

NetApp® Filers

F700 Series

Field Service Guide

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- ◆ To reduce the risk of personal injury or damage to the equipment, 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 lithium batteries. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Do not attempt to recharge the battery, disassemble it, or dispose of it in a fire.

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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 following guides.

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, refer to 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:
 - ❖ NVRAM adapter
 - ❖ FC-AL adapter
 - ❖ SCSI adapters
 - ❖ network adapters

Note

Refer to 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 refer to the keys on the keyboard. (The keys on your keyboard might not be labeled exactly as they are in this guide.)

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

Overview of this chapter

About this chapter

This chapter identifies and describes the units that are field replaceable in the filer models of the NetApp F700 series.

This chapter includes the following information:

- ◆ the units that can be replaced in the NetApp F700 series
- ◆ tools and equipment required for servicing the filer

Chapter contents

This chapter discusses the following topics:

- ◆ [“Overview of the field replaceable units”](#) on [page 2](#)
- ◆ [“Tools and equipment”](#) on [page 4](#)

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. The units are accessible from the front or back panel. With the exception of system memory modules and disks drives, you must purchase all field replaceable units from Network Appliance.

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

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

Units that cannot be individually replaced: The following are onboard interfaces on the motherboard:

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

If there are problems with these interfaces, you must replace the motherboard.

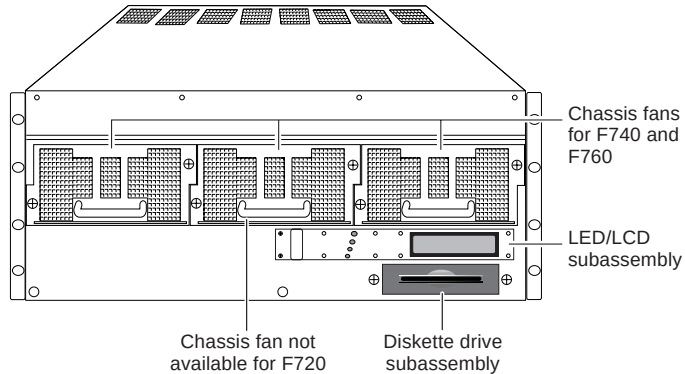
Units that can be optionally added: You can add the following units in the NetApp F700 series in the field:

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

- ◆ Optional second power supply for the F720

Units accessible from the filer front

The filer front panel is covered by a plastic bezel. You can remove the bezel to get access to the fan subassembly, the LED/LCD subassembly, and the diskette drive subassembly. The following figure shows the replaceable units accessible from the bezel side.

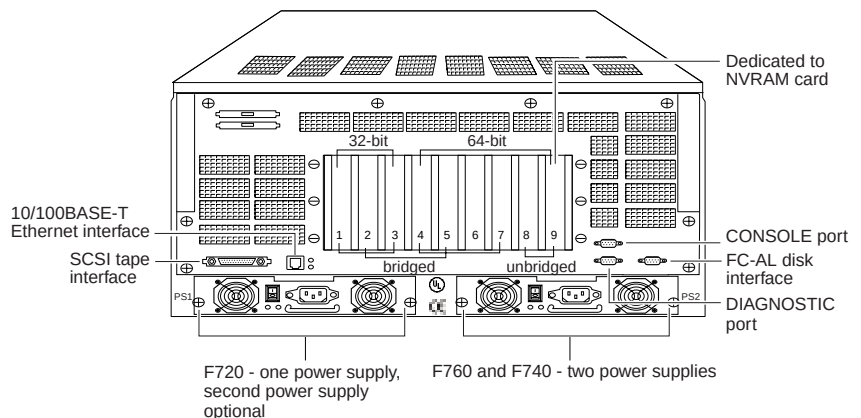


Units accessible from the filer back

The following units are accessible from the back of the filer:

- ◆ power supply
- ◆ 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 units accessible from the back of the filer.



Tools and equipment

Required tools and equipment

Assemble the following tools and equipment before you begin replacing components:

- ◆ 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>.

Overview of this chapter

About this chapter This chapter describes the procedures for opening, removing, and closing the filer PCB carrier.

Chapter contents This chapter discusses the following topics:

- ◆ [“Opening the PCB carrier” on page 6](#)
- ◆ [“Removing the PCB carrier” on page 8](#)
- ◆ [“Closing the PCB carrier” on page 9](#)

Opening the PCB carrier

Why open the PCB carrier?

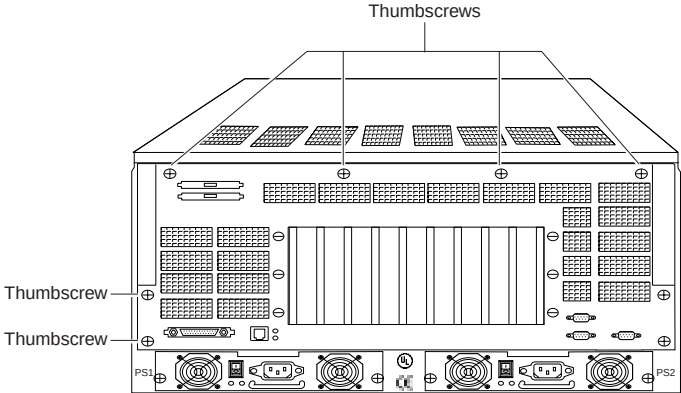
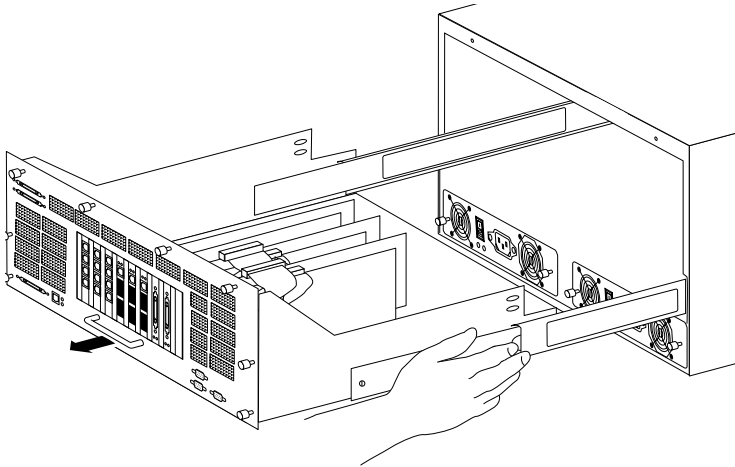
You might need to open the PCB carrier to gain access to the motherboard, expansion cards, and other field-replaceable units in the filer.

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. The motherboard in the PCB carrier, like the power supplies and the chassis fans, plugs into the internal blind-mated connectors in the system backplane without any other cables. When you pull out the PCB carrier, the connections are broken. You cannot power on the system again until the PCB carrier is completely closed. For information about shutting down the system properly, refer to the *System Administrator's Guide*.

How to open the PCB carrier

To open the PCB carrier, follow these steps.

Step	Actions
1	Shut down the filer and turn off power to the filer. Caution————— Always use the halt command to perform a clean shutdown.
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.

Step	Actions
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. It features eight thumbscrews arranged in two rows of four. A label 'Thumbscrews' points to the top row. Two individual thumbscrews are also labeled 'Thumbscrew' with arrows pointing to them. The panel includes various ports and components, with 'PS1' and 'PS2' labels at the bottom corners.
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 centimeters).  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 partially extended position, with its front panel visible. The chassis is shown in a perspective view, highlighting the slide rails and the carrier's travel distance.

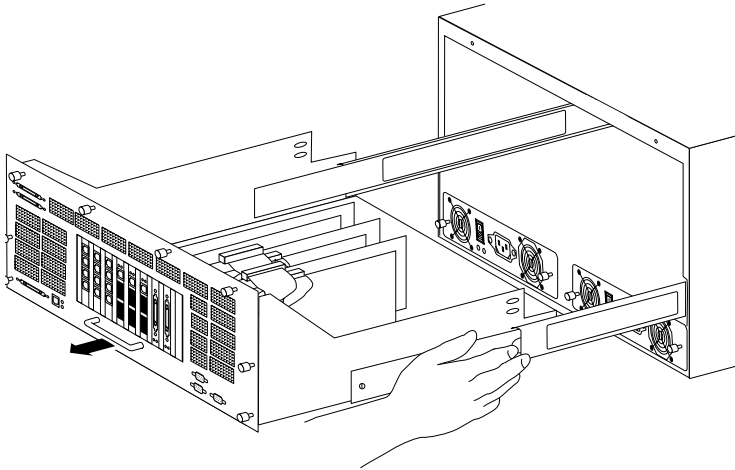
Removing the PCB carrier

Why remove the PCB carrier?

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

How to remove the PCB carrier

To remove the PCB carrier from the filer, follow these steps.

Step	Action
1	Follow the procedure for “ Opening the PCB carrier ” on page 6 .
2	Press inward on the carrier tabs on each slide rail while pulling the PCB carrier out of the chassis. The PCB carrier comes free of the carrier tabs that lock it in place. 
3	Support the PCB carrier with both hands, and set it aside.

Closing the PCB carrier

How to close the PCB carrier

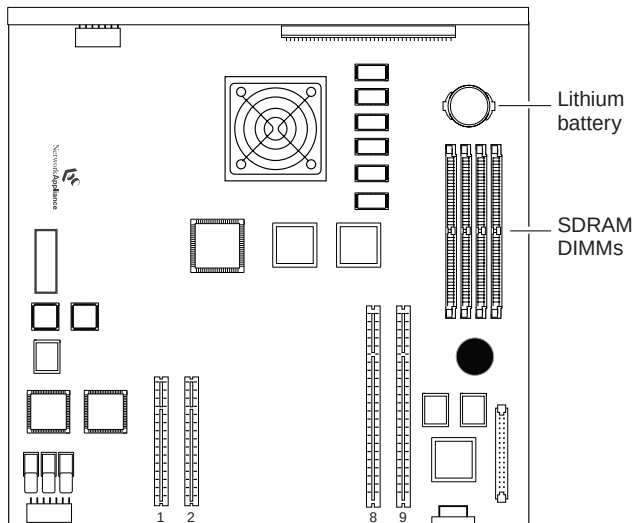
To close the PCB carrier, follow these steps.

Step	Action
1	If you removed the PCB carrier, insert the carrier slide rails evenly and slowly into the slide rails using both hands to support the PCB carrier. There should be no resistance. Caution— The carrier slide rails must align with the ball bearings along the 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	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
5	Turn on the filer.

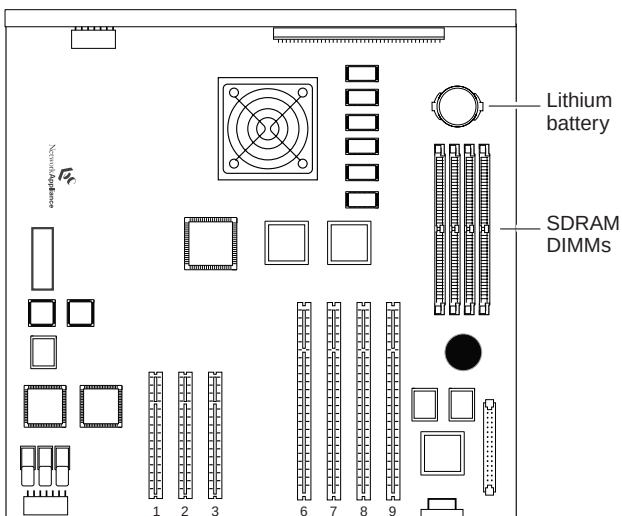
About this chapter

This chapter describes the procedures for removing and installing the F700 series motherboard. There are three variations of the F700 series motherboard:

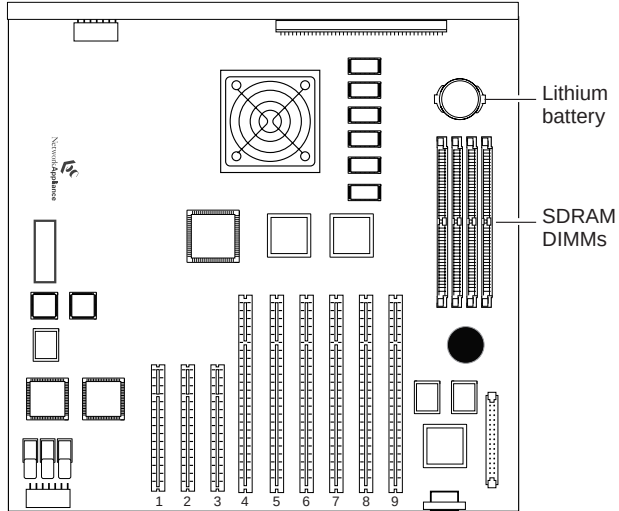
- ◆ F720 motherboard



- ◆ F740 motherboard



◆ F760 motherboard



This chapter also describes the procedures for replacing or upgrading the following units on the motherboard:

- ◆ SDRAM (synchronous random access memory) DIMMs for the system memory
- ◆ CPU fan
- ◆ lithium battery

Chapter contents

This chapter discusses the following topics:

- ◆ “[NetApp F700 motherboard](#)” on [page 13](#)
- ◆ “[Replacing the motherboard](#)” on [page 15](#)
- ◆ “[Replacing SDRAM DIMMs on the motherboard](#)” on [page 18](#)
- ◆ “[Replacing the lithium battery on the motherboard](#)” on [page 21](#)
- ◆ “[Replacing the CPU fan](#)” on [page 24](#)

NetApp F700 motherboard

About this section

The following table describes the main components of the motherboard and indicates whether they are field replaceable.

Note

The motherboard must be replaced for onboard components that are not field replaceable.

Components	Description	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 cooler fan	The CPU fan is mounted on the CPU heat sink and must be operating any time the filer is powered on. Refer to “Replacing the CPU fan” on page 24 for replacement instructions.	yes	yes	yes
SDRAM DIMMs	The SDRAM DIMMs are installed into four DIMM slots (J27, J28, J29, and J30).	yes	yes	yes

Components	Description	F720	F740	F760
Lithium battery	The motherboard uses one 3.3-volt lithium battery to provide backup power to the real-time clock and motherboard firmware configuration NVRAM. The lithium battery on the motherboard differs from the batteries on the NVRAM adapter. The batteries for the motherboard and the NVRAM adapter cannot be interchanged.	yes	yes	yes

Replacing the motherboard

How to remove the motherboard

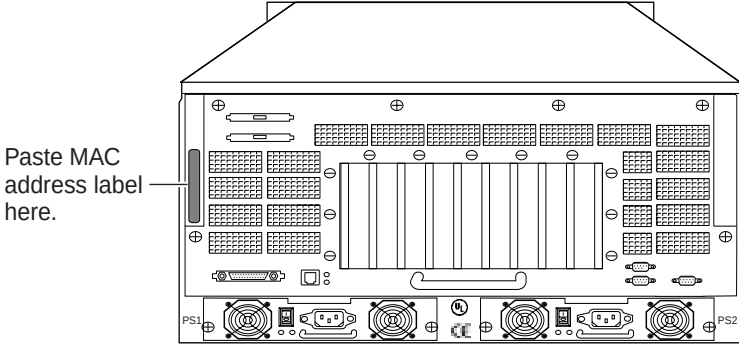
To remove the motherboard, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution _____ Always use the halt command to perform a clean shutdown. _____
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
4	Disconnect all cables connected to the ports on the back panel of the filer.
5	Using a 3/16 socket wrench, remove all the screwlocks of all the onboard components.
6	To open the PCB carrier, follow Steps 4 and 5 of the procedure described in “Opening the PCB carrier” on page 6 .
7	To remove the PCB carrier from the chassis, follow Steps 2 and 3 of the procedure described in “Removing the PCB carrier” on page 8 .
8	Using a #0 or #1 Phillips screwdriver, remove all adapters from all expansion slots on the motherboard. For information about this procedure, refer to “How to remove an existing expansion adapter” on page 29 .
9	To remove all SDRAM DIMMs, follow Steps 3 and 8 of the procedure described in “How to remove an SDRAM DIMM” on page 18 .
10	Using a #2 Phillips screwdriver, remove the 11 screws holding the motherboard to the PCB carrier and lift the motherboard and slide it out of the PCB carrier.

Step	Action
11	Proceed to “How to install the motherboard” on page 16.

How to install the motherboard

To install the replacement motherboard, follow these 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	To reinstall all SDRAM DIMMs, follow Steps 1 and 4 of the procedure described in “How to install an SDRAM DIMM” on page 19.
3	Using a #0 or #1 Phillips screwdriver, reinstall all adapters into the expansion slots on the motherboard. For information about this procedure, refer to “How to install an expansion adapter” on page 34.
4	To reinstall the PCB carrier into the chassis and close it, follow the procedure described in “Closing the PCB carrier” on page 9.
5	Paste the MAC (Media Access Control) address label provided with the replacement board on the PCB carrier, as shown.  Paste MAC address label here.
6	Using a 3/16 socket wrench, replace all the screwlocks of all the onboard components.

Step	Action
7	Reconnect all the cables to the ports on the back panel of the filer.
8	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
9	Turn on the filer.

Replacing SDRAM DIMMs on the motherboard

About this section

This section provides the procedures for adding or replacing the SDRAM DIMMs on the motherboard.

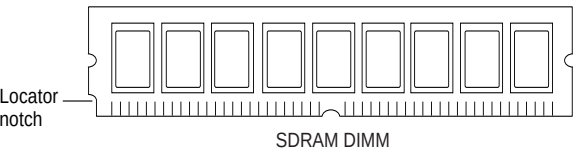
The memory requirements for the F700 series filers are as follows.

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.

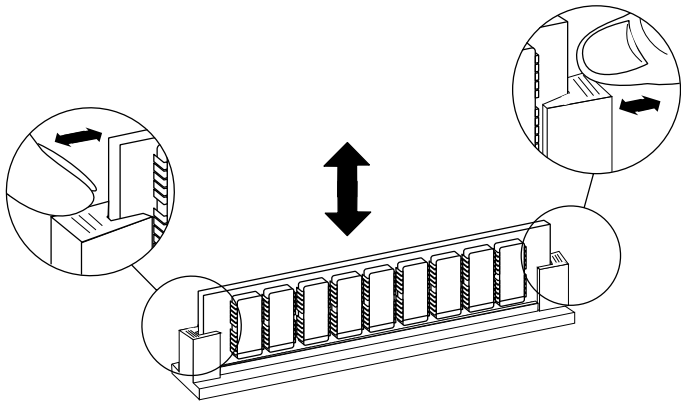
The following figure illustrates a typical SDRAM DIMM.



How to remove an SDRAM DIMM

To remove an SDRAM DIMM, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution Always use the halt command to perform a clean shutdown.
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.

Step	Action
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
4	To open the PCB carrier, follow Steps 4 and 5 of the procedure described in “Opening the PCB carrier” on page 6 .
5	Locate the DIMM that you want to remove.
6	Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown. 
7	Pull the DIMM out of the slot.
8	Set the DIMM aside in an antistatic bag.
9	Proceed to “How to install an SDRAM DIMM.”

How to install an SDRAM DIMM

To install a replacement SDRAM DIMM, follow these steps.

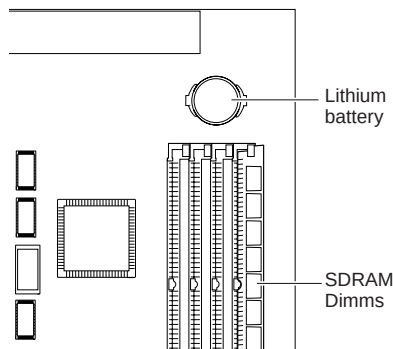
Step	Action
1	Locate the DIMM slot for the DIMM you are installing.
2	Hold the DIMM by its top corners to avoid damaging the components and turn the DIMM so that the locator notches on the edge connector are away from the lithium battery.

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	Push in the PCB carrier and tighten the eight thumbscrews on the back panel.
6	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
7	Turn on the filer.

Replacing the lithium battery on the motherboard

Where is the battery located?

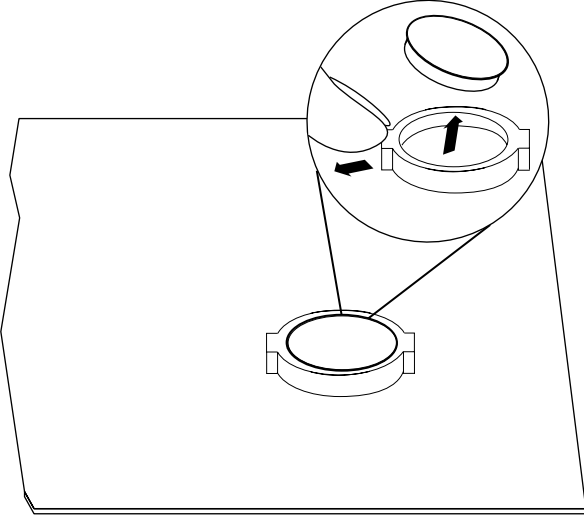
This section provides the procedures for adding or replacing the 3.3-volt lithium battery on the motherboard. The following figure shows the location of the lithium battery.



Removing the motherboard lithium battery

To remove the motherboard lithium battery, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution ————— Always use the halt command to perform a clean shutdown.
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
4	To open the PCB carrier, follow Steps 4 and 5 of the procedure described in “ Opening the PCB carrier ” on page 6 .

Step	Action
5	Lift up the battery toward the open side of the battery holder, as shown in the following figure. 
6	Dispose of the old battery according to the manufacturer's instructions that come with the replacement battery.
7	Proceed to “How to install the motherboard lithium battery.”

How to install the motherboard lithium battery

To install a replacement motherboard lithium battery, follow these steps.

WARNING

There is danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

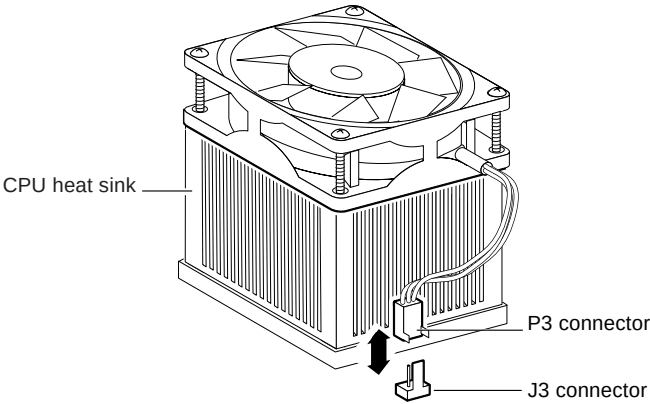
Step	Action
1	Turn the battery so that the positive side is up (marked with a “+”).
2	Push the battery through the open side of the battery holder so that it sits flush inside the battery holder.

Step	Action
3	Push in the PCB carrier and tighten the eight thumbscrews on the back panel.
4	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
5	Turn on the filer.

Replacing the CPU fan

About this section This section provides the procedures for replacing the CPU fan on the motherboard.

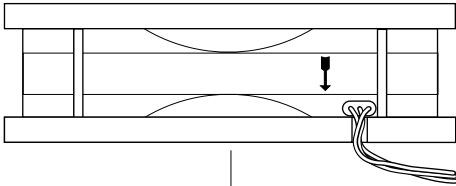
How to remove the CPU fan To remove the CPU fan, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution Always use the halt command to perform a clean shutdown.
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
4	To open the PCB carrier, follow Steps 4 and 5 of the procedure described in “Opening the PCB carrier” on page 6 .
5	Unplug the P3 fan power connector from the J3 connector on the motherboard, as shown in the following figure. 

Step	Action
6	Remove the four screws that fasten the fan to the CPU heat sink.
7	Lift the CPU fan from the CPU heat sink.
8	Set the CPU fan aside.
9	Proceed to “How to install a CPU fan.”

How to install a CPU fan

To install a replacement CPU fan, follow these steps.

Step	Action
1	Orient the replacement 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	Push in the PCB carrier and tighten the eight thumbscrews on the back panel.
5	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
6	Turn on the filer.

Overview of this chapter

About this chapter

This chapter

- ◆ lists the expansion adapters used
- ◆ specifies whether the expansion adapters used require preparation
- ◆ specifies the location of the expansion slots on the F700 series filers
- ◆ describes the procedures for removing and installing expansion adapters

To ensure compatibility, performance, and reliability, you must obtain filer expansion adapters from Network Appliance or an authorized reseller.

Chapter contents

This chapter discusses the following topics:

- ◆ “[NetApp F700 series expansion adapters](#)” on [page 28](#)
- ◆ “[Installing or replacing expansion adapters](#)” on [page 29](#)
- ◆ “[Replacing units on an NVRAM adapter](#)” on [page 39](#)

NetApp F700 series expansion adapters

Expansion adapters used

The following expansion adapters are used in NetApp F700 series filers:

- ◆ NVRAM adapter
- ◆ Fibre Channel adapters
- ◆ SCSI adapters for disk storage and external tape devices
- ◆ network interface adapters (NIAs)

Note

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

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.

Preparing expansion adapters

The network, FC-AL, and SCSI adapters do not require preparation before you install them in the filer. However, 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.

Installing or replacing expansion adapters

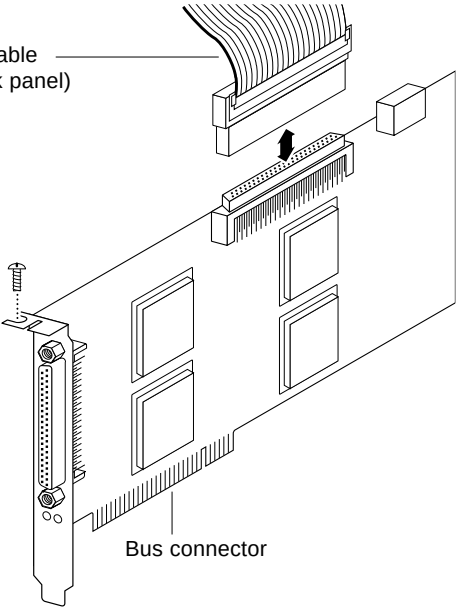
About this section

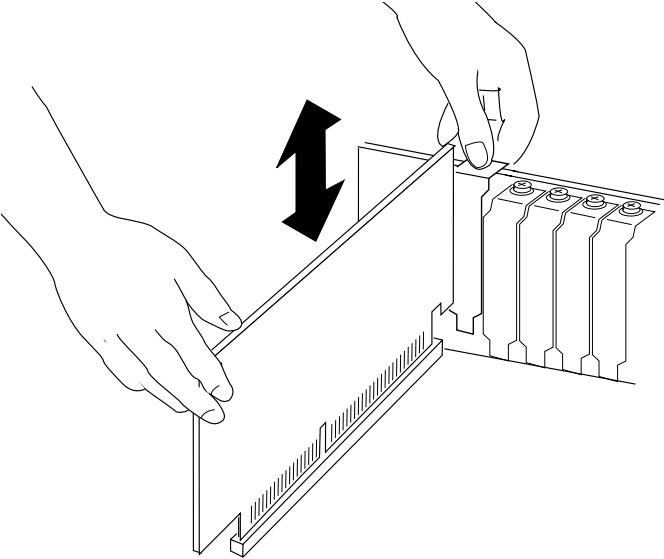
This section describes the steps involved in replacing an expansion adapter or installing a new expansion adapter.

How to remove an existing expansion adapter

To remove existing expansion adapters, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution————— Always use the halt command to perform a clean shutdown.
2	Turn off the power to the disk shelves.
3	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
4	Note which cables (if any) are connected to the connectors on the faceplate of the expansion adapter before disconnecting the cables. Caution————— Do not disconnect SCSI cables from, or connect SCSI cable-to-filer SCSI connectors, while the filer is powered up. You could cause permanent damage to the SCSI adapters in the filer.
5	To open the PCB carrier, follow Steps 4 and 5 of the procedure described in “Opening the PCB carrier” on page 6.
6	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.

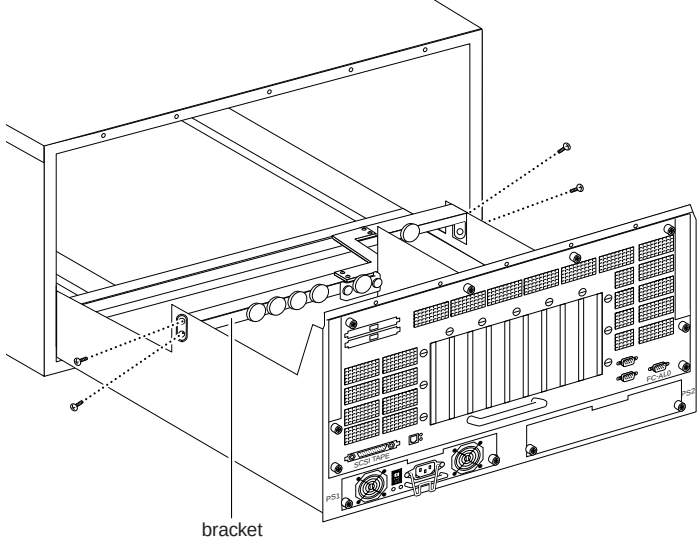
Step	Action
7	If you are replacing or removing the differential wide SCSI adapter for disk shelves, disconnect the internal SCSI ribbon cable from the internal connector on the top edge of the differential wide SCSI adapter. The following figure shows the location of the internal connector on the top edge of the adapter.  The diagram illustrates a differential wide SCSI adapter installed in a back panel. An internal ribbon SCSI cable, labeled 'Internal ribbon SCSI cable (connected to the back panel)', is shown being disconnected from the top edge of the adapter. A black arrow points to the internal connector on the top edge of the adapter. The bus connector is also labeled.
8	Remove the screw holding the expansion adapter faceplate to the back panel bracket and save it for reinstalling the adapter.

Step	Action
9	Pull upward on the top edge of the expansion adapter and lift it out of the chassis, as shown. 
10	If you are not installing a replacement adapter: Install a slot cover using the screw you saved in Step 6, and then skip to Step 14. If you are replacing units on the NVRAM adapter: Proceed to “Replacing units on an NVRAM adapter” on page 39. If you are installing a replacement adapter: Proceed to the next section.

How to install an expansion adapter

To install an expansion adapter, follow these steps.

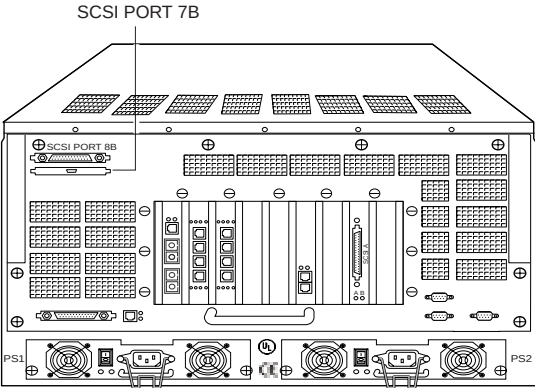
Step	Action
1	If there is a new adapter: Pull it out of the antistatic bag. If this adapter is a replacement, put the adapter you are replacing into the same antistatic bag. With an NVRAM adapter, for example, you can replace units on the adapter without replacing the adapter.
	If you are installing 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.
	If you are installing a new SCSI adapter and there is a SCSI adapter in an adjacent expansion slot: Disconnect the internal SCSI cable from the internal connector on the top edge of that SCSI adapter and fold the cable over the top of the back panel. Note _____ This step makes it easier to see what you are doing when you install the new SCSI adapter and its internal cable. _____

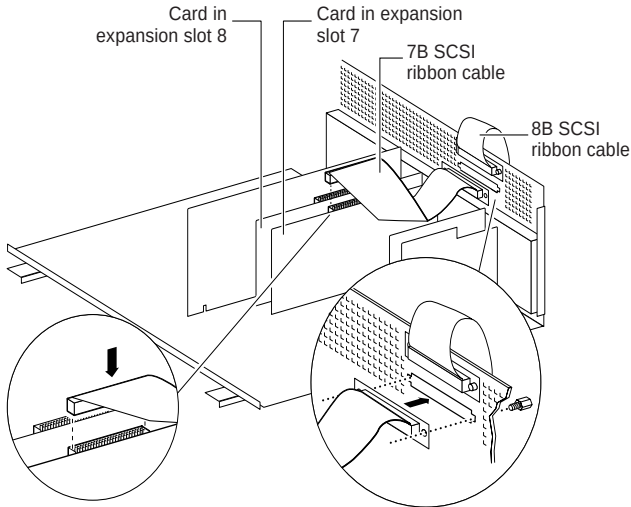
2	If the adapter you are installing cannot fit into the assigned expansion slot, remove the bracket at the middle of the PCB carrier. The bracket is attached to the PCB carrier by a pair of screws on each side.  bracket
3	Holding the adapter by its top edge, with the faceplate near your left hand, lower the adapter into the slot until its connector edge meets the grooves in the expansion slot, as shown in the figure on page 33. The faceplate of the adapter should be in position against the back panel, and should cover the endplate slot on the back panel.
4	Press carefully on the top edge of the adapter until the edge connector is seated in the expansion slot.
5	Replace the faceplate screw to secure the adapter to the back panel.
6	If you are replacing a SCSI adapter Reconnect the SCSI ribbon cable to the internal connector on the top of the adapter, as shown in the figure on page 30.
	If you are installing an additional SCSI adapter: Proceed to “How to connect the additional SCSI adapter to PORT B” on page 37 before continuing with the rest of this procedure.

7	Reconnect the cables to the external connectors on the replacement expansion adapter.
8	Push in the PCB carrier and tighten the eight thumbscrews on the back panel.
9	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
10	Turn on the filer and disk shelves.

How to connect the additional SCSI adapter to PORT B

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

Step	Action
1	Remove the PORT 7B 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. The following figure shows the location of PORT 7B on the PCB carrier back panel. 
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.

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. The following figure shows the installation of the internal SCSI cable. 
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 cable that you disconnected in “How to install an expansion adapter” on page 34 to the top edge of the SCSI adapter in expansion slot 8.
8	Return to “How to install an expansion adapter” on page 34 to complete the installation.

Replacing units on an NVRAM adapter

About this section

This section provides information about the following procedures:

- ◆ adding or replacing NVRAM SIMMs
- ◆ changing the lithium batteries

You can upgrade memory or replace the batteries on an NVRAM adapter before installing it in the filer.

Note

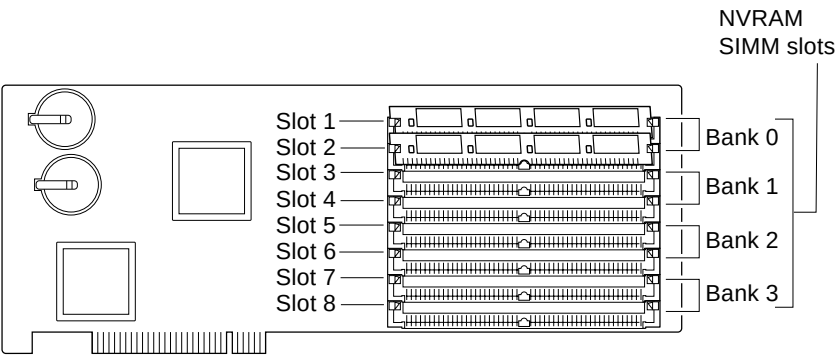
The NVRAM II adapter in the NetApp F700 series is different than the NVRAM adapter in other models of NetApp filers and, therefore, is not interchangeable with NVRAM adapters from other models of NetApp filers.

How to replace NVRAM SIMMs

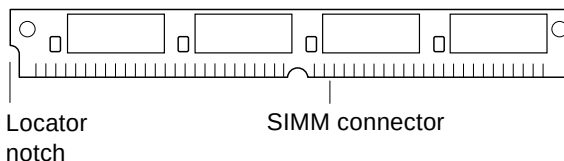
The filers in the NetApp F700 series have the following NVRAM configurations.

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.

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



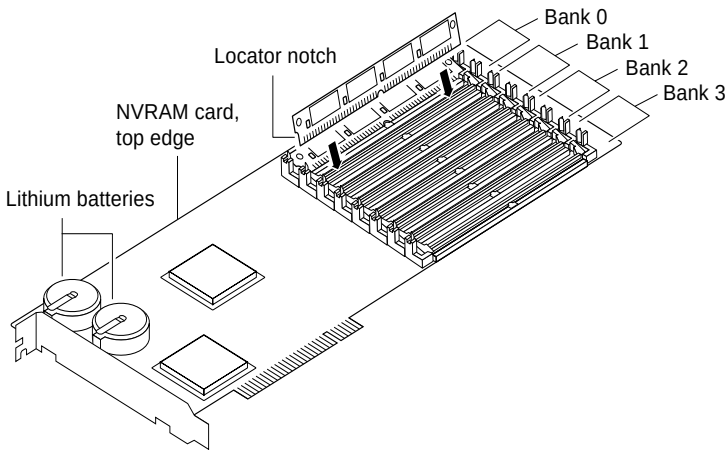
The figure below illustrates a typical NVRAM SIMM.

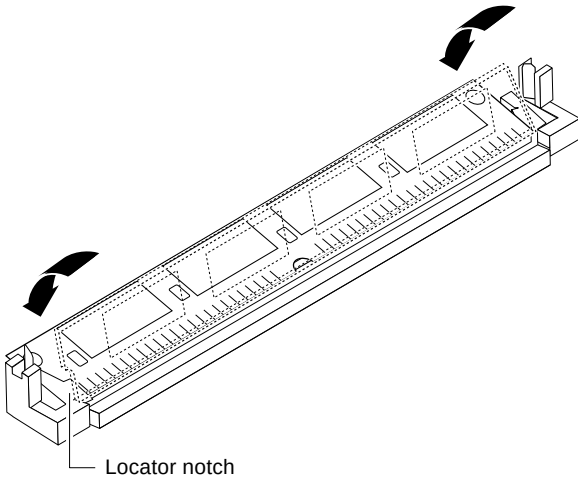


How to remove NVRAM SIMMs: Follow these steps to remove the NVRAM SIMMs.

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. The following figure illustrates how to remove a SIMM. The diagram shows a perspective view of a multi-bank adapter. There are four banks labeled 'Bank 0', 'Bank 1', 'Bank 2', and 'Bank 3' from top to bottom. Each bank contains several SIMM modules. Arrows indicate the direction to press the mounting tabs. A circular inset provides a close-up view of a 'SIMM mounting tab' being pressed down.
2	Place the SIMMs you've removed in an antistatic bag.
3	Proceed to “How to install NVRAM SIMMs.”

How to install NVRAM SIMMs: Follow these steps to install the NVRAM SIMMs.

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.
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 following figure illustrates how to align a SIMM to insert it in a slot. 
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. The following figure illustrates how to lock an NVRAM SIMM in place in its slot.  Locator notch 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.
5	Return to “How to install an expansion adapter” on page 34 to complete the installation.

How to replace the NVRAM lithium batteries

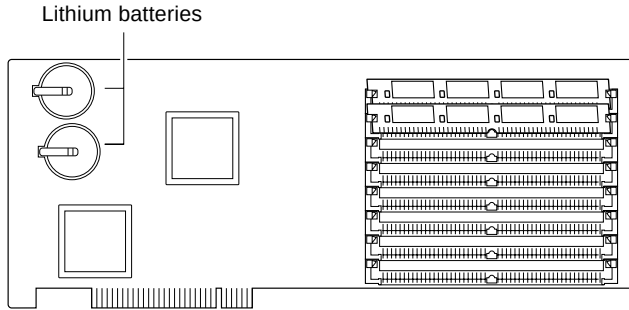
The NVRAM adapter has two lithium batteries. Replacing the NVRAM lithium batteries consists of the following two procedures.

- ◆ “[How to remove the NVRAM lithium batteries](#)” on page 43
- ◆ “[How to install the NVRAM lithium batteries](#)” on page 44

Note

The lithium batteries on the NVRAM adapter differ from the lithium battery used on the motherboard. The batteries for the NVRAM adapter and the motherboard cannot be interchanged.

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.

How to remove the NVRAM lithium batteries: Follow these steps to remove the NVRAM lithium batteries.

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. The following figure illustrates how to remove a battery from a battery holder. Caution Do not bend the metal clip because this can damage the connection between the battery and the NVRAM adapter.

Step	Action
2	Dispose of the old batteries according to the manufacturer's instructions that come with the replacement batteries.

How to install the NVRAM lithium batteries: Follow these steps to install the NVRAM lithium batteries.

WARNING —————
There is danger of explosion if a battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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	Return to " How to install an expansion adapter " on page 34 to complete the installation.

Overview of this chapter

About this chapter

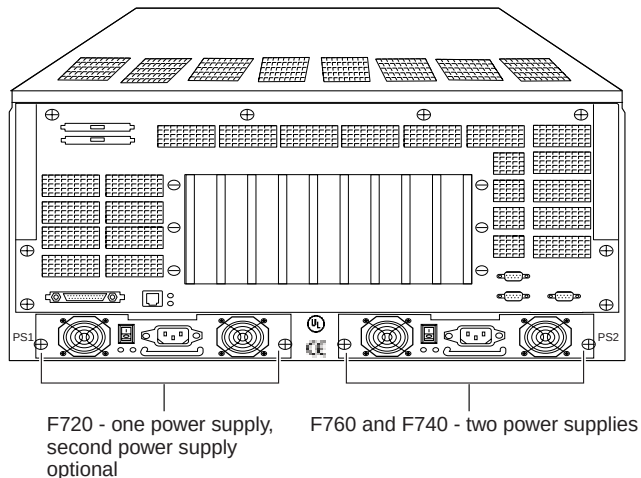
This chapter describes the procedures for removing and installing the power supply in the NetApp F700 series.

Note

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

Locating the power supply unit

The following figure shows the power supply location.



Chapter contents

This chapter discusses the following topics:

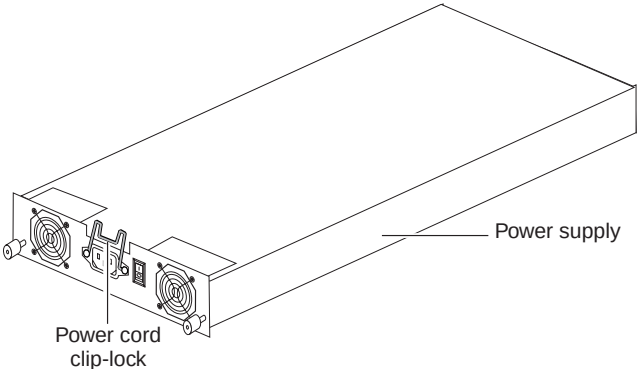
- ◆ “[Removing the power supply](#)” on [page 46](#)
- ◆ “[Installing a new or replacement power supply](#)” on [page 48](#)

Removing the power supply

How to remove a power supply

To remove a NetApp F700 series power supply, follow these steps.

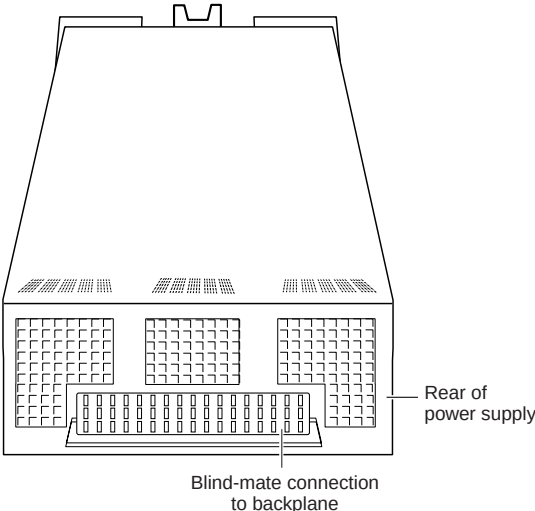
Step	Actions
1	If you have an F720: You have only one power supply unit in the filer, shut down the filer and turn off power to the filer. Caution_____ Always use the halt command to perform a clean shutdown. _____
	If you have and F740 or and F760: Proceed to Step 2 because you have two power supplies that are hot swappable; and there is no need to shut down the filer.
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
3	Put on the antistatic wrist strap and attach the grounding leash to an acceptable grounding unit.
4	Loosen the power supply thumbscrews by turning each thumbscrew counterclockwise.

Step	Actions
5	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 the unit from its bay.
6	Set the power supply aside.

Installing a new or replacement power supply

How to install a power supply

To install a NetApp F700 series power supply, follow these steps

Step	Action
1	Turn the power supply so that its passive interlock power connector faces into the power supply bay on the filer.  Blind-mate connection to backplane Rear of power supply You can only insert the power supply for the NetApp F700 series into the filer power supply bay in one way.
2	Push the power supply, slowly and firmly, into the bay until the power supply is firmly seated in the bay.
3	Turn the thumbscrew clockwise until it stops, to secure the power supply in its bay. Note_____ If the thumbscrews cannot be engaged and you cannot secure the power supply in its bay, then the power supply was inserted the wrong way. _____

Step	Action
4	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
5	Plug the other end of the AC power cord into the power outlet.
6	Turn on the filer.

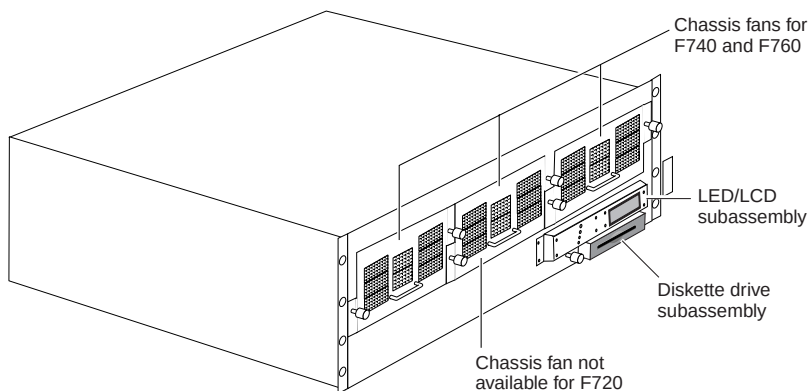
Overview of this chapter

About this chapter

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

Locating the LED /LCD subassembly

The following figure shows the LED/LCD subassembly location.



Chapter contents

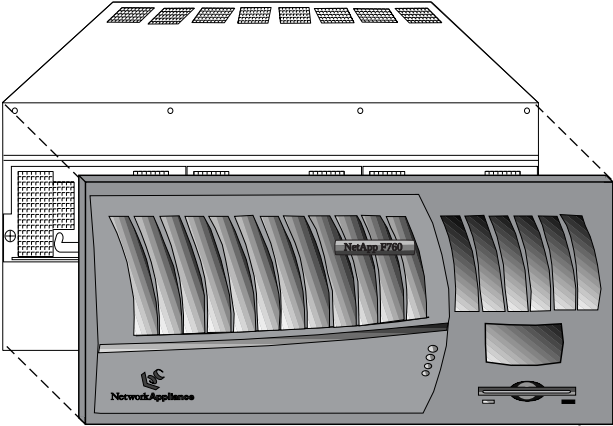
This chapter discusses the following topics:

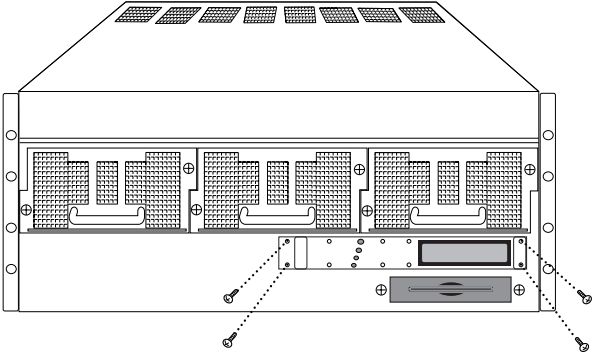
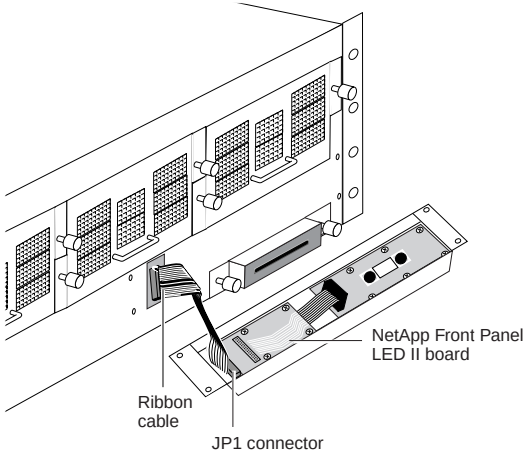
- ◆ [“Removing the LED/LCD subassembly” on page 52](#)
- ◆ [“Installing the replacement LED/LCD subassembly” on page 54](#)

Removing the LED/LCD subassembly

How to remove the LED/LCD subassembly

To remove the LED/LCD subassembly, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution_____ Always use the halt command to perform a clean shutdown. _____
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
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. A technical line drawing of a Network Appliance Filer. The front panel features a large, curved, ribbed bezel. To the left of the bezel, a dashed line indicates its removal path. To the right, a small rectangular panel is shown being pulled away from the main bezel. The bezel has the 'NetApp F760' label on the right side and the 'Network Appliance' logo on the left. The main body of the filer is shown behind the bezel, with various ports and components visible.
4	Wear the antistatic wrist strap and attach the grounding leash to acceptable grounding unit.

Step	Action
5	Using a #1 Phillips screwdriver, 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 hole in the chassis front panel. 
7	Unplug the LED ribbon cable from the JP1 connector.
8	Set the LED/LCD subassembly aside.

Installing the replacement LED/LCD subassembly

How to install the LED/LCD subassembly

To install the LED/LCD subassembly, follow these steps.

Step	Action
1	Plug the LED ribbon cable to the JP1 connector of the replacement LED/LCD subassembly
2	Feed the cable back through the hole in the filer front panel as you push the LED/LCD subassembly against the filer front panel.
3	Insert and tighten the four panhead screws to secure the LED/LCD subassembly to the chassis front panel.
4	Align the pins on the bezel with the holes on the front panel of the filer, and then push the bezel straight onto the front panel.
5	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
6	Turn on the filer.

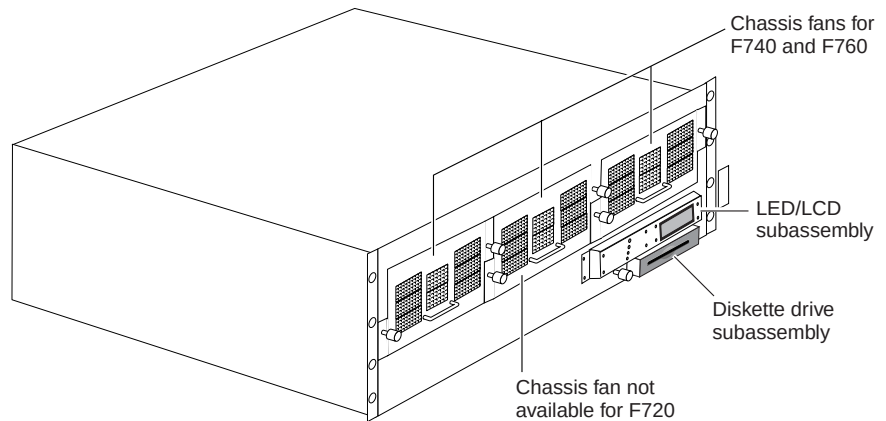
Overview of this chapter

About this chapter

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

Locating the diskette drive subassembly

The following figure shows the diskette drive location.



Chapter contents

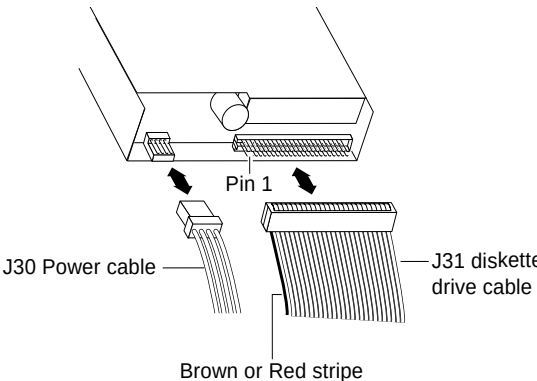
This chapter discusses the following topics:

- ◆ “[Removing the diskette drive subassembly](#)” on [page 56](#)
- ◆ “[Installing a replacement diskette drive subassembly](#)” on [page 57](#)

Removing the diskette drive subassembly

How to remove the diskette drive subassembly from the filer

To remove the diskette drive subassembly, follow these steps.

Step	Action
1	Shut down the filer and turn off power to the filer. Caution _____ Always use the halt command to perform a clean shutdown. _____
2	Lift up the clip lock and unplug the AC power cord from the filer power supplies.
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 acceptable grounding unit.
5	Loosen the two thumbscrews on the diskette drive subassembly.
6	Pull the diskette drive subassembly out of the drive bay.
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 connector on the back of the diskette drive.

Installing a replacement diskette drive subassembly

How to install a diskette drive subassembly into the filer

To install a replacement diskette drive subassembly into the filer, follow these steps.

Step	Action
1	Plug the diskette drive cable connector (J31) into the data connector on the back of the replacement diskette drive. The red stripe on the ribbon cable aligns with pin 1 on the connector.
2	Plug the power cable connector (J30) into the power connector on the back of the replacement diskette drive. The power cable connector is keyed to connect to the diskette drive power connector in only one way.
3	Turn the replacement diskette drive subassembly so that its rails align with the grooves in the drive bay. The diskette drive subassembly is keyed to fit in the drive bay in only one way.
4	Slide the replacement diskette drive subassembly into the drive bay.
5	Tighten the two thumbscrews to secure the replacement diskette drive subassembly to the chassis.
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	Plug the AC power cord into the AC power cord receptacle on the power supply and secure it with the clip lock.
8	Turn on the filer.

Overview of this chapter

About this chapter

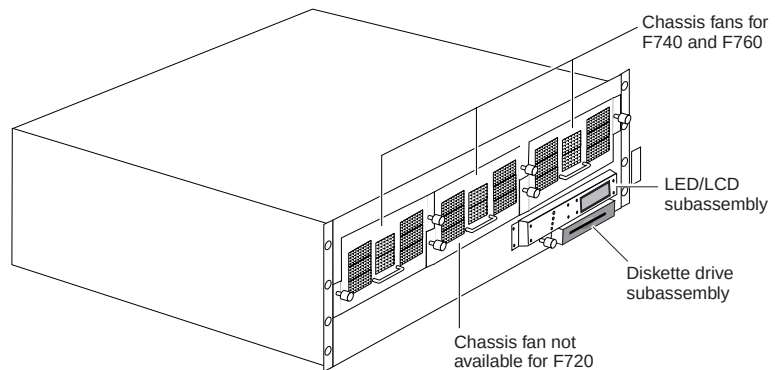
This chapter describes the procedures for removing and installing a fan subassembly. An F720 filer has two fan subassemblies to circulate air through the chassis; the F740 and F760 filers have three fan subassemblies. The fans are secured to the front of the chassis.

Note

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

Locating the fan subassembly

The following figure shows the fan subassembly locations.



Chapter contents

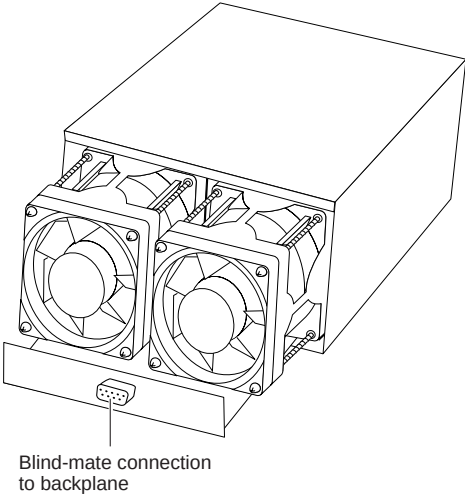
This chapter discusses the following topics:

- ◆ [“Removing the chassis fan subassembly” on page 60](#)
- ◆ [“Installing the chassis fan subassembly” on page 61](#)

Removing the chassis fan subassembly

About this section This section describes how to remove a fan subassembly from the chassis of any F700 series filer.

How to remove the fan assembly To remove the fan assembly, follow these steps.

Step	Actions
1	Use the grooves on the left and right edges of the front bezel and pull it straight off the front panel of the filer.
2	Loosen the thumbscrews on the fan assembly.
3	Using the handle, pull the fan assembly straight out of the filer chassis. 
4	Set the fan assembly aside.
5	Proceed to “How to install a fan assembly” on page 61.”

Installing the chassis fan subassembly

About this section

This section describes how to install a fan subassembly into the chassis of any F700 series filer.

How to install a fan assembly

To install a new or replacement fan assembly, follow these steps.

Step	Actions
1	Using the handle, slide the fan subassembly straight into the filer chassis.
2	Tighten the thumbscrews to secure the 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 fans are operating.

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