

**RA8000/ESA12000 and
MA8000/EMA12000
Solution Software V8.5b
for OpenVMS**

Installation Reference Guide

AA-RH4BC-TE
Third Edition (April 2000)
Compaq Computer Corporation

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RA8000/ESA12000 and MA8000/EMA12000 Solution Software V8.5b for OpenVMS
Installation Reference Guide
Third Edition April 2000
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About This Guide

This section contains a flowchart to guide you through the installation procedure. This section also describes the contents of this guide. In addition, it includes a list of associated documents, as well as Support and Services Contact Information.

Installation Roadmap

On page ix is a roadmap to follow while installing the storage subsystem.

Document Structure

This guide contains the following information:

Chapter 1: Preparing the Host System

Checking software revisions.

Installing host bus adapters.

Chapter 2: Setting Up the Controllers and Switches

Cabling

Chapter 3: Configuring the Controller for the OpenVMS O/S

Setting up the controller(s) for compatibility with OpenVMS computers.

Chapter 4: Installing StorageWorks Command Console Agent for HS* Controllers

Installing SWCC Agent on the OpenVMS computer.

Chapter 5: Configuring Storage for OpenVMS

Assigning an OpenVMS identifier for previously-creating virtual storage units.

Chapter 6: Verifying Storage Subsystem Configuration from the Host

How to verify the configuration from the host.

Intended Audience

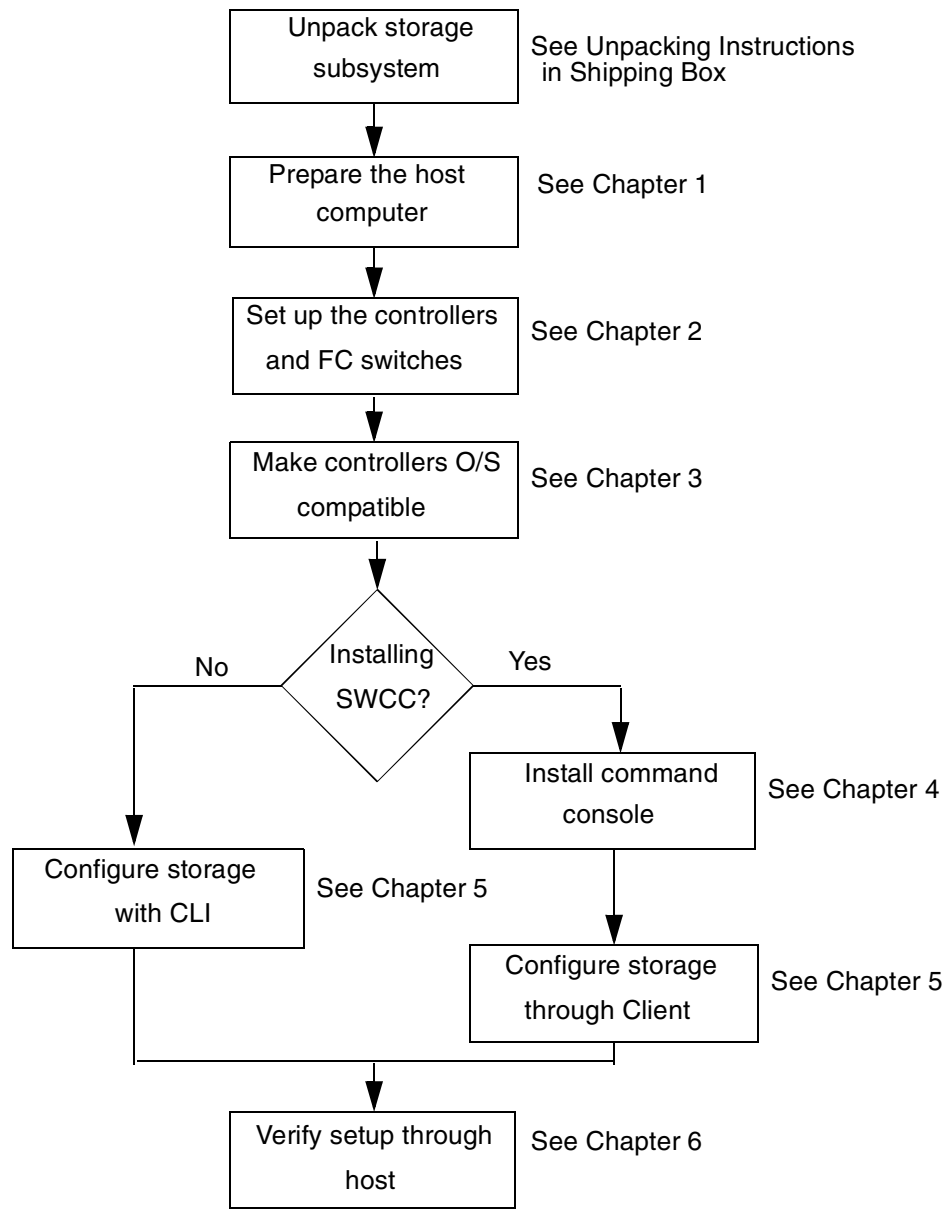
This guide is intended for administrators of StorageWorks RAID Array Subsystems. Installing the StorageWorks RAID Array Subsystem requires a general understanding of OpenVMS administration and installation procedures and RAID terminology.

Visit our Web Site for the Latest Information

Check out the web for the latest technical tips and documentation. We can be found in the technical area of our web page:

<http://www.compaq.com/products/storageworks>

Roadmap for Using this Manual to Install the Storage Subsystem



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Related Documents

In addition to this guide, the following documentation is useful to the reader:

Table 1 Related Documents	
Document Title	Order Number
<i>Compaq StorageWorks Command Console V2.3 User Guide</i>	AA-RFA2F-TE
<i>Compaq StorageWorks HSG80 Array Controller ACS V8.5 Configuration Guide</i>	EK-HSG85-CG
<i>Compaq StorageWorks HSG80 Array Controller ACS V8.5 CLI Reference Guide</i>	EK-HSG85-RG
<i>Compaq StorageWorks HSG80 Array Controller ACS V8.5 Maintenance and Service Guide</i>	EK-HSG84-SV

Support and Services

Who to contact in the Americas

Information and Product Questions:

Local Sales Office/StorageWorks Hotline
1-800-786-7967

Installation Support:

contact the Compaq Distributor where the Storage Solution was Purchased/Local Compaq Sales Office.

Compaq Multivendor Customer Service (MCS):

Installation:

Contact the Customer Support Center (CSC)
1-800-354-9000

Warranty:

Contact the Customer Support Center (CSC) for warranty service after solution is installed and operating.

Remedial:

Contact the Customer Support Center (CSC)
NOTE: In the event the equipment is out of warranty, contact the local Compaq Sales Office.

Who to contact in Europe

Information and Product Questions,
Installation Support, and Installation:

Contact the Compaq Distributor or reseller from whom the Storage Solution was purchased.

Warranty:

See the Warranty Card packaged with the product.

Remedial:

Contact the Compaq Distributor or reseller from whom the Storage Solution was purchased.
NOTE: A Service Contract is recommended when the equipment is out of warranty.

Who to contact in Asia Pacific

For all services, contact the Compaq Distributor or reseller from whom the equipment was purchased.

Revision Record

This Revision Record provides a concise publication history of this manual. It lists the manual revision levels, release dates, and summary of changes.

The following revision history lists all revisions of this publication and their effective dates. The publication part number is included in the Revision Level column, with the last entry denoting the latest revision.

<u>Revision Level</u>	<u>Date</u>	<u>Summary of Changes</u>
Revision A	April 1999	Original Release
Revision B	October 1999	
Revision C	April 2000	

Chapter 1

Preparing the Host System

This chapter describes how to prepare your OpenVMS host computer to accommodate the HSG80 controller storage subsystem.

There are two parts to preparing the host computer system for use with the storage subsystem:

1. Software: verifying/installing the correct version of software. Software considerations are covered in the section *Software: Verifying/Installing Required Versions*.
2. Hardware: installing a host bus adapter into the host. Hardware considerations are covered in the section *Hardware: Making A Physical Connection*.

Software: Verifying/Installing Required Versions

Compatibility with the HSG80 controller requires that the host run version 7.2 OpenVMS at minimum. You also need to install the following TIMA kit:

DEC-AXPVMS-VMS72_HARDWARE-V0100--4.PCSI

Multiple switch fabrics are supported by OpenVMS with the following TIMA kit:

DEC-AXPVMS-VMS721_FIBRECHAN-V0200--4.PCSI

AlphaServer ES40, DS20, DS20E, and DS10 require the above kit for Fibre Channel support on OpenVMS V7.2-1. In addition, Compaq recommends that all OpenVMS Fibre Channel configurations run OpenVMS V7.2-1 with this kit.

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To obtain the TIMA kits, go to the following website:
<http://ftp.support.compaq.com/public/vms/axp>

Installation directions are included in the kits.

Installation is verified as part of the installation procedure. You can also check the installation database on the host.

Alternately, the update will be available as “OpenVMS Alpha V7.2 HW01 Remedial Kit.” This kit will be available through DECdirect or the normal sales channels.

Hardware: Making a Physical Connection

In order to attach your host computer to the storage subsystem, you must install one or more host bus adapters into the computer. A Fibre Channel cable goes from the host bus adapter to a Fibre Channel (FC) switch.

Preparing to Install the Host Adapter

Perform the following steps:

1. Perform system backups of your operating system file systems.
2. Shutdown your computer system.

Installing the Host Adapter

The first step in physical connection is installation of a host bus adapter.

NOTE: Protect the host bus adapter board from electrostatic discharge by wearing an ESD wriststrap. DO NOT remove the board from the antistatic cover until you are ready to install it.

You need the following to begin:

- Host bus adapter board
- Your computer hardware manual
- Appropriate tools to service your computer

The host adapter board plugs into a standard PCI slot in the host computer. Refer to your system manual for instructions on installing PCI devices.

After installing the host bus adapter, go to Chapter 2 for cabling and powerup procedures.

NOTE: Don't power on anything yet. In order for the FC switches to autoconfigure, you must power on equipment in a certain sequence. Also, the controllers in the subsystem are not yet configured for compatibility with OpenVMS.

Initial Setup Settings

Your new storage system components must be initially configured using a serial cable connection to the HSG80 array controllers. You must have SCSI-3 mode and Multibus Failover mode, Fabric mode, Command Console Lun Identifier, and Unit Identifier (as units created). The controllers are preset as follows: SCSI-2 mode, CCL enabled, and Transparent Failover mode. The KGPSA PCI Fibre Channel adapter is preset to Arbitrated Loop mode ;the VMS user **MUST** have all settings listed prior to use.

Chapter 2

Setting Up the Controllers and Switches

This chapter contains procedures for cabling and powering on the switches and the RA8000/ESA12000 and MA8000/EMA12000 storage subsystem.

The host bus adapters (installed in Chapter 1) attach to the storage subsystem through Fibre Channel switches (also called “FC switches” or just “switches”). The switches constitute the fabric connection. This chapter illustrates how to attach the cables.

NOTE: Power to the host computer, switches, and storage subsystem should be OFF at the start of this procedure. Powering on equipment in order lets the switches automatically configure the fabric.

Cabling

The storage subsystem can contain either one or two controllers.

- Figure 2-1 shows cabling for systems with one controller and two FC switches.
- Figure 2-2 shows cabling for systems with two controllers and two FC switches.

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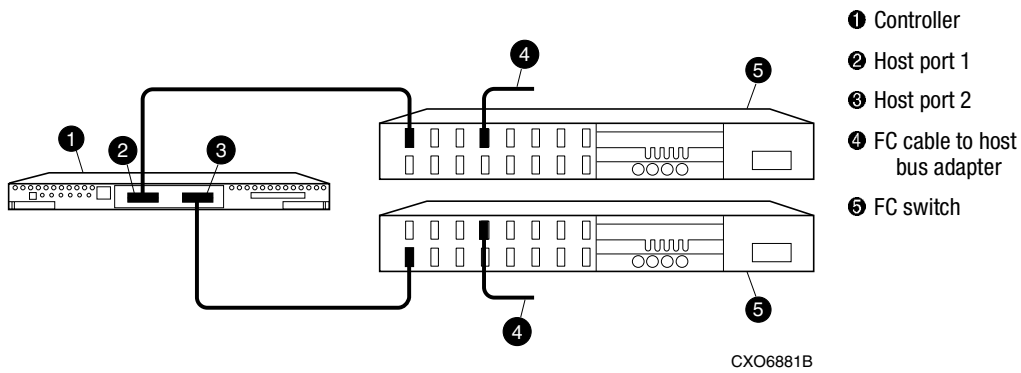


Figure 2-1. Cabling one controller and two switches

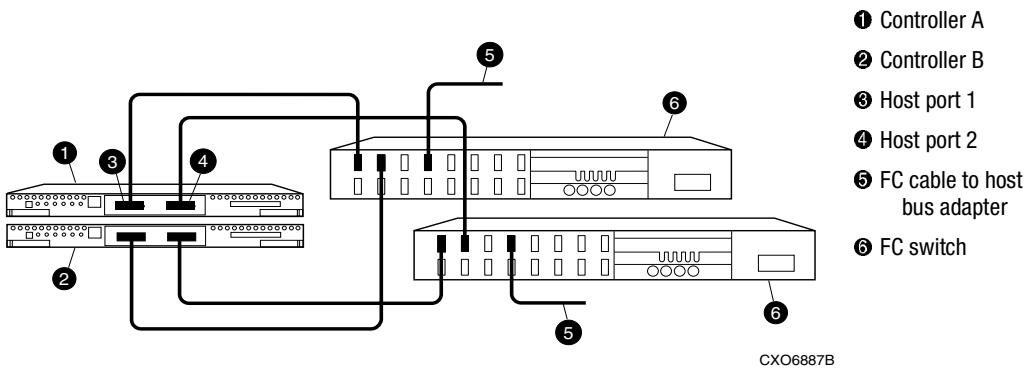


Figure 2-2. Cabling two controllers and two switches

Chapter 3

Configuring the Controller for the OpenVMS Operating System

This chapter describes how to initially configure the controllers for compatibility with the OpenVMS operating system.

Some preliminary configuration is necessary to setup your controllers to work with the OpenVMS operating system. This configuration procedure, explained in detail in this chapter, is done through the controllers' Command Line Interpreter (CLI).

Controller Terminology

The controllers in a dual-redundant pair are referred to as "controller A" and "controller B." CLI commands frequently refer to "this controller" and "other controller." The meaning of these designations is presented below.

Controller Designations “A” and “B”

Controllers and cache modules are designated either A or B depending on their location in the enclosure, as shown Figure 3-1 and Figure 3-2

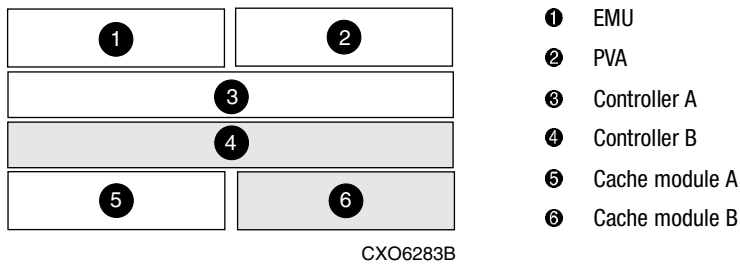


Figure 3-1. Location of controllers and cache modules in a BA370 Enclosure

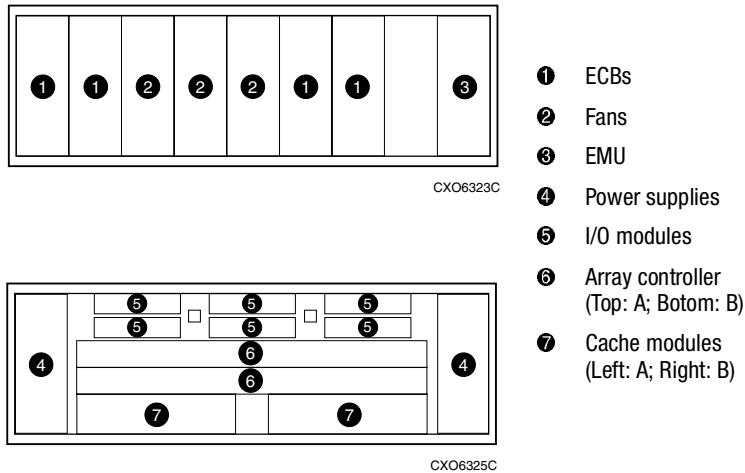


Figure 3-2. Location of controllers and cache modules in a Model 2200 controller enclosure

Controller Designations “This” and “Other”

Some CLI commands use the terms “this” and “other” to identify one controller or the other in a dual-redundant pair. These designations are a shortened form of the CLI parameters *this_controller* and *other_controller*. These parameters are defined as follows:

- *this_controller* —The controller which is the focus of the CLI session. That is, the controller through which the CLI commands are entered. *this_controller* is usually shortened to *this* in CLI commands.
- *other_controller* —The controller which is not the focus of the CLI session and through which CLI commands are not entered. *other_controller* is usually shortened to *other* in CLI commands.

NOTE: Note that these terms are relative. Neither term is tied to a physical controller.

Establishing a Local Connection to the Controller

A local connection is required to configure the controller until a command console LUN (CCL) is established using the CLI; after that, communication with the controller can be through either the CLI or through the SWCC graphic interface.

The maintenance port, as shown in Figure 3-3, provides a convenient way to connect a PC or terminal to the controller so that you can troubleshoot and configure it. This port accepts a standard RS-232 connector from any EIA-423 compatible terminal or a PC with a terminal emulation program. The maintenance port supports serial communications with default values of 9600 baud using 8 data bits, 1 stop bit, and no parity.

The maintenance port cable shown in Figure 3-3 has a 9-pin connector molded onto the end for a PC connection. If you need a terminal connection or a 25-pin connection, optional cabling is available and can be ordered.

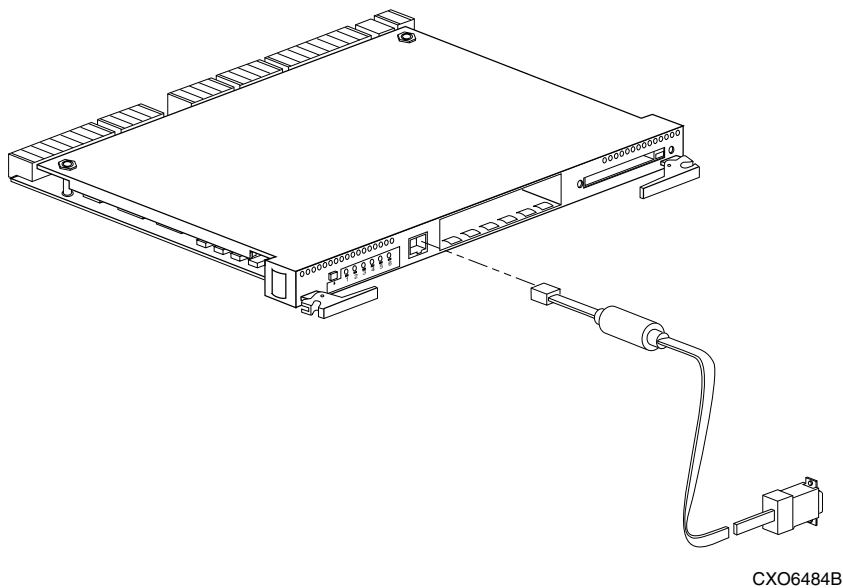


Figure 3-3. Terminal to maintenance port connection



CAUTION: The maintenance port described in this book generates, uses, and can radiate radio frequency energy through cables that are connected to it. This energy may interfere with radio and television reception. Disconnect all maintenance port cables when you will not be communication with the controller for a while.

Follow these steps to establish a local connection for setting the controller's initial configuration:

1. Connect the PC or terminal to the controller as shown in Figure 3-3.
2. Turn on the PC or terminal.
3. Configure the PC or terminal for 9600 baud, 8 data bits, 1 stop bit, and no parity. The default baud rate for the Array Controller is 9600, which makes communication between the two compatible.
4. Turn on the storage subsystem.

The powerup sequence takes approximately 45 seconds. At the end of the powerup sequence, the audible alarm on the EMU sounds and the EMU error LED is solidly lit. Turn off the alarm by pressing once and releasing the reset button on the EMU.

The alarm will go off, but the LED will remain on until the controllers are bound into failover mode. The CLI will display a copyright notice and a last gasp report from the OTHER controller.

5. Press the Enter or Return key. A copyright notice and the CLI prompt appear, indicating that you established a local connection with the controller.

Alternately, you can communicate to the CLI through a computer with a terminal emulator program. Simply cable the maintenance port of the controller to the COM1 or COM2 port of the computer.

Using the CLI to Configure One Controller

The local connection to the maintenance port of the controller enables direct access to the Command Line Interpreter (CLI), through which you can enter controller configuration commands.

Initially the host is not able to communicate to the controller because the controller does not have any logical units numbers (LUNs) configured. The controller is, in effect, “invisible” to the host. The local connection gives you access to the controller’s Command Line Interpreter (CLI), through which you make the controller accessible and able to communicate and operate with the OpenVMS host.

Use the following steps to configure your controller.

1. Enter the following command to stop the CLI from reporting a misconfiguration error resulting from having no failover mode specified:

```
CLEAR CLI
```

2. Enter a SHOW THIS command to verify the node ID, using the following command:

```
SHOW THIS
```

The node ID is located in the third line of the SHOW THIS result:

```
HSG1402> show this
Controller:
  HSG80 ZG80900583 Software V8.5F-0, Hardware E01
  NODE_ID           = 5000-1FE1-0001-3F00
  ALLOCATION_CLASS = 0
```

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3. If the node ID is present, go to step 5.
If the node ID is all zeroes, enter the node ID and checksum, which are located on a sticker on the BA370 enclosure (RA8000/ESA12000), as shown in Figure 3-4 or on the array controller in a Model 2200 controller enclosure (MA8000/EMA12000). Use the following syntax to enter the node ID:

set this node_id=NNNN-NNNN-NNNN-NNNN nn

NNNN-NNNN-NNNN-NNNN is the node ID and nn is the checksum.

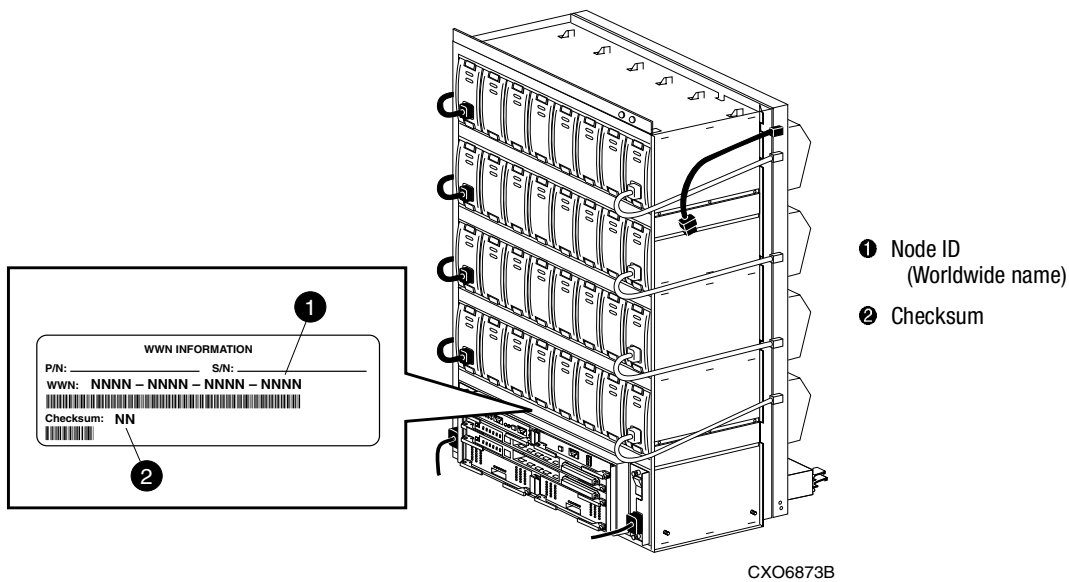


Figure 3-4. Location of the node ID (world wide name) sticker on a BA370 enclosure

4. Set up a fabric topology using the following commands:

```
SET THIS PORT_1_TOPOLOGY=FABRIC
```

```
SET THIS PORT_2_TOPOLOGY=FABRIC
```

5. Allocation class must be set to a decimal number between 0 and 999. Set allocation class using the following syntax:

```
SET THIS ALLOCATION_CLASS=N
```

6. Set the version to SCSI-3 using the following command:

```
SET THIS SCSI_VERSION=SCSI-3
```

NOTE: Setting the SCSI version to SCSI-3 does not make the controller fully compliant with the SCSI-3 standards.

7. Assign an identifier for the communication LUN (also called the command console LUN, or CCL). The CCL must have a unique identifier that is a decimal number in the range 1 to 32767, and which is different from the identifiers of all units. Use the following syntax:

```
SET THIS IDENTIFIER=N
```

NOTE: Identifier must be unique among all the controllers attached to the fabric within the specified allocation class.

8. Restart the controller, using the following command:

```
RESTART THIS
```

It takes about a minute for the CLI prompt to come back after a RESTART command.

9. Set the time on the controller with the following syntax:

```
SET THIS TIME=dd-mmm-yyyy:hh:mm:ss
```

10. Use the FRUTIL utility to set up the battery discharge timer in the controller. Use the following command to start FRUTIL:

```
RUN FRUTIL
```

NOTE: The RESTART commands start memory tests, which take a few minutes to run. If the diagnostics are still running, FRUTIL will not start and a message will inform you that memory tests are running. FRUTIL will start after the tests complete.

When FRUTIL asks if you intend to replace the battery, answer “y”:

```
Do you intend to replace this controller's cache battery? Y/N [N] Y
```

FRUTIL will print out a procedure, but won't give you a prompt. Ignore the procedure and just press return.

11. Verify that all commands have taken effect. Use the following command:

SHOW THIS

Verify node ID, allocation class, SCSI version, failover mode, identifier, and port topology. Following is a sample result of a SHOW THIS command, with arrows emphasizing the areas of interest.

```
HSG> show this
Controller:
  HSG80 ZG80900583 Software V8.5F-0, Hardware E01
  NODE_ID           = 5000-1FE1-0001-3F00 ←
  ALLOCATION_CLASS   = 0 ←
  SCSI_VERSION      = SCSI-3 ←
  Not configured for dual-redundancy
  Device Port SCSI address 7
  Time: NOT SET
  Command Console LUN is lun 0 (NOIDENTIFIER) ←
Host PORT_1:
  Reported PORT_ID = 5000-1FE1-0001-3F01
  PORT_1_TOPOLOGY = FABRIC (fabric up) ←
  Address          = 200213
Host PORT_2:
  Reported PORT_ID = 5000-1FE1-0001-3F02
  PORT_2_TOPOLOGY = FABRIC (fabric up) ←
  Address          = 200413
  NOREMOTE_COPY
Cache:
  512 megabyte write cache, version 0012
  Cache is GOOD
  No unflushed data in cache
  CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
Mirrored Cache:
  Not enabled
Battery:
  NOUPS
  FULLY CHARGED
  Expires:          WARNING: UNKNOWN EXPIRATION DATE!
  WARNING: AN UNKNOWN NUMBER OF DEEP DISCHARGES HAVE OCCURRED!
```

Using the CLI to Configure Two Controllers

The local connection to the maintenance port of the controller enables direct access to the Command Line Interpreter (CLI), through which you can enter controller configuration commands.

Initially the host is not able to communicate to the controllers because the controllers do not have any logical units numbers (LUNs) configured. The controllers are, in effect, “invisible” to the host. The local connection gives you access to the controllers’ Command Line Interpreter (CLI), through which you make the controllers accessible and able to communicate and operate with the OpenVMS host.

Use the following steps to configure your controllers.

1. Enter the following command to stop the CLI from reporting a misconfiguration error resulting from having no failover mode specified:

```
CLEAR CLI
```

2. Enter a SHOW THIS command to verify the node ID, using the following command:

```
SHOW THIS
```

The node ID is located in the third line of the SHOW THIS result:

```
HSG1402> show this
Controller:
  HSG80   (C) DEC ZG09030200 Software V85F, Hardware 0000
  NODE_ID           = 5000-1FE1-000-1480
  ALLOCATION_CLASS = 1
```

3. If the node ID is present, go to step 5.
If the node ID is all zeroes, enter the node ID and checksum, which are located on a sticker on the BA370 enclosure (RA8000/ESA12000), as shown in Figure 3-4 or on the array controller in a Model 2200 controller enclosure (MA8000/EMA12000). Use the following syntax to enter the node ID:

```
set this node_id=NNNN-NNNN-NNNN-NNNN nn
```

NNNN-NNNN-NNNN-NNNN is the node ID and nn is the checksum.

4. Put the controller pair into multiple-bus failover mode, using the following command:

```
SET MULTIBUS COPY=THIS
```

The copy qualifier specifies where the good copy of the array configuration is. Initially, the copy qualifier is meaningless because there is no array configuration yet, but it is part of the command syntax and must be specified.

NOTE: If you want to keep configuration information, which will probably be the case if the controllers are not factory-new, set COPY to the controller that contains the good configuration information.

When the command is entered, the OTHER controller (the one to which the serial line is not attached) will restart. The restart may set off the audible alarm of the EMU. To silence the alarm, press once and release the amber button on the EMU. The alarm will go off, but the LED will remain on until the controllers bind into failover mode. The binding process takes about 15 seconds. The CLI will print out a last gasp report from the OTHER controller. This just indicates that the OTHER controller restarted. The CLI will continue reporting this condition until cleared with the following command:

CLEAR CLI

5. Set up a fabric topology using the following commands:

```
SET THIS PORT_1_TOPOLOGY=FABRIC
```

```
SET THIS PORT_2_TOPOLOGY=FABRIC
```

```
SET OTHER PORT_1_TOPOLOGY=FABRIC
```

```
SET OTHER PORT_2_TOPOLOGY=FABRIC
```

6. Allocation class must be set to a decimal number between 0 and 999. Set allocation class using the following syntax:

```
SET THIS ALLOCATION_CLASS=N
```

7. Set the version to SCSI-3 using the following command:

```
SET THIS SCSI_VERSION=SCSI-3
```

NOTE: Setting the SCSI version to SCSI-3 does not make the controller fully compliant with the SCSI-3 standards.

8. Assign an identifier for the communication LUN (also called the command console LUN, or CCL). The CCL must have a unique identifier that is a decimal number in the range 1 to 32767, and which is different from the identifiers of all units. Use the following syntax:

```
SET THIS IDENTIFIER=N
```

NOTE: Identifier must be unique among all the controllers attached to the fabric within the specified allocation class.

9. Restart both controllers, using the following commands:

```
RESTART OTHER
```

```
RESTART THIS
```

When the OTHER controller restarts, the EMU audible alarm will sound, but the restart of THIS controller will turn it off.

It takes about a minute for the CLI prompt to come back after a RESTART command.

10. Set the time on THIS controller with the following syntax:

```
SET THIS TIME=dd-mmm-yyyy:hh:mm:ss
```

11. Use the FRUTIL utility to set up the battery discharge timer in THIS controller. Use the following command to start FRUTIL:

```
RUN FRUTIL
```

NOTE: The RESTART commands start memory tests, which take a few minutes to run. If the diagnostics are still running, FRUTIL will not start and a message will inform you that memory tests are running. FRUTIL will start after the tests complete.

When FRUTIL asks if you intend to replace the battery, answer “y”:

```
Do you intend to replace this controller's cache battery? Y/N [N] y
```

FRUTIL will print out a procedure, but won't give you a prompt. Ignore the procedure and just press return.

12. Move the serial cable to the lower controller and repeat step 9.

13. Verify that all commands have taken effect. Use the following commands:

```
SHOW THIS
```

```
SHOW OTHER
```

Verify node ID, allocation class, SCSI version, failover mode, identifier, and port topology. Following is a sample result of a SHOW THIS command, with arrows emphasizing the areas of interest.

14. Optional: Set up mirrored cache for the controller pair using the following command:

```
SET THIS_CONTROLLER MIRRORED_CACHE
```

This command causes a restart, so the EMU audible alarm may sound.

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```
HSG1402> show this
Controller:
  HSG80 (C) DEC ZG09030200 Software V85F, Hardware 0000
  NODE_ID = 5000-1FE1-0000-0000 ←
  ALLOCATION_CLASS = 1 ←
  SCSI_VERSION = SCSI-3 ←
  Configured for MULTIBUS_FAILOVER with ZG80200284 ←
  In dual-redundant configuration
  Device Port SCSI address 6
  Time: 10-Mar-1999:12:30:34
  Command Console LUN is lun 0 (IDENTIFIER = 88) ←
Host PORT_1:
  Reported PORT_ID = 5000-1FE1-0000-0001
  PORT_1_PROFILE = PLDA
  PORT_1_TOPOLOGY = FABRIC (fabric up) ←
  Address = 210313
Host PORT_2:
  Reported PORT_ID = 5000-1FE1-0000-0002
  PORT_2_PROFILE = PLDA
  PORT_2_TOPOLOGY = FABRIC (fabric up) ←
  Address = 210513
  NOREMOTE_COPY
Cache:
  64 megabyte write cache, version 0012
  Cache is GOOD
  No unflushed data in cache
  CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
Mirrored Cache:
  64 megabyte write cache, version 0012
  Cache is GOOD
  No unflushed data in cache
Battery:
  FULLY CHARGED
  Expires: 13-SEP-2000
  NOCACHE_UPS
```

The next step is to power up the CPU and switch, then there is one more configuration step to do with the CLI.

Powering Up and Finishing Installation

Perform the following:

1. Turn on power to the FC switches.
2. Turn on power to the host computer.
3. Boot the host computer(s).
4. When the host(s) have rebooted, return to the CLI terminal. Enter the following command:

```
SHOW CONNECTIONS
```

This command shows a table of host connections, as shown below. Each host bus adapter connected to a switch is a connection. In this example, the host connections show the default operating system of WINNT for Windows NT.

Host Name	Operating system	Controller	Port	Address	Status	Offset
!NEWCON00 HOST_ID=1000-0000-C920-273E	WINNT	THIS	2	000000 PORT_ID=1000-0000-C920-273E	OFFLINE	0
!NEWCON01 HOST_ID=1000-0000-C920-273E	WINNT	THIS	1	000000 PORT_ID=1000-0000-C920-273E	OFFLINE	0
!NEWCON02 HOST_ID=1000-0000-C920-0591	WINNT	THIS	2	000000 PORT_ID=1000-0000-C920-0591	OFFLINE	0

5. Specify the operating system for each connection to your OpenVMS host(s). For example, for connection!NEWCON00, use the following command:

```
SET !NEWCON00 OPERATING_SYSTEM=VMS
```

6. Verify operating system with the following command:

```
SHOW CONNECTIONS
```

This concludes the controller configuration, but many optional CLI commands can make working with your system easier (such as changing the host connection names). See the *Compaq StorageWorks HSG80 Array Controller ACS V8.5 CLI Reference Guide*.

Installation Verification

To verify installation, give your OpenVMS host the following command:

```
SHOW DEVICES
```

Your host computer should report that it sees a device whose designation matches the identifier (CLL) that you assigned the controller(s). For example, if you assigned an identifier of **88**, your host computer will see device **\$1\$GGA88**.

This verifies that your host computer is communicating with the controller or controller pair.

This concludes the basic installation and configuration. The next step is configuring storage units. If you are going to install SWCC, go to Chapter 4 for installation instructions, then to Chapter 5 for information on configuring storage units. If you are not going to install SWCC, Chapter 5 presents information on configuring storage units through the CLI.

Chapter 4

Installing StorageWorks Command Console Agent for HS* Controllers

This Chapter describes how to install and configure a copy of StorageWorks Command Console (SWCC) Agent for HS* Controllers on your host computer(s).

Introduction

StorageWorks Command Console (SWCC) Agent for HS* Controllers (hereafter called “Agent”) is an application that helps with configuring, operating, and monitoring your storage subsystems. Agent runs on your OpenVMS host computer as a server application. Agent’s partner is SWCC Client, which runs on Windows 2000 or Windows NT computers. Client is a Graphical User Interface (GUI) that interacts with Agent to present a user-friendly way to configure your storage subsystems.

In summary:

1. **Agent** runs on the OpenVMS host computer.
2. **Client** (the GUI) runs on a Windows 2000 or Windows NT computer.

Client and Agent communicate by TCP/IP network protocol, as shown in Figure 4-1.

Agent can also be used as a standalone application without Client. In this mode of operation, referred to as Agent Only, Agent monitors the status of the subsystem and provides local and remote notification in the event of a failure. Local notification is by e-mail. Remote notification can be made via e-mail and/or SNMP messages to an SNMP Monitor.

This manual deals with Agent only. Details on installing Client and running SWCC are in *Compaq StorageWorks Command Console V2.3 User Guide*, which also contains the SNMP MIB specifications.

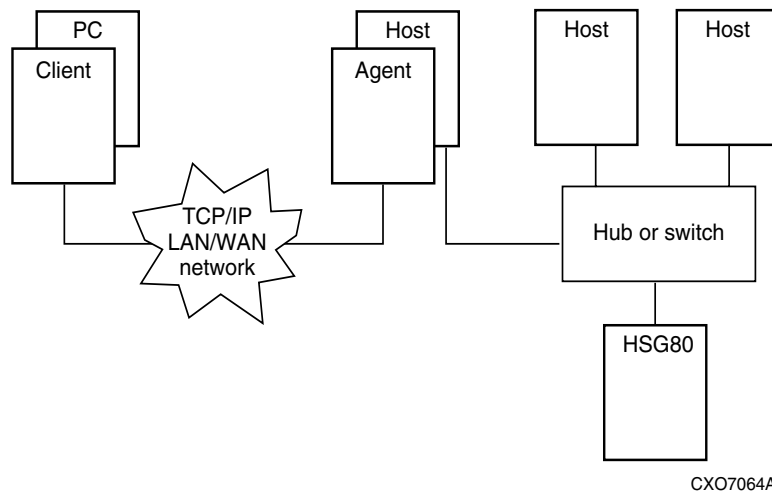


Figure 4-1. Client/Agent connection

Agent runs on the host storage subsystem sending notification messages to Client sessions connected to it whenever a fault occurs. You can configure Agent to use TCP notification to Client and SNMP notification to an SNMP-compatible monitoring application.

Minimum Requirements

Before you can install Agent:

- One of the following is required:
 - TCP/IP Services for OpenVMS (V5.0 or later) with FTP and Telnet utilities enabled
 - TCPWARE (V5.2 or later)
 - Multinet TCP/IP for OpenVMS (V4.0 or later)
- Your OpenVMS host's resources must meet the minimum requirements specified in Table 4-1.
- The configuration procedures in Chapter 3 must be complete.

- Client, if used, must be Version 2.1 at minimum.

Table 4-1 Minimum OpenVMS Host Requirements

Host Feature	Requirements
Architecture	AlphaServer with 1000 blocks free space on system disk
Operating System	OpenVMS Version 7.2 with all patches installed

Options for Running Agent

Agent runs as an OpenVMS process called “SWCC_AGENT.” You can use the Agent configuration program to control the execution of this process. The program offers the following options for running the Agent:

- You can choose to immediately start or stop your Agent.
- You can choose to start your Agent automatically each time the host is booted (This is the only mode available for TCPWare and Multinet).
- You can choose to start your Agent as an auxiliary service of TCP/IP Services for OpenVMS. This option is the default, and it starts Agent on demand on any Client access.

Installing and Configuring Agent

Agent needs to be installed on every host that needs to support Client connections.

These steps tell you how to install the Agent from the SWCC CD-ROM.(For the following examples, you can replace DKB600 with the CD device suitable for your system).

1. Insert the SWCC CD-ROM into the system that is connected to the controller. To mount the CD-ROM, type the following at the command prompt (substituting the name of your CD-ROM device) and then press RETURN:

```
$ MOUNT/OVER=ID/MEDIA=CD DKB600:
```
2. To create a local directory on your system, type the following at the command prompt and then press RETURN. You will copy the installation file from the CD-ROM to this directory. Replace DKB100 with the name of a hard drive on the system that is connected to the controller:

```
$CREATE/DIRECTORY DKB100:[SWCC]
```

A directory named DKB100:[SWCC] has been created.

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To set the default working directory to [SWCC], type the following at the command prompt and then press RETURN (Replace DKB100 with the name of your hard drive):

```
$SET DEFAULT DKB100:[SWCC]
```

3. Copy the self-extracting file from the CD-ROM to the default directory. Type the following command and then press RETURN (Replace DKB600 with the name of your CD-ROM drive):

```
$ COPY DKB600:[SWCC.AGENTS.VMS]SWCC23_A.EXE *.*
```

4. To expand the self-extracting file, type the following and then press RETURN:

```
$ RUN SWCC23_A.EXE
```

5. At the next \$ prompt, type:

```
PRODUCT INSTALL SWCC/SOURCE=[ ]
```

6. The system responds with a message that SWCC is the product selected to install and asks if you want to continue. Answer **YES** or press **Enter**.

An installation verification message appears. The last line of this message is:

```
To configure SWCC Agent for HS* Controllers:@sys$manager:swcc_config
```

After the installation, execute the command procedure to start the Agent configuration:

```
@SYS$MANAGER:SWCC_CONFIG.COM.
```

NOTE: If you have an OpenVMS cluster running the MultiNet stack, the command procedure SWCC_CONFIG.COM will only upgrade the services of each system disk's first node. To upgrade the services database of the other nodes that share the system disk, type **@MULTINET:INSTALL_DATABASES** or reboot the system.

Configuration Considerations

Agent must be configured as part of initial installation. Table 4-2 explains the required configuration information.

Table 4-2 Information Needed to Configure Agent

Host name of client system	Network names for the computers on which Client (the GUI) runs
Access Level	How much information and control is available through the Client system. Configuration capability requires entry of an access password.

Table 4-2 Information Needed to Configure Agent (Continued)

Password	Entered from the Client system to gain configuration access. 4 to 16 characters
Notification schemes	The notification options are as follows: 0=No notification over network, but local notification through e-mail and an entry in the system error log file. 1=Notification sent to Client, local notification sent through e-mail and an entry in the system error log file. 2=Notification sent to the SNMP monitor, local notification sent through e-mail, and an entry in the system error log file. 3=Notification sent to Client and the SNMP monitor, local notification sent through e-mail, and an entry in the system error log file.
Subsystem name	Each controller in a single controller storage subsystem and each controller pair in a dual controller subsystem need a unique name.
Device name	Device name associated with subsystem name
Monitoring interval in seconds	How often the subsystem is monitored
E-mail destination for notification	Modify file pagemail.com in directory sys\$manager . System is the default.

Sample Agent configuration

The Agent configuration program prompts for the information listed in Table 4-2. Following is a sample configuration dialog, with the user's response **bolded**.

```
@sys$manager:swcc_config
SWCC-I-TCPIP, using TCP/IP Services for OpenVMS stack.
%UAF-I-MDFYMSG, user record(s) updated

StorageWorks Command Console Agent Configuration Procedure
This procedure helps you define the parameters required to
run the StorageWorks Command Console VMS agent on this system.
The Agent cannot be run until the following questions are answered.
. . . . . Entering Client Data...
The client computer(s) you name will be allowed the access you specify.
Any blank entry will exit client addition and return to main menu.

NOTE: Input is case sensitive! Match client's case in TCP/IP Services for
OpenVMS host database.

Enter the host name of the Client system: george
Each client requires an access level which controls the capabilities a
client has when communicating with the Agent server.
The possible options are:
    0 = No Access
    1 = Show Level Access Only
    2 = Storage Subsystem Configuration Capability
Enter Access Level (0, 1, 2): 2
The Agent server can notify a client when an error condition is detected.
Notification schemes available are:
    0 = No Error Notification
    1 = Notification via a TCP/IP Socket
    2 = Notification via the SNMP protocol
    3 = Notification via both TCP/IP and SNMP
Enter Error Notification Level (0, 1, 2, 3): 0
Adding client: reserve, access level: 2, error notification: 0
Creating file SWCCGUI:CLIENT.INI.
Enter the host name of the Client system: <Enter>
```

Installing StorageWorks Command Console Agent for HS Controllers 4-7*

```
* Done adding client data? [NO]? y
. . . . . Entering Storage Subsystem Data...
Any blank entry will exit storage addition and return to main menu

NOTE: Input will be converted to lower case!

Enter a name for a subsystem: hsg80
Enter the device name used to access this subsystem: $1$GGA88:
SWCC-I-HSZ, dkd2: assumed to be HSZ controller.
Enter monitoring interval in seconds (0 => no monitoring): 300
Adding subsystem:
, access device: dkd2:, monitoring interval: 300
Creating file SWCCGUI:STORAGE.RAW.
Enter a name for a subsystem: <Enter>
* Done adding storage data? [NO]? y
. . . . . Entering SWCC Agent for HS* Controllers Password
Enter the client access password:
. . . . .Enabling services
Now enabling on this cluster...

The SWCC Agent for HS* Controllers can be enabled either as a TCP/IP
Services for OpenVMS auxiliary service or as a detached process.
Enabling is necessary on each cluster node you desire the agent to run
on. Select only nodes that are attached to the storage subsystems you
have selected to be to be monitored.

* Enable agent as a service of TCP/IP Services for OpenVMS? [YES]? n
* Enable SWCC agent as a detached process? [YES]? <Enter>
SWCC Agent for HS* Controllers will be started as a detached process on
future boots. If you wish it to be started now, answer yes to next
question.

* Immediate start of agent? [NO]? y
Starting SWCC Agent for HS* Controllers on node XANDER
Starting the SWCC Agent for HS* Controllers...
%RUN-S-PROC_ID, identification of created process is 20E00F6D
SWCC Agent for HS* Controllers startup complete.
```

Updating Agent

To update to a new version of Agent, stop all previously installed versions of SWCC, then install the new version. Older versions will be automatically removed before the update, but all configuration information will be preserved.

Uninstalling CC Agent

NOTE: Don't uninstall Agent if you want to preserve configuration information. If you only want to install an upgrade, see section Updating Agent, above.

You can remove an Agent using the Agent configuration program. To remove an Agent, enter:

```
@SYS$MANAGER:SWCC_CONFIG
```

at the \$ prompt and choose the menu option "uninstall."

NOTE: Note that this option stops all instances of the Agent on all cluster nodes. This option also deletes all Agent files, except the .PCSI file that was transferred to your host over the network when the Agent was originally installed.

Chapter 5

Configuring Storage for OpenVMS

This chapter describes, and gives examples for, the one unique step that OpenVMS requires for storage unit configuration.

One unique step is required when configuring storage units for OpenVMS: specifying an identifier (or LUN ID alias) for each unit. OpenVMS uses identifier (LUN ID alias) to assign the unit a device name.

NOTE: A unique identifier is required for each unit (virtual disk). This identifier must be unique in the cluster.

This chapter covers only assigning identifier, or LUN ID alias. This chapter does not cover the lengthy topics of planning and configuring storage through the Command Line Interpreter (CLI), which is covered in the *Compaq StorageWorks HSG80 Array Controller ACS Version 8.5 Configuration Guide*. The topic of configuring storage units through the SWCC Client Graphical User Interface is covered in the *Compaq StorageWorks Command Console V2.3 User Guide*. SWCC also has comprehensive online help.

This chapter gives two examples of setting an identifier for a previously created unit: one using CLI and one using SWCC. The CLI uses older and less industry standard terms “identifier” and “unit”, while SWCC uses newer terms “LUN ID alias” and “virtual disk”.

Identifier = LUN ID alias

Unit = virtual disk

Using CLI to Specify Identifier for a Unit

You can access the controller's CLI through the terminal interface you established in Chapter 3. Alternately, you can access the CLI through the CLI window of SWCC.

To open the CLI window in SWCC, go to a computer running SWCC Client connected to the Agent on your OpenVMS computer and proceed as follows:

1. In the Navigation Window, double-click on a system folder.
2. Double-click the CLI Window icon to open a CLI Window.
3. Enter your password if required.
4. Enter CLI commands into the command line area directly underneath the CLI Window Menu Bar.

Whether you are using CLI through the terminal or through the SWCC window, the CLI commands you enter are the same.

The command syntax for setting the identifier for a previously created unit (virtual disk) is as follows:

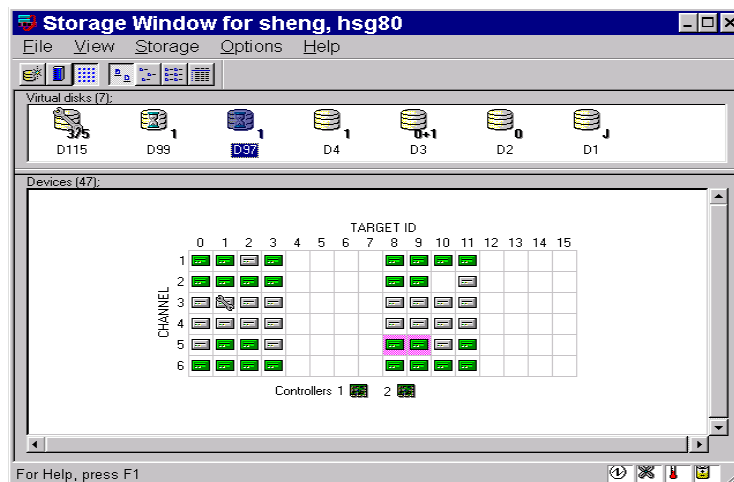
```
SET UNIT_NUMBER IDENTIFIER=NN
```

It is strongly suggested that, for simplicity, the identifier match the unit number. For example, to set an identifier of 97 for unit D97, use the following command:

```
SET D97 IDENTIFIER=97
```

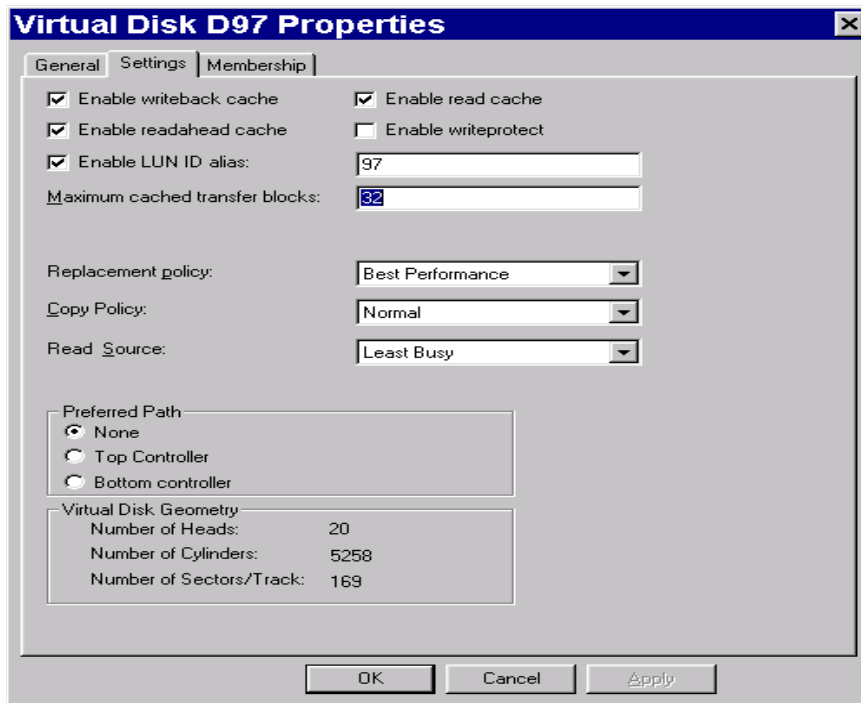
USING SWCC TO SPECIFY LUN ID ALIAS FOR A VIRTUAL DISK

Setting a LUN ID alias for a virtual disk means the same thing as setting an identifier for a unit. In order to set LUN ID alias for a previously created virtual disk, navigate to the storage window (shown below) and double-click on the icon of the virtual disk in the top pane.



This brings up the properties window for that virtual disk. Click on the Settings Tab to see settable properties. Click on the “Enable LUN ID Alias” button, and enter the LUN ID alias (identifier) in the following field. It is strongly suggested that, for simplicity, the LUN ID alias match the virtual disk number. Shown below is an example of setting LUN ID alias 97 for virtual disk D97.

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Chapter 6

Verifying Storage Subsystem Configuration from the Host

Description

This chapter briefly describes how to verify that multiple paths exist to virtual disk units.

After you configure a virtual disk through either the CLI or SWCC, verify that the disk is correctly presented to the OpenVMS host computer.

The command to use consists of the following syntax:

```
SHOW DEVICE/FULL <NAME OF VIRTUAL DISK>
```

For example, disk \$1\$DGA1 was configured with two paths, one path through host bus adapter PGA0 and one through host bus adapter PGB0.

Procedure

Use the following command to verify the configuration:

```
SHOW DEVICE/FULL $1$DGA1
```

The disk information returned is as follows:

```
Disk $1$DGA1: (NOCORD), device type DEC HSG80, is online, file-oriented
device, shareable, device has multiple I/O paths, served to cluster via
MSCP Server, error logging is enabled.
```

```
Error count 0      Operations completed 0
```

```
Owner process ""   Owner UIC      [SYSTEM]
```

```
Owner process ID  00000000   Dev Prot S:RWPL,O:RWPL,G:R,W
```

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```
Reference count 0    Default buffer size 512
Allocation class  1
I/O paths to device  2
Path PGA0.5000-1FE1-0000-0173 (NOCORD), primary path, current path.
Error count 0    Operations completed 0
Path PGB0.5000-1FE1-0000-0171 (NOCORD).
Error count 0    Operations completed 0
```

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