

FAS250 Storage Appliance Hardware and Service Guide

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Part number 210-00432
May 2003

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Preface

About this guide	This guide describes how to set up, install, connect, and manage the NetApp® FAS250 storage appliance.
Audience	This guide is for qualified system administrators and service personnel who are familiar with Network Appliance™ filers and/or NetCache™ appliances.
Terminology	This guide uses the following terms: ◆ <i>Appliance, storage appliance, and filer</i> refer to the Fabric-Attached Storage (FAS) appliance. ◆ <i>Device carrier</i> refers to the container that encases a fan/power supply unit or a disk. ◆ <i>Disk</i> applies to any Fibre Channel disk encased in its device carrier. ◆ <i>CPU module</i> refers to the actual filer module that oversees the data input/output between the disk drives.
Command conventions	You can enter filer commands on the system console or from any client that can obtain access to the filer using a Telnet session. This guide uses the command syntax and output of SunOS 4.1x in examples of commands run on a UNIX® workstation. If you use a different version of UNIX, the command syntax and output might be different.
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.
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

This guide uses capitalization and some abbreviations to refer to the keys on the keyboard. The keys on your keyboard might not be labeled exactly as they are in this guide.

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, although the key is named Return on some keyboards.
<i>type</i>	Used to mean pressing one or more keys on the keyboard.
<i>enter</i>	Used to mean pressing one or more keys and then pressing the Enter key.

Special messages

This guide contains special messages that are described as follows:

Note

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

Caution

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

WARNING

A warning contains instructions that you must follow to avoid personal injury.

Safety Information (Sicherheitshinweise)

Safety rules

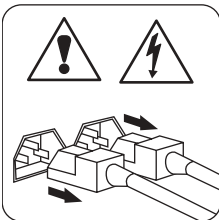
All products are Class 1 laser devices. You must follow these safety rules when working with this equipment:

WARNING

Failure to follow these directions could result in bodily harm or loss of life.

- ◆ When installing disk shelves and a storage appliance 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 is furnished with 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.

Warning for units with multiple power cords



If your storage appliance 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.

Sicherheitsvorgaben

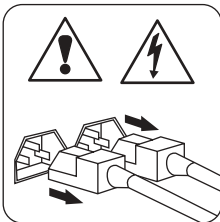
Alle Produkte sind Lasergeräte der Klasse 1. Die folgenden Sicherheitshinweise sind beim Betreiben des Geräts unbedingt zu beachten:

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 Netzan-schlussleitungen



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

ACHTUNG

Gerät besitzt zwei Netzan-schlussleitungen. Vor Wartung alle Anschlüsse vom Netz trennen.

About this chapter

This chapter identifies what you need for the first-time installation of a NetApp FAS250 storage appliance and describes characteristics of the appliance and the tools you need when installing the system.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Preparing your site”](#) on page 2
- ◆ [“Required tools and equipment”](#) on page 4
- ◆ [“Planning and organizing the installation”](#) on page 5

Preparing your site

About this section

This section tabulates the following information:

- ◆ Appliance dimensions
- ◆ Appliance weight
- ◆ Space requirements
- ◆ Environmental requirements for operating or storing your storage appliance
- ◆ Electrical requirements for your appliance

Your site must be capable of housing a storage appliance with these requirements.

Appliance dimensions

The following table lists the physical characteristics of your appliance.

Dimensions		U.S.	Metric
Height	Tower	20.3 in.	51.5 cm
	Rack mounted	5.25 in.	13.3 cm
Width	Tower	10.4 in.	26.4 cm
	Rack mounted	17.6 in.	44.8 cm
Depth		20.0 in.	50.9 cm

Appliance weight

The following table lists the weight of a single appliance based on its configuration.

Weight	U.S.	Metric
When empty	50.6 lbs	23 kg
With 14 disk drives	77 lbs	35 kg

Space requirements For the appliance to have the proper operating conditions, the front of the appliance must be at least 1 inch from the nearest obstruction. The back of the appliance must be at least 6 inches from the nearest obstruction.

Environmental conditions The following table lists the range of environmental conditions that your site must meet to properly run or store your appliance.

Environmental condition	Operating condition	Storage condition
Temperature range	50° F to 104° F (10° C to 40° C)	-40° F to 149° F (-40° C to 65° C)
Relative humidity (noncondensing)	10% to 90%	5% to 95%

Note—
The recommended operating condition temperature range is 68 to 77° F (20 to 25° C).

Electrical requirements The following table lists the AC electrical requirements for the appliance.

Condition	Requirement
Voltage range	100–127/200–240V
Frequency	50/60 Hz

Power	Rating
Watts	350W
Heat dissipation BTU/hr	1,195 BTU/hr. maximum

Note—
For detailed environmental and electrical information, see the *Site Requirements Guide*.

Required tools and equipment

Required tools and equipment for installation

Assemble the following tools and equipment:

- ◆ #1 and #2 Phillips screwdrivers
- ◆ Antistatic wrist strap and grounding leash

Caution

The FAS250 uses electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures around you can damage these components. Put on an antistatic wrist strap and grounding leash to free yourself of static electricity before touching any electronic components.

- ◆ Appropriate screws, if the provided screws do not fit your rack

Note

For rack installations, this guide assumes that the rack has threaded holes. If it does not, you need to provide clip nuts or nut-bars for fastening the screws.

Planning and organizing the installation

Preparing for the installation

This section identifies the components you require for your storage appliance system and the rules and regulations you need to observe for the proper installation of your storage appliance system. It also provides an overview of the entire system installation process and the appropriate documentation references for the procedures.

For detailed information

For detailed information, see the following topics:

- ◆ [“Checking shipment contents”](#) on page 6
- ◆ [“Guide to the installation process”](#) on page 7

Checking shipment contents

Checking shipment package contents

Make sure that your shipment package includes the following items, in addition to this *FAS250 Storage Appliance Hardware & Service Guide*:

- ◆ A storage appliance containing the power supplies and Fibre Channel disks you ordered
- ◆ Console cable
- ◆ DB-9 to RJ-45 console adapter
- ◆ Fibre Channel loopback terminator
- ◆ Two documentation boxes
- ◆ *FAS250 Quick Start Guide*
- ◆ Software license
- ◆ Media kit
- ◆ Hardware kits (2)
- ◆ Tower stand (optional)
- ◆ Four bezel mounting screw covers
- ◆ Power cables
- ◆ Three FAS250 mounting kit options, which contain the following items:
 - ❖ A center-of-gravity kit with a pair of center-of-gravity brackets and a hardware kit containing screws to secure the brackets
 - ❖ A two-post telco tray kit with one two-piece equipment tray with left and right halves, and hardware kit
 - ❖ A four-post rail kit with one side rail set, one side support set, four location pins, and hardware kit

Note

Shipment contents might include additional parts that aren't required for your particular installation.

Guide to the installation process

The installation process

The following table is a guide to the storage appliance installation process.

Stage	Procedure	Is the procedure required?	For instructions, go to...
1	Install the storage appliance in a freestanding rack.	Yes, unless you ordered your system in the tower configuration.	“Installing an FAS250” on page 9.
2	Connect the storage appliance to the network	Yes.	“Connecting the appliance to a network” on page 18
3	Connect the storage appliance to a power source.	Yes.	“Connecting the appliance to a power source” on page 21.
4	Configure the system.	Yes.	See the <i>Data ONTAP Software Setup Guide</i> or the <i>Quick Start Guide</i> that was included in the packaging.
5	Connect the storage appliance to a third-party device.	No.	“Connecting the FAS250 to third-party devices” on page 22

About this chapter

This chapter provides all the information you need to install an FAS250 into a rack.

Note

For the FAS250 tower version, choose a location and place the appliance vertically upright on its own base. Then proceed to “[Connecting an FAS250](#)” on page 17.

Topics in this chapter

This chapter discusses the following topics:

- ◆ “[Before you begin your installation](#)” on page 10
- ◆ “[Installing an FAS250 in a rack](#)” on page 11

Before you begin your installation

Rules for installing the appliance in a rack

You need to observe the following rules and restrictions when installing the storage appliance in a standard 19-inch (48.26 cm) telco equipment rack with mounting rails:

- ◆ You must work with another person.

WARNING

The storage appliance is extremely heavy. To avoid injuring yourself or damaging the appliance, you must work with at least one other person when you install the storage appliance in the rack.

- ◆ Install the storage appliance in the lowest available slot in the rack.

WARNING

Install the equipment from the bottom up when installing it in a movable rack. This helps prevent the rack from tipping over and seriously injuring you or someone else.

- ◆ If you have any empty disk drive bays, make sure that the proper cover is installed over the empty slot to ensure proper air flow and cooling.

Supported disk drives

The FAS250 supports 36-GB, 72-GB, and 144-GB block checksum disk drives.

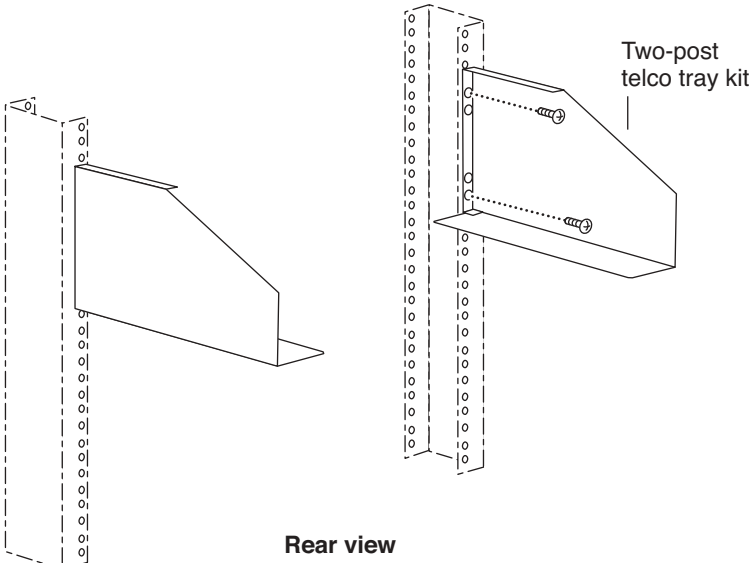
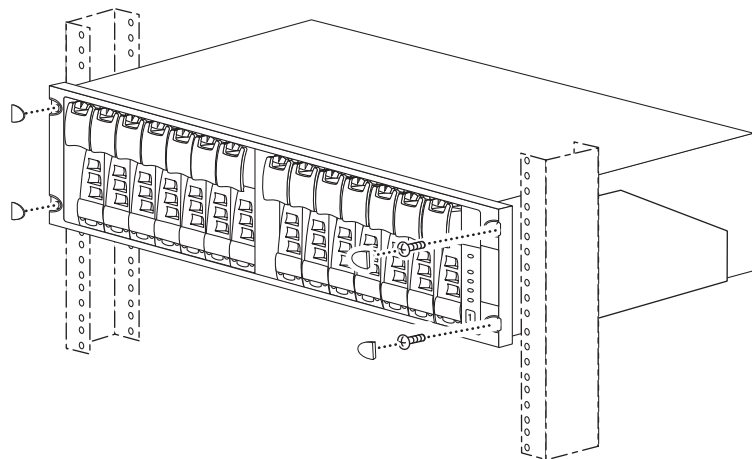
Installing an FAS250 in a rack

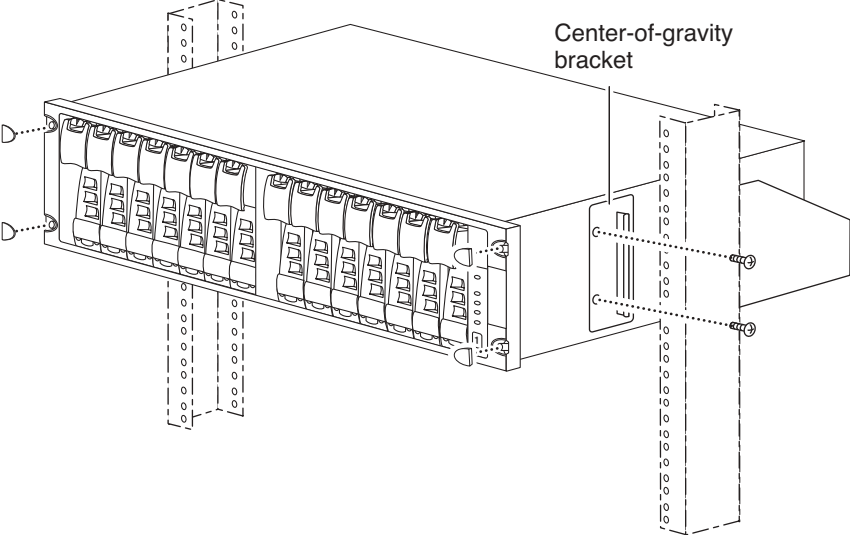
Installing an FAS250

To install the appliance in a rack, complete the following steps.

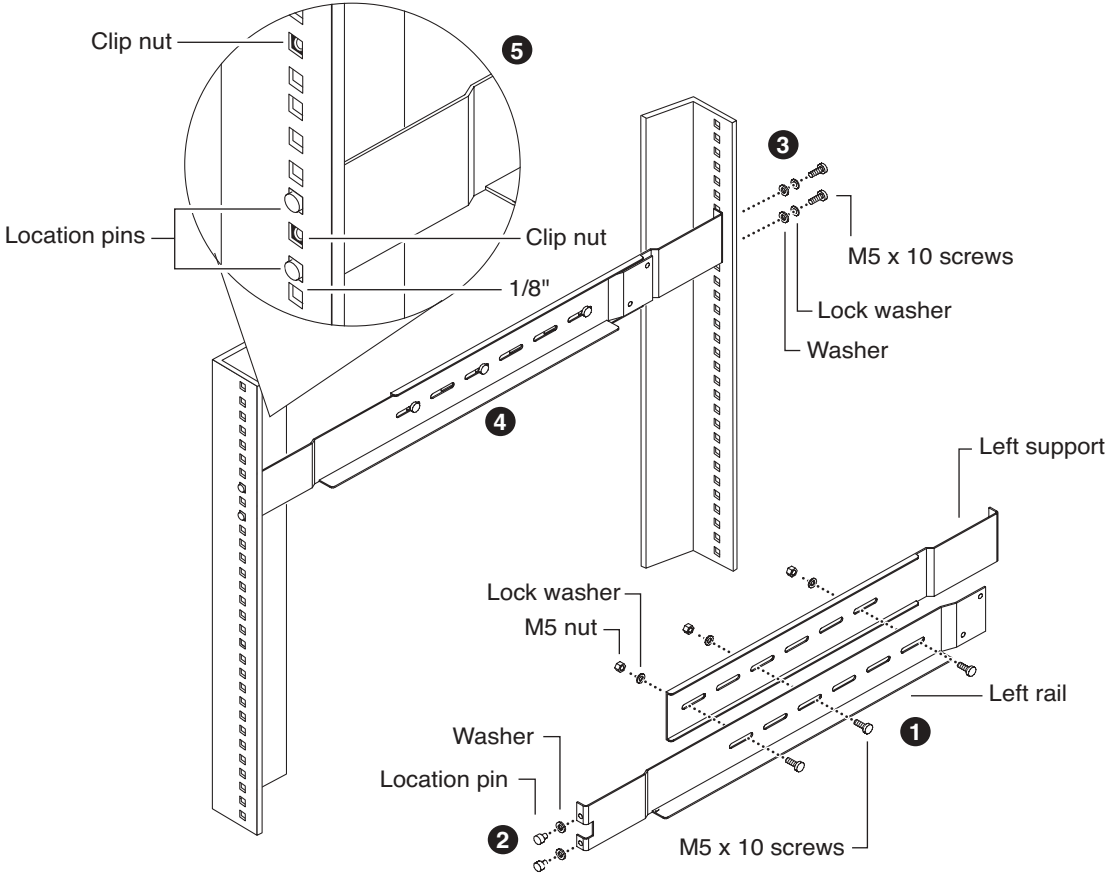
WARNING — You must install the FAS250 with either the two-post telco tray kit, the center-of-gravity bracket kit, or the four-post rail kit that came in your shipment package. Do not flush-mount the appliance using only the front ear-mounts; the appliance will collapse from the rack under its own weight.

Step	Action	
1	Put on the antistatic wrist strap and grounding leash.	
2	Select two holes on each side of the rack for the installation, making sure that the holes on the opposite sides of the rack are aligned with each other horizontally.	
3	If you are using the...	Then...
	Two-post telco tray kit	1. Align the left post screw holes on the two-post rack with the screw holes on the left half of the telco tray, then secure it to the post with four screws. 2. Align the right half of the telco tray with the left half and repeat Step 1 above to secure it to the post. 3. Install the appliance onto the telco tray kit and retain it with the mounting screws to secure the appliance mounting flanges to the telco-type rack. 4. Conceal the mounting screws with the provided bezel mounting screw covers.

Step	Action
	The following illustration shows the two-post telco tray kit being installed.  Rear view The following illustration shows an FAS250 being installed in a two-post telco tray kit. 

Step	Action	
	Center-of-gravity bracket kit	1. Install the two-post telco trays to the rack only, as shown in the previous procedure. Do not install the appliance yet. 2. Attach the center-of-gravity brackets to each side of your appliance with the supplied screws, as shown in the following illustration. 3. With the center-of-gravity brackets installed, slide the appliance onto the two-post telco trays and secure the center-of-gravity brackets to the rack using screws from the supplied hardware kit.
	The following illustration shows an FAS250 installed in a rack using a center-of-gravity bracket. 	

Step	Action	
	Four-post rail kit	For Step 1 through Step 5 below, see the illustration that follows. 1. Connect the left support with the left rail, using three M5 nuts, three lock washers, and three M5 x 10 screws. Leave them loose enough so that you can adjust the length of the rail. 2. Align the holes in the front of the assembled rail with the front post of the four-post rack, and secure it to the post with two location pins and washers. 3. Attach the rear of the assembled rail to the rear post using two M5 x 10 screws, washers, and lock washers, then tighten the rail and support. 4. Repeat Step 1 through Step 3 for the right support rail. 5. Install the clip nuts for the appliance into the equipment rack posts. The bottom-most clip nut should be directly above the bottom locator pin and the top clip nut should be six holes above the bottom clip nut. 6. Install the appliance onto the rack mount kit and retain it with the mounting screws to secure the appliance mounting flanges to the front posts of the rack. 7. Conceal the mounting screws with the provided bezel mounting screw covers.

Step	Action
	The following illustration shows how to install a four-post rail kit.  Diagram illustrating the installation of a four-post rail kit. The diagram shows the assembly of the rail kit onto a support structure. Key components and steps are labeled: Step 1: Left support, Left rail, M5 x 10 screws, Lock washer, Washer. Step 2: Location pin, Washer, M5 nut, Lock washer. Step 3: M5 x 10 screws, Lock washer, Washer. Step 4: 1/8" (dimension), Clip nut, Location pins. Step 5: Clip nut.
4	Go to “Connecting an FAS250” on page 17.

About this chapter This chapter describes how to connect an FAS250.

Topics in this chapter

This chapter describes the following topics:

- ◆ [“Connecting the appliance to a network”](#) on page 18
- ◆ [“Connecting the appliance to a power source”](#) on page 21
- ◆ [“Connecting the FAS250 to third-party devices”](#) on page 22

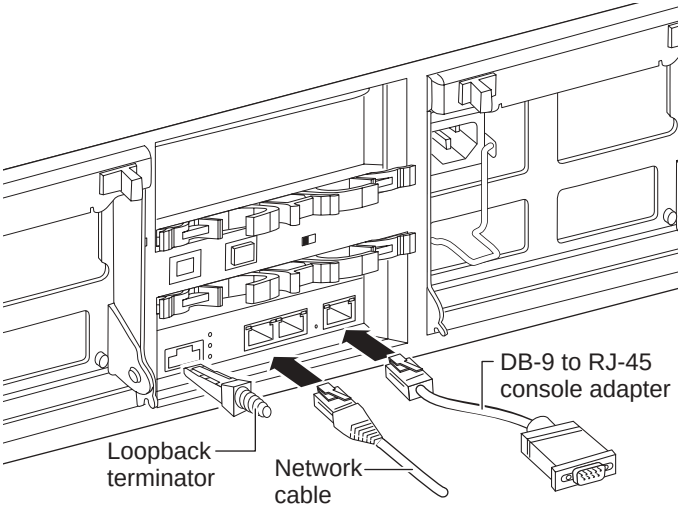
Connecting the appliance to a network

About this procedure

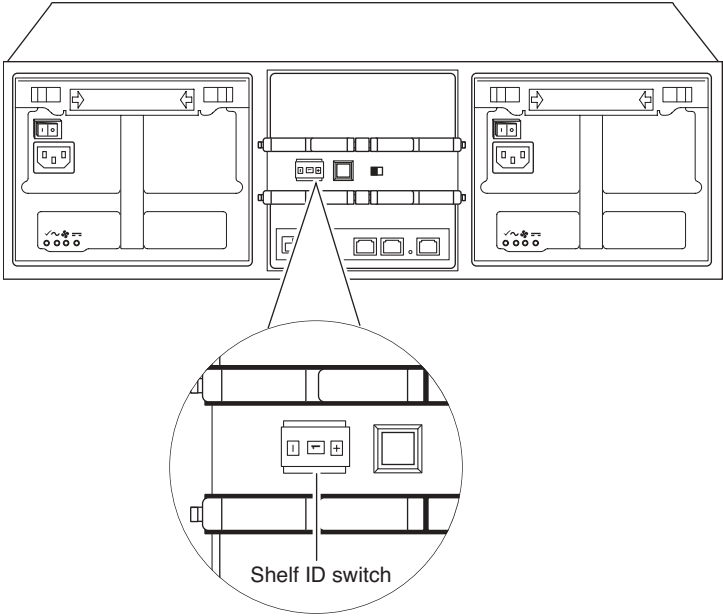
This procedure covers the standard connections necessary to get an FAS250 up and running on your network. Additional connectivity options are covered in subsequent sections.

Connecting an FAS250 to a network

To connect the FAS250, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Make sure that the appliance is turned off.
3	Connect your appliance to the network by plugging the network cable into either the left or right network input connection (green ports) in the center of the CPU module at the rear of the appliance. The following illustration shows the 10/100/1000 Ethernet network cable plugging into the RJ-45 connection on the CPU module.  Loopback terminator Network cable DB-9 to RJ-45 console adapter

Step	Action
4	Connect the console cable to the console connection port (blue port) at the far right of the CPU module, using the DB-9 to RJ-45 console adapter. For information about connecting a console cable, see “Connecting the storage appliance to an ASCII terminal console” on page 27.
5	Insert the Fibre Channel loopback terminator, spring clip facing up, into the Fibre Channel port (orange port) at the far left of the CPU module. For information about connecting a third-party device, see “Connecting the FAS250 to third-party devices” on page 22.
6	Make sure that the 1 Gb/2 Gb switch is set to the 1 Gb position. Note This switch sets the Fibre Channel link speed to 1 Gb/s or 2 Gb/s. The FAS250 will not work if the switch is set to 2 Gb/s. You must set the switch to 1 Gb/s.

Step	Action
7	The disk shelf ID switch on the back of the appliance is used for future upgrade options. For the FAS250, the default and recommended setting for the ID switch is “1.” Note — When you use the thumbwheel switch on the back of the appliance to change the disk shelf ID, you must first power-off the appliance, change the thumbwheel value, then power-on the appliance to make the change take effect. 
8	Make sure that the appliance power switches are turned off.
9	Go to “Connecting the appliance to a power source” on page 21.

Connecting the appliance to a power source

About the power supplies

The FAS250 is shipped with two power supplies, labeled PSU1 and PSU2, respectively. Each power supply has its own AC power cord. You should have separate circuit breakers for each power supply for redundancy.

Connecting the appliance to power

To connect your appliance to a power source, complete the following steps.

Step	Action
1	Make sure that your appliance is turned off.
2	Plug the power cord for PSU1 into the power receptacle on the left connector (rear view).
3	Plug the power cord for PSU2 into the power receptacle on the right connector (rear view).
4	Fasten the power cords with the clamps.
5	Plug the other end of each power cord into a grounded AC power source.
6	Turn on the power switch for both power supplies. Note _____ The default spin up time for all disks in the appliance is 60 seconds. Reduce this spin up time to 20 seconds by turning on the switches of both power supplies within 5 seconds of each other. _____
7	After turning on your system for the first time, run diagnostics to make sure the appliance is functioning properly and to diagnose any hardware problems. See the <i>Diagnostics Guide</i> for more information.

Connecting the FAS250 to third-party devices

Supported interface You can connect third-party devices to your appliance through a *copper* Fibre Channel interface. The FAS250 does not support connections to a parallel SCSI or optical Fibre Channel interface.

Preparing the third-party devices To prepare the third-party devices, complete the following steps.

Step	Action
1	Set the appropriate ID on the tape backup device. See the documentation that came with the tape backup device.
2	If you have a robotic loader on the tape backup device or a Fibre Channel switch, set its ID. See the documentation that came with the Fibre Channel switch.
3	Turn off all third-party devices and go to the following sections, as applicable: ◆ “Connecting to a third-party tape backup device” on page 23 ◆ “Connecting to a third-party Fibre Channel switch” on page 25

Rules for connecting the third-party devices

Observe the following rules for connecting the third-party devices:

- ◆ Use a cable that is
 - ❖ Appropriate to the Fibre Channel connection on your appliance
 - ❖ Of an approved length for the third-party device

Note

See the documentation for the third-party device.

- ◆ Check the System Configuration Guide at <http://now.netapp.com> to verify support for your tape backup device. An unsupported tape backup device might cause the appliance to halt.
- ◆ For additional information on Fibre Channel cables, visit http://now.netapp.com/NOW/knowledge/docs/san/guides/FC_cable/

Connecting to a third-party tape backup device

Supported tape backup devices

The FAS250 requires a tape backup device that supports a *copper* Fibre Channel interface. See the *System Configuration Guide* for supported tape backup devices.

Connecting a tape backup device

The copper Fibre Channel interface is hot-pluggable, meaning it is not necessary to power off your appliance before adding the tape backup device. To connect a third-party tape backup device to your storage appliance, complete the following steps.

Step	Action
1	Connect the tape device cable to the following points of connection: ◆ The Fibre Channel port (orange) at the back panel of your appliance, on the CPU module ◆ The port on the tape device

The diagram illustrates the physical connection between a storage appliance and a tape backup device. On the left, the back panel of the storage appliance is shown with its internal components, including a CPU module. An orange Fibre Channel port is highlighted on the CPU module. A braided copper cable is connected from this port to the back of the tape backup device on the right. A copper fibre channel cable is also shown connected to the storage appliance. Labels with leader lines identify the 'Tape backup device', 'Braided copper cable', and 'Copper fibre channel cable'.

Step	Action
2	Ground your appliance to the tape backup device. Using the provided M5 x 0.5 inch shelf screw, connect one end of the copper grounding cable to the threaded hole adjacent to the power supply receptacle on your appliance, as shown in the preceding illustration.
3	Connect the other end of the grounding cable to the tape backup device. See the User's manual that came with the tape device for more information.

Connecting to a third-party Fibre Channel switch

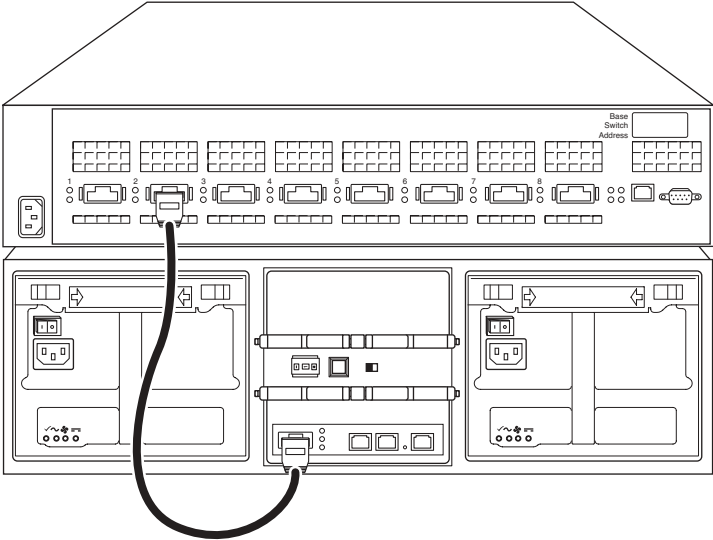
Connecting to a Fibre Channel switch

To connect your appliance to a third-party Fibre Channel switch, complete the following steps.

Note

A Fibre Channel switch is utilized for data backup only. See the third-party documentation about connecting a Fibre Channel tape backup device to the Fibre Channel switch.

Step	Action
1	Shut down the appliance by entering the following command at the console: halt Caution— Always use the <code>halt</code> command to perform a clean shutdown.
2	Turn off the power to the appliance.

Step	Action
3	Connect the cable to the following points of connection: ◆ The Fibre Channel port (orange) at the back panel of your appliance, on the CPU module ◆ An available port on the Fibre Channel switch  The diagram illustrates the back panel of a device with a top section containing various ports and a bottom section with three bays. A cable is shown connected to the Fibre Channel port (orange) on the CPU module in the top section. The bottom section contains three bays, each with a Fibre Channel port and a power connector. The cable is connected to the Fibre Channel port on the middle bay.

Connecting the storage appliance to an ASCII terminal console

About the ASCII terminal console

The ASCII terminal console enables you to monitor the boot process, helps you configure the appliance after it boots, and enables you to perform system administration. It is connected to the appliance with a DB-9 serial cable, attached to a DB-9 to RJ-45 console adapter, then through the RJ-45 console port (blue port) on the CPU module at the rear of the appliance.

ASCII terminal console wiring

The following table lists the RJ-45 connection pinout for the ASCII terminal console wiring.

Pin number	Signal
1	Connected to pin 8
2	Not connected
3	TXD (from appliance)
4	GND
5	GND
6	RXD (to appliance)
7	Not connected
8	Connected to pin 1

DB-9 to RJ-45 console adapter pin connections

The DB-9 to RJ-45 console adapter is used to connect the ASCII terminal console to your appliance. Its purpose is to convert the RJ-45 pinout on the FAS250 appliance to the DB-9 pinout, like those on other Network Appliance products, and all PCs.

The following table lists the console adapter pin number connections between the PC-style DB-9 male connector and the FAS250 RJ-45 connection.

DB-9 male			RJ-45	
Pin number	Signal		Pin number	Signal
1	Not connected	—	1	Not connected
4	Not connected	—	2	Not connected
3	TXD	→	3	TXD
5	GND	→	4	GND
6	Not connected	—	5	Not connected
2	RXD	→	6	RXD
7	Not connected	—	7	Not connected
8	Not connected	—	8	Not connected
9	Not connected	—	9	Not applicable

Connecting to an ASCII terminal console

To connect an ASCII terminal console to the storage appliance, complete the following steps.

Step	Action	
1	Set the following communications parameters to the same values for both the appliance and ASCII terminal.	
	Parameter	Setting
	Baud	9600
	Data bit	8
	Parity	None
	Stop bits	1
	Flow control	None
	Note ————— See your terminal documentation for information about changing your ASCII console terminal settings. —————	
2	Connect the DB-9 serial cable to the DB-9 to RJ-45 converter cable, then connect the RJ-45 end to the console port (blue port) on the appliance and the other end to the ASCII terminal.	

About this chapter

This chapter describes how to monitor your appliance from the error messages displayed on the console that is connected to your appliance. It also identifies the location of the various LEDs on your appliance.

Note

The quick reference cards in the slide-out tray at the base of the FAS250 describe the functions of each LED on your appliance and the suggested course of action.

Topics in this chapter

This chapter discusses the following topics:

- ◆ “[Monitoring the front operation panel](#)” on page 32
- ◆ “[Monitoring the power supply](#)” on page 34
- ◆ “[Monitoring the Fibre Channel disk](#)” on page 36
- ◆ “[Monitoring the CPU module](#)” on page 38

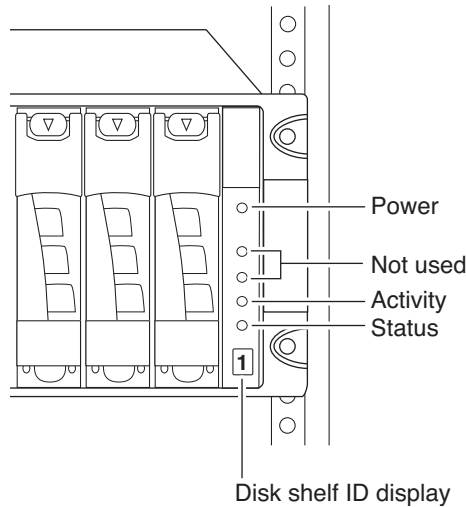
Monitoring the front operation panel

About monitoring the front operation panel

The front operation panel has five LEDs and a disk shelf ID display. The LEDs indicate whether your appliance is functioning normally or whether there are problems with the hardware. You can also identify any hardware failure associated with the front operation panel of the appliance from the error messages displayed on your storage appliance console.

Location of LEDs

The following illustration shows the location of the disk shelf ID display and the front panel LEDs.



Note

See [“Interpreting the front panel LEDs”](#) on page 33 for an illustrated explanation of how the LEDs function.

About the disk shelf ID display

The disk shelf ID display is used for future upgrade options. For the FAS250, the default and recommended setting for the ID switch is “1.” For more information, see [Step 7 of “Connecting an FAS250 to a network”](#) on page 18.

Interpreting the front panel LEDs

Use the following table to interpret the front panel LEDs.

Description	LEDs			Action item
	Power	Activity	Status	
Normal operation	Green on	Green on or flashing	Amber off	None.
System fault detected	Green on	Green on or flashing	Amber on	1. Check the LEDs on the modules at the rear of the appliance. 2. Check the system console for detailed messages. 3. Run diagnostics on the system. See the <i>Diagnostics Guide</i> for more information. 4. Contact Network Appliance Customer Service.

Monitoring the power supply

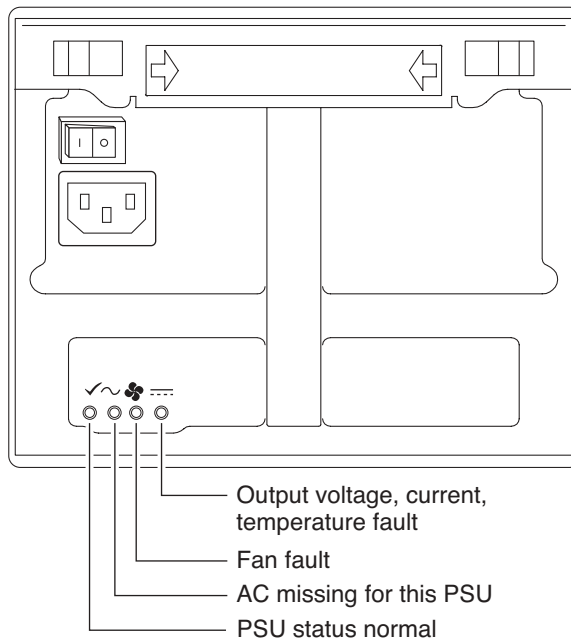
LEDs on the FAS250 power supply

The FAS250 power supply has four LEDs. The LEDs indicate whether the power supply or the integrated fan module is functioning normally or whether there are problems with the hardware. You can also identify any hardware failure associated with the power supplies from the error messages displayed on your appliance console.

A normal functioning power supply shows the “check mark” green LED on the far left as ON, with the rest of the amber LEDs off. A power supply fault turns on the appropriate amber LED, and causes the check mark LED to turn off.

Location of LEDs

Each power supply, which contains four LEDs, is encased in a device carrier and housed at the rear of your appliance. The following illustration shows the location of the power supply LEDs.



Interpreting power supply LEDs

The following table describes how to interpret the power supply LEDs.

Fault condition	Description	LEDs			
		PSU status normal	AC missing for this PSU	Fan fault	Output voltage, current, temperature fault
N	Normal operation	On	Off	Off	Off
1	Power supply failure	Off	Off	Off	On
2	Fan failure	Off	Off	On	Off
3	No power to this PSU	Off	On	Off	On

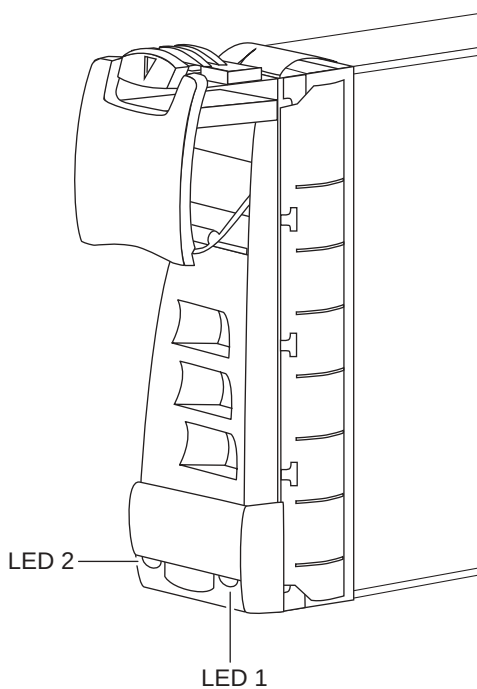
Monitoring the Fibre Channel disk

About monitoring the FAS250 Fibre Channel disk

The FAS250 Fibre Channel disk has two LEDs. The LEDs indicate whether the disk is functioning normally or whether there are problems with the hardware.

Location of LEDs

The following illustration shows the Fibre Channel disk, which has two LED indicators on the front.



Interpreting Fibre Channel disk LEDs

Use the following table to interpret the disk LEDs.

LED 1 (green)	LED 2 (amber)	State
Off	Off	No drive installed.
On/Blink off	Off	Drive installed and operational.
Off	Flashes 1 second on and 1 second off	SES device identification set.
Off	On	SES device fault bit set.
Off	Flashes 3 seconds on and 1 second off	Disk port isolated (either port).

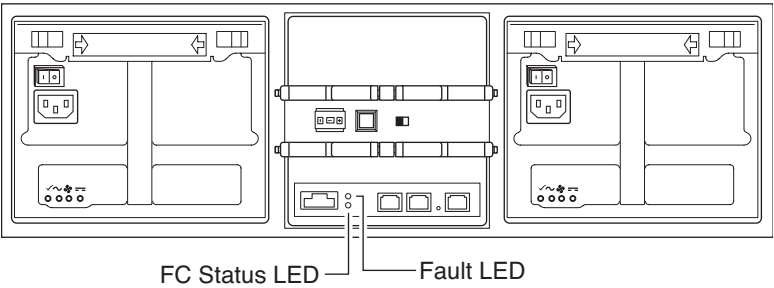
Monitoring the CPU module

LEDs on the FAS250 CPU module

The CPU module has two LEDs. The LEDs indicate whether the CPU module and the Fibre Channel port are functioning normally.

Location of LEDs

The following illustration shows the location of the LEDs at the rear of the CPU module.



Interpreting CPU module LEDs

Use the following table to interpret the CPU module LEDs.

FC Status LED (green)	Fault LED (amber)	State	Action
On	Off	Normal	None.
Off	Off	Loop fault	Fibre Channel loop is open and needs to be fixed.

FC Status LED (green)	Fault LED (amber)	State	Action
On	On	CPU module fault	Perform the following steps until the problem is resolved. 1. Run diagnostics to isolate the failure and decide if CPU module replacement is necessary. See the <i>Diagnostics Guide</i> for more information. 2. Replace the CPU module. See “Replacing the CPU module” on page 44. 3. Contact Network Appliance Customer Service.
Off	On	Loop fault and module fault	

About this chapter This chapter describes how to replace disks in your appliance, the CPU module, and other devices.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Replacing a disk in an FAS250”](#) on page 42
- ◆ [“Replacing the CPU module”](#) on page 44
- ◆ [“Replacing the SDRAM DIMM on the CPU module”](#) on page 48
- ◆ [“Replacing the CompactFlash card on the CPU module”](#) on page 51
- ◆ [“Replacing a power supply in an FAS250”](#) on page 53

Replacing a disk in an FAS250

Reasons to replace a disk

You can replace a disk in your appliance for any reason. However, the most common reason is disk failure. If a disk fails, the FAS250 logs a warning message to the system console indicating which disk failed.

About replacing a disk in your appliance

Replacing a disk in the FAS250 consists of the following procedures:

- ◆ “[Removing a disk](#)” on page 42
- ◆ “[Installing a disk](#)” on page 43

Removing a disk

To remove a disk, complete the following steps.

Step	Action
1	Enter one of the following commands, as appropriate. To remove a disk which is a: ◆ member of a volume, use disk fail <i>disk_name</i>. ◆ spare disk, use disk remove <i>disk_name</i>. Either command causes the amber fault LED on the disk to illuminate. For more information about LEDs, see “Monitoring the Fibre Channel disk” on page 36. For more information about disk commands, see the <i>Data ONTAP System Administrator’s Guide</i>.
2	Wait 30 seconds for the disk to stop spinning.
3	Put on the antistatic wrist strap and grounding leash.

Step	Action
4	To remove the disk, press down on its release mechanism with one hand while grasping the top flange of the appliance with the other hand. Gently slide the disk out of your appliance. WARNING _____ When removing a disk, always use two hands to support its weight. _____ Caution _____ If you have any empty disk drive bays, make sure that the cover is installed over the empty slot to ensure proper cooling. _____

Installing a disk

To install a disk, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Orient the device carrier so that the release mechanism is at the top (or to the right, for the tower version). Note _____ FAS250 disks use special drive keys to prevent the use of nonqualified disks being used in your appliance. If the device carrier does not slide into the open guide slot, check to make sure that the disk drive is qualified for use in your appliance. _____
3	Insert the device carrier into the guide slot in the appliance and gently push it in until it stops. Lift the handle on the drive carrier to engage the drive with the backplane, and push it until you see the release mechanism click into place. Caution _____ Do not slam the device carrier into place. _____

Replacing the CPU module

About replacing the CPU module

Replacing the CPU module consists of the following procedures:

- ◆ “[Removing the CPU module](#)” on page 45
- ◆ “[Installing the CPU module](#)” on page 47

Location of the CPU module and blank filler module

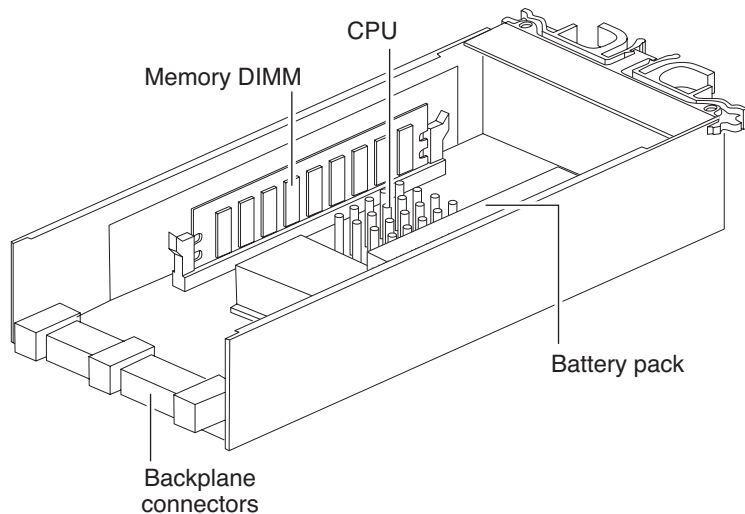
The CPU module is at the center-bottom position on the back of your appliance. A blank filler module is directly above it. Both modules use the same cam mechanism levers to remove and install the module.

Caution

Both modules must be in place during operation to ensure proper airflow through the appliance.

CPU module contents

The CPU module contains the system motherboard, CPU, memory DIMM, CompactFlash™ card, battery pack, and other system components.



Reasons for removing the CPU module

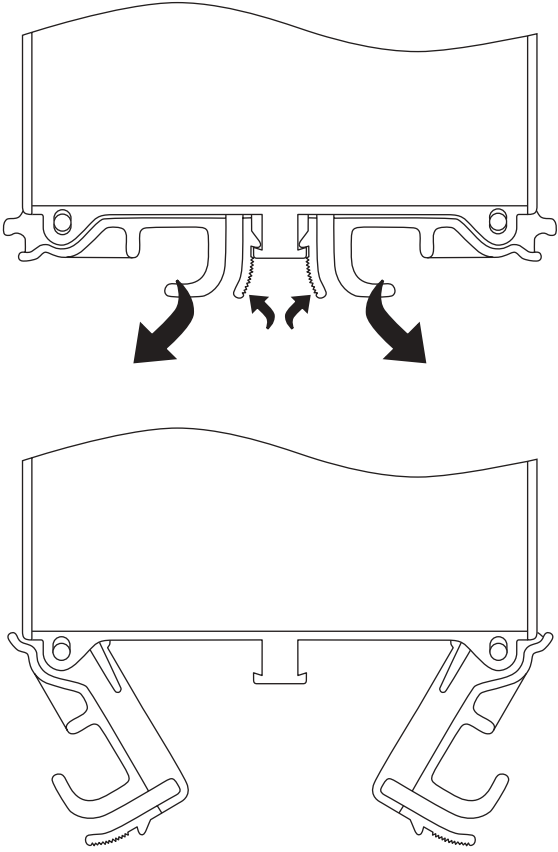
There are several reasons for removing the CPU:

- ◆ Replacement of a defective CPU module
- ◆ Replacement of the SDRAM DIMM
- ◆ Accessing the CompactFlash card
- ◆ Accessing the system battery and connection to the motherboard
- ◆ Appliance upgrade and conversion options

Removing the CPU module

To remove the CPU module, complete the following steps.

Step	Actions
1	Shut down the appliance by entering the following command at the console: halt Caution — Always use the halt command to perform a clean shutdown.
2	Turn off and disconnect the power to the appliance.
3	Disconnect all cables to the CPU module.
4	Put on the antistatic wrist strap and attach the grounding leash to the appliance chassis.

Step	Actions
5	At the rear-center of your appliance, using your thumb and index finger of both hands, press the cam mechanism levers in the middle of the CPU module to release it. The following figure shows how to release the cam mechanism.  The figure consists of two line drawings. The top drawing shows a side view of a rectangular CPU module mounted on a base. Below the module, there are four vertical cam levers. Four black arrows point downwards towards these levers, indicating they should be pressed. The bottom drawing shows the same CPU module, but the four cam levers are now flipped outwards at an angle, indicating they have been released.
6	Carefully pull the cam handle so that the CPU module slides out from the chassis. The CPU module has a travel distance of approximately 10 inches (25.4 centimeters).

Installing the CPU module

To install the CPU module in your appliance, complete the following steps.

Caution

Do not use excessive force when sliding the CPU module into the chassis. You can damage the connector.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	At the back of your appliance, with the CPU module motherboard and components facing up, slide the module into the CPU module bay and push the cam mechanism levers into place.
3	Connect all cables to the CPU module. See “Connecting the appliance to a network” on page 18.
4	Reconnect the power to your appliance and turn on the power switch on both power supplies. See “Connecting the appliance to a power source” on page 21.
5	After turning on your system, run diagnostics. See the <i>Diagnostics Guide</i> for more information.
6	If you installed a new CPU module with a new CompactFlash card, the card might not contain any data, in which case you need to boot your appliance from a remote image. This process is called netbooting. See “Netbooting an FAS250” on page 65.

Replacing the SDRAM DIMM on the CPU module

About replacing SDRAM DIMMs

Replacing the SDRAM DIMM consists of the following procedures:

- ◆ “[Removing the SDRAM DIMM](#)” on page 48
- ◆ “[Installing an SDRAM DIMM](#)” on page 49

Required memory configurations

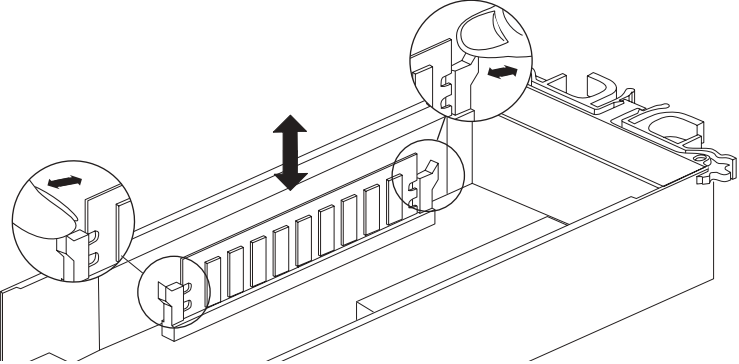
The FAS250 supports 1 x 512 MB, 2.5V 184P DDR SDRAM DIMM. The DIMM slot is inside the CPU module.

Caution —
All DIMMs must be listed on the Network Appliance Approved Parts List. Contact Network Appliance Sales to obtain this list. Unapproved DIMMs have not been tested for reliability and might cause system downtime.

Removing the SDRAM DIMM

To remove the SDRAM DIMM, complete the following steps.

Step	Action
1	Perform a clean system shutdown before removing the DIMM. Caution — Removing the DIMM without first performing a clean system shutdown can result in data loss.
2	Remove the CPU module. Follow the procedure in “ Removing the CPU module ” on page 45.
3	Put on the antistatic wrist strap and grounding leash.
4	Disconnect the battery pack from the motherboard before removing the DIMM. For the location of the battery pack, see “ CPU module contents ” on page 44.

Step	Action
5	Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown. 
6	Pull the DIMM out of the slot.
7	Set the DIMM aside in an antistatic bag.

Installing an SDRAM DIMM

To install an SDRAM DIMM, complete the following steps.

Step	Action
1	Remove the CPU module, if you have not done so already. Follow the procedure in “Removing the CPU module” on page 45.
2	Put on the antistatic wrist strap and grounding leash.
3	Locate the DIMM slot on the CPU module for the DIMM you are installing.
4	Hold the DIMM by its top corners to avoid damaging the components.

Step	Action
5	Insert the DIMM straight into the slot. The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and try again. Caution_____ Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the DIMM does not make complete contact with the slot. _____
6	Push carefully but firmly on the top edge of the DIMM until the latches snap into place.
7	Reconnect the battery pack to the motherboard. For the location of the battery pack, see “ CPU module contents ” on page 44.
8	Go to “ Installing the CPU module ” on page 47.
9	After turning on your system, run diagnostics on the SDRAM DIMM. See the <i>Diagnostics Guide</i> for more information.

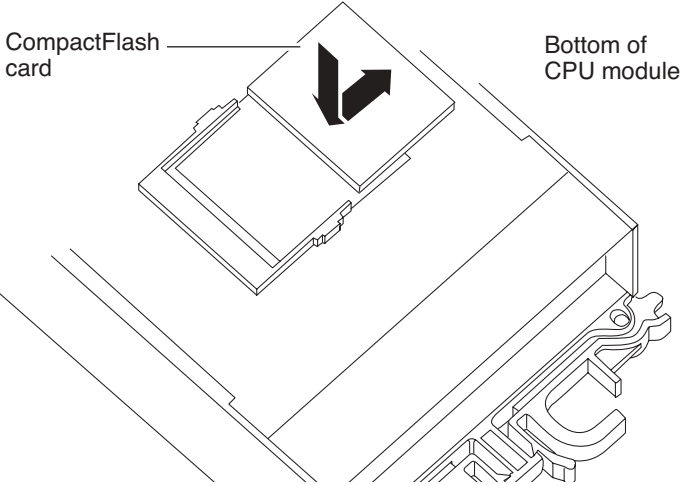
Replacing the CompactFlash card on the CPU module

About replacing the CompactFlash card

The CompactFlash card is on the back side of the CPU module.

Replacing the CompactFlash card

To remove the CompactFlash card, complete the following steps.

Step	Action
1	Remove the CPU module. Follow the procedure in “ Removing the CPU module ” on page 45.
2	Put on the antistatic wrist strap and grounding leash.
3	On the bottom side of the CPU module, remove the CompactFlash card. Use your thumb to apply pressure to the exposed surface of the card, while gently sliding the card out of the socket, as shown in the following illustration. 

Step	Action
4	To install the CompactFlash card, orient the card correctly so that the pin slots on the card engage properly with the pins inside the socket, and gently slide the card into place until it is firmly seated in the socket. Caution————— Damage to the card socket and/or card can result if the card is not oriented properly during insertion.
5	Reinstall the CPU module. See “ Installing the CPU module ” on page 47.
6	Your new CompactFlash card might not contain any data, in which case you need to boot your appliance from a remote image. This process is called netbooting. See “ Netbooting an FAS250 ” on page 65.
7	After turning on your system, run diagnostics on the CompactFlash card. See the <i>Diagnostics Guide</i> for more information.

Replacing a power supply in an FAS250

About replacing a power supply

Replacing a power supply in an FAS250 consists of the following procedures:

- ◆ “[Removing a power supply](#)” on page 53
- ◆ “[Installing a power supply](#)” on page 54

Rules for replacing power supplies

When replacing the power supply in your appliance, observe the following rules:

- ◆ You do not need to turn off the power when you replace one power supply.
- ◆ If you are replacing both power supplies, replace them one at a time to avoid powering down your appliance.
- ◆ Although a single fan failure in one of the power supplies is not a critical event, it is recommended that you install a new power supply when one of the two fans in either power supply stops working.
- ◆ When hot swapping power supplies, replace and install the power supplies within two minutes of each other.

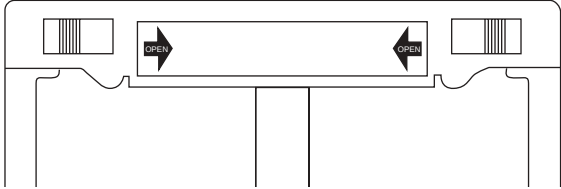
Caution

Your appliance can run with one power supply for a maximum of two minutes. If the power supplies are not replaced within two minutes of each other, the system halts and no data is accessible.

Removing a power supply

To remove a power supply, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Turn off the switch on the power supply that you are replacing.
3	Lift up the clip lock and unplug the power cord from your appliance’s power supply.

Step	Action
4	At the top of the rear of the unit, using your thumb and index finger, press the cam mechanism levers toward each other to release the power supply handle. The following figure shows how to press the levers on the cam mechanism and release the power supply handle. 
5	Use the handle to pull the power supply out of the appliance. WARNING _____ When removing a power supply, always use two hands to support its weight. _____

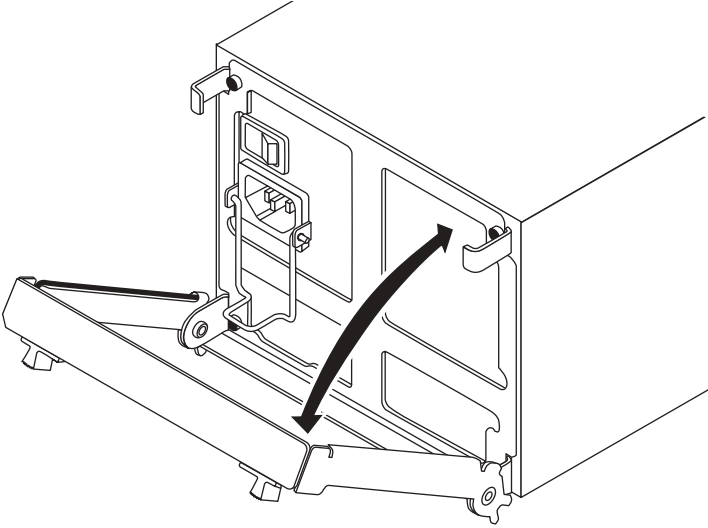
Installing a power supply

To install a power supply, complete the following steps.

Caution

Do not use excessive force when sliding the power supply into your appliance. You can damage the connector.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Slide the power supply into the power supply bay until you hear the power supply connect with the connector inside your appliance chassis.

Step	Action
3	Raise the handle while pressing the cam mechanism levers toward each other, and push the power supply handle into place. The following figure shows how to raise the handle into place. 
4	Plug the power cord into the power receptacle and fasten it with the clamp.
5	Plug the other end of the power cord into a grounded AC power source.
6	Turn on the power switch and confirm proper operation by checking the power supply LEDs. See “Monitoring the power supply” on page 34.
7	After turning on your system, run diagnostics. See the <i>Diagnostics Guide</i> for more information.

About this chapter

This chapter lists error messages you might encounter during the boot process.

Note

If you contact Network Appliance Customer Service, have the console messages available.

- Topics in this chapter
- This chapter discusses the following topics:
- ◆ “[Startup error messages](#)” on page 58
 - ◆ “[Operational error messages](#)” on page 62
 - ◆ “[Netbooting an FAS250](#)” on page 65
 - ◆ “[Troubleshooting hardware problems](#)” on page 66

Where to get more information

The following table lists the documentation that can help you with some of the corrective actions.

If you are troubleshooting...	Then...
FAS250 hardware problems and need to access your appliance	See “ Replacing FAS250 Devices ” on page 41.
Software problems	See the Data ONTAP System Administration Guides.

Startup error messages

Startup sequence

When you apply power to your appliance, it verifies the hardware that is in the system, loads the operating system, and displays two types of startup informational and error messages on the system console:

- ◆ Power-On Self-Test (POST) messages
- ◆ Boot messages

POST messages

POST is a series of tests run from the motherboard PROM. These tests check the hardware on the motherboard and differ depending on your system configuration. The following series of messages are examples of POST messages displayed on the console.

Header:

CFE version 1.0.0 based on Broadcom CFE: 1.0.35

Copyright (C) 2000,2001,2002,2003 Broadcom Corporation.

Portions Copyright (C) 2002,2003 Network Appliance Corporation.

POST messages:

CPU type 0x1040102: 600MHz

Total memory: 0x20000000 bytes (512MB)

CFE>boot_primary

Loading: Failed.

Could not load fatfs://ide0.0/MIPS/kernel/FAS250/primary.krn

Loading: 0xffffffff80001000/7871032 Entry at 0xffffffff80..

Starting program at 0xffffffff80001000

Press CTRL-C for special boot menu

Note

If the messages are not appearing on your system console, verify that the DB-9 to RJ-45 adapter is being used.

Boot messages

After the boot is successfully completed, your appliance loads the operating system. The following message is an example of the boot message that appears on the system console of an FAS250 at first boot. The exact boot messages that appear on your system console depend on your system configuration.

Boot messages	
NetApp Release x.x.x: Wed Mar 12 04:06:00: PST 2003	
System ID: 0084163842 ()	
System Serial Number: 999999	
slot 0:	System Board
	Processors: 1
	Processor revision: B2
	Processor type: 1250
	Memory Size: 510 MB
slot 0:	FC Host Adapter 0b
	14 Disks: 952.0 GB
	1 shelf with EFH
slot 0:	FC Host Adapter 0c
slot 0:	SB1250 Gigabit Dual Ethernet Controller
	e0a MAC Address: 00:a0:98:00:e9:b3 (auto-unknown)
	e0a MAC Address: 00:a0:98:00:e9:b4 (auto-unknown)
slot 0:	NetApp ATA/IDE Adapter 0a (0x000000000000001f0)
	0a.0 122MB

Types of startup error messages

You might encounter two groups of startup error messages displayed on the system console during the boot process:

- ◆ POST error messages
- ◆ Boot error messages

For detailed information

For a detailed list of the startup error messages, see the following sections:

- ◆ [“POST error messages”](#) on page 60
- ◆ [“Boot error messages”](#) on page 61

Startup error messages

POST error messages

POST error messages

The following table describes the extended POST (Power-On Self-Test) error messages that might appear on the system console if your appliance encounters CPU-level system errors during the POST process.

Note _____
Always power cycle your appliance when you receive any of the following errors. If the system repeats the error message, follow the corrective action for that error message.

Error message or code	Description	Corrective action
[RAMX]	No physical memory found by system.	Try reseating the DIMM. See “Replacing the SDRAM DIMM on the CPU module” on page 48.

Boot error messages

When boot error messages appear

Boot error messages might appear after the hardware passes all POSTs and your appliance begins to load the operating system.

Boot error messages

The following table describes the error messages that might appear on the system console if your appliance encounters errors while starting up.

Error message or code	Description	Corrective action
[Cerr]	Cache error.	These are cache errors. These errors indicate a bad CPU. If a power-cycle doesn't fix the problem, replace the CPU module. See “Replacing the CPU module” on page 44.
[Cer2]	Cache error.	
[RAMX]	No physical memory found by system.	Indicates that the system doesn't see any memory. Try reseating the DIMM. See “Replacing the SDRAM DIMM on the CPU module” on page 48.
[EXC!]	Exception.	Indicates that the system took an exception while in firmware. If it is repeatable, this is likely a software bug in the firmware. Contact Network Appliance and provide a log of the error. If you can't get past this error, boot the system using the backup firmware image.
[RUN!]	CFE (common firmware environment) is jumping to executable code.	This is not an error but rather a progress state indicator used to help troubleshoot the problem.

Operational error messages

When operational error messages appear

These error messages might appear on the system console when the system is operating, when it is halted, or when it is restarting because of system problems.

Error messages

The following table describes other error messages that might appear on the system console if your appliance encounters errors while starting up or during operation.

Error message or code	Description	Corrective action
[HELO]	Very early Init code.	If the system stops on one of these error codes, there is likely a hardware problem. First, try Step 1 below. If this doesn't fix the problem, proceed to the subsequent steps until the problem is fixed. 1. Power-cycle the system. 2. Try booting with the backup firmware image. 3. Replace the CPU module. See "Replacing the CPU module" on page 44.
[L1CI]	L1 cache INIT.	
[L2CI]	L2 Cache INIT.	
[TST1]	Simple POST test: cache of both levels and tags.	
[CPU1]	CPU1 INIT.	
[cpu1]	CPU1 entering IDLE loop.	

Error message or code	Description	Corrective action
[DRAM]	Running on CPU0, on memory segment 0 (that is, program is now running in RAM rather than flash memory).	If the system stops on this error code, the memory is bad or the NVLOG subsystem malfunctioned. To test this, reseal the DIMM and disconnect the battery. See “Replacing FAS250 Devices” on page 41. If that fails to clear the problem, replace the DIMM. See “Replacing the SDRAM DIMM on the CPU module” on page 48.
[Zero]	Zero memory...no nvmem.	
[Keep]	Keep memory...preserve nvmem.	
[ZBSS]	Zero the BSS segment.	
[CODE]	Zero and copy the code segment from flash to memory.	
[DATA]	Zero and copy the data segment from flash to memory.	
[RELO]	Jump to the new code segment.	
[L12F]	Flush and enable caches.	
[MAIN]	Jump to the main CFE memory.	
[KMEM]	Initialize CRDs heap.	
[NVCL]	Clear memory that isn’t owned by NVMEM or CFE.	
[CONS]	Attach console device.	Check the connection between your appliance and the console device. Replace the cable if it is defective.
[CIOK]	Copy right etc.	A message of this type doesn’t indicate a specific failure, but a general failure of some system component. 1. Try booting with the backup firmware image. 2. Otherwise, replace the CPU module. See “Replacing the CPU module” on page 44.
[AREN]	Physical memory map INIT.	
[DEVI]	Misc devices INIT.	
[ENVI]	Environmental variable subsystem INIT.	

Error message or code	Description	Corrective action
[PCIH]	PCI host bridge INIT.	If the system stops with one of these error codes, there is likely a problem with either the SB1250 or the ISP2312 FC-AL chip. 1. Try booting with the backup firmware image. 2. Otherwise, replace the CPU module. See “Replacing the CPU module” on page 44.
[PCIB]	PCI try to init P2P bridges.	
[PCIS]	PCI device scan.	
[CFE]	This message is written when CFE jumps to the exception handler, for whatever reason. This is caused by either bad hardware or a bad flash memory.	1. Power-cycle the system. 2. Try booting with the backup firmware image. 3. Replace the CPU module. See “Replacing the CPU module” on page 44.

Netbooting an FAS250

Configuration requirements for netboot servers

You can configure a system to serve boot images to Network Appliance devices that support netboot. To do so, you must configure the following items:

- ◆ HTTP and/or TFTP services on your system
- ◆ The rest of your netbooting environment to use the system as the netboot source

For example, you might configure BOOTP, DHCP, bootparamd, and/or rarpd, depending on the specific procedure you are using.

Note—
For more information about netbooting, see Appendix B of the *System Administration Storage Management Guide*, or the release notes that came with your appliance.

Netbooting an FAS250 from a remote image

To netboot an FAS250 from a remote image, complete the following steps.

Step	Action
1	Place a Data ONTAP boot image on a local HTTP server. The boot image can be copied from the FAS250 boot directory, /etc/boot/netapp-mips, or downloaded from http://now.netapp.com .
2	At the appliance CFE (common firmware environment) prompt, enter one of the following commands: Using DHCP: <code>ifconfig e0a -auto</code> Using manual configuration: <code>ifconfig e0a -addr=filer_addr -mask=netmask -gw=gateway -dns=dns_addr -domain=dns_domain</code>
3	At the CFE prompt, enter the following command: <code>netboot URL</code> For example: <code>netboot http://myserver/bootimages/netapp/netapp-mips</code>
4	You should then see normal boot messages during the netboot process.

Troubleshooting hardware problems

Troubleshooting the FAS250 Use this table to troubleshoot specific problems with your appliance.

Problem	Possible cause	Solution
CFE (common firmware environment) won't boot. Last console status code might be [ZBSS], [L12F], or [CERR].	This indicates that something is wrong with the memory DIMM.	To fix this problem, begin with the first procedure in the following list. If that doesn't solve the problem, continue down to the next troubleshooting tip on the list until the problem is solved. ◆ Unplug the battery in the CPU module for 5 seconds, plug the battery back in, and try booting the appliance. Note _____ Unplugging the battery might reset the clock. _____ ◆ Reseat the DIMM on the CPU module. ◆ Replace the DIMM. ◆ Replace the CPU module.
CFE comes up but [CERR] is printed out when booting the kernel	This is a problem with NVMEM. NVMEM is mainly for power outages. Handling the CPU module outside the shelf while NVMEM is valid might corrupt memory.	◆ If the CPU module was not handled, contact Network Appliance Customer Service. ◆ Otherwise, unplug the battery in the CPU module for 5 seconds, plug the battery back in, and try booting the appliance. Note _____ Unplugging the battery might reset the clock. _____

Problem	Possible cause	Solution
CFE comes up but can't boot anything from the CompactFlash card.	Contents of the CompactFlash card are not correct.	Try this at the CFE prompt, which is equivalent to 'dir c:' from a PC: test fatfs ide0.0 If no errors occur and nothing is shown on the console, the contents of the CompactFlash card are not valid. If there is an error, replace the CompactFlash card.
Real-Time Clock (RTC) loses its time.	The rechargeable battery for NVMEM also powers the real-time clock. If this battery is disconnected for more than a few seconds or the battery is discharged, the real-time clock might be reset.	Plug the battery back in to the motherboard and reset the clock to the correct time.
The appliance does not recognize any of the installed disk drives.	The 1 Gb/2 Gb switch is not set to the 1 Gb position.	1. Power off the appliance. 2. Move the switch to the 1 Gb position. See Step 6 of "Connecting an FAS250 to a network" on page 18. 3. Power on the appliance.

About this appendix This appendix discusses how to determine the power line lengths running from your appliance 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 your appliance and disk shelves, can often exceed 50 feet.

Note

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

The following table lists the recommended conductor size for 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 feet	12 AWG	10 AWG	8 AWG	8 AWG
50 feet	8 AWG	6 AWG	6 AWG	4 AWG
75 feet	6 AWG	4 AWG	4 AWG	2 AWG

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

The following table list the approximate equivalent wire gauge (American Wire Gauge (AWG) to Harmonized Cordage).

AWG	8	10	12
Harmonized, mm-mm ¹	4.0	2.5	1.5

¹ mm-mm = millimeter squared

About this appendix This appendix lists the regulatory notices you need to be aware of when installing and operating your Network Appliance equipment.

Regulatory notices

FCC notices (U.S. only)

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

The FCC and Network Appliance 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 Network Appliance.
- ◆ Use shielded cables with metallic RFI/EMI connector hoods to maintain compliance with applicable emissions standards.
- ◆ If the system has nine or more Fibre Channel disk shelves, install the system in two or three NetApp System Cabinets to maintain performance within Part 15 of CFR 47 regulations.

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 Network Appliance device to the EMC Directive and the Low Voltage Directive of the European Union. Such marking is indicative that this Network Appliance device meets the technical standards listed in "Declaration of Conformity," later in this appendix.

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:

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:

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.

Declaration of Conformity

Declaration of Conformity			
Network Appliance, Inc. 495 East Java Drive Sunnyvale, CA 94089, U.S.A, declare under our sole responsibility that the products			
Type of equipment	Description	Model number	Year of manufacture
Disk drive storage shelf	Fibre Channel storage appliance	FAS250	2003
to which this declaration relates conform to the following standards: EN 60950:1992, with A1-A4, A11, Information Technology Equipment (Safety) EN 55022:1998, Emissions Requirements for Information Technology Equipment EN 55024:1998, Immunity Requirements for Information Technology Equipment EN 60825-1, Safety of Laser/LED Equipment IEC 1000-3-2:1995 Limits for Harmonic Current Emissions IEC 1000-3-3:1994 Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems following the provisions of the directives listed below: 73/23/EEC, Low Voltage Directive (Product Safety) 89/336/EEC, Electromagnetic Compatibility Directive Date Jerry Lopatin Vice President, Platform Engineering Part number: 210-00503			

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