

NetApp[®] NearStore[™]

R100 Hardware and Service Guide

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Preface

About this guide

This guide describes how to install a NetApp® NearStore™ R100 storage system, connect it to the network, and start it up.

Audience

This guide is for system administrators who are familiar with operating systems that run on the storage system's clients, such as UNIX®, Windows 95™, Windows® NT, and Windows® 2000. The procedures in this guide describe replacement, upgrade, and maintenance tasks for personnel with the following skills and experience:

- ◆ Working familiarity with small computer system hardware and operation
- ◆ Basic understanding of common networking concepts and practices
- ◆ Working familiarity with accepted tools and procedures for installing and operating sensitive electronic equipment

Terminology

This guide uses the following terms:

- ◆ *R100 or R100 system* refers, at a minimum, to an R100 chassis and seven connected R100 SCSI disk shelves.
- ◆ *Disk shelf* refers to an R100 disk shelf.
- ◆ *Chassis, or R100 chassis*, refers to the “controller unit” that the disk shelves are attached to.

Note

In the Data ONTAP™ software documentation that came with your R100 storage system, the term *filer* is used in place of the word *chassis*. For this instance, the terms *filer* and *chassis* refer to the same physical component of the storage system; that is, the one that oversees the flow of data to and from the disk shelves.

Formatting conventions

The following table lists the kinds of formatting this guide uses to identify special information.

Formatting convention	Type of information
<i>Italic type</i>	◆ Words or characters that require special attention. ◆ File names and path names. ◆ Placeholders for information you must supply. For example, if the guide says to enter the arp -d <i>hostname</i> command, you enter the characters “arp -d” followed by the actual name of the host. ◆ Man page names. ◆ Book titles in cross-references.
Monospaced font	◆ Command and daemon names. ◆ Information displayed on the system console or other computer monitors. ◆ The contents of files.
Bold monospace font	Words or characters you type. What you type is always shown in lowercase letters, unless you must type it in uppercase letters for it to work properly.

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

You must follow these safety rules when working with this equipment:

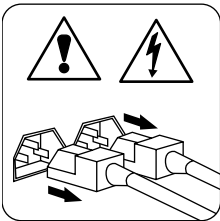
WARNING

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

When installing disk shelves and a filer, NetCache™ appliance, or NearStore™ 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 is furnished with one or more replaceable batteries. There is danger of explosion if the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Warning for units with multiple power cords



If your filer, NetCache appliance, NearStore 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

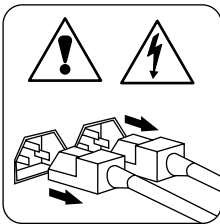
Die folgenden Sicherheitshinweise sind beim Betreiben des Geräts unbedingt zu beachten:

Vorsicht

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

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

Warnhinweis für Geräte mit mehrfachen Netzanschlussleitungen



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

ACHTUNG

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

About this chapter

This chapter specifies the preparation requirements for a first-time installation of a NetApp NearStore R100 storage system.

The preparation requirements include tabulated descriptions of site requirements, lists of required tools and equipment, and rules for the installation of the storage system.

Note

This guide does not provide the process for configuring your new storage system. However, it does provide a list of the hardware equipment you require to configure your storage system.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Required tools, equipment, and documentation”](#) on page 2
- ◆ [“R100 component and environmental parameters”](#) on page 4
- ◆ [“Installation rules and restrictions”](#) on page 9

Required tools, equipment, and documentation

Equipment you should receive

In addition to this guide, your R100 storage system contains the following components:

- ◆ One chassis and bezel
- ◆ Seven disk shelves
- ◆ Rack mounting hardware kit for chassis and disk shelves if the system was purchased without a storage cabinet
- ◆ A DB-9 to DB-9 straight-through serial cable for an ASCII terminal connection
- ◆ Seven, 2M SCSI cables for connecting the chassis to the seven disk shelves
- ◆ A disposable antistatic grounding leash
- ◆ The appropriate rack installation kit, if you ordered your R100 for rack installation
- ◆ R100 user manuals

Required tools

To install the storage system components in an equipment rack, you need the following tools and equipment:

- ◆ Phillips screwdrivers (#0, #1, and #2)
- ◆ #10-32 steel screws for fastening the chassis to the rack
- ◆ Antistatic wrist strap and grounding leash

Caution

The storage system uses electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures around you can damage these components. Always wear an antistatic wrist strap and attach the grounding leash so that you are appropriately grounded before touching any electronic components.

Required configuration equipment

To configure your system, you need the following equipment on site:

- ◆ ASCII terminal (also referred to as an ANSI terminal)
- ◆ Serial console
- ◆ Communications server

- ◆ Null modem cable (optional if the DB-9 to DB-9 serial cable for an ASCII terminal connection is not compatible with your terminal connector.)

Required documentation

The following table lists documentation you might need to help manage the storage system.

Document name	When to use
Site Requirements Guide	Use this guide to assist you in preparing your site for your new storage system.
System Configuration Guide	Use this guide to determine which NICs are supported by the chassis.
Data ONTAP System Administrator's Guide	Use this guide to configure your system software.

R100 component and environmental parameters

Installation considerations

When planning your storage system installation, you must consider the following:

- ◆ Physical characteristics, such as height and weight
- ◆ Environmental requirements, such as temperature and humidity
- ◆ Space requirements that you must have around the chassis
- ◆ Electrical requirements for the chassis

R100 system environmental conditions

The following table lists the environmental conditions that your site must meet to properly run or store your chassis and disk shelves.

Environmental condition	Operating condition	Storage condition
Temperature range	50° F to 104° F (10° C to 40° C)	-4° F to 149° F (-20° C to 65° C)
Relative humidity (noncondensing)	10% to 90%	10% to 90% in original shipping container; otherwise, 50%.

Freestanding equipment rack requirements

The freestanding equipment rack must meet the following requirements:

- ◆ A width of 19 inches (48.26 cm)
- ◆ Front installation rails compliant with EIA standard EIA-310-D
- ◆ Adequate space for air circulation directly above the chassis ventilation holes

If you install a device above the chassis, leave at least 0.5 inches (1.3 cm) of space directly above the ventilation holes. You can install equipment directly on the unvented area as long as it does not extend over and block the ventilation holes on the chassis.

R100 chassis

Physical characteristics

The following table lists the physical characteristics of the chassis.

Characteristics	U.S.	Metric
Height	8.75 in. or 5U, where 1U = 1.75 in.	22.2 cm
Width	17 in.	43.2 cm
Depth	25.25 in.	64.1 cm
Weight fully loaded	66 lbs	30 kg

Space requirements

The following table describes the recommended minimum clearance for the chassis.

Recommended minimum clearance	U.S.	Metric
Front clearance	9 in.	22.9 cm
Rear clearance	30 in.	76.2 cm
Clearance in vertical rack space above chassis for rear vents	0.5 in.	3.81 cm

Electrical requirements

The following table lists the AC power electrical requirements for the chassis.

Condition	Requirement
AC power supply	100 to 240V AC single phase
Maximum rated current per AC input	5A at 100 to 240V AC
Typical current per AC input	2.25A at 100V AC

Inrush current	40A maximum at 110V AC per power supply 50A maximum at 220V AC per power supply
Frequency	50 to 60 Hz

Power	Rating
Watts	300 maximum (with Power Factor correction)
BTU/hr	1,025 maximum

Note

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

R100 disk shelf

Physical characteristics

The following table lists the physical characteristics for each disk shelf.

Characteristics	U.S.	Metric
Height	7.0 in. or 4U, where 1U = 1.75 in.	17.8 cm
Width	17 in.	43.2 cm
Depth	22.0 in.	55.9 cm
Weight fully loaded	55 lbs	25 kg

Environmental specifications for each disk shelf enclosure

The following table lists the environmental operating specifications for each disk shelf.

Condition	Requirement
Power input	115/230V AC, 8/6A, 50/60 Hz, auto-sensing
Power output	164 Watts (max.)
Steady state current	0.7A
Inrush current	50Apk/2.5msec. @ 120V AC, or 60Apk/2.5msec. @ 200V AC.
Temperature	41° to 104°F (5° to 40°C)
Humidity	5% to 95%, noncondensing
Operating shock	5G's at 8mS
Operating vibration	0.100G rms for 10–300Hz, 0.88G rms for 301–500Hz
Altitude	-650 to 10,000 feet

**Electrical
requirements for
the entire R100
system**

The following table lists the AC power electrical requirements for the entire R100 system.

Power	Rating
Current	7A (steady state; 180V AC) 14A (steady state; 120V AC)
Watts	1,100 (steady state current)
BTU/hr	3,750

Installation rules and restrictions

General rules and restrictions

Observe the following rules and restrictions when installing a NetApp storage system:

- ◆ You must wear an antistatic wrist strap when you handle electronic equipment.
- ◆ You must work with another person.

WARNING

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

Rules for arranging the components in the rack

Observe the following rules when arranging the components in a rack for an R100 storage system:

- ◆ The R100 chassis supports 7 disk shelves.
- ◆ The storage system is designed to be arranged in the equipment rack with four disk shelves on the bottom, followed by the chassis, followed by three disk shelves installed above the chassis.
- ◆ Only install the number of disk shelves supported by your chassis. Go to the System Configuration Guide at <http://now.netapp.com> to determine the current storage limit for your model.

About this chapter This chapter provides all the information you need to install an R100 system into a rack.

Topics in this chapter This chapter describes the following topics:

- ◆ “[Installing an R100 disk shelf](#)” on page 12
- ◆ “[Installing an R100 chassis](#)” on page 21

Installing an R100 disk shelf

About this section

This section provides all the information you need to install an R100 disk shelf into a rack.

Topics in this section

This section describes the following topics:

- ◆ [“Before you begin your installation”](#) on page 13
- ◆ [“Installing an R100 disk shelf using two-post mounting brackets”](#) on page 15
- ◆ [“Installing an R100 disk shelf using the four-post rail kit”](#) on page 19

Installing an R100 disk shelf

Before you begin your installation

Supported disk drives

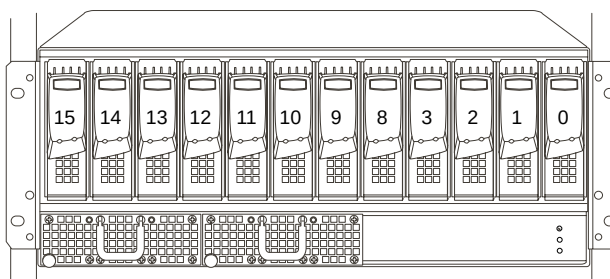
Each R100 disk shelf supports 12 160 GB ATA hard disk drives with an actual storage capacity of 136 GB per hard drive after formatting.

Disk drive labeling

Each disk drive is labeled with a unique SCSI address, which helps define its location within the disk shelf. Addresses are assigned to each drive bay beginning right to left in groups of four, corresponding to the four disks supported by each bridge in the disk shelf.

	SCSI address	Drive bay number
Bridge 1	0	0
	1	1
	2	2
	3	3
	4	SES device
reserved	5	unused
	6	unused
	7	SCSI adapter
Bridge 2	8	4
	9	5
	10	6
	11	7
Bridge 3	12	8
	13	9
	14	10
	15	11

Therefore, the 12 drive bays in the disk shelf are labeled between 0 and 15 from right to left with SCSI addresses 5, 6, and 7 reserved for other internal functions. The SCSI address labels are shown in the following illustration.



*4,5,6,7 are reserved

Enclosure services monitoring

The R100 storage system uses the enclosure services monitoring method to monitor environmental conditions of the disk shelf. Enclosure services conditions are communicated to the chassis through the EMU module.

The following table describes the three stages of enclosure services monitoring.

Stage	Device	What it does...
1	Chassis	Uses a subset of SCSI-3 commands to monitor the disk shelf for data related to disk presence, temperature, power supply units, and fan status.
2	Disk shelf	The SCSI-ATA bridge requests information from the EMU.
3	Disk shelf	The EMU returns the environmental data to the bridge.
4	Disk shelf	The bridge returns EMU data to the chassis.

Installing an R100 disk shelf using two-post mounting brackets

Installing the disk shelf

To install the R100 disk shelf using two-post mounting brackets, complete the following steps.

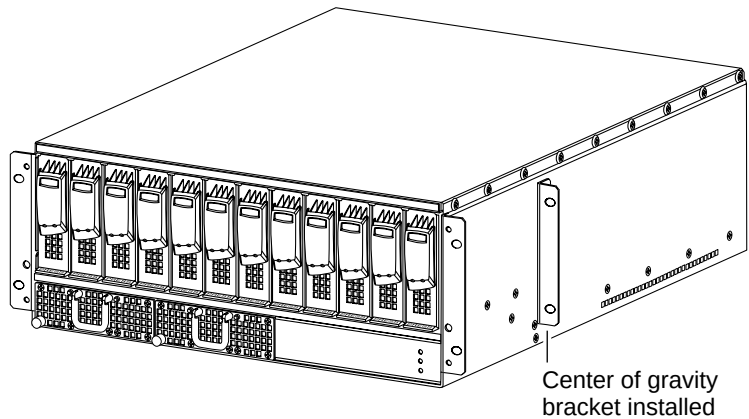
WARNING

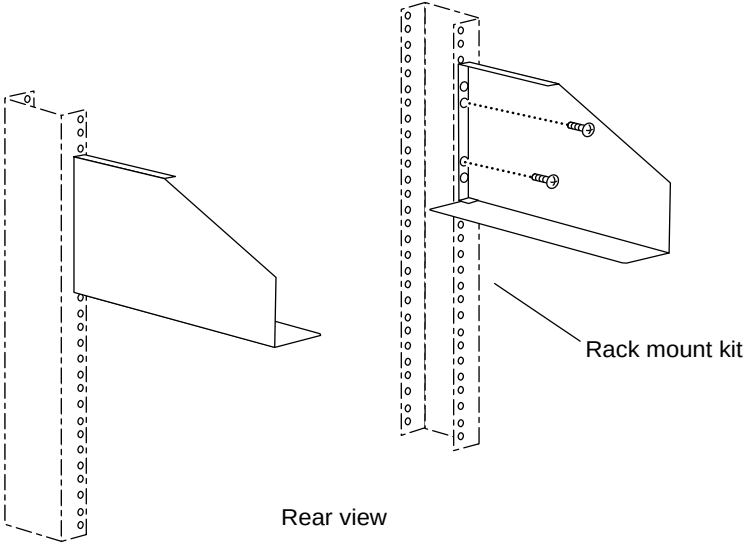
You must install each disk shelf with either the two Telco brackets or the center-of-gravity brackets that came with the rack mounting hardware kit in your shipment package. Do not ear-mount the R100 into a Telco-type rack without Telco support brackets; the R100 disk shelf will collapse from the rack under its own weight.

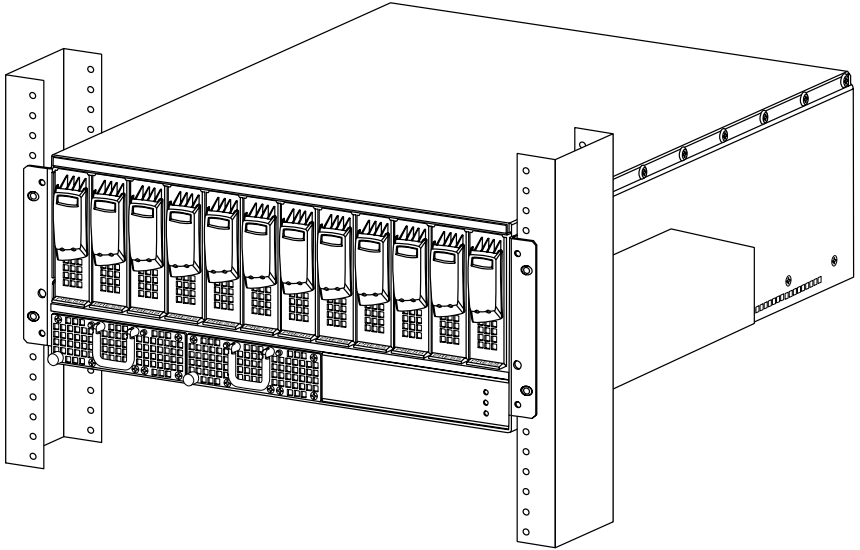
Step	Action	
1	Put on the antistatic wrist strap and grounding leash.	
2	If the disk shelf is...	Then...
	Part of a new storage system that you are installing	Install the chassis and disk shelves according to the recommended component arrangement; see “Rules for arranging the components in the rack” on page 9
	A replacement shelf	Carefully replace the previous shelf in the rack with the newer shelf; see “Replacing a disk shelf in a rack” on page 70.
3	Select two holes on each side of the rack for the installation.	

Step	Action	
4	If you are using the...	Then...
	Center-of-gravity bracket kit	1. Select two holes in the middle of each side of the disk shelf to which you want to attach the brackets and secure the brackets with the #10 Phillips head screws. 2. Align the holes on the rack to the holes on the bracket and secure the disk shelf to the rack with the mounting screws.

The following illustration shows an R100 disk shelf with a center-of-gravity bracket installed.



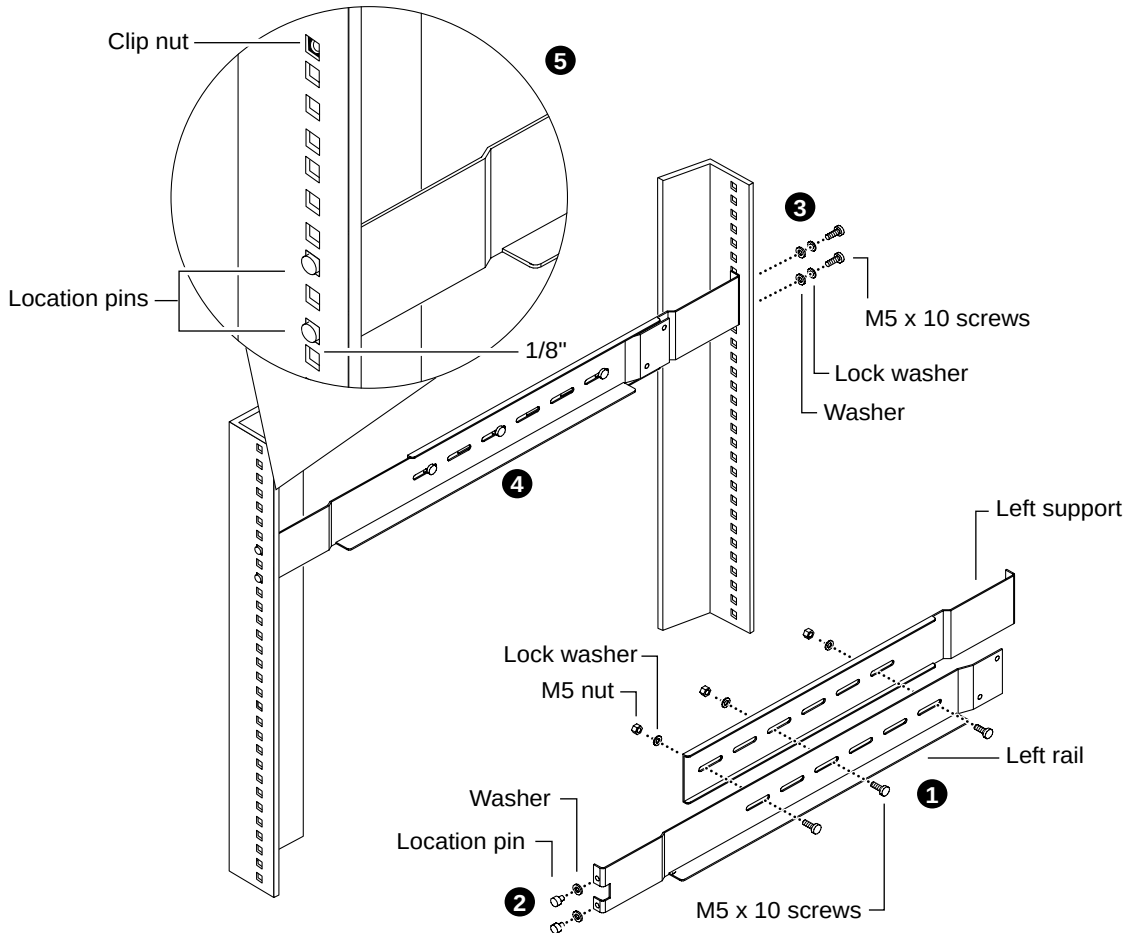
Step	Action	
5	Rack mount kit	1. Align the rack mount kit to the holes. Note You might need another person to help hold the rack steady. 2. Insert the mounting screws through the two inner holes of the mounting bracket. Tighten the screws so that the mounting bracket is firmly attached to the Telco rack. Repeat for the opposite mounting bracket. The following illustration shows the rear view of the rack mount kit being installed.  Rear view Rack mount kit

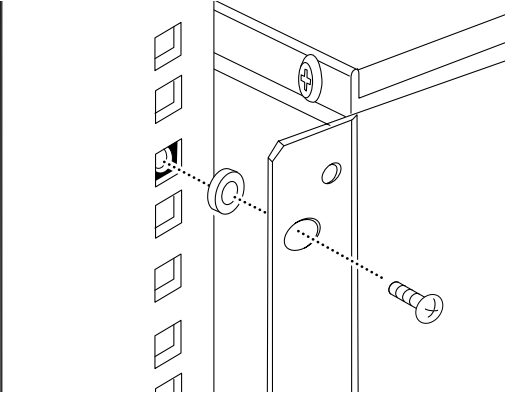
Step	Action	
6		3. Install the disk shelf onto the rack mount kit and retain it to the Telco-type rack. The following illustration shows an R100 disk shelf being attached using the rack mount kit. 
7	Repeat the disk shelf installation for each disk shelf until four disk shelves are installed together from the bottom of the rack.	
8	Go to “ Installing an R100 chassis ” on page 21 for instructions about installing the chassis.	
9	Repeat the disk shelf installations for the remaining three disk shelves above the chassis.	
10	Go to “ Connecting an R100 System ” on page 25.	

Installing an R100 disk shelf using the four-post rail kit

Installing the disk shelf

To install the R100 disk shelf using the four-post rail kit, complete the following steps, using the illustration for reference.



Step	Action
1	Connect the left support with the left rail, using three M5 nuts, three lock washers, and three M5 x 10 screws. Leave them loose enough so that you can adjust the length of the rail.
2	Align the holes in the front of the assembled rail with the front post of the four-post rack, and secure it to the post with two location pins and washers.
3	Attach the rear of the assembled rail to the rear post using two M5 x 10 screws, washers, and lock washers, then tighten the rail and support.
4	Repeat Steps 1 through 3 for the right support rail.
5	Install the clip nuts for the disk shelf into the equipment rack posts. Only one clip nut is required per side, located seven holes above the top location pin of the mounting bracket.
6	Slide your R100 disk shelf onto the support rails and secure it to the equipment rack. Before securing the disk shelf to the rack, be sure to install the supplied spacers between the mounting flange of the disk shelf and the mounting post of your rack, as shown in the following illustration. 

Installing an R100 chassis

About this section

This section describes your options for installing an R100 chassis in a freestanding 19-inch equipment rack.

Positioning your chassis

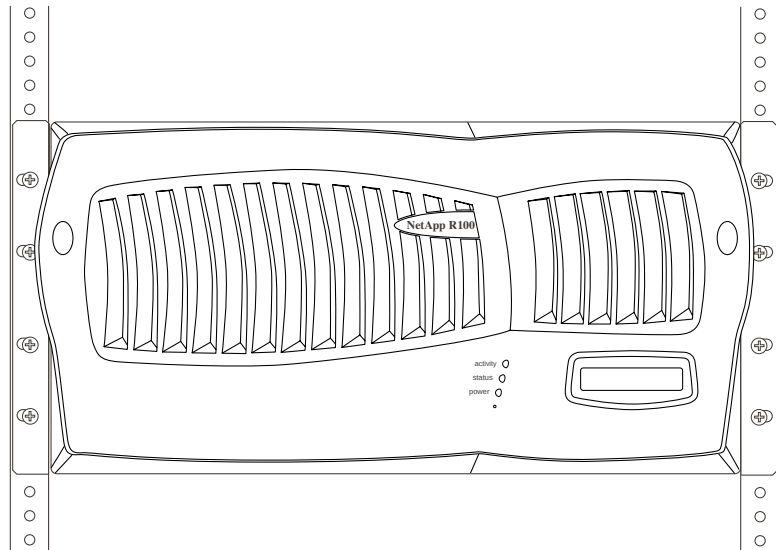
The R100 chassis has adjustable installation brackets that enable you to install it in one of three horizontal positions in the rack.

WARNING

When you install disk shelves and a chassis into a rack, you must install the equipment from the bottom up to ensure the greatest stability.

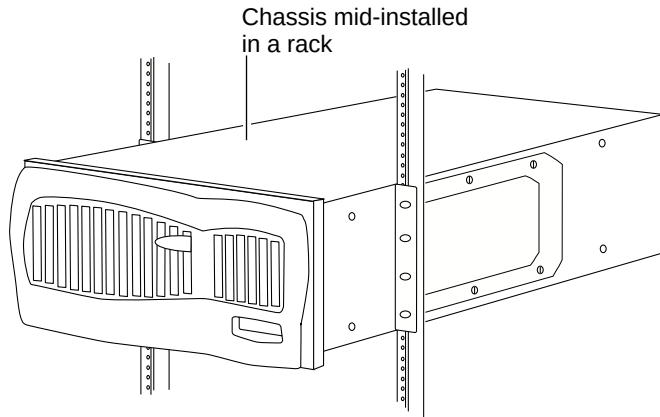
- ◆ Front-installed position—The installation brackets lie flush with the chassis front panel.

The chassis is shipped with the installation brackets in this position. The following figure shows a front-installed R100 chassis.



- ◆ Two mid-installed positions—You can move the installation brackets to extend the chassis 4.75 inches or 9.5 inches in front of the rack, providing more room to service the chassis from the back.

The following illustration shows an R100 chassis mid-installed (4.75 inches) in a rack.



WARNING

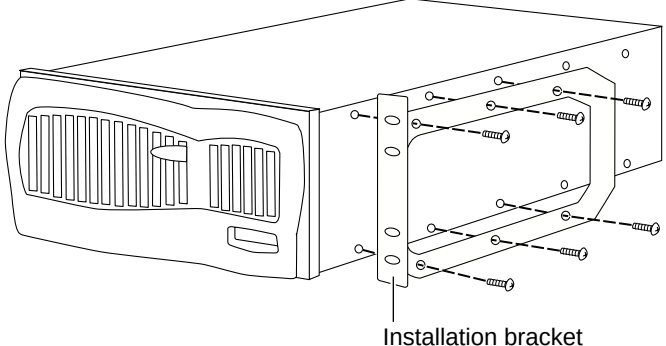
To avoid injuring yourself or damaging the chassis, you must work with at least one other person when you install the chassis in the rack.

Moving the installation brackets

If you want to mid-install the chassis in a rack, you must move the installation brackets on the sides of the chassis from the default position.

To move the installation brackets, complete the following steps.

Step	Action
1	Put on an antistatic wrist strap and attach the grounding leash so that you are appropriately grounded.

Step	Action
2	Use a #2 Phillips screwdriver to remove the installation brackets attached to each side of the chassis.  Installation bracket
3	For each installation bracket, select a position 4.75 inches or 9.5 inches from the first hole on one side of the chassis and align the installation bracket holes with the chassis holes.
4	Attach each installation bracket to the chassis by inserting screws into the bracket and chassis holes and tightening the screws.

Installing the chassis

To install the chassis in a 19-inch equipment rack, complete the following steps.

Step	Action
1	Put on an antistatic wrist strap and grounding leash.
2	Select four holes on each front rack rail. These holes should have the same spacing as the holes on the chassis installation brackets.
3	Align the rack holes with the installation bracket holes on the chassis. The person assisting you should stand behind the rack to help support the weight of the chassis.

Step	Action
4	Insert the mounting screws in the bottom hole on each side first and tighten the screws using a #2 Phillips screwdriver. Note_____ The rack can support the weight of the chassis after the chassis is attached by the bottom screws. You do not need another person to hold the chassis from the back of the rack after fastening these screws. _____
5	Insert and tighten the remaining screws.
6	For disk shelf installation, see “Installing an R100 disk shelf using two-post mounting brackets” on page 15. For disk shelf connection to your R100 chassis, see “Connecting an R100 System” on page 25.

About this chapter This chapter describes how to connect an R100 system.

Topics in the chapter

This chapter provides information about the following topics:

- ◆ [“Connecting an R100 disk shelf”](#) on page 26
- ◆ [“Connecting an R100 chassis to third-party devices”](#) on page 33
- ◆ [“Connecting an R100 chassis to an Ethernet network”](#) on page 38

Connecting an R100 disk shelf

About this section

Depending on your configuration, your R100 system uses either dual-port or single-port SCSI adapter cards to connect the disk shelves to the chassis.

Topics in this section

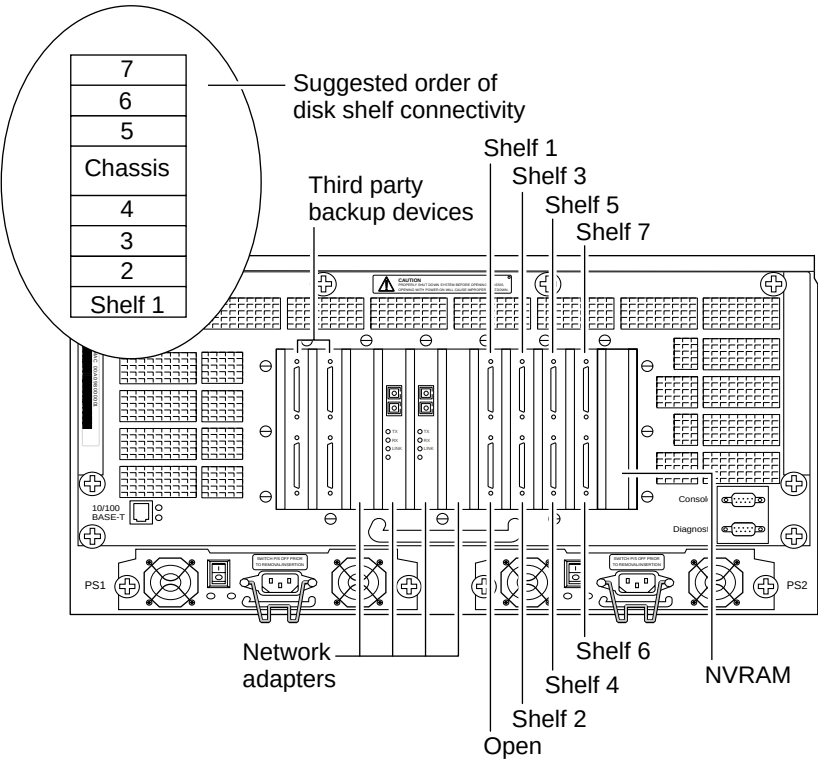
For details about connecting a disk shelf to the R100 chassis, see the following topics:

- ◆ [“Connecting a disk shelf using a dual-port SCSI adapter”](#) on page 27
- ◆ [“Connecting a disk shelf using a single-port SCSI adapter”](#) on page 29
- ◆ [“Securing the cables”](#) on page 31

Connecting a disk shelf using a dual-port SCSI adapter

Sequence of disk shelf connections

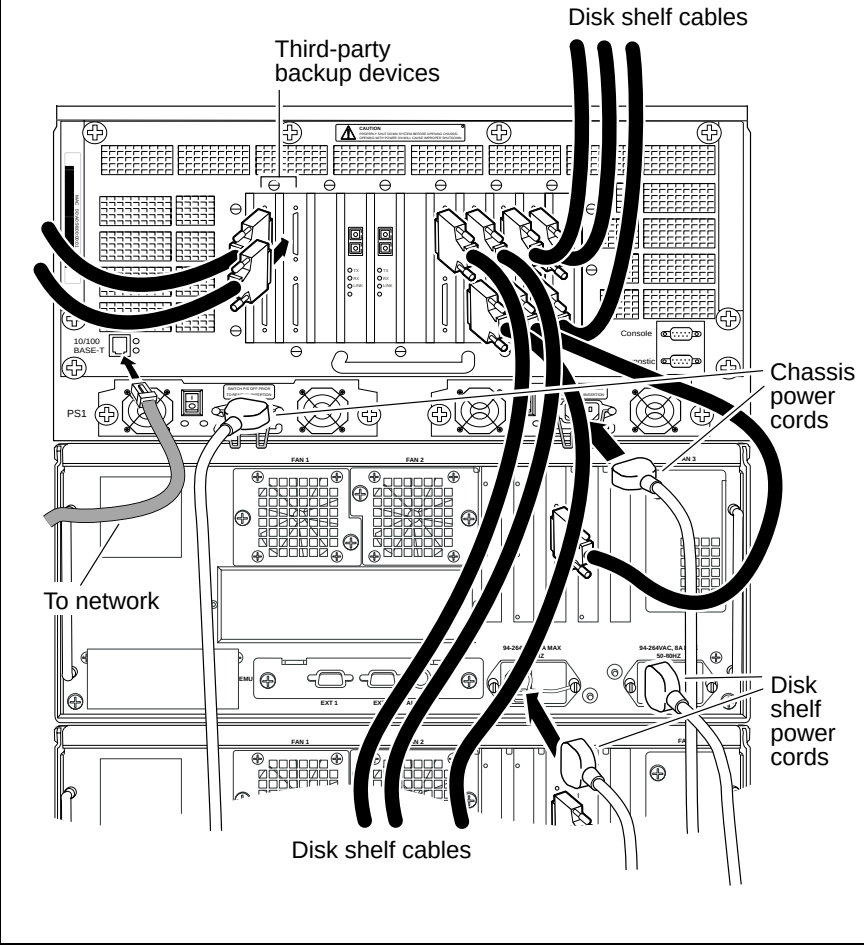
Connect the disk shelves to the chassis in the sequence shown in the following illustration.



Connecting a disk shelf to the chassis

To connect a disk shelf to the chassis, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Make sure that the chassis and the disk shelves are turned off.
3	Connect each disk shelf to the chassis using the supplied SCSI cables (SCSI LVD VHDCI-68P), as shown in the following illustration.

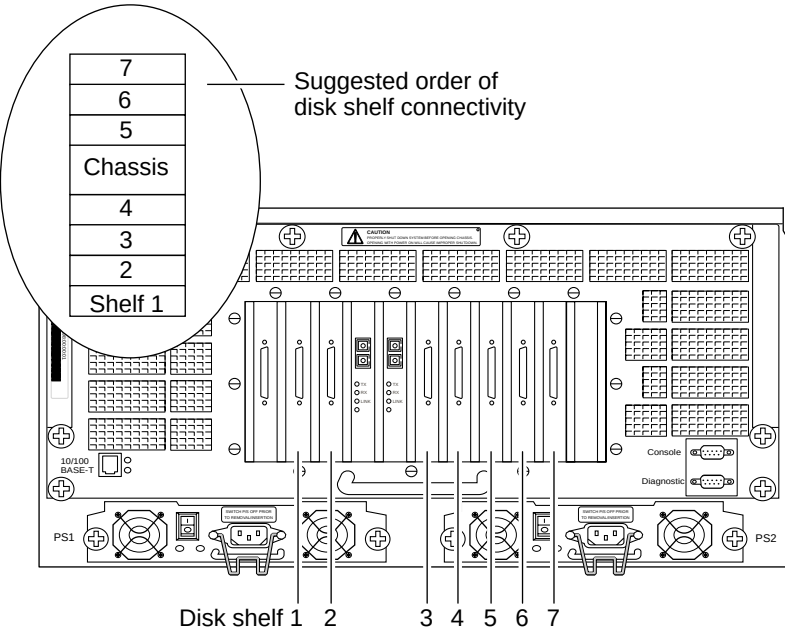


Connecting an R100 disk shelf

Connecting a disk shelf using a single-port SCSI adapter

Sequence of disk shelf connections

Connect the disk shelves to the chassis in the sequence shown in the following illustration.



Connecting a disk shelf to the chassis

To connect a disk shelf to the chassis, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Make sure that the chassis and the disk shelves are turned off.
3	Connect each disk shelf to the chassis using the supplied SCSI cables (SCSI LVD VHDCI-68P), as shown in the following illustration.

— Third-party backup device

Disk shelf cables

Chassis power cords

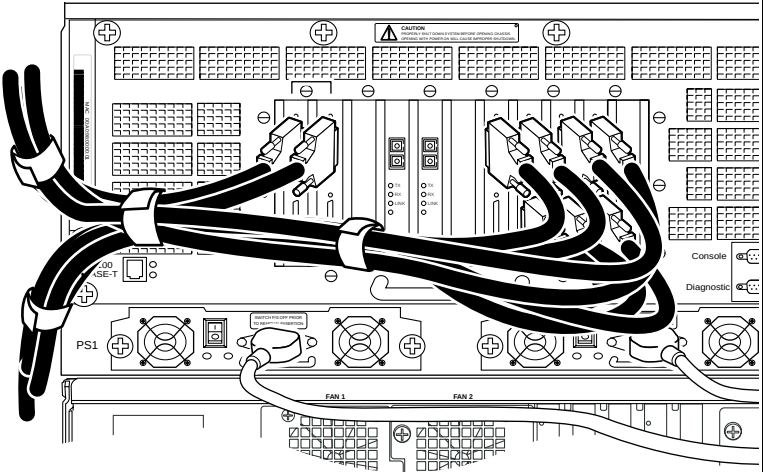
Disk shelf power cords

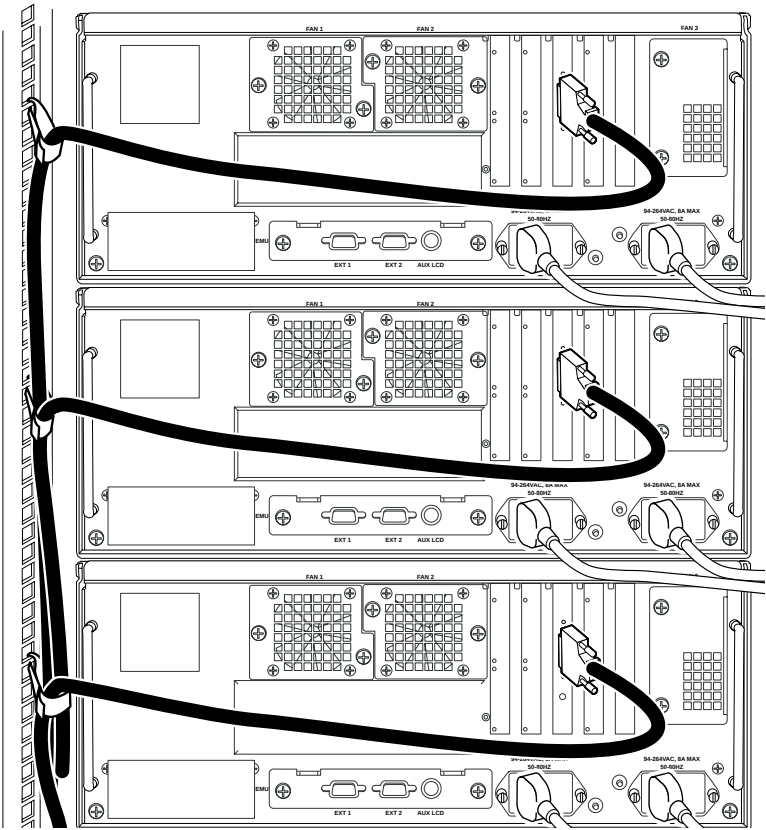
To network

Connecting an R100 disk shelf

Securing the cables

Securing the cables To secure the cables, complete the following steps.

Step	Action
1	Attach the cables so that the connectors protrude directly outward from the cable connections on the chassis, allowing sufficient stress relief within the cables. Caution_____ There should be no twisting or bending of the connectors at the connection points. Excessive bending and twisting might damage components within the chassis, or to the cables. _____ 
2	After making the connections, use cable ties to secure the cables into place as shown in the preceding illustration.

Step	Action
3	Use cable ties at the locations shown in the photograph. 

Connecting an R100 chassis to third-party devices

About this section

This section discusses how to connect your R100 chassis to a third-party SCSI tape backup device or to a third-party Fibre Channel switch that you connect to a third-party FC-AL tape backup device.

Rules for connecting the third-party devices

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

- ◆ Use a cable that is
 - ❖ Appropriate to the tape adapter installed in your chassis
 - ❖ Of an approved length for the third-party device

Note

See the documentation for the third-party device.

- ◆ Check the System Configuration Guide at <http://now.netapp.com> to verify support for your tape backup device. An unsupported tape backup device might cause the chassis to halt.

Topics in this section

For details about connecting an R100 to third-party devices, see the following topics:

- ◆ “[Connecting the chassis to a third-party SCSI tape backup device](#)” on page 34
- ◆ “[Connecting the chassis to a third-party Fibre Channel switch](#)” on page 36

Connecting the chassis to a third-party SCSI tape backup device

Preparing the tape backup device

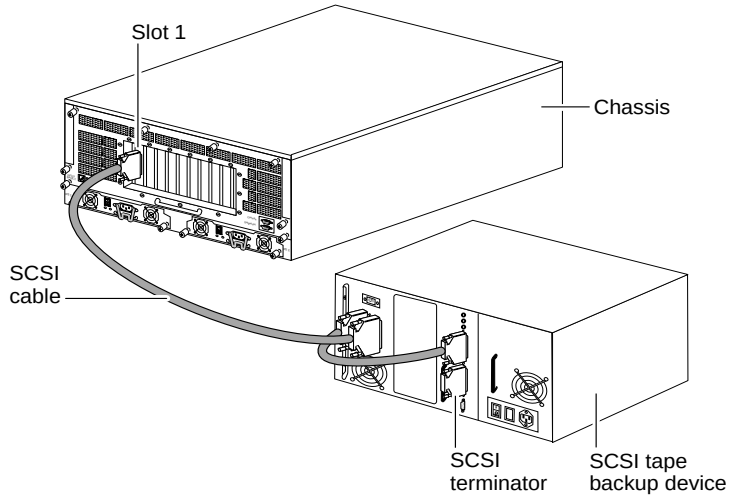
To prepare the tape backup device, complete the following steps.

Step	Action
1	Set the ID on the tape backup device. See the documentation for the tape backup device.
2	If you have a robotic loader on the tape backup device or a Fibre Channel switch, set its ID.
3	Turn off all third-party devices and go to “Connecting a SCSI tape backup device.”

Connecting a SCSI tape backup device

To connect a third-party SCSI tape backup device to the chassis, complete the following steps.

Step	Action
1	Shut down the chassis 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 chassis.
3	Connect the cable provided with the tape device to the following points of connection: 1. The appropriate port on the back panel of the chassis, typically slot 1. 2. The port on the tape device

Step	Action
4	Tighten each end of the cable.
5	Terminate any open port on the tape backup device with an active SCSI terminator. For information about terminating the open port, see the documentation for the tape backup device.  The diagram illustrates the connection of an SCSI cable. On the left, a 'Chassis' is shown with a 'Slot 1' on its front panel. An 'SCSI cable' is plugged into this slot. The other end of the 'SCSI cable' is connected to an 'SCSI tape backup device'. On the front panel of the backup device, the cable is connected to a port labeled 'SCSI terminator'. The backup device also has other ports and a fan visible on its front panel.
6	Go to “Connecting an R100 chassis to an Ethernet network” on page 38.

Connecting the chassis to a third-party Fibre Channel switch

Preparing the Fibre Channel switch

To prepare the Fibre Channel switch, complete the following steps.

Step	Action
1	Set the ID on the Fibre Channel switch. See the documentation for the Fibre Channel switch device.
2	Turn off all third-party devices and go to “ Connecting a Fibre Channel switch. ”

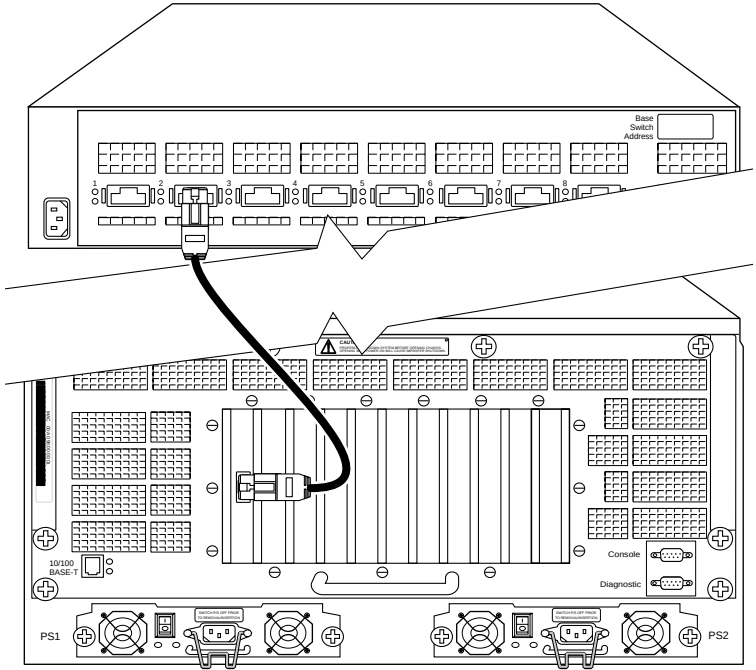
Connecting a Fibre Channel switch

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

Note

See the third-party documentation about connecting the Fibre Channel tape-backup device to the Fibre Channel switch.

Step	Action
1	Shut down the chassis 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 chassis.
3	Install the Fibre Channel switch in a separate rack location or according to the manufacturer’s instructions.

Step	Action
4	Connect the cable provided with the Fibre Channel switch to the following points of connection: - The appropriate port on the back panel of the chassis - An available port on the Fibre Channel switch  The diagram illustrates the connection of a Fibre Channel cable. The top part shows the back panel of a chassis with multiple ports. A cable is plugged into one of these ports. The bottom part shows a Fibre Channel switch with a corresponding port. The cable is connected to this port on the switch. The chassis back panel also features a 'Base Switch Address' label and various other ports and connectors.
5	Clip and click in each end of the cable.
6	Go to “Connecting an R100 chassis to an Ethernet network” on page 38.

Connecting an R100 chassis to an Ethernet network

About this section

This section identifies the types of Ethernet connections supported by your R100 chassis and how to connect to each type of Ethernet connection.

For detailed information

For details about connecting an R100 chassis to an Ethernet network, see the following topics:

- ◆ [“Types of Ethernet networks supported”](#) on page 39
- ◆ [“Connecting to an Ethernet port using copper cabling”](#) on page 41
- ◆ [“Connecting to a 1000Base-SX fiber port”](#) on page 43

Types of Ethernet networks supported

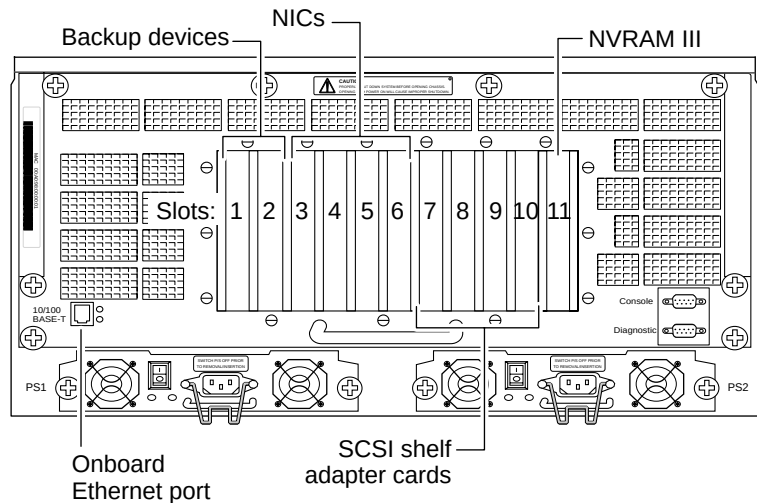
Supported Ethernet connections

Your R100 chassis has an onboard 10Base-T/100Base-TX port and supports the following types of Ethernet network interface cards (NICs):

- ◆ 100Base-TX/1000Base-T
- ◆ 1000Base-SX (fiber connectivity)

Slot assignments on the chassis

The following illustration shows the location of the onboard Ethernet port and the suggested slot locations for additional NICs, SCSI shelf adapter cards, NVRAM III card, and backup device (dual-port SCSI adapter configuration shown).



Note

For specific information about the slot assignments available and the NICs supported by the chassis, see the System Configuration Guide at <http://now.netapp.com>.

Ethernet cabling requirements

The following table lists the cabling requirements for Ethernet connections.

Note

Do not exceed the maximum cable length specification.

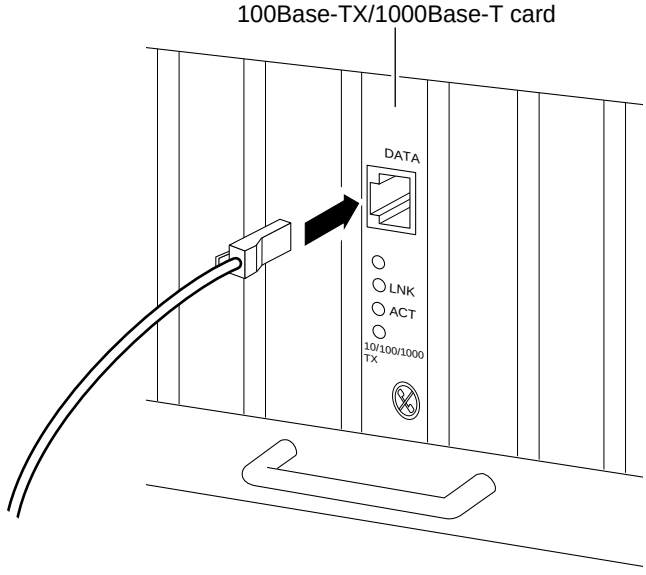
Ethernet port	Cabling requirements	
10Base-T/ 100Base-TX	Category 3 (10Base-T only) or 5 (10Base-T/100Base-TX) unshielded twisted-pair (UTP) cable with RJ-45 connectors	
100Base-TX/ 1000Base-T	Category 5 unshielded twisted-pair (UTP) cable with RJ-45 connectors	
1000Base-SX fiber	Type of cable	Max. distance
	50 micron multimode fiber optic cable with SC connector	550m
	62.5 micron multimode fiber optic cable with SC connector	220m

Connecting to an Ethernet port using copper cabling

Connecting to an Ethernet port using copper cabling

To connect the chassis to a 10Base-T/100Base-TX or 100Base-TX/1000Base-T Ethernet network using copper cabling, complete the following step.

Step	Action	
1	If your Ethernet port is...	Then...
	The chassis' onboard Ethernet port, labeled 10Base-T/100Base-TX	Push the cable with the RJ-45 connector into the onboard Ethernet port on the chassis, until it clicks and locks into place.

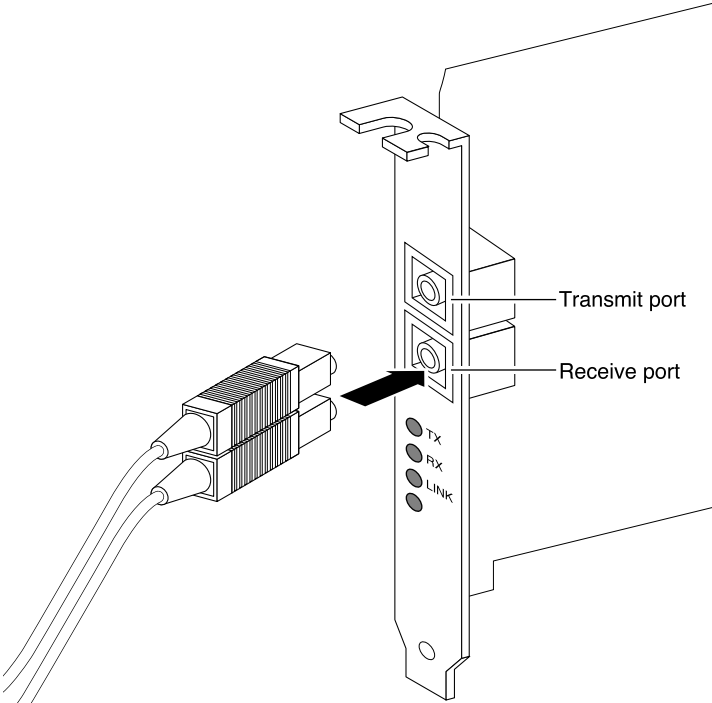
Step	Action
1	A 100Base-TX/1000Base-T NIC Push the cable with the RJ-45 connector into the RJ-45 port on the NIC, until it clicks and locks into place. The following illustration shows a UTP cable with an RJ-45 connector connecting to a single-port 100Base-TX/1000Base-T NIC. Note The NIC is labeled 10/100/1000-TX; however, the chassis supports only 100Base-TX/1000Base-T.  100Base-TX/1000Base-T card DATA LNK ACT 10/100/1000 TX

Connecting an R100 chassis to an Ethernet network

Connecting to a 1000Base-SX fiber port

Connecting to a 1000Base-SX fiber port

To connect the chassis to a 1000Base-SX network using fiber, complete the following step.

Step	Action
1	Push the cable with the SC connector into the ports on the 1000Base-SX NIC, until it clicks and locks into place. 

Powering On an R100 System

About this chapter

This chapter describes how to establish a console connection to the chassis and how to power on the system.

Topics in this chapter

This chapter describes the following topics:

- ◆ [“Connecting the chassis to an ASCII terminal console”](#) on page 46
- ◆ [“Connecting the system to a power source and powering on”](#) on page 48

Connecting the chassis to an ASCII terminal console

About the ASCII terminal console

The ASCII terminal console enables you to monitor the boot process and helps you configure the chassis after it boots. You must use an ASCII terminal attached through the serial port on the back of the chassis if you want to do local system administration.

Note _____
Make sure that you are using an ASCII terminal console attached to the chassis serial port, and that the display length is set to 25 lines.

ASCII terminal console cable wiring

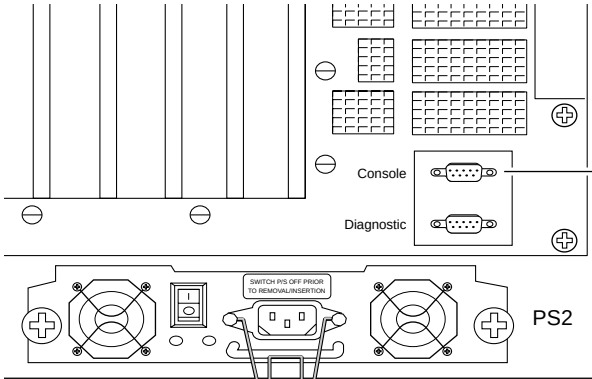
The ASCII terminal console is connected to the chassis with a DB-9 serial cable through the serial port on the back of the chassis. The following table lists how the DB-9 serial cable is wired. Input indicates data flow from the ASCII terminal to the chassis and output indicates data flow from the chassis to the ASCII terminal.

Pin number	Signal	Data flow direction	Description
1	DCD	Input	Data carrier detect
2	SIN	Input	Serial input
3	SOUT	Output	Serial output
4	DTR	Output	Data terminal ready
5	GND	N/A	Signal ground
6	DSR	Input	Data set ready
7	RTS	Output	Request to send
8	CTS	Input	Clear to send
9	RI	Input	Ring indicator

Connecting to an ASCII terminal console

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

Step	Action												
1	Set the following communications parameters to the same values for both the chassis and ASCII terminal.												
	<table><tr><th>Parameter</th><th>Setting</th></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></table>	Parameter	Setting	Baud	9600	Data bit	8	Parity	None	Stop bits	1	Flow control	None
	Parameter	Setting											
	Baud	9600											
	Data bit	8											
	Parity	None											
	Stop bits	1											
	Flow control	None											
Note _____													
See your terminal documentation for information about changing your ASCII console terminal settings.													

2	Connect the DB-9 serial cable to the Console port on the chassis and to the ASCII terminal. The following illustration shows the location of the Console port.  Console port												
3	Set the console display line length to exactly 25 lines.												

Connecting the system to a power source and powering on

Sequence for powering on system components

You power on the components in your system in this sequence:

- ◆ Disk shelves first
- ◆ Chassis last

Caution

You must power on the chassis after the disk shelves.

The disk shelves and disk drives require time to power on, reset, and prepare to respond to the chassis. The chassis expects these units to be ready for input/output when it powers on and performs its reset and self-test.

Power-on process

The power-on process for a new installation automatically

- ◆ Checks all connections to the chassis
- ◆ Runs the `setup` command

For detailed information

For details about connecting the system to a power source and powering on, see the following topics:

- ◆ [“Connecting the disk shelves to AC power”](#) on page 49
- ◆ [“Connecting the chassis to AC power”](#) on page 51

Connecting the system to a power source and powering on

Connecting the disk shelves to AC power

About AC power supplies

The disk shelf is shipped with two power supplies, labeled PSU1 and PSU2, respectively, and an AC power cord for each power supply.

Connecting and powering on the R100 disk shelves

To connect each disk shelf to an AC power source, complete the following steps.

Step	Action
1	Make sure that the chassis and the disk shelves are turned off.
2	Plug the power cord for PSU1 into the power receptacle on the right connector (rear view).
3	Plug the power cord for PSU2 into the power receptacle on the left connector (rear view).
4	Plug the other end of each power cord into separate grounded AC power sources. Caution_____ To obtain power supply redundancy, make sure that you connect the second power supply to a separate AC circuit.
5	Fasten the power cord with the clamp.
6	Turn the power switch of each power supply to the On position. Result: The disk shelf lights illuminate, indicating system activity. Note_____ The default spin-up time for all disks in the disk shelf 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.

Step	Action
7	Make sure that the following LEDs illuminate: ◆ Front panel LEDs ◆ Power supply LEDs The LED responses are described in “Disk shelf LED responses at startup” on page 61. Note_____ If the LEDs do not illuminate, contact Network Appliance Technical Support. _____

Connecting the chassis to AC power

Connecting the R100 chassis to AC power

To connect the chassis to an AC power source, complete the following steps.

Step	Action
1	Confirm that the power switch on each power supply is in the Off (0) position.
2	Connect the socket end of the supplied power cord to the recessed power plug on the power supply.
3	Secure the power cord with the retaining clip on the power supply.
4	Plug the other end of the power cord into a grounded electrical outlet.
5	Repeat Steps 1 through 4 for the second power supply. Caution_____ To obtain power supply redundancy, make sure that you connect the second power supply to a separate AC circuit. _____
6	Turn the power switch on the power supplies to the On (I) position. Result: The system verifies the hardware and loads the operating system.
7	Make sure that the following LEDs illuminate: ◆ Front panel LEDs ◆ Power supply LEDs ◆ Network port LEDs The LED responses are described in “Chassis LED responses at startup” on page 54. Note_____ If the LEDs do not illuminate, contact Network Appliance Technical Support. _____

Step	Action
8	Check the startup messages as they appear on the console or LCD. The system messages are described in “System messages at startup” on page 63. Note_____ If the startup messages do not appear, contact Network Appliance Technical Support. _____
9	Go to the <i>Getting Started Guide</i> to install software on the chassis and configure it for use when the following default host name prompt appears on the console screen: toaster>

About this chapter

This chapter describes the startup responses from the R100 system and various hardware components on the system. These responses include

- ◆ The LED responses from the various hardware components on the chassis
- ◆ The LED responses from the various hardware components on the disk shelf
- ◆ The system messages displayed on
 - ❖ The chassis LCD
 - ❖ The console connected to the chassis

Topics in this chapter

This chapter describes the following topics:

- ◆ [“Chassis LED responses at startup”](#) on page 54
- ◆ [“Disk shelf LED responses at startup”](#) on page 61
- ◆ [“System messages at startup”](#) on page 63

Chassis LED responses at startup

About this section

This section describes the LED responses from the chassis and various hardware components on the chassis at startup.

For detailed information

For details about chassis LED responses at startup, see the following topics:

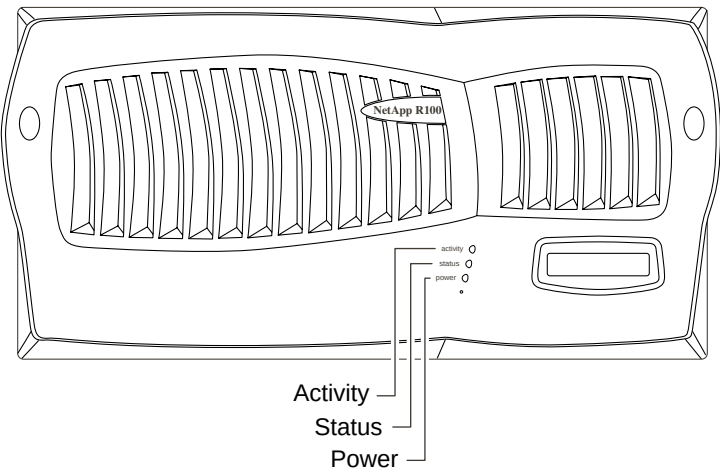
- ◆ [“Front panel LEDs”](#) on page 55
- ◆ [“Power supply LEDs”](#) on page 57
- ◆ [“Network connection LEDs”](#) on page 58

Chassis LED responses at startup

Front panel LEDs

Location of front panel LEDs

The following illustration shows the LEDs on the front panel of an R100 chassis.



Description of front panel LEDs

The following table describes the three LEDs on the front panel.

LED	State of illumination	Explanation
Activity	Green	Operation/activity is normal.
	Flashing	CPU activity is detected.
	Off	No activity is detected.

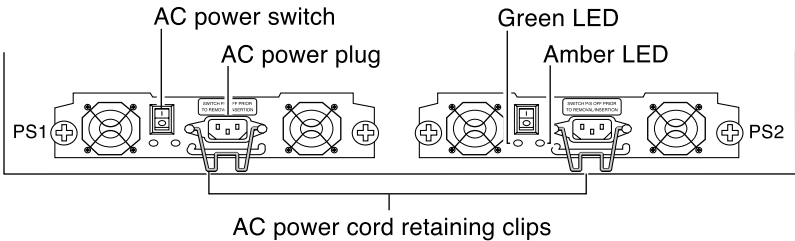
LED	State of illumination	Explanation
Status	Green	The system is operating normally.
	Amber	The Status LED turns amber when you turn on the chassis and stays lit while the operating system is loading. Note_____ If the Status LED remains amber, a fault occurred or the system halted. The chassis LCD identifies the reason for this continued state of illumination. _____
Power	Green	The system is on.
	Off	The system is off.

Chassis LED responses at startup

Power supply LEDs

About this section This section describes the LED responses for the AC power supply in your R100 chassis. The location of the LEDs is identified and the LED functionality is described:

AC power supply LEDs **Location of LEDs:** The following illustration shows the AC power supply LEDs on the back panel.



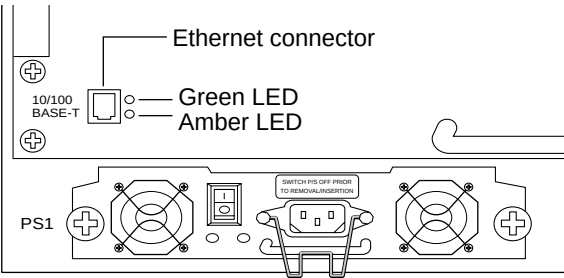
Description of LEDs: The following table describes the AC power supply LEDs.

LED	State of illumination	Explanation
Amber	On	Power supply is receiving AC power.
	Off	AC power is not present.
Green	On	Power supply output is good.
	Off	Power supply output is bad.

About this section This section describes the LED responses for the network connections supported by your R100 chassis. For each of the following types of network connections, the location of the LEDs is identified and the LED functionality is described:

- ◆ “Onboard 10Base-T/100Base-TX Ethernet port LEDs”
- ◆ “100Base-TX/ 1000Base-T NIC LEDs” on page 59
- ◆ “1000Base-SX fiber NIC LEDs” on page 60

Onboard 10Base-T/100Base-TX Ethernet port LEDs **Location of LEDs:** The onboard 10Base-T/100Base-TX Ethernet port has two LEDs, as shown in the following illustration.

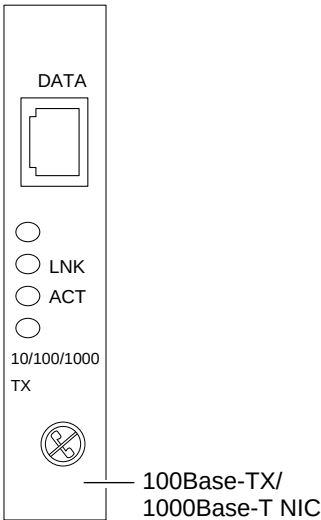


Description of LEDs: The following table describes the LEDs for the onboard 10Base-T/100Base-TX Ethernet port.

LEDs	State of illumination	Indicates...
Green	On	Valid network connection.
	Off	No Ethernet connection is present.
Amber	On	Transmitting and receiving data.
	Off	Idle.

**100Base-TX/
1000Base-T NIC
LEDs**

Location of LEDs: The 100Base-TX/1000Base-T NIC has one port and four LEDs, as shown in the following illustration.



Description of LEDs: The following table describes the LEDs on the 100Base-TX/1000Base-T NIC.

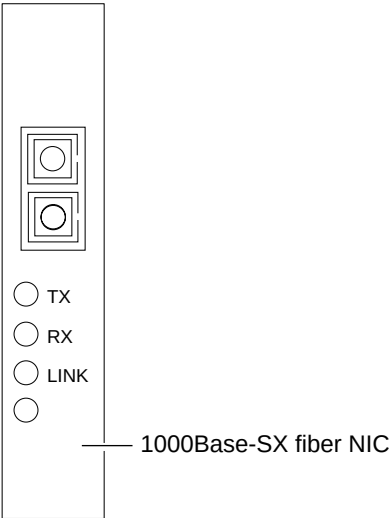
LEDs	State	Indicates...
Top (not labeled)	N/A	Not used.
LNK	On	Valid network connection. For some devices, the LED can take several seconds to light up.
	Off	Link to network is not present.
ACT	On	Sending or receiving data.
	Off	Idle.
Bottom (not labeled)	Amber	Operating at 1000 Mbps.
	Green	Operating at 100 Mbps.

**1000Base-SX fiber
NIC LEDs**

Location of LEDs: The 1000Base-SX fiber NIC has one port and four LEDs, as shown in the following illustration.

Note_____

The R100 chassis uses only the TX, RX, and LINK LEDs.



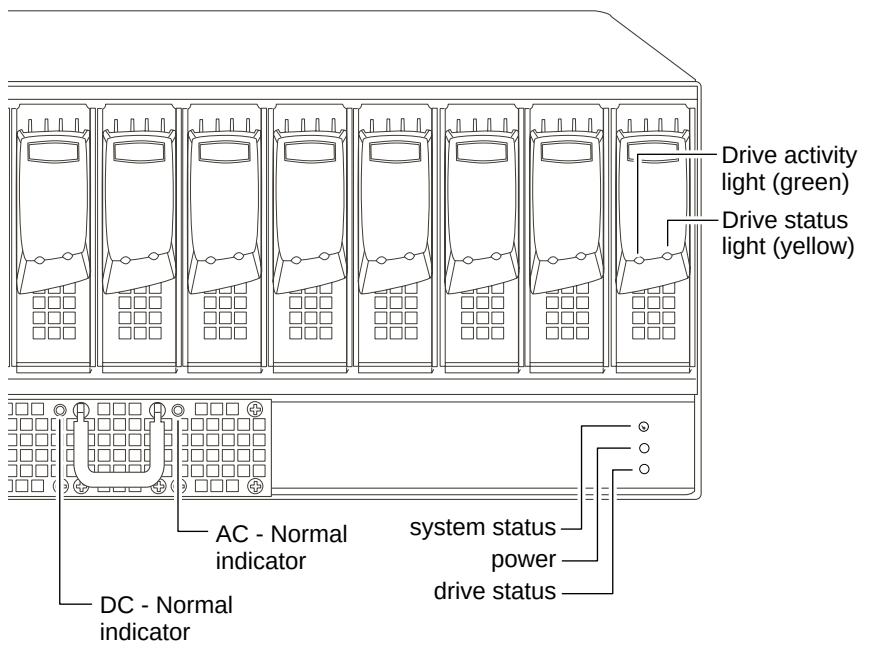
Description of LEDs: The following table describes the LEDs on the 1000Base-SX fiber NIC.

LED	State	Indicates...
TX	On	Transmitting data.
	Off	Idle.
RX	On	Receiving data.
	Off	Idle.
LINK	On	Valid network connection.
	Off	Connections need to be checked.

Disk shelf LED responses at startup

About this section This section discusses the types and functions of each LED on the front of the disk shelf.

Location of LEDs The disk shelf LEDs are displayed on the front side of the disk shelf, as shown in the following illustration.



Interpreting the disk shelf LEDs

LED	State	Indicates...
AC—Normal indicator	On (green)	Power supply is functioning properly.
	Off	Power supply failure or nonpowered up condition.
DC—Normal indicator	On (green)	Power supply is correctly converting AC input into the DC voltages that the disk shelf and disks require.
	Off	Power supply failure or nonpowered up condition.
system status	On (blue)	Disk shelf is connected and is communicating with the chassis.
	Off	Communication failure between the chassis and the disk shelf.
power	On (yellow)	Disk shelf is powered on.
	Off	Disk shelf is powered off.
drive status	On (green)	Disk shelf drives are operating normally.
	Off	One or more drives in the disk shelf are experiencing failure. Check the Drive status light on each disk drive to determine which disk drive failed.
Drive activity light	On (green)	Disk drive is active. The light flashes in response to activity while the drive is being accessed.
	Off	Disk drive is idle.
Drive status light	On (yellow)	Disk drive failure.
	Off	Normal operation.

System messages at startup

Types of startup messages

When the system is powered on, it verifies the hardware, loads the operating system, and displays two types of startup messages on the console and LCD:

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

POST messages

When you turn on the power, the chassis checks the hardware on the motherboard by running a series of POSTs from the PROM (Programmable Read-Only Memory).

The following is an example of the POST messages that appear on the system console of an R100.

Header:

```
Intel Open Firmware by FirmWorks
Copyright 1995-2001 FirmWorks, Network Appliance. All Rights
Reserved.
Firmware release x.x_il
Press <DEL> to abort boot, <ESC> to skip POST
```

POST messages:

```
Memory size is 3072 MB
Testing SIO
Testing LCD
Probing devices
Testing 3072 MB
Complete
Finding image...
Starting
```

Note

The chassis LCD displays only the POST messages without the preceding header.

Boot messages

The boot messages appear after the hardware passes all POSTs and the chassis begins to load the operating system.

The following message is an example of the boot message that appears on the system console of an R100 when the storage system is successfully started for the first time. The exact boot messages that appear on your system console depend on your system configuration.

Boot Messages

```
NetApp Release x.x.x: Wed Oct 31 04:06:00: PST 2001
System ID: 0033591409 (u13)
System Serial Number: 1234567
System Rev: B0
slot 0: System Board 866 MHz (Netapp System Board VII A0)
      Model Name:      R100
      Serial Number:   247783
      Firmware Release: 3.2_i1
      Processors:      2
      Memory Size:     3072 MB
slot 0: FastEnet-10/100 Ethernet Controller
      Device Type:     82559
      e0 MAC Address:   00:a0:98:00:ba:2b (auto-100tx-fd-up)
slot 0: NetApp ATA/IDE Adapter ata0a (1f0)
      ata0a.0   SanDisk SDCFB-32 vds   0.2GB (501744 512B/sect)
slot 2: SCSI Host Adapter 2 (Qlogic ISP 1080)
      Ultra2/Wide, Low Voltage Differential
      Firmware Version 8.15                      Clock Rate 100MHz.
      0: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      1: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      2: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      3: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      8: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      9: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      10: Maxtor 4G160J8U66     GAK8 136.0GB (320163048 512B/sect)
      11: Maxtor 4G160J8U66     GAK8 136.0GB (320163048 512B/sect)
      12: Maxtor 4G160J8U66     GAK8 136.0GB (320163048 512B/sect)
      13: Maxtor 4G160J8U66     GAK8 136.0GB (320163048 512B/sect)
      14: Maxtor 4G160J8U66     GAK8 136.0GB (320163048 512B/sect)
      15: Maxtor 4G160J8U66     GAK8 136.0GB (320163048 512B/sect)
      Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 3: SCSI Host Adapter 3 (Qlogic ISP 1080)
      Ultra2/Wide, Low Voltage Differential
      Firmware Version 8.15                      Clock Rate 100MHz.
      0: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      1: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      2: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      8: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      3: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
      9: Maxtor 4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
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13: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
14: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
15: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
10: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
12: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
11: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 4: Gigabit Ethernet Controller II
e4 MAC Address: 00:d0:b7:81:2b:4d (auto-1000sx-fd-up)
Device Type:    Rev 3
slot 5: FastEnet-10/100 Quad Ethernet Controller
Device Type:    82559ER
e5a MAC Address: 00:20:fc:1e:98:1c (auto-100tx-fd-up)
e5b MAC Address: 00:20:fc:1e:98:1d (auto-100tx-fd-up)
e5c MAC Address: 00:20:fc:1e:98:1e (auto-100tx-fd-up)
e5d MAC Address: 00:20:fc:1e:98:1f (auto-100tx-fd-up)
slot 6: SCSI Host Adapter 6 (Qlogic ISP 1080)
Ultra2/Wide, Low Voltage Differential
Firmware Version 8.15 Clock Rate 100MHz.
1: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
2: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
3: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
8: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
0: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
9: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
15: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
13: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
10: Maxtor     4G160H8U66      GAK8 136.0GB (320163048 512B/sect)
14: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
11: Maxtor     4G160H8U66      GAK8 136.0GB (320163048 512B/sect)
12: Maxtor     4G160H8U66      GAK8 136.0GB (320163048 512B/sect)
Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 7: SCSI Host Adapter 7 (Qlogic ISP 1080)
Ultra2/Wide, Low Voltage Differential
Firmware Version 8.15 Clock Rate 100MHz.
0: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
1: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
8: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
2: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
3: Maxtor      4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
11: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
15: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
13: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
9: Maxtor      4G160H8U66      GAK8 136.0GB (320163048 512B/sect)
14: Maxtor     4G160H8U66      GAK8 136.0GB (320163048 512B/sect)
10: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)
12: Maxtor     4G160J8U66      GAK8 136.0GB (320163048 512B/sect)

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Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 8: SCSI Host Adapter 8 (Qlogic ISP 1080)
Ultra2/Wide, Low Voltage Differential
Firmware Version 8.15 Clock Rate 100MHz.
0: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
1: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
2: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
8: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
3: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
11: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
15: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
9: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
13: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
14: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
10: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
12: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 9: SCSI Host Adapter 9 (Qlogic ISP 1080)
Ultra2/Wide, Low Voltage Differential
Firmware Version 8.15 Clock Rate 100MHz.
3: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
0: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
1: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
8: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
2: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
9: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
13: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
14: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
10: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
15: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
11: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
12: Maxtor 4G160J8U66 GAK8 136.0GB (320163048 512B/sect)
Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 10: SCSI Host Adapter 10 (Qlogic ISP 1080)
Ultra2/Wide, Low Voltage Differential
Firmware Version 8.15 Clock Rate 100MHz.
1: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
2: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
3: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
8: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
0: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
9: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
13: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
14: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
10: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
15: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
11: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)

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12: Maxtor 4G160H8U66 GAK8 136.0GB (320163048 512B/sect)
Shelf 0: R100Shelf, EMU rev. 0829 Bridge firmware rev. N118
slot 11: NVRAM (NetApp NVRAM III)
Revision: A2
Serial Number: 36977
Memory Size: 128 MB
Battery Status: OK
```


About this chapter

This chapter describes how to replace disk shelves in a rack, disks in a disk shelf, and other devices.

Topics in this chapter

This chapter provides information about the following topics:

- ◆ [“Replacing a disk shelf in a rack”](#) on page 70
- ◆ [“Replacing a disk in a disk shelf”](#) on page 72
- ◆ [“Replacing a power supply in a disk shelf”](#) on page 76
- ◆ [“Replacing the EMU”](#) on page 80
- ◆ [“Replacing the cooling fans and blower”](#) on page 83

Replacing a disk shelf in a rack

About this section

This section discusses how to remove a disk shelf from a rack. It does not discuss how to install a disk shelf. For information about installing a disk shelf in a rack, see “[Installing an R100 disk shelf using two-post mounting brackets](#)” on page 15.

For detailed information

For details about removing a disk shelf from a rack, see “[Removing a disk shelf from the R100 rack](#)” on page 71.

Removing a disk shelf from the R100 rack

Removing a disk shelf from a rack

To remove a disk shelf from an R100 rack, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Shut down the chassis by entering the following command at the console: <pre>halt</pre> Caution _____ Always use the <code>halt</code> command to perform a clean shutdown. _____
3	Verify that the LCD display at the front of the chassis displays the following message: <pre>Halted</pre>
4	Turn off and unplug the power to the chassis and the disk shelf.
5	Disconnect the two disk shelf power cords from the disk shelf.
6	Disconnect the SCSI adapter cable connecting the disk shelf and chassis.
7	Use a Phillips screwdriver to remove the screws securing the R100 disk shelf to the Telco tray or the center-of-gravity bracket.
8	With the help of another person, remove the disk shelf from the rack. WARNING _____ Because the disk shelf is very heavy when fully loaded, it is advised that at least two people remove the disk shelf. _____

Replacing a disk in a disk shelf

About replacing a disk

You can replace a disk in a disk shelf for any reason. However, the most common reason is disk failure. Disk drives are also hot swappable, meaning that they can be replaced while the system remains powered on. If a disk in your R100 disk shelf fails, the chassis logs a warning message to the system console indicating which SCSI disk on which disk shelf failed.

Preparing to replace a disk

Before you replace a disk in a disk shelf, you must first check the disk shelf to ensure that after you remove the disk you still have enough disks installed to meet the enclosure services requirements. For information about these requirements, see “[Disk drive labeling](#)” on page 13.

For detailed information

For details about replacing a disk in a disk shelf, see the following topics:

- ◆ “[Removing a disk from a disk shelf](#)” on page 73
- ◆ “[Installing a disk in a disk shelf](#)” on page 74

Replacing a disk in a disk shelf

Removing a disk from a disk shelf

Removing a disk To remove a disk, complete the following steps.

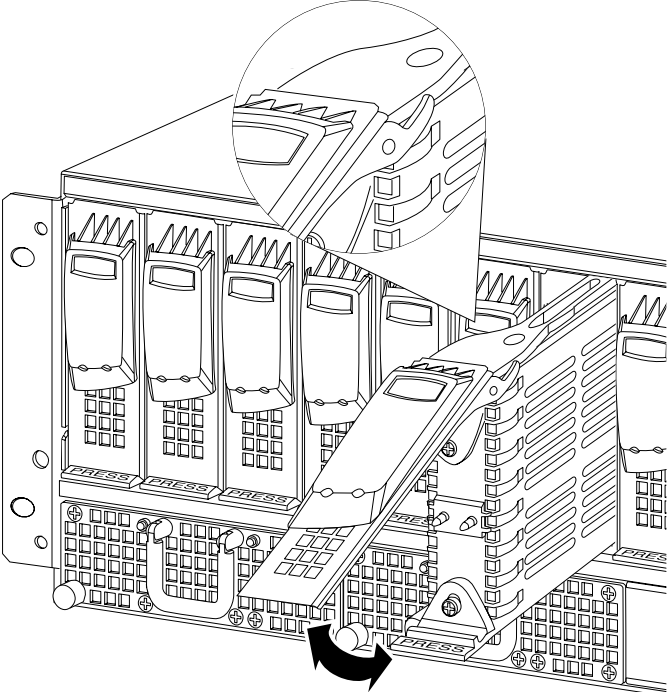
Step	Action
1	Enter one of the following commands, as appropriate: ◆ <code>disk fail disk_name</code> ◆ <code>disk remove disk_name</code> Either command causes the yellow drive status LED on the disk to illuminate. For more information about LEDs, see “Disk shelf LED responses at startup” on page 61 For more information about disk commands, see the <i>Data ONTAP System Administrator’s Guide</i>.
2	Wait 30 seconds for the disk to stop spinning.
3	Put on the antistatic wrist strap and grounding leash.
4	To remove the disk, press down on its release mechanism. The drive handle is spring loaded and springs open after you depress the latch. Gently slide the disk out of the disk shelf. Caution_____ When removing a disk, always use two hands to support its weight. _____

Replacing a disk in a disk shelf

Installing a disk in a disk shelf

Installing a disk

To install a disk in a disk shelf, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Orient the disk drive carrier so that the cam mechanism is at the top and the “press” release bar is on the bottom. Caution——— When inserting a disk drive carrier into an R100 disk shelf, the drive carrier handle should be fully extended to its release position before insertion, as shown in the following illustration. Failure to do this might result in damage to the disk drive carrier locking mechanism. 

Step	Action
3	Insert the disk drive carrier into the guide slot in the disk shelf and firmly push it in until it engages the backplane. Caution_____ Do not slam the device carrier into place. _____
4	Making sure that the cam fingers engage the top of the disk drive carrier, swing the drive handle down until it clicks into place.

Replacing a power supply in a disk shelf

About replacing a disk shelf power supply

Replacing a disk shelf power supply consists of the following procedures:

- ◆ Removing a power supply from a disk shelf
- ◆ Installing a power supply in a disk shelf

Rules for replacing power supplies

When replacing a disk shelf power supply, observe the following rules:

- ◆ You do not need to turn off the power when you replace one of the two power supplies.
- ◆ If you are replacing both power supplies in the same disk shelf, replace them one at a time to avoid powering down the disk shelf.

For detailed information

For details about replacing a disk shelf power supply, see the following topics:

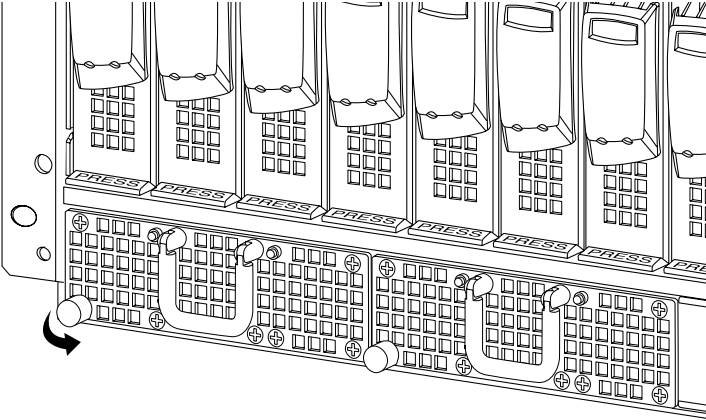
- ◆ [“Removing a power supply from a disk shelf”](#) on page 77
- ◆ [“Installing a power supply in a disk shelf”](#) on page 79

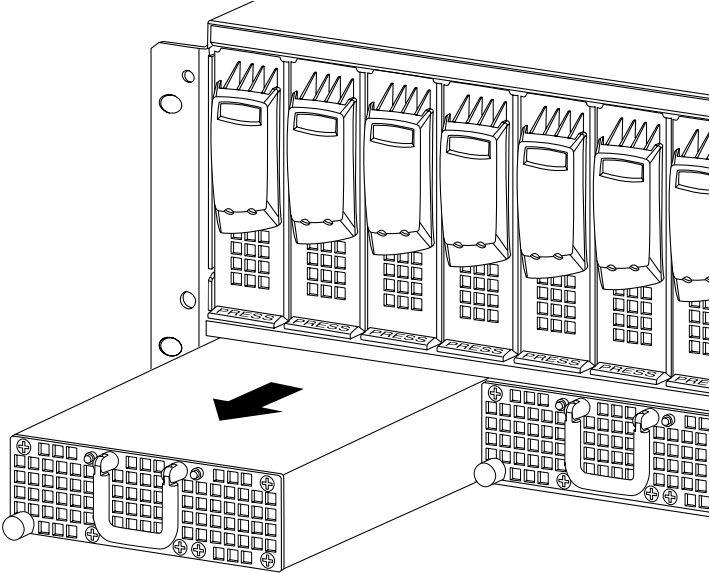
Replacing a power supply in a disk shelf

Removing a power supply from a disk shelf

Removing a power supply

To remove a power supply from a disk shelf, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Turn off the power supply that you are replacing and disconnect the AC power cord.
3	Loosen the thumbscrew on the lower lefthand corner of the power supply that you want to remove while simultaneously pulling the power supply handle towards you. 

Step	Action
4	After the thumbscrew is cleared of its threading, use the handle to pull the power supply out of the disk shelf. Caution _____ When removing a power supply, always use two hands to support its weight. 

Installing a power supply in a disk shelf

Installing a power supply

To install a power supply in a disk shelf, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Slide the power supply into the disk shelf until the threaded end of the thumbscrew contacts the matching screw hole assembly inside the disk shelf. Caution_____ Do not use excessive force when sliding the power supply into the disk shelf; you can damage the connector.
3	Using your fingers, or a screwdriver if necessary, turn the thumbscrew on the lower left-hand corner of the power supply to help pull it into place until the front face is flush with the second power supply. Note_____ The power supply thumbscrew is used for pulling the power supply into the backplane and securing it in place. Do not overtighten the thumbscrew. Apply only enough force to pull the power supply into place. If using a power screwdriver, set the torque initially to its lowest setting.
4	Connect the AC power cord to the back of the disk shelf.
5	Turn on the power supply.

Replacing the EMU

About the EMU

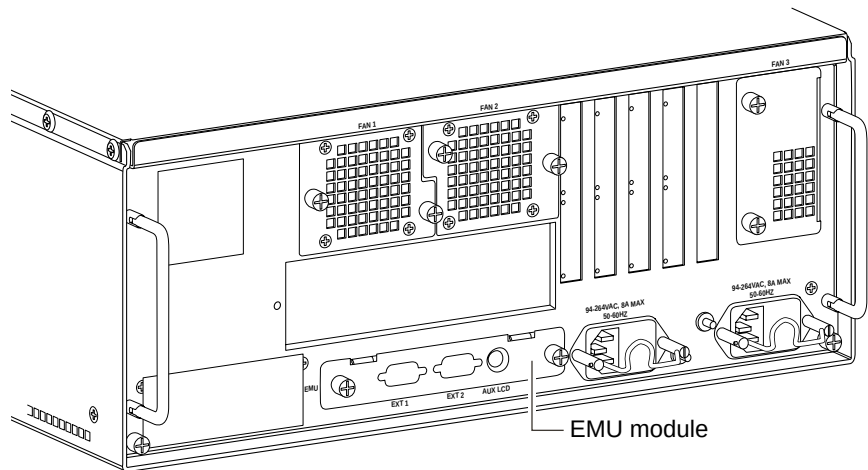
Each disk shelf enclosure features external system indicators (LEDs) that are controlled by the Environmental Monitoring Unit (EMU). The EMU is field replaceable by removing two thumbscrews and sliding it out the back of the enclosure. The EMU, however, is not hot swappable—the disk shelf must be powered down before replacement. The EMU communicates In-Band to the SCSI host system through its serial port, which is connected to the HDD Backplane Serial Port.

Location of the EMU

The EMU is plugged into the power backplane at the back of the enclosure.

Note

The external connection ports on the EMU are not used.



For detailed information

For details about replacing the EMU in a disk shelf, see the following topics:

- ◆ [“Removing the EMU from the disk shelf”](#) on page 81
- ◆ [“Installing an EMU in a disk shelf”](#) on page 82

Removing the EMU from the disk shelf

Removing the EMU To remove the EMU from a disk shelf, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Shut down the chassis by entering the following command at the console: <pre>halt</pre> Caution _____ Always use the <code>halt</code> command to perform a clean shutdown. _____
3	Verify that the LCD display at the front of the chassis displays the following message: <pre>Halted</pre>
4	Turn off the power and unplug both power cables to the disk shelf.
5	At the rear of the disk shelf, loosen the two thumbscrews on the left and right side of the EMU.
6	Using both hands, carefully remove the EMU from the back side of the disk shelf and place it on a nonconductive/antistatic surface.

Installing an EMU in a disk shelf

Installing an EMU

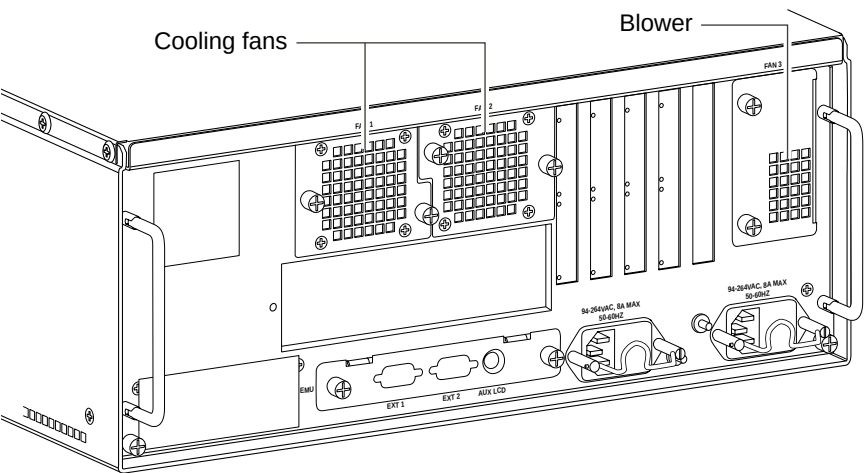
To install an EMU in a disk shelf, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Line up both sides of the EMU card with the guides on each side of the EMU bay. Caution————— Install the card in its correct orientation; that is, with the circuit board components facing down. Even though it's physically possible to install the EMU card upside down with the components facing up, the connecting pins do not engage with the connection terminal on the power backplane when it is installed that way.
3	Using both hands, carefully slide the EMU into the rear slot of the disk shelf until it is seated into the insertion slot. Caution————— Do not use excessive force when sliding the EMU into the disk shelf; you can damage the connector.
4	Tighten the thumbscrew on each side of the EMU.
5	Connect both AC power cords to the back of the disk shelf.
6	Turn on the power supply.

Replacing the cooling fans and blower

About the cooling fans

The R100 disk shelf uses two 60 mm cooling fans and one blower mounted at the rear of the disk shelf enclosure to help provide adequate airflow and cooling.



Rules for replacing the fans and blower

When replacing a fan or blower, observe the following rules:

- ◆ You do not need to turn off the power when replacing the blower or two cooling fans as these components are hot swappable.
- ◆ If you are replacing a fan or blower in the disk shelf with the power on, replace them one at a time.

Replacing the fans or blower

To replace a cooling fan or blower, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	At the rear of the disk shelf, loosen the two thumbscrews securing the fan or blower in place.
3	Remove the old fan or blower by sliding it out through its slot.

Step	Action
4	Carefully disconnect the fan or blower from the power harness.
5	Attach the replacement fan or blower to the power harness and confirm proper operation. WARNING _____ The replacement fan or blower will start spinning once connected to the power harness. Keep fingers clear of the fan blades. _____
6	Carefully slide it into the slot. Secure it in place by tightening both thumbscrews.

About this chapter

This chapter provides the necessary procedures for replacing components inside the chassis.

Topics in this chapter

This chapter provides information about the following topics:

- ◆ [“Opening the PCB carrier”](#) on page 86
- ◆ [“Removing the PCB carrier”](#) on page 88
- ◆ [“Replacing the motherboard”](#) on page 90
- ◆ [“Replacing SDRAM DIMMs on the motherboard”](#) on page 95
- ◆ [“Installing or replacing expansion adapters”](#) on page 98
- ◆ [“Replacing the NVRAM III battery”](#) on page 104
- ◆ [“Replacing the motherboard lithium battery”](#) on page 108
- ◆ [“Closing the PCB carrier”](#) on page 110

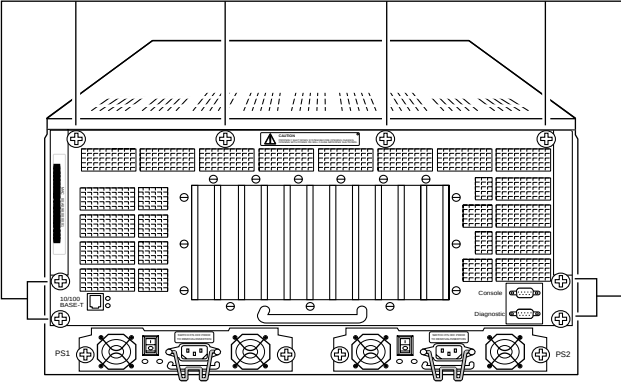
Opening the PCB carrier

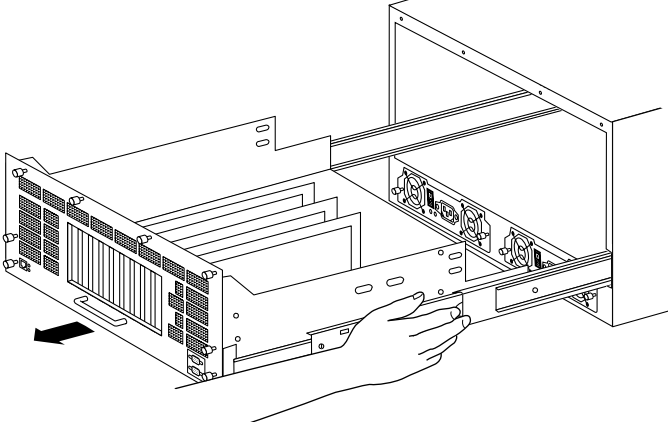
Reasons to open the PCB carrier

You open the PCB carrier to access the motherboard, expansion adapters, and other field-replaceable units in the chassis.

Opening the PCB carrier

To open the PCB carrier, complete the following steps.

Step	Actions
1	Shut down the chassis by entering the following command at the console: halt Caution_____ Always use the halt command to perform a clean shutdown. _____
2	Turn off and disconnect the power to the chassis.
3	Put on the antistatic wrist strap and attach the grounding leash to the chassis frame.
4	Using a #0 or #1 Phillips screwdriver, loosen the eight thumbscrews on the back panel of the PCB carrier. Thumbscrews 

Step	Actions
5	Carefully pull the PCB carrier out of the chassis until the carrier tabs click to lock the slide rails in place. The PCB carrier has a travel distance of approximately 19 inches (48.26 centimeters). WARNING _____ There is danger of electric shock from hazardous energy on the backplane. Do not put hands or tools inside the chassis. _____ 

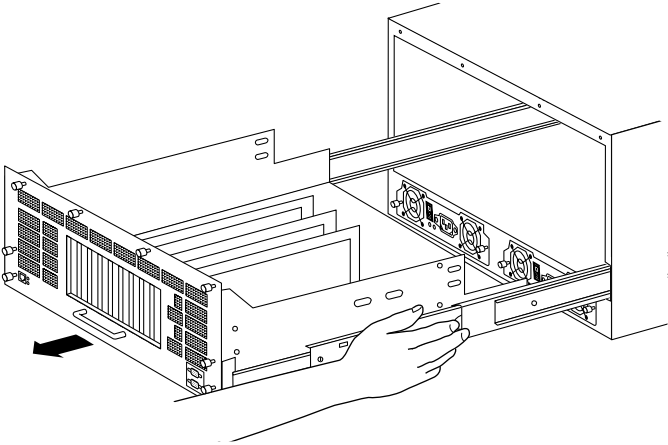
Removing the PCB carrier

Reasons to remove the PCB carrier

You can remove the PCB carrier from the chassis to make maneuvering easier when replacing units.

Removing the PCB carrier

To remove the PCB carrier from the chassis, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “Opening the PCB carrier” on page 86.
2	Press inward on the carrier tabs on each slide rail while pulling the PCB carrier out of the chassis. 
3	Support the PCB carrier with both hands, and set it aside.

Step	Action	
4	If you are...	Then...
	Replacing the motherboard	Disconnect all cables connected to the ports on the back of the PCB carrier and go to “Replacing the motherboard” on page 90.
	Not replacing the motherboard, but you are replacing units on it	Go to the appropriate procedure for the unit you are replacing: ◆ “Replacing SDRAM DIMMs on the motherboard” on page 95 ◆ “Installing or replacing expansion adapters” on page 98 ◆ “Replacing the NVRAM III battery” on page 104 ◆ “Replacing the motherboard lithium battery” on page 108

Replacing the motherboard

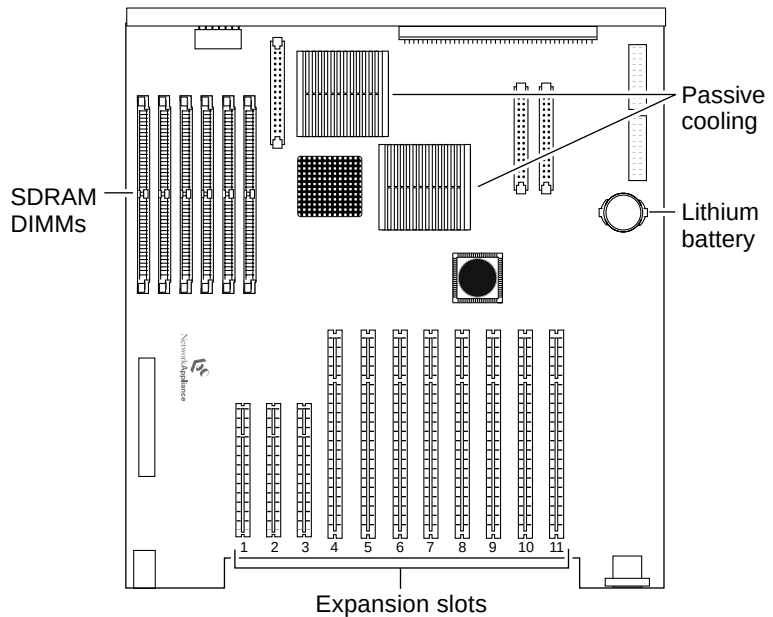
About the motherboard components

Replacing the motherboard consists of the following procedures:

- ◆ “[Removing the motherboard](#)” on page 90
- ◆ “[Installing the motherboard](#)” on page 93

Illustration of an R100 motherboard

The following illustration shows the R100 motherboard.



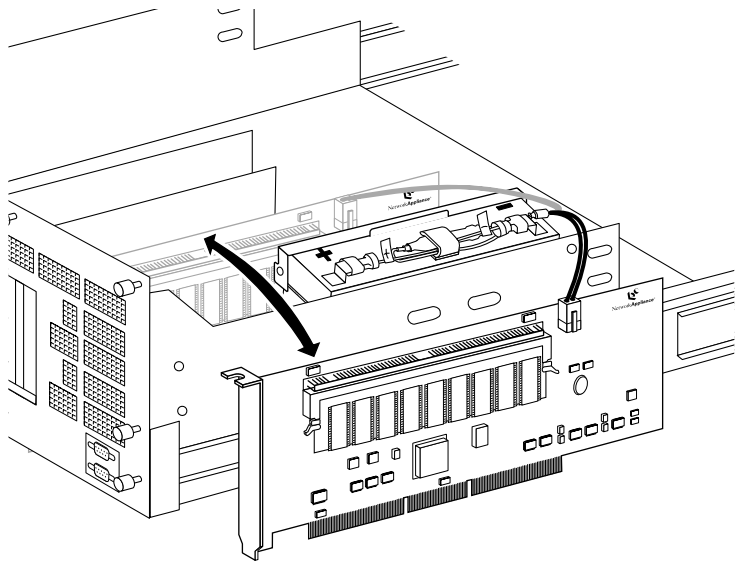
Removing the motherboard

To remove the motherboard, complete the following steps.

Caution

To prevent shorting the NVRAM III battery, you must perform this procedure on a nonconductive surface. Shorting the NVRAM III battery causes data loss.

Step	Action
1	Open the PCB carrier by following Steps 2 through 5 of the procedure described in “Opening the PCB carrier” on page 86. Note If any motherboard failure occurs, the chassis performs a “dirty shutdown,” and you cannot perform the recommended clean shutdown. However, your data from the last transaction is still buffered in the battery-backed memory on the NVRAM III adapter. If, however, you performed a clean shutdown using the <code>halt</code> command, the contents of the NVRAM III battery were flushed. In this case, you can safely disconnect the battery from the NVRAM III adapter without the risk of data loss.
2	Remove the PCB carrier by following Steps 2 through 4 of the procedure described in “Removing the PCB carrier” on page 88.
3	Using the #0 or #1 Phillips screwdriver, remove all adapters except the NVRAM III adapter from the expansion slots on the motherboard by following Steps 2 through 6 of the procedure described in “Removing an existing expansion adapter” on page 99. Set the screws and adapters aside for later use.
4	Using a #0 or #1 Phillips screwdriver, remove the screw securing the NVRAM III adapter to the PCB carrier. Set the screw aside for later use.

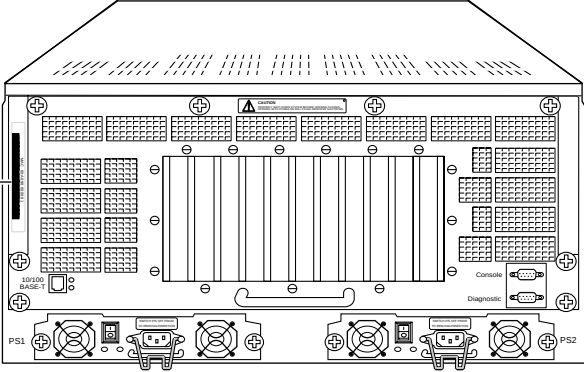
Step	Action
5	Lift the NVRAM III adapter out of the expansion slot and carefully lay it over the side of the chassis. This allows easy access for the removal of the NVRAM III battery. Caution_____ If a dirty shutdown occurred, do not disconnect the NVRAM III battery wire from the NVRAM III adapter. This disconnection causes data loss. _____ 
6	Using a #0 or #1 Phillips screwdriver, loosen the two thumbscrews securing the NVRAM III battery carrier to the chassis frame.
7	Lift the NVRAM III battery out of the PCB carrier and place the battery and the still-connected NVRAM III adapter on the nonconductive surface.
8	Remove all SDRAM DIMMs by following Steps 3 through 5 of the procedure described in “Removing an SDRAM DIMM” on page 95. Set the DIMMs aside for later use.

Step	Action
9	Using a 3/16-inch socket wrench, remove the four screws on the back of the chassis that secure the Console and Diagnostic ports to the chassis.
10	Using a #2 Phillips screwdriver, remove the 11 screws securing the motherboard to the PCB carrier.
11	Lift the motherboard and slide it out of the PCB carrier.

Installing the motherboard

To install the motherboard, complete the following steps.

Step	Action
1	Slide the replacement motherboard into the PCB carrier and, using a #2 Phillips screwdriver, secure the motherboard to the PCB carrier with the 11 screws.
2	Reinstall all SDRAM DIMMs by following Steps 1 through 4 of the procedure described in “Installing an SDRAM DIMM” on page 96.
3	Without disconnecting the wire from the NVRAM III adapter, reinstall the NVRAM III battery into its place on the PCB carrier. Note —— Maintaining the connection between the NVRAM III adapter and the NVRAM III battery is necessary only if a dirty shutdown occurred.
4	Tighten the two thumbscrews securing the NVRAM III battery carrier to the PCB carrier.
5	Carefully turn over the still-connected NVRAM III adapter that is outside the chassis and reinstall it in the expansion slot.
6	Using the #0 or #1 Phillips screwdriver, secure the NVRAM III adapter to the PCB carrier.
7	Reinstall all other adapters into the expansion slots on the motherboard by following Steps 3 through 6 of the procedure described in “Installing an expansion adapter” on page 100.

Step	Action
8	Using a 3/16 socket wrench, connect all the screwlocks to the PCB carrier.
9	Paste the MAC (Media Access Control) address label provided with the replacement motherboard on the PCB carrier, as shown.  Paste MAC address label here.
10	Go to “Closing the PCB carrier” on page 110.

Replacing SDRAM DIMMs on the motherboard

About replacing SDRAM DIMMs

This section provides the supported memory configurations for the chassis and the procedures for replacing the SDRAM DIMMs on the motherboard. Replacing the SDRAM DIMMs on the motherboard consists of the following procedures:

- ◆ “[Removing an SDRAM DIMM](#)” on page 95
- ◆ “[Installing an SDRAM DIMM](#)” on page 96

Supported memory configurations

The following table lists the supported memory configuration for the R100 chassis.

DIMM slots	Required memory configuration
J40, J41, J42, J43, J45, J46	3.3V, unbuffered, 6x512 MB SDRAM DIMMs

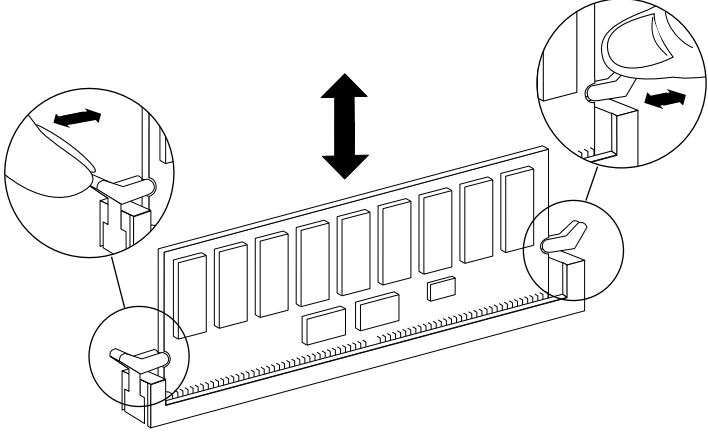
Caution

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

Removing an SDRAM DIMM

To remove an SDRAM DIMM, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “ Opening the PCB carrier ” on page 86.
2	Locate the DIMM that you want to remove.

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

Installing an SDRAM DIMM

To install the SDRAM DIMM, complete the following steps.

Step	Action
1	Locate the DIMM slot for the DIMM you are installing.
2	Hold the DIMM by its top corners to avoid damaging the components.

Step	Action
3	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. _____
4	Push carefully, but firmly on the top edge of the DIMM until the latches snap into place.
5	Go to “ Closing the PCB carrier ” on page 110.

Installing or replacing expansion adapters

About installing or replacing expansion adapters

This section describes the steps involved in replacing an expansion adapter or installing a new expansion adapter. Replacing an expansion adapter consists of the following procedures:

- ◆ “[Removing an existing expansion adapter](#)” on page 99
- ◆ “[Installing an expansion adapter](#)” on page 100

Additional procedures: The NVRAM adapter might also require the following additional procedures:

- ◆ “[Removing the NVRAM III DIMM](#)” on page 101
- ◆ “[Installing the NVRAM III DIMM](#)” on page 102

Expansion adapters used

The R100 chassis uses the following expansion adapters:

- ◆ NVRAM III adapter
- ◆ SCSI LVD 1080 for disk storage
- ◆ Tape adapters
 - ❖ SCSI
 - ❖ FC-AL
- ◆ Network interface cards

Where to get current configuration information

The System Configuration Guide at <http://now.netapp.com> provides current configuration information for the following:

- ◆ Expansion slots that are available on the chassis
- ◆ Supported adapters
- ◆ Expansion slot assignments

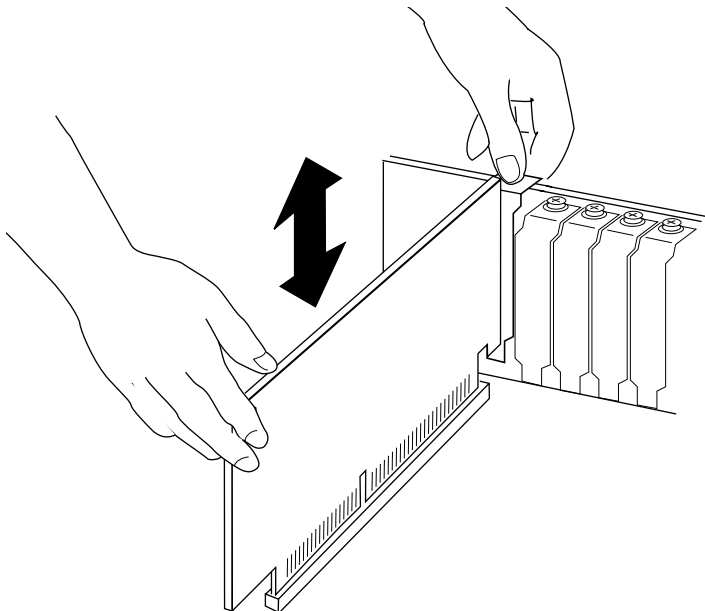
Caution

Install only supported expansion adapters in the assigned expansion slots. To ensure compatibility, performance, and reliability, you must obtain expansion adapters for the chassis from Network Appliance or an authorized reseller.

Removing an existing expansion adapter

To remove existing expansion adapters, complete the following steps.

Step	Action	
1	Open the PCB carrier. Follow the procedure in “Opening the PCB carrier” on page 86.	
2	Note which cables (if any) are connected to the connectors on the faceplate of the expansion adapter before disconnecting the cables. Caution ————— Do not disconnect or connect SCSI cables while the chassis is powered up. You could cause permanent damage to the hardware.	
3	If you are replacing...	Then...
	The NVRAM III adapter or replacing the DIMM on the NVRAM III adapter	Unplug the electrical wires from the J1 connector on the NVRAM III adapter. See the figure in “Replacing the NVRAM III battery” on page 104. Caution ————— If you did not perform a clean shutdown using the <code>halt</code> command, disconnecting the NVRAM battery from the NVRAM III adapter results in data loss.
	The FC-AL adapter for tape	Press the latches on both sides of the HSSDC port of the GBIC module and remove the module, if one is present. This enables you to remove the adapter without difficulty.
4	Remove the screw holding the expansion adapter faceplate to the back panel bracket and save it for reinstalling the adapter.	

Step	Action	
5	Pull upward on the top edge of the expansion adapter and lift it out of the chassis, as shown. 	
6	If you are...	Then...
	Not installing a replacement expansion adapter	Install a slot cover using the screw you saved in Step 4.
	Installing a replacement expansion adapter	Go to “ Installing an expansion adapter ” on page 100.
	Installing the DIMM on the NVRAM adapter	Go to “ Installing the NVRAM III DIMM ” on page 102.

Installing an expansion adapter

To install an expansion adapter, complete the following steps.

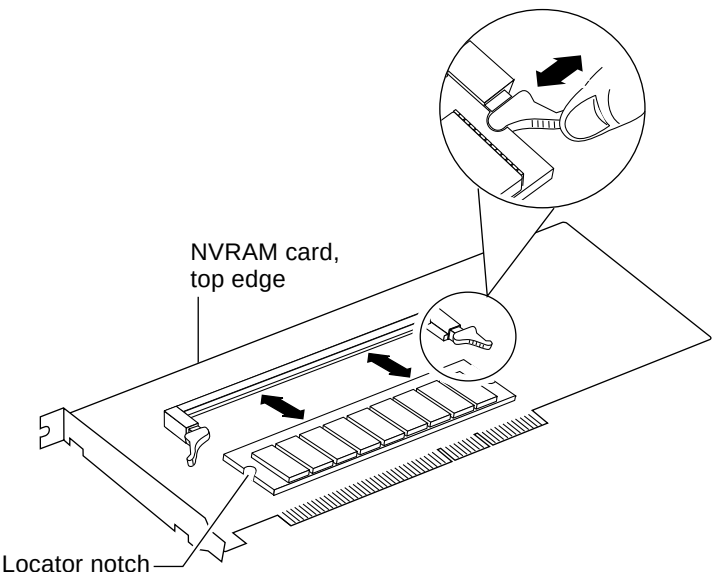
Step	Action	
1	If you are...	Then...
	Installing a new adapter	Take the adapter out of the antistatic bag and discard the bag.
	Installing a replacement adapter	Take the replacement adapter out of the antistatic bag and place the used adapter into that bag.
2	If you are...	Then...
	Replacing or reinstalling an NVRAM III adapter	Plug the electrical wires from the NVRAM battery to the connector on the NVRAM III adapter. See the figure in “Replacing the NVRAM III battery” on page 104.
	Reinstalling all other adapters	Go to Step 3.
3	Holding the adapter by its top edge, with the faceplate near the back of the machine, lower the adapter into the slot until its connector edge meets the grooves in the expansion slot. The faceplate of the adapter should be in position against the back panel, and should cover the endplate slot on the back panel.	
4	Press carefully on the top edge of the adapter until the edge connector is seated in the expansion slot.	
5	Replace the faceplate screw to secure the adapter to the back panel.	
6	Reconnect the cables to the external connectors on the replacement expansion adapter.	
7	Go to “Closing the PCB carrier” on page 110.	

Removing the NVRAM III DIMM

To remove the NVRAM III DIMM, complete the following steps.

Note

This procedure assumes that you already removed the NVRAM III adapter, as described in [“Removing an existing expansion adapter”](#) on page 99.

Step	Action
1	Push apart the latches on both sides of the DIMM with your index fingers.  NVRAM card, top edge Locator notch
2	Place the DIMM in an antistatic bag.

**Installing the
NVRAM III DIMM**

To install the NVRAM III DIMM, complete the following steps.

Step	Action
1	Hold the DIMM at the top corners to avoid damaging the components or the edge connector.
2	Align the DIMM over the slot and then tilt the top edge of the DIMM at a slight angle away from the top edge of the NVRAM adapter.

Step	Action
3	Insert the DIMM into the slot. The DIMM should slide into the slot easily if you wiggle the DIMM into position. If not, realign the DIMM with the slot and try again.
4	Push the DIMM into the slot until the mounting tabs close over the DIMM to lock it in place. Caution_____ Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the DIMM could bend or break when pushed to the locked position. _____
5	Return to “Installing an expansion adapter” on page 100 to complete the installation.

Replacing the NVRAM III battery

About replacing the NVRAM III battery

The NVRAM adapter has one detached, sealed, lead-acid battery that is recharged whenever the system is turned on and operating normally. If the battery continues to read low after 24 hours of normal system operation, you must replace the battery or the NVRAM III adapter.

Note

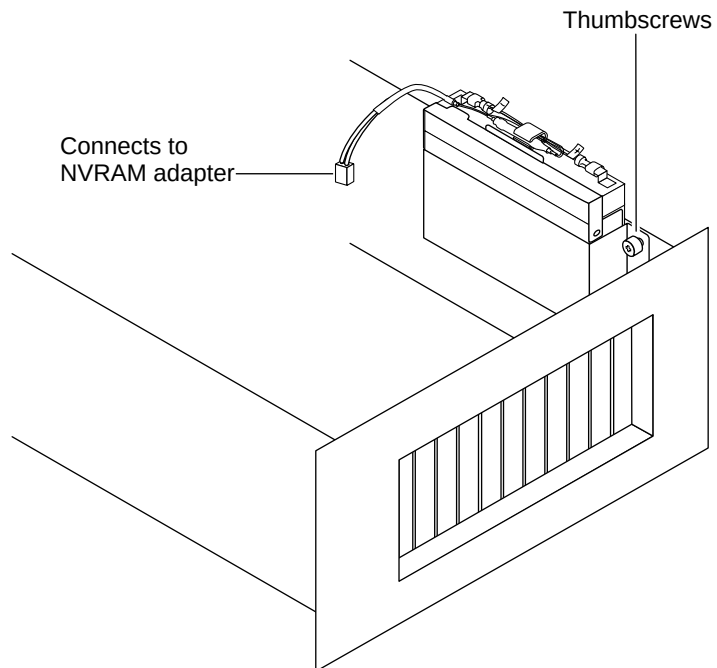
The NVRAM III adapter in the R100 is different from the NVRAM adapter in other models of NetApp chassis and, therefore, is not interchangeable with NVRAM adapters from other models of NetApp chassis.

Replacing the NVRAM battery consists of the following two procedures:

- ◆ “[Removing the NVRAM III battery](#)” on page 105
- ◆ “[Installing the NVRAM III battery](#)” on page 106

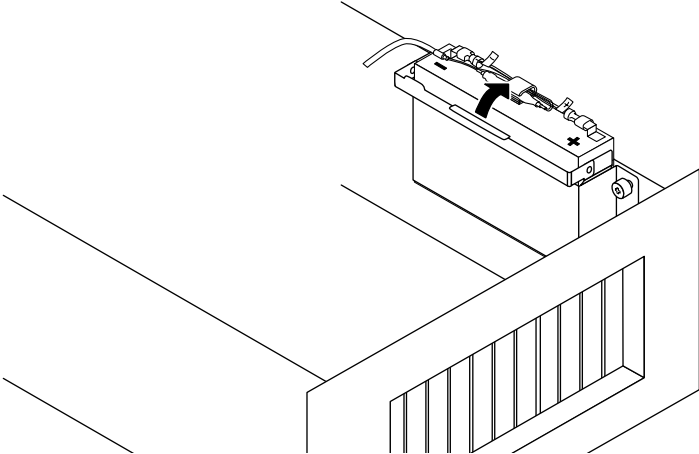
Location of the NVRAM III battery

The following figure shows the battery location.



Removing the
NVRAM III battery

To remove the NVRAM III battery, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “ Opening the PCB carrier ” on page 86.
2	Unplug the electrical cable from the connector on the NVRAM III adapter. Caution _____ If you did not perform a clean shutdown using the halt command, disconnecting the NVRAM battery from the NVRAM III adapter results in data loss.
3	Flip the retaining clip on the battery carrier down. WARNING _____ If the battery is leaking, follow the procedure in “Handling a leaking NVRAM III battery” on page 105. 
4	Remove the battery from the battery carrier in the chassis and set it aside.

Handling a leaking
NVRAM III battery

The hazardous components of the NVRAM III battery are lead, sulphuric acid, fiberglass, and polystyrene.

To handle a leaking NVRAM III battery, complete the following steps.

Caution_____

Perform this procedure after you remove the battery from the chassis.

Step	Action	
1	Neutralize the leaking substance with bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime).	
2	Flush the neutralized substance with water into the sewage system. WARNING _____ Do not flush or pour the unneutralized substance into the sewage system.	
3	If the unneutralized substance...	Then...
	Has made contact with your skin and the contact area is large, or if blisters form	Flush the affected area with water and see a physician.
	Has made contact with your eye	Call a physician immediately and flush your eye with water until the physician arrives.
	Is ingested	Call a physician. If the patient is still conscious, also flush the patient's mouth with water and have the patient drink milk or sodium bicarbonate solution.

Installing the NVRAM III battery

To install the NVRAM III battery, complete the following steps.

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
1	Insert the NVRAM III battery into the battery carrier in the chassis, and flip the retaining clip up to secure the battery in place.
2	Plug the electrical cable into the J1 connector on the NVRAM III adapter.
3	Go to “Closing the PCB carrier” on page 110.

Replacing the motherboard lithium battery

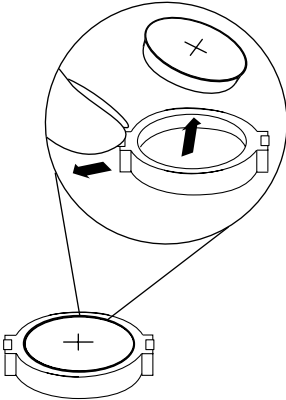
About the motherboard lithium battery

Replacing the 3.3V lithium battery on the motherboard consists of the following procedures:

- ◆ “[Removing the motherboard lithium battery](#)” on page 108
- ◆ “[Installing the motherboard lithium battery](#)” on page 109

Removing the motherboard lithium battery

To remove the motherboard lithium battery, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “Opening the PCB carrier” on page 86. Caution _____ Be sure to wear the antistatic wrist strap and attach the grounding leash to the chassis frame.
2	Lift up the battery toward the open side of the battery holder, as shown. 

Installing the motherboard lithium battery

To install the motherboard lithium battery, complete the following steps.

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
1	Turn the battery so that the positive side is up (marked with a "+").
2	Push the battery through the open side of the battery holder so that it sits flush inside the battery holder.
3	Go to " Closing the PCB carrier " on page 110.

Closing the PCB carrier

Closing the PCB carrier

To close the PCB carrier, follow these steps.

Step	Action
1	If you removed the PCB carrier, insert the carrier slide rails evenly and slowly into the slide rails using both hands to support the PCB carrier. There should be no resistance. Caution— The carrier slide rails must align with the ball bearings along the chassis slide rails; otherwise the PCB carrier does not go in and the slide rails could be bent permanently.
2	Carefully push the PCB carrier into the chassis. If the PCB carrier is locked in position, press inward on the carrier tabs on each carrier slide rail while pushing the PCB carrier into the chassis.
3	Tighten and then torque the eight thumbscrews on the back panel of the PCB carrier 8 to 10 in.-lbs to prevent access without a tool.
4	Reconnect any adapter cables you removed.
5	Reconnect and turn on the power to the chassis.
6	Interrupt the boot process by pressing the Delete key during the memory test.
7	Run diagnostics by entering the following command at the <code>ok></code> prompt: sys-diag See the <i>Diagnostics Guide</i> for more information.
8	Run the specific diagnostics that apply to the unit you installed or replaced.

About this chapter This chapter provides the procedures for replacing external components accessible from the outside of the R100 chassis.

Topics in this chapter This chapter describes the following topics:

- ◆ [“Replacing the chassis fan subassembly”](#) on page 112
- ◆ [“Replacing the power supply in the chassis”](#) on page 116
- ◆ [“Replacing the LED/LCD subassembly”](#) on page 119
- ◆ [“Replacing the CompactFlash unit subassembly”](#) on page 122

Replacing the chassis fan subassembly

About replacing chassis fan subassemblies

Replacing an R100 chassis fan subassembly consists of the following procedures:

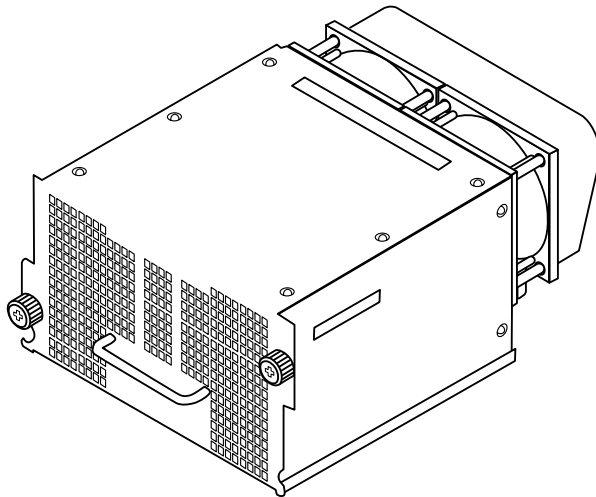
- ◆ “[Removing a chassis fan subassembly](#)” on page 113
- ◆ “[Installing a chassis fan subassembly](#)” on page 114

There are three chassis fan subassemblies on an R100 chassis. Each chassis fan subassembly has two fans. The chassis fans are secured to the front of the chassis.

Note

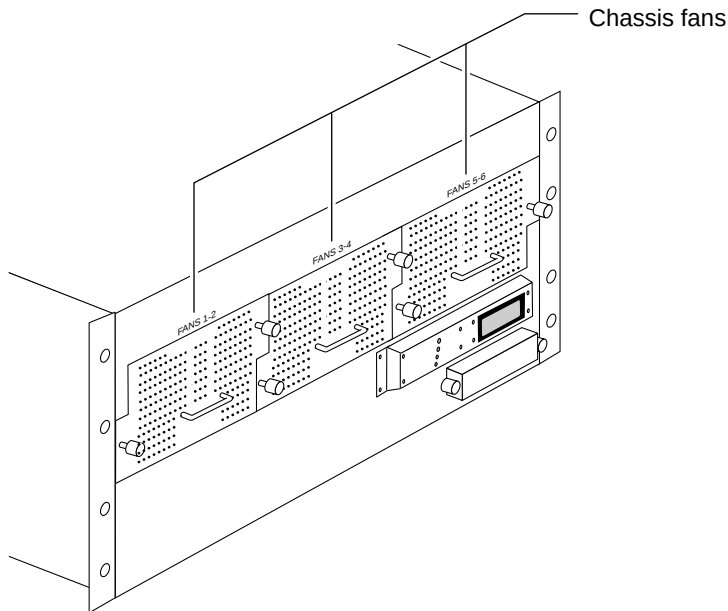
To maintain UL, CSA, and TUV safety certifications, you must obtain replacement chassis fan subassemblies from Network Appliance. Using unapproved replacement chassis fans voids the safety certifications.

The following is an illustration of the chassis fan assembly.



Location of the chassis fan subassemblies

The chassis fan subassemblies are located behind the front bezel. The following figure shows the chassis fan subassembly locations with the front bezel removed. The sheet metal above the chassis fan subassemblies is silk-screened with the labels Fans 1-2, Fans 3-4, and Fans 5-6.



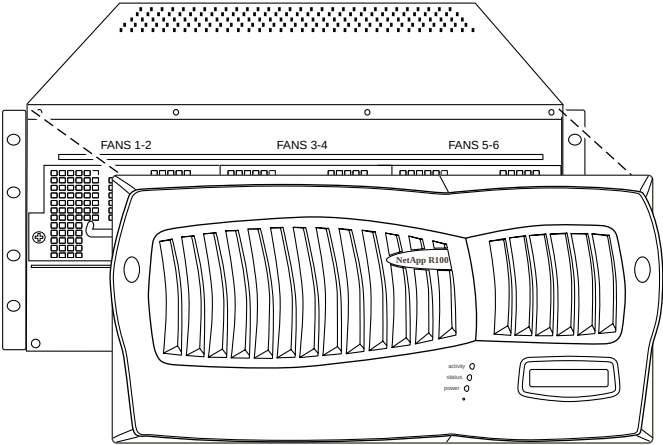
Removing a chassis fan subassembly

To remove a chassis fan subassembly, complete the following steps.

Note

Because the three chassis fan subassemblies are hot swappable, there is no need to shut down the chassis.

Step	Action
1	From the console, note the identification of the chassis fan subassembly that failed.

Step	Action
2	Pull the bezel straight off the front panel of the chassis by using the grooves on the left and right edges of the bezel. 
3	Loosen the thumbscrews on the chassis fan subassembly that failed. Note_____ The thumbscrews are torqued at the factory. You need to use a #2 Phillips screwdriver to loosen the thumbscrews. _____
4	Using the handle, pull the chassis fan subassembly straight out of the chassis frame. Note_____ The chassis reports a failure for the removed fan assembly. _____
5	Set the chassis fan subassembly aside.

Installing a chassis fan subassembly

To install a chassis fan subassembly, complete the following steps.

Step	Action
1	Using the handle, slide the chassis fan subassembly straight into the open slot on the chassis.

Step	Action
2	Tighten and then torque the chassis fan thumbscrews 8 to 10 in.-lbs.
3	Align the pins on the bezel with the holes on the front panel of the chassis, and then push the bezel straight onto the front panel.
4	Reconnect and turn on the power to the chassis.
5	Interrupt the boot process by pressing the Delete key during the memory test.
6	Run diagnostics by entering the following command at the ok> prompt: sys-diag See the <i>Diagnostics Guide</i> for more information.
7	Run the diagnostics that apply to the unit you installed or replaced.

Replacing the power supply in the chassis

About replacing the power supply

This chapter describes the procedures for replacing the hot swappable power supplies in your R100 chassis. Replacing a power supply consists of the following procedures:

- ◆ “[Removing a power supply](#)” on page 116
- ◆ “[Installing a power supply](#)” on page 117

Note

To maintain UL, CSA, and TUV safety certifications, you must obtain replacement power supplies from Network Appliance.

Power supply compatibility

Be aware of the following caution regarding the compatibility between the two power supplies in the chassis.

Caution

When replacing a power supply, be sure not to mix two different power supplies. The two power supplies in your R100 chassis must have the same part number.

Removing a power supply

To remove a power supply, complete the following steps.

WARNING

To avoid an electric shock hazard, you must disconnect the power supply before removing it from the chassis.

Note

Because you have two power supplies that are hot swappable, you do not have to shut down the chassis.

Step	Action
1	From the console or LCD screen, identify the failed power supply. Note _____ The power supply identifiers, PS1 and PS2, are silk-screened onto the chassis frame. _____
2	Turn off the power switch and disconnect the power to the failed power supply on the chassis. Note _____ The chassis reports a failure for the removed power supply. _____
3	Lift up the clip lock and unplug the power cord from the chassis power supply.
4	Loosen the power supply thumbscrews by turning each thumbscrew counterclockwise.
5	Pull the power supply out of the power supply bay in the chassis. WARNING _____ The power supply is heavy. Support the bottom of the unit while removing the unit from its bay. _____
6	Set the power supply aside.

Installing a power supply

To install a power supply, complete the following steps.

Step	Action
1	Verify that the switch on the power supply is turned off.
2	Push the power supply, slowly and firmly, into the bay until the power supply is firmly seated in the bay.
3	Secure the power supply by turning the thumbscrew clockwise until it stops.

Step	Action
4	Plug the power cord into the power cord receptacle on the power supply and secure it with the clip lock.
5	Turn on the power to the new power supply in the chassis.

Replacing the LED/LCD subassembly

About replacing the LED/LCD subassembly

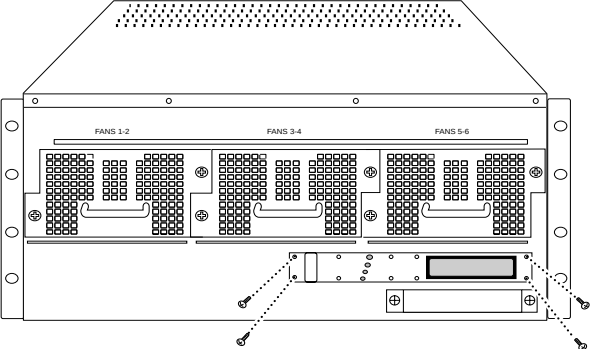
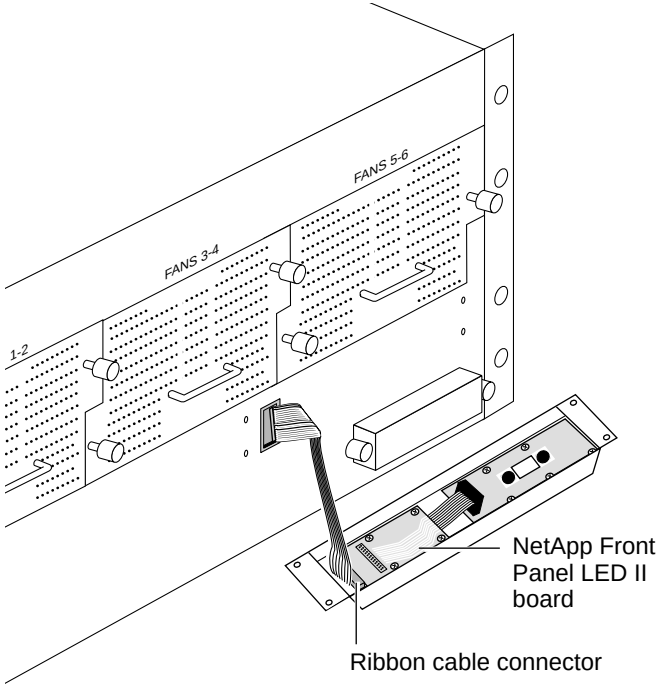
This section provides the procedures for replacing the LED/LCD subassembly. Replacing the LED/LCD subassembly consists of the following procedures:

- ◆ “[Removing the LED/LCD subassembly](#)” on page 119
- ◆ “[Installing the LED/LCD subassembly](#)” on page 121

Removing the LED/LCD subassembly

To remove the LED/LCD subassembly, complete the following steps.

Step	Action
1	Shut down the chassis by entering the following command at the console: <code>halt</code> Caution————— Always use the <code>halt</code> command to perform a clean shutdown.
2	Turn off and disconnect the power to the chassis.
3	Pull the bezel straight off the front panel of the chassis by using the grooves on the left and right edges of the bezel.
4	Put on the antistatic wrist strap and attach the grounding leash to the chassis frame.

Step	Action
5	Use a #1 Phillips screwdriver to remove the four panhead screws that fasten the LED/LCD subassembly to the front panel. Save the screws. 
6	Carefully pull the LED/LCD subassembly and the attached cable from the hole in the chassis front panel. 

Step	Action
7	Unplug the LED ribbon cable from the JP1 connector.
8	Set the LED/LCD subassembly aside.

Installing the LED/LCD subassembly

To install the LED/LCD subassembly, complete the following steps.

Step	Action
1	Plug the LED ribbon cable to the JP1 connector of the LED/LCD subassembly
2	Feed the cable back into the chassis as you push the LED/LCD subassembly against the chassis front panel.
3	Insert and tighten the four panhead screws to secure the LED/LCD subassembly to the chassis front panel.
4	Align the pins on the bezel with the holes on the front panel of the chassis, and then push the bezel straight onto the front panel.
5	Reconnect and turn on the power to the chassis.
6	Interrupt the boot process by pressing the Delete key during the memory test.
7	Run diagnostics by entering the following command at the <code>ok></code> prompt: sys-diag See the <i>Diagnostics Guide</i> for more information.
8	Run the diagnostics that apply to the unit you replaced.

Replacing the CompactFlash unit subassembly

About this section

This section describes the procedures for replacing the CompactFlash™ unit subassembly in the R100 chassis. It also includes information about the LEDs on the front of the CompactFlash unit card reader.

About the CompactFlash card

The R100 chassis uses a CompactFlash card that plugs into the CompactFlash card reader.

The CompactFlash card in the reader is the primary boot device.

Topics in this section

This section provides information about the following topics:

- ◆ [“Replacing the CompactFlash card”](#) on page 123
- ◆ [“Replacing the CompactFlash card reader subassembly”](#) on page 126

Replacing the CompactFlash unit subassembly

Replacing the CompactFlash card

About replacing the CompactFlash card

The CompactFlash card on the R100 chassis is not accessible from the chassis’ front bezel. You must remove the bezel to access the CompactFlash card.

Replacing the CompactFlash card consists of the following procedures:

- ◆ “[Removing a CompactFlash unit](#)” on page 123
- ◆ “[Installing a CompactFlash unit](#)” on page 124

Caution_____

The CompactFlash card is required for normal chassis operation. Remove the CompactFlash card only when you suspect a failed CompactFlash card or CompactFlash card reader.

Removing a CompactFlash unit

To remove the CompactFlash card, complete the following steps.

Step	Action
1	Shut down the chassis by entering the following command at the console: halt Caution_____ Always use the <code>halt</code> command to perform a clean shutdown of the chassis. If you do not perform a clean shutdown before removing the CompactFlash card, your system panics.
2	Turn off the power switch to the chassis.
3	Pull the bezel straight off the front panel of the chassis by using the grooves on the left and right edges of the bezel.
4	Push the eject button on the right front of the CompactFlash card reader.
5	Pull the CompactFlash card (the CompactFlash card and adapter unit) out of the reader.

Installing a CompactFlash unit

To install and restore the image on a replacement CompactFlash card, complete the following steps.

Caution

You must purchase replacement preformatted CompactFlash cards from Network Appliance.

Step	Action
1	Slide the CompactFlash card (the CompactFlash card and adapter unit) into the slot on the front of the CompactFlash card reader.
2	Reinstall the front bezel by aligning the pins on the bezel with the holes on the front panel of the chassis, and then pushing the bezel straight onto the front panel.
3	Turn on the power switch to the chassis.
4	Interrupt the boot process by pressing the Delete key during the memory test.
5	Enter the following command at the <code>ok></code> prompt, and then run the CompactFlash card diagnostics: sys-diag See the <i>Diagnostics Guide</i> for information about running specific diagnostic tests.
6	Exit the diagnostics to return to the <code>ok></code> prompt.
7	Boot from hard disk by entering the following command at the <code>ok></code> prompt: boot fcal Result: This causes the system to boot from the hard disk instead of the CompactFlash unit.
8	Update the image on the CompactFlash card by entering the following command at the chassis prompt: download Result: The CompactFlash card image is restored using information from the hard disk.

Step	Action
9	Boot from the CompactFlash unit by entering the following command at the chassis prompt: reboot

Replacing the CompactFlash card reader subassembly

About replacing the card reader subassembly

Replacing the CompactFlash card reader subassembly consists of the following procedures:

- ◆ “[Removing the card reader subassembly](#)” on page 126
- ◆ “[Installing the card reader subassembly](#)” on page 128

Removing the card reader subassembly

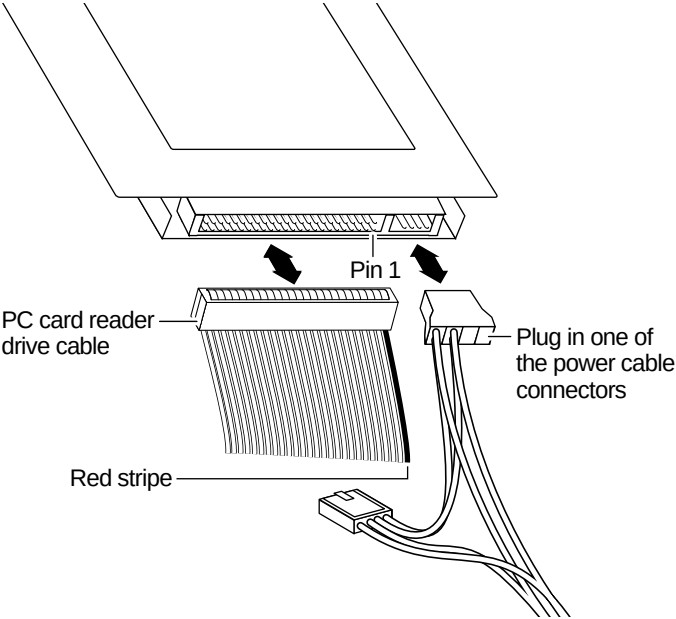
To remove the CompactFlash card reader subassembly, complete the following steps.

Step	Action
1	Shut down the chassis by entering the following command at the console: halt Caution_____ Always use the <code>halt</code> command to perform a clean shutdown of the chassis. If you do not perform a clean shutdown before removing the CompactFlash card, your system panics.
2	Turn off and disconnect the power to the chassis.
3	Put on the antistatic wrist strap and attach the grounding leash to the chassis frame.
4	Remove the CompactFlash card by following Steps 3 through 5 of the procedure described in “Removing a CompactFlash unit” on page 123.

Step	Action
5	Remove chassis fans 5-6 to access the CompactFlash card reader subassembly cables by following these steps: 1. Loosen the thumbscrews on the chassis fan 5-6 subassembly. Note _____ The thumbscrews are torqued at the factory. Use a #2 Phillips screwdriver to loosen the thumbscrews. 2. Pull the fan subassembly straight out of the chassis frame. 3. Set the fan subassembly aside.
6	Loosen the two thumbscrews on the CompactFlash card reader subassembly.
7	Press on the latches on either side of the connector on the backplane to release the connector, then pull out the cable. Reach into the space previously occupied by chassis fans 5-6 and unplug the CompactFlash card reader data cable from the chassis backplane. Note _____ It might be necessary to partially pull the CompactFlash card reader subassembly out of the chassis to access the cables.
8	Unplug the CompactFlash card reader power cable from the chassis backplane.
9	Pull the CompactFlash card reader subassembly out of the drive bay.
10	Disconnect the data cable and power cable from the back of the CompactFlash card reader subassembly and set them aside.

Installing the card reader subassembly

To install the CompactFlash card reader subassembly, complete the following steps.

Step	Action
1	Connect the data cable that you set aside to the back of the CompactFlash card reader subassembly. The data cable is keyed on both ends, and either end of the data cable can connect to the back of the CompactFlash card reader subassembly.
2	Connect the power cable that you set aside to the back of the CompactFlash card reader subassembly. The power cable has two different connectors for connection to the CompactFlash card reader. Plug the proper-sized power cable connector into the connector on the back of the CompactFlash card reader subassembly. 
3	Turn the replacement CompactFlash card reader subassembly so that its rails align with the grooves in the drive bay.

Step	Action
4	Slide the CompactFlash card reader subassembly into the drive bay.
5	Plug the power cable into the chassis backplane power connector.
6	Plug the CompactFlash card reader data cable into the chassis backplane 40-pin data connector. The 30-pin data connector is used for diskette drives, which are not used on chassis with a CompactFlash card reader. Note_____ Ensure that the excess slack of the CompactFlash card reader data and power cables is folded neatly and does not obstruct the installation of chassis fans 5-6 in the next step. _____
7	Using the handle on the chassis fans 5-6 subassembly, slide the chassis fan subassembly straight into the open slot on the chassis.
8	Tighten and then torque the chassis fan thumbscrews 8 to 10 in.-lbs.
9	Tighten the two thumbscrews to secure the CompactFlash card reader subassembly to the chassis.
10	Slide the CompactFlash card (the CompactFlash card and adapter unit) into the slot on the front of the CompactFlash card reader.
11	Reinstall the front bezel by aligning the pins on the bezel with the holes on the front panel of the chassis, and then pushing the bezel straight onto the front panel.
12	Reconnect and turn on the power to the chassis.
13	Verify that the chassis fans are operating.
14	Interrupt the boot process by pressing the Delete key during the memory test.
15	Enter the following command at the <code>ok></code> prompt, and then run the CompactFlash card diagnostics: sys-diag See the <i>Diagnostics Guide</i> for information about running specific diagnostic tests.

CompactFlash card reader LEDs

The following table describes the LEDs on the front of the CompactFlash card reader.

Note_____

To view the CompactFlash card reader LEDs, you must remove the front bezel of the chassis.

LED	State	Indicates
Green	On	The CompactFlash card is inserted in the CompactFlash card reader.
	Off	The CompactFlash card is not inserted in the CompactFlash card reader.
Red	On	CompactFlash card reader activity, for example, the system is booting or running diagnostics.
	Off	No CompactFlash card reader activity.

About this chapter

This section identifies and describes the different types of error messages that appear on the LCD and suggests corrective actions for the problems.

Note

If you contact Network Appliance Technical Support for service, report both the LCD message and the console message. Most LCD messages are truncated versions of console messages that provide more information about the error condition than the LCD messages.

Topics in this chapter

This chapter describes the following topics:

- ◆ “[POST error messages](#)” on page 132
- ◆ “[Boot error messages](#)” on page 136
- ◆ “[All other error messages](#)” on page 141

References

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

If you are troubleshooting...	Then...
R100 chassis hardware problems and need to open the chassis	See “ Replacing Internal Chassis Components ” on page 85.
R100 SCSI disk shelf problems	See “ Replacing R100 Disk Shelf Devices ” on page 69.
Software problems	See the <i>Data ONTAP System Administrator's Guide</i> .

POST error messages

About POST error messages

POST error messages might appear when the chassis checks the hardware on the motherboard by running a series of POSTs from the PROM.

The following table describes the error messages that might appear on the LCD if the chassis encounters errors during the POSTs.

POST error message	Explanation	Fatal?	Corrective action
*2V power bad *3V power bad *5V power bad *+12V power bad *-12V power bad	One (or more) of the power voltages is bad. This could be due to a bad power supply or power-regulation device.	Yes	Replace the power supply or the motherboard.
* <i>Boot DeviceErr</i>	Diskette drive or CompactFlash card could not be found to boot from.	Yes	Replace the diskette drive or insert a CompactFlash card.
* <i>Clock bogus. Date reset</i>	The system real-time clock (RTC) contains an invalid date value. The system does not boot, but the date is reset to January 1, 1970, to enable a subsequent boot.	Yes	Reboot the chassis and reset the date immediately to avoid file system problems.
* <i>Clock dead</i> *Clock battery is dead	The system RTC failed and its battery expired.	Yes	Replace the failed RTC battery, or replace the motherboard.
* <i>Clock error</i>	The system real-time clock (RTC) is not operating (counting) correctly.	Yes	Replace the motherboard.
* <i>Clock reset</i>	The system RTC is not running. The system does not boot, but the date is reset to January 1, 1970, to enable a subsequent boot.	Yes	Reboot the chassis and reset the date immediately to avoid file system problems.

POST error message	Explanation	Fatal?	Corrective action
<i>*CPU ucode err</i>	The CPU microcode update did not occur or, in a multiprocessor system, the microcode updates in the CPUs do not match; that is, they have different revisions.	Yes	Update the firmware to a version that contains an updated microcode database. In a multiprocessor system, ensure that both CPUs are the same revision.
<i>*CPU0 fan failed</i>	The CPU cooling fan is not rotating.	Yes	1. Power off the chassis. 2. Make sure that the fan subassembly is plugged in. 3. If necessary, replace the identified CPU fan/heat sink assembly.
<i>*CPU0 fan stopped</i>	The CPU cooling fan stopped spinning or is spinning too slowly. This can damage the CPU chip.	Yes	1. Power off the chassis. 2. Replace the identified CPU fan/heat sink assembly.
<i>*CPU0 power bad</i> <i>*CPU1 power bad</i>	Voltage to the CPU is not within tolerances.	Yes	Replace the motherboard.
<i>*CPU speed err</i>	The CPU's measured clock speed does not match the expected value for the chassis model. This indicates problems with system clocks and/or buses.	No	Replace the motherboard.
<i>*Env-A rupt err</i> <i>*Env-B rupt err</i> <i>*Env-C rupt err</i> <i>*Env-D rupt err</i>	One of four environmental status monitors on the chassis cannot interrupt the processor, which prevents the chassis from properly monitoring its environmental health.	Yes	Replace the motherboard.

POST error message	Explanation	Fatal?	Corrective action
<i>*Env-A stat err</i> <i>*Env-B stat err</i> <i>*Env-C stat err</i> <i>*Env-D stat err</i>	One of four environmental status monitors on the chassis indicates that it cannot properly monitor its environmental health.	Yes	Replace the motherboard.
<i>*Fan(s) stopped</i>	One or more chassis fans stopped spinning or are spinning too slowly. If two or more chassis fans fail, the system does not boot.	Maybe	Replace the chassis fan subassembly containing the failed fan.
<i>*FLPY init fail</i> <i>*FLPY reg error</i> <i>*FLPY seek err</i> <i>*FLPY track err</i> <i>*FLPY head err</i> <i>*FLPY format err</i> <i>*FLPY read err</i> <i>*FLPY setup err</i>	These messages indicate that the diskette drive subassembly failed.	No	Replace the diskette drive subassembly or replace the motherboard.
<i>*FP button stuck</i>	The front panel Reset button is stuck.	Yes	1. Make sure that the button is not stuck. 2. Replace the LED/LCD subassembly. 3. Replace the motherboard.
<i>*LCD won't open</i> <i>*LCD cmd stall</i> <i>*LCD cursor err</i> <i>*LCD data error</i>	The system LCD device is not operating correctly. All subsequent POST messages are displayed on the console.	No	Replace the LED/LCD subassembly or replace the motherboard.
<i>*No power info</i>	The system is clearly running but no information about the power supply is being reported. Something is wrong with the power supply or the status reporting circuitry.	No	Replace the power supply or the motherboard.
<i>*Onboard battery low</i>	The lithium battery on the motherboard is low.	No	Replace the lithium battery on the motherboard.

POST error message	Explanation	Fatal?	Corrective action
<i>*Overtemp alert</i>	The internal temperature sensor has detected a dangerously high temperature that can damage the system components inside the chassis.	Yes	1. Power down the chassis. 2. Reduce the ambient temperature to 40° C or lower. 3. Make sure that you have proper air circulation through the chassis. If the temperature inside the chassis is not excessively hot, the sensor itself might have failed. 4. Replace the motherboard.
<i>*PCCRD init fail</i> <i>*PCCRD reg error</i> <i>*PCCRD seek err</i> <i>*PCCRD track err</i> <i>*PCCRD head err</i> <i>*PCCRD format err</i> <i>*PCCRD read err</i> <i>*PCCRD setup err</i>	These messages indicate that the CompactFlash card drive subassembly failed.	No	Replace the CompactFlash card, the CompactFlash card reader subassembly, or the motherboard.
<i>*PS #1 failed</i> <i>*PS #2 failed</i>	If the chassis has a second power supply, one of the power supplies failed and the chassis is running on the second power supply.	No	Replace the identified power supply.
<i>*SIO error</i>	The chassis SIO or ISA bridge chip failed its timer interrupt test. The system cannot operate properly without this function.	Yes	Replace the motherboard.
<i>*Watchdog failed</i>	The chassis watchdog reset hardware, used to reset the chassis from a system hang condition, is not functioning properly.	No	Replace the motherboard.

Boot error messages

About boot error messages

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

The following table describes the error messages that might appear on the LCD if the chassis encounters errors while starting up.

Boot error message	Explanation	Fatal?	Corrective action
<i>No /etc/rc</i>	The <i>/etc/rc</i> file is corrupted.	No	1. At the <code>hostname></code> prompt, enter setup. 2. As the system prompts for system configuration information, use the information you recorded in the chassis configuration information worksheet in the <i>Getting Started Guide</i>. For more information about the storage system <code>setup</code> program, see the <i>Data ONTAP System Administrator's Guide</i>.
<i>No /etc/rc, running setup</i>	The system cannot find the <i>/etc/rc</i> file and automatically starts <code>setup</code> .	No	As the system prompts for system configuration information, use the information you recorded in the storage system configuration information worksheet in the <i>Getting Started Guide</i> . For more information about the storage system <code>setup</code> program, see the <i>Data ONTAP System Administrator's Guide</i> .

Boot error message	Explanation	Fatal?	Corrective action
<i>Cannot initialize labels</i>	When the system tries to create a new file system, it cannot initialize the disk labels.	Yes	Usually, you do not need to create and initialize a file system; do so only after consulting Network Appliance Technical Support.
<i>Cannot read labels</i>	When the chassis tries to initialize a new file system, it has a problem reading the disk labels it wrote to the disks. This problem can be because the system failed to read the disk size, or the written disk labels were invalid	Yes	Usually, you do not need to create and initialize a file system; do so only after consulting Network Appliance Technical Support.
<i>Disk label processing failed</i>	The chassis detects that the disk is not in the correct drive bay.	Yes	Make sure that the disk is in the correct bay.
<i>Dirty shutdown in degraded mode</i>	The file system is inconsistent because you did not shut down the system cleanly when it was in degraded mode.	Yes	Contact Network Appliance Technical Support for instructions about repairing the file system.
<i>Halted: firmware too old</i>	The disk firmware is an old version.	Yes	Update the disk firmware by entering the following command: disk_fw_update
<i>No disk controllers</i>	The system cannot detect any disk controllers.	Yes	Turn off power to the chassis and verify that all adapters are properly seated in the appropriate expansion slots.
<i>No disks</i>	The system cannot detect any disks.	Yes	Verify that all disks are properly seated in the drive bays.

Boot error message	Explanation	Fatal?	Corrective action
<i>Drive %s.%d not supported</i>	%s—The adapter slot number; %d—The disk ID number. The system detects an unsupported disk drive.	Yes	1. Remove the drive immediately or the system drops down to the PROM monitor within 30 seconds. 2. Check the System Configuration Guide at http://now.netapp.com to verify support for your disk drive.
<i>FC-AL loop down, adapter %d</i>	The system cannot detect the FC-AL loop or adapter.	Yes	1. Identify the adapter by entering the following command: storage show adapter 2. Turn off the power on the chassis and verify that the adapter is properly seated in the expansion slot. 3. Verify that all Fibre Channel cables are connected.

Boot error message	Explanation	Fatal?	Corrective action
<i>File system may be scrambled</i>	One of the following errors causes the file system to be inconsistent:		
	◆ An unclean shutdown when the chassis is in degraded mode and when NVRAM is not working.	Yes	Contact Network Appliance Technical Support to learn how to start the system from a system boot diskette and repair the file system.
	◆ The number of disks detected in the disk array is different than the number of disks recorded in the disk labels. The system cannot start when more than one disk is missing.	Yes	Make sure that all disks on the system are properly installed in the disk shelves.
	◆ The system encounters a read error while reconstructing parity.	Yes	Contact Network Appliance Technical Support for help.
	◆ A disk failed at the same time the system crashed.	Yes	Contact Network Appliance Technical Support to learn how to repair the file system.
<i>Invalid PCI card slot %d</i>	%d—The expansion slot number. The system detects a adapter that is not supported by Network Appliance.	Yes	Replace the unsupported adapter with an adapter that is included in the System Configuration Guide at http://now.netapp.com .
<i>Configuration exceeds max PCI space</i>	The memory space for mapping PCI adapters has been exhausted, because either ◆ There are too many PCI adapters in the system ◆ An adapter is demanding too many resources	Yes	Verify that all expansion adapters in the chassis are supported. Contact Network Appliance Technical Support for help. Have a list ready of all expansion adapters installed in the chassis.

Boot error message	Explanation	Fatal?	Corrective action
<i>No network interfaces</i>	The system cannot detect any network interfaces.	Yes	1. Turn off the system and verify that all NICs are seated properly in the appropriate expansion slots. 2. Run diagnostics to check the onboard Ethernet port. If the problem persists, contact Network Appliance Technical Support.
<i>ServerNet: wrong pci slot</i>	The system detects that the cluster interconnect adapter is in the wrong expansion slot.	Yes	See the System Configuration Guide at http://now.netapp.com and place the adapter in the approved expansion slot.
<i>No NVRAM present</i>	The system cannot detect the NVRAM adapter.	Yes	Make sure that the NVRAM adapter is securely installed in expansion slot 11.
<i>Replace NVRAM batteries</i>	The NVRAM battery is low. The system shuts down immediately.	Yes	Replace the battery.
<i>Replace %s</i>	%s—The number of NVRAM batteries. The R100 chassis has a single NVRAM battery.	Yes	Replace the battery.
<i>NVRAM #n downrev</i>	n—The serial number of the NVRAM adapter. The NVRAM adapter is an early revision that cannot be used with the system.	Yes	Check the console for information about which revision of the NVRAM adapter is required. Replace the NVRAM adapter.
<i>NVRAM test failed</i>	An error occurred while the system tested the NVRAM.	Yes	Contact Network Appliance Technical Support if this message appears.
<i>Unsupported NVRAM size %dMB</i>	%d—The amount of memory on the NVRAM adapter. The specified size is not supported.	Yes	Verify that the system has 128 MB of NVRAM.

All other error messages

About all other error messages

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

Error message	Explanation	Fatal?	Corrective action
<i>Disk n is broken</i>	<i>n</i> —The RAID group disk number. The solution depends on whether you have a hot spare in the system.	No	See the <i>Data ONTAP System Administrator's Guide</i> for information about how to locate a disk based on the RAID group disk number and how to replace a faulty disk.
<i>Fans stopped; replace them</i>	One of the fan subassemblies of the chassis failed.	No	Replace the failed fan subassembly as soon as possible.
<i>Backplane fans non-functional</i>	One of the fan subassemblies of the chassis failed.	Yes	Replace the failed fan subassembly immediately.
<i>Power supply degraded</i>	One of the power supply units is turned off, was removed from the chassis, or failed.	No	Verify that both power supplies are installed and turned on. If you still get this error, replace the power supplies one at a time to determine the failed power supply.
<i>Dumping core</i>	The system is dumping core after a system crash.	Yes	Write down the system crash message on the system console and report the problem to Network Appliance Technical Support.

Error message	Explanation	Fatal?	Corrective action
<i>Disk hung during swap</i>	A disk error occurred as you were hot swapping a disk.	Yes	1. Disconnect the disk shelf from the power supply. 2. Wait 15 seconds to allow all disks to spin down. 3. Reconnect the power source to the disk shelf. 4. Restart the system by entering the following command: boot
<i>Error dumping core</i>	The system cannot dump core during a system crash and restarts without dumping core.	Yes	Report the problem to Network Appliance Technical Support.
<i>Panicking</i>	The system is crashing. If the system does not hang while crashing, the message <code>Dumping core</code> appears.	Yes	Report the problem to Network Appliance Technical Support.
<i>System too hot</i>	The temperature sensor indicates that the system temperature is too high.	Yes	Verify that the ventilation holes on the top cover of the system are not blocked. If the ventilation holes are not blocked and the problem persists, contact Network Appliance Technical Support for help.

About this appendix The information in this appendix helps you to determine the power line lengths running from the R100 system to the power source.

AC power line sizes

About AC power feeds

Longer AC power feeds must be properly designed to preserve voltage levels to the equipment. The wiring from the breaker panel to the power strip, which supplies power to the R100 chassis and disk shelves, can often exceed 50 feet.

Note

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

Recommended conductor size

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

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

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

Wire gauge approximates

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

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

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

Regulatory notices

FCC notices (U.S. only)

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

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

- ◆ Install and operate this equipment in accordance with the specifications and instructions in this guide.
- ◆ Modify this equipment only in the ways specified by Network Appliance.
- ◆ Use shielded cables with metallic RFI/EMI connector hoods to maintain compliance with applicable emissions standards.
- ◆ If the system has nine or more Fibre Channel disk shelves, install the system in two or three NetApp System Cabinets to maintain performance within Part 15 of CFR 47 regulations.

Compliance with Part 15 of CFR 47

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

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

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

Compliance with ICES-003

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

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

Compliance with EN regulations

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

Caution

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

**Bureau of
Standards,
Metrology, and
Inspections notice
(BSMI, Taiwan only)****警告使用者：**

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

Translation of the BSMI notice:

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

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

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

Translation of the VCCI-A notice:

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

Declaration of Conformity

**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 manufacture
Network File Server	NetApp R100 Chassis and disk shelves	R100	2001

to which this declaration relates conform to the following standards:

EN 60950:1992, with A1-A4, A11, Information Technology Equipment (Safety)

EN 55022:1998, Emissions Requirements for Information Technology Equipment

EN 50024:1998, Immunity Requirements for Information Technology Equipment

EN 60825-1, Safety of Laser/LED Equipment

IEC 1000-3-2:1995 Limits for Harmonic Current Emissions

IEC 1000-3-3:1994 Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems

following the provisions of the directives listed below:

73/23/EEC, Low Voltage Directive (Product Safety)

89/336/EEC, Electromagnetic Compatibility Directive

Part number: 210-00159

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