

NetApp™ Hardware

S500 Hardware Guide

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Safety Information (Sicherheitshinweise)

Safety rules

All products are Class 1 laser devices, except the NVRAM5 cluster media converter, which is Class 1M. You must follow these safety rules when working with this equipment:

WARNING

Failure to follow these directions could result in bodily harm or death.

- ◆ When using an NVRAM5 cluster media converter, the storage system must be installed in a restricted access location.
- ◆ **Switzerland only—for FAS900, GF900, R200, and C6200 systems:** This equipment relies on fuses/circuit breakers in the building installation for overcurrent protection. Each power supply must receive power from a separately dedicated outlet with a 10A fuse/circuit breaker.
- ◆ When installing disk shelves and a storage system into a movable cabinet or rack, install from the bottom up for best stability.
- ◆ DC-based systems must be installed in a restricted access location and the two input power terminals for the DC power supply must be connected to separate isolated branch circuits.
- ◆ To reduce the risk of personal injury or equipment damage, allow internal components time to cool before touching them and ensure that the equipment is properly supported or braced when installing options.
- ◆ This equipment is designed for connection to a grounded outlet. The grounding type plug is an important safety feature. To avoid the risk of electrical shock or damage to the equipment, do not disable this feature.
- ◆ This equipment has one or more replaceable batteries. There is danger of explosion if the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

For units with multiple power cords

If your storage system or disk shelf has multiple power cords and you need to turn the unit off, heed the following warning:

WARNING

This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect all power supply cords before servicing.

Sicherheitshinweise

Sicherheitsvorgaben

Alle Produkte sind Lasergeräte der Klasse 1. Die folgenden Sicherheitshinweise sind beim Betreiben des Geräts unbedingt zu beachten:

Vorsicht

Nichtbeachtung dieser Anweisungen kann zu schweren Körperschäden führen oder tödlich sein.

- ◆ Bei der Montage der Diskettenregale und Archivierungsgeräte, des NetCache™ -Geräts oder des NearStore™ -Systems in bewegliche Schränke oder Regale sind die Geräte von unten nach oben einzubauen, um optimale Stabilität zu gewährleisten.
- ◆ Gleichstrom-Systeme müssen an Betriebsstätte mit beschränktem Zutritt installiert sein und die beiden Eingangsstromklemmen für das Gleichstrom-Netzteil müssen an separate und isolierte Abzweigleitungen angeschlossen sein.
- ◆ Zum Schutz vor Körperverletzung oder Sachschäden am Gerät lassen Sie die inneren Bauteile stets vor dem Berühren abkühlen. Sorgen Sie dafür, dass das Gerät richtig abgestützt ist oder fest aufrecht steht, bevor Sie neues Zubehör einbauen.
- ◆ Dieses Gerät ist für die Einspeisung aus einer geerdeten Netzverbindung ausgelegt. Der Netzstecker mit Erdungsvorrichtung ist ein wichtiger Sicherheitsschutz. Zum Schutz vor elektrischem Schlag oder Sachschäden am Gerät die Erdung nicht abschalten.
- ◆ Das Gerät ist mit einer oder mehreren auswechselbaren Batterien ausgestattet. Bei unsachgemäßem Auswechseln der Batterie besteht Explosionsgefahr. Batterien nur mit dem vom Hersteller empfohlenen Typ oder entsprechenden Typen ersetzen. Gebrauchte Batterien sind gemäß den Anweisungen des Herstellers zu entsorgen.

Warnhinweis für Geräte mit mehrfachen Netzanschlussleitu- ngen

Sollte Ihr Archiviergerät, NetCache-Gerät, NearStore-System oder Diskettenregal mehrfache Netzanschlussleitungen aufweisen und Sie wollen das Gerät abschalten, bitte folgenden Warnhinweis beachten.

ACHTUNG

Gerät besitzt zwei Netzanschlussleitungen. Vor Wartung alle Anschlüsse vom Netz trennen. mehrfachen Netzanschlussleitungen

Preface

About this guide

This guide describes the following tasks and topics:

- ◆ Installing a StoreVault® S500 storage system in a two-post or four-post rack
- ◆ Connecting the storage system to a network
- ◆ Starting the system
- ◆ Replacing field-replaceable units (FRUs)

This guide does not cover basic system and network administration, which are covered in the *StoreVault Manager 3.2 User's Guide*.

The preface contains the following sections:

- ◆ “Audience” on page v
- ◆ “Formatting conventions” on page v
- ◆ “Keyboard conventions” on page vi
- ◆ “Special messages” on page vii
- ◆ “Other documents” on page vii

Audience

The *StoreVault S500 Hardware Guide* is for system administrators and personnel who are familiar with installing hardware connected to the network. For definitions of terms used in this guide, see the “Glossary” on page 101.

Formatting conventions

The following table lists different character formats used in this guide to set off special information.

Formatting convention	Type of information
<i>Italic type</i>	◆ Words or characters that require special attention. ◆ Placeholders for information you must supply. For example, if the guide requires you to enter the <code>fc test adaptername</code> command, you enter the characters “fc test” followed by the actual name of the adapter. ◆ Book titles in cross-references.

Formatting convention	Type of information
Monospaced font	◆ Command and daemon names. ◆ Information displayed on the system console or other computer monitors. ◆ The contents of files.
Bold monospaced font	Words or characters you type. What you type is always shown in lowercase letters, unless your program is case-sensitive and uppercase letters are necessary for it to work properly.

Keyboard conventions

The following table lists different character formats used in this guide to set off special information.

What is in this guide...	What it means...
hyphen (-)	Used to separate individual keys. For example, Ctrl-D means holding down the Ctrl key while pressing the D key.
<i>Enter</i>	Used to refer to the key that generates a carriage return; the key is named Return on some keyboards.
type	Used for information you must type.

Special messages

This document might contain the following types of messages to alert you to conditions you need to be aware of. Danger notices and caution notices only appear in hardware documentation, where applicable.

Note

A note contains important information that helps you install or operate the system efficiently.

Attention

An attention notice contains instructions that you must follow to avoid a system crash, loss of data, or damage to the equipment.

Danger

A danger notice warns you of conditions or procedures that can result in death or severe personal injury.

Caution

A caution notice warns you of conditions or procedures that can cause personal injury that is neither lethal nor extremely hazardous.

Other documents

The StoreVault S500 storage system includes the following documentation:

- ◆ *StoreVault S500 Quick Start Guide*
- ◆ *StoreVault Manager 3.2 User's Guide*

About this chapter This chapter gives an overview of the StoreVault S500 storage system.

Topics in this chapter This chapter discusses the following topics:

- ◆ “[An overview of the StoreVault S500](#)” on page 2
- ◆ “[StoreVault S500 management application](#)” on page 3
- ◆ “[What RAID is](#)” on page 51
- ◆ “[Primary storage](#)” on page 6
- ◆ “[Software features](#)” on page 8
- ◆ “[System requirements](#)” on page 12

An overview of the StoreVault S500

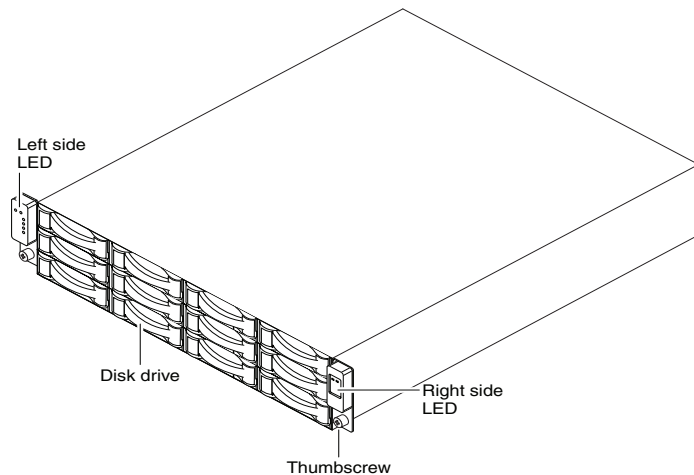
The StoreVault line of products from NetApp Inc. are all-in-one storage systems, which provide network attached storage (NAS) and storage area network (SAN) protocols. StoreVault products make it simple to provision and manage storage for files and applications and provide protection for your critical business data.

It supports up to 12 disk drives of 250 GB storage capacity SATA I or 500 GB storage capacity SATA II and scales up from 1 TB to 6 TB. StoreVault products provide RAID4 or state-of-the-art RAID-DP for unparalleled data protection. StoreVault products are powered by Data ONTAP operating system for simplicity and reliability. Dual hot-swappable power supplies in the StoreVault S500 provide resiliency in the event of a power supply failure. The optional Fibre Channel SAN target card allows the StoreVault S500 to provide storage on a Fibre Channel SAN.

The StoreVault S500 storage system can contain 4 to 12 hard disks.

StoreVault front view: The front side contains the following components:

- ◆ placeholder for disks
- ◆ light-emitting diodes (LEDs) panel
- ◆ thumbscrews below the LED panels



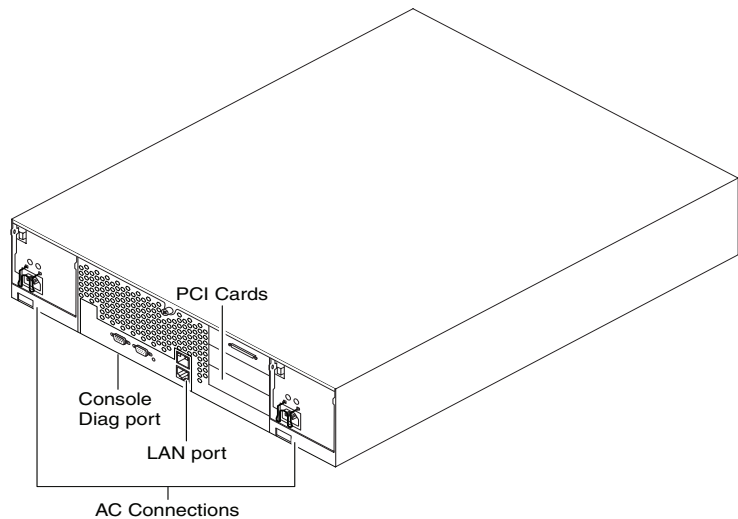
Each hard disk contains LEDs of green and red colors.

- ◆ Green color indicates that the drive is active and working properly
- ◆ Red color indicates that the drive is not working properly.

For more information on disk drives, see [“Replacing Disk Drives”](#) on page 33.

StoreVault rear view: The rear part of the StoreVault S500 storage system contains the following components:

- ◆ Ports for power supply and network connections, such as
 - ❖ AC connections
 - ❖ LAN port
 - ❖ Optional PCI cards slots for QLogic FC card and SCSI card
 - ❖ Console diag port



For more information, see [“Connecting the StoreVault S500 to a Network”](#) on page 27.

StoreVault S500 management application

StoreVault Manager is a management software application for running your StoreVault S500.

StoreVault Manager is a graphical user interface (GUI) based software for managing StoreVault S500. Using StoreVault Manager, you can perform the following functions:

- ◆ Manage StoreVault S500 as well other StoreVault model storage systems
- ◆ Set up shared directories on the network
- ◆ Add storage capacity
- ◆ Configure storage for specific applications

- ◆ Set quota rules for users and groups
- ◆ Create application-centric logical unit numbers (LUNs)
- ◆ Schedule Snapshot™ copies
- ◆ Back up data onto a tape device
- ◆ Automatically monitor the overall health of the storage system

The StoreVault S500 provides unparalleled data-protection features based on proven enterprise-level technology from NetApp®.

For more information about StoreVault Manager, see the *StoreVault Manager 3.2 User's Guide*.

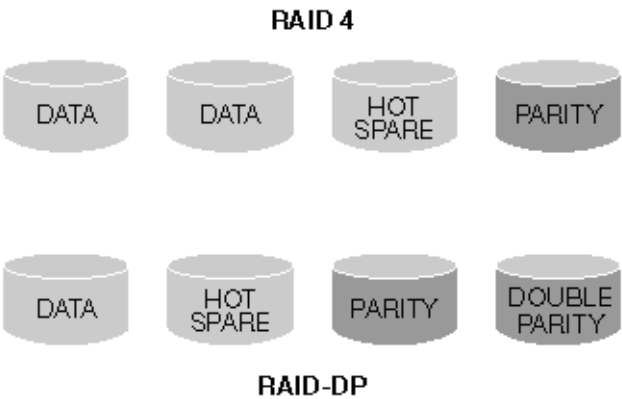
What RAID is

The StoreVault S500 storage system uses redundant array of independent disks (RAID) technology.

The following table describes the two levels of RAID that are supported by the StoreVault S500 storage system.

RAID level	Description
RAID4 (default)	Single-parity RAID uses one dedicated parity disk in addition to the data storage disks to protect your data. It offers protection against a single disk failure. Data is re-created using parity and data information remaining on unaffected disks in the array.
RAID-DP™	Double-parity RAID uses a second parity disk in addition to the standard parity disk to give a second layer of data protection. With RAID-DP, data can be recovered even if two disks fail at the same time.

The following figure illustrates RAID-4 and RAID-DP.



Primary storage

The StoreVault S500 storage system has a capacity for 12 disks. Each of these disk drives can be configured as a primary storage or spare drive. The following table explains the configuration types.

Drive type	Description
Primary storage drive	A primary storage drive can store data or parity information. This drive is considered as a part of the RAID group of active drives.
Spare drive	A spare drive is a working drive that can be used for one of the following tasks: ◆ Adding to the RAID group to increase the overall storage capacity ◆ Replacing a drive that is failed

Note

It is recommended to maintain at least one spare drive at all times.

StoreVault S500 components

StoreVault S500 components: The following table lists the StoreVault S500 components.

Description	Function
Disk drives	Can have up to twelve 250 GB or 500 GB SATA Disk Drives
Power supply	Input 100-127V ~9A or 200-240V~4.5A Auto ranging 50/60 Hz Output +3.3V DC / +5V DC / +12V DC / -5V DC / -12V DC Redundant power supplies can be hot-swapped without powering down the unit
SCSI card	(Optional) One 68-pin VHDCI for LVD SCSI devices
CompactFlash card	512 MB CompactFlash card provides operating system redundancy
NVRAM card	NVRAM, provides 72-hour battery backup for data and file system integrity left in cache from an unexpected power failure
Fan assembly	Provides cooling for StoreVault S500 components and CPU
Network interface	On Board Dual Ethernet Network Interface 10/100/1000
StoreVault S500 chassis	StoreVault 2U chassis, compatible with 19" system racks (2 or 4 post)

Software features

The following table lists the StoreVault Manager software features.

Type	Description
Data ONTAP operating system	StoreVault storage system runs on the Data ONTAP operating system for simplicity and reliability.
Windows-based Management Application	StoreVault Manager is supported on Windows 2003 Server and Windows XP. StoreVault Manager runs on the Windows client to easily configure and manage your data storage needs on the StoreVault storage system. Note——— You cannot use enterprise NetApp management tools such as FilerView or the command-line interface (CLI) to manage the StoreVault storage system.
Data Protection	Uses Snapshot™ technology for data protection. Battery-powered nonvolatile RAM (NVRAM) maintains system data in the event of total power failure and ensures file system integrity. SnapRestore® (StoreVault edition) provides for complete system restore. This is an optional license feature.
Snapshot copy	A Snapshot copy on the StoreVault storage system is a virtual image of the set of files and directories as they were at a specific time, and allows easy recovery of data. Snapshots can be scheduled, and they can also be taken manually as needed.
StoreVault Replication	Enables scheduled replication of file or block-based data from one StoreVault storage system to another for disaster protection or data distribution. Data is available in read-only form on the destination storage system. StoreVault Replication is an optional licensed feature. You need to purchase the StoreVault Replication licenses for both the source and destination storage systems along with the StoreVault setup.

CIFS for Windows file sharing	Uses the Common Internet File System (CIFS) protocol to store and update files in a Windows environment (optional license feature).
NFS	Uses the Network File System (NFS) that allows users to access remote files and directories on a network as if they were local. NFS is compatible with Microsoft Windows and UNIX-based systems, including Linux and Mac OS X (optional license feature). Note— After licensing either CIFS or NFS from the Software dialog box, users must log out of StoreVault Manager and log in again to use CIFS or NFS, respectively.
iSCSI	Uses the iSCSI standard for transfer of Small Computer System Interface (SCSI) commands over Internet Protocol (IP) networks.
FCP	Uses the Fibre Channel Protocol (FCP) standard for transfer of FCP commands over Internet Protocol (IP) networks.
NDMP	Network Data Management Protocol is used for data backup.
AutoSupport Diagnostics Emails (ASUP)	The StoreVault system automatically sends e-mail messages to the administrator and technical support team if the StoreVault system experiences problems. Note— It is highly recommended to keep 'AutoSupport Diagnostic Email' enabled to ensure proper service for your StoreVault. For more information on ASUP, see.
Network Time Protocol support (NTP)	The Network Time Protocol (NTP) feature synchronizes the date and time of StoreVault with the Network Time Protocol (NTP) server. You need to provide the NTP server name or IP address and the synchronization occurs automatically.

LUN reserve auto-tuner	The StoreVault Manager LUN reserve auto-tuner feature set a guaranteed amount of space reserve for Snapshot copies. You need to enable the LUN reserve auto-tuner when creating a LUN. Here, a default amount of space is allocated by the system for Snapshot copies. As the data is written onto the LUN and Snapshot copies are taken the system allocates extra space for Snapshot copies as per the requirement. The system reclaims the reserved space when the Snapshot copies are deleted and the reclaimed space is added to global free space of the system. How the LUN reserve auto-tuner works: When you create a LUN with snapshotting on and enable LUN reserve auto tuner, the system allocates 20% of the LUN size as snapshot reserve. This space is free before Snapshot copies are taken. When the data is written on the LUN and snapshotting is scheduled for the LUN, then the reserved space is used. The system observes the space utilization by the Snapshot copies and starts allocating extra space automatically. When the reserve space reaches 130% of the LUN size, then the system starts deleting the oldest Snapshot copy. The reserve space for Snapshot copies can expand up to 140% of the LUN size. Once the snapshot reserve reaches 140% of the LUN size, the scheduled snapshotting will be disabled and an alert is sent to the administrator. Note_____ You can enable LUN reserve auto-tuner for a LUN size of 50 GB or greater and you need to enable snapshotting before enabling LUN reserve auto-tuner. If LUN reserve auto-tuner is not enabled while LUN creation, an additional static snapshot tax of 100% is added to the 50% snapshot reserve. _____ Reclaiming Snapshot reserve space: When the LUN Snapshot copies are deleted manually or deleted by the system faster than it was used, then the system starts reclaiming the freed space. The process of reclaiming free space is performed every hour. This process stops once the snapshot reserve space reaches the minimum limit of 20% of the LUN size.
------------------------	--

Cross-protocol	The StoreVault storage system enables a Windows client to access the UNIX machine data and a UNIX client to access the Windows machine data with cross-protocol support. You can share or export directories existing in default /vol/shares or /vol/exports directory paths. Note_____ You need to have licenses for both NFS and CIFS to use the cross-protocol feature. For a Windows client to access UNIX security style directory, you need to add a share to the existing UNIX security style directory. The existing directory can be a part of either the /vol/shares or the /vol/exports default directory and can be at any level in the directory. After adding a share, you can see the shared path in the Windows Shares Properties dialog box. For a UNIX client to access Windows security style directory, you need to add an export to the existing Windows security style directory. The existing Windows directory can be a part of either the /vol/shares or the /vol/exports default directories and can be at any level in the directory. After adding an export, you can see the exported path in the UNIX Export Properties dialog box. User mapping enables cross-protocol support.
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User mapping	Mapping a user having a Windows username and a UNIX username is a fundamental aspect of cross-protocol access. Cross-protocol access evaluates the user's rights to perform file and folder operations within the Windows and UNIX environments. For cross-protocol access to work, ensure that the Windows user name and the UNIX user name are same. Note_____ A default user mapping exists between the Windows administrator and UNIX root user for same rights in the cross-protocol environment. _____
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System requirements

For all the StoreVault S500 storage system requirements, see “[Environmental Requirements](#)”.

About this chapter

This chapter describes the following:

- ◆ Components included with the StoreVault S500 storage system shipment
- ◆ Installation tools and equipment required for installation
- ◆ Physical characteristics, such as height and weight
- ◆ Electrical, environmental, and space requirements

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Required tools, equipment, and documentation”](#) on page 14
- ◆ [“StoreVault S500 dimensions and environmental parameters”](#) on page 16

Required tools, equipment, and documentation

Equipment received with StoreVault S500

The StoreVault S500 storage system shipment includes the following components:

- ◆ One StoreVault S500 system
- ◆ Rack installation kit (optional)
- ◆ Two power cables
- ◆ Two network cables
- ◆ StoreVault S500 documentation
- ◆ Console cable for advanced diagnostics

Note _____
Use the console cable only on instructions from the technical support team.

Equipment rack installation components

The following table lists the StoreVault S500 storage system components that you need to install in the equipment rack.

Tools or equipment	Two-post equipment rack	Four-post equipment rack
Four-post rack adjustable supports		X
Rail mounting screws	X	X
Two-post rack mounts	X	

Required tools

To install the StoreVault S500 components in an equipment rack, you need the following tools and equipment:

- ◆ #2 Phillips screwdriver
- ◆ Antistatic wrist strap with grounding leash (recommended)

CAUTION

The StoreVault S500 storage system has electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures can damage these components. It is recommended that you wear an antistatic wrist strap and a grounding leash to prevent static discharge.

Required configuration equipment

To configure system, you need the following equipment:

- ◆ Windows workstation connected to the network
- ◆ StoreVault Manager software (included)
- ◆ License keys (included)

Required documentation

The following table lists the documents that you need to manage the StoreVault S500 storage system.

Document name	When to use
<i>StoreVault Manager Quick Start Guide</i>	Use this guide in unboxing and setting up your StoreVault S500.
<i>S500 Hardware Guide</i>	Use this guide to install and connect the StoreVault S500 storage system.
<i>StoreVault Manager 3.2 User's Guide</i>	Use this guide to install, administer, manage, and optimize StoreVault S500.

StoreVault S500 dimensions and environmental parameters

Installation considerations

You need to consider the following elements:

- ◆ Physical characteristics, such as height and weight
- ◆ Space requirements
- ◆ Environmental requirements, such as temperature and humidity
- ◆ Electrical requirements

Physical characteristics

The StoreVault S500 storage system is 19" EIA rack compliant. The following table lists the physical characteristics of StoreVault S500.

Characteristic	U.S.	Metric
Height	3.5 in. (2 U)	13.3 cm
Width	17.6 in.	44.7 cm
Depth	20 in.	50.8 cm
Weight (fully loaded)	52 lbs	35.8 kg

Space requirements

The following table lists the recommended minimum clearances for StoreVault S500.

Recommended minimum clearance	U.S.	Metric
Front clearance	10.55 in.	26.8 cm
Rear clearance	16.3 in.	41.4 cm

Environmental requirements

The following table lists the environmental ranges for operation and storage for StoreVault S500.

Environmental condition	Operating range	Storage range
Temperature	0° C to 40° C 32° F to 104° F	-10° C to 65° C -40° F to 149° F
Relative humidity, non-condensing	20% to 85%	20% to 95%

Environmental stress specifications

The following table lists the environmental stress specifications for StoreVault S500.

Condition	Requirement
Operating shock	5g 10 ms
Operating vibration	0.21g 5–500 Hz random
Altitude	0 to 7,000 ft (2,133 m)

Electrical ratings

The following table lists the AC power ratings for StoreVault S500.

Condition	Requirement
AC Power/ Max. Current	100 VAC to 120 VAC, 9A 200 VAC to 240 VAC, 4.5A
Frequency	50 to 60 Hz

Power consumption ratings

The following table lists the power consumption rating for the StoreVault S500 storage system.

Power	Rating
Heat dissipation BTU/hr.	1,706 BTU fully loaded

About this chapter This chapter identifies the preparation requirements and instructions for first-time installation of StoreVault S500.

Topics in this chapter This chapter discusses the following topics:

- ◆ [“Before you begin”](#) on page 20
- ◆ [“Installing the StoreVault S500 in a two-post rack”](#) on page 23
- ◆ [“Installing the StoreVault S500 in a four-post rack”](#) on page 25

Before you begin

Prerequisites

Before beginning the installation of StoreVault S500, have the following items available:

- ◆ StoreVault S500 system
- ◆ Rack installation kit (optional)
- ◆ #2 Phillips screwdriver
- ◆ Antistatic wrist strap with grounding leash
- ◆ StoreVault S500 documentation

Telco tray and rack mount kit (optional)

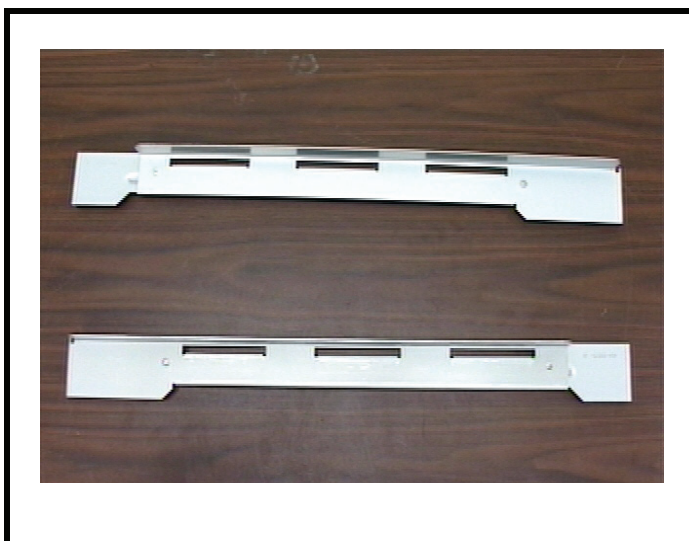
The optional rack mount kit contains the following items:

- ◆ Telco tray and rail kit installation instructions
- ◆ One set of two-post telco trays
- ◆ One set of four-post rack rails
- ◆ One set of two mid-mount brackets (not used for the StoreVault S500)
- ◆ Attachment hardware (screws, nuts, and washers)

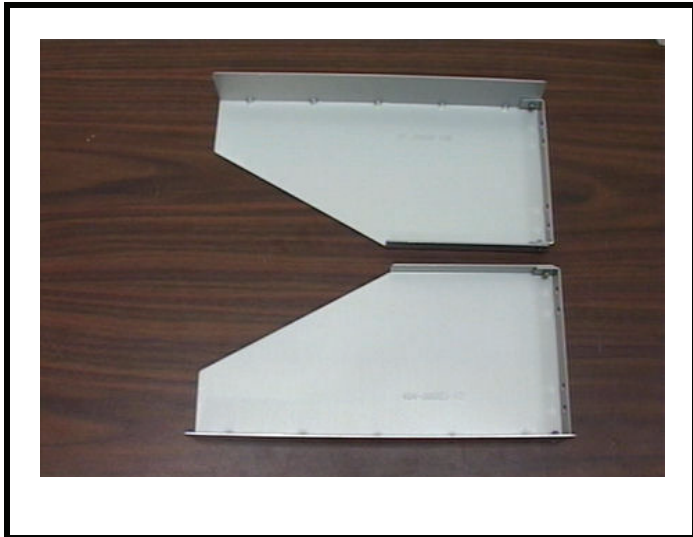
Note

The rack installation kit comes with a variety of hardware to fit most Telco rack configurations. It is recommended to use only the rack mount kit supplied with the StoreVault S500 storage system. You might face difficulty while removing and replacing StoreVault S500 if you are using a different rack mount kit.

Rack Mount Kit



Rails



Telco Trays



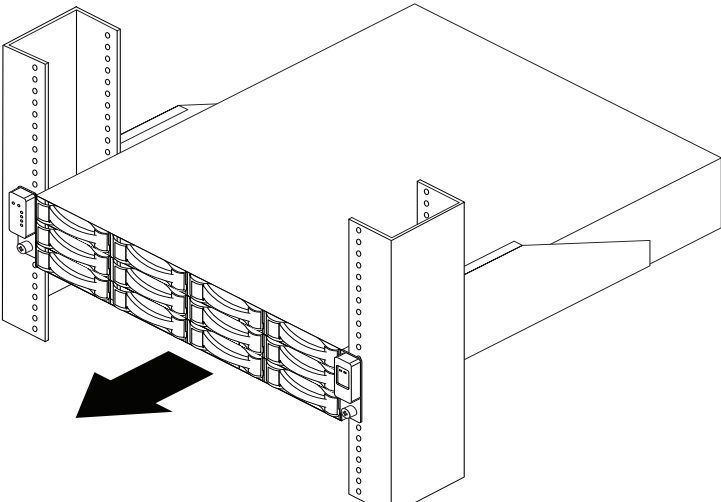
Mounting Hardware (screws, nuts, bolts, washers)

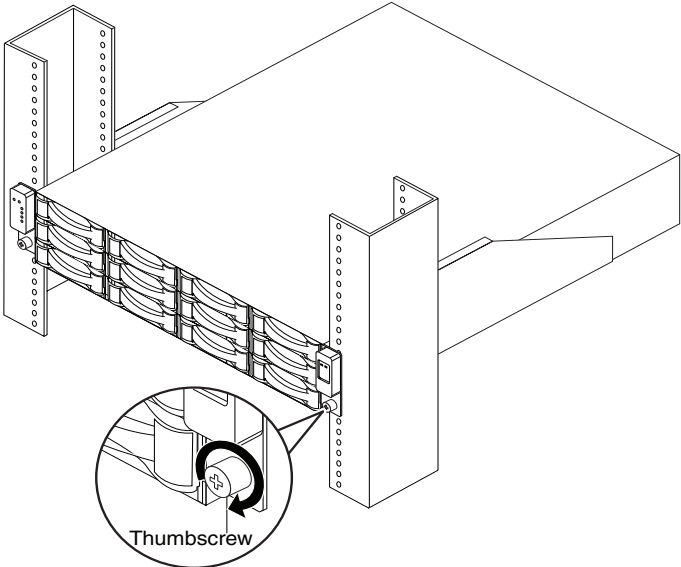
Installing the StoreVault S500 in a two-post rack

Installing with a two-post telco tray

To install StoreVault S500 in a two-post equipment rack using the telco tray kit, complete the following steps.

Step	Action
1	Locate where you want install the telco tray on the two-post rack.
2	Use the rack alignment tool to make sure that you install the telco tray in the same holes on both posts of the rack.
3	Align the left-post screw holes on the two-post rack with the screw holes on the left half of the telco tray.
4	Secure the tray to the left post with two of the appropriate size and type of mounting screws.
5	Repeat Step 1 through Step 4 for the right half of the telco tray.
6	Slide the StoreVault S500 onto the telco tray and secure it to the two-post rack by tightening the thumb screws.

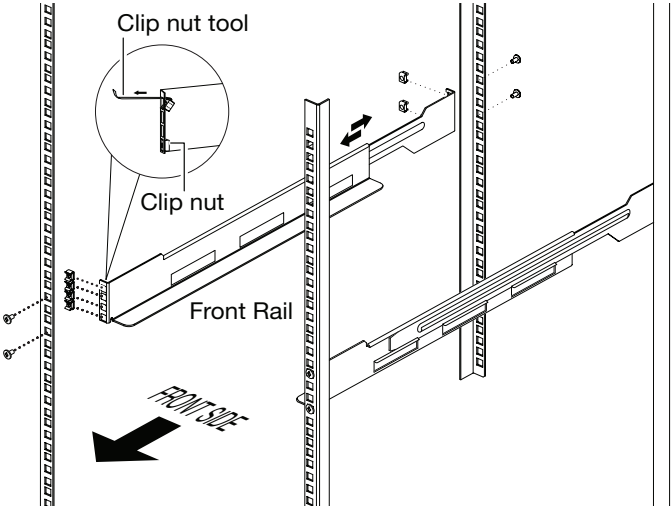


Step	Action
7	For instructions about connecting the StoreVault S500 storage system to the network, go to Chapter 4, “ Connecting the StoreVault S500 to a Network ”.
8	The StoreVault S500 storage system is installed in the rack while the thumbscrews are being tightened.  The diagram illustrates the installation of the StoreVault S500 storage system into a two-post rack. The system is shown with its front panel and internal components. A circular inset shows a close-up of a thumbscrew being tightened onto the front panel.

Installing the StoreVault S500 in a four-post rack

Installing with a four-post rail kit

To install your StoreVault S500 in a four-post equipment rack using the rail kit, complete the following steps.

Step	Action
1	Determine the appropriate screw and clip nut size for your four-post rack.
2	Install the clip nuts on the rail using the clip nut tool. You install a minimum of four clip nuts per rail.
3	Locate the position the rail will occupy when installed, on the right rear of the four-post rack. 
4	Hold the rail against the rear post and secure the rail to the post, using the appropriate screws.
5	Slide the rail front to the front rack post, and secure the rail to the post, using the appropriate screws.
6	Repeat Steps 2 through 5 for the left rail.

Step	Action
7	Slide your StoreVault S500 onto the adjustable supports and secure it to the four-post rack by tightening the thumb screws.
8	For instructions about connecting the StoreVault S500 to the network, see Chapter 4, “ Connecting the StoreVault S500 to a Network ”.

About this chapter

This chapter describes how to connect the StoreVault S500 storage system to an Ethernet network and to an AC power source, and how to power on the StoreVault S500 storage system.

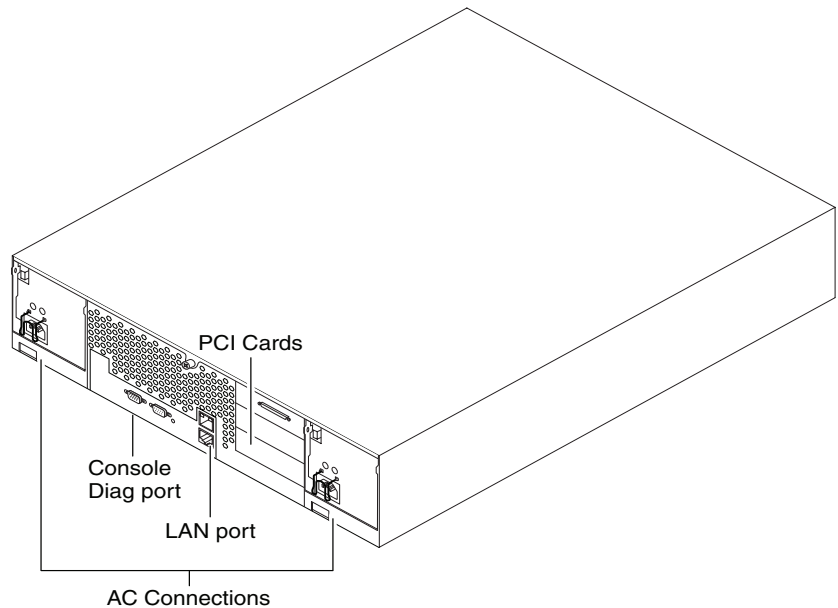
Topics in this chapter

This chapter discusses the following topics:

- ◆ “[Locating the appropriate connection](#)” on page 28
- ◆ “[Connecting to an Ethernet network](#)” on page 29
- ◆ “[Connecting to an Ethernet port using copper cabling](#)” on page 30
- ◆ “[Connecting StoreVault S500 to server using Fibre channel cable](#)” on page 31
- ◆ “[Connecting to an AC power source](#)” on page 32

Locating the appropriate connection

The connections on your StoreVault S500 are made through the back of the chassis. The following illustration gives an overview of onboard ports, optional PCI cards, and power connections.



Connecting to an Ethernet network

Supported Ethernet NICs The StoreVault S500 storage system has two onboard 10/100/1000 TX Ethernet ports.

Supported Ethernet connections Use the following table to determine the Ethernet connection and cabling requirements of your Ethernet NICs.

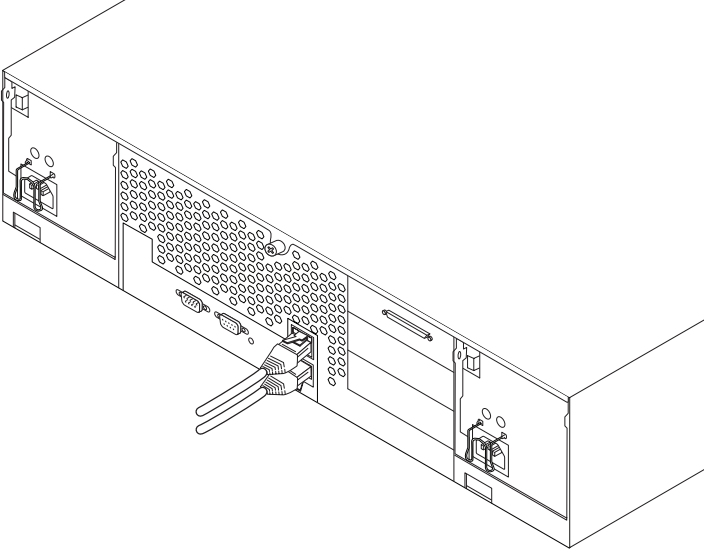
Attention _____
Do not exceed the maximum cable length specification.

Ethernet type	Supported ports	Cabling requirements	Maximum distance
10Base-T/ 100Base-TX/1000Base-T Copper	◆ Dual	Category 5 unshielded twisted pair (UTP) copper cable with RJ-45 connectors	100 m
	◆ Quad ◆ Onboard	Category 5e or category 6 UTP copper cable with RJ-45 connectors	100 m

Connecting to an Ethernet port using copper cabling

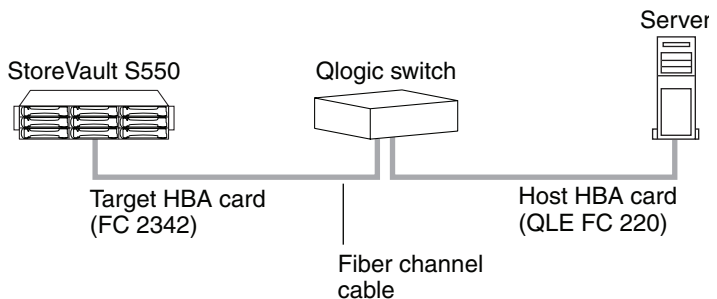
Connecting to a multiport GbE NIC using copper cabling

To connect to the onboard Ethernet ports complete the following step, using the figure for reference.

Step	Action
1	Push the RJ-45 connector into the Ethernet port until it clicks and locks into place. Repeat this step to connect another network to the other port.  A line drawing of a server chassis from a three-quarter perspective. On the front panel, there is a large circular ventilation grille. To the right of the grille, there are two RJ-45 ports. An RJ-45 connector is shown being inserted into the lower of these two ports. The connector has a locking tab on its side. To the left of the grille, there are other ports, including a USB port and a serial port. The server is shown in a rack-mountable format with ears on the sides.

Connecting StoreVault S500 to server using Fibre channel cable

You can connect the StoreVault S500 storage system to a server using fibre channel cable. The following block diagram illustrates the network connection between StoreVault S500, QLogic switch, and server using the Fibre Channel cable.



Note

You need to install the supplied target HBA card (QLA 2342 dual port 2 Gb) in the StoreVault S500 storage system and host HBA card in the server (QLE FC220). You can directly connect the StoreVault S500 without a switch if you have a single host.

Connecting to an AC power source

The purpose of the power-on sequence

The power-on sequence for a new installation automatically checks all connections to the StoreVault S500 storage system.

Connecting and powering on an AC system

To connect your StoreVault S500 to an AC power source and power it on, complete the following steps.

Step	Action
1	Connect the socket end of the supplied power cord to the recessed power plug on both power supplies.
2	Plug the other end of the power cord into a grounded electrical outlet. CAUTION _____ To obtain power supply redundancy, you must connect the second power supply to a separate AC circuit. _____
3	Ensure that the following LEDs are lit: ◆ Front panel LEDs ◆ Power supply LEDs ◆ Network port LEDs The LED responses are described in “ Interpreting power supply LED messages ” on page 82.

Attention _____

If the LEDs are not lit, contact the technical support.

About this chapter This chapter guides you through the process of removing and installing disk drives in the StoreVault S500 storage system.

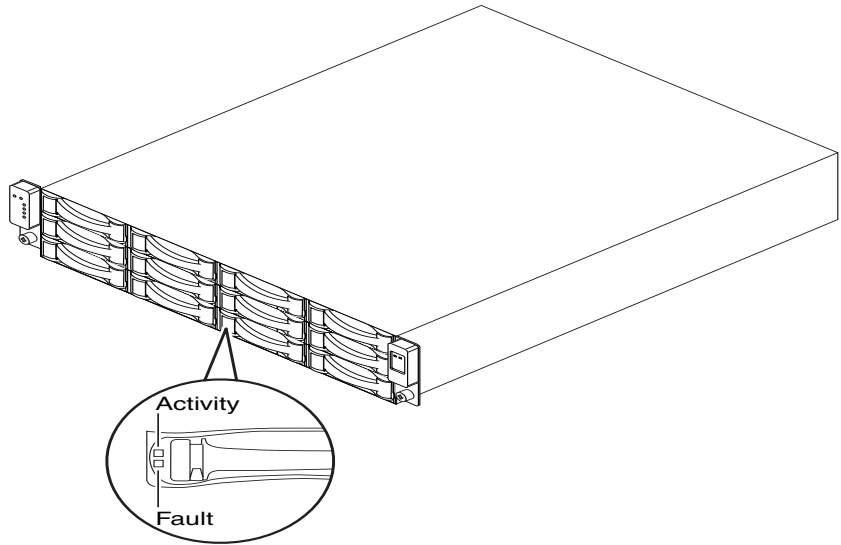
Topics in this chapter This chapter discusses the following topics:

- ◆ “[Drive status indicator](#)” on page 34
- ◆ “[Proper drive handling](#)” on page 34
- ◆ “[Removing a disk drive](#)” on page 36
- ◆ “[Installing a disk drive](#)” on page 37

Drive status indicator

The drive status LED indicator shows disk drive activity.

- ◆ Green: indicates drive active, working properly
- ◆ Red: indicates drive needs attention and is not working properly



Drive status LEDs

Proper drive handling

Hard disk drives are very delicate and sensitive device. While it is true that newer (and especially smaller) drives are less fragile than their older counterparts, it is also true that all hard disk drives have to be properly handled to avoid damage.

In most cases, handling of disk drives is something that happens very rarely. A drive is received, installed, and left in the StoreVault S500 storage system. If it is necessary to handle a disk drive, proper handling technique is essential.

When handling a new or replacement disk drive, observe the following precautions:

- ◆ Do not drop or jar the drive
- ◆ Keep the drive in the protective antistatic and packing container until ready to install
- ◆ Protect the drive from static charge by wearing a grounded wrist strap
- ◆ Handle the drive by the edges of the frame

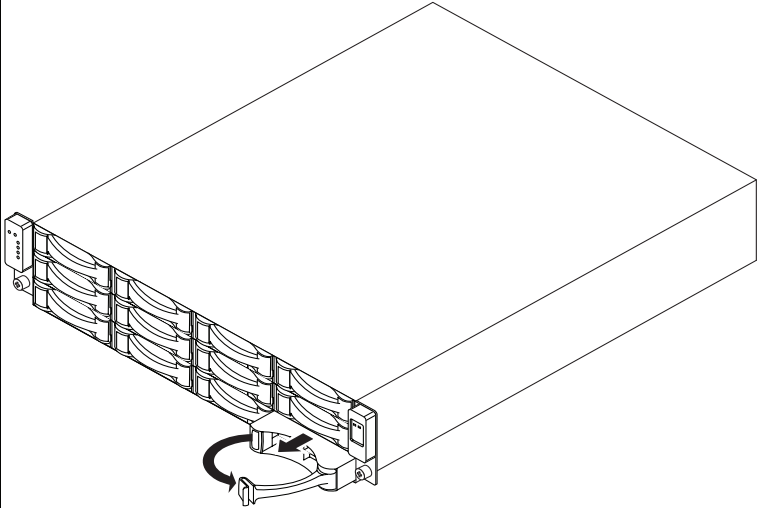
- ◆ Do not apply pressure or attach labels to the circuit board or the top cover of the drive

Removing a disk drive

Procedure

To remove a disk drive, complete the following steps.

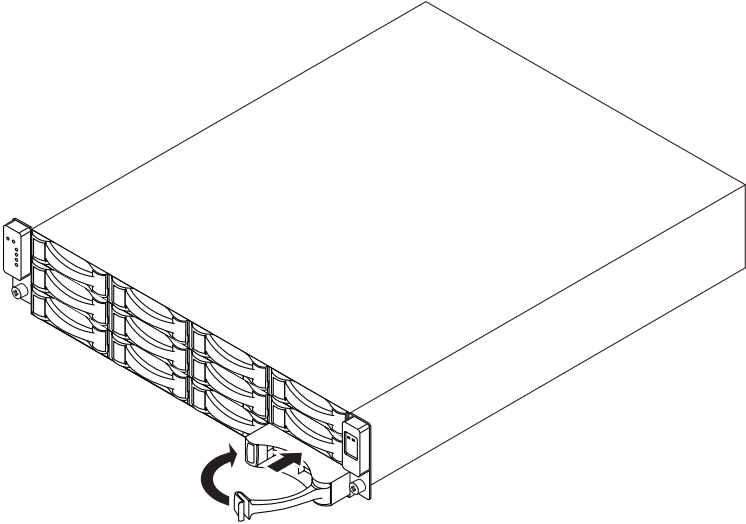
Note Because the disk drives are hot-swappable you do not need to power down the StoreVault S500 storage system while you complete this procedure.

Step	Action
1	Put on the antistatic wrist strap.
2	If you are removing a failed disk, locate the failed disk from the StoreVault Manager main screen drives section represented red 'X' icon.
3	Press the disk carrier clasp and pull the handle of the disk carrier.
4	Pull the disk drive toward you until the disk is free from the bay. 

Installing a disk drive

Items required Replacement disk drive.

Procedure To install a disk drive, complete the following steps. The time required is approximately five minutes.

Step	Action
1	Remove the new disk drive from the antistatic bag.
2	Align the disk drive properly in the drive bay and gently push it in until it stops. Ensure that the disk drive connects with the backplane.
3	Push the drive carrier handle until the clasp fits properly.
4	Slide the entire assembly toward you until it is free of the drive bay. 
5	Ensure normal disk operation by checking the disk LEDs.

About this chapter

This chapter guides you through StoreVault S500 power supplies removing and installing procedure.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Removing a power supply”](#) on page 40
- ◆ [“Installing a power supply”](#) on page 44

Removing a power supply

Items required

Antistatic wrist strap with grounding leash (recommended.)

Procedure

There are two power supplies in the back of a StoreVault S500. The power supplies are redundant, hot-swappable, and interchangeable.

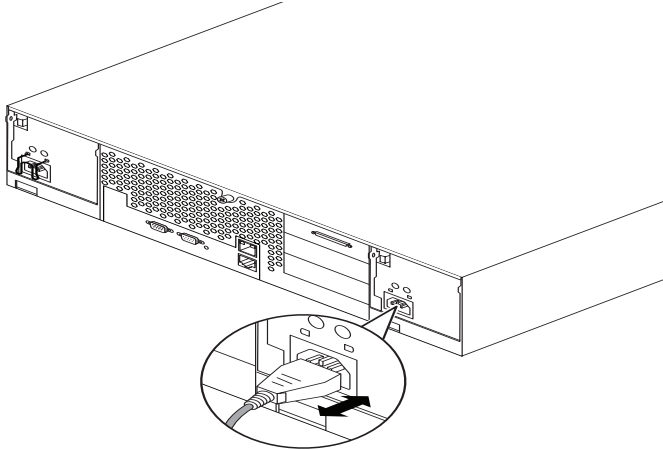
The time required to remove a power supply is approximately five minutes.

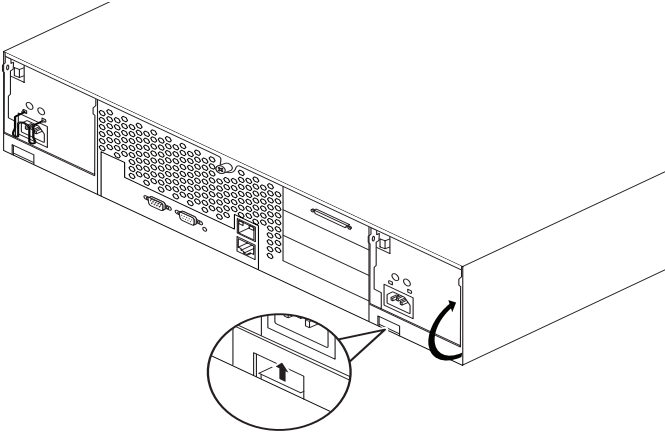
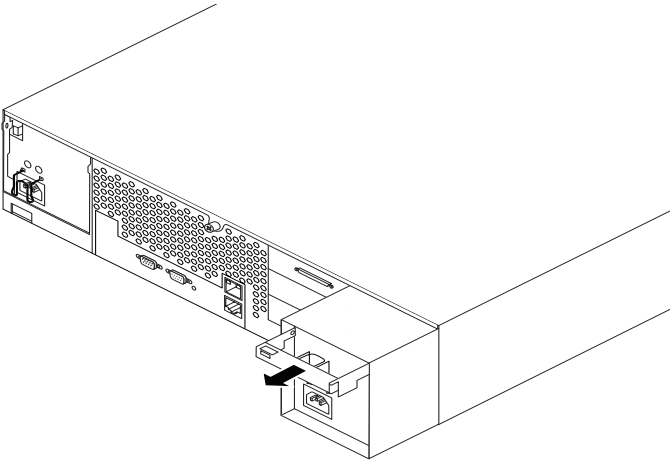
CAUTION _____

The power supply is heavy. Use both hands when removing it from the chassis to avoid injury.

To remove a power supply, complete the following steps.

Step	Action
1	Identify the power supply you want to replace, based on error messages or the power supply LEDs.
2	Use a grounding leash to ground yourself to the system chassis.

Step	Action
3	Lift up the clip lock and unplug the power cord from your storage system power supply.  The diagram shows a perspective view of a storage system power supply unit. A power cord is plugged into the power input jack on the right side. A circular inset provides a magnified view of the power jack, showing a small clip lock on the right side of the port. A black arrow points upwards from the clip lock, indicating the direction to lift it to release the power cord.

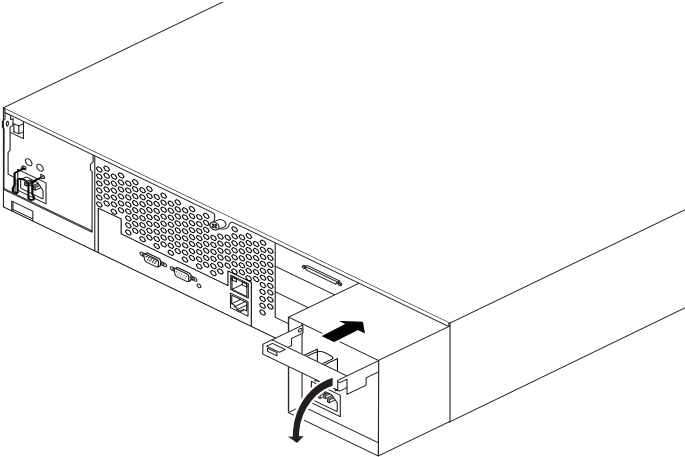
Step	Action
4	Release the power supply cam handle and raise it toward the top of the system. 
5	Slide the power supply out. Be sure to support the power supply with your other hand as you pull the power supply out of the chassis. 

Installing a power supply

Items required Antistatic wrist strap with grounding leash (recommended), replacement power supply.

Procedure Replacing the power supply is an easy operation. The replacement procedure is the reverse of the removal procedure. The time required to replace a power supply is approximately five minutes.

To install a power supply, complete the following steps.

Step	Action
1	Use a grounding leash to ground yourself to the system chassis.
2	Align the power supply with the opening in the chassis and slide it in as far as it can go. Be sure to support the bottom of the power supply with your other hand. 

Step	Action
3	Seat the power supply in the chassis by pushing its edges with your fingers. When properly seated, the power supply cam handle begins to swing up, indicating that it is engaged and ready for locking.
4	Swing the power supply cam handle down to the locking position and engage the lock tab.
5	Plug the power cord into the new power supply and turn it on. The power supply may take a few seconds to come online.

Completing the replacement process

Return the failed part to NetApp, as described in the RMA instructions shipped with the unit.

About this chapter

This chapter guides you through the process of removing and installing the fan assembly unit in the StoreVault S500 storage system.

Topics in this chapter

This chapter discusses the following topics:

- ◆ “[Removing a Fan Assembly](#)” on page 48
- ◆ “[Installing a Fan Assembly](#)” on page 52

CAUTION

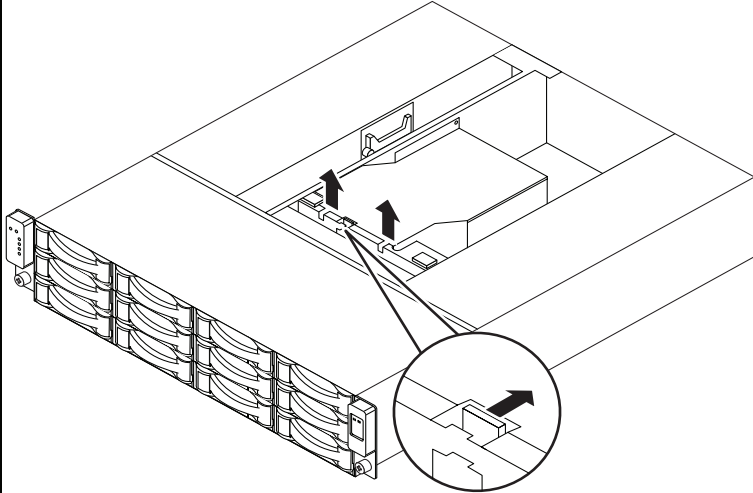
Replacing a non-redundant and non-hot swappable component is a disruptive operation. Never attempt to remove or replace a non-redundant and non-hot swappable component with the StoreVault S500 storage system powered on.

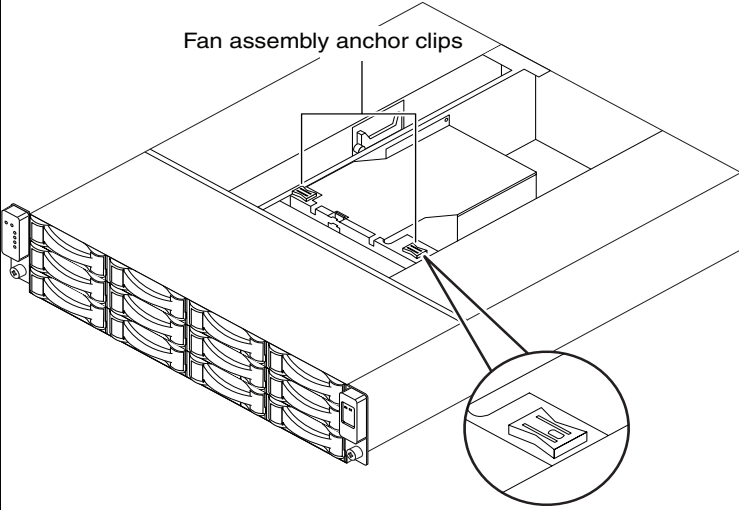
Removing a Fan Assembly

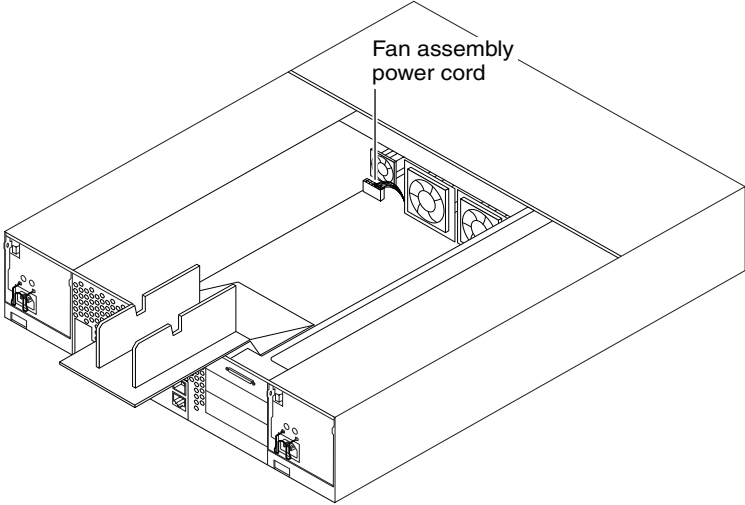
Procedure

To remove a fan assembly, complete the following steps.

Step	Action
1	Stop all system activity.
2	Shut down the StoreVault S500 storage system using the StoreVault Manager. Turn off the StoreVault S500 storage system and unplug the power cables. Position the StoreVault S500 storage system so that the top cover is accessible.
3	Remove the rear cover screw and carefully remove the top cover from the StoreVault S500 storage system.
4	Follow proper ESD precautions. Ground yourself to the system chassis.

Step	Action
5	Squeeze the release clip at the back of the plastic air baffle. Lift the air baffle cover up and forward. Remove the air baffle from the front chassis anchor pin and set the fan assembly cover aside. 

Step	Action
6	Loosen the two small screws on the top of the fan assembly. Do not remove the screws.  Fan assembly anchor clips
7	Slide the two blue plastic anchor clips toward each other to separate the fan assembly unit from the chassis. Lift the entire fan assembly unit up.

Step	Action
8	Disconnect the power connection from the motherboard, and then set the fan assembly aside.  Fan assembly power cord The diagram shows a perspective view of a server chassis. A fan assembly is located at the rear of the chassis. A power cord is shown connecting the fan assembly to a port on the motherboard. The cord is labeled 'Fan assembly power cord' with a leader line pointing to it. The chassis has various components visible, including a drive bay on the left and a power supply unit on the right.

Installing a Fan Assembly

Procedure

To install a fan assembly, complete the following steps.

Step	Action
1	Unpack the new fan assembly from the antistatic bag.
2	Connect the power connection cable of the fan assembly to the motherboard.
3	Place the fan assembly in the designated place, fans facing disk drives.
4	Push the two blue plastic anchor clips into chassis slot.
5	Tighten the two small screws on the top of the fan assembly.
6	Carefully close the air baffle and see that the clip clicks.
7	Replace the top cover of the chassis and tighten the rear screw of the cover.
8	Connect the power cables and turn on the StoreVault S500 storage system. Ensure normal operation from StoreVault Manager.

About this chapter

This chapter guides you through the process of removing and installing the CompactFlash card in the StoreVault S500 storage system.

Topics in this chapter

This chapter discusses the following topic:

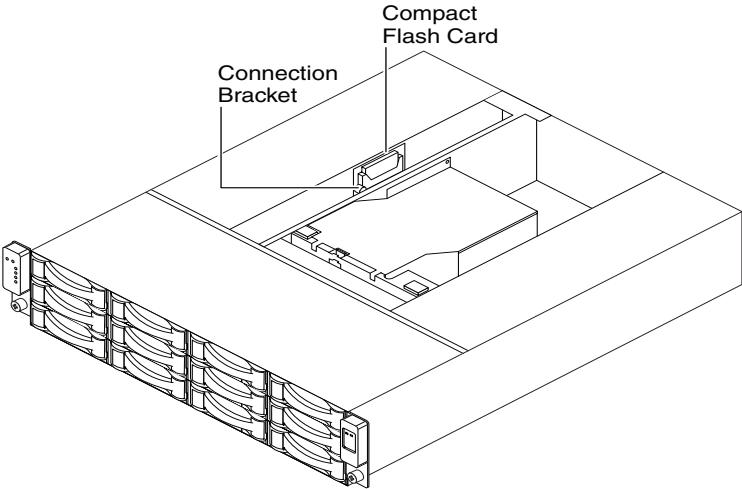
- ◆ “[Removing a CompactFlash card](#)” on page 54
- ◆ “[Installing a CompactFlash Card](#)” on page 56

CAUTION

Replacing a non-redundant and non-hot swappable component is a disruptive operation. Never attempt to remove or replace a non-redundant and non-hot swappable component with the StoreVault S500 storage system powered on.

Removing a CompactFlash card

Removal procedure To remove a CompactFlash card, complete the following steps.

Step	Action
1	Stop all system activity.
2	Shut down the StoreVault S500 storage system using the StoreVault Manager. Turn off the StoreVault S500 storage system and unplug the power cables. Position the StoreVault S500 storage system so that the top cover is accessible.
3	Remove the rear screw of the cover and remove the top cover from the StoreVault S500 storage system. Follow proper ESD precautions. Ground yourself to the system chassis.
4	Locate the CompactFlash card assembly on the left side of the StoreVault S500 storage system chassis. 

Step	Action
5	Hold the CompactFlash card between your thumb and forefinger. Rock the CompactFlash card gently back and forth lengthwise while pulling upward.
6	Remove the CompactFlash card from the connection bracket.

Installing a CompactFlash Card

Procedure

To install a CompactFlash Card, complete the following steps.

Step	Action
1	Unpack the new CompactFlash Card from the antistatic bag.
2	Insert the CompactFlash Card in the connection bracket.
3	Replace the top cover of the chassis and tighten the rear screw of the cover.
4	Connect the power cables and turn on the StoreVault S500 storage system. Ensure normal operation from in the StoreVault Manager.

About this chapter

This chapter guides you through the process of removing and installing the SCSI and FCP cards in the StoreVault S500 storage system.

Topic in this chapter

This chapter discusses the following topic:

- ◆ “[Removing a SCSI and FCP card](#)” on page 58
- ◆ “[Installing a SCSI and FCP card](#)” on page 61

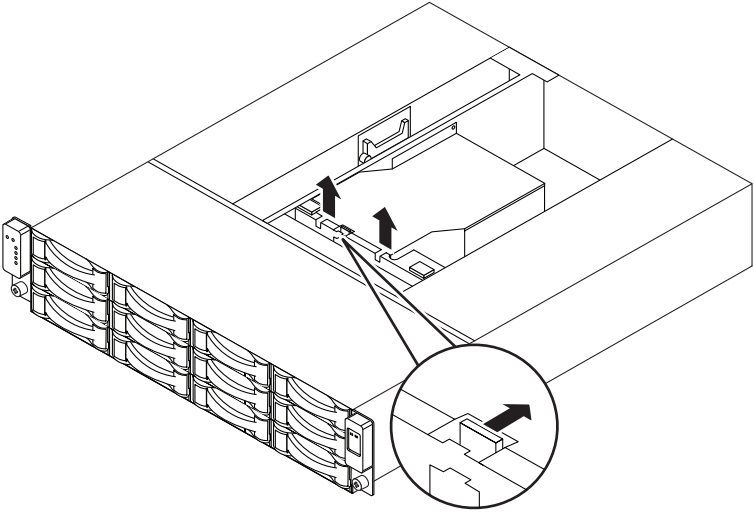
CAUTION

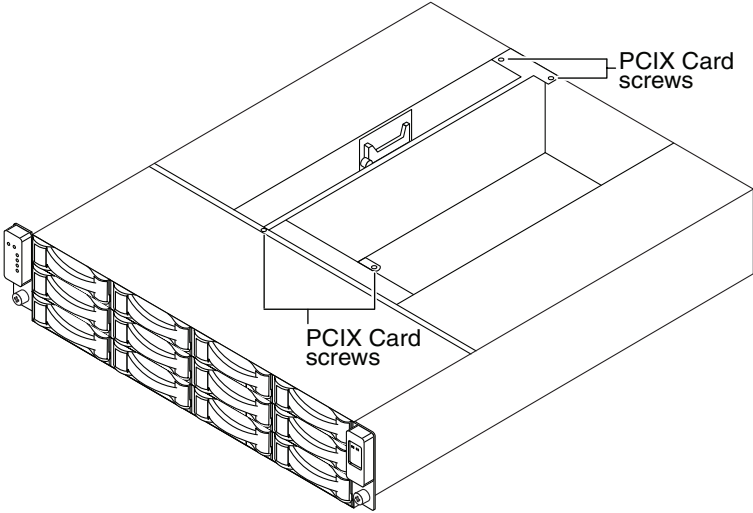
Replacing a non-redundant and non-hot swappable component is a disruptive operation. Never attempt to remove or replace a non-redundant and non-hot swappable component with the StoreVault S500 powered on.

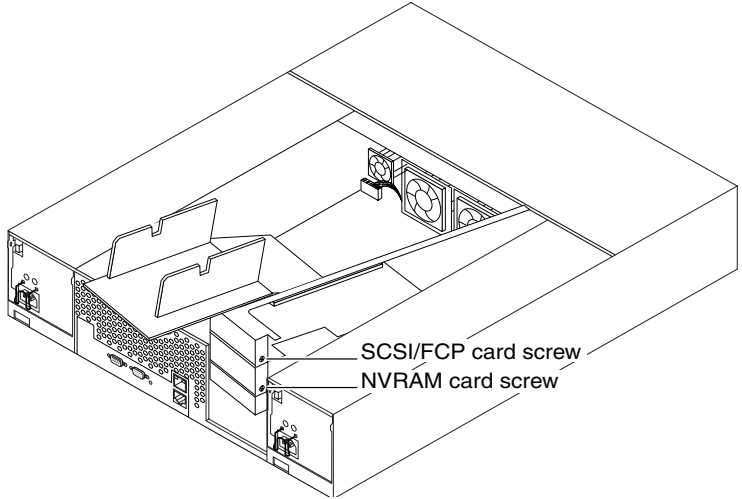
Removing a SCSI and FCP card

Procedure

To remove a SCSI and FCP card, complete the following steps.

Step	Action
1	Stop all system activity.
2	Shut down the StoreVault S500 storage system using the StoreVault Manager. Turn off the StoreVault S500 storage system and unplug the power cables. Position the StoreVault S500 storage system so that the top cover is accessible.
3	Remove the rear cover screw and carefully remove the top cover from the StoreVault S500 storage system. Follow proper ESD precautions. Ground yourself to the system chassis. Squeeze the release clip and lift up the air baffle. 

Step	Action
4	Remove the four screws from the PCI-X interface board. 
5	Loosen the small screw on the top of the fan assembly. Do not remove the screw.
6	Slide out the blue plastic anchor clip of the fan assembly.
7	Carefully lift the PCI-X interface board from the motherboard connector so that the SCSI or FCP card can be accessed.

Step	Action
8	Remove the SCSI or FCP card connection screw.  SCSI/FCP card screw NVRAM card screw
9	Remove the SCSI, or FCP card by gently rocking the card back and forth lengthwise while pulling up.

Installing a SCSI and FCP card

Procedure

To install a SCSI and FCP card, complete the following steps.

Step	Action
1	Install the new SCSI or FCP card by gently rocking the card back and forth lengthwise while pressing down until the card is properly seated in the slot.
2	Replace the SCSI or FCP card connection screw.
3	Carefully replace the PCI-X interface board in the motherboard connector.
4	Replace the four screws on the PCI-X interface board.
5	Push the blue plastic anchor clip into chassis slot.
6	Carefully close the air baffle and see that the clip clicks.
7	Carefully replace the top cover on the StoreVault S500 storage system and replace the rear cover screw.
8	Reconnect the power cables and supply power to the StoreVault S500 storage system.
9	Ensure that normal operation is indicated in StoreVault Manager.

About this chapter

This chapter guides you through the process of removing and installing the NVRAM Card in the StoreVault S500 storage system.

Topics in this chapter

This chapter discusses the following topics:

- ◆ “[Removing a NVRAM card](#)” on page 64
- ◆ “[Installing a NVRAM card](#)” on page 67

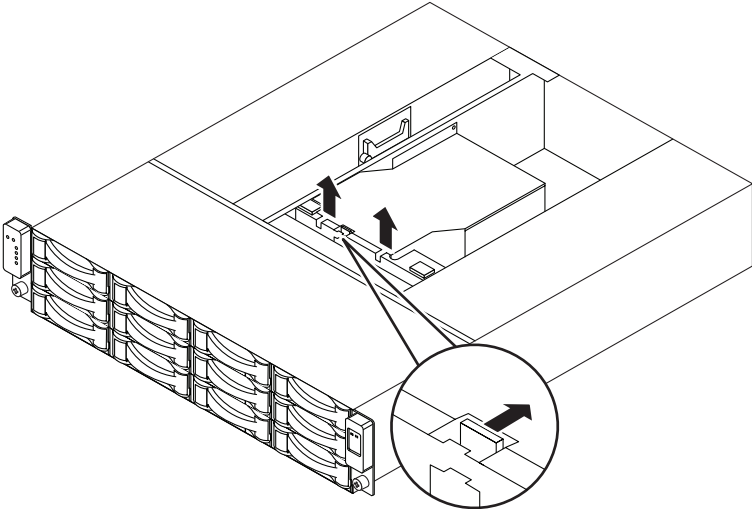
CAUTION

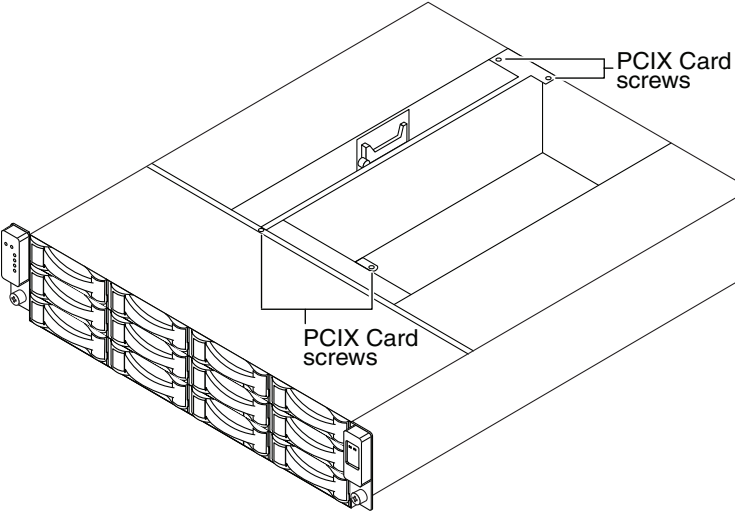
Replacing a non-redundant and non-hot swappable component is a disruptive operation. Never attempt to remove or replace a non-redundant and non-hot swappable component with the StoreVault S500 storage system powered on.

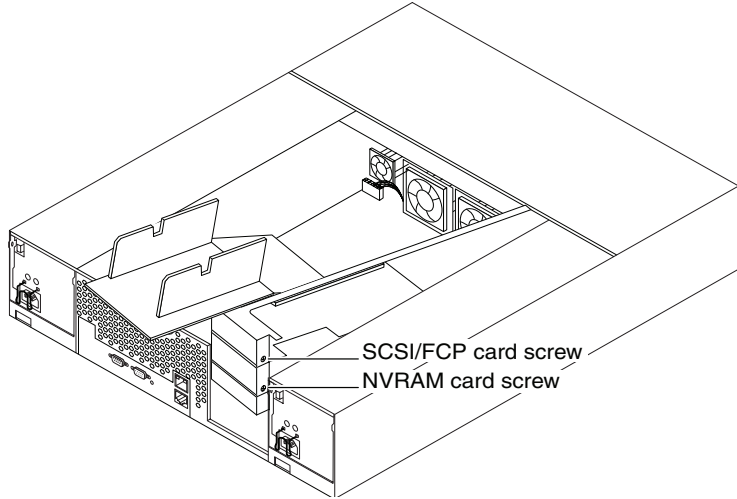
Removing a NVRAM card

Procedure

To remove a NVRAM card, complete the following steps.

Step	Action
1	Stop all system activity.
2	Shut down the StoreVault S500 storage system using the StoreVault Manager. Turn off the StoreVault S500 storage system and unplug the power cables. Position the StoreVault S500 storage system so that the top cover is accessible.
3	Remove the rear cover screw and carefully remove the top cover from the StoreVault S500 storage system. Follow proper ESD precautions. Ground yourself to the system chassis. Squeeze the release clip and lift up the air baffle. 

Step	Action
4	Remove the four screws from the PCI-X interface board. 
5	Loosen the small screw on the top of the fan assembly. Do not remove the screw.
6	Slide the blue plastic anchor clip of the fan assembly out.
7	Carefully lift the PCI-X interface board from the motherboard connector so that the NVRAM card can be accessed.

Step	Action
8	Remove the NVRAM card connection screw. 
9	Remove the NVRAM card by gently rocking the card back and forth lengthwise while pulling up.

Installing a NVRAM card

Procedure

To install a NVRAM card, complete the following steps.

Step	Action
1	Install the new NVRAM card by gently rocking the card back and forth lengthwise while pressing down until the card is properly seated in the slot.
2	Replace the NVRAM card connection screw.
3	Carefully replace the PCI-X interface board in the motherboard connector.
4	Replace the four screws on the PCI-X interface board.
5	Push the blue plastic anchor clip into chassis slot.
6	Carefully close the air baffle and see that the clip clicks.
7	Carefully replace the top cover on the StoreVault S500 storage system and replace the rear cover screw.
8	Reconnect the power cables and supply power to the StoreVault S500 storage system.
9	Ensure that normal operation is indicated in StoreVault Manager.

About this chapter

This chapter guides you through the process of replacing the StoreVault S500 storage system chassis. This is primarily a hardware component exchange. This procedure preserves all data, system, and network settings, except for software license keys that are associated with the system (chassis) serial number.

Topics in this chapter

This chapter discusses the following topic:

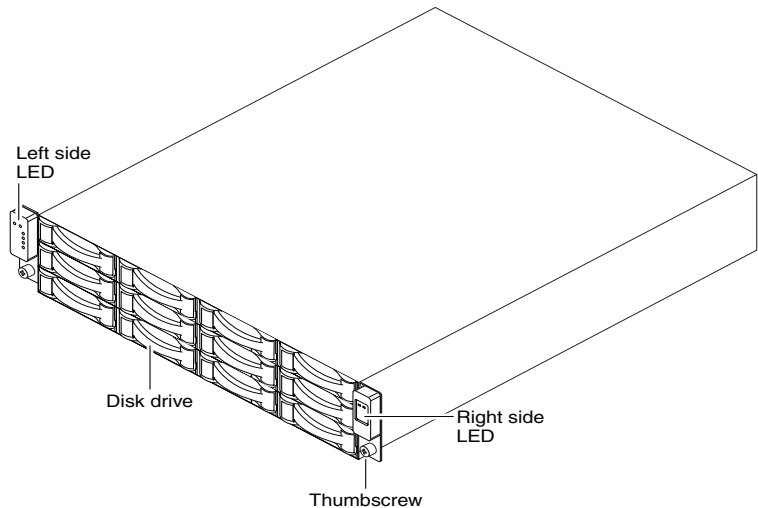
- ◆ [“Installing a chassis”](#) on page 70

CAUTION

Replacing a non-redundant and non-hot swappable component is a disruptive operation. Never attempt to remove or replace a non-redundant and non-hot swappable component with the StoreVault S500 storage system powered on.

Installing a chassis

The following figure shows the StoreVault S500 storage system chassis.



Note

The StoreVault S500 storage system software is dependent on the serial number of the chassis unit. This dependency will require additional steps to update the serial number in the StoreVault S500 software.

If a chassis replacement is required then remove power supplies, disk drives, and all field-replaceable units from the existing StoreVault S500 storage system and and reinstall the same in the new chassis.

Prerequisites

- ◆ Plan a sufficient downtime.
- ◆ Back up all the important data from the StoreVault S500 storage system.
- ◆ Note the StoreVault S500 IP address from the StoreVault Manager or from DNS/DHCP records.
- ◆ New license key.

Time required to complete the replacement procedure is approximately 1.5 to 2.0 hours.

Note_____

The amount of time required to perform this procedure may vary depending on the complexity of the network, server, and application environment.

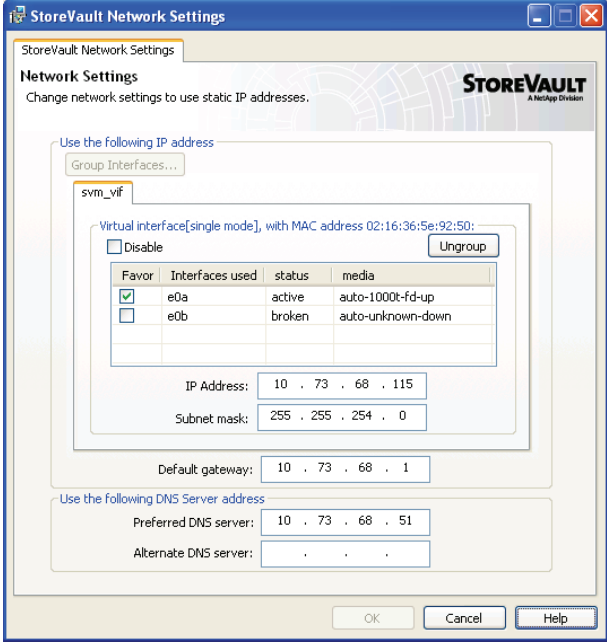
Note_____

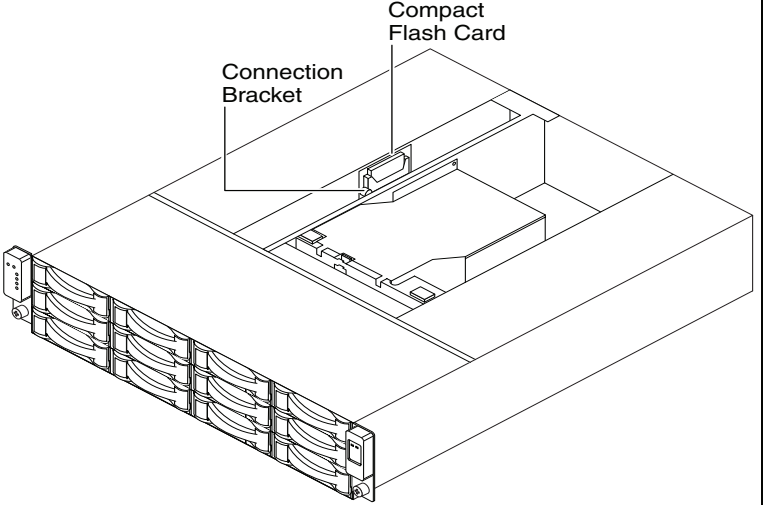
The technical support team will send a new license key through an e-mail for the new chassis. Contact support team if you have not received the new license key

Procedure

To replace a chassis, complete the following steps.

Step	Action
1	Ensure that all the users and servers are not connected to the StoreVault S500 storage system.

Step	Action
2	Note the StoreVault S500 IP address from StoreVault Manager or DNS/DHCP records. 
3	Shut down the StoreVault S500 storage system through StoreVault Manager.
4	Press the power button and power off the StoreVault S500 storage system.
5	Disconnect the power cables from the two power supplies of StoreVault S500.
6	Remove the new StoreVault S500 chassis from the carton.
7	Remove the CompactFlash card from the old StoreVault S500 storage system.

Step	Action
8	Insert the CompactFlash card in the new StoreVault S500 storage system in correct orientation.  The diagram shows a perspective view of a storage chassis. Inside the chassis, there is a connection bracket. A CompactFlash card is shown being inserted into the bracket. Labels with leader lines point to the 'Connection Bracket' and the 'Compact Flash Card'. Attention ————— Remove the CompactFlash card from the new chassis, if installed and insert the old CompactFlash card that you have removed from the old StoreVault S500 storage system. —————
9	Fix the new empty StoreVault S500 chassis onto the rack and tight the thumbscrews.
10	Transfer each of the disk drives from the old StoreVault S500 chassis to the new chassis. one at a time. Ensure that each disk drive is installed correctly and lock the drive carrier handles.
11	Release the latches behind the power supplies and pull out both the power supplies one after other.
12	Install the power supplies into the new chassis, lock the latches and connect the power cables to both the power supplies.
13	Plug-in the power cable into the power socket. StoreVault automatically power-up.

Step	Action
14	If, the StoreVault does not power-up automatically, press the power button on the StoreVault and see that the LED on the chassis displays “11” after booting. Booting takes few minutes.
15	Connect all network cables to the new chassis (Ethernet, FC, SCSI).
16	Open command prompt from the Windows and telnet StoreVault S500 using previous IP address and login as root. Example: a. In the command prompt type “telnet <StoreVault IP address>” b. log in using “root”. c. Type the password for the root of your StoreVault.
17	Using the following commands in the CLI CIFS: <pre>>priv set advanced >registry set options.nlicense.cifs <new CIFS license> ALL Licenses, including CIFS >nlicense add <new license> {CIFS, NFS, SnapRestore} Example >nlicense add <CIFS license> >nlicense add <NFS license> >nlicense add <SnapRestore license> Cont</pre>
18	Log on to the StoreVault Manager and confirm the software licenses are correct.
19	Confirm no errors are shown in the System Status pane. Contact technical support team for assistance if system shows errors after booting.
20	Reconnect all the clients and servers to your StoreVault S500 after successfully completing the preceding steps.

About this chapter

This chapter guides you through the removing and replacing procedure of a real time clock (RTC) battery.

Topics in this chapter

This chapter discusses the following topic:

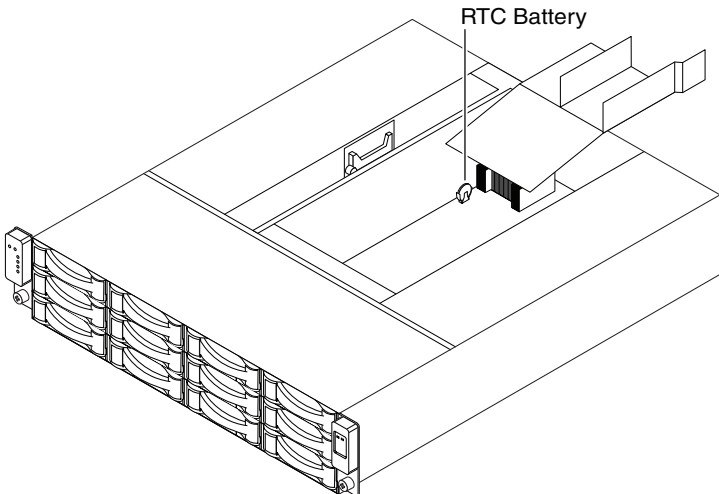
- ◆ [“Removing an RTC battery”](#) on page 76
- ◆ [“Installing an RTC battery”](#) on page 78

Removing an RTC battery

Items required Items required for this procedure are #2 Phillips screw driver and tweezers.

Procedure To remove an RTC battery, complete the following steps.

Step	Action
1	Shut down the StoreVault S500 storage system using the StoreVault Manager. Turn off the StoreVault S500 storage system and disconnect the power cables.
2	Position the StoreVault S500 storage system so that the top cover is accessible.
3	Remove the rear cover screw and carefully remove the top cover from the StoreVault S500 storage system. Follow proper ESD precautions. Ground yourself to the system chassis. Squeeze the release clip and lift up the air baffle.
4	Note the orientation of the battery before removing it.

Step	Action
5	Remove the RTC battery by using pair of tweezers.  RTC Battery

Installing an RTC battery

Procedure

To install an RTC battery, complete the following steps.

Step	Action
1	Install the new RTC battery and orient it the same way as the old battery.
2	Reseat the air baffle.
3	Carefully replace the top cover on the StoreVault S500 storage system and replace the rear screw of the cover.
4	Power on the StoreVault S500 storage system and ensure that normal operation is indicated in StoreVault Manager.
5	Reset the StoreVault S500 storage system date and time to current date and time after replacing the RTC battery using the StoreVault Manager. Attention _____ It is important to reset the date and time; otherwise, the CIFS Shares stop working because it can no longer authenticate from the AD domain and might have other impacts on NFS data and LUNs. _____

About this chapter

This chapter provides a reference to the error messages that you might encounter while installing, configuring, and using a StoreVault S500.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“How to get help”](#) on page 80
- ◆ [“Interpreting power supply LED messages”](#) on page 82
- ◆ [“Where to go next”](#) on page 87

How to get help

Troubleshooting

This will help you solve problems that you might encounter while installing or replacing hardware on the StoreVault S500 storage system.

StoreVault Manager Status Indications

The StoreVault Manager software indicates the status of the StoreVault S500 storage system disk drives with the following indications:

Icon	Symbol	Indication
	Green Up Arrow	Normal condition of an active data disk
	Green S	Spare Drive
	Green P	Parity Drive
	Green DP	Double parity Drive
	Yellow Up Arrow	Drive rebuilding or RAID DP drive calculating - Warning status
	Red Cross	Component has failed
	Gray E	Missing or uninstalled component
	Orange up arrow	A foreign disk drive installed from another StoreVault S500

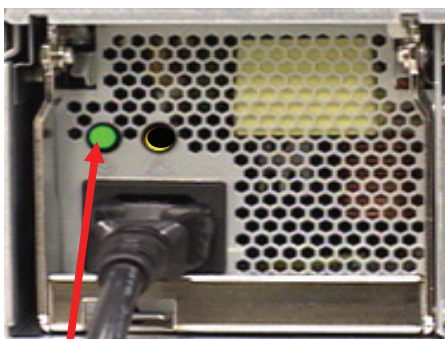
Moving the mouse over the icon will give you more information on that specific component. For additional information, see the *StoreVault Manager 3.2 User's Guide*

Interpreting power supply LED messages

LED indicators

Verify that all the LED indicators on the power supplies and disk drives are green. If they are not green, down the unit and reset the power supplies. Power the system up and re-verify the LED status. If the indicators are still not green, please see further explanations in this chapter.

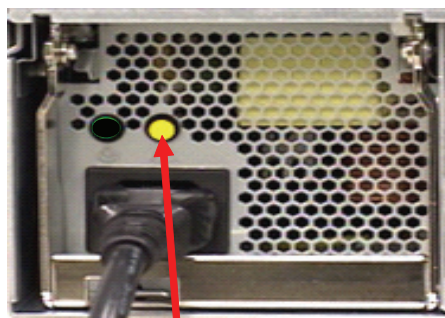
Power supply LED is green



When the green LED is lit, the power supply status is normal.

The green LED blinks when only standby voltage is available.

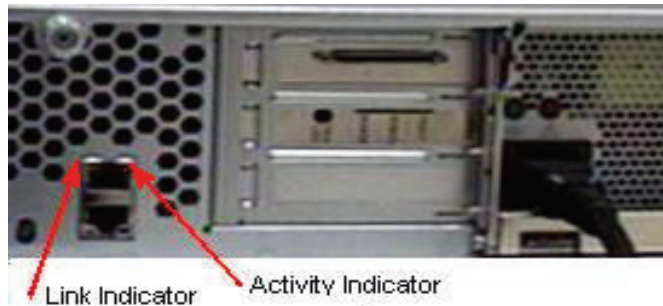
Power supply LED is amber



When the amber LED is lit, a fault has been detected or there is no power supply to PSU.

Ethernet port LEDs

There are two Ethernet (RJ-45) ports on the rear of the StoreVault S500 storage system unit. Each Ethernet port has two LEDs associated with it.

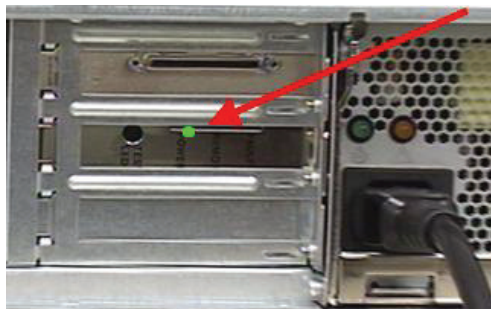


NVRAM LEDs

Non-Volatile Random Access Memory (NVRAM) is a type of computer memory chip which does not lose its information when power is turned off.

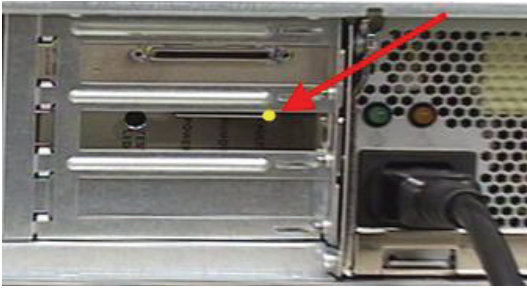
The storage system uses battery-backed up non-volatile RAM (NVRAM) to avoid losing any data input/output requests and to eliminate data corruption on the StoreVault S500 storage system.

On the rear of the StoreVault S500 storage system unit, there is a LED to indicate the status of the NVRAM.



A Green LED

When the NVRAM power LED is Green the status is normal

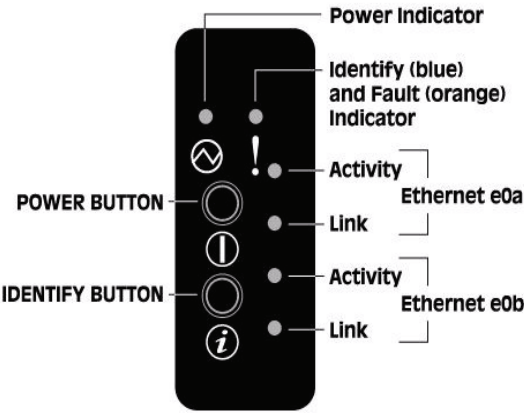


A Yellow LED

If the NVRAM LED is Yellow, a fault has been detected.

Front LEDs

The following is a picture of the LEDs on the left front of the StoreVault S500 storage system,



Left front LEDs

The Power LED is the LED light on the left.

Power LED	Indications
Green	System on, working fine.
Off	System is not getting power, check power cords and power supplies. Press power button to start StoreVault unit.

The Identification LED is to the right of the Power LED.

Identification LED	Indications
Blue - not flashing	System power on. No fault assertion and The Identify button is not pressed.
Blue - flashing	The Identify button is pressed main power is on or off.
Amber - flashing	System fault event assert.
Off	System is off. The Identify button is not pressed and fault not asserted.

- ◆ The top button is the Power button.
- ◆ The bottom button is the Identify button.
- ◆ The lights to the right of the buttons are link and activity lights for the network interface cards installed in the StoreVault S500 storage system.

Right front LEDs

The following is the picture of the LEDs on the right front of the StoreVault S500 storage system,

The LED counter on the right side of the StoreVault S500 storage system goes through the power-on self-test when the StoreVault unit power is started. When the power-on self-test is completed, this counter is set to zero.

LED Code	Indications
00	Starting to boot Data ONTAP Also received when hardware is at halt status
12	Booting Data ONTAP
11	Boot Data ONTAP Complete
E1	DHCP fails on both ethernet ports
E2	Boot the StoreVault S500 storage system when battery level goes below 4.00 volts
E3	Boot the StoreVault S500 storage system when battery disabled (jumper not connected)
E4	Boot the StoreVault S500 storage system after halt

Where to go next

Next tasks

After installing and powering on the StoreVault S500 storage system, the next tasks include the following:

- ◆ Install the StoreVault Manager software.
- ◆ Configure the StoreVault S500 using the Data Manager software.

For information regarding the StoreVault Manager software, see the *StoreVault Manager User's Guide*.

For additional information on the StoreVault S500, see the <http://now.netapp.com>

About this appendix This appendix discusses how to determine the power line lengths running from the StoreVault S500 storage system to the power source.

Recommended AC power line sizes

About AC power feeds

Longer AC power feeds need to be properly designed to preserve voltage levels to the equipment. The wiring from the breaker panel to the power strip, which supplies power to the StoreVault S500 storage system, can often exceed 50 feet.

Note _____
Total AC wire length = breaker to wall or ceiling outlet + extension cable or ceiling drop.

Recommended conductor size

The following table lists the recommended conductor size for a 2% voltage drop for a particular distance in feet (taken from the Radio Engineer’s Handbook).

110V, single-phase	20A circuit	30A circuit	40A circuit	50A circuit
25 ft	12 AWG	10 AWG	8 AWG	8 AWG
50 ft	8 AWG	6 AWG	6 AWG	4 AWG
75 ft	6 AWG	4 AWG	4 AWG	2 AWG

220V, single-phase	20A circuit	30A circuit	40A circuit	50A circuit
25 ft	14 AWG	12 AWG	12 AWG	10 AWG
50 ft	12 AWG	10 AWG	8 AWG	8 AWG
75 ft	10 AWG	8 AWG	6 AWG	6 AWG

Wire gauge approximates

The following table lists the approximate equivalent of American Wire Gauge (AWG) to Harmonized Cordage.

AWG	8	10	12
Harmonized, mm-mm	4.0	2.5	1.5

StoreVault S500 dimensions and environmental parameters

Installation considerations

You need to consider the following elements:

- ◆ Physical characteristics, such as height and weight
- ◆ Space requirements
- ◆ Environmental requirements, such as temperature and humidity
- ◆ Electrical requirements

Physical characteristics

The following table lists the physical characteristics of your StoreVault S500.

Characteristic	U.S.	Metric
Height	3.5 in. (2 U)	13.3 cm
Width	17.6 in.	44.7 cm
Depth	20 in.	50.8 cm
Weight (fully loaded)	52 lbs	35.8 kg

Space requirements

The following table lists the recommended minimum clearances for your StoreVault S500.

Recommended minimum clearance	U.S.	Metric
Front clearance	10.55 in.	26.8 cm
Rear clearance	16.3 in.	41.4 cm

Environmental requirements

The following table lists the environmental ranges for operation and storage temperatures and humidity.

Environmental condition	Operating range	Storage range
Temperature	0° C to 40° C 32° F to 104° F	-10° C to 65° C -40° F to 149° F
Relative humidity, non condensing	20% to 85%	20% to 95%

Environmental stress specifications

The following table lists the environmental stress specifications for your StoreVault S500.

Condition	Requirement
Operating shock	5g 10 ms
Operating vibration	.21 grams 5–500 Hz random
Altitude	0 to 7,000 ft (2,133m)

Electrical ratings

The following table lists the AC power ratings for your StoreVault S500.

Condition	Requirement
AC Power/ Max. Current	100V to 120VAC, 9A 200 to 240VAC, 4.5A
Frequency	50/60 Hz

Power consumption ratings

The following table lists the power consumption rating for your StoreVault S500.

Power	Rating
Heat dissipation BTU/hr.	1,706 BTU fully loaded

The following table lists the StoreVault S500 LEDs description.

Hardware part	LED color/code	Description
Power Supply	Green	The power supply status is normal
	Amber	A fault has been detected or there is no power supply to PSU.
NVRAM LEDs	Green	The status is normal
	Amber	A fault has been detected.
Left Front Panel LEDs	Green	System on, working fine.
	Blue - not flashing	System power on. No fault assertion and The Identify button is not pressed.
	Blue - flashing	The Identify button is pressed main power is on or off.
	Amber - flashing	System fault event assert.
Right panel Front LEDs	00	
	11	Boot Data ONTAP Complete
	12	Booting Data ONTAP
	E1	DHCP fails on both ethernet ports

Hardware part	LED color/code	Description
	E2	Boot the StoreVault S500 storage system when battery level goes below 4.00 volts

About this appendix This appendix contains the regulatory notices you need to be aware of when installing and operating your StoreVault S500.

Regulatory notices

FCC notices (U.S. only)

NetApp devices are designed for a CFR 47 (Code Federal Regulations) Part 15 Class A environment.

The FCC and NetApp guarantee the user's rights to operate this equipment only if the user complies with the following rules and regulations:

- ◆ Install and operate this equipment in accordance with the specifications and instructions in this guide.
- ◆ Modify this equipment only in the ways specified by NetApp.

Compliance with Part 15 of CFR 47

This equipment has been tested and found compliant with Part 15 of the CFR 47 rules for Class A digital devices. These rules are designed to provide reasonable protection from interference to electronics equipment operated in a commercial environment.

Operation of this device is subject to the following two conditions:

- ◆ This device cannot cause harmful interference.
- ◆ This device must accept any interference received, including interference that may cause undesired operation.

Compliance with ICES-003

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A conforme à la norme NMB-003 du Canada.

Compliance with EN regulations

Marking by the symbol  indicates compliance of this NetApp device to the EMC Directive and the Low Voltage Directive of the European Union. Such marking is indicative that this NetApp device meets the technical standards listed in Declaration of Conformity is available upon request.

Caution

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

**Bureau of
Standards,
Metrology, and
Inspections notice
(BSMI, Taiwan only)**

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻
干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Translation of the BSMI notice:

Caution

Warning: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

**Voluntary Control
Council for
Interference by
Information
Technology
Equipment (VCCI,
Japan)**

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスA 情報技術装置です。この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Translation of the VCCI-A notice:

Caution

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. If such trouble occurs, the user may be required to take corrective actions.

**Korean Class A
Statement**

기종별	사용자 안내문
<u>A 급기기</u>	이기는 업무용으로 전자파적합등록한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을때에는 가정용으로 교환하시기 바랍니다.

Translation of the notice:

Caution

Warning: This device is registered for industrial use. The seller or buyer should be aware of this. If this type was sold or purchased by mistake, it should be replaced with a residential use type.

Glossary

antistatic grounding leash

This wrist strap is a safety device used to channel static electricity to a proper ground when you are handling sensitive computer equipment.

field replaceable unit (FRU)

A unit or component of a system that is designed to be replaced in the field; that is, without returning the system to the factory or repair location.

hot-swappable drive

A disk drive that can replace a defective unit in a system. The swap can be performed while the system is performing its normal function.

LAN

Local Area Network. A communications infrastructure designed to connect a large number of intercommunicating nodes.

multi drive

Having multiple concurrent disk drives working simultaneously.

NAS

Network-attached storage. Refers to storage elements that connect to a network and provide file access services to computer systems. A NAS storage element consists of an engine, which implements the file services, and one or more devices on which data is stored.

NVRAM

Nonvolatile Random Access Memory. A type of computer memory that does not lose its information when power is turned off, preventing data corruption.

In the StoreVault storage system, at least once every ten seconds the file system generates an internal snapshot called a consistency point, so that the disks contain a completely self-consistent version of the file system. The storage system uses battery-backed-up NVRAM to avoid losing any data input/output requests that might have occurred after the most recent consistency point.

RAID	Redundant Array of Independent Disks. A methodology that utilizes two or more hard disks to ensure that data is stored safely. The StoreVault S500 uses RAID technology to store your data safely.
RAID-DP™	RAID-DP, or Double Parity RAID, uses a second parity disk in addition to the standard parity disk to give a second layer of data protection. With RAID-DP, data can be recovered if more than one disks fails at the same time.
SAN	Storage Area Network. A network whose primary purpose is the transfer of data between computer systems and storage elements. A SAN consists of a a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage elements, and computer systems.
SCSI	Small Computer System Interface.

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