



# Sun StorEdge™ 3000 Family Installation, Operation, and Service Manual

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Sun StorEdge 3310 SCSI Array

Sun Microsystems, Inc.  
www.sun.com

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# Preface

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This manual gives step-by-step procedures for installing and initially configuring the Sun StorEdge™ 3310 SCSI array.



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**Caution** – You should read the *Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual* before beginning any procedure in this manual.

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## How This Book Is Organized

This book covers the following topics:

[Chapter 1](#) provides an overview of RAID features.

[Chapter 2](#) covers the site planning and basic safety requirements.

[Chapter 3](#) provides general procedures for unpacking and inspecting the array.

[Chapter 4](#) provides procedures for cabling and for connecting to power and to the network.

[Chapter 5](#) provides procedures for a first-time configuration.

[Chapter 6](#) describes the front and rear panel LEDs.

[Chapter 7](#) describes maintenance procedures.

[Chapter 8](#) describes troubleshooting procedures.

[Appendix A](#) provides Sun StorEdge 3310 array specifications.

[Appendix B](#) shows how to cable JBODs to one or more host servers.

[Appendix C](#) provides information about failed component alarm codes.

[Appendix D](#) provides tables for recording configuration data.

[Appendix E](#) provides pinout identification for each connector.

[Appendix F](#) provides information on configuring Sun servers running the Solaris™ operating environment.

[Appendix G](#) provides information on configuring Windows 2000 servers.

[Appendix H](#) provides information on configuring Linux servers.

[Appendix I](#) provides information on configuring IBM AIX servers.

[Appendix J](#) provides information on configuring HP-UX servers.

[Appendix K](#) provides information on configuring Windows NT servers.

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## Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris operating environment.
- Other software documentation that you received with your system

<http://docs.sun.com>

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# Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

---

# Typographic Conventions

Typeface <sup>1</sup>	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>% You have mail.</code>
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output	<code>% <b>su</b></code> <code>password:</code>
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

<sup>1</sup> The settings on your browser might differ from these settings.

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## Related Documentation

Title	Part Number
<i>Sun StorEdge 3310 SCSI Array Release Notes</i>	816-7292
<i>Sun StorEdge 3000 Family Best Practices Manual</i>	816-7293
<i>Sun StorEdge 3000 Family RAID Firmware 3.25 and 3.27 User's Guide</i>	817-3711
<i>Sun StorEdge 3000 Family 1.5 Software Installation Manual</i>	817-3764
<i>Sun StorEdge 3000 Family Configuration Service 1.5 User's Guide</i>	817-3337
<i>Sun StorEdge 3000 Family Diagnostic Reporter 1.5 User's Guide</i>	817-3338
<i>Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays</i>	817-3629
<i>Sun StorEdge 3000 Family FRU Installation Guide</i>	816-7326
<i>Sun StorEdge 3000 Family CLI 1.5 User's Guide</i>	817-4951
<i>Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual</i>	816-7930

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## Accessing Sun Documentation

For late-breaking news and troubleshooting tips, review the *Sun StorEdge 3310 SCSI Array Release Notes* located at:

[http://www.sun.com/products-n-solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/3310](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310)

<http://docs.sun.com/db/coll/3310SCSIarray>

You can view, print, or purchase a broad selection of Sun documentation at:

<http://www.sun.com/documentation>

You can order printed copies of manuals for the Sun StorEdge 3310 SCSI array at:

<http://corppub.iuniverse.com/marketplace/sun>

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# Contacting Sun Technical Support

For late-breaking news and troubleshooting tips, review the *Sun StorEdge 3310 SCSI Array Release Notes* located at:

[http://www.sun.com/products-n-solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/3310](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310)

If you have technical questions about this product that are not answered in the documentation, go to:

<http://www.sun.com/service/contacting>

To initiate or check on a USA-only service request, contact Sun support at:

800-USA-4SUN

To obtain international technical support, contact the sales office of each country at:

<http://www.sun.com/service/contacting/sales.html>

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## 508 Accessibility Features

The Sun StorEdge documentation is available in 508-compliant HTML files that can be used with assistive technology programs for visually impaired personnel. These files are provided on the Documentation CD for your product as well as on the websites identified in the previous “Accessing Sun Documentation” section. Additionally, the software and firmware applications provide keyboard navigation and shortcuts, which are documented in the user's guides.

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# Sun Welcomes Your Comments

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<http://www.sun.com/hwdocs/feedback>

Please include the title and part number of your document with your feedback: *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*, part number 816-7290-15



# Array Overview

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This chapter provides a brief overview of your Sun StorEdge 3310 SCSI array which is an LVD/SE device. Topics covered in this chapter are:

- [“Introducing the Array Models” on page 1-1](#)
- [“Task Map” on page 1-3](#)
- [“Additional Software Tools” on page 1-3](#)

---

## 1.1 Introducing the Array Models

The Sun StorEdge 3310 SCSI array models include:

- A redundant array of independent disks (RAID) with a single controller
- A RAID with two controllers
- An expansion unit or JBOD (an array with disks and no controller)

Providing up to 432 GB RAID based on 36 GB drives in an amazingly small footprint (3.5-inch tall by 19 inches wide) storage unit, the Sun StorEdge 3310 SCSI RAID array is a high-performance, storage device that contains one or two internal RAID controllers and up to twelve disk drives with SCSI connectivity to the data host.



**FIGURE 1-1** Front View of a Sun StorEdge 3310 SCSI Array (RAID, Expansion Unit, or JBOD)

Highly scalable, the RAID-equipped array supports up to two expansion chassis (expansion unit arrays that have a set of drives and no controller) for a total of 36 drives. The RAID array and expansion units connect to the storage devices and consoles via standard serial port, Ethernet, and SCSI connections.

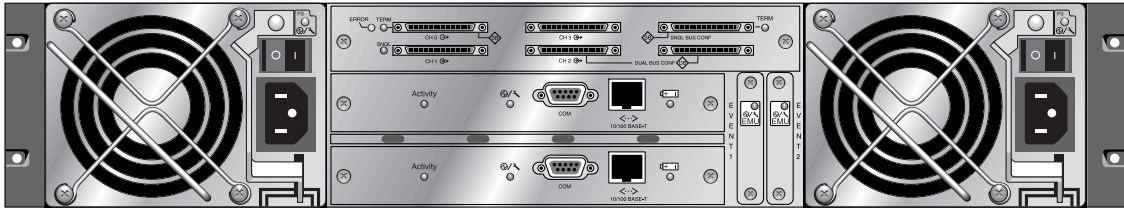


FIGURE 1-2 Rear View of a RAID Array

Also available is a JBOD array (Just a Bunch of Disks), which is similar to an expansion unit except that it is connected directly to a host server rather than to a RAID array.

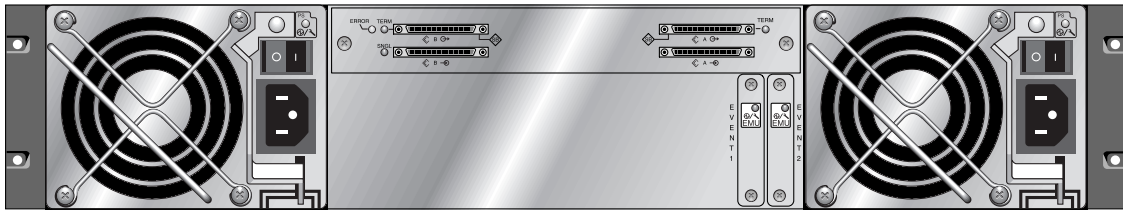


FIGURE 1-3 Rear View of an Expansion Unit or JBOD

Extensive reliability, availability, and serviceability (RAS) features include redundant components, notification of failed components, and the ability to replace components while the unit is online.

The RAID array can be used either as a standalone storage unit or as a building block, interconnected with expansion arrays of the same type. The array can be placed on a tabletop or rackmounted in a server cabinet or expansion cabinet.

For information about specifications and agency approvals, refer to [Appendix A, "SCSI Array Specifications"](#) on page A-1.

---

## 1.2 Task Map

The following task map outlines the key steps for installing, configuring, and managing the array.

1

### Read Release Notes

Before beginning the installation, review the release notes for late-breaking news and updates, located at:

[http://www.sun.com/products-n-solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/3310](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310)

2

### Prepare Site and Plan Configuration

Prior to installation, you must review important safety guidelines in the *Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual*.

To prepare the site and plan the array configuration, refer to:

- *Sun StorEdge 3000 Family Array Installation, Operation, and Service Manual*
- *Sun StorEdge 3000 Family Best Practices Manual*

3

### Prepare Host System

Install up to two HBA adapters in the host system(s). Refer to the documentation that came with your host adapter and system for instructions.

4

### Install Hardware

Install the Sun StorEdge 3310 SCSI Array on a desktop or in a rack. Refer to this manual for instructions, and to the *Sun StorEdge 3000 Family Rack Installation Manual for 2U Arrays* (816-7320).

For additional firmware instructions, refer to *Sun StorEdge 3000 Family RAID Firmware User's Guide* (816-7296).

5

### Install Software

Optionally install any or all of the software applications from the Professional Storage Manager CD, and use the following guides.

- *Sun StorEdge 3000 Family Configuration Service User Guide*
- *Sun StorEdge 3000 Family Diagnostic Reporter User Guide*

---

## 1.3 Additional Software Tools

The following additional software tools are available on the Sun StorEdge Professional Storage Manager CD-ROM, provided with your array:

- Sun StorEdge Configuration Service, a management and monitoring program
- Sun StorEdge Diagnostic Reporter software, a monitoring utility
- Sun StorEdge CLI, a command line utility to manage the array.

The Sun StorEdge 3310 SCSI Array Documentation CD-ROM provides the related user guides with detailed installation and configuration procedures for these tools.

For other supported software tools, refer to the release notes for your array, located at:

[http://www.sun.com/products-n-solutions/hardware/docs/  
Network\\_Storage\\_Solutions/Workgroup/3310](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310)

## Site Planning

---

This chapter outlines the site-planning requirements and basic safety requirements for the installation and use of Sun StorEdge 3310 SCSI arrays. Customers are asked to complete a [“Preinstallation Worksheet” on page 2-7](#) and to prepare the site for installation according to the worksheet details and the specified site planning requirements.

Review the details of this chapter before installing a Sun StorEdge 3310 SCSI array. Topics covered in this chapter are:

- [“Customer Obligations” on page 2-2](#)
- [“Safety Precautions” on page 2-2](#)
- [“Environmental Requirements” on page 2-3](#)
- [“Electrical and Power Specifications” on page 2-4](#)
- [“Physical Specifications” on page 2-5](#)
- [“Layout Map” on page 2-5](#)
- [“Console and Other Requirements” on page 2-7](#)
- [“Preinstallation Worksheet” on page 2-7](#)

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**Note** – Refer to the *Sun StorEdge 3310 SCSI Array Release Notes* for the current lists of supported operating environments, host platforms, software, and qualified cabinets.

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## 2.1 Customer Obligations

The customer is obliged to inform Sun Microsystems, Inc. of any and all ordinances and regulations that would affect installation.



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**Caution** – When selecting an installation site for the Sun StorEdge 3310 SCSI array, choose a location that avoids excessive heat, direct sunlight, dust, or chemical exposure. Such exposure greatly reduces the product's longevity and might void your warranty.

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The customer is responsible for meeting all government codes and regulations concerning facilities. The customer is also responsible for compliance with the following requirements:

- Meet all local, national, and international codes covered in this specification. The subjects covered include fire and safety, building, and electrical codes.
- Document and inform Sun Microsystems, Inc. of any deviations from this specification.

---

## 2.2 Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all safety precautions and requirements specified in the *Sun StorEdge 3310 SCSI Array Safety, Regulatory, and Compliance Manual*.
- A fully loaded array weighs over 50 pounds. Use two people to lift the array to avoid injury.
- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

- To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Sun products are designed to work with single-phase power systems having a grounded neutral conductor. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.
- Your Sun product is shipped with a grounding-type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.
- Do not use household extension cords with your Sun product. Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems.
- Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.

---

## 2.3 Environmental Requirements

**TABLE 2-1** Environmental Specifications

	Operating	Non-Operating
<b>Altitude</b>	To 3000 meters (9000 feet)	To 12,000 meters (36,000 feet)
<b>Temperature (rack-mounted)</b>	5 degrees C to 35 degrees C	-40 degrees C to +65 degrees C
<b>Temperature (desktop)</b>	5 degrees C to 40 degrees C	-40 degrees C to +65 degrees C
<b>Humidity Range</b>	10% to 90% RH at 27 degrees C max wet bulb (noncondensing)	0 to 93% @ 38degrees C (noncondensing)

### 2.3.1 Electromagnetic Compatibility (EMC)

The following is required for all installations:

- All AC mains and supply conductors to power distribution boxes for both the rackmounted array and the desktop array must be enclosed in a metal conduit or raceway when specified by local, national, or other applicable government codes and regulations.
- The supply conductors and power distribution boxes (or equivalent metal enclosure) must be grounded at both ends.

- The supplied arrays require voltages within minimum fluctuation.
- The facilities voltage supplied by the customer must maintain a voltage of not more than (+/-) 5 percent. The customer facilities must provide suitable surge protection.

---

## 2.4 Electrical and Power Specifications

All Sun StorEdge 3310 SCSI arrays require two independent power sources. Each array has two power-supply-and-fan modules for redundancy.

Each Sun StorEdge 3310 AC array requires two 115 VAC/15A or two 240 VAC service outlets. All AC power supplies are autoranging and are automatically configured to a range of 90-264 VAC and 47-63 Hz. There is no need to make special adjustments.

Each DC array requires two -48 VDC service outlets, and has a input voltage range of -36 VDC to -72 VDC.

---

**Note** – To ensure power redundancy, connect the two Sun StorEdge 3310 SCSI power modules to two separate circuits (for example, one commercial circuit and one UPS).

---

**TABLE 2-2** Power Specifications

---

AC power:	Voltage and frequency 90 to 264 VAC, 47 to 63 Hz
Input current:	5A max
Power-supply output voltages:	+5 VDC and +12 VDC
DC power:	-48 VDC (-36 VDC to -72 VDC)

---



---

## 2.5 Physical Specifications

Use the following physical specifications to plan the location of your array.

**TABLE 2-3** Physical Specifications

Category	Description
Dimensions	2U (3.5-in.) height 20-in.chassis depth 17.5-in.(19 in.with ears) width
Installation clearances	For FRU removal and replacement, 15-in.(37 cm) is required front and back.
Cooling clearances	6-in. (15 cm) is required front and back. No cooling clearance is required on the sides or the top and bottom of the array.

---

## 2.6 Layout Map

It is helpful to create a sketch or layout map to indicate the exact location for the Sun StorEdge 3310 SCSI array installation as well as the location of the hosts, console, and Ethernet connections that will be connected to it.

As you lay out the components, consider the cable lengths that will be used.

### 2.6.1 Rack Placement

Follow these guidelines when preparing a rackmount placement for your system.

- Ensure that the floor surface is level.
- Leave enough space in front of the rack to access components for servicing.
- Leave enough space in back of the rack to access components for servicing.
- Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels or raceways.

- Route interface cables (excluding fiber-optic cables) away from motors and other sources of magnetic or radio frequency interference.
- Stay within the cable length limitations.
- Provide two separate power sources for the array. These power sources must be independent of each other, and each must be controlled by a separate circuit breaker at the power distribution point.

## 2.6.2 Tabletop Placement

Sun StorEdge 3310 SCSI arrays can be positioned on a desk or a table. Follow these guidelines when preparing a tabletop placement for your system.

- Choose a desk or a table that can support 50 pounds for one fully-configured array or 100 pounds for two arrays.
- Do not place the array(s) on the edge of the table. Set the array so that at least 50 percent of the array is inside the table or desk leg support area. Failure to do this may cause the table to tip over.
- Leave enough space in front and in back of the array to access components for servicing. To remove the components requires a clearance of 15 inches (37 cm) in front and in back of the array.
- Provide a minimum space of 6 inches (15 cm) in front and in back of the array for adequate airflow.
- Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels or raceways.
- Route interface cables away from motors and other sources of magnetic or radio frequency interference.
- Stay within the cable length limitations.
- Ensure that the operating system for the array does not exceed the specifications.
- Use two people to lift the array to avoid injury. The array can weigh up to 50 pounds.
- Do not place the array in a vertical position. Place the array horizontally.
- If you are installing multiple arrays you can stack up to five arrays on top of each other. Do not stack more than five arrays in one stack.
- Provide two separate power sources for the array. These power sources must be independent of each other, and each must be controlled by a separate circuit breaker at the power distribution point.

---

## 2.7 Console and Other Requirements

A console (with one serial port or one Ethernet connection) is necessary for installation and configuration of your Sun StorEdge 3310 SCSI array.

Refer to the following Preinstallation Worksheet for additional preparation details.

---

## 2.8 Preinstallation Worksheet

When ordering a Sun StorEdge 3310 SCSI array, complete the following Preinstallation Worksheet and then prepare the site for installation according to the site-planning requirements.

You are responsible for ensuring that the site consistently conforms to all stipulated standards, and that necessary peripherals are made available to the engineer during installation.

Review the details of your specific survey before installing your Sun StorEdge 3310 SCSI array.

If necessary, attach or sketch a network diagram to the survey.

**TABLE 2-4** Preinstallation Worksheet

---

Rackmounting	<p>Customers must ensure that the appropriate service outlets are available for installation. Requirements vary.</p> <p>Will the Sun StorEdge 3310 SCSI array be rackmounted? Yes / No</p> <ul style="list-style-type: none"><li>• Is the rack supplied by Sun? Yes / No</li><li>• If yes, include Sun model number: _____</li><li>• If not, make/model: _____ / _____</li></ul> <p>Does the rack mount:</p> <ul style="list-style-type: none"><li>• Front and back? If so, depth? _____</li><li>• Center/Telco? _____</li></ul> <p>What cable lengths are required? _____</p> <p><b>** Diagram preferred **</b></p> <p>Are there any power strips or power sequencers in the rack? Yes / No</p> <p>Are they supplied by Sun? Yes / No If yes, part number: _____</p> <p>If not, quantity of plugs/outlets required: _____ / _____</p>
IP address	<p>Array IP address: _____.</p> <p>Array network mask: _____.</p>
Cabling	<p>SCSI cable lengths to connect to hosts: _____</p>

---

**TABLE 2-5** Host Connectivity Summarized

**Host Connectivity - Host #1**

---

Host Name: \_\_\_\_\_

Host Make/Model: \_\_\_\_\_

HBA connector types: \_\_\_\_\_

Cable distance from the array to the host(s): \_\_\_\_\_

Operating system: \_\_\_\_\_

Patches installed: \_\_\_\_\_

IP addresses:

- Network \_\_\_\_\_
  - Host \_\_\_\_\_
- 

**Host Connectivity - Host #2**

---

Host Name: \_\_\_\_\_

Host Make/Model: \_\_\_\_\_

HBA connector types: \_\_\_\_\_

Cable distance from the array to the host(s): \_\_\_\_\_

Operating system: \_\_\_\_\_

Patches installed: \_\_\_\_\_

IP addresses:

- Network \_\_\_\_\_
  - Host \_\_\_\_\_
-



## Inspecting the Array Package

---

This chapter gives the general procedure for inspection and reviews the Sun StorEdge 3310 SCSI array package. Topics covered in this chapter are as follows:

- “Unpacking the Array” on page 3-1
- “Checking the Package Contents” on page 3-2
- “Field-Replaceable Units” on page 3-3
- “Customer-Provided Cables” on page 3-4
- “Mounting Your Array in a Rack or Cabinet” on page 3-4
- “Converting a JBOD to a RAID Array” on page 3-4

---

### 3.1 Unpacking the Array

Follow these guidelines for unpacking the equipment.



---

**Caution** – Always use two people to remove the unit from its container, to avoid personal injury or damage to the equipment during installation. A fully loaded unit weighs approximately 60 pounds.

---

1. Select a suitable area for unpacking.
2. Store all packing material and boxes for possible equipment returns.
3. Check the Contents Sheet in your product package. See “[Checking the Package Contents](#)” on page 3-2.

The Contents Sheet summarizes the standard contents for your product.

**4. Compare the packing slip and the list of parts with the items you received.**

If the list of parts on your packing slip does not match the items you received, or any items appear damaged, immediately notify your carrier agent and the supplier who prepared your shipment.

**5. Carefully examine the cables provided in the package.**

If any cable appears to be damaged, contact the Technical Service department for an immediate replacement.

**6. Check the list of “Customer-Provided Cables” on page 3-4.**

These are required to complete your installation.



---

**Caution** – You must purchase or provide 160M-compliant SCSI cables for connecting the Sun StorEdge 3310 SCSI array to host servers.

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## 3.2 Checking the Package Contents

It is important to inspect your Sun StorEdge 3310 SCSI array packages for standard items as well as purchased options before you begin installation. If any parts are missing or damaged, contact your sales representative immediately.

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Quantity	Item
1	One or more of the following Sun StorEdge 3310 SCSI arrays: <ul style="list-style-type: none"><li>• Sun StorEdge 3310 SCSI array with single controller</li><li>• Sun StorEdge 3310 SCSI array with dual controllers</li><li>• Sun StorEdge 3310 Expansion Unit or JBOD (a group of disks, no controller)</li></ul>
1	<ul style="list-style-type: none"><li>• <i>Sun StorEdge 3310 SCSI Array Contents Sheet</i></li><li>• To download and print the latest Sun StorEdge 3310 SCSI array release notes, go to: <a href="http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310">http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310</a></li></ul>
2	CDs in a CD set; one CD for software and one CD for user documentation
1	SCSI jumper cable, 1-foot (30cm), VHDCI-VHDCI (for bus setting)
1	SCSI jumper cable, 1.5-foot (45cm), VHDCI-VHDCI (if you ordered a JBOD or expansion unit)
1	Serial null modem cable
1 or 2	25-foot (7.5m), CAT5 Ethernet cable per controller in each array
1	Cable adapter, DB9-to-DB25

---



Quantity	Item
2	DC power cables if you ordered a DC-powered array
2	AC power cables if you ordered an AC-powered array (shipped separately as part of the country kit).
2	AC cord locks in a plastic bag if you ordered an AC-powered array
2	Front-bezel keys in a plastic bag, to secure the front bezel onto the chassis
Various	Purchased options. These options are ordered at the time of purchase and are integrated into or added to the unit prior to delivery.

## 3.3 Field-Replaceable Units

Check that you received all field-replaceable units (FRUs) ordered with your Sun StorEdge 3310 SCSI array. For additional FRUs, consult your sales representative. For instructions on how to install or replace FRUS, review the following manuals located on the product website:

- *Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays*
- *Sun StorEdge 3000 Family FRU Installation Guide*

FRU Model Number	Description
F370-5394-01	Event monitoring unit
F370-5396-01	I/O module, LVD, expansion unit or JBOD
F370-5397-01	I/O module, LVD, RAID
F370-5403-01	Controller module, 512 memory, battery, 2U LVD
F370-5399-01	Terminator module
F370-5422-01	Drive module, 36GB LVD, 10K RPM
F370-5398-01AC	AC power and fan module, 2U
F370-5527-01DC	DC power and fan module, 2U
F370-5533-01	Battery, LVD
F370-5405-01	Cable, LVD, 1-foot, jumper
F370-5528-01	Cable, LVD, 1.5-foot, expansion
F370-5393-01	Box, 2U, JBOD, LVD
F370-5524-01	Box, 2U, RAID, LVD
XTA-3310-DC-KIT	Power and fan module, 2U, DC

XTA-3310-RK-19M	Rackmount kit, 2U, 19-in. wide, 18- to 28-in. deep
XTA-3310-RK-19L	Rackmount kit, 2U, 19-in. wide, 28- to 36-in. deep
XTA-3310-RK-19C	Rackmount kit, Telco center mount, 2U, 19-in wide
XTA-3310-RK-19F	Rackmount kit, Telco flush mount, 2U, 19-in wide

---

## 3.4 Customer-Provided Cables

Customers must provide the following cables.

- One Ultra 160 SCSI cable per host to connect a host to a RAID array, expansion unit or JBOD; up to two host cables may be needed per array.

To obtain qualified cables, consult your Sun sales representative.

## 3.5 Mounting Your Array in a Rack or Cabinet

Refer to *Sun StorEdge 3000 Family Rack Installation Guide* for instructions on how to install and prepare a rack or cabinet for mounting your array.

## 3.6 Converting a JBOD to a RAID Array

If you want to convert a JBOD to a RAID array, refer to the *Sun StorEdge 3000 Family FRU Installation Guide*.

## Connecting Ports

---

This chapter provides procedures for cabling the Sun StorEdge 3310 SCSI array for single or dual-bus configurations and for connecting the array to power and to network devices.

The topics covered in this chapter are as follows:

- [“Converting Your Front Bezel Locks So the Keys Cannot Be Removed”](#) on page 4-2
- [“Hardware Connections”](#) on page 4-4
- [“Connecting the Chassis to an AC Power Outlet”](#) on page 4-5
- [“Connecting the Chassis to DC Power Outlets”](#) on page 4-7
- [“Single and Dual Drive-Bus Configurations”](#) on page 4-9
- [“Connecting Cables for a Single-Bus Configuration”](#) on page 4-12
- [“Connecting Cables for a Dual-Bus Configuration”](#) on page 4-16
- [“Connecting SCSI Ports to Host\(s\)”](#) on page 4-19
- [“Cabling Configurations with Two Expansion Units”](#) on page 4-20
- [“Configuring a COM Port to Connect to a RAID Array”](#) on page 4-23
- [“Setting an IP Address”](#) on page 4-24
- [“Setting Up Out-of-Band Management Over Ethernet”](#) on page 4-25

Before you connect the Sun StorEdge 3310 SCSI array to the network, position the Sun StorEdge 3310 SCSI array in the rack or in the location where it will remain.



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**Caution** – When positioning the array, do not block the air vents at the front or back of the unit. Follow all safety precautions specified in the *Sun StorEdge 3310 Safety, Regulatory, and Compliance Manual*.

---



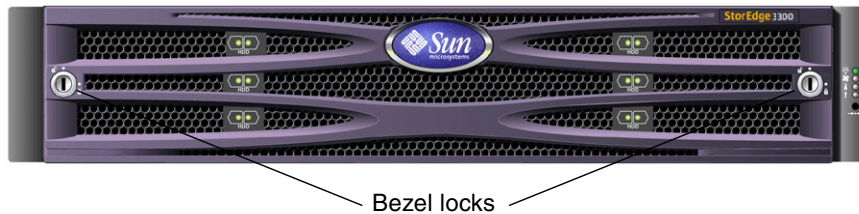
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**Caution** – When you power off the array, wait five seconds before you power it back on. If you power the array off and on too quickly, a race condition might occur.

---

## 4.1 Converting Your Front Bezel Locks So the Keys Cannot Be Removed

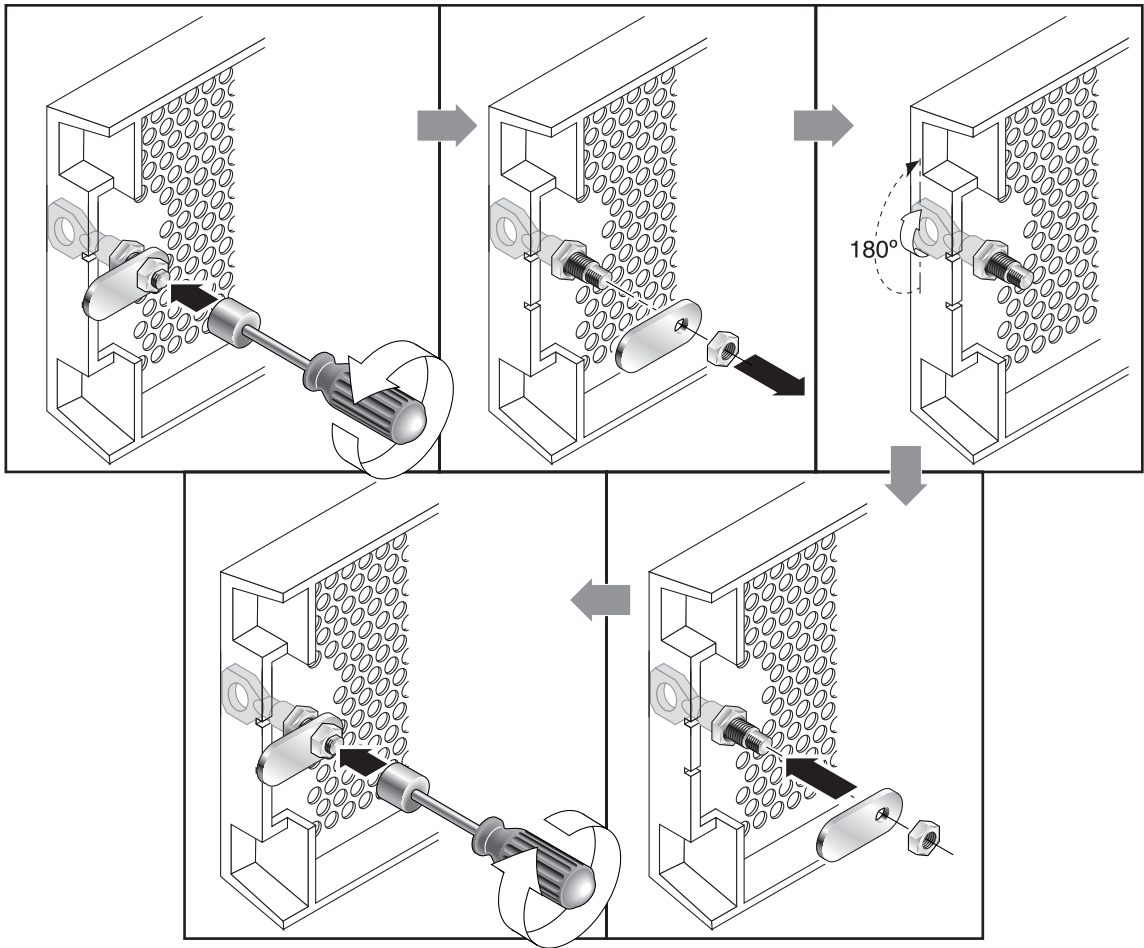
The bezel on your array has two locks whose keys can be removed when the locks are in either the locked or open position. It is possible to reconfigure the locks so that the keys cannot be removed.



**FIGURE 4-1** Front Bezel and Front Bezel Locks of an Array

To change the locks so the keys cannot be removed, follow these steps:

1. **Remove the bezel by gently pivoting the swing arms out of their ear sockets.**
2. **Make sure the key is in the locked position, with the pawl extending horizontally past the edge of the bezel.**



**FIGURE 4-2** Sequence of Steps to Change Front Bezel Locks So Keys Cannot Be Removed

3. Hold the key in place and use a 12-mm or 3/8-inch nut driver to remove the locking nut that holds the pawl in place, as shown in the first panel of [FIGURE 4-2](#).



**Caution** – Be sure to hold the key in place. Otherwise there is a risk of breaking the small tab on the lock that serves as a stop.

4. Lift the pawl off the threaded part of the lock body, as shown in the second panel of [FIGURE 4-2](#).
5. Set the pawl aside, face up, so that you can remember its orientation when you replace it.

6. Use the key to turn the lock 180 degrees, as shown in the third panel of [FIGURE 4-2](#)
7. Replace the pawl in the same orientation as before, as shown in the fourth panel of [FIGURE 4-2](#).
8. Hold the key in place and use the nut driver to refasten the locking nut that holds the pawl in place, as shown in the fifth panel of [FIGURE 4-2](#). Be careful not to cross-thread the nut.



---

**Caution** – Be sure to hold the key in place. Otherwise there is a risk of breaking the small tab on the lock that serves as a stop.

---

9. Replace the bezel.

---

**Note** – To convert your bezel locks back so that the keys can be removed, repeat this procedure.

---

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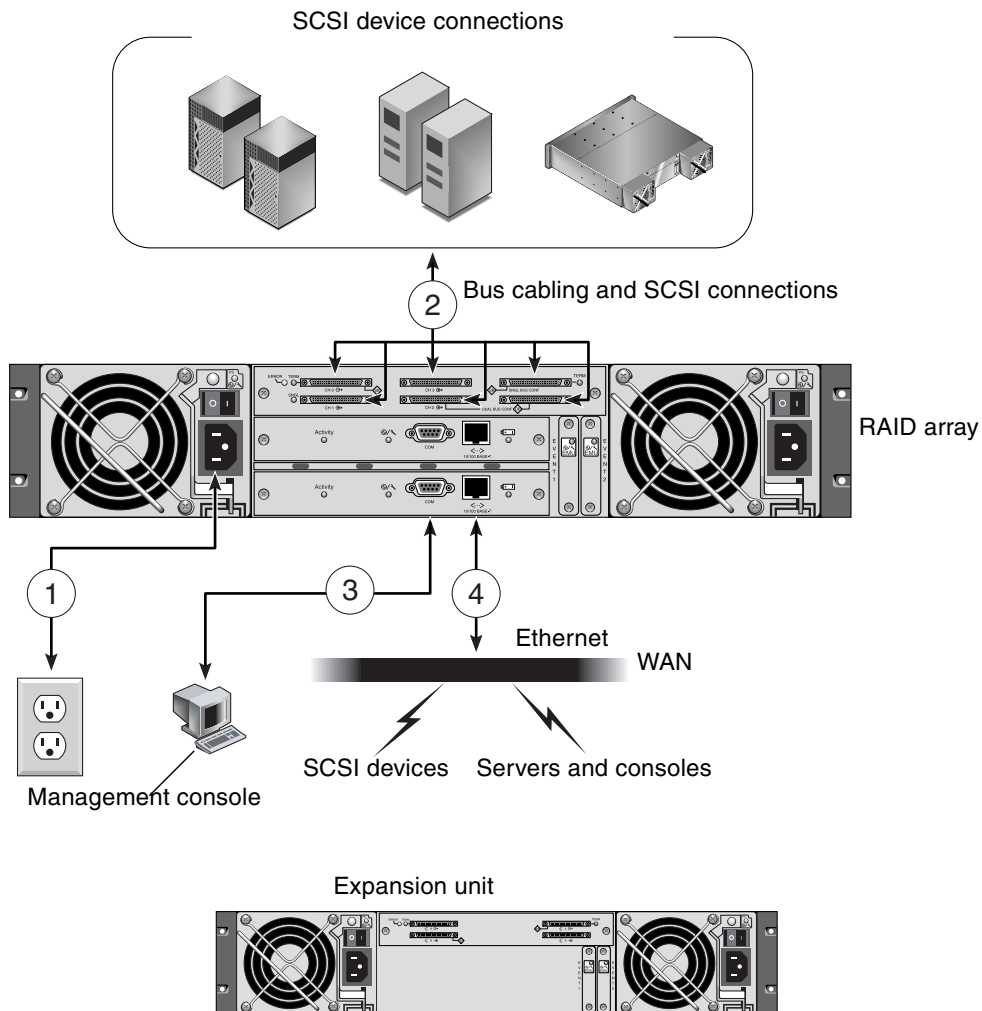
## 4.2 Rack-Mounting the Array

To rackmount the array in a rack or a cabinet, refer to the installation manual which is provided with the rack or refer to the *Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays* on the product website.

---

## 4.3 Hardware Connections

[FIGURE 4-3](#) identifies a typical series of hardware connections used when you install an array. These procedures are designed for a redundant configuration.



**FIGURE 4-3** Typical Sequence of Installation Steps

## 4.4 Connecting the Chassis to an AC Power Outlet

When you connect the AC power cords, you should install the provided two cord locks at the same time. The provided AC cord locks are used to securely fasten the AC cable connectors.



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**Caution** – For AC power: If the array is connected to AC power sources not within the designated 90–135, 180–265 VAC PFC range, damage might occur to the unit.

---

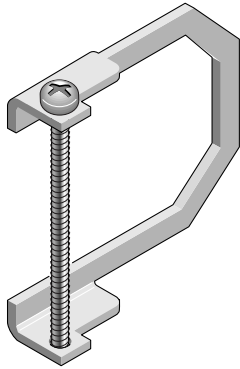
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**Note** – To ensure power redundancy, be sure to connect the two power supply modules to two separate circuits (for example, one commercial circuit and one UPS).

---

To connect the AC power cords, perform the following procedure.

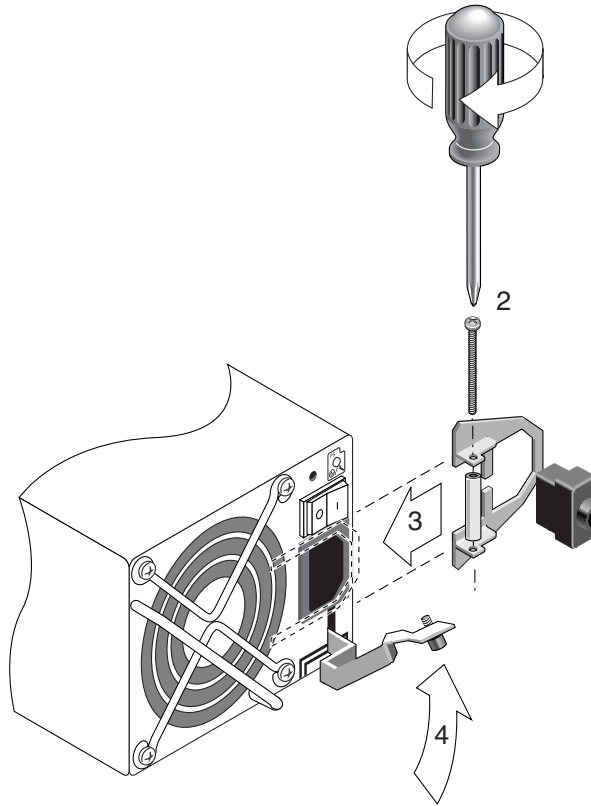
1. Obtain an appropriate AC power cable.
2. Use a screwdriver to remove the screw and cylindrical standoff from one of the two cord locks provided and set them aside for reassembly later.



**FIGURE 4-4** AC Cord Lock

3. Slide the cord lock over the AC power connector.
4. Hold the cylindrical standoff between the two screw-holes on the flanges of the cord lock.
5. Insert the screw into the first screw-hole, through the standoff, and then into the threaded screw-hole on the other flange.
6. Tighten the screw with a screwdriver until the flanges bottom out on the cylindrical standoff.
7. Push the power cord into the power supply receptacle until it is firmly seated.
8. Push the green ejector handle forward until it is seated against the power supply.
9. Turn the thumbscrew of the green ejector handle clockwise until it is finger-tight to secure the handle and the cord lock.





**FIGURE 4-5** Inserting the Cord Lock

10. Repeat this procedure for the second cord lock and second power cable.

---

## 4.5 Connecting the Chassis to DC Power Outlets

Two CD power cords are packaged with each DC array. To connect the DC power cords, perform the following procedure.

1. Connect a DC power cable to the first power supply and to a power outlet.

---

**Note** – Use only the DC power cables provided with the array.

---

2. Check the DC cable part number and wire labels carefully before connecting the cable to the source.

**TABLE 4-1** DC Cable Wiring for Cable 35-00000148

Pin Number	Voltage	Color
A3	Return	Red
A2	GND (Chassis Ground)	Green/Yellow
A1	-48 VDC	Black

**TABLE 4-2** DC Cable Wiring for Cable 35-00000156

Pin Number	Voltage	Color
A3	L+	Red
A2	GND (Chassis Ground)	Green/Yellow
A1	L-	White



---

**Caution** – If the Sun StorEdge 3310 SCSI array is connected to DC power sources not within the designated –48V DC (–36 VDC to –72 VDC) range, damage might occur to the unit.

---

---

**Note** – To ensure power redundancy, be sure to connect the two power supply modules to two separate circuits (for example, one commercial circuit and one UPS).

---

---

**Note** – To extend the length of the DC power cable as needed, strip the last 1/4" of the cable, insert the stripped end into a provided Panduit tube, and crimp the tube.

---

3. Tighten the cable locking screws to attach the cable securely to the power supply power outlet.
4. Connect the second power cable to the second power supply and to a second power outlet. Tighten the cable locking screws.  
If one power supply fails, the second power supply automatically takes the full load.

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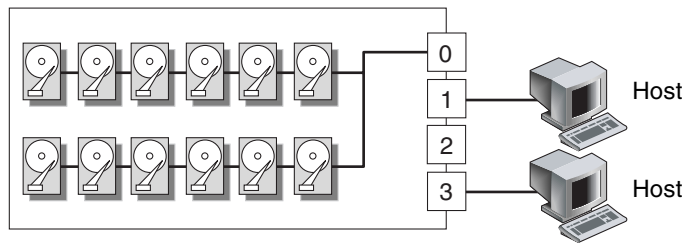
## 4.6 Single and Dual Drive-Bus Configurations

The drive-bus configuration determines how drives and drive IDs are assigned to drive channels on the controller.

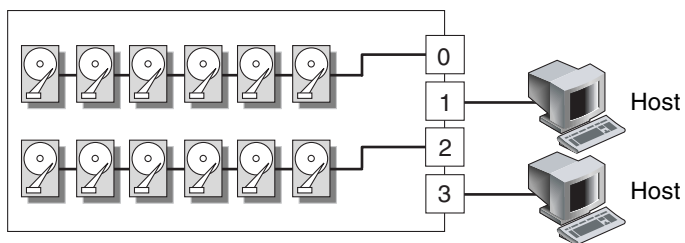
A single-bus configuration assigns all disk drive IDs in a controller to one channel (typically CH 0 for the RAID array and CH 2 for an expansion unit).

A dual-bus configuration assigns half the disk drive IDs to CH 0 and the other half to CH 2 in the RAID array, and then typically adds additional disk drive IDs to both CH 0 and CH2 when it is connected to an expansion unit.

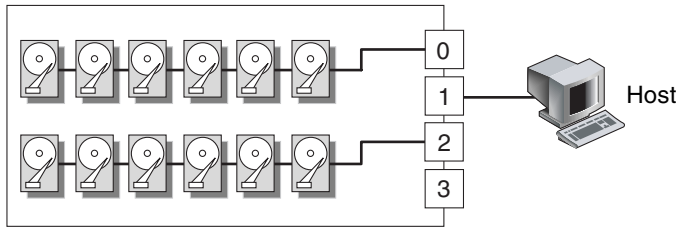
The following figures illustrate the six standard cabling scenarios for a 12-drive array:



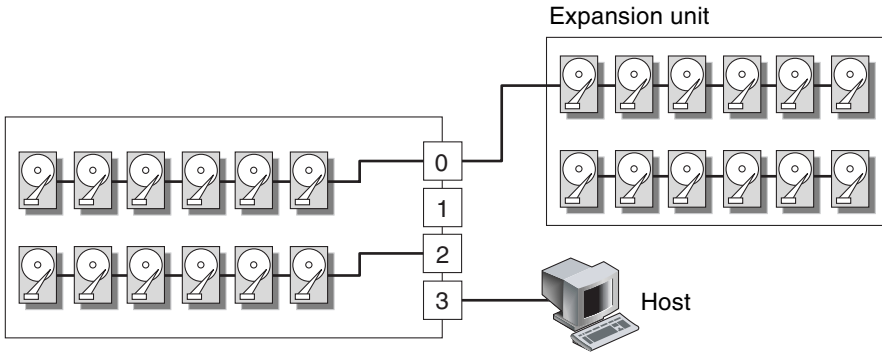
**FIGURE 4-6** Configuration #1: Single-Bus Configuration With Two Hosts



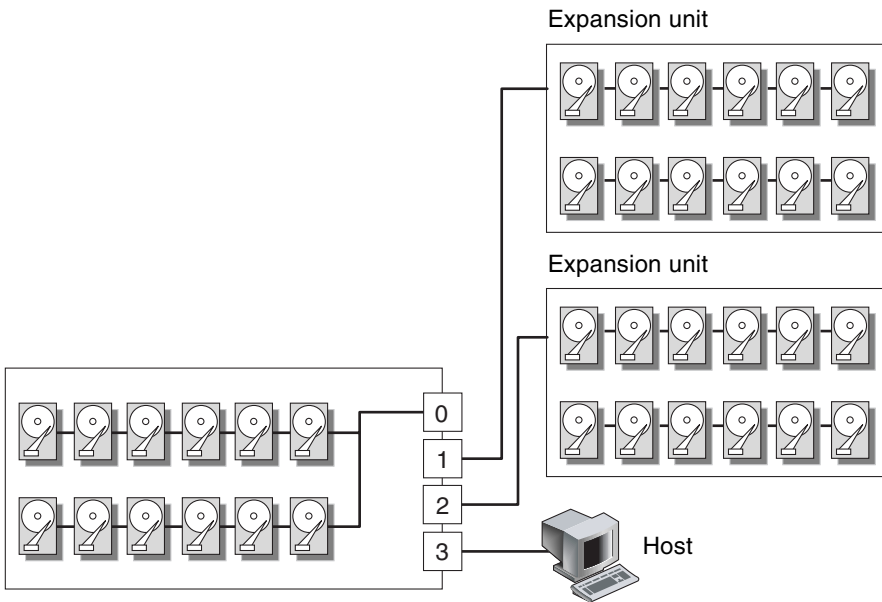
**FIGURE 4-7** Configuration #2: Dual-Bus Configuration With Two Hosts



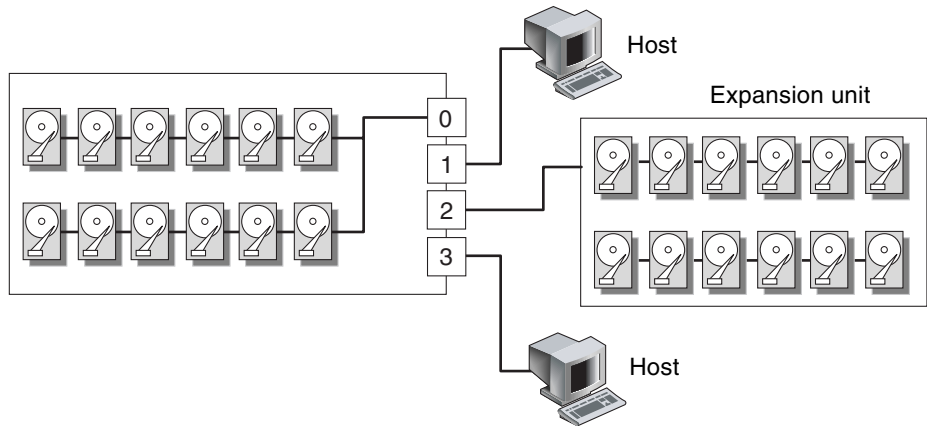
**FIGURE 4-8** Configuration #3: Dual-Bus Configuration With One Host



**FIGURE 4-9** Configuration #4: Dual-Bus Configuration With One Expansion Unit



**FIGURE 4-10** Configuration #5: Single-Bus Configuration with Two Expansion Units



**FIGURE 4-11** Configuration #6: Single-Bus RAID Connected to One Expansion Unit

Each drive channel can have up to 16 IDs (0 to 15); ID 6 and ID 7 are reserved for internal connections.



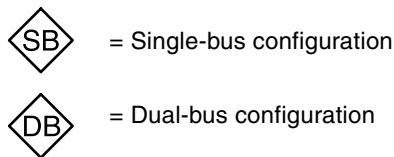

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**Caution** – A maximum of 16 drive IDs is allowed per channel. Therefore, *do not* connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

---

On the rear panel of each RAID array on the I/O module, the SB icon is displayed next to the CH 0 port and the SCSI SNGL BUS CONF port to indicate where to connect the SCSI jumper cable for a single-bus configuration.

Similarly, the DB icon is displayed next to the CH 2 port and the dual-bus CONF port to indicate where to connect the SCSI jumper cable for a dual-bus configuration.



**FIGURE 4-12** Single-Bus and Dual-Bus Icons

On the rear panel of each expansion unit, the SB icon indicates where to connect the jumper cable for a single-bus configuration.

The SCSI IDs are also displayed on the lower inside-front edge of the chassis. These IDs are automatically assigned and appear in the RAID controller status tables.

DUAL/SNGL	DUAL/SNGL	DUAL/SNGL	DUAL/SNGL
CH2-ID0 CH0-ID0	CH2-ID3 CH0-ID3	CH0-ID0 CH0-ID8	CH0-ID3 CH0-ID11
CH2-ID1 CH0-ID1	CH2-ID4 CH0-ID4	CH0-ID1 CH0-ID9	CH0-ID4 CH0-ID12
CH2-ID2 CH0-ID2	CH2-ID5 CH0-ID5	CH0-ID2 CH0-ID10	CH0-ID5 CH0-ID13

FIGURE 4-13 Disk Drive IDs Displayed Inside the Lower Edge of the Chassis

## 4.7 Connecting Cables for a Single-Bus Configuration

A single-bus I/O configuration assigns all disk drive IDs in a chassis (RAID or expansion unit) to one channel. This configuration is convenient administratively if you want to assign all RAID array drive IDs to Channel 0, and assign all expansion unit drive IDs to Channel 2.

1. To configure a RAID array as a single-bus configuration, connect the SCSI jumper cable between the SCSI ports labeled “CH 0” and “SNGL BUS CONF” as shown in FIGURE 4-14. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.

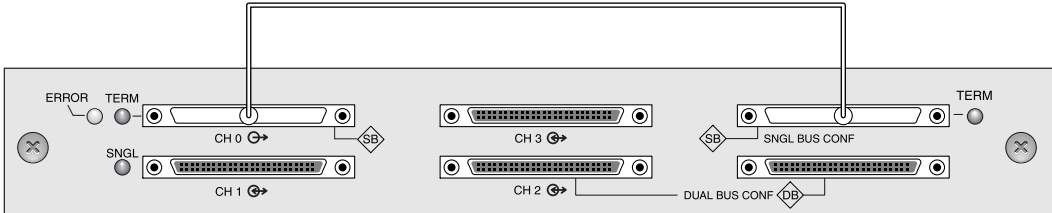
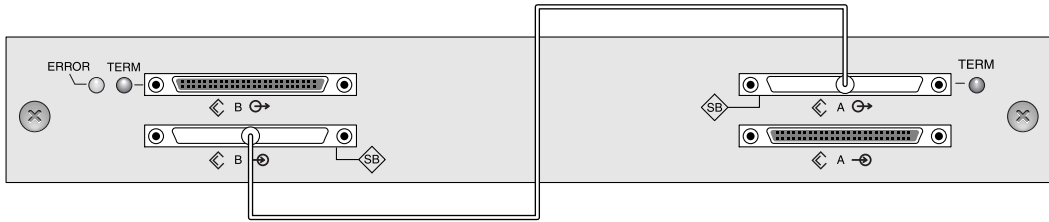


FIGURE 4-14 Single-Bus Connection: All Drives are Assigned to a Single Channel (CH 0)

2. To configure an expansion unit as a single-bus configuration, connect the SCSI jumper cable between SCSI ports (lower left and upper right ports), as shown in FIGURE 4-15. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.



**FIGURE 4-15** Required Jumper Cabling for a Single-Bus Expansion Unit




---

**Caution** – A maximum of 16 drive IDs is allowed per channel. Therefore, with a 12-drive array, do not connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

---

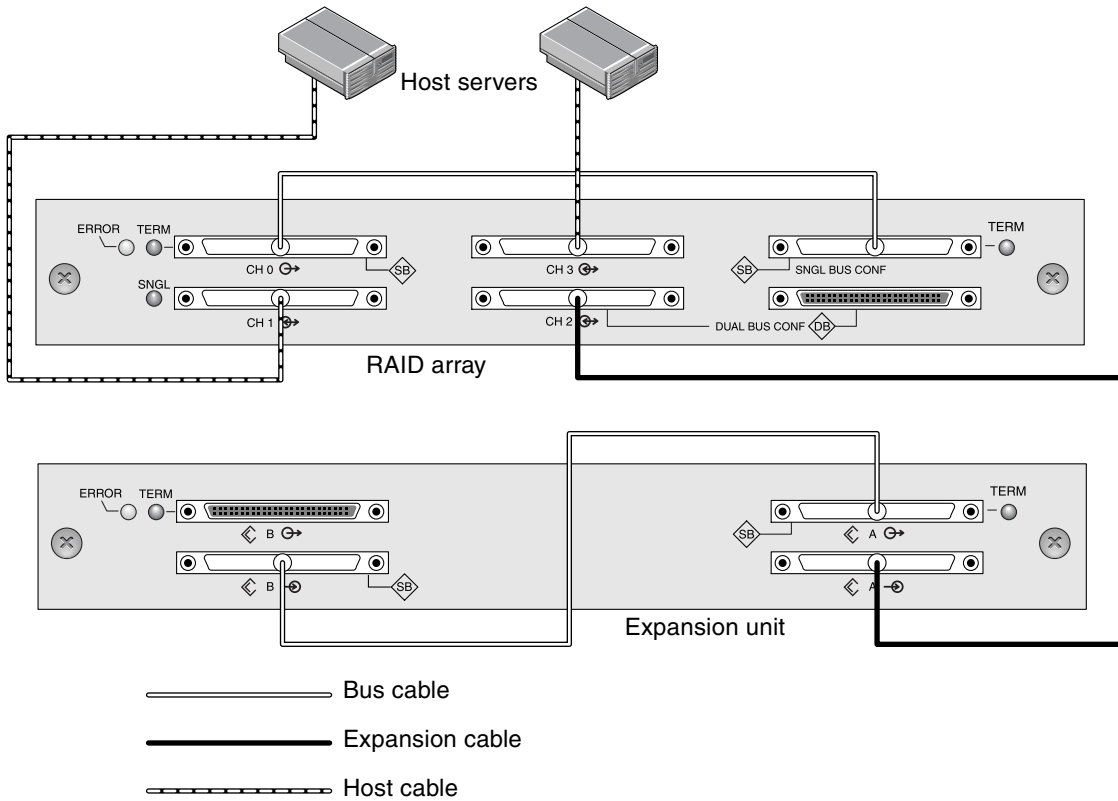
3. (Optional) Use a SCSI cable to connect a RAID array (Channel 2 port) to an expansion unit (lower right port). Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.

The configuration in [FIGURE 4-16](#) shows a RAID array with all its drive IDs assigned to Channel 0, and an expansion unit with all its drive IDs assigned to Channel 2.

---

**Note** – In a single bus configuration of the expansion unit, the jumper cable must be attached to the lower left and upper right ports. The host connection must be connected to the lower right port of the expansion unit.

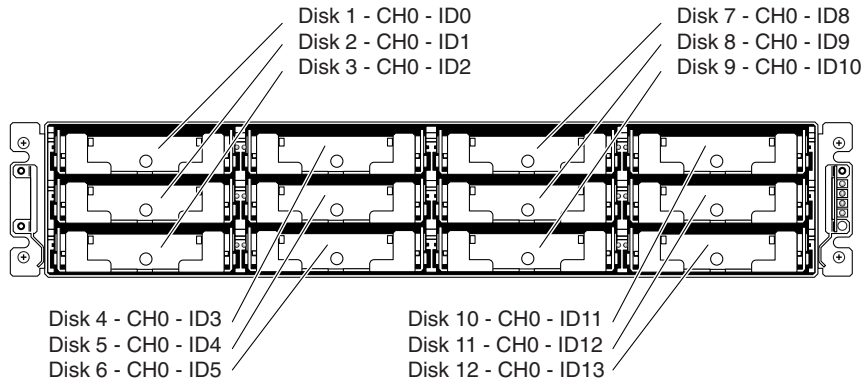
---



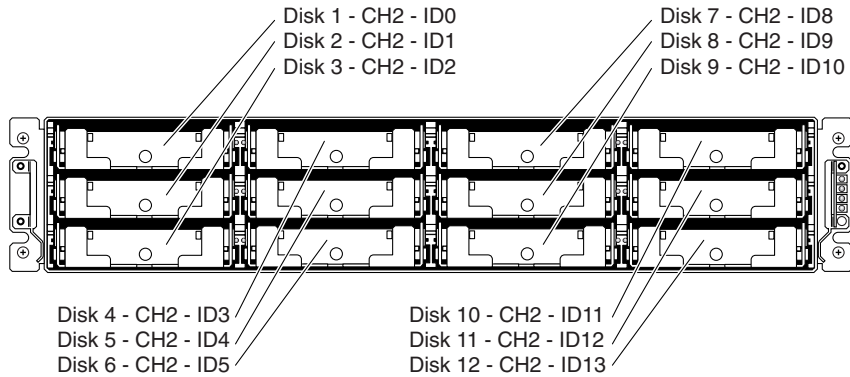
**FIGURE 4-16** Required Single-Bus Expansion Unit Configuration when Connected to a Host

Based on the configuration in [FIGURE 4-16](#), the default drive IDs for a 12-drive single-bus configuration are shown in [FIGURE 4-17](#) and [FIGURE 4-18](#). (ID6 and ID7 are reserved for host HBAs.)





**FIGURE 4-17** RAID Array - Single-Bus Configuration, Default IDs



**FIGURE 4-18** Expansion Unit - Single-Bus Configuration, Default IDs

The IDs are also displayed on the lower inside-front edge of the chassis. These IDs are automatically assigned and appear in RAID controller status tables.

**4. Connect your RAID array (SCSI Channel 1 and 3 ports) to one or two host servers with SCSI cables.**

SCSI ports for Channels 1 and 3 are assigned as host channels by default.

## 4.8 Connecting Cables for a Dual-Bus Configuration

A dual-bus configuration assigns half the disk drives to one channel and the other to the second channel. This configuration can be helpful when you want to use one set of drives to mirror the second set with drives configured as RAID 1 drives.

1. **To create a dual-bus configuration on a RAID array, use the SCSI jumper cable to connect the CH 2 port to the dual-bus CONF port. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

Six IDs are assigned to CH 0, and six IDs are assigned to CH 2 in a 12-drive array.

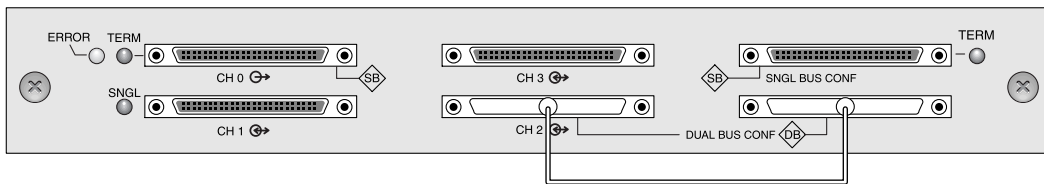


FIGURE 4-19 RAID Dual-Bus Configuration

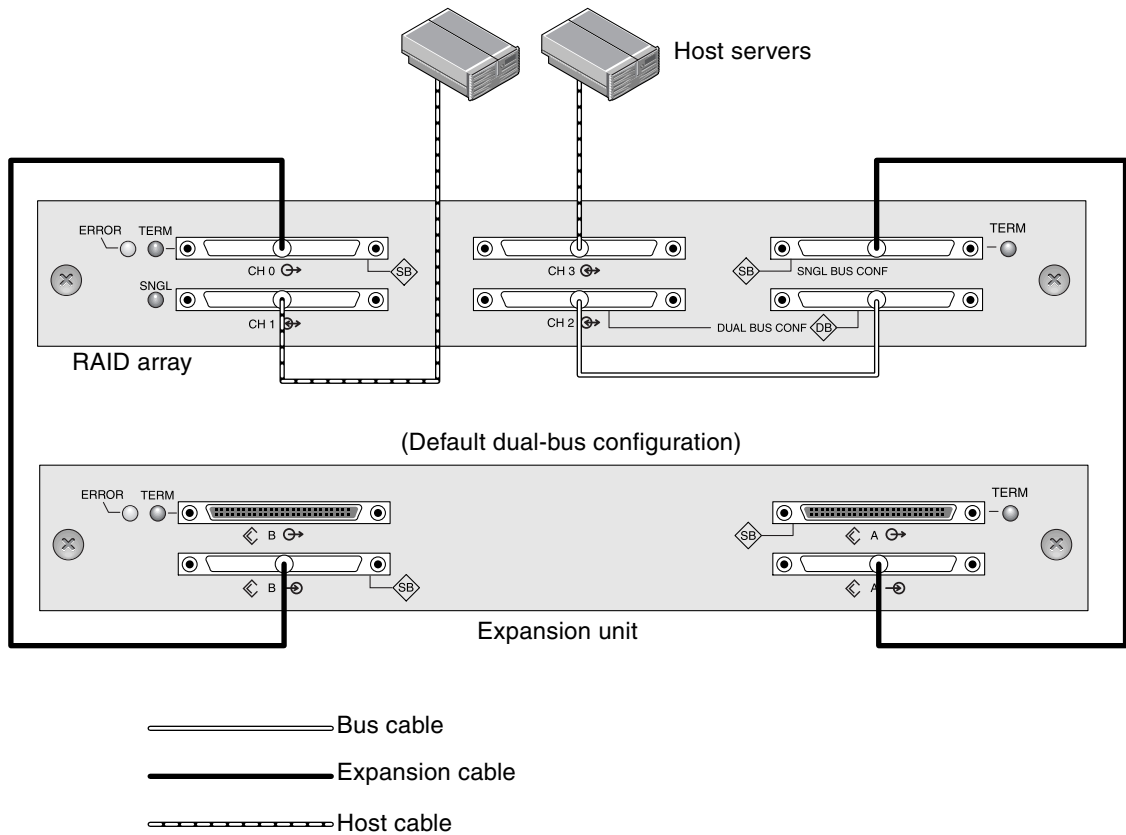
In the dual-bus JBOD configuration, no jumper cable is required.



FIGURE 4-20 Expansion Unit Dual-Bus Configuration

2. **(Optional) Use a SCSI cable to connect a RAID array (Channel 2 port) to an expansion unit lower input port. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

In [FIGURE 4-21](#), RAID Channels 0 and 2 are expanded into the expansion unit, in a dual-bus configuration set up on the RAID array and kept by default for the expansion unit.



**FIGURE 4-21** Dual-Bus Configuration with One RAID Array and One Expansion Unit



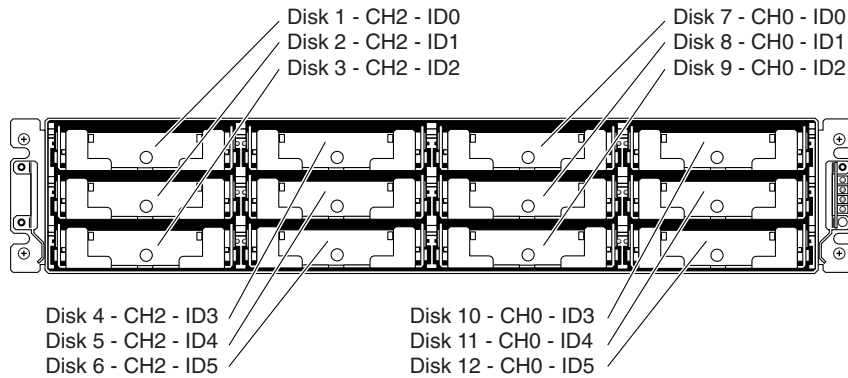
**Caution** – A maximum of 16 drive IDs is allowed per channel. Therefore, with a 12-drive array, do not connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

The dual-bus configuration shown in the preceding figure assigns half the IDs from the RAID and the expansion unit to Channel 0, and the other half to Channel 2. The “SINGLE BUS CONF” port is a Channel 2 expansion port in a dual-bus configuration.

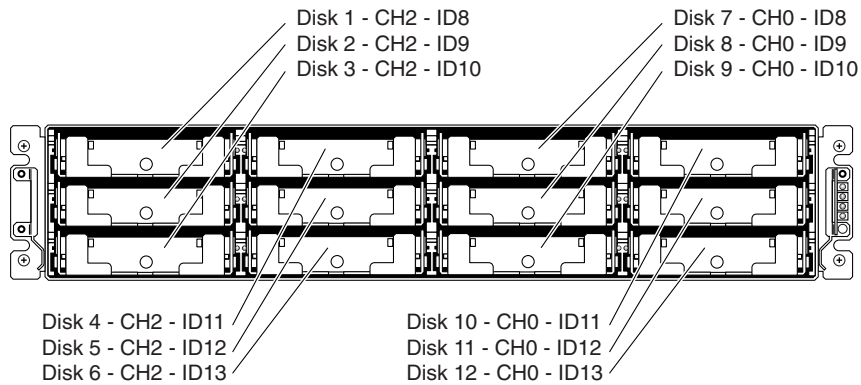
**3. Based on the configuration shown in FIGURE 4-21, the default drive IDs for a dual-bus configuration are shown in the following figures.**

ID6 and ID7 are reserved and are not available for drive IDs.

The IDs are also displayed on the lower inside edge of the chassis. These IDs are automatically assigned and appear in RAID controller status tables.



**FIGURE 4-22** RAID Array: Dual-Bus Configuration, Default IDs



**FIGURE 4-23** Expansion Unit: Dual-Bus Configuration, Default IDs

**4. Connect your RAID array (SCSI Channel 1 and 3 ports) to two host servers with SCSI cables.**

SCSI ports for Channels 1 and 3 are assigned as host channels by default.

---

## 4.9 Connecting SCSI Ports to Host(s)

By default, channels 1 and 3 (the upper middle SCSI port and lower left SCSI port on the I/O module) are host channels. The array can be connected to a host in one of the two following ways:

- By means of an Ultra160 LVD-compliant HBA installed in a host
- By means of a qualified and supported onboard single-ended server-embedded SCSI controller

Connect the array to one or two hosts with SCSI cables. Refer to the *Sun StorEdge 3310 SCSI Array Release Notes* for a list of the supported cables.

### 4.9.1 Connecting a Sun StorEdge 3310 RAID Array

The SCSI specification states that the maximum bus length for Ultra3 SCSI is 25 meters for point-to-point connections. The Sun StorEdge 3310 RAID array uses a point-to-point implementation. Each channel connector is on a separate physical SCSI bus.

Taking into account the internal bus length of .5 meters and the internal SCSI bus length of the host, the maximum SCSI cable length to each channel connector could conceivably be around 24 meters when connected to an Ultra3 host adapter. However, the longest Ultra3 cable qualified by Sun is 10 meters in length.

When connected to single-ended host adapters, the longest support bus length per connector is 1.5 meters.

---

**Note** – When connecting to Ultra3 host adapters, all SCSI cables must be Ultra3-qualified.

---

---

**Note** – If you connect two hosts to the same channel on a RAID array, you do not need to change the scsi-initiator-id of one host adapter.

---

## 4.9.2 Connecting a Sun StorEdge 3310 JBOD Array

The SCSI specification states that the maximum bus length for Ultra3 SCSI is 12 meters for multidrop connections. The Sun StorEdge 3310 JBOD array uses a multidrop implementation. The ports on each channel are connected to the same physical SCSI bus.

Taking into account the internal bus length of .5 meters, and the internal SCSI bus length of the host, the maximum SCSI bus length for each channel is 12 meters when connected to an LVD host adapter.

You must ensure that the length of all cables to any connected nodes, as well as the internal bus length of .5 meters internal to the Sun StorEdge 3310 JBOD array and the internal bus length of the host, is less than 12 meters in total. Also include the jumper cable length of .3 meters if the JBOD is being used in a single-bus configuration.

The longest Ultra3 cable qualified by Sun is 10 meters in length.

When connected to single-ended host adapters, the longest supported bus length per channel is 1.5 meters.

---

**Note** – If you connect two hosts to the same channel, you must change the scsi-initiator-id of one host adapter as described in the host adapter documentation. When either of these hosts is subsequently booted, SCSI reset warnings are displayed on the other host.

---

---

## 4.10 Cabling Configurations with Two Expansion Units

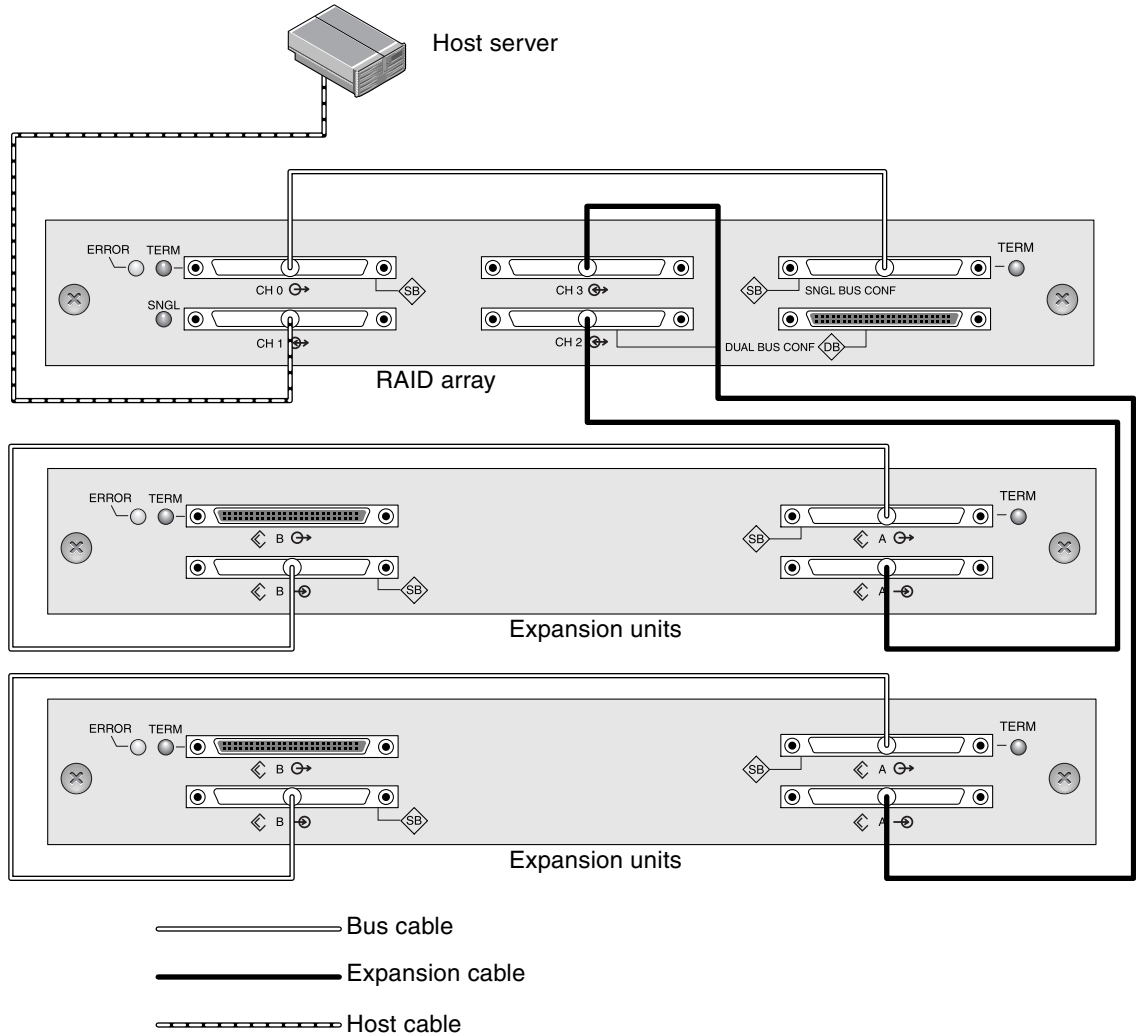
Designed for a fully redundant configuration, a standard RAID array has Channels 0 and 2 assigned as drive channels, and Channels 1 and 3 assigned as host channels.

However, you can attach two expansion units to a RAID array if Channel 1 or Channel 3 is configured as a drive channel. For details, refer to [“Configuring SCSI Channels as Host or Drive \(Optional\)” on page 5-8](#).

The following figures are examples of configurations that have a RAID array connected to two expansion units.



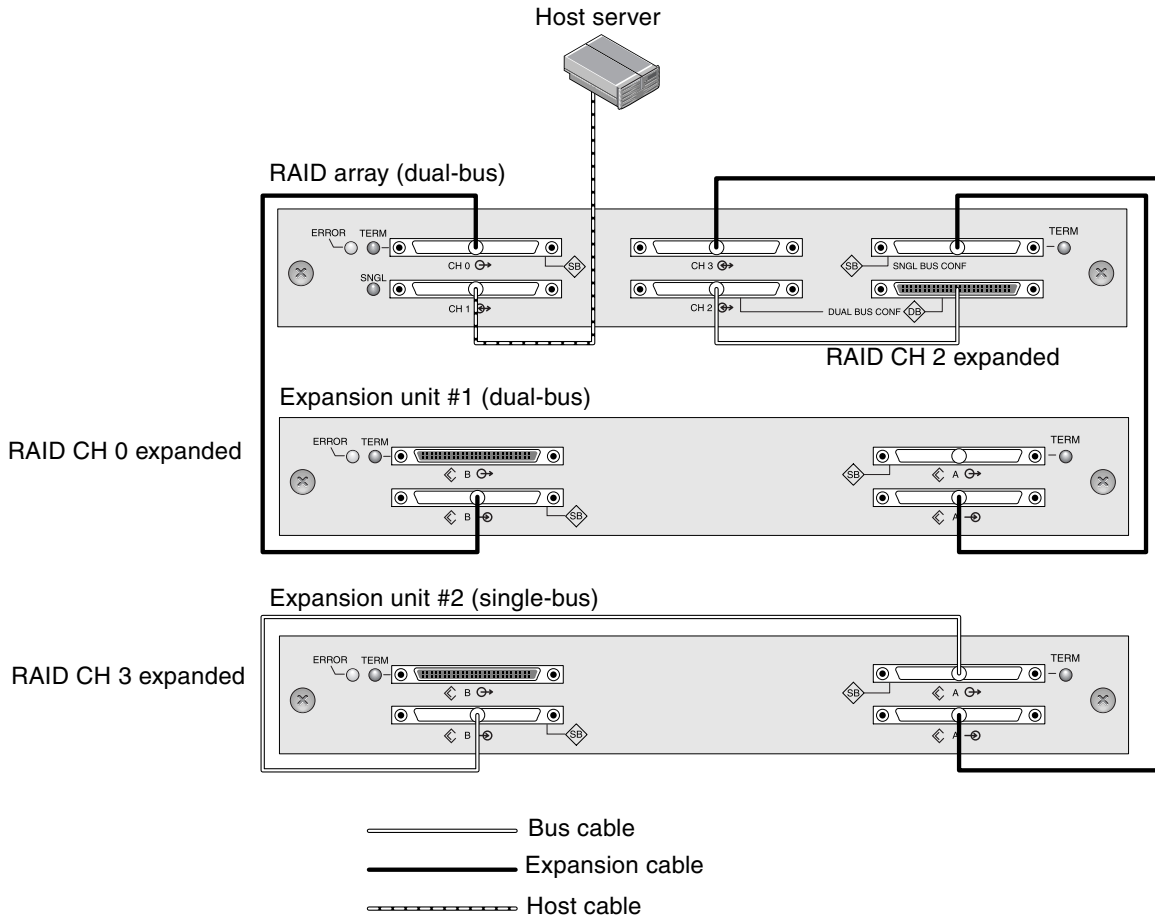
**Caution** – A maximum of 16 drive IDs is allowed per channel. Therefore, in a 12-drive array, do not connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).



**FIGURE 4-24** Single-Bus Configuration with One Host and Two Expansion Units

In [FIGURE 4-24](#), the RAID array and the two expansion units have been set up for single-bus configuration; Channel 3 has been reassigned as a drive channel and connected to the second expansion unit.

In [FIGURE 4-25](#), the RAID array and one expansion unit #1 have been configured for dual-bus configuration and expansion unit #2 is set for single-bus configuration; Channel 3 has been reassigned as a drive channel and connected to the second expansion unit. The RAID Channels 0 and 2 are connected and expanded into the dual-bus expansion unit #1, and RAID Channel 3 is connected and expanded into a single-bus expansion unit #2.



**FIGURE 4-25** Dual/Single-Bus Configuration With One Host and Two Expansion Units



---

## 4.11 Configuring a COM Port to Connect to a RAID Array

The RS-232 COM port on either controller module is used to configure and monitor the RAID array. It can be connected to a VT100 terminal or terminal emulation program, to a terminal server, or to the serial port of a Solaris host.

---

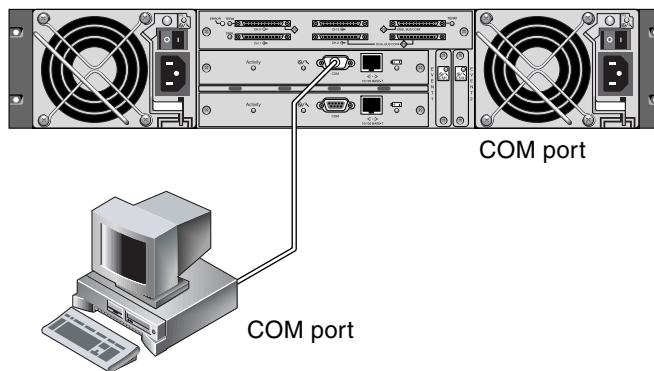
**Note** – You can also monitor and configure a RAID array over an IP network using the controller firmware or the Sun StorEdge Configuration Service software, once you have an IP address to the array. For details, see [“Setting Up Out-of-Band Management Over Ethernet”](#) on page 4-25 and refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

---

1. Use a serial cable to connect the COM port of the RAID array to a serial port on a workstation.

A DB9-to-DB25 serial cable adapter is provided to connect the serial cable to DB25 serial ports on workstations.

Make sure that a null modem cable can be attached to the host serial port. The null modem cable has serial signals swapped for connecting to a standard serial interface.



**FIGURE 4-26** RAID Array COM Port Connected Locally to the COM Port of a Workstation or Computer Terminal

2. Power up the array.
3. Set the serial port parameters on the workstation as follows:
  - 38400 baud
  - 8 bit

- 1 stop bit
- no parity
- no flow control.

For additional information on how to set serial port parameters on a specific server, see:

- [“Configuring a Server Running the Solaris Operating Environment”](#) on page F-1.
- [“Configuring a Windows 2000 Server”](#) on page G-1.
- [“Configuring a Linux Server”](#) on page H-1.
- [“Configuring an IBM Server Running the AIX Operating Environment”](#) on page I-1.
- [“Configuring an HP Server Running the HP-UX Operating Environment”](#) on page J-1.
- [“Configuring a Windows NT Server”](#) on page K-1

---

## 4.12 Setting an IP Address

The controller Ethernet port offers interactive out-of-band management through two interfaces:

- The Sun StorEdge Configuration Service application. Refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide* for details.
- The firmware application you access when you use the `telnet` command to connect to the IP address of the controller.

To access the array using the Ethernet port, you must set up an IP address for the controller. You can set the IP address by typing in values for the IP address itself, the subnet mask, and the IP address of the gateway manually. If your network is using a Reverse Address Resolution Protocol (RARP) server or a Dynamic Host Configuration Protocol (DHCP) server to automatically configure IP information for devices on the network, you can specify the appropriate protocol instead of typing in the information manually.



---

**Caution** – If you assign an IP address to an array to manage the array out-of-band, for security reasons make sure that the IP address is on a private network rather than a publicly routable network. When your array is on a public network, it is susceptible to viruses, worms, and other malware attacks.

---

To set the IP address, subnet mask, and gateway addresses of the RAID controller, perform the following steps.

1. Access the array through the COM port on the controller module of the array.
2. From the Main Menu, choose “view and edit Configuration parameter” and press Return.
3. Choose “Communication Parameters” and press Return.
4. Choose “Internet Protocol (TCP/IP)” and press Return.
5. Choose the chip hardware address.
6. Choose “Set IP Address” and press Return.
7. Type in the desired IP address, subnet mask, and gateway address, choosing each menu option in turn.

If your network sets IP addresses using a RARP server, simply type RARP rather than an IP address and do not type in a subnet mask or gateway address. If your network sets IP addresses using a DHCP server, simply type DHCP rather than an IP address and do not type in a subnet mask or gateway address.

8. Press Esc to continue.

A confirmation prompt is displayed.

```
Change/Set IP Address ?
```

9. Select Yes to continue.

---

**Note** – You must reset the controller for the configuration to take effect.

---

You are prompted to reset the controller.

10. Select Yes to reset the controller.

The controller takes a few minutes to format a small storage sector on each physical drive before logical drives can be successfully initialized.

---

## 4.13 Setting Up Out-of-Band Management Over Ethernet

The Ethernet connection enables you to configure and monitor RAID arrays and expansion units remotely by using `telnet` to access the firmware application on the array and by using the Sun StorEdge Configuration Service software.

---

**Caution** – If you assign an IP address to an array in order to manage it out-of-band, for security reasons make sure that the IP address is on a private network, rather than a publicly routable network.

---

There are two main reasons for placing your arrays on a private subnet:

- When your array is on a public network, it is susceptible to viruses, worms, and other malware attacks.
- A variety of security software is available to detect and mitigate these attacks. Some port-scanning and other security software can have an adverse impact on your ability to access data. In extreme cases, some of this software can cause Sun StorEdge 3000 Family arrays to hang.

Since it is not possible to predict the side-effects of all current and future security software products, place your Sun StorEdge 3310 SCSI arrays and Sun StorEdge 3510 FC arrays on private subnets.

1. **To access the RAID Array over an Ethernet connection, first set the IP address of the RAID Array by using the RAID array's COM port and the RAID firmware. See "Setting an IP Address" on page 4-24 for more information.**
2. **Connect the RAID array Ethernet port on each controller to the network.**

---

**Note** – In a dual-controller RAID array, be sure to connect both Ethernet ports to the network, which will provide failover if one controller fails.

---

3. **To use the firmware application program from the host server, connect to the IP address of the RAID array controller with the following command:**

```
# telnet IP address
```

Press Ctrl-L to refresh the screen and view the Main Menu.

---

**Note** – If you reset the controller during a `telnet` session, you are disconnected from the RAID array and need to use the `telnet` command to log back in to the array.

---

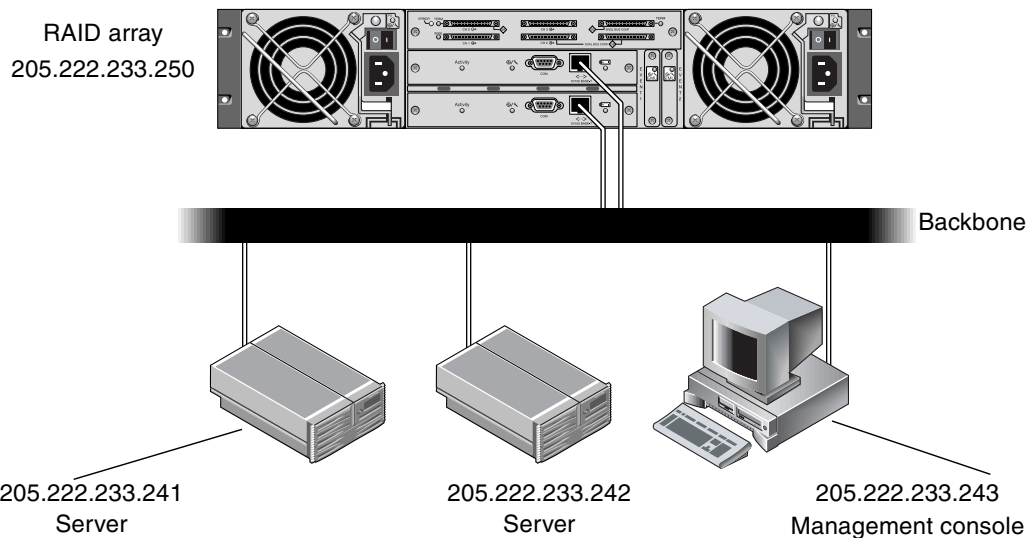
4. To connect the Sun StorEdge Configuration Service program (on a host server) to a RAID array which has an IP address, refer to the out-of-band management instructions in the *Sun StorEdge 3000 Family Software Configuration Service User's Guide*.

In the following network illustration, two servers receive Sun StorEdge Configuration Service Alert messages, and a Sun StorEdge Configuration Service management console monitors and configures the RAID array as needed.

---

**Note** – It is good practice to connect the Ethernet port on both controllers to the backbone. Redundant connections to both Ethernet ports eliminate a single point of failure in case one controller becomes unavailable.

---



**FIGURE 4-27** RAID Array 10/100BASE-T Ethernet Port Connected Directly to a Network

Refer to the *Sun StorEdge 3000 Family Software Configuration Service User's Guide* for more detailed information about using SNMP traps and MIBs to send information to other out-of-band management software.



## First-Time Configuration

---

This chapter summarizes the most common procedures used for first-time configuration and includes the following topics:

- “Controller Defaults and Limitations” on page 5-2
- “Battery Operation” on page 5-4
- “Write-Back Versus Write-Through Cache Options” on page 5-5
- “Accessing the Management Tools” on page 5-5
- “First-Time Controller Configuration” on page 5-6
  - “Viewing the Initial Firmware Windows” on page 5-7
  - “Configuring SCSI Channels as Host or Drive (Optional)” on page 5-8
  - “Creating Additional Host IDs (Optional)” on page 5-10
  - “Selecting Sequential or Random Optimization” on page 5-11
  - “Reviewing Default Logical Drives and RAID Levels” on page 5-13
  - “Completing Basic Configuration” on page 5-15
  - “Creating Logical Drive(s) (optional)” on page 5-15
  - “Preparing for Logical Drives Larger Than 253 Gbytes on Solaris Systems” on page 5-21
  - “Changing a Logical Drive Controller Assignment (Optional)” on page 5-23
  - “Partitioning a Logical Drive (optional)” on page 5-24
  - “Planning for 128 LUNs (Optional)” on page 5-27
  - “Mapping Logical Drive Partitions to Host LUNs” on page 5-29
  - “Creating Logical Drive(s) (optional)” on page 5-15
  - “Saving Configuration (NVRAM) to a Disk” on page 5-32
- “Installing Software” on page 5-33
  - “Other Supported Software” on page 5-33
  - “Enabling VERITAS DMP” on page 5-33

---

## 5.1 Controller Defaults and Limitations

The following controller functions describe the redundant controller operation.

- Both controllers must be exactly the same. They must operate with the same firmware version, the same size of memory, and the same number of host and drive channels. If one controller in a dual-controller configuration is replaced with a field-replaceable unit (FRU) controller, the array automatically compares the firmware versions of the two controllers. If they differ, the FRU controller firmware is automatically changed to that of the existing controller in the array.
- The controller firmware assumes that two controllers are available, or might be made available during operation at any time. In a 1U single-controller configuration, a 2U single-controller configuration, or a 2U dual-configuration, once the primary controller (which might be the only controller) is powered on, it begins to scan for a second controller. Until a second controller is discovered, which does not happen in a 1U single-controller configuration or a 2U single-controller configuration, the “Peripheral Device Status” for the redundant controller will show a Status of “Scanning.” This is correct behavior and enables the firmware to discover a second controller whenever it is added without the necessity of rebooting the primary controller.
- In redundant mode, the maximum number of disk drive IDs on a SCSI drive channel is 16. IDs 6 and 7 are used for host HBA connections.
- After booting in a redundant configuration, the controllers autonegotiate and designate one controller as primary and the other controller as secondary.
- The two controllers behave as one primary controller. Once the redundant configuration takes effect, user configurations and settings can be done only on the primary controller. The secondary controller then synchronizes with the configuration of the primary controller, making the configurations of the two controllers exactly the same.

The two controllers continuously monitor each other. When a controller detects that the other controller is not responding, the working controller immediately takes over and disables the failed controller.

- It is necessary to connect all interfaces to both controllers so that the surviving controller can readily continue all services provided for the RAID system. For example, if you connect one controller to the Ethernet, you should also connect the second controller to the Ethernet.
- In an active-to-active configuration (standard configuration), you can assign any appropriate logical drives to either of the controllers, and then map the logical configurations to host channel IDs/LUNs. I/O requests from host computer are directed to the primary or the secondary controller accordingly. The total drive capacity can be grouped into several logical configurations and equally assigned to both controllers so that they share the workload.



---

**Note** – Logical volumes, an alternative to logical drives, are unsuited to some modern configurations such as Sun Cluster environments, and do not work in those configurations. Use logical drives instead. For more information see [“First-Time Controller Configuration” on page 5-6](#).

---

The active-to-active configuration engages all array resources to actively maximize performance. Users might also assign all logical configurations to one controller and let the other act as a standby.

- An active-to-standby configuration is an available configuration but it is not usually selected. By assigning all the logical configurations of drives to one controller, the other controller stays idle and becomes active only when its counterpart fails.

---

## 5.2 Single-Controller Considerations

In a single-controller configuration, keep the controller as the primary controller at all times and assign all logical drives to the primary controller. The primary controller controls all logical drive and firmware operations. In a single-controller configuration, the controller must be the primary controller or the controller cannot operate.

The secondary controller is used only in dual-controller configurations for redistributed I/O and for failover.



---

**Caution** – Do not disable the Redundant Controller setting and do not set the controller as a secondary controller. If you disable the Redundant Controller Function and reconfigure the controller with the Autoconfigure option or as a secondary controller, the controller module becomes inoperable and will need to be replaced.

---

The Redundant Controller setting (“View and Edit Peripheral Devices → Set Peripheral Device Entry”) must remain enabled for single-controller configurations. This preserves the default primary controller assignment of the single controller. The controller status shows “scanning,” which indicates that the firmware is scanning for primary and secondary controller status and redundancy is enabled even though it is not used. There is no performance impact.

---

## 5.3 Battery Operation

The battery LED (on far right side of the controller module) is an amber LED if the battery is bad or missing. The LED is blinking green if the battery is charging and is solid green when the battery is fully charged.

### 5.3.1 Battery Status

The initial firmware screen displays the battery status at the top of the initial screen where BAT: status displays somewhere in the range from BAD to ----- (charging), or +++++ (fully charged).

For maximum life, lithium ion batteries are not recharged until the charge level is very low, indicated by a status of -----. Automatic recharging at this point takes very little time.

A battery module whose status shows one or more + signs can support cache memory for 72 hours. As long as one or more + signs are displayed, your battery is performing correctly.

**TABLE 5-1** Battery Status Indicators

Battery Display	Description
-----	Discharged; the battery is automatically recharged when it reaches this state.
+----	Adequately charged to maintain cache memory for 72 hours or more in case of power loss. Automatic recharging occurs when the battery status drops below this level.
++---	Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.
+++--	Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.
++++-	Over 90% charged; adequate to maintain cache memory for 72 hours or more in case of power loss.
+++++	Fully charged; adequate to maintain cache memory for 72 hours or more in case of power loss.

Your lithium ion battery should be changed every two years if the unit is continuously operated at 25 degrees C. If the unit is continuously operated at 35 degrees C or higher, it should be changed every year. The shelf life of your battery is three years.

---

**Note** – The RAID controller has a temperature sensor which shuts off battery charging above 54 degrees C. When this happens, the battery status may be reported as BAD, but no alarm is written to the event log since no actual battery failure has occurred. This behavior is normal. As soon as the temperature returns to the normal range, battery charging resumes and the battery status is reported correctly. It is not necessary to replace or otherwise interfere with the battery in this situation.

---

For information on the date of manufacture and how to replace the battery module, refer to the *Sun StorEdge 3000 Family FRU Installation Guide*.

For more information, see [“Environmental Requirements” on page 2-3](#) for the acceptable operating and non-operating temperature ranges for your array.

---

## 5.4 Write-Back Versus Write-Through Cache Options

Unfinished writes are cached in memory in write-back mode. If power to the array is discontinued, data stored in the cache memory is not lost. Battery modules can support cache memory for several days.

Write cache is not automatically disabled when the battery is offline due to battery failure or a disconnected battery. You can enable or disable the write-back cache capabilities of the RAID controller. To ensure data integrity, you may choose to disable Write Back cache option and switch to the Write Through cache option through the firmware application (go to “view and edit Configuration parameters” and select “Caching Parameters”). The risk of data loss is remote.

---

## 5.5 Accessing the Management Tools

You can manage the array through one of the following three methods:

- With the out-of-band serial port connection, you can use a Solaris `tip` session or a Windows terminal emulation program to access the firmware application. For details, refer to [“Configuring a COM Port to Connect to a RAID Array” on page 4-23](#).
- With the out-of-band Ethernet port connection, you can use `telnet` to access the firmware application. For details, refer to [“Setting Up Out-of-Band Management Over Ethernet” on page 4-25](#).

- With in-band SCSI host connections, you can use the Sun StorEdge Configuration Service software or CLI software. Refer to the *Sun StorEdge 3000 Family Configuration Service User Guide* for in-band setup procedures.

## 5.6 First-Time Controller Configuration

Sun StorEdge 3310 SCSI arrays are preconfigured and require minimal configuration. [TABLE 5-2](#) summarizes the typical series of procedures for completing a first-time RAID controller configuration. All other procedures can be performed by using either the COM port or the Ethernet port connection to a management console.

**TABLE 5-2** Summary of First-Time Controller Configuration Steps

---

**Bold = Required minimum configuration**

---

1. **Cabling from the RAID array to host(s) must be complete.**
2. **Set up a serial port connection.**  
See [“Configuring a COM Port to Connect to a RAID Array” on page 4-23](#) for more information.
3. Configure SCSI channels as host or drive (optional).
4. Create primary ID and secondary ID on host channel(s).
5. Reset controller. The IDs assigned to controllers only take effect after controller is reset.
6. Remove default logical drive(s) and create new logical drives (optional).
7. Assign logical drives to the secondary controller (optional).
8. Repartition the logical drive(s) (optional).
9. **Map each logical drive partition to a LUN on a host channel.**
10. **Reset controller. \***  
*Configuration is complete.*
11. Save configuration to disk.

\* Reset the controller after each step or at the end of the configuration process.

---

**Note** – Resetting the controller can result in occasional host-side error messages such as parity error and synchronous error messages. No action is required and the condition corrects itself as soon as reinitialization of the controller is complete.

---

---

**Note** – For security reasons, only a single monitoring and management session is allowed for a firmware connection to an array. When the firmware is accessed more than once at the same time--either in-band and out-of-band, or through multiple out-of-band sessions, both screens are synchronized and both users will interfere with each other's operations.

---

## 5.6.1 Viewing the Initial Firmware Windows

You see the initial controller screen when you first access the RAID controller firmware. The initial screen is displayed when the RAID controller is powered-on.

1. **Use the up and down arrow keys to select the VT100 terminal emulation mode, and then press Return to enter the Main Menu.**

See [“Introducing Key Screens and Commands” on page 7-2](#) for detailed information about understanding and using the initial firmware screen.

2. **Use the following keys to navigate within the application:**

← → ↑ ↓	To select options
Return or Enter	To perform the selected menu option or display a submenu
Esc	To return to the previous menu without performing the selected menu option
Ctrl-L (Ctrl key and L key together)	To refresh the screen information
Press a letter as a keyboard shortcut for commands which have a boldface capital letter	To access a Main Menu command quickly

The firmware procedures use the term “Choose” as a shortcut description. Quotation marks are used to indicate a specific menu option or a series of menu options.

Procedure	Meaning
Choose “menu option”	Highlight the menu option and press Return. or Press the key that corresponds to the capitalized letter in the menu option if one is available.
Choose “menu option 1 → menu option 2 → menu option 3”	This represents a series of nested menus options which are selected with arrow keys. Press Return after each selection in order to access the next menu item and to complete the series.

3. Proceed to configure the array using options from the Main Menu as described in the rest of this chapter.

```

_____ < Main Menu > _____
| Quick installation |
| view and edit Logical drives |
| view and edit logical Volumes |
| view and edit Host luns |
| view and edit scsi Drives |
| view and edit Scsi channels |
| view and edit Configuration parameters |
| view and edit Peripheral devices |
| system Functions |
| view system Information |
| view and edit Event logs |

```

FIGURE 5-1 Firmware Main Menu

## 5.6.2 Configuring SCSI Channels as Host or Drive (Optional)

All Sun StorEdge 3310 SCSI RAID arrays are preconfigured when they arrive from the factory. Default channel settings and rules are specified as follows:

- Channel 0 (CH 0) must be a drive channel.
- Channels 1, 2, and 3 (CH 1, CH 2, CH 3) might be drive or host channels.
- Default channel settings are:
  - CH 0 and CH 2 = Drive channels
  - CH 1 and CH 3 = Host channels

The most common reason to change a host channel to a drive channel is to attach an expansion unit to a RAID array when you need only one host channel.

To change the use of a SCSI channel, reconfigure the channel according to the following procedure.

**1. Choose “view and edit Scsi channels” from the Main Menu.**

```

< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
  
```

Chl	Mode	PID	SID	DefSynClk	DefWid	S	Term	CurSynClk	CurWid
0	Drive	7	6	80.0MHz	Wide	L	0n	80.0MHz	Wide
1	Host	0		80.0MHz	Wide	L	0n	80.0MHz	Wide
2	Drive	7	6	80.0MHz	Wide	L	0n	80.0MHz	Wide
3	Host	NA	2	80.0MHz	Wide	L	0n	80.0MHz	Wide
6(D)	RCCOM								

The communications path for the controllers is displayed as “RCCOM (Redundant Controller Communications).”

2. Select the channel that you want to modify.
3. Choose “channel Mode” from the displayed menu.
4. Select Yes to change the host or drive assignment.

```

< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
  
```

Ch	Mode	PID	SID	DefSynClk	DefWid	S	Term	CurSynClk	CurWid
0	channel Mode					L	0n	80.0MHz	Wide
1	Change Mode to Host Channel ?					L	0n	80.0MHz	Wide
2	View and edit scsi target parity check - Enabled				Wide	L	0n	80.0MHz	Wide
3	view chip inFormation								



---

**Caution** – The channels of redundant controllers must be the same. For example, if the primary controller uses channel 2 to connect to a group of drives, the secondary controller must also use channel 2 to connect to the same group of drives. Changes to the primary controller are automatically made to the secondary controller.

---

## 5.6.3 Creating Additional Host IDs (Optional)

All RAID arrays are preconfigured when they arrive from the factory.

Default host channel IDs are:

- Channel 1 ID 0 (primary controller)
- Channel 3 ID 1 (secondary controller)

Each host channel might have two editable ID numbers:

- Primary controller ID
- Secondary controller ID

Each ID number must be a unique number within the host channel. You can:

- Edit each host ID number to change the SCSI target number of each controller host channel that is seen by the host.
- Add additional host ID numbers (by adding a second host ID to channels 1 and 3, and additional host IDs if you make Channel 2 into a host channel).

---

**Note** – To map 128 partitions into 128 LUNs, you must add additional host IDs. A minimum of four host IDs are required; a maximum of six host IDs are possible. For details on mapping 128 LUNs, refer to [“Planning for 128 LUNs \(Optional\)” on page 5-27](#).

---

To select a unique ID number for a host channel:

1. Choose **“view and edit Scsi channels.”**
2. Select the host channel on which you want to edit the Primary/Secondary ID.
3. Choose **“view and edit scsi Id.”**  
If a host ID has already been assigned to that channel, it is displayed.
4. Select the existing host ID and press **Return**.
5. Choose **“Add Channel SCSI ID.”**



6. Select the controller on which you want to add a host ID.

< Main Menu >

Quick installation  
 view and edit Logical drives  
 view and edit logical Volumes  
 view and edit Host luns  
 view and edit scsi Drives  
**view and edit Scsi channels**

Ch	channel Mode	efWid	S	Term	CurSynClk	Cur
0	<b>Primary controller scsi id</b>	Wide	L	On	80.0MHz	Wi
1	Secondary controller scsi id	Wide	L	On	80.0MHz	Wi
2	Wide transfer	Wide	L	On	80.0MHz	Wi
3	parity check - Enabled	Wide	L	On	80.0MHz	Wi
6	view chip information					

ID 0  
 ID 1  
 ID 2  
 ID 3  
 ID 4  
 ID 5  
 ID 6  
 ID 7  
 ID 8  
 ID 9  
 ID 10  
 ID 11  
 ID 12  
 ID 13  
 ID 14  
 ID 15

7. Choose an ID number for that controller.

A confirmation dialog is displayed.

---

**Note** – To create a total of 128 LUNs, you must have a minimum of four host IDs (two each for Channels 1 and 3) and might have a maximum of six host IDs (two each for Channels 1 and 2, and 3). Each host ID can have up to 32 partitions, which are then mapped to LUNs to create a total not to exceed 128.

---

8. Choose Yes to confirm.
9. From the Main Menu, choose “system Functions → Reset controller” and then choose Yes to confirm.

The configuration change takes effect only after the controller is reset.

## 5.6.4 Selecting Sequential or Random Optimization

Before creating or modifying logical drives, you should select the optimization mode for all logical drives you create. The optimization mode determines the block size used when writing data to the drives in an array.

- Sequential I/O uses large blocks of data:
  - 128 Kbyte for RAID 0, 1, and 5 logical drives
  - 16 Kbyte for RAID 3 logical drives
- Random I/O uses small blocks of data:
  - 32 Kbyte for RAID 0, 1, and 5 logical drives
  - 4 Kbyte for RAID 3 logical drives

---

**Note** – Your array is preconfigured for Sequential Optimization. If Random Optimization is most appropriate for your use, you will need to delete all of the preconfigured logical drives, change the optimization mode, and then create new logical drives.

---

The type of application the array is working with determines whether Random or Sequential I/O should be applied. Video/imaging application I/O size can be 128, 256, 512 Kbyte, or up to 1 Mbyte, so the application reads and writes data to and from the drive as large-block, sequential files. Database/transaction-processing applications read and write data from the drive as small-block, randomly-accessed files.

There are two limitations that apply to the optimization modes:

- One optimization mode must be applied to all logical drives in an array.
- Once the optimization mode is selected and data written to logical drives, the only way to change the optimization mode is to back up all data to another location, delete all logical configurations of drives, reconfigure the logical drive with the new optimization mode, and reboot the array.

---

**Note** – The maximum allowable size of a logical drive optimized for Sequential I/O is 2 Tbyte. The maximum allowable size of a logical drive optimized for Random I/O is 512 Gbyte. When creating a logical drive that is greater than these limits, an error message is displayed.

---

For more information about optimization modes, including how to change your optimization, refer to the *Sun StorEdge 3000 Family RAID Firmware User's Guide* for your array.

### 5.6.4.1 Maximum Number of Disks and Maximum Usable Capacity for Random and Sequential Optimization

Your choice of Random or Sequential optimization affects the maximum number of disks you can include in an array and the maximum usable capacity of a logical drive. The following tables contain the maximum number of disks per logical drive and the maximum usable capacity of a logical drive.

---

**Note** – You can have a maximum of eight logical drives and 36 disks, using one array and two expansion units.

---

**TABLE 5-3** Maximum Number of Disks per Logical Drive for a 2U Array

Disk Capacity (GB)	RAID 5 Random	RAID 5 Sequential	RAID 3 Random	RAID 3 Sequential	RAID 1 Random	RAID 1 Sequential	RAID 0 Random	RAID 0 Sequential
36.2	14	31	14	31	28	36	14	36
73.4	7	28	7	28	12	30	6	27
146.8	4	14	4	14	6	26	3	13

**TABLE 5-4** Maximum Usable Capacity (Gbyte) per Logical Drive for a 2U Array

Disk Capacity	RAID 5 Random	RAID 5 Sequential	RAID 3 Random	RAID 3 Sequential	RAID 1 Random	RAID 1 Sequential	RAID 0 Random	RAID 0 Sequential
36.2	471	1086	471	1086	507	543	507	1122
73.4	440	1982	440	1982	440	1101	440	1982
146.8	440	1908	440	1908	440	1908	440	1908

---

**Note** – You might not be able to use all disks for data when using 36 146-Gbyte disks. Any remaining disks can be used as spares.

---

## 5.6.5 Reviewing Default Logical Drives and RAID Levels

A logical drive is a set of drives grouped together to operate under a given RAID level. Each controller is capable of supporting as many as eight logical drives. The logical drives can have the same or different RAID levels.

- A logical drive can be further divided into a maximum of 32 partitions.
- The total number of partitions must not exceed 128 partitions per RAID array. To create a maximum of 128 partitions, refer to [“Planning for 128 LUNs \(Optional\)” on page 5-27](#).

For a 12-drive array, the RAID array is preconfigured as follows:

- Two RAID 5 logical drives, consisting of five physical drives in each logical drive
- Two global spares

For a 5-drive array, the RAID array is preconfigured as follows:

- One RAID 5 logical drive, consisting of four physical drives
- One global spare

---

**Note** – While the ability to create and manage logical volumes remains a feature of Sun StorEdge 3000 Family FC and SCSI RAID arrays for legacy reasons, the size and performance of physical and logical drives have made the use of logical volumes obsolete. Logical volumes are unsuited to some modern configurations such as Sun Cluster environments, and do not work in those configurations. Avoid using them and use logical drives instead. For more information about logical drives, refer to the *Sun StorEdge 3000 Family RAID Firmware User's Guide*.

---

The following table highlights the RAID levels available.

**TABLE 5-5** RAID Level Definitions

RAID Level	Description
RAID 0	Striping without data redundancy; provides maximum performance.
RAID 1	Mirrored or duplexed disks; for each disk in the system, a duplicate disk is maintained for data redundancy. It requires 50% of total disk capacity for overhead.
RAID 3	Striping with dedicated parity. Parity is dedicated to one drive. Data is divided into blocks and striped across the remaining drives.
RAID 5	Striping with distributed parity; this is the best-suited RAID level for multi-tasking or transaction processing. The data and parity are striped across each drive in the logical drive, so that each drive contains a combination of data and parity blocks.
NRAID	NRAID stands for Non-RAID. The NRAID option in the firmware application is no longer used and is not recommended.
RAID 1+0	RAID 1+0 combines RAID 1 and RAID 0—mirroring and disk striping. RAID 1+0 allows multiple drive failure because of the full redundancy of the hard disk drives. If four or more hard disk drives are chosen for a RAID 1 logical drive, RAID 1+0 is performed automatically.
RAID (3+0)	A logical volume with several RAID 3 member logical drives.
RAID (5+0)	A logical volume with several RAID 5 member logical drives.

For more information about logical drives, spares, and RAID levels, refer to Chapter 1, Basic Concepts, in the *Sun StorEdge 3000 Family RAID Firmware User's Guide*.

## 5.6.6 Completing Basic Configuration

- Optionally define any additional partitions for each logical drive. Refer to [“Partitioning a Logical Drive \(optional\)” on page 5-24](#).
- Optionally add host SCSI IDs and more logical drives to create 128 LUNs. Refer to:
  - [“Planning for 128 LUNs \(Optional\)” on page 5-27](#),
  - [“Creating Additional Host IDs \(Optional\)” on page 5-10](#),
  - [“Creating Logical Drive\(s\) \(optional\)” on page 5-15](#).
- Map the logical drive(s) to the host LUNs (required). Refer to [“Mapping Logical Drive Partitions to Host LUNs” on page 5-29](#).

## 5.6.7 Creating Logical Drive(s) (optional)

The RAID array is already configured with one or two RAID 5 logical drives and one global spare. Each logical drive consists of a single partition by default.

This procedure is used to modify the RAID level and to add more logical drives, if necessary. In this procedure, you configure a logical drive to contain one or more hard drives based on the desired RAID level, and partition the logical drive into additional partitions.

---

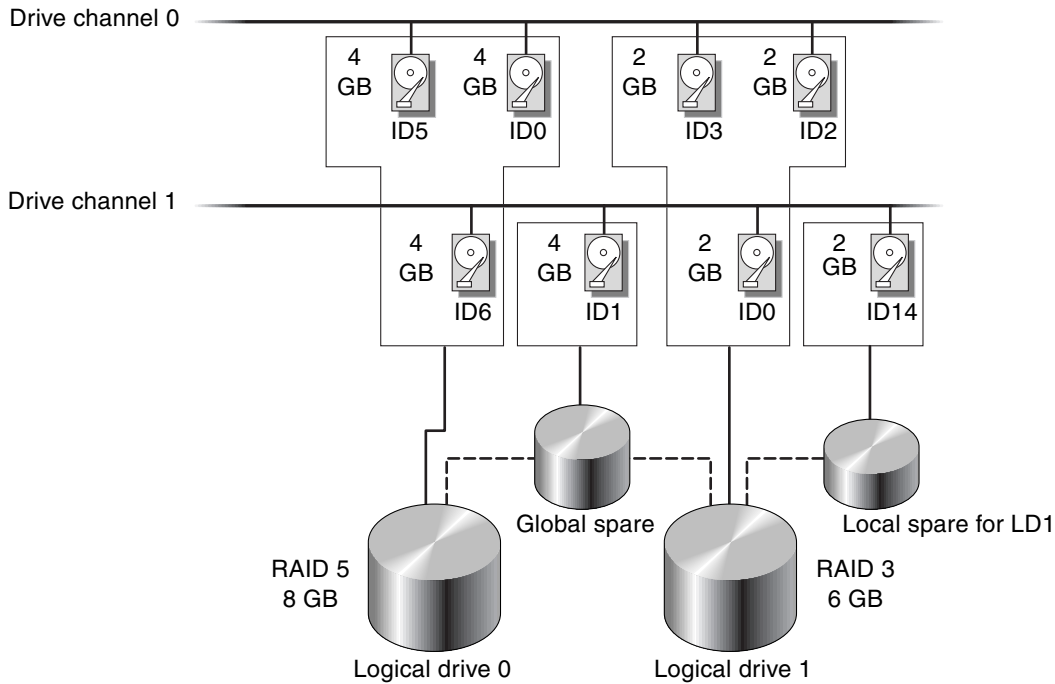
**Note** – If you want to assign 128 partitions to 128 LUNs in an array, you need to have a minimum of four logical drives (each with 32 partitions).

---

For redundancy across separate channels, you can also create a logical drive containing drives distributed over separate channels. You can then partition the logical unit into one or several partitions.

A *logical drive* consists of a group of SCSI drives. Each logical drive can be configured a different RAID level.

A drive can be assigned as the *local spare drive* to one specified logical drive, or as a *global spare drive* that is available to all logical drives on the RAID array. Spares can be part of automatic array rebuild. A spare is not available for logical drives with no data redundancy (RAID 0).



**FIGURE 5-2** Example Allocation of Local and Spare Drives in Logical Configurations

View the connected drives. Before configuring disk drives into a logical drive, it is necessary to understand the status of physical drives in your enclosure.

**1. Choose “view and edit Scsi drives.”**

This displays information of all the physical drives that are installed.

Quick view	Slot	Ch1	ID	Size(MB)	Speed	LG_DRV	Status	Vendor and Product ID
view		0	0	70007	160MB	0	ON-LINE	SEAGATE ST373405LC
view		0	1	70007	160MB	0	ON-LINE	SEAGATE ST373405LC

**2. Use the arrow keys to scroll through the table. Check that all installed drives are listed here.**

If a drive is installed but is not listed, it might be defective or might not be installed correctly, contact your RAID supplier.

When the power is on, the controller scans all hard drives that are connected through the drive channels. If a hard drive was connected after the controller completed initialization, use the “Scan SCSI Drive” function to let the controller recognize the newly added hard drive and configure it as a member of a logical drive.



---

**Caution** – Scanning an existing drive removes its assignment to any logical drive. All data on that drive is lost.

---

After you have determined the status of your disk drives, Create a logical drive with the following steps.

1. Choose “view and edit Logical drive” from the Main Menu.

Q	LG	ID	LV	RAID	Size(MB)	Status	0	#LN	#SB	#FL	NAME
V	0			NONE							
V	1			NONE							
V	2			NONE							
V	3			NONE							
S	4			NONE							
V	5			NONE							
V	6			NONE							
V	7			NONE							

2. Select the first available unassigned logical drive (LG) to proceed.

You can create as many as eight logical drives from drives on any SCSI bus.

3. When prompted to “Create Logical Drive? ” select Yes.

A pull-down list of supported RAID levels is displayed.

4. Select a RAID level for this logical drive.

RAID 5 is used in the following example screens.



For brief descriptions of RAID levels, refer to [“Reviewing Default Logical Drives and RAID Levels” on page 5-13](#). For more information about RAID levels, refer to Chapter 1 in the *Sun StorEdge 3000 Family RAID Firmware User’s Guide*.

5. Select your member drive(s) from the list of available physical drives.

The drives can be tagged for inclusion by highlighting the drive and then pressing Return. An asterisk (\*) mark is displayed on the selected physical drive(s).

To deselect the drive, press Return again on the selected drive. The "\*" mark disappears.

**Note** – You must select at least the minimum number of drives required per RAID level.

a. Use the up and down arrow keys and press Return to select more drives.

LG	ID	LU	RAID	Size(MB)	Status	0	#	RAID 5	NAME
0	Slot	Ch1	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID	
1		2	0	9999	40MB	NONE	NEW DRU	SEAGATE ST31055W	
2		2	1	9999	40MB	NONE	NEW DRU	SEAGATE ST31055W	
3		2	2	9999	40MB	NONE	NEW DRU	SEAGATE ST31055W	
4		2	4	9999	40MB	NONE	NEW DRU	SEAGATE ST31055W	
5			NONE						
6			NONE						
7			NONE						

b. After all physical drives have been selected for the logical drive, press the Esc key to continue to the next option.

After member physical drives are selected, a list of selections is displayed.

Maximum Drive Capacity :	34476MB
Assign Spare Drives	
Disk Reserved Space:	256 MB
Logical Drive Assignments	

6. (Optional) Set Maximum Physical Drive Capacity.

a. (Optional) Choose "Maximum Drive Capacity" from the menu.

The Maximum Available Drive Capacity and Maximum Drive Capacity is displayed.



---

**Note** – Changing the maximum drive capacity reduces the size of the logical drive and leave some disk space unused.

---

```

Maximum Available Drive Capacity(MB): 9999
Maximum Drive Capacity(MB)           : 9999
  
```

**b. (Optional) Type a desired drive capacity and press Return if you want to reduce drive capacity.**

As a rule, a logical drive should be composed of physical drives with the same capacity. A logical drive can only use the capacity of each drive up to the maximum capacity of the smallest drive.

**7. (Optional) Add a local spare drive from the list of unused physical drives.**

---

**Note** – A global spare cannot be created while creating a logical drive.

---

The spare chosen here is a local spare and automatically replaces any failed disk drive in this logical drive. The local spare is not available for any other logical drive.

**a. (Optional) Choose “Assign Spare Drives” from the menu.**

A list of available drives is displayed.

LG	ID	LV	RAID	Size(MB)	Status	O	#LN	#SB	#FL	NAME
P0	5794866F	NA	RAID1	3500	GOOD	S	2	0	0	
S1	7F5353A	NA	RAID1	3500	GOOD	S	2	0	0	
P2	54568151	NA	RAID1	3500	GOOD	S	2	0	0	
S3	2E7C1FD4	NA	RAID1	3500	GOOD	S	2	0	0	Scrunchy_4
4			NONE							
<div style="border: 1px solid black; padding: 5px;">           Maximum Drive Capacity : 34476MB            Assign Spare Drives            Disk Reserved Space: 256 MB            Logical Drive Assignments         </div>										

b. (Optional) Select a drive from the displayed list and press Return.

An asterisk is displayed in the Slot column of the selected drive.

LG	ID	LV	RAID	Size(MB)	Status	0	#LN	#SB	#FL	NAME
P0	5794866F	NA	RAID1	3500	GOOD	S	2	0	0	
S1	7F5353A	NA	RAID1	3500	GOOD	S	2	0	0	
P2	54568151	NA	RAID1	3500	GOOD	S	2	0	0	
S3	2E7C1FD4	NA	RAID1	3500	GOOD	S	2	0	0	Scrunchy_4
4			NONE							

Slot	Ch1	ID	Size(MB)	Speed	LG_DRV	Status	Vendor and Product ID
*	0	12	34732	160MB	NONE	FRM1 DRV	SEAGATE ST336605LSUN36G
	0	13	34732	160MB	NONE	NEW DRV	SEAGATE ST336605LSUN36G

---

**Note** – A logical drive created in a RAID level which has no data redundancy (RAID 0) does not support spare drive rebuilding.

---

c. (Optional) Press the Esc key to continue.

8. (Optional) Assign this logical drive to the secondary controller.

By default, all logical drives are automatically assigned to the primary controller.

If you use two controllers for the redundant configuration, a logical drive can be assigned to either of the controllers to balance workload. Logical drive assignment can be changed any time later.

a. Choose “Logical Drive Assignments.”

A confirmation dialog is displayed.

Redundant Controller Logical Drive Assign to Secondary Controller ? <input checked="" type="radio"/> Yes <input type="radio"/> No
--

b. Choose Yes to confirm. Press Esc key or No to exit from this window without changing the controller assignment.

9. Press the Esc key to continue.

A confirmation box is displayed on the screen.

- Verify all information in the box before choosing Yes to continue.

```

Raid Level           : RAID 5
Online SCSI Drives  : 4
Disk Reserved Space: 256 MB
Maximum Drive Capacity : 9999 MB
Spare SCSI Drives   : 1
Logical Drive Assignment: Primary Controller

Create Logical Drive ?
  Yes          No

```

A message indicates that the logical drive initialization has begun.

- Press Esc key to cancel the “Notification” prompt.
- After the logical drive initialization is completed, use the Esc key to return to the Main Menu.
- Choose “view and edit Logical drives” to view details of the created logical drive.

## 5.6.8 Preparing for Logical Drives Larger Than 253 Gbytes on Solaris Systems

The Solaris operating environment requires drive geometry for various operations, including `newfs`. For the appropriate drive geometry to be presented to the Solaris operating environment for logical drives larger than 253 Gbyte, change the default settings to “< 65536 Cylinders” and “255 Heads” to cover all logical drives over 253 GB and under the maximum limit. The controller automatically adjusts the sector count, and then the operating environment can read the correct drive capacity.

For Solaris operating environment configurations, use the values in the following table.

**TABLE 5-6** Cylinder and Head Mapping for the Solaris Operating Environment

Logical Drive Capacity	Cylinder	Head	Sector
< 253 GB	variable (default)	variable (default)	variable (default)
253 GB - 1 TB	< 65536 Cylinders	255	variable (default)

**Note** – Earlier versions of the Solaris operating environment do not support drive capacities larger than 1 terabyte.

For Solaris operating environment configurations, use the values in the following table.

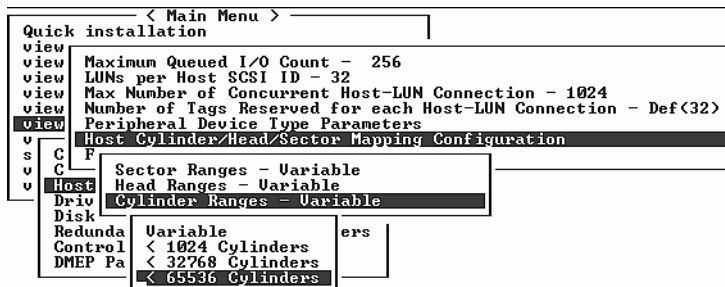
**TABLE 5-7** Cylinder and Head Mapping for the Solaris Operating Environment

Logical Drive Capacity	Cylinder	Head	Sector
< 253 GB	variable (default)	variable (default)	variable (default)
253 GB - 1 TB	< 65536 Cylinders *	255 *	variable (default)

\* These settings are also valid for all logical drives under 253 GBytes. After settings are changed, they apply to all logical drives in the chassis.

To revise the Cylinder and Head settings, perform the following steps.

1. Choose “view and edit Configuration parameters → Host-Side SCSI Parameters → Host Cylinder/Head/Sector Mapping Configuration → Sector Ranges - Variable → 255 Sectors → Head Ranges - Variable.”
2. Specify “255 Heads.”
3. Choose “Cylinder Ranges - Variable → < 65536 Cylinders.”



Refer to *Sun StorEdge 3000 Family RAID Firmware User's Guide* for more information about firmware commands used with logical drives.

## 5.6.9 Changing a Logical Drive Controller Assignment (Optional)

By default, logical drives are automatically assigned to the primary controller. If you assign half the drives to the secondary controller, the maximum speed and performance is somewhat improved due to the redistribution of the traffic.

To balance the workload between both controllers, you can distribute your logical drives between the primary controller (displayed as the Primary ID or PID) and the secondary controller (displayed as the Secondary ID or SID).

After a logical drive has been created, it can be assigned to the secondary controller. Then the host computer associated with the logical drive can be mapped to the secondary controller (see [“Mapping Logical Drive Partitions to Host LUNs” on page 5-29](#)).

To change a logical drive controller assignment:

1. Choose **“view and edit Logical drives.”**
2. **Select a logical drive.**
3. **Choose “logical drive Assignments.”**  
A confirmation dialog is displayed.

4. **Choose Yes to confirm.**

Q	LG	ID	LV	RAID	Size(MB)	Status	0	#LN	#SB	#FL	NAME
v	P0	6281CB39	NA	RAID5	200	GOOD	S	3	0	0	
v	View scsi drives										
v	Delete logical drive										
v	Partition logical drive										
v	logical drive Name										
S	logical drive Assignments										
v	Redundant Controller Logical Drive Assign to Secondary Controller ?										
v	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>										
	6			NONE							
	7			NONE							

The reassignment is evident from the “view and edit Logical drives” screen.

A “P” in front of the LG number means that the logical drive is assigned to the primary controller. An “S” in front of the LG number means that the logical drive is assigned to a secondary controller.

For example, “S1” indicates that logical drive 1 assigned to the secondary controller.

---

**Note** – The editable logical drive NAME name is used only in the RAID firmware administration and monitoring, and does not appear anywhere on the host. You can create a logical drive NAME after the logical drive is created: Select the logical drive in the previous screen, and press Return. Then select “logical drive name,” type the desired name, and press Return.

---

A confirmation message is displayed:

NOTICE: Change made to this setting will NOT take effect until the controller is RESET. Prior to resetting the controller, operation may not proceed normally. Do you want to reset the controller now?

**5. Choose Yes to reset the controller.**

You must reset the controller for the changes to take effect.

## 5.6.10 Partitioning a Logical Drive (optional)

You might divide a logical drive into several partitions, or use the entire logical drive as a single partition. You might configure up to 32 partitions for each logical drive.

For guidelines on setting up 128 LUNs, refer to [“Planning for 128 LUNs \(Optional\)” on page 5-27](#).



---

**Caution** – If you modify the size of a partition or logical drive, you lose all data on those drives.

---







7. Choose Yes to confirm.

The remaining capacity of the logical drive is automatically allotted to the next partition. In the following figure, a partition size of 3000 MB was entered; the remaining storage of 27000 MB is allocated to the partition below the partition created.

Q	LG	ID	LU	RAID	Size<MB>	Partition	Offset<MB>	Size<MB>	NAME
U	P0	B61E5AB	NA	RAID5	30000	0	0	3000	
U	1			NONE		1	3000	27000	
U	2			NONE		2			
U	3			NONE		3			

8. Repeat the preceding steps to partition the remaining capacity of your logical drive.

You can create up to 32 partitions per logical drive, with a total number of partitions not to exceed 128 partitions/LUNs per the RAID array.

---

**Note** – When you modify a partition or logical drive size, you must reconfigure all host LUN mappings. All the host LUN mappings are removed with any change to partition capacity. See [“Mapping Logical Drive Partitions to Host LUNs” on page 5-29.](#)

---



---

**Note** – When a partition of logical drive/logical volume is deleted, the capacity of the deleted partition is added to the partition above the deleted partition.

---

## 5.6.11 Planning for 128 LUNs (Optional)

If you want to create 128 LUNs which is the maximum number of storage partitions which can be mapped for a RAID array, set up one of the following configurations:

- Create four host IDs. Create four logical drives. Partition each logical drive into 32 partitions (4 times 32 = 128). Map the 128 partitions to the four host IDs. This is the most commonly used configuration.
- or
- Create six host IDs (this requires three host drives), perform one of the following steps, and then map the 128 partitions to the 6 host IDs.
  - Create 4 logical drives of 32 partitions each
  - Create 5 logical drives with total number of partitions equaling 128 (four logical drives with 25 partitions each and one with 28 partitions)

- Create 6 logical drives (5 logical drives with 21 partitions each and 1 with 23 partitions).

For details on how to add host IDs, refer to [“Creating Additional Host IDs \(Optional\)”](#) on page 5-10.

---

**Note** – For an overview of how partitions, LUNs, and host IDs work, refer to [“Mapping Logical Drive Partitions to Host LUNs”](#) on page 5-29.

---

To set up 128 LUNs, the following steps are required.

**1. Create a minimum of four host IDs.**

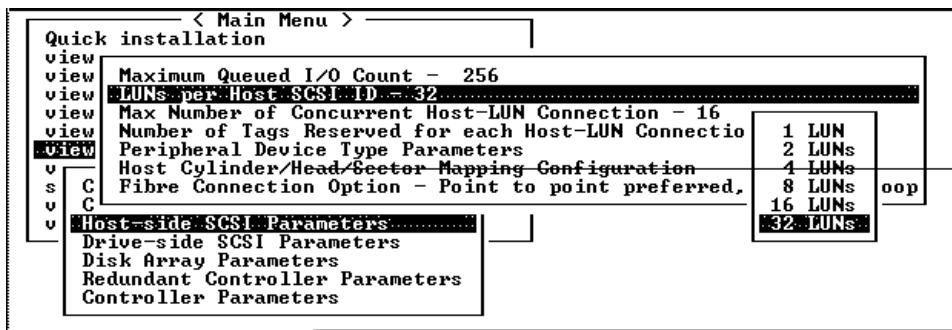
By default, you have two host IDs: Channel 1 ID 0 (primary controller) and Channel 3 ID 1 (secondary controller). You can have a total of two IDs per channel, one for the Primary Controller and one for the secondary controller.

For the detailed procedure, refer to [“Creating Additional Host IDs \(Optional\)”](#) on page 5-10.

**2. Confirm that the allowed number of LUNs per host ID is 32.**

Choose “view and edit Configuration parameters → host-side SCSI Parameters.”

If the “LUNs per Host SCSI ID” is not 32, highlight the line, press Return and select the number 32. Then choose Yes to confirm.



**3. Create at least four logical drives.**

For the detailed procedure, refer to [“Creating Logical Drive\(s\) \(optional\)”](#) on page 5-15.

**4. For each logical drive, create a number of partitions per logical drive until you reach a total of 128 partitions, then map those partitions to the host IDs.**

For the detailed procedures, refer to [“Partitioning a Logical Drive \(optional\)”](#) on page 5-24 and [“Mapping Logical Drive Partitions to Host LUNs”](#) on page 5-29.

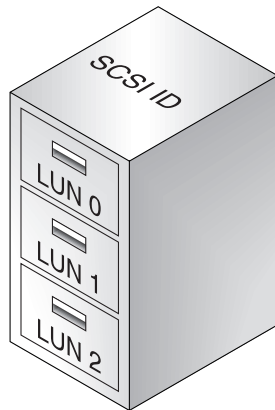
## 5.6.12 Mapping Logical Drive Partitions to Host LUNs

The next step is to map each storage partition as one system drive (host ID/LUN). The host SCSI adapter recognizes the system drives after re-initializing the host bus.

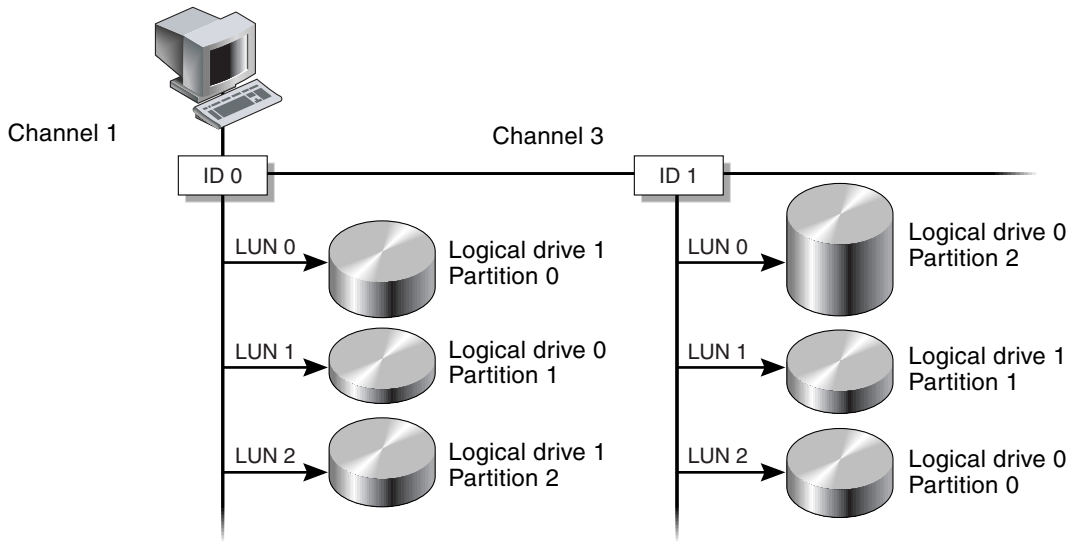
A SCSI channel (SCSI bus) can connect up to 15 devices (excluding the controller itself) when the Wide function is enabled (16-bit SCSI). Each device has one unique ID.

The following figure illustrates the idea of mapping a system drive to host ID/LUN combination.

- The SCSI ID is like a cabinet, and the drawers are the LUNs (LUN is short for logical unit number).
- Each cabinet (SCSI ID) can have up to 32 drawers (LUNs).
- Data can be stored into one of the LUNs of the SCSI ID. Most SCSI host adapters treat a LUN like another SCSI device.
- The maximum number of LUNs which can be created for a RAID array is 128. To create a total of 128 LUNs, refer to [“Planning for 128 LUNs \(Optional\)” on page 5-27](#).



Each SCSI ID/LUN looks like a storage device to the host computer.



**FIGURE 5-4** Mapping Partitions to Host ID/LUNs

To map a logical drive partition to a LUN, perform the following steps.

1. Choose “view and edit Host luns” from the Main Menu.
2. Select a specific host-channel ID and press Return. Select a logical drive if prompted.

```

      < Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
v
v CHL 1 ID 3 <Primary Controller>
v CHL 1 ID 4 <Secondary Controller>
v CHL 3 ID 3 <Primary Controller>
s CHL 3 ID 4 <Secondary Controller>
v E me List
v Logical Drive
v Logical Volume
  
```

3. Select a LUN number, and press Return.  
A list of available logical drives is displayed.
4. Select a logical drive.  
A list of available partitions is displayed.

5. Select a partition.

LUN	LV/LD	DRV	Partition	Size(MB)	RAID
0					
1					

LG	ID	LV	RAID	Size(MB)	Status	O	#LN	#SB	#FL	NAME
P0	62A-2975	NA	RAIDS	9998	GOOD	S	3	0	0	

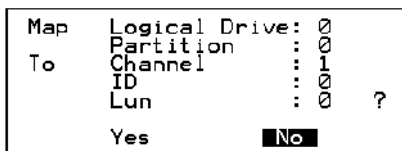
Partition	Offset(MB)	Size(MB)
0	0	597

6. Choose “Map Host LUN.”

A confirmation dialog is displayed.



7. Choose Yes to confirm.



The same partition might be mapped to multiple LUNs on multiple host channels. This feature is necessary for clustered environments and redundant path environments.

8. Press Esc key to return to the Main Menu.

9. Repeat [Step 1](#) through [Step 8](#) for each partition until all partitions are mapped to a LUN.

10. Choose “system Functions → Reset controller” and then choose Yes to reset the controller and implement the new configuration settings.

11. Each operating system or environment has a method for recognizing storage devices and LUNs, and may require the use of specific commands or modification of specific files. Be sure to check the information for your operating system/environment to ensure that you have performed the necessary commands or file edits.

For information about the different operating environments and operating systems, see:

- [“Configuring a Server Running the Solaris Operating Environment” on page F-1.](#)

- “Configuring a Windows 2000 Server” on page G-1.
- “Configuring a Linux Server” on page H-1.
- “Configuring an IBM Server Running the AIX Operating Environment” on page I-1.
- “Configuring an HP Server Running the HP-UX Operating Environment” on page J-1.
- “Configuring a Windows NT Server” on page K-1

## 5.6.13 Saving Configuration (NVRAM) to a Disk

You can select to back up your controller-dependent configuration information. We recommend using this function to save configuration information whenever a configuration change is made.

The logical configuration information is stored within the logical drive.

---

**Note** – A logical drive must exist for the controller to write NVRAM content onto it.

---

1. Choose “system Functions → controller maintenance → save NVRAM to disks.”

A confirmation dialog is displayed.

2. Choose Yes to confirm.

A prompt confirms that the NVRAM information has been successfully saved.



To restore the configuration, refer to “Restoring Your Configuration (NVRAM) From a File” on page 7-18.

---

## 5.7 Installing Software

The following software tools are available on the Sun StorEdge 3000 Family Professional Storage Manager CD, provided with your array:

- Sun StorEdge Configuration Service, a management and monitoring program
- Sun StorEdge Diagnostic Reporter software, a monitoring utility
- `sscli(1M)`, a command line utility to download firmware and display the event log

The Sun StorEdge 3000 Family Documentation CD provides the related user guides with detailed installation and configuration procedures for these tools.

### 5.7.1 Other Supported Software

For other supported software, see the release notes for your array.

### 5.7.2 Enabling VERITAS DMP

To enable VERITAS Dynamic Multi-Pathing (DMP) support on VERITAS Volume Manager Version 3.2 for a RAID array, perform the following steps.

1. **Configure at least two SCSI channels as host channels (channels 1 and 3 by default) and add additional SCSI host IDs if needed.**
2. **Connect host cables to the I/O host ports in step 1.**
3. **Map each LUN to two host channels to provide dual-pathed LUNs.**
4. **Add the correct SCSI string to `vxddladm` so VxVM can manage the LUNs as a multi-pathed JBOD.**

```
# vxddladm addjbod vid=SUN pid="StorEdge 3310"
# vxddladm listjbod
VID          PID          Opcode    Page     Code    Page Offset SNO length
=====
SEAGATE     ALL          PIDs      18      -1      36          12
SUN         StorEdge    3310      18       -1      36          12
```

5. **Reboot the hosts. System reboot is required to implement these changes.**





## Checking LEDs

---

This chapter describes the front- and rear-panel LEDs, which give the clear status of the operation of all drives and modules. Topics covered in this chapter are:

- “LEDs When Array Is First Powered On” on page 6-1
- “Front-Panel LEDs” on page 6-3
- “Rear-Panel LEDs” on page 6-5

---

### 6.1 LEDs When Array Is First Powered On

With the array powered up without the SCSI bus configuration cable installed while the array is not connected to a server, you should see the LED conditions described in [TABLE 6-1](#) and [TABLE 6-2](#).

**TABLE 6-1** Front-Panel LED Status When Array Is First Powered On

---

Drive LEDs	Solid green
Chassis ear LEDs	Solid green

---

**TABLE 6-2** Rear-Panel LED Status When Array Is First Powered On

---

<b>I/O Module:</b>	
ERROR LED	Blinking green (no bus configuration; invalid state)
TERM LED	Solid green (autotermination enabled)
SNGL LED	Inactive (no bus configuration; invalid state)

---

<b>Controller Module:</b>	
ACTIVITY LED	(Inactive (controller not busy))
Center LED (status symbol)	Slow blinking green: good primary controller Solid green: good secondary controller
Right LED (battery symbol)	Blinking green if battery is charging Solid green if battery is fully charged
Ethernet port LEDs	Inactive

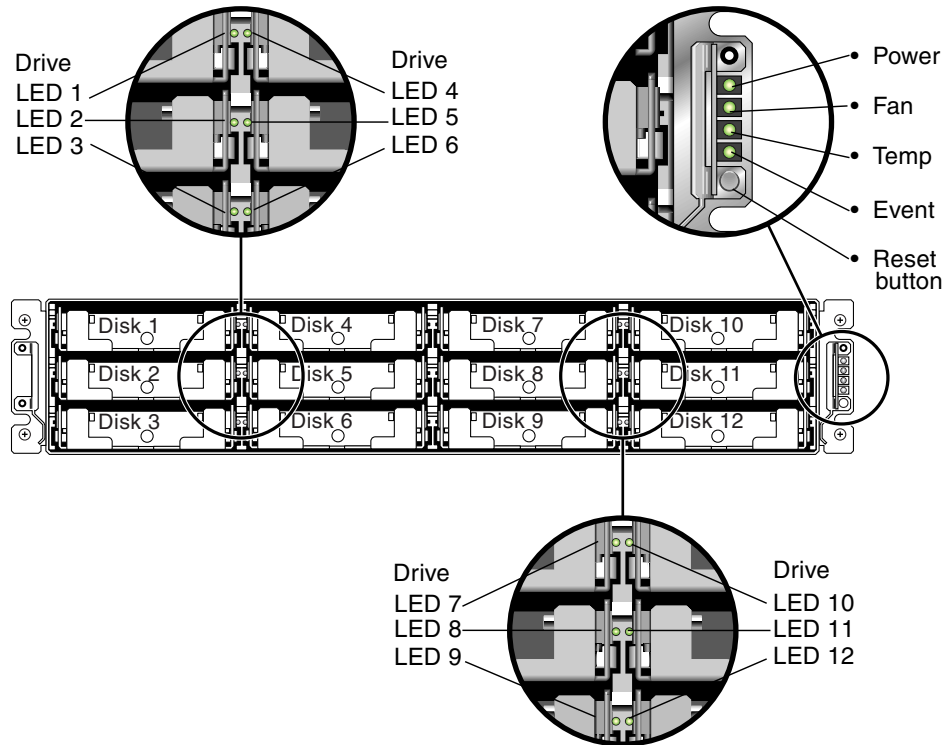
---

Power/fan module LEDs	Solid green
Event module LEDs	Solid green

---

## 6.2 Front-Panel LEDs

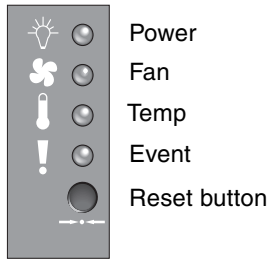
The drive LEDs are located between the rows of drives on the front panel (see following figure). The system operation LEDs are located on the right ear of the chassis.



**FIGURE 6-1** Front Panel LEDs

The following figure shows the front panel LEDs and the **Reset** button.

Use a paperclip to push the **Reset** button to silence a failed component alarm. See [“Silencing Audible Alarms” on page 7-5](#) for more information about silencing audible alarms.



**FIGURE 6-2** Chassis Ear LEDs and Reset Button on Front Panel

The following table lists the front-panel LEDs.

**TABLE 6-3** Front Panel LEDs

LED	LED Color	Description
Drive	Solid green Blinking green Solid amber	Good: Drive power-up and spin-up OK. Good: Drive activity. Failed: Drive failure.
Power (Light bulb icon) Monitors the DC output voltage within tolerance specification. Overcurrent protection shutting down any voltage output displayed. Voltage thresholds: +5 VDC +/- .25 VDC +12 VDC +/- .6 VDC Current thresholds: +5 VDC 35A +12 VDC 25A	Solid green Solid amber	Power supply good. Failed: One or more output voltages out of range.
Fan (Fan icon) Monitors the fan speed within nominal operational RPM specification of 5000 RPM.	Solid green Solid amber	Good: Over 900 RPM. Faulty: Failed: Under 900 RPM.
Temp (Thermometer icon) Monitors the temperature level and indicates overtemp status.	Solid green Solid amber	Good: Normal temperature. Failed: Temperature over threshold.
Event (Caution icon) Indicates any abnormal or failure event in the EMU.	Solid green Solid amber	Normal operation of EMUs. Abnormal event EMU.

See [“Sun StorEdge 3310 Temperature Sensor Locations”](#) on page 7-16 for a description of temperature sensors and their locations.

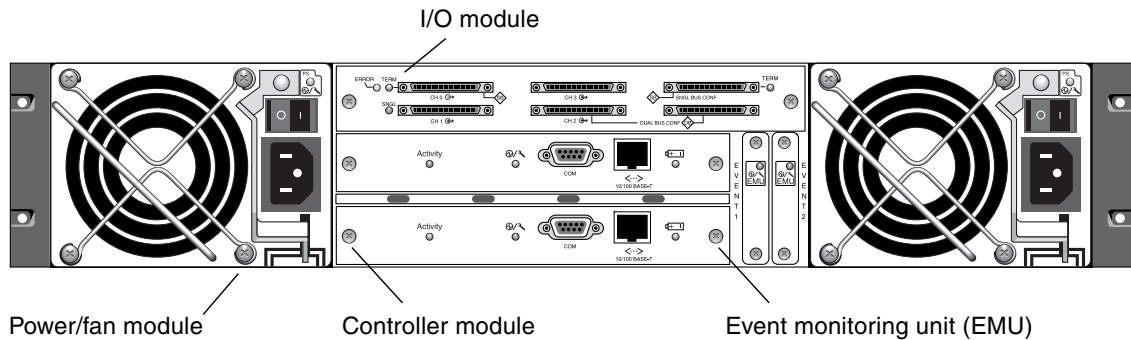
---

**Note** – To test that the LEDs work, using a paperclip, press and hold the Reset button for 5 seconds. All the LEDs should change from green to amber when you perform this test. Any LED that fails to light indicates a problem with the LED. When you release the Reset button, the LEDs return to their initial state.

---

## 6.3 Rear-Panel LEDs

The rear-panel LED colors indicate the conditions described in the following figures and tables. The following figure is the rear-panel with LEDs.



**FIGURE 6-3** Rear-Panel LEDs

If you see a blinking green or amber LED, you might have an incorrect configuration or a failed component.

---

**Note** – To test that the LEDs work, using a paperclip, press and hold the Reset button for 5 seconds. All the LEDs should change from green to amber when you perform this test. Any LED that fails to light indicates a problem with the LED. When you release the Reset button, the LEDs return to their initial state.

---

### 6.3.1 RAID Controller LEDs

The following figure shows the RAID controller LEDs on the rear panel.



**FIGURE 6-4** RAID Controller LEDs

The following table lists the RAID Controller LEDs.

**TABLE 6-4** RAID Controller LEDs

LED	Color	Status
Activity LED	LED inactive	Not active.
	Blinking green	Controller is busy.
	Solid green	Controller data is in cache.
	Solid amber	Power is lost and data is in memory.
Center LED (status symbol)	Slow-blinking green	Good: primary controller.
	Solid green	Good: secondary controller.
	Solid amber	Failed controller.
Right LED (battery symbol)	Blinking green	Battery is charging.
	Solid green	Battery is fully charged.
	Solid amber	Battery failed.
Ethernet 10/100 BASE-T LEDs (left and right corners of the connector)	Amber	Ethernet link is connected and working.
	Blinking green	Ethernet link is transmitting or receiving data.

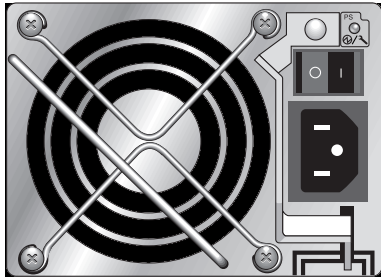
## 6.3.2 Other Rear-Panel LEDs

The following table lists the other rear-panel module LEDs.

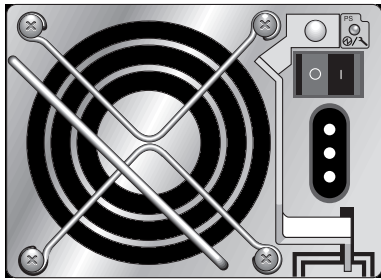
**TABLE 6-5** Other Rear-Panel Module LEDs

Module	LED Color	Status
<b>Power supply/fan</b>		
Monitors the DC output voltage within tolerance specification.	Solid green	Power supply good.
	Solid amber	Failed: one or more output voltages out of range.
Overcurrent protection shutting down any voltage output is also displayed.	Solid green	Good fan: Over 900 RPM.
	Solid amber	Faulty/failed: Under 900 RPM.
Voltage thresholds: +5 VDC +/-0.25 VDC +12 VDC +/-0.6 VDC		
Current Thresholds: +5 VDC 35A +12 VDC 25A		
<hr/>		
<b>EMU module</b>		
	Solid green	Good EMU module.
	Solid amber	Failed EMU module.
<hr/>		
<b>I/O module</b>		
TERM LEDs	Solid green	Autotermination enabled.
	Inactive LED	Autotermination disabled.
ERROR LED	Blinking green	Invalid single- or dual-cable configuration.
	Solid amber	Failed I/O module.
	Inactive LED	Valid single- or dual-bus configuration, and I/O module is good.
SNGL LED	Solid green	Cabled for single-bus configuration or no configuration.
	Inactive LED	Cabled for dual-bus configuration.

The AC and DC power supply and fan modules have a single LED.

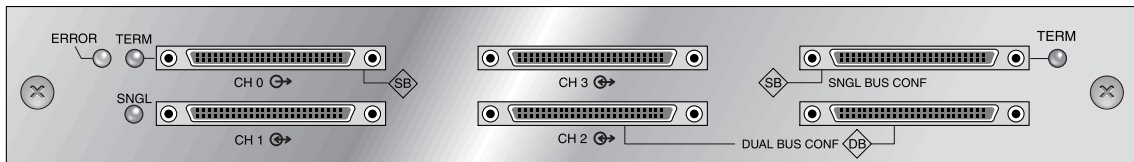


**FIGURE 6-5** AC Power Supply and Fan Module



**FIGURE 6-6** DC Power Supply and Fan Module

The I/O modules for a RAID array and for the expansion units have TERM, ERROR, and SNGL LEDs.



**FIGURE 6-7** I/O Module for a RAID Array



The following figure illustrates the I/O Module for the Expansion Unit.



**FIGURE 6-8** I/O Module for an Expansion Unit

The EMU module has a single LED.



**FIGURE 6-9** EMU Module



## Maintaining Your Array

---

This chapter covers the following maintenance and troubleshooting topics:

- “Introducing Key Screens and Commands” on page 7-2
  - “The Controller Firmware Initial Screen” on page 7-2
  - “Main Menu” on page 7-4
  - “Quick Installation (Reserved)” on page 7-4
- “Silencing Audible Alarms” on page 7-5
- “Checking Status Windows” on page 7-6
  - “Logical Drive Status Table” on page 7-7
  - “Logical Volume Status Table” on page 7-9
  - “SCSI Drive Status Table” on page 7-9
  - “SCSI Channel Status Table” on page 7-12
  - “Controller Voltage and Temperature Status” on page 7-14
  - “Viewing SAF-TE Status” on page 7-14
  - “Viewing Event Logs on the Screen” on page 7-17
- “Restoring Your Configuration (NVRAM) From a File” on page 7-18
- “Upgrading Firmware” on page 7-19
  - “Patch Downloads” on page 7-20
  - “Controller Firmware Upgrade Features” on page 7-20
  - “Installing Firmware Upgrades” on page 7-21
  - “Installing Controller Firmware Upgrades from the Firmware Application” on page 7-22
- “Replacing the Front Bezel and Ear Caps” on page 7-23

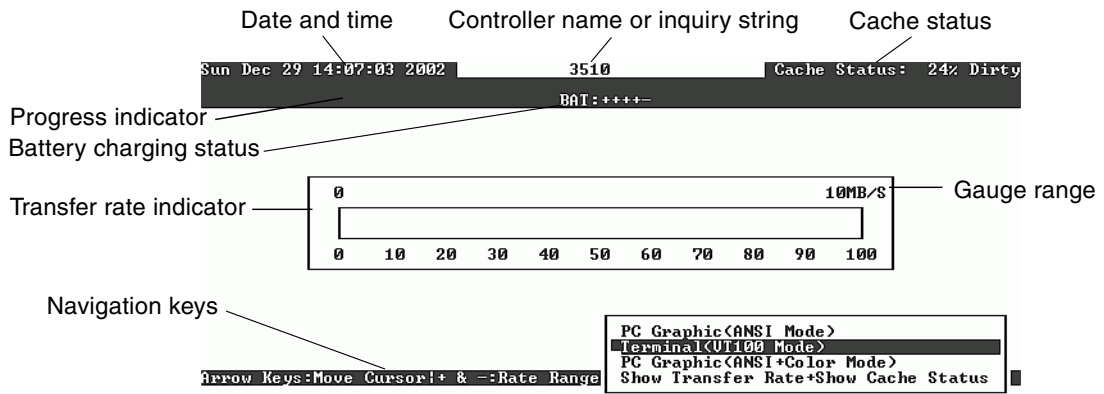
# 7.1 Introducing Key Screens and Commands

This section introduces the initial and the Main Menu RAID controller firmware screens.

## 7.1.1 The Controller Firmware Initial Screen

You see the following initial controller screen when you first access the RAID controller firmware via the controller COM port or Ethernet port.

To complete the connection to your management console, select the VT100 terminal mode or the appropriate mode for your communications software, and press Return.



**TABLE 7-1** Components of the Controller Firmware Window

Component	Description
Cursor bar	Move the cursor bar to a desired item, and then press Return to select.
Controller name	Identifies the type of controller.
Progress indicator	Indicates the current progress of an event.
Transfer rate indicator	Indicates the current data transfer rate.
Gauge range	Use + or - keys to change the transfer rate indicator's range. The default is 10 Mbyte per second.
Cache status	Indicates the percentage in the controller cache that differs from what is saved to disk.

**TABLE 7-1** Components of the Controller Firmware Window (Continued)

Component	Description
PC Graphic (ANSI mode)	Enters the Main Menu and operates in ANSI mode.
(VT-100 mode)	Enters the Main Menu and operates in VT-100 mode.
PC graphic (ANSI+color mode)	Enters the Main Menu and operates in ANSI color mode.
Show transfer rate+show cache status	Press Return on this item to show the cache status and transfer rate.

The progress indicator is displayed when necessary to indicate the percentage of completion of a particular task or event. Sometimes the event is represented by a descriptive title, such as “Drive Copying:”

LG	ID	LU	RAID	Size<MB>	Status	1	2	3	0	C	#LN	#SB	#FL	NAME
P0	488FFB8	NA	RAID5	103428	GOOD				7	B	4	0	0	
P1	34E	Drive Copying												
2		<div style="border: 1px solid black; width: 80%; margin: 0 auto; height: 20px; position: relative;"> <div style="position: absolute; top: -5px; left: 50%; transform: translate(-50%, -50%);">-----</div> </div>												
3		87% Completed												

Events showing full descriptive titles for the progress indicator include:

- Drive Copying
- Flash Erasing
- Flash Programming

For other events the progress indicator merely shows a two-letter code in front of the percentage completed. These codes and their meanings are shown in the following table:

**TABLE 7-2** Progress Indicator Prefix Meanings

Prefix	Description
IX:	Logical Drive Initialization
PX:	Parity Regeneration
EX:	Logical Drive Expansion
AX:	Add SCSI Drives

**Note** – For information about the battery status indicator, see [“Battery Status” on page 5-4](#).

## 7.1.2 Main Menu

After you have selected the mode and pressed Return on the initial screen, the Main Menu is displayed.

```
----- < Main Menu > -----
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices
system Functions
view system Information
view and edit Event logs
```

Use the arrow keys to move the cursor through the menu items, then press Return to choose a menu, or press the ESC (Escape) key to return to the previous menu/screen.

---

**Note** – Each menu option has one letter that is capitalized and highlighted. This letter represents a keyboard shortcut you can use to invoke that menu option. Using this keyboard shortcut achieves the same results as using the arrow keys to select the menu option and pressing the Return key.

---

## 7.1.3 Quick Installation (Reserved)

This menu option is not used in normal operation. It is reserved for special use in special situations, and only when directed by Technical Support.



---

**Caution** – Do not use this menu item unless directed by Technical Support. Using it results in the loss of your existing configuration and all data you have on the devices.

---

---

## 7.2 Silencing Audible Alarms

An audible alarm indicates that either a component in the array has failed or a specific controller event has occurred. Error conditions and controller events are reported by event messages and event logs. Component failures are also indicated by LED activity on the array.

---

**Note** – It is important to know the cause of the error condition because how you silence the alarm depends on the cause of the alarm.

---

To silence the alarm, perform the following steps:

1. **Check the error messages, event logs, and LED activity to determine the cause of the alarm.**

Component event messages include but are not limited to the following terms:

- SES/PLD firmware mismatch
- Temperature
- Cooling element
- Power supply
- Battery
- Fan
- Voltage sensor

---

**Caution** – Be particularly careful to observe and rectify a temperature failure alarm. If you detect this alarm, shut down the controller and the server as well if it is actively performing I/O operations to the affected array. Otherwise, system damage and data loss can occur.

---

See [“Failed Component Alarm Codes”](#) on page C-1 for more information about component alarms.

Controller event messages include but are not limited to the following terms:

- Controller
- Memory
- Parity
- Drive SCSI Channel
- Logical drive
- Loop connection

Refer to the “Event Messages” appendix in the *Sun StorEdge 3000 Family RAID Firmware User’s Guide* for more information about controller events.

2. Depending on whether the cause of the alarm is a failed component or a controller event and which application you are using, silence the alarm as specified in the following table.

**TABLE 7-3** Silencing the Alarm

Cause of Alarm	To Silence Alarm		
Failed Component Alarms	Firmware Application	Sun StorEdge Configuration Service	Command-Line Interface
	Use a paperclip to push the Reset button on the right ear of the array.		
Controller Event Alarms	From the Main Menu, choose "system Functions → Mute beeper." Refer to the <i>Sun StorEdge 3000 Family RAID Firmware User's Guide</i> for more information.	Refer to "Updating the Configuration" in the <i>Sun StorEdge Configuration Service User's Guide</i> for information about the "Mute beeper" command.	Run <code>mute [controller]</code> . Refer to the <i>Sun StorEdge 3000 Family CLI User's Guide</i> for more information.

---

**Note** – Pushing the Reset button has no effect on controller event alarms and muting the beeper has no effect on failed component alarms.

---

## 7.3 Checking Status Windows

The status windows used to monitor and manage the array are described in the following sections:

- "Logical Drive Status Table" on page 7-7
- "Logical Volume Status Table" on page 7-9
- "SCSI Drive Status Table" on page 7-9
- "SCSI Channel Status Table" on page 7-12
- "Controller Voltage and Temperature Status" on page 7-14
- "Viewing SAF-TE Status" on page 7-14
- "Viewing Event Logs on the Screen" on page 7-17





**TABLE 7-4** Parameters Displayed in the Logical Drive Status Window *(Continued)*

Parameter	Description
FATAL FAIL	More than one drive member in a logical drive has failed.
REBUILDING	The logical drive is rebuilding.
DRV ABSENT	One of the disk drives cannot be detected.
INCOMPLETE	Two or more member disk drives in this logical drive have failed.
O	Indicates the performance optimization set when the logical drive was initialized. This cannot be changed after the logical drive is created. S Optimization for Sequential I/O R Optimization for Random I/O
#LN	Total number of drive members in this logical drive.
#SB	Number of standby drives available for the logical drive. This includes local spare and global spare disk drives available for the logical drive.
#FL	Number of failed disk drive member(s) in the logical drive.
Name	Logical drive name (user configurable)

To handle failed, incomplete, or fatal fail status, see [“Identifying a Failed Drive for Replacement” on page 8-8](#) and [“Recovering From Fatal Drive Failure” on page 8-11](#).

## 7.3.2 Logical Volume Status Table

To check status and to configure logical volumes, from the Main Menu choose “view and edit logical volumes,” and press Return. The screen displays the status of all logical volumes. A logical volume may contain up to eight logical drives.

Q	LV	ID	Size(MB)	#LD	ses parameters vices
v	P0	466C5C8D	60000	1	
v	1				
v	2				
v	3				
s	4				
v	5				
v	6				
v	7				

**TABLE 7-5** Parameters Displayed in the Logical Volume Status Window

Parameters	Description
	Logical volume number where P = primary controller and S = secondary controller
ID	Logical volume ID number (controller-generated)
Size (MB)	Capacity of the logical volume in megabytes
#LD	The number of logical drive(s) in this logical volume

## 7.3.3 SCSI Drive Status Table

To check and configure physical SCSI drives, from the Main Menu choose “view and edit scsi Drives,” and press Return.

The following screen displays the status of all SCSI drives.

If there is a drive installed but not listed, the drive may be defective or not installed correctly.

When power is on, the controller scans all hard drives that are connected through the drive channels. If a hard drive was connected after the controller completes initialization, use “Scan SCSI Drive” under the “view and edit scsi Drives” command to let the controller recognize the newly added hard drive and configure it as a member of a logical drive.

Quick view view view view	Slot	Chl	ID	Size(MB)	Speed	LG_DRV	Status	Vendor and Product ID
		0	0	70007	160MB	0	ON-LINE	SEAGATE ST373405LC
		0	1	70007	160MB	0	ON-LINE	SEAGATE ST373405LC

**TABLE 7-6** Parameters Displayed in the Drive Status Window

Parameters	Description
Slot	Slot number of the SCSI drive
Chl	SCSI channel of the connected drive
ID	SCSI ID of the drive
Size (MB)	Drive capacity in megabytes
Speed	xxMB Maximum synchronous transfer rate of this drive. Async The drive is using asynchronous mode.
LG_DRV	x The SCSI drive is a drive member of logical drive x. If Status shows “STAND-BY,” the SCSI drive is a local spare drive of logical drive x.
Status	<p>GLOBAL The SCSI drive is a global spare drive.</p> <p>INITING The drive is initializing.</p> <p>ON-LINE The drive is in good condition.</p> <p>REBUILD The drive is rebuilding.</p> <p>STAND-BY Local spare drive or global spare drive. The local spare drive’s LG_DRV column shows the logical drive number. The global spare drive LG_DRV column shows “Global.”</p> <p>NEW DRV The new drive has not been configured to any logical drive or as a spare drive.</p> <p>USED DRV The drive was previously configured as part of a logical drive from which it has been removed; it still contains data from this logical drive.</p> <p>FRMT DRV The drive has been formatted with reserved space allocated for controller-specific information.</p> <p>BAD Failed drive.</p>

**TABLE 7-6** Parameters Displayed in the Drive Status Window (*Continued*)

Parameters	Description
ABSENT	Drive slot is not occupied.
MISSING	Drive once existed, but is now missing.
SB-MISS	Spare drive missing.
Vendor and Product ID	Vendor and product model information of the drive.

A physical drive has a USED status when it was once a part of a logical drive but no longer is. This can happen, for instance, when a drive in a RAID 5 array is replaced by a spare drive and the logical drive is rebuilt with the new drive. If the removed drive is later replaced in the array and scanned, the drive status is identified as USED since the drive still has data on it from a logical drive.

When the RAID set is deleted properly, this information is erased and the drive status is shown as FRMT rather than USED. A drive with FRMT status has been formatted with either 64 KB or 256 MB of reserved space for storing controller-specific information, but has no user data on it.

If you remove the reserved space, using the “View and Edit SCSI drives” menu, the drive status changes to NEW.

To handle BAD drives, refer to [“Identifying a Failed Drive for Replacement” on page 8-8](#).

If two drives show BAD and MISSING status, see [“Recovering From Fatal Drive Failure” on page 8-11](#).

---

**Note** – If a drive is installed but not listed, the drive may be defective or installed incorrectly.

---

---

**Note** – When power is on, the controller scans all hard drives that are connected through the drive channels. If a hard drive was connected after the controller completes initialization, use the “Scan scsi drive” submenu option after you have selected a drive to let the controller recognize the newly added hard drive and configure it as a member of a logical drive.

---

## 7.3.4 SCSI Channel Status Table

To check and configure SCSI channels, from the Main Menu choose “view and edit Scsi channels,” and press Return. The resulting screen displays the status of all SCSI channels for this controller.




---

**Caution** – Do not change the PID and SID values of drive channels.

---

```

      < Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
  
```

Chl	Mode	PID	SID	DefSynClk	DefWid	S	Term	CurSynClk	CurWid
0	Drive	7	6	80.0MHz	Wide	L	On	80.0MHz	Wide
1	Host	0		80.0MHz	Wide	L	On	80.0MHz	Wide
2	Drive	7	6	80.0MHz	Wide	L	On	80.0MHz	Wide
3	Host	NA	2	80.0MHz	Wide	L	On	80.0MHz	Wide
6(D)	RCCOM								

A mapped host channel sometimes shows the current sync clock as “Async/Narrow” and correctly identify the change in speed. The host adapter driver is designed to downgrade the negotiation rate on certain errors (predominantly parity errors). There is little or no performance change.

**TABLE 7-7** Parameters Displayed in the SCSI Channel Window

Parameters	Description
Chl	SCSI channel's ID.
Mode	Channel mode.
	RCCom            Redundant controller communication channel
	Host              The channel is functioning as a host channel.
	Drive             The channel is functioning as a drive channel.
PID	Primary controller's SCSI ID mapping:
	*                  Multiple SCSI IDs were applied (host channel mode only).

**TABLE 7-7** Parameters Displayed in the SCSI Channel Window (*Continued*)

Parameters	Description
	x The SCSI ID for host LUNs mapped to this channel in Host Channel mode. SCSI ID for the primary controller in drive channel mode.
	NA No SCSI ID applied.
SID	Secondary controller's SCSI ID mapping:
	* Multiple SCSI IDs (Host Channel mode only).
	x The SCSI ID for host LUNs mapped to this channel in host channel mode. SCSI ID for the secondary controller in drive channel mode.
	NA No SCSI ID applied
DefSynClk	Default SCSI bus synchronous clock:
	xx.xMHz Maximum synchronous transfer rate set to xx.x.
	Async Channel is set for asynchronous transfers.
DefWid	Default SCSI bus width:
	Wide Channel is set to allow wide (16-bit) transfers.
	Narrow Channel is set to allow narrow (8-bit) transfers.
S	Signal:
	S Single-ended
	L LVD
	F Fibre
Term	Terminator status:
	On Termination is enabled.
	Off Termination is disabled.
	NA For a redundant controller communications channel (RCCOM).
CurSynClk	Current SCSI bus synchronous clock:
	xx.xMHz The current speed at which the channel is communicating.
	Async. The channel is communicating asynchronously or not device is detected.
	(empty) The default SCSI bus synchronous clock has changed. Reset the controller for changes to take effect.
CurWid	Current SCSI bus width:

**TABLE 7-7** Parameters Displayed in the SCSI Channel Window (*Continued*)

Parameters	Description
Wide	The channel is currently servicing wide 16-bit transfers.
Narrow	The channel is currently servicing narrow 8-bit transfers.
(empty)	The default SCSI bus width has changed. Reset the controller for the changes to take effect.

## 7.3.5 Controller Voltage and Temperature Status

To check the status of controller voltage and temperature, perform the following steps.

1. Choose “view and edit Peripheral devices → Controller Peripheral Device Configuration → View Peripheral Device Status.”

The components checked for voltage and temperature are displayed on the screen and are defined as normal or out-of-order.

The screenshot shows a menu titled "< Main Menu >". The menu items are: Quick installation, view and edit Logical drives, view and edit logical Volumes, view and edit Host luns, view an, view an, view an, view an, view an, s, v, v, View, Set, Defi, Adju, Cont. A sub-menu is open for "View", showing: +3.3V, +5V, +12V, CPU Temperature, Board1 Temperature, Board2 Temperature. The "View" sub-menu is further expanded to show "View Peripheral Device Status" and "Voltage and Temperature Parameters".

ITEM	VALUE	STATUS
+3.3V	3.384V	Operation Normally
+5V	5.126V	Operation Normally
+12V	12.199V	Operation Normally
CPU Temperature	37.0 (C)	Temperature within Safe Range
Board1 Temperature	50.5 (C)	Temperature within Safe Range
Board2 Temperature	50.0 (C)	Temperature within Safe Range

2. Choose “Voltage and Temperature Parameters” to view or edit the trigger thresholds that determine voltage and temperature status.

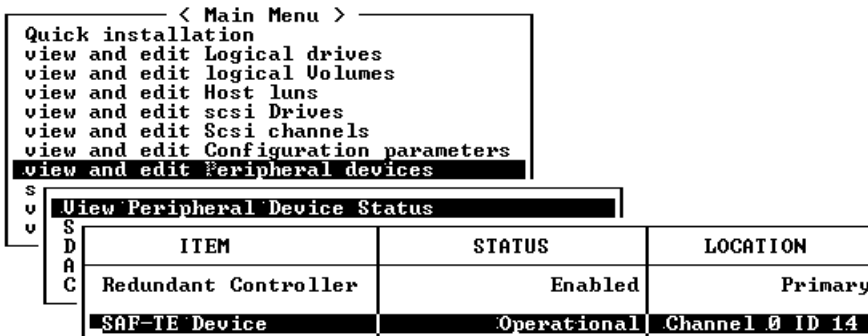
## 7.3.6 Viewing SAF-TE Status

The SAF-TE controller is located on the SCSI I/O module.

To check the status of SAF-TE components (temperature sensors, cooling fans, the beeper speaker, power supplies, and slot status), perform the following steps.



1. Choose “view and edit Peripheral devices → View Peripheral Device Status → SAF-TE Device.”



The temperature sensor displays the current temperature of each sensor in degrees Fahrenheit.

The drive slot status indicates that a slot is filled by displaying a SCSI ID number:

- Single bus configuration: 0 through 13 ID numbers if all 12 drives are filled. SCSI IDs 6 and 7 are reserved for host communication. If there is an empty slot, the message “No Device Inserted” is displayed. See [FIGURE 7-1](#).
- Dual-bus configuration (not supported): the message “No Device Inserted” for the six drives on one channel and six ID numbers for the second channel. See [FIGURE 7-2](#).

Product ID	StorEdge 2310 A	Drive Slot 1	SCSI ID 1
Revision Level	0.62	Drive Slot 2	SCSI ID 2
Unique ID	3030303132323338	Drive Slot 3	SCSI ID 3
Cooling Fan 0	Operational	Drive Slot 4	SCSI ID 4
Cooling Fan 1	Operational	Drive Slot 5	SCSI ID 5
Power Supply 0	Operational and On	Drive Slot 6	SCSI ID 8
Power Supply 1	Operational and On	Drive Slot 7	SCSI ID 9
Temp Sensor 0	78	Drive Slot 8	SCSI ID 10
Temp Sensor 1	78	Drive Slot 9	SCSI ID 11
Temp Sensor 2	80	Drive Slot 10	SCSI ID 12
Temp Sensor 3	86	Drive Slot 11	SCSI ID 13
Temp Sensor 4	91		
Temp Sensor 5	82		
Temp Sensor 6	82		
Temp Alert	Normal		
Speaker Status	Off or No Speaker		
Drive Slot 0	SCSI ID 0		

FIGURE 7-1 Example of SAF-TE Device Status Window in a Single-Bus Configuration

In the following dual-bus configuration example, the SAF-TE window displays “No Device Inserted” for six drives which are actually inserted into slots. The SAF-TE protocol does not support a dual-bus configuration and only recognizes one bus (half the drives) if you have a dual-bus configuration.

Product ID	StorEdge 3310 A	Drive Slot 1	No Device Inserted
Revision Level	A000	Drive Slot 2	No Device Inserted
Unique ID	3132333435362020	Drive Slot 3	No Device Inserted
Cooling Fan 0	Operational	Drive Slot 4	No Device Inserted
Cooling Fan 1	Operational	Drive Slot 5	No Device Inserted
Power Supply 0	Operational and On	Drive Slot 6	SCSI ID 0
Power Supply 1	Operational and On	Drive Slot 7	SCSI ID 1
Temp Sensor 0	89	Drive Slot 8	SCSI ID 2
Temp Sensor 1	86	Drive Slot 9	SCSI ID 3
Temp Sensor 2	82	Drive Slot 10	SCSI ID 4
Temp Sensor 3	77	Drive Slot 11	SCSI ID 5
Temp Sensor 4	82		
Temp Sensor 5	84		
Temp Sensor 6	82		
Temp Alert	Normal		
Speaker Status	Off or No Speaker		
Drive Slot 0	No Device Inserted		

FIGURE 7-2 Example of SAF-TE Device Status Window in a Dual-Bus Configuration

2. To check that you have all slots filled in a dual-bus configuration, see [“SCSI Drive Status Table” on page 7-9](#) and check the column labeled “Chl ID.”

TABLE 7-8 Sun StorEdge 3310 Temperature Sensor Locations

Temp Sensor ID	Description
0	Port A Drive Midplane Temperature #1
1	Port A Drive Midplane Temperature #2
2	Port A Power Supply Temperature #1 (PS 0)
3	Port B EMU Temperature #1 (left module as seen from back)
4	Port B EMU Temperature #2 (right module as seen from back)
5	Port B Drive Midplane Temperature #3
6	Port B Power Supply Temperature #2 (PS 1)
CPU Temperature	CPU on Controller
Board1 Temperature	Controller
Board2 Temperature	Controller

## 7.3.7 Viewing Event Logs on the Screen

A controller event log records an event or alarm which occurs after the system is powered on.

---

**Note** – The Event Monitoring Units in each RAID unit and each Expansion Unit send messages to the controller log which report problems and status of the fans, temperature, and voltage.

---



---

**Caution** – Powering off or resetting the controller automatically deletes all recorded event logs.

---

To view the event logs on screen:

1. Choose “view and edit Event logs” on the Main Menu.

```
----- < Main Menu > -----
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices
system Functions
view system Information
view and edit Event logs
```

A log of recent events is displayed.

**TABLE 7-9** Example Event Logs

---

```
[0181] Controller Initialization Completed
[2181] LG:0 Logical Drive NOTICE: Starting Initialization
[2182] Initialization of Logical Drive 0 Completed
[2181] LG:1 Logical Drive NOTICE: Starting Initialization
[2182] Initialization of Logical Drive 2 Completed
```

---

---

**Note** – The controller can store up to 1000 event logs. An event log can record a configuration or operation event as well as an error message or alarm event

---

2. Use your arrow keys to move up and down through the list.

3. To clear the events from the log once you've read them, use your arrow keys to move down to the last event you want to clear and press Return.

A "Clear Above xx Event Logs?" confirmation message is displayed.

4. Choose Yes to clear the recorded event logs.

---

**Note** – Resetting the controller clears the recorded event logs. To retain event logs after controller resets, you can install and use the Sun StorEdge Configuration Service program.

---

---

## 7.4 Restoring Your Configuration (NVRAM) From a File

If you have saved a configuration file and want to apply the same configuration to another array or reapply it to the array that had the configuration originally, you must be certain that the channels and SCSI IDs in the configuration file are correct for the array where you are restoring the configuration.

The NVRAM configuration file restores all configuration settings (channel settings, and host IDs) but does not rebuild logical drives.

To save a configuration file, see ["Saving Configuration \(NVRAM\) to a Disk" on page 5-32.](#)



---

**Caution** – If the channels or SCIS IDs are not a correct match for the array, you lose access to the mismatched channels or drives when you restore the configuration with the configuration file.

---

---

**Note** – In the Sun StorEdge Configuration Service program, you can save a configuration file that can restore all configurations and rebuild all logical drives. However, it also erases all data when it rebuilds all logical drives, so operation is performed only when no data has been stored or all data has been transferred to another array.

---

To restore configuration settings from a saved NVRAM file, perform the following steps.

1. **Choose “system Functions → Controller maintenance → Restore NVRAM from disks.”**

A confirmation dialog is displayed.

2. **Choose Yes to confirm.**

A prompt notifies you that the controller NVRAM data has been successfully restored from disks.

---

## 7.5 Upgrading Firmware

From time to time, firmware upgrades are made available as patches that you can download from SunSolve™ Online, located at <http://sunsolve.sun.com>. Each patch applies to one or more particular pieces of firmware, including:

- Controller firmware
- Drive firmware
- SES firmware (Fibre Channel only)
- PLD firmware (Fibre Channel only)
- SAF-TE firmware (SCSI only)

SunSolve has extensive search capabilities that can help you find these patches, as well as regular patch reports and alerts to let you know when firmware upgrades and other patches become available. In addition, SunSolve provides reports about bugs that have been fixed in patch updates.

Each patch includes an associated README text file that provides detailed instructions about how to download and install that patch. But, generally speaking, all firmware downloads follow the same steps:

- Locating the patch on SunSolve that contains the firmware upgrade you want.
- Downloading the patch to a location on your network.
- Using your array software (SSCS or `sscli(1M)` or array firmware, in the case of controller firmware, to “flash” the firmware to the device it updates.

## 7.5.1 Patch Downloads

1. Once you have determined that a patch is available to update firmware on your array, make note of the patch number or use SunSolve Online's search capabilities to locate and navigate to the patch.
2. Read the README text file associated with that patch for detailed instructions on downloading and installing the firmware upgrade.
3. Follow those instructions to download and install the patch.

## 7.5.2 Controller Firmware Upgrade Features

The following firmware upgrade features apply to the controller firmware:

- Redundant Controller Rolling Firmware Upgrade

When download is performed on a dual-controller system, firmware is flashed onto both controllers without interrupting host I/O. When the download process is complete, the primary controller resets and lets the secondary controller take over the service temporarily. When the primary controller comes back on-line, the secondary controller hands over the workload and then resets itself so the new firmware can take effect. This rolling upgrade is automatically performed by controller firmware, and the user's intervention is not necessary.

- Automatically Synchronized Controller Firmware Versions

A controller that replaces a failed unit in a dual-controller system is often running a newer release of firmware version. To maintain compatibility, the surviving primary controller automatically updates the firmware running on the replacement secondary controller to the firmware version of the primary controller.

---

**Note** – When you upgrade your firmware, the `format(1M)` command still shows the earlier revision level. To correct this you need to update the drive label, using the `autoconfigure` option (option 0) of the `format(1M)` command. When you select `label`, the drive is labelled with the updated firmware version.

---

- Upgrading Firmware Using the Serial Port Connections (from Windows hosts)

The firmware can be downloaded to the RAID controller by using an ANSI/VT-100 compatible emulation program. The emulation program must support the ZMODEM file transfer protocol. Emulation programs such as HyperTerminal, Telix, and PROCOMM Plus can perform the firmware upgrade.

## 7.5.3 Installing Firmware Upgrades

It is important that you run a version of firmware that is supported for your array.



---

**Caution** – Before updating your firmware, make sure that the version of firmware you want to use is supported for your array. Refer to the Release Notes for your array for Sun Microsystems patches containing firmware upgrades that are available for your array, and to SunSolve Online for subsequent patches containing firmware upgrades.

---

If you are downloading a Sun Microsystems patch that includes a firmware upgrade, the README file associated with that patch tells you which Sun StorEdge 3000 Family arrays support this firmware release.

To download new versions of controller firmware, disk drive firmware, SAF-TE firmware, use one of the following tools:

- Sun StorEdge CLI (with an in-band SCSI connection, for Linux and Windows hosts, and for servers running the Solaris operating environment)
- Sun StorEdge Configuration Service program (with an in-band SCSI connection, for Linux and Windows hosts and servers running the Solaris operating environment)
- Firmware application (for controller firmware download only from a Windows host with an out-of-band serial port connection). Refer to [“Installing Controller Firmware Upgrades from the Firmware Application”](#) on page 7-22.

---

**Note** – To download firmware to disk drives or SAF-TE firmware to a JBOD directly attached to a host, you must use the Sun StorEdge Configuration Service program.

---

---

**Note** – For instructions on how to download firmware to disk drives in a JBOD directly attached to a host, refer to the README file in the patch that contains the firmware.

---



---

**Caution** – You should not use both in-band and out-of-band connections at the same time to manage the array or you might cause conflicts between multiple operations.

---

## 7.5.4 Installing Controller Firmware Upgrades from the Firmware Application

You can use a Windows terminal emulation session with ZMODEM capabilities to access the firmware application. To upgrade the RAID controller firmware through the serial port and the firmware application, perform the following steps.

1. **Establish the serial port connection.**
  - To upgrade both the boot record and the firmware binary, perform step 2.
  - To upgrade only the firmware binary, perform step 3.
2. **Upgrade both boot record and firmware binaries with the following steps.**
  - a. **Choose “system Functions → Controller maintenance → Advanced Maintenance Functions → Download Boot Record and Firmware.”**
  - b. **Set ZMODEM as the file transfer protocol of your emulation software.**
  - c. **Send the Boot Record Binary to the controller:**

In HyperTerminal, go to the “Transfer” menu and choose “Send file.” If you are not using HyperTerminal, choose “Upload” or “Send” (depending on the software).
  - d. **After the Boot Record has been downloaded, send the Firmware binary to the controller:**

In HyperTerminal, go to the “Transfer” menu and choose “Send file.” If you are not using HyperTerminal, choose “Upload” or “Send” (depending on the software).

When the firmware update is complete, the controller automatically resets itself.
3. **Upgrade the firmware binary only with the following steps.**
  - a. **Choose “system Functions → Controller maintenance → Download Firmware.”**

A confirmation message is displayed.
  - b. **Select “Ignore.”**

---

**Note** – The serial port communication must be at a rate of 38,400 Baud. If you select OK to accept a rate of 96000 Baud, you cannot communicate through the serial port.

---

- c. **Set ZMODEM as the file transfer protocol of your emulation software.**



**d. Send the firmware binary to the controller:**

In HyperTerminal, select “Send file.” If you are not using Hyper, choose “Upload” or “Send” (depending on the software).

When the firmware update is complete, the controller automatically resets itself.

---

## 7.6 Replacing the Front Bezel and Ear Caps

Some procedures require that you remove the front bezel and the small vertical plastic caps on either side of the bezel that cover the rackmount tabs. These rackmount tabs are often referred to as “ears.”

### 7.6.1 Removing the Front Bezel and Ear Caps

1. Use the provided key to unlock both bezel locks.
2. Grasp the front bezel cover on both sides and pull it forward and then down.

---

**Note** – For many operations, including replacing disk drives, it is not necessary to further detach the bezel, since dropping it down moves it sufficiently out of the way.

---

3. Press the right bezel arm (hinge) towards the left side to release it from the chassis hole.

The left hinge also disengages.

4. Note the location of the chassis bezel holes on each ear.
5. Remove the plastic caps from the front left and right ears of the array.  
Both plastic caps are removed in the same way.
  - a. Squeeze both sides of the cap at the top and the bottom.
  - b. Turn the cap toward the center of the array until it disengages and pull it free.

## 7.6.2 Placing the Bezel and Ear Caps Back Onto the Chassis

Each plastic cap is replaced in the same way, but be sure to place the cap with LED labels on the right ear.

1. **Align the inside round notches of the cap with the round cylindrical posts (ball studs) on the ear.**
2. **Push the top and bottom of the ear cap onto the ear, pressing in on the top side toward the center of the array first.**
3. **Continue pushing the top and bottom of the ear cap onto the ear, pressing on the side toward the outside of the array.**

Do not use force when placing a cap on an ear.

---

**Caution** – Be careful to avoid “wedging” the Reset button below the LEDs on the right ear when you replace the plastic cap over it.

---

4. **Insert the bezel arms into the chassis holes.**
5. **Lift the bezel into position and press it onto the front of the chassis until it is flush with the front.**
6. **Use the key to lock both bezel locks.**

## Troubleshooting Your Array

---

This chapter covers the following troubleshooting topics:

- “RAID LUNs Not Visible to the Host” on page 8-2
- “JBOD Disks Not Visible to the Host” on page 8-2
- “Controller Failover” on page 8-3
- “Rebuilding Logical Drives” on page 8-4
  - “Automatic Logical Drive Rebuild” on page 8-4
  - “Manual Rebuild” on page 8-6
  - “Concurrent Rebuild in RAID 1+0” on page 8-7
  - “Identifying a Failed Drive for Replacement” on page 8-8
  - “Flash Selected Drive” on page 8-9
  - “Flash All SCSI Drives” on page 8-10
  - “Flash All But Selected Drive” on page 8-10
  - “Recovering From Fatal Drive Failure” on page 8-11
- “Using the Reset Button” on page 8-12

To check front-panel and back-panel LEDs, see “Checking LEDs” on page 6-1.

For more troubleshooting tips, refer to the Sun StorEdge 3310 SCSI Release Notes at:

[http://www.sun.com/products-n-solutions/hardware/docs/  
Network\\_Storage\\_Solutions/Workgroup/3310](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310)

---

## 8.1 RAID LUNs Not Visible to the Host

By default, all RAID arrays are preconfigured with one or two logical drives. For a logical drive to be visible to the host server, its partitions must be mapped to host LUNs. (For mapping details, refer to [“Mapping Logical Drive Partitions to Host LUNs” on page 5-29.](#)) Check that you have completed this task.

To make the mapped LUNs visible to a specific host, perform the steps required for your operating system or environment, if there are any special requirements. For host-specific information about different operating environments and operating systems see:

- [“Configuring a Server Running the Solaris Operating Environment” on page F-1](#)
- [“Configuring a Windows 2000 Server” on page G-1](#)
- [“Configuring a Linux Server” on page H-1](#)
- [“Configuring an IBM Server Running the AIX Operating Environment” on page I-1](#)
- [“Configuring an HP Server Running the HP-UX Operating Environment” on page J-1](#)
- [“Configuring a Windows NT Server” on page K-1](#)

---

## 8.2 JBOD Disks Not Visible to the Host

If you attach a JBOD array directly to a host server and do not see the drives on the host server, check that the cabling is correct and that there is proper termination. Refer to the special cabling procedures in [“Cabling JBODs” on page B-1.](#)

For additional information about specific servers, see the operating system appendices in the previous section of this document.

---

## 8.3 Controller Failover

Controller failure symptoms are as follows:

- The surviving controller sounds an audible alarm.
- The center LED (status symbol) flashes amber on the failed controller.
- The surviving controller sends event messages announcing the controller failure of the other controller.

A “SCSI Bus Reset Issued” alert message is displayed for each of the SCSI channels. A “Redundant Controller Failure Detected” alert message is also displayed. These messages are also written to the event log.

If one controller in the redundant controller configuration fails, the surviving controller temporarily takes over for the failed controller until it is replaced.

A failed controller is managed by the surviving controller which disables and disconnects from its counterpart while gaining access to all the signal paths. The surviving controller then manages the ensuing event notifications and takes over all processes. It is always the primary controller regardless of its original status, and any replacement controller afterward assumes the role of the secondary controller.

The failover and failback processes are completely transparent to the host.

Controllers are hot-swappable if you are using a redundant configuration, and replacing a failed unit takes only a few minutes. Since the I/O connections are on the controllers, you may experience some unavailability between the times when the failed controller is removed and a new one is installed in its place.

To maintain your redundant controller configuration, replace the failed controller as soon as possible. For details, refer to *Sun StorEdge 3000 Family FRU Installation Guide*.

---

## 8.4 Rebuilding Logical Drives

This section describes automatic and manual procedures for rebuilding logical drives.

---

**Note** – As disks fail and are replaced the rebuild process regenerates the data and parity information that was on the failed disk. However, the NVRAM configuration file that was present on the disk is not recreated. After the rebuild process is complete, restore your configuration as described in [“Restoring Your Configuration \(NVRAM\) From a File”](#) on page 7-18.

---

### 8.4.1 Automatic Logical Drive Rebuild

**Rebuild with Spare:** When a member drive in a logical drive fails, the controller first examines whether there is a local spare drive assigned to this logical drive. If yes, it automatically starts to rebuild the data of the failed disk to it.

If there is no local spare available, the controller searches for a global spare. If there is a global spare, it automatically uses it to rebuild the logical drive.

**Failed Drive Swap Detect:** If neither a local spare drive nor a global spare drive is available, and the “Periodic Auto-Detect Failure Drive Swap Check Time” is “disabled,” the controller does not attempt to rebuild unless you apply a forced-manual rebuild.

To enable this feature, follow these steps:

1. Choose “view and edit Configuration parameters → Drive-side SCSI Parameters → Periodic Auto-Detect Failure Drive Swap Check Time.”

When the “Periodic Auto-Detect Failure Drive Swap Check Time” is “Enabled” (that is, a check time interval has been selected), the controller detects whether or not the failed drive has been swapped (by checking the failed drive's channel/ID). Once the failed drive has been swapped, the rebuild begins immediately.

---

**Note** – This feature requires system resources and can impact performance.

---

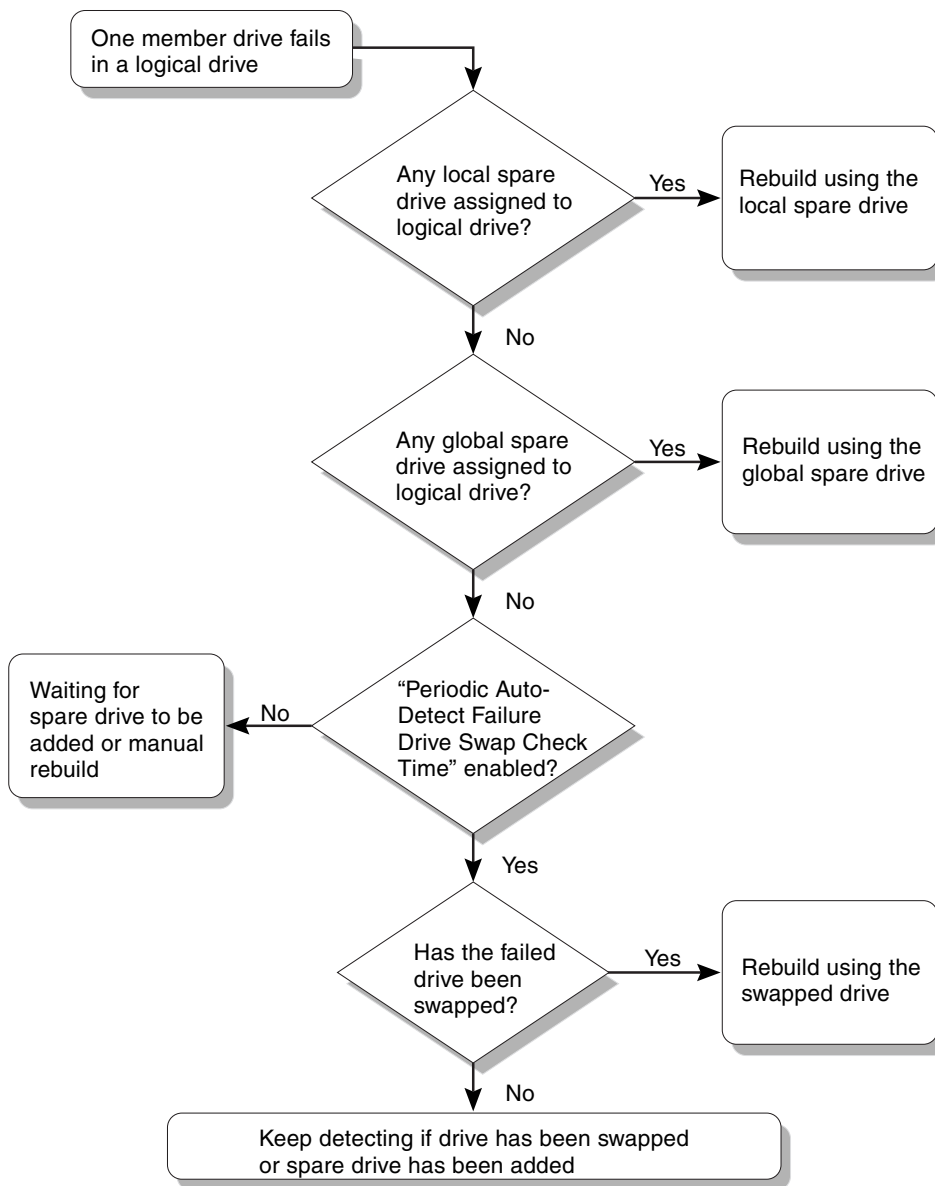
2. Choose a time interval from the displayed list to enable this feature, or choose Disabled to disable it.

A confirmation dialog is displayed.

### 3. Choose Yes to confirm.

If the failed drive is not swapped but a local spare is added to the logical drive, the rebuild begins with the spare.

For a flowchart of automatic rebuild, see [FIGURE 8-1](#).



**FIGURE 8-1** Automatic Rebuild

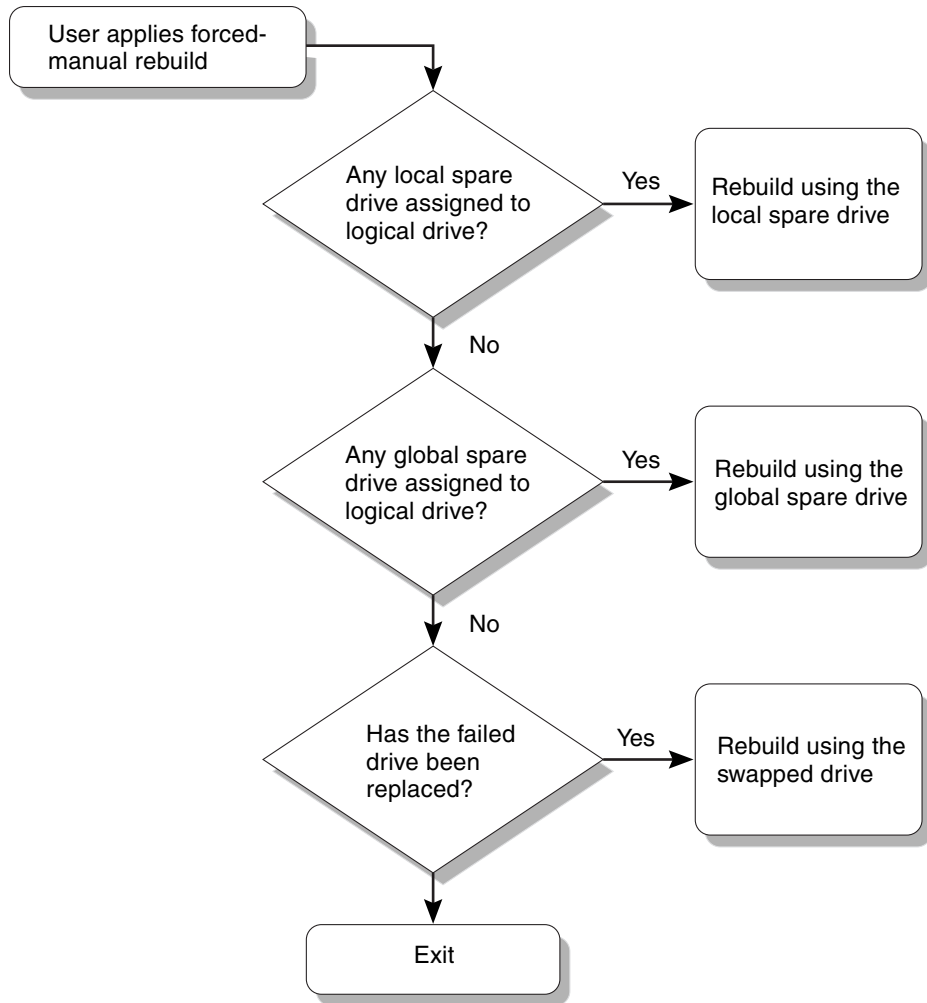
## 8.4.2 Manual Rebuild

When a user applies forced-manual rebuild, the controller first examines whether there is any local spare assigned to the logical drive. If yes, it automatically starts to rebuild.

If there is no local spare available, the controller searches for a global spare. If there is a global spare, the logical drive rebuild begins. See [FIGURE 8-2](#) for a flow-chart illustration of this process.

If neither local spare nor global spare is available, the controller examines the SCSI channel and ID of the failed drive. After the failed drive has been replaced by a healthy one, the logical drive rebuild begins on the new drive. If there is no drive available for rebuilding, the controller does not attempt to rebuild until the user applies another forced-manual rebuild.





**FIGURE 8-2** Manual Rebuild

### 8.4.3 Concurrent Rebuild in RAID 1+0

RAID 1+0 allows multiple-drive failure and concurrent multiple-drive rebuild. Drives newly swapped must be scanned and set as local spares. These drives are rebuilt at the same time; you do not need to repeat the rebuilding process for each drive.

## 8.4.4 Identifying a Failed Drive for Replacement

If there is a failed drive in the RAID 5 logical drive, replace the failed drive with a new drive to keep the logical drive working.



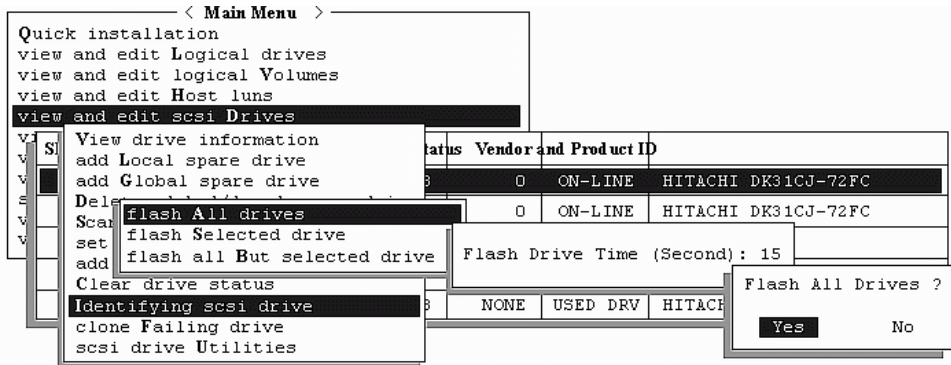
**Caution** – If, when trying to remove a failed drive, you mistakenly remove the wrong drive in the same logical drive, you can no longer access the logical drive because you have incorrectly failed a second drive and caused a critical failure of the RAID set.

**Note** – The following procedure only works if there is no I/O activity.

To find a failed drive, identify a single drive, or test all drive activity LEDs, perform the following steps.

1. Choose “view and edit scsi Drives.”
2. Select any drive and press Return.
3. Choose “Identify scsi drive → flash All drives.”

This command flashes the activity LEDs of all of the drives in the drive channel.



**FIGURE 8-3** Identify Drive Option with Flashing LEDs on Drives

The option to change the Flash Drive Time is displayed.

4. Press Return to accept the default value, or type a flash time between 1 and 999 seconds and press Return.

A confirmation dialog is displayed.

## 5. Choose Yes to confirm.

The read/write LED of a failed hard drive does not light. Identifying the drive whose LED does not light helps you avoid removing the wrong drive.

Alternatively, to flash the read/write LED of only a selected drive, choose “flash Selected drive” or “flash all But selected drive” and perform the same procedure.

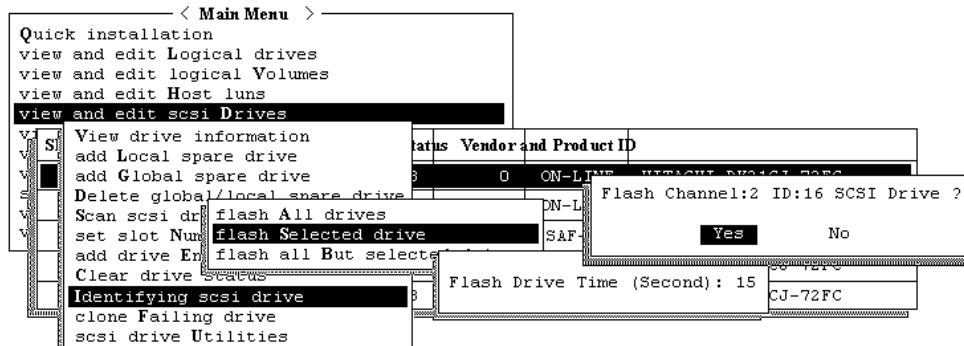


FIGURE 8-4 Selecting a Command to Flash a Selected Drive LED

## 8.4.5 Flash Selected Drive

When you choose this menu option, the read/write LED of the drive you select flashes for a configurable period of time from 1 to 999 seconds.

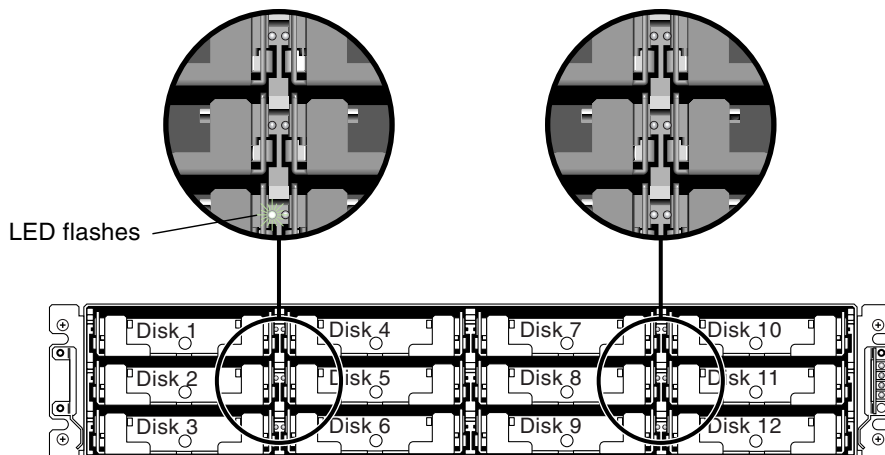
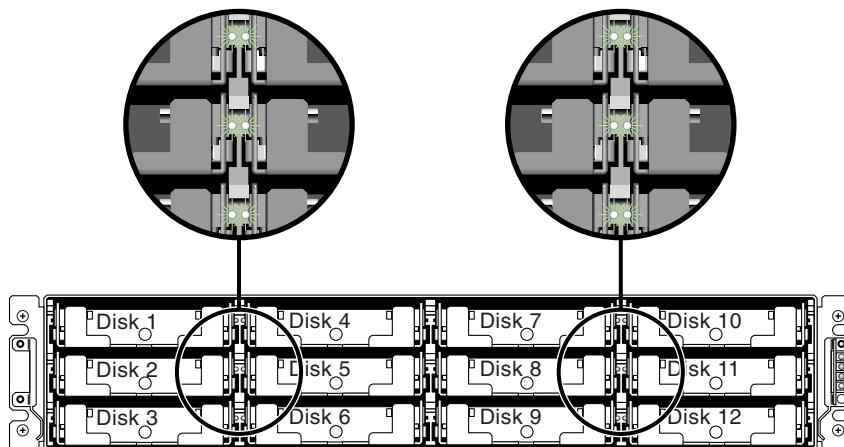


FIGURE 8-5 Flashing the Drive LED of a Selected Drive

## 8.4.6 Flash All SCSI Drives

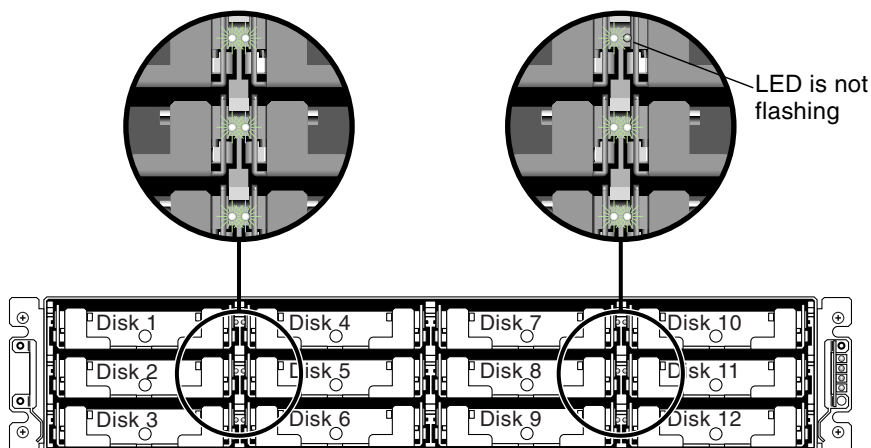
The “Flash All SCSI Drives” menu option flashes LEDs of all good drives but does not flash LEDs for any defective drives. In the illustration, there are no defective drives.



**FIGURE 8-6** Flashing All Drive LEDs to Detect a Defective Non-Flashing Drive

## 8.4.7 Flash All But Selected Drive

With this menu option, the read/write LEDs of all connected drives except the selected drive flash for a configurable period of time from 1 to 999 seconds.



**FIGURE 8-7** Flashing All Drive LEDs Except a Selected Drive LED

## 8.4.8 Recovering From Fatal Drive Failure

With the redundant RAID array system, your system is protected with the RAID parity drive and by a default global spare or spares.

---

**Note** – A FATAL FAIL status occurs when there is one more drive failing than the number of spare drives available for the logical drive. If a logical drive has two global spares available, then three failed drives must occur for FATAL FAIL status.

---

In an extremely rare occurrence where two or more drives appear to fail at the same time, perform the following steps.

- 1. Discontinue all input/output activity immediately.**
- 2. To cancel the beeping alarm, in the firmware Main Menu, choose “system Functions → Mute beeper.”**  
See [“Silencing Audible Alarms” on page 7-5](#) for more information about silencing audible alarms.
- 3. Physically check that all the drives are firmly seated in the array and that none have been partially or completely removed.**
- 4. Check again the firmware Main Menu and check the “view and edit Logical drives,” and look for:**  
Status: FAILED DRV (one failed drive) or  
Status: FATAL FAIL (two or more failed drives)
- 5. Highlight the logical drive, press Return, and select “view scsi drives.”**  
If two physical drives have a problem, one drive has a BAD status and one drive has a MISSING status. The MISSING status is a reminder that one of the drives may be a “false” failure. The status does not tell you which drive might be a false failure.
- 6. Do one of the following:**
  - Choose “system Functions → Reset controller” and then choose Yes to confirm.  
or
  - Power off the array. Wait five seconds, and power on the array.
- 7. Repeat steps 4 and 5 to check the logical and SCSI drive status.**  
After resetting the controller, if there is a false bad drive, the array automatically starts rebuilding the failed RAID set.  
If the array does not automatically start rebuilding the RAID set, check the status under “view and edit Logical drives.”
  - If the status is “FAILED DRV,” manually rebuild the RAID set (refer to [“Manual Rebuild” on page 8-6](#)).

- If the status is still “FATAL FAIL,” you have lost all data on the logical drive and must recreate the logical drive. Proceed with the following procedures:
  - “Replacing a Drive” (*Sun StorEdge 3000 Family FRU Installation Guide*)
  - “Deleting a Logical Drive” (*Sun StorEdge 3000 Family RAID Firmware User’s Guide*)
  - “Creating Logical Drive(s) (optional)” on page 5-15

---

**Note** – As disks fail and are replaced the rebuild process regenerates the data and parity information that was on the failed disk. However, the NVRAM configuration file that was present on the disk is not recreated. After the rebuild process is complete, restore your configuration as described in “[Restoring Your Configuration \(NVRAM\) From a File](#)” on page 7-18.

---

For additional troubleshooting tips, refer to the *Sun StorEdge 3000 Family Release Notes* located at:

[http://www.sun.com/products-n-solutions/hardware/docs/Network\\_Storage\\_Solutions/Workgroup/3310](http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310)

---

## 8.5 Using the Reset Button

To test that the LEDs work, using a paperclip, press and hold the Reset button for 5 seconds. All the LEDs should change from green to amber when you perform this test. Any LED that fails to light indicates a problem with the LED. When you release the Reset button, the LEDs return to their initial state. See “[Chassis Ear LEDs and Reset Button on Front Panel](#)” on page 6-4 for more information.

To silence audible alarms that are caused by component failures, use a paperclip to push the Reset button. See “[Silencing Audible Alarms](#)” on page 7-5 for more information about silencing audible alarms.

---

## 8.6 Silencing Audible Alarms

An audible alarm indicates that either a component in the array has failed or a specific controller event has occurred. The cause of the alarm determines how you silence the alarm. See “[Silencing Audible Alarms](#)” on page 7-5 for more information about silencing audible alarms.

# SCSI Array Specifications

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This appendix provides the specifications for the Sun StorEdge 3310 SCSI array. The topics covered are:

- [“Physical Specifications” on page A-2](#)
- [“Summary of Sun StorEdge 3310 SCSI Array Specifications” on page A-3](#)
- [“Agency Approvals and Standards” on page A-4](#)

---

# A.1 Physical Specifications

**TABLE A-1** Sun StorEdge 3310 SCSI Array Physical Specifications

Description	Desktop	Rackmount
Height	3.64" / 9.25 cm.	2U (3.45" / 8.76 cm.)
Width	19" / 48.26 cm.	17.56" / 44.60 cm. (body)
Depth	Main chassis 18" / 45.72 cm.	Main chassis 18" / 45.72 cm.
	To back of power supply: 20" / 50.8 cm.	To back of power supply: 20" / 50.8 cm.
	To back of power supply handle: 21" / 53.34 cm.	To back of power supply handle: 21" / 53.34 cm.
Weight (fully loaded)	60.0 lbs. / 27.2 kg. with 73GB drives	54.0 lbs. / 24.5 kg. with 73GB drives
Weight (fully loaded JBOD or expansion unit)	57.2 lbs. / 25.9 kg. with 73GB drives	51.2 lbs. / 23.2 kg. with 73GB drives

---

**Note** – Add 10.6 lbs. (4.8 kg.) for packaging if you want to know the shipping weight of your array or expansion unit.

---



---

## A.2 Summary of Sun StorEdge 3310 SCSI Array Specifications

**TABLE A-2** Summary of Array Specifications

Feature	Description
General	<ul style="list-style-type: none"><li>• 12 hot-pluggable drives in a 2U (3.5" high) chassis</li><li>• Ultra 160 SCSI buses</li><li>• Autosensing AC or DC power supplies</li><li>• Dual-host access in certain configurations</li></ul>
Density	<ul style="list-style-type: none"><li>• Up to 432 GB in a RAID array</li><li>• 21 in. chassis depth</li><li>• RAID supports one expansion chassis in a dual-host configuration, or two expansion chassis in a single-host configuration</li></ul>
Reliability	<ul style="list-style-type: none"><li>• Redundant hot swappable FRUs</li><li>• Single or redundant active/active hot-swappable RAID controllers</li><li>• Redundant hot swappable event monitoring units (EMU)</li><li>• N+1 hot swappable power and cooling</li><li>• NEBS Level 3 and HALT test certified; Designed to meet 99.999% reliability</li></ul>
RAID System Storage Resource Management	<ul style="list-style-type: none"><li>• Web-based 10/100BASE-T Ethernet support</li><li>• Serial port out-of-band support with modem control</li><li>• RAID Levels 0, 1, 1+0, 3, 5, 3+1, 5+1</li><li>• Rolling firmware upgrades (with redundant RAID controllers)</li><li>• Up to 128 LUNs</li><li>• SNMP traps and MIB in firmware</li><li>• 512 MB cache memory standard</li><li>• Four Ultra160 SCSI channels</li><li>• User-configurable as drive or host</li><li>• Support for Sun StorEdge Configuration Service and Diagnostic Reporter management software</li></ul>

## A.3 Agency Approvals and Standards

**TABLE A-3** Agency Approvals and Standards

---

### Product Safety

<b>Country</b>	<b>Standard</b>
U.S.	UL Listed to UL60950:2000, 3rd Edition
Canada	CSA Standard CAN/CSA-C22.2 No. 60950-00 3rd Edition
Germany	TÜV
European Union	EN 60950:2000
Japan	Part of World-wide CB Scheme
Australia	Part of World-wide CB Scheme
Argentina	Resolution 92-98 (S-Mark)
Germany	GS mark (ergonomics) (Rheinland)
Russia	Part of World-wide CB Scheme (GOST-R mark)
Russia	Hygienic Mark (ergonomics)

---

### Electromagnetic Compatibility

<b>Country</b>	<b>Standard</b>
U.S.	FCC #47, Part 15, Subpart B, Class B
Canada	ICES-003
Japan	VCCI Class B
European Union	EN 55022:1998 Class B
Australia/New Zealand	AS/NZS 3548:1996
Taiwan	BSMI CNS 13438 Class B
Russia	GOST-R mark
Germany	Same as European Union
Argentina	S mark

**TABLE A-3** Agency Approvals and Standards

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**Electromagnetic Interference**

<b>Test</b>	<b>Standard</b>
Harmonics Emissions	EN 61000-3-2:2000 (No Limits)
Voltage Flicker	EN 61000-3-3:1995/A1:2001 (No Limits)
ESD	EN 55024 (8kV Contact, 15kV Air)
RF Field	EN 55024 (10V/m)
Electrical Fast Transient Burst	EN 55024 (1kV I/O, 2kV Power)
Surge	EN 55024 (1kV I/O, 1kV Power L-L, 2kV Power L-G)
RF Conducted	EN 55024 (3V I/O and Power)
Power Frequency Magnetic Field	EN 55024 (N/A monitors only)
Voltage Dip and Interruption	EN 55024 (0V/0.5cycle, 70%V/0.5sec, 0V/5sec)

---



## Cabling JBODs

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You can connect a Sun StorEdge 3310 JBOD (Just a Bunch of Disks, no controller) array directly to a host server.

This appendix covers the following topics:

- [“Cabling a Single-Bus JBOD with One Host Connection” on page B-3](#)
- [“Cabling a Single-Bus JBOD with Two Host Connections” on page B-4](#)
- [“Cabling a Dual-Bus Single-Initiator JBOD Configuration” on page B-5](#)
  - [“Connecting a Dual-Bus JBOD to One Host” on page B-6](#)
- [“Cabling a Dual-Bus, Multi-Initiator JBOD Configuration” on page B-7](#)
- [“Enabling VERITAS DMP in a Single-Bus Configuration” on page B-12](#)



**Caution** – SCSI IDs are set based on the cabling on the array when it is powered up. If you are switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on. If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

---



**Caution** – When you connect or disconnect SCSI cables, the host I/O must be inactive.

---



**Caution** – The I/O module is hot-serviceable, which means that you can replace it or change its cables while the array is powered on but the SCSI host buses connected to the array must be inactive.

---

---

## B.1 Known Limitations Affecting Sun StorEdge 3310 SCSI JBOD Arrays

Limitations affecting the Sun StorEdge 3310 SCSI JBOD array are listed below:

- Booting from a JBOD disk is not supported in this release.
- The `mpxio` functionality of Sun StorEdge SAN Foundation Suite 4.2 software is not supported with Sun StorEdge 3310 SCSI JBOD arrays.
- Only Sun hosts running the Solaris operating system are supported in this release.
- Sun Cluster software is not supported in this release.
- VERITAS Cluster Server (VCS) software is not supported in this release.
- Only direct-attached single-host connections to a single JBOD are supported in this release. There is no multihost support in this release. Daisy-chaining is not supported in this release.
- Sun Storage Automated Diagnostic Environment (StorADE) 2.2 software is not supported in this release.
- Do not use the `luxadm` utility to diagnose or manage Sun StorEdge 3310 SCSI JBOD arrays.
- Sun StorEdge Configuration Service software supports Sun StorEdge 3310 SCSI JBOD arrays. However, since Sun StorEdge 3310 SCSI JBOD arrays do not have a RAID controller or RAID controller firmware to manage the disks, this software support is necessarily limited. Monitoring functionality that does not require a RAID controller or RAID controller firmware works in the same way it does for RAID arrays.
- The Sun StorEdge CLI supports Sun StorEdge 3310 SCSI JBOD arrays. However, since Sun StorEdge 3310 SCSI JBOD arrays do not have a RAID controller or RAID controller firmware to manage the disks, this CLI support is limited to the following `sccli` commands:
  - `download pld-firmware filename`
  - `download safte-firmware filename`
  - `download ses-firmware filename`
  - `quit`
  - `select`
  - `version`

---

## B.2 Cabling a Single-Bus JBOD with One Host Connection

To connect a JBOD in a single-bus configuration to a single host, connect the following ports:

- Connect the bottom left input port to the top right port of the JBOD with the SCSI jumper cable.
- Connect the bottom right input port to one host with a SCSI cable.



---

**Caution** – Before you disconnect a cable from the array, the host bus on that cable must be inactive.

---



---

**Caution** – SCSI IDs are set based on the cabling on the array when it is powered up. If you are switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on.

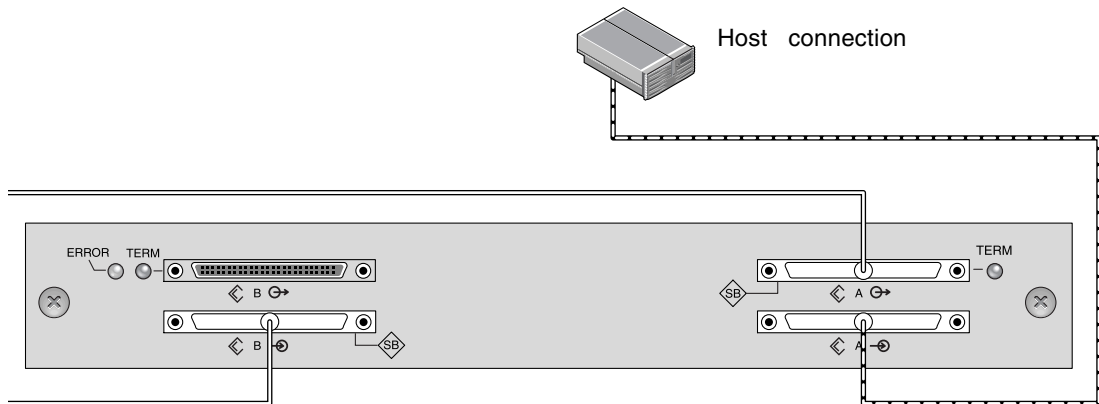
---



---

**Caution** – If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

---



**FIGURE B-1** A Single-Bus JBOD with One Host Connection (Rear View)

The following table shows the default SCSI IDs for a 12-drive JBOD when you set up single-bus configuration.

**TABLE B-1** SCSI Drive IDs for a JBOD in a Single-Bus Configuration (Front View)

ID 0	ID 3	ID 8	ID 11
ID 1	ID 4	ID 9	ID 12
ID 2	ID 5	ID 10	ID 13

---

## B.3 Cabling a Single-Bus JBOD with Two Host Connections

To connect a JBOD in a single-bus configuration to two hosts, connect the following ports:

- Connect the two bottom JBOD input ports with the SCSI jumper cable.
- Connect each top JBOD output port to a host server with a SCSI cable.



---

**Caution** – Before you disconnect a cable from the array, the host bus on that cable must be inactive.

---



---

**Caution** – SCSI IDs are set based on the cabling on the array when it is powered up. If you are switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on.

---

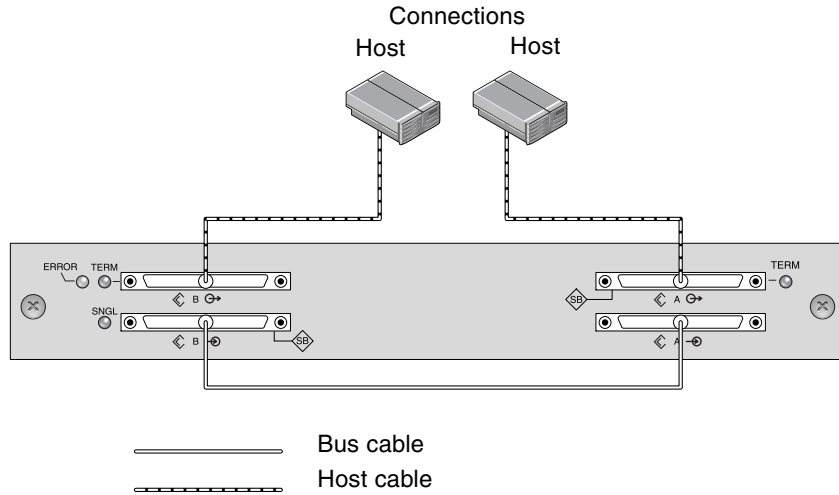


---

**Caution** – If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

---





**FIGURE B-2** A Single-Bus JBOD with Two Host Connections (Rear View)

The following table shows the default SCSI IDs for a 12-drive JBOD when you set up a single-bus configuration. The SCSI IDs are 0–13, with IDs 6 and 7 reserved for host HBA connections.

**TABLE B-2** SCSI Drive IDs for a JBOD in a Single-Bus Configuration (Front View)

ID 0	ID 3	ID 8	ID 11
ID 1	ID 4	ID 9	ID 12
ID 2	ID 5	ID 10	ID 13

## B.4 Cabling a Dual-Bus Single-Initiator JBOD Configuration

There are two important features to note with the dual-bus single-initiator JBOD configuration:

- The bottom input ports on the JBOD must be terminated with an HBA host connection or external terminator. The upper I/O SCSI connectors are auto-terminated.
- In a dual-bus configuration, the SCSI ID numbers automatically change according to the cabling.

Single-initiator mode has only one host connection on a SCSI channel.

FIGURE B-4 shows a dual-bus JBOD with two host connections using one host connection to each channel (single-initiator mode). In this example, the array can be connected to two hosts or to two ports on one host. For the single host configuration, this is an efficient way to provide mirroring capability for the single host.

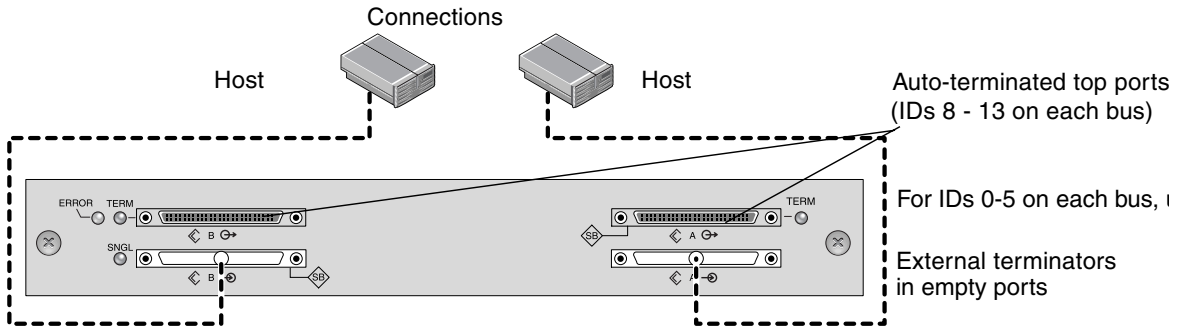


FIGURE B-3 Dual-Bus Single-Initiator JBOD Configuration

Dual-bus, single-initiator mode: SCSI IDs are 8 to 13 on each channel. In the following table, A and B indicate the two host channels. The table shows the IDs assigned to each channel in the dual-bus configuration.

TABLE B-3 SCSI Drive IDs for a Dual-Bus JBOD in Single-Initiator Mode

Channel A ID 8	Channel A ID 11	Channel B ID 8	Channel B ID 11
Channel A ID 9	Channel A ID 12	Channel B ID 9	Channel B ID 12
Channel A ID 10	Channel A ID 13	Channel B ID 10	Channel B ID 13

**Note** – If you want to have IDs of 0 to 5 and plan to add host connections to the top two ports later, you can put external terminators into the top two ports and preserve the IDs 0 to 5 for the life of the JBOD. For more information, refer to the *Sun StorEdge 3000 Family FRU Installation Guide for 2U Arrays*.

## B.4.1 Connecting a Dual-Bus JBOD to One Host

To connect a dual-bus JBOD, perform the following steps.

1. Stop any I/O on the host bus that will have a cable installed on the bus.
2. Connect each JBOD port to a host.



---

**Caution** – The bottom input ports of the JBOD must have a host connection or external terminator to maintain SCSI bus integrity.

---



---

**Caution** – Before you disconnect a cable from the array, the host bus on that cable must be inactive.

---

---

**Note** – SCSI IDs are set based on the cabling on the array when it is powered up. If you are switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on.

---

---

**Note** – If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

---

---

## B.5 Cabling a Dual-Bus, Multi-Initiator JBOD Configuration

An enhanced SCSI JBOD I/O module, part number 370-5396-02/50 or higher, is now used in Sun StorEdge 3310 SCSI arrays. The enhanced SCSI JBOD I/O module now supports dual-bus, multi-initiator JBOD configurations.

The new I/O module implements termination power on all ports. Used primarily in Sun Cluster environments, this enhancement provides easier configuration and enables you to use an external terminator, when required, in any of the four SCSI ports.

If you have earlier I/O modules and do not have JBOD I/O modules with part number 370-5396-02/50 or higher, see “Older JBOD Dual-Bus Configurations” in the latest *Sun StorEdge 3000 Family FRU Installation Guide*. Refer to the same manual for additional single-bus and dual-bus configurations.

---

**Note** – SCSI IDs are set based on the cabling on the array when it is powered up. If you are switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on. If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

---

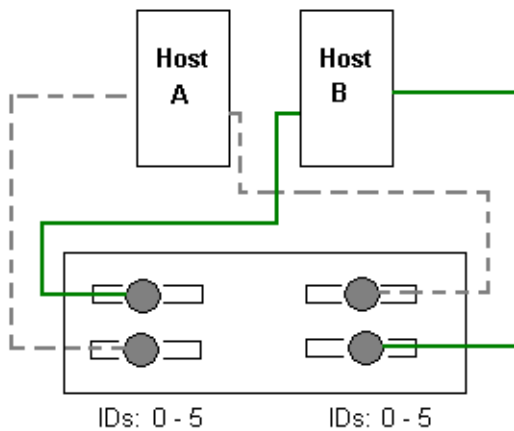
FIGURE B-4 shows a multi-initiator, dual-bus configuration where each host is connected to each host channel. This configuration is common for failover protection in a network cluster environment.

When you remove one or more host cables for maintenance purposes, insert an external terminator into each empty port to maintain the SCSI drive IDs for the active host connections.

---

**Note** – The I/O module is hot-serviceable, which means that you can replace it or change its cables while the array is powered on, but the SCSI host buses connected to the array must be inactive.

---



**FIGURE B-4** Dual-Host, Dual-Bus Multi-Initiator JBOD Configuration

In this configuration, the dual-bus, multi-initiator mode creates SCSI IDs 0 to 5 on each channel as shown in TABLE B-4.

**TABLE B-4** SCSI Drive IDs for a Dual-Bus JBOD in Multi-Initiator Mode

Channel A ID 0	Channel A ID 3	Channel B ID 0	Channel B ID 3
Channel A ID 1	Channel A ID 4	Channel B ID 1	Channel B ID 4
Channel A ID 2	Channel A ID 5	Channel B ID 2	Channel B ID 5

To connect a dual-bus JBOD to two hosts, perform the following steps.

1. **Stop any I/O on the host bus that will have a cable installed on the bus.**

2. Connect each JBOD port to a host as shown in [FIGURE B-4](#).

The bottom input ports of the JBOD must have a host connection or external terminator to maintain SCSI bus integrity.

---

**Note** – Before you disconnect a cable from the array, the host bus on that cable must be inactive.

---

---

**Note** – SCSI IDs are set based on the cabling on the array when it is powered up. If you are switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs will change after you power off, change the cabling, and then power on. If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

---

---

## B.6 Downloading Firmware to Disk Drives in a JBOD

For instructions on how to download firmware to disk drives in a JBOD directly attached to a host, refer to the README file in the patch that contains the firmware.

---

## B.7 Replacing a Disk Drive in a Sun StorEdge 3310 SCSI JBOD Array

Replacing a disk drive is a straightforward operation that involves first removing the defective disk drive and then installing a replacement drive.

---

**Note** – If you are using disk management software or volume management software to manage your disk storage, you might need to perform software operations to take a disk offline before you remove it, and after you have replaced a drive to bring it back online. Refer to the documentation that accompanies your disk management software or volume management software for more information.

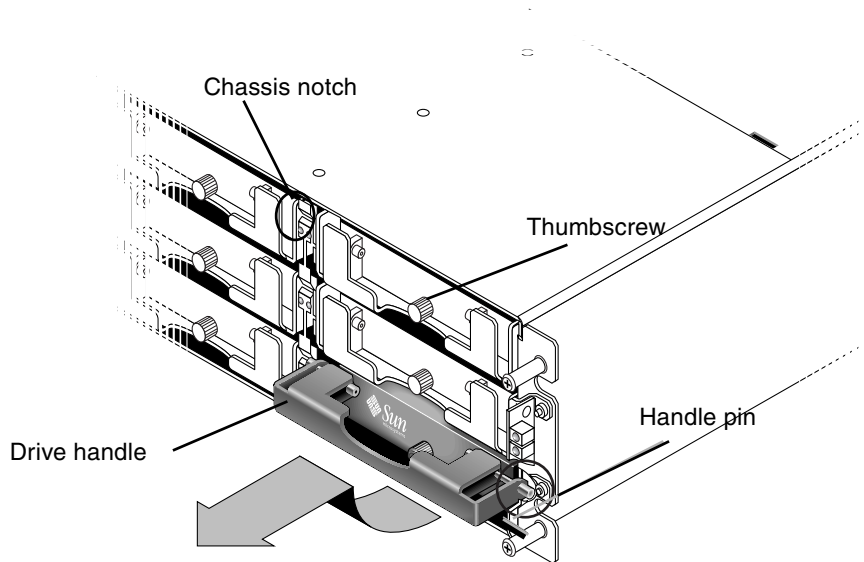
---

The drive module is hot-swappable; you can replace it while the array is powered on. To replace a disk drive module, first follow the procedure for removing a disk drive and then follow the procedure for installing a new disk drive.

---

**Note** – If you are removing a disk drive that you do not intend to replace, install an air management sled in its place. See [“Installing an Air Management Sled”](#) on [page B-11](#) for more information.

---



**FIGURE B-5** Front View of a Drive Module Pulled Out of the Chassis

## B.7.1 Removing a Disk Drive

To remove a disk drive from an array, perform the following steps.

1. Perform any host software operations necessary to take the disk offline.
2. Unlock the locks with the provided key, and gently pull the plastic front bezel away from the front of the unit so that it drops down and is supported by the two hinged brackets on the sides.
3. Turn the thumbscrew counterclockwise several full turns until the thumbscrew and drive handle are loosened.
4. Gently pull the drive handle upward.
5. Slide the drive module out of the array.

## B.7.2 Installing a New Disk Drive

To install a disk drive in an array, perform the following steps.

1. Gently slide the drive module into the drive slot until the handle pins slip into the chassis notch.
2. Lower the disk drive handle until it is vertical.
3. Press and hold the drive handle in while you press the thumbscrew in until it engages the threads.
4. Turn the thumbscrew clockwise until it is finger-tight.

---

**Note** – To ensure that a thumbscrew is finger-tight, tighten it with a screwdriver and then loosen the thumbscrew counterclockwise a quarter-turn.

---

5. Push the plastic front bezel onto the front of the unit until it is seated firmly, and use the key to lock the locks.
6. Perform any operations your host software requires to recognize the new drive and bring it under software control.

## B.7.3 Installing an Air Management Sled

The front of an air management sled looks similar to a disk drive module, but the air management sled is an empty box used to maintain optimum airflow in a chassis.

If you have removed a disk drive and do not intend to replace it, insert an air management sled to maintain the optimum airflow inside the chassis. You can install the air management sled by using the same procedure as [“Installing a New Disk Drive” on page B-11](#), except that no software operations are necessary.

---

## B.8 Enabling VERITAS DMP in a Single-Bus Configuration

To enable VERITAS Dynamic Multi-Pathing (DMP) support on VERITAS Volume Manager Version 3.2, ensure the HBA device SCSI initiator IDs are unique and then start the system. Perform the following steps.

1. **Create a single-bus, multi-initiator configuration that links two cables to two different HBAs.**

For details about creating a single-bus multi-initiator configuration, see [“Cabling a Single-Bus JBOD with Two Host Connections”](#) on page B-4.

2. **Stop the server and at the ok prompt, type:**

```
ok setenv auto-boot? false
ok reset-all
ok probe-scsi-all
```

3. **Issue the remaining commands on only one of the paths.**
4. **Edit or create the nvramrc to set the SCSI-initiator-id to a non-conflicting ID for these devices based on the information returned in step 2.**
5. **From the OBP type:**

```
ok nvedit
0: probe-all install-console banner
1: cd /pci@6,4000/scsi@3 *** your path information here ***
2: 6 " scsi-initiator-id" integer-property
3: device-end
4: banner (Ctrl-c)
```

6. **Press Ctrl-c, and store the nvramrc by typing:**

```
ok nvstore
```

7. **Set the system to use the nvramrc and reset auto-boot by typing:**

```
ok setenv use-nvramrc? true
ok setenv auto-boot? true
```



8. Reset the configuration by typing:

```
ok reset-all
```

9. Reboot the hosts. A system reboot is required to implement these changes.

---

**Note** – JBOD arrays require a license from VERITAS in order to enable any of its advanced features. Refer to VERITAS Volume Manager Release Notes or contact VERITAS Software Corporation for licensing terms and information.

---



# Failed Component Alarm Codes

---

This appendix describes failed component alarm codes.

Failed component alarm codes use Morse code dot and dash characters. The dot “.” is a short tone sounding for one unit of time. The dash “-” is a long tone sounding for three units of time.

Alarms, also referred to as beep codes, are presented in a sequence, starting with the critical component failure alarm, which alerts you to a component problem or failure, or a firmware mismatch. This alarm is then followed by alarms for whichever component or assemblies have failed. Once the beep code sequence is complete, it continues to repeat. To understand the beep codes, listen to the sequence of codes until you can break down the sequence into its separate alarms. You can also check your software or firmware for alarms, error messages or logs to isolate and understand the cause.

For example, in the case of a fan failure in a power supply, you might first hear the critical component failure alarm, followed by a power supply failure alarm from power supply 0 or power supply 1, followed by a fan failure event alarm, followed by an event alarm. This sequence will continue to repeat.

**TABLE C-1** Failed Component Alarm Codes

Failure	Morse Code Letter	Morse Code Sound Pattern
Critical component failure or mismatch	8 dashes	-----
Power supply 0 failure	P0	. -- . -----
Power supply 1 failure	P1	. -- . . -----
Event alarm	E	.

**TABLE C-1** Failed Component Alarm Codes

Failure	Morse Code Letter	Morse Code Sound Pattern
Fan failure	F	. . - .
Voltage failure	V	. . . -
Temperature failure	T	-

See [“Front-Panel LEDs” on page 6-3](#) for more information about the SES/PLD firmware mismatch mentioned in [TABLE C-1](#).



**Caution** – Be particularly careful to observe and rectify a temperature failure alarm. If you detect this alarm, shut down the controller and the server as well if it is actively performing I/O operations to the affected array. Otherwise system damage and data loss can occur.

## Record of Settings

---

This appendix provides tables for recording configuration data. Topics covered are:

- [“View and Edit Logical Drives” on page D-2](#)
- [“Logical Drive Information” on page D-2](#)
- [“Logical Drive Partition Information” on page D-3](#)
- [“View and Edit Host LUNs” on page D-4](#)
- [“LUN Mappings” on page D-4](#)
- [“View and Edit SCSI Drives” on page D-5](#)
- [“View and Edit SCSI Channels” on page D-6](#)
- [“View and Edit Peripheral Devices” on page D-7](#)
- [“Save NVRAM to Disk, Restore from Disk” on page D-7](#)

In addition to saving the configuration data in NVRAM to disk, keeping a hard copy of the controller configuration is also recommended. This speeds the recreation of the RAID array in the event of a disaster.

The following tables are provided as a model for recording configuration data.

As a general rule, the configuration data in the NVRAM should be saved to disk or file whenever a configuration change is made.

---

## D.1 View and Edit Logical Drives

### D.1.1 Logical Drive Information

LG	ID	LV	RAID Level	Size (MB)	Status	O	#LN	#SB	#FL	Name	Disk Reserved Space











---

## D.5 View and Edit Peripheral Devices

### View System Information

Firmware Version \_\_\_\_\_

Bootrecord Version \_\_\_\_\_

Serial Number \_\_\_\_\_

---

## D.6 Save NVRAM to Disk, Restore from Disk

Update Firmware	Date	Save NVRAM to Disk or File	Date/Location	Restore NVRAM from Disk	Date



## Connector Pinouts

---

This appendix identifies the pinouts for each connector used in the Sun StorEdge 3310 SCSI Array. Topics covered are:

- “SCSI Host or Drive Connector” on page E-1
- “RJ-45 Connector” on page E-3
- “DB9 COM Port Connector” on page E-4

---

### E.1 SCSI Host or Drive Connector



**FIGURE E-1** SCSI Host or Drive Connector

**TABLE E-1** SCSI Connector Pin Descriptions

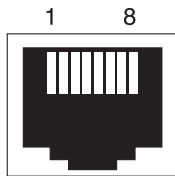
<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
1	Data 12 +	35	Data 12 -
2	Data 13 +	36	Data 13 -
3	Data 14 +	37	Data 14 -
4	Data 15 +	38	Data 15 -
5	Parity 1 +	39	Parity 1 -
6	Data 0 +	40	Data 0 -
7	Data 1 +	41	Data 1 -
8	Data 2 +	42	Data 2 -
9	Data 3 +	43	Data 3 -
10	Data 4 +	44	Data 4 -
11	Data 5 +	45	Data 5 -
12	Data 6 +	46	Data 6 -
13	Data 7 +	47	Data 7 -
14	Parity 0 +	48	Parity 0 -
15	Ground	49	Ground
16	DIFF_SENS	50	Ground
17	TERM_PWR	51	TERM_PWR
18	TERM_PWR	52	TERM_PWR
19	N/C	53	N/C
20	Ground	54	Ground
21	ATN +	55	ATN -
22	Ground	56	Ground
23	BSY +	57	BSY -
24	ACK +	58	ACK -
25	RST +	59	RST -
26	MSG +	60	MSG -
27	SEL +	61	SEL -
28	C/D +	62	C/D -
29	REQ +	63	REQ -

**TABLE E-1** SCSI Connector Pin Descriptions (Continued)

Pin	Description	Pin	Description
30	I/O +	64	I/O -
31	Data 8 +	65	Data 8 -
32	Data 9 +	66	Data 9 -
33	Data 10 +	67	Data 10 -
34	Data 11 +	68	Data 11 -

---

## E.2 RJ-45 Connector



**FIGURE E-2** Ethernet RJ-45 Socket 10Base-T

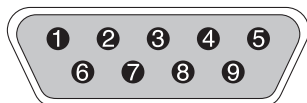
**TABLE E-2** Ethernet RJ-45 Pin Descriptions

Pin No.	Description.	Color
1	TX +	White with orange
2	TX -	Orange
3	RX +	White with green
4		Blue
5		White with blue
6	RX -	Green
7		White with brown
8		Brown

---

## E.3 DB9 COM Port Connector

The COM port is a female DB9 connector that requires a male DB9 null modem cable.



**FIGURE E-3** RS-232 DB9 (EIA/TIA 574) View of the Male End

**TABLE E-3** Pin Names

Pin No.	Name	Notes/Description
1	DCD	Data Carrier Detect
2	RD	Receive Data (a.k.a. RxD, Rx)
3	TD	Transmit Data (a.k.a. TxD, Tx)
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator



# Configuring a Server Running the Solaris Operating Environment

---

This appendix provides the following Solaris-specific information:

- [“Accessing the Firmware Application From a Host Running the Solaris Operating Environment”](#) on page F-1
- [“Editing the sd.conf File”](#) on page F-3
- [“Enabling a Host Running the Solaris Operating Environment to Recognize New Devices and LUNs”](#) on page F-5
- [“Labeling a Volume”](#) on page F-7
- [“Making JBODs Visible to Hosts Running the Solaris Operating Environment”](#) on page F-11

---

## F.1 Accessing the Firmware Application From a Host Running the Solaris Operating Environment

This section provides information on redefining the baud rate for the serial port connection, and using the `tip` command to access the array remotely. For more information about the baud rate and other communication settings, see [“Configuring a COM Port to Connect to a RAID Array”](#) on page 4-23.

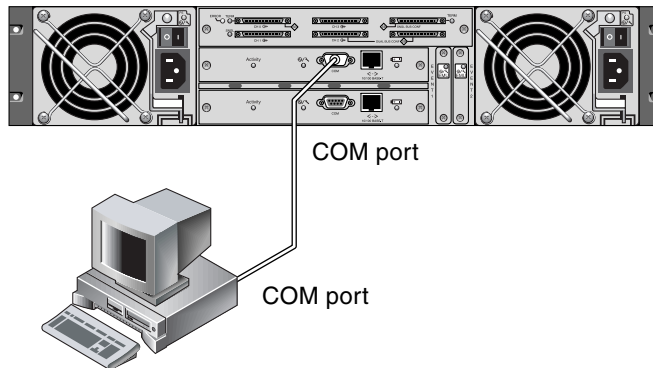
---

**Note** – You can also monitor and configure a RAID array over an IP network using the RAID firmware or the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, see [“Setting Up Out-of-Band Management Over Ethernet”](#) on page 4-25 refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

---

You can specify the baud rate of 38,400 when you type the `tip` command.

1. **Connect the RAID array COM port to a serial port of a Solaris workstation (see [FIGURE F-1](#)).**



**FIGURE F-1** RAID Array COM Port Connected Locally to the COM Port of a Workstation or Computer Terminal

2. **Use the `tip` command to access the array locally.**

```
# tip -38400 /dev/ttyn
```

where *n* is the COM port identifier. For instance, if you have connected the array to the COM port identified as `ttyb`, use this command:

```
# tip -38400 /dev/ttyb
```

3. **Refresh your screen by holding down the Control key on your keyboard (this is abbreviated `Ctrl` on some keyboards) and pressing the letter `L` key on your keyboard.**

---

## F.2 Editing the `sd.conf` File

Edit the `/kernel/drv/sd.conf` file to add additional targets and LUNs, up to 128 LUNs which can be used in a single Sun StorEdge 3310 SCSI Array. Then reboot the host.

You may want to allow a few extra LUNs for flexibility over the coming months, but generally most administrators minimize the number of unused LUNs because each LUN causes a seven-second delay when you reboot the host.

---

**Note** – The maximum number of LUNs per target is 32.

---



---

**Caution** – After you edit `sd.conf`, you must reboot the host to enable the new LUN assignments.

---

The following example file sets up targets 1 and 3 with a total of 41 LUNs (LUNs 0 through 31 on target 0, and LUNs 0 through 8 on target 3). Default LUNs are listed first, followed by new LUNs.

```
# Copyright (c) 1992, by Sun Microsystems, Inc.
#
#ident"@(#)sd.conf1.998/01/11 SMI"

name="sd" class="scsi" class_prop="atapi"
target=0 lun=0;
.
.
name="sd" class="scsi"
target=15 lun=0;

#NEW LUNs have been appended to the default settings in the file,
starting here.

name="sd" class="scsi"
target=1 lun=1;

name="sd" class="scsi"
target=1 lun=2;

name="sd" class="scsi"
target=1 lun=3;

name="sd" class="scsi"
target=1 lun=4;

name="sd" class="scsi"
target=1 lun=5;

name="sd" class="scsi"
target=1 lun=6;
name="sd" class="scsi"
target=1 lun=7;
.
.
.
name="sd" class="scsi"
target=1 lun=31;
```

```
name="sd" class="scsi"
target=3 lun=1;

name="sd" class="scsi"
target=3 lun=2;

name="sd" class="scsi"
target=3 lun=3;

name="sd" class="scsi"
target=3 lun=4;

name="sd" class="scsi"
target=3 lun=5;

name="sd" class="scsi"
target=3 lun=6;

name="sd" class="scsi"
target=3 lun=7;

name="sd" class="scsi"
target=3 lun=8;

# END additional lun entries
```

---

## F.3 Enabling a Host Running the Solaris Operating Environment to Recognize New Devices and LUNs

By default, a Solaris host is configured for one host LUN per SCSI target, which is not enough LUNs for a Sun StorEdge 3310 SCSI array. You need to edit the appropriate onboard HBA driver configuration file to add additional targets and LUNs, up to 32 LUNs per logical drive, and a maximum of 128 LUNs per Sun StorEdge 3310 array.

Driver configuration files include `/kernel/drv/qus.conf` and `/kernel/drv/glm.conf`. Edit the file which is appropriate for your HBA.

---

**Note** – Refer to the `driver.conf(4)` man page for information and syntax to use. Refer to your HBA Release Notes and your HBA Installation Guide for specific configuration information.

---

Once you have edited the configuration file, reboot the host for the changes to take effect.

1. **Edit the `/kernel/drv/qus.conf` or `/kernel/drv/glm.conf` file (whichever is appropriate to your HBA) to add more targets and LUNs (up to 32 LUNs per logical drive, and a maximum of 128 LUNs per Sun StorEdge 3310 array).**

---

**Note** – If the file does not exist, create it using the format below:

---

An example of text to add to `/kernel/drv/qus.conf` or `/kernel/drv/glm.conf` is:

```
device-type-scsi-options-list = "SUN StorEdge 3310",
"SE3310-scsi-options":
SE3310-scsi-options = 0x43ff8;
```



---

**Caution** – Do not edit the `/etc/system` file to accomplish the same purpose. While this can have the desired effect, it can also cause interference with other storage devices attached to the same host.

---

2. **Reboot the host to implement the file changes.**

The Solaris 8 operating environment requires a reconfiguration reboot to create device files and implement `sd.conf` changes but you do not need a reconfiguration reboot for the Solaris 9 operating environment.

```
reboot -- -r
```

For the Solaris 9 operating environment, use the following commands to create device files after you have edited `sd.conf`. No reboot is necessary with this command:

```
update_drv -f sd
devfsadm
```

The new LUNs are displayed when you perform the `format` command.

3. To display the new LUNs, perform the following command:

```
format
```

---

## F.4 Labeling a Volume

For the Solaris operating environment to recognize a volume, it must be labeled with the `format` command. Whenever you create a volume, label it using the following procedure. For more information on the `format` command, see the `format(1M)` man page.

To label a volume, perform the following steps.

1. **On the data host, type `format` at the root prompt.**
2. **Specify the disk number when prompted.**

In this example, the array is shown as disk number 2. You can identify it by the SUN-3310-0200 label.

## format

Searching for disks...done

### AVAILABLE DISK SELECTIONS:

0. c0t2d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk8  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b230,0
1. c0t2d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk9  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b230,1
2. c0t4d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk10  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b37f,0
3. c0t4d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk11  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b37f,1
4. c0t6d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk12  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b28e,0
5. c0t6d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk13  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b28e,1
6. c0t8d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk14  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b719,0
7. c0t8d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk15  
/pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b719,1
8. c1t1d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk8  
/pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000af55,0
9. c1t1d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk9  
/pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000af55,1
10. c1t3d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk10  
/pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000afdf,0
11. c1t3d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk11  
/pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000afdf,1
12. c1t5d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256> disk12  
/pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b723,0
14. c3t2d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>  
/sbus@7d,0/SUNW,fas@1,8800000/sd@2,0
15. c3t3d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>  
/sbus@7d,0/SUNW,fas@1,8800000/sd@3,0

Specify disk (enter its number): 2

selecting c0t4d0

[disk formatted]

If the volume had not been labeled previously using the format command, the following confirmation prompt is displayed:

```
Disk not labeled. Label it now?
```



3. (Optional) If you see this confirmation prompt, type y and press Return to display the FORMAT MENU.

The FORMAT MENU is displayed.

4. Type type to select a drive type:

```
FORMAT MENU:
  disk      - select a disk
  type      - select (define) a disk type
  partition - select (define) a partition table
  current   - describe the current disk
  format    - format and analyze the disk
  repair    - repair a defective sector
  label     - write label to the disk
  analyze   - surface analysis
  defect    - defect list management
  backup    - search for backup labels
  verify    - read and display labels
  save      - save new disk/partition definitions
  inquiry   - show vendor, product and revision
  volname   - set 8-character volume name
  !<cmd>    - execute <cmd>, then return0
  quit
format> type
```

5. Type 0 to choose the Auto configure option.

Select the Auto configure option regardless of which drive types are displayed by the type option.

```
AVAILABLE DRIVE TYPES:
  0. Auto configure
  1. Quantum ProDrive 80S
  2. Quantum ProDrive 105S
  3. CDC Wren IV 94171-344
  4. SUN0104
  5. SUN0207
  6. SUN0327
  7. SUN0340
  8. SUN0424
  9. SUN0535
 10. SUN0669
 11. SUN1.0G
 12. SUN1.05
 13. SUN1.3G
 14. SUN2.1G
 15. SUN2.9G
 16. SUN-3310-0100
 17. other
Specify disk type (enter its number)[16]: 0
c1t1d0: configured with capacity of 33.34GB
<SUN-3310-0200 cyl 34145 alt 2 hd 16 sec 128>
selecting c1t1d0
[disk formatted]
```

**6. Type label and answer y when prompted to continue.**

```
format> label
Ready to label disk, continue? y
```

---

**Note** – For further information on partitioning, see the Solaris format(1M) man page.

---

---

## F.5 Making JBODs Visible to Hosts Running the Solaris Operating Environment

If the JBOD cabling is correct and the drives are still not visible, run the `devfsadm` utility to rescan the drives. The new disks can be seen when you perform the `format` command.

If the drives are still not visible, reboot the host(s) with the `reboot -- -r` command so that the drives are visible to the host.



## Configuring a Windows 2000 Server

---

This appendix provides platform-specific host installation and configuration information to use when you connect a Sun StorEdge 3310 SCSI array to a host running the Windows 2000 Server operating system.

The Sun StorEdge 3310 SCSI Array supports Microsoft Windows 2000 Server and Microsoft Windows 2000 Advanced Server, Service Pack 3 or greater, in dual path configurations using Sun StorEdge Traffic Manager 3.0 failover drivers for Microsoft Windows 2000.

If you are going to use dual path instead of single path, refer to the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for Microsoft Windows 2000 and Windows NT* for detailed instructions about setting up the device driver on the server and for additional information about configuring your Windows 2000 Server or Advanced Server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit <http://www.sun.com/sales>.

For more information on Multi-Platform support see:  
[http://www.sun.com/storage/san/multiplatform\\_support.html](http://www.sun.com/storage/san/multiplatform_support.html).

The information in this appendix supplements the configuration steps presented in [Chapter 5](#), and covers the following steps:

- “Setting Up the Serial Port Connection” on page G-2
- “Accessing the Firmware Application From a Windows 2000 Server” on page G-5
- “Enabling a Windows 2000 Server to Recognize New Devices and LUNs” on page G-5

---

## G.1 Setting Up the Serial Port Connection

The RAID controller can be configured by means of a host system running a VT100 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

---

**Note** – You can also monitor and configure a RAID array over an IP network using the RAID firmware or the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, see [“Setting Up Out-of-Band Management Over Ethernet” on page 4-25](#) refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

---

1. **Use a null modem serial cable to connect the COM port of the RAID array to an unused serial port on your host system.**

A null modem cable has serial signals swapped for connecting to a standard serial interface.

---

**Note** – A DB9-to-DB25 serial cable adapter is included in your package contents to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

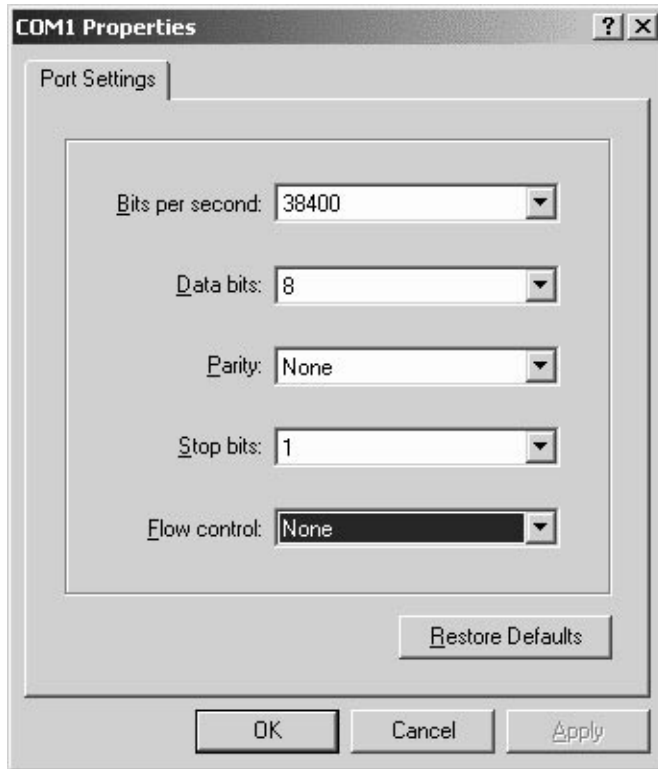
---

2. **Power up the array.**
3. **On the Windows 2000 server, select Start → Programs → Accessories → Communications → HyperTerminal.**
4. **Type a name and choose an icon for the connection.**

5. In the Connect To window, choose the COM port from the Connect Using: drop-down menu that is connected to the array.



6. Click OK.
7. In the Properties window, set the serial port parameters using the drop-down menus.
  - 38400 baud
  - 8 bit
  - 1 stop bit
  - Parity: None
  - Flow control: None



8. To save the connection and its settings, select **File → Save**.

The connection filename is *connection\_name* where *connection\_name* is the name you gave this HyperTerminal connection when you created it.

9. To make a connection shortcut on your desktop, select **Start → Find → For Files or Folders**. Enter the *connection\_name* and click the **Search Now** button. **Highlight and right-click on the filename in the Search Results window, select Create Shortcut, and click Yes.**

You are now ready to configure your array.



---

## G.2 Accessing the Firmware Application From a Windows 2000 Server

To access the array from a Windows NT Server through a serial port, use the HyperTerminal connection you configured in [“Setting Up the Serial Port Connection” on page G-2](#) or install a VT100 terminal emulation program and use the parameters described there.

To access the array through an Ethernet connection, follow the procedures in [“Setting Up Out-of-Band Management Over Ethernet” on page 4-25](#). To access the command prompt described there from a Windows 2000 server, choose Programs → Accessories → Command Prompt.

---

## G.3 Enabling a Windows 2000 Server to Recognize New Devices and LUNs

Before beginning this procedure, make sure that you are using a supported SCSI host bus adapter (HBA) such as an Adaptec 39160. Refer to the Release Notes for your array for current information about which HBAs are supported.

Also make sure that you are using a supported driver for your HBA. For the Adaptec 39160, use FMS V4.0a or later.

1. **Boot your system and verify that the host bus adapter (HBA) basic input/output system (BIOS) recognizes your new SCSI device(s).**

---

**Note** – While your system is starting up you should see your new SCSI device(s).

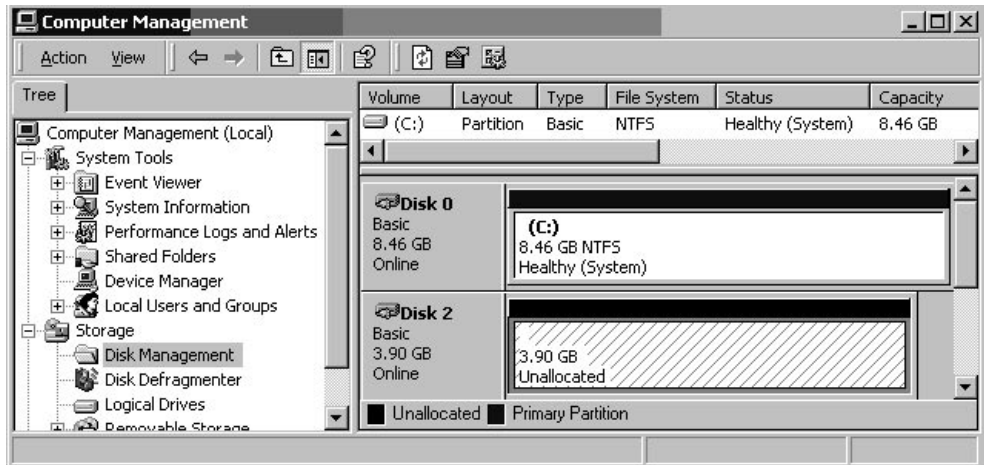
---

2. **If a Found New Hardware Wizard is displayed, click Cancel.**  
You are now ready to format your new device(s).
3. **Open the Disk Management folder.**
  - a. **Right-click on the My Computer icon to display a pop-up menu.**
  - b. **Select Manage.**
  - c. **Select the Disk Management folder.**

d. If a Write Signature and Upgrade Disk Wizard is displayed, click Cancel.

A "Connecting to Logical Disk Manager Server" status message is displayed.

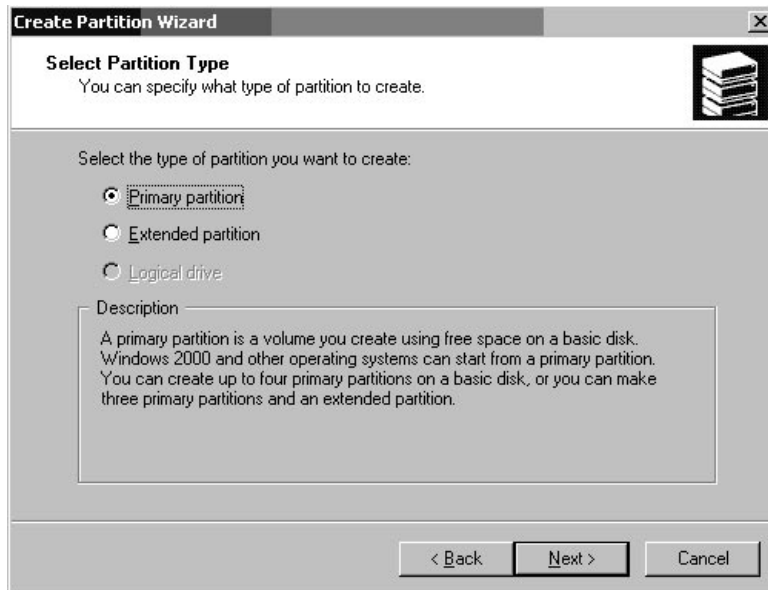
4. Select your new device when it is displayed.



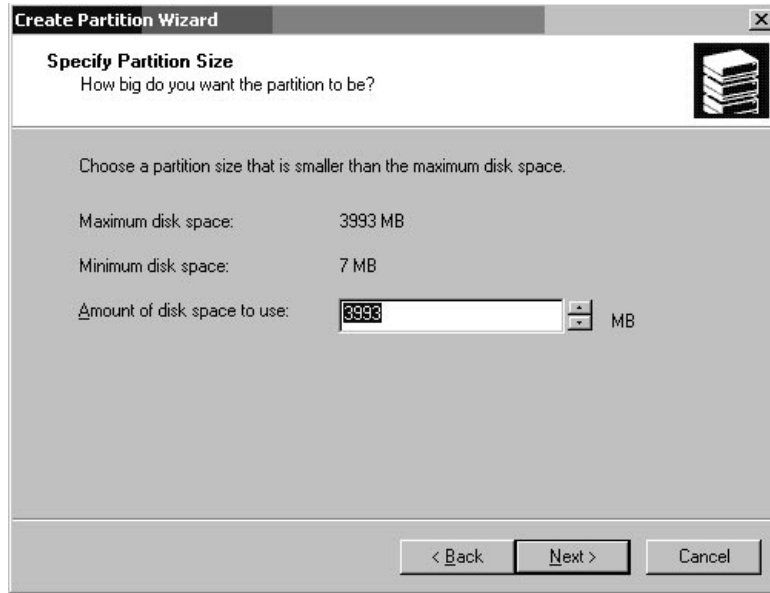
5. Right-click in the Unallocated partition of your device to display a pop-up menu.

6. Select Create Partition from the pop-up menu.

A Create Partition Wizard is displayed.

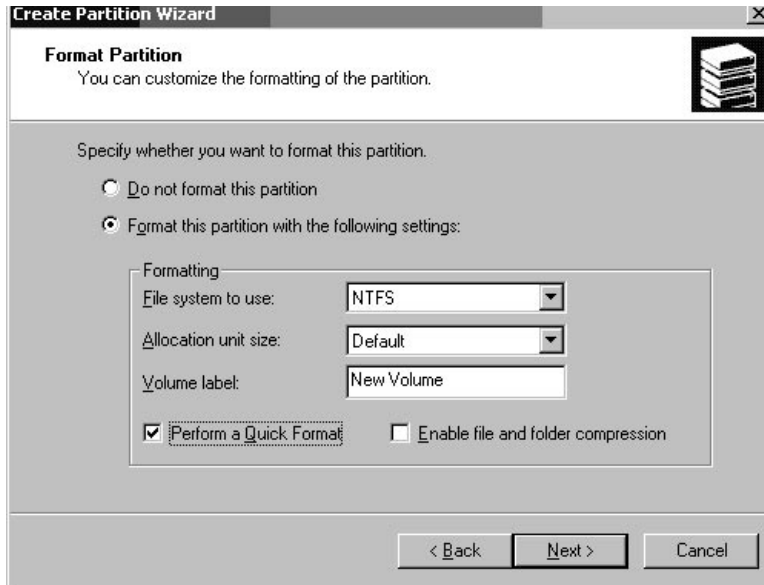


7. Click Next.
8. Select Primary partition and click Next.
9. Specify the amount of disk space to use or accept the default value, and click Next.



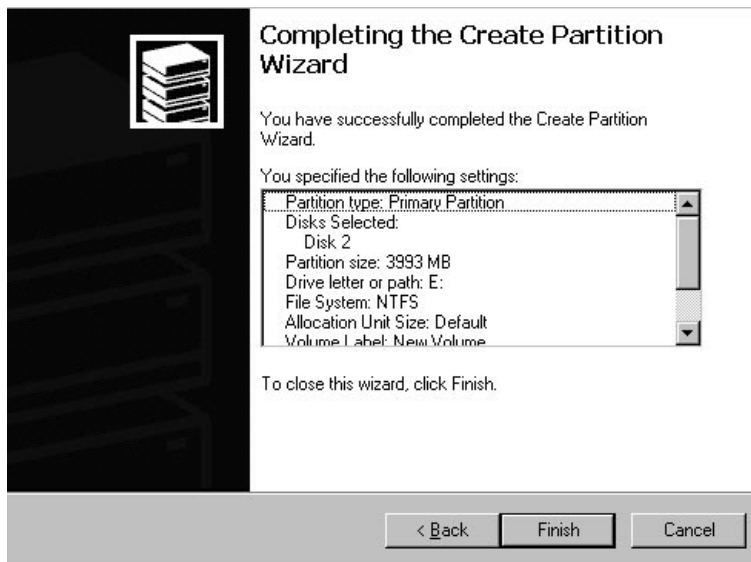
10. Assign a drive letter if desired and click Next.
11. Select Format this partition with the following settings.
  - a. Specify NTFS as the File system to use.

b. Make sure the Perform a Quick Format checkbox is checked.



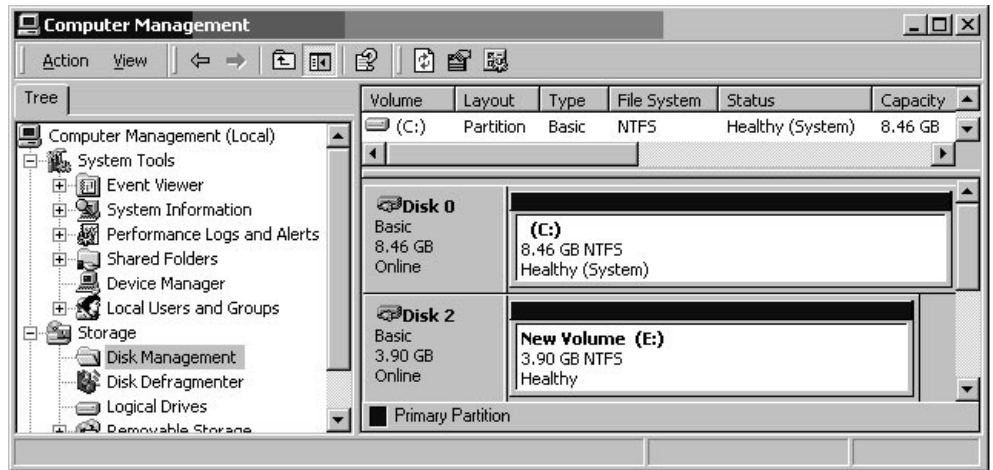
c. Click Next.

A confirmation dialog displays the settings you have specified.



**12. Click Finish.**

The new partition is formatted and the formatted partition is identified as NTFS in the Computer Management window.



**13. Repeat these steps for any other new partitions and devices you want to format.**



# Configuring a Linux Server

---

This appendix provides LUN setup information needed when you connect a Sun StorEdge 3310 SCSI array or a Sun StorEdge 3310 FC array to a Linux operating environment. For a list of supported adapters, refer to the release notes of each array.

This information supplements the configuration steps presented in the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual* and covers the following steps:

- [“Checking the Adapter BIOS” on page H-1](#)
- [“Multiple LUN Linux Configuration” on page H-2](#)
- [“Making an ext3 Filesystem for Linux” on page H-3](#)
- [“Creating a Filesystem” on page H-4](#)
- [“Creating a Mount Point and Mounting the Filesystem Manually” on page H-4](#)
- [“Mounting the Filesystem Automatically” on page H-5](#)

---

## H.1 Checking the Adapter BIOS

When booting the server, watch for the host bus adapter (HBA) card BIOS message line to show up and then press the proper sequence of keys in order to get into the HBA BIOS: Key strokes for SCSI Adaptec cards = <Ctrl><A>

The key strokes are listed on the screen when the adapter is initializing. After you enter the Adaptec HBA BIOS with <Ctrl><A>, perform the following steps.

1. **Highlight** Configure/View Host Adapter Settings **and press Return.**
2. **Go to** Advanced Configuration Options **and press Return.**
3. **Go to** Host Adapter BIOS **and press Return.**
  - a. **Select** disabled:scan bus **if this is not going to be a bootable device.**

- b. If it is going to be bootable device, select the default Enabled. The \* represents the default setting.**
- 4. Press Esc until you get back to the main options screen where Configure/View Host Adapter Settings was located.**
  - 5. Highlight SCSI Disk Utilities and press Return.**

The BIOS scans the SCSI card for any SCSI devices attached to the HBA.

The HBA's SCSI ID is displayed, as well as any other SCSI devices attached to the HBA. If you see only the HBA's SCSI ID, then something is not correct with the configuration on the SCSI attached device, or the cable between the HBA and the SCSI device is bad or not attached.
  - 6. If you are satisfied with the configuration, press Esc.**

A confirmation prompt asks you if you want to exit the utility.
  - 7. Select Yes and press Return.**

A confirmation prompt is displayed:

```
Please press any key to reboot.
```

- 8. Press any key.**

The server reboots.

Repeat this procedure for every HBA that is going to be attached to the Sun StorEdge 3000 Family SCSI arrays.

---

## H.2 Multiple LUN Linux Configuration

By default, the Linux kernel does not support multiple LUNs. To support multiple LUNs, modify the kernel with the following steps.

- 1. Log in as root, or su to root if you are logged in as a user.**
- 2. Add this line to the end of /etc/modules.conf file and save the file.**

```
options scsi_mod max_scsi_luns=255
```



3. At the system prompt, enter this command and press Return:

```
mkinitrd -f /boot/initrd-2.4.9-e.3.img 2.4.9-e.3
```

The 2.4.9-e.3 entries refer to the current kernel. To find out your current kernel, type `uname -r` and substitute your kernel information in place of the 2.4.9-e.3 entries.

4. Reboot the server.

To halt the server completely, use `shutdown -h`. To reboot automatically after the shutdown is complete, use `shutdown -r`.

---

## H.3 Making an ext3 Filesystem for Linux

The following procedure to label and partition drives using `fdisk` applies to an ext3 filesystem. To discover which disk you want to label, you need to find out what device it is.

1. To list all devices and their paths, start a terminal session and type:

```
# fdisk -l
```

Record the device name(s) and path(s) which you plan to use.

2. Then type:

```
# fdisk /dev/sd(x) x= a,b,c,...
```

A banner appears for the specified array device. The last statement displays a prompt Command (m or help):

3. Type *m* or *help*.
4. On the displayed menu, select *n* for the Command action and press Return.

Two choices are displayed:

- e extended
- p primary partition (1-4)

Only four primary partitions are allowed per array. All additional partitions must be added as extended LUNs under one primary partition. Only one primary partition is allowed to have extended LUNs.

5. For the first partition, choose `p`.

When several options appear, keep the defaults. You can reconfigure this after you understand the process and see what it looks like. Add additional primary partitions and extended partitions as needed.

6. After you have completed accepting the defaults and are back at the Command (m or help): screen, press `w` to save the configuration and exit `fdisk`.

Your partition is ready for a filesystem now.

---

## H.4 Creating a Filesystem

1. Log in as `root`, or `su` to root if you are logged in as a user.
2. Take the device that you ran `fdisk` on and run the following command to create an ext3 filesystem:

```
# mkfs -t ext3 /dev/sdb(x)
```

where `x` = the partition that you want to have become a filesystem. Replace `x` with `1` since there is only one partition.

---

## H.5 Creating a Mount Point and Mounting the Filesystem Manually

1. Go to the directory where you want to create a directory to use as the mount point.
2. Type this command:

```
# mkdir name
```

3. To mount your filesystem, type the following:

```
# mount /dev/sdb(x) /directory path
```

where `x` = `1` for this partition.

---

## H.6 Mounting the Filesystem Automatically

You can label the partition so that it can be entered in the `fstab` file for mounting the partition automatically at bootup. The use of the label and `fstab` file is a faster operation than mounting the filesystem manually with a device path.

1. Type the following command to add a label to the partition:

```
# e2label /dev/sdb(x) /directory_path
```

where `x = 1` for this partition and the directory path is the directory that was created and where it is located.

2. Edit the `/etc/fstab` file and add the following line:

```
# LABEL=/mount/point /mount/point ext3 1 2
```

3. Save the file.
4. To check to see if `fstab` was set up correctly, type:

```
# mount -a
```

If the mount point and the `fstab` file are correctly set up, no errors appear.

5. To verify it is mounted and list all mounted filesystems, type:

```
# df -k
```

6. To unmount the filesystem, type:

```
# umount /filesystem_name
```



# Configuring an IBM Server Running the AIX Operating Environment

---

This appendix provides access information and LUN setup information needed when you connect a Sun StorEdge 3310 SCSI array to an IBM server running the IBM AIX operating environment.

For a list of supported HBA adapters, refer to the *Sun StorEdge 3310 SCSI Array Release Notes*.

The Sun StorEdge 3310 SCSI Array supports versions 4.3.3 and 5.1L of the IBM AIX operating environment in dual path configurations using Sun StorEdge Traffic Manager 3.0 failover drivers for IBM AIX.

Refer to the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for the IBM AIX Operating System* for detailed instructions about setting up the device driver on the server and for additional information about configuring your IBM server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit <http://www.sun.com/sales>.

For more information on Multi-Platform support see:  
[http://www.sun.com/storage/san/multiplatform\\_support.html](http://www.sun.com/storage/san/multiplatform_support.html).

The information in this appendix supplements the configuration steps presented in this manual and covers the following topics:

- "Setting Up a Serial Port Connection" on page I-2
- "Identifying the Device On Which To Create a Logical Volume" on page I-4
- "Identifying the Device On Which To Create a Logical Volume" on page I-4
- "Using SMIT to Enable an AIX Host to Recognize New LUNs" on page I-5
- "Creating a Volume Group" on page I-6
- "Creating a Logical Volume" on page I-7
- "Creating a File System" on page I-7
- "Mounting the New File System" on page I-8
- "Verifying That the New File System Is Mounted" on page I-9

---

## I.1 Setting Up a Serial Port Connection

The RAID controller can be configured by means of a host system running a VT1000 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

---

**Note** – You can also monitor and configure a RAID array over an IP network using the RAID firmware or the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, see [“Setting Up Out-of-Band Management Over Ethernet” on page 4-25](#) refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

---

If you are planning to access your array over an IP network or through a terminal server and only want to connect through a serial port for the initial configuration of the array, it is not necessary to configure a serial port connection from your IBM host. For convenience, installers frequently perform the initial array configuration using a serial port on a portable computer.

If you want to use a Windows portable computer for this initial array configuration, see [“Setting Up the Serial Port Connection” on page G-2](#) for Windows 2000 systems or [“Setting Up the Serial Port Connection” on page K-2](#) for Windows NT systems.

If you prefer to connect through a serial port on your IBM server, consult the hardware information for your IBM host system to locate a serial port you can use for configuring the Sun StorEdge 3310 SCSI array. The system documentation also tells you what device file to use in accessing that port. For more information about the baud rate and other communication settings, see [“Configuring a COM Port to Connect to a RAID Array” on page 4-23](#).

---

**Note** – The next section also shows how to use the Kermit utility to set these parameters.

---

Once you have configured your serial port, follow the instructions in the next section.

## I.2 Accessing the Firmware Application From an IBM Server Running AIX

The RAID controller can be configured from the host system by means of terminal emulators such as Kermit.

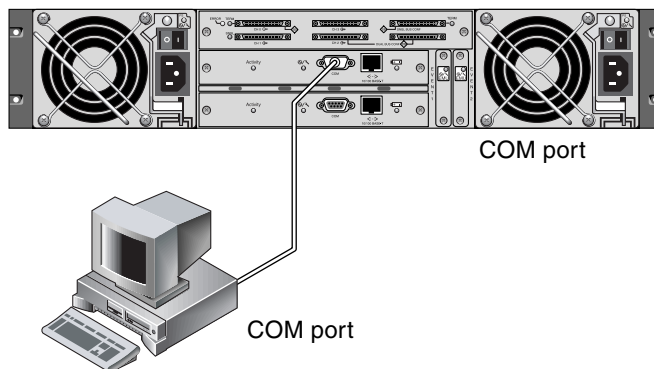
To access the controller firmware through the serial port, perform the following steps.

1. Connect the serial null-modem cable to the disk array and to the serial port on the IBM server.

---

**Note** – A DB9-to-DB25 serial cable adapter is shipped with the disk array to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

---



**FIGURE I-1** RAID Array COM Port Connected Locally to the Serial Port of a Host System

2. Power on the array.
3. After the array is powered up, power on the IBM server and log in as `root`, or `su to root` if you are currently logged in as a user.
4. Start the Kermit program and set the parameters as shown in the following example. Use the device-specific name for the serial port you are using. In the example, the serial port being configured is `/dev/tty0p1`.

```
# kermit
Executing /usr/share/lib/kermit/ckermite.ini for UNIX...
Good Morning!
C-Kermit 7.0.197, 8 Feb 2000, for HP-UX 11.00
  Copyright (C) 1985, 2000,
    Trustees of Columbia University in the City of New York.
Type ? or HELP for help.
(/) C-Kermit>set line /dev/tty0p1
(/) C-Kermit>set baud 38400
/dev/tty0p1, 38400 bps
(/) C-Kermit>set term byte 8
(/) C-Kermit>set carrier-watch off
(/) C-Kermit>C
Connecting to /dev/tty0p1, speed 38400.
The escape character is Ctrl-\ (ASCII 28, FS)
Type the escape character followed by C to get back,
or followed by ? to see other options.
-----
```

---

**Note** – To return to the Kermit prompt type Ctrl \ and then C. To exit Kermit, first return to the Kermit prompt and then type `exit`.

---

## I.3 Identifying the Device On Which To Create a Logical Volume

1. Display all the defined disk devices on your system.

```
# lsdev -Cc disk
```

A list of defined disk devices is displayed along with information about those devices.

2. Identify the name of the device on which you want to create a logical volume; for example, `hdisk7`.



3. Verify that the disk you've identified is the one you want.

```
# lscfg -v -l devicename
```

Detailed information about the device you specified is displayed.

4. Examine the manufacturer information and model information to make sure you have specified the device you want.

---

## I.4 Using SMIT to Enable an AIX Host to Recognize New LUNs

The simplest way to configure your IBM AIX host to use your array is to use System Management Interface Tool (SMIT). SMIT can be used with a graphical user interface (GUI) if your host is configured with a graphics card or if you want to export your display to an X-Windows terminal. SMIT can also be used with an ASCII interface which can be accessed through an ASCII terminal or console window on another system on the network. Because the ASCII interface is available on all systems, it is used as an example in the remainder of this appendix, but either interface can be used to perform the procedures described here. In addition, the same operations can be performed directly from the command line using standard AIX system administration commands.

---

**Note** – Use the Enter key when you have finished filling out a screen to advance to the next screen. Use the keystroke combinations shown on the screen to move back to previous screens.

---

1. Start SMIT using the ASCII interface to display the System Management screen.

```
# smit -a
```

2. Choose System Storage Management (Physical and Logical Storage) from the System Management menu.
3. Choose Logical Volume Manager from the System Storage Management menu.

The Logical Volume Manager menu is displayed on the Logical Volume Manager screen. You use menu options from this menu to create a Volume Group and then a Logical Volume within this Volume Group.

---

Logical Volume Manager

---

Volume Groups

Logical Volumes

Physical Volumes

Paging Space

---

Volume Groups are a way of dividing and allocating disk storage capacity. Volume groups can be used to subdivide a large partition of storage into smaller units of usable space called logical volumes.

Each volume group is divided into Logical Volumes, which are seen by applications as individual disks. Logical Volumes can contain their own file systems.

The underlying physical storage in a volume group consists of one or more Physical Volumes. A physical volume can be a single physical disk or a partition of a disk array. In this appendix, the physical volume is the disk device you identified in [“Identifying the Device On Which To Create a Logical Volume” on page I-4](#).

---

## I.5 Creating a Volume Group

1. **Choose Volume Group from the Logical Volume Manager menu.**
2. **Choose Add a Volume Group from the Volume Groups menu.**
3. **Type the name you want to give the volume group next to Volume Group name.**
4. **Next to PHYSICAL VOLUME name, type the name of the disk device you identified in [“Identifying the Device On Which To Create a Logical Volume” on page I-4](#).**  
An ARE YOU SURE confirmation screen is displayed.
5. **Confirm this message to display a status screen.**  
When the volume group is created, a status screen displays Command: OK.
6. **Return to the Volume Groups screen to activate the new volume group.**
7. **Choose Activate a Volume Group from the Volume Groups menu.**
8. **Next to VOLUME GROUP name, type the name you gave the volume group.**  
When the volume group is activated, a status screen displays Command: OK.

---

## I.6 Creating a Logical Volume

1. Return to the Logical Volume Manager screen.
2. Choose Logical Volumes from the Logical Volume Manager menu to display the Logical Volumes screen.
3. Choose Add a Logical Volume from the Logical Volumes menu to display the Add a Logical Volume screen.
4. Type the name you gave the volume group next to VOLUME GROUP name.  
The Add a Logical Volume screen is displayed.
5. Type the name you want to give the new logical volume next to LOGICAL VOLUME (new).
6. Type the number of partitions you want to create on the new logical volume next to Number of LOGICAL PARTITIONS.
7. Type the values you want to use for the other parameters on the Add a Logical Volume screen or accept the default values.

When the logical volume is created, a status screen displays Command: OK and displays the name of the new logical volume.

---

## I.7 Creating a File System

The following steps create a file system on the new logical volume.

1. Return to the System Storage Management (Physical and Logical Storage) screen.  
The System Storage Management screen is displayed.
2. Choose File Systems from the System Storage Management menu to display the File Systems screen.
3. Choose Add / Change / Show / Delete File Systems from the File Systems menu.
4. Choose Journaled File System to display the Journaled File System screen.
5. Choose Add a Journaled File System from the Journaled File System menu.
6. Choose Add a Standard Journaled File System to display the Volume Group Name screen.

The Volume Group Name screen displays the names of available volume groups.

7. Move the cursor to highlight the name of the volume group you created in **“Creating a Volume Group”** on page I-6.

The Add a Standard Journaled File System screen is displayed.

8. Specify the size of the file system you want to create by typing the number of blocks you want next to **SIZE** of file system (in 512-byte blocks).
9. Next to **MOUNT POINT**, type the directory name (and filepath, if desired) on which you want to mount the new file system.

---

**Note** – If the mount point directory does not already exist it is created.

---

When the file system is created, a status screen displays **Command: OK**, the Journaled File System, the mount point, and the size of the file system.

---

## I.8 Mounting the New File System

1. Return to the File Systems screen.
2. Choose **List All File Systems** from the File Systems menu to see the names of all file systems.
3. Identify the name of the file system you created in the **Name** column; for example, `ldev/lv00`.
4. Choose **Mount a File System** from the File Systems menu to display the **Mount a File System** screen.
5. Type the name of the file system you identified in step 3 next to **FILE SYSTEM** name.
6. Type the name of the mount point you specified next to **DIRECTORY** over which to mount.

When the file system is mounted, a status screen displays **Command: OK**.

7. Exit **SMIT**.

---

## I.9 Verifying That the New File System Is Mounted

1. Use the `mount` command to verify that the logical volume is mounted correctly.

```
# mount
```

The mounted file systems and directories are displayed.

2. Examine the list to make sure your new file system is mounted at the mount point you specified.
3. Display the attributes of the new file system.

```
# df -k mountpoint
```



# Configuring an HP Server Running the HP-UX Operating Environment

---

This appendix provides access information and LUN setup information needed when you connect a Sun StorEdge 3310 SCSI array to a computer running the HP-UX operating environment.

For a list of supported host bus adapters, refer to the *Sun StorEdge 3310 SCSI Array Release Notes*.

The Sun StorEdge 3310 SCSI array supports the HP-UX operating environment Level 11.0 and Level 11.i in dual path configurations using Sun StorEdge Traffic Manager 3.0 failover drivers for the HP-UX operating environment.

Refer to the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for the Hewlett Packard HP-UX Operating System* for detailed instructions about setting up the device driver on the server and for additional information about configuring your HP server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit <http://www.sun.com/sales>.

For more information on Multi-Platform support see:  
[http://www.sun.com/storage/san/multiplatform\\_support.html](http://www.sun.com/storage/san/multiplatform_support.html).

The information in this appendix supplements the configuration steps presented in this manual and covers the following topics:

- “Setting Up a Serial Port Connection” on page J-2
- “Accessing the Firmware Application From an HP Server Running HP-UX” on page J-3
- “Attaching the Disk Array” on page J-5
- “Logical Volume Manager” on page J-6
- “Definitions of Common Terms” on page J-6
- “Creating a Physical Volume” on page J-7
- “Creating a Volume Group” on page J-7
- “Creating a Logical Volume” on page J-9

- [“Creating an HP-UX File System”](#) on page J-10
- [“Mounting the File System Manually”](#) on page J-10
- [“Mounting the File System Automatically”](#) on page J-10

---

## J.1 Setting Up a Serial Port Connection

The RAID controller can be configured by means of a host system running a VT1000 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

---

**Note** – You can also monitor and configure a RAID array over an IP network using the RAID firmware or the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, see [“Setting Up Out-of-Band Management Over Ethernet”](#) on page 4-25 refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

---

If you are planning to access your array over an IP network or through a terminal server and only want to connect through a serial port for the initial configuration of the array, it is not necessary to configure a serial port connection from your IBM host. For convenience, installers frequently perform the initial array configuration using a serial port on a portable computer.

If you want to use a Windows portable computer for this initial array configuration, see [“Setting Up the Serial Port Connection”](#) on page G-2 for Windows 2000 systems or [“Setting Up the Serial Port Connection”](#) on page K-2 for Windows NT systems.

If you prefer to connect through a serial port on your HP server, consult the hardware information for your HP host system to locate a serial port you can use for configuring the Sun StorEdge 3310 SCSI array. The system documentation also tells you what device file to use in accessing that port. For more information about the baud rate and other communication settings, see [“Configuring a COM Port to Connect to a RAID Array”](#) on page 4-23.

---

**Note** – The next section also shows how to use the Kermit utility to set these parameters.

---



---

## J.2 Accessing the Firmware Application From an HP Server Running HP-UX

The RAID controller can be configured from the host system by means of terminal emulators such as `cu` or Kermit. These instructions show the use of Kermit. For information on `cu`, see `cu(1)`.

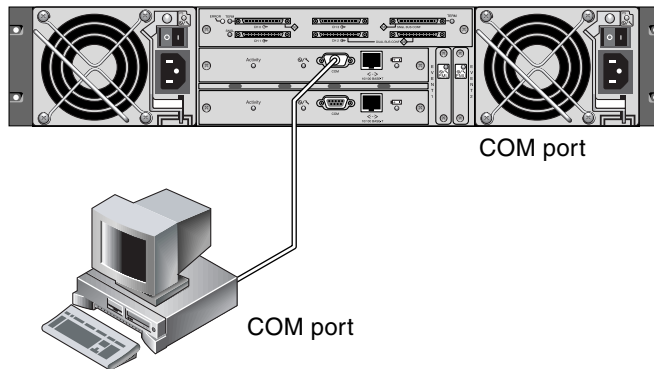
To access the controller firmware through the serial port, perform the following steps.

1. **Connect the serial null-modem cable to the disk array and to the serial port on the HP server.**

---

**Note** – A DB9-to-DB25 serial cable adapter is shipped with the disk array to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

---



**FIGURE J-1** RAID Array COM Port Connected Locally to the Serial Port of a Host System

2. **Power on the array.**
3. **After the array is powered up, power on the HP server and log in as `root`, or `su` to `root` if you are logged in as a user.**
4. **Start the Kermit program and set the parameters as shown in the following example. Use the device-specific name for the serial port you are using. In the example, the serial port being configured is `/dev/tty0p1`.**

```
# kermit

Executing /usr/share/lib/kermit/ckermi.ini for UNIX...

Good Morning!

C-Kermit 7.0.197, 8 Feb 2000, for HP-UX 11.00

Copyright (C) 1985, 2000,

Trustees of Columbia University in the City of New York.

Type ? or HELP for help.

(/) C-Kermit>set line /dev/tty0p1

(/) C-Kermit>set baud 38400

/dev/tty0p1, 38400 bps

(/) C-Kermit>set term byte 8

(/) C-Kermit>set carrier-watch off

(/) C-Kermit>C

Connecting to /dev/tty0p1, speed 38400.

The escape character is Ctrl-\ (ASCII 28, FS)

Type the escape character followed by C to get back,

or followed by ? to see other options.
```

---

**Note** – To return to the Kermit prompt type Ctrl \ and then C. To exit Kermit, first return to the Kermit prompt, and then type exit.

---

---

## J.3 Attaching the Disk Array

The simplest way to configure a disk array is to use System Administration Manager (SAM), HP-UX's system administration tool. If SAM is not installed on your system, or if you prefer to use the command-line interface, the following procedures can guide you through the task. For more information please consult the HP document *Configuring HP-UX for Peripherals*:

1. Use the `ioscan` command to determine what addresses are available on the host bus adapter (HBA) you plan to attach to the Sun StorEdge 3310 SCSI array.
2. Access the firmware application on the Sun StorEdge 3310 SCSI array and set the SCSI IDs of the host channels you want to use.
3. Map the partitions containing storage that you want to use to the appropriate host channels.

Partitions must be assigned to LUNs in sequential order beginning at LUN 0.

4. Halt the operating system using the `shutdown` command.
5. Turn off all power to peripheral devices and then to the server.
6. Attach one or more host channels of the Sun StorEdge 3310 SCSI array to the SCSI interface cards in the host using the supplied SCSI cables.
7. Turn on the power to the Sun StorEdge 3310 SCSI array and all other peripheral devices.
8. After they are initialized, power on the server and boot HP-UX.  
During the boot process, the operating system recognizes the new disk devices and builds device files for them.
9. Verify that you can see the new storage resources by running the `ioscan` command. You are now ready to use the storage.

---

**Note** – If you create and map new partitions to the array, you can have them recognized by the operating system without rebooting. Run the `ioscan` and the `insf` commands to discover the resources and to create their device files.

---

---

## J.4 Logical Volume Manager

The Logical Volume Manager (LVM) is a disk management system provided by HP in all versions of HP-UX 11. The LVM allows you to manage storage as logical volumes. This section describes some concepts used by the LVM and explains how to create logical volumes on your StorEdge 3310 SCSI array. For more detailed information on the LVM, please consult `lv(7)` and the HP publication *Managing Systems and Workgroups: Guide for HP-UX System Administration* (HP part number B2355-90742).

As with many systems administration tasks you can use SAM to create and maintain logical volumes; however some functions can only be performed with HP-UX commands. The procedures in this appendix are performed using the command line interface rather than using SAM.

---

## J.5 Definitions of Common Terms

*Volume groups* are HP-UX's method for dividing and allocating disk storage capacity. Volume groups can be used to subdivide a large partition of storage into smaller units of usable space called logical volumes.

Each volume group is divided into *logical volumes*, which are seen by the applications as individual disks. They can be accessed as either character or block devices and can contain their own file systems.

The underlying physical storage in a volume group consists of one or more *physical volumes*. A physical volume can be a single physical disk or a partition of a disk array.

Each physical volume is divided into units called *physical extents*; the default size of these units is 4 MB, but can range in size from 1 MB to 256 MB. The maximum number of physical extents that a volume group can contain is 65,535. With the default size of 4 MB, this limits the size of the volume group to 255 GB.

To create a volume group larger than 255 GB, you must increase the size of the physical extents when creating the volume group. See `vgcreate(1m)` for further information.

---

## J.6 Creating a Physical Volume

To use a storage resource in the LVM, it must first be initialized into a physical volume (also called an LVM disk).

Log in as root, or su to root if you are not logged in with root user privileges.

1. Select one or more partitions on the Sun StorEdge 3310 that you want to use. The output of `ioscan(1M)` shows the disks attached to the system and their device names:

```
# ioscan -fnC disk

Class I   H/W Path      Driver  S/W State  H/W Type  Description
-----
disk  1   0/12/0/0.6.0  sdisk   CLAIMED   DEVICE    Sun StorEdge 3310

/dev/dsk/c12t6d2 /dev/rdisk/c12t6d2
```

2. Initialize each partition as an LVM disk with the `pvcreate` command. For example, enter:

```
# pvcreate /dev/rdisk/c12t6d2
```



---

**Caution** – This process results in the loss of any data that resides on the partition.

---

---

## J.7 Creating a Volume Group

The volume group contains the physical resources that you can use to create usable storage resources for your applications.

1. Create a directory for the volume group and a device file for the group in that directory:.

```
# mkdir /dev/vgmynewvg  
  
# mknod /dev/vgmynewvg/group c 64 0x060000
```

The name of the directory is the name of the volume group. By default, HP-UX uses names of the format *vgNN*, but you can choose any name that is unique within the list of volume groups.

In the preceding example the `mknod` command has the following arguments:

- The fully qualified pathname of the new device file `group`
- The letter `c` indicates a character device file
- The major number `64` (used for all volume groups)
- A minor number of the form `0xNN0000`, where *NN* is the two-digit hexadecimal representation of the volume group number (`06` in the example)

To associate the physical volume with a volume group use the `vgcreate` command:

```
# vgcreate /dev/vgmynewvg /dev/dsk/c12t6d2
```

To verify the creation and view the volume group properties, use the `vgdisplay` command.

---

```
# vgdisplay vg02  
--- Volumegroups ---  
  
VG Name                /dev/vg02  
VG Write Access        read/write  
VG Status               available  
Max LV                 255  
Cur LV                0  
Open LV                0  
Max PV                 16  
Cur PV                1  
Act PV                 1  
Max PE per PV          2167  
VGDA                   2
```

---

---

PE Size (Mbytes)	4
Total PE	2167
Alloc PE	0
Free PE	2167
Total PVG	0

---

In the output of `vgdisplay`, the Total PE field gives the number of physical extents in the volume group.

The size of each physical extent is given in the PE Size field (the default is 4 MB), so the total capacity of this volume group is  $2167 \times 4 \text{ MB} = 8668 \text{ MB}$ .

The Alloc PE field shows the numbers of physical extents allocated to logical volumes. At this point, the Alloc PE field is zero because we have not assigned any of this volume group's capacity to logical volumes.

---

## J.8 Creating a Logical Volume

To create a logical volume within the volume group, use the `lvcreate` command with the `-L` option to specify the size of the logical volume in megabytes. The logical volume size should be a multiple of the physical extent size. In the following example, a logical volume of 4092 MB is created:

```
# lvcreate -L 4092 /dev/vg02
```

Both character and block device files for the new logical volume are created in the volume group directory:

```
# ls /dev/vg02  
  
group    lvoll    rlvoll
```

Applications should use these names to access the logical volumes. Unless you specify otherwise, HP-UX creates names in the form shown in the example. To specify custom names for logical volumes please see `vgcreate(1M)`.

---

## J.9 Creating an HP-UX File System

The following command creates a file system on the logical volume created in the previous steps.

```
# /sbin/newfs -F vxfs /dev/vgmynewvg/rlvol1
```

---

## J.10 Mounting the File System Manually

The process of incorporating a file system into the existing directory structure is known as mounting the file system. The files, although present on the disk, are not accessible to users until they are mounted.

1. **Create a directory to use as the mount point for your new file system:**

```
# mkdir /usr/local/myfs
```

2. **To mount your file system, type the following:**

```
# mount /dev/vgmynewvg/lvol1 /usr/local/myfs
```

---

## J.11 Mounting the File System Automatically

By placing information about your file system in the `fstab` file, you can have HP-UX mount the file system automatically during bootup. You can also use the name of the mount point in mount commands that you issue from the console.

1. **Make a copy of the existing `fstab` file:**

```
# cp /etc/fstab /etc/fstab.orig
```



2. To include the file system created in the example, add the following line to the file `/etc/fstab`.

```
/dev/vg0mynewvg/lvol1 /usr/local/myfs vxfs delaylog 0 2
```

See the entry for `fstab(4)` for details on creating `/etc/fstab` entries.

3. To check to see if `fstab` was set up correctly, type:

```
# mount -a
```

If the mount point and the `fstab` file are correctly set up, no errors appear.

4. To verify it is mounted and list all mounted file systems, type:

```
# bdf
```

5. To unmount the file system, type:

```
# umount /usr/local/myfs
```



## Configuring a Windows NT Server

---

This appendix provides platform-specific host installation and configuration information to use when you connect a Sun StorEdge 3310 SCSI array to a host running the Windows NT 4.0 operating system.

The Sun StorEdge 3310 SCSI Array supports Microsoft Windows NT 4.0, Service Pack 6A or greater, in either single-path or dual-path configurations. Dual-path configurations use the Sun StorEdge Traffic Manager 3.0 for Microsoft Windows NT.

If you are going to use dual path instead of single path, see the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for Microsoft Windows 2000 and Windows NT* for detailed instructions about setting up the device driver on the server and for additional information about configuring your Windows NT server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit <http://www.sun.com/sales>.

For more information on Multi-Platform support see:  
[http://www.sun.com/storage/san/multiplatform\\_support.html](http://www.sun.com/storage/san/multiplatform_support.html).

The information in this appendix supplements the configuration steps presented in [Chapter 5](#), and covers the following steps:

- “Setting Up the Serial Port Connection” on page K-2
- “Accessing the Firmware Application From a Windows NT Server” on page K-5
- “Enabling a Windows NT Server to Recognize New Devices and LUNs” on page K-5

---

## K.1 Setting Up the Serial Port Connection

The RAID controller can be configured by means of a host system running a VT100 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

---

**Note** – You can also monitor and configure a RAID array over an IP network using the RAID firmware or the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, see [“Setting Up Out-of-Band Management Over Ethernet” on page 4-25](#) refer to the *Sun StorEdge 3000 Family Configuration Service User’s Guide*.

---

1. **Use a null modem serial cable to connect the COM port of the RAID array to an unused serial port on your host system.**

A null modem cable has serial signals swapped for connecting to a standard serial interface.

---

**Note** – A DB9-to-DB25 serial cable adapter is included in your package contents to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

---

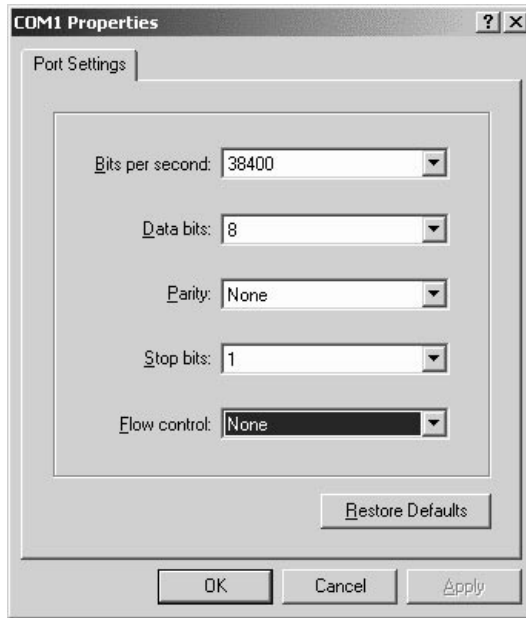
2. **Power up the array.**
3. **On the Windows NT server, select Start → Programs → Accessories → Hyperterminal → HyperTerminal.**
4. **Type a name and choose an icon for the connection.**

5. In the Connect To window, choose the COM port from the Connect Using: drop-down menu that is connected to the array.



6. Click OK.
7. In the Properties window, set the serial port parameters using the drop-down menus.
  - 38400 baud
  - 8 bit
  - 1 stop bit
  - Parity: None

- Flow control: None



8. Click OK.

9. To save the connection and its settings, select File → Save.

The connection filename is *connection\_name* where *connection\_name* is the name you gave this HyperTerminal connection when you created it.

10. To make a connection shortcut on your desktop, select Start → Find → For Files or Folders. Enter the *connection\_name* and click the Search Now button. Highlight and right-click on the filename in the Search Results window, select Create Shortcut, and click Yes.

You are now ready to configure your array.

---

## K.2 Accessing the Firmware Application From a Windows NT Server

To access the array from a Windows NT Server through a serial port, use the HyperTerminal connection you configured in [“Setting Up the Serial Port Connection” on page K-2](#) or install a VT100 terminal emulation program and use the parameters described there.

To access the array through an Ethernet connection, follow the procedures in [“Setting Up Out-of-Band Management Over Ethernet” on page 4-25](#). To access the command prompt described there from a Windows NT server, choose Programs → Command Prompt.

---

## K.3 Enabling a Windows NT Server to Recognize New Devices and LUNs

Before beginning this procedure, make sure that you are using a supported SCSI host bus adapter (HBA) such as an Adaptec 39160. Refer to the Release Notes for your array for current information about which HBAs are supported.

Also make sure that you are using a supported driver for your HBA. For the Adaptec 39160, use FMS V4.0a or later.

1. **Boot your system and verify that the host bus adapter (HBA) basic input/output system (BIOS) recognizes your new SCSI device(s).**

---

**Note** – As your system starts up you see your new SCSI device(s).

---

You are now ready to partition and format your new device(s).

2. **Open the Disk Administrator application.**

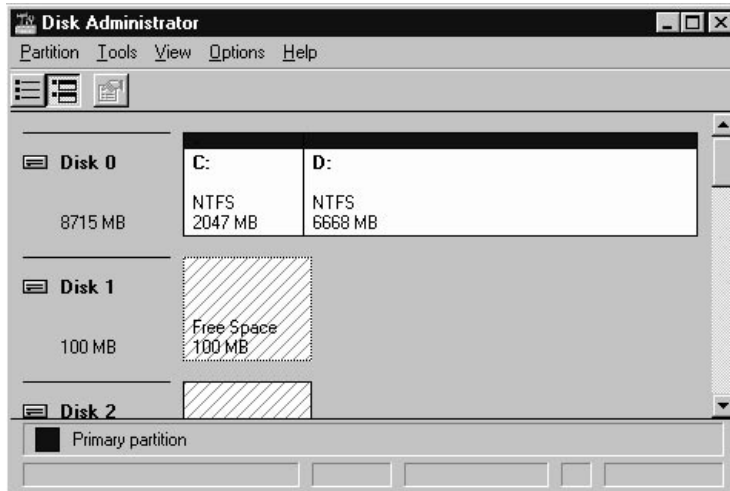
- a. **Click Start**

- b. **Choose Administrative Tools → Disk Administrator.**

A Disk Administrator is initializing progress indicator is displayed.

A Disk Administrator window then displays the drives recognized by the system.

3. Select the disk whose Free Space you want to partition and format.



a. Choose **Create...** from the **Partition** menu.

A Create Primary Partition dialog box enables you to specify the size of the partition.

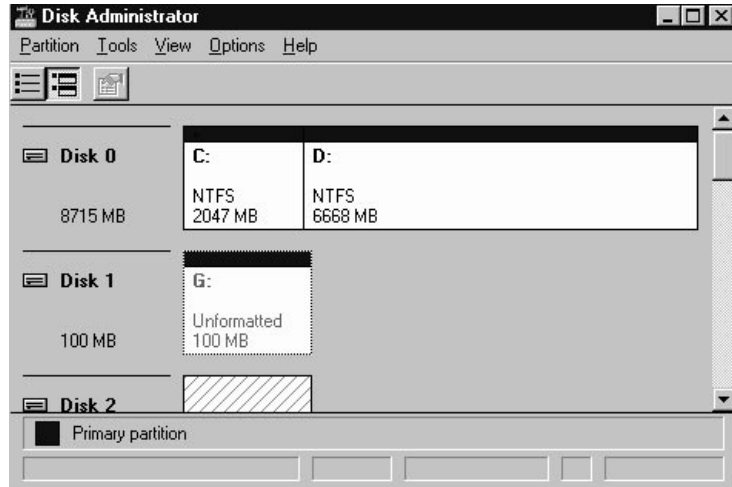
b. Specify a size or accept the default.

c. Click **OK** to create the partition.

The partition is now identified as Unformatted in the Disk Administrator window.



**4. Select the Unformatted partition.**



**5. Choose Commit Changes Now... from the Partition menu.**

A confirmation dialog box is displayed.

**6. Click Yes to save the changes you have made.**

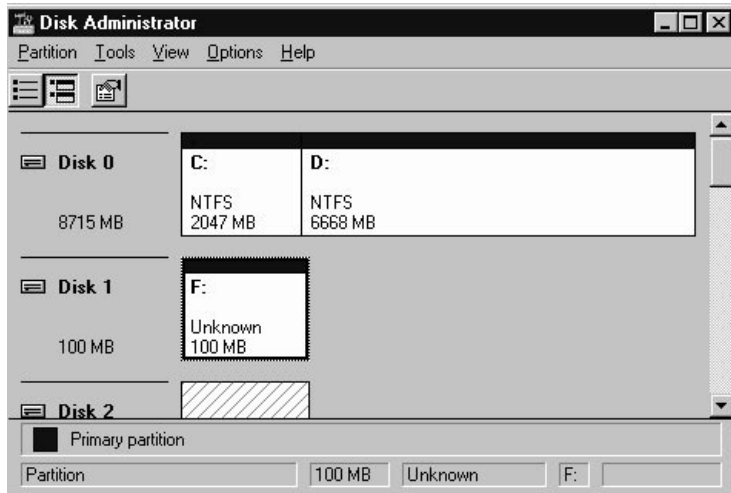
A dialog box confirms that disks were updated successfully.

**7. Click OK.**

The partition is now identified as Unknown in the Disk Administrator window.

**8. Format the Unknown partition.**

- a. Select the Unknown partition.



- b. Choose Format... from the Tools menu.

A Format dialog box is displayed.

- c. Choose NTFS from the File System drop-down menu.

- d. Make sure the Quick Format checkbox is checked.

- e. When you have specified the settings you want, click Start.

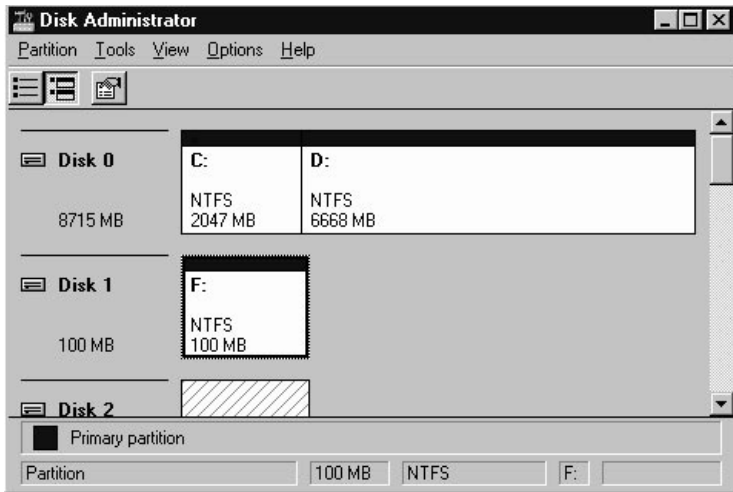
A dialog box warns you that any existing data on the disk will be erased.

- f. Click OK to format the disk.

The new partition is formatted and a dialog box confirms that the format is complete.

9. Click OK.

The formatted partition is identified as NTFS in the Disk Administrator window.



10. Repeat these steps for any other new partitions and devices you want to format.



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