Sun StorageTek™ 2500 Series Array Hardware Installation Guide

Sun Microsystems, Inc.
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Preface

The *Sun StorageTek 2500 Series Array Hardware Installation Guide* describes how to install rack-mounting rails and array modules on the Sun StorageTek 2500 Series array.

Host management, data host management, and remote command line interface (CLI) functions are performed by the Sun StorageTek Common Array Manager software. For installation and initial configuration of the Sun StorageTek 2500 Series array, including firmware upgrades, initial array setup, partitioning domains, configuring storage, and configuring IP addressing, see the *Sun StorageTek Common Array Manager Software Installation Guide*.

Before You Read This Book

Before you begin to install the Sun StorageTek 2500 Series array, you must have already prepared the site as described in these books:

- *Sun StorageTek 2500 Series Array Regulatory and Safety Compliance Manual*
- *Sun StorageTek 2500 Series Array Site Preparation Guide*

How This Book Is Organized

Chapter 1 provides an overview of the Sun StorageTek 2500 Series array and the hardware installation process.

Chapter 2 describes how to install rack-mounting rails, controller modules, and expansion cabinets in three Sun cabinets.

Chapter 3 describes how to connect the management host and data hosts to enable access to the array.

Chapter 4 describes tray power-on procedures.

Chapter 5 describes data host software and what you need to do to acquire and install it.

Chapter 6 describes how to configure IP addressing on the local management host and the array controllers.

Appendix A describes how to set up a DHCP server.

Related Documentation

Application	Title	Part Number
Site planning information	*Sun StorageTek 2500 Series Array Site Preparation Guide*	820-0024-*nn*
Late-breaking information not included in the information set	*Sun StorageTek 2500 Series Array Release Notes*	820-0031-*nn*
	Sun StorageTek Common Array Manager Release Notes	820-0030-*nn*
Instructions for installing the Common Array Manager host management software	*Sun StorageTek Common Array Manager Software Installation Guide*	819-7035-*nn*
Quick reference information for the CLI	*Sun StorageTek 6130, 2500 Series, and 6540 Arrays sscs(1M) CLI Quick Reference*	820-0029-*nn*

Application	Title	Part Number
Regulatory and safety information	*Sun StorageTek 2500 Series Array Regulatory and Safety Compliance Manual*	820-0025-*nn*
Instructions for installing the Sun StorageTek Expansion cabinet	*Sun StorageTek Expansion Cabinet Installation and Service Manual*	805-3067-*nn*
Instructions for installing the Sun Rack 900/1000 cabinets	*Sun Rack Installation Guide*	816-6386-*nn*

In addition, the Sun StorageTek 2500 Series Array includes the following online documentation:

- Sun StorageTek Common Array Manager online help

  Contains system overview and configuration information.

- Service Advisor

  Provides guided FRU replacement procedures with system feedback. You can access Service Advisor from the Sun StorageTek Common Array Manager software.

- sscs man page commands for the CLI

  Provides help on man page commands available on a management host or on a remote CLI client.

Accessing Sun Documentation

You can obtain Sun network storage documentation at:

`http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions`

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Sun StorageTek 2500 Series Array Hardware Installation Guide, part number 820-0015-10.

CHAPTER 1

Tray Overviews

The Sun StorageTek 2540 Array, the Sun StorageTek 2530 Array, and the Sun StorageTek 2501 Array are a family of storage products that provide high-capacity, high-reliability storage in a compact configuration.

The Sun StorageTek 2540 Array is a modular, rackmountable controller tray. It is scalable from a single dual-controller tray (1x1) configuration to a maximum configuration of 1x3 with two additional drive expansion trays behind one controller tray.

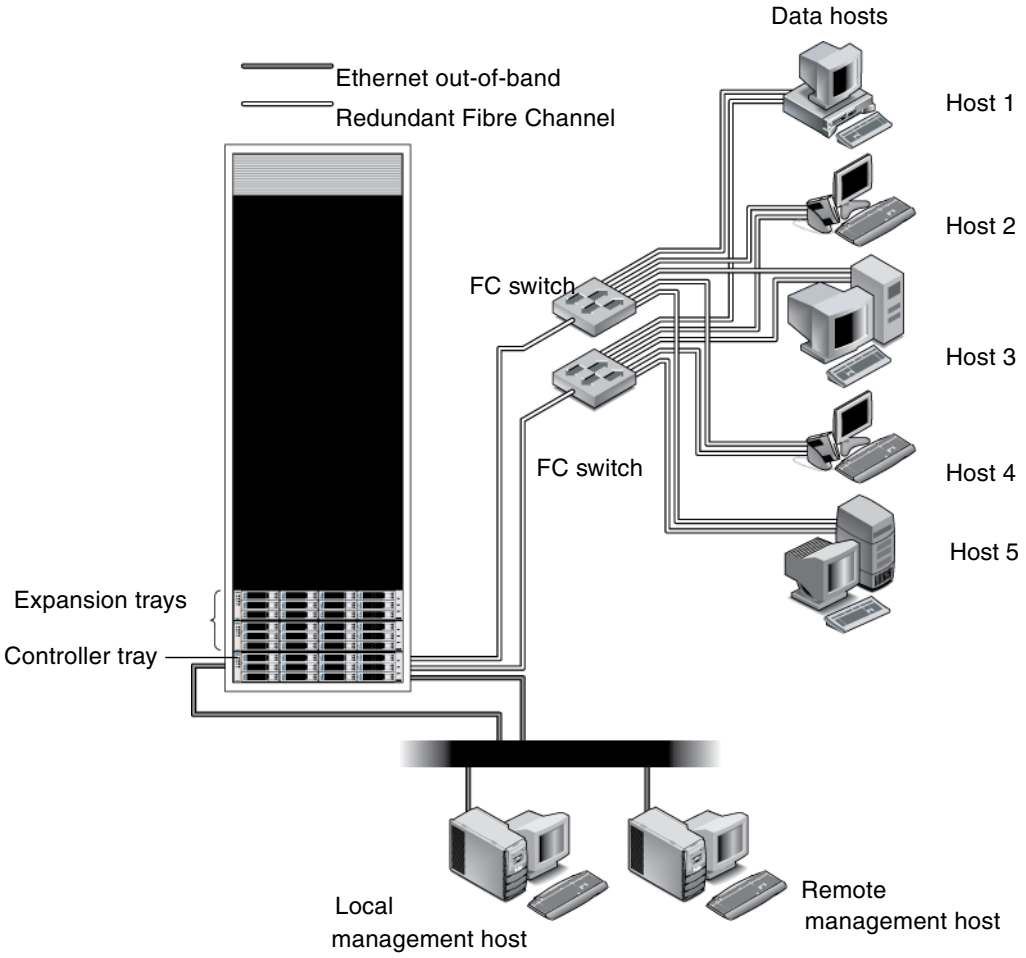
All three of the trays can be installed in the following cabinets:

- Sun Rack 900/1000 cabinet
- Sun StorageTek Expansion cabinet
- Any 19-inch wide, 4-post, EIA-compatible rack or cabinet with a front-to-back depth between vertical cabinet rails of 61 cm to 91 cm (24 in. to 36 in.). The cabinet can have threaded or unthreaded cabinet rails.

The Sun StorageTek 2540 Array and the Sun StorageTek 2530 Array contain disk drives for storing data and controllers that provide the interface between a management and/or data host and the disk drives. The Sun StorageTek 2540 Array provides a Fibre Channel connection from the data host to the controller. The Sun StorageTek 2530 Array provides a Serial Attached SCSI (SAS) connection from the data host to the controller.

The Sun StorageTek 2501 Array drive expansion tray provides additional storage. You can attach the drive expansion tray to either the Sun StorageTek 2540 Array or the Sun StorageTek 2530 Array.

FIGURE 1-1 Sun StorageTek 2500 Series Array Product Overview



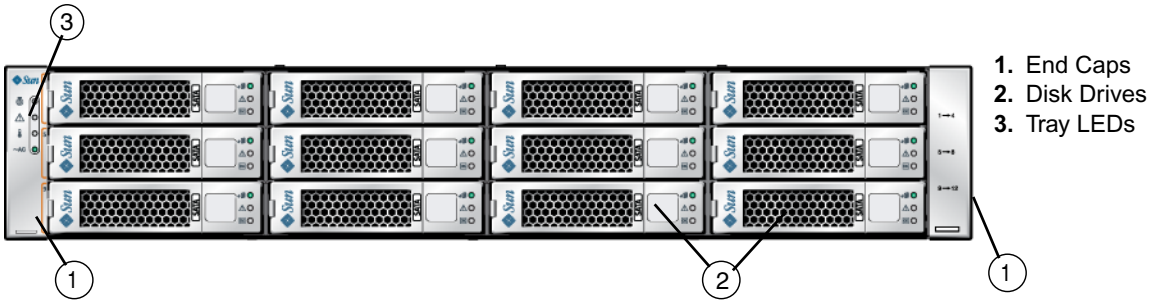
Front-Access Components of the Trays

Components that are accessed through the front of the Sun StorageTek 2540 Array, the Sun StorageTek 2530 Array, and the Sun StorageTek 2500 Array are identical in appearance. The disk drives in your controller tray might differ in appearance from those shown in FIGURE 1-2. The variation does not affect the function of the disk drives.

The front-access components include the following:

- **End caps** – Plastic, removable caps on the right and left side of the tray. Numbers on the side of the right end cap indicate the numbering of the drives.
- **LEDs (light emitting diodes)** – Four LEDs located on the on the left-side end cap
- **Disk drives** – Twelve removable disk drives

FIGURE 1-2 Tray Front-Access Components



LEDs on the Front of the Trays

The four LEDs on the front of the Sun StorageTek 2540 Array, the Sun StorageTek 2530 Array, and the Sun StorageTek 2501 Array are identical in appearance and function. The LEDs are located on the left-side endcap of the tray.

FIGURE 1-3 Location of the LEDs on the Front of the Trays

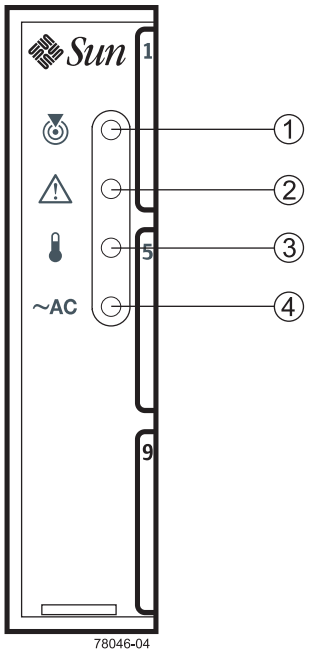


TABLE 1-1 Description of the LEDs on the Front of the Trays

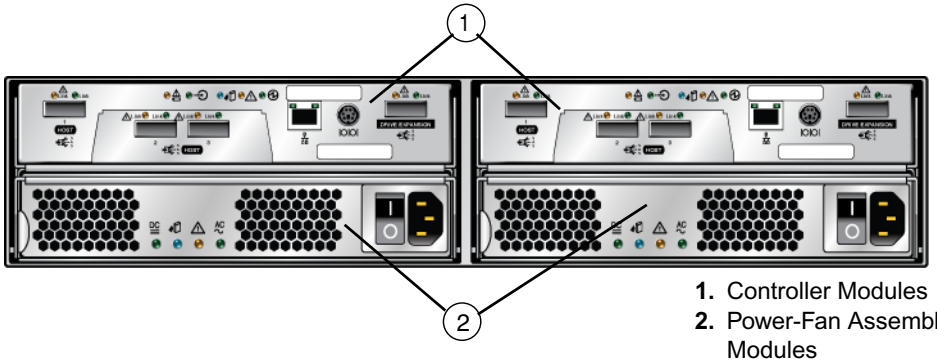
Location	LED	Color	On	Off
1	Locate	White	Indicates a failed component on this tray. The locate light is turned on manually by CAM to help you find the tray that requires attention.	Normal condition
2	Service Action Required (Fault)	Amber	A component within the tray requires attention.	The components in the tray are operating normally.
3	Over Temperature	Amber	The tray temperature has reached an unsafe level.	The tray temperature is within operational range.
4	Power	Green	Power is present.	Power is not present.

Rear-Access Components of the Trays

Components that are accessed from the rear of the Sun StorageTek 2540 Array and the Sun StorageTek 2530 Array controller trays include:

- **Controller Modules –** Two removable controller modules.
- **Power-fan assembly** – Two removable power supply modules with cooling fans. The power-fan assembly is identical and interchangeable to the power-fan assemblies used for Sun StorageTek 2501 Array drive expansion tray.

FIGURE 1-4 Controller Tray Rear-Access Components

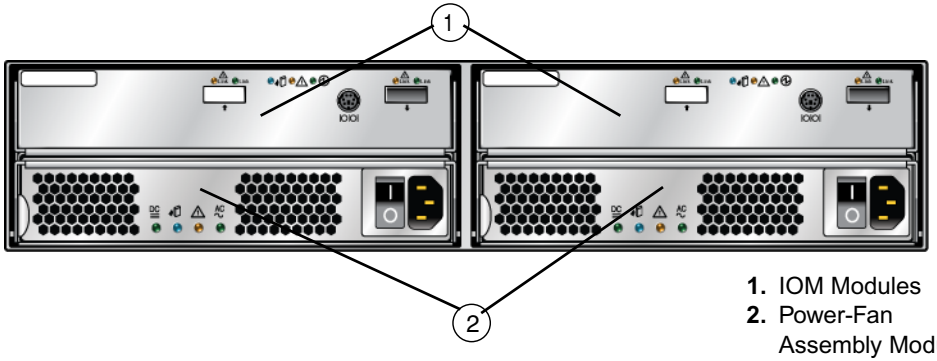


1. Controller Modules
2. Power-Fan Assembly Modules

Components that are accessed from the rear of the Sun StorageTek 2501 Array drive expansion tray are:

- **I/O Modules (IOMs)** – Two removable input/output modules
- **Power-fan assemblies** – Two removable power supply modules with cooling fans. The power-fan assembly is identical and interchangeable to the power-fan assemblies used for Sun StorageTek 2540 Array and the Sun StorageTek 2540 Array.

FIGURE 1-5 Drive Expansion Tray Rear-Access Components



1. IOM Modules
2. Power-Fan Assembly Modules

Controllers

The Sun StorageTek 2540 Array and the Sun StorageTek 2530 Array have two controllers. The controllers manage the input/output (I/O) between the volumes and the data host. The controllers have an Ethernet connection to the management host for out-of-band management and contain a battery that provides backup power to the 1 GB DIMM cache memory for up to three days in the event of a power loss.

Because each controller tray contains two controllers, the data path through one controller can fail and the other controller provides a redundant data path to all of the disk drives. If a controller fails, you can replace the failed controller while the power is applied and the storage array is processing data (a hot swap). The system automatically updates the firmware for the new controller so that it matches the configuration database.

Each controller has a media access control (MAC) address that identifies it on the network. The MAC address for a controller is on a label on the controller. The MAC address label is attached to the controller in two places: at the top of the tray and at the rear of the tray.

The tray ID numbers are set by the trays themselves on first power on. However, you can change the setting through the Common Array Manager software. The tray ID numbers on both of the controllers in one controller tray are identical under optimal operating conditions.

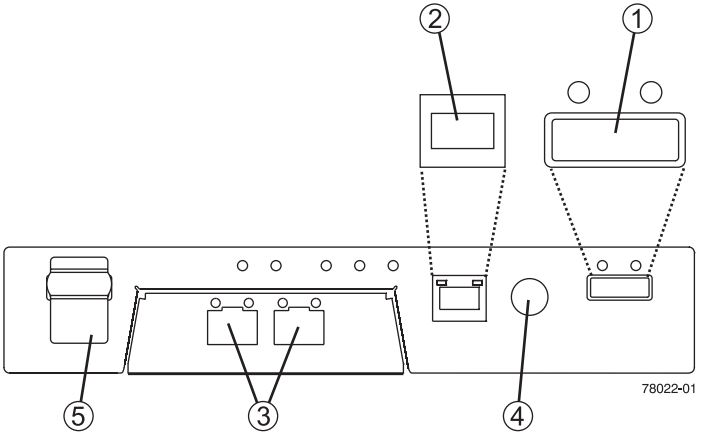
Sun StorageTek 2540 Array

This Fibre Channel (FC) controller tray provides the following capabilities:

- Two data host connectors per controller that can support either a fiber-optic interface or a copper interface with 1, 2, or 4 Gb/s data host connection speed
- One drive expansion tray Serial Attached SCSI (SAS) connector with 3 Gb/s drive expansion tray connection speed
- 512-MB or 1-GB mirrored cache
- Maximum connection of 36 disk drives (one controller tray and two drive expansion trays)

When fiber-optic cables are used to connect to the data host, a Small Form-factor Pluggable (SFP) transceiver is required to make the connection.

FIGURE 1-6 Sun StorageTek 2540 Array Connectors



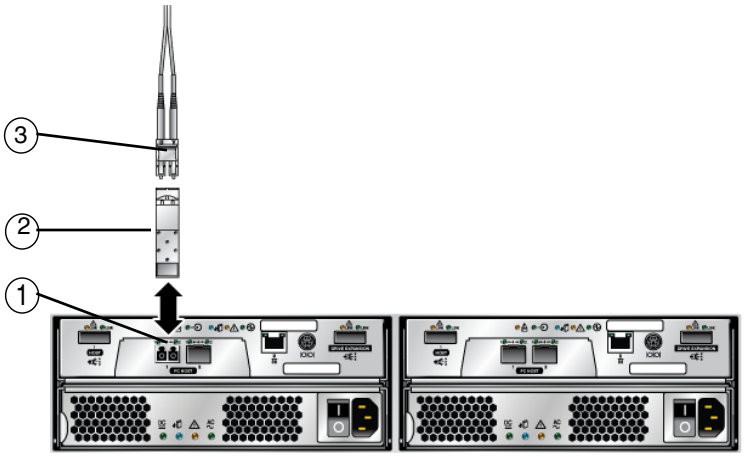
1. Drive Expansion Tray Connector (SAS Out)
2. Ethernet Management Host Connector
3. Fibre Channel Data Host Connectors or Copper Data Host Connectors
4. RS-232 Connector (Diagnostics Port)
5. Not Used

SFP Transceivers

You can connect the Sun StorageTek 2540 Array to either copper host interface cables or fiber-optic host interface cables. If you use fiber-optic cables, you must install an SFP transceiver in each interface connector on the controller where a fiber-optic cable is to be installed. The SFP transceiver is required to translate the optical signals from the fiber-optic cable into digital signals for the controller.

Note – The SFP transceiver shown might look different from those that are shipped with your controller tray. The difference does not affect transceiver performance.

FIGURE 1-7 SFP Transceiver for the Sun StorageTek 2540 Array



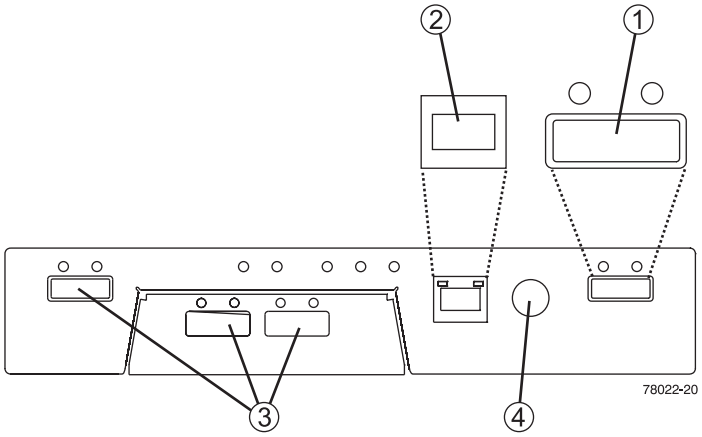
1. Data Host Connector
2. SFP Transceiver
3. Fiber-Optic Cable

Sun StorageTek 2530 Array

This SAS controller tray provides the following capabilities:

- Three SAS host connectors with 3 Gb/s host connection speed
- One drive expansion tray SAS connector for the drive channel with 3 Gb/s drive expansion tray connection speed
- 512-MB or 1-GB mirrored cache
- Maximum connection of 36 disk drives (one controller tray and two drive expansion trays)

FIGURE 1-8 Sun StorageTek 2530 Array Controller Connectors



1. Drive Expansion Tray Connector (SAS Out)
2. Ethernet Management Host Connector
3. SAS Data Host Connectors
4. RS-232 Connector (Diagnostics Port)

Controller Tray and Drive Expansion Tray Power-Fan Assembly

The power-fan assembly for the Sun StorageTek 2540 Array, the Sun StorageTek 2530 Array, and the Sun StorageTek 2501 Array is identical and interchangeable.

Note – A minimum of two disk drives must be operating in a controller tray or a drive expansion tray to avoid generating a power-fan assembly error.

The power-fan assembly contains an integrated cooling fan. The power supply provides power to the internal components by converting incoming AC voltage to DC voltage. The fan circulates air inside of the tray by pulling air in through the vents on the front of the assembly and pushing the air out of the vents on the back of each fan.

Each tray contains two power-fan assemblies. If one power supply is turned off or malfunctions, the other power supply maintains electrical power to the tray. Likewise, the fans provide redundant cooling. If one of the fans in either fan housing fails, the remaining fan continues to provide sufficient cooling to operate the tray. The remaining fan runs at a higher speed until the failed fan is replaced. Replace the failed fan as soon as possible.

Sun StorageTek 2501 Array

The drive expansion tray expands the storage capacity of a storage array. The controllers in the controller tray can connect to the drive expansion tray and access the disk drives in the drive expansion tray for additional storage. A drive expansion tray contains both physical components (disk drives, IOMs, and power-fan assemblies) and logical components (virtual disks and volumes).

Drive Expansion Tray IOM

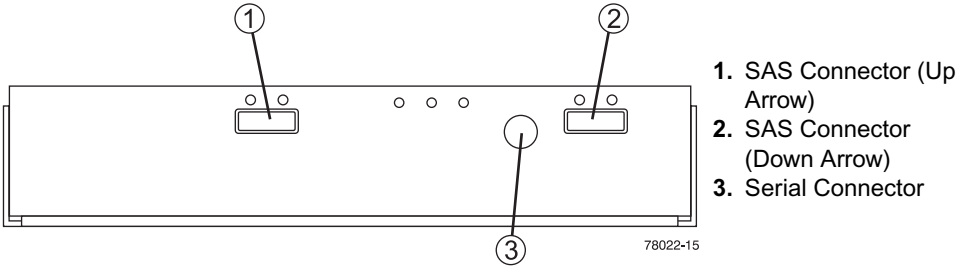
The drive expansion tray contains two IOMs that provide the interface between the disk drives in the drive expansion tray and the controllers in the controller tray. The IOM also monitors sub-system parameters. Each controller in the controller tray connects to an IOM.

If one IOM fails, the other IOM provides a redundant data path to the disk drives. You can replace a failed IOM while the power to the storage array is turned on and the storage array is processing data (a hot swap).

Drive Expansion Tray IOM Connectors

The IOM connects to the controller tray and drive expansion trays with SAS cables. Each IOM in a drive expansion tray has two SAS expansion connectors. One connector shows an up arrow, and the other connector shows a down arrow.

FIGURE 1-9 SAS Connectors on the Drive Expansion Tray IOM



When connecting the SAS cable from an IOM in one drive expansion tray to an IOM in another drive expansion tray, connect from a down arrow to an up arrow. If the cable is plugged into two connectors with arrows of the same direction, communication between the two drive expansion trays is lost.

LEDs on the Rear of the Trays

Controller LEDs on the Sun StorageTek 2540 Array

FIGURE 1-10 Locations of the Controller LEDs on the Sun StorageTek 2540 Array

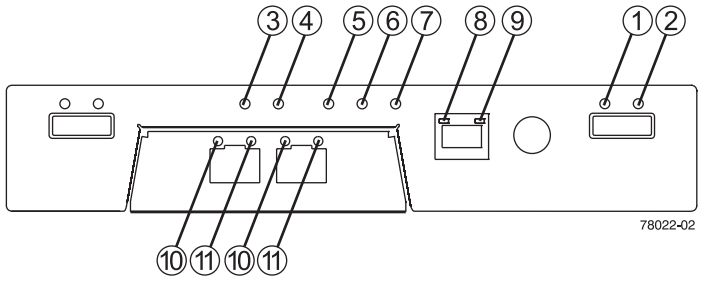


TABLE 1-2 Descriptions of the Controller LEDs on the Sun StorageTek 2540 Array *(1 of 2)*

Location	LED	Color	On	Off
1	Link Fault	Amber	At least one link has an error.	Normal condition
2	Drive Link	Green	At least one link is active.	At least one link has an error
3	Battery Fault	Amber	Indicates a fault within the battery backup unit.	Normal condition
4	Cache Active	Green	Caching is enabled. When blinking, the cache has data.	Indicates a problem if caching is enabled.
5	Service Action Allowed	Blue	The controller can be removed from the controller tray.	The controller cannot be removed from the controller tray.
6	Service Action Required (Fault)	Amber	Indicates a fault within the controller.	Normal condition
7	Power	Green	Power is present.	No power is applied to the controller tray.

TABLE 1-2 Descriptions of the Controller LEDs on the Sun StorageTek 2540 Array *(2 of 2)*

Location	LED	Color	On	Off
8	Ethernet Link	Green	The connection is active.	The connection is not active.
9	Ethernet 100BASE-TX	Green	100BASE-TX connection is active.	The 100BASE-TX connection is not active.
10 and 11	Host Link	Green	Both LEDs on indicate a 4-Gb/s data rate from the management software host. Left LED on and right LED off indicate a 1-Gb/s data rate from the management software host. Right LED on and left LED off indicate a 2-Gb/s data rate from the management software host.	Both LEDs off indicate no link to the management software host.

Controller LEDs on the Sun StorageTek 2530 Array

FIGURE 1-11 Locations of the Controller LEDs on the Sun StorageTek 2530 Array

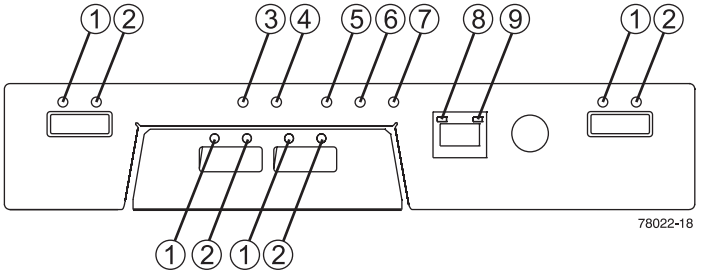


TABLE 1-3 Descriptions of the Controller LEDs on the Sun StorageTek 2530 Array *(1 of 2)*

Location	LED	Color	On	Off
1	Link	Green	At least one link is active.	All links have failed.
2	Link Fault	Amber	At least one link has an error.	Normal condition.
3	Battery Fault	Amber	Indicates a fault within the battery backup unit.	Normal condition.

TABLE 1-3 Descriptions of the Controller LEDs on the Sun StorageTek 2530 Array *(2 of 2)*

Location	LED	Color	On	Off
4	Cache Active	Green	Caching is enabled. When blinking, the cache has data.	Indicates a problem if caching is enabled.
5	Service Action Allowed	Blue	The controller can be removed from the controller tray.	The controller cannot be removed from the controller tray.
6	Service Action Required (Fault)	Amber	Indicates a fault within the controller.	Normal condition
7	Power	Green	Power is present.	No power is applied to the controller tray.
8	Ethernet Link	Green	The connection is active.	The connection is not active.
9	Ethernet 100BASE-TX	Green	100BASE-TX connection is active.	The 100BASE-TX connection is not active.

Controller Tray and Drive Expansion Tray Power-Fan Assembly LEDs

The power-fan assembly LEDs for the Sun StorageTek 2540 Array, the Sun StorageTek 2530 Array, and the Sun StorageTek 2501 Array are identical.

FIGURE 1-12 Locations of the Power-Fan Assembly LEDs

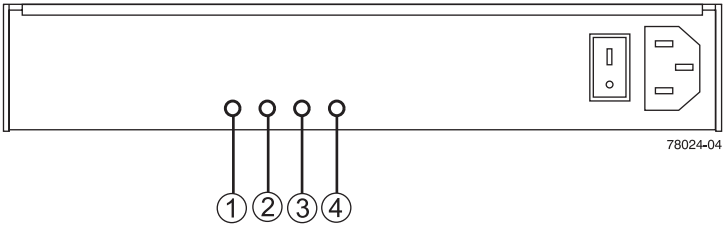


TABLE 1-4 Descriptions of the Power-Fan Assembly LEDs

Location	LED	Color	On	Off
1	DC Power (DC Good)	Green	DC power from the power-fan assembly is available.	DC power from the power-fan assembly is not available.
2	Service Action Allowed	Blue	The power-fan assembly can be removed from the tray.	The power-fan assembly cannot be removed from the tray.
3	Fault	Amber	A fault exists within the power-fan assembly.	Normal condition
4	Power (AC Good)	Green	Power is present	Power is not present

IOM LEDs on the Sun StorageTek 2501 Array

FIGURE 1-13 Locations of the IOM LEDs

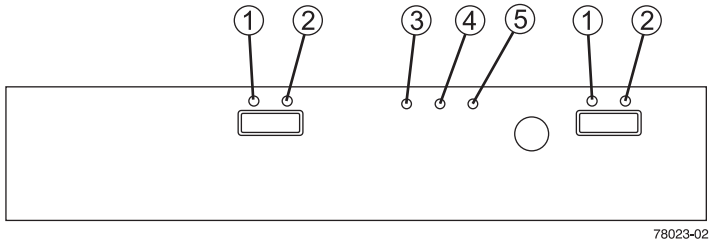


TABLE 1-5 Descriptions of the IOM LEDs

Location	LED	Color	On	Off
1	IOM Link Fault	Amber	A link error occurred.	No errors have occurred.
2	IOM Link	Green	The link is active.	A link error occurred.
3	Service Action Allowed	Blue	The IOM can be removed from the drive expansion tray.	The IOM cannot be removed from the drive expansion tray.
4	Service Action Required (Fault)	Amber	A fault exists within the IOM.	Normal condition
5	Power	Green	Power is present in the drive expansion tray.	No power is applied to the drive expansion tray.

Service Action LEDs

Each controller, power-fan assembly, IOM, and disk drive has a Service Action Allowed LED. The Service Action Allowed LED indicates when you can remove a component safely. See the "LEDs on the Rear of the Trays" section on page 1-11 for the locations and descriptions of the Service Action Allowed LEDs on a controller tray and a drive expansion tray, and see "LEDs on the Disk Drives" on page 1-18 for disk drive Service Allowed LEDs.

Caution – Potential loss of data access – Never remove a power-fan assembly, a controller module, or a disk drive unless the Service Action Allowed LED is turned on or you are given specific instructions to do so by the Common Array Manager software Service Advisor.

If a module fails and must be replaced, the Service Action Required LED on that module turns on to indicate that a service action is required. The Service Action Allowed LED also will turn on if it is safe to remove the module. If there are data availability dependencies or other conditions that dictate that a module should not be removed, the Service Action Allowed LED remains off.

The Service Action Allowed LED automatically turns on or turns off as conditions change. In most cases, the Service Action Allowed LED turns on when the Service Action Required (Fault) LED is turned on for a module.

Note – If the Service Action Required (Fault) LED is turned on but the Service Action Allowed LED is turned off for a particular module, you might have to service another component first. Check the Common Array Manager software Service Advisor to determine the action you should take.

Disk Drives

Disk drives for the Sun StorageTek 2500 Series Array have three components: a hard drive, a hard drive carrier, and an adapter card for connecting the disk drive to the midplane. The disk drives can be Serial Advance Technology Attachment (SATA) disk drives, Fibre Channel (FC) disk drives, or SAS disk drives.

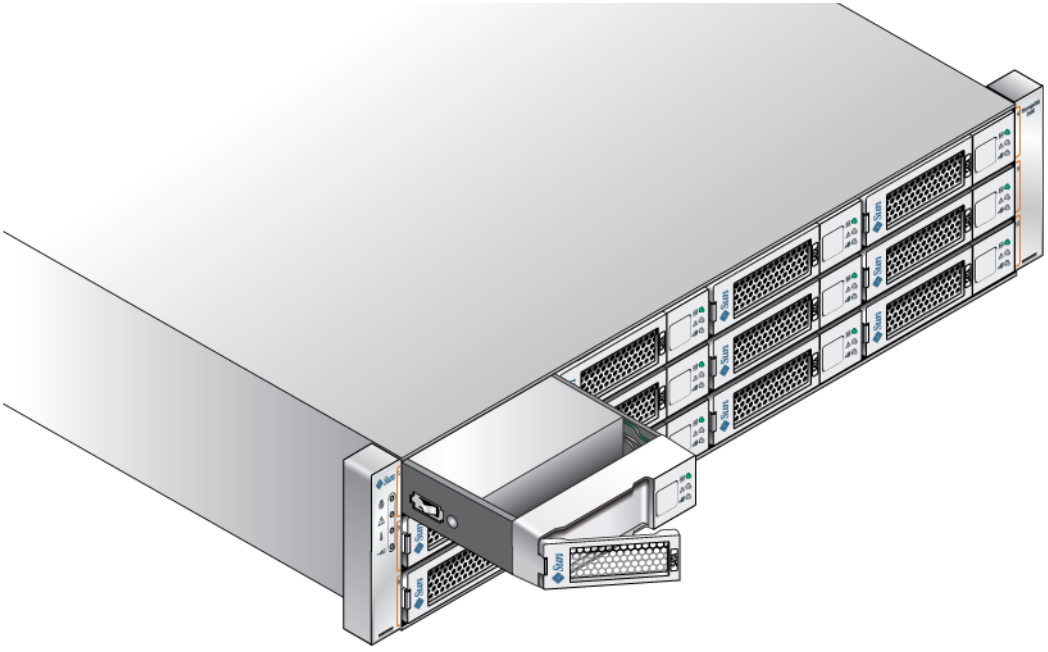
Controller trays or drive expansion trays hold up to 12 disk drives, for a maximum of 36 disk drives in a storage array. To reach the maximum of 36 disk drives, the storage array must consist of one controller tray and two drive expansion trays.

Access to disk drives is from the front of the tray.

Refer to the storage array release notes for supported drives.

Note – The disk drives in your tray might differ in appearance from those shown here. The variation does not affect their function.

FIGURE 1-14 Disk Drives



The physical locations of the disk drives are numbered 1 through 12, from left to right, and from top to bottom. The right end cap has numbers on the side showing the numbers of the adjacent drives. The Common Array Manager Service Advisor software automatically detects a disk drive's tray ID and slot designation.

LEDs on the Disk Drives

FIGURE 1-15 Locations of the Disk Drive LEDs

TABLE 1-6 Descriptions of the Disk Drive LEDs

Location	LED	Color	General Behavior
1	Service Action Allowed	Blue	On – The disk drive can be removed from the tray. Off – The disk drive cannot be removed from the tray.
2	Fault	Amber	On – The disk drive has a problem. Off – Normal condition.
3	Power	Green	Off – The power is turned off. On – The power is on and the disk drive is operating normally. On and blinking (0.5 s on, 0.5 s off) –Disk drive I/O activity is taking place.

TABLE 1-7 Disk Drive States Represented by the LEDs

Disk Drive State	Power (Green LED)	Fault (Amber LED)
Power is not applied.	Off	Off
Normal operation, power is turned on, no disk drive I/O activity is occurring.	On, solid	Off
Normal operation, disk drive I/O activity is occurring.	On, blinking	Off
Service action required, a fault condition exists, and the disk drive is offline.	On, solid	On, solid

Common Array Manager Software

The Sun StorageTek 2500 Series Array is managed by the Sun StorageTek Common Array Manager software. The Common Array Manager provides web browser–based management and configuration from an external management host, data host software that controls the data path between the data host and the array, and a remote command-line interface (CLI) client that provides the same control and monitoring capability as the web browser, and is scriptable for running frequently performed tasks.

The Common Array Manager software includes Service Advisor, an online reference full of hardware and software configuration and troubleshooting information and procedures.

For information about installing the Common Array Manager software and configuring and managing the array, see the *Sun StorageTek Common Array Manager Software Installation Guide*.

Service Advisor and Customer-Replaceable Units

Customer-replaceable units (CRUs) are designed to be replaceable by customers.

To see a list of the hardware components that can be replaced at the customer site refer to Service Advisor in the Sun StorageTek Common Array Manager software.

The Service Advisor also provides information and procedures for replacing array components.

Overview of the Installation Process

Before you begin to install the array, you must do the following:

- Read the *Sun StorageTek 2500 Series Array Release Notes* for any late-breaking information related to the installation of the array.
- Prepare the site as described in these books:
  - *Sun StorageTek 2500 Series Array Regulatory and Safety Compliance Manual*
  - *Sun StorageTek 2500 Series Array Site Preparation Guide*

The following checklist (TABLE 1-8) outlines all of the tasks required for installing the Sun StorageTek 2500 Array hardware and tells you where you can find detailed procedures. To ensure a successful installation, perform the tasks in the order in which they are presented.

TABLE 1-8 Sun StorageTek 2500 Series Array Hardware Installation Checklist

Step	Installation Task	Where to Find Procedure
1.	Unpack the cabinet and move it into position.	Unpacking guide attached to the outside of the shipping carton
2.	Install and secure the cabinet.	• *Sun StorageTek Expansion Cabinet Installation and Service Manual* • *Sun Rack Installation Guide*
3.	Unpack the rackmounting kit and check its contents.	"Preparing the Universal Rail Kit" on page 24
4.	Unpack the tray box and check its contents.	"Preparing the Tray" on page 25
5.	Prepare the cabinet for installation.	"Preparing the Cabinet" on page 26
6.	Attach the rails to the cabinet.	"Attaching the Rails to a Cabinet" on page 27
7.	Mount the controller tray and expansion trays in the cabinet.	"Installing a Tray in a Cabinet" on page 37
8.	Attach the power cables.	"Connecting the Power Cables" on page 42
9.	Cable the controller tray and expansion trays.	"Intertray Cabling" on page 42

TABLE 1-8 Sun StorageTek 2500 Series Array Hardware Installation Checklist

Step	Installation Task	Where to Find Procedure
10.	Connect the management host.	"Connecting the Management Host" on page 49
11.	Attach the host interface cables.	"Connecting Data Hosts to the 2540 Array" on page 51
12.	Turn on the power.	"Powering On the Array" on page 62

When the tasks in TABLE 1-8 are complete, you can install the Common Array Manager software on an external management host, install and upgrade firmware from the management host, and perform initial array setup and system configuration. See the *Sun StorageTek Common Array Manager Software Installation Guide* for complete information on software-related tasks.

CHAPTER 2

Installing Trays

Use the procedures in this chapter to install trays in a cabinet. The number of trays you need to install depends on your overall storage requirements. You can install a maximum of three trays, one controller tray and up to two expansion trays for each array.

This chapter describes the process of installing the Sun StorageTek 2500 Series Array. It contains the following sections:

- "Preparing for the Installation" on page 24
- "Attaching the Rails to a Cabinet" on page 27
- "Installing a Tray in a Cabinet" on page 37
- "Connecting the Power Cables" on page 42
- "Intertray Cabling" on page 42
- "Drive Module Cable Labeling" on page 47
- "Next Steps" on page 48

The installation procedures in this chapter require the following items:

- #2 Phillips screwdriver (minimum 4-inch length recommended)
- #3 Phillips screwdriver (minimum 4-inch length recommended)
- Antistatic protection

Caution – Electrostatic discharge can damage sensitive components. Touching the array or its components without using a proper ground might damage the equipment. To avoid damage, use proper antistatic protection before handling any components.

Preparing for the Installation

Use the following procedures to prepare for installation:

- "Preparing the Universal Rail Kit" on page 24
- "Preparing the Tray" on page 25
- "Preparing the Cabinet" on page 26

Preparing the Universal Rail Kit

Use the universal rail kit to mount the Sun StorageTek 2500 Series Array trays in any of the following cabinets:

- Any standard Sun cabinet, such as the Sun Rack 900/1000 cabinet
- Any 19-inch wide, 4-post, EIA-compatible rack or cabinet with a front-to-back depth between vertical cabinet rails of 24-36 inches (with threaded or unthreaded cabinet rails).
- The Sun StorageTek Expansion cabinet

Unpacking the Universal Rail Kit

Unpack the universal rail kit and check the contents.

The universal rail kit (part number 594-2489-02) comes with pre-assembled rails and contains the following items:

- Left rail assembly
- Right rail assembly
- 10 8-32x3/8" panhead screws with lockwashers
- 4 M4 flathead screws
- 4 cabinet rail adapter plates (used for unthreaded cabinet rails only)

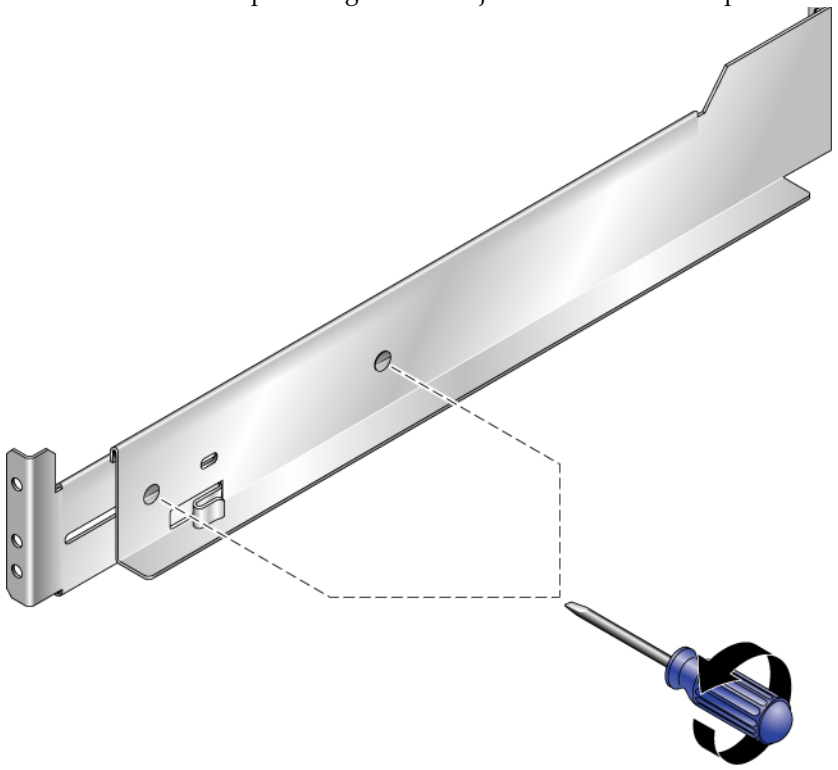
Loosening the Rail Adjustment Screws

To loosen the adjustment screws on the left and right rails:

Use a flathead screwdriver to loosen the two rail adjustment screws on each rail to allow adjustment of each rail length (FIGURE 2-1).

FIGURE 2-1 Loosening the Rail Screws to Adjust the Rail Length

Note – The rails are preconfigured to adjust to cabinet rail depths of between 24



inches (609.6 mm) and 34 inches (863.6 mm).

Preparing the Tray

Caution – Two people are needed to lift and move the tray. Use care to avoid injury. A traycan weigh up to 54.3 pounds (24.6 kg).

1. **Unpack the tray.**
2. **Check the contents of the box for the following items:**

- Sun StorageTek 2500 Series Arraytrays (controller or expansion)
- Ship kit for the controller tray
  - One pair left and right end caps (plastic bezels)
  - Four 4 Gbps FC SFPs (2 per FC Controller module)

- Two 6-meter RJ45 -RJ45 Ethernet cables (one per controller module)
- One RJ45-DIN9 cable
- One RJ45-DB9 adapter
- Sun StorageTek Common Array Manager Software CD
- *Sun StorageTek Common Array Manager Software Installation Guide* (on the software CD)
- *Common Array Manager sscs CLI Quick Reference Card*
- *Sun StorageTek 2500 Series Array Hardware Installation Guide* (Hardcopy)
- *Accessing Documentation* guide
- Premium feature license cards (ordered optionally)

- Ship kit for each expansion tray
  - Two 1-meter copper SAS cables (one per I/O module)
  - *Accessing Documentation* guide

AC power cords are shipped separately with each tray.

Preparing the Cabinet

Select the cabinet in which you will be installing the array. Be sure the cabinet is installed as described in the installation instructions provided with it.

1. **Stabilize the cabinet as described in the cabinet documentation.**
2. **If the cabinet has casters, make sure the casters are locked to prevent the cabinet from rolling.**
3. **Remove or open the front panel.**
4. **Remove or open the vented back panel.**

Planning the Order of the Tray Installation

Install the trays starting with the controller tray at the lowest available 2RU tray slot in the cabinet. Next, install the expansion trays for the first controller tray. If room remains in the cabinet, repeat for the next controller and expansion trays.

Starting at the bottom distributes the weight correctly in the cabinet.

Attaching the Rails to a Cabinet

Depending on the type of cabinetin which you will install the tray, use one of the following procedures to attach the rails:

- "Attaching the Universal Rail Kit to a Standard Sun or 19-Inch Cabinet With Threaded Cabinet Rails" on page 27
- "Attaching the Universal Rail Kit to a Standard 19-Inch Cabinet With Unthreaded Cabinet Rails" on page 31

Each tray requires two standard mounting rack units (2RU) of vertical space in the cabinet. Each standard mounting rack unit (RU) has three mounting holes in the left and right cabinet rails. The top mounting hole of the lower RU is always closest to the bottom mounting hole of the upper RU, hence the divsion between RUs on a cabinet rail is between the two closeest mounting holes in a grouping.

The universal rails have an adjustable depth of 24" to 34".

Attaching the Universal Rail Kit to a Standard Sun or 19-Inch Cabinet With Threaded Cabinet Rails

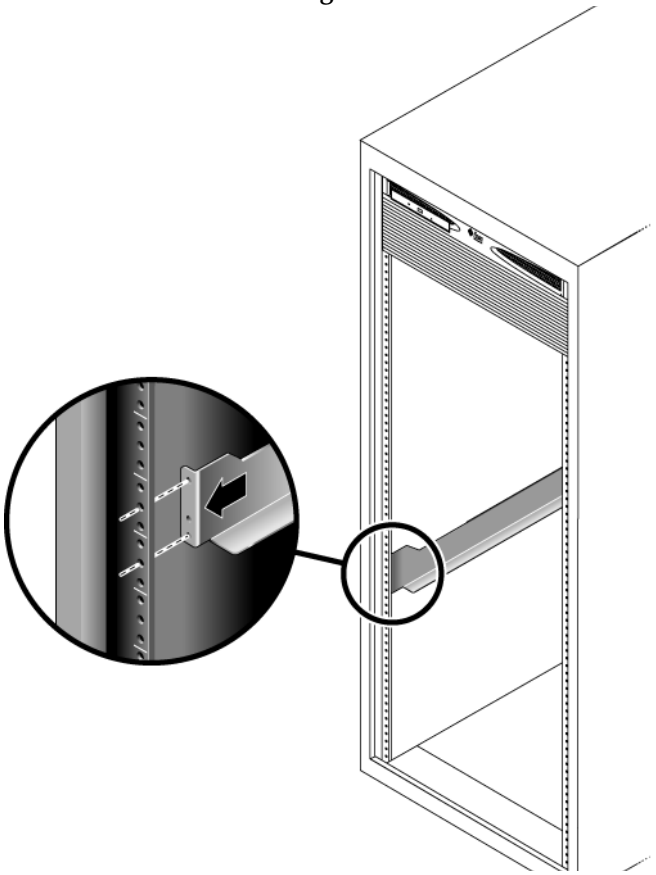
This procedure describes the steps to attach the universal rail kit to:

- All standard Sun cabinets, including the Sun Rack 900/1000 cabinets
- Sun StorageTek Expansion cabinets
- All 19-inch wide, 4-post EIA-compatible racks and cabinets with the following cabinet rail types:
  - M5 threaded
  - M6 threaded
  - 10-32 threaded
  - 12-24 threaded
  - circular unthreaded

1. To attach the universal rail kit to a cabinet withthese cabinet rail types**Position the front flange of the left universal rail behind the left front cabinet rail (**FIGURE 2-2**).**

Note – The RUs are not labeled on all racks, as they are on the Sun cabinets. The rule of thumb to remember is that the division of RUs passes between the two closest rail holes in each set of holes (see FIGURE 2-2**).**

FIGURE 2-2 Positioning the Front of the Left Rail Behind the Left Front Cabinet Rail

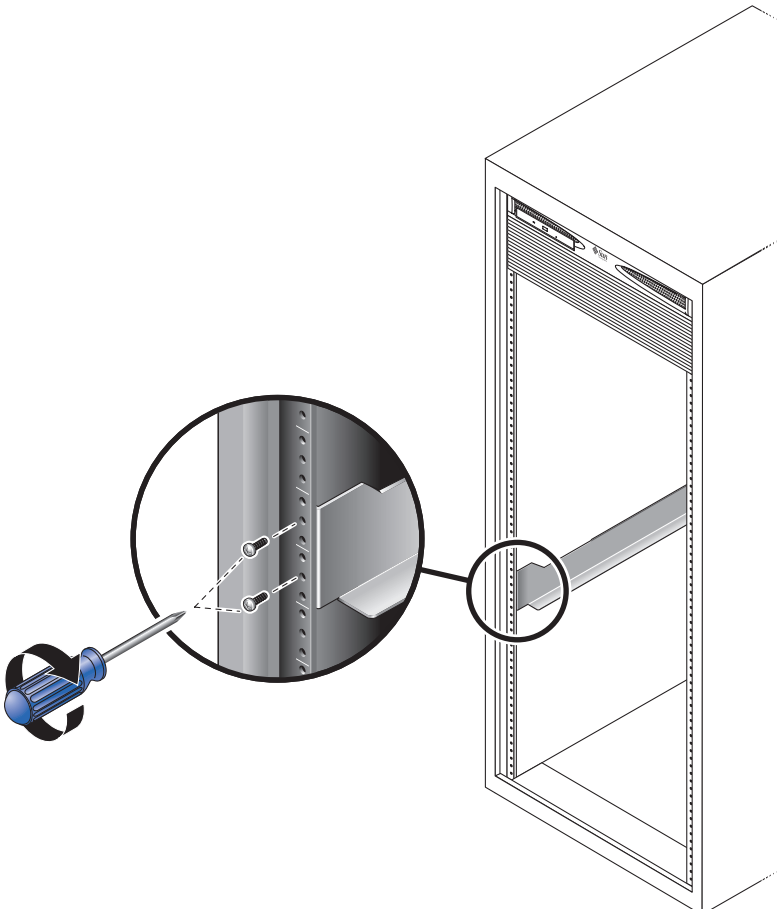


2. **Insert the 8-32 screws through the center holes in each RU of the rack into the top and bottom holes in the Universal rail (**FIGURE 2-3**).**

   These screws pass through the cabinet rail holes and screw into threaded holes in the Universal rail.

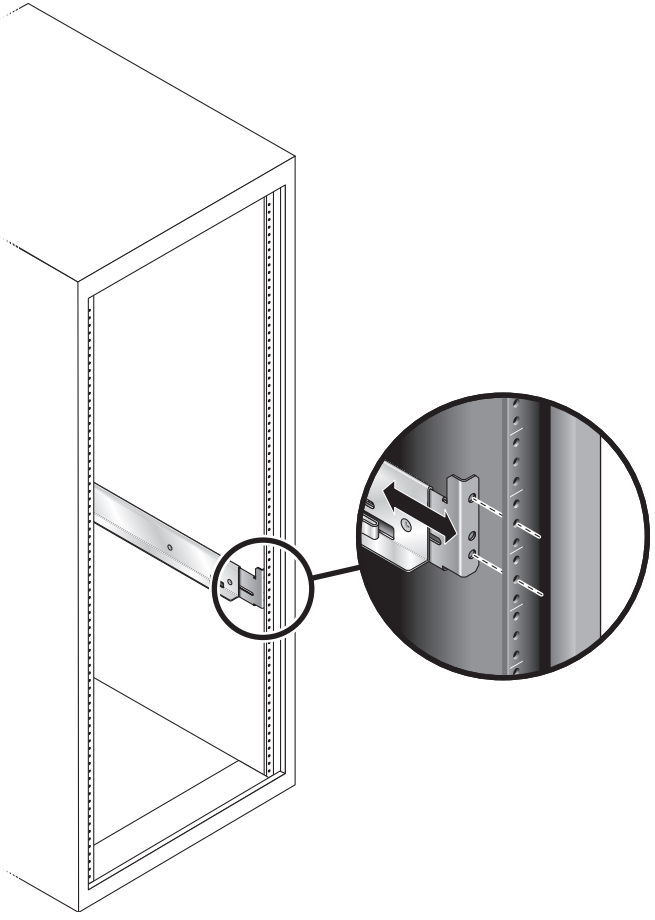
FIGURE 2-3 Securing the Left Rail to the Front of the Cabinet

3. **Repeat** Step 1 **and** Step 2 **for the right rail.**



4. **At the back of the cabinet, adjust the length of the left rail as needed to fit the cabinet, and position the rail flange behind the face of the cabinet rail (**FIGURE 2-4**).**

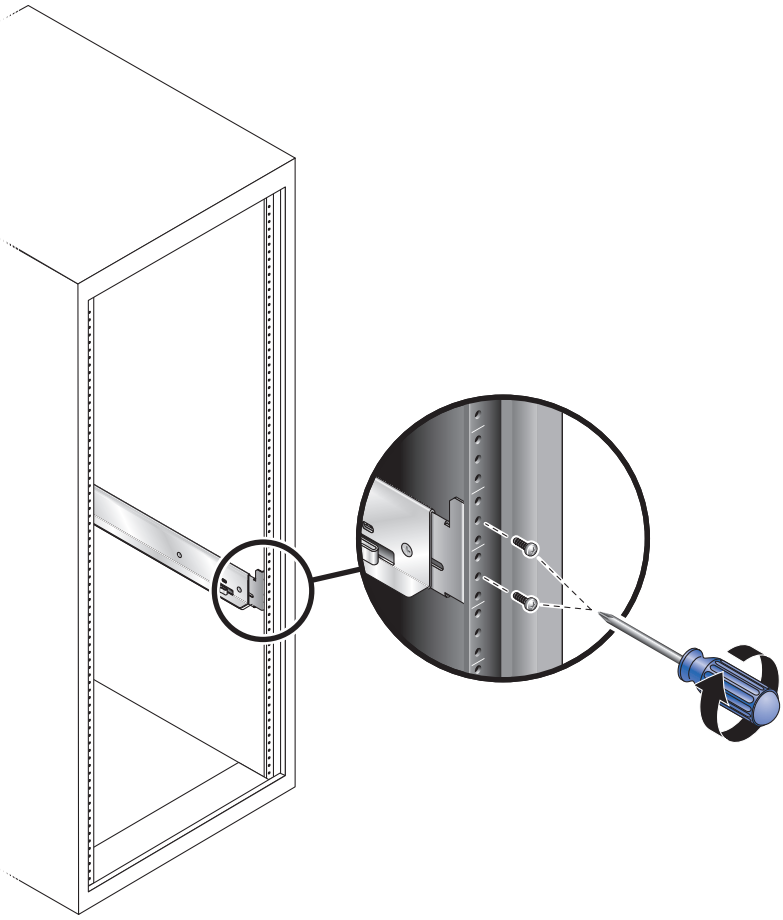
FIGURE 2-4 Adjusting the Length of the Left Rail at the Back of the Cabinet



5. **Align the rail flange so that the top and bottom mounting holes match the center holes in the RUs corresponding to those used on the front of the cabinet.**

6. **Insert the 8-32 screws through the center holes of the rack into the top and bottom mounting holes on the universal rail (FIGURE 2-5).**

FIGURE 2-5 Securing the Left Rail to the Back of the Cabinet



7. **Repeat Step 4, Step 5, and Step 6 for the right rail.**

Attaching the Universal Rail Kit to a Standard 19-Inch Cabinet With Unthreaded Cabinet Rails

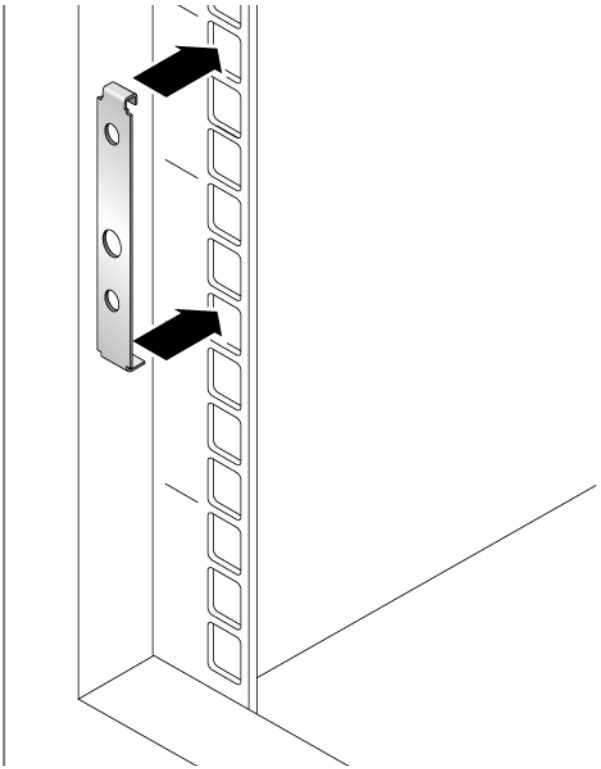
This procedure describes the steps to attach the universal rail kit to:

- All 19-inch wide, 4-post EIA-compatible racks and cabinets with unthreaded cabinet rails (square hole racks).

To attach the universal rail kit to a cabinet with unthreaded cabinet rails, follow these steps first for the left rail and then for the right rail:

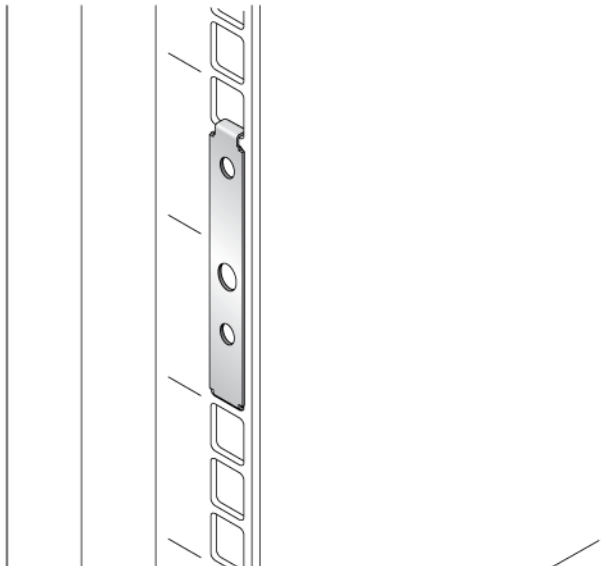
1. **Hook a cabinet rail adapter plate over the front of the cabinet rail. (**FIGURE 2-6**)**

FIGURE 2-6 Inserting the Cabinet Rail Adapter Plate on the Cabinet Rail



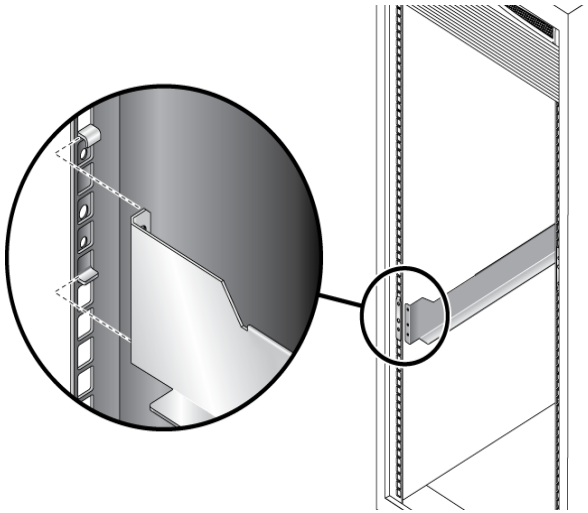
Position the adapter plate over of the 2RU slot in which the tray is to be mounted. The hook on the top of the adapter plate hooks into the top hole of the upper RU. The flat flange on the bottom of the adapter plate fits into the bottom hole of the lower RU (FIGURE 2-7).

FIGURE 2-7 Adapter plate in place on the Cabinet Rail.



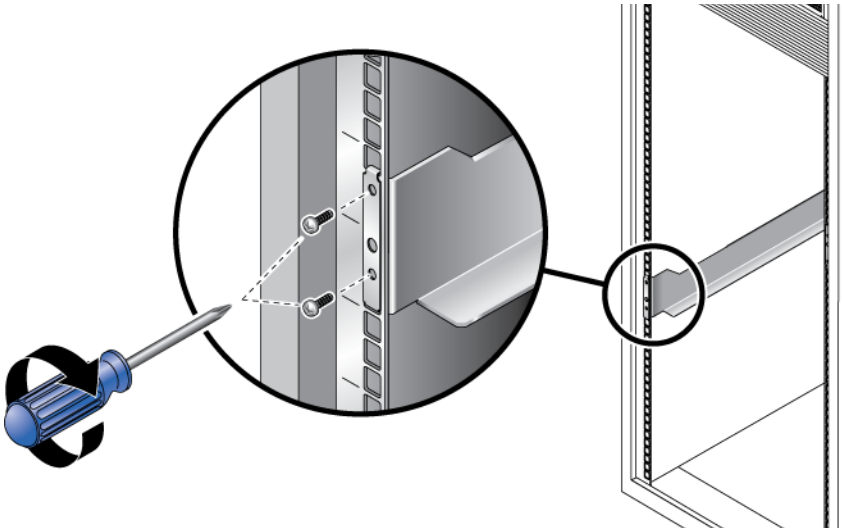
2. **Slide the front flange of the universal rail between the front cabinet rail and the top hook of the rail adater plate (**FIGURE 2-8**).**

FIGURE 2-8 Slide the flange of the rail behind the cabinet rail and between that and the hook of the rail adapter plat.e, as shown.



3. **Insert and tighten two 8-32 screws through the top and bottom holes in the adapter plate, through the cabinet rail, and into the top and bottom threaded holes in the universal rail mounting flange (**FIGURE 2-9**).**

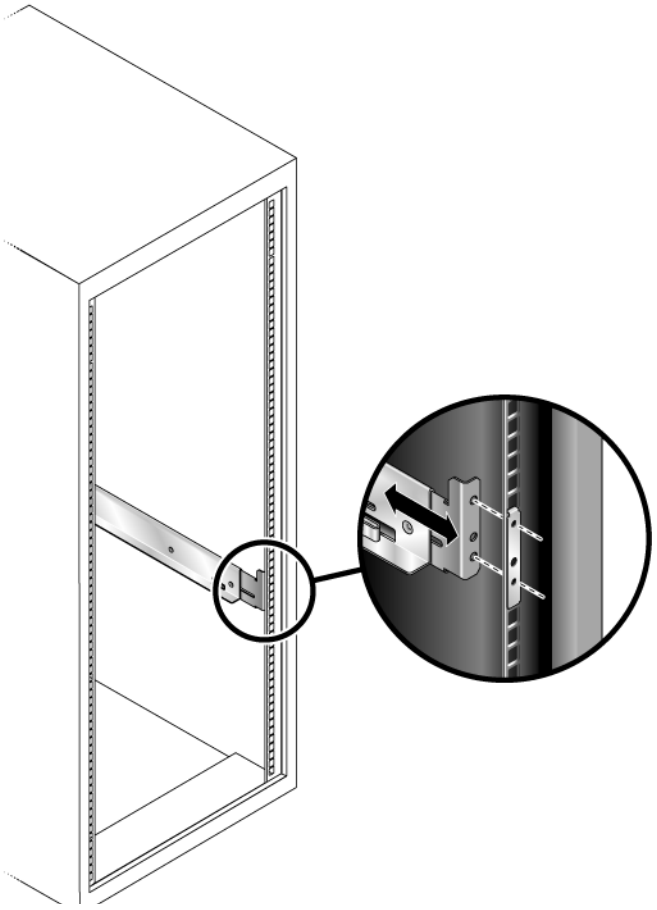
FIGURE 2-9 Securing the Rail to the Front left of the Cabinet



4. **Repeat** Step 1 **through** Step 3 **on the corresponding cabinet rail at the back of the cabinet (**FIGURE 2-10**).**

   Mounting the rail on the back of the cabinet is the same as mounting it to the front, after you extend the rail the necessary length to reach the rear cabinet rail.

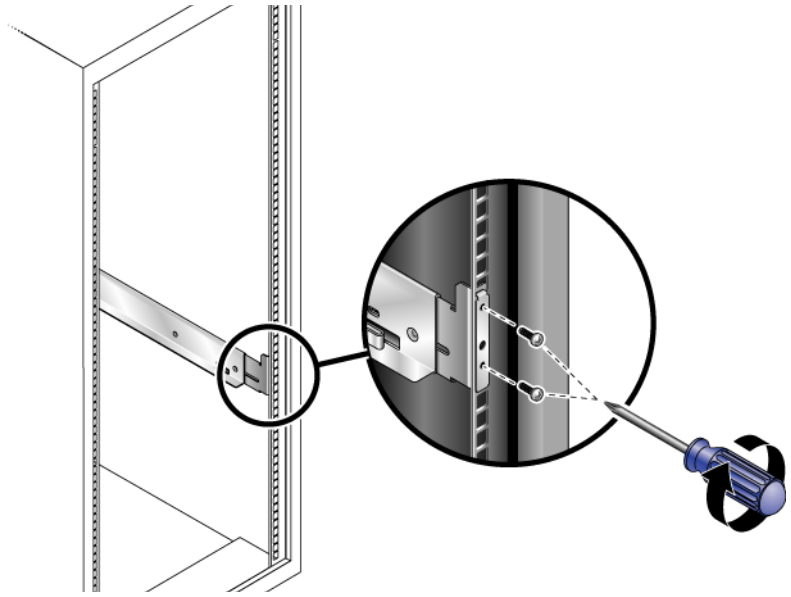
FIGURE 2-10 Adjusting the Length of the Rail at the Back of the Cabinet



5. **Insert and tighten two 8-32 screws through the top and bottom holes in the adpater plate, back cabinet rail, and universal rail mounting flange (**FIGURE 2-11**).**

   The screws passes through the unthreaded holes of the adapter plate and cabinet rail mounting rail and screw into the threaded holes of the rail mounting flange.

FIGURE 2-11 Securing the Rail to the Back of the Cabinet



For extra stability, you can tighten the rail screws as in FIGURE 2-1.

6. **Repeat Step 1 through Step 5 to install the right rail.**

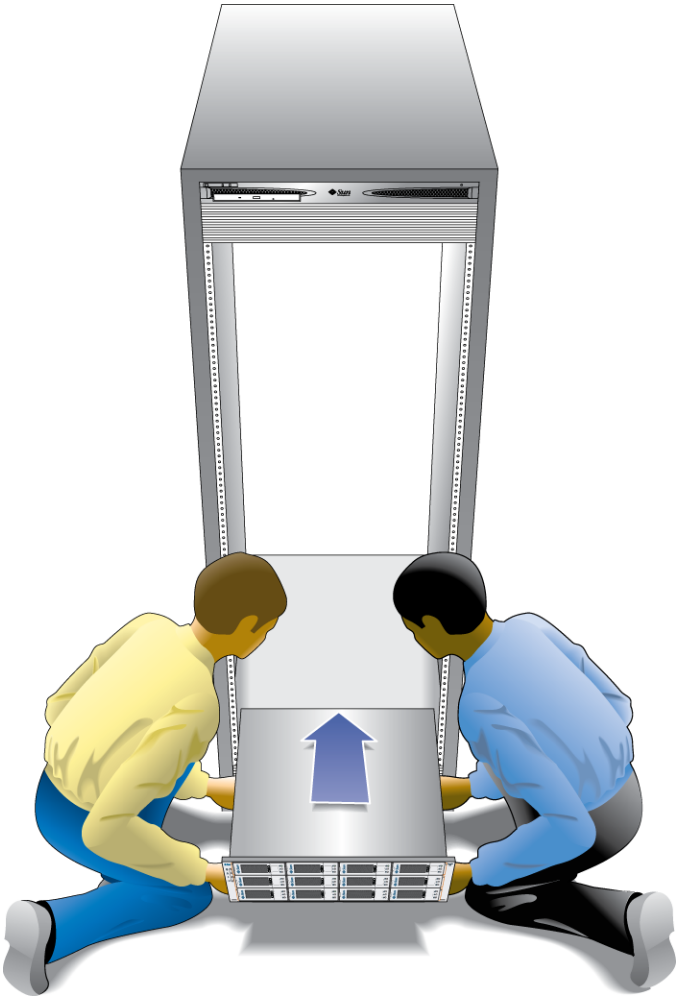
Installing a Tray in a Cabinet

Install the controller tray in the first empty 2RU slot at the bottom of the cabinet. If you are installing expansion trays, continue installing the trays from the bottom up.

1. **Using two people, one at each side of the tray, carefully lift and rest the tray on the bottom ledge of the left and right rails (FIGURE 2-12).**

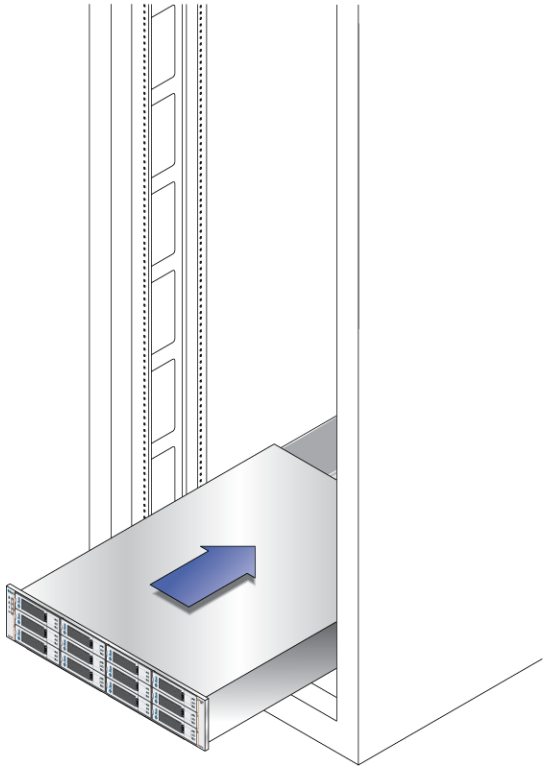
Caution – Use care to avoid injury. A tray can weigh up to 55 pounds (25 kg).

FIGURE 2-12 Positioning the Tray in the Cabinet



2. **Carefully slide the tray into the cabinet until the front mounting flanges on the tray touch the vertical face of the cabinet (**FIGURE 2-13**).**

FIGURE 2-13 Array Controller Tray Installed

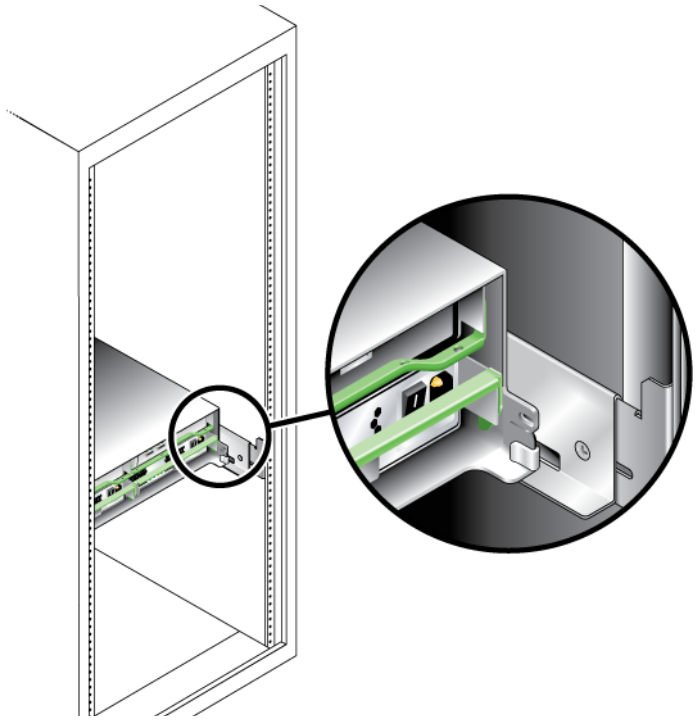


The tray has mounting flanges on both sides with three mounting holes in them. The top and bottom holes are large enough to fit over the heads of the screws already in the cabinet rails used to mount the universal rails. If the tray was shipped with end caps (bezels) clipped on the tray mounting flanges, remove them before sliding the tray all the way in over the mounting screw heads.

To remove an end cap , place your thumb on the lower front face of the cap and reach your forefinger underneath to the back bottom edge of the cap, then pull the cap towards you and slightly upwards.

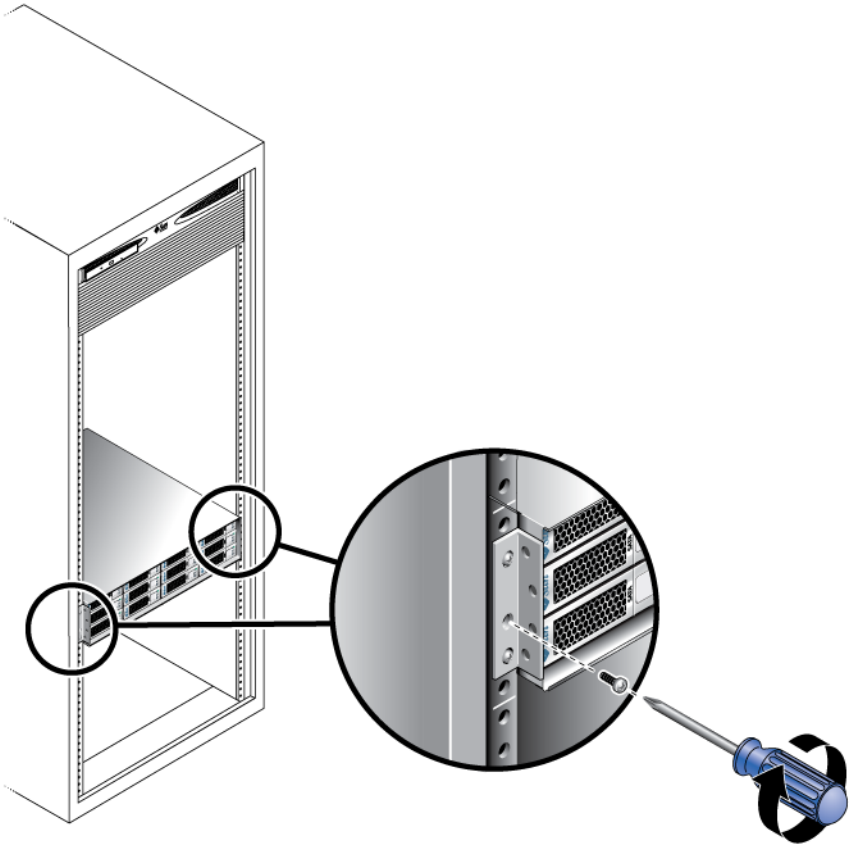
On the rear of the array tray, a flat metal tab on each side corner slides into a special mounting clip on the rear of each universal rail, securing the back of the array tray. This makes the use of rear mounting screws to secure the tray in the rail unnecessary, especially in locations where the rack and trays are not likely to be moved. For racks that will be moved or shipped, Sun recommends that you install M4 screws through the hole in the tab and into the corresponding threaded hole in the rail as shown in FIGURE 2-14.

FIGURE 2-14 Rail clip and rear mounting hole on rear of array tray.



3. **Insert a single 8-32 pan head screw through the center hole in each front mounting flange and tighten (**FIGURE 2-15**).**

FIGURE 2-15 Securing the Tray to the Front of a Sun Rack 900/1000 Cabinet



4. **Replace the end caps (bezels) that cover the mounting flanges on the front of the array tray.**

   On each front mounting flange, there is a small tab over which the end caps fit. The end caps have a slot on top for this tab.

   a. **Place the end cap over the tab so the tab can go into the slot.**

   b. **Snap the bottom of the end cap into place.**

Connecting the Power Cables

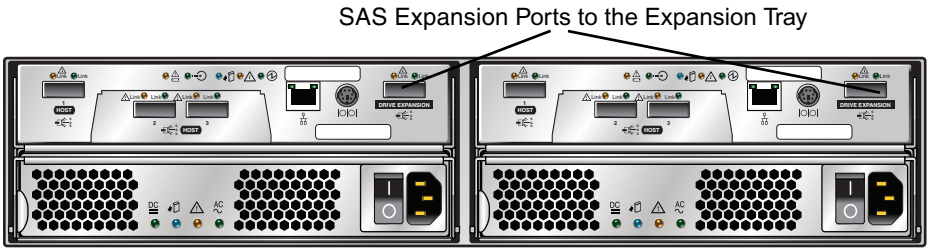
1. **Verify that both power switches are turned off.**
2. **Verify that the circuit breakers in the cabinet are turned off.**
3. **Connect each power supply in the tray to a separate power source in the cabinet.**
4. **Connect the primary power cables from the cabinet to the external power source.**

Note – Do not power on the array until you complete the procedures in this chapter. The power-on sequence is described in detail in Chapter 4.

Intertray Cabling

This section describes how to cable a controller tray to expansion trays for several different configurations. Each controller has one expansion port (FIGURE 2-16). Controller A controls drive channel 1 through the A-side drive modules; Controller B controls drive channel 2 through the B-side modules. Each drive channel provides a separate path for data transfer from the controller tray to the expansion trays; the two channels provide redundancy.

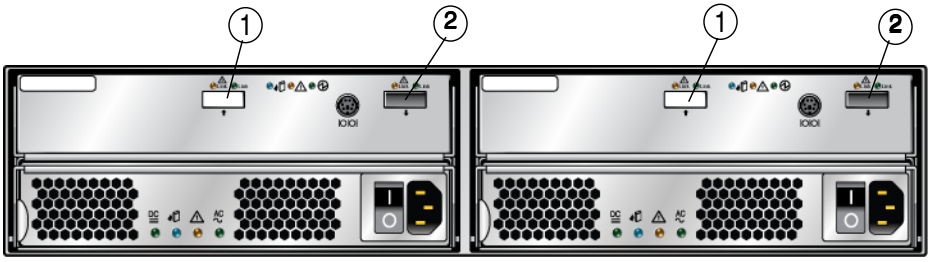
FIGURE 2-16 Expansion Ports on the Controller Tray



Each expansion tray has two SAS port connectors, one marked with an up arrow and the other marked with a down arrow (FIGURE 2-17). You use SAS cables to connect expansion trays to controllers.

Note – Perform all SAS connections from an Out (down arrow) port to an In (up arrow) port. If the cable is connected to two connectors with the same arrows, communication between the two drive modules will be lost.

FIGURE 2-17 Expansion Ports on an Expansion Tray



1. SAS Expansion In Port
2.SAS Expansion Out Port

Array Configuration Naming Convention

The configuration naming convention is “controllers x trays” where the first number is the controller tray and the second is the sum of the controller tray and the number of expansion trays. For example, 1x1 is a standalone controller tray, 1x2 is the controller tray and one expansion tray, 1x is the controller tray and 2expansion trays (TABLE 2-1).

TABLE 2-1 Controller and Expansion Tray Configurations

Configuration Identifier	Controller Tray	Number of Expansion Trays
1x1	1	0
1x2	1	1
1x3	1	2

Note – Do not add more expansion trays than the array supports.

Use the following instructions to connect the dual-RAID controller tray to one or more expansion trays.

Connecting Expansion Trays

Keep the following points in mind when adding expansion trays to your storage array:

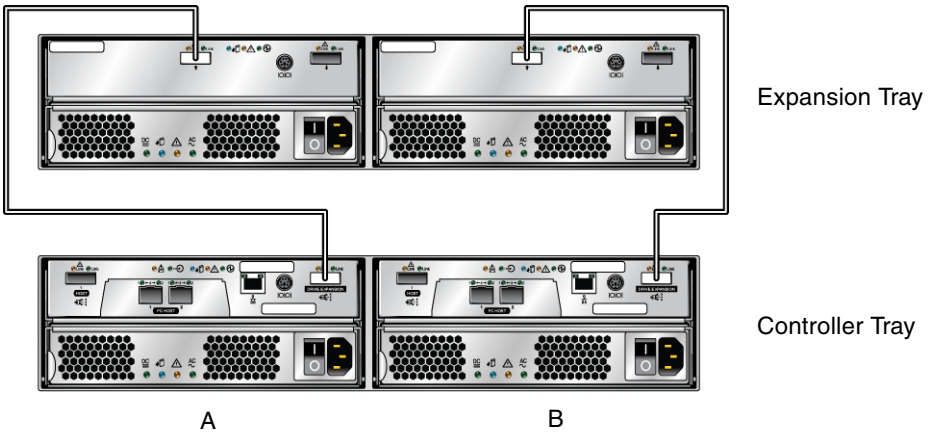
- Expansion trays must be added with power to the array and I/O data transfer turned off. If you need to add an expansion tray to an array that cannot be taken off-line, contact your Sun Technical Support representative before attempting to connect the new tray.
- Controller and expansion trays are shipped with protective plastic plugs in the SAS expansion ports. You must remove these before connecting cables.
- Expansion trays are added serially, in a chain (actually two chains: channel one through the A-side controller and modules, and channel two through the B-side controller and modules). The SAS cable from the expansion port on a controller connects to the In port (Up arrow) on an expansion tray drive module. The SAS cable from a drive module on expansion tray 1 to a corresponding drive module on expansion tray 2 connects from the Out port on expansion tray 1 to the corresponding In port on expansion tray 2. This pattern repeats for each additional drive module on a channel. See FIGURE 2-19 for an illustration of this reverse cabling pattern.
- To connect cables for maximum redundancy, *controller* B must be cabled to the expansion tray B-side modules in the opposite order as the expansion tray A-side modules. That means the last drive module in the A-side chain from *controller* A must be the first drive module in the B-side chain from *controller* B. See FIGURE 2-19 for an illustration of cabling for maximum tray level redundancy.
- On all SAS cables, affix a label to each end of the cable. See "Drive Module Cable Labeling" on page 47 for labeling tips.

Cabling an Expansion Tray to a Controller Tray

A Controller tray has two expansion ports, one on the Controller A module and one on the Controller B module. To connect an expansion tray, connect an SAS cable from each expansion port on the controller to each In port on the expansion tray. FIGURE 2-18 shows a 1x2 array configuration consisting of one controller tray and one expansion tray. Two SAS cables are required.

FIGURE 2-18 1x2 Array Configuration Cabling Example

To cable a 1x2 array configuration:



1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-16**).**
2. **Locate the In and Out expansion ports at the A-side and B-side back of the expansion tray (**FIGURE 2-17**).**
3. **Connect one SAS cable between the Controller A expansion port and the A-side In port on the expansion tray (**FIGURE 2-18**).**
4. **Connect one SAS cable between the Controller B expansion port and the B-side In port on the expansion tray (**FIGURE 2-18**).**

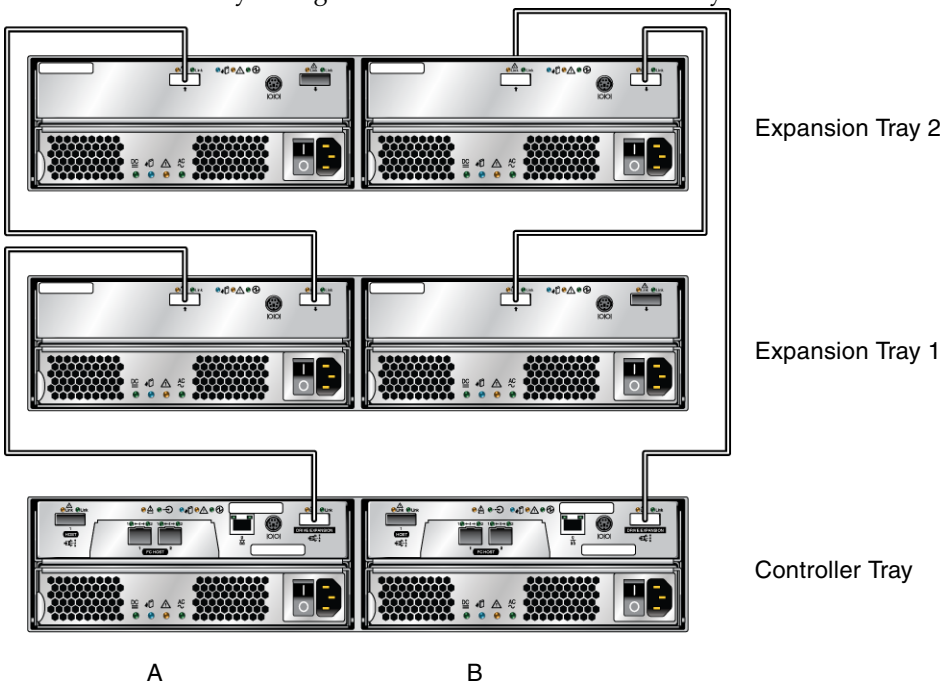
Cabling an Expansion Tray to Another Expansion Tray

Each additional expansion tray is added to the preceding expansion tray by connecting SAS cables from the Out ports of the first tray to the In ports of the next tray. FIGURE 2-19 illustrates a 1x3 array configuration consisting of one controller tray

and two expansion trays. The cable connections on the B-side are reversed (the cable from the controller A expansion port goes to the In port of expansion tray 1; the cable from the controller B expansion port goes to the In port on expansion tray 2) for maximum redundancy. This pattern continues for each additional tray you add. Two more SAS cables are required for each additional tray.

FIGURE 2-19 1x3 Array Configuration Cabling

To cable a 1x3 array configuration for maximum redundancy:



1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-16**).**
2. **Locate In and Out expansion ports at the A-side and B-side back of the expansion tray (**FIGURE 2-17**).**
3. **Connect one SAS cable between the Controller A expansion port and the A-side expansion In port of expansion tray 1 (**FIGURE 2-19**).**
4. **Connect one SAS cable between the Controller B expansion Out port and the B-side expansion In port of expansion tray 2 (**FIGURE 2-19**).**
5. **Connect one SAS cable between the expansion tray 1 Out port and the A-side expansion In port of expansion tray 2 (**FIGURE 2-19**).**

6. **Connect one SAS cable between the expansion tray 2 B-side Out port and the B-side In port of expansion tray 2 (FIGURE 2-19).**

Drive Module Cable Labeling

Labels for the drive cables identify which controller ports and which expansion connections in an expansion tray you use when you attach cables between a controller and the drive modules on an expansion tray. Cable labels are useful if you need to disconnect cables to service a controller. Attach a label to each end of the cable. Use this design to create labels for drive cables:

- Controller ID (for example, Controller A)
- Expansion tray ID (for example, Tray A)
- Expansion port ID (for example, In or Out)
- Drive module ID

Example Label Abbreviation

In this example, the storage configuration has the following characteristics:

- Drive channel 1
- Controller A, drive channel 1
- Drive module 1
- Expansion Tray A (which is the left drive module), Out port

Using this design, the label includes the following information:

CtA-Dch1, Dm1-Tray_A (left), Out

Simplex Configurations

A simplex configuration is a 2530 Array with a single controller and a single backend channel. By definition, there is a single path SAS connection to the data host, and no redundancy is available. There can be expansion modules on the single backend channel.

Simplex cabling is the same as the cabling on a single channel of an ordinary array, such as that shown on the A-side in FIGURE 2-18. CRU removal and replacement procedures in a simplex configuration are the same as those for a duplex configuration with a failed controller (with the exception of the service procedures targeted at the failed controller). These procedures are available in Service Advisor. Maintenance procedures such as firmware updates or servicing of the controller or expansion modules will cause loss of access to the array during the performing of the procedure, since there is no backup channel.

Performance and default behavior are the same as a duplex configuration with a failed or missing controller. Write cache is by nature in write-through mode because there is no cache mirroring possible.

Next Steps

Now you are ready to connect the management and data hosts, as described in Chapter 3.

CHAPTER 3

Connecting the Management Host and Data Hosts

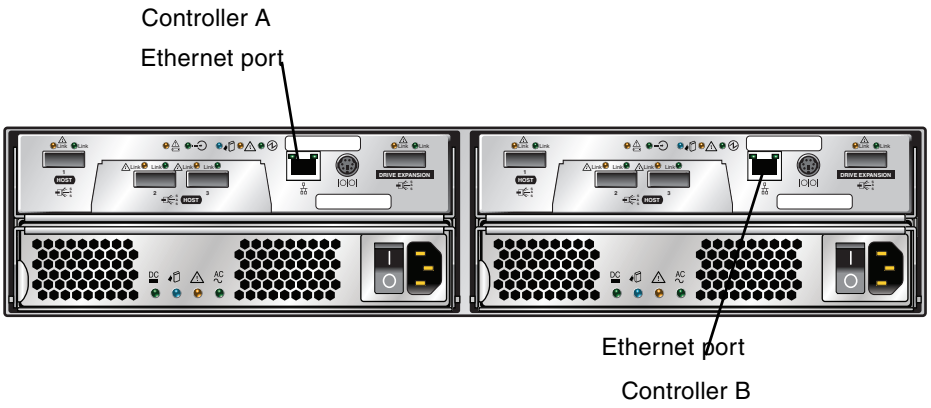
This chapter describes Sun StorageTek 2500 Series Array cable connections for hosts. It contains the following sections:

- "Connecting the Management Host" on page 49
- "Connecting Data Hosts to the 2540 Array" on page 51
- "Connecting Data Hosts to the 2530 Array" on page 56
- "Host Cable Labeling" on page 59
- "Next Steps" on page 59

Connecting the Management Host

The management host directly manages Sun StorageTek 2500 Series Arrays over an out-of-band network. This section describes how to setup a connection between the Ethernet port of a controller (FIGURE 3-1) and the management host.

FIGURE 3-1 Ethernet Ports for Controller A and Controller B



Note – Before you begin, ensure that the tworequired Ethernet cables are available. These requirements are outlined in the *StorageTek 2500 Series Array Site Preparation Guide*.

There are three ways to establish a connection between the management host and Ethernet port 1 of an array controller:

- "Attaching the Ethernet Ports to the LAN of the Management Host" on page 50
- "Attaching the Ethernet Ports to the Management Host Using an Ethernet Hub" on page 51
- "Attaching the Ethernet Ports Directly to the Management Host With a Cross-Over Cable" on page 51

Attaching the Ethernet Ports to the LAN of the Management Host

To attach the Ethernet ports to the local area network (LAN) of the management host:

1. **Locate the Ethernet port for Controller A and Controller B at the back of the controller tray (**FIGURE 3-1**).**
2. **Connect Ethernet cables to the Ethernet ports of each controller.**
3. **Connect the other end of each Ethernet cable to the LAN on which your management host resides (preferably on the same subnet).**

Attaching the Ethernet Ports to the Management Host Using an Ethernet Hub

To attach the Ethernet ports and the management port Ethernet interface to an Ethernet hub on a private subnet:

1. **Locate Ethernet ports on Controller A and Controller B at the back of the controller tray (**FIGURE 3-1**).**
2. **Connect Ethernet cables to the Ethernet ports of each controller module.**
3. **Connect the other end of each Ethernet cable to an Ethernet hub.**
4. **Connect an Ethernet port on the management host to the Ethernet hub.**

Attaching the Ethernet Ports Directly to the Management Host With a Cross-Over Cable

---

Note – This method would typically be used only to establish temporary IP connectivity between the management host and the controller's Ethernet ports.

To attach the Ethernet ports directly to the management host using cross-over cables:

1. **Locate the Ethernet ports for Controller A and Controller B at the back of the controller tray (**FIGURE 3-1**).**
2. **Obtain and connect Ethernet cross-over cables to the Ethernet port of each controller module.**
3. **Connect the other end of each Ethernet cable directly to your management host Ethernet ports.**

Connecting Data Hosts to the 2540 Array

The Sun StorageTek 2540 Array connects to data hosts through Fibre Channel (FC) cables.

Note – For maximum hardware redundancy, you must install a minimum of two HBAs in each host. Dual-port HBAs give you two paths into the storage array but do not ensure redundancy if the HBA fails.

2540 Array Data Host Connection Topologies

You can connect data hosts to access the Sun StorageTek 2540 Array directly to the array, or through Fibre Channel (FC) switches to the array. The following figures illustrate four possible host connection topologies for the 2540 Array:

- Direct connection from a single data host server (FIGURE 3-2)
- Direct connection from two data host servers (FIGURE 3-3)
- Data host connection through Fiber Channel switch fabric (FIGURE 3-4)
- Mixed connection, direct and through switch (FIGURE 3-5)

FIGURE 3-2 Direct connection from a single data host server

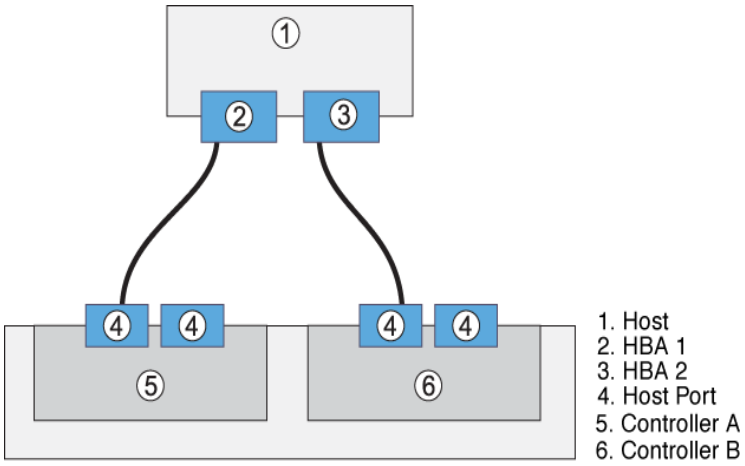


FIGURE 3-3 Direct Connection from two data host servers

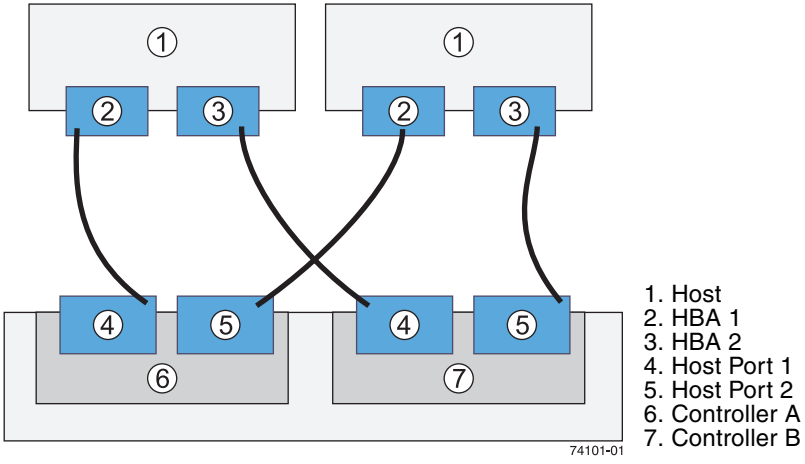


FIGURE 3-4 Data host connection through a Fibre Channel switch

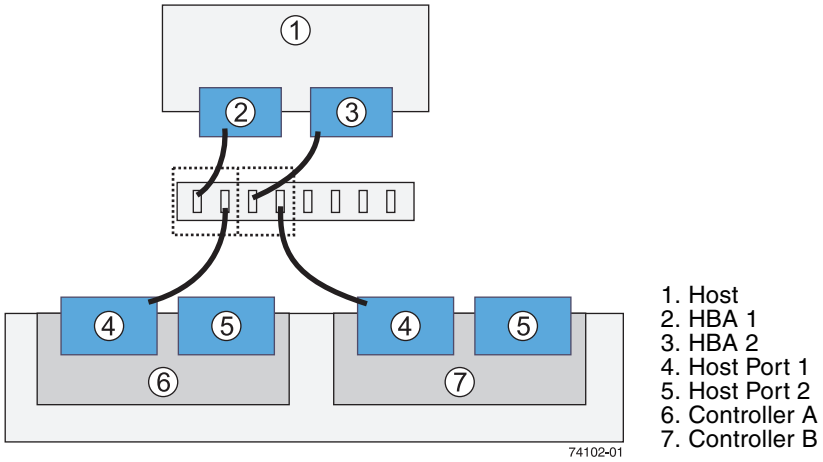
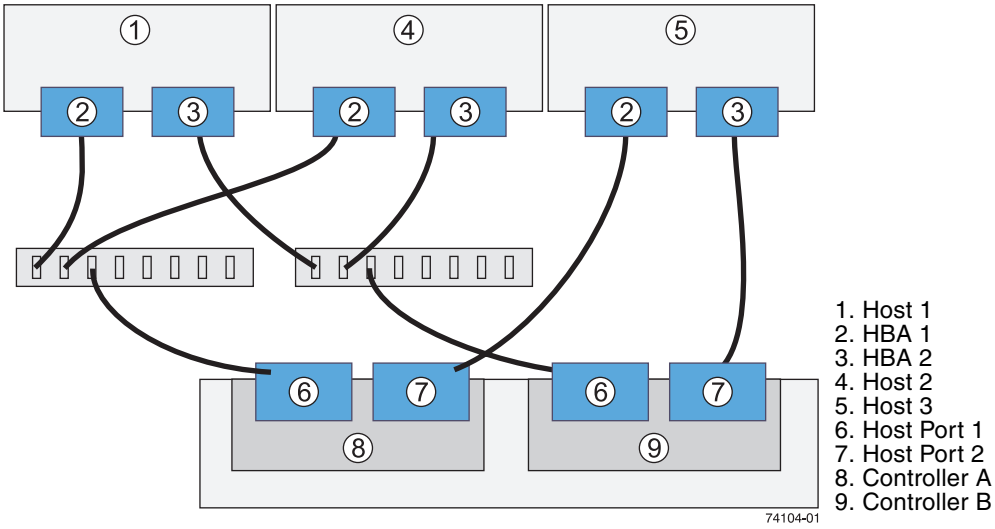


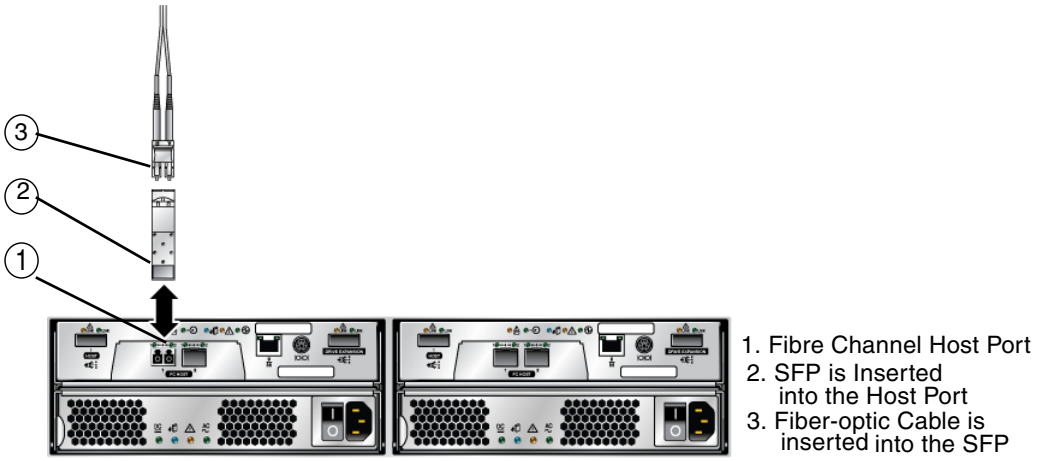
FIGURE 3-5 Mixed topology of data hosts connected directly and through FC switches



2540 Array Data Host Connections

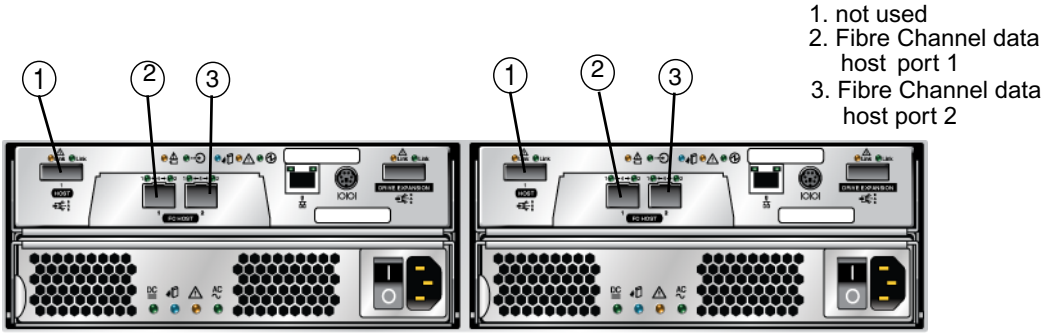
Data transmission from the host to the array controller modules is through fiber-optic cables. The fiber-optic cables connect to the controllers through Small Form-factor Pluggable (SFP) transceivers (FIGURE 3-6).

FIGURE 3-6 Connecting the SFP and Fiber-optic Cable to a 2540 Controller



The Sun StorageTek 2540 Array controller tray has fourFC host connector ports, two per controller module. To maintain redundancy, connect two data paths from each host, one to each controller.

FIGURE 3-7 FC host connectors on the 2540 controller.



▼ To Connect Data Hosts Using Fibre Channel

1. **Locate the host ports at the back of the controller tray (FIGURE 3-7).**

   If the host port has a plastic protection plug, remove it.

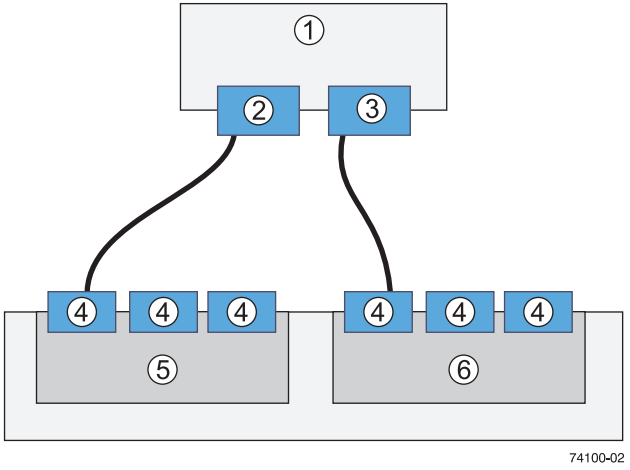
2. **Plug one SFP transceiver into a host port.**

3. **Plug one end of the fiber-optic cable into the SFP transceiver.**
4. **Plug the other end of the fiber-optic cable into one of the HBAs in the host (direct topology) or into a switch (fabric topology).**
5. **Affix a label to each end of the cable. See** "Host Cable Labeling" on page 59 **for labeling tips.**
6. **Repeat these steps for each host-to-controller connection.**

Connecting Data Hosts to the 2530 Array

Data transmission from the host to the controllers in the array module is through Serial Attached SCSI (SAS) cables. All connections from the host to the controllers are direct connections (with no intermediate switches). FIGURE 3-8 shows an example of a direct host connection from a single data host with dual HBAs.

FIGURE 3-8 Direct Connection From a Single Host With Dual HBAs



1. Host
2. HBA 1
3. HBA 2
4. Host Connectors on the Controllers
5. Controller A
6. Controller B

FIGURE 3-9 shows an example of direct host connections from two data hosts, each with dual HBAs.

FIGURE 3-9 Direct connections from two data hosts with dual HBAs.

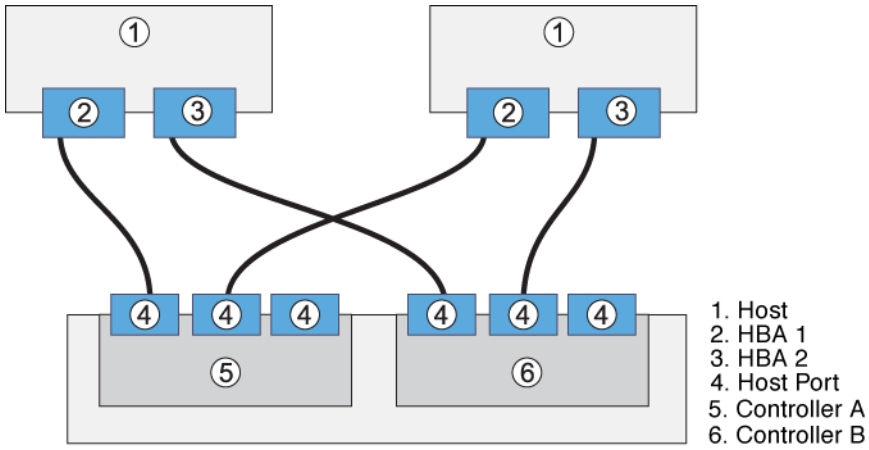
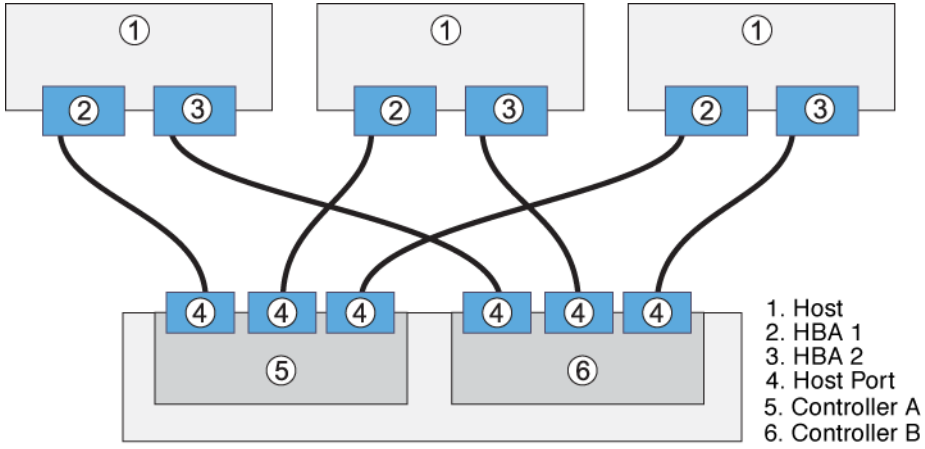


FIGURE 3-10 shows an example of direct host connections from three data hosts, each with dual HBAs.

FIGURE 3-10 Direct connections from three data hosts with dual HBAs.



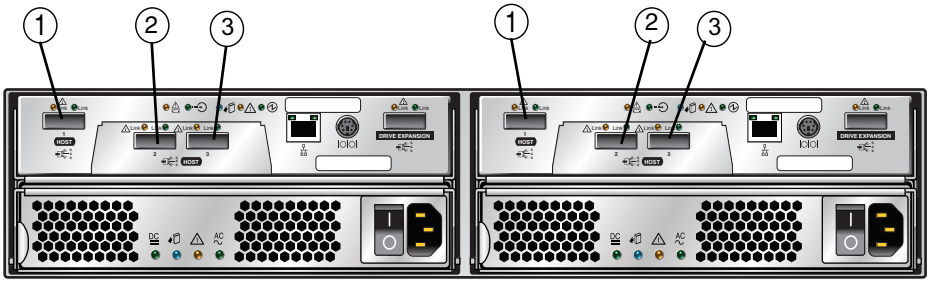
Note – For maximum hardware redundancy, you must install a minimum of two HBAs in each host. Dual-port HBAs give you two paths into the storage array but do not ensure redundancy if the HBA fails.

Before you connect data hosts directly to the array, check that the following prerequisites have been met:

- Interface cables are connected and between the HBAs and the array controllers.
- SAS cables (1-, 3-, or 6-meters) are available to connect the array host ports to the data host HBAs.

Each controller module on a controller tray has three SAS host ports (FIGURE 3-11**).**

FIGURE 3-11 SAS Data Host Ports (on back of tray).



▼ To Connect Data Hosts to a 2530 Array

1. **Locate the host ports at the back of the controller tray (**FIGURE 3-11**).**

   If the host port has a plastic protection plug, remove it.

2. **Connect one end of the SAS cable to a host port on a controller module.**

   Host ports are numbered from left to right: host port 1, host port 2, and host port 3.

3. **Connect the other end of each SAS cable to a data host HBA.**

4. **Affix a label to each end of the cable. See** "Host Cable Labeling" on page 59 **for information about cable labels.**

5. **Repeat these steps for each host-to-controller connection.**

Host Cable Labeling

Labels for host cabling identify which host HBA ports and which controller ports you use when you attach cables between the host and the controller. Cable labels are useful if you need to disconnect cables to service a controller. Attach a label to each end of the cable. Use this design to create labels for host cables:

- Host name and HBA port
- Controller ID (for example, Controller A)
- Host channel ID (for example, Host channel 1)

Example Label Abbreviation

In this example, the storage configuration has the following characteristics:

- Host name is “Engineering”
- Host HBA 1, port 1
- Controller A, channel 1

Using this design, the label includes the following information:

Heng-HBA1/P1, CtA-Hch1

Next Steps

After you connected the management and data hosts, you can power on the trays, as described in Chapter 4.

CHAPTER 4

Powering On the Array

This chapter describes initial tray power-on procedures. Perform the following procedures in the order listed:

- "Before Powering On" on page 61
- "Powering On the Array" on page 62
- "Powering Off the Array" on page 63
- "Next Steps" on page 64

Before Powering On

You can set up a Dynamic Host Configuration Protocol (DHCP) server to issue the IP address to each controller. If a DHCP server is not available, the controller tray defaults to internal static IP addresses. (See the *Sun StorageTek Common Array Manager Software Installation Guide* for information about configuring IP addresses on array controllers.)

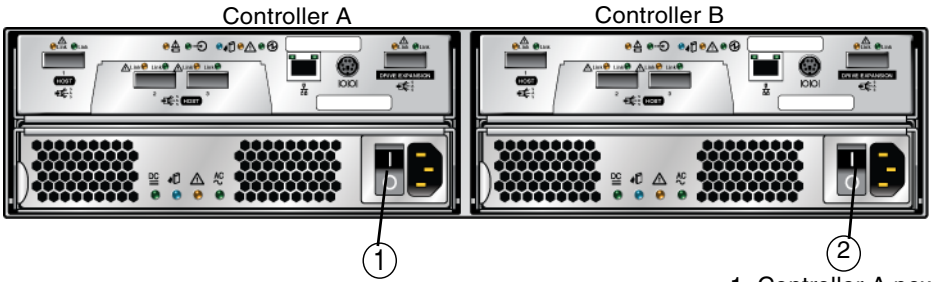
For instructions on configuring IP addresses on the array controllers, see "Configuring the IP Address of the Array Controllers" on page 74. For instructions on how to set up the DHCP server, see "Configuring a DHCP Server" on page 81.

Powering On the Array

Use this procedure to turn power on for all trays installed in the cabinet (FIGURE 4-1).

Note – The order in which you power up the trays is important. Be sure to power on the controller tray last in order to ensure that the disks in the expansion trays have enough time to spin completely before being scanned by the redundant array of independent disks (RAID) controllers in the controller tray.

FIGURE 4-1 Tray Power Connectors and Switches



1. Controller A power switch
2. Controller B power switch

1. **Prepare the power cables as specified in** "Connecting the Power Cables" on page 42**.**
2. **Turn on the cabinet circuit breakers, if applicable.**
3. **Press the power switches at the back of each expansion tray to the On position.**

   While the tray powers on, the green and amber LEDs on the front and back of the controller tray turn on and off intermittently. Depending on your configuration, it can take several minutes for the tray to power on. When the power-on sequence is complete, the LEDs are steady green.

   Wait until all the disk drive indicator lights on the expansion trays are steady green before proceding to the next step.
4. **Press each power switch at the back of the controller tray to the On position.**
5. **Check the status of each tray.**

   After the power-on sequence is complete, confirm the following:

- The green OK/Power LEDs on each drive in the tray are steady on.

- The green OK/Power LED on the tray is steady on.

  If all tray and drive Ok/Power LEDs are steady green and the amber Service Required LEDs are off, the power-on sequence is complete and no faults have been detected.

Powering Off the Array

The array rarely needs to be powered off. You remove power only when you plan to physically move the array to another location or are adding additional trays to a controller.

To power off the array, do the following:

1. **Stop all I/O from the hosts, if connected, to the storage system.**
2. **Wait approximately 2 minutes until all disk drive LEDs have stopped flashing.**

Note – If Disk Scrubbing is enabled, the disk drive LEDs will continue to flash after the 2-minute period has elapsed. By waiting the 2-minute period, you ensure that the data residing in cache has been written to disk. The LED flash rate during disk scrubbing (slow, periodic blink) is different from the flash rate of I/O (fast, random).

   After the 2-minute period, data residing in cache is written to disk and the battery mechanisms are disengaged.

3. **Check the Cache Active LED on the controller (**FIGURE 1-10**) to determine if any outstanding cache needs to be written.**

   If the LED is on, there is still data that needs to be flushed and written to disk.

4. **Ensure that the Cache Active LED is no longer flashing before powering off the array.**
5. **Press each power switch at the back of the controller tray to the Off position.**
6. **Press the power switches at the back of each expansion tray to the Off position.**

Next Steps

After you have connected the management host and data hosts, you are ready to install the management host software as described in the *Sun StorageTek Common Array Manager Software Installation Guide* and the data host software as described in Chapter 5.

CHAPTER 5

Data Hosts, HBAs, and Other Software

This chapter describes how to install data host software, HBAs, and other software on different host platforms. It contains the following sections:

- "Data Host Software" on page 65
- "Setting Up a Data Host On a Solaris System" on page 66
- "Installing Data Host Software for Operating Systems Other Than Solaris" on page 69
- "Enabling Multipathing Software" on page 70
- "Next Steps" on page 71

Data Host Software

The data host software contains tools that manage the data path I/O connections between the data host and the array. This includes drivers and utilities that enable array management hosts to connect to, monitor, and transfer data in a storage area network (SAN).

Note – Some management hosts can also be used as data hosts.

HBAs and Drivers

A Host Bus Adapter (HBA) is a network interface card that manages all data I/O on your data host. The specific HBAs you need depend on the data host server platform, operating system, data transport (SAS or FC), and data transfer rates used

in your storage area network. HBAs must be ordered separately, from Sun or their respective manufacturers. Sun HBAs can be ordered from: `/www.sun.com/storagetek/storage_networking/hba/`

The required versions of HBAdrivers must be installed on the data host before you can set up a data host. The *Sun StorageTek 2500 Series Array Release Notes* lists the data host requirements for HBAs and drivers. Refer to the specific vendor HBA documentation for instructions on installing HBA drivers.

Multipathing

Data host software controls the data path between the data host and the array. Since there can be more than one path between the host and the array for redundancy, this function is called multipathing.

You must install data host software (including multipathing) on each data host that communicates with the Sun StorageTek 2500 Series Array. The multipathing software you need depends on the host platform, HBA, and the data transport (SAS or FC) in your storage area network. This information is listed in the latest version of the *Sun StorageTek 2500 Series Array Release Notes*.

Setting Up a Data Host On a Solaris System

The Sun StorageTek 2500 Series Array provides data path support for data hosts running Solaris, Windows 2000, Windows Server 2003, Red Hat Linux, HP-UX, NetWare, and IBM AIX operating systems. This section applies to hosts running Solaris OS 8, 9, and 10.

See the *Sun StorageTek 2500 Series Array Release Notes* for the latest supported operating system versions.

Note – To install data host software on systems that are not running the Solaris OS, see "Installing Data Host Software for Operating Systems Other Than Solaris" on page 69.

You must install data host software (including multipathing) on each data host that communicates with the Sun StorageTek 2500 Series Array. Multipathing is included in the Solaris 10 OS. For Solaris OS 8 and 9 data hosts, you need the SAN Foundation Kit software (which includes the multipathing software).

To install data host software on Solaris OSs, see the following sections:

- "To Obtain Sun Solaris 8 and 9 Data Host Software" on page 67
- "To Install the SAN 4.4 Data Host Software" on page 67

▼ To Obtain Sun Solaris 8 and 9 Data Host Software

Obtain Sun Solaris OS 8 and 9 data host software as follows:

1. **Go to the Sun Microsystems web page (sun.com).**

   The Sun home page is displayed.

2. **Select Downloads from the home page navigation bar.**

   The Downloads page is displayed (it is not labeled).

3. **On the View by Category tab, select System Administration>Storage Management.**

   The Storage Management page is displayed, showing a list of downloadable storage-related products.

4. **Select the SAN 4.4 product.**

   The login page is displayed.

5. **Login using your Sun account ID.**

   The SAN 4.4.x Download page is displayed.

6. **Accept the License Agreement and select the SAN 4.4 version required for your operating system.**

   The data host software version you need depends on your operating system. See the *Sun StorageTek 2500 Series Array Release Notes* for the current data host software requirements. Download the Solaris *x* (8 or 9) Base Package (if you do not already have it installed), and then the Install_it Script SAN 4.4.x version as recommended in the release notes.

   There is a README file available on the SAN 4.4.x Download page with instructions for unpacking and installing the download file on your data host computer.

▼ To Install the SAN 4.4 Data Host Software

To launch the host software installer:

1. **Log in to the host as** `root`**.**
2. **Change to the** `SAN_4.4.`*xx_install_it* **directory in which the compressed installation file was unpacked:**

   `cd` <*user-specified location*>`/SAN_4.4.`*xx_install_it*
3. where *xx* is the software version number of the installed files.**Start the host software installer by typing the following command:**

   `./install_it`

   When the installation is complete, the root prompt returns.
4. **Enable the Sun StorageTek Traffic Manager multipathing software (see** "Enabling Multipathing Software" on page 70**).**

▼ To Obtain Traffic Manager for Operating Systems Other Than Solaris

1. **Go to the Sun Microsystems web page (sun.com).**

   The Sun home page is displayed.
2. **Select Downloads from the home page navigation bar.**

   The Downloads page is displayed (it is not labeled).
3. **On the View by Category tab, select System Administration>Storage Management.**

   The Storage Management page is displayed, showing a list of downloadable storage-related products.
4. **Scroll down and select the Traffic Manager version for the operating system you have.**

   The login page is displayed.
5. **Login using your Sun account ID.**

   The Traffic Manager product Download page is displayed.
6. **Accept the License Agreement and select the Traffic Manager version required for your operating system.**

   The data host software version you need depends on your operating system. See the *Sun StorageTek 2500 Series Array Release Notes* for the current data host software requirements.

   There is a README file available on the download page with instructions for unpacking and installing the download file on your data host computer.

Installing Data Host Software for Operating Systems Other Than Solaris

To install data host software for operating systems other than Solaris, see the following sections:

- "About Data Host Software For Non-Solaris Platforms" on page 69
- "Downloading and Installing Sun RDAC Software" on page 69

Note – To dowload software from the Sun Download Center, you must register as a Sun customer. The first time you click Download to download a software product, click the Register Now link on the Login page, complete the required fields, and click Register.

About Data Host Software For Non-Solaris Platforms

The data host software for Red Hat Linux, HP-UX, AIX, and Windows platforms is Sun Redundant Dual Array Controller (RDAC), also known as MPP, and is available from the Sun Download Center (SDLC).

See the *Sun StorageTek 2500 Series Array Release Notes* for a list of supported operating systems, patches, and HBAs.

Downloading and Installing Sun RDAC Software

1. **To download the latest version of Sun RDAC software (support for Windows and Linux multipathing), go to:**

   `http://www.sun.com/download/index.jsp`

   and select Hardware Drivers>Storage.

2. **Select the link for the RDAC driver for the Operating System you have.**

   An RDAC Driver download page is displayed.

3. **Click Download.**

4. **Log in using your SDLC user name and password.**

5. **Read and accept the license agreement.**

6. **Select the link for the data host platform that you want to install.**
7. **Save the install package to a temporary directory.**
8. **Uncompress and untar the install package.**
9. **When the download is finished, log out of the SDLC.**

A `readme` file is provided as part of the installation package. To install the software, refer to the `readme` file for platform-specific instructions.

Enabling Multipathing Software

Sun StorageTek SAN Foundation software includes the Sun StorageTek Traffic Manager multipathing software.

The procedure you use to enable multipathing software depends on the version of Solaris OS running on the host:

- "Enabling Multipathing Software for Solaris 8 or 9 OS" on page 70
- "Enabling Multipathing Software for Solaris 10 OS" on page 71

▼ Enabling Multipathing Software for Solaris 8 or 9 OS

To enable the multipathing software on hosts running Solaris OS 8 or 9:

1. **Open the `/kernel/drv/scsi_vhci.conf` file with a text editor.**
2. **Set `mpxio-disable="no";` in the file.**
3. **Set `load-balance="round-robin";` in the file.**
4. **Set `auto-failback="enable";` in the file.**
5. **Save the updated file.**
6. **Reboot the host.**

7. **Use the `cfgadm` command to configure HBA paths.**

   How you configure paths depends on how you are using your arrays in a SAN or direct attach environment. See the *Sun StorageEdge SAN Foundation Software 4.4 Configuration Guide* (`www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/SAN/san_software/`) for information about configuring paths.

▼ Enabling Multipathing Software for Solaris 10 OS

To enable multipathing software for all Fibre Channel (FC) ports on hosts running Solaris OS 10:

1. **Type the following command:**

   ```
   # stmsboot -e
   ```

Note – See the `stmsboot`(1M) man page for complete details.

   You are prompted to confirm the command:

   ```
   WARNING: This operation will require a reboot.
   Do you want to continue ? [y/n] (default: y)
   ```

2. **Press Return to reboot the host.**

Next Steps

After you have installed and enabled multipathing on the data hosts, configure IP addressing on the array controllers as described in Chapter 6.

CHAPTER 6

Configuring IP Addressing

In order for there to be an out-of-band Ethernet connection between the local management host and the array controllers, the management host and the array controllers must have valid IP addresses.

This chapter describes how to configure IP addressing on the local management host and the array controllers. It contains the following sections:

- "About IP Addressing" on page 73
- "Configuring the IP Address of the Array Controllers" on page 74

About IP Addressing

The Sun StorageTek 2500 Series Array is managed out-of-band by way of a standard Ethernet connection between the redundant array of independent disk (RAID) controllers and your management host.

Perform the following procedures to ensure that the local management host and the array controllers have valid IP addresses:

- Configure IP addresses for the array controllers (see "Configuring the IP Address of the Array Controllers" on page 74)
- Configure an IP address for the management host (see the *Sun StorageTek Common Array Manager Software Installation Guide*)

Configuring the IP Address of the Array Controllers

You can configure two types of IP addressing for the Ethernet port of each array controller:

- Dynamic Host Configuration Protocol (DHCP) IP addressing – IP addresses for the Ethernet port are assigned dynamically from a DHCP server running bootstrap protocol (BOOTP) services. An IP address assigned to an Ethernet port is held only as long as needed. By default, DHCP is not enabled at initial power-on, so you must connect to it using a serial console or the Common Array Manager and the controller's static IP address, and then enable DHCP.
- Static IP Addressing – You assign a specific IP address to the Ethernet port of each controller. Static IP addresses remain in effect until you modify or remove them or you change the method of IP addressing for the Ethernet port to DHCP.

  By default, if the array controllers cannot find a DHCP server upon initial power-on, an internal IP address is assigned to Ethernet port 1 of each controller:

- The Ethernet port of Controller A is assigned IP address `192.168.128.101`
- The Ethernet port of Controller B is assigned IP address `192.168.128.102`
- The default subnet mask for each port is `255.255.255.0`

To configure the Ethernet port on a controller with either dynamic or static IP addressing, see one of the following sections:

- "Configuring Dynamic (DHCP) IP Addressing" on page 74
- "Configuring Static IP Addressing" on page 75

Configuring Dynamic (DHCP) IP Addressing

If BOOTP services are available on the DHCP server at initial array power on, this server assigns a dynamic IP address for the Ethernet port on each controller.

If a DHCP server is not available, the controller tray defaults to internal static IP addresses as described in "Configuring the IP Address of the Array Controllers" on page 74.

If you want to set up a DHCP server, refer to Appendix A for a description of how to configure BOOTP services in Sun Solaris or Microsoft Windows environments.

You can restore DHCP IP addressing to Ethernet port 1 of either controller in either of three ways:

- Start a DHCP server on the same subnet, then reboot the 2500 Series Array.

- Using the serial port interface (see "Using the Serial Port Interface to Assign IP Addresses" on page 75)
- Using the Sun StorageTek Common Array Manager (see the *Sun StorageTek Common Array Manager Software Installation Guide*)

Configuring Static IP Addressing

There are two methods of assigning static IP addresses to the Ethernet ports of a controller:

- The serial port interface (see "Using the Serial Port Interface to Assign IP Addresses" on page 75)
- The Common Array Manager (see the *Sun StorageTek Common Array Manager Software Installation Guide*)

Note – It is recommended that you use the serial port interface to assign IP addresses to the Ethernet port of each controller, if possible.

Using the Serial Port Interface to Assign IP Addresses

You can use the serial port interface on a controller to set the IP address for the Ethernet port on the controller.

To use the serial port interface to configure IP addressing for the Ethernet port of each controller, you must complete the tasks described in the following sections:

- "To Connect a Terminal to the Serial Port" on page 75
- "To Set Up the Terminal Emulation Program" on page 76
- "To Establish a Connection With the Serial Port" on page 77
- "To Configure the IP Addresses" on page 78

▼ To Connect a Terminal to the Serial Port

You will establish a serial connection to each controller, Controller A and Controller B. Two mini-DIN to RJ45 serial port cables are supplied with each controller tray.

To connect a terminal to the serial port of a controller:

1. **Connect the 6-pin mini-DIN connector of the serial cable to the serial port connector (diagnostic port) on the controller (**FIGURE 1-3 **on page 6****).**
2. **Connect the RJ-45 connector of the serial cable to the serial port connector on the terminal. It may be necessary to use an RJ45-DB9 adapter between the serial cable RJ-45 connector and the serial port of the terminal.**
3. **For PC and laptop serial connections, you will also need to use a null modem. Connect the null modem between the serial cable or RJ45-DB9 adapter and the PC serial port.**

Note – If your PC does not have a serial port, you can use a USB–Serial Port adapter (separately available from third-party vendors; not included with 2500 Series Array ship kits).

Serial Cable Pinouts

TABLE 6-1 shows the pinouts for the RJ45-DIN serial cable (Sun part number 530-3544) included with the 2500 Series Array shipkit.

TABLE 6-1 RJ45 to DIN Serial Cable Pinouts

RJ45 ---------->	PS2-miniDin
1 Tx	6 Rx
2	
3 Rx	1 Rx
4,5,7	3, 5 GRD
6 Rx	2 Tx
8	4

▼ To Set Up the Terminal Emulation Program

To set up a terminal emulation program to connect to the serial port:

1. **Select VT100 emulation.**
2. **Remove any modem strings from the connection profile.**
3. **Set up the connection profile with the following communication settings:**

- Data Rate: 38400
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow Control: None

▼ To Establish a Connection With the Serial Port

To establish a connection with the serial port and display the Service Interface menu:

1. **Press Break.**

Note – The array serial port requires that the break character be received. Use the appropriate escape sequence for your terminal setup to send the required break character to the array controller, For example, you generate the Break character on some terminals by pressing the Control and Break keys simultaneously.

The serial port responds with a request to synchronize with the baud rate of the terminal:

```
Set baud rate: press <space> within 5 seconds
```

2. **Press the space bar within five seconds.**

   The serial port confirms the established baud rate for the connection:

   ```
   Baud rate set to 38400
   ```

3. **Press Break (see Note above)**

   The serial port responds with the following message:

   ```
   Press within 5 seconds: <S> for Service Interface, <BREAK>
   for baud rate
   ```

4. **Press S to access the Service Interface menu.**

Note – Send Break to synchronize the serial port to a different terminal port rate (see Note above).

The serial port requests the serial port password:

```
Enter Password to access Service Interface (60 sec timeout):
->
```

5. **Type the serial port password,** `kra16wen`**, and press Enter.**

   The Service Interface menu is displayed.

```
Service Interface Main Menu
 ============================
1) Display IP Configuration
2) Change IP Configuration
3) Reset Storage Array (SYMbol) Password
Q) Quit Menu

Enter Selection:
```

▼ To Configure the IP Addresses

The serial port Service Interface menu enables you to set up the IP address configuration for the Ethernet port on the controller.

To set up the IP address configuration for the Ethernet port on each controller:

1. **Select option 2, Change IP Configuration:**

```
Service Interface Main Menu
 ============================
1) Display IP Configuration
2) Change IP Configuration
3) Reset Storage Array (SYMbol) Password
Q) Quit Menu

Enter Selection: 2
```

2. **Specify that you do not want dynamic IP addressing, using a DHCP server, used for this port:**

```
Configure using DHCP ? (Y/N): n
```

The current or default IP configuration for the selected Ethernet port is displayed.

3. **Enter the static IP address and, optionally, a subnet mask for the Ethernet port:**

Note – If you are not using DHCP IP addressing and have a gateway IP address on your subnet, you must also specify a gateway IP address for the Ethernet port. This option displays only if the serial interface detects a gateway.

```
Press '.' to clear the field;
Press '-' to return to the previous field;
Press <ENTER> and then ^D to quit (Keep Changes)

                Current Configuration          New Configuration
IP Address      if1 : 192.168.128.101          IP-address
Subnet Mask     if1 : 255.255.255.0            <ENTER>
Gateway IP Address if1:                        <ENTER>
```

4. **When prompted, confirm the specified IP addressing.**

   The Service Interface menu is redisplayed.

5. **Select option 1, Display IP Configuration, to confirm the IP address changes.**

```
Service Interface Main Menu
 ============================
1) Display IP Configuration
2) Change IP Configuration
3) Reset Storage Array (SYMbol) Password
Q) Quit Menu

Enter Selection: 1
```

   The IP address configuration of the Ethernet port is displayed, and the Service Interface menu is redisplayed.

6. **Press Q to quit the Service Interface menu.**

7. **Switch the serial cable to the Ethernet port on the other controller and repeat these steps to set the IP address on that controller as well.**

8. **Power cycle the controllers off and on again to reset them with the new IP address.**

When you have completed the IP address configuration for the Ethernet port on both array controllers and power cycled them, see the *Sun StorageTek Common Array Manager Software Installation Guide* for instructions on registering and configuring the array.

CHAPTER A

Configuring a DHCP Server

This appendix describes how to configure bootstrap protocol (BOOTP) services in a Sun Solaris and Microsoft Windows environment. It contains the following sections:

- "Before You Begin" on page 81
- "Setting Up a Solaris DHCP Server" on page 81
- "Setting Up a Windows 2000 Advanced Server" on page 86

Dynamic IP addresses are assigned through dynamic host control protocol (DHCP) server BOOTP services.

Before You Begin

You need each controller's media access control (MAC) address to configure the DHCP server. The MAC address is located on the bar code label at the back of each redundant array of independent disks (RAID) controller. Since there are two controllers per array, you need two MAC addresses.

Setting Up a Solaris DHCP Server

The following procedure provides an example of how to set up a DHCP server with the BOOTP option for the Solaris 8, 9, and 10 Operating Systems. Your environment may require different steps.

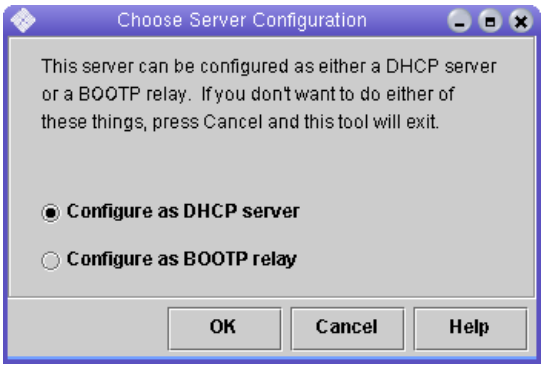
1. **Modify the** `netmasks` **line of the** `/etc/nsswitch.conf` **file as shown here:**

```
#netmasks:   nis [NOTFOUND=return] files
netmasks:   files nis [NOTFOUND=return]
```

2. **Start the DHCP wizard by issuing the following command at the command line:**

```
/usr/sadm/admin/bin/dhcpmgr &
```

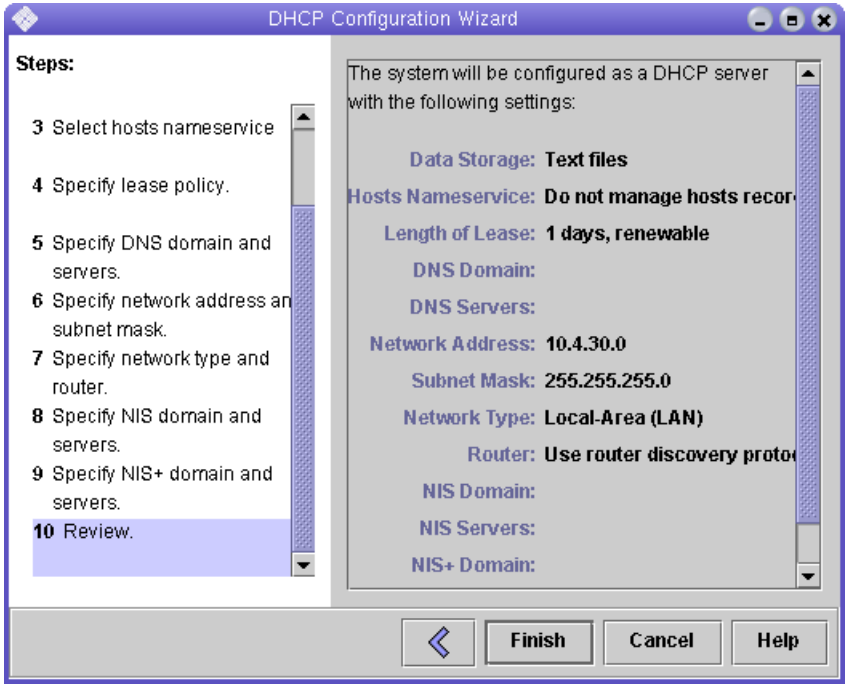
The following window is displayed:



The wizard will prompt you for information related to the configuration, network address, and subnet mask of the controller tray. Select or enter the following information:

- Data storage format: **`Text files`**
- Nameservice to store host records: **`Do not manage hosts records`**
- Length of lease:
- Network Address: *Network address of Controller A*
- Subnet Mask: For example, `255.255.255.0`
- Network Type: **`Local-Area (LAN)`**
- Router: **`Use router discovery protocol`**

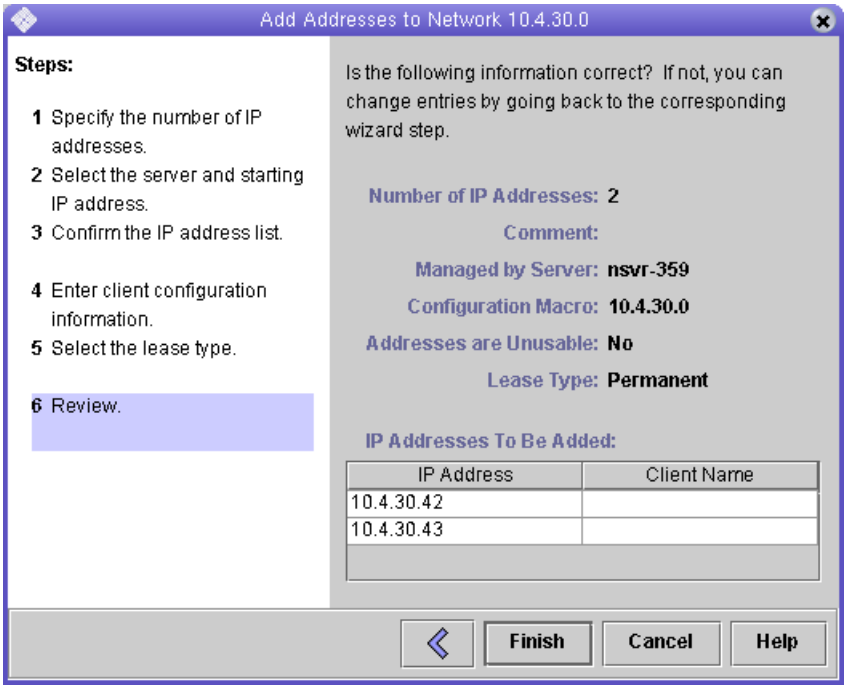
Your summary page should look similar to the following example:



3. **Verify your configuration information and click Finish.**
4. **When you are prompted to configure addresses for the server, click Yes.**
   The Add Address to Network wizard is displayed.
5. **Enter the following information:**

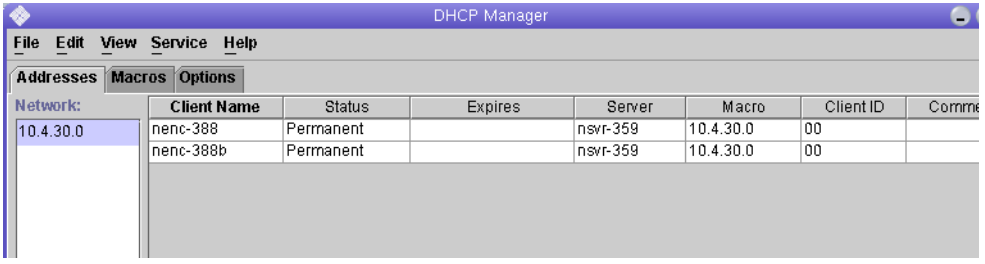
- Number of IP addresses
- Name of managing server
- Starting IP address
- Configuration macro to be used for configuring the clients
- Lease type

Your summary page should look similar to the following example:



6. **Verify your configuration information and click Finish.**

   The DHCP Manager displays the following:

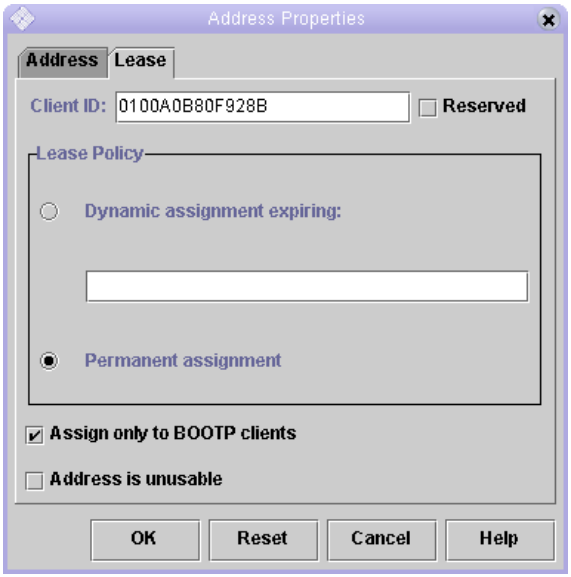


7. **In the Address Properties window, do the following:**

   a. **In each Client ID field, enter `01` followed by the MAC address that is printed on the back of the RAID controller. For example:**

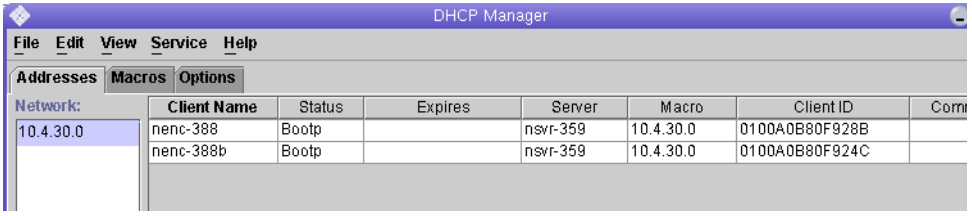
      `0100A0E80F924C`

   b. **Toward the bottom of the window, select "Assign only to BOOTP clients."**



c. **Click OK.**

The DHCP manager updates the status and client ID, as shown in the following example:

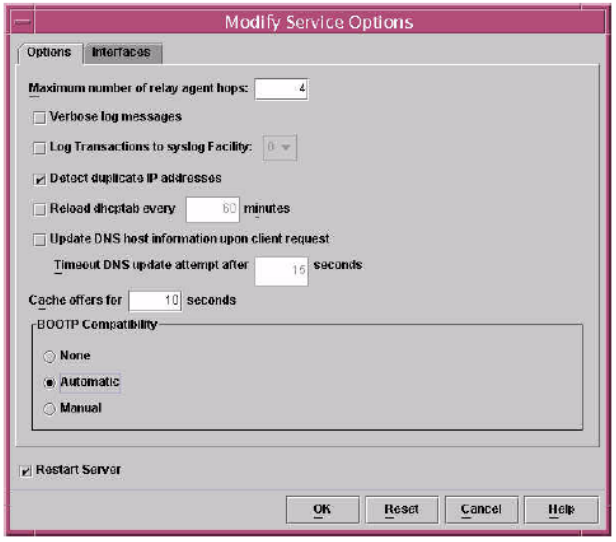


8. **Go to Modify Service Options and do the following:**

   a. **Select Detect Duplicate IP addresses.**

   b. **Under BOOTP Compatibility, select Automatic.**

   c. **Select Restart Server, as shown in the following example.**



d. Click OK.

After the configuration process has finished, the DHCP server provides BOOTP services to the MAC address you entered for each RAID controller.

9. **To verify that the BOOTP service is running, go to Service > Restart.**

10. **After you power on the array, ping the address.**

    If the ping responds with '`alive`', the DHCP server BOOTP operation was successful.

Setting Up a Windows 2000 Advanced Server

Before you begin, make sure the following requirements are met:

- Windows 2000 server and the array are on the same subnet.
- IP addresses that are assigned to the RAID controllers do not conflict.
- The array is in BOOTP IP addressing mode (the default setting for a new array).
- The Windows 2000 Server setup CD is available.

The following procedure provides an example of how to set up DHCP with the BOOTP option on the Windows 2000 Advanced Server. Your environment may require different steps.

Installing the DHCP Server

To install DHCP server on the Windows 2000 Advanced Server:

1. **From the Control Panel, go to Administrative Tools > Configure Your Server.**
2. **Select DHCP from the Networking drop-down menu on the left.**

   The wizard instructs you to use the Windows Components wizard to add the DHCP component.
3. **Start the Windows Components wizard and double-click Networking Services.**
4. **Select Dynamic Host Configuration Protocol (DHCP), click the check box to its left, and click OK.**

   The Windows Components wizard is displayed.
5. **Click Next.**
6. **If Terminal Services Setup is displayed, select Remote administration mode. Click Next.**

   If your server has obtained an address from a DHCP server for its own address, a warning is displayed.
7. **Click OK to accept the warning.**

   Local Area Connection Properties is displayed.
8. **Assign a static IP address to the server, or click Server to keep DHCP addressing for the server. Click OK.**
9. **Click Finish to exit the Windows Components wizard.**

   The DHCP server is now installed. The next step is to configure the server.

Configuring the DHCP Server

To configure the DHCP server:

1. **From the Control Panel, go to Administrative Tools > Computer Management > Services and Application > DHCP.**

2. **From the Action menu, select New Scope.**

   The New Scope wizard is displayed.

3. **Enter the following information as prompted:**

- Scope name and description:
- IP address range (for example, `192.168.0.170` to `192.168.0.171`)
- Subnet mask (for example, `255.255.255.0`)
- Add exclusions (do not exclude any IP addresses)
- Lease duration (accept the default of 8 days)
- Router (default gateway) of your subnet (for example, `192.168.0.1`)
- Domain name, WINS server (these are not needed)
- Activate Scope? (select "Yes, I want to activate this scope now")

4. **Click Finish to exit the wizard.**

   The contents of the DHCP server are listed.

5. **Right-click Scope [***ipaddress***] *scope-name* and select Properties.**

6. **In the Scope Properties box, click the Advanced tab.**

7. **Select BOOTP only, set the lease duration to Unlimited, and click OK.**

8. **Right-click Reservations.**

   The Controller A Properties box is displayed.

9. **Enter the IP address and the MAC address for Controller A. Click Add.**

   The Controller B Properties box is displayed.

10. **Enter the IP address and the MAC address for Controller B. Click Add.**

    The controllers are added to the right of the Reservations listing.

11. **Right-click Scope [***ipaddress***] *scope-name* to disable the scope.**

12. **Click Yes to confirm disabling of the scope.**

13. **Right-click Scope and select Activate.**

    The DHCP server is now configured with the BOOTP option for the array network.

14. **Power on or power cycle the array modules.**

15. **Click Address Leases in the left pane to check the DHCP server leases.**

    The lease expiration displays the following status for each RAID controller:

```
Reservation (active)
```

If the lease expiration for the controllers is inactive, try refreshing the list. If the lease is still inactive, check the following:

- Are the IP addresses allocated for BOOTP conflicting?
- Were the correct MAC addresses added to the DHCP server for the array controllers?
- Are the DHCP server and array on the same subnet?
- Is the gateway configured correctly on the DHCP server?

  The RAID controllers can gain a lease and an IP address, but they cannot respond out of the subnet for the software if the gateway is not configured properly.

- Are the RAID controllers set up for BOOTP access?

  It is possible that they were previously configured to have static IP addresses. You must be sure when you move an array that you change the array's IP addresses to IP addresses on the new subnet before setting up BOOTP services.

CHAPTER B

Using DC Power

This appendix describes using the DC Power Unit for the Sun StorageTek 2500 Series Arrays in the following sections:

- "DC Power Overview" on page 91
- "Installation Notes for DC Power" on page 92
  - "Ship Kit Changes" on page 93
  - "DC Power LEDS" on page 93
  - "Connecting Power Cables" on page 94
  - "Turning Off the DC Power During an Emergency" on page 96
  - "Relocation Cautions" on page 96

DC Power Overview

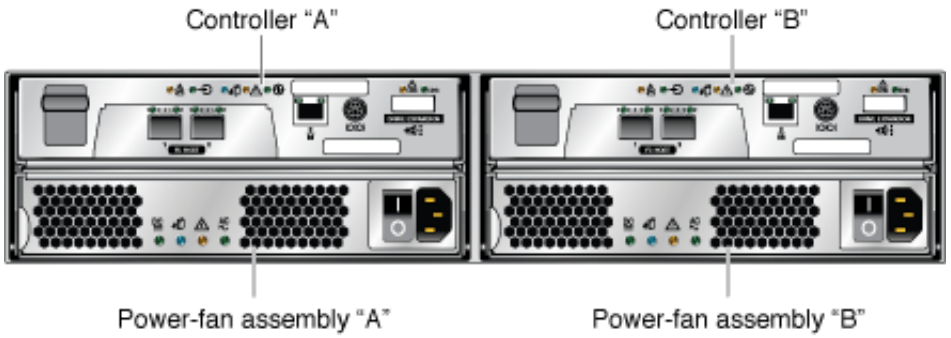
The Sun StorageTek 2500 Series Arrays can be ordered with a DC power connection and connector cables.

Caution – A qualified service person is required to make the DC power connection per NEC and CEC guidelines. A two-pole 20-amp circuit breaker is required between the DC power source and the array module for over-current and short-circuit protection. Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.

Caution – Electrical grounding hazard – This equipment is designed to permit the connection of the D.C. supply circuit to the earthing conductor at the equipment.

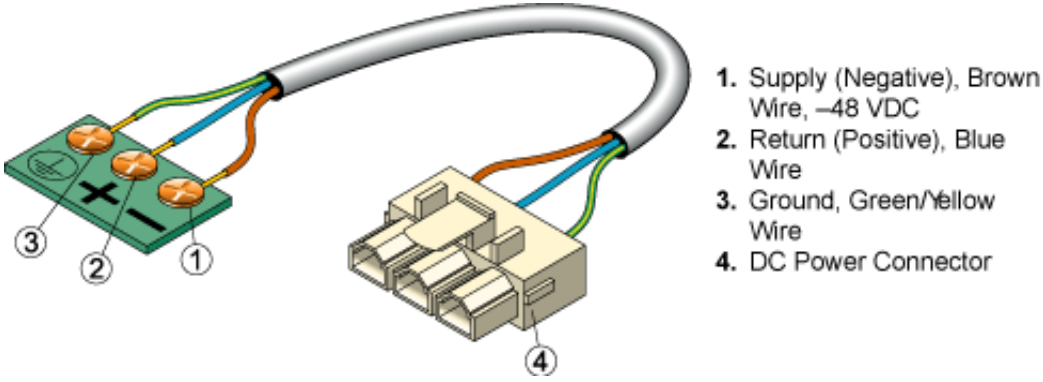
FIGURE B-1 shows the locations of the power-fan assemblies.

FIGURE B-1 Power Fan Assembly Locations.



Caution – Risk of electrical shock – This unit has more than one power source. To remove all power from the unit, all DC MAINS must be disconnected by removing all power connectors (item 4 in Appendix FIGURE B-2) from the power supplies.

FIGURE B-2 DC Power Connector Cable and Source Wires



Installation Notes for DC Power

The sections that follow provide hardware information about DC power.

- "Ship Kit Changes" on page 93
- "DC Power LEDS" on page 93
- "Connecting Power Cables" on page 94
- "Turning Off the DC Power During an Emergency" on page 96
- "Relocation Cautions" on page 96

Ship Kit Changes

If the DC power option is ordered, two DC power connector cables are provided with each controller tray for connection to centralized DC power plant equipment.

Caution – A qualified service person is required to make the DC power connection per NEC and CEC guidelines. A two-pole 20-amp circuit breaker is required between the DC power source and the array module for over-current and short-circuit protection. Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.

DC Power LEDS

FIGURE B-3 shows the LEDs, on/off power switch, and power cable receptacle on the back of the DC power module.

FIGURE B-3 DC Power Module LEDs, Power Switch, and Power Cable Receptacle.

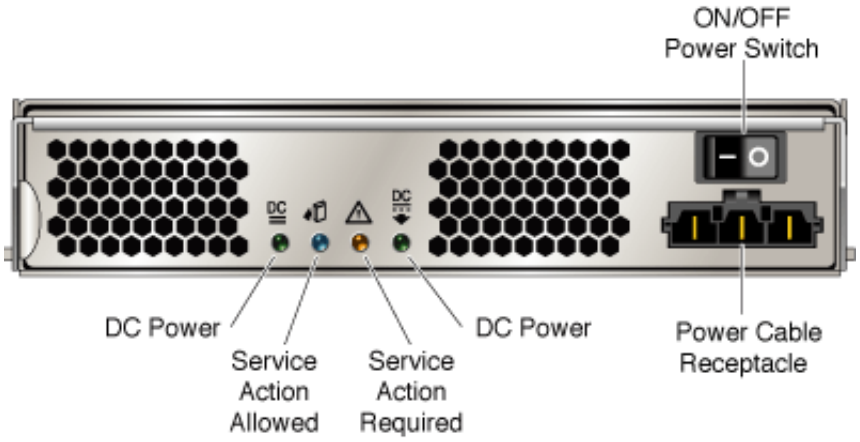


TABLE B-1 lists the LEDs for DC power.

TABLE B-1 DC Power Module LEDs.

LED	Color	On	Off
DC Power (DC Good)	Green	DC power from the power-fan assembly is available.	DC power from the power-fan assembly is not available.
Service Action Allowed	Blue	The power-fan assembly can be removed from the tray.	The power-fan assembly cannot be removed from the tray.
Service Action Required (Fault)	Amber	A fault exists within the power-fan assembly.	Normal condition
Power (DC Good)	Green	Power is present	Power is not present

Connecting Power Cables

Caution – A qualified service person is required to make the DC power connection per NEC and CEC guidelines. A two-pole 20-amp circuit breaker is required between the DC power source and the array module for over-current and short-circuit protection. Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.

Caution – Ensure that you do not turn on power to the array module or the connected drive modules until this guide instructs you to do so. For the proper procedure for turning on the power, see ""Connecting Power Cables" on page 94."

Caution – Electrical grounding hazard – This equipment is designed to permit the connection of the D.C. supply circuit to the earthing conductor at the equipment.

▼ Connecting the Cables

1. **Disconnect the two-pole 20-amp DC circuit breaker for the storage array.**
2. **Ensure that all DC power switches on the DC-powered array module and all DC power switches on any connected, DC-powered drive modules are turned off.**
3. **Connect the DC power connector cable to the DC power connector on the back of the array module.**

Caution – The three source wires on the DC power connector cable (–48 VDC) connect the array module to centralized DC power plant equipment, typically through a bus bar located above the cabinet.

4. **A qualified service person is required to make the DC power connection per NEC and CEC guidelines. A two-pole 20-amp circuit breaker is required between the DC power source and DC-powered modules for over-current and short-circuit protection. Connect the DC power source wires on the other end of the DC power connector cable to the centralized DC power plant equipment as follows (see "DC Power Connector Cable and Source Wires" on page 92).**
   a. **Connect the brown –48-VDC supply wire to the negative terminal.**
   b. **Connect the blue return wire to the positive terminal.**
   c. **Connect the green/yellow ground wire to the ground terminal.**
5. **If applicable, connect a DC power cable to each DC-powered expansion tray in the storage array.**

Turning Off the DC Power During an Emergency

Caution – Potential loss of data – An emergency shutdown of the storage array might not allow the server to complete its I/O to the storage array.

Note – Before turning off the power switches on a DC-powered tray you must disconnect the two-pole 20-amp circuit breaker.

Relocation Cautions

Use the following guidelines when relocating trays or drives from one storage array to another.

Caution – Potential data loss – Moving a array or array components that are configured as part of a volume group can result in data loss. To prevent data loss, always consult a Customer Support representative before relocating configured drives, controller trays or expansion trays.

Note – Trays in arrays can be connected to the DC power supply (–48 VDC). Before turning off any power switches on a DC-powered tray, you must disconnect the two-pole 20-amp circuit breaker.

Do not move controller trays or expansion trays that are part of a volume group configuration. If you must move array components, contact a Customer Support representative for procedures. A Customer Support representative might direct you to complete several tasks prior to undertaking the relocation. These tasks might include:

- Creating, saving, and printing an array profile of each storage array that is affected by the relocation of a drive or tray.
- Performing a complete backup of all data on the drives that you intend to move.
- Verifying that the volume group and each of its associated volumes on the affected array have an Optimal status.
- Determining the location and status of any global hot spares associated with the affected storage array.

Glossary

Definitions obtained from the Storage Networking Industry Association (SNIA) Dictionary are indicated with "(SNIA)" at the end. For the complete SNIA Dictionary, go to www.snia.org/education/dictionary.

A

agent

The component of the system monitoring and diagnostic software that collects health and asset information about the array.

alarm

A type of event that requires service action. See also event.

alert

A subtype of an event that requires user intervention. The term *actionable event* often describes an alert. See also event.

array

Multiple disk drives that function as a single storage device. A high-availability (HA) array configuration has redundant controllers and expansion trays of disk drives.

array hot-spare

A disk that serves as a hot-spare within an array as part of the storage pool; a reserve disk that can be made available to all virtual disks within an array. See also hot-spare.

B

block

The amount of data sent or received by the host per I/O operation; the size of a data unit.

C

capacity

The amount of storage you must allocate to storage elements, including volumes, pools, and virtual disks. Capacity planning should include allocations for volume snapshots and volume copies.

CLI

Command-line interface. The SSCS command-line interface is available from the remote CLI client or through an SSCS directory on the Solaris Operating System management software station.

controller tray

A tray with an installed redundant RAID controller pair. In a Sun StorageTek 2500 Series array, 1x1, 1x2, 1x3, and 1x4 array types are available.

control path

The route used for communication of system management information, usually an out-of-band connection.

customer LAN

See site LAN.

D

DAS

See direct attached storage (DAS).

data host

Any host that uses the system for storage. A data host can be connected directly to the array (direct attach storage, or DAS) or can be connected to an external switch that supports multiple data hosts (storage area network, or SAN). See also host.

data path

The route taken by a data packet between a data host and the storage device.

direct attached storage (DAS)

A storage architecture in which one or two hosts that access data are connected physically to a storage array.

disk

A physical drive component that stores data.

E

event

A notification of something that happened on a device. There are many types of events, and each type describes a separate occurrence. See also alarm and alert.

expansion tray

A tray that does not have a RAID controller, used to expand the capacity of an array. This type of tray must be attached to a controller tray to function.

extent

A set of contiguous blocks with consecutive logical addresses on a physical or virtual disk.

F

failover and recovery

The process of changing the data path automatically to an alternate path.

fault coverage

The percentage of faults detected against all possible faults or against all faults of a given type.

FC

See Fibre Channel (FC).

Fibre Channel (FC)

A set of standards for a serial I/O bus capable of transferring data between two ports at up to 100 megabytes/second, with standards proposals to go to higher speeds. Fibre Channel supports point to point, arbitrated loop, and switched

topologies. Fibre Channel was completely developed through industry cooperation, unlike SCSI, which was developed by a vendor and submitted for standardization after the fact.

Fibre Channel switch

A networking device that can send packets directly to a port associated with a given network address in a Fibre Channel storage area network (SAN). Fibre Channel switches are used to expand the number of servers that can connect to a particular storage port. Each switch is managed by its own management software.

field-replaceable unit (FRU)

An assembly component that is designed to be replaced on site, without the system having to be returned to the manufacturer for repair.

FRU

See field-replaceable unit (FRU).

H

HBA

See host bus adapter (HBA).

host

As a function of the Sun StorageTek 2500 Series array configuration, a representation of a data host that is mapped to initiators and volumes to create a storage domain. See also data host, initiator.

host bus adapter (HBA)

An I/O adapter that connects a host I/O bus to a computer's memory system. Abbreviated HBA. Host bus adapter is the preferred term in SCSI contexts. Adapter and NIC are the preferred terms in Fibre Channel contexts. The term NIC is used in networking contexts such as Ethernet and token ring. See also initiator.

host group

A group of hosts with common storage characteristics that can be mapped to volumes. See also host.

hot-spare

The drive used by a controller to replace a failed disk. See also array hot-spare.

I

in-band traffic

System management traffic that uses the data path between a host and a storage device. See also out-of-band traffic.

initiator

A system component that initiates an I/O operation over a Fibre Channel (FC) network. If allowed by FC fabric zoning rules, each host connection within the FC network has the ability to initiate transactions with the storage array. Each host in the FC network represents a separate initiator, so if a host is connected to the system through two host bus adapters (HBAs), the system identifies two different initiators (similar to multi-homed, Ethernet-based hosts). In contrast, when multipathing is used in round-robin mode, multiple HBAs are grouped together, and the multipathing software identifies the group of HBAs as a single initiator.

IOPS

A measure of transaction speed, representing the number of input and output transactions per second.

L

LAN

Local area network.

logical unit number (LUN)

The SCSI identifier for a volume as it is recognized by a particular host. The same volume can be represented by a different LUN to a different host.

LUN

See logical unit number (LUN).

M

MAC address

See media access control (MAC) address.

management host

A Solaris host serving the configuration, management, and monitoring software for the Sun StorageTek 2500 Series array. The software on the station can be accessed with a browser to run the browser interface or with a remote scripting command-line interface (CLI) client to access the `SSCS` CLI commands.

master / alternate master

A design for reliability that uses redundant configuration. Array configurations share master/alternate master configurations: each array configuration has two controller trays that are grouped as one host. In each case, the master component uses the IP address and name. If the master fails, the alternate master assumes the IP address and name and takes over the master's functions.

media access control (MAC) address

The physical address identifying an Ethernet controller board. The MAC address, also called an Ethernet address, is set at the factory and must be mapped to the IP address of the device.

mirroring

A form of storage – also called RAID Level 1, independent copy, and real-time copy – whereby two or more independent, identical copies of data are maintained on separate media. Typical mirroring technologies enable the cloning of data sets to provide redundancy for a storage system.

multipathing

A design for redundancy that provides at least two physical paths to a target.

N

O

out-of-band traffic

System management traffic outside of the primary data path that uses an Ethernet network. See also in-band traffic.

P

PDU

See power distribution unit (PDU).

pool

See storage pool.

power distribution unit (PDU)

The assembly that provides power management for the system. The redundant design uses two PDUs in each system so that the system's data path continues to function if one of the PDUs fails.

profile

See storage profile.

provisioning

The process of allocation and assignment of storage to hosts.

R

RAID

An acronym for Redundant Array of Independent Disks, a family of techniques for managing multiple disks to deliver desirable cost, data availability, and performance characteristics to host environments. Also, a phrase adopted from the 1988 SIGMOD paper A Case for Redundant Arrays of Inexpensive Disks.

remote monitoring

Monitoring of the functions and performance of a hardware system from a location other than where the hardware resides.

remote scripting CLI client

A command-line interface (CLI) that enables you to manage the system from a remote management host. The client communicates with the management software through a secure out-of-band interface, HTTPS, and provides the same control and monitoring capability as the browser interface. The client must be installed on a host that has network access to the system.

S

SAN

See storage area network (SAN).

site LAN

The local area network at your site. When the system is connected to your LAN, the system can be managed through a browser from any host on the LAN.

snapshot

An copy of a volume's data at a specific point in time.

SSCS

Sun Storage Command System. The command-line interface (CLI) that can be used to manage the array.

storage area network (SAN)

An architecture in which the storage elements are connected to each other and to a server that is the access point for all systems that use the SAN to store data.

storage domain

A secure container that holds a subset of the system's total storage resources. Multiple storage domains can be created to securely partition the system's total set of storage resources. This enables you to organize multiple departments or applications into a single storage management infrastructure.

storage pool

A container that groups physical disk capacity (abstracted as virtual disks in the browser interface) into a logical pool of available storage capacity. A storage pool's characteristics are defined by a storage profile. You can create multiple storage pools to segregate storage capacity for use in various types of applications (for example, high throughput and online transaction-processing applications).

storage profile

A defined set of storage performance characteristics such as RAID level, segment size, dedicated hot-spare, and virtualization strategy. You can choose a predefined profile suitable for the application that is using the storage, or you can create a custom profile.

storage tray

An enclosure containing disks. A tray with dual RAID controllers is called a controller tray; a tray without controllers is called an expansion tray.

stripe size

The number of blocks in a stripe. A striped array's stripe size is the stripe depth multiplied by the number of member extents. A parity RAID array's stripe size is the stripe depth multiplied by one less than the number of member extents. See also striping.

striping

Short for data striping; also known as RAID Level 0 or RAID 0. A mapping technique in which fixed-size consecutive ranges of virtual disk data addresses are mapped to successive array members in a cyclic pattern. (SNIA).

T

target

The system component that receives a SCSI I/O command. (SNIA).

thin-scripting client

See remote scripting CLI client.

tray

See storage tray.

U

V

virtual disk

A set of disk blocks presented to an operating environment as a range of consecutively numbered logical blocks with disk-like storage and I/O semantics. The virtual disk is the disk array object that most closely resembles a physical disk from the operating environment's viewpoint.

volume

A logically contiguous range of storage blocks allocated from a single pool and presented by a disk array as a logical unit number (LUN). A volume can span the physical devices that constitute the array, or it can be wholly contained within a single physical disk, depending on its virtualization strategy, size, and the internal array configuration. The array controller makes these details transparent to applications running on the attached server system.

volume snapshot

See snapshot.

W

WWN

World Wide Name. A unique 64-bit number assigned by a recognized naming authority such as the Institute of Electrical and Electronics Engineers (IEEE) that identifies a connection (device) or a set of connections to the network. The World Wide Name (WWN) is constructed from the number that identifies the naming authority, the number that identifies the manufacturer, and a unique number for the specific connection.

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