

# Sun Storage 6180 Array

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## Hardware Installation Guide



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# Using This Documentation

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The *Sun Storage 6180 Array Hardware Installation Guide* describes how to install rack-mounting rails and array modules for the Sun Storage 6180 array.

Host management, data host management, and remote Command Line Interface functions are performed by the Sun Storage Common Array Manager software. For installation and initial configuration of the Sun Storage 6180 array, including firmware upgrades, initial array setup, partitioning domains, configuring storage, and configuring IP addressing, see the *Sun Storage Common Array Manager Software Installation Guide*.

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## Before You Read This Book

Before you begin to install the Sun Storage 6180 array, you must have already prepared the site as described in these books:

- *Sun Storage 6180 Safety and Compliance Manual*
- *Sun Storage 6180 Array Site Preparation Guide*

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# Documentation, Support, and Training

These web sites provide additional resources:

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Sun Function	URL
Documentation	<a href="http://docs.sun.com/">http://docs.sun.com/</a>
Support	<a href="http://www.sun.com/support/">http://www.sun.com/support/</a>
Training	<a href="http://www.sun.com/training/">http://www.sun.com/training/</a>

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## Related Documentation

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Application	Title
Site planning information	<i>Sun Storage 6180 Array Site Preparation Guide</i>
Late-breaking information not included in the information set	<i>Sun Storage 6180 Array Release Notes</i>  <i>Sun Storage Common Array Manager Release Notes</i>
Quick reference information for installing the 6180 Array	<i>Getting Started Guide for Sun Storage 6180 Rack-Ready Arrays</i>
Instructions for installing the Common Array Manager host management software	<i>Sun Storage Common Array Manager Software Installation Guide</i>
Quick reference information for the CLI	<i>Sun Storage Common Array Manager CLI Quick Reference</i>
Regulatory and safety information	<i>Sun Storage 6180 Safety and Compliance Manual</i>
Instructions for installing the Sun StorEdge Expansion cabinet	<i>Sun StorEdge Expansion Cabinet Installation and Service Manual</i>
Instructions for installing the Sun Rack 900/1000 cabinets	<i>Sun Rack Installation Guide</i>
Instructions for installing the Sun Modular Rail Kit in the Sun Rack II Cabinet	<i>Sun Modular Storage Rail Kit Installation Guide for Sun Rack II Static Rail Kits</i>

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*Sun Storage 6180 Array Hardware Installation Guide*, part number 821-0135-11.



# Overview

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This chapter provides an overview of the Sun Storage 6180 array. It contains the following sections:

- “Product Overview” on page 1
- “About the Management Software” on page 21
- “Hardware Installation Overview” on page 21

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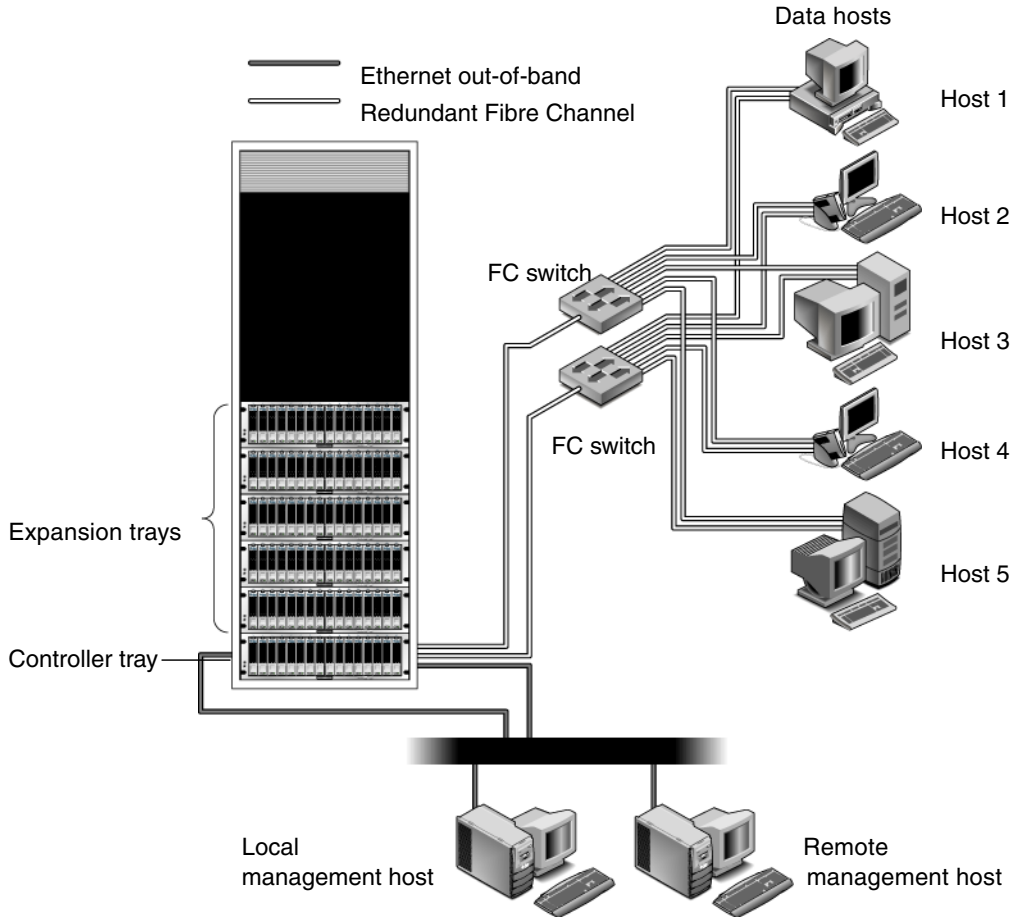
## Product Overview

The Sun Storage 6180 array is a high-performance, enterprise-class, full 8 Gigabit per second (Gb/s) I/O Fibre Channel solution (with backend loop speeds of 2 or 4 Gb/s) that combines outstanding performance with the highest reliability, availability, flexibility, and manageability.

The Sun Storage 6180 array is modular, rackmountable and scalable from a single dual-controller tray (1x1) configuration to a maximum configuration of 1x7 with six additional expansion trays behind one controller tray (see [FIGURE 1-1](#)).

This section contains an overview of the Sun Storage 6180 array hardware and software.

**FIGURE 1-1** Sun Storage 6180 Array Product Overview



## Hardware Overview

The Sun Storage 6180 array is a modular storage device that can scale from one controller tray to an array with a maximum of seven trays, consisting of one controller tray and six expansion trays. Each 4-port controller can support up to 64 disk drives; each 8-port controller or expansion tray can support up to 112 disk drives.

The Sun Storage 6180 array can be installed in the Sun Rack 900/1000, the Sun Rack II, or Sun StorEdge Expansion cabinets.

This section describes the main components of the Sun Storage 6180 array controller and expansion trays.

## Controller Tray Component Configurations

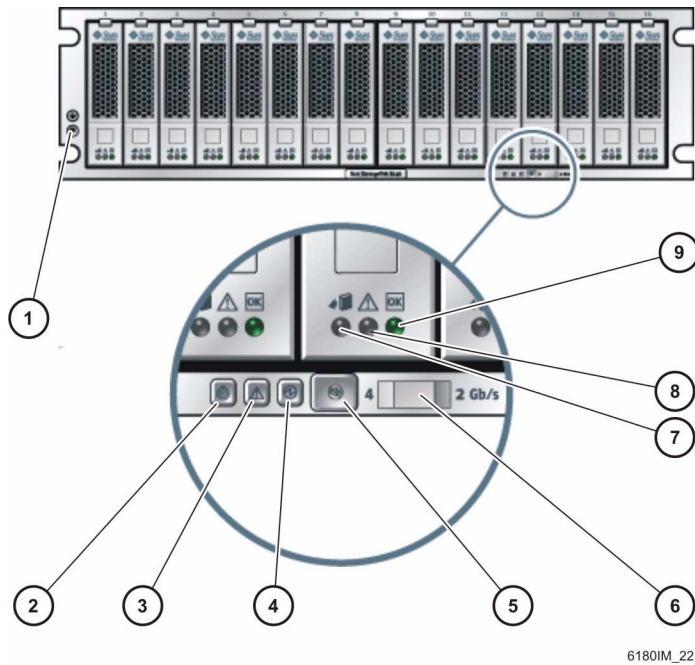
A controller tray contains two redundant array of independent disks (RAID) controllers, which operate independently and provide failover capability for the data and management paths. The controller tray is configured for Fibre Channel (FC) or Serial Advanced Technology Attachment (SATA) II disk drives and provides RAID functionality, caching, and disk storage.

**TABLE 1-1** Sun Storage 6180 Array Controller Tray Configuration

Description	Quantity
FC RAID controllers	2
FC/SATA II disk drives	5 –16, 4-Gb or 2-Gb drives per tray with circuitry to support operation in either 4- or 2-Gbit/second environments
Ethernet ports for management host connections	4 per tray (2 per controller)
8 /4/2 Gbps FC host ports with SFPs	4 per tray (2 per 4-port controller) 8 per tray (4 per 8-port controller)
4/2 Gbps FC expansion ports	4 (2 per controller)
Power supply/fan assemblies	2 per tray
Battery backup compartments	2 per tray

# Controller Tray

FIGURE 1-2 Controller Tray (Front View)



6180IM\_22

## Figure Legend

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1	Grounding strap connector	6	Rate select switch
2	Locate	7	Service action allowed
3	Service action required	8	Service action required
4	OK/Power	9	OK/Power
5	Alarm cancel		

---




# Controller Tray LEDs and Components

**Note** – A tray LED icon may not be visible unless the LED is illuminated.

**TABLE 1-2** Controller Tray LEDs and Components

LED/Component	Description
<i>Drive LEDs</i>	
Service Action Allowed 	Steady blue indicates that service action can be taken on the drive without adverse consequences. Off indicates that the drive is engaged and service cannot be implemented.
Service Action Required 	Steady amber indicates that the drive requires service. Off indicates that the drive does not require service.
OK  OK	Steady green indicates that power is applied to the drive and the drive is functioning normally. Off indicates that power is not applied to the drive. Flash indicates that normal activity is in progress.
<i>Tray LEDs</i>	
Locate  	Steady white identifies the tray after initiation from the management station.
Service Action Required  	Steady amber indicates that the tray requires service. Off indicates that the tray does not require service.
OK/Power  	Steady green indicates that power is applied to the tray and the tray is functioning normally. Off indicates that power is not applied to the tray. Flash indicates that normal activity is in progress.

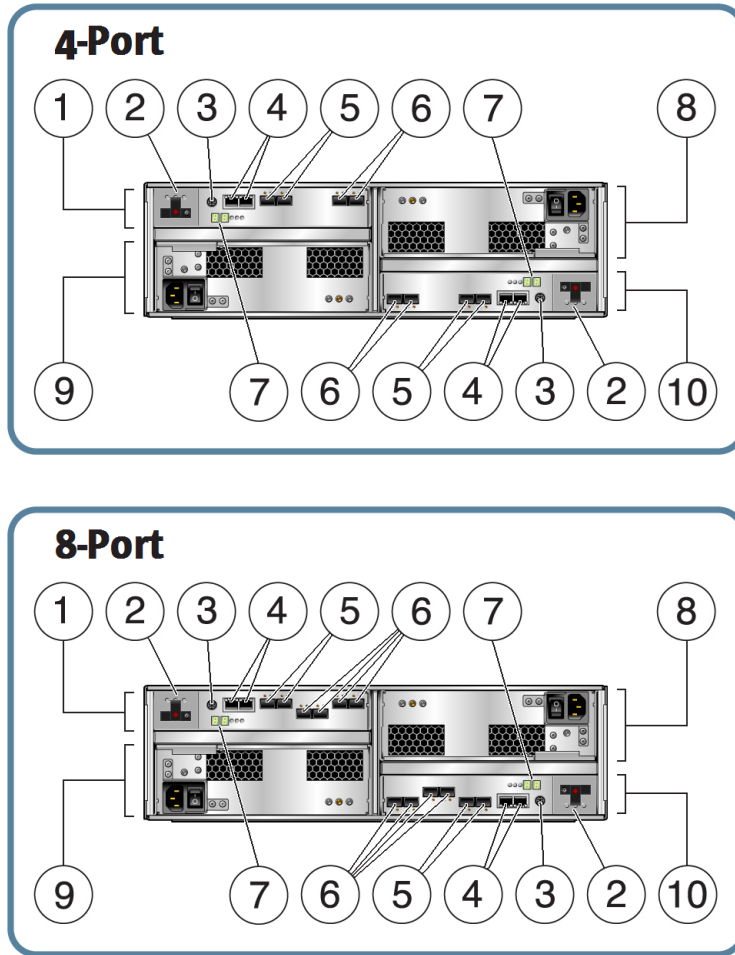
**TABLE 1-2** Controller Tray LEDs and Components

LED/Component	Description
<i>Tray Components</i>	
Alarm Cancel button 	Reserved for canceling audio alarm functionality that is not currently activated. Use the management software to review alarms and events.
Rate Select switch 	When the switch is in the left position, the link rate for the tray is 4 Gbits/second; When the switch is in the right position, the link rate for the tray is 2 Gbits/second. Set all tray switches to match the link rate of the drive with the lowest link rate of any tray in the array. <b>Note</b> - If the data rate switch is changed, a power cycle is required.
Grounding strap connector 	Use this connector to connect a grounding strap to the tray before handling the tray or its components.



# Controller Tray Ports

FIGURE 1-3 4-Port and 8-Port Controller Tray (Rear View)



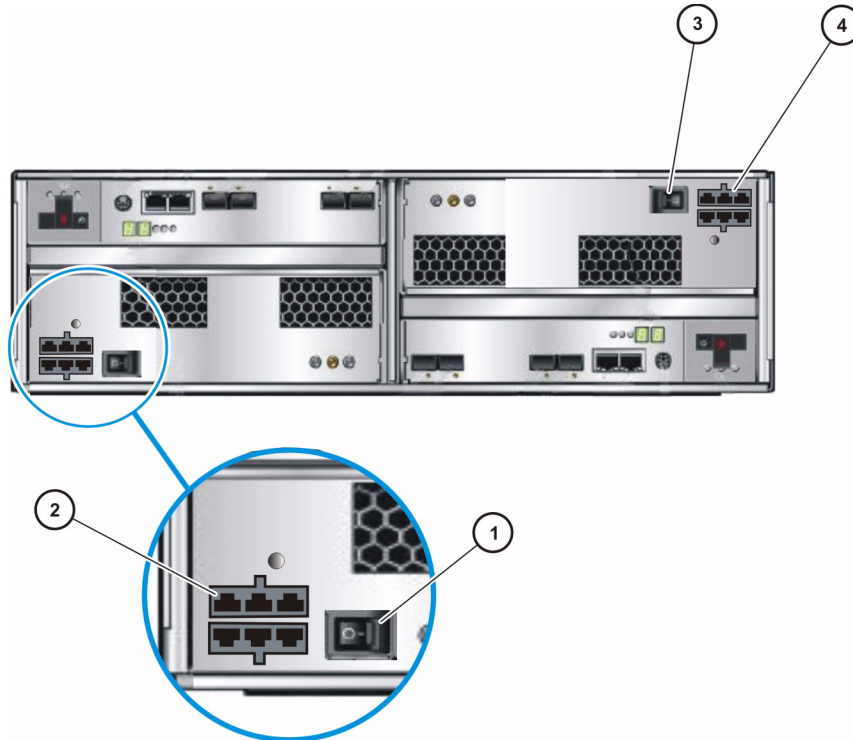
## Figure Legend

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| 1 Controller A                  | 6 Fibre Channel data host ports     |
| 2 Battery backup compartment    | 7 ID/Diagnostic display (7-segment) |
| 3 Serial port (diagnostic use)  | 8 Power supply A                    |
| 4 Ethernet management ports     | 9 Power supply B                    |
| 5 Fibre Channel expansion ports | 10 Controller B                     |

# DC Power Option

FIGURE 1-4 shows the location of the DC power connector and DC power switch at the back of the DC power option controller tray.

FIGURE 1-4 Controller Tray (Rear View) DC Power Option



6180IM 28

## Figure Legend

Power Supply B		Power Supply A	
1	DC power switch	3	DC power switch
2	DC power connectors	4	DC power connectors

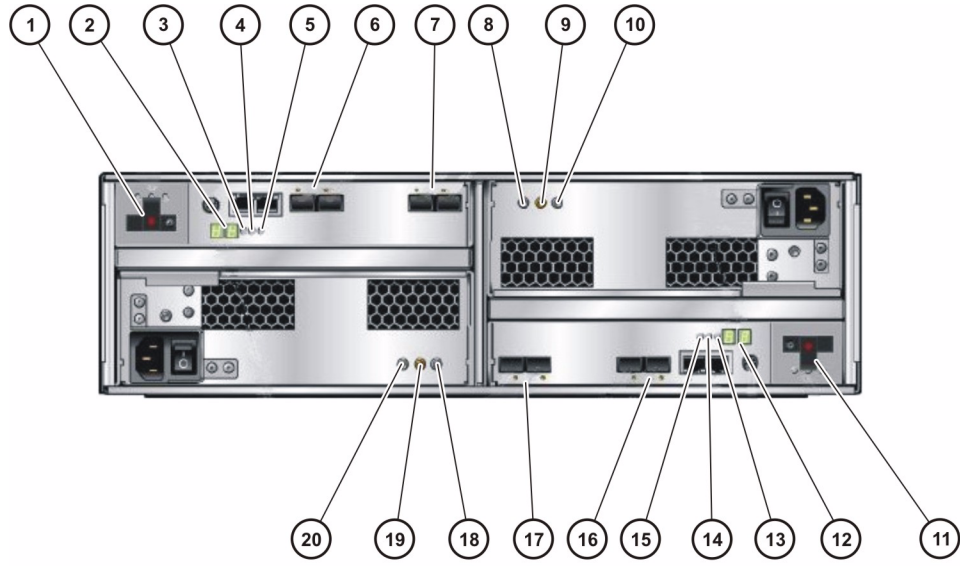
## Controller Tray Ports and Components

**TABLE 1-3** Controller Tray Ports and Components

Ports/Switches	Description
Host ports (Ch 1 - Ch4)	Four 4-, or 2-Gbit/second FC Small Form-factor Plug-in (SFP) ports. Ch4 host port is reserved for remote replication (if remote replication is licensed and activated; otherwise, Ch4 is available for host port use). <b>Note:</b> 1 Gbit/second operation is supported for legacy equipment only.
Ethernet ports (1 and 2)	RJ-45 Ethernet ports. Ethernet port 1 is used for out-of-band management of the RAID controller. An internal Ethernet device provides standard 10 Mbits/second and 100 Mbits/second full-duplex connectivity. Ethernet port 2 has limited functionality and is reserved for future use.
Expansion ports (P1 and P2)	4- or 2-Gbit FC ports used to connect to the drive channel device and expansion trays.
Serial port	Port that allows terminal access for display or configuration of the IP addresses for the array, and for recovery of a lost password for the array.
Power supplies (DC power optional)	For each controller tray, two power supplies with battery backup. The power supplies provide redundant power to both controllers. If one power supply fails, both controllers are powered by the remaining power supply.
Battery backup compartments	For each controller, a battery backup to maintain the integrity of the controller's data cache for up to 72 hours in the event of power loss to both controller tray power supplies. See <a href="#">"Battery Backup Compartments"</a> on page 14 for more information on the battery backup compartments.

# Controller Tray LEDs and Indicators

**FIGURE 1-5** Controller Tray (Rear View) LEDs and Indicators










6180IM\_24

**Figure Legend**


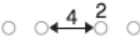

1	Battery backup compartment	11	Battery backup compartment
2	ID/Diag display	12	ID/Diag display
3	Cache active indicator	13	Cache active indicator
4	Service required indicator	14	Service required indicator
5	Service allowed indicator	15	Service allowed indicator
6	FC expansion port rate indicators	16	FC expansion port rate indicators
7	FC host port rate indicators	17	FC host port rate indicators
8	DC power indicator	18	DC power indicator
9	Service required indicator	19	Service required indicator
10	Service allowed indicator	20	Service allowed indicator

TABLE 1-4 describes the LEDs and indicators at the rear of the controller tray.

**TABLE 1-4** Controller Tray LEDs and Indicators

LED/Indicator	Description
<i>Power Supply LEDs</i>	
DC 	On indicates that the correct DC power is being output from the controller power supply.
Service Action Required 	Steady amber indicates that the power supply requires service. Off indicates that the power supply does not require service.
Service Action Allowed 	Steady blue indicates that service action can be taken on the power supply without adverse consequences. Off indicates that the power supply is engaged and service action should not be implemented.
AC 	On indicates that AC power is being supplied to the controller power supply.
<i>Controller LEDs</i>	
ID/Diag display	Seven-segment readouts indicate the ID of the tray and fault diagnostic status codes. See <a href="#">“LED Status Codes” on page 20</a> for definitions of the codes.
Cache Active 	Steady green indicates that data is in the cache. Off indicates that all data has been written to disk and the cache is empty.
Service Action Required 	Steady amber indicates that the controller requires service. Off indicates that the controller does not require service.
Service Action Allowed 	Steady blue indicates that service action can be taken on the controller without adverse consequences. Off indicates that the controller is engaged and service action should not be implemented.

**TABLE 1-4** Controller Tray LEDs and Indicators (Continued)

LED/Indicator	Description
<i>Controller Indicators</i>	
Host Port Rate 	The LEDs display the host port link rate: <ul style="list-style-type: none"> <li>• LED 2 On = 2 Gbits/second</li> <li>• LED 4 On = 4 Gbits/second</li> <li>• LED 2 and 4 On = 8 Gbits/second</li> </ul>
Expansion Port Rate 	The combined display indicates the expansion port link rate for the tray: <ul style="list-style-type: none"> <li>• LED 4 On, LED 2 On – 4 Gbits/second</li> <li>• LED 4 Off, LED 2 On – 2 Gbits/second</li> </ul>
Expansion Port Bypass 	Steady amber indicates that no valid device is detected and that the drive port is bypassed. Off indicates that there is no small form factor plug-in (SFP) transceiver installed or that the port is enabled.
Ethernet Link Activity (on upper left-side of Ethernet connector)	Steady green indicates that there is an active connection. Off indicates that there is not an active connection.
Ethernet Link Speed (on upper right-side of Ethernet connector)	Steady green indicates that there is a 100BaseTX connection to the port. Off (when Ethernet Status LED is on) indicates that there is a 10BaseT connection to the Ethernet port.

# Disk Drives and Tray Capacity

TABLE 1-5 lists the size, spindle speed, type, interface speed, and tray capacity for supported Fibre Channel (FC) and Serial Advanced Technology Attachment (SATA) disk drives for the Sun Storage 6180 array. Additional legacy drives might also be supported with this product.

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**Note** – All disk drives supported in the Sun Storage 6140 array are supported in the Sun Storage 6180 array.

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**TABLE 1-5** Supported Disk Drives

Drive	Description
FC, 73G15K	73-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 1168 Gbytes per tray
FC, 146G10K	146-Gbyte 10,000-RPM FC drives (4 Gbits/sec); 2336 Gbytes per tray
FC, 146G15K	146-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 2336 Gbytes per tray
FC, 300G10K	300-Gbyte 10,000-RPM FC drives (4 Gbits/sec); 4800 Gbytes per tray
FC, 300G15K	300-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 4800 Gbytes per tray
FC, 400G10K	400-Gbyte 10,000-RPM FC drives (4 Gbits/sec); 6400 Gbytes per tray
FC, 450G15K	450-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 7200 Gbytes per tray
SATA-2, 500G7.2K	500-Gbyte 7,200-RPM SATA drives (3 Gbits/sec); 8000 Gbytes per tray
FC, 600GB15K, Encryption Capable	600-Gbyte 15,000-RPM FC drives Encryption Capable (4 Gbits/sec); 9600 Gbytes per tray
SATA-2, 750G7.2K	750-Gbyte 7,200-RPM SATA drives (3 Gbits/sec); 12000 Gbytes per tray
SATA-2, 1T7.2K	1-Tbyte 7,200-RPM SATA drives (3 Gbits/sec); 16000 Gbytes per tray
SATA-2, 2TB7.2K	2-Tbyte 7,200-RPM SATA drives (3 Gbits/sec); 32000 Gbytes per tray

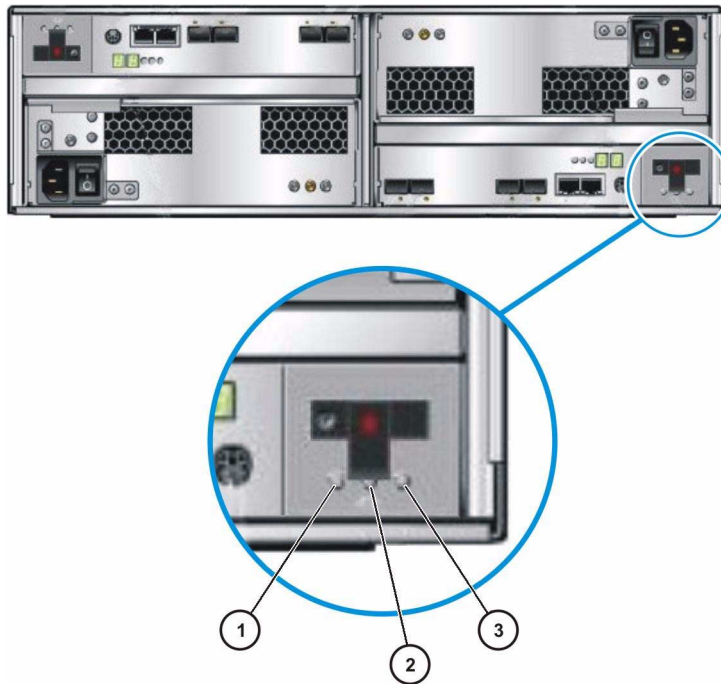
# Tray Capacity

- For controller trays with four host ports, up to three expansion trays can be added.
- For controller trays with eight host ports, up to six expansion trays can be added.
- The array configuration supports unlimited global hot spare drives, and each spare can be used for any disk in the array configuration.

# Battery Backup Compartments

The controller tray has a battery backup compartment for each controller in which a battery is housed for power backup.

**FIGURE 1-6** Battery Backup LEDs



6180IM\_23




### Figure Legend

- |                               |                  |
|-------------------------------|------------------|
| 1 Service action allowed LED  | 3 Battery status |
| 2 Service action required LED |                  |



TABLE 1-6 describes the LEDs on the rear of each battery backup compartment.

TABLE 1-6 Battery Backup Compartment LEDs

LED/Indicator	Description
Service action allowed 	Service action allowed: the battery may be removed when this LED is on. When the LED is off, the battery is engaged and should not be removed or disconnected. Data availability may be interrupted if the Service action required LED is on and the Service action allowed LED is off. Refer to your storage management software to determine what must be done.
Service action required 	Service action required: the battery requires replacement when this LED is on. When the LED is off, the battery does not require replacement.
Battery status 	Steady green indicates that the battery is fully charged. A slow blink indicates that the battery is charging. Off indicates that the battery is discharged or off.

## Expansion Tray

The CSM200 expansion tray provides from 5 to 16 additional FC or Serial Advanced Technology Attachment (SATA) II drives. An expansion tray is cabled directly to a controller tray and cannot operate independently.

**Note** – The CSM200 is the only expansion tray model supported by the Sun Storage 6180 array. Refer to “Installing Firmware for Additional Expansion Modules” in the Common Array Manager Release Notes, v.6.6.0 or higher, for more information on the procedure to upgrade trays without data.

TABLE 1-7 describes the expansion tray configuration. Check the latest *Sun Storage 6180 Array Release Notes* to verify the currently supported configuration.

**TABLE 1-7** Sun Storage 6180 Array Expansion Tray

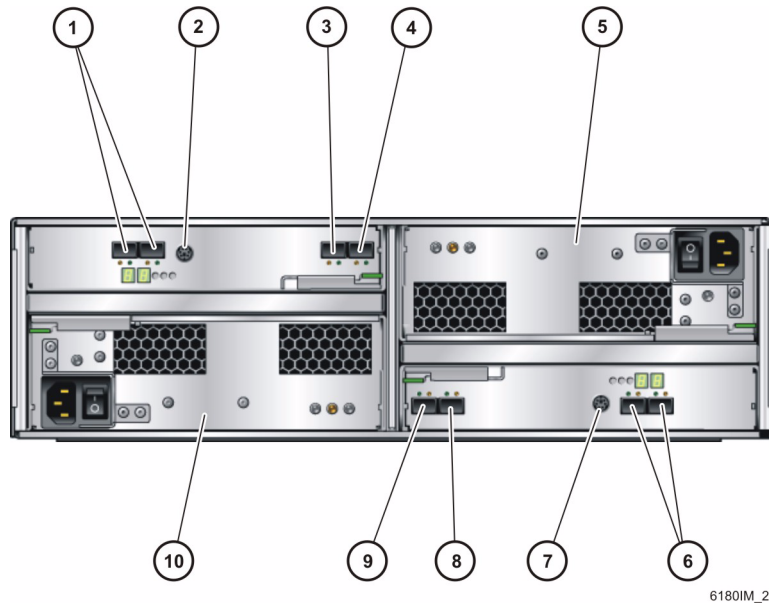
Description	Quantity
FC or SATA II disk drives	FC hard disk drives: Five to sixteen 4-Gbit/second drives 73G15K, 146G10K, 146G15K, 300G10K, 400G10K, 450G10K, 600GB15K Encryption Capable  SATA II hard disk drives: 500G7.2K, 750G7.2K, 1T7.2K, 2TB7.2K  Five to sixteen 3-Gbit/second drives with circuitry to support operation in either 4- or 2-Gbit/second environments.
Drive expansion ports	2 pairs per controller. One pair is for current use; an additional port pair (per controller) is reserved for future use. Ports 2A and 2B are disabled in firmware.
Power supply/fan assemblies	2
<b>Note</b> - Refer to the <i>Release Notes</i> for the most current drive types.	



**Caution** – To add expansion trays with existing stored data to the 6180 controller tray, contact your service representative for assistance to avoid data loss.

FIGURE 1-7 illustrates the ports and components at the rear of the expansion tray.

**FIGURE 1-7** Expansion Tray (Rear View) Ports and Components



6180IM\_20

**Figure Legend**

1	Reserved expansion ports (2A & 2B)	6	Reserved expansion ports (2A & 2B)
2	Serial port	7	Serial port
3	Expansion port 1B (Out)	8	Expansion port 1B (Out)
4	Expansion port 1A (In)	9	Expansion port 1A (In)
5	Power supply A	10	Power supply B

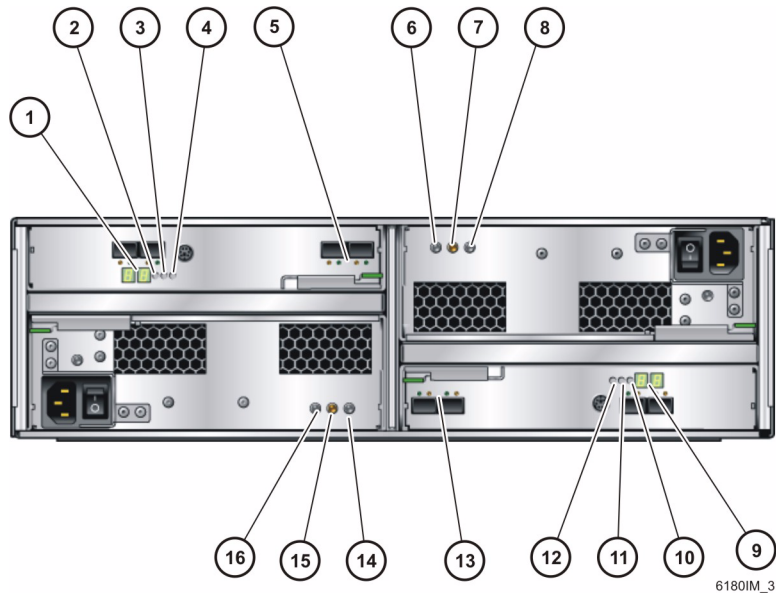
[TABLE 1-8](#) describes the ports and components at the rear of the expansion tray.

**TABLE 1-8** Expansion Tray Ports and Components

Ports/Switches/LEDs	Description
Expansion ports 1A (In), 1B (Out)	Two 4- or 2-Gbit FC ports used to connect to an array controller and/or additional expansion trays.
Serial port	Not used in the expansion trays.
Power supplies	For each expansion tray, two power supplies that provide redundant power to the tray. If one power supply fails, the tray is powered by the remaining power supply.
Reserved expansion ports 2A and 2B	Reserved for future use.

FIGURE 1-8 illustrates the LEDs at the rear of the expansion tray.

FIGURE 1-8 Expansion Tray (Rear View) LEDs and Indicators










**Figure Legend**



1 ID/Diag display	9 ID/Diag display
2 Locate	10 Locate
3 Service action required	11 Service action required
4 Service action allowed	12 Service action allowed
5 Expansion port link rate indicators	13 Expansion port link rate indicators
6 DC	14 DC
7 Service action required	15 Service action required
8 Service action allowed	16 Service action allowed

TABLE 1-9 describes the LEDs and indicates at the rear of the expansion tray.

**TABLE 1-9** Expansion Tray LEDs and Indicators

LED/Indicator	Description
<i>Power Supply LEDs</i>	
DC 	On indicates that the correct DC power is being output from the controller power supply.
Service Action Required 	Steady amber indicates that the power supply requires service. Off indicates that the power supply does not require service.
Service Action Allowed 	Steady blue indicates that service action can be taken on the power supply without adverse consequences. Off indicates that the power supply is engaged and service action should not be implemented.
AC 	On indicates that AC power is being supplied to the controller power supply.
<i>Expansion Tray LEDs</i>	
ID/Diag display	Seven-segment readouts indicate the ID of the tray and fault diagnostic status codes. See <a href="#">“LED Status Codes” on page 20</a> for definitions of the codes.
Locate 	Steady white identifies the controller after initiation from the management station.
Service Action Required 	Steady amber indicates that the controller requires service. Off indicates that the controller does not require service.
Service Action Allowed 	Steady blue indicates that service action can be taken on the controller without adverse consequences. Off indicates that the controller is engaged and service action should not be implemented.

**TABLE 1-9** Expansion Tray LEDs and Indicators (Continued)

LED/Indicator	Description
<i>Expansion Tray Indicators</i>	
Expansion Port Rate 	The combined display indicates the expansion port link rate for the tray: <ul style="list-style-type: none"> <li>• LED 4 On, LED 2 Off – 4 Gbits/second</li> <li>• LED 4 Off, LED 2 On – 2 Gbits/second</li> </ul>
Expansion Port Bypass 	Steady amber indicates that no valid device is detected and that the drive port is bypassed. Off indicates that there is no SFP installed or that the port is enabled.

## LED Status Codes

[TABLE 1-10](#) lists the status code meanings that might display on the numerical LEDs on the controller or expansion trays.

**TABLE 1-10** Tray LED Status Codes

Code	Description
FF	Expansion Tray Boot Diagnostic executing
05	Operating system is loading (flashes alternately with 5d during bootup)
5d	Start of day (flashes alternately with 05 during bootup)
88	This Expansion Tray is being held in Reset by the other Expansion Tray
AA	Expansion Tray A application is booting up
bb	Expansion Tray B application is booting up
L0	Mismatched Expansion Tray types
L2	Persistent memory errors
L3	Persistent hardware errors
L9	Over Temperature
H1	SFP Speed Mismatch (2 Gb/s SFP installed when operating at 4 Gb/s)
H2	Invalid/Incomplete Configuration
H3	Maximum Reboot Attempts Exceeded
H4	Cannot Communicate with Other Expansion Tray
H5	Midplane Harness Failure

**TABLE 1-10** Tray LED Status Codes *(Continued)*

Code	Description
H6	Firmware Failure
H7	Current Enclosure Fibre Channel Rate Different than Rate Switch
H8	SFP(s) Present in Currently Unsupported Slot (2A or 2B)

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## About the Management Software

The Sun Storage 6180 array is managed by the Sun Storage Common Array Manager software. The Common Array Manager (CAM) 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 CLI client that provides the same control and monitoring capability as the web browser, and is scriptable for running frequently performed tasks. The CAM version required is CAM 6.5.x (or higher).

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

---

## Hardware Installation Overview

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

- Read the *Sun Storage 6180 Array Release Notes* for any late-breaking information related to the installation of the array.
- Prepare the site as described in these books:
  - *Sun Storage 6180 Safety and Compliance Manual*
  - *Sun Storage 6180 Array Site Preparation Guide*

The following checklist (TABLE 1-11) outlines all of the tasks required for installing the Sun Storage 6180 array hardware and where you can find detailed procedures. To ensure a successful installation, perform the tasks in the order in which they are presented.

**TABLE 1-11** Sun Storage 6180 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.	<ul style="list-style-type: none"> <li>• <i>Sun StorEdge Expansion Cabinet Installation and Service Manual</i></li> <li>• <i>Sun Rack Installation Guide</i></li> <li>• <i>Sun Rack II Installation Guide</i></li> </ul>
3	Unpack the rackmounting kit and check its contents.	<a href="#">“Preparing the Universal Rail Kit” on page 24</a>
4	Unpack the tray box and check its contents.	<a href="#">“Preparing the Tray” on page 27</a>
5	Prepare the cabinet for installation.	<a href="#">“Preparing the Cabinet” on page 27</a>
6	Attach the rails to the cabinet	<a href="#">“Attaching the Rails to a Cabinet” on page 28</a>
7	Mount the controller tray and expansion trays in the cabinet.	<a href="#">“Installing a Tray in a Cabinet” on page 52</a>
8	Attach the power cables.	<a href="#">“Connecting the Power Cables” on page 58</a>
9	Cable the controller tray and expansion trays.	<a href="#">“Intertray Cabling” on page 59</a>
10	Set the link rate for all trays.	<a href="#">“Verifying the Link Rate for All Trays” on page 80</a>
11	Connect the management host.	<a href="#">“Connecting the Management Host” on page 69</a>
12	Attach the host interface cables.	<a href="#">“Connecting Data Hosts” on page 72</a>
13	Turn on the power.	<a href="#">“Powering On the Array” on page 82</a>



## Installing Trays

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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 seven trays—one controller tray and up to six expansion trays—for each array.

This chapter describes the process of installing the Sun Storage 6180 array. It contains the following sections:

- [“Preparing for the Installation” on page 24](#)
- [“Attaching the Rails to a Cabinet” on page 28](#)
- [“Preparing the Two-Post Telco Rack” on page 42](#)
- [“Installing a Tray in a Cabinet” on page 52](#)
- [“Connecting the Power Cables” on page 58](#)
- [“Intertray Cabling” on page 59](#)
- [“Next Steps” on page 68](#)

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.

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**Caution** – On both the controller and expansion trays, the rear of the chassis has very sharp edges.

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## Preparing for the Installation

Use the following procedures to prepare for installation:

- For Sun Rack II Modular Storage Rail Kit installation, refer to the *Sun Modular Storage Rail Kit Installation Guide for Sun Rack II Static Rail Kits*.
- [“Preparing the Universal Rail Kit” on page 24](#)
- [“Preparing the Tray” on page 27](#)
- [“Preparing the Cabinet” on page 27](#)

## Preparing the Universal Rail Kit

Use the universal rail kit to mount the Sun Storage 6180 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 StorEdge Expansion cabinet
- The Sun Fire cabinet

## Unpacking the Universal Rail Kit

Unpack the universal rail kit and check the contents.

The universal rail kit (part number 594-2489-02) contains the following items:

- Left rail (part number 341-2069-01) and extender rail (part number 341-2071-01)
- Right main rail (part number 341-2070-01) and extender rail (part number 341-2072-01)

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**Note** – Typically, the main and extender pieces of both the left and right rails are shipped pre-assembled.

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- 12 10-32 panhead screws
- Eight M6x12mm panhead screws
- Four 8-32 panhead screws
- 2 6-32 flathead screws
- 2 cabinet rail adapter plates (used for unthreaded cabinet rails only)

## Required Hardware by Cabinet/Rack Type

The mounting hardware required for each rack or cabinet type is listed in the following table:

\*For cabinet installations with M5 or 12-24 threaded cabinet rails, the following screws are not supplied. You must acquire these to match the threading requirements of your cabinet rails:

- Four screws to secure the left and right rails to the back cabinet rail
- Four screws to secure the front of the tray to the left and right front cabinet rails

\*\*For cabinet installations with unthreaded cabinet rails, the following hardware is not supplied. You must acquire these to match the requirements of your cabinet rails:

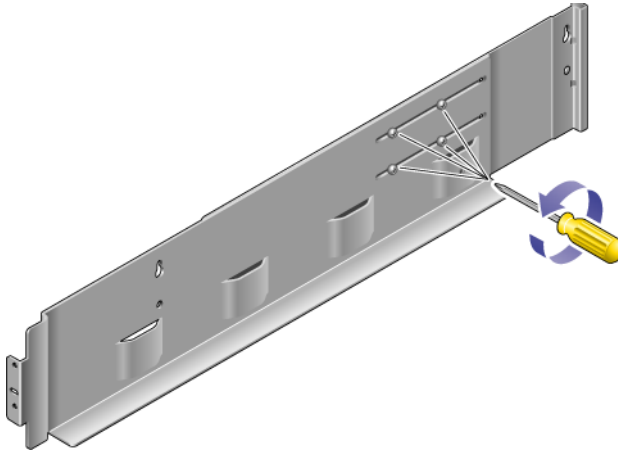
- Four cage nuts to snap over the rail mounting holes in the left and right front cabinet rails
- Four screws that match the cage nuts to secure the left and right rails to the left and right front cabinet rails
- Two cage nuts to snap over the rail mounting holes in the left and right back cabinet rails
- Two screws that match the cage nuts to secure the left and right rails to the back cabinet rail

## Loosening the Rail Adjustment Screws

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

Using the #2 Phillips screwdriver, loosen the four 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



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**Note** – The rails are pre-configured to adjust to cabinet rail depths of between 664.97 mm (26.18 inches) and 734.82 mm (28.93 inches). For cabinet rail depths outside of this range, remove and reposition the four rail adjustment screws (FIGURE 2-1) to support your required rail length.

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# Preparing the Tray



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**Caution** – Two people are needed to lift and move the tray. Use care to avoid injury. A tray can weigh up to 43 kg (95 pounds). Do *not* lift the front of the tray; this can cause damage to the drives.

---

## 1. Unpack the tray.

## 2. Check the contents of the box for the following items:

- Sun Storage 6180 array trays (controller or expansion)
- Ship kit for the controller tray
  - Two 5-meter optical Fibre Channel (FC) cables for connecting the redundant array of independent disks (RAID) controllers to your storage area network (SAN) or host
  - Two 6-meter RJ45 -RJ45 Ethernet cables
  - One RJ45-miniDIN cables
  - One RJ45-DB9 adapter
  - RJ45-DB9 null modem adapter
  - Sun Storage Common Array Manager Software DVD (optional)
  - *Sun Storage 6180 Getting Started Guide*
- Ship kit for each expansion tray
  - Two 2-meter optical FC cables and SFPs

AC power cords are shipped separately for 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 top 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 3RU tray slot in the cabinet. Next, install the expansion trays for the first controller tray. If space 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 cabinet in 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 28
- [“Attaching the Universal Rail Kit to a Sun StorEdge Expansion or Sun Fire Cabinet”](#) on page 33
- [“Attaching the Universal Rail Kit to a Standard 19-Inch Cabinet with Unthreaded Cabinet Rails”](#) on page 37
- For Sun Rack II Cabinets, refer to the *Sun Modular Storage Rail Kit Installation Guide*, part 820-5774. Follow the directions for the 1U static rail kits.

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

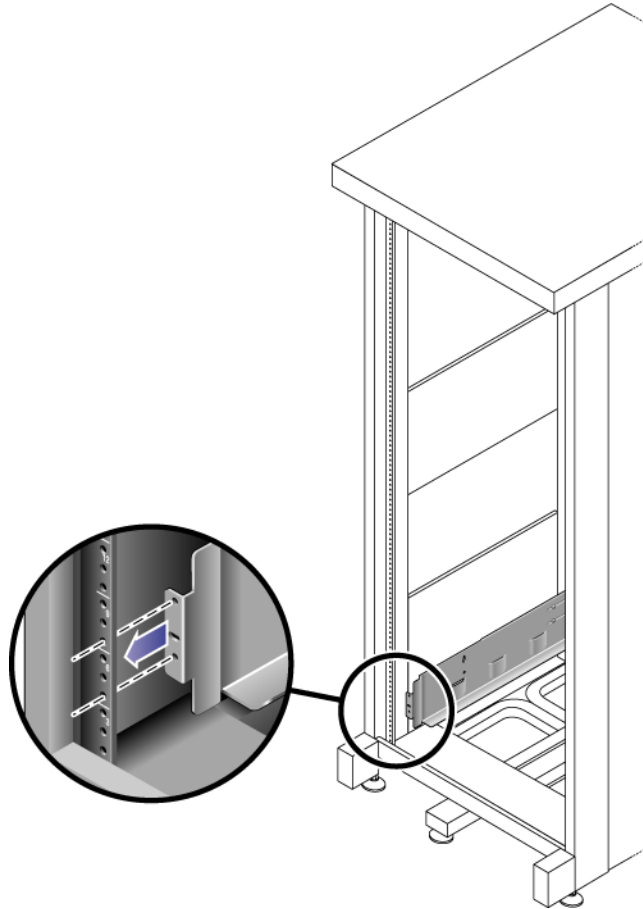
This procedure describes the steps to attach the universal rail kit to:

- All standard Sun cabinets, including the Sun Rack 900/1000 cabinets
- All 19-inch wide, 4-post EIA-compatible racks and cabinets with M5 or 12-24 threaded cabinet rails

To attach the universal rail kit to a cabinet with M5 or 12-24 threaded cabinet rails

- 1. Position the front of the left rail behind the left front cabinet rail** ([FIGURE 2-2](#)).

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

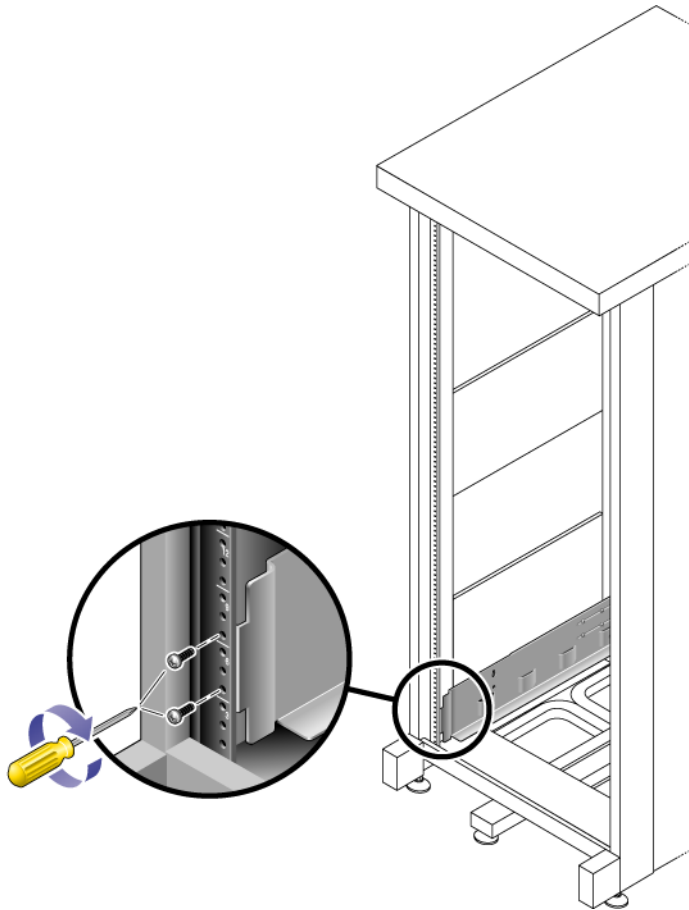


2. Use the #2 Phillips screwdriver to insert and tighten two 8-32 screws to secure the left rail to the front of the cabinet (FIGURE 2-3).

Each array requires three standard mounting units (3RU) of vertical space in the cabinet. Each standard mounting unit (U) has three mounting holes in the left and right cabinet rails. Insert the screws into the lowest holes in the top two mounting units of the 3RU slot in which the tray is to be mounted.

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

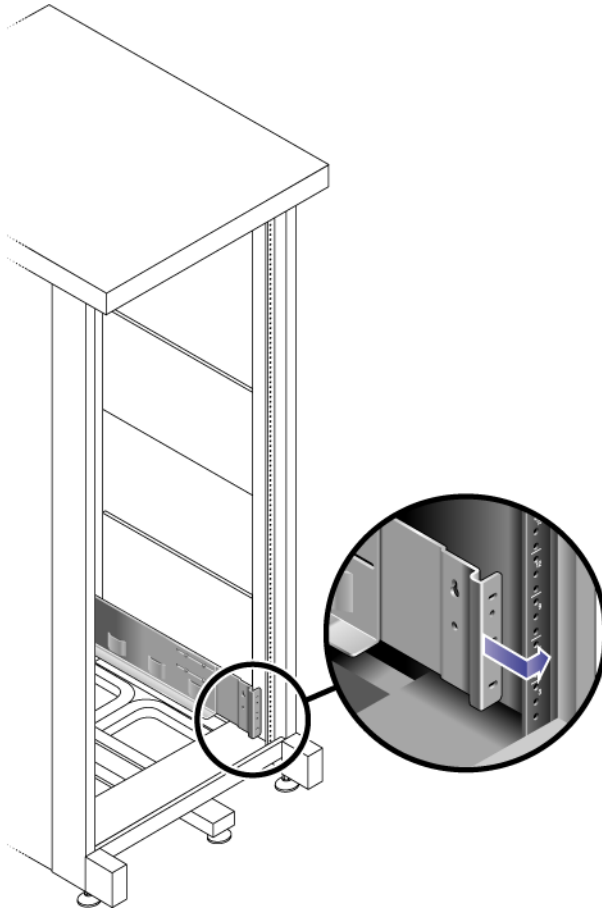
**FIGURE 2-3** Securing the Left Rail to the Front of the Cabinet



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 over the face of the cabinet rail ([FIGURE 2-4](#)).

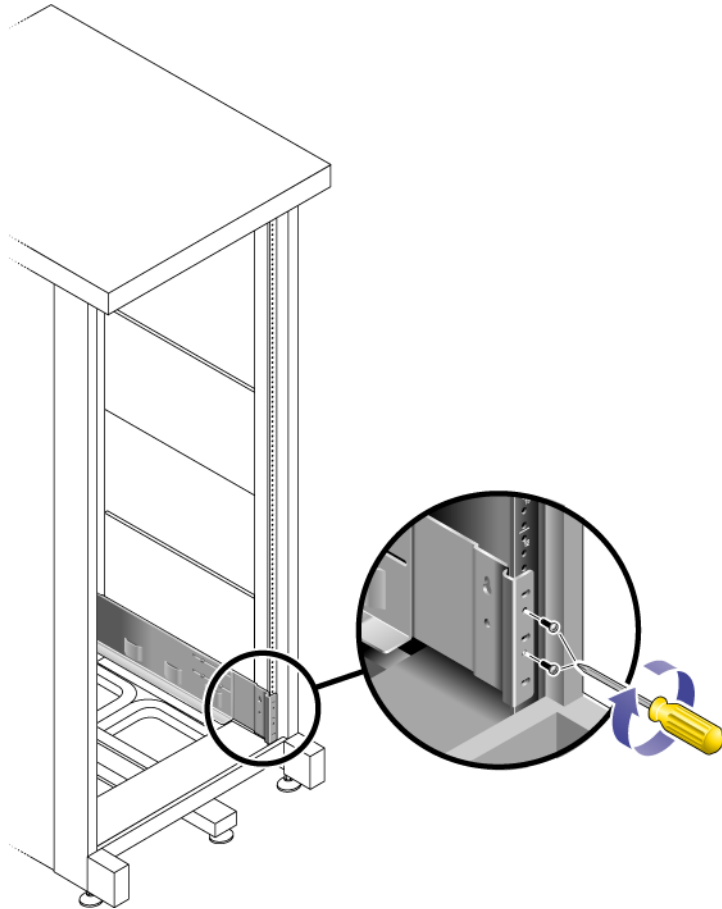


**FIGURE 2-4** Adjusting the Length of the Left Rail at the Back of the Cabinet



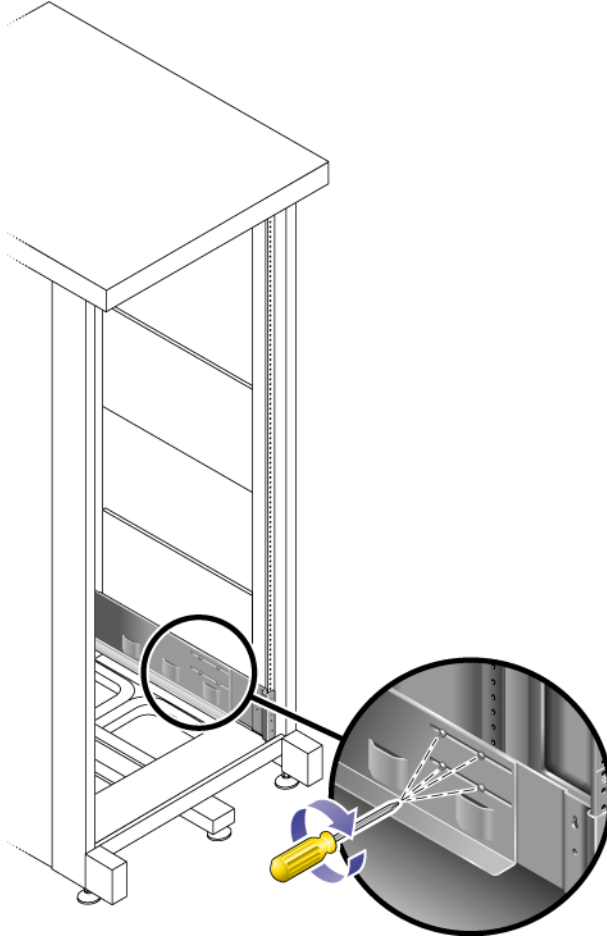
5. Align the rail flange so that the mounting holes correspond to those at the front of the cabinet.
6. Depending on the type of cabinet you have, do one of the following (FIGURE 2-5):
  - For a Sun Rack 900/1000 cabinet, use the #3 Phillips screwdriver to insert and tighten four metric M6 screws (two per side) at the back of the rail.
  - For cabinets with 10-32 cabinet threads, use the #2 Phillips screwdriver to insert and tighten four 10-32 screws (two per side) at the back of the rail.
  - For other cabinets, use self-supplied screws to secure the right rail to the cabinet rail.

**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.
8. Using the #2 Phillips screwdriver, tighten the eight adjustment screws (four on each side) toward the back of each rail ([FIGURE 2-6](#)).

**FIGURE 2-6** Tightening the Rail Adjustment Screws



## Attaching the Universal Rail Kit to a Sun StorEdge Expansion or Sun Fire Cabinet

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

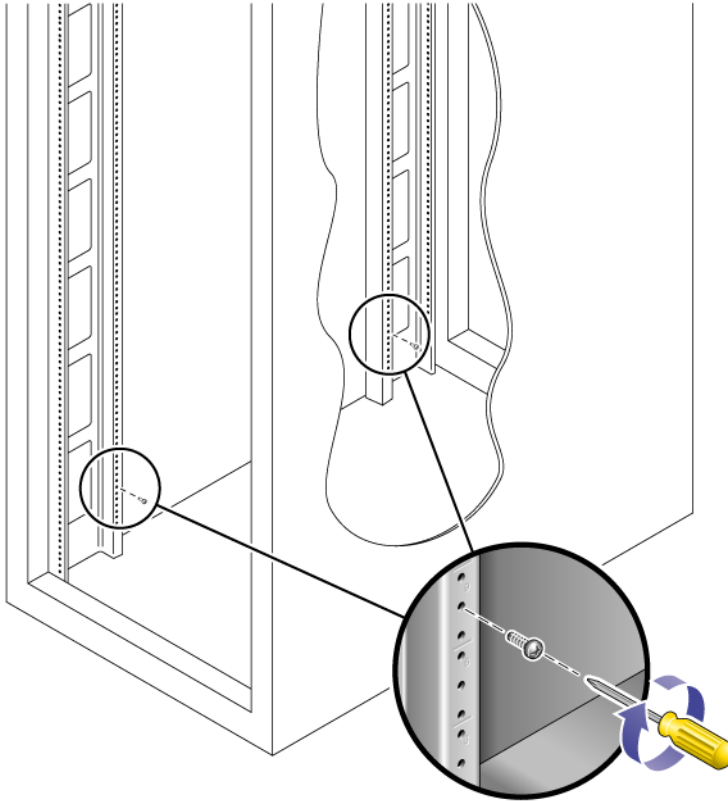
- Sun StorEdge Expansion cabinets
- Sun Fire cabinets

To attach the universal rail kit to a Sun StorEdge Expansion or Sun Fire cabinet, follow these steps first for the left rail and then for the right rail:

1. In each of the four inner mounting rails, insert a 10-32 screw in the center hole of the mounting unit of the 3RU slot in which the tray is to be mounted (FIGURE 2-7).

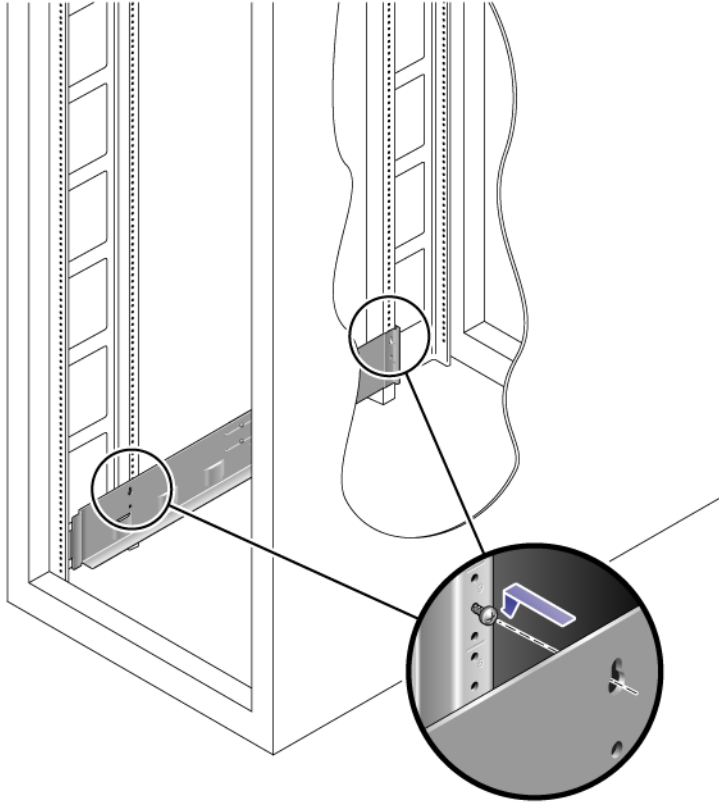
Do *not* tighten at this time. You will hang the side rails on these screws.

**FIGURE 2-7** Inserting Rail Mounting Screws in Middle Holes of the Upper Mounting Unit of the Mounting Slot



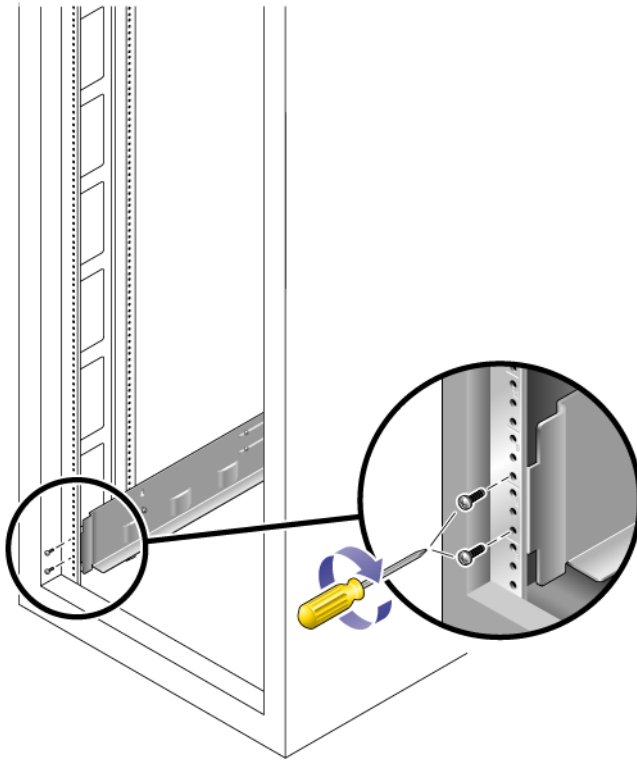
2. Hang the rail by aligning the large slots of the rail over the front and back screws and then pulling the rail down so that each screw is at the top of the slot (FIGURE 2-8).

**FIGURE 2-8** Hanging the Rail



3. Adjust the length of the rail to fit the cabinet.
4. Using the #2 Phillips screwdriver, insert two 10-32 screws in the lower side mounting holes for the rail (FIGURE 2-9).  
The hole corresponds to the center hole of the middle mounting unit of the 3RU slot in which the rail is installed.

**FIGURE 2-9** Inserting Screws in the Lower Side Mounting Holes of the Cabinet

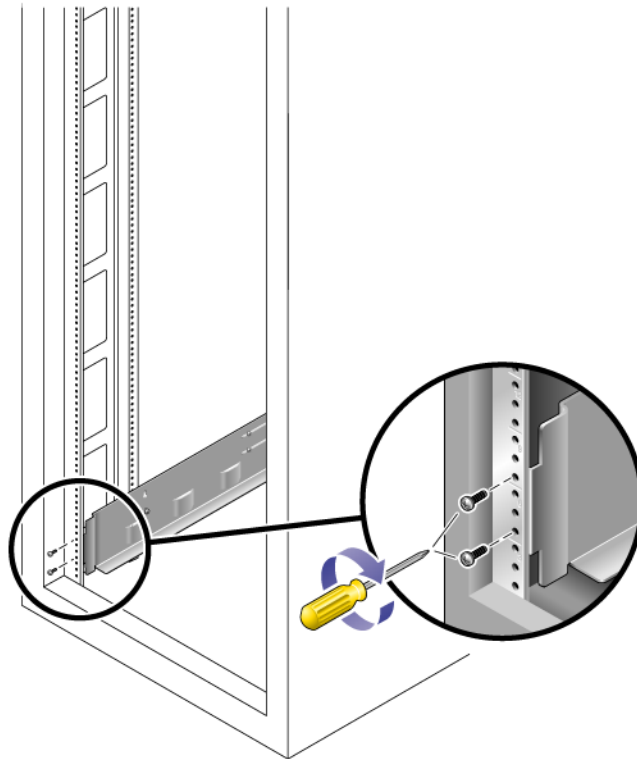


5. Use the #2 Phillips screwdriver to insert and tighten two 8-32 screws to secure the rail to the front of the cabinet (FIGURE 2-10).

These screws pass through the cabinet rail holes and screw into threaded holes in the front of the rails.

Insert the screws into the lowest holes in the top two mounting units of the 3RU slot in which the tray is to be mounted.

**FIGURE 2-10** Securing the Rail to the Front of the Cabinet



**6. Tighten all screws on the rail.**

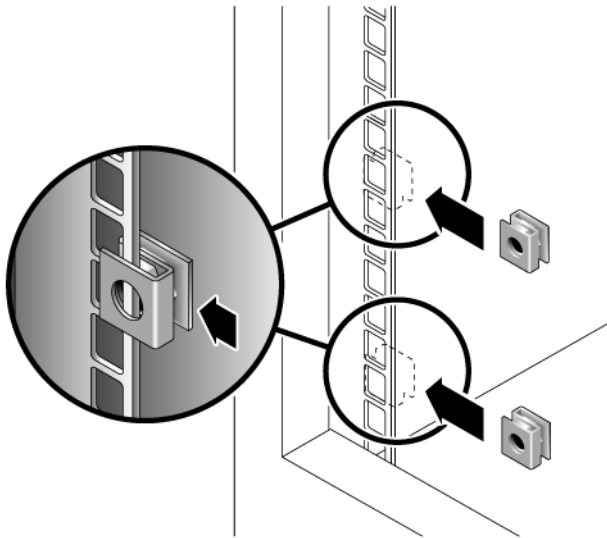
## Attaching the Universal Rail Kit to a Standard 19-Inch Cabinet with Unthreaded Cabinet Rails

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.

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:

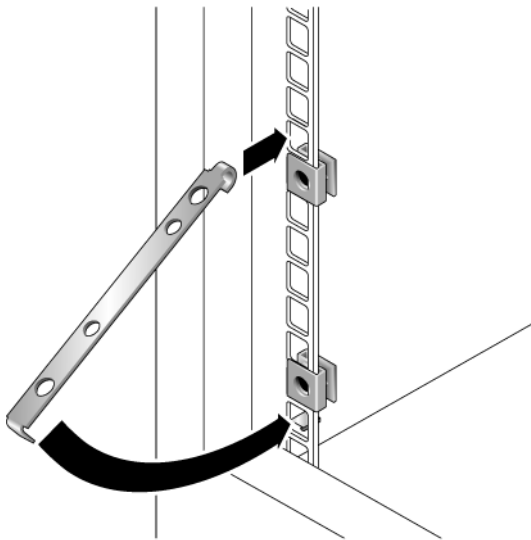
- 1. Snap two cage nuts over the middle holes in the upper and lower mounting units of the 3RU cabinet slot in which you will mount the tray (FIGURE 2-11).**

**FIGURE 2-11** Inserting Cage Nuts Over Rail Mounting Holes in Cabinet Rails



2. Hook a cabinet rail adapter plate over the front of the cabinet rail. ([FIGURE 2-12](#)).
3. Position the adapter plate over the 3RU slot in which the tray is to be mounted,

**FIGURE 2-12** Inserting the Cabinet Rail Adapter Plate on the Cabinet Rail

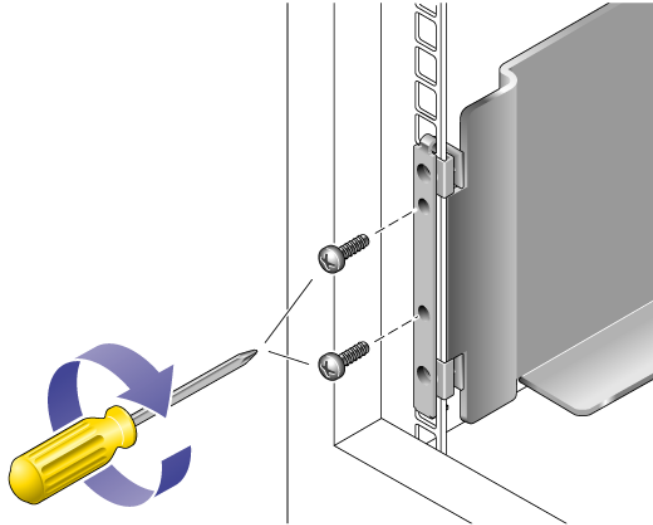




4. Use the #2 Phillips screwdriver to insert and tighten two 8-32 screws to secure the rail to the front of the cabinet (FIGURE 2-13).

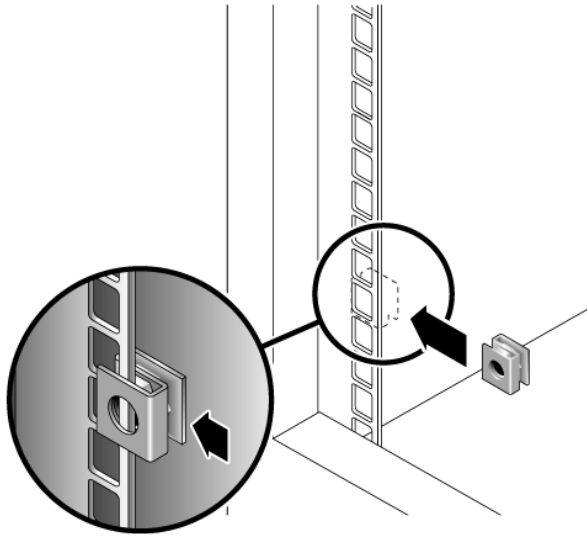
These screws pass through the unthreaded inner holes of the cabinet rail adapter plate and screw into the threaded holes in the front of the mounting rail.

**FIGURE 2-13** Securing the Rail to the Front of the Cabinet



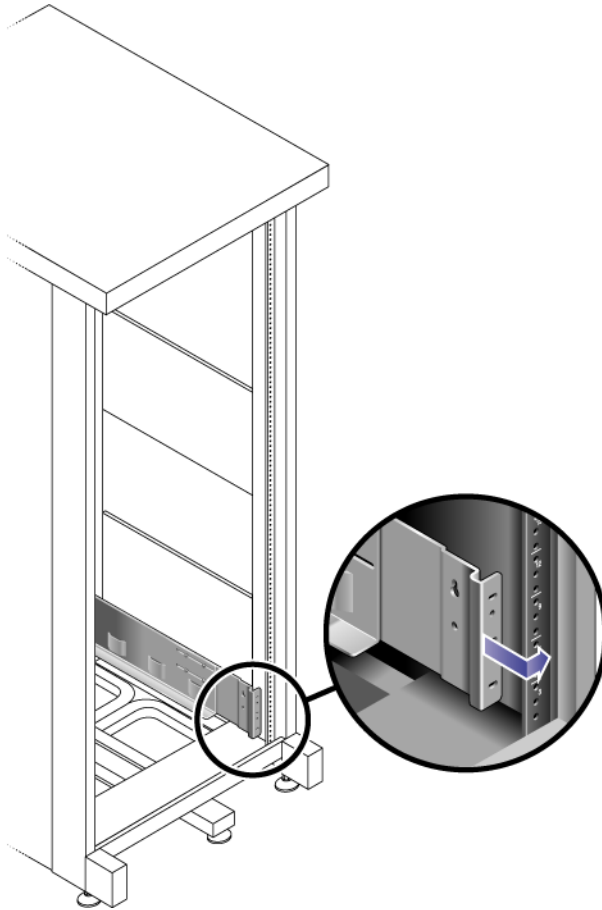
5. On the corresponding cabinet rail at the back of the cabinet, snap one cage nut over the lowest hole in the middle mounting unit of the 3RU cabinet slot in which you will mount the tray (FIGURE 2-14).

**FIGURE 2-14** Inserting A Cage Nut on the Cabinet Rail at the Rear of the Cabinet



6. At the back of the cabinet, adjust the length of the rail as needed to fit the cabinet, and position the rail flange over the face of the cabinet rail (FIGURE 2-15).

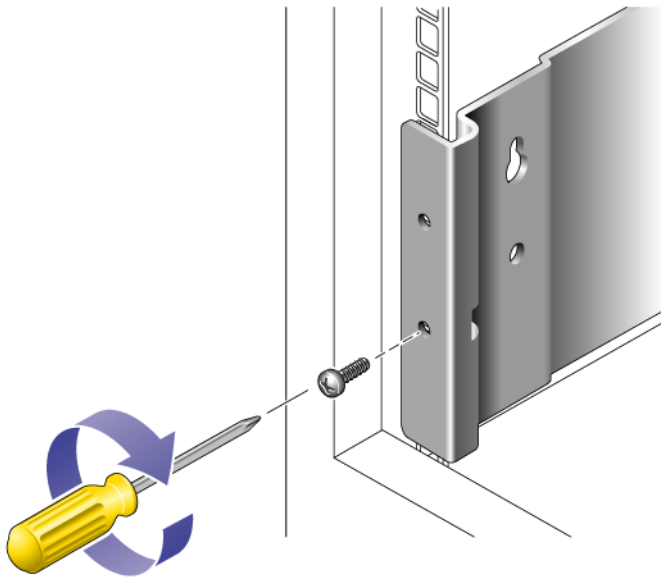
**FIGURE 2-15** Adjusting the Length of the Rail at the Back of the Cabinet



- 7. Insert and tighten a screw appropriate for the cage nut to secure the rail to the back cabinet rail (FIGURE 2-16).**

The screw passes through the lower unthreaded inner hole of the mounting rail and screws into the threaded hole of the cage nut.

**FIGURE 2-16** Securing the Rail to the Back of the Cabinet



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## Preparing the Two-Post Telco Rack

Use the procedures in this chapter to install trays in a standard Telco rack. (You can use the existing universal rack kit and procedures to install the Sun Storage 6180 array in a four-post Telco rack.) The number of trays you need to install depends on your overall storage requirements. You can install a maximum of eight, one controller tray and up to seven expansion trays, in a third-party Telco rack.

This chapter describes the process of installing Sun StorEdge 6180 trays. It contains the following sections:

- [“Preparing the Telco Rack” on page 43](#)
- [“Attaching the Rails to a Telco 2-Post Rack” on page 43](#)
- [“Installing a Tray in a Telco 2-Post Rack” on page 47](#)

The installation procedures in this chapter require the following items:

- #2 Phillips screwdriver
- #3 Phillips screwdriver
- Flathead screwdriver
- Antistatic protection



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**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.

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## Preparing the Telco Rack

Install the rack as described in the installation instructions provided by the manufacturer.

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**Note** – Sun Microsystems makes no warranties or guaranties as to fit, form, or function of the Sun Storage 6180 array installed in third-party racks or cabinets. It is the customer’s responsibility to ensure that the rack or cabinet can house the Sun Storage 6180 array in all conditions that may exist. All racks and cabinets must comply with local building and construction codes.

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Populating a rack with trays starting from the bottom and moving up distributes the weight correctly in the cabinet.

## Attaching the Rails to a Telco 2-Post Rack

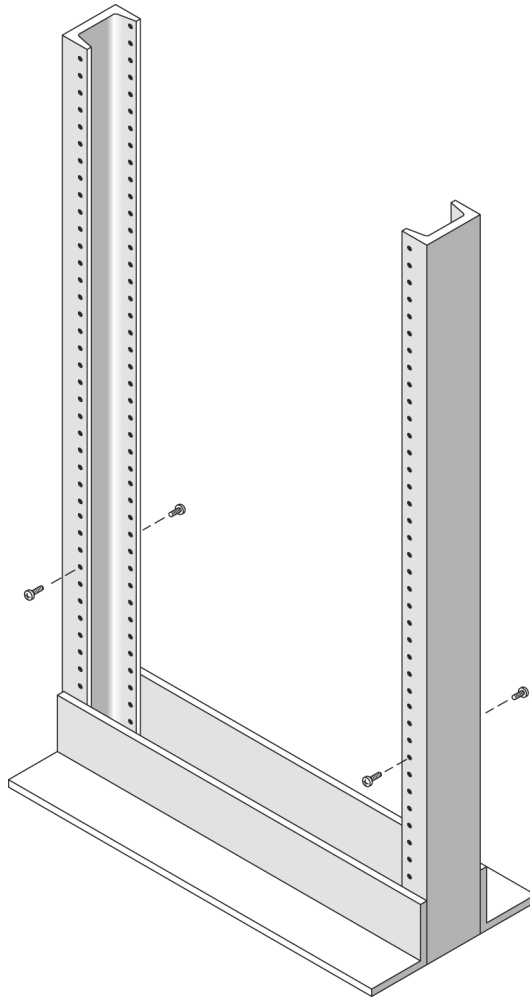
This procedure describes how to attach the rackmount rail kit to a Telco 2-post frame. You can use rack rails with a depth of 3-to-6 inches.

You will mount each tray with its horizontal center aligned with the frame of the Telco 2-post rack.

1. **Loosely adjust the rail length to accommodate the length of the array.**
1. **Insert four (12-24 or 10-32) screws (one in each post side) in the front and back mounting holes of the right and left posts (FIGURE 2-17). Do not tighten at this time.**

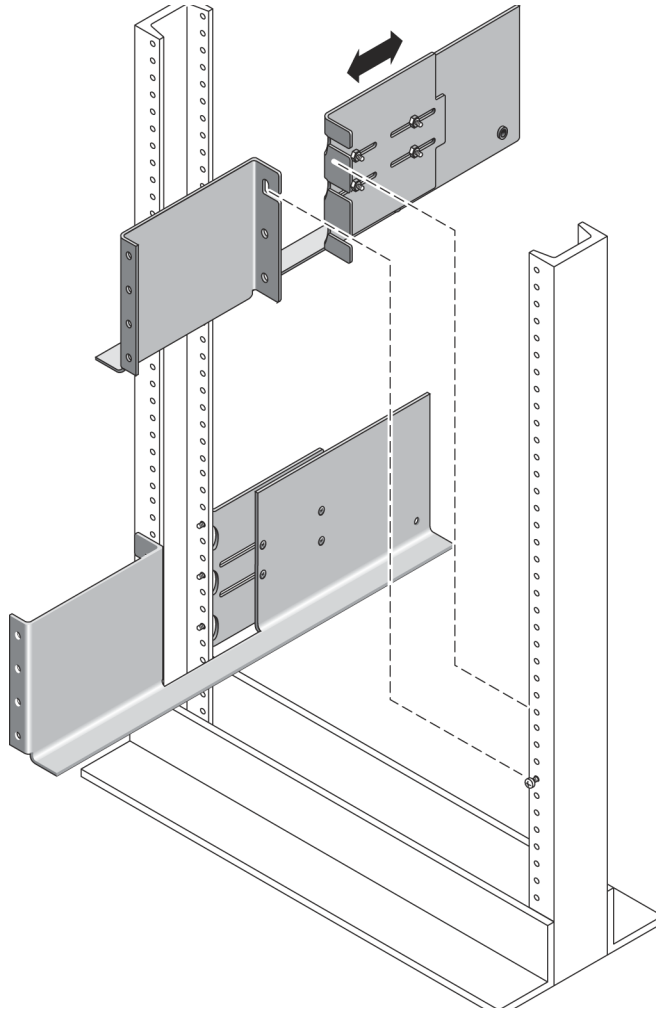
Use the lowest available mounting hole at the bottom of each post that can be aligned with the top mount slot on the rail. The mount slot allows the rail to hang over the screw. Make sure that all four screws are aligned and mounted at the same height.

**FIGURE 2-17** Inserting Screws in the Front and Back Mounting Holes



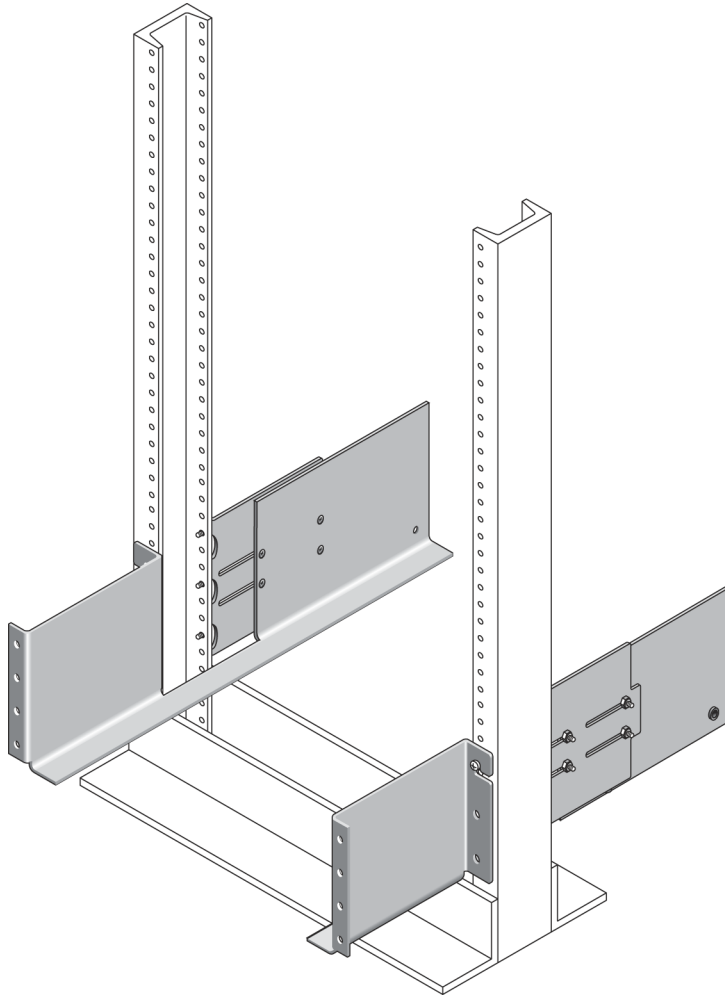
2. Align the open slot of the left mounting rail over the front and back screws of the left post, and press the rail down until it is seated over the screws (FIGURE 2-18). Repeat for the right rail.

**FIGURE 2-18** Seating the Mounting Rails Over the Front and Back Screws



3. Insert eight more (12-24 or 10-32) screws (two in each post side) in the lower mounting holes at the front and back of the left and right rails ([FIGURE 2-19](#)).

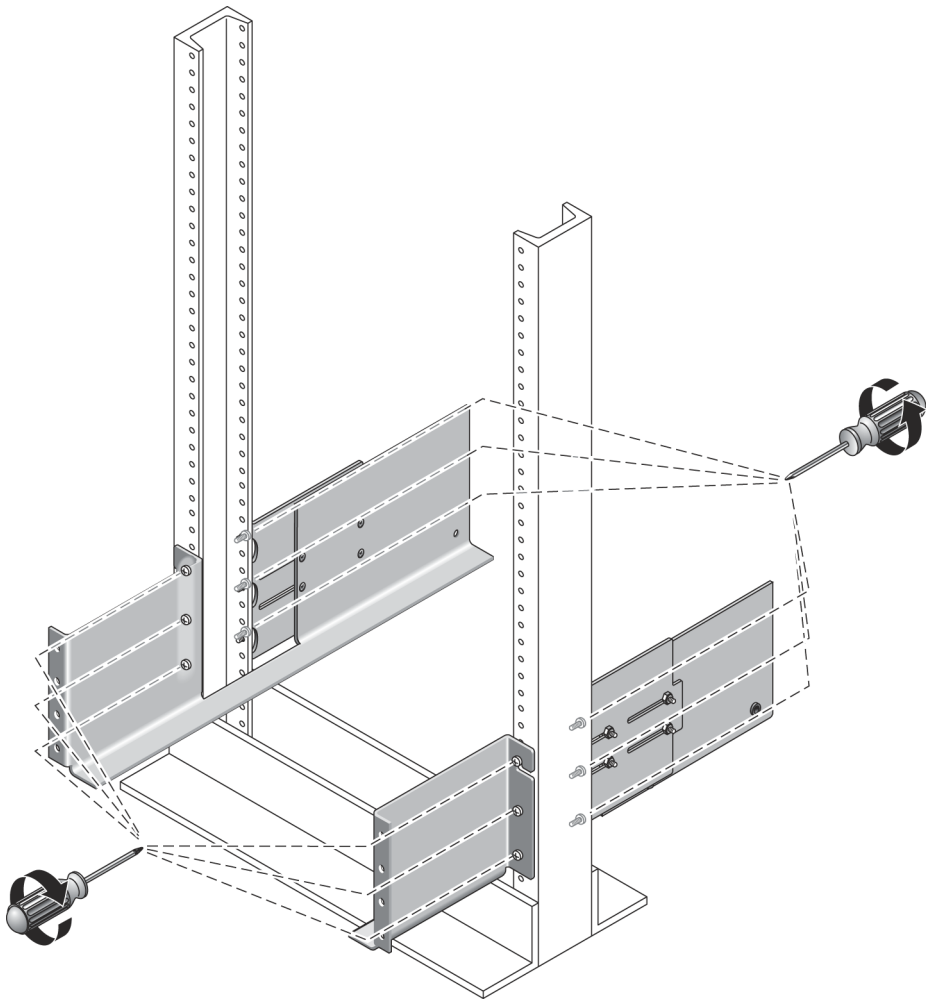
**FIGURE 2-19** Inserting Screws in the Lower Mounting Holes



4. Using the #3 Phillips screwdriver, tighten all twelve screws (three on each side of a post) at the front and back of both mounting rails to secure each rail to its post ([FIGURE 2-20](#)).



**FIGURE 2-20** Inserting Screws in the Lower Mounting Holes



## Installing a Tray in a Telco 2-Post Rack

When installing a tray in a Telco 2-post rack, follow these instructions:

- 1. Unsnap and remove the left and right end caps on the tray to permit access to the screw mounting holes.**

2. 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 2-21).

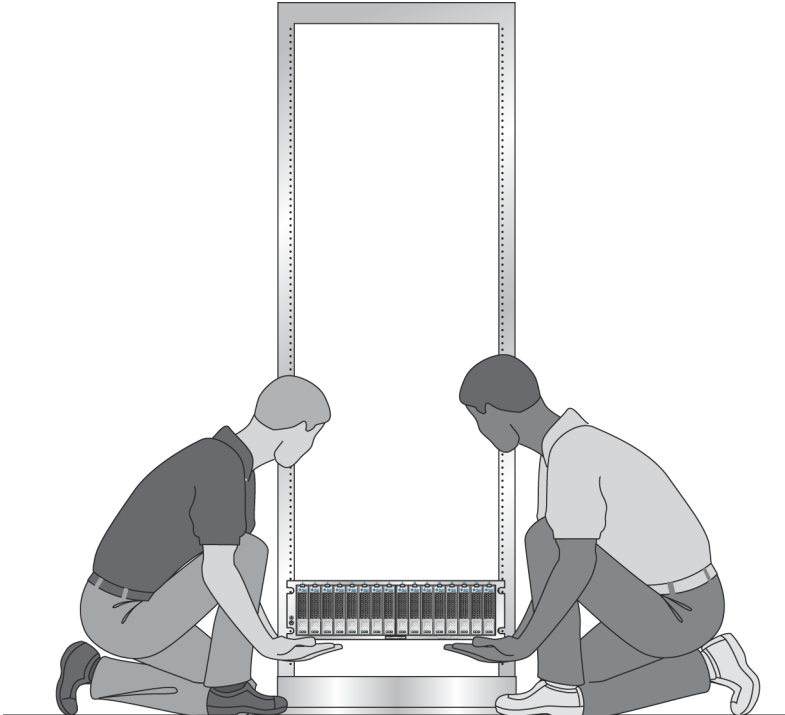


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**Caution** – Use care to avoid injury. An tray can weigh up to 95 pounds (45 kg).

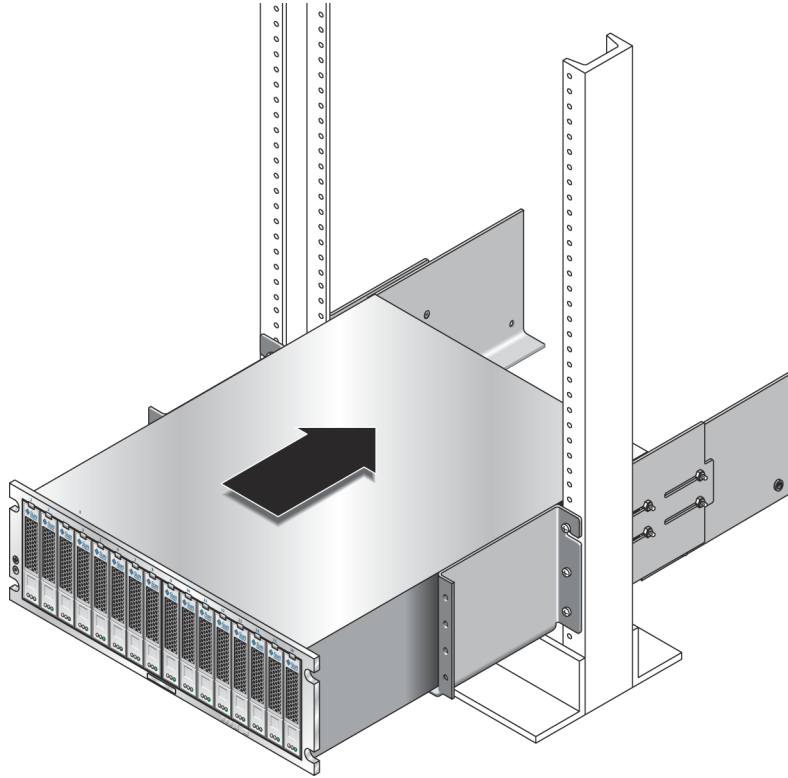
---

**FIGURE 2-21** Positioning the Tray in the Rack



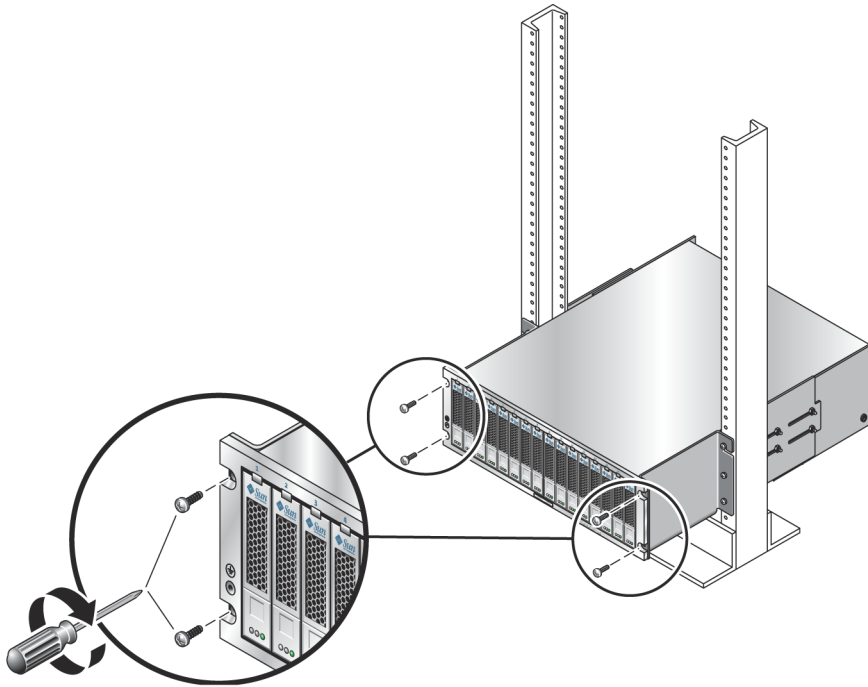
3. Carefully slide the tray onto the mounting rails until the front bezel of the tray contacts the rail flange on each side (FIGURE 2-22).

**FIGURE 2-22** Sliding the Tray Into the Rack



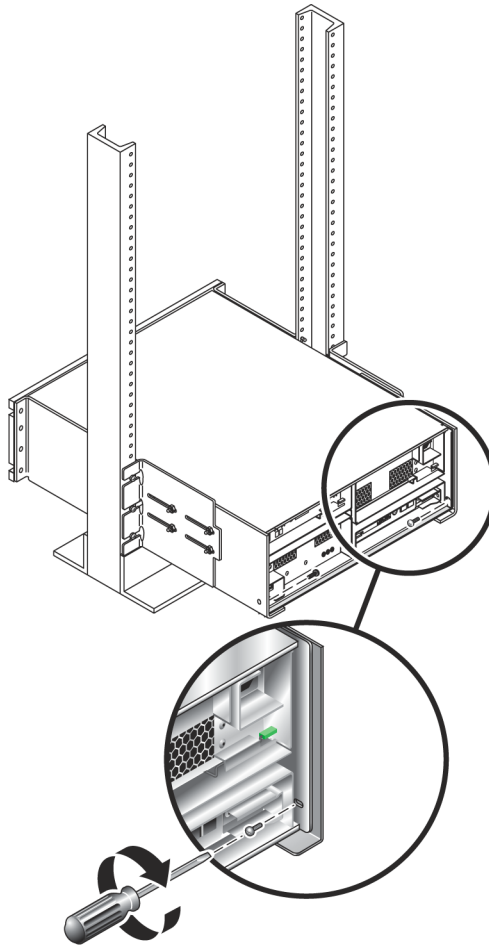
4. Use the #2 Phillips screwdriver to insert and tighten four 10-32 x 1/2-in. screws, washers, and nuts (two each per side) to secure the tray to the front of the rack (FIGURE 2-23).

**FIGURE 2-23** Securing the Tray to the Front of the Rack



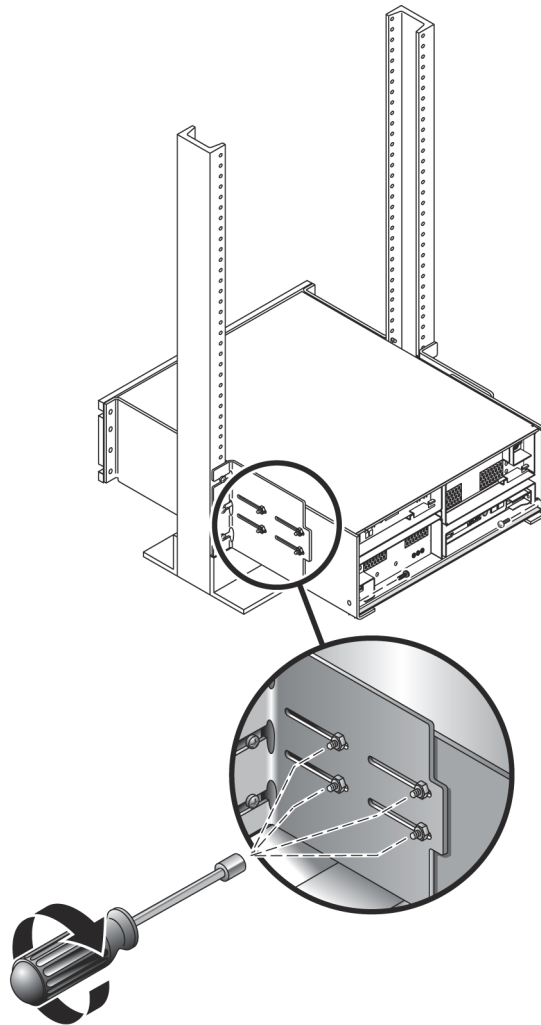
5. **Replace the left and right end caps to hide the front mounting screws.**  
The end caps snap onto the front bezel of the tray.
6. **At the back of the tray, make a final adjustment to the rail lengths to align the back mounting points (FIGURE 2-24) on the rail and array.**
7. **At the back of the tray, use the flathead screwdriver to install and tighten two 6-32 flat-head screws (one per side) through the back mounting points (FIGURE 2-25).**

**FIGURE 2-24** Securing the Tray to the Back of the Rack



8. Tighten the four 10-32 locknuts (two on each rail) on each rail extension to secure the rail length.

**FIGURE 2-25** Tightening the Locknuts on the Rail Extension



---

## Installing a Tray in a Cabinet

1. Install the controller tray in the first empty 3RU slot at the bottom of the cabinet. If you are installing expansion trays, continue installing the trays from the bottom up.

- a. 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 2-26)..

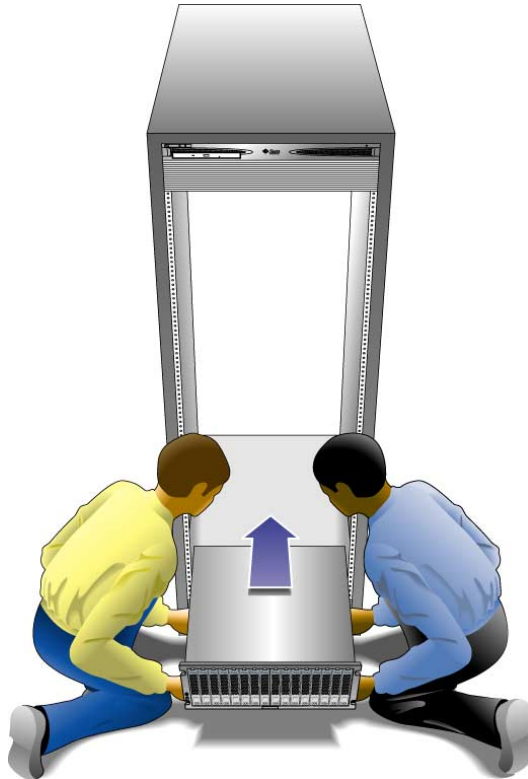


---

**Caution** – Use care to avoid injury. A tray can weigh up to 45 kg (95 lbs).

---

**FIGURE 2-26** Positioning the Tray in the Cabinet



### *Controller FRU Handle Can Be Hazardous*



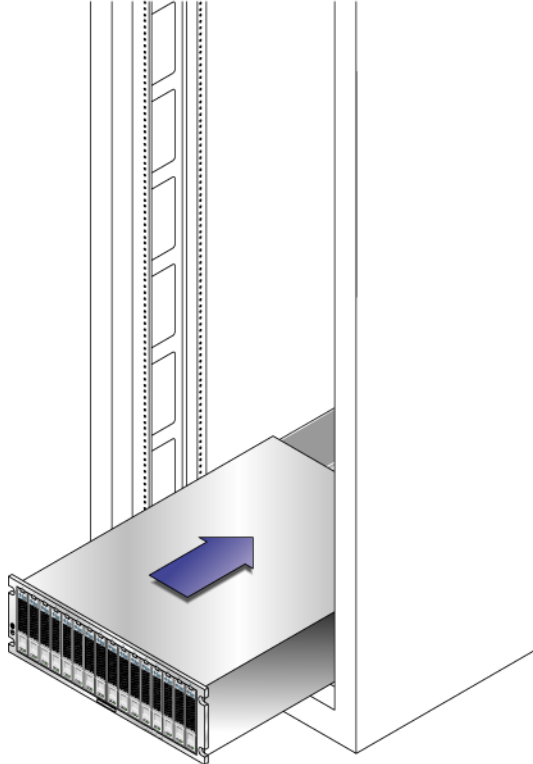
---

**Caution** – Be careful using the FRU handle on the controller tray. It can snap shut when pushed hard during installation, pinning fingers between the tray and handle edges.

---

- b. Carefully slide the tray into the cabinet until the front flanges of the tray touch the vertical face of the cabinet ([FIGURE 2-27](#)).

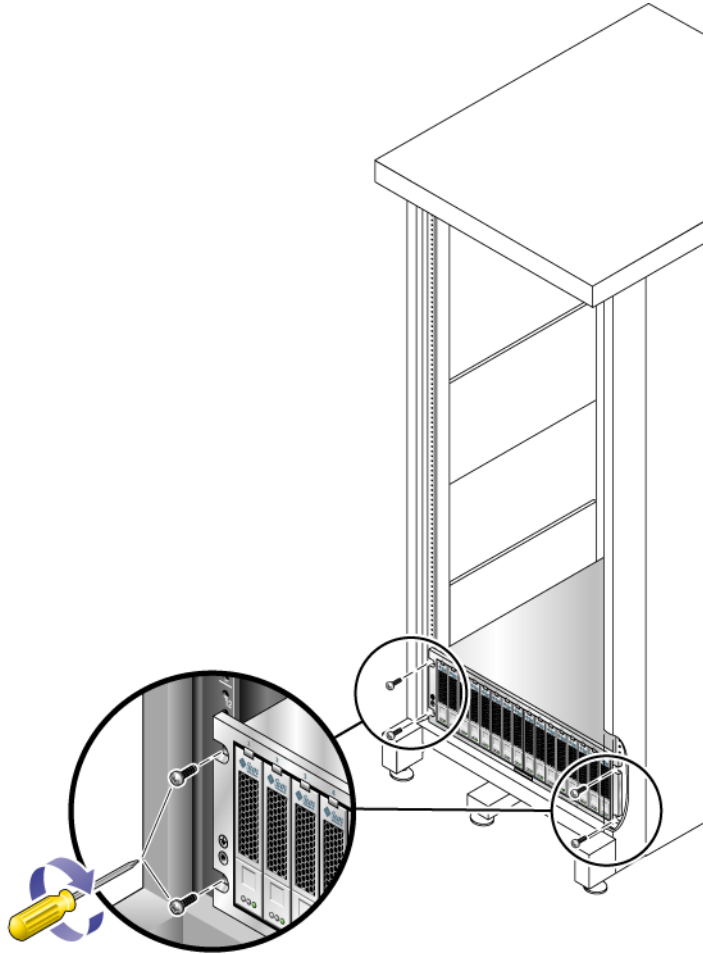
**FIGURE 2-27** Sliding the Tray Into the Cabinet



2. Depending on the type of cabinet you have, do one of the following:
  - For a Sun Rack 900/1000 cabinet and the Sun Rack II, use the #3 Phillips screwdriver to install and tighten four M6 screws (two per side) to secure the tray to the front of the cabinet ([FIGURE 2-28](#)).

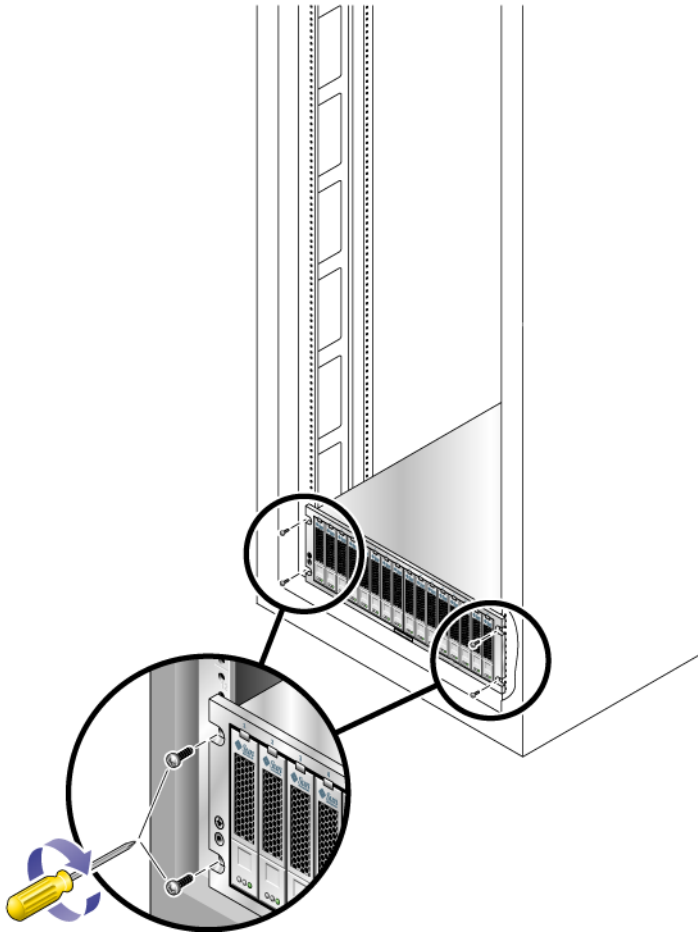


**FIGURE 2-28** Securing the Tray to the Front of a Sun Rack 900/1000 Cabinet



- For the Sun StorEdge Expansion cabinet or for cabinets with 10-32 cabinet rail threads, use the #2 Phillips screwdriver to insert and tighten four 10-32 screws (two per side) to secure the tray to the front of the cabinet ([FIGURE 2-29](#)).

**FIGURE 2-29** Securing the Tray to the Front of a Sun StorEdge Expansion Cabinet



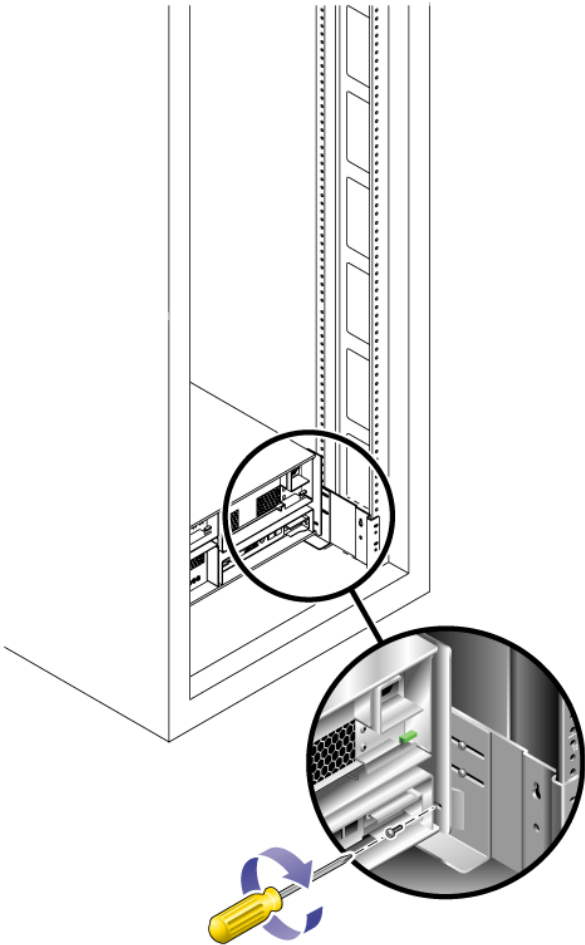
- For cabinets with other cabinet rail threads, secure the tray to the front of the cabinet with metric M5 or 12-24 screws.
  - For cabinets with unthreaded cabinet rails, secure the tray to the front of the cabinet with screws that match the inserted cage nuts
- 3. Install and tighten two 6-32 screws (one per side) at the back of the tray, to secure the back of the tray to the cabinet(FIGURE 2-30).**

---

**Note** – The two upper holes on the back of the tray are not used.

---

**FIGURE 2-30** Securing the Tray to the Back of the Cabinet Rail



---

# Connecting the Power Cables

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

---

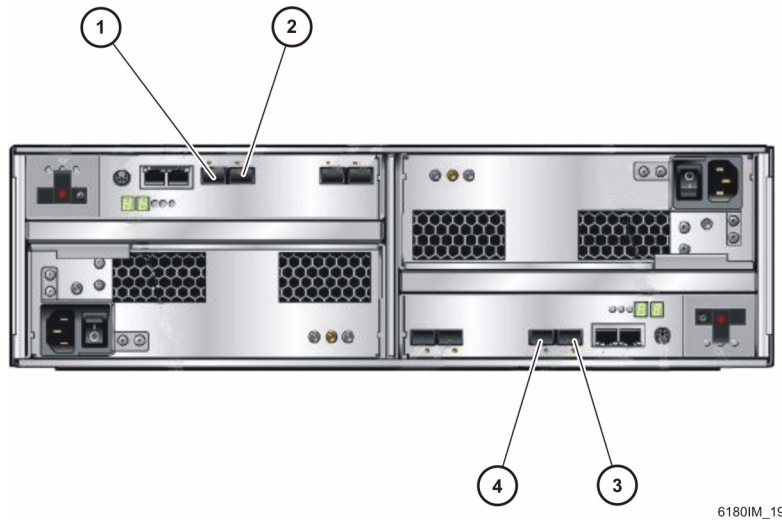
**Note** – Do *not* power on the array until you complete the procedures in this chapter. The power-on sequence is described in detail in [Chapter 4](#).

---

# Intertray Cabling

This section describes how to cable a controller tray to expansion trays for several different configurations. The controller tray uses Controller A and Controller B expansion ports to connect to FC-AL ports at the back of each expansion tray (FIGURE 2-31).

**FIGURE 2-31** Controller Fibre Channel Expansion Ports



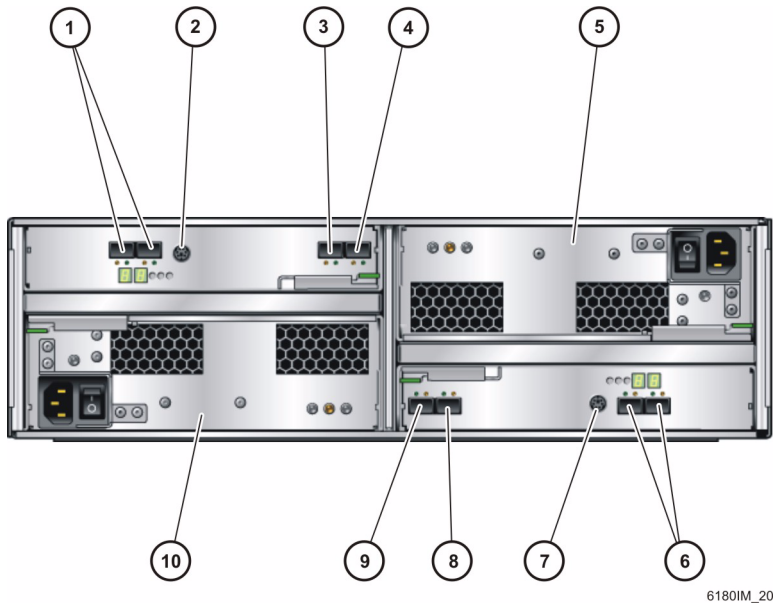
6180IM\_19

## Figure Legend

Controller A		Controller B	
1	Fibre Channel expansion Channel 1 (port 2)	3	Fibre Channel expansion Channel 2 (port 2)
2	Fibre Channel expansion Channel 1 (port 1)	4	Fibre Channel expansion Channel 2 (port 1)

FIGURE 2-32 illustrates the ports and components at the rear of the expansion tray.

**FIGURE 2-32** Expansion Tray (Rear View) Ports and Components



**Figure Legend**

1	Reserved expansion ports (2A & 2B)	6	Reserved expansion ports (2A & 2B)
2	Serial port	7	Serial port
3	Expansion port 1B (Out)	8	Expansion port 1B (Out)
4	Expansion port 1A (In)	9	Expansion port 1A (In)
5	Power supply	10	Power supply

## Array Configuration Naming Convention

The configuration naming convention is “controllers x trays” where:

- The first number is the controller tray
- 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; and 1x7 is the controller tray and 6 expansion trays (see also [TABLE 2-1](#)).

**TABLE 2-1** Controller and Expansion Tray Configurations

<b>Configuration Identifier</b>	<b>Controller Tray</b>	<b>Number of Expansion Trays</b>
1x1	1	0
1x2	1	1
1x3	1	2
1x4	1	3
1x5	1	4
1x6	1	5
1x7	1	6

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

## Balancing Expansion Trays

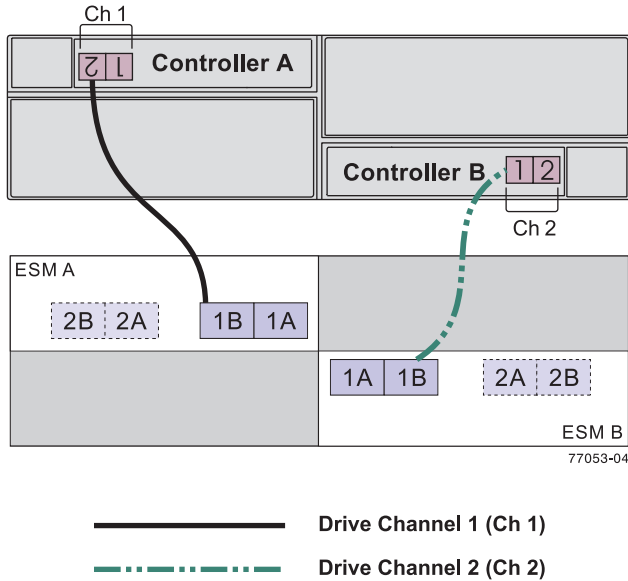
Each controller in the Sun Storage 6180 array has two expansion channels. For optimal reliability, availability, and serviceability, installation of expansion trays should be divided evenly between the two expansion channels.

If there are an uneven number of expansion trays, such as in a 1x4 and 1x6 array configuration, cable the extra expansion tray in the expansion channels of the two lowest expansion trays in the cabinet. This allows for easier addition of an expansion tray in the future.

# Cabling a 1x2 Array Configuration

A 1x2 array configuration consists of one controller tray and one expansion tray. Two 2-meter optical FC cables are required.

**FIGURE 2-33** 1x2 Array Configuration Cabling

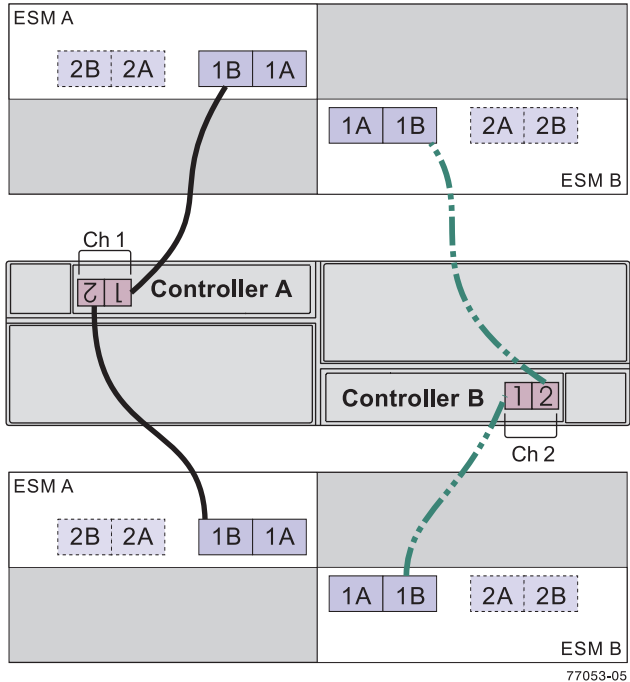




# Cabling a 1x3 Array Configuration

A 1x3 array configuration consists of one controller tray and two expansion trays. Four 2-meter optical FC cables are required.

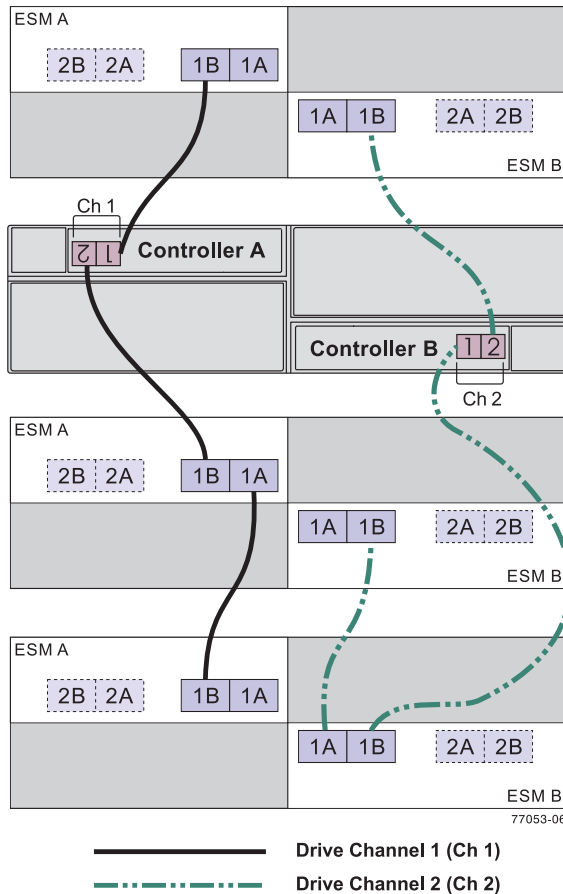
**FIGURE 2-34** 1x3 Array Configuration Cabling



# Cabling a 1x4 Array Configuration

A 1x4 array configuration consists of one controller tray and three expansion trays. Six 2-meter optical FC cables are required.

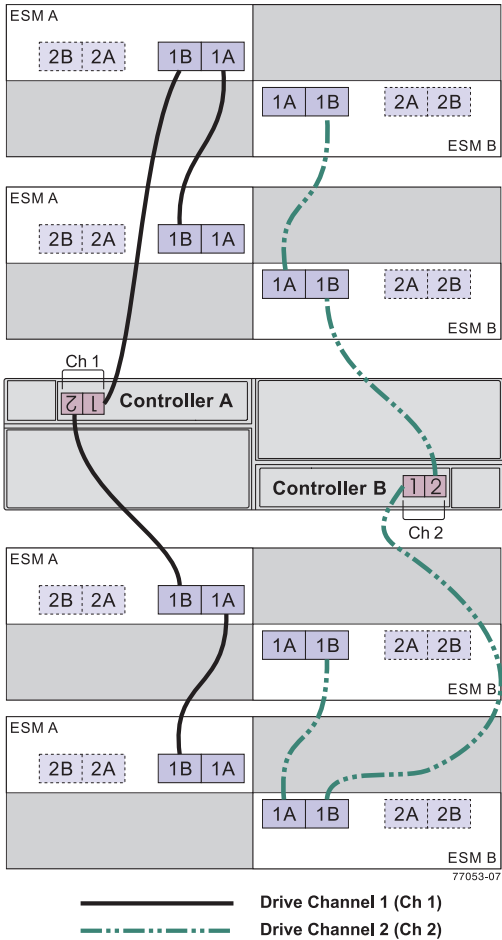
**FIGURE 2-35** 1x4 Array Configuration Cabling



# Cabling a 1x5 Array Configuration

A 1x5 array configuration consists of one controller tray and four expansion trays. Eight 2-meter optical FC cables are required.

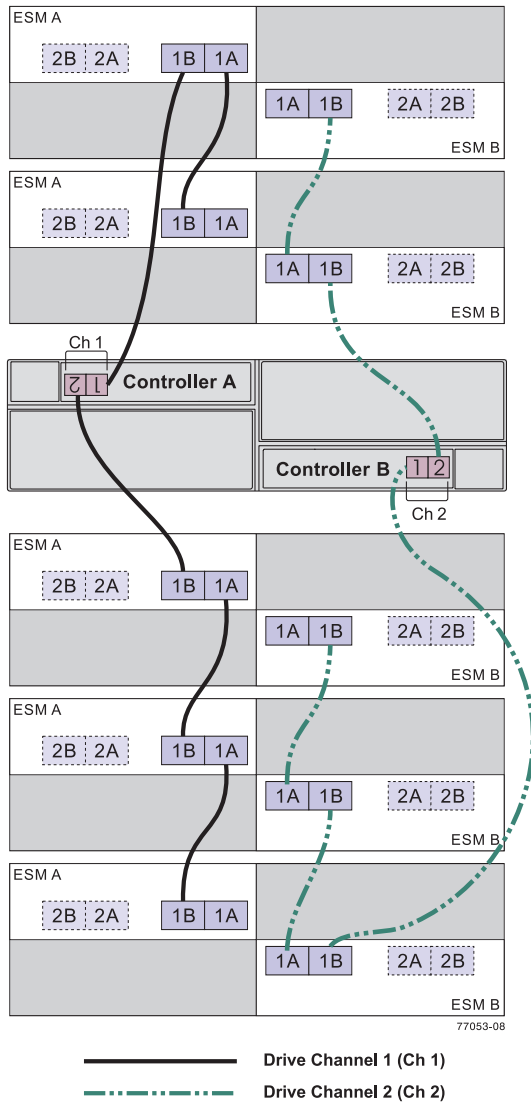
**FIGURE 2-36** 1x5 Array Configuration Cabling



# Cabling a 1x6 Array Configuration

A 1x6 array configuration consists of one controller tray and five expansion trays. Ten 2-meter optical FC cables are required.

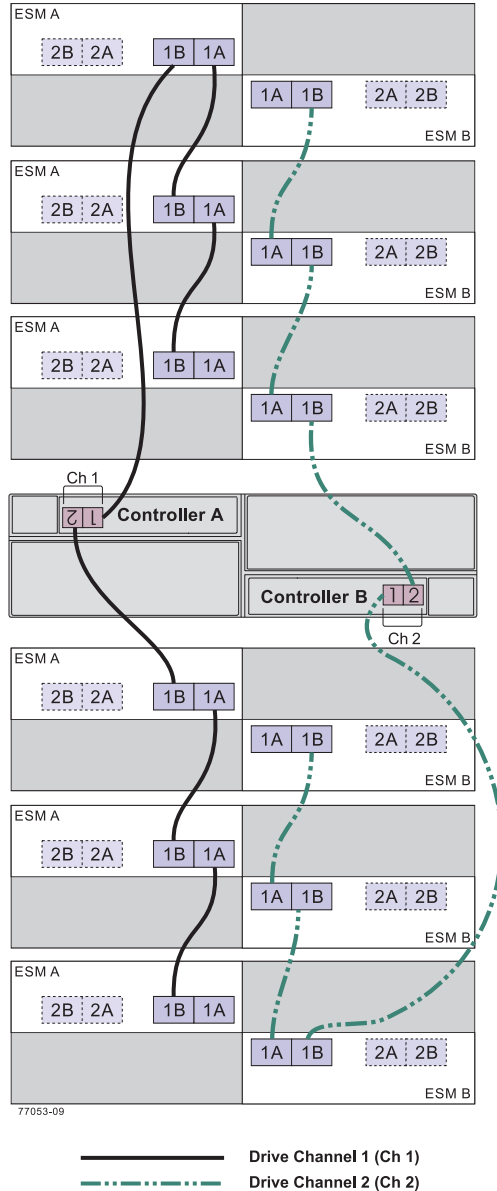
**FIGURE 2-37** 1x6 Array Configuration Cabling



# Cabling a 1x7 Array Configuration

A 1x7 array configuration consists of the controller tray and six expansion trays. Twelve 2-meter optical FC cables are required.

**FIGURE 2-38** 1x7 Array Configuration Cabling



---

## Next Steps

You are now ready to connect the management and data hosts, as described in [Chapter 3](#).

## Connecting the Management Host and Data Hosts

---

This chapter describes Sun Storage 6180 array cable connections to hosts. It contains the following sections:

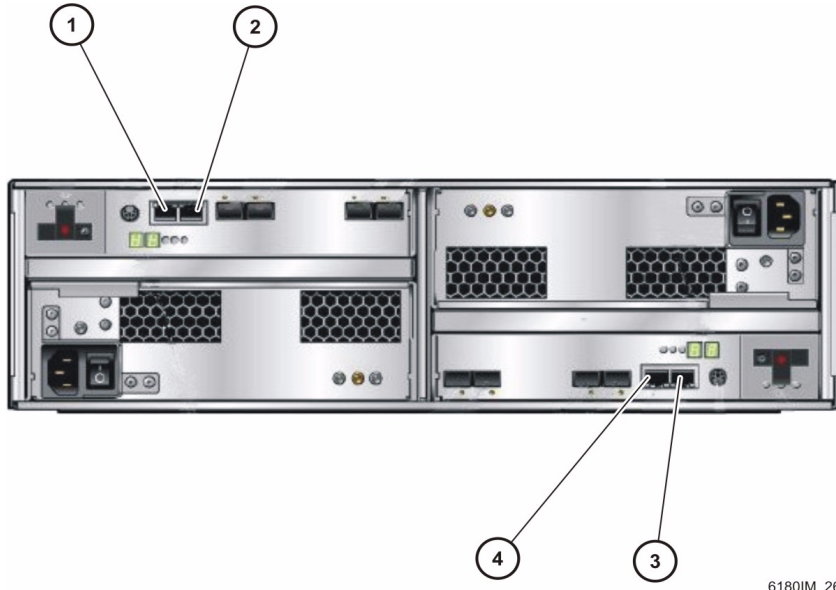
- [“Connecting the Management Host” on page 69](#)
- [“Connecting Data Hosts” on page 72](#)
- [“Next Steps” on page 77](#)

---

## Connecting the Management Host

The management host directly manages Sun Storage 6180 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



6180IM\_26

#### Figure Legend

1	Ethernet port 2 (reserved)	3	Ethernet port 2 (reserved)
2	Ethernet port 1	4	Ethernet port 1

**Note** – Before you begin, be sure that two required Ethernet cables are available. These requirements are outlined in the *Sun Storage 6180 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 71](#)
- [“Attaching the Ethernet Ports to the LAN Using an Ethernet Hub” on page 71](#)
- [“Attaching the Ethernet Ports Directly to the Management Host With a Cross-Over Cable” on page 71](#)

## 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 1 for Controller A and Controller B at the back of the controller tray (FIGURE 3-1).
2. Connect an Ethernet cable to Ethernet port 1 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 LAN 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 port 1 on Controller A and Controller B at the back of the controller tray (FIGURE 3-1).
2. Connect an Ethernet cable to Ethernet port 1 of each controller.
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 to directly to the management host using a cross-over cable:

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

---

# Connecting Data Hosts

You can connect data hosts to access the Sun Storage 6180 array through Fibre Channel (FC) switches to the array or directly to the array.

The Sun Storage 6180 array has eight host connections, four per controller. To maintain redundancy, connect two data paths from each host, one to each controller.

---

**Note** – If using the Sun Storage Data Replication premium feature, and it is enabled, the highest number host port is reserved for remote replication (Host Port 2); otherwise, Host Port 2 is available for use.

---

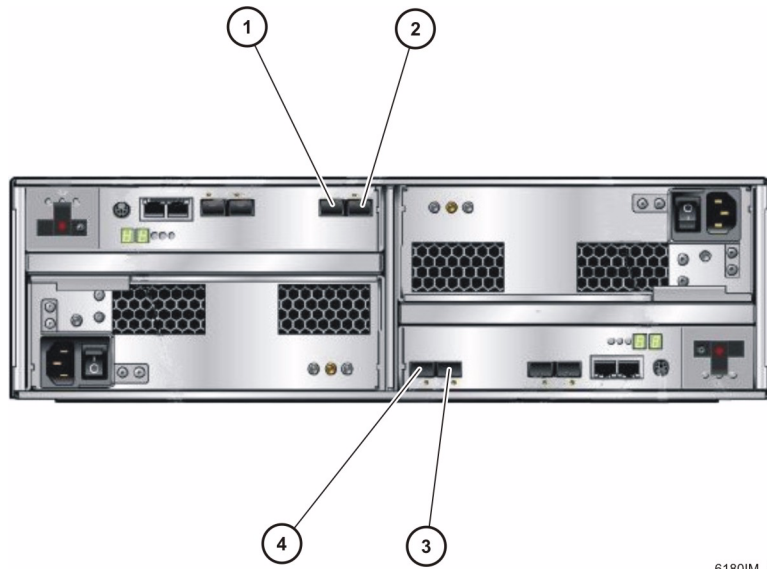
## Connecting Data Hosts Through External Fibre Channel Switches

You can connect the array to data hosts through external FC switches.

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

- The FC switch has been installed and configured as described in the vendor's installation documentation. (See the *Sun Storage 6180 Array Release Notes* for a list of supported switches.)
- Interface cables are connected and routed between the host bus adapters (HBAs), switches, and installation site.
- Fiber-optic cables (2-meter or required length) are available to connect the array to the FC switch.

**FIGURE 3-2** Host Connections



6180IM\_5

**Figure Legend**

---

1	Fibre Channel host port 1	3	Fibre Channel host port 1
2	Fibre Channel host port 2	4	Fibre Channel host port 2

---

**FIGURE 3-3** illustrates the data hosts connected through switches with direct connections.

1. Locate the data host ports (Small Form-factor Plug-in [SFP] transceivers) at the back of the controller tray (**FIGURE 3-2**).
2. Connect each fiber-optic cable to the host ports of Controller A and Controller B.



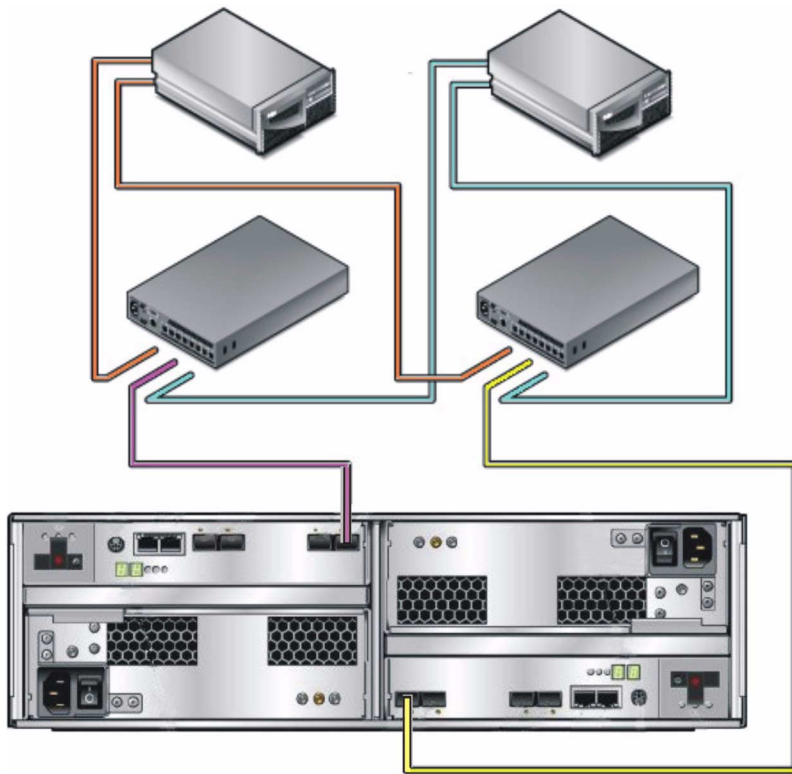
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**Caution** – Fiber-optic cables are fragile. Do *not* bend, twist, fold, pinch, or step on the fiber-optic cables. Doing so can degrade performance or cause data loss.

---

3. Connect the other end of each cable to the external switch as shown in the graphics that follow.

**FIGURE 3-3** Connecting Data Hosts Through a Switch



6180IM\_6

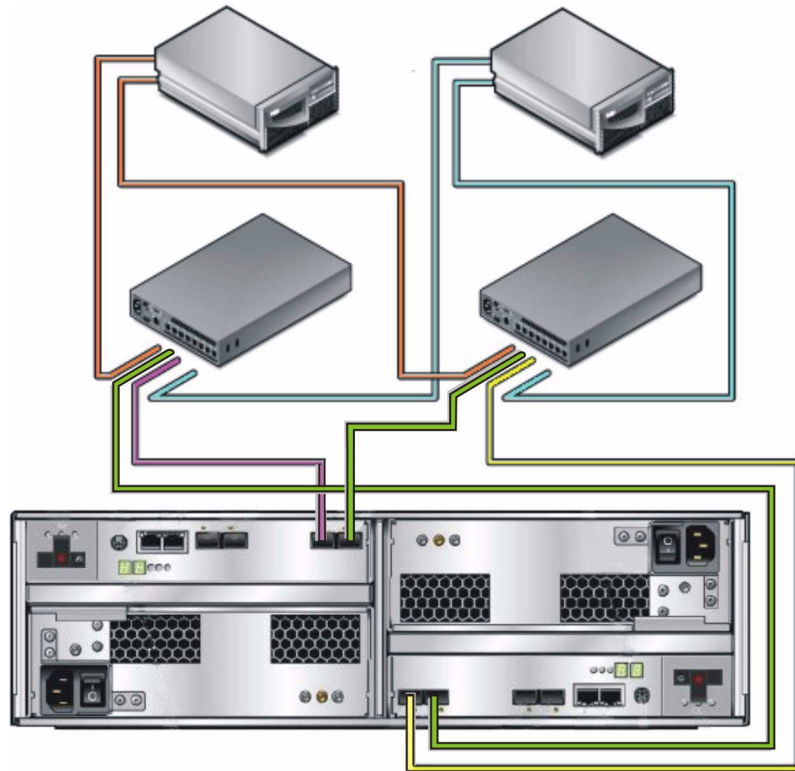
FIGURE 3-4 illustrates the data hosts connected through switches with cross-connections.

---

**Note** – The configuration in FIGURE 3-4 is not supported for use in a Sun Cluster environment.

---

**FIGURE 3-4** Connecting Data Hosts Through a Switch With Cross-Connections



6180IM\_7

4. Connect the cables from the switch to the HBAs for each data host.

## Connecting Data Hosts Directly

A direct point-to-point connection is a physical connection in which the HBAs are cabled directly to the array's host ports.

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

- Interface cables are connected and routed between the HBAs and the installation site.
- Fiber-optic cables (2-meter or required length) are available to connect the array host ports to the data host HBAs.

1. Locate the host ports at the back of the controller tray (FIGURE 3-2).

2. Connect a fiber-optic cable to each host port on Controller A and Controller B that you intend to use.



---

**Caution** – Fiber-optic cables are fragile. Do *not* bend, twist, fold, pinch, or step on the fiber-optic cables. Doing so can degrade performance or cause data loss.

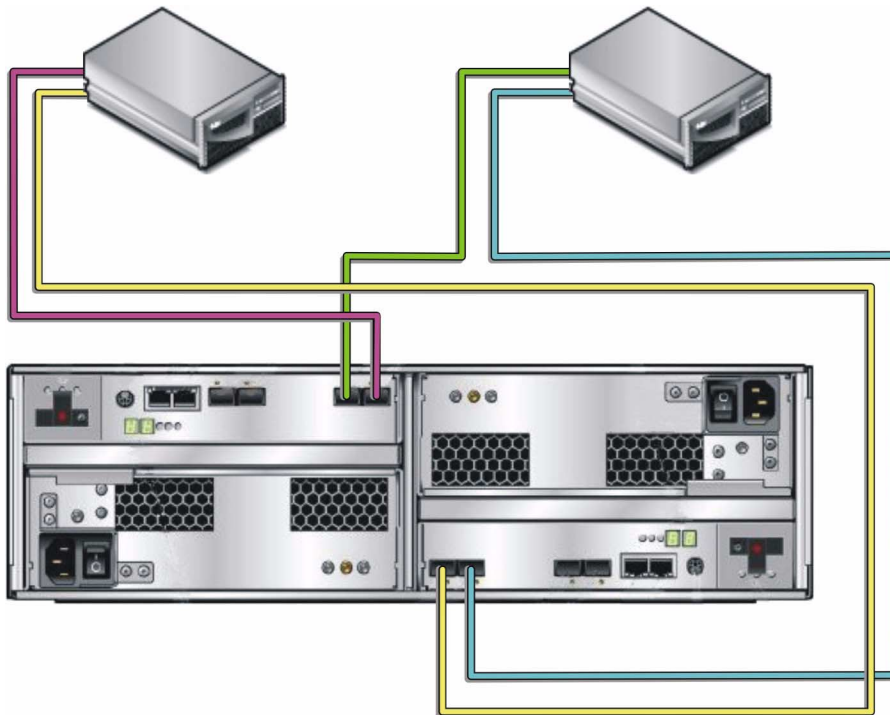
---

3. Connect the other end of each fiber-optic cable to a data host HBA.

FIGURE 3-5 illustrates an example of a direct host connection of two data hosts with dual HBAs.

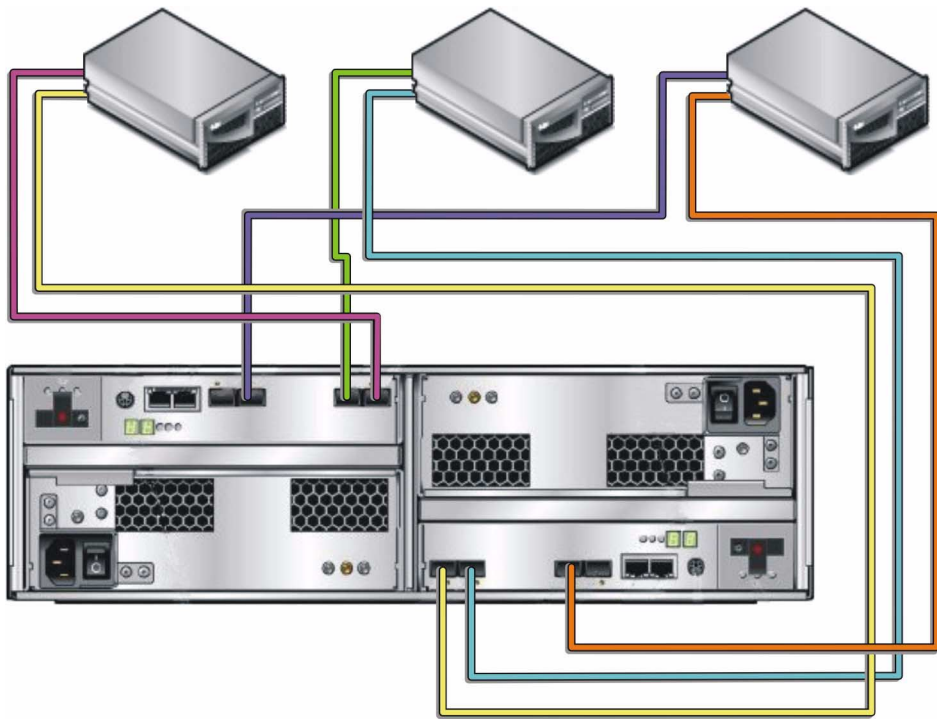
FIGURE 3-6 illustrates an example of a direct host connection of three data hosts with dual HBAs.

**FIGURE 3-5** Direct Connection to Two Hosts With Dual HBAs



6180IM\_8

**FIGURE 3-6** Direct Connection to Three Hosts With Dual HBAs



6180IM\_9

---

## Next Steps

After you connected the management and data hosts, you can set the link rate and power on the trays, as described in [Chapter 4](#).





# Verifying the Link Rate for Each Tray and 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 79](#)
- [“Verifying the Link Rate for All Trays” on page 80](#)
- [“Powering On the Array” on page 82](#)
- [“Checking the Link Rate for Each Port” on page 83](#)
- [“Powering Off the Array” on page 83](#)
- [“Next Steps” on page 84](#)

---

## 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 Storage Common Array Manager Software Installation Guide* for information about configuring IP addresses on array controllers.)

For instructions on how to set up the DHCP server, see [“Configuring a DHCP Server” on page 101](#).

---

## Verifying the Link Rate for All Trays

The Tray Link Rate switch on each tray enables you to set the data transfer rate to 4 Gbits/second or 2 Gbits/second for drives on the tray.

*The link rate must be the same for all trays.*

---

**Note** – The Tray Link Rate switch does not affect the data rate of host ports.

---

An expansion tray can contain disk drives supporting both 2 Gbits/second and 4 Gbits/second data transfer speeds. An expansion tray is set at the factory to whatever speed its disk drive rates are. It is possible to mix drive speeds within an enclosure supporting both 2 Gbits/second and 4 Gbits/second, but the expansion tray rate setting must be set to the lowest Disk Drive speed rate via the 2 Gbits/second and 4 Gbits/second switch located on the lower right of the enclosure (FIGURE 4-1).

If there is an enclosure-to-controller data transfer speed mismatch, the LED error code segment display at the back of the controller tray indicates a code of: H7 – Current Enclosure Fibre Channel Rate Different than Rate Switch.

You can determine the speed of the disks in the tray by removing one of the disk drives and examining the label. Next to the disk name on the label is a number indicating the RPM and speed of the disk. For example, the number 15k.4 indicates the disk is 15,000 RPMs and 4 Gbytes.

---

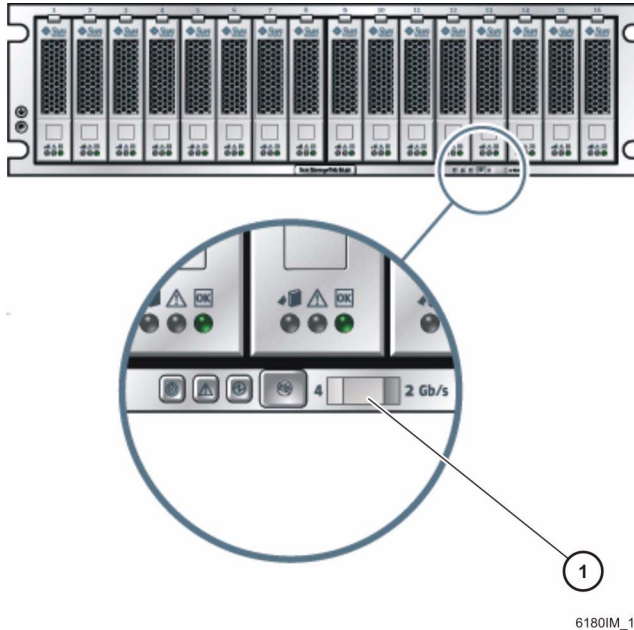
**Note** – Change the position of a Tray Link Rate switch only when the tray is powered off.

---

To set the link rate for each tray:

1. **Locate the Tray Link Rate switch at the lower right front of the tray (FIGURE 4-1).**

**FIGURE 4-1** Tray Link Rate Switch



6180IM\_18

**Figure Legend**

- 
- 1 Tray link rate switch:  
Left = 4 Gb/second  
Right = 2 Gb/second
- 

**2. Set the default rate for the tray as follows:**

- For 4 Gbits/second, slide the Tray Link Rate switch to the *left* position.
- For 2 Gbits/second, slide the Tray Link Rate switch to the *right* position.

---

# Powering On the Array

Use this procedure to turn power on for all trays installed in the cabinet ([FIGURE 4-2](#)).

---

**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 4-2** Tray Power Connectors and Switches



6180IM\_10

## Figure Legend

Power Supply B		Power Supply A	
1	Power switch	3	Power switch
2	Power connector	4	Power connector

1. Prepare the power cables as specified in [“Connecting the Power Cables”](#) on page 58.
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.
4. Press each power switch at the back of the controller 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 2.5 minutes for the tray to power on. When the power-on sequence is complete, the controller tray ID indicates 85.

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.

---

## Checking the Link Rate for Each Port

Verify the expected link rate for each port. Link rate indicators for the expansion ports are located at the back of the controller tray (FIGURE 4-1) and the expansion tray (FIGURE 1-8).

---

**Note** – The host port indicators at the back of the controller tray (FIGURE 1-5) cannot be verified until the hosts are connected (See “Connecting Data Hosts” on page 72).

---

---

## 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.

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 Media Scan is enabled (the default), 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 a media scan (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 1-5) 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.**
5. **First, press each power switch at the back of the controller tray to the Off position.**
6. **Next, 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 Storage Common Array Manager Software Installation Guide* and the data host software as described in [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:

- [“About Data Host Software” on page 85](#)
- [“Setting Up a Data Host On a Solaris System” on page 87](#)
- [“Installing Data Host Software for Operating Systems Other Than Solaris” on page 88](#)
- [“Enabling Multipathing Software for Solaris OS” on page 88](#)
- [“Downloading the Veritas Volume Manager ASL” on page 90](#)
- [“Next Steps” on page 91](#)

---

### About 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.

---

## About 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, and data transfer rates used in your storage area network. HBAs must be ordered separately, from Sun or their respective manufacturers.

The required versions of HBA drivers must be installed on the data host before you can set up a data host. The *Sun Storage 6180 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.

## About 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 Storage 6180 array. For Solaris OS 9 data hosts, the multipathing software is part of the Sun StorageTek SAN Foundation software. Solaris OS 10 includes the multipathing software.

For multipathing support on data host platforms running non-Solaris operating systems, see [“Installing Data Host Software for Operating Systems Other Than Solaris” on page 88](#).

## Single Path Data Connections



---

**Caution** – Because of the single point of failure, single path data connections are not recommended.

---

In a single path data connection, a group of heterogeneous servers is connected to an array through a single connection. Although this connection is technically possible, there is no redundancy, and a connection failure will result in loss of access to the array.



---

# Setting Up a Data Host On a Solaris System

You must install data host software (including multipathing) on each data host that communicates with the Sun Storage 6180 array. Multipathing is included in the Solaris 10 OS. For Solaris OS 9 data hosts, you need the Sun StorEdge SAN 4.4.x Foundation Kit software (which includes the multipathing software).

See the *Sun Storage 6180 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 88.

---

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

## Obtaining Sun Solaris 9 Data Host Software

Obtain Sun Solaris OS 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 Sun StorEdge SAN 4.4 product.**  
The Sun StorEdge SAN 4.4.x login page is displayed.
- 5. Read the Software License Agreement and click I agree.**
- 6. Login using your Sun account ID.**

**7. Download the Base Package (if you do not already have it installed).**

See the *Sun Storage 6180 Array Release Notes* for the current data host software requirements for your operating system version.

**a. Install\_it Script SAN 4.4.x version as recommended in the release notes.**

**b. See the README file for the unpacking and installation instructions.**

---

## Installing Data Host Software for Operating Systems Other Than Solaris

To install data host software for operating systems other than Solaris, refer to the following publications:

- *Sun StorageTek MPIO Device Specific Module Installation Guide For Microsoft Windows OS*
- *Sun StorageTek RDAC Multipath Failover Driver Installation Guide For Linux OS*

The data host software for Red Hat and Suse Linux is Sun Redundant Dual Array Controller (RDAC), and is available from the Sun Download Center (SDLC). Data host software for HP-UX and AIX platforms is Veritas Dynamic MultiPathing (DMP), which is part of the Veritas Volume Manager. Download the AIX ASL from <http://support.veritas.com>. The AIX ASL is available only from Veritas. Contact Veritas for HP-UX DMP. The Novell Netware OS requires Netware Multi-Processing Executive (MPE). Netware is available only from Novell.

See the *Sun Storage 6180 Array Release Notes* for a list of supported operating systems, patches, and HBAs.

---

## Enabling Multipathing Software for Solaris OS

Sun StorEdge SAN Foundation software includes the Sun StorEdge 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 9 OS” on page 89](#)
- [“Enabling Multipathing Software for Solaris 10 OS” on page 89](#)

# Enabling Multipathing Software for Solaris 9 OS

---

**Note** – A patch that will enable multipathing for Solaris 9 is currently being developed. Check the latest Release Notes for availability.

---

To enable the multipathing software on hosts running Solaris OS 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 StorEdge SAN Foundation Software 4.4 Configuration Guide* 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.**

---

# Downloading the Veritas Volume Manager ASL

Veritas Volume Manager provides support for the Sun Storage 6180 array in the form of the Array Support Library (ASL). If you are using the Veritas Volume Manager on your array (recommended), you will need the ASL. There are ASL software packages for the Solaris 9 and 10 OSs, and for the IBM AIX 5.1 and 5.2 OSs. The ASL must be installed on the same host system as the Volume Manager software to enable it to recognize the Sun Storage 6180 array trays.

## To Download the Solaris ASL Package

**1. Log in as superuser on the Sun server to be connected to the array.**

**2. Go to the Products Download page:**

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

**3. In the Search area, search for Veritas ASL, and click on the resulting link.**

The Products Downloads > Veritas Volume Manager ASL page is displayed.

**4. Click Download.**

**5. Log in:**

**a. Type your user name and password in the left column, and click Login.**

**b. On the Terms of Use page, read the license agreement, click Yes to Accept, and click Continue.**

**6. Download the compressed zip file that contains the ASL package for the Sun Storage 6180 array and README file.**

**7. Use the unzip command to extract the files.**

**8. Refer to the README file for instructions on installing the Veritas Volume Manager ASL.**

---

## 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](#).

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



## 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 93](#)
- [“Configuring the IP Address of the Array Controllers” on page 94](#)

---

### About IP Addressing

The Sun Storage 6180 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 94](#))
- Configure an IP address for the management host (see the *Sun Storage Common Array Manager Software Installation Guide*)

---

# Configuring the IP Address of the Array Controllers

You can configure two types of IP addressing for Ethernet port 1 of each array controller:

- Dynamic Host Configuration Protocol (DHCP) IP addressing—IP addresses for Ethernet port 1 are assigned dynamically from a DHCP server running bootstrap protocol (BOOTP) services. By default, this occurs automatically at initial power-on. An IP address assigned to an Ethernet port is held only as long as needed.
- Static IP Addressing—You assign a specific IP address to Ethernet port 1 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:

- Ethernet port 1 of Controller A is assigned IP address 192.168.128.101
- Ethernet port 1 of Controller B is assigned IP address 192.168.128.102

To configure Ethernet port 1 on a controller with either dynamic or static IP addressing, see one of the following sections:

- [“Configuring Dynamic \(DHCP\) IP Addressing” on page 94](#)
- [“Configuring Static IP Addressing” on page 95](#)

## 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 Ethernet port 1 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 94](#).

If you want to set up a DHCP server, refer to [“Configuring a DHCP Server” on page 101](#) 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 two ways:

- Using the serial port interface (see [“Using the Serial Port Interface to Assign IP Addresses” on page 95](#))
- Using the Sun Storage Common Array Manager (see the *Sun Storage 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 95)
- The Common Array Manager (see the *Sun Storage Common Array Manager Software Installation Guide*)

---

**Note** – It is recommended that you use the serial port interface to assign IP addresses to Ethernet port 1 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 Ethernet port 1 on the controller.

To use the serial port interface to configure IP addressing for Ethernet port 1 of each controller, you must complete the tasks described in the following sections:

- [“Connecting a Terminal to the Serial Port”](#) on page 95
- [“Setting Up a Terminal Emulation Program to Connect to the Serial Port”](#) on page 96
- [“Establishing a Connection With the Serial Port”](#) on page 96
- [“Configuring the IP Addresses”](#) on page 97

## Connecting 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 on the controller (FIGURE 1-5).**
2. **Connect the RJ-45 connector of the serial cable to the serial port connector on the terminal.**

# Setting 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

## Establishing 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:
```

## Configuring the IP Addresses

The serial port Service Interface menu enables you to set up the IP address configuration for Ethernet port 1 on the controller.

---

**Note** – Ethernet port 2 is reserved for future use.

---

To set up the IP address configuration for Ethernet port 1 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
```

The Select Ethernet Port menu is displayed.

**2. Specify the Ethernet port for which you want to configure IP addressing:**

**3. 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.

**4. 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 previously changed the gateway IP address, you must also specify a gateway IP address for the Ethernet port.

---

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

The Service Interface menu is redisplayed.

**6. 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 Select Ethernet Port menu is displayed.

**7. Specify the Ethernet port for which you want to display IP addressing:**

```
Select Ethernet Port
=====
1) Ethernet Port: 1
2) Ethernet Port: 2
Q) Quit

Enter Selection: 1
```

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

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

**9. Repeat these steps for the second Ethernet port on the controller.**

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



## 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 101](#)
- [“Setting Up a Solaris DHCP Server” on page 101](#)
- [“Setting Up a Windows 2000 Advanced Server” on page 106](#)

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 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:**

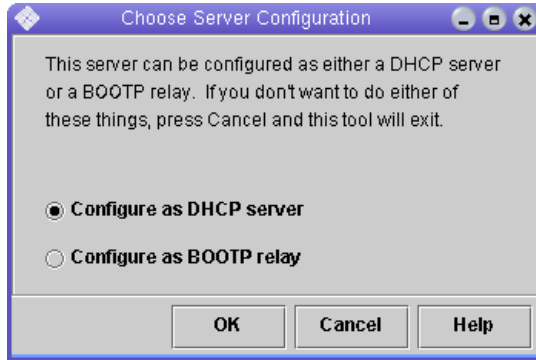
```
#netmasks: nis [NOTFOUND=return] files
```

```
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:

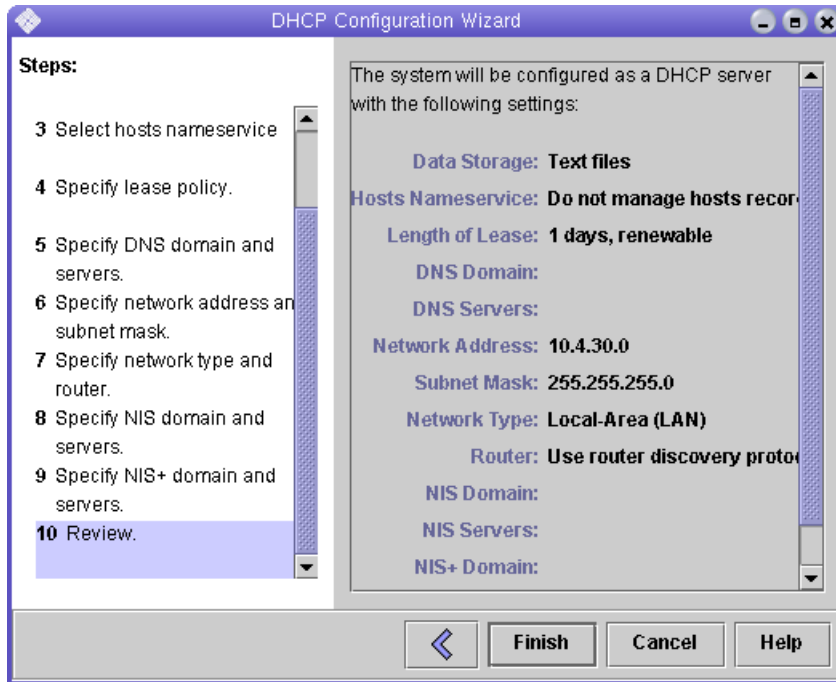


The wizard will prompt you for information related to the configuration, network address, and subnet mask of the controller tray. Select or enter the following information:

- 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**

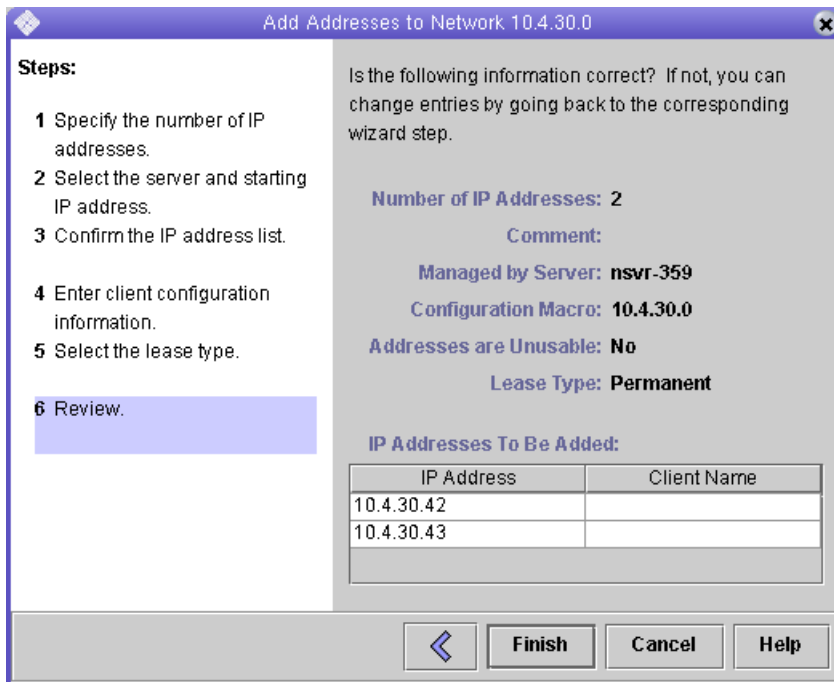
Your summary page should look similar to the following example:





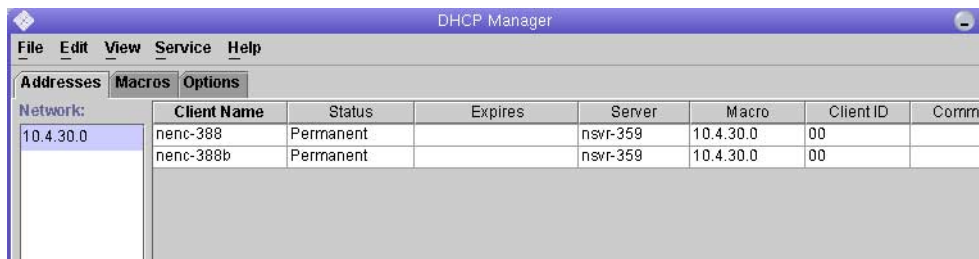
3. **Verify your configuration information and click Finish.**
4. **When you are prompted to configure addresses for the server, click Yes.**  
The Add Address to Network wizard is displayed.
5. **Enter the following information:**
  - Number of IP addresses
  - Name of managing server
  - Starting IP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

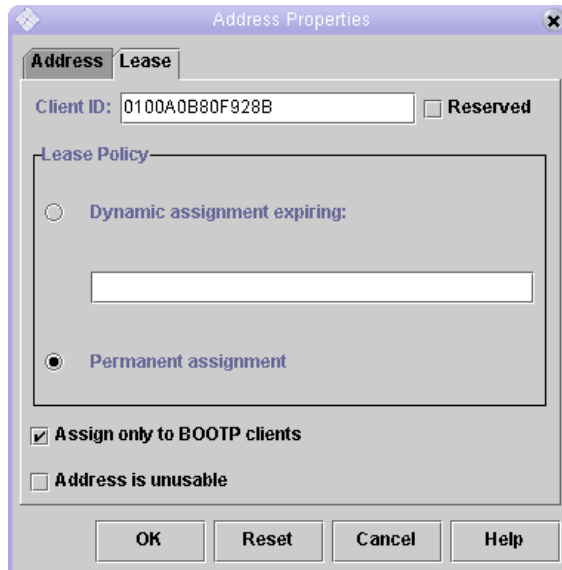


**7. In the Address Properties window, do the following for each RAID controller:**

**a. In the 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."**



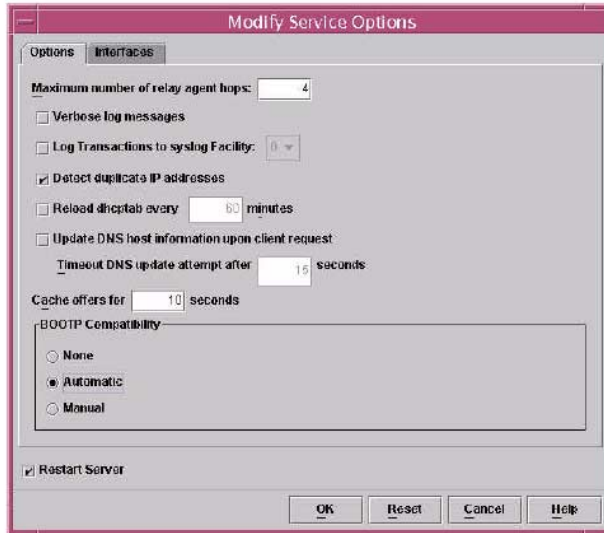
c. Click OK.

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

Network:	Client Name	Status	Expires	Server	Macro	Client ID	Com
10.4.30.0	nenc-388	Bootp		nsvr-359	10.4.30.0	0100A0B80F928B	
	nenc-388b	Bootp		nsvr-359	10.4.30.0	0100A0B80F924C	

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.





## Disk Drive Insertion

---

This appendix describes how to properly insert a disk drive into a controller or expansion tray.

Drives are inserted with the power on, unless specifically instructed not to by Sun technical support.

The correct way to insert a disk drive into the tray is as follows:

1. Lift the drive handle up to open it.
2. Push the disk drive into the chassis by slowly pushing against the drive housing until the drive handle engages with the chassis.
3. When the handle starts to move itself downwards, push the disk drive handle down. This will crank the disk drive the rest of the way into the chassis.

FIGURE B-1 shows a drive being inserted into the chassis the correct way.

**FIGURE B-1** Inserting a Disk Drive



When the drive is completely installed, the drive and handle will be flush with the others, as shown in [FIGURE B-2](#).

**FIGURE B-2** Successfully Inserted Disk Drive



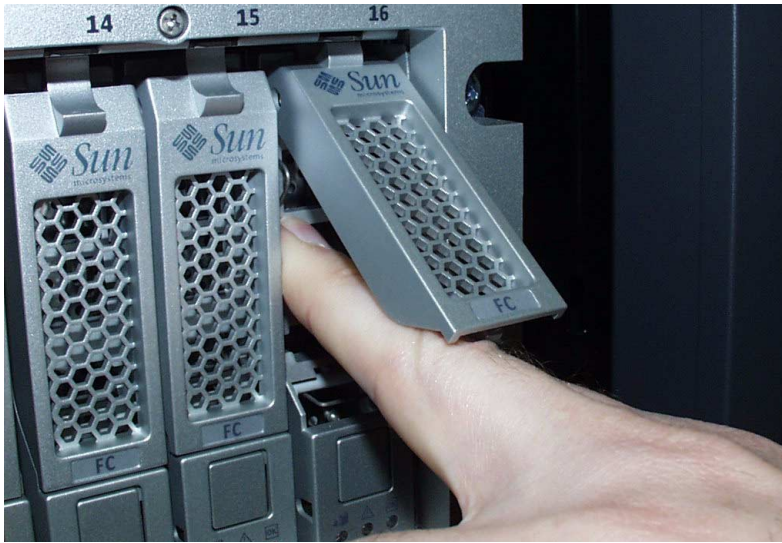
---

**Caution** – Do not insert a disk drive into a tray by pushing on its housing until it is all the way in. This can cause the handle to be stuck in the “up” position so it is unable to close.

---

FIGURE B-3 shows the incorrect way to insert the drive.

**FIGURE B-3** Incorrect Method of Inserting a Hard Drive



# 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](http://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 SCS command-line interface is available from the remote CLI client or through an SCS directory on the Solaris Operating System management software station.
- controller tray** A tray with an installed redundant RAID controller pair. In a Sun Storage 6180 array, 1x1, 1x2, 1x3, 1x4, 1x5, 1x6, and 1x7 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

<b>failover and recovery</b>	The process of changing the data path automatically to an alternate path.
<b>fault coverage</b>	The percentage of faults detected against all possible faults or against all faults of a given type.
<b>FC</b>	See <a href="#">Fibre Channel (FC)</a> .
<b>Fibre Channel (FC)</b>	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.
<b>Fibre Channel switch</b>	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.
<b>field-replaceable unit (FRU)</b>	An assembly component that is designed to be replaced on site, without the system having to be returned to the manufacturer for repair.
<b>FRU</b>	See <a href="#">field-replaceable unit (FRU)</a> .

## H

<b>HBA</b>	See <a href="#">host bus adapter (HBA)</a> .
<b>host</b>	As a function of the Sun Storage 6180 array configuration, a representation of a data host that is mapped to initiators and volumes to create a storage domain. See also <a href="#">data host</a> , <a href="#">initiator</a> .
<b>host bus adapter (HBA)</b>	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 <a href="#">initiator</a> .
<b>host group</b>	A group of hosts with common storage characteristics that can be mapped to volumes. See also <a href="#">host</a> .
<b>hot-spare</b>	The drive used by a controller to replace a failed disk. See also <a href="#">array hot-spare</a> .

## 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 Storage 6180 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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