Sun™ Storage J4200/J4400 Array System Overview

Sun Microsystems, Inc.
www.sun.com

Part No. 820-3223-14
June 2009

Submit comments about this document at: `http://www.sun.com/hwdocs/feedback`

Please
Recycle

Adobe PostScript

Contents

Preface xiii

1. The Sun Storage J4200/J4400 Array 1

Hardware Overview 6

Front Access to the J4200/J4400 Array 6

Indicators on the Front of the Trays 8

Disk Drives 9

Rear-Access Tray Components 11

J4200/J4400 Array SIM Board 13

SIM Board Status Indicators 16

J4200/J4400 Array Power Supplies 17

J4200 Power Supply Status Indicators 19

J4400 Power Supply Status Indicators 21

J4200 Array Fan Modules 22

J4200 Fan Status Indicators 23

Customer-Replaceable Units 24

Management Software 24

Full Management Software 25

Remote Proxy 25

Command-Line Interface 25

2. Specifications 27

3. Understanding the Status Indicators 31

Introduction 31

Front Status Indicators 31

Disk Drives 33

Rear Status Indicators 34

J4200 SIM Board 34

SIM Board Status Indicators 37

J4200/J4400 Array Power Supplies 38

J4200 Power Supply Status Indicators 40

41

J4400 Power Supply Status Indicators 42

J4200 Array Fan Modules 42

J4200 Fan Status Indicators 43

44

4. Understanding the J4000 Family Event Log 45

5. SAS Multipathing 49

System Requirements 49

Required Operating Systems 50

Required Patch for Solaris 10 U6 With SATA Drives 50

Required Firmware and Drivers 50

Where to Get Drivers 51

Required HBA 51

Required CAM Versions for Multipathing 51

Configuration Examples 52

Multipathing With One Array and One Host 53

Multipathing With Two Arrays and Two Hosts 54

Multipathing With Two Arrays and One Host 55
Enabling and Disabling Multipathing in the Solaris Operating System 56
Device Renaming 56
`stmsboot` Options 56
`stmsboot` Conditions 57
▼ To Enable Multipathing on all Multipath-Capable Controllers 58
▼ To Disable Multipathing on All Multipath-Capable Controllers 59
▼ To Enable Multipathing on Multipath-Capable Controller Ports 60
▼ To Disable Multipathing on Multipath-Capable Controller Ports 60
Configuring Multipathing on Selected Ports 60
Dynamic Discovery of SAS Devices 60
Enabling and Disabling Multipathing in the Windows Operating System 61
▼ To Enable Multipathing in Windows 2008 61
▼ To Discover Device Multipaths 64
▼ To Select a Load Balancing Policy 68
▼ To Disable Multipathing in Windows 2008 71
Enabling and Disabling Multipathing in the Linux Operating System 79
▼ To Enable Multipathing in Linux 79
▼ To Disable Multipathing in Linux 80
81

6. Troubleshooting and Hardware Replacement with Service Advisor 83
Service Advisor 83
Accessing Service Advisor Procedures 84
Basic Service Procedures 85
Taking ElectroStatic Discharge (ESD) Precautions 85
Reserving the Array for Maintenance 85
Releasing the Array After Maintenance 86
Troubleshooting 86

Problem Viewing the Number of Disks 86
LED Problems 87
Disk Swapping 87
Contacting Sun Technical Support 87

Glossary 89

Index 95

Figures

FIGURE 1-1 J4200 Array Connected to a Data and Management Host 2

FIGURE 1-2 J4400 Array Connected to a Data and Management Host 3

FIGURE 1-3 J4200 Array Interconnected With Three Additional J4200s 4

FIGURE 1-4 J4400 Array Interconnected With Three Additional J4400s 5

FIGURE 1-5 J4200 Array Front Access Components 7

FIGURE 1-6 J4400 Array Front Access Components 7

FIGURE 1-7 Indicators on the Front of a Sample J4200 Array 8

FIGURE 1-8 Disk Drive 10

FIGURE 1-9 J4200 Array Rear-Access Components 11

FIGURE 1-10 J4400 Array Rear-Access Components 12

FIGURE 1-11 J4200 Array SIM Board Components and Status Indicator Descriptions 14

FIGURE 1-12 J4400 Array SIM Board Components and Status Indicator Descriptions 14

FIGURE 1-13 J4200 Array Power Supplies 17

FIGURE 1-14 J4400 Array Power Supplies 18

FIGURE 1-15 Individual J4200 Power Supply 18

FIGURE 1-16 Individual J4400 Power Supply 20

FIGURE 1-17 J4200 Array Fans 22

FIGURE 1-18 Individual J4200 Array Fan Module 23

FIGURE 3-1 Indicators on the Front of a Sample J4200 Array 32

FIGURE 3-2 Disk Drive 33

FIGURE 3-3 J4200 Array SIM Board Components and Status Indicator Descriptions 35
FIGURE 3-4 J4400 Array SIM Board Components and Status Indicator Descriptions 35
FIGURE 3-5 J4200 Array Power Supplies 38
FIGURE 3-6 J4400 Array Power Supplies 39
FIGURE 3-7 Individual J4200 Power Supply 39
FIGURE 3-8 Individual J4400 Power Supply 41
FIGURE 3-9 J4200 Array Fans 42
FIGURE 3-10 Individual J4200 Array Fan Module 43
FIGURE 5-1 Cabling Example for Multipathing With One Array and One Host 53
FIGURE 5-2 Cabling Example for Multipathing With Two Arrays and Two Hosts 54
FIGURE 5-3 Cabling Example for Multipathing With Two Arrays and One Host 55
FIGURE 5-4 Start Menu With Server Manager Selection 61
FIGURE 5-5 Server Manager Feature Display 62
FIGURE 5-6 Add Features Wizard Select Features Window 63
FIGURE 5-7 Confirm Installation Selections Window 63
FIGURE 5-8 Add Features Wizard Installation Results Window 64
FIGURE 5-9 MPIO Properties Window 65
FIGURE 5-10 MPIO Properties Window Device Multi-Paths Tab 66
FIGURE 5-11 Highlighted Device Hardware for Discovering Multipaths 67
FIGURE 5-12 Reboot Required Window 67
FIGURE 5-13 Device Manager Window 68
FIGURE 5-14 Menu to Modify Device Configuration 69
FIGURE 5-15 Disk Drive Properties Window 70
FIGURE 5-16 Round Robin Load Balance Policy Selected 71
FIGURE 5-17 Selecting Administrative Tools > MPIO From the Start Menu 72
FIGURE 5-18 MPIO Properties Window 73
FIGURE 5-19 Highlighting Device For Which to Disable Multipathing 74
FIGURE 5-20 Reboot Required Window 74
FIGURE 5-21 MPIO Properties Window With Device Removed From List 75
FIGURE 5-22 Server Manager Window With Features Panel Open 76

FIGURE 5-23 Remove Features Wizard Window 77
FIGURE 5-24 Confirm Removal Selections Window 78
FIGURE 5-25 Removal Results Window 78
FIGURE 5-26 Restart Now Window 79
FIGURE 5-27 Removal Results Window 79

Tables

TABLE 1-1 J4200/J4400 Front Panel Status Indicators 8

TABLE 1-2 J4200/J4400 Disk Drive Status Indicators 10

TABLE 1-3 SIM Board Components and Indicator Associations 15

TABLE 1-4 J4200/J4400 Array SIM Board Status Indicator Descriptions 16

TABLE 1-5 J4200 Array Power Supply Components 19

TABLE 1-6 J4200 Power Supply Status Indicators 19

TABLE 1-7 J4400 Array Power Supply Components 20

TABLE 1-8 J4400 Power Supply Status Indicators 21

TABLE 1-9 J4200 Fan Status Indicators 23

TABLE 2-1 Sun Storage J4200/J4400 Specifications 27

TABLE 3-1 J4200/J4400 Front Panel Status Indicators 32

TABLE 3-2 J4200/J4400 Disk Drive Status Indicators 33

TABLE 3-3 SIM Board Components and Indicator Associations 36

TABLE 3-4 J4200/J4400 Array SIM Board Status Indicator Descriptions 37

TABLE 3-5 J4200 Array Power Supply Components 40

TABLE 3-6 J4200 Power Supply Status Indicators 40

TABLE 3-7 J4400 Array Power Supply Components 41

TABLE 3-8 J4400 Power Supply Status Indicators 42

TABLE 3-9 J4200 Fan Status Indicators 44

TABLE 4-1 J4000 Family Event Log Listings 45

TABLE 5-1 Operating Systems That Support J4200/J4400 Multipathing 50

TABLE 5-2 Required Drivers By Operating System 51

TABLE 5-3 `stmsboot` Options 56

TABLE 5-4 Load Balance Policies 70

Preface

The *Sun™ Storage J4200/J4400 Array System Overview* describes the components of the Sun™ Storage J4200/J4400 arrays and how they work together with the Sun StorageTek™ Common Array Manager (CAM) software. This document describes the individual components and status indicators, specifications, the event log, and troubleshooting information.

Refer to the *Sun Storage J4200/J4400 Array Release Notes* (820-3222-*nn*) for any late-breaking information.

Before You Read This Book

Before you begin to install the Sun Storage J4200/J4400, you must have already prepared the site as described in these books:

- *Sun Storage J4200/J4400 Site Preparation Guide*

Related Documentation

Application	Title	Part Number
Regulatory and safety information	*Sun StorageTek Regulatory and Safety Compliance Manual*	96272, Revision A
Multilanguage safety information	*Important Safety Information for Sun Hardware Systems*	816-7190-*nn*
Site planning information	*Sun Storage J4200/J4400 Array Site Preparation Guide*	820-3219-*nn*
Installation at a glance	*Sun Storage J4200 Array Setup Poster*	820-3221-*nn*
Installation at a glance	*Sun Storage J4400 Array Setup Poster*	820-4691-*nn*
Complete details of the hardware components, rail and tray installation, and cabling.	*Sun Storage J4200/J4400 Array Hardware Installation Guide*	820-3218-*nn*
Late-breaking information not included in the information set	*Sun Storage J4200/J4400 Array Release Notes*	820-3222-*nn*
General operation and troubleshooting	*Sun Storage J4200/J4400 Array System Overview*	820-3223-*nn*
Disk drive replacement procedures	*Sun Storage J4200/J4400 Array Disk Drive Replacement Guide*	820-3225-*nn*
SIM board replacement procedures	*Sun Storage J4200 Array SIM Board Replacement Guide*	820-3226-*nn*
SIM board replacement procedures	*Sun Storage J4400 Array SIM Board Replacement Guide*	820-4600-*nn*
Power supply replacement procedures	*Sun Storage J4200 Array Power Supply Replacement Guide*	820-3227-*nn*
Fan replacement procedures	*Sun Storage J4200 Array Fan Replacement Guide*	820-3229-*nn*
Power supply and fan replacement procedures	*Sun Storage J4400 Array Power Supply/Fan Replacement Guide*	820-3228-*nn*
Chassis replacement procedures	*Sun Storage J4200 Chassis Replacement Guide*	820-4413-*nn*
Chassis replacement procedures	*Sun Storage J4400 Chassis Replacement Guide*	820-4601-*nn*
Rail kit installation procedures	*Sun Storage J4200/J4400 Array Rail Kit Installation Guide*	820-3764-*nn*

Accessing Sun Documentation

You can also view, print, or purchase a broad selection of Sun network storage and other Sun documentation, including localized versions, at:

http://www.sun.com/documentation

Third-Party Web Sites

Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Contacting Sun Technical Support

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

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

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

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

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

Sun™ Storage J4200/J4400 Array System Overview, part number 820-3223-14

CHAPTER 1

The Sun Storage J4200/J4400 Array

The Sun Storage J4200 and J4400 arrays are general purpose, high-availability, and cost-effective serial attached SCSI (SAS) devices. The J4200 is a 2U, 12-disk tray and the J4400 is a 4U, 24-disk tray. Each supports SAS and Serial Advanced Technology Architecture (SATA) disk drives. The main components in each array are hot-swappable, including the SAS Interface Module (SIM) boards and drives, and the dual load-sharing power supplies and fans, providing a fault-tolerant environment with no single point of failure.

The J4200/J4400 arrays support 15K SAS drives and 7.2K SATA II drives. You can interconnect up to four J4200/J4400 trays, with up to 48 drives in interconnected J4200s and up to 96 drives in interconnected J4400s, all of which are designed to fit into a standard 19-inch cabinet.

This renders a raw storage capacity of 14.4 TB for SAS disks (300 GB per disk) or 36 TB for SATA II disks (750 GB per disk) for the J4200, and 28.8 TB for SAS disks (300 GB per disk) or 72 TB for SATA II disks (750 GB per disk) for the J4400. Refer to the *Sun Storage J4200/J4400 Array Release Notes* (820-3222-*nn*) for a complete listing of supported drives.

The J4200/J4400 array is available for Solaris, Linux, Windows, and VMware operating systems. You manage the array with the Sun StorageTek Common Array Manager (CAM) software.

Note – If you are using the J4400 array as part of a Sun Storage 7000 Unified Storage System, you do not manage the J4400 array using the Sun StorageTek Common Array Manager (CAM). Instead, you manage the J4400 using the management software provided with the Unified Storage System.

The trays can be installed into the following cabinets:

- Sun Rack 900/1000 cabinet
- Sun StorageEdge Expansion cabinet
- Sun Fire Expansion cabinet

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

The J4200/J4400 array can be delivered fully assembled or packaged as individually ordered components that you install into the chassis. "Customer-Replaceable Units" on page 24 provides a list of these components. All CRUs have a document describing installation instructions.

FIGURE 1-1 shows the Sun Storage J4200 SAS connection to a data and management host.

FIGURE 1-1 J4200 Array Connected to a Data and Management Host

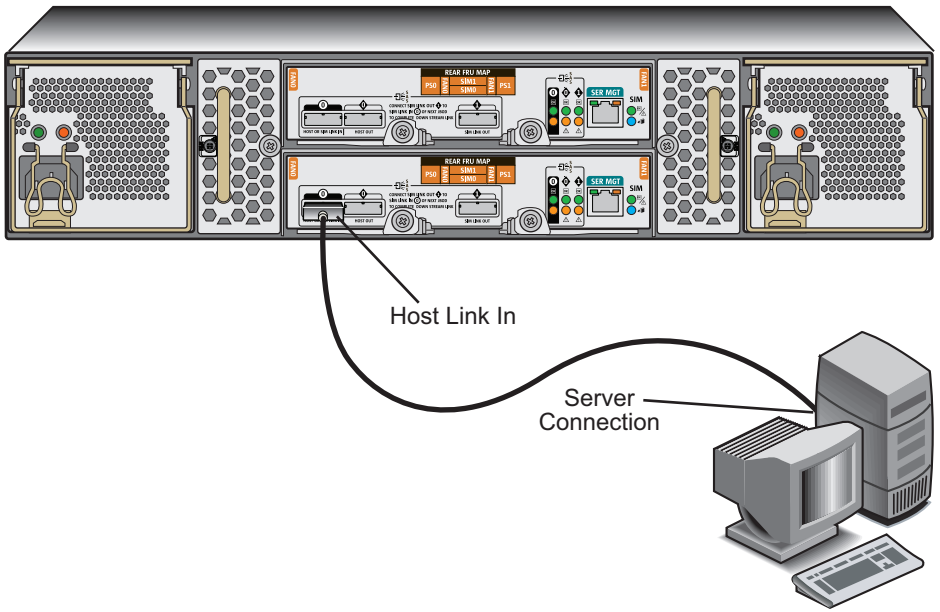


FIGURE 1-2 shows the Sun Storage J4400 SAS connection to a data and management host.

FIGURE 1-2 J4400 Array Connected to a Data and Management Host

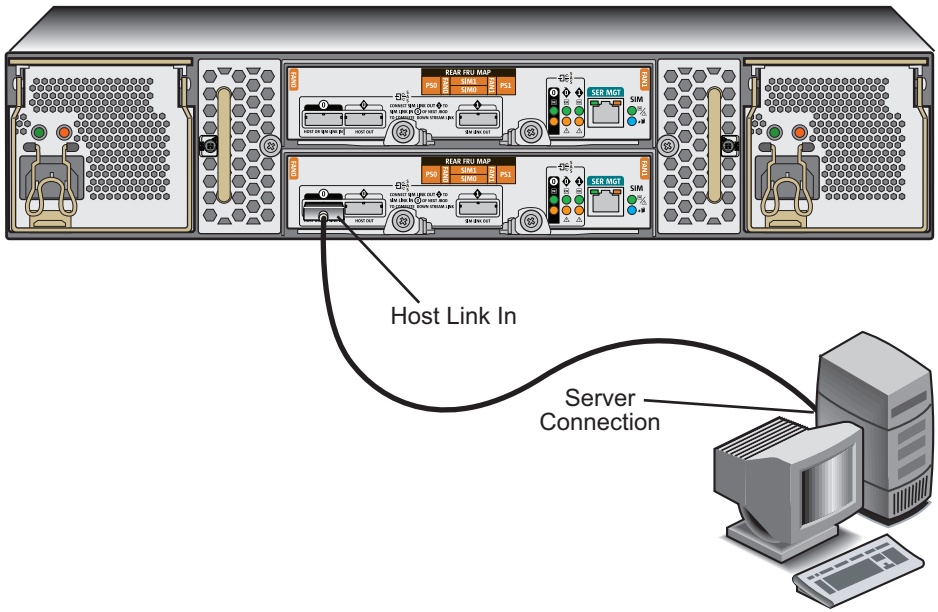


FIGURE 1-3 shows a Sun Storage J4200 interconnected with other J4200 arrays.

FIGURE 1-3 J4200 Array Interconnected With Three Additional J4200s

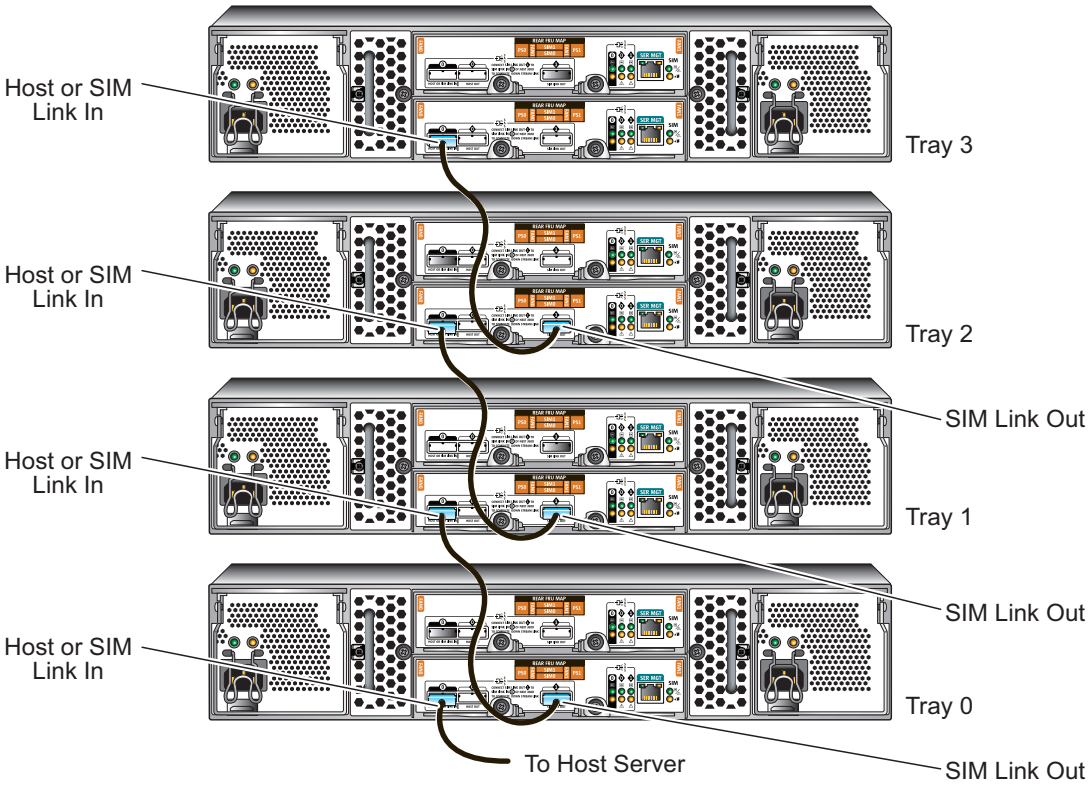
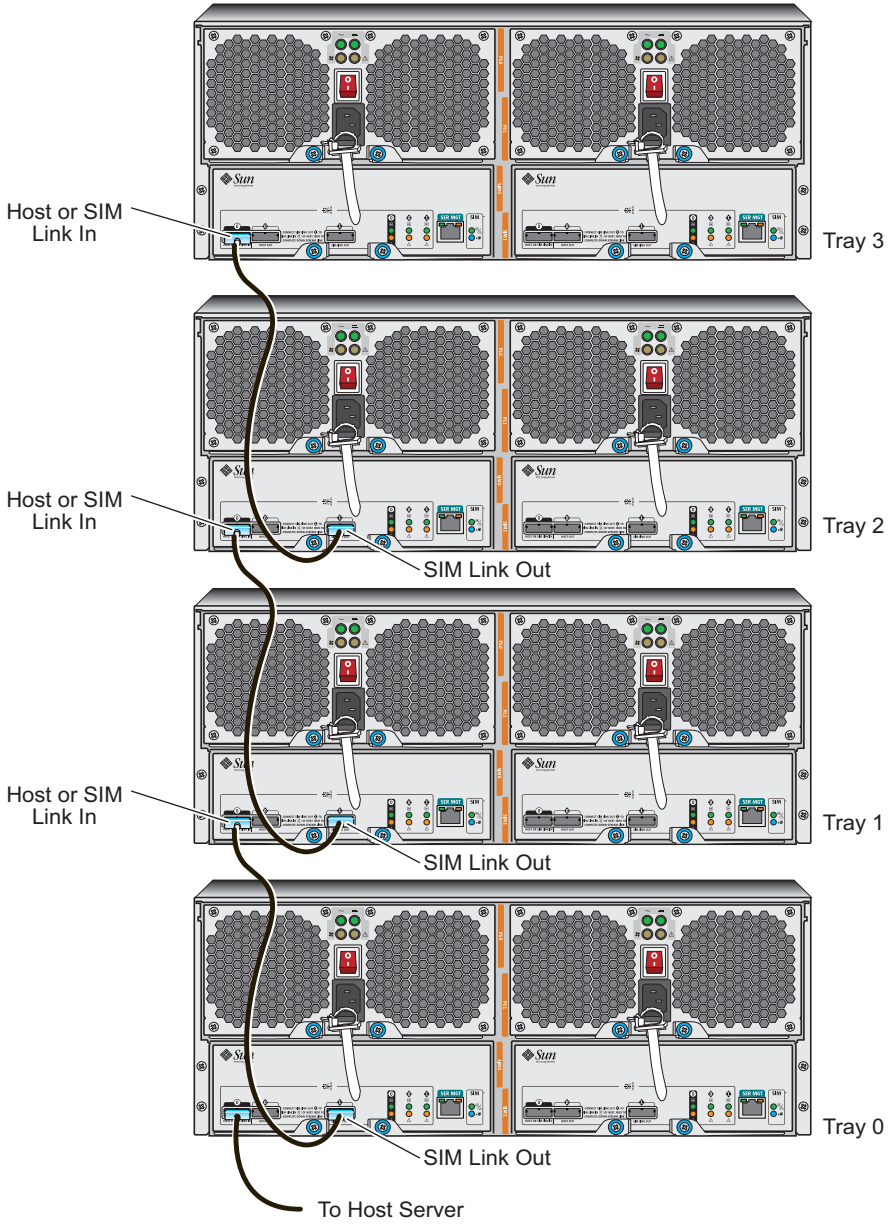


FIGURE 1-4 shows a Sun Storage J4400 interconnected with other J4400 Arrays.

FIGURE 1-4 J4400 Array Interconnected With Three Additional J4400s



Hardware Overview

This product is intended for restricted access areas whereby access is controlled through the use of a means of security (e.g., key, lock, tool, badge access), and personnel authorized for access have been instructed on the reasons for the restrictions and any precautions that need to be taken.

Caution – Only trained service personnel should remove the covers on this equipment.

Front Access to the J4200/J4400 Array

Features that are accessed from the front (see FIGURE 1-5 for the J4200 and FIGURE 1-6 for the J4400) of the Sun Storage J4200/J4400 include the following:

- **End caps** – Plastic caps on the right and left sides of the tray. The left side has the device's serial number. The right side includes the audible alarm silence button you can press to turn off an alarm. The system identifier dial is not currently supported.
- **Status Indicators** – Two status indicators located on the right end cap provide a system locate indicator and a system OK or fault indicator.
- **Disk Drives** – Twelve or 24 removable disk drives, labeled from 0 on the lower left to 11 (J4200) or 23 (J4400) on the upper right.

FIGURE 1-5 J4200 Array Front Access Components

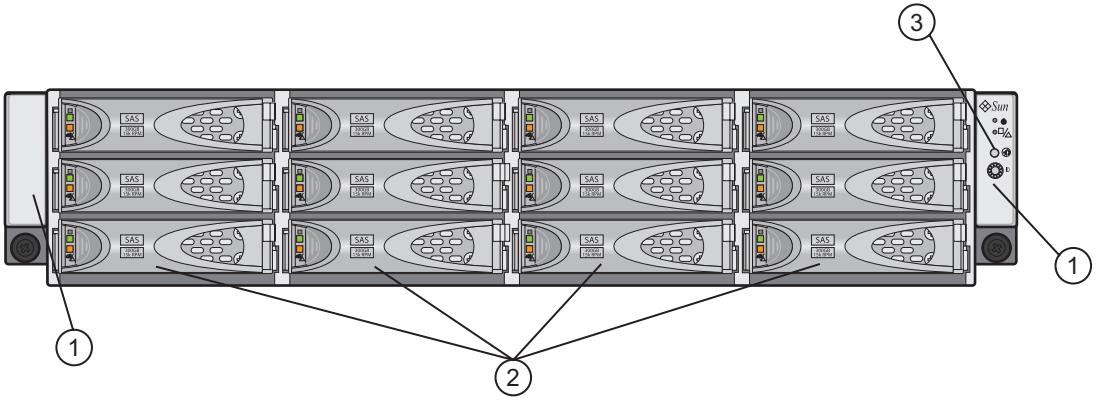


FIGURE 1-6 J4400 Array Front Access Components

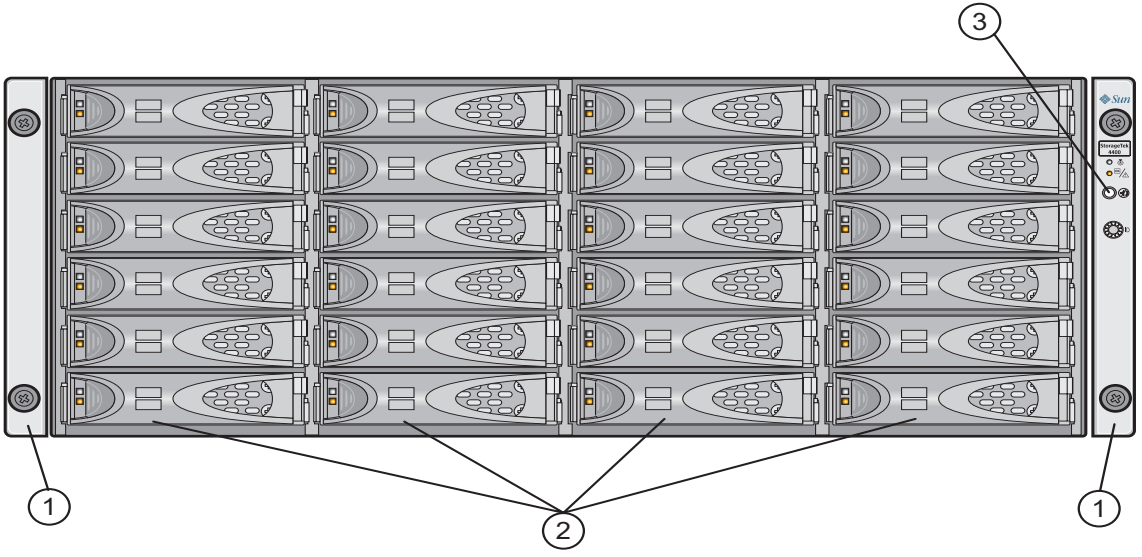


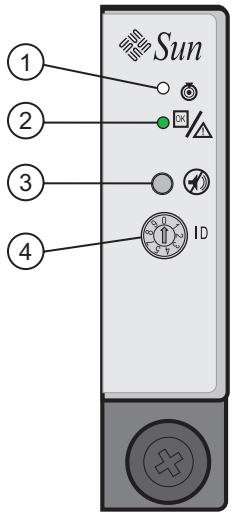
Figure Legend

ID	Description
1	End caps with serial number (left) and status indicators (right)
2	Disks
3	Audible alarm silence button

Indicators on the Front of the Trays

Two indicators on the front of the Sun Storage J4200/J4400 are located on the right-side end cap of the tray (FIGURE 1-7).

FIGURE 1-7 Indicators on the Front of a Sample J4200 Array



Following are the J4200/J4400 Array front panel status indicator descriptions.

TABLE 1-1 J4200/J4400 Front Panel Status Indicators

ID	Indicator	Color	Condition	Description
1	System Locate	White	Off	Not supported
		White	Blinking @ 1 Hz 50%	Location LED is active
2	System OK/ Fault	Green	On	System is powered on
		Green	Blinking @ 4 Hz 50%	System is booting or being configured
		Green	Off	System is powered off
		Amber	Off	No current faults
		Amber	On	System fault

Following are descriptions for the Audible Alarm Silence Button and the System ID:

3	Audible Alarm Silence Button	When the alarm is sounding, press this button to silence the enclosure's audible alarm.
4	System Identifier	Not supported.

Disk Drives

Disk drives for the Sun Storage J4200/J4400 array have several components: a hard disk, a hard disk carrier, the disk-release button, the disk ejector handle, and two status indicators (see FIGURE 1-8). You can access the disk drives from the front of the trays. The J4200/J4400 supports SAS disk drives or SATA II disk drives. A label on the handle indicates the drive type and its size and speed.

J4200s hold up to 12 disk drives, and four trays can be interconnected for a maximum of 48 disk drives in a chain; J4400s hold up to 24 disk drives, and four trays can be interconnected for a maximum of 96 disk drives in a chain. You must have at least two drives in either array.

Refer to the *Sun Storage J4200/J4400 Array Release Notes* for a complete listing of the supported drives.

Twelve or 24 removable disk drives are numbered from left to right, labeled from 0 on the lower left to 11 (J4200) or 23 (J4400) on the upper right.

FIGURE 1-8 shows the disk-release button, the disk handle, and the status indicators.

FIGURE 1-8 Disk Drive

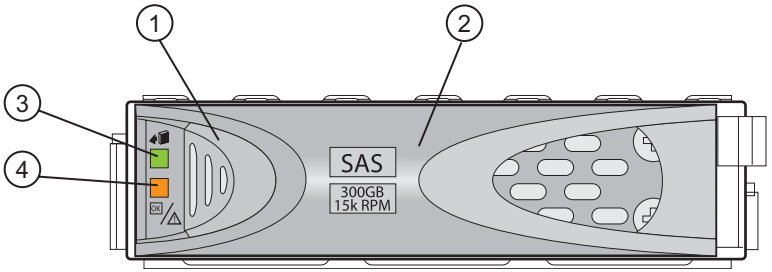


Figure Legend

ID	Description
1	Release button: press to the right to disengage the release handle.
2	Disk handle.
3	OK status indicator.
4	Ready to Remove/Fault status indicators.

Following are the J4200/J4400 disk drive status indicator descriptions.

TABLE 1-2 J4200/J4400 Disk Drive Status Indicators

ID	Indicator	Color	Condition	Description
3	OK	Green	On	Ready for access
		Green	Blinking	Spinning down or accessing drives
		Green	Off	Offline or inactive
4	Ready to Remove/Fault	Blue	On	Drives have no pending writes and can be removed safely
		Amber	On	HDD fault - Service Action Required
		Amber	Blinking @ 4 Hz 50%	HDD locator
		Amber	Off	No failures

Rear-Access Tray Components

Aside from a larger form factor, the J4200 and J4400 rear components are different. The J4200 has separate power supplies and fans, where the J4400 has an integrated power supplies and fan modules.

There are three mini-SAS connectors:

- The inbound connection is from the data host and management server.
- The two outbound connections are to another host or to an interconnected J4200/J4400.

FIGURE 1-9 shows the J4200 Array rear-access components.

FIGURE 1-9 J4200 Array Rear-Access Components

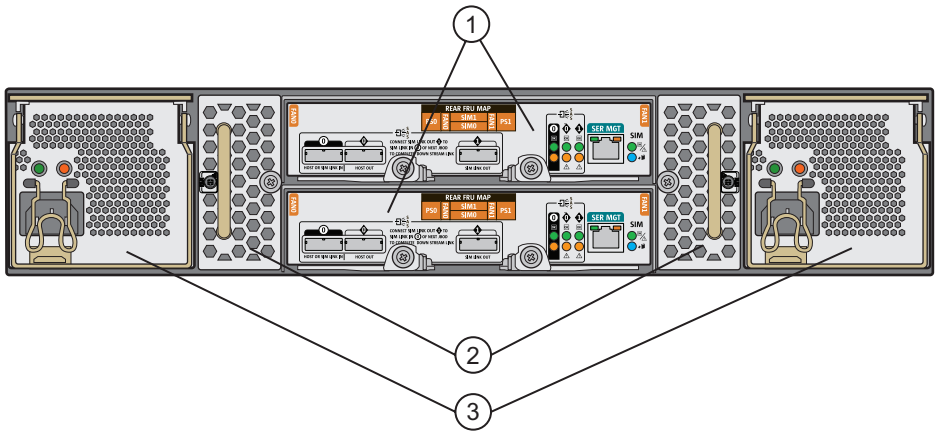


Figure Legend

ID	Component	Description
1	SIM Modules	Two removable SAS Interface Module (SIM) boards. Each has a Host or SIM Link In port, a Host Out port, a SIM Link Out port, and an RJ-45 port for serial console access (reserved for Sun Customer Support personnel). The SIM boards are identified as SIM 0 (bottom) and SIM 1 (top).
2	Fan Modules	Two removable cooling fan modules. Fan Module 0 is on the left and Fan Module 1 is on the right.
3	Power Supply Modules	Two removable power supply modules with built-in fans. Power Supply 0 is on the left and Power Supply 1 is on the right.

FIGURE 1-10 J4400 Array Rear-Access Components

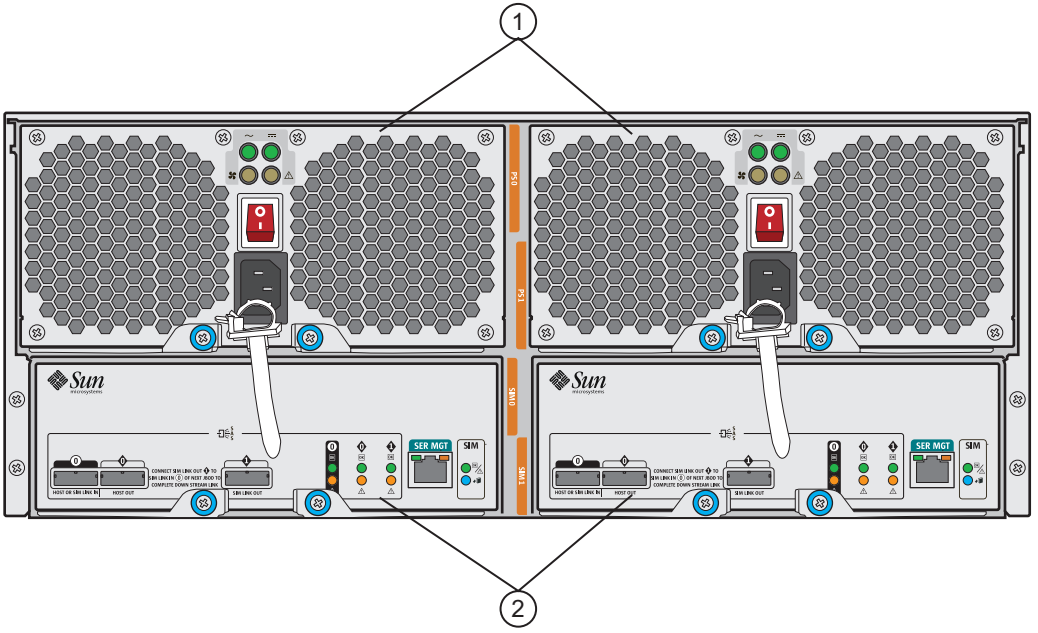


Figure Legend

ID	Component	Description
1	Power Supply Modules	Two removable power supply modules with built-in fans. Power Supply 0 is on the left and Power Supply 1 is on the right.
2	SIM Modules	Two removable SAS Interface Module (SIM) boards. Each has a Host or SIM Link In port, a Host Out port, a SIM Link Out port, and an RJ-45 port for serial console access (reserved for Sun Customer Support personnel). The SIM boards are identified as SIM 0 (left) and SIM 1 (right).

J4200/J4400 Array SIM Board

The SIM board for each of the arrays includes the same components, indicators, and ports, however, the J4400 SIM board is larger than the J4200 SIM board, as required by the array's form factor.

Each hot-swappable SIM board has one SAS inbound connector and two SAS outbound connectors, and one serial management port that is reserved for Sun Customer Support Personnel only.

FIGURE 1-11 and FIGURE 1-12 call out the individual components on the back of the SIM boards, and TABLE 1-3 provides descriptions of these components. TABLE 1-4 describes the SIM board component status indicators.

FIGURE 1-11 J4200 Array SIM Board Components and Status Indicator Descriptions

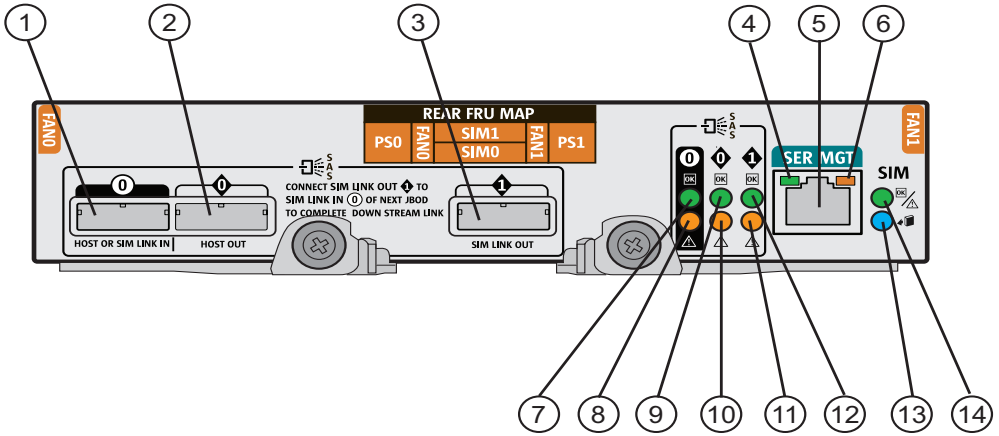


FIGURE 1-12 J4400 Array SIM Board Components and Status Indicator Descriptions

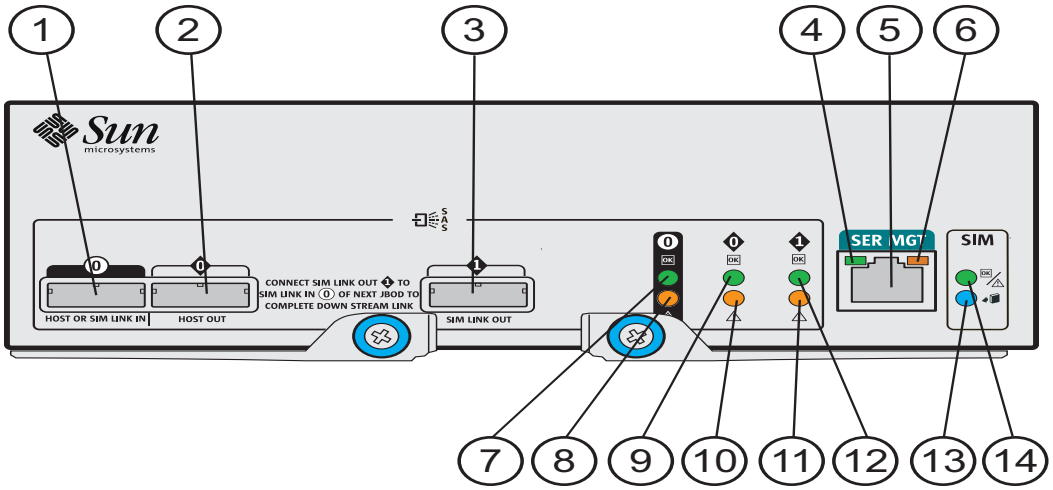


TABLE 1-3 SIM Board Components and Indicator Associations

ID	Component or Indicator	Description
1	Host or SIM Link IN	SAS connection to a data or management host, or a connection from another J4200/J4400.
2	Host OUT	SAS connection to a host.
3	SIM Link Out	SAS connection to another J4200/J4400.
4	Serial Management Port	Left Indicator - Green: Serial port is active.
5	Serial Management Port	Serial port - Reserved for Sun Customer Support Personnel only.
6	Serial Management Port	Right Indicator - Amber: Serial port fault.
7	Host or SIM Link IN	Top Indicator - Green
8	Host or SIM Link IN	Bottom Indicator - Amber
9	Host OUT	Top Indicator - Green
10	Host OUT	Bottom Indicator - Amber
11	SIM Link Out	Bottom Indicator - Amber
12	SIM Link Out	Top Indicator - Green
13	SIM Board	Locate Indicator - Blue: Identified as ready for service (not supported)
14	SIM Board	Power On/Fault Indicator - Green/Amber

SIM Board Status Indicators

Following are the J4200/J4400 SIM board status indicator descriptions:

TABLE 1-4 J4200/J4400 Array SIM Board Status Indicator Descriptions

ID	Indicator	Color	Condition	Description
4	Serial Management Port	Green	Serial port is active	Left status indicator - serial management connector
6	Serial Management Port	Amber	Serial port fault	Right status indicator - serial management connector
7 to 12	SAS Faults	Green/Amber	Green is On Amber is Off	Optimal operating status - no activity
		Green/Amber	Green is Off Amber is On	Link not operating
		Green/Amber	Green is Blinking Amber is Off	OK with activity
		Green/Amber	Green is Blinking Amber is On	Link operating with fewer than all four links
13	Locate SIM Board	Blue	On	Identified as ready for service (not supported)
		Blue	Off	Not identified
14	Power SIM Board	Green	On	Power on and system is operating
		Green	Blinking @ 1 Hz 50%	System is booting, being configured, or downloading firmware
		Amber	Off	SIM OK
		Amber	On	SIM fault

J4200/J4400 Array Power Supplies

The J4200 has separate power supplies and fans, where the J4400 has an integrated power supply and fan module.

Each tray contains two hot-swappable, redundant power supplies. If one power supply is turned off or malfunctions, the other power supply maintains electrical power to the tray.

Caution – The power supplies in this equipment can produce high energy hazards. Only instructed personnel with authorized access to this equipment can remove and replace modules in the system.

Caution – For products with multiple power cords, all power cords must be disconnected to completely remove power from the system.

FIGURE 1-13 shows J4200 array power supplies and FIGURE 1-14 shows J4400 array power supplies.

FIGURE 1-13 J4200 Array Power Supplies

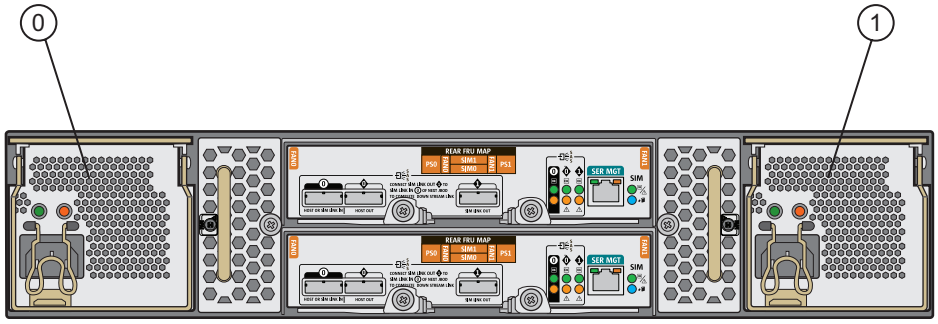


Figure Legend

ID	Component
0	Power Supply 0
1	Power Supply 1

FIGURE 1-14 J4400 Array Power Supplies

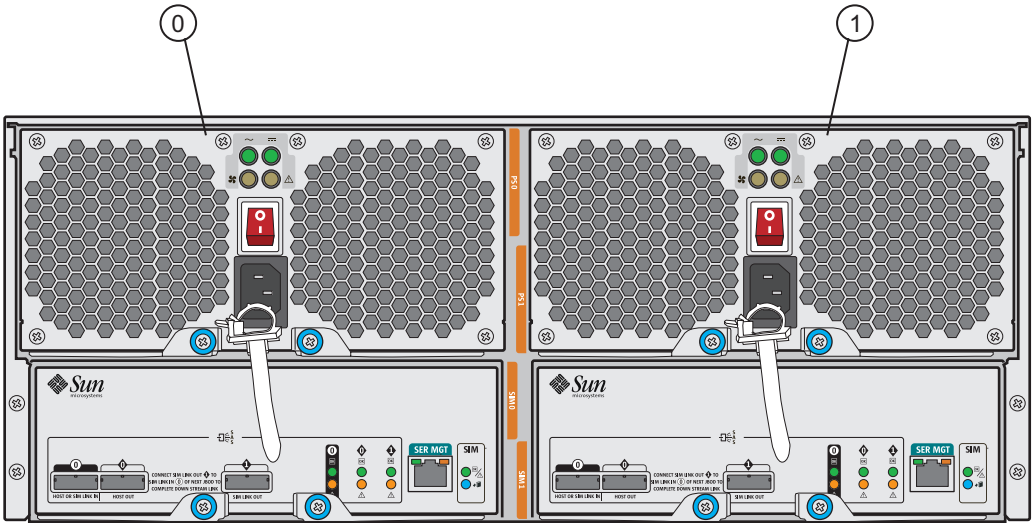


FIGURE 1-15 shows an individual J4200 array power supply and FIGURE 1-16 shows an individual J4400 array power supply.

FIGURE 1-15 Individual J4200 Power Supply

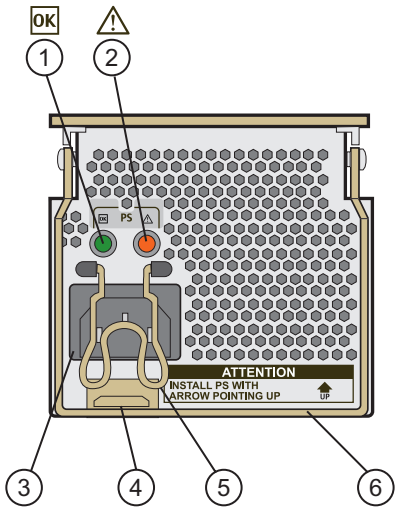


TABLE 1-5 describes the J4200 power supply components and TABLE 1-8 provides the J4200 power supply status indicator descriptions.

TABLE 1-5 J4200 Array Power Supply Components

ID	Component	Description
1	Green indicator	See TABLE 1-8.
2	Amber indicator	See TABLE 1-8.
3	Universal power input connector	Power cord connector.
4	Power supply latch	Holds the power supply handle down.
5	Power cord clamp	Holds the power cord in place.
6	Power supply handle	Used to remove the power supply from and insert the power supply into the J4200 enclosure.

J4200 Power Supply Status Indicators

Following are the J4200 power supply status indicator descriptions.

TABLE 1-6 J4200 Power Supply Status Indicators

ID	Indicator	Color	Condition	Description
1	Power Status	Green	On	AC/DC Power Ready
		Green	Off	No AC/DC Power Input
		Green	Blinking	AC Present and Standby Output is Available
2	Power Fault	Amber	On	Power Supply Failure
		Amber	Off	Power Supply Healthy

FIGURE 1-16 Individual J4400 Power Supply

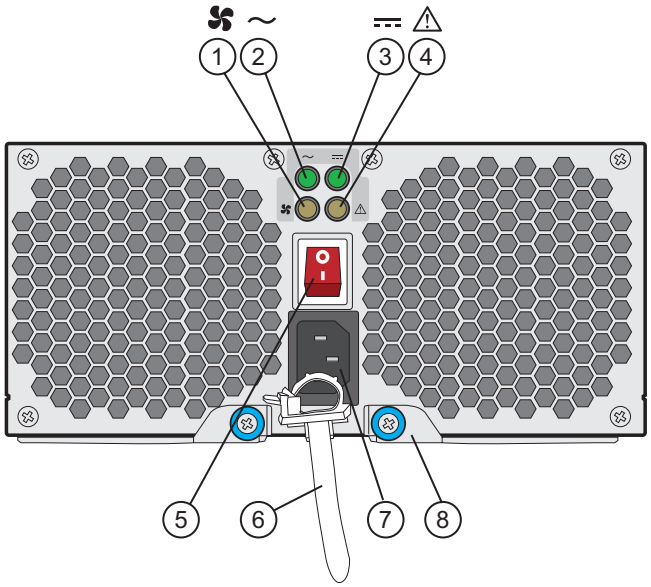


TABLE 1-7 describes the J4400 power supply components and TABLE 1-8 provides the J4400 power supply status indicator descriptions.

TABLE 1-7 J4400 Array Power Supply Components

ID	Component	Description
1	Cooling fan status indicator	See TABLE 1-8.
2	AC power status indicator	See TABLE 1-8.
3	DC power status indicator	See TABLE 1-8.
4	Power supply status indicator	See TABLE 1-8.
5	Power on/off switch	Turns power to the array on or off.
6	Power cord tie wrap	Holds the power cord in place.
7	Universal power input connector	Provides power to the array.
8	Right ejection arm and captive screw latch	Secures the power supply to the chassis.

J4400 Power Supply Status Indicators

Following are the J4400 power supply status indicator descriptions.

TABLE 1-8 J4400 Power Supply Status Indicators

ID	Indicator	Color	Condition	Description
1	Cooling fan status indicator	Amber	On	Fan failure
		Amber	Off	Fans healthy
2	AC power status indicator	Green	On	AC power ready
		Green	Off	No AC power input
3	DC power status indicator	Green	On	DC power ready
		Green	Off	No DC power input
4	Power supply status indicator	Amber	On	Power supply failure
		Amber	Off	Power supply healthy

J4200 Array Fan Modules

The fans circulate air inside the tray by pulling it through the vents on the front of the assembly and pushing it out of the vents on the back of each fan.

Each J4200 array contains two hot-swappable fans for redundant cooling. Fan Module 0 is on the left and Fan Module 1 is on the right. If one fails, the remaining fan continues to provide sufficient cooling to operate the array. The remaining fan runs at a higher speed until the failed fan is replaced. Replace a failed fan as soon as possible.

FIGURE 1-17 J4200 Array Fans

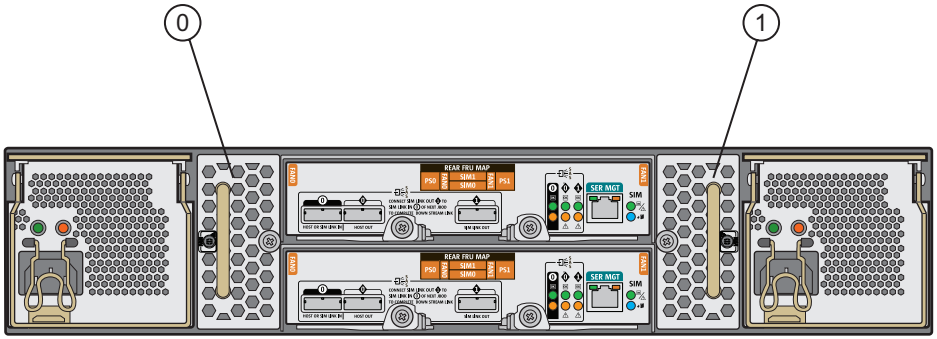


Figure Legend

ID	Description
0	Fan module 0
1	Fan module 1

FIGURE 1-18 Individual J4200 Array Fan Module

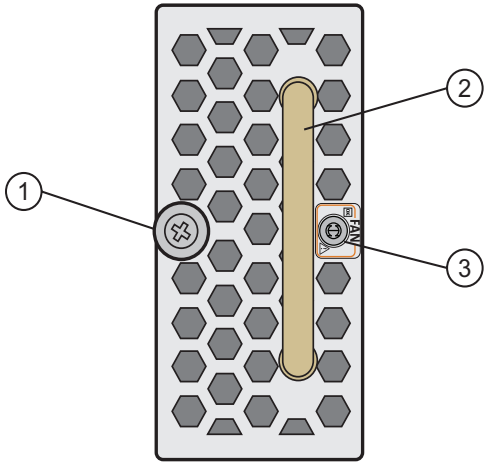


Figure Legend

ID	Description
1	Thumbscrew
2	Fan module handle
3	Bicolored (green/amber) status indicator

J4200 Fan Status Indicators

Following are the J4200 fan status indicator descriptions.

TABLE 1-9 J4200 Fan Status Indicators

Indicator	Color	Condition	Description
Fan Status	Green Amber	Off Off	No Power
	Green Amber	On Off	Fan Healthy
	Green Amber	Off On	Fan Fault

Customer-Replaceable Units

The J4200/J4400 Array can be delivered fully assembled or packaged as individual components that you install into the chassis. All customer-replaceable units (CRUs) have a document describing the installation instructions in its shipping box. Additionally, the Common Array Manager (CAM) software has a Service Advisor application with wizards that guide you through CRU replacements.

The J4200/J4400 CRUs are designed for customers to install without turning off the power, with the exception of the Chassis CRU, which by necessity must be shut down and replaced by another chassis.

The following hardware components are designed to be customer installable:

- SIM Board
- Power Supply
- Fan (J4200 only)
- Disk Drives
- Chassis

Management Software

The Sun StorageTek Common Array Manager (CAM) software suite provides management, monitoring, and service capabilities. The software has both a browser interface and a command-line interface (CLI).

The J4200/J4400 array requires a minimum version for CAM of 6.1.1. For detailed information about which versions of CAM to use with the array, refer to the *Sun Storage J4200/J4400 Array Release Notes*, part number 820-3222-*xx*, which is available at the following location:

`http://docs.sun.com/app/docs/prod/j4200.array`

For complete CAM documentation, go to the following location:

`http://docs.sun.com/app/docs/prod/stor.arrmgr`

For more information about CAM, and to download the latest version, go to the following location:

http://www.sun.com/storagetek/management_software/resource_management/cam/

Note – If you are using the J4400 array as part of a Sun Storage 7000 Unified Storage System configuration, you do not use the CAM software suite. Instead, you manage the array using the management software provided with the Unified Storage System.

Full Management Software

The full management software is installed on a management workstation. The management software communicates with the J4000 arrays via a proxy agent that is installed on the data host. It provides:

- A browser interface
- Multiple array management

Remote Proxy

The remote proxy agent enables communication, equivalent to in-band management, from the full management host to the array over an out-of-band-band IP network.

If the proxy is enabled, the full install of the Common Array Manager can manage the J4000 Family array remotely. To use the browser interface to manage the J4000 Family array, you sign into the IP address or host name of the full management host, sign into the software from the Java Web Console, and select the J4000 array. The remote proxy must be enabled while running the installation wizard or script.

The remote proxy should not be enabled for directly connected arrays.

Command-Line Interface

The Sun StorageTek Common Array Manager software's command-line interfaces provide the same control and monitoring capability as the Web browser and it is scriptable for running frequently performed tasks.

For more information about CLI commands, see the:

- `sscs` man page
- Documentation for your version of CAM, available at:

`http://docs.sun.com/app/docs/prod/stor.arrmgr`

CHAPTER 2

Specifications

This section provides Sun Storage J4200/J4400 specifications, including the system components, the host interface, management features, and environmental information.

Unless specifically noted for a particular array, the listed specifications are for both the J4200 and the J4400 arrays.

TABLE 2-1 Sun Storage J4200/J4400 Specifications

Item	Description
Host Interface	Three, 3 G SAS ports on each SIM module
Hard Disk Interface	SAS Disk Drives: 73 GB, 146 GB, and 300 GB at 15 K RPM
	SATA II Disk Drives: 250 GB, 500 GB, and 750 GB at 7.2 K RPM
Drive Slots	J4200: A maximum of 12 disks per system with a two-drive minimum; interconnects up to four systems and 48 disk drives
	J4400: A maximum of 24 disks per system with a two-drive minimum; interconnects up to four systems and 96 disk drives
	3.5-inch form factor, 1.0-inch height
Redundant, Hot Swappable Components	Two SIM boards
	Two power supply modules
	Two fan modules (J4200 only)

TABLE 2-1 Sun Storage J4200/J4400 Specifications

	Up to 12 (J4200) or 24 (J4400) SAS or SATA II disks
System Form Factor	Internal bays for up to 12 disks (J4200) or 24 disks (J4400)
	Rack mount in a 19-inch cabinet
Dimensions	J4200 - 2 Rack Units: The chassis is 17.51 in. (445 mm) wide X 3.44 in. (87.4 mm) high X 24.05 in. (611 mm) deep (not including cables) J4400 - 4 Rack Units: The chassis is 17.51 in. (445 mm) wide X 6.88 in. (174.8 mm) high X 23.38 in. (594 mm) deep (not including cables)
Management Features	Online software and firmware upgrades
	Status indicators for SIM boards, disks, power supplies, and fan modules
AC Power	J4200: 9 A maximum operating (100 VAC to 127 VAC range), 47 to 63 Hz 4.5 A maximum operating (200 VAC to 240 VAC range, 47 to 63 Hz
Maximum Operating Current	1.51 A maximum operating @ 240 VAC (198 VAC to 264 VAC range), 50 to 60 Hz J4400: 10 A maximum operating (100 VAC to 127 VAC range), 47 to 63 Hz
Maximum Operating Current	2.47 A maximum operating @ 240 VAC (198 VAC to 264 VAC range), 50 to 60 Hz
Operating Environment	Heat output J4200: 352.8 Watts (1204 BTU/hour)
	Heat output J4400: 662 Watts (2123 BTU/hour)
	Temperature: 35° F to 95° F (0° C to 35° C) maximum
	Humidity: 20% to 80% (noncondensing) maximum
	Altitude: 0 to 9,843 feet (3,000 meters)
	Shock: 31-G +/-5%, with pulse duration of 2.6 ms or less half-sine, bottom side tested only
	Vibration: 0.25 G (peak), 3 to 200 Hz sweep @ 1/2 octave per minute, bottom side tested only

TABLE 2-1 Sun Storage J4200/J4400 Specifications

ElectroMagnetic Compatibility (EMC) Standards	FCC 47CFR15 Subpart B Class A (USA)
	ICES-003 Class A (Canada)
	CE Mark including EN55022 Class A, EN55024, EN61000-3-2, and EN61000-3-3 (Europe)
	VCCI-03 Class A (Japan)
	CCC Class A (China)
	BSMI CNS13438 Class A (Taiwan)
	C-Tick Mark (Australia and New Zealand)
Safety Standards	UL/CUL: U.S. with Canada / UL60950-1
	TUV Sud: Europe / EN60950-1
	CB (by TUV): IEC60950-1
	BSMI: Taiwan / CNS14336
	CCC: China
Sun Supported Racks	Sun Rack 900/1000 cabinet
	Sun StorEdge Expansion cabinet
	Sun Fire Expansion Cabinet
	Any 19-inch wide, 4-post, EIA-compatible rack or cabinet with a front-to-back depth between vertical cabinet rails of 61 cm to 91 cm (24 in. to 36 in.) with threaded or unthreaded cabinet rails

CHAPTER 3

Understanding the Status Indicators

Introduction

This chapter provides details on the status indicators that appear on the front and back of the J4200/J4400 arrays. This chapter includes the following sections:

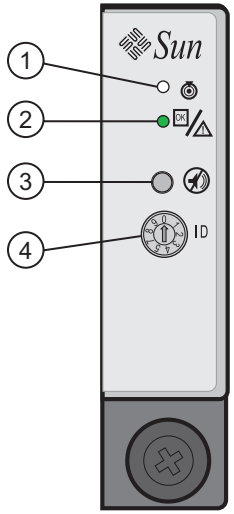
- Front Status Indicators
- Rear Status Indicators

Front Status Indicators

This section provides information on the disk drive status indicators.

Two indicators on the front of the Sun Storage J4200/J4400 are located on the right-side end cap of the tray (FIGURE 3-1).

FIGURE 3-1 Indicators on the Front of a Sample J4200 Array



Following are the J4200/J4400 Array front panel status indicator descriptions.

TABLE 3-1 J4200/J4400 Front Panel Status Indicators

ID	Indicator	Color	Condition	Description
1	System Locate	White	Off	Not supported
		White	Blinking @ 1 Hz 50%	Location LED is active
2	System OK/ Fault	Green	On	System is powered on
		Green	Blinking @ 4 Hz 50%	System is booting or being configured
		Green	Off	System is powered off
		Amber	Off	No current faults
		Amber	On	System fault

Disk Drives

This section cites the disk drive components and provides descriptions for the indicators.

FIGURE 3-2 shows the disk-release button, the disk handle, and the status indicators.

FIGURE 3-2 Disk Drive

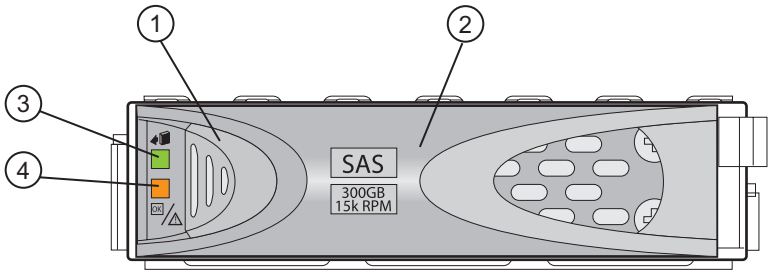


Figure Legend

ID	Description
1	Release button. Press to the right to disengage the release handle
2	Disk handle
3	OK status indicator
4	Ready to Remove/Fault status indicators

Following are the J4200/J4400 disk drive status indicator descriptions.

TABLE 3-2 J4200/J4400 Disk Drive Status Indicators

ID	Indicator	Color	Condition	Description
3	OK	Green	On	Ready for access
		Green	Blinking	Spinning down or accessing drives
		Green	Off	Offline or inactive
4	Ready to Remove/Fault	Blue	On	Drives have no pending writes and can be removed safely

ID	Indicator	Color	Condition	Description
		Amber	On	HDD fault - Service Action Required
		Amber	Blinking @ 4 Hz 50%	HDD locator
		Amber	Off	No failures

Rear Status Indicators

This section describes the status indicators on the back of the J4200/J4400 array.

J4200 SIM Board

Following are the J4200 SIM board components and indicator descriptions.

FIGURE 3-3 J4200 Array SIM Board Components and Status Indicator Descriptions

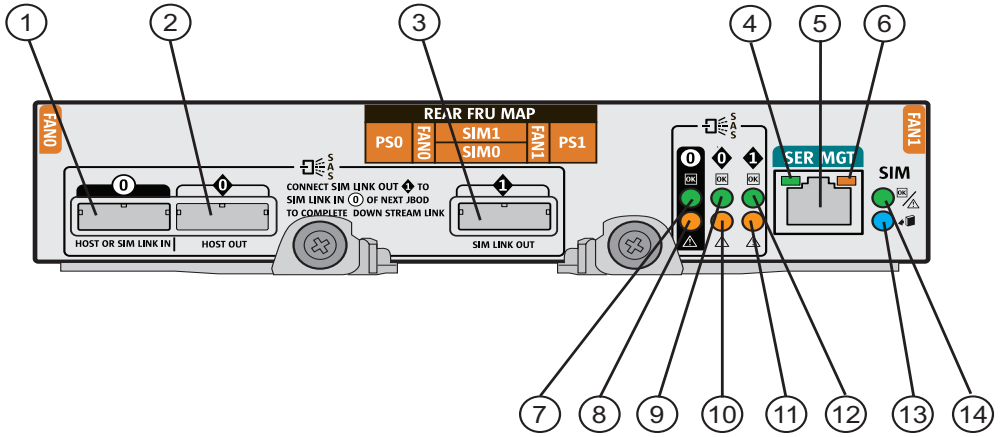


FIGURE 3-4 J4400 Array SIM Board Components and Status Indicator Descriptions

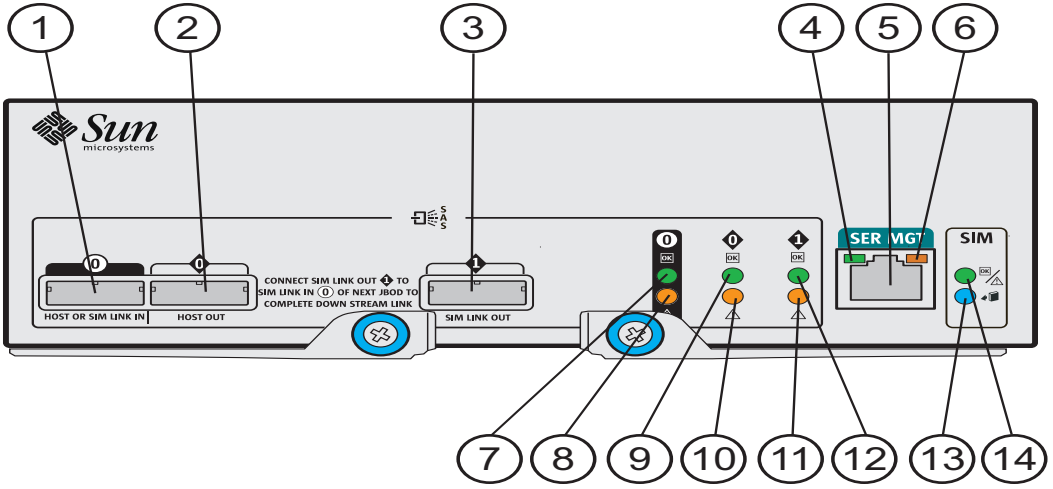


TABLE 3-3 SIM Board Components and Indicator Associations

ID	Component or Indicator	Description
1	Host or SIM Link IN	SAS connection to a data or management host, or a connection from another J4200/J4400.
2	Host OUT	SAS connection to a host.
3	SIM Link Out	SAS connection to another J4200/J4400.
4	Serial Management Port	Left Indicator - Green: Serial port is active.
5	Serial Management Port	Serial port - Reserved for Sun Customer Support Personnel only.
6	Serial Management Port	Right Indicator - Amber: Serial port fault.
7	Host or SIM Link IN	Top Indicator - Green
8	Host or SIM Link IN	Bottom Indicator - Amber
9	Host OUT	Top Indicator - Green
10	Host OUT	Bottom Indicator - Amber
11	SIM Link Out	Bottom Indicator - Amber
12	SIM Link Out	Top Indicator - Green
13	SIM Board	Locate Indicator - Blue: Identified as ready for service (not supported)
14	SIM Board	Power On/Fault Indicator - Green/Amber

SIM Board Status Indicators

Following are the J4200/J4400 SIM board status indicator descriptions:

TABLE 3-4 J4200/J4400 Array SIM Board Status Indicator Descriptions

ID	Indicator	Color	Condition	Description
4	Serial Management Port	Green	Serial port is active	Left status indicator - serial management connector
6	Serial Management Port	Amber	Serial port fault	Right status indicator - serial management connector
7 to 12	SAS Faults	Green/Amber	Green is On Amber is Off	Optimal operating status - no activity
		Green/Amber	Green is Off Amber is On	Link not operating
		Green/Amber	Green is Blinking Amber is Off	OK with activity
		Green/Amber	Green is Blinking Amber is On	Link operating with fewer than all four links
13	Locate SIM Board	Blue	On	Identified as ready for service (not supported)
		Blue	Off	Not identified
14	Power SIM Board	Green	On	Power on and system is operating
		Green	Blinking @ 1 Hz 50%	System is booting, being configured, or downloading firmware
		Amber	Off	SIM OK
		Amber	On	SIM fault

J4200/J4400 Array Power Supplies

Caution – The power supplies in this equipment can produce high energy hazards. Only instructed personnel with authorized access to this equipment can remove and replace modules in the system.

FIGURE 3-5 shows J4200 array power supplies and FIGURE 3-6 shows J4400 array power supplies.

FIGURE 3-5 J4200 Array Power Supplies

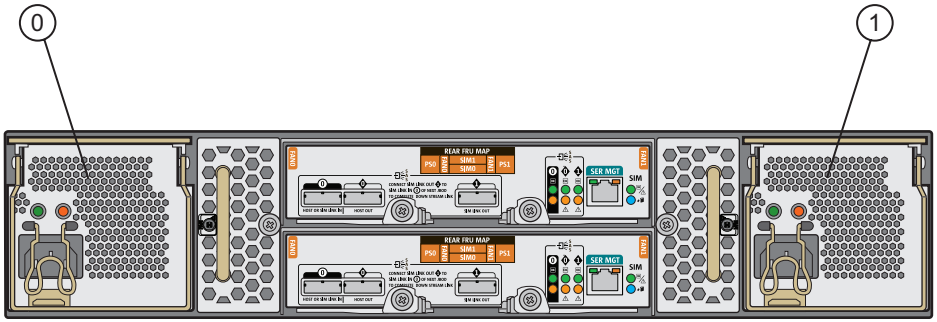


Figure Legend

ID	Component
0	Power Supply 0
1	Power Supply 1

FIGURE 3-6 J4400 Array Power Supplies

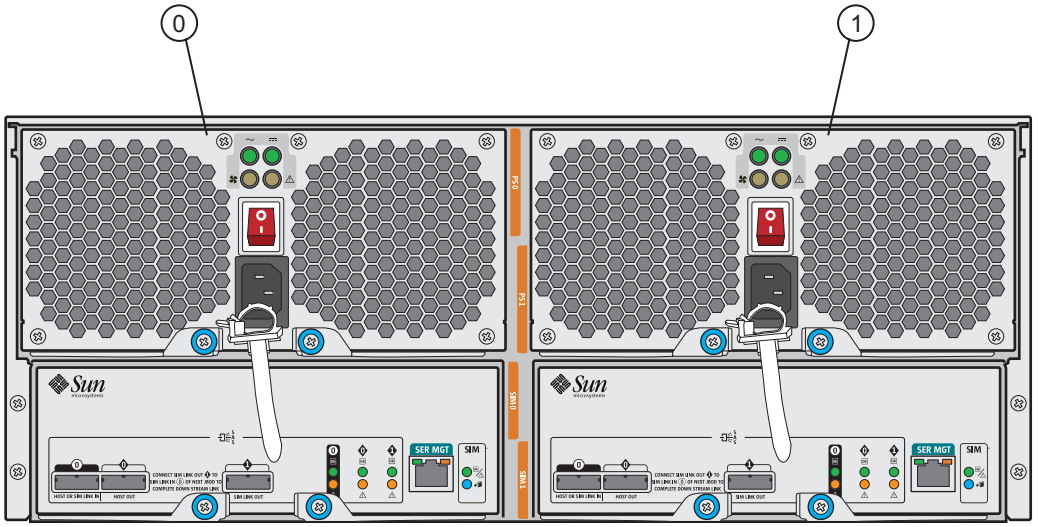


FIGURE 3-7 shows an individual J4200 array power supply and FIGURE 3-8 shows an individual J4400 array power supply.

FIGURE 3-7 Individual J4200 Power Supply

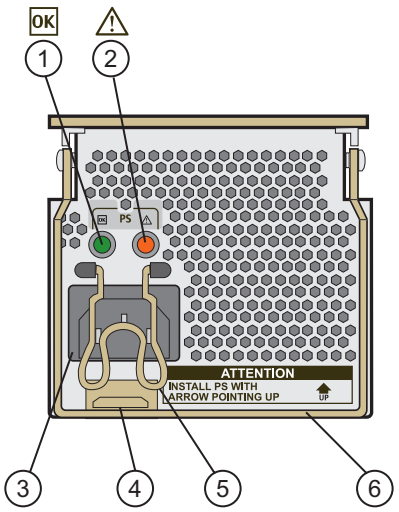


TABLE 3-5 describes the J4200 power supply components and TABLE 3-6 provides the J4200 power supply status indicator descriptions.

TABLE 3-5 J4200 Array Power Supply Components

ID	Component	Description
1	Green indicator	See TABLE 3-6.
2	Amber indicator	See TABLE 3-6.
3	Universal power input connector	Power cord connector.
4	Power supply latch	Holds the power supply handle down.
5	Power cord clamp	Holds the power cord in place.
6	Power supply handle	Used to remove the power supply from and insert the power supply into the J4200 enclosure.

J4200 Power Supply Status Indicators

Following are the J4200 power supply status indicator descriptions.

TABLE 3-6 J4200 Power Supply Status Indicators

ID	Indicator	Color	Condition	Description
1	Power Status	Green	On	AC/DC Power Ready
		Green	Off	No AC/DC Power Input
		Green	Blinking	AC Present and Standby Output is Available
2	Power Fault	Amber	On	Power Supply Failure
		Amber	Off	Power Supply Healthy

FIGURE 3-8 Individual J4400 Power Supply

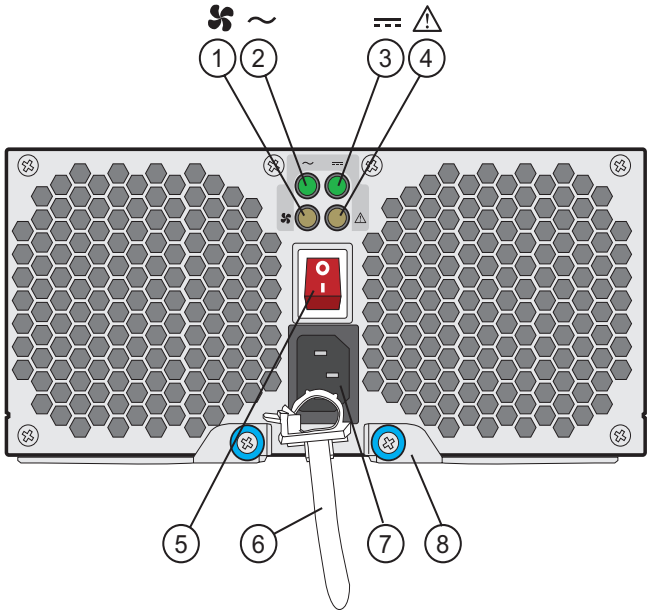


TABLE 3-7 describes the J4400 power supply components and TABLE 3-8 provides the J4400 power supply status indicator descriptions.

TABLE 3-7 J4400 Array Power Supply Components

ID	Component	Description
1	Cooling fan status indicator	See TABLE 3-8.
2	AC power status indicator	See TABLE 3-8.
3	DC power status indicator	See TABLE 3-8.
4	Power supply status indicator	See TABLE 3-8.
5	Power on/off switch	Turns power to the array on or off.
6	Power cord tie wrap	Holds the power cord in place.
7	Universal power input connector	Provides power to the array.
8	Right ejection arm and captive screw latch	Secures the power supply to the chassis.

J4400 Power Supply Status Indicators

Following are the J4400 power supply status indicator descriptions.

TABLE 3-8 J4400 Power Supply Status Indicators

ID	Indicator	Color	Condition	Description
1	Cooling fan status indicator	Amber	On	Fan failure
		Amber	Off	Fans healthy
2	AC power status indicator	Green	On	AC power ready
		Green	Off	No AC power input
3	DC power status indicator	Green	On	DC power ready
		Green	Off	No DC power input
4	Power supply status indicator	Amber	On	Power supply failure
		Amber	Off	Power supply healthy

J4200 Array Fan Modules

This section provides the fan module indicator descriptions.

FIGURE 3-9 J4200 Array Fans

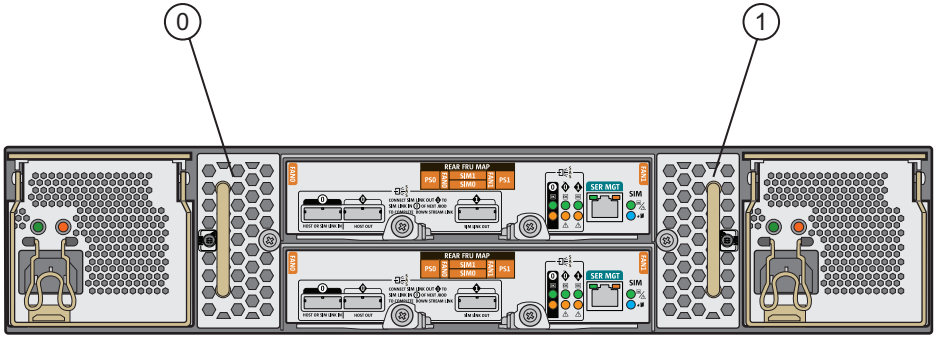


Figure Legend

ID	Description
0	Fan module 0
1	Fan module 1

FIGURE 3-10 Individual J4200 Array Fan Module

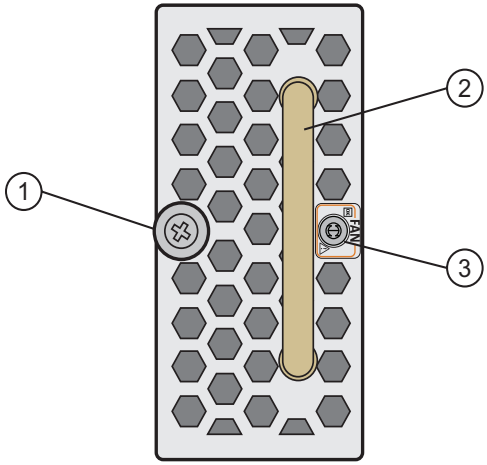


Figure Legend

ID	Description
1	Thumbscrew
2	Fan module handle
3	Bicolored (green/amber) status indicator

J4200 Fan Status Indicators

Following are the J4200 fan status indicator descriptions.

TABLE 3-9 J4200 Fan Status Indicators

Indicator	Color	Condition	Description
Fan Status	Green	Off	No Power
	Amber	Off	
	Green	On	Fan Healthy
	Amber	Off	
	Green	Off	Fan Fault
	Amber	On	

CHAPTER 4

Understanding the J4000 Family Event Log

TABLE 4-1 provides event IDs, log listings, descriptions, and where applicable, Service action recommendations.

Refer to the *Sun StorageTek Common Array Manager User Guide for the J4000 Array Family* (820-3765-*nn*) for information on viewing system events and configuring automatic notifications.

TABLE 4-1 J4000 Family Event Log Listings

Event ID	System Event Name	Description	Service Action
1	SYSLOG_SYSTEM_POWER_ON	System was powered on and booted.	
2	SYSLOG_SYSTEM_POWER_OFF	System was shut down.	Not currently supported.
3	SYSLOG_STATUS_FAIL_SIM0	SIM 0 was disabled due to runtime failure.	Contact Sun Service: http://www.sun.com/support/contacting
4	SYSLOG_STATUS_FAIL_SIM1	SIM 1 was disabled due to runtime failure.	Contact Sun Service: http://www.sun.com/support/contacting
5	SYSLOG_PLUGOUT_FAN0	Fan 0 was removed.	J4200 only. System is in degraded mode. Reinstall Fan 0 in 15 minutes to ensure system health.
6	SYSLOG_PLUGOUT_FAN1	Fan1 was removed.	J4200 only. System is in degraded mode. Reinstall Fan 1 in 15 minutes to ensure system health.

7	SYSLOG_PLUGOUT_SPS0	Power Supply 0 was removed.	J4200 only. System is in a degraded mode. Reinstall Power Supply 0 to ensure a high degree of fault tolerance.
8	SYSLOG_PLUGOUT_SPS1	Power Supply 1 was removed.	System is in a degraded mode. Reinstall Power Supply 1 to ensure a high degree of fault tolerance.
9	SYSLOG_PLUGOUT_DISK	Disk 1 was removed.	
10	SYSLOG_PLUGOUT_PORT	SAS port 1 is down.	Check the connection to SAS port 1.
11	SYSLOG_PLUGIN_OK_SIM0	SIM 0 is enabled.	
12	SYSLOG_PLUGIN_OK_SIM1	SIM 1 is enabled.	
13	SYSLOG_PLUGIN_FAN0	Fan 0 is present.	
14	SYSLOG_PLUGIN_FAN1	Fan 1 is present.	
15	SYSLOG_PLUGIN_SPS0	Power 0 is present.	
16	SYSLOG_PLUGIN_SPS1	Power 1 is present.	
17	SYSLOG_POWER_BTN	Front panel button is pressed to mute alarm.	
18	SYSLOG_PHY_ERR_CNT	PHY error count exceeds threshold value.	The drive slot or SAS port is unstable. Check disk status and SAS cable connections.
19	SYSLOG_PWROK_SPS0	Power supply 0 has power.	
20	SYSLOG_PWROK_SPS1	Power supply 1 has power.	
21	SYSLOG_NOT_PWROK_SPS0	Power supply 0 has failed.	Check the connection between the power cord and Power Supply 0.
22	SYSLOG_NOT_PWROK_SPS1	Power supply 1 has failed.	Check the connection between the power cord and Power Supply 1.
23	SYSLOG_ACOK_SPS0	Power supply 0 is OK.	J4400 only.
24	SYSLOG_ACOK_SPS1	Power Supply 1 is OK.	J4400 only.

25	SYSLOG_NOT_ACOK_SPS0	Power Supply 0 is down.	J4400 only. Check the connection between the power cord and Power Supply 0.
26	SYSLOG_NOT_ACOK_SPS1	Power Supply 1 is down.	J4400 only. Check the connection between the power cord and Power Supply 1.
27	SYSLOG_FAIL_SPS0	Power Supply 0 was removed.	J4400 only. System is in degraded mode. Reinstall Power Supply 0 to ensure a high degree of fault tolerance.
28	SYSLOG_FAIL_SPS1	Power Supply 1 was removed.	J4400 only. System is in degraded mode. Reinstall Power Supply 1 to ensure a high degree of fault tolerance.
29	SYSLOG_OK_SPS0	Power Supply 0 was installed.	J4400 only.
30	SYSLOG_OK_SPS1	Power Supply 1 was installed.	J4400 only.
31	SYSLOG_PLUGIN_PORT	SAS port 1 is up.	
32	SYSLOG_WDT_TIMEOUT	SIM 1 is disabled due to timeout.	
33	SYSLOG_DIAG_PASS	Completed and passed diagnostic test.	
34	SYSLOG_DIAG_FAIL	Completed and failed diagnostic test.	Contact Sun Service: http://www.sun.com/support/contacting
35	SYSLOG_PLUGOUT_SIM	SIM 1 was removed.	
36	SYSLOG_PLUGIN_SIM	SIM 1 is installed.	
37	SYSLOG_FAIL_I2C	Controller 1 has encountered a failure.	A hardware error occurred in SIM 1. Please replace SIM 1 with a new one immediately.
38	SYSLOG_SYSTEM_HEALTHY	System is back to normal state.	
39	SYSLOG_PLUGIN_DISK	Disk 1 is installed	
40	SYSLOG_FW_DIFF	The two SIM firmware versions are incompatible.	

41	SYS	Fan 1 has failed.
42	SYSLOG_TEMP_WARN	Nominal temperature has been exceeded.
43	SYSLOG_TEMP_CRIT	Maximum temperature has been exceeded.
44	SYSLOG_VOLT_WARN	Nominal voltage has been exceeded.
45	SYSLOG_VOLT_CRIT	Maximum voltage has been exceeded.

CHAPTER 5

SAS Multipathing

You can use J4200/J4400 arrays in a serial-attached SCSI (SAS) multipathing configuration. Multipathing provides higher availability by allowing data to use multiple paths to the arrays from Host Bus Adaptors (HBAs) on the same server or on different servers.

Multipathing capability resides in the operating systems running on the servers, not on the J4200/J4400 arrays. You enable, disable, and configure multipathing through the operating software.

This chapter includes the following information:

- "System Requirements" on page 49
- "Configuration Examples" on page 52
- "Enabling and Disabling Multipathing in the Solaris Operating System" on page 56
- "Enabling and Disabling Multipathing in the Windows Operating System" on page 61
- "Enabling and Disabling Multipathing in the Linux Operating System" on page 79

System Requirements

To use multipathing with the J4200/J4400 arrays, your configuration must meet the requirements specified in this section.

Required Operating Systems

TABLE 5-1 lists the operating systems that support multipathing with the J4200/J4400 arrays

TABLE 5-1 Operating Systems That Support J4200/J4400 Multipathing

Operating System	Versions That Support Multipathing With J4200/J4400 Arrays
Microsoft Windows	Windows 2008 (32/64 bit)
Solaris™ Operating System	Solaris 10, update 6
Linux Operating System	Linux RHEL 4, version 4.5 and higher Linux RHEL 5, version 5.2 and higher Linux SUSE 9, SP 3 and higher Linux SUSE 10, SP 2 and higher

Required Patch for Solaris 10 U6 With SATA Drives

To use the Solaris 10, update 6, operating system with multipathing and SATA drives, you must use a patch for the operating system. The patch ID is 138888-03 5.10 (SPARC) and 138889-03 5.10_x86 (x86).

Note – These patches are required only for multipathing with SATA drives. Multipathing with SAS drives and Solaris 10, U6 requires no patches.

Required Firmware and Drivers

To use multipathing with the J4200/J4400 arrays, the firmware in your configuration must meet these requirements:

- Every J4200/J4400 must have the latest SIM firmware available from the Common Array Manager (CAM) version 6.1.2.
- Every server must have the latest operating system firmware.

For each operating system, TABLE 5-2 lists the required drivers.

TABLE 5-2 Required Drivers By Operating System

Operating System	Required Driver(s)
Windows 2008	Included with the software
Solaris 10, update 6	Included with software
Linux RHEL 4, version 4.5 and higher	MPT 3.16.00.00
Linux RHEL 5, version 5.2 and higher	MPT 4.16.00.00
Linux SUSE 9, SP 3 and higher	MPT 3.16.00.00
Linux SUSE 10, SP 2 and higher	MPT 4.16.00.00

Where to Get Drivers

For the Linux MPT drivers, go to the following location:

http://www.lsi.com/support/sun/sg_xpci8sas_e_sRoHS.html

Required HBA

To use multipathing with the J4200/J4400 arrays, your servers must be using the following HBA:

- Model number: SG-XPCIE8SAS-E-Z
- Part number: 375-3487-*xx*, where *xx* is 02 or higher
- Current active firmware version: 011a0000 (1.26.00)
- Firmware image version: MPTFW-01.26.00.00-IT
- LSI Logic x86 BIOS image version: MPTBIOS-6.24.00.00 (2008.07.01)
- FCode image version: MPT SAS FCode Version 1.00.49 (2007.09.21)

Required CAM Versions for Multipathing

For the latest information about which versions of the Sun StorageTek Common Array Manager (CAM) you must use in a multipathing configuration, refer to the *Sun Storage J4200/J4400 Array Release Notes*, part number 820-3222-*xx*, which is available at the following location:

http://docs.sun.com/app/docs/prod/j4200.array

Configuration Examples

This section includes examples of how to cable J4200/J4400 arrays to each other and to host HBAs in a multipathing environment.

Multipathing With One Array and One Host

FIGURE 5-1 shows an example of SAS cables connecting the ports on the host's HBA to the SIM boards on the back of an array.

FIGURE 5-1 Cabling Example for Multipathing With One Array and One Host

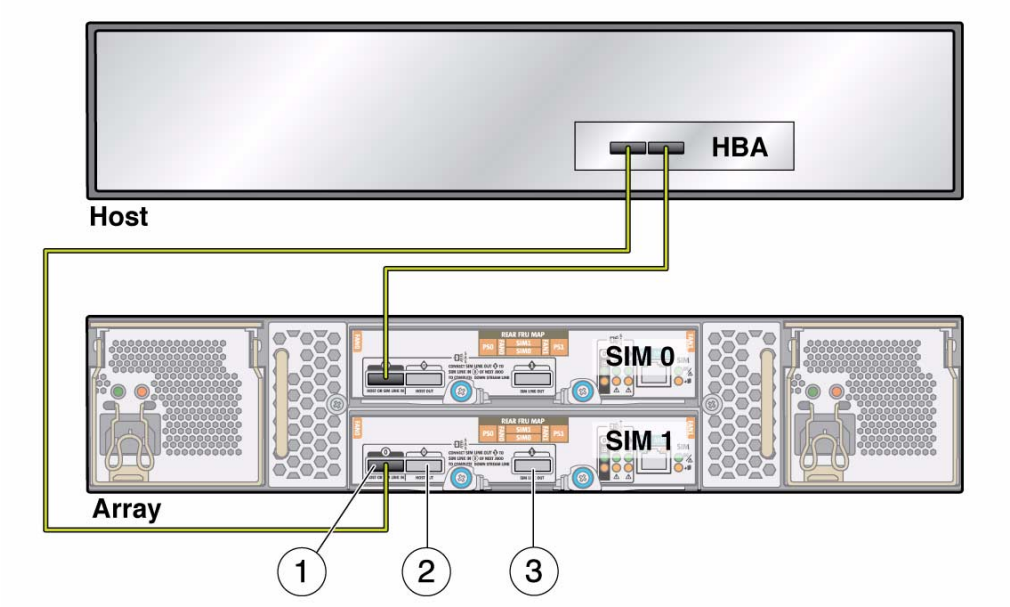


Figure Legend

1	Host or SIM Link In
2	Host Out
3	SIM Link Out

Multipathing With Two Arrays and Two Hosts

FIGURE 5-2 shows an example of cabling for multipath in a configuration with two hosts, with two HBAs on each host, and two arrays cabled together.

FIGURE 5-2 Cabling Example for Multipathing With Two Arrays and Two Hosts

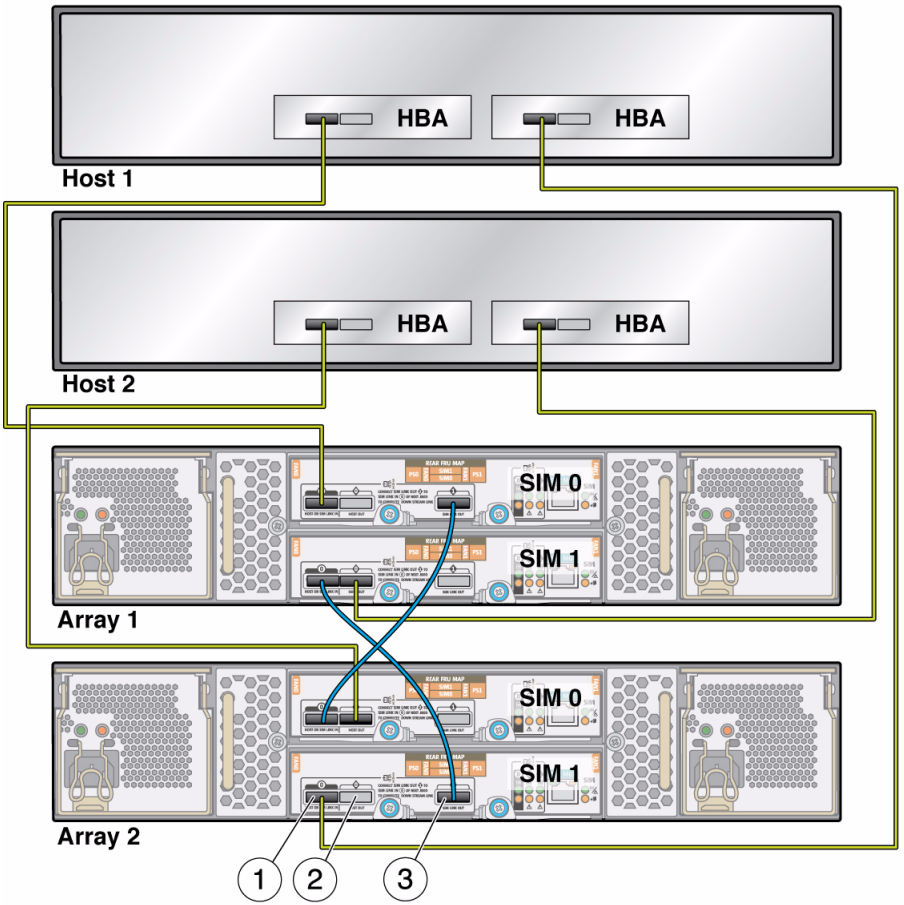


Figure Legend

1	Host or SIM Link In
2	Host Out
3	SIM Link Out

Multipathing With Two Arrays and One Host

FIGURE 5-3 shows an example of cabling for multipath in a configuration with one host, with two HBAs on that host, and two arrays cabled together.

FIGURE 5-3 Cabling Example for Multipathing With Two Arrays and One Host

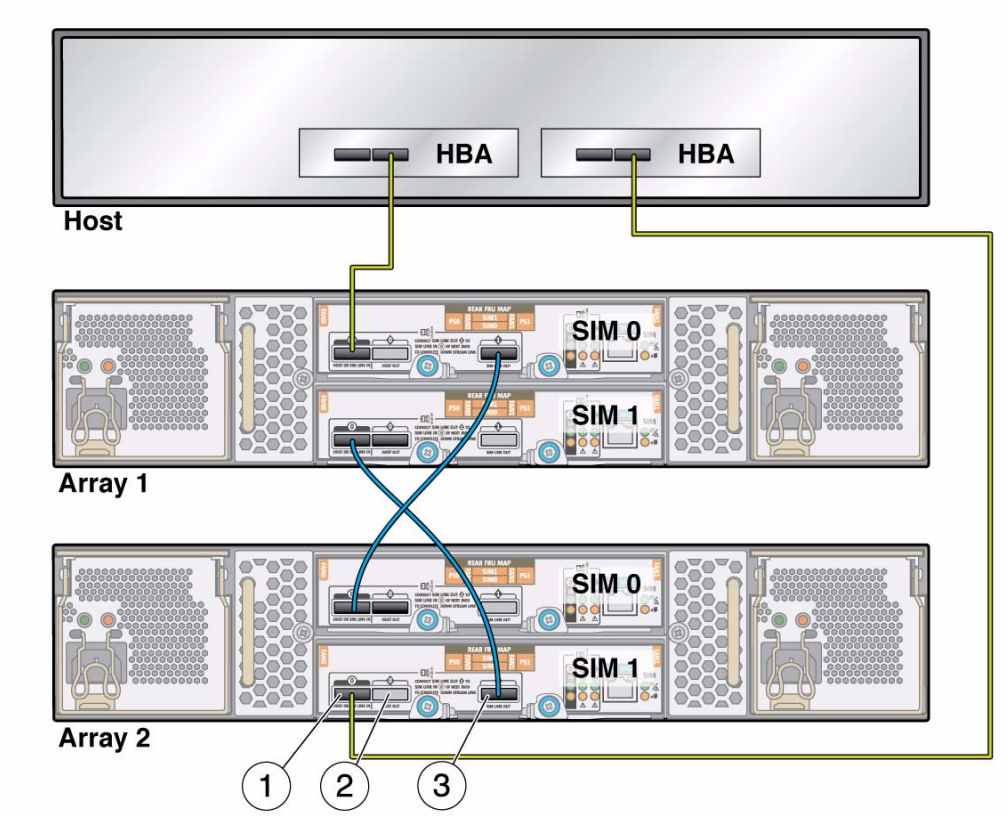


Figure Legend

1	Host or SIM Link In
2	Host Out
3	SIM Link Out

Enabling and Disabling Multipathing in the Solaris Operating System

This sections describes how to enable and disable multipathing in the Solaris 10, update 6, operating system.

Use the `stmsboot` command to enable multipathing in the Solaris 10, update 6, operating system. `stmsboot` manages enumeration of multipath–capable devices with multipathing; it has these characteristics:

- Multipathing-*enabled* devices are enumerated under scsi_vhci(7D).
- Multipathing-*disabled* devices are enumerated under the physical controller.

This section describes the `stmsboot(1M)` administration program for multipathing.

Device Renaming

In the `/dev` and `/devices` trees, multipathing-enabled devices receive new names that indicate that they are under multipathing control.

- This means a device has a different name from its original name (after enabling) when it is under multipathing control.
- The `stmsboot` command automatically updates /etc/vfstab and dump configuration to reflect the device names changes when enabling or disabling Multipathing.
- One reboot is required for changes to take effect.

`stmsboot` Options

TABLE 5-3 describes the options supported by `stmsboot(1M)`.

TABLE 5-3 `stmsboot` Options

`-e [-D fp | mpt]`	Enables multipathing on all supported multipath-capable controller ports. • Multipath-capable ports include SAS (mpt[7D]) controller ports. • Prompts you to reboot. • During reboot, vfstab and the dump configuration update to reflect the device-name changes. • Specifying `-D mpt` limits the enabling operation to ports attached using the specified driver.

TABLE 5-3 `stmsboot` Options *(Continued)*

`-d [-D fp | mpt]`	Disables multipathing on all supported multipath-capable controller ports. • Multipath-capable ports include SAS (mpt[7D]) controller ports. • Prompts you to reboot. • During reboot, vfstab and the dump configuration update to reflect the device name changes. • Specifying `-D mpt` limits the disabling operation to ports attached using the specified driver.
`-u`	Updates `vfstab` and the `dump` configuration after manually enabling or disabling multipathing on specific multipath- capable controller ports. • Prompts you to reboot. • During reboot, `vfstab` and the `dump` configuration update to reflect the device name changes.
`-L`	Displays the device name changes from non-multipathing-device names to multipathing device names on multipath-enabled controller ports. If multipathing is not enabled, no mappings display.
`-l controller_number`	Displays the device-name changes from non-multipathing device names to multipathing device names for the specified controller. If multipathing is not enabled, no mappings display.

`stmsboot` Conditions

`stmsboot` enables and disables multipathing on the host, with these conditions:

- The utility automatically updates `vfstab(4)` and `dumpadm(1M)` configuration to reflect device-name changes.

Note – The system administrator is responsible for modifying application configuration (for example, backup software, DBMS, and so forth) to reflect updated device names.

- The `-L` and `-l` options display the mapping between multipathed and non-multipathed device names, only *after* changes to the multipathing configuration take effect; that is, *following* reboot after invoking `stmsboot -e`.
- ZFS datasets, including ZFS root datasets, are correctly handled by `stmsboot`.

▼ To Enable Multipathing on all Multipath-Capable Controllers

---

Note – Multipathing is not supported on all controllers. After enabling multipathing, only supported controllers are placed under multipathing control. Non-supported controllers remain unchanged.

- **Type:**

```
# stmsboot -e
```

```
# stmsboot -e
Warning: stmsboot operates on each supported multipath-capable
controller detected in a host. In your system, these controllers
are
  /devices/pci@780/pci@0/pci@8/SUNW,qlc@0/fp@0,0
  /devices/pci@780/pci@0/pci@8/SUNW,qlc@0,1/fp@0,0
  /devices/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@1
  /devices/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@1
  /devices/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2
  /devices/pci@7c0/pci@0/pci@9/LSILogic,sas@0
  /devices/pci@7c0/pci@0/pci@9/LSILogic,sas@0

If you do NOT wish to operate on these controllers, please quit
stmsboot and re-invoke with -D { fp | mpt } to specify which
controllers you wish to modify your multipathing configuration for.

Do you wish to continue? [y/n] (default: y) y
Checking mpxio status for driver fp
Checking mpxio status for driver mpt
WARNING: This operation will require a reboot.
Do you want to continue ? [y/n] (default: y) y
The changes will come into effect after rebooting the system.
Reboot the system now ? [y/n] (default: y) y
```

Note – `stmsboot` updates the `/etc/vfstab` file and dump configuration to reflect device-name changes during reboot.

The following conditions apply to the `stmsboot -e`, `-d`, and `-u` options:

- Reboot immediately after running `stmsboot`.

- Ensure that `eeprom(1m)` boot device is set to boot from your current boot device; `stmsboot` reboots the machine to complete the operation.
- `stmsboot` saves a copy of your original `/kernel/drv/mpt.conf` and `/etc/vfstab` files before modifying them.

▼ To Disable Multipathing on All Multipath-Capable Controllers

- **Type:**

```
# stmsboot -d
```

```
# stmsboot -d
WARNING: stmsboot operates on each supported multipath-capable
controller detected in a host. In your system, these controllers
are
/devices/pci@780/pci@0/pci@8/SUNW,qlc@0/fp@0,0
/devices/pci@780/pci@0/pci@8/SUNW,qlc@0,1/fp@0,0
/devices/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@1
/devices/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@1
/devices/pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2
/devices/pci@7c0/pci@0/pci@9/LSILogic,sas@0
/devices/pci@7c0/pci@0/pci@9/LSILogic,sas@0

If you do NOT wish to operate on these controllers, please quit
stmsboot and re-invoke with -D { fp | mpt } to specify which
controllers you wish to modify your multipathing configuration for.

Do you wish to continue? [y/n] (default: y) y
Checking mpxio status for driver fp
Checking mpxio status for driver mpt
WARNING: This operation will require a reboot.
Do you want to continue ? [y/n] (default: y) y
The changes will come into effect after rebooting the system.
Reboot the system now ? [y/n] (default: y) y
```

Note – During reboot, `/etc/vfstab` and the dump configuration update to reflect the device-name changes.

▼ To Enable Multipathing on Multipath-Capable Controller Ports

- **Type:**

```
# stmsboot -D mpt -e
```

▼ To Disable Multipathing on Multipath-Capable Controller Ports

- **Type:**

```
# stmsboot -D mpt -d
```

Configuring Multipathing on Selected Ports

To enable multipathing on specific ports and disable multipathing on others, edit the `/kernel/drv/mpt.conf` file. To update `vfstab(4)` and `dumpadm(1M)` configurations to reflect the changed device names, type:

```
# stmsboot -u
```

Dynamic Discovery of SAS Devices

SAS devices, added and removed dynamically with the `mpt(7d)` driver, enable your system to detect specific targets and LUNs attached, with these conditions:

- If you add or remove a device in your SAS domain, messages are written to the /var/adm/messages file indicating presence or removal.
- If a device has been added, it is visible to, and available by, the `format(1m)` command.

Note – To clean up the CTD# for your device tables, run the following command: `devfsadm -C`.

Enabling and Disabling Multipathing in the Windows Operating System

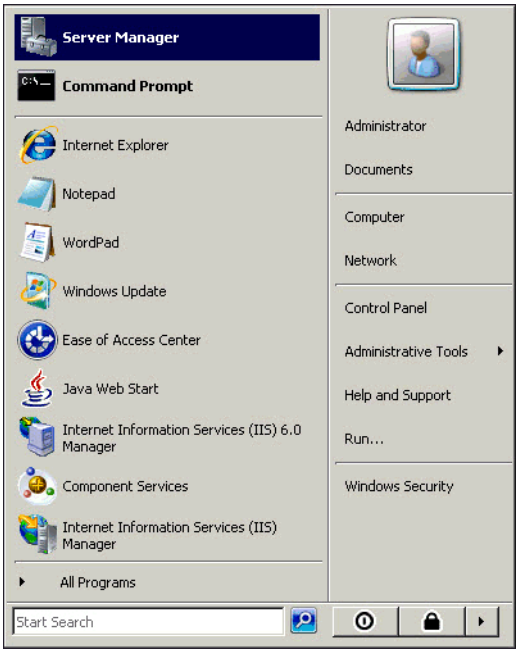
This section describes how to enable and disable multipathing in the Windows 2008 operating system.

▼ To Enable Multipathing in Windows 2008

1. **From the Start menu, select Server Manager, as shown in** FIGURE 5-4**.**

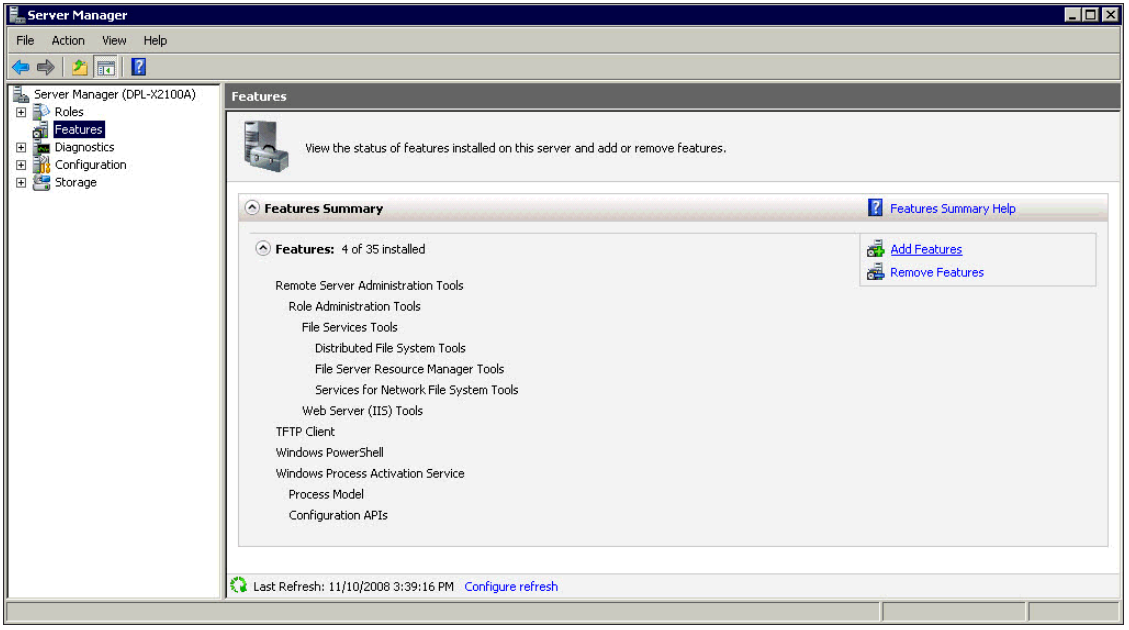
   The Server Manager opens.

FIGURE 5-4 Start Menu With Server Manager Selection



2. **Select Features from the list of folders on the left to open the Features panel, as shown in** FIGURE 5-5**.**

FIGURE 5-5 Server Manager Feature Display

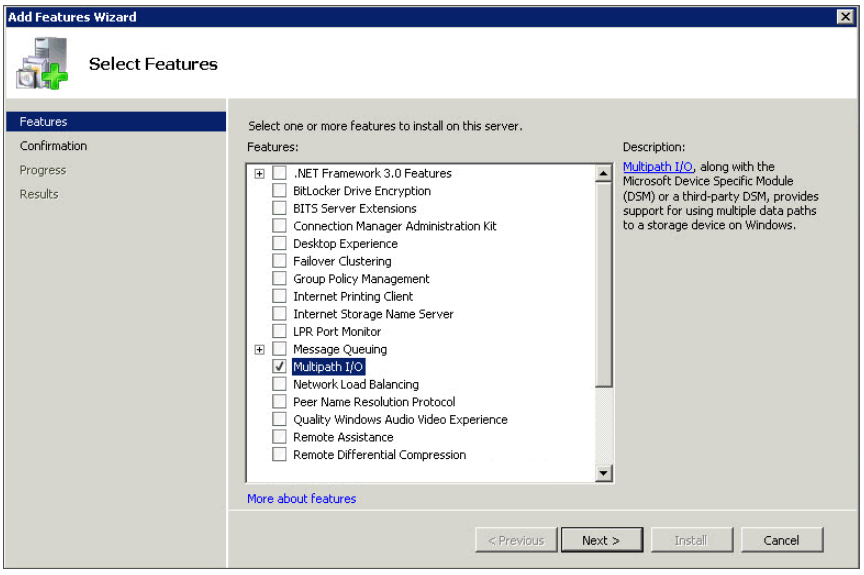


In the Features panel, you can click the Features Summary arrow to open or close the Features Summary and click the Features arrow to view the status of installed features.

3. **Click Add Features to enable the Add Features Wizard.**

   The Add Features Wizard Select Features window opens with the default Features selected and a list of optional features available for installation in your system, as shown in FIGURE 5-6.

FIGURE 5-6 Add Features Wizard Select Features Window

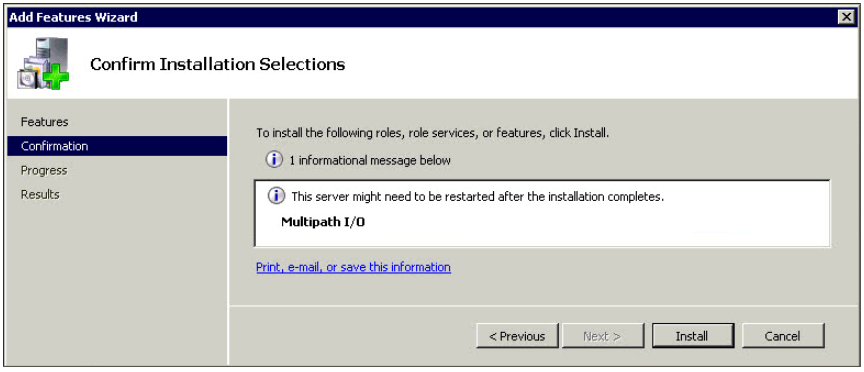


4. Select the Multipath I/O option from the Message Queuing sublist.

5. Click Next.

The Add Features Wizard Confirm Installation Selections window opens, as shown in FIGURE 5-7.

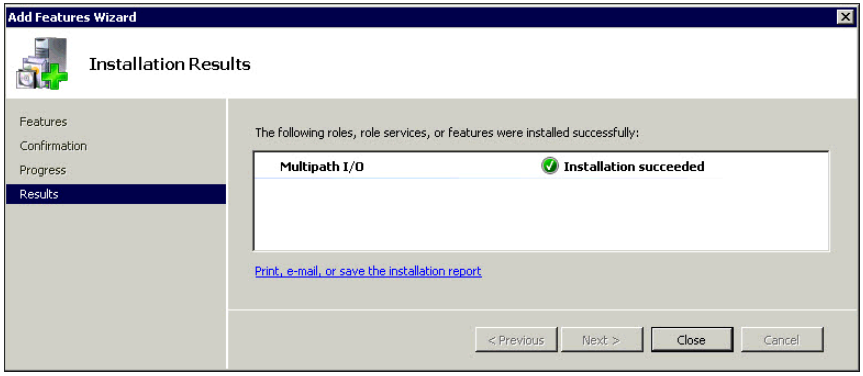
FIGURE 5-7 Confirm Installation Selections Window



6. Click Install.

The Add Features Wizard Installation Results window opens as shown in FIGURE 5-8.

FIGURE 5-8 Add Features Wizard Installation Results Window



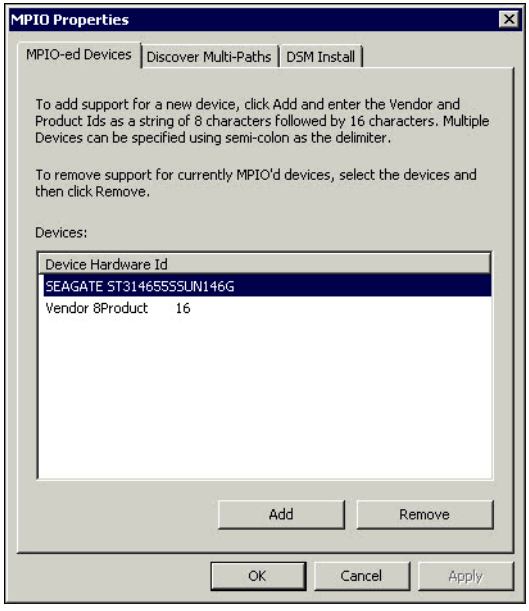
7. **Click Close.**
8. **Close the Server Manager main window.**

▼ To Discover Device Multipaths

1. **From the Windows Start menu (**FIGURE 5-4**), select Administrative Tools.**

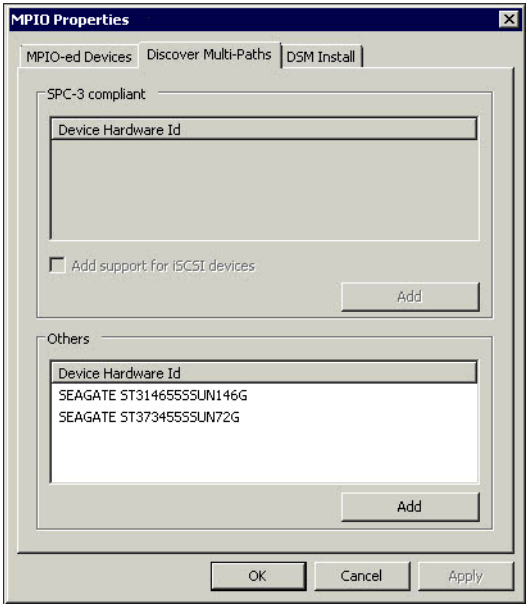
   The MPIO Properties window, as shown in FIGURE 5-9..

FIGURE 5-9 MPIO Properties Window



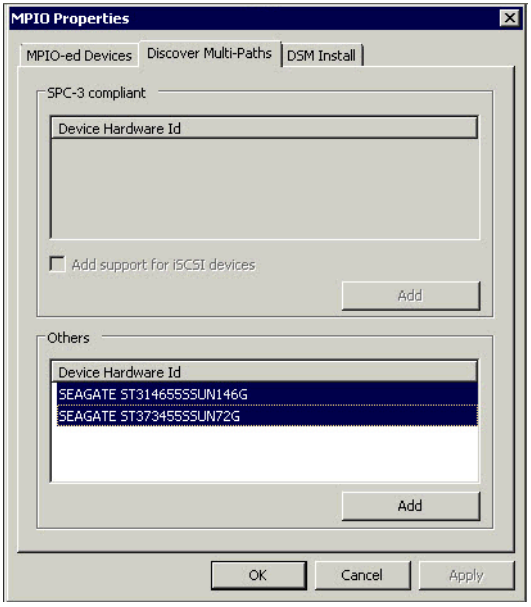
2. **Select the Discover Multi-Paths tab, as shown in** FIGURE 5-10**.**

FIGURE 5-10 MPIO Properties Window Device Multi-Paths Tab



3. **Highlight the Device Hardware for which you want to discover multipaths, as shown in** FIGURE 5-11**.**

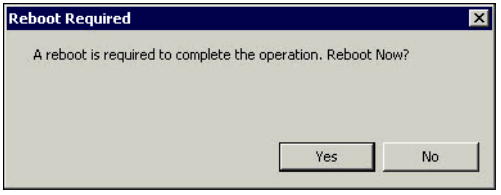
FIGURE 5-11 Highlighted Device Hardware for Discovering Multipaths



4. Click OK.

The Reboot Required window opens, as shown in FIGURE 5-12.

FIGURE 5-12 Reboot Required Window



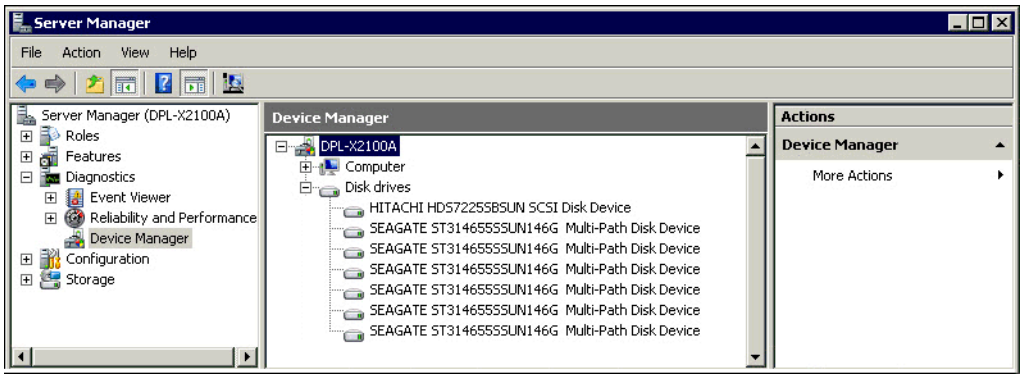
5. Click Yes.

Note – For best results, after reboot, log in and change the default settings of the MPIO policies. See "To Select a Load Balancing Policy" on page 68.

▼ To Select a Load Balancing Policy

1. **From the Windows Start menu, select Server Manager, as shown in** FIGURE 5-4**.**
2. **Select Diagnostics > Device Manager from the list of folders on the left to open the Device Manager window, as shown in** FIGURE 5-13**.**

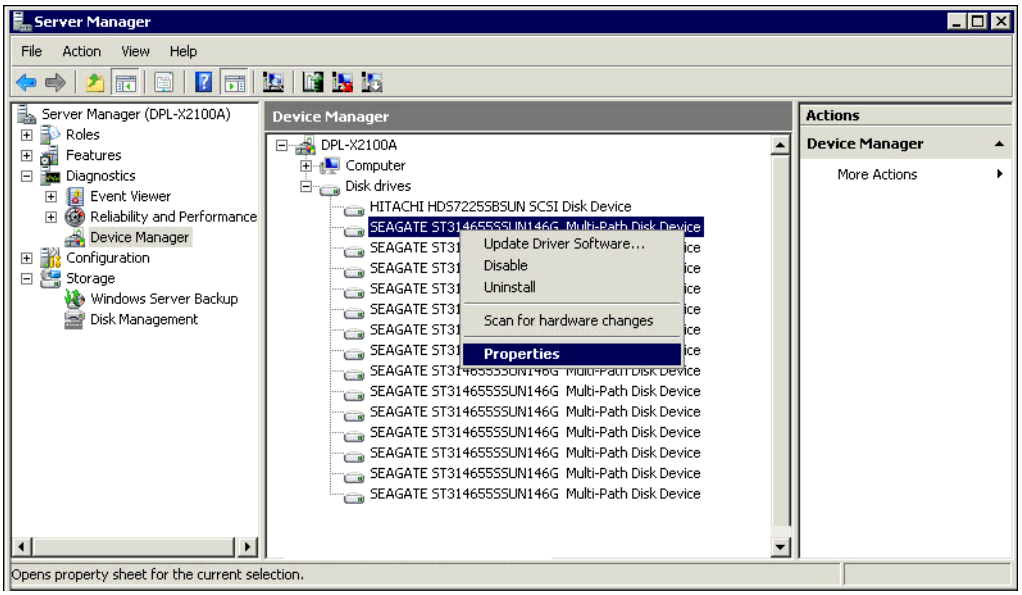
FIGURE 5-13 Device Manager Window



3. **Click the Device name.**
4. **Click Disk drives.**

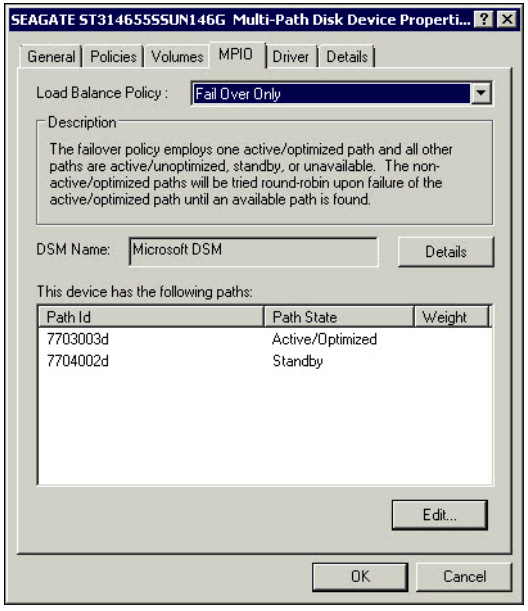
   The list of disk drives opens, as shown in FIGURE 5-13.
5. **Move your cursor over the device drive name for which you want information.**
6. **Right-click to open a menu and select Properties, as shown in** FIGURE 5-14**.**

FIGURE 5-14 Menu to Modify Device Configuration



The Disk Drive Properties window opens, as shown in FIGURE 5-15.

FIGURE 5-15 Disk Drive Properties Window



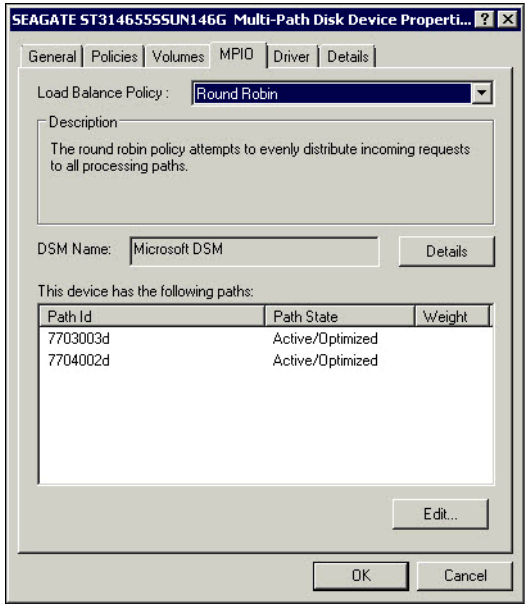
7. **Use the drop-down menu to select a load-balancing policy, as shown in FIGURE 5-16.**

   The choices for load-balancing policies are listed in TABLE 5-4. By default, the Fail Over Policy is configured. For best results with the J4200/J4400 array, use the Round Robin policy.

TABLE 5-4 Load Balance Policies

Load Balance Policy	Description
Fail Over Only	The failover policy employs one active/optimized path and all other paths are active/unoptimized, standby, or unavailable. The non-active/optimized paths will be tried round-robin upon failure of the active/optimized path until an available path is found.
Round Robin	The round robin policy attempts to evenly distribute incoming requests to all processing paths.
Round Robin with Subset	The round robin with subset policy executes the round robin policy only on paths designated as active/optimized. The non-active/optimized paths will be tried on a round-robin approach upon failure of all active/optimized paths.
Least Queue Depth	The least queue depth policy compensates for uneven loads by distributing proportionately more I/O requests to lightly loaded processing paths.
Weight Paths	The weighted paths policy allows the user to specify the relative processing load of each path. A large number means that the path priority is low

FIGURE 5-16 Round Robin Load Balance Policy Selected



8. **Click OK.**

Note – Load balance policie are set on a per-device basis. Repeat this procedure for each disk drive.

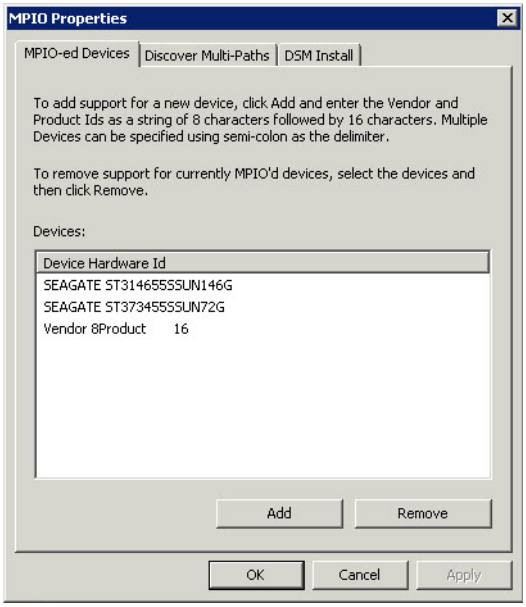
▼ To Disable Multipathing in Windows 2008

1. **From the Windows Start menu, select Administrative Tools > MPIO, as shown in** FIGURE 5-17**.**

   The MPIO Properties window opens, as shown in FIGURE 5-18.

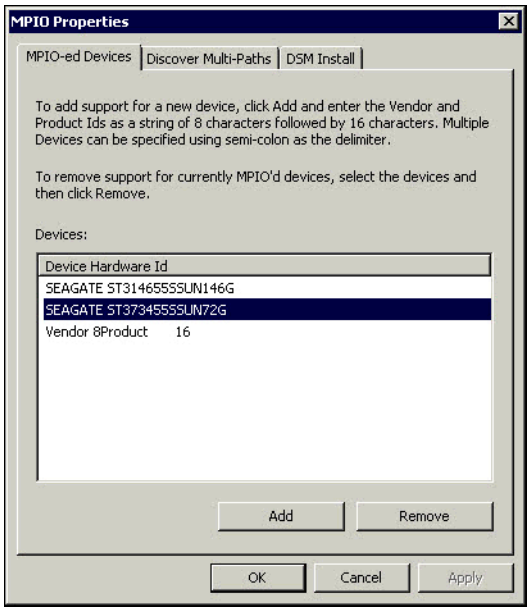
FIGURE 5-17 Selecting Administrative Tools > MPIO From the Start Menu

FIGURE 5-18 MPIO Properties Window



2. Highlight a device in the list, as shown in FIGURE 5-19**.**

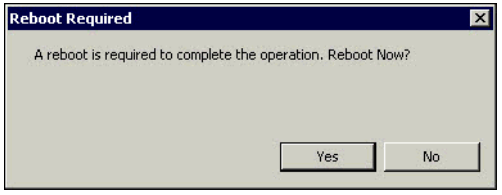
FIGURE 5-19 Highlighting Device For Which to Disable Multipathing



3. **Click Remove.**

   The Reboot Required window opens, as shown in FIGURE 5-20.

FIGURE 5-20 Reboot Required Window



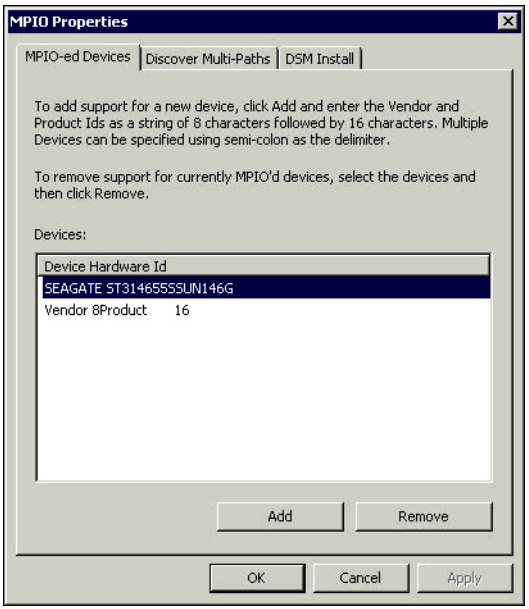
4. **Click Yes.**

   The system reboots.

5. **After reboot, select Administrative Tools > MPIO from the Windows Start menu.**

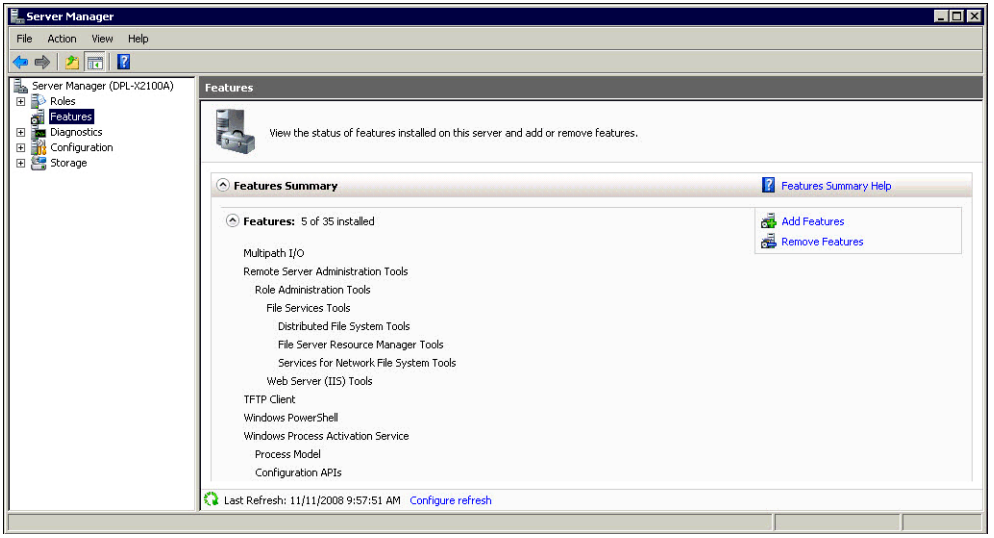
   The MPIO Properties window opens, showing the device removed from the list, as shown in FIGURE 5-21.

FIGURE 5-21 MPIO Properties Window With Device Removed From List



6. **Repeat Step 2 through Step 5 until all devices are removed from the Device Hardware Id list.**
7. **From the Windows Start menu, select Server Manager to open the Server Manager window.**
8. **Select Features from the list of folders on the left to open the Features panel, as shown in FIGURE 5-22.**

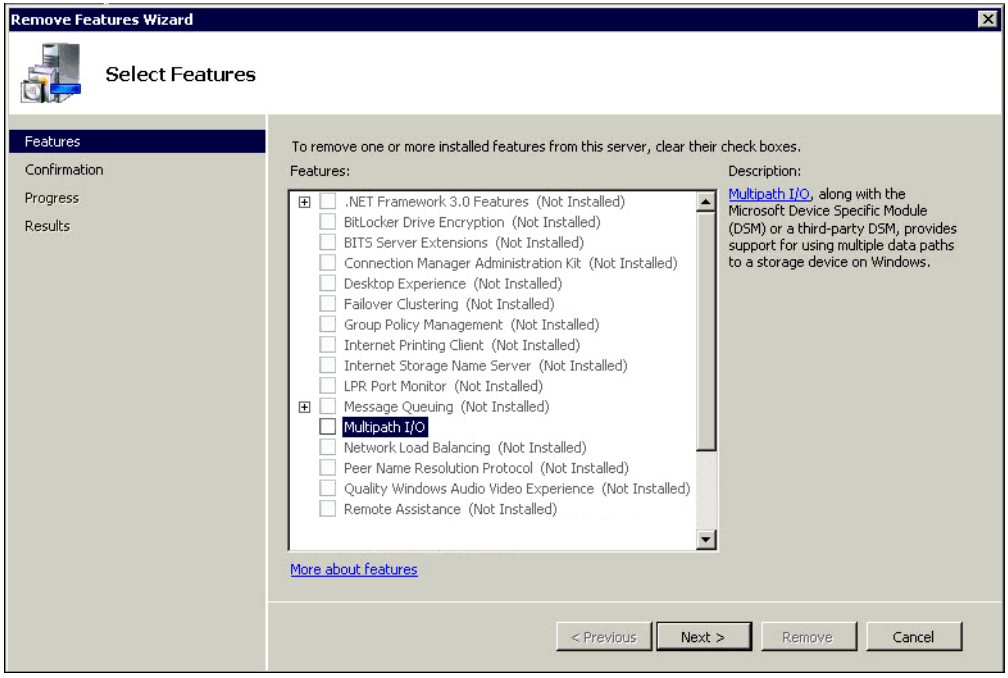
FIGURE 5-22 Server Manager Window With Features Panel Open



9. **Select Remove Features.**

   The Remove Features Wizard window opens, as shown in FIGURE 5-23.

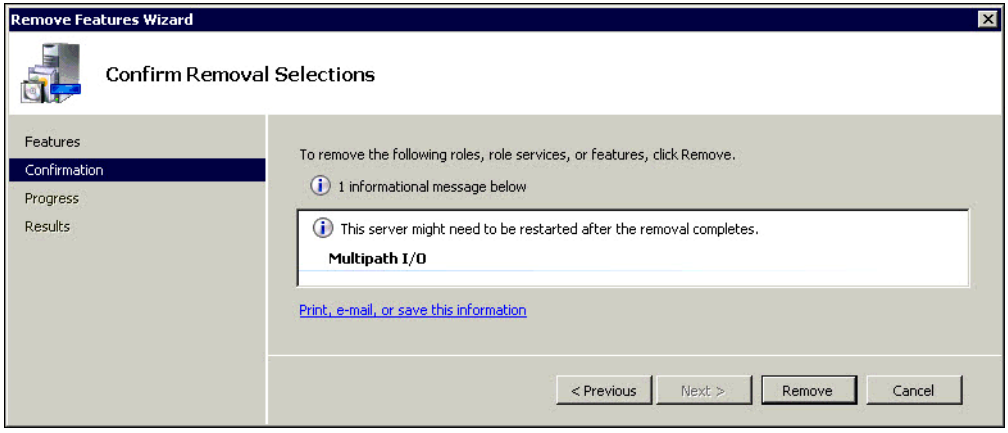
FIGURE 5-23 Remove Features Wizard Window



10. **Highlight Multipath I/O from the Message Queuing sublist.**

The Confirm Removal Selections window opens, as shown in FIGURE 5-24.

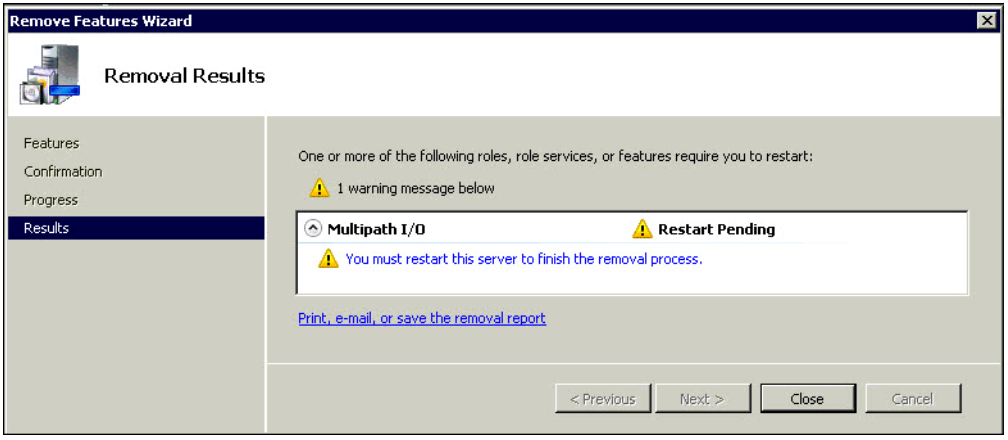
FIGURE 5-24 Confirm Removal Selections Window



11. **Click Remove.**

The Removal Results window opens, as shown in FIGURE 5-25.

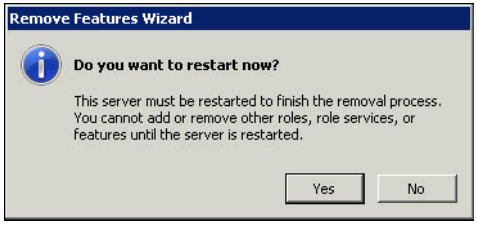
FIGURE 5-25 Removal Results Window



12. **Click Close.**

The system asks if you want to restart the server now, as shown in FIGURE 5-26.

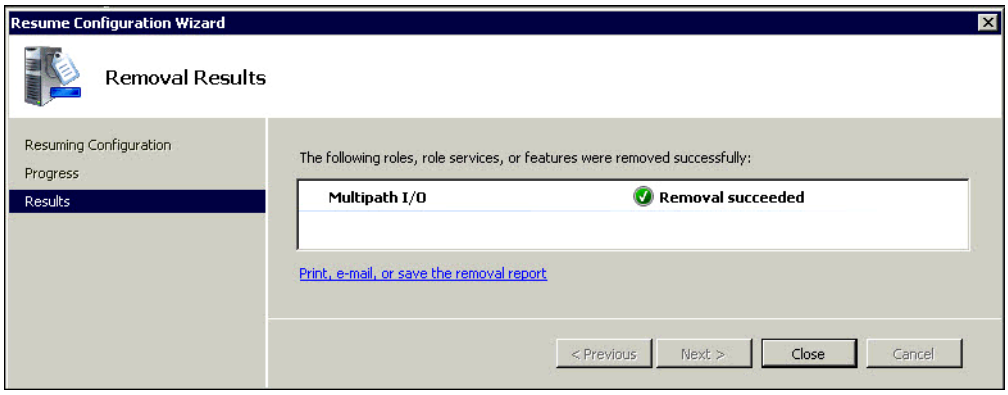
FIGURE 5-26 Restart Now Window



13. **Click Yes.**

When the sever has restarted, the Removal Results window opens, as shown in FIGURE 5-27.

FIGURE 5-27 Removal Results Window



Enabling and Disabling Multipathing in the Linux Operating System

This section describes how to enable and disable multipathing in supported versions of the Linux operating system.

▼ To Enable Multipathing in Linux

1. **Attach a J4200 or a J4400 to a server with a supported version of Linux installed.**
2. **On the server, edit or create the** `/etc/multipath.conf` **file.**
3. **Reboot the server.**
4. **After the reboot, make sure that the OS discovers all the disks in the J4200/J4400 arrays either by using the Linux commands,** `fdisk` **or** `lsscsi`**.**
5. **Partition any disks you want to the desired sizes.**
6. **Use the Linux command** `modprobe` **to add the loadable kernel modules** `dm-multipath` **and** `dm-round-robin`**.**

```
# modprobe dm-multipath
# modprobe dm-round-robin
```

7. **Start the `multipathd` daemon.**

   For Linux SUSE 9, use the following command:

   ```
   # multipathd -v0
   ```

   For other supported Linux versions, use the following command:

   ```
   # service multipathd start
   ```

8. **Start the multipathing device mapper target autoconfig.**

   ```
   # multipath -v2
   ```

9. **List the multipath devices that have been created.**

   ```
   # multipath -ll
   ```

   The output should list the same number of devices as there are disks in the J4200/J4400 arrays; it will look similar to the following:

```
35000c5000357625bdm-2 SEAGATE,ST340008SSUN0.4
[size=373G][features=0][hwhandler=0]
        \_ round-robin 0 [prio=2][active]
        \_ 0:0:0:0  sda 8:0     [active][ready]
        \_ 1:0:0:0  sdm 8:192   [active][ready]
```

▼ To Disable Multipathing in Linux

1. **If a RAID volume, LVM volume, or volume mount have been placed over the device node of the multipathed disk, quiesce the volume.**

2. **Use the `multipath -f` command to disable multipathing to a specific device.**

   ```
   multipath -f mpath1
   ```

3. **Use the `multipath -F` command to disable multipathing on all multipathed devices.**

   ```
   multipath -F
   ```

Note – If the message `map in use` appears for a device when you attempt to disable multipathing, the device is still in use. You must unmount or otherwise quiesce the device before you can disable multipathing. If you cannot quiesce the device, edit the `/etc/multipath.conf` file to exclude the device and then reboot the server.

CHAPTER 6

Troubleshooting and Hardware Replacement with Service Advisor

Use the information in this chapter to help you troubleshoot your J4200/J4400 Array. This chapter contains the following sections:

- Service Advisor
- Basic Service Procedures
- Troubleshooting

Service Advisor

The Sun StorageTek Common Array Manager software includes the Service Advisor application, which provides guided wizards with system feedback for hardware replacement of Customer Replaceable Units (CRUs). In addition, Service Advisor provides troubleshooting procedures for alarms.

Before you can access Service Advisor procedures, you must have already installed the Common Array Manager software, as described in:

- *Sun StorageTek Common Array Manager User Guide for the J4000 Array Family* (820-3765-*nn*)

Host management, data host management, and remote command line interface (CLI) functions are performed by the Sun StorageTek Common Array Manager software.

The CRU replacement procedures available through the Sun StorageTek Common Array Manager Service Advisor application include:

- Disks
- Power Supplies
- Fans

- Power Supply/Fan
- SIMs
- Chassis

Accessing Service Advisor Procedures

To launch Service Advisor and access hardware replacement procedures:

1. Log on to the Sun Java Web Console on the management software host.

   For example, https://*management_host_address*:6789

2. In the Storage section of the Sun Java Web Console page, select Sun StorageTek Common Array Manager.

   The navigation pane and the Storage System Summary page appear.

3. Select an array under Storage Systems.

4. At the top right of the Storage System Summary page, click Service Advisor.

   The Service Advisor application is displayed in a separate window.

5. In the left pane, select the type of hardware replacement procedure you want to perform:
   - CRU/FRU Removal/Replacement Procedures
   - X-Options
   - Array Troubleshooting Procedures
   - Service Only

Note – Service-only procedures are password protected for access by Sun service personnel only. Contact a Sun service representative for further information and assistance with service only procedures.

---

6. To view a procedure, in the right pane either select it or expand its category, and select the hardware component that corresponds to the procedure.

Basic Service Procedures

This section describes procedures common to most Sun Storage J4200/J4400 Array service procedures:

- "Taking ElectroStatic Discharge (ESD) Precautions" on page 85
- "Reserving the Array for Maintenance" on page 85
- "Releasing the Array After Maintenance" on page 86

Service procedures for the Sun Storage J4200/J4400 Array should be performed using the Service Advisor guided function available from the CAM software.

Taking ElectroStatic Discharge (ESD) Precautions

Follow these steps to prevent damaging any CRU during the removal and replacement process:

- Remove all plastic, vinyl, and foam material from the work area.
- Before handling any CRU, discharge any static electricity by touching a grounded surface.
- Wear an anti-static wrist strap at all times when handling any CRU.
- Do not remove a CRU from its anti-static protective bag until you are ready to install it.
- After removing a CRU from the cabinet, immediately place it in an anti-static bag or anti-static packaging.
- Handle any card CRU only by its edges and avoid touching the components or circuitry.
- Do not slide a CRU over any surface.
- Limit body movement (which builds up static electricity) during the removal and replacement of a CRU.

Reserving the Array for Maintenance

1. **From Service Advisor, click the link to reserve the array for maintenance.**
2. **Enter a description of the service action.**
3. **Select the estimated duration of the service action in hours from the pull-down.**

4. **Select the Reserve button.**

   Other users will be alerted that this service action is in progress when they log in.

5. **Use the back arrow to return to the procedure.**

Releasing the Array After Maintenance

1. **From Service Advisor, disable the reserve array function by selecting the Release button.**

Troubleshooting

Consider these scenarios while troubleshooting your J4200/J4400 Array:

- Problem Viewing the Number of Disks
- LED Problems
- Disk Swapping

If you are unable to resolve your issues, you can browse the online Sun Solve repository to view additional suggestions:

http://sunsolve.sun.com/

Additionally, you can refer to "Contacting Sun Technical Support" on page 87.

Problem Viewing the Number of Disks

The number of disks present is not shown in the Device Management screen.

Action

Verify that the J4200/J4400 array is turned on, the cables are properly connected, and the CAM software is installed.

Also, to view the number of disks being managed, the host system and the J4200/J4400 must be powered on separately prior to establishing connections with the SAS cable.

LED Problems

The ID/Status LED on the J4200/J4400 front panel is Amber.

Action

Check to see if there are any malfunctioning components.

The SAS Link Status LED on the SIM board of the JB4200 is amber.

Action

Make sure the SIM board is not disconnected from the SAS cable.

Disk Swapping

When swapping out disks from a J4200/J4400 Array, always replace a removed disk back into the same slot it had been in prior to the fault. Failure to do this could result in lost or corrupted data.

Contacting Sun Technical Support

If you are unable to resolve your problem, go to:

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

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

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.

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 available physical capacity, whether of a disk, a tray of disks, or an interconnected environment with several trays of disks.

CLI

The command-line interface used to manage and monitor the software and hardware.

control path

The route used for communication of system management information, in the case of the J4200/J4400 Array, this is the in-band connection.

customer-replaceable unit (CRU)

An assembly component that is designed to be replaced on site by a customer, without the array having to be returned to the manufacturer for repair; for example, a SIM board, a power supply, a fan, a rail.

CRU

See customer-replaceable unit (CRU).

D

data host

Any host that uses the array for storage. A data host is connected directly to the device. 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.

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.

H

HBA

See host bus adapter (HBA).

host

As a function of the Sun Storage J4200/J4400 Array configuration, a data host connected to the device using an HBA.

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.

I

in-band management

Software management traffic that uses the data path between a host and a storage device.

IOPS

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

L

LAN

Local area network.

M

management host

A host serving the management and monitoring software for the Sun Storage J4200/J4400 Array. The software can be controlled from a standalone Java graphical user interface (GUI) or a command-line interface (CLI) client.

multipathing

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

N

O

P

power supply

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

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.

S

SAS Interface Module (SIM)

See SIM.

SIM

SAS Interface Module (SIM).

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 tray

An enclosure containing disks.

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).

tray

See storage tray.

U

V

W

Index

B

book
- before you read, xiii
- related documentation, xiv
- submitting comments to Sun, xv

C

cabinet, 1, 29

comments
- submitting to Sun, xv

contacting technical support, xv, 87

CRUs
- customer-replaceable units, 24

customer-replaceable units
- CRUs, 24

D

disk drives, 6

documentation
- accessing from Sun, xv
- related, xiv

E

end caps
- alarm silence button, 6
- system identifier switch, 6

F

fan LEDs, 23, 43

fans
- Fan 0, 11
- Fan 1, 11
- LEDs, 11

H

HBA required for multipathing, 51

L

LEDs
- back, 14, 35
- front, 6
- tray front, 8

M

management software, 24

multipathing, 49

P

power supplies, 11, 12
- power supply 0, 11, 12
- power supply 1, 11, 12

power supply LEDs, 19, 21, 40, 42

product overview
- software
  - management software, 24
  - remote CLI client, 25

R

rear-access components, 11, 12

related documentation, xiv

remote CLI client, 25

S

SAS Interface Module

SIM, 1, 11, 12
serial port, 11, 12
SIM
SAS Interface Module, 1, 11, 12, 93
SIM boards, 1, 11, 12
software overview
management software, 24
remote CLI client, 25

T

technical support
contacting, xv, 87
third party web sites, xv

W

web sites
third-party, xv