Sun StorageTek™ 6140 Array Getting Started Guide

Release 2.0 Installation and Configuration

Sun Microsystems, Inc.
www.sun.com

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Preface

The *Sun StorageTek 6140 Array Getting Started Guide* is a combined installation, initial configuration, and getting started guide for the Sun StorageTek 6140 array, release 2.0. This guide describes how to install rack-mounting rails, array modules, and management and configuration software.

Before You Read This Book

Before you begin to install the Sun StorageTek 6140 array, you must have already prepared the site as described in these books:

- *Sun StorageTek 6140 Array Regulatory and Safety Compliance Manual*
- *Sun StorageTek 6140 Array Site Preparation Guide*

How This Book Is Organized

Chapter 1 provides an overview of the Sun StorageTek 6140 array, management software, and installation process.

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

Chapter 3 describes tray power-on procedures.

Chapter 4 describes how to connect the management host and data hosts to enable access to the array.

Chapter 5 describes how to install management and data host software on hosts running Solaris OS.

Chapter 6 describes how to configure IP addressing for the array.

Chapter 7 describes initial array setup procedures using the management software.

Chapter 8 describes how to install data host and remote management software on hosts not running Solaris OS.

Chapter 9 introduces you to the software and provides information for planning your storage configuration.

Appendix A provides worksheets to help you gather the information you need to complete the installation.

Appendix B describes how to set up a DHCP server.

Using UNIX Commands

This document does not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at `http://docs.sun.com`

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

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

* The settings on your browser might differ from these settings.

Related Documentation

Application	Title	Part Number
Site planning information	*Sun StorageTek 6140 Array Site Preparation Guide*	819-5046-*nn*
Late-breaking information not included in the information set	*Sun StorageTek 6140 Array Release Notes*	819-5044-*nn*
	Sun Storage Automated Diagnostic Environment Enterprise Edition Release Notes	819-0432-*nn*
Quick reference information for installing the array	*Sun StorageTek 6140 Array Poster*	819-5064-nn
Printable version of the online help	*Sun StorageTek 6140 Array Administration for the Browser Interface Management Software*	819-5050-nn
Quick reference information for the CLI	*Sun StorageTek 6130, 6140, and 6540 Arrays sscs(1M) CLI Quick Reference*	819-5051-nn
Regulatory and safety information	*Sun StorageTek 6140 Array Regulatory and Safety Compliance Manual*	819-5047-*nn*
Instructions for installing the Sun StorEdge Expansion cabinet	*Sun StorEdge Expansion Cabinet Installation and Service Manual*	805-3067-*nn*
Instructions for installing the Sun Rack 900/1000 cabinets	*Sun Rack Installation Guide*	816-6386-*nn*

Accessing Sun Documentation

You can obtain Sun network storage documentation at:

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

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http://www.sun.com/documentation

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Please include the title and part number of your document with your feedback:

Sun StorageTek 6140 Array Getting Started Guide, part number 819-5045-11.

CHAPTER 1

Overview

This chapter provides an overview of the Sun StorageTek 6140 Array. It contains the following sections:

Product Overview

The Sun StorageTek 6140 Array is a high-performance, enterprise-class, full 4 Gigabit per second (Gb/s) Fibre Channel solution that combines outstanding performance with the highest reliability, availability, flexibility, and manageability.

The Sun StorageTek 6140 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 (FIGURE 1-1).

This section contains an overview of the Sun StorageTek 6140 Array hardware and software.

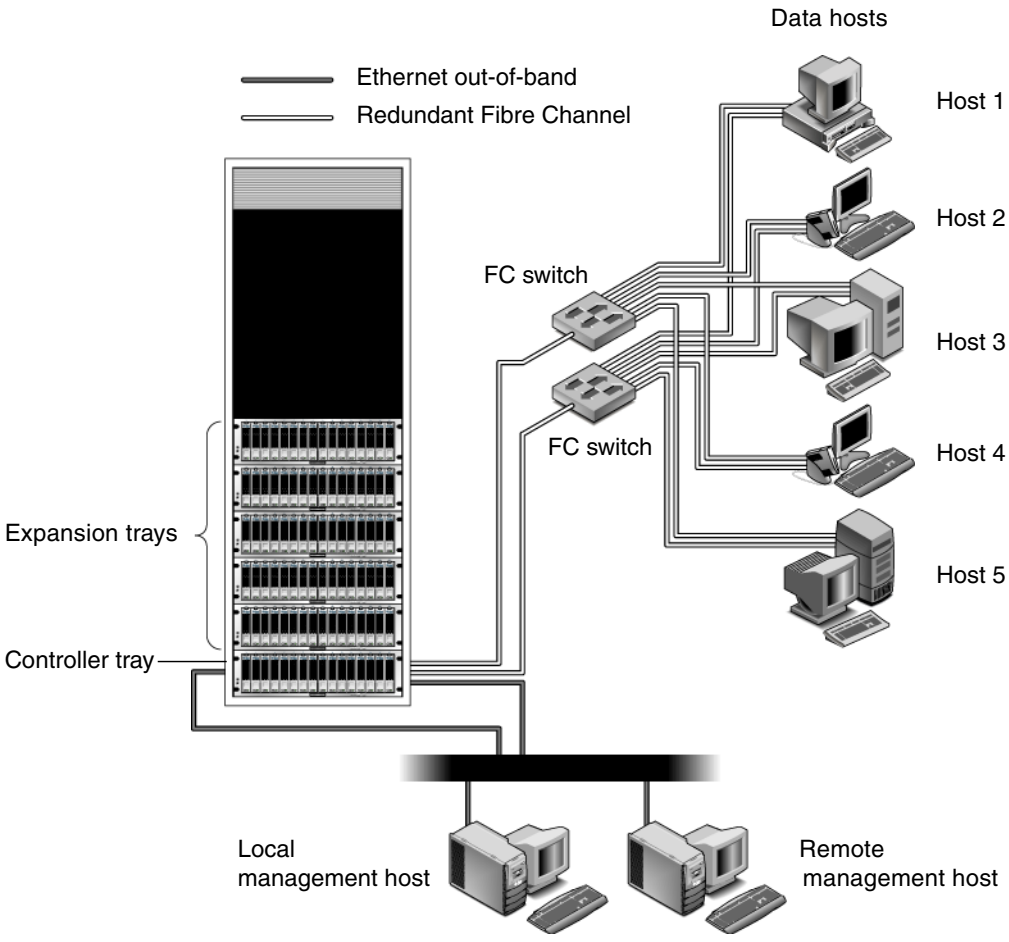


FIGURE 1-1 Sun StorageTek 6140 Array Product Overview

Hardware Overview

The Sun StorageTek 6140 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 controller or expansion tray can contain 5 to 16 disk drives, allowing the array to support up to 112 disk drives.

The StorageTek 6140 Array can be installed in the Sun Rack 900 /1000 or Sun StorEdge Expansion cabinets.

This section describes the main components of the Sun StorageTek 6140 Array controller and expansion trays.

Controller Tray

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 describes the controller tray configuration.

TABLE 1-1 Sun StorageTek 6140 Array Controller Tray

Description	Quantity
FC RAID controllers	2
FC/SATA II disk drives	5 –16, 4-Gb or 2-Gb drives per tray
Ethernet ports for management host connections	4 (2 per controller)
4/2 Gbps FC host ports with SFPs	8 (4 per controller)
4/2 Gbps FC expansion ports	4 (2 per controller)
Power supply/fan assemblies	2
Battery Backup Compartments	2

FIGURE 1-2 shows the LEDs and components at the front of the controller tray.

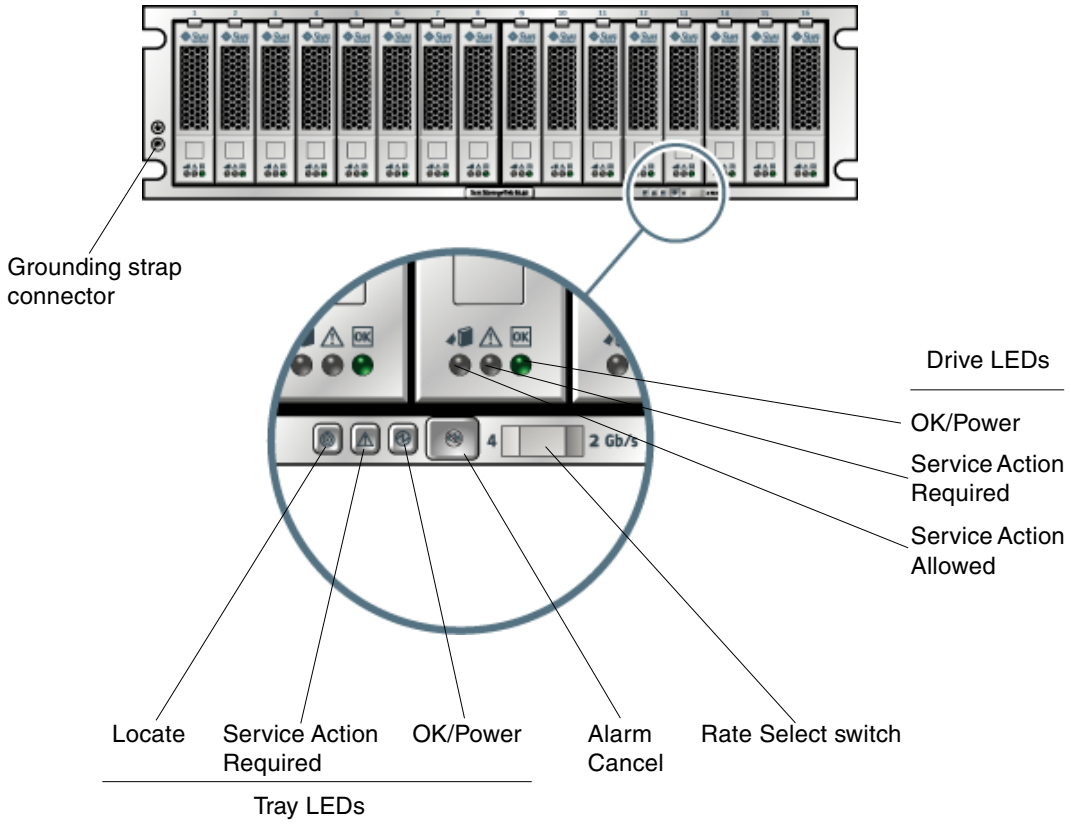


FIGURE 1-2 Controller Tray (Front View)

TABLE 1-2 describes the LEDs and components at the front of the controller tray.

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

TABLE 1-2 Controller Tray LEDs and Components (Front)

LED/Component	Description
Drive LEDs	
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.
Tray LEDs	
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 (Front) *(Continued)*

LED/Component	Description
Tray Components	
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.
Grounding strap connector 	Use this connector to connect a grounding strap to the tray before handling the tray or its components.

FIGURE 1-3 shows the ports and components at the back of the controller tray.

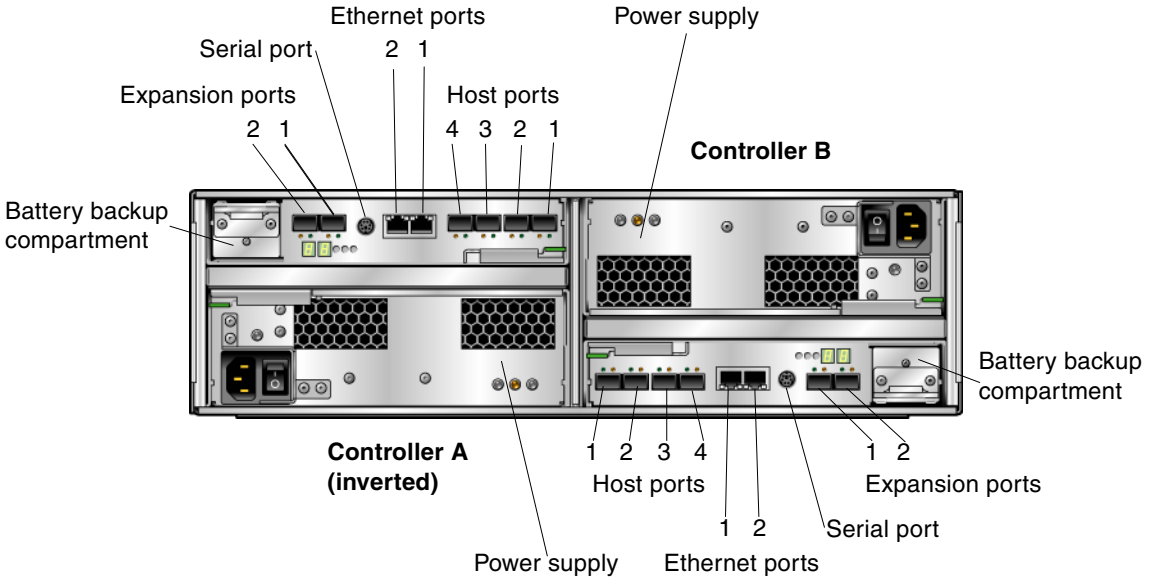


FIGURE 1-3 Controller Tray Port and Components (Back View)

TABLE 1-3 describes the ports and components at the back of the controller tray.

TABLE 1-3 Controller Tray Ports and Components (Back)

Ports/Switches	Description
Host ports (Ch 1 - Ch4)	Four 4-, 2-, or 1-Gbit/second FC Small Form-factor Plug-in (SFP) ports. Ch4 host port is reserved for remote replication requirements. **Note:** 1 Gbit/second operation is not supported.
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 tray, and for recovery of a lost password for the tray.
Power supplies	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 "Battery Backup Compartments" on page 10 for more information on the battery backup compartments.

FIGURE 1-4 shows the LEDs and indicators at the back of the controller tray.

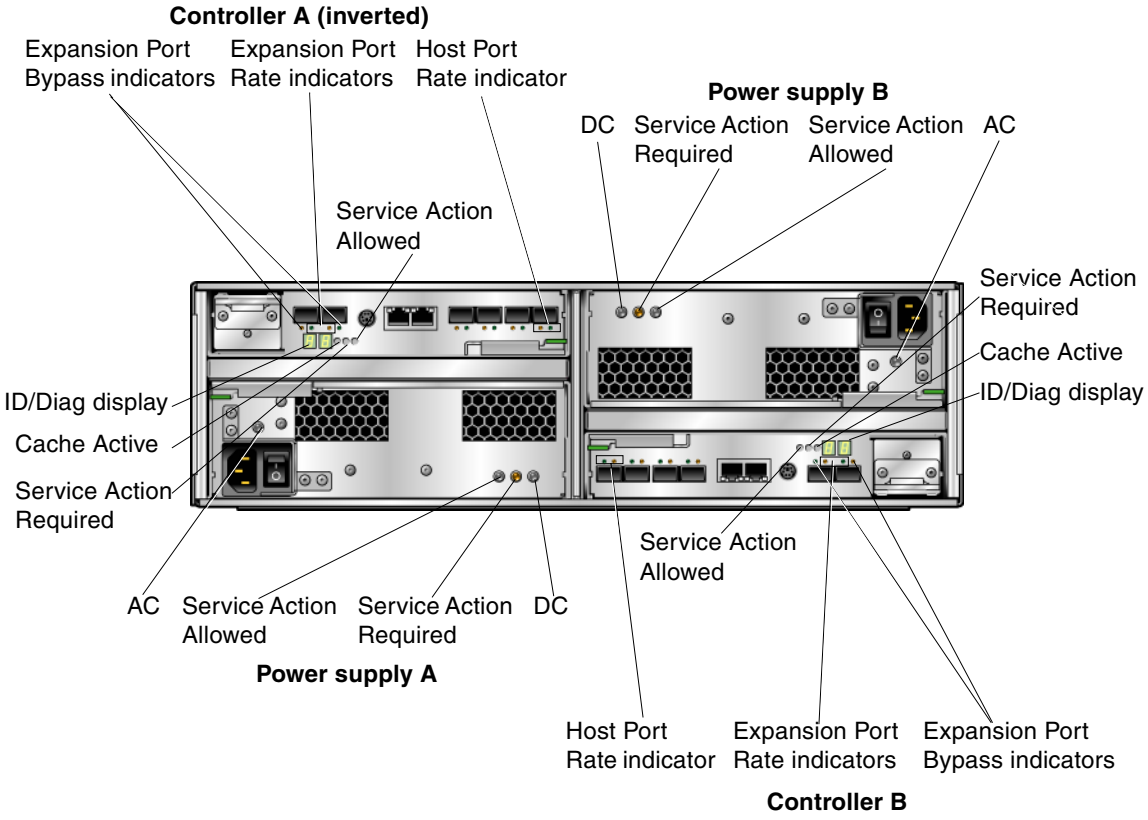


FIGURE 1-4 Controller Tray LEDs and Indicators (Back View)

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

TABLE 1-4 Controller Tray LEDs and Indicators (Back)

LED/Indicator	Description
Power Supply LEDs	
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.
Controller LEDs	
ID/Diag display	Seven-segment readouts indicate the ID of the tray.
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 (Back) *(Continued)*

LED/Indicator	Description
Controller Indicators	
Host Port Rate 	The combined display indicates the host port link rate for the tray: • LED 1 On, LED 2 On – 4 Gbits/second • LED 1 Off, LED 2 On – 2 Gbits/second • LED 1 On, LED 2 Off – 1 Gbits/second (Not supported)
Expansion Port Rate 	The combined display indicates the expansion port link rate for the tray: • LED 4 On, LED 2 Off – 4 Gbits/second • LED 4 Off, LED 2 On – 2 Gbits/second
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 Status (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 Rate (on upper right-side of Ethernet connector)	Steady green indicates that the 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.

Battery Backup Compartments

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

FIGURE 1-5 shows the location of the battery compartments on the controller and identifies the LEDs on the compartment.

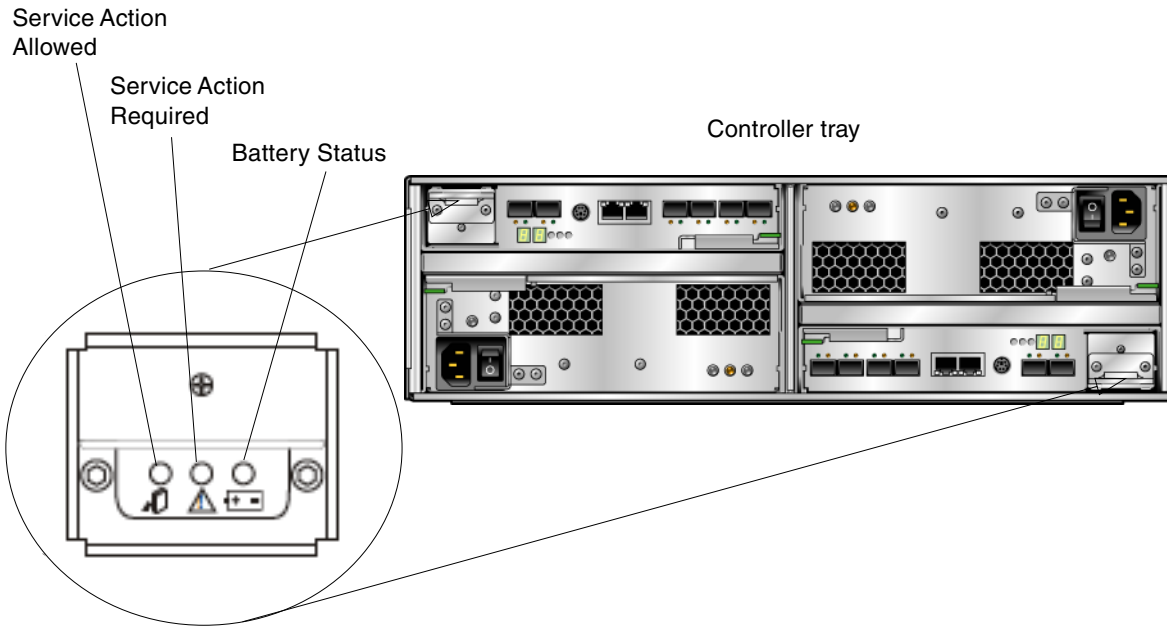


FIGURE 1-5 Battery Backup Compartment LEDs

TABLE 1-5 describes the LEDs on the back of each battery backup compartment.

TABLE 1-5 Battery Backup Compartment LEDs

LED/Indicator	Description
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 should not be implemented.
Service Action Required 	Steady amber indicates that the power supply requires service. Off indicates that the battery does not require service.
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 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.

TABLE 1-6 describes the expansion tray configuration.

TABLE 1-6 Sun StorageTek 6140 Array Expansion Tray

Description		Quantity
FC or SATA II disk drives	FC hard disk drives: 73G10K, 73G15K, 146G10K	Five to sixteen 4- or 2-Gbit/second drives.
	SATA II hard disk drives: 500G7.2K	Five to sixteen 3-Gbit/second drives with circuitry to support operation in either 4- or 2-Gbit/second environments.
Drive expansion ports		1 per controller. An additional expansion port per controller is reserved for future use.
Power supply/fan assemblies		2

FIGURE 1-6 shows the ports and components at the back of the expansion tray.

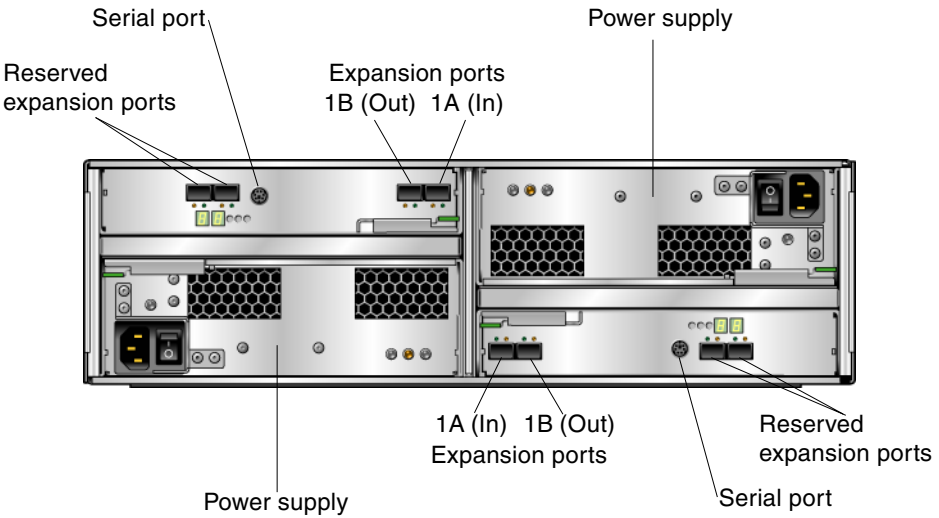


FIGURE 1-6 Expansion Tray Ports and Components (Back)

TABLE 1-7 describes the ports and components at the back of the expansion tray.

TABLE 1-7 Expansion Tray Ports and Components (Back)

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	A port that allows terminal access for display or configuration of the IP addresses for the tray, and for recovery of a lost password for the tray.
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	Reserved for future use.

FIGURE 1-7 shows the LEDs at the back of the expansion tray.

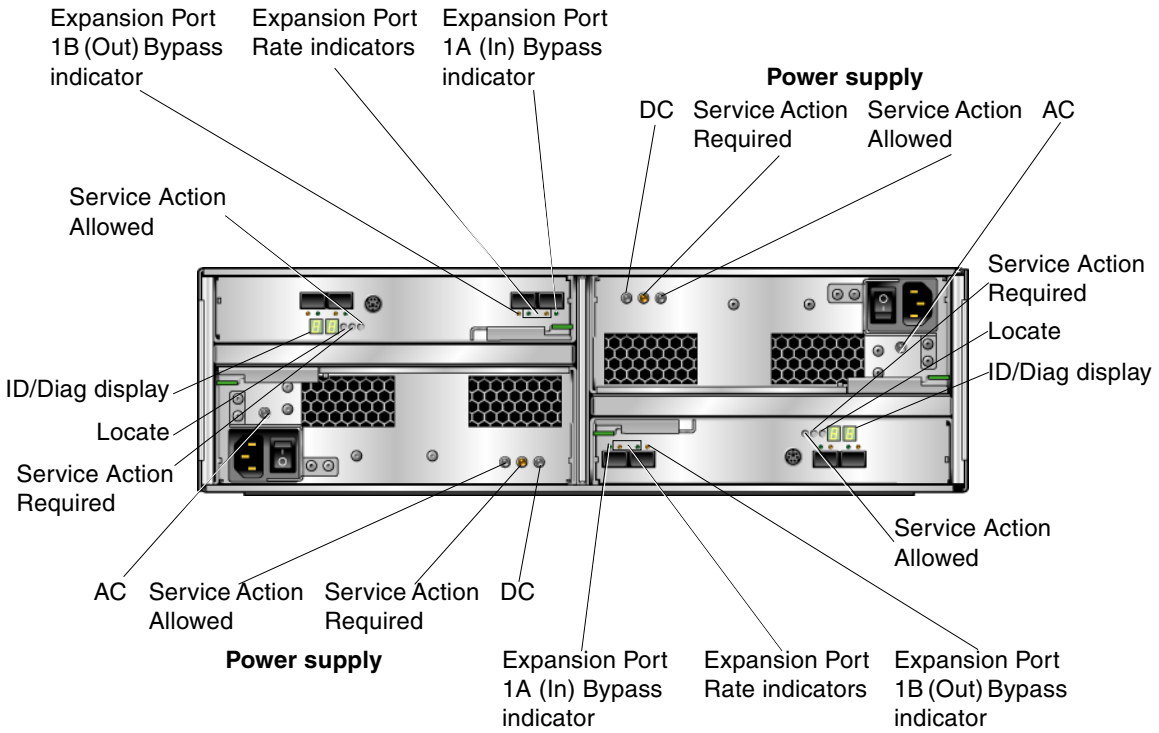


FIGURE 1-7 Expansion Tray LEDs and Indicators (Back)

TABLE 1-8 describes the LEDs and indicators at the back of the expansion tray.

TABLE 1-8 Expansion Tray LEDs and Indicators (Back)

LED/Indicator	Description
Power Supply LEDs	
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.
Expansion Tray LEDs	
ID/Diag display	Seven-segment readouts indicate the ID of the tray.
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 1-8 Expansion Tray LEDs and Indicators (Back) *(Continued)*

LED/Indicator	Description
Expansion Tray Indicators	
Expansion Port Rate 	The combined display indicates the expansion port link rate for the tray: • LED 4 On, LED 2 Off – 4 Gbits/second • LED 4 Off, LED 2 On – 2 Gbits/second
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.

Software Overview

The Sun StorageTek 6140 Array software is delivered on CD and consists of the tools described in the following topics:

- "Management Software" on page 15
- "Remote CLI Client" on page 16
- "Monitoring and Diagnostic Software" on page 16
- "Data Host Software" on page 16

You specify the functionality you require, and the CD installs the necessary software.

Management Software

The Sun StorageTek 6140 Array web-based management software is the primary interface for configuring and managing the array. The management software consists of a suite of tools that you install on an external management host, including the command-line interface (CLI). The management host must be a Sun workstation running the Solaris 8, 9, or 10 Operating System (OS).

The management software enables the storage administrator to manage the Sun StorageTek 6140 Array from any system with a web browser that is on the same network as the management host. For a list of supported browsers, see the *Sun StorageTek 6140 Array Release Notes*.

Remote CLI Client

You can also manage and configure storage for the Sun StorageTek 6140 Array using the remote CLI client. The CLI provides the same control and monitoring capability as the web browser, and it is scriptable for running frequently performed tasks.

The remote CLI client is available for Solaris OS and several other operating systems. See the *Sun StorageTek 6140 Array Release Notes* for a list of supported operating system platforms. For more information about the CLI commands, see the `sscs` man page.

Monitoring and Diagnostic Software

The Sun Storage Automated Diagnostic Environment is a monitoring and diagnostic tool for the array. You can configure the software to monitor on a 24-hour basis, collecting information that enhances the reliability, availability, and serviceability (RAS) of the Sun StorageTek 6140 Array. For additional information, see the *Storage Automated Diagnostic Environment Enterprise Edition Release Notes*.

The monitoring and diagnostic software can be accessed from a web browser or from the command line.

Data Host Software

The Sun StorageTek 6140 Array data host software controls the data path between the data host and the array.

Note – The management host can also be used as a data host.

The data host software consists of the following tools:

- Sun StorEdge SAN Foundation software for managing the data path I/O connections between data hosts and the array. This software includes drivers and utilities that enable Solaris data hosts to connect to, monitor, and transfer data in a storage area network (SAN).

Note – The SAN Foundation software is embedded in the Solaris 10 OS.

- Sun StorEdge Traffic Manager software, which provides multipathing functionality and the ability to reliably communicate with the array's storage.

Data host software enables Solaris 8, 9, and 10 workstations and other operating system platforms to communicate with the Sun StorageTek 6140 Array. For a list of supported operating system platforms, see the *Sun StorageTek 6140 Array Release Notes*.

Data host software for the Solaris OS is distributed on the Sun StorageTek 6140 Host Installation Software CD. See Chapter 8 for information about how to obtain the software for other operating systems from Sun's Download Center.

Overview of the Installation Process

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

- Read the *Sun StorageTek 6140 Array Release Notes* for any late-breaking information related to the installation of the array.
- Prepare the site as described in these books:
  - *Sun StorageTek 6140 Array Regulatory and Safety Compliance Manual*
  - *Sun StorageTek 6140 Array Site Preparation Guide*

The following checklist (TABLE 1-9) outlines all of the tasks required for installing the Sun StorageTek 6140 Array hardware and software and tells you where you can find detailed procedures. To ensure a successful installation, perform the tasks in the order in which they are presented.

TABLE 1-9 Sun StorageTek 6140 Array Installation Checklist

Step	Installation Task	Where to Find Procedure
1.	Unpack the cabinet and move it into position.	Unpacking guide attached to the outside of the shipping carton
2.	Install and secure the cabinet.	• *Sun StorEdge Expansion Cabinet Installation and Service Manual* • *Sun Rack Installation Guide*
3.	Unpack the rackmounting kit and check its contents.	"Preparing the Universal Rail Kit" on page 20
4.	Unpack the tray box and check its contents.	"Preparing the Tray" on page 23
5.	Prepare the cabinet for installation.	"Preparing the Cabinet" on page 24
6.	Attach the rails to the cabinet.	"Attaching the Rails to a Cabinet" on page 24
7.	Mount the controller tray and expansion trays in the cabinet.	"Installing a Tray in a Cabinet" on page 39

TABLE 1-9 Sun StorageTek 6140 Array Installation Checklist *(Continued)*

Step	Installation Task	Where to Find Procedure
8.	Attach the power cables.	"Connecting the Power Cables" on page 43
9.	Cable the controller tray and expansion trays.	"Intertray Cabling" on page 44
10.	Set the link rate for each tray.	"Setting the Link Rate for Each Tray" on page 60
11.	Turn on the power.	"Powering On the Array" on page 61
12.	Connect the management host.	"Connecting the Management Host" on page 65
13.	Attach the host interface cables.	"Connecting Data Hosts" on page 67
14.	Install the management and data host software on Solaris OS hosts.	"Installing Management and Data Host Software on Solaris OS Hosts" on page 73
15.	Configure the IP addresses of the array controllers.	"Configuring IP Addressing" on page 95
16.	Start and log in to the management software.	"Starting the Management Software" on page 109
17.	Set initial array settings.	"Using the Browser Interface to Set Up the Array" on page 113
18.	Set initial Storage Automated Diagnostic Environment settings.	"Setting Up the Sun Storage Automated Diagnostic Environment" on page 127
19.	Install the management and data host software on operating systems other than Solaris.	"Installing Data Host and Remote Management Software on Hosts Not Running the Solaris OS" on page 133
20.	Start to configure your storage.	"Planning Your Storage Configuration" on page 139

CHAPTER 2

Installing Trays

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

This chapter describes the process of installing the Sun StorageTek 6140 array. It contains the following sections:

The installation procedures in this chapter require the following items:

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

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

Preparing for the Installation

Use the following procedures to prepare for installation:

Preparing the Universal Rail Kit

Use the universal rail kit to mount the Sun StorageTek 6140 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 main 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)

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

- 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:

Type	Quantity	Use
Sun Rack 900/1000		
10-32 panhead screw	8	Assemble main and extender sections of left and right rails (Typically, left and right rails are shipped pre-assembled)
8-32 panhead screw	4	Mount left and right rails to front of cabinet rails
Metric M6 panhead screw	4	Mount left and right rails to back of cabinet rails
Metric M6 panhead screw	4	Secure front of tray to left and right cabinet rails
6-32 flathead screw	2	Secure back of tray to left and right side rails
Sun StorEdge Expansion cabinet		
10-32 panhead screw	8	Assemble main and extender sections of left and right rails (Typically, left and right rails are shipped pre-assembled)
10-32 panhead screw	8	Mount left and right rails to inner mount points at front and back of cabinet
8-32 panhead screw	4	Mount left and right rails to front cabinet rails
10-32 panhead screw	4	Secure front of tray to left and right cabinet rails
6-32 flathead screw	2	Secure back of tray to left and right side rails
19-inch wide, 4-post EIA-compatible cabinet with 10-32 threaded cabinet rails		
10-32 panhead screw	8	Assemble main and extender sections of left and right rails (Typically, left and right rails are shipped pre-assembled)
8-32 panhead screw	4	Mount left and right rails to front cabinet rails
10-32 panhead screw	4	Mount left and right rails to back cabinet rails
10-32 panhead screw	4	Secure front of tray to left and right cabinet rails
6-32 flathead screw	2	Secure back of tray to left and right side rails
19-inch wide, 4-post EIA-compatible cabinet with M5 or 12-24 threaded cabinet rails*		
10-32 panhead screw	8	Assemble main and extender sections of left and right rails (Typically, left and right rails are shipped pre-assembled)
8-32 panhead screw	4	Mount left and right rails to front cabinet rails
6-32 flathead screw	2	Secure back of tray to left and right side rails

Type	Quantity	Use
19-inch wide, 4-post EIA-compatible cabinet with unthreaded cabinet rails**		
10-32 panhead screw	8	Assemble main and extender sections of left and right rails (Typically, left and right rails are shipped pre-assembled)
Cabinet rail adapter plate	2	Snaps into left and right front cabinet rails to allow you to secure the front of the array to the left and front cabinet rails
10-32 panhead screw	4	Secure the front of the array to the adapter plates on the left and front cabinet rails
6-32 flathead screw	2	Secure back of tray to left and right side rails

*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).

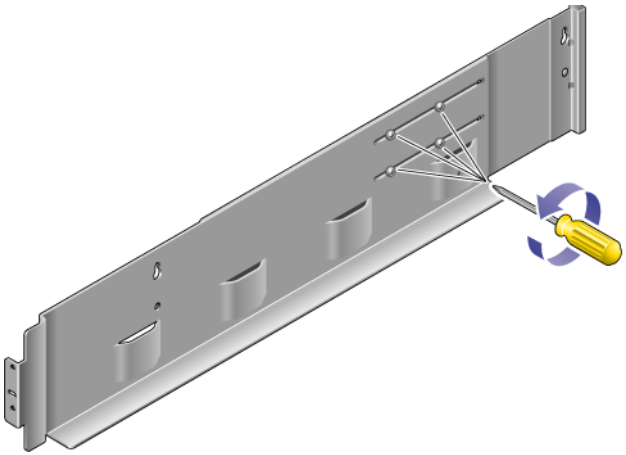


FIGURE 2-1 Loosening the Rail Screws to Adjust the Rail Length

---

Note – The rails are preconfigured to adjust to cabinet rail depths of between 26.18 inches (664.97 mm) and 28.93 inches (734.82 mm). 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.

Preparing the Tray

Caution – Two people are needed to lift and move the tray. Use care to avoid injury. A tray can weigh up to 95 pounds (43 kg). 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 StorageTek 6140 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
- Sun StorageTek 6140 Host Installation Software CD
- *Sun StorageTek 6140 Array Getting Started Guide*
- *Sun StorageTek 6140 Array Poster*
- *Accessing Documentation* guide

- Ship kit for each expansion tray
  - Two 2-meter copper FC cables
  - *Accessing Documentation* guide

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 room remains in the cabinet, repeat for the next controller and expansion trays.

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

Attaching the Rails to a Cabinet

Depending on the type of 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 25
- "Attaching the Universal Rail Kit to a Sun StorEdge Expansion or Sun Fire Cabinet" on page 30
- "Attaching the Universal Rail Kit to a Standard 19-Inch Cabinet With Unthreaded Cabinet Rails" on page 33

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**).**

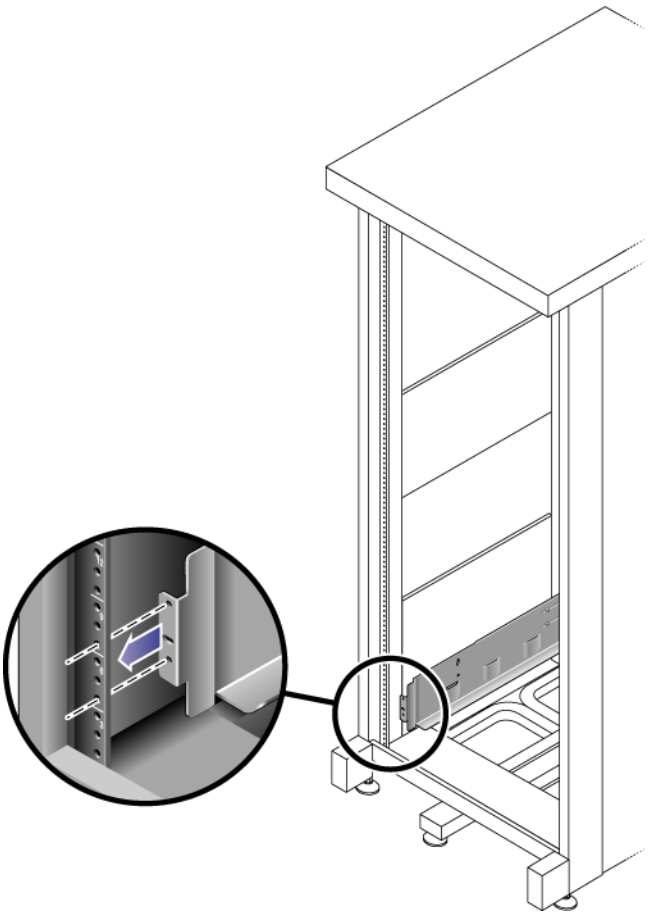


FIGURE 2-2 Positioning the Front of the Left Rail Behind the Left Front Cabinet Rail

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.

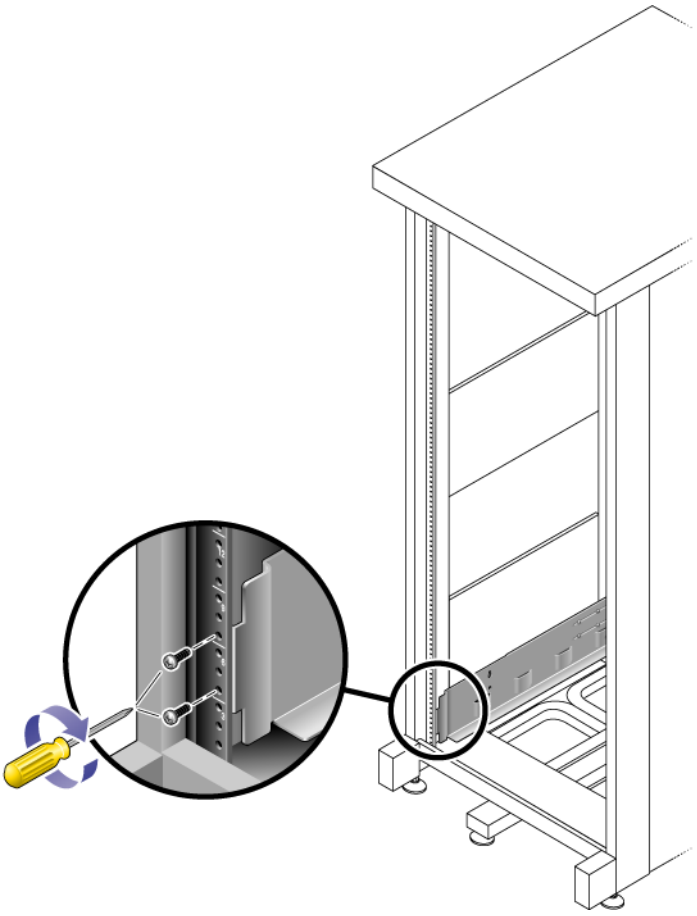


FIGURE 2-3 Securing the Left Rail to the Front of the Cabinet

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).**

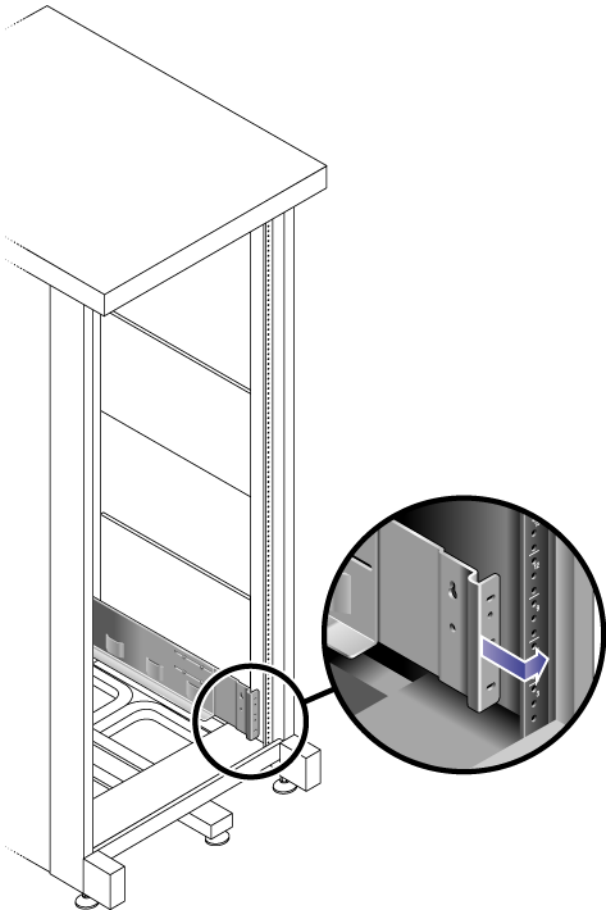


FIGURE 2-4 Adjusting the Length of the Left Rail at the Back of the Cabinet

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 or Sun Rack 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 rail 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.

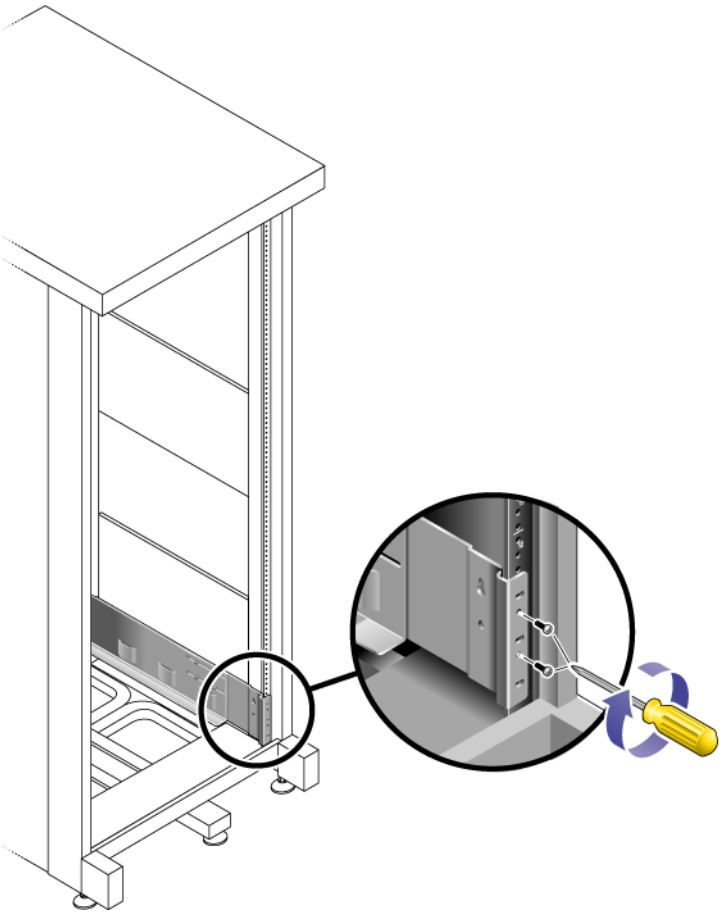


FIGURE 2-5 Securing the Left Rail to the Back of the Cabinet

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**).**

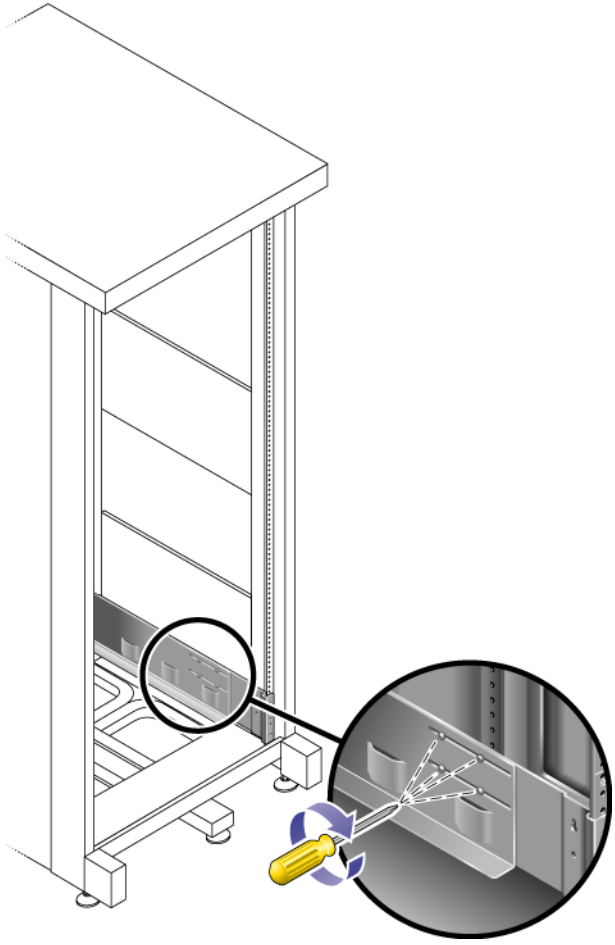


FIGURE 2-6 Tightening the Rail Adjustment Screws

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.

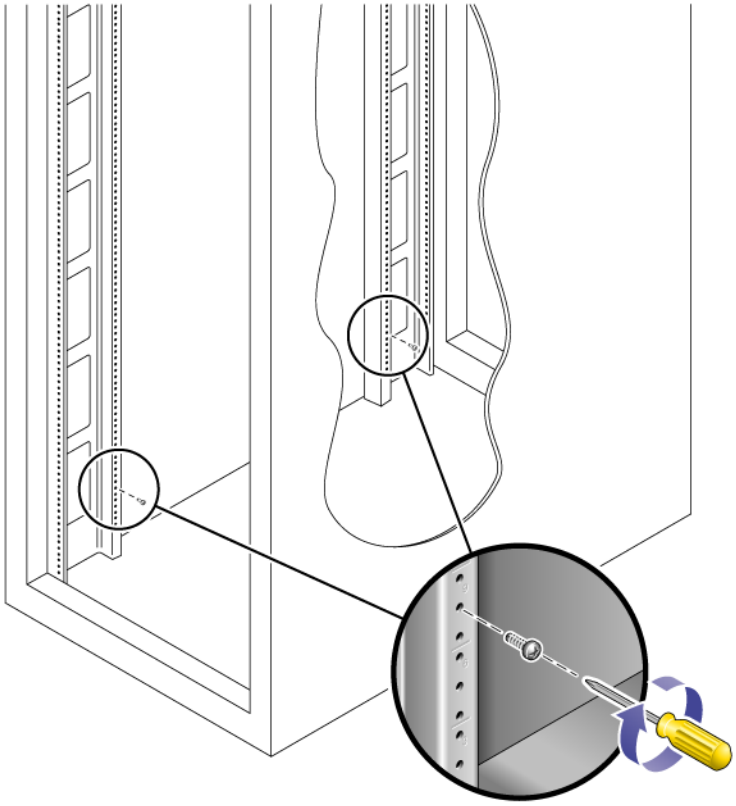


FIGURE 2-7 Inserting Rail Mounting Screws in Middle Holes of the Upper Mounting Unit of the Mounting Slot

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**).**

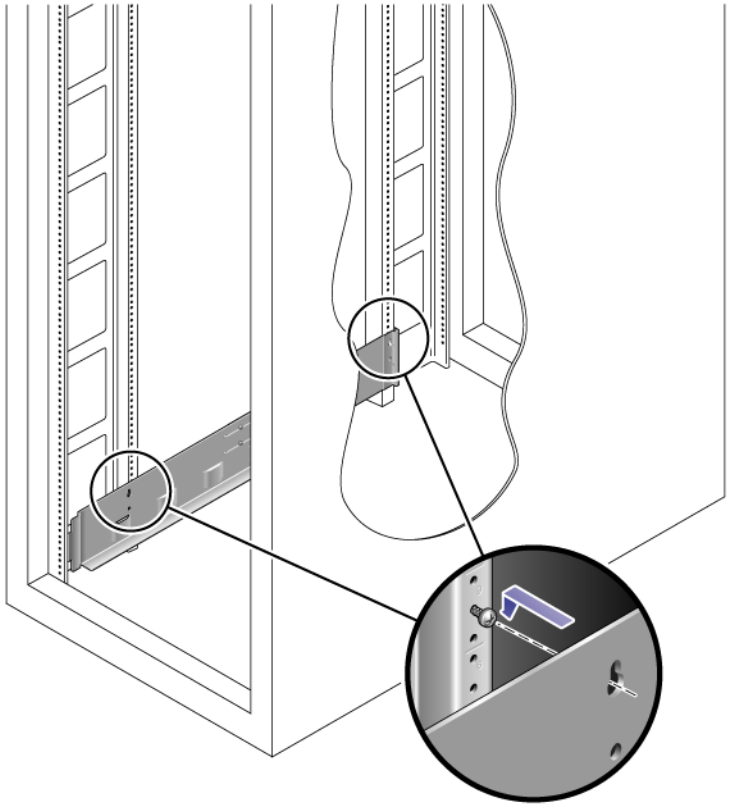


FIGURE 2-8 Hanging the Rail

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.

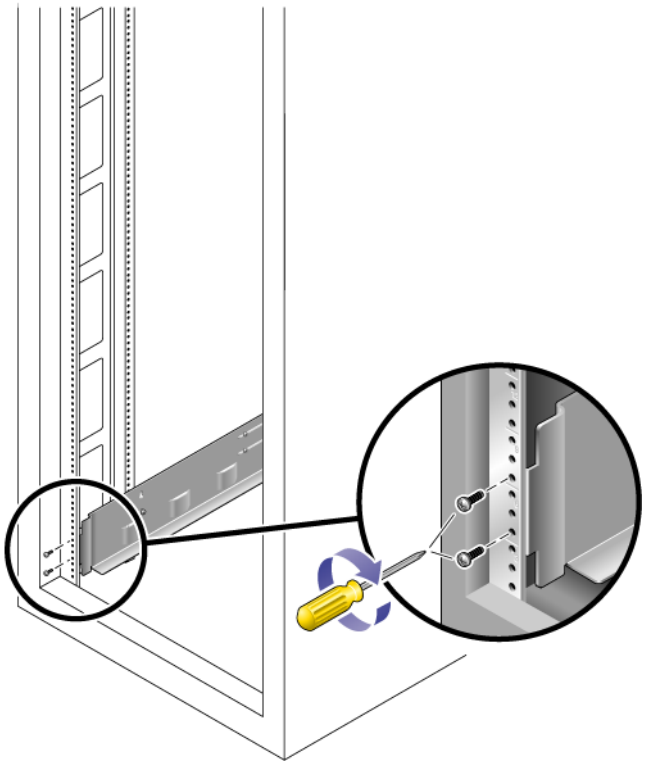


FIGURE 2-9 Inserting Screws in the Lower Side Mounting Holes of the Cabinet

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.

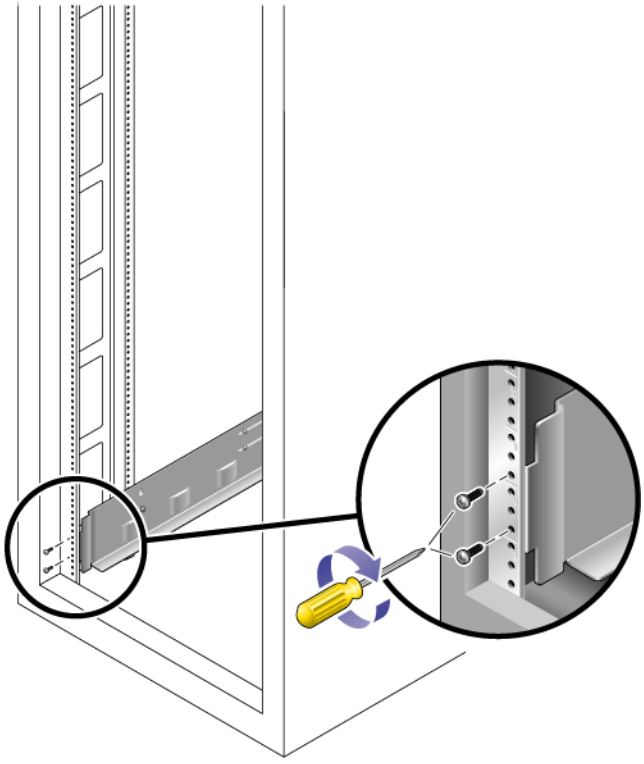


FIGURE 2-10 Securing the Rail to the Front of the Cabinet

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**).**

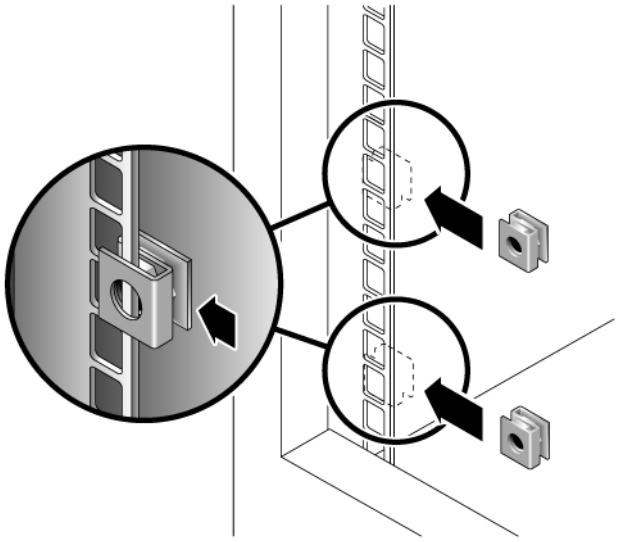


FIGURE 2-11 Inserting Cage Nuts Over Rail Mounting Holes in Cabinet Rails

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

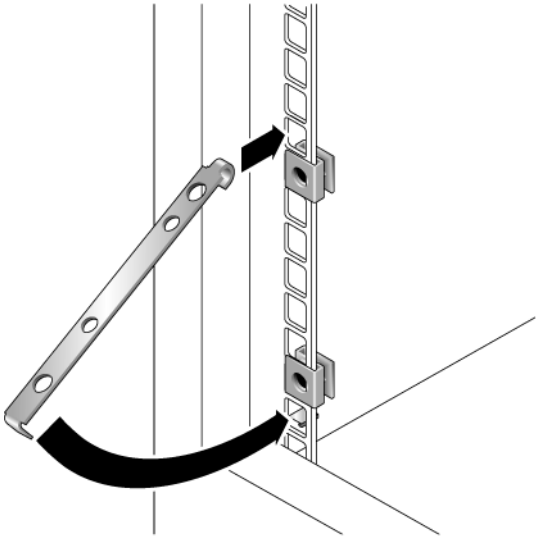


FIGURE 2-12 Inserting the Cabinet Rail Adapter Plate on the Cabinet Rail

3. **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.

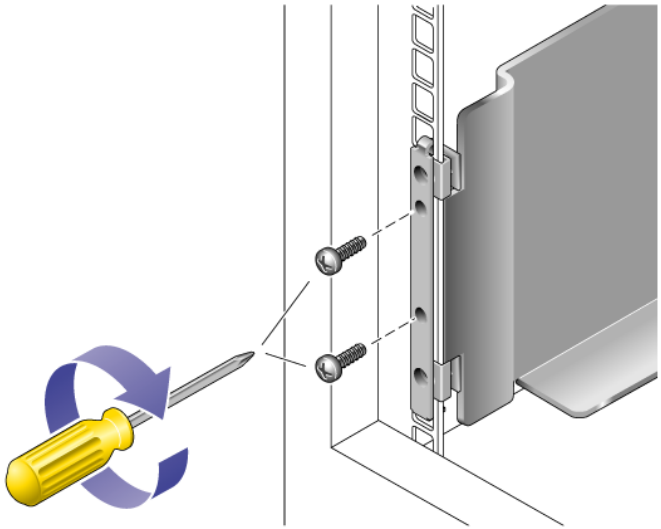


FIGURE 2-13 Securing the Rail to the Front of the Cabinet

4. **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**).**

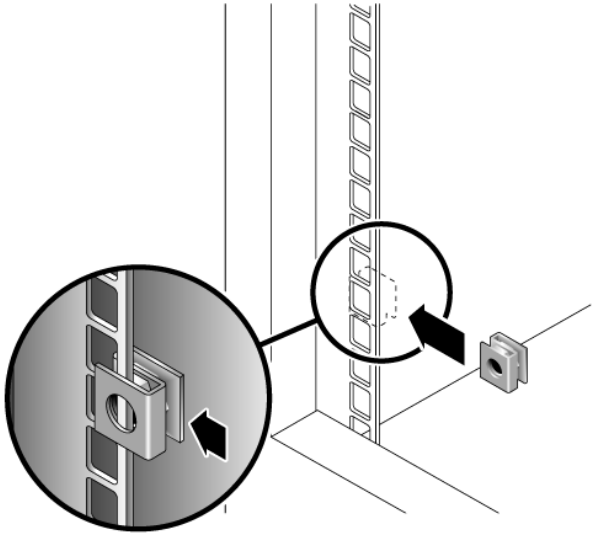


FIGURE 2-14 Inserting A Cage Nut on the Cabinet Rail at the Rear of the Cabinet

5. **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**).**

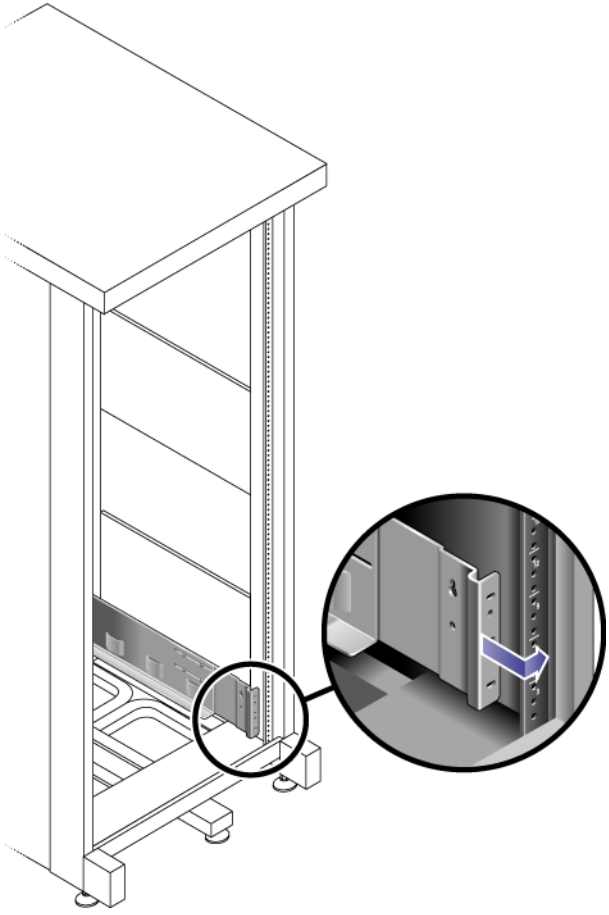


FIGURE 2-15 Adjusting the Length of the Rail at the Back of the Cabinet

6. **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.

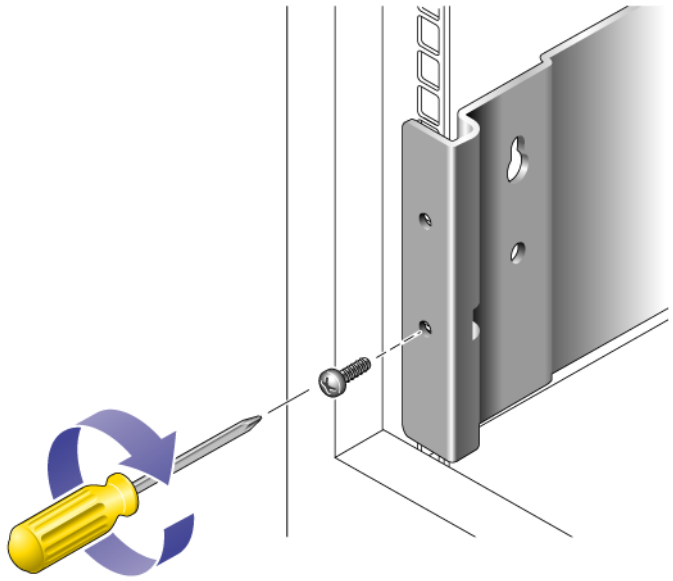


FIGURE 2-16 Securing the Rail to the Back of the Cabinet

Installing a Tray in a Cabinet

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.

1. **Using two people, one at each side of the tray, carefully lift and rest the tray on the bottom ledge of the left and right rails (**FIGURE 2-17**).**

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

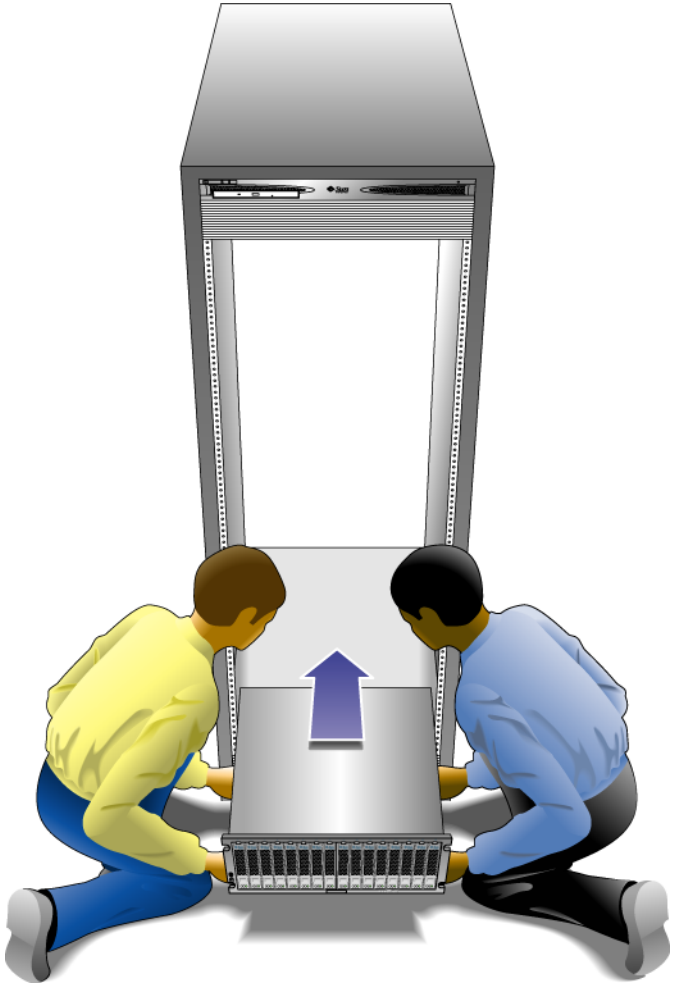


FIGURE 2-17 Positioning the Tray in the Cabinet

2. **Carefully slide the tray into the cabinet until the front flanges of the tray touch the vertical face of the cabinet (**FIGURE 2-18**).**

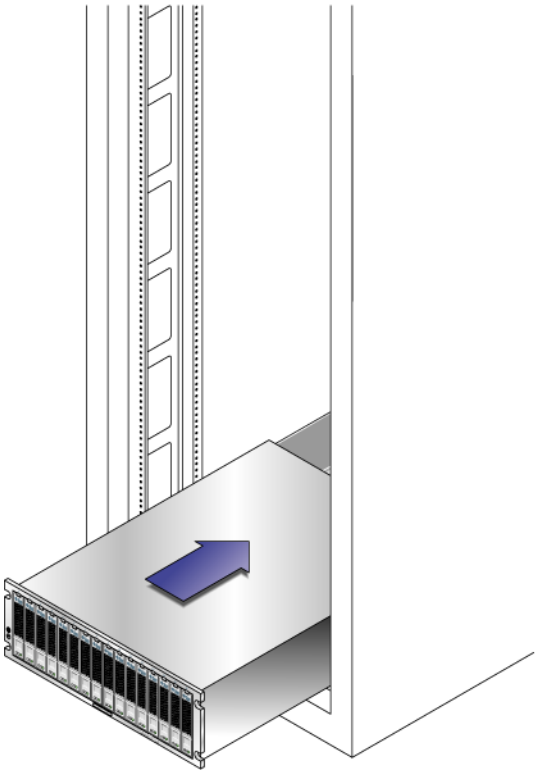


FIGURE 2-18 Sliding the Tray Into the Cabinet

3. **Depending on the type of cabinet you have, do one of the following:**
   - For a Sun Rack 900/1000 cabinet, 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 2-19).

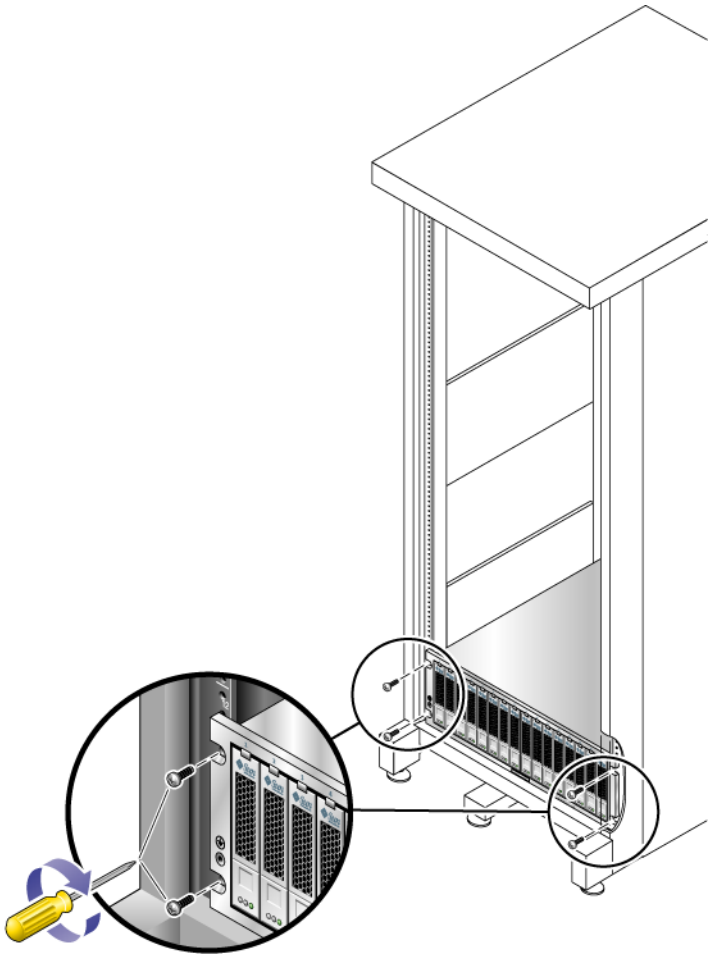


FIGURE 2-19 Securing the Tray to the Front of a Sun Rack 900/1000 Cabinet

- 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 2-20).

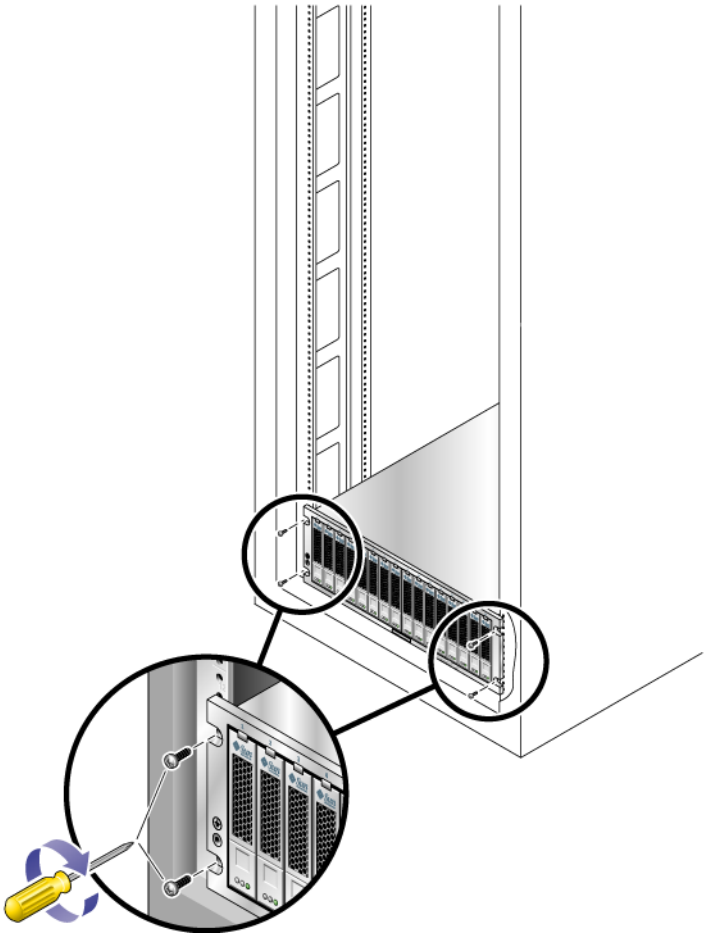


FIGURE 2-20 Securing the Tray to the Front of a Sun StorEdge Expansion Cabinet

- 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.

4. **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 2-21**).**

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

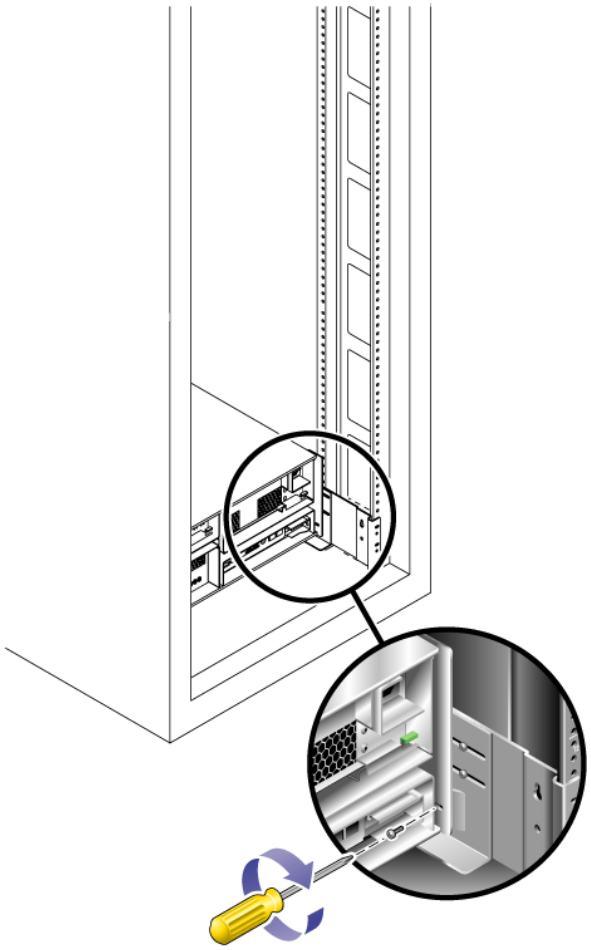


FIGURE 2-21 Securing the Tray to the Back of the Cabinet Rail

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 3.

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 2-22).

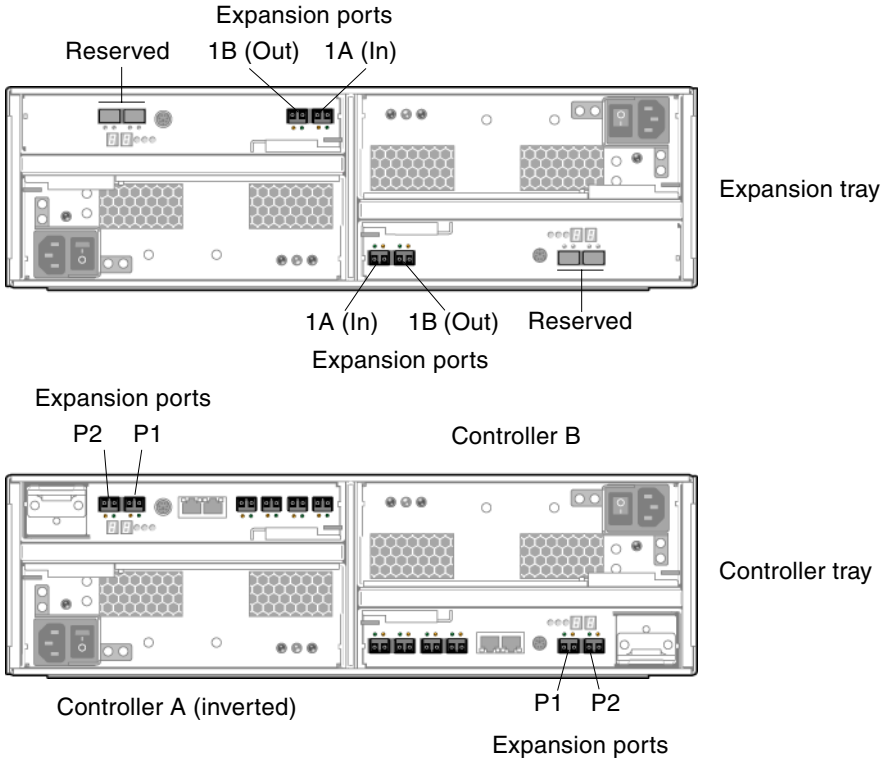


FIGURE 2-22 Expansion Ports on the Controller and Expansion Trays

Array Configuration Naming Convention

The configuration naming convention is “controllers x trays” where the first number is the controller tray and the second is the sum of the controller tray and the number of expansion trays. wFor 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 (TABLE 2-1).

TABLE 2-1 Controller and Expansion Tray Configurations

Configuration Identifier	Controller Tray	Number of Expansion Trays
1x1	1	0
1x2	1	1
1x3	1	2
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 StorageTek 6140 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 copper FC cables are required (530-3327-01).

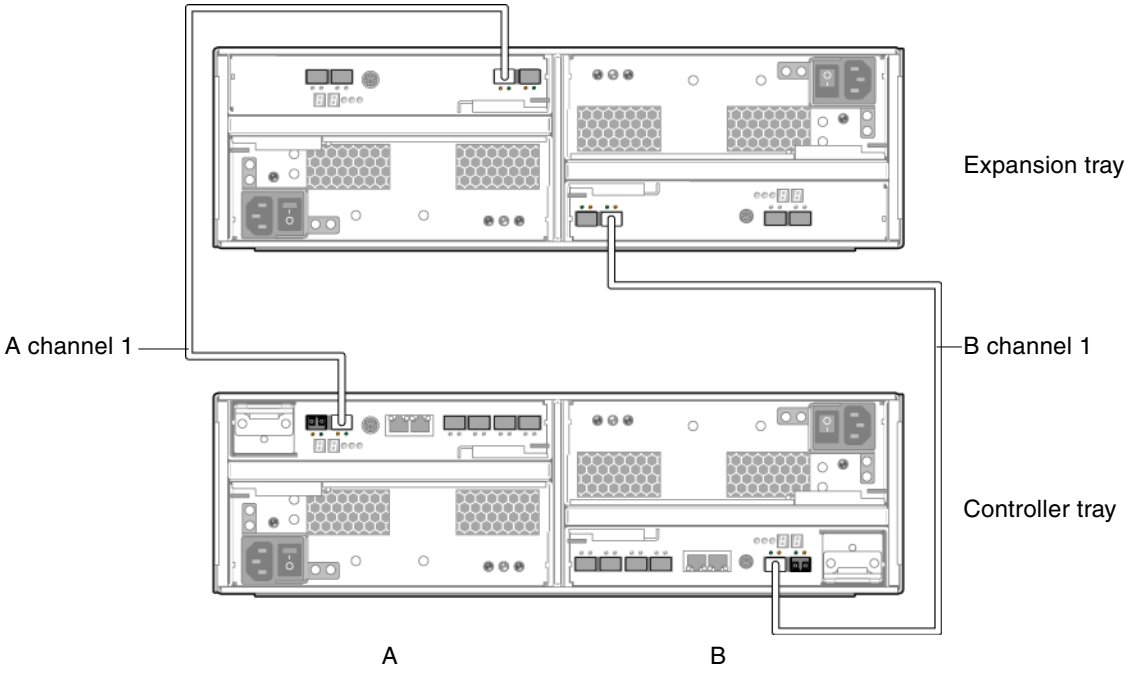


FIGURE 2-23 1x2 Array Configuration Cabling

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-22**).**
2. **Locate expansion ports 1A (In) and 1B (Out) at the A-side and B-side back of the expansion tray (**FIGURE 2-22**).**
3. **Connect one FC cable between the Controller B channel 1 expansion port and the B-side port 1B of the expansion tray (**FIGURE 2-23**).**
4. **Connect one FC cable between the Controller A channel 1 expansion port and the A-side port 1B of the expansion tray (**FIGURE 2-23**).**

   In this configuration, the following expansion ports are not used:

   - Controller B channel 2 expansion port
   - Controller A channel 2 expansion port
   - A-side controller expansion port 1A of the expansion tray

- B-side controller expansion port 1A of the expansion tray

Cabling a 1x3 Array Configuration

A 1x3 array configuration consists of one controller tray and two expansion trays. Four 2-meter copper FC cables are required (530-3327-01).

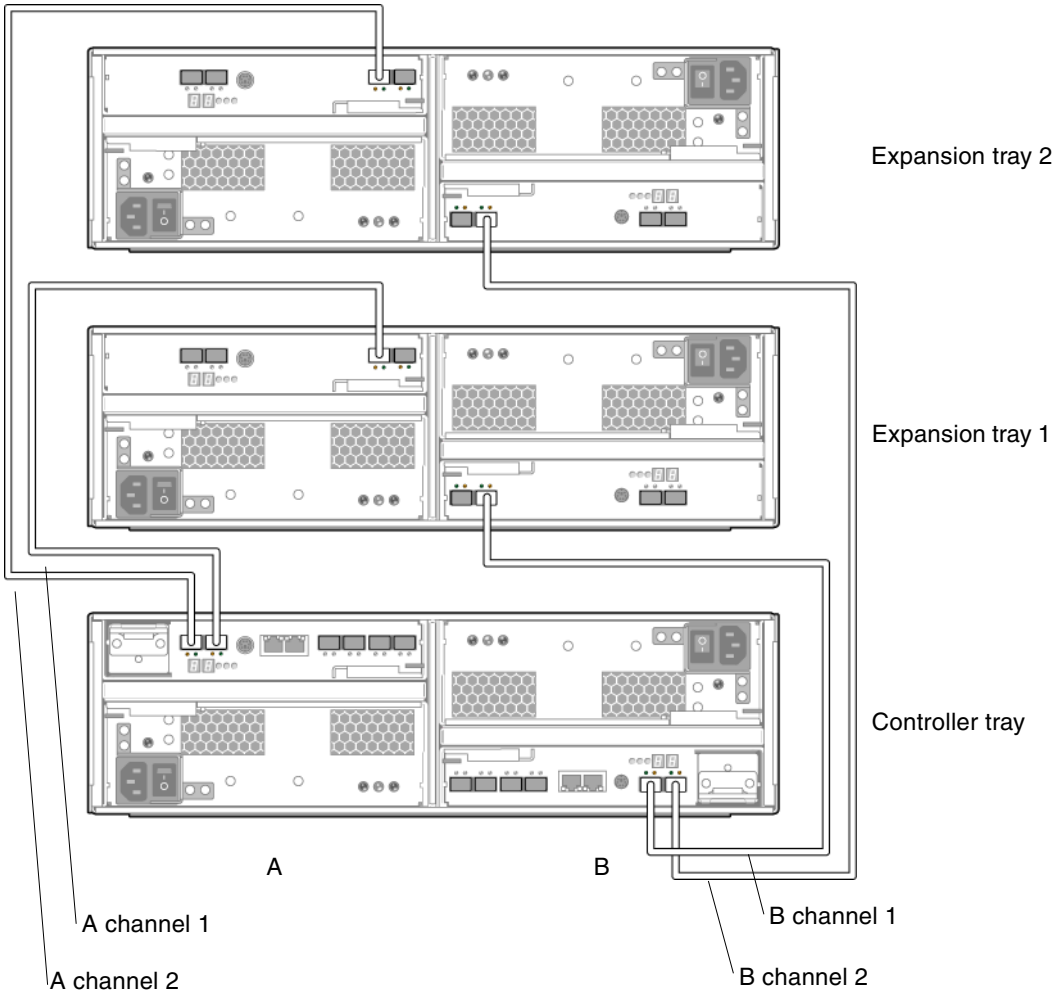


FIGURE 2-24 1x3 Array Configuration Cabling

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-22**).**
2. **Locate expansion ports 1A (In) and 1B (Out) at the A-side and B-side back of the expansion tray (**FIGURE 2-22**).**
3. **Connect one FC cable between the Controller B channel 1 expansion port and the B-side expansion port 1B of expansion tray 1 (**FIGURE 2-24**).**
4. **Connect one FC cable between the Controller B channel 2 expansion port and the B-side expansion port 1B of expansion tray 2 (**FIGURE 2-24**).**
5. **Connect one FC cable between the Controller A channel 1 expansion port and the A-side expansion port 1B of expansion tray 1 (**FIGURE 2-24**).**
6. **Connect one FC cable between the Controller A channel 2 expansion port and the A-side expansion port 1B of expansion tray 2 (**FIGURE 2-24**).**

   In this configuration, the following expansion ports are not used:

   - A-side controller expansion port 1A of expansion tray 1
   - A-side controller expansion port 1A of expansion tray 2
   - B-side controller expansion port 1A of expansion tray 1
   - B-side controller expansion port 1A of expansion tray 2

Cabling a 1x4 Array Configuration

A 1x4 array configuration consists of one controller tray and three expansion trays. Six 2-meter copper FC cables are required (530-3327-01).

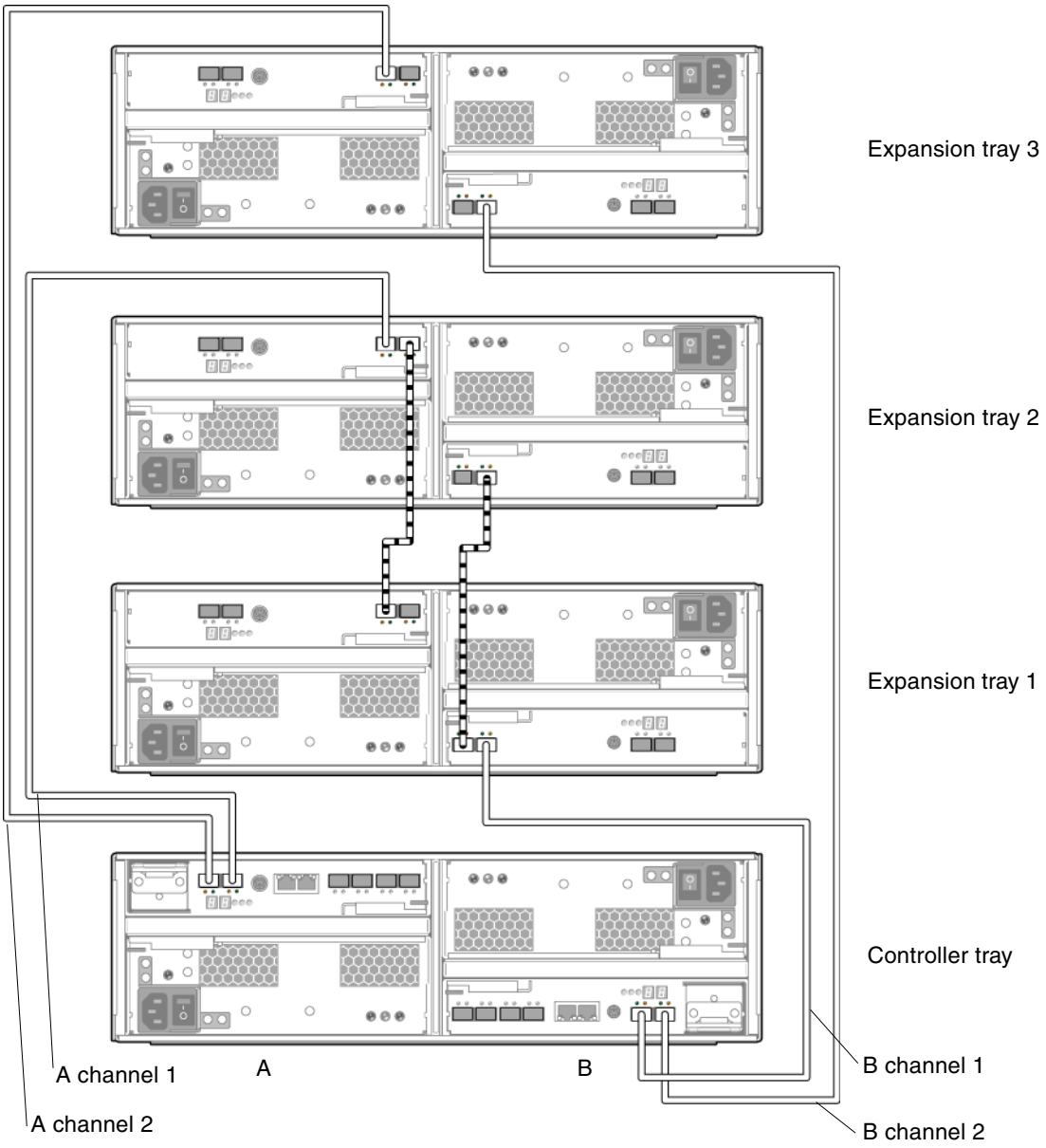


FIGURE 2-25 1x4 Array Configuration Cabling

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-22**).**
2. **Locate the expansion ports 1A (In) and 1B (Out) at the A-side and B-side back of the expansion tray (**FIGURE 2-22**).**
3. **Connect one FC cable between the Controller B channel 1 expansion port and the B-side expansion port 1B of expansion tray 1 (**FIGURE 2-25**).**
4. **Connect one FC cable between the Controller B channel 2 expansion port and the B-side expansion port 1B of expansion tray 3 (**FIGURE 2-25**).**
5. **Connect one FC cable between the B-side expansion port 1A of expansion tray 1 and the B-side expansion port 1B of expansion tray 2 (**FIGURE 2-25**).**
6. **Connect one FC cable between the Controller A channel 1 expansion port and the A-side expansion port 1B of expansion tray 2 (**FIGURE 2-25**).**
7. **Connect one FC cable between the Controller A channel 2 expansion port and the A-side expansion port 1B of expansion tray 3 (**FIGURE 2-25**).**
8. **Connect one FC cable between the A-side expansion port 1B of expansion tray 1 and the A-side expansion port 1A of expansion tray 2 (**FIGURE 2-25**).**

   In this configuration, the following expansion ports are not used:

   - A-side controller expansion port 1A of expansion tray 1
   - A-side controller expansion port 1A of expansion tray 3
   - B-side controller expansion port 1A of expansion tray 2
   - B-side controller expansion port 1A of expansion tray 3

Cabling a 1x5 Array Configuration

A 1x5 array configuration consists of one controller tray and four expansion trays. Eight 2-meter copper FC cables are required (530-3327-01).

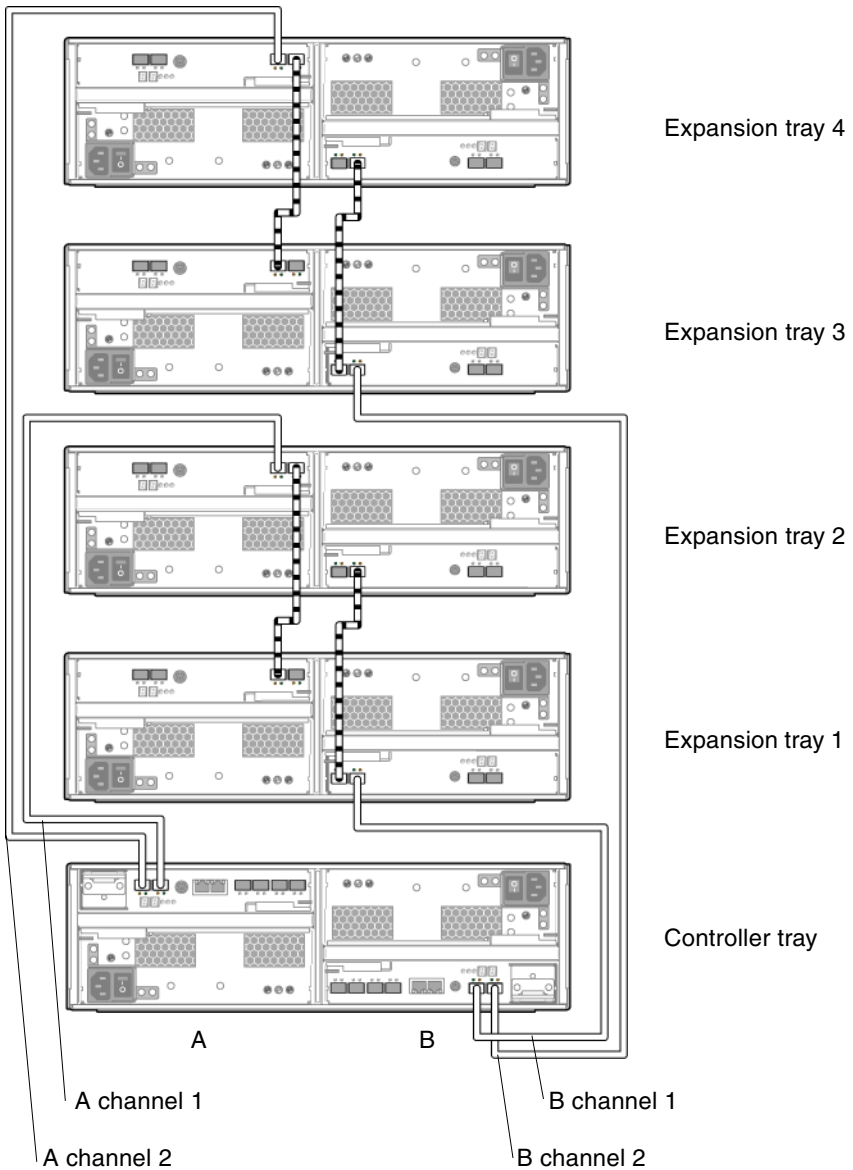


FIGURE 2-26 1x5 Array Configuration Cabling

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-22**).**
2. **Locate the expansion ports 1A (In) and 1B (Out) at the A-side and B-side back of the expansion tray (**FIGURE 2-22**).**
3. **Connect one FC cable between the Controller B channel 1 expansion port and the B-side expansion port 1B of expansion tray 1 (**FIGURE 2-26**).**
4. **Connect one FC cable between the B-side expansion port 1A of expansion tray 1 and the B-side expansion port 1B of expansion tray 2 (**FIGURE 2-26**).**
5. **Connect one FC cable between the Controller B channel 2 expansion port and the B-side expansion port 1B of expansion tray 3 (**FIGURE 2-26**).**
6. **Connect one FC cable between the B-side expansion port 1A of expansion tray 3 and the B-side expansion port 1B of expansion tray 4 (**FIGURE 2-26**).**
7. **Connect one FC cable between the Controller A channel 1 expansion port and the A-side expansion port 1B of expansion tray 2 (**FIGURE 2-26**).**
8. **Connect one FC cable between the A-side expansion port 1A of expansion tray 2 and the A-side expansion port 1B of expansion tray 1 (**FIGURE 2-26**).**
9. **Connect one FC cable between the Controller A channel 2 expansion port and the B-side expansion port 1B of expansion tray 4 (**FIGURE 2-26**).**
10. **Connect one FC cable between the A-side expansion port 1A of expansion tray 4 and the A-side expansion port 1B of expansion tray 3 (**FIGURE 2-26**).**

    In this configuration, the following expansion ports are not used:

    - A-side controller expansion port 1A of expansion tray 1
    - A-side controller expansion port 1A of expansion tray 3
    - B-side controller expansion port 1A of expansion tray 2
    - B-side controller expansion port 1A of expansion tray 4

Cabling a 1x6 Array Configuration

A 1x6 array configuration consists of one controller tray and five expansion trays. Ten 2-meter copper FC cables are required (530-3327-01).

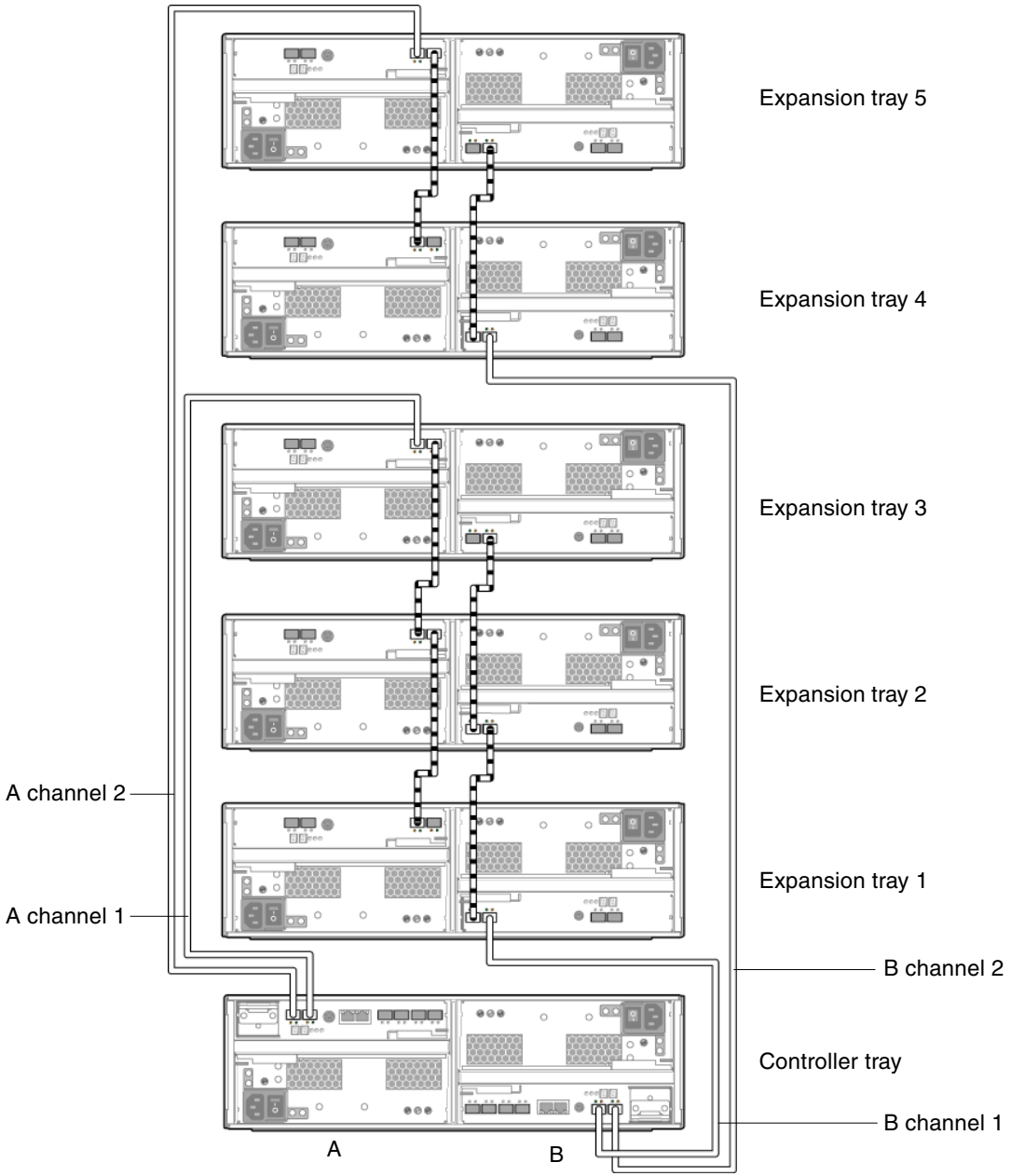


FIGURE 2-27 1x6 Array Configuration Cabling

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-22**).**
2. **Locate the expansion ports 1A (In) and 1B (Out) at the A-side and B-side back of the expansion tray (**FIGURE 2-22**).**
3. **Connect one FC cable between the Controller B channel 1 expansion port and the B-side expansion port 1B of expansion tray 1 (**FIGURE 2-27**).**
4. **Connect one FC cable between the B-side expansion port 1A of expansion tray 1 and the B-side expansion port 1B of expansion tray 2 (**FIGURE 2-27**).**
5. **Connect one FC cable between the B-side expansion port 1A of expansion tray 2 and the B-side expansion port 1B of expansion tray 3 (**FIGURE 2-27**).**
6. **Connect one FC cable between the Controller B channel 2 expansion port and the B-side expansion port 1B of expansion tray 4 (**FIGURE 2-27**).**
7. **Connect one FC cable between the B-side expansion port 1A of expansion tray 4 and the B-side expansion port 1B of expansion tray 5 (**FIGURE 2-27**).**
8. **Connect one FC cable between the Controller A channel 1 expansion port and the A-side expansion port 1B of expansion tray 3 (**FIGURE 2-27**).**
9. **Connect one FC cable between the A-side expansion port 1A of expansion tray 3 and the A-side expansion port 1B of expansion tray 2 (**FIGURE 2-27**).**
10. **Connect one FC cable between the A-side expansion port 1A of expansion tray 2 and the A-side expansion port 1B of expansion tray 1 (**FIGURE 2-27**).**
11. **Connect one FC cable between the Controller A channel 2 expansion port and the B-side expansion port 1B of expansion tray 5 (**FIGURE 2-27**).**
12. **Connect one FC cable between the A-side expansion port 1A of expansion tray 4 and the A-side expansion port 1B of expansion tray 4 (**FIGURE 2-27**).**

    In this configuration, the following expansion ports are not used:

    - A-side controller expansion port 1A of expansion tray 1
    - A-side controller expansion port 1A of expansion tray 4
    - B-side controller expansion port 1A of expansion tray 3
    - B-side controller expansion port 1A of expansion tray 5

Cabling a 1x7 Array Configuration

A 1x7 array configuration consists of the controller tray and six expansion trays. Twelve 2-meter copper FC cables are required (530-3327-01).

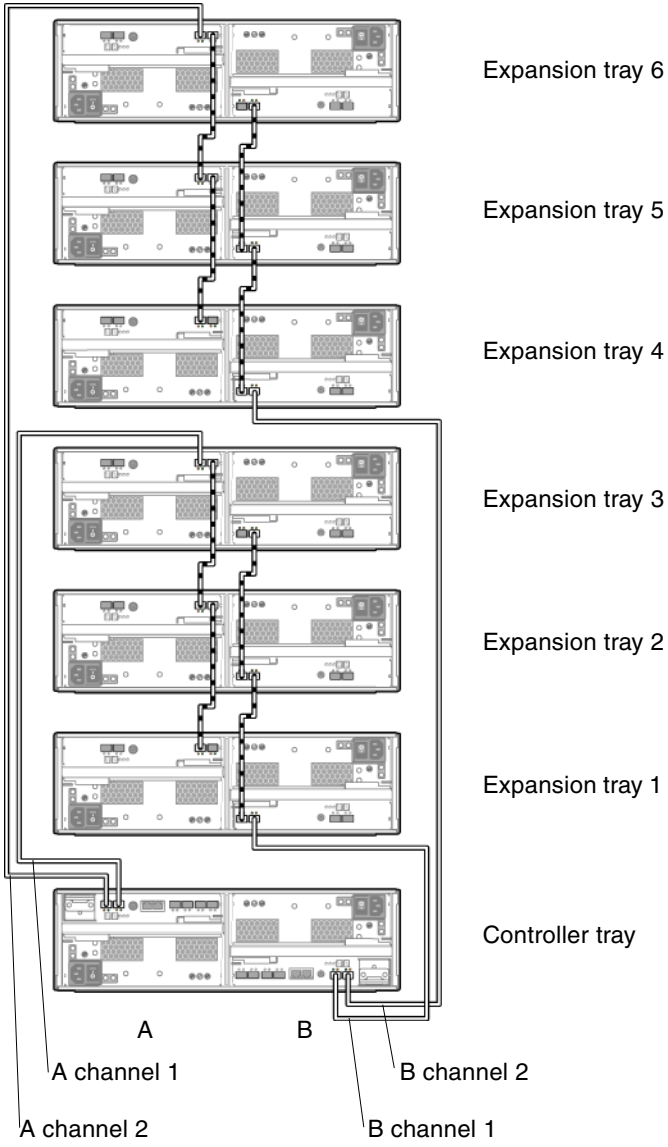


FIGURE 2-28 1x7 Array Configuration Cabling

1. **Locate the Controller A and Controller B expansion ports at the back of the controller tray (**FIGURE 2-22**).**
2. **Locate the expansion ports 1A (In) and 1B (Out) at the A-side and B-side back of the expansion tray (**FIGURE 2-22**).**
3. **Connect one FC cable between the Controller B channel 1 expansion port and the B-side expansion port 1B of expansion tray 1 (**FIGURE 2-28**).**
4. **Connect one FC cable between the B-side expansion port 1A of expansion tray 1 and the B-side expansion port 1B of expansion tray 2 (**FIGURE 2-28**).**
5. **Connect one FC cable between the B-side expansion port 1A of expansion tray 2 and the B-side expansion port 1B of expansion tray 3 (**FIGURE 2-28**).**
6. **Connect one FC cable between the Controller B channel 2 expansion port and the B-side expansion port 1B of expansion tray 4 (**FIGURE 2-28**).**
7. **Connect one FC cable between the B-side expansion port 1A of expansion tray 4 and the B-side expansion port 1B of expansion tray 5 (**FIGURE 2-28**).**
8. **Connect one FC cable between the B-side expansion port 1A of expansion tray 5 and the B-side expansion port 1B of expansion tray 6 (**FIGURE 2-28**).**
9. **Connect one FC cable between the Controller A channel 1 expansion port and the A-side expansion port 1B of expansion tray 3 (**FIGURE 2-28**).**
10. **Connect one FC cable between the A-side expansion port 1A of expansion tray 3 and the A-side expansion port 1B of expansion tray 2 (**FIGURE 2-28**).**
11. **Connect one FC cable between the A-side expansion port 1A of expansion tray 2 and the A-side expansion port 1B of expansion tray 1 (**FIGURE 2-28**).**
12. **Connect one FC cable between the Controller A channel 2 expansion port and the A-side expansion port 1B of expansion tray 6 (**FIGURE 2-28**).**
13. **Connect one FC cable between the A-side expansion port 1A of expansion tray 6 and the A-side expansion port 1B of expansion tray 5 (**FIGURE 2-28**).**
14. **Connect one FC cable between the A-side expansion port 1A of expansion tray 5 and the A-side expansion port 1B of expansion tray 4 (**FIGURE 2-28**).**

    In this configuration, the following expansion ports are not used:

    - A-side controller expansion port 1A of expansion tray 1
    - A-side controller expansion port 1A of expansion tray 4
    - B-side controller expansion port 1A of expansion tray 3
    - B-side controller expansion port 1A of expansion tray 6

Next Steps

After you cable all of the trays, you can power on the trays, as described in Chapter 3.

CHAPTER 3

Setting 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

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 "Configuring the IP Address of the Array Controllers" on page 96 for details.)

For instructions on how to set up the DHCP server, see "Configuring a DHCP Server" on page 159.

Setting the Link Rate for Each Tray

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.

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

If the array has one or more disk drives that operate at 2 Gbits/second, set the Tray Link Rate switch on all trays to 2 Gbits/second. If all disk drives in the array operate at 4 Gbits/second, set the Tray Link Rate switches to 4 Gbits/second.

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 3-1**).**

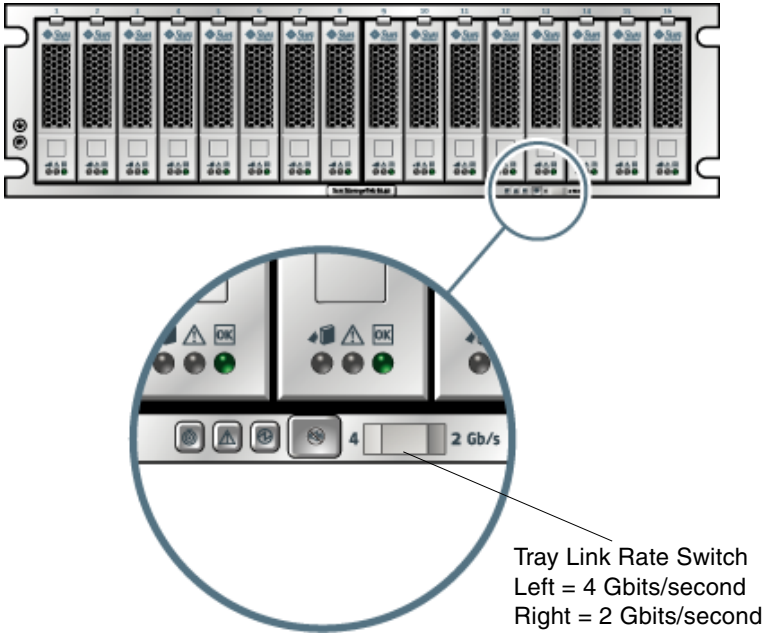


FIGURE 3-1 Tray Link Rate Switch

2. **Do one of the following:**
   - To set the default link rate for the tray to 4 Gbits/second, slide the Tray Link Rate switch to the left position.
   - To set the default link rate for the tray to 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 3-2**).**

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.

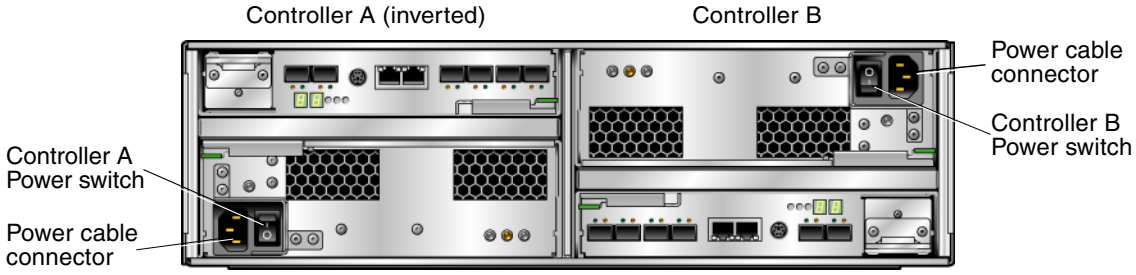


FIGURE 3-2 Tray Power Connectors and Switches

1. **Prepare the power cables as specified in** "Connecting the Power Cables" on page 43**.**
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 several 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 1-4) and the expansion tray (FIGURE 1-7).

Note – The host port indicators at the back of the controller tray (FIGURE 1-4) cannot be verified until the hosts are connected (See "Connecting Data Hosts" on page 67).

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 1-4) to determine if any outstanding cache needs to be written.**

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

4. **Ensure that the Cache Active LED is no longer flashing before powering off the array.**

5. **Press each power switch at the back of the controller tray to the Off position.**

6. **Press the power switches at the back of each expansion tray to the Off position.**

Next Steps

Now you are ready to connect the management host and data hosts, as described in Chapter 4.

CHAPTER 4

Connecting the Management Host and Data Hosts

This chapter describes Sun StorageTek 6140 Array cable connections for hosts. It contains the following sections:

Connecting the Management Host

The management host directly manages Sun StorageTek 6140 Arrays over an out-of-band network. This section describes how to setup a connection between the Ethernet port of a controller (FIGURE 4-1) and the management host.

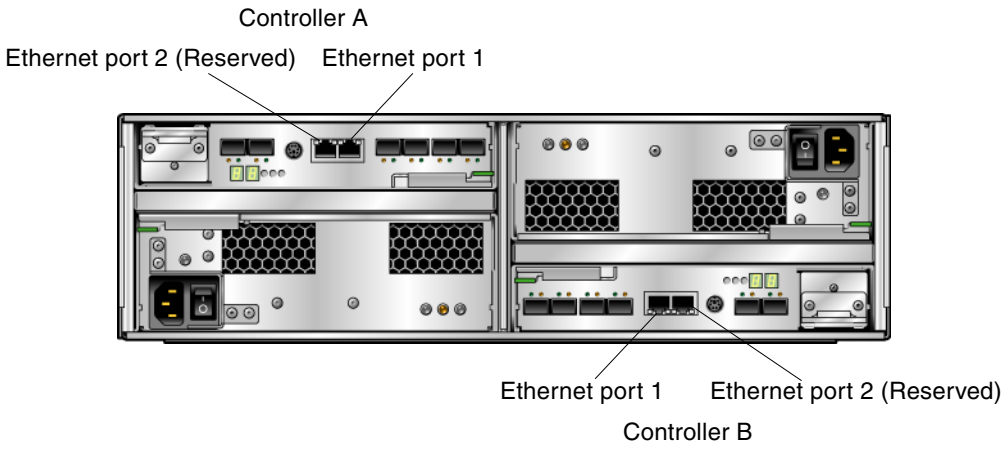


FIGURE 4-1 Ethernet Ports for Controller A and Controller B

Note – Before you begin, ensure that the two required Ethernet cables are available. These requirements are outlined in the *StorageTek 6140 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 66
- "Attaching the Ethernet Ports to the LAN Using an Ethernet Hub" on page 66
- "Attaching the Ethernet Ports Directly to the Management Host With a Cross-Over Cable" on page 67

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 4-1).**
2. **Connect an Ethernet cable to Ethernet port 1 of each controller.**
3. **Connect the other end of each Ethernet cable to the LAN that 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 4-1).**
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 4-1**).**
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 StorageTek 6140 Array through Fibre Channel (FC) switches to the array or directly to the array.

The Sun StorageTek 6140 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 Remote Replication premium feature, do not use Data host port 4 on both Controller A and Controller B, as it is reserved for that feature.

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 StorageTek 6140 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.

1. **Locate the data host ports (Small Form-factor Plug-in (SFP) transceivers) at the back of the controller tray (FIGURE 4-2).**

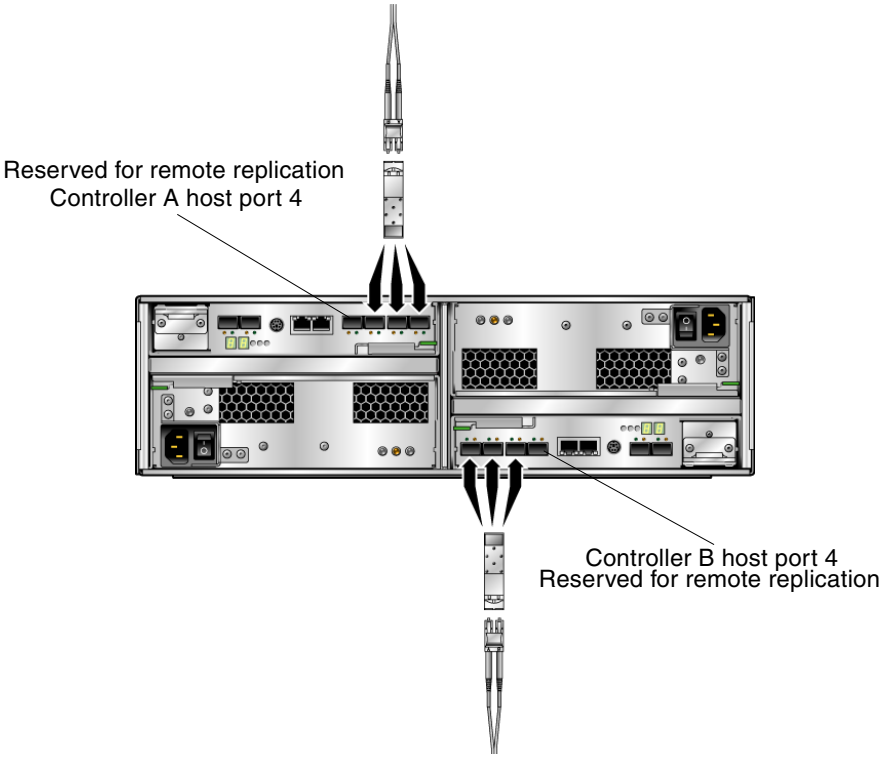


FIGURE 4-2 Host Connections

2. **Connect each fiber-optic cable to the host ports of Controller A and Controller B.**

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 4-3 shows the data hosts connected through switches with direct connections.

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

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

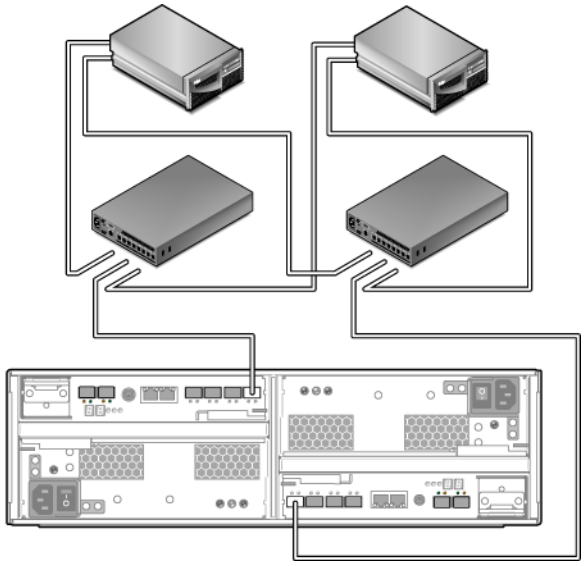


FIGURE 4-3 Connecting Data Hosts Through a Switch

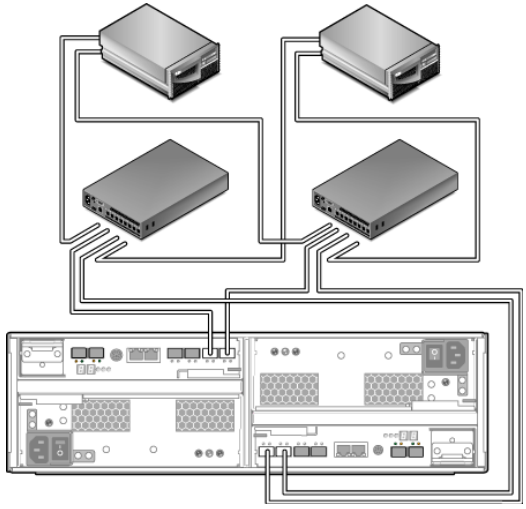


FIGURE 4-4 Connecting Data Hosts Through a Switch With Cross-Connections

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 4-2**).**
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 4-5 shows an example of a direct host connection of two data hosts with dual HBAs.

   FIGURE 4-6 shows an example of a direct host connection of three data hosts with dual HBAs.

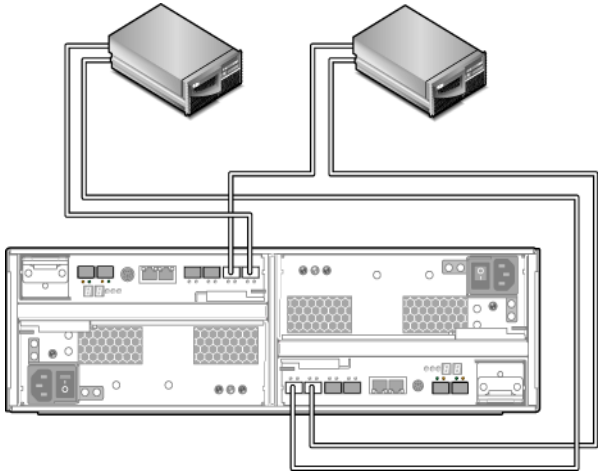


FIGURE 4-5 Direct Connection to Two Hosts With Dual HBAs

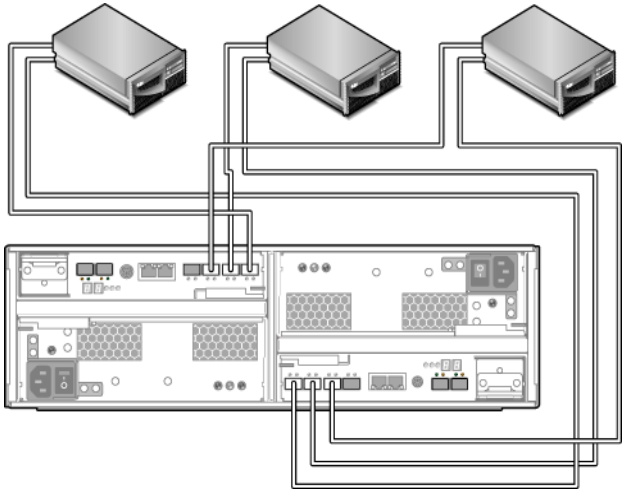


FIGURE 4-6 Direct Connection to Three Hosts With Dual HBAs

Next Steps

After you have connected the management host and data hosts, you are ready to install the management and data host software as described in Chapter 5.

CHAPTER 5

Installing Management and Data Host Software on Solaris OS Hosts

This chapter describes how to install the management and data host software. It contains the following sections:

About the Software Installation CD

The Sun StorageTek 6140 Host Installation Software CD provides three installation-related wizards:

- Management Software Installer – The host software installer enables you to install a selection of applications and drivers to support a local management host, a data host, or a remote management host.
- Array Firmware Upgrade Installer – The array firmware upgrade installer enables you to upgrade the array to the latest versions of base and NVSRAM firmware.
- Uninstaller – The uninstall wizard enables you to uninstall the management and data host software from a host.

Note – Alternatively, you can install the management and data host software using the `./setup -c` command in the command-line interface (CLI). Refer to the *Sun StorageTek 6140 Array Release Notes* for instructions.

Before You Begin

The README.txt file on the CD contains the latest information and instructions for the software installation CD. Before unpacking the compressed installation file on the target host, be sure to review the README.txt file on the CD.

Before unpacking the compressed installation file, check that the following requirements are met:

- The operating system is Solaris 8 OS Update 4, Solaris 9 OS for the SPARC platform, or Solaris 10.
- The root password of the management or data host is available so that you can run the installation wizards and log in to the Sun Java Web Console for the first time.
- The DISPLAY environment variable is set to mgt_server:0.0. This is required in either of the following scenarios:
  - you log in to the management host as a user other root, and then use the su command to log in as root.
  - you log in to any host and use the telnet command to log in to the management host as root.
- There is 550 megabytes of space for the unpacked the installation files in a local directory of the host.
- To install the management and data host software, the following disk space is available in the specified directories of the management host:
  - root – 20 megabytes
  - /tmp – 150 megabytes
  - /usr – 40 megabytes
  - /var – 90 megabytes
  - /opt – 1,000 megabytes (1.0 gigabytes)
- Previous versions of the management software are not installed.

  Previous versions of the Storage Automated Diagnostic Environment will be detected and automatically upgraded by the installer. See "Setting Up a Local Management Host" on page 78 for further details.
- Sun StorEdge SAN Foundation software was not installed when you installed Solaris OS 8 and OS 9. The SAN software will be installed with the management host software for hosts running Solaris OS 8 or Solaris OS 9.

  However, Sun StorEdge SAN Foundation software is installed with Solaris OS 10 and should not be removed. Install the latest patches for Solaris OS 10 to ensure that the host has the latest Sun StorEdge SAN Foundation software.

- A previously installed service, such as the Storage Automated Diagnostic Environment, is not performing a function on the array over Ethernet port 1 of either array controller.

The installation script verifies these requirements. If a requirement is not met, the script informs you or, in some cases, exits the installation script.

Note – If a version of Sun Java Web Console prior to 2.2.5 is installed on the management host, the script prompts you to upgrade to the current version of the Sun Java Web Console. If you choose not to upgrade, the script exits.

Unpacking the Installation File

Sun StorageTek 6140 management software is distributed on the Sun StorageTek 6140 Host Installation Software CD that is shipped with the array.

Note – Note that you can also download the latest version of the software from the following site: `http://www.sun.com/download/index.jsp?cat=Systems%20Administration&tab=3&subcat=Storage%20Management`

The array installers are provided in a compressed `.bin` file on the CD.

Before you can use the installers, you must unpack the contents of this file on the host in which you will use the installers.

To unpack the installers:

Note – Before you continue, check that all of the requirements are met, as listed in "Before You Begin" on page 74.

---

1. **Log in to the Solaris OS as `root`.**
2. **Insert the host software installation CD into a local drive.**

   The following items should appear in a directory window:

   - `README.txt`
   - `RunMe.bin`
   - `HostSoftwareInstaller.bin`
   - copyright information
   - doc/819-5045-10.pdf (this guide)

If the compressed installation file does not appear in a directory window:

a. **Change to the /**`cdrom/cdrom0` **directory:**

```
cd /cdrom/cdrom0
```

b. **Display the contents of the CD.**

```
ls -l
```

3. **Review the README.txt file for the latest information on the product and the installation process.**

4. **To unpack the contents of the compressed installation file, do one of the following:**

   - Double-click the `RunMe.bin` icon
   - Type the following command to launch `RunMe.bin`:

```
./RunMe
```

5. **When prompted, specify the full path of the directory location in which the files will be unpacked.**

   The files are unpacked into the following directory in the location you specify:

   `Host_Software_2.0.0.`*xx*

   where *xx* is the software version number of the installed files.

   The default location for the directory is `/var/tmp`.

   The contents of the `Host_Software_2.0.0.`*xx* directory include:

   - `copyright`
   - `bin/README.txt`
   - `bin/setup`
   - `bin/arrayinstall`
   - `bin/uninstall`
   - `bin/backout`
   - `components/`
   - `util/`

   The host software installer is launched after the installation file is unpacked. Complete the following step before using the wizard.

6. **Review the** `README.txt` **file in the** `Host_Software_2.0.0.`*xx* **directory for a summary of the command syntax required for each wizard.**

7. **Eject the CD and remove it from the drive.**

Using the Host Software Installer

The host software installer provides a wizard interface to enable you to install management and data host software for any of three host functions:

- Local management host
- Data host
- Remote management host

Software Installation Options

The specific management applications and tools you install on a host depend on the intended function of the host. The host software installer provides the installation options identified as shaded blocks in TABLE 5-1.

TABLE 5-1 Software Installation Option s

Component	Typical Installation	Custom Installation		
		Management Host	Data Host	Remote Management Host
Sun Java Web Console				
Java Runtime Environment (JRE)				
Sun StorageTek Configuration Services browser interface				
Sun StorageTek Configuration Services command-line interface (CLI)				
Sun Storage Automated Diagnostic Environment, browser interface				
Sun Storage Automated Diagnostic Environment, Enterprise Edition CLI				
Sun StorageTek Software Manager (SSM)				
Sun StorageTek 6140 Controller Module Firmware Patches				
Storage area network (SAN) Drivers (including multipathing driver)				

Note – *The SAN drivers are installed only on servers running Solaris OS 8 and 9. Servers running Solaris OS 10 should be updated with the latest Solaris OS 10 patches, which include the SAN drivers.

Setting Up a Local Management Host

Note – Before you start the installation, check that all of the host requirements are met, as listed in "Before You Begin" on page 74.

To set up a local management host, complete the procedures in the following sections:

Launching the Software Installer

Note – Alternatively, you can install software using the `./setup -c` command in the command-line interface (CLI). For instructions and command syntax for the CLI installer commands, refer to the `bin/README.txt` file in the installation directory and the *Sun StorageTek 6140 Array Release Notes*.

The host software installer is automatically launched after the CD installation file is unpacked.

To manually launch the host software installer:

1. **Log in to the host as `root`.**
2. **Change to the `Host_Software_2.0.0.`*xx* directory in which the compressed installation file was unpacked:**

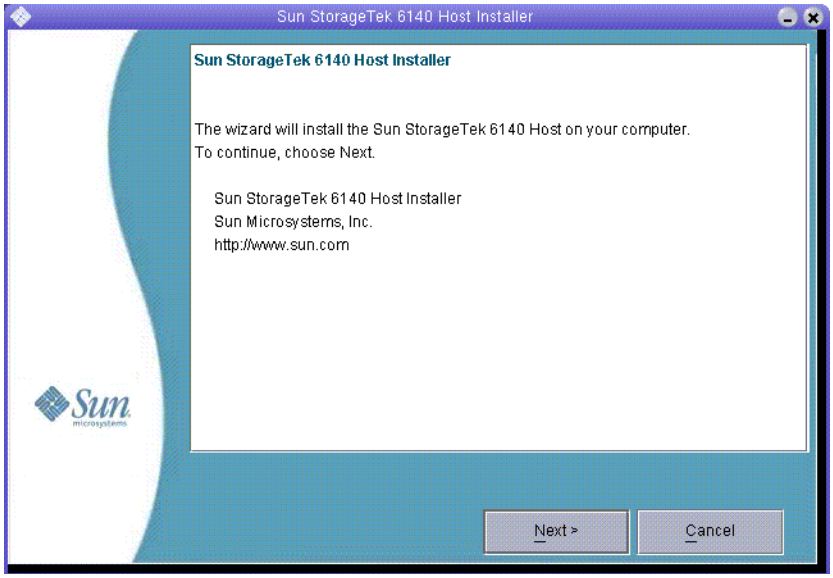
   `cd` <*user-specified location*>`/Host_Software_2.0.0.`*xx*

   where *xx* is the software version number of the installed files.
3. **Start the host software installer by typing the following command:**

   `./setup`

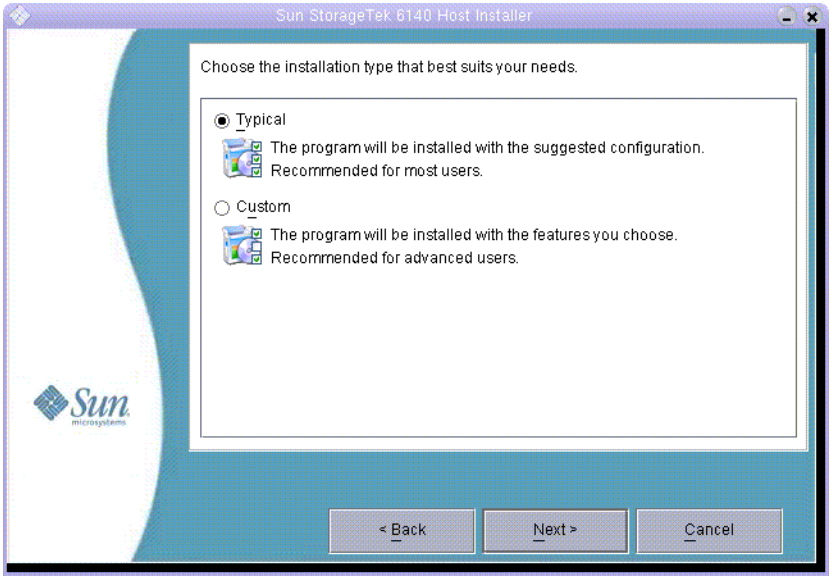
Installing the Local Management Host Software

When you launch the host software installer, the initial wizard screen is displayed.



If the initial wizard screen is not displayed or you receive an error message, recheck that the host requirements in "Before You Begin" on page 74 are met.

1. **Follow the steps in the wizard.**
2. **When prompted to select the installation type, do one of the following:**
   - If the host will function as both a management host and a data host, select Typical, then click Next.
   - If the host will function as a management host only, select Custom, click Next, and then Select Management Host and deselect the other custom options.



See TABLE 5-1 to decide which installation option is right for the local management host.

Note – During the software installation, the progress indicator initially reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the installation is complete, the host software installer Installation Summary screen is displayed.

3. **Click Finish.**
4. **If the management host is also a data host, enable the Multipathing Software (See "Enabling Multipathing Software" on page 80).**

Enabling Multipathing Software

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 8 or 9 OS" on page 81
- "Enabling Multipathing Software for Solaris 10 OS" on page 81

Enabling Multipathing Software for Solaris 8 or 9 OS

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

1. **Open the `/kernel/drv/scsi_vhci.conf` file with a text editor.**
2. **Set `mpxio-disable=no` in the file.**
3. **Save the updated file.**
4. **Reboot the host.**

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 `stmsboot`(1M) 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 the Return key to reboot the host.**

Completing Post-Installation Tasks

After you install the management host software on a local management host, you need to do the following:

1. **Configure IP addressing for the array.**

   See "Configuring IP Addressing" on page 95.

2. **Register the array.**

   See "Registering the Array" on page 118.

3. **Upgrade the base and NVSRAM firmware levels of the array.**

   All arrays managed by the management host must be at the same base and NVSRAM firmware levels.

You can choose to upgrade the firmware during the process of registering the array, or you can wait and upgrade the firmware in either of two ways:

- Using the Array Firmware Upgrade Wizard (see "Using the Array Firmware Upgrade Installer" on page 92).
- Using the firmware upgrade function in the Sun StorageTek Configuration Service browser interface (see the online help).

Setting Up a Data Host

The Sun StorageTek 6140 Array provides data path support for data hosts running Solaris, Windows 2000, Windows Server 2003, Red Hat Linux, HP-UX, NetWare, and SGI IRIX operating systems.This section applies to hosts running Solaris OS 8, 9, or 10.

See the *Sun StorageTek 6140 Array Release Notes* for the latest operating system versions that are supported.

Note – To install data host software on systems that are not running Solaris OS, see "Installing Data Host Software for Operating Systems Other Than Solaris" on page 137.

To set up a data host, complete the procedures in the following sections:

- "Preparing to Set Up a Data Host" on page 82
- "Installing the Data Host Software" on page 83
- "Configuring the Data Host Agent" on page 86

Preparing to Set Up a Data Host

Before setting up a data host, verify the following for each data host:

- All of the requirements are met, as listed in "Before You Begin" on page 74.
- The operating system and version are supported as described in the release notes.
- The host bus adapter (HBA) is installed as described in the release notes.
- HBA firmware is at the required level as described in the release notes (HBA drivers are distributed through the Sun Download Center).
- Data hosts are cabled to the array as described in "Connecting Data Hosts" on page 67.
- The installation files are unpacked on the data host (see "Unpacking the Installation File" on page 75).

Note – See the *Sun StorageTek 6140 Array Release Notes* for a list of supported operating systems, operating system patches, and HBAs.

Launching the Software Installer

Note – Alternatively, you can install software using the `./setup -c` command in the command-line interface (CLI). For instructions and command syntax for the CLI installer commands, refer to the `bin/README.txt` file in the installation directory and the *Sun StorageTek 6140 Array Release Notes*.

The host software installer is automatically launched after the CD installation file is unpacked.

To manually launch the host software installer:

1. **Log in to the host as `root`.**
2. **Change to the `Host_Software_2.0.0.`*xx* directory in which the compressed installation file was unpacked:**

   `cd` <*user-specified location*>`/Host_Software_2.0.0.`*xx*

   where *xx* is the software version number of the installed files.
3. **Start the host software installer by typing the following command:**

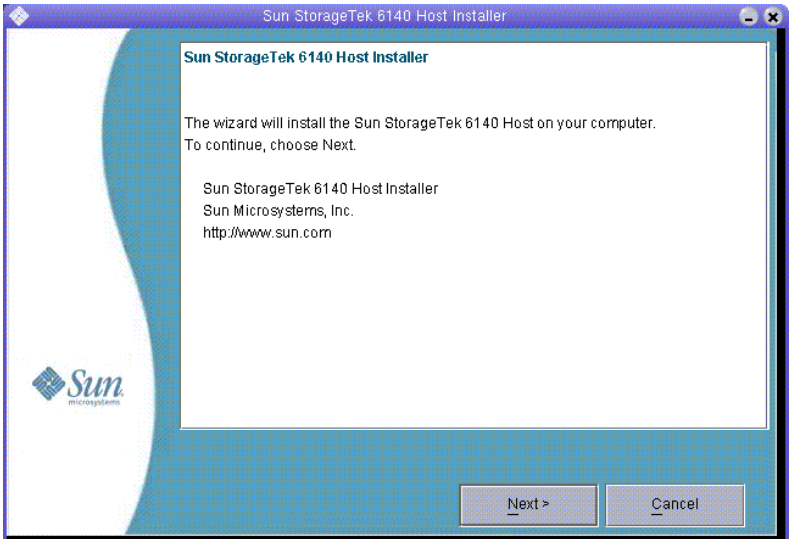
   `./setup`

Installing the Data Host Software

Note – Before you start the installation, check that all of the requirements are met, as listed in "Preparing to Set Up a Data Host" on page 82.

Use the procedures in this section to install only the data host software on a data host. The data host software enables the data host to interact with management hosts.

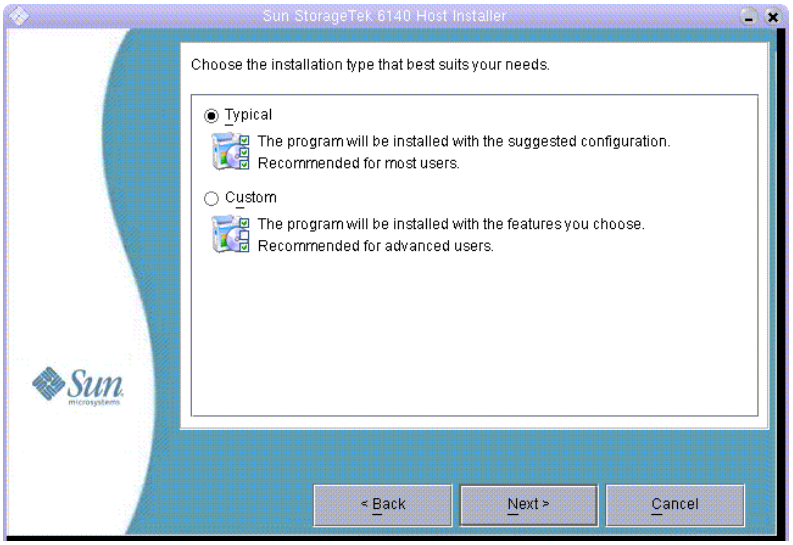
When you launch the host software installer, the initial wizard screen is displayed.



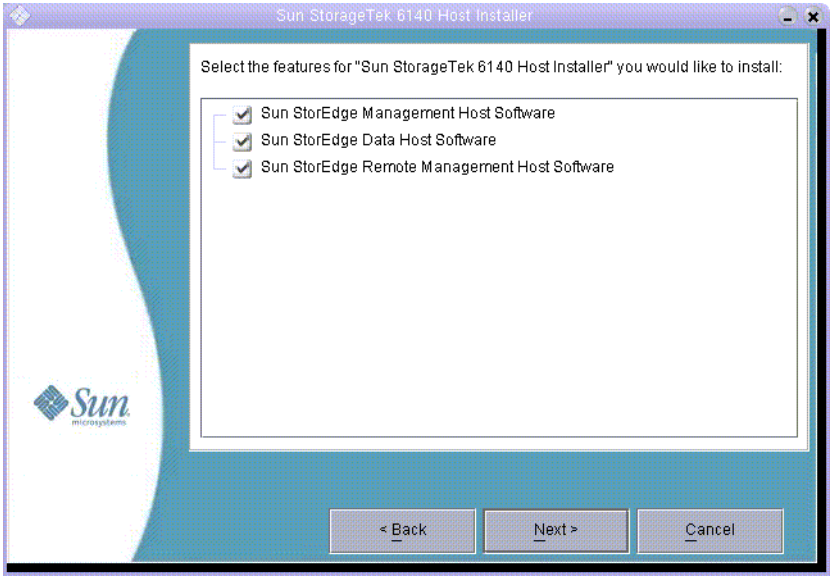
If the initial wizard screen is not displayed or you receive an error message, recheck that the host requirements in "Before You Begin" on page 74 are met.

To use t he host software installer to install data host software:

1. **Follow the steps in the wizard.**
2. **When prompted to select the installation type, select Custom and then click Next.**



3. **When prompted to select the software you want to install, select Sun StorEdge Data Host Software, deselect all other options, and click Next.**



4. **When the software installation is complete, click Finish.**

5. **Enable the Sun StorEdge Traffic Manager multipathing software (see** "Enabling Multipathing Software" on page 80**).**

Configuring the Data Host Agent

After you have done all of the following, you are ready to configure the Sun Storage Automated Diagnostic Environment slave agent on the data host and synchronize it with the master agent on the management host:

- Installed the management host software on your management host
- Defined the IP address of the management host
- Installed the data host software on a data host

To configure the slave agent on the data host, type:

```
/opt/SUNWstade/bin/ras_install
```

Note – Only use the `ras_install` command on data hosts, never on the management host that contains the management software with the master agent.

The `ras_install` script is displayed. Type the following when prompted:

- **`S`** for the slave agent
- The IP address of management host
- **`C`** to start the slave agent

The following is the output from a sample `ras_install` script:

```
+---------------------------------+
| Installing the Package and Crons |
+---------------------------------+
? Are you installing a Master or a Slave Agent? (Enter M=master,S=
slave, E=Empty Master) [M/S/E]: (default=M) S

The address of the master must already be defined before a slave
can be installed.
If the master has not been installed yet, abort this install and
go install this package on the host that was selected to be the
master.

? Enter the IP Name/Address of the Master Host Agent 10.x.xx.xxx

- Testing communication with host '10.xx.xx.xxx' ..
- Communication successful.

- Starting the Storage A.D.E service (rasserv):

/opt/SUNWstade/rasserv/bin/apachectl startssl: ./rasserv started

- Setting up crons:
? Do you want to C=start or P=stop the Agent cron [C/P] : (default=
C) C

- cron installed.
- Testing access to rasserv (this test will timeout after 4 tries
of 10 secs):
- ping '10.x.xx.xxx' succeeded!
- 1/4 attempting to contact agent service...

- Contacted agent with hostid=xxcffxxx.
+-------------------------------+
| SUNWstade installed properly |
+-------------------------------+

- Sending monitored device-list to agent at 10.x.xx.xxx
-- diag-xxxx.Central.Sun.xxx already there
OK
```

Setting Up a Remote Management Host

You can select a custom software installation to install only the Sun StorageTek Configuration Services command-line interface (CLI) and the Java Runtime Environment (JRE).

This section applies to hosts running Solaris OS 8, 9, or 10.

Note – To install remote management host software on systems that are not running Solaris OS, see "Installing Remote Management Host Software for Operating Systems Other Than Solaris" on page 133.

To set up a data host, complete the procedures in the following sections:

- "Preparing to Set Up a Data Host" on page 82
- "Installing the Data Host Software" on page 83
- "Configuring the Data Host Agent" on page 86

Preparing to Set Up a Remote Management Host

Before setting up a remote management host, verify the following for each remote management host:

- All of the requirements are met, as listed in "Before You Begin" on page 74.
- The operating system and version are supported as described in the release notes.
- The installation files are unpacked on the data host (see "Unpacking the Installation File" on page 75).

Note – See the *Sun StorageTek 6140 Array Release Notes* for a list of supported operating systems and operating system patches.

Launching the Software Installer

Note – Alternatively, you can install software using the `./setup -c` command in the command-line interface (CLI). For instructions and command syntax for the CLI installer commands, refer to the `bin/README.txt` file in the installation directory and the *Sun StorageTek 6140 Array Release Notes*.

The host software installer is automatically launched after the CD installation file is unpacked.

To manually launch the host software installer:

1. **Log in to the host as** `root`**.**
2. **Change to the** `Host_Software_2.0.0.`*xx* **directory in which the compressed installation file was unpacked:**

   `cd` <*user-specified location*>`/Host_Software_2.0.0.`*xx*

   where *xx* is the software version number of the installed files.
3. **Start the host software installer by typing the following command:**

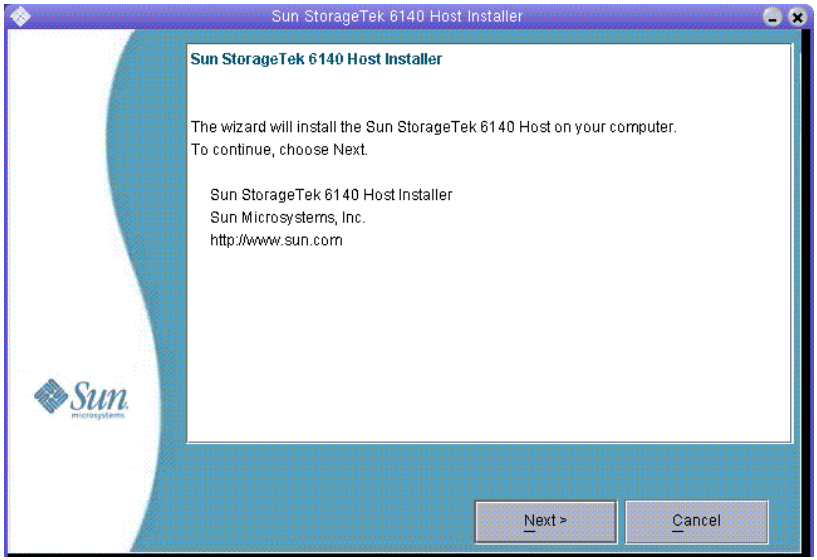
   `./setup`

Installing the Remote Management Host Software

Note – Before you start the installation, check that all of the requirements are met, as listed in "Preparing to Set Up a Remote Management Host" on page 88.

Use the procedures in this section to install only the remote management host software on a remote management host. The remote management host software enables the remote management host to perform monitoring functions using the command-line interface (CLI) of the Sun StorageTek Configuration Service.

When you launch the host software installer, the initial wizard screen is displayed.

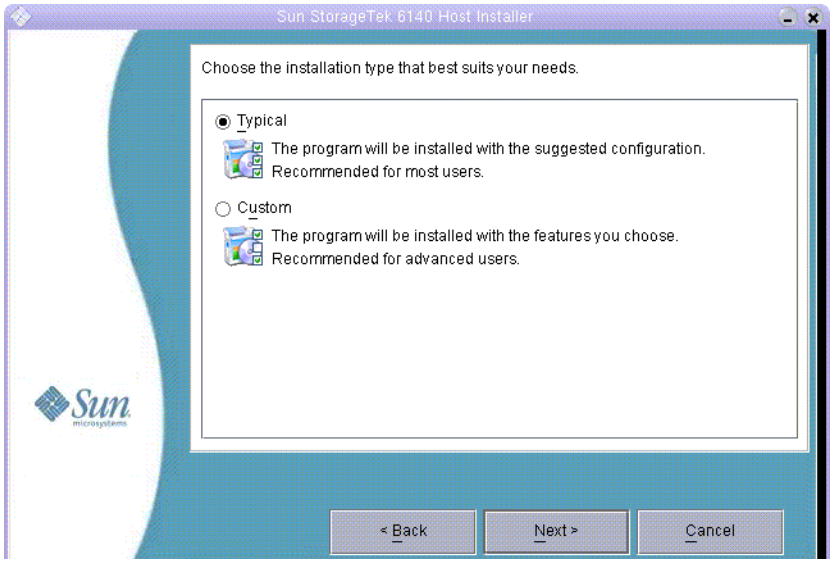


If the initial wizard screen is not displayed or you receive an error message, recheck that the host requirements in "Before You Begin" on page 74 are met.

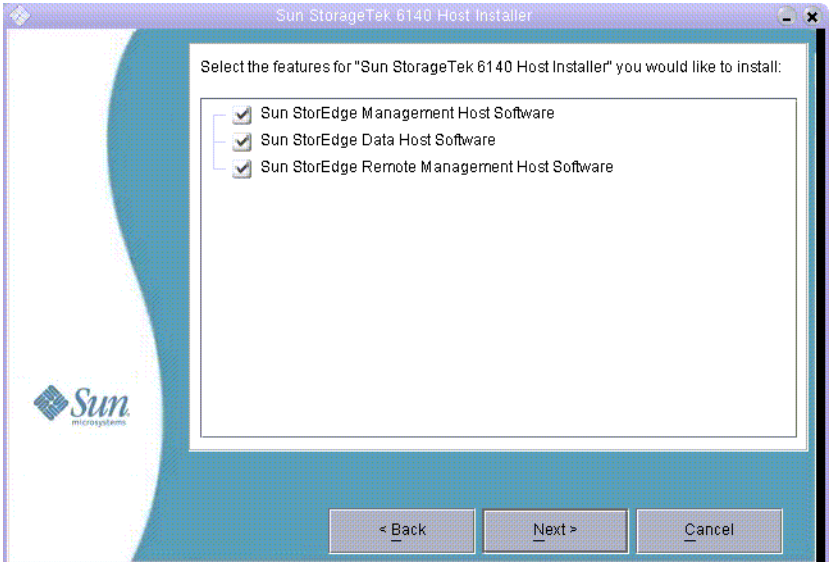
To use the host software installer to install remote management host software:

1. **Follow the steps in the wizard.**

2. **When prompted the installation type, select Custom and then click Next.**



3. **When prompted to select the software you want to install, select Sun StorEdge Remote Management Host Software, deselect all other options, and click Next.**



4. **When the software installation is complete, click Finish.**

Using the Array Firmware Upgrade Installer

Note – Before you can upgrade the firmware on the array, you must first use the Sun StorageTek Configuration Service to register the array. See "Registering the Array" on page 118 for instructions.

Use the array firmware upgrade installer to install the latest base and NVSRAM firmware levels on the Sun StorageTek 6140 Array.

Note – Alternatively, you can upgrade the firmware of the array using the `./arrayinstall -c` command in the command-line interface (CLI). For instructions and command syntax for the CLI installer commands, refer to the `bin/README.txt` file in the installation directory and the *Sun StorageTek 6140 Array Release Notes*.

To install the latest base and NVSRAM firmware on the array:

1. **Log in to the management host as `root`.**

1. Ensure that the installation files are unpacked on the management host.

   If the installation files are not unpacked on the host, see "Unpacking the Installation File" on page 75 for instructions.

2. **Change to the `Host_Software_2.0.0.`*xx* directory in which the compressed installation file was unpacked:**

   `cd` *user-specified-location*`/Host_Software_2.0.0.`*xx*

   where *xx* is the software version number of the installed files.

3. **Start the array firmware upgrade installer by typing the following command:**

   `./arrayinstall`

   The array firmware upgrade installer wizard is displayed.

4. **Follow the steps in the wizard.**

5. **When the installation is complete, click Finish.**

Using the Uninstall Wizard

Use the Uninstall wizard to remove all management and data host software from a host.

Note – Alternatively, you can uninstall the management and data host software using the `./uninstall -c` command in the command-line interface (CLI). For instructions and command syntax for the CLI installer commands, refer to the `bin/README.txt` file in the installation directory and the *Sun StorageTek 6140 Array Release Notes*.

To remove all management and data host software from a host:

1. **Log in to the management host as `root`.**
2. **Ensure that the installation files are unpacked on the management host.**

   If the installation files are not unpacked on the host, see "Unpacking the Installation File" on page 75 for instructions.
3. **Change to the `Host_Software_2.0.0.`*xx* directory in which the compressed installation file was unpacked:**

   `cd` *user-specified-location*`/Host_Software_2.0.0.`*xx*

   where *xx* is the software version number of the installed files.
4. **Start the uninstall wizard by typing the following command:**

   `./uninstall`

   The array uninstaller wizard is displayed.
5. **Follow the steps in the wizard.**
6. **When the uninstall operation is complete, click Finish.**

Next Steps

You are now ready to set up IP addressing for the array, as described in Chapter 6 or to install management or data host software on operating systems other than Solaris as described in Chapter 8,.

CHAPTER 6

Configuring IP Addressing

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

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

About IP Addressing

The Sun StorageTek 6140 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.

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

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 96
- "Configuring Static IP Addressing" on page 97

Configuring Dynamic (DHCP) IP Addressing

At initial array power on, if BOOTP services are available on the DHCP server, this server assigns a dynamic IP address for Ethernet port 1 on each controller.

If you want to set up a DHCP server, refer to Appendix B 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 97)
- Using the Sun StorageTek Configuration Service (see the online help)

Configuring Static IP Addressing

There are two methods of assigning static IP addresses to the Ethernet ports of a controller, as described in the following sections:

- "Using the Serial Port Interface to Assign IP Addresses" on page 97
- "Using the Sun StorageTek Configuration Service to Assign IP Addresses" on page 102

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 97
- "Setting Up the Terminal Emulation Program" on page 98
- "Establishing a Connection With the Serial Port" on page 98
- "Configuring the IP Addresses" on page 99

Connecting a Terminal to the Serial Port

Two serial port cables are supplied with each controller tray:

- A 6-pin mini-DIN connector to standard 9-pin serial connector base cable
- A standard 9-pin serial connector to standard 9-pin serial connector extension cable

---

Note – You can use any null serial extension cable that mates with serial port base cable.

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

1. **Connect the 6-pin mini-DIN connector of the base cable to the serial port connector on the controller (**FIGURE 1-3 **on page 6****).**
2. **Connect the 9-pin serial extension cable from the 9-pin connector of the base cable to the serial port connector of the terminal.**

Setting Up the Terminal Emulation Program

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

1. **Select VT100 emulation.**
2. **Remove any modem strings from the connection profile.**
3. **Set up the connection profile with the following communication settings:**
   - Data Rate: 38400
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
   - Flow Control: None

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 the 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:**

```
Select Ethernet Port
 ============================
1) Ethernet Port: 0
2) Ethernet Port: 1
Q) Quit

Enter Selection: 1
```

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.

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

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

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: 0
2) Ethernet Port: 1
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.**

When you have completed the IP address configuration for the Ethernet ports on both array controllers, see "Using the Browser Interface to Set Up the Array" on page 113 for instructions and on registering and configuring the array.

Using the Sun StorageTek Configuration Service to Assign IP Addresses

To use the Sun StorageTek Configuration Service to assign IP addresses for Ethernet port 1 of each controller, you must perform the procedures in the following sections:

- "Establishing Temporary IP Connectivity With the Management Host" on page 102
- "Assigning an IP Address to Ethernet Port 1 on Each Controller" on page 103
- "Restoring the Management Host IP Configuration" on page 104

Note – Before attempting the procedures in this section, be sure to connect the management host has an Ethernet connection to the controller's Ethernet ports as directed in "Connecting the Management Host" on page 65.

Establishing Temporary IP Connectivity With the Management Host

In order to assign IP addresses to the controllers, you must establish temporary IP connectivity between the management host and Ethernet port 1 of each controller.

There are two methods by which to do that, depending on the method by which the management host and controller's Ethernet ports are physically connected to the Ethernet, and the availability of an Ethernet interface on the management host.

The two methods of establishing temporary IP connectivity are as follows:

- Assigning a temporary IP address to a management host Ethernet interface in the same subnet as the default IP addresses of the controller's Ethernet ports (for example, IP address `192.168.128.100`).

  Use this method if the following conditions are true:

  - You have an available Ethernet interface on the management host or you can temporarily reassign the IP address of an Ethernet interface on the management host.
  - Ethernet port 1 of each controller can be directly connected to an Ethernet interface on the management host by an Ethernet crossover cable (see "Attaching the Ethernet Ports Directly to the Management Host With a Cross-Over Cable" on page 67), or Ethernet port 1 of each controller and an Ethernet interface of the management host are connected to the same Ethernet hub (see "Attaching the Ethernet Ports to the LAN Using an Ethernet Hub" on page 66).

  For information on changing the IP address of an Ethernet interface on the management host, see "Configuring the IP Address of the Management Host" on page 105

- Creating a temporary virtual subnet on the management host.

  Use this method if there is not an available Ethernet interface on the management host or if Ethernet port 1 of each controller is connected to a subnet on the local area network (LAN) that is not the subnet of the management host.

  For information on creating a temporary virtual subnet on the management host, see "Creating and Deleting a Temporary Virtual Subnet on a Management Host" on page 107.

Assigning an IP Address to Ethernet Port 1 on Each Controller

After you have established temporary IP connectivity between the controller's Ethernet ports and the management host, you can use the Sun StorageTek Configuration Service to assign a static IP address to Ethernet port 1 of each controller or to change the IP addressing for the port to DHCP.

1. **Access the Sun StorageTek Configuration Service:**

   a. **Open a web browser and enter the IP address of the management host:**

      `https://`*management-host*`:6789`**

      management-host is the IP address of the machine where you installed the management software.

      The login page is displayed.

   b. **Log in as `root`:**

      Login: **`root`**

      Password: *root-password*

      root-password is the root password of the machine where you installed the management software.

   c. **From the Sun Java Web Console page, click Sun StorageTek Configuration Service.**

      The Array Summary page is displayed.

2. **Temporarily register the array with the default Ethernet port IP addresses.**

   To register the array, see "Registering the Array" on page 118 for instructions.

3. **Assign a static IP address to Ethernet port 1 on each controller.**

   a. **Select the array from the Array Summary page.**

   b. **In the navigation pane, choose Administration > General Settings.**

      The General Setup page is displayed.

   c. **Enter the array name and click OK.**

d. In the navigation pane, choose Physical Storage > Controllers.

The Controller Summary page is displayed.

e. First for Controller A's (Controller 1) Ethernet port 1 and then for Controller B's (Controller 2) Ethernet port 1, select Specify Network Configuration and then enter the IP address, gateway address, and netmask. Click OK.

You might see an error message indicating that contact has been lost with the array as a result of the changed IP address. You can ignore this message.

4. Delete the array to remove the default IP addresses:

a. Log out of the console and then log in again.

The Array Summary page is displayed.

b. On the Array Summary page, click the check box next to the original array with the original IP address, and click the Delete button to remove the old IP address.

5. Reregister the array with the static IP addresses.

To register the array, see "Registering the Array" on page 118 for instructions.

6. If you are configuring multiple arrays, use the following Solaris OS commands to clean the Address Resolution Protocol (ARP) table entry for each controller:

`arp -d` *ip-address-controller-A*
`arp -d` *ip-address-controller-B*

Restoring the Management Host IP Configuration

If you changed the IP address of the management host, you must restore the original Ip address.

To restore the original IP address of an Ethernet interface on the management host, see "Configuring the IP Address of the Management Host" on page 105.

If you established a virtual subnet to assign IP addressed, you should delete it.

To delete the temporary virtual subnet on the management host, see "Creating and Deleting a Temporary Virtual Subnet on a Management Host" on page 107.

Configuring the IP Address of the Management Host

To configure IP addressing for the array, you may have to temporarily change the IP address of management host.

The method you use to configure the IP address on the host depends on the platform you are using. Follow the instructions in one of the following sections, depending on your platform:

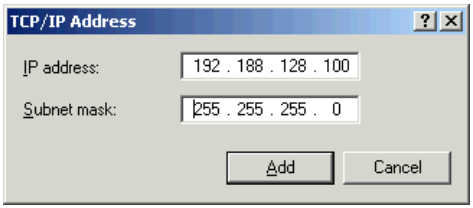
- "Configuring the IP Address on the Management Host for the Solaris Operating System" on page 105
- "Configuring the IP Address for Windows 2000 Advanced Server" on page 105
- "Configuring the IP Address for Windows Server 2003" on page 106

Configuring the IP Address on the Management Host for the Solaris Operating System

For information about changing the IP address on a Solaris server, see the `ifconfig` man page.

Configuring the IP Address for Windows 2000 Advanced Server

1. **From the Control Panel, select Network and Dial-Up Connections.**
2. **Select Local Area Connection > Properties > Internet Protocol (TCP/IP).**
3. **Make sure that a static IP address is configured, and click Advanced.**
4. **In Advanced TCP/IP Settings, select the IP address you want to configure, and click Add directly below the IP addresses listing.**
5. **Type the IP address and subnet mask as shown in the following example:**



6. **Click Add.**

   The new IP address is added to the IP addresses listing.

7. **Open a command window and try to ping the IP addresses of the controller's Ethernet ports, as shown in the following example:**

   > **`ping 192.188.128.101`**

   If the `ping` is unsuccessful, try rebooting the server and `ping` the IP address again.

Configuring the IP Address for Windows Server 2003

1. **From the Control Panel, select Network and Dial-Up Connections.**
2. **Select Local Area Connection > Properties > Internet Protocol (TCP/IP).**
3. **Make sure a static IP address is configured, and click Advanced.**
4. **In Advanced TCP/IP Settings, click Add directly below the IP addresses listing.**
5. **Type an IP address that is on the same subnet as Controller A (`192.168.128.101`) and Controller B (`192.168.128.102`).**

   For example, you can use `192.168.128.100` because it is on the same subnet and does not conflict with the controller IP addresses.

6. **Click Add.**

   The new IP address is added to the IP addresses listing.

Creating and Deleting a Temporary Virtual Subnet on a Management Host

To configure IP addressing for an array, you might have to establish a virtual subnet in order to temporarily access the array from the management host You should delete the virtual subnet after you configure IP addressing for the array.

This section contains the following subsections:

Creating a Temporary Virtual Subnet on a Management Host

1. **To display the Ethernet ports that are in use on the server, type the following:**

   `ifconfig -a`

   The Ethernet ports that are in use are displayed, as shown in the following example:

```
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232
index 1
        inet 127.0.0.1 netmask ff000000
bge0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500
index 2
        inet 10.4.30.110 netmask ffffff00 broadcast 10.4.30.255
        ether 0:3:ba:32:4d:f1
```

2. **As `root`, configure a temporary virtual subnet by typing the following:**

   `# ifconfig` *ethernet-port*`:1 plumb`

   `#` **`ifconfig`** *ethernet-port*`:1 192.168.128.100 up`

   For example:

   `#` **`ifconfig bge0:1 plumb`**

   `#` **`ifconfig bge0:1 192.168.128.100 up`**

3. **Type the following command to view the changes and thereby verify that you have established IP connectivity between the management host and the array controllers:**

   `ipconfig -a`

Deleting a Temporary Virtual Subnet on a Management Host

After you have assigned static IP addresses to the controllers, you can delete the temporary virtual subnet.

1. **Enter the following commands as** `root`**:**

   `# ifconfig` *ethernet-port***`:1 down`**

   `# ifconfig` *ethernet-port***`:1 unplumb`**

2. **View the changes:**

   `ifconfig -a`

Next Steps

You are now ready to use the management software to set up the array, as described in Chapter 7.

CHAPTER 7

Using the Management Software and Setting Up the Array

This chapter provides an overview of the management software and the steps required for first time you log in. It contains the following sections:

Starting the Management Software

The Sun StorageTek 6140 Array provides two interfaces for accessing the configuration software and the monitoring software for the array:

- A remote scripting command-line interface (CLI) that enables you to run commands interactively from an out-of-band management station, or write scripts to automate certain administrative tasks.

  For access instructions, see "Logging In and Out Using the CLI" on page 110.

- A browser interface for running the graphical interface on any management host that is connected to the site LAN. The web-based browser interface is the primary interface for configuring, managing, and monitoring the system.

  For access instructions, see "Logging In Using the Browser Interface" on page 111.

Logging In and Out Using the CLI

The following explains how to log in to and out of a remote host using the CLI. Do so either by remotely logging in to a management software station or by using the Solaris remote client on a remote host.

1. **Access the `CLI` directory:**

   `cd /opt/SUNWsesscs/cli/man`

Note – Be sure to add the `/opt/SUNWsesscs/cli/bin` directory to your path.

---

2. **Log in by typing the following command:**

   `% sscs login -h` *6140-hostname* **`[t] -u`** *username*

   where:

   - *6140-hostname* is the management host machine where you installed the software
   - *username* is one of the defined users in the management host software. See "Using and Adding Users" on page 124.

   TABLE 7-1 describes the optional arguments associated with the `sscs login` command for the Sun StorageTek 6140 Array.

TABLE 7-1 `sscs login` Command-Line Optional Arguments

Argument	Description
`-t`	Logs you in using an HTTP connection.

You can now use CLI commands to perform the same software operations as those available in the browser interface. For more information, see the `sscs`(1M) man page, located in `/opt/SUNWsesscs/cli/man`.

Note – To locate the `sscs`(1M) man page, you must update your `MANPATH` variable or use the `-m` option with the `man` command.

---

3. **Log out by typing the following command:**

   `# sscs logout`

Logging In Using the Browser Interface

You can start the management software on any system that is connected to the user LAN.

1. **Open a supported web browser.**

Note – For information about supported web browsers, see the *Sun StorageTek 6140 Array Release Notes*.

---

2. **Enter the IP address of the management host using this format:**

   `https://`*6140-management-host*`:6789`

   6140-management-host is the IP address of the machine where you installed the Sun StorageTek 6140 management software.

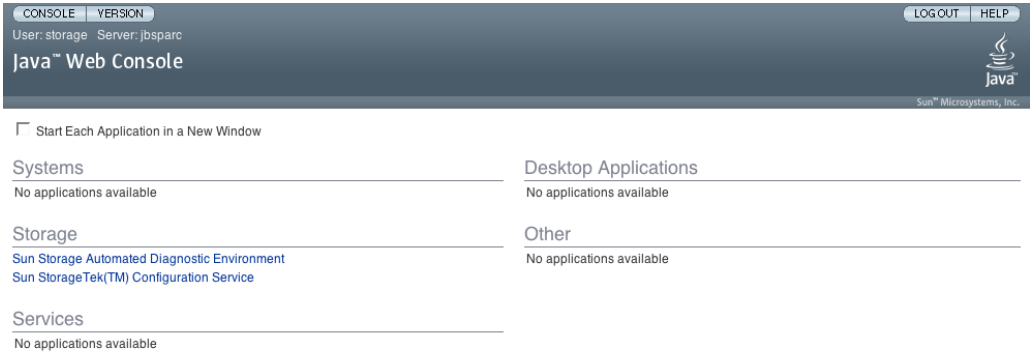
   The login page is displayed.

3. **Enter `root` for the user name and the root password of the machine on which you installed the software.**

Note – To maintain security on the server running the management host software, the `root` user name and password should be used only the first time you log in. At that time, create at least one user with a `storage` user role. Thereafter, that created user can perform all available management functions, including adding or modifying users.

4. **Click Log In.**

   The Sun Java Web Console page is displayed.



   The Sun Java Web Console page provides two entry points:

   - Sun Storage Automated Diagnostic Environment
   - Sun StorageTek Configuration Service

   When you select one of the entry points, the appropriate page is displayed.

   At this point, you are logged in to the system. Before you begin configuring the system, you should become familiar with the components of the browser interface and how to get help.

Note – The connection closes automatically if there is no activity for approximately 15 minutes.

Using the Browser Interface to Set Up the Array

This section describes the tasks for setting up the array and includes the following topics:

For more information about the management software, you can click the Help button at the top right corner of any window. For more information, see "Getting Help" on page 117.

Accessing the Sun StorageTek Configuration Service

To access the management software, start by selecting Sun StorageTek Configuration Service from the Storage section of the Sun Java Web Console page.

The Array Summary page is displayed (FIGURE 7-1).

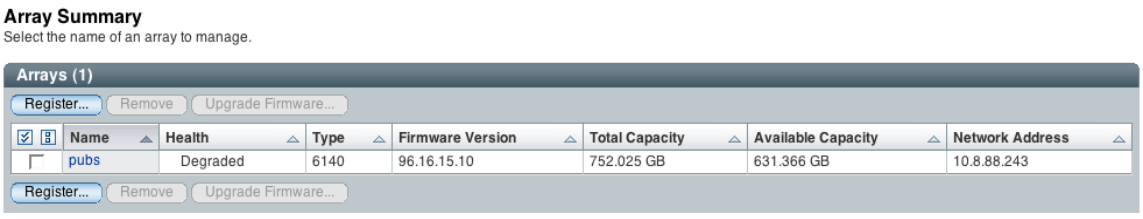


FIGURE 7-1 Array Summary Page

From here, you can carry out the setup tasks described in the following subsections, including registering and naming arrays, setting the array password, setting the system time, adding new users, and enabling premium features.

Navigating the Sun StorageTek Configuration Service

This section describes the user interface elements and navigation methods. It includes the following topics:

About the Browser Interface

The Sun StorageTek 6140 Array browser interface is the main interface for the system.

This section describes the main elements of the browser interface:

- Access buttons
- Quick status displays
- Navigational controls
- Page content and actions

Access Buttons

The access buttons (FIGURE 7-2) are located across the top of the web page and enable you to access some of the most common functions and displays.

FIGURE 7-2 Access Buttons

The access buttons have the following functions:

- **Console** returns you to the Sun Java Web Console page.
- **Version** displays version of the application you are running.
- **Refresh updates the current display**
- **Log Out** logs you out of the system and returns you to the Sun Java Web Console login page.
- **Help** opens the online help system.

Quick Status Displays

The quick status displays (FIGURE 7-3) provide user role and server name information, as well as the status of current alarm.

FIGURE 7-3 Quick Status Displays

The displays provide the following information:

- The display on the left shows the current user role and server name.
- The display on the right shows the current status of the system, including the number of current users logged in, date and time of the last software update, and current alarms.

For a description of the alarm symbols, see the Sun Storage Automated Diagnostic Environment online help. Click the Search tab and type `controls and indicators`.

Navigation Controls

You use the navigational controls to move between web pages to view, configure, manage, and monitor the system.

FIGURE 7-4 shows the navigation pane available for the Sun StorageTek Configuration Service.

FIGURE 7-5 shows the navigational tabs available for the Sun Storage Automated Diagnostic Environment.

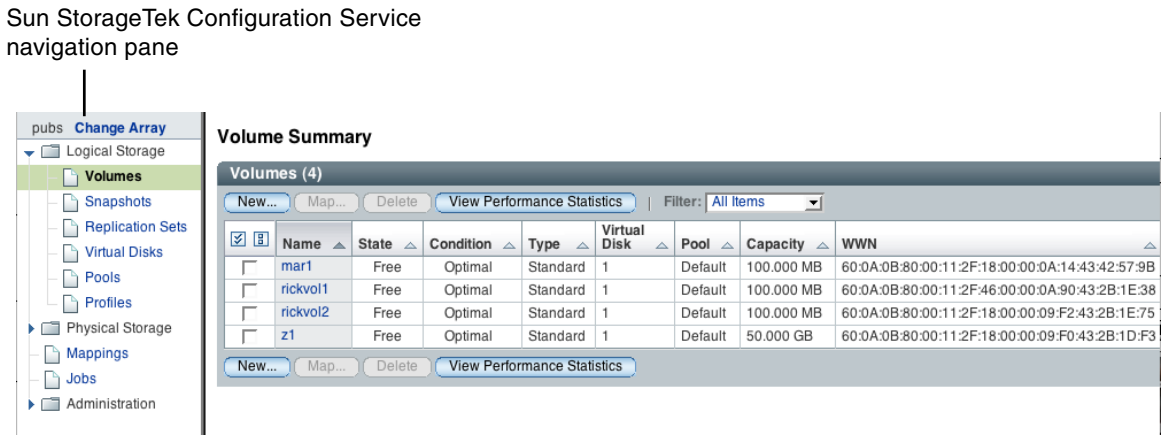


FIGURE 7-4 Navigation Pane: Sun StorageTek Configuration Service

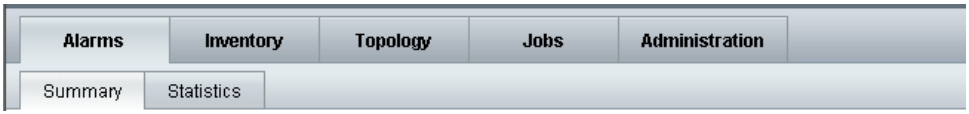


FIGURE 7-5 Navigational Tabs: Sun Storage Automated Diagnostic Environment

Page Content and Actions

The content part of each page displays system information and provides a method for performing actions that allow you to administer, manage, monitor, and service the system.

You can click links on each page to display more detailed information about a storage component or device. You can also use browser interface elements such as icons, buttons, check boxes, and radio buttons to perform system administration and storage management tasks.

FIGURE 7-6 shows a typical page content area for the Sun StorageTek Configuration Service.

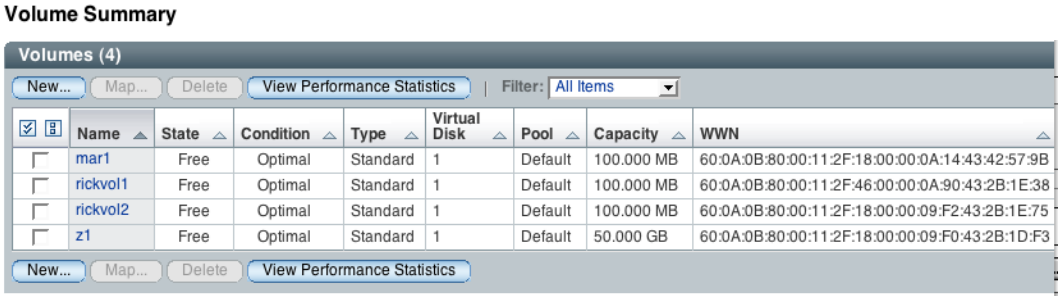


FIGURE 7-6 Page Content and Actions

TABLE 7-2 describes commonly used elements in the content part of the page.

TABLE 7-2 Interface Elements

Element	Description
	Sets the window to scroll or page through displayed data. Click this button to toggle between Page Through Data and Scroll Through Data.
	The column is sorted in ascending (A to Z) order. Click this button to toggle back to sort in descending order. The icon is redisplayed pointing downward.
	The column is the active column on which the page is sorted. Click this button to toggle back to sort in descending order. The icon is redisplayed pointing downward.
	Selects all data currently displayed. Click this button to select all data.
	Deselects all selected data.

Getting Help

You can open the online help system by clicking the Help button at the top right corner of the page (FIGURE 7-7).

FIGURE 7-7 Help Button

The online help system is context sensitive and will display help for the current page. The help system also provides conceptual, procedural, and reference information. You can use the Table of Contents, Index, and Search tabs to locate help topics that contain information you are looking for.

Setting Up the Array

To set up the array for basic operation, perform the procedures outlined in the following sections:

- "Registering the Array" on page 118
- "Naming an Array" on page 120
- "Setting an Array Password" on page 121
- "Resetting the Array Password" on page 123
- "Setting the System Time" on page 123
- "Using and Adding Users" on page 124
- "Enabling Premium Features" on page 127

Registering the Array

Using the Array Registration wizard, you can have the management software either auto-discover one or more arrays that are connected to the network and are not already registered, or you can choose to manually register an array.

The auto-discover process sends out a broadcast message across the management host subnet to identify any unregistered arrays. The discovery process displays the percentage of completion while the array management software polls devices in the network to determine whether any new arrays are available. When complete, a list of discovered arrays is displayed. You can then select one or more arrays to register from the list.

Manual registration enables you to register an array by identifying the IP address of its controller. This option is typically used only to add a storage array that is outside of the subnet of the management host.

The Array Registration wizard displays firmware information for each array and lists any action recommended to bring each array up to the current firmware baseline level. You can choose to perform the recommended firmware upgrade action now or you can modify the array firmware later by selecting the array and clicking the Upgrade Firmware button on either the Array Summary page or the Administration > General page.

You can automatically discover and register arrays that are on the same subnet as the management host.

If the arrays are not on the same subnet as the management host, use Register Array to manually discover the array (see "Manually Registering an Array" on page 120).

Auto Discovering Arrays

To automatically discover and register arrays on the management host subnet:

1. **In the Register Array wizard, click Auto Discover Arrays.**

   The management software detects the array you installed on its subnet and adds it to the Array Summary page.

Note – It takes approximately 2 minutes for the software to discover each array.

---

2. **Verify that the array has been added to the Array Summary page.**
3. **If the array is not displayed, do one of the following:**
   - Check the array status using the `ping` command.
   - Check the hardware connections.

   If the array is still not displayed, you can register the array manually as described in the next section.

Manually Registering an Array

To register an array:

1. **Click Sun StorageTek Configuration Service.**

   The Array Summary page is displayed.

2. **Click Register.**

   The management software launches the Register Array wizard.

3. **Follow the instructions in the wizard.**

Note – The password of the array is not a required entry. No array is shipped with a default password. This field is used only if the array being registered is one that was previously managed and had a set password. To give the array a password, see "Setting an Array Password" on page 121.

Unregistering an Array

To unregister an array:

1. **Click Sun StorageTek Configuration Service.**

   The Array Summary page is displayed.

2. **Select the check box to the left of the array you want to remove from the list of registered arrays.**

   This enables the Remove button.

3. **Click Remove.**

Naming an Array

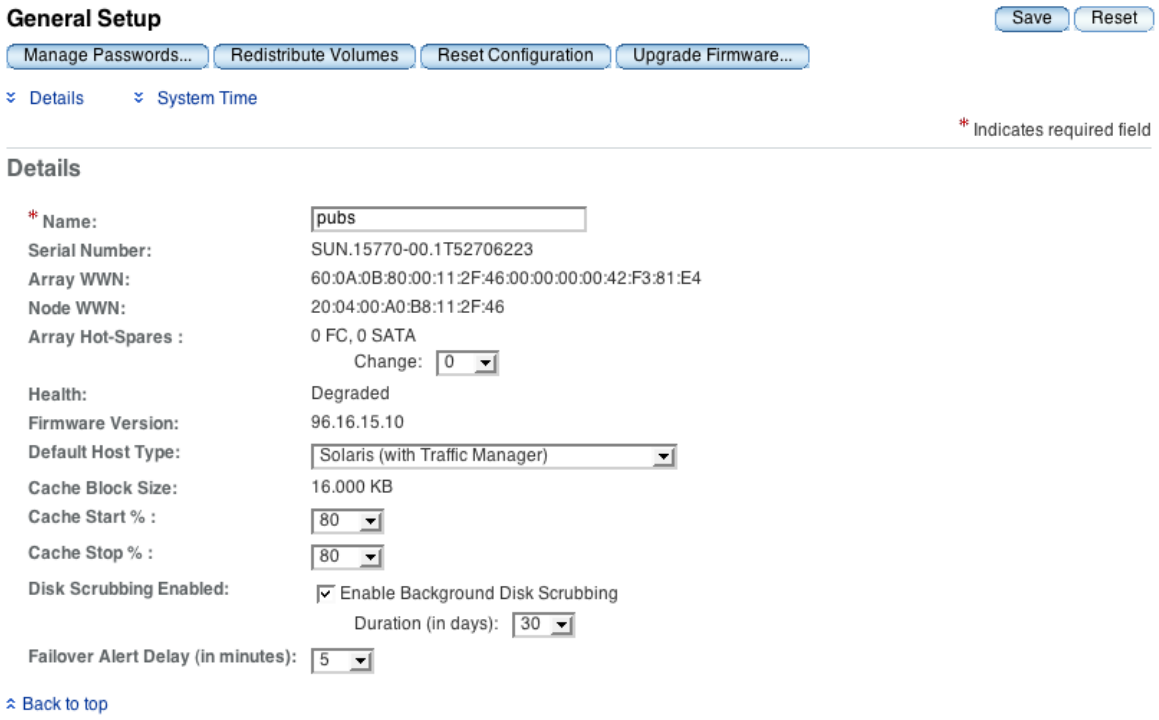
Each array requires a unique name.

To name an array:

1. **On the Array Summary page, click the array you want to name or rename.**

2. **In the navigation pane, choose Administration > General Settings.**

   The General Setup page is displayed.



3. **In the Name field, enter a unique name consisting of up to 30 characters.**

   The General Setup page contains other features that you may decide to configure. See the online help for more information.

   Your next step is to set a password for the array, if you want, while you are still on the General Setup page.

Setting an Array Password

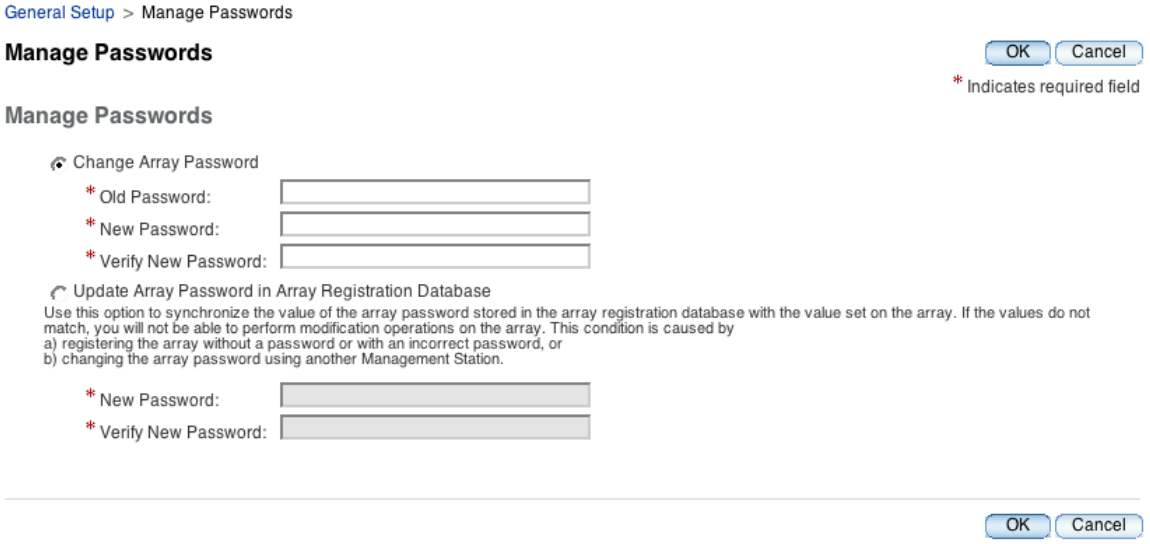
A new Sun StorageTek 6140 Array is shipped with a blank, or empty, password field. Sun recommends that you establish an array password during initial setup for security purposes. The password prevents other management hosts from unauthorized access to the configuration of the array.

Note – If you assign or change an array password in the Sun StorageTek Configuration Service, you should also add it in the Sun Storage Automated Diagnostic Environment, using the Update Monitoring and Setup Information function. See the online help for more information.

To set an array password on a new array:

1. **On the General Setup page, click Manage Passwords.**

   The Manage Passwords page is displayed.



2. **Select Change Array Password.**
3. **Leave the Old Password field blank.**

   This is the only time you can leave this field blank, when you establish a password for a new array.

4. **Enter a new password consisting of up to 30 characters for the array.**
5. **Enter the password again to confirm the new password.**
6. **Click OK.**

   The General Setup page is displayed.

   The management software stores an encrypted copy of the array password, known as the local password, on the management host. Use the Update Array Password in Array Registration Database to ensure that there is no password conflict with another instance of the management software.

Resetting the Array Password

If you need to change the array password and you do not have the password that was set during installation, you can use the Service Interface menu of a controller serial port to reset the array password.

To reset the array password:

1. **Access the serial port Service Interface menu using the procedures specified in** "Using the Serial Port Interface to Assign IP Addresses" on page 97**.**
2. **Select Reset Storage Array (SYMbol) Password.**

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

Enter Selection: 3
```

3. **Enter y to confirm that you want to reset the array password.**

```
Are you sure that you want to reset the Storage Array Password ?
(Y/N): y
```

The array password is reset to no password and a confirmation message is displayed.

4. **To redefine a password for the array, see** "Setting an Array Password" on page 121**.**

Setting the System Time

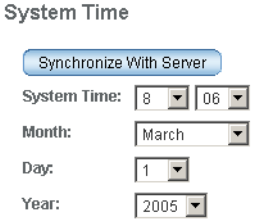
You can also update the system time and date on the General Setup page. When you set the time and date for a selected array, the values are updated for all arrays in the system.

There are two ways in which you can update the system time and date:

- Click Synchronize with Server to synchronize the time on the array with your management host
- Set the time manually

To set the time manually:

1. **On the General Setup page, scroll down to the System Time section:**



2. **Select the current hour and minute according to a 24-hour clock.**
3. **If the date is incorrect, change the month, day, and year to the current date.**
4. **Click OK to save your changes.**

   The General Setup page is refreshed, and `Success` is displayed at the top of the page.

   For more information about the fields and buttons on the General Setup page that you can use after you set up your system, see the online help.

Using and Adding Users

One default user name and two user roles are supplied with the management software.

About Users and User Roles

One default user name, `root`, with an assigned user role of `storage` is supplied with the management software.

The user role assigned to a user determines that user's access to the management functions for the array. TABLE 7-3 describes the valid user names and user role functions and the requirements for each.

TABLE 7-3 Valid User Names and User Roles

User Name	Required Password	User Role	Description
root	UNIX password for root on the management host	`storage`	A `storage` user can use all of the software features related to storage device configuration and array management.
`Any valid UNIX user on the management host`	UNIX password assigned to the user on the management host	`storage`	A `storage` user can use all of the software features related to storage device configuration and array management.
		`guest`	A `guest` user has read-only privileges and can only view information. This user cannot modify any settings or features.

Note – To maintain security on the server running the management host software, the `root` user name and password should be used only the first time you log in. At that time, create at least one user with a `storage` user role. Thereafter, that created user can perform all available management functions, including adding or modifying users.

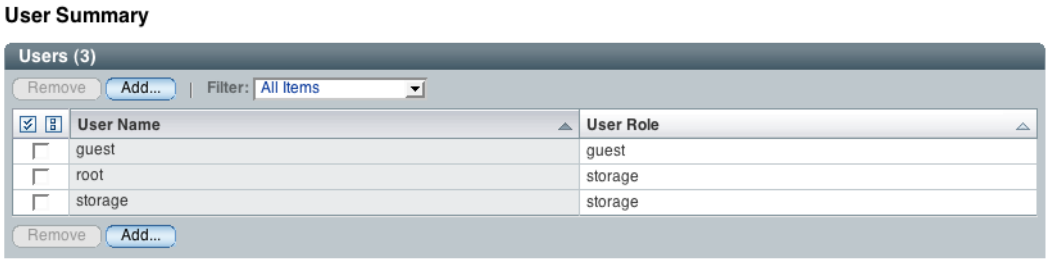
Multiple instances of the same user name can be logged in concurrently. However, because users with the `storage` user role have write privileges, there is a risk that the changes of one logged in user will overwrite previous changes of another logged-in user. Therefore, you should develop policies about who can make changes and how to notify others.

Adding New Users

Before you can add a user and assign that user a user role, the user name must be defined in the Solaris Operating System `/etc/passwd` file or network information server (NIS).

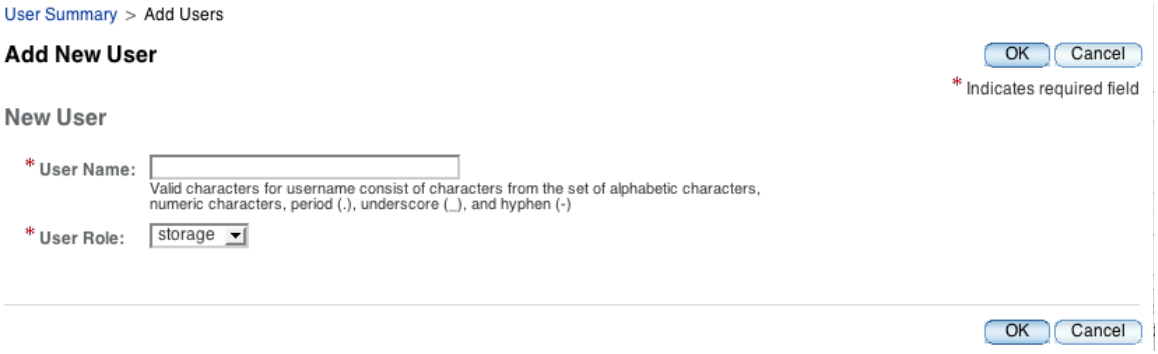
1. **To view the list of defined users, choose Administration > User Management in the navigation pane.**

   The User Summary page is displayed.



2. **To add a new user, click the Add button.**

   The Add New User page is displayed.



3. **In the User Name field, enter a valid user name.**

   The user name must be defined in the Solaris Operating System `/etc/passwd` file or NIS.

4. **From the User Role list, select the role you want to assign for this user.**

   You can assign a user to one of the user roles identified in TABLE 7-3.

5. **Click OK.**

   The User Summary page is displayed with a success message, and the name is added to the list.

Note – Newly added users should enter the same password for the Sun Java Web Console that they use in their Solaris accounts.

Enabling Premium Features

License certificates are issued when you purchase premium services.

Premium features that are available with the Sun StorageTek 6140 Array include:

- Volume Copy
- Volume Snapshot
- Storage Domain capacity of 16 and 64
- Remote Replication

Refer to your license certificate and the Sun License Center for license information. Go to `http://www.sun.com/licensing` for your local Sun License Center phone number.

To add a license to enable a premium feature:

1. **Click the array for which you want to add a new license.**

   The Volume Summary page for that array is displayed.

2. **In the navigation name, choose Administration > Licensing.**

   The Licensable Feature Summary page is displayed.

3. **Click Add License.**

   The Add License page is displayed.

4. **Select the type of license you want to add.**

5. **Enter the information provided to you by the Sun Licensing Center and click OK.**

   The license is added to the Licensable Feature Summary page.

Setting Up the Sun Storage Automated Diagnostic Environment

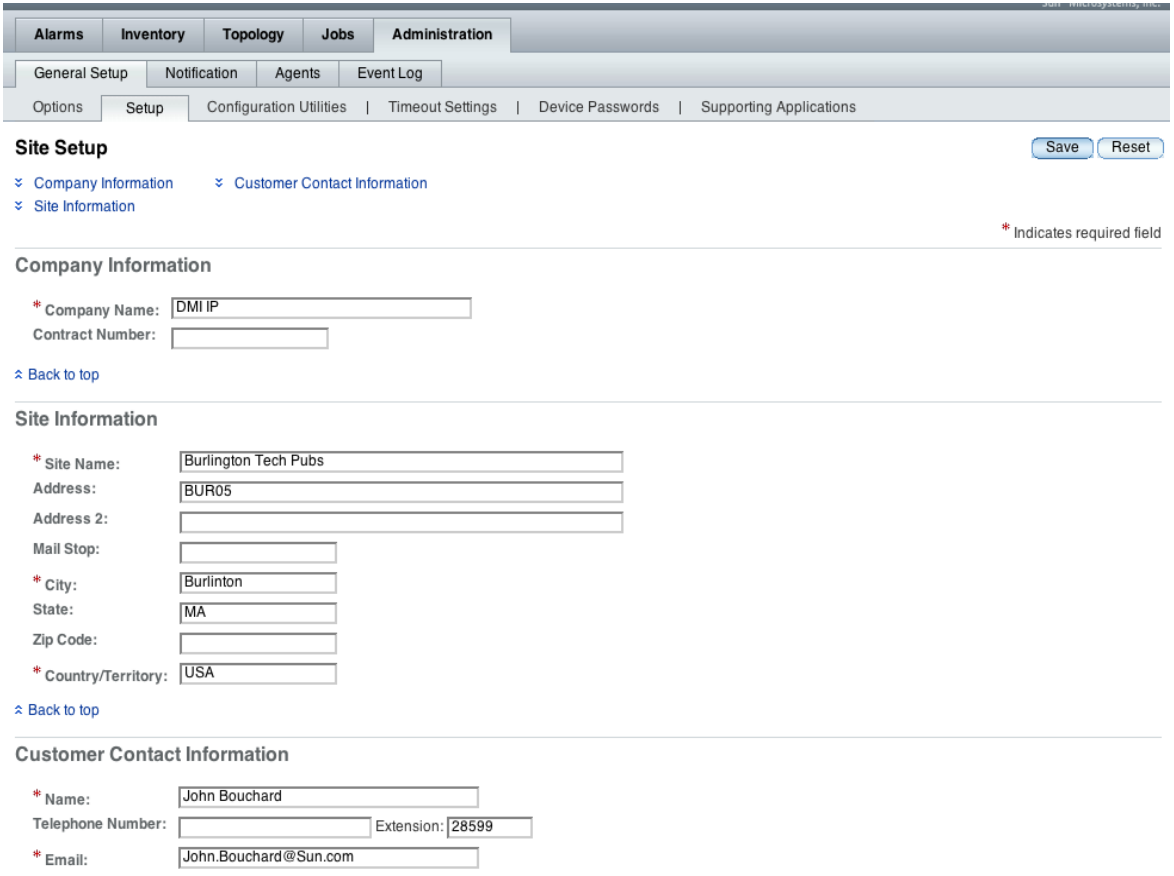
The Sun Storage Automated Diagnostic Environment software enables you to monitor and diagnose your arrays and storage environment, including all Sun storage area network (SAN) devices. See the *Storage Automated Diagnostic Environment Enterprise Edition Release Notes* for a list of supported devices.

1. **From the Sun Java Web Console page, click Sun Storage Automated Diagnostic Environment.**

2. **Click Administration > General Setup > Setup.**

   The Site Setup page is displayed:

Note – If this is your first time accessing the Sun Storage Automated Diagnostic Environment, the Site Setup page is displayed automatically.



3. **Complete the required company, site, and customer contact information and click OK.**

   Many parameters have default settings you can accept. If you need help on any of the fields, click the Help button.

4. **Check the devices that have been discovered and their monitoring status.**

a. **Click Inventory.**

   The Devices page displays all of the devices that were discovered by the Sun StorageTek Configuration Service.

b. **Verify that all of the expected hosts and devices are listed and that the monitoring status displays Monitored for each device.**

5. **Discover other supported devices such as SAN switches.**

   a. **Click Discover on the Devices page.**

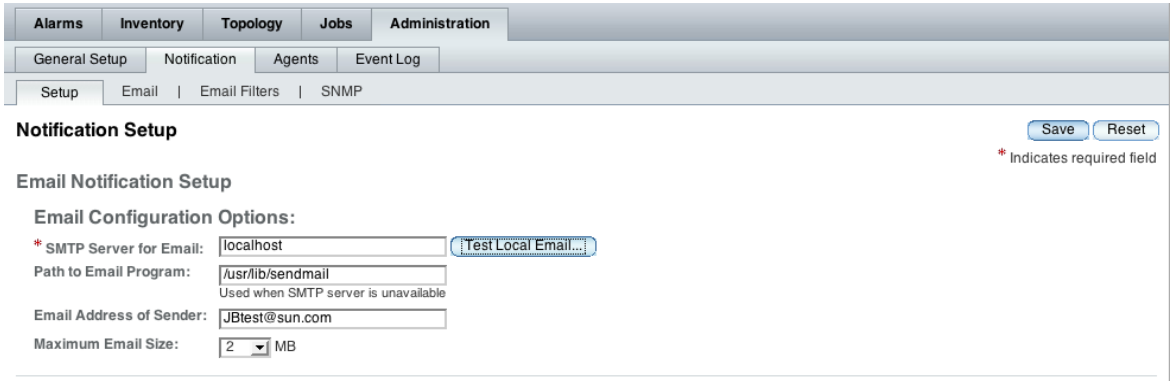
      The Discovery page is displayed.

   b. **Complete the fields on the Discovery page and click Start Discovery.**

      When the device discovery process is complete, the discovered devices are displayed on the Devices page.

6. **Click Administration > Notification.**

   The Notification Setup page is displayed.



7. **Enable local email.**

   a. **Enter the name of the SMTP server.**

      If the host running this software has the `sendmail` daemon running, you can accept the default server, localhost, or the name of this host in the required field.

   b. **Specify the other optional parameters, as desired.**

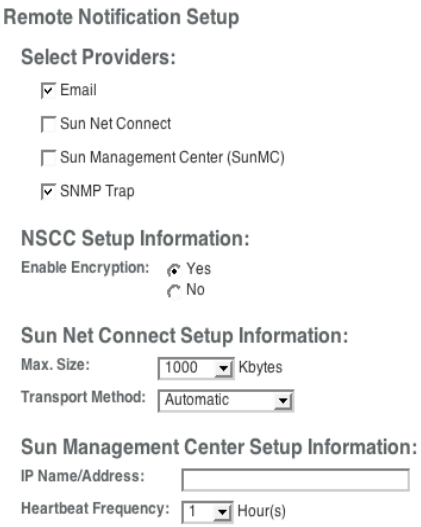
   c. **If you have changed or entered any parameters, click Save.**

   d. **(Optional) Click Test Local Email to test your local email setup by sending a test email.**

      If you need help on any of the fields, click the Help button.

8. **(Optional) Set up remote notifications to Sun Microsystems services or to an enterprise management application.**

   a. **Scroll down the Notification Setup page to Remote Notification Setup.**



   b. **Select one or more providers.**

      Email notification is enabled by default. Remote notification selections include Sun Net Connect, Sun Management Center (SunMC), SNMP, and NSCC. If you need information about any of these remote providers, click Help.

   c. **Click Save.**

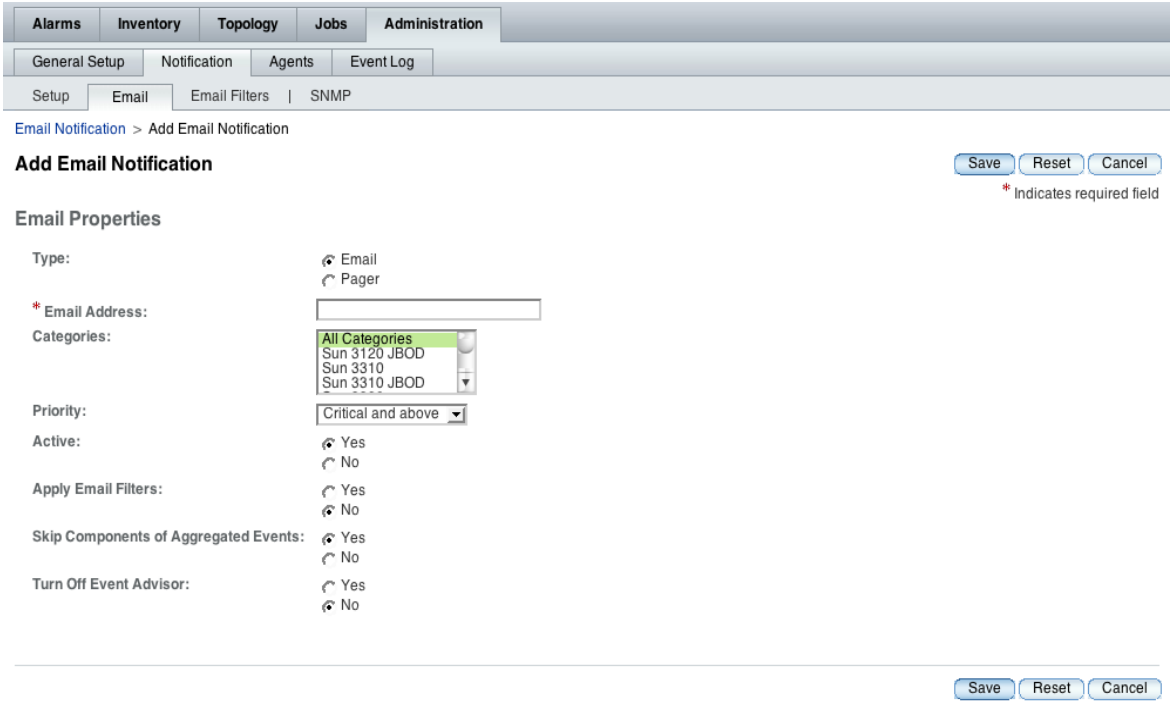
9. **Set up local email notification recipients.**

   a. **Click Administration > Notification > Email.**

      The Email Notification page is displayed.

   b. **Click New.**

      The Add Email Notification page is displayed.



c. Enter an email address for local notification. At least one address is required to begin monitoring events. You can customize emails to specific severity, event type, or product type.

d. Click Save.

10. Check the devices that have been discovered and their monitoring status.

a. Click Inventory.

The Devices page displays all of the devices that were discovered by the Sun StorageTek Configuration Service.

b. Verify that all of the expected hosts and devices are listed and that the monitoring status displays Monitored for each device.

11. Discover other supported devices such as SAN switches.

a. Click Discover on the Devices page.

The Discovery page is displayed.

b. Complete the fields on the Discovery page and click Start Discovery.

When the device discovery process is complete, the discovered devices are displayed on the Devices page.

12. **Perform optional setup tasks:**
    - Confirm general setup information.
    - Add and activate agents.
    - Specify system timeout settings.

    For information about these setup tasks, see the online help.

Next Steps

Now you are ready to install data host and remote management host software on hosts that are not running Solaris OS, as described in Chapter 8.

CHAPTER 8

Installing Data Host and Remote Management Software on Hosts Not Running the Solaris OS

This chapter describes how to install the remote CLI software on operating system platforms other than those running the Solaris operating system (OS). It contains the following sections:

Installing Remote Management Host Software for Operating Systems Other Than Solaris

This section shows how to install the remote management host software on hosts running an operating system other than Solaris.

It contains the following subsections:

About the Remote Management Host Software

The remote command-line interface (CLI) client enables you to configure and monitor the array from hosts other than the management host. You can run commands interactively from a remote client, or write a script to automate certain administrative tasks.

Note – The remote management host software provides remote management capabilities, in addition to those provided on the Solaris OS management host. It cannot be used in place of the Solaris OS management host.

The remote CLI client is available for Windows, Red Hat Linux, AIX, and HP-UX operating environments.

Note – See the *Sun StorageTek 6140 Array Release Notes* for the operating system versions that are supported.

For information about the remote CLI client commands, see the `sscs`(1M) man page.

Downloading the Software

The remote CLI client for operating systems other than Solaris is distributed from the Sun Download Center (SDLC).

Note – You do not need to download a remote CLI client for a SPARC/Solaris host. It is included on the host software CD.

To download the software, follow these steps:

1. **From the host on which you want to install the software, open a browser window and go to the Sun Download Center:**

   `http://wwws.sun.com/software/download/sys_admin.html`

2. **Click the Sun StorageTek 6140 Host CLI Package for Non-Solaris software link.**
3. **Click Download to access the download window for all operating systems.**
4. **Log in using your customer user name and password.**
5. **Read the license agreement, click Accept, and then click Continue.**

6. **For the AIX, HP-UX, or Linux operating system, follow these steps:**

   a. **Click the file you want to download.**

      The web browser prompts you to download the file.

   b. **Download to any directory except** `/opt`**.**

   c. **Save the installation package to a temporary working directory after you download it:**

      `#  cp` *install-package*`.tar.Z /`*directory*

      install-package is the name of the compressed `.tar`, file and *directory* is the name of the directory name to which you want to copy the package.

   d. **Change to the temporary directory:**

      # **`cd /`***directory*

   e. **Uncompress the tar file.**

   f. **Extract the contents:**

      `tar -xvf` *tar-file*.tar

Note – If `checksum` errors occur when you use a platform-specific `tar`, use the GNU version of `tar`.

---

7. **For the Windows 2000 or Windows 2003 operating systems, follow these steps:**

   a. **Click the file you want to download.**

      The web browser prompts you to download the file.

   b. **Download to any directory.**

   c. **Unzip** `Disk1.zip` **using any supported zip program.**

   d. **Save the unzipped folder to any directory.**

Installing the Windows Remote CLI Client

1. **Download the software for the Windows host as described in** "Downloading the Software" on page 134**.**

2. **Double-click** `setup.exe`**.**

3. **Read the license agreement and answer the licensing question.**

   If you accept the licensing agreement, the software is installed on the host.

4. **From the Start menu, click Programs > Accessories > Command Prompt.**

5. **Add** `c:\Program Files\Sun Microsystems\SSCS` **to your command prompt path.**

   The remote CLI client is now installed, enabling you to enter `sscs` commands in the Command Prompt window. For information about the commands, see the `sscs`(1M) man page.

Installing the Red Hat Linux, HP-UX, and AIX Remote CLI Client

1. **Download the remote CLI software for the appropriate operating system as described in** "Downloading the Software" on page 134**.**

2. **Log in as superuser (**`root`**).**

3. **Remove any aliases created for the environment (for example,** `cp="cp -i"`**).**

   If aliases exist in the superuser environment or profile, the software installation and configuration might have unexpected results.

   For the Korn shell: `# unalias -a`

   For the C shell: `> unalias *`

4. **Verify that you have write permissions in** `/opt`**.**

5. **Run the install script by issuing the following command:**

   ./se6x20

6. **Read the licensing agreement, click Accept, and then click Continue.**

   When you accept the licensing agreement, the software is installed in `/opt/se6x20` on the host.

7. **Add** `/opt/se6x20/bin` **to your path.**

8. **Type** `/opt/se6x20/bin/sscs` **at the command line.**

   The remote CLI client is now installed. For information about the commands, see the `sscs`(1M) man page.

Installing Data Host Software for Operating Systems Other Than Solaris

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

About the Data Host Software

The data host software for Red Hat Linux, HP-UX, AIX, NetWare, and SGI IRIX hosts is available from the Sun Download Center (SDLC).

See the *Sun StorageTek 6140 Array Release Notes* for a list of supported operating systems, patches, and HBAs.

Preparing for Installation

Before installing the data host software, verify the following for each data host:

- Operating system and version are supported as described in the release notes.
- Host bus adapter (HBA) is installed and supported as described in the release notes.
- HBA firmware is at the required level as described in the release notes (HBA drivers are distributed through the Sun Download Center).
- Data hosts are cabled to the array as described in "Connecting Data Hosts" on page 67.

Note – See the *Sun StorageTek 6140 Array Release Notes* for a list of supported operating systems, patches, and HBAs.

Downloading the Software

1. **To download the latest version of the software, go to:**

   `http://www.sun.com/download/index.jsp?cat=Systems%20Administration&tab=3&subcat=Storage%20Management`

2. **Select the link for the Sun StorageTek 6140 Array Host Installation software and click Download.**
3. **Log in using your SDLC user name and password.**

   If you have not already registered, click Register Now.

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

Installing the Software

A `readme` file is provided as part of the installation package.

1. **To install the software, refer to the `readme` file for platform-specific instructions.**
2. **For post-installation instructions, refer to the** *Sun StorageTek 6140 Array Release Notes***.**

Next Steps

You are now ready to plan your storage configuration, as described in Chapter 9.

CHAPTER 9

Planning Your Storage Configuration

This chapter introduces you to the Sun StorageTek 6140 Array storage components. It contains the following sections:

For more information about the concepts introduced in this chapter, see the appropriate topic in the online help.

Storage Array Configuration Components

The array management software provides access to both physical and logical storage components. The physical components of a storage array are as follows.

- **Host** – A server, or data host, with one or more initiators that can store data on an array. You can define volume-to-logical unit number (LUN) mappings to an individual host or assign a host to a host group.
- **Host group** – A collection of one or more data hosts in a clustered environment. A host can be part of only one host group at a time. You can map a host group to one or more volumes to enable the hosts in the group to share access to a volume.
- **Initiator** – A port on a Fibre Channel (FC) host bus adapter (HBA) that allows a host to gain access to the storage array. The initiator has a World Wide Name (WWN) that is globally unique.
- **Tray** – An enclosure that contains from 5 to 16 disks.

- **Disk** – A non-volatile, randomly addressable, rewriteable data storage device. Physical disks are managed as a pool of storage space for creating volumes.

The logical components of a storage array are as follows:

- **Storage domain** – A logical entity used to partition storage. By default, users receive one storage domain. You can optionally purchase RTU licenses to increase this number to 4, 8, or 16 domains on a Sun StorageTek 6140 array with 2 GB cache; or 4, 8, 16, or 64 domains on a Sun StorageTek 6140 array with 4 GB cache.
- **Profile** – A set of attributes that are used to create a storage pool. The system has a predefined set of storage profiles. You can choose a profile suitable for the application that is using the storage, or you can create a custom profile.
- **Pool** – A collection of volumes with the same configuration. A storage pool is associated with a storage profile, which defines the storage properties and performance characteristics of a volume.
- **Virtual disk** – One or more physical disks that are configured with a given RAID level (or RAID set). All physical disks in a virtual disk must be of the same type, FC or SATA II.
- **Volume** – A container into which applications, databases, and file systems store data. Volumes are created from virtual disks, based on the characteristics of a storage pool. You map a volume to a host or host group.
- **Snapshot** – A point-in-time copy of a primary volume. The snapshot can be mounted by an application and used for backup, application testing, or data mining without requiring you to take the primary volume offline. Snapshots are a premium feature that require a right-to-use license.

For additional information on physical and logical components, refer to the online help.

FIGURE 9-1 shows the relationship of logical and physical storage components.

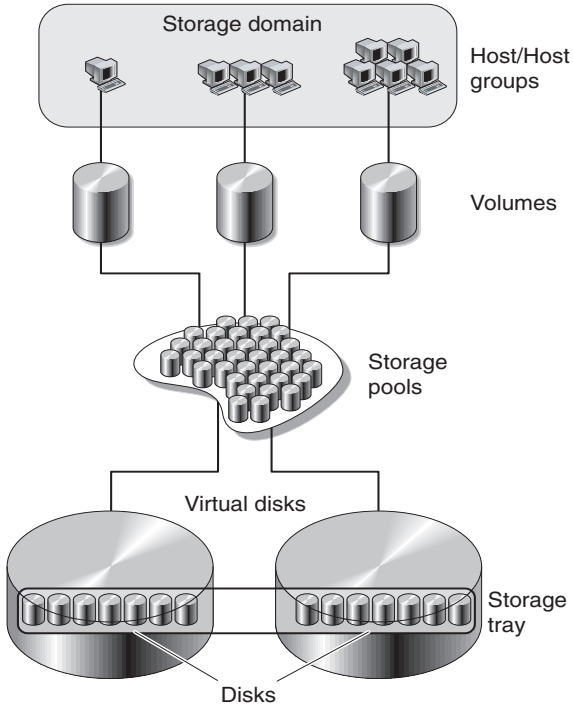


FIGURE 9-1 Logical and Physical Storage Components

Partitioning Storage Using Storage Domains

Storage domains enable you to partition storage, allowing hosts or host groups access to specific volumes. Hosts access volumes on the array through the physical host ports (or initiators) residing on host HBAs. Volume-to-LUN mapping allows you to specify the host or host group that can access a specific volume on your storage array. For more information about storage domains and LUN mapping, see the online help.

FIGURE 9-2 shows how storage domains can be used to partition storage. It depicts a storage array configured with three storage domains, Storage Domain 1, Storage Domain 2, and Storage Domain 3.

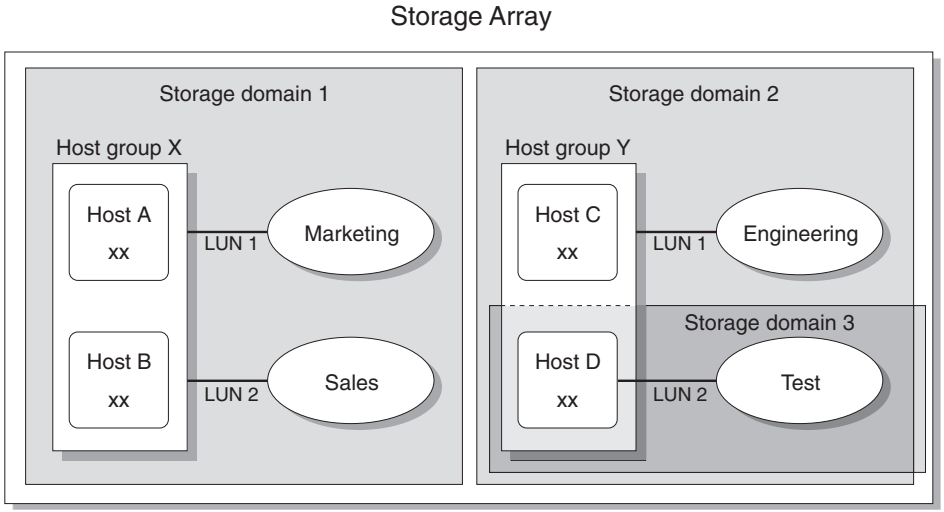


FIGURE 9-2 Storage Array With Three Domains

Storage Domain 1 consists of two volumes, Marketing and Sales, that are mapped to Host Group X. Host Group X contains two hosts, Host A and Host B. All initiators associated with Host A and Host B, within Host Group X, have access to volume Marketing by way of LUN ID 1 and to volume Sales by way of LUN ID 2.

Storage Domain 2 consists of one volume, Engineering, that is mapped to Host Group Y. Host Group Y contains two hosts, Host C and Host D. By virtue of being associated with any host within Host Group Y, all initiators associated with Host C and Host D have access to volume Engineering by way of LUN ID 1.

Storage Domain 3 consists of one volume, Test, that is mapped to Host D. All initiators associated with Host D have access to volume Test by way of LUN ID 2. Note that Host D is a member of Host Group Y; however, since volume Test is mapped directly to Host D and not to Host Group Y, Host D is the only member of Host Group Y that can access volume Test.

Note – LUN IDs must be unique within a storage domain.

Storage Configuration Considerations

When configuring a storage array, you need to determine how to organize and allocate the total storage capacity into volumes and share those volumes among your data hosts. As you plan your storage configuration, it is important that you consider the following requirements for your site:

- **Performance requirements** – You can optimize I/O activity by selecting a predefined storage profile with different characteristics or by creating a custom profile.
- **Access requirements** – You can use storage domains to organize and allocate storage so that only certain hosts have access to volumes. Volumes in a storage domain can be accessed only by hosts and host groups that are in the same storage domain. You can associate a storage domain with individual hosts or with a host group.
- **Combination of redundancy with performance** – To maximize both performance and redundancy, a combination of RAID levels is necessary. The data striping provided by RAID 0 is a cost-effective way to create high levels of performance in a disk array, and having multiple copies of data through data mirroring provided by RAID 1 is the best way to create redundancy. By combining RAID 1 with RAID 0, you can take advantage of both features.

  To combine disk mirroring with disk striping, configure RAID 1 with more than two drives. The firmware automatically creates a RAID 1+0 virtual disk.

The Sun StorageTek 6140 Array software is configured with a default storage profile, storage pool, and storage domain:

- The default storage profile configures associated volumes to have a RAID-5 RAID level, 512-Kbyte segment size, enabled read-ahead mode, FC disk type, and a variable number of drives.
- The default storage pool uses the default profile (RAID-5) and groups all volumes with the same storage characteristics, as defined by the storage profile.
- The default storage domain has no restrictions and allows all hosts and host groups to share access to the same volumes. If you want to restrict access to volumes from certain hosts, you should use storage domains.

You must plan your configuration to determine what storage profile and storage pool to use. For more information, see Planning Volumes in the online help.

Allocating Storage to Data Hosts

Before you create a volume, you should have a plan for how you want to allocate your storage. You should know the number of data hosts you are configuring and the storage capacity and performance needs of each data host.

The New Volume wizard guides you through the steps for creating a volume. When you create a volume, the wizard prompts you to enter or select the following information:

- Volume name and capacity
- A storage pool, which is associated with a storage profile
- The mode in which virtual disks will be created
- Optionally, a mapping from the volume to a host or host group

Configuring Storage on the Array

This section describes how to start to configure storage on the array. It guides you through the following steps:

- "Logging In" on page 144
- "Selecting a Profile" on page 145
- "Creating Hosts and Host Groups" on page 146
- "Creating an Initiator" on page 148
- "Creating a Storage Pool" on page 149
- "Creating a Volume and Mapping It to a Host or Host Group" on page 150

Logging In

1. **Open your browser and enter the IP address of the management host using this format:**

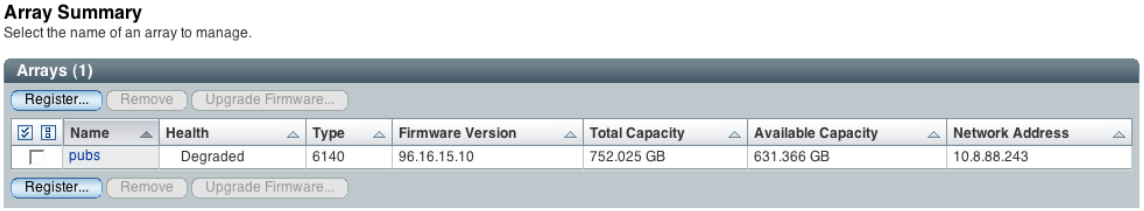
   `https://`*IP-address-management-host***`:6789`**

2. **Log in as a user with the `storage` role.**

   The Sun Java Web Console page is displayed.

3. **Click Sun StorageTek Configuration Service.**

   The Array Summary page is displayed.



Selecting a Profile

The Sun StorageTek 6140 Array provides several storage profiles that meet most storage configuration requirements. If the Default storage profile does not meet your performance needs, you can select one of several other predefined profiles, or you can create a custom profile.

To view the predefined storage profiles:

1. **On the Array Summary page, click the array you want to configure.**

   The Volume Summary page for that array is displayed.

2. **In the navigation pane, choose Logical Storage > Profiles.**

   The Storage Profile Summary page is displayed.

   TABLE 9-1 describes the characteristics of the predefined storage profiles.

TABLE 9-1 Sun StorageTek 6140 Array Predefined Storage Profiles

Name	RAID Level	Segment Size	Read-Ahead Mode	Drive Type	Number of Drives
Default	RAID-5	512 KB	Enabled	FC	Variable
High_Capacity_Computing	RAID-5	512 KB	Enabled	SATA	Variable
High_Performance_Computing	RAID-5	512 KB	Enabled	FC	Variable
Mail_Spooling	RAID-1	512 KB	Enabled	FC	Variable
NFS_Mirroring	RAID-1	512 KB	Enabled	FC	Variable
NFS_Striping	RAID-5	512 KB	Enabled	FC	Variable
Oracle_DSS	RAID-5	512 KB	Enabled	FC	Variable
Oracle_OLTP	RAID-5	512 KB	Enabled	FC	Variable

TABLE 9-1 Sun StorageTek 6140 Array Predefined Storage Profiles *(Continued)*

Name	RAID Level	Segment Size	Read-Ahead Mode	Drive Type	Number of Drives
Oracle_OLTP_HA	RAID-1	512 KB	Enabled	FC	Variable
Random_1	RAID-1	512 KB	Enabled	FC	Variable
Sequential	RAID-5	512 KB	Enabled	FC	Variable
Sybase_DSS	RAID-5	512 KB	Enabled	FC	Variable
Sybase_OLTP	RAID-5	512 KB	Enabled	FC	Variable
Sybase_OLTP HA	RAID-1	512 KB	Enabled	FC	Variable

3. **Select a profile that matches your storage requirements.**

   You will need the name of the storage profile later, when you create a storage pool.

Note – If you want to create a custom profile, click New on the Storage Profile Summary page. If you need information about any of the fields, click Help.

Creating Hosts and Host Groups

Host groups enable you to designate a collection of hosts that will share access to a volume. You can map volumes to a host group or to individual hosts that have a LUN.

If you have many hosts to create, you may find it easier to create the hosts first and then to add the hosts to a host group.

Creating Hosts

Follow these steps for each data host to which you wish to assign storage.

1. **In the navigation pane, choose Physical Storage > Hosts.**

   The Host Summary page is displayed.

2. **Click New.**

   The Create New Host page is displayed.

3. **Type a name for the new host, using a maximum of 30 characters.**

   Use a name that will allow you to recognize the data host on your network.

4. **If host groups have already been created, you can assign the new host directly to a host group.**

5. **Click OK.**

   The host is created and added to the Host Summary page.

Creating a Host Group

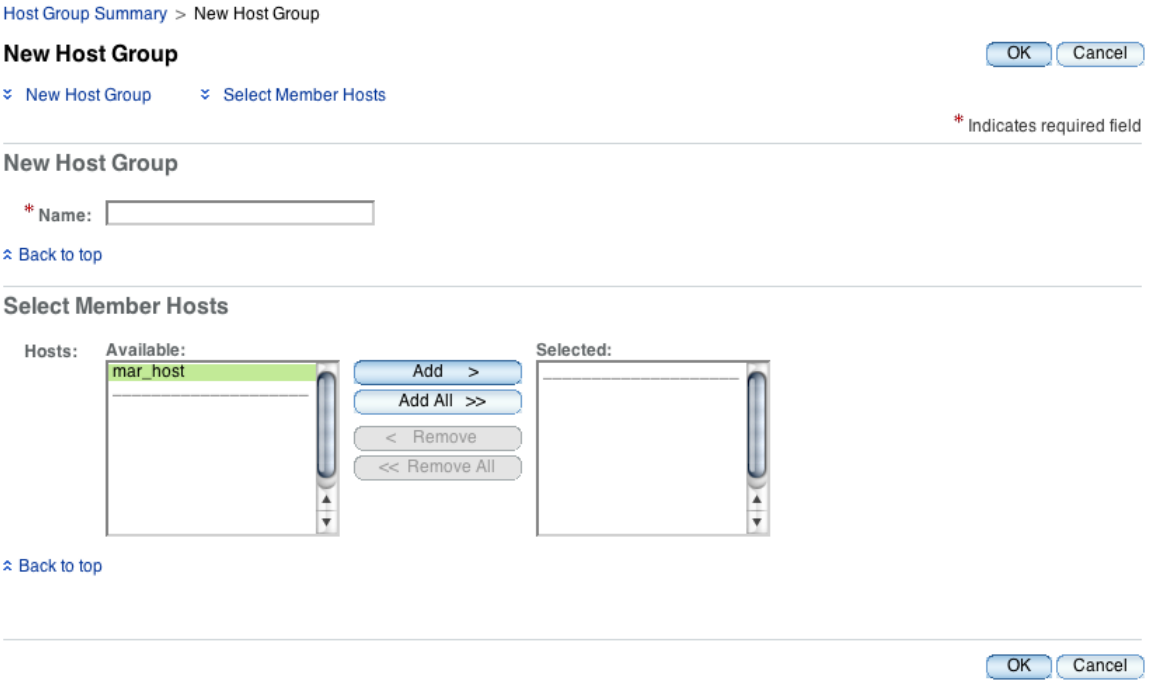
You typically create host groups in a cluster environment.

1. **In the navigation pane, choose Physical Storage > Host Groups.**

   The Host Group Summary page is displayed.

2. **Click New.**

   The New Host Group page is displayed.



3. **Enter a name for the new host group, using a maximum of 30 characters.**
4. **Double-click the names of the available hosts you want to add to the group. You can also click Select All or Remove All to add or remove all of the available hosts.**
5. **Click OK.**

   The new host group is created and added to the Host Group Summary page.

Creating an Initiator

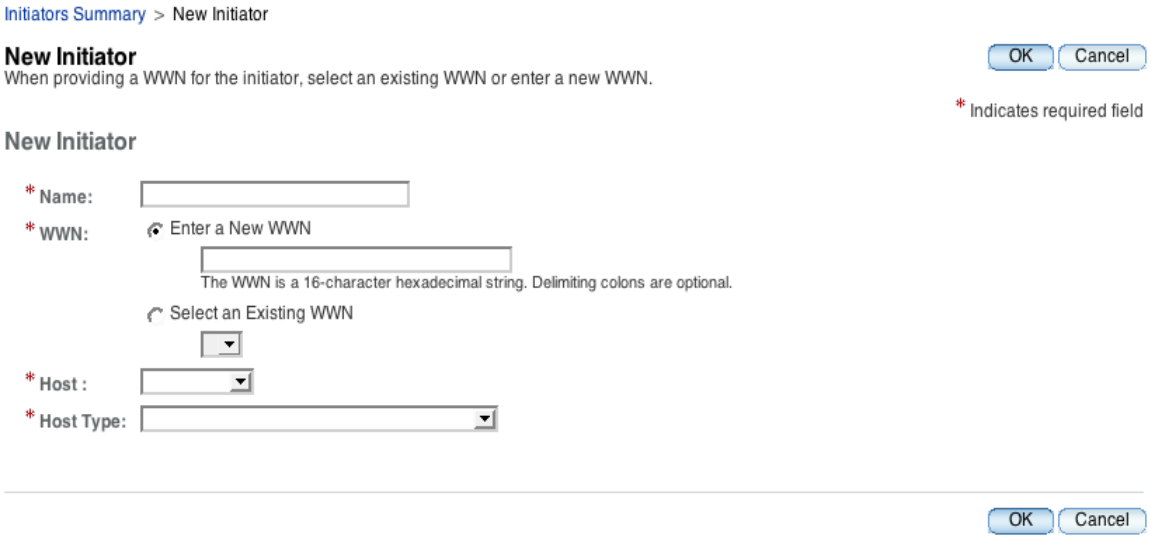
To make storage available to a data host or host group, you create an initiator and associate it with a volume. An initiator is an FC port that is identified by a unique WWN of an HBA installed on the data host. You will need the WWN for the initiator that you want to associate with a volume.

1. **In the navigation pane, choose Physical Storage > Initiators.**

   The Initiator Summary page is displayed.

2. **Click New.**

   The New Initiator page is displayed:



3. **Enter a name for the new initiator, using a maximum of 30 characters.**
4. **Specify a new WWN for the initiator or select an existing WWN from the drop-down list of unassigned WWNs.**

   If you specify a new WWN, the delimiting colons (:) of the 16-character hexadecimal WWN are optional.
5. **Select the host name for the new initiator.**
6. **Select the host type for the new initiator.**
7. **Click OK.**

   The Initiator Summary page displays the initiator name, host name, host type, and WWN of the new initiator.

Creating a Storage Pool

A storage pool is a collection of volumes with the same configuration.

1. **In the navigation pane, choose Logical Storage > Pools.**

   The Storage Pool Summary page is displayed.

2. **Click New.**

   The Create New Storage Pool page is displayed.

3. **Enter a name for the new storage pool, using a maximum of 30 characters.**
4. **Select Default or another predefined storage profile that meets your storage needs.**

   See "Selecting a Profile" on page 145.

5. **Click OK.**

   The new storage pool is displayed on the Storage Pool Summary page.

Creating a Volume and Mapping It to a Host or Host Group

A volume is a "container" into which applications, databases, and file systems can store data. A volume is created from virtual disks that are part of a storage pool. Based on your selections, the array automatically allocates storage from different disks to meet your volume configuration requirements.

The New Volume wizard guides you through the steps for creating a volume.

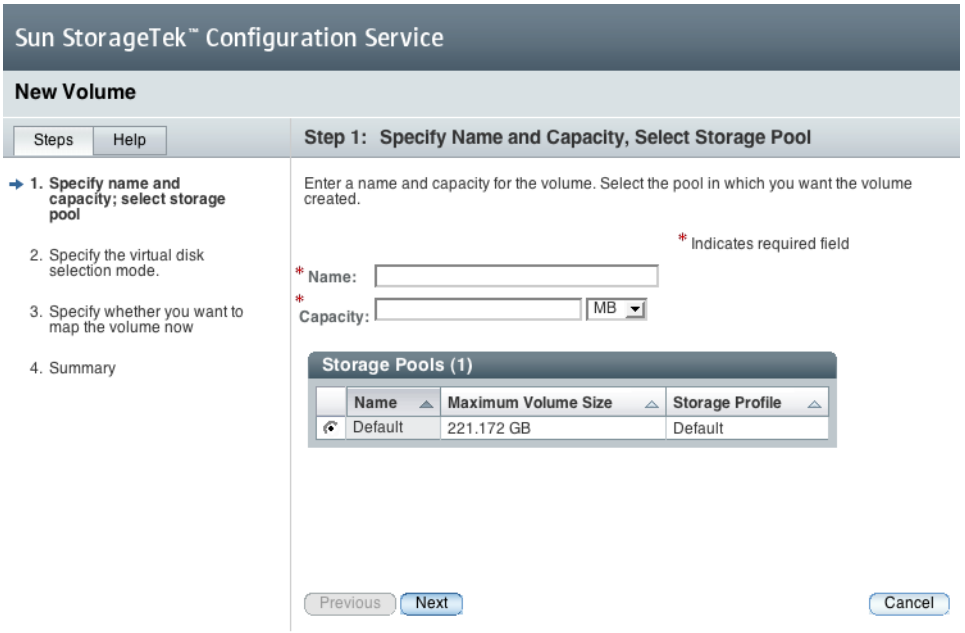
1. **In the navigation pane, choose Logical Storage > Volumes.**

   The Volume Summary page is displayed.

2. **Click New.**

   The New Volume wizard is displayed.

Note – You will be unable to select New if there is not enough disk space to create a new virtual disk volume or if no existing virtual disks match the selected profile.

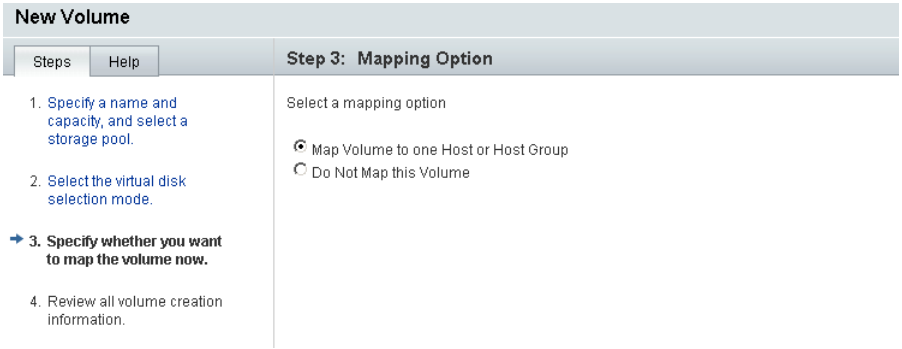


3. **Enter a name and capacity for the volume, and select the storage pool with which you want it to be associated.**
   - The volume name can consist of a maximum of 30 characters.
   - The volume capacity equals the amount of virtual disk space to be used.
   - The storage pool you select is associated with a storage profile, which determines the volume's storage characteristics.
4. **Click Next.**

   You are prompted to select the method by which virtual disks will be selected:

5. **Select the method you want to use to create a virtual disk:**
   - **Automatic** – The software assigns the physical disks to be used based on the profile.
   - **Create Volume on an Existing Virtual Disk** – You are prompted to select a virtual disk from a list of available virtual disks and their characteristics, including RAID level, capacity, and maximum volume size.
   - **Create Volume on a New Virtual Disk** – You create a new virtual disk by specifying the number of physical disks, or by selecting from a list of available disks.
6. **Click Next.**

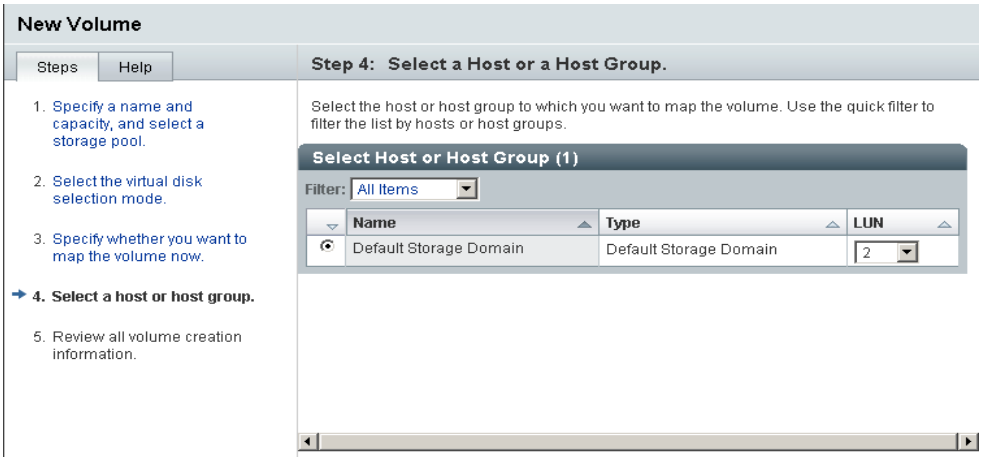
   You are prompted to select a mapping option:



7. **To map the volume now, select Map Volume to one Host or Host Group.**

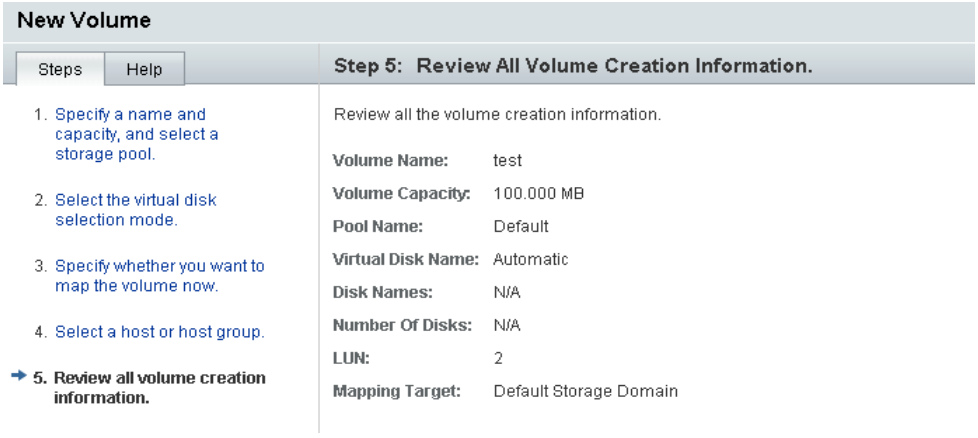
   If you select Do Not Map this Volume, you can map the volume after it is created. See the online help for more information about mapping a volume after a volume is created.
8. **Click Next.**

   You are prompted to select a host or host group:



9. **Select the name of a host or host group to which you want to map the volume, and click Next.**

   You are prompted to review your selections for this volume:



10. **If the values are correct, click Finish.**

    If you want to change any selections, click Previous to go back to the step that you want to change, or click Cancel to start again.

    After you click Finish, the new volume is displayed on the Volume Summary page.

APPENDIX **A**

Configuration Worksheets

Use the worksheets in this appendix to help you collect the information that you will need to perform the installation. Two worksheets are provided:

TABLE A-2 lists the information you need to configure the array.

TABLE A-1 Sun StorageTek 6140 Array Configuration Worksheet

Controller A MAC address:	
Controller B MAC address:	
Controller A, Ethernet Port 1 IP address:	
Controller A, Ethernet Port 2 (Reserved)	
Controller B, Ethernet Port 1 IP address:	
Controller B, Ethernet Port 2 (Reserved)	
Management host IP address:	
Network mask:	
Name server domain name:	
IP address of the domain name server (DNS):	
Gateway IP address:	
Email notification address:	

TABLE A-2 lists the information you need to collect for each data host connected to the Sun StorageTek 6140 Array.

TABLE A-2 Sun StorageTek 6140 Array Data Host Information

Host name:	
Vendor:	
Model:	
Operating system:	
Patch/Service pack:	
Number of HBAs:	
HBA World Wide Name (WWN):	
HBA model:	
HBA driver:	

CHAPTER B

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:

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

Before You Begin

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

Setting Up a Solaris DHCP Server

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

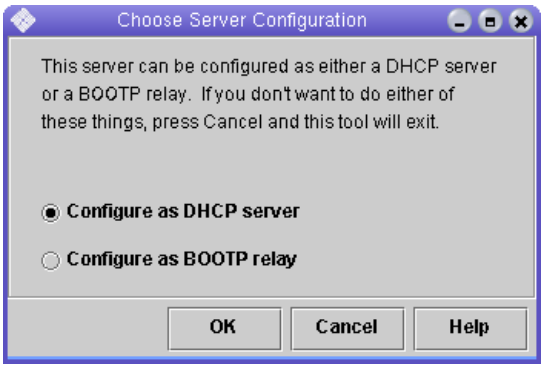
1. **Modify the** `netmasks` **line of the** `/etc/nsswitch.conf` **file as shown here:**

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

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

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

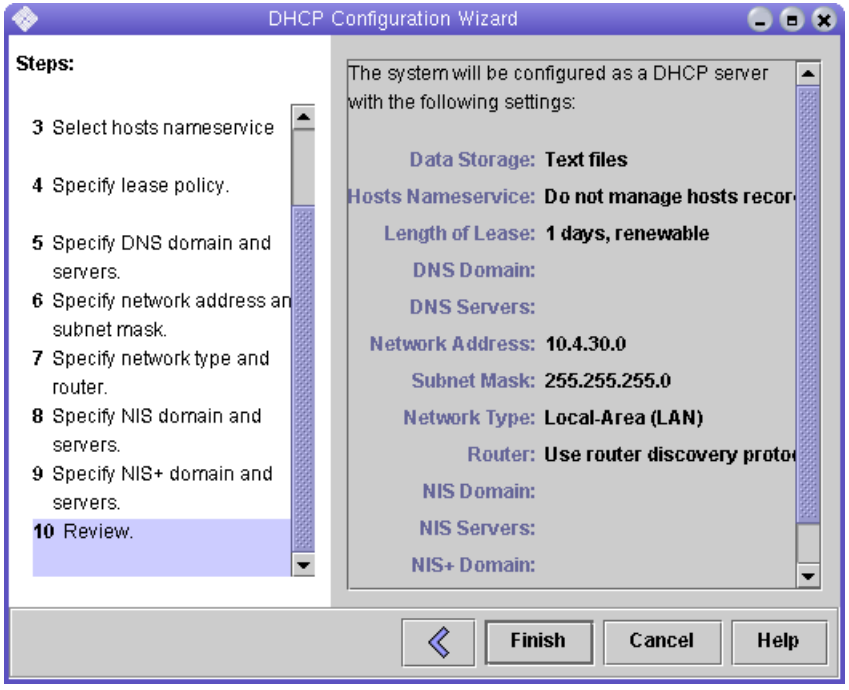
   The following window is displayed:



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

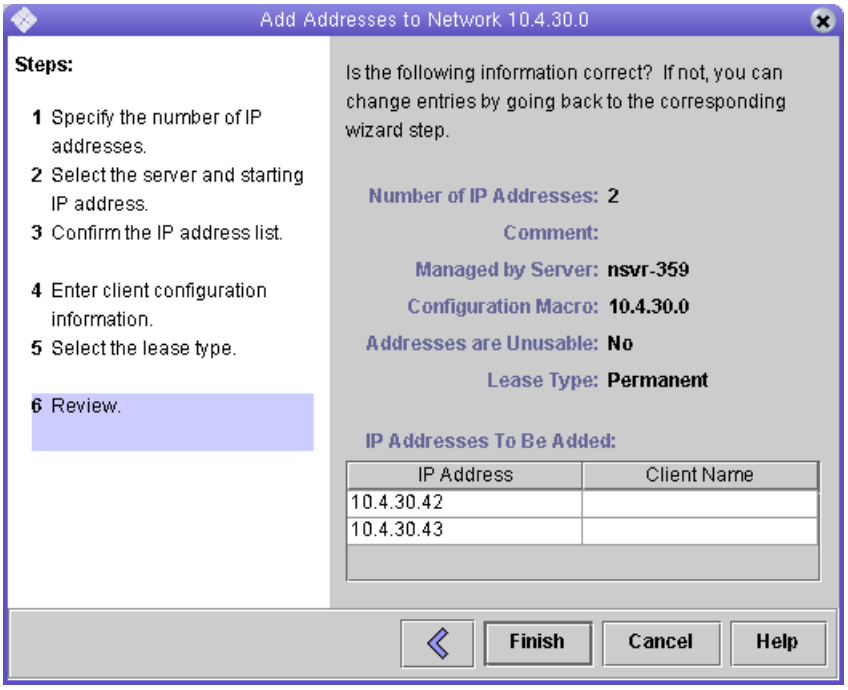
   - Data storage format: **`Text files`**
   - Nameservice to store host records: **`Do not manage hosts records`**
   - Length of lease:
   - Network Address: *Network address of Controller A*
   - Subnet Mask: For example, `255.255.255.0`
   - Network Type: **`Local-Area (LAN)`**
   - Router: **`Use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

   Your summary page should look similar to the following example:



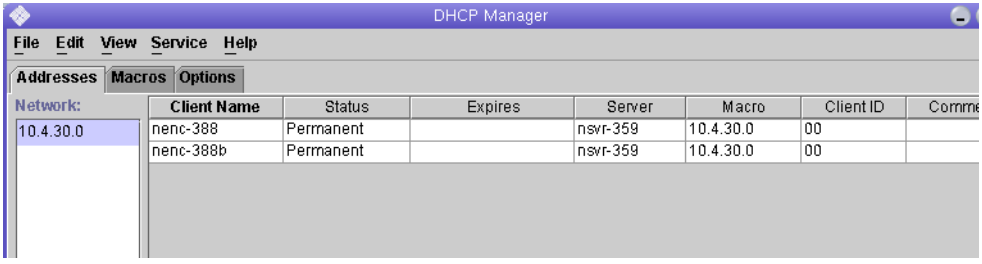
3. **Verify your configuration information and click Finish.**
4. **When you are prompted to configure addresses for the server, click Yes.**
   The Add Address to Network wizard is displayed.
5. **Enter the following information:**
   - Number of IP addresses
   - Name of managing server
   - Starting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

   Your summary page should look similar to the following example:



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

   The DHCP Manager displays the following:

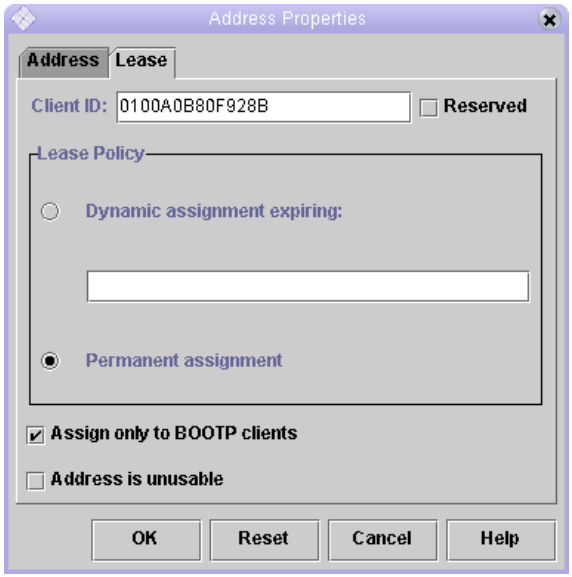


7. **In the Address Properties window, do the following for each RAID controller:**

   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:**

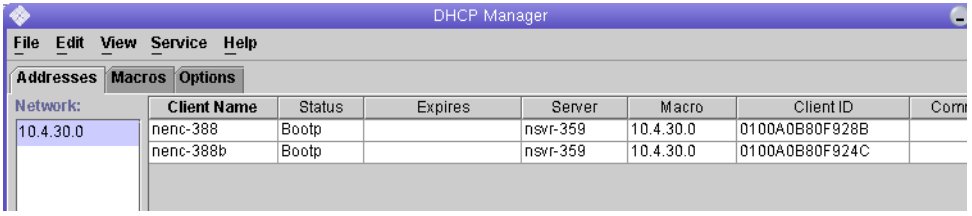
      `0100A0E80F924C`

   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:

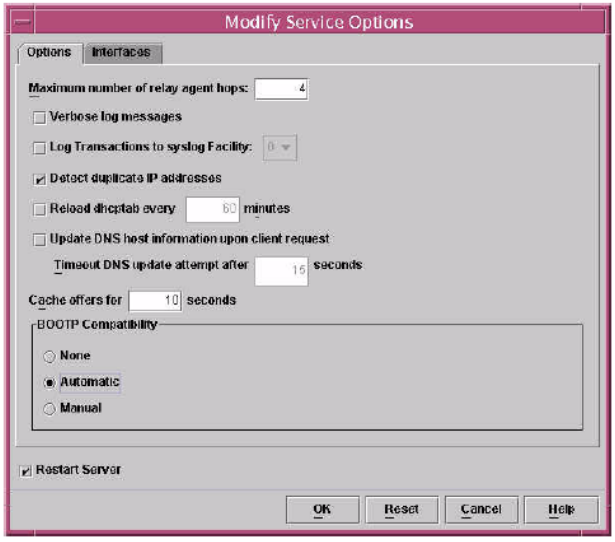


8. **Go to Modify Service Options and do the following:**

   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.

Glossary

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

A

agent

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

alarm

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

alert

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

array

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

array hot-spare

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

B

block

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

C

capacity

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

CLI

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

controller tray

A tray with an installed redundant RAID controller pair. In a Sun StorageTek 6140 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 strorage, or DAS) or can be connected to an external switch that supports multiple data hosts (storage area network, or SAN). See also host.

data path

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

direct attached storage (DAS)

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

disk

A physical drive component that stores data.

E

event

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

expansion tray

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

extent

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

F

failover and recovery

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

fault coverage

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

FC

See Fibre Channel (FC).

Fibre Channel (FC)

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

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

Fibre Channel switch

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

field-replaceable unit (FRU)

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

FRU

See field-replaceable unit (FRU).

H

HBA

See host bus adapter (HBA).

host

As a function of the Sun StorageTek 6140 array configuration, a representation of a data host that is mapped to initiators and volumes to create a storage domain. See also data host, initiator.

host bus adapter (HBA)

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

host group

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

hot-spare

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

I

in-band traffic

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

initiator

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

IOPS

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

L

LAN

Local area network.

logical unit number (LUN)

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

LUN

See logical unit number (LUN).

M

MAC address

See media access control (MAC) address.

management host

A Solaris host serving the configuration, management, and monitoring software for the Sun StorageTek 6140 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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