FAS200 Series Storage Appliance
Hardware and Service Guide

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Preface

About this guide

This guide describes how to connect, manage, and troubleshoot a NetApp® FAS250, FAS270, or FAS270c storage system. For information about installation and setup, see the Quick Start Instructions that came with your system.

Audience

This guide is for qualified system administrators and service personnel who are familiar with Network Appliance™ storage systems and/or NetCache® appliances.

Terminology

This guide uses the following terms:

- *Appliance* refers to those NetApp filers, NetCache appliances, and Fibre-Attached Storage (FAS) appliances that support the disk shelves.
- *CPU module* refers to the storage appliance module that oversees the data input/output between the disk drives. The CPU modules are at the rear-center of the appliance.
- *Device carrier* refers to the container that encases a fan/power supply unit or a disk.
- *Disk* applies to any Fibre Channel disk encased in its device carrier.
- *Disk shelf* refers to any Fibre Channel disk shelf model.
- *DS14mk2* refers to both the DS14mk2 FC and the DS14mk2 AT disk shelves, unless called out separately.
- *ESH* (*Embedded Switching Hub*) *module* refers to a device that provides a means of managing an FC-AL loop in an intelligent manner, such that a single drive failure does not take down the loop. It also contains the enclosure services processor, which communicates the environmental data of the disk shelf. ESH modules are not used with FAS200 series systems. ESH2 or AT-FCX modules are used instead of ESH modules.
- *ESH2 module* refers to a second-generation ESH module. These modules have an auto-terminate sensing function, and therefore do not have terminate switches.
- *Loop* refers to one or more daisy-chained disk shelves connected to a storage appliance.
- *LRC* (*Loop Resiliency Circuit*) *module* refers to a device that keeps the FC-AL loop intact during the addition and removal of disks within a disk shelf. It also contains the enclosure services processor, which communicates the environmental data of the disk shelf. The LRC reconditions the signal so that

there is no accumulated error in the data signals. As the signal moves, waveforms might distort slightly. Over many hops these distortions would otherwise accumulate, causing high error rates. The LRC prevents this.

- *Multiloop appliance* refers to a storage appliance with more than one FC-AL adapter connected to disk shelves.
- *Node* refers to a CPU module when used in a clustered configuration.
- *Storage appliance* refers to those NetApp filers, NetCache appliances, and FAS appliances that support the disk shelves.
- *System* and *storage system* refer to those NetApp filers, NetCache appliances, and FAS appliances, either by themselves or with additional disk shelves.
- *Terminate* refers to the process of closing a loop on an LRC or ESH module by activating a termination switch on the last disk shelf in the loop. The termination switch replaces the Output terminators and the auto-termination mechanism in previous versions of Fibre Channel disk shelves.

Command conventions

You can enter commands on the system console or from any client that can obtain access to the appliance using a Telnet session. In examples that illustrate commands executed on a UNIX® workstation, the command syntax and output might differ, depending on your version of UNIX.

Formatting conventions

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

Formatting convention	Type of information
Italic type	◆ Words or characters that require special attention. ◆ Placeholders for information you must supply. For example, if the guide requires you to enter the `fctest` *adaptername* command, you enter the characters “fctest” 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.

Formatting convention	Type of information
`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.
Enter	Used to refer to the key that generates a carriage return, although the key is named Return on some keyboards.
type	Used to mean pressing one or more keys on the keyboard.
enter	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, 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.

Sicherheitsvorgaben

Alle Produkte sind Lasergeräte der Klasse 1, mit Ausnahme des NVRAM5 Cluster-Medienkonverters, der in Klasse 1M fällt. Beim Einsatz dieser Geräte sind die Sicherheitsvorschriften zu beachten:

Vorsicht

Nichtbeachtung dieser Vorschriften kann zu Verletzungen oder Tod führen.

- Bei der Verwendung eines NVRAM5 Cluster-Medienkonverters muss das Speichersystem an einem Standort mit beschränktem Zugriff installiert werden.
- **Nur für die Schweiz - Systeme FAS900, GF900, R200 und C6200:** Diese Geräte erfordern den Festeinbau von Sicherungen zum Überstromschutz. Jeder Netzanschluss muss mit Strom aus getrennten, speziell für diesen Zweck vorgesehenen Steckdosen versorgt werden, die jeweils mit einer 10A-Sicherung geschützt sind.
- Werden die Plattenregale und das Speichersystem in einen beweglichen Schrank oder Turm eingebaut, ist wegen der höheren Stabilität der Einbau von unten nach oben vorzunehmen.
- Gleichstrom-Systeme müssen an Betriebsstaette mit beschraenktem 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.

Für Geräte mit mehrfachen Netzanschlussleitungen

Wenn Ihr Speichersystem oder Plattenregal über mehrere Stromkabel verfügt und Sie die Einheit ausschalten müssen, folgenden Warnhinweis beachten:

ACHTUNG

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

Connecting a FAS200 Series Appliance 1

About this chapter

This chapter describes how to connect a FAS250, FAS270, and FAS270c.

Topics in this chapter

This chapter describes the following topics:

Connecting your appliance to a network

About this procedure

You connect your appliance in either a nonclustered configuration (FAS250 or FAS270), or clustered configuration (FAS270c). This chapter describes the following topics:

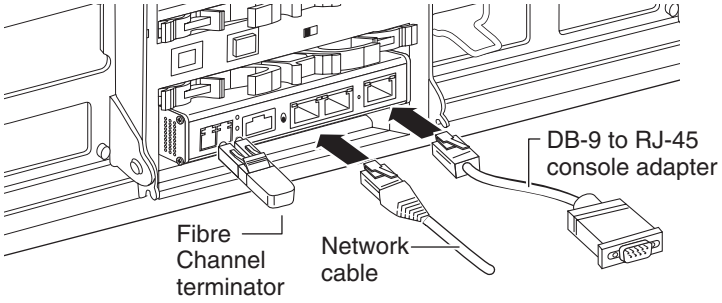
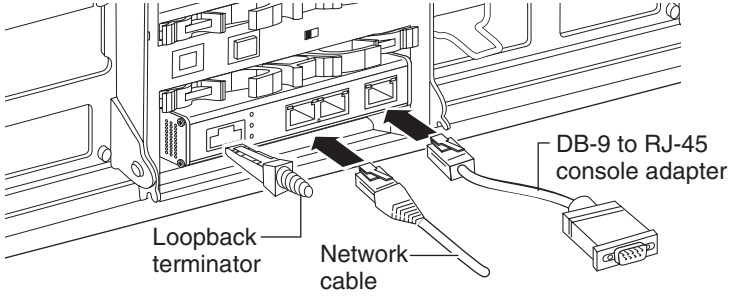
- "Connecting a nonclustered system" on page 3
- "Connecting a clustered system" on page 8

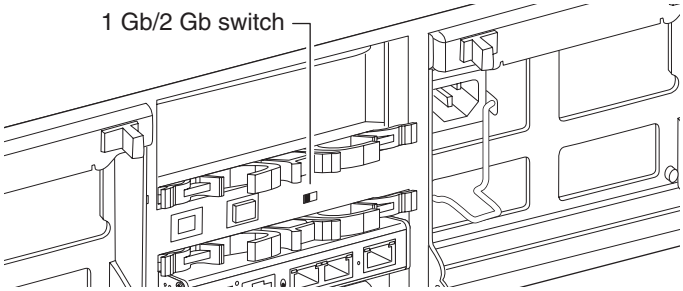
Connecting a nonclustered system

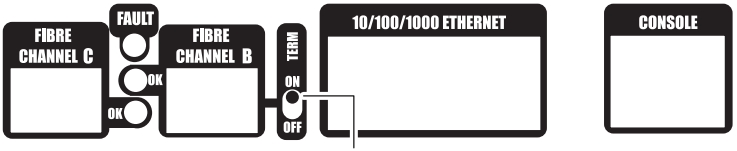
Connecting a nonclustered FAS250 or FAS270

To connect your nonclustered appliance, complete the following steps.

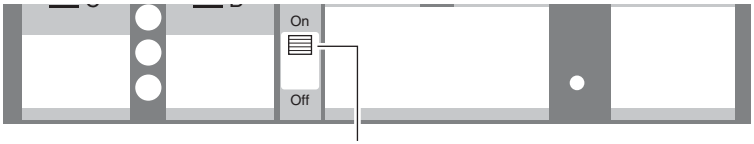
Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Make sure that the appliance is turned off.
3	Connect your appliance to the network by plugging the network cable into either the left (Port A) or right (port B) network input connection in the center of the CPU module at the rear of the appliance. The illustration in the next step shows the connection to the CPU module.

Step	Action
4	Connect the console cable to the console connection 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 your appliance to an ASCII terminal console" on page 32. **For FAS270—non-RoHS:**  **For FAS250—non-RoHS:**  **Note** The Reduction of Hazardous Substances (RoHS) version of the FAS200 series uses a Small Form Factor Pluggable (SFP) module in the tape backup port (left-most port). You must plug the SFP module into this port before to cabling or terminating it.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">5</td><td>If…</td><td>Then…</td></tr>
<tr><td>You are not attaching a third-party device to the Fibre Channel port</td><td>Plug in the SFP module, if needed, and then insert the Fibre Channel terminator, or loopback terminator, into the Fibre Channel port at the far left (Port C) of the CPU module.</td></tr>
<tr><td>You are attaching a third-party device, such as a tape backup or a Fibre Channel switch</td><td>Plug in the SFP module, if needed, leave the Fibre Channel port unterminated, and see “Connecting to third-party devices” on page 27.</td></tr>
<tr><td>6</td><td colspan="2">Make sure that the 1 Gb/2 Gb switch is set to the 1-Gb position.
 
</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>7</td><td>If you are...</td><td>Then...</td></tr>
<tr><td></td><td>Connecting your FAS270 to one or more additional disk shelves</td><td>Set the terminate switch on the CPU module to Off.</td></tr>
<tr><td></td><td>Not connecting your FAS270 to an additional disk shelf</td><td>Set the terminate switch to On.</td></tr>
<tr><td></td><td>Using a FAS250 system</td><td>Skip this step and go to Step 8.</td></tr>
<tr><td></td><td colspan="2">Non-RoHS port labeling:
 

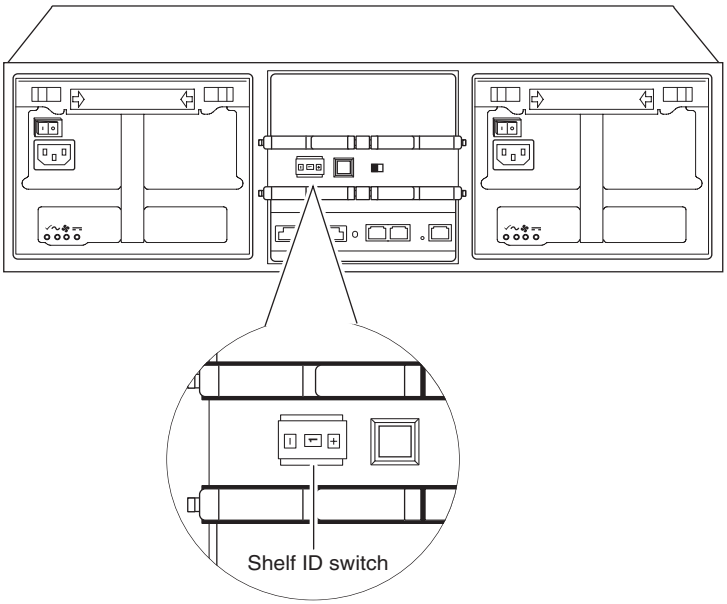
Example: No additional disk shelves

RoHS port labeling:
 

Example: No additional disk shelves</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>8</td><td colspan="2">Set the shelf ID to “1.” The shelf ID switch on the back of the appliance differentiates the FAS270 from additional disk shelves connected to the system. For the FAS270 and FAS250, the default and recommended setting for the ID switch is “1.”

Attention
Power to the appliance must be off before changing the thumbwheel switch value. The change takes effect after power is restored to the appliance. Do not change the thumbwheel switch ID value while the power is on.

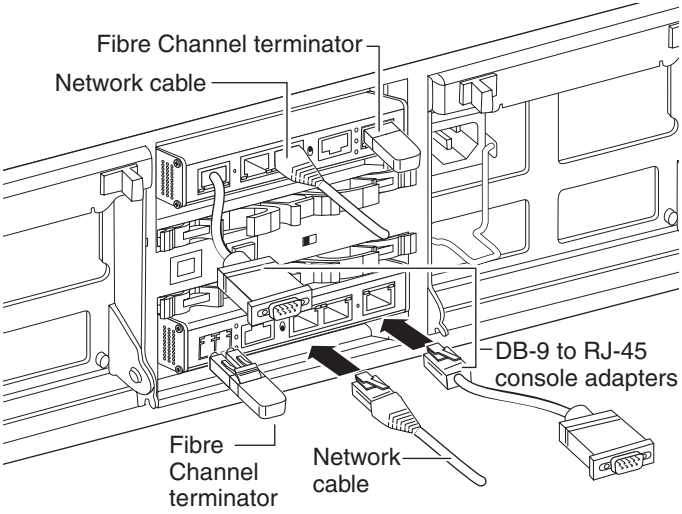
 
</td></tr>
<tr><td rowspan="3">9</td><td>If you are…</td><td>Then…</td></tr>
<tr><td>Adding disk shelves to your FAS270</td><td>See “Connecting additional disk shelves” on page 12.</td></tr>
<tr><td>Not adding disk shelves to your FAS270, or if your system is a FAS250</td><td>See “Connecting your system to a power source” on page 26.</td></tr>
</table>

Connecting a clustered system

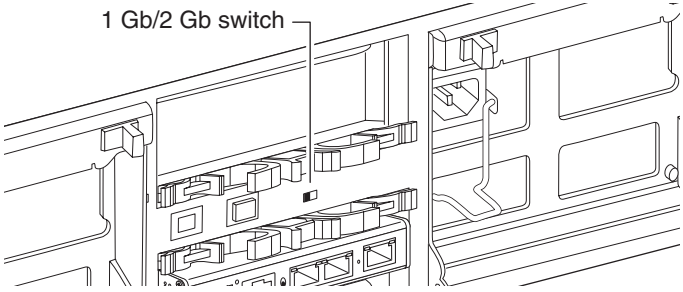
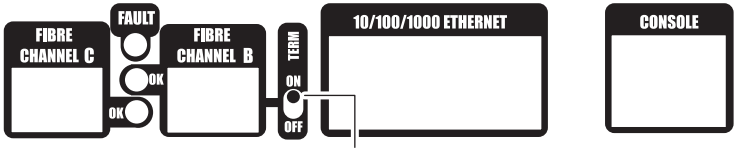
Connecting a clustered FAS270c

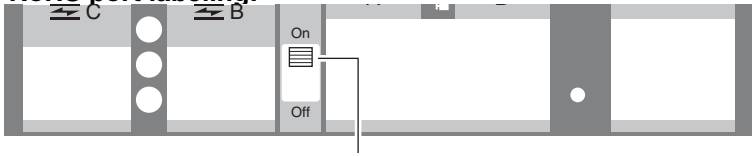
To connect your clustered FAS270c, complete the following steps.

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 Port A or port B network input connections at the center of both CPU modules at the rear of the appliance.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>4</td><td colspan="2">Connect console cables to the console port on both CPU modules. Use the DB-9 to RJ-45 console adapter. For information about connecting a console cable, see “Connecting your appliance to an ASCII terminal console” on page 32.
 

Note
The RoHS version of the FAS200 series uses a SFP module in the tape backup port (Port C). You must plug the SFP module into this port before to cabling or terminating it.</td></tr>
<tr><td rowspan="3">5</td><td>If…</td><td>Then…</td></tr>
<tr><td>You are not attaching a third-party device to the Fibre Channel port</td><td>Plug in the SFP module, if needed, and then insert the Fibre Channel terminator into the Fibre Channel port at the far left (port C) of the CPU module.</td></tr>
<tr><td>You are attaching a third-party device, such as a tape backup or a Fibre Channel switch</td><td>Plug in the SFP module, if needed, then leave the Fibre Channel port unterminated, and see “Connecting to third-party devices” on page 27.</td></tr>
</table>

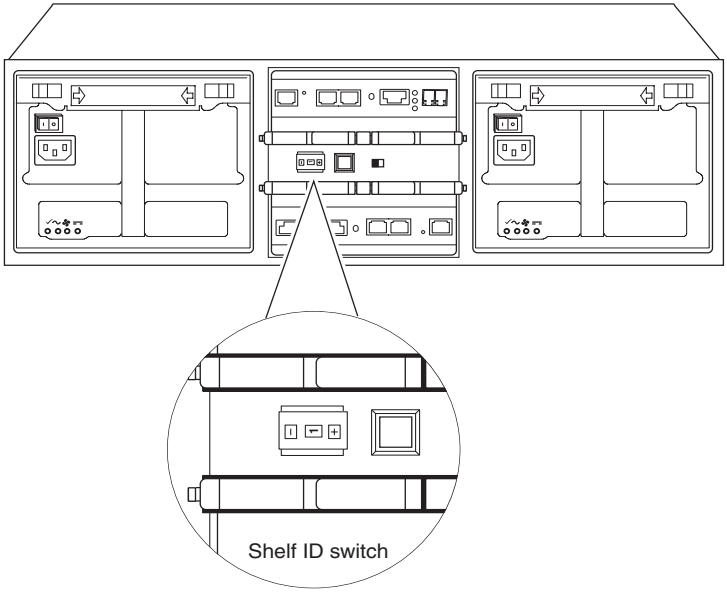
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>6</td><td>Make sure that the 1 Gb/2 Gb switch is set to the 1-Gb position.
 
</td></tr>
<tr><td>7</td><td><table>
<tr><th>If you are...</th><th>Then...</th></tr>
<tr><td>Connecting your FAS270 to one or more additional disk shelves</td><td>Set the terminate switch on the CPU module to Off.</td></tr>
<tr><td>Not connecting your FAS270 to an additional disk shelf</td><td>Set the terminate switch to On.</td></tr>
</table>
Non-RoHS port labeling:
 

Example: No additional disk shelves
RoHS port labeling:
 

Example: No additional disk shelves</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>8</td><td colspan="2">Set the shelf ID to “1.” The disk shelf ID switch on the back of the appliance differentiates the FAS270c from additional disk shelves connected to the system. For the FAS270c, the default and recommended setting for the ID switch is “1.”

Attention
Power to the appliance must be off before changing the thumbwheel switch value. The change will take effect after power is restored to the appliance. Do not change the thumbwheel switch ID value while the power is on.

 
</td></tr>
<tr><td rowspan="3">9</td><td>If you are…</td><td>Then…</td></tr>
<tr><td>Adding disk shelves to your system</td><td>See “Connecting additional disk shelves” on page 12.</td></tr>
<tr><td>Not adding disk shelves to your system</td><td>See “Connecting your system to a power source” on page 26.</td></tr>
</table>

Connecting additional disk shelves

About this section

This section explains how to connect your nonclustered or clustered system to one or more additional DS14mk2 FC or DS14mk2 AT disk shelves.

For detailed information

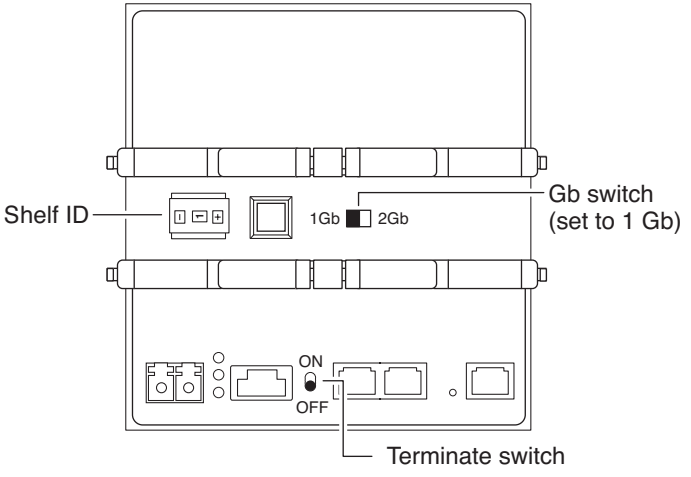
For details about connecting a disk shelf to a FAS270/FAS270c, see the following topics:

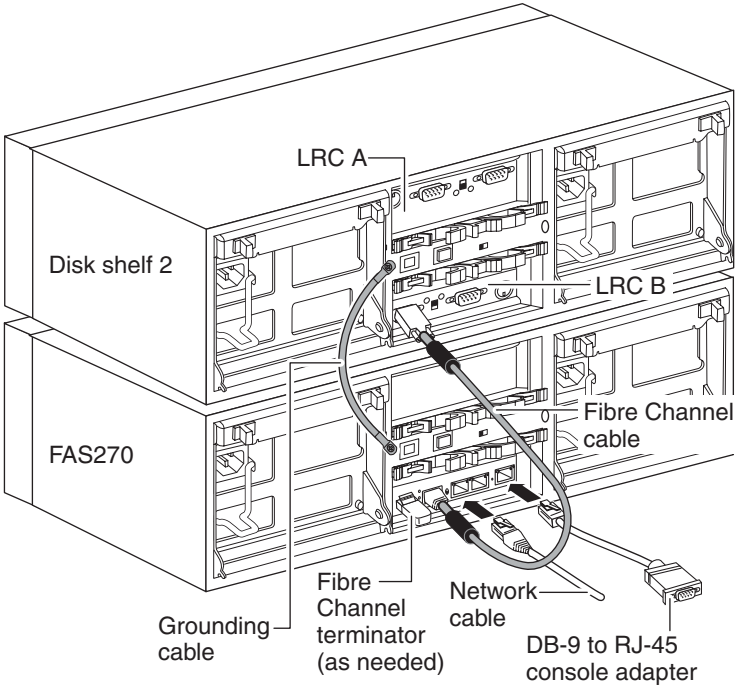
- "Connecting disk shelves to a FAS270" on page 13
- "Connecting disk shelves to a FAS270c" on page 19

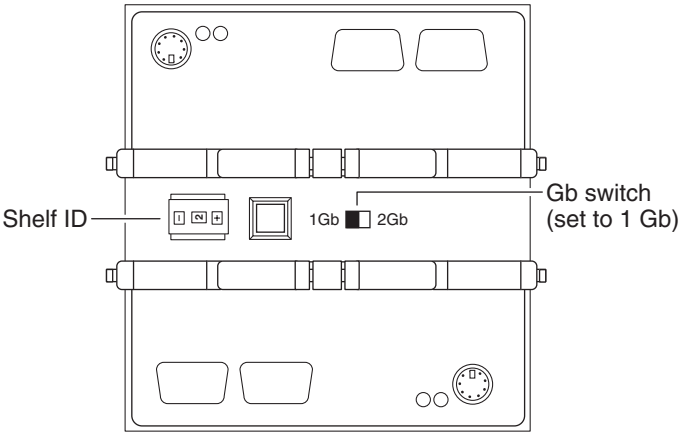
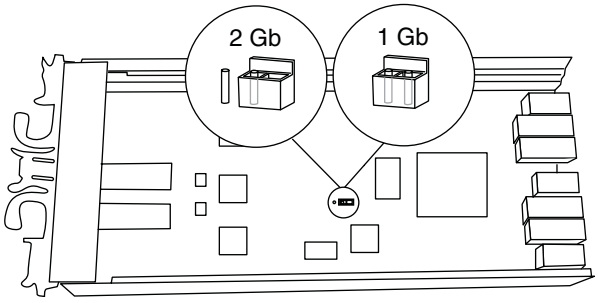
Connecting disk shelves to a FAS270

Connecting disk shelves to a nonclustered system

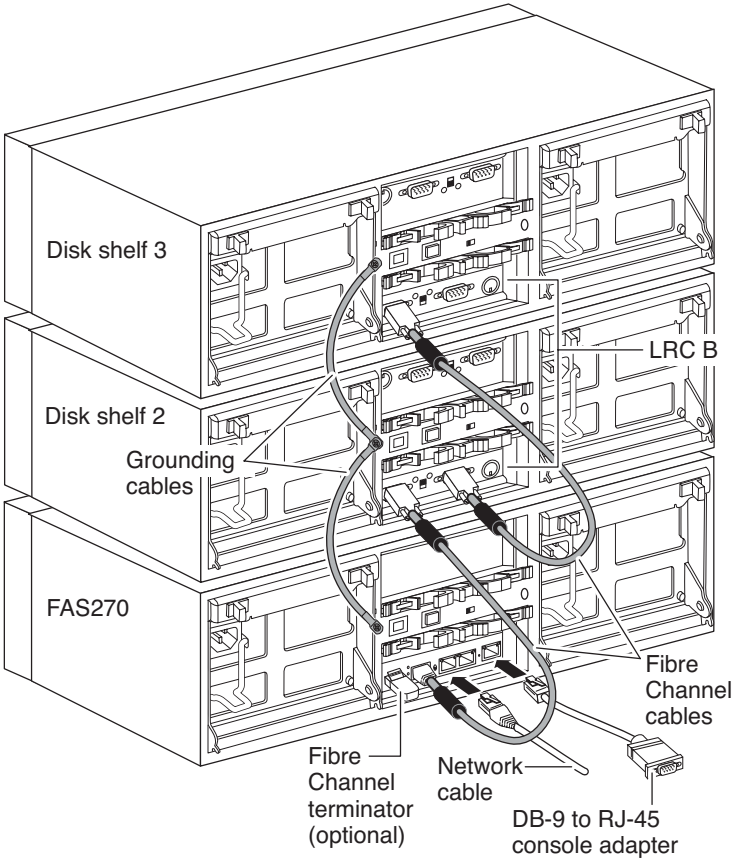
To connect your nonclustered FAS270 to additional disk shelves, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash, and then turn off the system. **Note** You can hot-add a disk shelf to your system. See the *DiskShelf14, DiskShelf14mk2 FC, and DiskShelf14mk4 FC Hardware and Service Guide* for information about hot-adding a disk shelf to your system.
2	At the rear of your FAS270, confirm that the terminate switch on the CPU module is set to Off. Confirm that the FAS270 shelf ID is set to 1. 

Step	Action
3	Cable the Fibre Channel port on the CPU module (Port B) to the disk shelf LRC B, ESH2 B, or AT-FCX B module Input port of your second disk shelf. Make sure that the cable connection on the disk shelf is tight. **Caution** Do not use ESH modules in place of LRC or ESH2 modules. The FAS270/FAS270c cannot use ESH modules. 
4	Attach the grounding cable between shelves, as shown in the preceding illustration.

Step	Action
5	Set the disk shelf ID on your second disk shelf to 2, and set the disk shelf loop speed to 1 Gb. The loop speed for ESH2 modules is set on the disk shelf. AT-FCX modules require you to set the loop speed by moving the jumper inside the module. LRC and ESH modules do not have a loop speed switch. See the *DiskShelf14mk2 AT Hardware Guide* or the *DiskShelf14mk2 FC Hardware Guide* for more information. **ESH2 modules:**  **AT-FCX modules:** 

Step	Action	
6	**If…**	**Then…**
	This is the only disk shelf you are adding to your system, and your system uses LRC modules	Set the terminate switch on the back of your disk shelf to On, and proceed to "Connecting your system to a power source" on page 26.
	This is the only disk shelf you are adding to your system, and your system uses ESH2 or AT-FCX modules	Proceed to "Connecting your system to a power source" on page 26.
	You are adding another disk shelf to a system using LRC modules	Set the terminate switch on your disk shelf to Off, and proceed to Step 7.
	You are adding another disk shelf to a system using ESH2 or AT-FCX modules	Proceed to Step 7.

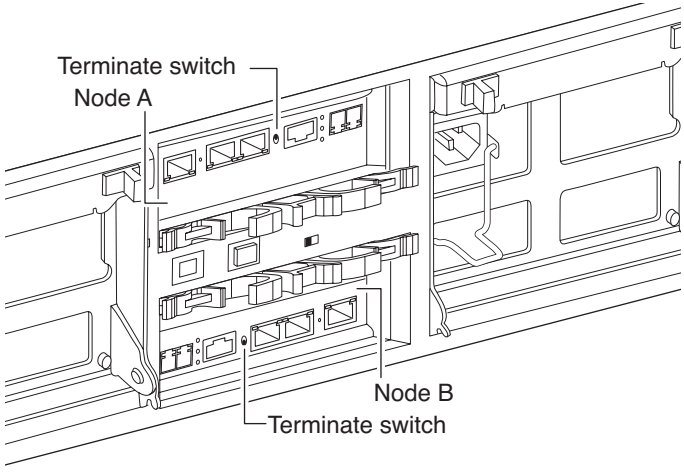
Step	Action
7	Cable the disk shelf LRC B, ESH2 B, or AT-FCX B module Output port of your second disk shelf to the LRC B, ESH2 B, or AT-FCX B module Input port of your third disk shelf. Make sure that the cable connections on both disk shelves are tight. 
8	Attach the grounding cable between shelves, as shown in the illustration.
9	Set the disk shelf ID on your third disk shelf to 3, and set the disk shelf loop speed to 1 Gb, as described in Step 5.

Step	Action	
10	**If…**	**Then…**
	Your system uses LRC modules	Set the terminate switch on the third disk shelf to On, and power on your disk shelf and system. See “Connecting your system to a power source” on page 26.
	Your system uses ESH2 or AT-FCX modules	Power on your disk shelf and system. See “Connecting your system to a power source” on page 26.

Connecting disk shelves to a FAS270c

Clustering terminology

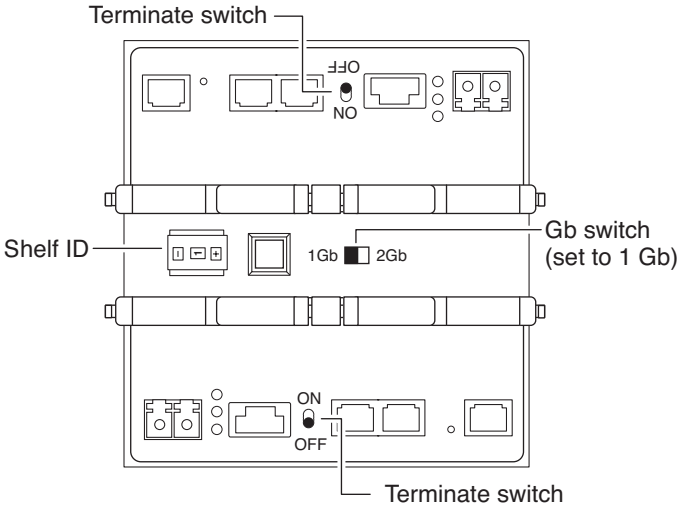
For clustering, the CPU modules are referred to as "nodes." Node A is the top CPU module at the rear of the appliance, and Node B is the bottom CPU module.

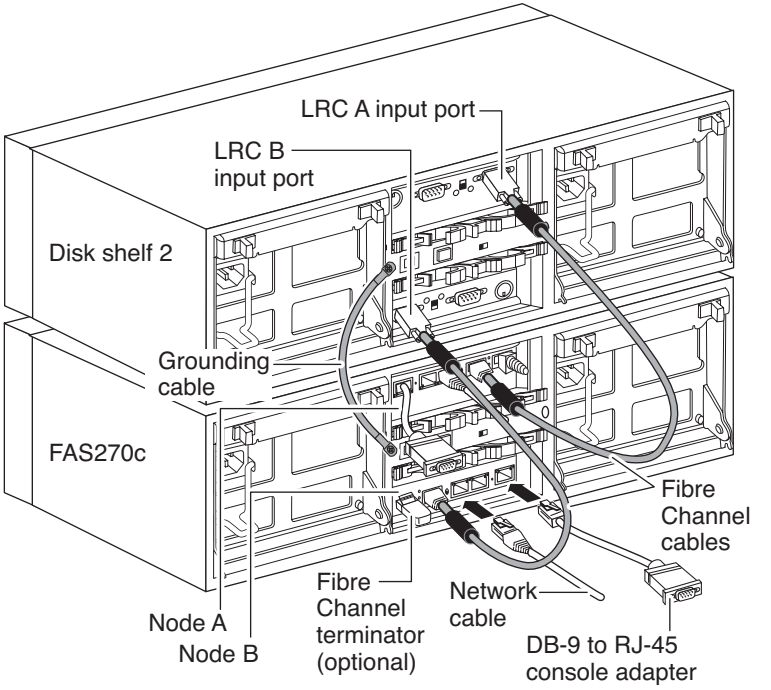


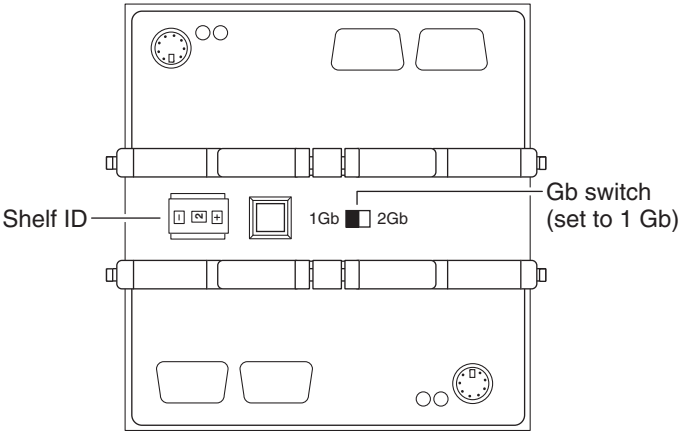
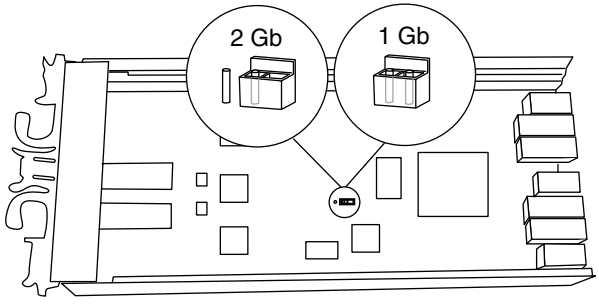
Connecting disk shelves to a clustered system

To connect additional disk shelves to your clustered FAS270c, complete the following steps.

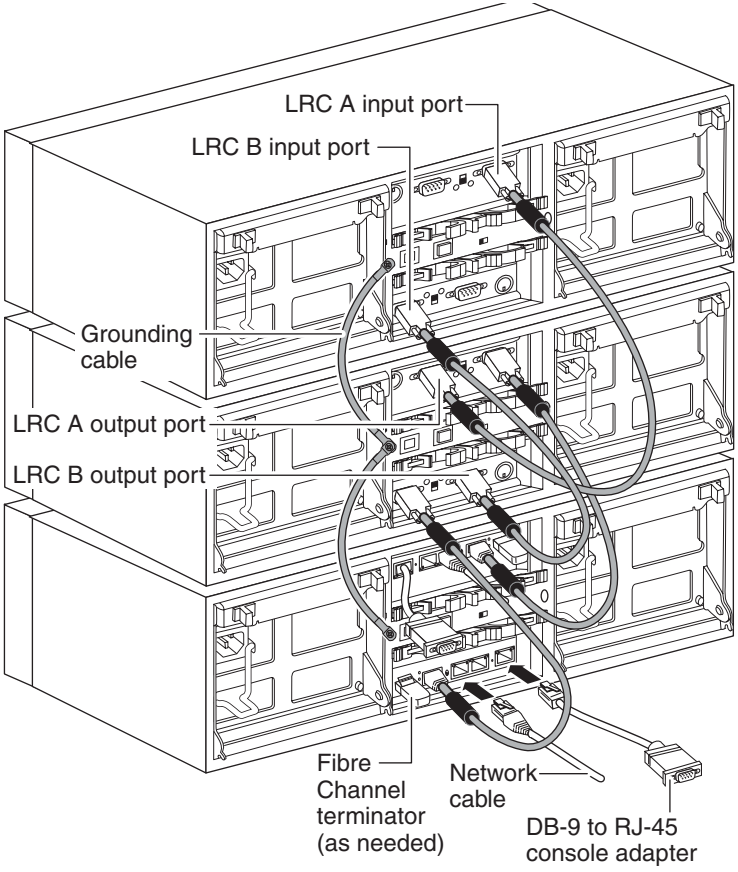
Step	Action
1	Put on the antistatic wrist strap and grounding leash, and then take over the target node and turn off the system.
2	Take over the target node, and then shut down the target node. **Note** You can hot-add a disk shelf to your system. See the *DiskShelf14, DiskShelf14mk2 FC, and DiskShelf14mk4 FC Hardware and Service Guide* for information about hot-adding a disk shelf to your system.

Step	Action
3	At the rear of your FAS270c, confirm that the terminate switches on both CPU modules are set to Off. Confirm that the FAS270c shelf ID is set to 1. 

Step	Action
4	Connect the Fibre Channel port on Node B (Port B) to the disk shelf LRC B, ESH2 B, or AT-FCX B module Input port of your second disk shelf. Connect the Fibre Channel port on Node A to the LRC A, ESH2 A, or AT-FCX A module Input port of the same disk shelf. Make sure that the cables on the disk shelf are tight. Do not use ESH modules in place of LRC or ESH2 modules. The FAS270/FAS270c cannot use ESH modules. 
5	Attach the grounding cable between shelves, as shown in the illustration.

Step	Action
6	Set the disk shelf ID switch on your second disk shelf to 2, and set the disk shelf loop speed to 1 Gb. The loop speed for ESH2 modules is set on the disk shelf. AT-FCX modules require you to set the loop speed by moving the jumper inside the module. LRC and ESH modules do not have a loop speed switch. See the *DiskShelf14mk2 AT Hardware Guide* or the *DiskShelf14mk2 FC Hardware Guide* for more information. **ESH2 modules:**  **AT-FCX modules:** 

Step	Action	
7	**If…**	**Then…**
	This is the only disk shelf you are adding to your system, and your system uses LRC modules	Set the terminate switch on both LRC modules to On, and go to Step 12.
	This is the only disk shelf you are adding to your system, and your system uses ESH 2 modules	Go to Step 12.
	You are adding another disk shelf to a system using LRC modules	Set the terminate switch on both LRC modules to Off and proceed to Step 8.
	You are adding another disk shelf to a system using ESH2 or AT-FCX modules	Proceed to Step 8.

Step	Action
8	Cable the disk shelf LRC B, ESH2 B, or AT-FCX B module Output port of your second disk shelf to the LRC B, ESH2 B, or AT-FCX B module Input port of your third disk shelf. Cable the disk shelf LRC A, ESH2 A, or AT-FCX A module Output port of your second disk shelf to the LRC A, ESH2 A, or AT-FCX A module Input port of your third disk shelf. Make sure that the cable connections on both disk shelves are tight. 
9	Attach the grounding cable between shelves, as shown in the illustration.
10	Set the disk shelf ID switch on your third disk shelf to 3, and set the disk shelf loop speed to 1 Gb, as described in Step 5.

Step	Action
11	Set the terminate switch on the third disk shelf to On, if applicable.
12	Give back the target node and reboot it. Run Diagnostics as needed.

Connecting your system to a power source

About the power supplies

The FAS250, FAS270, and FAS270c appliances and DS14mk2 disk shelves are 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 your 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 hold-down 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 that it is functioning properly and to diagnose any hardware problems. See the *Diagnostics Guide* for more information.

Connecting to third-party devices

Supported interface for FAS270/FAS270c

You can connect third-party devices to your appliance through an *optical* Fibre Channel interface using the Fibre Channel C port on the back of the CPU module. You must use an SFP module on this port. The FAS270/FAS270c does not support connections to a parallel SCSI interface.

Note

Your appliance has one external Fibre Channel port that you can use for "target mode" to support FCP SAN, or "initiator mode" to support tape devices. This port supports one or the other, but not both concurrently.

Supported interface for FAS250

You can connect third-party devices to your appliance. You must use an optical SFP module on this port for RoHS-compliant systems, or copper HSSDC cables for non-RoHS compliant systems.

Rules for connecting third-party devices

Observe the following rules for connecting third-party devices:

- Use the supplied SFP module and a cable that is appropriate to the Fibre Channel connection on your appliance and 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 third-party device. An unsupported tape backup device might cause the appliance to halt.
- For additional information about Fibre Channel cables, see http://now.netapp.com/NOW/knowledge/docs/san/guides/FC_cable/.

Preparing the third-party devices

To prepare the third-party devices, turn off all third-party devices and go to the following sections, as applicable:

- "Connecting to a third-party tape backup device" on page 28
- "Connecting to a third-party Fibre Channel switch" on page 30

Connecting to a third-party tape backup device

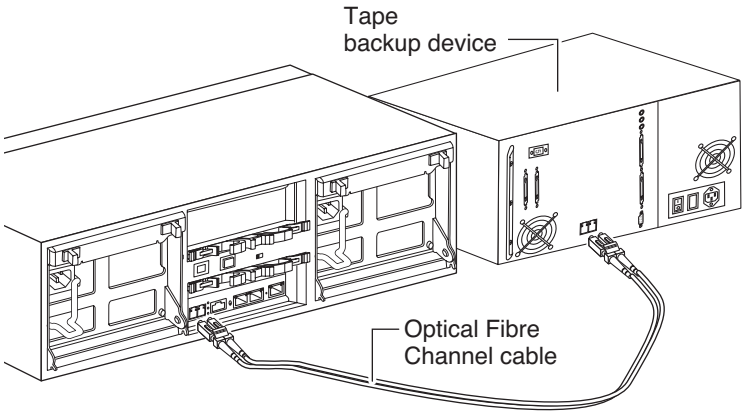
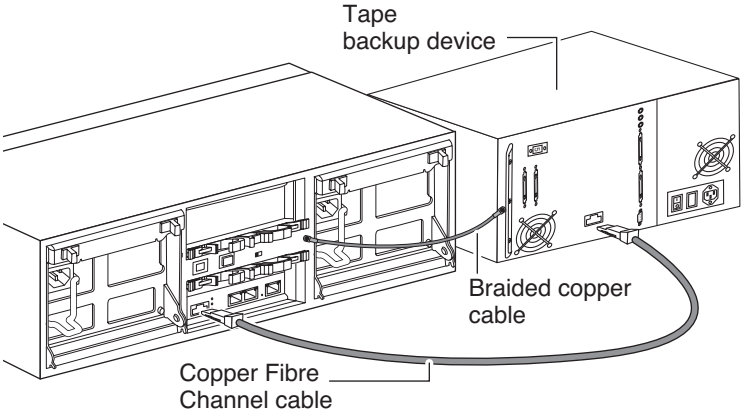
Supported tape backup devices

See the *System Configuration Guide* for supported tape backup devices for your appliance.

Connecting a tape backup device

The Fibre Channel interface is hot-pluggable, meaning that you do not need 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 step.

Step	Action	
1	Put on a grounding strap.	
2	**If the system is...**	**Then...**
	RoHS-compliant	Plug the SFP module into the left-most port on the CPU module.
	Non-RoHS compliant	Go to Step 3.

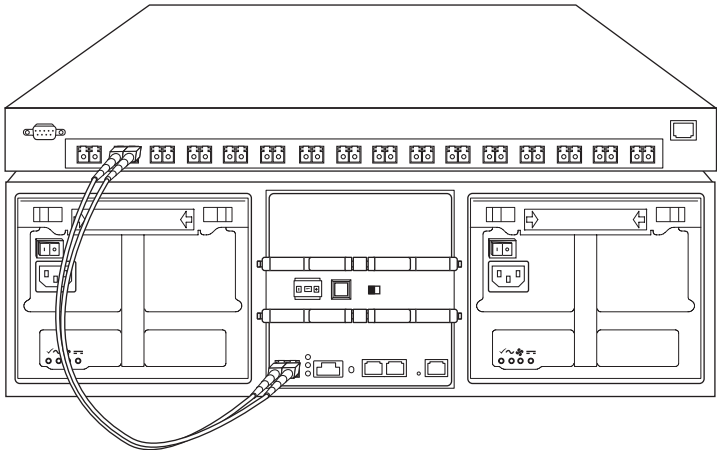
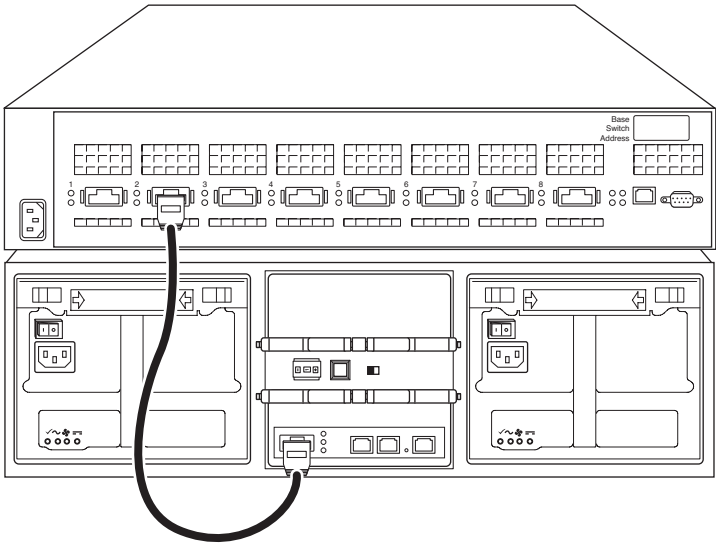
Step	Action
3	Connect the tape device to the CPU module. **For FAS270/FAS270c:**  **For FAS250:** 
4	**For FAS250 only:** Ground your appliance to the tape backup device. Using the provided M5 x 0.5 inch shelf screw, connect one end of the copper grounding cable to the threaded hole adjacent to the power supply receptacle on your appliance, as shown in the preceding illustration. Connect the other end of the grounding cable to the tape backup device. See the user's manual that came with the tape backup 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.

Step	Action	
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 the power to the appliance and put on a grounding strap.	
3	**If the system is...**	**Then...**
	RoHS-compliant	Plug the SFP module into the left-most port on the CPU module.
	Non-RoHS compliant	Go to Step 4.

Step	Action
4	Connect the cable to the following points of connection: ◆ The Fibre Channel port on the CPU module at the back panel of your appliance ◆ An available port on the Fibre Channel switch **For FAS270/FAS270c:**  **For FAS250:** 

Connecting your 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 your appliance after it boots, and enables you to perform system administration. It is normally connected to the appliance with a DB-9 serial cable, attached to a DB-9 to RJ-45 console adapter, and then connected through the RJ-45 console 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

You use the DB-9 to RJ-45 console adapter to connect the ASCII terminal console to your appliance. Its purpose is to convert the RJ-45 pinout on the appliance to the DB-9 pinout, like those on other NetApp products, and all PCs.

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

DB-9 male			RJ-45	
Pin number	**Signal**	**Connects to**	**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	–	–	–

Connecting to an ASCII terminal console

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

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="8">1</td><td colspan="2">Set the following communications parameters to the same values for both the appliance and ASCII terminal.</td></tr>
<tr><td>Parameter</td><td>Setting</td></tr>
<tr><td>Baud</td><td>9600</td></tr>
<tr><td>Data bit</td><td>8</td></tr>
<tr><td>Parity</td><td>None</td></tr>
<tr><td>Stop bits</td><td>1</td></tr>
<tr><td>Flow control</td><td>None</td></tr>
<tr><td colspan="2">Note
See your terminal documentation for information about changing your ASCII console terminal settings.</td></tr>
<tr><td>2</td><td colspan="2">Connect the DB-9 serial cable to the DB-9 to RJ-45 converter cable, and then connect the RJ-45 end to the console port on the appliance and the other end to the ASCII terminal.</td></tr>
</table>

Configuring a FAS270/FAS270c 2

About this chapter

This chapter describes how to configure a FAS270/FAS270c.

Topics in this chapter

This chapter describes the following topics:

Configuring for a cluster

Cluster configuration tasks

These instructions address the initial setup of Data ONTAP software on a FAS270c system. The instructions include planning worksheets and installation procedures for the following tasks:

- Gathering and recording information about the two nodes in "System setup information worksheet" on page 37
- Recording or assigning disks to each node, as needed, in "Disk assignments" on page 38
- Configuring the system at initial boot by completing the instructions in "Booting your cluster for the first time" on page 41

System setup information worksheet

System setup worksheet

You need the following information to complete the setup script. See "Setup script questions" on page 46 for an example of the setup script questions.

Setup parameters	Node A	Node B
Host name:		
Network configuration information		
Virtual interfaces:		
IP address—first interface, e0a:		
IP address—second interface, e0b:		
Netmask—first interface, e0a:		
Netmask—second interface, e0b:		
Media type/speed (100tx-fd, 100tx, auto [100/1000])—first interface, e0a:		
Media type/speed (100tx-fd, 100tx, auto [100/1000])—second interface, e0b:		
Flow control (none, receive, send, full)—e0a:		
Flow control (none, receive, send, full)—e0b:		
Enable jumbo frames?—first interface, e0a:		
Enable jumbo frames?—second interface, e0b:		
IP address or name of default gateway:		
IP address or name of administration host: (Leave blank for root access to /etc from any NFS client)		
Where is filer located? (Text string)		
Do you want to run DNS resolver?		
Do you want to run NIS client?		

Disk assignments

Disk reservation and ownership in a FAS270c running Data ONTAP 6.5.0 or earlier

In the FAS270c running Data ONTAP 6.5.0 or earlier, each node must have ownership of at least one SES disk in each disk shelf in the system. For example, in a single disk shelf system, Node A could own the disk in bay 0, and Node B would then own the disk in bay 1.

In a factory-configured system, one node has ownership of one SES bay disk and the other node owns the second SES bay disk. In addition, each node has ownership of one parity disk and one spare disk. Node B owns disks 0b.16, 0b.18, and 0b.20, and Node A owns disks 0b.17, 0b.19, and 0b.21. The balance of the disks are unowned.

If you add storage to your FAS270c, it arrives with unowned disks. You must assign ownership of the SES disks to the appropriate node.

Note

You can change the disk ownership pattern after initial setup. For information about how to change disk ownership, see the Data ONTAP *Storage Management Guide*.

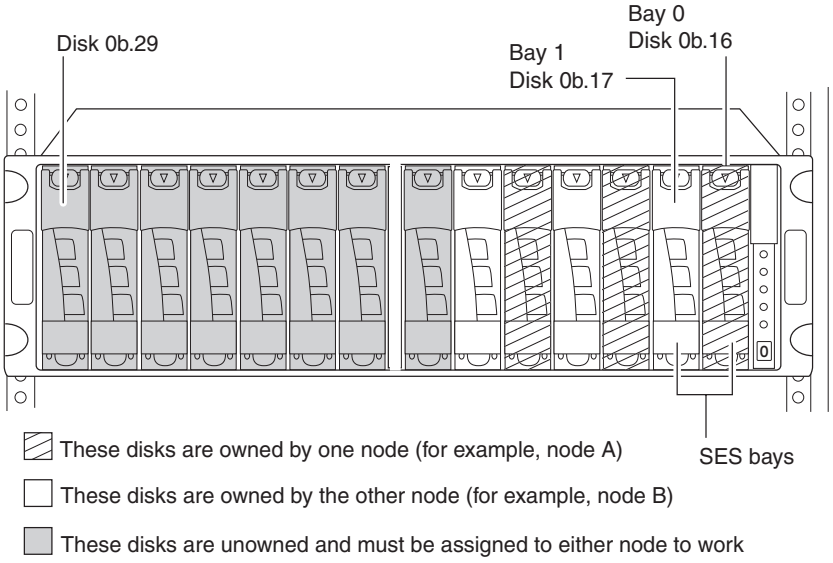
The following illustration identifies the SES bays in the FAS270c or in a DS14 family disk shelf.

Note

For FAS270 systems with no Fiber Channel disks, all disk drive bays except bays 0 and 1 contain disk drive blanks. Bays 0 and 1 contain power supply load boards.

Disk reservation and ownership in a FAS270c running Data ONTAP 6.5.1 or later

In a FAS270c running Data ONTAP 6.5.1 or later, a node can own both SES disks in the system. You must still assign disks to nodes with new systems, and if your system has no Fibre Channel disks, bays 0 and 1 must contain power supply load boards, along with blanks in the remaining drive bays.



Disk ownership worksheet

Complete the following worksheet to determine disk assignments for your cluster. Identify any disks whose ownership you want to change, and mark in the worksheet which node will own the disk. You should use this sheet to check ownership during the setup process.

Bay	Disk shelf 1			Disk shelf 2			Disk shelf 3		
	Disk ID	**Node A**	**Node B**	**Disk ID**	**Node A**	**Node B**	**Disk ID**	**Node A**	**Node B**
0	0b.16 SES disk	❑	❑	0b.32 SES disk	❑	❑	0b.48 SES disk	❑	❑
1	0b.17 SES disk	❑	❑	0b.33 SES disk	❑	❑	0b.49 SES disk	❑	❑
2	0b.18	❑	❑	0b.34	❑	❑	0b.50	❑	❑
3	0b.19	❑	❑	0b.35	❑	❑	0b.51	❑	❑
4	0b.20	❑	❑	0b.36	❑	❑	0b.52	❑	❑
5	0b.21	❑	❑	0b.37	❑	❑	0b.53	❑	❑
6	0b.22	❑	❑	0b.38	❑	❑	0b.54	❑	❑
7	0b.23	❑	❑	0b.39	❑	❑	0b.55	❑	❑
8	0b.24	❑	❑	0b.40	❑	❑	0b.56	❑	❑
9	0b.25	❑	❑	0b.41	❑	❑	0b.57	❑	❑
10	0b.26	❑	❑	0b.42	❑	❑	0b.58	❑	❑
11	0b.27	❑	❑	0b.43	❑	❑	0b.59	❑	❑
12	0b.28	❑	❑	0b.44	❑	❑	0b.60	❑	❑
13	0b.29	❑	❑	0b.45	❑	❑	0b.61	❑	❑

Booting your cluster for the first time

Booting your cluster

To boot your cluster for the first time, complete the following steps for the appropriate node.

Step	Node A action	Node B action
1	Complete the system setup worksheet for each node, as described in "System setup information worksheet" on page 37.	
2	Complete the disk ownership worksheet, as described in "Disk reservation and ownership in a FAS270c running Data ONTAP 6.5.0 or earlier" on page 38.	
3	Check that the disk shelf IDs and terminate switches are properly set, and confirm that the system is properly grounded. For more information, see "Connecting additional disk shelves" on page 12.	
4	Turn on the power first to the disk shelves, if applicable, and then to the FAS270c. **Result:** The system begins to boot and stops at the first installation question, which is displayed on each node's console window: `Please enter the new hostname []:`	

Step	Node A action	Node B action
5	Go to the system console for Node A and answer the installation questions for that node, using the information you collected in the "System setup information worksheet" on page 37. When asked for the takeover address, make sure that you enter the IP address for Node B.	Go to the system console for Node B and answer the installation questions for that node, using the information you collected in the "System setup information worksheet" on page 37. When asked for the takeover address, make sure that you enter the IP address for Node A.
	Note When you encounter the Timezone question, you can press Enter to accept the default setting, if you do not know how to set the timezone. You can then set the timezone after you complete initial setup. See the Timezone manual (man) page for more information. For information about accessing man pages, see the System Administration Guide.	

6	Assign disks to Node A by completing the following steps, using the disk ownership worksheet:
	a. Determine disk ownership by entering the following command from either console:
	`disk show -v`
	b. Assign the disk or disks to this node by entering the following command:
	`disk assign 0a.NN`
		In similar fashion, assign disks to Node B by completing the following steps:
		a. Determine disk ownership using the `disk show -v` command.
		b. Assign disks to this node using the `disk assign` command.

Step	Node A action	Node B action
7	**a.** Check the licenses on the node by entering the following command: **`license`** **Note** Clustering must be licensed on *both* nodes. **b.** Add any missing licenses by entering the following command for each missing license: **`license add xxxx`** *xxxx* is the license code for the product.	**a.** Check the licenses on the node using the `license` command. **b.** Add any missing licenses using the `license add` command.
8	Reboot the node by entering the following command: **`reboot`**	Reboot the node using the `reboot` command.
9	Enable clustering by entering the following command on a console: **`cf enable`**	N/A
10	Check node status by entering the following command: **`cf status`**	Check node status using the `cf status` command.

Step	Node A action	Node B action

11	Test takeover and giveback on this node by completing the following steps:
	a. Initiate takeover by entering the following command:
	`cf takeover`
	Result: Takeover succeeds. If not, run the Cluster Configuration Checker, fix any errors, reboot the node, and repeat the test.
	b. Check the status of the takeover using the `cf status` command.
	c. Give back the node by entering the following command:
	`cf giveback`
	d. Check the status of the cluster using the `cf status` command.
		Test takeover and giveback on this node by completing the following steps:
		a. Initiate takeover by entering the following command:
		`cf takeover`
		Result: Takeover succeeds. If not, run the Cluster Configuration Checker, fix any errors, reboot the node, and repeat the test.
		b. Check the status of the takeover using the `cf status` command.
		c. Give back the node by entering the following command:
		`cf giveback`
		d. Check the status of the cluster using the `cf status` command.

Step	Node A action	Node B action
12	Complete the booting procedure according to your system configuration.	
	If you are setting up a…	**Then…**
	NAS cluster	Go to the *Software Setup Guide* for advanced system setup.
	SAN cluster with FCP	Complete the following steps: **a.** License FCP services. **b.** Reboot the appliance (this allows the FC port to operate in target mode). **c.** Set up LUNs, as described in the Data ONTAP *Block Access Management Guide for FCP.*
	SAN cluster with iSCSI	Complete the following steps: **a.** License FCP services. **b.** Set up LUNs, as described in the Data ONTAP *Block Access Management Guide for iSCSI.*

Setup script questions

Setup script questions

The following example lists the setup script questions and answers you see when you boot your system for the first time. Script feedback is in italics.

Please enter the new hostname []: **bu-165**
Do you want to configure virtual network interfaces? [n]: **n**
Please enter the IP address for Network Interface e0a []: **172.22.6.165**
Please enter the netmask for Network Interface e0a []: **255.255.255.0**
Should interface e0a take over a partner IP address during failover? [n]: **y**
The clustered failover software is not yet licensed. To enable network failover, you should run the 'license' command for clustered failover.
Please enter the IP address or interface name to be taken over by e0a []: **172.22.6.164**
Please enter the media type for e0a {100tx-fd, tp-fd, 100tx, tp, auto (10/100/1000)} [auto]:
Please enter the flow control for e0a {none, receive, send, full} [full]:
Do you want e0a to support jumbo frames? [n]:
Please enter the IP address for Network Interface e0b []:
Should interface e0b take over a partner IP address during failover? [n]:
Would you like to continue setup through the web interface? [n]:
Please enter the name or IP address of the default gateway []: **172.22.6.1**
The administration host is given root access to the filer's /etc files for system administration. To allow /etc root access to all NFS clients, enter RETURN below.
Please enter the name or IP address of the administration host:
Please enter timezone [GMT]: **PST8PDT**
Where is the filer located? []: **orlab**

`Do you want to run DNS resolver? [n]:` **`y`**
`Please enter DNS domain name [xxx]:`
You may enter up to 3 nameservers
`Please enter the IP address for first nameserver []:`
`Do you want another nameserver? [y]:` **`n`**
`Do you want to run NIS client? [n]:` **`n`**
This system will send event messages and weekly reports to NetApp Technical Support. To disable this feature, enter "options autosupport.support.enable off" within 24 hours. Enabling Autosupport can significantly speed problem determination and resolution should a problem occur on your system. For further information on Autosupport, please see: http://now.netapp.com/autosupport/.
Press the Return key to continue.
Setting the administrative (root) password for bu-165 …
`New password:`
`Retype new password:`

Configuring the Fibre Channel port

Function of the ports

The FAS270/FAS270c CPU module provides two independent Fibre Channel ports, identified as 0b and 0c (Ports B and C on RoHS-compliant systems):

- You use the 0b port to communicate to internal and external disks.
- The 0c port has an external optical connector on the rear of the FAS270/FAS270c. You can configure the 0c port in one of two modes:
  - You use initiator mode to communicate with tape backup devices, such as in a TapeSAN backup configuration.
  - You use target mode to communicate with SAN hosts or a front end SAN switch.

Fibre Channel port 0c does not support mixed initiator/target mode. The default mode for port 0c is initiator mode. If you have not licensed the FCP service and you want to use port 0c in initiator mode, you do not need to configure the port.

Note

Port C, the left-most port, requires that you plug an SFP module into the port before cabling it.

FAS270c cluster configurations

FAS270c cluster configurations must be cabled to switches that support public loop topology. To connect a FAS270c to a fabric topology that includes switches that only support point-to-point topology, such as McDATA Director class switches, you must connect the cluster to an edge switch and use this switch as a bridge to the fabric. For information about specific switch models supported and fabric configuration guidelines, see the *FCP/iSCSI Configuration Guide* at http://now.netapp.com/NOW/ knowledge/docs/san/fcp_iscsi_config/.

Configuring port 0c for target mode

To configure the external Fibre Channel port 0c for target mode, complete the following steps.

Step	Action

1	Enable the FCP license by entering the following command:
	`license add FCP_code`
	FCP_code is the FCP service license code provided to you by NetApp.
	Example:
	`fas270a> license add XXXXXXX`
	`A fcp site license has been installed.`
	`cf.takeover.on_panic is changed to on`
	`Run 'fcp start' to start the FCP service.`
	`Also run 'lun setup' if necessary to configure LUNs.`
	`A reboot is required for FCP service to become available.`
	`FCP enabled.`
	`fas270a> Fri Dec 5 14:54:24 EST [fas270a: rc:notice]: fcp licensed`

2	Reboot the system by entering the following command: **`reboot`**

Step	Action
3	Verify that Fibre Channel port 0c is in target mode by entering the following command: **sysconfig** **Example:** fas270a> sysconfig NetApp Release R6.5xN_031130_2230: Mon Dec 1 00:07:33 PST 2003 System ID: 0084166059 (fas270a) System Serial Number: 123456 (fas270a) slot 0: System Board Processors: 2 Processor revision: B2 Processor type: 1250 Memory Size: 1022 MB slot 0: FC Host Adapter 0b 14 Disks: 952.0GB 1 shelf with EFH slot 0: Fibre Channel Target Host Adapter 0c slot 0: SB1250-Gigabit Dual Ethernet Controller e0a MAC Address: 00:a0:98:01:29:cd (100tx-fd-up) e0b MAC Address: 00:a0:98:01:29:ce (auto-unknown-cfg_down) slot 0: NetApp ATA/IDE Adapter 0a (0x00000000000001f0) 0a.0 245MB **Note** Fibre Channel port 0c is identified as Fibre Channel Target Host Adapter 0c.
4	Start the FCP service by entering the following command: **fcp start** **Example:** fas270a> fcp start FCP service is running. Wed Sep 17 15:17:04 GMT [fas270a: fcp.service.startup:info]: FCP service startup

Changing port 0c back to initiator mode

To change the port 0c back to initiator mode from target mode, complete the following steps.

Step	Action

1	Remove the FCP license by entering the following command:
	`license delete fcp`
	Example:
	`fas270a> license delete fcp`
	`Fri Dec  5 14:59:02 EST [fas270a: fcp.service.shutdown:info]: FCP service shutdown`
	`cf.takeover.on_panic is changed to off`
	`A reboot is required for TapeSAN service to become available.`
	`unlicensed fcp.`
	`FCP disabled.`
	`fas270a> Fri Dec  5 14:59:02 EST [fas270a: rc:notice]: fcp unlicensed`

2	Reboot the system by entering the following command: **`reboot`**

Step	Action

3	After the reboot, verify that port 0c is in initiator mode by entering the following command:
	sysconfig
	Example:
	`fas270a> sysconfig`
	`NetApp Release RscrimshawN_030824_2300: Mon Aug 25 02:20:04 PDT 2003`
	`System ID: 0084165669 (fas270a); partner ID: 0084165671 (fas270b)`
	`System Serial Number: 379589 (fas270a)`
	`slot 0: System Board`
	`Processors: 2`
	`Processor revision: B2`
	`Processor type: 1250`
	`Memory Size: 1022 MB`
	`slot 0: FC Host Adapter 0b`
	`14 Disks: 952.0GB`
	`1 shelf with EFH`
	`slot 0: FC Host Adapter 0c`
	`slot 0: SB1250-Gigabit Dual Ethernet Controller`
	`e0a MAC Address: 00:a0:98:00:d5:90 (100tx-fd-up)`
	`e0b MAC Address: 00:a0:98:00:d5:91 (auto-unknown-cfg_down)`
	`slot 0: NetApp ATA/IDE Adapter 0a (0x00000000000001f0)`
	`0a.0 122MB`
	Note
	Fibre Channel port 0c is identified as FC Host Adapter 0c.

4	Enable port 0c by entering the following command.
	storage enable adapter 0c
	Example:
	`fas270a> storage enable adapter 0c`
	`Mon Dec 8 08:55:09 GMT [rc:notice]: Onlining Fibre Channel adapter 0c.`
	`host adapter 0c enable succeeded`

For more information

For more information about configuring your SAN, see the following resources:

- Fibre Channel Tape SAN Solutions at http://www.netapp.com/osn/info/config.html
- *Data ONTAP System Administration FCP Block Access Management Guide*

Monitoring Your System 3

About this chapter

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

Note

The quick reference card in the slide-out tray at the base of your appliance describes 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

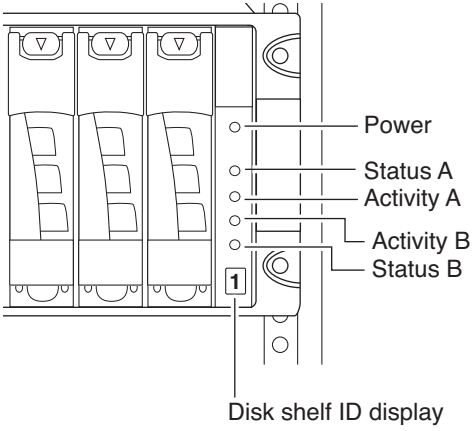
About monitoring the front operation panel

The front operation panel has five LEDs and a disk shelf ID display. The LEDs indicate whether your system 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 system console.

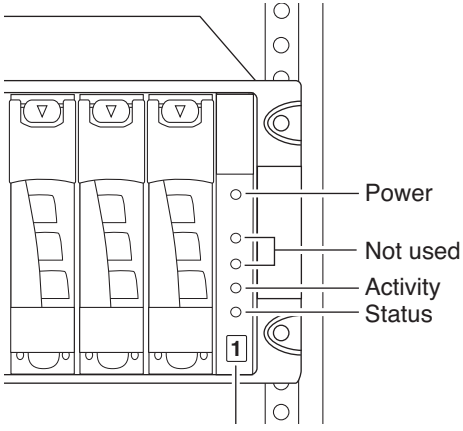
Location of LEDs

The following illustrations show the location of the disk shelf ID display and the front panel LEDs.

For FAS270/FAS270c:



For FAS250:



Note

See "Interpreting the front panel LEDs" on page 55 for an explanation of what the LEDs mean.

About the disk shelf ID display

The disk shelf ID display shows the current disk shelf number setting from the rear thumbwheel switch on the back of the appliance. For the FAS270/FAS270c, the default and recommended setting for the ID switch is "1." For more information, see Step 8 of "Connecting a nonclustered FAS250 or FAS270" on page 3, or Step 8 of "Connecting a clustered FAS270c" on page 8.

Interpreting the front panel LEDs

Use the following table to interpret the front panel LEDs on a FAS270/FAS270c.

Description	FAS270/FAS270c LEDs					Action item
	Power	**Activity A**	**Status A**	**Activity B**	**Status B**	
Normal operation	Green on	Green on or flashing	Amber off	Green on or flashing	Amber off	None.
System fault detected	Green on	Green off	Amber on	Green on or flashing	Amber off	**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 *Diagnostics Guide* for more information. **4.** Contact technical support.
System fault detected	Green on	Green on or flashing	Amber off	Green off	Amber on	

Use the following table to interpret the front panel LEDs on a FAS250.

Description	FAS250 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 *Diagnostics Guide* for more information. **4.** Contact Network Appliance Customer Service.

Monitoring the power supply

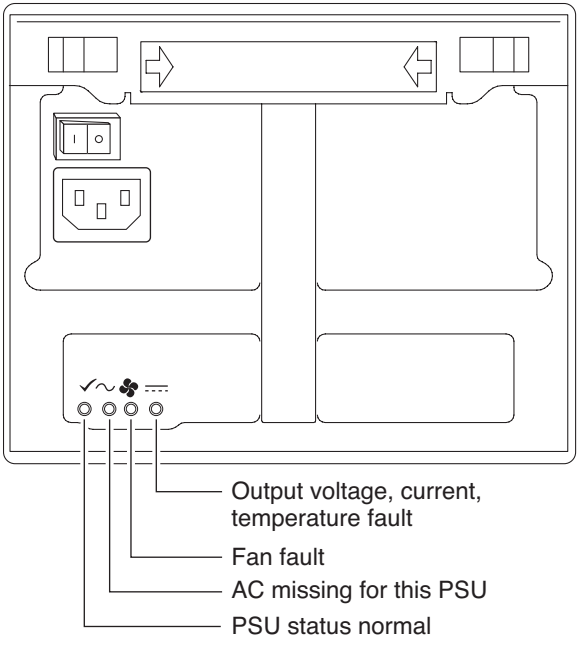
LEDs on the power supply

The FAS200 series 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 system 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 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

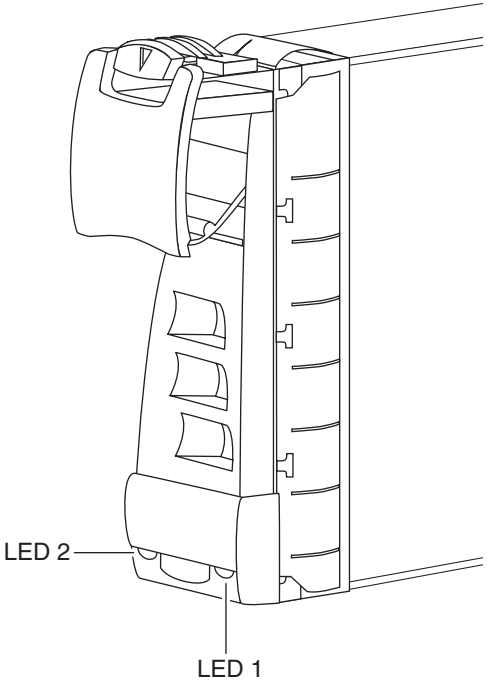
Monitoring the Fibre Channel disk

About monitoring the Fibre Channel disk

The FAS200 series 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 location of the Fibre Channel disk LEDs.



Interpreting Fibre Channel disk LEDs

Use the following table to interpret the disk LEDs.

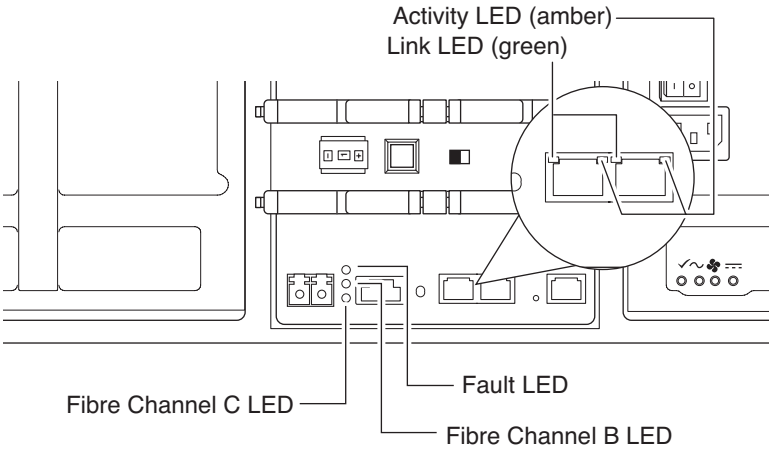
LED 1 (green)	LED 2 (amber)	State
Off	Off	No drive installed.
On/Blink off	Off	Drive installed and operational.
On	Flashes 1 second on and 1 second off	SES device identification set.
On or off	On	SES device fault bit set.
On or off	Flashes 3 seconds on and 1 second off	Disk port isolated (either port).

Monitoring the CPU module

LEDs on the FAS270/FAS270c CPU module

The CPU module has several LEDs. The LEDs indicate whether the CPU module, Fibre Channel ports, and network connections are functioning normally.

Location of LEDs on the CPU module: The following illustration shows the location of the Ethernet and Fibre Channel LEDs at the rear of the CPU module.



Interpreting Ethernet LEDs on a FAS270/FAS270c: Use the following table to interpret the Ethernet port LEDs on the FAS270/FAS270c CPU module.

Link LED (green)	Activity LED (amber)	State
Off	Off	Network connection is not present.
On	Off	Network connection is present but there is no data input or output occurring.
On	On/blinking	Network connection is present and data input and output is occurring.

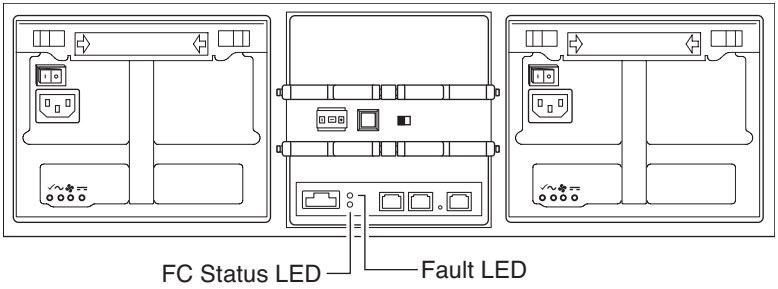
Interpreting Fibre Channel LEDs on a FAS270/FAS270c: Use the following table to interpret the Fibre Channel LEDs on the FAS270/FAS270c CPU module.

Fault LED (amber)	Fibre Channel B LED (green)	Fibre Channel C LED (green)	State	Action
Off	On	On	Normal	None.
Off	Off	On	Loop B fault	Fibre Channel B loop is open and needs to be fixed.
Off	On	Off	Loop C fault	Fibre Channel C loop is open and needs to be fixed.
On	On	On	CPU module fault	Perform the following steps until the problem is resolved: **1.** Check the cables at the rear of the system. **2.** Make sure that the 1 Gb/2 Gb switches are set to 1 Gb. **3.** Check all terminate switches. Last shelf in the loop must be set to On. All other shelves must be set to Off. **4.** If Fibre Channel C port is unused, install the Fibre Channel terminator or ignore the Fibre Channel C LED. It is alright for the LED to be off if the port is not used. **5.** Run diagnostics to isolate the failure and decide whether CPU module replacement is necessary. See the *Diagnostics Guide* for more information. **6.** Replace the CPU module. See "Replacing the CPU module" on page 68. **7.** Contact technical support.
On	Off	On	Loop B fault and module fault	
On	On	Off	Loop C fault and module fault	

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 on the FAS250 CPU module: The following illustration shows the location of the LEDs at the rear of the FAS250 CPU module.



Interpreting CPU module LEDs on a FAS250: Use the following table to interpret the FAS250 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.
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 *Diagnostics Guide* for more information. 2. Replace the CPU module. See "Replacing the CPU module" on page 68. 3. Contact technical support.
Off	On	Loop fault and module fault	

Replacing FAS200 Series Devices 4

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

Reasons to replace a disk

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

About replacing a disk in your appliance

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

- "Removing a disk" on page 66
- "Installing a disk" on page 67

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, enter **`disk fail`** *disk_name*. ◆ Spare disk, enter **`disk remove`** *disk_name*. 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 59. For more information about disk commands, see the Data ONTAP *Storage Management Guide*.
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, use two hands to support its weight.** **Caution** If you have any empty disk drive bays, make sure to install the cover 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. **Attention** The disks on your appliance use special drive keys to prevent the use of nonqualified disks 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.
4	**For FAS270/FAS270c:** From the console, assign the disk to the CPU module receiving the disk by entering the following command: `disk assign disk_name`

Replacing the CPU module

About replacing the CPU module

Replacing the CPU module consists of the following procedures:

- "Removing the CPU module" on page 70
- "Moving the Data ONTAP software" on page 73
- "Procedures for installing the CPU module" on page 75

Location of the CPU module and blank filler module

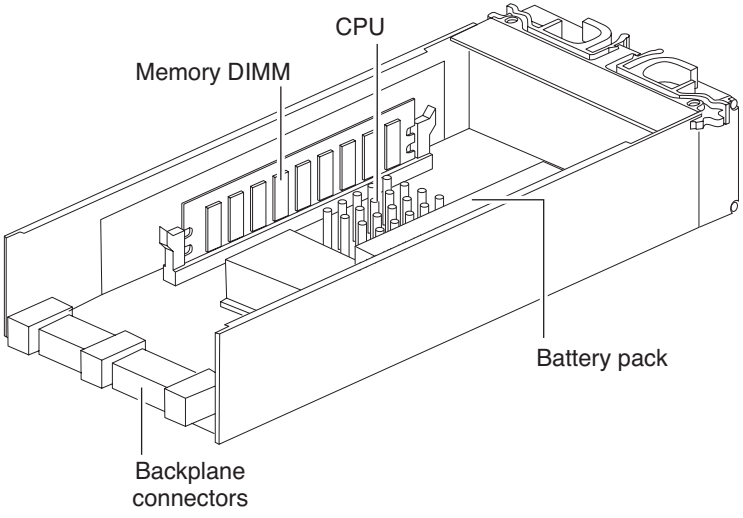
The CPU module is at the center position on the back of your appliance. A clustered FAS270c has two CPU modules (nodes), with Node A above Node B. On a FAS250 or nonclustered FAS270, a blank filler module is in the top position directly above the bottom CPU module. Both modules use the same cam handle 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 (underside), battery pack, and other system components.



Reasons for removing the CPU module

There are several reasons for removing the CPU module:

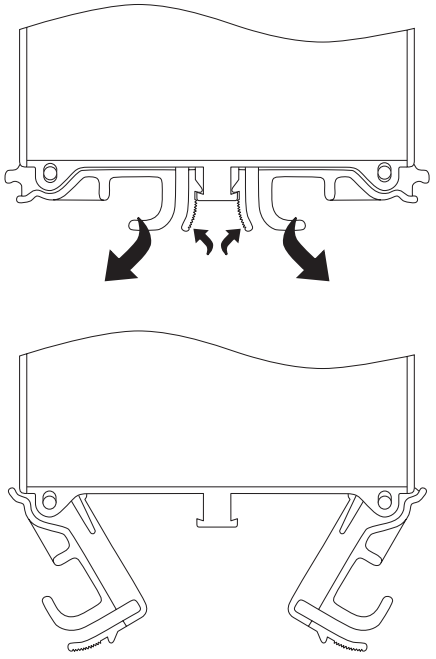
- Replacing a defective CPU module
- Replacing the SDRAM DIMM
- Accessing the CompactFlash card
- Accessing the system battery and connection to the motherboard
- System upgrade and conversion options

Removing the CPU module

Removing the CPU module

To remove the CPU module, complete the following steps.

Step	Actions	
1	**If you are performing…**	**Then…**
	A planned CPU module replacement on a FAS250 or a nonclustered FAS270	Shut down the appliance by entering the following command at the console: **`halt`** **Caution** Always use the `halt` command to perform a clean shutdown.
	An unplanned CPU module replacement on a FAS250 or a nonclustered FAS270	If possible, shut down the appliance by entering the following command at the console: **`halt`** **Caution** Use the `halt` command to perform a clean shutdown whenever possible.
	A planned CPU module replacement on a clustered FAS270c	Determine which module is to be replaced. From the partner CPU module, perform a takeover operation by entering the following command: **`cf takeover`**
	An unplanned CPU module replacement on a clustered FAS270c, where the partner node did or did not perform a takeover	Proceed to Step 2.

Step	Actions
2	Put on the antistatic wrist strap and attach the grounding leash to the appliance chassis.
3	Disconnect all cables to the CPU module that you are replacing.
4	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. 
5	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).

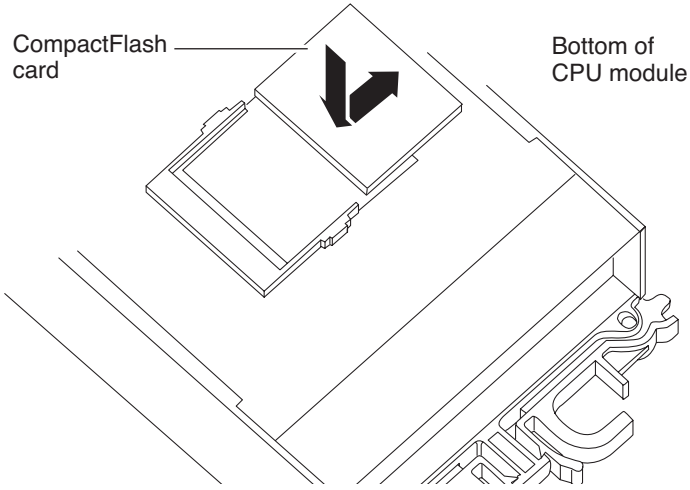
Step	Actions	
6	**If you are…**	**Then…**
	Replacing a defective CPU module with a new one	Proceed to "Moving the Data ONTAP software" on page 73.
	Servicing a component on the CPU module	See the appropriate procedure in this chapter, then proceed to "Procedures for installing the CPU module" on page 75.

Moving the Data ONTAP software

Moving the Data ONTAP software

The Data ONTAP software is installed on the CompactFlash card of the old CPU module. The CompactFlash card on the replacement CPU module is blank. To get the correct version of Data ONTAP onto the replacement CPU module, you need to move the CompactFlash card from the old CPU module to the replacement CPU module.

To install the correct version of Data ONTAP onto the replacement CPU module, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	On the bottom side of the old 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. 
3	Repeat the same procedure by removing the CompactFlash card from the replacement CPU module.

Step	Action
4	Install the old CompactFlash card into the replacement CPU module by orienting the card so that the pin slots on the card engage properly with the pins inside the socket, and then gently sliding the card into place until it is firmly seated in the socket. **Caution** Damage to the card socket and card can result if you do not orient the card properly during insertion.
5	Install the blank CompactFlash card from the replacement CPU module into the old CPU module and return the old CPU module to NetApp.
6	Proceed to “Procedures for installing the CPU module” on page 75 to install your replacement CPU module.

Procedures for installing the CPU module

Choosing the proper installation procedure

There are three separate cases to consider when installing a CPU module. Choose one of the following three procedures, based on your system criteria:

- "Installing the module in a nonclustered system" on page 75
- "Installing the module in a clustered system with cf disabled" on page 77
- "Hot-swapping a module in a clustered system while in takeover mode" on page 79

Installing the module in a nonclustered system

To install the CPU module in a nonclustered system, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Connect all cables to the CPU module before inserting the module into its CPU module bay. For more information, see "Connecting your appliance to a network" on page 2.
3	From the back of your appliance, slide the module into the CPU module bay and push the cam mechanism levers into place.
4	**For FAS270 only:** Set the terminate switch on the CPU module to the proper position. See Step 7 of the section "Connecting a nonclustered FAS250 or FAS270" on page 3.
5	Reconnect the power to your appliance and turn on the power switch on both power supplies. See "Connecting your system to a power source" on page 26.
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. See "Netboot process for the FAS200 series" on page 107.

Step	Action
7	At the console screen, bring your system to the CFE (common firmware environment) prompt, or halt the system if it tries to autoboot Data ONTAP, by entering the following command: **`halt`**
8	Run diagnostics on the new CPU module by entering the following command: **`boot_diags`**
9	At the diagnostics prompt, run all tests by entering the following command: **`all`** **Note** The RTC (real-time clock) uses the same battery as NVMEM. If the battery is disconnected and drained, the RTC loses its time, which can cause some tests to fail on startup. One solution is to ignore the message and set the clock in Data ONTAP later, or set the clock from within diagnostics and repeat the diagnostics tests.
10	Exit diagnostics by entering the following command: **`exit`** See the *Diagnostics Guide* at http://now.netapp.com for more information.
11	Boot Data ONTAP by entering the following command: **`boot_ontap`**
12	Press **`ctrl-c`** to enter the maintenance menu.
13	Select option 5 to enter maintenance mode.
14	Fix disk ownership. To see all disks and the old CPU module name, enter the following command: **`disk show -v`**
15	Reassign disk ownership by entering the following command: **`disk assign -o`** ***`systemname`***

Step	Action
16	Shut down the appliance by entering the following command at the console: `halt`
17	Boot Data ONTAP by entering the following command: `boot_ontap`

Installing the module in a clustered system with cf disabled

To install the CPU module in a clustered system where the partner node has not performed a takeover, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Connect all cables to the CPU module before inserting the module into its CPU module bay. For more information, see “Connecting your appliance to a network” on page 2.
3	From the back of your appliance, slide the module into the CPU module bay and push the cam mechanism levers into place.
4	Set the terminate switch on the CPU module to the proper position.
5	If power was removed, reconnect the power to your appliance and turn on the power switch on both power supplies. See “Connecting your system to a power source” on page 26.
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. See “Netboot process for the FAS200 series” on page 107.
7	Press `ctrl-c` to stop rebooting.
8	Run diagnostics on the new CPU module by entering the following command: `boot_diags`

Step	Action
9	At the diagnostics prompt, run all tests by entering the following command: **`all`**
10	Exit diagnostics by entering the following command: **`exit`** See the *Diagnostics Guide* at http://now.netapp.com for more information.
11	Boot Data ONTAP by entering the following command: **`boot_ontap`**
12	Press **`ctrl-c`** to enter the maintenance menu.
13	Select option 5 to enter maintenance mode.
14	Fix disk ownership. To see all disks and the old CPU module name, enter the following command: **`disk show -v`**
15	Reassign disk ownership by entering the following command: **`disk assign -o`** ***`systemname`***
16	Shut down the appliance by entering the following command at the console: **`halt`**
17	Boot Data ONTAP by entering the following command: **`boot_ontap`**

Hot-swapping a module in a clustered system while in takeover mode

To install the CPU module in a clustered system where the partner node has performed a takeover, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Connect all cables to the CPU module before inserting it into the module bay. For more information, see “Connecting your appliance to a network” on page 2.
3	Set the terminate switch on the CPU module to the proper position.
4	From the back of your appliance, slide the module into the module bay and push the cam mechanism levers into place.
5	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. See “Netboot process for the FAS200 series” on page 107.

6	Capture the output from the console. Be sure to write down the system ID number, as shown in bold in the following example. The output should look something like this:
	`Loading: 0xffffffff80001000/8500653 Entry at 0xffffffff80001000`
	`Closing network.`
	`Starting program at 0xffffffff80001000`
	`Press CTRL-C for special boot menu`
	`.`
	`.`
	`WARNING: there do not appear to be any disks attached to the system.`
	`Check that disks have been assigned ownership to this system (ID` **`84166052`**`) using the 'disk show' and 'disk assign' commands from maintenance mode`
	`No root volume found.`
	`Rebooting...`

7	Press **`ctrl-c`** to stop rebooting.

Step	Action

8	Enter the following command *from the partner node* using the recorded system ID from Step 6, for example:
	`disk reassign -d 84166052`
	The console screen should display something resembling the following:
	`node x(takeover)> priv set advanced`
	`node x(takeover)*> disk reassign -d 84166083`
	
	`Disk ownership will be updated on all disks previously belonging to Filer with serial number 123456.`
	`Would you like to continue (y/n)?`

9	Select **`y`**.
10	Verify disk ownership. Make sure that all disks that were supposed to be reassigned, were reassigned. To see all disks, enter the following command: **`disk show -v`**
11	The new CPU module should see the disk on the next reboot, accompanied by the following message: `Waiting for cluster giveback` From the *partner node*, enter the following command: **`cf giveback`** **Note** If the giveback doesn't succeed, see the *System Administration Storage Management Guide* for additional information.

Replacing the SDRAM DIMM on the CPU module

About replacing SDRAM DIMMs

The SDRAM DIMM is on the CPU module motherboard. You must remove the CPU module from the chassis before replacing the DIMM.

Required memory configuration

The FAS270/FAS270c supports 1 x 1 GB, 2.5V 184P DDR SDRAM DIMM. The DIMM slot is inside the CPU module.

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

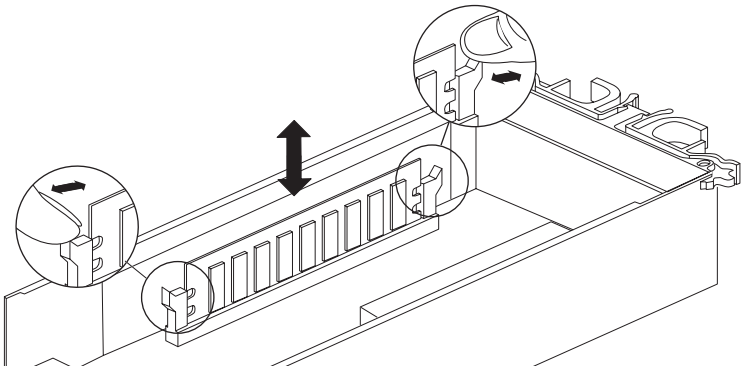
Caution

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

Replacing 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 containing the DIMM to be replaced. Follow the procedure in “Removing the CPU module” on page 70.
3	If you don't have the antistatic wrist strap and grounding leash on from the previous step, put it on now.
4	Unplug the battery pack from the motherboard before removing the DIMM. For the location of the battery pack and cable connection, see the illustration in Step 4 of “Replacing the battery” on page 86.

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 old DIMM aside in an antistatic bag.
8	Pick up the new DIMM by its top corners to avoid damaging the components.
9	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.
10	Push carefully but firmly on the top edge of the DIMM until the latches snap into place.
11	Plug the battery cable back into the motherboard.
12	Reinstall the CPU module. See “Procedures for installing the CPU module” on page 75.
13	After turning on your system, run diagnostics on the SDRAM DIMM. See the *Diagnostics Guide* for more information.

Replacing the CompactFlash card on the CPU module

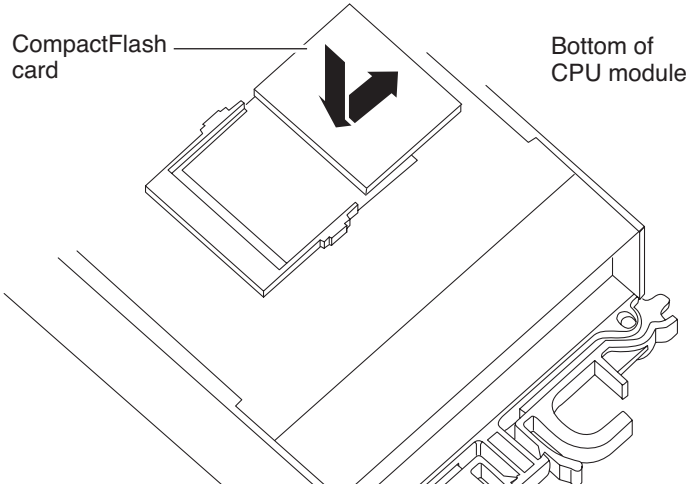
About replacing the CompactFlash card

The CompactFlash card is on the back side of the CPU module. Replacing the CompactFlash card consists of the following tasks:

- Removing the CPU module
- Replacing the CompactFlash card
- Reinstalling the CPU module

Replacing the CompactFlash card

To replace the CompactFlash card, complete the following steps.

Step	Action
1	Remove the CPU module by following the procedure in "Removing the CPU module" on page 70.
2	If you don't have the antistatic wrist strap and grounding leash on from the previous step, put it on now.
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	Install the CompactFlash card by orienting the card correctly so that the pin-slots on the card engage properly with the pins inside the socket, and gently sliding the card into place until it is firmly seated in the socket. **Caution** Damage to the card socket and/or card can result if you do not orient the card properly during insertion.
5	Reinstall the CPU module. See “Procedures for installing the CPU module” on page 75.
6	Boot your appliance from a remote image. See “Netboot process for the FAS200 series” on page 107. Otherwise, proceed to Step 8.
7	Copy the correct Data ONTAP boot files to the CompactFlash card by entering the following command: `download`

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>8</td><td colspan="2">Test the CompactFlash card by using one of the following two options.</td></tr>
<tr><td></td><td>Option 1</td><td>Option 2</td></tr>
<tr><td></td><td>1. Reboot the appliance and let it autoboot by entering the following command:
<code>reboot</code>
2. After Data ONTAP boots, copy the boot files to the secondary backup area of the CompactFlash card by entering the following command:
<code>download</code></td><td>1. Shut down the appliance by entering the following command at the console:
<code>halt</code>
2. Run diagnostics by entering the following command:
<code>boot_diags</code>
See the Diagnostics Guide for more information.
3. When finished, exit diagnostics by entering the following command:
<code>exit</code>
4. Boot Data ONTAP by entering the following command:
<code>boot_ontap</code></td></tr>
</table>

Replacing the battery on the CPU module

About replacing the battery

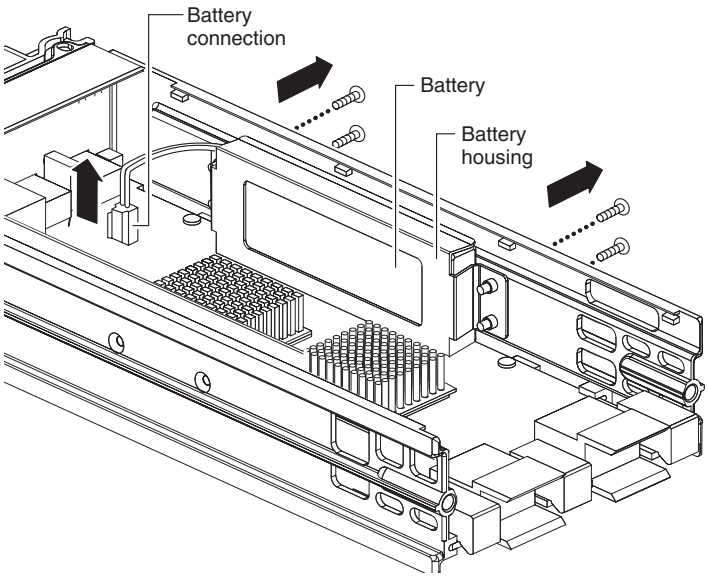
If the battery inside your CPU module fails, you need to replace it. Replacing the battery consists of the following tasks:

- Removing the CPU module
- Replacing the battery
- Reinstalling the CPU module

Replacing the battery

To replace the battery, complete the following steps.

Step	Action
1	Remove the CPU module by following the procedure in “Removing the CPU module” on page 70.
2	If you don't have the antistatic wrist strap and grounding leash on from the previous step, put it on now.
3	Disconnect the battery wire from the CPU module motherboard.

Step	Action
4	At the side of the CPU module, remove the four screws holding the battery housing, as shown in the following illustration, and remove the battery.  **WARNING** **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.** **AVERTISSEMENT** **Il y a danger d'explosion s'il y a remplacement incorrect de la pile. Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.** **ACHTUNG** **Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Die Batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.**

Step	Action
5	Install the new battery by placing it into the battery housing, and secure the battery housing to the CPU module using the four screws.
6	Reconnect the battery wire to the CPU module.
7	Reinstall the CPU module. See “Procedures for installing the CPU module” on page 75.
8	After turning on your system, run diagnostics on the new battery. See the *Diagnostics Guide* for more information. **Note** The battery is rechargeable, and diagnostics might indicate a low charge after installation. This is normal. The battery begins charging automatically after you boot Data ONTAP.
9	Check and set the date and time values on your appliance. Replacing the battery will likely cause these values to get reset.

Replacing a power supply

About replacing a power supply

Replacing a power supply in your appliance, or in a DS14mk2 disk shelf, consists of the following procedures:

- "Removing a power supply" on page 89
- "Installing a power supply" on page 90

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 to the appliance when you replace one power supply at a time.
- 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

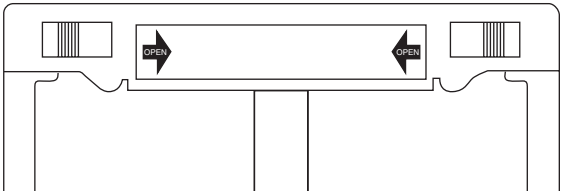
Your appliance can run with one power supply for a maximum of two minutes. The airflow through your appliance is degraded when only one power supply is present and operating. Therefore, if the power supplies are not replaced within two minutes of each other, the system halts and no data is accessible.

- Have the replacement power supply close by and ready to install before removing the old one.

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.

Step	Action
3	Lift up the clip lock and unplug the power cord from your appliance's power supply.
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.**

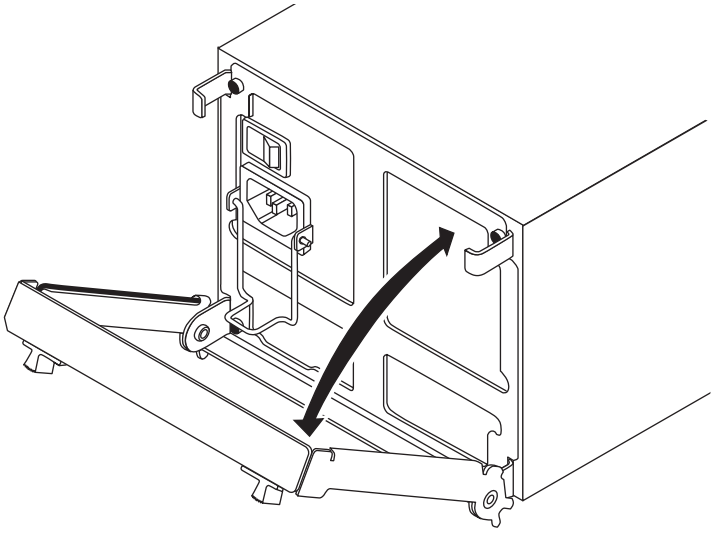
Installing a power supply

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 57.
7	After turning on your system, run diagnostics. See the *Diagnostics Guide* for more information.

Replacing LRC modules with ESH2 modules in a disk shelf

About replacing the modules

You can convert a FAS270/FAS270c system using disk shelves with LRC modules to one with disk shelves using ESH2 modules. You can convert a FAS270c system by hot-swapping the LRC with ESH2 modules; that is, by allowing the system to continue running without powering off. A FAS270 system, however, has a single loop, requiring that you take the system offline before converting the modules.

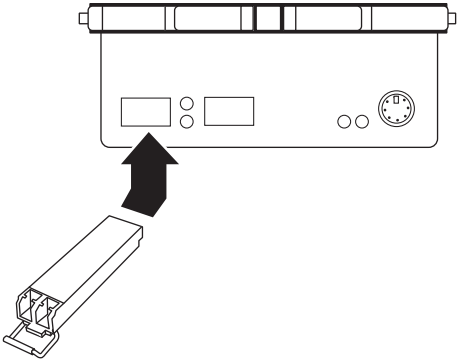
Caution

If you attempt to hot-swap the LRC module with an ESH2 module on a disk shelf that does not have multipath connections, you lose all access to the drives on that disk shelf as well as those connected below it.

Replacing the modules

To replace the LRC modules with ESH2 modules, complete the following steps.

Step	Action	
1	Verify that your NetApp appliance meets the minimum software requirements to support the disk shelf and module combination. See the System Configuration Guide at http://now.netapp.com for more information.	
2	**If you are converting modules in a…**	**Then…**
	FAS270 system	Power off your system and go to Step 6.
	FAS270c system	Select which node/loop you want to convert first; A or B. For the sake of clarity, the following steps convert node/loop B.
3	From the node A console, enter the following command and observe the output: `cf enable` **Result:** Takeover of node B is enabled on node A.	

Step	Action
4	Enter the following command from the node A console: **`cf takeover`** **Result:** Node A takes over node B and gives the following output: `takeover completed`
5	Make sure that node A can access both node B and node A disks.
6	Put on the antistatic wrist strap and grounding leash.
7	Disconnect the LRC modules from the Fibre Channel cabling on all disk shelves in the B loop, and remove the cabling from the system.
8	Remove all LRC modules in the B loop.
9	Install all replacement ESH2 modules into the B loop of the disk shelves. **Caution** Do not use excessive force when sliding the module into the disk shelf; you might damage the connector.
10	Plug the optical SFP into the input port on the ESH2 modules if they are not already plugged in. 

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>11</td><td colspan="2">Connect all ESH2 modules to your storage appliance.
Note
You need to replace the LRC cabling with the proper HSSDC2-to-SFP cabling for ESH2 modules. See the DiskShelf14 and DiskShelf14mk2 FC Hardware Guide for more information.</td></tr>
<tr><td rowspan="3">12</td><td>If you converted modules for a…</td><td>Then…</td></tr>
<tr><td>FAS270 system</td><td>Turn on the power and reboot the system.</td></tr>
<tr><td>FAS270c system</td><td>Give back the partner node by entering the following command:
<tt>cf giveback</tt>
Result: The local node releases the partner node, which reboots and resumes normal operation. The following message is displayed on the console when the process is complete:
<tt>giveback completed</tt></td></tr>
<tr><td>13</td><td colspan="2">On FAS270c systems, repeat Step 3 through Step 12 for the second node/loop.</td></tr>
<tr><td>14</td><td colspan="2">Set the loop speeds to 1 Gb on all disk shelves in the system.</td></tr>
</table>

Error Messages and Troubleshooting 5

About this chapter

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

Note

If you contact technical support, have the console messages available.

Topics in this chapter

This chapter discusses the following topics:

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…
A hardware problem and need to access your appliance	See "Replacing FAS200 Series Devices" on page 65.
Fibre Channel disk shelf problems	See the disk shelf hardware guide that came with your expansion shelf.
Software problems	See the Data ONTAP *Storage Management Guide*.

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 the Power-On Self-Test (POST) messages on the system console.

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 1.1.0 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:

```
HyperTransport: 400MHz
CPU type 0x1040102: 650MHz
Total memory: 0x40000000 bytes (1024MB)
Starting AUTOBOOT press any key to abort...
Loading: Failed.
Loading: 0xffffffff80001000/8604573 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 you are using the DB-9 to RJ-45 adapter.

Boot messages

After the boot is successfully completed, your appliance loads the operating system. The following message is an example of the boot messages and questions that appear on the system console of a FAS270/FAS270c 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: Mon Oct 20 04:06:00: PDT 2003
System ID: 0084170726 ();partner ID: 0084170777 (f5a-filer)
System Serial Number: 999999
slot 0:    System Board
           Processors:      1
           Processor revision: B2
           Processor type: 1250
           Memory Size:   1022 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-unknow
           e0a MAC Address: 00:a0:98:00:e9:b4 (auto-unknow
slot 0:    NetApp ATA/IDE Adapter 0a (0x00000000000001f0)
           0a.0    245MB
Please enter the new hostname []: hw-166
Do you want to configure virtual network interfaces? [n]:
Please enter the IP address for Network Interface e0a []: 172.22.6.166
Please enter the netmask for Network Interface e0a []:
Should interface e0a take over a partner IP address during failover? [n]: y
Please enter the IP address or interface name to be taken over by e0a []: 172.22.6.167
Please enter media type for e0a {100tx-fd, tp-fd, 100tx, tp, auto (10/100/1000)}
[auto]:
Please enter flow control for e0a {none, receive, send, full} [full]:
Do you want e0a to support jumbo frames? [n]:
Please enter the IP address for Network Interface e0b []:
Should interface e0b take over a partner IP address during failover? [n]:
```

Boot messages

```
Would you like to continue setup through the web interface? [n]:
Please enter the name or IP address of the default gateway []:
          The administration host is given root access to the filer's
          /etc files for system administration.  To allow /etc root access
          to all NFS clients enter RETURN below.
Please enter the name or IP address of the administration host:
Please enter timezone [GMT]:
Where is the filer located? []: orlab
Do you want to run DNS resolver? [n]: y
Please enter DNS domain name []:
You may enter up to 3 nameservers
Please enter the IP address for first nameserver []:
Do you want another nameserver? [y]: n
Do you want to run NIS client? [n]:
```

POST error messages

The following table describes the extended POST 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 was found by the system.	This indicates that the system doesn't see any memory. Try reseating the DIMM. See "Replacing the SDRAM DIMM on the CPU module" on page 81.

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 68.
[Cer2]	Cache error.	
[EXC!]	Exception.	This indicates that the system took an exception while in firmware. If it is repeatable, this is likely a software bug in the firmware. Contact technical support 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.
[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 off the system, then power it back on. **2.** Try booting with the backup firmware image. See "Booting your appliance from a backup firmware image" on page 109. **3.** Replace the CPU module. See "Replacing the CPU module" on page 68.
[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 one of these error codes, the memory is bad or the NVLOG subsystem malfunctioned. To test this, reseat the DIMM and disconnect the battery. See "Replacing FAS200 Series Devices" on page 65. If that fails to clear the problem, replace the DIMM. See "Replacing the SDRAM DIMM on the CPU module" on page 81.
[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.

Error message or code	Description	Corrective action
[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. See "Booting your appliance from a backup firmware image" on page 109. 2. Otherwise, replace the CPU module. See "Replacing the CPU module" on page 68.
[AREN]	Physical memory map INIT.	
[DEVI]	Misc devices INIT.	
[ENVI]	Environmental variable subsystem INIT.	
[PCIH]	PCI host bridge INIT.	If the system stops with one of these error codes, there is likely a problem with either the SB1250 chip or the ISP2312 FC-AL chip. 1. Try booting with the backup firmware image. See "Booting your appliance from a backup firmware image" on page 109. 2. Otherwise, replace the CPU module. See "Replacing the CPU module" on page 68.
[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. See "Booting your appliance from a backup firmware image" on page 109. 3. Replace the CPU module. See "Replacing the CPU module" on page 68.

Environmental EMS messages

Environmental EMS messages

The following table describes the environmental EMS messages that might appear on the system console if your appliance encounters extremes in its operational environment.

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.chassisFan.ok NOTICE	fru_name STRING	This message is issued when the chassis fans are OK.	No corrective action needed.	LOG_NOTICE: Chassis FRU is ok	#366: Chassis FRU is ok
monitor.chassisFan.slow ALERT	fru_name STRING	This is a warning message that is issued when a chassis fan is spinning too slowly.	The fan unit should be replaced.	LOG_ALERT: Chassis FRU contains at least one fan spinning slowly	#365: Chassis FRU contains at least one fan spinning slowly
monitor.chassisFan.stop ALERT	fru_name STRING	This is a warning message that is issued when a chassis fan is stopped.	The fan unit should be replaced.	LOG_ALERT: Chassis FRU contains at least one stopped fan	#364: Chassis FRU contains at least one stopped fan
monitor.chassisFan.removed ALERT	fan_name STRING	This is a warning message that is issued when a chassis fan is removed.	The fan unit should be replaced.	LOG_ALERT: Chassis FRU is removed	#363: Chassis FRU is removed

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.chassisTemperature.ok NOTICE		This message is issued when the chassis temperature is normal.	No corrective action needed.	LOG_NOTICE: Chassis temperature is ok	#376: Chassis temperature is ok
monitor.chassisTemperature.warm ALERT	describe_toowarm STRING	This is a warning message that is issued when the chassis temperature is too warm.	Check to see if air conditioning units are needed, or whether they are functioning properly.	LOG_ALERT: Chassis temperature is too warm	#372: Chassis temperature is too warm
monitor.chassisTemperature.cool ALERT	describe_toocool STRING	This is a warning message that is issued when the chassis temperature is too cool.	Raise the ambient temperature around the appliance.	LOG_ALERT: Chassis temperature is too cool	#372: Chassis temperature is too cool
monitor.shutdown.chassisOverTemp CRIT	describe_toohot STRING	This message is issued just before shutdown, indicating the chassis temperature is too hot.	Check to see if air conditioning units are needed, or whether they are functioning properly.	LOG_CRIT: Chassis temperature is too hot	#371: Chassis temperature is too hot

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.shutdown.chassisUnderTemp CRIT	describe_toocold STRING	This message is issued just before shutdown when the chassis temperature becomes too cold.	Raise the ambient temperature around the appliance.	LOG_CRIT: Chassis temperature is too cold	#371: Chassis temperature is too cold
monitor.cpuFan.ok INFO	cpu_number INT	This message indicates that a CPU fan is OK.	No corrective action needed.	LOG_INFO: CPU Fan OK	#386: CPU Fan OK
monitor.cpuFan.degraded NOTICE	cpu_number INT	This message indicates that a CPU fan is degraded.	The CPU fan or the system motherboard might need to be replaced. See the hardware and service guide that came with your system.	LOG_NOTICE: CPU Fan is slow	#383: CPU Fan is slow
monitor.cpuFan.failed NOTICE	cpu_number INT	This message indicates that a CPU fan is degraded.	The CPU fan or the system motherboard might need to be replaced. See the hardware and service guide that came with your system.	LOG_NOTICE: CPU Fan is stopped	#381: CPU Fan is stopped

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.chassis PowerSupplies. ok INFO		This message indicates that all power supplies are OK.	No corrective action needed.	LOG_INFO: Chassis power supplies OK	#396: Chassis power supplies OK
monitor.chassis PowerSupply.of f NOTICE	ps_number INT	This message indicates that a power supply is turned off.	Turn the power supply on.	LOG_NOTICE: Chassis power supply off	#395: Chassis power supply is off
monitor.chassis PowerSupply. notPresent NOTICE	ps_number INT	This message indicates that a power supply is not present.	Add a power supply to the appliance.	LOG_NOTICE: Chassis power supply not present	#394: Chassis power supply is not present
monitor.chassis PowerSupply. degraded NOTICE	ps_number reasonText INT STRING	This message indicates that a power supply is degraded.	A replacement power supply might be required. Contact technical support for further instruction.	LOG_NOTICE: Chassis power supply is degraded	#392: Chassis power supply is degraded
monitor.chassis Power.ok NOTICE		This messages indicates that the motherboard power is OK.	No corrective action needed.	LOG_NOTICE: Chassis power is OK	#406: Chassis power is OK

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.chassis Power.degraded NOTICE	reasonText STRING	This message indicates that a power supply is degraded.	Replace the power supplies.*	LOG_NOTICE: Chassis power is degraded	#403: Chassis power is degraded

* Degraded power might be caused by bad power supplies, bad wall power, or bad components on the motherboard. If spare power supplies are available, try replacing them to see whether that alleviates the problem. Otherwise, contact technical support for further instruction.

Netboot process for the FAS200 series

Reason to perform the netboot process

The netboot process enables you to boot your appliance from a remote server if your CompactFlash media becomes damaged or unusable.

Configuration requirements for netboot servers

You can configure a system to serve boot images to NetApp devices that support the netboot process. 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 the netbooting process, see the Data ONTAP *Storage Management Guide*.

Performing the netboot process from a remote image

To perform the netboot process on a FAS200 series appliance from a remote image, complete the following steps.

Step	Action
1	Place a Data ONTAP boot image on a local HTTP server. You can copy the boot image from the appliance boot directory, /etc/boot/netapp-mips, or download it from http://now.netapp.com.
2	At the appliance CFE prompt, enter one of the following commands: Using DHCP: **ifconfig e0a -auto** Using manual configuration: **ifconfig e0a -addr=*filer_addr* -mask=*netmask* -gw=*gateway* -dns=*dns_addr* -domain=*dns_domain***

Step	Action
3	At the CFE prompt, enter the following command: **`netboot`** *URL* **Example:** **`netboot`** http://myserver/bootimages/netapp/netapp-mips **Result:** You should then see normal boot messages during the netboot process.

Note

If you performed the netboot process because your CompactFlash card is blank or corrupted, be sure to execute the Data ONTAP **`download`** command to copy the correct files from the disks to the CompactFlash card. See the Data ONTAP *System Administration Storage Management Guide* for more details.

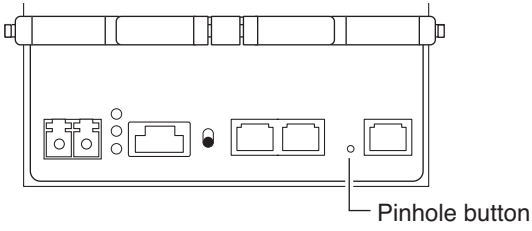
Booting your appliance from a backup firmware image

Caution about this procedure

This procedure boots your appliance using a stored backup firmware image and should only be used as a last resort.

Booting with a backup firmware image

To boot using a backup firmware image, complete the following steps.

Step	Action
1	With the system powered off, insert a paper clip into the tiny, unmarked hole between the console and Ethernet ports. Make sure that you can feel the button pushing in. 
2	While the button is pressed with the paper clip, turn on power to the appliance.
3	Remove the paper clip from the hole. **Result:** The appliance begins booting, showing its progress on the console screen.

Troubleshooting hardware problems

Troubleshooting the FAS270/FAS270c Use this table to troubleshoot specific problems with your system.

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 technical support. ◆ 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 entering this command 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 your appliance to a network" on page 2. 3. Power on the appliance.
I replaced a CPU module and now the new module can't see the disks	The disk ownership mechanism ties disks to CPU module system IDs. If you replace a CPU module with a new one in, the disks are still stamped with the system ID of the old module.	Perform a `disk reassign` command. Use the **`help`** command to get the exact syntax.
I have unowned disks; why didn't Data ONTAP use them to reconstruct a failed drive?	The disks need to be "SPARES," not "unowned."	Assign the disks as spares.

Problem	Possible cause	Solution
The battery is discharged and Data ONTAP won't boot.	The battery voltage is too low to hold data for 3 days during a power-out condition. If you turn on the machine and let it sit at the firmware (CFE) prompt, it does not turn on the charger. You need to boot Data ONTAP to get the software to turn on the battery charger.	You have two main options at this point: **1.** Leave the appliance alone for a few hours to let the battery charge. **2.** Press Ctrl-C to override this check. Contact technical support if you need to check your battery status or need additional assistance.
CFE failed, creating a POST code.	CFE firmware runs a series of Power-On-Self-Tests (POST) before trying to load Data ONTAP. If any of the POSTs fail, a code is printed.	See "POST error messages" on page 98 for a description of the error.

Problem	Possible cause	Solution
Fibre Channel adapter 0b appears to be unattached or disconnected.	You have an open loop. Fibre Channel needs a closed/completed loop to communicate.	◆ Check the terminate switch on the CPU module. If an expansion shelf is attached to your system, the terminate switch should be OFF. If there's no expansion shelf, you must have the terminate switch set to ON. ◆ If you have expansion shelves, the last shelf must have its terminate switch set to ON. All other shelves in the loop (including the CPU module) must have the terminate switches set to OFF. ◆ If that doesn't fix it, you might have a faulty shelf, drive, or cable. Try removing items until the loop closes and then add them back until you see the failure. While removing/adding, be sure to set the terminate switches appropriately. ◆ If that still doesn't fix it, you might have a bad adapter on the CPU module (rare case). Replace the CPU module.
The appliance won't stop beeping.	It is the kernel's responsibility to "ping" the ops panel occasionally so the ops panel's watchdog timer doesn't start beeping.	Push the MUTE button on the back of the shelf to stop the beeping. If beeping continues, contact technical support.

Recommended Power Line Sizes

A

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

Communications Regulations B

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

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.
- 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 CE 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," 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, 使用者會被要求采取某些適當的對策.

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

Network Appliance, Inc.,
495 East Java Drive
Sunnyvale, California, 94089, U.S.A.,

declare under our sole responsibility that the products

Type of equipment	Description	Model number	Year of introduction
Network File Server	NetApp FAS270/FAS270c Fibre Channel storage appliance	FAS270 FAS270c	2003
Disk drive storage shelf	Fibre Channel storage appliance	FAS250	2003

to which this declaration relates conform to the following standards:

EN 60950:2000, Information Technology Equipment (Safety)

EN 55022:1998, Emissions Requirements for Information Technology Equipment

EN 50024:1998, Immunity Requirements for Information Technology Equipment

EN 60825-1:1994+A11, Safety of Laser/LED Equipment

EN 61000-3-2:2002 Limits for Harmonic Current Emissions

EN 61000-3-3:1995/A1:2001 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

Gerald Lopatin
Vice President,
Storage Systems Engineering

Part number: 210-00610

Feature Update Record

C

Feature update history

The following table lists and describes the history of changes made to this manual. When a change is implemented, it applies to the release in which it was implemented and all subsequent releases, unless otherwise specified.

Feature updates	Feature first implemented in	Feature release date
◆ ESH2 information added ◆ Troubleshooting section updated to include environmental EMS messages ◆ Procedure for replacing LRC modules with ESH2 modules	Data ONTAP 7.0	October 2004
◆ Consolidated FAS250, FAS270 and FAS270c information into one hardware guide	Data ONTAP 7.0.1	May 2005
◆ Updated information to include RoHS compliancy	Data ONTAP 7.1	November 2005
◆ Updated graphics for RoHS compliancy ◆ Added RoHS and non-RoHS cable appendix ◆ Added AT disk shelf information	Data ONTAP 7.1	March 2006
◆ Corrected SES information concerning required disk assignments. Nodes can own both SES disks.	Data ONTAP 6.5.1	December 2006
◆ Corrections made for BURT concerning ESH settings.	N/A	June 2007

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