hp StorageWorks

HSG80 Array Controller V8.7 Command Line Interface Reference Guide

Part Number: EK–G80CL–RA. B01

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Product Version: 8.7

This guide provides detailed descriptions of all CLI commands and step-by-step instructions on how to use each command.

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Glossary

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About this Guide

This Command Line Interface reference guide provides information to help you:

- Use the CLI commands
- Contact technical support for additional assistance

Document Conventions

The conventions included in Table 1 apply in most cases.

Table 1: Document Conventions

Element	Convention
Key names, menu items, buttons, and dialog box titles	**Bold**
File names and application names	*Italics*
User input, command names, system responses (output and messages)	`Monospace font` `COMMAND NAMES` are uppercase unless they are case sensitive
Variables	`Monospace, italic font`
Website addresses	Sans serif font (http://www.compaq.com)

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

> ⚠ **WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.**

> **CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

> **Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.**
>
> **WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.**

Rack Stability

> **WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:**
>
> • **The leveling jacks are extended to the floor.**
> • **The full weight of the rack rests on the leveling jacks.**
> • **In single rack installations, the stabilizing feet are attached to the rack.**
> • **In multiple rack installations, the racks are coupled.**
> • **Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.**

Getting Help

If you still have a question after reading this guide, contact service representatives or visit our website.

StorageWorks Technical Support

In North America, call StorageWorks technical support at 1-800-OK-COMPAQ, available 24 hours a day, 7 days a week.

NOTE: For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call StorageWorks technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the StorageWorks website: http://www.compaq.com.

Be sure to have the following information available before calling:

• Technical support registration number (if applicable)

• Product serial numbers

- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions.

StorageWorks Website

The StorageWorks website has the latest information on this product, as well as the latest drivers. Access the StorageWorks website at: <u>http://www.compaq.com/storage</u>. From this website, select the appropriate product or solution.

StorageWorks Authorized Reseller

For the name of your nearest StorageWorks Authorized Reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the StorageWorks website for locations and telephone numbers.

1

CLI Command Introduction

Command line interface (CLI) provides a set of commands used to maintain controller parameters and manage storagesets. These CLI commands can be delivered to 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 chapter provides a general description of the CLI interface and an outline of how to use this interface. Chapter 2 contains a description of each CLI command with the correct syntax and examples of usage.

CLI Overview

Issuing CLI commands via the maintenance port of the controller is the most direct means of communicating with the controller. 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.

Using the CLI

Access the CLI through the following methods:

- Connecting a PC or local terminal to the maintenance port on the front of the controller.

- Using the diagnostic utility protocol (DUP) utility from a system terminal, enable a remote connection to the controller. After the controller is initially configured and made visible to the host, other configuration tasks can be performed 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 perform.

Command Overview

CLI commands are divided into categories based on the options or structures they control. The following sections list these 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
- CONFIGURATION
- EXIT
- HELP
- POWEROFF
- RESTART
- SELFTEST
- SET
- SHOW
- RUN
- SHUTDOWN

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

- SET FAILOVER
- SET MULTIBUS_FAILOVER
- SET NOFAILOVER

- SET NOMULTIBUS_FAILOVER

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 PASSTHROUGH
- CLEAR ERRORS
- DELETE
- INITIALIZE
- LOCATE
- RENAME
- SET

The CLI commands that support sparesets and failedsets include:

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

Selective Storage Presentation Commands

Selective Storage Presentation commands enable or disable access to individually selected units from host and controller ports. Paths can be enabled or disabled either all inclusively or specifically on a per-path basis during the addition of new units or as a modification of existing units.

The CLI commands that pertain to the Selective Storage Presentation feature include:

- ADD UNITS (the ENABLE_ACCESS_PATH switch)
- ADD UNITS (the DISABLE_ACCESS_PATH switch)

- SET unit-number (the ENABLE_ACCESS_PATH switch)
- SET unit-number (the DISABLE_ACCESS_PATH switch)
- ADD CONNECTIONS (the UNIT_OFFSET switch)
- SET connection-name (the UNIT_OFFSET switch)

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 include:

- ADD MIRRORSET
- ADD RAIDSET
- ADD STRIPESET
- DELETE
- INITIALIZE
- LOCATE
- MIRROR
- REDUCE
- RENAME
- SET
- SHOW
- UNMIRROR

Partition Commands

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

The CLI Commands that pertain to partitions include:

- 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 include:

- ADD CONCATSETS
- ADD SNAPSHOT_UNITS
- DELETE
- LOCATE
- RENAME
- RETRY_ERRORS UNWRITEABLE_DATA
- SET
- SHOW

Diagnostic and Utility Commands

Diagnostic and utility commands perform general controller support functions.

The commands that pertain to the diagnostics and utilities include:

- DIRECTORY
- RUN

Data Replication Manager (DRM) Commands

DRM uses the peer-to-peer remote copy function of the HSG80 controller to achieve data replication. HSG80 controller pairs at the initiator site are connected to a partner HSG80 controller pair at the target site. Remote copy sets are created from units at the initiator and target sites. These remote copy sets are mirrors of each other.

The HSG80 controllers provide failover and failback capabilities in case of failures. Failover makes the data available at the target site after a failure. Failback is used to move data operations back to the initiator site once the site is back online.

NOTE: All DRM commands are hidden and inoperative until the controller pair is put into remote copy mode by specifying the *REMOTE_COPY* switch of the SET *controller* command. DRM applies only to the HSG80 array controller running ACS version 8.7P.

The CLI commands used to configure a DRM environment and for failover and failback procedures include:

- ADD ASSOCIATIONS

- ADD REMOTE_COPY_SET

- DELETE *association-set-name*

- DELETE *remote-copy-set-name*

- SET *association-set-name*

- SET *remote-copy-set-name*

- SITE FAILOVER

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 that is known, 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_CONTROLLER=?
```

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

```
SET THIS PROMPT=?
```

Entering CLI Commands

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

- Commands are *not* case-sensitive.

- For most commands, only 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, regardless of the number of commands entered. A controller experiencing heavy data I/O might respond slowly to CLI commands.

Specific keys or a combination of keys allow the ability to recall and edit the last four commands. This feature can save time and help prevent mistakes when entering 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 key or **Ctrl**+**B** keys, **Down Arrow** key or **Ctrl**+**N** keys	Steps forwards or backward through the four most recent CLI commands.
Left Arrow key or **Ctrl**+**D** keys, **Right Arrow** key or **Ctrl**+**F** keys	Moves the cursor left or right in a command line.
Ctrl+**E** keys	Moves the cursor to the end of the line.
Ctrl+**H** keys	Moves the cursor to the beginning of the line.
Ctrl+**J** keys or **Linefeed** key	Deletes the word to the left of the cursor.
Ctrl+**U** keys	Deletes all characters on the same line as the cursor.
Ctrl+**A** keys or **F14** key	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** keys	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 guide 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 guide 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 represented in this guide 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 guide as capitalized, italicized text.

Changing the CLI Prompt

Change the CLI prompt display by using the SET *controller PROMPT* command. Enter a 1- to 16- character string as the new prompt. For example, the prompt could be changed to indicate the array controller type, such as "HSG>."

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CLI Command Descriptions

The previous chapter provided a general description of the CLI interface and an outline of how to use the interface. This section contains the CLI command descriptions that 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 versions 8.7F, 8.7G, 8.7P, and 8.7S 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 ASSOCIATIONS

An association set is a group of remote copy sets that shares common attributes (See SET ASSOCIATIONS for the attribute list). This command adds an association set to the controller pair's configuration. The association set can be initialized with a single remote copy set through the use of the *remote-copy-set-name* switch. Additional remote copy sets can be added to the association set with the SET *association-set-name* command.

NOTE: This command is hidden and inoperative until the controller pair is put into remote copy mode by specifying the REMOTE_COPY switch of the SET controller command.

This command is valid only on the node on which the Initiator resides (where remote copy sets are configured).

This command is rejected if the specified remote copy set is unknown to the controller pair.

Syntax

ADD ASSOCIATIONS *association-set-name*

Parameters

The following parameters are required for the ADD ASSOCIATIONS command:

association-set-name

The association-set-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

NOTE: Association sets cannot be renamed with the RENAME command. If the wrong name is entered, the association set must be deleted and then added again.

Switches

The following switch is available with the ADD ASSOCIATIONS command:

remote-copy-set-name

The name of the first member of the association set.

Examples

To create an association set, AS3, from remote copy sets RSC1 and RSC2, enter:

```
ADD ASSOCIATIONS AS3 RSC1
SET AS3 ADD=RSC2
```

See Also

ADD REMOTE_COPY_SETS
SET *association-set-name*
SHOW ASSOCIATIONS
SHOW *association-set-name*

ADD CONCATSETS

Creates a specialized volume, called a concatset (short for concatenation set), from a storageset that has been given a unit number. Another storageset can then be added to the concatset by the SET *CONCATSETS* command, thereby dynamically increasing the size of the unit.

⚠ **CAUTION:** This command should only be executed with host operating systems that support dynamic volume expansion. If the operating system cannot handle one of its disks increasing in size, use of this command could make data inaccessible.

Syntax

ADD CONCATSETS *concatset-name storageset-name*

Parameters

The following parameters are required for the ADD CONCATSETS command:

- *concatset-name*
- *storageset-name*

These parameters are described in the following paragraphs:

concatset-name

The name to be assigned to the concatenation, or concatset.

The concatset-name must consist of a string of up to nine printable characters excluding commas and back-slashes.

storageset-name

Designates the first storageset to be a member of the concatset. The storageset specified must already be configured as a unit.

Switches

There are no switches associated with this command.

Examples

To convert unit D0, which consists of stripeset STRIPE1, to a concatset, enter:

```
ADD CONCATSETS C1 STRIPE1
```

To add STRIPE2 to the concatset C1, enter:

```
SET C1 ADD=STRIPE2
```

See Also

DELETE *concatset-name*
SET *concatset-name*
SHOW CONCATSETS
SHOW *concatset-name*

ADD CONNECTIONS

Each path between a Fibre Channel adapter in a host computer and an active host port on a controller is a connection.

This command adds the specified host connection to the table of known connections. This table is maintained in the controller's memory. The maximum table length is 96 connections; if the table contains 96 entries, new connections cannot be added unless some old ones are deleted.

There are two mechanisms for adding a new connection to the table:

• Physically connecting a host adapter to a controller host port. During Fibre Channel initialization, the controller is aware of the connection and adds it to the table. The controller assigns a default connection name to new connections that are discovered through the physical connection. The default connection name is of the form !NEWCON*nn*.

NOTE: Certain host conditions, such as a power cycle, that disturb the state of the switched fabric may cause a connection to reappear in the table. The connection is assigned a default connection name.

• Adding a connection through the ADD CONNECTIONS command.

NOTE: ADD CONNECTIONS adds an entry to the table whether the connection physically exists or not. The table can be completely filled with fictitious connections.

Syntax

ADD CONNECTIONS *connection-name* HOST_ID=*host-id*
    ADAPTER_ID=*adapter-id* CONTROLLER=*controller* PORT=*port*

ADD CONNECTIONS REJECTED_HOST=*index*

Parameters

The following parameters support the ADD CONNECTIONS command:

• *connection-name*

• *HOST_ID*

• *ADAPTER_ID*

• *CONTROLLER*

• *PORT*

- *REJECTED_HOST*

These parameters are described in the following paragraphs:

connection-name

> The name assigned to the host connection. The connection-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

> The controller automatically assigns default connection name when a connection is physically made between a host adapter and a controller port. The form of a default connection name is !NEWCONnn.

HOST_ID=*host-id*

> HOST_ID is the parameter name for the *host-id* variable, which is the worldwide name (WWN) of the host. WWN is a 16-character hexadecimal number. The hyphens are not necessary, but are recommended to avoid mistakes in entering the number. The HOST_ID parameter name must be entered, followed by an equal sign, followed by the WWN of the host.

> For example, to specify a WWN of AAAA-BBBB-CCCC-DDDD, enter:

```
HOST_ID=AAAA-BBBB-CCCC-DDDD
```

ADAPTER_ID=*adapter-id*

> ADAPTER_ID is the parameter name for the *adapter-id* variable, which is the worldwide name (WWN) of the host Fibre Channel adapter. WWN is a 16-character hexadecimal number. The hyphens are not necessary, but are recommended to avoid mistakes in entering the number. The ADAPTER_ID parameter name must be entered, followed by an equal sign, followed by the WWN of the host bus adapter.

> For example, to specify a WWN of WWN of AAAA-BBBB-CCCC-DDDD, enter:

```
ADAPTER_ID=AAAA-BBBB-CCCC-DDDD
```

> **NOTE:** The worldwide name of the host and adapter are sometimes the same. This is a characteristic of the adapter.

CONTROLLER=*controller*

> CONTROLLER is the parameter name for the *controller* variable, which specifies which controller the host is to connect through. The choices are THIS_CONTROLLER and OTHER_CONTROLLER.

PORT=*port*

PORT is the parameter name for the *port* variable that specifies which host port (1 or 2) the connection is on.

REJECTED_HOST=*rejected-host-index*

To manually add rejected host zero, issue the following command:

```
ADD CONNECTION REJECTED_HOST=0
```

NOTE: Use SHOW CONNECTIONS FULL to display the rejected host connections.

This command adds a !NEWCON*xx* connection to the connection table in an OFFLINE state. The host must issue a FC PLOGI to make the connection active. There are mechanisms to do this in UNIX, VMS, but not NT (except reboot).

For example, to force the connection into an online state, issue the following command:

```
CLI> SET <THIS | OTHER> PORT_<1|2>_TOPOLOGY = OFFLINE
```

followed by:

```
CLI> SET <THIS | OTHER> PORT_<1|2>_TOPOLOGY = FABRIC
```

This forces all hosts connected to that controller/port to re-login. Additionally, hosts connected to the controller pair through the same switch (regardless of controller | port) re-login as well.

> $\triangle$ **CAUTION:** This implementation is the safest, since pinging the fabric name server would result in all hosts re-logging in (up to 96).

When the connection is added, it gets deleted from the reject list. Index numbers for remaining rejected hosts are re-ordered.

Switches

The following switches are available with the ADD CONNECTION command:

- *OPERATING_SYSTEM*
- *RESERVATION_STYLE*
- *UNIT_OFFSET*

These switches are described in the following paragraphs:

OPERATING_SYSTEM=OS_name

Specifies the operating system of the host. The *OPERATING_SYSTEM* switch tailors the controller's behavior for use with a particular operating system. See your operating system specific Solution Kit to determine which value should be used. The following values are supported: WINNT, TRU64_UNIX, VMS, HP, HP_VSA, IBM, NETWARE, SGI, SNI, SUN, AIX_CAMBEX.

RESERVATION_STYLE=CONNECTION_BASED (default)
RESERVATION_STYLE=HBA_PORT_ID_BASED

Selection of a RESERVATION_STYLE should be based upon the capabilities of the host operating system. See the OS kit for more details. SCSI persistent reservations are processed differently by the HSG80 based upon the RESERVATION_STYLE. Normal SCSI reservations (not persistent) are always treated as CONNECTION_BASED.

When set to *HBA_PORT_ID_BASED,* a single persistent reservation command is propagated to all HSG80 controller ports, thereby enabling the host to access the unit over any available path.

When set to *CONNNECTION_BASED,* the persistent reservation is only valid for the port on which it is received, thereby limiting the host access to those paths that have been explicitly reserved.

IMPORTANT: If a particular host prefers either the *CONNECTION_BASED* or *HBA_PORT_ID_BASED* reservation style, all the connections to that particular host must have identical reservation style settings.

The most important advantage of this mechanism is that it allows various hosts, with different reservation style requirements, to be connected to the same HSG80 controllers in a SAN environment.

UNIT_OFFSET=n

UNIT_OFFSET is a decimal value (*n*) that establishes the beginning of the range of units that a host connection can access. This offset defines and restricts host connection access to a contiguous group of unit numbers.

In transparent failover mode, host connections on port 1 default to an offset of 0; port 1 connections can see units 0 through 99. Host connections on port 2 default to an offset of 100; port 2 connections can see units 100 through 199.

In multiple-bus failover mode, the default offset is 0 for all host connections.

NOTE: If a controller pair is switched from transparent failover mode to multiple-bus failover mode, the unit offsets for transparent mode remain in effect.

The LUN number equals the unit number minus the offset:

LUN number = unit number – offset

- Logical unit number or LUN number = the logical unit number presented to the host connection.

- Unit number = the number assigned to the unit in the ADD UNITS command. This is the number by which the unit is known internally to the controllers.

For example, a system has three host connections, each of which can see 8 LUNs. Each connection designates its LUNs as 0 through 7. To define for each of these connections a block of 8 units, set the offset for each connection, as follows:

```
CLI>SET SERVER1 UNIT_OFFSET=0
CLI>SET SERVER2 UNIT_OFFSET=10
CLI>SET SERVER3 UNIT_OFFSET=120
(It is not necessary to use offsets that are divisible by 10, but it
makes things simpler.)
```

The effects of these offset assignments are as follows:

- Server1 accesses units D0 through D7, which it sees as LUNs 0 through 7.

- Server2 accesses units D10 through D17, which it sees as LUNs 0 through 7.

- Server3 accesses units D120 through D127, which it sees as LUNs 0 through 7.

There is one additional factor to consider when assigning unit numbers and offsets. If the *SCSI_VERSION* qualifier of the SET THIS/OTHER CONTROLLER command is set to SCSI-3, the command console LUN (CCL) is presented as LUN 0 to every connection, superseding any unit assignments. For more information see the ADD UNITS command.

Examples

This example shows how to add an entry for a connection named George to the table of known connections, with the indicated host and adapter worldwide names, on port 2 of "this controller," and with reservations checked using the port_id of the host bus adapter.

```
ADD CONNECTIONS GEORGE HOST_ID=1000-0000-C920-1234
    ADAPTER_ID=1000-0000-C920-5678 CONTROLLER=THIS PORT=2
    RESERVATION_STYLE=HBA_PORT_ID_BASED
```

See Also

DELETE *connection-name*
SET *connection-name*
RENAME
SHOW *connection-name*
SHOW CONNECTIONS

ADD DISKS

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 by issuing the RUN CONFIG command.

NOTE: The controller supports a maximum of 84 physical storage devices, even though more than 84 target IDs are available. Do not exceed the maximum number of physical devices in the subsystem.

Syntax

ADD DISKS *disk-name scsi-port-target-lun*

Parameters

The following parameters are required for the ADD DISKS command:

- *disk-name*
- *scsi-port-target-lun*

These parameters are described in the following paragraphs:

disk-name

Assigns a name to the disk device. This disk-name can then be used with the ADD UNITS command to create a logical unit, or a parameter in the adding of a storageset.

The disk-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

A disk drive is commonly named DISK*pttll*, where *pttll* is the disk Port-Target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of disk drive and the disk drive SCSI location.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place at least 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. Valid device target IDs for single controller configurations are 00–15, excluding ID 7. Valid device target IDs for dual controller configurations are 00–15, excluding IDs 6 and 7.

- *lun*—Indicates the LUN of the disk drive and is always zero.

The parameters *port*, *target*, and *lun* must be entered with at least one space between them. Leading zeroes can be excluded.

Switches

The following switches are available with the ADD DISKS command:

- *TRANSFER_RATE_REQUESTED*

- *TRANSPORTABLE and NOTRANSPORTABLE*

These switches are described in the following paragraphs:

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=DEFAULT
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 can 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: StorageWorks 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 DISKS DISK10000 1 0 0
```

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

```
ADD DISKS 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 DISKS DISK30200 3 2 0 NOTRANSPORTABLE
TRANSFER_RATE_REQUESTED=10MHZ
```

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

```
INITIALIZE DISK40200
```

```
ADD UNITS D199 DISK40200
```

See Also

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

ADD MIRRORSETS

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 MIRRORSETS *mirrorset-name disk-name1 [disk-nameN]*

Parameters

The following parameters are required for the ADD MIRRORSETS command:

- *mirrorset-name*
- *disk-name1*

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 UNITS command to identify the mirrorset as a host-addressable unit.

The mirrorset-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

A mirrorset is commonly named 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 a unique identifier for the container 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 MIRRORSETS command:

- *COPY*
- *POLICY* and *NOPOLICY*
- *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-nameSET mirrorset-nameSET mirrorset-namepage 2–130).

READ_SOURCE=LEAST_BUSY (default)
READ_SOURCE=ROUND_ROBIN

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

- 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 mirrorset named MIRR1 consisting of disks DISK10000, DISK20100, and DISK30200, enter:

```
ADD MIRRORSETS MIRR1 DISK10000 DISK20100 DISK30200
```

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

```
INITIALIZE MIRR1
ADD UNITS D104 MIRR1
```

See Also

ADD DISKS
ADD UNITS
DELETE *container-name*
INITIALIZE
MIRROR
REDUCE
SHOW *mirrorset-name*
SHOW MIRRORSETS
SHOW STORAGESETS
UNMIRROR

ADD PASSTHROUGH

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

NOTE: The controller supports a maximum of 84 physical storage devices, even though more than 84 target IDs are available. Do not exceed the maximum number of physical devices in the subsystem.

Syntax

ADD PASSTHROUGH *passthrough-name scsi-port-target-lun*

Parameters

The following parameters are required for the ADD PASSTHROUGH command:

- *passthrough-name*
- *scsi-port-target-lun*

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 UNITS command to create a logical unit.

The passthrough-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

A passthrough device is commonly named *PASSpttll*, where *pttll* is the disk Port-Target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of passthrough device and the passthrough device SCSI location.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place at least 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 passthrough device resides.

- *target*—Designates the SCSI target ID of the passthrough device on the port. Valid device target IDs for single controller configurations are 00–15, excluding ID 7. Valid device target IDs for dual controller configurations are 00–15, excluding IDs 6 through 7.

- *lun*—Indicates the LUN of the passthrough device.

The parameters *port*, *target*, and *lun* must be entered with at least one space between them. Leading zeroes can be excluded.

Switches

The following switch is available with the ADD PASSTHROUGH command:

- *TRANSFER_RATE_REQUESTED*

These switches are described in the following paragraphs:

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=DEFAULT
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 passthrough device. The transfer rate might need to be limited to accommodate long cables between the controllers and the device.

Examples

To add PASS10200 at port 1, target 2, LUN 0, enter:

```
ADD PASSTHROUGH PASS10200 1 2 0
ADD UNIT P4 PASS10200
```

See Also

ADD UNITS
DELETE *container-name*
LOCATE
SHOW DISKS
SHOW DEVICES
SHOW PASSTHROUGH
SET *container-name*

ADD RAIDSETS

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

NOTE: The maximum size of a RAIDset is 1.024TB

StorageWorks RAIDsets are RAID level 3/5 storagesets that use the best characteristics of RAID level 3 and RAID level 5. A RAIDset should contain only disk drives of the same capacity. The controller limits the effective capacity of each member to the capacity of the smallest member in the storageset (base member size) when the storageset is initialized. Thus, if you combine 9 GB disk drives with 4 GB disk drives in the same storageset, you will waste 5 GB of capacity on each 9 GB member. A RAIDset must include at least 3 disk drives, but no more than 14.

Syntax

ADD RAIDSETS *RAIDset-name disk-name1 disk-name2 disk-name3 [disk-nameN]*

Parameters

The following parameters are available to the ADD RAIDSETS command:

- *RAIDset-name*

- *disk-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 UNITS command to identify the RAIDset as a host-addressable unit.

The RAIDset-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

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.

disk-name1 disk-name2 disk-name3 [disk-nameN]

Identifies the disks 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 RAIDSETS command:

- *POLICY and NOPOLICY*

- *RECONSTRUCT*

- *REDUCED and NOREDUCED*

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 for more information regarding this procedure.

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 RAIDSETS 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 RAIDSETS RAID8 DISK10000 DISK20100 DISK30200 POLICY=BEST_FIT
```

NOTE: Enter the ADD RAIDSETS 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 RAIDSETS RAID8 DISK10000 DISK20100 DISK30200
INITIALIZE RAID8
ADD UNITS 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 is erased if you reinitialize the RAIDset.

```
ADD RAIDSETS RAID6 DISK10300 DISK20400 DISK30200 REDUCED
```

See Also

      ADD UNITS
      DELETE *container-name*
      INITIALIZE
      SET RAIDSETS
      SHOW RAIDSETS
      SHOW *RAIDset-name*
      SHOW STORAGESETS

ADD REMOTE_COPY_SETS

Creates a remote copy set (RCS) consisting of one unit at the initiator site and one unit at the target site. The units may be a single disk (JBOD) or a stripeset, mirrorset, or RAIDset.

NOTE: This command works only in a DRM environment and requires an HSG80 array controller with ACS version 8.7P code. Like all DRM commands, use of this command is heavily restricted. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for examples of usage.

This command must only be used on the initiator (local) site.

The following restrictions apply to remote copy sets:

- There is a maximum of 12 remote copy sets per initiator/target pair.

- Neither initiator nor target units can be transportable units, concatset units, or snapshot units.

Syntax

ADD REMOTE_COPY_SETS *remote-copy-set-name initiator-unit-name remote-node-name\target-unit-name*

Parameters

The parameters required for this command are:

- *remote-copy-set-name*

- *initiator-unit-name*

- *remote-node-name\target-unit-name* (this parameter is not required; it can be added later through the SET command)

These parameters are described in the following paragraphs:

remote-copy-set-name

The name by which the remote copy set is known. This name must be unique across the fabric.

NOTE: Remote copy sets cannot be renamed with the RENAME command. If the wrong name is entered, the remote copy set must be deleted and then added again.

The remote-copy-set-name may consist of a maximum of nine characters excluding commas and back-slashes.

initiator-unit-name

The name of the initiator unit that is to be the first member of the remote copy set. This unit cannot be involved in a snapshot, and must not be a concatset.

remote-node-name\target-unit-name

The *remote-node-name* part of the parameter specifies the name of the controller pair—called a *node*—receiving the command. The *target-unit-name* part specifies the unit on the remote node to be added as the target of the remote copy set.

Switches

The following switches are available with the ADD REMOTE_COPY_SETS command:

- *OPERATION_MODE*
- *OUTSTANDING_IOS*

These switches are described in the following paragraphs:

OPERATION_MODE=SYNCHRONOUS (default)
OPERATION_MODE=ASYNCHRONOUS

This switch determines which of two normal operating modes is assigned to the remote copy set.

In synchronous mode, write operations must be completed on the remote units of the remote copy set before the host is informed that the operation is complete. Synchronous operation assures data consistency at all times among the members of a remote copy set.

In asynchronous mode, the write operation is reported as complete to the host before the data is written to the remote units of the remote copy set. Asynchronous mode gives greater performance and faster response time, but the data on all members of the remote copy set cannot be assumed to be always the same.

OUTSTANDING_IOS=n (1 to 240; default is 200)

This switch sets the number of outstanding I/O operations from the initiator to the target. The way this switch operates depends on which operating mode is set by the *OPERATION_MODE* switch:

- In synchronous mode, *OUTSTANDING_IO* refers to the number of remote writes (write operations from the initiator to the target) that can be outstanding.

- In asynchronous mode, *OUTSTANDING_IO* refers to the number of write operations that can be reported as completed to the host before they have been written on all the members of the remote copy set.

Example

To create remote copy set RCS1, consisting of unit D1 on the local controller pair and unit D21 on a remote controller pair (node) named London, enter:

```
ADD REMOTE_COPY_SETS RCS1 D1 LONDON\D21
```

See Also

ADD ASSOCIATIONS
SET *controller* REMOTE_COPY
SET *remote-copy-set-name*

ADD SNAPSHOT_UNITS

Creates and names a snapshot unit. A snapshot unit is one that reflects the contents of another unit at a particular point in time (the instant the ADD SNAPSHOT_UNITS command is entered). The snapshot unit can be manually presented to the host. The snapshot unit remains until it is deleted (DELETE command).

NOTE: This command is operational only in ACS versions 8.7S and 8.7P and only if both controllers have mirrored cache.

Syntax

ADD SNAPSHOT_UNITS *snapshot-unit storageset-name source-unit*

Parameters

The following parameters are required for the ADD SNAPSHOT_UNITS command:

- *snapshot-unit*
- *storageset-name*
- *source-unit*

The relationship of the parameters can be summarized as follows:

When the ADD SNAPSHOT_UNITS command is entered, *storageset-name* becomes *snapshot-unit* and archives the current contents of *source-unit* at that instant.

These parameters are described in the following paragraphs:

snapshot-unit

The unit number assigned to the snapshot unit. See the ADD UNITS command for an explanation of unit numbers.

The snapshot unit is created with all host access disabled by default. Do a SET unit-name ENABLE command to set up host access.

The snapshot unit is created on the same controller as the source unit, and always remain online to the same controller as the source-unit.

storageset-name

Identifies the name of the storageset that becomes the snapshot unit. The storageset must have the following characteristics:

- Capacity equal to or greater than the source unit

- Initialized

- Not a partition or a concatset

source-unit

The unit whose contents are frozen in time and preserved on the snapshot unit. The source unit must have the following characteristics:

- Less than 1.024 TB

- Write-back cache enabled

- Non-transportable

- Must be preferred to one controller or the other. See SET *unit-number* PREFERRED_PATH.

Switches

The following switch is available with the ADD SNAPSHOT_UNITS command:

- *USE_PARENT_WWID*

  This switch causes the snapshot unit to be created with a special WWID derived from that of the parent/source unit. If the special WWID for the specified source unit is in use, then a new WWID is automatically allocated, and a warning message is displayed.

NOTE: The use of this switch limits the number of WWIDs that an operating system needs to track. This may become an issue if snapshots are created and subsequently deleted from the same source/parent unit on a regular basis.

Example

To create unit D4, which consists of storageset RAID4 and which become a point-in-time snapshot of unit D1, enter:

```
ADD SNAPSHOT_UNITS D4 RAID4 D1
```

See Also

SET *units*
DELETE *container-name*
SHOW UNITS

ADD SPARESETS

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 SPARESETS *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 SPARESETS command.

Switches

There are no switches associated with this command.

Example

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

```
ADD SPARESETS DISK20200
ADD SPARESETS DISK30300
```

See Also

DELETE SPARESETS
SHOW SPARESETS
SHOW STORAGESETS

ADD STRIPESETS

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.

NOTE: The maximum size of a stripeset is 1.024 TB (1024 GB). The size of a stripeset is approximated by multiplying the size of the smallest member by the number of members in the stripeset.

Syntax

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

Parameters

The following parameters are required for the ADD STRIPESETS 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 UNITS command to identify the stripeset as a host-addressable unit.

The stripeset-name may consist of up to nine characters excluding commas and back-slashes.

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.

NOTE: A 256-character limit exists for the command line. If configuring a stripeset with many members, consider renaming the members to shorter names in order to enter the entire command line.

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 STRIPESETS STRIPE1 DISK10000 DISK20100 DISK30200
```

To create a logical unit from STRIPE1, enter:

```
INITIALIZE STRIPE1
ADD UNITS D103 STRIPE1
```

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

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

```
ADD MIRRORSETS MR1 DISK10000 DISK20100
ADD MIRRORSETS MR2 DISK30200 DISK40300
ADD STRIPESETS STRIPE1 MR1 MR2
INITIALIZE STRIPE1
ADD UNITS D104 STRIPE1
```

See Also

ADD UNITS
ADD MIRRORSETS
DELETE *container-name*
INITIALIZE
SHOW STORAGESET
SHOW STRIPESETS
SHOW *stripeset-name*

ADD UNITS

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 UNITS command. Units can be created from all container types:

- Disk and passthrough devices
- Stripesets
- Mirrorsets
- RAIDsets
- Partitions
- Striped mirrorsets

If adding a newly created container to a subsystem, the container must be initialized in order to be added as a logical unit. If adding a container with previously stored data that needs to be maintained, do not initialize this container; the container is added as a logical unit.

> △ **CAUTION:** Adding a unit immediately makes that unit available to all host connections unless the *DISABLE_ACCESS_PATH* switch is specified. See the *ENABLE_ACCESS_PATH/DISABLE_ACCESS_PATH* switch description for more information.

Syntax

ADD UNITS *unit-number container-name*

Parameters

The following parameters are required for the ADD UNITS command:

- *unit-number*
- *container-name*

These parameters are described in the following paragraphs:

unit-number

The unit number is the designation by which the controller keeps track of the unit. This number maps to one or more host-accessible LUNs. Unit numbers are prefixed by D and are in the range of 0–199. How units are assigned to ports depends on the failover mode.

- Transparent failover mode:

    — D0 to D99 are units assigned to port 1

    — D100 to D199 are units assigned to port 2

    — In transparent failover mode, adding unit D1 creates a logical unit and presents it as D1 to the host on port 1. Adding unit D101 creates a logical unit and presents it as D1 to the host on port 2.

    NOTE: When a dual redundant pair of controllers is in Transparent Failover Mode, only one port per controller is active.

- Multiple-bus failover mode:

    — D0 to D199 are units visible to the hosts through both ports of both controllers

    — In multiple-bus failover mode, adding unit D0 creates a logical unit that is presented to both ports on both controllers. What hosts can see the unit is determined by parameters of the ADD CONNECTIONS command and by the *ENABLE/DISABLE_ACCESS_PATH* switch of the ADD UNITS command.

Refer to the detailed description of failover modes that are contained in the controller installation and configuration guide for further information regarding the relationship between unit numbers and failover mode.

All units composed from the partitioning of a storage set must be maintained on the same controller.

The LUN number a host connection uses to access a unit is a function of the *UNIT_OFFSET* switch in the ADD (or SET) CONNECTIONS command. LUN number equals unit number minus offset:

LUN number = unit number – offset

If no value is specified for the *UNIT_OFFSET* switch in the ADD (or SET) CONNECTIONS command, the offsets are as follows:

- In transparent failover mode, host connections on port 1 have an offset of 0 and host connections on port 2 have an offset of 100.

- In multiple-bus failover mode, all ports have a default offset of 0.

container-name

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

> A unit can consist of a maximum of 48 devices.

Switches

Table 2–1 lists all switches for the ADD UNITS 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 UNITS Switches for New Containers

Switch	Container Type	RAIDset	Stripeset	Mirrorset	N0Transportable	Transportable	Passthrough
ENABLE_ACCESS_PATH *DISABLE_ACCESS_PATH*		✓	✓	✓	✓	✓	✓
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*		✓	✓	✓	✓	✓	
READAHEAD_CACHE *NOREADAHEAD_CACHE*		✓	✓	✓	✓	✓	
RUN *NORUN*		✓	✓	✓	✓	✓	
WRITE_LOG *NOWRITE_LOG*		✓	✓	✓	✓		

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

Switch	Container Type	RAIDset	Stripeset	Mirrorset	N0Transportable	Transportable	Passthrough
WRITE_PROTECT *NOWRITE_PROTECT*		✓	✓	✓	✓	✓	
WRITEBACK_CACHE *NOWRITEBACK_CACHE*		✓	✓	✓	✓		

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

ENABLE_ACCESS_PATH=
DISABLE_ACCESS_PATH=

> Determines which host connections can access the unit. The allowable variables are:
>
> • ALL
>
> • A string of connection names separated by commas and enclosed in parentheses.
>
> Setting *ENABLE_ACCESS_PATH=ALL* permits all host connections to access the unit. This is the default.

> ⚠ **CAUTION:** If the storage subsystem has more than one host connection, access path must be specified carefully to avoid giving undesirable host connections access to the unit. The default condition is that access paths to all host connections are enabled. To restrict host access to a set of host connections, specify *DISABLE_ACCESS_PATH=ALL* when the unit is added, then use the SET *unit* command to specify the set of host connections that are to have access to the unit.
>
> Enabling the access path to a particular host connection does not override previously enabled access paths. All access paths previously enabled are still valid; the new host connection is simply added to the list of connections that can access the unit.
>
> The procedure of restricting access by enabling all access paths and then disabling selected paths is particularly <u>not</u> recommended because of the potential data/security breach that occurs when a new host connection is added.

MAX_READ_CACHED_TRANSFER_SIZE=n
MAX_READ_CACHED_TRANSFER_SIZE=32 (default)

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=n
MAX_WRITE_CACHED_TRANSFER_SIZE=32 (default)

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=n
MAXIMUM_CACHED_TRANSFER_SIZE=32 (default)

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 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 use 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 tells the controller if it is expected to bring a unit online in dual boot situations.

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.

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.

NOTE: If your controllers are configured to operate in transparent-failover mode, do not set the PREFERRED_PATH switch with the ADD UNITS or SET *unit-number* command—otherwise, an error message is generated. This error message will indicate the assignment of a preferred controller path at the unit level as valid only when operating in multiple bus failover mode.

- 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 this unit online.

- Select *PREFERRED_PATH=OTHER_CONTROLLER* to instruct the "other controller" to bring this unit 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 access the data from disks.

Read caching improves performance in almost all situations. Therefore, it is recommended that 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 is 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.

WRITE_LOG
NOWRITE_LOG (default)

Marks the defined unit as an OpenVMS Host Based Volume Shadowing shadow set member.

IMPORTANT: This switch is only supported with ACS version 8.7R or version 8.7W code.

NOTE: The specified unit is only marked and not enabled.

To enable a unit as an OpenVMS Host Based Volume Shadowing shadow set member, a single controller or both controllers of a dual redundant pair must be restarted. During the restart, the additional memory structures required for GWHL are allocated and initialized. Once enabled, the unit can only be disabled as an OpenVMS Host Based Volume Shadowing shadow set member by use of the NOWRITE_LOG command. When the log unit is disabled, it is not necessary to restart the controllers—this needs to be done only when a log unit is enabled. Log units can be JBODs, stripesets, RAIDsets, or mirrorsets. However, this unit cannot be a member of a Snapshot or Remote Copy set.

When a SHOW *unit-number* command is entered for a given unit, one of the following is displayed in the subsequent unit status display:

- Host-Based Logging NOT Specified

  Indicates that a SET *unit-number* WRITE_LOG command has never been entered for the specified unit, or Mini-Merge Logging has been disabled for a previously enabled unit through the SET *unit-number* NOWRITE_LOG command.

- Host Based Logging Specified, NOT Enabled

  Indicates that a prior SET *unit-number* WRITE_LOG command has been entered for the specified unit but the controller in a single controller configuration, or both controllers in a dual redundant controller pair configuration have not yet been restarted for Host Based Logging to become enabled.

- Host Based Logging Specified, Enabled, NOT Active

  Indicates that a prior SET *unit-number* WRITE_LOG command has been entered for the specified unit and the controller in a single controller configuration, or both controllers in a dual redundant controller pair configuration, have been restarted to enable Host Based Logging. However, Host Based Logging has not as yet been activated for the unit through a specific Host initiated command to do so.

- Host Based Logging Specified, Enabled, Active

  Indicates that a prior SET *unit-number* WRITE_LOG command has been entered for the specified unit and the controller in a single controller configuration, or both controllers in a dual redundant controller pair configuration have been restarted to enable Host Based Logging, and Host Based Logging has been activated for the unit through a specific Host initiated command to do so.

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 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 devices without being cached.

> △ **CAUTION:** Although there is built-in redundancy to protect data contained in cache, allowing data to be written to write-back cache may result in the loss of data if the controller fails.

> 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, enter:

```
ADD UNITS D102 DISK10000
```

• If the controller pair is in transparent failover mode, this unit is on port 2. It is presented to each host connection as LUN (2 – offset). Offset is a host connection characteristic, specified in the ADD (or SET) CONNECTIONS command.

• If the controller pair is in multiple-bus failover mode, this unit can potentially be seen by all four controller ports. It is presented to each host connection as LUN (2 – offset). Offset is a host connection characteristic, specified in the ADD (or SET) CONNECTIONS command.

To create unit D5 from mirrorset MIRR1, and to let only two host connections (Server1 and Server2) have access to this unit, enter:

```
ADD UNITS D5 MIRR1 DISABLE_ACCESS_PATH=ALL
SET UNITS D5 ENABLE_ACCESS_PATH=(SERVER1,SERVER2)
```

- If the controller pair is in transparent failover mode, this unit is on port 1, and is available only to host connections Server1 and Server2. Server1 and Server2 must be connected to host port 1 to access the unit. The unit is presented to each host connection as LUN (5 – offset). Offset is a host connection characteristic, specified in the ADD (or SET) CONNECTIONS command.

- If the controller pair is in multiple-bus failover mode, this unit can potentially be seen by all four controller ports, but is accessible only by host connections Server1 and Server2. It is presented to each host connection as LUN (5 – offset).

To create unit D7 from a RAIDset named RAID9 and instruct the unit to take advantage of the controller's write-back caching feature, enter:

```
ADD RAIDSETS RAID9 DISK10100 DISK20100 DISK30100 DISK40100
INITIALIZE RAID9
ADD UNITS D7 RAID9 WRITEBACK_CACHE
```

See Also

CREATE_PARTITION
DESTROY_PARTITION
DELETE *unit-number*
SET *unit-number*
SHOW *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. The command only stops the CLI from displaying the error.

There are three message types:

- General information
- Warning (user may want to examine, but the command is 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 *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, SET NOFAILOVER, or SET NOMULTIBUS FAILOVER commands first.

Syntax

CLEAR_ERRORS *controller* INVALID_CACHE *data-retention-policy*

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:

IMPORTANT: Because unintentional misuse of this command can cause data loss, both the command and the switch DESTROY_UNFLUSHED_DATA or NODESTROY_UNFLUSHED_DATA must be entered in their entirety. They cannot be abbreviated.

- Specify NODESTROY_UNFLUSHED_DATA to retain the cached data and discard controller information. The controller metadata synchronizes with the cache module data and preserves any unwritten data for eventual flushing to the disk array.

The NODESTROY_UNFLUSHED_DATA parameter is used in the following situations:

- If the controller module has been replaced.

- If the controller nonvolatile memory (NVMEM) contents were lost.

The DESTROY_UNFLUSHED_DATA parameter is used to retain the controller information and discard unwritten cache data in the following situations:

- If the cache module has been replaced.

- Any other reason not listed above.

$\triangle$ **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 replacing a controller module, enter the following command on one line:

```
CLEAR_ERRORS THIS_CONTROLLER INVALID_CACHE NODESTROY_UNFLUSHED_DATA
```

To clear an invalid cache error on the "other controller" after replacing a cache module, 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

NOTE: The keyword UNKNOWN cannot be abbreviated.

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 LOST_DATA
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: The keyword LOST_DATA cannot be abbreviated.

$\triangle$ **CAUTION:** When prompted to issue this command, data loss has occurred.

Parameters

unit-number

Identifies the unit number 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 UNITS 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

IMPORTANT: Because misuse of this command will cause data loss, the command cannot be abbreviated.

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 UNITS 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 nonvolatile memory (NVRAM) of "this controller."

IMPORTANT: This command sets the controller to a default configuration and shuts down the controller, disabling communication between host and controller. Enter new configuration information through the SET THIS_CONTROLLER command or the CONFIGURATION RESTORE command to make the controller operational.

This command 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 is 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 or SET NOMULTIBUS FAILOVER 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 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 or SET NOMULTIBUS FAILOVER= command. These CLI commands "copy" the configuration file from the defined controller nonvolatile memory and place the file into the redundant controller nonvolatile memory. For example, use SET FAILOVER COPY=OTHER_CONTROLLER or SET NOMULTIBUS FAILOVER executed from "this controller" to place the "other controller" configuration file into the "this controller" nonvolatile 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.

Initiate the CONFIGURATION RESET command from the controller operator control panel (OCP) using the following steps:

1. Push and hold port button #5 and then momentarily press the reset (//) button.

2. Continue holding the port button until the port button #5 LED starts FLASHING.

3. Release 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 information 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 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.

IMPORTANT: Use this command for a single controller configuration only. StorageWorks *does not* recommend using this command for controllers in a dual-redundant configuration.

Initiate the CONFIGURATION RESTORE command from the controller OCP using the following steps:

1. Push and hold port button #5 and then momentarily press the reset (//) button.

2. Continue holding the port button until the port button #5 LED starts FLASHING.

3. Release 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 the controller installation and configuration guide for configuration information.

IMPORTANT: The INITIALIZE *container-name SAVE_CONFIGURATION* command on page 2–76 must be used to save controller configuration information to a disk in order to reset the configuration or to restore the configuration. See the commands on page 2–74, CONFIGURATION RESETpage 2–50, and page 2–54 for more information.

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 on the disk array. This command forces an immediate update. In single-controller subsystems, the configuration is saved on the disk array. If a container had the *SAVE_CONFIGURATION* switch specified when it was initialized (through the INITIALIZE command), the disks that constitute that unit is able to save a copy of the configuration.

IMPORTANT: Use this command for a single controller configuration only. StorageWorks *does not* recommend using this command for controllers in a dual-redundant configuration.

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 or 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—a partition. Any non-transportable disk or storageset can be divided into a maximum of eight partitions, then each partition can be separately presented to the host.

Initialize all disks and storagesets before creating or destroying partitions.

> △ **CAUTION:** Issuing an INITIALIZE command on either disks or storagesets destroys any existing partitions without warning.

The following is applicable only for those HSG80 variants that support Host Based Logging capability.

IMPORTANT: Due to heavy controller resource requirements for both Partitions and Host Based Logging capability, the two aspects are deemed mutually exclusive. This aviods exhausting the existing level of resources available to either.

The following restrictions apply to this command:

- If no units are enabled for Host Based Logging, the CREATE PARTITION command is allowed.

- If one or more units are enabled for Host Based Logging capability, the CREATE PARTITION command is disallowed.

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 command (for example, ADD DISKS, ADD STRIPESETS, 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 associated with the CREATE_PARTITION command:

- *SIZE*

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 eight 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 the space allocated to the partition.

- 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 RAIDSETS 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 UNITS D101 RAID9 PARTITION=1
ADD UNITS D102 RAID9 PARTITION=2
ADD UNITS D103 RAID9 PARTITION=3
ADD UNITS D104 RAID9 PARTITION=4
```

See Also

> ADD UNITS
> DELETE *unit-number*
> DESTROY_PARTITION
> SET *unit-number*
> SHOW *unit-number*

DELETE *association-set-name*

Deletes an existing association set.

NOTE: This command works only in a DRM environment and requires an HSG80 array controller with ACS version 8.7P code. Like all DRM commands, use of this command is heavily restricted. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for examples of usage.

Syntax

DELETE *association-set-name*

Parameters

association-set-name

The name of the association set to be deleted.

Switches

There are no switches associated with this command.

Examples

To delete association set AS4, enter:

```
DELETE AS4
```

See Also

ADD ASSOCIATIONS
SET *associations*

DELETE *concatset-name*

Deletes an existing concatset. If the concatset is associated with a unit, the unit must be deleted before deleting the concatset.

Syntax

DELETE *concatset-name*

Parameters

concatset-name

The name of the concatset to be deleted.

Switches

There are no switches associated with this command.

Examples

To delete concatset C1, which is associated with unit D0, enter:

```
DELETE D0
DELETE C1
```

See Also

DELETE *unit-number*
SET *concatsets*

DELETE *connection-name*

Deletes a specified connection from the table of known connections maintained by the controller, whether or not the host adapter is still physically connected to a controller port.

The table of known host connections is maintained in the controller's memory. Once a connection is added to the table, it stays there, even if the physical connection between host adapter and controller port is severed. The only way to remove a connection from the table is through this command.

NOTE: A connection with an access path *explicitly* enabled on a unit cannot be deleted. Access path is enabled explicitly through the *ENABLE_ACCESS_PATH* qualifier of the ADD UNITS or SET unit commands. If access path is generically enabled for all connections (*ENABLE_ACCESS_PATH= ALL*), then any or all connections can be deleted. A connection with explicit access path must have the access path disabled (through the *DISABLE_ACCESS_PATH* qualifier of the SET *unit* command) before the connection can be deleted.

Syntax

DELETE *connection-name*

Parameters

connection-name

The name given to the host connection. The connection name is one of the following:

- The default name assigned to the host connection when it was physically connected to the controller port. Default names are of the form !NEWCON*nn*.

- The name given through the RENAME command.

- The name given through the ADD CONNECTIONS command.

Switches

There are no switches associated with this command.

Examples

To delete host connection Server1 from the table of known connections (unless the access path to Server1 is specifically enabled for one or more units), enter:

```
DELETE SERVER1
```

To delete host connection Server4 from the table of known connections when Server4 has explicit access path to unit D7, enter:

```
SET D7 DISABLE_ACCESS_PATH=SERVER4
DELETE SERVER4
```

See Also

ADD CONNECTIONS
ADD UNITS
SET *connection-name*
SET *unit-number*
SHOW CONNECTIONS
SHOW *connection-name*

DELETE *container-name*

Deletes a specified container belonging to the controller configuration.

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

Also, to delete a unit that belongs to a remote copy set, the remote copy set must be deleted first. (One exception to this rule: a remote (target) member of a remote copy set can be deleted from the copy set.)

NOTE: This command *does not* delete failedsets or sparesets. See page 2–64 and page 2–66 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 command (for example, ADD DISKS, ADD STRIPESETS, 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 SPARESETS
SHOW STORAGESETS
UNMIRROR

DELETE FAILEDSETS

Removes a disk drive from a 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 FAILEDSETS 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 FAILEDSETS *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 FAILEDSETS DISK20200
```

See Also

SET FAILEDSETS
SHOW FAILEDSETS

DELETE *remote-copy-set-name*

Deletes a specified remote copy set. Upon completion of this command, the target unit will no longer be a member of the remote copy set.

NOTE: This command works only in a DRM environment and requires an HSG80 array controller with ACS version 8.7P code. Like all DRM commands, use of this command is heavily restricted. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for examples of usage.

This command works only on the site acting as initiator. This is the local site except in a failover situation.

This DELETE command is only valid if the error mode of the remote copy set is normal. The error mode is set by the *ERROR_MODE* switch of the SET *remote copy set* command.

If the remote copy set is a member of an association set, the association set must be deleted before the remote copy set is deleted.

Syntax

DELETE *remote-copy-set-name*

Parameters

remote-copy-set-name

The name given to the remote copy set that is to be deleted.

Switches

There are no switches associated with this command.

Examples

To delete RCS1, enter:

```
DELETE RCS1
```

See Also

ADD REMOTE_COPY_SETS
SET *remote-copy-set-name*
SHOW REMOTE_COPY_SETS
SHOW *remote-copy-set-name*

DELETE SPARESETS

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 SPARESETS *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 SPARESETS DISK20300
```

See Also

ADD SPARESETS
SHOW SPARESETS

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 UNITS 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 UNITS
CLEAR_ERRORS
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 all partitions are destroyed, the container from which they were 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 command (for example, ADD DISKS, ADD STRIPESETS, 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
```

If partition 2 of RAID9 has not yet been assigned a unit number, to delete partition 2, enter:

```
DESTROY_PARTITION RAID9 PARTITION=2
```

See Also

CREATE_PARTITION
DELETE *unit-number*
INITIALIZE
SHOW *container-name*
SHOW *unit-number*
SHOW *storageset-name*

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      V87P D
FRUTIL      V87P D
CHVSN       V87P D
CLCP        V87P D
CLONE       V87P D
CLONEW      V87P D
CONFIG      V87P D
DILX        V87P D
DIRECT      V87P D
DSTAT       V87P D
 DWNGRD     V87P D
FMU         V87P D
VTDPY       V87P D
```

NOTE: CHVSN, DSTAT and DWNGRAD are not user utilities. These utilities are used by StorageWorks authorized service providers only.

See Also

RUN

EXIT

This command is used only to terminate a remote virtual terminal connection. Use of this command exits the CLI program and returns control to the host.

Syntax

EXIT

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To terminate the CLI program, enter:

```
EXIT
```

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 enter a space
followed by a (?) to print a list of all available options at that point in
the command. For example:

                    SET THIS_CONTROLLER?

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

To list all legal commands pertaining to a specific CLI command: enter the command, type a space, and enter a question mark. For example:

```
SET?
```

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. Disks made transportable (using the *TRANSPORTABLE* switch of the ADD DISKS command) do not contain metadata.

Units are not initialized; a container is initialized before being assigned to a unit.

> **CAUTION:** The INITIALIZE command destroys all metadata on the container unless you use the *NODESTROY* switch. The *NODESTROY* switch is valid only on mirrorsets and striped mirrorsets.
>
> If a partitioned container is initialized, all partitions are eliminated.

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:

- Prior to creating a unit from a newly installed disk.
- Prior to creating a unit from a newly created RAIDset, stripeset, or mirrorset.
- To destroy all existing partitions on a container.

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 command (for example, ADD DISKS, ADD STRIPESETS, and so forth).

Switches

The following switches are used by this command:

- Geometry switches

— *CAPACITY*

— *CYLINDERS*

— *HEADS*

— *SECTORS_PER_TRACK*

• *CHUNKSIZE*

• *DESTROY and NODESTROY*

• *SAVE_CONFIGURATON and NOSAVE_CONFIGURATION*

These switches are described in the following paragraphs:

CAPACITY=n (1 to the maximum container size in blocks)

> **NOTE:** When executing the INITIALIZE command with the switch CAPACITY, it appears that the command did not complete because the SHOW DISKxxxxx command does not display any change to the SIZE. It shows the total size of the disk, not the new size.

> The new size is not seen until the corresponding UNIT has been added. The command SHOW Dx will display the new size.

> Example:

> ```
> HSG80> INITIALIZE DISKxxxxx CAPACITY=4000000
> HSG80> SHOW DISKxxxxx
> ```

> **NOTE:** The new capacity is not seen after this command.

> To show the new size, enter:

> ```
> HSG80> ADD UNIT Dx
> HSG80> SHOW Dx
> ```

CYLINDERS=n (1 to16,777,215)
HEADS=n (1 to 255)
SECTORS_PER_TRACK=n (1 to 255)

> These commands are used to set the geometry switches reported to the host.

> **NOTE:** The geometry switches should not be used unless there is a compatibility problem with the existing defaults.

> The geometry switches for the INITIALIZE command are ignored when you create partitions. The geometry switches supplied with the CREATE_PARTITION command are used by the unit.

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*.

NOTE: The CHUNKSIZE switch is only valid with stripesets and raidsets.

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. StorageWorks *does not* recommend a chunk size less than 128 blocks (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 controller installation and configuration guide for information regarding recommended chunk size settings for this 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 initialize RAID4 and to reserve an area for configuration information on all the disks that constitute RAID4, enter:

```
INITIALIZE RAID4 SAVE_CONFIGURATION
```

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

```
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:

```
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
```

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
```

See Also

ADD DISKS
ADD MIRRORSETS
ADD RAIDSETS
ADD STRIPESETS
ADD PASSTHOUGH
ADD UNITS
CONFIGURATION RESET
CONFIGURATION RESTORE
CREATE_PARTITION
MIRROR

LOCATE

Facilitates discovery of the physical location of configured units, storagesets, and devices by FLASHING the device fault LED on the front of the storage device. A FLASHING LED helps to distinguish between located devices and failed devices.

The LOCATE command causes the device fault LED to function as follows:

- FLASH once per second on a good device. The LED turns OFF with the LOCATE CANCEL command.

- Illuminate continuously on a failed device. The LED stays ON even after being turned OFF with the LOCATE CANCEL command.

NOTE: The LOCATE command can also be used to test the device fault LED.

Not all devices provide a device fault LED; therefore, these devices cannot be identified using the LOCATE command.

Syntax

LOCATE *parameter*

Parameters

The following parameters are available to the LOCATE command:

- *ALL*

- *CANCEL*

- *container-name*

- *DISKS*

- *ptl*

- *UNITS*

- *unit-number*

These parameters are described in the following paragraphs:

NOTE: Only one of the following parameters can 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.

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 fault LED FLASHES. If a storageset name is given, the fault LED on all of the devices assigned to the storageset FLASHES.

DISKS

Causes the device fault LEDs of all configured disks to FLASH.

ptl (scsi-port-target-lun)

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

UNITS

Causes the device fault LEDs of all devices used by the units to FLASH.

NOTE: This parameter is useful for determining which storage devices are not currently configured into logical units.

unit-number

Causes the device fault LEDs on the devices making up the *unit-number* to FLASH.

Switches

There are no switches associated with this command.

Examples

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

```
LOCATE DISK10000
```

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 device fault LEDs that are FLASHING 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 MIRRORSETS 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 mirrorset-name may consist of a maximum of nine printable characters excluding commas and back-slashes.

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 and NOPOLICY*

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 (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 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-namepage 2–130).

Example

The following steps show how to create a striped mirrorset with full redundancy:

1. Create a normal stripeset.

2. Create a unit from the stripeset.

3. Make each member of the normal stripeset a mirrorset containing two members.

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

```
ADD STRIPESETS STRIPE1 DISK10100 DISK20100 DISK30100
INITIALIZE STRIPE1
ADD UNITS 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 MIRRORSETS
INITIALIZE
REDUCE
SHOW MIRRORSETS
UNMIRROR

POWEROFF

This command only applies to BA370 enclosure configurations for turning OFF the power to the subsystem enclosure.

NOTE: Stop all I/O operations between the hosts and controllers before issuing a POWEROFF command.

Syntax

POWEROFF

Parameters

There are no parameters for this command.

Switches

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

- *BATTERY* and *BATTERY_OFF*

- *OVERRIDE_BAD_FLUSH* and *NO_OVERRIDE_BAD_FLUSH*

- *SECONDS*

These switches are described in the following paragraphs:

BATTERY _ON
BATTERY_OFF (default)

Instructs the external cache battery (ECB) charger to turn OFF or remain ON.

- Specify *BATTERY_ON* to keep the ECB charger ON after the POWEROFF command is issued.

- Specify *BATTERY_OFF* to turn OFF the ECB charger after the POWEROFF command is issued.

NOTE: The ECB LEDs will continue to FLASH in both cases, but the cache module LEDs cease FLASHING when *BATTERY_OFF* is used.

OVERRIDE_BAD_FLUSH
NO_OVERRIDE_BAD_FLUSH (default)

Instructs the controller to either power OFF the enclosure or remain ON depending on the cache flush results.

- Specify *OVERRIDE_BAD_FLUSH* to override a failed cache flush and power OFF the enclosure.

- Specify *NO_OVERRIDE_BAD_FLUSH* to prevent a power OFF when the cache flush fails.

SECONDS=nn

When the POWEROFF command is entered, all disk units in the enclosure are set to write-through. When the time interval, as represented by nn seconds, has elapsed, an orderly rundown of all units is started. When all units in the enclosure are successfully rundown, the enclosure power is turned OFF. Table 2–2 shows what action is taken depending on the switch settings and the results of the attempted flush.

> **CAUTION:** If the *BATTERY_OFF* switch is used with the *OVERRIDE_BAD_FLUSH* switch, unwritten data could be lost. Do not power off the subsystem until the unwritten data has been recovered.

Table 2–2: POWEROFF Switch Settings

Battery Switch	Override Switch	Flush Results	Action
BATTERY_ON	OVERRIDE_BAD_FLUSH	Success	Controller and units in the enclosure shut down and the ECB charger remains ON.
BATTERY_ON	OVERRIDE_BAD_FLUSH	Failure	Controller and units in the enclosure shut down and the ECB charger remains ON.
BATTERY_ON	NO_OVERRIDE_BAD_FLUSH	Success	Controller and units in the enclosure shut down and the ECB charger remains ON.
BATTERY_ON	NO_OVERRIDE_BAD_FLUSH	Failure	Nothing is shut down, the ECB charger remains ON, and the user is notified of a bad flush.
BATTERY_OFF	OVERRIDE_BAD_FLUSH	Success	Controller and units in the enclosure shut down and the ECB charger turned OFF.
BATTERY_OFF	OVERRIDE_BAD_FLUSH	Failure	Controller and units in the enclosure shut down and the ECB charger turned OFF.

Table 2–2: POWEROFF Switch Settings (Continued)

Battery Switch	Override Switch	Flush Results	Action
BATTERY_OFF	NO_OVERRIDE_BAD_FLUSH	Success	Controller and units in enclosure shut down and the ECB charger turned OFF.
BATTERY_OFF	NO_OVERRIDE_BAD_FLUSH	Failure	Nothing is shut down, the ECB charger remains ON, and the user is notified of a bad flush.

In dual-redundant mode, if both controllers cannot be shutdown, then both controllers and associated battery chargers remain ON.

Example

To power off the disk units and the enclosure in 10 seconds (*BATTERY_OFF* and *NO_OVERRIDE_BAD_FLUSH* are the defaults), enter:

```
POWEROFF SECONDS=10
```

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 MIRRORSETS *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 MIRRORSETS
MIRROR
RUN CLONE
SET *mirrorset-name*
SHOW MIRRORSETS

RENAME

Renames a specified container or specified host connection.

NOTE: Units, remote copy sets, and association sets cannot be renamed.

Syntax

RENAME *old-container-name new-container-name*

Parameters

The following parameters are available to the RENAME command:

- *old*-container-*name*
- *new*-container-*name*

These parameters are described in the following paragraphs:

old-container-name

Specifies the existing name of the container or host connection.

new-container-name

Assigns the new name for the container or host connection.

A name of a host connection can be any combination of letters and numbers, with the one restriction that it cannot take the form of the default assigned by the controller (!NEWCON*nn*).

Switches

There are no switches associated with this command.

Example

To change the name of DISK10000 to MYDISK, enter:

```
RENAME DISK10000 MYDISK
```

To change the name of host connection !NEWCON03 to server2, enter:

```
RENAME !NEWCON03 SERVER2
```

RESTART *controller*

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

Syntax

RESTART *controller*

Parameters

controller

Identifies which controller is to receive the RESTART command. You must specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER.

Switches

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

- *IGNORE_ERRORS* and *NOIGNORE_ERRORS*

- *IMMEDIATE_SHUTDOWN* and *NOIMMEDIATE_SHUTDOWN*

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.

Examples

To restart "this controller," enter:

```
RESTART THIS_CONTROLLER
```

To restart "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 UNITS 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 StorageWorks authorized service providers only.

- CLCP—A utility used to load updated software code or patches.

- CLI—A utility that allows the entry of the command line interface commands into the controller.

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

- CLONEW—A utility used in the same manner as the CLONE utility, except that it uses the linked WWID associated with the source unit instead of allocating a new one.

- 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 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.

> $\triangle$ **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 StorageWorks authorized service providers only.

- DWNGRD—This is not a user utility. This utility may be used by StorageWorks authorized service providers 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.

- 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 controller troubleshooting reference 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
```

See Also

DIRECTORY

SELFTEST

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

Identifies which controller is to perform the SELFTEST *controller* command. You must specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER.

Switches

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

- *IGNORE_ERRORS* and *NOIGNORE_ERRORS*
- *IMMEDIATE_SHUTDOWN* and *NOIMMEDIATE_SHUTDOWN*

These switches are described in the following paragraphs:

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

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

<table>
<tr><td>△</td><td>**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.</td></tr>
</table>

- 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.

Examples

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 *association-set-name*

Changes the characteristics of an association set.

NOTE: This command works only in a DRM environment and requires an HSG80 array controller with ACS version 8.7P code. Like all DRM commands, use of this command is heavily restricted. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for examples of usage.

Syntax

SET *association-set-name*

NOTE: Only one characteristic of an association set can be changed at any one time; therefore, only one switch at a time can be specified with any SET *association-set-name* command.

Parameters

association-set-name

These name of the association set whose characteristics are to be changed.

Switches

The following switches are available for the SET *association-set-name* command:

- *ADD*
- *FAIL_ALL* and *NOFAIL_ALL*
- *LOG_UNIT* and *NOLOG_UNIT*
- ORDER_ALL and NOORDER_ALL

These switches are described in the following paragraphs:

ADD=remote-copy-set-name

This switch adds the specified remote copy set to the association set.

FAIL_ALL
NOFAIL_ALL

This switch determines the failsafe lock operation of members of the association set. (Failsafe lock is a condition a remote copy set assumes under certain potentially catastrophic error conditions. The failsafe locked condition prevents further write operations from the host to the remote copy set members.)

When *FAIL_ALL* is specified, all the members of the association set assume the same failsafe lock condition if they are in failsafe error mode. Failsafe lock is enabled by the *ERROR_MODE* switch of the SET *remote-copy-set-name* command. If one member of the association set becomes failsafe locked, any association set member that has failsafe lock enabled also becomes failsafe locked.

When *NOFAIL_ALL* is specified, the members of the association set react independently to failsafe lock conditions. One member of the association set becoming failsafe locked has no effect on the other members of the association set.

This switch has no effect if all members of the association set have failsafe lock disabled (normal error mode).

LOG_UNIT=unit-name
NOLOG_UNIT

Specifying *LOG_UNIT* assigns a dedicated log unit for the association set. Should the initiator become unable to access the target, the unit specified by *unit-name* logs a history of write commands from the host. When the target becomes accessible, the initiator can read the log disk and can send the write commands, in order, to the target, which brings the target into congruency with the initiator.

CAUTION: When the command is entered, a header is immediately written to the log unit, which may make it difficult or impossible to recover any user data previously written on the unit. Care should be taken in specifying which unit should be the log unit.

The log unit must be either a mirrorset or a striped mirrorset. It cannot be a partitioned unit. The log unit must reside at the initiator site and cannot be moved to the target site. In addition, it must have the following characteristics:

- Write-back caching disabled

- Access disabled

- Other unit settings at default

This switch is valid only if all members of the association set are in normal (not failsafe) error mode. Error mode is determined by the *ERROR_MODE* switch of the SET *remote-copy-set-name* command.

Specifying NOLOG_UNIT deassigns the log unit.

ORDER_ALL
NOORDER_ALL

When *ORDER_ALL* is specified:

- If one member of the association set starts logging a history of write operations, all members of the association set start logging write operation history.

- The order of all asynchronous write operations across all members of the association set is preserved.

When *NOORDER_ALL* is specified:

- Members of the association set start to log (or not) independently.

- The order of all asynchronous write operations across all members of the association set is not preserved.

This switch cannot be changed when a log unit is assigned to the association set. The log unit must be removed, then the order switch changed, then the log unit must be reassigned. The order switch goes into effect when the log unit is assigned.

Examples

To add remote copy sets RCS2 and RCS4 to association set AS3, enter:

```
SET AS3 ADD=RCS2
SET AS3 ADD=RCS4
```

See Also

ADD ASSOCIATIONS
ADD REMOTE_COPY_SETS
SET *remote-copy-set-name*

SET *concatset-name*

Expands an existing unit by concatenating another storageset of the same type to the storageset that constitutes the unit.

NOTE: The maximum size of a concatset is 1.024TB

⚠ **CAUTION:** This command should be done only with host operating systems that can support dynamic volume expansion. If the operating system cannot handle one of its disks getting suddenly bigger, use of this command could make data inaccessible.

This command is subject to restrictions:

- Both storagesets must be of the same type.

- If either member storageset becomes inoperative, the concatset becomes inoperative. However, a reduced RAIDset does not make the concatset inoperative.

- Mirrorsets cannot be used.

- Partitions cannot be used.

- Concatsets cannot be partitioned.

- The maximum total disks in a concatset is 24.

- Storagesets must have been initialized before being added to the concatset.

- The CLONE utility cannot be used on a concatset.

- Concatsets cannot be used in remote copy sets.

Syntax

SET *concatset-name*

Parameters

concatset-name

The name of the concatset to be expanded.

Switches

ADD=storage-set-name

Concatenates the storageset specified by *storage-set-name* to the concatset.

Examples

To expand the capacity of unit D0 which consists of stripeset Stripe1, by adding another stripeset (Stripe2), enter:

```
ADD CONCATSETS C1 STRIPE1
SET C1 ADD=STRIPE2
```

See Also

ADD CONCATSETS
DELETE *concatsets*
SHOW CONCATSETS

SET *connection-name*

Changes the operating characteristics of a host connection. Each path between a Fibre Channel adapter in a host computer and an active host port on a controller is a connection.

This command adds the specified host connection to the table of known connections. This table is maintained in the controller's memory. The maximum table length is 96 connections; if the table contains 96 entries, new connections cannot be added unless some old ones are deleted.

The SET *connection-name* command changes the operating parameters of the specified host connection. A host connection is a specific instance of one host connected to one port of one controller through one host adapter.

Syntax

SET *connection-name*

Parameters

connection-name

This is the name of the host connection. When a new host-adapter-port-controller connection is made, the new connection is given a default connection name. The default connection name is !NEWCON*nn*, where *nn* is a decimal number. The connection name can be changed through the RENAME command.

Switches

The following switches are available for the SET *connection-name* command:

- *OPERATING_SYSTEM*
- *RESERVATION_STYLE*
- *UNIT_OFFSET*

These switches are described in the following paragraphs:

OPERATING_SYSTEM=OS_name

> Specifies the operating system of the host. The *OPERATING_SYSTEM* switch tailors the controller's behavior for use with a particular operating system. See your operating system specific Solution Kit to determine which value should be used. The following values are supported: WINNT, TRU64_UNIX, VMS, HP, HP_VSA, IBM, NETWARE, SGI, SNI, SUN, AIX_CAMBEX.

RESERVATION_STYLE=CONNECTION_BASED (default)
RESERVATION_STYLE=HBA_PORT_ID_BASED

> Selection of a RESERVATION_STYLE should be based upon the capabilities of the host operating system. See the OS kit for more details. SCSI persistent reservations are processed differently by the HSG80 based upon the RESERVATION_STYLE. Normal SCSI reservations (not persistent) are always treated as CONNECTION_BASED.

> When set to *HBA_PORT_ID_BASED,* a single persistent reservation command is propagated to all HSG80 controller ports, thereby enabling the host to access the unit over any available path.

> When set to *CONNNECTION_BASED,* the persistent reservation is only valid for the port on which it is received, thereby limiting the host access to those paths that have been explicitly reserved.

IMPORTANT: If a particular host prefers either the *CONNECTION_BASED* or *HBA_PORT_ID_BASED* reservation style, all the connections to that particular host must have identical reservation style settings.

The most important advantage of this mechanism is allowing various hosts, with different reservation style requirements, to be connected to the same HSG80 controllers in a SAN environment.

UNIT_OFFSET

> Unit offset (usually just called offset) is a decimal value that establishes the beginning of the range of units that a host connection can access. It defines and restricts host connection access to a contiguous group of unit numbers.

> If no value is specified for the *UNIT_OFFSET* switch, then host connections have default offsets as follows:

> - In transparent failover mode, connections on port 1 have an offset of 0 and connections on port 2 have an offset of 100.

> - In multiple-bus failover mode, all connections have an offset of 0.

> The relationship between LUN number, unit number, and offset is as follows:

>> LUN = unit-number – offset

- Logical unit-number (LUN) = the logical unit-number presented to the host connection

- Unit-number = the number assigned to the unit in the ADD UNITS command. This is the number by which the unit is known internally to the controllers.

Example

set !newcon31 operating_system=vms unit_offset=20

See Also

ADD CONNECTIONS
SHOW CONNECTIONS
DELETE *connections*
RENAME

SET *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 *controller*

Parameter

controller

Identifies which controller is to be set. Specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER.

Switches

Table 2–3 lists the switches available with this command. Descriptions of the switches follow the table.

Table 2–3: SET *controller* Switches

Switch	Values
ALLOCATION_CLASS	0-4294967295, 0 (default)
CACHE_FLUSH_TIMER=n	1-65535, 10 (default)
COMMAND_CONSOLE_LUN *NOCOMMAND_CONSOLE_LUN*	None
CONNECTIONS_LOCKED *CONNECTIONS_UNLOCKED*	None
INDENTIFIER=n *NOIDENTIFIER*	1-9999
MIRRORED_CACHE *NOMIRRORED_CACHE*	None
NODE_ID	nnn-nnnn-nnnn-nnnn xx

Table 2–3: SET *controller* Switches (Continued)

Switch	Values
PORT_1_AL_PA=n *PORT_2_AL_PA=n*	0-EF (hexidecimal); factory defaults: port 1 is 71 and port 2 is 72
PORT_1_TOPOLOGY=FABRIC *PORT_2_TOPOLOGY=FABRIC*	None
PORT_1_TOPOLOGY=LOOP_HARD *PORT_1_TOPOLOGY=LOOP_SOFT* *PORT_1_TOPOLOGY=OFFLINE* *PORT_2_TOPOLOGY=LOOP_HARD* *PORT_2_TOPOLOGY=LOOP_SOFT* *PORT_2_TOPOLOGY=OFFLINE*	None
PROMPT="new prompt"	1-16 characters
REMOTE_COPY=node-name *NOREMOTE_COPY*	None
SCSI_VERSION=SCSI-2 *SCSI_VERSION=SCSI-3*	None
SMART_ERROR_EJECT	Disable Enable
TERMINAL_PARITY *NOTERMINAL_PARITY*	Odd or even, no terminal parity (default)
TERMINAL_SPEED	4800, 9600 (default), or 19200
TIME	Two-digit day, three-character month, four-digit year, and two-digit hour, minute, and second
UPS=NODE_ONLY *UPS=DATACENTER_WIDE* *NOUPS*	None

ALLOCATION_CLASS

Allocation class is a unique identification number assigned to the controller pair under certain operating systems. The value for an allocation class is 0-4294967295. I; for Compaq Tru64 UNIX, it is a 4-byte number. It is reported in

response to the SCSI inquiry command and is the same for all units connected to one or both controllers. The allocation class value allows the host to identify the controllers that are a matched dual-redundant pair. This number should be unique for every pair of dual-redundant controllers in the cluster.

IMPORTANT: This value must not be zero (default) in dual-redundant configurations in host systems that implement allocation class. A zero value in this configuration causes the operating system to disable failover between the controller pair. Some operating systems do not implement allocation class, in which case the default of zero has no meaning.

CACHE_FLUSH_TIMER=n
CACHE_FLUSH_TIMER=10 (default)

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.

COMMAND_CONSOLE_LUN
NOCOMMAND_CONSOLE_LUN

Enables or disables the command console LUN (CCL), a communication LUN used to initially setup StorageWorks Command Console. When changed, the new setting for this switch takes effect immediately.

This switch works in SCSI-2 mode only. This switch has no effect in SCSI-3 mode. SCSI mode is set by the *SCSI_MODE* switch of this command.

- Select *COMMAND_CONSOLE_LUN* to enable the CCL.

- Select *NOCOMMAND_CONSOLE_LUN* to disable the CCL.

If all LUNs have already been allocated and you attempt to enable the CLL, the following message displays:

Error 1230: Command console LUN can't be enabled because all LUNs are allocated.

CONNECTIONS_LOCKED
CONNECTIONS_UNLOCKED (default)

Controls access to the connection table maintained in NonVolatile RAM (NVRAM). When the table is locked, the host login request (PLOGI) is rejected (unless the connection is already in the table) and the request is stored internally in a rejected hosts table. If a login request is received when the connection table is unlocked, the connection is granted if there is room in the connection table.

- Select CLI> SET <THIS | OTHER> CONNECTIONS_LOCKED to lock the table.

- Select CLI> SET <THIS | OTHER> CONNECTIONS_UNLOCKED to unlock the table.

NOTE: The CONNECTIONS_LOCKED and CONNECTIONS_UNLOCKED switch must be typed completely to prevent inadvertently changing the state of the lock.

NOTE: The ADD CONNECTIONS command is not affected by the state of the lock.

IDENTIFIER=n
NOIDENTIFIER

IDENTIFIER provides an alternative way (other than worldwide name) for some operating systems to identify the command console LUN (CCL).

The *IDENTIFIER* switch is used with the *SCSI_VERSION* switch when the SCSI version is set to SCSI-3 mode. The *IDENTIFIER* switch creates a *CCL identifier* that makes the controller and the CCL visible to the host. This number can be a value between 1–9999.

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 nonmirrored mode.

- Enables mirrored write-back cache on both controllers.

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

IMPORTANT: 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.

NODE_ID=nnnn-nnnn-nnnn-nnnn xx

Sets the subsystem worldwide name (node ID).

- *nnnn-nnnn-nnnn-nnnn* is the node id

- *xx* is the checksum

> △ **CAUTION:** Each subsystem has its own unique worldwide name (node ID). If you attempt to set the subsystem worldwide name to a name other than the one that came with the subsystem, the data on the subsystem is not accessible. Never set two subsystems to the same worldwide name; data corruption occurs.

NODE_ID is used to set the worldwide name. Worldwide name, which is actually a number, is a Fibre Channel convention. Every port has a unique 64-bit number, consisting of 16 hex digits. Each StorageWorks Fibre Channel enclosure is assigned a node ID, which the controller pair in the enclosure assumes. The port IDs derive from the node ID. The node ID assigned to a enclosure never changes.

The node ID ends in a zero. An example of a node ID is 5000-1FE1-FF0C-EE00. The derivation of port IDs from the node ID is done automatically by the controllers. The numerical value of the port IDs depends on what failover mode the controllers are in.

In transparent failover mode, the port ID of port 1 for both controllers is the node ID plus 1, so in the above example, the port ID for port 1 would be 5000-1FE1-FF0C-EE01. Both controllers share this port ID for port 1 because in the transparent failover mode, only one controller's port 1 is active at any time, and the other port 1 is on standby. Similarly, both controllers share a port ID for port 2, which is the node ID plus 2 (in the example, 5000-1FE1-FF0C-EE02).

For a single configuration controller, the Port ID is derived the same way (plus 1 for port 1, plus 2 for port 2).

In multiple-bus failover, all four ports are independent, and each has its own port ID. The port IDs are assigned as follows:

- Controller B port 1 = node ID + 1

- Controller B port 2 = node ID + 2

- Controller A port 1 = node ID + 3

- Controller A port 2 = node ID + 4

When one of the pair of controllers in a dual redundant configuration is replaced, the remaining controller remembers the node ID. When the replacement controller is installed, the in-place controller tells the node ID to the replacement controller, and the replacement controller automatically assumes the correct port IDs.

If a situation occurs that requires the node ID to be reset, it can be done through the CLI by specifying the *NODE_ID* parameter in the SET *controller* command. The node ID *must* be reset to the number on the enclosure sticker. (The sticker calls it the worldwide name.) The sticker also contains a checksum, which verifies the ID number. When the node ID is entered, both controllers assume the correct port IDs automatically. Figure 2–1 shows the location of the sticker.

CXO6873B
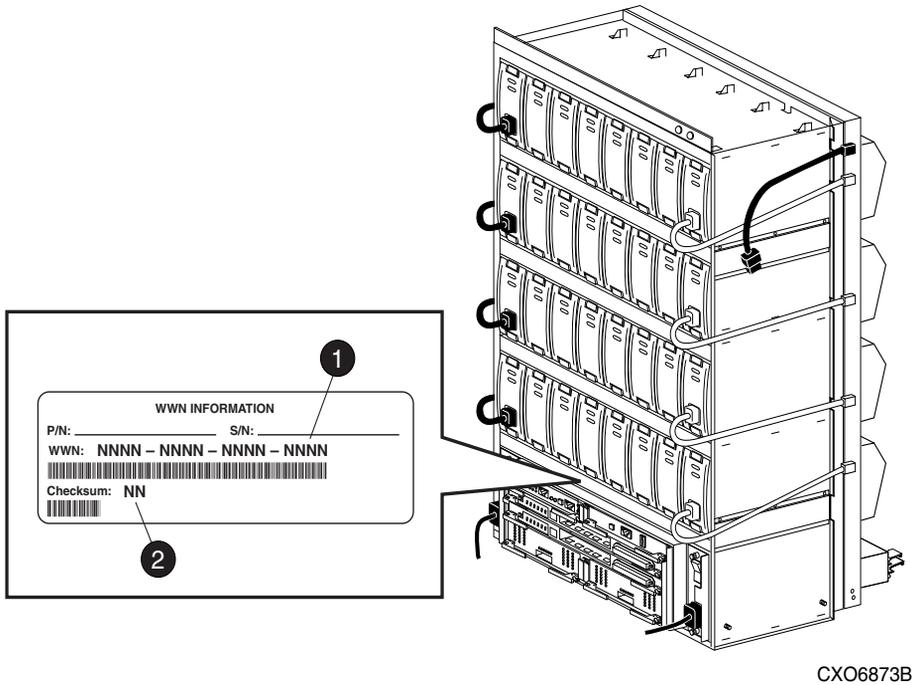
❶ Node ID   ❷ Checksum

Figure 2–1: Location of node ID sticker on a BA370 enclosure

PORT_1_AL_PA=n
PORT_2_AL_PA=n

Specifies the arbitrated loop physical address (AL-PA) for the host ports (used only in Fibre Channel arbitrated loop (FC-AL) topology). This switch works only when *LOOP_HARD* is specified for the *PORT_1_TOPOLOG*Y or *PORT_2_TOPOLOGY* switches. The range of addresses allowed is 0-EF (hexadecimal).

The factory settings for AL-PA are 71 for port 1 and 72 for port 2. If the controller memory is wiped out, the AL-PA for both ports defaults to 69.

PORT_1_TOPOLOGY=FABRIC
PORT_2_TOPOLOGY=FABRIC

Specifies switch topology for a host port (used only in Fibre Channel switch (FC-SW) topology).

PORT_1_TOPOLOGY=LOOP_HARD
PORT_1_TOPOLOGY=LOOP_SOFT
PORT_1_TOPOLOGY=OFFLINE
PORT_2_TOPOLOGY=LOOP_HARD
PORT_2_TOPOLOGY=LOOP_SOFT
PORT_2_TOPOLOGY=OFFLINE

Indicates whether the user or controller selects the AL-PA for a host port, or whether the port is to be set offline (used only in AL-PA (FC-AL-PA) topology). LOOP_HARD allows you to pick the AL-PA. LOOP_SOFT requests the controller to pick the ALPA. OFFLINE sets the host port offline. Specify OFFLINE for a port when it is not used.

IMPORTANT: If a topology is already selected, topology must be set to offline before another topology is selected.

PROMPT="new prompt"

Specifies the alpha-numeric characters that are displayed when the ACS command line interface 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.

REMOTE_COPY=node-name
NOREMOTE_COPY

IMPORTANT: This command works in a remote copy environment and requires ACS version 8.7P code. Using either remote copy switch causes the controller to restart.
No other switch can be specified in the same command with the remote copy switches.

The *REMOTE_COPY* switch names a controller pair (node) and puts the controller pair into remote copy mode. The node-name can be up to eight characters long. It is suggested that the node-name be something meaningful in the context of the DRM setup, such as the location, that distinguishes one controller pair from another.

IMPORTANT: *Do not* use "local" and "remote" as node names. These are reserved as keywords.

All the other DRM commands are hidden until *REMOTE_COP*Y is specified for the controller pair.

The *NOREMOTE_COPY* switch disables remote copy functionality for the controller pair. It also removes the node-name given by the *REMOTE_COPY* switch. The switch does not work if there are any remote copy sets or remote copy connections associated with the controller pair.

SCSI_VERSION=SCSI-2 (default)
SCSI_VERSION=SCSI-3

Specifies the host protocol to use. SCSI-3 means that the controller uses some SCSI-3 commands. It does not mean that it is a fully-compliant SCSI-3 device. The command console LUN, CCL, presents to the host a LUN through which it communicates with the controller.

A side effect of the SCSI mode is how the command console LUN (CCL) is handled.

- SCSI-2 specifies that the CCL is not fixed at a particular location, but floats depending on the configuration.

- SCSI-3 specifies that the CCL is fixed at LUN 0. The SCSI device-type returned to the host is array controller.

Changes to this switch take place at the next controller restart.

SMART_ERROR_EJECT=SMART ERROR EJECT

When this switch is enabled, drives in a normalized and redundant set that report a smart error are removed from that set. Smart errors that are reported by drives in a nonredundant or non-normal set continue to handle this condition as a recovered error.

If the smart error eject state is disabled, all smart errors are reported as recovered errors. The recovered error report contains the ASC = 0x5D, the ASC for all smart errors, and the appropriate ASCQ. The default value for this feature is disabled.

TERMINAL_PARITY=ODD
TERMINAL_PARITY=EVEN
NOTERMINAL_PARITY (default)

> 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 (default)

> 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 using a 24-hour clock. 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 uninterruptible power supply (UPS) directly connected to a PVA module. 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 "this controller" CLI prompt, enter:

```
SET THIS_CONTROLLER PROMPT="TOP"
```

To change the "other controller" CLI prompt, enter:

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

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.

SMART Error Drive Eject Disabled example:

```
AP_TOP> show this
Controller:
        HSG80 ZG02804912 Software V87S-0, Hardware  E12
        NODE_ID          = 5000-1FE1-FF00-0090
        ALLOCATION_CLASS = 1
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER with ZG02804288
            In dual-redundant configuration
        Device Port SCSI address 7
        Time: 22-NOV-2001 01:14:32
        Command Console LUN is lun 0 (IDENTIFIER = 99)
        Host Connection Table is NOT locked
        Smart Error Eject Disabled
        ...
```

SMART Error Drive Eject Enabled example:

```
AP_TOP> show this
Controller:
        HSG80 ZG02804912 Software V87S-0, Hardware  E12
        NODE_ID          = 5000-1FE1-FF00-0090
        ALLOCATION_CLASS = 1
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER with ZG02804288
            In dual-redundant configuration
        Device Port SCSI address 7
        Time: 22-NOV-2001 01:17:47
        Command Console LUN is lun 0 (IDENTIFIER = 99)
        Host Connection Table is NOT locked
        Smart Error Eject Enabled
        ...
```

See Also

RESTART *controller*
SET FAILOVER
SET MULTIBUS_FAILOVER
SHOW *controller*
SHUTDOWN *controller*

SET *device-name*

Enables changes to the transfer rate and transportable characteristics of the specified disk drive.

Syntax

SET *device-name*

Parameter

device-name

Specifies the name of the device to change, such as disk or passthrough device.

Switches

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

- *TRANSFER_RATE_REQUESTED*

- *TRANSPORTABLE* and *NOTRANSPORTABLE*

These switches are described in the following paragraphs:

TRANSFER_RATE_REQUESTED=ASYNCHRONOUS
TRANSFER_RATE_REQUESTED=DEFAULT
TRANSFER_RATE_REQUESTED=20MHZ (default)
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).

NOTE: This switch works only if the disk drive is not used by a higher level assembly, such as a storageset or a unit, and is used by disk containers 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.

- StorageWorks 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: Specifying *TRANSPORTABLE* should be avoided unless transportability of the device or media is imperative and there is no other way to accomplish moving the data.

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 DISKS
SHOW DEVICES
SHOW DISKS

SET EMU

Sets operating parameters for the environmental monitoring unit (EMU) in a BA370 enclosure.

In subsystems with more than one BA370 enclosure, and therefore more than one EMU, the SET EMU command controls both the master and slave EMU settings. The EMU within the primary (master) enclosure instructs the EMUs within the other enclosures to operate at the same settings as the master EMU.

Syntax

SET EMU

Parameters

There are no parameters for this command.

Switches

The following switches are available to the SET EMU command:

- *ALARM*
- *FANSPEED*
- *SENSOR-n-SETPOINT*

These switches are described in the following paragraphs:

ALARM=silent
ALARM=audible

Determines whether or not the audible alarm of the EMU will sound in the following cases:

- Drive failure
- Controller restart

The EMU alarm will still sound in the event of an adverse environmental condition, such as a power failure or an over-temperature condition.

FANSPEED=HIGH
FANSPEED=AUTOMATIC (default)

Sets the speed at which the fan operates.

- Select *FANSPEED=HIGH* to force the fans in all connected enclosures to operate at high speed continuously.

- Select *FANSPEED=AUTOMATIC* to allow the EMU to control the fan speed for the fans in all connected enclosures.

The EMU instructs the fans to operate at high speed when any of the temperature setpoints are exceeded or when one or more fans are not functioning.

SENSOR_1_SETPOINT=nn
SENSOR_2_SETPOINT=nn
SENSOR_3_SETPOINT=nn
SENSOR_x_SETPOINT=35 (default)

Sets the acceptable temperatures (in Celsius) at which the subsystem operates. Sensor 1 and Sensor 2 set the maximum operating temperature for the primary subsystem enclosure. Sensor 3 sets the maximum operating temperature for the EMU unit. The allowable range for the setpoint is 0°C (32°F) to 49°C (120°F). The EMU determines the default setpoint for all three sensors.

Table 2–4 lists the valid EMU set-point temperatures in both Fahrenheit and Celsius.

Table 2–4: EMU Set Point Temperatures

ºC	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC	ºF
0	32	10	50	20	68	30	86	40	104
1	34	11	52	21	70	31	88	41	106
2	46	12	54	22	72	32	90	42	108
3	37	13	55	23	73	33	91	43	109
4	39	14	57	24	75	34	93	44	111
5	41	15	59	25	77	35	95	45	113
6	43	16	61	26	79	36	97	46	115
7	45	17	63	27	81	37	99	47	117
8	46	18	64	28	82	38	100	48	118
9	48	19	66	29	84	39	102	49	120

If any of the setpoints assigned to a slave EMU do not match the corresponding setpoints assigned to the master EMU, the slave EMU settings change to match the corresponding master EMU settings.

Refer to the enclosure documentation for detailed information about setting the EMU temperature set points.

Examples

This example shows how to set EMU sensor number 2 to 34°C:

```
SET EMU SENSOR_2_SETPOINT=34
```

This example shows how to set the EMU fan to operate at high speed:

```
SET EMU FANSPEED=HIGH
```

SET DISABLE_MANAGERS

This command provides the capability to revoke management rights from selected host connections. A Manager is a host connection that is allowed to issue CLI commands through a LUN. By default all host connections are enabled as managers. This command has no effect on CLI commands issued through the Maintenance Port of the HSG80.

NOTE: This command has no effect on I/O operations. It only affects the host's ability to issue CLI commands to the HSG80.

NOTE: After issuing SET DISABLE_MANAGERS=ALL, the HSG80 only accepts CLI commands through the Maintenance Port. Commands from all other sources are rejected with a SCSI status of ASC:91 ASCQ:08

Syntax

SET DISABLE_MANAGERS=ALL
SET DISABLE_MANAGERS=connection-names

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

To revoke the ability of host1 and host2 to issue CLI commands, enter:

```
SET DISABLE_MANAGERS=host1,host2
```

To revoke the ability of all hosts, except host1, to issue CLI commands, enter:

IMPORTANT: The following commands must be issued through the Maintenance Port of the HSG80. Otherwise all subsequent commands are rejected.

```
SET DISABLE_MANAGERS=ALL
SET ENABLE_MANAGERS=host1
```

An alternative way to perform the same functionality, without the restriction of using the Maintenance Port is by entering:

```
SET DISABLE_MANAGERS=host2,host3,host4,host5...
```

See Also

SET ENABLE_MANAGERS
SHOW MANAGERS

SET ENABLE_MANAGERS

This command provides the capability to define a subset of host connections that have management rights. A Manager is a host connection that is allowed to issue CLI commands through a LUN. By default all host connections are enabled as managers. This command has no effect on CLI commands issued through the Maintenance Port of the HSG80.

NOTE: This command has no effect on I/O operations. It only affects the host's ability to issue CLI commands to the HSG80.

Syntax

SET ENABLE_MANAGERS=ALL
SET ENABLE_MANAGERS=connection-names

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

To accept only control commands from host connections !NEWCON00 and !NEWCON01, enter:

```
SET ENABLE_MANAGERS=!NEWCON00,!NEWCON01
```

See Also

SET DISABLE_MANAGERS
SHOW MANAGERS

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.

   INITIALIZE DISK10000

4. Delete the disk.

   DELETE DISK10000

5. Add disk to the Spareset or remove disk from the enclosure.

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=*controller*

Configures both controllers to operate in a dual-redundant configuration under transparent failover mode. 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.

IMPORTANT: Remove all connections that appear using the SHOW CONNECTIONS command prior to establishing transparent failover mode.

NOTE: Before putting the controllers in failover mode, remove any previous mode with the SET NOFAILOVER command.

Syntax

SET FAILOVER COPY=*controller*

Parameters

There are no parameters for this command.

Switches

COPY=controller

Identifies which controller contains the source subsystem configuration for the copy. You must specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER. The companion controller receiving the configuration information restarts after the command is executed.

> ⚠ **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 the "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.

Example

To set the controllers in transparent failover mode and copy the configuration information from "this controller" to "other controller," enter:

```
SET FAILOVER COPY=THIS_CONTROLLER
```

See Also

SET MULTIBUS_FAILOVER
SET NOFAILOVER
SET NOMULTIBUS_FAILOVER

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 MIRRORSETS command.

Switches

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

- *COPY*

- *MEMBERSHIP*

- *POLICY and NOPOLICY*

- *READ_SOURCE*

- *REMOVE*

- *REPLACE*

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.

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 (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 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 (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 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.

For each reduced mirrorset, there must be at least one remaining normal member after the reduction. A normal member is one whose contents are the same as the other members.

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 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 DISKS 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 and immediately begin the copy operation onto DISK 30200, enter:

```
SET MIRR1 REPLACE=DISK30200
```

See Also

ADD MIRRORSETS
MIRROR
REDUCE
SHOW MIRRORSETS
SHOW *mirrorset-name*
UNMIRROR

SET MULTIBUS_FAILOVER

Places "this controller" and the "other controller" into multiple-bus failover mode. Failover is a process that allows a controller to take over total control of the storage subsystem in the event of the failure of its companion controller.

IMPORTANT: Remove all connections that appear using the SHOW CONNECTIONS command prior to establishing multibus failover mode.

NOTE: Before putting the controllers in MULTIBUS_FAILOVER mode, remove any previous transparent failover mode with the SET NOFAILOVER command.

Syntax

SET MULTIBUS_FAILOVER COPY=*controller*

Parameters

There are no parameters for this command.

Switches

COPY=controller

Identifies which controller contains the source configuration. You must specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER. The companion controller receives the configuration information and restarts.

$\triangle$ **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 the "this controller" to "other controller."

- Specify OTHER_CONTROLLER to copy the device configuration information from the "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.

Example

This example shows how to configure a controller pair to operate in multiple bus failover mode:

```
SET MULTIBUS_FAILOVER COPY=THIS_CONTROLLER
```

The configuration on "this controller" is automatically copied to the "other controller" when you issue the SET MULTIBUS_FAILOVER command. If you want to prefer specific units to specific controllers, use the following command after setting multiple bus failover:

```
SET D100 PREFERRED_PATH=THIS_CONTROLLER
SET D101 PREFERRED_PATH=OTHER_CONTROLLER
```

See Also

SET FAILOVER
SET NOFAILOVER
SET NOMULTIBUS_FAILOVER

SET NOFAILOVER
SET NOMULTIBUS_FAILOVER

The SET NOFAILOVER and SET NOMULTIBUS_FAILOVER commands remove "this controller" and the "other controller" (if currently reachable) from failover mode. Either command can be used to cancel failover, as they both perform exactly the same actions.

The controller on which the command was entered is always removed from the dual-redundant mode, even if the second controller is not currently reachable. No configuration information is lost. All units that were accessed through the "other controller" fail over to "this controller," and the "other controller" is shut down.

IMPORTANT: Immediately after entering this command, one controller should be physically removed because the sharing of devices is not supported by single controller configurations. 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.

The SET NOFAILOVER and SET NOMULTIBUS_FAILOVER commands affect both controllers, regardless of the controller on which the command is carried out.

Syntax

SET NOFAILOVER
or
SET NOMULTIBUS_FAILOVER

Parameters

There are no parameters associated with this command.

Switches

DESTROY_UNFLUSHABLE_DATA
NODESTROY_UNFLUSHABLE_DATA (default)

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, SET NOMULTIBUS FAILOVER, 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 transparent failover mode between two controllers in a dual-redundant configuration, enter:

```
SET NOFAILOVER
```

See Also

SET FAILOVER
SET MULTIBUS_FAILOVER

SET *RAIDset-name*

Changes the characteristics of the specified RAIDset.

NOTE: The number and type of disk drives that are used to create the storageset determine the maximum size of the RAIDset.

Syntax

SET *RAIDset-name*

Parameters

RAIDset-name

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

Switches

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

- *POLICY and NOPOLICY*

- *RECONSTRUCT*

- *REMOVE*

- *REPLACE*

These switches are described in the following paragraphs:

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
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 the smallest 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-name* 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) and immediately begin reconstruction on DISK20100, enter:

```
SET RAID9 REPLACE=DISK20100
```

See Also

ADD RAIDSETS
SHOW RAIDSETS
SHOW *RAIDset-name*

SET *remote-copy-set-name*

Changes the characteristics of a remote copy set.

NOTE: This command works only in a DRM environment and requires an HSG80 array controller with ACS version 8.7P code. Like all DRM commands, use of this command is heavily restricted. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for examples of usage.

This command works only on the site that is functioning as initiator.

Syntax

SET *remote-copy-set-name*

Parameters

remote-copy-set-name

Specifies the name of the remote copy set to modify. This is the name used with the ADD REMOTE_COPY_SETS command to identify the remote copy set as a host-addressable unit.

Switches

The following switches are available to the SET *remote-copy-set-nam*e command:

- *ADD*

- *ERROR_MODE*

- *INITIATOR*

- *OPERATION_MODE*

- *OUTSTANDING_IOS*

- *REMOVE*

- *RESUME*

- *SUSPEND*

These switches are described in the following paragraphs:

ADD=remote-node-name\target-unit-name

Specifies a unit to add into the remote copy set.

Remote-node-name is the name of the controller pair that controls the unit that is to be added. This name is assigned through the *REMOTE_COPY* switch of the SET *controller* command.

Target-unit-name is the name of the unit to be added to the remote copy set.

ERROR_MODE=FAILSAFE
ERROR_MODE=NORMAL (default)

Two options are available:

- *ERROR_MODE=FAILSAFE* enables failsafe lock mode for the members of the remote copy. Failsafe lock is a condition the members of the remote copy set assume under certain potentially catastrophic error conditions. The failsafe lock condition disables access to the remote copy set members.

- *ERROR_MODE=NORMAL* allows write operations to continue even when an error condition is present.

INITIATOR=initiator-unit-name

Moves the role of initiator to the specified target member.

NOTE: This command is part of the site failover procedure. Use of this switch is restricted to only site failover conditions. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for examples of usage.

OPERATION_MODE=SYNCHRONOUS (default)
OPERATION_MODE=ASYNCHRONOUS

This switch determines which of two normal operating modes is assigned to the remote copy set.

- In synchronous mode, write operations must be written to the target cache before the host is informed that the operation is complete. Synchronous operation assures data consistency among the members of a remote copy set.

- In asynchronous mode, the write operation is reported as complete to the host before the data is written to the remote units of the remote copy set. Asynchronous mode provides greater performance and response time, but the data on all members of the remote copy set cannot be assumed to be always the same.

OUTSTANDING_IOS=n (1 to 240; default is 200)

This switch sets the number of outstanding I/O operations from the initiator to the target. The way this switch operates depends on which operating mode is set by the *OPERATION_MODE* switch:

- In synchronous mode, *OUTSTANDING_IO* refers to the number of remote writes (write operations from the initiator to the target) that can be outstanding.

- In asynchronous mode, *OUTSTANDING_IO* refers to the number of write operations that can be reported as completed to the host before they have been written on all the members of the remote copy set.

REMOVE=remote-node-name/target-unit-name

Removes a unit from an existing remote copy set.

Remote-node-name is the name of the controller pair that controls the unit that is to be removed. This name is assigned through the *REMOTE_COPY* switch of the SET THIS_CONTROLLER command.

Target-unit-name is the name of the unit to be removed from the remote copy set.

RESUME=remote-node-name/target-unit-name

This switch starts a recovery procedure called "mini-merge." When the target becomes accessible, this switch enables the initiator to read the log disk and send the write commands, in order, to the target, which brings the target into congruency with the initiator.

A SET *remote-copy-set-name* command with the *SUSPEND* switch specified must have been entered prior to entering a SET r*emote-copy-set-name* command with the *RESUME* switch specified.

SUSPEND=remote-node-name/target-unit-name

This switch allows suspension of write operations to the target so that the target can be used for backup, and then remote copy functionality can be resumed.

This switch starts the logging of write operations. When the target becomes accessible, entering a SET *remote-copy-set-name* command with the *RESUME* switch specified enables the initiator to read the log disk and send the write commands, in order, to the target, which brings the target into congruency with the initiator.

Examples

```
SET RCS7 ERROR_MODE=FAILSAFE
SET RCS7 OPERATION_MODE=SYNCHRONOUS
SET RCS7 OPERATION_MODE=ASYNCHRONOUS
SET RCS7 OUTSTANDING_IOS=240
```

See Also

> ADD REMOTE_COPY_SETS
> SET *controller* REMOTE_COPY
> SHOW REMOTE_COPY_SETS
> SHOW *remote-copy-set-name*

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 UNITS command.

Switches

Table 2–5 lists all switches for the SET *unit-number* command and shows which switches can be used with each type of device and storageset. Descriptions of the switches follow the table.

Table 2–5: SET *unit-number* Switches for Existing Containers

Switch	Container Type	RAIDset	Stripeset	Mirrorset	N0Transportable Disk	Transportable Disk
ENABLE_ACCESS_PATH *DISABLE_ACCESS_PATH*		✓	✓	✓	✓	✓
IDENTIFIER *NOIDENTIFIER*		✓	✓	✓	✓	
MAX_READ_CACHED_TRANSFER_SIZE		✓	✓	✓	✓	✓
MAX_WRITE_CACHED_TRANSFER_SIZE		✓	✓	✓	✓	✓
MAXIMUM_CACHED_TRANSFER_SIZE		✓	✓	✓	✓	✓

Table 2–5: SET *unit-number* Switches for Existing Containers (Continued)

Switch	Container Type	RAIDset	Stripeset	Mirrorset	N0Transportable Disk	Transportable Disk
PREFERRED_PATH *NOPREFERRED_PATH*		✓	✓	✓	✓	✓
READ_CACHE *NOREAD_CACHE*		✓	✓	✓	✓	✓
READAHEAD_CACHE *NOREADAHEAD_CACHE*		✓	✓	✓	✓	✓
RUN *NORUN*		✓	✓	✓	✓	✓
WRITE_LOG *NOWRITE_LOG*		✓	✓	✓	✓	
WRITE_PROTECT *NOWRITE_PROTECT*		✓	✓	✓	✓	✓
WRITEBACK_CACHE *NOWRITEBACK_CACHE*		✓	✓	✓	✓	

ENABLE_ACCESS_PATH=connection-names
ENABLE_ACCESS_PATH=ALL (default)
DISABLE_ACCESS_PATH=connection-names
DISABLE_ACCESS_PATH=ALL

> Specifies the access path. It can be a single specific host ID, multiple host IDs, or all host IDs (ALL). If you have multiple hosts on the same bus, you can use this switch to restrict hosts from accessing certain units. This switch limits visibility of specific units from certain hosts. For example, if two hosts are on the same bus, you can restrict each host to access only specific units.

⚠️ **CAUTION:** If the storage subsystem has more than one host connection, access path must be specified carefully to avoid giving undesirable host connections access to the unit. The default condition is that access paths to all host connections are enabled. To restrict host access to a set of host connections, specify *DISABLE_ACCESS_PATH=ALL* when the unit is added, then use the SET *unit* command to specify the set of host connections that are to have access to the unit.

Enabling the access path to a particular host connection does not override previously enabled access paths. All access paths previously enabled are still valid; the new host connection is simply added to the list of connections that can access the unit.

The procedure of restricting access by enabling all access paths and then disabling selected paths is particularly <u>not</u> recommended because of the potential data/security breach that occurs when a new host connection is added.

IDENTIFIER=n
NOIDENTIFIER (default)

> The *IDENTIFIER* switch creates a unique *unit identifier* that makes the unit visible to the host. This number can be a value between 0–32767.

> Identifier is required for OpenVMS operating systems to identify the unit.

MAX_READ_CACHED_TRANSFER_SIZE=n
MAX_READ_CACHED_TRANSFER_SIZE=32 (default)

> 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_TRANSFER_SIZE=n
MAX_WRITE_CACHED_TRANSFE_SIZE=32 (default)

> 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=n
MAXIMUM_CACHED_TRANSFER_SIZE=32 (default)

> Sets the largest number of read and write blocks to be cached by the controller. The controller will not cache any transfers over the set size. Acceptable read and 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 use of this switch has the effect of setting both the *MAX_READ_CACHED_TRANSFER_SIZE* and the *MAX_WRITE_CACHED_TRANSFER_SIZE* switches.

PREFERRED_PATH=OTHER_CONTROLLER
PREFERRED_PATH=THIS_CONTROLLER
NOPREFERRED_PATH (default)

This command is only valid when in MULTIBUS_FAILOVER mode.

The *PREFERRED_PATH* switch allows you to balance the I/O load by specifying the controller through which the unit is 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 (default)
NOREAD_CACHE

If *READ_CACHE* is selected, when the controller receives a read request from the host, it 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 that you leave its default setting, *READ_CACHE*, enabled. However, under certain conditions, such as when performing a backup, read caching may not be necessary because the data will probably not be re-read. 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 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 is read from the controller cache instead of disk. Read-ahead caching is the default for units.

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

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

WRITE_LOG
NOWRITE_LOG (default)

Marks the defined unit as a Host Based Volume Shadowing shadow set member.

NOTE: This switch is only supported with ACS Version 8.7R or Version 8.7W.

NOTE: The specified unit is only marked and not enabled.

To enable a unit as a Host Based Volume Shadowing shadow set member, a single controller or both controllers of a dual redundant pair must be restarted. During the restart, the additional memory structures required for Host Based Logging are allocated and initialized. Once enabled, the unit can only be disabled as a Host Based Volume Shadowing shadow set member by use of the NOWRITE_LOG command. When a unit is disabled for Host Based Logging, a restart of the controllers is *not* required for the subsequent disabling action to take effect. Log units can be JBODs, stripesets, RAIDsets, or mirrorsets. However, this unit cannot be a member of a Snapshot, Remote Copy Set, or Partition.

When a SHOW *unit-number* command is entered for a given unit, one of the following is displayed in the subsequent unit status display:

- Host Based Logging NOT Specified

  Indicates that a SET *unit-number* WRITE_LOG command has never been entered for the specified unit, or Host Based Logging has been disabled for a previously enabled unit through the SET *unit-number* NOWRITE_LOG command.

- Host Based Logging Specified, NOT Enabled

  Indicates that a prior SET *unit-number* WRITE_LOG command has been entered for the specified unit but the controller in a single controller configuration, or both controllers in a dual redundant controller pair configuration have not yet been restarted for Host Based Logging to become enabled.

- Host Based Logging Specified, Enabled, NOT Active

  Indicates that a prior SET *unit-number* WRITE_LOG command has been entered for the specified unit and the controller in a single controller configuration, or both controllers in a dual redundant controller pair configuration, have been restarted to enable Host Based Logging. However, Host Based Logging has not as yet been activated for the unit through a specific Host initiated command to do so.

- Host Based Logging Specified, Enabled, Active

  Indicates that a prior SET *unit-number* WRITE_LOG command has been entered for the specified unit and the controller in a single controller configuration, or both controllers in a dual redundant controller pair configuration have been restarted to enable Host Based Logging, and Host Based Logging has been activated for the unit through a specific Host initiated command to do so.

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 (default)
NOWRITEBACK_CACHE

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

- Specify *WRITEBACK_CACHE* for all new RAIDsets, mirrorsets, and units to take advantage of the controller write-back caching feature. This switch allows 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.

> **CAUTION:** Though there is built-in redundancy in mirrored cache to protect data, allowing data to be written to write-back cache may result in the loss of data if the cache fails.

WRITEBACK_CACHE cannot be applied to transportable disks.

The *NOWRITEBACK_CACHE* switch 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, and then notifies the host when the write operation is complete. Write-through caching is enabled only when write-back caching is disabled.

NOWRITEBACK_CACHE is the default on transportable disks.

NOTE: When specifying the *NOWRITEBACK_CACHE* switch, the controller might take 5 minutes to flush data contained within the write-back cache.

Examples

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

```
SET D102 WRITE_PROTECT NOREAD_CACHE
```

To allow only a host connection named Roger1 to access unit D0, enter:

```
SET D0 DISABLE_ACCESS_PATH=ALL
```

```
SET D0 ENABLE_ACCESS_PATH=ROGER1
```

See Also

ADD UNITS
SHOW UNITS
SHOW *unit-number*

SHOW ASSOCIATIONS

Displays information on all association sets known to the subsystem.

Syntax

SHOW ASSOCIATIONS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW ASSOCIATIONS command:

- *FULL*

Example

```
INT_TOP> show association


Name            Association                     Uses            Used by
-------------------------------------------------------------------
A1              association                     RCS1
                                                RCS2
                                                RCS3
                                                RCS4
```

See Also

ADD ASSOCIATION
SET *association-set-name*
SHOW *association-set-name*

SHOW *association-set-name*

Displays information on the specified association set.

Syntax

SHOW *association-set-name*

Parameters

association-set-name

Specifies the name of the association set to be displayed.

Switches

There are no switches associated with this command.

Example

```
INT_TOP> show A1

Name            Association                        Uses            Used by
-----------------------------------------------------------------
A1              association                        RCS1
                                                   RCS2
                                                   RCS3


        Switches:
          NOFAIL_ALL
          NOORDER_ALL
          LOG_UNIT = D12 (No data logged)
```

See Also

ADD ASSOCIATION
SET *association-set-name*
SHOW ASSOCIATIONS

SHOW CONCATSETS

Displays information on all concatsets known to the subsystem.

Syntax

SHOW CONCATSETS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW CONCATSETS command:

• *FULL*

Example

```
show concatsets


Name            Storageset                      Uses            Used by
------------------------------------------------------------------
C1              concatset                       DISK10300       D1
                                                DISK30400
```

See Also

ADD CONCATSET
SET *concatset-name*
SHOW *concatset-name*

SHOW *concatset-name*

Displays information on the specified concatset.

Syntax

SHOW *concatset-name*

Parameters

concatset-name

Specifies the name of the concatset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show C1


Name          Storageset                        Uses          Used by
------------------------------------------------------------------
C1            concatset                         DISK10300     D1
                                                DISK30400

        State:
          NORMAL
         DISK10300 (member  0) is NORMAL
         DISK30400 (member  1) is NORMAL
        Size:           35538354 blocks
```

See Also

ADD CONCATSET
SET *concatset-name*
SHOW CONCATSET

SHOW CONNECTIONS

Displays the following information for all connections: connection name, operating system, controller, controller port, adapter ID address, online or offline status, and unit offset.

<<< LOCKED >>> appears in the title area when the connection table is locked. If unlocked, or not supported (HOST_FC only).

Syntax

SHOW CONNECTIONS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW CONNECTIONS command:

- *FULL*

    This switch displays the rejected hosts, with an index.

Examples

The full switch displays rejected hosts with an index.

```
SMV_Top> sho conn full
Connection                <<<LOCKED>>>
Name         Operating     Controller  Port  Address      Status       Offset
             System
REV50A       TRU64_UNIX    THIS        1     011000       OL this      0
   HOST_ID=2000-0000-C922-556D        ADAPTER_ID=1000-0000-C922-556D
REV50B       TRU64_UNIX    OTHER       1     031000       OL other     0
   HOST_ID=2000-0000-C921-0919        ADAPTER_ID=1000-0000-C921-0919


Rejected connections:
Key         HOST_ID      ADAPTER_ID  Controller        Port
1           2000-0000-   1000-0000-  THIS              1
            C921-83FC    C921-83FC
0           2000-0000-   1000-0000-  OTHER             1
            C923-9AA5    C923-9AA5
```

See Also

ADD CONNECTIONS
DELETE *connection-name*
SET CONNECTIONS
SHOW *connection-name*
RENAME

SHOW *connection-name*

Displays the following information for the specified *connection-name*: operating system, controller, controller port, adapter ID address, online or offline status, and unit offset.

Syntax

SHOW *connection-name*

Parameters

connection-name

Specifies the name of the connection to be displayed.

Switches

There are no switches associated with this command.

Examples

The full switch displays rejected hosts with an index.

```
SMV_Top> sho REV50A

Connection

Name        Operating    Controller  Port  Address    Status      Offset
            System

REV50A      TRU64_UNIX   THIS        1     011000     OL this     0
    HOST_ID=2000-0000-C922-556D        ADAPTER_ID=1000-0000-C922-556D
```

See Also

ADD CONNECTIONS
DELETE *connection-name*
SET CONNECTIONS
SHOW *connection-name*
RENAME

SHOW *controller*

Displays information about the specified controller.

Syntax

SHOW *controller*

Parameters

controller

Identifies which controller is displayed. Specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER.

Switches

The following switch is available for the SHOW *controller* command:

• *FULL*

Example

To display the full information for a controller, enter:

```
SHOW OTHER_CONTROLLER FULL

     Controller:
     HSG80 (c) Compaq xxxxxxxxxx Software xxxxxx, Hardware xxxx
     NODE_ID         = 5000-1FE1-0005-9C10
     ALLOCATION_CLASS = 1
     SCSI_VERSION    = SCSI-2
     Configured for MULTIBUS_FAILOVER with ZG95005203
     In dual-redundant configuration
     Device Port SCSI address 7
     Time: NOT SET
     Command Console LUN is lun 0 (NOIDENTIFIER)
     Host Connection Table is NOT locked
     Smart Error Eject Disabled
Host PORT_1:
     Reported PORT_ID = 5000-1FE1-0005-9C13
     PORT_1_TOPOLOGY  = FABRIC (connection down)
Host PORT_2:
     Reported PORT_ID = 5000-1FE1-0005-9C14
     PORT_2_TOPOLOGY  = FABRIC (connection down)
     NOREMOTE_COPY
```

```
Cache:
     32 megabyte write cache, version 0012
     Cache is GOOD
     Unflushed data in cache
     CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
Mirrored Cache:
     32 megabyte write cache, version 0012
     Cache is GOOD
     Unflushed data in cache
Battery:
     NOUPS
     FULLY CHARGED
     Expires:              04-DEC-2002
Extended information:
     Terminal speed 19200 baud, eight bit, no parity, 1 stop bit
     Operation control: 00000000  Security state code: 25059
     Configuration backup disabled

     Vendor ID: DEC
```

See Also

RESTART *controller*
SET *controller*
SET FAILOVER
SET MULTIBUS_FAILOVER
SHUTDOWN *controller*

SHOW DEVICES

Displays information about all devices known to the subsystem.

Syntax

SHOW DEVICES

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW DEVICES command:

• *FULL*

Example

```
BOT> show devices


Name          Type                        Port Targ  Lun        Used by
------------------------------------------------------------------
DISK10000     disk                         1     0    0          M1
DISK20000     disk                         2     0    0          M1
DISK20400     disk                         2     4    0          M1
DISK30400     disk                         3     4    0        SPARESET
```

See Also

SHOW UNITS
SHOW MIRRORSETS
SHOW RAIDSETS
SHOW STRIPESETS
SHOW SPARESETS
SHOW FAILEDSETS

SHOW DISKS

Displays information about all disks known to the subsystem.

Syntax

SHOW DISKS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW DISK command:

- *FULL*

Example

```
BOT> show disks

Name          Type                   Port Targ  Lun       Used by
-----------------------------------------------------------------
DISK10000     disk                     1    0    0          M1
DISK20000     disk                     2    0    0          M1
DISK20400     disk                     2    4    0          M1
DISK30400     disk                     3    4    0        SPARESET
```

See Also

ADD DISKS
DELETE *container-name*
SET *device-name*
SHOW *device-name*

SHOW *disk-name*

Displays information about the specified disks.

Syntax

SHOW *disk-name*

Parameters

disk-name

Specifies the name of the association set to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show DISK10000


Name           Type                       Port Targ  Lun        Used by
-------------------------------------------------------------------
DISK10000     disk                         1    0    0          M1
          COMPAQ   BD0366349C       3B02
      Switches:
        NOTRANSPORTABLE
        TRANSFER_RATE_REQUESTED=20MHZ(synchronous 20.00 MHZ
negotiated)
      Size:           71114623 blocks
```

See Also

ADD DISKS
DELETE *container-name*
SET *device-name*
SHOW DISKS

SHOW EMU

Displays information regarding the status of the environmental monitoring unit.

Syntax

SHOW EMU

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW EMU command:

• *FULL*

SHOW FAILEDSETS

Displays a list of devices in the failedset.

Syntax

SHOW FAILEDSETS

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

```
BOT> show failedset


Name         Storageset                    Uses          Used by
------------------------------------------------------------------
FAILEDSET    failedset                     DISK10000
        Switches:
           NOAUTOSPARE
```

See Also

DELETE FAILEDSET
SET FAILEDSET
SHOW SPARESETS

SHOW ID

Displays a sorted list of any unit associated with an ID. If no units are associated with an ID, the informational message "No Units with Identifiers" is displayed.

Syntax

SHOW ID

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

To display a list of units associated with IDs, enter:

```
SHOW ID

Unit      ID
----      ---

D0        12
D3        9
D7        24
D25       90
D123      1
```

See Also

SET *unit-number*

SHOW MANAGERS

Displays a list of host connections with management rights. A Manager is a host connection that is allowed to issue CLI commands through a LUN. By default all host connections are enabled as managers. Status as a Manager has no effect on CLI commands issued through the Maintenance Port of the HSG80.

Syntax

SHOW MANAGERS

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

```
G80> SHOW MANAGERS
Connection              <<<All Connections Enabled>>>
Name        Operating   Controller  Port   Address      Status
            System
!NEWCON14   AIX         THIS        1      011000       0
   HOST_ID=2000-0000-C922-46E2      ADAPTER_ID=1000-0000-C922-46E2
!NEWCON15   WINNT       THIS        1      011200       0
   HOST_ID=2000-0000-C927-6735      ADAPTER_ID=1000-0000-C927-6735
!NEWCON16   AIX         OTHER       1      011100       0
   HOST_ID=2000-0000-C925-0096      ADAPTER_ID=1000-0000-C925-0096
!NEWCON17   WINNT       OTHER       1      011300       0
   HOST_ID=2000-0000-C923-2CD2      ADAPTER_ID=1000-0000-C923-2CD2
                        <<<All Connections Enabled>>>
```

See Also

SET ENABLE_MANAGERS
SET DISABLE_MANAGERS

SHOW MIRRORSETS

Displays information about all mirrorsets known to the subsystem.

Syntax

SHOW MIRRORSETS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW MIRRORSETS command:

- *FULL*

Example

```
BOT> show mirrorset

Name          Storageset                      Uses          Used by
------------------------------------------------------------------
M1            mirrorset                       DISK10000     S1
                                              DISK20000
                                              DISK20400

M2            mirrorset                       DISK10100     S1
                                              DISK20100
                                              DISK30100
```

See Also

ADD MIRRORSETS
DELETE *container-name*
SHOW *mirrorset-name*
SHOW STRIPESETS

SHOW *mirrorset-name*

Displays information about the specified mirrorset.

Syntax

SHOW *mirrorset-name*

Parameters

mirrorset-name

Specifies the name of the mirrorset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show M1


Name            Storageset                          Uses            Used by
------------------------------------------------------------------
M1              mirrorset                           DISK10000         S1
                                                    DISK20000
                                                    DISK20400
        Switches:
          POLICY (for replacement) = BEST_PERFORMANCE
          COPY (priority) = NORMAL
          READ_SOURCE = LEAST_BUSY
          MEMBERSHIP = 3, 3 members present
        State:
          RECONSTRUCTING
          DISK20000 (member  0) is NORMAL
          DISK20400 (member  1) is NORMAL
          DISK10000 (member  2) is COPYING   6% complete
        Size:           71114623 blocks
```

See Also

ADD MIRRORSETS
DELETE *container-name*
SHOW MIRRORSETS
SHOW STRIPESETS

SHOW PASSTHROUGH

Displays information about all passthrough devices known to the subsystem.

Syntax

SHOW PASSTHROUGH

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW PASSTHROUGH command:

- *FULL*

See Also

ADD PASSTHROUGH
DELETE *container-name*

SHOW RAIDSETS

Displays information about all RAIDsets known to the subsystem.

Syntax

SHOW RAIDSETS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW RAIDSETS command:

• *FULL*

Example

```
BOT> show raidset full
Name          Storageset                        Uses          Used by
-----------------------------------------------------------------
R0            raidset                           DISK10400     D0
                                                DISK20500
                                                DISK30000
        Switches:
          NOPOLICY (for replacement)
          RECONSTRUCT (priority) = NORMAL
          CHUNKSIZE = 256 blocks
        State:
          RECONSTRUCT 3% complete
          DISK10400 (member  0) is RECONSTRUCTING   3% complete
          DISK20500 (member  1) is RECONSTRUCTING   3% complete
          DISK30000 (member  2) is RECONSTRUCTING   3% complete
        Size:          35529666 blocks
```

See Also

> ADD RAIDSETS
> DELETE *container-name*
> SET *RAIDset-name*
> SHOW *RAIDset-name*

SHOW *raidset-name*

Displays information about the specified RAIDset.

Syntax

SHOW *raidset-name*

Parameters

raidset-name

Specifies the name of the RAIDset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show R0
Name            Storageset                      Uses            Used by
----------------------------------------------------------------------
R0              raidset                         DISK10400       D0
                                                DISK20500
                                                DISK30000
        Switches:
          NOPOLICY (for replacement)
          RECONSTRUCT (priority) = NORMAL
          CHUNKSIZE = 256 blocks
        State:
          RECONSTRUCT 3% complete
          DISK10400 (member  0) is RECONSTRUCTING   3% complete
          DISK20500 (member  1) is RECONSTRUCTING   3% complete
          DISK30000 (member  2) is RECONSTRUCTING   3% complete
        Size:          35529666 blocks
```

See Also

      ADD RAIDSETS
      DELETE *container-name*
      SET *RAIDset-name*
      SHOW RAIDSETS

SHOW REMOTE_COPY_SETS

Displays information on all remote copy sets known to the subsystem.

Syntax

SHOW REMOTE_COPY_SETS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW REMOTE_COPY_SETS command:

• *FULL*

Example

```
INT_TOP> show remote_copy_sets


Name                                       Uses            Used by

-----------------------------------------------------------------

RCS1          remote copy                  D1              A1

RCS2          remote copy                  D2              A1

RCS3          remote copy                  D3              A1

RCS4          remote copy                  D4              A1
```

See Also

ADD ASSOCIATIONS
ADD REMOTE_COPY_SETS
DELETE *remote-copy-set-name*
SET *remote-copy-set-name*
SHOW ASSOCIATIONS
SHOW *controller*
SHOW *remote-copy-set-name*

SHOW *remote-copy-set-name*

Displays information on the specified remote copy set.

Syntax

SHOW *remote-copy-set-name*

Parameters

remote-copy-set-name

Specifies the name of the remote copy set to be displayed.

Switches

There are no switches associated with this command.

Example

```
INT_TOP> show RCS1


Name                                            Uses          Used by
-------------------------------------------------------------------
RCS1          remote copy                       D1               A1
         Reported LUN ID: 6000-1FE1-FF00-0090-0001-0010-3889-05C0
         Switches:
           OPERATION_MODE  = SYNCHRONOUS
           ERROR_MODE      = NORMAL
           FAILOVER_MODE   = MANUAL
           OUTSTANDING_IOS = 200
         Initiator (INT\D1) state:
           ONLINE to this controller
           Not reserved
         Target state:
           TGT\D1          is NORMAL
```

See Also

> ADD ASSOCIATIONS
> ADD REMOTE_COPY_SETS
> DELETE *remote-copy-set-name*
> SET *remote-copy-set-name*
> SHOW ASSOCIATIONS
> SHOW *controller*
> SHOW REMOTE_COPY_SETS

SHOW SPARESETS

Displays infomration on all devices in the spareset.

Syntax

SHOW SPARESETS

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

```
BOT> show spareset

Name           Storageset                  Uses           Used by
-------------------------------------------------------------------
SPARESET       spareset                    DISK30400
```

See Also

ADD SPARESETS
DELETE SPARESETS
SHOW FAILEDSET

SHOW STORAGESETS

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

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

- *CONCATSETS*—Shows all concatsets configured to the controller.
- *FAILEDSETS*—Shows the failedset configured to the controller.
- *MIRRORSETS*—Shows all mirrorsets configured to the controller.
- *RAIDSETS*—Shows all RAIDsets configured to the controller.
- *SPARESETS*—Shows the sparesets configured to the controller.
- *STORAGESETS*—Shows all storagesets configured with the controller.
- *STRIPESETS*—Shows all stripesets configured to the controller.

Syntax

SHOW STORAGESETS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW STORAGESETS command:

- *FULL*

Example

```
show storagesets

Name          Storageset                      Uses            Used by
-------------------------------------------------------------------
S1            stripeset                       M1              D4
                                              M2


M1            mirrorset                       DISK10000       S1
                                              DISK20000
                                              DISK20400
M2            mirrorset                       DISK10100       S1
                                              DISK20100
                                              DISK30100


SPARESET      spareset


FAILEDSET     failedset
```

See Also

> ADD DISKS
> ADD MIRRORSETS
> ADD RAIDSETS
> DELETE *container-name*
> SHOW DISKS
> SHOW MIRRORSETS
> SHOW RAIDSETS
> SHOW UNITS

SHOW STRIPESETS

Displays information about all stripesets known to the subsystem.

Syntax

SHOW STRIPESETS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW STRIPESETS command:

• *FULL*

Example

```
BOT> show stripesets


Name          Storageset                    Uses          Used by
-----------------------------------------------------------------
S1            stripeset                     M1            D4
                                            M2
```

See Also

ADD STRIPESETS
DELETE *container-name*
SHOW *stripeset-name*

SHOW *stripeset-name*

Displays information about the specified stripeset.

Syntax

SHOW *stripeset-name*

Parameters

stripeset-name

Specifies the name of the stripeset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show S1


Name          Storageset                    Uses          Used by
-----------------------------------------------------------------
S1            stripeset                     M1            D4
                                            M2
        Switches:
          CHUNKSIZE = 256 blocks
        State:
          NORMAL
          M1         (member  0) is NORMAL
          M2         (member  1) is NORMAL
        Size:            142229246 blocks
```

See Also

ADD STRIPESETS
DELETE *container-name*
SHOW STRIPESETS

SHOW UNITS

Displays information for all units known to the subsystem.

Syntax

SHOW UNITS

Parameters

There are no parameters associated with this command.

Switches

The following switch is available for the SHOW UNITS command:

- *FULL*

Example

```
BOT> show units

    LUN                                         Uses          Used by
    -----------------------------------------------------------------
    D0                                          R0
    D1                                          DISK10300
    D2                                          M3
    D3                                          S2
```

See Also

ADD UNITS
DELETE *unit-number*
SET *unit-number*
SHOW *unit-number*

SHOW *unit-number*

Displays information about the specified unit.

Syntax

SHOW *unit-number*

Parameters

unit-number

Specifies the unit to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show D0


  LUN                                          Uses          Used by
----------------------------------------------------------------
  D0                                            R0
        LUN ID:      6000-1FE1-000F-E500-0001-8080-0475-0005
        NOIDENTIFIER
        Switches:
        RUN              NOWRITE_PROTECT      READ_CACHE
          READAHEAD_CACHE          WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
              ALL
        State:
          ONLINE to this controller
          Not reserved
          NOPREFERRED_PATH
          Host Based Logging NOT Specified
        Size:          35529666 blocks
        Geometry (C/H/S): (10512 / 20 / 169)
```

See Also

ADD UNITS
DELETE *unit-number*
SET *unit-number*
SHOW UNITS

SHUTDOWN *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

Identifies the controller to shut down. You must specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER.

Switches

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

- *IGNORE_ERRORS and NOIGNORE_ERRORS*
- *IMMEDIATE_SHUTDOWN and NOIMMEDIATE_SHUTDOWN*

These switches are described in the following paragraphs:

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

Controls the controller reaction 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.

Examples

To shut down "this controller," enter:

```
SHUTDOWN THIS_CONTROLLER
```

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

```
SHUTDOWN OTHER_CONTROLLER IGNORE_ERRORS
```

See Also

RESTART *controller*
SELFTEST *controller*

SITE_FAILOVER

Performs the site failover function in the event the original initiator site is not operational.

NOTE: This command works only in a DRM environment and requires an HSG80 array controller with ACS version 8.7P code. Use of this command is heavily restricted. Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide* for an explanation and examples of usage.

The SITE_FAILOVER command changes the role of a target unit to an initiator unit. A remote copy set is created with two members:

- Original target (which is the new initiator)

- Original initiator (which is the new target)

Syntax

SITE_FAILOVER *remote-node-name\remote-copy-set-name*

Parameters

remote-node-name\remote-copy-set-name

The *remote-node-name* part of the parameter specifies the name of the controller pair—called a node—receiving the command.

The *remote-copy-set-name* part of the parameter specifies the name by which the remote copy set is known. This name must be unique across the fabric.

NOTE: Remote copy sets cannot be renamed with the RENAME command. If the wrong name is entered, the remote copy set must be deleted and then added again.

The *remote-copy-set-name* must start with RCS and can consist of a maximum of 9 characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

Switches

There are no switches associated with this command.

Examples

Refer to the *StorageWorks by Compaq Data Replication Manager HSG80 ACS Version 8.7P Operations Guide*.

UNMIRROR

Converts a one-member mirrorset back to a nonmirrored 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 MIRRORSETS
MIRROR
REDUCE
RUN CLONE
SET *mirrorset-name*

Glossary

This glossary defines terms used in this guide or related to this product and 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.

AL_PA
Arbitrated loop physical address. A one-byte value used to identify a port in an Arbitrated Loop topology.

ANSI
Pronounced "ann-see." Acronym for the American National Standards Institute. An organization who develops standards used voluntarily by many manufacturers within the USA. ANSI is not a government agency.

arbitrated loop
In Fibre Channel Technology, a serial bus configuration in which device ports are connected in a loop. Each port has a unique loop address and it communicates with other ports on the loop by arbitrating for loop access. Loop addresses are assigned via cooperative port intercommunication during loop initialization, which occurs any time the device configuration on the loop is physically changed.

arbitrated loop physical address
See AL_PA

array controller
See controller

array controller software
See ACS

association set
A group of remote copy sets that share selectable attributes for logging and failover. Members of an association set transition to the same state simultaneously. For example, if one association set member assumes the failsafe locked condition, then other members of the association set also assume the failsafe locked condition. An association set can also be used to share a log between a group of remote copy set members that require efficient use of the log space. *See also* remote copy set.

asynchronous
Pertaining to events that are scheduled as the result of a signal asking for the event; pertaining to that which is without any specified time relation. *See also* synchronous.

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.

backplane
The electronic printed circuit board into which you plug subsystem devices—for example, a controller or power supply.

bad block
A data block containing a physical defect.

bad block replacement
See BBR

battery hysteresis
The ability of the software to allow write-back caching during the time a battery is charging, but only when a previous down time has not drained more than 50 percent of rated battery capacity.

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.

BIST

Built-in self-test. A diagnostic test performed by the array controller software on the controller's policy processor.

bit

A single binary digit having a value of either 0 or 1. A bit is the smallest unit of data a computer can process.

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. *Also called* sector.

bootstrapping

A method used to bring a system or device into a defined state by means of its own action. For example, a machine routine whose first few instructions are enough to bring the rest of the routine into the computer from an input device.

built-in self-test

See BIST

byte

A binary character string made up of 8 bits operated on as a unit.

cache memory

A portion of memory used to accelerate read and write operations. The objective of caching data in a system is to improve performance by placing the most frequently used data in the highest performance memory.

CDU

Cable distribution unit. The power entry device for StorageWorks racks (cabinets). The CDU provides the connections necessary to distribute power to the rack enclosures and fans.

channel

An interface which allows high speed transfer of large amounts of data. Another term for a SCSI bus. *See also* SCSI.

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 download patches to the Array Controller Software.

CLI
Command Line interface. A command line entry utility used to interface with the HS-series controllers. CLI enables the configuration and monitoring of a storage subsystem through textual commands.

coax or
coaxial cable
A two-conductor wire in which one conductor completely wraps the other with the two separated by insulation.

code-load code-patch utility
See CLCP

command line interface
See CLI

computer interconnect 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. (2) 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.

CSR

Control and Status Register.

DAEMON

Pronounced "demon." A program usually associated with a UNIX system that performs a utility (housekeeping or maintenance) function without being requested or even known of by the user. A daemon is a diagnostic and execution monitor.

data center cabinet (rack)

A generic reference to large subsystem racks, such as those in which StorageWorks products can be mounted.

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 simultaneously to the same remote node.

device

In its physical form, a magnetic disk 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; peripheral device.

differential I/O module

A 16-bit I/O module with SCSI bus converter circuitry for extending a differential SCSI bus. *See also* I/O module.

differential SCSI bus

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

DILX

Disk Inline Exerciser. 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.

DIMM

Dual Inline Memory Module.

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.

disaster tolerance

The ability to resume data center operations shortly after a significant event occurs at the primary data center. The ability to restart processing can require an alternate data center, with current copies of critical data in a usable state.

disk inline exerciser

See DILX

DMA
Direct Memory Access.

DOC
DWZZA-on-a-chip. An SYM53C120 SCSI bus extender chip used to connect a SCSI bus in one enclosure to the corresponding SCSI bus in another enclosure.

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
See DDL

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

dual-simplex
A communications protocol that allows simultaneous transmission in both directions in a link, usually with no flow control.

DUART
Dual Universal Asynchronous Receiver and Transmitter. An integrated circuit containing two serial, asynchronous transceiver circuits.

DWZZA
A StorageWorks SCSI-bus-signal converter used to connect 8-bit single-ended devices to hosts with 16-bit differential SCSI adapters. This converter extends the range of a single-ended SCSI cable to the limit of a differential SCSI cable. *See also* SCSI bus signal converter.

DWZZB
A StorageWorks SCSI bus signal converter used to connect a variety of 16-bit single-ended devices to hosts with 16-bit differential SCSI adapters. *See also* SCSI bus signal converter.

DWZZC
The 16-bit SCSI table-top SCSI bus signal converter used to extend a differential SCSI bus, or to connect a differential SCSI bus to a single-ended SCSI bus. *See also* SCSI bus signal converter.

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.

EIA

Electronic Industries Association. EIA is a standards organization specializing in the electrical and functional characteristics of interface equipment.

EMU

Environmental Monitoring Unit. A unit that provides increased protection against catastrophic failures. Some subsystem enclosures include an EMU which works with the controller to detect conditions such as failed power supplies, failed blowers, elevated temperatures, and external air sense faults. The EMU also controls certain cabinet hardware including DOC chips, alarms, and fan speeds.

environmental monitoring unit

See EMU

ESD

Electrostatic Discharge. The discharge of potentially harmful static electrical voltage as a result of improper grounding.

extended subsystem

A subsystem in which one or two enclosures are connected to the primary enclosure.

external cache battery

See ECB

F_Port

A port in a fabric where an N_Port or NL_Port may attach.

fabric

A group of interconnections between ports that includes a fabric element.

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

See FMU

FC–AL

The Fibre Channel Arbitrated Loop standard.

FC–ATM

ATM AAL5 over Fibre Channel.

FCC

Federal Communications Commission. The federal agency responsible for establishing standards and approving electronic devices within the United States.

FCC Class A

This certification label appears on electronic devices that can only be used in a commercial environment within the United States.

FCC Class B

This certification label appears on electronic devices that can be used in either a home or a commercial environment within the United States.

FC–FG

Fibre Channel Fabric Generic requirements.

FC-GS-1

Fibre Channel Generic Services-1.

FC–GS-2

Fibre Channel Generic Services-2.

FC–IG

Fibre Channel Implementation Guide.

FC–LE
Fibre Channel Link Encapsulation (ISO 8802.2).

FCP
The mapping of SCSI-3 operations to Fibre Channel.

FC–PH specification
The Fibre Channel Physical and Signaling standard.

FC–SB
Fibre Channel Single Byte Command Code Set.

FC–SW
Fibre Channel Switched Topology and Switch Controls.

FD SCSI
The fast, narrow, differential SCSI bus with an 8-bit data transfer rate of 10 MB/s. *See also* FWD SCSI; SCSI.

FDDI
Fiber Distributed Data Interface. An ANSI standard for 100 megabaud transmission over fiber optic cable.

FG–FP
Fibre Channel Framing Protocol (HIPPI on FC).

fiber
A fiber or optical strand. Spelled *fibre* in Fibre Channel.

fiber optic cable
A transmission medium designed to transmit digital signals in the form of pulses of light. Fiber optic cable is noted for its properties of electrical isolation and resistance to electrostatic contamination.

FL_Port
A port in a fabric where N_Port or an NL_Port may be connected.

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.

frame

An invisible unit used to transfer information in Fibre Channel.

FRU

Field Replaceable Unit. A hardware component that can be replaced at a customer location by StorageWorks authorized service providers.

FRUTIL

Field Replacement Utility.

full duplex (adj)

Pertaining to a communications method in which data can be transmitted and received at the same time.

full duplex (n)

A communications system in which there is a capability for 2-way transmission and acceptance between two sites at the same time.

FWD SCSI

A fast, wide, differential SCSI bus with a maximum 16-bit data transfer rate of 20 MB/s. *See also* SCSI; FD SCSI.

GBIC

Gigabit Interface Converter. The devices that are inserted into the ports of the Fibre Channel switch and that hold the Fibre Channel cables.

giga

A prefix indicating a billion (10^9) units, as in gigabaud or gigabyte.

gigabaud

An encoded bit transmission rate of one billion (10^9) bits per second.

gigabyte

A value normally associated with the storage capacity of a disk drive, meaning a billion (10^9) bytes. The decimal value 1024 is usually used for one thousand.

GLM

Gigabit Link Module.

half-duplex (adj)
Pertaining to a communications system in which data can be either transmitted or received but only in one direction at one time.

hard address
The AL_PA which an NL_Port attempts to acquire during loop initialization.

heterogeneous host support
Also called *noncooperating host support*.

HIPPI–FC
Fibre Channel over HIPPI.

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

host adapter
A device that connects a host system to a SCSI bus. The host adapter usually performs the lowest layers of the SCSI protocol. This function may be logically and physically integrated into the host system.

host compatibility mode
A setting used by the controller to provide optimal controller performance with specific operating systems. This improves the controller performance and compatibility with the specified operating system.

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.

hot-pluggable
A replacement method that allows normal I/O activity on a device bus to remain active during device removal and insertion. The device being removed or inserted is the only device that cannot perform operations during this process. *See also* pluggable.

HSUTIL
Format and Device Code Load Utility.

I/O
Refers to input and output functions.

I/O driver
The set of code in the kernel that handles the physical I/O to a device. This is implemented as a fork process. *Also called* driver.

I/O interface
See interface

I/O module
A device that integrates an enclosure with either an 8-bit single-ended SCSI bus, 16-bit single-ended SCSI bus, 16-bit differential SCSI bus, or Fibre Channel bus.

I/O operation
The process of requesting a transfer of data from a peripheral device to memory (or visa versa), the actual transfer of the data, and the processing and overlaying activity to make the request and transfer occur.

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 device bus. The host is the initiator on the host bus.

instance code
A 4-byte value displayed in most text error messages and issued by the controller when a subsystem error occurs. The instance code indicates when during software processing the error was detected.

interface
A set of protocols used between components, such as cables, connectors, and signal levels.

IPI
Intelligent Peripheral Interface. An ANSI standard for controlling peripheral devices by a host computer.

IPI-3 Disk
Intelligent Peripheral Interface Level 3 for Disk.

IPI-3 Tape
Intelligent Peripheral Interface Level 3 for Tape.

JBOD
Just a bunch of disks. A term used to describe a group of single-device logical units not configured into any other container type.

kernel
The most privileged processor access mode.

L_Port
A node or fabric port capable of performing Arbitrated Loop functions and protocols. NL_Ports and FL_Ports are loop-capable ports.

link
A connection between two Fibre Channel ports consisting of a transmit fibre and a receive fibre.

local connection
A connection to the subsystem, by way of the controller serial maintenance port, to a maintenance terminal or the host terminal. A local connection enables you to connect to one subsystem controller to perform maintenance tasks. *See also* maintenance terminal; local terminal.

local terminal
A terminal plugged into the EIA-423 maintenance port located on the front bezel of the controller. *See also* maintenance terminal; local connection.

logical bus
A single-ended bus connected to a differential bus by a SCSI bus signal converter.

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. *See also* unit; LUN.

logical unit number
See LUN

logon
Also called login. A procedure whereby a participant, either a person or network connection, is identified as being an authorized network participant.

loop
See arbitrated loop.

loop tenancy
The period of time between the following events: when a port wins loop arbitration and when the port returns to a monitoring state.

Loop_ID
A 7-bit value numbered contiguously from zero to 126-decimal and represent the 127 legal AL_PA values on a loop (not all of the 256 hex values are allowed as AL_PA values per FC-AL).

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; local connection.

mass storage control protocol
See MSCP

Mbps
Approximately one million (10^6) bits per second—that is, megabits per second.

MBps
Approximately one million (10^6) bytes per second—that is, megabytes per second.

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. Non transportable 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

MIST

Module Integrity Self-Test.

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.

multibus failover

Allows the host to control the failover process by moving the unit(s) from one controller to another.

N_Port

A port attached to a node for use with point-to-point topology or fabric topology.

network

A data communication, a configuration in which two or more terminals or devices are connected to enable information transfer.

NL_Port

A port attached to a node for use in all three topologies.

node

In data communications, the point at which one or more functional units connect transmission lines. In Fibre Channel, a device that has at least one N_Port or NL_Port.

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.

Non-L_Port

A node of fabric port that is not capable of performing the Arbitrated Loop functions and protocols. N_Ports and F_Ports are loop-capable ports.

non-participating mode

A mode within an L_Port that inhibits the port from participating in loop activities. L_Ports in this mode continue to retransmit received transmission words but are not permitted to arbitrate or originate frames. An L_Port in non-participating mode may or may not have an AL_PA. *See also* participating mode.

nonredundant controller configuration

(1) A single controller configuration. (2) A controller configuration that does not include a second controller.

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

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.

OCP

Operator control panel. The control and indicator panel associated with an array controller. The OCP is mounted on the controller and is accessible to the operator.

operator control panel

See OCP

other controller

The controller in a dual-redundant pair that is connected to the controller serving your current CLI session. *See also* "this controller."

outbound fiber

One fiber in a link that carries information away from a port.

parallel data transmission

A data communication technique in which more than one code element (for example, bit) of each byte is sent or received simultaneously.

parity

A method of checking if binary numbers or characters are correct by counting the ONE bits. In odd parity, the total number of ONE bits must be odd; in even parity, the total number of ONE bits must be even. Parity information can be used to correct corrupted data. RAIDsets use parity to improve the availability of data.

parity bit

A binary digit added to a group of bits that checks to see if errors exist in the transmission.

parity check

A method of detecting errors when data is sent over a communications line. With even parity, the number of ones in a set of binary data should be even. With odd parity, the number of ones should be odd.

parity RAID

See RAIDset

participating mode

A mode within an L_Port that allows the port to participate in loop activities. A port must have a valid AL_PA to be in participating mode.

partition

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

PCMCIA

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. The card, commonly known as a PCMCIA card or program card, is about the size of a credit card. *See also* program card.

peripheral device
Any unit, distinct from the CPU and physical memory, that can provide the system with input or accept any output from it. Terminals, printers, tape drives, and disks are peripheral devices.

pluggable
A replacement method that allows the complete system to remain online during device removal or insertion. The system bus must be halted, or quiesced, for a brief period of time during the replacement procedure. *See also* hot-pluggable.

point-to-point connection
A network configuration in which a connection is established between two, and only two, terminal installations. The connection might include switching facilities.

port
In general terms, the port is: (1) A logical channel in a communications system. (2) 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: (1) 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. (2) The hardware and software that connects a controller to a SCSI device.

port_name
A 64-bit unique identifier assigned to each Fibre Channel port. The Port_Name is communicated during the logon and port discovery process.

preferred address
The AL_PA which an NL_Port attempts to acquire first during initialization.

primary enclosure
The subsystem enclosure that contains the controllers, cache modules, external cache batteries, and the PVA module.

private NL_Port
An NL_Port which does not attempt login with the fabric and only communicates with NL_Ports on the same loop.

program card
The PCMCIA card containing the controller operating software. *See also* PCMCIA.

protocol
The conventions or rules for the format and timing of messages sent and received.

PTL
Port-Target-LUN. The controller method of locating a device on the controller device bus.

public NL_Port
An NL_Port that attempts login with the fabric and can observe the rules of either public or private loop behavior. A public NL_Port may communicate with both private and public NL_Ports.

PVA module
Power Verification and Addressing module.

RAID
Redundant array of independent disks. Represents multiple levels of storage access developed to improve performance or availability or both.

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 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 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 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 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

(1) The process of calculating missing data from redundant data. (2) 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.

remote copy

A feature intended for disaster tolerance and replication of data from one storage subsystem or physical site to another subsystem or site. Remote copy also provides methods of performing a backup at either the local or remote site. With remote copy, user applications continue to run while data movement goes on in the background. Data warehousing, continuous computing, and enterprise applications all require remote copy capabilities.

remote copy set

A bound set of two units, one located locally and one located remotely for long distance mirroring. The units can be a single disk, or a storageset, mirrorset, or RAIDset. A unit on the local controller is designated as the "initiator" and a corresponding unit on the remote controller is designated as the "target." *See also* association set.

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.

RFI

Radio Frequency Interference. The disturbance of a signal by an unwanted radio signal or frequency.

SCSI

Small Computer System Interface. (1) 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. (2) 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 bus signal converter

(1) A device used to interface between the subsystem and a peripheral device unable to be mounted directly into the SBB shelf of the subsystem. (2) A device used to connect a differential SCSI bus to a single-ended SCSI bus. (3) A device used to extend the length of a differential or single-ended SCSI bus.

Also called adapter. *See also* DWZZA, DWZZB, DWZZC, and I/O module.

SCSI device

(1) A host computer adapter, a peripheral controller, or an intelligent peripheral that can be attached to the SCSI bus. (2) Any physical unit that can communicate on a SCSI bus.

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.

SCSI ID number

The representation of the SCSI address that refers to one of the signal lines numbered 0 through 15.

SCSI port

(1) Software: The channel controlling communications to and from a specific SCSI bus in the system. (2) Hardware: The name of the logical socket at the back of the system unit to which a SCSI device is connected.

SCSI-A cable

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

SCSI-P cable

A 68-conductor (34 twisted-pair) cable generally used for differential bus connections.

selective storage presentation

Selective Storage presentation is a feature of the HSG80 controller that enables the user to control the allocation of storage space and shared access to storage across multiple hosts. This is also known as "Restricting Host Access."

serial transmission

A method transmission in which each bit of information is sent sequentially on a single channel rather than simultaneously as in parallel transmission.

service rate

The rate at which an entity is able to service requests. For example, the rate at which an Arbitrated Loop is able to service arbitrated requests.

signal converter

See SCSI bus signal converter

single ended I/O module

A 16-bit I/O module. *See also* I/O module.

single-ended
SCSI bus

An electrical connection where one wire carries the signal and another wire or shield is connected to electrical ground. Each signal logic level is determined by the voltage of a single wire in relation to ground. This is in contrast to a differential connection where the second wire carries an inverted signal.

spareset

A collection of disk drives used by the controller to replace failed members of a storageset.

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* node and CI bus.

storage array

An integrated set of storage devices.

storage array subsystem

See storage subsystem

storage subsystem

The controllers, storage devices, shelves, cables, and power supplies used to form a mass storage subsystem.

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

(1) A group of devices configured with RAID techniques to operate as a single container. (2) Any collection of containers, such as stripesets, mirrorsets, striped mirrorsets, and RAIDsets.

storageset expansion

The dynamic expansion of the storage capacity (size) of a unit. A storage container is created in the form of a concatenation set which is added to the existing storage set defined as a unit.

StorageWorks

A family of modular data storage products that allow customers to design and configure their own storage subsystems. Components include power, packaging, cabling, devices, controllers, and software. Customers can integrate devices and array controllers in StorageWorks enclosures to form storage subsystems. StorageWorks systems include integrated devices and array controllers to form storage subsystems.

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.

switch

A method that controls the flow of functions and operations in software.

synchronous
Pertaining to a method of data transmission which allows each event to operate in relation to a timing signal. *See also* asynchronous.

tape
A storage device supporting sequential access to variable sized data records.

target
(1) A SCSI device that performs an operation requested by an initiator. (2) Designates the target identification (ID) number of the device.

target ID number
The address a bus initiator uses to connect with a bus target. Each bus target is assigned a unique target address.

this controller
The controller that is serving your current CLI session through a local or remote terminal. *See also* "other controller."

TILX
Tape inline exerciser. The controller diagnostic software to test the data transfer capabilities of tape drives in a way that simulates a high level of user activity.

topology
An interconnection scheme that allows multiple Fibre Channel ports to communicate with each other. For example, point-to-point, Arbitrated Loop, and switched fabric are all Fibre Channel topologies.

transfer data rate
The speed at which data may be exchanged with the central processor, expressed in thousands of bytes per second.

transparent failover
Keeps the storage array available to the host(s) by allowing the surviving controller of a dual redundant pair to take over total control of the subsystem and is transparent (invisible) to the host(s).

ULP
Upper Layer Protocol.

ULP process
A function executing within a Fibre Channel node which conforms to the ULP requirements when interacting with other ULP processes.

Ultra SCSI bus
A Fast-20 SCSI bus. *See also* Wide Ultra SCSI.

uninterruptible power supply
See UPS

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. *See also* target; target ID number.

unwritten cached data
Sometimes called unflushed data. *See also* dirty data.

UPS
Uninterruptible 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. Uninterruptible power supplies are usually rated by the amount of voltage supplied and the length of time the voltage is supplied.

VHDCI
Very High-Density-Cable Interface. A 68-pin interface that is required for Ultra SCSI connections.

virtual terminal
A software path from an operator terminal on the host to the controller 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. *See also* maintenance terminal.

VTDPY
Virtual terminal display. A utility that allows viewing of specific informational displays using CLI commands.

wide Ultra SCSI
Fast-20 on a Wide SCSI bus.

worldwide name

A unique 64-bit number assigned to a subsystem by the Institute of Electrical and Electronics Engineers (IEEE) and set by DIGITAL manufacturing prior to shipping. *Also called* node ID within the CLI.

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.

write-through caching

A cache management method used to decrease the subsystem's response time to a read. This method allows the controller to satisfy the request from the cache memory rather than from the disk drives.

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