Compaq StorageWorks™

HSJ80 Array Controller
ACS Version 8.5J-2
CLI Reference Guide

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About This Guide

This guide describes the Command Line Interpreter (CLI) of the HSJ80 Array Controller running Array Controller Software (ACS) Version 8.5J-2. This guide is divided into an overview section and a command description section. The overview provides a general description of the CLI interface and an outline of how to use it. The command description contains the description, full syntax, and examples of the use of each command available on the CLI interface.

This book does not contain information about the operating environments to which the controller may be connected, nor does it contain detailed information about subsystem enclosures or their components. See the documentation that accompanied these peripherals for that information.

Conventions

This book uses the following special notices and typographical conventions to help you find what you are looking for:

Special Notices

This book does not contain detailed descriptions of standard safety procedures; however, it does contain warnings for procedures that could cause personal injury, and cautions for procedures that could damage the controller or its related components. Look for these symbols when you are carrying out the procedures in this book:

WARNING: A *Warning* contains information essential to people's safety. It advises users that failure to take or avoid a specific action could result in physical harm to the user or hardware. Use a warning, not a caution, when such damage is possible

CAUTION: A *Caution* contains information that the user needs to know to avoid damaging the software or hardware.

IMPORTANT: An *Important* note is a type of note that provides information essential to the completion of a task. Users can disregard information in a note and still complete a task, but they should not disregard an important note.

NOTE: A *note* indicates neutral or positive information that emphasizes or supplements important points of the main text. A note supplies information that may apply only in special cases—for example, memory limitations, equipment configurations, or details that apply to specific versions of a program.

Text Conventions

Convention	Meaning
ALLCAPS	Command syntax that must be entered exactly as shown, for example: SET FAILOVER COPY=OTHER
ALLCAPS	Command syntax that is discussed within text, for example: "Use the SHOW SPARESET command to show the contents of the spareset."
MONOSPACED	SCREEN DISPLAYS ARE IN UPPER-CASED MONOSPACED FONT.
Sans serif italic *Sans serif italic*	Command variable or numeric value that you supply, for example: SHOW *RAIDset-name* or SET THIS_CONTROLLER PORT_1_SCS_NODENAME=*"xxxxxx"*
italic	Reference to other books, for example: "Refer to the *Compaq StorageWorks HSJ80 Array Controller Configuration Guide* for details."
. . .	Indicates that a portion of an example or figure has been omitted.
"this controller"	The controller serving your current CLI session through a local or remote terminal
"other controller"	The controller in a dual-redundant pair that is connected to the controller serving your current CLI session.

Related Publications

The following table lists some of the documents related to the use of the controller, cache module, and external cache battery.

Document Title	6-3 Part Numbers	2-5-2 Part Numbers
Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Maintenance and Service Guide	163134-001	EK-HSJMS-SA
Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Configuration Procedures Guide	163133-001	EK-HSJAC-PA
Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Configuration Planning Guide	163132-001	EK-HSJCP-PA
Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Software Solution Kit Overview	N/A	EK-HSJSO-OA
Compaq StorageWorks DS-BA356-MW Controller Enclosure Upgrade/Add-on Kit Installation Guide	143876-001	EK-356MW-IA
Compaq StorageWorks DS-BA356-MW Controller Enclosure Upgrade/Add-on Kit Quick Setup Guide	143177-001	EK-356MW-QA
Compaq StorageWorks DS-BA356-MW Controller Enclosure User Guide	143875-001	EK-356MW-UA
Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 for OpenVMS™ Release Notes	163135-001	EK-HSJAA-RA

Revision History

Second Release: August 2000

First Release: December 1999

Chapter **1**

CLI Command Introduction

Command Line Interpreter (CLI) commands are used to interact with your controller to establish various controller parameters and storagesets. These CLI commands can be entered into the controller by any of the following means:

■ A local terminal connected to the maintenance port of the controller

■ A remote connection by way of the host system terminal

■ The StorageWorks Command Console (SWCC)

This overview section provides a general description of the CLI interface and an outline of how to use it. The next section contains a description of each CLI command with the correct syntax and examples of useage.

CLI Overview

The CLI is one of the user interfaces through which you control your Compaq StorageWorks array controller in the storage subsystem (the CLI being the most direct). The CLI commands allow you to manage the subsystem by viewing and modifying the configuration of the controller and the devices attached to them. You can also use the CLI to start controller diagnostic and utility programs.

While the CLI provides the most detailed level of subsystem control, a graphical user interface (GUI) is available for use with the CLI. The GUI that is designed for use in the application of CLI commands is called the StorageWorks Command Console (SWCC). The SWCC replicates most of the functions available within the CLI in graphic form and provides a user-friendly method of executing CLI commands.

CLI commands for configuring and viewing the controllers use the relative terms "this controller" and "other controller." See "Text Conventions," page ix, for an explanation of these terms.

Using the CLI

You can access the CLI through the following methods:

■ Connecting a local terminal/PC to the maintenance port on the front of the controller.

■ Using the DUP utility from a system terminal, you may also enable a remote connection to the controller. After you have initially configured the controller and made it visible to the host, you can perform other configuration tasks through this remote connection.

■ Using the SWCC by way of a PC setup on the subsystem. The SWCC can be used to perform most of the CLI commands that the local terminal can.

Command Overview

CLI commands are divided into categories based on the options or structures they control. The following is a list of the command categories:

Controller Commands

Controller commands configure the maintenance terminal characteristics, CLI prompt, and so forth. These commands are also used to shut down and restart the controller. There are two types of controller commands: general and failover.

The CLI commands that pertain to the controllers in a general way are:

■ CLEAR_ERRORS

❏ CLI

❏ INVALID_CACHE

■ CONFIGURATION

❏ RESET

❏ RESTORE

❏ SAVE

■ EXIT

■ HELP

- RESTART

- SELFTEST

- SET *this controller* SET *other controller*

- SHOW

- RUN

- SHUTDOWN *this controller* SHUTDOWN *other controller*

The CLI commands controlling the failover mode of a controller pair are:

- SET FAILOVER

- SET NOFAILOVER

Device Commands

Device commands create and configure containers made from physical devices attached to the controller. There are two types of device commands: general and spareset/failedset.

The CLI Commands that allow you to add and configure physical devices in general are:

- ADD DISK

- ADD TAPE

- ADD CDROM

- ADD LOADER

- ADD OPTICAL

- ADD PASSTHROUGH

- CLEAR ERRORS

  - LOST_DATA

  - UNKNOWN

  - UNWRITEABLE_DATA

- DELETE *container-name*

- INITIALIZE *container-name*

- LOCATE

- RENAME

- SET *device-name*
- SHOW

The CLI commands that allow you to change the sparesets/failedsets are:

- ADD SPARESET
- DELETE FAILEDSET
- DELETE SPARESET
- SET FAILEDSET
- SHOW

Storageset Commands

Storageset commands create and configure complex containers made from groups of device containers. These commands group device containers together and allow them to be handled as single units. There are four types of storagesets: stripesets, RAIDsets, striped-mirrorsets, and mirrorsets.

The CLI commands that pertain to storagesets are:

- ADD MIRRORSET
- ADD RAIDSET
- ADD STRIPESET
- DELETE *container-name*
- INITIALIZE *container-name*
- LOCATE
- MIRROR
- REDUCE
- RENAME
- SET *mirroeset-name* SET *RAIDset-name*
- SHOW
- UNMIRROR

Partition Commands

Partition commands create multiple logical disk units from the same container.

The CLI Commands that pertain to partitions are:

- CREATE_PARTITION
- DESTROY_PARTITION

Logical Unit Commands

Logical unit commands create and optimize access to logical units made from any container type.

The CLI commands that pertain to units are:

- ADD UNIT
- DELETE *unit-number*
- LOCATE
- RETRY_ERRORS UNWRITEABLE_DATA
- SET *unit-number*
- SHOW

Diagnostic and Utility Commands

Diagnostic and utility commands perform general controller support functions.

The commands that pertain to the diagnostics and utilities are:

- DIRECTORY
- RUN

Getting Help

To get Help with using the CLI commands, enter HELP at the CLI prompt. The resulting display shows an overview of the CLI Help System. To obtain help with a specific command or to determine what switches are available with a command, enter as much of the command syntax as you know, followed by a space and a question mark.

For example, to get information on the switches used with the SET *this_controller* command, enter:

SET THIS ?

To see what is allowed for a prompt, enter the following:

SET THIS PROMPT=?

See the HELP command on Page 2–57 for further information.

Entering CLI Commands

Use the following tips and techniques for the entering of CLI commands:

■ Commands are not case-sensitive.

■ For most commands, you only need to enter enough of the command to make the command unique. For example, SHO is the same as entering SHOW.

■ The controller processes each command in sequence. You can continue entering subsequent commands while the controller is processing prior commands. A controller experiencing heavy data I/O may respond slowly to CLI commands.

Specific keys or a combination of keys allow you to recall and edit the last four commands. This feature can save time and help prevent mistakes when you need to enter similar commands during the configuration process. Table 1–1 lists the keys used to recall and edit commands.

Table 1–1 Recall and Edit Command Keys

Key	Function
Up Arrow or Ctrl/B, Down Arrow or Ctrl/N	Steps forwards or backward through the four 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 all characters on the same line as the cursor
Ctrl/A or F14	Toggles between insert and overstrike mode: ■ The default setting is insert mode allowing you to insert characters at the cursor location (moving the existing characters to the right). ■ Overstrike mode replaces existing characters. The CLI prompt returns to insert mode at the beginning of each line.
Ctrl/R	Recalls the contents of the command line. This function is especially helpful if the system issues a message that interrupts your typing.

Command Syntax

Each CLI command is described using the following structure:

COMMAND <PARAMETER_NAME=*parameter*> *SWITCHES*

- COMMAND—A word or phrase expressed as a verb that is used to instruct the controller what to do. Commands are represented in this manual in capitalized form.

- PARAMETER_NAME—The name of a parameter, followed by an equal sign and the parameter variable. If a specific command specifies parameter names, they must be entered in the command string. Parameter names are represented in this manual in capitalized form.

- *parameter*—When required in the command, parameters are used as one or more words or phrases that supply necessary information to support the action of the COMMAND. Note that not all CLI commands require parameters. Parameters are representedin this manual as lowercase, italicized text.

- *SWITCHES*—An optional word or phrase that modifies the command/parameter string. Not all CLI commands require switches. Switches are represented in this manual as capitalized, italicized text.

Chapter **2**

CLI Command Descriptions

The previous chapter provided a general description of the CLI interface and an outline of how to use it. This section contains the CLI command descriptions which contain the description, full syntax, and examples of the use of each command available on the CLI interface.

CLI Command Descriptions

This section contains the descriptions of the available CLI commands used with the ACS Version 8.5J-2 software. Each command is described using the following format:

■ Command name and brief description

■ Syntax needed to enable command

■ Parameters needed (if any) to further specify the command

■ Switches needed (if any) to modify the command

■ Example(s) to illustrate the command usage

■ A "See Also" section to cross-reference to others with similar usage

ADD CDROM

Names a CD-ROM and adds it to the controller configuration.

Syntax

ADD CDROM *container-name scsi-port-target-lun*

Parameters

The following parameters are required for the ADD CDROM command:

- *container-name*
- *scsi-port-target-lun*

These parameters are described in the following paragraphs.

container-name

Assigns a name to the CD-ROM device. This container name is then used with the ADD UNIT command to create a single-disk unit.

The container name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a CD-ROM drive DISK*pttll*, where *pttll* is the device Port-Target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of disk drive and its SCSI location.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place one space between the port number, target number, and the LUN number when entering the PTL address.

- ❏ *port*—Designates the SCSI device port number, from 1 to 6, on which the disk resides.
- ❏ *target*—Designates the SCSI target ID of the disk on the port. There can be up to 14 devices addressed. The device storage enclosures use target IDs of 00-05 and 08-15 (the controllers use 06 and 07).
- ❏ *lun*—Indicates the LUN of the disk drive, and is always zero.

> **NOTE:** Refer to the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J for OpenVMS Release Notes* to determine whether the disk drive you are planning to use is compatible with the controller.

Switches

The following switch is available with the ADD CDROM command:

TRANSFER_RATE_REQUESTED=<value>

This switch is described in the following paragraph.

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=20MHZ default)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

Specifies the maximum data transfer rate at which the controller is to communicate with the disk drive. The transfer rate might need to be limited to accommodate long cables between the controllers and the device.

Examples

To add CDR10000 at port 1, target 0, LUN 0, enter:

ADD CDROM CDR10000 1 0 0

To add CDR40200 as a disk drive to port 4, target 2, LUN 0, enter:

ADD CDROM CDR40200 4 2 0

To add a CD-ROM drive named CDR30200 as a disk to port 3, target 2, LUN 0 and set the data transfer rate to 10 MHz, enter the following on one line:

ADD CDROM CDR30200 3 2 0 TRANSFER_RATE_REQUESTED=10MHZ

See also

ADD UNIT
DELETE *container-name*
LOCATE
SHOW DEVICES
SET *container-name*

ADD DISK

Names a disk drive and adds it to the controller configuration. This command is typically used when disk drives are added to a previously configured subsystem. During initial setup, the entire disk set is customarily added to the controller's configuration through the CONFIG utility.

Syntax

ADD DISK *container-name scsi-port-target-lun*

Parameters

The following parameters are required for the ADD DISK command:

- *container name*

- *scsi-port-target-lun*

These parameters are described in the following paragraphs.

container-name

Assigns a name to the disk device. This container name is then used with the ADD UNIT command to create a logical unit. It is also used as a parameter in the adding of a storageset.

The disk name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a disk drive DISK*pttll*, where *pttll* is the disk's Port-Target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of disk drive and its SCSI location.

scsi-port-target-lun

> Indicates the SCSI device PTL address. Place one space between the port number, target number, and the LUN number when entering the PTL address.
>
> ❏ *port*—Designates the SCSI device port number, from 1 to 6, on which the disk resides.
>
> ❏ *target*—Designates the SCSI target ID of the disk on the port. There can be up to 14 devices addressed. The device storage enclosures use target IDs of 00-05 and 08-15 (the controllers use 06 and 07).
>
> ❏ *lun*—Indicates the LUN of the disk drive and is always zero.
>
> > **NOTE:** Refer to the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J for OpenVMS Release Notes* to determine whether the disk drive you are planning to use is compatible with the controller.

Switches

The following switches are available with the ADD DISK command:

■ *TRANSFER_RATE_REQUESTED*

■ *TRANSPORTABLE*

These switches are described in the following paragraphs.

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=20MHZ (default)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

> Specifies the maximum data transfer rate at which the controller is to communicate with the disk drive. The transfer rate might need to be limited to accommodate long cables between the controllers and the device.

TRANSPORTABLE
NOTRANSPORTABLE (default)

Indicates whether a disk drive can be accessed exclusively by StorageWorks controllers or may be used by non-StorageWorks systems:

❏ *TRANSPORTABLE* = disk drives do not contain any metadata or restricted areas. Therefore, transportable disks forfeit the advantage metadata provides, but can be moved to a non-StorageWorks environment with their data intact. Disks that are to be used in storagesets cannot be set as transportable.

❏ *NOTRANSPORTABLE* = the controller makes a small portion of the disk inaccessible to the host. This restricted space is used to store administrative information (metadata) used to improve data reliability, error detection, and the ability to recover data. As a result of this metadata, only StorageWorks controllers can retrieve data from non-transportable devices.

If you specify the *NOTRANSPORTABLE* switch and there is no metadata on the unit, the unit must be initialized. If you specify *TRANSPORTABLE* for a disk that was originally initialized as a *NOTRANSPORTABLE*, you should initialize the disk.

> **NOTE:** Compaq recommends you avoid using transportable disks unless there is no other way to move the data.

Examples

To add DISK10000 at port 1, target 0, LUN 0, enter:

ADD DISK DISK10000 1 0 0

To add DISK40200 as a transportable disk drive to port 4, target 2, LUN 0, enter:

ADD DISK DISK40200 4 2 0 TRANSPORTABLE

To add a disk drive named DISK30200 as a non-transportable disk to port 3, target 2, LUN 0 and set the data transfer rate to 10 MHz, enter the following on one line:

ADD DISK DISK30200 3 2 0 NOTRANSPORTABLE TRANSFER_RATE_REQUESTED=10MHZ

To create a host-addressable unit after the disk is added, enter:

INITIALIZE DISK40200

ADD UNIT D199 DISK40200

See also

ADD UNIT
DELETE *container-name*
INITIALIZE
LOCATE
SHOW DISKS
SHOW DEVICES
SET *container-name*

ADD LOADER

Names a device loader (optical or tape) and adds it to the controller configuration.

Syntax

ADD LOADER *container-name scsi-port-target-lun*

Parameters

The following parameters are required for the ADD LOADER command:

- *container-name*
- *scsi-port-target-lun*

These parameters are described in the following paragraphs.

container-name

Assigns a name to the device loader. This is the name used with the ADD PASSTHROUGH command to create a passthrough container to access the loader.

The name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a loader LOAD*n*, where *n* is a sequentially assigned, unique identifier. Other naming conventions are acceptable, but this naming convention presents both the type of container and its unique identifier in an intuitive manner.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place one space between the port number, target number, and the LUN number when entering the PTL address.

- ❏ *port*—Designates the SCSI device port number, from 1 to 6, on which the disk resides.
- ❏ *target*—Designates the SCSI target ID of the loader on the port. There can be up to 14 devices addressed. The device storage enclosures use target IDs of 00-05 and 08-15 (the controllers use 06 and 07).
- ❏ *lun*—Indicates the LUN of the loader, and is usually 1.

Switches

The following switch is available with the ADD CDROM command:

TRANSFER_RATE_REQUESTED=<value>

This switch is described in the following paragraph.

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=20MHZ default)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

Specifies the maximum data transfer rate at which the controller is to communicate with the disk drive. The transfer rate might need to be limited to accommodate long cables between the controllers and the device.

Examples

To add loader LOAD421 at port 2, target 0, LUN 1, enter:

```
ADD LOADER LOAD421 2 0 1
ADD PASSTHROUGH PASS1 LOAD421
ADD UNIT D100 PASS1
```

See also

ADD PASSTHROUGH
DELETE *container-name*
SHOW *loader*

ADD MIRRORSET

Names a mirrorset and adds it to the controller configuration. Mirrorsets are often referred to as RAID 1 storagesets. The data capacity of a RAID 1 is determined by the storage size of the smallest member (base member size).

Syntax

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

Parameters

The following parameters are required for the ADD MIRRORSET command:

■ *mirrorset-name*

■ *disk-name*

These parameters are described in the following paragraphs.

mirrorset-name

Assigns a name to the mirrorset container. This is the name used with the ADD UNIT command to identify the mirrorset as a host-addressable unit.

The mirrorset name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a mirrorset MIRR*n*, where *n* is a sequentially assigned, unique identifier. Other naming conventions are acceptable, but this naming convention presents both the type of container and its unique identifier in an intuitive manner.

disk-name1 [disk-nameN]

Identifies the disk drives making up the mirrorset. A mirrorset may contain one to six disk drives.

Switches

The following switches are available with the ADD DISK command:

■ *COPY*

■ *POLICY*

■ *READ_SOURCE*

These switches are described in the following paragraphs.

COPY=FAST
COPY=NORMAL (default)

Sets the speed at which the controller copies data to a new member from normal mirrorset members:

■ Specify *COPY=FAST* to allow the creation of mirrored data to take precedence over other controller operations. When you specify COPY=FAST, the controller uses more resources to create the mirrored data and copying takes less time. However, overall controller performance is reduced.

■ Specify *COPY=NORMAL* when operations performed by the controller should take priority over the copy operation. If you specify *COPY=NORMAL* creating the mirrored data has a minimal impact on performance.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement disk from the spareset when a mirrorset member fails.

■ Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the mirrorset was initialized). If there is more than one disk drive in the spareset that meets the criteria, the controller selects a disk drive with the best performance.

■ Specify *POLICY=BEST_PERFORMANCE* to allow the software to choose a replacement disk drive from the spareset with the best performance. The controller attempts to select a disk on a different port than existing mirrorset members. If more than one disk drive in the spareset matches the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size.

■ Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. The mirrorset operates in a reduced state until a *POLICY=BEST_FIT* or *POLICY=BEST_PERFORMANCE* is selected or a member is manually placed in the mirrorset (see "SET mirrorset-name" on page 2–87).

READ_SOURCE=disk-name
READ_SOURCE=LEAST_BUSY (default)
READ_SOURCE=ROUND_ROBIN

Selects the mirrorset member used by the controller to satisfy a read request:

■ Specify the *READ_SOURCE=disk-name* of a specific member to which you want the controller to direct all read requests. If the member fails out of the mirrorset, the controller selects the first normal member it finds to satisfy its read requests.

■ Specify *READ_SOURCE=LEAST_BUSY* to direct read requests to the mirrorset disk with the least amount of work in its queue. If multiple disks have equally short queues, the controller queries normal disks for each read request as it would when *READ_SOURCE=ROUND_ROBIN* is specified.

■ Specify *READ_SOURCE=ROUND_ROBIN* to sequentially direct read requests to each local mirrorset disk. The controller equally queries all normal disks for each read request.

Examples

To create a a mirrorset named MIRR1 consisting of disks DISK10000, DISK20100, and DISK30200, enter:

    ADD MIRRORSET MIRR1 DISK10000 DISK20100 DISK30200

To create a host-addressable unit after the mirrorset MIRR1 has been created, enter:

    INITIALIZE MIRR1
    ADD UNIT D104 MIRR1

See also

ADD DISK
ADD UNIT
DELETE *container-name*
INITIALIZE
MIRROR
REDUCE
SHOW *mirrorset-name*
SHOW MIRRORSETS
SHOW STORAGESETS
UNMIRROR

ADD OPTICAL

Names an optical disk drive and adds it to the controller configuration.

Syntax

ADD OPTICAL *container-name scsi-port-target-lun*

Parameters

The following parameters are required for the ADD OPTICAL command:

- *container-name*
- *scsi-port-target-lun*

These parameters are described in the following paragraphs.

container-name

Assigns a name to the optical device. This container name is then used with the ADD UNIT command to create a logical unit.

The disk name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name an optical drive OPT*pttll*, where *pttll* is the device Port-Target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of disk drive and its SCSI location.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place one space between the port number, target number, and the LUN number when entering the PTL address.

- ❏ *port*—Designates the SCSI device port number, from 1 to 6, on which the disk resides.

- ❏ *target*—Designates the SCSI target ID of the optical device on the port. There can be up to 14 devices addressed. The device storage enclosures use target IDs of 00-05 and 08-15 (the controllers use 06 and 07).

- ❏ *lun*—Indicates the LUN of the optical device, and is always zero.

> **NOTE:** Refer to the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J for OpenVMS Release Notes* to determine whether the disk drive you are planning to use is compatible with the controller.

Switches

The following switch is available with the ADD OPTICAL command:

TRANSFER_RATE_REQUESTED

This switch is described in the following paragraph.

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=20MHZ (default)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

Specifies the maximum data transfer rate at which the controller is to communicate with the disk drive. The transfer rate might need to be limited to accommodate long cables between the controllers and the device.

Examples

To add OPT10000 at port 1, target 0, LUN 0, enter:

ADD OPTICAL OPT10000 1 0 0

To add an optical drive named OPT30200 as a disk to port 3, target 2, LUN 0 and set the data transfer rate to 10 MHz, enter the following on one line:

ADD OPTICAL OPT30200 3 2 0 TRANSFER_RATE_REQUESTED=10MHZ

To create a host-addressable unit after the disk is added, enter:

ADD UNIT D199 OPT10000

See also

ADD UNIT
DELETE *container-name*
INITIALIZE
LOCATE
SHOW DISKS
SHOW DEVICES
SET *container-nam*

ADD PASSTHROUGH

Names a passthrough container and adds the container to the controller configuration. Passthrough containers allow the host to "pass" SCSI commands directly to the passthrough container. Optical drive loaders and tape loaders are examples of passthrough containers.

Syntax

ADD PASSTHROUGH *passthrough-name container-name*

Parameters

The following parameters are required for the ADD PASSTHROUGH command:

- *passthrough-name*

- *container-name*

These parameters are described in the following paragraphs.

passthrough-name

Assigns a name to the passthrough device. This container name is then used with the ADD UNIT command to create a logical unit.

The passthrough container name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a passthrough device PASS*pttll*, where *pttll* is the device Port-Target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of disk drive and its SCSI location.

container-name

Assigns a name to the passthrough container. This name is used with the ADD UNIT command to identify the passthrough container as a host-addressable unit.

The passthrough container name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a passthrough device container name as PAS*pttll*, where *pttll* is the device Port-Target-LUN address. Although other naming conventions are acceptable, this one presents the user with the type of disk drive and its SCSI location.

Switches

There are no switches with this command.

Examples

To create a passthrough container named PASS1 from loader LOAD421, enter:

```
ADD LOADER LOAD421 4 2 1
ADD PASSTHROUGH PASS1 LOAD421
ADD UNIT D100 PASS1
```

See also

ADD CDROM
ADD LOADER
ADD OPTICAL
ADD UNIT
DELETE *container-name*
SHOW

ADD RAIDSET

Names a RAIDset and adds the RAIDset to the controller configuration. RAIDsets can contain from 3 to 14 members.

Compaq RAIDsets are often referred to as RAID level 3/5 storagesets because they use the best characteristics of RAID level 3 and RAID level 5. The number of members in the storageset is determined by the number of containers (logical disk units) specified by the *container-name* parameter in the command. The data capacity of the RAIDset is determined by the storage size of the smallest member (base member size).

Syntax

ADD RAIDSET *RAIDset-name container-name1 container-name2 container-name3 [container-nameN]*

Parameters

The following parameters are available to the ADD RAIDSET command:

■ *RAIDset-name*

■ *container-name*

These parameters are described in the following paragraphs.

RAIDset-name

Assigns a name to the RAIDset. This is the name used with the ADD UNIT command to identify the RAIDset as a host-addressable unit.

The RAIDset name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a RAIDset RAID*n*, where *n* is a sequentially assigned, unique identifier. This naming convention presents the user with the type of container and its unique identifier.

container-name1 container-name2 container-name3 [container-nameN]

Identifies the containers making up the RAIDset. RAIDsets must include at least 3 containers and no more than 14.

Switches

The following switches are available with the ADD RAIDSET command:

■ *POLICY*

■ *COPY*

■ *RECONSTRUCT*

■ *REDUCED*

These switches are described in the following paragraphs.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement member from the spareset when a RAIDset member fails:

■ Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size of the remaining members of the RAIDset. If more than one disk drive in the spareset is the correct size, the controller selects a disk drive giving the best performance.

■ Specify *POLICY=BEST_PERFORMANCE* to choose a replacement disk drive from the spareset resulting in the best performance of the RAIDset. The controller attempts to select a disk on a different port than existing RAIDset members. If there is more than one disk drive in the spareset matching the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size of the RAIDset.

■ Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. This RAIDset operates in a reduced state until you select either *POLICY=BEST_PERFORMANCE* or *POLICY=BEST_FIT*, or manually place a member in the RAIDset. See "SET RAIDset-name," on page 2–93, for more information regarding this procedure.

COPY=FAST
COPY=NORMAL (default)

Sets the speed at which the controller copies data to a new member from normal RAIDset members when data is being mirrored to the storageset's disk drives:

■ Specify *COPY=FAST* to allow the creation of RAIDset data to take precedence over other controller operations. When you specify *COPY=FAST*, the controller uses more resources to create the RAIDset data, and copying takes less time. However, overall controller performance is reduced.

■ Specify COPY=NORMAL when operations performed by the controller should take priority over the copy operation. If you specify COPY=NORMAL, creating the RAIDset data has a minimal impact on performance.

RECONSTRUCT=FAST
RECONSTRUCT=NORMAL (default)

Sets the speed at which the controller reconstructs data to a new RAIDset disk that replaces the failed disk:

■ Specify FAST to allow the reconstruct process to take precedence over other controller operations. When the *RECONSTRUCT=FAST* switch is specified, the controller uses more resources to perform the reconstruction. Reconstruction takes less time, but overall controller performance is reduced during reconstruction.

■ Specify *NORMAL* to balance other controller operations with the reconstruct operation. The controller uses relatively few resources to perform the reconstruct process and there is little impact on performance.

REDUCED
NOREDUCED (default)

Permits the addition of a RAIDset that is missing a member (due to a failure):

■ Specify the *REDUCED* switch when you add a reduced RAIDset (a RAIDset that is missing one member).

  NOTE: Verify that the RAIDset contains all but one of its disks before specifying the *REDUCED* switch.

■ Specify the *NOREDUCED* switch when all the disks making up the RAIDset are present—for instance, when creating a new RAIDset.

Examples

To create a RAIDset named RAID9 that contains disks DISK10000, DISK20100, and DISK30200, enter:

```
ADD RAIDSET RAID9 DISK10000 DISK20100 DISK30200
```

To create a RAIDset named RAID8 that contains disks DISK10000, DISK20100, and DISK30200, and uses the *BEST_FIT* switch to indicate the replacement policy, enter:

```
ADD RAIDSET RAID8 DISK10000 DISK20100 DISK30200 POLICY=BEST_FIT
```

> **NOTE:** Enter the ADD RAIDSET command on one line.

To create a RAIDset named RAID8 that contains disks DISK10000, DISK20100, and DISK30200, then initialize it and make it into a host-addressable unit, enter:

```
ADD RAIDSET RAID8 DISK10000 DISK20100 DISK30200
INITIALIZE RAID8
ADD UNIT D70 RAID8
```

To create a three-member RAIDset from the members of a reduced four-member RAIDset, enter the following (do not initialize the RAIDset again):

> ⚠ **CAUTION:** Data contained on the RAIDset will be erased if you reinitialize the RAIDset.

```
ADD RAIDSET RAID6 DISK10300 DISK20400 DISK30200 REDUCED
```

See also

ADD UNIT
DELETE *container-name*
SET RAIDSET
SHOW RAIDSET
SHOW *RAIDset-name*
SHOW STORAGESETS
INITITALIZE

ADD SPARESET

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

Syntax

ADD SPARESET *disk-name*

Parameters

disk-name

Indicates the name of the disk drive being added to the spareset. Only one disk drive can be added to the spareset with each ADD SPARESET command.

Switches

There are no switches associated with this command.

Example

To add disk drives named DISK20200 and DISK30300 to a spareset, enter:

    ADD SPARESET DISK20200
    ADD SPARESET DISK30300

See also

DELETE SPARESET
SHOW SPARESET
SHOW STORAGESETS

ADD STRIPESET

Names a stripeset and adds it to the controller configuration. A stripeset can contain from 2 to 24 members. Stripesets are also referred to as RAID level 0 storagesets. The number of members in the stripeset is determined by the number of *container-name* parameters specified.

Syntax

ADD STRIPESET *stripeset-name container-name1 container-name2 [container-nameN]*

Parameters

The following parameters are required for the ADD STRIPESET command:

■ *stripeset-name*

■ *container-name*

These parameters are described in the following paragraphs.

stripeset-name

Assigns a name to the stripeset. This is the name used with the ADD UNIT command to identify the stripeset as a host-addressable unit.

The stripeset name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a stripeset STRIPE*n*, where n is a sequentially assigned, unique identifier. This naming convention presents to the user both the type of container and its unique identifier.

container-name1 container-name2 [container-nameN]

Identifies the members (disk drives or mirrorsets) making up the stripeset. Stripesets can contain between 2 and 24 members.

The container name each must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a stripeset container CONT*n*, where n is a sequentially assigned, unique identifier. This naming convention presents to the user both the type of container and its unique identifier.

Switches

There are no switches associated with this command.

Examples

To create a stripeset named STRIPE1 that contains disks DISK10000, DISK20100, and DISK30200, enter:

```
ADD STRIPESET STRIPE1 DISK10000 DISK20100 DISK30200
```

To create a stripeset named STRIPE1 and then create a logical unit from it, enter:

```
INITIALIZE STRIPE1
ADD UNIT D103 STRIPE1
```

To create a two-member striped mirrorset (a stripeset whose members are mirrorsets), and a logical unit from it, enter the following:

> NOTE: Because you can initialize the stripeset, you do not need to individually initialize the mirrorset members.

```
ADD MIRRORSET MR1 DISK10000 DISK20100
ADD MIRRORSET MR2 DISK30200 DISK40300
ADD STRIPESET STRIPE1 MR1 MR2
INITIALIZE STRIPE1
ADD UNIT D104 STRIPE1
```

See also

ADD UNIT
ADD MIRRORSET
DELETE *container-name*
INITIALIZE
SHOW STORAGESET
SHOW STRIPESET
SHOW *stripeset-name*

ADD TAPE

Names a tape drive and adds it to the controller configuration.

Syntax

ADD TAPE *tape-name port-target-LUN*

Parameters

The following parameters are required for the ADD TAPE command:

■ *tape-name*

■ *port-target-LUN*

These parameters are described in the following paragraphs.

tape-name

Assigns a name to the tape drive. This is the name used with the ADD UNIT command to identify the tape drive as a host-addressable unit.

The tape name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a tape container TAPE*n*, where n is a sequentially assigned, unique identifier. This naming convention presents both the type of container and its unique identifier.

scsi port-target-LUN

Indicates the SCSI device PTL address. Place one space between the port number, target number, and the LUN number when entering the PTL address.

❏ *port*—Designates the SCSI device port number, from 1 to 6, on which the disk resides.

❏ *target*—Designates the SCSI target ID of the tape on the port. There can be up to 14 devices addressed. The device storage enclosures use target IDs of 00-05 and 08-15 (the controllers use 06 and 07).

❏ *lun*—Indicates the LUN of the tape drive, and is always zero.

> **NOTE:** Refer to the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J for OpenVMS Release Notes* to determine whether the disk drive you are planning to use is compatible with the controller.

Switches

The following switch is available with the ADD TAPE command:

TRANSFER_RATE_REQUESTED

This switch is described in the following paragraph.

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=20MHZ (default)
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

Specifies the maximum data transfer rate at which the controller is to communicate with the disk drive. The transfer rate might need to be limited to accommodate long cables between the controllers and the device.

Examples

To create a tape drive named TAPE1 to port 1, target 0, LUN 0, enter:

```
ADD TAPE TAPE100 1 0 0
ADD UNIT T102 TAPE100
```

See also

ADD UNIT
DELETE *container-name*
SET UNIT
SHOW TAPES

ADD UNIT

Creates a logical unit from a specified container. The controller maps all requests from the host to the logical-unit number as requests to the container specified in the ADD UNIT command. Units can be created from all container types:

■ Devices such as CD-ROMs, disks, optical storage, tapes, and passthrough

■ Stripesets

■ Mirrorsets

■ RAIDsets

■ Partitions

If you add a newly created container to your subsystem, you must initialize it before it can be added as a logical unit. If you are adding a container that has data on it that you want to maintain, do not initialize it; it will be added as a logical unit.

> △ **CAUTION:** Adding a unit immediately makes that unit available to all host connections unless the port access switch is specified. There is more information about this under the description of the *THIS/OTHER_PORT_1/2_ACCESS=* switch.

Syntax

ADD UNIT *unit-number container-name*

Parameters

The following parameters are required for the ADD UNIT command:

■ *unit-number*

■ *container-name*

These parameters are described in the following paragraphs.

unit-number

Assigns a number to the unit being created from a device, storageset, or partition in the subsystem. The unit number consists of a device-type letter followed by the logical unit number (0-4094). The device type letter is either:

■ "D" for all container types (including passthrough), except for tape devices

■ "T" for non-passthrough tape devices

For example, the unit number of a non-tape logical unit 544 is D544.

container-name

Specifies the name of the container (disk drive, device, storageset, or partition) being used to create the unit.

Switches

Table 2–1 lists all switches for the ADD UNIT command and identifies which switches may be used with each type of device or storageset. Descriptions of each switch follow the table.

Table 2–1 ADD UNIT Switches for New Containers

Switch	RAIDset	Stripeset	Mirrorset	N0transportable Disk	Transportable Disk	Passthrough	CD-ROM	Optical	Tape
MAX_READ_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓		✓	✓	✓
MAX_WRITE_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓		✓	✓	✓
MAXIMUM_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓		✓	✓	✓
PARTITION=partition-number	✓	✓	✓	✓					
PREFERRED_PATH *NOPREFERRED_PATH*	✓	✓	✓	✓	✓	✓	✓	✓	✓
READ_CACHE *NOREAD_CACHE*	✓	✓	✓	✓	✓		✓	✓	

Table 2–1 ADD UNIT Switches for New Containers (Continued)

Switch	Container Type	RAIDset	Stripeset	Mirrorset	N0transportable Disk	Transportable Disk	Passthrough	CD-ROM	Optical	Tape
READAHEAD_CACHE *NOREADAHEAD_CACHE*		✓	✓	✓	✓	✓		✓	✓	
RUN *NORUN*		✓	✓	✓	✓	✓	✓	✓	✓	✓
THIS_PORT_1_ACCESS={NONE|READ|FULL} *OTHER_PORT_1_ACCESS={NONE|READ|FULL}*		✓	✓	✓	✓	✓	✓	✓	✓	✓
THIS_PORT_2_ACCESS={NONE|READ|FULL} *OTHER_PORT_2_ACCESS={NONE|READ|FULL}*		✓	✓	✓	✓	✓	✓	✓	✓	✓
WRITE_PROTECT *NOWRITE_PROTECT*		✓	✓	✓	✓	✓	✓		✓	✓
WRITEBACK_CACHE *NOWRITEBACK_CACHE*		✓	✓	✓	✓					

NOTE: The *NORUN* switch cannot be specified for partitioned units.

MAX_READ_CACHED_TRANSFER_SIZE=32 (default)
MAX_READ_CACHED_TRANSFER_SIZE=n

Sets the largest number of read blocks to be cached by the controller. The controller will not cache any transfers over the size set. Acceptable values are 0 through 2048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and write-back cache when set on a controller that has read and write-back caching.

MAX_WRITE_CACHED_TRANSFE_SIZE=32 (default)
MAX_WRITE_CACHED_TRANSFER_SIZE=n

Sets the largest number of write blocks to be cached by the controller. The controller will not cache any transfers over the size set. Acceptable write block sizes are 0 through 2048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and write-back cache when set on a controller that has read and write-back caching.

MAXIMUM_CACHED_TRANSFER_SIZE=32 (default)
MAXIMUM_CACHED_TRANSFER_SIZE=n

Sets the largest number of read and write blocks to be cached by the controller. The controller will not cache any transfers over the size set. Acceptable write block sizes are 0 through 2048.

The *MAXIMUM_CACHED_TRANSFER_SIZE* switch affects both read and write-back cache when set on a controller that has read and write-back caching. The setting of this switch has the effect of setting both the *MAX_READ_CACHED_TRANSFER_SIZE* and the *MAX_WRITE_CACHED_TRANSFER_SIZE* switches.

PARTITION=partition-number

Identifies the partition-number for a partition on a container. The *partition-number* identifies the partition associated with the unit number being added. Use the SHOW *container-name* command to find the partition numbers used by a storageset or a single-disk unit.

> **NOTE:** Transportable units cannot be partitioned. All partitions on a container must be addressed through the same controller. If you add a unit for a partition and specify the preferred path switch, all partitions on that container inherit the same path.

PREFERRED_PATH=OTHER_CONTROLLER
PREFERRED_PATH=THIS_CONTROLLER
NOPREFERRED_PATH (default)

The *PREFERRED_PATH* switch allows you to balance the 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.

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.

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

■ When no preferred path is assigned, the unit is targeted through the controller which detects the unit first after the controllers start.

■ Select *PREFERRED_PATH=THIS_CONTROLLER* to instruct "this controller" to bring the units online.

■ Select *PREFERRED_PATH=OTHER_CONTROLLER* to instruct the "other controller" to bring the units online.

> **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 inherit the same preferred path setting.

READ_CACHE (default)
NOREAD_CACHE

Sets the controller's read-cache policy function. When *READ_CACHE* is selected, and the controller receives a read request from the host, the following events occur: the controller reads the data from the disk drives, delivers it to the host, and stores the data in its cache module. Subsequent reads for the same data will take the data from cache rather than accessing the data from the disks.

Read caching improves performance in almost all situations. Therefore, it is recommended you leave its default setting, *READ_CACHE*, enabled. However, under certain conditions, such as when performing a backup, read caching may not be necessary since only a small amount of data is cached. In such instances, it may be beneficial to disable the read cache function and remove the processing overhead associated with caching data.

READAHEAD_CACHE (default)
NOREADAHEAD_CACHE

Enables the controller to keep track of read I/Os. If the controller detects sequential read I/Os from the host, it will then try to keep ahead of the host by reading the next sequential blocks of data (those the host has not yet requested) and putting the data in cache. This process is sometimes referred to as prefetch. The controller can detect multiple sequential I/O requests across multiple units.

Read-ahead caching improves host application performance since the data will be read from the controller cache instead of disk. Read-ahead caching is the default for units.

If you are adding a unit that is not expected to get sequential I/O requests, select *NOREADAHEAD_CACHE* for the unit.

RUN (default)
NORUN

Controls the unit's availability to the host:

- Specify *RUN* to make a unit available to the host.

- Specify *NORUN* to make a unit unavailable to the host and to cause any data in cache to be flushed to one or more drives. *NORUN* spins down all the disks used in the unit. The drives making up the unit spin down after the data has been completely flushed.

> **NOTE:** Do not specify the *RUN* / *NORUN* switches for partitions.

THIS_PORT_1_ACCESS=<FULL, READ, or NONE>
THIS_PORT_2_ACCESS=<FULL, READ, or NONE>
OTHER_PORT_1_ACCESS=<FULL, READ, or NONE>
OTHER_PORT_2_ACCESS=<FULL, READ, or NONE>

Each unit is accessed in one of the following modes:

- *FULL* - read and write

- *READ* - read only

- *NONE* - no read or write access

Port access switches that are unspecified are given the default value of *READ* if the CLI command SET *controller MULTI_CLUSTER* was successfully executed last.

Port access switches that are unspecified are given the default value of *FULL* if the CLI command SET *controller NOMULTI_CLUSTER* was successfully executed last.

WRITE_PROTECT
NOWRITE_PROTECT(default)

Specifies whether data contained on the selected unit can be overwritten:

- Specify *WRITE_PROTECT* to prevent host write operations to the unit. However, the controller may still write to a write-protected RAIDset to satisfy a reconstruct pass or to reconstruct a newly replaced member. Additionally, metadata, reconstruct, and copy writes are still allowed to RAIDsets and mirrorsets.

- Specify *NOWRITE_PROTECT* to allow the host to write data to the unit. This allows the controller to overwrite existing data. *NOWRITE_PROTECT* is the default for transportable disks.

WRITEBACK_CACHE
NOWRITEBACK_CACHE

Enable or disable the write-back data caching function of the controller. The controller's write-back caching feature improves write performance.

> **NOTE:** *NOWRITEBACK_CACHE* is the default on transportable disks. *WRITEBACK_CACHE* is the default on notransportable disks.

- Specify *WRITEBACK_CACHE* for all new RAIDsets, mirrorsets, and units that you want to take advantage of the controller write-back caching feature.

- Specify *NOWRITEBACK_CACHE* for units that you want data from the host to go directly to the specified device(s) without being cached.

Specifying *NOWRITEBACK_CACHE* enables only write-through caching. In write-through caching, when the controller receives a write request from the host it places the data in its cache module, writes the data to the disk drives, then notifies the host when the write operation is complete. This process is called write-through caching because the data passes through—and is stored in—the cache memory on its way to the disk drives. Write-through caching is only enabled when write-back caching is disabled, or when the *MAXIMUM_CACHED_TRANSFER_SIZE* switch is set to zero.

> **NOTE:** The controller may take up to five minutes to flush data contained within the write-back cache when you specify the *NOWRITEBACK_CACHE* switch.

Examples

To create unit D102 from a single-disk drive named DISK10000 and set the host access to the unit through "this controller," enter:

    ADD UNIT D102 DISK10000 PREFERRED_PATH=THIS_CONTROLLER

To create unit D107 from a RAIDset named RAID9 and instruct the unit to take advantage of the controller's write-back caching feature.

    ADD RAIDSET RAID9 DISK10100 DISK20100 DISK30100 DISK40100
    INITIALIZE RAID9
    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. Errors are displayed (even after the error condition has been rectified) until the controller is restarted or this command is entered.

NOTE: This command does not clear the error condition, it only stops the CLI from displaying it.

There are three message types:

■ General information

■ Warning (user may want to examine, but the command will be executed)

■ Error (command will not execute)

Syntax

CLEAR_ERRORS CLI

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To clear any message enter:

```
CLEAR_ERRORS CLI
```

See also

CLEAR_ERRORS *controller* INVALID_CACHE
CLEAR_ERRORS *unit-number* LOST_DATA
CLEAR_ERRORS *device-name* UNKNOWN
CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

CLEAR_ERRORS *this_ controller* INVALID_CACHE
CLEAR_ERRORS *other_ controller* INVALID_CACHE

Clears an invalid cache error and allows the controller and cache to resume operation. If the error is due to a mirrored-cache configuration that is incorrect, the controller indicates mirrored mode status after the error is cleared.

Use this command for the following situations:

■ When the controller or cache modules have been replaced resulting in mismatched data between the controllers.

■ When the controller or cache module is replaced while data is still in cache and not properly flushed with the SHUTDOWN or SET NOFAILOVER commands.

Syntax

CLEAR_ERRORS *controller* INVALID_CACHE

> **NOTE:** Spell out INVALID_CACHE when using this command.

Parameters

The following parameters are required for the CLEAR_ERRORS INVALID_CACHE command:

■ *controller*

■ *data-retention policy*

These parameters are described in the following paragraphs.

controller

Identifies which controller is to receive the CLEAR_ERRORS command. You must specify *this_controller* (the one connected to the CLI maintenance terminal) or *other_controller.*

data-retention policy

Instructs the controller how to handle write-back cached data:

■ Specify *nodestroy_unflushed_data* (default) to retain the cached data and discard controller information.

■ Specify *destroy_unflushed_data* to retain the controller information and discard the cached data.

The *nodestroy_unflushed_data* parameter is used in the following situations:

■ If the controller module has been replaced.

■ If the controller's nonvolatile memory (NVMEM) has lost its contents.

The *destroy_unflushed_data* parameter is used in the following situations:

■ If the cache module has been replaced.

■ Any other reason not listed above.

> **CAUTION:** Specifying the *destroy_unflushed_data* parameter destroys data remaining in cache, which can result in data loss.

Switches

There are no switches associated with this command.

Examples

To clear an invalid cache error on "this controller" after you have replaced a controller module, enter the following command on one line:

    CLEAR_ERRORS THIS_CONTROLLER INVALID_CACHE NODESTROY_UNFLUSHED_DATA

> **NOTE:** Because misuse of this command can cause data loss, both the command and the parameter DESTROY_UNFLUSHED_DATA OR NODESTROY_UNFLUSHED DATA must be written in their entirety. They cannot be abbreviated.

To clear an invalid cache error on the "other controller" after a cache module has been replaced, enter the following command on one line:

    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 *device-name* UNKNOWN

Use this command to force the controller to recognize a failed device, regardless of the controller's prior evaluation of the device's condition.

A device failure may cause the controller to label the device as unknown. When that happens, the controller does not check the device again to see if it has been repaired or if the error condition has been corrected. You must enter this command so the controller can recognize the device after the cause of the error has been corrected.

Syntax

CLEAR_ERRORS *device-name* UNKNOWN

Spell out UNKNOWN when using this command.

Parameters

device-name

Identifies the device with the unknown error.

Switches

There are no switches associated with this command.

Example

To force the controller to recognize a previously unknown device named DISK30000, enter:

CLEAR_ERRORS DISK30000 UNKNOWN

See also

CLEAR_ERRORS CLI
CLEAR_ERRORS INVALID_CACHE
CLEAR_ERRORS UNKNOWN
CLEAR_ERRORS UNWRITEABLE_DATA

CLEAR_ERRORS *unit-number* LOST_DATA

Clears lost data errors on a unit; all partitions on the unit's container are affected.

The controller reports a lost data error on the unit when you remove a write-back cache module or when the cache module contains unflushed data, possibly due to an interruption in the primary power source with no backup power present. The CLEAR_ERRORS *unit_number* LOST_DATA command clears the lost data error but does not recover the lost data.

> **NOTE:** Clearing lost data errors or lost data block errors on a RAIDset causes a reconstruction of all parity blocks. Clearing lost data errors or lost data block errors on a mirrorset causes members to normalize.

Syntax

CLEAR_ERRORS *unit-number* LOST_DATA

> **NOTE:** Spell out LOST_DATA when using this command.

> △ **CAUTION:** This command may cause data loss.

Parameters

unit-number

Identifies the unit on which the lost data error is to be cleared. The *unit-number* is the same name given to the unit when you added it to the controller's configuration with the ADD UNIT command.

Switches

There are no switches associated with this command.

Example

To clear the lost data error on disk unit number D103, enter:

CLEAR_ERRORS D103 LOST_DATA

See also

CLEAR_ERRORS CLI
CLEAR_ERRORS INVALID_CACHE
CLEAR_ERRORS UNKNOWN
CLEAR_ERRORS UNWRITEABLE_DATA

CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

Clears an unwriteable data error on a unit.

This command affects all partitions on the same container.

If a storageset or disk drive fails before its data has been written to it, the controller reports an unwriteable data error. The CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA command removes the data from the cache and clears the unwriteable data error.

CAUTION: This command will cause data loss.

Syntax

CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

> **NOTE:** Spell out UNWRITEABLE_DATA when using this command.

Parameters

unit-number

Identifies the unit having the unwriteable data error. The *unit-number* is the name given to the unit when it was created with the ADD UNIT command.

Switches

There are no switches associated with this command.

Example

To clear the unwriteable data error on disk unit D103, enter:

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

CONFIGURATION RESET

Erases the entire subsystem configuration data file stored in the non-volatile memory (NVRAM) of "this controller." The command sets the controller to a default configuration and shuts down the controller. It does **not** erase the configuration file that was stored on disk with the INITIALIZE *container name SAVE_CONFIGURATION* command.

> **NOTE:** Before issuing this command, make sure the subsystem configuration is saved.

- In single-controller subsystems, the configuration is saved on the disk array. If a container has the *SAVE_CONFIGURATION* switch specified when it is initialized (through the INITIALIZE command), the disks that constitute that unit will be able to save a copy of the configuration.

- For dual-redundant controllers, the configuration is stored in the companion controller.

Specify the CONFIGURATION RESET command on "this controller" in nofailover mode (SET NOFAILOVER CLI command) only. Enter this command to ensure all of the old configuration information is removed when a controller module is moved from one subsystem to another.

Dual-redundant controller subsystems have the configuration information stored on the "other" controller and therefore, do not need to use the INITIALIZE *container name SAVE_CONFIGURATION* command unless the subsystem is being upgraded (for example, both controllers are being replaced with newer versions).

- New subsystem configuration information can be re-entered by using the SET *this_controller* command.

- Saved subsystem configuration information can be re-established by using the CONFIGURATION RESTORE command.

- New subsystem configuration information can be re-established by using the SET FAILOVER COPY= command. This CLI command "copies" the configuration file from the defined controller's non-volatile memory and places it into the other controller's non-volatile memory. Use SET FAILOVER COPY=*other* executed from "this" controller to place the "other" controller's configuration file into "this" controller's non-volatile memory.

- Ensure subsystem configuration is stored on disk for single controller subsystems by way of the INITIALIZE *container-name SAVE_CONFIGURATION* or the CONFIGURATION SAVE command.

You can also initiate the CONFIGURATION RESET command from the controller operator control panel (OCP) by:

1. Pushing and holding Port Button 5 and momentarily pressing the RESET button.

2. Holding the port button until the Port Button LED starts flashing.

3. Releasing the Port Button.

Syntax

CONFIGURATION RESET

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To erase the subsystem configuration in "this" controller, enter:

CONFIGURATION RESET

See also

CONFIGURATION RESTORE
CONFIGURATION SAVE
INITIALIZE

CONFIGURATION RESTORE

Copies the subsystem configuration information from the configuration file saved on disk into the non-volatile memory (NVRAM) of "this controller." This command locates the most recent configuration file created on disk and restores it. This command causes a reboot and takes effect immediately.

> **CAUTION:** If a disk has been moved from one subsystem to another, and it contains configuration information, perform a CONFIGURATION SAVE command to synchronize the new disk with the subsystem configuration.

You can also initiate the CONFIGURATION RESTORE command from the controller operator control panel (OCP) by:

1. Pushing and holding Port Button 6 and momentarily pressing the RESET button.

2. Holding the port button until the Port Button LED starts flashing.

3. Releasing the Port Button.

If the controller you are installing was previously used in another subsystem, it will restart with the configuration that resides in its nonvolatile memory. If this differs from the current configuration of the subsystem, you can purge the controller's old configuration with the following command:

CONFIGURATION RESET

Use of the CONFIGURATION RESET command erases the entire configuration on the controller, restores the controller's default configuration, and performs a shutdown of the controller. Press the controller RESET button to restart the controller after the controller has been configured (refer to "Configuring an HSJ80 Controller" in the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Configuration Guide*).

> **NOTE:** The INITIALIZE *container-name SAVE_CONFIGURATION* command (page 2–59 of this guide) must be used to save the controller's configuration to a disk (see "SAVE_CONFIGURATION NOSAVE_CONFIGURATION (default)," on page 2–61).
> In order to reset the configuration (see "CONFIGURATION RESET," on page 2–41) or to restore the configuration (see "CONFIGURATION RESTORE," on page 2–43 and "CONFIGURATION SAVE," on page 2–45).

Syntax

CONFIGURATION RESTORE

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To restore the subsystem configuration into the memory of the controller in a single-controller subsystem, enter:

CONFIGURATION RESTORE

See also

CONFIGURATION RESET
CONFIGURATION SAVE
INITIALIZE

CONFIGURATION SAVE

Forces the controller to copy the subsystem configuration information in its NVRAM memory onto a configuration file on the disk array. This allows you to know exactly when a copy of the configuration is saved. The command takes effect immediately.

Use the INITIALIZE *container-name SAVE_CONFIGURATION* command to set up the location of the configuration file on the specified container and to save the current subsystem configuration.

The controller periodically updates the configuration file saved on the specified disk automatically. This provides the same result as executing the CONFIGURATION SAVE command. This automatic save feature works for both single and dual-redundant controller configurations.

NOTE: It is recommended that this command be used for single-controller subsystems only.

Syntax

CONFIGURATION SAVE

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To save the subsystem configuration into the memory of the controller in a single-controller subsystem, enter:

CONFIGURATION SAVE

See also

CONFIGURATION RESET
CONFIGURATION RESTORE
INITIALIZE

CREATE_PARTITION

Divides a non-transportable disk drive storageset into several separately addressable storage units. The command marks a specified percentage of a disk drive or storageset to be used as a separately addressable unit. You can divide any non-transportable disk or storageset into a maximum of eight partitions. Each partition can then be separately presented to the host.

Initialize all disks and storagesets before creating or destroying partitions.

Syntax

CREATE_PARTITION *container-name SIZE=percent*

Parameters

container-name

Identifies the disk or storageset to partition. This is the same name given to the disk or storageset when it was created with the ADD xxxx command (for example, ADD DISK, ADD STRIPESET, and so forth). Any disk, stripeset, mirrorset, striped mirrorset, or RAIDset can be partitioned. A transportable disk cannot be partitioned. You must initialize the container before creating the first partition.

Switches

The following switch is used with the CREATE_PARTITION command:

SIZE

This switch is described in the following paragraphs.

SIZE=percent
SIZE=LARGEST

Specifies the size of the partition to be created as a percentage of the total container's storageset size:

■ Specify *SIZE=percent* to create a partition on the specified container that is a percentage of the container's total capacity. Up to 8 partitions may be created on any one container.

> **NOTE:** The resulting partition is slightly smaller than the size specified because metadata also occupies some of partition's allocated space.

■ Specify *SIZE=LARGEST* to:

❑ Have the controller create the largest partition possible from unused space on the disk or storageset.

❑ Create the last partition on a container. Because the remaining space is not equal to an exact percentage value, specifying LARGEST allows you to optimize use of the remaining space.

Example

To create a RAIDset named RAID9, divide it into four equal parts, and create host-addressable units for each partition, enter:

```
ADD RAIDSET RAID9 DISK10000 DISK20100 DISK30200
INITIALIZE RAID9
CREATE_PARTITION RAID9 SIZE=25
CREATE_PARTITION RAID9 SIZE=25
CREATE_PARTITION RAID9 SIZE=25
CREATE_PARTITION RAID9 SIZE=LARGEST
ADD UNIT D101 RAID9 PARTITION=1
ADD UNIT D102 RAID9 PARTITION=2
ADD UNIT D103 RAID9 PARTITION=3
ADD UNIT D104 RAID9 PARTITION=4
```

See also

ADD UNIT
DELETE *unit-number*
DESTROY PARTITION
SET *unit-number*
SHOW

DELETE *container-name*

Deletes a specified container belonging to the controller's configuration.

> **IMPORTANT:** A container cannot be deleted if it is in use by a higher-level container. For example, you cannot delete a disk belonging to a member of a RAIDset, or a RAIDset unit. To delete a member of one of these storagesets, you must first delete the higher-level container or containers.

> **NOTE:** This command does not delete spareset or failedsets. See the DELETE FAILEDSET and DELETE SPARESET commands for details.

When a storageset is deleted, the individual disks are free to be used by another container. If you create the container again with the exact same disk configuration, and none of the disks have been used for anything or initialized, then the container can be reassembled using its original disks.

Syntax

DELETE *container-name*

Parameters

container-name

Identifies the container to be deleted. This is the name given to the container when it was created using the ADD xxxx command (for example, ADD DISK, ADD STRIPESET, and so forth).

Switches

There are no switches associated with this command.

Examples

To delete a disk drive named DISK10000, enter:

DELETE DISK10000

To delete a stripeset named STRIPE1, enter:

DELETE STRIPE1

To delete a RAIDset named RAID9, enter:

DELETE RAID9

See also

DELETE FAILEDSET
DELETE SPARESET
UNMIRROR

DELETE FAILEDSET

Removes a disk drive from the failedset. The failedset contains disk drives that were:

■ Removed by the controller from RAIDsets and mirrorsets because they failed

■ Manually removed using the SET command (for example, SET *mirrorset-name REMOVE=disk-name)*

Enter the DELETE FAILEDSET command before physically removing failed members from the storage enclosure for testing, repair, or replacement.

You should consider all disk drives in the failedset as defective. Repair or replace disks found in the failedset.

Syntax

DELETE FAILEDSET *disk-name*

Parameters

disk-name

Identifies the disk you want to delete from the failedset. Only one disk at a time can be removed from a failedset.

Switches

There are no switches associated with this command.

Example

To delete DISK20200 from the failedset, enter:

DELETE FAILEDSET DISK20200

See also

SET FAILEDSET
SHOW FAILEDSET

DELETE SPARESET

Removes a disk drive from the spareset. The spareset contains disk drives that are available for use, but not yet added to the controller configuration.

Syntax

DELETE SPARESET *disk-name*

Parameters

disk-name

Identifies the disk drive being deleted from the spareset. Remove only one disk at a time from a spareset.

Switches

There are no switches associated with this command.

Example

To remove DISK20300 from the spareset, enter:

DELETE SPARESET DISK20300

See also

ADD SPARESET
SHOW SPARESET

DELETE *unit-number*

Deletes a unit from the subsystem configuration.

The DELETE command causes the flushing of any user data from the write-back cache to the disks and deletes the specified unit. The command deletes the association of the unit with its underlying device, storageset, RAIDset, or partition. The container and any data in it are left intact.

If any errors occur when trying to flush the user data, the logical unit is not deleted. To delete a unit that has existing errors, you must clear all the errors using a CLEAR_ERRORS command.

Syntax

DELETE *unit-number*

Parameters

unit-number

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

Switches

There are no switches associated with this command.

Example

This example shows how to delete disk unit number D103:

DELETE D103

See also

ADD UNIT
CLEAR_ERRORS LOST_DATA
CLEAR_ERRORS UNWRITEABLE_DATA
DELETE *container-name*
DELETE FAILEDSETS
DELETE SPARESETS
DESTROY_PARTITION

DESTROY_PARTITION

Removes a partition from a container. Marks the area reserved for a partition as available. The available area is then consolidated with any adjacent free areas.

> ⚠ **CAUTION:** Data contained on a partition is lost when you enter the DESTROY_PARTITION command.

You cannot destroy a partition that has been assigned a unit number. You must first enter the DELETE *unit-number* command to delete the unit using the partition.

After a partition is destroyed, the container from which it was created must be initialized

Syntax

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

Parameters

The following parameters are available to the DESTROY_PARTITION command:

■ *container-name*

■ *partition-number*

These parameters are described in the following paragraphs.

container-name

Identifies the disk or storageset containing the partition to be destroyed. This is the name given to the container when it was created using the ADD xxxx command (for example, ADD DISK, ADD STRIPESET, and so forth).

partition-number

Identifies the partition to be destroyed. Use the SHOW *container-name* command to identify the correct partition before carrying out the DESTROY_PARTITION command.

Switches

There are no switches associated with this command.

Example

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

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

See also

CREATE_PARTITION
DELETE *unit-number*
SHOW

DIRECTORY

Displays a list of the diagnostics and utilities available on "this controller."

Syntax

DIRECTORY

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To display a directory listing, enter:

DIRECTORY

The following is an example of the resultant display:

```
HSUTIL     V85J D
FRUTIL     V85J D
CHVSN      V85J D
CLCP       V85J D
CLI        V85J D
CLONE      V85J D
CONFIG     V85J D
DILX       V85J D
DIRECT     V85J D
DSTAT      V85J D
FMU        V85J D
SWUPD      V85J
TILX       V85J D
VTDPY      V85J D
```

NOTE: CHVSN and DSTAT are not user utilities. They may be used by Compaq authorized service personnel only.

See also

RUN

HELP

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

IMPORTANT: A character space must precede the question mark.

Syntax

HELP

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To display information regarding the HELP command, enter:

HELP

The following is displayed:

```
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.

SET ?

```
Your options are:
```

```
OTHER_CONTROLLER
```

```
THIS_CONTROLLER
```

```
FAILEDSET

FAILOVER

NOFAILOVER

Unit number or mirrorset or raidset or device name
```

INITIALIZE

Initializes metadata on the specified container. During initialization, a small amount of disk space is reserved for metadata that the controller uses to keep track of the array. This metadata is inaccessible to the host. Transportable disks do not contain controller metadata.

> ⚠ **CAUTION:** The INITIALIZE command destroys all user data on the container unless you use the *NODESTROY* switch. The *NODESTROY* switch is valid only on mirrorsets and striped mirrorsets.

Syntax

INITIALIZE *container-name*

If you initialize a transportable disk, any metadata contained on the disk is destroyed and the entire disk drive is accessible by the host. The drive does not have the error detection and data security provided by the metadata that is on notransportable disks.

Use the INITIALIZE command when:

■ Creating a unit from a newly installed disk.

■ Creating a unit from a newly created RAIDset, stripeset, or mirrorset.

■ Initializing the data structure of a previously partitioned container.

Do not use the INITIALIZE command when:

■ Creating a unit from the same disks previously initialized, such as when a RAIDset is moved.

■ Creating a storageset from existing members.

■ Adding a RAIDset with the REDUCED switch.

Parameters

container-name

Specifies the container to initialize. This is the same name given to the disk or storageset when it was created using the ADD xxxx command (for example, ADD DISK, ADD STRIPESET, and so forth).

Switches

The following switches are used by this command:

■ *CHUNKSIZE*

■ *DESTROY*

■ *SAVE_CONFIGURATON*

These switches are described in the following paragraphs.

CHUNKSIZE=DEFAULT (default)
CHUNKSIZE=n

Specifies the block chunk size to be used for RAIDsets and stripesets. You can specify the chunk block size by entering *CHUNKSIZE=n*, or allow the controller to set the chunk size by entering *CHUNKSIZE=DEFAULT.*

The default chunk size for storagesets with less than or equal to nine members is 256 blocks, or 128 kilobytes (K). The default chunk size for storagesets with more than nine members is 128 blocks or 64K.

IMPORTANT: The default chunk size should be used with caution. It is imperative that you analyze the I/O transfers being used with your application to determine the proper chunk size. An improper value used as a chunk size may cause serious performance problems with the subsystem.

Refer to the detailed description of chunk size that is contained in the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Configuration Guide* for information regarding recommended chunk size settings for your application.

DESTROY (default)
NODESTROY

Controls how the metadata on the initialized container is to be handled.

NOTE: The *DESTROY* and *NODESTROY* switches are valid only with striped mirrorsets and mirrorsets.

■ Specify *NODESTROY* to preserve forced error metadata during the initialization process. Use the *NODESTROY* switch only when a unit is to be created from disk drives reduced from mirrorsets. This allows the data on the container to be accessed by a mirrorset or striped mirrorset unit. The *NODESTROY* switch is not valid for RAIDsets, simple stripesets, and single-disk configurations.

■ Specify *DESTROY* to overwrite user data and forced error flags during the initialization.

SAVE_CONFIGURATION
NOSAVE_CONFIGURATION (default)

Instructs the controller to save the controller configuration (or not to save the configuration) to the container being initialized.

The *SAVE_CONFIGURATION* switch requires only one disk to be initialized with this option. However, more disks may be used, if desired, for redundancy.

■ Specify *SAVE_CONFIGURATION* to store a copy of the controller configuration on the container being initialized. A new controller can receive information from a container containing configuration information saved with the *SAVE_CONFIGURATION* switch. If you specify *SAVE_CONFIGURATION* for a multi-device storageset, such as a stripeset, the complete controller configuration information is stored on each disk drive in the storageset.

■ A disk drive initialized with the *SAVE_CONFIGURATION* switch specified has slightly less storage space available for user data.

■ Specify *NOSAVE_CONFIGURATION* if you do not want to store a copy of the controller configuration on a container.

Examples

To initialize container DISK10000 and save a copy of the controller configuration on it, enter.

INITIALIZE DISK10000 SAVE_CONFIGURATION

To show the devices with the *SAVE_CONFIGURATION* switch enabled, enter:

SHOW DEVICES FULL

```
Name            Type                    Port    Targ    Lun     Used by
-----------------------------------------------------------------------
DISK10000   disk                    1       0       0           S2
            DEC     RZ28M   (C) DEC 1003
        Switches:
         NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 10.00 MHZ negotiated)
         LOCAL
        Size: 4108970 blocks
        Configuration being backed up on this container
DISK30300   disk                    3       3       0           S2
             DEC    RZ28M   (C) DEC 1003
        Switches:
         NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 10.00 MHZ negotiated)
         LOCAL
        Size: 4108970 blocks
        Configuration being backed up on this container
```

To initialize stripeset STRIPE1 with the default chunk size, enter:

    ADD STRIPESET STRIPE1 DISK10100 DISK20100 DISK30100
    INITIALIZE STRIPE1

> **NOTE:** Note that the chunk size is not specified, so the controller initializes the unit with the default chunk size.

To initialize RAIDset RAID9 with a chunk size of 20, enter:

    ADD RAIDSET RAID9 DISK10200 DISK20200 DISK30200
    INITIALIZE RAID9 CHUNKSIZE=20

To initialize DISK40400 and preserve the data after it is removed (reduced) from a mirrorset, enter:

    REDUCE DISK40400
    INITIALIZE DISK40400 NODESTROY

LOCATE

Indicates the physical location of configured units, storagesets, and devices by flashing the device fault LED on the front of the storage device. The LOCATE command causes the device fault LED to:

■ Flash once per second on a good device. This light turns off with the LOCATE CANCEL command.

■ Illuminate continuously on a failed device. This light stays on even after being turned off with the LOCATE CANCEL command.

> **NOTE:** The LOCATE command can also be used to test the LED itself.

Syntax

LOCATE *parameter*

Parameters

The following parameters are available to the LOCATE command:

■ *all*

■ *cancel*

■ *container-name*

■ *disks*

■ *optical*

■ *ptl*

■ *tapes*

■ *units*

■ *unit-number*

These parameters are described in the following paragraphs.

> **NOTE:** Only one of the following parameters may be entered with each LOCATE command.

all

Causes the device fault LEDs of all configured devices to flash. You can also specify ALL to test all of the LEDs at once. Enter LOCATE *cancel* to turn off the LEDs.

cancel

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

container-name

Causes the device fault LEDs on the devices within the *container-name* to flash. If a device name is given, the device's fault LED flashes. If a storageset name is given, the fault LED on all of the devices assigned to the storageset flashes. Use LOCATE CANCEL to turn off the LEDs.

disks

Causes the device fault LEDs of all configured disks to flash. Enter LOCATE CANCEL to turn off the LEDs.

optical

Causes the device fault LEDs of all configured optical devicesto flash. Enter LOCATE CANCEL to turn off the LEDs.

ptl (SCSI-location)

Causes the device fault LED on the device at the given SCSI location to flash.

Not all devices have a device fault LED. Therefore, they do not appear to respond to the LOCATE command.

tapes

Causes the device fault LEDs of all configured tapes to flash. Enter LOCATE CANCEL to turn off the LEDs.

units

Causes the device fault LEDs of all devices used by the units to flash. This command is useful to determine which devices are not currently configured into logical units. Enter LOCATE CANCEL to turn off the device fault LEDs.

unit-number

Causes the device fault LEDs on the devices making up the *unit-number* to flash. Use LOCATE CANCEL to turn off the LEDs.

Switches

There are no switches associated with this command.

Examples

To cause the device fault LED on device DISK10000 to flash, enter:

```
LOCATE DISK10000
LOCATE CANCEL
```

To cause the device fault LEDs on all of the devices assigned to disk unit number D102 to flash, enter:

```
LOCATE D102
```

To cause the device fault LEDs on all configured disk devices to flash, enter:

```
LOCATE DISKS
```

To turn off the flashing device fault LEDs on all devices, enter:

```
LOCATE CANCEL
```

MIRROR

Creates a one-member mirrorset from a single disk and names it.

> **NOTE:** This command is used **only** on disks already configured as units or members of a stripeset.

Use the ADD MIRRORSET command to create a mirrorset from disk drives not already members of higher-level containers.

After the disk drive is converted to a mirrorset, increase the nominal number of members by entering the SET *mirrorset-name* MEMBERSHIP=*number-of-members* command, then enter the SET *mirrorset-name* REPLACE=*disk-name* command to add more members to the mirrorset.

Syntax

MIRROR *disk-name mirrorset-name*

Parameters

The following parameters are available to the MIRROR command:

■ *disk-name*

■ *mirrorset-name*

These parameters are described in the following paragraphs.

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

Assigns a name for the mirrorset.

The tape name must start with a letter (A through Z) and may consist of a maximum of nine characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

It is common to name a mirrorset MIRR*n*, where n is a sequentially assigned, unique identifier. Other naming conventions are acceptable, but this naming convention provides both the type of container and its unique identifier.

Switches

The following switches are available for use with the MIRROR command:

■ *COPY*

■ *POLICY*

These switches are described in the following paragraphs.

COPY=FAST
COPY=NORMAL (default)

Sets the speed at which the controller copies data to a new member from normal mirrorset members when data is being mirrored to the storageset's disk drives:

■ Specify *COPY=FAST* to allow the creation of mirrored data to take precedence over other controller operations. When you specify *COPY=FAST*, the controller uses more resources to create the mirrored data, and copying takes less time. However, overall controller performance is reduced.

■ Specify *COPY=NORMAL* when operations performed by the controller should take priority over the copy operation. If you specify *COPY=NORMAL* creating the mirrored data has a minimal impact on performance.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE
NOPOLICY (default)

Sets the selection criteria the controller uses to choose a replacement disk from the spareset when a mirrorset member fails:

■ Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the mirrorset was initialized). If there is more than one disk drive in the spareset that meets the criteria, the controller selects a disk drive with the best performance.

■ Specify *POLICY=BEST_PERFORMANCE* to choose a replacement disk drive from the spareset with the best performance. The controller attempts to select a disk on a different port than existing mirrorset members. If there is more than one disk drive in the spareset matching the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size.

■ Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. This causes the mirrorset to operate in a reduced state until either *POLICY=BEST_PERFORMANCE* or *POLICY=BEST_FIT* is selected, or a member is manually placed in the mirrorset (see "SET mirrorset-name," on page 2–87).

Example

The following example shows how to create a normal stripeset and create a unit from it. Each member of the normal stripeset is then made into a mirrorset containing two members. This results in a striped mirrorset with full redundancy.

The commands used in this script set the nominal number of members in each mirrorset to two and add a second disk to each mirrorset. It is not necessary to initialize the mirrorsets or add them as units because the higher-level structure of the stripeset is carried down to the mirrorsets.

```
ADD STRIPESET STRIPE1 DISK10100 DISK20100 DISK30100
INITIALIZE STRIPE1
ADD UNIT D102 STRIPE1
MIRROR DISK10100 MIRROR1
SET MIRROR1 MEMBERSHIP=2
SET MIRROR1 REPLACE=DISK20200
MIRROR DISK20100 MIRROR2
SET MIRROR2 MEMBERSHIP=2
SET MIRROR2 REPLACE=DISK30200
MIRROR DISK30100 MIRROR3
SET MIRROR3 MEMBERSHIP=2
SET MIRROR3 REPLACE=DISK10200
```

See also

ADD MIRRORSET
REDUCE
SHOW MIRRORSETS
UNMIRROR

REDUCE

Removes member disk drives from mirrorsets and decreases the nominal number of members in the mirrorsets.

This command does **not** put reduced members into the failedset (unlike the SET *mirrorset-name* REMOVE=*disk-name* command). When using the REDUCE command to take a snapshot of a striped mirrorset, you must reduce all mirrorsets with one command. The CLONE utility does this automatically.

The nominal number of members in a mirrorset is determined by the number of members assigned to the mirrorset with the SET *mirrorset-name* MEMBERSHIP=*number-of-members* command or the ADD MIRRORSET *mirrorset-name disk-name1 [disk-nameN]* command—in other words, the number of disks that the mirrorset originally contained before it was reduced. The actual number of members contained in the mirrorset may be less than the nominal number of members if:

■ A disk drive is not added back to the mirrorset.

■ A member remains removed from the mirrorset.

■ The mirrorset replacement policy switch *NOPOLICY* is specified with the SET *mirrorset-name* command.

■ No spare disks exist.

The actual number of members in the mirrorset can never be greater than the nominal number of members. The disks to be removed do not need to be members of the same mirrorset. However, the disks must all be part of the same unit (for example, the same striped mirrorset). When a disk is reduced from a mirrorset, the controller:

■ Flushes all of the unit's data from write-back data cache.

■ Pauses I/O to the unit.

■ Removes the specified disk(s).

■ Decreases the nominal number of members of the mirrorset(s) by the number of disk(s) removed from the mirrorset(s).

■ Re-establishes I/O to the unit.

For each reduced mirrorset, there must be at least one remaining normal member after the reduction. If this is not true for all of the *disk-names* specified, the mirrorset is not reduced.

Only normal members can be reduced. A normal member is a mirrorset member whose entire contents are the same as all other normal members within the mirrorset.

> **NOTE:** An error is displayed if you attempt to reduce any mirrorset so that there would not be any normal member remaining.

Syntax

REDUCE *disk-name1 disk-name2 disk-name3...*

Parameters

disk-name1 disk-name2 disk-name3...

Specifies the names of the disk or disks to be removed from the mirrorset or mirrorsets. Multiple members can be removed with the REDUCE command.

Switches

There are no switches associated with this command.

Example

To remove DISK20100, DISK20200, and DISK40200 from their respective mirrorsets, enter:

```
SHOW STRIPE1

Name       Storageset       Uses                      Used by
-------------------------------------------------------------
STRIPE1    stripeset        MIRR1                         D104
                            MIRR2
                            MIRR3


SHOW MIRRORSETS

Name Storageset Uses                                   Used by
-------------------------------------------------------------
MIRR1      mirrorset        DISK10100                 STRIPE1
                            DISK20100
MIRR2      mirrorset        DISK10200                 STRIPE1
                            DISK20200
MIRR3      mirrorset        DISK30300                 STRIPE1
                            DISK40200


REDUCE DISK20100 DISK20200 DISK40200
```

```
    SHOW MIRRORSETS

Name              Storageset    Uses                                          Used by
-----------------------------------------------------------------------------
MIRR1             mirrorset     DISK10100                                    STRIPE1
MIRR2             mirrorset     DISK10200                                    STRIPE1
MIRR3             mirrorset     DISK30300                                    STRIPE1
```

See also

ADD MIRRORSET
MIRROR
RUN CLONE
SHOW MIRRORSET
SET *mirrorset-name*

RESTART *this_controller*   RESTART *other_controller*

Flushes all user data from the write-back cache of the specified controller and restarts the controller.

Syntax

RESTART *controller*

Parameters

controller

The *controller* parameter indicates which controller is to be restarted. Specify *other_controller* or *this_controller*.

Switches

The following switches are available to the RESTART *controller* command:

■ *IGNORE_ERRORS*

■ *IMMEDIATE_SHUTDOWN*

■ *OVERRIDE_ONLINE*

These switches are described in the following paragraphs.

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

Controls the reaction of the controller based on the status of write-back cache.

> ⚠ **CAUTION:** The *IGNORE_ERRORS* switch might 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 until the controller flushes the cache.

■ Specify *IGNORE_ERRORS* to instruct the controller to restart even if the data within write-back cache cannot be written to the devices.

■ Specify *NOIGNORE_ERRORS* to instruct the controller to not restart if the data within write-back cache cannot be written to the devices.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (default)

Instructs the controller when to shutdown and whether to flush the write-back cache or not.

> ⚠ **CAUTION:** The *IMMEDIATE_SHUTDOWN* switch instructs the controller to immediately shutdown without regard to any data contained within write-back cache. Do not perform any hardware changes until the controller flushes the cache.

■ Specify *IMMEDIATE_SHUTDOWN* to instruct the controller to restart immediately without flushing data from the write-back cache to devices.

■ Specify *NOIMMEDIATE_SHUTDOWN* to instruct the controller not to restart before all data has been flushed from write-back cache to the devices.

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE (default)

■ Specify *OVERRIDE_ONLINE* to instruct the controller to ignore the fact that the unit may be online to the host.

■ Specify *NOOVERRIDE_ONLINE* to instruct the controller not to ignore the fact that the unit may be online to the host.

Examples

To restart "this controller," enter:

    RESTART THIS_CONTROLLER

To restart the "other controller," enter:

    RESTART OTHER_CONTROLLER

See also

SELFTEST *controller*
SHUTDOWN *controller*

RETRY_ERRORS *unit-number* UNWRITEABLE_DATA

Causes the controller to attempt to write previously unwriteable data from the write-back cache to the specified devices. No data is lost if the retry fails.

If a container fails in a way that prevents the data in write-back cache to be written to the container, an unwriteable data error is reported.

Syntax

RETRY_ERRORS *unit-number* UNWRITEABLE_DATA

Parameter

unit-number

Identifies the unit number to which the data contained in write-back cache tries to write. The unit-number is the same name given to the unit when it was created using the ADD UNIT command.

Switches

There are no switches associated with this command.

Example

To retry the writing of the cached data previously marked "unwriteable to disk unit D103," enter:

RETRY_ERRORS D103 UNWRITEABLE_DATA

See also

CLEAR_ERRORS UNWRITEABLE_DATA

RUN

Runs the specified diagnostic or utility program on "this controller."

Syntax

RUN *program-name*

Parameter

program-name

The *program-name* parameter specifies the name of the diagnostic or utility program to be run. The following programs can currently be run:

- *chvsn*—This is not a user utility. This utility may be used by Compaq authorized service personnel only.

- *clcp*—A utility used to load updated software code or patches. refer to "*Upgrading the Subsystem*" in the *Compaq StorageWorks HSJ80 ACS Version 8.5J-2 Maintenance and Service Guide* for more information regarding this utility.

- *cli*—A utility that allows the entry of the Command Line Interpreter (CLI) commands into the controller.

- *clone*—A utility used to automate the process of mirroring units to create a snapshot copy of host unit data.

- *config*—A utility used to locate and add devices to the controller configuration. The *config* utility may be run anytime new devices are added to the subsystem.

- *dilx*—A utility used to test and verify the controller's operation with attached storage devices under a high or low I/O load. Run DILX (disk inline exerciser) only when there is no activity on the controller. The total I/O load is handled by the controller, bypassing the host.

The *dilx* utility has two modes: autoconfigure mode and standard mode.

> **CAUTION:** Run the *dilx* utility in the autoconfigure mode only at initial installations. When write operations are enabled, the *dilx* utility may overwrite existing data.

The autoconfigure mode is the most thorough mode and allows you to:

❏ Automatically test all of the disk units configured

❏ Automatically perform thorough tests on all units with write operations enabled

The standard mode is more flexible and allows you to:

❏ Test disks you select

❏ Perform tests in read-only mode or write-only mode

❏ Provide run time and performance summary option

❏ Run in read-only mode

■ *direct*—A command used to display a list of all executable diagnostic or utility programs.

■ *dstat*—This is not a user utility. This utility may be used by Compaq authorized service personnel only.

■ *fmu*—A fault management utility used to control several spontaneous errors. FMU also displays information regarding the most recent controller and memory system failure.

■ *frutil*—A utility used when replacing a failed controller, external cache battery, or cache module.

■ *hsutil*—A utility used to format a disk device or to download new firmware to a tape or disk device.

■ *tilx*—A utility used to test and verify the controller's operation with attached storage devices under a high or low I/O load. Run TILX (tape inline exerciser) only when there is no activity on the controller. The total I/O load is handled by the controller, bypassing the host.

■ *vtdpy*—A utility used to display the current controller state, performance data, processor utilization, host post activity and status, device state, logical unit state, cache performance, and I/O performance.

Refer to the Troubleshooting section in the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Maintenance and Service Guide* for more information regarding these utilities.

Switches

There are no switches associated with this command.

Example

To start the DILX diagnostic program, enter:

```
RUN DILX

Disk Inline Exerciser - version 2.0.
  .
  .
  .
```

See also

DIRECTORY

SELFTEST *this_controller* SELFTEST *other_controller*

Flushes the data from the specified controller write-back cache (if present) and shuts down the controller. It then restarts the controller in looping self-test mode. Press the controller reset (//) button to take the controller out of self-test mode.

Syntax

SELFTEST *controller*

Parameters

controller

The *controller* parameter indicates which controller is to perform the self-test program. Specify *other_controller* or *this_controller.*

Switches

The following switches are available to the SELFTEST *controller* command:

- *IGNORE_ERRORS*

- *IMMEDIATE_SHUTDOWN*

- *OVERRIDE_ONLINE*

These switches are described in the following paragraphs.

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

Instruct the controller how to respond to write-back cache errors.

> **CAUTION:** The *IGNORE_ERRORS* switch might cause data to remain in write-back cache. Do not perform any hardware changes until the controller flushes the cache.

- Specify *IGNORE_ERRORS* to instruct the controller to ignore any write-back cache errors. Such errors can result from data contained within write-back cache unable to be written to the devices or lost data errors.

- Specify *NOIGNORE_ERRORS* to instruct the controller not to run the self-test program if the write-back cache errors are detected.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (default)

Instructs the controller whether to flush the write-back cache.

> ⚠ **CAUTION:** The *IMMEDIATE_SHUTDOWN* switch instructs the controller to immediately shut down, without regard to any data contained within write-back cache. Do not perform any hardware changes until the controller flushes the cache.

- Select *IMMEDIATE_SHUTDOWN* to instruct the controller to run the self-test program immediately without flushing user data from write-back cache to devices.

- Select *NOIMMEDIATE_SHUTDOWN* to instruct the controller to flush data from write-back cache before running the self-test program.

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE(default)

OVERRIDE_ONLINE
NOOVERRIDE_ONLINE (default)

- Specify *OVERRIDE_ONLINE* to instruct the controller to ignore the fact that the unit may be online to the host. Then start the self-test after all user data is written to the disk.

- Specify *NOOVERRIDE_ONLINE* to instruct the controller not to ignore the fact that the unit may be online to the host.

To start the self-test program on "this controller," enter:

    SELFTEST THIS_CONTROLLER

To run the self-test program on the "other controller," even if the "other controller" cannot flush all data from the write-back cache, enter:

    SELFTEST OTHER_CONTROLLER IGNORE_ERRORS

See also

RESTART *controller*
SHUTDOWN *controller*

SET *controller*

See SET *this_controller*/SET *other_controller*

SET *device-name*

Enables changes to the characteristics of the specified disk drive.

Syntax

SET *device-name*

Parameter

device-name

Specifies the name of the device to change. This can be a previously named device, disk, passthrough device, tape, or container.

Switches

The following switches are available to the SET *device-name* command:

■ *TRANSFER_RATE_REQUESTED*

■ *TRANSPORTABLE*

These switches are described in the following paragraphs.

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=20MHZ
TRANSFER_RATE_REQUESTED=10MHZ
TRANSFER_RATE_REQUESTED=5MHZ

Specifies the maximum data transfer rate for the controller 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.

NOTE: This switch is used by all container types

TRANSPORTABLE
NOTRANSPORTABLE

Indicates whether a disk can be accessed exclusively by StorageWorks controllers (the *TRANSPORTABLE* switch is used for disks only).

■ Storagesets cannot be made transportable.

■ Specify *NOTRANSPORTABLE* for all disks used in RAIDsets, stripesets, mirrorsets, and sparesets.

■ Transportable disks do not contain any metadata or restricted areas on the disk. Therefore, transportable disks forfeit the advantage metadata provides.

■ Transportable disks can be moved to a non-StorageWorks environment with their data intact.

■ If you specify the *NOTRANSPORTABLE* switch and there is no metadata on the unit, the unit must be initialized.

■ If you specify *TRANSPORTABLE* for a disk that was originally initialized as a *NOTRANSPORTABLE*, you should initialize the disk.

■ Compaq recommends you avoid specifying *TRANSPORTABLE* unless transportability of the device or media is imperative and there is no other way to accomplish moving the data.

> **NOTE:** This switch is used by disk containers only.

Examples

To set the data transfer rate of DISK20000 to 5MHz, enter:

```
SET DISK20000 TRANSFER_RATE_REQUESTED=5MHZ
```

To set DISK10300 to transportable, enter:

```
SET DISK10300 TRANSPORTABLE
```

See also

ADD CDROM
ADD DISK
ADD LOADER
ADD OPTICAL
SHOW DEVICE

SET FAILEDSET

Enables changes to the automatic replacement policy for the failedset.

Syntax

SET FAILEDSET

Parameters

There are no parameters associated with this command.

Switches

AUTOSPARE
NOAUTOSPARE

Specifies the policy to be used by the controller when a disk drive is physically replaced in the failedset.

■ Specify *AUTOSPARE* to instruct the controller to automatically move devices physically replaced in the failedset into the spareset.

■ Specify *NOAUTOSPARE* to instruct the controller to leave devices physically replaced in the failedset. The device, though replaced, remains in the failedset until it is manually removed with the DELETE FAILEDSET command.

In most circumstances, a disk physically replaced into the failedset is functional and contains no metadata—that is, a new device (one that has not been initialized). If you specify the *AUTOSPARE* switch when a disk is physically replaced in the failedset, the controller checks to see if any metadata is present. If the controller detects metadata, the disk remains in the failedset. If the controller does not detect metadata, the controller automatically initializes the disk and moves it from the failedset to the spareset. Now a member of the spareset, the disk is available for any mirrorset or RAIDset requiring a replacement member. If the automatic initialization fails, the disk remains in the failedset.

Disks that you plan to use for *AUTOSPARE* must not have valid metadata on them. If you suspect a disk does have metadata on it (if it was used in a stripeset or was initialized as *NOTRANSPORTABLE*) you must use the following procedure to make the disk available as a spareset replacement disk (DISK10000 is used as an example):

1) Delete all containers to which the disk belongs.

2) Make the disk transportable.

> SET DISK10000 TRANSPORTABLE.

3) Initialize the disk.

> INIT DISK10000

4) Delete the disk.

> DELETE DISK10000

5) Add to Spareset.

Example

To enable the automatic spare feature, enter:

SET FAILEDSET AUTOSPARE

To disable the automatic spare feature, enter:

SET FAILEDSET NOAUTOSPARE

See also

DELETE FAILEDSET
SHOW FAILEDSET

SET FAILOVER COPY=*this_controller*
SET FAILOVER COPY=*other_controller*

Configures both controllers to operate in a dual-redundant configuration. This command allows both controllers to access the storage devices, providing controller fault-tolerant data processing. If one of the two controllers fail, the devices and any cache attached to the failed controller become available to and accessible through the other controller.

NOTE: The controllers must be present and placed in non-failover mode by entering the SET NOFAILOVER command before they can be set to failover mode.

Syntax

SET FAILOVER COPY=*controller*

Parameters

controller

> *this_controller*
> *other_controller*

Specifies which controller ("this" or "other") contains the source subsystem configuration for the copy. The companion controller receiving the configuration information restarts after the command is carried out.

> ⚠ **CAUTION:** Make sure you know which controller has the good configuration information before entering this command. The device configuration information from the controller specified by the *controller* parameter overwrites the information on the companion controller.

■ Specify *this_controller* to copy the device configuration information from "this controller" to "other controller."

■ Specify *other_controller* to copy the device configuration information from "other controller" to "this controller."

Due to the amount of information being passed from one controller to the other, this command may take up to two minutes to complete.

Switches

There are no switches associated with this command.

Example

To set the controllers in a dual-redundant failover configuration and copy the configuration information from "this controller" to "other controller," enter:

```
SET FAILOVER COPY=THIS_CONTROLLER
```

See also

SET NOFAILOVER

SET *mirrorset-name*

Changes the characteristics of a mirrorset including the addition and removal of members.

Syntax

SET *mirrorset-name*

Parameter

mirrorset-name

Specifies the name of the mirrorset to modify. This is the same name given to the mirrorset when it was created with the ADD MIRRORSET command.

Switches

The following switches are available to the SET *mirrorset-name* command:

■ *COPY*

■ *MEMBERSHIP*

■ *POLICY*

■ *READ_SOURCE*

■ *REMOVE*

■ *REPLACE*

These switches are described in the following paragraphs.

COPY=FAST
COPY=NORMAL

Sets the speed at which the controller copies data to a new member from normal mirrorset members when data is being mirrored to the storageset's disk drives.

■ Specify *COPY=FAST* to allow the creation of mirrored data to take precedence over other controller operations. When you specify *COPY=FAST*, the controller uses more resources to create the mirrored data, and copying takes less time. However, overall controller performance is reduced.

■ Specify *COPY=NORMAL* when operations performed by the controller should take priority over the copy operation. If you specify *COPY=NORMAL* , creating the mirrored data has a minimal impact on performance.

MEMBERSHIP=number-of-members

Sets the nominal number of mirrorset members to the number you specify for the *number-of-members* value. A maximum of six members can be specified.

> **NOTE:** No other switches can be set when you specify the *MEMBERSHIP* switch.

If you increase the number of members, the controller automatically adds disk drives from the spareset to the mirrorset until 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 the *NOPOLICY* switch is specified, the *REPLACE=disk-name* switch must be specified to bring the mirrorset up to the new nominal number of members.

You cannot set the nominal number of members lower than the actual number of members. Specify the *REMOVE* switch to reduce the number of disk drives from the mirrorset.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement disk from the spareset when a mirrorset member fails.

■ Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the mirrorset was initialized). If there is more than one disk drive in the spareset that meet the criteria, the controller selects a disk drive with the best performance.

■ Specify *POLICY=BEST_PERFORMANCE* to choose a replacement disk drive from the spareset with the best performance. The controller attempts to select a disk on a different port than existing mirrorset members. If there is more than one disk drive in the spareset matching the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size of the mirrorset.

■ Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. The mirrorset operates in a reduced state until a *POLICY=BEST_FIT* or *POLICY=BEST_PERFORMANCE* is selected, or a member is manually placed in the mirrorset.

READ_SOURCE=disk-name
READ_SOURCE=LEAST_BUSY
READ_SOURCE=ROUND_ROBIN

Selects the mirrorset member used by the controller to satisfy a read request.

■ Specify the *READ_SOURCE=disk-name* of a specific member to which you want the controller to direct all read requests. If the member fails out of the mirrorset, the controller selects the first normal member it finds to satisfy its read requests.

■ Specify *READ_SOURCE=LEAST_BUSY* to direct read requests to the mirrorset member with the least amount of work in its queue. If multiple members have equally short queues, the controller queries these members for each read request as it would when *READ_SOURCE=ROUND_ROBIN* is specified.

■ Specify *READ_SOURCE=ROUND_ROBIN* to sequentially direct read requests to each mirrorset member. The controller equally queries all normal members for each read request.

REMOVE=disk-name

Instructs the controller to remove a member 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.

> **NOTE:** No other switches can be set when the *REMOVE=* switch is specified.

If the mirrorset will not have a normal or normalizing member remaining after you remove the disk drive, the controller reports an error and no action is taken. A normal or normalizing member is a mirrorset member whose contents are the same as all other normal members. For each reduced mirrorset, there must be at least one remaining normal member after the reduction.

Unlike the REDUCE command, 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 to the nominal number of members.

> **NOTE:** Normalizing members exist only when you first create a mirrorset or when you clear lost data on a mirrored unit. The controller recognizes the member as normal, and all other original mirrorset members as "normalizing." New data that is written to the mirrorset is written to all members. The controller copies the normal member's data existing data before the mirrorset was created to the normalizing members. The controller recognizes the normalizing members as normal when all the normalizing member's blocks are the same.

REPLACE=disk-name

Instructs the controller to add a disk member to an existing mirrorset if the following conditions are met.

■ The replacement policy is set to *NOPOLICY.*

■ The mirrorset is missing at least one member.

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

The disk name used is the name given to a disk when it was added to the configuration with the ADD DISK command.

> **NOTE:** Do not specify any other switches when the *REPLACE=* switch is specified.

Examples

To change the replacement policy of mirrorset MIRR1 to BEST_FIT, enter:

SET MIRR1 POLICY=BEST_FIT

To remove member DISK30000 from mirrorset MIRR1 created above, enter:

SET MIRR1 REMOVE=DISK30000

> **NOTE:** 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.

To add disk DISK30200 to the mirrorset MIRR1, enter:

SET MIRR1 REPLACE=DISK30200

A copy operation begins immediately onto DISK30200.

See also

ADD MIRRORSET
MIRROR
REDUCE
SHOW MIRRORSET
UNMIRROR

SET NOFAILOVER

Reconfigures both controllers to operate in a non-dual-redundant (nonfailover) configuration. Immediately after entering this command, remove one controller from the enclosure because the sharing of devices is not supported by nonredundant controllers

It is recommended that both controllers be present when this command is carried out. Otherwise, the controllers become misconfigured with each other, requiring additional steps later to allow the "other controller" to be configured for failover.

Syntax

SET NOFAILOVER

Parameters

There are no parameters associated with this command.

Switches

DESTROY_UNFLUSHABLE_DATA
NODESTROY_UNFLUSHABLE_DATA

Instructs the controller how to handle data contained within write-back cache. These switches have no effect if both controllers are operational. Select one of these switches to indicate how the controller is to handle data contained in cache if one of the controllers fails before it can properly shut down with the SET NOFAILOVER or SHUTDOWN commands.

Under some circumstances, the data in a failed controller's write-back cache may not fail over to the operating controller's write-back cache. For example, cache data will not failover if the operating controller has a failed cache battery because of the risk of data loss if the power is interrupted.

■ Specify *NODESTROY_UNFLUSHABLE_DATA* to leave the unwritten data intact in the failed controller's write-back cache. When the failed controller is replaced and placed into service, the write-back cache data is flushed to the appropriate devices.

■ Specify *DESTROY_UNFLUSHABLE_DATA* to reconfigure the operational controller before replacing the failed controller. The unwritten data of the failed controller may reference devices not present in the new configuration. If you do not destroy the old configuration data, it may conflict with the new configuration and cause the subsystem to behave unpredictably.

> ⚠ **CAUTION:** Unflushed data cannot be recovered after it is destroyed.

Example

To terminate failover mode between two controllers in a dual-redundant configuration, enter:

SET NOFAILOVER

See also

SET FAILOVER

SET *RAIDset-name*

Changes the characteristics of the specified RAIDset.

Syntax

SET *RAIDset-name*

Parameters

RAIDset-name

Specifies the name of the RAIDset to modify. This is the name used with the ADD UNIT command to identify the RAIDset as a host-addressable unit.

Switches

The following switches are available to the SET RAIDset-name command:

■ *POLICY*

■ *RECONSTRUCT*

■ *REMOVE*

■ *REPLACE*

These switches are described in the following paragraphs.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE
NOPOLICY

Specifies the replacement policy to use when a member within the RAIDset fails.

■ Specify *BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the RAIDset was initialized). If more than one disk drive in the spareset is the correct size, the controller selects a disk drive with the best performance.

■ Specify *POLICY=BEST_PERFORMANCE* to choose a replacement disk drive from the spareset resulting in the best performance of the RAIDset. The controller attempts to select a disk on a different port than existing members. If more than one disk drive in the spareset matches the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size of the RAIDset.

■ Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. This causes the RAIDset to operate in a reduced state until either *POLICY=BEST_PERFORMANCE* or *POLICY=BEST_FIT* is selected, or a member is manually replaced in the mirrorset.

RECONSTRUCT=FAST
RECONSTRUCT=NORMAL (default)

Sets the speed at which the controller reconstructs the data on the new RAIDset member replacing a failed member.

■ Specify *RECONSTRUCT=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.

■ Specify *RECONSTRUCT=FAST* when the reconstruct operation must take precedence over other controller operations. The controller uses more resources to perform the reconstruction. Reconstruction takes less time, but overall controller performance is reduced during the reconstruction.

REMOVE=disk-name

Instructs the controller to remove a member from an existing RAIDset. The disk drive specified by *disk-name* is removed from the RAIDset specified by *RAIDset-name*. The removed disk drive is added to the failedset.

If a RAIDset is already in a reduced state, an error is displayed and the command is rejected. If a replacement policy is specified, the replacement is taken from the spareset to replace the removed member using the policy specified.

If the *NOPOLICY* switch is specified with the SET RAIDset command, the RAIDset continues to operate in a reduced state until a replacement policy is specified or the *REPLACE* switch is specified. See the *REPLACE=disk-name* switch for information on manually replacing a RAIDset member. See the *POLICY* and *NOPOLICY* switches for information regarding setting a policy for automatic member replacement.

NOTE: Do not specify other switches when you use the *REMOVE=* switch.

REPLACE=disk-name

Instructs the controller to add a disk member to an existing RAIDset if the following conditions are met:

- The replacement policy is set to *NOPOLICY.*

- The disk member is not in any configuration, including a spareset.

An error is displayed and the command is rejected if the RAIDset is not in a reduced state, if a replacement policy is already specified, or if the disk specified is already being used by a configuration (including a spareset).

NOTE: Do not specify other switches when you use the *REPLACE=* switch.

Examples

To change the replacement policy for RAIDset RAID9 to *BEST_FIT*, enter:

SET RAID9 POLICY=BEST_FIT

To remove member DISK10000 from the RAID9 RAIDset, enter:

SET RAID9 REMOVE=DISK10000

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

To add disk DISK20100 to the reduced RAIDset, RAID9, enter:

SET RAID9 REPLACE=DISK20100

Reconstruction immediately begins on DISK20100.

See also

ADD RAIDSET
SHOW RAIDSETS

SET *this_controller*   SET *other_controller*

Changes specified switch values on the specified controller. "This controller" indicates the controller that is connected to the maintenance terminal while executing CLI commands. "Other controller" is the controller not connected to the maintenance terminal in dual-redundant controller configurations.

> **NOTE:** After doing a SET command to either controller, use a SHOW *this_controller* and a SHOW *other_controller* command to verify that the changes went into effect.

Syntax

SET *this_controller*
SET *other_controller*

Parameter

controller

Indicates which controller is to be set. Specify *other_controller* or *this_controller*.

Switches

Table 2–2 lists the switches available with this command. Descriptions of the switches follow the table.

Table 2–2 SET *controller* Switches

Switch	Values
CACHE_FLUSH_TIMER=n	1-65535 sec, 10 (default)
MULTI_CLUSTER *NOMULTI_CLUSTER*	None
MIRRORED_CACHE *NOMIRRORED_CACHE*	None
PORT_1_CI_4K_PACKET_CAPABILITY *NOPORT_1_CI_4K_PACKET_CAPABILITY*	None
PORT_2_CI_4K_PACKET_CAPABILITY *NOPORT_2_CI_4K_PACKET_CAPABILITY*	None

Table 2–2 SET *controller* Switches (Continued)	
Switch	**Values**
PORT_1_ID=n	0-31
PORT_2_ID=n	0-31
PORT_1_MAX_NODES=n	16, 32
PORT_2_MAX_NODES=n	16, 32
PORT_1_MAXIMUM_HOSTS=n	1-31
PORT_2_MAXIMUM_HOSTS=n	1-31
PORT_1_MSCP_ALLOCATION_CLASS=n	0-255
PORT_2_MSCP_ALLOCATION_CLASS=n	0-255
PORT_1_PATH_A *NOPORT_1_PATH_A*	None
PORT_2_PATH_A *NOPORT_2_PATH_A*	None
PORT_1_PATH_B *NOPORT_1_PATH_B*	None
PORT_2_PATH_B *NOPORT_2_PATH_B*	None
PORT_1_SCS_NODENAME="xxxxxx"	1-6 characters
PORT_2_SCS_NODENAME="xxxxxx"	1-6 characters
PORT_1_TMSCP_ALLOCATION_CLASS=n	0-255
PORT_2_TMSCP_ALLOCATION_CLASS=n	0-255
PROMPT	1-16 characters
TERMINAL_PARITY *NOTERMINAL_PARITY*	odd, even
TERMINAL_SPEED	4800, 9600, 19200
TIME	dd–mmm–yyy:hh:mm:ss
UPS=NODE_ONLY *UPS=DATACENTER_WIDE* *NOUPS*	None

CACHE_FLUSH_TIMER=n
CACHE_FLUSH_TIMER=10

Specifies how many seconds (1–65535) of idle time on a unit may elapse before the write-back cache flushes its entire contents to the disks of this idle unit. The default setting is 10 seconds. When changed, the new value entered for this switch takes effect immediately.

MULTICLUSTER
NOMULTICLUSTER

This switch places both controllers into either single-cluster or dual-cluster mode. Both controllers must be restarted for the change to take effect.

When switching from single to multi-cluster mode, both unit port access switches belonging to both controllers are set to read-only (See "SET unit-number" on page 2–104). The following two cautions should be observed:

> ⚠ **CAUTION:** When using this mode of operation, the port access of the controllers and the logical units must be set correctly, or data loss may occur. See the description in the SET *unit-number* CLI command for additional information.

> ⚠ **CAUTION:** The setting of this switch from single to multi-cluster must be done only when the dual-redundant controller pair is set to operate in single controller mode. After the switch is set to multi-cluster mode, the controller pair can then be set to dual-redundant mode and the SET FAILOVER COPY= command used to bring the new configuration to the second controller. Refer to Chapter 2, *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Configuration Procedures Guide* "Configuring and Add-On Controller" for an example.

MIRRORED_CACHE
NOMIRRORED_CACHE

Enables the mirrored-write-back-data cache feature on dual-redundant controllers. When changed, both controllers restart for the new switch setting to take effect.

The following tasks are performed when the *NOMIRRORED_CACHE* switch is specified:

■ Data in write-back cache is flushed when cache is configured in non-mirrored mode.

■ Enables mirrored write-back cache on both controllers.

■ If an invalid cache configuration exists within the cache modules, an error is generated

NOTE: Both controllers must be operational before this command is accepted.

Issue this switch through only one controller. The controllers must have a valid cache configuration before specifying this switch. The controllers automatically restart when this switch is specified.

NOTE: All unwritten write-cached data is automatically flushed from the cache before restart when the *MIRRORED_CACHE* switch is specified. Depending on the amount of data to be flushed, this command may take several minutes to complete before the controller is restarted.

The *NOMIRRORED_CACHE* switch disables mirror mode. Data in write-back cache is flushed when this switch is entered from mirrored mode. This switch disables mirrored write-back cache on both controllers. Therefore, this switch is only to be issued through one controller. The controller must contain a valid cache configuration before this switch is assigned. Unlike going from nonmirrored mode to mirrored mode, going from mirrored mode to nonmirrored mode is permitted with a failed cache module. The controller automatically restarts when this switch is specified.

PORT_1_CI_4K_PACKET_CAPABILITY
NOPORT_1_CI_4K_PACKET_CAPABILITY
PORT_2_CI_4K_PACKET_CAPABILITY
NOPORT_2_CI_4K_PACKET_CAPABILITY

Enables/disables 4KB packet transfers for the specified controller and port. The use of large packet transfers can improve performance. This feature should only be enabled if the host system adapters support large packet transfers. The specified controller must be restarted for the change to take effect.

NOTE: The 4KB packet capability must be disabled when using any system with L0019 link modules.

PORT_1_ID=n
PORT_2_ID=n

> Specifies the Star Coupler CI node number for the specified controller and port. The value must be in the range of 0 through MAX_NODES minus 1.

> **NOTE:** The CI Node Number is treated as invalid on a per controller/port basis until set by this switch. While the CI Node Number is in this invalid state, communication is disabled for the given port.

PORT_1_MAX_NODES=n
PORT_2_MAX_NODES=n

> Specifies the maximum number of nodes allowed for the Star Coupler associated with the specified controller and port. The value must be greater than the present values of the related node number and *MAXIMUM_HOSTS* number. Valid values are either 16 or 32.

> The specified controller must be restarted for the change to take effect.

PORT_1_MAXIMUM_HOSTS=n
PORT_1_MAXIMUM_HOSTS=15
PORT_2_MAXIMUM_HOSTS=n
PORT_2_MAXIMUM_HOSTS=15

> Specifies the number of host systems allowed for the Star Coupler associated with the specified controller and port. This number must be a value from 1 to the value of *MAX_NODES* minus 1.

> The specified controller must be restarted for the change to take effect.

PORT_1_MSCP_ALLOCATION_CLASS=n
PORT_2_MSCP_ALLOCATION_CLASS=n

> Specifies the cluster allocation class for the specified controller and port. This number must be in the range of 0-255 for a single controller configuration and 1-255 for a dual-controller configurations.

> The specified controller must be restarted for the change to take effect.

PORT_1_PATH_A
NOPORT_1_PATH_A
PORT_2_PATH_A
NOPORT_2_PATH_A

> Enables or disables CI Path A for the specified controller and port. The change takes effect immediately.

PORT_1_PATH_B
NOPORT_1_PATH_B
PORT_2_PATH_B
NOPORT_2_PATH_B

Enables or disables CI Path B for the specified controller and port. The change takes effect immediately.

PORT_1_REMOTE_DISK_COPY_DATA
NOPORT_1_REMOTE_DISK_COPY_DATA
PORT_2_REMOTE_DISK_COPY_DATA
NOPORT_2_REMOTE_DISK_COPY_DATA

Enables or disables Remote Disk Copy Data operations for the specified controller and port. The host must support the use of Remote Disk Copy to use this feature. The specified controller must be restarted for the change to take effect.

PORT_1_SCS_NODENAME="xxxxxx"
PORT_2_SCS_NODENAME="xxxxxx"

Specifies a 1-6 character cluster node name for the specified controller and port.

■ The first character must be a letter and the remaining characters can be a combination of letters or numbers.

■ The user may enter either lower or uppercase letters, but the lowercase letters are converted to uppercase.

■ The name must be in quotes.

NOTE: The SCSI Node Name is treated as invalid on a per controller/port basis until set by this switch. While the CI Node Name is in this invalid state, communication is disabled for the given port.

The specified controller must be restarted for the change to take effect.

CAUTION: Before changing either the *SCS_NODENAME* or the ID values for a given port, both paths (A and B) should be disabled, or the port should be physically disconnected. Once all values have been changed (and the controller rebooted), the paths may be re-enabled or the port re-connected.

When changing either the *SCS_NODENAME* or the ID, **both** must be changed to values not previously used during periods when the paths and physical connections were enabled since the last cluster-wide reboot. If these procedures are not followed, a cluster-wide reboot must be performed before the controller can properly join the cluster.

PORT_1_TMSCP_ALLOCATION_CLASS=n
PORT_2_TMSCP_ALLOCATION_CLASS=n

> Specifies the cluster tape allocation class for the specified controller and port. This number must be in the range of 0-255 for a single controller configuration and 1-255 for a dual-controller configurations.

The specified controller must be restarted for the change to take effect.

PROMPT="new prompt"

Specifies the alpha-numeric characters that are displayed when the ACS command line interpreter prompts for input. This display (prompt) may be from 1-16 characters in length (only printable ASCII characters and spaces). The new prompt name must be enclosed within quotes. When changed, the new text entered for this switch takes effect immediately.

TERMINAL_PARITY=ODD
TERMINAL_PARITY=EVEN
NOTERMINAL_PARITY

> Specifies the parity with which data is transmitted and received. When changed, the new setting for this switch takes effect immediately.

TERMINAL_SPEED=baud_rate
TERMINAL_SPEED=9600

Sets the terminal transmission and reception speed (baud rate) to 4800, 9600 (default), or 19200 baud. When changed, the new value entered for this switch takes effect immediately.

TIME=dd–mmm–yyyy:hh:mm:ss

Sets the date and time. The time is set on both controllers in a dual-redundant configuration. When changed, the new value entered for this switch takes effect immediately.

UPS=NODE_ONLY
UPS=DATACENTER_WIDE
NOUPS

Specifies whether the controller should perform regular battery condition checks. Setting the *UPS/NOUPS* switch for either controller sets the switch for both controllers. Both controllers must be restarted in order for the new setting to take effect.

■ Specify *UPS=NODE_ONLY* if your storage subsystem power is supplied by a separate uninterruptable power supply (UPS) directly connected to the PVA. If *NODE_ONLY* is specified the controller continues to check the condition of the cache batteries.

> ⚠ **CAUTION:** Setting *UPS=NODE_ONLY or UPS=DATACENTER_WIDE* without having a UPS or similar backup system in place may result in data loss if power is interrupted.

■ Specify *UPS=DATACENTER_WIDE* if the whole room or building (not just the subsystem) is supported by a UPS. If *DATACENTER_WIDE* is specified, the controller does not check the condition of the cache batteries and ignores the battery's state. This causes RAIDsets and mirrorsets to always be available, regardless of the condition of the cache batteries.

■ Specify *NOUPS* to instruct the controller to perform regular cache battery checks and evaluate the condition of the cache batteries.

Examples

To change the other controller's CLI prompt, enter:

SET OTHER_CONTROLLER PROMPT="CONTROLLER B"

To change the other controller's CLI prompt, enter:

SET OTHER_CONTROLLER PROMPT="TOP"

To set the name of the controller pair and put the controller pair in remote copy mode, enter:

SET THIS_CONTROLLER REMOTE_COPY=LONDON

> **NOTE:** The other controller in the pair automatically receives the same name.

See also

SHOW *this_controller*
SHOW *other_controller*

SET *unit-number*

Changes the characteristics of the specified logical unit.

Syntax

SET *unit-number*

Parameters

unit-number

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

Switches

Table 2–3 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 2–3 SET *unit_number* Switches for Existing Containers

Switch	Container Type	RAIDset	Stripeset	Mirrorset	NOtransportable Disk	Transportable Disk	Passthrough	CD-ROM	Optical	Tape
MAX_READ_CACHED_TRANSFER_SIZE		✓	✓	✓	✓	✓		✓	✓	
MAX_WRITE_CACHED_TRANSFER_SIZE		✓	✓	✓	✓	✓		✓	✓	
MAXIMUM_CACHED_TRANSFER_SIZE		✓	✓	✓	✓	✓		✓	✓	
PREFERRED_PATH *NOPREFERRED_PATH*		✓	✓	✓	✓	✓	✓	✓	✓	✓
READ_CACHE *NOREAD_CACHE*		✓	✓	✓	✓	✓		✓	✓	

Table 2–3 SET *unit_number* Switches for Existing Containers (Continued)

Switch	Container Type	RAIDset	Stripeset	Mirrorset	NOtransportable Disk	Transportable Disk	Passthrough	CD-ROM	Optical	Tape
READAHEAD_CACHE *NOREADAHEAD_CACHE*		✓	✓	✓	✓	✓		✓	✓	
RUN *NORUN*		✓	✓	✓	✓	✓	✓	✓	✓	✓
THIS_PORT_1_ACCESS={NONE|READ|FULL} *OTHER_PORT_1_ACCESS={NONE|READ|FULL}*		✓	✓	✓	✓	✓	✓	✓	✓	✓
THIS_PORT_2_ACCESS={NONE|READ|FULL} *OTHER_PORT_2_ACCESS={NONE|READ|FULL}*		✓	✓	✓	✓	✓	✓	✓	✓	✓
WRITE_PROTECT *NOWRITE_PROTECT*		✓	✓	✓	✓	✓	✓		✓	
WRITEBACK_CACHE *NOWRITEBACK_CACHE*		✓	✓	✓	✓					

NOTE: Regardless of storageset type, the *NORUN* switch cannot be specified for units that are partitioned.

MAX_READ_CACHED_TRANSFER_SIZE=32 (default)
MAX_READ_CACHED_TRANSFER_SIZE=n

Sets the largest number of read blocks to be cached by the controller. The controller will not cache any transfers over the size set. Acceptable values are 0 through 2048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and write-back cache when set on a controller that has read and write-back caching.

MAX_WRITE_CACHED_TRANSFE_SIZE=32 (default)
MAX_WRITE_CACHED_TRANSFER_SIZE=n

Sets the largest number of write blocks to be cached by the controller. The controller will not cache any transfers over the size set. Acceptable write block sizes are 0 through 2048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and write-back cache when set on a controller that has read and write-back caching.

MAXIMUM_CACHED_TRANSFER=32
MAXIMUM_CACHED_TRANSFER=n

Sets the largest number of write blocks to be cached by the controller. The controller will not cache any transfers over the set size. Acceptable write block sizes are 1 through 1024. The *MAXIMUM_CACHED_TRANSFER* switch affects both read and write-back cache when set on a controller that has read and write-back caching.

PREFERRED_PATH=OTHER_CONTROLLER
PREFERRED_PATH=THIS_CONTROLLER
NOPREFERRED_PATH

The *PREFERRED_PATH* switch allows you to balance the 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.

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.

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

■ When no preferred path is assigned, the unit is targeted through the controller that detects the unit first after the controllers start.

■ Select *PREFERRED_PATH=THIS_CONTROLLER* to instruct "this controller" to bring the units online.

■ Select *PREFERRED_PATH=OTHER_CONTROLLER* to instruct the "other controller" to bring the units online.

> 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 inherit the same path.

READ_CACHE
NOREAD_CACHE

Sets the controller's read-cache policy function.

Read caching improves performance in almost all situations. Therefore, it is recommended you leave its default setting, *READ_CACHE*, enabled. However, under certain conditions, such as when performing a backup, read caching may not be necessary since only a small amount of data is cached. In such instances, it may be beneficial to disable the read cache function and remove the processing overhead associated with caching data.

READAHEAD_CACHE
NOREADAHEAD_CACHE

Enables the controller to keep track of read I/Os. If the controller detects sequential read I/Os from the host, it will then try to keep ahead of the host by reading the next sequential blocks of data (those the host has not yet requested) and put the data in cache. This process is sometimes referred to as prefetch. The controller can detect multiple sequential I/O requests across multiple units.

Read ahead caching improves host application performance since the data will be read from the controller cache instead of disk. Read ahead caching is the default for units.

If you are adding a unit that is not expected to get sequential I/O requests, select *NOREADAHEAD_CACHE* for the unit.

RUN
NORUN

Controls the unit's availability to the host.

■ Specify *RUN* to make a unit available to the host.

■ Specify *NORUN* to make a unit unavailable to the host and to cause any data in cache to be flushed to one or more drives. *NORUN* spins down all the disks used in the unit. The drives making up the unit spin down after the data has been completely flushed.

> **NOTE:** Specifying NORUN and then RUN to a unit also causes the subsystem configuration to be updated to the selected disk unit.

THIS_PORT_1_ACCESS=<FULL, READ, or NONE>
THIS_PORT_2_ACCESS=<FULL, READ, or NONE>
OTHER_PORT_1_ACCESS=<FULL, READ, or NONE>
OTHER_PORT_2_ACCESS=<FULL, READ, or NONE>

Each unit is accessed in one of the following modes:

■ *FULL* - read and write

■ *READ* - read only

■ *NONE* - no read or write access

Port access switches that are unspecified are given the default value of *READ* if the CLI command SET *controller MULTI_CLUSTER* was successfully executed last.

Port access switches that are unspecified are given the default value of *FULL* if the CLI command SET *controller NOMULTI_CLUSTER* was successfully executed last.

Port access switch changes take effect only after rebooting both controllers.

> **CAUTION:** When using this mode of operation, the port access of the controllers and the logical units must be set correctly, or data loss may occur. See the description in the examples section of this command for additional information as well as the *Compaq StorageWorks HSJ80 Array Controller ACS Version 8.5J-2 Configuration Planning Guide.*

WRITE_PROTECT
NOWRITE_PROTECT

Specifies whether data contained on the selected unit can be overwritten.

■ Specify *WRITE_PROTECT* to prevent host write operations to the unit. However, the controller may still write to a write-protected RAIDset to satisfy a reconstruct pass or to reconstruct a newly replaced member. Additionally, metadata, reconstruct, and copy writes are still allowed to RAIDsets and mirrorsets.

■ Specify *NOWRITE_PROTECT* to allow the host to write data to the unit. This allows the controller to overwrite existing data. *NOWRITE_PROTECT* is the default for transportable disks.

WRITEBACK_CACHE
NOWRITEBACK_CACHE

Enable or disable the write-back data caching function of the controller. The controller's write-back caching feature improves write performance. *NOWRITEBACK_CACHE* is the default on transportable disks.

■ Specify *WRITEBACK_CACHE* for all new RAIDsets, mirrorsets, and units you want to take advantage of the controller write-back caching feature.

■ Specify *NOWRITEBACK_CACHE* for units you want to receive data directly from the host without being cached.

> **NOTE:** The controller may take up to five minutes to flush data contained within the write-back cache when you specify the *NOWRITEBACK_CACHE* switch.

Examples

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

```
SET D102 WRITE_PROTECT NOREAD_CACHE
```

The following example command syntax shows the setting of the access to port 1 to full on "this" controller (and "other") for container D100. This is followed by the syntax to turn on the access to port 2 to full on "this" controller (and "other") for container D200:

```
SET D100 THIS_PORT_1_ACCESS=FULL
SET D100 THIS_PORT_2_ACCESS=NONE
SET D100 OTHER_PORT_1_ACCESS=FULL
SET D100 OTHER_PORT_2_ACCESS=NONE

SET D200 THIS_PORT_2_ACCESS=FULL
SET D200 THIS_PORT_1_ACCESS=NONE
SET D200 OTHER_PORT_2_ACCESS=FULL
SET D200 OTHER_PORT_1_ACCESS=NONE
```

Using this example, cluster "A" has full access to D100, while cluster "B" does not "see" D100. Conversely, cluster "B" has full access to D200, while cluster "A" does not "see" D100.

See also

SHOW UNITS
SHOW *unit-number*

SHOW

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

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

Syntax

SHOW *parameter*

Parameters

The following parameters are available to the SHOW command:

- *controller*
- *device-name*
- *device-type*
- *storageset-name*
- *storageset-type*
- *failedset*
- *sparesets*
- *unit-number*
- *units*

These parameters are described in the following paragraphs.

controller

    this_controller
    other_controller
    Specifies the controller to be displayed.

device-name

    Specifies the name of a particular device to be displayed. For example, SHOW DISK20100 displays information about the device named DISK20100.

device-type

Specifies the type of devices you want to be displayed. Valid choices are:

■ *cd-roms*—Shows all CD-ROMS attached to the controller.

■ *devices*—Shows all devices attached to the controller.

■ *disks*—Shows all disks attached to the controller.

■ *loader*—Shows all device loaders attached to the controller.

■ *tapes*—Shows all tape devices attached to the controller.

■ *opticals*—Shows all optical disks attached to the controller.

■ *passthrough*—Shows all passthrough containers attached to the controller.

storageset-name

Specifies the name of a particular storageset to be displayed. For example, SHOW STRIPE1 displays information about the stripeset named STRIPE1.

storageset-type

Specifies the type of storageset to be displayed. Valid types are:

■ *mirrorsets*—Shows all mirrorsets configured to the controller.

■ *raidsets*—Shows all RAIDsets configured to the controller.

■ *storagesets*—Shows all storagesets configured with the controller.

■ *stripesets*—Shows all stripesets configured to the controller.

failedset

Shows the failedset configured to the controller.

sparesets

Show the spareset configured to the controller.

unit-number

Specifies the name of a particular unit to be displayed. For example, SHOW D102 displays information about the unit named D102.

units

Displays information for all units configured to the controller.

Switches

FULL

Displays additional information about each device, storageset, or controller.

Examples

To display a listing of disks, enter:

SHOW DISKS

```
Name       Type      Port       Targ        Lun         Used by
-----------------------------------------------------------------------
DISK20300  disk      1          0           0           D100
DISK10100  disk      1          1           0           D101
```

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

SHOW DEVICES FULL

```
Name       Type      Port       Targ        Lun         Used by
-----------------------------------------------------------------------
DISK100    disk      1          0           0           R0

       Switches:
         NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)

       Size: 8378028 blocks
DISK200    disk      2          0           0           R0

       Switches:
         NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)

       Size: 8378028 blocks
DISK300 disk         3          0           0           R0

       Switches:
          NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)

       Size: 8378028 blocks
DISK400    disk      4          0           0           R0
```

```
Switches:
  NOTRANSPORTABLE
 TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)

Size: 8378028 blocks
Configuration being backed up on this container
```

To display a complete listing of the mirrorset named MIRR1, enter:

SHOW MIRR1

```
Name          Storageset                  Uses                   Used by
--------------------------------------------------------------------------
MIRR1         mirrorset                   DISK50300                  S0
                                          DISK60300
         Switches:
           POLICY (for replacement) = BEST_PERFORMANCE
           COPY (priority) = NORMAL
           READ_SOURCE = LEAST_BUSY
           MEMBERSHIP = 2, 2 members present
         State:
           NORMAL
           DISK60300 (member  0) is NORMAL
           DISK50300 (member  1) is NORMAL
         Size: 17769177 blocks
```

To show the full information for a mirrorset, enter:

SHOW MIRRORSET FULL

```
Name      Storageset          Uses                      Used by
----------------------------------------------------------------
M0        mirrorset           DISK100                      D0
                              DISK200
                              DISK300
                              DISK400
         Switches:
           COPY (priority) = NORMAL
```

```
          READ_SOURCE = LEAST_BUSY
          MEMBERSHIP = 4, 4 MEMBER PRESENT
        State:
          RECONSTRUCTING
        Size: 8378028 blocks
```

To show the full information for a controller, enter:

SHOW THIS_CONTROLLER FULL

```
Controller:
HSJ80 (c) Compaq EM00103056 Software V85J-2, Hardware H01
   Not configured for dual-redundancy
   Configured for single cluster
   Device port SCSI address 7
   Time: NOT SET

Host Port_1:
   Node name: MASS, valid CI node 7, 16 max nodes
   System ID 420010072D4D
   Path A is on
   Path B is on
   MSCP allocation class 0
   Maximum hosts = 10
   NOCI_4K_PACKET_CAPABLITY
   NOREMOTE_DISK_COPY_DATA

Host Port_2:
   Node name: MASS, valid CI node 29, 32 max nodes
   System ID 4200101E2D4D
   Path A is on
   Path B is off
   MSCP allocation class 123
   Maximum hosts = 20
   NOCI_4K_PACKET_CAPABLITY
   NOREMOTE_DISK_COPY_DATA


Cache:
   512 megabyte write cache, version 0004
   Cache is GOOD
   Battery is GOOD
   No unflushed data in cache
   CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
   NOCACHE_UPS
Mirrored Cache:
   512 megabyte write cache, version 4
   Cache is GOOD
   Battery is GOOD
```

```
   No unflushed data in cache
Battery:

  More than 50% charged
  Expires:23-AUG-2002
  1 out of 4 deep discharges have occurred
  223 out of 300 significant discharges have occurred
  NOCACHE_UPS
```

SHUTDOWN *this_controller*   **SHUTDOWN** *other_controller*

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

Syntax

SHUTDOWN *controller*

Parameter

controller

this_controller
other_controller
Indicates which controller is to shut down.

Switches

The following switches are available to the SHUTDOWN controller command.

■ *IGNORE_ERRORS*

■ *IMMEDIATE_SHUTDOWN*

■ *OVERRIDE_ONLINE*

These switches are described in the following paragraphs.

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

Controls the reaction of the controller based on the status of write-back cache.

> △ **CAUTION:** The *IGNORE_ERRORS* switch causes 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 until the controller flushes the cache.

■ Specify *IGNORE_ERRORS* to instruct the controller to shutdown even if the data within write-back cache cannot be written to the devices.

■ Specify *NOIGNORE_ERRORS* to instruct the controller to stop operation if the data within write-back cache cannot be written to the devices.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (default)

Instructs the controller when to shutdown.

> ⚠ **CAUTION:** The *IMMEDIATE_SHUTDOWN* switch causes 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 until the controller flushes the cache.

■ Specify *IMMEDIATE_SHUTDOWN* to cause the controller to shutdown immediately without checking for online devices or before flushing data from the write-back cache to devices.

■ Specify *NOIMMEDIATE_SHUTDOWN* to cause the controller not to shutdown without checking for online devices or before all data has been flushed from the write-back cache to devices.

OVERRIDE _ONLINE
NOOVERRIDE_ONLINE(default)

■ Specify *OVERRIDE_ONLINE* to instruct the controller to ignore the fact that the unit may be online to the host.

■ Specify *NOOVERRIDE_ONLINE* to instruct the controller not to ignore the fact that the unit may be online to the host.

Examples

To shut down "this controller," enter:

    SHUTDOWN THIS_CONTROLLER

To shut down the other controller, even if it cannot write all of the write-back cached data to the units, enter:

    SHUTDOWN OTHER_CONTROLLER IGNORE_ERRORS

See also

RESTART *controller*
SELFTEST *controller*

UNMIRROR

Converts a one-member mirrorset back to a non-mirrored disk drive and deletes the mirrorset from the list of known mirrorsets. This command can **only** be used on mirrorsets already members of higher-level containers (stripesets or units).

The UNMIRROR command is not valid for disk drives having a capacity greater than the capacity of the existing mirrorset. If a mirrorset is comprised of disk drives with different capacities, the mirrorset capacity is limited to the size of the smallest member; larger members contain unused capacity. If a member with unused capacity is the last remaining member of a mirrorset, the UNMIRROR command cannot be used to change the disk drive back to a single-disk unit. This change would cause a change in the reported disk capacity, possibly corrupting user data.

Syntax

UNMIRROR *disk-name*

Parameters

disk-name

Specifies the name of the normal mirrorset member to be removed from a mirror storageset.

Switches

There are no switches associated with this command.

Example

To convert DISK10300 back to a single device, enter:

UNMIRROR DISK10300

See also

ADD MIRRORSET
MIRROR
REDUCE
RUN CLONE
SET *mirrorset-name*

Glossary

This glossary defines terms pertaining to the HSJ80 Array Controller. It is not a comprehensive glossary of computer terms.

ACS	Array Controller Software. The software component of the HS-series array controller storage systems. ACS executes on the controller and processes input/output requests from the host, performing the device-level operations required to satisfy the requests.
adapter	A device that converts the protocol and hardware interface of one bus type into that of another without changing functionality of the bus.
array controller	A hardware device that, with proprietary software, facilitates communications between a host and one or more storage devices organized in a storage array. The HS-series of the StorageWorks family of controllers are all array controllers. *See also* controller.
array controller software (ACS)	*See* ACS.
autospare	A controller feature that automatically replaces a failed disk drive. Autospare aids the controller in automatically replacing failed disk drives. You can enable the *AUTOSPARE* switch for the failedset causing physically replaced disk drives to be automatically placed into the spareset. Also called "autonewspare."

bad block	A disk drive data block containing a physical defect.
bad block replacement (BBR)	*See* BBR.
BBR	Bad Block Replacement. A replacement routine that substitutes defect-free disk blocks for those found to have defects. This process takes place in the controller, transparent to the host.
block	A number of consecutive bytes of data stored on a storage device. In most storage systems, a block is the same size as a physical disk sector.
cache memory	A portion of high-speed memory used as an intermediary between a data user and a larger amount of storage. The objective of caching data in a system is to improve performance by placing the most frequently used data in the highest performance memory.
chunk	In any form of RAID that stripes data, data is stored in pieces called chunks. One chunk is stored on each member device in the unit. Taken together, the chunks make up a stripe. The chunk size can be used in some controllers to tune the stripeset for a specific application.
chunk size	The number of data blocks, assigned by a system administrator, written to the primary RAIDset or stripeset member before the remaining data blocks are written to the next RAIDset or stripeset member.
CI bus	Computer Interconnect bus. A serial 70 MHz, dual path, party-line, bus . It is the host bus for the HSJ-series controller-based storage systems. The CI bus is used by OpenVMS hosts to connect the nodes in a clustered subsystem.
CLCP	Code-load code-patch utility. This utility can be used to down-load patches to the ACS software.
CLI	Command Line Interpreter. The HS-series controllers operator command line interface. CLI enables the configuration and monitoring of a storage subsystem through textual commands.
code-load code-patch utility (CLCP)	See CLCP
cold swap	A method of device replacement that requires that power be removed from the controller and all shelves in a cabinet. This method is used when conditions preclude the use of the warm-swap or hot-swap methods.

command line interpreter (CLI)   *See* CLI.

computer interconnect bus (CI bus)   *See* CI bus.

configuration file   A file that contains a representation of a storage subsystem configuration.

container
- Any entity that is capable of storing data, whether it is a physical device or a group of physical devices.

- A virtual, internal controller structure representing either a single disk or a group of disk drives linked as a storageset. Stripesets and mirrorsets are examples of storageset containers that the controller uses to create units.

See also storage unit.

controller   A hardware device that, with proprietary software, facilitates communications between a host and one or more storage devices organized in a storage array. The HS-series of the StorageWorks family of controllers are all array controllers.

copying   A state in which data to be copied to the mirrorset is inconsistent with other members of the mirrorset.

See also normalizing.

copying member   Any member that joins the mirrorset after the mirrorset is created is regarded as a copying member. Once all the data from the normal member (or members) is copied to a normalizing or copying member, the copying member then becomes a normal member.

See also normalizing member.

data striping   The process of segmenting logically sequential data, such as a single file, so that segments can be written to multiple physical devices (usually disk drives) in a round-robin fashion. This technique is useful if the processor is capable of reading or writing data faster than a single disk can supply or accept the data. While data is being transferred from the first disk, the second disk can locate the next segment.

DDL   Dual Data Link. The ability to operate on the CI bus using both paths.

device In its physical form, a magnetic or optical disk, tape, or CD-ROM that can be attached to a SCSI bus. The term is also used to indicate a physical device that has been made part of a controller configuration; that is, a physical device that is known to the controller. Units (virtual disks) can be created from devices, once the devices have been made known to the controller

The targets, initiators, hubs, converters, adapters, and similar items interconnected to form a SCSI bus. Connectors, expanders, and hubs do not use a SCSI bus ID.

See also node and peripheral device.

DILX Disk Inline Exerciser. DILX is a diagnostic used to test the data transfer capabilities of disk drives in a way that simulates a high level of user activity.

dirty data The write-back cached data that has not been written to storage media, even though the host operation processing the data has completed.

disk inline exerciser (DILX) *See* DILX.

driver A hardware device or a program that controls or regulates another device. For example, a device driver is a driver developed for a specific device that allows a computer to operate with the device, such as a printer or a disk drive.

dual data link (DDL) See DDL.

dual-redundant configuration A storage subsystem configuration consisting of two active controllers operating as a single controller. If one controller fails, the other controller assumes control of the failing controller's devices.

ECB External Cache Battery. The unit that supplies backup power to the cache module in the event the primary power source fails or is interrupted.

external cache battery (ECB) *See* ECB.

failback The process of restoring data access to the newly-restored controller in a dual-redundant controller configuration.

See also failover.

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 and repaired before being placed back into the spareset.

See also spareset.

failover   The process that takes place when one controller in a dual-redundant configuration assumes the workload of a failed companion controller. Failover continues until the failed controller is repaired or replaced.

See also failback.

fault management utility (FMU)   *See* FMU.

flush   The act of writing dirty data from cache to a storage media. *See also* dirty data.

FMU   Fault Management Utility. A utility that is run to provide fault or error reporting information.

forced errors   A data bit indicating that a corresponding logical data block contains unrecoverable data.

host   The primary or controlling computer to which a storage subsystem is attached.

hot disks   A disk containing multiple hot spots. Hot disks occur when the workload is poorly distributed across storage devices which prevents optimum subsystem performance.

See also hot spots.

hot spots   A portion of a disk drive frequently accessed by the host. Because the data being accessed is concentrated in one area, rather than spread across an array of disks providing parallel access, I/O performance is significantly reduced.

See also hot disks.

I/O interface   *See* interface.

I/O module   A hardware device that allows communication between the controller and the storage device enclosure. The I/O module uses either a 8 or 16-bit single ended, or 16-bit differential SCSI bus to communicate to the enclosure.

INIT	An abbreviation for initialize.
initiator	A SCSI device that requests an I/O process to be performed by another SCSI device, namely, the SCSI target. The controller is the initiator on the storage device bus.
interface	A set of protocols used between components such as: cables, connectors, and signal levels.
JBOD	An acronym for "just a bunch of disks." A term used to describe a group of single-device logical units not configured into any other container type.
LBN	Logical Block Number. A volume-relative address of a block on a mass storage device. The blocks that form the volume are labeled sequentially starting with LBN 0.
least recently used (LRU)	*See* LRU.
local connection	A connection to the subsystem using either the controller's serial maintenance port or from the host terminal. A local connection enables you to connect to one subsystem controller to perform maintenance tasks.
local terminal	A terminal plugged into the EIA-423 maintenance port located on the front bezel of the controller.
	See also maintenance terminal and local connection.
logical block number (LBN)	*See* LBN.
logical unit	A physical or virtual device addressable through a target ID number. LUNs use their target's bus connection to communicate on the SCSI bus.
logical unit number (LUN)	*See* LUN.
LRU	Least Recently Used. LRU is a cache term used to describe the block replacement policy for read cache.
LUN	Logical Unit Number. A value that identifies a specific logical unit belonging to a SCSI target ID number. A number associated with a physical device unit during a task's I/O operations. Each task in the system must establish its own correspondence between logical unit numbers and physical devices.
	See also logical unit.

maintenance terminal	An EIA-423-compatible terminal used with the controller. This terminal is used to identify the controller, enable host paths, enter configuration information, and check the controller's status. The maintenance terminal is not required for normal operations. *See also* local terminal and local connection.
mass storage control protocol (MSCP)	*See* MSCP.
member	A container that is a storage element in a RAID array.
metadata	The data written to a disk for the purposes of controller administration. Metadata improves error detection and media defect management for the disk drive. It is also used to support storageset configuration and partitioning. Nontransportable disks also contain metadata to indicate they are uniquely configured for StorageWorks environments. Metadata can be thought of as "data about data."
mirrored write-back caching	A method of caching data that maintains two copies of the cached data. The copy is available if either cache module fails
mirroring	The act of creating an exact copy or image of data.
mirrorset	*See* RAID level 1.
MSCP	Mass Storage Control Protocol. MSCP is the protocol by which blocks of information are transferred between the host and the subsystem controller on the CI bus.
node	■ In OpenVMS clusters, the number of connection points among the members of the cluster. For example, two HSJ80 controllers and one host may be six nodes on the cluster by virtue of the use of both host ports on each controller communicating with two host port adapters. ■ In data communications, the point at which one or more functional units connect transmission lines.
nominal membership	The desired number of mirrorset members when the mirrorset is fully populated with active devices. If a member is removed from a mirrorset, the actual number of members may fall below the "nominal" membership.
nonredundant controller configuration	■ A single controller configuration. ■ A controller configuration that does not include a second controller.

non-volatile memory (NVM)
See NVM.

normal member
A mirrorset member that, block-for-block, contains the same data as other normal members within the mirrorset. Read requests from the host are always satisfied by normal members.

normalizing
Normalizing is a state in which, block-for-block, data written by the host to a mirrorset member is consistent with the data on other normal and normalizing members. The normalizing state exists only after a mirrorset is initialized. Therefore, no customer data is on the mirrorset.

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. A normalizing member is created by a normal member when either all of the normal members fail or all of the normal members are removed from the mirrorset.

See also copying member.

NVM
Non-Volatile Memory. A type of memory where the contents survive power loss. Also known as NVMEM. The NVMEM in the HSJ80 controller stores the configuration parameters for the storage subsystem.

OCP
Operator Control Panel. The control or indicator panel associated with a device. The OCP for the HSJ80 contains the RESET buttons, the device I/O port quiesce buttons, and the PCMCIA program card.

See also PCMCIA.

operator control panel (OCP)
See OCP.

other controller
The controller in a dual-redundant pair that is not connected to the controller serving your current CLI session with a local terminal.

See also this controller.

parity RAID
See RAIDset.

partition
A logical division of a container represented to the host as a logical unit.

PCMCIA	An acronym for personal computer memory card industry association. An international association formed to promote a common standard for PC card-based peripherals to be plugged into notebook computers. A PCMCIA card is about the size of a credit card and is used in the HSJ80 to load the controller software.
port	In general terms, the port is:

- A logical channel in a communications system.

- The hardware and software used to connect a host controller to a communications bus, such as a SCSI bus or serial bus.

Regarding the controller, the port is:

- The logical route for data in and out of a controller that can contain one or more channels, all of which contain the same type of data.

- The hardware and software that connects a controller to a SCSI device.

program card	The PCMCIA card containing the controller's operating software. *See also* PCMCIA card.
PTL	An abbreviation for Port-Target-LUN. The controller's method of locating a device on the controller device bus.
RAID level 0	A RAID storageset that stripes data across an array of disk drives. A single logical disk spans multiple physical disks, allowing parallel data processing for increased I/O performance. While the performance characteristics of RAID level 0 is excellent, this RAID level is the only one that does not provide redundancy. Raid level 0 storagesets are sometimes referred to as stripesets.
RAID level 0+1	A RAID storageset that stripes data across an array of disks (RAID level 0) and mirrors the striped data (RAID level 1) to provide high I/O performance and high availability. Raid level 0+1 storagesets are sometimes referred to as striped mirrorsets.
RAID level 1	A RAID storageset of two or more physical disks that maintains a complete and independent copy of the entire virtual disk's data. This type of storageset has the advantage of being highly reliable and extremely tolerant of device failure. Raid level 1 storagesets are sometimes referred to as mirrorsets.

RAID level 3
A RAID storageset that transfers data parallel across the array's disk drives a byte at a time, causing individual blocks of data to be spread over several disks serving as one enormous virtual disk. A separate redundant check disk for the entire array stores parity on a dedicated disk drive within the storageset.

See also RAID level 5.

RAID level 3/5
A specially developed RAID storageset that stripes data and parity across three or more members in a disk array. A RAIDset combines the best characteristics of RAID level 3 and RAID level 5. A RAIDset is the best choice for most applications with small to medium I/O requests, unless the application is write intensive. A RAIDset is sometimes called parity RAID. Raid level 3/5 storagesets are sometimes referred to as RAIDsets.

RAID level 5
A RAID storageset that, unlike RAID level 3, stores the parity information across all of the disk drives within the storageset.

See also RAID level 3.

RAIDset
See RAID level 3/5.

read caching
A cache management method used to decrease the subsystem response time to a read request by allowing the controller to satisfy the request from the cache memory rather than from the disk drives.

read-ahead caching
A caching technique for improving performance of synchronous sequential reads by prefetching data from disk.

reconstruction
The process of regenerating the contents of a failed member's data. The reconstruct process writes the data to a spareset disk and then incorporates the spareset disk into the mirrorset, striped mirrorset, or RAIDset from which the failed member came.

See also regeneration.

reduced
A term that indicates that a mirrorset or RAIDset is missing one member because the member has failed or has been physically removed.

redundancy
The provision of multiple interchangeable components to perform a single function in order to cope with failures and errors. A RAIDset is considered to be redundant when user data is recorded directly to one member and all of the other members include associated parity information.

regeneration	■ The process of calculating missing data from redundant data.
	■ The process of recreating a portion of the data from a failing or failed drive using the data and parity information from the other members within the storageset.
	The regeneration of an entire RAIDset member is called reconstruction.
	See also reconstruction.
replacement policy	The policy specified by a switch with the SET FAILEDSET command indicating whether a failed disk from a mirrorset or RAIDset is to be automatically replaced with a disk from the spareset. The two switch choices are *AUTOSPARE* and *NOAUTOSPARE*.
request rate	The rate at which requests are arriving at a servicing entity.
SBB	Storage Building Block:
	■ A modular carrier plus the interface required to mount the carrier into a standard StorageWorks enclosure.
	■ Any device conforming to enclosure mechanical and electrical standards installed in a 3.5-inch or 5.25-inch carrier, whether it is a storage device or power supply.
SCSI	An Acronym for Small Computer System Interface:
	■ An American National Standards Institute (ANSI) interface standard defining the physical and electrical parameters of a parallel I/O bus used to connect initiators to devices.
	■ A processor-independent standard protocol for system-level interfacing between a computer and intelligent devices including hard drives, floppy disks, CD-ROMs, printers, scanners, and others.
SCSI device ID number	A bit-significant representation of the SCSI address referring to one of the signal lines, numbered 0 through 7 for an 8-bit bus, or 0 through 15 for a 16-bit bus. *See also* target ID number.
spareset	A pool of disk drives used by the controller to replace failed members of a RAIDset.

star coupler   The physical hub of the CI cluster subsystem cabling. The star coupler is a set of connection panels contained within a cabinet containing cable connections and transformers through which the nodes of a cluster connect to one another through the CI bus.

See also nodes, CI bus.

storage building block (SBB)   *See* SBB.

storage unit   The general term that refers to storagesets, single-disk units, and all other storage devices that are installed in your subsystem and accessed by the 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.

See also container.

storageset
■ A group of devices configured with RAID techniques to operate as a single container.

■ Any collection of containers, such as stripesets, mirrorsets, striped mirrorsets, JBODs, and RAIDsets.

stripe   The data divided into blocks and written across two or more member disks in an array.

stripe size   The stripe capacity as determined by $n–1$ times the chunksize, where n is the number of RAIDset members.

striped mirrorset   *See* RAID level 0+1.

stripeset   *See* RAID level 0.

striping   The technique used to divide data into segments, also called chunks. The segments are striped, or distributed, across members of the stripeset. This technique helps to distribute hot spots across the array of physical devices to prevent hot spots and hot disks.

Each stripeset member receives an equal share of the I/O request load, improving performance.

surviving controller   The controller in a dual-redundant configuration pair that serves its companion's devices when the companion controller fails.

this controller   The controller that is serving your current CLI session through a local or
                             remote terminal.

                             See also other controller.

unit   A container made accessible to a host. A unit may be created from a single
                             disk drive. A unit may also be created from a more complex container such as
                             a RAIDset.

unwritten cached data   Sometimes called unflushed data.

                             See also dirty data.

UPS   An abbreviation for uninterruptable power supply. A battery-powered power
                             supply guaranteed to provide power to an electrical device in the event of an
                             unexpected interruption to the primary power supply. Uninterruptable power
                             supplies are usually rated by the amount of voltage supplied and the length of
                             time the voltage is supplied.

virtual terminal   A software path from an operator terminal on the host to the controller's CLI
                             interface, sometimes called a host console. The path can be established via
                             the host port on the controller or via the maintenance port through an
                             intermediary host.

VTDPY   An abbreviation for virtual terminal display utility.

write hole   The period of time in a RAID level 1 or RAID level 5 write operation when
                             an opportunity emerges for undetectable RAIDset data corruption. 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 in cache and
                             unsuccessful write operations can be retried.

write-back caching   A cache management method used to decrease the subsystem's response time
                             to write requests by allowing the controller to declare the write operation
                             "complete" as soon as the data reaches its cache memory. The controller
                             performs the slower operation of writing the data to the disk drives at a later
                             time.

write-through cache   A cache management technique for retaining host write requests in read cache. When the host requests a write operation, the controller writes data directly to the storage device. This technique allows the controller to complete some read requests from the cache, greatly improving the response time to retrieve data. The operation is complete only after the data to be written is received by the target storage device.

This cache management method may update, invalidate, or delete data from the cache memory accordingly, to ensure that the cache contains the most current data.

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