



Sun StorEdge™ 6320 System 1.2 Reference and Service Guide

Sun Microsystems, Inc.
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Preface

The *Sun StorEdge 6320 System 1.2 Reference and Service Manual* provides a product overview, discusses all components, describes the utilities available for performing administrative tasks on the systems, and explains how to repair and replace the components.

This guide is written for Sun™ support and Sun-trained personnel who are already familiar with Sun's hardware and software products.

How This Book Is Organized

This book contains the following chapters and appendix:

Chapter 1 “Introduction to the Sun StorEdge 6320 System” introduces the Sun StorEdge™ 6320 system and gives an overview of the components in the Sun StorEdge 6320 system. This chapter discusses all the hardware and software that make up the storage systems. The chapter also presents information about the default Sun StorEdge 6320 system. The information includes the Sun StorEdge 6320 system layout, all settings for the Sun StorEdge 6020 arrays, Sun StorEdge network Fibre Channel (FC) switches, and Ethernet addresses.

Chapter 2 “Managing the System” gives instructions for using the Sun StorEdge Configuration Service web interface software to complete configuration tasks for the Sun StorEdge 6320 system.

Chapter 3 “Fault Detection and Isolation Overview” contains a brief overview of the functionality provided by the Storage Automated Diagnostic Environment software that performs fault detection and isolation on Sun StorEdge 6320 systems.

Chapter 4 describes the steps required to service the field-replaceable units (FRUs) in the system. It then presents general instructions about the placement of FRUs and how to install and remove FRUs from the system and the Sun StorEdge Expansion

Cabinets. The chapter then provides instructions for removing and replacing the Ethernet hub, the Sun StorEdge network FC switch-16 switches, and the Sun StorEdge 6020 arrays

Appendix A “Managing the System Using the CLI” provides procedures to complete configuration tasks using the Configuration Service Command Line Interface.

Appendix B “Sun StorEdge 6320 Cable Labels” has a set of tables that list the cable labels for the Sun StorEdge 6320 system.

Appendix C “Adding Host Ports to the System” documents adding ports to the system.

Appendix D “Running Controller SAT Diagnostics” describes running Controller SAT, a ROM-based diagnostic tool.

Using UNIX Commands

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

See one or more of the following for this information:

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

Typographic Conventions

TABLE P-1

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

¹ The settings on your browser might differ from these settings.

Shell Prompts

TABLE P-2

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

Related Documentation

The following is a list of documents related to the Sun StorEdge 6320 system. For any document number with an *nn* suffix, use the most current release of the document.

TABLE P-3

Product	Title	Part Number
Late-breaking news	<ul style="list-style-type: none">• <i>Sun StorEdge 6320 System 1.2 Release Notes</i>	816-7880- <i>nn</i>
Sun StorEdge 6320 system information	<ul style="list-style-type: none">• <i>Sun StorEdge 6320 System 1.2 Installation Guide</i>	816-7878- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6320 System 1.2 Regulatory and Safety Compliance Manual</i>	816-7876- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6320 System 1.2 Site Preparation Guide</i>	816-7877- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6000 Family Host Installation Software Guide</i>	817-1739- <i>nn</i>
Sun StorEdge 6020 array information	<ul style="list-style-type: none">• <i>Sun StorEdge 6120 Arrays Start Here Guide</i>	817-0198- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6120 Arrays Site Preparation Guide</i>	817-0960- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6120 Arrays Regulatory and Safety Compliance Manual</i>	817-0961- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6120 Arrays Installation Guide</i>	816-0199- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6020 and 6120 Arrays System Manual</i>	817-0200- <i>nn</i>
	<ul style="list-style-type: none">• <i>Sun StorEdge 6120 Array Release Notes</i>	817-0201- <i>nn</i>
Diagnostics	<ul style="list-style-type: none">• <i>Storage Automated Diagnostic Environment 2.2 User's Guide -- Device Edition</i>	817-0822- <i>nn</i>
	<ul style="list-style-type: none">• <i>Storage Automated Diagnostic Environment 2.2 Device Edition Release Notes</i>	817-0823- <i>nn</i>

TABLE P-3

Product	Title	Part Number
Sun StorEdge network FC switch-16 switch	• <i>Sun StorEdge SAN Foundation 2 Gbit FC Switch-8 and Switch-16 Guide to Documentation</i>	817-0061- <i>nn</i>
	• <i>Sun StorEdge SAN Foundation Release Notes</i>	817-0071- <i>nn</i>
	• <i>Sun StorEdge SAN Foundation Installation Guide</i>	817-0056- <i>nn</i>
	• <i>Sun StorEdge SAN Foundation Configuration Guide</i>	817-0057- <i>nn</i>
	• <i>Sun StorEdge SAN 4.0 Release Notes</i>	816-4472- <i>nn</i>
	• <i>Sun StorEdge SAN 4.0 Release Guide to Documentation</i>	816-4470- <i>nn</i>
	• <i>Sun StorEdge SAN 4.0 Release Installation Guide</i>	816-4469- <i>nn</i>
	• <i>Sun StorEdge SAN 4.0 Release Configuration Guide</i>	816-0830- <i>nn</i>
	• <i>Sun STorEdge SAN Foundation 4.2 Release Notes</i>	817-1246- <i>nn</i>
	• <i>SANbox2-16 Switch Management User's Manual</i>	
	• <i>SANbox2-16 Installer's/User's Manual</i>	
Expansion cabinet	• <i>Sun StorEdge Expansion Cabinet Installation and Service Manual</i>	805-3067- <i>nn</i>
Storage Server Processor	• <i>Sun V100 Server User's Guide</i>	806-5980- <i>nn</i>

Accessing Sun Documentation

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

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

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

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

Sun StorEdge 6320 System 1.2 Reference and Service manual, part number 816-7879-11

Introduction to the Sun StorEdge 6320 System

The Sun StorEdge 6320 system offers a complete storage solution with a modular architecture and integrated system-wide manageability.

This chapter is organized as follows:

- “Sun StorEdge 6320 System Features” on page 1-1
- “System Architecture” on page 1-11
- “System-Level Support Information” on page 1-12
- “Hardware Descriptions” on page 1-12
- “Software Descriptions” on page 1-16
- “Default System Configurations and Settings” on page 1-22
- “Remote Service Options” on page 1-31

1.1 Sun StorEdge 6320 System Features

The following are features available on the Sun StorEdge 6320 system:

- **Installation** – The Sun StorEdge 6320 system requires minimal setup. The Sun StorEdge 6020 array units are preconfigured at the factory, eliminating the need to create storage pools. You can create volumes as required within allowed limits.
- **RAID Striped Data with Standby Hot Spare** – Internal Sun StorEdge 6020 arrays are preconfigured with RAID 5 storage pools at the factory. Each Sun StorEdge 6020 array is preconfigured with one RAID 5 storage pool and one hot spare. The hot spare is located in slot 14. You can change to RAID 1 or RAID 0.

- **Volume Access Control** – The Sun StorEdge 6320 systems provides support for volume access control. Support for initiator groups and volume groups are provided. The Sun StorEdge 6020 arrays support a maximum of 64 volumes per storage array and provide support for initiator groups. The Sun StorEdge 6020 can be used to set volume access control properties for a group of host initiators.
- **Bandwidth** – The system uses Fibre Channel technology to provide the optimum bandwidth. The integrated front-end switches are 2 Gbit/second transfers that provide for 2 Gbit host connectivity.

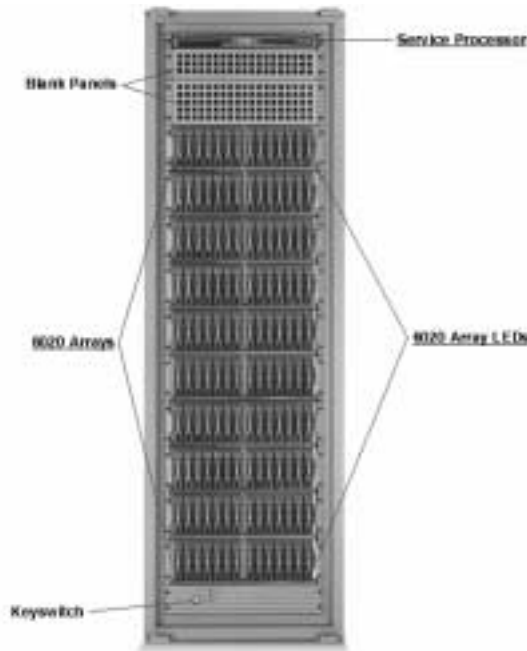


FIGURE 1-1 The Sun StorEdge 6320 System - Front View

- **Capacity** – The Sun StorEdge 6320 system supports 36.4-Gbyte, 73.4-Gbyte, and 146.8- Gbyte disk drives in the Sun StorEdge 6020 arrays. The supported capacity for the Sun StorEdge 6320 system is a minimum of 504 Gbytes and a maximum of 45 Tbytes. Mixed drive sizes are supported.

Note – If mixed drive sizes are used within a storage pool, the lowest drive size dictates the usable storage of each drive within that volume. For instance, if a volume of seven disks has six 146 Gbyte disks and one 36 Gbyte disk, all disks will be viewed as 36 Gbyte disks.

- **System Redundancy** – The systems provide full data path redundancy with no data path component as a single point of failure, offering 24x7 data availability. Redundant components include the Fibre Channel switches (if used), Sun StorEdge 6020 array, and dual power sequencers.

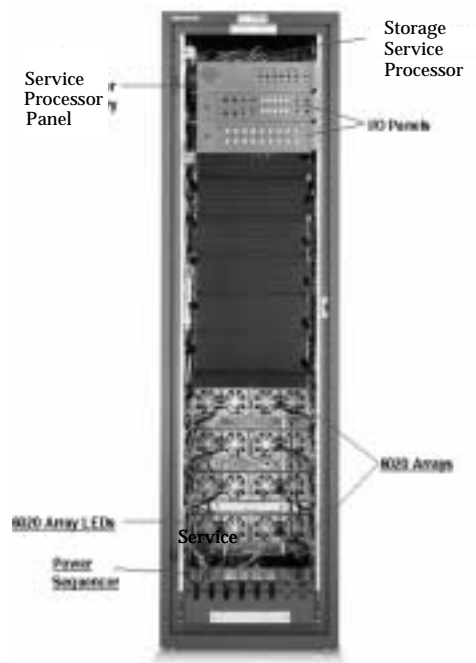


FIGURE 1-2 The Sun StorEdge 6320 System - Rear View

- **Host Managed Multipathing** – The system provides at least two full speed physical I/O paths to each host. The Sun StorEdge 6020 arrays provide two 2-Gbit physical I/O paths. Host software is required to manage the I/O multipathing and load balancing across these I/O paths. Supported software includes Sun StorEdge Traffic Manager software and VERITAS Dynamic Multipathing (DMP).

- **Host Support** – The Sun StorEdge 6320 system supports the following minimal level operating systems. Refer to the latest version of the *Sun StorEdge 6320 System Release Notes* for the latest support information.
 - Solaris 8, Solaris 9, and later releases
 - Microsoft Windows NT Enterprise Edition 4.0, Service Pack 6
 - Microsoft Windows 2000 Server and Windows 2000 Advanced Server, Service Pack 2
 - Hewlett Packard HP-UX 11.i and HP-UX 11
 - IBM AIX 4.3.3 (32-bit), AIX 5.1 (32-bit and 64-bit)
 - RED HAT Linux 7.2
- **Software Support** – The Sun StorEdge 6320 system supports several software packages including the following:
 - Sun StorEdge Remote Response service software (to support optional service)
 - Remote power management
 - Storage Automated Diagnostic Environment
 - SANbox2 Manager
 - Sun StorEdge SAN Foundation software release support
- **Multiple Host Support** – Each Sun StorEdge 6020 array HA configuration supports up to 16 hosts. This enables the Sun StorEdge 6320 system to allow up to 176 hosts with Fibre Channel SAN zoning (this assumes the 2x2 configurations are used within the system). With integrated Fibre Channel switches, the Sun StorEdge 6320 systems can provide for direct connectivity of five partner groups of hosts connections. Additional host connections can be achieved using external switches.
- **Local or Remote Serviceability** – The Sun StorEdge 6320 system includes a Storage Service Processor. Support for the Sun StorEdge Remote Response service software is built into the Storage Service Processor. All configurations are Sun StorEdge Remote Response service ready. Local serviceability and management is provided by IP Ethernet connectivity to the Storage Service Processor.
- **Hot-Swappable FRUs** – The Sun StorEdge 6320 systems use hot-swappable field-replaceable units (FRUs). The FRUs include power supplies and cooling units (PCU), batteries, disk drives, loop cards, RAID controllers FC switches, and Ethernet hub. Not all FRUs can be replaced by customers. The Storage Service Processor, Storage Service Processor accessory tray, and the service panel must be replaced by Sun service personnel. The FC switches, Storage Service Processor, and Ethernet hub can be replaced without rebooting the Sun StorEdge 6020 arrays.
- **Switched and Switchless Configurations** – The Sun StorEdge 6320 systems provide both a switched and switchless configuration. The internal switched configuration is delivered with Sun StorEdge Network FC Switch-16 switches. An external switch configuration can use external switches, supplied by either Sun or

the customer. With a switchless configuration you can directly connect to a data host without the use of a switch.

Neither the internal or external switches are connected to the system's internal LAN. Instead, these switches connect to an outside Ethernet connection.

- **Host Connect Support** – The Sun StorEdge 6320 system provides native Fabric (F-port) host connectivity. Integrated switches also provide for larger host connectivity.
- **Remote Lights-Out Power Management** – The Sun StorEdge 6320 system supports remote lights-out power management. Power sequencers and a universal serial bus relay are used to control the power sequencing. This enables users to remotely shut down the components in the system to save power. The power down shuts down most of the components in the subsystem. Only the Storage Service Processor and minimal other components are kept running to enable a subsequent remote power on operation. Power can be restored remotely at any time. The remote lights-out power management interface also provides capability to completely shut down the power to all the components. If power is completely shut down, it cannot be restored remotely.
- **Online Firmware Upgrades** – The Sun StorEdge 6320 system supports online firmware upgrade of most components. There is 100 percent data availability during the online firmware upgrade operation. Online upgrade is not supported on the firmware of the individual disks.
- **Depopulated Drive Support** – The Sun StorEdge 6320 system supports having depopulated drive trays in the Sun StorEdge 6020 trays. Each drive tray can contain 7 to 14 drives. Slots without drives must have dummy drives inserted in them.
- **Storage Array Configurations** – The Sun StorEdge 6320 system supports attaching controller-less Sun StorEdge 6020 arrays to existing Sun StorEdge 6020 arrays that have controllers. These controller-less trays are referred to as *expansion units*. The naming convention used in configuration is “*controller x trays*” (controller by trays). A 2x2 configuration means there are two controllers and two trays. A 2x4 configuration means there are two controllers and four trays. The Sun StorEdge 6320 system supports the following configurations:
 - Sun StorEdge 6020 HA array with 2x2
 - Sun StorEdge 6020 HA array with 2x4
 - Sun StorEdge 6020 HA array with 2x6
- **Other Support and Features** – Other support and features include:
 - Network Time Protocol (NTP)
 - Simple Network Management Protocol (SNMP)
 - Array-based Common Information Model (CIM) support
 - Sun Indicator Standard support (LED improvement on the enclosure)
 - Dynamic Host Configuration Protocol (DHCP)

- Integration with the Sun StorEdge Enterprise Storage Manager software
- A maximum of 10 Sun StorEdge 6020 arrays (trays) in the base Sun StorEdge Expansion Cabinet
- A maximum of 22 Sun StorEdge 6020 arrays using the base cabinet and a second Sun StorEdge Expansion Cabinet
- Installation, configuration, and support services (optionally available)
- Logical unit number (LUN) security access for the storage consolidation models
- Cluster and simultaneous independent host attach support
- **Reliability, availability, and serviceability (RAS) features** – The Sun StorEdge 6320 systems provide you with the reliability, availability, and serviceability (RAS) features shown in TABLE 1-1:

TABLE 1-1 RAS Features

Benefits	RAS Features
Serviceability	<ul style="list-style-type: none"> • Sun Indicator Support (SIS) on enclosure chassis LED (Locator/Fault LED) • Sun Standard compliant field-replaceable unit identification (FRU ID) support • Security in the Storage Service Processor to isolate customer LAN
Firmware reliability and failure analysis techniques	<ul style="list-style-type: none"> • Automatic firmware crash dump in exception scenarios • Internal management and diagnostics commands • Real time checkers (RTC) used to reduce panics in firmware • Improved firmware robustness

TABLE 1-1 RAS Features *(Continued)*

Benefits	RAS Features
Reliability	<ul style="list-style-type: none">• Easier insertion and extraction and better locking mechanisms for disks and other FRUs• Blind mate connectors to avoid bent pins on FRU insertion
Availability	<ul style="list-style-type: none">• Enhanced temperature monitoring to shut down the system only when temperature thresholds are exceeded• Automated power and cooling unit (PCU) adjusts fan speed based on the temperature monitoring• Improved battery recharge control to avoid missing battery recharge if a Sun StorEdge 6020 array is shut down during battery recharge cycles• Automated and online firmware upgrade and downgrades• Hardware integrated device electronics (IDE) interface to introduce cache saving procedures without adding battery cost as higher density enclosures are developed
Fault detection, fault isolation, and failure fencing	<ul style="list-style-type: none">• Support for parity on RISC RAM hardware• Loop card with standard SSC100 management processor and VSC055 serial backplane controller provides better enclosure management• Faster and modular loop card serial communication protocol• Failure fencing (fault containment) in case of hardware failures• Automatic hardware bypass of the faulty drive should a drive cause loop disruptions• Hardware support that creates a diagnostics loop of disks for performing background tests• Temperature sensors for continuous threshold-based temperature monitoring. The temperature sensors are located close to heat spots to provide accurate temperature measurements• Fibre Channel ECHO ELS support, which allows for both external echo tests (invoked from the Sun StorEdge 6020 array) and passive echo tests (invoked from the Fibre Channel switch)• External and internal loopback test support to test front-end controller and back-end Fibre Channel ports• Fibre Channel link status counters for threshold-based analysis of link error statistics

1.1.1 Sun StorEdge 6320 System with Internal Switches

The Sun StorEdge 6320 system has the most capabilities when configured with two internal switches. With the internal switches, the system can take best advantage of the it's management software and can support up to 10 Sun StorEdge 6020 trays in the first cabinet. By adding a second Sun StorEdge Expansion Cabinet, the Sun StorEdge 6320 system supports up to 12 additional Sun StorEdge 6020 trays (a total

of 22 trays). FIGURE 1-3 illustrates a representation of the Sun StorEdge 6320 system connections. For a cabinet representation of the Sun StorEdge 6320 system, see FIGURE 1-5.

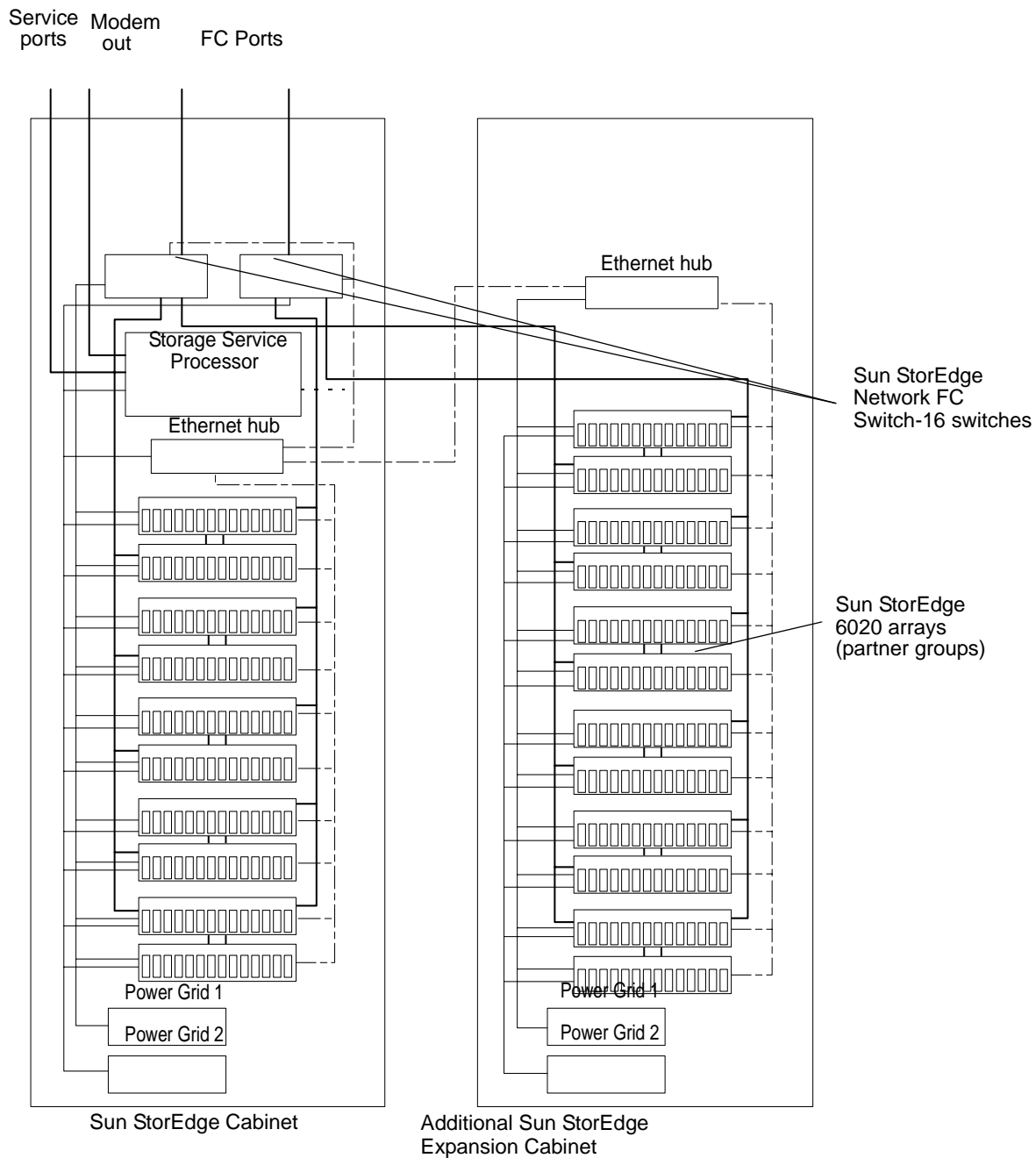


FIGURE 1-3 Sun StorEdge 6320 System

1.1.2 Sun StorEdge 6320 Switchless Systems

The Sun StorEdge 6320 systems can be configured without switches. The Sun StorEdge 6320 switchless configuration system can be directly attached to your host. Sun provides the following cables and cards for switchless configurations:

- Prime input power cords (two each) for mounting a pair of third-party switches in the front end of a Sun StorEdge 6320 system cabinet.
- For the Sun StorEdge 6320 system, Sun provides FC cable connectivity for up to 22 Sun StorEdge 6020 trays.

1.1.3 Sun StorEdge 6320 System with External Switches

The Sun StorEdge 6320 systems can be configured an external switches.

Note – The Sun-supplied and customer-supplied switches that are installed in a Sun StorEdge 6320 system cannot be connected to the internal local area network (LAN) of the system. All Fibre Channel switches must be managed from an outside Ethernet connection.

Supported Brocade and McData switches can be used with the Sun StorEdge SAN Foundation software.

Note – The switches in the SAN must be homogeneous (all Sun, all Brocade, or all McData).

With Sun StorEdge 6320 switchless systems, you are responsible for providing:

- All host FC cable connections
- An Ethernet cable connection between any third-party switches (if applicable) and a storage area network (SAN) maintenance console. The connection is used to monitor and perform diagnostic reporting.

Neither customer-supplied switches or the Sun-installed external switches are monitored or diagnosable by the internal Storage Service Processor in the Sun StorEdge 6320 systems.

1.2 System Architecture

The basic architecture of the Sun StorEdge 6320 system SAN configuration is shown in FIGURE 1-4. Note that the Fibre Channel switches are optional. If the switches are not present, the Sun StorEdge 6020 arrays connect directly to the SAN.

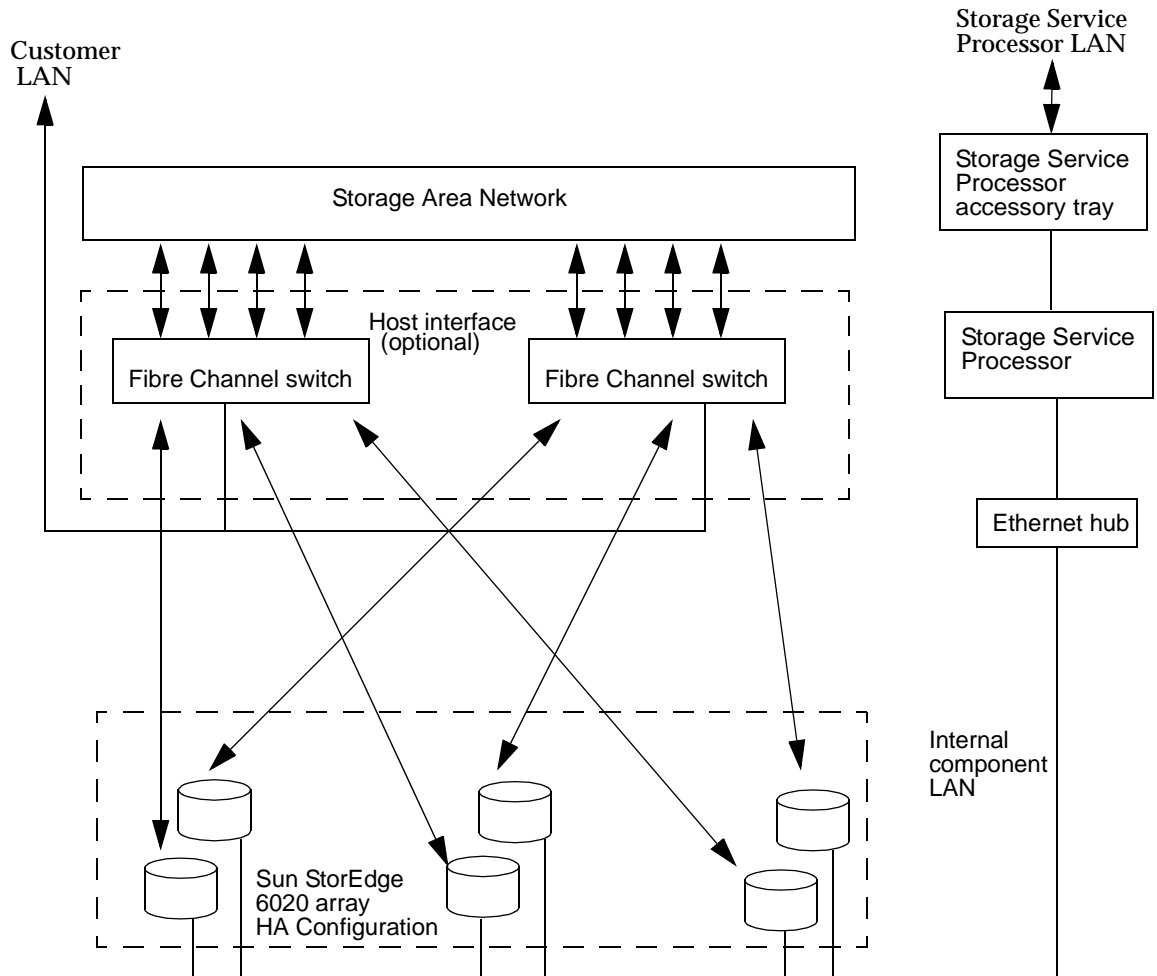


FIGURE 1-4 Basic Sun StorEdge 6320 System Architecture

1.3 System-Level Support Information

TABLE 1-2 shows Sun StorEdge 6320 system information.

TABLE 1-2 Sun StorEdge 6320 System-Level Configurations

System	Sun StorEdge 6320 system
Bandwidth ¹	4400 Mbytes/sec maximum
Capacity ²	504 Gbytes to 45 Tbytes
Maximum Host Connectivity ³	5 (with integrated switches) 88 (with external switches)
Maximum LUNs	704 (64 per Sun StorEdge 6020 array)
LUN Masking	Yes

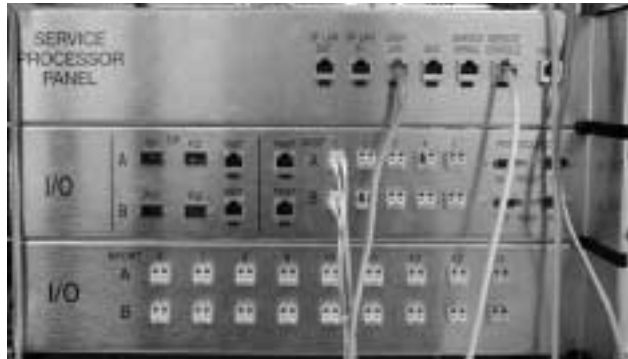
1 - Bandwidth is defined as the theoretical maximum using full-duplex Fibre Channel connections.
2 - Minimum capacity is calculated using 36-Gbyte drives, and maximum capacity is calculated using 146.8-Gbyte drives. The available data capacity using default configurations are slightly lower due to capacity used for parity and hot spares. The minimum size is 10 Mbyte for all LUNs. The maximum size is 2 Tbytes for all LUNs.
3 - All host connections are redundant partner groups.

1.4 Hardware Descriptions

The hardware building blocks for the Sun StorEdge 6320 system include:

- Service Processor Panel
- Storage Service Processor
- Customer management connection
- Storage devices
- Ethernet hub
- FC switches
- Storage Service Processor accessory tray
- Sun StorEdge expansion cabinet

1.4.1 Service Processor Panel



The Service Processor Panel simplifies the cabling to the system. You can connect your cables to these accessible panel connections rather than to individual components of the system.

1.4.2 Storage Service Processor

The Storage Service Processor is a Sun Fire™ V100 server. The Sun Fire server provides a 550-MHz, 64-bit UltraSPARC® IIe processor, 512 Gbytes of memory, a 40 Gbyte IDE internal drive, a CD-ROM drive, and a universal serial bus (USB) flash disk to save the Storage Service Processor personality data.

The hot-swappable USB flash disk provides 16 Mbyte of removable storage. The USB flash disk enables you to restore the Storage Service Processor personality files (for example, `/etc/ethers`). The data can be restored in the event of a Storage Service Processor failure.

Every Storage Service Processor is configured with the same hardware and software components to ensure ease of replacement. All Storage Service Processors have built in hardware and software support for the Sun StorEdge Remote Response service utility.

The Storage Service Processor supports health monitoring and fault mitigation independent of the customer's server. There is no data path connectivity, thus the unit is not a mission-critical component.

Customers use a web interface or a command-line interface to perform functions on the Storage Service Processor.

1.4.3 Customer Management Connection

The customer management connection is a dedicated Ethernet connection that connects to the designated Storage Service Processor. Each Storage Service Processor serves as the master for collecting data from its Sun StorEdge 6320 system. This connection is also referred to as the customer LAN. If more than one Sun StorEdge 6320 system is connected to the customer management connection, alert traffic will be passed across the LAN. The traffic consists of monitoring data that reflects the overall health as well as specific alerts that may occur within the Sun StorEdge 6320 system.

1.4.4 Storage Devices

The Sun StorEdge 6020 arrays provide backend data storage inside the Sun StorEdge 6320 system. Each Sun StorEdge 6020 array supports 36 Gbyte, 73 Gbyte, or 146 Gbyte disk drives.

In factory-configured systems, the Sun StorEdge 6020 arrays are configured with one storage pools per Sun StorEdge 6020 tray. Each tray contains a full-capacity RAID 5 (6 or 13 disks) storage pool with a segment size of 16 Kbytes and is configured with one standby hot spare.

Utilities are provided on the Storage Service Processor that enable users to reconfigure the Sun StorEdge 6020 arrays to meet workload performance requirements.

The following features are available on a Sun StorEdge 6320 system:

- Volume support – You can create up to 64 volumes (also called LUNs) from a storage pool per storage array.
- LUN access control – This restricts host HBA access to the volumes.

The RAID levels supported on the Sun StorEdge 6320 system configurations are:

- RAID 0 – A volume that arranges data across one or more components. Striping alternates equally-sized segments of data across two or more components, forming one logical storage unit. These segments are interleaved round-robin, so that the combined space is made alternately from each component, in effect, shuffled like a deck of cards. Striping enables multiple controllers to access data at the same time, which is also called parallel access. Parallel access can increase I/O throughput because all disks in the volume are busy most of the time servicing I/O requests.
- RAID 1 – This version of RAID 1 is considered to be RAID 1+0. Each data block in a RAID 1 volume is mirrored on two physical drives. If one of the mirrored pair fails, the data from the other drive is used. Because the data is mirrored in a RAID

1 configuration, the volume has only half the capacity of the assigned drives. For example, if you create a 4-drive RAID 1 volume with 36 Gbyte drives, the resulting data capacity is $4 \times 36 / 2 = 72$ Gbytes.

- RAID 5 – In a RAID 5 configuration, data is striped across the drives in the volumes in segments, with parity information being striped across the drives, as well. Because of this parity, if a single drive fails, data can be recovered from the remaining drives. Two drive failures in the same storage pool cause all data to be lost. A RAID 5 volume has the data capacity of all the drives in the logical unit, less one. For example, a five-drive RAID 5 volume with 73 Gbyte drives has a capacity of $(5 - 1) \times 73 = 292$ Gbytes.

1.4.5 Ethernet Hub

The Sun StorEdge 6320 system uses an Ethernet hub as the backbone for the internal service network. The allocation of Ethernet ports is as follows:

- One for the Storage Service Processor (per system)
- Two for each Sun StorEdge 6020 array partner group
- One for the Ethernet hub that is installed in the second Sun StorEdge Expansion Cabinet in the Sun StorEdge 6320 or 6320 switchless systems (if the second cabinet is used)

1.4.6 Fibre Channel Switches

The Sun StorEdge network 2 Gbit Fibre Channel switch-16 switch provides cable consolidation and increased connectivity. The Sun StorEdge network FC switch-16 switches are used for the internal data interconnection infrastructure.

The switches are paired to provide data path redundancy. Two switches are used in each Sun StorEdge 6320 system.

These switches can be monitored through the SANbox2 Manager GUI.

These switches are configured using the Sun StorEdge Configuration Service software, which is installed on the customer's host. These are discussed in "Sun StorEdge Configuration Service Software" on page 1-18 and "Managing the System" on page 2-1.

The Sun StorEdge 6320 switchless system will not have switches present.

1.4.7 Storage Service Processor Accessory Tray

The Storage Service Processor accessory tray is an enclosure that contains all the components necessary to support the Sun StorEdge Remote Response service software. This enclosure simplifies serviceability, as the entire unit is an FRU.

The Storage Service Processor accessory tray contains the following:

- Serial Network Terminal Concentrator (NTC) used for remote serviceability support
- Ethernet router/firewall used to provide additional security to Sun from the customer management LAN
- Personal Computer Memory Card International Association (PCMCIA) compatible modem
- A single AC power supply used by all components in the tray

1.4.8 Sun StorEdge Expansion Cabinet

The Sun StorEdge 6320 system is packaged in the Sun StorEdge Expansion Cabinet, which is also used for several other Sun products. The customer-accessible areas of the system are clearly labeled. Service-accessible areas of the system are clearly labeled as such. All physical configurations will be completed by Sun-trained personnel. Customers not trained for service by Sun will have significantly limited access to the physical layout of the system.

1.5 Software Descriptions

The software included with the Sun StorEdge 6320 system is:

- Solaris 9 operating environment
- Sun StorEdge Configuration Service software:
 - web interface
 - command line interface (CLI) - `sscs(1M)`

Additionally, the Sun StorEdge 6320 systems support several software packages, including the following:

- Sun StorEdge Remote Response service software (to support optional service)
- Remote power management
- Storage Automated Diagnostic Environment (system edition)

- SANbox2 Manager
- Sun StorEdge SAN Foundation software release support

Note – The above software packaged with the Sun StorEdge 6320 system is not meant for use on the data host servers.

1.5.1 Solaris 9 Operating System

A customized version of the Solaris 9 operating system is installed on the Storage Service Processor.

1.5.2 Sun StorEdge Remote Response Software

The Sun StorEdge Remote Response service software is included on all Sun StorEdge 6320 systems. Sun StorEdge Remote Response service software provides “phone home” capability and dial-back access by Sun. This enables Sun storage experts to remotely troubleshoot, diagnose, and service the Sun StorEdge 6320 system.

The features of Sun StorEdge Remote Response service include:

- Early fault detection
- Fast response and reaction to alerts and alarms
- Remote troubleshooting, diagnosis, and repair
- Increased system availability
- Reduced cost of ownership

1.5.3 Remote Power Management

The Sun StorEdge 6320 system is equipped with the hardware and software necessary to support a remote power on. When enabled, a system administrator can turn the power sequencer on and off either locally or remotely using the Sun StorEdge 6320 system’s Sun StorEdge Configuration Service software.

The default mode for the Sun StorEdge 6320 system control management is for all Sun StorEdge 6320 system configurations to have the remote power on software disabled.

To use the remote power off mode, you must configure the cabinets for this operation. Once configured, the Storage Service Processor detects the presence of the relay board and enables two additional functions in the rack control management software. The modes are:

- Local power on (powering on the Sun StorEdge 6320 system at the system)
- Remote power on (powering on the system either locally or remotely)

These modes are used to logically shut down the Sun StorEdge 6020 arrays and instruct the power sequencers to remove power from those components.

The configuration information for the lights-out setup is in the *Sun StorEdge 6320 Installation Guide*.

Note – During these modes, the Storage Service Processor and the Storage Service Processor accessory tray remain powered and active to provide control over the power relay board.

Note – Do not use the remote power-off mode when moving the cabinets to a different location. You must use the complete power-down procedure before moving the cabinets.

1.5.4 Sun StorEdge Configuration Service Software

The Sun StorEdge Configuration Service software enables you to configure and manage the Sun StorEdge 6320 systems. The software is available for use through a web-browser interface and the command-line interface (CLI) `sscs(1M)`.

The CLI provides a remote client command-line interface that enables you to invoke `sscs` commands to administer the Sun StorEdge 6320 system. This interface is not a `telnet(1)` session.

All software features are available through the web interface and CLI; you can use either interface to manage volumes, storage pools, volume groups, initiator groups, storage trays, and the Storage Service Processor.

1.5.5 Storage Automated Diagnostic Environment

The Storage Automated Diagnostic Environment is a distributed online health and diagnostic monitoring tool. A special host version is customized to use with the Sun StorEdge 6320 system. It can be configured to monitor on a 24-hour basis, collecting information that enhances the reliability, availability, and serviceability (RAS) of the storage devices.

The Storage Automated Diagnostic Environment offers the following features:

- A web-based user interface for device monitoring and diagnostics
- Distributed test invocation by means of lists or topology. You can run the tests through the Storage Automated Diagnostic Environment GUI or through the command-line interface (CLI).
- Topology grouping for multi-level hosts and components
- Revision updates
- Support for the Storage Service Processor and components of Sun StorEdge 6320 system
- Remote notification through Sun StorEdge Remote Response
- Role-based access
- Service utilities
- Encryption through a Secure Socket Layer (SSL) protocol to protect transmitted information.

1.5.5.1 Diagnostic Functionality

Diagnostic tests have been integrated into the Storage Automated Diagnostic Environment for device diagnostics and FRU isolation. Each test can be run individually from the command line or from the Storage Automated Diagnostic Environment user interface.

The Storage Automated Diagnostic Environment Diagnostic tests are described in the *Storage Automated Diagnostics Environment 2.2 System Edition User's Guide*.

1.5.6 SANbox2 Manager

The SANbox2 Manager software is supported on the Sun StorEdge 6320 systems.

SANbox2 Manager is a GUI consisting of menus, buttons, and pages (screen windows) that you can use to easily manage switches from a server running supported Solaris, Linux, or Windows operating systems. Using SANbox2 Manager, you can view and change network, switch, and port configuration for one or more Fabrics concurrently.

SANbox2 Manager displays the most current Fabric information. When a Fabric changes, the new Fabric information is sent to the workstation and is reflected in the SANbox2 Manager window.

SANbox2 Manager enables you to perform the following procedures:

- Display multiple fabrics
- Associate the switch management interface with its IP network configuration parameters
- View the FC connection
- View hardware and firmware version information for the selected chassis
- View switch names and worldwide names (WWNs)
- View port addresses on the selected chassis

The SANbox2 Manager Help menu contains information about the product and a complete online help guide.

1.5.7 Sun StorEdge SAN Foundation Software Release Support

The Sun StorEdge SAN Foundation software (version 4.2 or later) is supported for the Sun StorEdge 6320 systems for use with data hosts using the Solaris operating systems. (Sun StorEdge Traffic Manager can be used with data hosts running other operating systems.) The Sun StorEdge SAN Foundation release is Sun's latest full Fabric, open heterogeneous SAN featuring support for the following:

- Sun 2 Gbit HBAs and switches
- Sun StorEdge 6020 array
- Brocade SilkWorm 16-port 2 Gbit 3800 FC switch, SilkWorm 64-port, 2 Gbit 12000 Fibre Channel Core Fabric Switch, and McData Intrepid 6064 Director
- Storage Automated Diagnostic Environment
- Sun StorEdge Diagnostic Expert software
- Sun StorEdge Enterprise Storage Manager 1.2 software
- Sun StorEdge Resource Manager Suite 6.0
- Sun StorEdge Availability Suite 3.1
- Sun StorEdge Traffic Manager

- Sun StorEdge Performance Suite
- Sun StorEdge Utilization Suite Software
- VERITAS file system (VxFS)
- VERITAS NetBackup
- VERITAS Volume Manager (VxVM)
- Solstice Backup
- Solaris Logical Volume Manager
- Support for open heterogeneous SANs with Fabric support for Linux, Windows NT 4.0, Windows 2000, HP/UX and IBM AIX based servers
- Support for large, complex SANs with support for up to 7 inter-switch hops, up to 64 switches, and both core Fabric switches and directors

1.6 Default System Configurations and Settings

This section presents information about default Sun StorEdge 6320 system configurations. The information includes all settings for the Sun StorEdge 6020 arrays, Sun StorEdge network Fibre Channel switches, and IP address settings.

This section is organized as follows:

- “Sun StorEdge 6320 System Layout” on page 1-23
- “Sun StorEdge 6020 Array and 6320 System Settings” on page 1-24
- “Sun StorEdge Network FC Switch Settings” on page 1-27
- “IP Address Settings” on page 1-29

1.6.1 Sun StorEdge 6320 System Layout

FIGURE 1-5 shows the layout (back view) of the hardware components in a Sun StorEdge 6320 system that has two cabinets. The Sun StorEdge 6320 switchless system has the same layout, without the FC switches (sw1a and sw1b).

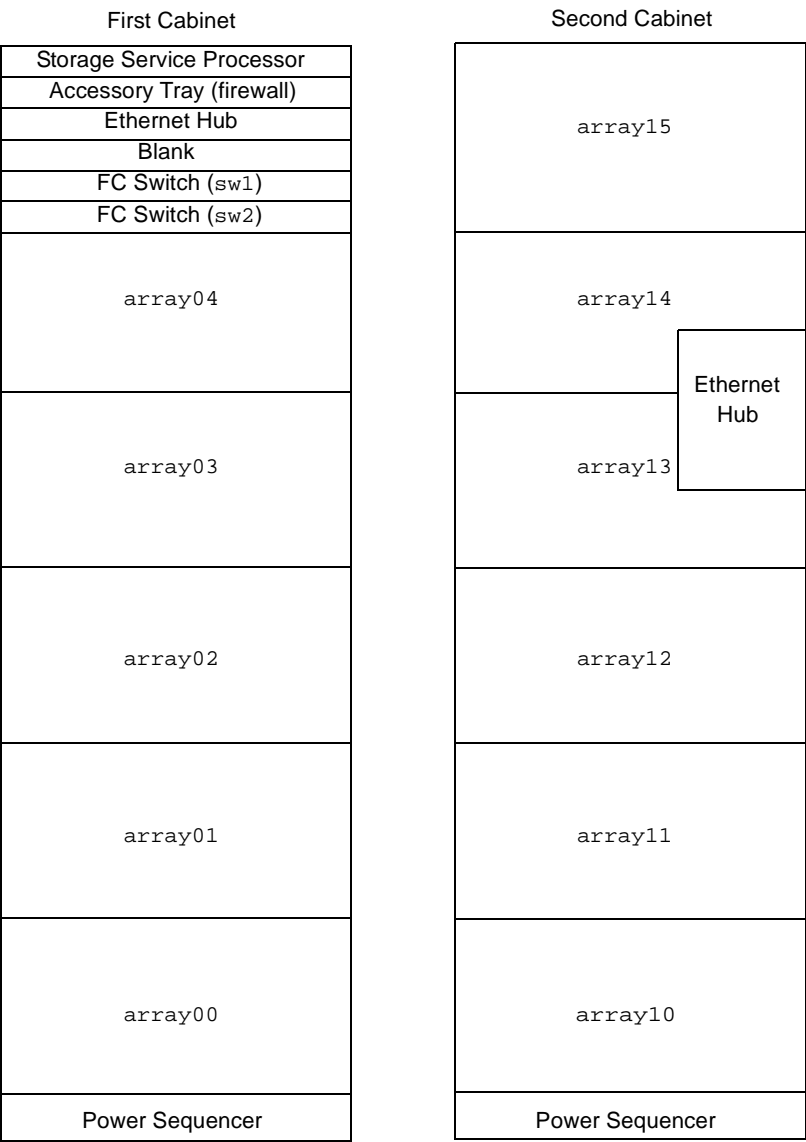


FIGURE 1-5 Back View of the Sun StorEdge 6320 System

1.6.2 Sun StorEdge 6020 Array and 6320 System Settings

The default supported configurations for the Sun StorEdge 6020 arrays and Sun StorEdge 6320 systems are shown in TABLE 1-3.

TABLE 1-3 Default 6320 System Configuration

Element	Sun StorEdge 6020 and 6320 System ¹
Hot Spare (one per tray)	Yes
Block Size	16 Kbytes
Cache	auto
Mirror	auto
Failover Mode (mp_support)	Explicit LUN failover
Read Ahead (rd_ahead)	on
Recon Rate	med
RAID Type	5 (with hot spare)
Disk Scrubbing	enabled
Storage Pool/Tray	1
Configured Volumes/Trays ²	0

- 1. All Sun StorEdge 6020 arrays ship from the factory in the specified default configuration.
- 2. All Sun StorEdge 6020 arrays are shipped with no LUNs configured. Volume slicing is always enabled and cannot be disabled. LUNs will be configured on the Sun StorEdge 6320 arrays at the customer site to meet the customer requirements.

The default Sun StorEdge 6020 array target IDs and host names are shown in TABLE 1-4. This information only applies if the Sun StorEdge 6320 system is being used in an arbitrated loop configuration. Fabric configurations do not use array target ID information.

TABLE 1-4 Default Sun StorEdge 6020 Array Target ID and Host Name

Sun StorEdge 6020 Array	Target ID	Host Name
array00	0, 1	array00
array01	2, 3	array01
array02	4, 5	array02
array03	6, 7	array03
array04	8, 9	array04
array10	10, 11	array10
array11	12, 13	array11
array12	14, 15	array12
array13	16, 17	array13
array14	18, 19	array14
array15	20, 21	array15

The Sun StorEdge 6020 array command configuration settings are given in TABLE 1-5.

TABLE 1-5 Sun StorEdge 6020 Array Set Command Configuration Settings

Parameter	Default Value
bootmode	auto
bootdelay	3
sn	<i>nnnnnn</i>
ip	See TABLE 1-10
netmask	255.255.255.0
gateway	0.0.0.0
tftp host	0.0.0.0
tftp file	<NULL>
hostname	<NULL> for the Sun StorEdge 6020 arrays
vendor	0301

TABLE 1-5 Sun StorEdge 6020 Array Set Command Configuration Settings (*Continued*)

Parameter	Default Value
model	501-5710-00(50) (Can change with board revisions)
revision	300 (Can change with firmware revisions)
logto	*
loglevel	3
rarp	on
mac	<i>n:n:n:n:n</i>

The command configuration settings for the Sun StorEdge 6020 array system list are shown in TABLE 1-6.

TABLE 1-6 Sun StorEdge 6020 Array System Commands Default Configuration

Parameter	Default Value
blocksize	16 Kbytes
cache	auto
mirror	auto
mp_support	mpxio
rd_ahead	on
recon_rate	med
disk_scrubbing	enabled
sys_memsize	256 Mbytes
cache_memsize	1024 Mbytes
enable_volslice	on
fc_topology	auto
fc_speed	auto cable
loop1_split	auto
naca	off

The Sun StorEdge 6020 array miscellaneous configuration parameters are shown in TABLE 1-7.

TABLE 1-7 Sun StorEdge 6020 Array Miscellaneous Configuration Parameters

Parameter	Default Value
vol init	rate = 16
vol verify	rate = 1
port host	sun

1.6.3 Sun StorEdge Network FC Switch Settings

This section presents a series of tables that provide information about the default settings for the Sun StorEdge network FC switch-16 switches that come factory installed in the Sun StorEdge 6320 system. The following information is included in this subsection:

- Sun StorEdge network FC switch-16 parameters
- Sun StorEdge 6320 system switch configuration

The Sun StorEdge network FC switch-16 parameters are given in TABLE 1-8.

TABLE 1-8 Sun StorEdge Network FC Switch-16 Parameters

Field	Value
Default Ethernet Address	10.0.0.1
Operational State	Online
Principal Switch Role	FALSE
Chassis Type	SANbox2 16-port switch
Flash	1.n.n
PROM Version	0.4.n.n
DOMAIN ID	1 (sw1) 2 (sw2)
Port Properties	
Port State	Online
1 Gbyte/2 Gbyte Transfer Rate	Auto-detect
Multi-frame Sequence (MFS)	FALSE
Bundling Enabled	

TABLE 1-8 Sun StorEdge Network FC Switch-16 Parameters *(Continued)*

Field	Value
ExtCredit	0
TOVs	
edtov	2000
mfstov	0
ratov	10000
rttov	100
Network Properties	
IP Mask	255.255.255.0
Gateway Address	0.0.0.0
Discovery	Static
Security Enable	FALSE
SNMP	
Trap Authentication	FALSE
SNMP Location	<Undefined>
SNMP Contact	<Undefined>

The default Sun StorEdge 6320 system switch configuration is given in TABLE 1-9.

TABLE 1-9 Sun StorEdge 6320 System Switch Configuration

sw1	sw2
Port 0 = G-Port (Host#1a)	Port 0 = G-Port (Host#1b)
Port 1 = G-Port (Host#2a)	Port 1 = G-Port (Host#2b)
Port 2 = G-Port (Host#3a)	Port 2 = G-Port (Host#3b)
Port 3 = G-Port (Host#4a)	Port 3 = G-Port (Host#4b)
Port 4 = G-Port (Host#5a)	Port 4 = G-Port (Host#5b)
Port 5 = G-Port (array00 master)	Port 5 = G-Port (array00 altmaster)
Port 6 = G-Port (array01 master)	Port 6 = G-Port (array01 altmaster)
Port 7 = G-Port (array02 master)	Port 7 = G-Port (array02 altmaster)
Port 8 = G-Port (array03 master)	Port 8 = G-Port (array03 altmaster)
Port 9 = G-Port (array04 master)	Port 9 = G-Port (array04 altmaster)
Port 10 = G-Port (array10 master)	Port 10 = G-Port (array10 altmaster)

TABLE 1-9 Sun StorEdge 6320 System Switch Configuration *(Continued)*

sw1	sw2
Port 11 = G-Port (array11 master)	Port 11 = G-Port (array11 altmaster)
Port 12 = G-Port (array12 master)	Port 12 = G-Port (array12 altmaster)
Port 13 = G-Port (array13 master)	Port 13 = G-Port (array13 altmaster)
Port 14 = G-Port (array14 master)	Port 14 = G-Port (array14 altmaster)
Port 15 = G-Port (array15 master)	Port 15 = G-Port (array15 altmaster)

1.6.4 IP Address Settings

The IP addressing configurations are given in TABLE 1-10.

TABLE 1-10 IP Addressing Configurations

IP Address	Designator	Description
127.0.0.1	localhost	Standard UNIX loopback
192.168.0.2	sp	dmfe 1 Ethernet port log host
192.168.0.40	array00	Lowest Sun StorEdge 6020 arrays in first cabinet
192.168.0.41	array01	Second Sun StorEdge 6020 arrays in first cabinet
192.168.0.42	array02	Third Sun StorEdge 6020 arrays in first cabinet
192.168.0.43	array03	Fourth Sun StorEdge 6020 arrays in first cabinet
192.168.0.44	array04	Fifth Sun StorEdge 6020 arrays in first cabinet
192.168.0.50	array10	Lowest Sun StorEdge 6020 arrays in second cabinet
192.168.0.51	array11	Second Sun StorEdge 6020 arrays from bottom in second cabinet
192.168.0.52	array12	Third Sun StorEdge 6020 arrays from bottom in second cabinet
192.168.0.53	array13	Fourth Sun StorEdge 6020 arrays from bottom in second cabinet
192.168.0.54	array14	Fifth Sun StorEdge 6020 arrays from bottom in second cabinet
192.168.0.55	array15	Sixth Sun StorEdge 6020 arrays from bottom in second cabinet

The numbering scheme used to calculate the IP addresses depends on the Sun StorEdge 6320 system ID number. If the Sun StorEdge 6320 system firewall is 10.0.0.*n*, the Storage Service Processor IP address is 10.0.0.*n*+8, and the IP address for the Storage Service Processor accessory tray will be 10.0.0.*n*+1. The LAN IP addresses for the first eight Sun StorEdge 6320 systems shipped to the same site are listed in TABLE 1-11.

TABLE 1-11 Storage Service Processor LAN IP Addresses

IP Address	Designator	Description
10.0.0.242	new_firewall	Default factory address for the Sun StorEdge 6320 system firewall
10.0.0.243	new_ntc	Default factory address for the Network Terminal Concentrator (NTC), which is inside the Storage Service Processor accessory tray
10.0.0.250	new_sp new_sp.	Default factory address for the Storage Service Processor
10.0.0.2	sp0-firewall	First Sun StorEdge 6320 system firewall
10.0.0.3	sp0-ntc	First Storage Service Processor accessory tray (NTC)
10.0.0.10	sp0 sp0.	First Storage Service Processor
10.0.0.12	sp1-firewall	Second Sun StorEdge 6320 system firewall
10.0.0.13	sp1-ntc	Second Storage Service Processor accessory tray (NTC)
10.0.0.20	sp1 sp1.	Second Storage Service Processor
10.0.0.22	sp2-firewall	Third Sun StorEdge 6320 system firewall
10.0.0.23	sp2-ntc	Third Storage Service Processor accessory tray (NTC)
10.0.0.30	sp2 sp2.	Third Storage Service Processor
10.0.0.32	sp3-firewall	Fourth Sun StorEdge 6320 system firewall
10.0.0.33	sp3-ntc	Fourth Storage Service Processor accessory tray (NTC)
10.0.0.40	sp3 sp3.	Fourth Storage Service Processor
10.0.0.42	sp4-firewall	Fifth Sun StorEdge 6320 system firewall
10.0.0.43	sp4-ntc	Fifth Storage Service Processor accessory tray (NTC)
10.0.0.50	sp4 sp4.	Fifth Storage Service Processor
10.0.0.52	sp5-firewall	Sixth Sun StorEdge 6320 system firewall
10.0.0.53	sp5-ntc	Sixth Storage Service Processor accessory tray (NTC)
10.0.0.60	sp5 sp5.	Sixth Storage Service Processor

TABLE 1-11 Storage Service Processor LAN IP Addresses *(Continued)*

IP Address	Designator	Description
10.0.0.62	sp6-firewall	Seventh Sun StorEdge 6320 system firewall
10.0.0.63	sp6-ntc	Seventh Storage Service Processor accessory tray (NTC)
10.0.0.70	sp6 sp6.	Seventh Storage Service Processor
10.0.0.72	sp7-firewall	Eighth Sun StorEdge 6320 system firewall
10.0.0.73	sp7-ntc	Eighth Storage Service Processor accessory tray (NTC)
10.0.0.80	sp7 sp7.	Eighth Storage Service Processor

1.7 Remote Service Options

This section describes the remote service configuration options associated with supported Sun StorEdge 6320 system configurations.

This chapter is organized as follows:

- “Standalone Without Remote Service” on page 1-32
- “Remote Service to a Single Unit” on page 1-33
- “Remote Service to Multiple Units” on page 1-34

1.7.1 Standalone Without Remote Service

A standalone Sun StorEdge 6320 system can be configured without remote service. In a standalone configuration without remote service option, the Storage Service Processor must be configured as a master service processor.

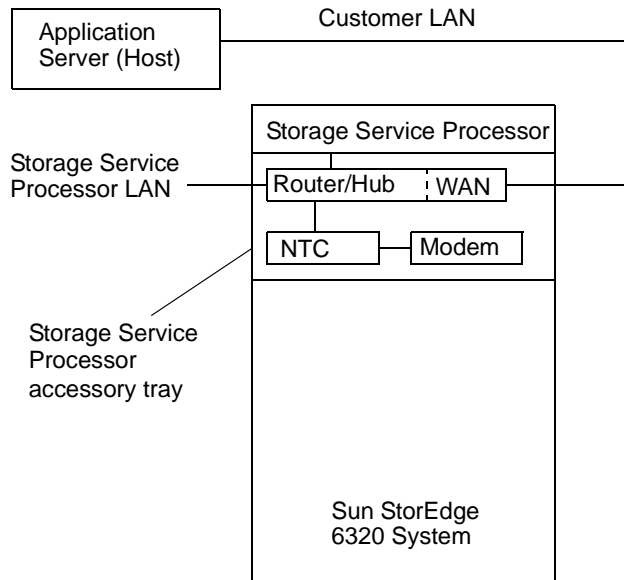


FIGURE 1-6 Standalone Sun StorEdge 6320 System With No Remote Service

The features supported in this configuration are:

- Storage Automated Diagnostic Environment
- Local or host access to monitoring, component management, and alerts
- One customer LAN address for each Sun StorEdge 6320 system
- Storage Service Processor serviceability using the console connection (NTC)
- Host access through the Storage Service Processor by way of one customer LAN address to the Storage Automated Diagnostic Environment software

1.7.2 Remote Service to a Single Unit

This configuration offers remote service to a single Sun StorEdge 6320 system.

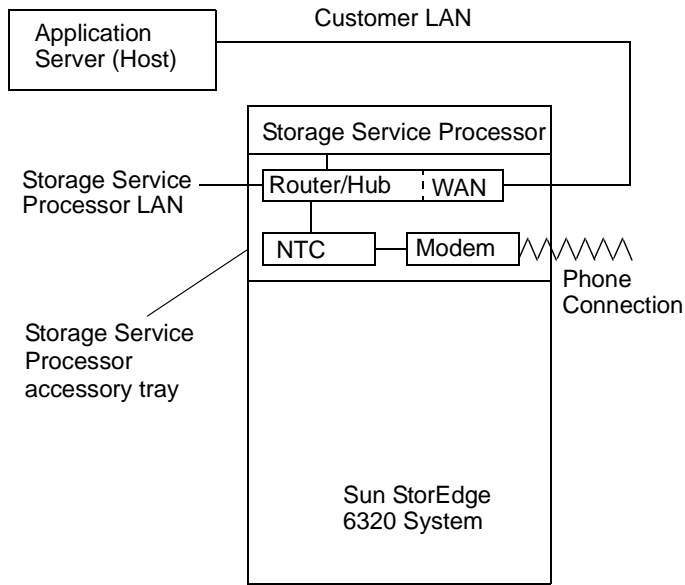


FIGURE 1-7 Remote Service to a Single Sun StorEdge 6320 System

For security reasons, inbound `telnet(1)` and `ftp(1)` connections to the Storage Service Processor have been disabled.

The features supported in this configuration are:

- Storage Automated Diagnostic Environment
- Remote services by phone connection
- Exported product telemetry data stream
- Storage Service Processor serviceability using the console connection (NTC)
- Host access through the Storage Service Processor by way of one customer LAN address to the Storage Automated Diagnostic Environment software

1.7.3 Remote Service to Multiple Units

This configuration offers remote service to multiple Storage Service Processors in the configuration. Aggregation is only supported on the Storage Service Processor LAN for remote connectivity purposes.

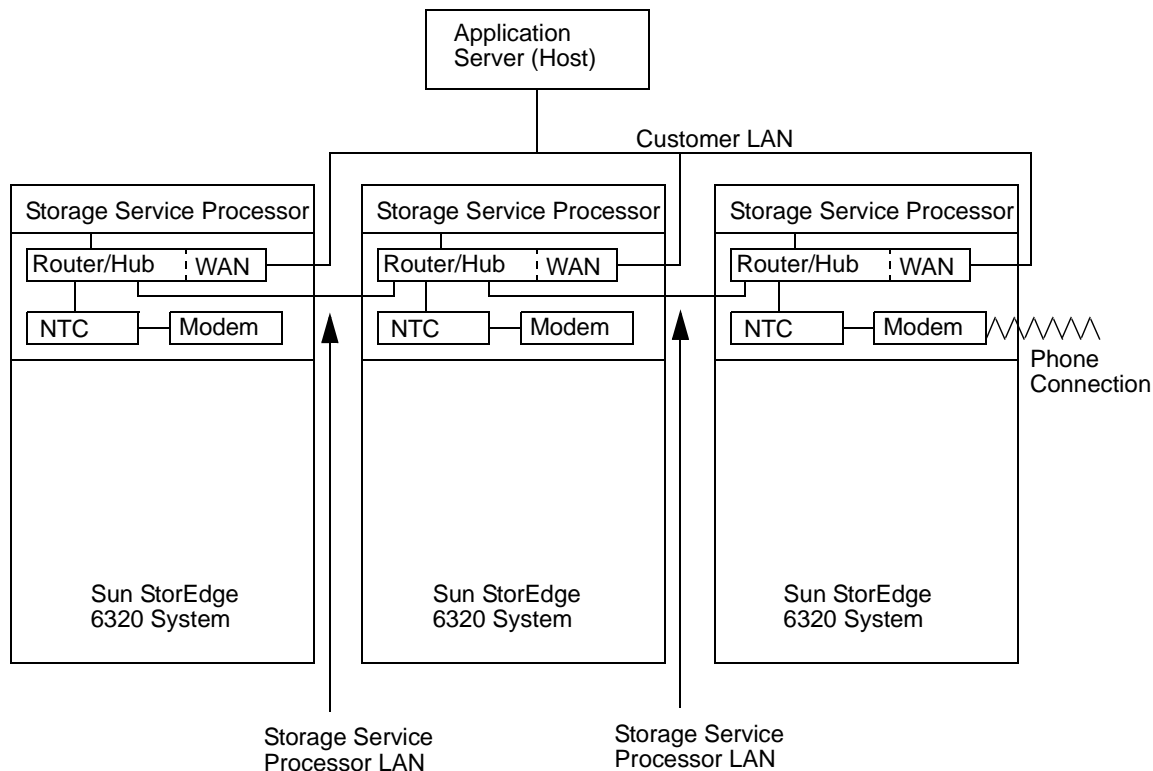


FIGURE 1-8 Remote Service to Multiple Sun StorEdge 6320 Systems

Supported features in this configuration are:

- Storage Automated Diagnostic Environment
- Remote services
- Exported product telemetry data stream
- Storage Service Processor serviceability using a NTC connection
- Host access through the Storage Service Processor by way of one customer LAN to address or Storage Service Processor LAN
- Aggregation of Storage Service Processors for remote service and alert/telemetry

Managing the System

This chapter provides instructions for using the web interface of the Sun StorEdge Configuration Service software to configure the various components of the Sun StorEdge 6320 systems.

This chapter is organized by task. You can also refer to the software's online help, which is organized by menu. Also, the initial configuration of the Sun StorEdge 6320 system is documented in the *Sun StorEdge 6320 System 1.2 Installation Guide*.

Refer to Appendix A for information about using the Sun StorEdge Configuration Service command-line interface, `sscs`.

This chapter is organized as follows:

- “Overview of the Software” on page 2-1
- “Using the Software” on page 2-2

2.1 Overview of the Software

The Sun StorEdge Configuration Service software enables you to configure and manage the Sun StorEdge 6320 systems.

Using this software, you can:

- Manage users who can use the software
- Configure the network interface (customer LAN)
- Set the email contact address
- Manage the arrays
- Manage storage profiles
- Create initiators and optionally add initiators to a group
- Create initiator groups and add initiators to a group

- Create volume groups
- Create a volume, set the LUN number, and add it to a volume group
- Manage remote power operation

Note – The software of the software includes wizards that help simplify the tasks of creating volumes, volume groups, storage pools, and initiators.

2.2 Using the Software

You can log in through the following supported browsers:

- Netscape Navigator™, minimum revision level 4.79 (Netscape version 6 or 7 is preferred). If time-out conditions become an issue, update your browser to a version that supports HTTP 1.1 (Netscape 6 or higher).
- Microsoft Internet Explorer, minimum revision level 5.0

You can manage the system components and related system network features. The software also enables you to launch the Storage Automated Diagnostic Environment software application. This application provides fault management and health reporting for Sun storage devices.

You can perform the following by clicking the labeled tabs:

- “Accessing Help” on page 2-3
- “Logging In and Out” on page 2-3
- “Administering Users” on page 2-6
- “Configuring System Settings” on page 2-8
- “Managing Jobs” on page 2-13
- “Managing Arrays” on page 2-14
- “Managing Storage Profiles” on page 2-27
- “Managing Storage Pools” on page 2-31
- “Managing Array Volumes” on page 2-37
- “Managing Volume Groups” on page 2-40
- “Managing Initiators and Initiator Groups” on page 2-43
- “Viewing System Reports and Logs” on page 2-49

2.2.1 Accessing Help

A Help button is available at the top right-hand side of the Content frame on every page. Choose the **Help** button (FIGURE 2-1) to access detailed procedural help for configuring and managing your system.



FIGURE 2-1 Accessing the Online Help

2.2.2 Logging In and Out

The following procedures describe how to log in and out of the software. Only users with passwords on the Storage Service Processor can log in. See TABLE 2-1 for the supported Storage Service Processor login and default passwords.

TABLE 2-1 Default Storage Service Processor Users and Initial Passwords

User	Initial Password
admin	!admin
storage	!storage
guest	!guest

The interface supports both secure and non-secure connections through the following default ports:

- 9080 - Use this HTTP port for non-secure access
- 9443 - Use this HTTPS port for secure access, especially if you are concerned about password security

2.2.2.1 Logging In

1. Open a web browser such as Netscape Navigator.

2. Type one of the following URLs:

- For a non-secure HTTP server connection:

```
http://ip_address:9080/
```

Where *ip_address* represents the IP address of the Sun StorEdge 6320 system (for example, 10.1.1.12), and port 9080 represents the non-secure port number for Configuration services.

- For a secure HTTPS server connection:

```
https://ip_address:9443/
```

Where *ip_address* represents the IP address of the Sun StorEdge 6320 system (for example, 10.1.1.12), and port 9443 represents the secured port number for Configuration services.

The Login page is displayed.

3. Log in as admin:

```
User Name: admin
Password: !admin
```

Note – To change storage configuration after completing the administrative tasks, you will have to logout and log back in as a storage user.

4. Choose Log In.

The Admin > General page is displayed, as shown in FIGURE 2-2.

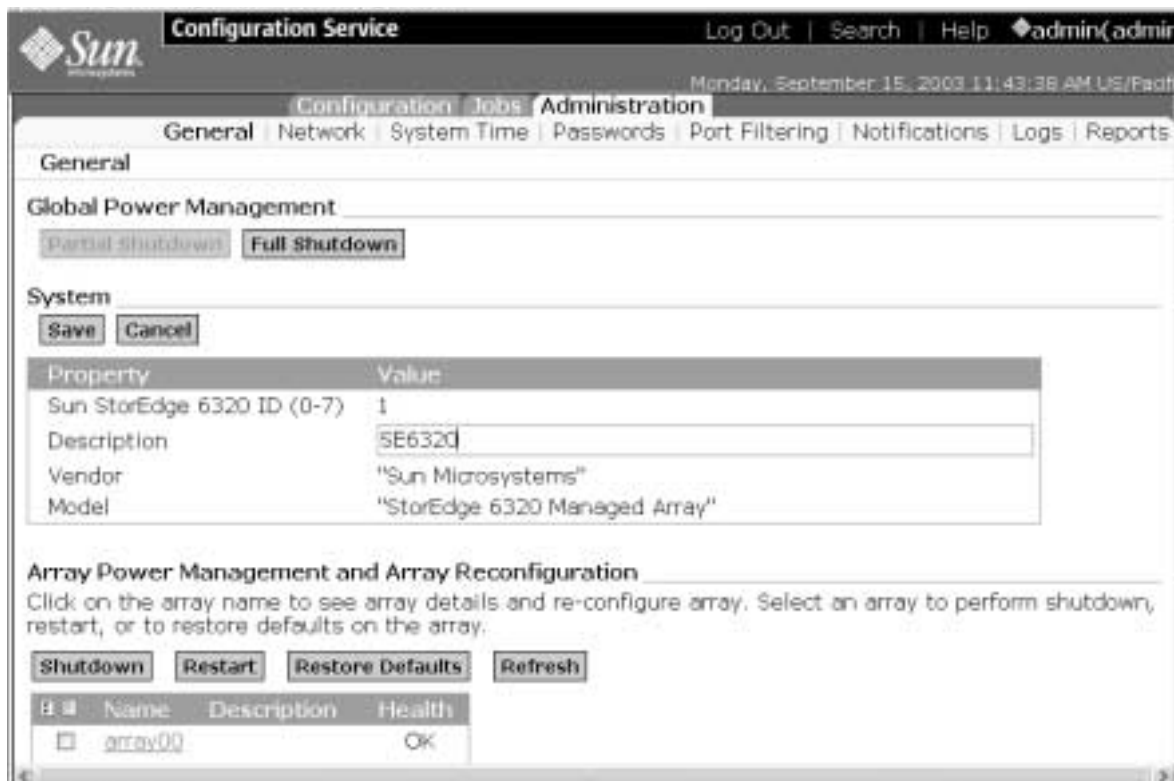


FIGURE 2-2 The Administration > General Screen

2.2.2.2 Logging Out

- Choose **Log Out** from any page.

2.2.3 Administering Users

This section describes how to manage users and their access rights to the software.

The Sun StorEdge 6320 systems are configured with the three user accounts shown in TABLE 2-2. The software enables you to set passwords for the accounts. As the `admin` user, you authorize users to access the software and system. The user accounts are as follows:

TABLE 2-2 User Accounts

User Account	Description
<code>admin</code>	An <code>admin</code> user has all administration privileges. The <code>admin</code> user can modify system attributes on the Administration page and set passwords for the accounts.
<code>storage</code>	A <code>storage</code> user can use most of the software features related to storage device configuration. The Administration page is available to this user as read-only; this user cannot modify admin settings. This user can use the features available from the Array Management and Storage Access pages.
<code>guest</code>	A <code>guest</code> has read-only privileges and can view the information in the software pages. This user cannot modify any settings or features.

The Passwords link on the Administration page enables you to set passwords for the three user accounts that are allowed to access the software. Once added, a user can log in to the software using the `admin`, `storage`, or `guest` user name and password.

Note – See TABLE 2-1 for user account passwords.

2.2.3.1 Creating or Modifying a User Password

1. Choose the Passwords link on the Administration page.
2. Type a new password in the Enter New Password and Confirm New Password fields for the user type you want.
3. Choose Save.

2.2.3.2 Adding Event Email Notifications

The Notifications page displays a table that summarizes the categories of events that have occurred in the system. You can display details about an event by clicking a link in the Event Category column.

The page that is displayed enables you to manage the email notification list. The system sends event information, such as when volumes have been deleted, when storage pools are created, and so on, to users whose email address you type.

Email Event subscribers can receive “All” events, events from an individual category, or just a single event.

- 1. Choose Notifications at the Administration tab.**

You can add “All” category subscribers here in the New Subscription section. Type email addresses, separating each address you type with a comma character (,).

- 2. Choose an Event Category link in the table.**

You can add individual category subscribers here in the New Subscription section. Type email addresses, separating each address you type with a comma character (,).

- 3. Choose an Event Name in the Event Category Detail section.**

You can add single event category subscribers here in the New Subscription section. Type email addresses, separating each address you type with a comma character (,).

- 4. Choose Add.**

2.2.3.3 Removing Event Email Notifications

- 1. Choose Notifications at the Administration tab.**

- 2. Choose an Event link in the table.**

- 3. Scroll down to the Subscribed Users region.**

- 4. Choose the check box next to the email address to select that address.**

- 5. Choose Remove.**

2.2.3.4 Viewing Event Email Notifications

1. **Choose Notifications at the Administration tab.**

The Event Categories table is displayed.

2. **Choose an Event Category link in the table.**

The Event Category Detail page is displayed.

3. **Choose a link in the Name column of the Events table.**

The Event Detail table displays information about the event. This page also shows the subscribed users that will receive email notification about this event.

2.2.4 Configuring System Settings

The procedures described in the following subsections enable the administrator (admin user) to configure the Storage Service Processor settings.

2.2.4.1 Modifying the Network Address

The Network page displays the current network IP address and other settings for the system. Typically, these values are set at the factory or by Sun service engineers or authorized service personnel.

Caution – Changing these settings might disable access temporarily, and require the user to re-log in. If invalid network settings are supplied, it may disable access to the application.

1. **Choose Network at the Administration tab.**

2. **Choose DHCP if your system obtains its network settings from a Dynamic Host Configuration Protocol (DHCP) server.**

This choice is the default setting for the system.

3. **Choose Fixed to manually configure network settings.**

4. To manually configure the network settings, type the following entries:

IP Address: type the Storage Service Processor or array IP address

Gateway IP: type the gateway IP address

Netmask: type the subnet mask IP address

Name Server: type the domain name server (DNS) IP address.

Domain Name: type the domain name, if required for Sendmail to function properly in your network.

5. Choose Save to save the new settings.

2.2.4.2 Modifying the Network Time Protocol Server

The System Time page enables you to automatically get the system time from a Network Time Protocol (NTP) server on your network or to manually set the time.

Note – Changing the time on the system may log off any active users and require them to log in to the application again.

Setting the Time Automatically

1. Choose System Time at the Administration tab.
2. Select NTP and type the NTP IP address in the NTP Server Address Field.
3. Select the Greenwich Mean Time offset from the Time Zone Offset List.

Setting the Date/Time Manually

1. Choose System Time at the Administration tab.
2. Select Manual.
3. Type the month, day, and year in the text fields.
4. Choose Save.

Modifying the Time Zone

1. Choose System Time at the Administration tab.
2. Choose Change Time Zone.
3. Select the Greenwich Mean Time offset from the Time Zone Offset list.

For example, select GMT-08 if your location is 8 hours or time zones behind the Greenwich Mean time zone.

4. Select your location's time zone from the Selection list.

5. Choose Save.

2.2.4.3 Modifying the Firewall

This page enables you to open or close ports to enable or disable access to the Storage Service Processor, system, or the Sun StorEdge Configuration Service software. You can open or close the following ports:

Port	Port Number	Description
Array Management HTTP, non-secure	9080	Enables access to the Sun StorEdge Configuration Service Login page. A non-secure connection.
Array Management HTTPS	9443	Enables secure access to the Sun StorEdge Configuration Service Login page. This port uses the Secure Socket Layer (SSL) protocol. Log in using this port if you are concerned about password security.
Storage Automated Diagnostic Environment software, non-secure HTTP	7654	Enables access to the Storage Automated Diagnostic software. The software is installed by default on the Storage Service processor. You can optionally install the software on a Solaris host if you are using Sun StorEdge 6120 arrays.
Storage Automated Diagnostic Environment software, secure HTTPS	7443	Enables access to the Storage Automated Diagnostic software. The software is installed by default on the Storage Service processor. You can optionally install the software on a Solaris host if you are using Sun StorEdge 6120 arrays.
SNMP	161	Enables the simple network management protocol port for third-party device management application access.
CIM HTTP	5988	Enables the Common Information Model port for CIM-compatible web-based management application access.
NTP	123	Enables the system to request the current time from a network time protocol server.
PatchPro	443	Enables access to the Sun PatchPro web page to provide updates for firmware and software updates.

Enabling or Disabling Port Access

1. **Choose the Port Filtering link at the Administration page.**

This page displays the current port configuration. A selected check box indicates that the related port is open; an unselected check box indicates that the port is closed or not accessible.

2. **Select the ports you wish to open or unselect the ports you wish to close.**

3. **Choose Save.**

2.2.4.4 Modifying the Power Settings

The General link on the Administration tab enables the admin user to power down the system or the array. This page enables the admin user to power down the entire storage system, all arrays, or individual arrays. The individual array power down is useful when adding trays or other components to an array.

Note – To power on the system or arrays after you have remotely powered them off, you must manually power them on at the cabinet.

However, if you perform a partial shutdown on arrays in the Sun StorEdge 6300 system, a Restart button is available from the General link at the Administration tab the next time you display this page.

The Partial Shutdown button is enabled only if you or Sun Service personnel have installed a USB cable between the remote power relay and the Storage Service Processor.

Powering Down the System (Full Shutdown)

1. **Choose General at the Administration tab.**
2. **Choose the Full Shutdown button to power down the Sun StorEdge 6300 storage system Storage Service Processor and all arrays.**

Powering Down All Arrays (Partial Shutdown)

1. **Choose General at the Administration tab.**
2. **Choose the Partial Shutdown button.**

When you click the Partial Shutdown button, the Storage Service Processor and accessory tray remain powered on and accessible. The arrays are powered down.

Restarting All Arrays (from Partial Shutdown)

1. **Choose General at the Administration tab.**
2. **Choose the Restart button to reset and power on the arrays.**

Powering Down Individual Arrays

1. **Choose General at the Administration tab.**
2. **Select one or more arrays in the table under the Array Power Management and Array Reconfiguration section.**
3. **Choose the Shutdown button.**
To power on the array, you must manually power them on at the array cabinet.
4. **Confirm the power down action.**

Restarting an Array

1. **Choose General at the Administration tab.**
2. **Select one or more arrays in the table under the Array Power Management and array Reconfiguration section.**
3. **Choose the Restart button.**
4. **Confirm the restart action.**

2.2.5 Managing Jobs

The Jobs page displays jobs that the software is currently performing such as:

- Creating storage pools
- Creating volumes
- Duplicating tray characteristics

Use the following procedures to view, delete, or cancel one or more jobs.

2.2.5.1 Viewing Job Status

1. Choose the Jobs tab.

The Jobs page is displayed. This page shows a summary of all current or outstanding jobs.

2. Perform one of the following steps:

- - Select All Jobs from the menu to view current and completed jobs.
- - Select Outstanding Jobs from the menu to view current jobs.

3. Choose Refresh List to update the page.

You can also set the Autorefresh from the drop-down menu. You can choose 30 second or 60 second refreshes.

2.2.5.2 Canceling One or More Jobs

1. Choose the Jobs tab.

2. Select Outstanding Jobs from the menu.

3. Select one or more jobs in the Jobs Summary table.

If the job state is “Running,” it cannot be canceled unless it is a “CREATE POOL” job. A job can be canceled while it is being queued for execution.

4. Choose Cancel Job.

5. Click Confirm.

6. Click Refresh to update the page.

2.2.5.3 Deleting Jobs

1. Click the **Jobs** tab.
2. Select **All Jobs** or **Outstanding Jobs** from the menu.
3. Select one or more jobs in the **Jobs Summary** table.
Only completed jobs can be deleted.
4. Click **Delete Jobs from List**.

2.2.6 Managing Arrays

Use the procedures described in the following subsections to configure the Sun StorEdge 6020 array attributes and components.



Caution – When you change some array settings, such as segment size, data found on any detected volumes is deleted. You will see a warning message and be required to confirm the requested operation.

Note – Log in as a storage user (storage,!storage) to make changes that affect the arrays and storage. The **Configuration > Array Selection** page is displayed,

2.2.6.1 Viewing the Graphic Array Overview

From the **Configuration > Array Selection** page, press the **Show Overview** button, or choose on the name of the array in the Tree pane. An array overview in graphic form is displayed. The page shows a table of icons representing all trays and disks in the specified array.

Clicking on a disk image displays disk details such as the following example:

- Disk: t0d3
- Capacity: 33.92GB
- Pool: pool_1
- Role: data disk
- Status: OK
- State: enabled

If the disk is assigned to a pool, you can click on the pool name to open the Pool Details menu to perform modify the pool.

Clicking on the Controller icon displays information such as the following example:

- Tray Type: Controller
- Role: Master
- State: Enabled
- Status: Ready
- Diagnostics -this is a link to *Storage Automated Diagnostic Environment*, where other information can be viewed about the system.

You can also create pools from the graphic by clicking on a disk and then selecting the Pool Name link. This starts the Create New Pool Wizard.

2.2.6.2 Viewing Array Information

1. **Choose General at the Administration tab.**
2. **Choose the array Name link in the table in the Array Power Management and Array Reconfiguration section.**

The Array Details page is displayed. A table shows a summary of details, such as name, description, firmware version, and array health. For more tray details, see “Viewing Tray Details” on page 2-25.

2.2.6.3 Configuring an Array

Caution – Before you reconfigure an existing array, note that any information you type and save at this page overwrites the existing information for the array.

1. **Select the Configuration >Array Selection tab.**
2. **Select a storage array in the table and choose Configure.**
You can also configure a Fibre Channel array settings from this page. See “Configuring Fibre Channel Port Settings” on page 2-23.
3. **Type a description of the array in the Description text field.**

The maximum number of characters allowed is 39.

4. Select or enable the following:

Note – You may need to click on the [More...>>] button in the Array Properties table to view more configuration options.

- **Segment Size**

You can choose a LUN segment size of 4 Kbytes, 8 Kbytes, 16 Kbytes, 32 Kbytes, or 64 Kbytes. In a RAID-5 configuration, the segment size is the size of the data striped across volumes.

- **Read Ahead cache mode**

Select On to enable it or select Off to disable it.

- **Disk Scrubbing (firmware Version 3.1 only)**

Select enabled or disabled.

The *disk scrubber* feature constantly reviews the volumes for consistency. As a result, you will see the disk LEDs flash regardless of I/O. Disk scrubber is enabled by default.



Caution – Sun does not recommend disabling the disk scrubber. Disabling the disk scrubber may lead to latent disk block errors which could cause multiple disk failures and lose of data.

The disk scrubber may find certain media errors on a read for all RAID levels. For RAID0 volumes, it reports this to the `syslog`. For RAID1 and RAID5 volumes, this will be fixed. For details, see “Managing Disk Scrubber” on page 35.

- **Disk Reconstruction Rate**

Selecting high might impact system I/O performance; selecting low might increase system I/O performance.

- **Failover Mode**

Select Explicit LUN Failover or Implicit LUN Failover.

- **Cache Mode**

off - disable the cache mode.

auto - use write-behind or write-through caching depending on I/O characteristics.

writebehind - write all read and write operations to cache.

writethrough - write data to cache and then to disk.

- **Number of Array Hot Spares (Firmware 3.1)**

Select the number of available hotspare drives in the array.

5. Choose Save.

2.2.6.4 Adding an Expansion Unit to an Array

Caution – Before performing these configuration procedures, ensure that you back up your data to tape or other media. See also “Restoring Array Default Settings” on page 2-22.

The Array Details page that is shown after clicking the Array Name link from the Administration page (see “Viewing Array Information” on page 2-15) enables the admin user to add expansion units to an array.

A wizard guides you through the expansion unit addition. Before attempting these procedures, consider the following:

- The Sun StorEdge 6020 and 6100 Arrays System Manual contains more details about physically adding and removing expansion units and other array configuration changes. **Please read the array configuration chapter in this manual and the Sun StorEdge 6120 Array Release Notes before attempting this procedure.** Note that the Sun StorEdge 6300 system does not allow access by telnet. The wizards described in this manual perform the underlying commands needed to add expansion units.
- Perform all configurations while the system is offline and prevented from accepting I/O operations from the host system (that is, I/O operations have been quiesced).
- System reconfigurations involve power cycling of storage arrays.
- Evacuate any data stored on the arrays before removing trays. If you are adding trays, you might want to back up your existing data on the arrays.

Note – Depending on the current state of the selected array, the Add Expansion button may be disabled. For example, you cannot add more trays in a 2x6 configuration.

1. Choose General at the Administration tab.
2. Choose the array Name link in the table in the Array Power Management and Array Reconfiguration section.
3. Choose the Add Expansion button.

The Add Expansion Unit wizard is displayed.

- The wizard detects if any active jobs are running.
- If active jobs are running, wait until the jobs are completed before you choose the Next button.

4. Choose the Next button.

This step begins the array “unconfiguration” procedure. The wizard shows the following operations being performed:

- Place any existing storage pools in the offline state
- Disable the tray alternate master controller and unconfigure the controller (if necessary; this step is skipped if the controller is already disabled or if the controller is the only controller, as in a 1x1 configuration)
- Shut down the array

When the operations are completed, the wizard instructs you to choose Next to view a summary of instructions to physically add the expansion units.

The instructions shown in the wizard are as follows:

- Turn off power by pressing the power rocker switches on each array power and cooling unit (PCU)
- Remove all power cords from all enclosures in the original configuration
- Verify all LEDs are off before proceeding
- Disconnect loop card cables
- Add the new expansion units
- Move the controller board from the former alternate master enclosure to the enclosure above it.
- If the new configuration is 2x4, the controller board should be on the first and third enclosure from the bottom. If the new configuration is 2x6, the controller board should be on the first and fourth enclosure from the bottom. Do not move the tray, move only the controller board.
- Connect the loop card, Ethernet, and host cables
- Connect power cords to all enclosures
- Power on the array
- Once the array is powered on and all LEDs are lighted, choose the Next button to perform verification of the new configuration

Note – You must allow enough time for the storage array to boot completely before clicking the Next button. Otherwise, if you proceed to the next screen before the newly configured storage array is completely booted, the wizard will timeout because it cannot communicate with the storage array. If the wizard times out before the array boots, choose the Retry button in the wizard to reattempt communication with the array.

5. **Choose the Next button when the array is powered on and all LEDs are lighted.**

The wizard refreshes as the array is detected. This process might take up to 20 minutes or more, depending on the physical configuration of the array. If the wizard times out, re-check the array installation.

When the software detects the array, the wizard displays a confirmation message that the array is available and shows a link to the Storage Automated Diagnostic Environment software (if installed).

6. **(Optional) Select the Online Existing Pools to place the existing storage pools online.**

7. **Choose the Finish Wizard button.**

Note – You can use the Storage Automated Diagnostic Environment software (if installed) to perform an array test such as `volverify` after adding expansion units.

8. **If desired, configure the array using the procedures in this section. (See “Configuring an Array” on page 2-15.)**

2.2.6.5 Removing an Expansion Unit from an Array

Caution – All data is lost when performing this procedure. Before performing these reconfiguration procedures, ensure that you back up your data to tape or other media. You may also wish to record your storage pool and volume configuration information.

The Array Details page that is shown after clicking the Array Name link from the Administration page (see “Viewing Array Information” on page 2-15) enables the admin user to remove expansion units from an array.

A wizard guides you through the expansion unit removal. Before attempting these procedures, consider the following:

- The Sun StorEdge 6020 and 6100 Arrays System Manual contains more details about physically removing expansion units and other array configuration changes. **Please read the array configuration chapter in this manual before attempting this procedure.** Note that the Sun StorEdge 6300 system does not allow access by telnet. The wizards described in this manual perform the underlying commands needed to remove expansion units.
- Perform all reconfigurations while the system is offline and prevented from accepting I/O operations from the host system (that is, I/O operations have been quiesced).

- System reconfigurations involve power cycling of storage arrays.
- Evacuate any data stored on the arrays before removing trays.

Note – Depending on the current state of the selected array, the Remove Expansion button may be disabled. For example, you cannot remove trays in a 2x2 configuration.

1. Choose General at the Administration page.

2. Choose the array Name link in the table in the Array Power Management and Array Reconfiguration section.

The Array Details and Reconfiguration page is displayed.

3. Choose the Remove Expansion button.

The Remove Expansion Unit wizard is displayed.

- The wizard verifies the Reverse Address Resolution Protocol (RARP) service configuration and that the entry for the RARP service exists. It also shows the associated controller's media access control (MAC) address

4. Choose the Next button if the RARP information is correct.

Note – This step is no longer required for arrays which have been upgraded to controller firmware Version 3.1.

- The wizard detects if any active jobs are running.
- If active jobs are running, wait until the jobs are completed before you choose the Next button.

Caution – You cannot cancel this operation if you choose the Next button in this wizard. Choose Cancel to cancel the procedure.

5. Choose the Next button.

This step begins the array “unconfiguration” procedure. The wizard shows the following operations being performed:

- Place any existing storage pools in the offline state
- Disable the tray alternate master controller and unconfigure the controller (if necessary; this step is skipped if the controller is already disabled or if the controller is the only controller, as in a 1x1 configuration)

- Reset labels (this action might take a few minutes; see also “Restoring Array Default Settings” on page 2-22)
- Shut down the array

When the operations are completed, the wizard instructs you to choose Next to view a summary of instructions to physically remove the expansion units.

Note – Also, always remove expansion units in pairs. An array configuration should always contain two, four, or six expansion units.

The instructions shown in the wizard are as follows:

- Turn off power by pressing the power rocker switches on each array power and cooling unit (PCU)
- Remove all power cords from all enclosures in the original configuration
- Verify all LEDs are off before proceeding
- Disconnect loop card cables
- Move the controller board down to the next tray. For example, if the resulting configuration is 2x4, the boards should be in the first and third enclosure from the bottom.
- Remove the expansion unit.
- Connect the loop card, Ethernet, and host cables
- Connect power cords to all enclosures
- Power on the array
- Once the array is powered on and all LEDs are lighted, choose the Next button to perform verification of the new configuration

Note – You must allow enough time for the storage array to boot completely before clicking the Next button. Otherwise, if you proceed to the next screen before the newly configured storage array is completely booted, the wizard will timeout because it cannot communicate with the storage array. If the wizard times out before the array boots, choose the Retry button in the wizard to reattempt communication with the array.

6. Choose the Next button when the array is powered on and all LEDs are lighted.

The wizard refreshes as the array is detected. This process might take up to 20 minutes. If the wizard times out, re-check the array installation.

When the software detects the array, the wizard displays a confirmation message that the array is available and shows a link to the Storage Automated Diagnostic Environment software (if installed).

7. Choose the Close Wizard button.
8. If desired, configure the array using the procedures in this section. (See “Configuring an Array” on page 2-15.)

2.2.6.6 Restoring Array Default Settings

Caution – Performing this procedure results in unrecoverable data loss. Data stored on the arrays will need to be evacuated before any reconfiguration procedures start. This procedure might take up to 15 minutes to complete. This procedure reboots the selected array.

Restoring array defaults clears all system labels, configuration settings, and volume information for the selected array. You typically restore an array if you want to return it to its initial default state. You must then reconfigure the array when the operation is complete.

Consider the following when restoring an array:

- Perform all reconfigurations while the system is offline and prevented from accepting I/O operations from the host system (that is, I/O operations have been quiesced).
- System reconfigurations involve power cycling of storage arrays.
- Evacuate any data stored on the arrays before removing trays. If you are adding trays, you might want to back up your existing data on the arrays.

1. Choose General at the Administration page.
2. Select one or more arrays in the array table.
3. Choose Restore Array Defaults.

A confirmation page is displayed. Ensure that the information displayed on this page is correct (selected arrays, MAC address, and so on).

4. Perform one of the following:
 - Choose Cancel if the page shows any active jobs or users on the array
 - Choose Restore Array Defaults if you are sure you want to clear the arrayWhen the procedure is completed, the Administration>General page is displayed.
5. If desired, configure the array using the procedures in this section. (See “Configuring an Array” on page 2-15.)

2.2.6.7 Duplicating Tray Settings to Another Tray

Note – These procedures will duplicate array settings and all associated objects, including pools, volumes, volume groups, initiators, initiator groups, and all permissions.

1. **Select the Configuration/Array selection tab.**
2. **Select an array in the Array Selection table and choose Configure.**
3. **Select Trays from the Sub-reports view drop-down menu.**

The trays in the array table displays the tray type, role (Master or Alternate Master), State (Enabled or Disabled), Status, Number of Driver, and Array Hot Spares (AHS - firmware Version 3.1 only). For arrays that are not a controller, the Role, State, and Status Columns shows the dash (-) character.

4. **Choose Duplicate Tray.**

The Duplicate Tray wizard is displayed.

5. **Select the following in the wizard:**

- The source tray that has the settings to duplicate
- The destination trays

Note – If the destination tray has pools with volumes, you will receive a notification of what will be deleted in order to duplicate the configuration of the source tray.

6. **Choose Confirm.**

2.2.6.8 Configuring Fibre Channel Port Settings

This page displays when you choose the FC Configuration button from the Configuration page. After you set the FC port configuration settings, the array will attempt to maintain those settings, but may revert to previous settings.

1. **Select the port speed from the Set Speed menu.**

You can set the speed to 1 Gigabits per second, 2 Gigabits per seconds, or auto.

2. Select the Fibre Channel topology for the array.

You can set the topology as follows:

- **auto** - automatically sense the topology type
- **loop** - loop
- **fabric loop** - arbitrated loop
- **fabric point-to-point** - point to point
- **no connection**

3. Choose Save.

2.2.6.9 Creating a Storage Pool on an Array

Note – Before you reconfigure an existing array, note that any information you type here overwrites the existing information for the array.

Note – You can create a single storage pool by selecting Pools from the View drop-down menu and clicking on Create.

1. Select the Configuration/Array selection tab.

2. Select an array in the Array Selection table and choose Configure.

The Configuration page displays showing array details. You can update the array description and the settings in the Array Properties table.

3. Choose Apply Profile to Configure Storage.

The Configure Storage Profiles Wizard displays, showing a list of profiles applicable for the new pools on this array on the first page. If there are no pools on this array, the only restriction for the profiles may be a fixed number of drives or “Array Type.” If there are pools on the array, an additional limiting factor is the segment size. Only profiles with the same segment size are selectable.

4. Select a profile from the Profile List.

When you select a profile, its details are displayed.

Note – If you don’t want to use the profile, you can also create a new profile by selecting <Create New Profile> and entering the parameters for the profile.

5. Choose next.

6. Select one or more trays from the table.

You can create a pool using a profile.

7. Select the number of pools (one or two) that you want to assign to this tray from the drop-down menu.

8. Choose next.

The default pools names are displayed. You can type custom pool names.

9. Choose next.

The Confirm Selection page appears with a list of the affected volumes and trays that will be affected by a changed profile.

10. Choose Confirm to initiate the operation.

2.2.6.10 Viewing Tray Details

1. Select the Configuration/Array selection tab.

2. Select an array in the Array Selection table and choose Configure.

3. Select Trays from the Sub-reports view drop-down menu.

The trays in the array table displays the tray type, role (Master or Alternate Master), State (Enabled or Disabled), Status, Number of Drives, and Array Hot Spares (AHS). For arrays that are not a controller, the Role, State, and Status Columns shows the dash (-) character.

4. Choose the Tray ID link.

The Tray Details page is displayed. To view existing storage pools for this tray, see “Viewing Storage Pools for Individual Trays” on page 2-26.

2.2.6.11 Viewing Storage Pools for Individual Trays

1. **Perform the steps in “Viewing Tray Details” on page 2-25.**

This page shows the Tray Details. You can select either pools or disks from the Sub-reports drop-down menu.

2. **Select Pools from the Sub-reports view drop-down menu.**

The pools on tray table displays the Pool Name, RAID type, Profile, Available disk space, Total disk space, Hot Spare, Status (online, offline, initializing), and State (idle or verifying).

3. **Choose the Pool Name link to display the storage pool details.**

The volumes assigned to a storage pool are displayed in the Volumes Associated With Pool table. Each volume name is a link that, when clicked, shows volume details.

Note – If you choose the Name link in the table, you can change the volume access permissions on this page.

2.2.7 Managing Storage Profiles

Use the procedures described in the following subsections to create and manage storage profiles on the Sun StorEdge 6020 arrays. You can create, delete, modify, import, and export profiles.

Clicking the Configuration -> Profiles tab displays the Profile Management page. You can choose a pre-configured profile or create a new one. Filter the profiles to display with the following information:

- Name - The profile name
- Raid - RAID levels 0, 1, or 5
- Segment size- A segment size of 4 Kbytes, 8 Kbytes, 16 Kbytes, 32 Kbytes, or 64 Kbytes. In a RAID-5 configuration, the segment size is the size of the data striped across volumes.
- Readahead - The read-ahead cache.status (on/off)
- Array Type - Determines the specific array type to use:
 - 1) Exact Match – IOPS (1x2, 2x4 array)
 - 2) Exact Match – Bandwidth (1x1, 2x2 array)
 - 3) Exact Match – Capacity (1x3, 2x6 array)
 - 4) Best Available Match – IOPS
 - 5) Best Available Match – Bandwidth
 - 6) Best Available Match - Capacity

Types 1 to 3 match only one array configuration (1x1, 1x2, 1x3, 2x2, 2x4, 2x6). If a profile has one of these three parameter settings and the specific array is not available, then the profile cannot be applied.

Types 4 to 6 attempt to match the best available array based on the environment (IOPS, Bandwidth, Capacity). For example, Best Available Match should be applied to 2x6 but can be applied to 2x4 or 2x2 as well. The system does not determine the best match, but the user selects an array and uses a profile to create pools.

The following rules apply to the three Best Available Match settings:

- (SE6120: MR-1) IOPS: 1x2 - 1x1 - 1x3
- (SE6120: MR-1) Bandwidth: 1x1 - 2x2 - 1x3
- (SE6120: MR-1) Capacity: 1x3 - 1x2 - 1x1
- (SE6120: MR-2, SE6320) IOPS: 2x4 - 2x2 - 2x6
- (SE6120: MR-2, SE6320) Bandwidth: 2x2 - 2x4 - 2x6
- (SE6120: MR-2, SE6320) Capacity: 2x6 - 2x4 - 2x2

Note: For the last three choices, the array or system does not determine the best available match.

2.2.7.1 Creating a Storage Profile

1. Select the Configuration/Profiles selection tab.

2. Choose Create.

The Create New Profile page is displayed.

3. Select the following in the New profile properties table:

- Type a name for the new profile
- Type a description for the profile
- Select the RAID level
- Select a segment size
- Select the readahead status
- Select the number of drives
- Select the array type
- Select the dedicated hot spare status

4. Choose Save.

Note – If your profile has the same storage settings as an existing profile, a confirmation page displays asking you if you want to create the profile. Choose “Cancel” to end the profile creation, or select “Create” to continue.

2.2.7.2 Viewing Modifying a Storage Profile

1. Select the Configuration/Profiles selection tab.

The Profile Management page displays a Profiles table containing all profiles configured on the array. The profile name, RAID type, segment size, read-ahead status and array type are displayed.

You can select an option from the Filter drop-down menu. You can display:

- All profiles
- Profiles in use
- Profiles not in use

2. Select a Name link for an individual profile you want to view.

The Profile Details page displays the Name, Description, RAID level, Segment size, Read Ahead status, Number of drives, Array type, the Dedicated hot spare status.

3. Select one or more profile settings to modify.

You can only modify the name and description of a profile that has storage configured to it.

Note – You can create a new profile with similar settings by clicking the “Save As...” button.

4. Choose Save.

2.2.7.3 Importing a Storage Profile

1. Select the Configuration/Profiles selection tab.

2. Select Import.

The Import Profiles: File Selection page is displayed.

3. Choose Load.

The Confirm Import Profiles page is displayed.

4. Select profiles to import.

Note – If a profile has an import status of “Conflicting Setting,” importing it will overwrite the existing profile.

5. Choose Import.

2.2.7.4 Exporting a Storage Profile

1. **Select the Configuration/Profiles selection tab.**
2. **Select one or more profiles from the Profile Management page to export.**
3. **Click Export.**

A dialog box is displayed. Enter a file name or accept the default file name and select the directory.

4. **Choose Ok on the Save as... dialog box to export the profile.**

The selected profiles will be exported to the local file system in the selected file. See “Importing a Storage Profile” on page 2-29 if you need to import the saved profile.

2.2.7.5 Deleting a Storage Profile

1. **Select the Configuration/Profiles selection tab.**
2. **Select one or more profiles to delete from the Profiles table.**
3. **Choose Delete.**

The Confirm Profile Delete page is displayed.

Note – Profiles that are “In Use” cannot be deleted. Profiles that are in use are listed in the Profiles in Use table.

To view the affected (profiles to be deleted) profiles details page, choose the Profile Name link in the Affected Profiles table.

4. **Choose Delete Profiles.**

2.2.8 Managing Storage Pools

Use the procedures described in the following subsections to create and manage storage pools on the Sun StorEdge 6020 arrays. You can create and delete storage pools, place the storage in the pools online or offline, and configure related pool settings.

2.2.8.1 Creating a Storage Pool

1. **Select the Configuration/Array selection tab.**
2. **Select a storage array in the table and choose Configure.**
3. **Ensure that Pools are listed in the Sub-reports view menu.**
4. **Choose Create.**

The Create New Pool wizard is displayed.

5. **Select the following in the wizard:**
 - Select the first tray where you will create the storage pool and choose Next.
 - Select a profile from the profile list, or alternately, you can create a new profile. Choose Next to continue.
 - Name the pool and select the number of disk drives to use in the construction of the storage pool. Choose Next to continue.
6. **Choose Confirm.**

2.2.8.2 Initializing a Storage Pool

1. **Select the Configuration/Array selection tab.**
2. **Select a storage array in the table and choose Configure.**
3. **Ensure that Pools are listed in the Sub-reports view menu.**
4. **Select one or more pools in the table to initialize.**

You will receive a Warning message if volume data is detected on the storage pool. Choose “Initialize” to continue, or “Cancel” to end the storage pool initialization.

5. **Choose Initialize.**

2.2.8.3 Placing a Storage Pool Online or Offline

1. **Select the Configuration/Array selection tab.**
2. **Select a storage array in the table and choose Configure.**
3. **Ensure that Pools are listed in the Sub-reports view menu.**
4. **Select one or more pools in the table.**
5. **Choose one of the following buttons:**
 - Choose Online to place the storage pool volumes online, making the storage available
 - Choose Offline to place the storage pool volumes offline. Note - you can initialize a pool that is offline.
6. **Choose Refresh to update the storage pool status in the table.**

2.2.8.4 Viewing the Storage Pool Summary

1. **Select the Configuration/Array selection tab.**
2. **Select a storage array in the table and choose Configure.**
3. **Ensure that Pools are listed in the Sub-reports view menu.**

The storage pool summary table is displayed. The table displays the following information:

- Pool name - name of an existing pool
- RAID - RAID level of the pool volumes; levels are 0, 1, or 5
- Profile Name - the name of the profile containing the storage pool configuration settings
- Available - the available storage capacity for new volumes you might create and add to this pool.

With no volumes created, the Available column shows the total storage capacity available to the pool.

The maximum size for a new volume is limited by the size of the pool. With one or more volumes created, the Available column shows the maximum allowed size for the next new volume you create and add to this pool, or the actual amount of storage available to a new volume.

- Total - the total storage capacity of the pool. Once you create a storage pool, this number remains constant
- Status - shows the pool status, online and available or offline and unavailable. See “Placing a Storage Pool Online or Offline” on page 2-32
- State - shows the current state of the pool

You can also access storage pool summary information by clicking on Pools in the Tree pane or by selecting Array Selection and Manage Pools.

See also “Viewing Storage Pool Details” on page 2-33.

2.2.8.5 Viewing Storage Pool Details

- 1. Select the Configuration/Array selection tab.**
- 2. Select a storage array in the table and choose Configure.**
- 3. Ensure that Pools are listed in the Sub-reports view menu.**
- 4. Choose the Pool Name link to display the storage pool details.**

The volumes assigned to a storage pool are displayed in the Volumes Associated table. Each volume name is a link that, when clicked, shows volume details.

You can also access storage pool details by clicking on the pool name in the Tree pane or by selecting Array Selection, Manage Pools, then the Pool name.

2.2.8.6 Applying a Different Profile to a Storage Pool

1. **Perform the steps in “Viewing Storage Pool Details” on page 2-33 to get to the desired storage pool.**

2. **Choose Apply Different Profile.**

The Apply Different Profile page displays profiles that can be applied without affecting the pool.

You can perform the addition or removal of a spare for a pool by changing the profile. If you have a spare, and change to a profile that does not have a spare, the spare will be removed (if using array firmware Version 3.1). Similarly, a spare can be added if available.

3. **Select a profile to apply from the profile table.**

Only profiles that can be applied to the pool will be displayed.

4. **Choose Save.**

2.2.8.7 Deleting a Storage Pool

1. **Select the Configuration/Array selection tab.**
2. **Select a storage array in the table and choose Configure.**
3. **Ensure that Pools are listed in the Sub-reports view menu.**
4. **Select one or more pools in the table to delete.**
5. **Choose Delete.**

2.3 Managing Disk Scrubber

The *disk scrubber* feature constantly reviews the volumes for consistency. As a result, you will see the disk LEDs flash regardless of I/O. Disk scrubber is enabled by default.



Caution – .Sun does not recommend disabling the disk scrubber. Disabling the disk scrubber may lead to latent disk block errors which could cause multiple disk failures and loss of data.

2.3.1 Media Errors

The disk scrubber finds certain media errors on a read for all RAID levels. For RAID0 volumes it reports this to the `syslog`. For RAID1 and RAID5 volumes, the errors will be fixed.

This condition will be indicated by a `syslog` entry as shown in the following example:

■ Media Error on `uld02`:

```
uld02 Sense Key = 0x3, Asc = 0x11, Ascq = 0x0
Jan 09 09:08:42 array00 ISR1[1]: W: uld02 Sense Data
Description Unrecovered Read Error
```

■ RAID1: Messages from the disk scrubber task:

```
Jan 09 09:08:42 array00 SX11[1]: N: ulctr fixing data on verify
scb=441069c
```

■ RAID5: Messages from the disk scrubber task:

```
Jan 09 09:24:13 array00 SX11[1]: N: ulctr fixing parity on
verify scb=433bde0
```

■ Messages sent after the fix:

```
Jan 09 09:08:42 array00 ISR1[1]: N: uld02 Sense Key =0x1, Asc =
0xc, Ascq = 0x1
```

```
Jan 09 09:08:42 array00 ISR1[1]: N: uld02 Sense Data
Description = Write Error - Recovered With Auto Reallocation
```

2.3.2 Data and Parity Errors

If the disk scrubber feature finds any inconsistencies in the data or computed parity, it sends messages to the array `syslog` file.

These inconsistencies are also fixed as seen in the following example messages:

Examples of new `syslog` messages from running the disk scrubber:

■ No mismatch output:

```
Sep 22 18:02:25 psc0[1]: N: Vol verify (m1) started
```

```
Sep 22 18:02:28 psc0[1]: N: Vol verify (m1) ended
```

■ RAID5: Computed parity and read parity mismatch

```
Sep 22 18:06:17 psc0[1]: N: Vol verify (m1) started
```

```
Sep 22 18:06:18 WXFT[1]: E: ulctr: vol (m1), Slice  
Name:(m1slice) vol verify detected
```

```
data parity mismatch on Stripe: 7, Lun:0
```

```
Sep 22 18:06:18 WXFT[1]: N: ulctr Parity on stripe 7 is fixed  
in vol (m1)
```

```
Sep 22 18:06:20 psc0[1]: N: Vol verify (m1) ended
```

■ RAID1:Data and mirror copy mismatch

```
Sep 22 18:06:17 psc0[1]: N: Vol verify (m1) started
```

```
Sep 22 18:06:18 WXFT[1]: E: ulctr: vol (m1), Slice  
Name:(m1slice) vol verify detected data and mirror mismatch on  
block: 31, Lun:0
```

```
Sep 22 18:12:46 WXFT[1]: N: ulctr Mirror block 31 is fixed in  
vol (m1)
```

```
Sep 22 18:12:56 psc0[1]: N: Vol verify (m1) ended
```

▼ To Enable or Disable Disk Scrubber

1. **Select the Configuration → Array Selection tab.**
2. **Select a storage array in the table and choose** `Configure`.
3. **Select** `Enable Disk Scrubbing` **or** `Disable Disk Scrubbing`.

2.3.3 Managing Array Volumes

Use the procedures described in the following subsections to create and manage volumes on Sun StorEdge 6020 arrays. You can create, modify, and delete volumes.

Note – To manage volume groups, see “Managing Volume Groups” on page 2-40

2.3.3.1 Creating a Volume

Note – You cannot change a volume’s name after creating and naming it.

1. Select the Configuration/Array selection tab.

2. Select an array from the Array Selection table and select Manage Volumes from the drop-down menu. Alternately, you can choose “Configure” and select “Volumes” view from the sub-reports section of the page.

The Manage Volumes page displays a current list of volumes on the selected array. The Volume table displays the Name, Pool, Profile name, LUN, Capacity, and Status of currently-configured volumes.

3. Choose Create.

The Create New Volume wizard is displayed in a new page.

4. Select or type the following in the wizard:

- Volume name; the name can contain only 9 characters (a-z or A-Z)
- Storage pool to which you add the volume
- Volume size - The minimum size for the new volume is 10MB; the maximum size for a new volume is 2 TB (the maximum size of the pool).
- Permissions: None, Read-Write, Read-Only
- Default logical unit number (LUN)
- Volume group to which you add the volume

5. Choose Confirm.

2.3.3.2 Changing Volume Access Permissions

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and select Manage Volumes from the drop-down menu.**

The Manage Volumes page is displayed. This page displays a table showing details about currently-configured volumes.
3. **Choose a Name link in the Volumes table.**

The Volume Details page is displayed.
4. **Select a permission type from the Permissions menu:**
 - None; this setting is the default, specifying no access
 - Read-only; specifies read access only for this volume
 - Read/Write; specifies full access (read and write) for this volume
5. **Choose Save.**

Optional: You can also add this volume to an existing volume group:

 - a. **Choose Add to Group.**
 - b. **Select a volume group in the Volume Groups table.**
 - c. **Choose Save.**

2.3.3.3 Adding a Volume to a Volume Group

Note – To add a volume from an existing volume group to another volume group, remove the volume from its existing volume group first. See “Removing a Volume from a Volume Group” on page 2-39.

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and select Manage Volumes from the drop-down menu.**

The Manage Volumes page is displayed. This page displays a table showing details about currently-configured volumes.
3. **Choose a Name link in the Volumes table.**

4. **Choose Add to Group**
5. **Select a volume group in the Volume Groups table.**
6. **Choose Add.**

2.3.3.4 Removing a Volume from a Volume Group

Note – See also “Removing One or More Volumes from a Volume Group” on page 2-42.

1. **Select the Configuration/Array selection tab.**
2. **Select a source array from the Array Selection table and select Manage Volumes from the drop-down menu.**

The Manage Volumes page is displayed. This page displays a table showing details about currently-configured volumes.
3. **Choose a Name link in the Volumes table.**
4. **Choose Remove from Group.**

2.3.3.5 Deleting a Volume

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and select Manage Volumes from the drop-down menu. Alternately, you can choose “Configure” and select “Volumes” view from the sub-reports section of the page.**

The Manage Volumes page is displayed. This page displays a table showing details about currently-configured volumes.
3. **Select one or more volumes to delete.**

The Confirm Volume Delete Operation page is displayed, showing initiators that will be impacted by the volume deletion. If you don’t want to impact the volume/initiator configuration, choose Cancel to end the deletion process.
4. **Choose Delete Volume(s)**

2.3.4 Managing Volume Groups

Use the procedures described in the following subsections to manage volume groups on the Sun StorEdge 6020 arrays. You can create, add, modify, remove, and delete volume groups.

Note – To manage volumes, see “Managing Array Volumes” on page 2-37

2.3.4.1 Creating a Volume Group

Note – To add a volume from an existing volume group to another volume group, remove the volume from its existing volume group first. See “Removing One or More Volumes from a Volume Group” on page 2-42.

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Volume Groups from the drop-down menu.**

The Manage Volume Groups page is displayed. This page displays a table showing links to details about currently-configured volume groups and associated initiator groups.

3. **Choose Create.**

The Create New Volume wizard is displayed in a new page.

4. **Select or type the following in the wizard:**
 - Volume group name; the name can be up to 16 characters.
 - Volumes to add to the group, if any. You can only add volumes if they are not a member of a volume group.
 - Initiator groups to associate with this volume group and association permissions
5. **Choose Confirm.**

2.3.4.2 Viewing Volume Group Details

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Volume Groups from the drop-down menu.**

The Manage Volume Groups page is displayed. This page displays a table showing existing volume groups and initiators as links. When you choose a link, a page is displayed showing details about that volume group or associated initiator groups.

3. **Choose a volume group name link in the table.**

The details include the volume group name, a View List link to associated initiator groups, and a table showing each volume in the group.
4. **Choose the initiator group or volume name link to see details about that selection.**

2.3.4.3 Adding Volumes to a Volume Group

Note – To add a volume from an existing volume group to another volume group, remove the volume from its existing volume group first. See “Removing One or More Volumes from a Volume Group” on page 2-42.

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Volume Groups from the drop-down menu.**

The Manage Volume Groups page is displayed. This page displays a table showing links to details about currently configured volume groups and associated initiator groups.

3. **Choose a volume group Name link to select a volume group.**
4. **Choose Add.**
5. **Select volumes from the volume table.**

You can only add volumes that are not a member of a group.
6. **Choose Add Selected.**

2.3.4.4 Removing One or More Volumes from a Volume Group

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Volume Groups from the drop-down menu.**

The Manage Volume Groups page is displayed. This page displays a table showing existing volume groups and initiators as links. When you choose a link, a page is displayed showing details about that volume group or associated initiator groups.

3. **Choose a volume group name link in the table.**
The Volume Group details page is displayed.
4. **Select one or more volumes from the Members table.**
5. **Choose Remove.**
6. **Remove from Group.**

2.3.4.5 Deleting a Volume Group

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Volume Groups from the drop-down menu.**
3. **Choose Manage Volume Groups.**

The Manage Volume Groups page is displayed. This page displays a table showing links to details about currently-configured volume groups and associated initiator groups.

4. **Select one or more volume groups in the table.**
You must first remove all volumes from the selected volume group before deleting the volume group.
5. **Choose Delete.**
6. **Choose Confirm.**

2.3.5 Managing Initiators and Initiator Groups

Use the procedures described in the following subsections to manage initiators and initiator groups in the Sun StorEdge 6020 arrays. You can modify, create, add, and delete initiators and initiator groups.

2.3.5.1 Creating an Initiator

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table to create an initiator.**
3. **Choose Manage Initiators from the drop-down menu.**

The Manage Initiators page is displayed. This page displays a table showing existing initiators as links. When you choose a link, a page is displayed showing details about that initiator.

4. **Choose Create.**
5. **Type the following:**
 - World Wide Name (WWN) has to be exactly 16 hex characters. Valid characters are 0-9, and A-F.
 - Text description of up to 64 characters
6. **(Optional) Select one or more initiator groups in which to add the initiator.**
7. **Choose Save.**

2.3.5.2 Viewing Initiator Details

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Initiators from the drop-down menu.**
3. **Choose a WWN link to see details about the initiator.**

The Initiator Details page is displayed. The details shown include the WWN and the Description. Initiator groups and related volume groups to which the initiator belongs are also included in the Initiator Memberships section.
4. **Choose an Initiator Group or Volume Group link to display details about those groups.**

2.3.5.3 Deleting One or More Initiators

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table to delete an initiator.**
3. **Choose Manage Initiators from the drop-down menu.**
4. **Select one or more initiators.**
5. **Choose Delete.**
6. **Choose Confirm.**

2.3.5.4 Creating an Initiator Group

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table to create an initiator group.**
3. **Choose Manage Initiator Groups from the drop-down menu.**

The Manage Initiator Groups page is displayed. This page displays a table showing existing initiator groups as links. When you choose a link, a page is displayed showing details about that group.

4. **Choose Create.**
5. **Enter an initiator group Name in the Value field.**
The name can be up to 15 characters.
6. **Select one or more initiators in the table.**
7. **Choose Create.**

2.3.5.5 Duplicating Initiator Groups

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table.**
3. **Choose Duplicate Initiators from the drop-down menu.**

The Initiator Group Section page is displayed. Select initiator groups that you want to import.

4. Choose Select Targets.

Select one or more arrays that you want to import the initiator group(s) to. If you want to cancel the operation, choose Cancel.

5. Choose Import to Selected Arrays.

2.3.5.6 Adding Initiators to an Initiator Group

- 1. Select the Configuration/Array selection tab.**
- 2. Select an array from the Array Selection table to add an initiator group.**
- 3. Choose Manage Initiator Groups from the drop-down menu.**
- 4. Choose the initiator group Name link.**
- 5. Choose Add.**
- 6. Select one or more initiators.**
- 7. Choose Add Selected.**

2.3.5.7 Deleting an Initiator Group

- 1. Select the Configuration/Array selection tab.**
- 2. Select an array from the Array Selection table to delete an initiator group.**
- 3. Choose Manage Initiator Groups from the drop-down menu.**
- 4. Select one or more initiator groups.**
- 5. Choose Delete**
- 6. Choose Delete Initiator Group(s).**

2.3.5.8 Removing One or More Initiators from an Initiator Group

This page also enables you to add initiators to an initiator group. See “Adding Initiators to an Initiator Group” on page 2-45.

- 1. Select the Configuration/Array selection tab.**
- 2. Select an array from the Array Selection table and choose Manage Initiator Groups from the drop-down menu.**
- 3. Select a Name link to view the Initiator Group Details page.**

4. **Select one or more members of the initiator group.**
5. **Choose Remove.**
6. **Choose Confirm.**

2.3.5.9 Adding a Volume Group to an Initiator Group

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Initiator Groups from the drop-down menu.**
3. **Choose the `show` link in the Volume Groups column.**
4. **Choose Add.**

Setting access permissions between initiator and volume groups sets access permissions for all initiators in the selected initiator group to all volumes in the selected volume group.

- a. **Select one or more initiator groups in the table.**
- b. **Select the access from the menu: Read/Write or Read-Only.**
- c. **Add Selected.**

2.3.5.10 Adding an Initiator Group to a Volume Group

1. **Select the Configuration/Array selection tab.**
2. **Select an array from the Array Selection table and choose Manage Volume Groups from the drop-down menu.**
3. **Choose the `show` link in the Initiator Groups column.**

The current initiator groups associated with the volume are displayed. From this page, you can click on the Name link to view initiator group details, or change the current Access permissions for the initiator group.

4. **Choose Add.**
5. **Select an initiator group to add to the volume group.**
6. **Choose Add Selected.**

2.3.5.11 Removing an Association between a Volume Group and an Initiator Group

1. Select the **Configuration/Array** selection tab.
2. Select an array from the **Array Selection** table and choose **Manage Initiator Groups** from the drop-down menu.
3. Choose the **show** link in the **Volume Groups** column.
4. Select one or more volume groups.
5. Choose **Remove**.

2.3.5.12 Exporting Initiator Groups to Other Arrays

1. Select the **Configuration/Array** selection tab.
2. Select an array from the **Array Selection** table and choose **Duplicate Initiator Groups** from the drop-down menu.
3. Select initiator groups to export.
4. Choose **Select Targets**.
5. Select one or more target arrays.
6. Choose **Import to Selected Arrays**.

2.3.5.13 Viewing Initiator Group Details

1. Select the **Configuration/Array** selection tab.
2. Select an array from the **Array Selection** table and choose **Manage Initiator Groups** from the drop-down menu.
3. Choose an **Initiator Group Name** link to see details about the initiator group.
The Initiator Group Details page is displayed. The details shown include a “view list” hyperlink to any related volume groups to which the initiator group belongs.
4. Choose a **Volume Group** or an **Initiator link WWN** to display details about those items.

2.3.5.14 Viewing the Access Matrix

The Configuration -> Array Selection -> Access Matrix (drop-down menu) page, lists the read/write permissions for each initiator by volume with the following fields:

- Volume Name.
- LUN - The logical unit number of the volume. The default LUN is the first one available.
- Group - The volume group name. A volume can only belong to one volume group.
- Initiator WWN - The World Wide Name (wwn) of the initiator. For example, 210000e08b047212.
- Group - The initiator group name.
- Permissions Default - Default read/write/none permissions on the volume. The permissions apply to all initiators unless mapped otherwise.
- Group - Group permissions between the volume group and this initiator group.
- Effective - Actual permission that the initiator has on the volume.

2.3.6 Viewing System Reports and Logs

Use the procedures described in the following subsections to view system reports and logs of events (also known as alarms) that have occurred. You can view all events or you can sort the events or alarms by category.

2.3.6.1 Viewing System Logs

1. **Choose the Administration tab.**
2. **Choose Logs.**
3. **Choose Next to see more logs if more than one page of system logs exists.**

2.3.6.2 Viewing System Reports

This page displays detailed information about each storage array, tray, volume, and disk drive in the system. Scroll down the page to view more report information.

1. **Choose the Administration tab.**
2. **Choose Reports.**
3. **Scroll down to see system reports for all components in the system.**

Fault Detection and Isolation Overview

This chapter provides a brief overview of the functionality provided when using the Storage Automated Diagnostic Environment 2.2 software to perform fault detection and isolation on the Sun StorEdge 6320 systems.

For detailed instructions about configuring and using the Storage Automated Diagnostic Environment, refer to the *Storage Automated Diagnostic Environment User's Guide*.

This chapter is organized as follows:

- “Monitoring” on page 3-1
- “Fault Detection” on page 3-2
- “Fault Isolation” on page 3-4
- “Security” on page 3-4
- “Connecting to the Storage Automated Diagnostic Environment” on page 3-5

3.1 Monitoring

If the customer's host is part of the configuration, the individual components are monitored by the Storage Automated Diagnostic Environment through the out-of-band paths connected directly to the host server. See the *Storage Automated Diagnostic Environment 2.2 System Edition User's Guide* for additional information.

Out-of-band refers to the connections and devices that are not in the data path. In this case, the Storage Service Processor does not have access to the data that is stored on the Sun StorEdge 6320 systems.

3.2 Fault Detection

The Storage Automated Diagnostic Environment software running on the Storage Service Processor collects and evaluates information through out-of-band management paths to all storage devices in the Sun StorEdge 6320 system.

One way in which the Storage Service Processor can have access to the in-band diagnostic information is to have the Storage Automated Diagnostic Environment software running on the customer host. The information collected by the Storage Automated Diagnostic Environment is relayed to the Storage Service Processor so that it can aggregate the host information with the device information and send the events to Sun service for monitoring purposes.

The Storage Automated Diagnostic Environment event and alarm notifications are the result of configuring polling devices to be monitored. The polling results are generated when changes to the state and status of these devices are detected.

3.2.1 Local Monitoring

The Storage Automated Diagnostic Environment software can be configured to send alerts and events to a mail(1) address or even to a pager address.

If you are not interested in remote monitoring or are not concerned about security you can choose to enable local monitoring of the Sun StorEdge 6320 system only. In this case, you have two choices:

- Allow the Storage Service Processor to be connected to the management LAN which provides access to one or more host servers.
- Provide a standalone workstation to be connected to the Storage Service Processor as a dedicated resource to send alerts to predetermined staff 24 hours a day, 7 days a week.

If you already have a license for Sun StorEdge Remote Response service, you can choose that method to pass alerts and event status messages to Sun. In that situation, all Sun StorEdge 6320 systems that are grouped share the Sun StorEdge Remote Response modem interface to send alerts to Sun. The master system running Storage Automated Diagnostic Environment software is located on the host where Sun StorEdge Remote Response is running. All grouped Sun StorEdge 6320 systems send all alert and event traffic over the customer's management LAN to the Sun StorEdge Remote Response host server for shipment to Sun. The master system running the Storage Automated Diagnostic Environment software is optionally configured to send email or pager messages locally.

If you use the management LAN connection without host Sun StorEdge Remote Response support, you can set up the Storage Automated Diagnostic Environment software can be set up to send email or pager message notification when an alert or event occurs. To use this service, you must allow access to a host server containing email or pager message service. The Storage Automated Diagnostic Environment software on the Storage Service Processor is then configured for a group of Sun StorEdge 6320 systems and routes all of its alert and event traffic to the shared modem on the customer's host server. The master system is responsible for forwarding the traffic through the specified medium.

If you do not want any connection between the Storage Service Processor and the host servers, a dedicated workstation can be attached to the Storage Service Processor. The Storage Automated Diagnostic Environment software on the Storage Service Processor that is configured as a master sends the messages to that resource. This solution requires you to do both of the following:

- Provide a full-time person to monitor the workstation
- Report serviceable action items to Sun in a timely manner to comply with the service contract

3.2.2 Remote Monitoring

Fault detection, using the Sun StorEdge Remote Response service, is enabled through the Storage Automated Diagnostic Environment provider function.

Events and alarms are sent through a preconfigured modem to servers that receive them. Based on several conditions, such as type and severity, a support person might be paged. The Sun StorEdge Remote Response service is enabled in the Storage Automated Diagnostic Environment software using the provider function in the maintenance section of the administration GUI. When enabled, the service transmits events to Sun and alerts the Sun StorEdge Remote Response solution centers by way of uucp(1) through the modems.

The Sun Service center can dial into the system if necessary to perform corrective actions.

3.3 Fault Isolation

Fault isolation in the Sun StorEdge 6320 system is normally done using first-fault isolation techniques. For instance, if a disk drive failure occurs, a notification is immediately sent. In some cases diagnostics need to be executed and the Storage Automated Diagnostic Environment software provides diagnostics for the Sun StorEdge 6020 arrays including Volume Verification and loopback tests.

The diagnostics for the Storage Service Processor are monitored using remote access to the Storage Service Processor module.

3.4 Security

The Sun StorEdge Remote Response service provides remote monitoring and serviceability. Sun provides as safe an environment as possible for its Sun StorEdge Remote Response service through the use of security software installed on the Storage Service Processor.

Sun uses the secure shell (`ssh(1)`) command for the connection between the dial-up line and the Storage Service Processor, which adds encryption and some authentication. After access to the Storage Service Processor is established using PPP and CHAP, the OPIE authentication tool requires the user to call the SunService Center and answer a unique login challenge.

The SunServiceSM center, after authenticating the caller, provides the authentication key to allow connection to the Storage Service Processor. When you access the Storage Service Processor through the Storage Automated Diagnostic Environment GUI, the GUI software contains an authentication process requiring a login and password that can be tuned for specific users to have specific capabilities. Secure Socket Layer (SSL) encryption is employed between the Storage Service Processor and the customer's network connection to prevent snooping. Through the Storage Automated Diagnostic Environment, port 7654 (exclusively managed by this software environment) and port 7443 (secure shell) are used.

If you activate the Sun StorEdge Remote Response service and want to access the Storage Service Processor through the local area network (LAN), you should implement your standard security procedures for the creation of a private network using modems that also has access into your LAN.

The following services are enabled on the Storage Service Processor:

- `tftp(1)`

- Reverse Address Resolution Protocol (RARP) (`in.rarpd(1M)`)

The following services are disabled on the Storage Service Processor:

- `picld(1M)`, the Platform Information and Control Library (PICL)
- `automount(1M)`
- Networked File System (NFS) server
- NFS client
- `telnet(1)`
- `ftp(1)`

Contact your Sun Service provider to activate the Sun StorEdge Remote Response service.

3.5 Connecting to the Storage Automated Diagnostic Environment

To open a non-secure connection to the Storage Automated Diagnostic Environment, use the following URL:

```
http://system_ip_address:7654
```

To open a secure connection, use the following URL:

```
https://system_ip_address:7443
```

The username and passwords are shared with the configuration software. You can use the `admin`, `storage`, and `guest` usernames that are discussed in Chapter 2 in the Storage Automated Diagnostic Environment.

Preparing for Servicing FRUs

The Sun StorEdge 6320 system is preconfigured with all the FRUs installed as specified by the customer. This chapter describes the preparation required for trained service personnel to service the FRUs in the system. All other system features require maintenance by Sun Service personnel.

This chapter is organized as follows:

- “Safety Requirements for Servicing FRUs” on page 4-1
- “Removing and Replacing the Cabinet Doors” on page 4-2
- “Removing and Replacing FRUs” on page 4-5
- “Servicing the Expansion Cabinet” on page 4-13
- “Servicing the Ethernet Hub” on page 4-21
- “Servicing the Service Processor Panel” on page 4-25
- “Servicing the Storage Service Processor” on page 4-34
- “Servicing the Sun StorEdge Network FC Switch-16 Switches” on page 4-39
- “Servicing a Sun StorEdge FC Switch” on page 4-39
- “Servicing Sun StorEdge 6020 Arrays” on page 4-41
- “Servicing the Storage Service Processor Accessory Tray” on page 4-59

The tools and parts required are described in each FRU section.

4.1 Safety Requirements for Servicing FRUs

- Ensure that the voltage and frequency of the power outlet to be used match the electrical rating labels on the system.
- Wear an antistatic wrist strap when handling any magnetic storage FRUs or system boards.

- Use only properly grounded power outlets.
- Installation and removal of some FRUs may require two or more people.



Caution – You must read the *Sun StorEdge 6320 System Regulatory and Safety Compliance Manual* before beginning any procedure in this manual.



Caution – *Do not* make mechanical or electrical modifications to the system. Sun Microsystems is not responsible for regulatory compliance of modified cabinets.

4.2 Removing and Replacing the Cabinet Doors

During the process of removing and replacing a FRU, you might need to remove the front door of the Sun StorEdge 6320 system. This section explains how to remove and replace the front door of the system.

No tools are required to remove the front door.

4.2.1 Removing the Front Door

1. Open the front screen door.
2. Reach inside the door and push down on the lever attached to the spring of the top hinge pin.

This causes the hinge pin to retract into the door.

3. Tilt the door out from the top mounting bracket and lift up slightly.
4. Remove the door and set it aside.

4.2.2 Replacing the Front Door

1. Tilt the door and insert the bottom hinge pin with the outside hole of the lower-left mounting bracket.

2. **Reach inside the door and push down on the lever attached to the spring of the top hinge pin.**

This causes the hinge pin to retract into the door.

3. **Align the top hinge pin with the outside hole of the top-left mounting bracket.**

4. **Release the lever.**

The hinge pin extends into the mounting bracket.

4.2.3 Removing and Replacing a Side Panel

You will need to use a 1/4-inch Allen wrench when removing or replacing the side panel.

▼ Removing a Side Panel

- **Use an Allen wrench to loosen the four 1/4-inch shoulder screws that fasten the panel to the system, and then remove the panel from the system (FIGURE 4-1). Repeat step for each panel.**

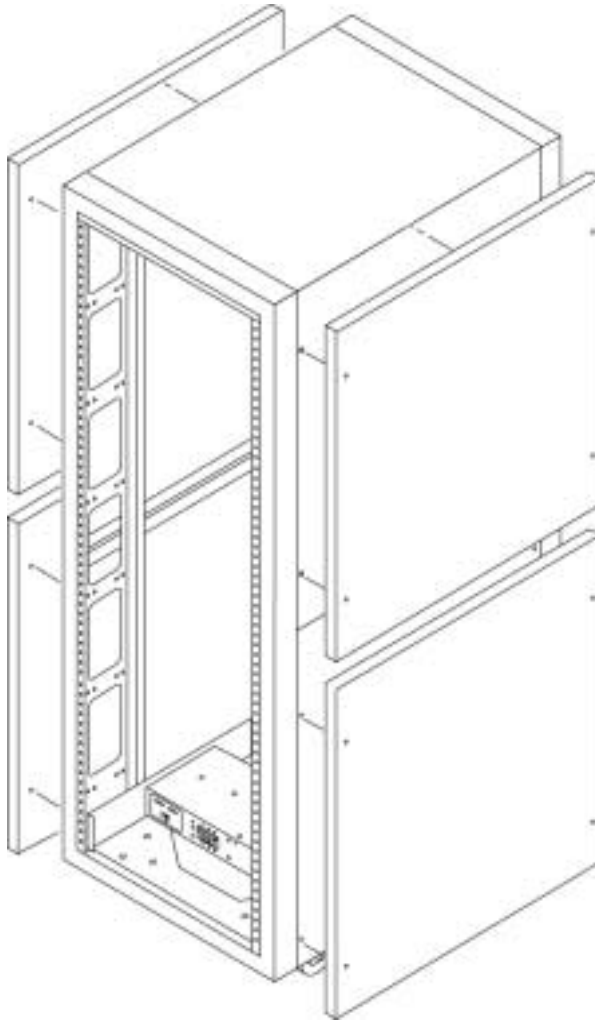


FIGURE 4-1 Removing and Replacing the Side Panels

4.2.4 Replacing the Side Panel

1. **Align the panel screw holes to the system screw holes.**
2. **Use an Allen wrench to tighten the four 1/4-inch shoulder screws to fasten the panel to the system (FIGURE 4-1).**

4.2.5 Opening the Back Door of the System

- Open the back door of the expansion cabinet (FIGURE 4-2).

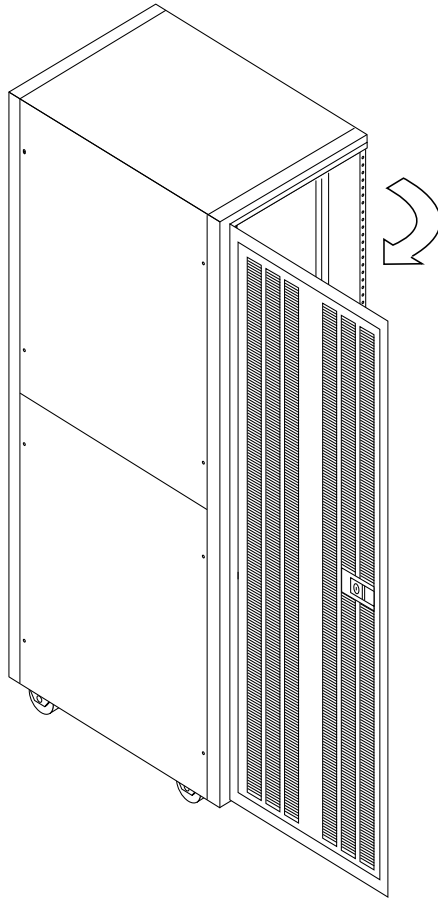


FIGURE 4-2 Opening the Back Door

4.3 Removing and Replacing FRUs

This section describes the general instructions about how to install and remove a FRU, the default configuration settings for the Sun StorEdge 6320 system, and the placement of the FRUs in the system.

Procedures to configure or modify the configuration of FRUs that have a software component are described in the chapter associated with the specific FRU.



Caution – FRUs in the system must be loaded from the bottom to the top to keep the system center of gravity as low as possible. When servicing the storage system, remove only one FRU from the storage system at a time. If possible, remove FRUs from top to bottom to prevent raising the system's center of gravity.

See FIGURE 4-3 and FIGURE 4-4 for the naming conventions and the placement of FRUs in the system.

This chapter is organized as follows:

- “Safety Requirements for Servicing FRUs” on page 4-1
- “FRU Locations” on page 4-7
- “Required Tools for Servicing FRUs” on page 4-6

4.3.1 Required Tools for Servicing FRUs

The required tools for installing FRUs are:

- Slotted screwdriver
- No. 2 Phillips screwdriver
- 1/4-inch Allen wrench
- 9/32-inch nut driver

4.3.2 FRU Locations

The locations where FRUs can be mounted in the Sun StorEdge 6320 storage system are shown in FIGURE 4-3 and FIGURE 4-4. The locations are defined by the number of rack units (RU) occupied by a FRU or blank panel.

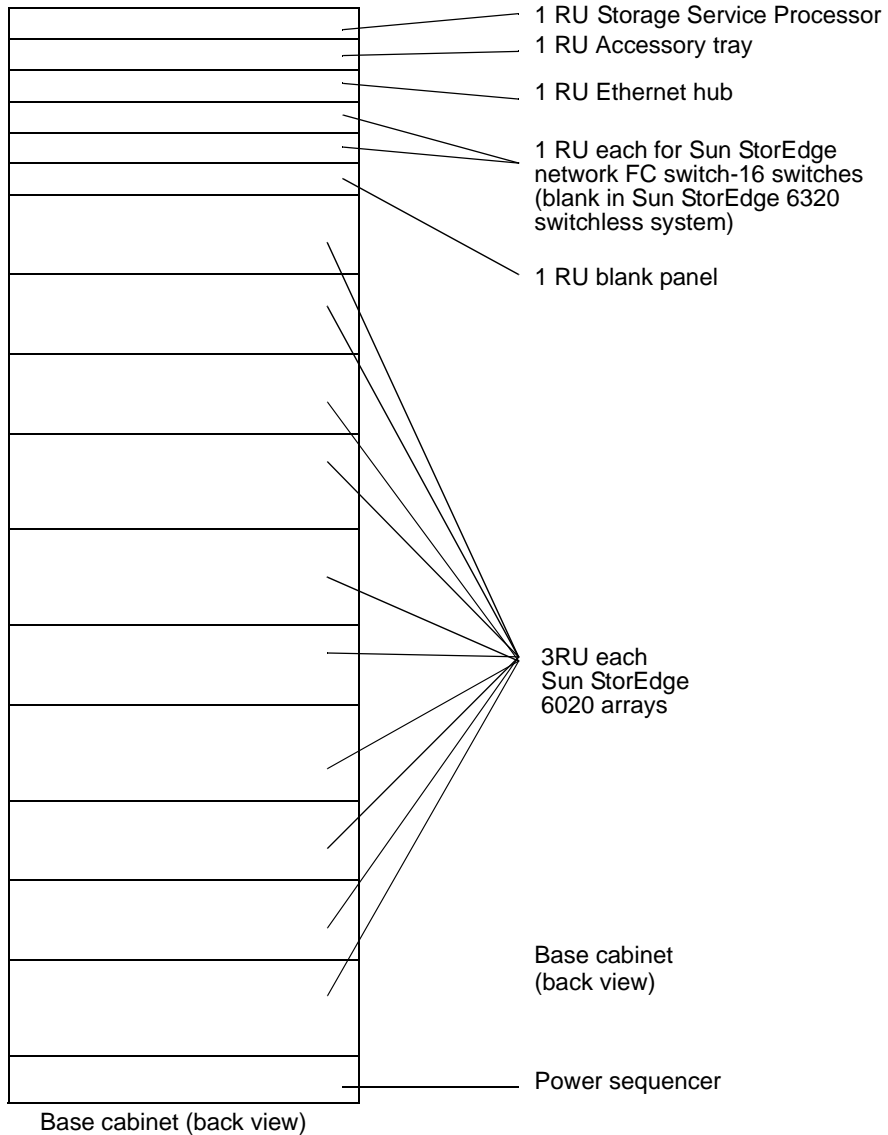


FIGURE 4-3 Sun StorEdge 6320 System FRU Placement

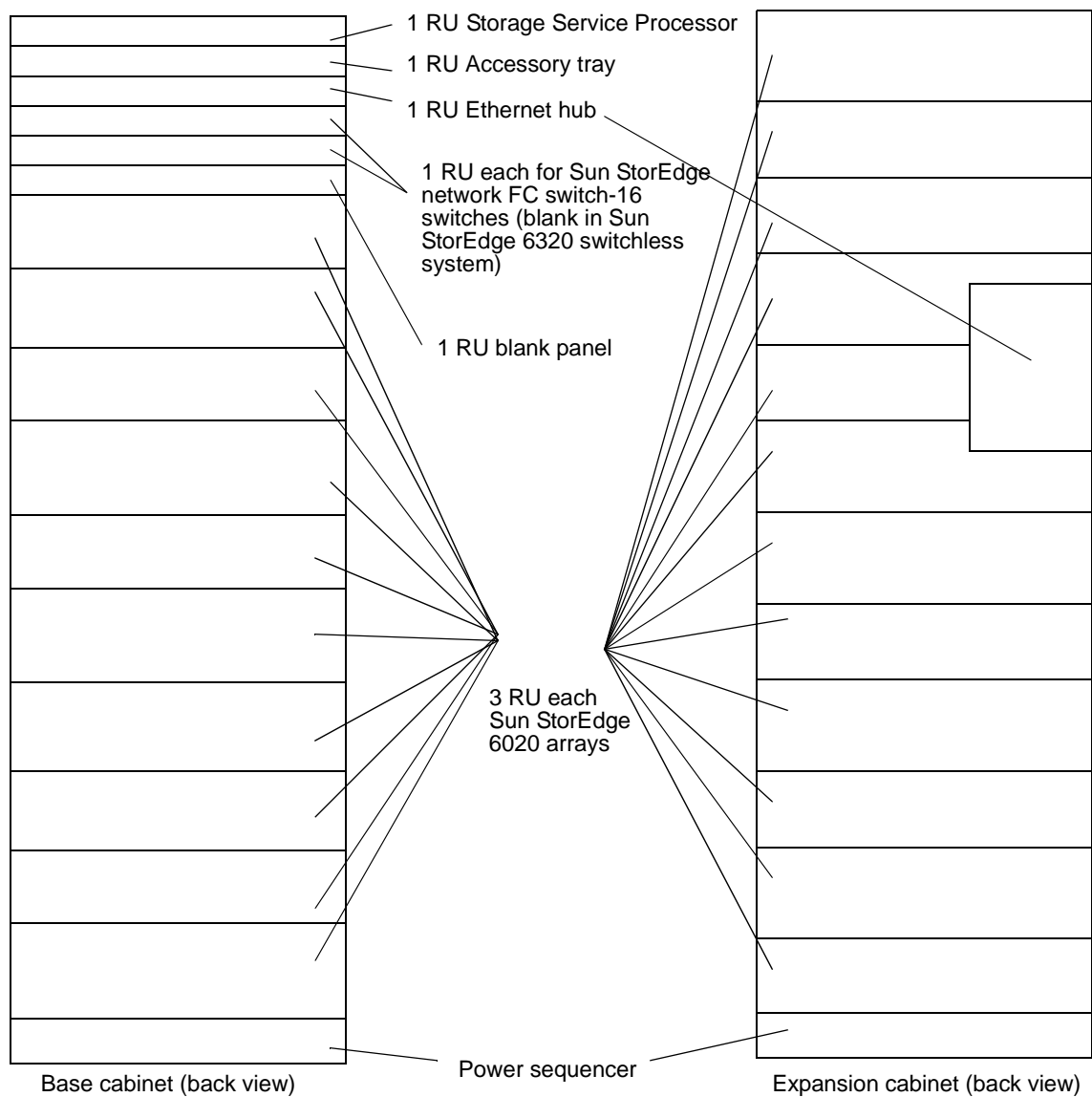


FIGURE 4-4 Sun StorEdge 6320 System FRU Locations

4.3.3 Opening the System and Installing a FRU

1. Remove the side panels, if necessary.

Refer to Section 4.2.3, “Removing and Replacing a Side Panel” on page 4-3 for a description of removing the side panels.

2. Determine where you are going to install the FRU.

Refer to the system Section 4.3.2, “FRU Locations” on page 4-7.

3. Open the back door of the Sun StorEdge 6320 system cabinet.

4. Remove the front door to install a FRU, if necessary.

Refer to Section 4.2, “Removing and Replacing the Cabinet Doors” on page 4-2.

5. Remove the filler panel located where you will install the FRU (FIGURE 4-5).

a. Use a No. 2 Phillips screwdriver to loosen the PEM fastener screws that attach the panel to the storage system. The screws will remain attached to the filler panel.

b. Remove the filler panel and save it for future use.

Note – To maintain proper airflow, make sure that you install filler panels over locations that do not have FRUs mounted.

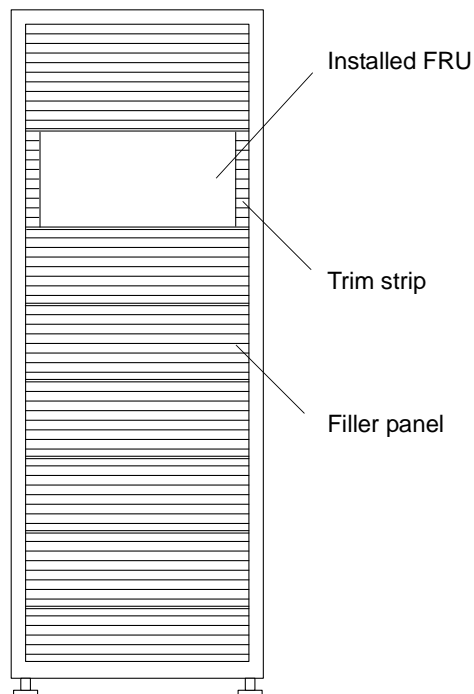


FIGURE 4-5 Filler Panel and Trim Strip Location

6. If the storage system is not mounted to the floor, extend the stabilizer legs.

The stabilizer legs are located under the front of the storage system. Refer to the *Sun StorEdge 6320 System Installation Guide* for detailed instructions.



Caution – Always extend or retract the stabilizer legs as a pair. Make sure that the levelers have been adjusted before attempting to move the stabilizer legs.

7. Install the FRU.

Refer to the section Section 4.3.2, “FRU Locations” on page 4-7.

8. Route the power cables from the FRU to the power sequencer(s).

A storage system that is ordered without all possible FRUs installed has the power cables routed as shown in FIGURE 4-6.

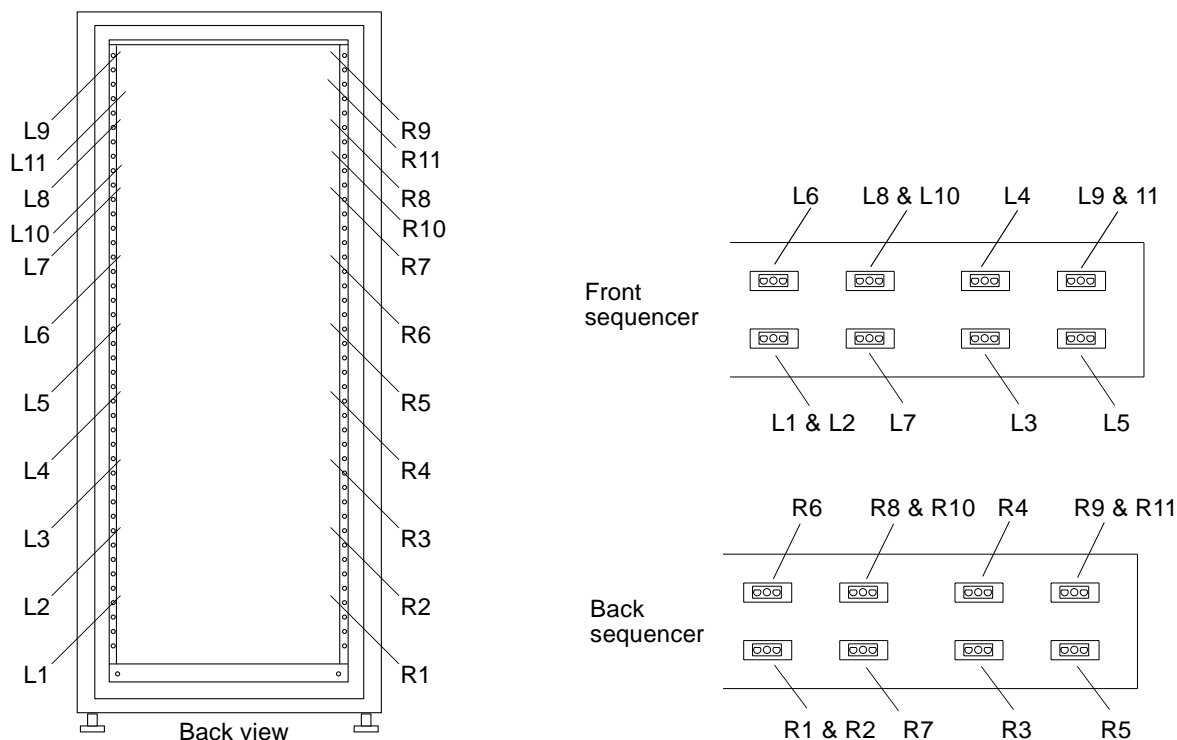


FIGURE 4-6 Power Cable Routing



Caution – Power cable routing can vary, depending on how the storage system is configured.

9. Install the trim strips (FIGURE 4-5).

Use a No. 2 Phillips screwdriver to tighten the captive screws.

10. If necessary, retract the stabilizer legs under the storage system.

11. If necessary, close the front screen door.

If you previously removed the door, refer to Section 4.2, “Removing and Replacing the Cabinet Doors” on page 4-2.

12. Replace the side panels, if you removed them.

See Section 4.2.3, “Removing and Replacing a Side Panel” on page 4-3 for a description of replacing side panels.

4.3.4 Removing a FRU

Required tools are:

- Slotted screwdriver
- No. 2 Phillips screwdriver
- 1/4-inch Allen wrench

To remove a FRU:

1. Remove the side panels, if necessary.

Refer to Section 4.2.3, “Removing and Replacing a Side Panel” on page 4-3 for a description of removing the side panels.

2. For cabinets equipped with a front screen door, open the front screen door.

If it is necessary to remove the front door to remove a FRU, refer to Section 4.2, “Removing and Replacing the Cabinet Doors” on page 4-2.

3. Remove the trim strips beside the FRU (FIGURE 4-5).

Use a No. 2 Phillips screwdriver to loosen the captive screws that attach the trim strips to the system.

Save the trim strips for future use.

4. If the storage system is not mounted to the floor, extend the stabilizer legs.

The stabilizer legs are located under the front of the system.



Caution – Always extend or retract the stabilizer legs as a pair. Make sure that the levelers have been adjusted before attempting to move the stabilizer legs.

5. Remove the FRU.

Refer to Section 4.3.2, “FRU Locations” on page 4-7 for the location of FRUs in the system.

6. If you are not replacing the FRU, install a filler panel over its previous location (FIGURE 4-5).

Use a No. 2 Phillips screwdriver to tighten the captive screws.

Note – To maintain proper airflow, make sure that you install filler panels over locations that do not have FRUs mounted.

7. If necessary, retract the stabilizers under the system.

8. If necessary, close the front screen door.

If you previously removed the door, refer to Section 4.2, “Removing and Replacing the Cabinet Doors” on page 4-2.

9. Replace the side panels, if you removed them.

See Section 4.2.3, “Removing and Replacing a Side Panel” on page 4-3 for a description of replacing the side panels.



4.4 Servicing the Expansion Cabinet

This chapter describes the removal and replacement of FRUs in the Sun StorEdge Expansion Cabinets.

This chapter is organized as follows:

- “Servicing the Power Sequencer” on page 4-13
- “Servicing the AC Power Cable” on page 4-15
- “Servicing the Key Switch” on page 4-17
- “Adding a Second Cabinet” on page 4-19

4.4.1 Servicing the Power Sequencer

This section describes the removal and replacement of the power sequencer. TABLE 4-1 shows the FRU associated with the power sequencer:

TABLE 4-1 Sun StorEdge Expansion Cabinet FRU List

FRU Description
Power sequencer

Required tools are:

- 1/4-inch slotted screwdriver
- No. 2 Phillips screwdriver

4.4.1.1 Removing the Power Sequencer

The power sequencer is hot-swappable.

1. **Ensure that the power to the power sequencer that you are changing is off.**
See the *Sun StorEdge 6320 System Installation Guide*.
2. **Disconnect the key switch adapter cable from the mating power supply connector at the back of the power sequencer (FIGURE 4-7).**

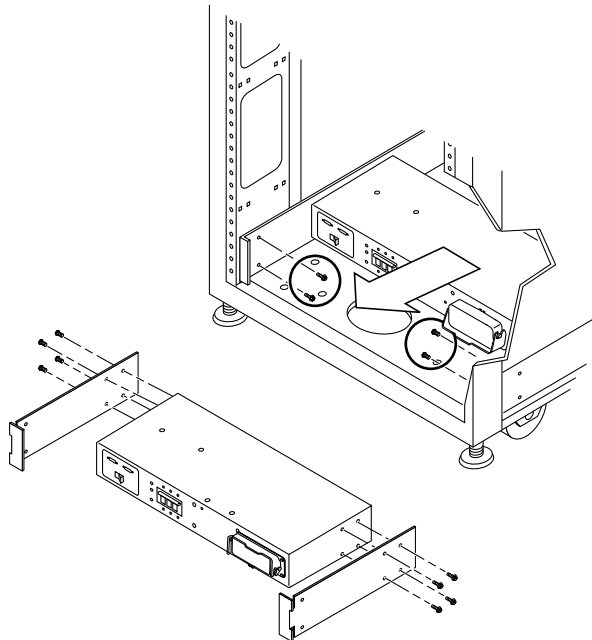


FIGURE 4-7 Removing the Power Sequencer

3. **Disconnect the AC power cable from the grounded outlet.**
4. **Disconnect the AC power cable from the power sequencer.**
See Section 4.4.2.1, “Removing the AC Power Cable” on page 4-15.
5. **Disconnect the grounding strap from the power sequencer.**
6. **Using a No. 2 Phillips screwdriver, remove the screws that secure the sequencer to the chassis.**
7. **Label the power cables to identify their locations.**
8. **Disconnect all other power cables from the sequencer.**

- 9. Remove remote power sequencer cable (P14/P15).
- 10. Remove the power sequencer from the Sun StorEdge 6320 system.

4.4.1.2 Replacing the Power Sequencer

- 1. Slide the power sequencer into the storage system (FIGURE 4-7).
- 2. Tighten the screws that secure the sequencer to the chassis.
- 3. Reconnect the grounding strap to the power sequencer.
- 4. Connect the AC power cable to the power sequencer.
See Section 4.4.2.2, “Replacing the AC Power Cable” on page 4-16.
- 5. Connect all cables to the back of the power sequencer.
- 6. Connect the AC power cable to a grounded outlet.
- 7. Power on the power sequencer.
See the *Sun StorEdge 6320 System Installation Guide*.

4.4.2 Servicing the AC Power Cable

This subsection describes the removal and replacement of the AC power cable. TABLE 4-2 lists the FRUs associated with the power cable:

TABLE 4-2 AC Power Cable FRU List

FRU Description
Assembly, cable, rack AC input, international
Assembly, cable, rack AC input, domestic

No tools are required to remove or replace the power cable.

4.4.2.1 Removing the AC Power Cable



Caution – Ensure that the power to the power sequencer is off. See the *Sun StorEdge 6320 System Installation Guide* for a description of powering off the system.

- 1. Disconnect the power cable from the grounded outlet.

2. **Disconnect the AC power cable from the power connector on the power sequencer (FIGURE 4-8).**

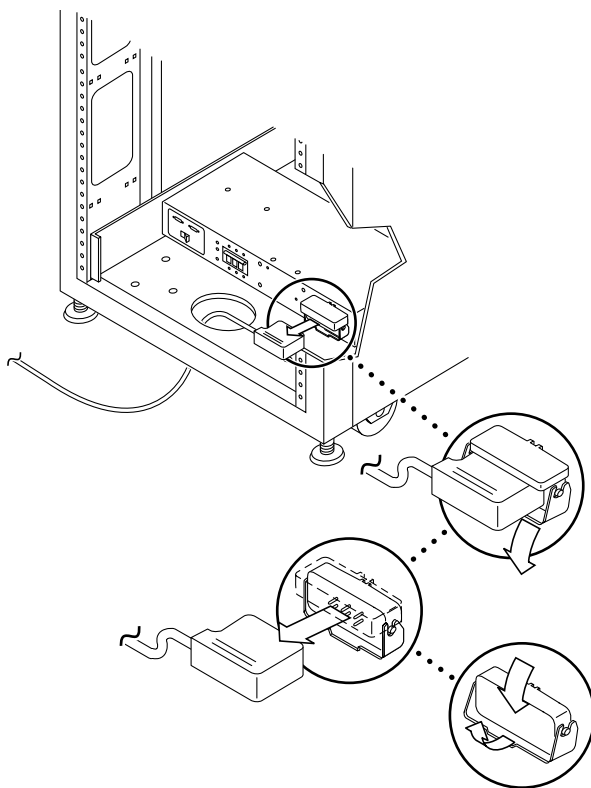


FIGURE 4-8 Disconnecting the AC Power Cable

4.4.2.2

Replacing the AC Power Cable



Caution – Be sure that the power to the AC power cable is off. See the *Sun StorEdge 6320 System Installation Guide* for a description of how to power off the system.

1. **Pull back the power connector cover (FIGURE 4-8).**
Flip the cover latch open to access the connector.
2. **Connect the power cable to the power connector on the power sequencer.**
3. **Pull the latch over the power cable to secure it to the power connector.**
4. **Connect the power cable to a grounded outlet.**

5. Power on the power sequencer.

See the *Sun StorEdge 6320 System Installation Guide* for a description of powering on the system.

4.4.3 Servicing the Key Switch

This section describes the removal and replacement of the key switch. TABLE 4-3 lists the FRU associated with the key switch:

TABLE 4-3 Key Switch FRU List

FRU Description
Key switch panel assembly

Required tools are:

- Needle-nose pliers
- 1/4-inch slotted screwdriver
- No. 2 Phillips screwdriver

4.4.4 Removing the Key Switch



Caution – Ensure that the power to the storage system is off. See the *Sun StorEdge 6320 System Installation Guide* for instructions about powering off the system.

1. Disconnect the key switch cable connector from the adapter-cable connector near the back of the power sequencers (FIGURE 4-9).

The adapter cable remains connected to the power sequencer.

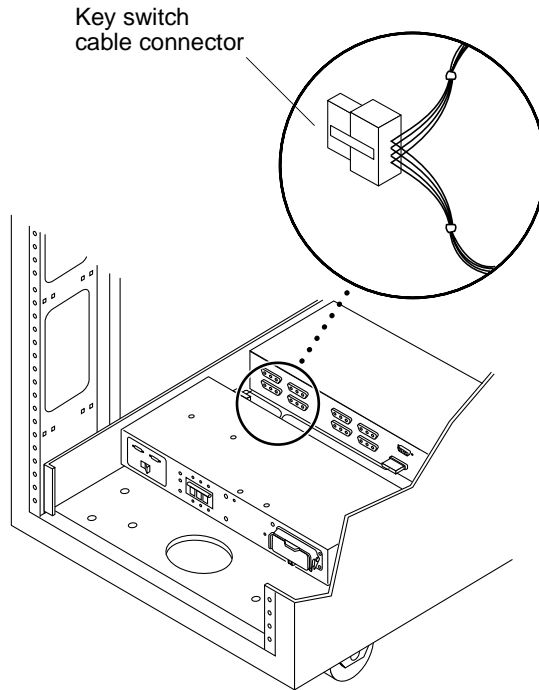


FIGURE 4-9 Key Switch Cable Connector Location

2. Facing the back of the key switch on the inside of the system, use a pair of needle-nose pliers to slide out and remove the metal clip that secures the key switch to the system (FIGURE 4-10).

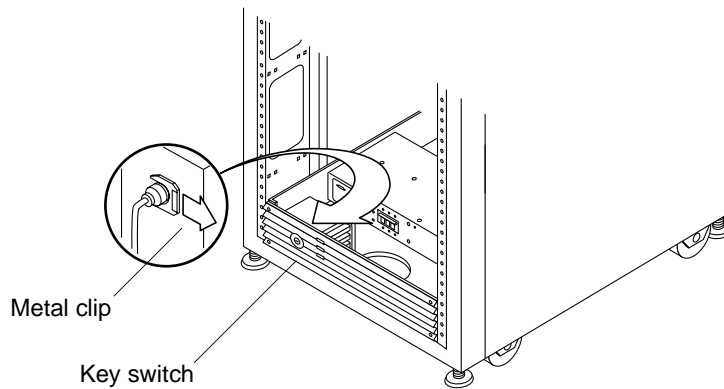


FIGURE 4-10 Removing and Replacing the Key Switch

3. Pull the key switch out of the chassis opening.

4.4.4.1 Replacing the Key Switch

1. Insert the key switch into the panel opening.
2. Facing the back of the key switch on the inside of the system, slide the metal clip onto the notch of the key switch body to secure it in place (FIGURE 4-10).
Each screw secures a clamp on the frame that holds the cable in place.
3. Connect the key switch cable connector to the adapter-cable connector near the back of the power sequencer (FIGURE 4-9).
4. Power on the storage system.

See the *Sun StorEdge 6320 System Installation Guide* for instructions about powering on the system.

4.4.5 Adding a Second Cabinet

Use the following procedures to add a second cabinet to a single Sun StorEdge 6320 system.

1. Set up the second cabinet, connect the cables, and follow the remaining procedures for setting up the second cabinet as described in the *Sun StorEdge 6320 System Installation Guide*.
2. On a server, bring up the Storage Automated Diagnostic Environment.
3. Enter the user name and password.
4. From the Storage Automated Diagnostic Environment main page, click **Manage > Service**.
5. From the left pane, click **Ethers**.

The system displays the Update Ethers page, which lists the names and corresponding IP addresses of all standard and optional components that can make up the StorEdge 6320 system.

6. Locate the MAC address of the master controller of each array in the expansion cabinet.

The MAC address is located on a sticker on the back panel of each tray in an array. The bottom tray of an array is the master controller.

7. Enter the MAC address of the master controller in an array in the appropriate MAC address field.

MAC addresses for the arrays in the expansion cabinet correspond to IP addresses 192.168.0.50 through 192.168.0.55. Enter the MAC addresses, starting from the bottom of expansion cabinet and ending at the top. For example, enter the MAC address for the master controller of the array in the bottom of the cabinet in the MAC address field that corresponds to IP address 192.168.0.50.

8. Power cycle each array individually in the expansion cabinet, or power cycle the entire expansion cabinet.

To power cycle an individual array, toggle the two power switches on the back panel of each tray in the array. When you toggle the switches to the off position, the array battery backup comes on and allows the write cache to flush. To determine that the array is completely shut down, verify that all LEDs on the back of all trays are turned off. After approximately 30 seconds, toggle the two power switches back to the on position.

To power cycle the expansion cabinet, insert the key into the power sequencer in the front bottom of the expansion cabinet and turn the key to the off position. When you power off the cabinet, the array battery backup for each array comes on and allows the write cache to flush. To determine that the arrays are completely shut down, verify that all LEDs on the back of all trays are turned off. After approximately 30 seconds, turn the key back to the on position.

9. Click Update Ethers.

The system associates the MAC address of the array with the corresponding IP address to identify the array to the system.

10. Create a new system inventory snapshot:

a. Click Manage > Service > Inventory Maintenance.

b. Click Generate New Inventory.

c. After the system generates a new inventory, click Save Inventory.

For detailed instructions on how to generate a system inventory, see “Creating an Updated Inventory” on page 4-51.

11. Set passwords on all Sun StorEdge 6020 arrays that are in the new cabinet.

Use the instructions in the “Setting the Array Password” on page 4-51 to set the passwords.

4.5 Servicing the Ethernet Hub

This chapter describes the removal and replacement of the Ethernet hub.

Note – Servicing the Ethernet hub in either the first or second cabinet does not affect customer I/O. No software action is required when you perform service on the Ethernet hubs.

This section is organized as follows:

- “Servicing the Ethernet Hub Overview” on page 4-21
- “Removing the Ethernet Hub From the First Cabinet” on page 4-22
- “Replacing the Ethernet Hub in the First Cabinet” on page 4-22
- “Removing the Ethernet Hub from the Second Cabinet” on page 4-23
- “Replacing the Ethernet Hub in the Second Cabinet” on page 4-24
- “Removing the Mounting Bracket in the Second Cabinet” on page 4-24
- “Replacing the Mounting Bracket in the Second Cabinet” on page 4-25

4.5.1 Servicing the Ethernet Hub Overview

TABLE 4-4 lists the FRUs associated with the Ethernet hub:

TABLE 4-4 Ethernet Hub FRU List

FRU Description

Ethernet hub (with rackmount kit for first cabinet)

Ethernet hub (with rackmount kit for second cabinet)
--

Required tools are:

- No. 2 Phillips screwdriver
- 7/16-inch open end wrench
- Adjustable wrench

▼ Removing the Ethernet Hub From the First Cabinet

1. Open the front door of the system.
2. Remove as many of the filler panels as necessary to gain access to the Ethernet hub.
3. Disconnect the power cable from the Ethernet hub.
4. Remove the two Phillips screws holding the Ethernet Hub to the mounting rails.
5. Open the back door of the system.
6. Open the service panel.

The service panel is held shut by five PEM captive fastener screws.
7. Ensure that all Ethernet cables are labeled and note the ports to which they are connected.
8. Moving from right to left, disconnect the cables.
9. Remove the two screws holding the back Ethernet hub mounting rails.
10. Go to the front of the system.
11. Remove the Ethernet hub by sliding it out of the front of the cabinet.
12. Remove the four screws (two per side) and three small screws holding the Ethernet hub to the center brackets.

▼ Replacing the Ethernet Hub in the First Cabinet

1. Secure the new Ethernet hub to the mounting brackets with the seven screws.
2. From the front of the system, slide the Ethernet hub into the cabinet until it meets the stops.
3. Replace the two screws that attach the front of the Ethernet hub's mounting bracket to the cabinet.
4. Replace the two screws that attach the back of the Ethernet hub's mounting bracket to the cabinet.
5. Moving from left to right, reconnect the cables.
6. Reconnect the power cable to power on the Ethernet hub.

TABLE 4-4 shows the base IP addressing configuration of the Ethernet hub. See the procedure in this chapter for the configuration utilities used to modify the base addressing configuration.

7. **Close the service panel and lock it in place using the PEM fasteners.**
8. **Replace the filler panels in the front.**
9. **Close the front and back doors.**

▼ Removing the Ethernet Hub from the Second Cabinet

FIGURE 4-11 illustrates the removal of the Ethernet hub from the second cabinet.

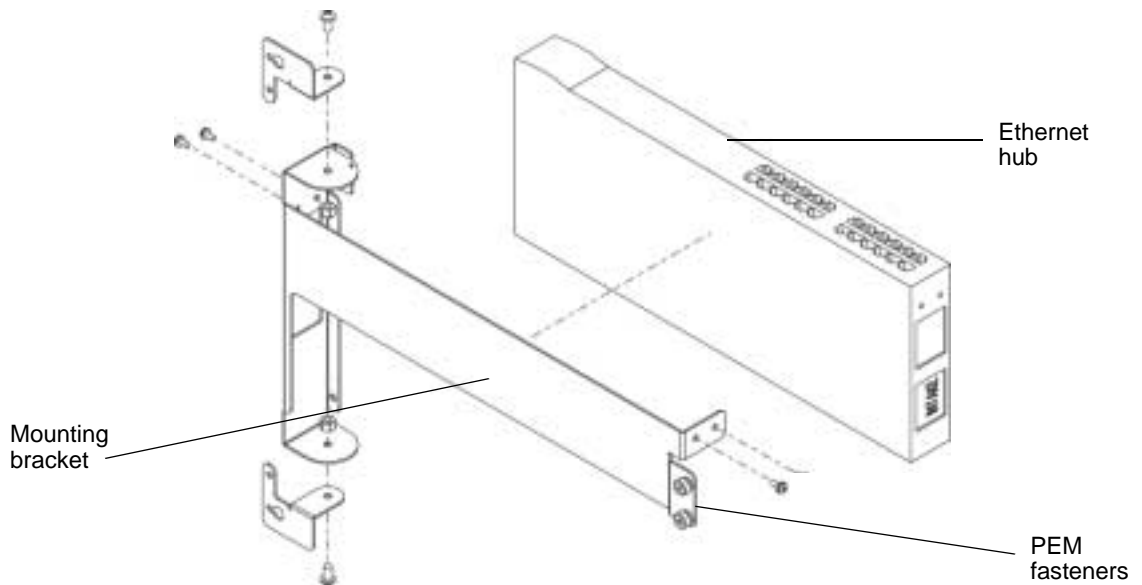


FIGURE 4-11 Ethernet Hub Removal from Second Cabinet

To remove the Ethernet hub from the second cabinet, follow these steps:

1. **Open the back door of the second cabinet.**
2. **Unscrew the two PEM fasteners on the right side of the Ethernet hub mounting bracket.**
3. **Swing open the mounting bracket.**

4. **Disconnect the power cable from the Ethernet hub.**
5. **Ensure that all Ethernet cables are labeled and note the ports to which they are connected.**
6. **Moving from right to left, disconnect the cables.**
7. **Unscrew the four screws (two on the left and two on the right) that secure the Ethernet hub to the mounting bracket.**

Note – Make sure you hold the Ethernet hub while removing the screws, as the unit will fall once all the screws are removed.

▼ Replacing the Ethernet Hub in the Second Cabinet

1. **Hold the new Ethernet hub in place in the mounting bracket and secure the four screws (two on the left and two on the right).**
2. **Moving from right to left, connect the cables back into the appropriate connections on the Ethernet hub.**
3. **Connect the power cable into the Ethernet hub.**
4. **Swing the mounting bracket closed.**
5. **Secure the two PEM fasteners on the right side of the Ethernet hub mounting bracket.**
6. **Close the back door.**

▼ Removing the Mounting Bracket in the Second Cabinet

These instructions tell how to remove the mounting bracket from the second cabinet should it become damaged or broken. FIGURE 4-11 provides an illustration of the mounting bracket.

1. **Open the back door.**
2. **Unscrew the two PEM fasteners on the right side of the Ethernet hub mounting bracket.**
3. **Swing open the mounting bracket.**

4. Disconnect the power cable from the Ethernet hub.
5. Ensure that all Ethernet cables are labeled and note the ports to which they are connected.
6. Moving from right to left, disconnect the cables.
7. Unscrew the four screws that hold the mounting bracket to the Sun StorEdge Expansion Cabinet.

Note – Make a note of the location where the mounting bracket was attached to the Sun StorEdge Expansion Cabinet.

8. Unscrew the four screws (two on the left and two on the right) that secure the Ethernet hub to the mounting bracket.

▼ Replacing the Mounting Bracket in the Second Cabinet

1. Assemble the new mounting bracket.
2. Connect the Ethernet hub to the new mounting bracket using the four screws (two on the left and two on the right).
3. Screw the mounting bracket to the Sun StorEdge Expansion Cabinet in the same location where the old bracket was connected.
4. Moving from left to right, reconnect all the cables to the Ethernet hub.
5. Connect the power cable into the Ethernet hub.
6. Close the mounting bracket and secure it with the two PEM fasteners.
7. Close the back door.

4.6 Servicing the Service Processor Panel

This section provides the procedures for repairing and replacing the Storage Service Processor panel. This chapter is organized as follows:

- “Servicing the Service Processor Panel Overview” on page 4-26
- “Removing the Service Panel” on page 4-31

- “Replacing the Service Processor Panel” on page 4-32
- “Removing the USB Relay Panel” on page 4-33
- “Replacing the USB Relay Panel” on page 4-33

4.6.1 Servicing the Service Processor Panel Overview

TABLE 4-5 lists the FRU associated with the Storage Service Processor panel.

TABLE 4-5 Storage Service Processor Panel FRU List

FRU Description
Storage Service Processor Service Panel
Main I/O Panel
Extension I/O Panel
USB Relay Panel

Required tools are:

- No. 2 Phillips screwdriver
- 7/16-inch open end wrench
- Adjustable wrench

The access to the Storage Service Processor is through the Storage Service Processor service panel, which is bolted inside the back cover of the Sun StorEdge 6320 system. The functions of the Storage Service Processor are carried out through a console cable connected from the serial console port on the service panel to a laptop or a serial port of a workstation or server. The cables and DB-9 and DB-25 adapters are shipped with the system.

FIGURE 4-12 shows the front view of the Service Processor Panel and its connections to the Storage Service Processor, the Storage Service Processor accessory tray, and the Sun StorEdge 6020 arrays.

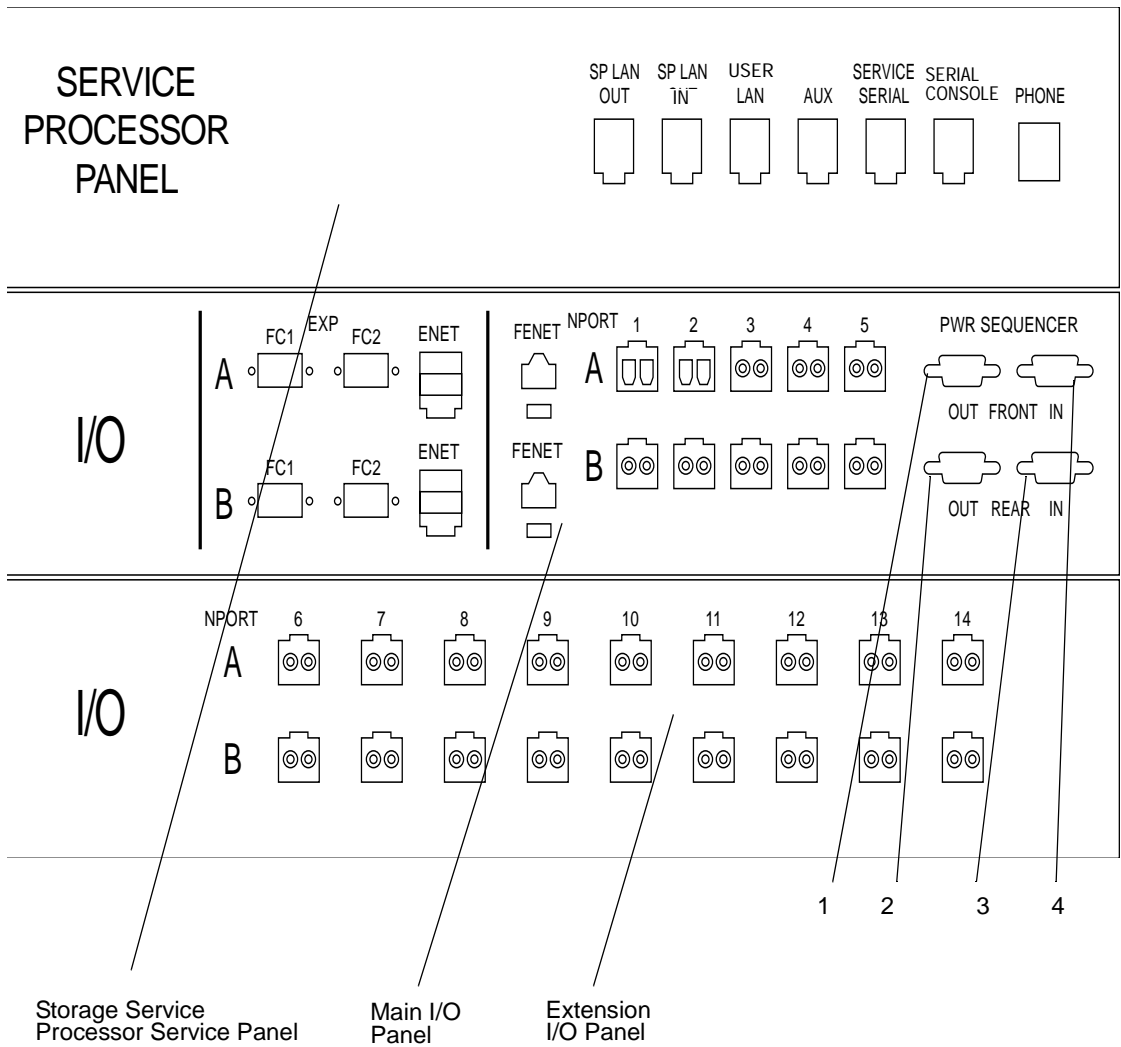


FIGURE 4-12 Front View of the Storage Service Processor Service Panel Connectors

FIGURE 4-13 shows the back view of the Storage Service Processor panel. The two connections are in the upper right corner.

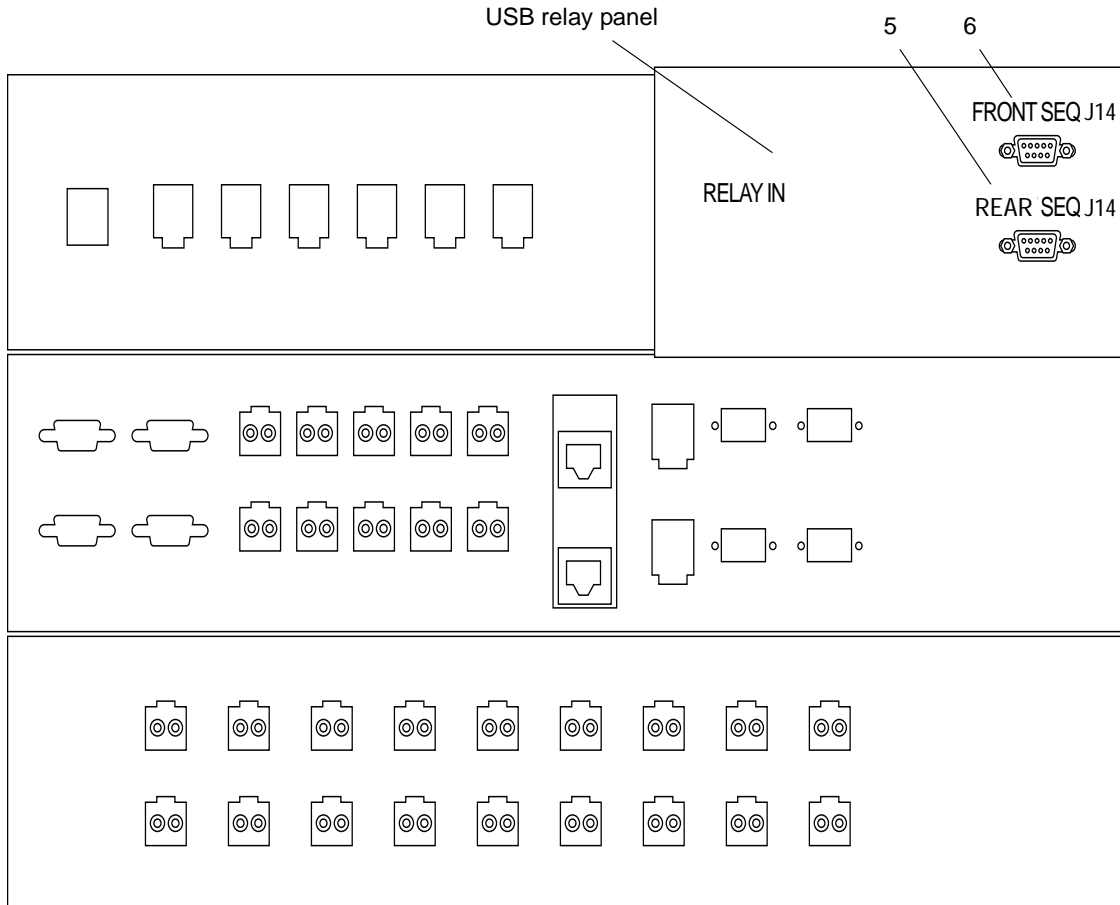


FIGURE 4-13 Back View of the Storage Service Processor Panel Connectors

TABLE 4-6 shows the cabling information for the Storage Service Processor panel. Refer to FIGURE 4-13 and TABLE 4-7 to locate the cable designation in the first column of TABLE 4-6.

TABLE 4-6 Storage Service Processor to Service Panel Cabling

Cable Designation	Type	Description
1	DB-9 (male) to DB-9 (female)	Connects the J15 port on the Front Power sequencer to the Front Sequencer Out port on the service panel.
2	DB-9 (male) to DB-9 (female)	Connects the J15 port on the Rear Power sequencer to the Rear Sequencer Out port on the service panel.
3	DB-9 (male) to DB-9 (female)	Connects the Rear Sequencer Out port on the first Sun StorEdge 6320 system panel (outward face, printed side) to the Rear Sequencer In port on the second Sun StorEdge Expansion Cabinet panel #1 (inward, nonprinted face)
4	DB-9 (male) to DB-9 (female)	Connects the Front Sequencer Out port on the Sun StorEdge 6320 system panel (outward face, printed side) to the Rear Sequencer In port on the second Sun StorEdge Expansion Cabinet panel #1 (inward, nonprinted face).
5	DB-9 (male) to DB-9 (female)	Connects the Rear Sequencer J14 port on the relay bracket (located on the back of the service panel) to the J14 port on the Front Power Sequencer.
6	DB-9 (male) to DB-9 (female)	Connects the Front Sequencer J14 port on the relay bracket (located on the back of the Service Processor Panel) to the J14 port on the Front Power Sequencer.

TABLE 4-7 describes the service panel connectors.

TABLE 4-7 Service Panel Connectors

Connector Name	Type	Description
SP LAN OUT	RJ-45M/RJ-45M	Cat-5 (1-1 / 8-8) Connects the service panel SP LAN OUT port to another Storage Service Processor or to a management station.
SP LAN IN	RJ-45M/RJ-45M	Cat-5 (1-1 / 8-8) Connects the service panel SP LAN IN port to another Storage Service Processor or to a management station.
USER LAN	RJ-45M/RJ-45M	Cat-5 (1-1 / 8-8) Connects the access panel USER LAN port to the Storage Service Processor accessory tray.
AUX	RJ-45M/RJ-45M	Cat-5 (1-1 / 8-8) Connects the access panel AUX port to an external serial port or modem.

TABLE 4-7 Service Panel Connectors *(Continued)*

Connector Name	Type	Description
Service Serial	RJ-45M/RJ-45M	Cat-5 (1-1 / 8-8) Connects the service panel SERVICE SERIAL port to the device serial port.
Service Console	RJ-45M/RJ-45M	Cat-5 (1-1 / 8-8) Connects the service panel SERVICE CONSOLE port to a laptop or management station.
Phone	RJ-11M/RJ-11M	Standard 4 conductor phone cord connects the service access panel PHONE to the customer's Telco.
FC1 to Second Cabinet	MTP/MTP	Contains 12 Fibre pairs bound together into one sheathing used to connect the Sun StorEdge 6020 arrays in the second cabinet to the primary Sun StorEdge 6320 system.
FC1 to Internal	MTP/6xLC	If FC switches are present in the primary Sun StorEdge 6320 system, the fan out cables are connected to the switch. If FC switches are not installed, the individual LC connection go to the A connections on NTPORT 6-11.
FC2 to Second Cabinet	MTP/MTP	Contains 12 Fibre pairs bound together into one sheathing used to connect the Sun StorEdge 6020 arrays in the second cabinet to the primary Sun StorEdge 6320 system.
FC1 to Internal	MTP/6xLC	If FC switches are present in the primary Sun StorEdge 6320 system, the fan out cables are connected to the switch. If FC switches are not installed, the individual LC connection are connected to the B connections of NTPORT 6-11. The FC connections inside the 6xLC cable are numbered 0 through 5 and should be connected to 6 through 11.
ENET	RJ-11/RJ-11	Cat-5 (1-1 / 8-8) Ethernet connection that connects the Ethernet hub from the second cabinet into the primary Sun StorEdge 6320 system. This ties the second cabinet into the internal component LAN so the Sun StorEdge 6020 arrays can be managed and monitored by the Storage Service Processor.

TABLE 4-7 Service Panel Connectors *(Continued)*

Connector Name	Type	Description
FENET	RJ-11/RJ-11	Cat-5 (1-1 / 8-8) Ethernet connection that connects the switches to internal hosts at your site. Used only if switches reside in the Sun StorEdge 6320 system.
NPORT 1-5 (Internal; inside of the panel)	LC/LC	Connects to either the Sun StorEdge network FC switch-16 switches or directly to the Sun StorEdge 6020 arrays.
NPORT 1-5 (External; outside of the panel)	LC/LC	Host connections to the Sun StorEdge 6320 system.

▼ Removing the Service Panel

Note – Stop all I/O to the Sun StorEdge 6320 system before servicing the Service Processor panel.

1. Halt all I/O to the Sun StorEdge 6320 system.
2. Open the back door of the system.
3. Label and remove all cables from the outside of the service panel.
4. Make a note of the RU locations for all screws and the PEM fasteners that hold the service panel in place.

Note – You must replace the service panel in the same location or the cables might not fit.

5. Unscrew the five PEM fasteners on the right side of the service panel and swing the panel out.
6. Identify and label the location of each cable on the inside of the service panel through the placement shown in FIGURE 4-12 and FIGURE 4-13.

TABLE 4-6 and TABLE 4-7 document the types of cables used on the inside and outside of the service panel.

7. Remove all cables from the inside of the service panel.
8. Close the service panel.

9. Identify the location of each cable on the outside of the service panel by the placement shown in FIGURE 4-12 and FIGURE 4-13 along with TABLE 4-6 and TABLE 4-7.
10. Remove the remaining four screws that hold the left side of the service panel to the side of the Sun StorEdge Expansion Cabinet.

Note – Make a note of the RU locations of the screws.

11. Lift the service panel away from the system.
12. Dismantle as many of the three sections of the service panel as is necessary to replace the broken piece.
You will need to disassemble the entire service panel if the top or center section is broken.

▼ Replacing the Service Processor Panel

1. Place the new Service Processor panel in the exact location that the old one was in.
2. Replace the four screws on the left side to hold the service panel in place on the system.
3. Reconnect the cables that you removed from the inside of the old Service Processor panel to the inside of the Service Processor panel

Note – Make sure that you connect the cables in the same location where they were before. Use TABLE 4-6 and TABLE 4-7 to identify the type and location of the cables.

4. Replace any cable ties that were cut during the replacement.
5. Close the Storage Service Processor panel.
6. Connect the PEM fasteners on the right side of the panel.
7. Replace all the cables that were removed from the outside of the previous Storage Service Processor panel.

Note – Make sure that you connect the cables in the same position that they were in before. Use TABLE 11-2 and TABLE 11-3 to identify the type and location of the cables.

8. Close the back door of the cabinet.

9. Restart I/O to the system.

▼ Removing the USB Relay Panel

Note – If the Sun StorEdge 6320 system is configured for remote power management, you must turn the keyswitch from Standby to On before following this procedure.

1. Open the back door of the Sun StorEdge 6320 system.
2. Loosen the five PEM fasteners on the right side of the Storage Service Processor panel and open the panel.
3. Remove the Rear Sequencer J14 and the Front Sequencer J14 connections.
See FIGURE 4-13 for the location of the J14 connections.
4. Disconnect the USB cable from the left side of the USB Relay Panel.
5. Unscrew the four screws holding the USB Relay Panel in place.

Note – The four screws that hold the panel in place are not PEM fasteners, which means when they are loosened, they can fall into the system. Use care when moving the cables out of the way of the bottom screws.

4.6.2 Replacing the USB Relay Panel

1. Attach the new USB Relay Panel using the four screws.

Note – Use care when moving the cables out of the way of the bottom screws.

2. Reconnect the Rear Sequencer J14 and the Front Sequencer J14 connections.
3. Reconnect the USB relay cable.
4. Close the Storage Service Processor panel and tighten the five PEM fasteners on the right side.
5. Close the back door.

Note – If the Sun StorEdge 6320 system is configured for remote power management, you must turn the keyswitch from On to Standby before closing the back door.

4.7 Servicing the Storage Service Processor

This section provides the procedures for removing and replacing the Storage Service Processor. All Storage Service Processors are configured by default as a master Storage Service Processor, which gives them the primary role of aggregating multiple storage processors into one administrative point, as well as controlling the alerts and forwarding them to the designated service providers.

The IP addressing of the aggregation of Storage Service Processors is dictated by the `/etc/inet/hosts` file. The default settings in that file for all Storage Service Processors shipped by Sun have the IP address set to 10.0.0.250 and the name set to `new_sp`.

This chapter is organized as follows:

- “Servicing the Storage Service Processor Overview” on page 4-34
- “Removing the Storage Service Processor” on page 4-36
- “Replacing the Storage Service Processor” on page 4-37
- “Replacing the USB Flash Disk” on page 4-38

4.7.1 Servicing the Storage Service Processor Overview

Instructions for making various connections to the Storage Service Processor are included in this section.

TABLE 4-8 lists the FRUs associated with the Storage Service Processor.

TABLE 4-8 Storage Service Processor FRU List

FRU Description
Storage Service Processor
Standard cable
USB Flashdisk

Required tools are:

- No. 2 Phillips screwdriver

The files from the Storage Service Processor that are preserved on the USB flash disk include:

- /etc/ethers
- /etc/inet/hosts
- /etc/passwd
- /etc/shadow
- /etc/hostname.dmfe1
- /etc/hostname.dmfe0
- /etc/fcswitch.conf
- /etc/inet/services
- /etc/inet/inetd.conf
- /var/spool/cron/crontabs
- /etc/cron.d
- /etc/uucp
- /etc/ppp
- /var/opt/SUNWstade/DATA/*
- /var/opt/SUNWstade/log/*
- /var/remote.support/files/*
- /var/adm/messages.se6320
- /etc/net/ticlts/hosts
- /etc/net/ticots/hosts
- /etc/net/ticotsord/hosts
- /tftpboot/config.sys
- /opt/SUNWsespfw/repository
- /opt/SUNWsespfw/rom-0.bak
- /opt/se6x20/data
- /opt/se6x20/PSDATA/*
- /opt/se6x20/.providerkeystore
- /etc/nodename
- /etc/net/*/hosts
- /etc/dumpadm.conf
- /etc/resolv.conf

▼ Removing the Storage Service Processor

1. **Open the back door of the system.**

2. **Open the service panel.**

The service panel is held shut by five PEM fastener screws.

3. **Make a note of the RU locations for all screws and the PEM fasteners that hold the service panel in place.**

Note – You must replace the service panel in the same location or the cables might not fit.

4. **If possible, verify the host name of the Storage Service Processor being replaced.**

Log in to the Storage Service Processor using either of the following methods:

- A console cable connected from the serial console port on the service panel to a laptop
- A console cable connected from the serial console port on the service panel to a workstation or server

Cables and DB-9 and DB-25 adapters are shipped with the Sun StorEdge 6320 system.

Note – If the Storage Service Processor does not respond, skip to step 6.

5. **Type the following command and make a note of the host name that is displayed:**

```
sp0# uname -n
sp0
sp0#
```

6. **Run the `fbr(1M)` command with the `-b` (backup) option to ensure the flash disk contains the latest system-specific information from the Storage Service Processor.**

```
# /opt/SUNWsefbru/bin/fbr -b
```

7. **Power off the Storage Service Processor.**

It takes time for the Storage Service Processor to shut down. The amount of time can be as long as five minutes depending on the amount of data on the system disk.

8. **Verify that all cables that are attached to the Storage Service Processor are labeled and note the location of the cables.**

The cables include the power cord, SP Net 0, SP Net 1, ttya and optionally, the Relay 0 or 1 (optional).

9. **Remove the flash disk from the USB0 connection.**
10. **Disconnect the Storage Service Processor from the internal net, the service panel, and the power cable.**
11. **Open the front door of the Sun StorEdge 6320 system.**
12. **Remove the trim strips holding the Storage Service Processor to the system.**
The trim strips are held in place by two Phillips screws.
13. **Remove the two screws from the front rail.**
14. **Remove the Storage Service Processor by sliding it out the front of the cabinet.**

Note – There are no keeper tabs (stops) that halt the removal of the Storage Service Processor.

15. **Remove the 12 screws (6 on each side) that hold the Storage Service Processor to the mounting brackets.**

Note the orientation of the Storage Service Processor to the mounting brackets. Also note the way the bracket is removed from the front of the system.

▼ Replacing the Storage Service Processor

1. **Attach the mounting brackets to the new Storage Service Processor using the 12 screws.**
2. **Open the front door of the system if it is closed.**
3. **Install the new Storage Service Processor by sliding it into the front of the system.**
4. **Replace the two screws that attach the front rail.**
5. **Replace the trim strips that hold the Storage Service Processor to the system.**
Each trim strip is held in place by one Phillips screw.
6. **Close the front door of the Sun StorEdge 6320 system.**
7. **Open the back door of the system if it is closed.**

8. Secure the Storage Service Processor using the two screws that hold it to the cabinet frame.
9. Reconnect all cables.
10. Reinsert the flash disk into either the USB0 port.
11. Power on the Storage Service Processor.
12. Close the service panel and lock it in place using the PEM fasteners.
13. Log in to the Storage Service Processor, using either of the following methods:
 - A console cable connected from the serial console port on the service panel to a laptop
 - A console cable connected from the serial console port on the service panel to a workstation or server

Cables and DB-9 and DB-25 adapters are shipped with the Sun StorEdge 6320 system.
14. Install the customized version of the Solaris 9 operating system on to the Storage Service Processor.

Note – If you do not have a CD-ROM with the customized version of the Solaris 9 operating system, you can obtain one from your service representative.

15. Run the `fbr` command with the `-r` (restore) option to write the personality (system-specific information) of the Storage Service Processor from the flash disk onto the system:

```
# /opt/SUNWsefbbru/bin/fbr -r
```

16. Reboot the Storage Service Processor.

```
# /etc/init 6
```

17. Close the back door.

▼ Replacing the USB Flash Disk

1. Disconnect the USB flash disk from the USB0 connection on the Storage Service Processor.
2. Log in to the Storage Service Processor, using either of the following methods:

- A console cable connected from the serial console port on the service panel to a laptop
- A console cable connected from the serial console port on the service panel to a workstation or server

Cables and DB-9 and DB-25 adapters are shipped with the Sun StorEdge 6320 system.

3. **Connect the new USB flash disk into the USB0 connection on the Storage Service Processor.**
4. **Run the `fbr` command with the `-b` (backup) option to write the personality (system-specific information) from the Storage Service Processor to the flash disk.**

```
# /opt/SUNWsefbru/bin/fbr -b
```

4.8 Servicing the Sun StorEdge Network FC Switch-16 Switches

This section provides the procedures for removing and replacing the Sun StorEdge network FC switch-16 switches.

This section contains the following sections:

- “Servicing a Sun StorEdge FC Switch” on page 4-39
- “Removing a Sun StorEdge FC Switch” on page 4-40
- “Replacing a Sun StorEdge FC Switch” on page 4-41

4.9 Servicing a Sun StorEdge FC Switch

The following sections detail how to remove and replace the Sun StorEdge network FC switch-16 from the Sun StorEdge 6320 systems.

TABLE 4-9 lists the FRUs associated with the Sun StorEdge network FC switch-16 switches.

TABLE 4-9 Sun StorEdge Network FC Switch-16 FRU List

FRU Description

Sun StorEdge network FC switch-16 (with rackmount kit)

Standard Adapter Cable

The tool required is:

- No. 2 Phillips screwdriver

▼ Removing a Sun StorEdge FC Switch

1. **Identify which Sun StorEdge network FC switch-16 switch must be replaced.**
2. **Verify that the hosts that were connected to this switch have their path changed to the other switch.**

Note – The Sun StorEdge network FC switch-16 switches are not hot swappable.

3. **Open the back door of the system.**
4. **Open the service panel.**
5. **Power off the switch to be removed.**
There are two power supplies and both must be powered off.
6. **Disconnect the two power cables from the switch.**
7. **Remove the gigabit interface converters (GBICs) from the ports and make a note of the port numbers where the GBICs were inserted.**
8. **Unscrew the two keeper screws on the back of the Sun StorEdge network FC switch-16 switch.**
9. **Open the front door.**
10. **At the front of the system, remove the grill that covers the switch and set it aside.**
11. **Remove the two screws that connect the switch to the Sun StorEdge 6320 system.**
12. **Remove the switch by sliding it out the front of the cabinet.**

13. Identify and note the media access control (MAC) address for the removed switch.

The MAC address for the Sun StorEdge network FC switch-16 switches is a 12-digit number that is printed on the label on the back of the switch.

▼ Replacing a Sun StorEdge FC Switch

- 1. Reinsert the GBICs into the new switch in the same port numbers they occupied on the removed switch.**

Note – Make certain you use the same ports you made a note of in Step 7 of Section t, “Removing a Sun StorEdge FC Switch” on page 4-40.

- 2. Identify and note the MAC address for the new switch and make a note of the address.**

The MAC address for the FC switch is a 12-digit number that is printed on the label on the back of the FC switch.

- 3. Slide the switch into the Sun StorEdge 6320 system.**
- 4. Replace the screws that connect the switch to the front of the cabinet.**
- 5. Replace the grill that covers the switch.**
- 6. Close the front door.**
- 7. Reconnect the power cable to the switch.**
- 8. Connect all FC cables into the GBIC.**
- 9. Power on the FC switch.**
- 10. Close the service panel.**
- 11. Close the back door.**
- 12. Set the switch IP address using the RARP or another method as documented in the Sun StorEdge network FC switch-16 documentation.**

4.10 Servicing Sun StorEdge 6020 Arrays

This section provides the procedures for removing and replacing Sun StorEdge 6020 arrays.

For additional information about upgrading a Sun StorEdge 6020 array, refer to the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

This chapter is organized as follows:

- “Servicing the Sun StorEdge 6020 Array Overview” on page 4-42
- “Removing a Sun StorEdge 6020 Array” on page 4-46
- “Replacing a Sun StorEdge 6020 Array” on page 4-48
- “Adding a Disk to a Sun StorEdge 6020 Array” on page 4-52
- “Adding One or More Sun StorEdge 6020 Arrays” on page 4-53
- “Replacing an Interconnect Loop Card” on page 4-58
- “Replacing a Sun StorEdge 6020 Array Controller Card” on page 4-58
- “Replacing the Power and Cooling Unit” on page 4-58
- “Replacing the UPS Battery” on page 4-58

4.10.1 Servicing the Sun StorEdge 6020 Array Overview

The Sun StorEdge 6020 arrays contain from 2 to 6 disk trays, each of which have from 7 to 14 disk drives. The disk drives can have a capacity as high as 146 Gbytes. A disk tray is either a controller unit or an expansion unit. A controller unit includes a RAID controller.

The array includes 2 Gbyte per second Fibre Channel connectivity to hosts. Extensive reliability, availability, and serviceability features include redundant components, notification of failed components, and the ability to replace components while the unit is online.

You should have a copy of the following manuals available when performing procedures from this chapter:

- *Sun StorEdge 6020 and 6120 Arrays Installation Guide*
- *Sun StorEdge 6020 and 6120 Arrays System Manual*
- *Sun StorEdge 6320 System Installation Guide*
- *Storage Automated Diagnostic Environment 2.2 User’s Guide—System Edition*
- Sun StorEdge Configuration Service software online help

TABLE 4-10 lists the FRUs associated with the Sun StorEdge 6020 arrays.

TABLE 4-10 Sun StorEdge 6020 Array FRU list

FRU Description
Sun StorEdge 6020 Array with midplane

Required tools are:

- No. 2 Phillips screwdriver
- Flashlight

4.10.2 Changing Array Configuration

Sun StorEdge Configuration Service software supports the addition and removal of expansion units (trays without controller cards) on existing array configurations through wizards in the web interface. This software supports the following array configuration changes:

- The addition of expansion units to an existing array 2x2 or 2x4 HA configuration.
- The removal of expansion units from an existing array 2x4 or 2x6 HA configuration.

FIGURE 4-14 illustrates the HA configurations and the corresponding tray numbers in the Sun StorEdge Configuration Service software.

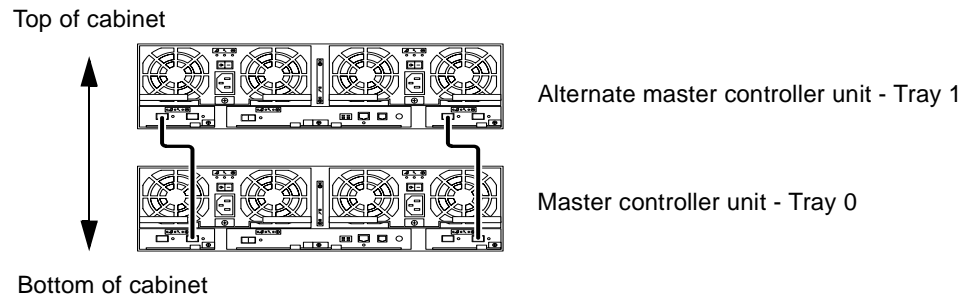
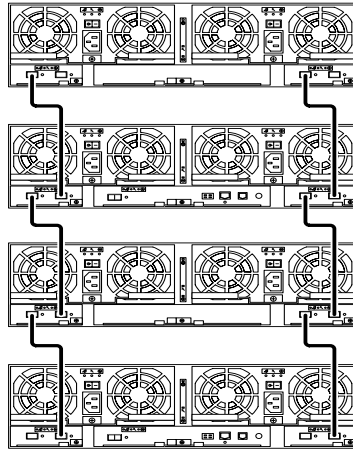


FIGURE 4-14 2x2 HA Configuration and Corresponding Tray Numbers

FIGURE 4-15 illustrates a Sun StorEdge 6120 array 2x4 HA configuration and corresponding tray numbers.

Top of cabinet



Expansion unit - Tray 3

Alternate master controller unit - Tray 2

Expansion unit - Tray 1

Master controller unit - Tray 0

Bottom of cabinet

FIGURE 4-15 2x4 HA Configuration and Corresponding Tray Numbers

FIGURE 4-16 illustrates a Sun StorEdge 6120 array 2x6 HA configuration and corresponding tray numbers.

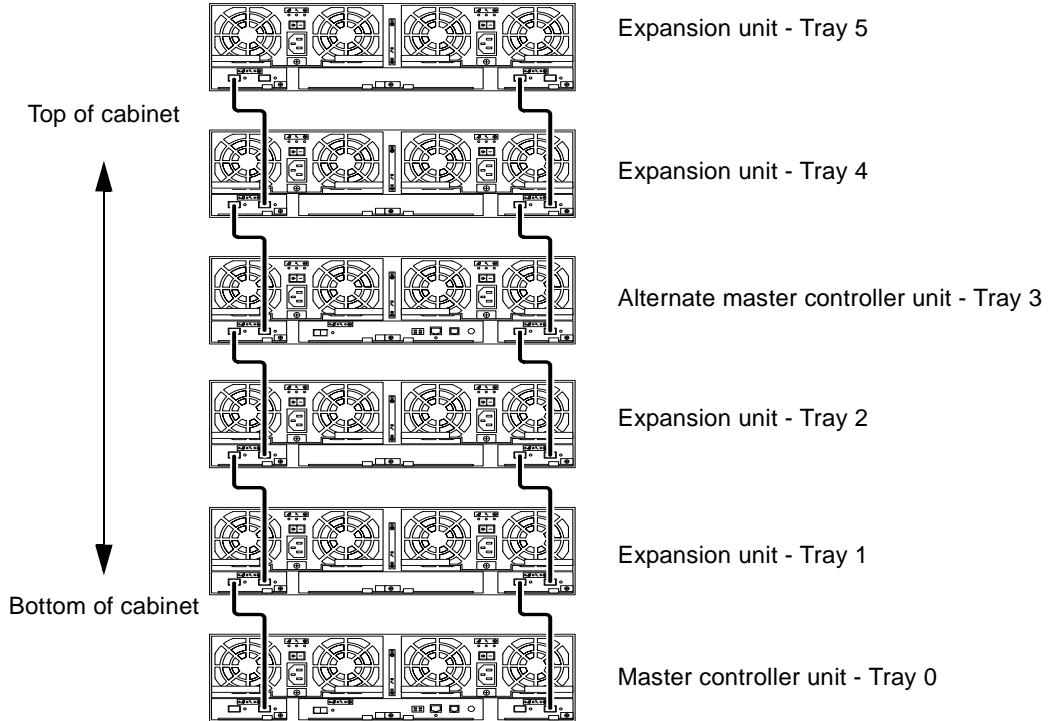


FIGURE 4-16 2x6 HA Configuration and Corresponding Tray Numbers

Note – If you use the management software to change the array configuration, make sure that the master controller unit is identified as Tray 0 before you begin. If the master controller unit has failed over, the alternate master controller unit assumes the master controller unit status. When this happens, the master controller unit tray numbers updated to the tray number of the alternate master controller unit. To change back to the original configuration and tray numbering, you must reset the array controller.

▼ To View the Expansion Unit Online Help

To review instructions about adding and removing expansion units, access the online help as follows:

1. **Choose the online help link in the Sun StorEdge Configuration Service browser.**
2. **Navigate to Administering Your System → Array Details and Tray Reconfiguration.**
3. **Select one of the following options:**
 - To Add an Expansion Unit to an Array
 - To Remove an Expansion Unit from an Array

▼ Removing a Sun StorEdge 6020 Array

Note – This procedure assumes two service engineers are available at the site.

1. **Backup customer data from the array using the host-based software.**
2. **Open the back door of the Sun StorEdge 6320 system.**
3. **Note the MAC address of the Sun StorEdge 6020 array that is being removed.**

The MAC address for the Sun StorEdge 6020 array is a 12-digit number that is printed on the label on the back of the array.
4. **On a server, bring up the Storage Automated Diagnostic Environment in your web browser.**

`https://system_ip_address:7443/`

5. **Enter the user name and password.**

`User Name: admin`
`Password: !admin`

6. **Unconfigure the array that is being removed.**
 - a. **From the Storage Automated Diagnostic Environment main page, choose Manage.**
 - b. **Choose the Service link.**

c. From the left pane, choose **Configure Devices**.



Select the checkbox that corresponds to the array that is being removed.

d. Choose **Unconfigure Selected**.

A message is displayed confirming the device is now unconfigured.

▼ Removing the Array

1. Turn off the two circuit breakers on the array that is being removed.

The circuit breakers are on/off switches located on each side of the array.

2. Remove the two power cables.

3. If a controller card is present, disconnect the Ethernet cable.

4. Disconnect the Ethernet cable from the keepers.

5. Disconnect and remove the two loop card cables from each side of the Sun StorEdge 6020 array.

6. Remove the four screws that secure the Sun StorEdge 6020 array to the side rails in the back.

7. Open the front door of the Sun StorEdge 6320 system.

8. Remove the trim strips from each side of the Sun StorEdge 6020 array.

9. Remove the four screws that attach the Sun StorEdge 6020 array to the Sun StorEdge 6320 system.

10. **Using two people, slowly push the Sun StorEdge 6020 array from the back of the Sun StorEdge 6320 system.**

The second person must be present to guide the array out from the front.

11. **Set the array on a table and remove the eight screws that hold the side rails on each side of the unit.**

12. **Remove all FRUs from the broken array that will to be used in the replacement Sun StorEdge 6020 array.**

The replacement Sun StorEdge 6020 array might be delivered to the site without all the FRUs inside. Remove and save all the FRUs that will be reused. The five FRUs in a Sun StorEdge 6020 include:

- All disk drives
- Loop cards
- Controller card
- Power and cooling unit
- Battery

4.10.3 Replacing a Sun StorEdge 6020 Array

The instructions for replacing a Sun StorEdge 6020 array are broken into the following subsections:

- “Preparing to Replace an Array” on page 4-48
- “Connecting the Cables” on page 4-49
- “Entering the MAC Address” on page 4-49
- “Setting the Array Password” on page 4-51
- “Creating an Updated Inventory” on page 4-51

▼ Preparing to Replace an Array

1. **Note the MAC address of the replacement (new) array.**

Tip – Refer to *Sun StorEdge 6020 and 6120 Arrays Installation Guide* for instructions about how to locate the MAC address.

2. **Set the new Sun StorEdge 6020 array on a table and attach the side rails using the eight screws provided.**

3. Align the Sun StorEdge 6020 array's rails with the rails inside the Sun StorEdge 6320 system, and then push the array into the cabinet.
4. Reinstall the four screws that secure the array to the front of the Sun StorEdge 6320 system.

Note – Use care when installing the screws, as the weight of the array can cause the screws to become cross-threaded.

5. Reattach the trim strips using the two screws on each side of the Sun StorEdge 6020 array.
6. Close the front door of the Sun StorEdge 6320 system.
7. Open the back door of the Sun StorEdge 6320 system.
8. Replace the four screws that secure the Sun StorEdge 6020 array to the side rails in the back.

▼ Connecting the Cables

1. Reconnect the two loop card cables on each side of the Sun StorEdge 6020 array.
2. Reconnect the Ethernet cable to the keepers.
3. Connect the Ethernet cable to the controller card if one is present in the array.
4. Connect the power cables and turn on the power supply circuit breakers.

All LEDs on the back of the Sun StorEdge 6020 array will flash as the power on self-tests are run by the unit. It will take 3-5 minutes for the Sun StorEdge 6020 array to completely power up. Wait until it has completely powered up before proceeding with this procedure.

5. Close the back door of the Sun StorEdge 6320 system.

▼ Entering the MAC Address

1. On a server, bring up the Storage Automated Diagnostic Environment in your web browser.

`https://system_ip_address:7443/`

2. Enter the user name and password.

User Name: **admin**
Password: **!admin**

3. From the Storage Automated Diagnostic Environment main page, choose Manage.

4. Choose the Service link.

5. From the left pane, choose Ethers.

This will update the /etc/ethers file.

6. Enter the MAC address for the replacement array and choose on the Update Ethers button.

Caution – Be sure to assign the MAC address for the Sun StorEdge 6020 arrays to the correct array position in the Sun StorEdge 6320 system. IP address assignments are listed in Chapter 3.

The screenshot shows the Sun Storage Automated Diagnostic Environment (SADE) interface for a Sun StorEdge 6320 system. The top navigation bar includes 'Administration', 'Monitor', 'Troubleshoot', 'Manage', and 'Reports'. The left sidebar contains 'Service Manager' and 'Ethers' (with sub-links: Ethers, Inventory, Performance, Service, Performance, Configure, Monitor). The main content area is titled 'Ethers' and contains instructions: 'Enter MAC Addresses for each IP name from the /etc/hosts file. Erase the MAC Address to delete the entry from the /etc/ethers file. Push "Update Ethers File" to update /etc/ethers file.' Below this is a table titled 'Update Ethers' with columns 'Name', 'IP', and 'MAC Address'. The table lists 16 entries, with the first entry having a pre-filled MAC address. At the bottom right is an 'Update Ethers' button.

Name	IP	MAC Address
		08:00:04:00:00:00
ip	192.168.0.2	
isp1	192.168.0.25	
array00	192.168.0.40	08:00:04:00:00:00
array01	192.168.0.41	
array02	192.168.0.42	
array03	192.168.0.43	
array04	192.168.0.44	
array10	192.168.0.50	
array11	192.168.0.51	
array12	192.168.0.52	
array13	192.168.0.53	
array14	192.168.0.54	
array15	192.168.0.55	

7. Reboot the Sun StorEdge 6020 array to enable RARP to set the IP address.

▼ Setting the Array Password

1. From the Storage Automated Diagnostic Environment main page, choose **Manage**.
2. Choose the **Utilities** link.
3. Set the password.

Most Sun StorEdge 6020 arrays do not have a password set when delivered. Arrays that are not new should also have the password cleared.

Leave the “Old Password” field blank if the array was delivered without a password. Change the “New Password” pulldown menu to be “Saved Password” and leave the field blank. The factory-set password will continue to be used for all arrays.



4. Choose **Change All Passwords**.

▼ Creating an Updated Inventory

1. Create a new system inventory snapshot.

Select **Manage** → **Service** → **Inventory Maintenance** and choose **Generate New Inventory**. Once the inventory is generated, choose **Save Inventory**.

2. Configure the Sun StorEdge 6020 array

Select Manage → Service → Configure Devices and choose Configure All.

3. Verify and fix the firmware revisions for the replacement array.

Select Manage → Service → Revision Maintenance and choose Create Patch Report. This verifies the Sun StorEdge 6020 array has the most recent patches applied.

Choose Select Patches. Check to see if any of the patches are listed for the replacement array. The list is presented with the names of the arrays and which patches are needed. Select the patches that you want to apply. The Patch Installation Report generates a log of the changes that have been applied.

Note – The Revision Maintenance may require initial setup if this is the first time it has been used on your Sun StorEdge 6320 system. This is done through the Revision Setup portion of the Storage Automated Diagnostic Environment.



▼ Adding a Disk to a Sun StorEdge 6020 Array

You can add from 1-to-7 drives at a time to a Sun StorEdge 6020 array. The only caveat is that if you add less than the full compliment of 7 drives, you use your last storage pool for the tray. That means you must backup and restore data when you decide to add additional disks at a later date.

For additional information on adding disks to the Sun StorEdge 6020 arrays, refer to Chapter 6 of the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

1. **Remove the blank spacer from the Sun StorEdge 6020 array from the desired slot.**
2. **Insert the new disk and lock it in place.**

Note – You must wait one minute after inserting the new disk into the tray before proceeding to Step 3 to allow time for the system to update the internal states.

3. **On a server, bring up the Storage Automated Diagnostic Environment in your web browser.**

`https://system_ip_address:7443/`

4. **Enter the user name and password.**

`User Name: admin`
`Password: !admin`

5. **Create a new system inventory snapshot.**

Select Manage → Service → Inventory Maintenance and choose Generate New Inventory. Once the inventory is generated, choose Save Inventory.

Note – By generating a new inventory with the added disk, you can immediately see if the disk is recognized by the system.

▼ Adding One or More Sun StorEdge 6020 Arrays

1. **Note the MAC address of the new array.**

The MAC address for the Sun StorEdge 6020 array is a 12-digit number that is printed on the label on the back of the array.

Tip – Refer to *Sun StorEdge 6020 and 6120 Arrays Installation Guide* for instructions about how to locate the MAC address.

2. **Set the new Sun StorEdge 6020 array on a table and attach the side rails using the eight screws.**

3. Align the Sun StorEdge 6020 array's rails with the rails inside the Sun StorEdge 6320 system and push the array into the cabinet.
4. Install the four screws that secure the array to the front of the Sun StorEdge 6320 system.

Note – Use care when installing the screws as the weight of the array can cause the screws to become cross threaded.

5. Attach the trim strips using the two screws on each side of the Sun StorEdge 6020 array.
6. Close the front door of the Sun StorEdge 6320 system.
7. Open the back door of the Sun StorEdge 6320 system.
8. Insert the four screws that secure the Sun StorEdge 6020 array to the side rails in the back of the Sun StorEdge 6320 system.
9. Connect the two loop card cables on each side of the Sun StorEdge 6020 array.
10. Connect the Ethernet cable to the keepers.
11. Connect the Ethernet cable to the controller card if one is present in the array.
12. Connect the Fibre Channel cables.
13. Connect the power cables and turn on the power supply circuit breakers.

All LEDs on the back of the Sun StorEdge 6020 array will flash as the power on self-tests are run by the unit. It will take 3-5 minutes for the Sun StorEdge 6020 array to completely power up. Wait until it has completely powered up before proceeding.
14. Close the back door of the Sun StorEdge 6320 system.
15. On a server, bring up the Storage Automated Diagnostic Environment in your web browser.

`https://system_ip_address:7443/`

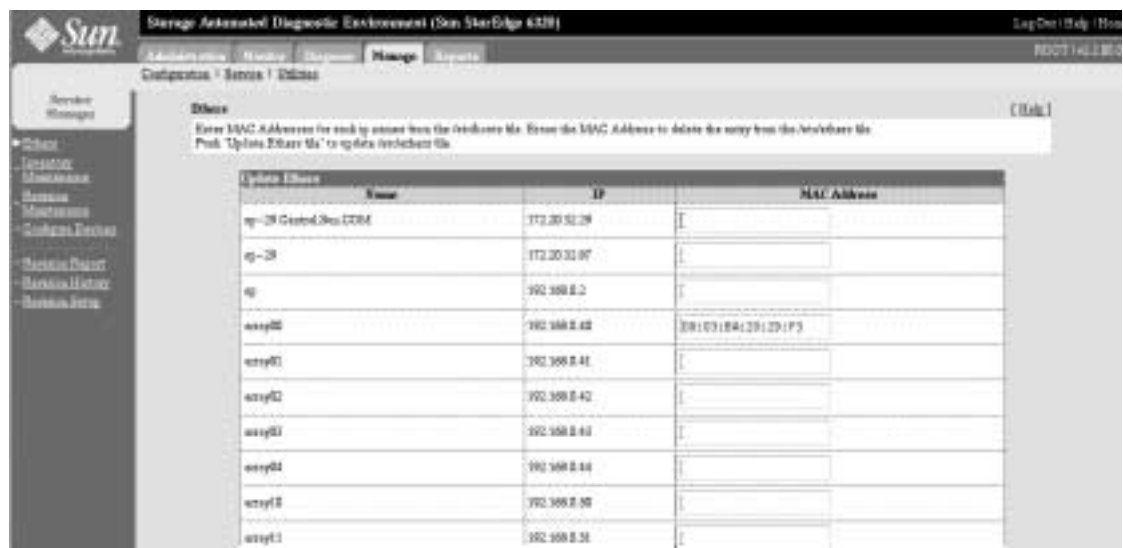
16. Enter the user name and password.

User Name: `admin`
Password: `!admin`

17. Enter the MAC address for the replacement array.

In the Storage Automated Diagnostic Environment choose Manage → Service Manager → Ethers. Enter the MAC address for the replacement array. Choose Update to apply the changes.

Caution – Be sure to assign the MAC address for the Sun StorEdge 6020 arrays to the correct array position in the Sun StorEdge 6320 system. IP address assignments are listed in Chapter 3.



18. Reboot the Sun StorEdge 6020 array to enable RARP to set the IP address.

19. Set the password.

Most Sun StorEdge 6020 arrays do not have a password set when they are delivered. Arrays that are not new should also have the password cleared.

Leave the “Old Password” field blank if the array was delivered without a password. Change the “New Password” pulldown menu to be “Saved Password” and leave the field blank. The factory-set password will continue to be used for all arrays.

The screenshot shows the Sun StorEdge 6320 Storage Automated Diagnostic Environment (SDE) interface. The title bar reads "Storage Automated Diagnostic Environment (Sun StorEdge 6320)". The interface has a sidebar on the left with a "Utilities" section containing links for "Display Inventory", "Array Passwords", "Mount DLI", and "Volume Volumes". The main content area is titled "Array Passwords" and includes a help link "[Help]". Below the title, there is a note: "This utility can be used to change the passwords on the internal arrays or to replace the password on an array that is being added to the system. NOTE: The system's stored password is stored as plain text. A new password is entered using the 'Manual Entry' option." The form contains three rows: "Old Password" with a "Saved password" dropdown and a text field; "New Password" with a "Manual Entry" dropdown and a text field; and "Confirm New Password" with a text field. A "Change All Passwords" button is located at the bottom right of the form.

20. Create a new system inventory snapshot.

Select Manage → Service → Inventory Maintenance and choose Generate New Inventory. Once the inventory is generated, choose Save Inventory.

21. Configure the Sun StorEdge 6020 array

Select Manage → Service → Configure Devices” and choose Configure All.

22. Verify and fix the firmware revisions for the replacement array.

Select Manage → Service → Revision Maintenance and choose Create Patch Report. This verifies the Sun StorEdge 6020 array has the most recent patches applied.

Choose Select Patches. Check to see if any of the patches are listed for the replacement array. The list is presented with the names of the arrays and which patches are needed. Select the patches that you want to apply. The Patch Installation Report generates a log of the changes that have been applied.

Note – The Revision Maintenance may require initial setup if this is the first time it has been used on your Sun StorEdge 6320 system. This is done through the Revision Setup portion of the Storage Automated Diagnostic Environment.



▼ To View the Expansion Unit Online Help

1. Click the online help link in the Sun StorEdge Configuration Service browser.
2. Navigate to **Administering Your System → Array Details and Tray Reconfiguration**.
3. Select one of the following options:
 - To Add an Expansion Unit to an Array
 - To Remove an Expansion Unit from an Array

4.10.4 Replacing an Interconnect Loop Card

For procedures to replace the interconnect loop card in a Sun StorEdge 6020 array, refer to Chapter 6 of the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

4.10.5 Replacing a Sun StorEdge 6020 Array Controller Card

For procedures to replace the controller card in a Sun StorEdge 6020 array, refer to Chapter 6 of the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

4.10.6 Replacing the Power and Cooling Unit

For procedures for replacing the power and cooling unit in a Sun StorEdge 6020 array, refer to Chapter 6 of the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

4.10.7 Replacing the UPS Battery

For procedures for replacing the UPS battery in a Sun StorEdge 6020 array, refer to Chapter 6 of the *Sun StorEdge 6020 and 6120 Arrays System Manual*.

4.11 Servicing the Storage Service Processor Accessory Tray

The chapter discusses how to service the Storage Service Processor accessory tray.

This chapter is organized as follows:

- “Overview of the Storage Service Processor Accessory Tray” on page 4-59”.
- “Security of the Storage Service Processor Accessory Tray” on page 4-61
- “Overview of the Storage Service Processor Accessory Tray Cables” on page 4-61
- “Removing the Storage Service Processor Accessory Tray” on page 4-65.
- “Replacing the Storage Service Processor Accessory Tray” on page 4-66

4.11.1 Overview of the Storage Service Processor Accessory Tray

The Storage Service Processor accessory tray is mounted in the Sun StorEdge 6320 system directly below the Storage Service Processor. The Storage Service Processor accessory tray contains the following pieces:

- Serial Network Terminal Concentrator (NTC) – Used for remote serviceability support. The NTC provides secure access for inbound and outbound connections, LAN-to-LAN, the console server, and ISP connections. The NTC supports Point-to-Point protocol (PPP), Serial Line Internet Protocol (SLIP/CSLIP), SecurID, Radius, Kerberos, UNIX, NetWare, and local user’s database for authentication on inbound and outbound connections. Additional protection is provided through the routing capabilities. TCP/IP, IPX, and AppleTalk protocols can be routed, in addition to supporting Network Address Translation (NAT).
- Ethernet router/firewall – Used to provide additional security to Sun from the customer management LAN. Because the Storage Service Processor could be connected to the customer’s management LAN, there is a security risk to the Storage Service Processor and its software components. This security issue is heightened with the presence of Sun StorEdge Remote Response, which would extend the risk into the Sun Remote Support Ctype. Using a hardware firewall enables Sun to establish the type of traffic allowed to pass through to the Storage Service Processor from the customer’s management LAN.

The 4-port Ethernet hub provides connectivity to support additional external Storage Service Processors connected to any given Storage Service Processor, thus forming a miniature “daisy-chained” LAN. The WAN port can be used to connect

the “master” Storage Service Processor to your management LAN or provide a local port for service actions. Combining this hardware firewall with a 4-port Ethernet hub eliminates both problems.

- Personal Computer Memory Card International Association (PCMCIA) compatible modem – The PCMCIA modem will be the default connection point for the Sun StorEdge Remote Response solutions center support personnel. If the location of the system is not within one of the supported countries, an external serial port is available to connect an external modem qualified for that country locally.
- A single AC power supply used by all components in the tray.

The Storage Service Processor in the Sun StorEdge 6320 system contains Storage Automated Diagnostic Environment software that identifies devices, logs events, and alerts Sun engineers by email and pager if the data falls outside of pre-defined tolerances.

The Storage Service Processor communicates on two networks. The internal component LAN (IP address 192.168.0.2) and the SP LAN (IP address 10.0.0.2). The SP LAN is used to aggregate the Sun StorEdge Remote Response access to a modem.

Most of this information can be obtained by running the `ifconfig(1M)` command on the Storage Service Processor. The interface information that is not the 100 FRU is the information required.

The following example output from `ifconfig` shows the Storage Service Processor IP address (10.0.0.10), the netmask being used (ff000000), and the broadcast being used (10.0.0.255).

Note – The internal component LAN is a private network for the Storage Service Processor only.

The Storage Service Processor LAN is on `dmfe0` and the internal component LAN is on `dmfel` of the Storage Service Processor. For example, use the following commands to view the network interface parameters:

```
# ifconfig dmfe0
dmfe0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 2
      inet 10.0.0.10 netmask ff000000 broadcast 10.0.0.255
# ifconfig dmfel
dmfel: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
      inet 192.168.0.1 netmask ffffffff broadcast 192.168.0.255
```

TABLE 4-11 lists the FRU associated with the Storage Service Processor accessory tray and components.

TABLE 4-11 Storage Service Processor Accessory Tray FRU List

FRU Description
SPA Tray

The required tool is:

- No. 2 Phillips screwdriver

4.11.2 Security of the Storage Service Processor Accessory Tray

Security for the Storage Service Processor is provided in part by the aggregation of Storage Service Processors, the security module, and in part by the use of secure socket layer (SSL). SSL is implemented between the customer's management LAN connection and one of the Storage Service Processors using the Storage Automated Diagnostic Environment software.

Security on the Sun StorEdge Remote Response side of the Storage Service Processor is handled by the application of secure shell (`ssh(1)`) between the Storage Service Processor and the Network Terminal Concentrator. The Storage Service Processor is secured by an OPIE (One-time Password In Everything) software package.

You are responsible for providing physical security for the Sun storage product. The storage cabinet is equipped with a lock and key. Ensure that a trusted individual possesses the key and that the cabinet is secured at all times, except during local service actions.

4.11.3 Overview of the Storage Service Processor Accessory Tray Cables

This section describes the cables and connections involved when removing and replacing the Storage Service Processor accessory tray.

FIGURE 4-17 shows the connections on the Storage Service Processor accessory tray.

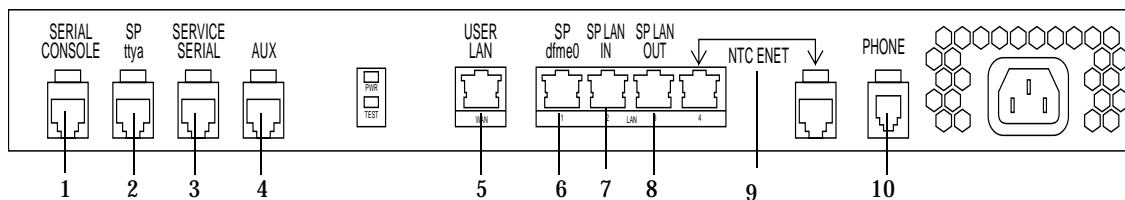


FIGURE 4-17 Storage Service Processor Accessory Tray Connections

TABLE 4-12 lists the external cables used to connect the Storage Service Processor accessory tray to the Storage Service Processor and the Storage Processor Access Panel.

TABLE 4-12 Sun StorEdge Remote Response Program Service Panel Cabling

Cable	Type	Description
1	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects the Service Processor Access Panel Serial Console Port to the Storage Service Processor accessory tray Serial Console Port
2	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects Storage Service Processor SP TTY-A port to the Storage Service Processor Accessory tray SP ttya port
3	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects Service Processor access panel service serial port to the Storage Service Processor accessory tray Service Serial port
4	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects Service Processor access panel AUX port to the Storage Service Processor accessory tray Aux port
5	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects Service Processor access panel user LAN port to the Storage Service Processor accessory tray user LAN
6	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects the Storage Service Processor DFME-0 Ethernet port to the Storage Service Processor accessory tray SP dfme0 port
7	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects the Service Processor access panel SP-LAN In port to the Storage Service Processor accessory tray SP LAN In port

TABLE 4-12 Sun StorEdge Remote Response Program Service Panel Cabling *(Continued)*

Cable	Type	Description
8	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects the Service Processor access panel SP-LAN Out port to the Storage Service Processor accessory tray SP LAN Out port
9	RJ45M/RJ45M	Cat-5 (1-1/8-8) Connects the Storage Service Processor accessory tray NTC Enet port to the Storage Service Processor accessory tray SP-LAN Enet port
10	RJ11M/RJ11M	Standard four-conductor phone cord. Connects Service Processor access panel phone port to the Storage Service Processor accessory tray phone port

FIGURE 4-18 shows the cables inside the Storage Service Processor accessory tray.

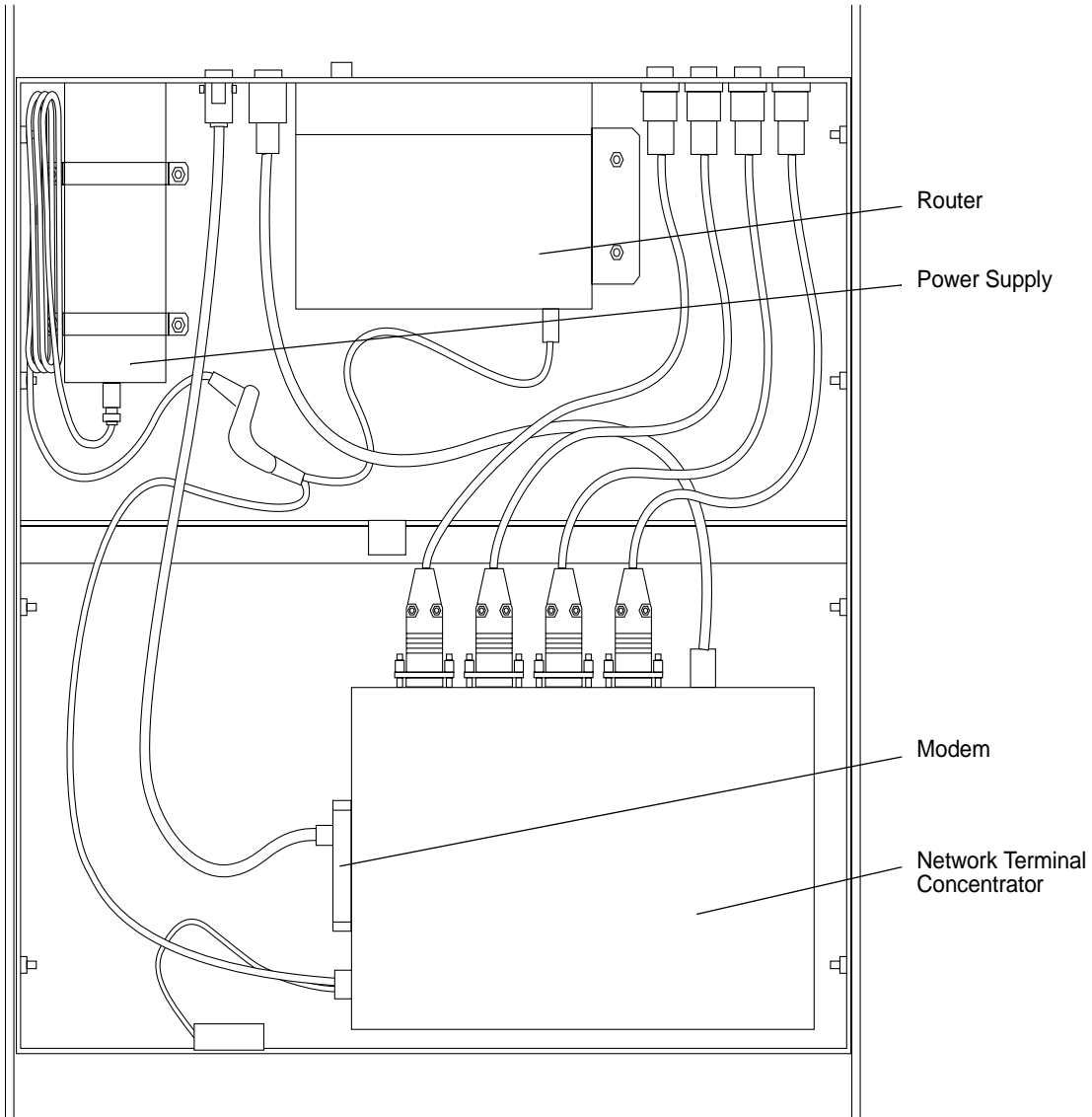


FIGURE 4-18 Internal Layout of the Storage Service Processor Accessory Tray

▼ Removing the Storage Service Processor Accessory Tray

1. **Open the back door of the system.**

2. **Open the service panel.**

The service panel is held shut by five PEM fastener screws.

3. **Disconnect the power cable from the Storage Service Processor accessory tray.**

4. **Make sure all cables are labeled and moving from right to left, disconnect all cables.**

See TABLE 4-12 to identify the names of all cables.

Note – There is no On/Off switch on the Storage Service Processor accessory tray. Disconnecting the unit performs the shutdown.

5. **Remove the two screws that hold the Storage Service Processor accessory tray in place.**

Note – The screw that holds the left rail in place is hidden behind a bundle of cables. Use care when moving the cables out of the way. These are not PEM fastener screws and can fall into the system.

6. **Open the front door of the system.**

7. **Remove as many of the filler panels and strip panels as necessary to remove the Storage Service Processor accessory tray.**

The panel is held in place by four PEM fastener Phillips screws.

8. **Remove the two screws that secure the front of Storage Service Processor accessory tray to the cabinet.**

Note – These are not PEM fastener screws and can fall into the system.

9. **Remove the Storage Service Processor accessory tray by sliding it out the front of the cabinet.**

Note – There are no keeper tabs (stops) that halt the removal of the Storage Service Processor accessory tray.

10. Remove the six screws (three on each side) that hold the Storage Service Processor accessory tray to the mounting brackets.

Note the orientation of the Storage Service Processor accessory tray to the mounting brackets.

▼ Replacing the Storage Service Processor Accessory Tray

1. Attach the mounting brackets to the new Storage Service Processor accessory tray using the six screws.

2. Open the front door of the system.

3. Slide the Storage Service Processor accessory tray into the system.

The rails on the mounting brackets fit on the top and bottom of the rails in the system.

4. Replace the two screws that secure the front of Storage Service Processor accessory tray to the cabinet.

Note – These are not PEM fastener screws and can fall into the system.

5. Replace any filler panels or strip panels that were removed while removing the Storage Service Processor accessory tray.

6. Close the front door of the system.

7. Open the back door of the system.

8. Replace the two screws in the back of the mounting rails.

Note – The screw that holds the left rail in place is hidden behind a bundle of cables. Use care when moving the cables out of the way. These are not PEM fastener screws and can fall into the system.

9. Moving from left to right, replace all the cables.

See TABLE 15-2 to identify the location of all cables.

10. Connect the power cable back into the Storage Service Processor accessory tray.

11. Close the service panel and lock it in place using the PEM fasteners.
12. Close the back door of the system.
13. To configure the software on the Storage Service Processor accessory tray, refer to Chapter 6 of the *Sun StorEdge 6320 System Installation Guide*.

Managing the System Using the CLI

This appendix provides instructions for using the Sun StorEdge Configuration Service CLI. This chapter is organized by command in the following section:

- “Using the Command-Line Interface” on page A-1

A.1 Using the Command-Line Interface

This section describes the `sscs` command line and options. The `sscs(1M)` command enables you to perform the same software operations as those available on the web browser. Any changes made using this command are shown in the web-browser user interface when you refresh or reload the related page in your browser.

The `sscs` command has an inactivity timer of 30 minutes to address security concerns. If you don't issue any `sscs` commands for 30 minutes, the session is terminated. When you issue a command after the time out, you will be told to log in first.

This section is organized as follows:

- “Command Syntax and Usage Summary” on page A-2
- “Logging In and Out Using the CLI” on page A-5
- “Administering Users Using the CLI” on page A-7
- “Configuring System Settings Using the CLI” on page A-8
- “Managing Arrays Using the CLI” on page A-13
- “Managing Jobs Using the CLI” on page A-15
- “Managing Storage Profiles Using the CLI” on page A-16
- “Managing Storage Pools Using the CLI” on page A-20
- “Managing Array Volumes Using the CLI” on page A-22

- “Managing Volume Groups Using the CLI” on page A-24
- “Managing Initiators and Initiator Groups Using the CLI” on page A-27
- “Displaying Jobs, Logs, System Setting, and Array Components Using the CLI” on page A-31

A.1.1 Command Syntax and Usage Summary

The `sscs` command is the command-line interface (CLI) for the software. The `sscs` command enables you to manage the storage components in your array, such as initiators, volumes, and so on. These commands are the CLI equivalent of functions that are also available from the web-browser user interface.

Depending on your user name, you might not be able to execute all commands. The three users associated with the software permissions are `admin`, `storage`, and `guest` shown in TABLE 4-13.

TABLE 4-13 Supported User Accounts

User	Description
<code>admin</code>	An <code>admin</code> user has all administration privileges. The <code>admin</code> user can modify system attributes and set passwords for the accounts.
<code>storage</code>	A <code>storage</code> user can use most of the software features related to storage device configuration. The Administration page is only available to this user as read-only; this user cannot modify admin settings.
<code>guest</code>	A <code>guest</code> has read-only privileges and can view the features of the software. This user cannot modify any settings or features.

A.1.1.1 Displaying a List of Subcommands

- **Type:**

```
# sscs --help
```

A.1.1.2 Displaying a Usage Summary of the Subcommands

- Type the following where *subcommand* is one of the subcommands shown in TABLE 4-14.:

```
# sscs subcommand --help
```

A.1.1.3 Short and Long Option Names

Note – When you use a double hyphen option, do not type a space between the hyphens.

The `sscs` command can accept a short or long name for each option. A short name option requires a single hyphen (`-`). A long name option requires a double hyphen (`--`) in the command-line arguments tables, in this chapter, the short name option and the long name options are separated by a comma. In the following example you would use either the `-a` or the `--array` argument:

```
# sscs create { -a | --array } array-name initgroup group-name
```

A.1.1.4 `sscs` Subcommand Tables

TABLE 4-14 shows the `sscs` subcommands, sorted by alphabetical order. You can also refer to the `sscs` man page.

TABLE 4-14 `sscs` Subcommands Sorted Alphabetically

Subcommand	See This Section
<code>add initgroup</code>	“Adding an Initiator to an Initiator Group” on page A-30
<code>add notification</code>	“Adding Email Notifications” on page A-8
<code>add volgroup</code>	“Adding a Volume to a Volume Group” on page A-25
<code>create initgroup</code>	“Creating an Initiator Group” on page A-29
<code>create initiator</code>	“Creating an Initiator” on page A-28
<code>create pool</code>	“Creating a Storage Pool” on page A-21
<code>create profile</code>	“Creating a Storage Profile” on page A-16
<code>create volgroup</code>	“Creating a Volume Group” on page A-25

TABLE 4-14 sscs Subcommands Sorted Alphabetically (*Continued*)

Subcommand	See This Section
create volume	“Creating a Volume” on page A-23
delete initgroup	“Deleting an Initiator Group” on page A-30
delete initiator	“Deleting an Initiator” on page A-29
delete pool	“Deleting a Storage Pool” on page A-22
delete profile	“Deleting a Storage Profile” on page A-20
delete volgroup	“Deleting a Volume Group” on page A-27
delete volume	“Deleting a Volume” on page A-24
export profile	“Exporting a Storage Profile” on page A-20
import profile	“Importing a Storage Profile” on page A-18
list array	“Listing Disk Arrays” on page A-32
list arraypower	“Listing Array Power Status” on page A-31
list date	“Listing the Date and Time” on page A-32
list disk	“Listing Disks in an Array” on page A-32
list firewall	“Listing the Firewall” on page A-33
list initgroup	“Listing the Initiator Group” on page A-33
list initiator	“Listing the Initiator” on page A-33
list jobs	“Listing the Jobs” on page A-33
list log	“Listing the Log Messages” on page A-34
list net	“Listing the Network Configuration” on page A-34
list notification	“Listing Email Notifications” on page A-32
list ntp	“Listing the Network Time Protocol” on page A-35
list pool	“Listing the Storage Pools” on page A-35
list power	“Listing the Power Status” on page A-35
list profile	“Listing the Storage Profiles” on page A-35
list system	“Listing the Storage Service Processor Information” on page A-36
list timezone	“Listing the Time Zone” on page A-36
list tray	“Listing the Storage Trays” on page A-36
list volgroup	“Listing the Volume Groups” on page A-36
list volume	“Listing the Volumes” on page A-37
login	“Logging In” on page A-6

TABLE 4-14 `sscs` Subcommands Sorted Alphabetically (*Continued*)

Subcommand	See This Section
<code>logout</code>	“Logging Out” on page A-7
<code>modify array</code>	“Modifying the Sun StorEdge 6020 Arrays” on page A-13
<code>modify arraypower</code>	“Modifying the Power State of an Array” on page A-12
<code>modify date</code>	“Modifying the Date and Time” on page A-10
<code>modify firewall</code>	“Modifying the Firewall” on page A-11
<code>modify initiator</code>	“Modifying an Initiator” on page A-28
<code>modify jobs</code>	“Managing Jobs Using the CLI” on page A-15
<code>modify net</code>	“Modifying the Network Addresses” on page A-9
<code>modify ntp</code>	“Modifying the Network Time Protocol Server” on page 9
<code>modify password</code>	“Creating or Modifying a User Password” on page A-7
<code>modify pool</code>	“Modifying a Storage Pool” on page A-21
<code>modify power</code>	“Modifying the Power Settings” on page A-12
<code>modify profile</code>	“Modifying a Storage Profile” on page A-17
<code>modify timezone</code>	“Modifying the Time Zone” on page A-11
<code>modify tray</code>	“Modifying the Controller Trays” on page A-15
<code>modify volgroup</code>	“Modifying a Volume Group” on page A-26
<code>modify volume</code>	“Modifying a Volume” on page A-23
<code>remove initgroup</code>	“Removing an Initiator from an Initiator Group” on page A-31
<code>remove notification</code>	“Removing Email Notifications” on page A-8
<code>remove volgroup</code>	“Removing a Volume or an Initiator Group from a Volume Group” on page A-26

A.1.2 Logging In and Out Using the CLI

The following commands enable you to log in to and out of `sscs`. Only designated users can log in; see “Administering Users Using the CLI” on page A-7.

A.1.2.1 Downloading the CLI Client

A thin-scripting client is available for the Solaris operating system as well as other hosts. The thin-scripting client provides a command-line interface (CLI) that enables access to system and management facilities. The client is available for download from:

`http://www.sun.com/`

You can navigate to the site that contains the scripting client files using either of the following methods:

▼ To Retrieve the Client from the Sun Download Center

1. **Go to the `http://www.sun.com` home page and click Downloads.**
2. **Go to Browse Downloads by Category and click System Administration.**
3. **Go to Storage Management and click Sun StorEdge 6320 System Software products (the “download” listing appears to be for the Windows platform but actually links you to downloads for all platforms).**
4. **Provide the user name and password to log in.**
5. **Download the appropriate files for your operating system.**

For example, the files for the Linux operating system are:

- `linux_se6x20.tar`
- `linux_README.txt`

The README file contains the client installation instructions.

A.1.2.2 Logging In

The `sscs login` command-line syntax is shown next.

```
# sscs login -h hostname [-t] [-f] [-u username]
```

TABLE 4-15 describes the arguments associated with the `login` subcommand:

TABLE 4-15 `sscs login` Command-Line Arguments

Argument	Description
<code>-u, --username <i>username</i></code>	Specifies the user name of <code>admin</code> , <code>storage</code> , or <code>guest</code> .
<code>-h, --hostname <i>hostname</i></code>	Specifies the host name of the Storage Service Processor.
<code>-f, --force</code>	Forces a login to the Storage Service Processor if another user with the same user name is already logged in.
<code>-t, --http</code>	Log in using an HTTP connection.

A.1.2.3 Logging Out

- **Type:**

```
# sscs logout
```

A.1.2.4 Administering Users Using the CLI

This section explains how to use the `sscs` commands for administering the `admin`, `storage`, and `guest` users. When the administrator assigns passwords to users, users can perform functions according to their account privileges. See TABLE 4-13 for user account passwords. See TABLE 4-13 for a description of the user accounts and privileges.

A.1.2.5 Creating or Modifying a User Password

Use the following `sscs` arguments to create or modify the password for the user.

```
# sscs modify password
```

To create the password for the Storage Service Processor user accounts, enter the *username* and the command prompts you to enter a password. For example:

```
# sscs modify password username
password:
```

The valid user names are `admin`, `storage`, and `guest`.

A.1.2.6 Adding Email Notifications

When a storage device alarm or event occurs, email is sent by the software to users designated by the administrator. These commands enable the administrator to manage this capability.

You can Add or Remove email notifications. The address is the fully-qualified (user name and domain) address that the `sscs` command uses to send alarms, alerts, or other events. For example, to Add a notification:

```
# sscs add [-a] [-c category-id] [-e event-id] notification email-address, ...
```

Where *email-address* is a fully-qualified email address; `-a`, `--all` specifies that all notifications are sent to email addresses; `-c`, `--category` specifies that all notifications from a specific *category-id* are sent to email addresses; and `-e`, `--event` specifies that all notifications from a specific *event-id* are sent to email addresses.

A.1.2.7 Removing Email Notifications

To Remove a notification:

```
# sscs remove [-a] [-c category-id] [-e event-id] notification email-address, ...
```

Where *email-address* is a fully-qualified email address; `-a`, `--all` specifies that all subscribers from the “all” category group are removed (does not affect specific category or event subscriptions); `-c`, `--category` specifies that all notifications from a specific *category-id* be removed, and `-e`, `--event` specifies that all notifications from a specific *event-id* be removed.

A.1.3 Configuring System Settings Using the CLI

The `sscs` commands described in the following subsection enables the administrator (`admin`) user to configure the Storage Service Processor settings.

A.1.3.1 Modifying the Network Addresses

Use this command to modify the network addresses of the Storage Service Processor. The `sscs modify net` command-line syntax is shown next.

```
# sscs modify [-d {on | off}] [-n ip-address] [-i ip-address] [-g ip-address]
[-m netmask] [-D domain-name] net
```

TABLE 4-16 describes the arguments associated with the `modify net` subcommand.

TABLE 4-16 `sscs modify net` Command-Line Arguments

Argument	Description
<code>-n, --nameserver ip-address</code>	Specifies the domain name server (DNS) IP address.
<code>-d, --dhcp {on off}</code>	Specifies on if the Storage Service Processor gets its network addresses from a DHCP server.
<code>-i, --ipaddress ip-address</code>	Specifies the Storage Service Processor IP address. Use if <code>-d, --dhcp</code> is off.
<code>-g, --gateway ip-address</code>	Specifies the gateway IP address. Use if <code>-d, --dhcp</code> is off.
<code>-m, --netmask netmask</code>	Specifies the netmask IP address. Use if <code>-d, --dhcp</code> is off.
<code>-D, --domain domain-name</code>	Specifies the domain name that may be needed for UNIX mail to work in the customer environment.

A.1.3.2 Modifying the Network Time Protocol Server

Use this command to modify or disable the Network Time Protocol (NTP) server IP address with the following arguments and options.

The `sscs modify ntp` command-line syntax is shown next:

```
# sscs modify {-e | -d} ntp [ip-address]
```

TABLE 4-17 describes the arguments associated with the `modify ntp` subcommand.

TABLE 4-17 `sscs modify ntp` Command-Line Arguments

Argument	Description
<code>-d,--disable</code>	Disable the use of the NTP server.
<code>-e,--enable</code>	Enable the use of the NTP server specified by the <i>ip-address</i> option. You must specify the server IP address.
<i>ip-address</i>	Specifies the NTP server IP address.

A.1.3.3 Modifying the Date and Time

Use this command to modify the date and time on the Storage Service Processor with the following arguments and options.

Note – To specify a four-digit year, use the *cc* and *yy* options

The `sscs modify date` command-line syntax follows.

```
# sscs modify -G { true | false } date [ [mmdd] HHMM | mmddHHMM
[cc] yy [.SS] ]
```

TABLE 4-18 describes the arguments associated with the `modify date` subcommand.

TABLE 4-18 `sscs modify date` Command-Line Arguments

Argument	Description
<code>-G,--GMT {true false}</code>	Specifies enable (true) or disable (false) for Greenwich Mean Time (GMT).
<i>mmdd</i>	Specifies the month and day number. For example, 0331 for March 31.
<i>HHMM</i>	Specifies the hour and minute. The hour number is based on a 24-hour clock; for example, 1:30 PM is 1330.
<i>cc</i>	Specifies the century minus one. For example, specify the twenty-first century as 20.
<i>yy</i>	Specifies the two-digit year number.
<i>SS</i>	Specifies the seconds of the hour.

A.1.3.4 Modifying the Time Zone

Use this command to set the time zone on the Storage Service Processor. The `sscs modify timezone` command-line syntax follows.

```
# sscs modify timezone timezone
```

timezone is a valid time zone of up to 128 characters long. The time zone information in the Solaris operating system is found in the `/usr/share/lib/zoneinfo` file.

A.1.3.5 Modifying the Firewall

Use this command to set the firewall port options for application and user access. The `sscs modify firewall` command-line syntax follows.

```
# sscs modify [-r {open | close}] [-R {open | close}]  
[-s {open | close}] [-S {open | close}] [-m {open | close}]  
[-c {open | close}] [-n {open | close}] [-p {open | close}] firewall
```

TABLE 4-19 describes the arguments associated with the `modify firewall` subcommand.

TABLE 4-19 `sscs modify firewall` Command-Line Arguments

Argument	Description
<code>-r,--array-management-http {open close}</code>	Open or close the non-secure HTTP port on the Storage Service Processor.
<code>-R,--array-management-https {open close}</code>	Open or close the secure HTTP port on the Storage Service Processor.
<code>-s,--service-http {open close}</code>	Open or close the non-secure port on the Storage Service Processor for service personnel.
<code>-S,--service-https {open close}</code>	Open or close the secure port on the Storage Service Processor for service personnel.
<code>-m,--snmp {open close}</code>	Open or close the Simple Network Management Protocol port on the Storage Service Processor for third-party device management application access.

TABLE 4-19 `sscs modify firewall` Command-Line Arguments

<code>-c,--cim-http {open close}</code>	Open or close the Common Information Model port on the Storage Service Processor for CIM-compatible web-based management application access
<code>-n,--ntp {open close}</code>	Open or close the Network Time Protocol port on the Storage Service Processor for access to an NTP server.
<code>-p,--patchpro {open close}</code>	Open or close the port on the Storage Service Processor to enable access to the Sun PatchPro web page, providing updates for firmware and software updates

A.1.3.6 Modifying the Power Settings

Use the `sscs modify power` command to set the power mode of the storage arrays. The `sscs modify power` command-line syntax follows.

```
# sscs modify power { on | off | down }
```

TABLE 4-20 describes the arguments associated with the `modify power` subcommand.

TABLE 4-20 `sscs modify power` Command-Line Arguments

Argument	Description
<code>on</code>	Specifies a power on or restore from a partial system shut down.
<code>off</code>	Specifies a full shut down, including the Storage Service Processor.
<code>down</code>	Specifies a partial system shut down; the Storage Service Processor remains powered on and the storage arrays are powered off.

A.1.3.7 Modifying the Power State of an Array

Use the `sscs modify arraypower` command to modify the power state of an array. The `sscs modify arraypower` command-line syntax follows.

```
# sscs modify -a array-name arraypower { off | restart | rad }
```


TABLE 4-21 describes the arguments associated with the `modify arraypower` subcommand.

TABLE 4-21 `sscs modify arraypower` Command-Line Arguments

Argument	Description
<code>-a</code> , array <i>array-name</i>	Specifies the array. The <i>array-name</i> can be up to 40 alphanumeric characters.
<code>off</code>	Shuts down the array. The array must be powered up manually after this action is performed.
<code>restart</code>	Restarts the array.
<code>rad</code>	Restores the array to the default values.

A.1.4 Managing Arrays Using the CLI

Use the `sscs` commands described in the following subsection to configure the Sun StorEdge 6020 array attributes and components.

Do not use spaces, commas, or special characters (`?`, `*`, `!`, `@`, `%`, or `&`) in the array or initiator group names.



Caution – When you change array settings, data found on any detected volumes is deleted. When you change an existing array profile, data found on any detected volumes is deleted. When you change an existing profile to a new profile, the existing profile's settings (such as cache settings) are copied to the new profile and the existing profile is deleted.

A.1.5 Modifying the Sun StorEdge 6020 Arrays

Use this command to modify the Sun StorEdge 6020 arrays. The `sscs modify array` command-line syntax follows.

```
# sscs modify [-s { 4k | 8k | 16k | 32k | 64K}] [-c {auto | writebehind
| writethrough | off}] [-r {on | off}] [-R {high | medium | low}]
[-f {explicit | implicit | none}] [-F {auto | loop | fabric-p2p}]
[-p {auto | 1 | 2}] [-h hot-spare-drive-count] [-k {enabled | disabled}]
[-o {on | off}] [-d text] array array-name
```

TABLE 4-22 describes the arguments associated with the `modify array` subcommand.

TABLE 4-22 `sscs modify array` Command-Line Arguments

Argument	Description
<code>-s,--segment {4k 8k 16K 32K 64K}</code>	Specify a segment size of 4 Kbytes, 8 Kbytes, 16 Kbytes, 32 Kbytes, or 64 Kbytes.
<code>-c,--cache {auto writebehind writethrough off}</code>	Specify the volume cache characteristics or disable the cache. Specify off for no read or write caching. <ul style="list-style-type: none"> • <code>auto</code> - use write-behind or write-through caching depending on I/O characteristics. • <code>writebehind</code> - All read and write operations are written to cache. • <code>writethrough</code> - data is written to cache and then to disk. • <code>off</code> - No read or write caching.
<code>-r,--readahead {on off}</code>	Enable or disable the volume read-ahead cache.
<code>-R,--reconrate {high medium low}</code>	Specify the LUN reconstruction rate. Selecting high might impact system I/O performance; selecting low might increase system I/O performance.
<code>-f,--failover {explicit implicit none}</code>	Specify the LUN failover mode.
<code>-p,--fcportspeed {auto 1 2}</code>	Specify the Fibre Channel port speed: auto, 1 Gbyte, or 2 Gbyte.
<code>-F,--fctopology {auto loop fabric_p2p}</code>	Specify the Fibre Channel topology for the array: auto, loop (arbitrated loop), or <code>fabric_p2p</code> (point-to-point).
<code>-h,--hot-spare <i>hot-spare-drive-count</i></code>	Specifies the hot spare count for the array. The <i>hot-spare-drive-count</i> limit is (0...8).
<code>-k,--disk-scrubbing {enabled disabled}</code>	Specifies if disk scrubbing is enabled or disabled for the array.
<code>-o,--ondg {on off}</code>	Specifies if the “online loop diagnostics mode” is on or off. The online loop diagnostic controls the monitoring of Loop Initialization Protocol (LIP) storms and backend fault detection. This feature should always be on. If you encounter problems, it can be turned off.
<code>-d,--description <i>text</i></code>	Type text describing the array, up to 16 characters long

A.1.5.1 Modifying the Controller Trays

Use this command to modify the controller trays. The `sscs modify tray` command-line syntax follows.

```
# sscs modify -a array-name { -d | -u | -e } tray tray-id, tray-id, ...
```

TABLE 4-23 describes the arguments associated with the `modify tray` subcommand.

TABLE 4-23 `sscs modify tray` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-d, --disable</code>	Disable an existing alternate master controller.
<code>-u, --unconfigure</code>	Unconfigure a controller tray
<code>tray tray-id, tray-id, ...</code>	Specifies one or more <i>tray-ids</i> up to 24 characters long.

A.1.6 Managing Jobs Using the CLI

Use the following `sscs` command to delete or cancel one or more jobs by job identification number. The `sscs modify jobs` command-line syntax follows.

```
# sscs modify {[ -k job-id, job-id, ... ] [ -d job-id, job-id, ... ]} jobs
```

TABLE 4-24 describes the arguments associated with the `modify jobs` subcommand.

TABLE 4-24 `sscs modify jobs` Command-Line Arguments

Argument	Description
<code>-k, --kill job-id, job-id, ...</code>	Cancel (kill) a running or outstanding job or jobs.
<code>-d, --delete</code>	Delete a running or outstanding job or jobs.

A.1.7 Managing Storage Profiles Using the CLI

Use the `sscs` commands described in these subsections to create and manage storage profiles on the Sun StorEdge 6020 arrays. You can create, delete, modify, import, and export profiles.

A.1.7.1 Creating a Storage Profile

Use this command to create a storage profile. The `sscs create profile` command-line syntax follows.

```
# sscs create [-d profile-description] -r {0 | 1 | 5} -t {iops | bandwidth  
| capacity | bm_iops | bm_bandwidth | bm_capacity} -s {4K | 8K | 16K  
| 32K | 64K} -h {on | off} -n {variable | 2 | 3 | ... | 14} -D {yes |  
no} profile profile-name
```

TABLE 4-25 describes the arguments associated with the `create profile` subcommand.

TABLE 4-25 `sscs create profile` Command-Line Arguments

Argument	Description
<code>-d,--description</code> <i>profile-description</i>	Specifies the <i>profile-description</i> up to 256 (with spaces) alphanumeric characters long.
<code>-r,--raidlevel</code> {0 1 5}	Specifies the RAID levels 0, 1, or 5.
<code>-t,--array-type</code> {iops bandwidth capacity bm_logs bm_bandwidth bm_capacity}	Specifies the array type to use.
<code>-s,--segment-size</code> {4K 8K 16K 32K 64K}	Specifies the segment size.
<code>-h,--readahead</code> {on off}	Specifies if readahead is on or off.

TABLE 4-25 `sscs create profile` Command-Line Arguments

Argument	Description
<code>-n,--number-of-disks {variable 2 3 ... 14}</code>	Specifies the number of disks
<code>-D,--dedicated-hot-spare {yes no}</code>	Specifies if a dedicated hot spare is required
<code>profile profile-name</code>	Specifies a <i>profile-name</i> up to 32 alphanumeric characters long.

A.1.7.2 Modifying a Storage Profile

Use this command to modify a storage profile. No settings, other than the description and name can be modified for pools that are defined by *profile-name*. The `sscs modify profile` command-line syntax follows.

```
# sscs modify [-d profile-description] [-N profile-name] [-r {0 | 1 | 5}]
[-t {iops | bandwidth | capacity | bm_iops | bm_bandwidth |
bm_capacity}] [-s {4K | 8K | 16K | 32K | 64K}] [-h {on | off}]
[-n {variable | 2 | 3 | ... | 14}] [-D {yes | no}] profile profile-name
```

TABLE 4-26 describes the arguments associated with the `modify profile` subcommand.

TABLE 4-26 `sscs modify profile` Command-Line Arguments

Argument	Description
<code>-d,--description profile-description</code>	Specifies the <i>profile-description</i> up to 256 (with spaces) alphanumeric characters long.
<code>-N,--new-name new-name</code>	Specifies a new name for the profile.
<code>-r,--raidlevel {0 1 5}</code>	Specifies the RAID levels 0, 1, or 5.
<code>-t,--array-type {iops bandwidth capacity bm_iops bm_bandwidth bm_capacity}</code>	Specifies the array type to use.
<code>-s,--segment-size {4K 8K 16K 32K 64K}</code>	Specifies the segment size.

TABLE 4-26 `sscs modify profile` Command-Line Arguments

Argument	Description
<code>-h,--readahead</code> {on off}	Specifies if readahead is on or off.
<code>-n,--number-of-disks</code> {variable 2 3 ... 14}	Specifies the number of disks
<code>-D,--dedicated-hot-spare</code> {yes no}	Specifies if a dedicated hot spare is required
<code>profile</code> <i>profile-name</i>	Specifies a <i>profile-name</i> up to 32 alphanumeric characters long.

A.1.7.3 Importing a Storage Profile

Use this command to import one or more storage profiles from an xml location. The output of the export profile command is sent to stdout. You should redirect the output into a file or another usable mechanism. The `sscs export profile` command-line syntax follows.

```
# sscs import [ -L | -f ] -x xml-location profile [profile-name, ...]
```

TABLE 4-27 describes the arguments associated with the `import profile` subcommand.

TABLE 4-27 `sscs import profile` Command-Line Arguments

Argument	Description
<code>-L,--list</code>	Specifies that no import will occur. Instead, all profiles in the xml (or those specified via <i>profile-name</i> , ...) will be listed. Each profile is identified as follows: <ul style="list-style-type: none"> • Exists - the profile already exists with all the same parameter values. • Duplicate Settings - a profile with exactly the same parameters (description and/or version can be different) exists, and no profile with the given name is in use by the system. • Conflicting - a profile with the same name exists, has different parameters, and is not currently in use by the system. • In Use - a profile with the same name exists, has different parameters, and is currently in use by the system. • New - None of the above labels apply.
<code>-f,--force</code>	Specifies that the import will be forced. If you specify the <code>--force</code> option, profiles identified as “New” and “In Use” are imported. Profiles identified as “Conflicting” are imported, but replace current profiles with the same name. Profiles identified as “Duplicate Settings” are imported, creating a new profile. Profiles identified as “Exists” are not imported.
<code>-x,--xml <i>xml-location</i>, ...</code>	Specifies that the import of one or more profiles from an <i>xml-location</i> . The <i>xml-location</i> can be in the form of a url (<code>http://...</code> or <code>file:///...</code>) or a filename. In either case, it should specify the location of xml containing the profiles to be imported.
<code>profile <i>profile-name</i></code>	Specifies a <i>profile-name</i> to import. If no profiles are specified, all profiles are imported.

A.1.7.4 Exporting a Storage Profile

Use this command to export one or more storage profiles into an xml representation. The output of the export profile command is sent to stdout. You should redirect the output into a file or another usable mechanism. The `sscs export profile` command-line syntax follows.

```
# sscs export profile [profile-name, ...]
```

TABLE 4-28 describes the arguments associated with the `export profile` subcommand.

TABLE 4-28 `sscs export profile` Command-Line Arguments

Argument	Description
<code>profile</code> <i>profile-name</i>	Specifies the <i>profile-name</i> to export. If no profiles are specified, all profiles are exported.

A.1.7.5 Deleting a Storage Profile

Use this command to delete one or more storage profiles. Profiles that are “In Use” cannot be deleted. The `sscs delete profile` command-line syntax follows.

```
# sscs delete profile profile-name, ...
```

TABLE 4-29 describes the arguments associated with the `delete profile` subcommand.

TABLE 4-29 `sscs delete profile` Command-Line Arguments

Argument	Description
<code>profile</code> <i>profile-name</i> , ...	Specifies one or more <i>profile-names</i> to be deleted.

A.1.8 Managing Storage Pools Using the CLI

Use the `sscs` commands described in these subsections create and manage storage pools on the Sun StorEdge 6020 arrays. You can create and delete storage pools, place the storage in the pools online or offline, and configure related pool settings.

A.1.8.1 Creating a Storage Pool

Use this command to create a storage pool. After creating the pool, use the `create volume` subcommand to specify volumes and the `add` subcommand to add storage volumes to the pool. The `sscs create pool` command-line syntax follows.

```
# sscs create -a array-name -t tray-id [-d number-of drives] -r RAID-level
-s {0 | 1} pool pool-name
```

TABLE 4-30 describes the arguments associated with the `create pool` subcommand.

TABLE 4-30 `sscs create pool` Command-Line Arguments

Argument	Description
<code>-a,--array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-t,--trayid tray-id</code>	Specifies a disk tray identification name <i>tray-id</i> up to 24 characters long.
<code>-d,--drives number-of-drives</code>	Specifies the number of drives in the pool.
<code>-r,--raidlevel {0 1 5}</code>	Specifies RAID levels 0, 1, or 5.
<code>-s,--spare {0 1}</code>	Specifies if the pool contains a spare drive: specify 1 if the pool contains a spare, 0 if it does not contain a spare.
<code>pool pool-name</code>	Specifies a <i>pool-name</i> up to 12 characters long.

A.1.8.2 Modifying a Storage Pool

Use this command to modify the state of a storage pool, placing the pool storage online or offline. The `sscs modify pool` command-line syntax follows.

```
# sscs modify -a array-name [-p profile-name]
[-s {online | offline | initialize}] pool pool-name
```

TABLE 4-31 describes the arguments associated with the `modify pool` subcommand.

TABLE 4-31 `sscs modify pool` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-p, --profile profile-name</code>	Specifies the profile name.
<code>-s, --status {online offline initialize}</code>	Places the pool online, offline, or initializes the pool.
<code>pool pool-name</code>	Specifies a <i>pool-name</i> up to 12 characters long.

A.1.9 Deleting a Storage Pool

Use this command to delete one or more storage pools that exist in a specified Sun StorEdge 6020 array. The `sscs delete pool` command-line syntax follows.

```
# sscs delete -a array-name pool pool-name, ...
```

TABLE 4-32 describes the arguments associated with the `delete pool` subcommand.

TABLE 4-32 `sscs delete pool` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>pool pool-name, ...</code>	Specifies one or more <i>pool-names</i> up to 12 characters long.

A.1.10 Managing Array Volumes Using the CLI

Use the `sscs` commands described in these subsections to create and manage volumes on the Sun StorEdge 6020 arrays. You can create, modify, and delete volumes.

Note – To add or remove a volume from a volume group, see “Managing Volume Groups Using the CLI” on page A-24.

A.1.10.1 Creating a Volume

Use this command to create a volume on a specified Sun StorEdge 6020 array. The `sscs create volume` command-line syntax follows.

```
# sscs create -a array-name -p pool-name -s {sizegb | sizemb}
  [-P { none | readwrite | readonly}] [-n lun] volume vol-name
```

TABLE 4-33 describes the arguments associated with the `create volume` subcommand.

TABLE 4-33 `sscs create volume` Command-Line Arguments

Argument	Description
<code>-a,--array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-p,--pool pool-name</code>	Specifies the storage <i>pool-name</i> the volume belongs to. The <i>pool-name</i> can be up to 12 characters long.
<code>-s,--size sizegb sizemb</code>	Specifies the volume <i>size</i> in gigabytes or megabytes. The minimum volume size is 10 Mbytes
<code>-P,--permissions none readwrite readonly</code>	Specifies the user access rights to this drive. The default setting is none.
<code>-n,--number lun</code>	Specify the logical unit number <i>lun</i> of the volume.
<code>volume vol-name</code>	<i>vol-name</i> can be up to 12 alphanumeric characters long.

A.1.10.2 Modifying a Volume

Use this command to modify a volume's attributes on a specified Sun StorEdge 6020 array. The `sscs modify volume` command-line syntax follows.

```
# sscs modify -a array-name -P { none | readwrite | readonly}
  volume vol-name
```

TABLE 4-34 describes the arguments associated with the `modify volume` subcommand.

TABLE 4-34 `sscs modify volume` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-P, --permissions none readwrite readonly</code>	Specifies the user access rights to this drive. The default setting is none.
<code>volume vol-name</code>	Specifies a <i>vol-name</i> up to 12 alphanumeric characters long.

A.1.10.3 Deleting a Volume

Use this command to delete one or more volumes on a specified Sun StorEdge 6020 array. The `sscs delete volume` command-line syntax follows.

```
# sscs delete -a array-name volume vol-name, ...
```

TABLE 4-35 describes the arguments associated with the `delete volume` subcommand.

TABLE 4-35 `sscs delete volume` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>volume vol-name, ...</code>	Specifies one or more <i>vol-names</i> up to 12 alphanumeric characters long.

A.1.11 Managing Volume Groups Using the CLI

Use the `sscs` commands described in these subsections to manage volume groups on the Sun StorEdge 6020 arrays. You can create, add, modify, remove, and delete volume groups.

Note – To manage volumes, see “Managing Array Volumes Using the CLI” on page A-22.

A.1.11.1 Creating a Volume Group

Use this command to create a volume group in a disk array. After creating the volume group, use the `create volume` subcommand to create volumes and the `add` subcommand to add volumes to the group. The `sscs create volgroup` command-line syntax follows.

```
# sscs create -a array-name volgroup volgroup-name
```

TABLE 4-36 describes the arguments associated with the `create volgroup` subcommand.

TABLE 4-36 `sscs create volgroup` Command-Line Arguments

Argument	Description
<code>-a,--array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>volgroup volgroup-name</code>	Specifies a <i>volgroup-name</i> up to 24 characters long.

A.1.11.2 Adding a Volume to a Volume Group

Use this command to add one or more storage volumes to a volume group in the array. The `sscs add volgroup` command-line syntax follows.

```
# sscs add -a array-name -v volume-name, ... volgroup volgroup-name
```

TABLE 4-37 describes the arguments associated with the `add volgroup` subcommand.

TABLE 4-37 `sscs add volgroup` Command-Line Arguments

Argument	Description
<code>-a,--array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-v,--volume vol-name, ...</code>	Specifies one or more <i>vol-names</i> up to 12 characters long.
<code>volgroup volgroup-name</code>	Specifies a <i>volgroup-name</i> up to 24 characters long.

A.1.11.3 Modifying a Volume Group

Use this command to associate an initiator group with a volume group and set group access rights to volumes in the group using the modify volume group arguments. The `sscs modify volgroup` command-line syntax follows.

```
# sscs modify -a array-name -i initgroup-name -P {readwrite | readonly}
volgroup volgroup-name
```

TABLE 4-38 describes the arguments associated with the `sscs modify volgroup` command.

TABLE 4-38 `sscs modify volgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-i, --initgroup initgroup-name</code>	Specifies an <i>initgroup-name</i> up to 16 characters long.
<code>-P, --permissions readwrite readonly</code>	Specifies the user access rights to this group.
<code>volgroup volgroup-name</code>	Specifies a <i>volgroup-name</i> up to 24 characters long.

A.1.11.4 Removing a Volume or an Initiator Group from a Volume Group

Use this command to remove one or more volumes or initiator groups from a volume group. The volume group must exist. The `sscs remove volgroup` command-line syntax follows.

```
# sscs remove -a array-name {-i initgroup-name, ... | -v vol-name, ... }
volgroup volgroup-name
```

TABLE 4-39 describes the arguments associated with the `remove volgroup` subcommand.

TABLE 4-39 `sscs remove volgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-i, --initgroup initgroup-name, ...</code>	Specifies one ore more <i>initgroup-names</i> up to 16 characters long.
<code>-v, --volume vol-name, ...</code>	Specifies one or more <i>vol-names</i> up to 12 characters long.
<code>volgroup volgroup-name</code>	Specifies a <i>volgroup-name</i> up to 24 characters long.

A.1.11.5 Deleting a Volume Group

Use this command to delete a volume group. The volume group must exist in the specified storage array. The `sscs delete volgroup` command-line syntax follows.

```
# sscs delete -a array-name volgroup volgroup-name
```

TABLE 4-40 describes the arguments associated with the `delete volgroup` subcommand.

TABLE 4-40 `sscs delete volgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>volgroup volgroup-name</code>	Specifies a <i>volgroup-name</i> up to 24 characters long.

A.1.12 Managing Initiators and Initiator Groups Using the CLI

Use the `sscs` commands described in these subsections to manage initiators and initiator groups in the Sun StorEdge 6020 arrays. You can modify, create, add, and delete initiators and initiator groups.

A.1.12.1 Creating an Initiator

Use this command to create one or more initiators in the Sun StorEdge 6020 array. The `sscs create initiator` command-line syntax follows:

```
# sscs create -a array-name initiator wwn, ...
```

TABLE 4-41 describes the arguments associated with the `create initiator` subcommand.

TABLE 4-41 `sscs create initiator` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>initiator wwn, ...</code>	Specifies one or more initiators by worldwide name (<i>wwn</i>). The <i>wwn</i> can be up to 16 hexadecimal characters. For example, 210000e08b047212.

A.1.12.2 Modifying an Initiator

Use this command to modify or create the initiator device description. The `sscs modify initiator` command-line syntax follows.

```
# sscs modify -a array-name -d text initiator wwn
```

TABLE 4-42 describes the arguments associated with the `modify initiator` subcommand.

TABLE 4-42 `sscs modify initiator` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>-d, --description text</code>	Specifies a text <i>description</i> up to 64 characters long.
<code>initiator wwn</code>	Specifies an initiator by worldwide name (<i>wwn</i>). The <i>wwn</i> can be up to 16 hexadecimal characters. For example, 210000e08b047212.

A.1.12.3 Deleting an Initiator

Use this command to delete one or more initiators in the Sun StorEdge 6020 array. The initiators must exist in the specified array. The `sscs delete initiator` command-line syntax follows:

```
# sscs delete -a array-name initiator wwn, ...
```

TABLE 4-43 describes the arguments associated with the `delete initiator` subcommand.

TABLE 4-43 `sscs delete initiator` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>initiator wwn, ...</code>	Specifies one or more initiators by worldwide name (<i>wwn</i>). The <i>wwn</i> can be up to 16 hexadecimal characters. For example, 210000e08b047212.

A.1.12.4 Creating an Initiator Group

Use this command to create an initiator group in a specified disk array. Do not use spaces, commas, or special characters (`?`, `*`, `!`, `@`, `%`, or `&`) in the array or initiator group names. After creating the initiator group, use the `add` subcommand to add devices to it.

The `sscs create initgroup` command-line syntax follows.

```
# sscs create -a array-name initgroup initgroup-name
```

TABLE 4-44 describes the arguments associated with the `create initgroup` subcommand.

TABLE 4-44 `sscs create initgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>initgroup initgroup-name</code>	Specifies an initiator group by name. <i>initgroup-name</i> can be up to 16 characters long.

A.1.12.5 Adding an Initiator to an Initiator Group

Use this command to add one or more devices to the initiator group name in the initiator group. Specify the device by its worldwide name (WWN). The `sscs add initgroup` command-line syntax follows.

`sscs add -a array-name -i wwn, ww2, ... initgroup initgroup-name`

TABLE 4-45 describes the arguments associated with the `add initgroup` subcommand.

TABLE 4-45 `sscs add initgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specify an <i>array-name</i> up to 40 characters long.
<code>-i, --initiator wwn, ww2, ...</code>	Specify one or more devices by WWN. The <i>wwn</i> can be up to 16 hex characters. For example, <code>-i 210000e08b047212</code> .
<code>initgroup initgroup-name</code>	Specifies an initiator group by name. The <i>initgroup-name</i> can be up to 16 characters long.

A.1.12.6 Deleting an Initiator Group

Use this command to delete the initiator group. The initiator group must exist in the specified array. The `sscs delete initgroup` command-line syntax follows.

`sscs delete -a array-name initgroup initgroup-name`

TABLE 4-46 describes the arguments associated with the `delete initgroup` subcommand.

TABLE 4-46 `sscs delete initgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specifies an <i>array-name</i> up to 40 characters long.
<code>initgroup initgroup-name</code>	Specifies an initiator group by name. <i>initgroup-name</i> can be up to 16 characters long.

A.1.12.7 Removing an Initiator from an Initiator Group

Use this command to remove one or more initiators from an initiator group. The `sscs remove initgroup` command-line syntax follows.

```
# sscs remove -a array-name -i wwn, ... initgroup initgroup-name
```

TABLE 4-47 describes the arguments associated with the `remove initgroup` subcommand.

TABLE 4-47 `sscs remove initgroup` Command-Line Arguments

Argument	Description
<code>-a, --array array-name</code>	Specify an <i>array-name</i> up to 40 characters long.
<code>-i, --initiator wwn</code>	Specify one or more devices by WWN. The <i>wwn</i> can be up to 16 hex characters. For example, <code>-i 210000e08b047212</code> .
<code>initgroup initgroup-name</code>	Specifies an initiator group by name. <i>initgroup-name</i> can be up to 16 characters long.

A.1.13 Displaying Jobs, Logs, System Setting, and Array Components Using the CLI

Use the `sscs` commands described in this subsection lists details about outstanding or completed jobs, log files, system settings, and array components.

A.1.13.1 Listing Array Power Status

Use the `sscs list arraypower` command to list information about array power status. The `sscs list arraypower` command-line syntax follows.

```
# sscs list -a array-name arraypower
```

Where `-a, --array array-name` specifies the array. The *array-name* can be up to 40 alphanumeric characters.

A.1.13.2 Listing Disk Arrays

This command displays the details about one or more disk arrays. If you do not specify an *array-name*, the command lists the disk array names and status only. The `sscs list array` command-line syntax follows.

```
# sscs list array [array-name1, array-name2, ...]
```

A.1.13.3 Listing Disks in an Array

This command displays the details about one or more disks in an array. The `sscs list disk` command-line syntax follows.

```
# sscs list -a array-name [-t, --tray tray-id ] disk [disk-name, ...]
```

A.1.13.4 Listing the Date and Time

This command displays the current date and time of the Storage Service Processor in the following format:

day month day-number hour:minute:second timezone year

For example, Thu Aug 22 16:09:36 PDT 2002.

The `sscs list date` command-line syntax follows.

```
# sscs list date
```

A.1.13.5 Listing Email Notifications

You can list one or more email contact addresses configured for status alerts by using the `sscs list notification` argument. For example:

```
# sscs list [-a, --all] [-c, --category category-id, ...] [-e, --event event-id, ...] notification
```

A.1.13.6 Listing the Firewall

This command displays current firewall port filter settings. The command lists the indicated port as open (allowing traffic) or closed (disallowing traffic). The `sscs list firewall` command-line syntax follows.

```
# sscs list firewall
```

A.1.13.7 Listing the Initiator

This command displays information about one or more initiators. If you do not specify a worldwide name (WWN), the command lists all initiators. The `sscs list initiator` command-line syntax follows.

```
# sscs list -a array-name initiator [wwn1, wwn2, ...]
```

A.1.13.8 Listing the Initiator Group

This command displays information about one or more initiator groups. The `sscs list initgroup` command-line syntax follows.

```
# sscs list -a array-name initgroup [initgroup-name, initgroup-name, ...]
```

A.1.13.9 Listing the Jobs

This command displays information about jobs by status (outstanding) or by job identification number. The command lists all jobs if you do not specify any options. The `sscs list jobs` command-line syntax follows.

```
# sscs list [-o,--outstanding] [-a array-name ] jobs [job-id, ...]
```

A.1.13.10 Listing the Log Messages

This command displays log messages for the software. If you do not specify any options, all log messages are displayed. The command lists all jobs if you do not specify any options. The `sscs list log` command-line syntax follows.

```
# sscs list [-s {[mmdd]HHMM | mmddHHMM[cc]yy} [.SS]]  
            [-f {[mmdd]HHMM | mmddHHMM[cc]yy} [.SS]] [-t number] log
```

TABLE 4-47 describes the arguments associated with the `list log` subcommand.

TABLE 4-48 `sscs list log` Command-Line Arguments

Argument	Description
<code>-s,--start</code> <code>{[mmdd]HHMM mmddHHMM[cc]yy} [.SS]</code>	Lists all log messages starting at the date specified by the date options. Use with the <code>-f,--finish</code> subcommand to specify a date range.
<code>-f,--finish</code> <code>{[mmdd]HHMM mmddHHMM[cc]yy} [.SS]</code>	Lists all log messages ending at the date specified by the date options. Use with the <code>-s,--start</code> subcommand to specify a date range.
<code>mmdd</code>	Specifies the month and day number. For example, 0331 for March 31.
<code>HHMM</code>	Specifies the hour and minute. The hour number is based on a 24-hour clock; for example, 1:30 PM is 1330.
<code>cc</code>	Specifies the century minus one. For example, specify the twenty-first century as 20.
<code>yy</code>	Specifies the two-digit year number.
<code>SS</code>	Specifies the seconds of the hour.
<code>-t,--tail number</code>	Lists the most recent log messages as specified by <i>number</i> . For example, to list the last 100 messages, type: <code>sscs list -t 100 log</code> .

A.1.13.11 Listing the Network Configuration

This command displays the array or system network configuration information. The `sscs list net` command-line syntax follows.

```
# sscs list net
```

A.1.13.12 Listing the Network Time Protocol

This command shows Network Time Protocol IP address. The `sscs list ntp` command-line syntax follows.

```
# sscs list ntp
```

A.1.13.13 Listing the Storage Profiles

This command displays a list of information about one or more profile names. If you do not specify a profile name, all profiles are listed. The `sscs list profile` command-line syntax follows.

```
# sscs list profile [profile-name, ...]
```

A.1.13.14 Listing the Storage Pools

This command displays information about one or more storage pools. If you do not specify a pool name, the command shows all pool names. The `sscs list pool` command-line syntax follows.

```
# sscs list pool [pool-name1, poolname2,...]
```

A.1.13.15 Listing the Power Status

This command displays the power status for the array. The command shows the status of ON, UNKNOWN, or DOWN (DOWN indicates that the array is powered down). The `sscs list power` command-line syntax follows.

```
# sscs list power
```

A.1.13.16 Listing the Storage Service Processor Information

This command displays the system Storage Service Processor information, such as system ID, description, and vendor and model type. The `sscs list system` command-line syntax follows.

```
# sscs list system
```

A.1.13.17 Listing the Time Zone

This command displays the currently-configured time zone. The `sscs list timezone` command-line syntax follows.

```
# sscs list timezone
```

A.1.13.18 Listing the Storage Trays

This command displays information about one or more storage trays in the array. If you do not specify a *trayid*, the command shows all trays. The `sscs list tray` command-line syntax follows.

```
# sscs list -a array-name tray [trayid1, trayid2, ...]
```

A.1.13.19 Listing the Volume Groups

This command displays information about one or more volume groups. If you do not specify a *volgroup-name*, the command shows all volume groups. The `sscs list volgroup` command-line syntax follows.

```
# sscs list [-a array-name] volgroup [volgroup-name1, volgroup-name2, ...]
```


A.1.13.20 Listing the Volumes

This command displays information about one or more volumes. If you do not specify a *vol-name*, the command shows all volumes. The `sscs list volume` command-line syntax follows.

```
# sscs list -a array-name volume [ vol-name1 , vol-name2 , ... ]
```

A.1.14 Array Hot Spares

The *array hot spare* feature enables you to designate disks as hot standbys to substitute for failed drives. You can configure hot spares to be global for the array or dedicated to a specific pool.

▼ To configure array hot spares:

1. **Open the Configure Array screen and specify between 0 and 8 global hot spares for the array, based on the available disks.**

▼ To configure a dedicated hot spare for a pool

1. **Apply a different profile to the storage pool.**
2. **Perform the steps in To View Storage Pool Details to view to the desired storage and click Apply Different Profile.**

The Apply Different Profile page displays profiles that can be applied without affecting the pool.

3. **Add or remove a spare for a pool by changing the profile.**

▼ To configure array hot spares with the CLI

1. **Use the `modify array` command.**

```
sscs modify -h hot-spare-drive-count array array-name
```

You can specify 0-8 hot spare drives.

▼ To configure dedicated hot spares with the CLI.

1. Use the `modify profile` command.

```
sscs modify -D yes profile profile-name
```

A.1.15 Managing Disk Scrubber

The *disk scrubber* feature constantly reviews the volumes for consistency. As a result, you will see the disk LEDs flash regardless of I/O. Disk scrubber is enabled by default.



Caution – .Sun does not recommend disabling the disk scrubber. Disabling the disk scrubber may lead to latent disk block errors which could cause multiple disk failures and lose of data.

A.1.16 Media Errors

The disk scrubber finds certain media errors on a read for all RAID levels. For RAID0 volumes it reports this to the `array syslog` file. For RAID1 and RAID5 volumes, the errors will be fixed.

This condition will be indicated by a `syslog` entry as shown in the following example:

- Media Error on `uld02`:

```
uld02 Sense Key = 0x3, Asc = 0x11, Ascq = 0x0  
Jan 09 09:08:42 array00 ISR1[1]: W: uld02 Sense Data  
Description Unrecovered Read Error
```

- RAID1: Messages from the disk scrubber task:

```
Jan 09 09:08:42 array00 SX11[1]: N: ulctr fixing data on verify  
scb=441069c
```

- RAID5: Messages from the disk scrubber task:

```
Jan 09 09:24:13 array00 SX11[1]: N: ulctr fixing parity on  
verify scb=433bde0
```

- Messages sent after the fix:

```
Jan 09 09:08:42 array00 ISR1[1]: N: uld02 Sense Key =0x1, Asc =  
0xc, Ascq = 0x1
```

```
Jan 09 09:08:42 array00 ISR1[1]: N: uld02 Sense Data  
Description = Write Error - Recovered With Auto Reallocation
```

A.1.17 Data and Parity Errors

If the disk scrubber feature finds any inconsistencies in the data or computed parity, it sends messages to the array `syslog` file.

These inconsistencies are also fixed as seen in the following example messages:

Examples of new `syslog` messages from running the disk scrubber:

■ No mismatch output:

```
Sep 22 18:02:25 psc0[1]: N: Vol verify (m1) started
```

```
Sep 22 18:02:28 psc0[1]: N: Vol verify (m1) ended
```

■ RAID5: Computed parity and read parity mismatch

```
Sep 22 18:06:17 psc0[1]: N: Vol verify (m1) started
```

```
Sep 22 18:06:18 WXFT[1]: E: ulctr: vol (m1), Slice  
Name:(m1slice) vol verify detected
```

```
data parity mismatch on Stripe: 7, Lun:0
```

```
Sep 22 18:06:18 WXFT[1]: N: ulctr Parity on stripe 7 is fixed  
in vol (m1)
```

```
Sep 22 18:06:20 psc0[1]: N: Vol verify (m1) ended
```

■ RAID1:Data and mirror copy mismatch

```
Sep 22 18:06:17 psc0[1]: N: Vol verify (m1) started
```

```
Sep 22 18:06:18 WXFT[1]: E: ulctr: vol (m1), Slice  
Name:(m1slice) vol verify detected data and mirror mismatch on  
block: 31, Lun:0
```

```
Sep 22 18:12:46 WXFT[1]: N: ulctr Mirror block 31 is fixed in  
vol (m1)
```

```
Sep 22 18:12:56 psc0[1]: N: Vol verify (m1) ended
```

▼ To Enable or Disable Disk Scrubber in the CLI:

1. To enable disk scrubber, from the CLI, enter the following:

```
sscs modify -k enabled array array-name
```

2. To disable disk scrubber, from the CLI, enter the following:

```
sscs modify -k disabled array array-name
```

A.1.18 Backend Fault Isolation Task (BEFIT)

The BEFIT feature, also known as online loop diagnostic mode, maintains the availability of backend drives at all times by detecting, isolating, and correcting faulty FRUs (Field Replaceable Units).

The online loop diagnostics controls the monitoring of Loop Initialization Protocol (LIP) storms and backend fault detection. This feature should always be on. If you encounter problems, it can be turned off.

BEFIT is enabled by default during system boot and automatically completes diagnostics on the system. If a faulty FRU is detected during system boot, it is isolated and corrective action is applied. Corrective action may include bypassing the faulty FRU. After the system is booted, BEFIT checks system health every five seconds.

Note – If BEFIT fails to detect and correct a problem, the system can reset itself to ensure that customer data is safe from corruption.

Note – There are many faults that occur on Fibre Channel loops. Many of these are addressed by the device retrying the I/O. BEFIT sees these faults and checks for bad FRU's to ensure there are no hardware failures. It is normal to see BEFIT initiate a test and then return no fault found. If there were a hardware issue, BEFIT would isolate the FRU and send the appropriate notice to the `syslog` file.

When a fault is detected, BEFIT halts I/O and executes diagnostics. When BEFIT is completed, host I/O is resumed. If a faulty FRU is disabled, diagnostic LEDs on the FRU are lit. BEFIT messages are also sent to the array `syslog` file. View the `syslog` file from the Storage Automated Diagnostics Environment software.

Messages can include information on the fault detection, faulty FRU, and BEFIT completion. For example:

- When a fault is detected, messages similar to the following are displayed in the `syslog` file:

Console: RAS: Backend Loop fault detected, initiating diagnostics

Syslog: RASE[2]: Backend Loop fault detected, initiating diagnostics

- When a drive is identified as the faulty FRU, messages similar to the following are displayed in the `syslog` file:

Console: Faulty Drive Port(s):
uld09: port 1 port 2

Syslog: BFIT[2]: E: [BFIT] uld09 - Has bad port on Loop 1
BFIT[2]: E: [BFIT] uld09 - Has bad port on Loop 2
BFIT[2]: E: uld09 has faulty ports, drive bypassed.

- When a loopcard is identified as a fault FRU, messages similar to the following are displayed in the `syslog` file:

Console: Fault detected on Loop 1: u211 disabled

Syslog: BFIT[2]: E: Fault detected on Loop 1
BFIT[2]: E: Diagnosed u211 faulty, disabled.

- When BEFIT completes diagnostics without finding a fault, the following messages are displayed in the `syslog` file:

Console: RAS: Backend Loop fault diagnostics completed -
No fault found.

Syslog: RASE[2]: N: Backend Loop fault diagnostics completed -
No fault found.

You can enable or turn off the BEFIT feature by using the `ondg` option of the `modify array` command.

▼ To Enable or Disable BEFIT in the CLI:

1. To enable online loop diagnostic mode, enter the following:

```
sscs modify -o on array array-name
```

2. To disable online loop diagnostic mode, enter the following:

```
sscs modify -o off array array-name
```

A.1.19 Fibre Channel Fault Diagnostics

To better detect and isolate array faults and to provide additional support for expansion units, the `sim_diag` diagnostic command has been enhanced to allow multiple iterations. (Diagnostic commands are for use by Sun-authorized personnel.)

The `sim_diag` command can now specify the number of times to execute the `sim_diag echo` and `sim_diag loopback` commands.

When running multiple iterations of the `sim_diag echo` command, the diagnostic test repeatedly checks for data corruption and other Fibre errors. When running multiple iterations of the `sim_diag loopback` command, the diagnostic test repeatedly checks for transient errors with front-end connectivity.

The `sim_diag echo` command syntax follows.

```
array:/:<l>sim_diag echo <ctrlr> <echo test> <payload pattern1> <payload pattern2>  
<payload size> [<iterations>]
```

The `sim_diag loopback` command syntax follows.

```
array:/:<l>sim_diag loopback <ctrlr> <ISP> <Loopback test> <payload pattern1>  
<payload pattern2> <payload size> <iterations>
```

The following table describes the arguments associated with the `sim_diag echo` and `sim_diag loopback` commands.

TABLE 4-49 Fibre Channel Fault Diagnostics Options

Argument	Description
<code>sim_diag echo</code>	Specifies that you are executing the <code>sim_diag echo</code> command.
<code>sim_diag loopback</code>	Specifies that you are executing the <code>sim_diag loopback</code> command.
<code>ctrlr</code>	Specifies a unit number with a valid online controller on which the diagnostic test is to be executed.
<code>echo test</code>	Specifies echo command arguments: 0 - vendor unique ELS (not recommended) 1 - Echo ELS
<code>ISP</code>	Specifies the Backend (e.g., 0 1) or Frontend (e.g., 2) ISP.
<code>Loopback test</code>	Specifies loopback command arguments: 0 - Internal 10-bit 1 - Internal 1-bit 2 - External loop back
<code>payload pattern1</code>	Specifies any 4-byte hexadecimal number.
<code>payload pattern2</code>	Specifies any 4-byte hexadecimal number.
<code>payload size</code>	Specifies the payload size. <ul style="list-style-type: none"> If you are executing the “<code>sim_diag echo</code>” command, the maximum payload size is 220 bytes if <code><echo test> = 1</code>; if <code><echo test> = 0</code>, the maximum is 2k bytes. If you are executing the “<code>sim_diag loopback</code>” command, the maximum payload size is 65528 bytes.
<code>iterations</code>	Specifies the number of times to execute the command. This argument is optional for the “ <code>sim_diag echo</code> ” command.

▼ Run Fibre Channel Fault Diagnostics:

1. To execute Fibre channel fault diagnostics and check for data corruption, from the array diagnostics command line, enter the following:

```
:/:<1> sym_diag echo 1 1 1a7tj6ed 2bor8ttb 220 100
```

2. To execute Fibre channel fault diagnostics and check for transient errors, from the array diagnostics command line, enter the following:

```
:/:<2> sym_diag loopback 1 0 0 1a7tj6ed 2bor8ttb 65528 100
```

A.1.20 Controller SAT Diagnostics

Controller SAT is a ROM-based diagnostic tool that provides a robust, thorough, and comprehensive test suite, offering maximum coverage on all hardware components within a FRU (Field Replaceable Unit). The controller SAT diagnostic targets hardware components at the chip, bit, and cell level.

During the diagnostic test, all status messages are displayed on the array console terminal. The terminal is constantly updated with real-time status information indicating what tests are currently running.

The following diagnostic tests are included in the test suite:

- RS-232 diagnostics
- Ethernet interface diagnostics
- Fibre Channel diagnostics

▼ To Setup and Run Controller SAT Diagnostics

1. **Plug the controller boards into the sockets on the SAT backplane.**

Ensure that all connectors on the controller board front-end are connected to the harness consisting of the 1 Gig Fibre Channel, the 100bt Ethernet, and the nine pin RS-232.

2. **Attach the array controller console serial interface to the SAT test station.**

The output of the SAT test suite is sent to the controller front-end serial port which is connected to the Controller SAT test station.

3. **Once all connections are made, apply power to the SAT backplane.**

This starts the diagnostic test suite. Diagnostic testing will continue to cycle until power is removed from the SAT test stand. The output of the SAT test suite is sent to the controller front-end serial port.

4. **To stop the test suite, remove power from the SAT test stand.**

Once testing is complete, results can be written to each controller's FRU ID by plugging the controller into the array and entering the `seg` command.

Sun StorEdge 6320 Cable Labels

This appendix contains tables that list the cable labels for the Sun StorEdge 6320 system and the Sun StorEdge 6320 switchless system.

This appendix is organized as follows:

- “Sun StorEdge 6320 System RJ-45/RJ-45 Cabling” on page B-1
- “Second Expansion Cabinet RJ-45/RJ-45 Cabling” on page B-3
- “Sun StorEdge 6320 System Switch Cabling” on page B-4
- “Sun StorEdge 6320 System Without Switch Cabling” on page B-5
- “Sun StorEdge 6320 System Expansion FC Cable Requirements” on page B-7
- “Sun StorEdge 6320 System Power Cable Requirements” on page B-8
- “Sun StorEdge 6320 Expansion System Power Cable Requirements” on page B-9
- “Miscellaneous Cable Requirements” on page B-10

B.1 Sun StorEdge 6320 System RJ-45/RJ-45 Cabling

TABLE B-1 lists the RJ-45/RJ-45 cabling requirements for the primary cabinet of the Sun StorEdge 6320 system.

TABLE B-1 Sun StorEdge 6320 RJ-45/RJ-45 System Cabling Requirements

Ethernet Hub	Array	Label
Port 1	array0B	Hub 1 to array 0B
Port 2	array0D	Hub 2 to array 0D

TABLE B-1 Sun StorEdge 6320 RJ-45/RJ-45 System Cabling Requirements *(Continued)*

Port 3	array0F	Hub 3 to array 0F
Port 4	array0H	Hub 4 to array 0H
Port 5	array0J	Hub 5 to array 0J
Port 13	array0A	Hub 13 to array 0A
Port 14	array0C	Hub 14 to array 0C
Port 15	array0E	Hub 15 to array 0E
Port 16	array0G	Hub 16 to array 0G
Port 17	array0I	Hub 17 to array 0I
Ethernet Hub	Storage Service Processor	Label
Port 12	DMFE1 (net1)	Hub 12 to SSP (net1)
Ethernet Hub	Service Processor Panel	Label
Port 11	EnetA	Hub 11 to PP ENET A
Port 23	EnetB	Hub 23 to PP ENET B
SSP Accessory Tray	Service Processor Panel	Label
Serial Console	Serial Console	SSPAT SrlCnsl to PP SrlCnsl
Service Serial	Service Serial	SSPAT SrvSrl to PP SrvSrl
AUX	AUX	SSPAT Aux to PP Aux
User LAN	User LAN	SSPAT U-Lan to PP U-Lan
SP-LAN In	SP-LAN In	SSPAT SP-L-In to PP SP-L-In
SP-LAN Out	SP-LAN Out	SSPAT SP-L-Out to PP SP-L-Out
SSP Accessory Tray	Storage Service Processor	Label
SP ttya	TTYA (A LOM)	SP (A-LOM) to SSPAT TTYA
SP dmfe0	DMFE0 (net0)	SP (net0) to SSPAT DMFE0
SSP Accessory Tray	SSP Accessory Tray	Label
NTC ENET	NTC ENET	SSPAT NTC ENET to SSPAT NTC ENET
Switch	Service Processor Panel	Label
Enet port	FENET A	SW1 Enet to PP FENET A
Enet port	FENET B	SW2 Enet to PP FENET B

B.2 Second Expansion Cabinet RJ-45/RJ-45 Cabling

TABLE B-2 lists the RJ-45/RJ-45 cabling requirements for the second (expansion) cabinet attached to a Sun StorEdge 6320 system.

TABLE B-2 Sun StorEdge 6320 System RJ-45/RJ-45 Cabling Requirements (Second Cabinet)

Ethernet Hub	Array	Label
Port 1	array1B	Hub 1 to array1B
Port 2	array1D	Hub 2 to array1D
Port 3	array1F	Hub 3 to array1F
Port 4	array1H	Hub 4 to array1H
Port 5	array1J	Hub 5 to array1J
Port 6	array1L	Hub 6 to array1L
Port 13	array1A	Hub 13 to array1A
Port 14	array1C	Hub 14 to array1C
Port 15	array1E	Hub 15 to array1E
Port 16	array1G	Hub 16 to array1G
Port 17	array1I	Hub 17 to array1I
Port 18	array1K	Hub 18 to array1K
Ethernet Hub	Service Processor Panel	Label
Port 12	Enet A/B	Hub 12 to PP A/B

Note – Port 12 can be connected to either Enet A or Enet B.

B.3

Sun StorEdge 6320 System Switch Cabling

TABLE B-3 lists the Sun StorEdge 6320 system cabling requirements when Sun StorEdge network FC Switch-16 switches are installed in the system.

TABLE B-3 Sun StorEdge 6320 System Cabling Requirements for Switches

Switch 1 (SW1)	Service Processor Panel	Label	
Port0	1A	SW1 P0 to PP 1A	
Port1	2A	SW1 P1 to PP 2A	
Port2	3A	SW1 P2 to PP 3A	
Port3	4A	SW1 P3 to PP 4A	
Port4	5A	SW1 P4 to PP 5A	
Switch 1 (SW1)	Array	Label	
Port5	array00 (M)	SW1 P5 to array00 (M)	
Port6	array01 (M)	SW1 P6 to array01 (M)	
Port7	array02 (M)	SW1 P7 to array02 (M)	
Port8	array03 (M)	SW1 P8 to array03 (M)	
Port9	array04 (M)	SW1 P9 to array04 (M)	
Switch 1 (SW1)	Service Processor Panel	Fanout End Label	MTP End Label
Port10 ¹	FC1A ¹	SW1 P10	PP FC1 A
Port11 ¹		SW1 P11	
Port12 ¹		SW1 P12	
Port13 ¹		SW1 P13	
Port14 ¹		SW1 P14	
Port15 ¹		SW1 P15	
Switch 2 (SW2)	Service Processor Panel	Label	
Port0	1B	SW2 P0 to PP 1B	
Port1	2B	SW2 P1 to PP 2B	

TABLE B-3 Sun StorEdge 6320 System Cabling Requirements for Switches *(Continued)*

Port2	3B	SW2 P2 to PP 3B	
Port3	4B	SW2 P3 to PP 4B	
Port4	5B	SW2 P4 to PP 5B	
Switch 2 (SW2)	Array	Label	
Port5	array00 (A/M)	SW2 P5 to array00 (A/M)	
Port6	array01 (A/M)	SW2 P6 to array01 (A/M)	
Port7	array02 (A/M)	SW2 P7 to array02 (A/M)	
Port8	array03 (A/M)	SW2 P8 to array03 (A/M)	
Port9	array04 (A/M)	SW2 P9 to array04 (A/M)	
Switch 2 (SW2)	Service Processor Panel	Fanout End Label	MTP End Label
Port10 ¹	FC1B ¹	SW2 P10	PP FC1 B
Port11 ¹		SW2 P11	
Port12 ¹		SW2 P12	
Port13 ¹		SW2 P13	
Port14 ¹		SW2 P14	
Port15 ¹		SW2 P15	

1 - Denotes MTP to Fanout cable for both FC1B and FC1A.



B.4 Sun StorEdge 6320 System Without Switch Cabling

TABLE B-4 lists the Sun StorEdge 6320 system FC cabling requirements when switches are not present in the main cabinet.

TABLE B-4 Sun StorEdge 6320 System Cable Requirements Without Switches

Service Processor Panel	Array	Label
1A (back)	array00 (M)	array00 (M) to PP 1A (back)
2A (back)	array01 (M)	array01 (M) to PP 2A (back)
3A (back)	array02 (M)	array02 (M) to PP 3A (back)

TABLE B-4 Sun StorEdge 6320 System Cable Requirements Without Switches *(Continued)*

4A (back)	array03 (M)	array03 (M) to PP 4A (back)	
5A (back)	array04 (M)	array04 (M) to PP 5A (back)	
1B (back)	array00 (A/M)	array00 (A/M) to PP 1B (back)	
2B (back)	array01 (A/M)	array01 A/(M) to PP 2B (back)	
3B (back)	array02 (A/M)	array02 (A/M) to PP 3B (back)	
4B (back)	array03 (A/M)	array03 (A/M) to PP 4B (back)	
5B (back)	array04 (A/M)	array04 (A/M) to PP 5B (back)	
Service Processor Panel	Service Processor Panel	MTP End Label	Fanout End Label
PP FC1 A (back) ¹	6A (back)	PP FC1A (back)	PP 6A (back)
	7A (back)		PP 7A (back)
	8A (back)		PP 8A (back)
	9A (back)		PP 9A (back)
	10A (back)		PP 10A (back)
	11A (back)		PP 11A (back)
PP FC1 B (back) ¹	6B (back)	PP FC1 B (back)	PP 6B (back)
	7B (back)		PP 7B (back)
	8B (back)		PP 8B (back)
	9B (back)		PP 9B (back)
	10B (back)		PP 10B (back)
	11B (back)		PP 11B (back)

1 - Denotes MTP to Fanout cable for both FC1B and FC1A.

B.5 Sun StorEdge 6320 System Expansion FC Cable Requirements

TABLE B-5 lists the Sun StorEdge 6320 system expansion cabinet FC cable requirements.

TABLE B-5 Sun StorEdge 6320 System Expansion FC Cable Requirement

Exp Service Processor Panel	Main Service Processor Panel	Label	
EXP FC1A	EXP FC1A	Main PP EXP FC1 A to Expansion PP EXP FC1 A	
EXP FC1B	EXP FC1B	Main PP EXP FC1 A to Expansion PP EXP FC1 A	
Exp Service Processor Panel	Array	MTP End Label	Fanout End Label
Expansion FC1A ¹	array10 (M)	PP Expansion FC1 A	array10 (M)
	array11 (M)		array11 (M)
	array12 (M)		array12 (M)
	array13 (M)		array13 (M)
	array14 (M)		array14 (M)
	array15 (M)		array15 (M)
Expansion FC1B ¹	array10 (A/M)	PP Expansion FC1 B	array10 (A/M)
	array11 (A/M)		array11 (A/M)
	array12 (A/M)		array12 (A/M)
	array13 (A/M)		array13 (A/M)
	array14 (A/M)		array14 (A/M)
	array15 (A/M)		array15 (A/M)

¹ - Denotes MTP to Fanout cable for both FC1B and FC1A.

Note – In TABLE B-5, the EXP FC1A and EXP FC1B denote the MTP to fanout cable.

B.6

Sun StorEdge 6320 System Power Cable Requirements

TABLE B-6 lists the Sun StorEdge 6320 system power cable requirements.

TABLE B-6 Sun StorEdge 6320 System Power Cable Requirements

Front PS	Service Processor Panel	Label	
J14	Front Seq J14	J14 to PP Front Seq J14 In	
J15	Front Seq Out	J15 to PP Front Seq J15 Out	
Front PS	Storage Service Processor	Label	Label
J2 ¹	SSP Power (Unused)	J2	J2 to SSP (Unused)
Front PS	Switches	Label	Label
J1 ¹	SW1 Power	J1	J1 to SW1
	SW2 Power		J1 to SW2
Rear PS	Service Processor Panel	Label	
J14	Rear Seq J14	J14 to PP Rear Seq J14 In	
J15	Rear Seq Out	J15 to PP Rear Seq J15 Out	
Rear PS	SSPAT/Ethernet Hub	Label	Label
J2 ¹	SSPAT Power	J1	J2 to SSPAT
	Hub Power		J2 to Hub
Rear PS	Switches	Label	Label
J1 ¹	SW1 Power	J1	J1 to SW1
	SW2 Power		J1 to SW2
Front PS ²	Array	Rear PS ²	Array
J6	array0F	J6	array0F
J9	array0C	J9	array0C
J10	array0D	J10	array0D
J11	array0E	J11	array0E
J5 ¹	array0A	J5 ¹	array0A

TABLE B-6 Sun StorEdge 6320 System Power Cable Requirements *(Continued)*

	array0B		array0B
J8 ¹	array0G	J8 ¹	array0G
	array0H		array0H
J12 ¹	array0I	J12 ¹	array0I
	array0J		array0J
1 - Denotes Y cable.			
2 - Denotes “no labels required.”			

B.7

Sun StorEdge 6320 Expansion System Power Cable Requirements

TABLE B-7 lists the Sun StorEdge 6320 expansion system power cable requirements.

TABLE B-7 Sun StorEdge 6320 Expansion System Power Cable Requirements

Front PS	Ethernet Hub	Label	
J2	Hub Power	J2 to Hub	
Front PS	Service Processor Panel	Label	
J14	Front Seq J14	J14 to PP Front Seq J14 In	
J15	Front Seq Out	J15 to PP Front Seq J15 Out	
Rear PS	Service Processor Panel	Label	
J14	Rear Seq J14	J14 to PP Rear Seq J14 In	
J15	Rear Seq Out	J15 to PP Rear Seq J15 Out	
Front PS ²	Array	Rear PS ²	Array
J6	array1G	J6	array1G
J7	array1H	J7	array1H
J9	array1C	J9	array1C

TABLE B-7 Sun StorEdge 6320 Expansion System Power Cable Requirements *(Continued)*

J10	array1D	J10	array1D
J5 ¹	array1A array1B	J5 ¹	array1A array1B
J8 ¹	array1I array1J	J8 ¹	array1I array1J
J11 ¹	array1E array1F	J11 ¹	array1E array1F
J12 ¹	array1L array1K	J12 ¹	array1L array1K
1 - Denotes Y cable. 2 - Denotes "no labels required."			



B.8 Miscellaneous Cable Requirements

TABLE B-8 lists the miscellaneous Sun StorEdge 6320 system cable requirements.

TABLE B-8 Sun StorEdge 6320 Miscellaneous Cable Requirements

Main Rack - USB Cable Requirements	Storage Service Processor	Service Processor Panel (Relay)
	USB Port 1	Relay In
Main Rack RJ11/RJ11 Cable Requirements	SSP Accessory Tray	Service Processor Panel
	Phone	Phone

Adding Host Ports to the System

This Appendix describes the process of adding additional host ports to the Sun StorEdge 6320 system. The default number of host ports is five.

C.1 Overview

This section describes key considerations for understanding the process of adding host ports to the Sun StorEdge 6320 System.

The system cabinet uses two 16-port switches to provide Fibre Channel connectivity to hosts that are outside of the cabinets, and 6020 storage arrays that are inside the cabinets.

The base assumption is that you have two 6020 storage devices that require a master connection and an alternate master connection. Connections that are removed will be recabled to the Service Processor Panel to provide additional host connections.

The top switch is called Switch 1 and it connects the master path Fibre Channel connections. The bottom switch is called Switch 2 and it connects alternate master path Fibre Channel connections.

The Fibre Channel ports are labeled 0 to 15. The default wiring scheme follows:

- Ports 0 to 4 are for direct connections to the Service Processor Panel for host connections.
- Ports 5 to 9 are for connections to internal 6020 storage inside the master cabinet.
- Ports 10 to 15 are connected to the switch for internal storage in an expansion cabinet.

The Service Processor Panel ports are labeled 1 to 14 A and B. There will be mismatches in port numbers. The Service Processor Panel has 28 total Fibre Channel ports while the switches have 30 total ports; so there are two ports on each switch that you cannot allocate to hosts.

This procedure removes the connections for internal storage in the expansion cabinet (Ports 10 to 15) and reduces the number of internal storage connections (Ports 7 to 9). Ports 5 and 6 cannot be allocated to a host port.

Note – Eliminating the expansion storage connections through implementation of this procedure negates the ability to add an expansion cabinet in the future. Additionally, removing of the expansion cable (530-1058-01) can damage it and render it unusable.

C.1.1 Total Number of Ports You Can Add

The maximum number of additional host ports that can be added is nine master path connections and nine alternate master path connections.

C.2 Sample Fibre Channel Connections

This section provides a sample of the Sun StorEdge 6320 system Fibre Channel connections.

C.2.1 Service Processor Panel-to-Switches

C.2.1.1 LC-to-LC Cables (5pcs) Service Processor Panel to Switches (host connections) - (537-1057-01 LC-LC .8M)

- Service Processor Panel 1A to SW1 Port 0
- Service Processor Panel 2A to SW1 Port 1
- Service Processor Panel 3A to SW1 Port 2
- Service Processor Panel 4A to SW1 Port 3
- Service Processor Panel 5A to SW1 Port 4

C.2.1.2 LC-to-LC Cables (5pcs) Service Processor Panel to Switches (host connections) - (537-1057-01 LC-LC .8M)

- Service Processor Panel 1B to SW2 Port 0
- Service Processor Panel 2B to SW2 Port 1
- Service Processor Panel 3B to SW2 Port 2
- Service Processor Panel 4B to SW2 Port 3
- Service Processor Panel 5B to SW2 Port 4

C.2.2 Switches-to-Master Cabinet Arrays

C.2.2.1 LC-to-LC Cables (5pcs) Switches to Array in Master cabinet (Masters) - (537-1041-01 LC-LC 2M)

- SW1 Port 5 to (array00) Master
- SW1 Port 6 to (array01) Master
- SW1 Port 7 to (array02) Master
- SW1 Port 8 to (array03) Master
- SW1 Port 9 to (array04) Master

C.2.2.2 LC-to-LC Cables (5pcs) Switches to Array in Master Cabinet (Alt. Master's) -(537-1041-01 LC-LC 2M)

- SW2 Port 5 to (array00) Alternate Master
- SW2 Port 6 to (array01) Alternate Master
- SW2 Port 7 to (array02) Alternate Master
- SW2 Port 8 to (array03) Alternate Master
- SW2 Port 9 to (array04) Alternate Master

C.2.3 Connecting Switches to Arrays in the Expansion Cabinet Using the Storage Service Panel

Master Breakout Cable (1pc) - (537-1058-01 MPT TO FANOUT, MASTER (70cm [40cm ruggedized])

- Cable connect 1A-1B to SW1 Port 10
- Cable connect 2A-2B to SW1 Port 11
- Cable connect 3A-3B to SW1 Port 12
- Cable connect 4A-4B to SW1 Port 13
- Cable connect 5A-5B to SW1 Port 14
- Cable connect 6A-6B to SW1 Port 15
- MPT-to-Service Processor Panel EXP FC 1A

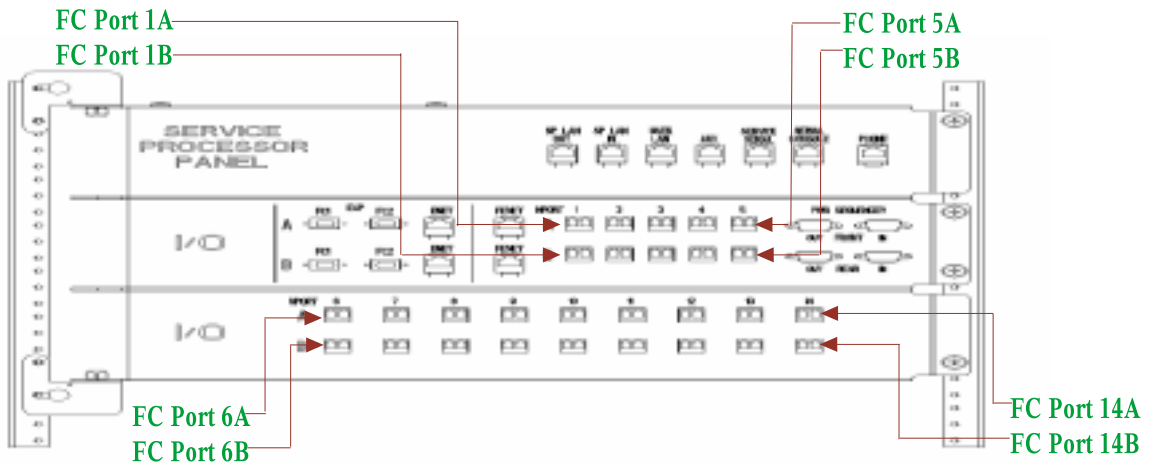
Master Breakout Cable (1pc) - (537-1058-01 MPT TO FANOUT, MASTER (70cm [40cm ruggedized])

- Cable connect 1A-1B to SW2 Port 10
- Cable connect 2A-2B to SW2 Port 11
- Cable connect 3A-3B to SW2 Port 12
- Cable connect 4A-4B to SW2 Port 13
- Cable connect 5A-5B to SW2 Port 14
- Cable connect 6A-6B to SW2 Port 15
- MPT-to-Service Processor Panel EXP FC 1B

FIGURE C-1 shows the Sun StorEdge 6320 system Service Processor Panel details.

Maserati 6320 Patch Panel Details

Patch Panel Front View (Exterior Face)



Patch Panel Rear View (Interior Face)

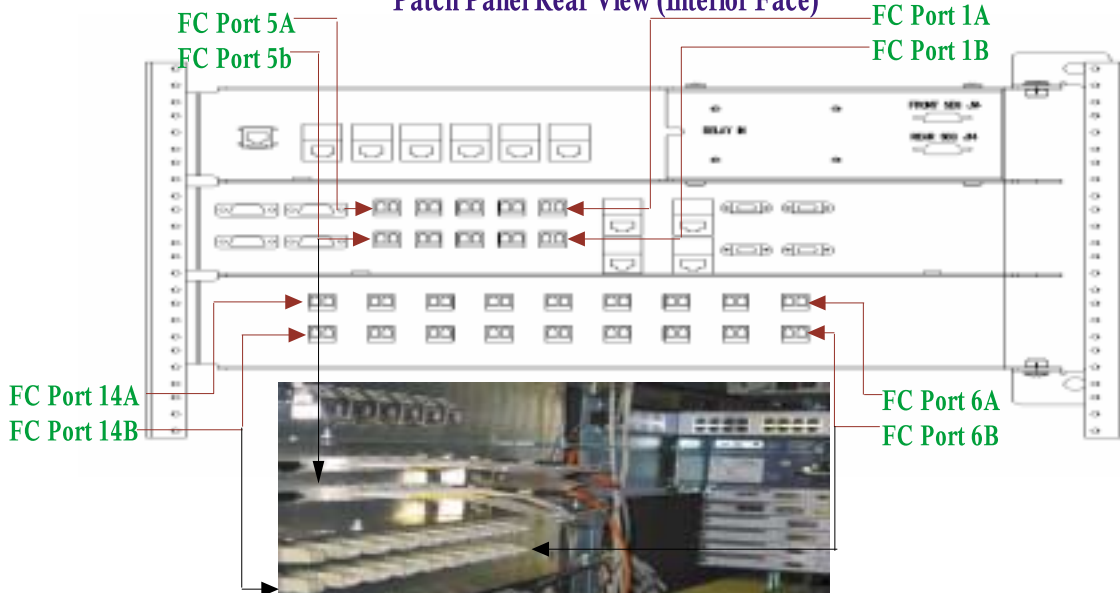


FIGURE C-1 Sun StorEdge 6320 System Service Processor Panel Details

FIGURE C-2 shows a 16-port Fibre Channel Switch details.

Maserati 6320 16-Port Fibre Channel Switch Details

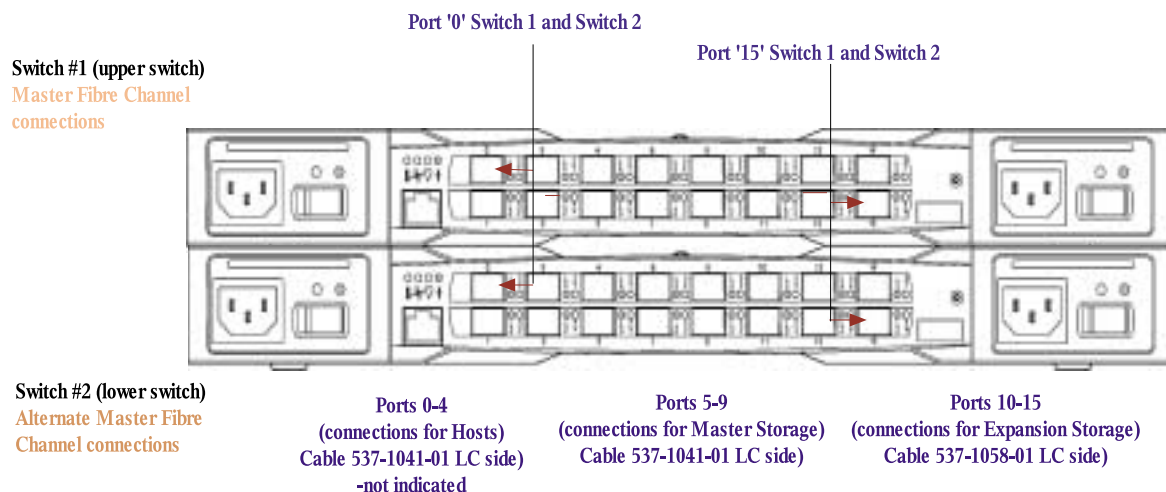


FIGURE C-2 16-port Fibre Channel Switch Details

C.3 Removing and Replacing Connections to Add Host Ports

The steps provided here describe the logical sequence to remove and then replace the connections to add hosts to the Sun StorEdge 6320 system. Refer to FIGURE C-1 for switch and port references.

1. **Remove the following connections from Switch 1 that use the MPT-to-Fanout cable (537-1058-01).**
 - LC connector 1A-1B to Switch 1 Port 10
 - LC connector 2A-2B to Switch 1 Port 11
 - LC connector 3A-3B to Switch 1 Port 12
 - LC connector 4A-4B to Switch 1 Port 13
 - LC connector 5A-5B to Switch 1 Port 14
 - LC connector 6A-6B to Switch 1 Port 15

2. Remove the following connections from Switch 2 that use the MPT-to-Fanout cable (537-1058-01).

- LC Connector 1A-1B to Switch 2 Port 10
- LC Connector 2A-2B to Switch 2 Port 11
- LC Connector 3A-3B to Switch 2 Port 12
- LC Connector 4A-4B to Switch 2 Port 13
- LC Connector 5A-5B to Switch 2 Port 14
- LC Connector 6A-6B to Switch 2 Port 15

Steps 1 and 2 Notes:

- Removing the MTP connection to the Service Processor Panel for the MPT-to-Fanout cable (537-1058-01) is optional.
- Tie off the MPT-to-Fanout cable (537-1058-01) securely when you remove the connections. This cable is fragile and can be damaged or rendered nonoperational during implementation of this procedure.

3. Add the following master path host connections between the Service Processor Panel and Switch Number 1 using cable 537-1057-01 (0.8M, LC-LC) (6 pcs).

- LC connector to Switch 1 Port 10, opposite LC connector to Service Processor Panel Port 9A
- LC connector to Switch 1 Port 11, opposite LC connector to Service Processor Panel Port 10A
- LC connector to Switch 1 Port 12, opposite LC connector to Service Processor Panel Port 11A
- LC connector to Switch 1 Port 13, opposite LC connector to Service Processor Panel Port 12A
- LC connector to Switch 1 Port 14, opposite LC connector to Service Processor Panel Port 13A
- LC connector to Switch 1 Port 15, opposite LC connector to Service Processor Panel Port 14A

4. Add the following alternate master path host connections between the Service Processor Panel and Switch 2 using cable 537-1057-01 (0.8M,LC-LC)(6 pcs).

LC connector to Switch 2 Port 10, opposite LC connector to Service Processor Panel Port 9B
LC connector to Switch 2 Port 11, opposite LC connector to Service Processor Panel Port 10B
LC connector to Switch 2 Port 12, opposite LC connector to Service Processor Panel Port 11B
LC connector to Switch 2 Port 13, opposite LC connector to Service Processor Panel Port 12B
LC connector to Switch 2 Port 14, opposite LC connector to Service Processor Panel Port 13B
LC connector to Switch 2 Port 15, opposite LC connector to Service Processor Panel Port 14B

Steps 3 and 4 Notes:

- Steps 3 and 4 add six master and alternate master host connections.
 - Do not stretch or pinch routing cable 537-1057-01 (0.8M, LC-LC).
 - Tie off the cables 537-1057-01 (0.8M, LC-LC) securely to other cables in the bundle.
- 5. Remove the following Master Storage connections from Switch 1 that use cable 2M, LC-LC (537-1041-01).**

The cable specified for removal should not be already connected to a 6020 in the Master cabinet. If the cable is connected to a 6020 *skip* disconnecting this cable.

- LC Connector to Switch 1 Port 7, other LC connector connected to (array02) Master (if not populated in the cabinet)
- LC Connector to Switch 1 Port 8, other LC connector connected to (array03) Master (if not populated in the cabinet)
- LC Connector to Switch 1 Port 9, other LC connector connected to (array04) Master (if not populated in the cabinet)

6. Remove the following Alternate Master Storage connections from Switch 2 that use cable 2M LC-LC (537-1041-01).

The cable specified for removal should not be connected already to a 6020 in the Master cabinet. If the cable is connected to a 6020 *skip* disconnecting this cable.

- LC Connector to Switch 2 Port 7, other LC connector connected to (array02) Alt-Master (if not populated in the cabinet)
- LC Connector to Switch 2 Port 8, other LC connector connected to (array03) Alt-Master (if not populated in the cabinet)
- LC Connector to Switch 2 Port 9, other LC connector connected to (array04) Alt-Master (if not populated in the cabinet)

7. Add the following master path host connections between the Service Processor Panel and Switch 1 using cable 537-1057-01 (0.8M,LC-LC)(3 pcs).

- LC Connector to Switch 1 Port 7, other LC connector connected to Service Processor Panel Port 6A
- LC Connector to Switch 1 Port 8, other LC connector connected to Service Processor Panel Port 7A
- LC Connector to Switch 1 Port 9, other LC connector connected to Service Processor Panel Port 8A

8. Add the following alternate master path host connections between the Service Processor Panel and Switch 2 using cable 537-1057-01 (0.8M,LC-LC)(3 pcs).

- LC Connector to Switch 2 Port 7, other LC connector connected to Service Processor Panel Port 6B
- LC Connector to Switch 2 Port 8, other LC connector connected to Service Processor Panel Port 7B
- LC Connector to Switch 2 Port 9, other LC connector connected to Service Processor Panel Port 8B

Steps 7 and 8 Notes:

- Steps 7 and 8 add up to four master and alternate master host connections, depending on how many 6020s were already populated in the cabinet.
- Steps 7 and 8 add three master and alternate master host connections.
- Do not stretch or pinch routing cable 537-1057-01 (0.8M, LC-LC).
- Tie off the cables 537-1057-01 (0.8M, LC-LC) securely to other cables in the bundle.

Running Controller SAT Diagnostics

Controller SAT is a ROM-based diagnostic tool that provides a robust, thorough, and comprehensive test suite, offering maximum coverage on all hardware components within a FRU (Field Replaceable Unit). The controller SAT diagnostic targets hardware components at the chip, bit, and cell level.

During the diagnostic test, all status messages are displayed on the 6120 console terminal. The terminal is constantly updated with real-time status information indicating what tests are currently running.

The following diagnostic tests are included in the test suite:

- RS-232 diagnostics
- Ethernet interface diagnostics
- Fibre Channel diagnostics

▼ To Setup and Run Controller SAT Diagnostics

1. Plug the controller boards into the sockets on the SAT backplane.

Ensure that all connectors on the controller board front-end are connected to the harness consisting of the 1 Gig Fibre Channel, the 100bt Ethernet, and the nine pin RS-232.

2. Attach the 6120 controller console serial interface to the SAT test station.

The output of the SAT test suite is sent to the controller front-end serial port which is connected to the Controller SAT test station.

3. Once all connections are made, apply power to the SAT backplane.

This executes the diagnostic test suite. Diagnostic testing will continue to cycle until power is removed from the SAT test stand. The output of the SAT test suite is sent to the controller front-end serial port.

4. To stop the test suite, remove power from the SAT test stand.

Once testing is complete, results can be written to each controller's FRU ID by plugging the controller into the 6100 and executing the "seg" command.

Glossary

customer LAN	See LAN: customer
Dynamic Multipathing (DMP)	A VERITAS Volume Manager feature that provides an alternate pathing mechanism for rerouting data in the event of a controller failover.
F port	On a Fibre Channel switch, a port that supports a point-to-point or Fabric connection.
Fabric	A Fibre Channel network built around one or more switches. It is also common to refer to something as a "Fabric device" or being in "Fabric mode." When used in this context, it means a public device, capable of logging in to a Fabric and having public loop characteristics (as opposed to a private loop legacy device).
Fibre Channel	A cost-effective Gigabit communications link deployed across a wide range of hardware.
FC-AL	Fibre Channel-Arbitrated Loop. A loop can contain up to 126 nodes, accessible through only one or two servers.
FRU	Field-Replaceable Unit. An assembly that a manufacturer replaces on failure of an assembly component.
GBIC	Gigabit Interface Converter. A hot-swappable input/output device that connects in to a Gigabit Ethernet port or Fibre Channel.
Hard zones	Hard zones enable the division of the Fabric (one or more switch chassis) into multiple Fabric-wide zones that define the ports that can communicate with each other.
HBA	Host Bus Adapter. A controller board that connects the I/O expansion bus to other Fibre Channel components.
hot spare	A drive in a RAID 1 or RAID 5 configuration that contains no data and acts as a standby in case another drive fails.

hot-swappable	The ability of a field-replaceable unit (FRU) to be removed and replaced while the system remains powered on and operational.
LAN: customer	The Ethernet Lan in the customer's premises external to the system.
LAN: Storage Service Processor	An Ethernet LAN internal to the system used to perform local management and service functions on the Storage Service Processor. It also facilitates aggregation of telemetry data from multiple Storage Service Processors. By design, the Storage Service Processor LAN address is configured to be 10.0.0. <i>n</i> .
LUN	Logical Unit Number or Logical Unit. A system assigned number that allows host software to differentiate multiple logical units within the same system.
LUN mapping	The process of changing the logical unit number that is presented from storage.
LUN masking	The characteristic that enables an administrator to dynamically expose or hide logical units from specific HBA ports. This provides an individual server or multiple servers access to an individual logical unit or multiple logical units and prohibits unwanted server access to the same logical units.
MAC address	Media Access Control. A unique address that identifies an Ethernet device.
NTC	Network Terminal Concentrator. A modem connection point for the Sun StorEdge Remote Response software. The NTC facilitates a point-to-point protocol (PPP) connection from a remote support and does not depend on the Storage Service Processor to complete a call.
OPIE	One-time Passwords In Everything. OPIE is a package derived from the Bellcore S/Key Version 1 distribution that secures a system against replay attacks.
out-of-band	Refers to the connections that go over Ethernet and not Fibre Channel. This connection is not in the data path. The Storage Service Processor does not have access to the data that is stored on the Sun StorEdge 6320 system; thus this information is considered to be out-of-band.
N port	A Fibre Channel port in a point-to-point or Fabric connection.
page	A screen window in the software or online help.
Pool	Defines a RAID level and a hot spare configuration for a collection of disk drives.
RAID	Redundant Array of Independent Disks. A configuration in which multiple drives are combined into a single virtual drive to improve performance and reliability.
RARP	Reverse Address Resolution Protocol. A protocol in the Solaris operating system that enables automatic assignment of the array IP address from the host.

RU	Rack unit.
SCSI	Small Computer Systems Interface. An industry standard for connecting disk and tape devices to a host.
storage array	One or more trays with at least one being a controller tray. All the trays are managed as a single unit.
storage pool	A group of volumes that can be disks. From the volumes, you can create virtual drives.
Storage Service Processor	
LAN	See LAN: Storage Service Processor
USB	Universal Serial Bus. A standard bus type for many devices. USB devices are hot-swappable, meaning they can be connected and disconnected while computer is on. The Storage Service Processor uses a USB flash disk to store personality data about the Sun StorEdge 6320 system.
Volume	Also called a logical unit number or LUN, a volume is one or more drives that can be grouped into a unit for data storage.
WWN	World-Wide Name. A number used with HBAs to identify array volumes, Fibre Channel ports, or storage arrays.
zone	A dedicated path between a device Fibre Channel port and a HBA port.
zoning	The act of setting up a zone.

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