

C1200 and C2100 NetCache™ Appliance Hardware and Service Guide

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Part number 210-00378
December 2002

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Safety Information (Sicherheitshinweise)

Safety rules

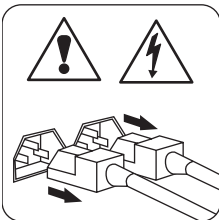
You must follow these safety rules when working with this equipment:

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

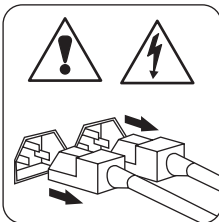
Die folgenden Sicherheitshinweise sind beim Betreiben des Geräts unbedingt zu beachten:

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 Abzweigungen 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.

Preface

About this guide

This guide describes the following tasks and topics:

- ◆ How to install a C1200 or C2100 NetCache™ appliance in a two-post equipment rack or double two-post equipment rack
- ◆ How to connect it to a network
- ◆ How to start up the system
- ◆ How to perform basic troubleshooting
- ◆ How to replace field-replaceable units (FRUs)

This guide does not cover basic system or network administration, which is covered in the *System Administration Guide*.

Audience

This guide is for qualified system administrators and service personnel who are familiar with NetApp®—the Network Appliance™ Company NetCache appliances, which are Serving Data by Design™ and how the Network File System (NFS), Common Internet File System (CIFS), and Hypertext Transfer Protocol (HTTP) protocols are used to share and transfer files.

Terminology

This guide uses the following terms:

- ◆ *FRU* refers to any field-replaceable unit that is replaceable at the customer site.
- ◆ *NetCache appliance* and *appliance* refer to a C1200 NetCache appliance or a C2100 NetCache appliance that share common components or procedures. When components or procedures that apply specifically to a C1200 or C2100 are noted, the full model number is included in the reference.

Command conventions

You can enter commands on the system console or from any client that has access to the system using Telnet. In examples of commands run on a UNIX workstation, this guide uses the command syntax and output of SunOS 4.1x. If you use a different version of UNIX, the command syntax and output might be different.

Keyboard conventions

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

What is in this guide...	What it means...
hyphen (-)	Used to separate individual keys. Example: Ctrl-D means holding down the Ctrl key while pressing the D key.
Enter	Used to refer to the key that generates a carriage return, although the key is named Return on some keyboards.
type	Used to mean pressing one or more keys on the keyboard.
enter	Used to mean pressing one or more keys and then pressing the Enter key.

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. ◆ Placeholders for information you must supply. For example, if the guide requires you to enter the arp -d hostname command, you enter the characters “arp -d” followed by the actual name of the host. ◆ Book titles in cross-references.
Monospaced font	◆ Command and daemon names. ◆ Information displayed on the system console or other computer monitors. ◆ Contents of files.

Formatting convention	Type of information
Bold monospaced font	Words or characters you type. What you type is always shown in lowercase letters, unless 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.

About this chapter

This chapter identifies the tools and manuals you need for first-time installation of a C1200 NetCache appliance or a C2100 NetCache appliance.

It describes the following:

- ◆ Physical characteristics, such as height and weight
- ◆ Electrical, environmental, and space requirements
- ◆ Installation tools and equipment you need
- ◆ Components you should receive with the appliance

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Required tools, equipment, and documentation”](#) on page 2
- ◆ [“Appliance dimensions and environmental parameters”](#) on page 4

Required tools, equipment, and documentation

Equipment you receive with your appliance

In addition to this guide, your shipment should have the following components:

- ◆ A NetCache appliance and bezel
- ◆ The appropriate number of disk drives, installed in the appliance
- ◆ A DB-9 to DB-9 straight-through serial cable and a DB9-RJ45 adapter for your ASCII terminal connection, if ordered
- ◆ The appropriate rack installation kit
- ◆ The NetCache appliance user guides

Equipment rack installation components

The following table lists the components you receive to install the NetCache appliance in a specific type of equipment rack.

Tools or equipment	Front-mounted on a two-post equipment rack	Center-mounted on a two-post equipment rack	Double two-post equipment rack or system cabinet
Four-post slide rail assemblies			↔
Two-post mounting brackets	↔	↔	
Mounting screws, washers, and nuts	↔	↔	

Caution

When mounting your NetCache appliance in an equipment rack or system cabinet, you must use mounting brackets approved by NetApp. Failure to use mounting brackets approved by NetApp voids your warranty.

Required tools

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

- ◆ #2 Phillips screwdriver
- ◆ Marker
- ◆ Hand level
- ◆ Antistatic wrist strap and grounding leash

Caution

The appliance has electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures can damage these components. Always wear an antistatic wrist strap and grounding leash to prevent static discharge.

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

Required documentation

The following table lists additional documentation you need to help manage the appliance.

Document name	When to use
<i>Site Requirements Guide</i>	Use this guide to assist you in preparing your site for your appliance.
<i>NetCache Release Notes</i>	Use this document to see what is new with your appliance, for a listing of new procedures that didn't make the user documentation, and for a listing of the changes since the last release of the software.
<i>Configuration Guide</i>	Use this guide to configure and optimize your appliance.
<i>Administration Guide</i>	Use this guide to administer, manage, and optimize your appliance.

Appliance dimensions and environmental parameters

Installation considerations

When planning your installation, you must consider the following:

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

Physical characteristics

The following table lists the physical characteristics.

Characteristic	Model	U.S.	Metric
Height	C1200	1.75 in. (1U)	4.4 cm
	C2100	3.5 in. (2U)	8.9 cm
Width	C1200	16.9 in.	43.0 cm
	C2100	17.1 in.	43.4 cm
Depth	C1200	25.5 in.	64.8 cm
	C2100	25.5 in.	64.8 cm
Weight fully loaded	C1200	29 lbs	13.2 kg
	C2100	47 lbs	21.4 kg

Environmental requirements

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

Environmental condition	Operating range	Storage range
Temperature	50° F to 95° F (10° C to 35° C)	-40° F to 158° F (-40° C to 70° C)

Environmental condition	Operating range	Storage range
Humidity	85% (noncondensing at 40° C)	90% (noncondensing at 35° C)

Space requirements The following table lists the recommended minimum clearances.

Recommended minimum clearance	U.S.	Metric
Front clearance		
Cooling	1 in.	2.54 cm
Maintenance-without slide rails	10 in.	25.4 cm
Maintenance-with slide rails	30 in.	76.2 cm
Rear clearance		
Cooling	6 in.	15.2 cm
Maintenance	12 in.	30.5 cm

Electrical requirements

The following tables list the AC electrical requirements and the power and heat parameters.

Condition	Requirement
Voltage range	100–127/200–240V
Current range	C2100 appliance 5/2.5 Amps
	C1200 appliance 3.6/1.8 Amps
Frequency	50/60 Hz

Power	Rating
C1200	310W
C2100	152W
Heat dissipation BTU/hr.	
C1200	519 BTU/hr. maximum
C2100	1,058 BTU/hr. maximum

Note

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

- Types of installation** The following list specifies the types of installations you can perform:
- ◆ Double two-post installation using slide rails
 - ◆ Two-post equipment rack as a mid-mount or flush-mount installation

- Topics in this chapter** This chapter discusses the following topics:
- ◆ [“Installing in a double two-post equipment rack”](#) on page 8
 - ◆ [“Installing in a two-post equipment rack”](#) on page 9

Installing in a double two-post equipment rack

Installing the appliance

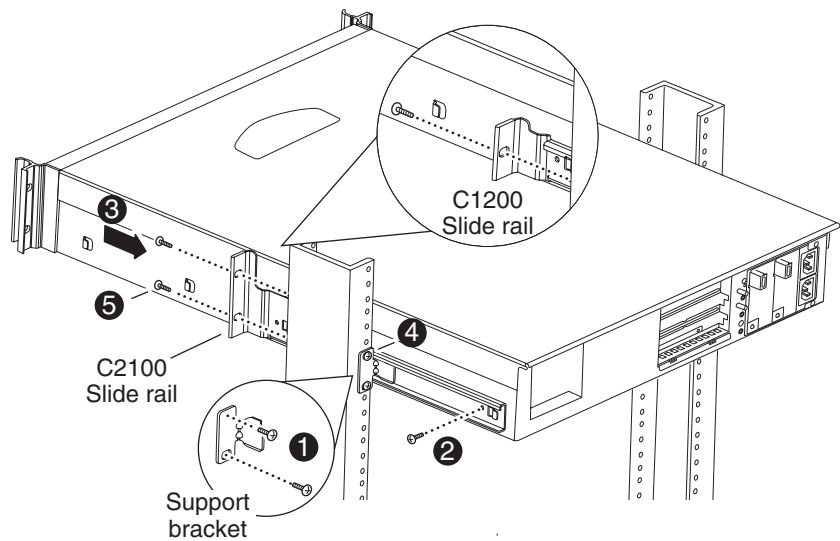
To install the appliance in a double two-post equipment rack, complete the following steps.

Step	Action
1	Unpack the supplied slide rail kit and follow the enclosed instructions to install the slide rails and the appliance into the equipment rack.
2	Go to Chapter 3, “ Connecting the NetCache appliance ,” on page 11, for instructions about connecting the appliance to your network and connecting an ASCII terminal.

Installing in a two-post equipment rack

Installing the appliance

To install the appliance in a two-post equipment rack as either a mid-mount or flush-mount installation, complete the following steps, using the figure for reference.



Step	Action
1	Attach the support bracket to the equipment rack, using the appropriate screws from the mounting kit. Do not tighten the screws completely. The bracket should have some play for proper alignment.
2	Attach the slide rail to the front-most tab on the side of the appliance for flush mount, or to the back-most tab on the appliance for mid-mount.
3	Secure the slide rail to the appliance by inserting a 6-32 x 3/16 in. screw into the front hole in the slide rail.
4	Repeat Steps 1 through 3 for the other side of the appliance.

Step	Action	
5	Align the back of the slide rails with the small brackets attached to the equipment rack, then carefully slide the appliance into place and tighten the screws on the two small brackets into the posts.	
6	If you are mounting the appliance as a...	Then...
	Flush-mount	Secure the appliance to the rack posts by inserting the appropriate screws (two for the C1200 and four for the C2100) through the holes in the left and right mounting handles and slide rail ears. Note_____ After tightening the brackets on your C1200, the chassis might sag slightly. To keep the chassis from sagging, loosen all mounting screws slightly and lift up the rear of the chassis until it is level. While holding the chassis level, retighten all the bracket screws. _____
	Mid-mount	Secure the left and right slide rail ears to their respective posts using two M5 screws.
7	Connect the appliance to the network and ASCII terminal, as described in Chapter 3, “ Connecting the NetCache appliance ,” on page 11.	

About this chapter

This chapter discusses how to connect the NetCache appliance to a network through several types of Ethernet adapters, and how to connect the appliance to an ASCII terminal console.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Connecting to an Ethernet network”](#) on page 12
- ◆ [“Connecting to an ASCII terminal console”](#) on page 15

Connecting to an Ethernet network

Supported Ethernet connections

The appliance has two onboard 10Base-T/100Base-TX Ethernet ports. It also supports the following Ethernet network interface cards (NICs) in the internal PCI riser:

- ◆ 10Base-T/100Base-TX/1000Base-T Gigabit Ethernet (GbE) NIC, with an RJ45 connection
- ◆ GbE NIC, with a fiber optic connection

Note

See the System Configuration Guide at <http://now.netapp.com> for slot assignments.

Cabling requirements

The following table lists the cabling requirements for the system Ethernet connections.

Ethernet adapter type	Type of cable used	Maximum distance
10Base-T/ 100Base-TX	Category 3 (10Base-T only) or 5 (10Base-T/100Base-TX) unshielded twisted-pair (UTP) cable with RJ-45 connectors	100m
10Base-T/ 100Base-TX/ 1000Base-T GbE	Category 5 UTP cable with RJ-45 connector for the copper GbE adapter only	100m
GbE fiber optic connection	50 micron multimode fiber optic cable, SC connector	550m
	62.5 micron multimode fiber optic cable, SC connector	220m

For detailed information

For detailed information about network connections, see the following sections:

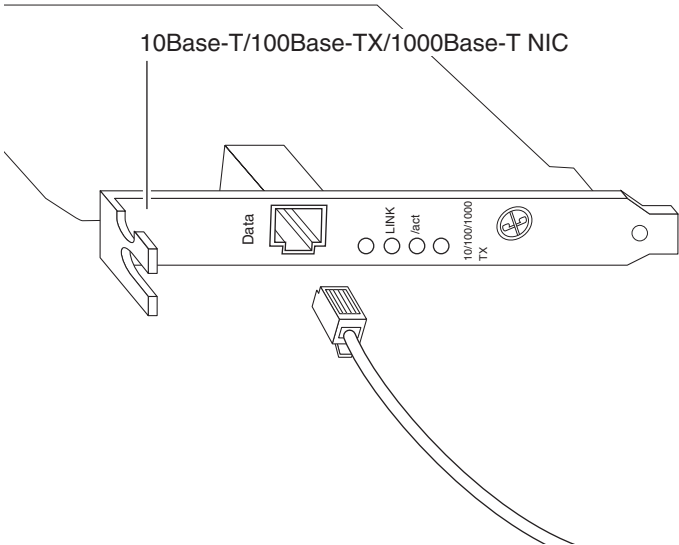
- ◆ “[Connecting through an RJ45 connection](#)” on page 13
- ◆ “[Connecting through a fiber optic GbE network](#)” on page 14

Connecting to an Ethernet network

Connecting through an RJ45 connection

Connecting through an RJ-45 connection

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

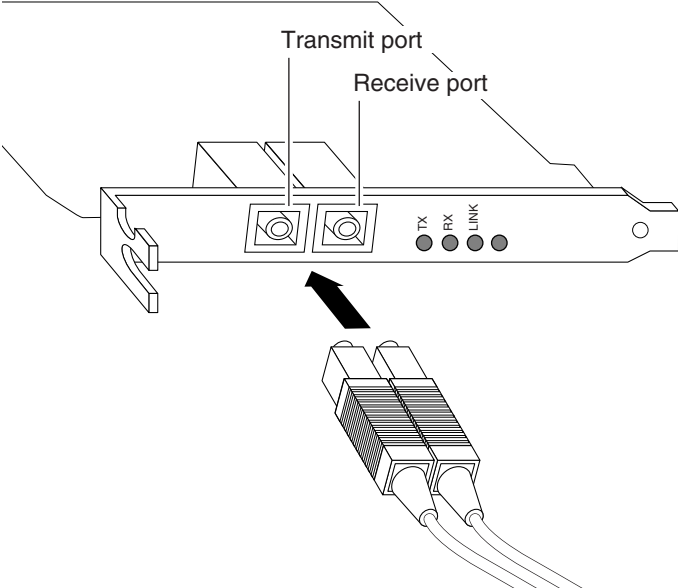
Step	Action
1	Push the RJ-45 connector into the Ethernet port until it clicks and locks into place. The following figure shows a UTP cable with an RJ-45 connector connecting to a 10Base-T/100Base-TX/1000Base-T NIC.  The diagram shows a horizontal network interface card (NIC) with a UTP cable plugged into its RJ-45 port. The NIC has several labels and indicators: 'Data' on the left, a 'LINK' indicator, a '10/100/1000 TX' label, and a circular icon with a diagonal line through it. The cable is labeled '10Base-T/100Base-TX/1000Base-T NIC'.

Connecting to an Ethernet network

Connecting through a fiber optic GbE network

Connecting through a fiber optic GbE connection

To connect the appliance to a fiber optic GbE network, complete the following step.

Step	Action
1	Push the fiber optic cable with the SC connector into the ports on the NIC, until it clicks and locks into place. 

Connecting 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 appliance after it boots. You must use an ASCII terminal attached through the serial port on the back of the appliance if you want to do local system administration.

ASCII terminal console cable wiring

The ASCII terminal console is connected to the serial port on the back of the appliance with a serial DB-9 to RJ-45 cable. The following table lists how this cable is wired. Input indicates data flow from the ASCII terminal to the appliance and output indicates data flow from the appliance 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 appliance, complete the following steps.

Step	Action	
1	Set the following communications parameters to the same values for both the appliance and ASCII terminal.	
	Parameter	Setting
	Baud	9600
	Data bit	8
	Parity	None
	Stop bits	1
	Flow control	None
	Note _____	
See your terminal documentation for information about changing your ASCII console terminal settings. _____		
2	Connect the RJ-45 end of the cable to the console port on the appliance and the DB-9 of the cable to the ASCII terminal.	
3	Go to Chapter 4, “ Powering on the NetCache appliance ,” on page 17.	

Powering on the NetCache appliance

About this chapter

This chapter describes how to prepare the NetCache appliance for initial power on and what to expect when you apply power to the appliance.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Connecting to a power source and powering on”](#) on page 18
- ◆ [“Configuring the appliance at initial boot”](#) on page 19

Connecting to a power source and powering on

Connecting and powering on

To connect the appliance to a power source and power it on, complete the following steps.

Step	Action
1	Plug one end of a power supply cord into each power supply inlet connector, then plug the other end of the power cord into grounded electrical outlets on separate AC circuits. Note— The C1200 appliance only has one power supply.
2	Check the LEDs on the power supplies. Make sure that the primary power supply LED is green.
3	Press the power button on the front of the appliance bezel.
4	Observe the messages on the front LCD of the C2100 and on the terminal console of the C1200 during boot. If you encounter errors, see “Startup error messages” on page 24 for corrective actions.
5	Observe the network status LEDs on the appliance NICs during boot. The LEDs should be like the following list: ◆ Network connectivity—Green indicates the appliance is connected to the network. ◆ Network communication—Flashing amber LEDs indicate network access. See “Interpreting LED messages” on page 48 for descriptions of messages you might see during the boot process.
6	Observe the console startup messages for errors. If you encounter errors, see “Error Messages and Troubleshooting” on page 23 for corrective actions.

Configuring the appliance at initial boot

Ways to configure the NetCache appliance

- You can configure the appliances:
- ◆ Through the console or through the front bezel buttons on the C2100
 - ◆ Through the console only on the C1200

Information you need to supply

- You need to supply the following configuration information when you first boot your appliance:
- ◆ IP address for the default network interface
 - ◆ Netmask for the network interface
 - ◆ IP address for the default gateway

Note—
If your network has a DHCP server, which was preconfigured to supply information to your appliance, these values might be supplied. All you need to do is confirm the displayed values.

After you bring up the system, you need to complete the configuration through the Web interface. See the *Quick Setup Guide* for information about completing system configuration.

Configuring the appliances through the ASCII console

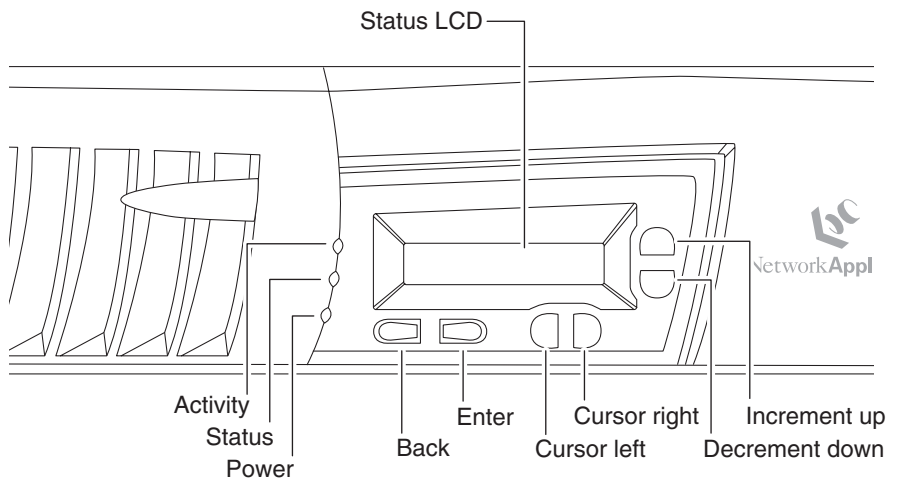
To configure the appliance using the ASCII console, complete the following steps.

Step	Action
1	Connect the ASCII console to the appliance, as described in “Connecting to an ASCII terminal console” on page 15.
2	Apply power to the system and boot it to the first series of configuration questions. Note — If you do not enter any information on the console, the system attempts to boot with default data.

Step	Action
3	Enter the requested information through the ASCII console keyboard. Note_____ If you need to stop the setup program, press Ctrl-C. To restart the setup program, enter setup at the system prompt.
4	Go to the <i>Quick Setup Guide</i> to complete the installation.

Configuring the appliance through the bezel—C2100 only

To configure the C2100 appliance using the buttons on the bezel, complete the following steps, using the figure for reference.



Step	Action
1	Apply power to the system and boot it to the first series of configuration questions displayed on the Status LCD.
2	Enter the requested information for each configuration question displayed on the Status LCD, by using the following procedure: 1. Using the Cursor right or Cursor left buttons on the front of the bezel, select the field you want to change. 2. Press the Increment or Decrement buttons to change the highlighted value in the display. 3. Press Enter to accept the displayed value and to move to the next variable. 4. Repeat Steps 1 through 3 for other values in the display. Note_____ If you do not enter any information on the console, the system attempts to boot with default data. _____
3	Go to the <i>Quick Setup Guide</i> to complete the installation. Note_____ If you want to restart the initial configuration process, push the left and right cursor buttons at the same time. _____

About this chapter

This chapter lists error messages you might encounter during the boot process. It also describes the location of the LEDs and how to interpret the information they provide.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Startup error messages”](#) on page 24
- ◆ [“Operational error messages”](#) on page 38
- ◆ [“System beep code error messages”](#) on page 45
- ◆ [“Interpreting LED messages”](#) on page 48

Startup error messages

Startup sequence

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

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

POST messages

POST is a series of tests run from the motherboard PROM. These tests check the hardware on the motherboard and differ depending on your system configuration. POST displays errors in configuration or hardware as messages on the system console. The following list specifies the types of POST error messages you might see:

- ◆ Environmental messages, displayed as English error messages
- ◆ CMOS-level errors, displayed as three-digit numeric error codes and an English description
- ◆ CPU-level errors, displayed as four-digit numeric codes and an English description

The following series of messages are examples of POST messages displayed on the console.

```
Intel Open Firmware by FirmWorks
Copyright 1995-2000 FirmWorks, Network Appliance. All Rights
Reserved.

Firmware release x.x_in
Memory size is 3GB
Testing SIO
Testing LCD
Probing devices
Testing 3GB
Complete
Finding image...
Starting
```

Note

The C2100 appliance LCD displays only the POST messages without the preceding header.

Boot messages

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

```
NetApp Release x.x.x: Thu January 10 04:06:00: PST 2002
Copyright (c) 1992-2002 Network Appliance, Inc.
Starting boot on Thu January 10 23:42:47 GMT 2002
System ID: 0016777216 ()
slot 0: System Board
      Memory Size:      3 GB
slot 0: Ethernet Controller e0
      MAC Address:      00:c0:94:00:13:12 (auto-100tx-fd-up)
slot 1: Ethernet Controller e3
      MAC Address:      00:a0:92:f7:62:56 (tp-down)
slot 4: NVRAM
      Memory Size:      64 MB
Please enter the new hostname [ ]:
```

For detailed information

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

- ◆ [“POST error messages”](#) on page 26
- ◆ [“Boot error messages”](#) on page 34

POST error messages

POST error messages

The following table describes the POST error messages that might appear on the system console of the appliance, if the system encounters environmental, CMOS, or CPU errors during the POST process.

Note

Always power cycle the appliance when you receive any of the following errors. If the system repeats the error message, follow the corrective action for that error message. Also, if any *Processor 2* error messages are displayed, power cycle the system. If the error message persists, replace the motherboard, as described in [“Replacing the motherboard”](#) on page 102.

Error message or code	Description	Corrective action
<i>*Boot DeviceErr</i>	The CompactFlash™ card could not be found to boot from.	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.	Reboot the appliance and reset the date immediately to avoid file system problems.
<i>*Clock dead</i> <i>*Clock battery is dead</i>	The system RTC failed and its battery expired.	Replace the failed RTC battery, or replace the motherboard.
<i>*Clock error</i>	The system real-time clock (RTC) is not operating (counting) correctly.	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.	Reboot the appliance and reset the date immediately to avoid file system problems.

Error message or code	Description	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.	Update the firmware to a version that contains an updated microcode database.
<i>*CPU speed err</i>	The CPU's measured clock speed does not match the expected value for the appliance model. This indicates problems with system clocks and/or busses.	Replace the motherboard.
<i>*FP button stuck</i>	The front panel Reset button is stuck.	Free the Reset button. Replace the LED/LCD subassembly. 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—C2100 only.	Replace the motherboard or replace the chassis.
<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.	Replace the power supply or the motherboard.
<i>*Onboard battery low</i>	The lithium battery on the motherboard is low.	Replace the lithium battery on the motherboard.
<i>*SIO error</i>	The appliance SIO or ISA bridge chip failed its timer interrupt test. The system cannot operate properly without this function.	Replace the motherboard.
<i>*Watchdog failed</i>	The appliance watchdog reset hardware, used to reset the appliance from a system hang condition, is not functioning properly.	Replace the motherboard.

Error message or code	Description	Corrective action
<i>*Fan stopped; Replace it!</i>	A fan in the appliance stopped and should be replaced as soon as possible. The system console displays information about which fan stopped.	Replace the identified fan, as described in “ Replacing the fans ” on page 80.
<i>*Power supply degraded!</i>	A power supply in the appliance is faulty and will fail soon or is unplugged. The system console displays information about the specific power supply or what caused it to become degraded.	Replace the power supply or power supply cord, as described in “ Replacing the power supplies ” on page 89.
<i>*SHUTDOWN FOR ENV. ISSUES</i>	An environmental event caused the system to shut down. Possible events are as follows: ◆ A power supply fan failed or is running slowly. ◆ Two of the four fans in the system either stopped or are running slowly. ◆ The appliance reached a critical temperature and is too hot. ◆ A power voltage line is in a critical state and not functioning properly.	Do one of the following: ◆ Replace the identified fan, as described in “Replacing the fans” on page 80. ◆ Replace a power supply or power cord, as described in “Replacing the power supplies” on page 89. ◆ Check the heatsink fan—C2100 only. ◆ Check and remove any airflow obstructions.
<i>100 Timer channel 2 error</i>	An error was detected on timer channel 2.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.
<i>101 Master interrupt controller</i>	The master interrupt controller detected an error.	
<i>102 Slave interrupt controller</i>	The slave interrupt controller detected an error.	
<i>103 CMOS battery failure</i>	The battery used by CMOS is discharged or failed.	

Error message or code	Description	Corrective action
104 CMOS options not set	CMOS options are missing or not set.	Ignore this error message and continue booting to the operating system. If the system does not boot, call Network Appliance Customer Support.
105 CMOS checksum failure	A checksum failure occurred during CMOS testing.	
106 CMOS display error	A display error occurred during CMOS testing.	
107 Insert key pressed	The appliance does not support an attached keyboard.	
108 Keyboard locked message		
109 Keyboard stuck key		
10A Keyboard interface error		
10B System memory size error	The system memory is different than expected.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.
11B Date/time not set	The system date and time is not set and should be.	1. Ignore this error message and continue booting to the operating system. 2. Reset the date and time, as described in the <i>System Administrator’s Guide</i>. If the system does not boot or does not hold the corrected date and time, call Network Appliance Customer Support.
11E Cache memory bad	The onboard system cache memory is corrupted or failed.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.

Error message or code	Description	Corrective action
<i>120 CMOS clear</i>	The CMOS is clear.	Ignore this error message and continue booting to the operating system. If the system does not boot, call Network Appliance Customer Support.
<i>121 Password clear</i>	The system password is not set.	
<i>140 PCI error</i>	A PCI slot error was encountered.	Attempt to isolate the problem by completing the following steps: 1. Shut down the system. 2. Remove one PCI adapter, starting with the NICs, as described in “Installing or replacing expansion adapters” on page 95. 3. Reboot the system. If the system boots without the error message, replace the NIC you removed in Step 2. Otherwise, repeat Steps 1 and 2 with the remaining NICs and the NVRAM 4 adapter. 4. Replace the motherboard, as described in “Replacing the motherboard” on page 102. If the problem persists, call Network Appliance Customer Support.
<i>141 PCI memory allocation error</i>	A PCI memory allocation was encountered.	
<i>142 PCI IO allocation error</i>	A PCI input/output allocation was encountered.	
<i>143 PCI IRQ allocation error</i>	A PCI IRQ interrupt allocation was encountered.	
<i>144 Shadow of PCI ROM failed</i>	The PCI shadow ROM failed or was not detected.	
<i>145 PCI ROM not found</i>	No PCI ROM was detected.	
<i>146 Insufficient memory to shadow PCI ROM</i>	The PCI shadow ROM failed, was partially detected, or was not detected.	

Error message or code	Description	Corrective action
<i>8100 Processor 1 failed BIST</i>	The CPU failed the built-in self test.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.
<i>8110 Processor 1 internal error (IERR)</i>	The CPU encountered an internal error.	
<i>8120 Processor 1 thermal trip error</i>	The CPU thermal sensor detected a high temperature on the CPU.	
<i>8130 Processor 1 disabled</i>	The CPU is disabled or not functioning.	
<i>8140 Processor 1 failed FRB-3 timer</i>	The CPU failed the FRB-3 timer test.	
<i>8150 Processor 1 failed initialization on last boot</i>	The CPU did not initialize properly.	
<i>8160 Processor 01: unable to apply BIOS update</i>	The CPU cannot apply a recent BIOS update.	
<i>8170 Processor P1 :L2 cache failed</i>	The L2 cache on the CPU failed.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.
<i>8180 Bios does not support current stepping for processor P1</i>	The BIOS and CPU versions are out of synch.	
<i>8190 Watchdog timer failed on last boot</i>	The watchdog timer failed on the last boot.	Ignore this error message and continue booting to the operating system. If the system does not boot, call Network Appliance Customer Support.

Error message or code	Description	Corrective action
<i>8191 4:1 Core to bus ratio: processor cache disabled</i>	The CPU cache was disabled.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.
<i>8192 L2 cache size mismatch</i>	The expected and detected L2 cache do not match.	
<i>8193 CUID, processor stepping are different</i>	The expected and detected CPU speeds are different.	
<i>8194 CUID, processor family are different</i>	The expected and detected CPU family are different.	
<i>8195 Front side bus speed mismatch; system halted</i>	A bus error occurred. The expected and detected bus speeds are different.	
<i>8196 Processor models are different</i>	The expected and detected CPU models are different.	
<i>8197 CPU speed mismatch</i>	The expected and detected CPU speeds are different.	
<i>8300 Baseboard management controller failed to function</i>	The baseboard management controller failed.	
<i>8301 Front panel controller failed to function</i>	The front panel controller failed.	Replace the system chassis, as described in “ Replacing the appliance chassis ” on page 106.
<i>8305 Hot swap controller failed to function</i>	The hot swap controller failed—C2100 only.	
<i>8420 Intelligent system monitoring chassis opened</i>	N/A	Ignore this error message and continue booting to the operating system. If the system does not boot, call Network Appliance Customer Support.
<i>84F1 Intelligent system monitoring forced shutdown</i>		

Error message or code	Description	Corrective action
<i>84F2 Server management interface failed</i>	The server management interface failed.	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102. If the problem persists, call Network Appliance Customer Support.
<i>84F3 BMC in update mode</i>	The BMC is in update mode and is not operating.	
<i>84F4 Sensor data record empty</i>	The sensor data log is empty.	
<i>84FF System event log full</i>	The system event log is full and did not record properly.	1. Ignore this error message and continue booting to the operating system. If the system does not boot, call Network Appliance Customer Support. 2. Open the System Event Log and save the contents to a different file. Clear the Event Log and save the empty file.

Boot error messages

When boot error messages appear

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

Boot error messages

The following table describes the error messages that might appear on the C2100 LCD or on the C1200 console, if the appliance encounters errors while starting up.

Boot error message	Explanation	Corrective action
<i>No /etc/rc</i>	The /etc/rc file is corrupted.	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 appliance configuration information worksheet in the <i>Getting Started Guide</i>. For more information about the appliance <code>setup</code> program, see the <i>System Administration Guide</i>.
<i>No /etc/rc, running setup</i>	The system cannot find the /etc/rc file and automatically starts <code>setup</code> .	As the system prompts for system configuration information, use the information you recorded in the appliance configuration information worksheet in the <i>Getting Started Guide</i>. For more information about the appliance <code>setup</code> program, see the <i>System Administration Guide</i>.
<i>Cannot initialize labels</i>	When the system tries to create a new file system, it cannot initialize the disk labels.	Contact Network Appliance Customer Support.

Boot error message	Explanation	Corrective action
<i>Cannot read labels</i>	When the appliance 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	Contact Network Appliance Customer Support.
<i>Disk label processing failed</i>	The appliance detects that the disk is not in the correct drive bay.	Make sure that the disk is in the correct bay.
<i>Halted: firmware too old</i>	The disk firmware is an old version.	Update the disk firmware by entering the following command: disk_fw_update
<i>No disks</i>	The system cannot detect any SCSI disks.	Verify that all disks are properly seated in the drive bays.
<i>Drive %s.%d not supported</i>	%s—The disk number; %d—The disk ID number. The system detects an unsupported disk drive.	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>Halted: Illegal configuration</i>	Incorrect cluster configuration.	1. Check the console for details. 2. Verify that all cables are correctly connected.

Boot error message	Explanation	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 appliance is in degraded mode and when NVRAM is not working.	Contact Network Appliance Customer 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 from the number of disks recorded in the disk labels. The system cannot start when more than one disk is missing.	Make sure that all disks on the system are properly installed.
	◆ The system encounters a read error while reconstructing parity.	Contact Network Appliance Customer Support for help.
	◆ A disk failed at the same time the system crashed.	Contact Network Appliance Customer 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.	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 was exhausted, because either ◆ There are too many PCI adapters in the system ◆ An adapter is demanding too many resources	Verify that all expansion adapters in the appliance are supported. Contact Network Appliance Customer Support for help. Have a list ready of all expansion adapters installed in the appliance.

Boot error message	Explanation	Corrective action
<i>No network interfaces</i>	The system cannot detect any network interfaces.	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 Customer Support.
<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—C2100 only.	Contact Network Appliance Customer Support for instructions about repairing the file system.
<i>No NVRAM present</i>	The system cannot detect the NVRAM adapter—C2100 only.	Make sure that the NVRAM adapter is securely installed in riser and is plugged in properly.
<i>Replace NVRAM batteries</i>	The NVRAM battery is low. The system shuts down immediately—C2100 only.	Recharge the battery.
<i>NVRAM #n downrev</i>	<i>n</i> —The serial number of the NVRAM adapter. The NVRAM adapter is an early revision that cannot be used with the system—C2100 only.	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—C2100 only.	Contact Network Appliance Customer Support if this message appears.
<i>Unsupported NVRAM size %dMB</i>	<i>%d</i> —The amount of memory on the NVRAM adapter. The specified size is not supported—C2100 only.	Verify that the system has 64 MB of NVRAM.

Operational error messages

When operational error messages appear

These error messages might appear on the system console or LCD when the system is operating, when it has halted, or when it is restarting because of system problems. These errors are generated by sensors in the appliance that constantly monitor heat, power, and other environment characteristics while the system is operating.

The following table specifies the sensor names displayed in the error messages.

Sensor type	C2100 sensors	C1200 sensors
Fan sensors	PwrDstBrd Fan	Baseboard Fan 1
	System Fan 1	Baseboard Fan 2
	System Fan 2	Baseboard Fan 3
	System Fan 3	Baseboard Fan 4
	Proc Fan	Baseboard Fan 5
Temperature sensors	Baseboard Temp	Baseboard Temp
	FntPnl Amb Temp	FntPnl Amb Temp
	Processor1 Temp	Processor1 Temp
	PwrDstBrd Temp	N/A
	Hot Swap Temp	Hot Swap Temp

Sensor type	C2100 sensors	C1200 sensors
Power voltage sensors	Baseboard 1.25V	Baseboard 1.25V
	Baseboard 2.5V	Baseboard 2.5V
	Baseboard 3.3V	Baseboard 3.3V
	Baseboard 3.3VSB	Baseboard 3.3VSB
	Baseboard 5.0V	Baseboard 5.0V
	Baseboard 12V	Baseboard 12V
	Baseboard -12V	Baseboard -12V
	Baseboard VBAT	Baseboard VBAT
	Baseboard VRM	Baseboard VRM
Power supply sensors	Power Supply 1	Power Supply 1
	Power Supply 2	N/A

Operational messages

The following table describes the operational error messages that might appear on the C2100 appliance LCD or on the C1200 console, if the appliance encounters errors during operation.

Error message	Explanation	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— C2100 only.	See the <i>System Administration 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 appliance failed.	Replace the failed fan subassembly as soon as possible.
<i>Power supply degraded</i>	One of the power supply units is turned off, was removed from the appliance, or failed.	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.

Error message	Explanation	Corrective action
<i>Dumping core</i>	The system is dumping core after a system crash.	Write down the system crash message on the system console and report the problem to Network Appliance Customer Support.
<i>Disk hung during swap</i>	A disk error occurred as you were hot swapping a disk—C2100 only.	1. Disconnect the disk from the power supply by opening the latch and pulling it half-way out. 2. Wait 15 seconds to allow all disks to spin down. 3. Reinstall the disk. 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.	Report the problem to Network Appliance Customer Support.
<i>Panicking</i>	The system is crashing. If the system does not hang while crashing, the message <code>Dumping core</code> appears.	Report the problem to Network Appliance Customer Support.
<i>System too hot</i>	The temperature sensor indicates that the system temperature is too high.	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 Customer Support for help.
<i>Fan %n is spinning at or above normal speed</i>	A fan is back to normal condition from a warning or critical condition.	No action needed.
<i>Fan %n is in Warning State;</i> <i><current reading></i> <i><range></i>	One or more fans are spinning below the noncritical limit but within the critical limit. The fan might fail soon.	

Error message	Explanation	Corrective action
<i>Fan %n is in Critical State; Replace the fan immediately to avoid overheating!!</i> <current reading> <range>	One fan, other than the power supply fan, is spinning below the critical limit.	Replace the fan, as described in “Replacing the fans” on page 80.
<i>Emergency shutdown: Fan failure. Replace the failed fans immediately.</i> <i>Shutting down the system because of Fan failure.</i>	The power supply fan or two of four fans (three system fans and one processor fan) are spinning below the critical limit. The system will be shut down—C2100 only. Two of five system fans are spinning below the critical limit. System will be shut down—C1200 only.	
<i>Temperature %a within normal operating temperature range</i> <current reading> <range>	A temperature is back to a normal condition from a warning or critical condition	No action needed.
<i>System temperature <high/low> warning: sensor Temperature %a</i> <current reading> <range>	A temperature is outside the noncritical limit but within the critical limit.	Adjust the temperature of the room where the system is located.
<i>Emergency Shutdown: System too <hot/cold>: sensor Temperature %a</i> <current reading> <range> <i>Shutting down the system because of System too <hot/cold></i>	A temperature is outside the critical limit. The system shuts down when it reaches this limit.	

Error message	Explanation	Corrective action
<i>Power %a status OK</i> <current reading> <range>	A power voltage is back to a normal condition from a warning or critical condition.	No action needed.
<i>Power %a outside normal functioning voltage levels but within critical range</i> <current reading> <range>	A power voltage is outside noncritical limits but within critical limits.	If the condition persists, replace the identified power supply, as described in “ Replacing the power supplies ” on page 89.
<i>Power %a POWER SUPPLY FAILED!!</i> <current reading> <range> <i>Shutting down the system because of Power %a POWER SUPPLY FAILED!!</i>	A power voltage is outside the critical limit. The system shuts down.	Replace the power supply, as described in “ Replacing the power supplies ” on page 89.
<i>Power Supply %a:</i> <event>	One of the following events occurred at a power supply: ◆ A power supply was removed ◆ A power supply failed ◆ Predictive failure of a power supply ◆ Current to the power supply was lost	Check the power supply for the failed conditions, then replace it, as described in “ Replacing the power supplies ” on page 89, if needed.
<i>Power Supply %a:</i> <event> deasserted <Power Supply %a>: state normal	The power supply is back to a normal operating conditions.	No action needed.

Error message	Explanation	Corrective action
<i>“Power Unit: <event>”</i>	One of the following events was detected at the power unit sensor: ◆ Power off ◆ Power cycle ◆ AC lost ◆ AC lost deasserted (restored)	Check the power and correct any conditions or replace the power supply, as described in “Replacing the power supplies” on page 89.
<i>“Power Unit Redundancy: <event>”</i>	One of the following events was detected at the power unit redundancy sensor: ◆ Redundancy lost ◆ Redundancy regained	
<i>POST error: POST error message or number</i>	A POST error was detected at the POST error sensor.	See “Startup error messages” on page 24 for information about the displayed error.
<i>Critical Interrupt: <event></i>	A bus error was detected at the critical interrupt sensor.	Report the problem to Network Appliance Customer Support.
<i>Memory: <event></i>	One of the following events was detected at the memory sensor: ◆ Correctable ECC ◆ Uncorrectable ECC	Report the problem to Network Appliance Customer Support.
<i>SCSI Voltage Performance: <event></i>	One of the following events was detected at the SCSI voltage performance sensor: ◆ Performance lags ◆ Performance met	No action needed.

Error message	Explanation	Corrective action
<i>Processor %n Stat:</i> <i><event></i>	One of the following events was detected at the processor sensor: ◆ Absence ◆ Thermal trip ◆ IERR ◆ FRB1 ◆ FRB2 ◆ FRB3 ◆ Disabled	No action needed.
<i>DIMM %n: <event></i>	One of the following events was detected at the DIMM n (n = 1-6) sensor: ◆ Fault status ◆ Installed ◆ Disabled	Replace the identified DIMM, if faulty, as described in “ Replacing the DIMMs in the appliance ” on page 92.
<i>Sensor failure: <event></i>	One of the following events was detected at the sensor failure sensor: ◆ I2C device not found ◆ I2C error ◆ I2C bus timeout	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102.

System beep code error messages

About system beep code error messages

The appliance emits a series of beeps when an error is encountered that cannot be displayed on the system console. These beeps are sounded in the following types:

- ◆ Four groupings of beeps, with a pause between each grouping
- ◆ Single, consecutive beeps with no pause between the beeps
- ◆ Beeps with displayed messages for BIOS errors

Interpreting four groupings of beeps

The following table lists the beep code error messages, sounded as four groupings of beeps, you might encounter, provides a brief explanation of what the beep code means, and lists the corrective action you need to take.

Beeps	Description	Corrective action
1-5-1-1	FRB failure (processor failure)	Call Network Appliance Customer Support.
1-5-2-1	Empty processor	Check the appliance for a CPU. If it is missing, call Network Appliance Customer Support.
1-5-2-2	No processor	
1-5-4-2	Power fault: DC power unexpectedly lost (power control failures)	Replace the power supply, as described in “Replacing the power supplies” on page 89.
1-5-4-3	Chipset control failure	Call Network Appliance Customer Support.
1-5-4-4	Power control failure	Replace the power supply, as described in “Replacing the power supplies” on page 89.

Interpreting single beeps

The following table lists the single beep error code messages you might encounter, provides a brief explanation of what the error message means, and lists the corrective action you need to take.

Beeps	Description	Corrective action
1	Refresh timer failure. The memory refresh circuitry on the motherboard is faulty.	Reboot the system. If the problem persists, replace the motherboard, as described in “Replacing the motherboard” on page 102. If the problem persists, call Network Appliance Customer Support.
2	Parity error. Parity cannot be reset.	Reboot the system. If the problem persists, call Network Appliance Customer Support.
3	Base memory failure. Base memory test failure. The error could be one of the following: ◆ No memory was found in the system. ◆ Memory mixed type detected. ◆ EDO is not supported. ◆ First row memory test failure. ◆ Mismatched DIMMs in a row. ◆ Base memory test failure. ◆ Failure on decompressing post module. ◆ Generic memory error. ◆ SMBUS protocol error. ◆ All other combinations Generic memory error.	Check and replace defective DIMMs, as described in “Replacing the DIMMs in the appliance” on page 92.
4	System timer. System timer is not operational.	Reboot the system. If the problem persists, call Network Appliance Customer Support.
5	Processor failure detected.	Reboot the system. If the problem persists, call Network Appliance Customer Support.

Beeps	Description	Corrective action
6	Keyboard controller. Gate A20 failure. The keyboard controller might be bad. The BIOS cannot switch to protected mode.	Call Network Appliance Customer Support.
7	Processor exception interrupt error. The CPU generated an exception interrupt.	
8	Display memory read/write error. The system video adapter is either missing or its memory is faulty. This is not a fatal error.	
9	ROM checksum error. System BIOS ROM checksum error.	
10	Shutdown register error. Shutdown CMOS register read/write error detected.	
11	Invalid BIOS. General BIOS ROM error.	

Beep codes with displayed messages

The following table lists the beep codes you might encounter if the appliance BIOS is corrupted, provides a brief explanation of what the error message means, and lists the corrective action you need to take.

Beep	Error message	Description	Corrective action
1	<i>Recovery started</i>	Start recovery process.	None needed.
2	<i>Recovery boot error</i>	Cannot boot to diskette, ATAPI, or ATAPI CD-ROM. Recovery process is retried.	Call Network Appliance Customer Support.
Series of low-pitched single beeps	<i>Recovery failed</i>	Unable to process valid BIOS recovery images. BIOS already passed control to OS and flash utility.	
Two long high-pitched beeps	<i>Recovery complete</i>	BIOS recovery succeeded; ready for power-down and reboot.	None needed.

Interpreting LED messages

Types of LEDs

There are two sets of LEDs that provide you with basic information about how your system is running. These sets are described in the following table.

LED location	Basic information given
External LEDs ◆ LEDs visible on the front of the appliance with the bezel in place ◆ LEDs visible on the back of the appliance	Gives high-level device status at a glance, along with network activity.
Internal LEDs, behind the bezel	Gives status about individual components, such as power supplies and disk drives. These components are hidden by the bezel.

For detailed information

For detailed information about the LEDs, see the following sections:

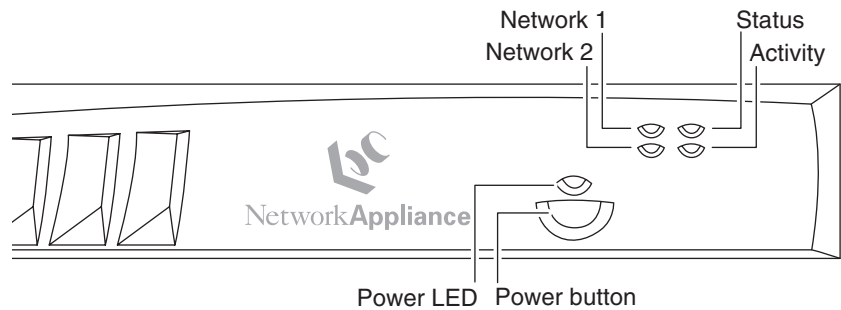
- ◆ [“External LEDs”](#) on page 49
- ◆ [“Internal LEDs”](#) on page 60

Interpreting LED messages

External LEDs

LEDs visible from the C1200 appliance front

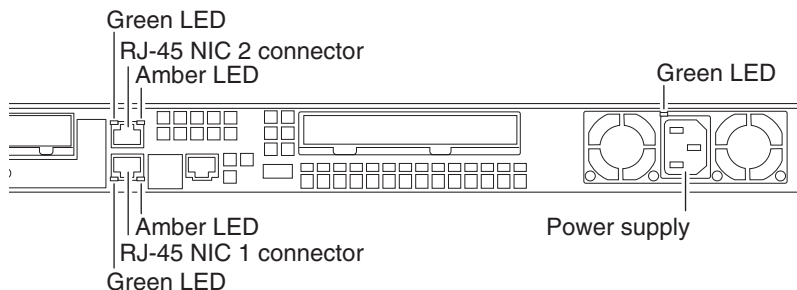
The following figure and table shows and describes the LEDs visible from the front of the C1200.



LED	Status indicator	Description
Activity	Green, blinking	The system is actively processing data.
	Off	No activity is detected.
Status	Green	The system is operating normally.
	Amber	The system halted or a fault occurred. Note — This LED remains lit during boot, while the operating system loads.
Power	Green	The system is receiving power.
	Off	The system is not receiving power.
	Blinking	Sleep/ACPI S1 state.
NIC 1/NIC 2	Green, blinking	Indicates NIC activity.

LEDs visible from the C1200 appliance back

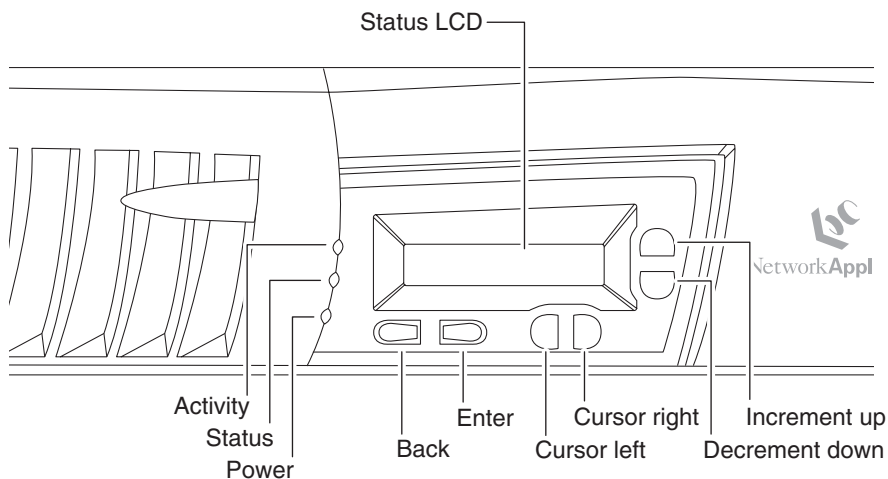
The following figure and table shows and describes the LEDs visible from the back of the appliance. These LEDs are located on the on-board Ethernet ports and on the power supplies.



LED type	Status indicator	Description
NIC network connectivity	Green	The appliance is connected to the network.
	Off	There is no network connection present.
NIC network communication	Blinking amber	Data is being transmitted across the network to and from the appliance.
	Off	There is no network activity present.
Power supply LED	Green	The AC power source is good and is powering the system.
	Blinking green	The AC power source is good and the power supply is in standby mode.
	Amber	The AC power source is good, but no power is reaching the power supply or the power supply failed.
	Off	There is no power to this power supply.

LEDs visible from the C2100 appliance front

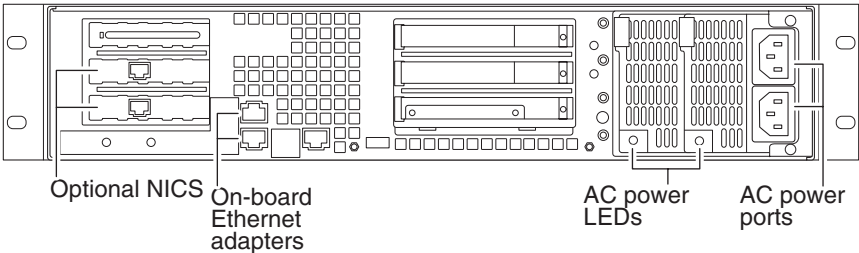
The following figure and table shows and describes the LEDs visible from the front of the C2100.



LED label	Status indicator	Description
Activity	Green	The system is operating and is active.
	Blinking	The system is actively processing data.
	Off	No activity is detected.
Status	Green	The system is operating normally.
	Amber	The system halted or a fault occurred. The fault is displayed in the LCD. Note — This LED remains lit during boot, while the operating system loads.
Power	Green	The system is receiving power.
	Off	The system is not receiving power.

LEDs visible from the C2100 appliance back

The following figure and table shows and describes the LEDs visible from the back of the C2100. These LEDs are located on the on-board Ethernet ports and on the power supplies.



LED type	Status indicator	Description
NIC network connectivity	Green	The appliance is connected to the network.
	Off	There is no network connection present.
NIC network communication	Blinking amber	Data is being transmitted across the network to and from the appliance.
	Off	There is no network activity present.
Power supply LED	Green	The AC power source is good and is powering the system.
	Blinking green	The AC power source is good and the power supply is in standby mode.
	Amber	The AC power source is good, but no power is reaching the power supply or the power supply failed.
	Off	There is no power to this power supply.

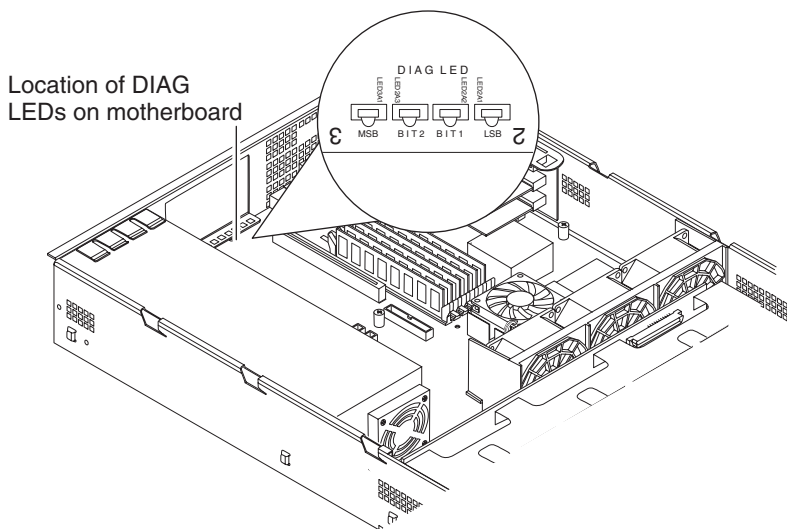
Interpreting motherboard LEDs

There are four LEDs at the rear of the motherboard that are visible through the back vents of the appliance or by removing the cover and looking under the NIC riser. These LEDs turn on or off and reflect POST errors generated during the POST portion of the boot sequence.

Corrective action for the motherboard LEDs is a two-step procedure, listed in the following table.

Step	Action	
1	Call Network Appliance Customer Support and describe the LED error sequence.	
2	If Customer Support corrective actions...	Then...
	Do not require replacing the motherboard	Follow the instructions the Customer Support representative gives you.
	Requires replacing the motherboard	Replace the motherboard, as described in “ Replacing the motherboard ” on page 102.

The following figure and table shows and describes these LEDs.



POST code	Status indicator from left LED to right LED				Description
	Left			Right	
07h	Off	Grn	Grn	Grn	Uncompress various BIOS modules.

POST code	Status indicator from left LED to right LED				Description
	Left			Right	
08h	Grn	Off	Off	Off	Verify password checksum.
08h	Grn	Off	Off	Off	Verify CMOS checksum.
07h	Off	Grn	Grn	Grn	Read microcode updates from BIOS ROM.
07h	Off	Grn	Grn	Grn	Initializing the processors. Set up processor registers. Select least featured processor as the BSP.
0Bh	Grn	Off	Grn	Grn	Hook before the keyboard BAT command is issued.
0Ch	Grn	Grn	Off	Off	Keyboard Controller Test: The keyboard controller input buffer is free. Next, issuing the BAT command to the keyboard controller
0Eh	Grn	Grn	Grn	Off	Init after keyboard test: The keyboard controller BAT command result was verified. Next, performing any necessary initialization after the keyboard controller BAT command test.
0Fh	Grn	Grn	Grn	Grn	Write Command Byte 8042: The initialization after the keyboard controller BAT command test is done. The keyboard command byte is written next.
10h	Off	Off	Off	Red	Keyboard Init: The keyboard controller command byte is written. Next, issuing the pin 23 and 24 blocking and unblocking commands
10h	Off	Off	Off	Red	Disable and initialize 8259.
11h	Off	Off	Off	Amb	Detect configuration mode, such as CMOS clear.
13h	Off	Off	Grn	Amb	Chipset initialization before CMOS initialization.
19h	Grn	Off	Off	Amb	Init System Timer: The 8254 timer test is over. Starting the memory refresh test next.
1Ah	Grn	Off	Grn	Red	Check Refresh Toggle: The memory refresh line is toggling. Checking the 15 second on/off time next.

POST code	Status indicator from left LED to right LED				Description
	Left			Right	
23h	Off	Off	Amb	Grn	Setup Interrupt Vectors: Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24h	Off	Grn	Red	Off	Before Vector: Configuration is required before interrupt vector initialization is completed. Interrupt vector initialization is about to begin.
25h	Off	Grn	Red	Grn	Init interrupt Vectors: Interrupt vector initialization is done.
F2h	Red	Red	Amb	Red	Initialize SMM handler. Initialize USB emulation.
F5h	Red	Amb	Red	Amb	Validate NVRAM areas. Restore from backup if corrupted.
12h	Off	Off	Grn	Red	Load defaults in CMOS RAM if bad checksum or CMOS clear jumper is detected.
					Initializing APP CMOS RAM for appliance servers only.
					Check point after CMOS initialized.
27h	Off	Grn	Amb	Grn	Validate date and time in RTC.
F4h	Red	Amb	Red	Red	Load microcode to all CPUs.
F6h	Red	Amb	Amb	Red	Scan SMBIOS GPNV areas.
15h	Off	Grn	Off	Amb	8254 timer test on channel 2.
					Enable 8042.
					Keyboard reset.
26h	Off	Grn	Amb	Off	Initialize LCD, if supported.
28h	Grn	Off	Red	Off	Set Video Mode: Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.

POST code	Status indicator from left LED to right LED				Description
	Left			Right	
29h	Grn	Off	Red	Grn	Debugger hook.
2Ah	Grn	Off	Amb	Off	Init PCI devices and motherboard devices. Pass control to video BIOS. Start serial console redirection.
2Bh	Grn	Off	Amb	Grn	Platform hook.
2Dh	Grn	Grn	Red	Grn	Initialize AMI display manager module. Initialize support code for headless system if no video controller is detected.
					Scan flash for logos and Initialize logo data areas.
30h	Off	Off	Red	Red	Detect PS/2 mouse.
					Hook after c000 ROM control.
2Eh	Red	Red	Amb	Off	Set up video parameters in BIOS data area.
37h	Off	Grn	Amb	Amb	Activate ADM: The display mode is set. Displaying the power-on message next.
					Initialize language module. Display splash logo.
					Display sign-on message, BIOS ID, and processor information.
38h	Grn	Off	Red	Red	Detect USB mouse: Initializing the bus input and general devices next, if present.
34h	Off	Grn	Red	Red	Reset IDE controllers.
39h	Grn	Off	Red	Amb	Displaying bus initialization error messages.
3Ah	Grn	Off	Amb	Red	Display setup message: The new cursor position was read and saved. Displaying the hit setup message next.
40h	Off	Red	Off	Off	Ensure that timer keyboard interrupts are on.
4Bh	Grn	Red	Grn	Grn	Memory Test: The amount of memory above 8 MB was found and verified. Checking for a soft reset and clearing the memory below 8 MB for the next soft reset. If this is a power-on situation, going to checkpoint 4Eh next.

POST code	Status indicator from left LED to right LED				Description
	Left			Right	
57h	Off	Amb	Grn	Amb	Chipset hook after memory size.
53h	Off	Red	Amb	Amb	Display processor cache size.
54h	Off	Amb	Off	Red	Disable parity and NMI reporting.
60h	Off	Red	Red	Off	Test 8237 DMA Controller: The DMA page register test passed. Performing the DMA Controller 1 base register test next.
65h	Off	Amb	Red	Grn	Init 8237 DMA Controller: The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
					Init 8237 DMA Controller: The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
7Fh	Grn	Amb	Amb	Amb	Extended NMI Enable: Extended NMI source enabling is in progress.
80h	Red	Off	Off	Off	Enable Mouse and Keyboard: The keyboard test started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next.
81h	Red	Off	Off	Grn	Keyboard Interface Test: A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.
82h	Red	Off	Grn	Off	Check Stuck Key Enable Keyboard: The keyboard controller interface test was completed. Writing the command byte and initializing the circular buffer next.
83h	Red	Off	Grn	Grn	Disable Parity NMI: The command byte was written and global data initialization completed. Checking for a locked key next.

POST code	Status indicator from left LED to right LED				Description
	Left			Right	
84h	Red	Grn	Off	Off	Verify RAM Size: Checking for a memory size mismatch with CMOS RAM data next.
					Check ATA cable type presence of ATAPI devices.
					Display keyboard message.
16h	Off	Grn	Grn	Red	Display IDE mass storage devices.
17h	Off	Grn	Grn	Amb	Display USB mass storage devices.
85h	Red	Grn	Off	Grn	Report the first set of POST errors to error manager.
86h	Red	Grn	Grn	Off	Boot Password Check: The password was checked. Performing any required programming before next Setup.
8Dh	Amb	Grn	Off	Grn	OEM Patch 9.
					Set Printer RS-232 timeout.
					Init FDD Devices: Resetting the hard disk controller next.
95h	Red	Grn	Off	Amb	Lock out PS/2 keyboard/mouse if unattended start is enabled.
92h	Red	Off	Grn	Red	Option ROM scan.
98h	Amb	Off	Off	Red	Init Boot Devices: The adapter ROM had control and then returned control to BIOS POST. Performing any required processing after the option ROM returned control.
9Bh	Amb	Off	Grn	Amb	Float Processor Initialize: Performing any required initialization before the next coprocessor test.
9Eh	Amb	Grn	Grn	Red	Enable Interrupts 0, 1, 2: Checking the extended keyboard, keyboard ID, and NUM Lock key next. Issuing the keyboard ID command next.
A2h	Red	Off	Amb	Off	Off Report second set of POST errors to error messenger.

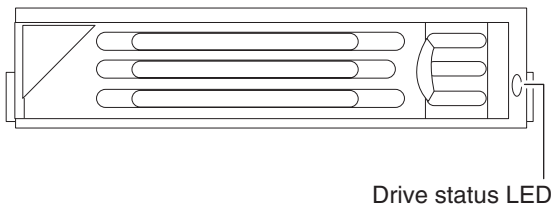
POST code	Status indicator from left LED to right LED				Description
	Left			Right	
86h	Red	Grn	Grn	Off	Prepare and run setup: Error manager displays and logs POST errors. Waits for user input for certain errors. Execute setup.
8Bh	Amb	Off	Grn	Grn	Set base expansion memory size.
8Ch	Amb	Grn	Off	Off	Adjust setup: Programming the setup options next.
A5h	Red	Grn	Red	Grn	Set display mode.
A7h	Red	Grn	Amb	Grn	OEM patch 12.
					Build SMBIOS table and MP tables.
					Program hot key and timeout settings in keyboard controller.
					Processor initialization before boot.
					Copy required language strings to shadow RAM.
AAh	Amb	Off	Amb	Off	Clear video screen.
000h	Off	Off	Off	Off	One beep to indicate end of POST. No beep if silent boot is enabled.
					POST completed. Passing control to INT 19h boot loader next.

Interpreting LED messages

Internal LEDs

LED visible on the disk drives

The following figure and table show and describe the disk drive LED that is visible after you remove the bezel.



Indicator type	Status indicator	Description
Disk drive LED	Blinking green	Data is being accessed or is writing to the disk drive.
	Off	The disk drive is inactive.
	Amber	The disk drive failed.

About this chapter

This chapter lists field-replaceable units (FRUs) that are available for the NetCache appliance, and describes the tasks you must complete to replace each type of FRU.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Field-replaceable unit overview”](#) on page 62
- ◆ [“Required tools and equipment”](#) on page 64
- ◆ [“Opening the appliance”](#) on page 65
- ◆ [“Closing the appliance”](#) on page 66
- ◆ [“Adding or replacing disk drives”](#) on page 67
- ◆ [“Replacing the fans”](#) on page 80
- ◆ [“Replacing the power supplies”](#) on page 89
- ◆ [“Replacing the DIMMs in the appliance”](#) on page 92
- ◆ [“Installing or replacing expansion adapters”](#) on page 95
- ◆ [“Replacing the motherboard”](#) on page 102
- ◆ [“Replacing the appliance chassis”](#) on page 106

Field-replaceable unit overview

About FRUs

A field-replaceable unit (FRU) is a component in your appliance that you can replace if it fails. FRUs must be purchased through Network Appliance or from an authorized reseller.

Units you can replace

The following list specifies the FRUs in the C1200 and C2100.

C1200	C2100
Appliance base or chassis with motherboard	N/A
N/A	Motherboard
Cold swap disk drives: ❖ 36-GB disk drive with the drive carrier ❖ 72-GB disk drive with the drive carrier	Hot swap disk drives: ❖ 36-GB disk drive with the drive carrier ❖ 72-GB disk drive with the drive carrier
Bezel	Bezel
Fan assemblies: ❖ Chassis fan block ❖ N/A ❖ N/A	Fan assemblies: ❖ Chassis fans (3) ❖ Power supply fan ❖ CPU heatsink fan
Power supply assemblies (1)	Power supply assemblies (2)
DIMMs on the motherboard	DIMMs on the motherboard

C1200	C2100
Expansion adapters ❖ N/A ❖ GbE network adapter ❖ 10Base-T/100Base-TX/1000Base-T GbE network adapter	Expansion adapters ❖ NVRAM 4 adapter ❖ GbE network adapter ❖ 10Base-T/100Base-TX/1000Base-T GbE network adapter

What to do if the failed item isn't on the FRU list

If you need to replace a component that is not on the FRU list, you must call Network Appliance Customer Support for instructions.

Required tools and equipment

Required tools and equipment

To replace components, you need the following tools and equipment:

- ◆ Phillips screwdrivers (#0, #1, and #2)
- ◆ 3/16-inch socket wrench—C2100 only
- ◆ Torque screwdriver
- ◆ Antistatic wrist strap and grounding leash
- ◆ Antistatic bag

Caution

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

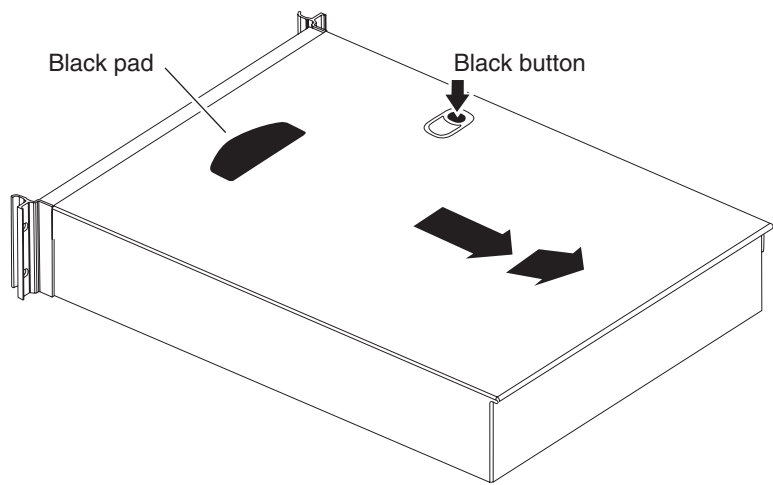
Note

If you are adding expansion adapters to the appliance, check for information about expansion adapter slot assignments in the System Configuration Guide at <http://now.netapp.com>.

Opening the appliance

Opening the appliance

To open the appliance for access to the internal FRUs, complete the following steps, using the figure for reference.



Step	Action
1	Ground yourself using an antistatic wrist strap, then shut down the appliance by entering the following command at the prompt: halt
2	Unplug the appliance and disconnect it from all power sources. Note _____Because of the weight of the C2100, you should remove the power supplies before removing the appliance from the equipment rack. See “Removing a power supply from the C2100” on page 89.
3	Remove the bezel, then loosen the screws that hold the appliance to the equipment rack and remove it from the rack.
4	Press the black button on the left of the appliance lid, gently press the heel of your hand on the black pad on the front of the lid, then slide the lid up and to the rear of the appliance.

Closing the appliance

Closing the appliance

To close the appliance after completing the FRU replacement, complete the following steps.

Step	Action
1	Align the cover with the notches on the sides of the appliance, then slide the cover down and forward to seat it.
2	Reinstall the appliance into the rack, as described in “ Installing the NetCache appliance ” on page 7. Note _____ If you have a C2100 and removed the power supplies, install them, as described in “ Replacing the power supplies ” on page 89.
3	Reinstall the bezel onto the front of the chassis.
4	Reconnect the appliance to the power source and reboot, as described in “ Powering on the NetCache appliance ” on page 17.

Adding or replacing disk drives

About replacing disk drives

When a disk drive fails or is added in a C2100 system, all you need to do is replace the failed drive, or install the new disk drive into the system. This can be done while the system is running.

Replacing a failed disk drive or adding an additional disk drive to a C1200 system can be different from the C2100, depending on how many disk drives your system has. If your C1200 system has two or more disk drives, they are replaced or installed the same way as a C2100 system. However, if your C1200 has only one disk drive, you must complete special procedures to replace it.

For detailed information

For detailed information about removing and installing disk drives, see the following section:

- ◆ [“Hot swapping disks in a C2100”](#) on page 68
- ◆ [“Removing, adding, or installing disks in a single-disk C1200”](#) on page 70
- ◆ [“Hot swapping disks in a multi-disk C1200”](#) on page 75
- ◆ [“Downgrading a multi-disk C1200 to a single-disk C1200”](#) on page 77

Replacing the disk drives

Hot swapping disks in a C2100

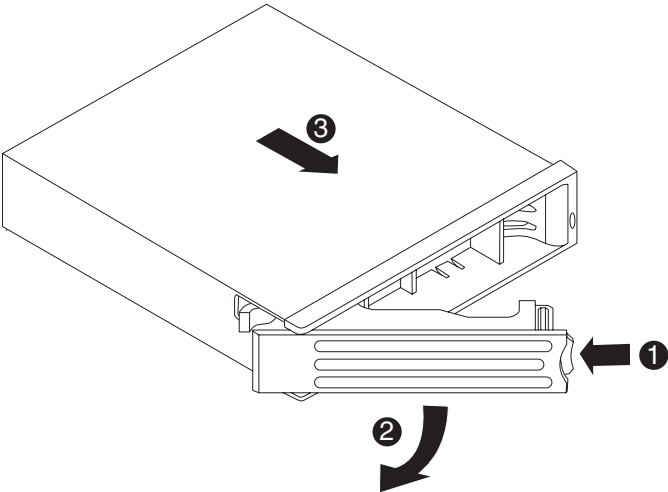
About replacing disk drives in a C2100 system

Replacing a disk drive in a C2100 system consists of the following procedures:

- ◆ “[Removing a disk drive](#)” on page 68
- ◆ “[Installing a disk drive](#)” on page 69

Removing a disk drive

To remove a disk drive from the C2100, complete the following steps, using the figure for reference.



Step	Action
1	Enter the following command on the system console: disk swap Result: System activity is suspended to the disks, allowing you to safely remove the disk. See the <i>NetCache Administration Guide</i> for more information.

Step	Action	
2	While grounded, remove the bezel, then press the release button on the disk drive carrier handle to unlock the drive and swing the drive carrier handle away from the C2100.	
3	Slide the drive completely out of the bay.	
4	If you are...	Then...
	Installing a new or replacement disk drive	Go to “ Installing a disk drive ” on page 69.
	Not installing or replacing a disk drive	Install the slot cover over the empty slot.

Installing a disk drive

To install a disk drive, complete the following steps.

Step	Action
1	Remove the slot cover, if applicable, then align the replacement drive with the edges of the empty drive bay, then slide the drive all the way into the bay.
2	Close the drive carrier handle and push until it seats into place. Make sure that the drive is securely in place by giving it a gentle tug. If the drive comes out, reseal it and lock it into place, then replace the bezel. Result: The system restarts data processing after the disk is locked in place.

Removing, adding, or installing disks in a single-disk C1200

Considerations for replacing or adding a disk to a C1200

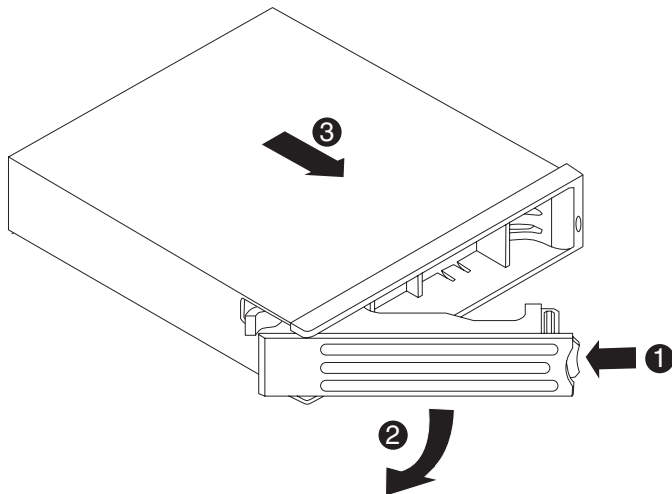
The procedures for removing, replacing, or adding a disk drive to a C1200 system depend on how many drives are currently in the system. For example, if you are replacing or adding a disk to a C1200 that has two or more disks, it can be done without shutting down the system. If you are replacing a disk in a single-disk system, the system must be shut down and the replacement process must be treated as if the C1200 system were being installed for the first time.

Replacing or adding a disk in a C1200 system consists of the following procedures:

- ◆ [“Removing a disk in a single-disk C1200”](#) on page 70
- ◆ [“Installing a disk in a single-disk C1200”](#) on page 71
- ◆ [“Adding additional disks to a single-disk C1200”](#) on page 72

Removing a disk in a single-disk C1200

To remove a disk in a single-disk C1200, complete the following procedure, using the figure as reference.



Step	Action
1	Back up your data, as described in the <i>NetCache Administration Guide</i> .
2	Enter the following command on the system console: halt Result: System activity is suspended to the disks. It might take several minutes for system activity to cease completely.
3	Turn off the appliance power and unplug it from the power source.
4	While grounded, remove the bezel, then press the release button on the disk drive carrier handle to unlock the drive.
5	Swing the drive carrier handle away from the appliance and slide the drive out of the disk drive bay.

Installing a disk in a single-disk C1200

To install the replacement disk drive in the single-disk C1200 system, complete the following steps.

Step	Action
1	Make sure that the system is off and unplugged from the power source. If it is not, complete the shutdown and power-off steps described in “ Removing a disk in a single-disk C1200 ” on page 70.
2	Align the replacement drive with the edges of the empty slot 0 drive bay, then slide the drive all the way into the bay. Note _____You can only install a replacement disk in a single-disk system in disk drive slot 0._____
3	Close the drive carrier handle and push until it seats. Make sure that the drive is secure by giving it a gentle tug. If the drive comes out, reseal it and lock it into place, then replace the bezel.

Step	Action
4	Connect the system to the power source, then press the Power button on the front panel to reboot the system. The green power LED illuminates when the power is on. Result: The system boots, then displays the following prompt: Press Ctrl-C for special boot menu
5	Press Ctrl-C on your keyboard and select 4 from the following menu: Result: The console displays the following menu: <pre> 1) Normal Boot 2) Boot without starting system devices 3) Change Password 4) Initialize all disks 5) Maintenance mode boot Selection (1-5)? </pre>
6	Enter y to the following questions, to begin initialization. Zero disks and install a new file system? This will erase all the data on the disks, are you sure?
7	Reinstall the NetCache software, as described in the <i>NetCache Administration Guide</i>.

Adding additional disks to a single-disk C1200

To add a second or third disk to a C1200 that has a single disk, complete the following steps.

Step	Action
1	Back up your data, as described in the <i>NetCache Administration Guide</i>.

Step	Action
2	Enter the following command on the system console: <pre>halt</pre> Result: System activity is suspended to the disks.
3	Ground yourself, then turn off power to the appliance and unplug it from the power source.
4	Remove the bezel, then remove the slot cover from disk drive slot 1 and store the slot cover for later use.
5	Align the replacement drive with the edges of the empty drive bay, then slide the drive all the way into the bay.
6	Close the drive carrier handle and push until it seats into place. Make sure that the drive is secure by giving it a gentle tug. If the drive comes out, reseal it and lock it into place, then replace the bezel.
7	Repeat Steps 4 through 6 for drive slot 2, if you are adding a third drive to the system
8	Connect the system to the power source, then press the Power button to reboot the system. The green power LED should be lit. Result: The system boots, then displays the following prompt: <pre>Press Ctrl-C for special boot menu</pre>
9	Press Ctrl-C on your keyboard and select 4 from the following menu: Result: The console displays the following menu: <pre> 1) Normal Boot 2) Boot without starting system devices 3) Change Password 4) Initialize all disks 5) Maintenance mode boot Selection (1-5)? </pre>

Step	Action
10	Enter y to the following questions, to begin initialization. Zero disks and install a new file system? This will erase all the data on the disks, are you sure?
11	Reserve a disk as a hot spare by entering y to the following question: Reserve a disk for use as a "hot spare"? Result: Disk 0 is reserved as a hot spare. You see the following message, confirming the action: "Hot spare" disk 0 reserved.
12	Install NetCache software, as described in the <i>NetCache Administration Guide</i>.

Hot swapping disks in a multi-disk C1200

When you can hot swap disks

You can hot swap disks only in a C1200 that has two or more disk drives.

Removing a failed disk in a multi-disk C1200

To remove a failed disk in a multi-disk C1200 system, complete the following steps.

Step	Action
1	Enter the following command on the system console: disk swap Result: System activity is suspended to the disks, allowing you to safely remove the disk. See the <i>NetCache Administration Guide</i> for more information.
2	While grounded, remove the bezel, then press the release button on the disk drive carrier handle to unlock the drive.
3	Swing the drive carrier handle away from the C1200, then slide the drive completely out of the bay.
4	Go to “ Hot adding a disk in a multi-disk C1200 ” on page 76

Hot adding a disk in a multi-disk C1200

To hot add a disk drive in a multi-disk C1200 system, complete the following steps.

Step	Action
1	While grounded, align the replacement drive with the edges of the empty drive bay, then slide the drive all the way into the bay. Note_____ If you are adding a third disk to a two-disk system, you might need to remove the slot cover from disk slot 2. Remember to save the slot cover for later use. _____
2	Close the drive carrier handle and push until it seats into place. Make sure that the drive is securely in place by giving it a gentle tug. If the drive comes out, reseal it and lock it into place, then replace the bezel. Result: The system restarts data processing after the disk is locked in place.

Downgrading a multi-disk C1200 to a single-disk C1200

Considerations for downgrading your system

If your C1200 is a multi-disk system, you can remove all but the first disk drive and run the system with a single drive. You must consider the following if you downgrade your system to a single disk:

- ◆ The surviving disk must be reinitialized
- ◆ All RAID-4 capabilities are lost
- ◆ Any data on the surviving disk is lost
- ◆ NetCache software must be reinstalled

For more information about RAID and disk drive capabilities, see the *NetCache Administration Guide*.

Downgrading the system

To downgrade the system from a multi-disk Raid-4 system to a single-drive RAID-0 system, complete the following steps.

Step	Action
1	Back up your data, as described in the <i>NetCache Administration Guide</i> .
2	Enter the following command on the system console: halt Result: System activity is suspended to the disks. It might take several minutes for system activity to cease completely.
3	Turn off the appliance power and unplug it from the power source.
4	While grounded, remove the bezel, then press the release button on the disk drive carrier handle to unlock the drive.

Step	Action	
5	If you have...	Then...
	A system with three disk drives	1. Press the release button on the disk drive carrier handle to unlock the drive in disk slot 2. 2. Swing the drive carrier handle away from the appliance and slide the drive out of the disk drive bay. 3. Install the slot cover over the empty disk drive slot. 4. Repeat Steps 1 through 3 for the disk drive in disk slot 1. 5. Go to Step 6.
	A system with two disk drives	1. Press the release button on the disk drive carrier handle to unlock the drive in disk slot 1. 2. Swing the drive carrier handle away from the appliance and slide the drive out of the disk drive bay. 3. Install the slot cover over the empty disk drive slot. 4. Go to Step 6.

Step	Action
6	Connect the system to the power source, then press the Power button on the front panel to reboot the system. The green power LED is lit when the power is on. Result: The system boots, then displays the following prompt: Press Ctrl-C for special boot menu
7	Press Ctrl-C on your keyboard and select 4 from the following menu: Result: The console displays the following menu: <pre> 1) Normal Boot 2) Boot without starting system devices 3) Change Password 4) Initialize all disks 5) Maintenance mode boot Selection (1-5)? </pre>
8	Enter y to the following questions, to begin initialization. Zero disks and install a new file system? This will erase all the data on the disks, are you sure?
9	Reinstall the NetCache software, as described in the <i>NetCache Administration Guide</i>.

Replacing the fans

Types of fans

The appliance has three types of FRU fans, listed in the following table.

Note

Not all appliance fans are FRUs. The power supply fan and the heatsink fan in the C1200 are not FRUs.

Fan type	Quantity	Model number	Location of fan
Power supply fan	1	C2100 only	Part of the power supply chassis
CPU heatsink fan	1	C2100 only	Clipped onto the top of the CPU heatsink
Chassis fans	5/block	C1200	A block near the SCSI backplane
	3/block	C2100	A block near the SCSI backplane

When to replace fans

The C1200 and C2100 can continue to run with one failed chassis fan, but shut down if two or more fans fail. If possible, wait until a regularly scheduled maintenance period to replace a chassis fan in the C2100 or a chassis fan block in the C1200. The C2100 shuts down if the power supply fan or CPU heatsink fan fails, therefore requiring immediate replacement.

Procedures for replacing fans

Replacing a chassis fan consists of the following procedures:

- ◆ [“Removing a chassis fan from the C2100”](#) on page 82
- ◆ [“Installing a chassis fan in the C2100”](#) on page 83
- ◆ [“Removing a fan block from the C1200”](#) on page 84
- ◆ [“Installing a fan block in the C1200”](#) on page 84

Replacing the power supply fan consists of the following procedures:

- ◆ “[Removing the power supply chassis on the C2100](#)” on page 85
- ◆ “[Installing the power supply chassis on the C2100](#)” on page 86

Replacing the CPU heatsink fan consists of the following procedures:

- ◆ “[Removing the CPU heatsink fan from the C2100](#)” on page 87
- ◆ “[Installing the CPU heatsink fan on the C2100](#)” on page 88

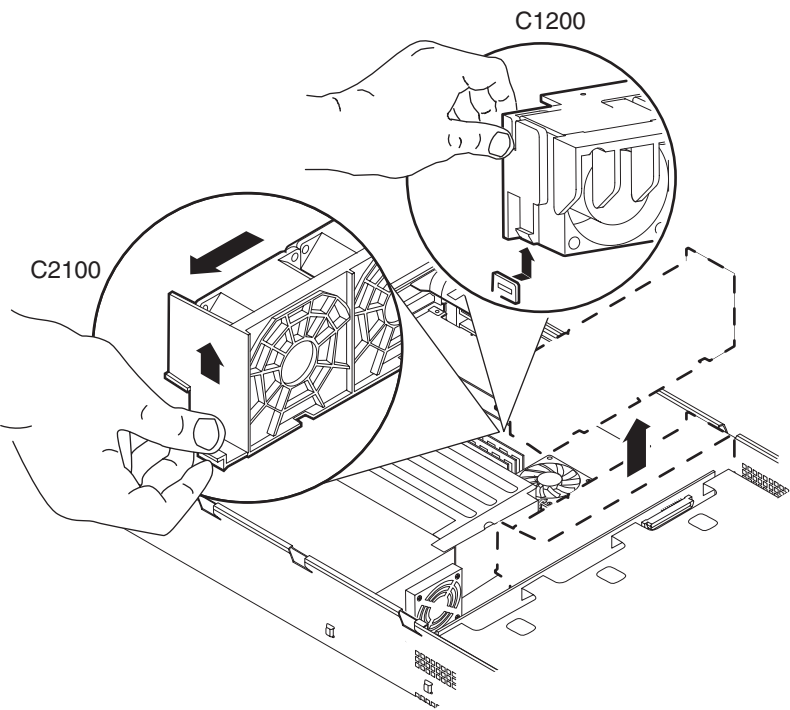
Replacing the fans

Replacing chassis fans

Removing a chassis fan from the C2100

Individual chassis fans can be removed and replaced from the chassis fan block in the C2100.

To remove a chassis fan from the fan block, complete the following steps, using the figure for reference for both the C2100 and C1200.



Step	Action
1	Open the appliance, as described in “Opening the appliance” on page 65.
2	Locate and mark the failed fan, then unplug the fan power cables from the motherboard.

Step	Action
3	Remove the ATA Flex cable retaining bracket, located on the backplane.
4	Unplug the copper-colored ATA Flex cable from the backplane. This cable is just to the left of the fan block.
5	Lift up on the retaining clip on the bottom right of the fan block, then slide the fan block to the right and lift it out of the chassis.
6	Press down on the latch below the failed fan, and swing the fan out of the fan block.

Installing a chassis fan in the C2100

To install a chassis fan in the C2100 fan block, complete the following steps.

Step	Action
1	Insert the fan into the open slot in the fan block, pushing the fan from the bottom so it snaps into place. Note_____ Ensure that the fan is inserted into the fan block so that the airflow direction is consistent with the remaining fans' airflow direction. _____
2	Reseat the fan block in the chassis, making sure to align the fan block bottom slots with the hooks on the chassis bottom.
3	Slide the fan block to the left, until the retaining clip seats and locks the fan block in place.
4	Plug the fan power cables back into the motherboard and plug the copper-colored ATA Flex cable back into the SCSI backplane and reattach the ATA Flex cable retaining bracket.
5	Close the appliance, as described in “ Closing the appliance ” on page 66.

Removing a fan block from the C1200

Individual chassis fans cannot be removed and replaced in the chassis fan block of the C1200; the entire fan block must be removed and replaced.

To remove a chassis fan block from the C1200, complete the following steps, using the figure in “[Removing a chassis fan from the C2100](#)” on page 82 for reference.

Step	Action
1	Open the appliance, as described in “ Opening the appliance ” on page 65.
2	Remove the “L” shaped air baffle by pulling up and lifting out.
3	Unplug the fan power cable from the motherboard.
4	Press the tab on the end of the fan block to release it from the chassis slot.
5	Lift the fan block from the chassis.

Installing a fan block in the C1200

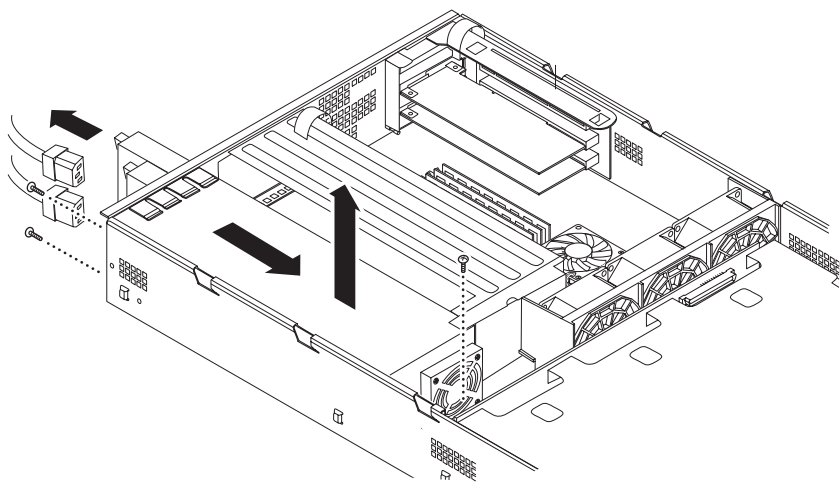
To install a chassis fan block in the C1200, complete the following steps.

Step	Action
1	Slide the “L” shaped foot on the fan block into the chassis slot near the chassis sidewall.
2	Lower the fan block to the chassis floor. Ensure that it is seated between the raised guides and not on top of them.
3	Press down on the opposite end of the fan block until the tab fits into the chassis slot.
4	Plug the power cable into the system fan connector on the motherboard.
5	Install the air baffle.
6	Close the appliance, as described in “ Closing the appliance ” on page 66.

Replacing power supply fans

Removing the power supply chassis on the C2100

The power supply fan is integrated into the power supply chassis. If the power supply fan fails, you must replace the power supply chassis. To remove the power supply chassis from the C2100, complete the following steps, using the figure for reference.



Step	Action
1	Open the appliance, as described in “ Opening the appliance ” on page 65.
2	Remove both power supplies, as described in “ Removing a power supply from the C2100 ” on page 89.
3	Remove the ATA Flex cable retaining bracket, located on the backplane, then disconnect the copper-colored ATA Flex cable from the SCSI backplane.
4	Remove the cooling fan block, as described in “ Replacing chassis fans ” on page 82.

Step	Action
5	Remove the two screws on the back of the power supply chassis, then remove the inside screw that secures the power supply chassis to the C2100 chassis.
6	Disconnect the cables running from the back of the power supply chassis, then slide the power supply chassis toward the front of the appliance and lift it out of the C2100 chassis.

Installing the power supply chassis on the C2100

To install a power supply chassis, complete the following steps.

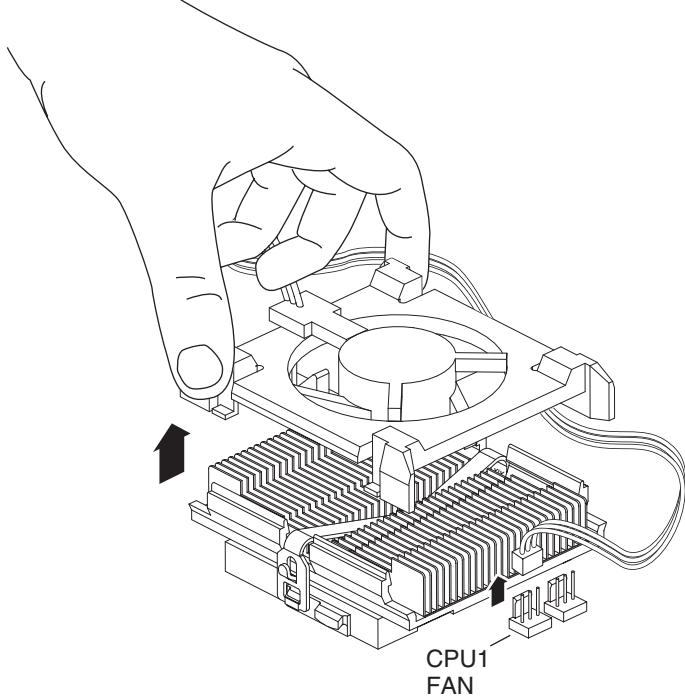
Step	Action
1	Lower the new power supply cage into place in the appliance, then slide it toward the back of the appliance.
2	Secure the power supply cage to the chassis with the three screws that you removed in Step 5 of “ Removing the power supply chassis on the C2100 ” on page 85.
3	Reconnect the cables running from the back of the power supply cage to the motherboard.
4	Reinstall the chassis fan assembly, as described in “ Replacing chassis fans ” on page 82.
5	Reconnect the copper-colored ATA Flex cable to the SCSI backplane, then reattach the ATA Flex cable retaining bracket to the backplane.
6	Slide the two power supplies into the power supply cage, and lock them into place.
7	Close the appliance, as described in “ Closing the appliance ” on page 66.

Replacing the fans

Replacing the CPU heatsink fan

Removing the CPU heatsink fan from the C2100

To remove the CPU heatsink fan from the C2100, complete the following steps, using the figure for reference.



Step	Action
1	Open the appliance, as described in “Opening the appliance” on page 65.
2	Pull the fan power plug out of the CPU1 FAN connector on the motherboard.

Step	Action
3	With your thumb and forefinger, gently pinch the two locking tabs on the side of the fan and lift the fan off the heatsink. WARNING _____ Do not touch the heatsink; it might be hot enough to burn you.

Installing the CPU heatsink fan on the C2100

To install the CPU heatsink fan in the C2100, complete the following steps.

Step	Action
1	Center the fan over the heatsink until the four locking tabs are aligned at the corners and push straight down until all four tabs click into place.
2	Push the fan power plug back into the connector designated CPU1 FAN on the motherboard. Caution _____ Failure to attach the fan power plug into the CPU1 FAN connector can cause erroneous system warnings to be issued.
3	Close the appliance, as described in “ Closing the appliance ” on page 66.

Replacing the power supplies

About replacing a power supply

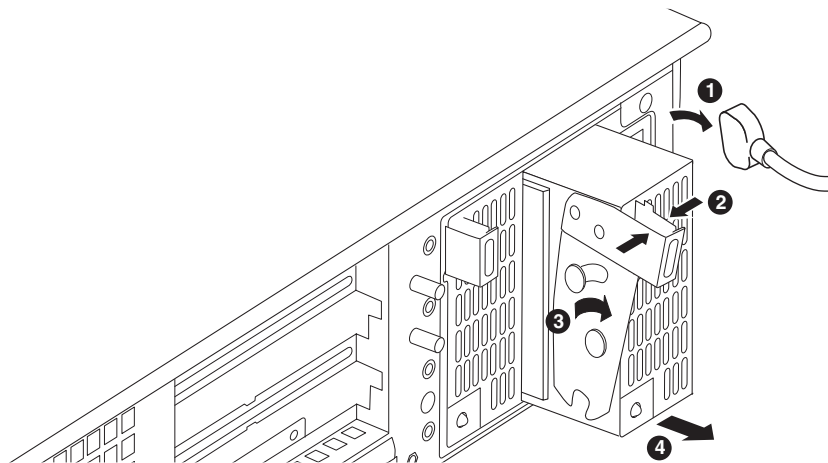
The C1200 has one power supply at the back of the appliance that can only be replaced when the power is shut off to the system. The C2100 has two power supplies at the back of the appliance that can be replaced, one at a time, while the system is powered on and running.

Replacing a power supply consists of the following procedures:

- ◆ “[Removing a power supply from the C2100](#)” on page 89
- ◆ “[Installing a power supply in the C2100](#)” on page 90
- ◆ “[Removing a power supply from the C1200](#)” on page 90
- ◆ “[Installing a power supply in the C1200](#)” on page 91

Removing a power supply from the C2100

To remove a power supply from the C2100, complete the following steps, using the figure for reference



Step	Action
1	Ground yourself using an antistatic wrist strap, then unplug the power cord at the power supply and from the power source.
2	Pull the locking latch toward you.

Step	Action
3	Slide the power supply assembly out of the power supply cage.

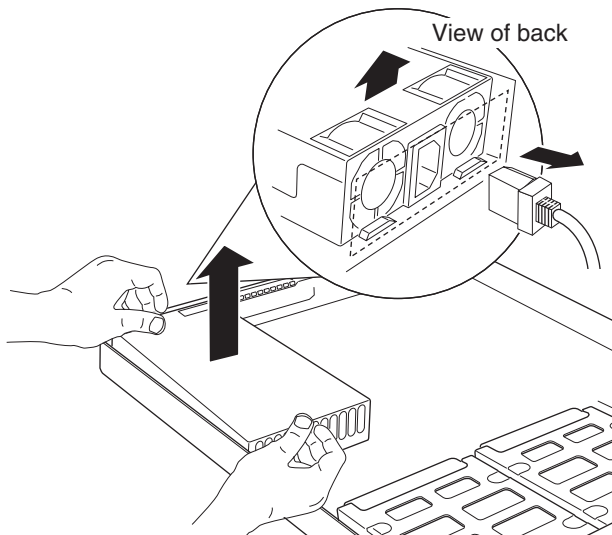
Installing a power supply in the C2100

To install a power supply in the C2100, complete the following steps.

Step	Action
1	Align the new power supply with the opening in the power supply cage, then carefully slide it into the power supply cage. Make sure that the locking latch is in the upper-left corner of the power supply.
2	Swing the lock up and push it into the power supply frame.
3	Plug the power cord into the appliance, then back into the power source.

Removing a power supply from the C1200

To remove a power supply from the C1200, complete the following steps, using the figure for reference



Step	
1	Enter the following command on the system console: halt Result: System activity is suspended to the disks.
2	Ground yourself using an antistatic wrist strap, then unplug the power cord from the power supply and from the power source.
3	Open the appliance, as described in “ Opening the appliance ” on page 65.
4	Lift the rear of the power supply module up enough to clear the edge of the raised guides. Caution ————— Lifting the power supply module too high can damage the edge connector and power supply board. —————
5	Slide the power supply module to the rear until it disengages from the power distribution board, then lift the module out of the chassis.

Installing a power supply in the C1200

To install a power supply in the C1200, complete the following steps.

Step	Action
1	Place the edge connector end of the replacement module onto the chassis floor and slide it toward the front of the chassis until the edge connector is fully inserted in the power distribution board connector. Note ————— Ensure that the replacement module is fully seated on the chassis floor and not resting on the raised guides. —————
2	Replace the chassis cover, as described in “ Closing the appliance ” on page 66.

Replacing the DIMMs in the appliance

About replacing DIMMs

Replacing DIMMs consists of the following procedures:

- ◆ “[Removing a DIMM](#)” on page 92
- ◆ “[Installing a DIMM](#)” on page 93

Supported memory configurations

The following table lists the memory configurations of the DIMMs for the C1200 and C2100.

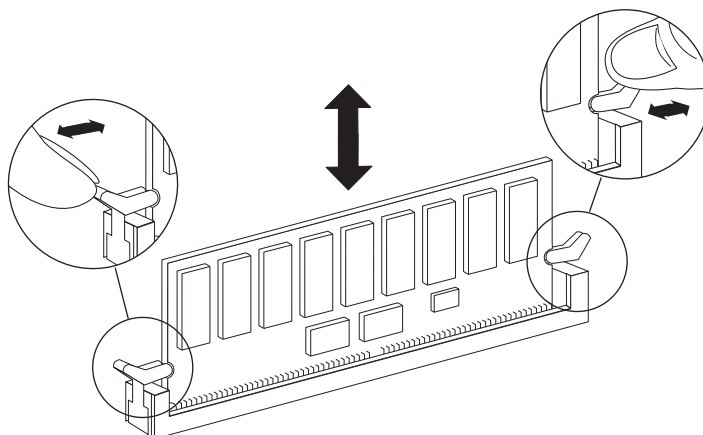
Appliance	DIMM slots	Required memory configuration
C1200	DIMM 1a (J5E1) and DIMM 1b (J6E2)	3.3V, registered, 2 X 256 MB, SDRAM, PC 133, low-profile
C2100	All six slots	3.3V, registered, 6 X 256 MB, SDRAM, PC 133

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 a DIMM

To remove a DIMM from the system motherboard, complete the following steps, using the figure for reference.



Step	Action
1	Open the appliance, as described in “ Opening the appliance ” on page 65. Make sure that both power cords are unplugged from the appliance.
2	Locate the DIMM you want to remove, press down and outward on the ejectors at the end of the DIMM socket until the DIMM pops free of the socket, then lift the DIMM free.

Installing a DIMM

To install a DIMM into the system motherboard, complete the following steps.

Step	Action
1	Align the new DIMM with the socket, making sure that the notches at the end of the DIMM are aligned with the DIMM ejectors. When inserting DIMMs, follow these guidelines: ❖ You can only insert the DIMM one way into the DIMM socket. If the DIMM does not fit properly, turn the DIMM 180 degrees and reinsert it into the socket. ❖ Ensure that DIMMs are inserted into the correct slots for your appliance model (C1200 or C2100). See “Supported memory configurations” on page 92 for correct slot IDs.

Step	Action
2	Press down on the DIMM while pulling up on the ejectors to lock the DIMM into the socket.
3	Close the appliance, as described in “ Closing the appliance ” on page 66.

Installing or replacing expansion adapters

Types of expansion adapters

The following list specifies the expansion adapters that the C1200 and C2100 can use:

Note

The NVRAM 4 adapter is only used in the C2100.

◆ NVRAM 4 adapter

The NVRAM 4 adapter has an attached, sealed, lithium-ion battery that is recharged whenever the system is turned on and operating normally. The NVRAM 4 adapter also contains the CompactFlash™ card, which is used during system boot. This card contains the most recently downloaded versions of Data ONTAP™ software, system diagnostics, and boot files.

Replace the NVRAM 4 adapter only if the following situations occur:

- ❖ The battery continues to read low after 24 hours of normal system operation.
- ❖ The system does not boot, or you receive warning messages during boot that the CompactFlash card is invalid or damaged.
- ❖ Diagnostic tests indicate a problem with the NVRAM 4 adapter that requires replacing it.

Note

When replacing the NVRAM 4 adapter, you must reinitialize the CompactFlash card. See “[Updating software and firmware](#)” on page 98 and the *Software Setup Guide* for instructions about how to perform this task.

◆ NICs

- ❖ GbE network adapter
- ❖ 10Base-T/100Base-TX/1000Base-T GbE network adapter

C2100 expansion adapter location

The expansion adapters are in slots 4 and 5. These slots are located on the PCI riser card in the C2100. Slot 4 is the bottom slot of the PCI riser card and has a physical ID of e0a. Slot 5 is at the middle of the PCI riser card and has a physical ID of e0b.

Where to get configuration information

The System Configuration Guide at <http://now.netapp.com> lists current configurations for your appliance. The Web site lists the following information:

- ◆ Expansion slots that are available on your appliance
- ◆ Supported adapters
- ◆ Expansion slot assignments

Caution

Do not use an expansion adapter that is not listed in the System Configuration Guide, or install it in an expansion slot not listed in the guide. Installing an expansion adapter incorrectly or using an unsupported adapter can adversely affect your system performance. Purchase your adapters only through Network Appliance or an authorized reseller.

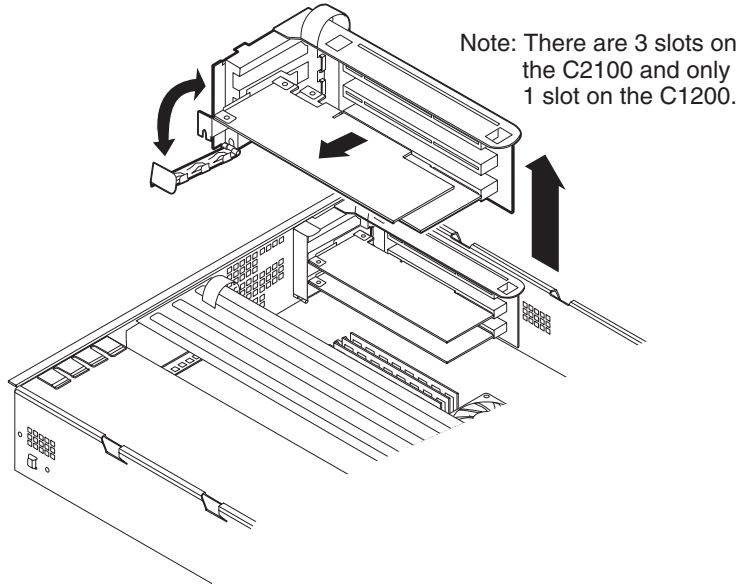
Procedures for replacing expansion adapters

Replacing a expansion adapters consists of the following procedures:

- ◆ “[Removing an expansion adapter](#)” on page 96
- ◆ “[Installing an expansion adapter](#)” on page 98

Removing an expansion adapter

To remove an expansion adapter, complete the following steps, using the figure for reference.



Step	Action	
1	Open the appliance, as described in “ Opening the appliance ” on page 65.	
2	If you are...	Then...
	Removing a NIC	1. Unplug the RJ-45 cables from the NICs in the rear of the appliance. 2. Gently lift the riser out of the PCI slot. 3. Go to Step 3.
	Removing the NVRAM 4 adapter—C2100 only	1. Gently lift the riser out of the PCI slot. 2. Unplug the cable coming from the end of the NVRAM 4 adapter. 3. Go to Step 3.

Step	Action
3	Unhook the locking clip from the end of the riser assembly and swing it down and out of the way.
4	Gently remove the adapter from the riser assembly.

Installing an expansion adapter

To install an expansion adapter, complete the following steps.

Step	Action						
1	Install the adapter into the riser assembly, making sure that you do not flex or bend the adapter while installing it.						
2	Swing the locking clip back into place and secure it to the riser.						
3	<table> <tr> <th>If you are installing...</th><th>Then...</th></tr> <tr> <td>A NIC</td><td> 1. Reinstall the NIC riser into the motherboard. 2. Reconnect the cables to each NIC. 3. Go to Step 4. </td></tr> <tr> <td>An NVRAM 4 adapter—C2100 only</td><td> 1. Reconnect the cable to the NVRAM 4 adapter. 2. Reinstall the NIC riser into the motherboard. 3. Go to Step 4, then go to “Updating software and firmware” on page 98. </td></tr> </table>	If you are installing...	Then...	A NIC	1. Reinstall the NIC riser into the motherboard. 2. Reconnect the cables to each NIC. 3. Go to Step 4.	An NVRAM 4 adapter—C2100 only	1. Reconnect the cable to the NVRAM 4 adapter. 2. Reinstall the NIC riser into the motherboard. 3. Go to Step 4, then go to “Updating software and firmware” on page 98.
If you are installing...	Then...						
A NIC	1. Reinstall the NIC riser into the motherboard. 2. Reconnect the cables to each NIC. 3. Go to Step 4.						
An NVRAM 4 adapter—C2100 only	1. Reconnect the cable to the NVRAM 4 adapter. 2. Reinstall the NIC riser into the motherboard. 3. Go to Step 4, then go to “Updating software and firmware” on page 98.						
4	Close the appliance, as described in “Closing the appliance” on page 66.						

Updating software and firmware

To update the software and firmware for your C2100, or to update the software and firmware on your C1200, complete the following steps.

Step	Action
1	Power on the system. Result: The appliance console displays the POST messages. After POST is completed, the console displays the following menu: <pre>Data ONTAP [backup] Data ONTAP Service Menu</pre>
2	Using the arrow keys, select <code>Service Menu</code> from the list. Result: The appliance console displays the Disk Boot Menu.
3	Select <code>Boot</code> from the first disk, if possible. Result: The appliance attempts to boot from the first disk.

Step	Action	
4	If the appliance...	Then...
	Can boot from the selected disk	The following menu appears: 1) Normal Boot 2) Boot without /etc/rc 3) Change Password 4) Initialize all disks 5) Maintenance mode boot Selection (1-5)? Go to Step 5.
	Cannot boot from the selected disk	An error message appears stating that it cannot boot from the selected disk. 1. Press any key to return to the Disk boot menu and select one of the following boot options: - Boot from the second disk, if possible. - Boot from the third disk, if possible. 2. Go to Step 5.
5	Select 1) Normal Boot at the appliance console to boot from the selected disk.	
6	List the available software files and look for matches from the sysconfig output, by entering the following command on the console: install -l	

Step	Action	
7	If...	Then...
	No software files match	1. Download the appropriate software image from http://now.netapp.com, using the following command: install -dl 2. Save the software image to the CompactFlash card, using the following command: install -c <i>image_name</i>
	Software files match	Save the software image to the CompactFlash card, using the following command: install -c <i>image_name</i>
8	Reboot the system by entering the following command at the prompt: reboot	

Replacing the motherboard

About replacing the motherboard

Only the C2100 has a replaceable motherboard. To replace the motherboard on a C1200, you must replace the entire chassis. To replace the chassis on the C1200 go to [“Replacing the appliance chassis”](#) on page 106.

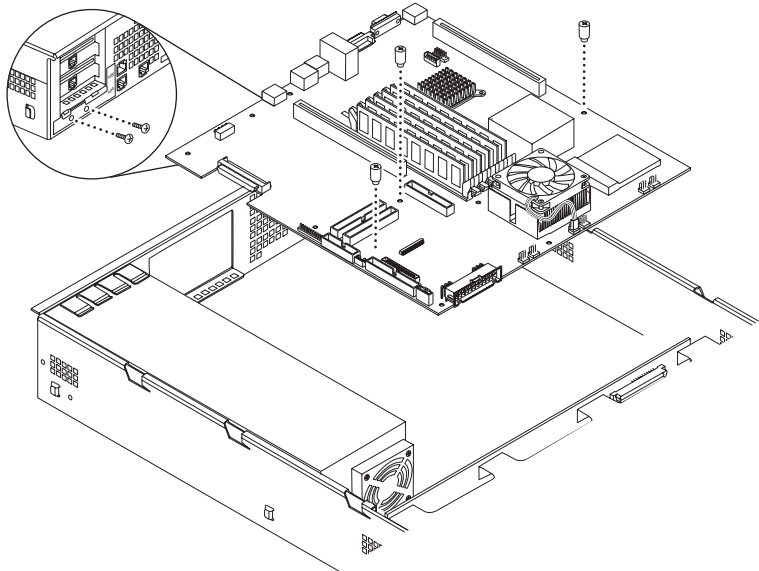
Replacing the motherboard on the C2100 NetCache appliance consists of the following procedures:

- ◆ [“Removing the motherboard”](#) on page 102
- ◆ [“Installing the motherboard—C2100 only”](#) on page 104
- ◆ [“Updating the motherboard firmware”](#) on page 105

Removing the motherboard

To remove the motherboard from the C2100 chassis, complete the following steps, using the figure for reference.

Remove screws
from chassis rear



Step	Action
1	Open the appliance, as described in “Opening the appliance” on page 65.
2	Remove the risers and expansion adapters, as described in “Removing an expansion adapter” on page 96. Note— Do not unplug the NVRAM 4 adapter. Fold the riser to the top of the disk drive housing.
3	Unplug and mark the following cables from the motherboard: ◆ SCSI ribbon cable—gray and white cable ◆ ATA Flex cable—copper colored ribbon cable ◆ Motherboard power cable—large, multicolored plug ◆ Aux power cable—small black plug near the main power cable ◆ Aux USB cable—round, white cable near the second CPU socket ◆ Fan cables—three sets of multicolored cables with small plugs Note— For later reference during reinstallation, record the routing location and direction of each of the cables as you unplug and remove them.
4	Remove the ATA Flex cable retaining bracket from the backplane, then remove the chassis fan assembly, as described in “Removing a chassis fan from the C2100” on page 82.
5	Carefully remove the three thumbscrews securing the motherboard to the chassis. (Save the MB clip used to secure the ATA Flex cable.) Then remove the two screws from the back of the chassis directly below the expansion adapter NIC ports, which secure the system ID cover.
6	Lift the edge of the motherboard closest to the disk drives, tilt the motherboard slightly, then slide it toward the front of the chassis, until it clears the lip at the back of the chassis. Lift the motherboard clear of the chassis and place it on an antistatic mat.

Step	Action
7	Remove the DIMMs, as described in “Removing a DIMM” on page 92.

Installing the motherboard— C2100 only

To install a motherboard, complete the following steps.

Step	Action
1	Seat the new motherboard into the chassis, aligning the screw holes in the motherboard and chassis. Secure it to the chassis with the motherboard screws, then attach the two screws on the back of the appliance, below the NIC ports.
2	Using two screws, reattach the system ID cover directly below the expansion adapter ID ports.
3	Plug all power wires and the SCSI ribbon cable into the motherboard. Caution — Make sure that you match the wires with the correct plugs on the motherboard and have attached the ATA Flex cable retaining bracket.
4	Install the DIMMs, as described in “Installing a DIMM” on page 93.
5	Install the chassis fans, as described in “Installing a chassis fan in the C2100” on page 83.
6	Connect all motherboard cables to their appropriate places on the motherboard.
7	Install the NIC and NVRAM 4 risers, as described in “Installing an expansion adapter” on page 98.
8	Close the appliance, as described in “Closing the appliance” on page 66.
9	Go to “Updating the motherboard firmware” on page 105.

Updating the motherboard firmware

To update the firmware on the new motherboard, complete the following steps.

Step	Action
1	Power on the system and boot it to the main GRUB menu. Result: The appliance console displays the POST messages. After POST is completed, the console displays the following menu: <pre>Data ONTAP [backup] Data ONTAP Service Menu</pre>
2	Using the arrow keys, select <code>Service Menu</code> from the list. Result: The appliance console displays service and boot options.
3	Select <code>Platform Specific Services</code> from the list. Result: Several platforms are displayed, including the appliance.
4	Select <code>Appliance Platform Menu</code> from the list.
5	Select <code>Install Appliance Firmware</code> from the list. Result: The motherboard firmware is installed into the new motherboard.
6	After firmware installation is completed, shut down the system, power it down for ten seconds, and then reapply power.
7	Boot the appliance and run all system diagnostics. See the Diagnostics Guide at http://now.netapp.com for more information.

Replacing the appliance chassis

About replacing the chassis

The replacement chassis for the C1200 is equipped with a motherboard that is integral to the chassis. The replacement chassis for the C2100 is not equipped with a motherboard.

Replacing the chassis consists of the following procedures:

- ◆ “[Removing the chassis](#)” on page 106
- ◆ “[Installing the chassis](#)” on page 107

Removing the chassis

To remove the chassis, complete the following steps.

Step	Action	
1	Ground yourself, then remove the cover and bezel of the appliance, as described in “ Opening the appliance ” on page 65.	
2	Remove the disk drives, as described in “ Adding or replacing disk drives ” on page 67.	
3	If you are replacing a...	Then...
	C1200 chassis	Skip this step. The C1200 power supply is included in the replacement chassis.
	C2100 chassis	Remove the power supplies, as described in “ Removing a power supply from the C2100 ” on page 89.
4	If you are have a...	Then...
	C1200	Remove the chassis from the equipment rack, then remove the side brackets from the C1200 chassis.
	C2100	Remove the chassis from the equipment rack.

Step	Action	
5	Remove the expansion adapters, as described in “ Removing an expansion adapter ” on page 96.	
6	If you have a...	Then...
	C1200	Do not remove the motherboard. It is to be returned to Network Appliance with the chassis.
	C2100	Remove the motherboard, as described in “ Removing the motherboard ” on page 102.
7	Go to “ Installing the chassis ” on page 107.	

Installing the chassis

To install the chassis, complete the following steps.

Step	Action	
1	If you have a...	Then...
	C1200	You do not need to replace it; the C1200 chassis comes with a motherboard.
	C2100	Install the motherboard, as described in “ Installing the motherboard—C2100 only ” on page 104.
2	Make sure you are grounded, then replace the expansion adapter risers, as described in “ Installing an expansion adapter ” on page 98.	

Step	Action	
3	If you have a...	Then...
	C1200 chassis	Skip this step.
	C2100 chassis	Install the power supplies, as described in “ Installing a power supply in the C2100 ” on page 90.
4	Replace the cover on the system, as described in “ Closing the appliance ” on page 66.	
5	Install the side brackets in the replacement chassis, then install the chassis back into the equipment rack, as described in the appropriate section of “ Installing the NetCache appliance ” on page 7.	
6	Install the disk drives, as described in “ Adding or replacing disk drives ” on page 67.	
7	If needed, update the boot image on the CompactFlash card and install the NetCache software on the system, as described in “ Updating software and firmware ” on page 98.	
8	Boot the system and run all the system diagnostics. For more information, see the Diagnostics Guide on the NOW site at http://now.netapp.com .	

About this appendix This appendix discusses how to determine the power line requirements.

Recommended AC power lines

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 appliance, can often exceed 50 feet.

Note

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

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	4 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

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 caching appliance	NetCache appliance C1200	C1200	2002
Network caching appliance	NetCache appliance C2100	C2100	2002

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: 210-00299

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