTF followed by an IPL of the system, the MULTIPLE INCREMENTAL FLASHCOPY: CHANGE RECORDING V2 status will be seen in the output of the F DEVMAN,REPORT console command. Refer to *z/OS MVS System Commands* for information about the F DEVMAN,REPORT console command.

If Multiple Incremental FlashCopy is disabled by issuing SET DEVSUP=XX with MULTINCRFLC=NO in the DEVSUPxx parmlib member, the MULTIPLE INCREMENTAL FLASHCOPY: CHANGE RECORDING V2 status is not in the output of the F DEVMAN,REPORT command.

NON_VSAM_XTIOT=**NO**

Disables support for XTIOT, uncaptured UCB, and DSAB control blocks that reside above the 16-megabyte line for data sets that use BSAM, QSAM, or BPAM. The default value for NON_VSAM_XTIOT is NO.

YES

Enables support for XTIOT, uncaptured UCB, and DSAB control blocks that reside above the 16-megabyte line for data sets that use BSAM, QSAM, or BPAM.

This option controls whether the access method OPEN macro supports these three options of the data set dynamic allocation function. Set NO if you are concerned that some programs, including installed products, might not correctly handle these options. You can set YES if all programs that might process data sets that were dynamically allocated by other programs can handle these options. Setting YES but not using these options has no effect on virtual storage or performance.

OCE_ABEND_DESCRIPTION

This keyword is checked for syntax but otherwise it is obsolete and has no effect. Its original purpose was to specify whether most error messages in the OPEN/CLOSE/EOV component would have additional information to explain the error. .

NO

Specifies that OPEN, EOV, and CLOSE abend messages will not include a descriptive text for the associated numeric abend and numeric return code. To diagnose and respond to the messages, you might have to look up the codes.

YES

Specifies that abend messages for selected OPEN, EOV, and CLOSE determinant errors include descriptive text for the associated numeric abend code and numeric return code. This option can eliminate the need to look up the meanings of the abend and reason codes that are returned in the messages.

Default: NO

PPRCSYMCONFG=

NO

Specifies that the PPRC/Metro Mirror HyperSwap configuration is not symmetrical. This indicates that the same volume address is not used to identify primary and secondary volumes in a pair relationship.

YES

Specifies that the PPRC/Metro Mirror HyperSwap configuration is symmetrical. This indicates the same volume address is used to identify both primary and secondary volumes in a pair relationship.

Default: NO

A symmetrical logical configuration is a duplicate configuration where the Metro Mirror primary and secondary disk subsystems are configured with the same Logical Subsystem number (LSS) and Channel Connection Address (CCA) pairs. That is the PPRC primary and secondary devices have the same LSS and CCA in the local and remote storage controllers. These configurations are believed to be common as most clients configure Metro Mirror primary and secondary disk subsystems identically. An asymmetrical configuration has logical LSS and CCA numbers different between the local and remote sites.

STAT011_PRESERVE_INDEX=

YES

If CVAF returns a STAT011 error to its caller, the VTOC index is not disabled.

If STAT011_PRESERVE_INDEX=YES and RETRY(STAT011) are both specified in the DEVSUPxx member, DADSM allocation performs the following actions without disabling the VTOC index:

1. Detect the failure that is associated with IEC608I message and performs an SVC dump of DADSM with the following diagnostic codes:

- 0820040B
- 0853040B
- 0854040B
- 0855040B

Those codes occur when the common VTOC access facility (CVAF) sets the status x0B (STAT011) while using an orphan Format-3 DSCB as a free Format-0 DSCB. If this situation is detected, the dump is not issued until later during VTOC validation process.

2. Use the VTOC validation function to determine the status of the orphan Format-3 DSCBs and other VTOC conditions. Examples of VTOC conditions are VTOC NOT CONVERTED, INCORRECT

EXTENTS, or DUPLICATE F1 WITH SAME F3. The following message indicates that validation is entered. The validation does not reclaim any orphan Format-3 DSCBs.

```
IEC604I VTOC VALIDATE ENTERED ON DEVICE xxxx,volser ,----,DEVMAN
```

If there are DSCB-related errors, DSCBs, message IEC618_ is displayed. If there are other VTOC errors, an IEC602I message may be issued. For example:

```
IEC618I ORPHAN FMT-3 DSCB,DEV=uuuu,volser,yy, (DSCBN0=xxxxxxxx, DSCB=ccccchhrr)
```

```
IEC618E INCORRECT EXTENTS IN DSCB=ccccchhrr), DSN=Up to 44-byte datasetname
```

```
IEC618E Fn=ccccchhrr IS MULTIPLY POINTED BY MORE THAN ONE Fm DSCB
```

```
IEC618E INCORRECT F3s COUNT IN F9=ccccchhrr), DSN=Up to 44-byte datasetname
```

```
IEC602I VTOC NOT CONVERTED ON uuuu,volser, 0,(EXTENT=CCHHCCHH,DSCB=CCCCHHHRR-CCCCHHHRR)
```

Take a DEVMAN SVC dump of the current indexed VTOC. The dump will be presented as follows:

```
DUMP TITLE=VTOC VALIDATTION,VOLSER=volser, REASON=IEC6xxx,ERROR= errormessage-text. The REASON=IEC6xxx will be REASON=IEC618I, REASON= IEC618E, or REASON= IEC602I.
```

errormessage-text will include one of the following reasons:

- ORPHAN FMT3 CHAIN
- ORPHAN FMT-3 DSCB
- INCORRECT EXTENTS IN DSCB
- ORPHAN F3 W/ INVALID DSCB
- F3/F9 IS MULTIPLY POINTED
- INCORRECT F3s COUNT IN F9
- OTHER VTOC ERRORS

If orphan Format-3 DSCB is the only type of error that is indicated by orphan Format-3 DSCB in message IEC618I, and if RETRY(STAT011) is activated in the system, the system will retry the allocation to use up one or two orphan Format-3 DSCB. The VTOC index is not disabled because STAT011_PRESERVE_INDEX=YES was specified. If RETRY(STAT011) is not activated, the system will not retry to use up ORPHAN FMT-3 DSCB. However, the failure will still not disable the VTOC index.

If another VTOC error (as shown in IEC618_ and IEC602I with a different reason text such as ORPHAN FMT3 CHAIN or INCORRECT EXTENTS IN DSCB), is detected, the VTOC index is not disabled. The failure is issued with CVAF status code STAT011 regardless of whether RETRY(STAT011) is activated.

If the retry does not succeed, the following message is issued to confirm the error:

```
IEC603I VTOC ERRORS MAY EXIST ON uuuu,volser, 8
```

NO

If CVAF returns a STAT011 error to its caller, the VTOC index may be disabled.

If STAT011_PRESERVE_INDEX=NO is activated, DADSM allocation performs the following actions in addition to disabling the VTOC index or converting it to OSVTOC:

- Internally detects the failure associated with IEC608I message followed by an SVC dump of DADSM with diagnostic codes: DIAG=0820040B, 0853040B, 0854040B, or 0855040B. Those codes are occur when CVAF sets status x0B(STAT011) when it uses an orphan Format-3 DSCB as a free Format-0 DSCB. The dump is not being issued until validation processing begins.

- A VTOC validation function determines the status of the orphan Format-3 DSCBs and other VTOC conditions. The following message is displayed to indicate that validation is entered.

```
IEC604I VTOC VALIDATE ENTERED ON DEVICE xxxx,volser,----,DEVMAN
```

- Message IEC618_ is displayed for any errors about the DSCBs. If there are other VTOC errors, an IEC602I message may be issued. For example:

```
IEC618I ORPHAN FMT-3 DSCB,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx, DSCB=cccchhhrr)
```

```
IEC618E ORPHAN FMT3 CHAIN,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx, DSCB=cccchhhrr)
```

```
IEC618E INCORRECT EXTENTS IN DSCB=cccchhhrr, DSN=Up to 44-byte datasetname
```

```
IEC618E Fn=cccchhhrr IS MULTIPLY POINTED BY MORE THAN ONE Fm DSCB
```

```
IEC618E INCORRECT F3s COUNT IN F9=cccchhhrr, DSN=Up to 44-byte datasetname
```

```
IEC602I VTOC NOT CONVERTED ON uuuu,volser, 0, (EXTENT=CCHHCCH,DSCB=CCCCHHHRR-CCCCHHHRR)
```

Take a DEVMAN SVC dump of the current indexed VTOC. For example:

```
DUMP TITLE=VTOC VALIDATION,VOLSER=volser, REASON=IEC6xxx,ERROR= errormessage-text
```

REASON=IEC6xxx will be REASON=IEC618I, REASON= IEC618E, or REASON= IEC602I.

The *error-message-text* will be one of the following reasons:

- ORPHAN FMT3 CHAIN
- ORPHAN FMT-3 DSCB
- INCORRECT EXTENTS IN DSCB
- ORPHAN F3 W/ INVALID DSCB
- F3/F9 IS MULTIPLY POINTED
- INCORRECT F3s COUNT IN F9
- OTHER VTOC ERRORS

If orphan Format-3 DSCB is the only type of errors indicated by ORPHAN FMT-3 DSCB in IEC618I, and if RETRY(STAT011) is activated in the system, the system will retry the allocation to use up one or at most two orphan Format-3 DSCB. It will not disable the index if the allocation is successful. If RETRY(STAT011) is not activated, the system will not retry to use up the orphan Format-3 DSCB. However, any VTOC failure will disable the VTOC index because STAT011_PRESERVE_INDEX=NO is used.

In addition to detecting the orphan Format-3 DSCBs (only 'ORPHAN FMT3 CHAIN' in IEC618I message) condition, if another VTOC error is detected as shown in IEC618E or IEC602I with a different reason text, the VTOC index will be disabled, and the system will call the CONVERT routine to convert to non-indexed VTOC(aka.OSVTOC).

An IEC608I message with reason code 24 is issued.

```
EC608I DADSM FUNCTION DISABLED THE VTOC devn,volser, 24, CCHHR
```

Issue an IEC604I message before converting the disabled-index VTOC to non-indexed VTOC(OSVTOC) device.

```
IEC604I VTOC CONVERT ROUTINE ENTERED ON devn,volser, DI-0,DEVMAN
```

The CONVERT(IGG0425P) routine will attempt to reclaim the orphan DSCBs, and fix any space errors if possible.

The system will restart the allocation one more time on the non-indexed VTOC device.

Tip: After the disabled indexed VTOC is converted to OSVTOC, performance might be affected by a large VTOC or the increasing number data sets over time. If that is the case, use the ICKDSF program to convert the VTOC back to an indexed VTOC with the ICKDSF BUILDIX command. For example:

```
BUILDIX DDNAME(DDVOL) IX
```

If the keyword is not specified, no message is logged.

Default: NO

RETRY(STAT011)

If the keyword is activated, DADSM allocation will perform the following actions:

1. Detect the failure with the IEC608I message followed by an SVC DADSM dump with diagnostic codes 0820040B, 0853040B, 0854040B, or 0855040B. They are the result of CVF setting status x0B(STAT011).
2. Take a DEVMAN SVC dump of the disabled-index VTOC and issue the IEC608I message with reason code 24.

```
IEC608I DADSM FUNCTION DISABLED THE VTOC devn,volser, 24,CCHHR
```

3. Issue the IEC604I message before converting the disabled-index VTOC to non-indexed VTOC(OSVTOC) device. For example:

```
IEC604I VTOC CONVERT ROUTINE ENTERED ON devn,volser, DI-0,DEVMAN
```

4. Restart the allocation one more time on the non-indexed VTOC device. Notice that the disabled indexed VTOC has been converted to OSVTOC. The performance may affect slightly if the number data sets is increased significantly over time. If that is the case, use ICKDSF program to convert the VTOC back to an indexed VTOC with the ICKDSF BUILDIX command:

```
BUILDIX DDNAME(DDVOL) IX
```

Refer to the STAT011_PRESERVE_INDEX keyword to see how the system behaves when the RETRY(STAT011) keyword is used with STAT011_PRESERVE_INDEX keyword.

The following two tables provide a summary of how these two keywords are combined together in the system.

Table 1. Without the *RETRY(STAT011)* *DEVSUP* keyword

STAT011_PRESERVE_INDEX=NO	STAT011_PRESERVE_INDEX=YES
<p>This is existing behavior without this fix. It is also the default behavior similar to prior releases.</p> <ol style="list-style-type: none"> 1. Will not detect orphan DSCBs and will not validate VTOC during the time of the failure. 2. Takes an SVC dump of the VTOC with the IEC608I message. This is a SVC dump, not a DEVMAN dump like specified in the other quadrants. The SVC dump is accompanied with DIAG=0820040B, 0853040B, 0854040B, or 0855040B. It is the result of CVAF setting status x0B(STAT011) when it uses an orphan Format-3 DSCB as a free Format-0 DSCB. 3. The VTOC index is disabled and the job fails. 4. The next access or allocation to the VTOC will cause VTOC convert routine to be entered and reclaimed the orphan DSCBs. 5. An ICKDSF job must be executed by a system administrator with the option to convert back to indexed VTOC. 	<ol style="list-style-type: none"> 1. Detects orphan DSCBs and validates VTOC. This message is issued: <div data-bbox="873 300 1373 352" data-label="Text"> <pre>IEC604I VTOC VALIDATE ENTERED ON DEVICE xxxx,volser,----,DEVMAN</pre> </div> <p>Message IEC618_ is displayed for any errors about the DSCBs. If there are other VTOC errors, the IEC602I message may be issued.</p> <div data-bbox="873 478 1437 531" data-label="Text"> <pre>IEC618I ORPHAN FMT-3 DSCB,DEV=uuuu,volser,yy (DSCBNO=xxxxxxxx,DSCB=cccchhhrr)</pre> </div> <div data-bbox="873 569 1446 621" data-label="Text"> <pre>IEC618E ORPHAN FMT3 CHAIN,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx,DSCB=cccchhhrr)</pre> </div> <div data-bbox="873 659 1448 711" data-label="Text"> <pre>IEC618E INCORRECT EXTENTS IN DSCB=cccchhhrr,DSN=Up to 44-byte datasetname</pre> </div> <div data-bbox="873 749 1437 802" data-label="Text"> <pre>IEC618E Fn=cccchhhrr IS MULTIPLY POINTED BY MORE THAN ONE Fm DSCB</pre> </div> <div data-bbox="873 840 1424 892" data-label="Text"> <pre>IEC618E INCORRECT F3s COUNT IN F9=cccchhhrr,DSN=Up to 44-byte datasetname</pre> </div> <div data-bbox="873 930 1432 982" data-label="Text"> <pre>IEC602I VTOC NOT CONVERTED ON uuuu,volser,0, (EXTENT=CCHHCCHH,DSCB=CCCCHHHRR-CCCCHHHRR)</pre> </div> 2. Take DEVMAN DUMP:DUMP TITLE=VTOC VALIDATION,VOLSER=volser,REASON=IEC6xxx,ERROR= error-message-text. <p>The IEC6xxI reason will be IEC618I, IEC618E, or IEC602I.</p> <p>The error-message-text will be one of the following reasons:</p> <pre>ORPHAN FMT3 CHAIN ORPHAN FMT-3 DSCB INCORRECT EXTENTS IN DSCB ORPHAN F3 W/ INVALID DSCB F3/F9 IS MULTIPLY SUPPORTED INCORRECT F3s COUNT IN F9 OTHER VTOC ERRORS</pre> 3. Will fail because it's not attempting to retry on orphan DSCBs because the keyword <i>RETRY(STAT011)</i> is not used. Since the VTOC index is to be preserved, the VTOC convert routine will not be entered to clean up orphan DSCBs. 4. An ICKDSF job needs to be executed by a system administrator with REFVTOC option to clean the orphan DSCBs.

Table 2. With the RETRY(STAT011) DEVSUP keyword

STAT011_PRESERVE_INDEX=NO	STAT011_PRESERVE_INDEX=YES
<p>1. Detect orphan DSCBs and validate VTOC.</p> <p>Issue these messages:</p> <pre>IEC604I VTOC VALIDATE ENTERED ON DEVICE xxxx,volser,----,DEVMAN</pre> <p>Message IEC618_ is displayed for any errors about the DSCBs. If there are other VTOC errors, the IEC602I message may be issued.</p> <pre>IEC618I ORPHAN FMT-3 DSCB,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx,DSCB=cccchhhrr)</pre> <pre>IEC618E ORPHAN FMT3 CHAIN,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx,DSCB=cccchhhrr)</pre> <pre>IEC618E INCORRECT EXTENTS IN DSCB=cccchhhrr,DSN=Up to 44-byte datasetname</pre> <pre>IEC618E Fn=cccchhhrr IS MULTIPLY POINTED BY MORE THAN ONE Fm DSCB</pre> <pre>IEC618E INCORRECT F3s COUNT IN F9=cccchhhrr,DSN=Up to 44-byte datasetname</pre> <pre>IEC602I VTOC NOT CONVERTED ON uuuu,volser,0, (EXTENT=CCHHCCHH,DSCB=CCCCHHHRR-CCCCHHHRR)</pre> <p>2. Take DEVMAN DUMP: DUMP TITLE=VTOC.</p> <pre>VALIDATION,VOLSER=volser,REASON=IEC6xxx,ERROR =error-message-text</pre> <p>The IEC6xxI reason will be IEC618I, IEC618E, or IEC602I.</p> <p>The <i>error-message-text</i> will be one of the following reasons:</p> <ul style="list-style-type: none"> ORPHAN FMT3 CHAIN ORPHAN FMT-3 DSCB INCORRECT EXTENTS IN DSCB ORPHAN F3 W/ INVALID DSCB F3/F9 IS MULTIPLY SUPPORTED INCORRECT F3s COUNT IN F9 OTHER VTOC ERRORS <p>3. Will retry on the orphan DSCB because the keyword RETRY(STAT011) is used.</p> <p>If orphan Format-3 DSCB is the only type of error indicated by ORPHAN FMT-3 DSCB in IEC618I, the system will retry the allocation to use up one or at most two orphan format-3 DSCBs, and will disable the VTOC index because STAT011_PRESERVE_INDEX=NO. If the retry fails, it will disable index and convert to OSVTOC to retry allocation once more. It will reclaim the orphan DSCBs.</p>	<p>1. Detect orphan DSCBs and validate VTOC. This message is issued:</p> <pre>IEC604I VTOC VALIDATE ENTERED ON DEVICE xxxx,volser,----,DEVMAN</pre> <p>Message IEC618_ is displayed for any errors about the DSCBs. If there are other VTOC errors, the IEC602I message may be issued.</p> <pre>IEC618I ORPHAN FMT-3 DSCB,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx,DSCB=cccchhhrr)</pre> <pre>IEC618E ORPHAN FMT3 CHAIN,DEV=uuuu,volser,yy, (DSCBNO=xxxxxxxx,DSCB=cccchhhrr)</pre> <pre>IEC618E INCORRECT EXTENTS IN DSCB=cccchhhrr,DSN=Up to 44-byte datasetname</pre> <pre>IEC618E Fn=cccchhhrr IS MULTIPLY POINTED BY MORE THAN ONE Fm DSCB</pre> <pre>IEC618E INCORRECT F3s COUNT IN F9=cccchhhrr,DSN=Up to 44-byte datasetname</pre> <pre>IEC602I VTOC NOT CONVERTED ON uuuu,volser,0, (EXTENT=CCHHCCHH,DSCB=CCCCHHHRR-CCCCHHHRR)</pre> <p>2. Take DEVMAN DUMP: DUMP TITLE=VTOC</p> <pre>VALIDATION,VOLSER=volser,REASON=IEC6xxx,ERROR =error-message-text</pre> <p>The <i>error-message-text</i> will be one of the following reasons:</p> <ul style="list-style-type: none"> ORPHAN FMT3 CHAIN ORPHAN FMT-3 DSCB INCORRECT EXTENTS IN DSCB ORPHAN F3 W/ INVALID DSCB F3/F0 IS MULTIPLY POINTED INCORRECT F3s COUNT IN F9 OTHER VTOC ERRORS <p>3. Will retry on the orphan DSCB because the keyword RETRY(STAT011) is used.</p> <p>If orphan Format-3 DSCB is the only type of error indicated by ORPHAN FMT-3 DSCB in IEC618I, and since RETRY(STAT011) is used, the system will retry the allocation to use up one or at most two orphan format-3 DSCB, and will not disable the VTOC index because STAT011_PRESERVE_INDEX=YES. If the retry fails, it will not disable index and will not convert to OSVTOC to retry to reclaim the orphans.</p> <p>4. An ICKDSF job needs to be executed by a system administrator with REFVTOC option to clean the orphan DSCBs.</p>

TAPEAUTHDSN=

NO

Indicates that OPEN processing to issue RACROUTEs based on the options set in RACF® such as SETROPTS TAPEDSN and SETROPTS CLASSACT(TAPEVOL).

YES

Enables tape authorization checks in the DATASET class but without DSTYPE=T. All tape data set names created are RACF-protected.

DSTYPE=T indicates to RACF that the check is for data set on a tape volume and that special RACF tape data set and a tape volume processing is to be performed. Without DSTYPE=T RACF authorization checking considers only profiles in the DATASET class.

The system uses the data set name that is specified in the allocation or JCL to check your authorization to read or write the specified file.

In addition, the system determines the RACF erase-on-scratch setting from the RACF profile and passes it to your tape management system.

Use this option only when you have a tape management system, such as DFSMSrmm, installed and actively checking that the 44 character data set name that is specified by the user matches the data set name on tape. Without a tape management system, tape data set open processing can only validate the last 17 characters of the data set name against the tape volume labels.

When you request bypass label processing (BLP) and the mounted volume uses standard labels, OPEN issues the authorization check that the user is authorized to use BLP. This processing uses the existing ICHBLP resource in the RACF FACILITY class. When you specify TAPEAUTHDSN=YES only, it replaces the check that RACF makes as part of tape volume authorization checking.

Default: NO**TAPEAUTHF1=****NO**

Disables additional tape authorization checks in the DATASET class for existing files on the same tape volume when any other file on the tape volume is opened. The default value is NO.

YES

Enables additional tape authorization checks in the DATASET class for existing files on the same tape volume when any other file on the tape volume is opened. This function depends on the tape management system returning the 44 character data set name and data set sequence number to OPEN/EOV through the IFGTEP during the Volume Mount exit Volume Security function; if no data set name is returned by the tape management system, processing is as if this keyword had not been specified.

Although intended to enable an additional authorization check for the first data set when any other data set on the tape volume is opened, the implementation allows your tape management system to request one or more additional authorization checks when any data set on a tape volume is opened. Each additional data set name and data set sequence number returned results in an additional RACROUTE. Do not use this function unless you have a tape management system and it can return a data set name and data set sequence number. A data set sequence number is the label number that is normally specified in the JCL LABEL keyword and stored in the catalog.

When TAPEAUTHDSN=YES is in use, any additional RACROUTE matches that issued for TAPEAUTHDSN except for the data set name and data set sequence number. Otherwise, TAPEAUTHF1 uses a RACROUTE that matches that used for SETROPTS TAPEDSN. When neither TAPEAUTHDSN nor SETROPTS TAPEDSN is in use, TAPEAUTHF1 support is not provided.

TAPEAUTHRC4=

This applies to authorization checks in the DATASET class, and applies only to the results of TAPEAUTHDSN=YES and TAPEAUTHF1=YES processing.

ALLOW

Allows accessing of data sets that are not protected by a security profile. RC4 refers to the return code value of 4 returned from SAF as a result of the RACROUTE issued by OPEN/CLOSE/EOV. A return code of 4 in general means that the resource is not protected.

FAIL

Denies accessing of data sets that are not protected by a security profile. TAPEAUTHRC4=FAIL and TAPEAUTHDSN=YES together ensure that all tape data set names created including temporary names that are generated by the tape system are RACF-protected.

Default: FAIL

Use this keyword to control PROTECTALL processing for tape data sets. This applies to the results of RACROUTE processing when both TAPEAUTHDSN=YES and when TAPEAUTHF1=YES are specified.

TAPEAUTHRC8=

Provides a managed and controlled implementation of tape authorization checks in the DATASET class, and applies only to the results of TAPEAUTHDSN=YES and TAPEAUTHF1=YES processing. This keyword is provided as an aid to the implementation of TAPEAUTHDSN and TAPEAUTHF1.

FAIL

Denies accessing of data sets that typically cannot be accessed.

WARN

Allows accessing of data sets that typically cannot be accessed. RACF issues an ICH408I message to indicate why access is not allowed; however OPEN/EOV allows access.

Default: FAIL

TAPEBLKSZLIM=

Specifies the default block size limit for the system to use when a user omits the block size limit on a DD statement for a tape data set and the data class does not supply one. The system stores this value in the DFA (data facilities area), for use by the system and by application programs. See [*z/OS DFSMSdfp Advanced Services*](#). The system uses this value only in cases when all of the following statements are true.

- An application program uses the large block interface (LBI) of BSAM or QSAM to open a tape data set for output without DISP=MOD. Check the information for the program; if its maximum block size is 32760 or less, or it cannot write to tape, the program probably does not use the LBI.
- The BLKSIZE (block size) value is omitted from all sources.
- The DD statement or dynamic allocation equivalent and the data class do not specify a BLKSZLIM value.

Restriction: DFSMSdss only supports BLKSZLIM of 65,520 and larger.

An application program that uses EXCP can take this value from the DFA.

If you code K, M, or G at the end of the number, the system multiplies the number by 1024, 1,048,576 or 1,073,741,824 respectively. The minimum values are 32760 when specified in bytes, 32 K when specified in kilobytes, 1 M when specified in megabytes, and 1G when specified in gigabytes. The maximum values are 2147483648, 2097152 K, 2048 M, and 2 G. These maximum block size values are much larger than the system supports for BLKSIZE. However, coding a large value allows the system to choose the largest optimal block size for the device.

The default for this parameter is 32760. Do not code a value that exceeds 32760 in DEVSUPxx if both of the following statements are true:

- Your system has a job that writes on tape using the large block interface and the job does not supply a value for BLKSIZE or BLKSZLIM. Programs that use the large block interface include IEBGENER, ICEGENER, DFSORT, and programs that are compiled with COBOL for OS/390® and VM Version 2 Release 2.
- The tapes with a large block size might be read on a level of MVS that precedes OS/390 Version 2 Release 10 or might be read on another type of system that does not support such large blocks. OS/400® supports large blocks.

TAPE_MULTI_VOLUME_ANOMALY=

Specifies how the system handles any multivolume tape label anomaly condition that is not yet resolved after the Label Anomaly exit is called. This keyword is processed at IPL time, but can be changed by the operator using SET DEVSUP=xx.

If the Label Anomaly exit sets return code 12, it is honored and in all cases it fails the request, overriding the DEVSUPxx setting.

ALLOW

Use this setting to allow applications to process multi-volume tape data sets even when the volume set is incomplete or in the wrong sequence.

FAIL

Use this setting to prevent applications from processing multi-volume tape data sets when the volume set is incomplete or in the wrong sequence.

Default: ALLOW.

When a request is failed, either by the Label Anomaly exit return code 12, or by the FAIL option, the System Completion Codes are: 413-58 (OPEN RDBK), 413-5C (OPEN FIRST), 637-B4 (EOV OUTSEQ), and 637-B8 (EOV LAST).

DFSMSrmm attempts to recover from errors that are noted in the label anomaly exit using the volume sequence information that is recorded in the DFSMSrmm control data set (CDS). Based on information that is returned by DFSMSrmm, OPEN, and EOV processing attempts to resolve the error by updating the volume list in the job file control block (JFCB) and any JFCB extensions.

Tape users can bypass the system multivolume tape label anomaly processing by specifying OPTCD=B in the JCL. For more information about the considerations using OPTCD=B, see the topic [Determining volume switch](#) in these references:

- [z/OS DFSMS Using Magnetic Tapes](#)
- [z/OS MVS JCL User's Guide](#)
- [z/OS MVS JCL Reference](#)

The tape application can optionally recover from a tape label anomaly failure by providing a DCB abend exit for the applications' DCB. When the application DCB abend exit requests recovery, the missing or out of sequence volume condition is ignored.

VOLNSNS=

NO

Specifies that tape cartridges written at track capacities that the drive is not capable of reading (for example, a 36-track cartridge on a D/T3480, or a 256-track cartridge on a D/T3590 Model B1x), are not allowed to be relabeled. Attempts to relabel the cartridges are rejected when RACF protection for tape volumes is active. If no installation default for the VOLID facility VOLNSNS is provided by using the DEVSUPxx member, the system assumes VOLNSNS=NO.

YES

Specifies that tape cartridges written at track capacities that the drive is not capable of reading. For example, it specifies that a 36-track cartridge on a D/T3480 or a 256-track cartridge on a D/T3590 Model B1x is to be relabeled at the device-capable track capacity by the OPEN or EOV label editor routines. This relabel editor option is permitted only if the user is RACF-authorized to the volume. The volume serial number that is passed to RACF is obtained from the VOLID mark that is written on the cartridge by the device and placed in the sense data.

MVS system commands and RPFC for XRC

To support RPFC for XRC, new DEVSUP(FLASHCOPYTOXRC) keywords were added to the MODIFY DEVNAME command, and a new FLASHCOPYTOXRC keyword was added to the MODIFY DEVMAN,ENABLE and MODIFY DEVMAN,DISABLE commands.

Communicating with the device manager address space

Use the MODIFY DEVMAN command to communicate with the device manager address space to display information or to request a specified service.

Restriction: Use this command only at the direction of the system programmer.

Notes:

DEVMAN RACF Requirements

The DEVMAN started task needs to have a protected USERID assigned to it.

Steps to define a protected USERID to DEVMAN:

1. Define a protected user ID for the DEVMAN started task if one is not already established. A protected user ID cannot be used to enter the system by any method that uses a supplied password.

The attributes NOPASSWORD and NOPHRASE for the ADDUSER/ALTUSER-constitute the PROTECTED attribute. For example:

```
ADDUSER userid NOPASSWORD NOPHRASE DFLTGRP(SYS1) OWNER(M16)
```

2. Define a profile for DEVMAN in the RACF STARTED class. Assign the user ID from Step 1 to the DEVMAN procedure in the STARTED class. For example:

```
RDEFINE STARTED DEVMAN.* STDATA(USER(userid) GROUP(SYS1)) OWNER(M16SPEC)
```

For more information, see "Defining protected user IDs" in [z/OS Security Server RACF Security Administrator's Guide](#).

DEVMAN parameters require communication with ICKDSF. Currently, only the REFVTOC parameter has this requirement.

During startup of the DEVMAN address space, the ICKDSF program is loaded by DEVMAN. If you are using RACF or another security product to control the use of the ICKDSF program, then the USERID associated with the DEVMAN address space must have READ access to use the ICKDSF program. Otherwise, a security violation will occur when the DEVMAN address space is started.

Steps to take if ICKDSF is Program Controlled when using RACF:

1. Permit the user ID for the DEVMAN started task to call ICKDSF by allowing read access to ICKDSF in the PROGRAM class. For example:

```
PERMIT ICKDSF CLASS(PROGRAM) ID(userid) ACCESS(READ)
```

2. Refresh the storage RACF profiles by using the command:

```
SETR WHEN(PROGRAM) REFRESH
```

3. Refresh the STARTED profiles, if necessary, using the command:

```
SETR RACLIST(STARTED) REFRESH
```

If you are using RACF or another security product to control specific ICKDSF commands, then profiles must be created for either the specific commands or for a generic profile. For example:

```
STGADMIN.ICK.REFORMAT or STGADMIN.ICK.**
```

The USERID associated with the DEVMAN address space must then have read access to the security product profile(s) that protect the ICKDSF command(s), otherwise a security violation will occur when DEVMAN attempts to invoke the ICKDSF command. The specific ICKDSF commands that are used by DEVMAN are REFORMAT and INIT.

Steps to take if ICKDSF functions (REFORMAT or INIT) are protected when using RACF:

1. If the DEVMAN REFVTOC function is enabled and you have a security profile controlling this ICKDSF REFORMAT function, permit the userid associated with the DEVMAN address space read access to this profile. For example, if a generic security profile is used:

```
PERMIT STGADMIN.ICK.** CLASS(FACILITY) ID(userid) ACCESS(READ)
```

and if a discrete security profile is used:

```
PERMIT STGADMIN.ICK.REFORMAT CLASS(FACILITY) ID(userid)ACCESS(READ)
```

2. If you are using the z/OS Management Facility (z/OSMF) interface for storage management and have a security profile controlling the ICKDSF INIT function, permit the userid associated with the DEVMAN address space read access to this profile. For example, if a generic security profile is used:

```
PERMIT STGADMIN.ICK.** CLASS(FACILITY) ID(userid)ACCESS(READ)
```

and if a discrete security profile is used:

```
PERMIT STGADMIN.ICK.INIT CLASS(FACILITY) ID(userid)ACCESS(READ)
```

For information about using program control to restrict access to programs such as ICKDSF, see [z/OS Security Server RACF Security Administrator's Guide](#).

For more information about using RACF commands to set up the security definitions, see [z/OS Security Server RACF Command Language Reference](#).

```
F DEVMAN,{DUMP}  
    {REPORT}  
    {RESTART}  
    {END(taskid)}  
    {ENABLE(feature)}  
    {DISABLE(feature)}  
    {TRAPON (feature)}  
    {TRAPOFF (feature)}  
    {DEVSUP(FLASHCOPYTOXRC)}  
    {?|HELP}
```

The following are brief descriptions of the parameters.

DUMP

Captures a diagnostic dump of the device manager address space, including the dataspace that contains device manager CTRACE records.

Note: The device manager CTRACE component name is SYSDMO. To connect the device manager to an output writer, use the command TRACE CT,ON,COMP=SYSDMO.

REPORT

Provides basic information about the current activity and module levels for the device manager address space.

When you issue DEVMAN,REPORT, the VTOC_USE_ZHPF option is displayed if zHPF was enabled in one of those two ways:

- By specifying ENABLE(VTOC_USE_ZHPF) in the DEVSUPxx parmlib member.
- By specifying F DEVMAN,ENABLE(VTOC_USE_ZHPF).

If VTOC_USE_ZHPF is disabled, the report does not show 'VTOC_USE_ZHPF'.

Notes:

1. If Easy-Tier Copy Temperature function for software defined storage is enabled by setting EASYTIERHINTS=YES in the DEVSUPxx member of PARMLIB, the output of the F DEVMAN,REPORT command displays the EASY-TIER FOR SOFTWARE DEFINED STORAGE status.

If Easy-Tier Copy Temperature function for software defined storage is disabled by issuing the SET DEVSUP=xx command with EASYTIERHINTS=NO in the DEVSUPxx member of PARMLIB, the EASY-TIER FOR SOFTWARE DEFINED STORAGE status does not appear in the output of the F DEVMAN,REPORT command.

If the TCT compression function is enabled, the output of the FDEVMAN,REPORT command displays the TCTCOMPRESSION status. If the TCT compression function is disabled, the

TCTCOMPRESSION status does not appear in the output of the FDEVMAN,REPORT command. The TCT compression function is enabled and disabled in one of two ways:

- By specifying ENABLE/DISABLE(TCTCOMPRESSION) in the DEVSUPxx parmlib member
- By specifying F DEVMAN,ENABLE/DISABLE(TCTCOMPRESSION)

For an example of the output of the F DEVMAN,REPORT command, see Example 5 under “Examples” on page 29. For more information about the EASYTIERHINTS keyword, see [z/OS MVS Initialization and Tuning Reference](#).

2. If Easy-Tier Copy Temperature function for software defined storage is enabled by setting EASYTIERHINTS=YES in the DEVSUPxx member of PARMLIB, the output of the F DEVMAN,REPORT command displays the EASY-TIER FOR SOFTWARE DEFINED STORAGE status.

If Easy-Tier Copy Temperature function for software defined storage is disabled by issuing the SETDEVSUP=xx command with EASYTIERHINTS=NO in the DEVSUPxx member of PARMLIB, the EASY-TIER FOR SOFTWARE DEFINED STORAGE status does not appear in the output of the F DEVMAN,REPORT command.

For an example of the output of the F DEVMAN,REPORT command, see Example 5 under “Examples” on page 29. For more information about the EASYTIERHINTS keyword, see [z/OS MVS Initialization and Tuning Reference](#).

3. If it is acceptable for Global Mirror primary volumes to be marked FlashCopy capable by setting ENABLE(FLASHCOPYTOGM) in the DEVSUPxx member of PARMLIB, the output of the F DEVMAN,REPORT command displays the FLASHCOPYTOGM status.

If it is not acceptable for Global Mirror primary volumes to be marked FlashCopy capable by issuing the SET DEVSUP=xx command without ENABLE(FLASHCOPYTOGM) or DISABLE(FLASHCOPYTOGM) in the DEVSUPxx member of PARMLIB, the FLASHCOPYTOGM status will not appear in the output of the F DEVMAN,REPORT command.

For an example of the output of the F DEVMAN,REPORT command, see Example 6 under “Examples” on page 29. For more information about the FLASHCOPYTOGM keyword, see [z/OS MVS Initialization and Tuning Reference](#).

RESTART

Terminates the device manager address space and restarts the device manager in a new address space. The system allows any subtasks that are active in the device manager address space at the time of the restart to finish processing. The time that is allowed for subtask completion is determined by using the average time that is taken by previous subtasks. The system abnormally ends any subtasks that do not complete in time before it restarts the address space.

Notes:

1. Use RESTART to avoid IPL when you install software. You can install most device manager APARs by refreshing LLA (F LLA,REFRESH), and then restarting the device manager (F DEVMAN,RESTART).
2. You can end and not restart the device manager address space by using the CANCEL DEVMAN command. When you end the address space in this way, you must restart the device manager with the DEVMAN cataloged procedure.

END(taskid)

Terminates the subtask that is identified by *taskid*. The F DEVMAN,REPORT command displays the *taskid* for a subtask.

ENABLE(feature)

Enables an optional feature. The supported features are named as follows:

DATRACE

Capture dynamic allocation diagnostic messages.

FLASHCOPYTOGM

Enables the FlashCopy to Global Mirror support which means it is acceptable for Global Mirror primary volumes to be marked FlashCopy capable.

FLASHCOPYTOXRC

Enables Remote Pair FlashCopy in an XRC environment. For more information, see:

- The description of the FCTOXRCPPRIMARY keyword in [COPY FULL](#) and [COPY TRACKS](#) in [z/OS DFSMSdss Storage Administration](#)
- The description of the ALLOWXRCP keyword in [FRRECOV](#) command in [z/OS DFSMSHsm Storage Administration](#)

PPRCSUM

Enables the PPRCSUM feature of the Device Manager, which means using message IEA075I instead of IEA494I to report devices that transition to PPRC suspended state. The PPRCSUM feature significantly reduces the volume of messages that are written to the console when devices in a PPRC relationship are suspended due to a PPRC freeze. If you enable PPRCSUM, the system issues one or more IEA075I messages to summarize the PPRC state for all devices in the control unit.



Attention: If GDPS or other PPRC monitoring software is active, make sure that you have the appropriate version of this software before enabling PPRCSUM.

If the PPRCSUM feature is enabled or disabled after IPL, one device in every control unit must be varied online to activate the feature.

QUERYFC:num

Enables Query FlashCopy Capability (QUERYFC) with the specified number *num* (1 - 9999) of requests. The *num* variable represents a UNIT of work for requests that are issued at any given time when an ADRDSSU COPY command is invoked. A conservative value for UNIT is 64, which is specified by the F DEVMAN,ENABLE(QUERYFC:64) command, indicating that 64 QUERYFC channel programs are issued in parallel. When the first 64 complete, another set of 64 QUERYFC channel programs are added, and the sequence repeats until all volumes in the Storage Group are queried.

When QUERYFC is enabled, the F DEVMAN,REPORT command verifies that the UNIT value is specified correctly by using the *num* parameter. The command also reports the maximum number of observed QUERYFC requests. If many tasks are running in parallel, a large number of QUERYFC requests is typical.

REFUCB

Enables the automatic REFUCB function of the Device Manager. When the REFUCB feature is enabled the system automatically updates the UCB when device support software detects that a DSS COPY or RESTORE or ICKDSF REFORMAT NEWVTOC operation has changed either the volser or the VTOC location. In the case of a volser or VTOC location change, the system invokes the DEVMAN REFUCB service on each system in the sysplex that has REFUCB enabled.

- If the device is ONLINE, REFUCB issues a VARY ONLINE,UNCONDITIONAL command, which updates both the volser and VTOC location in the UCB.
- If the device is OFFLINE, no action is taken.

REFVTOC

Use ICKDSF to automatically REFORMAT/REFVTOC a volume when it expands.

VTOCPROT

Enhanced protection and diagnostics for EXCP format writes to the VTOC.

VTOC_USE_ZHPF

Enables the system to read or write VTOC DSCB records, using zHPF when it is available. You must have already enabled zHPF by specifying ZHPF=YES on the ZHPF statement in the IECIOSxx parmlib member or by using the SETIOS command.

TCTCOMPRESSION

Transparent cloud tiering compression.

DISABLE(feature)

Disables one of the following optional features:

- DATRACE

- FLASHCOPYTOGM

Disables the FlashCopy to Global Mirror support which means it is not acceptable for Global Mirror primary volumes to be marked FlashCopy capable.

- FLASHCOPYTOXRC

- PPRCSUM

When PPRCSUM feature is disabled, the system issues a PPRC suspend notification message (IEA494I) for each individual device in the control unit.

If the PPRCSUM feature is enabled or disabled after IPL, one device in every control unit must be varied online to activate the feature.

- QUERYFC

Disables QUERYFC, which allows all Query FlashCopy Capability (QUERYFC) requests to be issued simultaneously. This is the default, which does not limit users to a fixed number of requests. For example, the F DEVMAN,DISABLE(QUERYFC) command does not limit the number of QUERYFC requests, allowing all requests to go to the controller simultaneously.

- REFUCB

- REFVTOC

- VTOCPROT

Enhanced protection and diagnostics for EXCP format writes to the VTOC.

- VTOC_USE_ZHPF

Prevents the system from using zHPF to access the VTOC.

- TCTCOMPRESSION

Disables transparent cloud tiering compression.

TRAPON(feature)

Enables an optional feature. The supported features are named as follows:

STOPEXTENTCONSOLIDATION

Disable DADSM EXTEND processing to combine extents if the new extents are contiguous to the last extent. This message is issued:

```
DM00012I  DEVICE  MANAGER  TRAPON(STOPEXTENTCONSOLIDATION)  COMPLETE
```

TRAPOFF(feature)

Enables an optional feature. The supported features are named as follows:

STOPEXTENTCONSOLIDATION

Enable DADSM EXTEND processing to combine extents if the new extents are contiguous to the last extent. This is the default option. This message is issued:

```
DM00012I  DEVICE  MANAGER  TRAPOFF(STOPEXTENTCONSOLIDATION)  COMPLETE
```

Note: DEVMAN report does not display the current status as these options are not recommended by IBM as the default option optimizes storage usage.

DEVSUP(FLASHCOPYTOXRC)

Restores the state of the FLASHCOPYTOXRC function to that set by the previous SET DEVSUP command.

HELP|?

Displays the DEVMAN MODIFY command syntax.

TCTCOMPRESSION

Transparent cloud tiering compression.

Examples

Example 1:

The DEVMAN REPORT display has the following format:

```
FMID: HDZ1A10
APARS: NONE
OPTIONS: REFVTOC
SUBTASKS:
JOBNAME  STARTED  SERVICE  UNIT  STATUS  ID
-----
DEVMAN   15.42.32  REFVTOC  3700  SUBTASK RUNNING  0001
```

Where:

FMID

Displays the FMID level of DEVMAN.

APARS

Displays any DEVMAN APARS that are installed (or the word NONE).

OPTIONS

Displays the currently enabled options (in the example, REFVTOC is enabled).

SUBTASKS

Lists the status of any subtasks that are currently executing.

Example 2:

The MODIFY DEVMAN,HELP command displays the DEVMAN MODIFY syntax, as follows:

```
?|HELP      - display devman modify command parameters
REPORT      - display devman options and subtasks
RESTART     - quiesce and restart devman in a new address space
DUMP        - obtain a dump of the devman address space
END(taskid) - terminate subtask identified by taskid
DSFTRACE((TP01))- define ICKDSF trace point(s) ((TP01)(TP02)(etc))
ENABLE(feature) - enable an optional feature
DISABLE(feature) - disable an optional feature
TRAPON(feature) - disable an optional feature
TRAPOFF(feature) - enable an optional feature
-----
Optional features:
REFVTOC      - automatic VTOC rebuild
REFUCB       - allow UCB update after DSS volume restore
PPRCSUM      - DASD summary message support DATRACE
              - dynamic allocation diagnostic trace
QUERYFC:num  - enable QUERYFC with num(1-9999) requests
QUERYFC      - disable QUERYFC to allow all QUERYFC requests
VTOCPROT     - enhance VTOC protection and diagnostics
VTOC_USE_ZHPF - use zHPF for VTOC I/O
TCTCOMPRESSION - transparent cloud tiering compression
```

Example 3:

The F DEVMAN,ENABLE(QUERYFC:64) command displays the following example text:

```
DM00012I  DEVICE MANAGER ENABLE QUERYFC(64)
f devman,report
**** DEVMAN ****
* FMID: HDZ1D10 *
* APARS: OA39569 UA63192 *
* OPTIONS: *
* QUERYFC : UNIT = 0064 TOTAL = 0000 *
* NO SUBTASKS ARE ACTIVE *
**** DEVMAN ****
```

Example 4:

When Multiple Incremental FlashCopy is enabled, the F DEVMAN,REPORT command displays the following example text:

```
**** DEVMAN ****
* FMID: HDZxxx *
```

```

* APARS: AA46256
* OPTIONS: NONE
* HPF FEATURES DISABLED: NONE
* MULTIPLE INCREMENTAL FLASHCOPY: CHANGE RECORDING V2
* NO SUBTASKS ARE ACTIVE
**** DEVMAN *****

```

Note that the **APARS** field displays only DEVMAN APARs or PTFs; it does not display APARs or PTFs that are not in the DEVMAN component.

Example 5:

When Easy-Tier Copy Temperature function for software defined storage is enabled, the F DEVMAN,REPORT command displays the following example text:

```

**** DEVMAN *****
* FMID: HDZxxxx
* APARS: AA45241
* OPTIONS: NONE
* HPF FEATURES DISABLED: NONE
* EASY-TIER FOR SOFTWARE DEFINED STORAGE
* NO SUBTASKS ARE ACTIVE
**** DEVMAN *****

```

Example 6:

When it is acceptable for Global Mirror primary volumes to be marked FlashCopy capable, the F DEVMAN,REPORT command displays the following example text:

```

**** DEVMAN *****
* FMID: HDZxxxx
* APARS: OA57173 UA99244
* OPTIONS: REFVTOC REFUCB SSR
* HPF FEATURES DISABLED: NONE
* MULTIPLE INCREMENTAL FLASHCOPY: CHANGE RECORDING V2
* FLASHCOPYTOGM IS ENABLED
* NO SUBTASKS ARE ACTIVE
**** DEVMAN *****

```

ANTXIN00 parmlib parameters

Use the RemotePairFlashCopy parameter in the ANTXIN00 member of parmlib to indicate whether Remote Pair FlashCopy support should be enabled for the specified XRC session. Changes are also made to SuspendOnLongBusy and XstartQuery.

Parmlib parameters use syntax similar to that of TSO commands. Parameters consist of a category name, parameter names, and values. Table 3 on page 31 provides a list of the possible parmlib parameters, as well as their associated XSET parameter, if applicable. XRC references static (S) parameters only once when the corresponding function is first invoked. XRC references dynamic (D) parameters continually each time the function is executed. The rightmost column lists the tuning tables' offset value that is associated with the parmlib parameter.

You can continue parameters from one line to the next by placing a dash (-) as the last character on the line. You can add comments with the /* */ syntax. The following rules apply to comments:

- Comments cannot span multiple lines. If a comment is longer than a single line, break it into multiple lines that contain an opening /* and a closing */ on each line.
- Comments must be to the left of any continuation sign. The dash that indicates a continuation in the command must be located to the right of any comments for that line.
- You must include a continuation character on the comment line when the comment line is placed in the middle of lines that are being continued.

To determine the current settings for the parmlib parameter values, issue the XQUERY ENVIRONMENT(PARM) command. To find the default values for the parameters, issue the XQUERY ENVIRONMENT(PARM) command to an inactive or undefined session. The values displayed are from the control address space (ANTAS000).

Table 3. ANTGIN00 parmlib parameters

Parmlib parameter	Associated XSET parameter	Ranges/values	Dynamic / Static	Default Value
Category: BITMAP				
ChangedTracks	RTRACKS	0–99999	D	7500
DelayTime	RFREQUENCY	00.00.00, 00.00.30–18.00.00	D	00.30.00
Category: CONTIME				
DefaultSessionID	-	-	D	-
DefaultHlq	-	-	D	SYS1
Category: COUPLING				
DatasetDelay		25–250	D	45
DeadSessionDelay		10–120	D	45
Category: DIAG				
SCDumpType		STATESAV, NDSS	S	STATESAV
TraceTableBufferSize		5-255	S	120
Category: IOTIMING				
InitializationReadWrite		0–255	D	120
MinExtenderRead		0–255	D	55
MinLocalRead		0–255	D	0
MiscHigh		0–255	D	15
MiscLow		0–255	D	2
ShadowRead		0–255	D	10
ShadowWrite		0–255	D	10
ShadowTimeoutPercent		10–90	D	40
Category: MONITOR				
MonitorOutput		ON, OFF	D	OFF
MonitorWakeup		5000–120000	D	10000
Category: NAMES				
Hlq		–	S	SYS1
MHlq		–	S	SYS1
Category: SHADOW				
AllowEnhancedReader		Yes, No	D	No
ConsistencyGroupCombined		1–999	D	5
DeviceBlockingThreshold		0–255	D	20
DfltWritePacingLvl	DVCBLOCK	0-F		0

Table 3. ANTGIN00 parmlib parameters (continued)				
Parmlib parameter	Associated XSET parameter	Ranges/values	Dynamic / Static	Default Value
JournalPriority		251–253	D	251
LowAttention		1–255	S	192
MaxBytesTransferred		0, 60000–9999999	D	512500
MaxTotalReaderTasks		32-80	D	40 if AllowEnhancedReader(NO) 32 if AllowEnhancedReader(YES)
MaxTracksFormatted		0–999	D	0
MaxTracksRead		1–255 Values above 246 are accepted but are equivalent to 246.	D	64
MaxTracksUpdated		0–999	D	0
NoTimeStampCount		0–99999	D	5000
NumberReaderTasks		Tuples containing (SCSN, #tasks) #tasks range is 0-16	D	(*, 0) Use the number of XRCUTL volumes.
PacingReportThreshold		0-255	D	10
PavByteThreshold		60000–9999999	D	512500
PavVolumes		1–9	D	1
ReadDelay		100–5000	S	1000
ReaderPacingLimit		20–65	D	33
ReaderPacingWindow		1–30	D	3
ReadRecordsPriority		251–253	D	252
RemotePairFlashCopy		YES, NO	S	NO
RequireUtility		YES, NO		YES
ResidualLeftToRead		1–500	D	128
ScheduleVerify		YES, NO		NO
StorageControlTimeout	TIMEOUT	00.00.00–18.00.00	D	DEFAULT
SuspendOnLongBusy		YES, NO		YES
UtilityDevice	UTILITY	FLOAT, FIX	D	FIX
VerifyInterval		0–24		24
WriteRecordsPriority		251–253	D	253
WrtPacingResidualCnt		0–255		80

Table 3. ANTGIN00 parmlib parameters (continued)				
Parmlib parameter	Associated XSET parameter	Ranges/values	Dynamic / Static	Default Value
WorkloadWritePacing		DISABLED or 6 values 0-F	Initial S, Change D	None
Category: STARTUP				
ClusterMSession		lists of system name and master session name		DISABLED
ClusterName		lists of system name and cluster session name	D	*
Global		<i>member_name</i>	S	
Hlq		String for high level qualifier (8 bytes max)	S	SYS1
MaxControlTasks		128–233		128
MessageVolumeFormat		VOLSER, DEVNUM or BOTH		VOLSER
MHlq			S	SYS1
OfflineDiscovery		YES, NO	S	NO
Parmlib		XCOPY, SYS1	S	
Session		lists of <i>session_id</i> <i>member_name</i>	S	
SuppressTimestamp		YES, NO	S	NO
XstartQuery		ENVPARM and NONE	S	ENVPARM
zIIPEnable		FULL, YES, NO	D (ANTAS0nn only)	NO
Category: STORAGE				
BuffersPerStorageControl		100 – 999999	D	576
PermanentFixedPages	PAGEFIX	0 - 99999	D	8
ReleaseFixedPages		YES, NO	D	NO
TotalBuffers		100 - 999999	D	25000
IODataAreas		100–9999	D	256
Category: VOLINIT				
EnableRefreshs	REFRESHS	YES, NO	D	NO
InitializationMethod	COPY	FULL, QUICK	D	FULL
InitializationsPerPrimary	SCSYNCH	0–45	D	2

Table 3. ANTGIN00 parmlib parameters (continued)				
Parmlib parameter	Associated XSET parameter	Ranges/values	Dynamic / Static	Default Value
InitializationsPerSecondary	SCSYNCH	0–45	D	2
HaltAnyInit		YES, NO	D	NO
HaltThreshold		0–65535	D	5120
MaxNumberInitializations	SYNCH	0–45	D	4
SelectionAlgorithm	PRIORITY	LOAD, FIFO, SIZE	D	LOAD
TracksPerRead		1–64	D	3
TracksPerWrite		1–15	D	3
SecondaryDeviceRange		comma or space delimited ranges	D	NONE
SecondaryVolserPattern		comma or space delimited patterns	D	NONE

BITMAP

XRC maintains two resynchronization bitmaps for each primary volume in a session, called n and $n-1$. The active bitmap is n , and the inactive bitmap is $n-1$. As an application program writes to a primary track, XRC records the change made by turning on a bit in the n bitmap. Periodically, the two bitmaps are switched in order to reduce the number of tracks that have to be copied in a recovery situation. The following parameters determine when the switching occurs.

ChangedTracks (RTRACKS)

Specifies the number of tracks that must change before the system data mover (SDM) switches the resynchronization bitmaps. You can specify a value from 0 to 99999. XRC does not use the number of changed tracks to determine whether to switch the bitmaps when the following conditions exist:

- The tracks value is set to zero
- The tracks value is set to a value that is greater than the number of tracks on a volume

DelayTime (RFREQUENCY)

Specifies how long the system data mover waits before it switches the resynchronization bitmaps. You can specify the frequency in hours, minutes, and seconds. You can specify a value between 00.00.30 (30 seconds) and 18.00.00 (18 hours). If you set the frequency value to zero (00.00.00), XRC does not use elapsed time to determine whether to switch the bitmaps.

Note:

1. The ChangedTracks and DelayTime parameters control how often the system data mover switches the resynchronization bitmaps. These parameters are triggers for the switch process based on either changed tracks or elapsed time. When the switch process is triggered, both time and track counters are reset. Each volume's bitmap is reset individually and independently of other volumes starting from the time when the volume first started synchronization. This process tends to occur randomly for a number of volumes in any given interval.
2. In general, the defaults that are set for the ChangedTracks and DelayTime parameters work for most configurations. However, there might be benefits in decreasing these parameter values to minimize the amount of data that is transferred after returning from suspension. For instance, you would want to decrease the parameter values if:
 - You are running in an environment with a limited network configuration (and slower synchronization).

- You are running in an environment with a high probability of short outages on the SDM connectivity.
3. When you set the ChangedTracks and DelayTime parameters, ensure that the settings do not refresh the volume bitmaps more than once every 5–10 minutes. For example, if the bitmaps are cleared at one minute intervals, significant subsystem and processor resources are used. Setting a higher value than the default for the ChangedTracks and DelayTime parameters can result in a longer volume resynchronization time. This is because it is likely that more data has changed on the primary volumes. Conversely, setting a lower value for these parameters can put a greater demand on the system data mover MIPS (for software bitmaps) or disk subsystem resources (for hardware bitmaps).
 4. In an extremely large and active configuration, you might consider increasing the ChangedTracks value to a number greater than 7500; otherwise, switching might be performed too frequently. Also, when you are using a majority or mostly 3390-9 devices, the ChangedTracks option is more dominant.
 5. For an extended outage, it is likely that the number of tracks updated during an outage are greater than those in the bitmap at the time of the outage. Therefore, the ChangedTracks and DelayTime parameters have less effect than for short outages. You must consider the expected length of an XRC outage when you evaluate the benefit that is gained from changing these parameter values versus the increased overhead.

CONTIME

This category of parameters is used by the ANTRQST API request of ILK=XRC XCONTIME to provide the session ID and High Level Qualifier values for accessing the dataset containing the session consistency time of volumes used by z/OS System Logger.

Note: If the *session_id* is specified as ANTAS000 in the XSET command, the parmlib values are applied to the ANTAS000 address space and not to a specific session.

DefaultSessionID

Specifies the session id to be used in determining the master recoverable time for an XRC master session, or if a master session is not found, the consistency time for an XRC session through the XCONTIME API request. The session id must be the name specified on the MSESSION parameter of the XCOUPLE ADD request, or the session ID of a session specified on the XSTART command.

If an XRC session is coupled to a master session, specify the master session name to get the master recoverable time for the XRC session. If you specify the session id for a coupled session, the consistency time returned will be the data consistency time of the session if XRECOVER has not been executed against the XRC session.

DefaultHlq

Specifies the high level qualifier to be used in accessing the XRC master data set, or the state data set, to acquire the XRC consistency time through the XCONTIME API request. The hlq must be the hlq specified with the MSESSION parameter of the XCOUPLE ADD request (or default) or the hlq specified on the XSTART (or default) with the indicated session name on the DefaultSessionID parameter.

COUPLING

This category of parameters controls the coupling of multiple XRC sessions.

DatasetDelay

Specifies how often XRC reads from the master data set in a CXRC environment. If the XRC sessions are pacing each other, decrease this value. Based on the update activity level of the system, high-stress environments require a lower value than moderate-stress environments. You can set this value between 25 milliseconds and 250 milliseconds.

DeadSessionDelay

Specifies the time (in seconds) an active XRC session or set of active XRC sessions waits for a nonresponsive session, before suspending a session. This parameter applies to a CXRC environment. You can set a value between 10 and 120 seconds.

Some customers have found that increasing this value prevents a premature suspension of the session if an extended event occurs that can obstruct a single XRC session. If you are generating a dump of the XRC session, set this value to a higher value, such as 90 seconds.

DIAG

This category of parameters is used for diagnostics.

SCDumpType

Specifies the type of storage control dump to be taken for errors that result in state saves. Specify STATESAV for a storage control dump with warmstart (the default). Specify NDSS to request that a non-disruptive state save be taken, if the necessary level of microcode is present on the target controller. This parameter does not affect the STATESAVE Modify commands.

TraceTableBufferSize

Specifies the size, in megabytes, of the trace table buffer for XRC component trace records. IBM recommends a value of 120 or higher. Each XRC session's trace table buffer is triple-buffered, so there must be enough storage to contain 3 times the amount specified in the parameter value for each XRC session.

To change the trace table buffer size for an XRC session, set this parameter in parmlib member ANTGIN00 and restart the ANTAS000 address space. Any subsequent XRC sessions that are started or restarted with an XSTART command are created with trace table buffers of the specified size.

Note: Parameter TraceTableBufferSize is processed only in the ANTGIN00 parmlib member. The parameter is ignored in all other parmlib members.

IOTIMING

Normally, I/O is not timed. If it has not completed in an installation-defined amount of time (the missing interrupt handler (MIH) value), a warning message is issued to the operator console. This message states that a device interrupt might have been missed for the device. MVS periodically issues this message until either the I/O completes or is canceled. Because XRC is designed to monitor time on all of its I/O, it can tell the operating system it must cancel the operation. This occurs if an I/O operation has not completed in a specified amount of time.

The parameters that make up the IOTIMING XRC category control the timeout values for the XRC I/Os. If the XRC session initiates an I/O that fails to complete in the time specified in these fields, the I/Os end with a permanent error. A value of 0 in any of the following fields specifies no timing. If timing is used, the MIH is ignored for XRC I/Os.

InitializationReadWrite

Specifies the timeout values for the functions that read and write tracks during volume initialization. You can specify a value between 0 and 255. A value of 0 means that no timing is used.

MinExtenderRead

Specifies the minimum number of seconds that are used to time the I/O if XRC is reading record sets through channel extenders. You can specify a value between 0 and 255, where 0 indicates that the parameter must not be used. XRC ignores this parameter unless you set ShadowRead to 1.

MinLocalRead

Specifies the minimum number of seconds that are used to time the I/O if XRC is reading record sets locally. You can specify a value between 0 and 255. A value of 0 indicates that the parameter must not be used. XRC ignores this parameter unless you set ShadowRead to 1.

MiscHigh

Specifies the timeout value, in seconds, for volume initialization that performs the read of the hardware bitmap as well as other functions. You can specify a value between 0 and 255, where 0 indicates that the parameter must not be used. You may want to increase this value in a channel extender environment.

MiscLow

Specifies the timeout value, in seconds, for XQUERY I/O, among other things. You can specify a value between 0 and 255, where 0 indicates that the parameter must not be used. In a channel extender environment, increase this value to 10 seconds.

ShadowRead

Controls the read record set I/O time. The default value directs XRC to calculate the appropriate time based on the type of connection and the XSET TIMEOUT value specified. You can specify a value between 0 and 255 for the exact number of seconds to wait for the I/O to complete. If you specify 0, XRC does not use timing. If the value is set to 1, XRC uses the following method to determine the actual timeout value:

1. Find the minimum timeout value of all the storage disk subsystems. (See StorageControlTimeout under the SHADOW parameter.)
2. Find the maximum value from among the calculation from step 1, MinExtenderRead, and MinLocalRead.
3. Multiply the answer from step 2 by the ShadowTimeoutPercent value to get the number of seconds to wait.

If the I/O times out, XRC performs a test to determine if it is experiencing performance impacts—to determine if XRC is running out of data buffers, for example. If the answer is no, the I/O is issued again. If the answer is yes, XRC returns an error for the I/O.

ShadowWrite

Specifies the timeout value for writing updates to secondary volumes. A value of 0 indicates that the parameter is not used. You can specify a value between 0 to 255 seconds. If the value is 1, XRC uses the following method to determine the actual timeout value:

1. Find the minimum timeout value of all the storage disk subsystems. (See StorageControlTimeout under the SHADOW parameter.)
2. Multiply the answer from part 1 by the ShadowTimeoutPercent value to get the number of seconds to wait.

If the I/O times out, XRC performs a test to determine if it is experiencing performance impacts—to determine if XRC is running out of data buffers, for example. If the answer is no, the I/O is issued again. If the answer is yes, XRC returns an error for the I/O.

ShadowTimeoutPercent

Ensures that I/O times out before a storage control session timeout value is reached. This parameter specifies the percentage to use when XRC calculates read or write record set timeout values. (See the ShadowRead and ShadowWrite parameters.) You can specify a value between 10 and 90 percent.

MONITOR

XRC has a monitor task that periodically checks for delays in processing. If there are any delays, XRC issues message ANT8117I. In addition, XRC can save the statistics that are used in making these determinations. XRC uses the value specified with the MonitorOutput parameter to tell if these statistics must be saved.

MonitorOutput

Specifies if the results of a monitor check must be saved. A value of ON routes the results to the MONITOR1 member of the state data set. A value of OFF directs XRC to not write the statistics.

MonitorWakeup

Specifies the delay time between collection of monitor statistics intervals in milliseconds. The default value is 10000 milliseconds (10 seconds). The range of valid values is between 5000 and 120000 milliseconds (5 seconds to 120 seconds).

If XRC sessions are coupled to a master session through a cluster, the MonitorWakeup value must be equivalent to the value specified for the cluster. If not, a message is issued warning that the cluster value is used for the XRC session.

NAMES

Values that are found in this category are only used when the XSTART command processes. To take effect, they must be in member ANTGIN00. If these values are found in any other member, they are ignored.

Hlq

Specifies the high-level qualifier for XRC data sets. The default is SYS1. This parameter is not applied unless it is in the ANTGIN00 member and is processed when the XSTART command processes. It can be temporarily overridden on the XADVANCE, XCOUPLE, and XRECOVER commands. It is permanently overridden on the XSTART command.

MHlq

Specifies the high-level qualifier for the XRC master data set. The default is SYS1. This parameter is not applied unless it is in the ANTGIN00 member and is processed at XSTART time. It can be temporarily overridden on the XCOUPLE, XEND, XQUERY, and XSUSPEND commands.

SHADOW

Shadowing (mirroring) is a main function of XRC. XRC takes a copy of data that is changed on a primary volume and writes it out to the corresponding secondary volume. You can specify the following parameters to control this process.

AllowEnhancedReader

Default value: NO

Specifies the use of the enhanced multiple reader function. Associated values are NO (the default) or YES.

- YES — enables the use of the enhanced multiple reader function if the required microcode features are available. Specifying YES allows you to activate the NumberReaderTasks parameter.

If AllowEnhancedReader(YES) is specified, then to enable the enhanced multiple reader functions, do the following:

1. Specify UTILITY(FIX) and RequireUtility(YES).
2. Set the default value of MaxTotalReaderTasks to 32.

- NO — disables the use of the enhanced multiple reader function.

Note: If you do not suspend the volumes, you can not change the value from YES to NO for an active session.

ConsistencyGroupCombined

Default value: 5

Specifies a value that allows XRC to combine multiple consistency groups when data is written to secondary volumes. You can specify a value between 1 and 999. When using the XRC Multiple Reader function, use values of 5 or lower.

A high value can be advantageous if there is a secondary queue build up because combining consistency groups can result in increased parallelism when writing to the secondary volumes. This is beneficial if there are many volumes that are simultaneously being updated by application programs.

DeviceBlockingThreshold

Defines the number of record sets that must be in cache for a particular device before device blocking for that device is activated. The value can range from 0 to 255. A value of 0 instructs XRC to refrain from device blocking. The actual number of record sets used as a threshold value is the value of this parameter multiplied by 64.

DfltWritePacingLvl

Default value: 0

This value specifies the default session write pacing level to be applied to volumes that have explicitly been assigned the DVCBLOCK(WP0) attribute.

The write pacing level specifies the maximum level of write pacing that can be applied to the primary volume. The levels range from 1 (smallest) to F (largest injected pacing).

If nonzero, the value also applies to new volumes on write pacing-capable controllers that are added to the session without an explicit DONOTBLOCK or DVCBLOCK specification.

If you use the default or specify zero, the system enables volumes without DONOTBLOCK or DVCBLOCK specifications for device blocking. Also, if DVCBLOCK(WP0) is specified on the command, a zero value results in an XADDPAIR, or XSET error.

JournalPriority

Changes the dispatching priority for writing record sets to the journal. You can specify a value between 251 and 253. Higher values position the task earlier in the queue.

LowAttention

Specifies a low threshold value to be used by the storage control of the primary volume when XRC adds a volume pair. You can specify a value between 1 and 255 record sets. If the storage control session contains this number of record sets in cache, XRC raises an attention. This informs XRC that there are record sets that need to be read.

MaxBytesTransferred

Restricts the number of bytes that are written to secondary volumes by a single channel program. Generally, the IBM ESS can write an unlimited amount of data in a single channel program. Older technology disk subsystems may experience secondary performance slowdown when writing large amounts of data in a single chain.

A value of 0 indicates that the amount of data that is written remains unrestricted. You can specify a value between 60000 and 9999999.

MaxTotalReaderTasks

Default value: If AllowEnhancedReader(NO) is specified, the default value is 40. If AllowEnhancedReader(YES) is specified, the default value is 32.

Controls the limit on the number of active LSS and SCID combinations in a XRC session. The value is 32-80. The parameter prevents the lack of buffer and inefficient processing caused by the excessive numbers of reader tasks. The ability to use a higher number is retained for the benefit of installations that might have more than 32 LSS and SCID combinations active in a session, but using higher numbers is not recommended.

If you increase the MaxTotalReaderTasks value, you can add new LSS/SCID combinations in an XRC session when issuing XADDPAIR commands. If the number of the active sessions is greater than or equal to the number of existing LSS/SCID combinations, you can decrease the value in MaxTotalReaderTasks. When the number of active sessions is less than the number of existing LSS and SCID combinations, you cannot decrease the value the MaxTotalReaderTasks. If you issue the XADDPAIR, the new value in the MaxTotalReaderTasks is used.

Note: If you change the value when XRC is inactive, and the new value is smaller than the number of LSS and SCID's in the session, the XSTART command fails. To reduce the value below the amount used by the session, issue an XDELP AIR command to reduce the actual number of LSS/SCID combinations.

MaxTracksFormatted

Restricts the number of tracks being formatted in a single write record set channel program. A 0 value states that there are no restrictions. You can specify a value between zero and 999.

Note: XRC does not format tracks and update tracks in the same channel program.

MaxTracksRead

Specifies the maximum number of record sets that are read in a single channel program. The maximum number of record sets read in a single channel program is 246. For compatibility with previous releases, MaxTracksRead values between 1 and 255 are accepted, but any value above 246 is treated as equivalent to 246.

MaxTracksUpdated

Restricts the number of tracks being updated in a single write record set channel program. A zero value indicates that there are no restrictions. You can specify a value between zero and 999.

Note: XRC does not format tracks and update tracks in the same channel program.

NoTimeStampCount

Specifies the waiting period before XRC issues message ANT_X8030W. If an application program writes to a primary volume, a copy of the changed data is saved in cache in a record set. At the beginning of a record set is a timestamp that indicates when the record set was created. Under certain circumstances, the timestamp might be zero. This parameter specifies the number of zero timestamps that are generated before message ANT_X8030W is issued. You can specify a value between 0 and 99999. A value of 0 instructs XRC to not issue a message.

NumberReaderTasks

Specifies whether auxiliary readers are to be used and the number of the auxiliary readers. Each entry is a tuple. The first value is the SCSN value that the number of read tasks is set for. The second value is the number of read tasks to be used. The default value is (*,0). The default value means using the number of XRCUTL volumes to control the number of auxiliary readers, and applying the value to all SCSNs.

An asterisk (*) in the SCSN field indicates that the number of tasks value must be applied. Refer to the following two examples:

- (AA, 8) indicates that you must set the number of read tasks for SCSESSION=AA to a value of eight.
- (*, 6) indicates set the number of read tasks for all SCSESSIONS to a value of six.

To enable the specification of NumberReadTasks, use either of the following ways:

- Issue an XADDPAIR command for a volume. The system uses the specifications of NumberReadTasks for each SCSN within each SSID during the XSTART of a new or inactive XRC session. If the new volumes are not added, the existing number of reader tasks might be increased or decreased by the specifications.
- Use the XSET session_id parmlib (member, ACTION(APPLY)) command for an active XRC session. You can activate the NumberReadTasks specification by using the parmlib to increase the number of reader. If all volumes in a SCSN on a SSID are suspended, you can only decrease the number of reader tasks.

PacingReportThreshold

Default value: 10 (milliseconds)

This value specifies the number of milliseconds of injected write pacing, per write I/O, that must exist for a write pacing-enabled volume to be flagged as "blocked" in XQUERY reports and XRC monitor data. Valid values are 0-255.

Note: When a write channel program creates several record sets, the maximum value is equal to the maximum value of pacing multiplied by the number of record sets created by the channel program.

PavByteThreshold

Default value: 512500 (bytes)

Specifies the number of bytes used to determine when write I/O for a secondary device is to be split into multiple tasks. When the total number of secondary bytes in a consistency group for a given secondary device exceeds this value, XRC splits the I/O across the number of tasks specified in the PavVolumes parameter.

PavVolumes

Default value: 1

Specifies the number of parallel write I/O tasks to be used when PavBytesThreshold is exceeded for a given secondary device in a consistency group. Use values above 1 only when Parallel

Access Volume (PAV) aliases are available for the XRC secondary volumes. In order to use PAVs, secondary volumes must be online.

ReadDelay

Specifies the frequency that XRC checks to see if there are record sets in cache. You can specify a value between 100 and 5000. The value is in milliseconds with a default of 1000 (one second).

You can attain the following results by changing the XRC parmlib to use a smaller SHADOW READDELAY value, such as 500:

- Achieve more aggressive Recovery Point Objective targets.
- Avoid delays from lightly loaded data movers in large scale configurations.

ReaderPacingLimit

Default value: 33 (percent)

Dynamically reduces the effective reader pacing window after "leading" readers have accumulated updates in the specified percentage of available data mover buffers. You can specify values between 20 and 65 percent. Higher values can increase data mover efficiency, but should be used only in environments where data mover buffers are plentiful. In cases where data mover buffers are tightly constrained, a value of 20 should be used.

ReaderPacingWindow

Default value: 3 (seconds)

Limits the extent to which the data mover can "read ahead" in a given session. Since data mover buffers are limited, "leading" readers that are keeping up with application updates must eventually wait for those "lagging" readers that are not keeping up.

This parameter specifies the number of seconds worth of updates that leading readers may accumulate in data mover buffers while waiting for lagging readers to catch up. The larger the pacing window value, the more efficiently the data mover can operate. You can specify values between 1 and 30 seconds, although values larger than 5 seconds should be used with care and only in situations where sparse updates are occurring and data mover buffers are plentiful. In cases where data mover buffers are tightly constrained, a value of 1 should be used.

Note that the use of an excessively large pacing window can lead to a data mover hang, allowing record sets to accumulate in cache with a potentially serious impact to Application I/O.

ReadRecordsPriority

Changes the dispatching priority for read record sets. You can specify a value between 251 and 253. Higher values position the task earlier in the queue.

RemotePairFlashCopy

Default value: No

This parameter indicates whether or not Remote Pair FlashCopy support should be enabled for the specified XRC session. The values are YES or NO (the default).

RemotePairFlashCopy(YES) requires several other parameters:

- AllowEnhancedReader(YES)
- RequireUtility(YES)
- UtilityDevice(FIX)
- SuspendOnLongBusy(YES).

Remote pair FlashCopy cannot be activated with XSET. It is enabled or disabled only during XSTART based on the value in parmlib.

RequireUtility

Default value: Yes

This parameter optionally prevents XADDPAIR of a non-XRCUTL when an active storage control session does not exist for the specified (or default) SCSESSION. Associated values are NO or YES (the default).

- YES — prevents XADDPAIR of a non-XRCUTL volume pair when an active storage control session does not exist for the specified (or default) SCSESSION.
YES is required to perform an initial XADDPAIR of an offline primary volume.
- NO — enables XADDPAIR of a non-XRCUTL volume to proceed when an active storage control session does not exist.

ResidualLeftToRead

Specifies the smallest number of remaining record sets that causes XRC to perform another read. You can specify a value between 1 and 500 record sets.

Example: If you set the ResidualLeftToRead value to 50, and after reading record sets, there are only 40 record sets remaining, XRC does not read them. However, if you set the ResidualLeftToRead value to 50, and there are 50 or more record sets, then XRC issues another channel program to read the remaining record sets.

ScheduleVerify

Controls whether the data mover periodically schedules mirror status verification. The default value is NO.

StorageControlTimeout (TIMEOUT)

Specifies the primary storage control timeout value for application impact. The initial value is set when a storage control is installed. If XRC stops reading the session's record sets, after the timeout value has elapsed, the session automatically terminates (for non-2105 disk subsystems) or suspends (2105 disk subsystems). You can specify a value in *hh.mm.ss* format between 00.00.00 and 18.00.00, where 00.00.00 uses the default value set during installation. When a storage control session initially starts, XRC uses the timeout value specified in the parameter. However, you can dynamically alter it using an XSET command.

Non-2105 storage controls end their affected storage control sessions at the end of the specified TIMEOUT duration. XRC must then resynchronize all volumes in these sessions with a full-volume copy. 2105 storage controls suspend their affected storage control sessions and perform hardware bitmapping of changes to primary volumes. XRC does not need to perform a full-volume copy to resynchronize these volumes.

You can override the value specified with this parameter by issuing a timeout value with the XSUSPEND TIMEOUT command. The new timeout value remains in effect until you restart the XRC session.

SuspendOnLongBusy

Used to enable or disable Suspend on Long Busy function when a new storage control session is added. The default, YES, enables the function.

If the storage control microcode supports the function, enabling will cause the microcode to automatically suspend the storage control session instead of raising extended long busy when sidefile limits are exceeded.

If the storage control microcode does not support the function, enabling will cause the data mover to suspend a storage control session as soon as it detects extended long busy due to sidefile exceeding limits. Storage control sessions that do not support suspension will be terminated.

Disabling allows the data mover to tolerate the long busy condition for 80% of the storage control session timeout interval, after which mirroring is suspended.

Note: Changing this value does not affect the attributes of existing storage control sessions. Use XSET with the SSID and SUSLBUSY keywords to change the Suspend on Long Busy attribute of existing storage control sessions.

During an XSTART of a suspended non-incremental resync XRC session and during an XADDPAIR of a suspended utility volume, the SuspendOnLongBusy setting for the storage control session is updated to match the setting found in the XRC parmlib member.

UtilityDevice (UTILITY)

Specifies the method used for selecting a utility device.

FIX

XRC uses the same primary volume. FIX is required to perform an initial XADDPAIR of an offline primary volume.

FLOAT

XRC dynamically picks the primary volume that has the lowest I/O activity.

VerifyInterval

Specifies the interval, in hours, between the scheduled verifications. The default value is 24 hours. A value of zero specifies that verification is performed during every monitor interval.

Note: Continual verification can degrade data mover performance. In production XRC environments, avoid specifying zero.

WriteRecordsPriority

Changes the dispatching priority for writing record sets to a secondary volume. You can specify a value between 251 and 253. Higher values position the task earlier in the queue.

WrtPacingResidualCnt

Default value: 80

This value is multiplied by 64 to determine a target device residual count, at which the maximum permissible pacing will be injected for a given write pacing-enabled volume. A value of 0 has the effect of disabling Write Pacing for a volume when it is next processed with XADDPAIR or XSET DVCBLOCK. Valid values are 0-255.

In general, larger values for this parameter will tend to give higher session delay times and less frequent pacing. Smaller values will tend to give lower session delay times and more frequent pacing.

WorkloadWritePacing

Default value: None

The values are as follows:

DISABLED

Workload-based write pacing should not be used

max-levels

For workload-based write pacing, specifies the maximum write pacing levels that can be applied to application system writes depending on the Workload Manager settings for the application's service class. *max-levels* consists of 6 values, 0-F, separated by commas or spaces. The values correspond to the available WLM settings for the Importance parameter, which has 5 levels and 1 discretionary value (the sixth number). The first value corresponds to WLM importance 1, the second value to importance 2, and so on. The values for WorkloadWritePacing must follow an ascending sequence, that is, each of the second through sixth values must be greater than or equal to the preceding entry, to ensure that high priority workloads (as indicated by a lower value for importance) are paced at a lower level than low priority workloads. Values that are equal to the preceding value in the list are accepted and act as a placeholder for importance levels that are unused at the application site. At least one of the 6 values must be non-zero.

If WorkloadWritePacing is not specified at XSTART, there is no default value. Instead, the WorkloadWritePacing values in effect before the session was suspended are used, or if WorkloadWritePacing was previously disabled, the value from volume-level write pacing parameters that were set on the XADDPAIR or XSET command are used.

To disable workload-based write pacing, you must specify WorkloadWritePacing(DISABLED). Removing the WorkloadWritePacing parameter does not cause XRC to revert to volume-level write pacing when the session is restarted with XSTART, or when you issue the XSET PARMLIB APPLY command. You can use the XSET PARMLIB APPLY command only to change the existing values for *max-levels*.

WorkloadWritePacing with *max-levels* cannot be specified with a value of 0 for WrtPacingResidualCnt.

STARTUP

Use the values that are found in this category during the following functions:

- When you issue the XSTART command.
- When you start the MVS MODIFY operation of CREFRESH.
- During startup or restart of the XRC control address space (ANTAS000).
- When you issue the XADVANCE or XRECOVER command to start a cluster session.

Note:

1. If both NAMES and STARTUP are specified in ANTXIN00, and both have either 'HLQ' or 'MHLQ' parameters, then XRC uses the parameters specified under STARTUP.
2. You can change the parameters specified in the STARTUP category and then use the MVS MODIFY operation of CREFRESH.

ClusterMSession

This parameter allows you to specify the XRC master session name to be associated with a cluster session. The msession id name is the logical session name used on the XCOUPLE command. A value of DISABLED (default) indicates that a cluster session is disabled for a logical partition. If something other than DISABLED is specified, all coupled XRC sessions in a logical partition are coupled to this specified master session through the cluster session.

To specify the XRC master session name, use the following guidelines:

- When you specify a single parameter, use the parameter name as the master session name on the logical partition to access to this parmlib.
- When you specify multiple parameters, specify the parameters in pairs. Each pair represents the system name of the LPAR and the master session name to be used in the LPAR. Use the system name as the first parameter of a pair. Use the master session name as the second parameter of a pair.

Here is an example for lists of names: where **System 1** represents the system name and **msess1** the master session name for the first partition and **System 2** represents the system name and **msess2** the master session name for the second logical partition.

```
ClusterMSession(System1 msess1-  
                System2 msess2)
```

ClusterName

This parameter allows you to specify the XRC cluster session name to be used in a logical partition. This parameter is not applied unless it is in the ANTXIN00 member and is processed when the ANTAS000 address space is started or restarted and when the following MVS console command

```
F ANTAS000,CREFRESH
```

is processed. If no value is specified, the system name for the logical partition is used as the cluster session name (default).

To specify the XRC cluster session name, use the following guidelines:

- When you specify a single parameter, use the parameter name as the cluster session name on LPARs to access to this parmlib.
- When you specify multiple parameters, specify the parameters in pairs. Each pair represents an LPAR system name and the cluster session name to be used in the named LPAR. Use the system name as the first parameter of a pair. Use the cluster session name as the second parameter of a pair.

Here is an example for lists of names: where **System 1** represents the system name and **cluster1** the cluster session name for the first partition and **System 2** represents the system name and **cluster2** the cluster session name for the second logical partition.

```
ClusterName(System1 cluster1-  
            System2 cluster2)
```

Global

Specifies the data set member name containing XRC parmlib parameters which are applied to all XRC sessions when started using the XSTART command.

NOTE: XRC parmlib parameters also specified in the member specified on the Session parameter override the values specified in this Global member.

Hlq

Specifies the high-level qualifier for XRC data sets. The default is SYS1. This parameter is not applied unless it is in the ANTGIN00 member and is processed when the XSTART command processes. It can be temporarily overridden on the XADVANCE, XCOUPLE, and XRECOVER commands. It is permanently overridden on the XSTART command.

MaxControlTasks

This parameter enables you to control the number of tasks available in the ANTAS000 address space for the parallel processing of the following ANTRQST requests:

- ILK=XRC
- ILK=PPRC

The value ranges from 128 to 233. The default value is 128.

Note: GDPS Global – XRC and GDPS Metro installations must have at least one task available for each defined auto-operator.

MessageVolumeFormat

This parameter enables you to control how volumes are identified in messages.

VOLSER

By volume serial

DEVNUM

By device number

BOTH

By both volume serial and device number, in this format: *volume-serial/device-number*.

MHlq

Specifies the high-level qualifier for the XRC master data set. The default is SYS1. This parameter is not applied unless it is in the ANTGIN00 member and is processed at XSTART time. It can be temporarily overridden on the XCOUPLE, XEND, XQUERY, and XSUSPEND commands.

OfflineDiscovery

Controls whether offline device discovery is performed during IPL when the ANTAS000 address space first starts up, and thereafter when ANTAS000 restarts after it has been canceled. A value of YES causes offline discovery to be performed. A value of NO bypasses offline device discovery. NO is the default.

Offline device discovery at IPL should be needed only if you are using one of the following:

- GDPS Metro/zGlobal Mirror (XRC) in HYPER-PPRC mode (Incremental Resynch)
- GDPS Metro/zGlobal Mirror under z/OS V2R1 with XRC offline primary devices.

Other XRC configurations or non-XRC environments do not directly benefit from offline device discovery at IPL. To avoid increasing overall IPL elapsed time unnecessarily, do not request offline device discovery unless it is required.

The value of OfflineDiscovery takes effect when the ANTAS000 address space is started during IPL, or with the automatic restart of ANTAS000 after it has been canceled. To activate a new value for OfflineDiscovery without an IPL, do the following:

1. Update the value in parmlib member ANTXIN00
2. Issue the system command CANCEL ANTAS000

The OfflineDiscovery keyword is ignored and is not processed if it is specified in the ALL or session member of *hlq.XCOPY.PARMLIB*.

Parmlib

Specifies which data sets to use when searching for members that contain parmlib parameters. A value of XCOPY (the default) indicates to XRC that it use *hlq.XCOPY.PARMLIB*. A value of SYS1 indicates to XRC that it use the MVS parmlib concatenation. If the parmlib concatenation is being used, messages that include the parameter library data set name, such as ANTI1020I, display SYS1.PARMLIB+.

Session

This parameter allows you to specify groups of session id name and member name. The session id name is the logical session name used on the XSTART command, and the member name is the data set member name containing the parmlib parameters to be applied to the logical session when the session is started.

Note: The number of parameters specified with Session must be a multiple of 2 (for example, session_id name followed by member name). If multiples of 2 values are not specified, error message ANTI1031E is issued.

SuppressTimestamp

This parameter allows you to suppress channel program timestamping on XRC system data mover systems. A value of YES suppresses timestamping. A value of NO allows timestamping. If SuppressTimestamp is not specified, it is interpreted as SuppressTimestamp(NO).

You should suppress channel program timestamping if the XRC system data mover runs on a system that does not share a common time reference with the application systems that writes to the XRC primary volumes, to avoid the introduction of incorrect timestamps into the XRC storage control sessions.

The recommended use of this parameter is:

- SuppressTimestamp(NO) on application systems with a common time reference
- SuppressTimestamp(YES) on remote systems processing XRC, GDPS control systems (K-systems) and z/OS systems that have access to XRC primary volumes and do not share a common time reference with production systems.

Do not use SuppressTimestamp(YES) on application systems, as that would defeat the data consistency mechanism of XRC. SuppressTimestamp(YES) should be used only on systems that are not updating data or that do not have a common time reference, as a preventative measure to avoid incorrect adjustments to the XRC consistency time.

The value of SuppressTimestamp takes effect when the ANTAS000 address space is started during IPL, or with the automatic restart of ANTAS000 after it has been cancelled. To activate a new value for SuppressTimestamp without an IPL, do the following:

1. Update the value in parmlib
2. Issue this system command: CANCEL ANTAS000.

The value of SuppressTimestamp takes effect when the ANTAS000 address space is started during IPL, or with the automatic restart of ANTAS000 after it has been cancelled. To activate a new value for SuppressTimestamp without an IPL, do the following:

1. Update the value in parmlib
2. Issue this system command: CANCEL ANTAS000.

zIIPEnable

This parameter specifies whether the ANTAS000, ANTAS0nn, and ANTCL0nn address spaces are enabled for running on zIIP processors. The values are:

FULL

The address spaces are enabled for running on zIIP processors. This option allows the maximum amount of XRC offload possible. The offloaded work will be visible in enclave reports.

YES

The address spaces are enabled for running on zIIP processors. This option allows non-I/O related XRC operations to be offloaded to zIIP processors.

NO

The address spaces are prevented from running on zIIP processors.

You can change the value dynamically for ANTAS0nn by changing the value and using the XSET command to activate the change. The new values apply to all newly created ANTAS0nn address spaces.

If you change the zIIPENABLE parameter, restart the XRC address spaces with these commands:

1. Either XSUSPEND TIMEOUT or XEND (according to your local procedures) to end ANTAS0nn address spaces
2. XSTART.

zIIPEnable is a global parameter, so the value contained in parmlib member ANTGIN00 is used at startup for all address spaces. Note that the zIIPEnable parameter is not processed if it is specified in the global member (specified with a member name of ALL in the global parameter) or in a session member. You can change the parameter dynamically by modifying the value, then using the XSET command to specify its location and activate the change. The updated value is applied to all newly created ANTAS0nn and ANTCL0nn address spaces and to any existing ANTAS0nn and ANTCL0nn address spaces that are restarted or that create new tasks.

Changes to this parameter are only recognized by XRC address spaces that are restarted after the change, or for which the XSET command is used to activate parmlib changes. The XQUERY ENVIRONMENT(PARM) command shows the current global setting. This setting may differ from the parameter in use by XRC address spaces that were not restarted and were not updated by the XSET command.

STORAGE

XRC uses virtual storage to process data. Use this parameter to define the amount of storage that is used in various operations.

The parameters include:

BuffersPerStorageControl

Specifies how many buffers XRC allocates per scsession specified. A value of 576 allocates 35 MB for each unique scsession that is specified with the XADDPAIR command. If enough memory is available, you can improve performance by using a higher value for this parameter. You can specify a value between 100 and 999999 buffers.

PermanentFixedPages (PAGEFIX)

Specifies the maximum amount of real storage, in MB, that XRC keeps page fixed to process I/O operations. You can specify a value between 0 and 999999 MB. A value of 0 directs XRC to release fixed pages after they have been used.

Example: To minimize the processor load for two storage controls, you would set the PAGEFIX value to 70. The two storage controls divide the 70 MB to get 35 MB each, which is the maximum per storage control session. However, you must allocate 35 MB of storage for each unique scsession level that you initiate. If you have two primary storage controls and start two storage control sessions on each, you would set the PAGEFIX value to 140 MB of storage.

ReleaseFixedPages

Instructs XRC to release fixed pages. XRC tries to free up pages of storage that are not being used. For example, during heavy stress, a large number of buffers are pagefixed to hold the record sets that are being read from cache. Once the heavy demand has decreased, the pages that were fixed are freed if it is determined that the buffers are no longer needed. A value of NO instructs XRC to keep the pages, even if they are no longer needed. A value of YES instructs XRC to release pages that are no longer needed.

Note:

1. If you use ReleaseFixedPages(YES) and need to XDELPAIR all volumes for one or more sessions, IBM recommends that you suspend (throughXSUSPEND TIMEOUT) and restart the data mover session immediately after the XDELPAIR's have completed. Failure to do so can result in extensive storage fragmentation in the data mover address space, resulting in a subsequent inability of the data mover to obtain sufficient contiguous storage for XADDPAIR, XQUERY, and other processes.
2. The number of pages kept fixed for an extended period of time does not exceed the value specified in the PermanentFixedPages parameter.

TotalBuffers

Controls the maximum number of buffers used for an XRC session. Some customers have used a lower value to limit the amount of real storage that is used for an XRC session. You can specify a value between 100 and 999999 buffers. It is recommended that a value of 300000 or less be used. If the journal data sets used in the XRC session are not extended format, the TotalBuffers value is limited to 25000.

Lower this value to a level that allows all the buffers to be pagefixed when the system has insufficient real storage to pagefix all of the allocated buffers. Lowering this value might improve performance. It may also reduce processor usage as long as the lower value does not introduce significant performance problems caused by the smaller number of buffers as a working set.

If you apply a parmlib change to an active session that decreases the number of buffers available, excess buffers will be freed immediately. This occurs even when RELEASEFIXEDPAGES (NO) is currently in effect. IBM recommends that you make such changes during periods of light workload. Making the change during a heavy workload period may adversely impact session performance.

If you apply a change that increases the number of buffers available, the new buffers are allocated the next time the data mover encounters a data shortage.

Note: This is not an absolute limit on the storage that will be used for buffers in an XRC session.

IODataAreas

Specifies the real storage allocation for XRC channel programs and work areas that are associated with I/O operations. A value of 256 is best for installations that have less than 256 volumes. You can specify a value between 100 and 9999.

VOLINIT

Volume synchronization and resynchronization is the process of copying data from a primary volume to the secondary volume with which it has been associated. The following parameters help control this process.

EnableRefreshes (REFRESHS)

Indicates whether the TSO XSET REFRESHS command is enabled for execution. The default is NO, disabling the REFRESHS command. EnableRefreshes requires a YES value to enable the XSET REFRESHS function. See the REFRESHS parameter description for more information.

InitializationMethod (COPY)

Specifies the extent to which the primary volume is copied to the secondary volume. Specify FULL if the complete primary volume is to be copied to the secondary volume. If only the allocated space on the primary volume is to be copied, specify QUICK. At the beginning of a quick copy operation, XRC performs a reserve against the VTOC of the primary volume to get the allocated extents. After XRC determines the allocated extents, it releases the reserve.

Note: To ensure data integrity, the initial processing for QUICKCOPY must issue a reserve and then a release for the primary volume. This must be done during the initial phase of the synchronization process. If access to the primary volume is through a channel extender and the connection fails while XRC has the volume reserved, applications at the primary site are not able to access the primary volume.

InitializationsPerPrimary (SCSYNCH *primary*)

Specifies the maximum number of primary volume synchronizations and resynchronizations that can occur concurrently on a single storage control. You can specify a value between 0 and 45. A value of 0 stops the selection process but processing of existing volume synchronization and resynchronization tasks continues.

InitializationsPerSecondary (SCSYNCH *secondary*)

Specifies the maximum number of secondary volume synchronizations and resynchronizations that can occur concurrently on a single storage control. You can specify a value between 0 and 45. A value of 0 stops the selection process but processing of existing volume synchronization and resynchronization tasks continues.

HaltAnyInit

Pauses volume initialization if the record set residual count rises above the HaltThreshold value on any storage control, rather than just the storage control with which the primary volume is associated. A YES value allows pausing of any storage control. A NO value allows pausing for only the primary volume storage control.

HaltThreshold

Stops volume synchronizations or resynchronizations if the record set residual count of the storage control associated with a volume reaches this threshold value. A low value reduces the impact of volume initialization activity that is running concurrently with heavy update activity. If this threshold is reached, volume initialization pauses until the residual count drops below the threshold. When the residual count drops below the HaltThreshold value, the volume synchronizations or resynchronizations begin again. You can specify a value between 0 and 65535. A value of 0 stops all volume synchronizations or resynchronizations regardless of Ioad or IO activity.

MaxNumberInitializations (SYNCH)

Specifies the number of volume synchronizations and resynchronizations that can occur simultaneously in an XRC session. You can specify a value between 0 and 45. A value of 0 stops the selection process, but continues processing existing volume synchronization and resynchronization tasks.

MaxNumberInitializations specifies an XRC session-level value. For each synchronization task that it starts, XRC fixes real page storage that is based on the following formula:

```
{MaxNumberInitializations*(number of pairs in CPY status)*360K}
```

This storage is in addition to the real storage that is used by normal update processing. The real storage remains pagefixed for the total time the volumes are being synchronized or resynchronized.

SelectionAlgorithm (PRIORITY)

Specifies the method the system data mover should use when choosing the next volume pair to be synchronized or resynchronized.

FIFO

Choose volumes in the order that they were added with the XADDPAIR command

LOAD

Choose volumes whose primary storage controls have the least load. XRC considers a primary storage control to be overloaded if it has a higher number of record sets than the value set for the HaltThreshold parameter. LOAD is the default.

XRC bypasses a volume pair if the primary storage control is overloaded. If bypassed, the volume remains the next eligible candidate for XRC to select when the load decreases.

SIZE

Choose volumes based on the total number of cylinders, from largest to smallest. The parameters MaxNumberInitializations, InitializationsPerPrimary and InitializationsPerSecondary are honored; in addition, to avoid overloading storage control sessions, SIZE causes the system data mover to choose the volume with largest number of cylinders on the controller with the least residual load. If there are multiple volumes with the same number of cylinders on controllers with the same residual load, the volume that was XADDED first is processed next.

TracksPerRead

Specifies a value as follows:

1-15

The number of tracks to read in one channel program.

16-64

The number of channel command words in one channel program.

For best performance, changes to the values within this range should be done in multiples of 16.

TracksPerWrite

Specifies a value as follows:

1-15

The number of tracks to written in one channel program.

16-64

The number of channel command words in one channel program.

For best performance, changes to the values within this range should be done in multiples of 16.

SecondaryDeviceRange

Specifies whether a secondary device range filter should be used and if so, the list of device ranges to use. The filter is applied to the secondary device in an XADDPAIR command. If the secondary device number is not within one of the specified ranges, the XADDPAIR command will fail.

Each range contains two 4-digit hexadecimal numbers separated by a colon, representing device numbers in logical subchannel set 0. The value to the left of each colon must be less than or equal to the value to the right of the respective colon. If both values in the range are the same, a filter will be created for the single specified device number. Values with less than four digits are right justified and padded with zeroes. The list of ranges may be separated by commas or blanks. There can be up to 256 ranges in the list.

If SecondaryDeviceRange (NONE) is issued, the list of secondary device ranges will be cleared. If any other device range values are listed along with value 'NONE', the command will fail. Here are a few examples:

- (0F50:0F5F, 0F70:0F7F) means to create secondary device range filters for ranges 0F50 to 0F5F and 0F70 to 0F7F.
- (F5F:F5F F86:F86) means to create secondary device range filters for device number 0F5F and device number 0F86.
- (NONE) means to not use any secondary device range filters.

Once a SecondaryDeviceRange value has been applied, the filter will be used for all subsequent XADDPAIR commands. The default value is 'NONE'. The default value means that no secondary device range filters will be used when processing an XADDPAIR command.

SecondaryVolserPattern

Specifies whether a secondary VOLSER pattern filter should be used and if so, the list of VOLSER patterns to use. The filter is applied to the secondary device in the XADDPAIR command. If the secondary VOLSER does not match one of the specified VOLSER patterns, the XADDPAIR command will fail.

Each pattern contains a six-character or smaller value with valid characters being those characters which are valid to appear in a VOLSER plus a single-character wildcard '%'. Each pattern must contain at least one single-character wildcard. Lower case is converted to upper case prior to comparison. The list may be separated by commas or blanks. There can be up to 256 patterns in the list.

If SecondaryvolserPattern (NONE) is issued, the list of VOLSER patterns will be cleared. If any other VOLSER values are listed along with value 'NONE', the command will fail. Here are a few examples:

- (X%%%%%) means to create a secondary VOLSER pattern filter for pattern X%%%%%. Acceptable VOLSERs must have an 'X' as the first character and must be one to six characters in length.
- (%%B %) means to create a secondary VOLSER pattern filter for patterns %%B and %. Acceptable VOLSERs must be three characters in length with the third character of 'B', or they must be one character in length.
- (S%S%%%,S%N%%%) means to create a secondary VOLSER pattern filter for patterns S%S%%% and S%N%%%. Acceptable VOLSERs must have an 'S' as the first character, an 'S' or 'N' as the third character, and must be three to six characters in length.
- (NONE) means to not use any secondary VOLSER pattern filter.

Once a SecondaryVolserPattern value has been applied, the filter will be used for all subsequent XADDPAIR commands. The default value is 'NONE'. The default value means that no secondary VOLSER pattern filters will be used when processing an XADDPAIR command. If both SecondaryDeviceRange and SecondaryVolserPattern are specified, the device number comparison is performed first with an XADDPAIR command. Therefore if the device number isn't found within any of the specified ranges, the XADDPAIR will fail regardless of whether or not the VOLSER matches a VOLSER pattern.

XstartQuery

Specifies whether or not the specified XQUERY will be issued at XSTART. The values are:

ENVPARM

An XQUERY ENVIRONMENT(PARM) report is issued upon a successful XSTART request. The report is printed to the SYSLOG only, not the console.

NONE

No XQUERY is issued.

Chapter 3. Using RPFC for XRC

This topic describes operation and use changes, marked with revision bars, related to RPFC for XRC.

These include:

- Changes to XRECOVER processing. When RPFC for XRC is enabled, XRECOVER checks the secondary and tertiary volumes for support of Cascading FlashCopy. See [“XRECOVER–Recovering data on the recovery system”](#) on page 53.
- Changes to SuspendOnLongBusy on XSET. See [“XSET–Changing session parameters”](#) on page 54.
- Information in XQUERY XFEATURES reports about the microcode and software enablement status for RPFC for XRC. See [“XQUERY storage control XFEATURES report”](#) on page 61.
- Information in XQUERY ENV(PARM) reports about the values for the parmlib settings related to RPFC for XRC. See [“XQUERY ENVIRONMENT\(PARM\) report”](#) on page 61.
- A TGTXRCPRI keyword on the FCESTABLISH request of the ANTRQST macro lets you invoke RPFC. See [“Syntax for ILK=ESSRVCS”](#) on page 62.
- Volume capability and reason codes on the ANTQFRVL macro. See [“ANTQFRVL macro”](#) on page 79.
- The FCTOXRCPrimary parameter on the DFSMSdss COPY command. See [“DFSMSdss and RPFC for XRC”](#) on page 85.
- Changes to DFSMSShsm fast replication recovery and backup. See [“DFSMSShsm and RPFC for XRC”](#) on page 103.
- An option for specifying a transition copy technique of RPFC for XRC when defining a management class. See [“DFSMSdfp and RPFC for XRC”](#) on page 110.

XRECOVER–Recovering data on the recovery system

Use the XRECOVER command to bring data on the XRC recovery system to a consistent, recoverable state if there is a disaster to the primary system.

The first command at the recovery site must be the XRECOVER command. You will receive a "session not active" message if you issue another XRC command before an XSTART or XRECOVER command has completed.

When you issue the XRECOVER command to each individual XRC session, it determines the common consistency time to which all coupled sessions can be recovered. All appropriate updates are then applied to the target XRC session to reach that consistency time.

Issue the XRECOVER command on the recovery system to complete the updating of all journal data to the secondary (target) volumes. The secondary volume serial numbers of volume pairs in the duplex or seqcheck state are changed to match the primary volume serial number. The secondary volume serial numbers of suspended volume pairs are also changed, provided that the pairs have completed initial volume synchronization prior to being suspended. For SESSIONTYPE(XRC), the XRC recovery function must continue to have access to the appropriate journal, control, and state data sets that were in use at the time of the failure, or when the XRC session ended. A migration session requires only the state data set.

When Remote Pair FlashCopy is enabled (with the RemotePairFlashCopy parameter of parmlib member ANTGIN00), XRECOVER checks the secondary or tertiary volumes for support of Cascading FlashCopy. The XRECOVER operation fails before attempting to apply any updates, with return code 4705, and the XQUERY FLASHCOPY output is displayed under the following conditions:

- Cascading FlashCopy is not supported on the XRECOVER volumes, and there is a FlashCopy relationship with a volume not in the XRC session (that is, a tertiary copy)
- Cascading FlashCopy is supported on the XRECOVER volumes, but there is an Incremental FlashCopy relationship with a volume not in the XRC session (that is, a tertiary copy).

In these cases, wait until the conflicting relationships have ended, or withdraw the incremental relationship, then reissue XRECOVER.

If the XRC session has either been suspended or ended normally by a command, and the FORCE keyword has not been specified on the XRECOVER command, processing compares the internal timestamps of the state and control data sets of the XRC session being recovered with the internal timestamps of the master and cluster data sets to ensure that the difference between them is less than the value for DEADSESSIONDELAY in the ANTXIN00 member of PARMLIB plus 15 seconds. Additionally, if the XRC session is coupled, processing checks that the number of volumes being included in the XRECOVER matches the number of volumes expected to be recovered in the coupled or clustered environment. The purpose of these checks is to ensure that the correct control data sets are being used for the XRECOVER.

Next, XRECOVER applies the journaled data to update secondary volumes that were suspended while XRC was writing the last consistency group when the XRC session was active. XRC attempts to apply all outstanding data to the secondary volumes so that these volumes are consistent with the rest of the session.

If the suspended volumes can be made consistent, XRC then changes the volume status from SUS to RCV and relabels the secondary volumes. If the XRC session has continued to apply consistency groups, then the volume stays in SUS status. XRC relabels the secondary volumes to the primary volume serial numbers, provided that the volume pair had completed initial volume synchronization prior to the recovery action.

You can also issue the XRECOVER command to recover a group of interlocked coupled sessions to the same consistency time.

In order to provide master session consistency, CXRC applies updates to volumes on the sessions that are behind to allow them to advance to the forward session. CXRC will forward-recover volumes that are suspended because of an error and that have the necessary journal data available. It will not forward-recover volumes that are suspended because of an XSUSPEND command.

Finally, the XRECOVER command automatically generates a recovery report. The report includes the last applied timestamp that defines the recovered, consistent state for all volumes. The XRECOVER command also automatically generates an XQUERY MASTER report for coupled sessions.

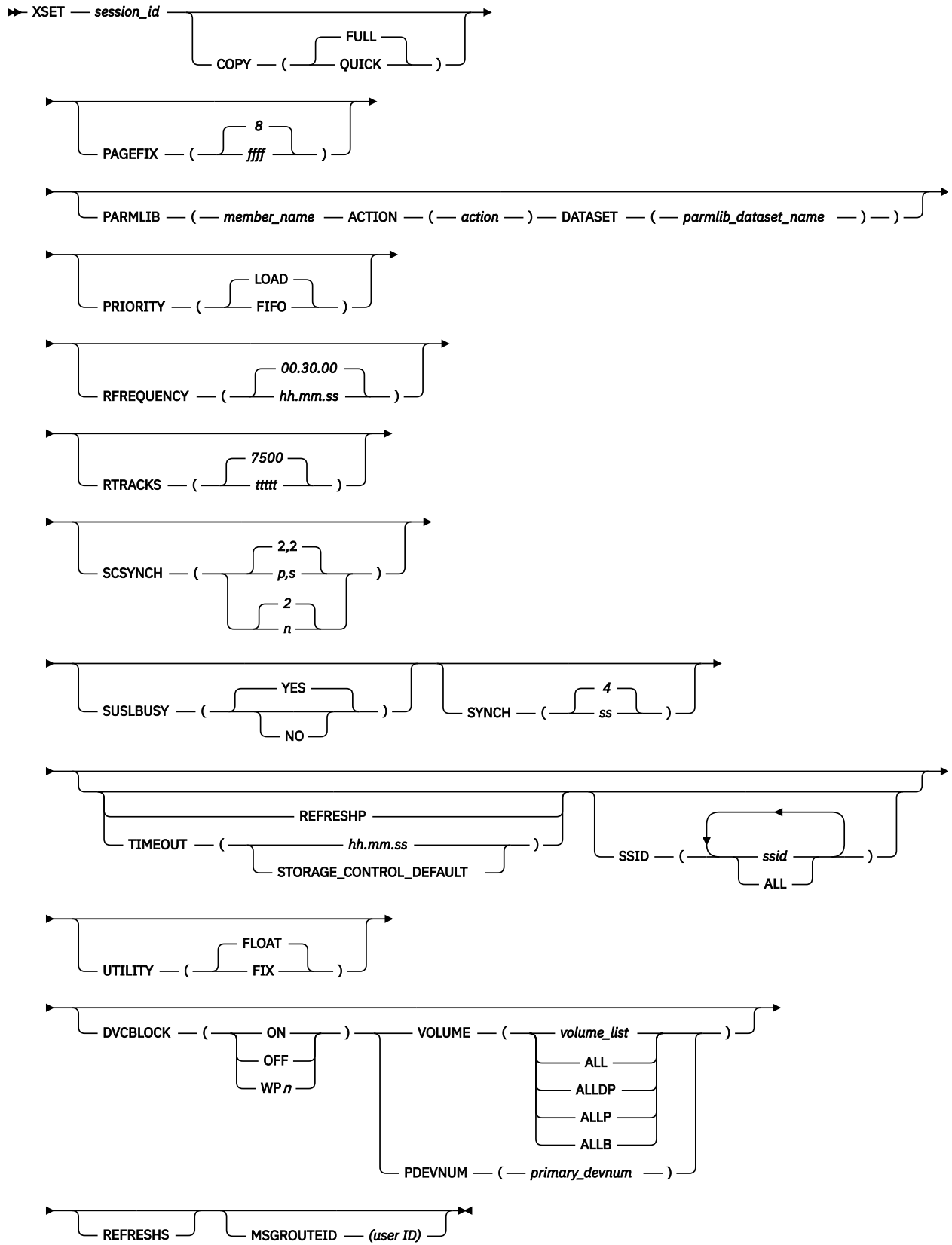
Note: Do not issue the XRECOVER command to an active XRC session. If a session is active when you issue the XRECOVER command, XRC rejects the command. You must first issue an XSUSPEND or XEND command for the session, and then make all primary volumes offline to the SDM system. The XRECOVER command that follows the XSUSPEND or XEND command relabels each eligible secondary volume with the primary volume serial number.

XSET—Changing session parameters

Use the XSET command to change the characteristics of an active session without requiring that you suspend and restart the session. The XSET command allows you to dynamically change XRC session control values.

When the XSET command processes, characteristics of the XRC session are updated. The changes remain in effect for the duration of the session, even through session suspension and restart, unless changed with another XSET command.

XSET command syntax



Optional parameters

COPY

Specifies the default initialization method for the secondary volumes of volume pairs that are added to an XRC session.

The values are:

FULL

Specifies that XRC make a copy of each track of the primary volume onto the secondary volume at the same time that additional application updates are made to both copies. The volumes are initially in pending status and enter duplex state when the initial volume copy is completed.

QUICK

Specifies that XRC make a copy of only allocated tracks on the primary volume onto the secondary volume at the same time that additional application updates are made to both copies. XRC reads the VTOC of the primary volume to determine the allocated tracks on the volume. The volumes are initially in pending status and enter duplex state when the quick volume copy completes.

PAGEFIX

Specifies the maximum amount of real storage that XRC will keep page fixed to process I/O operations. This storage is freed back to the system when the system data mover no longer needs the storage. The system data mover, however, can fix and free any amount of additional real storage, for short-term durations, as required, up to 35 MB per storage control session.

The default value is 8 MB. You can specify the value from zero (no permanent page-fixed storage) to 9999. Changes specified with the PAGEFIX parameter take place when the next set of storage control buffers are processed.

Attention: Unpredictable results can occur if you specify an amount of permanently page-fixed storage that exceeds or is near the limits of available processor storage. An IPL may be necessary.

PARMLIB

To invoke parmlib support at times other than XRC start up, you can issue the XSET PARMLIB command. You can use the XSET PARMLIB command both before and after you issue an XSTART command. If you invoke XSET PARMLIB before an XSTART command, you can check the validity of the parameter syntax without applying any of the parameters. Syntax checking looks for occurrences of data specification errors, such as missing commas and illegal parameters, as well as the validity of the commands and their structure. If you invoke XSET PARMLIB after an XSTART command, you can apply the command parameters as well as perform syntax checking.

The following values must be specified as noted when using the XSET PARMLIB command:

member_name

Specifies which parmlib member to read.

ACTION(action)

Specifies the type of action to perform. This can be:

- VERIFY, which performs a syntax check. This is the default.
- APPLY, which performs a syntax check, and if everything is correct, applies the parameters.

DATASET(parmlib_dataset_name)

Specifies the parameter library to use. This field is optional. If you do not supply a value for this field and the specified session is active, XRC uses the data set that is set up when the XSTART command processes.

XRC requires this parameter if the session (*session_id*) is not an existing session.

Note: If *session_id* is not an active logical session, XSET runs in address space ANTAS000. XRC only performs a verification (return code 4088 if ACTION is set to apply), and the DATASET parameter is required (return code 4089 if DATASET is missing). This process provides a way of checking parameters before an XSTART command is issued.

PRIORITY

Specifies the priority that the XADDPAIR command uses for selecting the next volume to synchronize or resynchronize. Changes specified with the PRIORITY parameter take place when the next volume is processed. The default value is LOAD.

The values are:

FIFO

Specifies that the system data mover select volumes in the order that is specified on the XADDPAIR command.

LOAD

Specifies that the system data mover select volumes whose primary storage control has the least load.

RFREQUENCY

Specifies how long the system data mover will wait before it resets the resynchronization bitmaps. You can specify the frequency in hours, minutes, and seconds. The time can range from 00.00.30 to 18.00.00. The default time is 30 minutes. If you set the frequency value to zero (00.00.00), XRC does not use elapsed time to determine whether to reset the storage control session bitmap.

RTRACKS

Specifies the number of tracks that must change before the system data mover resets the resynchronization bitmaps. You can specify a value from 0 to 99999. The default value is 7500 tracks.

SCSYNCH

Specifies the maximum number of volume pairs that the system data mover can synchronize or resynchronize concurrently per storage control.

You can specify the XSET SCSYNCH parameter as SCSYNCH(*p,s*) or as SCSYNCH(*n*). The limit specified with *n* applies to both primary and secondary storage controls. You can specify a value between 0 and 45 for each variable (*p,s*, or *n*).

Examples: These are possible examples for setting the XSET SCSYNCH parameter:

- XSET SCSYNCH(2)
- XSET SCSYNCH(2,2)
- XSET SCSYNCH(4,2)

Set the SCSYNCH value in conjunction with the SYNCH parameter, which specifies the *session* limits for concurrent volume synchronization tasks. Changes specified with the SCSYNCH parameter take place when the next volume initialization is processed.

SUSLBUSY

Used to enable or disable the Suspend on Long Busy function. Acceptable values are YES (enable) and NO (disable), with YES as the default.

SUSLBUSY is mutually exclusive with TIMEOUT and REFRESHP. If SSID is also specified, the attributes of the storage control sessions that are associated with the specified SSIDs are immediately modified. If SSID is not specified, the global value for the session is modified. The global value is used for any new storage control session that is subsequently added.

SUSLBUSY cannot be disabled when Remote Pair FlashCopy is enabled.

If the storage control microcode supports the function, enabling causes the microcode to automatically suspend the storage control session instead of raising extended long busy when sidefile limits are exceeded.

If the storage control microcode does not support the function, enabling the Suspend on Long Busy function causes the data mover to suspend a storage control session as soon as it detects extended Long Busy due to the sidefile exceeding limits. Storage control sessions that do not support suspension are terminated.

Disabling the Suspend on Long Busy function allows the data mover to tolerate the Long Busy condition for 80% of the storage control session timeout interval, after which mirroring is suspended.

Changing this value does not affect the attributes of existing storage control sessions. Use XSET with the SSID and SUSLBUSY keywords to change the Suspend on Long Busy attribute of existing storage control sessions.

During an XSTART of a suspended MODE(NORMAL) XRC session, and during an XADDPAIR of a suspended utility volume, the SuspendOnLongBusy setting for the storage control session is updated to match the setting that is found in the XRC PARMLIB.

SYNCH

Specifies the maximum number of volume synchronization or resynchronization tasks that XRC can concurrently start in the XRC session. The range of ss is from zero to 45 tasks; the default is four. Specify a value of zero to ensure that XRC does not start any new volume initialization. XRC will continue with existing volume synchronization or resynchronization tasks. Changes specified with the SYNCH parameter take place when XRC processes the next volume. SYNCH specifies an XRC session-level value. For each synchronization task that it starts, XRC fixes real page storage that is based on the following formula:

```
{ SYNCH * (number of volume pairs in CPY status) * 360K }
```

TIMEOUT

Specifies the primary storage control timeout value for application impact. This value specifies the maximum time that applications are unable to update volumes before the storage control suspends, or ends, the storage control session.

You can specify this parameter in hours, minutes, and seconds, can range from a minimum of one second (00.00.01) to a maximum of 18 hours (18.00.00). Specify TIMEOUT(STORAGE_CONTROL_DEFAULT) to request that XRC use the default set in the storage control, which is normally five minutes (00.05.00). Changes specified with the TIMEOUT parameter take place when you add a new storage control to the XRC session. You can also specify which storage subsystems are immediately affected by the TIMEOUT parameter, using the SSID parameter.

TIMEOUT is mutually exclusive with SUSLBUSY.

SSID

Specifies the SSIDs that the value specified on the TIMEOUT is applied to, thereby qualifying the scope of the TIMEOUT parameter.

If you do not specify the SSID parameter, then only storage controls that are added in the future will get the new timeout value. If you specify SSID(ALL), all current and future storage controls immediately get the new timeout value.

If you specify a specific set of SSIDs, only the listed storage controls immediately use the new timeout value. Storage controls that you add in the future will get the original timeout value, not the one specified in the TIMEOUT parameter.

You can specify up to nine SSIDs on a single XSET command. Specify each SSID with up to four character values. Separate each SSID by a comma or a blank.

UTILITY

Specifies how the utility device is selected for reading data from the primary storage control. The values include:

FLOAT

Specifies the utility device for a storage control session will be selected by the storage control. FLOAT is the default.

FIX

Specifies the utility device for a storage control session is to be a specified (fixed) device.

Note: Be aware that issuing the XSET command with the UTILITY parameter specified does not activate or deactivate fixed utility device support. This support is enabled when you issue an XADDPAIR command with a secondary volume serial number of XRCUTL.

DVCBLOCK

Specifies the device blocking option to be applied to the volume, list of volumes, or all volumes in a session specified with the VOLUME parameter.

Workload-based write pacing affects the behavior of DVCBLOCK.

The DVCBLOCK values are:

ON

Specifies that device blocking is enabled for the specified volume(s).

When workload-based write pacing is in use, XRC automatically converts DVCBLOCK(ON) to DVCBLOCK(WP n), where n is the discretionary level, 6.

OFF

Specifies that device blocking is disabled for the specified volume(s). This is the default.

WP n

Specifies that write pacing is to be activated for the specified volume(s), with n specifying the level of write pacing delay, 0-F.

WP0 specifies that the session default level will be used, as specified the SHADOW DfltWritePacingLvl PARMLIB value.

WP1-WP7 result in pacing maximums of 0.02, 0.04, 0.1, 0.5, 1, and 2 milliseconds per recordset, respectively. These levels are useful for volumes with high rates of small blocksize writes, such as data base logs, where minimal response time impact is essential.

WP8-WPC result in pacing maximums of 5, 10, 25, 50, and 100 milliseconds per recordset, respectively. These levels are useful for volumes with high mb/sec write rates.

WPD-WPF result in pacing maximums of 200, 500, and 1000 milliseconds per recordset, respectively. These levels should be used only in exceptional situations where a very high degree of pacing is required.

Delay is injected per recordset, but a write channel program might create several recordsets. In such cases, the maximum possible delay per write channel program is equal to the pacing maximum multiplied by the number of recordsets that the channel program creates. For example, at pacing level WPC, a channel program that creates 4 recordsets can be delayed for a total of 4×100, or 400 milliseconds.

There is no overall limit on the amount of delay that can be injected for a channel program. Very large channel programs, such as those used in Sort applications, can experience delays measured in seconds when higher pacing levels are used.

Note: Only the volumes specified with the VOLUME parameter are affected by the DVCBLOCK parameter. No other XSET parameters are associated with this parameter.

VOLUME

Specifies that all volumes, a list of volumes, or a single volume in a session be processed according to the value specified in the DVCBLOCK parameter.

The VOLUME values are:

volume_list

A list of 1 to 50 six-character volume serial numbers. Use either a blank or a comma to separate the serial numbers.

ALL

Specifies that all volumes in a session are to be changed. Message ANT8131I will be issued indicating the total number of volumes for which the DVCBLOCK value was accepted.

ALLDP

All primary volumes specified as WP0 are to be changed.

ALLB

All primary volumes set to DVCBLOCK(ON) are to be changed.

ALLP

All primary volumes specified as WP1 - WPF are to be changed.

PDEVNUM

Requests that the device with the specified number be processed according to the value specified in the DVCBLOCK parameter, as well as any other specified report criteria.

The PDEVNUM parameter is mutually exclusive with the VOLUME parameter.

REFRESHP

Specifies that the system data mover is to examine the capabilities of the specified primary storage control(s) and update the data mover's internal control information accordingly. This allows detection of new capabilities, such as write pacing, without having to suspend or reissue the addpair request.

The system data mover does not compare the data on the old and new volumes.

REFRESHP cannot be used with TIMEOUT.

REFRESHS

Specifies that the system data mover is to examine the SSID and CCA locations of any suspended secondary volume and update the system data mover's internal control information. If you make an exact copy of one or more secondary volumes, you can resume mirroring with the new volumes without first having to reissue XDELPAIR for any of the old volumes and XADDPAIR for any of the new volumes. This option thus eliminates the need for a full copy from primary to secondary volume, resulting in a faster return to duplex mode.

The system data mover does not compare the data on the old and new volumes. You must ensure that the relocated secondary volume is identical to the original secondary at the time of suspension.

The following conditions must exist to update the location of any secondary volume:

- The session must be active.
- Each pair with secondary volumes to be relocated must be suspended, or, if duplex, a successful hyperswap of the secondary volumes must have taken place with the same UCB as the original secondary volume.
- Each new secondary volume must be online to the system data mover system.
- Each new secondary volume must have the same volume serial number, the same or greater number of cylinders, and the same number of tracks per cylinder as the old secondary volume. If a secondary volume is relocated to a larger secondary volume, you cannot switch back to the old secondary.
- Ensure that the XRC PARMLIB parameter VOLINIT ENBLEREFRESHS(YES) is specified.

Using a combination of XRC commands, you can track which secondary volumes are relocated and where they were relocated:

1. Issue an XQUERY CONFIG request, redirecting it to a data set.
2. Issue XSET REFRESHS. You receive message ANT8141I indicating number of volumes relocated.
3. Issue the XQUERY CONFIG request to redirect the data set to a different data set.
4. Compare the two XQUERY CONFIG data sets to find the relocated secondary volumes.

Note:

1. Use REFRESHS with care to prevent creating inconsistent data on the primary and secondary volumes.
2. REFRESHS cannot be used with any other optional XSET keyword except MSGROUTEID.

MSGROUTEID

Specifies the user ID to which XRC messages associated with the processing of this command are routed. If the specified user ID is logged off, TSO saves messages in the TSO BROADCAST data set and displays them after the next logon.

Note: Messages issued by the initial command syntax-checking routine are sent to the user ID that issues the TSO command.

XQUERY storage control XFEATURES report

The following is an example of a report generated by a XQUERY STORAGECONTROL command with the XFEATURE parameter. The report includes information about workload-based write pacing. Several fields are highlighted and are described further following the example.

```
ANTQ8202I XQUERY STORAGECONTROL_XFEATURES REPORT - 002
ANTQ8370I  T LIC          FEATURES
ANTQ8371I SSID Y LEVEL      FU D W SL ER IR EX WP FC
ANTQ8203I -----
ANTQ8372I 7B74 U 5.3.1.172  YY N N NN YN Y  ED YY YY
ANTQ8372I 7B76 S 5.3.1.172  C* C C C* C* C  ** C* YY
ANTQ8375I UTL=1 SUTL=1
ANTQ8231I DATA CONSISTENT(NO_TIME_AVAILABLE) IDLE(00:00:22.6)
ANTQ8201I XQUERY STO_XFEATURES REPORT COMPLETE FOR SESSION(A)
```

The information related to workload-based write pacing is as follows:

- **TY** shows the type of utility: U for standard utility or S for swap utility.
- **WP** is the workload-based writing pacing status.
 - The first character is the microcode status: - if the microcode support is not loaded into the storage controller and Y if the microcode support has been activated.
 - The second character is the software status: N if parmlib parameter WorkloadWritePacing is not active, and Y if parmlib parameter WorkloadWritePacing parameter is active.
- **FC** shows the Remote Pair FlashCopy for XRC indicators.
 - The first character indicates hardware support: - if the microcode support for Remote Pair FlashCopy is not installed, C if it is installed but not enabled, and Y if it is installed and enabled.
 - The second character is the RemotePairFlashCopy setting in parmlib: N if the value is NO, and Y if the value is YES.
- Message ANTQ8375I shows the total number of utilities and swap utilities in the session.
- Message ANTQ8372I, the swap utility detail line, shows these values:
 - For hardware features: C if it is capable, - if it is not installed, Y if it is installed and enabled.
 - For software features: * if XRC is not managing the devices.

XQUERY ENVIRONMENT(PARM) report

The following example screen shows the output that is received from the following command:

```
XQUERY session_id ENVIRONMENT(PARM)
```

```

ANTQ8200I XQUERY STARTED FOR SESSION(A) ASNAME(ANTAS001) 840
ANTQ88251I NAME VALUE NAME VALUE
ANTQ8203I -----
ANTQ8253I zIIPEnable NO MHlq SYS1
ANTQ8253I AllLowEnhancedReader YES NoTimeStampCount 5000
ANTQ82202I XQUERY ENVIRONMENT_PARM REPORT - 001
ANTQ53I BuffersPerStorageCon 576 NumberReaderTasks *,0
ANTQ8253I ChangedTracks 7500 OfflineDiscovery NO
ANTQ8253I ClusterMSession ***** PacingReportThreshol 10
ANTQ8253I ClusterName ***** PavByteThreshold 512500
ANTQ8253I ConsistencyGroupComb 5 PavVolumes 1
ANTQ8253I DatasetDelay 75 PermanentFixedPages 8
ANTQ8253I DeadSessionDelay 45 ReaderPacingLimit 33
ANTQ8253I DefaultHlq SYS1 ReaderPacingWindow 3
ANTQ8253I DefaultSessionId DEFAULT ReadDelay 1000
ANTQ8253I DelayTime 00.30.00 ReadRecordsPriority 252
ANTQ8253I DeviceBlockingThresh 20 ReleaseFixedPages NO
ANTQ8253I DfltWritePacingLvl 0 RemotePairFlashCopy YES
ANTQ8253I EnableREFRESHES NO RequireUtility YES
ANTQ8253I HaltAnyInit NO ResidualLeftToRead 128
ANTQ8253I HaltThreshold 5120 ScheduleVerify NO
ANTQ8253I Hlq SYS1 SecondaryDeviceRange (none)
ANTQ8253I InitializationsPerPr 2 SecondaryVolserPatte (none)
ANTQ8253I InitializationsPerSe 2 SelectionAlgorithm LOAD
ANTQ8253I InitializationMethod FULL ShadowRead 10
ANTQ8253I InitializationReadWr 120 ShadowTimeoutPercent 40
ANTQ8253I IODataAreas 256 ShadowWrite 10
ANTQ8253I JournalPriority 251 StorageControlTimeou DEFAULT
ANTQ8253I LowAttention 192 SuppressTimestamp NO
ANTQ8253I MaxBytesTransferred 512500 SuppressXrecABEND NO
ANTQ8253I MaxControlTasks 128 SuspendOnLongBusy YES
ANTQ8253I MaxNumberInitializat 4 SCDumpType NDSS
ANTQ8253I MaxTotalReaderTasks 32 TotalBuffers 25000
ANTQ8253I MaxTracksFormatted 0 TraceTableBufferSize 120
ANTQ8253I MaxTracksRead 64 TracksPerRead 3
ANTQ8253I MaxTracksUpdated 0 TracksPerWrite 3
ANTQ8253I MessageVolumeFormat VOLSER UtilityDevice FIX
ANTQ8253I MinExtenderRead 55 VerifyInterval 24
ANTQ8253I MinLocalRead 0 WorkloadWritePacing (below)
ANTQ8253I MiscHigh 15 WriteRecordsPriority 253
ANTQ8253I MiscLow 2 WrtPacingResidualCnt 80
ANTQ8253I MonitorOutput OFF XstartQuery ENVPARM
ANTQ8253I MonitorWakeup 10000
ANTQ8203I -----
ANTQ8253I WorkloadWritePacing 1,2,3,4,5,6
ANTQ8203I -----
ANTQ8201I XQUERY ENVIRONMENT_PARM REPORT COMPLETE FOR SESSION(A)

```

Syntax for ILK=ESSRVCS

The ANTRQST macro for ILK=ESSRVCS is written in the following format:

Parameter	Description
<i>name</i>	<i>name</i> : Is an optional symbol, starting in column 1, that is the name on the ANTRQST macro invocation. The name must conform to the rules for an ordinary assembler language symbol.
(blank)	One or more blanks must precede ANTRQST.
ANTRQST	
(blank)	One or more blanks must follow ANTRQST.
ILK=ESSRVCS	
REQUEST=LEVEL	
,RETINFO=<i>retinfo</i>	<i>retinfo</i> : RS-type address or address in register (2) - (12).
REQUEST=FCESTABLISH	

Parameter	Description
,SDEVN=<i>sdevn</i>	<i>sdevn</i> : RS-type address or address in register (2) - (12).
,TDEVN=<i>tdevn</i>	<i>tdevn</i> : RS-type address or address in register (2) - (12).
,DEVN=<i>devn</i>	<i>devno</i> : RS-type address or address in register (2) - (12).
,SRCSERIAL=<i>srcserial</i>	<i>sernum</i> : RS-type address or address in register (2) - (12).
,SRCSSID=<i>srcssid</i>	<i>ssid</i> : RS-type address or address in register (2) - (12).
,SRCLSS=<i>srclass</i>	<i>lss</i> : RS-type address or address in register (2) - (12).
,SRCDVC=<i>srcdvc</i>	<i>device</i> : RS-type address or address in register (2) - (12).
,TGTSERIAL=<i>tgtserial</i>	<i>sernum</i> : RS-type address or address in register (2) - (12).
,TGTLSS=<i>tgtlss</i>	<i>lss</i> : RS-type address or address in register (2) - (12).
,TGTDVC=<i>tgtdvc</i>	<i>device</i> : RS-type address or address in register (2) - (12).
,TGTUCB=<i>tgtucb</i> YES | NO	<i>tgtucb</i> : RS-type address or address in register (2) - (12). Default: TGTUCB=YES.
,OPENDVCS=<i>opendvcs</i> YES | NO	<i>device</i> : RS-type address or address in register (2) - (12). Default: OPENDVCS=NO.
,REMOTE=<i>remote</i> YES | NO	<i>remote</i> : RS-type address or address in register (2) - (12). Default: REMOTE=NO.
,INCREMENTAL=<i>incremental</i> NO | YES | YTW	<i>incremental</i> : RS-type address or address in register (2) - (12). Default: INCREMENTAL=NO.
,TGTPPRIM=<i>tgtpprim</i> YES | NO	<i>tgtpprim</i> : RS-type address or address in register (2) - (12). Default: TGTPPRIM=NO.
,SRCEXTENTS=<i>srcextents</i>	<i>srcextents</i> : RS-type address or address in register (2) - (12).
,TGTEXTENTS=<i>tgtextents</i>	<i>tgtextents</i> : RS-type address or address in register (2) - (12).
,RETINFO=<i>retinfo</i>	<i>retinfo</i> : RS-type address or address in register (2) - (12).
,MODE=<i>mode</i> COPY | NOCOPY | NO2CPY | ASYNC	<i>mode</i> : RS-type address or address in register (2) - (12). Default: MODE=COPY.

Parameter	Description
,ONLINTGT=onlintgt YES | <u>NO</u>	<i>onlintgt</i> : RS-type address or address in register (2) - (12). Default: ONLINTGT=NO.
,ACTION=action FREEZE | FRR	<i>action</i> : RS-type address or address in register (2) - (12).
,SETGTOK=setgtok NO|YES	<i>setgtok</i> : RS-type address or address in register (2) - (12). Default: SETGTOK=NO
,MSGREQ=msgreq YES | <u>NO</u>	<i>msgreq</i> : RS-type address or address in register (2) - (12). Default: MSGREQ=NO.
,ECB=ecb	<i>ecb</i> : RS-type address or address in register (2) - (12). Default: ECB=NO_ECB.
,WAITTIME=waittime	<i>waittime</i> : RS-type address or address in register (2) - (12). Default: WAITTIME=0.
,PRESMIR=presmir <u>NO</u> | REQ	<i>presmir</i> : RS-type address or address in register (2) - (12). Default: PRESMIR=NO.
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
,TSUBCHSET=tsubchset	<i>tsubchset</i> : RS-type address or address in register (2) - (12). Default: TSUBCHSET=0.
,TGTXRCPRI=xrcpri YES | <u>NO</u>	<i>xrcpri</i> : RS-type address or address in register (2) - (12). Default: TGTXRCPRI=NO.
REQUEST=FCQUERY	
,DEVN=devn	<i>devn</i> : RS-type address or address in register (2) - (12).
,QRYSIZE=qrysize	<i>qrysize</i> : RS-type address or address in register (2) - (12).
,QRYINFO=qryinfo	<i>qryinfo</i> : RS-type address or address in register (2) - (12).
,QRYSERIAL=qryserial	<i>qryserial</i> : RS-type address or address in register (2) - (12).
,QRYSSID=qryssid	<i>qryssid</i> : RS-type address or address in register (2) - (12).
,QRYLSS=qrylss	<i>qrylss</i> : RS-type address or address in register (2) - (12).
,OPENDVCS=opendvcs YES | <u>NO</u>	<i>opendvcs</i> : RS-type address or address in register (2) - (12). Default: OPENDVCS=NO.

Parameter	Description
,REMOTE=remote YES | NO	<i>remote</i> : RS-type address or address in register (2) - (12). Default: REMOTE=NO.
,FORMAT=xformat FQMAP | NO	<i>xformat</i> : RS-type address or address in register (2) - (12). Default: FORMAT=NO.
,RETINFO=retinfo	<i>retinfo</i> : RS-type address or address in register (2) - (12).
,ALET=alet	<i>alet</i> : RS-type address or address in register (2) - (12). Default: ALET=0.
,ECB=ecb	<i>ecb</i> : RS-type address or address in register (2) - (12). Default: ECB=NO_ECB.
,WAITTIME=waittime	<i>waittime</i> : RS-type address or address in register (2) - (12). Default: WAITTIME=0.
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
REQUEST=FCWITHDRAW	
,SDEVN=sdevn	<i>sdevn</i> : RS-type address or address in register (2) - (12).
,TDEVN=tdevn	<i>tdevn</i> : RS-type address or address in register (2) - (12).
,DEVN=devno	<i>devno</i> : RS-type address or address in register (2) - (12).
,SRCSERIAL=srcserial	<i>sernum</i> : RS-type address or address in register (2) - (12).
,SRCSSID=srcssid	<i>ssid</i> : RS-type address or address in register (2) - (12).
,SRCLSS=srcISS	<i>ISS</i> : RS-type address or address in register (2) - (12).
,SRCDVC=srcdvc	<i>device</i> : RS-type address or address in register (2) - (12).
,TGTSERIAL=tgtserial	<i>sernum</i> : RS-type address or address in register (2) - (12).
,TGTLSS=tgtISS	<i>ISS</i> : RS-type address or address in register (2) - (12).
,TGTDVC=tgtdvc	<i>device</i> : RS-type address or address in register (2) - (12).
,TGTCB=tgtucb YES | NO	<i>tgtucb</i> : RS-type address or address in register (2) - (12). Default: TGTCB=YES.

Parameter	Description
,OPENDVCS=opendvcs YES | NO	<i>opendvcs</i> : RS-type address or address in register (2) - (12). Default: OPENDVCS=NO.
,REMOTE=remote YES | NO	<i>remote</i> : RS-type address or address in register (2) - (12). Default: REMOTE=NO.
,ACTION=action COMMIT | REVERT | THAW	<i>action</i> : RS-type address or address in register (2) - (12).
,RETINFO=retinfo	<i>retinfo</i> : RS-type address or address in register (2) - (12).
,DDSW=ddsw YES | NO	<i>ddsw</i> : RS-type address or address in register (2) - (12). Default: DDSW=NO.
,SRCEXTENTS=srcextents	<i>srcextents</i> : RS-type address or address in register (2) - (12). Default: SRCEXTENTS=0.
,SPACEREL=spacerel	<i>spacerel</i> : RS-type address or address in register (2) - (12). Default: SPACEREL=NO.
,TGTEXTENTS=tgttextents	<i>tgttextents</i> : RS-type address or address in register (2) - (12). Default: TGTEXTENTS=0.
,ALET=alet	<i>alet</i> : RS-type address or address in register (2) - (12). Default: ALET=0.
,ECB=ecb	<i>ecb</i> : RS-type address or address in register (2) - (12). Default: ECB=NO_ECB.
,WAITTIME=waittime	<i>waittime</i> : RS-type address or address in register (2) - (12). Default: WAITTIME=0.
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
,TSUBCHSET=tsubchset	<i>tsubchset</i> : RS-type address or address in register (2) - (12). Default: TSUBCHSET=0.
REQUEST=QFRVOLS	
,CTLVOL=ctlvol	<i>ctlvol</i> : RS-type address or address in register (2) - (12). Default: CTLVOL=NO_CTLVOL.
,CTLDVC=ctldvc	<i>ctldvc</i> : RS-type address or address in register (2) - (12). Default: CTLDVC=NO_CTLDVC.
,VOLLIST=vollist	<i>vollist</i> : RS-type address or address in register (2) - (12).

Parameter	Description
,VOLSRCTGT=volsrctgt	<i>volsrctgt</i> : RS-type address or address in register (2) - (12).
,TGTPPRIM=tgtpprim YES | <u>NO</u>	<i>tgtpprim</i> : RS-type address or address in register (2) - (12). Default: TGTPPRIM=NO.
,RETINFO=retinfo	<i>retinfo</i> : RS-type address or address in register (2) - (12).
,ALET=alet	<i>alet</i> : RS-type address or address in register (2) - (12). Default: ALET=0.
, SEFLC=seflc, YES | <u>NO</u>	<i>seflc</i> : RS-type address or address in register (2) - (12). Default: SEFLC=NO.
,ECB=ecb	<i>ecb</i> : RS-type address or address in register (2) - (12). Default: ECB=NO_ECB.
,WAITTIME=waittime	<i>waittime</i> : RS-type address or address in register (2) - (12). Default: WAITTIME=0.
,PRESMIR=presmir <u>NO</u> | REQ	<i>presmir</i> : RS-type address or address in register (2) - (12). Default: PRESMIR=NO.
,RETCODE=retcode	<i>retcode</i> : RS-type address or address in register (2) - (12).
,RSNCODE=rsncode	<i>rsncode</i> : RS-type address or address in register (2) - (12).
,PLISTVER=plistver	<i>plistver</i> : An optional byte input decimal value in the "0–4" range that specifies the macro version. Default: PLISTVER=IMPLIED_VERSION.
,MF=S	Default: MF=S
,MF=L,xmfctrl,xmfattr | OD	Default: MF=L,mfctrl,OD
,MF=M,xmfctrl,COMPLETE | NOCHECK	Default: MF=M,mfctrl,COMPLETE
,MF=E,xmfctrl,COMPLETE | NOCHECK	Default: MF=E,mfctrl,COMPLETE
REQUEST=QHA	
,DEVN=devn	<i>devn</i> : RS-type address or address in register (2) - (12).
,ALET=alet	<i>alet</i> : RS-type address or address in register (2) - (12). Default: ALET=0.
,CCA=cca	<i>cca</i> : RS-type address or address in register (2) - (12). Default: CCA=0.

Parameter	Description
,ECB=ecb	<i>ecb</i> : RS-type address or address in register (2) - (12). Default: ECB=NO_ECB.
,LSS=lss	<i>lss</i> : RS-type address or address in register (2) - (12). Default: LSS=0.
,QRYSIZE=qrysize	<i>qrysize</i> : RS-type address or address in register (2) - (12).
,QRYINFO=qryinfo	<i>qryinfo</i> : RS-type address or address in register (2) - (12).
,RETINFO=retinfo	<i>retinfo</i> : RS-type address or address in register (2) - (12).
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
,TGTUCB=tgtucb YES | NO	<i>tgtucb</i> : RS-type address or address in register (2) - (12). Default: TGTUCB=YES.
,WAITTIME=waittime	<i>waittime</i> : RS-type address or address in register (2) - (12). Default: WAITTIME=0.
REQUEST=RQUERY	
,SNBR=sessno	<i>sessno</i> : RS-type address or address in register (2) - (12).
,VOLSER=volno	<i>volno</i> : RS-type address or address in register (2) - (12).
,DEVN=devno	<i>devno</i> : RS-type address or address in register (2) - (12).
,ACTION=action STAT4ALSS|STAT4AESS | STAT4ACGRP|STAT4BLSS | STAT4BESS|STAT4C | STAT51|GMPSTAT | GMLSTAT|DVCSTAT	<i>action</i> : RS-type address or address in register (2) - (12).
,LSSNBR=lss	<i>lss</i> : RS-type address or address in register (2) - (12).
,LSSTYPE=lss CKD | FB	<i>type</i> : RS-type address or address in register (2) - (12).
,DVCNBR=nbr	<i>type</i> : RS-type address or address in register (2) - (12).
,QRYSIZE=size	<i>size</i> : RS-type address or address in register (2) - (12).
,QRYINFO=info	<i>info</i> : RS-type address or address in register (2) - (12).
,DSNAME=dsn	<i>dsn</i> : RS-type address or address in register (2) - (12).

Parameter	Description
,DSDISP=disp OLD | MOD | SHR	<i>disp</i> : RS-type address or address in register (2) - (12).
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
REQUEST=RSESSION	
,SNBR=sessno	<i>sessno</i> : RS-type address or address in register (2) - (12).
,VOLSER=volno	<i>volno</i> : RS-type address or address in register (2) - (12).
,DEVN=devno	<i>devno</i> : RS-type address or address in register (2) - (12).
,ACTION=action DEFINE | UNDEFINE | START | RESUME | PAUSE | STOP | CGPAUSE	<i>action</i> : RS-type address or address in register (2) - (12).
,LSSTYPE=lsstype CKD | FB	<i>lsstype</i> : RS-type address or address in register (2) - (12).
,LSSNBR=ls	<i>ls</i> : RS-type address or address in register (2) - (12).
,ESSSERIAL=ess	<i>ess</i> : RS-type address or address in register (2) - (12).
,CGINTERVAL=cgint	<i>cgint</i> : RS-type address or address in register (2) - (12).
,CGDRAIN=drain	<i>drain</i> : RS-type address or address in register (2) - (12).
,COORDINTERVAL=coord	<i>coord</i> : RS-type address or address in register (2) - (12).
,MSSERIAL=ms	<i>ms</i> : RS-type address or address in register (2) - (12).
,SBINFO=sbinfo	<i>sbinfo</i> : RS-type address or address in register (2) - (12).
,MANAGER=manager YES | NO	<i>manager</i> : RS-type address or address in register (2) - (12).
,FORCE=force YES | NO	<i>force</i> : RS-type address or address in register (2) - (12).
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
REQUEST=RVOLUME	
,SNBR=sessno	<i>sessno</i> : RS-type address or address in register (2) - (12).
,VOLSER=serialno	<i>serialno</i> : RS-type address or address in register (2) - (12).

Parameter	Description
,DEVN=devno	<i>devno</i> : RS-type address or address in register (2) - (12).
,LSSNBR=lss	<i>lss</i> : RS-type address or address in register (2) - (12).
,LSSTYPE=typ CKD | FB	<i>typ</i> : RS-type address or address in register (2) - (12).
,ESSSERIAL=ess	<i>ess</i> : RS-type address or address in register (2) - (12).
,ACTION=action JOIN | REMOVE	<i>action</i> : RS-type address or address in register (2) - (12).
,VOLLIST=vlist	<i>vlist</i> : RS-type address or address in register (2) - (12).
,VOLRANGE=vrange	<i>vrange</i> : RS-type address or address in register (2) - (12).
,MTVOLLIST=vlist	<i>vlist</i> : RS-type address or address in register (2) - (12).
,MTVOLRANGE=vrange	<i>vrange</i> : RS-type address or address in register (2) - (12).
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12). Default: SUBCHSET=0.
REQUEST=STATEQUERY	<i>devno</i> : RS-type address or address in register (2) - (12).
,DEVN=devno	<i>devno</i> : RS-type address or address in register (2) - (12).
,QRYLSS=qrylss	<i>qrylss</i> : RS-type address or address in register (2) - (12).
,QRYDVC=qrydvc	<i>qrydvc</i> : RS-type address or address in register (2) - (12).
,QRYSIZE=qrysize	<i>qrysize</i> : RS-type address or address in register (2) - (12).
,QRYINFO=qryinfo	<i>qryinfo</i> : RS-type address or address in register (2) - (12).
,RETINFO=retinfo	<i>retinfo</i> : RS-type address or address in register (2) - (12).
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12).
REQUEST=STATESAVE	
,DEVN=devno	<i>devno</i> : RS-type address or address in register (2) - (12).
,CALLER=caller	<i>caller</i> : RS-type address or address in register (2) - (12).
,CCA=cca	<i>caller</i> : RS-type address or address in register (2) - (12).

Parameter	Description
,DIAGREAS=diagreason	<i>diagreason</i> : RS-type address or address in register (2) - (12).
,DIAGRETC=diagretc	<i>diagretc</i> : RS-type address or address in register (2) - (12).
,FUNC=function	<i>function</i> : RS-type address or address in register (2) - (12).
,LSS=lss	<i>lss</i> : RS-type address or address in register (2) - (12).
,NDSS=statesave	<i>statesave</i> : RS-type address or address in register (2) - (12).
,SEQNO=seqno	<i>seqno</i> : RS-type address or address in register (2) - (12).
,SESSION=session	<i>session</i> : RS-type address or address in register (2) - (12).
,SUBCHSET=subchset	<i>subchset</i> : RS-type address or address in register (2) - (12).
,TIME=timestamp	<i>timestamp</i> : RS-type address or address in register (2) - (12).
,TITLE=title	<i>title</i> : RS-type address or address in register (2) - (12).
,TYPE=functiontype	<i>functiontype</i> : RS-type address or address in register (2) - (12).

Subparameters for REQUEST=FCESTABLISH

REQUEST=FCESTABLISH

Asks for the Establish FlashCopy relationship function to be executed.

,SDEVN=sdevn

Specifies the 2-byte hexadecimal device number of the source device. If the field contains the null value (X'0000'), the parameter is treated as omitted. Device number X'0000' cannot be used with the FlashCopy FCESTABLISH request.

For FlashCopy, the source device can be the same as the target device. In this case, the source and target extents must be specified, and the extents cannot overlap.

For Open System (fixed block) devices, this parameter is invalid. If specified with fixed block devices, this parameter must be set to the null (X'0000') value.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 2-character input field.

,TDEVN=tdevn

Specifies the 2-byte hexadecimal device number of the target device. If the field contains the null value (X'0000'), the parameter is treated as omitted. Device number X'0000' cannot be used with the FlashCopy establish request.

For FlashCopy, the target device can be the same as the source device. In this case, the source and target extents must be specified, and the extents cannot overlap.

For Open System (fixed block) devices, this parameter is invalid. If specified with fixed block devices, this parameter must be set to the null (X'0000') value.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 2-character input field.

,DEVN=devn

Specifies the binary device number to use for I/O.

When OPENDVCS(YES) is specified for a local FlashCopy relationship (REMOTE(NO) is specified or allowed to default), DEVN must specify a CKD access volume located in the same subsystem cluster as the fixed block device identified by SOURCE in this command.

When OPENDVCS(YES) is specified with (REMOTE(YES), DEVN must specify a CKD access volume located in the same subsystem cluster as the PPRC primary device that is paired with the PPRC secondary specified as the FlashCopy source.

When REMOTE(YES) is specified for CKD volumes (OPENDVCS(NO) is specified or allowed to default), DEVN must specify the PPRC primary device that is paired with the PPRC secondary specified as the FlashCopy source.

DEVN must be a 4-digit hexadecimal address of a configured device with a UCB on the IBM Z system issuing the command.

To code: Specify the RS-type address, or address in register (2)-(12), of an optional 2-character field.

,SRCSERIAL=srcserial

When OPENDVCS(YES) or REMOTE(YES) is specified, SRCSERIAL identifies the storage control serial number that can include up to 10 digits, depending on the type of storage control.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 10-character field.

,SRCLSS=srclass

When OPENDVCS=YES or REMOTE=YES is specified, this identifies the two-digit hexadecimal value for the logical subsystem (LSS) for the device (ESS only).

Note: The LSS number is required if the storage control supports logical subsystems (like the ESS) and not allowed if the storage control does not support logical subsystems.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 1-character field.

,SRCDVC=srcdvc

When OPENDVCS=YES or REMOTE=YES is specified, this identifies the two-digit hexadecimal value for the device (either logical unit number or channel connection address).

To code: Specify the RS-type address, or address in register (2)-(12), of a required 1-character field.

,TGTSERIAL=tgtserial

When OPENDVCS=YES or REMOTE=YES is specified, TGTSERIAL identifies the storage control serial number that can include up to 10, depending on the type of storage control.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 10-character field.

,TGTLSS=tgtlss

When OPENDVCS=YES or REMOTE=YES is specified, this identifies the two-digit hexadecimal value for the logical subsystem (LSS) for the device (ESS only).

Note: The LSS number is required if the storage control supports logical subsystems (like the ESS) and not allowed if the storage control does not support logical subsystems.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 1-character field.

,TGTDVC=*tgtdvc*

When OPENDVCS=YES or REMOTE=YES is specified, this identifies the two-digit hexadecimal value for the device (either logical unit number or channel connection address).

To code: Specify the RS-type address, or address in register (2)-(12), of a required 1-character field.

,TGUCB=*tgtuch*

,TGUCB=YES

Specifies YES or NO, indicating whether an MVS device number is used for target addressability. Yes is the default.

YES

Indicates that the SDEVN and TDEVN keywords are being used to identify the source and target devices in the relationship, using MVS device numbers.

NO

Indicates that an MVS device number is not used for the target device (TDEVN keyword is not used). Instead, the SDEVN, TGTSERIAL, TGTLSS, and TGTDVC keywords are used.

Note: TGUCB(NO) is not supported when OPENDVCS(YES) or REMOTE(YES) is specified.

To code: Specify the RS-type address, or address in register (2)-(12), of a required 3-character field.

,SRCSSID=*srcssid*

When REMOTE=YES is specified without OPENDVCS=YES, this is the two-byte binary unsigned SSID of the subsystem where the FlashCopy request is to occur. This must be the same value as that specified for SSID on the PPRC secondary volume on the PPRC establish pair command.

To code: Specify the RS-type address, or address in register (2)-(12), of an optional halfword field.

,OPENDVCS=*opendvcs*

,OPENDVCS=NO

Specifies whether Open System (fixed block) devices or CKD devices are addressed by this command. The values are:

NO

The required parameters (SDEVN and TDEVN) identify CKD devices. The default is NO.

YES

Specifies that the required parameters (DEVN, SRCSERIAL, SRCLSS, SRCSSID, SRCDVC, TGTSERIAL, TGTLSS, TGTDVC) identify fixed block devices using a CKD access device.

To code: Specify the RS-type address, or address in register (2)-(12), of an optional 3-character field.

,REMOTE=*remote*

,REMOTE=NO

Specifies whether the request is for a subsystem that is not directly attached to the issuing processor. The values are:

NO

The request is directed to a device on a subsystem locally attached to the issuing processor. The default is NO.

YES

The request is directed to a remote subsystem using Inband subsystem functions. When REMOTE=YES is specified, the request must be for a full volume.

When specifying an Inband request for a CKD secondary device, DEVN must identify a PPRC primary device in a subsystem accessible by the host processor issuing the request, and the FlashCopy source device must be the PPRC secondary of that DEVN.

When specifying an Inband request for an Open System (fixed block) secondary device, DEVN must identify an online CKD IBM Z device located in the same subsystem cluster as the fixed block device of the PPRC primary paired with the secondary designated as FlashCopy source.

To code: Specify the RS-type address, or address in register (2)-(12), of an optional 3-character field.

,INCREMENTAL=incremental

,INCREMENTAL=NO

Specifies whether the FlashCopy establish relationship remains active after initial copy is complete allowing subsequent changes to be tracked so that future FlashCopy operations require only a subset of the volume to be copied. The values are:

NO

The FlashCopy relationship ends after the background copy has completed (when MODE=COPY) is specified) or all source and target tracks have been updated (when MODE=NOCOPY) is specified). The default is NO.

YES

The FlashCopy relationship remains in effect after the request completes. Subsequent changes are tracked so that future FlashCopy operations are performed incrementally. This relationship continues until explicitly terminated with a FlashCopy Withdraw request.

YTW

The FlashCopy relationship remains in effect after the request completes. Subsequent changes are tracked so that future FlashCopy operations are performed incrementally. This relationship continues until explicitly terminated with a FlashCopy Withdraw request. YTW performs the same function as INCREMENTAL=YES except that YTW allows the target to be writable.

Note: The FlashCopy target is writable while the incremental relationship is active. Any writes done to the target during this period are overwritten if a subsequent increment is done, keeping the target a true copy of the source. If the relationship is reversed, the changes made to the target are reflected on the source.

To code: Specify the RS-type address, or address in register (2)-(12), of an optional 3-character field.

,TGTPPRIM=tgtpprim

,TGTPPRIM=NO

Specifies whether the target in the FlashCopy relationship can be the primary in a PPRC pair. The values are:

NO

The target in this FlashCopy relationship cannot be the primary in a PPRC pair. The default is NO.

YES

The target in this FlashCopy relationship can be the primary in a PPRC pair. This request proceeds normally to the specified target but the hardware ignores the PPRC status of the target.

To code: Specify the RS-type address, or address in register (2)-(12), of an optional 3-character field.

,SRCEXTENTS=srcextents

Is the extent data structure described below. The extents in the extent data structure describe the tracks on the source CKD volume that are active in this FlashCopy relationship.

If CKD devices are specified, this keyword is required. If Fixed Block devices are specified, this keyword is ignored.

The structure of the extent data is as follows:

- A 4 byte field with a hexadecimal count of the source extent fields in the following list. This count field must have a value of 1 to 110.

This field can also contain a 4-character value of 'ALL'. If this value is present, all tracks of the source device is active in the FlashCopy relationship (full volume). If this value is present, no other source extent information is used, and target extent information is ignored.

- A 4-byte reserved field.
- A list of source extent fields. Each 8-byte extent field has two extents, the beginning source extent and the ending source extent on the volume to be part of this FlashCopy relationship.

For non-EAV volume the extent format is 'CCHH' where CC is an unsigned 16 bit binary cylinder number. HH is an unsigned 16 bit binary track number.

For EAV volume the extent format is 'CCCCcccH' where CCCC is the low-order 16-bits of the cylinder number. ccc is the high-order 12-bits of the cylinder number. H is the four-bit track number.

The extents in each source extent field contain the following:

- A 4-byte beginning source extent.
- A 4-byte ending source extent.

Each source extent field must have a related target extent field identifying the same number of tracks.

The tracks identified in the source extent fields must be valid for the source device.

To code: Specify the RS-type address, or address in register (2)-(12) (ASM only), of a required variable character input field, aligned on a fullword.

,TGTEXTENTS=tgt extents

Is the extent data structure described below. The extents in the extent data structure describe the tracks on the target volume that are active in this FlashCopy relationship.

If CKD devices are specified, this keyword is required. If Fixed Block devices are specified, this keyword is ignored.

The structure of the extent data is as follows:

- A 4-byte field with a hexadecimal count of the target extent fields in the following list. This count field must have a value of 1 to 110.
- A 4-byte reserved field.
- A list of target extent fields. Each 8-byte extent field has two extents, the beginning extent and the ending extent on the target volume to be part of this FlashCopy relationship.

For non-EAV volume the extent format is 'CCHH' where CC is an unsigned 16 bit binary cylinder number. HH is an unsigned 16 bit binary track number.

For EAV volume the extent format is 'CCCCcccH' where CCCC is the low-order 16-bits of the cylinder number. ccc is the high-order 12-bits of the cylinder number. H is the four-bit track number.

The extents in each target extent field contain the following format:

- A 4-byte beginning target extent.
- A 4-byte ending target extent.

Each target extent field must have a related source extent field identifying the same number of tracks. The tracks identified in the target extent fields must be valid for the target device. The tracks identified in the target extent fields cannot overlap any source tracks or other target tracks. The target device must have the same track size and format as the source device. For FlashCopy Version 2 devices, the target extent track locations do not have to be the same as the source extent track locations.

To code: Specify the RS-type address, or address in register (2)-(12), of a required variable character input field, aligned on a fullword.

,RETINFO=retinfo

Is the name of a required 100-character output field that is used to return detailed information about the results of **executing** the request. The output field is a name (RS-type) or an address in register (2)-(12). The program returns information about the results of **scheduling** the request in

the RETCODE and RSNCODE fields. The area should align on a word boundary. The first 4-bytes contain the return code, and the second 4-bytes contain the reason code. The remainder of the information depends on the return and reason codes. See the coding example about how to coordinate the RETCODE, RSNCODE, and RETINFO fields.

,MODE=mode

,MODE=COPY

Specifies the type of FlashCopy relationship to be started for this pair of volumes.

COPY requests the program to establish a FlashCopy relationship between the source device and the target device. The program starts a background copy of all tracks within the specified extents from the source volume to the target volume. When the background copy completes, the FlashCopy relationship terminates. The target volume extents contain the same data as the source volume extents when the FlashCopy relationship was first established.

NOCOPY requests the program to establish a FlashCopy relationship between the source device and the target device. The program does not do a background copy of tracks from source volume to target volume. Processing of data on the source volume is the same as if the source volume was not in a FlashCopy relationship. Records read from the target volume within the specified extents have the same data as the related source volume records at the time the FlashCopy relationship was established.

Note: When a FlashCopy NOCOPY relationship is ended, the track data on the target device is unpredictable and should not be used. If updates occur to source device tracks in the FlashCopy NOCOPY relationship, a copy of the source tracks from the point-in-time of the FlashCopy establish may or might not be written to the target device.

Tracks might be copied from the source to the target volume even if the source track is not changed. This includes the track that contains the volume label. Therefore, to avoid duplicate volume serial problems when the target device is later varied online, IBM recommends that you relabel the target volume after withdrawing a volume-level FlashCopy NOCOPY relationship.

NO2CPY initiates a background copy from the source to target. When a MODE=NOCOPY relationship exists between source and target, this relationship ends when the background copy is completed. There must be an existing FlashCopy relationship between source and target. If one does not exist, none are created.

ASYNC indicates that this is being established to a volume set that is , or is part of a Global Mirror for ESS session.

The default is COPY.

To code: Specify the RS-type name, or address in register (2)-(12), of an optional 6-character input field. The value is left-align and padded on the right with blanks. If the field contains binary zeros, the program uses the default value.

,ONLINTGT=onlntgt

,ONLINTGT=NO

Is an optional 3-character input field that contains a keyword. This keyword specifies whether the FlashCopy Establish should continue if the specified target device is in an online state to any system. The name of the input field is a name (RS-type) or address in register (2)-(12). The value is left-align and padded on the right with blanks. If the field contains binary zeros, the program uses the default.

NO indicates fail the FlashCopy Establish if the target device is online to any system.

YES indicates continue the FlashCopy Establish if the target device is online to any system.

The default is NO.

ACTION=action

Identifies that an action is to take place during the FlashCopy establish request.

FREEZE

Specifies that the FlashCopy source volume is to be part of a FlashCopy consistency group. The FlashCopy relationship is established between the source and target volumes, or extents, and all I/O to the source volume is held (results in a long busy) until one of the following conditions is met:

- A FlashCopy withdraw with action THAW is processed by the LSS where the volume resides.
- A two-minute timer has expired. (The 2-minute time can be adjusted using the ESS Specialist GUI.)

ACTION=FREEZE is mutually exclusive with MODE(ASYNC).

FRR

Specifies Fast Reverse Restore, which is a function to be used with Global Mirror or Metro/Global Mirror for ESS when recovering from an outage. This reverses the direction of the FlashCopy relationship, restoring the source volume to the state it was in when it last flashed to the target. Changed tracks are copied back from the target to the source.

To code: Specify the RS-type name, or address in register (2)-(12), of an optional 12-byte (character) field. The value is left-align and padded on the right with blanks.

SETGTOK=*setgtok*

,SETGTOK=NO

Specifies whether the target of the specified full volume relationship can be a track space efficient volume.

NO indicates that the target cannot be a track space efficient volume. The default is NO.

YES indicates that the target can be a track space efficient volume. If an out of space condition occurs, the relationship is failed.

To code: Specify the RS-type name, or address in register (2)-(12), of a 3-character field. The specified character value is left-align and padded on the right with blanks.

,MSGREQ=*msgreq*

,MSGREQ=NO

Specifies whether to wait for FlashCopy Establish initialization to complete.

NO indicates to not wait.

YES indicates to wait. Only valid when MODE is COPY.

The default is NO.

To code: Specify the RS-type name, or address in register (2)-(12), of an optional 3-character field. The specified character value is left-align and padded on the right with blanks. If the field contains binary zeros, the program uses the default.

,ECB=*ecb*

,ECB=NO_ECB

Is an optional fullword input field that SDM posts for an asynchronous request. The name of the input field is a name (RS-type) or address in register (2)-(12). For synchronous requests, the program ignores this field.

The default is NO_ECB.

,WAITTIME=*waittime* | 0

Specifies how long in seconds SDM waits for a request to complete. A value of zero says to not time the request. If the time expires before the request is complete, the program returns a value of 7039 (RQST_WAITTIME_EXPIRED). For more information about RQST_WAITTIME_EXPIRED, refer to ANTRQSTL. If the request is a synchronous request, the program returns the value in the return code part of RETINFO. If the request is an asynchronous request, the program uses the value as the ECB post code.

The default is 0.

To code: Specify the RS-type name, or address in register (2)-(12), of an optional halfword input field. The specified character value is left-align and padded on the right with blanks. A value of zero says to not time the request.

,PRESMIR=presmir

,PRESMIR=(REQ|NO)

Indicates the handling of the request based on whether the specified target is a PPRC primary device. PRESMIR(REQ) is mutually exclusive with REMOTE(YES) and ACTION(FRR). TGTPPRIM(YES) is required with PRESMIR(REQ). This keyword does not apply to Global Mirror or Global Copy pairs.

REQ If the specified target device is a Metro Mirror primary device, the pair must not go into a duplex pending state as the result of this FCESTABLISH request.

NO The FCESTABLISH request is to be performed without considering a Preserve Mirror operation. This is the default.

The default is NO.

To code: Specify the RS-type name, or address in register (2)-(12), of an optional 4-character input field. The specified character value is left-align and padded on the right with blanks. A value of zero says to not time the request.

,SUBCHSET=subchset

,SUBCHSET=0

Specifies the subchannel set in which the command is to be issued. The subchannel set where the I/O is issued is the subchannel set as defined in the Hardware Configuration Dialog (HCD). The valid values are determined by what is supported by the host system's processor and configured for the device.

If you specify a value of X'00' or omit this keyword, the command is issued to the device that is logically in subchannel set 0. If a swap occurred, this might be the device that was defined in an alternate subchannel set in the I/O configuration (IODF), with HCD.

To code: Specify the RS-type name, or address in register (2)-(12), of an optional 1-byte (character) field.

,TSUBCHSET=tsubchset

,TSUBCHSET=0

Used with the TDEVN parameter. *tsubchset* is the name (RS-type) or address in register (2)-(12) of a 1-character field that specifies the subchannel set is to be used to get information about the target device specified with the TDEVN parameter. This is the subchannel set for the device as defined in the Hardware Configuration Dialog (HCD). The values are determined by what is supported by the host system's processor and configured for the device.

If you specify a value of X'00' or omit this keyword, the command is issued to the device that is logically in subchannel set 0. If a swap has occurred, this might be the device that was defined in an alternate subchannel set in the I/O configuration (IODF), with HCD.

,TGTXRCPRI=xrcpri

,TGTXRCPRI=NO

Specifies the handling of the request based on whether the specified target is an XRC primary device. The values are:

NO indicates that if the specified target device is an XRC primary device, the operation should fail. This is the default.

YES indicates that if the specified target device is an XRC primary device, the control unit provides the FlashCopy request to the data mover and the data mover attempts to mirror the FlashCopy operation at the remote site in a consistent manner. If the FlashCopy operation is unsuccessful at the remote site, XRC is suspended.

TGTXRCPRI is not allowed with REMOTE=YES. If TGTXRCPRI=YES is specified with PRESMIR=REQ, the command fails with return code 7610 (x'1DBA'), reason 156 (x'9C').

To code: Specify the RS-type name, or address in register (2)-(12), of an optional 3-character field. The specified character value is left-align and padded on the right with blanks. If the field contains binary zeros, the program uses the default.

ANTQFRVL macro

This macro maps the input and output fields in the parameter area pointed to by the VOLLIST keyword in the ANTRQST Query Fast Replication Volumes request.

The ANTRQST REQUEST=QFRVOLS VOLLIST parameter has the name of an area mapped by the ANTQFRVL macro. This area is required for the QFRVOLS request of ANTRQST.

The header area must be filled in by the caller. This includes setting QFRVLEYE to ANTQFRVL, setting QFRVLVRL to the value of the QFRVRLC symbol and setting QFRVLLEN to the total length, in bytes, of the parameter area.

The caller sets the number of volume entries, supplies the volume or device information for them and sets all other volume entry areas to binary zero.

Volume capability and reason codes

When ANTRQST returns to the caller, and the RETINFO return and reason code are zero, and the ANTQFRVL header return code is zero, each volume entry has one of the following values:

Volume Capable	Volume Reason	Description
1	0 (X'00')	The volume is source capable.
2	0 (X'00')	The volume is target capable.
0	.	The volume is not currently Fast Replication capable. The volume reason will have a non-zero value indicating the current cause for being incapable.
0	1 (X'01')	The maximum number of FlashCopy relationships are active on the volume.
0	2 (X'02')	The volume is a PPRC Primary volume.
0	3 (X'03')	The volume is a PPRC Secondary volume
0	4 (X'04')	The volume is a Concurrent Copy source.
0	5 (X'05')	The volume is extended Remote Copy source.
0	6 (X'06')	The volume is currently inhibited from starting any FlashCopy operations.
0	7 (X'07')	A volume level (phase 1) FlashCopy relationship is active on this volume.
0	8 (X'08')	The maximum number of FlashCopy relationships for the Enterprise Storage Server® (ESS) are active.
0	9 (X'09')	The volume is currently inaccessible.
0	10 (X'0A')	Asynchronous PPRC Primary target active for volume.
0	11 (X'0B')	Full volume target relation exists on the volume.
0	12 (X'0C')	Full volume source relation exists on the volume.
0	13 (X'0D')	Maximum full volume relations exist on the volume.
0	14 (X'0E')	Volume is space efficient, target capability requested and SETGTOK=YES was not specified, or Preserve Mirror was specified.

Volume Capable	Volume Reason	Description
0	15 (X'0F')	The volume is in the process of a PPRC cascading failover/failback recovery operation or the PPRC volume was established with incremental resynchronization started, and target capability checking was requested.
0	16 (X'10')	The volume is a cascaded PPRC volume.
0	17 (X'11')	The volume is not capable of data set level FlashCopy operations. (Space efficient volumes are not eligible for data set level FlashCopy operations.)
0	18 (X'12')	The volume is not capable of inhibiting writes to the source.
0	19 (X'13')	Reserved
0	20 (X'14')	Reserved
0	21 (X'15')	Device is in a Soft Fenced state
0	23 (X'17')	The specified volume is a target volume of an incremental relationship, source checking was requested, and the copy is not complete for the incremental relationship.
0	24 (X'18')	The maximum number of full volume relations exists and target capability was requested.
0	25 (X'19')	Volume is in an incremental FlashCopy relationship and is not eligible for new incremental FlashCopy relationship of the requested change recording version.
0	26 (X'1A)	Volume is Safeguarded Copy Source Volume.
0	27 (X'1B)	Safeguarded Copy Recovery target relations exists and source capability requested.
0	28 (X'1C')	FlashCopy onto a Global Mirror target cannot be performed because a Global Mirror force Consistency Group is in progress.
0	29 (X'1D')	FlashCopy onto a Safeguarded Copy source cannot be performed because a Safeguarded Copy reservation is active on the volume.
0	30-63	Reserved for common incapable reason codes.
0	64-95 (X'40-5F')	Reserved for XRC Remote Pair FlashCopy
0	96-127 (X'60-7F')	Reserved
0	128-159 (X'80-9F')	Reserved for PPRC Remote Pair FlashCopy
0	160-191 (X'A0-BF')	Reserved
0	200 (X'C8')	The volume cannot be found.
0	201 (X'C9')	The volume does not support FlashCopy.
0	202 (X'CA')	The volume and the control volume are not in the same subsystem.

Volume Capable	Volume Reason	Description
0	203 (X'CB')	An I/O error was detected when obtaining FlashCopy status of the volume. To obtain a diagnostic ABEND dump from the ANTMAIN address space that will provide additional information about the error, issue system command F ANTAS000,CTFLG ABEND_LIC ON, and resubmit the failing request. Once the dump has been obtained, issue system command F ANTAS000,CTFLG ABEND_LIC OFF.
0	204 (X'CC')	The volume does not have the same track geometry as the control volume.
0	205 (X'CD')	A VM formatted MVS minidisk.
0	206 (X'CE')	An I/O timeout was detected when obtaining FlashCopy status of the volume.
0	207 (X'CF')	The specified extent is outside the volume's capability.

Preserve Mirror reason codes for volume capability

When ANTRQST returns to the caller, and the RETINFO return and reason code are zero, and the ANTQFRVL header return code is zero, and Version 2 or later is specified, each volume entry has one of the values that are described in the following table.

Preserve Mirror Capable	Preserve Mirror Reason	Description
1	0 (X'00')	The volume is Preserve Mirror Capable.
2	0 (X'00')	Preserve Mirror checking not requested.
3	0 (X'00')	Preserve Mirror checking was not done because the volume is not FlashCopy capable.
0	.	The volume is not currently Preserve Mirror capable. The volume reason will have a nonzero value indicating the current cause for being incapable.
0	1 (X'01')	The maximum number of FlashCopy relations are active on the volume.
0	2 (X'02')	Reserved
0	3 (X'03')	Reserved
0	4 (X'04')	The volume's secondary is a Concurrent Copy source.
0	5 (X'05')	The volume's secondary is an XRC primary.
0	6 (X'06')	The volume's secondary currently is inhibited from starting any FlashCopy operations.

Preserve Mirror Capable	Preserve Mirror Reason	Description
0	7 (X'07')	A Volume Level (Phase 1) FlashCopy relation is active on this volume's secondary.
0	8 (X'08')	The maximum number of FlashCopy relations for the volume's secondary volume's SFI.
0	9 (X'09')	The volume's secondary is inaccessible.
0	10 (X'0A')	The volume's secondary is a Global Mirror primary.
0	11 (X'0B')	A full volume target relationship already exists in the volume's secondary.
0	12 (X'0C')	A full volume source relationship already exists on the volume's secondary and target capability was requested.
0	13 (X'0D')	The maximum number of full volume source relationships exist on the volume's secondary and source capability was requested.
0	14 (X'0E')	The volume's secondary is space efficient.
0	15 (X'0F')	The volume's secondary is in the process of a PPRC cascading failover/failback recovery or the PPRC volume was established with incremental resync. Target capability is required.
0	16 (X'10')	The volume's secondary is a cascaded PPRC volume.
0	17 (X'11')	The volume's secondary is not capable of data set-level FlashCopy operations,
0	18 (X'12')	The volume's secondary is not capable of inhibiting writes to the source.
0	21 (X'15')	Device is in a Soft Fenced state
0	23 (X'17')	The specified volume is a target volume of an incremental relationship, source checking was requested, and the copy is not complete for the incremental relationship.

Preserve Mirror Capable	Preserve Mirror Reason	Description
0	24 (X'18')	The maximum number of full volume relations exists and target capability was requested.
0	25 (X'19')	Volume is in an incremental FlashCopy relationship and is not eligible for new incremental FlashCopy relationship of the requested change recording version.
0	26 (X'1A)	Volume is Safeguarded Copy Source Volume.
0	27 (X'1B)	Safeguarded Copy Recovery target relations exists and source capability requested.
0	28 (X'1C')	FlashCopy onto a Global Mirror target cannot be performed because a Global Mirror force Consistency Group is in progress.
0	29 (X'1D')	FlashCopy onto a Safeguarded Copy source cannot be performed because a Safeguarded Copy reservation is active on the volume.
0	30-63	Reserved for common incapable reason codes.
0	64-95 (X'40-5F')	Reserved for XRC Remote Pair FlashCopy
0	96-127 (X'60-7F')	Reserved
0	128 (X'80')	The volume is not a PPRC primary device. For target checking, software can treat this as capable.
0	129 (X'81')	The volume's secondary and the control volume's secondary are not in the same SFI.
0	130 (X'82')	The volume's PPRC relationship is not full duplex.
0	131 (X'83')	The volume's secondary's SFI does not have the microcode installed that supports IBM Remote Pair FlashCopy (Preserve Mirror).
0	136 (X'88')	Volume has PPRC Multi-Target relationships and PSETCHAR is not configured correctly. USEFORPM is set for either none or more than one of the target volumes.

Preserve Mirror Capable	Preserve Mirror Reason	Description
0	132 (X'84')	The control volume is not a PPRC primary.
0	133 (X'85')	The command was received while the subsystem was installing a new microcode load and the level of one or both CECs does not support IBM Remote Pair FlashCopy (Preserve Mirror).
0	134 (X'86')	An error was detected when sending the command to the volume's secondary.
0	135 (X'87')	The volume is space efficient and target capability was requested. Space efficient volumes are not allowed as the target of a Preserve Mirror operation.
0	208 (X'D0')	The volume is a PPRC primary and the Preserve Mirror feature is not enabled.
0	209 (X'D1')	PPRC Primary not Full Duplex or Preserve Mirror version 2 not installed.
0	256 (X'100')	The controller does not have the Preserve Mirror feature enabled.

XRC Remote Pair FlashCopy reason codes

When ANTRQST returns to the caller, and the RETINFO return and reason code are zero, and the ANTQFRVL header return code is zero, each volume entry will have one of the values described in the XRC Remote Pair FlashCopy capability and reason fields if the volume is capable and the extents are specified.

XRC Remote Pair FlashCopy Capable	XRC Remote Pair FlashCopy Reason	Description
1	0 (X'00')	The volume is XRC Remote Pair FlashCopy capable.
2	0 (X'00')	XRC Remote Pair FlashCopy checking not requested.
3	0 (X'00')	XRC Remote Pair FlashCopy checking was not done because the volume is not FlashCopy capable.
0	.	The volume is not currently XRC Remote Pair FlashCopy capable. The volume reason will have a nonzero value indicating the current cause for being incapable.

XRC Remote Pair FlashCopy Capable	XRC Remote Pair FlashCopy Reason	Description
0	23-63 (X'16-3F')	Reserved for common incapable reason codes: FlashCopy incapable, PPRC Remote Pair FlashCopy incapable, and XRC Remote Pair FlashCopy incapable.
0	64 (X'40')	XRC Remote Pair FlashCopy not enabled by DSO Set Session Characteristics. Set XRC Remote Pair FlashCopy session name
0	65 (X'41')	Control Volume is not an XRC Primary.
0	66 (X'42')	XRC session names are not equal.
0	67 (X'43')	The control volume is in a suspended state.
0	68 (X'44')	Addressed volume is not an XRC primary.
0	69 (X'45')	Addressed volume is in an XRC suspended state.
0	70 (X'46')	Addressed volume is space efficient and target capability was requested. Space efficient target volumes are not allowed for XRC Remote Pair FlashCopy operations.
0	71 (X'47')	The control volume is space efficient. Space efficient target volumes are not allowed for XRC Remote Pair FlashCopy operations.
0	72 (X'48')	Microcode level of one or both CECs does not support XRC Remote Pair FlashCopy operations.
0	73-95 (X'49-5F')	Reserved for XRC Remote Pair FlashCopy
0	96-127 (X'60-7F')	Reserved

DFSMSdss and RPFC for XRC

RPFC for XRC impacts support for the COPY command. A FCTOXRCPrimary keyword enables RPFC for XRC. Details are provided in the topics that follow. There are associated changes for security and for determining the DFSMSdss version, release, and modification.

Restrictions: Do not use the FastReplication(NONE), COPYVolid, or FCFastReverseRestore keywords with the FCTOXRCPrimary keyword..

COPY command for DFSMSdss

The DFSMSdss COPY command performs data set movement, volume movement, and track movement from one DASD volume to another.

You can copy data sets to another volume of either like or unlike device types. Like devices have the same track capacity (3390 Model 2 and 3390 Model 3), while unlike devices have different track capacities (3380 Model K and 3390 Model 3).

However, the DASD must be of *like* device type if you copy a full volume, range of tracks, or physically copy a data set. The user must specify the source volumes and the target volumes. DFSMSdss only allows one source volume and one target volume.

DFSMSdss offers two ways to process COPY commands as follows:

- *Logical processing* is data set-oriented, which means that it operates against data sets and volumes independently of physical device format.
- *Physical processing* can operate against data sets, volumes, and tracks, but is oriented toward moving data at the track-image level. The processing method is determined by the keywords specified on the command.

Integrated catalog facility catalogs should not have a high-level qualifier of SYSCTLG because this causes DFSMSdss to treat them as control volumes.

DFSMSdss COPY will always preserve data set encryption attributes of the source data set. Therefore, new allocations will be defined with the source encryption attribute. If a pre-allocated target data set is encountered, it must also be encrypted to be considered a usable target data set. The usable pre-allocated target will be overwritten with the source encryption attributes (which includes the key label).

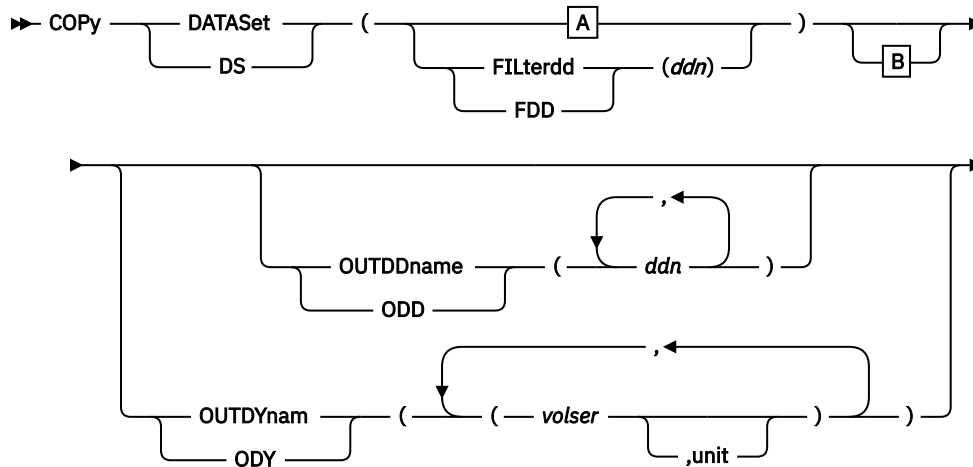
Special considerations for COPY

The following special considerations may apply when you perform a COPY operation:

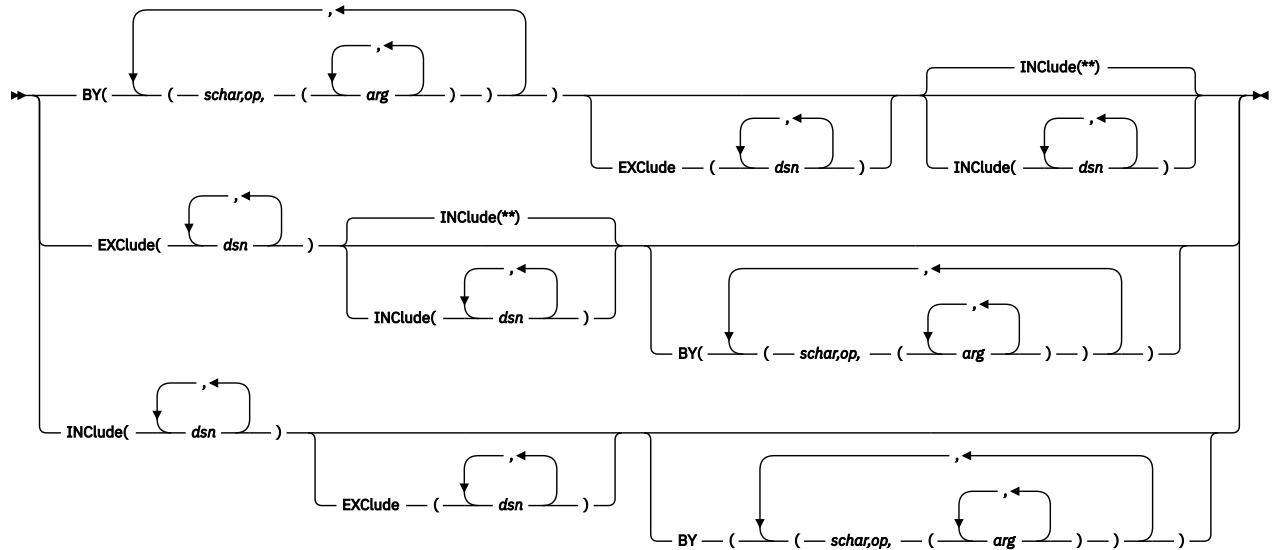
- The logical and physical data set COPY function supports hierarchical file system (HFS) data sets and zFS data sets. There is no support for copying individual files within an HFS or zFS.
- The COPY function is not supported for SAM compressed extended-format data sets being copied to a non-SMS-managed target.
- The COPY FULL or COPY TRACK commands might invoke ICKDSF to rebuild the VTOC INDEX data set for a target volume. Therefore, users of these commands require the appropriate authority for ICKDSF.
- When you perform a logical or physical COPY operation of a VSAM compressed data set, the target data set allocation must be consistent with the source data set allocation as follows:
 - If the source is an extended-format VSAM KSDS, then the target must be an extended-format VSAM KSDS.
 - If the source is a compressed VSAM KSDS, then the target must be a compressed VSAM KSDS.
 - If the source is an alternate index for an extended-format KSDS, then the target must be an alternate index for an extended-format KSDS.
 - The target control interval size must be equal to the source.
- If you copy a data set that has an F8/F9 DSCB pair to a volume that does not support F8/F9 DSCBs, the attributes in the F9 DSCB are lost. To retain these extended attributes, the target volumes of the COPY, either SMS or nonSMS, must support F8/F9 DSCBs.

Target data set allocation differs between a physical data set and logical data set copy of non-VSAM data sets. Logical data set copy allocates target data sets according to the amount of used space in the source data set, thereby freeing unused space. Physical data set copy preserves the original size of the source data set. To force unused space to be kept during logical data set copy, the ALLDATA or ALLEXCP keyword must be specified.

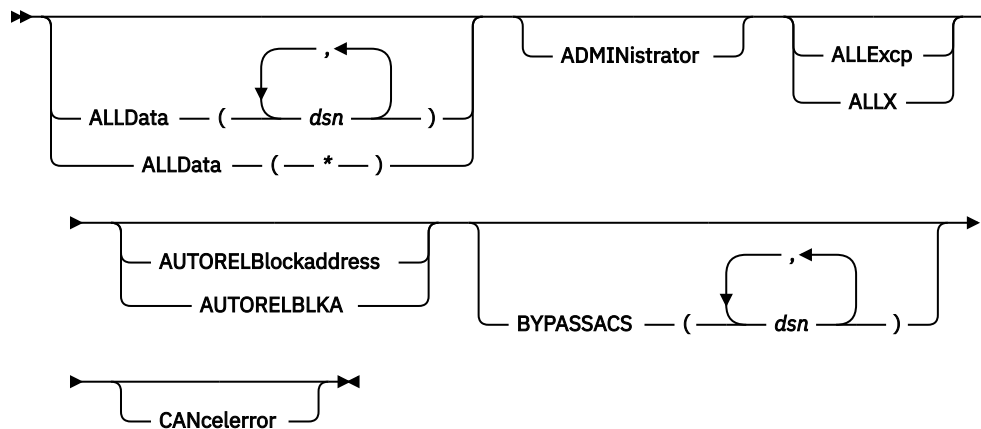
COPY DATASET Command Syntax for Logical Data Set



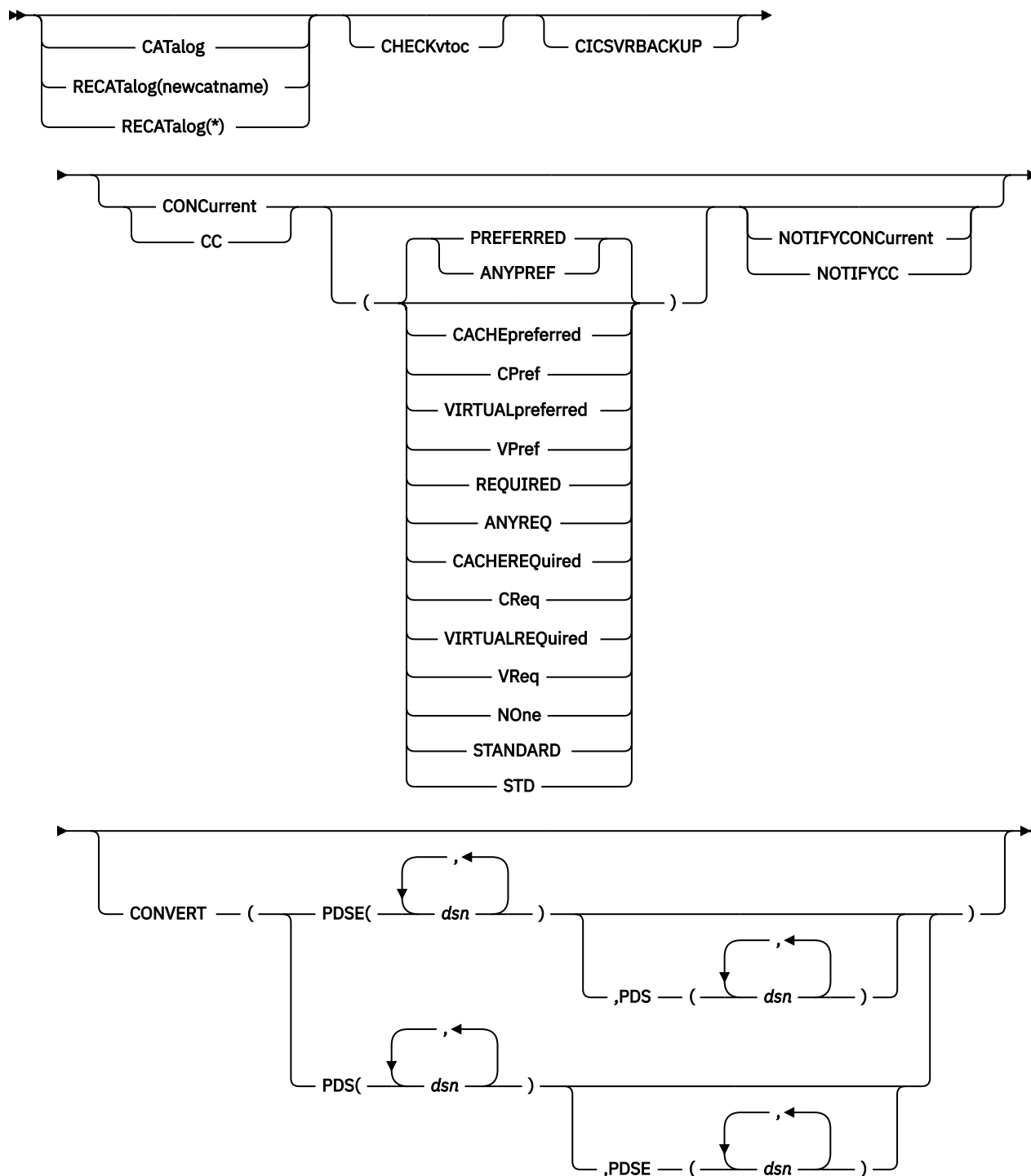
A: Additional Keywords Used for Logical Data Sets

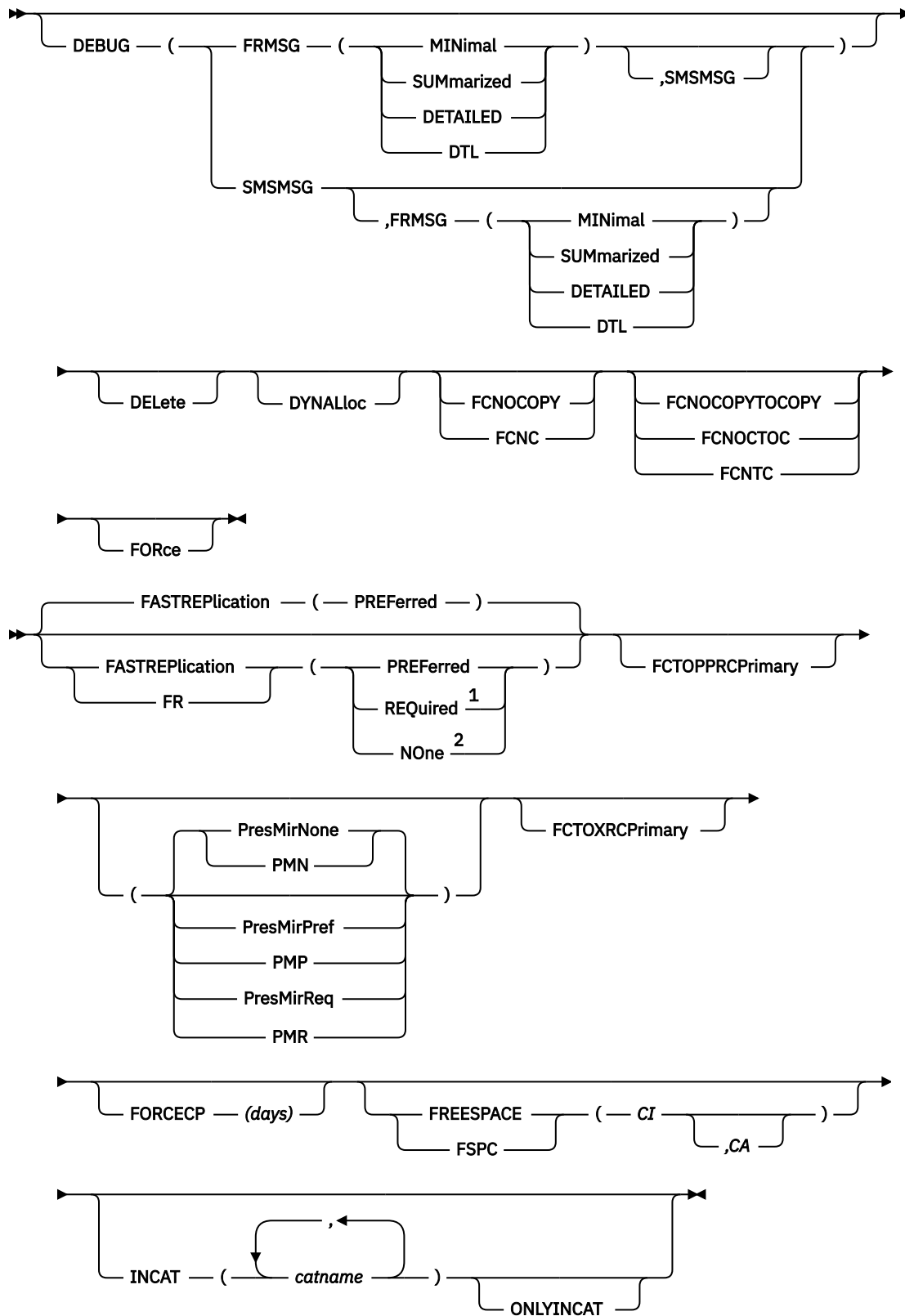


B: Optional Keywords Used for Logical Data Sets

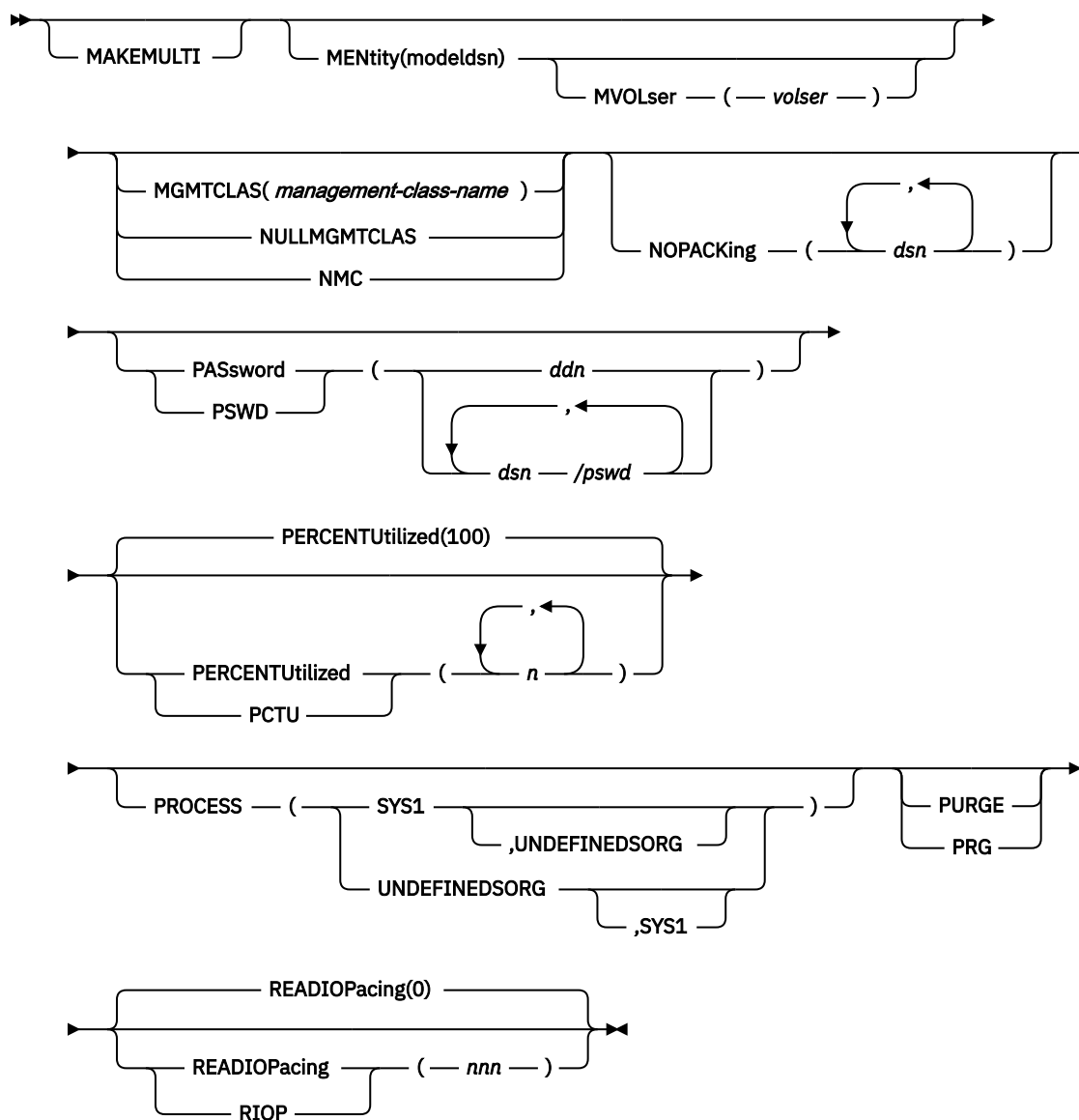


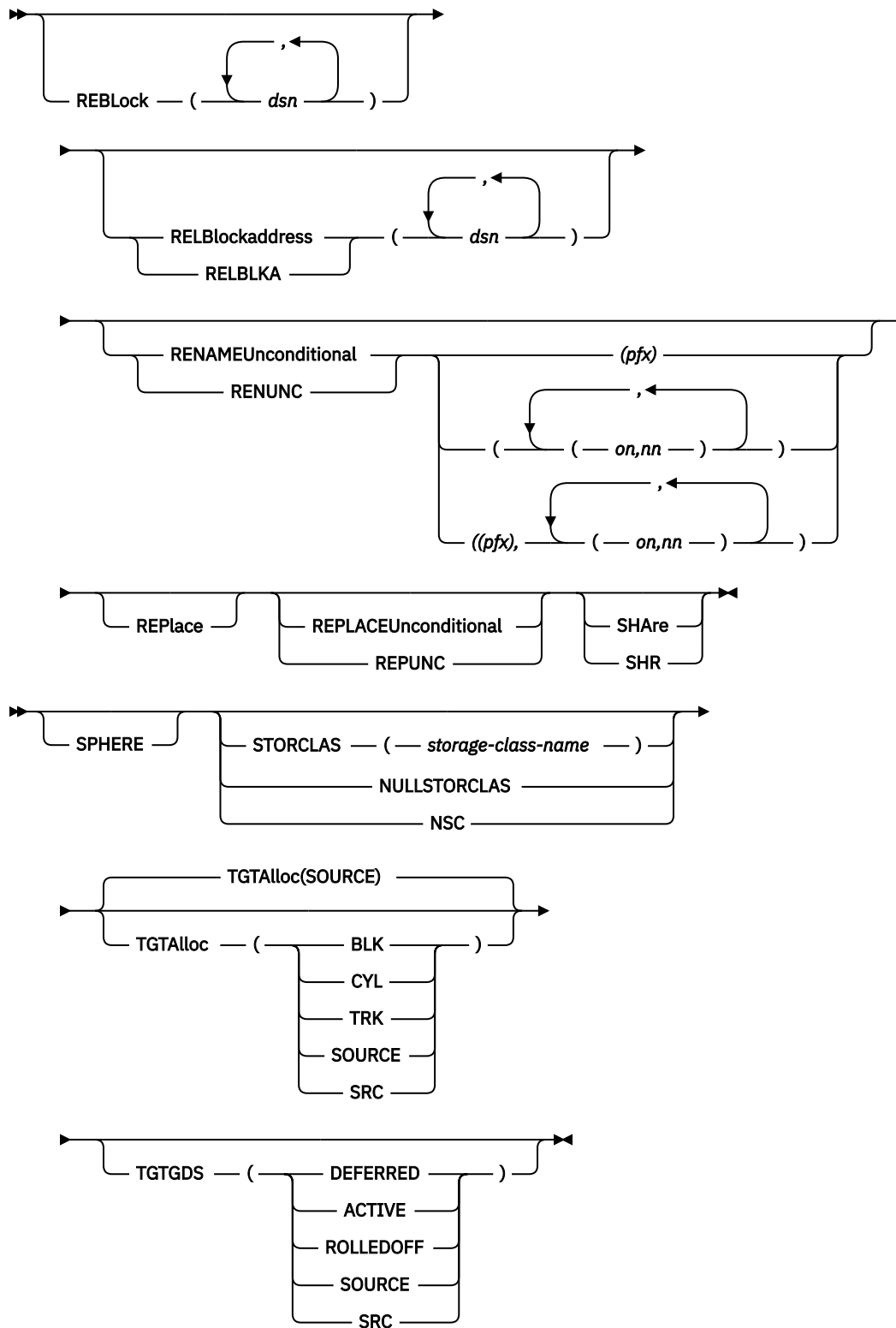
COPY Command



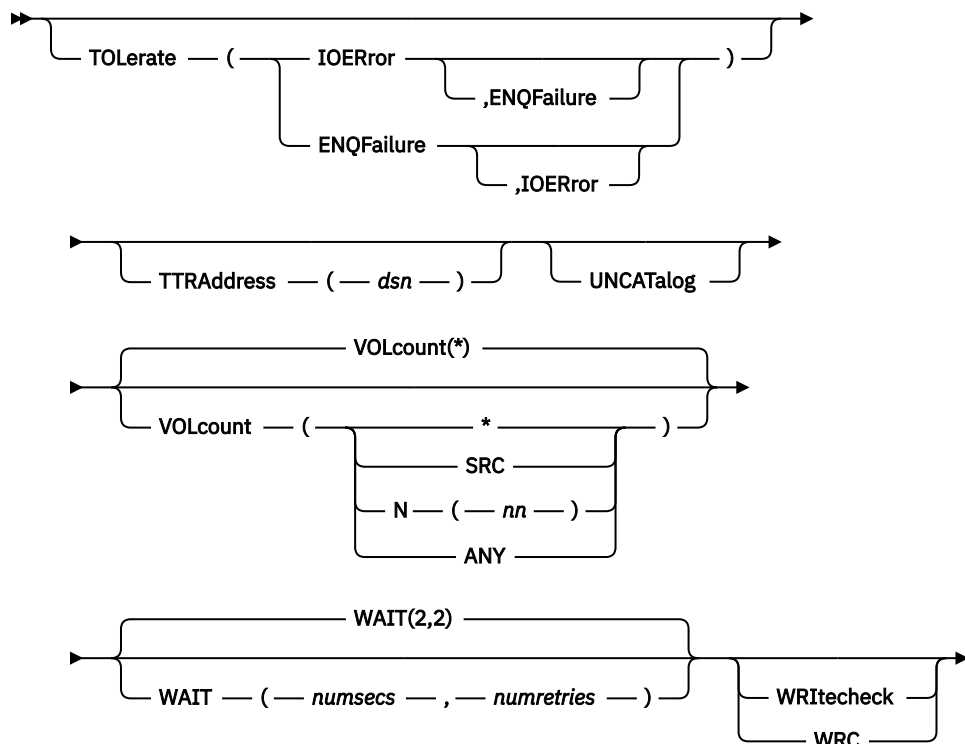


COPY Command





COPY Command

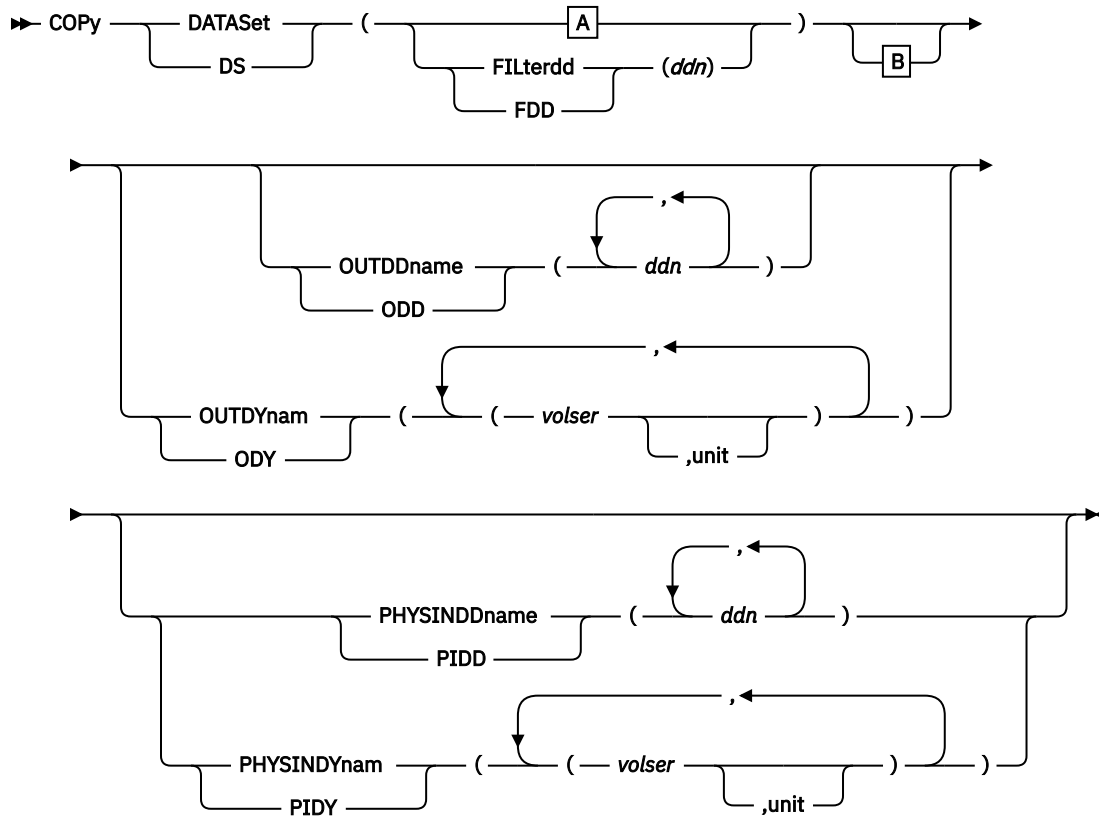


Notes:

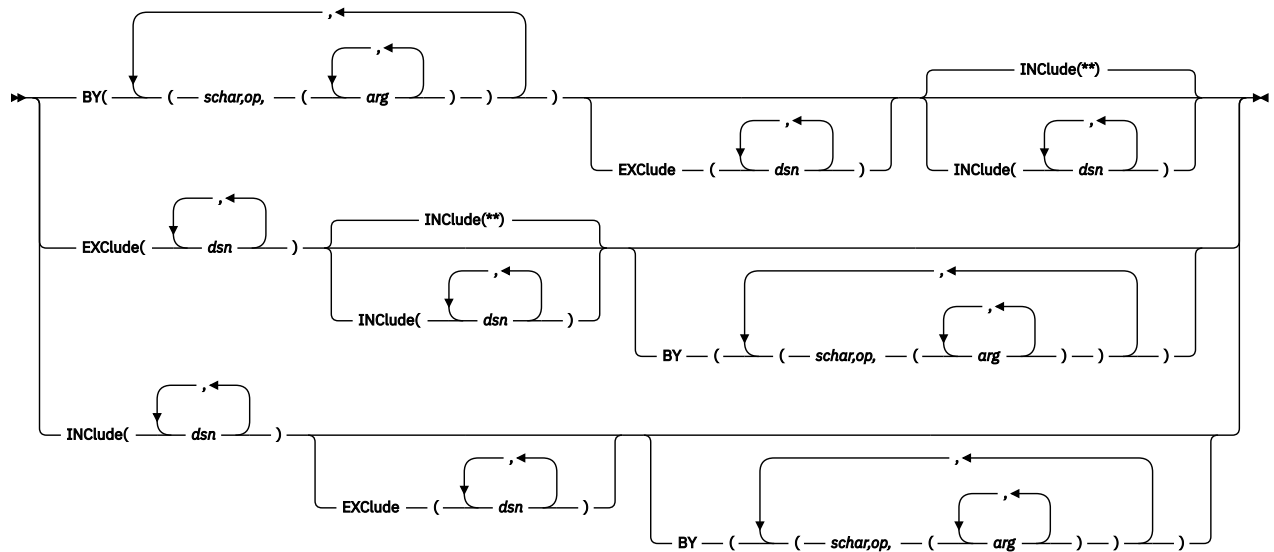
¹ Do not use the FASTREPLication (REQuired) keyword with the CONCURRENT(ANYPREF | ANYREQ | VIRTUALPREF | VIRTUALREQ | CACHEPREF | CACHEREQ) keyword.

² Do not use the FASTREPLication (NONE) keyword with the FCNOCOPY or FCTOPPRCPrimary keywords.

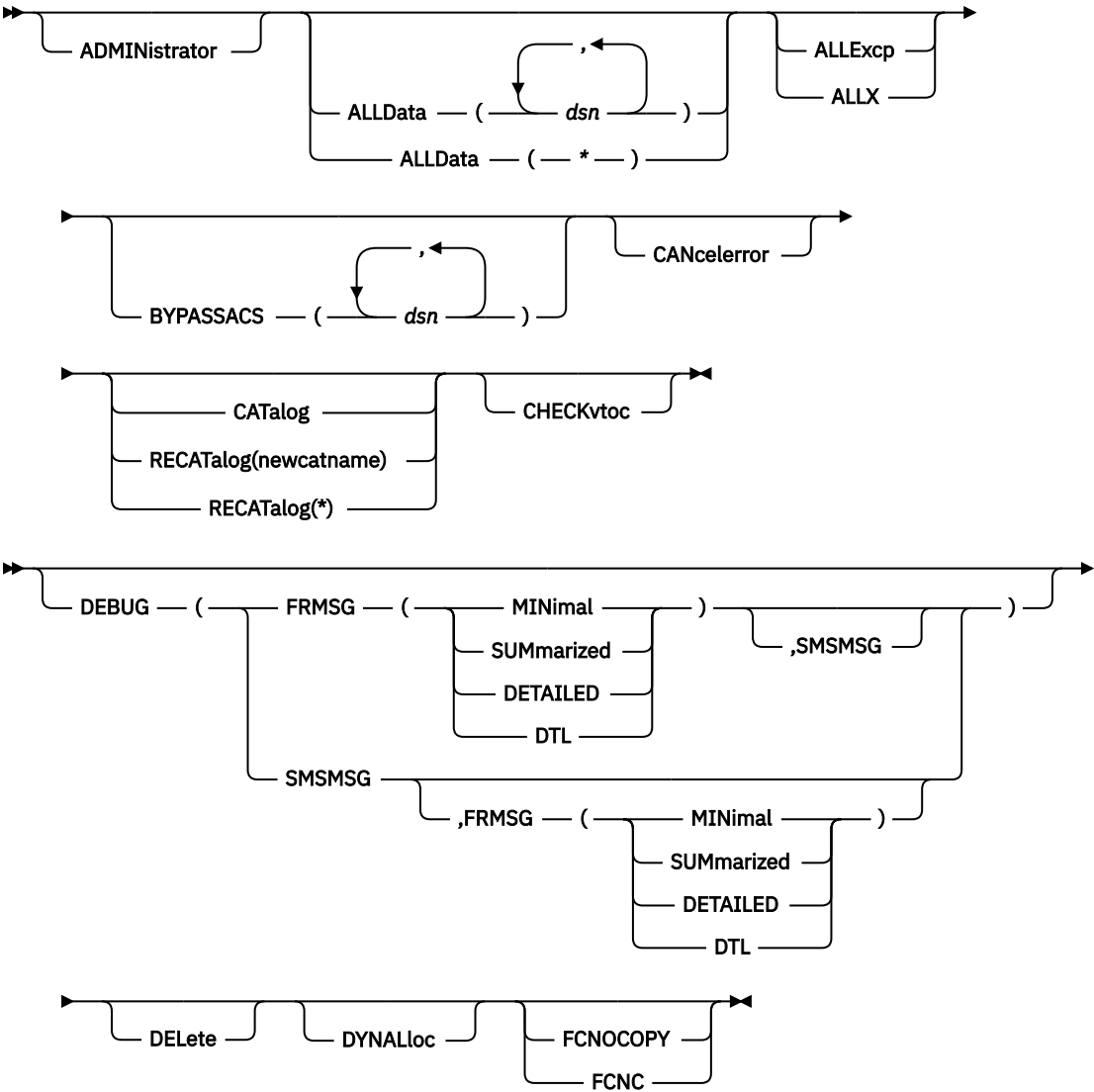
COPY DATASET Command Syntax for Physical Data Set

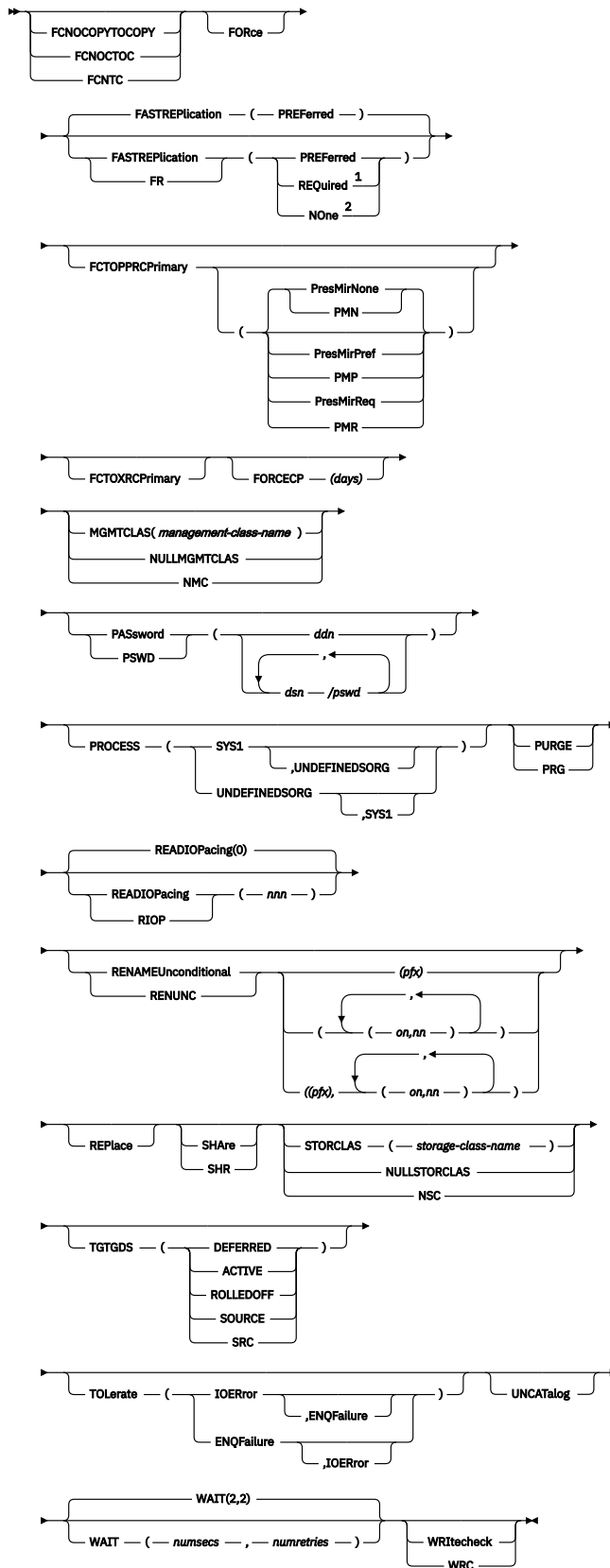


A: Additional Keywords Used for Physical Data Sets



B: Optional Keywords Used for Physical Data Sets





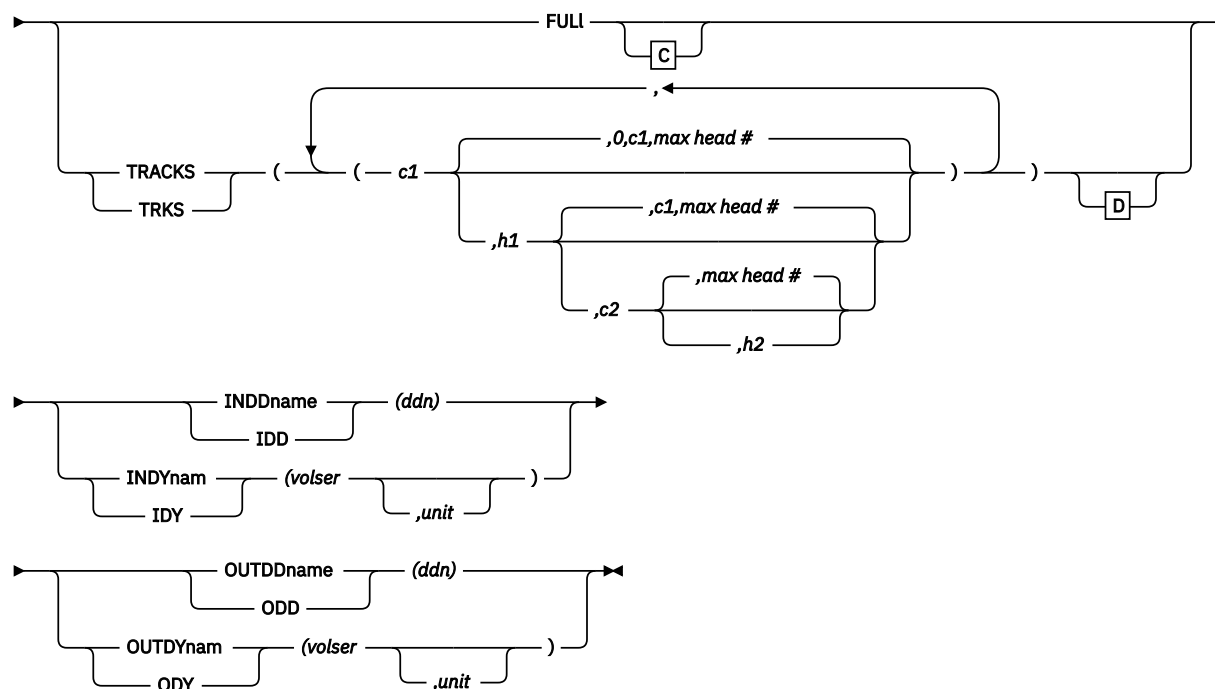
Notes:

¹ Do not use the FASTREPLICATION (REQuired) keyword with the CONCURRENT(ANYPREF | ANYREQ | VIRTUALPREF | VIRTUALREQ | CACHEPREF | CACHEREQ) keyword.

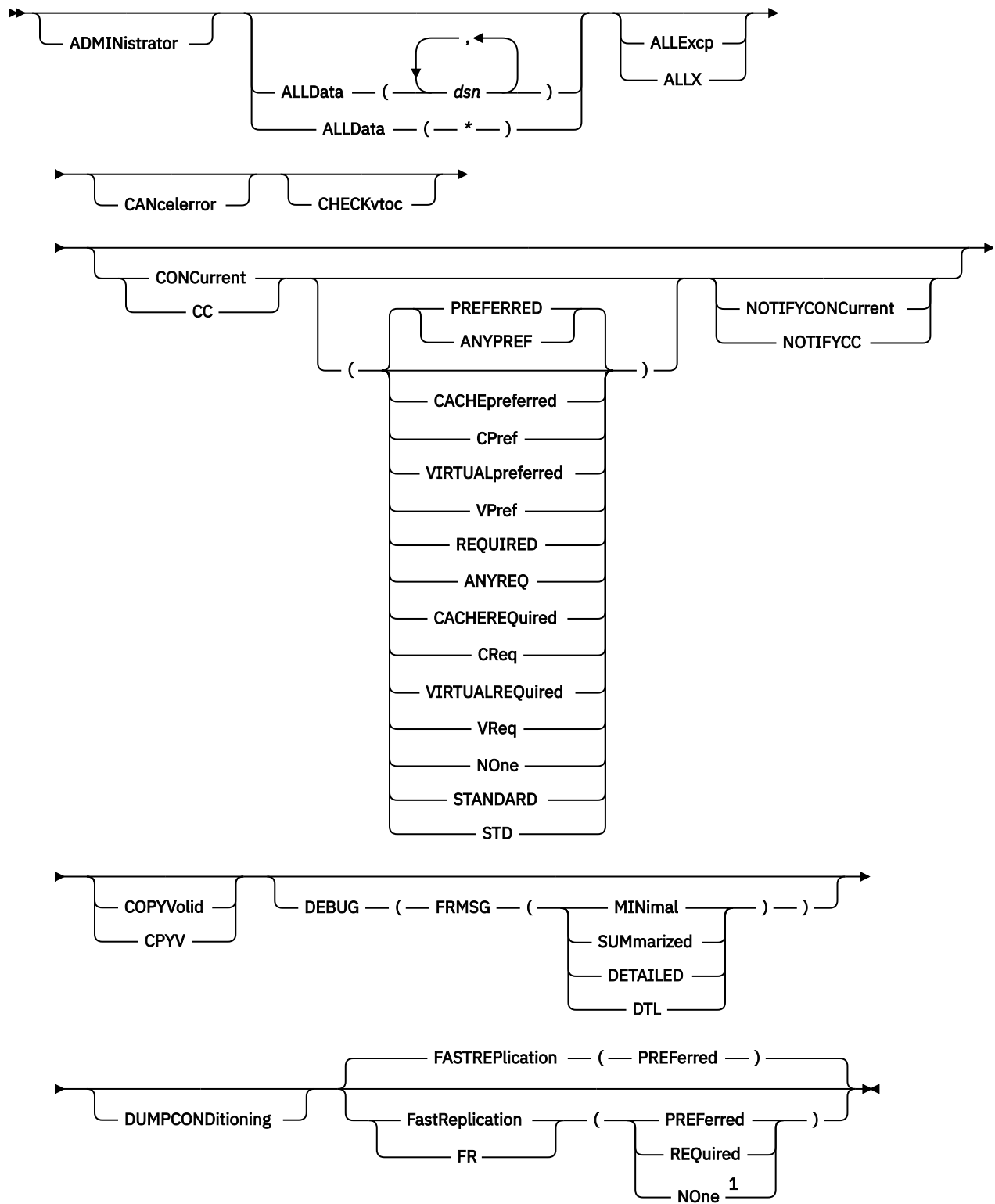
² Do not use the FASTREPLICATION (NONE) keyword with the FCNOCOPY or FCTOPPRCPrimary keywords.

COPY FULL and COPY TRACKS syntax

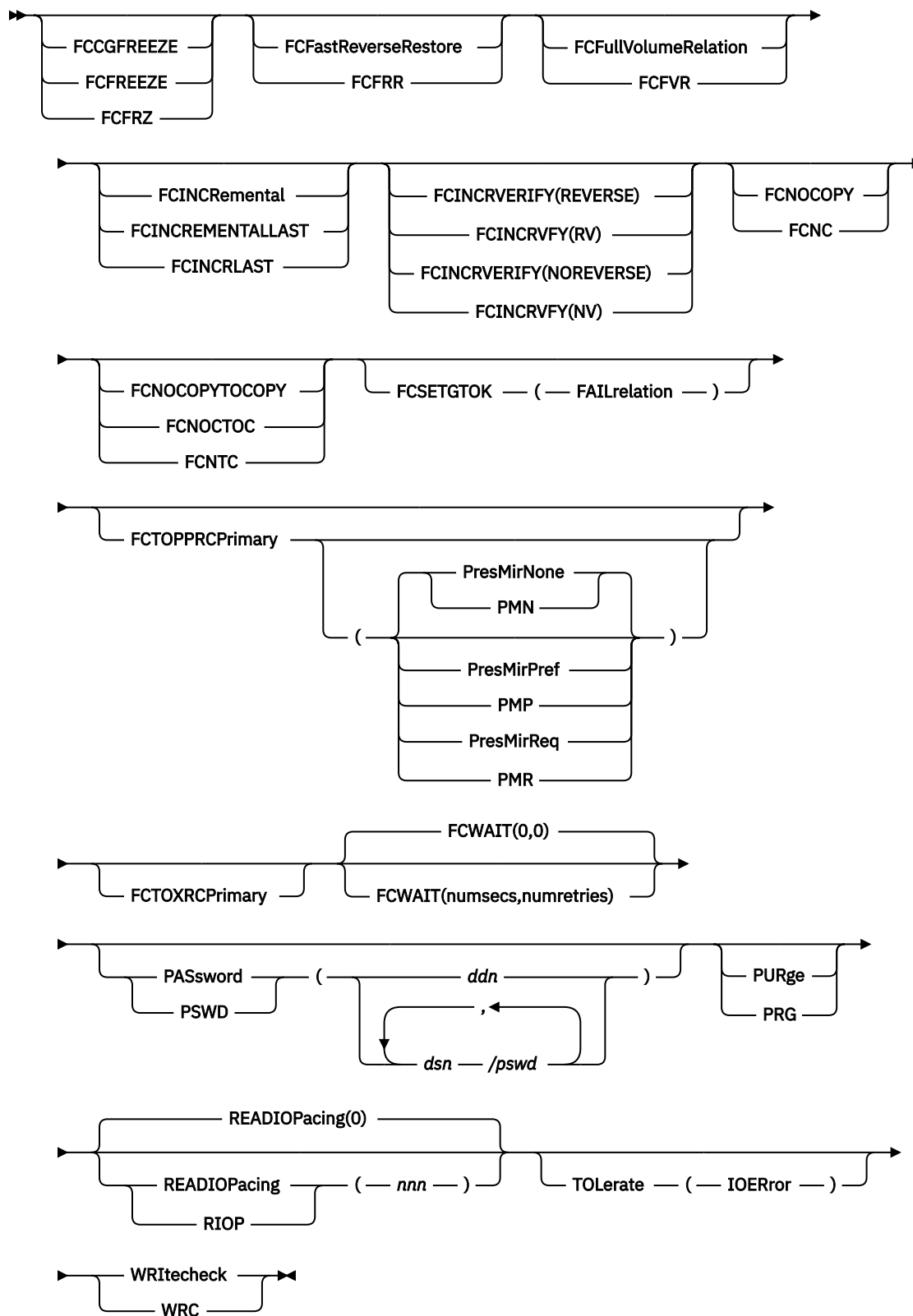
►► **COPy** ►►



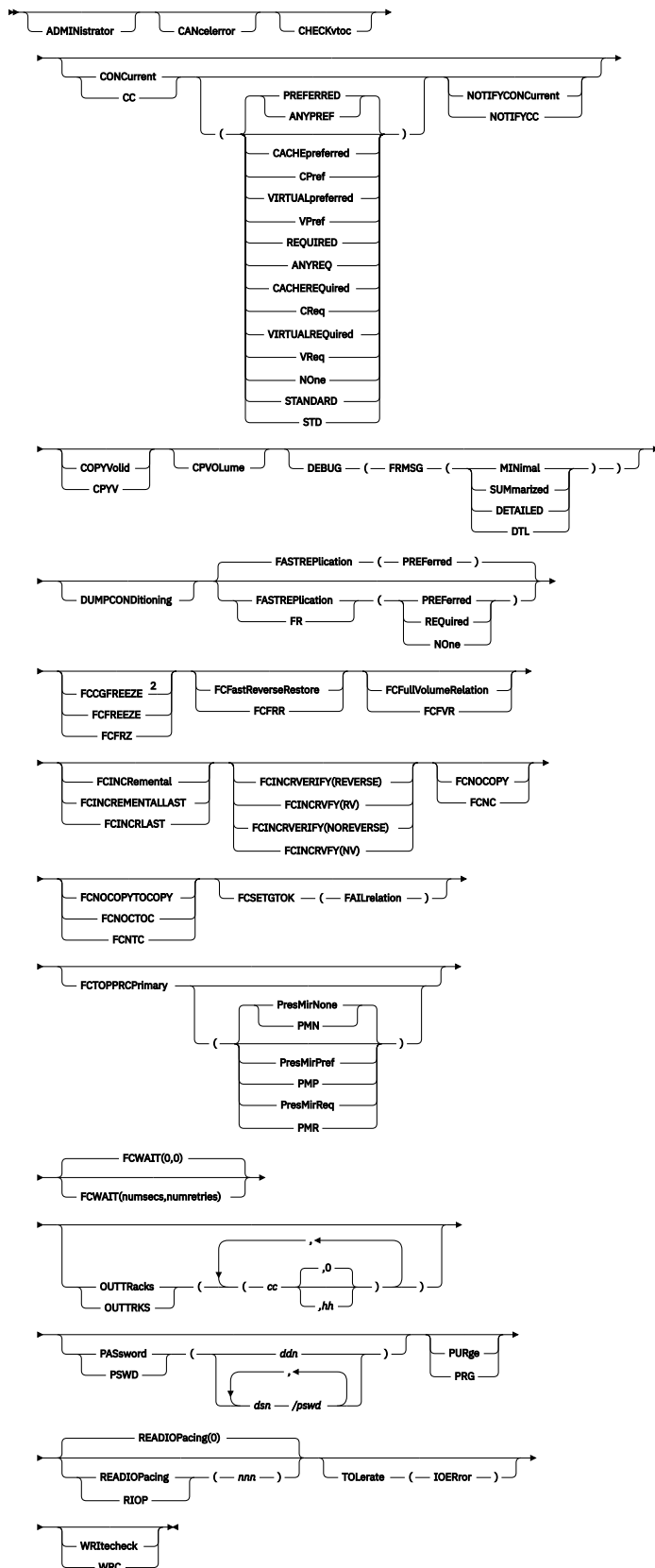
C: Optional Keywords with COPY FULL



COPY Command



D: Optional Keywords with COPY TRACKS



Notes:

¹ Do not use the FASTREPLICATION (NONE) keyword with the FCFULLVOLUMERELATION, FCNOCOPY, FCSETGTOK, or FCTOPPRCPPRIMARY keywords.

² For COPY TRACKS operations, the FCCGFREEZE, FCINCREMENTAL, and FCINCREMENTALLAST keywords require that the CPVOLUME keyword be specified, too. For more information, see the keyword descriptions.

Explanation of COPY Command Keywords

This section describes the keywords for the COPY command.

FCTOXRCPRIARY



FCTOXRCPriary indicates that if the specified target volume is an XRC primary device, it is allowed to become the target of a FlashCopy operation during any type of COPY command.

Note:

1. To specify FCTOXRCPriary, RACF authorization may be required.
2. Do not use the FastTReplication(NONE), COPYVolid, or FCFastReverseRestore keywords with the FCTOXRCPriary keyword.
3. The DEBUG(FRMSG(SUMMARIZED)) keyword is set as the default if no other DEBUG FRMSG option is specified.

For more information about RACF authorization, see [z/OS DFSMSdss Storage Administration](#).

For more information about RACF FACILITY class profiles, see [z/OS Security Server RACF Security Administrator's Guide](#).

For more information about Remote Pair FlashCopy for XRC, see [z/OS DFSMS Advanced Copy Services](#).

Protecting DFSMSdss functions with RACF FACILITY class profiles

Besides protecting DFSMSdss/ISMF functions, you can also protect certain DFSMSdss keywords and functions. You do so by defining RACF FACILITY class profiles and restricting access to those profiles. Table 4 on page 100 lists these keywords and functions, and their associated RACF FACILITY class profiles.

For a given command or parameter, protection occurs when both of the following conditions are met:

- RACF FACILITY class is active
- The indicated profile has been defined.

When the RACF FACILITY class is active and one of the profiles listed in Table 4 on page 100 is defined, you must have READ access authority to use the indicated command or keyword. Otherwise, anyone can use the indicated command or keyword. If RACF FACILITY class checking is not set up for these keywords, any DFSMSdss user can use them.

Table 4. RACF FACILITY Class Profile Names for DFSMSdss Keywords	
Keyword or Function	Profile Name
BYPASSACS with COPY	STGADMIN.ADR.COPY.BYPASSACS
BYPASSACS with RESTORE	STGADMIN.ADR.RESTORE.BYPASSACS
CGCREATED	STGADMIN.ADR.CGCREATE
CLOUD with DUMP	STGADMIN.ADR.DUMP.CLOUD
CLOUD with RESTORE	STGADMIN.ADR.RESTORE.CLOUD
CLOUDUTILS	STGADMIN.ADR.CLOUDUTILS
CONCURRENT with COPY	STGADMIN.ADR.COPY.CNCURRNT

Table 4. RACF FACILITY Class Profile Names for DFSMSdss Keywords (continued)

Keyword or Function	Profile Name
CONCURRENT with DUMP	STGADMIN.ADR.DUMP.CNCURRNT
CONSOLIDATE	STGADMIN.ADR.CONSolid
CONVERTV	STGADMIN.ADR.CONVERTV
DEFRAG	STGADMIN.ADR.DEFRAG
DELETCATALOGENTRY with RESTORE	STGADMIN.ADR.RESTORE.DELCATE
DELETE with CLOUDUTILS	STGADMIN.ADR.CLOUDUTILS.DELETE
FCCGFREEZE with COPY	STGADMIN.ADR.COPY.FCFREEZE
FCFASTREVERSERESTORE with COPY	STGADMIN.ADR.COPY.FCFRR
FCSETGTOK with COPY	STGADMIN.ADR.COPY.FCSETGT
FCTOPPRCPPRIMARY with COPY	STGADMIN.ADR.COPY.FCTOPPRCP
FCTOPPRCPPRIMARY with DEFRAG	STGADMIN.ADR.DEFRAG.FCTOPPRCP
FCTOXRCPPRIMARY with COPY	STGADMIN.ADR.COPY.FCTOXRCP
FlashCopy with CONSOLIDATE	STGADMIN.ADR.CONSolid.FLASHCPY
FlashCopy with COPY	STGADMIN.ADR.COPY.FLASHCPY
FlashCopy with DEFRAG	STGADMIN.ADR.DEFRAG.FLASHCPY
FORCE with CLOUDUTILS	STGADMIN.ADR.CLOUD.FORCE
IMPORT with RESTORE	STGADMIN.ADR.RESTORE.IMPORT
INCAT(<i>catname</i>) with COPY	STGADMIN.ADR.COPY.INCAT
INCAT(<i>catname</i>) with DUMP	STGADMIN.ADR.DUMP.INCAT
INCAT(<i>catname</i>) with RELEASE	STGADMIN.ADR.RELEASE.INCAT
PRINT	STGADMIN.ADR.PRINT
PRINT with TRACKS	STGADMIN.ADR.PRINT.TRACKS
PROCESS(SYS1) with COPY	STGADMIN.ADR.COPY.PROCESS.SYS
PROCESS(SYS1) with DUMP	STGADMIN.ADR.DUMP.PROCESS.SYS
PROCESS(SYS1) with RELEASE	STGADMIN.ADR.RELEASE.PROCESS.SYS
RESET with DUMP	STGADMIN.ADR.DUMP.RESET
RESET(YES) with RESTORE	STGADMIN.ADR.RESTORE.RESET.YES
SPACEREL	STGADMIN.ADR.SPACEREL
TOLERATE(ENQF) with COPY	STGADMIN.ADR.COPY.TOLERATE.ENQF
TOLERATE(ENQF) with DUMP	STGADMIN.ADR.DUMP.TOLERATE.ENQF
TOLERATE(ENQF) with RESTORE	STGADMIN.ADR.RESTORE.TOLERATE.ENQF
TOLERATE(WRITERS) with DUMP	STGADMIN.ADR.DUMP.TOLERATE.WRITERS
ZCOMPRESS with DUMP	STGADMIN.ADR.DUMP.ZCOMPRESS

You can bypass this type of RACF FACILITY class checking with the DFSMSdss installation options exit routine that your installation may be using.

For more information about the installation options exit routine, refer to [z/OS DFSMS Installation Exits](#).

For more information about RACF class profiles, refer to [*z/OS Security Server RACF Security Administrator's Guide*](#).

How to determine DFSMSdss version, release, and modification level

Subsystems that invoke DFSMSdss dynamically must determine if DFSMSdss is installed on the system, and if it is, its version, release, and modification level, and features supported. A DFSMSdss-provided macro tries to determine the DFSMSdss version, release, and modification level and features supported and pass the requested information in a register.

ADRMCLVL (in SYS1.MACLIB) is an inline executable assembler-language macro that can be invoked by a caller. The caller can be in problem program state and can have a user key. The caller must save registers 0, 1, 14, and 15 before invoking the macro. No other registers are disturbed. The caller can determine the installed level and features of DFSMSdss from the information that is returned in registers 1 and 14.

On return, register 1 contains information as follows:

- If the release level of ADRDSSU cannot be determined, register 1 contains X'04000000'.
- Otherwise, register 1 contains:

Byte 0

Product number, in binary:

- 0 = DFDSS
- 2 = MVS or OS/390 DFSMSdss
- 3 = z/OS DFSMSdss

Byte 1

Version number, in binary:

- 1 = Version 1
- 2 = Version 2

Byte 2

When byte 0 is 0 or 2:

– Release number, in binary:

- 1 = Release 1
- 2 = Release 2
- 3 = Release 3
- 4 = Release 4
- 5 = Release 5
- A = Release 10

When byte 0 is 3:

– Release number, in decimal:

- 01 = Release 1
- 02 = Release 2
- 03 = Release 3
- 04 = Release 4
- 05 = Release 5
- 10 = Release 10
- 11 = Release 11
- 12 = Release 12

Byte 3

Modification level, in binary:

- 0 = Modification level 0

1 = Modification level 1

2 = Modification level 2

On return, register 14 contains the following information:

- If the release level of ADRDSSU is less than DFSMSdss Version 1, Release 4, Modification level 0, then the contents of register 14 are unpredictable.
- Otherwise, register 14 contains the following:

Byte 0

Feature Flags:

Bit 0, when set to 1, means DFSMSdss cross-memory Application Programming Interface support for concurrent copy is available.

Bit 1, when set to 1, means the PTF that introduced the ZCOMPRESS keyword support (OA42238) is applied.

Bit 2, when set to 1, means the software support that introduced the Bypass verification exit (Eioption 22), Bypass Source Serialization (EI22_BYPASS_SOURCE_SER) during logical copy is applied (OA49854).

Bit 3, when set to 1, means DFSMSdss has the software support for the FCTOXRCPPRIMARY function (APAR OA44701).

Bit 4, when set to 1, means the PTF that introduced transparent cloud tiering cloud/archive (OA48365) is applied.

Bit 5, when set to 1, means that the PTF that introduced full volume support for transparent cloud tiering (OA57526) is applied.

Bits 6–7 are reserved.

Bytes 1–3

Reserved.

DFSMSHsm and RPFC for XRC

RPFC for XRC impacts support for fast replication recovery and backup, and includes an ALLOWXRC parameter on the FRRECOV command. For SMS-managed storage, a new transition copy technique, FC XRCPRIMARY (FCX), is added. Details are provided in the topics that follow.

Space management of SMS-managed storage

DFSMSHsm manages SMS-managed storage by data sets. That is, the specification for how to treat each data set on a volume is contained in the management class associated with that data set. The storage management subsystem determines to which volume the data set is recalled.

Specifying class transition attributes

The class transition attributes allow you to specify:

- When a data set is eligible to transition
- Which copy technique to use to move the data set
- What action to take when there is a serialization error

There are three defined class transition attributes that can be used to specify if and when data sets should transition:

- TIME SINCE CREATION indicates the YEARS, MONTHS and/or DAYS that must elapse relative to the date that a data set was created. If left blank (the default value), this indicates that no transitions should occur based on these criteria.
- TIME SINCE LAST USE indicates the YEARS, MONTHS and/or DAYS that must elapse relative to the date that a data set was last referenced or used. If left blank (the default value), this indicates that no transitions should occur based on these criteria.

- PERIODIC indicates a MONTHLY, QUARTERLY or YEARLY cycle for which a data set should transition. If left blank (the default value), this indicates that no transitions should occur based on these criteria.

TRANSITION COPY TECHNIQUE specifies whether a point in time copy technique should be used. The available parameters are:

- STANDARD (STD)
- FAST REPLICATION PREFERRED (FRP)
- FAST REPLICATION REQUIRED (FRR)
- PRESERVE MIRROR PREFERRED (PMP)
- PRESERVE MIRROR REQUIRED (PMR)
- FC XRCPRIMARY (FCX)

These parameters function as follows:

- STANDARD (STD) specifies that only standard I/O should be used to perform the data movement. This is the default.
- FAST REPLICATION PREFERRED (FRP) specifies that fast replication should be used when possible. If fast replication cannot be used, then it is acceptable to use standard I/O to perform the data movement.
- FAST REPLICATION REQUIRED (FRR) specifies that fast replication is required. If fast replication cannot be used, then the transition fails.
- PRESERVE MIRROR PREFERRED (PMP) specifies that a Metro Mirror primary volume is allowed to become a FlashCopy target, and it would be preferable that the Metro Mirror pair does not go into a duplex pending state as a result of the FlashCopy operation when the target volume is a Metro Mirror primary volume. If the preserve mirror operation cannot be accomplished, then the FlashCopy operation is still to be attempted. If the intended FlashCopy target volume is *not* a Metro Mirror primary volume, then the rules for FAST REPLICATION PREFERRED (FRP) are followed.
- PRESERVE MIRROR REQUIRED (PMR) specifies that a Metro Mirror or Global Mirror primary volume is allowed to become FlashCopy target volumes. If the FlashCopy target volume is a Metro Mirror primary device, a Preserve Mirror option is required when performing FlashCopy operation. If the target volume is *not* a Metro Mirror or Global Mirror primary volume, then the rules for FAST REPLICATION REQUIRED (FRR) are followed.
- FC XRCPRIMARY (FCX) specifies that an XRC primary volume is allowed to become a FlashCopy target. When the FCX option is set, the PMR option is also specified to DFSMSdss.

SERIALIZATION ERROR EXIT specifies an action to take when the data set cannot be exclusively serialized for the data movement. The available parameters are:

- NONE
- DB2®
- CICS®
- ZFS
- EXIT

These parameters function as follows:

- NONE specifies that the transition should fail with no additional action. This is the default.
- Db2 specifies that Db2 should be invoked to close the data set. If there are no Db2 transactions in progress and the data set is successfully closed and unallocated, then the data set will be exclusively serialized. If exclusive access is obtained, then the data set will be transitioned. After the data set has moved, Db2 is reinvoked to allocate and open the data set. If the serialization cannot be obtained or there are active Db2 transactions then the transition will fail.
- CICS specifies that CICS should be invoked to make the data set unavailable for use by CICS and to close all files open to the data set. If these steps are successful, then the data set will be exclusively serialized and then transitioned. After the data set has moved, CICS is reinvoked to enable the CICS

files to use the data set and make available the data set to be used by CICS. If the serialization cannot be obtained a second time, then the transition will fail.

- ZFS specifies that zFS should be invoked to unmount the data set. If the data set is successfully unmounted, then the data set will be exclusively serialized. The unmount will fail if the file system is currently accessing the data set. If exclusive access is obtained, then the data set will be transitioned. After the data set has moved, zFS is reinvoked to mount the data set.
- EXIT specifies that a user exit should be invoked to unserialize the data set. The exit will be invoked twice: initially to unserialize the data set, and a second time after the transition in order to reserialize the data set. The transition will be performed if the data set can be exclusively serialized after the user exit has been initially invoked.

Note:

1. When specifying a value other than NONE, ensure that only the appropriate types of data sets are assigned to the management class. For example, if Db2 is specified, then only Db2 objects should be assigned to this management class.
2. See *z/OS DFSMSdss Storage Administration* for more detailed information on the behavior of this option.
3. When a value of Db2 is specified, DFSMSShsm runs with DFSMSdss loaded in the DFSMSShsm address when transitioning/moving the data set.
4. When moving Db2 objects, DFSMSShsm must be authorized to the Db2 STOP and START commands.

Automatic primary space management

At the beginning of automatic primary space management, DFSMSShsm determines which volumes are candidates for processing. Volumes in storage groups that have a z/OS image specified by the MIGRATE SYSTEM/SYSPLEX NAME have a z/OS image affinity.

DFSMSShsm uses the following order of processing as a method of controlling input path contention. This order is subject to prioritizing for SMS volumes restricted to processing by one z/OS image.

1. Affinity SMS volumes
2. Retry of in-use affinity SMS volumes
3. Non-SMS and non-affinity SMS volumes

After DFSMSShsm has attempted to process all the candidate volumes eligible for automatic primary space management, it retries the selection of any of these volumes that were found to be in use by another DFSMSShsm function.

If multiple DFSMSShsm hosts perform automatic primary space management, only the first host to process a given volume performs the function.

Determining eligible data sets for backup

After DFSMSShsm determines that a data set is eligible for a class transition or migration, it checks whether the data set needs to be backed up.

For class transitions, a data set must be backed up if the TRANSITION COPY TECHNIQUE specifies that fast replication should be used or preserve mirror is preferred. If the data set has not been backed up and fast replication or preserve mirror are preferred, then standard data movement will be performed. If the data set has not been backed up and fast replication is required, then the transition will fail. A backup copy is not required when FC XRC Primary is set.

A backup copy is required whenever a fast replication technique other than preserve mirror required or FC XRC primary is used because DFSMSShsm processing for the data set completes before the data set is physically copied. If the TRANSITION TECHNIQUE preserve mirror required is specified to allow FlashCopy to Global Mirror Primaries, a valid backup copy must exist before the data set residing on a Global Mirror primary volume is transitioned. While unlikely, it is possible for the physical copy to fail. Requiring a backup copy of the data set ensures the availability of the data set should the physical copy

fail. Preserve mirror and Remote Pair FlashCopy (RPF) for XRC ensures that the data set is physically copied at both the local and remote site, which protects against errors.

For migration, a data set must be backed up if all of the following criteria are met:

- The data-set-changed indicator in the data set VTOC entry indicates that the data set has been changed.
- The management class contains the attribute AUTO BACKUP=Y.
- The management class ADMIN OR USER COMMAND BACKUP attribute contains either of the values ADMIN or BOTH.
- The storage group has the attribute AUTO BACKUP=Y.

DFSMSHsm identifies any migration-eligible data set that must be backed up. If the data set that must be backed up is identified for migration to tape, DFSMSHsm removes the identification as a migration candidate.

If concurrent copy was used to backup the data set and a system failure or cancel of DFSMSHsm occurred after the concurrent copy session was established, then the data-set-changed indicator can be off even though the data set was not successfully backed up. If this happens, migration will not identify the data set as needing a backup copy.

Transitioning an individual data set

You can drive SMS-managed data sets through class transition processing by using the MIGRATE or HMIGRATE command. When you issue a MIGRATE (or HMIGRATE) command with the TRANSITION keyword, DFSMSHsm invokes the ACS routines with the SPMGCLTR environment variable to determine the new management class, storage class and/or storage group to which the data set should be assigned. This is performed even when the data set is not eligible for a transition based on the class transition criteria for the currently assigned management class. If neither management class, storage class nor storage group changes, then no processing occurs. If only management class changes, then the data set is assigned the management class without any data movement. If either the storage class or storage group changes, then the data is moved. When data movement is performed, the management class transition copy technique and serialization error exit values are used.

For example, if a Db2 object is assigned a management class with a transition copy technique of PMREQ and serialization error exit value of Db2, and is assigned new storage group AGEDDATA, then a MIGRATE DSNAME(*db2.object*) TRANSITION command results in the object being closed by Db2 (if there are no active transitions), moved to a volume in storage group AGEDDATA using preserve mirror, and reopened by Db2 after the movement has completed.

Note: If a management class transition copy technique other than STANDARD, PRESERVE MIRROR REQUIRED, or FC XRCPRIMARY is specified, then a valid backup copy must exist before the data set is transitioned. This ensures that if an error occurs while physically moving the data through a storage controller function, then a backup is available to recover the data set.

If the transition technique PRESERVE MIRROR REQUIRED is specified to allow FlashCopy to Global Mirror Primaries, a valid backup copy must exist before the data set residing on a Global Mirror primary volume is transitioned. You can set one of the following patches to override this requirement:

```
PATCH .MGCB.+111 BITS(.....1.)
PATCH .MGCB.+111 BITS(.....1)
```

Moving data sets

Use the MOVE parameter with the MIGRATE command to move individual SMS-managed data sets from one L0 volume to another L0 volume. Specify MOVE with the MIGRATE DATASETNAME, MIGRATE VOLUME or MIGRATE STORAGEGROUP commands. MOVE causes DFSMSHsm to drive the standard allocation ACS routines to determine the volume to which the data set should be moved. DFSMSHsm then performs class transitioning processing for the data set When VOLUME or STORAGEGROUP processing is being

performed, all data sets on each volume are processed, regardless of threshold. When data movement is performed, the management class transition copy technique and serialization error exit values are used.

The MOVE parameter is intended to assist with the process of moving data off of one or volumes onto another. The typical cases for using MOVE are:

- Move data from one storage group to another (the basic case). The steps are as follows:
 1. Update the ACS routines such that new allocations go to the new storage group.
 2. Move existing data from the original storage group to the new storage group. When the move is being done, the ACS routines are already defined to drive the data to the new storage group.
- Move data from one volume to another within the same storage group. Moving within storage groups doesn't require any value here, because the allocation needs to be within the existing storage group. The existing ACS logic is usable because it just selects the same storage group. To prevent any new allocations from going to the source volume, this volume should be put into DISNEW or DISALL state. If allocations to the source volume are not prevented, then the MIGRATE MOVE command may fail if SMS selects one or more volumes on which the data set currently resides.

Note:

1. During MOVE processing, the statistic records (DSR and VSR) are created with the class transition function code.
2. The MOVE processing uses the transition processing messages.
3. The management class Transition Copy Technique setting can be also used to specify copy technique for MOVE processing. Note that if a copy technique other than STANDARD, PRESERVE MIRROR REQUIRED, or FC XRCPRIMARY is specified, then a valid backup copy must exist before the data set is transitioned. This ensures availability of the backup if an error occurs while physically moving.

If the transition technique PRESERVE MIRROR REQUIRED is specified to allow FlashCopy to Global Mirror Primaries, a valid backup copy must exist before the data set residing on a Global Mirror primary volume is transitioned. You can set one of the following patches to override this requirement:

```
PATCH .MGCB.+111 BITS(.....1.)
PATCH .MGCB.+111 BITS(.....1)
```

4. When moving Db2 objects, DFSMSHsm must be authorized to the Db2 STOP and START commands.

FRRECOV command: Requesting a fast replication recovery

The FRRECOV command can be used to recover a copy pool or individual volumes and data sets from the managed copy pool copies. The backup copy to be recovered can reside on either DASD or tape. If the backup copy resides on both DASD and tape, the default is to use the DASD backup copy.

To restrict the recovery to only backup copy versions residing on DASD or tape, use the FROMDASD or FROMDUMP options, respectively. If the backup copy version is not found on either DASD or tape, the recovery request will fail.

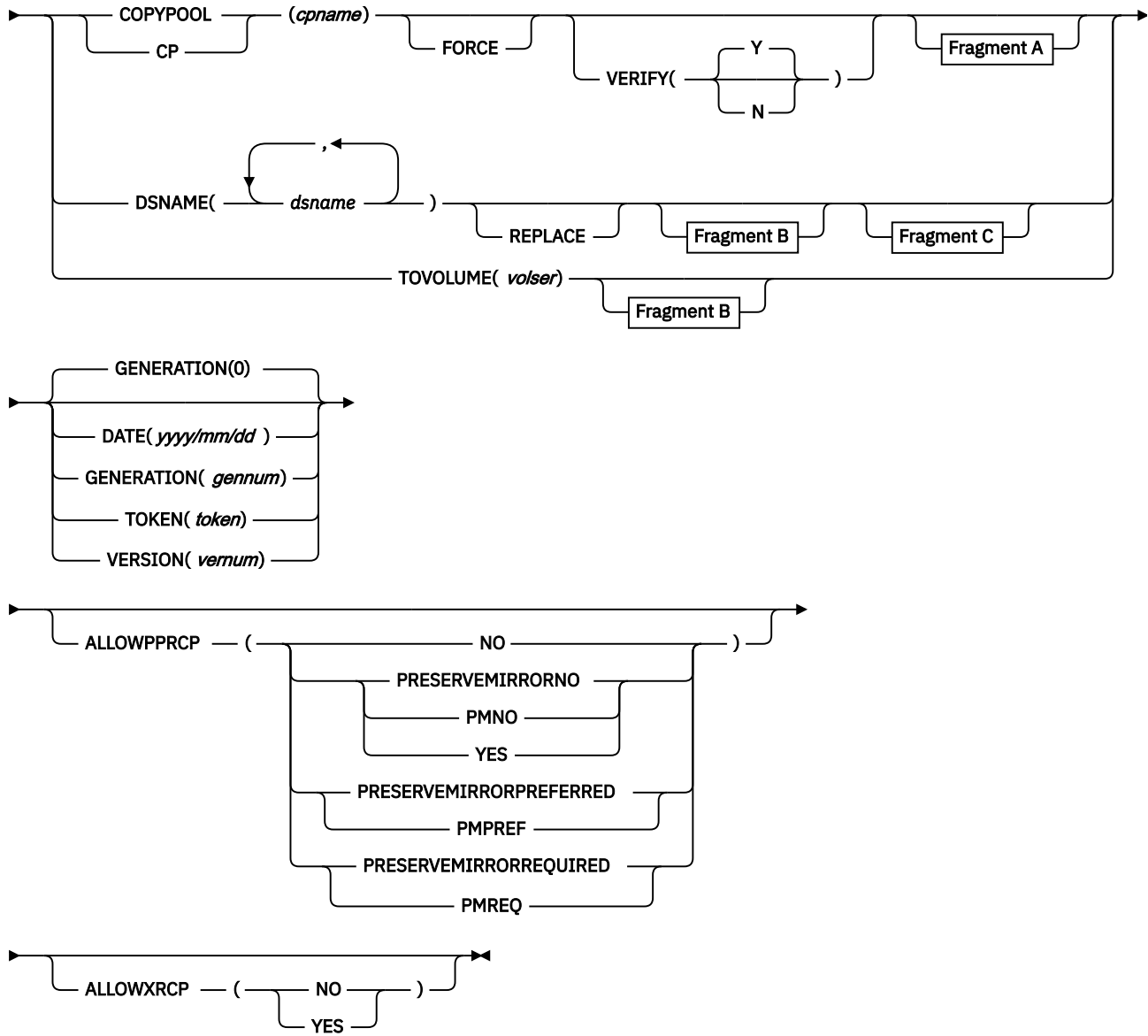
When DATE, GENERATION, TOKEN, or VERSION is specified, the corresponding backup copy will be recovered. If no specific backup copy is specified, an attempt to recover generation zero will occur. If no valid backup copy (either the indicated or implicit) is found, on DASD or tape, the recovery request will fail.

A specific dump class to recover the version from can be specified when recovering from a dump copy on tape. When recovery is performed at the copy pool level, and the dump copy to recover is a partial dump, the recovery request will fail unless the PARTIALOK option is specified.

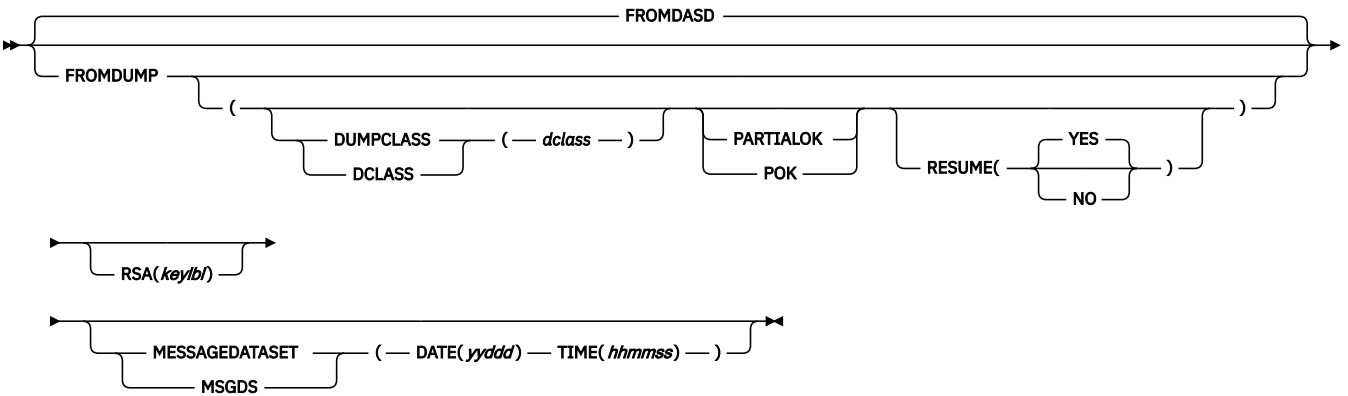
Note: Because fast replication can be used to make volume-level recoveries, there are important factors to consider to ensure that the backup and recovery process restores your data to a usable state. Before using the fast replication function, see [Managing volume backups with fast replication in z/OS DFSMS Advanced Copy Services](#).

Syntax of the FRRECOV command

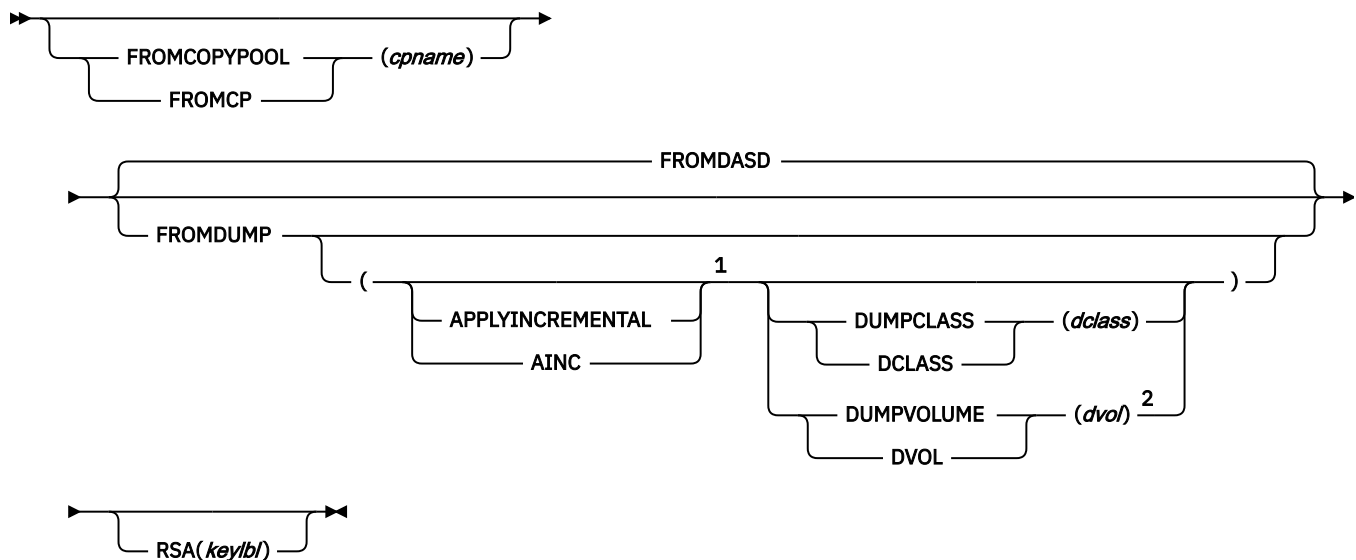
➤ FRRECOV ➤



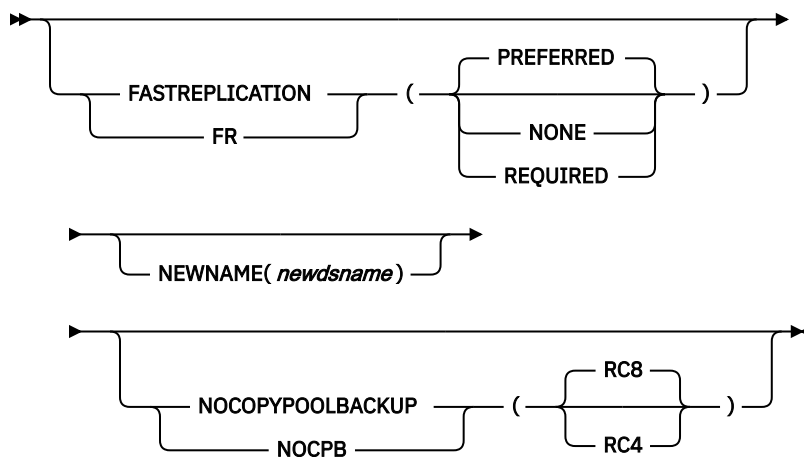
A: COPYPOOL and TOVOLUME optional parameters



B: DSNAME and TOVOLUME optional parameters



C: DSNAME only optional parameters



Notes:

¹ APPLYINCREMENTAL is valid only with the TOVOLUME keyword and is applicable only when the recovery is from a dump volume.

² FROMDUMP(DUMPVOLUME(dvol)) is mutually exclusive with the DATE, GENERATION, TOKEN, and VERSION parameters.

ALLOWXRCP: Specifying an extended remote copy primary volume option for a FlashCopy operation

Explanation:

ALLOWXRCP is an optional parameter that specifies whether an extended remote copy (XRC) primary volume is allowed to become a target of a FlashCopy operation during fast replication recovery. When you specify ALLOWXRCP, you must specify one of the following options:

NO

Specifies that an XRC primary volume is not to become a FlashCopy target. This is the default.

YES

Specifies that an XRC primary volume is allowed to become a FlashCopy target. If the target volume is not an XRC volume, this parameter has no effect.

Note:

1. The ALLOWXRCP parameter overrides the specified setting for the SMS copy pool. The override is not persistent and applies to the current invocation of the FRRECOV command only.
2. ALLOWXRCP is ignored when recovering from a tape.
3. ALLOWXRCP(YES) cannot be specified in combination with the FASTREPLICATION option of NONE for data set recoveries.
4. ALLOWXRCP(YES) cannot be specified in combination with the fast reverse restore option.

Defaults: If you do not specify ALLOWXRCP on the FRRECOV command, DFSMSHsm uses the currently specified option for the SMS copy pool. If no ALLOWXRCP option has been designated for the copy pool, the default is NO.

Related reading: For more information about IBM remote pair FlashCopy, XRC, and other copy services functions, see [z/OS DFSMS Advanced Copy Services](#).

Using the XRC primary volume during fast replication backup

You can use the FRBACKUP to XRC Primary Volumes allowed field in the SMS copy pool definition panel to indicate whether an XRC primary volume is an eligible FlashCopy target during backup processing.

If you specify a value (YES/NO) in the FRBACKUP to XRC Primary Volumes allowed field, the value specified is considered in selecting FlashCopy target volumes for FRBACKUP processing during volume pairing. If no XRC Primary allowed indicator is set for the copy pool, the default is NO. When you specify a value in the FRRECOV to XRC Primary Volumes allowed field in the SMS copy pool definition panel, the LO volumes are not examined for FlashCopy XRC primary eligibility for FRRECOV processing during volume pairing. If Remote Pair FlashCopy to XRC is required during fast replication recovery, you must ensure that your copy pool environment meets Remote Pair FlashCopy/XRC configuration requirements.

In a Metro/zOS GM environment, both XRC Primary YES and PMREQ option must be set to allow FlashCopy to metro mirror and XRC primary volumes. See [z/OS DFSMS Advanced Copy Services](#) for more information.

Using the XRC primary volume during fast replication recovery

The FRRECOV command uses fast replication to recover one or more data sets, a single volume, or a pool of volumes from the managed backup versions. You can use the SMS copy pool field FRRECOV to XRC Primary Volumes allowed to indicate to DFSMSHsm whether an XRC primary volume is an eligible FlashCopy target. DFSMSHsm indicates this option to DFSMSdss for fast replication recovery.

If you did not specify a value (YES/NO) in the FRRECOV to XRC Primary Volumes allowed field in the SMS copy pool definition panel, you can specify the ALLOWXRCP keyword on the FRRECOV command. Specifying ALLOWXRCP on the FRRECOV command overrides the currently defined FlashCopy to XRC Primary indicator for the copy pool. The ALLOWXRCP value specified on the FRRECOV command, however, is used only once during the FRRECOV operation and is not stored in the copy pool record. You can determine the value of the current FRRECOV to XRC Primary Allowed indicator for the COPYPOOL using the ISMF COPY POOL panels.

The fast reverse restore option cannot be combined with the FlashCopy to XRC Primary option. Do not specify FRBACKUP to XRC Primary Volumes (YES) or FRRECOV to XRC Primary Volumes (YES) for a copy pool defined allowing fast reverse restore.

In a Metro/zOS GM environment, both XRC Primary YES and the PMREQ option must be set to allow FlashCopy to metro mirror and XRC primary volumes. See [z/OS DFSMS Advanced Copy Services](#) for more information.

DFSMSdftp and RPFC for XRC

An option is now available for specifying a transition copy technique of RPFC for XRC, when you define a management class.

Steps for defining a copy pool

Before you begin:

1. Back up the SMS Source Control Data Set (SCDS).

Perform the following steps to define a copy pool.

1. Select option P, Copy Pool, on the ISMF Primary Option Menu for Storage Administrators. This displays the Copy Pool Application Selection panel.
2. Supply values on the Copy Pool Application Selection panel:

CDS Name

Specifies the name of the SCDS where the copy pool is located. Valid values include:

- A data set name that follows TSO naming conventions
- The quoted word 'ACTIVE', which specifies the currently active configuration

The CDS Name field is required. There is no default.

Copy Pool Name

Specifies the name of the copy pool. The maximum length is 23 alphanumeric or special characters. The first character cannot be numeric.

The Copy Pool Name field is required. There is no default.

Guideline: For Db2®, use the required Db2 naming convention when you name the copy pool.

Option

Select option 3, Define. This displays the Copy Pool Define panel.

3. Supply values on the Copy Pool Define panel. The SCDS Name and Copy Pool Name fields are primed by ISMF with the values that are specified on the Copy Pool Application Selection panel.

Description

Describes the copy pool. You can use up to 120 characters.

Description is optional.

Auto Dump

Specifies with Y or N whether volumes in this copy pool are to be eligible for automatic dump processing.

Auto Dump is a required field. The default is N.

Dump Sys/Sys Group Name

Specifies the 1-8 character name of the system or system group where volumes in this copy pool are to automatically dump to back-up volumes (the auto dump affinity).

Dump Sys/Sys Group Name is an optional field.

Dump Class

Specifies the 1-8 character names of up to five dump classes. ISMF does no validity checking of the values you enter in these fields.

Dump Class is an optional field.

Number of DASD Fast Replication Backup Versions with Background Copy

Specifies the number of fast replication backup versions of the copy pool that you want to be maintained by DFSMSHsm. Valid values range from 0 to 85. You can leave the field blank. If you specify 0 (zero), DFSMSHsm creates the DASD backup copy with the NOCOPY option.

Number of DASD Fast Replication Backup Versions with Background Copy is an optional field. The default is 2.

Each backup version that you specify requires a unique target volume for each source volume. Target volumes are defined in the copy pool backup storage group.

Recommendation: Specify a minimum of two backup versions.

FRBACKUP to PPRC Primary Volumes allowed

Specifies whether DFSMSHsm will target Metro Mirror or Global Mirror primary volumes, if available, for FRBACKUP processing. The values are:

NO

Do not use Metro Mirror or Global Mirror primary volumes as FlashCopy target volumes. This is the default.

PN

Metro Mirror and Global Mirror primary volumes can be FlashCopy target volumes. If the target volume is a Metro Mirror primary device, do not consider Preserve Mirror when determining FlashCopy eligibility and when performing fast replication backup.

PP

Metro Mirror and Global Mirror primary volumes can be FlashCopy target volumes. If the target volume is a Metro Mirror primary volume, a Preserve Mirror operation is preferred.

The IBM DS8880 series and newer IBM storage systems do not support the Preserve Mirror Preferred option for Metro Mirror. If you are using one of those storage systems, and you want to preserve your disk mirror or copy, specify PR.

PR

Metro Mirror and Global Mirror primary volumes can be FlashCopy target volumes. If the target volume is a Metro Mirror primary volume, a Preserve Mirror operation is required.

blank

Is the same as NO.

For more information about FlashCopy, Preserve Mirror, synchronous PPRC, also known as synchronous Peer-to-Peer Remote Copy (PPRC), and other copy services functions, refer to [*z/OS DFSMS Advanced Copy Services*](#).

For more information, see [Using Metro Mirror primary volume during fast replication backup in z/OS DFSMSHsm Storage Administration](#).

FRRECOV to PPRC Primary Volumes allowed

Specifies whether DFSMSHsm will target Metro Mirror or Global Mirror primary volumes, if available, for FRRECOV processing. The values are:

NO

Do not use Metro Mirror or Global Mirror primary volumes as FlashCopy target volumes. This is the default.

PN

Metro Mirror and Global Mirror primary volumes can be FlashCopy target volumes. If the target volume is a Metro Mirror primary device, do not consider Preserve Mirror when determining Flashcopy eligibility and when performing fast replication backup.

PP

Metro Mirror and Global Mirror primary volumes can be FlashCopy target volumes. If the target volume is a Metro Mirror primary volume, a Preserve Mirror operation is preferred.

The IBM DS8880 series and newer IBM storage systems do not support the Preserve Mirror Preferred option for Metro Mirror. If you are using one of those storage systems, and you want to preserve your disk mirror or copy, specify PR.

PR

Metro Mirror and Global Mirror primary volumes can be FlashCopy target volumes. If the target volume is a Metro Mirror primary volume, a Preserve Mirror operation is required.

The IBM DS8880 series and newer IBM storage systems do not support the Preserve Mirror Preferred option for Metro Mirror. If you are using one of those storage systems, and you want to preserve your disk mirror or copy, specify PR.

blank

Is the same as NO.

For more information about FlashCopy, Preserve Mirror, synchronous PPRC, also known as synchronous Peer-to-Peer Remote Copy (PPRC), and other copy services functions, see [z/OS DFSMS Advanced Copy Services](#).

For more information, refer to the topic about [Using Metro Mirror primary volume during fast replication recovery in z/OS DFSMSHsm Storage Administration](#).

FlashCopy Consistency Group

Specifies whether DFSMSHsm will use consistency groups for FlashCopy. The values are:

N (No)

Do not use consistency groups for FlashCopy. This is the default.

Y (Yes)

Use consistency groups for FlashCopy, to create data-consistent copies.

blank

Is the same as N (No).

For more information, refer to the topic about [Creating consistent copies using FlashCopy consistency groups in z/OS DFSMSHsm Storage Administration](#)

FRBACKUP to XRC Primary Volumes allowed

Specifies whether DFSMSHsm will target XRC primary volumes, if available, for FRBACKUP processing. The values are:

N (No)

Do not use XRC primary volumes as FlashCopy target volumes. This is the default.

Y (Yes)

XRC primary volumes are allowed to become FlashCopy target volumes.

blank

Is the same as N (No).

For more information about FlashCopy, XRC, also known as extended remote copy, and other copy services functions, refer to [z/OS DFSMS Advanced Copy Services](#).

FRRECOV to XRC Primary Volumes allowed

Specifies whether DFSMSHsm will target XRC primary volumes, if available, for FRRECOV processing. The specified value is considered in selecting FlashCopy target volumes for FRBACKUP processing during volume pairing. However, the LO volumes are not verified explicitly for remote pair FlashCopy eligibility for FRRECOV processing during DFSMSHsm volume pairing. The values are:

N (No)

Do not use XRC primary volumes as FlashCopy target volumes. This is the default.

Y (Yes)

XRC primary volumes are allowed to become FlashCopy target volumes.

blank

Is the same as N (No).

For more information about FlashCopy, XRC, also known as extended remote copy, and other copy services functions, refer to [z/OS DFSMS Advanced Copy Services](#).

4. Use the DOWN command to view page 2 of the panel.

5. Specify the values on page 2:

Catalog Name

Specifies the names of one or more valid catalogs (up to 10). Use fully qualified names, without quotation marks. Catalog Name is required if Capture Catalog Information for Data Set Recovery is R or P. There is no default.

Capture Catalog Information for Data Set Recovery

Specifies, to FRBACKUP processing, options for collecting catalog information. The options are:

- R (Required). If not able to capture catalog information, fail the backup version.

- P (Preferred). If not able to capture catalog information, issue a warning and do not fail the backup version.
- N (do not collect catalog information).

N is the default.

Note: It is not uncommon for mature or highly utilized catalogs to contain logical errors. However, the catalog capture function in DFSMSHsm Fast Replication requires the catalogs to be free of all errors to ensure that each cataloged data set can be recovered. If errors are present in a catalog when capture catalog information has been requested, message ARC1812I, indicating a catalog failure, may be issued. If the Required option was specified, the fast replication backup request will fail. To allow fast replication backup to succeed, you should correct all catalog errors. DFSMSHsm uses the Catalog Search Interface (CSI) to capture the catalog information. Thus, if the errors in a catalog cause CSI to return with an error, DFSMSHsm issues an ARC1812I message. To allow Fast Replication Backup to succeed, you should correct all catalog errors. Alternatively, specify the Preferred option, which will fail the capture catalog function but allow the FRBACKUP request to continue processing.

Allow Fast Reverse Restore

Indicates whether to allow recovery of a FlashCopy source from the FlashCopy target without waiting for the background copy to complete. The options are:

- Y (Yes). Allow fast reverse restore.
- N (No). Do not use fast reverse restore. This is the default.

6. Use the DOWN command to view page 3 of the panel.

7. Specify the names of one or more valid pool storage groups. You can specify up to 256 valid pool storage group names in the fields that appear on pages 3, 4 and 5 of the Copy Pool Define panel. Pages 4 and 5 of the panel are not shown here. Use the DOWN command to display them.

Storage Group Names is a required field. You must specify at least one storage group name. There is no default.

Rule: You must specify all associated extend and overflow storage groups to ensure that they are included in the copy pool.

8. Use the END command to save and exit the panel.

Result: When you are done, you have defined a new copy pool.

Defining class transition attributes

Pages 4 and 5 of the Management Class Define panel contain the class transition attributes. The class transition attributes apply to both OAM and HSM class transition processing.

Time Since Creation Years, Months, or Days

Indicate the time since the creation date that must pass before transition occurs.

Time Since Last Use Years, Months, or Days

Indicate the time since the last reference date that must pass before transition occurs.

Periodic

Indicates a time based on the calendar at which transition occurs.

Restriction: The Time Since Creation, Time Since Last Use, and Periodic fields cannot be specified together. A maximum date of 9999/12/31 is used if the requested Time Since Creation or Time Since Last Used exceeds the maximum date.

Monthly On Day

Specifies the day of each month that the transition occurs. If there are fewer days in the month than the number specified, the transition occurs on the last day of the month.

Quarterly On Day or In Month

Specify the time of each quarter that the transition occurs. If both Day and Month are specified, this attribute specifies the day of the month in each quarter that the transition occurs. If there are fewer

days in the specified month than the number specified in Day, then the transition occurs on the last day of the specified month.

Yearly On Day or In Month

Specify the day or month of each year that transition occurs. If both Day and Month are specified, this attribute specifies the day of the month in each year that transition occurs.

FIRST

Specifies that the transition occurs on the first day of each month, quarter, or year, whichever attribute is specified.

LAST

Specifies that the transition occurs on the last day of each month, quarter, or year.

Transition Copy Technique

Specify which copy technique should be used for the class transition of data associated with this management class.

FRP

Fast replication preferred

FRR

Fast replication required

STD

Standard (the default)

PMP

Flashcopy Preserve Mirror preferred

PMR

Flashcopy Preserve Mirror required

FCX

Remote pair FlashCopy for XRC

For more information about fast replication, FlashCopy, Preserve Mirror and other copy services functions, refer to [*z/OS DFSMS Advanced Copy Services*](#).

Serialization Error Exit

Specify the application or user exit to invoke when there is a serialization error. This is used by HSM during a class transition to notify DFSMSdss of which application needs to be invoked when a serialization error occurs.

DB2

Db2 is invoked with the Db2 CAF interface. Db2 closes the data set. If there are no Db2 transactions in progress and the data set is successfully closed and unallocated, then the data set is exclusively serialized. If exclusive access is obtained, then the data set is transitioned. After the data set has moved, Db2 is reinvoked to allocate and open the data set. If the serialization cannot be obtained or there are active Db2 transactions, the transition fails. Only Db2 objects should be assigned to a management class with this setting.

CICS

CICS is invoked with EXCI. CICS makes the data set unavailable for use by CICS and closes all files open to the data set. If these steps are successful, the data set is exclusively serialized and then transitioned. After the data set has moved, CICS is reinvoked to enable the CICS files to use the data set and make available the data set to be used by CICS. If the serialization cannot be obtained on the second attempt, then the transition fails. Only CICS data sets should be assigned to a management class with this setting.

ZFS

z/OS File System causes an UNMOUNT to be issued. If the data set is successfully unmounted, then the data set is exclusively serialized. The unmount fails if the file system is currently accessing the data set. If exclusive access is obtained, then the data set is transitioned. After the data set has moved, zFS is reinvoked to mount the data set. Only zFS data sets should be assigned to a management class with this setting.

EXIT

A user exit is invoked to unserialize the data set. The exit is invoked twice: initially to unserialize the data set, and a second time after the transition in order to reserialize the data set. The transition is performed if the data set can be exclusively serialized after the user exit has been initially invoked. A valid exit should be in place before this option is specified. No default exit is provided. The exit invoked is ADRDYEXT. See [*z/OS DFSMS Installation Exits*](#) for information about how this exit can be used.

NONE

The transition should fail with no additional action. This is the default. As a default, DFSMSHsm does not issue error messages for data sets that fail serialization.

Chapter 4. Overview of FlashCopy

FlashCopy enables you to make copies of a set of tracks, with the copies immediately available for read or write access. This set of tracks can consist of an entire volume, a data set, or just a selected set of tracks.

FlashCopy provides both source volume to target volumes support, which came with FlashCopy Version 1, and source data set level to target data set level support, which comes with FlashCopy Version 2. FlashCopy can be used in combination with XRC, synchronous PPRC, and PPRC-XD.

The primary objective of FlashCopy is to create a copy of a source volume on the target volume. This copy is called a point-in-time copy. Access to the point-in-time copy of the data on the source volume is through reading the data from the target volume. The actual point-in-time data that is read from the target volume might or might not be physically stored on the target volume. As soon as a FlashCopy relationship is established (more specifically, as soon as the initialization process for a FlashCopy establish, initiated with the FCESTABL command, is complete), the point-in-time data is available for reading from the target volume. However, if data is written to a track that is a target track in a FlashCopy relationship and the updated target track is read afterwards, the data that is returned is user-updated data, and not the point-in-time source track data. Target tracks are withdrawn from a FlashCopy relationship as soon as any application writes to these tracks.

FlashCopy V1 requires the entire source volume and target volume to be involved in a FlashCopy relationship, even if selected tracks were specified on the FCESTABL command. FlashCopy V1 relationships do not allow any other FlashCopy relationships to exist on either the source or target volume.

ESS FlashCopy Version 2 enhances the FlashCopy function by providing an alternative method to copying an entire source volume to a target volume. This enhancement includes the following features:

- Multiple FlashCopy relationships are allowed on a volume.
- Track relocation is possible because for tracks to be copied, the target tracks do not need to be in the same location on the target volume as on the source volume.
- A FlashCopy target and source volume need not be in the same logical subsystem (LSS) in an ESS. However, FlashCopy must be processed in the same ESS.
- Extent level (data set level) FlashCopy.
- Incremental/Persistent Flashcopy.
- NOCOPY to COPY conversion.

Guidelines: Do not use the TSO or the API FlashCopy functions to copy data sets that you intend to access from the target volume. With FlashCopy, TSO or API usage does not provide any data management services, such as allocation or cataloging. Data sets that are copied using these functions are not accessible from the target volume without the user manually performing these data management tasks. You can use a data set copy program that provides these data management services as part of the copy process, such as DFSMSdss.

Understanding how FlashCopy works

When a FCESTABL command is processed, an attempt is made to create a relationship between tracks on a source device and tracks on a target device. A track extent contains a beginning track, an ending track, and all the tracks between the beginning track and the ending track. For FlashCopy V2, a source track extent and a target track extent are required to describe a track set. A contiguous set of source tracks related to a contiguous set of target tracks is called a track set. Each track set makes up a FlashCopy relationship.

You can request a FlashCopy relationship using:

- TSO/E commands

- An application programming interface (API) macro (ANTRQST) using the REQUEST=FCESTABLISH command..
- A REXX exec that calls program ANTTREXX. ANTTREXX uses the ANTRQST API. .
- A Web-browser interface called “IBM TotalStorage Enterprise Storage Server Copy Services.” This Web-enabled interface is part of the ESS storage subsystem.
- DFSMSdss
- ICKDSF

A FlashCopy relationship can be established in:

- COPY mode, which runs a background copy process. This is the default.
- NOCOPY mode, which suppresses the background copy.

A FlashCopy relationship begins when the FlashCopy relationship is initiated and ends when the background copy completes or when you withdraw it, which you can do with the FCWITHDR command. When you use the FCESTABL command with the NOCOPY parameter to establish the FlashCopy relationship, you must explicitly withdraw the FlashCopy relationship when it is no longer required. You can specify one or more track sets using the FCWITHDR command, but each track set must have a source extent and a target extent.

You are not informed when the background copy is complete. To monitor when the copy completes, issue the FCQUERY command. A non-persistent FlashCopy relationship is terminated and this inactivity is reflected in the FCQUERY output. However, an incremental relationship, which is persistent, continues to appear as active in the FlashCopy report.

How long the actual physical copy takes depends on:

- The amount of data being copied
- The number of background copy processes that are occurring
- The other activities on the ESS.

When the FCESTABL command includes the MODE(COPY) parameter, the ESS copies all specified source tracks to specified target tracks. [Figure 2 on page 119](#) illustrates a full-volume copy, where the source tracks are copied to the target volume in the same track locations as the source tracks.

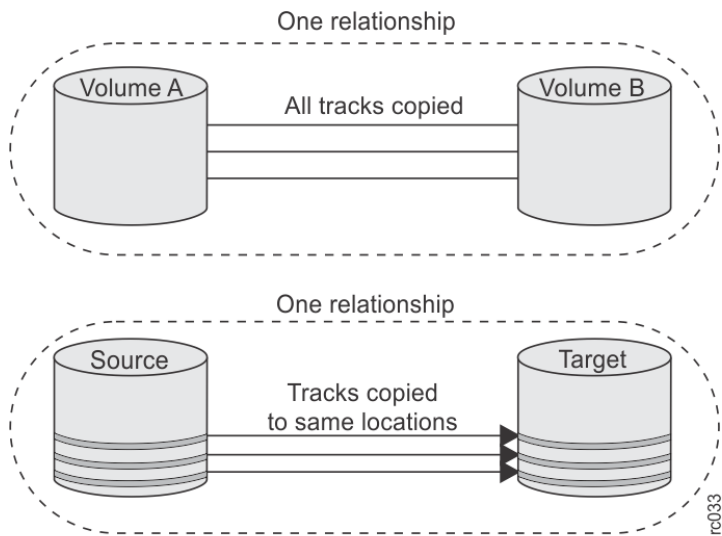


Figure 2. A full-volume copy, only one FlashCopy relationship active on a volume

You can copy the same source volume track to different tracks on one or more target volumes or even copy to a track on the source volume as a target, up to twelve times. [Figure 3 on page 120](#) illustrates this concept.

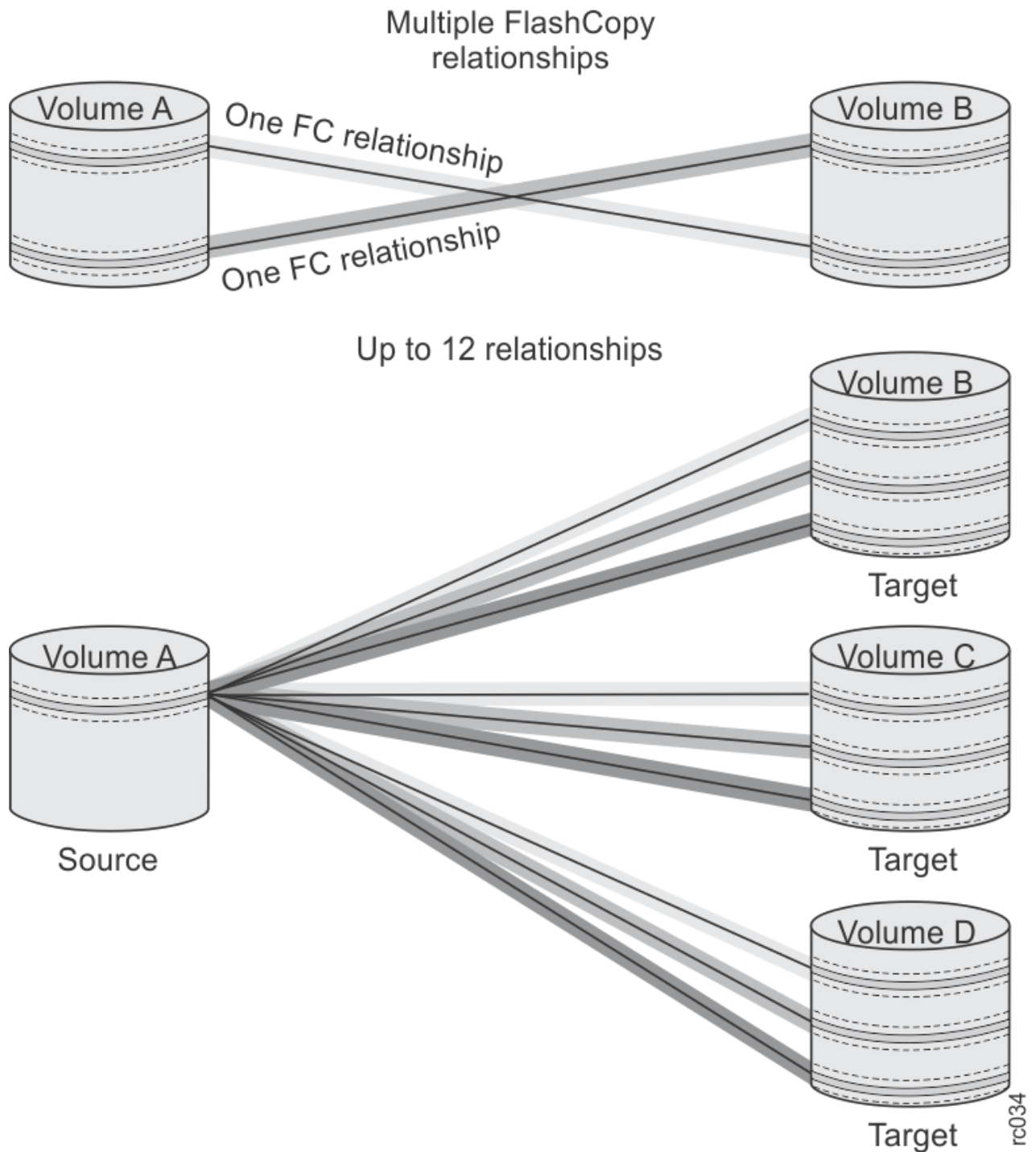


Figure 3. Multiple FlashCopy relationships active on a volume

Note: As long as a track on a volume is not a source or target track of an existing FlashCopy relationship, it can become the target track in a new FlashCopy relationship. The only restriction is that you cannot exceed the total number of active FlashCopy relationships per volume. Use the FCQUERY command to determine what that number is.

There might be circumstances that require you to withdraw a FlashCopy relationship. For example, you might not want to wait for the copy to complete or there might no longer be a need for the FlashCopy relationship. For either case, you can use the FCWITHDR command.

Chapter 5. Overview of extended remote copy (XRC)

Extended remote copy is a combined hardware and software solution to the problem of accurate and rapid disaster recovery. XRC also provides a DASD and workload migration solution.

XRC is designed for sites that match the following criteria:

- Must maintain the highest levels of performance on their primary system.
- Support extended distances between volume copies.
- Can support a recovery point objective time of a few seconds.
- Provides support for a mixed vendor environment. You are allowed to mix and match primary and secondary volumes for any vendor supporting XRC architecture. Primary volumes must have XRC architecture support, but secondary volumes need not have XRC architecture support.

Protecting your enterprise's data requires that related updates are applied to the secondary volumes in the same order as they were applied on the primary volumes. Maintaining data integrity becomes especially critical when a volume is updated by multiple applications, or when a data set exists on multiple volumes spread across multiple storage controls. XRC's design strategy ensures that secondary updates are applied on a consistent basis across multiple storage controls. This update sequencing is necessary in order to avoid data integrity problems and potential data loss.

XRC supports channel extenders, ESCON, FICON®, and parallel channel operation. With ESCON and FICON channels, the XRC function provides for the recovery system to reside at an extended distance from the primary system.

Figure 4 on page 121 presents an overview of the XRC option of remote copy. The workload (or DASD) migration configuration is basically the same, except that the "recovery site" would be considered the "migration target".

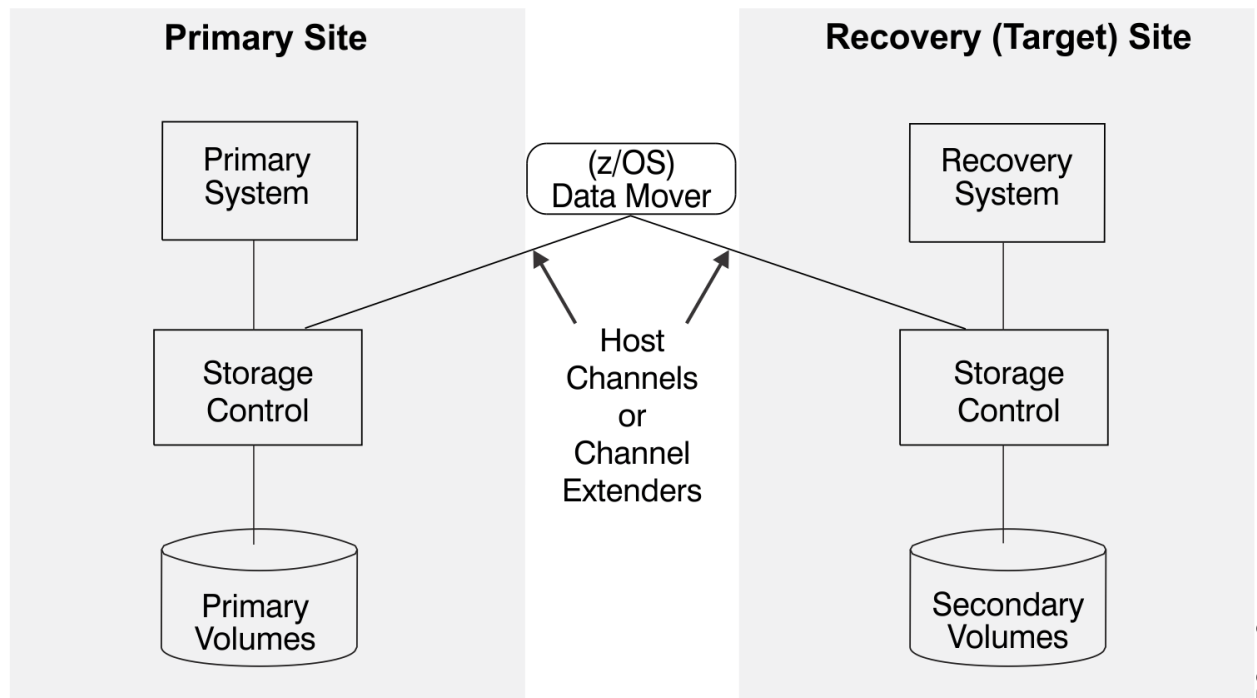


Figure 4. Extended remote copy overview

Overview of installing and configuring XRC

This topic provides a high-level overview of installing and configuring XRC.

About this task

To install and configure the extended remote copy support, perform the following steps after installing the appropriate z/OS release.

For details on this topic, see [Planning for extended remote copy in z/OS DFSMS Advanced Copy Services](#)

Procedure

1. Authorize XRC TSO commands by adding the command names to the AUTHCMD PARM parameter of the IKJTSOxx member of SYS1.PARMLIB. After adding the XRC command names to the IKJTSOxx member, issue the TSO command PARMLIB UPDATE(xx) to activate the new IKJTSOxx member.
2. Based on the application or applications that you plan to copy, determine all primary (source) and secondary (target) devices.
3. Allocate the appropriate journal, control, and state data sets on disk devices that have connectivity to the system data mover (SDM) and either the recovery or the target migration system. You can change the default SYS1 high-level qualifier (HLQ) in any of the examples in [Table 5 on page 122](#) to a name that corresponds with the HLQ issued on the XSTART command or in the ANTGIN00 PARMLIB member.

Table 5. Data Set Allocation Command Examples

Command . . .	Notes . . .
SYS1.XCOPY.session_id.CONTROL	This is only required with SESSIONTYPE(XRC).
SYS1.XCOPY.session_id.STATE	
SYS1.XCOPY.session_id.JRNL01	This is only required with SESSIONTYPE(XRC).
SYS1.XCOPY.PARMLIB	This is only used with PARMLIB support.
SYS1.XCOPY.session_id.JRNLxx	This is only required with SESSIONTYPE(XRC). A minimum of two journals are required (JRNL01 and JRNL02), up to JRNL16.

Note: Ensure that the ANTASnnn address space has update authority to these data sets.

If the XRC system data mover will run on a system that does not share a common time reference with the application systems that will write to the XRC primary volumes, be sure to configure the system in a way that avoids the introduction of incorrect timestamps into the XRC storage control sessions.

4. Issue the XSTART TSO command on the system that contains the system data mover. Specify the session ID that is associated with the journal data set names. Select the proper level of recovery for your environment.
5. Issue the XSET commands on the SDM system to tune the environment as you desire.
6. Issue the XADDPAIR TSO commands on the system data mover to perform the copy of primary to secondary volumes.
7. Issue the XQUERY TSO command on the SDM system to verify the XRC installation options currently in effect.
8. If you are using XRC for disk devices migration, follow a disk migration scenario.
9. If you are using XRC for disaster recovery, XRC continues to copy updates from the primary volumes to the secondary volumes for as long as the system is running, or until you issue a command to end the volume copies.

Chapter 6. DFSMS installation exits and RPFC for XRC

RPFC for XRC impacts the ADRUFO parameter list.

ADRUFO Parameter List

Register 1 contains the address of the ADRUFO parameter list. You can use the ADRUFO mapping macro to map the parameter list. These sections are shown in the ADRUFO parameter list.

UFOHDR

contains information describing the type of entry and, for a function entry, details of the function to be scheduled. It also contains an offset to UFOFUNCT or UFOPARM and the addresses of UFOVOL for input and UFOVOL for output.

UFOFUNCT

contains information about the function to be scheduled and which ones can be altered by this exit routine. The bits are described in the parameter list. It is created for the function entry.

UFOPARM

contains bits that can be set to change defaults or override commands. The bits are described in the parameter list. It is created for the PARM change entry.

UFOVOL

is an array of entries describing the volumes used for input and output for the specific function commands.

1	ADRUFO					
	OFFSET DECIMAL	OFFSET HEX	TYPE	LENGTH	NAME (DIM)	DESCRIPTION
	0	(0)	STRUCTURE	24	ADRUF0B	
	0	(0)	CHARACTER	24	UFOHDR	HEADER OF UFO PARM LIST
	0	(0)	CHARACTER	4	UFID	IDENTIFIER EBCDIC "UFO "
	4	(4)	SIGNED	2	UFLEN	LENGTH OF PARM LIST
	6	(6)	SIGNED	2	UFBDOFF	OFFSET TO UFOFUNCT OR UFOPARM
	8	(8)	ADDRESS	4	UFVOLI@	ADDR OF INPUT VOL LIST | 0
	12	(C)	ADDRESS	4	UFVOLI@	ADDR OF OUTPUT VOL LIST | 0
	16	(10)	BIT(16)	2	UFFUNCT	FUNCTION BEING PERFORMED '0000'X = PARM CHANGE ENTRY (THIS FIELD MUST BE KEPT IN SYNCHRONIZATION WITH FBMAJOR IN ADRFNCB)
	16	(10)	BIT(8)	1	UFFUNCT1	FUNCTION BYTE ONE
			1... ..		UFFUDEF	1 = DEFRAG OPERATION
			.1.. ..		UFFUCOPY	1 = COPY OPERATION
			..1.		UFFUREST	1 = RESTORE OPERATION
			...1		UFFUDUMP	1 = DUMP OPERATION
			.... 1...		UFFUPRT	1 = PRINT OPERATION
			.... .1..		UFFUCPYD	1 = COPYDUMP OPERATION
			.... ..1.		*	RESERVED
			.... ...1		UFFUCOMP	1 = COMPRESS OPERATION
	17	(11)	BIT(8)	1	UFFUNCT2	FUNCTION BYTE TWO
			1... ..		UFFURLSE	1 = RELEASE OPERATION
			.1..		UFFUCONV	1 = CONVERTV OPERATION
			..1.		UFFUBLSA	1 = BUILD SA OPERATION
			...1		*	RESERVED
			.... 1...		UFFUCGCR	1 = CGCREATE OPERATION
			.... .1..		UFFUCONS	1 = CONSOLIDATE OPERATION
			.... ..1.		UFFUSREL	1 = SPACEREL OPERATION
			.... ...1		*	RESERVED
	18	(12)	CHARACTER	1	UFFIND	FUNCTIONAL INDICATORS
			1... ..		UFFIFULL	1 = FULL VOLUME REQUEST (DUMP, RESTORE, COPY & DEFRAG)
			.1..		UFFIPART	1 = PARTIAL REQUEST (DUMP, RESTORE, COPY, DEFRAG & PRINT)
			..1.		UFFIFILT	1 = REQUEST BY FILTER/DSNAME (DUMP, RESTORE & PRINT)

		...1		UFFIPRTV	1 = PRINT VTOC
		.... 1...		UFFLOGCL	1=LOGICAL PROCESSING FOR COPY, DUMP, OR RELEASE: EITHER NO INPUT VOLUMES SPECIFIED (CATALOG FILTERING) OR 1 OF FOLLOWING: LOGINDDDNAME, LOGINDYNAM, LOGDDNAME, LOGDYNAM.
19	(13)	.... .1..		UFFPATH	1=UNIXFILE PROCESSING
		.... ..11		* RESERVED	
		1...	1	UFAIFLGS	APPLICATION INTERFACE FLGS
		.1...		UFAINV	1=INVOKED BY APPL. INTERF.
				UFUIMAL	1=ADRUIM NOT TO BE GIVEN CONTROL
		..1.		UFUIMCH	1=DO NOT ALLOW ADRUIM TO MODIFY OPTIONS, VALUES
		...1		UFSTOP	1=DO NOT SCHEDULE TASK (SAME AS RETURN CODE 8 FROM ADRUIXIT)
		.... 1...		UFSYSIN	1=SYSIN OR ALTERNATE NOT PRESENT ALLOWED IF UFPARAM=XX1000XX
		.... .1..		UFSYSRPR	1=SYSRPRINT/ALTERNATE NOT PRESENT ALLOWED IF UFPARAM=XX1000XX
		.... ..1.		UFNOIN	1=NO INPUT TAPE - ONLY FOR RESTORE
		.... ...1		UFNOOUT	1=NO OUTPUT TAPE - ONLY FOR DUMP
20	(14)	1...	1	UFFLAGS	FLAGS
		.1...		UFBYFCCK	1=BYPASS FACILITY CLASS CHECKS IF USER AUTHORIZED
				UFSAFOK	1=IT IS OK TO USE THE SAF INTERFACE AT THE HIGHEST SUPPORTED LEVEL
		..1.		UFFREWCL	1=rewind on close
		...1		UFIGCTNN	1=IGNORE CATALOG ENTRIES FOR NEW NAMED DATA SET, VALID ONLY FOR LOGICAL DUMP
		.... 1...		UFFCFRRT	1=RETRY FLASHCOPY WITHOUT FAST REVERSE RESTORE OPTION
		.... .1..		UFBYFRVF	1=BYPASS CHECKING FOR EXISTING FC RELATIONS DURING FAST REVERSE RESTORE OPERATION
21	(15)	.... ..11	3	*	reserved
24	(18)	CHARACTER	0	*	RESERVED
OFFSET DECIMAL	OFFSET HEX	TYPE	LENGTH	NAME (DIM)	DESCRIPTION
0	(0)	STRUCTURE	48	UFOFUNCT	LIST OF OPTIONS FOR FUNCTION. POINTED TO BY THE ADDRESS OF UFOHDR + UFBDOFF. PRESENT IF ANY BITS ARE ON IN UFFUNCT
0	(0)	BIT(8)	1	UFO1FLGS	1ST SET OF OPTION FLAGS
		1...		UFO1COMP	1 = COMPRESS (DUMP)
		.1...		UFO1CVOL	1 = COPYVOLID (RESTORE & COPY)
		..1.		UFO1PURG	1 = PURGE (DUMP, COPY & RESTORE)
		...1		UFO1RESE	1 = RESET CHANGE BIT (DUMP)
		.... 1...		UFO1WRCK	1 = WRITECHECK
		.... .1..		UFO1ALD	1 = ALLDATA
		.... ..1.		UFO1ALDL	1 = ALLDATA(LIST), 0 = ALLDATA(*), VALID ONLY IF UFO1ALD = 1. BIT MAY NOT BE SET ON BY THE EXIT BUT MAY BE RESET TO CHANGE ALLDATA(LIST) TO ALLDATA(*)
1	(1)	.... ...1	1	UFO1ALLE	1 = ALLEXCP
		1...		UFO2FLGS	2ND SET OF OPTION FLAGS
				UFO2DYNQ	0 = USE ENQ TO HOLD DATASET, 1 = USE DYNALOC TO HOLD DS (DUMP, DEFRAG, PRINT & RESTORE)
		.1...		UFO2ENQE	1 = ENQ EXCLUSIVE (DUMP, RESTORE AND PRINT)
		..1.		UFO2ENQS	1 = ENQ SHARED IF EXCL FAILS-DUMP, RESTORE & PRINT
		...1		UFO2ENQN	1 = DO NOT ENQ IF EXCL & SHR FAIL-DUMP, RESTORE & PRINT

		.... 1...	UFO2DEL	1 = DELETE AFTER DS DUMP
		.... .1..	UFO2CTLG	1 = CATALOG DATA SETS DURING A DATA SET RESTORE, COPY
		.... .1..	UFO2RECT	1 = RECATALOG DURING A DATA SET RESTORE, COPY
		.... ..1.	UFO2UNC	1 = UNCATALOG DATA SETS AFTER A DATA SET DUMP, COPY
		.... ...1	UFO2VALD	1 = VALIDATE: DUMP THE VSAM INDEXED DATA SET IN NEW FORMAT (LOGICAL DATA SET DUMP)
2	(2)	UNSIGNED	1 UFODUOPTM	OPTIMIZE VALUE (DUMP/COPY) (1, 2, 3, OR 4)
3	(3)	BIT(8)	1 UFOINSOP	INSTALLATION OPTIONS @REL11
		1... ..	UFOERASE	1 = ERASE DASD TRACKS
		.1.. ..	UFOIACPY	1 = DUMP MUST PRODUCE ALL OUTPUT COPIES OR NONE AT ALL
		..1.	UFOBLDIX	1 = INVOKE ICKDSF TO REBUILD VTOC INDEX
		...1	UFORACLG	RACFLOG=YES SPECIFIED OR FORCE RACF LOGGING
		.... 1...	UFOBK32K	TAPE BLK SIZE 32K
		.... .1..	UFOARBA	1=AUTORELBLKA SPECIFIED@LA71950
		.... ..1.	UFOMKMV	1=MAKEMULTI SPECIFIED
		.... ...1	UFOFLEAV	1=CLOSE LEAVE FLAG
4	(4)	UNSIGNED	4 UFOFRAGI	FRAGMENTATION INDEX(DEFRAG) 9,90,900=900, 09=90, 009=9
8	(8)	UNSIGNED	4 *	VOLCOUNT stuff
8	(8)	BIT(8)	1 UFOVCFLG	VOLCOUNT flags
		1... ..	UFOVCCUR	1 = VOLCOUNT(*)
		.1..	UFOVCSRC	1 = VOLCOUNT(SRC)
		..1.	UFOVCNUM	1 = VOLCOUNT(N(nn))
		...1	UFOVCANY	1 = VOLCOUNT(ANY)
		.... 1...	UFOSMALL	1 = SELECTMULTI(ALL)
		.... .1..	UFOSMANY	1 = SELECTMULTI(ANY)
		.... ..1.	UFOSM1ST	1 = SELECTMULTI(FIRST)
		.... ...1	UFOCPFRC	1 = FORCECP keyword
9	(9)	UNSIGNED	1 UFOVCVAL	VALUE FOR N VOLUMES
10	(A)	UNSIGNED	1 UFOCPDAY	DAYS value for FORCECP
11	(B)	CHARACTER	1 *	reserved
12	(C)	UNSIGNED	4 UFOMNSQT	MINIMUM SECONDARY ALLOCATION (MINSECQTY) FOR RELEASE
16	(10)	UNSIGNED	4 UFOMNTUS	MINIMUM UNUSED TRACKS (MINTRACKSUNUSED) FOR RELEASE
20	(14)	BIT(8)	1 UFO3FLGS	3RD OPTION FLAG BYTE
		1... ..	UFO3FORC	1= FORCE UNMOVABLES ON COPY, RESTORE
		.1..	UFO3REPL	1 = REPLACE(DATASET COPY, RESTORE)
		..1.	UFOFRBLK	1 = FORCE REBLOCKING OF DATA SETS (COPY, RESTORE)
		...1	UFODRBLK	1 = DISABLE REBLOCKING OF DATA SETS (COPY, RESTORE)
		.... 1...	UFOALLMU	1=SEARCH ALL VOLUMES FOR COPY OR DUMP
		.... .1..	UFOSPHER	1=PERFORM SPHERE PROCESSING
		.... ..1.	UFONOSMS	1=NULLSTORCLAS SPECIFIED
		.... ...1	UFONMGMT	1=NULLMGMTCLAS SPECIFIED
21	(15)	UNSIGNED	1 UFOWAITS	WAIT TIME IN SECONDS BETWEEN RESERVE & ENQ RETRIES(ALL)
22	(16)	UNSIGNED	1 UFOWAITR	NUMBER OF RETRIES ON RESERVE OR ENQ FAILURES(ALL COMMANDS)
23	(17)	BIT(8)	1 UFOTGTAL	TGTALLOC FLAGS
		1... ..	UFOTGTCY	1 = CYLINDER
		.1..	UFOTGTTR	1 = TRACK
		..1.	UFOTGTBL	1 = BLOCK
		...1	UFOTGTSR	1 = SOURCE
		.... 1111	*	RESERVED
24	(18)	BIT(8)	1 UFOPROCK	PROCESS OPTIONS(THIS FIELD MUST BE KEPT IN SYNC WITH FBPROCKW)
		1... ..	UFOPRUND	1 = PROCESS UNDEFDSORG
		.1..	UFOPRSYS	1 = PROCESS SYS1
		..11 1111	*	UNDEFINED
25	(19)	BIT(8)	1 UFO4FLGS	FOURTH SET OF OPTION FLAGS
		1... ..	UFOT0REQ	CONCURRENT COPY REQUESTED
		.1..	UFODCOND	DUMPCONDITIONING
		..1.	UFOCVRBK	CICSVRBACKUP
		...1	UFOFCNC	FLASHCOPY NOCOPY
		.... 1...	UFOFCWD	FLASHCOPY WITHDRAW
		.... .1..	UFOFC2PP	ALLOW FC TO PPRC PRIM
		.... ..1.	UFOFCN2C	FLASHCOPY NOCOPY TO COPY

26	(1A)	.... 1	2	UFOFCFRZ	FLASHCOPY CG FREEZE
28	(1C)	BIT(8)	1	UFORIOPC	READ I/O PACING
		1... ..		UFO5FLGS	FIFTH OPTIONS FLAGS BYTE
		.1.. ..		UFOFRREQ	FASTREPLICATION(REQUIRED)
		..1.		UFOFRPRF	FASTREPLICATION(PREFERRED)
		...1		UFOFRNO	FASTREPLICATION(NONE)
		.... 1...		UFO5REPU	REPLACEUNCONDITIONAL
		.... .1..		UFOFCINC	FCINCREMENTAL
		.... .1..		UFOFCINL	FCINCREMENTALLAST
		.... .1..		UFOFCVFR	FCVERIFY(REVERSE)
		.... .1..		UFOFCVFN	FCVERIFY(NOREVERSE)
29	(1D)	BIT(8)	1	UFO6FLGS	SIXTH OPTIONS FLAGS BYTE
		1... ..		UFOFRMSM	DEBUG(FRMSG(MINIMAL))
		.1.. ..		UFOFRMSS	DEBUG(FRMSG(SUMMARIZED))
		..1.		UFOFRMSD	DEBUG(FRMSG(DETAILED))
		...1		UFOHCOMP	HARDWARE COMPRESSION
		.... 1...		UFODBTRC	DEBUG(TRACE)
		.... .1..		UFODBSMS	DEBUG(SMSMSG)
		.... .1..		UFOFCVFX	FORCE FCCGVERIFY STOP
		.... .1..		*	RESERVED
30	(1E)	UNSIGNED	1	UFOFCWTS	FCWAIT TIME IN SECONDS
31	(1F)	UNSIGNED	1	UFOFCWTR	FCWAIT MAX RETRY COUNT
32	(20)	BIT(8)	1	UFO7FLGS	SEVENTH OPTIONS FLAGS BYTE
		1... ..		UFOFCSEF	FCSETGTOK(FAILRELATION)
		.1.. ..		*	RESERVED FOR SPE
		..1.		UFO7CCAR	CONCURRENT(ANYREQ)
		...1		UFO7CCVR	CONCURRENT(VIRTUALREQ)
		.... 1...		UFO7CCCR	CONCURRENT(CACHEREQ)
		.... .1..		UFO7CCAP	CONCURRENT(ANYPREF)
		.... .1..		UFO7CCVP	CONCURRENT(VIRTUALPREF)
		.... .1..		UFO7CCCP	CONCURRENT(CACHEPREF)
33	(21)	BIT(8)	1	UFO8FLGS	EIGHT OPTIONS FLAGS BYTE
		1... ..		UFOPMREQ	FCTOPPRCP(PRESMIRREQ)
		.1.. ..		UFOPMPRE	FCTOPPRCP(PRESMIRPREF)
		..1.		UFOPMNON	FCTOPPRCP(PRESMIRNONE)
		...1		UFOFCFRR	FCFASTREVERSERESTORE
		.... 1...		UFOFCFVR	FCFULLVOLUMERELATION
		.... .1..		UFO8RESY	FORCE RESET(YES)
		.... .1..		UFO8RESN	FORCE RESET(NO)
		.... .1..		UFO8RESD	FORCE RESET(DUMP)
34	(22)	UNSIGNED	2	UFOMAXTM	MAXTIME NUMBER OF MINUTES
36	(24)	BIT(8)	1	UFO9FLGS	NINTH OPTIONS FLAGS BYTE
		1... ..		UFOBRCCLK	BCSRECOVER(LOCK)
		.1.. ..		UFOBRCSU	BCSRECOVER(SUSPEND)
		..1.		UFOZCNON	ZCOMPRESS(NONE)
		...1		UFOZCPRE	ZCOMPRESS(PREF)
		.... 1...		UFOZCREQ	ZCOMPRESS(REQ)
		.... .1..		UFOFCTXRC	FCTOXRCP
		.... .1..		*	UNUSED
37	(25)	CHARACTER	8	UFO_ZWEBT_DD	Web Toolkit Debug OutDD
45	(2D)	BIT(8)	1	UFO10FLG	TENTH OPTIONS FLAGS BYTE
		1... ..		UFOSRMSM	DEBUG(SRMSG(MINIMAL))
		.1.. ..		UFOSRMSS	DEBUG(SRMSG(SUMMARIZED))
		..1.		UFOSRMSD	DEBUG(SRMSG(DETAILED))
		...1		UFOCLNNO	CLONE(NONE)
		.... 1...		UFOCLNPF	CLONE(PREF)
		.... .1..		UFOCLNRQ	CLONE(REQ)
		.... .1..		*	RESERVED
46	(2E)	CHARACTER	2	*	RESERVED
48	(30)	CHARACTER	0	*	RESERVED

OFFSET DECIMAL	OFFSET HEX	TYPE	LENGTH	NAME (DIM)	DESCRIPTION
0	(0)	STRUCTURE	32	UFOPARM	EXECUTE CARD PARAMETER OPTION LIST. POINTED TO BY THE ADDRESS OF UFOHDR + UFBDOFF. PRESENT IF ALL BITS ARE OFF IN UFFUNCT
0	(0)	CHARACTER	1	UFSEPAR UFFORSER	SERIAL / PARALLEL 1 = FORCE TO SERIAL
		1... ..		UFDEFPAR	1 = DEFAULT TO PARALLEL. IGNORED IF UFFORSER IS 1.
1	(1)	CHARACTER	1	* UFXAFLAG	RESERVED
		1... ..		UFXAFLAG	CNTL FLAGS FOR XA MODE
		.1.. ..		UFXAFLAG	1=I/O BUF ABOVE 16M REQ
		..1.		UFXAFLAG	1=AI BUF ABOVE 16M REQ
		...1		UFXAFLAG	1=64 BIT REAL REQ

2	(2)	...1 1111	8	* UFWKUNIT	RESERVED
10	(A)	CHARACTER	6	UFWKVOL	WORKUNIT PARAMETER
16	(10)	CHARACTER	1	UFOPFLG1	WORKVOL PARAMETER
		1... ..		UFOUEXCP	RESERVED (R1H0 AND ABOVE)
					1=USE EXCP FOR DUMP OUTPUT,
					RESTORE INPUT AND COPYDUMP
		.111 1111		* UFORMXTSK	RESERVED
17	(11)	UNSIGNED	1		MAX PARALLEL TASKS
18	(12)	CHARACTER	14	*	RESERVED (R1H0 AND ABOVE)
32	(20)	CHARACTER	0	*	

OFFSET DECIMAL	OFFSET HEX	TYPE	LENGTH	NAME (DIM)	DESCRIPTION
=====	=====	=====	=====	=====	=====
0	(0)	STRUCTURE	*	UFOVOL	VOLUME LIST HEADER. POINTED TO BY UFVOLI@ AND UFVOL@.
0	(0)	CHARACTER	4	UFOVHDR	HEADER
0	(0)	SIGNED	2	UFOVCNT	COUNT OF VOLUME LIST ENTRIES
2	(2)	CHARACTER	2	*	RESERVED
4	(4)	CHARACTER	20	UFOVENT(*)	VOLUME LIST ENTRY
4	(4)	ADDRESS	4	UFOVUCB@	ADDR OF UCB | 0
8	(8)	CHARACTER	8	UFODDNAM	DDNAME | BLANK
16	(10)	CHARACTER	6	UFOVOLID	VOLUME SERIAL | BLANK
22	(16)	CHARACTER	2	*	RESERVED

1 CROSS REFERENCE

NAME	HEX OFFSET	HEX VALUE	LEVEL
=====	=====	=====	=====
ADRUFOB	0		1
UFAIFLGS	13		3
UFAIINV	13	80	4
UFAI31B	1	40	3
UFB DYOFF	6		3
UFBYFCCK	14	80	4
UFBYFRVF	14	04	4
UFDEFPAR	0	40	3
UFDUOPTM	2		2
UFFCFRRT	14	08	4
UFFIFILT	12	20	4
UFFIFULL	12	80	4
UFFIND	12		3
UFFIPART	12	40	4
UFFIPRTV	12	10	4
UFFLAGS	14		3
UFFLOGCL	12	08	4
UFFORSER	0	80	3
UFFPATH	12	04	4
UFFREWCL	14	20	4
UFFUBLSA	11	20	5
UFFUCGCR	11	08	5
UFFUCOMP	10	01	5
UFFUCONS	11	04	5
UFFUCONV	11	40	5
UFFUCOPY	10	40	5
UFFUCPYD	10	04	5
UFFUDEF	10	80	5
UFFUDUMP	10	10	5
UFFUNCT	10		3
UFFUNCT1	10		4
UFFUNCT2	11		4
UFFUPRT	10	08	5
UFFUREST	10	20	5
UFFURLSE	11	80	5
UFFUSREL	11	02	5
UFID	0		3
UFIGCTNN	14	10	4
UFLEN	4		3
UFNOIN	13	02	4
UFNOOUT	13	01	4
UFO_ZWEBT_DD	25		2
UFOALLMU	14	08	3
UFOARBA	3	04	3
UFOBK32K	3	08	3
UFOB L DIX	3	20	3
UFOB RCLK	24	80	3
UFOB R CSU	24	40	3
UFOCLNNO	20	10	3
UFOCLNPF	20	08	3
UFOCLNRQ	20	04	3
UFOCPDAY	A		3
UFOCPFRC	8	01	4

1	UFOCVRBK	19	20	3
	UFODBSMS	1D	04	3
	CROSS REFERENCE			
	NAME	HEX OFFSET	HEX VALUE	LEVEL
	=====	=====	=====	=====
	UFODBTRC	1D	08	3
	UFODCOND	19	40	3
	UFODDNAM	8		3
	UFODRBLK	14	10	3
	UFOERASE	3	80	3
	UFOFCFRR	21	10	3
	UFOFCFRZ	19	01	3
	UFOFCFVR	21	08	3
	UFOFCINC	1C	08	3
	UFOFCINL	1C	04	3
	UFOFCNC	19	10	3
	UFOFCN2C	19	02	3
	UFOFCSEF	20	80	3
	UFOFCTXRC	24	04	3
	UFOFCVFN	1C	01	3
	UFOFCVFR	1C	02	3
	UFOFCVFX	1D	02	3
	UFOFCWD	19	08	3
	UFOFCWTR	1F		2
	UFOFCWTS	1E		2
	UFOFC2PP	19	04	3
	UFOFLEAV	3	01	3
	UFOFRAGI	4		2
	UFOFRBLK	14	20	3
	UFOFRMSD	1D	20	3
	UFOFRMSM	1D	80	3
	UFOFRMSS	1D	40	3
	UFOFRNO	1C	20	3
	UFOFRPRF	1C	40	3
	UFOFRREQ	1C	80	3
	UFOFUNCT	0		1
	UFOHCOMP	1D	10	3
	UFOHDR	0		2
	UFOIACPY	3	40	3
	UFOINSOP	3		2
	UFOMAXTM	22		2
	UFOMKMV	3	02	3
	UFOMNSQT	C		2
	UFOMNTUS	10		2
	UFOMXTSK	11		2
	UFONMGMT	14	01	3
	UFONOSMS	14	02	3
	UFOPARM	0		1
	UFOPFLG1	10		2
	UFOPMNON	21	20	3
	UFOPMPRE	21	40	3
	UFOPMREQ	21	80	3
	UFOPROCK	18		2
	UFOPRSYS	18	40	3
	UFOPRUND	18	80	3
	UFORACLG	3	10	3
	UFORIOPC	1A		2
	UFOSMALL	8	08	4
	UFOSMANY	8	04	4
	UFOSM1ST	8	02	4
1	CROSS REFERENCE			
	NAME	HEX OFFSET	HEX VALUE	LEVEL
	=====	=====	=====	=====
	UFOSPHER	14	04	3
	UFOSRMSD	2D	20	3
	UFOSRMSM	2D	80	3
	UFOSRMSS	2D	40	3
	UFOTGTAL	17		2
	UFOTGTBL	17	20	3
	UFOTGTCY	17	80	3
	UFOTGTSR	17	10	3
	UFOTGTTR	17	40	3
	UFOTOREQ	19	80	3
	UFOUEXCP	10	80	3
	UFOVCANY	8	10	4
	UFOVCCUR	8	80	4
	UFOVCFLG	8		3
	UFOVCNT	0		3

	UFOVCNUM	8	20	4
	UFOVCSRC	8	40	4
	UFOVCVAL	9		3
	UFOVENT	4		2
	UFOVHDR	0		2
	UFOVOL	0		1
	UFOVOLID	10		3
	UFOVUCB@	4		3
	UFOWAITR	16		2
	UFOWAITS	15		2
	UFOZCNON	24	20	3
	UFOZCPRE	24	10	3
	UFOZCREQ	24	08	3
	UFO1ALD	0	04	3
	UFO1ALDL	0	02	3
	UFO1ALLE	0	01	3
	UFO1COMP	0	80	3
	UFO1CVOL	0	40	3
	UFO1FLGS	0		2
	UFO1PURG	0	20	3
	UFO1RESE	0	10	3
	UFO1WRCK	0	08	3
	UFO10FLG	2D		2
	UFO2CTLG	1	04	3
	UFO2DEL	1	08	3
	UFO2DYNQ	1	80	3
	UFO2ENQE	1	40	3
	UFO2ENQN	1	10	3
	UFO2ENQS	1	20	3
	UFO2FLGS	1		2
	UFO2RECT	1	04	4
	UFO2UNC	1	02	3
	UFO2VALD	1	01	3
	UFO3FLGS	14		2
	UFO3FORC	14	80	3
	UFO3REPL	14	40	3
	UFO4FLGS	19		2
	UFO5FLGS	1C		2
	UFO5REPU	1C	10	3
	UFO6FLGS	1D		2
1	CROSS REFERENCE			
	NAME	HEX OFFSET	HEX VALUE	LEVEL
	=====	=====	=====	=====
	UFO7CCAP	20	04	3
	UFO7CCAR	20	20	3
	UFO7CCCP	20	01	3
	UFO7CCCR	20	08	3
	UFO7CCVP	20	02	3
	UFO7CCVR	20	10	3
	UFO7FLGS	20		2
	UFO8FLGS	21		2
	UFO8RESO	21	01	3
	UFO8RESN	21	02	3
	UFO8RESY	21	04	3
	UFO9FLGS	24		2
	UFPZB64R	1	20	3
	UFSAFOK	14	40	4
	UFSEPAR	0		2
	UFSTOP	13	10	4
	UFSYSIN	13	08	4
	UFSYSPR	13	04	4
	UFUIMAL	13	40	4
	UFUIMCH	13	20	4
	UFVOLI@	8		3
	UFVULO@	C		3
	UFWKUNIT	2		2
	UFWKVOL	A		2
	UFXABUFF	1	80	3
	UFXAFLAG	1		2

Chapter 7. DFSMS access method services commands and RPFC for XRC

RPFC for XRC impacts the DCOLLECT Management Class Definition (Record Type 'MC').The DMCCT SRL field is added.

DCOLLECT Output Record Structure

Note that in all the following tables, the notation KB represents 1024 bytes.

Table 6. DCOLLECT Output Record Structure

Offset	Type	Length	Name	Description
HEADER PORTION OF DCOLLECT OUTPUT RECORD. EACH DATA SECTION IS PRECEDED BY THIS HEADER.				
0(X'0')	STRUCTURE	24	DCUOUTH	DATA COLLECTION OUTPUT RECORD
0(X'0')	SIGNED	4	DCURDW	RECORD DESCRIPTOR WORD
0(X'0')	SIGNED	2	DCULENG	LENGTH OF THIS RECORD
2(X'2')	CHARACTER	2	*	RESERVED
4(X'4')	CHARACTER	2	DCURCTYP	RECORD TYPE FOR THIS RECORD (see Table 18 on page 170)
6(X'6')	SIGNED	2	DCUVERS	VERSION
8(X'8')	CHARACTER	4	DCUSYSID	SYSTEM ID FOR THIS OPERATION
12(X'C')	CHARACTER	8	DCUTMSTP	TIMESTAMP FIELD
12(X'C')	UNSIGNED	4	DCUTIME	TIME IN SMF HEADER FORMAT
16(X'10')	CHARACTER	4	DCUDATE	DATE IN SMF FORMAT (CCYYDDDF)
20(X'14')	CHARACTER	4	*	RESERVED
24(X'18')	CHARACTER		DCUDATA	END OF HEADER SECTION
ACTIVE DATA SET INFORMATION (RECORD TYPE "D")				
24(X'18')	STRUCTURE	444	DCDADSI	ACTIVE DATA SET INFORMATION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	44	DCDDSNAM	DATA SET NAME
68(X'44')	BITSTRING	1	DCDERROR	ERROR INFORMATION FLAG
	1... ..		DCDEMNGD	SMS-MANAGED INCONSISTENCY
	.1.. ..		DCDEDVVR	DUPLICATE VVR FOUND
	..1.		DCDNOSPC	NO SPACE INFORMATION PROVIDED
	...1		DCDVSAMI	VSAM INDICATORS INCONSISTENT
	.... 1...		DCDNOFM1	NO FMT 1 DSCB FOR THIS DATA SET
	.... .XXX		*	RESERVED
69(X'45')	BITSTRING	1	DCDFLAG1	INFORMATION FLAG #1

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
	1... ..		DCDRACFD	DATA SET IS RACF-DEFINED
	.1.. ..		DCDSMSM	SMS-MANAGED DATA SET
	..1.		DCDTEMP	TEMPORARY DATA SET
	...1		DCDPDSE	PARTITIONED DATA SET (EXTENDED)
	.... 1...		DCDGDS	GENERATION DATA GROUP DATA SET
	.... .1..		DCDREBLK	DATA SET CAN BE REBLOCKED
	.... ..1.		DCDCHIND	CHANGE INDICATOR
	.... ...1		DCDCKDSI	CHECKPOINT DATA SET INDICATOR
70(X'46')	BITSTRING	1	DCDFLAG2	INFORMATION FLAG #2
	1... ..		DCDNOVVR	NO VVR FOR THIS DATA SET
	.1.. ..		DCDINTCG	DATA SET IS AN INTEGRATED CATALOG FACILITY CATALOG
	..1.		DCDINICF	DATA SET IS CATALOGED IN ICF CAT
	..XX	*		RESERVED
	.... 1...		DCDALLFG	WHEN ON, DCDALLSP CONTAINS A VALID 31 BIT SIGNED VALUE.
	.... .1..		DCDUSEFG	WHEN ON, DCDUSEP CONTAINS A VALID 31 BIT SIGNED VALUE.
	.... ..1.		DCDSECFG	WHEN ON, DCDCALL CONTAINS A VALID 31 BIT SIGNED VALUE.
	.... ...1		DCDNMBFG	WHEN ON, DCDNMBLK CONTAINS A VALID 31 BIT SIGNED VALUE.
71(X'47')	BITSTRING	1	DCDFLAG3	INFORMATION FLAG #3
	1... ..		DCDPDSEX	POSIX FILE SYSTEM FILE(HFS)
	.1.. ..		DCDSTRP	DATA SET IS IN EXTENDED FORMAT
	..1.		DCDDDMEX	DDM INFO EXISTS FOR THIS DATA SET
	...1		DCDCPOIT	CHECKPOINTED DATA SETS
	.... 1...		DCDGT64K	GT 64K TRACKS SUPPORT ADDED
	.... .1..		DCDCMPTV	COMPRESSION TYPE (DCDCTYPE) IS VALID
	.... ..XX		*	RESERVED
72(X'48')	CHARACTER	2	*	RESERVED
74(X'4A')	BITSTRING	2	DCDDSORG	DATA SET ORGANIZATION
74(X'4A')	BITSTRING	1	DCDDSOR0	DATA SET ORGANIZATION BYTE 0
	1... .. .		DCDDSGIS	IS INDEXED SEQUENTIAL ORG
	.1.. .. .		DCDDSGPS	PS PHYSICAL SEQUENTIAL ORG
	..1.		DCDDSGDA	DA DIRECT ORGANIZATION
	...X XX..		*	RESERVED

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
	.... ..1.		DCDDSGPO	PO PARTITIONED ORGANIZATION
	.... ...1		DCDDSGU	U UNMOVABLE DATA SET
75(X'4B')	BITSTRING	1	DCDDSOR1	DATA SET ORGANIZATION BYTE 1
	1... ..		DCDDSGGS	GS GRAPHICS ORGANIZATION
	.XXX ..		*	RESERVED
	.... 1...		DCDDSGVS	VS VSAM DATA SET
	.... .XXX		*	RESERVED
76(X'4C')	BITSTRING	1	DCDRECRD	RECORD FORMAT BYTE
	11.. ..		DCDRECFM	RECORD FORMAT BITS (see Table 18 on page 170)
	..1.		DCDRECFT	TRACK OVERFLOW
	...1		DCDRECFB	BLOCKED RECORDS
	.... 1...		DCDRECFS	STANDARD BLOCKS(F) OR SPANNED(V)
	.... .1..		DCDRECFA	ANSI CONTROL CHARACTER
	.... ..1.		DCDRECFC	MACHINE CONTROL CHARACTER
	.... ...X		*	RESERVED
77(X'4D')	UNSIGNED	1	DCDNMEXT	NUMBER OF EXTENTS OBTAINED
78(X'4E')	CHARACTER	6	DCDVOLSR	VOLUME SERIAL NUMBER
84(X'54')	SIGNED	2	DCDBKLNG	BLOCK LENGTH
86(X'56')	SIGNED	2	DCDLRECL	RECORD LENGTH
88(X'58')	SIGNED	4	DCDALLSP	31 BIT SPACE ALLOCATED TO DATA SET IN KBs (1024). ONLY VALID WHEN DCDALLFG = ON.
92(X'5C')	SIGNED	4	DCDUSESP	31 BIT SPACE USED BY DATA SET IN KBs (1024). ONLY VALID WHEN DCDUSEFG = ON.
96(X'60')	SIGNED	4	DCDSCALL	31 BIT SECONDARY ALLOCATION IN KBs (1024). ONLY VALID WHEN DCDSECFG = ON.
100(X'64')	SIGNED	4	DCDNMBLK	31 BIT NUMBER OF KILOBYTES (1024) THAT COULD BE ADDED TO THE USED SPACE IF THE BLOCK SIZE OR CI SIZE WERE OPTIMIZED. ONLY VALID WHEN DCDNMBFG = ON.
104(X'68')	CHARACTER	4	DCDCREDT	CREATION DATE (yyyyddd F)
108(X'6C')	CHARACTER	4	DCDEXPDT	EXPIRATION DATE (yyyyddd F)
112(X'70')	CHARACTER	4	DCDLSTRF	DATE LAST REFERENCED (yyyyddd F)
116(X'74')	CHARACTER	6	DCDDSSER	DATA SET SERIAL NUMBER
122(X'7A')	CHARACTER	2	DCDVOLSQ	VOLUME SEQUENCE NUMBER
124(X'7C')	CHARACTER	8	DCDLBKDT	LAST BACKUP TIME AND DATE
132(X'84')	CHARACTER	32	DCDDCLAS	
132(X'84')	SIGNED	2	DCDDCLNG	DATA CLASS NAME LENGTH

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
134(X'86')	CHARACTER	30	DCDATCL	DATA CLASS NAME
164(X'A4')	CHARACTER	32	DCDSCLAS	
164(X'A4')	SIGNED	2	DCDSC LNG	STORAGE CLASS NAME LENGTH
166(X'A6')	CHARACTER	30	DCDSTGCL	STORAGE CLASS NAME
196(X'C4')	CHARACTER	32	DCDMCLAS	
196(X'C4')	SIGNED	2	DCDMCLNG	MANAGEMENT CLASS NAME LENGTH
198(X'C6')	CHARACTER	30	DCDMGTCL	MANAGEMENT CLASS NAME
228(X'E4')	CHARACTER	32	DCDSTGRP	
228(X'E4')	SIGNED	2	DCDSGLNG	STORAGE GROUP NAME LENGTH
230(X'E6')	CHARACTER	30	DCDSTGRP	STORAGE GROUP NAME
260(X'104')	CHARACTER	2	DCDCCSID	CODED CHARACTER SET IDENTIFIER
262(X'106')	BITSTRING XXXX XX.. .... ..11	1	DCDCATF DCDEATRC	CATALOGED FLAGS RESERVED VSAM EATTR VALUE IN CATALOG
263(X'107')	BITSTRING.... ..XX XXXX XX..	1	DCDDSCBF DCDEATRV	DSCB FLAGS NONVSAM EATTR VALUE IN VTOC. 00: EATTR not specified, 01: EATTR=NO 10: EATTR=OPT Reserved.
264(X'108')	CHARACTER	8	DCDUDSIZ	USER DATA SIZE (64 BIT UNSIGNED BINARY NUMBER)
272(X'110')	CHARACTER	8	DCDCUDSZ	COMPRESSED DATA SET SIZE (64 BIT UNSIGNED BINARY NUMBER)
280(X'118')	BITSTRING 1... ..	2	DCDEXFLG DCDBDSZ	COMPRESSION FLAGS (Not used for zEDC) DATA SIZES THAT ARE NOT VALID
282(X'11A')	UNSIGNED	2	DCDSCNT	STRIPE COUNT
284(X'11C')	UNSIGNED	4	DCDOVERA	OVER-ALLOCATED SPACE
288(X'120')	CHARACTER	32	DCDACCT	ACCOUNT INFORMATION
320(X'140')	BITSTRING 1... .. .1... .. ..1... .. ...1... 1111	1	DCDFLAG5 DCDALLFX DCDUSEFX DCDSCAFX DCDNMBFX *	
321(X'141')	CHARACTER	6	*	RESERVED
327(X'147')	BITSTRING 1... .. .111 1111	1	DCDDS9F1 DCDDS9CR	Format 9 DSCB Flag Format 9 DSCB built by CREATE
328(X'148')	CHARACTER	8	DCDJBNMC	Name of the job used to create the data set. Non-zero only when the data set has a format 8 DSCB

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
336(X'150')	CHARACTER	8	DCDSTNMC	Name of the step used to create the data set. Non-zero only when the data set has a format 8 DSCB
344(X'158')	BYTES	6	DCDIMEC	Microseconds after midnight local time that the data set was created. Valid only if DCDVOLSQ field (volume sequence number) at offset 122 is 1 and the DCDDS9RCR bit at offset 327 is on. See DCDCREDT for the creation date.
350(X'15E')	CHARACTER	2	*	RESERVED
352(X'160')	SIGNED	8	DCDALLSX	63 BIT SPACE ALLOCATED TO DATA SET IN KB (1024). ONLY VALID WHEN DCDALLFX = ON
360(X'168')	SIGNED	8	DCDUSESX	63 BIT SPACE USED BY DATA SET IN KB (1024). ONLY VALID WHEN DCDUSEFX = ON
368(X'170')	SIGNED	8	DCDSCALX	63 BIT SECONDARY ALLOCATION IN KB (1024). ONLY VALID WHEN DCDSCAFX = ON
376(X'178')	SIGNED	8	DCDNMBLX	63 BIT NUMBER OF KILOBYTES (1024) THAT COULD BE ADDED TO THE USED SPACE IF THE BLOCK SIZE OR CI SIZE WERE OPTIMIZED. ONLY VALID WHEN DCDNMBFX = ON
384(X'180')	UNSIGNED	1	DCDXPSEV	PS EXTENDED FORMAT VERSION NUMBER 0 = DS not created in Extended Format (default) 1/2 = DS created in Extended Format version 1 or 2.
385(X'181')	UNSIGNED	1	DCDCTYPE	COMPRESSION TYPE 0 = NOT COMPRESSED 1 = GENERIC 2 = TAILORED 3 = ZEDC ONLY VALID WHEN DCDCMPTV IS SET ON
386(X'182')	CHARACTER	66	DCDENCR	ENCRYPTION INFORMATION
386(X'182')	UNASSIGNED	2	DCDTYPE	Data set encryption type '0100'X - AES-256 XTS protected key 'FFFF'X - Data set is not encrypted
386(X'182')	UNASSIGNED	2	DCDTYPE	ENCRYPTION TYPE
388(X'184')	CHARACTER	64	DCDKLBL	ENCRYPTION KEY LABEL
452(X'1C4')	CHARACTER	16	*	RESERVED
468(X'1D4')	CHARACTER		DCDADSIE	END OF DOCUMENT Note: DCDDCLAS, DCDSCLAS, DCDMCLAS, DCDSTOGP, AND DCDACCT ARE NOT RETURNED FOR ALTERNATE INDEXES.

VSAM BASE CLUSTER ASSOCIATION INFORMATION (RECORD TYPE "A")

24(X'18')	STRUCTURE	180	DCASSOC	VSAM BASE CLUSTER ASSOCIATIONS (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	44	DCADSNAM	DATA SET NAME
68(X'44')	CHARACTER	44	DCAASSOC	BASE CLUSTER NAME
112(X'70')	BITSTRING	1	DCAFLAG1	VSAM INFORMATION FLAG #1
	1... ..		DCAKSDS	KEY-SEQUENCED DATA SET
	.1.. ..		DCAESDS	ENTRY-SEQUENCED DATA SET
	..1.		DCARRDS	RELATIVE RECORD DATA SET

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
	...1		DCALDS	LINEAR DATA SET
	.... 1...		DCAKRDS	KEY RANGE DATA SET
	.... .1..		DCAAIX	ALTERNATE INDEX DATA SET
	.... ..1.		DCADATA	VSAM DATA COMPONENT
	.... ...1		DCAINDEX	VSAM INDEX COMPONENT
113(X'71')	BITSTRING	1	DCAFLAG2	VSAM INFORMATION FLAG #2
	1...		DCAKR1ST	1ST SEGMENT OF KR DATA SET
	.1..		DCAIXUPG	ALTERNATE INDEX W/ UPGRADE
	..1.		DCAVRRDS	VARIABLE LENGTH RELATIVE RECORD DATA SET
	...1		DCANSTAT	NO VSAM STATISTICS FOR THIS RECORD
	.... 1...		DCASRCI	RBA IS CI NUMBER
	.... .1..		DCAG4G	EXTENDED ADDRESSABILITY
	.... ..1.		DCAZFS	zFS data set
	.... ...1		*	RESERVED
114(X'72')	CHARACTER	2	*	RESERVED
116(X'74')	UNSIGNED	4	DCAHURBA	HIGH USED RELATIVE BYTE ADDRESS
120(X'78')	UNSIGNED	4	DCAHARBA	HIGH ALLOCATED RELATIVE BYTE ADDRESS
124(X'7C')	SIGNED	4	DCANLR	NUMBER OF LOGICAL RECORDS
128(X'80')	SIGNED	4	DCADLR	NUMBER OF DELETED RECORDS
132(X'84')	SIGNED	4	DCAINR	NUMBER OF INSERTED RECORDS
136(X'88')	SIGNED	4	DCAUPR	NUMBER OF UPDATED RECORDS
140(X'8C')	SIGNED	4	DCARTR	NUMBER OF RETRIEVED RECORDS
144(X'90')	SIGNED	4	DCAASP	BYTES OF FREESPACE IN DATA SET
148(X'94')	SIGNED	4	DCACIS	NUMBER OF CONTROL INTERVAL (CI) SPLITS
152(X'98')	SIGNED	4	DCACAS	NUMBER OF CONTROL AREA SPLITS
156(X'9C')	SIGNED	4	DCAEXC	NUMBER OF EXCPs
160(X'A0')	SIGNED	2	DCARKP	RELATIVE KEY POSITION
162(X'A2')	SIGNED	2	DCAKLN	KEY LENGTH
164(X'A4')	CHARACTER	8	DCAHURBC	HIGH USED RBA CALCULATED FROM CI
172(X'AC')	CHARACTER	8	DCAHARBC	HIGH ALLOCATED RBA CALCULATED FROM CI
180(X'B4')	SIGNED	4	DCACISZ	NUMBER OF BYTES IN A CI

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
184(X'B8')	SIGNED	4	DCACACI	NUMBER OF CIs IN A CA
188(X'BC')	CHARACTER	4	DCATRDT	HSM CLASS TRANSITION DATE
192(X'A0')	CHARACTER	12	*	RESERVED
204(X'CC')	CHARACTER		DCASSOCE	END OF DCASSOC

VOLUME INFORMATION (RECORD TYPE "V")

24(X'18')	STRUCTURE	136	DCVVOLI	VOLUME INFORMATION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	6	DCVVOLSR	VOLUME SERIAL NUMBER
30(X'1E')	BITSTRING	1	DCVFLAG1	INFORMATION FLAG #1
	11..		DCVINXST	INDEX STATUS
	1...		DCVINXEX	INDEXED VTOC EXISTS
	.1..		DCVINXEN	INDEXED VTOC IS ENABLED
	..11 1...		DCVUSATR	USE ATTRIBUTE
	..1.		DCVUSPVT	PRIVATE
	...1		DCVUSPUB	PUBLIC
	.... 1...		DCVUSSTO	STORAGE
	.... .1..		DCVSHRDS	DEVICE IS SHAREABLE
	.... ..11		DCVPHYST	PHYSICAL STATUS (see Table 18 on page 170)
31(X'1F')	BITSTRING	1	DCVERROR	ERROR INFORMATION FLAG
	1...		DCVEVLCP	ERROR CALCULATING VOL CAPACITY
	.1..		DCVEBYTK	ERROR CALCULATING BYTES/TRK
	..1.		DCVELSPC	ERROR DURING LSPACE PROCESSING
	...X XXXX		*	RESERVED
32(X'20')	CHARACTER	3	*	RESERVED
35(X'23')	UNSIGNED	1	DCVPERCT	PERCENT FREE SPACE ON VOLUME
36(X'24')	UNSIGNED	4	DCVFRESP	FREE SPACE ON VOLUME (in KB when DCVCYLMG is set to 0 or in MB when DCVCLYMG is set to 1)
40(X'28')	UNSIGNED	4	DCVALLOC	ALLOCATED SPACE ON VOL (in KB when DCVCYLMG is set to 0 or in MB when DCVCLYMG is set to 1)
44(X'2C')	UNSIGNED	4	DCVVLCAP	TOTAL CAPACITY OF VOL (in KB when DCVCYLMG is set to 0 or in MB when DCVCLYMG is set to 1)
48(X'30')	SIGNED	4	DCVFRAGI	FRAGMENTATION INDEX
52(X'34')	UNSIGNED	4	DCVLGEXT	LARGEST EXTENT ON VOLUME

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
56(X'38')	SIGNED	4	DCVFREXT	NUMBER OF FREE EXTENTS
60(X'3C')	SIGNED	4	DCVFDSCB	FREE DSCBS IN VTOC
64(X'40')	SIGNED	4	DCVFIIRS	FREE VIRS
68(X'44')	CHARACTER	8	DCVDVTYP	DEVICE TYPE
76(X'4C')	UNSIGNED	2	DCVDVNUM	DEVICE NUMBER
78(X'4E')	CHARACTER	2	*	RESERVED
80(X'50')	CHARACTER	32	DCVSTGGP	
80(X'50')	SIGNED	2	DCVSGLNG	STORAGE GROUP NAME LENGTH
82(X'52')	CHARACTER	30	DCVSGTCL	STORAGE GROUP NAME
112(X'70')	CHARACTER	8	DCVDPTYP	PHYSICAL DEVICE TYPE
120(X'78')	UNSIGNED	1	DCVTRPCT	PER CENT FREE SPACE ON TRACK MANAGED SPACE
121(X'79')	BITSTRING	1	DCVEAVOL	EAV INDICATOR FLAG
	1		DCVCYLMG	WHEN DCVCYLMG IS SET TO 1, VOLUME HAS CYLINDER MANAGED SPACE AND BOTH TOTAL VOLUME AND TRACK-MANAGED STATISTICS FIELDS WILL BE RETURNED IN MEGABYTES. WHEN DCVCYLMG IS SET TO 0, BOTH TOTAL VOLUME AND TRACK-MANAGED STATISTICS FIELDS WILL BE RETURNED IN KILOBYTES
	.XXX XXXX		*	RESERVED
122(X'7A')	CHARACTER	2	*	RESERVED
124(X'7C')	UNSIGNED	4	DCVTRFSP	FREE SPACE ON THE TRACK-MANAGED PORTION OF A VOLUME. WHEN DCVCYLMG IS SET TO 1, THIS VALUE IS IN MEGABYTES. WHEN DCVCYLMG IS SET TO 0, THIS VALUE IS IN KILOBYTES AND RETURNS THE SAME VALUE AS FOR THE VOLUME FIELD, DCVFRESP.
128(X'80')	UNSIGNED	4	DCVTRALC	ALLOCATED SPACE ON THE TRACK-MANAGED PORTION OF A VOLUME. WHEN DCVCYLMG IS SET TO 1, THIS VALUE IS IN MEGABYTES. WHEN DCVCYLMG IS SET TO 0, THIS VALUE IS IN KILOBYTES AND RETURNS THE SAME VALUE AS FOR THE VOLUME FIELD, DCVALLOC.
132(X'84')	UNSIGNED	4	DCVTRVLC	TOTAL CAPACITY OF THE TRACK-MANAGED SPACE ON A VOLUME IN MEGABYTES, WHEN DCVCYLMG IS SET TO 1. WHEN DCVCYLMG IS SET TO 0, THIS VALUE IS IN KILOBYTES AND RETURNS THE SAME VALUE AS FOR THE VOLUME FIELD, DCVVLCAP. Note that this field may be rounded up to the nearest megabyte for EAV devices.
136(X'88')	SIGNED	4	DCVTRFRG	FRAGMENTATION INDEX FOR THE TRACK-MANAGED PORTION OF THE VOLUME
140(X'8C')	UNSIGNED	4	DCVTRLGE	LARGEST EXTENT FOR THE TRACK-MANAGED PORTION OF THE VOLUME
144(X'90')	SIGNED	4	DCVTRFRX	THE NUMBER OF FREE EXTENTS FOR THE TRACK-MANAGED PORTION OF THE VOLUME
148(X'94')	SIGNED	4	DCVFCYLS	FREE CYLINDERS ON VOLUME

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
152(X'98')	SIGNED	4	DCVFTRKS	FREE TRACKS ON VOLUME WHICH ARE NOT FOUND IN COMPLETE CYLS
156(X'9C')	CHARACTER	4	*	RESERVED
MIGRATED DATA SET INFORMATION (RECORD TYPE "M")				
24 (18)	STRUCTURE	424	UMMDSI	MIGRATED DATA SET INFORMATION (DEFINED ON DCUDATA)
24 (18)	CHARACTER	44	UMDSNAM	USER DATA SET NAME
68 (44)	BITSTRING 11.. .... ..1. .... ...1 XXXX	1	UMFLAG1 UMLEVEL UMCHIND UMSDSP *	INFORMATION FLAG 1 MIGRATED LEVEL (see Table 18 on page 170) CHANGED-SINCE-LAST-BACKUP INDICATOR SMALL DATA SET PACKING (SDSP) MIGRATED DATA SET RESERVED
69 (45)	CHARACTER	1	UMDEVCL	DEVICE CLASS OF THE MIGRATION VOLUME (see Table 18 on page 170)
70 (46)	CHARACTER	2	UMDSORG	DATA SET ORGANIZATION AT TIME OF MIGRATION
72 (48)	SIGNED	4	UMDSIZE	MIGRATION COPY DATA SET SIZE IN KILOBYTES/MEGABYTES
76 (4C)	CHARACTER	8	UMMDATE	TIMESTAMP FIELD
76 (4C)	CHARACTER	4	UMTIME	MIGRATED TIME (hhmmssstt FORMAT)
80 (50)	CHARACTER	4	UMDATE	MIGRATED DATE (yyyymmdd F FORMAT)
84 (54)	STRUCTURE	96	UMCLASS	
84 (54)	STRUCTURE	32	UMDCLAS	
84 (54)	SIGNED	2	UMDCLNG	LENGTH OF DATA CLASS NAME
86 (56)	CHARACTER	30	UMDATCL	DATA CLASS NAME
116 (74)	STRUCTURE	32	UMSCLAS	
116 (74)	SIGNED	2	UMSCLNG	LENGTH OF STORAGE CLASS NAME
118 (76)	CHARACTER	30	UMSTGCL	STORAGE CLASS NAME
148 (94)	STRUCTURE	32	UMMCLAS	
148 (94)	SIGNED	2	UMMCLNG	LENGTH OF MANAGEMENT CLASS NAME
150 (96)	CHARACTER	30	UMMGTCCL	MANAGEMENT CLASS NAME
180 (B4)	BITSTRING	1	UMRECRD	RECORD FORMAT BYTE
181 (B5)	BITSTRING 1... .... ..1. .... ...1 .......1 XXXX	1	UMRECOR UMESDS UMKSDS UMLDS UMRRDS *	VSAM ORGANIZATION OF THIS DATA SET ENTRY-SEQUENCED DATA SET KEY-SEQUENCED DATA SET LINEAR DATA SET RELATIVE-RECORD DATA SET RESERVED
182 (B6)	CHARACTER	2	UMBKLN	BLOCK LENGTH OF THIS DATA SET

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
184 (B8)	BITSTRING 1... .. .1. .... ..1. .... ...1 1... .... .1.. .... ..1. .... ...1	1	UMFLAG2 UMRACFD UMGDS UMREBLK UMPDSE UMSMSM UMCOMPR UMLFS UMENCRP	INFORMATION FLAG 2 RACF-INDICATED DATA SET IF SET TO 1, GENERATION GROUP DATA SET ¹ IF SET TO 1, SYSTEM-REBLOCKABLE DATA SET ¹ IF SET TO 1, PARTITIONED DATA SET EXTENDED ¹ IF SET TO 1, SMS-MANAGED DATA SET. IF SET TO 1, COMPRESSED DATA SET. IF SET TO 1, DATA SET IS LARGE FORMAT SEQ. IF SET TO 1, DATA SET IS ENCRYPTED Note: ¹ Only valid when the dataset is SMS-managed
185 (B9)	FIXED	1	UMPDSEV	PDSE Version number. N/A when value is zero
186 (BA)	SIGNED	2	UMNMIG	NUMBER OF MIGRATIONS FOR THIS DATA SET
188 (BC)	SIGNED	4	UMALLSP	SPACE ALLOCATED IN KILOBYTES
192 (C0)	SIGNED	4	UMUSESP	SPACE USED IN KILOBYTES
196 (C4)	SIGNED	4	UMRECSP	RECALL SPACE ESTIMATE IN KILOBYTES
200 (C8)	CHARACTER	4	UMCREDIT	CREATION DATE (yyyyddd F FORMAT)
204 (CC)	CHARACTER	4	UMEXPDT	EXPIRATION DATE (yyyyddd F FORMAT)
208 (D0)	CHARACTER	8	UMLBKDT	DATE OF LAST BACKUP (STCK FORMAT CONSISTENT WITH DCDLBKDT) ¹ ¹ Only valid when the dataset is SMS-managed
216 (D8)	CHARACTER	4	UMLRFDT	DATE LAST REFERENCED (yyyyddd F FORMAT)
220 (DC)	SIGNED	4	UM_USER_DATASIZE	DATA-SET SIZE, IN KB, IF NOT COMPRESSED
224 (E0)	SIGNED	4	UM_COMP_DATASIZE	COMPRESSED DATA-SET SIZE, IN KB. VALID WHEN UMCOMPR SET.
228 (E4)	CHARACTER	6	UMFRVOL	THE FIRST SOURCE VOLUME SERIAL OF THE MIGRATED DATA
234 (EA)	CHARACTER	4	UMLRECL	LRECL OF DATA SET
238 (EE)	BITSTRING	1	UMFLAG3	INFORMATION FLAG 3
	1... ..		UMEMPTY	ON, IF DATA SET WAS EMPTY AT THE TIME OF MIGRATION
	.1.		UM_CA_RECLAIM_ELIG	ON, IF THE VSAM KSDS DATA SET WAS ELIGIBLE FOR CA RECLAIM PROCESSING WHEN MIGRATED
	..1.		UMZFS	ON - VSAM LINEAR data set for ZFS usage
	...1		UMENCRDP	ON, WHEN THE DATA SET ENCRYPTION INFORMATION IN UMENCRYPTA IS PRESENT IN THIS MIGRATION RECORD
	.... 1...		UM_BSON	ON, if BSON VSAMDB data set
	.... .1..		UM_JSON	ON, if JSON VSAMDB data set
	.... ..1.		UM_CLD_COMP	ON, data is TCT compressed
	.... ...1		UM_CLD_ENCRYPT	ON, data is TCT encrypted
239 (EF)	BITSTRING	1	UMFLAG4	INFORMATION FLAG 4
	1... ..		UMALLSP_FMB	MBYTE FLAG FOR UMALLSP
	.1.		UMUSESP_FMB	MBYTE FLAG FOR UMUSESP
	..1.		UMRECSP_FMB	MBYTE FLAG FOR UMRECSP

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
	...1		UMDSIZE_FMB	MBYTE FLAG FOR UMSIZE
	.... 1...		UM_FMB	When set to 1, UM_USER_DATASIZE and UM_COMP_DATASIZE are in megabytes
	.... .XXX		*	Reserved
240 (F0)	STRUCTURE		UM_CLD_INFO	MCD extension for CLOUD information
240 (F0)	SIGNED	2	UM_CLOUD_NAME_LENGTH	Cloud Network Connection Name length
242 (F2)	CHARACTER	30	UM_CLOUD_NAME	Cloud Network Connection Name
272 (110)	CHARACTER	44	UM_CONTAINER_NAME	CLOUD container name
316 (13C)	SIGNED	4	UM_OBJ_NUMBER	Number of objects stored
320 (140)	FIXED	1	UM_CLD_COMP_PERCENT	Percent of space saved by TCT compression. Valid when UM_CLD_COMP=ON
321 (141)	BITSTRING	1	UMFLAG5	Information flag #5
	1...		UM_CDA_TCT	If ON, data was moved to S3 with CDA TCT.
	.1..		UM_CDA_DIRECT	If ON, data was moved to S3 with direct to cloud.
	..1.		UM_CDA_ZEDC	If ON, CDA compression was requested during S3 direct to cloud migration.
	...X XXXX		*	Reserved
322 (142)	CHARACTER	30	*	Reserved Space
352 (160)	CHARACTER	96	UMENCRYPTA	
352 (160)	FIXED	2	UMENCRPT	Data set encryption type '0100'X - AES-256 XTS protected key 'FFFF'X - Data set is not encrypted
354 (162)	CHARACTER	64	UMENCRPL	Data set encryption key label when encrypted All 'FF'X key label indicates that the data set is not encrypted
418 (1A2)	CHARACTER	30	UMENCRPR	Data set encryption reserved
448 (1C0)		0	UMMDSIE	END OF DCUMCDS
BACKUP DATA SET INFORMATION (RECORD TYPE “B”)				
24 (18)	STRUCTURE	300	UBBDSI	BACKUP DATA SET INFORMATION (DEFINED ON DCUDATA)
24 (18)	CHARACTER	44	UBDSNAM	USER DATA SET NAME
68 (44)	BITSTRING 1... .... ..1. .... ..1. .... ...1 1.... .... .XXX	1	UBFLAG1 UBINCAT UBNOENQ UBBWO UBNQ1 UBNQ2 *	INFORMATION FLAG 1 BACKUP VERSION OF A CATALOGED DATA SET NO DFSMSHsm ENQUEUE BACKUP-WHILE-OPEN CANDIDATE ENQ ATTEMPTED, BUT FAILED ENQ ATTEMPTED BUT FAILED, BACKUP RETRIED, AND ENQ FAILED AGAIN RESERVED
69 (45)	CHARACTER	1	UBDEVCL	DEVICE CLASS OF BACKUP VOLUME (see Table 18 on page 170)

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
70 (46)	CHARACTER	2	UBDSORG	DATA SET ORGANIZATION
72 (48)	SIGNED	4	UBDSIZE	BACKUP VERSION SIZE IN KILOBYTES
76 (4C)	CHARACTER	8	UBBDATE	BACKUP DATE/TIME
76 (4C)	CHARACTER	4	UBTIME	BACKUP TIME (hhmmssstth FORMAT)
80 (50)	CHARACTER	4	UBDATE	BACKUP DATE (yyyyddd F FORMAT)
84 (54)	CHARACTER	96	UBCLASS	SMS CLASS INFORMATION
84 (54)	CHARACTER	32	UBDCLAS	DATA CLASS WHEN BACKUP MADE
84 (54)	SIGNED	2	UBDCLNG	LENGTH OF DATA CLASS NAME
86 (56)	CHARACTER	30	UBDATCL	DATA CLASS NAME
116 (74)	CHARACTER	32	UBSCLAS	STORAGE CLASS WHEN BACKUP MADE
116 (74)	SIGNED	2	UBSCLNG	LENGTH OF STORAGE CLASS NAME
118 (76)	CHARACTER	30	UBSTGCL	STORAGE CLASS NAME
148 (94)	CHARACTER	32	UBMCLAS	MANAGEMENT CLASS WHEN BACKUP MADE
148 (94)	SIGNED	2	UBMCLNG	LENGTH OF MANAGEMENT CLASS NAME
150 (96)	CHARACTER	30	UBMGTC	MANAGEMENT CLASS NAME
180 (B4)	BITSTRING	1	UBRECRD	RECORD FORMAT BYTE OF THIS DATA SET
181 (B5)	BITSTRING 1... .. .1. .... ..1. .... ...1 XXXX	1	UBRECOR UBESDS UBKSDS UBLDS UBRRDS *	VSAM ORGANIZATION OF THIS DATA SET ENTRY-SEQUENCED DATA SET KEY-SEQUENCED DATA SET LINEAR DATA SET RELATIVE-RECORD DATA SET RESERVED
182 (B6)	CHARACTER	2	UBBKLN	BLOCK LENGTH OF THIS DATA SET
184 (B8)	BITSTRING 1... .. .1. .... ..1. .... ...1 1... 1.. .... ..1. 1	1	UBFLAG2 UBRACFD UBGDS UBREBLK UBPDSE UBSMSM UBCOMPR UBLFS UBNEWNAME	INFORMATION FLAG 2 RACF-INDICATED DATA SET IF SET TO 1, GENERATION GROUP DATASET ¹ IF SET TO 1, SYSTEM-REBLOCKABLE DATA SET ¹ IF SET TO 1, PARTITIONED DATA SET EXTENDED (PDSE) ¹ IF SET TO 1, SMS-MANAGED DATA SET AT TIME OF BACKUP IF SET TO 1, COMPRESSED DATA SET WHEN SET TO 1, DATA SET IS LARGE FORMAT SEQUENTIAL WHEN SET TO 1, NEWNAME SPECIFIED AT TIME OF BACKUP Note: ¹ Only valid when the dataset is SMS-managed

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
185 (B9)	BITSTRING 1... .. ..1.. .. ...1. 1... .... .1.. .... ..1. .... ...X	1	UBFLAG3 UBNOSPHERE UBGVCN UBF_RETAIN_SPCD UBF_NEVER_EXP UBENCRP UBZFS UBENCRDP *	INFORMATION FLAG 3 WHEN SET TO 1, SPHERE(NO) PROCESSED AT TIME OF BACKUP WHEN SET TO 1, GENVSAMCOMP NAMES PROCESSED AT TIME OF BACKUP WHEN SET TO 1, RETAIN DAYS SPECIFIED AT TIME OF BACKUP. WHEN SET TO 1, THIS VERSION WILL NEVER EXPIRE. ONLY VALID WHEN UBF_RETAIN_SPCD IS SET TO 1. WHEN SET TO 1, DATA SET IS ENCRYPTED WHEN SET TO 1, VSAM LINEAR data set for ZFS usage When set to 1, the data set encryption information in UBENCRYPTA is present in this backup record Reserved
186 (BA)	FIXED	2	UB_RETAIN DAYS	RETAIN DAYS VALUE. ONLY VALID WHEN UBF_RETAIN_SPCD IS SET TO 1 AND UBF_NEVR-EXP IS SET TO 0.
188 (BC)	SIGNED	4	UBALLSP	SPACE ALLOCATED IN KILOBYTES
192 (C0)	SIGNED	4	UBUSESP	SPACE USED IN KILOBYTES
196 (C4)	SIGNED	4	UBRECSP	RECOVERY SPACE ESTIMATE IN KILOBYTES
200 (C8)	SIGNED	4	UB_USER_ DATASIZE	VALID WHEN UBCOMP SET, VALUE IS DATA-SET SIZE, IN KB, IF NOT COMPRESSED
204 (CC)	SIGNED	4	UB_COMP_ DATASIZE	VALID WHEN UBCOMP SET, THIS VALUE IS ACTUAL COMPRESSED DATA-SET SIZE, IN KB
208 (D0)	CHARACTER	6	UBFRVOL	THE FIRST SOURCE VOLUME SERIAL OF THE BACKUP DATA
214 (D6)	BITSTRING	1	UBFLAG4	INFORMATION FLAG #4
	1... ..		UBALLSP_FMB	MBYTE FLAG FOR ALLOC SIZE
	.1.. ..		UBUSESP_FMB	MBYTE FLAG FOR USED SIZE
	..1.		UBRECSP_FMB	MBYTE FLAG FOR RECOVERED
	...1		UBDSIZE_FMB	MBYTE FLAG FOR BACKUP VERSION
	.... 1...		UB_FMB	When set to 1, UB_USER_DATASIZE and UB_COMP_DATASIZE are in megabytes
	.... .XXX		*	RESERVED
215 (D7)	CHARACTER	13	*	RESERVED SPACE
216 (D8)	CHARACTER	12	*	RESERVED
228 (E4)	CHARACTER	96	UBENCRYPTA	Data set encryption information in use by the access method for this data set at the time it was migrated. Valid when UBENCRDP is set
228 (E4)	FIXED	2	UBENCRPT	Data set encryption type '0100'X - AES-256 XTS protected key. 'FFFF'X - Data set is not encrypted

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
230 (E6)	CHARACTER	64	UBENCRPL	Data set encryption key label when encrypted All 'FF'X key label indicates that the data set is not encrypted
294 (126)	CHARACTER	30	UBENCRPR	Data set encryption reserved
324 (144)		0	UBBDSIE	END OF DCUBCDS
DASD CAPACITY PLANNING INFORMATION (RECORD TYPE “C”)				
24 (18)	CHARACTER	23	UCCAPD	DASD CAPACITY PLANNING RECORD (DEFINED ON DCUDATA)
24 (18)	CHARACTER	6	UCVOLSR	VOLUME SERIAL NUMBER
30 (1E)	CHARACTER	4	UCCOLDT	DATE THE STATISTICAL DATA WAS COLLECTED BY DFSMSHsm FOR THE VOLUME (yyyddd F FORMAT)
34 (22)	BITSTRING 11.. .... ..11 1111	1	UCFLAG1 UCLEVEL *	INFORMATION FLAG 1 LEVEL OF VOLUME (L0, L1; see Table 18 on page 170) RESERVED
35 (23)	CHARACTER	1	*	RESERVED
36 (24)	SIGNED	4	UCTOTAL	TOTAL CAPACITY OF VOLUME IN KILOBYTES
40 (28)	CHARACTER	7	UCOCCUP	
40 (28)	UNSIGNED	1	UCTGOCC	SPECIFIED TARGET OCCUPANCY OF VOLUME
41 (29)	UNSIGNED	1	UCTROCC	SPECIFIED TRIGGER OCCUPANCY OF VOLUME
42 (2A)	UNSIGNED	1	UCBFOCC	OCCUPANCY OF VOLUME BEFORE PROCESSING
43 (2B)	UNSIGNED	1	UCAFOCC	OCCUPANCY OF VOLUME AFTER PROCESSING (0 IF NOT PROCESSED)
44 (2C)	UNSIGNED	1	UCNOMIG	PERCENTAGE OF VOLUME DATA NOT MIGRATED BUT ELIGIBLE TO MIGRATE (EXCESS ELIGIBLE)
45 (2D)	UNSIGNED	1	UCNINTV	NUMBER OF TIMES INTERVAL MIGRATION WAS RUN AGAINST THE VOLUME
46 (2E)	UNSIGNED	1	UCINTVM	NUMBER OF TIMES TARGET OCCUPANCY WAS MET FOR THE VOLUME DURING INTERVAL MIGRATION
47 (2F)	CHARACTER		UCCAPDE	END OF DCCAPD
TAPE CAPACITY PLANNING INFORMATION (RECORD TYPE “T”)				
24 (18)	STRUCTURE	16	UTCAPT	TAPE CAPACITY PLANNING RECORD (DEFINED ON DCUDATA)
24 (18)	CHARACTER	1	UTSTYPE	TYPE OF TAPE CAPACITY PLANNING RECORD (see Table 18 on page 170)
25 (19)	CHARACTER	3	*	RESERVED
28 (1C)	SIGNED	4	UTFULL	NUMBER OF FULL TAPE VOLUMES

Table 6. DCOLLECT Output Record Structure (continued)

Offset	Type	Length	Name	Description
32 (20)	SIGNED	4	UTPART	NUMBER OF PARTIALLY FILLED TAPE VOLUMES
36 (24)	SIGNED	4	UTEMPTY	NUMBER OF EMPTY TAPE VOLUMES
40 (28)	CHARACTER		UTCAPTE	END PF DCTCAPT

The following records are generated when SMSDATA is specified:

Type**Description****DC**

Data Class construct information

SC

Storage Class construct information

MC

Management Class construct Information

BC

Base Configuration Information

SG

Storage Group construct Information

VL

Storage Group volume Information

AG

Aggregate Group Information

DR

OAM Drive Record Information

LB

OAM Library Record Information

CN

Cache Names from the Base Configuration Information

AI

Accounting Information from the ACS

Table 7. DCOLLECT Data Class Definition (Record Type 'DC')

Offset	Type	Length	Name	Description
DATA CLASS CONSTRUCT INFORMATION (RECORD TYPE 'DC')				
24(X'18')	STRUCTURE	540	DDCDATA	DATA CLASS DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DDCNMFLD	SPACE FOR NAME AND LENGTH
24(X'18')	SIGNED	2	DDCNMLEN	LENGTH OF NAME
26(X'1A')	CHARACTER	30	DDCNAME	NAME OF DATA CLASS
56(X'38')	CHARACTER	8	DDCUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DDCDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DDCTIME	TIME OF LAST UPDATE
84(X'54')	CHARACTER	120	DDCDESC	DESCRIPTION

DATA CLASS PARAMETERS SPECIFICATION BITS

Table 7. DCOLLECT Data Class Definition (Record Type 'DC') (continued)

Offset	Type	Length	Name	Description
204(X'CC')	CHARACTER	4	DDCSPEC	
204(X'CC')	BITSTRING	1	DDCSPEC1	
	1... ..		DDCFRORG	RECORD SPECIFIED FLAG
	.1... ..		DDCFLREC	LRECL SPECIFIED FLAG
	.1... ..		DDCFRFM	RECFM SPECIFIED FLAG
	...1 ...		DDCFKLEN	KEYLEN SPECIFIED FLAG
	... 1...		DDCFKOFF	KEYOFF SPECIFIED FLAG
	... .1..		DDCFEXP	EXPIRATION ATTRIB SPEC'D FLAG
	... .1.		DDCFRET	RETENTION ATTRIB SPEC'D FLAG
	... ..1		DDCFPSP	PRIMARY SPACE SPECIFIED FLAG
205(X'CD')	BITSTRING	1	DDCSPEC2	
	1... ..		DDCFSSP	SECONDARY SPACE SPEC'D FLAG
	.1... ..		DDCFDIR	DIRECTORY BLOCKS SPEC'D FLAG
	.1... ..		DDCFAUN	ALLOCATION UNIT SPEC'D FLAG
	...1 ...		DDCFAVR	AVGREC SPECIFIED FLAG
	... 1...		DDCFVOL	VOLUME CNT SPECIFIED FLAG
	... .1..		DDCF CIS	DATA CI SIZE SPECIFIED FLAG
	... .1.		DDCF CIF	FREE CI % SPECIFIED FLAG
	... ..1		DDCF CAF	FREE CA % SPECIFIED FLAG
206(X'CE')	BITSTRING	1	DDCSPEC3	
	1... ..		DDCFXREG	SHAREOPT XREGION SPEC'D FLAG
	.1... ..		DDCFXSYS	SHAREOPT XSYSTEM SPEC'D FLAG
	.1... ..		DDCFIMBD	VSAM IMBED SPECIFIED FLAG
	...1 ...		DDCFRPLC	VSAM REPLICATE SPECIFIED FLAG
	... 1...		DDCFCOMP	COMPACTION SPECIFIED FLAG
	... .1..		DDCFMEDI	MEDIA TYPE SPECIFIED FLAG
	... .1.		DDCFRECT	RECORDING TECHNOLOGY FLAG
	... ..1		DDCFVEA	VSAM EXTENDED ADDRESSING
207(X'CF')	BITSTRING	1	DDCSPEC4	
	1... ..		DDCSPRLF	SPACE CONSTRAINT RELIEF
	.1... ..		DDCREDUS	REDUCE SPACE BY % SPECIFIED
	.1... ..		DDCRABS	REC ACCESS BIAS SPECIFIED
	...1 ...		DDCFCT	COMPRESSION TYPE SPECIFIED
	... 1...		DDCBLMT	BLOCK SIZE LIMIT SPECIFIED
	... .1..		DDCCFS	RLS CF CACHE SPECIFIED
	... .1.		DDCDVCS	DYNAMIC VOLUME COUNT SPECIFIED
	... ..1		DDCFSCAL	PERFORMANCE SCALING SPECIFIED
DATA SET ATTRIBUTES				
208(X'D0')	UNSIGNED	1	DDCRCORG	DATA SET REORG -- SEE CONSTANTS

Table 7. DCOLLECT Data Class Definition (Record Type 'DC') (continued)

Offset	Type	Length	Name	Description
209(X'D1')	UNSIGNED	1	DDCRECFM	DATA SET RECFM -- SEE CONSTANTS
210(X'D2')	BITSTRING	1	DDCDSFLG	
	1...		DDCBLK	1 = BLOCKED, 0 = UNBLKED/NULL
	.1...		DDCSTSP	1 = STANDARD OR SPANNED, ELSE 0
	..XX XXXX		*	RESERVED
211(X'D3')	UNSIGNED	1	DDCCNTL	CARRIAGE CONTROL -- SEE CONSTS
212(X'D4')	SIGNED	4	DDCRETPD	RETENTION PERIOD-TIME ACCESSIBLE TO SYS
212(X'D4')	SIGNED	2	DDCEXPYR	EXPIRATION DATE - YEAR
214(X'D6')	SIGNED	2	DDCEXPDY	EXPDT - ABSOLUTE DAY OF YEAR
216(X'D8')	SIGNED	2	DDCVOLCT	MAXIMUM VOL COUNT FOR EXTEND
218(X'DA')	UNSIGNED	2	DDCDSNTY	DSN TYPE -- SEE CONSTS

DATA SET SPACE ATTRIBUTES

220(X'DC')	SIGNED	4	DDCSPPRI	PRIMARY SPACE AMOUNT
224(X'E0')	SIGNED	4	DDCSPSEC	SECONDARY SPACE AMOUNT
228(X'E4')	SIGNED	4	DDCDIBLK	DIRECTORY BLOCKS
232(X'E8')	UNSIGNED	1	DDCAVREC	AVGREC -- M, K, U -- SEE CONSTS
233(X'E9')	UNSIGNED	1	DDCREDUC	REDUCE PRIMARY OR SECONDARY SPACE BY 0-99%. DDCSPRLF AND DDCREDUS MUST BE ON.
234(X'EA')	UNSIGNED	1	DDCRBIAS	VSAM RECORD ACCESS BIAS. REQUIRES DDCRABS, SEE CONSTANTS.
235(X'EB')	UNSIGNED	1	DDCDVC	DYNALLOC VOL COUNT
236(X'EC')	SIGNED	4	DDCAUNIT	ALLOCATION UNIT AMOUNT
240(X'F0')	SIGNED	4	DDCBSZLM	DATA SET BLOCKSIZE LIMIT
244(X'F4')	SIGNED	4	DDCLRECL	RECORD LENGTH

VSAM ATTRIBUTES

248(X'F8')	SIGNED	4	DDCCISZ	CISIZE FOR KS, ES OR RR
252(X'FC')	CHARACTER	4	DDCFRSP	FREESPACE
252(X'FC')	SIGNED	2	DDCCIPCT	CI FREESPACE %
254(X'FE')	SIGNED	2	DDCCAPCT	CA FREESPACE %
256(X'100')	SIGNED	2	DDCSHROP	VSAM SHARE OPTIONS
256(X'100')	UNSIGNED	1	DDCXREG	VSAM XREGION SHARE OPTIONS
257(X'101')	UNSIGNED	1	DDCXSYS	VSAM XSYSTEM SHARE OPTIONS
258(X'102')	BITSTRING	1	DDCVINDX	VSAM SHARE OPTIONS
	1...		DDCIMBED	1 = IMBED, 0 = NO
	.1...		DDCREPLC	1 = REPLICATE, 0 = NO
	..XX XXXX		*	RESERVED
259(X'103')	UNSIGNED	1	DDCKLEN	VSAM KEY LENGTH
260(X'104')	SIGNED	2	DDCKOFF	VSAM KEY OFFSET
262(X'106')	UNSIGNED	1	DDCCAMT	VSAM CANDIDATE AMOUNT

Table 7. DCOLLECT Data Class Definition (Record Type 'DC') (continued)

Offset	Type	Length	Name	Description
MOUNTABLE DEVICE ATTRIBUTES				
264(X'108')	UNSIGNED	1	DDCCOMP	COMPACTION TYPE - SEE CONSTANTS
265(X'109')	UNSIGNED	1	DDCMEDIA	MEDIA TYPE - SEE CONSTANTS
266(X'10A')	UNSIGNED	1	DDCRECTE	RECORDING TECHNOLOGY - SEE CONSTANTS
267(X'10B')	CHARACTER	1	*	RESERVED
RECORD SHARING AND LOGGING ATTRIBUTES				
268(X'10C')	CHARACTER	4	DDCRLS1	RLS SUPPORT
268(X'10C')	UNSIGNED	1	DDCBWOTP	RWO TYPE, REQUIRES DDCBWOS. SEE CONSTANTS.
269(X'10D')	UNSIGNED	1	DDCLOGRC	SPHERE RECOVERABILITY, REQUIRES DDCLOGRS. SEE CONSTANTS.
270(X'10E')	UNSIGNED	1	DDCSPAND	RECORD SPANS CI ABILITY, REQUIRES DDCSPANS. SEE CONSTANTS.
271(X'10F')	UNSIGNED	1	DDCFRLOG	CICSVR FRLOG TYPE 1 = NONE 2 = REDO 4 = UNDO 6 = ALL
272(X'110')	CHARACTER	28	DDCLOGNM	LOG STREAM ID, REQUIRES DDCLSIDS.
272(X'10C')	SIGNED	2	DDCLOGLN	ID LENGTH
274(X'112')	CHARACTER	26	DDCLOGID	ID
300(X'12C')	CHARACTER	4	DDCSPECX	
300(X'12C')	BITSTRING	1	DDCSPECA	ADDITIONAL SPECIFICATION FLAGS
	1...		DDCBWOS	BWO SPECIFIED
	.1..		DDCLOGRS	SPHERE RECOVERABILITY SPECIFIED
	..1.		DDCSPANS	CI SPAN SPECIFIED
	...1		DDCLSIDS	LOGSTREAMID SPECIFIED
	.... 1...		DDCFRLGS	CICSVR FRLOG SPECIFICATION FLAG
	.... .1..		DDCFEXTC	EXTENT CONSTRAINT SPECIFIED
	.... .1.		DDCFA2GB	RLS ABOVE 2GB BAR SPECIFIED
	.... ...1		DDCFPSEG	PERFORMANCE SEGMENTATION SPECIFIED
301(X'12D')	BITSTRING	1	DDCSPECB	ADDITIONAL SPECIFICATION FLAGS
	1...		DDCFKYL1	KEYLABEL 1 SPECIFIED
	.1..		DDCFKYC1	KEYCODE 1 SPECIFIED
	..1.		DDCFKYL2	KEYLABEL 2 SPECIFIED
	...1		DDCFKYC2	KEYCODE 2 SPECIFIED
	.... 1...		DDCFVSP	SMBVSP SPECIFIED
	.... .1..		DDCFSDDB	SDB SPECIFIED
	.... .1.		DDCFOVRD	OVERRIDE JCK SPECIFIED
	.... ...1		DDCFCAR	CA RECLAIM SPECIFIED
302(X'12E')	BITSTRING	1	DDCSPECC	ADDITIONAL SPECIFICATION FLAGS
	1...		DDCFATTR	EATTR SPECIFIED

Table 7. DCOLLECT Data Class Definition (Record Type 'DC') (continued)

Offset	Type	Length	Name	Description
	.1..		DDCFLOGR	LOG REPLICATION SPECIFIED 1=SPECIFIED
	.1.		DDCFRMOD	VSAM SMB RMODE31 is specified.
	...1		DDCGSRDU	1 = Guaranteed Space Reduction 0 = No Guaranteed Space Reduction
	.... 1...		DDCFKLBL	DASD Data Set Key label specified
	.... .XXX		*	RESERVED
303(X'12F')	BITSTRING	1	DDCSPECD	ADDITIONAL SPECIFICATION FLAGS
	.XXX XXXX		*	RESERVED
304(X'130')	BITSTRING	1	DDCSFLG	ADDITIONAL SPECIFICATION FLAGS
	1...		DDCOVRD	BWO SPECIFIED
	.1..		DDCSDB	SPHERE RECOVERABILITY SPECIFIED
	..XX XXXX		*	RESERVED
305(X'131')	CHARACTER	4	DDCVSAM1	DATA CLASS VSAM ATTRIBUTE
305(X'131')	BITSTRING	1	DDCVBYT1	VSAM EXTENSION
	1...		DDCREUSE	0 = ACCESS DATA AS NEW DATA SET ON OPEN 1 = RE-ACCESS DATA IN VSAM CLUSTER ON OPEN (DEFAULT)
	.1...		DDCSPEED	1 = SPEED MODE. DO NOT PRE-FORMAT ON LOAD 0 = RECOVERY MODE. PRE-FORMAT ON LOAD
	.1.		DDCEX255	1 = OVER 255 EXTENTS ALLOWED 0 = OVER 255 ARE NOT ALLOWED
	...1		DDCLOGRP	LOG REPLICATION 1=YES 0=NO
	.... XXXX		*	RESERVED
	...X XXXX		*	RESERVED
306(X'132')	CHARACTER	3	*	RESERVED
309(X'135')	CHARACTER	1	DDCEATTR	EXTENDED ATTRIBUTE REQUIRES DDCFATTR, SEE CONSTANTS
310(X'136')	UNSIGNED	1	DDCCT	COMPRESSION TYPE 0 = GENERIC 1 = TAILORED 2 = ZR3 = ZP
311(X'137')	UNSIGNED	1	DDCDSCF	RLS CF CACHE VALUE 0 = ALL 1 = UPDATEDONLY 2 = NONE
312(X'138')	BITSTRING	1	DDCRBYTE	RLS BYTE

Table 7. DCOLLECT Data Class Definition (Record Type 'DC') (continued)

Offset	Type	Length	Name	Description
	.1... ..		DDCA2GB	RLS ABOVE 2GB BAR 0 = NO 1 = YES
	.1... ..		DDCRECLM	CA RECALIM 0=ENABLE (DEFAULT) 1=DISABLE
	..XX XXXX		*	RESERVED
313(X'139')	CHARACTER	8	DDCBLKLM	BLKSZLMT LOCATED AT THE LOWER 4 BYTES
313(X'139')	CHARACTER	4	*	RESERVED FOR FUTURE EXPANSION
317(X'13D')	CHARACTER	4	DDCBSZLM	BLOCK SIZE LIMIT VALUE
321(X'141')	CHARACTER	8	DDCTAPE1	TAPE SUPPORT USE
321(X'141')	UNSIGNED	1	DDCPSCA	PERFORMANCE SCALING OPTION: VALUE YES, NO OR BLANK
322(X'142')	UNSIGNED	1	DDCPSEG	PERFORMANCE SEGMENTATION: VALUE YES, NO OR BLANK
323(X'143')	CHARACTER	2	*	RESERVED
325(X'145')	CHARACTER	3	*	RESERVED
328(X'148')	CHARACTER	4	DDCVSP	SMB VSP field
328(X'148')	BITSTRING	1	DDCVSP	UNIT FOR SMBVSP VALUE
	1... ..		DDCVSPUK	UNIT IT KB
	.1... ..		DDCVSPUM	UNIT IN MB
	..XX XXXX		*	RESERVED
329(X'149')	UNSIGNED	3	DDCVSPV	SMBVSP VALUE
332(X'14C')	CHARACTER	66	DDCKYLB1	KEYLABEL 1
332(X'14C')	SIGNED	2	DDCKLBL1	Length of KEYLABEL 1
334(X'14E')	CHARACTER	64	DDCKLBN1	KEYLABEL 1 name field
398(X'18E')	UNSIGNED	1	DDCKYCD1	KEYCODE 1
399(X'18F')	UNSIGNED	1	*	Filler for byte skipping
400(X'190')	CHARACTER	66	DDCKYLB2	KEYLABEL 2
400(X'190')	SIGNED	2	DDCKLBL2	Length of KEYLABEL 2
402(X'192')	CHARACTER	64	DDCKLBN2	KEYLABEL 2 name field
466(X'1D2')	UNSIGNED	1	DDCKYCD2	KEYCODE 2
467(X'1D3')	UNSIGNED	1	*	Filler for byte skipping
468(X'1D4')	CHARACTER	1	*	Reserved
469(X'1D5')	UNSIGNED	1	DDCRMODE	VSAM SMB RMODE31 value 0 = BLANK 1 = ALL 2 = BUFF 3 = CB 4 = NONE
470(X'1D6')	CHARACTER	66	DDCDKYBL	DASD Data Set Key label
470(X'1D6')	SIGNED	2	DDCDKLBL	DASD Data Set Key Label length
472(X'1D8')	CHARACTER	64	DDCDKLBN	DASD Data Set Key Label name
536(X'218')	CHARACTER	28	*	Reserved
564(X'234')	CHARACTER		DDCDATAE	END OF DDCDATA

Table 8. DCOLLECT Storage Class Definition (Record Type 'SC')

Offset	Type	Length	Name	Description
STORAGE CLASS CONSTRUCT INFORMATION (RECORD TYPE 'SC')				
24(X'18')	STRUCTURE	256	DSCDATA	STORAGE CLASS DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DSCNMFLD	SPACE FOR NAME AND LENGTH
24(X'18')	SIGNED	2	DSCNMLEN	LENGTH OF NAME
26(X'1A')	CHARACTER	30	DSCNAME	NAME OF STORAGE CLASS
56(X'38')	CHARACTER	8	DSCUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DSCDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DSCTIME	TIME OF LAST UPDATE
84(X'54')	CHARACTER	120	DSCDESC	DESCRIPTION
STORAGE CLASS FLAGS				
204(X'CC')	BITSTRING	1	DSCFLAGS	
	1... ..		DSCDFGSP	GUARANTEED SPACE 1=YES, 0=NO
	.1.. ..		DSCDFAVL	AVAILABILITY, 1=SEE DSCAVAIL 0=DEFAULT=STANDARD
	..1.		DSCFDIRR	DIRECT RESPONSE TIME OBJECT, 0= DON'T CARE, 1= SEE DSCDIRR
	...1		DSCFDIRB	DIRECT BIAS, 0= DON'T CARE, 1= SEE DSCDIRB
	.... 1...		DSCFSEQR	SEQ RESPONSE TIME OBJECTIVE, 0= DON'T CARE, 1= SEE DSCSEQR
	.... .1..		DSCFSEQB	SEQ BIAS, 0= DON'T CARE, 1= SEE DSCSEQB
	.... ..1.		DSCSYNCD	SYNCDDEV, 1 = YES, 0 = NO
	.... ...1		DSCFIAD	1 = INITIAL ACCESS RESPONSE
205(X'CD')	BITSTRING	1	DSCFLAG2	
	1... ..		DSCDFACC	ACCESSIBILITY, 1 =SEE SCDACCES, 0 (DEFAULT) =CONTINUOUS PREFERRED
	.1.. ..		DSCDFSDR	STRIPING SUSTAINED DATA RATE 0 =NOT SPECED,1 =SEE SCDSTSDR
	..1.		DSCFDCFW	DIRECT CF WEIGHT SPECIFIED: 1 = YES, 0 = NO
	...1		DSCFSCFW	SEQUENTIAL WEIGHT SPECIFIED: 1 = YES, 0 = NO
	.... 1...		DSCVERS	ACC VERSIONING PARAMETER SPECIFIED 1 = see DSCVERSN, 0 = default

Table 8. DCOLLECT Storage Class Definition (Record Type 'SC') (continued)

Offset	Type	Length	Name	Description
	.... .1..		DSCBUSP	ACC Backup Parameter Specified, 1 = see DSCBAKUP, 0 = default
	.... .1.		DSCDSSEP	Data Set Separation Profile: 1 = Bypass, 0 = Perform
	.... ...1		DSCTIERS	Multi-tier SG specified? 1 = YES, 0 = NO
206(X'CE')	UNSIGNED	1	DSCVERSN	ACC Version Parameter Value: 0 = Blank, 1 = YES, 2 = NO
207(X'CF')	UNSIGNED	1	DSCBAKUP	ACC Backup Parameter Value: 0 = blank, 1 = YES, 2 = NO

STORAGE CLASS ATTRIBUTES

208(X'D0')	UNSIGNED	1	DSCAVAIL	AVAILABILITY OPTIONS
209(X'D1')	UNSIGNED	1	DSCDIRB	DIRECT BIAS - SEE CONSTS BELOW
210(X'D2')	UNSIGNED	1	DSCSEQB	SEQ BIAS - SEE CONSTS BELOW
211(X'D3')	UNSIGNED	1	DSCACCES	ACCESSIBILITY - SEE CONSTANTS
212(X'D4')	SIGNED	4	DSCIACDL	INITIAL ACCESS RESPONSE SEC
216(X'D8')	SIGNED	4	DSCDIRR	MICROSECOND RESPONSE TIME OBJECTIVE -- DIRECT
220(X'DC')	SIGNED	4	DSCSEQR	MICROSECOND RESPONSE TIME OBJECTIVE -- SEQUENTIAL
224(X'E0')	SIGNED	4	DSCSTSDR	STRIPING SUSTAINED DATA RATE
228(X'E4')	CHARACTER	32	DSCCCHST	CACHE SET NAME
228(X'E4')	SIGNED	2	DSCCSLEN	CACHE SET NAME LENGTH
230(X'E6')	CHARACTER	30	DSCCSNAM	CACHE SET NAME VALUE
260(X'104')	SIGNED	2	DSCDIRCW	DIRECT CF WEIGHT
262(X'106')	SIGNED	2	DSCSEQCW	SEQUENTIAL CF WEIGHT
264(X'108')	BITSTRING	1	DSCFLAG3	FLAG
	1...		DSCTIER	1 = MULTI-TIER SG 0 = NO MULTI-TIER SG
	.1..		DSCPAVS	PAV SPECIFIED 1 SEE DSCPAV
	..1.		DSCFOLS	OAM SUBLEVEL 1 SEE DSCPAV
	...X		*	RESERVED
	.... 1...		DSCFDCLS	Disconnect Sphere at CLOSE Specified. See DSCDCLS
	.... .XXX		*	RESERVED
265(X'109')	UNSIGNED	1	DSCPAV	PAV requirements, 0 = None, 1 = Standard, 2 = Preferred, 3 = Required

Table 8. DCOLLECT Storage Class Definition (Record Type 'SC') (continued)

Offset	Type	Length	Name	Description
266(X'10A')	UNSIGNED	1	DSCSTOSL	OAM SUBLEVEL VALUE
267(X'10B')	BITSTRING	1	DSCVFLG2	VSAM Flag 2
	1...		DSCDCLS	Disconnect Sphere at CLOSE 1 = YES 0 = NO
	.1..		DSCDSSFI	Single SFI Required 1 = YES 0 = NO (default)
	.X.. XXXX		*	RESERVED
	..XX XXXX		*	RESERVED
268(X'108')	BITSTRING	1	DSCCMMFT	CMM Flags
	1...		DSCHLERD	Eligible for zHyperlink reads 1 = YES 0 = NO
	.1..		DSCHLEWR	Eligible for zHyperlink writes 1 = YES 0 = NO
	..XX XXXX		*	RESERVED
269(X'10D')	CHARACTER	11	*	RESERVED
280(X'118')	CHARACTER		DSCDATAE	END OF DSCDATA

Table 9. DCOLLECT Management Class Definition (Record Type 'MC')

Offset	Type	Length	Name	Description
MANAGEMENT CLASS CONSTRUCT INFORMATION (RECORD TYPE 'MC')				
24(X'18')	STRUCTURE	284	DMCDATA	MANAGEMENT CLASS DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DMCNMFLD	SPACE FOR NAME AND LENGTH
24(X'18')	SIGNED	2	DMCNMLEN	LENGTH OF NAME
26(X'1A')	CHARACTER	30	DMCNAME	NAME OF MANAGEMENT CLASS
56(X'38')	CHARACTER	8	DMCUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DMCDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DMCTIME	TIME OF LAST UPDATE
84(X'54')	CHARACTER	120	DMCDESC	DESCRIPTION

GENERAL SPECIFICATION FLAGS

204(X'CC')	BITSTRING	1	DMCSPEC1	ATTRIBUTE SPECIFIED FLAGS, 1= SPECIFIED, 0= NOT SPEC'D
	1...		DMCFBVER	MCBKVS SPECIFIED FLAG
	.1..		DMCFBVRD	DMCBVRD SPECIFIED FLAG
	..1.		DMCFRBK	DMCBKDY SPECIFIED FLAG
	...1		DMCFRNP	DMCBKNP SPECIFIED FLAG
	.... 1...		DMCFEXDT	DMCEXDAT SPECIFIED FLAG

Table 9. DCOLLECT Management Class Definition (Record Type 'MC') (continued)

Offset	Type	Length	Name	Description
	.... .1..		DMCFEXDY	DMCEXPDY SPECIFIED FLAG
	.... ..1.		DMCFPRDY	DMCPRDY SPECIFIED FLAG
	.... ...X		*	RESERVED
205(X'CD')	BITSTRING	1	DMCSPEC2	ATTRIBUTE SPECIFIED FLAGS, 1= SPECIFIED, 0= NOT SPEC'D
	1...		DMCFL1DY	DMCL1DY SPECIFIED FLAG
	.1..		DMCFRLMG	DMCRLONG SPECIFIED FLAG
	..1.		DMCFPELE	DMCPELEM SPECIFIED FLAG
	...1		DMCFBKFQ	DMCBKFQ SPECIFIED FLAG
	.... XXXX		*	RESERVED

PARTIAL RELEASE CRITERIA

206(X'CE')	BITSTRING	1	DMCRLF	PARTIAL RELEASE FLAGS
	1...		DMCPREL	RELEASE 1 = YES, 0 = NO
	.1..		DMCPRCN	CONDITIONAL PARTITION RELEASE
	..1.		DMCPRIM	IMMEDIATE VALUE FOR RELEASE
	...X XXXX		*	RESERVED
207(X'CF')	CHARACTER	1	*	RESERVED

GENERATION DATA GROUP CRITERIA

208(X'D0')	BITSTRING	1	DMCGDGFL	GDG ATTRIBUTE FLAGS
	1...		DMCRLONG	MIGRATE OR EXPIRE ROLLED OFF GDS, 1 = MIGRATE, 0 = EXPIRE
	.XXX XXXX		*	RESERVED
209(X'D1')	CHARACTER	1	*	RESERVED
210(X'D2')	SIGNED	2	DMCPELEM	NUMBER OF GDG ELEMENTS ON PRIMARY

212(X'D4')	CHARACTER	4	*	RESERVED
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DATA SET RETENTION CRITERIA

216(X'D8')	BITSTRING	1	DMCRETf	DATA SET RETENTION FLAGS
	1...		DMCDYNOL	1=EXPIRE AFTER DAYS= NOLIMIT ELSE 0 AND SEE DMCEXPDY
	.1..		DMCDTNOL	1=EXPIRE AFTER DATE= NOLIMIT ELSE 0 AND SEE DMCEXDAT
	..XX XXXX		*	RESERVED

Table 9. DCOLLECT Management Class Definition (Record Type 'MC') (continued)

Offset	Type	Length	Name	Description
217(X'D9')	UNSIGNED	1	DMCRFMT	FORMAT USED FOR DMCEXDAT -- DATE OR DAYS SEE CONSTANTS
218(X'DA')	CHARACTER	2	*	RESERVED
220(X'DC')	SIGNED	4	DMCEXPDY	EXPIRE AFTER DAYS NO USE
224(X'E0')	SIGNED	4	DMCEXDAT	EXPIRE DAYS SINCE CREATE OR
224(X'E0')	UNSIGNED	2	DMCEYEAR	EXPIRE DATE SINCE CREATE
226(X'E2')	UNSIGNED	2	DMCEDAY	SEE DMCRFMT FOR FORMAT

DATA SET MIGRATION CRITERIA

228(X'E4')	BITSTRING	1	DMCMIGF	DATA SET MIGRATION FLAGS
	XX..		*	RESERVED
	..1.		DMCL1NOL	MIN DAYS ON LVL 1 / LAST USE, 1=NOLIMIT, ELSE SEE DMCL1DY
	...X XXXX		*	RESERVED
229(X'E5')	CHARACTER	1	*	RESERVED
230(X'E6')	SIGNED	2	DMCPRDY	MIN DAYS ON PRIM / LAST USE
232(X'E8')	SIGNED	2	DMCL1DY	MIN DAYS ON LVL 1 / LAST USE
234(X'EA')	UNSIGNED	1	DMCCMAU	COMMAND OR AUTO MIGRATE -- SEE CONSTANTS BELOW
235(X'EB')	CHARACTER	1	*	RESERVED

DATA SET BACKUP CRITERIA

236(X'EC')	BITSTRING	1	DMCBKFLG	BACKUP FLAGS
	1...		DMCRBNOL	1=>RETAIN DAYS ONLY BACKUP VERS = NOLIMIT 0=>SEE DMCBKNP FOR DAYS TO KEEP ONLY BACKUP
	.1..		DMCNPOL	1=>RETAIN DAYS EXTRA BACKUP VERS = NOLIMIT 0=>SEE DMCBKDY FOR DAYS TO KEEP EXTRA BACKUP
	..X.		*	RESERVED
	...1		DMCAUTBK	1=AUTO BACKUP ALLOWED, ELSE 0
	.... 1...		DMCCPYTF	COPY TECHNIQUE, 1=SEE DMCCPYTC 0=(DEFAULT)=STANDARD
	.... .XXX		*	RESERVED
237(X'ED')	CHARACTER	3	*	RESERVED
240(X'F0')	SIGNED	2	DMCBKFQ	BACKUP FREQUENCY
242(X'F2')	SIGNED	2	DMCBKVS	NUMBER OF BACKUP VERSIONS
244(X'F4')	SIGNED	2	DMCBVRD	NUM OF VERSIONS DS DELETED

Table 9. DCOLLECT Management Class Definition (Record Type 'MC') (continued)

Offset	Type	Length	Name	Description
246(X'F6')	SIGNED	2	DMCBKDY	DAYS TO KEEP BACKUP VERSION
248(X'F8')	SIGNED	2	DMCBKNP	DAYS TO KEEP ONLY BACKUP
250(X'FA')	UNSIGNED	1	DMCBADU	ALLOW ADMIN OR USER BACKUP. SEE CONSTANTS BELOW
251(X'FB')	UNSIGNED	1	DMCCPYTC	COPY TECHNIQUE - SEE CONSTANTS
252(X'FC')	CHARACTER	8	DMCBKUDC	BACKUP DESTINATION CLASS

MAXIMUM RETENTION CRITERIA

260(X'104')	BITSTRING	1	DMCMRETF	MAXIMUM RETENTION FLAGS
	1... ..		DMCRPNOL	RETPD (RETAIN PD) 1=NOLIMIT ELSE SEE DCMRTDY
	.XXX XXXX		*	RESERVED
261(X'105')	SIGNED	3	DMCMRTDY	MAXIMUM DAYS TO RETAIN

CLASS TRANSITION CRITERIA

264(X'108')	BITSTRING	1	DMCTSCR	TIME SINCE CREATION FLAGS
	1... ..		DMCTCYR	YEARS SPECIFIED
	.1.. ..		DMCTCMN	MONTHS SPECIFIED
	..1.		DMCTCDY	DAYS SPECIFIED
	...X XXXX		*	RESERVED
265(X'109')	BITSTRING	1	DMCTSLU	TIME SINCE LAST USED FLAGS
	1... ..		DMCTSYR	YEARS SPECIFIED
	.1.. ..		DMCTSMN	MONTHS SPECIFIED
	..1.		DMCTSDY	DAYS SPECIFIED
	...X XXXX		*	RESERVED
266(X'10A')	BITSTRING	1	DMCPERD	PERIODIC FLAGS
	1... ..		DMCPEMN	MONTHLY SPECIFIED
	.1.. ..		DMCPEQD	QUARTERLY ON DAY SPEC
	..1.		DMCPEQM	QUARTERLY ON MONTH SPEC
	...1		DMCPEYD	YEARLY ON DAY SPEC
	.... 1...		DMCPEYM	YEARLY IN MONTH SPEC
	.... .1..		DMCFIRST	FIRST DAY OF PERIOD SPEC
	.... ..1.		DMCLAST	LAST DAY OF PERIOD SPEC
	.... ..X		*	RESERVED
267(X'10B')	CHARACTER	1	*	RESERVED
268(X'10C')	CHARACTER	6	DMCVSCR	TIME SINCE CREATION VALUES

Table 9. DCOLLECT Management Class Definition (Record Type 'MC') (continued)

Offset	Type	Length	Name	Description
268(X'10C')	SIGNED	2	DMCVSCY	TIME SINCE CREATION YEARS
270(X'10E')	SIGNED	2	DMCVSCM	TIME SINCE CREATION MONTHS
272(X'110')	SIGNED	2	DMCVSCD	TIME SINCE CREATION DAYS
274(X'112')	CHARACTER	6	DMCVSLU	TIME SINCE LAST USED VALUES
274(X'112')	SIGNED	2	DMCVSUY	TIME SINCE LAST USED YEARS
276(X'114')	SIGNED	2	DMCVSUM	TIME SINCE LAST USED MONTHS
278(X'116')	SIGNED	2	DMCVSUD	TIME SINCE LAST USED DAYS
280(X'118')	SIGNED	2	DMCVPRD	PERIODIC VALUES
282(X'11A')	SIGNED	2	DMCVPMO	PERIODIC MONTHLY ON DAY
284(X'11C')	CHARACTER	4	DMCVPQT	PERIODIC QUARTERLY VALUES
284(X'11C')	SIGNED	2	DMCVPQD	PERIODIC QUARTERLY ON DAY
286(X'11E')	SIGNED	2	DMCVPQM	PERIODIC QUARTERLY IN MONTH
288(X'120')	CHARACTER	4	DMCVPYR	PERIODIC YEARLY VALUES
288(X'120')	SIGNED	2	DMCVPYD	PERIODIC YEARLY ON DAY
290(X'122')	SIGNED	2	DMCVPYM	PERIODIC YEARLY IN MONTH
292(X'124')	CHARACTER	16	*	RESERVED
308(X'134')	SIGNED	2	DMCCTSQL	HSM Class Transition Serialization Error action. 0 = Use default from HSM parm 1 = Use Db2 2 = Use ZFS 3 = Use CICS 4 = Use User Exit
310(X'136')	SIGNED	2	DMCCTCPY	HSM Class Transition Copy Technique 0 = Standard 1 = Fast Replication Prefer 2 = Fast Replication Request 3 = FlashCopy PresMirPref 4 = FlashCopy PresMirReq 5 = FlashCopy XRCPRIMARY
312(X'138')	SIGNED	2	MCDL2DY	Min days/last to move to cloud
314(X'13A')		32	DMCCLOUD	Cloud information
314(X'13A')	SIGNED	2	DMCCLEN	The length of the Cloud Network Connection Name
316(X'13C')	CHARACTER	30	DMCCLNAM	Cloud Network Connection Name for migration
346(X'15A')		2	*	Reserved

Table 9. DCOLLECT Management Class Definition (Record Type 'MC') (continued)

Offset	Type	Length	Name	Description
348(X'15C')	UNSIGNED	4	DCMSZLTE	Less than or equal to Data Size Threshold
352(X'160')	UNSIGNED	4	DCMSZGT	Greater than Data Size Threshold
356(X'164')	SIGNED	1	DMCACLTE	Action to take when less than or equal to the data set size 0 = NONE 1 = for CLOUD 2 = for ML1 3 = for ML2 4 = for MIG 5 = for Transition
357(X'165')	SIGNED	1	DMCACGT	Action to take when greater than the data set size 0 = NONE 1 = for CLOUD 2 = for ML1 3 = for ML2 4 = for MIG 5 = for Transition
358(X'166')		4	*	Reserved
362(X'16A')	CHARACTER	2	DMCDATAE	END OF DMCDATA

Table 10. DCOLLECT Storage Group Definition (Record Type 'SG')

Offset	Type	Length	Name	Description
STORAGE GROUP CONSTRUCT INFORMATION (RECORD TYPE 'SG')				
24(X'18')	STRUCTURE	898	DSGDATA	STORAGE GROUP DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DSGNMFLD	SPACE FOR NAME AND LENGTH
24(X'18')	SIGNED	2	DSGNMLEN	LENGTH OF NAME
26(X'1A')	CHARACTER	30	DSGNAME	NAME OF STORAGE GROUP
56(X'38')	CHARACTER	8	DSGUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DSGDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DSGTIME	TIME OF LAST UPDATE
84(X'54')	CHARACTER	120	DSGDESC	DESCRIPTION
STORAGE GROUP FLAG INFORMATION				
204(X'CC')	CHARACTER	2	*	RESERVED
206(X'CE')	CHARACTER	2	*	RESERVED

Table 10. DCOLLECT Storage Group Definition (Record Type 'SG') (continued)

Offset	Type	Length	Name	Description
STORAGE GROUP ATTRIBUTES				
208(X'D0')	UNSIGNED	1	DSGFTYPE	STORAGE GROUP TYPE -- SEE CONSTANTS BELOW
209(X'D1')	UNSIGNED	1	DSGFHTHR	HIGH THRESHOLD - 0 TO 99 %
210(X'D2')	UNSIGNED	1	DSGFLTHR	LOW THRESHOLD - 0 TO 99 %
211(X'D3')	CHARACTER	1	*	RESERVED
212(X'D4')	SIGNED	4	DSGFVMAX	VIO MAX DATA SET SIZE
216(X'D8')	CHARACTER	4	DSGFVUNT	VIO UNIT TYPE
220(X'DC')	CHARACTER	8	DSGDMPC(5)	DUMP CLASSES FOR AUTODUMP
260(X'104')	CHARACTER	1	DSGFPRST(8)	STATUS BY PROCESSOR
260(X'104')	UNSIGNED	1	DSGSTAT	STATUS
268(X'10C')	CHARACTER	8	DSGABSYS	AUTO BACKUP SYSTEM
276(X'114')	CHARACTER	8	DSGADSYS	AUTO DUMP SYSTEM
284(X'11C')	CHARACTER	8	DSGAMSYS	AUTO MIGRATE SYSTEM
292(X'124')	CHARACTER	1	DSGCNFRM(8)	CONFIRMED SMS STATUS FOR THIS STORAGE GROUP
292(X'124')	UNSIGNED	1	DSGCSMSS	CONFIRMED SMS STATUS
300(X'12C')	SIGNED	4	DSGGBKUF	GUARANTEED BACKUP FREQ
STORAGE GROUP OAM ATTRIBUTES				
304(X'130')	CHARACTER	8	DSGTBLGR	OAM TABLE SPACE ID GROUPNN
312(X'138')	BITSTRING	1	DSGOAMFL	OAM FLAGS
	1...		DSGFCYS	OAM CYCLE START/END GIVEN
	.1..		DSGFVLFT	VOLUME FULL THRESHOLD BIT
	..1.		DSGFDRST	DRIVE START THRESHOLD BIT
	...1		DSGVFFER	VOL FULL @ WRITE ERROR GIVEN
	.... 1...		DSGVFERR	VOL FULL @ WRITE ERROR BIT
	.... .1..		DSGFRETP	OAM RETENTION PROTECTION
	.... ..1.		DSGFDELP	OAM DELETION PROTECTION
	.... ...X		*	RESERVED
313(X'139')	CHARACTER	1	*	RESERVED
314(X'13A')	UNSIGNED	1	DSGCYLST	OAM CYCLE START TIME (HRS)
315(X'13B')	UNSIGNED	1	DSGCYLED	OAM CYCLE END TIME (HRS)
316(X'13C')	SIGNED	2	DSGVOLFT	VOLUME FULL THRESHOLD BIT
318(X'13E')	SIGNED	2	DSGDRVST	DRIVE START THRESHOLD BIT

Table 10. DCOLLECT Storage Group Definition (Record Type 'SG') (continued)

Offset	Type	Length	Name	Description
320(X'140')	CHARACTER	32	DSGOLIBS(8)	OPTICAL LIBRARIES
320(X'140')	SIGNED	2	DSGOLBNL	OPTICAL LIBRARY NAME LENGTH
322(X'142')	CHARACTER	8	DSGOLBNM	OPTICAL LIBRARY NAME
330(X'14A')	CHARACTER	22	*	RESERVED
576(X'240')	CHARACTER	8	DSGSSTAT(32)	STATUS BY PROCESSOR, CAN HAVE UP TO 32 SYSTEM STATUS ENTRIES.
576(X'240')	UNSIGNED	1	DSGSYSST	REQUESTED SYSTEM STATUS
577(X'241')	UNSIGNED	1	DSGCNSMS	CONFIRMED SMS STATUS
578(X'242')	CHARACTER	6	*	RESERVED
832(X'340')	CHARACTER	16	*	RESERVED

IF DCUVERS IS TWO OR HIGHER

848(X'350')	UNSIGNED	1	DSGOFLOW	OVERFLOW
849(X'351')	SIGNED	2	DSGEXNLN	LENGTH OF EXTEND NAME
851(X'353')	CHARACTER	30	DSGEXNM	EXTEND STORAGE GROUP NAME
881(X'371')	CHARACTER	2	*	RESERVED
883(X'373')	BITSTRING	1	DSGDFLAG2	INFORMATION FLAGS
	1...		DSGFLOWF	Overflow SG specified? 1=Yes 0=No If Yes, see DSGOFLOW
	.1..		DSGEXNMF	Extend SG Specified? 1=Yes 0=No If Yes, see DSGEXTNM
	..X.		*	Reserved
	...1		DSGEAVBP	Breakpoint Value Specified? 1=Yes 0=No if Yes, see
	.... XXXX		*	Reserved
884(X'374')	UNSIGNED	4	DSGSBKPT	EAV BREAKPOINT VALUE THIS VALUE IS REVERENT ONLY WHEN DSGEAVBP FLAG IS 1 (ON)
888(X'378')	UNSIGNED	2	DSGSHTHR	HIGH THRESHHOLD PERCENT FOR THE TRACK-MANAGED PORTION OF THE VOLUME
890(X'37A')	UNSIGNED	2	DSGSLTHR	LOW THRESHHOLD PERCENT FOR THE TRACK-MANAGED PORTION OF THE VOLUME
892(X'37C')	CHARACTER	24	*	RESERVED
916(X'394')	UNSIGNED	1	DSGTOTAP	TOTAL SPACE ALERT THRESHOLD PERCENT
917(X'395')	UNSIGNED	1	DSGTMSAP	TRACK-MANAGED SPACE ALERT THRESHOLD PERCENT
918(X'396')	CHARACTER	4	DSGOAMID	Db2 Identifier for OAM
922(X'39A')	CHARACTER	0	DSGDATAE	END OF STORAGE GROUP DATA

Table 11. DCOLLECT SMS Volume Information (Record Type 'VL')

Offset	Type	Length	Name	Description
SMS VOLUME DEFINITION (RECORD TYPE 'VL')				
24(X'18')	STRUCTURE	416	DVLDATA	SMS VOLUME DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DVLNMFLD	SPACE FOR NAME AND LENGTH
24(X'18')	SIGNED	2	DVLNMLEN	LENGTH OF NAME -- SHOULD BE 6
26(X'1A')	CHARACTER	6	DVLVSER	VOLUME SERIAL NUMBER
32(X'20')	CHARACTER	24	*	RESERVED FOR CONSISTENCY
56(X'38')	CHARACTER	8	DVLUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DVLDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DVLTIME	TIME OF LAST UPDATE
VOLUME RECORD FLAG INFORMATION				
84(X'54')	CHARACTER	1	DVLFLAGS	FLAGS AND RESERVED
	1...		DVLCONV	1 = VOL IS IN CONVERSION
	.X..		*	RESERVED
	..1.		DVLVTCIX	1 = VTOX IX, 0 = OSVTOC
	...1		DVLIXDIS	1 = VTOC Index Disabled
	.... 1...		DVLVTCOV	1 = VTOC Alert Override, when Warning ON, VLDSTSMS modified
	.... .X..		*	RESERVED
	.... ..1.		DVLCPAON	1 = Compression, alert is ON
	.... ...X		*	RESERVED
85(X'55')	BITSTRING	1	DVLFLGDC	DCOLLECT FLAGS
	1...		DVL32NAM	0 = Use DVLNSTAT, 1 = USE DVLSSTAT FLAG BIT ONLY; DOES NOT INDICATE NUMBER OF SYSTEMS.
	.XXX XXXX		*	RESERVED
86(X'56')	CHARACTER	2	*	RESERVED
STORAGE GROUP ASSOCIATION AND STATUS INFORMATION				
88(X'58')	CHARACTER	32	DVLSG	LENGTH AND NAME OF STORGRP
88(X'58')	SIGNED	2	DVLSGLEN	LENGTH OF STORGRP NAME
90(X'5A')	CHARACTER	30	DVLSTGRP	STORAGE GROUP OF THIS VOLUME
120(X'78')	CHARACTER	2	DVLNSTAT(8)	STATUS BY SYSTEM (8 SYSTEMS)
120(X'78')	UNSIGNED	1	DVLSMSS	SMS STATUS

Table 11. DCOLLECT SMS Volume Information (Record Type 'VL') (continued)

Offset	Type	Length	Name	Description
121(X'79')	UNSIGNED	1	DVLMVSS	MVS STATUS
VOLUME ATTRIBUTES				
144(X'90')	ADDRESS	4	DVLNUCBA	ADDRESS OF UCB IF KNOWN - OR 0
148(X'94')	UNSIGNED	4	DVLNTCPY	TOTAL CAPACITY IN MB
152(X'98')	UNSIGNED	4	DVLNFREE	AMOUNT FREE SPACE IN MB
156(X'9C')	UNSIGNED	4	DVLNLEXT	LARGEST FREE EXTENT IN MB
160(X'A0')	SIGNED	2	DVLN0CNT	VOLUME LEVEL RESET COUNT
162(X'A2')	UNSIGNED	2	DVLTRKSZ	VOLUME R1 TRACK CAPACITY
164(X'A4')	SIGNED	4	DVLNLEVL	UPDATE LEVEL FOR VOLUME
168(X'A8')	CHARACTER	8	DVLSSTAT(32)	STATUS BY PROCESSOR, CAN HAVE UP TO 32 SYSTEM STATUS ENTRIES.
168(X'A8')	UNSIGNED	1	DVLSTSMS	SMS SYSTEM STATUS
169(X'A9')	UNSIGNED	1	DVLSTMVS	MVS SYSTEM STATUS
170(X'AA')	UNSIGNED	1	*	RESERVED
171(X'AB')	UNSIGNED	1	DVLSRSMS	SOURCE OF SMS STATUS
172(X'AC')	UNSIGNED	1	DVLOGSMS	ORIGINAL SMS STATUS
173(X'AD')	CHARACTER	3	*	RESERVED
170(X'AA')	UNSIGNED	1	*	RESERVED.
171(X'AB')	UNSIGNED	1	DVLSRSMS	SOURCE OF SMS STATUS, Valid only for ACTIVE configuration = 0 STATUS FROM CDS = 1 MVS SETSMS COMMAND = 2 VTOC % USAGE ALERT = 3 STATUS ALERT RELIEF
173(X'AD')	CHARACTER	4	*	RESERVED.
424(X'1A8')	UNSIGNED	4	DVLTRKCP	TOTAL CAPACITY OF THE TRACK-MANAGED SPACE ON THE VOLUME IN MB
428(X'1AC')	UNSIGNED	4	DVLTRKFR	TOTAL FREE SPACE IN THE TRACK-MANAGED SPACE ON THE VOLUME IN MB
432(X'1B0')	UNSIGNED	4	DVLTRKEX	LARGEST FREE SPACE IN THE TRACK-MANAGED SPACE ON THE VOLUME IN MB
436(X'1B4)	CHARACTER	2	*	RESERVED
438(X'1B6')	UNSIGNED	1	DVLPVTOC	% USED VTOC RECORDS

Table 11. DCOLLECT SMS Volume Information (Record Type 'VL') (continued)

Offset	Type	Length	Name	Description
439(X'1B7')	UNSIGNED	1	DVLPIDX	% USED VTOC INDEX RECORDS
440(X'1B8')	CHARACTER	68	*	RESERVED
508(X'1FC')	CHARACTER		DVLDATE	ROUND TO DWORD BOUNDARY
436(X'1B4')	CHARACTER	4	*	RESERVED
440(X'1B8')	CHARACTER		DVLDATE	ROUND TO DWORD BOUNDARY

Table 12. DCOLLECT Base Configuration Information (Record Type 'BC')

Offset	Type	Length	Name	Description
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BASE CONFIGURATION INFORMATION (RECORD TYPE 'BC')

24(X'18')	STRUCTURE	960	DBCADATA	BASE CONFIGURATION INFORMATION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	*	RESERVED
56(X'38')	CHARACTER	8	DBCUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DBCDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DBCTIME	TIME OF LAST UPDATE
84(X'54')	CHARACTER	120	DBCDESC	DESCRIPTION

BASE CONFIGURATION FLAGS

204(X'CC')	BITSTRING	1	DBCFLAGS	RESERVED
205(X'CD')	BITSTRING	1	DBCFLGDC	DCOLLECT FLAGS
	1...		DBC32NAM	0 = USE DBCFSYSN, 1 = USE DBCSYSDT FLAG BIT ONLY; DOES NOT INDICATE NUMBER OF SYSTEMS.
	.XXX XXXX		*	RESERVED
206(X'CE')	CHARACTER	2	*	RESERVED

BASE CONFIGURATION DEFAULTS

208(X'D0')	CHARACTER	32	DBCDEFMC	DEFAULT MANAGEMENT CLASS
208(X'D0')	SIGNED	2	DBCMCLEN	DEFAULT MC LENGTH OF NAME
210(X'D2')	CHARACTER	30	DBCMCNAM	DEFAULT MANAGEMENT CLASS NAME
240(X'F0')	CHARACTER	8	DBCDEGEOM	DEFAULT DEVICE GEOMETRY
240(X'F0')	SIGNED	4	DBCTRKSZ	TRACK SIZE IN BYTES
244(X'F4')	SIGNED	4	DBCCYLCP	CYL CAPACITY (TRK/CYL)
248(X'F8')	CHARACTER	8	DBCUNIT	DEFAULT UNIT

Table 12. DCOLLECT Base Configuration Information (Record Type 'BC') (continued)

Offset	Type	Length	Name	Description
BASE CONFIGURATION INFORMATION				
256(X'100')	CHARACTER	8	DBCSRST	SMS RESOURCE STATUS TOKEN
264(X'108')	UNSIGNED	1	DBCSTAT	DATA SET STATUS -- SEE CONSTS
265(X'109')	CHARACTER	3	*	RESERVED
268(X'10C')	CHARACTER	8	DBCFSYSN(8)	SYSTEM NAMES (8 SYSTEMS)
332(X'14C')	CHARACTER	44	DBCSCDSN	FOR ACDS ONLY, NAME OF SCDS FROM WHICH IT WAS ACTIVATED

SYSTEM FEATURES

376(X'178')	CHARACTER	2	DBCSFEAT(8)	SUPPORTED SYSTEM FEATURES (8 SYSTEMS)
392(X'188')	UNSIGNED	1	DBCSYSNT(8)	TYPE OF SYSTEM NAMES. SEE CONSTANTS FOR TYPES.
400(X'190')	CHARACTER	16	DBCSYSDT (32)	STATUS BY PROCESSOR, CAN HAVE UP TO 32 SYSTEM STATUS ENTRIES.
400(X'190')	CHARACTER	8	DBCSYSNM	SYSTEM/GROUP NAME
408(X'198')	CHARACTER	2	DBCSYSFT	SUPPORTED SYSTEM FEATURES
410(X'19A')	CHARACTER	2	*	RESERVED
412(X'19C')	UNSIGNED	1	DBCSNMTY	SYSTEM NAME TYPE FOR THIS ENTRY. SEE CONSTANTS.
413(X'19D')	CHARACTER	3	*	RESERVED
912(X'390')	CHARACTER	16	*	RESERVED

IF DCUVERS IS TWO OR HIGHER,

928(X'3A0')	SIGNED	2	DBCSEPNL	SEPARATION NAME LENGTH
930(X'3A2')	CHARACTER	54	DBSEPNM	SEPARATION NAME
984(X'3D8')	CHARACTER		DBCDAE	END OF DBCDATA

Table 13. DCOLLECT Aggregate Group Definition (Record Type 'AG')

Offset	Type	Length	Name	Description
AGGREGATE GROUP DEFINITION (RECORD TYPE 'AG')				
24(X'18')	STRUCTURE	616	DAGDATA	AGGREGATE GROUP DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DAGNMFLD	SPACE FOR NAME AND LENGTH
24(X'18')	SIGNED	2	DAGNMLEN	LENGTH OF NAME
26(X'1A')	CHARACTER	30	DAGNAME	NAME OF DATA CLASS
56(X'38')	CHARACTER	8	DAGUSER	USERID OF LAST UPDATER

Table 13. DCOLLECT Aggregate Group Definition (Record Type 'AG') (continued)

Offset	Type	Length	Name	Description
64(X'40')	CHARACTER	10	DAGDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	2	*	RESERVED
76(X'4C')	CHARACTER	8	DAGTIME	TIME OF LAST UPDATE
84(X'54')	CHARACTER	120	DAGDESC	DESCRIPTION

AGGREGATE GROUP FLAG INFORMATION

204(X'CC')	BITSTRING	1	DAGFLAGS	
	1... ..		DAGTENQ	TOLERATE ENQ FAILURE, 1 = YES, 0 = NO
	.1.. ..		DAGFRET	RETENTION PERIOD SPECIFIED, 1 = YES, 0 = NO
	..1.		DAGFNCPY	NUMBER OF COPIES SPECIFIED, 1 = YES, 0 = NO
	...X XXXX		*	RESERVED
205(X'CD')	CHARACTER	3	*	RESERVED

AGGREGATE GROUP ATTRIBUTES

208(X'D0')	SIGNED	4	DAGRETPD	RETENTION PERIOD
208(X'D0')	SIGNED	2	DAGEXPYR	EXPIRATION YEAR
210(X'D2')	SIGNED	2	DAGEXPDY	ABSOLUTE DAY OF YEAR
212(X'D4')	CHARACTER	30	DAGDEST	DESTINATION
242(X'F2')	CHARACTER	33	DAGPREFIX	OUTPUT DATA SET PREFIX
275(X'113')	CHARACTER	1	*	RESERVED
276(X'114')	CHARACTER	52	DAGIDSNM	INSTRUCTION DATA SET NAME
276(X'114')	CHARACTER	44	DAGINDSN	DATA SET NAME
320(X'140')	CHARACTER	8	DAGINMEM	MEMBER NAME, IF ANY, OR BLANK
328(X'148')	CHARACTER	52	DAGDSNMS(5)	ARRAY OF DATA SET NAMES (5 NAMES)
328(X'148')	CHARACTER	44	DAGDSN	DATA SET NAME
372(X'174')	CHARACTER	8	DAGMEM	MEMBER NAME, IF ANY, OR BLANK
588(X'24C')	CHARACTER	32	DAGMGMTTC	MANAGEMENT CLASS
588(X'24C')	SIGNED	2	DAGMCLEN	MANAGEMENT CLASS LENGTH
590(X'24E')	CHARACTER	30	DAGMCNAM	MANAGEMENT CLASS NAME
620(X'26C')	SIGNED	4	DAGNCOPY	NUMBER OF COPIES
624(X'270')	CHARACTER	16	*	RESERVED
640(X'280')	CHARACTER		DAGDATAE	END OF DAGDATA

Table 14. DCOLLECT Optical Drive Information (Record Type 'DR')

Offset	Type	Length	Name	Description
SMS OPTICAL DRIVE DEFINITION (RECORD TYPE 'DR')				
24(X'18')	STRUCTURE	400	DDRDATA	SMS OPTICAL DRIVE DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DDRNMF LD	EXTENDED FOR CONSISTENCY
24(X'18')	SIGNED	2	DDR DVLEN	LENGTH OF NAME -- SHOULD BE 8
26(X'1A')	CHARACTER	30	DDRNAME	DRIVE NAME FIELD
26(X'1A')	CHARACTER	8	DDR DNAME	DRIVE NAME
34(X'22')	CHARACTER	22	*	RESERVED FOR CONSISTENCY
56(X'38')	CHARACTER	8	DDR DUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DDR DDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	1	DDR FLGAS	FLAGS AND RESERVED
	1...		DDR32NAM	0 = USE DD RNSTAT, 1 = USE DD RSTAT FLAG BIT ONLY; DOES NOT INDICATE NUMBER OF SYSTEMS.
	.XX XXXX		*	RESERVED
75(X'4B')	CHARACTER	1	*	RESERVED
76(X'4C')	CHARACTER	8	DDR DTIME	TIME OF LAST UPDATE
LIBRARY NAME FIELDS				
84(X'54')	CHARACTER	32	DDRLB	LENGTH AND NAME OF LIBRARY
84(X'54')	SIGNED	2	DDRLBLEN	LENGTH OF LIBRARY NAME
86(X'56')	CHARACTER	30	DDRLIBRY	LIBRARY FOR THIS DRIVE
86(X'56')	CHARACTER	8	DDRLBNM	LIBRARY NAME
94(X'5E')	CHARACTER	22	*	RESERVED
DRIVE STATUS BY SYSTEM				
116(X'74')	CHARACTER	4	DD RNSTAT(8)	STATUS BY SYSTEM (32 SYSTEMS)
116(X'74')	CHARACTER	4	DDROMST	STATUS OF EACH DRIVE
116(X'74')	UNSIGNED	1	DDRSOUT	REQUESTED OAM STATUS
117(X'75')	UNSIGNED	1	DDRCFCS	CURRENT OAM STATUS
118(X'76')	CHARACTER	2	*	RESERVED
MISCELLANEOUS INFORMATION				
148(X'94')	UNSIGNED	4	DDR DCONS	CONSOLE ID
152(X'98')	CHARACTER	8	DDRSTAT(32)	STATUS BY PROCESSOR, CAN HAVE UP TO 32 SYSTEM STATUS ENTRIES.
152(X'98.')	CHARACTER	4	DDRSYSST	STATUS FOR THIS SYSTEM

Table 14. DCOLLECT Optical Drive Information (Record Type 'DR') (continued)

Offset	Type	Length	Name	Description
152(X'98')	UNSIGNED	1	DDRREQST	REQUESTED SYSTEM STATUS
153(X'99')	UNSIGNED	1	DDRCURST	CURRENT SYSTEM STATUS
154(X'9A')	CHARACTER	2	*	RESERVED
156(X'9C')	CHARACTER	4	*	RESERVED
408(X'198')	CHARACTER	16	*	RESERVED
424(X'1A8')	CHARACTER		DDRDATAE	END OF DDRDATA

Table 15. DCOLLECT Optical Library Information (Record Type 'LB')

Offset	Type	Length	Name	Description
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SMS OPTICAL LIBRARY DEFINITION (RECORD TYPE 'LB')

24(X'18')	STRUCTURE	424	DLBDATA	SMS OPTICAL LIBRARY DEFINITION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	32	DLBNMFLD	EXTENDED FOR CONSISTENCY
24(X'18')	SIGNED	2	DLBNMLEN	LENGTH OF LIBRARY NAME
26(X'1A')	CHARACTER	30	DLBLNAME	LIBRARY NAME - LONG VERSION
26(X'1A')	CHARACTER	8	DLBNAME	NAME OF OPTICAL LIBRARY
34(X'22')	CHARACTER	22	*	RESERVED FOR CONSISTENCY
56(X'38')	CHARACTER	8	DLBDUSER	USERID OF LAST UPDATER
64(X'40')	CHARACTER	10	DLBDDATE	DATE OF LAST UPDATE
74(X'4A')	CHARACTER	1	DLBFLAGS	RESERVED
	1...		DLB32NAM	0 = USE DLBNSTAT, 1 = USE DLBSTAT FLAG BIT ONLY; DOES NOT INDICATE NUMBER OF SYSTEMS.
	.XXX XXXX		*	RESERVED
75(X'4B')	CHARACTER	5	*	RESERVED
80(X'50')	CHARACTER	8	DLBDTIME	TIME OF LAST UPDATE

OPTICAL LIBRARY STATUS BY SYSTEM

88(X'58')	CHARACTER	4	DLBNSTAT (X'8')	STATUS BY SYSTEM (32 SYSTEMS)
88(X'58')	CHARACTER	4	DLBOMST	STATUS FOR EACH LIBRARY
88(X'58')	UNSIGNED	1	DLBSOUT	REQUESTED OAM STATUS
89(X'59')	UNSIGNED	1	DLBCFCS	CURRENT OAM STATUS
90(X'5A')	CHARACTER	2	*	RESERVED

OPTICAL LIBRARY ATTRIBUTES

120(X'78')	UNSIGNED	1	DLBTYPE	REAL OR PSEUDO LIBRARY
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Table 15. DCOLLECT Optical Library Information (Record Type 'LB') (continued)

Offset	Type	Length	Name	Description
121(X'79')	CHARACTER	2	*	RESERVED
123(X'7B')	UNSIGNED	1	DLBDTYPE	LIBRARY DEVICE TYPE
124(X'7C')	UNSIGNED	4	DLBDCONS	LIBRARY CONSOLE ID
128(X'80')	UNSIGNED	1	DLBEDVT	ENTRY DEFAULT USE ATTRIBUTE (TAPE ONLY)
129(X'81')	UNSIGNED	1	DLBEJD	EJECT DEFAULT (TAPE ONLY)
130(X'82')	CHARACTER	5	DLBLCBID	LIBRARY ID IN LIB. CONF. DB. (TAPE ONLY)
135(X'87')	CHARACTER	1	*	RESERVED
136(X'88')	CHARACTER	8	DLBEDUNM	ENTRY DEFAULT UNIT NAME (TAPE ONLY)
144(X'90')	CHARACTER	32	DLBDEFDC	ENTRY DEFAULT DATA CLASS (TAPE ONLY)
144(X'90')	SIGNED	2	DLBDCLEN	LENGTH OF ENTRY DEFAULT DATA CLASS
146(X'92')	CHARACTER	30	DLBDCLNM	DEFAULT DATA CLASS LONG VERSION
146(X'92')	CHARACTER	8	DLBDCNAM	NAME OF ENTRY DEFAULT DATA CLASS
154(X'9A')	CHARACTER	22	*	RESERVED FOR CONSISTENCY
176(X'B0')	CHARACTER	8	DLBSTAT(32)	STATUS BY PROCESSOR, CAN HAVE UP TO 32 SYSTEM STATUS ENTRIES.
176(X'B0')	CHARACTER	4	DLBSYSST	STATUS FOR THIS SYSTEM
176(X'B0')	UNSIGNED	1	DLBREQST	REQUESTED SYSTEM STATUS
177(X'B1')	UNSIGNED	1	DLBCURST	CURRENT SYSTEM STATUS
178(X'B2')	CHARACTER	2	*	RESERVED
180(X'B4')	CHARACTER	4	*	RESERVED
432(X'1B0')	CHARACTER	16	*	RESERVED
448(X'1C0')	CHARACTER		DLBDATAE	END OF DLBDATA

Table 16. DCOLLECT Cache Names (Record Type 'CN')

Offset	Type	Length	Name	Description
SMS CACHE NAMES DEFINITION (RECORD TYPE 'CN')				
24(X'18')	STRUCTURE	152	DCNDATA	SMS CACHE SET AND SES CACHE NAMES (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	8	DCNCSNAM	CACHE SET NAME
32(X'20')	CHARACTER	16	DCNSESNM (X'8')	SES CACHE NAME
160(X'A0')	CHARACTER	16	*	RESERVED
176(X'B0')	CHARACTER		DCNDATAE	END OF DCNDATA

Table 17. DCOLLECT Accounting Information (Record Type 'AI')

Offset	Type	Length	Name	Description
SMS ACCOUNTING INFORMATION DEFINITION (RECORD TYPE 'AI')				
24(X'18')	STRUCTURE	328	DAIDATA	ACCOUNTING INFORMATION (DEFINED ON DCUDATA)
24(X'18')	CHARACTER	78	DAIDRTN	DATA CLASS ROUTINE
24(X'18')	CHARACTER	10	DAIDDATE	DATE LAST UPDATED
34(X'22')	CHARACTER	44	DAIDDSNM	DATA SET NAME WHERE STORED
78(X'4E')	CHARACTER	8	DAIDDSMR	MEMBER NAME IN DATA SET
86(X'56')	CHARACTER	8	DAIDSRID	USERID OF LAST UPDATER
94(X'5E')	CHARACTER	8	DAIDTIME	TIME LAST UPDATED
102(X'66')	CHARACTER	78	DAIMRTN	MANAGEMENT CLASS ROUTINE
102(X'66')	CHARACTER	10	DAIMDATE	DATE LAST UPDATED
112(X'70')	CHARACTER	44	DAIMDSNM	DATA SET NAME WHERE STORED
156(X'9C')	CHARACTER	8	DAIMDSMR	MEMBER NAME IN DATA SET
164(X'A4')	CHARACTER	8	DAIMSRID	USERID OF LAST UPDATER
172(X'AC')	CHARACTER	8	DAIMTIME	TIME LAST UPDATED
180(X'B4')	CHARACTER	78	DAISRTN	STORAGE CLASS ROUTINE
180(X'B4')	CHARACTER	10	DAISDATE	DATE LAST UPDATED
190(X'BE')	CHARACTER	44	DAISDSNM	DATA SET NAME WHERE STORED
234(X'EA')	CHARACTER	8	DAISDSMR	MEMBER NAME IN DATA SET
242(X'F2')	CHARACTER	8	DAISSRID	USERID OF LAST UPDATER
250(X'FA')	CHARACTER	8	DAISTIME	TIME LAST UPDATED
258(X'102')	CHARACTER	78	DAIGRTN	STORAGE GROUP ROUTINE
258(X'102')	CHARACTER	10	DAIGDATE	DATE LAST UPDATED
268(X'10C')	CHARACTER	44	DAIGDSNM	DATA SET NAME WHERE STORED
312(X'138')	CHARACTER	8	DAIGDSMR	MEMBER NAME IN DATA SET
320(X'140')	CHARACTER	8	DAIGSRID	USERID OF LAST UPDATER
328(X'148')	CHARACTER	8	DAIGTIME	TIME LAST UPDATED
336(X'150')	CHARACTER	16	*	RESERVED
352(X'160')	CHARACTER		DAIDATAE	END OF DAIDATA

The following constants are included in the DCOLLECT record mapping macro IDCDOU. These constants are used to describe selected fields in the DCOLLECT records:

Table 18. DCOLLECT Output Listing: CONSTANTS

Length	Type	Value	Name	Description
VALUES FOR DCURCTYP—RECORD TYPE				
2	CHARACTER	D	DCUDATAT	DATA TYPE RECORD
2	CHARACTER	A	DCUASSOC	VSAM ASSOCIATION RECORD
2	CHARACTER	V	DCUVULUT	VOLUME TYPE RECORD
2	CHARACTER	DC	DCUDCDEF	DATA CLASS
2	CHARACTER	SC	DCUSCDEF	STORAGE CLASS
2	CHARACTER	MC	DCUMCDEF	MANAGEMENT CLASS
2	CHARACTER	BC	DCUBCDEF	BASE CONFIGURATION
2	CHARACTER	SG	DCUSGDEF	STORAGE GROUP
2	CHARACTER	VL	DCUVLDEF	SMS VOLUME DEF
2	CHARACTER	AG	DCUAGDEF	AGGREGATE GROUP
2	CHARACTER	DR	DCUDRDEF	OPTICAL DRIVE
2	CHARACTER	LB	DCULBDEF	OPTICAL LIBRARY
2	CHARACTER	CN	DCUCNDEF	CACHE NAMES
2	CHARACTER	AI	DCUAIDEF	ACS INFORMATION
2	CHARACTER	M	UKTMIGR	MIGRATED DATA SET RECORD
2	CHARACTER	B	UKTBACK	BACKUP DATA SET RECORD
2	CHARACTER	C	UKCDASD	DASD CAPACITY PLANNING RECORD
2	CHARACTER	T	UKCTAPE	TAPE CAPACITY PLANNING RECORD
VALUES FOR UPID AND UPVERS - PARMLIST ID AND VERSION				
8	CHARACTER	ARCUTIL P	UPIDNAME	ID NAME
1	DECIMAL	1	UPVERNUM	CURRENT VERSION NUMBER
VALUES FOR UMLEVEL—MIGRATION VOLUME LEVEL				
	BIT	00	UKLEVL0	LEVEL 0 MIGRATION VOLUME
	BIT	01	UKLEVL1	LEVEL 1 MIGRATION VOLUME
	BIT	10	UKLEVL2	LEVEL 2 MIGRATION VOLUME
VALUES FOR UMDEVCL—MIGRATION VOLUME DEVICE CLASS AND UBDEVCL— BACKUP VOLUME DEVICE CLASS				
1	CHARACTER	D	UKDASDV	DASD VOLUME
1	CHARACTER	T	UKTAPEV	TAPE VOLUME

Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
VALUES FOR UCLEVEL—VOLUME LEVEL				
	BIT	00	UKLEVL0	LEVEL 0
	BIT	01	UKLEVL1	LEVEL 1 MIGRATION
VALUES FOR UTSTYPE—TYPE OF TAPE CAPACITY PLANNING RECORD				
1	CHARACTER	B	UKBKTAPE	BACKUP TAPES
1	CHARACTER	D	UKDUTAPE	DUMP TAPES
1	CHARACTER	M	UKMGTAPE	MIGRATION TAPES
2	CHARACTER	DC	DCUDCDEF	DATA CLASS CONSTRUCT
2	CHARACTER	SC	DCUSCDEF	STORAGE CLASS CONSTRUCT
2	CHARACTER	MC	DCUMCDEF	MANAGEMENT CLASS CONSTRUCT
2	CHARACTER	BC	DCUBCDEF	BASE CONFIGURATION INFORMATION
2	CHARACTER	SG	DCUSGDEF	STORAGE GROUP CONSTRUCT
2	CHARACTER	VL	DCUVLDEF	SMS VOLUME INFORMATION
2	CHARACTER	AG	DCUAGDEF	AGGREGATE GROUP CONSTRUCT
2	CHARACTER	DR	DCUDRDEF	OPTICAL DRIVE INFORMATION
2	CHARACTER	LB	DCULBDEF	OPTICAL LIBRARY INFORMATION
VALUES FOR DCVPHYST—PHYSICAL STATUS OF VOLUME				
1	BIT	0000001 1	DCVMANGD	VOLUME IS MANAGED BY SMS
1	BIT	0000000 1	DCVINITL	IN CONVERSION TO SMS
1	BIT	0000000 0	DCVNMNGD	NON-SMS MANAGED VOLUME
VALUES FOR DCDRECFM—RECORD FORMAT				
1	BIT	1000000 0	DCDRECFF	FIXED LENGTH RECORDS
1	BIT	0100000 0	DCDRECFV	VARIABLE LENGTH RECORDS
1	BIT	1100000 0	DCDRECFU	UNDEFINED LENGTH RCDS
CONSTANTS FOR DDCRBIAS—RECORD ACCESS BIAS				

Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
4	DECIMAL	0	DDCRABUS	USER
4	DECIMAL	1	DDCRABSY	SYSTEM

CONSTANTS FOR DDRCORG

4	DECIMAL	0	DDCORGNL	RECORD IS NULL - SAM
4	DECIMAL	1	DDCORGKS	RECORD IS VSAM KSDS
4	DECIMAL	2	DDCORGES	RECORD IS VSAM ESDS
4	DECIMAL	3	DDCORGRR	RECORD IS VSAM RRDS
4	DECIMAL	4	DDCORGSL	RECORD IS VSAM LDS

CONSTANTS FOR DDRECFM

4	DECIMAL	0	DDCFMNUL	RECFM IS NULL
4	DECIMAL	1	DDCFMU	RECFM IS UNDEFINED
4	DECIMAL	2	DDCFMV	RECFM IS VARIABLE
4	DECIMAL	3	DDCFMVS	RECFM IS VARIABLE SPANNED
4	DECIMAL	4	DDCFMVB	RECFM IS VARIABLE BLOCKED
4	DECIMAL	5	DDCFMVBS	RECFM IS VARIABLE BLOCKED SPANNED
4	DECIMAL	6	DDCFMF	RECFM IS FIXED
4	DECIMAL	7	DDCFMFS	RECFM IS FIXED STANDARD
4	DECIMAL	8	DDCFMFB	RECFM IS FIXED BLOCKED
4	DECIMAL	9	DDCFMFBS	RECFM IS FIXED BLOCKED SPANNED

CONSTANTS FOR DDCCNTL

4	DECIMAL	1	DDCCNTLA	CARRIAGE CONTROL IS ANSI
4	DECIMAL	2	DDCCNTLM	CARRIAGE CONTROL IS MACHINE
4	DECIMAL	3	DDCCNTLN	CARRIAGE CONTROL IS NULL

CONSTANTS FOR DDCAVREC

1	DECIMAL	1	DDCBYTES	AVGREC IS BYTES
1	DECIMAL	2	DDCKB	AVGREC IS KB
1	DECIMAL	3	DDCMB	AVGREC IS MB

CONSTANTS FOR DDCCDSNTY

1	DECIMAL	0	DDCCDSNUL	DSN TYPE IS NULL
1	DECIMAL	1	DDCCDSPDS	DSN TYPE IS PDS

Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
1	DECIMAL	2	DDCDSLIB	DSN TYPE IS LIBRARY
1	DECIMAL	3	DDCDSHFS	DSN TYPE IS HFS
1	DECIMAL	4	DDCDSEXR	DSN TYPE IS EXTENDED(R)
1	DECIMAL	5	DDCDSEXC	DSN TYPE IS EXTENDED(C)

CONSTANTS FOR DDCCOMP

4	DECIMAL	0	DDCCNUL	NULL COMPACTION TYPE
4	DECIMAL	1	DDCNOCMP	NO COMPACTION
4	DECIMAL	2	DDCIDRC	IMPROVED DATA RECORDING CAPABILITY, COMPACTION

CONSTANTS FOR DDCMEDIA

4	DECIMAL	0	DDCMENUL	MEDIA TYPE IS NULL
4	DECIMAL	1	DDCMEDA1	MEDIA 1 - CARTRIDGE SYSTEM
4	DECIMAL	2	DDCMEDA1	MEDIA 2 - ENH CAP CART SYSTEM TAPE
4	DECIMAL	3	DDCMEDA3	MEDIA 3 -HIGH PERFORMANCE
4	DECIMAL	4	DDCMEDA4	MEDIA 4 -RESERVED FOR EXTENDED HIGH

CONSTANTS FOR DDCRECTE

4	DECIMAL	0	DDCRTNUL	DDCRECTE IS NULL
4	DECIMAL	1	DDC18TRK	DDCRECTE IS 18 TRACK
4	DECIMAL	2	DDC36TRK	DDCRECTE IS 36 TRACK

CONSTANTS FOR DDCBWOTP

:

4	DECIMAL	1	DDCBWOC1	BWO TYPE CICS
4	DECIMAL	2	DDCBWONO	BWO TYPE NONE
4	DECIMAL	3	DDCBWOIM	BWO TYPE IMS

CONSTANTS FOR DDCLOGRC

4	DECIMAL	1	DDCLOGNO	NON-RECOVERABLE SPHERE
4	DECIMAL	2	DDCLOGUN	UNDO - USE EXTERNAL LOG
4	DECIMAL	3	DDCLOGAL	ALL - (UNDO) AND FORWARD

CONSTANTS FOR DDCSPAND

4	DECIMAL	0	DDCSPANN	RECORD CAN NOT SPAN CI
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Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
4	DECIMAL	1	DDCSPANY	RECORD MAY SPAN CI

CONSTANTS FOR DSCDIRB & DSCSEQB

4	DECIMAL	0	DSCBIADC	BIAS = DON'T CARE
4	DECIMAL	1	DSCBIARD	BIAS = READ
4	DECIMAL	2	DSCBIAWR	BIAS = WRITE

CONSTANTS FOR DSCAVAIL

4	DECIMAL	0	DSCAVLDC	AVAILABILITY = DON'T CARE
4	DECIMAL	1	DSCAVLST	AVAILABILITY = STANDARD
4	DECIMAL	2	DSCAVLCN	AVAILABILITY = CONTINUOUS
4	DECIMAL	3	DSCAVLPR	AVAILABILITY = CONTINUOUS PREFERRED

CONSTANTS FOR DSCACCES

4	DECIMAL	0	DSCACCPR	ACCESSIBILITY = CONTINUOUS PREFERRED
4	DECIMAL	1	DSCACCRQ	ACCESSIBILITY = CONTINUOUS
4	DECIMAL	2	DSCACCST	ACCESSIBILITY = STANDARD
4	DECIMAL	3	NOPREF	ACCESSIBILITY = NO PREFERENCE

CONSTANTS FOR DMCRFMT

4	DECIMAL	0	DMCNULL	FIELD WAS NOT USED
4	DECIMAL	1	DMCFDATE	EXPIRE FORMAT DATE/CREATE
4	DECIMAL	2	DMCFDAYS	EXPIRE FORMAT DAYS/CREATE

CONSTANTS FOR DMCCMAU

4	DECIMAL	0	DMCMNONE	NO MIGRATION ALLOWED
4	DECIMAL	1	DMCMCMD	MIGRATE ON COMMAND ONLY
4	DECIMAL	2	DMCMBOTH	AUTO MIGRATE OR ON COMMAND

CONSTANTS FOR DMCBADU

4	DECIMAL	0	DMCBNONE	NO USER OR ADMIN BACKUP
4	DECIMAL	1	DMCBADM	ALLOW ADMIN COMMAND BACKUP
4	DECIMAL	2	DMCBBOTH	ALLOW ADMIN OR USER COMMAND

Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
CONSTANTS FOR DMCRLF				
0	BIT	1000000 0	DMCRLFYE	PARTIAL RELEASE = YES, IMMEDIATE RELEASE = NO
0	BIT	0100000 0	DMCRLFCN	CONDITION PARTIAL RELEASE = YES, IMMEDIATE RELEASE = NO
0	BIT	0000000 0	DMCRLFNO	PARTIAL RELEASE = NO, IMMEDIATE RELEASE = NO
0	BIT	1010000 0	DMCRLFYI	PARTIAL RELEASE = YES, IMMEDIATE RELEASE = YES
0	BIT	0110000 0	DMCRLFCI	CONDITIONAL PARTIAL RELEASE = YES, IMMEDIATE CONDITIONAL RELEASE = YES
CONSTANTS FOR DMCCPYTC				
1	DECIMAL	0	DMCCPYST	STANDARD
1	DECIMAL	1	DMCCPYPR	CONCURRENT PREFERRED
1	DECIMAL	2	DMCCPYRQ	CONCURRENT REQUIRED
CONSTANTS FOR DSGFTYPE				
4	DECIMAL	0	DSGPOOL	STORAGE GROUP TYPE IS POOL
4	DECIMAL	1	DSGVIO	STORAGE GROUP TYPE IS VIO
4	DECIMAL	2	DSGDUMMY	STORAGE GROUP TYPE IS DUMMY
4	DECIMAL	3	DSGOBJ	STORAGE GROUP TYPE IS OBJECT
4	DECIMAL	4	DSGOBJBK	STORAGE GROUP TYPE IS OBJECT BACKUP
4	DECIMAL	5	DSGTAPE	STORAGE GROUP TYPE IS TAPE
4	DECIMAL	6	DSGTARGT	STORAGE GROUP TYPE IS COPY TARGET
CONSTANTS FOR DSGSTAT AND DSGSYSST				
1	DECIMAL	0	DSG0	NO STATUS SPECIFIED
1	DECIMAL	1	DSGENBL	STORAGE GROUP IS ENABLED
1	DECIMAL	2	DSGQUI	STORAGE GROUP IS QUIESCED/ALL
1	DECIMAL	3	DSGQUIN	STORAGE GROUP IS QUIESCED/NEW

Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
1	DECIMAL	4	DSGDIS	STORAGE GROUP IS DISABLED/ALL
1	DECIMAL	5	DSGDISN	STORAGE GROUP IS DISABLED/NEW

SMS STATUS - DVLSMSS AND DVLSTSMS

1	DECIMAL	0	DVLO	NO STATUS GIVEN
1	DECIMAL	1	DVLENBL	SMS STATUS IS ENABLED
1	DECIMAL	2	DVLQUI	SMS STATUS IS QUIESCED/ALL
1	DECIMAL	3	DVLQUIN	SMS STATUS IS QUIESCED/NEW
1	DECIMAL	4	DVLDIS	SMS STATUS IS DISABLED/ALL
1	DECIMAL	5	DVLDISN	SMS STATUS IS DISABLED/NEW

MVS STATUS - DVLMVSS AND DVLSTMVS

1	DECIMAL	1	DVLONLN	MVS STATUS IS ONLINE
1	DECIMAL	2	DVLOFFLN	MVS STATUS IS OFFLINE
1	DECIMAL	3	DVLPOFF	MVS STATUS IS PENDING OFFLINE
1	DECIMAL	4	DVLBOXED	MVS STATUS IS BOXED
1	DECIMAL	5	DVLNRDY	MVS STATUS IS NOT READY

CONSTANTS FOR DBCSTAT

4	DECIMAL	1	DBCVALID	DATA SET IS VALID
4	DECIMAL	2	DBCINVAL	DATA SET IS NOT VALID
4	DECIMAL	3	DBCUNKWN	DATA SET STATUS IS UNKNOWN

CONSTANTS FOR DBCSYSNT AND DBCSNMTY

4	DECIMAL	0	DBCSYSNS	NAME TYPE NOT SPECIFIED
4	DECIMAL	1	DBCSYSTEM	NAME TYPE IS SYSTEM NAME
4	DECIMAL	2	DBCSYSPL	NAME TYPE IS SYSTEM GROUP NAME

CONSTANTS FOR DBCSYSFT

2	HEX	X'80'	DBCASMS	ACTIVE SMS
2	HEX	X'40'	DBCPDSE	PDSE FEATURE
2	HEX	X'20'	DBCCDMP	SAM COMPRESSION
2	HEX	X'10'	DBCSESC	SES CACHE FEATURE

Table 18. DCOLLECT Output Listing: CONSTANTS (continued)

Length	Type	Value	Name	Description
MVS STATUS - DDRSOUT, DDRCFCS, DDRREQST, AND DDRCURST				
1	DECIMAL	0	DDRNOCON	OAM STATUS IS NO CONNECTIVITY
1	DECIMAL	1	DDRONLN	OAM STATUS IS ONLINE
1	DECIMAL	2	DDROFFLN	OAM STATUS IS OFFLINE
1	DECIMAL	3	DDRNORST	NO OUTSTANDING REQUEST
MVS STATUS - DLBSOUT, DLBCFCS, DLBREQST, AND DLBCURST				
1	DECIMAL	0	DLBNOCON	OAM STATUS IS NO CONNECTIVITY
1	DECIMAL	1	DLBONLN	OAM STATUS IS ONLINE
1	DECIMAL	2	DLBOFFLN	OAM STATUS IS OFFLINE
1	DECIMAL	3	DLBNORST	NO OUTSTANDING REQUEST (DLBSOUT ONLY)
1	DECIMAL	4	DLBLPENO	LIBRARY PENDING OFFLINE
TYPE OF LIBRARY - DLBTYPE				
1	DECIMAL	0	DLBNOOPT	NOT OPTICAL LIBRARY
1	DECIMAL	1	DLBREAL	REAL LIBRARY
1	DECIMAL	2	DLBPSEUD	PSEUDO LIBRARY
TYPE OF LIBRARY DEVICE - DLBDTYPE				
1	DECIMAL	0	DLBD9246	IBM 9246 LIBRARY
1	DECIMAL	1	DLBD3995	IBM 3995 LIBRARY
1	DECIMAL	2	DLBTAPE	TAPE LIBRARY
ENTRY DEFAULT USE ATTRIBUTE - DLBEDVT(TAPE LIBRARY ONLY)				
1	DECIMAL	1	DLBPRVT	PRIVATE VOLUME
1	DECIMAL	2	DLBSCRT	SCRATCH VOLUME
EJECT DEFAULT - DLBEJD				
1	DECIMAL	1	DLBPURGE	PURGE TCDB VOLUME RECORD
1	DECIMAL	2	DLBKEEP	KEEP TCDB VOLUME RECORD

Chapter 8. MVS system messages

This topic includes the messages that are new or changed for RPFC for XRC. They are marked with revision bars.

MVS system messages and RPFC for XRC: ADR and ANT

This topic includes the ADR and ANT messages that are new or changed for RPFC for XRC. They are marked with revision bars.

ADR055I (ttt)-mmmmm(yy), keyword
**OPTION WAS SPECIFIED BUT HAS
BEEN IGNORED BECAUSE THE
FUNCTION IS NOT ENABLED IN
PARMLIB**

Explanation

The keyword *keyword* was specified or the installation attempted to alter the value for the option representing the keyword but the request is ignored. If FCTOXRCPRIARY is the option that is ignored this is because the FLASHCOPYTOXRC=YES parameter is not specified in the DEVSUPxx member in PARMLIB.

System action

DFSMSdss processing continues. The return code is zero.

Operator response

None.

Programmer response

If FCTOXRCPRIARY is the option that is ignored, specify FLASHCOPYTOXRC=YES in the DEVSUPxx member in PARMLIB.

Source

DFSMSdss

ADR853I (ttt)-mmmmm(yy),
**FCTOXRCPRIARY COULD NOT
BE HONORED FOR {DATA SET
dsname | VOLUME volser |
THIS task TASK}, RETURN CODE
dss_return_code**

Explanation

The summarized_info is as follows:

```
[, {number {VOLUME WAS |  
VOLUMES WERE}REJECTED FOR {QFRVOLS  
XRC REMOTE PAIR FLASHCOPY  
VOLUME REASON CODEQFRVL_OUT_XF_RSN[ -  
QFRVL_OUT_XF_RSN_TEXT]}| QFRVOLS XRC  
REMOTE PAIR FLASHCOPY EXTENT  
REASON CODE QFRVL_OUT_XF_EXT_RSN[ -  
QFRVL_OUT_XF_EXT_RSN_TEXT ]}]
```

The detailed_info is as follows:

```
[, {VOLUME volser WAS REJECTED FOR{QFRVOLS XRC  
REMOTE PAIR FLASHCOPY VOLUME REASON CODE  
QFRVL_OUT_XF_RSN[ - QFRVL_OUT_XF_RSN_TEXT]  
| QFRVOLS XRC REMOTE PAIR FLASHCOPY  
EXTENT REASON CODE QFRVL_OUT_XF_EXT_RSN[ -  
QFRVL_OUT_XF_EXT_RSN_TEXT ]}]
```

DFSMSdss cannot use XRC Remote Pair FlashCopy during a FlashCopy to XRC primary operation. This message might be issued for diagnostic purposes if the FASTREPLICATION(REQUIRED) or DEBUG(FRMSG(MINIMAL | SUMMARIZED | DETAILED)) keyword is specified with the FCTOXRCPRIARY keyword. The return code and reason code listed in the message text are hexadecimal values.

See ANTQFRVL macro in *z/OS DFSMS Advanced Copy Services* for a list of the QFRVOLS volume and extent reason codes. The data set or volume included in the message is referring to the source that is being processed. The possible return codes (dss_return_code) are:

X'3'

One or more of the source devices are not eligible for a XRC Remote Pair FlashCopy operation. When FASTREPLICATION(REQUIRED) or DEBUG(FRMSG(SUMMARIZED)) is specified, return code X'3' is followed by summarized volume information that consists of reason codes that indicate why one or more volumes are not eligible. For each reason code issued, the number of volumes failing for that reason is provided. The reason codes include SDM QFRVOLS XRC Remote Pair Flashcopy volume reason codes (QFRVL_OUT_XF_RSN).

When `DEBUG(FRMSG(DETAILED))` is specified, return code `X'3'` is followed by detailed information that lists each volume that was considered, along with a reason code indicating why that volume was not eligible. The reason codes include SDM QFRVOLS XRC Remote Pair Flashcopy volume reason codes (QFRVL_OUT_XF_RSN).

When the `FCTOXRCPPRIMARY` keyword is specified, DFSMSdss cannot use FlashCopy when the target volume is an XRC Primary. Message ADR918I or ADR709E is issued if one or more target volumes selected by DFSMSdss is an XRC Primary.

System action

DFSMSdss processing continues. The return code is zero.

Operator response

None.

Programmer response

In order for the XRC Remote Pair FlashCopy to be used in subsequent operations, take the following action, depending on the return code.

X'3'

If the `FASTREPLICATION(REQUIRED)`, `DEBUG(FRMSG(SUMMARIZED))`, or `DEBUG(FRMSG(DETAILED))` keyword is specified, return code `X'3'` is followed by one or more QFRVOLS XRC Remote Pair FlashCopy volume reason codes (QFRVL_OUT_XF_RSN).

If you did not receive a reason code following return code `X'3'` and would like to have more information, specify the `DEBUG(FRMSG(SUMMARIZED | DETAILED))` keyword in the JCL and rerun the job.

You can disregard this message if the target volume is not a XRC Primary volume.

Source

DFSMSdss

ADR918I	(ttt)-mmmmm(yy), FAST REPLICATION COULD NOT BE USED FOR {DATA SET <i>dsname</i> | VOLUME <i>volser</i> | THIS task TASK}, RETURN CODE <i>dss_return_code</i>¹
----------------	---

Explanation

summarized_info is:

```
[, {number {VOLUME WAS | VOLUMES WERE}
REJECTED FOR {QFRVOLS VOLUME REASON CODE
qfrvols_vrsn[ - qfrvols_vrsn_text]
| QFRVOLS EXTENT REASON CODE qfrvols_xrsn
[ - qfrvols_xrsn_text
] | DFSMSDSS REASON CODE
dss_reason_code[ - dss_rsn_text]}]}
```

detailed_info is:

```
[, {VOLUME volser WAS REJECTED FOR
{QFRVOLS VOLUME REASON CODE qfrvols_vrsn[ -
qfrvols_vrsn_text
] | QFRVOLS EXTENT REASON CODE qfrvols_xrsn
[ - qfrvols_xrsn_text
] | DFSMSDSS REASON CODE dss_reason_code
[ - dss_rsn_text]}]}
```

DFSMSdss cannot use a fast replication method.

The system might issue this message for diagnostic purposes if the `DEBUG(FRMSG(MIN | SUM | DTL))` or the `FASTREPLICATION(REQ)` keyword is specified. The return code and reason code listed in the message text are hex values.

If any QFRVOLS reason codes are listed, see [z/OS DFSMS Advanced Copy Services](#) for a list of the QFRVOLS volume and extent reason codes (*qfrvols_vrsn* or *qfrvols_xrsn*). The possible return codes (*dss_return_code*) and reason codes (*dss_reason_code*) are:

X'1'

The source device is not capable of fast replication.

X'2'

The target device is not capable of fast replication.

X'3'

One or more of the source devices are not eligible for fast replication at this time.

When `DEBUG(FRMSG(SUMMARIZED))` is specified, return code `X'3'` is followed by summarized volume information that consists of reason codes that indicate why one or more volumes are not eligible. For each reason code issued, the number of volumes failing for that reason is provided. The reason codes include SDM QFRVOLS volume reason codes (*qfrvols_vrsn*) and extent reason codes (*qfrvols_xrsn*).

When `DEBUG(FRMSG(DETAILED))` is specified, return code `X'3'` is followed by detailed information that lists each volume that was considered, along with a reason code indicating why that volume was ineligible. The reason codes include SDM QFRVOLS volume reason codes (*qfrvols_vrsn*) and extent reason codes (*qfrvols_xrsn*).

¹ {summarized_info | detailed_info}

X'4'

The ANTRQST macro fails while trying to determine if fast replication can be used between the source and target volumes.

X'5'

The software required for fast replication is not installed.

X'7'

FASTREPLICATION(NONE) is specified for this task.

X'9'

One or more target devices are not eligible for fast replication at this time.

When DEBUG(FRMSG(SUMMARIZED)) is specified, return code X'9' is followed by summarized volume information that consists of reason codes that indicate why one or more volumes are not eligible. For each reason code issued, the number of volumes failing for that reason is provided. The reason codes include SDM QFRVOLS volume reason codes (*qfrvols_vrsn*) and extent reason codes (*qfrvols_xrsn*).

When DEBUG(FRMSG(DETAILED)) is specified, return code X'9' is followed by detailed information that lists each volume that was considered, along with a reason code indicating why that volume was ineligible. The reason codes include SDM QFRVOLS volume reason codes (*qfrvols_vrsn*) and extent reason codes (*qfrvols_xrsn*).

If *qfrvols_xrsn_text* is set to VOLUME INACCESSIBLE then issue FCQUERY DEVN(xxxx) SHOWRELS to identify existing FlashCopy relationships on the device. To withdraw an existing relationship issue FCWITHDR SDEVN() TDEVN().

X'A'

The source data set is a multi-layered VSAM data set, for which DFSMSdss must invoke a utility to move the data. This happens when multi-layered VSAM data sets are being flashed by using FR(REQ). Currently, DSS does not have the capability to flash multi-layered striped volumes.

Work around options are:

1. Invoking IDCAMS by virtue of the FR(PREF) option. However, this option subsequently only utilizes fast replication, if it is possible. The multi-layered files is still not eligible for FR.
2. Reorganize the multi-layered files onto bigger volumes. This reduces the likelihood of a stripe going into layers. Although this does still not guarantee FR(REQ) would work every time, failures are much less likely.

X'B'

The cluster is part of a sphere and another cluster in the same sphere cannot be processed using fast replication. During DFSMSdss SPHERE processing, if the base cluster or any of its associated alternate indexes cannot be processed using fast replication, the entire sphere cannot be processed using fast replication.

X'C'

The data set is a PDS and NOPACK is not specified.

X'D'

A failure occurs while attempting to register a session with the System Data Mover (SDM).

X'E'

The ANTRQST macro fails while trying to determine if the source or target volumes are eligible for fast replication.

X'F'

The volume does not support data set fast replication.

X'10'

The data set is being reblocked.

X'11'

The source data set stripe count does not match the target data set stripe count.

X'12'

The data set is a single-striped multivolume data set.

X'13'

The direct access data set is being processed block by block.

X'14'

For the non-SMS allocation, target volumes that support fast replication cannot be selected.

When DEBUG(FRMSG(SUMMARIZED)) is specified, return code X'14' is followed by summarized volume information that consists of reason codes that indicate why one or more volumes failed selection. For each reason code issued, the number of volumes failing for that reason is provided. The reason codes include SDM QFRVOLS volume reason codes (*qfrvols_vrsn*), QFRVOLS extent reason codes (*qfrvols_xrsn*), or DFSMSdss reason codes (*dss_reason_code*).

When DEBUG(FRMSG(DETAILED)) is specified, return code X'14' is followed by detailed information that lists each volume that was considered, along with a reason code indicating why that volume was ineligible. The reason codes include SDM QFRVOLS volume reason codes (*qfrvols_vrsn*), QFRVOLS extent reason codes (*qfrvols_xrsn*), or DFSMSdss reason codes (*dss_reason_code*).

The possible DFSMSdss reason codes (*dss_reason_code*) are:

X'1'

The target volume does not have enough space to accommodate the target data set.

X'2'

There are no free DSCBs in the VTOC.

X'3'

The volume is SMS-managed.

X'4'

The LSPACE macro was issued for the volume to determine whether enough free space existed on the volume. The LSPACE macro failed.

X'5'

The source data set resides on the volume and the data set is not being renamed.

X'6'

One of the following conditions occurred when DFSMSdss attempted to allocate the data set:

- Duplicate data set exists on the volume
- If the volume did not have a duplicate data set, this reason code indicates that the volume does not contain enough free space to accommodate the data set. For an ISAM data set, the matching space in the target was not available.

X'7'

One of the following conditions occurred when DFSMSdss attempted to allocate the data set:

- The data set is unmovable.
- Either an absolute track allocation (ABSTR) failed or the lack of system support for absolute track allocation precluded the use of absolute track allocation.

X'8'

DFSMSdss attempted to allocate the data set on the volume, but a DADSM failure occurred.

X'9'

An indexed VTOC does not exist on the volume. The REALLOC macro was issued for an absolute track allocation. The REALLOC macro failed because ALLOC=ABS is not supported on OS VTOCs.

X'15'

For the SMS allocation, target volumes that allow fast replication to be used cannot be selected.

When DEBUG(FRMSG(SUMMARIZED | DETAILED)) is specified, return code X'15' is followed by SMS allocation messages which provide summarized information. Detailed information at individual

volume level is not available. See the SMS messages for explanations.

X'16'

The ANTRQST macro fails while trying to determine if the device is capable of fast replication.

X'18'

The data set is a PDS that you are converting to a PDSE, or vice versa, which requires a utility to be used by DFSMSdss.

X'19'

The data set is a catalog BCS data set which requires a utility to be used by DFSMSdss.

X'1A'

The data set is a VSAM data set with key ranges and is extended, which requires a utility to be used by DFSMSdss.

X'1B'

The data set is a KSDS that has embedded indexes, which requires a utility to be used by DFSMSdss.

X'1C'

Multiple volumes are required for the target data set, but multivolume allocation cannot be used. Therefore, the data set must be extended during the copy, which requires a utility to be used by DFSMSdss.

X'1D'

The CA size of the target data set is different from that of the source data set, which requires a utility to be used by DFSMSdss.

X'1E'

The block size of the target data component is different from that of the source data component, which requires a utility to be used by DFSMSdss.

X'1F'

The blocks per track for the target data component is different from that of the source data component, which requires a utility to be used by DFSMSdss.

X'20'

The blocks per track for the target index component is different from that of the source index component, which requires a utility to be used by DFSMSdss.

X'21'

The block size of the target index component is different from that of the source index component, which requires a utility to be used by DFSMSdss.

X'22'

The data set is an indexed VSAM data set with an embedded index, TGTALLOC (CYL) was specified, and the source did not use cylinder allocation, which requires a utility to be used by DFSMSdss.

X'23'

Sufficient space cannot be allocated for the target multi-striped VSAM data set. Therefore, the target data set must be extended during the copy process, which requires a utility to be used by DFSMSdss.

X'24'

The target data set is smaller than the source data set because of an internal error.

X'25'

The volume has insufficient available FlashCopy relationships to complete the task.

X'26'

The source index or data component is full and the target has a greater allocation, which requires a utility to be used by DFSMSdss.

X'27'

FCTOPPRCPRIARY(PRESMIRREQ) was specified, but there were insufficient Preserve Mirror eligible volumes specified in the output volume list on which to allocate the target data set. DFSMSdss could not use Fast Replication to perform the operation without causing one or more PPRC pairs to go into 'duplex pending' status.

When FASTREPLICATION(REQUIRED) or DEBUG(FRMSG(SUMMARIZED)) is specified, return code X'27' is followed by summarized volume information that consists of reason codes that indicate why one or more volumes failed selection. For each reason code issued, the number of volumes failing for that reason is provided. The reason codes include SDM QFRVOLS PRESERVE MIRROR volume reason codes (*qfrvols_vrsn*) or QFRVOLS PRESERVE MIRROR extent reason codes (*qfrvols_xrsn*).

When DEBUG(FRMSG(DETAILED)) is specified, return code X'27' is followed by detailed information that lists each volume that was considered, along with a reason code indicating why that volume was ineligible. The reason codes include SDM QFRVOLS PRESERVE MIRROR volume reason codes (*qfrvols_vrsn*) or QFRVOLS PRESERVE MIRROR extent reason codes (*qfrvols_xrsn*).

X'28'

The source data set extended format version type does not match the target data set extended format version type.

X'29'

The source extended format sequential data set has an end of file on the non-last volume.

X'2A'

FCTOXRCPRIARY was specified, but there were insufficient XRC Remote Pair FlashCopy eligible

volumes specified in the output volume list on which to perform the copy. This prevented DFSMSdss from using fast replication to XRC primary volumes.

If the FCTOXRCPRIARY, FASTREPLICATION(REQUIRED), or DEBUG(FRMSG(SUMMARIZED | DETAILED)) keyword is specified, this return code X'2A' is followed by one or more QFRVOLS XRC Remote Pair FlashCopy volume reason codes (*qfrvols_vrsn*).

When DEBUG(FRMSG(DETAILED)) is specified, return code X'2A' is followed by detailed information that lists each volume that was considered, along with a reason code indicating why that volume was ineligible. The reason codes include SDM QFRVOLS XRC Remote Pair FlashCopy volume reason codes (*qfrvols_vrsn*) or QFRVOLS XRC Remote Pair FlashCopy extent reason codes (*qfrvols_xrsn*).

System action

DFSMSdss processing continues. The return code is zero.

Operator response

None.

Programmer response

If the FCTOXRCPRIARY, FASTREPLICATION(REQUIRED), or DEBUG(FRMSG(SUMMARIZED | DETAILED)) keyword is specified, return code X'2A' is followed by one or more QFRVOLS XRC Remote Pair FlashCopy volume reason codes (*qfrvols_vrsn*). See [z/OS DFSMS Advanced Copy Services](#) for a list of the QFRVOLS volume and extent reason codes (*qfrvols_vrsn* or *qfrvols_xrsn*).

If you did not receive a reason code following return code X'2A' and would like to have more information, specify the DEBUG(FRMSG(SUMMARIZED | DETAILED)) keyword in the JCL and rerun the job.

Source

DFSMSdss

ANTQ8209I

**NO SECONDARY VOLUMES MEET
REQUESTED SPECIFICATION**

Explanation

This message is part of a XQUERY FLASHCOPY report. It indicates that none of the secondary volumes are in a FlashCopy relationship.

System action

Information only.

System programmer response

None required.

Source

Extended remote copy (XRC).

ANTQ8280I	BEGIN | END BACKGROUND COPY CONFLICT FROM SECONDARY SOURCE VOLUME(<i>volser/dvcnbr</i>) TO SECONDARY TARGET VOLUME(<i>volser/dvcnbr</i>) BECAUSE <i>reason</i> FOR XRC SESSION <i>session- id</i>
------------------	--

Explanation

A FlashCopy operation between a secondary source volume and a secondary target volume cannot be completed because of an outstanding FlashCopy. When the condition is detected, the message begins with BEGIN. If the condition is resolved, the message begins with END. If the condition has a performance impact, the target volume pair is suspended and message ANTQ8181E is issued instead of message ANTQ8280I with END.

volser/dvcnbr

Are the FlashCopy secondary source and target volumes.

session-id

is the session ID of the XRC session.

reason

Is the reason for the conflict.

System action

The FlashCopy command is not executed between the secondary source and target volumes.

System programmer response

None required.

Source

Extended remote copy (XRC).

ANTQ8370I	T LIC FEATURES
------------------	-----------------------

Explanation

This message provides the header information for the output of the XQUERY command for a storage control xfeatures report. It is associated with header message ANTQ8371I and detail message ANTQ8372I. The explanation is provided with the ANTQ8372I detail message.

System action

N/A

System programmer response

N/A

Source

Extended Remote Copy (XRC)

ANTQ8371I	SSID Y LEVEL FU D W SL ER IR EX WP FC
------------------	--

Explanation

This message provides the header information for the output of the XQUERY command for a storage control features report. It is associated with header message ANTQ8370I and detail message ANTQ8372I. The explanation is provided with the ANTQ8372I detail message.

System action

N/A

System programmer response

N/A

Source

Extended Remote Copy (XRC)

ANTQ8372I	<i>ssid util-type lic-level features</i>
------------------	---

Explanation

This message provides the report details for the output of the XQUERY command for a storage control xfeatures report. It is associated with header messages ANTQ8370I and ANTQ8371I. The report shows the status of the storage control sessions within an XRC session.

ssid

Identifies the storage subsystem ID associated with the specified storage control session.

util-type

Identifies the type of utility: U for standard utility or S for swap utility

lic-level

Specifies the licensed internal code (microcode) level.

features

Specifies capability and enablement status of selected functions. For hardware features:

'_'

Not installed

'C'

Capable

'Y'

Installed and enabled.

For software features:

*

XRC is not managing the devices.

FU

Fixed Utility (microcode and software function)

D

Device Blocking

W

Write Pacing

SL

Suspend On Long Busy (microcode and software function)

ER

Enhanced Reader Support:

- First position - hardware microcode capable ('_' or 'Y' only).
- Second position - AllowEnhancedReader is ON/OFF ('Y'/'N', respectively).

IR

Incremental resync

- The status indicator is for microcode capability only ('_' or 'Y' only)

EX

Extended manufacturer

- '-' = Standard IBM channel connection
- 'ED' = IBM Extended Distance FICON channel
- 'CN' = Brocade CNT channel extender
- 'CS' = Cisco channel extender

WP

Workload Based Write Pacing:

- First position - available on the storage controller.
- Second position - enabled in the XRC parmlib parameters.

FC

Remote Pair FlashCopy:

- First position - available on the storage controller.
- Second position - enabled in the XRC parmlib parameters.

System action

N/A

System programmer response

N/A

Source

Extended Remote Copy (XRC)

ANTQ8700I SECVOL DEVCN RLTN S MIR EXT C

Explanation

This is a header line for the XQUERY FLASHCOPY report.

SECVOL

Secondary volume number

DEVCN

Device number

RLTN S

Count of relationships

MIR

The secondary is in a mirrored FlashCopy relationship.

EXT

The secondary is in an external (not mirrored) FlashCopy relationship.

C

The secondary is Cascading FlashCopy capable.

System action

Information only.

System programmer response

None required.

Source

Extended remote copy (XRC).

ANTQ8701I SECVOL DEVCN RLTNS MIR EXT C

Explanation

This is a detail line for the XQUERY FLASHCOPY report. The values for the SECVOL, DEVCN, RLTNS, and C columns are the secondary volume, device number, number of FlashCopy relationships, and Cascading FlashCopy capability. The value in column C is followed by an * (asterisk) if the secondary device is in an Incremental FlashCopy relationship. The potential values for the MIR and EXT columns are:

The device is not in a FlashCopy relationship.

SRC
The device is the source of one or more FlashCopy relationships.

TGT
The device is the target of one or more FlashCopy relationships.

BTH
The device is the source of one or more FlashCopy relationships and the target of one or more FlashCopy relationships.

System action

Information only.

System programmer response

None required.

Source

Extended remote copy (XRC).

**ANTQ8702I TOTAL=total MIRROR=mirror
EXTERNAL=external**

Explanation

This message, part of an XQUERY FLASHCOPY report, provides summary information. The report fields are as follows:

total
Total number of FlashCopy relationships on the secondary volumes.

mirror
Total number of FlashCopy relationships on the secondary volumes that were mirrored by XRC.

external

Total number of FlashCopy relationships on the secondary volumes that include an external device (not part of the XRC session).

Note: Mirrored FlashCopies are counted twice, because the source and target are both indicated as being in a FlashCopy relationship.

System action

Information only.

System programmer response

None required.

Source

Extended remote copy (XRC).

**ANTR5029E UNSUPPORTED PARAMETER
parameter FOUND FOR
SESSION(session_id)**

Explanation

A PARMLIB parameter was specified for the session *session_id* but is not supported on this release or PTF level.

System action

The XRECOVER or XADVANCE operation fails.

System programmer response

Perform the XRECOVER or XADVANCE operation on a system where the parameter is supported.

Source

Extended remote copy (XRC).

**ANTR8863E ERROR: KEYWORD
TGTXRCPRI(YES) CANNOT BE
COMBINED WITH TGTEXTNA OR
SRCEXTNA**

Explanation

Keyword value of TGTXRCPRI(YES) is not valid with full volume relationships.

System action

Command processing fails.

System programmer response

Correct the input and reissue the request.

Source

ESS FlashCopy, Peer-to-peer remote copy (PPRC), Global Mirror, or z/OS Global Mirror (XRC).

ANTX5000E	<i>device_number, serial_number, failing_CCW_command_code, failing_CCW_position, CCW_data_area, full_error_description</i>
------------------	--

Explanation

The XRC function encountered an I/O error. The message text provides the following information:

- *device_number* – The device number to which the I/O is directed. If the device is associated with a utility volume, the error can be a storage control error.
- *serial_number* – The volume serial number, if available, of the device that encountered the I/O error.
- *failing_CCW_command_code* – The channel command word (CCW) code that encounters the I/O error.
- *failing_CCW_position* – The position in the channel program chain on which the error occurs. If the error occurs at the first CCW in the chain (a Define Extent), the path to the storage control or device can have been dropped. This can indicate an operations error because of the storage path being removed.
- *CCW data_area* – The parameter list data area of the failing CCW.
- *full_error_description* – A brief description of the cause of the I/O error based on the sense data. The descriptions are as follows:
 - **STORAGE_CONTROL_SESSION_NUMBER_NOT_ACTIVE** – This indicates a dropped XRC session resulting from an error that ended the storage control session. The error can occur when the update-handling capability of XRC is exceeded by the update rate to the storage control. In this case, examine the number and configuration of volumes managed by XRC to determine the cause of the high update rate to the storage control. If this error persists, the XRC environment can require reconfiguration. This error can also occur if the timeout interval has expired.
 - **STORAGE_CONTROL_SESSION_NUMBER_NOT_ACTIVE_ON_PATH_xx** – This indicates that the path group ID used by XRC in sending requests to a storage control is physically unavailable. xx indicates the channel path ID associated with the path group ID that is physically unavailable. Ensure that *device_number* is online (or at least one other device associated with this channel path), and then vary the channel path xx offline and then vary the channel path back online. This will make available the path group ID needed by XRC. Issue the MVS MODIFY command of PATHS to list the channel paths currently associated with the device number *device_number*.
 - **NONVOLATILE_STORAGE_NOT_AVAILABLE** – This indicates that nonvolatile storage has been altered. Issue the DEVSERV MVS operator command to determine the status of nonvolatile storage. Do not disable nonvolatile storage for storage controls that have an active XRC session. Correct the problem by re-enabling nonvolatile storage and issuing the XADDPAIR command to add the volume or volumes behind the affected storage control to the XRC session.
 - **CACHE_NOT_AVAILABLE** – This indicates that cache has been disabled. Issue the DEVSERV MVS operator command to determine the status of cache storage. Cache storage should not be disabled for storage controls that have an active XRC session. Correct the problem by re-enabling cache for the storage control and issuing the XADDPAIR command to add the volume or volumes behind the affected storage control to the XRC session.
 - **TOO_MANY_STORAGE_CONTROL_SESSION_NUMBERS** – This indicates that either the maximum number of XRC sessions on the storage control (from multiple MVS hosts) has been exceeded or that the maximum number of concurrent copy and remote copy sessions on the storage control has been exceeded. The LISTSESS diagnostic command can be used to determine which sessions are active on a storage control. See *z/OS DFSMS Advanced Copy Services* for a description of the LISTSESS command. Reduce the number of active sessions on the affected storage control and issue the XADDPAIR command to add the volume or volumes behind the affected storage control to the XRC session.
 - **DEVICE_NOT_PART_OF_ANY_XRC_SESSION** – This indicates a dropped XRC session resulting from an operations error that produced a reset notification. This error can also indicate that an error has occurred in the storage control cache or that the cache is disabled, causing any knowledge of this device as part of an XRC session to be lost. Issue the DEVSERV MVS operator command to determine the status of cache storage. Correct

the problem by re-enabling cache for the storage control and issuing the XADDPAIR command to add the volume or volumes behind the affected storage control to the XRC session.

- PATH_GROUP_NOT_ESTABLISHED – This indicates a dropped XRC session resulting from an operations error that produced a reset notification. This error can also indicate that an error has occurred in the storage control cache or that the cache is disabled, causing any knowledge of this device as part of an XRC session to be lost. Issue the DEVSERV MVS operator command to determine the status of cache storage. Correct the problem by re-enabling cache for the storage control and issuing the XADDPAIR command to add the volume or volumes behind the affected storage control to the XRC session.
- XRC_SESSION_ALREADY_ACTIVE_FOR_DEVICE – This indicates that another MVS system already has an active XRC session on the specified device, or that the device is active in a session that has been suspended. Only one XRC session can be active per device.
- XRC_SESSION/DEVICE_SUSPENDED – This indicates that an XRC session or device is suspended on an ESS storage control unit. The error can occur on a session level when the update-handling capability of XRC is exceeded by the update rate to the storage control. Examine the number and configuration of volumes managed by XRC to determine the cause of the high update rate to the storage control. If this error persists, the XRC environment can require reconfiguration. This error can also occur if the timeout interval has expired. This error message can occur by command, at device or volume level.
- INVALID_COMMAND – This is due to issuing an XRC command to a storage control that does not have XRC capability.
- INVALID_COMMAND_SEQUENCE – This is either due to an internal error or because an XRC command has been issued to a storage control that does not have XRC capability.
- CCW_COUNT_LESS_THAN_REQUIRED – This is due to an internal error.
- INVALID_PARAMETER – This is either due to an internal error or because an XRC command has been issued to a storage control that does not have XRC capability.
- STORAGE_CONTROL_SESSION_NUMBER_ZERO_OR_ALREADY_USED – This is due to an internal error.
- STORAGE_CONTROL_CACHE_ALREADY_BEING_READ – This is due to an internal error.

- TARGET_CANNOT_BECOME_SOURCE – This is a FlashCopy I/O error. The FlashCopy target cannot become the FlashCopy source.
- TARGET_CANNOT_BECOME_ANOTHER_TARGET – This is a FlashCopy I/O error. The FlashCopy target cannot become another FlashCopy target.
- SOURCE_CANNOT_BECOME_TARGET – This is a FlashCopy I/O error. The FlashCopy source cannot become a FlashCopy target.
- OUTSTANDING_FLASHCOPY_ON_SECONDARY_SOURCE_OR_TARGET_DEVICE – This is a FlashCopy I/O error.

System action

The XRC action taken is based upon the ERRORLEVEL specified on the XSTART command, as follows:

- If ERRORLEVEL(SESSION) is specified, XRC suspends all active volumes on any I/O error. Correct the error and restart the XRC session. The session is suspended only if the volume is in a duplex state at the time of the error. Errors before a volume reaching duplex state do not affect the session.
- If ERRORLEVEL(VOLUME) is specified, the scope of the error determines the action taken. If the error occurs for a single primary or secondary volume, only the affected volume pair is removed from the session. If the error impacts a storage control, all volume pairs using that storage control are removed from the session. Certain errors have the potential to end the XRC session.
- If ERRORLEVEL(*group_name*) is specified, XRC suspends all volumes that belong to the specified group. Correct the error and add the volume pairs back into the session.

System programmer response

If the problem is an environmental or hardware error, then correct the error and restart the session or volumes. If the problem persists, search the problem reporting databases for a solution. If no solution exists, contact the IBM Support Center. Provide the system log and SVC dumps of the ANTAS000 and any ANTAS nnn address spaces that are active. To determine which address spaces are active, enter the console command DISPLAY A,ANTAS*. In addition, provide any SYS1.LOGREC information indicating the I/O error encountered. For some errors, a GTF trace can be required to determine the cause of the problem.

Source

Extended remote copy (XRC).

ANTX5700W **XRC SESSION(*sessionid*)**
SCSESSION(*scsession*)
VOLUME(*volumes*) RPFC DISABLED
– SSID(*ssid*) INCAPABLE

Explanation

The RemotePairFlashCopy parameter was specified in PARMLIB and the function is enabled for the XRC session, *sessionid*. However, during processing of an XADDPAIR operation, volumes were encountered that are not attached to a controller that is capable of Remote Pair FlashCopy. The volumes, *volumes*, are indicated by:

- *volser/device-number*
- *primary-volser/primary-device-number,swap-volser/swap-device-number*, for mode(hyper-pprc).

The devices that are not capable of Remote Pair FlashCopy are listed by SSID.

This message is not issued for auxiliary utility volumes.

System action

The XADDPAIR command succeeds, but the volume does not participate in Remote Pair FlashCopy.

System programmer response

If the desired effect is for the volumes to participate in Remote Pair FlashCopy, then move the contents of the primary or swap volume onto a controller that is capable of Remote Pair FlashCopy.

Source

Extended remote copy (XRC).

ANTX5701E **FLASHCOPY *location type***
VOLUME(*volser/dvcnbr*) IN
SESSION(*session-id*) *reason*

Explanation

A FlashCopy has been performed between a primary source volume and a primary target volume. However, the corresponding FlashCopy between the secondary source volume and the secondary target volume cannot be performed.

location

Is PRIMARY or SECONDARY.

type

Is the type of volume, either SOURCE or TARGET.

volser/dvcnbr

Is the FlashCopy source or target volume.

session-id

is the session ID of the XRC session.

reason

is the reason for the error.

System action

A FlashCopy command is not executed between the secondary source and target volumes.

System programmer response

Try the FlashCopy command again when the primary source and target volumes are in duplex.

Source

Extended remote copy (XRC).

ANTX5702E **FLASHCOPY SECONDARY**
TARGET VOLUME(*volser/dvcnbr*)
IN SESSION(*session-id*) ON
DIFFERENT CONTROLLER
THAN SECONDARY SOURCE
VOLUME(*volser/dvcnbr*)

Explanation

A FlashCopy has been performed between a primary source volume and a primary target volume. However, the corresponding FlashCopy between the secondary source volume and the secondary target volume cannot be performed.

volser/dvcnbr

Are the FlashCopy secondary target and source volumes.

session-id

is the session ID of the XRC session.

System action

A FlashCopy command is not executed between the secondary source and target volumes.

System programmer response

Try the FlashCopy command again with the secondary source and target volumes in the same controller.

Source

Extended remote copy (XRC).

ANTX5703W **FLASHCOPY *fc_copy location***
***type*VOLUME(*volser/dvcnbr*) IN**
SESSION(*session-id*) *reason*

Explanation

A FlashCopy has been performed between a primary source volume and a primary target volume. However, the corresponding FlashCopy between the secondary source volume and the secondary target volume cannot be performed.

fc_type

is ESTABLISH or WITHDRAW.

location

Is PRIMARY or SECONDARY.

type

Is the type of volume, either SOURCE or TARGET.

volser/dvcnbr

Are the FlashCopy source and target volumes.

session-id

is the session ID of the XRC session.

reason

Is the reason for the warning.

System action

A FlashCopy command is not executed between the secondary source and target volumes.

System programmer response

Re-issue the FlashCopy command:

- For reason IS A UTILITY VOLUME, select a different primary target.
- For reason NOT CURRENTLY IN DUPLEX, issue the FlashCopy command when the primary target volume pair are in duplex.

Source

Extended remote copy (XRC).

ANTX5704I **XRC SESSION(*session-id*)
SCSESSION(*scsession*) SSID(*ssid*)
VOLUME(*volser/dvcnbr*) SUSPEND
ON LONG BUSY *status***

Explanation

During the processing of an XADDPAIR or XSTART operation for a suspended session, the volume indicated by *volser/dvcnbr* was found to have a different value for the suspend on long busy setting than what was specified in PARMLIB parameter SuspendOnLongBusy. To match the value in PARMLIB, the suspend on long busy setting is either ENABLED or DISABLED for the storage control session *scsession* in XRC session *session-id* with SSID *ssid*. If the storage control microcode supports the suspend on long busy function, enabling it causes the microcode

to automatically suspend the storage control session, rather than raising extended long busy when sidefile limits are exceeded. If the storage control microcode does not support the suspend on long busy function, enabling it causes the data mover to suspend a storage control session as soon as it detects an extended long busy condition due to sidefile limits being exceeded. Storage control sessions that do not support suspension are terminated.

System action

The XADDPAIR or XSTART command succeeds with the suspend on long busy function enabled or disabled.

System programmer response

If the desired effect is different from what the message indicates, issue an XSET command using keyword SUSLBUSY to enable or disable the suspend on long busy function.

Source

Extended remote copy (XRC).

ANTX8180W **XSET PARAMETER *parameter* CAN
BE UPDATED ONLY AT XSTART,
PARAMETER IS IGNORED**

Explanation

During processing of an XSET PARMLIB command for an XRC session, the parameter *parameter* was found in PARMLIB. The parameter was either not present or had a different value when the session was previously started with the XSTART command.

System action

The XSET PARMLIB command succeeds, but the PARMLIB parameter is not applied to the session.

System programmer response

None required.

Source

Extended remote copy (XRC).

ANTX8181E **SESSION(*session-id*) TIMED
OUT WAITING TO PERFORM
FLASHCOPY FROM SECONDARY
SOURCE VOLUME(*volser/dvcnbr*)
TO SECONDARY
TARGET VOLUME(*volser/dvcnbr*),
SUSPENDING(*suspend-type*)**

Explanation

A FlashCopy has been performed between a secondary source volume and a secondary target volume. However, the resources necessary to perform the FlashCopy are not available.

session-id

is the session ID of the XRC session.

volser/dvcnbr

Is the FlashCopy source or target volume.

suspend-type

Is the type of suspension.

System action

A FlashCopy command is not executed between the secondary source and target volumes.

System programmer response

Issue the FlashCopy command again when the number of outstanding FlashCopy operations has decreased.

Source

Extended remote copy (XRC).

MVS system messages and RPFC for XRC: IGD

This topic includes the IGD messages that are new or changed for RPFC for XRC. They are marked with revision bars.

IGD17268I **(n) (text) VOLUMES WERE NOT USED FOR FAST REPLICATION BECAUSE (reason1 / reason3) | (n) FR-ELIGIBLE VOLUMES (reason2) | (n) FR-ELIGIBLE VOLUMES WERE NOT USED FOR PRESERVE MIRROR BECAUSE (reason3) | (n) FR-ELIGIBLE VOLUMES WERE NOT USED FOR A REMOTE PAIR FLASHCOPY XRC REQUEST BECAUSE (reason3)**

Explanation

This is an informational message that is issued, in conjunction with the IGD17269I message, in that very specific instance when the allocation request specified that fast replication was preferred, but this could not be honored because enough space could not be obtained on available fast replication volumes. The allocation was successful, but fast replication could not be satisfied. This message may be issued more than once for each request, depending on the 'reasons' for which volumes that are eligible for selection were not used for fast replication. It is to be used as a diagnostic tool to help determine why the fast replication request could not be honored. Refer to the ANTRQST section in *z/OS DFSMS Advanced Copy Services* for information on the QFRVOLS volume reason texts and volume reason code.

In the message text:

n

The number of volumes

text

Blank or RF-ELIGIBLE

reason1

Reason why these *n* volumes were rejected. The possible reasons are:

- THE SMS VOLUME STATUS WAS DISABLED
- THEY WERE NOT ONLINE
- THE UCB WAS NOT AVAILABLE
- OF (volume reason texts from ANTRQST QFRVOLS) - ANTRQST QFRVOLS VOLUME RSN (xxx)
- STORAGE GROUP HAS INSUFFICIENT FAST REPLICATION VOLUMES
- OF DADSM FAILURE (*diagdata*)
- THEY DID NOT SUPPORT THE AVAILABILITY REQUIREMENT
- THEY DID NOT SUPPORT THE ACCESSIBILITY REQUIREMENT
- THEY WERE NOT SPECIFIED ON A SPECIFIC GUARANTEED SPACE REQUEST
- THEY DID NOT SUPPORT THE EXTENDED FORMAT REQUIREMENT
- THEY DID NOT SUPPORT THE REQUEST FOR FIXED DASD (IART=0)
- THEY DID NOT HAVE SUFFICIENT SPACE (*diagdata*)
- THEY WERE NOT ON THE INCLUDE LIST
- THEY WERE ON THE EXCLUDE LIST
- THEY COULD NOT BE SUCCESSFULLY ALLOCATED
- THE UCB WAS OF THE WRONG TYPE
- THEY DID NOT HAVE ENOUGH SPACE FOR STRIPING
- THE DPCT WAS NOT AVAILABLE

- THEY DID NOT MEET REQUIRED SEPARATION CRITERIA
- THEY DID NOT SUPPORT THE PAV REQUIREMENT.
- OF DUPLICATE DATA SET NAME (*diagdata*)
- OF NO ROOM IN VTOC OR INDEX (*diagdata*)
- OF PERMANENT I/O OR CVAF ERROR (*diagdata*)
- THEY WERE REJECTED BY INSTALLATION EXIT (*diagdata*)
- THEY WERE NOT INITIALIZED (*diagdata*)
- OF EOF MARK WRITE FAILED (*diagdata*)
- OF INSUFFICIENT SPACE FOR BEST-FIT
- OF INSUFF TOTAL SPACE
- OF INSUFF FREE SPACE FOR FAST VOLUME SELECTION
- OF THE USEEAV(NO) SPECIFICATION
- THEY WERE SPACE EFFICIENT VOLUMES
- THEY WERE THE WRONG DEVICE TYPE FOR CLASS TRANSITION

reason2

Reason why these *n* fast replication eligible volumes were not preferred. The possible reasons are:

- WERE ABOVE THRESHOLD AND LESS PREFERRED
- WERE IN QUIESCED STATUS AND LESS PREFERRED
- WERE IN OVERFLOW SG AND LESS PREFERRED
- DID NOT MEET PREFERRED SEPARATION CRITERIA
- WERE IN TIERED STORAGE GROUP SELECTION
- WERE SPACE EFFICIENT VOLUMES AND LESS PREFERRED

reason3

Reason why these *n* volumes were rejected. The possible reason is:

- OF (volume reason texts from ANTRQST QFRVOLS) - ANTRQST QFRVOLS VOLUME RSN (*rsn-code*)

Where:

diagdata

is the DADSM diagnostic code or OTHERS after 10 diagnostic codes have been displayed for a failure reason.

rsn-code

is the error reason code returned by ANTRQST.

System action

Processing continues.

System programmer response

This message may provide some information as to why this data set could not be allocated on fast replication volumes. You may need to modify the ACS routines or take other action to make additional fast replication volumes available.

Programmer response

None. This is an informational message only.

Source

Data Facility Product (DFSMS)

**IGD17279I (n) VOLUMES WERE REJECTED
BECAUSE reason**

Explanation

SMS failed the allocation because volume(s) could not be selected. This message may be issued more than once for each volume selection failure, depending on the 'reasons' for which volumes were rejected. See the ANTRQST section in *z/OS DFSMS Advanced Copy Services* for information on the QFRVOLS volume reason texts and volume reason code. Also refer to [DADSM CREATE \(allocate\) return and diagnostic codes in z/OS DFSMSdfp Diagnosis](#).

In the message text:

n

The number of volumes

reason

One of the following reasons that the volume or volumes were rejected:

- OF DADSM FAILURE (*diagdata*)
- THE SMS VOLUME STATUS WAS DISABLED
- THE SMS STORAGE GROUP STATUS WAS DISABLED
- THEY WERE NOT ONLINE
- THE VOLUME WAS NOT AVAILABLE TO Asynchronous Operations Manager (AOM)
- THEY DID NOT SUPPORT THE AVAILABILITY REQUIREMENT
- THEY DID NOT SUPPORT DATA SET SEPARATION
- THEY DID NOT SUPPORT THE ACCESSIBILITY REQUIREMENT
- THEY WERE NOT SPECIFIED ON A SPECIFIC GUARANTEED SPACE REQUEST

- THEY DID NOT SUPPORT THE EXTENDED FORMAT REQUIREMENT
- THEY DID NOT SUPPORT THE REQUEST FOR FIXED DASD (IART=0)
- THEY DID NOT SUPPORT THE PAV REQUIREMENT
- THEY DID NOT HAVE SUFFICIENT SPACE (*diagdata*)
- THEY WERE NOT ON THE INCLUDE LIST
- THEY WERE ON THE EXCLUDE LIST
- THEY COULD NOT BE SUCCESSFULLY ALLOCATED
- THE UCB WAS OF THE WRONG TYPE
- THEY DID NOT HAVE ENOUGH SPACE FOR STRIPING
- THE DPCT WAS NOT AVAILABLE
- THEY DID NOT SUPPORT THE PAV REQUIREMENT
- OF DUPLICATE DATA SET NAME (*diagdata*)
- OF NO ROOM IN VTOC OR INDEX (*diagdata*)
- OF PERMANENT I/O OR CVAF ERROR (*diagdata*)
- THEY WERE REJECTED BY INSTALLATION EXIT (*diagdata*)
- THEY WERE NOT INITIALIZED (*diagdata*)
- OF EOF MARK WRITE FAILED (*diagdata*)
- OF (volume reason texts from ANTRQST QFRVOLS) FOR A REQUIRED FAST REPLICATION. ANTRQST QFRVOLS VOLUME RSN(*xxx*)
- OF INSUFFICIENT SPACE FOR BEST-FIT
- OF INSUFF TOTAL SPACE
- OF INSUFF FREE SPACE FOR FAST VOLUME SELECTION
- OF THE USEEAV(NO) SPECIFICATION
- THEY WERE SPACE EFFICIENT VOLUMES
- OF (volume reason texts from ANTRQST QFRVOLS) FOR A REQUIRED PRESERVE MIRROR. ANTRQST QFRVOLS PRESERVE MIRROR VOLUME RSN (*xxx*)
- THEY WERE THE WRONG DEVICE TYPE FOR CLASS TRANSITION
- THEY WERE READ-ONLY
- OF (volume reason texts from ANTRQST QFRVOLS) ANTRQST QFRVOLS VOLUME RSN(*rsn_code*)
- THEY WERE NOT D/T3390
- THEY WERE NOT CLOUD ELIGIBLE
- OF INSUFF VOLUMES IN THE SFI

- THEY WERE NOT TCT COMPRESSION ELIGIBLE
- THEY WERE NOT TCT ENCRYPTION ELIGIBLE

Where:

diagdata

is the DADSM diagnostic code or OTHERS. This code is described in DADSM CREATE (allocate) return and diagnostic codes in z/OS DFSMSdfp Diagnosis.

rsn_code

is the error reason code returned by ANTRQST.

System action

Processing stops.

Operator response

None

System programmer response

Correct the problem indicated by the reason in the message and resubmit the request.

Reason

Response

OF A DADSM FAILURE

Correct the DADSM condition.

THE SMS VOLUME STATUS WAS DISABLED

Enable the requested volumes.

THE SMS STORAGE GROUP STATUS WAS DISABLED

Enable the requested storage group or groups.

THEY WERE NOT ONLINE

Vary the volume online.

THE VOLUME WAS NOT AVAILABLE TO Asynchronous Operations Manager (AOM)

Vary the volume online.

THEY DID NOT SUPPORT THE AVAILABILITY REQUIREMENT

Refer to the SMS storage class.

THEY DID NOT SUPPORT DATA SET SEPARATION

Refer to the installation data set separation profile, or make another physical control unit available for allocation.

THEY DID NOT SUPPORT THE ACCESSIBILITY REQUIREMENT

Refer to the SMS storage class.

THEY DID NOT SUPPORT THE PAV REQUIREMENT

Refer to the SMS storage class.

THEY WERE NOT SPECIFIED ON A SPECIFIC GUARANTEED SPACE REQUEST

Specify additional volumes on the guaranteed space request.

THEY DID NOT SUPPORT THE EXTENDED FORMAT REQUIREMENT

Refer to the SMS data class.

THEY DID NOT SUPPORT THE REQUEST FOR FIXED DASD (IART=0)

Refer to the SMS storage class.

THEY DID NOT HAVE SUFFICIENT SPACE

Refer to installation procedures.

THEY WERE NOT ON THE INCLUDE LIST

Refer to DFSMSdss policy.

THEY WERE ON THE EXCLUDE LIST

The volumes were already in use by this data set.

THEY COULD NOT BE SUCCESSFULLY ALLOCATED

Vary the volumes online if they are offline, or make them available if they are otherwise unavailable.

THE UCB WAS OF THE WRONG TYPE

The device geometry was incompatible for data set extend. The volume that will be used for the extend must have the same geometry (that is, 3380 versus 3390) as the first volume of the data.

THEY DID NOT HAVE ENOUGH SPACE FOR STRIPING

Refer to installation procedures.

THE DPCT WAS NOT AVAILABLE

The volume was not available to IOS.

THE UCB WAS NOT AVAILABLE

The volume was not available to IOS.

OF INSUFF TOTAL SPACE

The primary quantity requested was larger than the total capacity of the largest available volume.

See *z/OS DFSMSdfp Storage Administration* for a detailed explanation.

OF INSUFF FREE SPACE FOR FAST VOLUME SELECTION

See *z/OS DFSMSdfp Storage Administration* for a detailed explanation.

OF THE USEEAV(NO) SPECIFICATION

All candidate EAVs were rejected because USEEAV(NO) was specified in SYS1.PARMLIB.

THEY WERE SPACE EFFICIENT VOLUMES

Space efficient volumes cannot be used for striped data sets

THEY WERE THE WRONG DEVICE TYPE FOR CLASS TRANSITION

Pick volumes with the correct device type for the class transition and resubmit the request.

NO ROOM IN VTOC OR INDEX (*diagdata*)

There is no room in the VTOC or VTOC index. For more information, see the DADSM CVAF diagnostic aid section in *z/OS DFSMSdfp Diagnosis*.

Source

Storage Management Subsystem (DFSMS)

Module

IGDVTSC2

SDM return codes RPFC for XRC

This topic describes the SDM return codes that are new or changed for RPFC for XRC. They are marked with revision bars.

Table 19. SDM return codes	
Return Code	Description and Suggested Recovery Action
4200	The XRECOVER or XADVANCE command failed because the state data set information indicates that the session previously used a PARMLIB parameter that is not supported with this release or PTF level. Perform the XRECOVER or XADVANCE command on a system that is at the same or later release or PTF level as the system that the session was active on.
4700	FlashCopy before volume pair in duplex.
4701	FlashCopy to volume not in duplex.
4702	Secondary source and target volumes on different controllers.

Table 19. SDM return codes (continued)

Return Code	Description and Suggested Recovery Action
4703	Discard the FlashCopy.
4704	I/O error when issuing FlashCopy.
4705	<p>The secondary volume is in a FlashCopy relationship that is not supported due to one or more of the following:</p> <ul style="list-style-type: none"> • Secondary volume is not Cascading-FlashCopy-capable and is in a FlashCopy relationship with a volume outside of the XRC session • Secondary volume is Cascading-FlashCopy-capable but is in an Incremental FlashCopy with a volume outside of the XRC session.
4706	XSET SUSLBUSY cannot be used when Remote Pair FlashCopy is enabled.
4711	Error from internal service.
4712	FlashCopy to utility volume.
4713	<p>This is a hardware I/O error. The XRC data mover function encountered an I/O error while attempting to execute a FlashCopy between a secondary source volume and a secondary target volume. Use the sense information and SYS1.LOGREC records to determine the cause of the error. Correct the error and reissue the FlashCopy between the primary source volume and the primary target volume. If the message that was issued with this return code was accompanied by an ANTX5000E, ANTX5001E, or ANTX5002E message, see those messages for further information.</p>

Chapter 9. MVS system codes and RPFC for XRC

This topic includes the system codes that are new or changed for RPFC for XRC. They are marked with revision bars.

101-112

A logic error occurred with XRC remote pair FlashCopy. Both a logrec entry and a non-disruptive state save on the storage controller were taken. In all cases, data on the secondary volumes is preserved at a known consistent state as reported by XRC messages. A dump is generated only if the XRCTRAP function is on.

Note that XRC has suspended, so, if requested, the tracks associated with FlashCopy are automatically resynchronized during normal volume resynchronization. The FlashCopy at the secondary does not occur, as resynchronization copying the primary tracks is done instead.

Appendix A. Accessibility

Accessible publications for this product are offered through [IBM Documentation for z/OS \(www.ibm.com/docs/en/zos\)](http://www.ibm.com/docs/en/zos).

If you experience difficulty with the accessibility of any z/OS documentation see [How to Send Feedback to IBM](#) to leave documentation feedback.

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Index

A

- accessibility
 - contact IBM [199](#)
- ADRMCLVL macro [102](#)
- ADRUF0 installation exits
 - parameter list [123](#)
- ADRUF0 mapping macro
 - description [123](#)
 - output example [123](#)
- ANTQ8209I [183](#)
- ANTQ8280I [184](#)
- ANTQ8370I [184](#)
- ANTQ8371I [184](#)
- ANTQ8372I [184](#)
- ANTQ8700I [185](#)
- ANTQ8701I [186](#)
- ANTQ8702I [186](#)
- ANTQFRVL macro [79](#)
- ANTR5029E [186](#)
- ANTR8863E [186](#)
- ANTRQST macro
 - FCESTABLISH request [71](#)
 - syntax [62](#)
- ANTX5000E [187](#)
- ANTX5700W [189](#)
- ANTX5701E [189](#)
- ANTX5702E [189](#)
- ANTX5703W [189](#)
- ANTX5704I [190](#)
- ANTX8180W [190](#)
- ANTX8181E [190](#)
- assistive technologies [199](#)
- attributes
 - object class
 - transition [114](#)
- automatic space management
 - candidate data sets for backup, determining, SMS-managed storage [105](#)
 - determining candidate data sets for backup, SMS-managed storage [105](#)
 - DFSMSHsm-managed volumes, SMS-managed storage [105](#)

C

- candidate data sets
 - for backup, determining, SMS-managed storage [105](#)
- command
 - transitioning
 - individual data sets [106](#)
- commands
 - DFSMSdss commands
 - COPY [86](#)
 - DFSMSHsm commands
 - FRRECOV [107](#)
 - MIGRATE [106](#)

- commands (*continued*)
 - XRC commands
 - XRECOVER - recovering data on recovery system [53](#)
 - XSET - modifying session parameters [54](#)
- common time reference (XRC) [3](#)
- contact
 - z/OS [199](#)
- COPY command
 - for DFSMSdss [86](#)
- copy operation for logical data set [86](#)
- coupled extended remote copy (CXRC)
 - type of environment used [121](#)

D

- Data Mover
 - hardware/software requirements for XRC [3](#)
- data sets
 - command
 - transitioning [106](#)
 - moving [106](#)
- DCOLLECT command
 - output record structure
 - active data set record [131](#)
 - backup data set record [141](#)
 - DASD capacity planning record [144](#)
 - header record [131](#)
 - interpreting output [131](#)
 - migrated data set record [139](#)
 - output listings [131](#)
 - tape capacity planning record [144](#)
 - volume information record [137](#)
 - VSAM association record [135](#)
- determining version, release, modification level using the ADRMCLVL macro [102](#)
- device
 - supported by XRC [3](#)
- device blocking
 - command syntax [54](#), [55](#)
 - DVCBLOCK [54](#), [55](#)
- DEVSUPxx parmlib member
 - statements and parameters [5](#)
 - syntax format [5](#)
- DFSMSdss
 - commands
 - COPY [86](#)
- DFSMSdss commands
 - COPY [86](#)
- DFSMSHsm
 - commands
 - FRRECOV [107](#)
- DFSMSHsm commands
 - FRRECOV [107](#)
- DFSMSHsm-managed
 - automatic space management, SMS-managed storage [105](#)

E

- expiration
 - object class
 - transition attributes [114](#)
- extended remote copy
 - choosing
 - reasons for [121](#)
 - hardware requirements [3](#)
 - installing [122](#)
 - introduction [121](#)
 - modifying session parameters [54](#)
 - overview [121](#)
 - recovering data on the recovery system [53](#)
 - requirements
 - hardware [3](#)
 - software [3](#)
 - supported devices [3](#)
 - XRC commands
 - XRECOVER - recovering data on recovery system [53](#)
 - XSET - modifying session parameters [54](#)

F

- FCSETGTOK keyword [96](#)
- FCTOXRCPPRIMARY keyword
 - COPY command [100](#)
- FlashCopy
 - commands
 - FCESTABL [117](#)
 - FCQUERY [120](#)
 - FCWITHDR [117](#)
 - FlashCopy V1 defined [117](#)
 - FlashCopy V2 defined [117](#)
 - FRRECOV
 - specifying XRC primary volume [109](#)
 - hardware requirements [4](#)
 - how FlashCopy works [117](#)
 - modes [118](#)
 - objective [117](#)
 - relationship [118](#)
 - software requirements [4](#)
- FLASHCOPYTOGM [26](#)
- FRRECOV
 - FlashCopy
 - specifying XRC primary volume [109](#)
- FRRECOV command
 - for DFSMSHsm [107](#)
 - optional parameters
 - ALLOWXRCP [109](#)

G

- GREATER_253 parameter in DEVSUPxx [12](#)

H

- hardware
 - XRC
 - requirements [3](#)
 - supported devices [3](#)
- HFS data set
 - logical data set COPY [86](#)

- host application requirements (XRC) [3](#)

I

- installing
 - XRC [122](#)

K

- keyboard
 - navigation [199](#)
 - PF keys [199](#)
 - shortcut keys [199](#)
- keyword
 - module protection [100](#)
 - profile names [100](#)

M

- mapping macros
 - ADRUFO [123](#)
- MIGRATE
 - command for SMS-managed data sets [106](#)
- moving
 - data sets [106](#)

N

- navigation
 - keyboard [199](#)
- NOTIFYCONCURRENT keyword [87](#)

O

- object
 - class
 - transition attributes [114](#)
- open system volumes
 - support in FlashCopy [4](#)
- overview
 - XRC [121](#)

P

- parameter lists
 - ADRUFO [123](#)
- parameters
 - ALLOWXRCP [109](#)
- parmlib
 - command descriptions [34](#)
 - hlq.XCOPY.PARMLIB [34](#)
 - parameter table [30](#)
 - using parameter libraries [34](#)
- PARMLIB
 - SYS1.PARMLIB [122](#)
 - SYS1.XCOPY.PARMLIB [122](#)
- procedures
 - installing remote copy [122](#)
- protection
 - keywords with RACF [100](#)

R

- RACF (Resource Access Control Facility)
 - keyword profiles [100](#)
 - protecting keyword modules [100](#)
 - protecting keywords [100](#)
- READIOPACING keyword [87, 93](#)
- recommendations
 - using copy pools [112](#)
- Resource Access Control Facility [100](#)
- restrictions
 - defining object class transition attributes [114](#)
- RIOP keyword [87, 93, 96](#)
- RPFC for XRC
 - getting started [2](#)
 - setting up [5](#)
 - what is [1](#)

S

- SAM compressed data set, copying [86](#)
- serialization error exit [115](#)
- shortcut keys [199](#)
- SMS-managed
 - storage
 - space management of [103](#)
- software
 - XRC requirements [3](#)
- solution_name
 - command? parameter? SMF record? [53](#)
 - requirements [2](#)
- space management
 - of SMS-managed storage [103](#)
- syntax [96](#)
- syntax diagram
 - COPY command [87](#)
- syntax for remote copy commands
 - XRECOVER [53](#)
 - XSET [54, 55](#)
- sysplex timer, requirement (XRC) [3](#)

T

- trademarks [204](#)
- transition copy technique [115](#)
- TSO commands
 - XRC commands
 - XRECOVER - recovering data on recovery system [53](#)
 - XSET - modifying session parameters [54](#)

U

- user interface
 - ISPF [199](#)
 - TSO/E [199](#)

V

- VOLNSNS parameter in DEVSUPxx [23](#)

X

- XRC primary volume

- XRC primary volume (*continued*)

- FlashCopy operation

- FRRECOV [109](#)

- XRECOVER

- description [53](#)

- syntax [53](#)

- XSET

- description [54](#)

- syntax [54, 55](#)

Z

- zFS data sets

- logical data set COPY [86](#)



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