CLI Reference Manual

HSZ40 Array Controllers

HSOF Version 3.0

StorageWorks

Part Number: EK–CLI40–RM. A01
October 1996

While Digital Equipment Corporation believes the information included in this manual is correct as of the date of publication, it is subject to change without notice. Digital makes no representations that the interconnection of its products in the manner described in this document will not infringe existing or future patent rights, nor do the descriptions contained in this document imply the granting of licenses to make, use, or sell equipment or software in accordance with the description. No responsibility is assumed for the use or reliability of firmware on equipment not supplied by Digital or its affiliated companies. Possession, use, or copying of the software or firmware described in this documentation is authorized only pursuant to a valid written license from Digital, an authorized sublicensor, or the identified licensor.

Commercial Computer Software, Computer Software Documentation and Technical Data for Commercial Items are licensed to the U.S. Government with Digital's standard commercial license and, when applicable, the rights in DFAR 252.227-7015, "Technical Data—Commercial Items."

© Digital Equipment Corporation, 1996.
Printed in U.S.A.
All rights reserved.

Alpha, CI, DCL, DECconnect, DECserver, Digital, DSSI, HSC, HSJ, HSD, HSZ, MSCP, OpenVMS, StorageWorks, TMSCP, VAX, VAXcluster, VAX 7000, VAX 10000, VMS, VMScluster, and the Digital logo are trademarks of Digital Equipment Corporation. All other trademarks and registered trademarks are the property of their respective holders.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Restrictions apply to the use of the local-connection port on this series of controllers; failure to observe these restrictions may result in harmful interference. Always disconnect this port as soon as possible after completing the setup operation. Any changes or modifications made to this equipment may void the user's authority to operate the equipment.

Warning!
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Avertissement!
Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l' utilisateur de prendre les mesures appropriées.

Contents

1 Introduction to the CLI, 1
CLI overview, 2
Accessing and exiting the CLI, 3
Entering CLI commands, 4

2 CLI Commands, 7
ADD CDROM, 8
ADD DISK, 10
ADD LOADER, 13
ADD MIRRORSET, 15
ADD OPTICAL, 18
ADD PASSTHROUGH, 20
ADD RAIDSET, 22
ADD SPARESET, 25
ADD STRIPESET, 26
ADD TAPE, 28
ADD UNIT, 30
CLEAR_ERRORS CLI, 36
CLEAR_ERRORS INVALID_CACHE, 37
CLEAR_ERRORS LOST_DATA, 39
CLEAR_ERRORS UNKNOWN, 40
CLEAR_ERRORS UNWRITEABLE_DATA, 41
CREATE_PARTITION, 42
DELETE *container-name*, 44

DELETE FAILEDSET, 45
DELETE SPARESET, 46
DELETE *unit-number*, 47
DESTROY_PARTITION, 49
DIRECTORY, 50
EXIT, 51
HELP, 52
INITIALIZE, 53
LOCATE, 56
MIRROR, 59
REDUCE, 62
RENAME, 64
RESTART THIS_CONTROLLER and RESTART OTHER_CONTROLLER, 65
RETRY_ERRORS UNWRITEABLE_DATA, 67
RUN, 68
SELFTEST OTHER_CONTROLLER and SELFTEST THIS_CONTROLLER, 69
SET *device-name*, 71
SET FAILEDSET, 73
SET FAILOVER, 74
SET *mirrorset-name*, 76
SET MULTIBUS_FAILOVER, 81
SET NOFAILOVER (SET NOMULTIBUS_FAILOVER), 83
SET THIS_CONTROLLER and SET OTHER_CONTROLLER, 85
SET *RAIDset-name*, 93
SET *unit-number*, 96
SHOW, 101
SHUTDOWN THIS_CONTROLLER and SHUTDOWN OTHER_CONTROLLER, 105
UNMIRROR, 107

Glossary, 109

Index, 121

Related documents

The following table lists some of the documents related to the use of this product.

Document title	Part number
DECevent Installation Guide	AA-Q73JA-TE
StorageWorks BA350-MA Controller Shelf User's Guide	EK-350MA-UG
StorageWorks Configuration Manager for DEC OSF/1 Installation Guide	AA-QC38A-TE
StorageWorks Configuration Manager for DEC OSF/1 System Manager's Guide for HSZterm	AA-QC39A-TE
StorageWorks Solutions Configuration Guide	EK-BA350-CG
StorageWorks Solutions Shelf and SBB User's Guide	EK-BA350-UG
StorageWorks Solutions SW300-Series RAID Enclosure Installation and User's Guide	EK-SW300-UG
StorageWorks SW500-Series Cabinet Installation and User's Guide	EK-SW500-IG
StorageWorks SW800-Series Data Center Cabinet Installation and User's Guide	EK-SW800-IG
StorageWorks SW500-Series Cabinet Cable Distribution Unit Installation Guide	EK-SW5CU-IG
StorageWorks SW800-Series Data Center Cabinet Cable Distribution Unit Installation Sheet	EK-SWCDU-IS
The RAIDBOOK—A Source for RAID Technology	RAID Advisory Board
VAXcluster Console System User's Guide	AA-GV45D-TE
VAXcluster Systems Guidelines for VAXcluster System Configurations	EK-VAXCS-CG

1 Introduction to the CLI

CLI Overview

How to access and exit the CLI

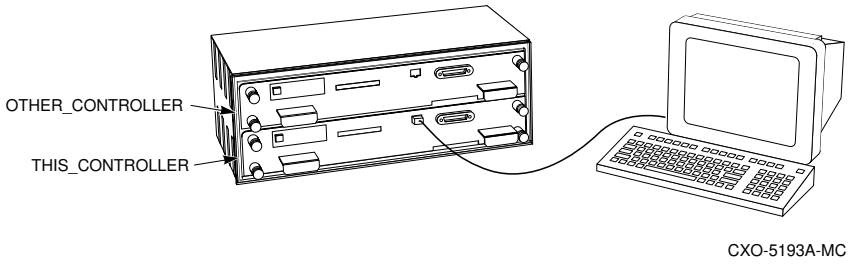
Entering CLI commands

CLI overview

The command line interpreter (CLI) is one of the user interfaces to the StorageWorks Array Controllers in your subsystem. The CLI commands allow you to manage the subsystem by viewing and modifying the configuration of the controllers and the devices attached to them. You also use the CLI to start controller diagnostic and utility programs.

CLI commands for configuring and viewing the controllers use the relative terms THIS_CONTROLLER and OTHER_CONTROLLER. THIS_CONTROLLER always refers to the controller that is running the current CLI session. You may have a maintenance terminal or PC directly connected to the terminal port on the front of the controller, or you may be using a virtual terminal connection through the host bus. In either case, THIS_CONTROLLER is the one that you are interacting with directly. This is shown in Figure 1.

Figure 1
Whichever controller has the terminal connection is THIS_CONTROLLER



OTHER_CONTROLLER always refers to the controller that is *not* running the current CLI session—the one that is not connected to a terminal or terminal session.

Accessing and exiting the CLI

Note

The maintenance terminal port on the controller is meant to be used only for initial configuration and required maintenance functions. Operation of this port may cause harmful radio frequency interference. Always disconnect the terminal and cable when you have finished working with the controller.

You can access the CLI from a maintenance terminal connected to the front bezel of the controller (local connection) or through the host operating system using a VAXcluster system console (VCS), a diagnostic and utility protocol (DUP), or an HSZterm (remote connection). You *must* use a local connection to perform initial controller configuration, such as setting the controller ID. Once you have completed initial configuration and the controller is visible on the host bus, you can perform all other configuration through a remote connection.

In a dual-redundant controller configuration, you can view and set the configurations of both controllers with one local or remote connection. Use THIS_CONTROLLER commands to change the configuration on the controller that is running the CLI session. Use OTHER_CONTROLLER commands to view or change the configuration on the partner controller.

If you are using a remote DUP connection to the CLI, enter the EXIT command at the CLI prompt to close the connection. You do not need to exit from a local connection.

Capturing your CLI session

If you are using a remote terminal connection via DUP on OpenVMS and you specified the /LOG switch on your command line, a log file of your CLI session is created. You must use the EXIT command to exit the CLI in order to close and print the log file.

Entering CLI commands

You can use the following tips and techniques when entering CLI commands:

- Commands aren't case sensitive.
- With few exceptions, you only need to enter enough of each command to make the command unique (usually three characters). For example, SHO is equivalent to SHOW.
- While the controller is processing a command, you can go ahead and type in succeeding commands without waiting for the CLI prompt. The controller will process each command when it has completed the previous command. (A unit that is experiencing heavy I/O load may be slow to respond to CLI commands.)
- You can enter only one switch (or "qualifier") with each SET command. To enter multiple switches for the same device or unit, you must use multiple SET commands.

You can recall and edit the last five commands. This feature can save time and help prevent mistakes when you need to enter similar commands during configuration. Use the following keys to recall and edit commands:

Key	Function
Up Arrow or Ctrl/B, Down Arrow or Ctrl/N	Steps backward and forward through the five most recent CLI commands.
Left arrow or Ctrl/D, Right arrow or Ctrl/F	Moves the cursor left or right in a command line.
Ctrl/E	Moves the cursor to the end of the line.
Ctrl/H or Backspace	Moves the cursor to the beginning of the line.
Ctrl/J or Linefeed	Deletes the word to the left of the cursor.
Ctrl/U	Deletes characters from the beginning of the line to the cursor.

Key	Function
Ctrl/A	Toggles between insert mode and overstrike mode. The default setting is insert mode, which allows you to insert characters at the cursor location, moving the existing characters to the right. Overstrike mode replaces existing characters when you type. The CLI returns to insert mode at the beginning of each line.
Ctrl/R	Recalls the contents of the command line. This is especially helpful if the system issues a message that interrupts your typing.

2 CLI Commands

Descriptions of all CLI commands

Required parameters

Optional switches

Examples

ADD CDROM

Adds a CDROM drive to the controller configuration and names the drive.

Format

```
ADD CDROM CDROM-name SCSI-location
```

Parameters

CDROM-name

Specifies a name for the CD–ROM drive. You use this name with the ADD UNIT command to identify the CD–ROM drive as a host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

SCSI-location

The address of the CD–ROM drive in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Examples

To add a CD–ROM drive at port 1, target 0, LUN 0, named CD_PLAYER:

```
CLI> ADD CDROM CD_PLAYER 1 0 0
```

See also

ADD UNIT

DELETE

SHOW CDROM

ADD DISK

Adds a disk drive to the controller configuration and names the drive.

Format

```
ADD DISK disk-name SCSI-location
```

Parameters

disk-name

Specifies a name for the disk drive. You use this name when adding the disk drive to a storageset or with the ADD UNIT command to create a single-disk host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

SCSI-location

The address of the disk drive to be added in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Switches

TRANSPORTABLE
NOTRANSPORTABLE (Default)
Specify the TRANSPORTABLE switch for any disk drive that you want to move to and from StorageWorks environments with the data intact.

Note

Use the TRANSPORTABLE switch only for disk drives that must be moved to StorageWorks environments with data intact.

A TRANSPORTABLE disk drive does not contain any special information space and can be moved to a non-StorageWorks environment with its data intact. You cannot use a TRANSPORTABLE disk drive in any type of storageset, such as a stripeset or RAIDset.

Specify NOTRANSPORTABLE for all disk drives that will be used in RAIDsets, stripesets, and mirrorsets. Also use the NOTRANSPORTABLE switch for all single-disk units that will be used exclusively in a StorageWorks or HSC controller. (You can freely move NOTRANSPORTABLE disk drives to and from HSC, HSD, HSJ, and HSZ controllers.)

The controller makes a small portion of NOTRANSPORTABLE disk drives inaccessible to the host and uses the space to store information (metadata) that improves data reliability, error detection, and recovery. Because of this metadata, only StorageWorks controllers can retrieve user data from NOTRANSPORTABLE disk drives.

Examples

To add nontransportable DISK100 at port 1, target 0, LUN 0:

```
CLI> ADD DISK DISK100 1 0 0
```

To add transportable disk DISK230 at port 2, target 3, LUN 0:

```
CLI> ADD DISK DISK230 2 3 0 TRANSPORTABLE
```

See also

DELETE

LOCATE

SHOW DISKS

SET *disk-name*

ADD LOADER

Adds a tape loader to the controller configuration and names the loader.

Note

This command is valid only for HSJ and HSD controllers. To add a loader to an HSZ controller configuration, use the ADD PASSTHROUGH command.

Format

```
ADD LOADER loader-name SCSI-location
```

Parameters

loader-name

Specifies a name for the loader. You use this name with the ADD PASSTHROUGH command to create a passthrough container (command disk) to access the loader.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

SCSI-location

The location of the loader in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0 or 1).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Examples

To add loader LOADER421 at port 2, target 0, LUN 0:

```
CLI> ADD LOADER LOADER421 4 2 1
CLI> ADD PASSTHROUGH PASS1 LOADER421
CLI> ADD UNIT D100 PASS1
```

See also

ADD PASSTHROUGH

ADD TAPE

DELETE

SHOW LOADERS

ADD MIRRORSET

Adds a mirrorset to the controller configuration and names the mirrorset. The number of members is set to the number of devices specified in the command.

Format

```
ADD MIRRORSET mirrorset-name disk-name1 [disk-nameN]
```

Parameters

mirrorset-name
Specifies a name for the mirrorset. You use this name with the ADD UNIT command to identify the mirrorset as a host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

disk-name1 disk-nameN
The names of the disk drives that make up the mirrorset. A mirrorset contains 1 to 6 disk drives.

Switches

COPY=NORMAL (Default)
COPY=FAST
The COPY switch allows you to set the speed at which the controller copies data from normal mirrorset members to new members.

Note

A normal mirrorset member is one whose entire contents are the same as all other normal members.

Select NORMAL to prioritize other controller operations over the copy operation. The controller uses relatively few resources to perform the copy, and there is little impact on performance.

Select FAST when the copy operation must take precedence over other controller operations. The controller uses more

resources and the copy takes less time, but overall controller performance is reduced during the copy.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (Default)
NOPOLICY
The POLICY switch allows you to set the criteria the controller uses to choose a replacement member from the spareset when a mirrorset member fails.

Select BEST_FIT to choose a replacement device from the spareset that most closely matches the capacities of the remaining members. If more than one device in the spareset is the correct size, the controller selects the device that gives the best performance.

Select BEST_PERFORMANCE to choose a replacement device from the spareset that results in the best performance (the device should be on a different port than existing members). If more than one device in the spareset has the best performance, the controller selects the device that most closely matches the size of the remaining members.

READ_SOURCE=ROUND_ROBIN
READ_SOURCE=LEAST_BUSY (Default)
READ_SOURCE=*disk-name*
The READ_SOURCE switch allows you to control which mirrorset member is used by the controller to satisfy a read request.

Select ROUND_ROBIN to cause the controller to direct read requests to each NORMAL mirrorset member in sequential membership order. No preference is given to any NORMAL member.

Select LEAST_BUSY to cause the controller to direct read requests to the NORMAL mirrorset member with the least busy work queue.

Select the *disk-name* of a specific member to cause the controller to direct all read requests to that member. If that member fails out of the mirrorset, the controller reverts to the LEAST_BUSY method for mirrorset read requests.

Examples

To add DISK100, DISK210, and DISK320 as a mirrorset with the name MIRR1:

```
CLI> ADD DISK DISK100 1 0 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK320 3 2 0
CLI> ADD MIRRORSET MIRR1 DISK100 DISK210 DISK320
CLI> INITIALIZE MIRR1
CLI> ADD UNIT D305 MIRR1
```

See also

ADD DISK

DELETE

INITIALIZE

MIRROR

REDUCE

SHOW MIRRORSETS

UNMIRROR

ADD OPTICAL

(HSD and HSJ controllers only.) Adds an optical disk drive to the controller configuration and names the drive.

Format

```
ADD OPTICAL optical-name SCSI-location
```

Parameters

optical-name

Specifies a name for the optical disk drive. You use this name with the ADD UNIT command to identify the optical disk drive as a host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

SCSI-location

The location of the optical drive to be added in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Examples

To add optical drive OPT230 at port 2, target 3, LUN 0:

```
CLI> ADD OPTICAL OPT230 2 3 0
CLI> ADD UNIT D103 OPT230
```

See also

ADD UNIT

DELETE

SHOW

ADD PASSTHROUGH

Creates a passthrough container (command disk) to allow direct access to a device. Passthrough containers are used by HSJ and HSD controllers to communicate with tape drives, optical drives, and tape loaders. HSZ controllers use passthrough containers to communicate with tape drives and tape loaders.

Format

For passthrough containers on HSJ and HSD controllers:

```
ADD PASSTHROUGH passthrough-name loader-name
```

Note

A warning message (Warning 3010) may appear when you add a passthrough container. You can safely ignore the warning.

For tape drives and loaders attached to HSZ controllers:

```
ADD PASSTHROUGH passthrough-name SCSI-location
```

Parameters

passthrough-name

Specifies a name for the passthrough container. You use this name with the ADD UNIT command to identify the passthrough container as a host-addressable unit. You may want to use a name that indicates the type of device served by the passthrough container, such as “TAPE” or “LOADER.”

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

loader-name

The name of the tape loader device that receives passthrough commands. This is the name that was given to the device with the ADD LOADER command.

SCSI-location
The location of the tape drive or loader in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0 or 1).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Examples

To create passthrough container PASS1 from loader LOADER421 on an HSJ or HSD controller:

```
CLI> ADD LOADER LOADER421 4 2 1
CLI> ADD PASSTHROUGH PASS1 LOADER421
CLI> ADD UNIT D100 PASS1
```

To add tape drive TAPE230 at port 2, target 3, LUN 0 on an HSZ controller:

```
CLI> ADD PASSTHROUGH TAPE230 2 3 0
CLI> ADD UNIT P100 TAPE230
```

Note

Digital UNIX requires HSZ passthrough units to be at LUN 0 (the third digit in the unit number). OpenVMS accepts LUN numbers 0-7.

To add a tape loader at port 2, target 3, LUN 1 on an HSJ controller:

```
CLI> ADD PASSTHROUGH LOADER231 2 3 1
CLI> ADD UNIT D103 LOADER231
```

See also

ADD LOADER

ADD UNIT

DELETE

SHOW PASSTHROUGH

ADD RAIDSET

Creates a RAIDset from 3 to 14 disks.

Format

```
ADD RAIDSET RAIDset-name disk-name1 disk-name2
[disk-nameN]
```

Parameters

RAIDset-name
Specifies a name for the RAIDset. You use this name with the ADD UNIT command to identify the RAIDset as a host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

disk-name1 disk-name2 disk-nameN
The disks that will make up the RAIDset. A RAIDset can contain 3 to 14 member disks.

Switches

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (Default)
NOPOLICY
The POLICY switch allows you to set the criteria the controller uses to choose a replacement member from the spareset when a RAIDset member fails.

Select BEST_FIT to choose a replacement device from the spareset that most closely matches the capacities of the remaining members. If more than one device in the spareset is the correct size, the controller selects the device that gives the best performance.

Select BEST_PERFORMANCE to choose a replacement device from the spareset that results in the best performance (the

device should be on a different port than existing members). If more than one device in the spareset has the best performance, the controller selects the device that most closely matches the size of the remaining members.

Select NOPOLICY to prevent the controller from replacing a failed disk drive. This causes the RAIDset to run in a reduced state until a BEST_FIT or BEST_PERFORMANCE policy is selected, or a member is manually replaced in the RAIDset (see SET *RAIDset-name*).

RECONSTRUCT=NORMAL (Default)
RECONSTRUCT=FAST
The RECONSTRUCT switch allows you to set the speed at which the controller reconstructs the data on a new RAIDset member that has replaced a failed member.

Select NORMAL to balance other controller operations against the reconstruct operation. The controller uses relatively few resources to perform the reconstruct, and there is little impact on performance.

Select FAST when the reconstruct operation must take precedence over other controller operations. The controller uses more resources and the reconstruct takes less time, but overall controller performance is reduced during the reconstruct.

REDUCED
NOREDUCED (Default)
The REDUCED switch allows you to add a RAIDset that is missing one member. You only need to use the REDUCED switch if you're re-adding a reduced RAIDset to the subsystem. The NOREDUCED setting is the default and indicates that all RAIDset members that make up the RAIDset are being specified, such as when creating a new RAIDset.

Examples

To create RAIDset RAID9 with disks DISK100, DISK210, and DISK320:

```
CLI> ADD DISK DISK100 1 0 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK320 3 2 0
CLI> ADD RAIDSET RAID9 DISK100 DISK210 DISK320
CLI> INITIALIZE RAID9
CLI> ADD UNIT D204 RAID9
```

To create RAIDset RAID8 with disks DISK100, DISK210, and DISK320, and use the BEST_FIT replacement policy:

```
CLI> ADD DISK DISK100 1 0 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK320 3 2 0
CLI> ADD RAIDSET RAID8 DISK100 DISK210 DISK320
POLICY=BEST_FIT
CLI> INITIALIZE RAID8
CLI> ADD UNIT D205 RAID8
```

The last example shows creating a three-member RAIDset from the members of a four-member RAIDset that was already reduced. Note that you must not initialize the RAIDset, because it was initialized in its previous location.

```
CLI> ADD DISK DISK100 1 3 0
CLI> ADD DISK DISK210 2 4 0
CLI> ADD DISK DISK320 3 5 0
CLI> ADD RAIDSET RAID6 DISK130 DISK240 DISK350 REDUCED
CLI> ADD UNIT D205 RAID6
```

See also

ADD UNIT

DELETE

SET RAIDSET

SHOW RAIDSET

INITIALIZE

ADD SPARESET

Adds a disk drive to the spareset and initializes the metadata on the drive. The spareset is a pool of disk drives available to the controller to replace failing members of RAIDsets and mirrorsets.

Format

ADD SPARESET *disk-name*

Parameters

disk-name

The name of the disk drive to add to the spareset. You can add only one drive to the spareset with each command.

Examples

To add DISK220 and DISK330 to the spareset:

```
CLI> ADD DISK DISK220 2 2 0
CLI> ADD DISK DISK330 3 3 0
CLI> ADD SPARESET DISK220
CLI> ADD SPARESET DISK330
```

See also

DELETE SPARESET

SET FAILEDSET

SHOW SPARESET

ADD STRIPESET

Creates a stripeset out of 2–14 disks or mirrorsets.

Format

```
ADD STRIPESET stripeset-name container-name1
[container-nameN]
```

Parameters

stripeset-name

Specifies a name for the stripeset. You use this name with the ADD UNIT command to identify the stripeset as a host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

container-name1 container-nameN

The names of the disk drives or mirrorsets that make up the stripeset. A stripeset can be made up of from 2 to 14 containers.

Examples

To create stripeset STRIPE1 with three disks: DISK100, DISK210, and DISK320:

```
CLI> ADD DISK DISK100 1 0 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK320 3 2 0
CLI> ADD STRIPESET STRIPE1 DISK100 DISK210 DISK320
CLI> INITIALIZE STRIPE1
CLI> ADD UNIT D403 STRIPE1
```

The next example shows creating a two-member striped mirrorset (a stripeset whose members are mirrorsets). Note that you only need to initialize the stripeset; you do not need to initialize the mirrorsets individually.

```
CLI> ADD DISK DISK100 1 0 0
CLI> ADD DISK DISK210 2 1 0
```

```
CLI> ADD DISK DISK320 3 2 0
CLI> ADD DISK DISK430 4 3 0
CLI> ADD MIRRORSET MR1 DISK100 DISK210
CLI> ADD MIRRORSET MR2 DISK320 DISK430
CLI> ADD STRIPESET STRIPE1 MR1 MR2
CLI> INITIALIZE STRIPE1
CLI> ADD UNIT D304 STRIPE1
```

See also

ADD UNIT

ADD MIRRORSET

DELETE

INITIALIZE

SHOW STRIPESET

ADD TAPE

Adds a tape drive to the controller configuration and names the tape drive.

Note

This command is valid only for HSJ and HSD controllers. To add a tape drive to an HSZ controller configuration, use the ADD PASSTHROUGH command.

Format

```
ADD TAPE tape-name SCSI-location
```

Parameters

tape-name

Specifies a name for the tape drive. You use this name with the ADD UNIT command to identify the tape drive as a host-addressable unit.

The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

SCSI-location

The location of the tape drive to be added in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Examples

To add a tape drive to port 1, target 0, LUN 0 and names it TAPE1:

```
CLI> ADD TAPE TAPE1 1 0 0
CLI> ADD UNIT T102 TAPE1
```

See also

ADD LOADER

ADD UNIT

DELETE

SET UNIT

SHOW TAPES

ADD UNIT

Identifies a device, container, or partition as a host-addressable logical unit. The controller maps all requests from the host to the logical unit number as requests to the container specified in the ADD UNIT command.

You must initialize the disk drive or container before you can add it as a unit.

Format

```
ADD UNIT unit-number container-name
```

Parameters

unit-number (HSJ and HSD controllers)
The device-type letter followed by the logical unit number (0–4094). The device type letter is either "D" for disk containers (including CDROMs and passthroughs) or "T" for tape drives. Using this format, logical unit 3, which is made up of a disk or disks (such as a stripeset), would be specified as D3, and logical unit 7, which is a tape device, would be T7.

unit-number (HSZ controllers)
A number such as D104, where D represents a device-type letter, 1 is one of the controller target IDs, and the 4 is a logical unit number (the middle number is always 0).

The device type letter is either "D" for disk containers (including CDROMs) or "P" for passthrough containers created from tape drives and loaders.

The controller target ID must be in the range 0-7, and must be one of the IDs set with the SET THIS_CONTROLLER ID and SET OTHER_CONTROLLER ID commands. You must leave out the target ID if it is 0, and only use the logical unit number.

The logical unit number must be in the range 0-7. You can assign up to eight logical units for each controller target ID.

Table 1 breaks out the components in HSZ unit numbering.

Table 1
HSZ unit numbering

Unit number	Device type	Target ID	LUN
D401	disk	4	1
T100	tape	1	0
D5	disk	0	5

On a partitioned container, all of the partitions must be addressed through a single controller. Thus, the unit numbers for all partitions on a container must have the same controller target ID.

container-name
The name of the container that is used to create the unit.

Switches

Table 2 lists all switches for the ADD UNIT command and shows which switches can be used with each type of device and storageset. Descriptions of the switches follow the table.

Table 2
Switches for the ADD UNIT command

Switch	RAID-set	Stripe-set	Mirror-set	NoTrans Disk	Trans Disk	Optical Disk	CDROM	Tape	Pass-through
PARTITION=*partition_number*	✓	✓	✓	✓					
MAXIMUM_CACHED_TRANSFER	✓	✓	✓	✓	✓	✓	✓		
PREFERRED_PATH NOPREFERRED_PATH (Default)	✓	✓	✓	✓	✓	✓	✓	✓	✓
READ_CACHE (Default) NOREAD_CACHE	✓	✓	✓	✓	✓	✓	✓		
RUN (Default) NORUN	✓	✓	✓	✓	✓	✓	✓		
WRITE_PROTECT NOWRITE_PROTECT (Default)	✓	✓	✓	✓	✓	✓			
WRITEBACK_CACHE NOWRITEBACK_CACHE (Default)	✓	✓	✓	✓		✓			
DEFAULT_FORMAT								✓	

PARTITION=*partition_number*
The PARTITION switch allows you to set the unit number for a partition on a storageset or single-disk unit. Use the *partition-number* to identify the partition for which you're adding the host-addressable unit number. (Use the SHOW command to find partition numbers for a storageset or single-disk unit.)

MAXIMUM_CACHED_TRANSFER=*n*
MAXIMUM_CACHED_TRANSFER=32 (Default)
The MAXIMUM_CACHED_TRANSFER switch allows you to set the largest transfer (in blocks) to be cached by the controller. The controller will not cache any transfers over this size. Valid values are 1–1024.

PREFERRED_PATH=THIS_CONTROLLER
PREFERRED_PATH=OTHER_CONTROLLER
NOPREFERRED_PATH (Default)
The PREFERRED_PATH switch allows you to balance I/O load by specifying the controller through which the unit will be accessed. If you set NOPREFERRED_PATH for a unit, it can be accessed through either controller.

Note

All partitions on a container must be addressed through the same controller. If you set PREFERRED_PATH for one partition, all partitions on that container will inherit the same path.

The controllers only use the PREFERRED_PATH setting if they are in a dual-redundant configuration. If one controller fails, all the devices are accessed through the remaining controller, ignoring the PREFERRED_PATH setting.

Note

The PREFERRED_PATH and NOPREFERRED_PATH switches are valid only for HSJ and HSD controllers in dual-redundant configurations and HSZ controllers in dual-redundant multibus-failover configurations. The preferred path for units on dual-redundant HSZ controllers is determined by the first digit in the unit number (the controller target ID) specified in the ADD UNIT command.

When the failed controller is restarted, the drives automatically return to the controller specified by the PREFERRED_PATH switch.

You can specify the PREFERRED_PATH switch on a single controller; however, the switch will not take effect until you add a second controller and configure the two controllers for dual-redundancy.

READ_CACHE (Default)
NOREAD_CACHE
The READ_CACHE switch allows you to enable or disable the use of read cache with a unit.

Read caching improves performance in almost all situations, so it is generally good to leave it enabled. However, under certain workloads, like a backup, there may be a low probability for a cache hit and it may be beneficial to turn read caching off to remove the overhead of caching.

RUN (Default)
NORUN
The RUN switch allows you to enable and disable a unit's availability to the host.

Select NORUN to make a unit unavailable to the host and to cause any user data for that unit to be flushed from the write-back cache to the disk drives. The devices that make up the unit are still spun up.

Select RUN to make a unit available to the host.

Note

Write protect disables the writing of any new data by the host. However, the controller may still write to a write-protected RAIDset to satisfy a reconstruct pass or to reconstruct a newly replaced member.

WRITE_PROTECT
NOWRITE_PROTECT (Default)
The WRITE_PROTECT switch allows you to ensure that data on a unit is not overwritten.

Select WRITE_PROTECT to prevent write operations to the unit.

Select NOWRITE_PROTECT to allow both reads and writes to the unit.

WRITEBACK_CACHE
NOWRITEBACK_CACHE (Default)
The WRITEBACK_CACHE switch allows you to enable or disable the use of write-back cache with a unit.

Note

WRITEBACK_CACHE requires that write-back cache modules be installed in the subsystem and that the licensed feature be enabled through FLS.

Select WRITEBACK_CACHE for all new RAIDsets and mirrorsets, and for all other units for which you want this feature. The write-back cache improves performance for write operations to the unit.

Note

It may take up to 5 minutes for the controller to flush unwritten data from the cache once you disable write-back caching.

Select NOWRITEBACK_CACHE for those units for which you want all writes to go directly to devices without being cached.

DEFAULT_FORMAT=*format*
DEFAULT_FORMAT=HOST_SELECTED
DEFAULT_FORMAT=DEVICE_DEFAULT (Default)
The DEFAULT_FORMAT switch allows you to specify the tape format to be used by the controller for write operations to a tape drive. You also use this switch to tell the controller to allow the host to set the tape format.

Not all tape devices support all formats. The easiest way to determine what formats are supported by a specific device is to enter the SET *tape-unit-number* DEFAULT_FORMAT= ? command. The controller will display the valid options for the unit.

Set the switch to HOST_SELECTED to allow the host to set the tape format.

Select DEVICE_DEFAULT to have the controller use the default tape format for the device. For devices on which the format is set via switches on the front panel, the DEVICE_DEFAULT is the current settings of those switches.

Examples

To create disk unit D102 from the single disk DISK100 and set unit access to be through THIS_CONTROLLER:

```
CLI> ADD DISK DISK100 1 0 0
CLI> INITIALIZE DISK100
CLI> ADD UNIT D102 DISK100 PREFERRED_PATH=THIS_CONTROLLER
```

To create tape unit T103 from container TAPE120 and set the unit to use the default tape format for the device type:

```
CLI> ADD TAPE TAPE120 1 2 0
CLI> ADD UNIT T103 TAPE120 DEFAULT_FORMAT=DEVICE_DEFAULT
```

To create disk unit D107 from RAIDset RAID9 and enable write-back caching for the unit:

```
CLI> ADD DISK DISK110 1 1 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK310 3 1 0
CLI> ADD DISK DISK410 4 1 0
CLI> ADD RAIDSET RAID9 DISK110 DISK210 DISK310 DISK410
CLI> INITIALIZE RAID9
CLI> ADD UNIT D107 RAID9 WRITEBACK_CACHE
```

See also

CREATE_PARTITION

DELETE *unit-number*

SET *unit-number*

SHOW UNITS

CLEAR_ERRORS CLI

Stops the display of current or previous error messages at the CLI prompt.

Note

This command does not clear the error conditions, it only stops displaying the errors at the CLI prompt.

The controller displays any error messages before the CLI prompt. After you correct the error condition, you must issue the CLEAR_ERRORS CLI command or restart the controller to clear the error message.

Format

```
CLEAR_ERRORS CLI
```

Examples

To clear the message "All NVPM components initialized to their default settings." from the CLI prompt:

```
CLI>

All NVPM components initialized to their default settings.
CLI> CLEAR_ERRORS CLI
```

See also

CLEAR_ERRORS INVALID_CACHE

CLEAR_ERRORS LOST_DATA

CLEAR_ERRORS UNKNOWN

CLEAR_ERRORS UNWRITEABLE_DATA

CLEAR_ERRORS INVALID_CACHE

Clears an INVALID_CACHE error and allows the controller and cache to resume operation.

A controller presents an INVALID CACHE error during initialization if it detects a mismatch between the cache information on the controller and the cache information on the cache module. The controller allows only a limited set of CLI commands until you clear the error, to prevent you from giving commands that may make the situation worse. The CLEAR_ERRORS INVALID_CACHE command either clears the information in the controller module or the information in the cache module.

Format

CLEAR_ERRORS *controller* INVALID_CACHE *data_retention*

You must completely spell out "INVALID_CACHE."

Parameters

controller
Identifies the controller for which to clear the INVALID_CACHE condition. You must specify either THIS_CONTROLLER or OTHER_CONTROLLER.

data_retention
Specifies whether to keep the cache data and overwrite the controller information (NODESTROY_UNFLUSHED_DATA) or keep the controller information and discard the cache data (DESTROY_UNFLUSHED_DATA).

Use the NODESTROY_UNFLUSHED_DATA parameter in the following situations:

- You have replaced the controller module
- The controller's non-volatile memory (NVMEM) has lost its memory, possibly from an NVMEM battery failure

- You removed the cache module while there was unflushed data

Use the DESTROY_UNFLUSHED_DATA parameter in the following situations:

- You have replaced the cache module
- Any other reason not listed above.

Examples

To clear an invalid cache error on THIS_CONTROLLER after replacing a controller module:

```
CLI> CLEAR_ERRORS THIS_CONTROLLER INVALID_CACHE
NODESTROY_UNFLUSHED_DATA
```

To clear an invalid cache error on the OTHER_CONTROLLER after replacing a cache module:

```
CLI> CLEAR_ERRORS OTHER_CONTROLLER INVALID_CACHE
DESTROY_UNFLUSHED_DATA
```

See also

CLEAR_ERRORS CLI

CLEAR_ERRORS LOST_DATA

CLEAR_ERRORS UNKNOWN

CLEAR_ERRORS UNWRITEABLE_DATA

CLEAR_ERRORS LOST_DATA

Clears the lost data error on a unit.

Note

Issuing the CLEAR_ERRORS LOST_DATA command for one partition on a container will clear the lost data for all partitions on the container.

If a write-back cache module is removed or fails while it contains data that has not been written to disk, a LOST DATA error is reported on the unit. The CLEAR_ERRORS LOST_DATA command clears the lost data error but does not recover the lost data. It may take up to 5 minutes to clear lost data.

Format

CLEAR_ERRORS *unit-number* LOST_DATA

You must completely spell out "LOST_DATA".

Parameters

unit-number

Specifies the unit number that will have the lost data error cleared. The *unit-number* is the name given the unit when it was created using the ADD UNIT command.

Examples

To clear the lost data error on disk unit D103:

```
CLI> CLEAR_ERRORS D103 LOST_DATA
```

See also

CLEAR_ERRORS CLI

CLEAR_ERRORS INVALID_CACHE

CLEAR_ERRORS UNKNOWN

CLEAR_ERRORS UNWRITEABLE_DATA

CLEAR_ERRORS UNKNOWN

Clears the UNKNOWN error from a device.

If a device has a failure such that the controller marks the device as UNKNOWN, the controller does not check the device again to see if it has been repaired or if the failure condition has been rectified. You must use this command for the controller to recognize the device after you correct the condition that caused the device to be marked UNKNOWN.

Format

CLEAR_ERRORS *device-name* UNKNOWN

You must completely spell out "UNKNOWN."

Parameters

device-name
Specifies the name of the device with the UNKNOWN error.

Examples

To cause the controller to recognize DISK300, a previously UNKNOWN device:

```
CLI> CLEAR_ERRORS DISK300 UNKNOWN
```

See also

CLEAR_ERRORS CLI

CLEAR_ERRORS INVALID_CACHE

CLEAR_ERRORS LOST_DATA

CLEAR_ERRORS UNWRITEABLE_DATA

CLEAR_ERRORS UNWRITEABLE_DATA

Clears the unwriteable data error on a unit.

Caution

This command causes loss of user data.

If a container fails in a way that user data in the write-back cache cannot be written to the container, the controller reports an unwriteable data error. The CLEAR_ERRORS UNWRITEABLE_DATA command removes the data from the cache and clears the unwriteable data error.

Format

CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

You must completely spell out "UNWRITEABLE_DATA."

Parameters

unit-number

Specifies the unit number that will have the unwriteable data error cleared. The *unit-number* is the name given the unit when it was created using the ADD UNIT command.

Examples

To clear the unwriteable data error on disk unit D103:

```
CLI> CLEAR_ERRORS D103 UNWRITEABLE_DATA
```

See also

CLEAR_ERRORS CLI

CLEAR_ERRORS INVALID_CACHE

CLEAR_ERRORS LOST_DATA

CLEAR_ERRORS UNKNOWN

RETRY_ERRORS UNWRITEABLE_DATA

CREATE_PARTITION

Marks part of a disk or storageset to be used as a separately addressable unit. You can divide any disk or storageset into up to eight partitions, each of which can be separately presented to the host.

Format

```
CREATE_PARTITION container-name SIZE=n
```

Parameters

container-name
The name of the disk or storageset from which you want to create a partition. This is the name given the disk or storageset when it was created using the ADD command (ADD DISK, ADD STRIPESET, and so forth). You can partition any disk, stripeset, mirrorset, striped mirrorset, or RAIDset. You must initialize the container before creating partitions.

Note

Once you've partitioned a container, you can't reunify it without reinitializing the container.

SIZE=*percent*
SIZE=LARGEST
Specifies the size of the partition to be created as a percentage of the total size of the disk or storageset.

Specify a percentage of the total container capacity to set the partition to a particular size, or to evenly divide the disk or storageset. The resulting partition will be slightly smaller than the size you specify, to accomodate controller information and so that each partition ends with a complete stripe.

Specify LARGEST to have the controller create the largest partition possible from unused space on the disk or storageset. You must also use the LARGEST setting when creating the last partition on a container, since the space will not be equal to an exact percentage value.

Examples

To create RAIDset R9 and divide it into 4 parts:

```
CLI> ADD DISK DISK100 1 0 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK320 3 2 0
CLI> ADD RAIDSET RAID9 DISK100 DISK210 DISK320
CLI> INITIALIZE RAID9
CLI> CREATE_PARTITION RAID9 SIZE=25
CLI> CREATE_PARTITION RAID9 SIZE=25
CLI> CREATE_PARTITION RAID9 SIZE=25
CLI> CREATE_PARTITOIN RAID9 SIZE=LARGEST
CLI> ADD UNIT D101 RAID9 PARTITION=1
CLI> ADD UNIT D102 RAID9 PARTITION=2
CLI> ADD UNIT D103 RAID9 PARTITION=3
CLI> ADD UNIT D104 RAID9 PARTITION=4
```

See also

ADD UNIT

DELETE *unit-number*

DESTROY PARTITION

SHOW

DELETE *container-name*

Deletes a container from the list of known containers. You cannot delete a container that is in use by a higher-level container. For example, you cannot delete a disk that is a member of a RAIDset, or a RAIDset that is declared as a unit. You must first delete the higher-level containers.

Format

DELETE *container-name*

Parameters

container-name

Specifies a name that identifies the container. This is the name given the container when it was created using the ADD command (ADD DISK, ADD STRIPESET, and so forth).

Note

You cannot delete the spareset and failedset containers.

Examples

To delete disk drive DISK100:

```
CLI> DELETE DISK100
```

To delete stripeset STRIPE1:

```
CLI> DELETE STRIPE1
```

To delete RAIDset RAID9:

```
CLI> DELETE RAID9
```

See also

DELETE FAILEDSET

DELETE SPARESET

UNMIRROR

DELETE FAILEDSET

Removes a disk drive from the failedset. The failedset contains the drives that were removed from RAIDsets and mirrorsets either because they failed or were manually removed via the SET command. The DELETE FAILEDSET command removes disk drives from the failedset, typically before you remove them physically from the shelf for testing, repair, or replacement.

You should consider disk drives in the failedset to be defective. Test the disk drives, then either repair them or replace them.

Format

```
DELETE FAILEDSET disk-name1 [disk-nameN]
```

Parameters

disk-name1 disk-nameN
The disk drive names to delete from the failedset. You can delete any number of disks from the failedset by issuing this command only once.

Examples

To delete DISK220 from the failedset:

```
CLI> DELETE FAILEDSET DISK220
```

To delete four disks from the failedset:

```
CLI> DELETE FAILEDSET DISK100 DISK210 DISK220 DISK330
```

See also

SET FAILEDSET

SHOW FAILEDSET

DELETE SPARESET

Removes a disk drive from the spareset. The spareset is a pool of drives available to the controller to replace failing members of RAIDsets and mirrorsets.

Format

```
DELETE SPARESET disk-name1 [disk-nameN]
```

Parameters

disk-name1 disk-nameN
The names of the disk drives to remove from the spareset. You can remove any number of disks from the spareset by issuing this command only once.

Examples

To remove DISK230 from the spareset:

```
CLI> DELETE SPARESET DISK230
```

To remove four disks from the spareset:

```
CLI> DELETE SPARESET DISK110 DISK210 DISK240 DISK320
```

See also

ADD SPARESET

SHOW SPARESET

DELETE *unit-number*

Deletes a logical unit from the controller configuration. The device, storageset, or partition will no longer be addressable by the host. If write-back caching was enabled for the unit, the controller flushes any user data from the cache to the devices before deleting the unit.

If a unit has cache errors, you must first clear the errors with the CLEAR_ERRORS UNWRITEABLE_DATA or CLEAR_ERRORS LOST_DATA commands.

Format

DELETE *unit-number*

Parameters

unit-number
Specifies the logical unit number that is to be deleted. The *unit-number* is the name given the unit when it was created using the ADD UNIT command.

Switches

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE (Default)
(HSJ and HSD only) Specify the override_online switch to cause the controller to ignore the fact that the unit may be online to the host.

Examples

To delete disk unit number 102 even if it is currently online to a host:

```
CLI> DELETE D102 OVERRIDE_ONLINE
```

To delete tape unit number 103:

```
CLI> DELETE T103
```

See also

ADD UNIT

CLEAR_ERRORS LOST_DATA

CLEAR_ERRORS UNWRITEABLE_DATA

DESTROY_PARTITION

DESTROY_PARTITION

Marks a used partition as free, and consolidates it with any adjacent free partitions. User data on the partition is lost.

You cannot destroy a partition that has a unit number assigned; you must first use the DELETE *unit-number* command to delete the unit.

Format

DESTROY_PARTITION *container-name* PARTITION=*partition-number*

Parameters

container-name
The name of the disk or storageset that contains the partition that you want to destroy. This is the name given the disk or storageset when it was created using the ADD command (ADD DISK, ADD STRIPESET, and so forth).

partition-number
The number of the partition that you want to destroy. You can use the SHOW command to find partition numbers.

Note

Be sure to use the SHOW command to identify the correct partition before using the DESTROY_PARTITION command.

Examples

To delete the unit for partition 2 on RAIDset RAID9 and destroy the partition:

```
CLI> DELETE D102
CLI> DESTROY_PARTITION RAID9 PARTITION=2
```

See also

CREATE_PARTITION

DELETE *unit-number*

SHOW

DIRECTORY

Lists the diagnostics and utilities available on THIS_CONTROLLER.

Format

```
DIRECTORY
```

Examples

To display directory listing:

```
CLI> DIRECTORY
TILX    V50J   D
DILX    V50J   D
DSTAT   V50J   D
VTDPY   V50J   D
FLS     V50J   D
ECHO    V50J   D
DIRECT  V50J   D
CLI     V50J   D
ECHO    V50J   D
CFMENU  V50J   D
CHVSN   V50J   D
CLCP    V50J   D
CLONE   V50J   D
CONFIG  V50J   D
FMU     V50J   D
```

See also

HELP

RUN

EXIT

Exits the CLI and breaks the remote connection.

When you type the EXIT command from a remote connection, the connection is broken and control is returned to the host. When you type the EXIT command from a local connection, the CLI restarts, displaying the copyright notice, the controller type, and the last fail packet.

Format

```
EXIT
```

Examples

To exit from a virtual terminal connection:

```
CLI> EXIT
Control returned to host
$
```

HELP

Displays a brief description of using the question mark (?) to obtain help on any command or CLI function.

Format

```
HELP
```

Examples

To see help about using the HELP command:

```
CLI> HELP
Help may be requested by typing a question mark (?) at the
CLI prompt. This will print a list of all available
commands
For further information you may enter a partial command and
type a space followed by a "?" to print a list of all
available options at that point in the command. For
example:

         SET THIS_CONTROLLER ?

Prints a list of all legal SET THIS_CONTROLLER commands
```

To get help on the SET command, using the (?) facility:

```
CLI> SET ?
Your options are:
FAILOVER
OTHER_CONTROLLER
NOFAILOVER
THIS_CONTROLLER
FAILEDSET
Unit number or container name
```

See also

DIRECTORY

INITIALIZE

Caution

The INITIALIZE command destroys all user data on the container, unless you specify the NODESTROY switch.

Initializes a container so that you can create a logical unit from it. During initialization, a small amount of disk space is reserved for controller metadata and is made inaccessible to the host.

If you set a single-disk container as TRANSPORTABLE, any metadata is destroyed on the device and the full device is accessible to the host.

You must use the INITIALIZE command before you:

- Create a unit from a newly installed disk
- Create a unit from a newly created RAIDset, stripeset, or mirrorset

You do not need to use the INITIALIZE command when you:

- Create a new unit from the same disks that were previously initialized as another unit, such as when a unit is moved
- Add a RAIDset with the REDUCED switch

Format

```
INITIALIZE container-name
```

Parameters

container-name
Specifies the container (disk, stripeset, mirrorset, or RAIDset) to initialize.

Switches

CHUNKSIZE=*n*
CHUNKSIZE=DEFAULT (Default)
Specifies the chunksize to be used for RAIDsets and stripesets. You can specify the chunk size in blocks

(CHUNKSIZE=*n*), or you can let the controller determine the optimal chunk size (CHUNKSIZE=DEFAULT). The CHUNKSIZE switch does not apply to mirrorsets.

DESTROY(Default)
NODESTROY
The NODESTROY switch tells the controller not to overwrite the user data and forced error metadata during the initialization. Only use the NODESTROY switch when you want to create a unit out of devices that have been reduced from mirrorsets. This allows the data on the container to be reused for a disk, stripeset, or mirrorset unit. (The NODESTROY switch is ignored for RAIDsets.)

SAVE_CONFIGURATION
NOSAVE_CONFIGURATION (Default)
The SAVE_CONFIGURATION switch tells the controller to keep a copy of the controller configuration on the disk devices that are being initialized. Should you replace the controller in a single-controller configuration, the configuration information will be read from a device and loaded into the new controller.

Specify SAVE_CONFIGURATION when initializing any disk device or container on which you want to store a copy of the controller configuration. If you use the switch for a multi-device storageset, such as a stripeset, the complete information is stored on each device in the storageset.

Specify NOSAVE_CONFIGURATION for devices and storagesets on which you do not want to store a copy of the controller configuration.

A device that is initialized with the SAVE_CONFIGURATION switch has slightly less storage space than an identical device that is not used to store the controller configuration.

Examples

To initialize single-disk container DISK100 and save a copy of the controller configuration on it:

```
CLI> ADD DISK DISK100 1 0 0
CLI> INITIALIZE DISK100 SAVE_CONFIGURATION
CLI> ADD UNIT D102 DISK100
```

To initialize stripeset STRIPE1 with the default chunk size (note that if you do not specify the chunksize, the controller initializes the unit with the default chunksize):

```
CLI> ADD DISK DISK110 1 1 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK310 3 1 0
CLI> ADD STRIPESET STRIPE1 DISK110 DISK210 DISK310
CLI> INITIALIZE STRIPE1
CLI> ADD UNIT D204 STRIPE1
```

To initialize RAIDset RAID9 with a chunk size of 20:

```
CLI> ADD DISK DISK120 1 2 0
CLI> ADD DISK DISK220 2 2 0
CLI> ADD DISK DISK320 3 2 0
CLI> ADD RAIDSET RAID9 DISK120 DISK220 DISK320
CLI> INITIALIZE RAID9 CHUNKSIZE=20
CLI> ADD UNIT D301 RAID9
```

To initialize DISK440 and preserve the data after removing it (REDUCE) from a mirrorset:

```
CLI> REDUCE DISK440
CLI> INITIALIZE DISK440 NODESTROY
CLI> ADD UNIT D201 DISK440
```

See also

ADD UNIT

LOCATE

Identifies configured units, storagesets, and devices by flashing the amber device fault LED on the front of the StorageWorks building block (SBB). The device fault LED will flash once per second until turned off with the LOCATE CANCEL command. You also can use the LOCATE command as a lamp test.

Note

The device fault LED flashes at a faster rate on any device that is in the failedset. The different flashing rate should help you distinguish between LOCATEd devices and failed devices. The device fault LED on failed devices will continue to flash after you issue the LOCATE CANCEL command.

Format

```
LOCATE
```

Switches

ALL

Turns on the amber device fault LEDs of all configured devices. This switch also can be used as a lamp test. Use LOCATE CANCEL to turn off the LEDs.

CANCEL

Turns off all amber device fault LEDs that were turned on with the LOCATE command.

DISKS

Turns on the amber device fault LEDs of all configured disk drives. Use LOCATE CANCEL to turn off the LEDs.

LOADERS

Turns on the amber device fault LEDs of all configured loader devices. Use LOCATE CANCEL to turn off the LEDs.

OPTICALS

Turns on the amber device fault LEDs of all configured optical drives. Use LOCATE CANCEL to turn off the LEDs.

TAPES

Turns on the amber device fault LEDs of all configured tape devices. Use LOCATE CANCEL to turn off the LEDs.

UNITS
Turns on the amber device fault LEDs of all devices used by units. This command is useful to determine which devices are not currently configured into logical units. Use LOCATE CANCEL to turn off device the LEDs.

PTL *SCSI-location*
Turns on the amber device fault LED on the device at the given SCSI location. *SCSI-location* is specified in the form PTL where:

P designates the port (1–6 for 6-port controllers, or 1–3 for 3-port controllers).

T designates the target ID of the device, (0–6 with a single controller, or 0–5 with dual-redundant controllers).

L designates the LUN of the device (must be 0 or 1).

When entering the PTL, you must put at least one space between the port, target, and LUN numbers.

Note

Although you can specify the PTL location or name of any device in the subsystem, not all devices have a device fault LED, and so may not seem to respond to the LOCATE command.

container-name
Turns on the amber fault LEDs on the devices that make up *container-name*. If a device name is given, the device's LED is lit. If a storageset name is given, all device LEDs that make up the storageset are lit. Use LOCATE CANCEL to turn off the LEDs.

unit-number
Turns on the amber fault LEDs on the devices that make up *unit-number*. Use LOCATE CANCEL to turn off the LEDs.

Examples

To turn on the device fault LED on device DISK100 and then turn it off:

```
CLI> LOCATE DISK100
CLI> LOCATE CANCEL
```

To turn on the device fault LEDs on all devices that make up disk unit number 102:

```
CLI> LOCATE D102
```

To turn on the device fault LEDs on all configured disk devices:

```
CLI> LOCATE DISKS
```

To turn off the device fault LEDs on all devices:

```
CLI> LOCATE CANCEL
```

MIRROR

Creates a one-member mirrorset from a single disk. Use this command on devices that are already members of higher level containers (stripesets or units). Use the ADD MIRRORSET command to create a mirrorset from devices that are not already members of higher level containers.

After you convert the device to a mirrorset, increase the nominal number of members with the SET *mirrorset-name* MEMBERSHIP=*number-of-members* command. Use the SET *mirrorset-name* REPLACE=*disk-name* command to actually add more members to the mirrorset.

Format

MIRROR *disk-name mirrorset-name*

Parameters

disk-name
Specifies the name of the disk to convert to a one-member mirrorset. The disk must be part of a unit.

mirrorset-name
Specifies a name for the mirrorset. The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

Note

If you MIRROR the members of a stripeset, you cannot use the stripeset with any version of controller firmware prior to Version 2.5.

Switches

COPY=NORMAL (Default)
COPY=FAST
The COPY switch allows you to set the speed at which the controller copies data from normal mirrorset members to new members.

Note

A normal mirrorset member is one whose entire contents are the same as all other normal members.

Select NORMAL to prioritize other controller operations over the copy operation. The controller uses relatively few resources to perform the copy, and there is little impact on performance.

Select FAST when the copy operation must take precedence over other controller operations. The controller uses more resources and the copy takes less time, but overall controller performance is reduced during the copy.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE
NOPOLICY (Default)
Specifies the replacement policy to be used when a mirrorset member fails.

Select BEST_FIT to choose a replacement device from the spareset that most closely matches the capacities of the remaining members. If more than one device in the spareset is the correct size, the controller selects the device that gives the best performance.

Select BEST_PERFORMANCE to choose a replacement device from the spareset that results in the best performance (the device should be on a different port than existing members). If more than one device in the spareset has the best performance, the controller selects the device that most closely matches the size of the remaining members.

Select NOPOLICY to prevent the controller from replacing a failed disk drive. This causes the mirrorset to run with less than the nominal number of members until a BEST_FIT or

BEST_PERFORMANCE policy is selected, or a member is manually replaced in the mirrorset.

Examples

The commands in this example create a one-member mirrorset from each member of a stripeset. The succeeding commands set the nominal number of members in each mirrorset to two and add a second disk to each mirrorset. Note that you do not need to initialize the mirrorsets or add them as units; the higher-level structure of the stripeset is carried down to the mirrorsets.

```
CLI> ADD DISK DISK110 1 1 0
CLI> ADD DISK DISK210 2 1 0
CLI> ADD DISK DISK310 3 1 0
CLI> ADD STRIPESET STRIPE1 DISK110 DISK210 DISK310
CLI> INITIALIZE STRIPE1
CLI> ADD UNIT D102 STRIPE1

CLI> MIRROR DISK110 MIRROR1
CLI> SET MIRROR1 MEMBERSHIP=2
CLI> SET MIRROR1 REPLACE=DISK220

CLI> MIRROR DISK210 MIRROR2
CLI> SET MIRROR2 MEMBERSHIP=2
CLI> SET MIRROR2 REPLACE=DISK320

CLI> MIRROR DISK310 MIRROR3
CLI> SET MIRROR3 MEMBERSHIP=2
CLI> SET MIRROR3 REPLACE=DISK120
```

See also

ADD MIRRORSET

REDUCE

SHOW MIRRORSETS

UNMIRROR

REDUCE

Note

The nominal number of members in a mirrorset is the number given in the SET *mirrorset-name* MEMBERSHIP=*number-of-members* command. The actual number of members may be less than the nominal number if you do not add devices to the mirrorset or if you remove a member. The actual number of members can never be greater than the nominal number of members.

Note

A NORMAL member is a mirrorset member whose entire contents are guaranteed to be the same as all other NORMAL members.

Removes member disk drives from mirrorsets and decreases the nominal number of members in the mirrorsets. The controller does not put removed members in the failedset, as with the SET *mirrorset-name* REMOVE=*disk-name* command. When using the REDUCE command to split off a copy of a striped mirrorset, you must reduce all mirrorsets at the same time with one command. The CLONE program does this automatically.

The disks to be removed do not need to be members of the same mirrorset. However, the devices *must* be part of the same unit (for example, the same striped mirrorset). The controller pauses I/O to the unit while it removes the specified mirrorset members.

Note that for each mirrorset that you reduce, there must be at least one remaining NORMAL member after the reduction. If this is not true for all disk-names specified, then none of the mirrorsets are reduced.

Format

```
REDUCE disk-name1 [disk-nameN]
```

Parameters

*disk-name*1
The name of the NORMAL mirrorset member to be removed.

[*disk-name*N]
The name of additional NORMAL mirrorset members to be removed from the same unit.

Examples

To remove DISK210, DISK250, and DISK420 from their respective mirrorsets:

```
CLI> SHOW STRIPE1
Name       Storageset          Uses                Used by
-------------------------------------------------------------
STRIPE1    stripeset           MIRR1
                               MIRR2
                               MIRR3


CLI> SHOW MIRRORSETS
Name       Storageset          Uses                 Used by
-------------------------------------------------------------
MIRR1      mirrorset           DISK110              STRIPE1
                               DISK210
MIRR2      mirrorset           DISK120              STRIPE1
                               DISK250
MIRR3      mirrorset           DISK330              STRIPE1
                               DISK420

CLI> REDUCE DISK210 DISK250 DISK420

CLI> SHOW MIRRORSETS
Name       Storageset          Uses                 Used by
-------------------------------------------------------------
MIRR1      mirrorset           DISK110              STRIPE1
MIRR2      mirrorset           DISK120              STRIPE1
MIRR3      mirrorset           DISK330              STRIPE1
```

See also

ADD MIRRORSET

MIRROR

RUN CLONE

SHOW MIRRORSET

SET *mirrorset-name*

RENAME

Renames a container.

Format

RENAME *old-name new-name*

Parameters

old-name

The existing name for the container.

new-name

The new name for the container. The name must start with a letter (A–Z) and can then consist of up to eight more characters made up of letters A-Z, numbers 0-9, periods (.), dashes (-), or underscores (_), for a total of nine characters.

Examples

To rename DISK0 to DISK100.

```
CLI> SHOW DISKS
Name          Type          Port Targ  Lun          Used by
-------------------------------------------------------------
DISK0         disk             1    0    0           D100
DISK110       disk             1    1    0           D110


CLI> RENAME DISK0 DISK100


CLI> SHOW DISKS
Name          Type          Port Targ  Lun          Used by
-------------------------------------------------------------
DISK100       disk             1    0    0           D100
DISK110       disk             1    1    0           D110
```

RESTART THIS_CONTROLLER and RESTART OTHER_CONTROLLER

Flushes all user data from the specified controller's write-back cache (if present) and restarts the controller. THIS CONTROLLER is the controller that is running the current CLI session. The OTHER_CONTROLLER is the controller that is *not* running the current CLI session.

Format

```
RESTART OTHER_CONTROLLER
RESTART THIS_CONTROLLER
```

Switches

Caution

The IGNORE_ERRORS and IMMEDIATE switches cause the controller to keep unflushed data in the write-back cache until it restarts and is able to write the data to devices. Do not perform any hardware changes and do not let the cache batteries run down before the controller can flush the cache.

IGNORE_ERRORS
NOIGNORE_ERRORS (Default)
Specify the IGNORE_ERRORS switch when you want the controller to restart even if it cannot write all user data from the write-back cache to devices.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (Default)
Specify the IMMEDIATE switch to cause the controller to restart immediately without checking for online devices or flushing user data from write-back cache to devices.

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE (Default)
(HSJ and HSD only) Specify the OVERRIDE_ONLINE switch to cause the controller to ignore the fact that some units may be online to the host. The controller restarts after all user data is written to disk.

Examples

To restart THIS_CONTROLLER as long as it does not have any units online:

```
CLI> RESTART THIS_CONTROLLER
```

To restart the OTHER_CONTROLLER even if there are units online to the OTHER_CONTROLLER:

```
CLI> RESTART OTHER_CONTROLLER OVERRIDE_ONLINE
```

See also

SELFTEST OTHER_CONTROLLER

SELFTEST THIS_CONTROLLER

SHUTDOWN OTHER_CONTROLLER

SHUTDOWN THIS_CONTROLLER

RETRY_ERRORS UNWRITEABLE_DATA

If a container fails in a way that data in the write-back cache cannot be written to the container, an unwriteable data error is reported. If possible, correct the condition that is causing the unwriteable data and try the write operation again. The RETRY_ERRORS UNWRITEABLE_DATA command causes the controller to try to write the unwriteable data. No data is lost if the retry fails.

Format

RETRY_ERRORS UNWRITEABLE_DATA *unit-number*

Parameters

unit-number

Specifies the logical unit number for which to try the write operation. The *unit-number* is the name given the unit when it was created using the ADD UNIT command.

Examples

To attempt to write the cached data that was previously marked unwriteable to disk unit D103:

```
CLI> RETRY_ERRORS UNWRITEABLE_DATA D103
```

See also

CLEAR_ERRORS UNWRITEABLE_DATA

RUN

Starts a diagnostic or utility program on THIS_CONTROLLER. You can run diagnostics and utilities *only* on THIS_CONTROLLER.

Format

RUN *program-name*

Parameters

program-name
The name of the diagnostic or utility to be run. DILX and CLONE are examples of utilities and diagnostics that can be run from the CLI.

Examples

To run the DILX diagnostic:

```
CLI> RUN DILX
Disk Inline Exerciser - version 2.0 . . .
```

See also

DIRECTORY

SELFTEST OTHER_CONTROLLER and SELFTEST THIS_CONTROLLER

Flushes all user data from the specified controller's write-back cache (if present) and shuts down the controller, then restarts it in self-test mode. You must press the controller reset (//) button to take the controller out of self-test mode.

THIS_CONTROLLER is the controller that is running the current CLI session. The OTHER_CONTROLLER is the controller that is *not* running the current CLI session.

Format

```
SELFTEST OTHER_CONTROLLER
SELFTEST THIS_CONTROLLER
```

Switches

Caution

The IGNORE_ERRORS and IMMEDIATE_SHUTDOWN switches cause the controller to keep unflushed data in the write-back cache until it restarts and is able to write the data to devices. Do not perform any hardware changes and do not let the cache batteries run down before the controller can flush the cache.

IGNORE_ERRORS
NOIGNORE_ERRORS (Default)
Specify the IGNORE_ERRORS switch when you want the controller to start the self-test even if it cannot write all user data to devices from the write-back cache.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (Default)
Specify the IMMEDIATE_SHUTDOWN switch to cause the controller to start the self-test immediately without checking for online devices or flushing user data from the write-back cache to devices.

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE (Default)
(HSJ and HSD only) Specify the OVERRIDE_ONLINE switch to cause the controller to ignore the fact that some units may be online to the host and start the self-test after all user data is written to disk.

Examples

To start the self-test on THIS_CONTROLLER, as long as it does not have any units online:

```
CLI> SELFTEST THIS_CONTROLLER
```

To start the self-test on the OTHER_CONTROLLER even if the controller cannot flush all data from the write-back cache:

```
CLI> SELFTEST OTHER_CONTROLLER IGNORE_ERRORS
```

See also

RESTART OTHER_CONTROLLER

RESTART THIS_CONTROLLER

SHUTDOWN OTHER_CONTROLLER

SHUTDOWN THIS_CONTROLLER

SET *device-name*

Changes the transportable characteristics of a disk drive, or sets the maximum data transfer rate between the controller and a device.

Format

`SET device-name`

Parameters

device-name
The name of the device to change.

Switches

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=DEFAULT (Default: 10MHZ)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ
Specifies the maximum data transfer rate for the controllers to use in communicating with the device. You may need to limit the transfer rate to accommodate long cables between the controllers and the device, such as with a tape library.

TRANSPORTABLE
NOTRANSPORTABLE (Default)
Specify the TRANSPORTABLE switch for any disk drive that you want to move to and from StorageWorks environments with the data intact.

Note

Use the TRANSPORTABLE switch only for disk drives that must be moved to StorageWorks environments with data intact.

A TRANSPORTABLE disk drive does not contain any special information space and can be moved to a non-StorageWorks environment with its data intact. You cannot use a TRANSPORTABLE disk drive in any type of storageset, such as a stripeset or RAIDset.

Specify NOTRANSPORTABLE for all disk drives that will be used in RAIDsets, stripesets, and mirrorsets. Also use the NOTRANSPORTABLE switch for all single-disk units that will be used exclusively in a StorageWorks or HSC controller. (You can freely move NOTRANSPORTABLE disk drives to and from HSC, HSD, HSJ, and HSZ controllers.)

The controller makes a small portion of NOTRANSPORTABLE disk drives inaccessible to the host and uses the space to store information (metadata) that improves data reliability, error detection, and recovery. Because of this metadata, only StorageWorks controllers can retrieve user data from NOTRANSPORTABLE disk drives.

Examples

To set DISK130 to transportable:

```
CLI> SET DISK130 TRANSPORTABLE
```

To limit the data transfer rate to 5MHz for LOADER200:

```
CLI> SET LOADER200 TRANSFER_RATE_REQUESTED=5MHZ
```

See also

ADD DISK

SHOW DISKS

SET FAILEDSET

Changes the automatic spare policy for the failedset.

Format

```
SET FAILEDSET
```

Switches

AUTOSPARE
NOAUTOSPARE (Default)

The AUTOSPARE switch allows you to enable automatic moving of replaced disk drives from the failedset to the spareset. When a disk drive in the failedset is replaced with a factory-fresh drive and this feature is enabled, the controller automatically removes that disk drive from the failedset and adds it to the spareset, where it is available as a hot spare for RAIDsets and mirrorsets.

Specify AUTOSPARE to enable the feature. Specify NOAUTOSPARE to disable the feature.

Examples

To enable the automatic spare feature:

```
CLI> SET FAILEDSET AUTOSPARE
```

See also

SHOW FAILEDSET

SET FAILOVER

Note

Both controllers must be in NOFAILOVER mode before you use the SET FAILOVER command.

Places THIS_CONTROLLER and the OTHER_CONTROLLER into a dual-redundant (failover) configuration. This allows both controllers to access the storage devices, providing higher throughput. If one of the two controllers fails, the devices and cache (if any) attached to the failed controller become available to and accessible through the operating controller.

Format

```
SET FAILOVER COPY=configuration-source
```

Parameters

COPY=THIS_CONTROLLER
COPY=OTHER_CONTROLLER
Specifies the controller that contains the source configuration for the copy. The other controller will restart when the command is completed.

Caution

The device configuration information from the specified controller will overwrite the information on the target controller. Make sure you know which controller has the good configuration information *before* entering this command.

Specify THIS_CONTROLLER to copy all the device configuration information from the controller running the CLI session to the other controller.

Specify OTHER_CONTROLLER to copy all the device configuration information from the controller that is *not* running the current CLI session to THIS_CONTROLLER (the controller that *is* running the current CLI session).

Due to the amount of information that must be passed between the two controllers, this command may take up to one minute to complete.

Examples

To place the controllers into a dual-redundant configuration and copy configuration information from the controller running the current CLI session to the other controller:

```
CLI> SET FAILOVER COPY=THIS_CONTROLLER
```

See also

SET MULTIBUS_FAILOVER

SET NOFAILOVER

SET *mirrorset-name*

Changes the characteristics of a mirrorset, including adding and removing members.

Format

SET *mirrorset-name*

Parameters

mirrorset-name
The name of the mirrorset that will have its characteristics modified. This is the name given to the mirrorset when it was created with the ADD MIRRORSET command.

Switches

MEMBERSHIP=*number-of-members*
Sets the nominal number of members of a mirrorset to the number specified by *number-of-members* (1-6).

If you increase the number of members and autosparing is turned on (by specifying POLICY=BEST_FIT or POLICY=BEST_PERFORMANCE), the controller automatically adds disk drives from the spareset to the mirrorset until either the new number of members is reached, or there are no more suitable disk drives in the spareset.

If you increase the number of members and autosparing is turned off (by specifying NOPOLICY), you must use the REPLACE switch to bring the mirrorset up to the new nominal number of members.

You cannot set the nominal number of members to be lower than the actual number of members. Use the REMOVE switch to reduce the number of devices that are part of the mirrorset.

Note

You cannot specify any other switches to the SET *mirrorset -name* command when you use the REPLACE switch.

REPLACE=*disk-name*
Adds a disk member into an existing mirrorset provided the following two conditions are met:

- The replacement policy is set to NOPOLICY.
- The nominal number of members is greater than the actual number of members.
- The disk member to be replaced is as large as the existing members of the mirrorset.

If these three conditions are met, the device specified by *disk-name* is added to the mirrorset specified by *mirrorset-name*. The nominal number of members does not change.

Note

You cannot specify any other switches to the SET *mirrorset -name* command when you use the REMOVE switch.

REMOVE=*disk-name*
Removes members from an existing mirrorset. The disk drive specified by *disk-name* is removed from the mirrorset specified by *mirrorset-name*. The removed disk drive is added to the failedset and a new member is autospared into the mirrorset (if applicable).

Note

A NORMAL mirrorset member's entire contents are the same as all other NORMAL members.

If the mirrorset will not have a remaining NORMAL or NORMALIZING member after the disk drive is removed, an error is reported and no action is taken.

(NORMALIZING members only exist when a mirrorset is first created. One member is identified as NORMAL, and all other *original* mirrorset members are marked as NORMALIZING. All new data that is written to the mirrorset is written to all members. All data on the NORMAL member that existed before the mirrorset was created is copied to the NORMALIZING members. When all the blocks on the members are the same, the NORMALIZING members are marked as NORMAL. Members may also be marked as NORMALIZING if cache data is lost.)

Note that the REMOVE switch does not change the nominal number of members in the mirrorset. If the mirrorset has a

replacement policy and there are acceptable disk drives in the spareset, the controller adds disk drives from the spareset to the mirrorset to make the actual number of members equal the nominal number of members.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (Default)
NOPOLICY
The SET *mirrorset-name* POLICY=*policy-type* command specifies the replacement policy to be used when a mirrorset member within the mirrorset fails.

Select BEST_FIT to choose a replacement device from the spareset that most closely matches the capacities of the remaining members. If more than one device in the spareset is the correct size, the controller selects the device that gives the best performance.

Select BEST_PERFORMANCE to choose a replacement device from the spareset that results in the best performance (the device should be on a different port than existing members). If more than one device in the spareset has the best performance, the controller selects the device that most closely matches the size of the remaining members.

NOPOLICY retires a failing device from the mirrorset without selecting a replacement. This causes the mirrorset to run with less than the nominal number of members until a BEST_FIT or BEST_PERFORMANCE policy is selected, or a member is manually replaced in the mirrorset.

READ_SOURCE=ROUND_ROBIN
READ_SOURCE=LEAST_BUSY (Default)
READ_SOURCE=*disk-name*
The READ_SOURCE switch allows you to control which mirrorset member is used by the controller to satisfy a read request.

Select ROUND_ROBIN to cause the controller to direct read requests to each NORMAL mirrorset member in sequential

membership order. No preference is given to any NORMAL member.

Select LEAST_BUSY to cause the controller to direct read requests to the NORMAL mirrorset member with the least busy work queue.

Select the *disk-name* of a specific member to cause the controller to direct all read requests to that member. If that member fails out of the mirrorset, the controller reverts to the LEAST_BUSY method for mirrorset read requests.

COPY=NORMAL (Default)
COPY=FAST
The COPY switch allows you to set the speed at which the controller copies data from normal mirrorset members to new members.

Note

A normal mirrorset member is one whose entire contents are the same as all other normal members.

Select NORMAL to prioritize other controller operations over the copy operation. The controller uses relatively few resources to perform the copy, and there is little impact on performance.

Select FAST when the copy operation must take precedence over other controller operations. The controller uses more resources and the copy takes less time, but overall controller performance is reduced during the copy.

Examples

To change the replacement policy of mirrorset MIRR1 to BEST_FIT:

```
CLI> SET MIRR1 POLICY=BEST_FIT
```

The following example removes member DISK300 from mirrorset MIRR1 that was created above. If the mirrorset has a replacement policy and an acceptable disk drive is in the spareset, the controller automatically adds the spare disk drive to the mirrorset.

```
CLI> SET MIRR1 REMOVE=DISK300
```

To add disk drive DISK320 to the mirrorset MIRR1:

```
CLI> SET MIRR1 REPLACE=DISK320
```

A copy operation begins immediately on DISK320.

See also

ADD MIRRORSET

MIRROR

REDUCE

SHOW MIRRORSET

UNMIRROR

SET MULTIBUS_FAILOVER

Note

Both controllers must be in NOFAILOVER mode before you use the SET MULTIBUS_FAILOVER command.

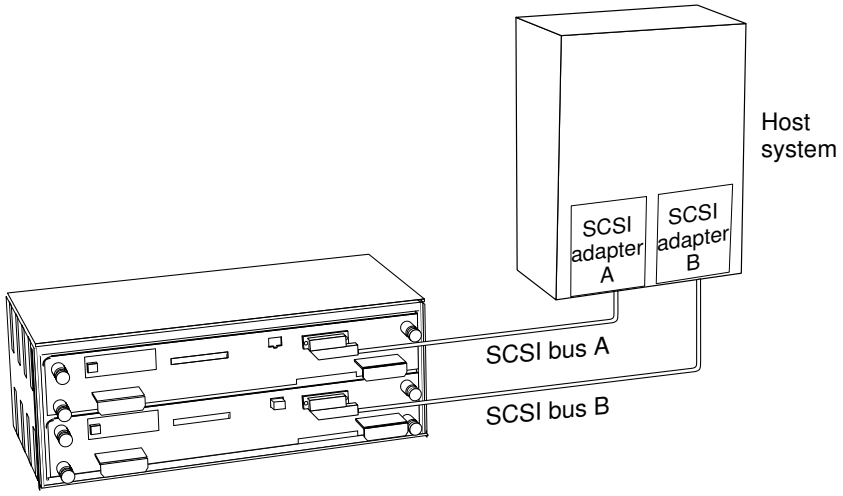
(HSZ controllers only) Places THIS_CONTROLLER and the OTHER_CONTROLLER into a dual-redundant (failover) configuration in a multiple bus environment. This allows both controllers to access the storage devices and provide greater throughput. If one of the controllers fails, the devices and cache (if any) attached to the failed controller become available to and accessible through the remaining operational controller.

Note

Partitioned storagesets and single-disk units cannot function in multibus failover. You'll have to delete your partitions before setting this switch.

This command is intended for use with host systems that have two SCSI adapters, each connected to one controller in the dual-redundant pair, show in Figure 2. The host operating system must be configured to recognize that all units can be accessed through either adapter/controller. If your host operating system does not support such a configuration, use the SET FAILOVER command instead.

Figure 2 In multibus configuration, each controller is connected to the host through a separate adapter and SCSI bus



Format

```
SET MULTIBUS_FAILOVER COPY=configuration-source
```

Parameters

Caution

The device configuration information from the specified controller will overwrite the information on the target controller. **Make sure you know which controller has the good configuration information *before* entering this command.**

COPY=THIS_CONTROLLER
COPY=OTHER_CONTROLLER
Specifies the controller that contains the source configuration for the copy. The other controller will restart when the command is completed.

Specify THIS_CONTROLLER to copy all the device configuration information from the controller running the CLI session to the OTHER_CONTROLLER.

Specify OTHER_CONTROLLER to copy all the device configuration information from the controller that is *not* running the current CLI session to THIS_CONTROLLER (the controller that *is* running the current CLI session).

Due to the amount of information that must be passed between the two controllers, this command may take up to one minute to complete.

Example

To configure two controllers as dual-redundant in a multiple bus environment:

```
CLI> SET THIS_CONTROLLER ID=(0,1,2,3)
CLI> RESTART THIS_CONTROLLER
CLI> SET MULTIBUS_FAILOVER COPY=THIS_CONTROLLER
```

The configuration on THIS_CONTROLLER is automatically copied to the OTHER_CONTROLLER when you issue the SET MULTIBUS_FAILOVER COPY command. If you want to prefer specific units to specific controllers, use the following command after setting multibus failover:

```
CLI> SET D100 PREFERRED=THIS_CONTROLLER
CLI> SET D101 PREFERRED=OTHER_CONTROLLER
```

See also

SET FAILOVER

SET NOFAILOVER

SET NOFAILOVER (SET NOMULTIBUS_FAILOVER)

Takes THIS_CONTROLLER and OTHER_CONTROLLER (if reachable) out of dual-redundant (failover) mode. Immediately after entering this command, you should remove one controller from the shelf because the sharing of devices is not supported by nonredundant controllers.

Note

Take all units offline on "this controller" or prefer them to the "other controller" before using the SET NOFAILOVER command on HSD- and HSJ-series controllers.

The controller on which you enter the command changes to nonfailover mode, even if the other controller is not reachable. All units that were accessed through OTHER_CONTROLLER failover to THIS_CONTROLLER. No configuration information is lost when changing modes.

Format

```
SET NOFAILOVER
```

Switches

NODESTROY_UNFLUSHABLE_DATA (Default)
DESTROY_UNFLUSHABLE_DATA

Note

This switch has no effect if both controllers are operational.

If one of your dual-redundant controllers fails before you can properly shut it down with the SET NOFAILOVER or SHUTDOWN commands, you'll have to use this switch.

Under some circumstances, the data in a failed controller's write-back cache may not failover to the operational controller's write-back cache. For example, if the cache battery has failed on the operational controller, failover won't jeopardize the write-cache data of the failed controller by trying to move it to the write-back cache associated with the operational controller. This makes the write-cache data associated with the failed controller unflushable.

The SET NOFAILOVER NODESTROY_UNFLUSHABLE_DATA leaves the unwritten data intact in the failed controller's write-back cache. When you replace the failed controller, it will flush the write-cache data to the appropriate devices when the controller comes online.

Caution

You will not be able to recover or obtain unwritten data once it's been destroyed.

Use the SET NOFAILOVER DESTROY_UNFLUSHABLE_DATA if you want to reconfigure the operational controller before you replace the failed controller. The unwritten data of the failed controller may reference devices that may not be present in your new configuration. If you don't destroy the old configuration data, it could conflict with your new configuration and cause your subsystem to behave unpredictably.

Examples

To remove the two controllers from a dual-redundant configuration:

```
CLI> SET NOFAILOVER
```

See also

SET FAILOVER

SET THIS_CONTROLLER and SET OTHER_CONTROLLER

Changes parameters on the specified controller. THIS_CONTROLLER is the controller that is running the current CLI session. The OTHER_CONTROLLER is the controller that is *not* running the current CLI session.

Format

```
SET THIS_CONTROLLER
SET OTHER_CONTROLLER
```

Switches

Table 3 lists all switches for the SET THIS_CONTROLLER and SET OTHER_CONTROLLER commands and shows which switches can be used with each type of controller. Descriptions of the switches follow the table.

Table 3
Switches for SET THIS and SET OTHER Command

Switch	HSD Values	HSJ Values	HSZ Values
CACHE_FLUSH_TIMER	1-65535 sec, default	1-65535 sec, default	1-65535 sec, default
CACHE_POLICY	A, B	A, B	A, B
CACHE_UPS	CACHE_UPS NOCACHE_UPS	CACHE_UPS NOCACHE_UPS	CACHE_UPS NOCACHE_UPS
CI_ARBITRATION	n/a	ASYNCHRONOUS SYNCHRONOUS	n/a
CI_4K_PACKET_CAPABILITY	n/a	CI_4K_PACKET_CAPABILITY NOCI_4K_PACKET_CAPABILITY	n/a
HOST_FUNCTION	n/a	n/a	A, B, C, D
ID	0-7	0-31	0-7 (x4)
INITIAL_CONFIGURATION	✓	✓	✓
MAX_NODES	n/a	8, 16, 32	n/a
MAXIMUM_HOSTS	1-4	1-(MAX_NODES-1)	n/a
MSCP_ALLOCATION_CLASS	0-255	0-255	n/a
PATH	PATH, NOPATH	PATH_A, NOPATH_A PATH_B, NOPATH_B	n/a

Switch	HSD Values	HSJ Values	HSZ Values
PREFERRED_ID	n/a	n/a	0-7 (x4)
PROMPT	1-16 characters	1-16 characters	1-16 characters
SCS_NODENAME	1-6 characters	1-6 characters	n/a
TERMINAL_PARITY NOTERMINAL_PARITY	ODD, EVEN	ODD, EVEN	ODD, EVEN
TERMINAL_SPEED	4800, 9600, 19200	4800, 9600, 19200	4800, 9600, 19200
TIME	dd-mmm-yyy: hh:mm:ss	dd-mmm-yyy: hh:mm:ss	dd-mmm-yyy: hh:mm:ss
TMSCP_ALLOCATION_CLASS	0-255	0-255	n/a
TRANSFER_RATE_REQUESTED	n/a	n/a	ASYNCHRONOUS, DEFAULT, 10MHZ, 5MHZ

CACHE_FLUSH_TIMER=*n*
CACHE_FLUSH_TIMER=DEFAULT
Specifies how many seconds (1–65535) of idle time may elapse before the write-back cache flushes its entire contents to disk. By default, this timer is set to 10 seconds. You must restart the controller before changes to the CACHE_FLUSH_TIMER take effect.

CACHE_POLICY=A (Default)
CACHE_POLICY=B
Sets the write-back cache battery policy used by the controller. (CACHE_POLICY is ignored if CACHE_UPS is enabled.) The policy affects the availability of RAIDsets and mirrorsets when the write-back cache battery is low:

- CACHE_POLICY=A makes inoperative all RAIDsets and mirrorsets until the battery has been recharged.
- CACHE_POLICY=B allows write-through access to all RAIDsets and mirrorsets for 10 hours, during which

time the battery should be recharging. If the batteries don't recharge within 10 hours, the RAIDsets and mirrorsets become inoperative.

There is some risk in using CACHE_POLICY=B: since the battery's state isn't good, there is no guarantee as to how long they will maintain data in the write cache module should the power fail.

Changing this policy on one controller in a dual-redundant configuration automatically changes it on the other controller. You must restart a controller for a new CACHE_POLICY to take effect.

Regardless of the CACHE_POLICY, a low or bad battery affects other controller operations as follows:

- Stripesets and single-disk units units with write-back caching enabled are accessed in write-through (read cache) mode, as long as unwritten cache data has not been lost.
- RAIDsets and mirrorsets failover to the companion controller's cache in a dual-redundant configuration, provided the other cache's batteries are fully charged.

  If the batteries are low after controller initialization, unwritten cache data is flushed from the cache and any RAIDset or mirrorset that does not have access to good batteries is made inoperative, regardless of the cache policy.
- If the batteries are bad or missing, RAIDsets and mirrorsets are made inoperative.
- Write-back caching automatically resumes when the cache batteries are fully recharged or replaced.

CACHE_UPS
NOCACHE_UPS (Default)
Specifies whether the controller should perform regular battery condition checks, and whether it should ignore the CACHE_POLICY setting.

Specify CACHE_UPS if your storage subsystem receives power from an uninterruptable power supply. The controller will not check the condition of the cache batteries, and it will ignore the CACHE_POLICY setting, which means that RAIDsets and mirrorsets will always be available, regardless of the condition of the cache batteries.

Specify NOCACHE_UPS to have the controller perform regular battery checks and follow the CACHE_POLICY setting for low batteries.

CI_ARBITRATION=ASYNCHRONOUS (Default)
CI_ARBITRATION=SYNCHRONOUS
ASYNCHRONOUS arbitration is currently implemented in HSJ HSOF. SYNCHRONOUS is for future CI host adapters.

CI_4K_PACKET_CAPABILITY
NOCI_4K_PACKET_CAPABILITY (Default)
Sets the HSJ controller to use (or not use) larger packet sizes for better performance in communicating with host systems. The CI adapters in the host systems must also support larger packets.

HOST_FUNCTION=(*ID, mode*)
Sets the host compatibility mode for a controller target ID. Each controller or pair of dual-redundant controllers can service two host modes simultaneously. You must repeat the command if you want to set different modes for each target ID, such as to support hosts with different operating systems on a single SCSI bus.

You can specify the following modes:

- A (normal: DigitalUNIX, OpenVMS, SUN, and HPUX)

- B (IBM host mode)
- C (HSZ15 compatibility mode)
- D (Windows NT mode)

ID=*n*
HSD: Specifies the DSSI node number (0–7).

HSJ: Specifies the CI node number (0 through (MAX_NODES - 1)).

Note

An HSZ controller can present up to eight units to the host with each target ID. Unit numbers identify both the target ID and the unit. For example, D203 is target 2, LUN 3. D5 is target 0, LUN 5.

HSZ: Specifies from one to four SCSI target IDs (0–7). Multiple target IDs allow the controller to present more units to the host. If you enter two or more target IDs, you must enclose the numbers in parentheses and separate them with commas.

If two HSZ controllers are in a dual-redundant configuration, both controllers have the same IDs. When you change the IDs on one controller, the other is updated automatically.

INITIAL_CONFIGURATION
Erases the entire configuration on THIS_CONTROLLER and restores the factory default values. Use this command to ensure that all of the old configuration information is removed when moving a controller from one location to another.

Note

You cannot recover the controller configuration after issuing the SET THIS_CONTROLLER INITIAL_CONFIGURATION command. Before issuing the command, be sure that you do not need the information.

You can only use the INITIAL_CONFIGURATION switch on THIS_CONTROLLER.

MAX_NODES=*n*
Specifies the maximum number of nodes on the CI cluster: 8, 16 (default), or 32.

MAXIMUM_HOSTS=*n*
Specifies the number of host (CPU) connections to the cluster. Note that if a single CPU has two or more adapters, you must count each adapter. For HSJ controllers, this

number must be smaller than MAX_NODES, because some cluster members (such as the HSJ controller) are not CPUs. For HSD controllers, the valid range is 1-4.

MSCP_ALLOCATION_CLASS=*n*
Specifies the allocation class (0–255 in a single controller configuration or 1–255 in a dual-redundant configuration).

When first installed, the controller's MSCP_ALLOCATION_CLASS is set to 0.

PATH
NOPATH (Default)
Enables or disables the DSSI port.

PATH_A
NOPATH_A (Default)
Enables or disables CI Path A.

PATH_B
NOPATH_B (Default)
Enables or disables CI Path B.

PREFERRED_ID=*(n1[,nN])*
NOPREFERRED_ID
In an HSZ dual-redundant configuration, PREFERRED_ID defines which targets (and units) are handled by the specified controller. You must first specify the total set of IDs with the ID switch. If you enter two or more PREFERRED_IDs, you must enclose the numbers in parentheses and separate them with commas.

For example, if a dual-redundant pair of HSZ controllers is set to IDs 0, 1, and 2, you could set one controller to respond to IDs 0 and 1; the other controller would automatically respond to ID 2. The first controller would present unit numbers 0–7 and 100–107 and the other controller would present unit numbers 200–207.

Except in an HSZ multibus failover environment, when you change the PREFERRED_IDs on one controller, the other

controller is automatically updated to support the remaining IDs (if any).

Specifying NOPREFERRED_ID for one controller makes it a "hot standby." The other controller processes all I/O during normal operation. However, if that controller fails, the controller with NOPREFERRED_ID would pick up the targets of the failed controller.

PROMPT="*new prompt*"
Specifies a 1- to 16-character prompt that is displayed when the controller's CLI prompts for input. Only printable ASCII characters are valid and they must be enclosed in quotes.

When first installed, the CLI prompt is set to the first three letters of the controller's model number (for example, HSJ>, HSD> or HSZ>).

SCS_NODENAME="*xxxxxx*"
Specifies a one- to six-character name for the node.

TERMINAL_PARITY=ODD
TERMINAL_PARITY=EVEN
NOTERMINAL_PARITY (Default)
Specifies the parity transmitted and expected.

TERMINAL_SPEED=*baud_rate*
Sets the terminal speed to 4800, 9600 (default), or 19200.

TIME=*dd-mmm-yyyy:hh:mm:ss*
The TIME switch sets the date and time. The time is set on both controllers in a dual-redundant configuration.

TMSCP_ALLOCATION_CLASS=*n*
Specifies the allocation class (0–255 in a single controller configuration or 1–255 in a dual-redundant configuration).

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=DEFAULT (Default: 10MHz)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

Specifies the maximum data transfer rate that HSZ controllers use when communicating with a SCSI host. You may need to limit the transfer rate to accommodate long cables between the subsystem and the host system.

Note

Set the same transfer rate for both controllers in a dual-redundant configuration.

Table 4 lists the maximum transfer rates for different lengths of fast and slow SCSI buses. These lengths represent cable lengths plus shelf-bus lengths.

Table 4
Maximum data transfer rates for different SCSI-bus cable lengths

Bus type	Transfer rate	Meters	Feet
8-bit, single ended	5 MHz	6	19.68
8-bit, single ended	10 MHz	3	9.84
16-bit, differential	20 MHz	25	82.02

Examples

To change the other controller's CLI prompt:

```
CLI> SET OTHER_CONTROLLER PROMPT="CONTROLLER B"
```

To activate this HSJ controller's two CI paths and sets the terminal speed to 1200 baud:

```
CLI> SET THIS_CONTROLLER PATH_A PATH_B SPEED=4800
```

To set this HSZ controller so it responds to requests for targets 2 and 5:

```
CLI> SET THIS_CONTROLLER ID=(2,5)
```

See also

SHOW THIS_CONTROLLER

SHOW OTHER_CONTROLLER

SET *RAIDset-name*

Changes the characteristics of a RAIDset.

Format

SET *RAIDset-name*

Parameters

RAIDset-name
The name of the RAIDset that will have its characteristics modified.

Switches

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (Default)
NOPOLICY
Specifies the replacement policy to use when a member within the RAIDset fails.

Select BEST_FIT to choose a replacement device from the spareset that most closely matches the capacities of the remaining members. If more than one device in the spareset is the correct size, the controller selects the device that gives the best performance.

Select BEST_PERFORMANCE to choose a replacement device from the spareset that results in the best performance (the device should be on a different port than existing members). If more than one device in the spareset has the best performance, the controller selects the device that most closely matches the size of the remaining members.

Select NOPOLICY to prevent the controller from replacing a failed disk drive. This causes the RAIDset to run in a reduced state until a BEST_FIT or BEST_PERFORMANCE policy is selected, or a member is manually replaced in the RAIDset (see SET *RAIDset-name*).

RECONSTRUCT=NORMAL (Default)
RECONSTRUCT=FAST
The RECONSTRUCT switch allows you to set the speed at which the controller reconstructs the data on a new RAIDset member that has replaced a failed member.

Select NORMAL to balance other controller operations against the reconstruct operation. The controller uses relatively few resources to perform the reconstruct, and there is little impact on performance.

Select FAST when the reconstruct operation must take precedence over other controller operations. The controller uses more resources and the reconstruct takes less time, but overall controller performance is reduced during the reconstruct.

REMOVE=*disk-name*

Note

You cannot specify any other switches to the SET *RAIDset-name* command when you use the REMOVE switch.

Removes a disk member from a RAIDset and adds it to the failedset. If the RAIDset is already in a reduced state, an error is displayed and the command is not carried out. If a replacement policy is specified, a replacement is taken from the spareset to replace the removed member. If NOPOLICY is specified, the RAIDset continues to operate in a reduced state until a replacement is manually specified (see the REPLACE switch) or a policy is specified (see the POLICY switch).

REPLACE=*disk-name*

Note

You cannot specify any other switches to the SET *RAIDset-name* command when you use the REPLACE switch.

Adds a disk drive into a reduced RAIDset. A reconstruct operation begins immediately on the new drive. The RAIDset must be reduced (missing one member) and have NOPOLICY set. The disk drive must not be in any configuration, including the spareset.

Examples

To change the replacement policy for RAIDset RAID9 to BEST_FIT:

```
CLI> SET RAID9 POLICY=BEST_FIT
```

To remove member DISK100 from the RAID9 RAIDset:

```
CLI> SET RAID9 REMOVE=DISK100
```

If there is a replacement policy, the controller moves a disk from the spareset to the RAIDset automatically.

To add disk DISK210 to the reduced RAIDset, RAID9:

```
CLI> SET RAID9 REPLACE=DISK210
```

A reconstruct operation begins immediately on DISK210.

See also

ADD RAIDSET

SHOW RAIDSETS

SET *unit-number*

Changes the characteristics of a unit.

Format

SET *unit-number*

Parameters

unit-number

Specifies the logical unit number to modify. The *unit-number* is the name given the unit when it was created using the ADD UNIT command.

Switches

Table 5 lists all switches for the SET *unit-number* command and shows which switches can be used with each type of device and storageset. Descriptions of the switches follow the table.

Table 5
Switches for the SET unit-number command

Switch	RAID-set	Stripe-set	Mirror-set	NoTrans Disk	Trans Disk	Optical Disk	CD ROM	Tape	Pass-through
MAXIMUM_CACHED_TRANSFER	✓	✓	✓	✓	✓	✓	✓		
PREFERRED_PATH NOPREFERRED_PATH (Default)	✓	✓	✓	✓	✓	✓	✓	✓	✓
READ_CACHE (Default) NOREAD_CACHE	✓	✓	✓	✓	✓	✓	✓		
RUN (Default) NORUN	✓	✓	✓	✓	✓	✓	✓		
WRITE_PROTECT NOWRITE_PROTECT (Default)	✓	✓	✓	✓	✓	✓			
WRITEBACK_CACHE NOWRITEBACK_CACHE (Default)	✓	✓	✓	✓		✓			
DEFAULT_FORMAT								✓	

PARTITION=*partition_number*

The PARTITION switch allows you to set the unit number for a partition on a storageset or single-disk unit. Use the

partition-number to identify the partition for which you're adding the host-addressable unit number. (Use the SHOW command to find partition numbers for a storageset or single-disk unit.)

MAXIMUM_CACHED_TRANSFER=*n*
MAXIMUM_CACHED_TRANSFER=32 (Default)
The MAXIMUM_CACHED_TRANSFER switch allows you to set the largest transfer (in blocks) to be cached by the controller. The controller will not cache any transfers over this size. Valid values are 1–1024.

PREFERRED_PATH=THIS_CONTROLLER
PREFERRED_PATH=OTHER_CONTROLLER
NOPREFERRED_PATH (Default)
The PREFERRED_PATH switch allows you to balance I/O load by specifying the controller through which the unit will be accessed. If you set NOPREFERRED_PATH for a unit, it can be accessed through either controller.

Note

All partitions on a container must be addressed through the same controller. If you set PREFERRED_PATH for one partition, all partitions on that container will inherit the same path.

The controllers only use the PREFERRED_PATH setting if they are in a dual-redundant configuration. If one controller fails, all the devices are accessed through the remaining controller, ignoring the PREFERRED_PATH setting.

Note

The PREFERRED_PATH and NOPREFERRED_PATH switches are valid only for HSJ and HSD controllers in dual-redundant configurations and HSZ controllers in dual-redundant multibus-failover configurations. The preferred path for units on dual-redundant HSZ controllers is determined by the first digit in the unit number (the controller target ID) specified in the ADD UNIT command.

When the failed controller is restarted, the drives automatically return to the controller specified by the PREFERRED_PATH switch.

You can specify the PREFERRED_PATH switch on a single controller; however, the switch will not take effect until you add a second controller and configure the two controllers for dual-redundancy.

READ_CACHE (Default)
NOREAD_CACHE
The READ_CACHE switch allows you to enable or disable the use of read cache with a unit.

Read caching improves performance in almost all situations, so it is generally good to leave it enabled. However, under certain workloads, like a backup, there may be a low probability for a cache hit and it may be beneficial to turn read caching off to remove the overhead of caching.

RUN (Default)
NORUN
The RUN switch allows you to enable and disable a unit's availability to the host.

Select NORUN to make a unit unavailable to the host and to cause any user data for that unit to be flushed from the write-back cache to the disk drives. The devices that make up the unit are still spun up.

Select RUN to make a unit available to the host.

Note

Write protect disables the writing of any new data by the host. However, the controller may still write to a write-protected RAIDset to satisfy a reconstruct pass or to reconstruct a newly replaced member.

WRITE_PROTECT
NOWRITE_PROTECT (Default)
The WRITE_PROTECT switch allows you to ensure that data on a unit is not overwritten.

Select WRITE_PROTECT to prevent write operations to the unit.

Select NOWRITE_PROTECT to allow both reads and writes to the unit.

Note

WRITEBACK_CACHE requires that write-back cache modules be installed in the subsystem and that the licensed feature be enabled through FLS.

WRITEBACK_CACHE
NOWRITEBACK_CACHE (Default)
The WRITEBACK_CACHE switch allows you to enable or disable the use of write-back cache with a unit.

Select WRITEBACK_CACHE for all new RAIDsets and mirrorsets, and for all other units for which you want this feature. The write-back cache improves performance for write operations to the unit.

Note

It may take up to 5 minutes for the controller to flush unwritten data from the cache once you disable write-back caching.

Select NOWRITEBACK_CACHE for those units for which you want all writes to go directly to devices without being cached.

DEFAULT_FORMAT=*format*
DEFAULT_FORMAT=HOST_SELECTED
DEFAULT_FORMAT=DEVICE_DEFAULT (Default)
The DEFAULT_FORMAT switch allows you to specify the tape format to be used by the controller for write operations to a tape drive. You also use this switch to tell the controller to allow the host to set the tape format.

Not all tape devices support all formats. The easiest way to determine what formats are supported by a specific device is to enter the SET *tape-unit-number* DEFAULT_FORMAT= ? command. The controller will display the valid options for the unit.

Set the switch to HOST_SELECTED to allow the host to set the tape format.

Select DEVICE_DEFAULT to have the controller use the default tape format for the device. For devices on which the format is set via switches on the front panel, the DEVICE_DEFAULT is the current settings of those switches.

Examples

To enable write protect and turn off the read cache on unit D102:

```
CLI> SET D102 WRITE_PROTECT NOREAD_CACHE
```

To set unit T47 to 1600 bpi:

```
CLI> SET T47 DEFAULT_FORMAT=1600BPI_9TRACK
```

See also

SHOW UNITS

SHOW *unit-number*

SHOW

Displays information about controllers, storagesets, devices, and partitions.

Note

The SHOW command may not display some information for devices accessed through the companion controller in a dual-redundant configuration. When device or parameter information does not appear, enter the same SHOW command from the other controller.

Format

```
SHOW device-type
SHOW device-name
SHOW storageset-type
SHOW storageset-name
SHOW UNITS
SHOW unit-name
SHOW THIS_CONTROLLER
SHOW OTHER_CONTROLLER
```

Parameters

device-type

Specifies the type of devices that you want to display. Valid choices are:

DEVICES – all devices attached to the controller

CDROMS – all CDROM devices attached to the controller

DISKS – all disk drive devices attached to the controller

LOADERS – all tape loader devices attached to the controller

OPTICALS – all optical disk drives attached to the controller

PASSTHROUGH – all passthrough containers attached to the controller

TAPES – all tape drive devices attached to the controller

device-name

Specifies the name of a particular device that you want to display. For example, SHOW DISK210 displays information about the device named DISK210.

storageset-type
Specifies the type of storageset that you want to display. Valid choices are:

STORAGESETS – all storagesets configured in the controller. This includes stripesets, mirrorsets, RAIDsets, the spareset and the failedset.

RAIDSETS – all RAIDsets configured in the controller

STRIPESETS – all stripesets configured in the controller

MIRRORSETS – all mirrorsets configured in the controller

SPARESET – the pool of disk drives available to replace failing members of RAIDsets and mirrorsets

FAILEDSET – all disk drives that have failed out of RAIDsets and mirrorsets

storageset-name
Specifies the name of a particular storageset that you want to display. For example, SHOW STRIPE1 displays information about the stripeset named STRIPE1.

UNITS
Displays information for all units configured in the controller.

unit-name
Specifies the name of a particular unit that you want to display. For example, SHOW D102 displays information about the unit named D102.

THIS_CONTROLLER
OTHER_CONTROLLER
Specifies the controller that you want to display.

Switches

FULL

Displays additional information about each device or controller.

Examples

To show a basic listing of CDROMs:

```
CLI> SHOW CDROM
Name          Type       Port Targ  Lun              Used by
-------------------------------------------------------------
CDROM230      cdrom         2    3    0              D623
CDROM240      cdrom         2    4    0              D624
```

To show a full listing of devices attached to the controller:

```
CLI> SHOW DEVICES FULL
Name          Type                        Port Targ  Lun        Used by
-------------------------------------------------------------------------

DISK100       disk                          1    0    0        D500
          DEC      RZ28     (C) DEC 435E
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 10MHZ (synchronous 10 MB/SEC negotiated)
        Size: 4109470 blocks

DISK120       disk                          1    2    0        S0
          DEC      RZ28     (C) DEC 435E
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 10MHZ (synchronous 10 MB/SEC negotiated)
        Size: 4109470 blocks

DISK140       disk                          1    4    0        S0
          DEC      RZ28M    (C) DEC 0616
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 10MHZ (synchronous 10 MB/SEC negotiated)
        Size: 4109470 blocks

DISK200       disk                          2    0    0        D501
          DEC      RZ28     (C) DEC 435E
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 10MHZ (synchronous 10 MB/SEC negotiated)
        Size: 4109470 blocks

DISK220       disk                          2    2    0        S0
          DEC      RZ28B    (C) DEC 0006
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 10MHZ (synchronous 10 MB/SEC negotiated)
        Size: 4109470 blocks
```

To show a complete listing of the mirrorset named MIRR1:

```
CLI> SHOW MIRR1
Name          Storageset             Uses          Used by
------------------------------------------------------------
MIRR1         mirrorset              DISK130       D202
        Switches:
          NOPOLICY (for replacement)
          COPY (priority) = NORMAL
          READ_SOURCE = LEAST_BUSY
          MEMBERSHIP = 2, 1 member present
        State:
          DISK130   (member  0) is NORMAL
        Size: 4109470 blocks
```

To show the full information for a controller:

```
CLI> SHOW THIS_CONTROLLER FULL

Controller:
     HSZ40-CX (C) ZG60300054 Firmware X10Z-0, Hardware 0000
     Not configured for dual-redundancy
     SCSI address 6
     Time: NOT SET
Host port:
     SCSI target(s) (4, 5), Preferred target(s) (5)
     TRANSFER_RATE_REQUESTED = ASYNCHRONOUS
Cache:
     No cache
     Host Functionality Mode = A
Licensing information:
     RAID (RAID Option) is ENABLED, license key is VALID
     WBCA (Writeback Cache Option) is ENABLED, license key is VALID
     MIRR (Disk Mirroring Option) is ENABLED, license key is VALID
Extended information:
        Terminal speed 19200 baud, eight bit, no parity, 1 stop bit
        Operation control: 00000005  Security state code: 24968
        Configuration backup disabled
```

SHUTDOWN THIS_CONTROLLER and SHUTDOWN OTHER_CONTROLLER

Flushes all user data from the specified controller's write-back cache (if present) and shuts down the controller. The controller does not restart. All units accessed through the controller failover to the surviving controller.

THIS CONTROLLER is the controller that is running the current CLI session. OTHER_CONTROLLER is the controller that is *not* running the current CLI session.

Format

```
SHUTDOWN OTHER_CONTROLLER
SHUTDOWN THIS_CONTROLLER
```

Switches

Caution

The IGNORE_ERRORS and IMMEDIATE switches cause the controller to keep unflushed data in the write-back cache until it restarts and is able to write the data to devices. Do not perform any hardware changes and do not let the cache batteries run down before the controller can flush the cache.

IGNORE_ERRORS
NOIGNORE_ERRORS (Default)
Specify the IGNORE_ERRORS switch when you want the controller to shut down even if it cannot write all user data to devices from the write-back cache.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (Default)
Specify the IMMEDIATE switch to cause the controller to shut down immediately without checking for online devices or flushing user data from write-back cache to devices.

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE (Default)
(HSJ and HSD only) Specify the OVERRIDE_ONLINE switch to cause the controller to ignore the fact that some units may be online to the host. The controller shuts down after it writes all user data to devices.

Examples

To shut down THIS_CONTROLLER as long as there are no units online:

```
CLI> SHUTDOWN THIS_CONTROLLER
```

To shut down the other controller even if it cannot write all write-back cache data to units:

```
CLI> SHUTDOWN OTHER_CONTROLLER IGNORE_ERRORS
```

See also

RESTART THIS_CONTROLLER

RESTART OTHER_CONTROLLER

SELFTEST THIS_CONTROLLER

SELFTEST OTHER_CONTROLLER

UNMIRROR

Converts a one-member mirrorset back to a single device and deletes the mirrorset from the list of known mirrorsets. You can use this command on mirrorsets that are already members of higher level containers (stripesets or units).

The UNMIRROR command is not valid for devices that have a capacity greater than the capacity of the mirrorset. If a mirrorset is comprised of devices of different capacities, the mirrorset capacity is limited to the size of the smallest member; larger members will have unused capacity. If a member with unused capacity is the last remaining member of a mirrorset, you cannot use the UNMIRROR command to change the device back to a single-disk unit, because that change would cause a change in reported disk capacity, possibly confusing the operating system.

Format

UNMIRROR *disk-name*

Examples

To convert DISK130 back to a single device:

```
CLI> UNMIRROR DISK130
```

See also

ADD MIRRORSET

MIRROR

REDUCE

RUN CLONE

SET *mirrorset-name*

Glossary

Adapter
A device that converts the protocol and hardware interface of one bus type into that of another without changing the functionality of the bus.

Allocation class
A numerical value assigned to a controller to identify units across multiple, independent controllers. (Controllers in a dual-redundant configuration must have the same allocation class.)

Array controller
A hardware/software device that facilitates communications between a host and one or more devices organized in an array. HS family controllers are examples of array controllers.

BBR
Bad block replacement. The procedure used to locate a replacement block, mark the bad block as replaced, and move the data from the bad block to the replacement block.

BBU
Battery backup unit. A StorageWorks SBB option that extends power availability after the loss of primary ac power or a power supply to protect against the corruption or loss of data.

Block
The smallest data unit addressable on a disk. Also called a sector. In integrated storage elements, a block contains 512 bytes of data, EDC, ECC, flags, and the block's address header.

CDU
Cable distribution unit. The power entry device for StorageWorks cabinets. The unit provides the connections necessary to distribute ac power to cabinet shelves and fans.

CI bus
Computer interconnect bus. Uses two serial paths, each with a transfer rate of 70 Mb/s (8.75 MB/s).

CLI
Command line interpreter. Operator command line interface for the HS family controller firmware.

Controller shelf
A StorageWorks shelf designed to contain controller and cache memory modules.

CRC
An 8-character cyclic redundancy check string used in conjunction with the customer identification string for turning on licensed features such as write-back caching.

Data center cabinet
A generic reference to the large cabinets, such as the SW800-series, in which StorageWorks components can be mounted.

DDL
Dual data link. The ability to operate on the CI bus using both paths simultaneously to the same remote node.

Differential SCSI bus
A signal's level is determined by the potential difference between two wires. A differential bus is more robust and less subject to electrical noise than is a single-ended bus.

DILX
Disk inline exerciser. Diagnostic firmware used to test the data transfer capabilities of disk drives in a way that simulates a high level of user activity.

DSA
Digital storage architecture. A set of specifications and interfaces describing standards for designing mass storage products. DSA defines the functions performed by host computers, controllers, and disk drives. It also specifies how they interact to accomplish mass storage management.

DSSI
Digital storage system interconnect. A Digital-specific data bus with an 8-bit data transfer rate of 4 MB/s.

Dual-redundant configuration
Two controllers in one controller shelf providing the ability for one controller to take over the work of the other controller in the event of a failure of the other controller.

DUART
Dual universal asynchronous receiver/transmitter. An integrated circuit containing two serial, asynchronous transceiver circuits.

DUP
Diagnostic and utility protocol. Host application software that allows a host terminal to be connected to the controller's command line interpreter.

DWZZA
The StorageWorks compatible SCSI bus signal converter.

ECB
External cache battery.

ECC
Error correction code. One or more cyclic redundancy check (CRC) words that allow detection of a mismatch between transmitted and received data in a communications system, or between stored and retrieved data in a storage system. The ECC allows for location and correction of an error in the received/retrieved data. All ECCs have limited correction power.

EDC
Error detection code. One or more checksum words that allow detection of a mismatch between transmitted and received data in a communications system, or between stored and retrieved data in a storage system. The EDC has no data correction capability.

ESD
Electrostatic discharge. The discharge of a potentially harmful static electric voltage as a result of improper grounding.

Failedset
A group of disk drives that have been removed from RAIDsets due to a failure or a manual removal. Disk drives in the failedset should be considered defective and should be tested, repaired, and then placed into the spareset.

Failover
The process that takes place when one controller in a dual-redundant configuration assumes the workload of a failed controller.

Flush
The act of writing data from the cache module to the media.

FRU
Field replaceable unit. A hardware component that can be replaced.

FWD SCSI
Fast, wide, differential SCSI. The differential SCSI bus with a 16-bit parallel data path that yields a transfer rate of up to 20 MB/s.

Half-height device
A device that occupies half of a 5.25 inch SBB carrier. Two half-height devices can be mounted in a 5.25 inch SBB carrier. The first half-height device is normally mounted in the lower part of the carrier. The second device is normally mounted in the upper part of the carrier.

HBVS
Host-based volume shadowing. Also known as Phase 2 volume shadowing.

HSOF
Hierarchical storage operating firmware. Software contained on a program card that provides the logic for the HS array controllers.

HIS
Host interconnect services. The firmware in the HS array controller that communicates with the host.

Host
Any computer to which a storage subsystem can be attached.

Hot swap
A method of replacing a device whereby the system that contains the device remains online and active during replacement. The device being replaced is the only device that cannot perform operations during a hot swap.

Initiator
A SCSI device that requests an I/O process to be performed by another SCSI device (a target). This is always the controller.

Local terminal
A terminal plugged into the EIA-423 maintenance port on the front bezel of the HS array controller. Also called a maintenance terminal.

Logical unit
The physical device or storage unit seen by the host. Often these logical units are spread across more than one physical device, especially in RAID implementations. This is *not* a LUN.

Logical Unit Number
See LUN.

LRU
Least recently used. This is cache terminology for the block replacement policy for the read cache.

LUN
A logical unit number is a physical or virtual peripheral device addressable through a target. LUNs use their target's bus connection to communicate on the SCSI bus.

Maintenance terminal
Any EIA-423 compatible terminal to be plugged into the HS controller. This terminal is used to identify the controller, enable host paths, define the configuration, and check controller status. It is not required for normal operations. It is sometimes referred to as a local terminal.

Metadata
Data written on the physical disk that is not visible to the host/customer that allows the HS array controller to maintain a high integrity of customer data.

Mirrorset
Two or more physical disks configured to present one highly reliable virtual unit to the host.

MSCP
Mass storage control protocol. The protocol by which blocks of information are transferred between the host and the controller.

Non-redundant configuration
A single controller configuration. A controller configuration which does not include an second backup controller permitting failover in the event of a failure.

Normal member
A mirrorset member whose entire contents is guaranteed to be the same as all other NORMAL members. All NORMAL members are exactly equivalent.

Normalizing member
A mirrorset member whose contents is the same as all other NORMAL and NORMALIZING members for data that has been written since the mirrorset was created or lost cache data was cleared. Data that has never been written may differ among NORMALIZING members.

NV
Nonvolatile. A term used to describe memory that can retain data during a power loss to the controller.

Partition
A percentage of a storageset or single-disk unit that may be presented to the host as a storage unit.

PPort
The hardware and software used to connect a host controller to a communication bus, such as CI, DSSI, or SCSI bus. This term also is used to describe the connection between the controller and its SCSI storage devices.

PTL
Port-target-LUN. A method of device notation where **P** designates the controller's device port (1-6), **T** designates the target ID of the device (0-6), and **L** designates the LUN of the device (0-7).

Qualified device
A device that has been fully tested in an approved StorageWorks configuration, (that is, shelf, cabinet, power supply, cabling, and so forth) and is in complete compliance with country-specific standards (for example, FCC, TUV, and so forth) and with all Digital standards.

Quiesce
To make a bus inactive or dormant. The operator must quiesce SCSI bus operations, for example, during a device warm swap.

RAID
Redundant array of independent disks. The multiple storage access methods devised for performance (RAID 0, striping) and/or various cost levels of availability (RAID 1 through RAID 5).

RAIDset
Three or more physical disks that are configured to present an array of disks as a single virtual unit to the host.

Read cache
The cache used to accelerate read operations by retaining data which has been previously read, written, or erased, based on a prediction that it will be reread.

Replacement policy
The method by which a spare disk is selected to replace a disk that has failed in a RAIDset.

SBB
StorageWorks building block. A modular carrier plus the individual mechanical and electromechanical interface required to

mount it into a standard StorageWorks shelf. Any device conforming to shelf mechanical and electrical standards is considered an SBB.

SBB shelf
StorageWorks building block shelf. A StorageWorks shelf, such as the BA350--Sx, designed to house plug-in SBB modules.

SCS
System communication services. A delivery protocol for packets of information (commands or data) to or from the host.

SCSI
Small computer system interface. An ANSI interface defining the physical and electrical parameters of a parallel I/O bus used to connect initiators to a maximum of seven devices. The StorageWorks device interface is implemented according to SCSI--2 standard, allowing the synchronous transfer of 8-bit data at rates of up to 10 MB/s.

SCSI device
A host computer adapter, a peripheral controller, or a storage element that can be attached to the SCSI bus.

SCSI device ID
The bit-significant representation of the SCSI addressing that refers to one of the signal lines numbered 0 through 7. Also referred to as a *target* ID.

SCSI--A cable
A 50-conductor (25 twisted pair cable used for single-ended, SCSI bus connections.

SCSI--P cable
A 68-conductor (34 twisted pair cable used for differential bus connections.

Small Computer System Interface
See SCSI.

Spareset
A pool of disk drives used by the controller to replace failed members of a RAIDset.

SPD
Software product description. A document that contains the legal description of a product.

Storageset
Any collection of containers, such as stripesets, RAIDsets, the spareset, and the failedset, that make up a container.

Storage unit
The general term that refers to storagesets, single disk units, and all other storage devices that can be installed in your subsystem and accessed by a host. A storage unit can be any entity that is capable of storing data, whether it is a physical device or a group of physical devices.

StorageWorks
Digital's family of modular data storage products that allows customers to design and configure their own storage subsystems. Components include power, packaging, cabling, devices, controllers, and software. Customers can integrate devices and array controllers in StorageWorks enclosure to form storage subsystems.

StorageWorks building block
See SBB.

Stripeset
A virtual disk drive with its physical data spread across multiple physical disks. Stripeset configurations do not include a data recovery mechanism.

Striped mirrorset
Stripesets whose members have been mirrored.

Tagged command queuing
A SCSI feature that allows a device to have multiple I/O requests outstanding to it at one time.

Target
A SCSI device that performs an operation requested by an initiator. The target number is determined by the device's address on its SCSI bus.

TILX
Tape inline exerciser. Diagnostic firmware used to test the data transfer capabilities of tape drives in a way that simulates a high level of user activity.

TMSCP
Tape mass storage control protocol. The protocol by which blocks of information are transferred between the host and the controller.

Unit
The host's view of a container on an HS array controller. A unit may be made up of simply a physical disk or tape drive, or a more complex container such as a RAIDset.

Unwritten cached data
Data in the write-back cache which has not yet been written to the physical device, but the user has been notified that the data has been written.

VCS
VAXcluster console system.

Virtual terminal
A software path from an operator terminal on the host to the controller's CLI. The path can be established via the host port on the controller (using DUP) or via the maintenance port through on intermediary host (VCS). A virtual terminal is also sometimes called a host console.

Warm swap
A method for adding or replacing a device whereby the system remains online, but all activity on the device's bus must be halted for the duration of the swap.

Write-back caching
A caching strategy that writes data to the cache memory, then flushes the data to the intended device at some future time. From the user's perspective, the write operation is complete when the data is stored in the cache memory. This strategy avoids unnecessary access of the devices.

Write hole
Undetectable RAID level 1 or 5 data corruption. A write hole is caused by the successful writing of some, but not all, of the storageset members. Write holes occur under conditions such as power outages, where the writing of multiple members can be abruptly interrupted. A battery backed-up cache design eliminates the write hole, because data is preserved and writes can be retried.

Write-through cache

A cache write strategy in which the destination of the write data is the primary storage media. This operation may update, invalidate, or delete data from the cache memory accordingly, to ensure that the cache does not contain obsolete data. The user sees the operation as complete only after the backup storage device has been updated.

Index

A

Adapter, 110
ADD CDROM command, 8
ADD DISK command, 10
ADD LOADER command, 13
ADD MIRRORSET command, 15
ADD OPTICAL command, 18
ADD PASSTHROUGH command, 20
ADD RAIDSET command, 22
ADD SPARESET command, 25
ADD STRIPESET command, 26
ADD TAPE command, 28
ADD UNIT command, 30
Adding
  CD-ROM drive, 8
  disk drive, 10
  HSD tape drive, 28
  HSD tape loader, 13
  HSJ tape drive, 28
  HSJ tape loader, 13
  HSZ tape drive, 20
  HSZ tape loader, 20
  mirrorset, 15
  optical disk drive, 18
  passthrough container, 20
  RAIDset, 22
  striped mirrorset, 26
  stripeset, 26
  unit, 30
Allocation class, 110
Array controller, 110
Automatic spare policy, 73

B

Battery policy, 86
BBR, 110
BBU, 110
Block, 110

C

Cables
  SCSI bus cable lengths, 92
Cache
  clearing invalid cache errors, 37
  enabling/disabling read cache, 33, 98
  enabling/disabling write-back cache, 34, 99
  flush timer, 86
  setting maximum transfer size, 32, 97
CD-ROM
  adding to controller, 8
  deleting, 44
  displaying information, 101
  showing, 101
CDU, 110
Chunksize, 53
CI
  enabling/disabling paths, 90
  setting arbitration, 88
  setting maximum hosts, 90
  setting maximum nodes, 89
  setting node number, 89
  specifying a node name, 91
CI bus, 110
CLEAR_ERRORS CLI command, 36
CLEAR_ERRORS INVALID_CACHE command, 37
CLEAR_ERRORS LOST_DATA command, 39
CLEAR_ERRORS UNKNOWN command, 40
CLEAR_ERRORS UNWRITEABLE_DATA command, 41
CLI, 110
  abbreviating commands, 4
  accessing, 3
  capturing your session, 3
  clearing error messages, 36
  command rules, 4
  definition, 2
  editing keys, 4
  exiting, 3, 51
  help, 52
  overview, 2
  printing the session log file, 3
  specifying a prompt, 91
  type ahead, 4
Command disk. *See* Passthrough container
Command line interpreter. *See* CLI
Commands
  abbreviating, 4
  ADD CDROM, 8
  ADD DISK, 10
  ADD LOADER, 13
  ADD MIRRORSET, 15
  ADD OPTICAL, 18
  ADD PASSTHROUGH, 20
  ADD RAIDSET, 22
  ADD SPARESET, 25
  ADD STRIPESET, 26
  ADD TAPE, 28
  ADD UNIT, 30
  CLEAR_ERRORS CLI, 36
  CLEAR_ERRORS INVALID_CACHE, 37

CLEAR_ERRORS LOST_DATA, 39
CLEAR_ERRORS UNKNOWN, 40
CLEAR_ERRORS UNWRITEABLE_DATA, 41
CREATE_PARTITION, 42
DELETE *container-name*, 44
DELETE FAILEDSET, 45
DELETE SPARESET, 46
DELETE *unit-number*, 47
DESTROY_PARTITION, 49
DIRECTORY, 50
EXIT, 51
HELP, 52
INITIALIZE, 53
LOCATE, 56
MIRROR, 59
REDUCE, 62
RENAME, 64
RESTART OTHER_CONTROLLER, 65
RESTART THIS_CONTROLLER, 65
RETRY_ERRORS, 67
RUN, 68
SELFTEST, 69
SET *device-name*, 71
SET FAILEDSET, 73
SET FAILOVER, 74
SET *mirrorset-name*, 76
SET MULTIBUS_FAILOVER, 81
SET NOFAILOVER, 83
SET OTHER_CONTROLLER, 85
SET *RAIDset-name*, 93
SET THIS_CONTROLLER, 85
SET *unit number*, 96
SHOW, 101
SHUTDOWN OTHER_CONTROLLER, 105
SHUTDOWN THIS_CONTROLLER, 105
UNMIRROR, 107
Configuration
restoring, 54
saving on devices, 54
Configuring
dual-redundant controllers, 3
initial controller configuration, 3
modifying controller configurations, 2
when to use a local connection, 3
when to use a remote connection, 3
Connection
local, 3
remote, 3
Controller
displaying information, 101
dual-redundant configuration, 3
immediate shutdown, 105
initial configuration, 3
showing, 101
showing attached devices, 101
shutting down, 105
Controller shelf, 110
CRC, 111
CREATE_PARTITION command, 42
Creating
host-addressable unit, 30
passthrough container, 20
RAIDsets, 22
single-disk unit, 35
striped mirrorset, 26
stripeset, 26
unit, 30

D

Data center cabinet, 111
DDL, 111
DELETE *container-name* command, 44
DELETE FAILEDSET command, 45
DELETE SPARESET command, 46
DELETE *unit-number* command, 47
Deleting
CD-ROM, 44
mirrorset, 44
optical disk drive, 44
RAIDset, 44
storagesets and devices, 44
stripeset, 44
tape drive, 44
tape loader, 44
unit, 47
DESTROY_PARTITION command, 49
Device data transfer rate
setting, 71
Diagnostics
list of, 50
starting, 2, 68
Differential SCSI bus, 111
DILX, 111
DIRECTORY command, 50
Disk drive
adding to a RAIDset, 22
adding to a reduced RAIDset, 94
adding to a stripeset, 26
adding to configuration, 10
adding to the spareset, 25
deleting, 44
displaying information, 101
initializing, 53
making transportable, 71
mirroring, 59

moving to non-«Brand» environments, 11, 72
moving with data intact, 11, 72
removing from a mirrorset, 62, 76
removing from a RAIDset, 94
removing from the failedset, 45
removing from the spareset, 46
renaming, 64
showing, 101
DSA, 111
DSSI, 111
enabling/disabling paths, 90
setting node number, 89
specifying a node name, 91
Dual-redundant configuration, 3, 111
disabling, 83
enabling, 74
DUART, 111
DUP, 111
DUP connection, 3
DWZZA, 112

E

ECB, 112
ECC, 112
EDC, 112
Error messages
clearing from CLI, 36
clearing invalid cache, 37
clearing lost data, 39
clearing unknown errors, 40
clearing unwriteable data errors, 41
ESD, 112
EXIT command, 51

F

Failedset, 112
changing the automatic spare policy, 73
deleting members, 45
displaying members, 102
Failover, 112
and preferred path, 32, 97
disabling, 83
enabling, 74
Finding devices and storagesets, 56
Flush, 112
FRU, 112
FWD SCSI, 112

H

Half-height device, 113
HBVS, 113
HELP command, 52
HIS, 113
Host, 113
Host compatibility mode, 88
Host data transfer rate
setting, 92
Hot spare, 73
Hot standby controller, 91
Hot swap, 113
HSOF, 113
HSZterm. *See* Remote connection

I

IBM host mode, 89
Initialize
before adding unit, 30
save user data, 54
INITIALIZE command, 53
Initiator, 113
Invalid cache error
clearing, 37

L

List
diagnostics and utilities, 50
Load balancing
HSD and HSJ controllers, 32, 97
HSZ controllers, 90
Loader. *See* Tape loader
Local connection, 3
Local terminal, 113
LOCATE command, 56
Logical unit, 113
Lost data error
clearing, 39
LRU, 113
LUN, 114

M

Maintenance terminal, 114. *See* Local connection
Metadata, 114
defined, 11, 72
MIRROR command, 59
Mirrorset
actual number of members, 62
adding members, 76
adding to controller, 15
as a member of a stripeset, 26
changing mirrorset name, 76

choosing a replacement member, 16, 60
converting back to a single device, 107
copying data to new members, 15, 60, 79
creating from a single disk, 59
deleting, 44
displaying information, 101
enabling write-back cache, 34, 99
initializing, 53
nominal number of members, 62
normal member defined, 15, 60, 79
preventing replacement of failed drive, 60
removing members, 62, 76
renaming, 64
setting a replacement policy, 16
setting the actual number of members, 15
setting the copying speed, 15, 60, 79
setting the read source, 16, 78
showing, 101
striping, 26
unmirror, 107
Moving
disk drives, 11, 72
MSCP, 114
MSCP allocation class
setting, 90

N

Non-redundant configuration, 114
Normal member, 114
normal mirrorset member
defined, 15, 60, 79
NV, 114

O

Optical disk drive
adding, 18
deleting, 44
displaying information, 101
showing, 101
OTHER_CONTROLLER
changing parameters, 85
defined, 2
displaying information, 101
removing from dual-redundant configuration, 83
self-test, 69

P

Partition
adding as a unit, 30
creating, 42
deleting unit, 47
destroying, 49
displaying size, 101
setting size, 42
showing, 101
Passthrough container
creating for HSJ and HSD controllers, 20
creating for HSZ controllers, 20
deleting, 44
renaming, 64
showing, 101
Port, 115
Port, target, and LUN numbers. *See* PTL
Preferred path
in dual-redundant configurations, 32, 97
setting for HSD and HSJ controllers, 32, 97
Preferred SCSI target IDs
setting, 90
PTL, 13

Q

Qualified device, 115
Quiesce, 115

R

RAIDset
adding a member when reduced, 94
adding while missing a member, 23
changing characteristics, 93
choosing a replacement member, 22
creating, 22
deleting, 44
displaying information, 101
enabling write-back cache, 34, 99
initializing, 53
number of members, 22
preventing replacement of failed member, 23, 93
removing a member, 94
renaming, 64
setting speed for reconstruct, 23, 94
showing, 101
specifying chunksize, 53
specifying replacement policy, 93
Read cache, 115
enabling and disabling, 33, 98
REDUCE command, 62
Remote connection, 3
Removing. *See also* Deleting
mirrorset member, 62

RENAME command, 64
RESTART OTHER_CONTROLLER command, 65
RESTART THIS_CONTROLLER command, 65
Restoring
  initial controller configuration, 89
RETRY_ERRORS command, 67
RUN command, 68

S

SBB, 115
SCS, 116
SCSI, 116
SCSI bus cable lengths, 92
SCSI target IDs
  preferring, 90
  setting, 89
SELFTEST command, 69
SET *device-name* command, 71
SET FAILEDSET command, 73
SET FAILOVER command, 74
SET *mirrorset-name* command, 76
SET MULTIBUS_FAILOVER command, 81
SET NOFAILOVER command, 83
SET OTHER_CONTROLLER command, 85
SET *RAIDset-name* command, 93
SET THIS_CONTROLLER command, 85
SET *unit-number* command, 96
Setting
  CI node number, 89
  controller preferred SCSI target IDs, 90
  controller SCSI target IDs, 89
  device data transfer rate, 71
  DSSI node number, 89
  Host data transfer rate, 92
  maximum cached transfer size, 32, 97
  MSCP allocation class, 90
  TMSCP allocation class, 91
  transportability, 71
SHOW command, 101
SHUTDOWN OTHER_CONTROLLER command, 105
SHUTDOWN THIS_CONTROLLER command, 105
Spareset
  adding a disk drive, 25
  definition, 46
  displaying members, 102
  removing a disk drive, 46
SPD, 116
Starting
  CLI session, 3
Storage unit, 117
Storageset
  displaying configured sets, 102
  displaying information, 101
  initializing, 53
  renaming, 64
  showing, 101
Striped mirrorset
  creating, 26
Stripeset
  creating, 26
  deleting, 44
  displaying information, 101
  initializing, 53
  mirroring, 59
  renaming, 64
  showing, 101
  specifying chunksize, 53

T

Tagged command queuing, 117
Tape drive
  adding to an HSD configuration, 28
  adding to an HSJ configuration, 28
  adding to an HSZ configuration, 20
  deleting, 44
  displaying information, 101
  renaming, 64
  showing, 101
  specifying tape format, 34, 99
Tape loader
  adding to an HSD configuration, 13
  adding to an HSJ configuration, 13
  adding to an HSZ configuration, 20
  deleting, 44
  displaying information, 101
  showing, 101
Target, 117
Terminal
  setting parity, 91
  setting speed, 91
Testing
  controllers, 69
THIS_CONTROLLER
  changing parameters, 85
  defined, 2
  displaying information, 101
  removing from dual-redundant configuration, 83
  self-test, 69
  setting to initial configuration, 89
  starting diagnostic or utility programs, 68

TILX, 117
Time
  setting on controllers, 91
TMSCP, 118
TMSCP allocation class
  setting, 91

U

Unit, 118
  adding, 30
  changing characteristics, 96
  clearing lost data error, 39
  deleting from the configuration, 47
  displaying configured units, 102
  displaying information, 101
  enabling/disabling host availability, 33, 98
  enabling/disabling read cache, 33, 98
  enabling/disabling write-back cache, 34, 99
  mirroring, 59
  numbering, 30
  setting write protection, 34, 99
  showing, 101
  specifying a preferred path, 32, 97
Unknown error
  clearing, 40
UNMIRROR command, 107
Unwriteable data error
  clearing, 41
  retrying, 67
UPS
  setting cache policy, 88
Utilities
  list of, 50
  starting, 2, 68

V

VCS, 118
Virtual terminal, 118. *See* Remote connection

W

Warm swap, 118
Windows NT host mode, 89
Write hole, 118
Write protection, 34, 99
Write-back cache
  enabling/disabling, 34, 99
  setting the battery policy, 86
  setting the flush timer, 86
Write-through cache, 119