

NetApp® Filers

F700 Series

Field Service Guide

Network Appliance, Inc.
495 East Java Drive
Sunnyvale, CA 94089
Telephone: +1 (408) 822-6000
Fax: +1 (408) 822-4501
Support telephone: +1 (888) 4-NETAPP
Information email: info@netapp.com
Information Web: <http://www.netapp.com>

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Preface

About this guide

This guide describes the field service procedures for replacing, upgrading, and maintaining hardware units in all models of the NetApp® F700 series of filers.

Use this guide after you familiarize yourself with the system hardware by reading the current version of the following guides.

Note

A current version of the following guides is available at the NetApp on the Web (NOW) Web page at <http://now.netapp.com>.

Reference document...	Provides information about...
<i>Data ONTAP System Administrator's Guide</i>	How to operate and manage your filer
<i>F700 Series Hardware Guide</i>	Initial system installation and how to open the filer chassis

This guide does not provide information about disk shelves. For disk shelf information, see the hardware guide for the disk shelf that is part of your system.

Audience

This guide is for field service engineers, service providers, and customers who purchased the service kit from Network Appliance. The procedures in this guide describe replacement, upgrade, and maintenance tasks for personnel with the following skills and experience:

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

Terminology

In this guide

- ◆ *Filer* refers to all Network Appliance™ filer models in the NetApp F700 series.
- ◆ *Expansion adapters* used in NetApp F700 series filers refers to the following adapters:
 - ❖ NVRAM adapter

- ❖ FC-AL adapter
- ❖ SCSI adapters
- ❖ Network interface cards/adapters (NICs)

Note

See the *System Configuration Guide* on the NetApp on the Web (NOW) Web site at <http://now.netapp.com> for a current version of the list of expansion adapters that you can use with your filer.

- ◆ *Disk shelf* refers to any NetApp disk shelf.

Command conventions

You can enter filer commands on the system console or from any client that can obtain access to the filer using `telnet`. In examples of commands run on a UNIX® workstation, this guide uses the command syntax and output of SunOS 4.1x. (The command syntax and output might be different, depending on your version of UNIX.)

Formatting conventions

In this guide, the following kinds of formatting in the text identify special information.

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

**Keyboard
conventions**

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

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

Special messages

This guide contains special messages that are described as follows:

Note_____

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

Caution_____

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

WARNING_____

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

Safety Information

Follow these safety rules

WARNING

Failure to follow the directions contained in the following statements could result in bodily harm or loss of life.

Heat Issues: To reduce the risk of personal injury from hot surfaces, allow the internal components time to cool before touching them or installing options.

Equipment weight: To reduce the risk of personal injury or damage to the equipment, ensure that the equipment is properly supported or braced when installing options.

Grounding: 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.

Lithium batteries: This equipment is furnished with one or more lithium batteries. If the battery is mistreated or incorrectly replaced, the danger of explosion and risk of personal injury exists. Do not attempt to recharge the battery, disassemble it, or dispose of it in a fire.

Power supply:

WARNING

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

AVERTISSEMENT

Cet appareil comporte plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant d'effectuer le dépannage.

ACHTUNG

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

Scope of this chapter

This chapter identifies the units that are field replaceable in the F700 series of filers.

After reading this chapter, you will be able to

- ◆ Identify the units that you can and cannot individually replace or optionally add, and those that you can gain access to from the front or back of the filer
- ◆ Identify the tools and equipment you require to perform the replacement of field replaceable units

Overview of the field replaceable units

Identification and description of units

The filers in the NetApp F700 series are designed for easy access so that you can remove and install units in the field. You can gain access to the units from the front or back panel. Except for system memory modules and disks drives, you must purchase all field replaceable units from Network Appliance.

Units that you can individually replace: You can replace the following units in the NetApp F700 series in the field:

- ◆ Motherboard (with removable DIMMs [dual in-line memory modules], lithium battery, and CPU cooler fan)
- ◆ Expansion adapters
 - ❖ NVRAM (nonvolatile random access memory) adapter (with removable SIMMs [single in-line memory modules] and lithium batteries)
 - ❖ SCSI adapters for disk storage
- ◆ CPU fan
- ◆ 3.5-inch diskette drive subassembly
- ◆ Power supply
- ◆ LED/LCD subassembly
- ◆ Chassis fan subassembly

Units that you cannot individually replace: You cannot replace the following onboard interfaces on the motherboard:

- ◆ 10/100Base-T Ethernet interface
- ◆ FC-AL (Fibre Channel Arbitrated Loop) interface
- ◆ SCSI tape interface

If you have problems with any of these interfaces, you need to replace the motherboard.

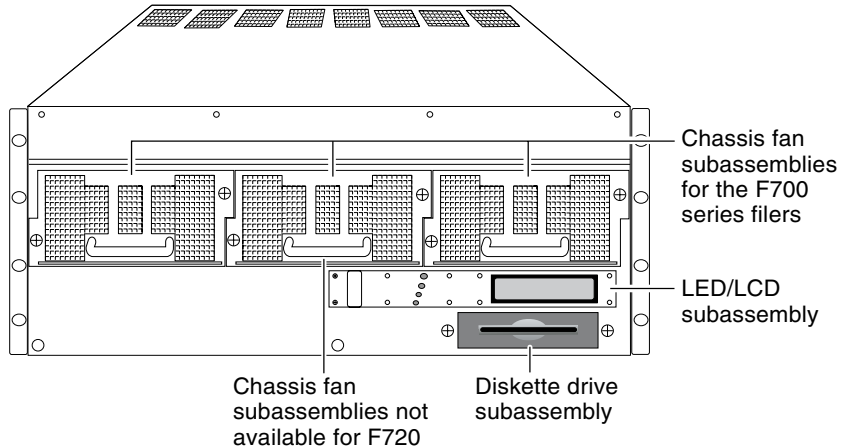
Units that you can optionally add: You can optionally add the following units in the NetApp F700 series in the field:

- ◆ Additional FC-AL adapters for fibre channel disk storage
- ◆ Additional network interface cards/adapters (NICs)
- ◆ Additional SCSI adapters for SCSI disk storage
- ◆ Additional SCSI adapter for a second tape drive for the F760 (Requires Data ONTAP™ 5.3 software or later.)

- ◆ Additional power supply for the F720

Units accessible from the filer front

A plastic bezel covers the front panel of the filer. You can remove the bezel to get access to the chassis fan subassembly, the LED/LCD subassembly, and the diskette drive subassembly. The following figure shows the replaceable units accessible from the filer front panel.

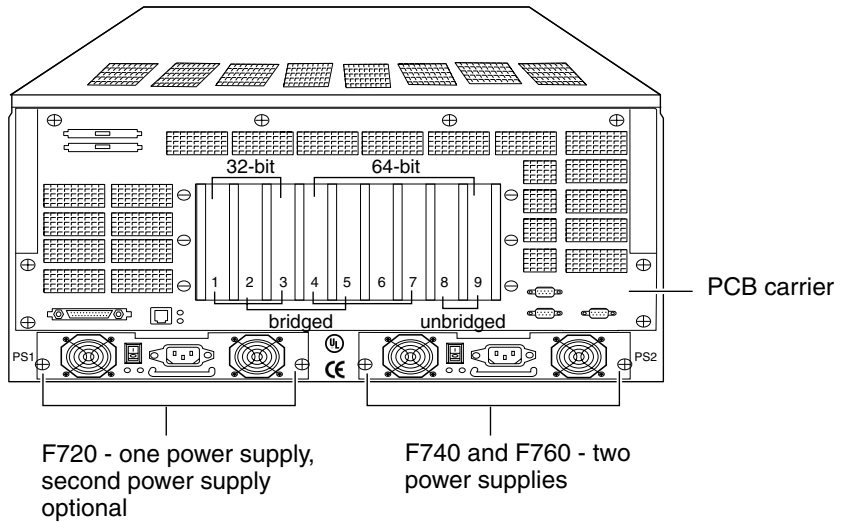


Units accessible from the filer back

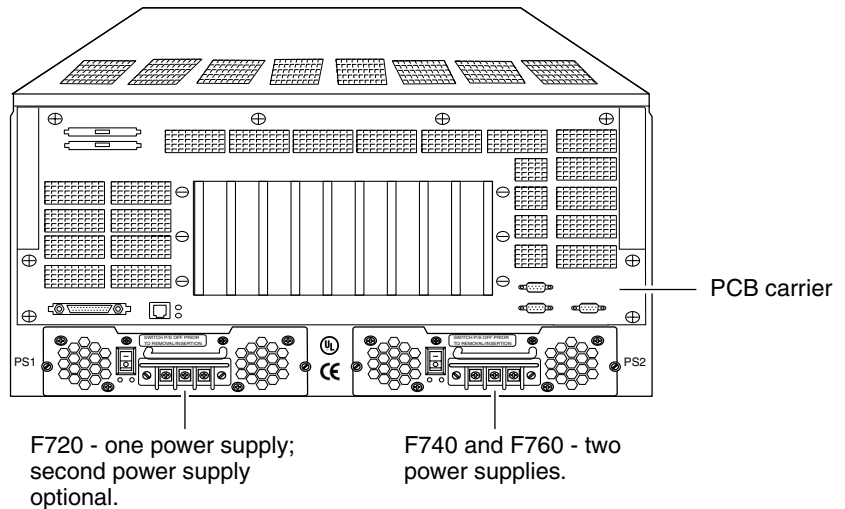
You can gain access to the following units from the back of the filer:

- ◆ Power supplies
- ◆ PCB (printed circuit board) carrier, a slide-mounted tray that serves as the mounting base for the motherboard

You can pull out the PCB carrier from the chassis for access to the motherboard and the expansion adapters. The following figure shows the replaceable units accessible from the back of a filer with an AC power supply.



The following figure shows the replaceable units accessible from the back of a filer with a DC power supply.



Assembling 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-nut driver
- ◆ Wire cutters (for cable ties)
- ◆ Antistatic wrist strap and grounding leash

Caution

The filer 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.

If you are adding expansion adapters to the filer, check for information about expansion adapter slot assignments at the NetApp on the Web (NOW) Web page at <http://now.netapp.com>.

Scope of this chapter

This chapter provides the necessary procedures for replacing units in the PCB carrier.

After reading this chapter, you will be able to perform the following tasks:

- ◆ Open the PCB carrier
- ◆ Remove the PCB carrier from your filer
- ◆ Replace the motherboard
- ◆ Replace SDRAM DIMMs on the motherboard
- ◆ Replace the lithium battery on the motherboard
- ◆ Replace the CPU fan
- ◆ Install or replace expansion adapters
- ◆ Replace units on an NVRAM adapter
- ◆ Close the PCB carrier

Opening the PCB carrier

About opening the PCB carrier

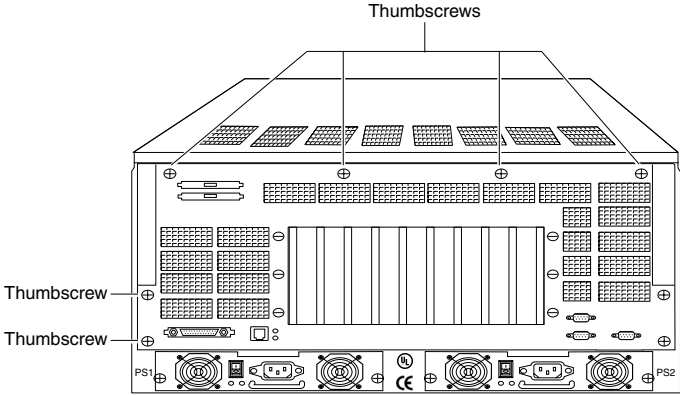
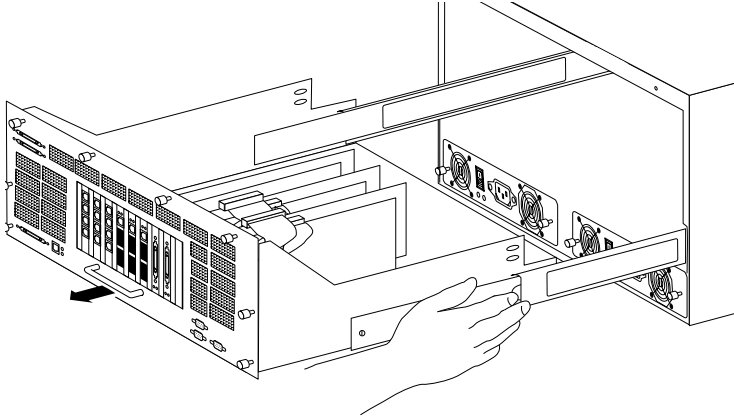
You might need to open the PCB carrier to gain access to the motherboard, expansion adapters, and other field-replaceable units in the filer.

Caution—————
Always enter the `halt` command to shut down the filer properly before opening the PCB carrier. Opening the PCB carrier without first shutting down the system causes the system to shut down improperly.

Opening the PCB carrier

To open the PCB carrier, complete the following steps.

Step	Action
1	Shut down the filer by entering the following command at the console: <code>halt</code> Caution ————— Always use the <code>halt</code> command to perform a clean shutdown.
2	Turn off and unplug the power to your filer and disk shelves.
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.

Step	Action
4	Loosen the eight thumbscrews on the back panel of the PCB carrier by turning each thumbscrew counterclockwise. Note The thumbscrews are torqued at the factory to prevent them from coming loose during shipment. You might need to use a Phillips screwdriver to loosen the thumbscrews the first time you open the PCB carrier.  The diagram shows the back panel of the PCB carrier. Eight thumbscrews are indicated by lines pointing to them, with the label 'Thumbscrews' at the top. Two specific thumbscrews on the left side are also labeled 'Thumbscrew'. The panel features various ports and components, including PS1 and PS2 ports at the bottom, and several circular connectors. The carrier is shown in a perspective view, highlighting its depth and the arrangement of the thumbscrews along the top edge.
5	Carefully pull the PCB carrier out of the chassis until the carrier tabs click to lock the slide rails in place. The PCB carrier has a travel distance of approximately 18 inches (46 cm).  The diagram illustrates the PCB carrier being pulled out of the chassis. A hand is shown at the bottom right, pulling the carrier forward. The carrier is shown in a perspective view, highlighting its depth and the arrangement of the thumbscrews along the top edge. The chassis is shown in a perspective view, highlighting the internal components and the slide rails. The carrier is shown in a perspective view, highlighting its depth and the arrangement of the thumbscrews along the top edge. The carrier is shown in a perspective view, highlighting its depth and the arrangement of the thumbscrews along the top edge.

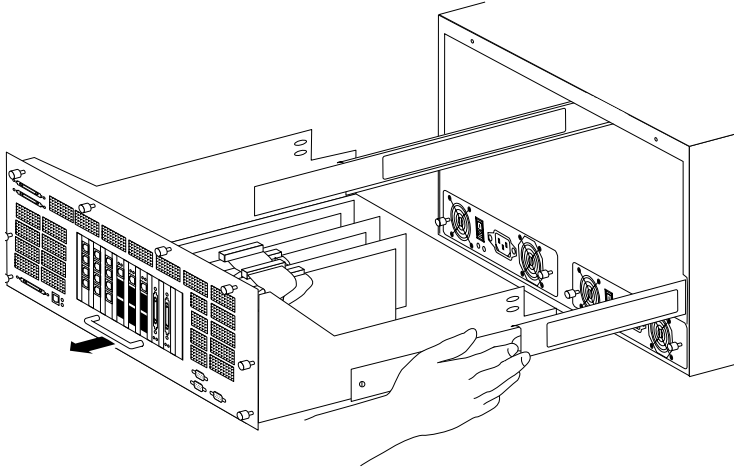
Removing the PCB carrier

About removing the PCB carrier

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

Removing the PCB carrier

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

Step	Action
1	Open the PCB carrier. Follow the procedure in “Opening the PCB carrier” on page 8.
2	Press inward on the carrier tabs on each slide rail while pulling the PCB carrier out of the chassis. 
3	Support the PCB carrier with both hands, and set it aside.

Step	Action	
4	If you are...	Then...
	Replacing the motherboard	Disconnect all cables connected to the ports on the back of the PCB carrier and proceed to “ Replacing the motherboard ” on page 12.
	Not replacing the motherboard, but you are replacing units on it	Proceed to the appropriate procedure for the unit you are replacing: ◆ “Replacing SDRAM DIMMs on the motherboard” on page 17 ◆ “Replacing the lithium battery on the motherboard” on page 20 ◆ “Replacing the CPU fan” on page 22 ◆ “Installing or replacing expansion adapters” on page 24 ◆ “Replacing units on an NVRAM adapter” on page 31

Replacing the motherboard

About the motherboard components

Replacing the motherboard consists of the following procedures:

- ◆ “[Removing the motherboard](#)” on page 15
- ◆ “[Installing the motherboard](#)” on page 16

The following table describes the main components of the motherboard and indicates whether you can replace them.

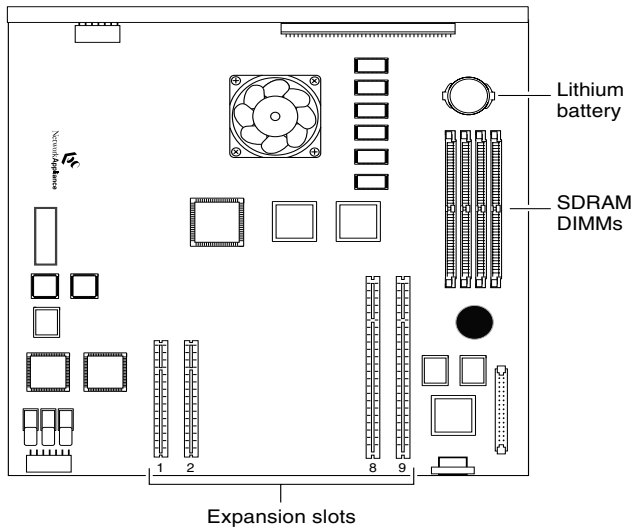
Components	Description	Is it field replaceable?		
		F720	F740	F760
CPU	21164A DEC Alpha® chip operating at 400 Mhz for F720 and F740, and at 600 Mhz for F760.	no	no	no
J6	Onboard FC-AL port	no	no	no
J45	Console/Diagnostic port	no	no	no
J1	Onboard Ethernet port	no	no	no
J26	Onboard differential fast wide SCSI port for external tape drive	no	no	no
CPU fan	The CPU fan is mounted on the CPU heat sink and must be operating any time the filer is powered on. See “ Replacing the CPU fan ” on page 22” for replacement instructions.	yes	yes	yes

Components	Description	Is it field replaceable?		
		F720	F740	F760
SDRAM DIMMs	The SDRAM DIMMs are installed into four DIMM slots (J27, J28, J29, and J30). See “Replacing SDRAM DIMMs on the motherboard” on page 17” for replacement instructions.	yes	yes	yes
Lithium battery	The 3.3V lithium battery provides backup power to the real-time clock and motherboard firmware configuration NVRAM. The lithium battery on the motherboard differs from the lithium batteries on the NVRAM adapter. You cannot interchange batteries for the motherboard and the NVRAM adapter. See “Removing the motherboard lithium battery” on page 20” for replacement instructions.	yes	yes	yes

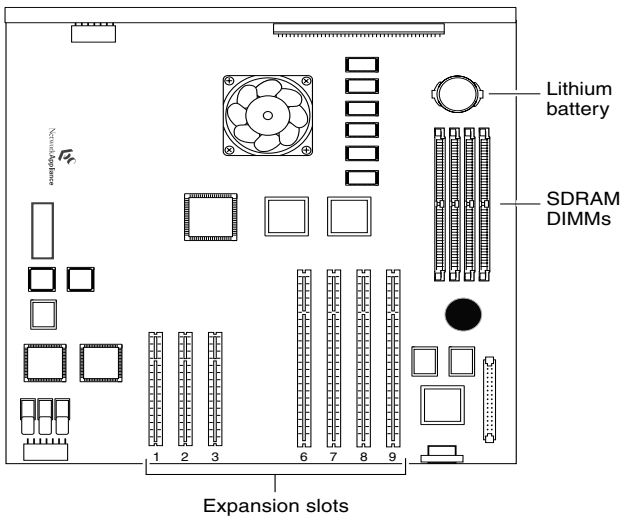
F700 series motherboard variations

The following figures show the three variations of the F700 series motherboard:

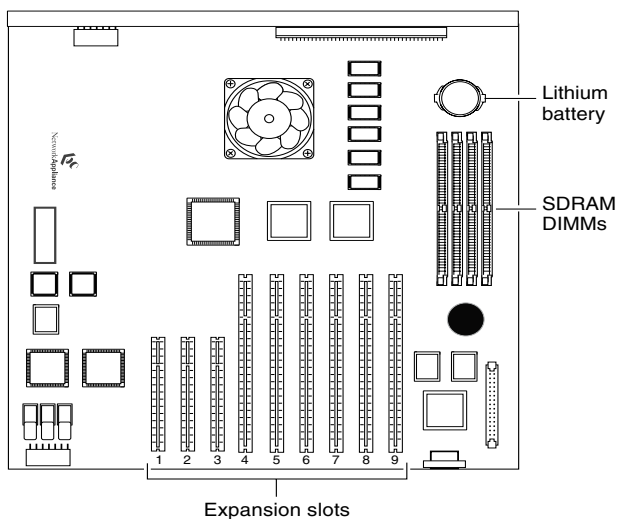
◆ F720 motherboard



◆ F740 motherboard



◆ F760 motherboard



Removing the motherboard

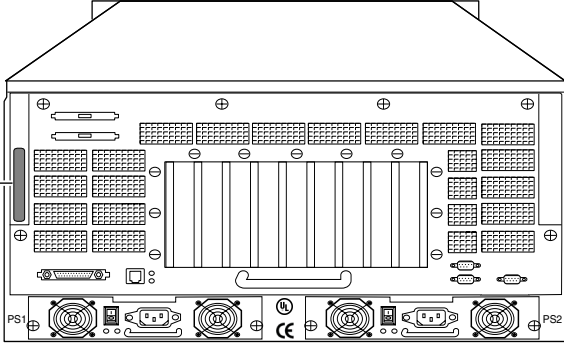
To remove the motherboard, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “Opening the PCB carrier” on page 8.
2	Using a 3/16 socket wrench, remove all the screwlocks connected to the PCB carrier.
3	Remove the expansion adapters on the motherboard. Follow Steps 3 through 5 of “Removing an existing expansion adapter” on page 25.
4	Remove the SDRAM DIMMs. Follow Steps 2 through 5 of “Removing an SDRAM DIMM” on page 18.
5	Using a #2 Phillips screwdriver, remove the 11 screws holding the motherboard to the PCB carrier.

Step	Action
6	Lift the motherboard and slide it out of the PCB carrier.

Installing the motherboard

To install the motherboard, complete the following steps.

Step	Action
1	Slide the replacement motherboard into the PCB carrier and, using a #2 Phillips screwdriver, secure the motherboard to the PCB carrier with the 11 screws.
2	Reinstall all SDRAM DIMMs. Follow Steps 1 through 4 of “ Installing an SDRAM DIMM ” on page 18.
3	Reinstall all expansion adapters into the expansion slots on the motherboard. Follow the procedure for “ Installing an expansion adapter ” on page 27.
4	Using a 3/16 socket wrench, connect all the screwlocks to the PCB carrier.
5	Paste the MAC (Media Access Control) address label provided with the replacement motherboard on the PCB carrier, as shown. 
6	Proceed to “ Closing the PCB carrier ” on page 39.

Replacing SDRAM DIMMs on the motherboard

About this section This section provides the supported memory configurations for the F700 series filers and the procedures for replacing the SDRAM DIMMs on the motherboard. Replacing the SDRAM DIMMs on the motherboard consists of the following procedures:

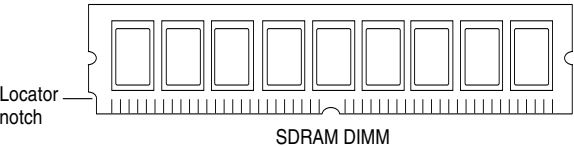
- ◆ “[Removing an SDRAM DIMM](#)” on page 18
- ◆ “[Installing an SDRAM DIMM](#)” on page 18

Supported memory configurations The supported memory configurations for the F700 series filers are as follows.

Filer	Required memory configuration
F720	3.3-volt, unbuffered, 4x64 MB SDRAM DIMMs
F740	3.3-volt, unbuffered, 4x128 MB SDRAM DIMMs
F760	3.3-volt, unbuffered, 4x256 MB SDRAM DIMMs

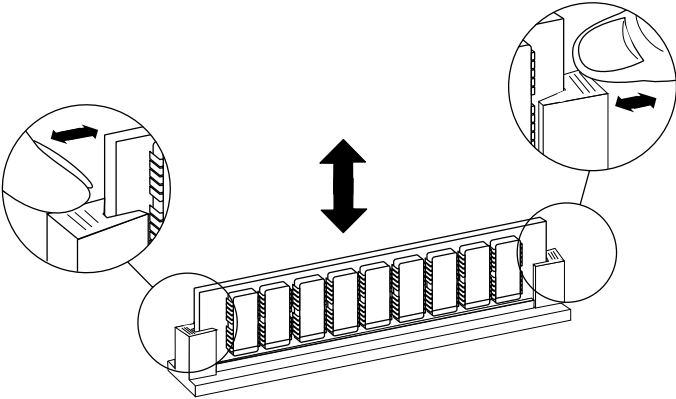
Caution All DIMMs must be listed on the Network Appliance Approved Parts List. Contact Network Appliance Sales to obtain this list. Do not use unapproved DIMMs.

The following figure illustrates a typical SDRAM DIMM.



Removing an SDRAM DIMM

To remove an SDRAM DIMM, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “ Opening the PCB carrier ” on page 8.
2	Locate the DIMM that you want to remove.
3	Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown. 
4	Pull the DIMM out of the slot.
5	Set the DIMM aside in an antistatic bag.

Installing an SDRAM DIMM

To install the SDRAM DIMM, complete the following steps.

Step	Action
1	Locate the DIMM slot for the DIMM you are installing.
2	Hold the DIMM by its top corners to avoid damaging the components and turn the DIMM so that the locator notches on the edge connector are away from the lithium battery.

Step	Action
3	Insert the DIMM straight into the slot. The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and try again. Caution_____ Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the DIMM does not make complete contact with the slot. _____
4	Push carefully, but firmly on the top edge of the DIMM until the latches snap into place.
5	Proceed to “Closing the PCB carrier” on page 39.

Replacing the lithium battery on the motherboard

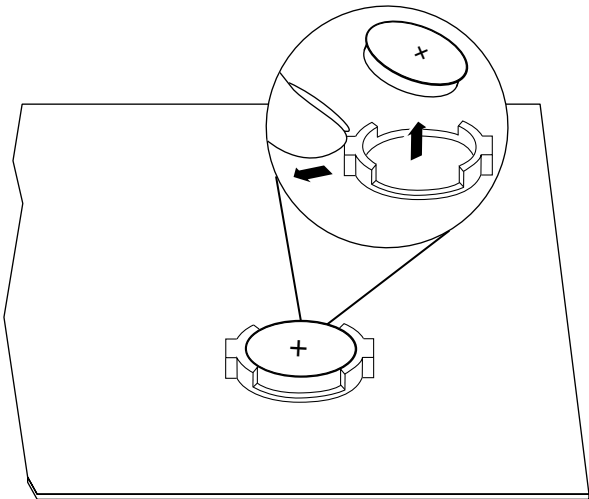
About this section

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

- ◆ “[Removing the motherboard lithium battery](#)” on page 20
- ◆ “[Installing the motherboard lithium battery](#)” on page 21

Removing the motherboard lithium battery

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

Step	Action
1	Open the PCB carrier. Follow the procedure in “ Opening the PCB carrier ” on page 8.
2	Lift up the battery toward the open side of the battery holder, as shown. 

Installing the motherboard lithium battery

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

WARNING _____
Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.

AVERTISSEMENT _____
Il y a danger d'explosion s'il y a remplacement incorrect de la pile.

Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.

ACHTUNG _____
Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Die batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.

Step	Action
1	Turn the battery so that the positive side is up (marked with a "+").
2	Push the battery through the open side of the battery holder so that it sits flush inside the battery holder.
3	Proceed to "Closing the PCB carrier" on page 39.

Replacing the CPU fan

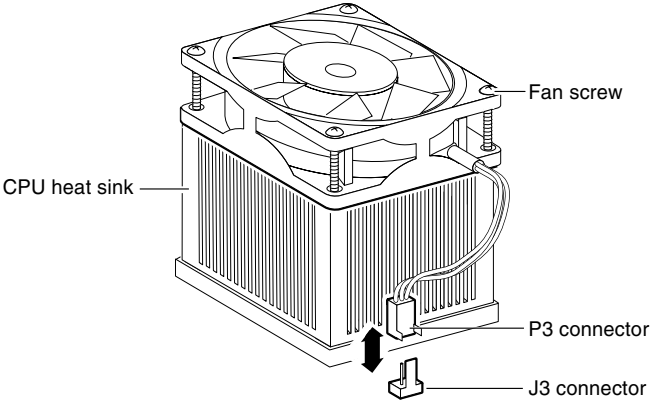
- About this section
- Replacing the CPU fan on the motherboard consists of the following procedures:
- ◆

“[Removing the CPU fan](#)” on page 22
- ◆

“[Installing a CPU fan](#)” on page 23

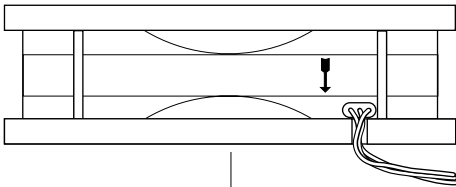
Removing the CPU fan

To remove the CPU fan, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in “ Opening the PCB carrier ” on page 8.
2	Unplug the P3 fan power connector from the J3 connector on the motherboard, as shown in the following figure. 
3	Remove the four screws that fasten the fan to the CPU heat sink.
4	Lift the CPU fan from the CPU heat sink.
5	Set the CPU fan aside.

Installing a CPU fan

To install the CPU fan, complete the following steps.

Step	Action
1	Orient the fan so that the label side is toward the heat sink.  Label side toward heat sink
2	Replace the four screws to secure the CPU fan to the heat sink. Caution _____ Do not overtighten the fan screws; otherwise, you might damage the heat sink and its bond to the CPU. _____
3	Plug the P3 CPU fan cable connector into the J3 connector on the motherboard. The connectors are keyed so that they can fit together only one way.
4	Proceed to “Closing the PCB carrier” on page 39.

Installing or replacing expansion adapters

About this section

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

- ◆ “[Removing an existing expansion adapter](#)” on page 25
- ◆ “[Installing an expansion adapter](#)” on page 27

If you are installing or replacing an additional SCSI adapter, you also need to follow the procedure in “[Connecting the additional SCSI adapter to PORT B](#)” on page 28.

Expansion adapters used

The NetApp F700 series filers use the following expansion adapters:

- ◆ NVRAM adapter
- ◆ Fibre Channel adapters
- ◆ SCSI adapters for disk storage and external tape devices
- ◆ Network interface cards/adapters (NICs)
- ◆ Cluster interconnect adapter

Note

The *F700 Series Hardware Guide* lists the supported network interfaces.

Slot assignments for expansion adapters

If you are adding expansion adapters to your F700 filer, the *NetApp System Configuration* on the NetApp on the Web (NOW) Web page at <http://now.netapp.com> provides current configurations for the following information:

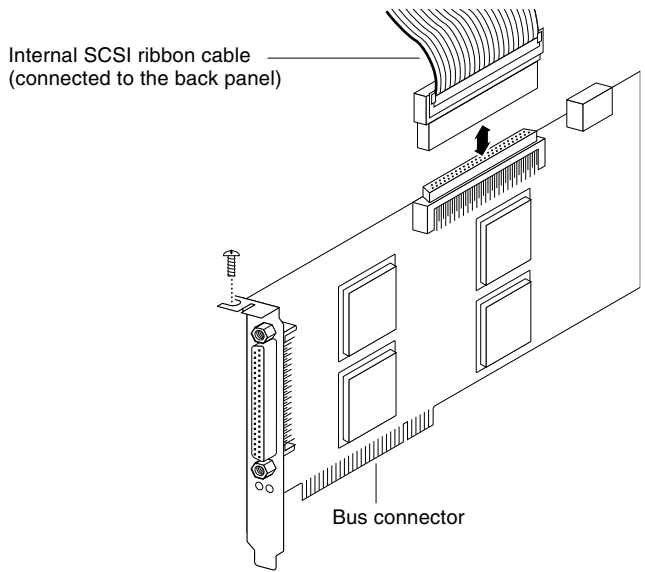
- ◆ Expansion slots that are available on your filer
- ◆ Supported adapters
- ◆ Expansion slot assignments

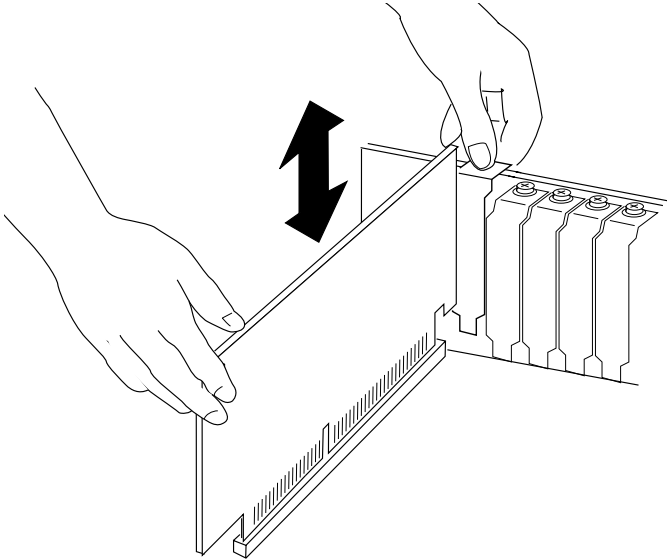
Caution

Only install supported expansion adapters in the assigned expansion slot. To ensure compatibility, performance, and reliability, you must obtain expansion adapters for your filer from Network Appliance or an authorized reseller.

Removing an existing expansion adapter

To remove the existing expansion adapters, complete the following steps.

Step	Action
1	Note which cables (if any) are connected to the ports on the back panel of your filer before disconnecting the cables. Caution— Do not connect or disconnect SCSI cables while your filer is powered up. You could cause permanent damage to the SCSI adapters in your NetCache Appliance.
2	Open the PCB carrier. Follow the procedure in “Opening the PCB carrier” on page 8.
3	If you are replacing or removing the differential wide SCSI adapter for disk shelves, disconnect the internal SCSI ribbon cable from the internal connector on the top edge of the differential wide SCSI adapter. The following figure shows the location of the internal connector on the top edge of the adapter. 

Step	Action	
4	Remove the screw holding the expansion adapter faceplate to the back panel bracket and save it for reinstalling the adapter.	
5	Pull upward on the top edge of the expansion adapter and lift it out of the chassis, as shown. 	
6	If you are...	Then...
	Not installing a replacement expansion adapter	Install a slot cover using the screw you saved in Step 4.
	Installing a replacement expansion adapter	Proceed to “Installing an expansion adapter” on page 27.
	Replacing units on the NVRAM adapter	Proceed to “Replacing units on an NVRAM adapter” on page 31.

Installing an expansion adapter

To install an expansion adapter, complete the following steps.

Step	Action	
1	If you are...	Then...
	Installing a new adapter	Take it out of the antistatic bag. (If this is a replacement adapter, put the adapter you are replacing into the same antistatic bag.)
	Installing a new NVRAM adapter	Remove the plastic insulator sheet between the lithium batteries and the metal clips. This insulator prevents the batteries from draining while the adapter is stored.
	Installing a new SCSI adapter and there is a SCSI adapter in an adjacent expansion slot	Disconnect the internal SCSI ribbon cable from the internal connector on the top edge of that SCSI adapter and fold the cable over the top of the back panel. This step makes it easier to see what you are doing when you install the new SCSI adapter and its internal cable.
	Reinstalling an existing adapter	Proceed to Step 2. You reinstall adapters when you replace the motherboard or if you are replacing units on the NVRAM adapter.
2	Holding the adapter by its top edge, with the faceplate near your left hand, lower the adapter into the slot until its connector edge meets the grooves in the expansion slot. The faceplate of the adapter should be in position against the back panel, and should cover the endplate slot on the back panel.	

3	Press carefully on the top edge of the adapter until the edge connector is seated in the expansion slot.	
4	Replace the screw to secure the adapter faceplate to the back panel.	
5	If you are...	Then...
	Replacing a SCSI adapter	Reconnect the SCSI ribbon cable to the internal connector on the top of the adapter and proceed to Step 7.
	Installing an additional SCSI adapter	Proceed to “ Connecting the additional SCSI adapter to PORT B ” on page 28 before continuing with the rest of this procedure.
6	If you removed the cables to the ports on the back panel of your filer, reconnect all the cables.	
7	Proceed to “ Closing the PCB carrier ” on page 39.	

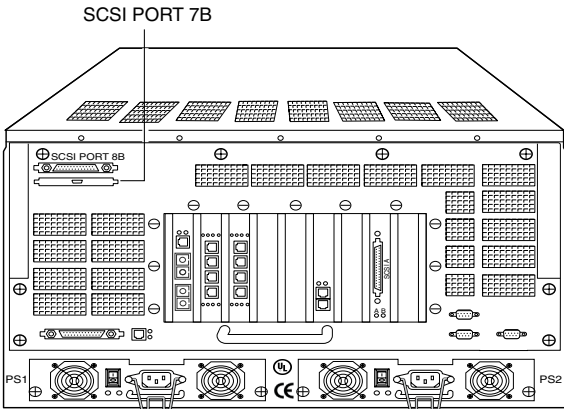
Connecting the additional SCSI adapter to PORT B

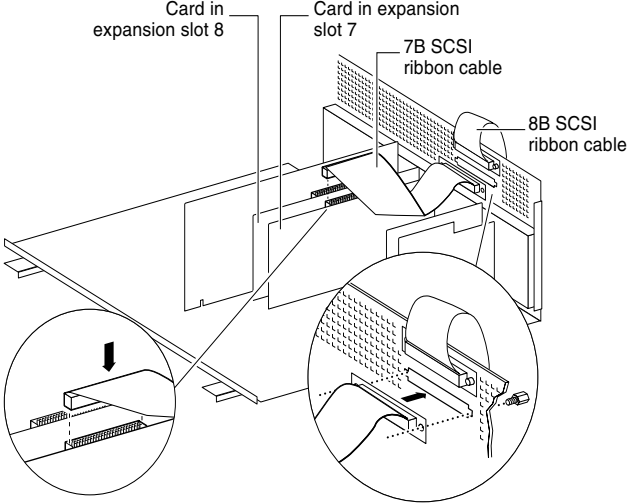
This procedure is only for when you are installing an additional SCSI adapter.

To connect the additional SCSI adapter to PORT B of the recommended expansion slot, complete the following steps.

Note

On the back panel of the filer there is a B PORT corresponding to the number of the expansion slot in which you installed the SCSI adapter.

Step	Action
1	Remove the PORT B metal knock-out plate on the back panel by inserting a screwdriver (from the inside of the PCB carrier) into the center hole and pushing out the knock-out plate. In the following figure, the PORT B metal knock-out plate is labeled 7B.  The diagram shows the back panel of a server with various ports and components. A label 'SCSI PORT 7B' points to a specific port on the left side of the panel. Other labels include 'SCSI PORT 8B', 'PS1', 'PS2', and 'CE'.
2	Discard the knock-out plate.
3	Locate the SCSI ribbon cable (included with the new SCSI adapter). This ribbon cable has a shielded external SCSI-2 connector on one end and an unshielded internal SCSI-2 connector on the other end.

Step	Action
4	Insert the shielded external SCSI-2 connector on the SCSI ribbon cable into the PORT 7B opening from the inside of the PCB carrier. 
5	Insert the two screw locks from the outside of the carrier back panel and tighten them to secure the cable connector in the PORT 7B opening. Caution _____ To avoid cross-threading the screw locks, start the screw locks by hand and then tighten them carefully using a 3/16 socket wrench.
6	Press the unshielded internal SCSI connector of the ribbon cable onto the internal SCSI connector on the top edge of the SCSI adapter in expansion slot 7.
7	Reconnect the internal SCSI ribbon cable that you disconnected in “Installing an expansion adapter” on page 27 to the top edge of the SCSI adapter in expansion slot 8.
8	Return to “Installing an expansion adapter” on page 27 to complete installing the additional SCSI adapter.

Replacing units on an NVRAM adapter

About this section

This section provides information about the following procedures:

- ◆ [“Replacing NVRAM SIMMs”](#) on page 32
- ◆ [“Replacing NVRAM lithium batteries”](#) on page 36

You must prepare the NVRAM adapter before installing it in the filer. Preparations include adding memory or replacing batteries on the NVRAM adapter before installing it in the filer.

Note

The NVRAM adapter in the NetApp F700 series is different than the NVRAM adapter in other models of NetApp filers. You cannot interchange them with NVRAM adapters from other models of NetApp filers.

Replacing NVRAM SIMMs

F700 NVRAM configurations

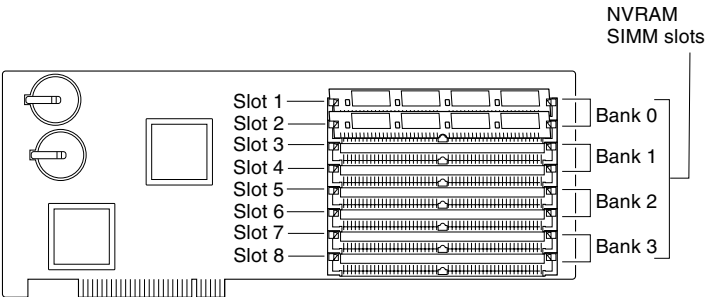
Replacing the NVRAM SIMMs consists of the following two procedures.

- ◆ “[Removing NVRAM SIMMs](#)” on page 33
- ◆ “[Installing NVRAM SIMMs](#)” on page 33

The NetApp F700 series filers have the following NVRAM configurations.

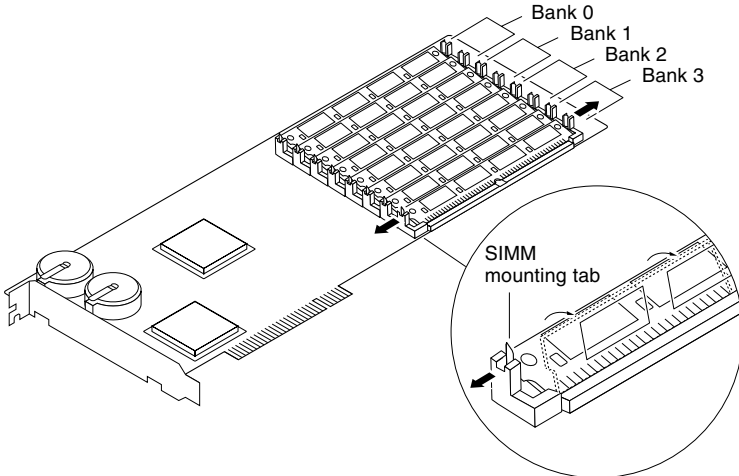
Filer	NVRAM configuration
F720	Bank 0 occupied by two 4-MB NVRAM SIMMs, for 8 MB of NVRAM.
F740 and F760	Banks 0, 1, 2, and 3 occupied by eight 4-MB NVRAM SIMMs, for 32 MB of NVRAM.

NVRAM SIMM slots: The following figure shows the location of the NVRAM SIMM slots.



Removing NVRAM SIMMs

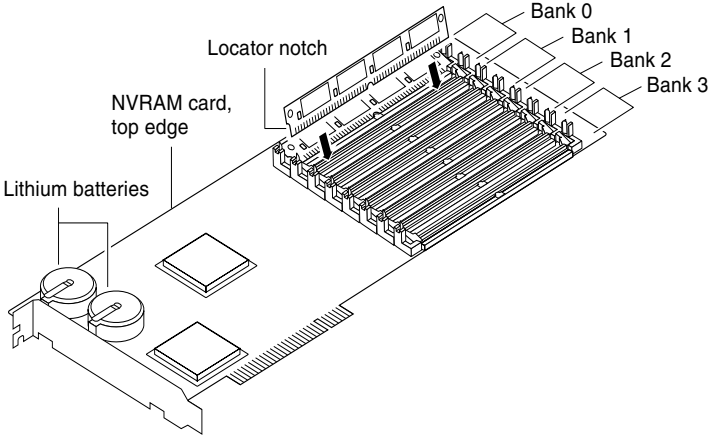
To remove the NVRAM SIMMs, complete the following steps.

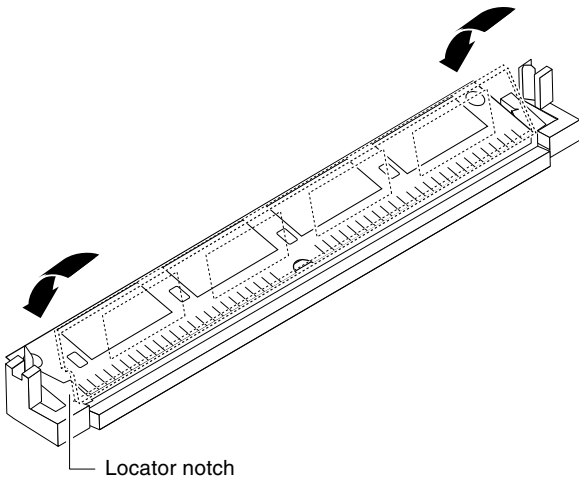
Step	Action
1	Starting with the first occupied SIMM slot closest to the bottom edge of the adapter, press and hold down the mounting tabs with your thumbs while raising the SIMM with your index fingers. 
2	Place the SIMMs you removed in an antistatic bag.

Installing NVRAM SIMMs

To install the NVRAM SIMMs, complete the following steps.

Step	Action
1	Hold the SIMM at the top corners to avoid damaging the components or the edge connector and turn the SIMM so that its locator notch is toward the lithium batteries.

Step	Action
2	Starting with the first unoccupied slot closest to the top edge of the NVRAM adapter, align the SIMM over the slot and then tilt the top edge of the SIMM at a slight angle toward the top edge of the NVRAM adapter.  The diagram illustrates the assembly of an NVRAM adapter. It shows a main circuit board with two lithium batteries at the bottom left. An NVRAM card is positioned above the batteries, with its top edge aligned with the top edge of the main board. A locator notch on the NVRAM card is shown fitting into a slot on the main board. The NVRAM card has four banks labeled Bank 0, Bank 1, Bank 2, and Bank 3. A SIMM is shown being inserted into a slot on the NVRAM card, with its top edge tilted slightly towards the top edge of the NVRAM card.
3	Insert the SIMM at an angle into the slot. The SIMM should slide into the slot easily if you wiggle the SIMM into position. If not, realign the SIMM with the slot and try again.

Step	Action
4	Push downward on the top edge of the SIMM until the mounting tabs close over the SIMM to lock it in place. Caution _____ Visually inspect the SIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the SIMM could bend or break when pushed to the locked position.  Locator notch
5	Go to “Installing an expansion adapter” on page 27 to install the NVRAM adapter.

Replacing NVRAM lithium batteries

NVRAM lithium batteries

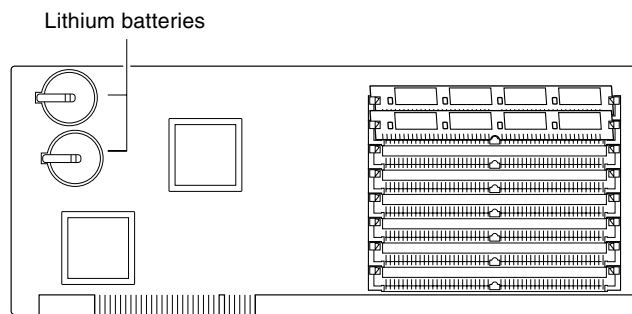
The NVRAM adapter has two lithium batteries. Replacing the NVRAM lithium batteries consists of the following two procedures.

- ◆ “[Removing the NVRAM lithium batteries](#)” on page 37
- ◆ “[Installing the NVRAM lithium batteries](#)” on page 37

Caution

The lithium batteries on the NVRAM adapter differ from the lithium battery on the motherboard. You cannot interchange the batteries for the NVRAM adapter and the motherboard.

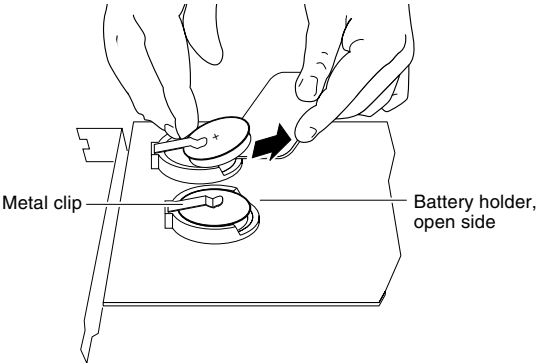
Battery locations: The following figure shows the battery locations.



To protect data integrity during a power failure, replace both lithium batteries when the filer indicates that the batteries are low.

Removing the NVRAM lithium batteries

To remove the NVRAM lithium batteries, complete the following steps.

Step	Action
1	Lift up the lithium battery while pushing the battery toward the open side of the battery holder. You can insert a nonconducting tool, such as a credit card, to help lift the battery. Caution _____ Do not bend the metal clip because this can damage the connection between the battery and the NVRAM adapter. _____ 

Installing the NVRAM lithium batteries

To install the NVRAM lithium batteries, complete the following steps.

WARNING _____

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

AVERTISSEMENT

Il y a danger d'explosion s'il y a remplacement incorrect de la pile.

Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.

ACHTUNG

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Die batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.

Step	Action
1	Turn the battery so that the positive side is up (marked with a "+").
2	Push the battery under the metal clip through the open side of the battery holder so that the battery sits flush inside the battery holder.
3	Go to " Installing an expansion adapter " on page 27 to install the NVRAM adapter.

Closing the PCB carrier

Closing the PCB carrier

To close the PCB carrier, complete the following steps.

Step	Action
1	If you removed the PCB carrier, insert the carrier slide rails evenly and slowly into the slide rails using both hands to support the PCB carrier. There should be no resistance. Caution— The carrier slide rails must align with the ball bearings along the cabinet slide rails; otherwise, the PCB carrier does not go in and the slide rails could be bent permanently.
2	Carefully push the PCB carrier into the chassis. If the PCB carrier is locked in position, press inward on the carrier tabs on each carrier slide rail while pushing the PCB carrier into the chassis.
3	Tighten the eight thumbscrews on the back panel of the PCB carrier by pressing in and turning each thumbscrew clockwise.
4	If you removed the cables to the ports on the back panel of your filer, reconnect all the cables.
5	Reconnect the power to your filer and disk shelves.
6	Turn on your filer and disk shelves.

Scope of this chapter

This chapter provides the procedures for replacing the hot swappable power supplies in the NetApp F700 series.

Note

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

Replacing the power supply

- About this section
- Replacing a power supply consists of the following two procedures.
- ◆

“[Removing a power supply](#)” on page 42
- ◆

“[Installing the power supply](#)” on page 43

Removing a power supply

To remove a 700 series power supply, complete the following steps.

Step	Actions	
1	If you have an...	Then...
	F720	You have only one power supply unit in the filer; shut down the filer by entering the following command at the console: halt Caution _____Always use the <code>halt</code> command to perform a clean shutdown. _____
	F740 or F760	Proceed to Step 2.
2	Turn off and unplug the power to your filer and disk shelves.	
3	If you have an F700 with...	Then...
	An AC power supply	Lift up the clip lock and unplug the power cord from the filer power supplies.
	A DC power supply	Remove the metal cover from the power supply terminal block and set it aside.

Step	Actions	
4	If you have an F700 with...	Then...
	An AC power supply	Proceed to Step 5.
	A DC power supply	Using a #2 Phillips screwdriver, remove the screws securing the positive, negative, and ground connectors to the power supply and save the screws.
5	Loosen the power supply thumbscrews by turning each thumbscrew counterclockwise.	
6	Pull the power supply out of the power supply bay in the filer. Caution _____ The power supply is heavy. Support the bottom of the unit while removing it from its bay. _____	
7	Set the power supply aside.	

Installing the power supply

To install a 700 series power supply, complete the following steps.

Step	Action
1	Push the power supply slowly and firmly into the bay until the power supply is firmly seated in the bay.
2	Secure the power supply by turning each thumbscrew clockwise until it stops. Note _____ If you cannot engage the thumbscrews and you cannot secure the power supply in its bay, you inserted the power supply the wrong way. _____

Step	Action	
3	If you have an F700 with...	Then...
	An AC power supply	Plug the power cord into the power cord receptacle on the power supply and secure it with the clip lock.
	A DC power supply	Using a #2 Phillips screwdriver, secure the positive, negative, and ground connectors to the power supply with the screws you saved.
4	If you have an F700 with...	Then...
	An AC power supply	Proceed to Step 5.
	A DC power supply	Cover the power supply terminal block with the metal cover that you set aside.
5	Turn on your filer and your disk shelves.	

Scope of this chapter

This chapter describes the procedures for replacing the LED/LCD subassembly.

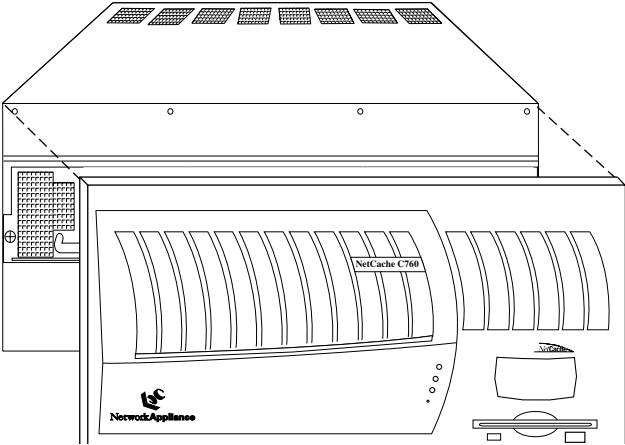
Replacing the LED/LCD subassembly

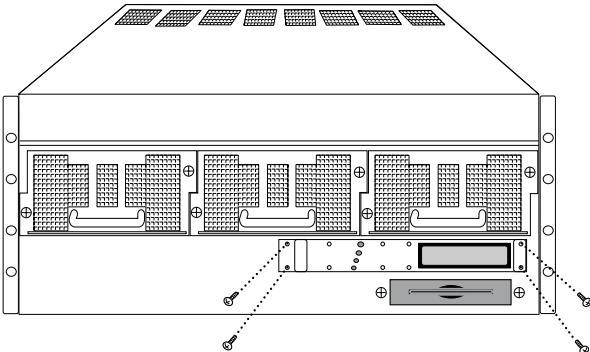
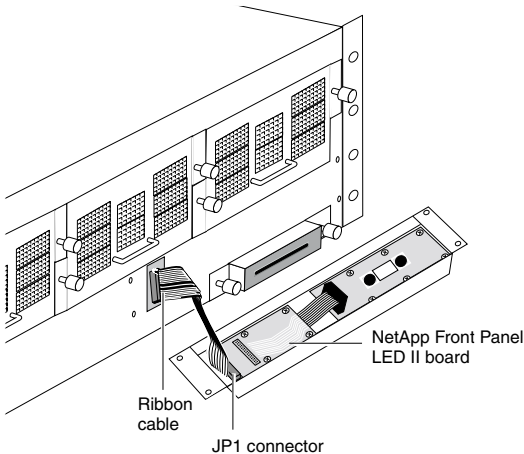
About this section Replacing a LED/LCD subassembly consists of the following two procedures.

- ◆ “[Removing the LED/LCD subassembly](#)” on page 46
- ◆ “[Installing the LED/LCD subassembly](#)” on page 48

Removing the LED/LCD subassembly

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

Step	Action
1	Shut down the filer by entering the following command at the console: halt Caution _____ Always use the halt command to perform a clean shutdown.
2	Turn off and unplug the power to your filer and disk shelves.
3	Use the grooves on the left and right edges of the front bezel and pull it straight off the front panel of the filer.  The diagram shows a Network Appliance NetCache C760. A dashed line indicates the front bezel being pulled away from the main unit. The bezel has grooves on its left and right edges. The main unit has a label 'NetCache C760' and a 'Network Appliance' logo at the bottom left. There are also some indicator lights and a small display on the right side of the bezel.

Step	Action
4	Wear the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
5	Use a #1 Phillips screwdriver to remove the four panhead screws that fasten the LED/LCD subassembly to the front panel of the chassis. Save the screws for reinstalling the unit. 
6	Carefully pull the LED/LCD subassembly and the attached cable from the chassis front panel.  Ribbon cable JP1 connector NetApp Front Panel LED II board

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

Installing the LED/LCD subassembly

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

Step	Action
1	Plug the LED ribbon cable to the JP1 connector of the LED/LCD subassembly.
2	Feed the cable back into the chassis as you push the LED/LCD subassembly against the chassis front panel.
3	Insert and tighten the four panhead screws to secure the LED/LCD subassembly to the chassis front panel.
4	Align the pins on the bezel with the holes on the chassis front panel, and then push the bezel straight onto the front panel.
5	Reconnect the power to your filer and disk shelves.
6	Turn on your filer and disk shelves.

Scope of this chapter

This chapter describes the procedures for replacing the diskette drive subassembly.

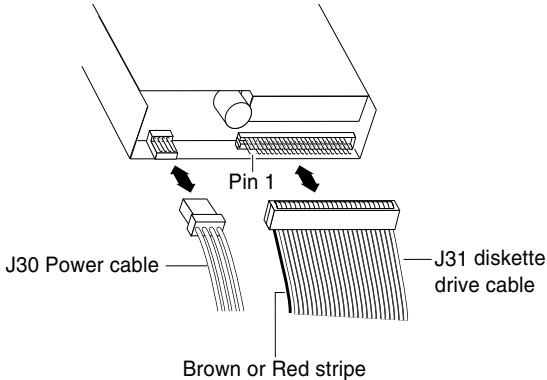
Replacing the diskette drive subassembly

- About this section
- Replacing a diskette drive subassembly consists of the following two procedures.
- ◆ “[Removing the diskette drive subassembly](#)” on page 50
 - ◆ “[Installing a diskette drive subassembly](#)” on page 51

Removing the diskette drive subassembly

To remove the diskette drive subassembly, complete the following steps.

Step	Action
1	Shut down the filer by entering the following command at the console: <code>halt</code> Caution_____ Always use the <code>halt</code> command to perform a clean shutdown.
2	Turn off and unplug the power to your filer and disk shelves.
3	Use the grooves on the left and right edges of the front bezel and pull it straight off the front panel of the filer.
4	Wear the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
5	Loosen the two thumbscrews on the diskette drive subassembly.
6	Pull the diskette drive subassembly out of the drive bay.

Step	Action
7	Unplug the diskette drive cable connector (J31) from the data connector on the back of the diskette drive. 
8	Unplug the power cable connector (J30) from the power connection on the back of the diskette drive.

Installing a diskette drive subassembly

To install the diskette drive subassembly into the filer, complete the following steps.

Step	Action
1	Plug the diskette drive cable connector (J31) into the data connector on the back of the diskette drive. The brown or red stripe on the ribbon cable aligns with pin 1 on the connector.
2	Plug the power cable connector (J30) into the power connection on the back of the diskette drive.
3	Turn the diskette drive subassembly so that its rails align with the grooves in the drive bay.
4	Slide the diskette drive subassembly into the drive bay.
5	Tighten the two thumbscrews to secure the diskette drive subassembly to the chassis.

Step	Action
6	Align the pins on the bezel with the holes on the front panel of the filer, and then push the bezel straight onto the front panel.
7	Reconnect the power to your filer and disk shelves.
8	Turn on your filer and your disk shelves.

Scope of this chapter

This chapter provides the procedures for replacing a chassis fan subassembly.

Replacing the chassis fan subassembly

About the chassis fan subassemblies

Replacing a chassis fan subassembly consists of the following two procedures.

- ◆ “[Removing the chassis fan subassembly](#)” on page 54
- ◆ “[Installing a chassis fan subassembly](#)” on page 55

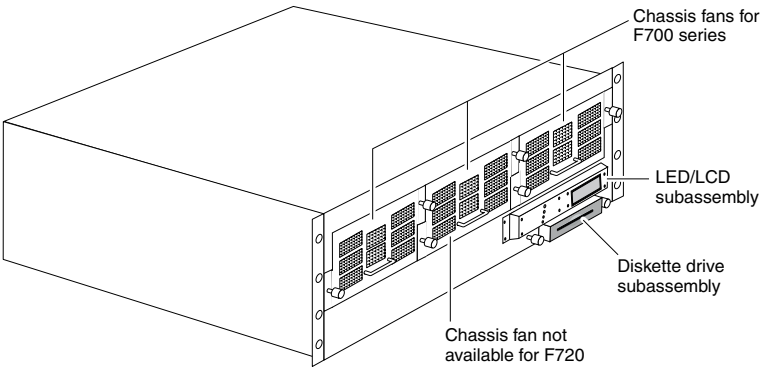
An F720 filer has two chassis fan subassemblies to circulate air through the chassis; the F740 and F760 filers have three chassis fan subassemblies. The chassis fans are secured to the front of the chassis.

Note

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

Locating the chassis fan subassembly

The following figure shows the chassis fan subassembly locations.



Removing the chassis fan subassembly

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

Step	Actions
1	From the console, note the identification of the fan subassembly that has failed.

Step	Actions
2	Use the grooves on the left and right edges of the front bezel and pull it straight off the front panel of the filer.
3	Loosen the thumbscrews on the chassis fan subassembly that has failed.
4	Using the handle, pull the chassis fan subassembly straight out of the filer chassis.
5	Set the chassis fan subassembly aside.

Installing a chassis fan subassembly

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

Step	Actions
1	Using the handle, slide the chassis fan subassembly straight into the filer chassis.
2	Tighten the thumbscrews to secure the chassis fan subassembly to the chassis.
3	Align the pins on the bezel with the holes on the front panel of the filer, and then push the bezel straight onto the front panel.
4	Verify that the chassis fans are operating.

**Scope of this
Appendix**

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

After reading this appendix, you will understand the communications regulations regarding 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 NetApp guarantee 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 the way 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, to maintain performance within Part 15 of CFR 47 regulations, install the system in two or three NetApp System Cabinets.

Compliant 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.

Compliant with ICES-003

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

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

Compliant 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 following technical standards:

- ◆ EN 55022—“Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.”
- ◆ EN 50082-1: 1992—“Electromagnetic compatibility—Generic immunity standard Part 1: Residential, Commercial, and Light Industry.”
- ◆ EN 60950—“Safety of Information Technology Equipment.”

Caution

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

Bureau of Commodity Inspection and Quarantine notice (BCIQ, 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 BCIQ 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.

This documentation package applies to the following products:

- ◆ NetApp Filers: F720, F740, and F760
- ◆ NetCache™ Appliances: C720, C720s, C720s2, and C760
- ◆ NetApp System Cabinets: P/N 110-01981, 110-01980
- ◆ Disk shelves: P/Ns XL401R-FJC-02D, XL401R-S-02Z, XL401R-R-02N, XL108-01471, and XL108-01472

DECLARATION OF CONFORMITY

We, Network Appliance, Inc.,
495 East Java Drive
Sunnyvale, California, 94089, USA

declare under our sole responsibility that the product(s)

Type of Equipment	Description	Part No.	Year of Manufacture
Network File Server	NetApp F700 Series Filer	F720, F740, F760	1998
Web Caching Appliance	NetCache Appliance C700 Series	C720, C720s, C760	1998

to which this declaration relate(s) is in conformance with the following standards:

EN 60950:1992, Information technology equipment (safety)
EN 55022:1987, Emissions requirements for Information technology equipment
EN 50082-1:1992, Generic immunity
IEC 801-2:1984, Immunity to Electrostatic Discharge
IEC 801-3:1984, Immunity to radiated RFI/electromagnetic fields
IEC 801-4:1988, Immunity to Electrical fast transients bursts

following the provisions of the directives listed below:

73/23/EEC, Low Voltage Directive (product safety)
89/336/EEC, Electromagnetic Compatibility Directive

5/12/99
Date


Helen Bradley
Officer of the Company

Part number:
210-02379

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