

Field Service Guide for the NetApp F200 and F300 Series

Network Appliance, Inc.
2770 San Tomas Expressway
Santa Clara, CA 95051
Tel: (408) 367-3000
Fax: (408) 367-3151
Support tel: (888) 4-NETAPP
Support email: support@netapp.com
Information email: info@netapp.com
Web: <http://www.netapp.com>

Part number 210-01383
May 1997

Copyright

Copyright © 1997 Network Appliance, Inc. All rights reserved. Printed in the U.S.A.

No part of this book covered by copyright may be reproduced in any form or by any means — graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system — without prior written permission of the copyright owner.

Network Appliance reserves the right to change any products described herein at any time, and without notice. Network Appliance assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by Network Appliance. The use and purchase of this product do not convey a license under any patent rights, trademark rights, or any other intellectual property rights of Network Appliance.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademarks

FAServer is a registered trademark in the U.S.A. and other countries, and Data ONTAP, NetApp, Network Appliance, the Network Appliance logo, and WAFL are trademarks of Network Appliance, Inc.

Digital is a trademark of Digital Equipment Corporation. NFS and SunOS are registered trademarks of Sun Microsystems, Inc. Ethernet is a registered trademark of Xerox Corporation.

All other products or services mentioned in this document are identified by the trademarks, service marks, or product names as designated by the companies who market these products. Inquiries concerning such trademarks should be made directly to those companies.

Communications regulation information

Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the users will be required to correct the interference at their own expense.

Cables

To maintain compliance with applicable emission standards, use cables shielded with metallic RFI/EMI connector hoods on this device.

Canada notice

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

Avis Canadien

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

BZT Hinweis

Hiermit wird bescheinigt, daß dieses Gerät in Übereinstimmung mit den Bestimmungen der BAPT-AmtsblVfg 243/1991 funkentstört ist. Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung.

Dem Bundesamt für Zulassungen in der Telekommunikation wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

Safety warnings

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

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

The DRAM single in-line memory modules (SIMMs), NVRAM card, system board, and many other components are susceptible to damage from static electricity. Except when servicing the power supply, leave the computer plugged in and connect a wrist strap from your wrist to the frame of the computer whenever you are working inside the equipment.

Table of Contents

Preface	xi
Chapter 1:	
Introduction.....	1-1
The NetApp F200 and F300 cabinet.....	1-2
Cabinet	1-2
Power supply.....	1-7
System board	1-8
Expansion cards.....	1-8
Tools and equipment	1-9
Chapter 2:	
System Boards	2-1
System board features	2-2
Replacing the system board	2-17
Chapter 3:	
Expansion Cards	3-1
Expansion cards	3-2
SCSI cards.....	3-2
Network cards	3-2
NVRAM card	3-3
Preparing expansion cards.....	3-4
Narrow SCSI card	3-4
NVRAM card	3-5
Installing or replacing expansion cards	3-9
Replacing or removing an existing card	3-9
Installing a new expansion card	3-12

Chapter 4:	
Diskette Drive and Internal Tape Drives	4-1
Storage device types	4-2
Preparing internal tape drives	4-2
Exabyte EXB-8505XL tape drive	4-3
Hewlett Packard DAT drive.....	4-5
Digital DLT drive	4-7
Replacing diskette or internal tape drives	4-10
Replacing the diskette drive.....	4-10
Replacing an internal tape drive	4-13
Chapter 5:	
Power Supplies and Fans.....	5-1
Replacing the power supply	5-2
Checking power supply output voltages.....	5-4
Replacing the fans.....	5-5
Chapter 6:	
LCD Control Panel.....	6-1
Removing the LCD control panel.....	6-3
Installing the LCD control panel	6-5
Index.....	I-1

List of Figures

Figure 1-1. The NetApp F330 cabinet with its door closed	1-2
Figure 1-2. NetApp F330 cabinet front panel with its bezel and door removed	1-3
Figure 1-3. Removable units on the NetApp F330 front panel	1-4
Figure 1-4. NetApp F330 control panel	1-5
Figure 1-5. NetApp F330 cabinet back panel	1-6
Figure 1-6. Removable units on the NetApp F330 back panel	1-7
Figure 2-1. The NetApp F330 system board	2-3
Figure 2-2. SIMM sockets on the system board	2-6
Figure 2-3. System board carrier thumbscrews	2-7
Figure 2-4. Opening the NetApp F330 system board carrier	2-8
Figure 2-5. Removing SIMMs	2-9
Figure 2-6. Installing SIMMs	2-10
Figure 2-7. Clock module and SRAM module locations	2-11
Figure 2-8. Removing the module	2-12
Figure 2-9. Inserting the replacement module	2-13
Figure 2-10. Disconnecting the CPU fan power cable	2-14
Figure 2-11. Removing the CPU fan and heat sink	2-15
Figure 2-12. Installing the CPU fan and heat sink	2-16
Figure 2-13. System board carrier thumbscrews	2-17
Figure 2-14. Opening the NetApp F330 system board carrier	2-18
Figure 2-15. Disconnecting the internal tape drive SCSI cable	2-19
Figure 2-16. Disconnecting the internal SCSI 0 connector cable ...	2-20
Figure 2-17. Disconnecting NetApp F330 system board cables	2-22
Figure 2-18. Removing the system board carrier	2-23

Figure 2-19. Removing the faceplate screw and hot swap cable from the SCSI card	2-25
Figure 2-20. Removing an expansion card.....	2-26
Figure 2-21. NetApp F330 back panel	2-27
Figure 2-22. NetApp F330 system board mounting screws	2-27
Figure 2-23. Removing the NetApp F330 system board.....	2-28
Figure 2-24. Disconnecting the serial connector cables.....	2-29
Figure 2-25. Disconnecting the internal SCSI 0 connector cable ...	2-30
Figure 2-26. Installing the NetApp F330 system board carrier	2-32
Figure 3-1. Narrow SCSI card active termination jumpers	3-4
Figure 3-2. NVRAM card SIMM slots	3-5
Figure 3-3. Installing NVRAM SIMMs.....	3-6
Figure 3-4. Replacing the lithium batteries	3-8
Figure 3-5. NetApp F330 back panel.....	3-9
Figure 3-6. Sliding out the NetApp F330 system board carrier	3-10
Figure 4-1. EXB-8505XL connectors and SCSI ID jumpers	4-3
Figure 4-2. Removing the EXB-8505XL terminating resistors	4-4
Figure 4-3. HP C1533A connectors and jumpers	4-5
Figure 4-4. HP C1533A option switches.....	4-6
Figure 4-5. DLT2000 and 4000 SCSI ID jumper locations	4-7
Figure 4-6. DLT2000 and 4000 bus termination jumpers	4-8
Figure 4-7. Removable media drive bays	4-10
Figure 4-8. Diskette drive assembly.....	4-11
Figure 4-9. Disconnecting the diskette drive cables	4-12
Figure 4-10. Removing the diskette drive from the carrier.....	4-12
Figure 4-11. EXB-8505XL tape drive assembly.....	4-14
Figure 4-12. Disconnecting the EXB-8505XL tape drive cables	4-15
Figure 4-13. Removing the tape drive from the carrier	4-15

Figure 4-14. Inserting the tape drive into the carrier.....	4-16
Figure 4-15. HP C1533A DAT drive assembly.....	4-17
Figure 4-16. Disconnecting the DAT drive cables.....	4-18
Figure 4-17. Removing the DAT drive from the carrier	4-18
Figure 4-18. Inserting the DAT drive into the carrier.....	4-19
Figure 4-19. Digital DLT drive assembly	4-20
Figure 4-20. Disconnecting the tape and diskette drive cables.....	4-21
Figure 4-21. Separating tape drive carrier from diskette carrier.....	4-22
Figure 4-22. Removing the DLT drive from the carrier	4-23
Figure 5-1. Power supply location in the cabinet.....	5-2
Figure 5-2. Removing the power supply.....	5-3
Figure 5-3. NetApp F300 series system board power connectors.....	5-4
Figure 5-4. Cabinet fans.....	5-5
Figure 5-5. Removing the fan tray.....	5-6
Figure 5-6. Disconnecting the fan tray power cable	5-7
Figure 6-1. LCD control panel.....	6-2
Figure 6-2. LCD control panel connections.....	6-2
Figure 6-3. Removing the LCD control panel power switch screws .	6-3
Figure 6-4. Disconnecting the power cable from the switch	6-4

List of Tables

Table 2-1. System board memory combinations	2-6
Table 2-2. Expansion card internal cable checklist	2-24
Table 3-1. Expansion card internal cable checklist	3-11

Preface

About this guide

This guide describes field service procedures for replacing, upgrading, and maintaining hardware components in all models of the Network Appliance NetApp™ F200 and F300 series.

In addition to service procedures, this guide provides information on preparing internal tape drives for installation in NetApp F200 and F300 series filers.

This guide is organized as follows:

Chapters	Provide information on ...
1	Filer features.
2 – 5	Hardware component replacement.

Use this guide in conjunction with the *System Administrator's Guide*, which describes how to operate and manage your filer.

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

The term “filer” applies to all models of the NetApp F200 and F300 series.

The term “FDDI adapter” refers to a network adapter that can be connected to a Fiber Distributed Data Interface (FDDI) network, whether the cable supported is a fiber-optic or twisted-pair cable. To distinguish FDDI adapters with different media types, this guide uses the terms “FDDI-fiber” and “FDDI-TP.”

Command conventions

You can enter filer commands on the system console or on an administration host, which is a client computer that accesses the filer via telnet. When describing commands entered on the administration host, this guide assumes that the host runs the SunOS operating system. The administration host, however, is not required to run SunOS. Refer to the *System Administrator's Guide* for more information about the administration host.

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 <code>arp -d hostname</code> 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 may not be labeled exactly as they are in this guide.)

When describing key combinations, this guide uses the hyphen (-) to separate individual keys. For example, “Ctrl-D” means pressing the Ctrl key while pressing the D key. In addition, this guide uses the term Enter to refer to the key that generates a carriage return, although the key is named Return on some keyboards.

This guide uses the term “type” to mean pressing one or more keys on the keyboard. It uses the term “enter” to mean pressing one or more keys and then Enter.

Special messages

This guide contains special paragraphs denoted by icons in the margin. They 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 equipment, a system crash, or loss of data.



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

Chapter 1: Introduction

This chapter provides an overview of the field replaceable units in the filer models in the NetApp F200 and F300 series.

This chapter includes the following information and procedures:

- an overview of the NetApp F200 and F300 cabinet, including the subsystems that can be replaced in the field
- tools and equipment required for servicing the filer

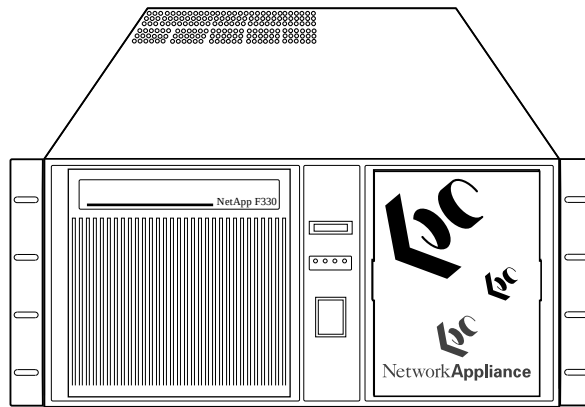


NOTE: This guide uses illustrations of a NetApp F330 to clarify functional and physical descriptions of the filer models in the NetApp F200 and F300 series. From a field service point-of-view, NetApp F200 models differ from NetApp F300 models in only one respect: the number of expansion slots on the system board. The information provided in descriptions and illustrations applies to all of the models in the NetApp F200 and F300 series unless otherwise noted.

The NetApp F200 and F300 cabinet

NetApp F200 and F300 filers use a 19-in rack-mountable cabinet (see Figure 1-1). This cabinet contains the following subsystems and features:

- a PCI (Peripheral Component Interconnect) system board
- PCI expansion cards
- storage device bays for removable-media storage devices
- one power supply
- a fan tray containing four fans



FAS.06a

Figure 1-1. The NetApp F330 cabinet with its door closed

Cabinet

The cabinet consists of a sheet metal cabinet and chassis. The metal chassis serves as the mounting base for the system board, power supply, expansion cards, and removable-media storage devices, and also provides EMI shielding. All of the major subsystems can be removed from the cabinet and replaced without opening the cabinet itself. If required, you can remove the top panel from the cabinet for easy access to the chassis and the system components and cabling.

The front of the cabinet is covered by a plastic bezel and a pull-off plastic door. Remove the pull-off door from the cabinet for access to the removable-media storage devices.

Front panel

The front panel of the cabinet (see Figure 1-2) contains the cabinet fan assembly, the cabinet control panel, and the removable media drive bays.

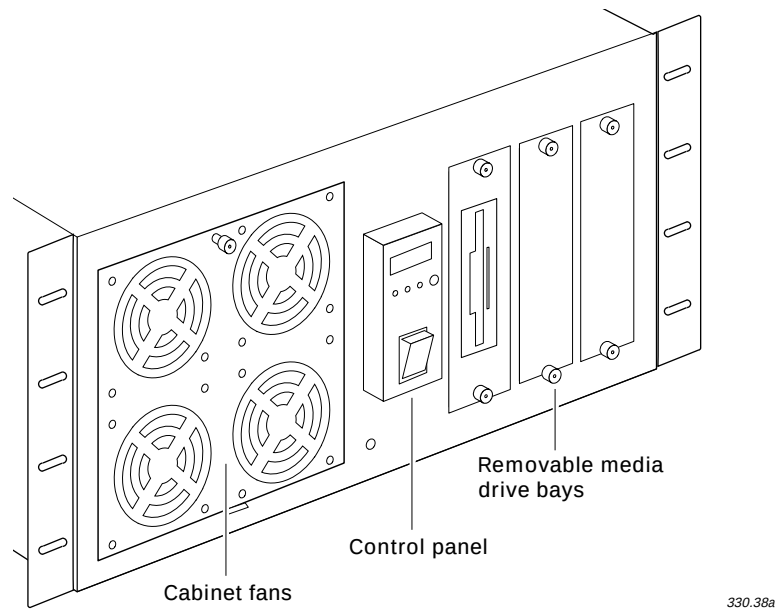


Figure 1-2. NetApp F330 cabinet front panel with its bezel and door removed

The cabinet fans. The cabinet fan assembly consists of four small muffin fans attached to a tilt-out tray set into the front panel of the cabinet (see Figure 1-3). The plastic bezel must be removed to gain access to the fan tray.

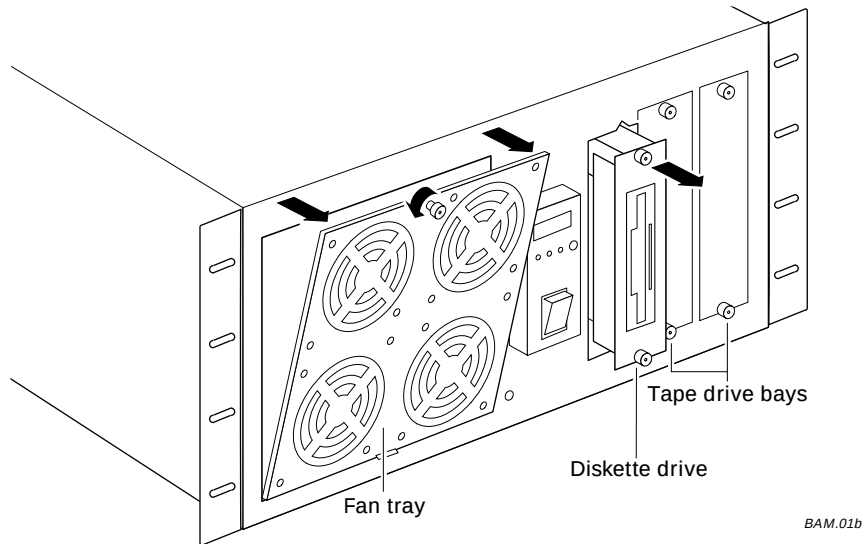


Figure 1-3. Removable units on the NetApp F330 front panel

The control panel. The control panel (see Figure 1-4) consists of an LCD, three LED indicators, an interrupt switch, and the AC power switch.

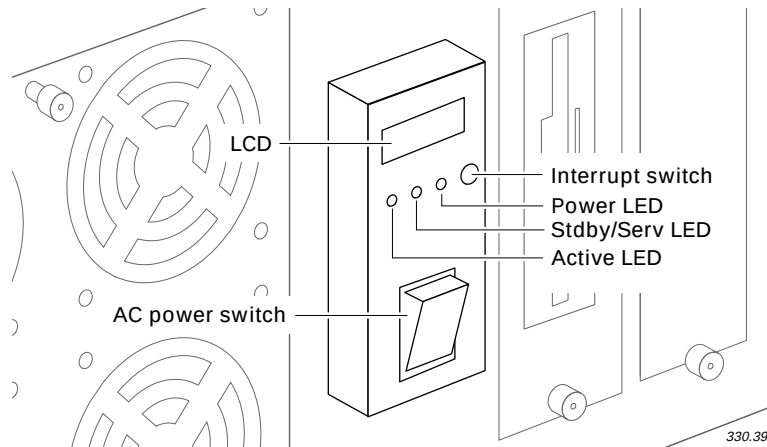


Figure 1-4. NetApp F330 control panel

The LCD is a two line by 16-character alphanumeric display for status and error messages.

The interrupt switch is an unlabeled, recessed push-button switch to the right of the Power LED. Its location is marked by a small access hole in the label. The interrupt switch is reserved for Network Appliance Technical Support for debugging purposes. Use this switch when instructed by Network Appliance Technical Support.

The on/off rocker switch turns AC power on and off.

Removable media drive bays. The cabinet front panel (see Figure 1-3) provides drive bays for three 5.25-in half-height (1.75-in form factor) removable media storage devices. These bays allow frontal access to the diskette drive and internal tape drives (when installed). The diskette drive and internal tape drives (when installed) are mounted on carriers that slide out of the drive bays.

Drive bay 1, the leftmost bay, is used for a 3.5-in diskette drive.

If the system is equipped with a half-height internal tape drive, it is installed in either drive bay 2, the middle bay, or drive bay 3, the rightmost bay. A second half-height tape drive can be installed in the remaining bay.

If the system is equipped with a full-height tape drive option, it occupies both drive bay 2 and 3.

Back panel

The cabinet back panel (see Figure 1-5) contains the power supply and the system board carrier.

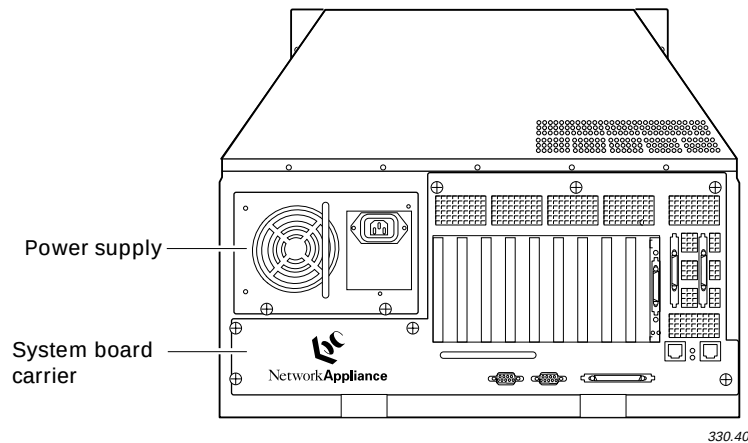


Figure 1-5. NetApp F330 cabinet back panel

The power supply is a removable module that inserts into a bay on the back panel of the cabinet (see Figure 1-6). The system board carrier is a slide-mounted tray that serves as the mounting base for the system board and the expansion cards. The system board carrier can be pulled out of the cabinet like a drawer for access to the system board and expansion cards (see Figure 1-6).

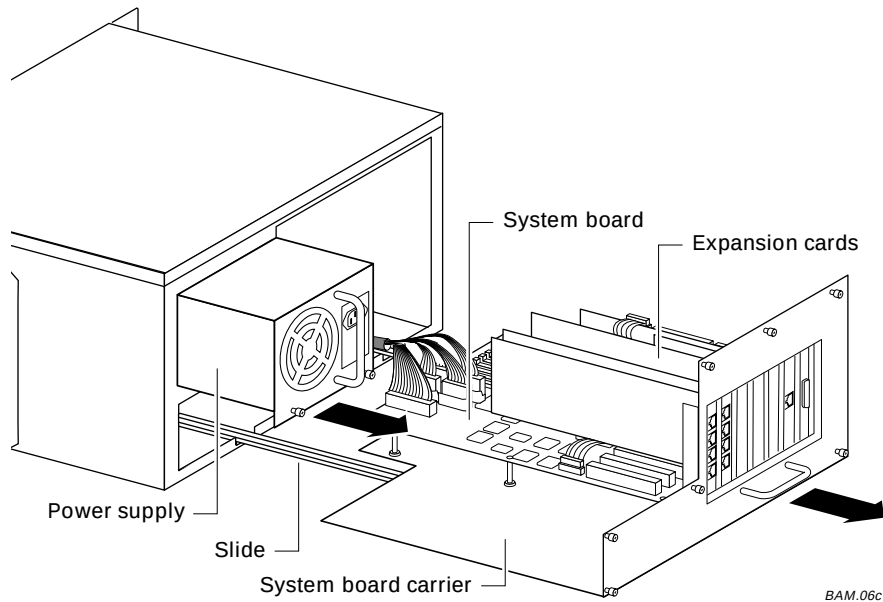


Figure 1-6. Removable units on the NetApp F330 back panel

Power supply

The power supply transforms high-voltage alternating current into the regulated low-voltage direct current required by the system. All DC voltages for the system and the peripherals are provided by the power supply. The power supply contains a fan to provide a flow of cooling air through the power supply.

The power supply features a line fuse, a thermal shutdown in case of fan failure, outputs protected from short-circuits, and over-voltage protection on the +5 VAC output. DC output from the power supply is through blind-mating, self-aligning connectors to power cables to the system board, removable media storage devices, and the cabinet fans. The power supply housing provides an AC line cord receptacle and an auxiliary line output socket.

On some systems, the power supply input range is set through a voltage selection switch accessible from the back panel of the cabinet. The input voltage range can be set to either 115 VAC or 230 VAC. Other systems are equipped with autoranging power supplies that automatically detect the voltage and set the correct range.

System board

The NetApp F200 series and NetApp F300 series use variants of the same NetApp System Board. The two system boards contain different numbers of PCI expansion slots: the system board in NetApp F200 models contains five PCI expansion slots; the system board in NetApp F300 models contains nine PCI expansion slots. Refer to Chapter 1, “System Boards,” for a more detailed description of this system board.

Expansion cards

The filers in the NetApp F200 and F300 series support the following types of expansion cards:

- Ethernet cards, which can be the following types:
 - single-port Ethernet cards for 10Base-T or 100Base-TX connections
 - quad-port Ethernet cards for 10Base-T or 100Base-TX connections
- FDDI cards, which can be the following types:
 - single-attachment FDDI-TP cards
 - single-attachment FDDI-fiber cards
 - dual-attachment FDDI-fiber cards
- ATM cards
- dual-channel single-ended narrow or wide SCSI cards, depending on your filer model
- NVRAM card

Refer to Chapter 3, “Expansion Cards,” for a more detailed description of these cards.

Tools and equipment

Most filer tasks can be performed with the following tools and equipment:

- Phillips screwdrivers, #1 and #2
- small needle-nose pliers
- voltmeter
- antistatic wrist strap and grounding leash



CAUTION: The NetApp filers use 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 cards to the system, check for information about expansion slot assignments at the “NetApp on the Web” (NOW) Web page at <http://now.netapp.com>.

Chapter 2: System Boards

This chapter provides the procedures for upgrading or replacing system boards in the NetApp F200 and F300 series. This chapter includes the following information:

- identifying system board features
- adding or replacing system memory on a system board
- replacing the system board

To replace a system board, you must remove all of the expansion cards and then reinstall them after the new system board has been installed. This chapter describes the general steps for expansion card removal and reinstallation. For more detailed information on expansion cards, refer to Chapter 3, “Expansion Cards.”



CAUTION: The system board, DRAM single in-line memory modules (SIMMs), expansion cards, and many other system components are susceptible to damage from static electricity. We recommend that, except when servicing the power supply, you leave the computer plugged in and connect a wrist strap from your wrist to the frame of the computer whenever you are working inside a filer.

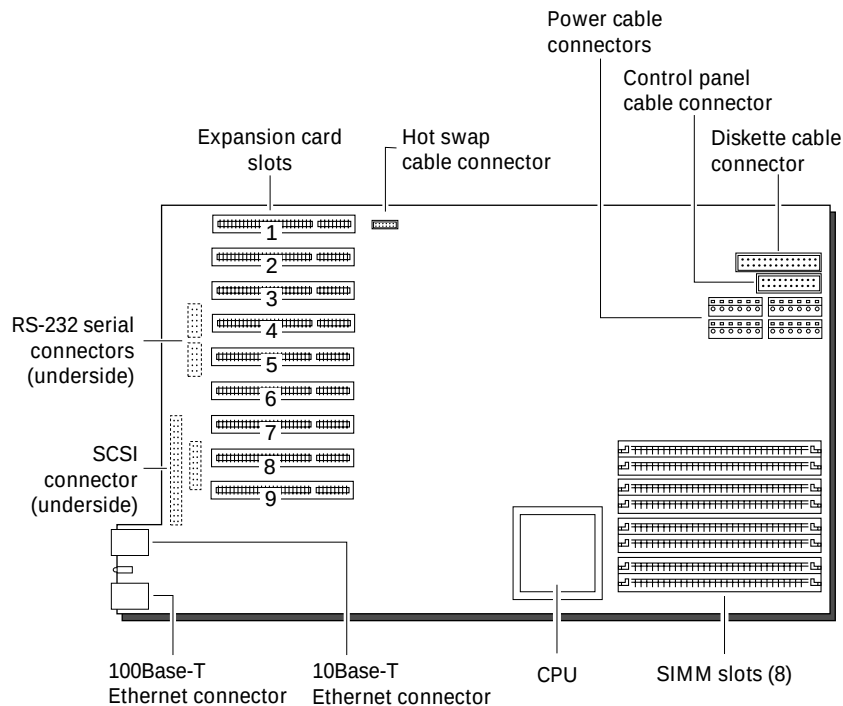
System board features

Filers in the NetApp F200 and F300 series use variants of the same system board. The system board in NetApp F200 models contains five PCI expansion slots; the system board in NetApp F300 models contains nine PCI expansion slots. For service procedures, the system board in NetApp F200 models and the system board in NetApp F300 models can be treated the same.

The system board provides the following major subsystems:

- CPU
- memory
- system interconnections

Figure 2-1 shows the physical layout of the main components on the NetApp F330 system board. The system board for the NetApp F200 has the same layout as the system board shown in Figure 2-1, but does not contain expansion slots 1 through 4. The numbering of the remaining expansion slots remains the same.



330.01

Figure 2-1. The NetApp F330 system board

CPU

The CPU is not a field-replaceable unit.

A small fan and heat sink are mounted on the CPU. The power cable for the CPU fan connects to a pig-tail cable on the system board power supply cable connector labeled J102. This fan must be connected and operating any time the filer is operating.

If the fan fails, the fan and heat sink can be replaced as a unit. The procedure for replacing the CPU fan and heat sink is described in “Replacing the CPU fan” on page 2-14.

Memory

The field-replaceable memory components of the NetApp F200 and F300 system boards include the DRAM system memory, the real-time clock (RTC), and the nonvolatile static RAM module.

DRAM system memory. The system board supports from 64 MB to 256 MB of DRAM system memory, installed as 72-pin, 32-MB SIMMs in eight SIMM sockets on the system board (see Figure 2-1). The procedure for adding memory to the system board is described in “Adding or replacing system memory” on page 2-6.



NOTE: The DRAM SIMMs used in the NetApp F200 and F300 series are different from the SIMMs used in other Network Appliance filers. Do not attempt to install SIMMs from other filers in the NetApp F200 and F300 series.

Real-time clock. The real-time clock contains a built-in lithium battery to maintain the system clock when system power is off. The RTC is a socketed module installed at component location U57 on the system board. The replacement procedure is described in “Replacing the clock and static RAM modules” on page 2-11.

Nonvolatile static RAM (SRAM). The nonvolatile SRAM provides battery-protected storage for system configuration parameters when system power is off. The nonvolatile SRAM is a socketed module installed at component location U60 on the system board. The replacement procedure is described in “Replacing the clock and static RAM modules” on page 2-11.

System interconnections

The system board provides the following system interconnections:

- PCI expansion card slots: nine for the NetApp F300 series; five for the NetApp F200 series

Expansion cards are described in “Expansion cards” on page 3-2.

- an on-board narrow SCSI port, accessed through a 25 x 2 header connector on the underside of the system board

- an on-board IDE diskette drive controller port, accessed through a 17 x 2 connector
- a 10Base-T Ethernet port, accessed through a shielded RJ-45 modular connector
- a 100Base-TX Ethernet port, accessed through a shielded RJ-45 modular connector
- two on-board full RS-232 serial ports, accessed through two 5 x 2 header connectors located on the underside of the back-panel edge of the system board
- a hot swap port from the on-board SCSI port, accessed through a 7 x 2 header connector
- the control panel interface (LCD, LEDs, and interrupt switch), accessed through a 12 x 2 connector
- system board power through four power supply cable connectors

Adding or replacing system memory

All SIMMs installed on the system board must be listed on the Network Appliance Approved Parts List. Do not use unapproved SIMMs.

All SIMMs must be the same type (for example, 32 MB). Do not mix different SIMM types on a system board.

SIMMs must be installed in pairs (one bank). SIMMs are installed in banks in sequence, starting with bank 0 (see Figure 2-2).

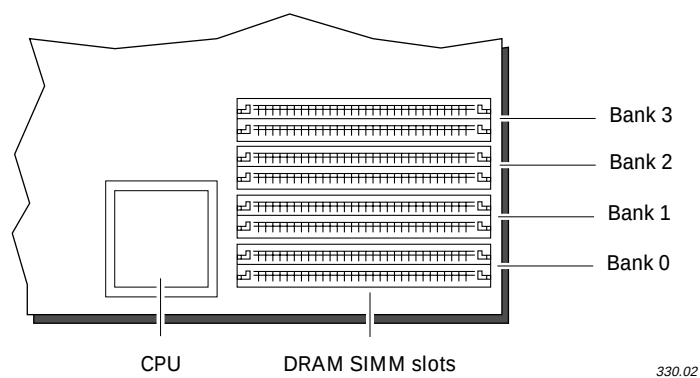


Figure 2-2. SIMM sockets on the system board

Table 2-1 lists memory configurations from 64 MB to 256 MB. These are the configurations that Network Appliance currently supports for the system boards in the NetApp F200 and F300 series.

Table 2-1. System board memory combinations

Total memory	Bank 0	Bank 1	Bank 2	Bank 3
64 MB	Two 32 MB	Empty	Empty	Empty
128 MB	Two 32 MB	Two 32 MB	Empty	Empty

Table 2-1. System board memory combinations (Continued)

Total memory	Bank 0	Bank 1	Bank 2	Bank 3
192 MB	Two 32 MB	Two 32 MB	Two 32 MB	Empty
256 MB	Two 32 MB	Two 32 MB	Two 32 MB	Two 32 MB

You can install SIMMs on the system board without removing it from the filer, but you may need to remove one or more expansion cards to open adequate work space around the SIMM sockets.

To remove and insert SIMMs, follow these steps:

1. Shut down the filer and the disk shelves.
2. Unscrew the seven captive thumbscrews that secure the system board carrier in the cabinet.

Figure 2-3 illustrates the locations of the system board carrier thumbscrews.

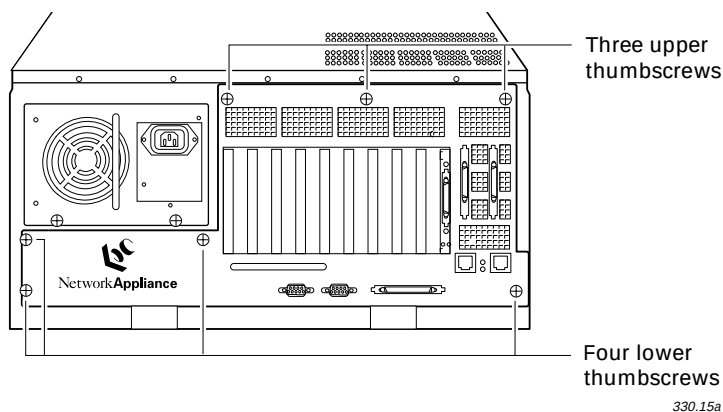


Figure 2-3. System board carrier thumbscrews

3. Slide the system board carrier out of the cabinet until the slides lock.

Figure 2-4 illustrates how to open the system board carrier.

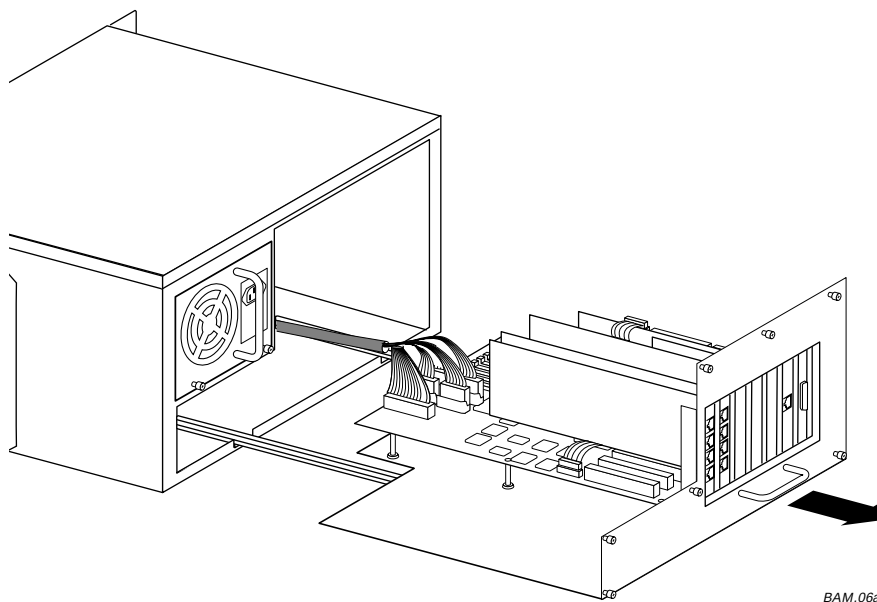


Figure 2-4. Opening the NetApp F330 system board carrier



NOTE: You may need to remove some of the expansion cards for easier access to the system board SIMM sockets. Note the position of all expansion cards before removing them so that you can reinstall them in their original slots after the memory upgrade.

4. Locate the target SIMM sockets (see Figure 2-2).

5. Remove the SIMMs already installed in the sockets.

Figure 2-5 illustrates how to remove a SIMM.

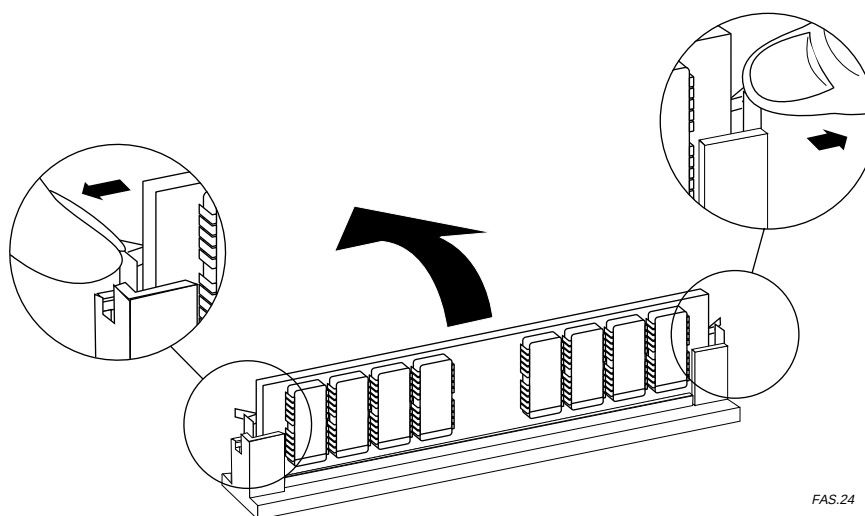


Figure 2-5. Removing SIMMs

- a. Pull outward gently on the spring latch at each end of the SIMM slot.



CAUTION: If you press too hard on the SIMM socket spring latches, you will bend or break the spring latches and make the system board unusable.

- b. Tilt the SIMM away from the spring latches and lift it out of the socket.
 - c. Place the SIMM in an antistatic bag or set it on an antistatic mat.
6. Use the following steps to install the replacement SIMMs or add new SIMMs (see Figure 2-6).

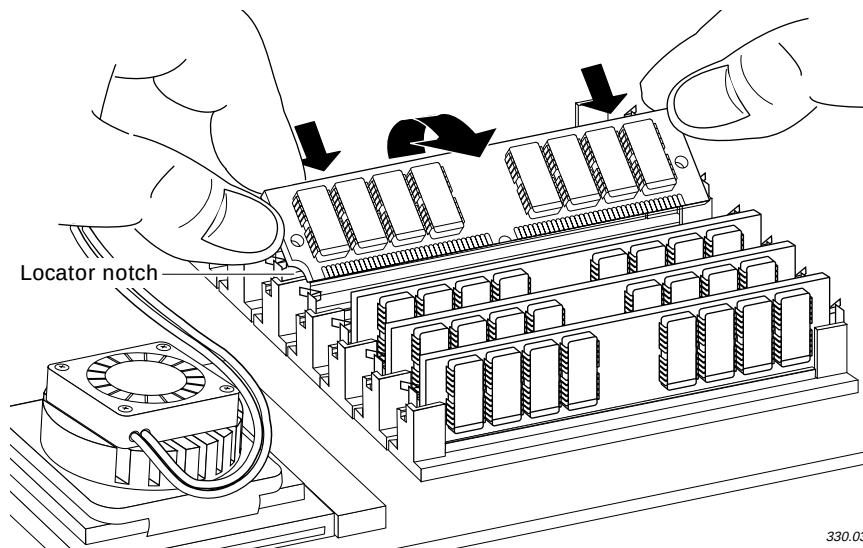


Figure 2-6. Installing SIMMs

- a. Hold the replacement SIMM by its top corners, with the locator notch on the lower left corner of the SIMM toward the CPU (see Figure 2-6).
- b. Align the SIMM at an angle above the socket and set the SIMM gently in the socket.
- c. Swing the SIMM gently upward until it is perpendicular to the system board, the locking pins are in the holes on the SIMM, and the spring latches at either end snap in place, locking the SIMM in position.



CAUTION: If you feel a slight resistance as the SIMM comes to its locking position on the positioning pins, the SIMM may not be seated correctly. Do not force it. Remove the SIMM, reinsert it, wiggle it gently as you press it into the socket, and try to tilt it to its locked position. It is very easy to damage the SIMM socket or break its connections to the system board by forcing the SIMM into its locked position.

7. Reinstall any cards temporarily removed from the filer.
8. Slide the system board carrier in and fasten the thumbscrews.
9. Switch on power.

When you power on the filer, the system runs its system diagnostics. If you added memory to the system, the system automatically detects the additional memory.

Replacing the clock and static RAM modules

The real-time clock module is installed in socket U57 on the system board (see Figure 2-7); the nonvolatile static RAM module is installed in socket U60. The replacement procedure is the same for both modules.

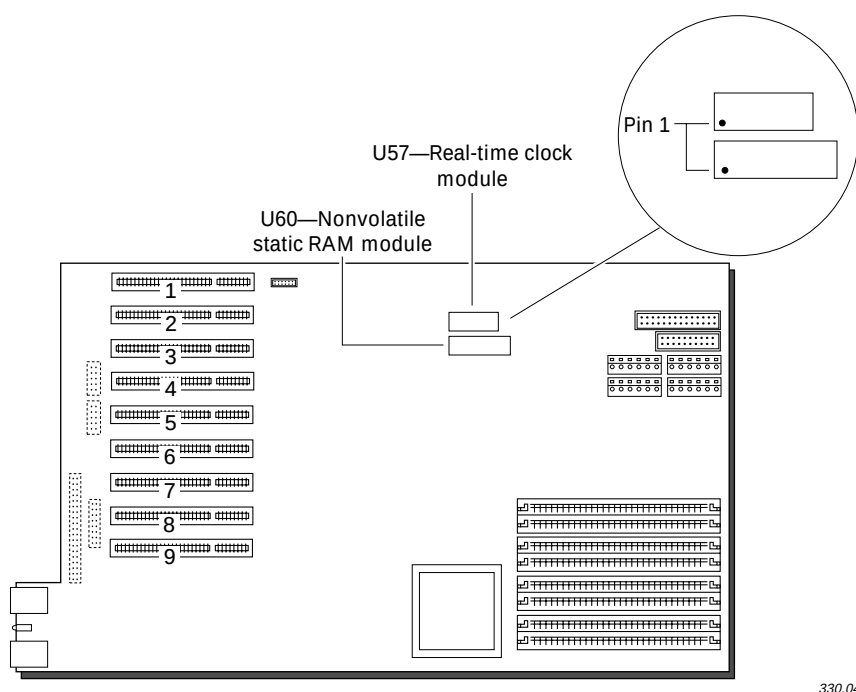


Figure 2-7. Clock module and SRAM module locations

To replace the clock module or the static RAM module, follow these steps:

1. Locate the socket of the module to be replaced (U57 for the clock module; U60 for the static RAM module).
2. Use a small flat-blade screwdriver to lever the ends of the module upward and expose the pins (see Figure 2-8).

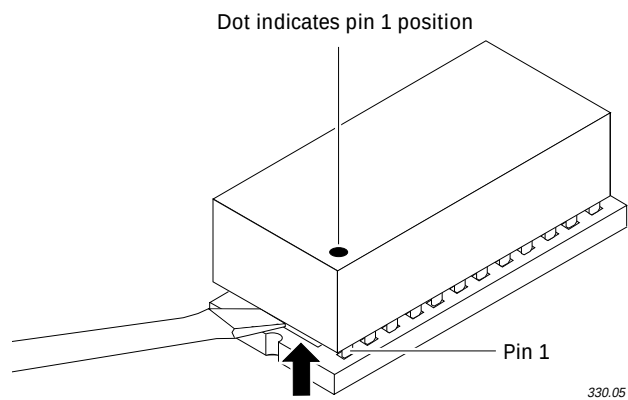


Figure 2-8. Removing the module

3. Grip the module and lift it straight out of the socket.
4. Orient the replacement clock module so that Pin 1 on the clock module is aligned with Pin 1 on the socket (see Figure 2-9).

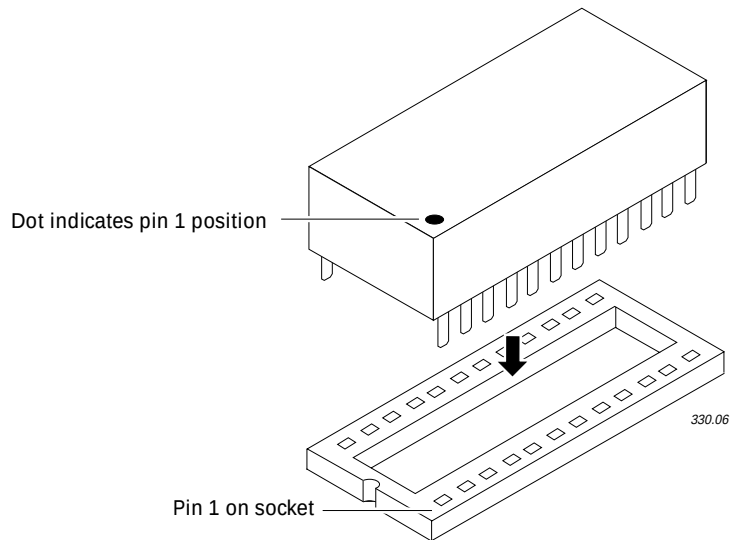


Figure 2-9. Inserting the replacement module

5. Insert the tips of the pins into their holes in the socket, verify that all of the pins are aligned, and then press the module into place.



CAUTION: Only a small amount of pressure is needed to seat the module. If you have to press hard, you are probably bending a pin.

6. Examine the module after you install it to make sure that there are no bent or overhanging pins.



WARNING: These modules contain lithium batteries. Dispose of these modules according to the manufacturer's instructions.

Replacing the CPU fan

To replace the CPU fan, follow these steps:

1. Shut down the filer and the disk shelves.
2. Unscrew the seven captive thumbscrews that secure the system board carrier in the cabinet and slide the system board carrier out of the cabinet until the slides lock.
3. Disconnect the CPU fan power cable (see Figure 2-10).

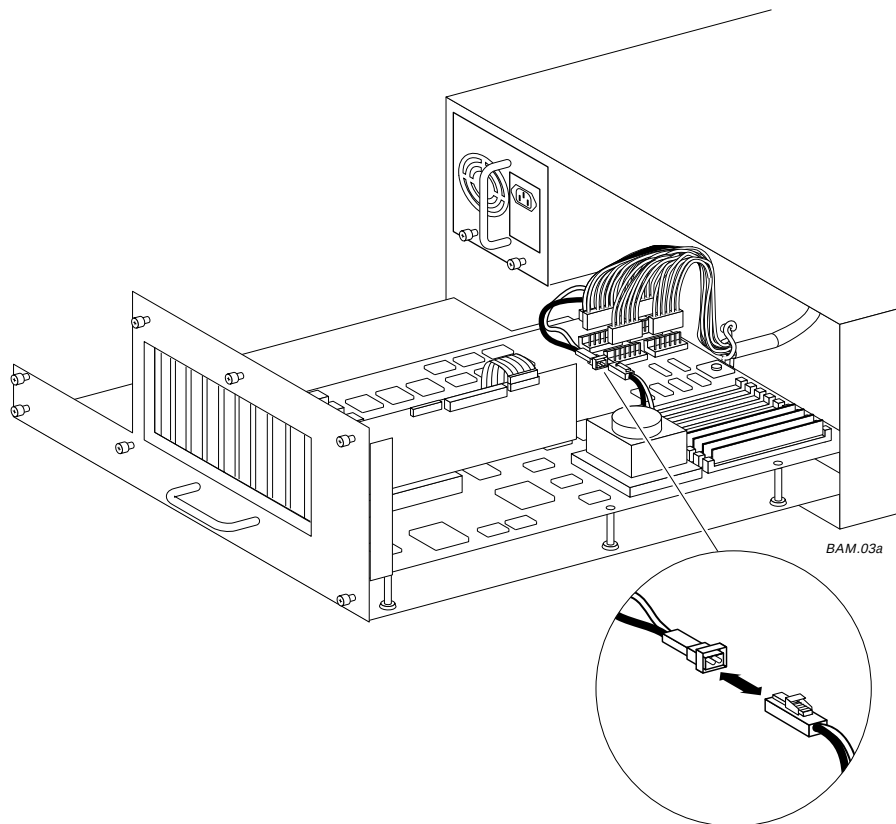


Figure 2-10. Disconnecting the CPU fan power cable

4. Grip the square fan and twist the fan and heat sink counterclockwise a quarter turn (see Figure 2-11).

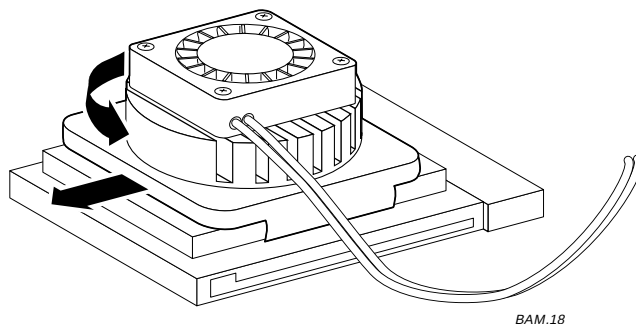


Figure 2-11. Removing the CPU fan and heat sink

Twisting the fan should raise the heat sink from the CPU enough so that you can slide the fan and CPU clamp. If the fan unit does not slide easily, twist the fan counterclockwise another quarter turn.

5. Gently slide the fan unit toward the system carrier back panel and lift it off the CPU.
6. Twist the replacement fan counterclockwise to make the heat sink almost flush with the CPU clamp; do not remove the heat sink from the CPU clamp.
7. Align the CPU clamp on the replacement fan with the side of the CPU, and slide the CPU clamp onto the CPU.

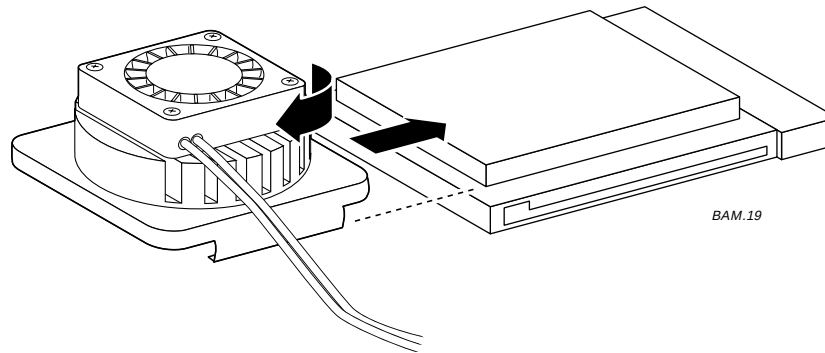


Figure 2-12. Installing the CPU fan and heat sink

8. Center the clamp and fan on the CPU, and gently twist the fan clockwise until the clamp and heat sink will not slide on the CPU.



CAUTION: Do not over-tighten the fan because you might damage the CPU.

Replacing the system board

To replace the system board, follow these steps:

1. Shut down the filer and disk shelves.
2. Unscrew the seven captive thumbscrews that secure the system board carrier in the cabinet (see Figure 2-13).

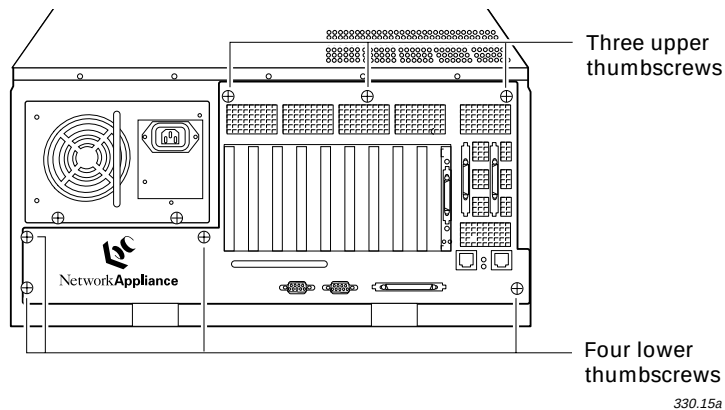


Figure 2-13. System board carrier thumbscrews



NOTE: All of the thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you open the system board carrier.

3. Pull the system board carrier out of the cabinet (see Figure 2-14) until the slide rails lock (18.5 inches of slide travel).

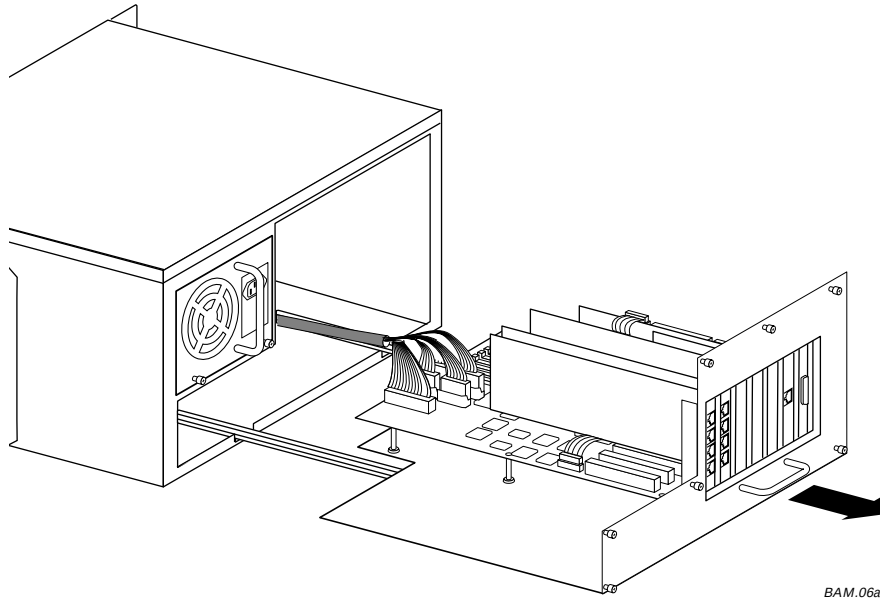


Figure 2-14. Opening the NetApp F330 system board carrier

4. Disconnect the internal SCSI tape drive (if present):

If your filer is equipped with a narrow SCSI card in expansion slot 9 and an internal tape drive, a cable attaches the internal tape drive to the internal SCSI B connector on the card (see Figure 2-15).

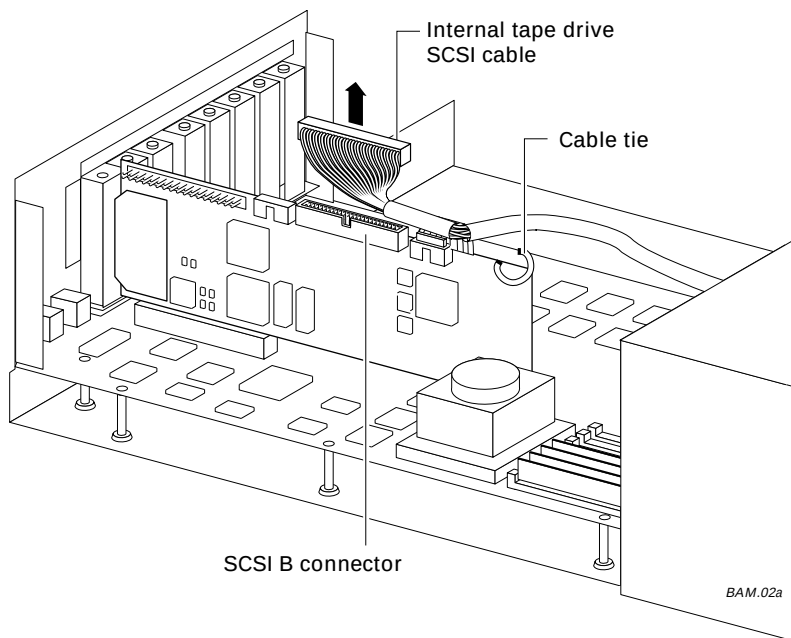


Figure 2-15. Disconnecting the internal tape drive SCSI cable

Disconnect the tape drive SCSI cable from the SCSI B connector on the SCSI card in slot 9 and cut the cable tie holding the cable to the SCSI card.

If your filer is equipped with a wide SCSI card in expansion slot 9 and an internal tape drive, a two-piece cable attaches the internal tape drive to the SCSI 0 connector on the underside of the system board (see Figure 2-16).

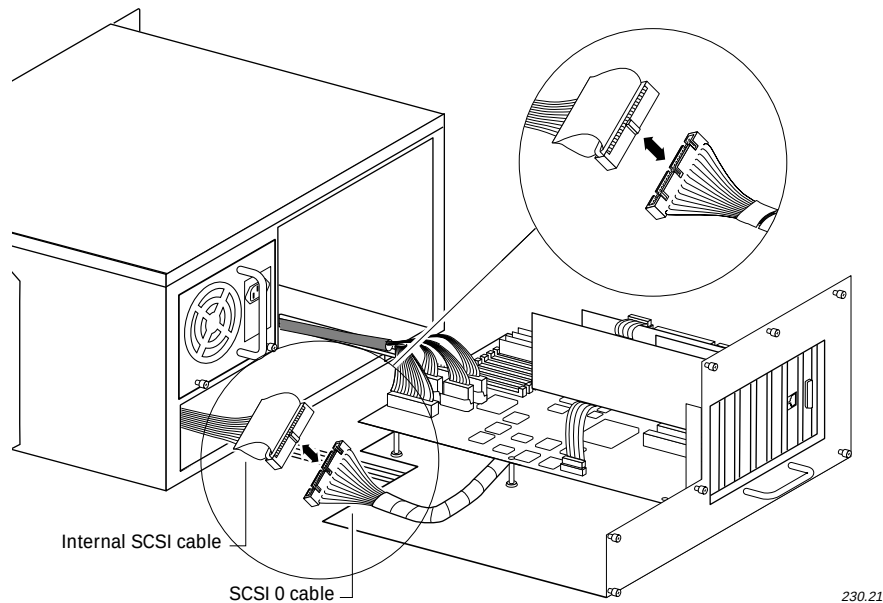


Figure 2-16. Disconnecting the internal SCSI 0 connector cable

Disconnect the internal SCSI cable in the cabinet from the system board SCSI 0 cable as shown in Figure 2-16.

5. Open the cable tie that fastens the system board cable harness and disconnect the power, control panel, diskette, and CPU fan power cable connectors (see Figure 2-17).

There are four 6-pin power cable connectors. The power cable connectors are color-coded to match the system board power connectors. Each power connector is also keyed so that it will fit only the correct system board connector.

The control panel connector is a 24-pin connector. The control panel cable connector and the system board connector are keyed so the cable connector can only be inserted one way.

The diskette data cable is a 34-pin connector. The diskette cable connector and the system board connector are keyed so the cable connector can only be inserted one way.

The CPU fan power cable comes from the white power cable connector that attaches to connector J102. Disconnect the CPU fan power cable by pressing on the connector lock and pulling the connector apart.

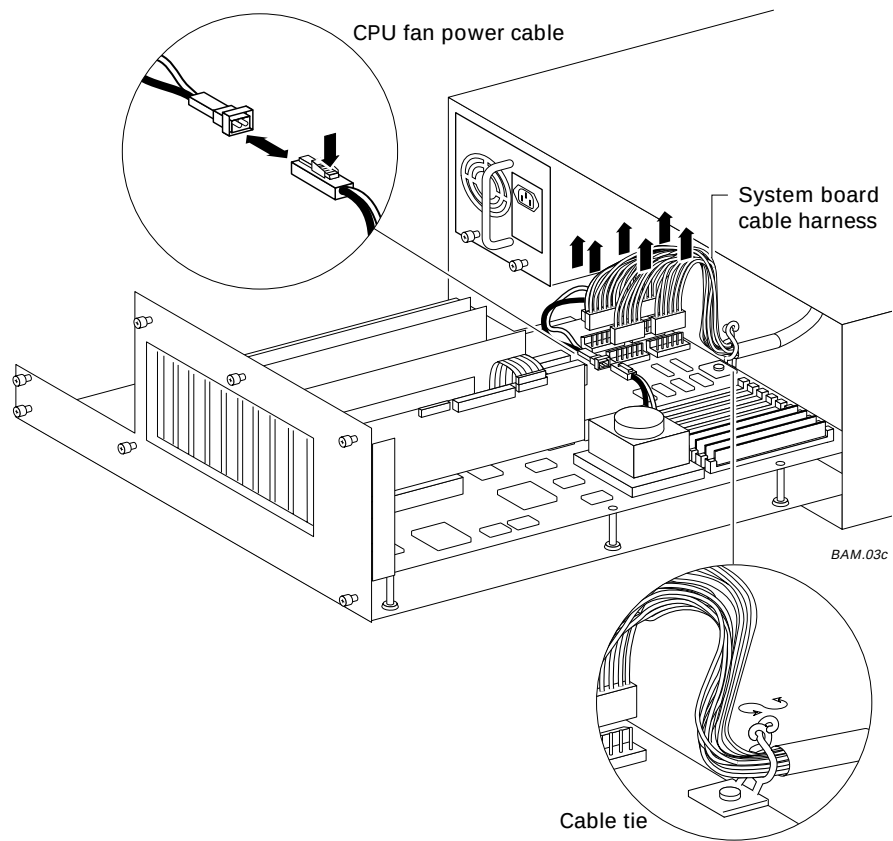
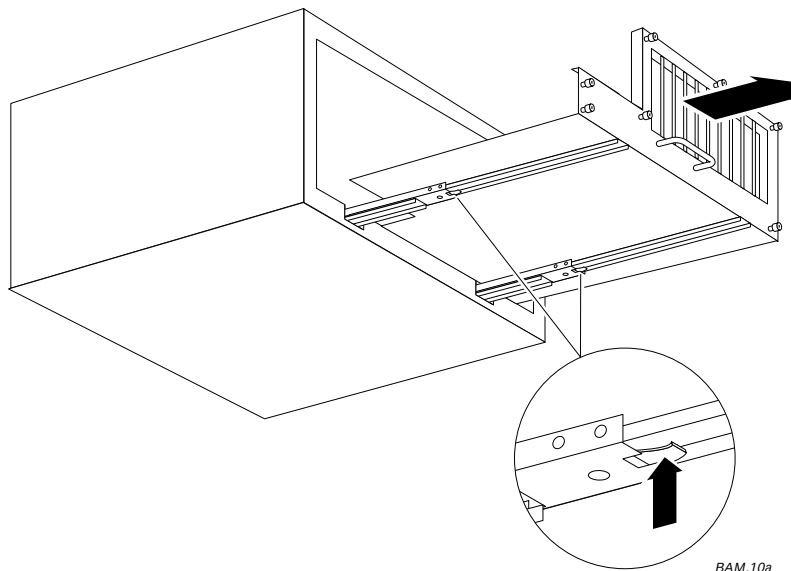


Figure 2-17. Disconnecting NetApp F330 system board cables

6. Remove the system board carrier from the cabinet:
 - a. On the underside of the system board carrier, press in on the slide locks (see Figure 2-18) to release the system board carrier from the slides in the cabinet.



BAM.10a

Figure 2-18. Removing the system board carrier

- b. Support the system board carrier with both hands and pull it off the slides in the cabinet.
7. Remove all of the expansion cards:
 - a. Note which expansion cards are installed in which expansion card slots.
 - b. Note which cables are connected to each expansion card, and then disconnect all cables.

Expansion card internal cabling varies by filer model. Table 2-2 is a checklist of expansion card internal cables.

Table 2-2. Expansion card internal cable checklist

Expansion card	Internal cable connections
Narrow SCSI card in slot 9	With an internal tape drive: a cable from the SCSI card's internal port to the internal tape drive. Without an internal tape drive: a cable from the SCSI card's internal port to the back-panel cable connector adapter (SCSI 9b). A cable from the SCSI card's hot swap connector to the hot swap connector on the system board.
Wide SCSI card in slot 9	A cable from the SCSI card's internal port to the back-panel cable connector card (SCSI 9b). A cable from the SCSI card's hot swap connector to the hot swap connector on system board.

- c. Remove the screws holding the expansion card faceplates to the back panel bracket (see Figure 2-19).

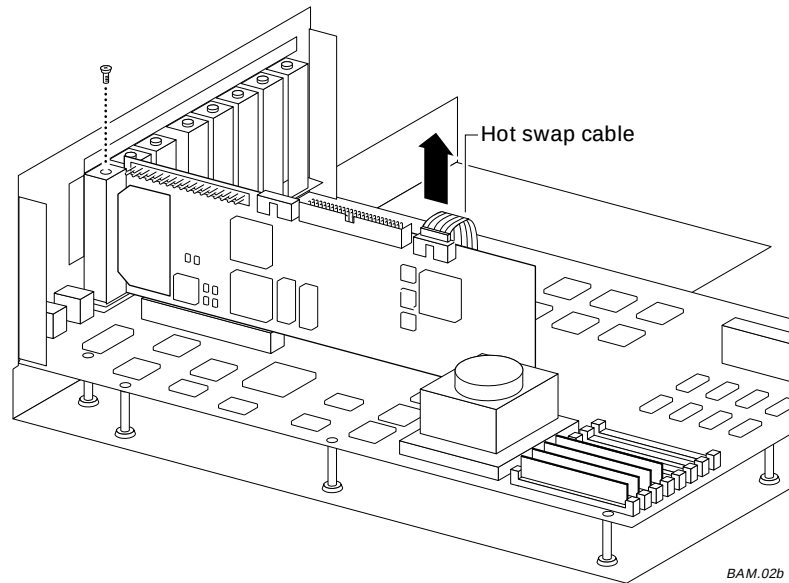


Figure 2-19. Removing the faceplate screw and hot swap cable from the SCSI card

- d. Starting with slot 9, pull upward on the top edge of the expansion card and lift it out of the chassis (see Figure 2-20).

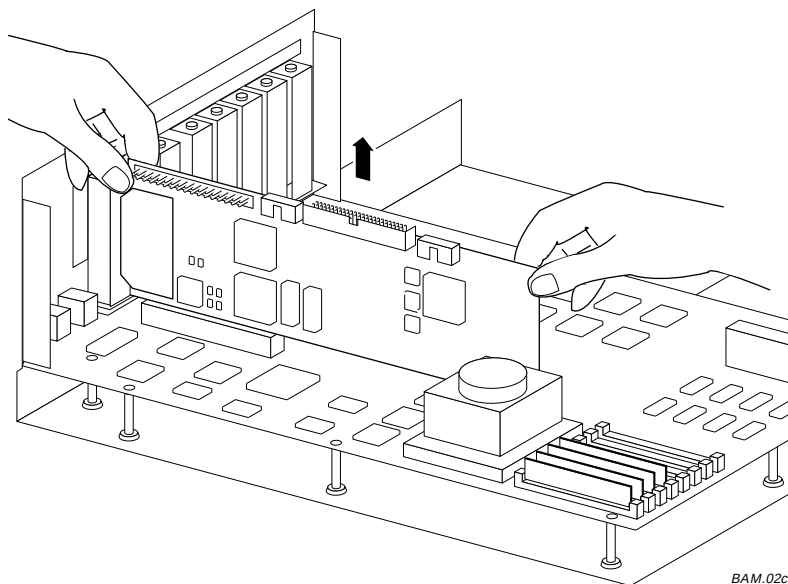


Figure 2-20. Removing an expansion card

- e. Put each expansion card in an antistatic bag and set the expansion cards aside in the order you remove them.

8. If your filer is equipped with a SCSI 0 connector on the back panel (see Figure 2-21), remove the two screws that fasten the SCSI 0 connector to the system board carrier.

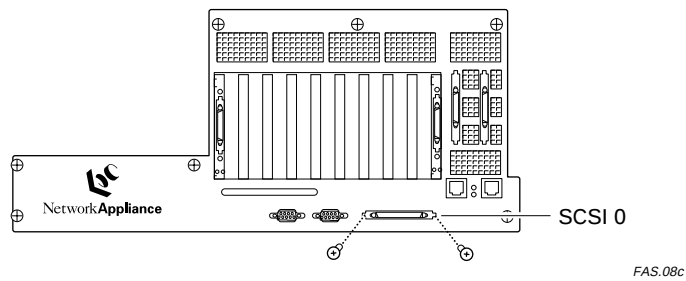


Figure 2-21. NetApp F330 back panel

9. Remove the ten 6-32 $\times$ 3/8 screws that secure the system board to the carrier (see Figure 2-22).

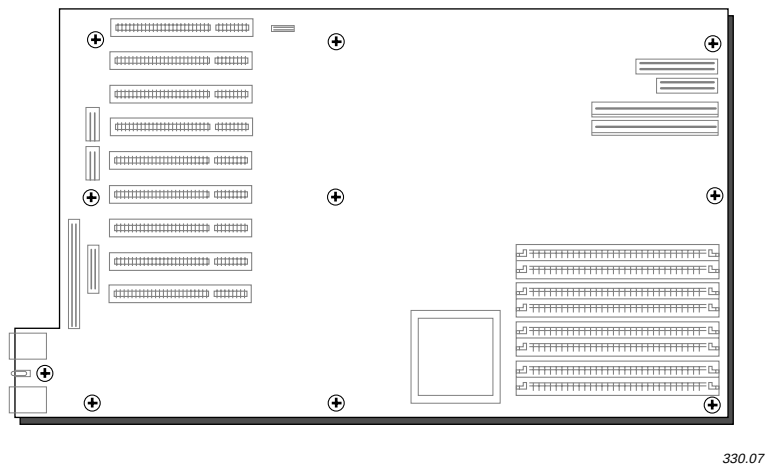


Figure 2-22. NetApp F330 system board mounting screws

The system board is supported by metal stand-offs that are attached to the system board carrier.

10. Remove the system board:

- a.** Pull the system board away from the back panel on the carrier and gently tilt the front-panel edge of the system board up (see Figure 2-23).

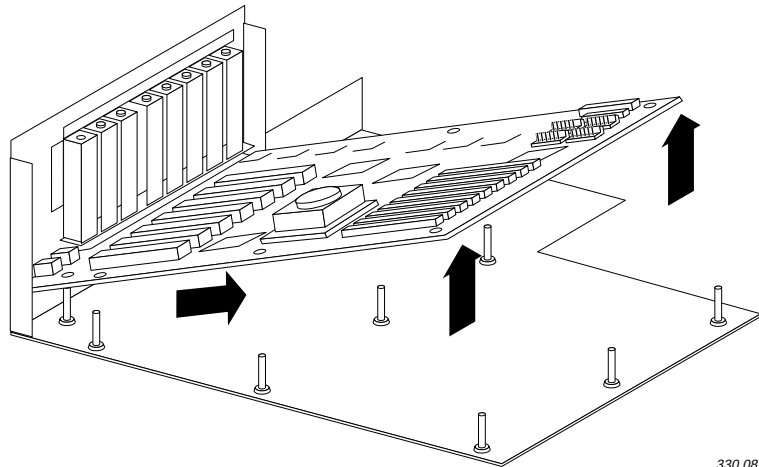


Figure 2-23. Removing the NetApp F330 system board

- b.** Pull the back panel connectors out of their openings, lift the system board up to gain access to the cable connections on the underside of the system board.

- c. Disconnect the serial connector cables from the headers on the underside of the system board (see Figure 2-24).

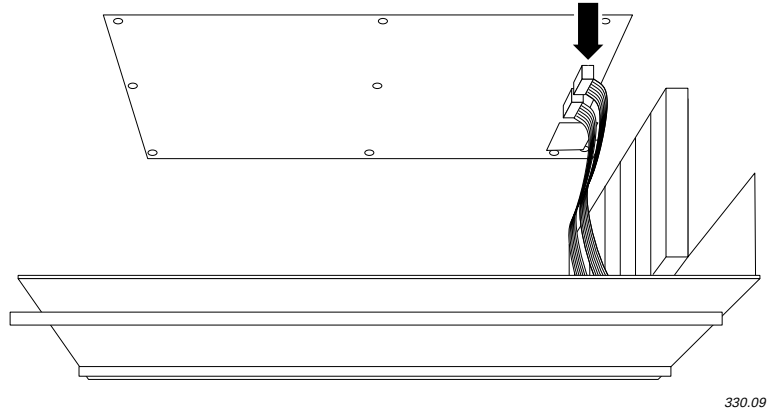


Figure 2-24. Disconnecting the serial connector cables

- d. If your filer is equipped with an internal tape drive cable that attaches to the SCSI 0 connector on the underside of the system board, disconnect the cable from the SCSI 0 connector (see Figure 2-25).

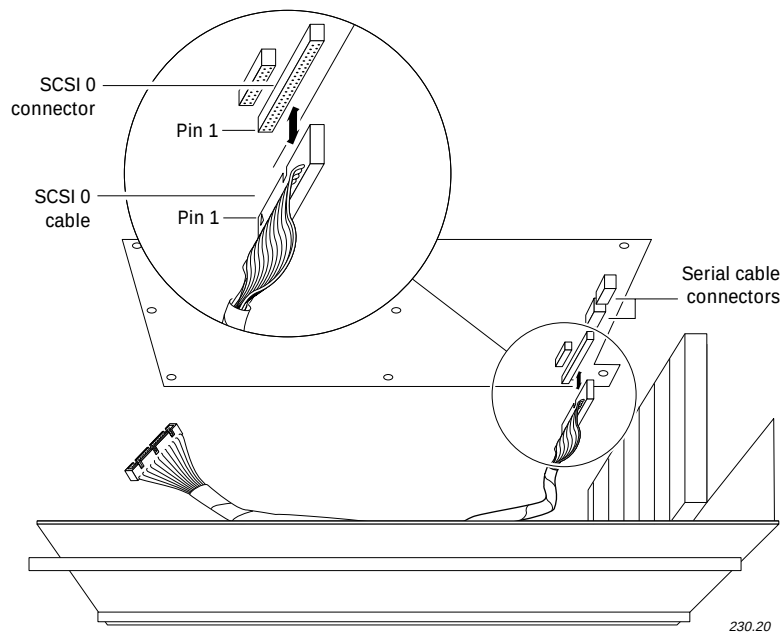


Figure 2-25. Disconnecting the internal SCSI 0 connector cable

- e. Set the system board on an antistatic mat or other static-free working surface.
- 11. Install the new system board:**
- a. If your filer is equipped with an internal tape drive cable that attaches to the SCSI 0 connector on the underside of the system board, attach the cable to the SCSI 0 connector (see Figure 2-25).



CAUTION: Pin 1 on the cable connector is marked by a small triangle on the side of the connector near one end. Pin 1 on the system board SCSI 0 connector is on the end of the connector nearest the Ethernet connectors.

- b.** Connect the serial connector cables to the headers on the underside of the system board (see Figure 2-24).
 - c.** Tilt the system board and gently insert the back-panel connectors in their holes in the back panel on the carrier (see Figure 2-23).
 - d.** Align the system board screw holes with the stand-offs on the carrier and insert — but don't tighten — the 10 screws removed in step 9.
 - e.** If your filer is equipped with a SCSI 0 connector on the back panel, thread the two screws into the SCSI 0 connector and then center the SCSI 0 connector in its hole (see Figure 2-21).
 - f.** Tighten the 10 system board screws.
 - g.** If your filer is equipped with a SCSI 0 connector on the back panel, tighten the two screws on the SCSI 0 connector.
- 12.** If you need to move the SIMMs from the old system board to the new system board, refer to “Adding or replacing system memory” on page 2-6.
- 13.** Reinstall the expansion boards and reconnect all expansion board cables.

14. Reinstall the system board carrier in the cabinet:

- a.** Support the system board carrier with both hands while aligning the carrier slide rails with the slide rails in the cabinet (see Figure 2-26).

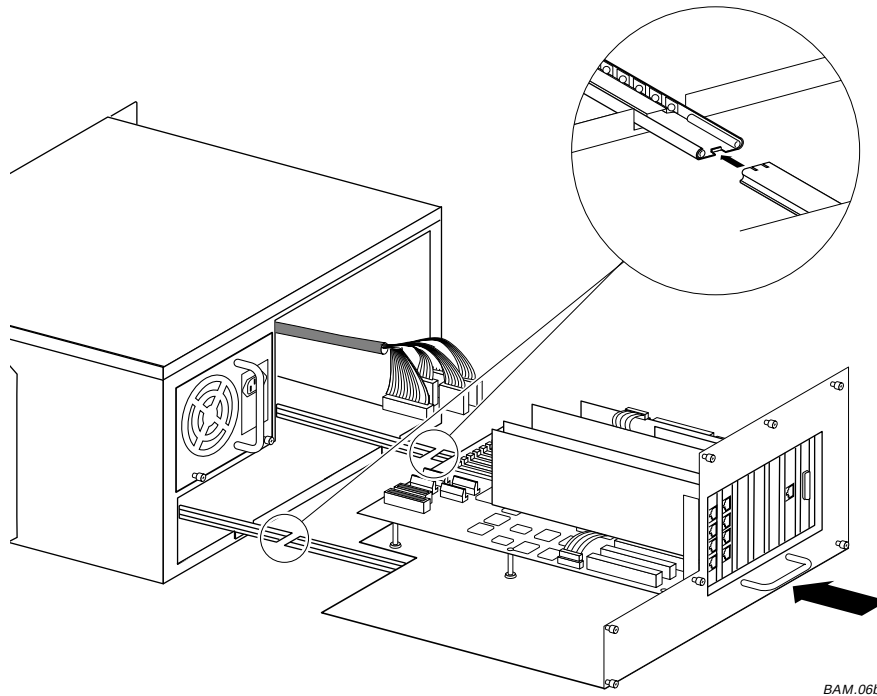


Figure 2-26. Installing the NetApp F330 system board carrier

- b.** When the carrier slide rails are engaged in the cabinet slide rails, push the carrier into the cabinet until the slide locks engage, preventing the carrier from moving.
- 15.** If your filer is equipped with an internal tape drive that attaches to the SCSI 0 connector on the underside of the system board, connect the system carrier SCSI 0 cable (see Figure 2-16) to the internal SCSI cable in the cabinet.

16. Reconnect the system board power, CPU fan, diskette, and control panel cable connectors (see Figure 2-17).



WARNING: The CPU fan must be connected and operating any time the filer is operating; otherwise, the CPU overheats and fails.

17. If the system is equipped with an internal tape drive that attaches to the SCSI B connector on a SCSI card in slot 9, reconnect the tape drive SCSI cable (see Figure 2-15).
18. Check all cables to be sure they are firmly seated.
19. Close and secure the system board carrier:
 - a. Push in on the slide locks on the bottom of the system board carrier (see Figure 2-18).
 - b. Push the system board carrier into the cabinet until the back panel of the carrier is flush with the back panel of the cabinet.
 - c. Fasten the thumbscrews.
20. Reconnect the AC power cord to the filer and power on the filer.

Chapter 3: Expansion Cards

This chapter describes the procedures for installing or replacing expansion cards in filers. This chapter includes the following information:

- Descriptions of expansion cards
- Procedures for preparing expansion cards for installation
- Procedures for adding and replacing expansion cards



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



CAUTION: The system board, DRAM single in-line memory modules (SIMMs), expansion cards, and many other system components are susceptible to damage from static electricity. Except when servicing the power supply, leave the computer plugged in and connect a wrist strap from your wrist to the frame of the computer whenever you are working inside a filer.

Expansion cards

The following expansion card types are used in the NetApp F200 and F300 series:

- SCSI cards
- network cards
- NVRAM card

SCSI cards

Two types of SCSI cards can be installed in the NetApp F200 and F300 series:

- dual-channel, single-ended narrow SCSI card
- dual-channel, single-ended wide SCSI card

Network cards

The NetApp F200 and F300 series filers support the following types of network cards:

- Ethernet (10Base-T and 100Base-TX)
- FDDI-fiber or FDDI-TP
- ATM

Ethernet

The NetApp F200 and F300 series filers can be equipped with the following Ethernet cards:

- single-port 10Base-T or 100Base-TX
- quad-port 10Base-T
- quad-port 10Base-T or 100Base-TX

The Ethernet cards require no preparation before installing them in a NetApp filer.

FDDI-Fiber and FDDI-TP

NetApp F200 and F300 series filers can be equipped with the following FDDI-fiber and FDDI-TP cards:

- single-attachment and dual-attachment FDDI-fiber
- single-attachment and dual-attachment FDDI-TP

The FDDI cards require no preparation before installing them in a NetApp filer.

NVRAM card

The full-length NetApp NVRAM card functions as a battery-backed write cache for incoming write data and NFS requests. The NVRAM card comes with 2 MB of NVRAM and can be upgraded to 4 MB or 8 MB by installing additional pairs of 1-MB SIMMs.



NOTE: The NVRAM SIMMs on the NetApp NVRAM card in the NetApp F200 and F300 series differ from those on NVRAM cards in other Network Appliance filers. Do not attempt to install NVRAM SIMMs from other filers in the NetApp F200 and F300 series. NVRAM SIMMs for the NetApp NVRAM card are available only from Network Appliance.

The cache information is protected against loss by a redundant battery system consisting of two lithium batteries. The power control circuitry monitors both batteries and switches back and forth to the stronger of the two batteries.

During normal operation, the filer periodically monitors the power status of the lithium batteries and displays a warning message when the batteries are near the failure threshold.



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

Preparing expansion cards

Some of the expansion cards must be prepared before they are installed in the filer. For example, you may need to set jumpers, add memory, or replace batteries on a card before installing it. The following sections describe the preparation procedures for specific card types. If a card is not described, no preinstallation preparation is required.

Narrow SCSI card

The only preinstallation procedure on the narrow SCSI card is verifying or setting jumpers to enable or disable active SCSI bus termination for the two SCSI channels on the cards.

By default, SCSI bus termination is enabled on the narrow SCSI card. Do not change this setting. Figure 3-1 shows the locations of the active termination jumpers and their settings. Verify that the jumpers are set as shown in Figure 3-1.

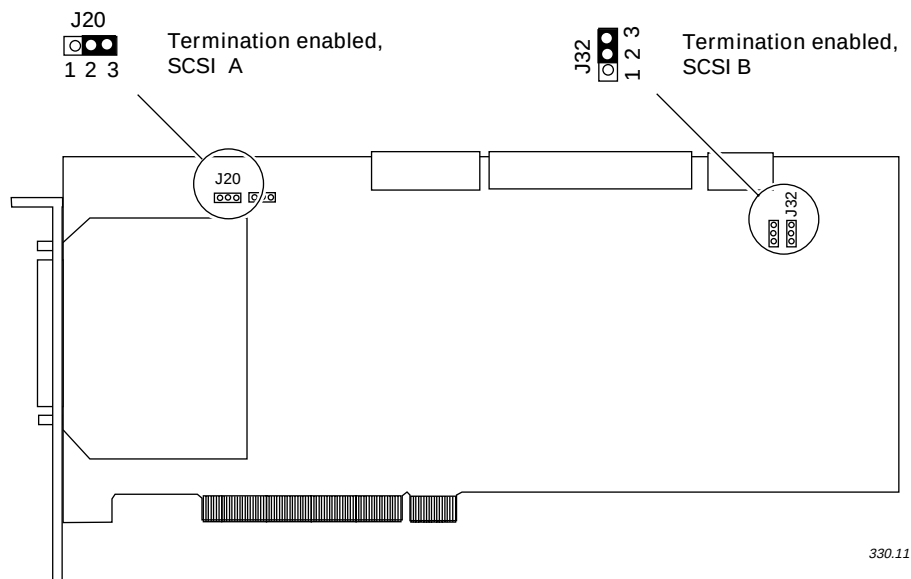


Figure 3-1. Narrow SCSI card active termination jumpers

NVRAM card

The following are preinstallation procedures required for the NVRAM card:

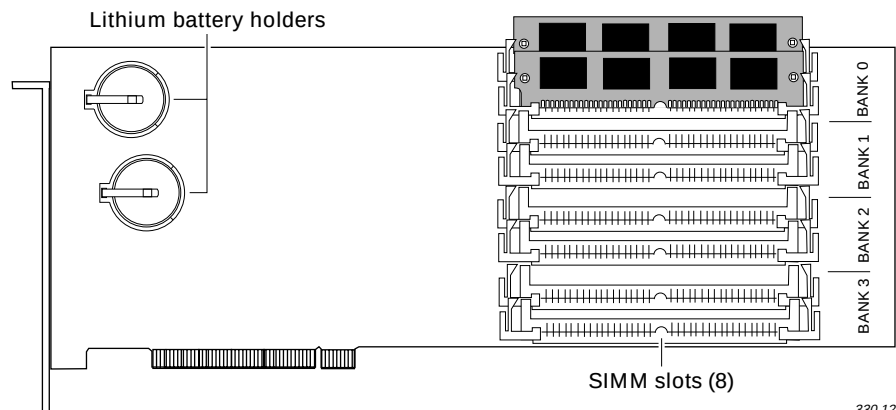
- add or replace NVRAM SIMMs on the card
- change the lithium batteries



CAUTION: Always use the halt command to perform a clean shutdown before upgrading or replacing the NVRAM card.

Adding or replacing NVRAM SIMMs

The NVRAM card comes with two NVRAM SIMMs (2 MB) installed in Bank 0 (see Figure 3-2). You can expand the NVRAM capacity to 4 MB or 8 MB by installing additional pairs of 1 MB NVRAM SIMMs. SIMMs must be added one bank at a time in the following order: Bank 1, Bank 2, then Bank 3.

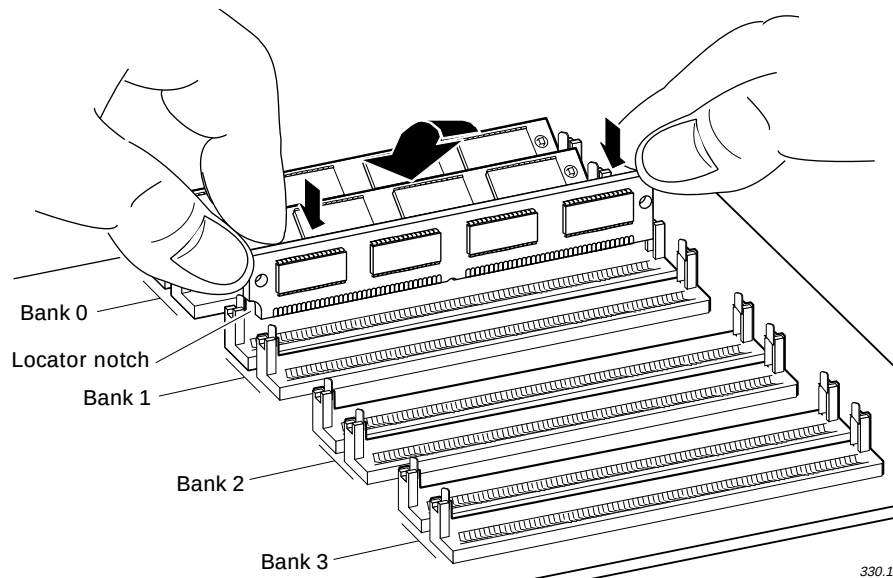


330.12

Figure 3-2. NVRAM card SIMM slots

To upgrade the NVRAM, follow these steps:

1. Hold the new SIMM by its top corners, with the locator notch at the lower left corner (see Figure 3-3).



330.13

Figure 3-3. Installing NVRAM SIMMs

2. Align the SIMM vertically above the socket and lower the SIMM gently into the socket.
3. Push the SIMM gently downward and inward to seat it firmly in the socket.
4. Tilt the SIMM downward until the locking pins are in the SIMM holes and the spring latches at either end snap in place, locking the SIMM in position.



CAUTION: If you feel a slight resistance as the SIMM comes to its locking position on the positioning pins, the SIMM may not be seated correctly. Do not force it. Remove the SIMM, reinsert it, wiggle it gently as you press it into the socket, and try to tilt it to its locked position. It is very easy to damage the SIMM socket or break its connections to the system board by forcing the SIMM into its locked position.

To verify that the added NVRAM has been detected, use the `sysconfig -v` command to display the configuration information and check the NVRAM section, which should display information similar to the following:

```
Slot 6: NVRAM (NetApp NVRAM I)
      Memory Size: 2 MB
      Battery 1 Status: 100% (3.30v)
      Battery 2 Status: 100% (3.29v)
```

Removing lithium battery insulators

NVRAM cards are shipped from the factory with a plastic sheet inserted between the positive (+) side of the batteries and the positive terminals on the battery holders. This insulator prevents the batteries from draining while the card is stored. The insulator must be removed before installing the NVRAM card in a filer.

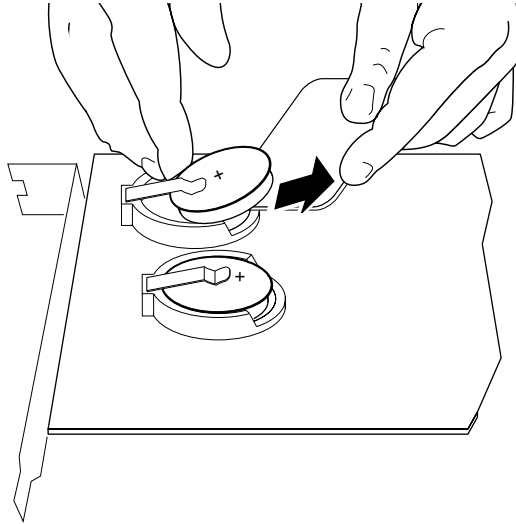
To remove a battery insulator, grip the insulator and pull the insulator out from between the battery and the positive terminal on the battery holder.

Replacing the lithium batteries

To protect data integrity during a power failure, replace both lithium batteries when the filer indicates that the batteries are discharged. Figure 3-4 shows the lithium batteries on the NVRAM card.



WARNING: There is danger of explosion if the batteries are replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer.



330.14

Figure 3-4. Replacing the lithium batteries

To replace the lithium batteries, use Figure 3-4 as a reference and follow these steps:

1. Use a credit card (or similar nonconducting tool) to lift the lithium battery over the edge of the battery holder and slide it out.
2. Hold the new battery with the cap side up (marked with a +) and slide the new battery under the clip and into the battery holder.



WARNING: Dispose of used batteries according to the manufacturer's instructions.

Installing or replacing expansion cards

This section describes the general steps involved in replacing an existing expansion card or installing a new expansion card. The procedure assumes that the expansion card has already been prepared for installation. Specific preparation procedures for expansion cards are described earlier in this chapter.

Replacing or removing an existing card

To install or replace expansion cards in a NetApp F200 or F300 series filer, follow these steps:

1. Shut down the filer and disk shelves.
2. Unscrew the seven captive thumbscrews that secure the system board carrier in the cabinet (see Figure 3-5).

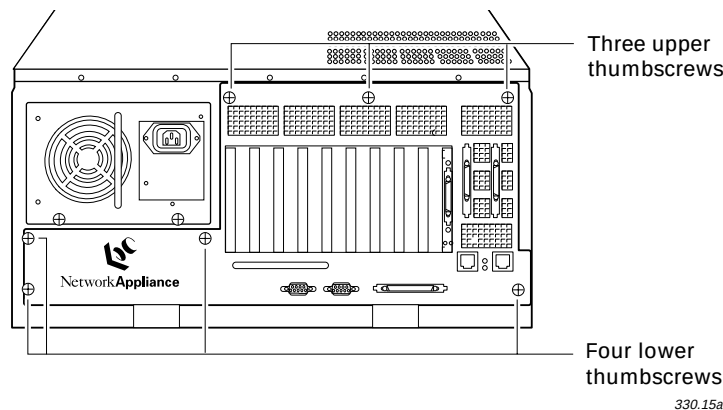


Figure 3-5. NetApp F330 back panel



NOTE: All of the thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you open the system board carrier.

3. Pull the system board carrier out of the cabinet (see Figure 3-6) until the slide rails lock (18.5 inches of slide travel).

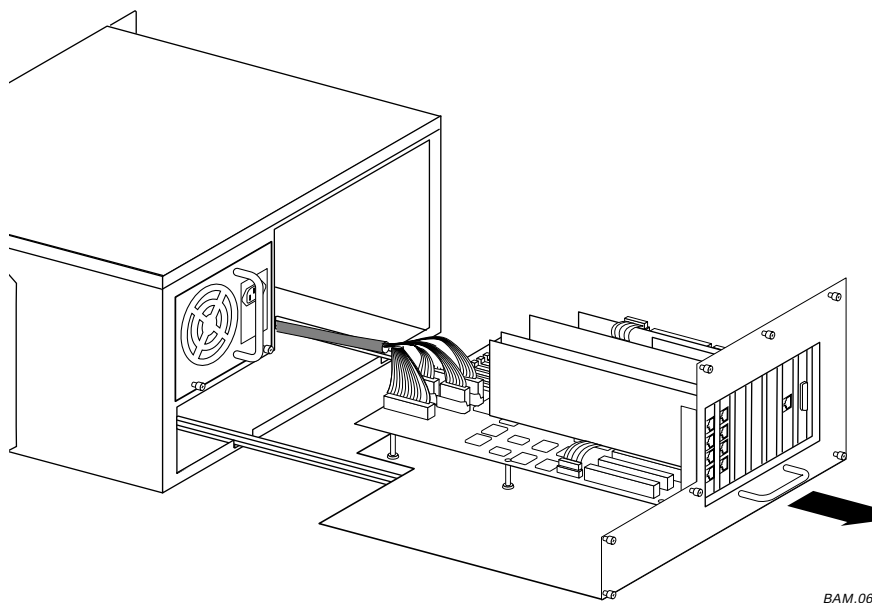


Figure 3-6. Sliding out the NetApp F330 system board carrier

4. Remove the expansion card:
 - a. Note which cables are connected to the expansion card (if any), then disconnect all cables.

Expansion card internal cabling varies by filer model.

Some models of the NetApp F200 and F300 series have the dual-channel single-ended narrow SCSI card installed in slot 9. The internal SCSI connector of this card can be connected either to one or more internal tape drives or to the SCSI 9b connector on the back panel of the filer.

Some models of the NetApp F200 series have the dual-channel single-ended wide SCSI card installed in slot 9. The internal

SCSI connector of this card is connected to the SCSI 9b connector on the back panel of the filer.

Table 3-1 is a checklist of expansion card internal cables.

Table 3-1. Expansion card internal cable checklist

Expansion card	Internal cable connections
Narrow SCSI card in slot 9	With an internal tape drive: a cable from the SCSI card's internal port to the internal tape drive. Without an internal tape drive: a cable from the SCSI card's internal port to the back-panel cable connector adapter (SCSI 9b). A cable from the SCSI card's hot swap connector to the hot swap connector on the system board.
Wide SCSI card in slot 9	A cable from the SCSI card's internal port to the back-panel cable connector adapter (SCSI 9b). A cable from the SCSI card's hot swap connector to the hot swap connector on system board.

- b.** Remove the screw holding the expansion card faceplate to the back panel bracket.
 - c.** Pull upward on the top edge of the expansion card and lift it out of the chassis.
- 5.** If you are simply taking the card out of service, install a slot cover using the screw you saved in step 4b, and skip to step 9.
- 6.** If you are replacing the card, pull the replacement card out of its antistatic sack and put the card you are replacing into the same antistatic sack.

7. Install the new expansion card:
 - a. Hold the card by its top edge, with the faceplate near your left hand. The component side should be facing you.
 - b. Lower the card into the slot until its connector edge meets the grooves in the system board slot.

The faceplate of the card should be in position against the back panel, and should cover the endplate slot on the back panel.
 - c. Press carefully on the top edge of the card until the edge connector is seated in the system board expansion card slot.
 - d. Replace the faceplate screw to secure the card to the back panel of the chassis.
8. Reconnect the cables to the expansion cards (see Table 3-1).
9. Push in on the slide locks on the bottom of the system board carrier, push the carrier into the cabinet until the back panel is flush with the cabinet, and then fasten the thumbscrews.
10. Reconnect the AC power cord to the filer and switch on power to the filer.

Installing a new expansion card

This section describes the procedure for adding a new expansion card to the filer. Depending on the type of card you are installing, you may need to prepare the card for installation. Expansion card preparation is described in “Preparing expansion cards” on page 3-4.

To add an expansion card to a NetApp F200 or F300 series filer, follow these steps:

1. Shut down the filer and disk shelves.
2. Unscrew the seven captive thumbscrews that secure the system board carrier in the cabinet.



NOTE: All of the thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you open the system board carrier.

3. Pull the system board carrier out of the cabinet until the slide rails lock (18.5 inches of slide travel).
4. Install the expansion card:
 - a. Identify the system board expansion card slot where the new expansion card will be installed.
 - b. Remove the screw holding the slot cover to the back panel of the chassis. Save the screw.
 - c. Hold the card by its top edge, with the faceplate near your left hand. The component side should be facing you.
 - d. Lower the card into the slot until its connector edge meets the grooves in the system board slot.

The faceplate of the card should be in position against the back panel, and should cover the endplate slot on the back panel.
 - e. Press carefully on the top edge of the card until the edge connector is seated in the system board expansion card slot.
 - f. Replace the faceplate screw to secure the card to the back panel of the chassis.
5. Reconnect the cables to the expansion cards (see Table 3-1).
6. Push in on the slide locks on the bottom of the system board carrier, push the carrier into the cabinet until the panel is flush with the cabinet, and then fasten the thumbscrews.

7. Reconnect the AC power cord to the filer and power on the filer.

Chapter 4: **Diskette Drive and Internal Tape Drives**

This chapter describes how to replace the internal diskette drive and optional internal tape drives in a NetApp F200 or F300 series filer.

This chapter includes the following information:

- descriptions of internal storage device types used
- procedures for setting up storage devices for installation
- procedures for replacing storage devices



NOTE: This chapter uses illustrations of a NetApp F330 to clarify functional and physical descriptions of the filer models in the NetApp F200 and F300 series. From a field service point-of-view, NetApp F200 models differ from NetApp F300 models in only one respect: the number of expansion slots on the system board. The information provided in descriptions and illustrations applies to all of the models in the NetApp F200 and F300 series unless otherwise noted.

Storage device types

NetApp F200 and F300 series filers are equipped with a 3.5-inch diskette drive and one or more optional SCSI internal tape drives (when installed). NetApp F200 and F300 series filers have no hard disk drives installed in the filer cabinet. They use external disk shelves.

Diskette drive

The internal 3.5-inch high-density diskette drive is a standard feature of all filers. The diskette drive requires no switch or jumper changes to operate in any of the filers.

Internal SCSI tape drives

The following optional internal SCSI tape drives have been qualified for use in the NetApp F200 and F300 series:

- Exabyte EXB-8505XL (5.25-in by 1.75-in form factor)
- Hewlett Packard C1533A DAT (3.5-in by 1.75-in form factor)
- Digital DLT2000 and 4000 (5.25-in by 3.5-in form factor)

Because these tape drives are SCSI devices, you must configure them with the appropriate SCSI ID and SCSI bus termination before you can install them in a filer. The preparation procedures for each tape drive type are described in separate sections in “Preparing internal tape drives,” starting on page 4-2.

Preparing internal tape drives

This section shows you how to configure an internal SCSI tape drive before you install it in a filer. The information in this section applies to all of the NetApp F200 and F300 filers. Each drive type is described under its own heading later in this chapter.



NOTE: This section only applies to internal tapes drives. The procedures for preparing and installing external tape drive units, such as tape stackers, are described in the hardware guide for the particular filer.

Exabyte EXB-8505XL tape drive

This section describes the specific preparation requirements for installing the tape drive, and provides a general preparation procedure.

To prepare the Exabyte EXB-8505XL drive for installation in your filer, perform the following steps, using Figure 4-1 as a reference.

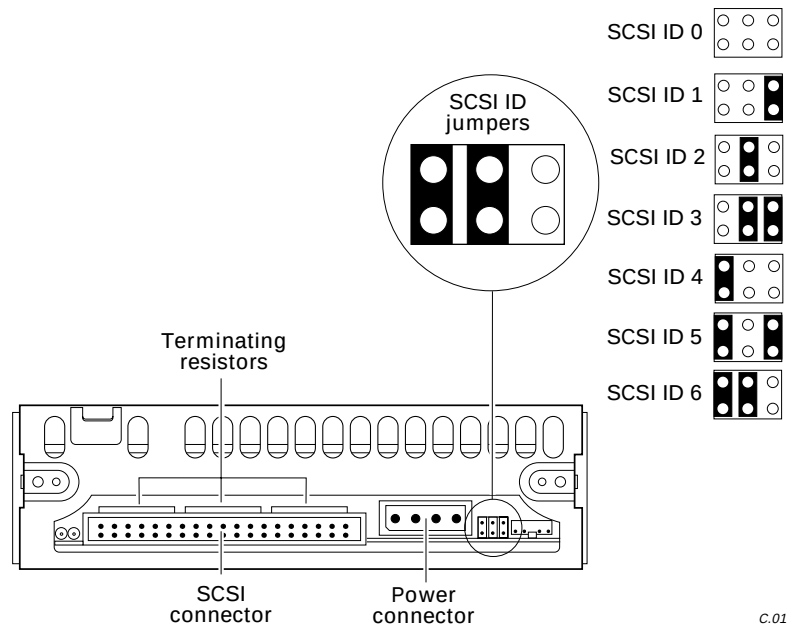


Figure 4-1. EXB-8505XL connectors and SCSI ID jumpers

1. Set the SCSI ID on the drive (see Figure 4-1):
 - a. Locate the SCSI ID jumper block on the back of the tape drive.
 - b. Using a pair of needle-nose pliers, slide the small plastic jumpers onto the pins on the jumper block to set the address to the SCSI ID used on the failed drive.



CAUTION: Do not allow loose jumpers to fall inside the tape drive.

2. Enable or disable SCSI bus termination. The tape drive is shipped from the factory with the three resistors installed (see Figure 4-1).
 - If the replacement tape drive is the only tape drive in the filer, leave the terminating resistors installed on the tape drive (because the drive becomes an end device on the SCSI bus).
 - If the replacement tape drive is the intermediate drive (that is, daisy-chained to another internal tape drive connected to the end of the SCSI cable), remove the terminating resistors from the intermediate drive and verify that the resistors are installed on the internal drive at the end of the SCSI cable (see Figure 4-2).

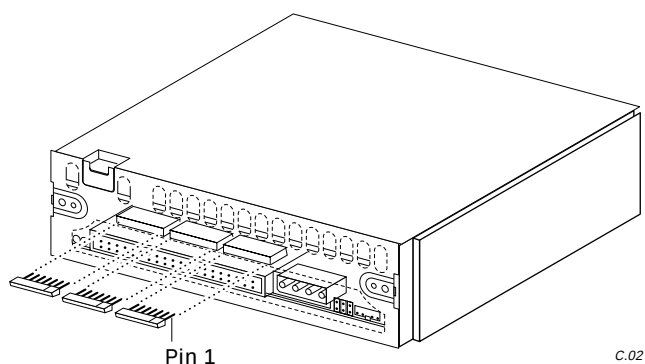


Figure 4-2. Removing the EXB-8505XL terminating resistors

Hewlett Packard DAT drive

To prepare the HP C1533A DAT drive for installation in your filer, perform the following steps, using Figure 4-3 as a reference.

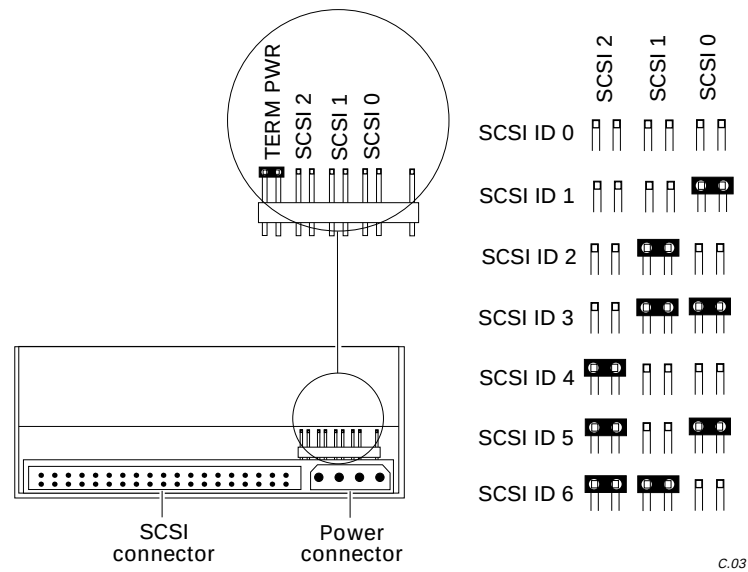


Figure 4-3. HP C1533A connectors and jumpers

1. Locate the SCSI ID jumper block above the power connector on the back of the tape drive.
2. Use your fingers or a pair of needle-nose pliers to slide the small plastic jumpers onto the pins on the jumper block to set the address to the SCSI ID used on the drive being replaced.

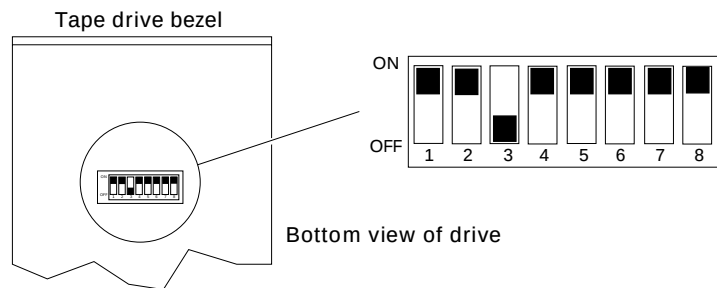


CAUTION: Do not allow loose jumpers to fall inside the tape drive.

3. Enable or disable SCSI bus termination (see Figure 4-3).
 - If the replacement tape drive is the only tape drive installed in the filer, leave the jumper installed on the TERM PWR pins on the

tape drive (because the drive becomes an end device on the SCSI bus).

- If the replacement tape drive is the intermediate drive (that is, daisy-chained to another internal tape drive connected to the end of the SCSI cable), remove the TERM PWR jumper from the intermediate drive and verify that the TERM PWR jumper is installed on the internal drive at the end of the SCSI cable.
4. Set the option switches on the underside of the replacement tape drive (see Figure 4-4) to match those on the failed drive.



C.04

Figure 4-4. HP C1533A option switches

Digital DLT drive

To prepare the Digital DLT2000 or 4000 drive for installation in your filer, use the following steps:

1. Locate the SCSI ID jumper block on the left side of the tape drive near the front bezel (see Figure 4-5).

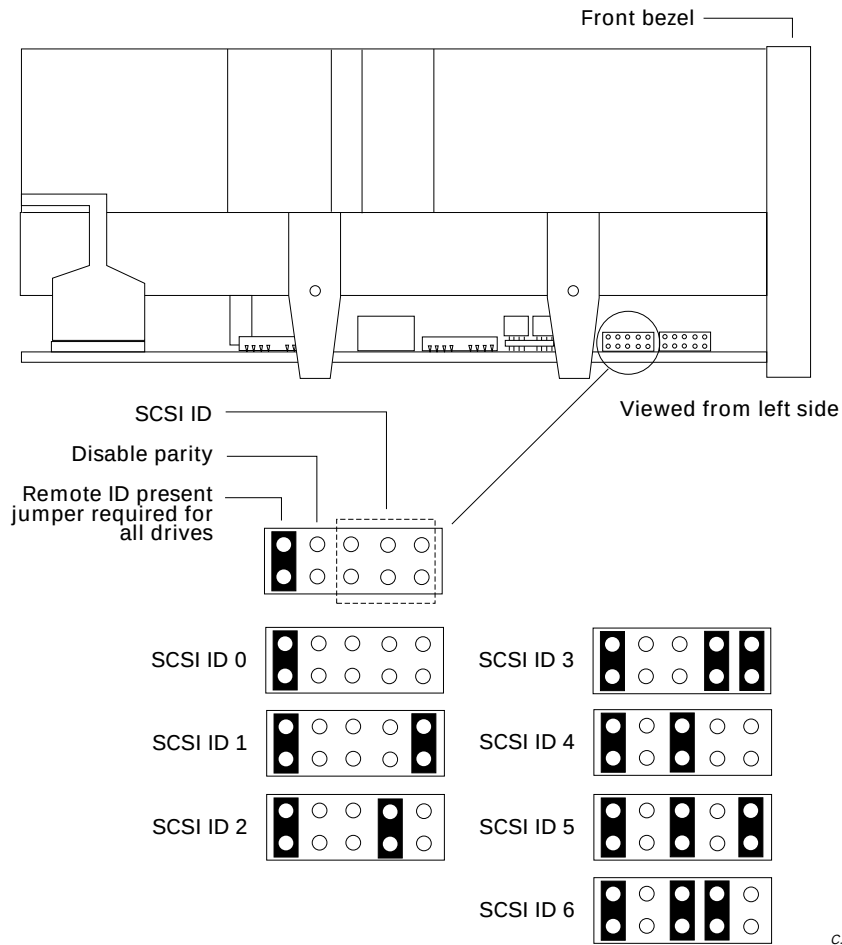


Figure 4-5. DLT2000 and 4000 SCSI ID jumper locations

C.05

2. Use your fingers or a pair of needle-nose pliers to slide the small plastic jumpers onto the pins on the jumper block to set the address to the SCSI ID used on the drive being replaced.



CAUTION: Do not allow loose jumpers to fall inside the tape drive.

3. Enable or disable SCSI bus termination (see Figure 4-6).

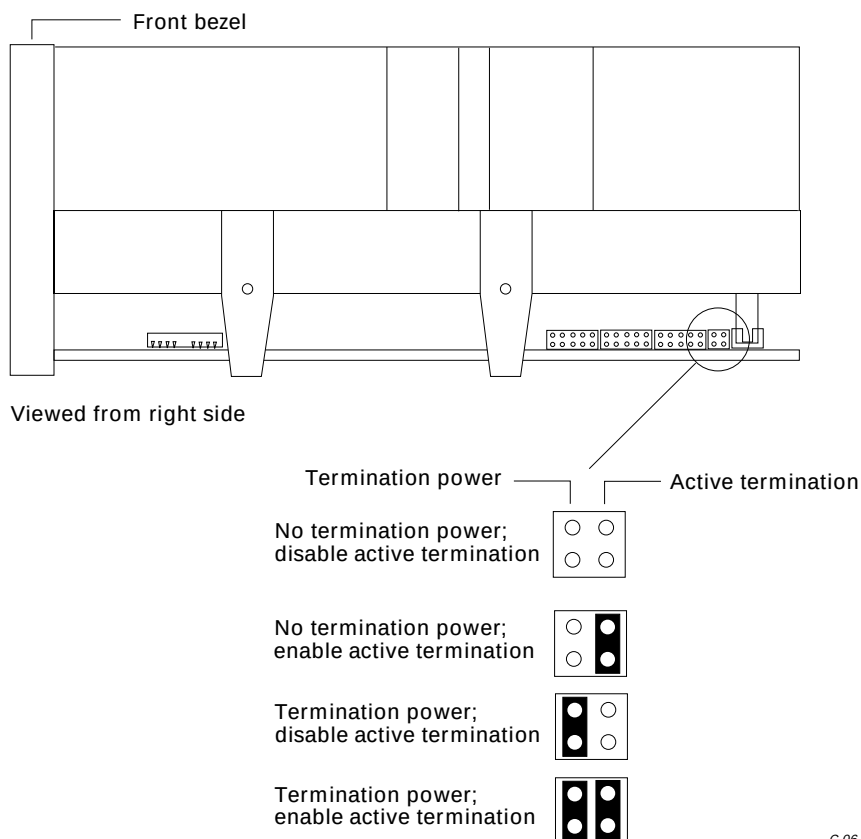


Figure 4-6. DLT2000 and 4000 bus termination jumpers

Because the Digital DLT drive is the only internal tape drive installed in the filer and is the end device on the SCSI cable, you must remove the jumper from the termination power pins and install a jumper on the active termination pins.

Replacing diskette or internal tape drives

The NetApp F200 and F300 cabinet (see Figure 4-7) provides three removable media drive bays in the cabinet front panel. No hard disk drives are installed in the cabinet. The system uses external hard disk shelves.

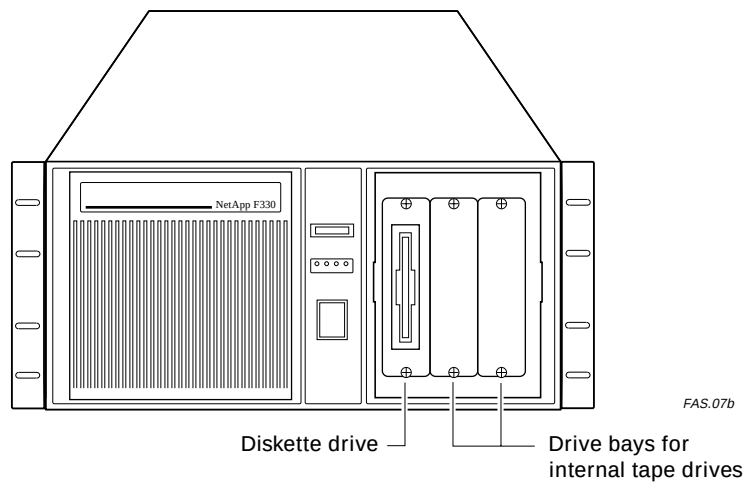


Figure 4-7. Removable media drive bays

Replacing the diskette drive

The internal 3.5-inch diskette drive is mounted in a 5.25-inch diskette drive carrier (see Figure 4-8). The diskette drive carrier is installed in the leftmost drive bay in the cabinet front panel (see Figure 4-7) and is secured to the chassis front panel with two thumbscrews.

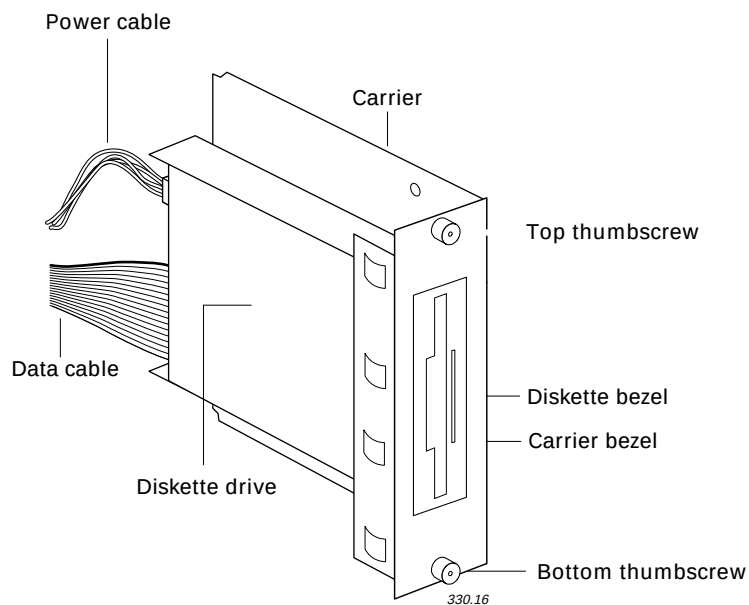


Figure 4-8. Diskette drive assembly

Removing the diskette drive

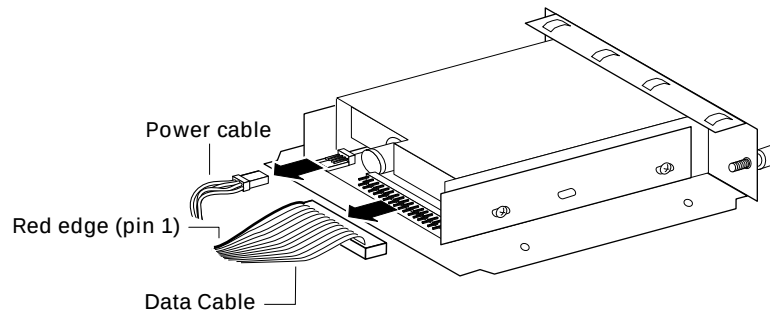
To remove the diskette drive, follow these steps:

1. Shut down the filer.
2. Unscrew the two captive thumbscrews and slide the diskette carrier out of the cabinet.



NOTE: All of the thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you pull the diskette drive carrier.

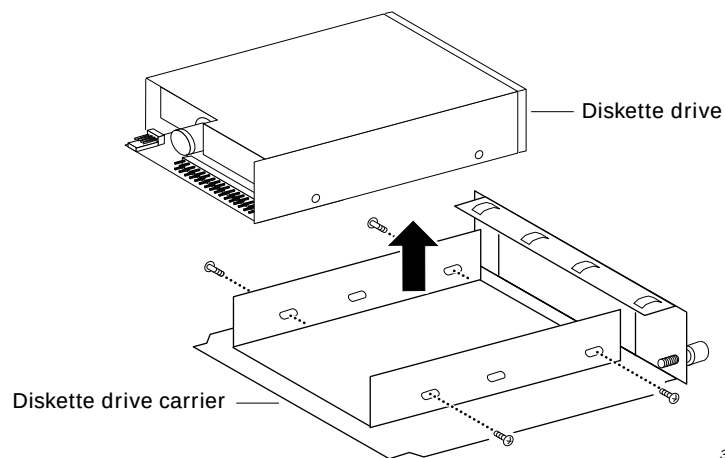
3. Disconnect the diskette drive power and data cables (see Figure 4-9).



330.17

Figure 4-9. Disconnecting the diskette drive cables

4. Remove the four screws (two on each side) holding the diskette drive in the carrier; lift the failed diskette drive out of the carrier (see Figure 4-10).



330.18

Figure 4-10. Removing the diskette drive from the carrier

5. Set the new diskette drive in place in the carrier and secure it with the four screws removed in the previous step.

6. Reconnect the diskette drive cables (see Figure 4-9).



NOTE: The diskette drive data cable connector has a small arrowhead on the side of the connector closest to the diskette drive power connector. This arrowhead indicates the position of pin 1 on the cable connector and must be reinstalled in the same orientation to pin 1 on the diskette drive connector. A small arrowhead on the side of the drive connector marks the location of pin 1 on the drive connector.

7. Slide the diskette drive carrier into its drive bay on the front of the cabinet and tighten the two thumbscrews to secure the diskette drive carrier to the cabinet front panel.
8. Switch on power to the filer.

Replacing an internal tape drive

The following tape drives have been qualified for installation in NetApp F200 and F300 filers:

- Exabyte EXB-8505XL (5.25-in by 1.75-in form factor)
- Hewlett Packard C1533A DAT (3.5-in by 1.75-in form factor)
- Digital DLT2000 or 4000 (5.25-in by 3.5-in form factor)

The replacement procedure for each drive type is described under its own heading later in this chapter.

Replacing an Exabyte EXB-8505XL tape drive

In a filer equipped with an Exabyte EXB-8505XL tape option, the 5.25-inch, half-height tape drive is installed in a tape drive carrier that is inserted in either the middle drive bay or rightmost drive bay in the cabinet front panel (see Figure 4-7) and secured to the chassis with two thumbscrews (see Figure 4-11).

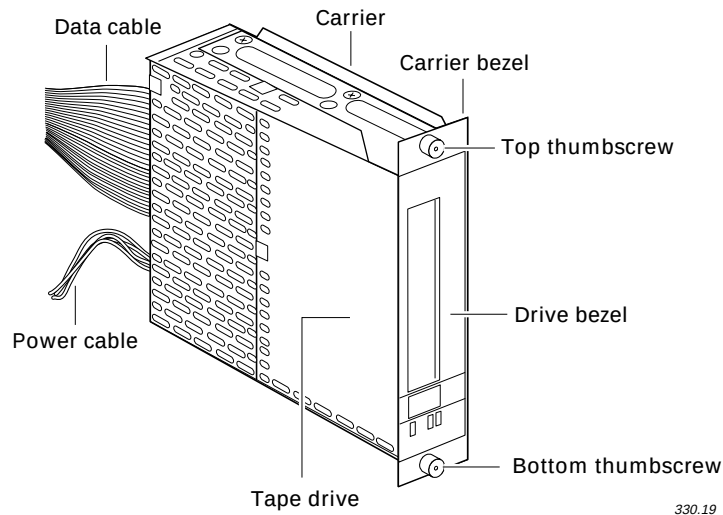


Figure 4-11. EXB-8505XL tape drive assembly

To replace the tape drive, follow these steps:

1. Shut down the filer.
2. Unscrew the two captive thumbscrews and slide the tape drive carrier out of the cabinet.



NOTE: All thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you pull the diskette drive carrier.

3. Disconnect the tape drive power and data cables (see Figure 4-12).

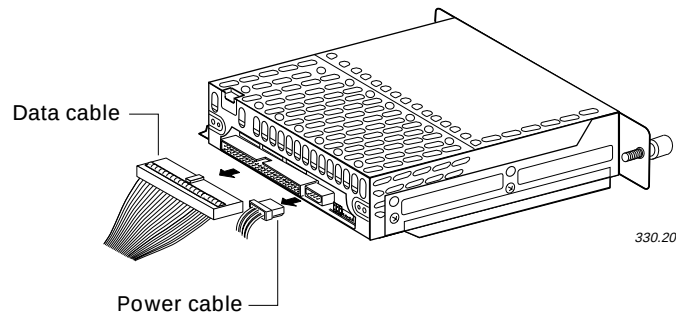


Figure 4-12. Disconnecting the EXB-8505XL tape drive cables

4. Remove the four screws (two on each side) holding the tape drive in the carrier and lift the failed tape drive out of the carrier (see Figure 4-13).

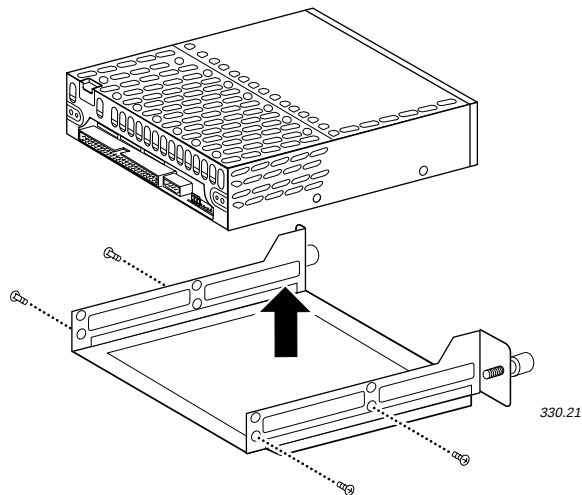


Figure 4-13. Removing the tape drive from the carrier

5. Configure the new drive according to the instructions in “Preparing internal tape drives” on page 4-2.
6. Set the new tape drive in place in the carrier and secure it with the four screws removed in step 4 (see Figure 4-14).

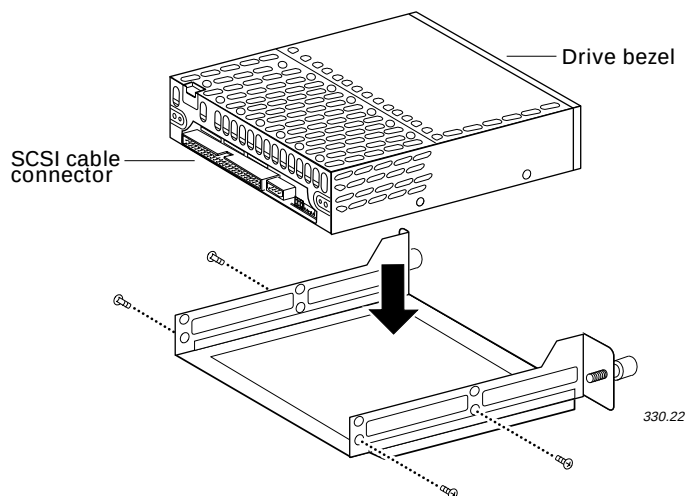


Figure 4-14. Inserting the tape drive into the carrier

7. Reconnect the tape drive power and data cables (see Figure 4-12).
8. Slide the tape drive carrier into its drive bay on the front of the cabinet and fasten the two thumbscrews to secure the tape drive carrier to the cabinet front panel.
9. Switch on power to the filer.

Replacing the HP C1533A DAT drive

In a filer equipped with an HP C1533A DAT drive option, the 3.5-inch, half-height tape drive is installed in a tape drive carrier that is inserted in the middle drive bay or rightmost drive bay in the cabinet front panel (see Figure 4-7) and secured to the chassis with two thumbscrews (see Figure 4-15).

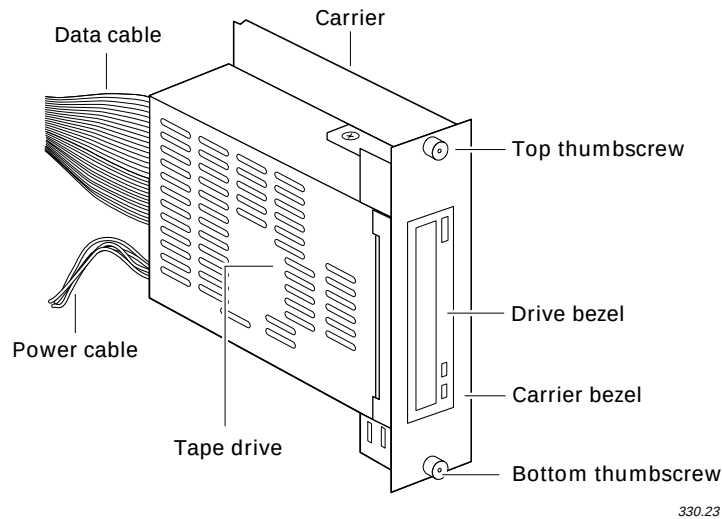


Figure 4-15. HP C1533A DAT drive assembly

To replace the tape drive, follow these steps:

1. Shut down the filer.
2. Unscrew the two captive thumbscrews and slide the tape drive carrier out of the cabinet.



NOTE: All thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you pull the diskette drive carrier.

3. Disconnect the tape drive power and data cables (see Figure 4-16).

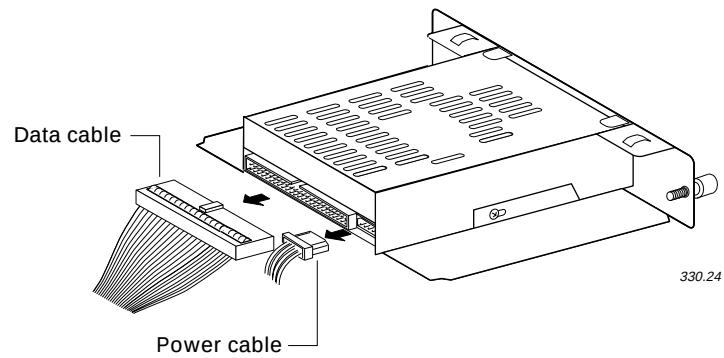


Figure 4-16. Disconnecting the DAT drive cables

4. Remove the two screws holding the tape drive in the carrier and lift the drive out of the carrier (see Figure 4-17).

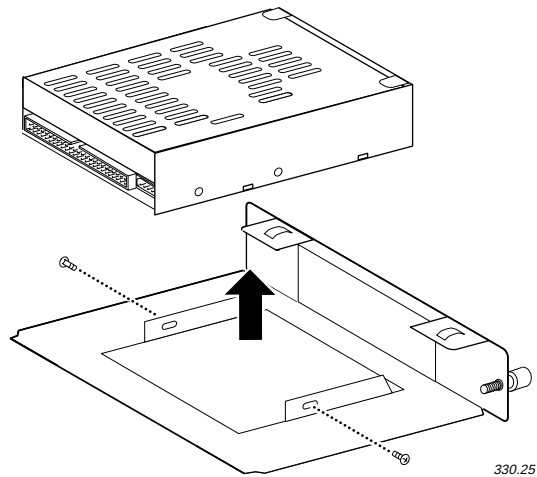


Figure 4-17. Removing the DAT drive from the carrier

5. Configure the new drive according to the instructions in “Preparing internal tape drives” on page 4-2.

6. Set the replacement tape drive in place in the carrier and secure it with the two screws removed in step 4 (see Figure 4-18).

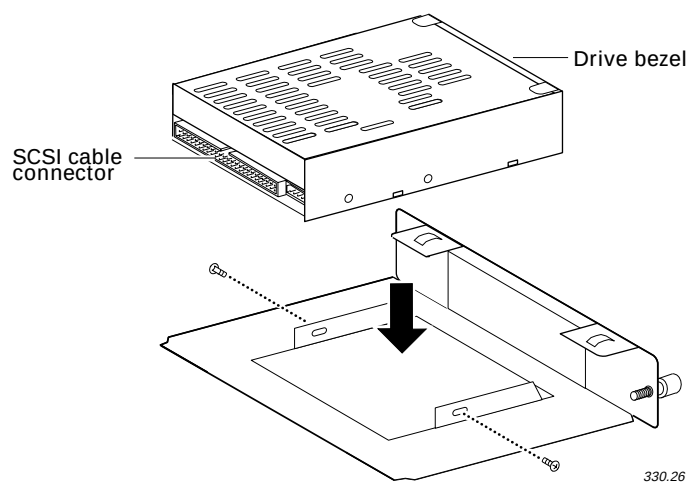


Figure 4-18. Inserting the DAT drive into the carrier

7. Reconnect the tape drive power and data cables (see Figure 4-16).
8. Slide the tape drive carrier into its drive bay on the front of the cabinet and tighten the two thumbscrews to secure the tape drive carrier to the cabinet front panel.
9. Switch on power to the filer.

Replacing the Digital DLT drive

In a filer equipped with a Digital DLT drive option, the 5.25-inch, full-height tape drive is installed in a tape drive carrier that is attached to the diskette drive carrier. The combined diskette and tape drive carrier occupies all three drive bays in the cabinet front panel (see Figure 4-7) and is secured to the chassis with the two thumbscrews on the diskette drive carrier (see Figure 4-19).

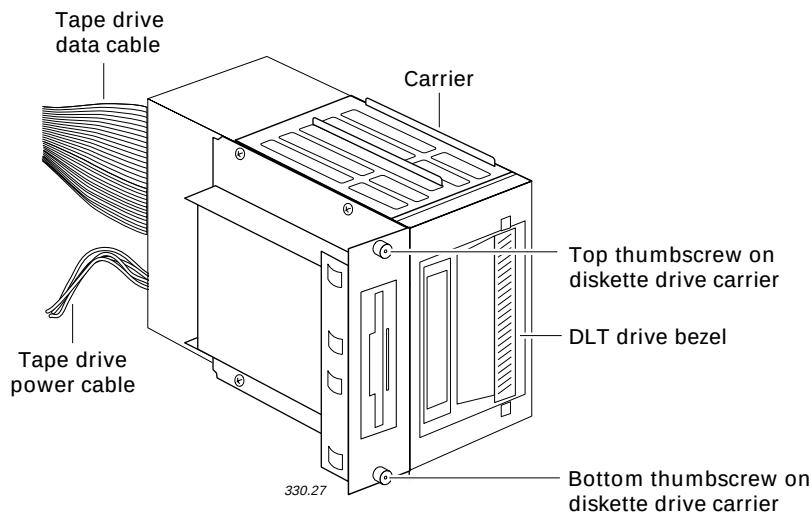


Figure 4-19. Digital DLT drive assembly

To replace the tape drive, follow these steps:

1. Shut down the filer.
2. Unscrew the two diskette drive thumbscrews and slide the combined diskette and tape drive carrier out of the cabinet.



NOTE: All thumbscrews are torqued at the factory to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you pull the diskette drive carrier.

3. Disconnect the tape drive and diskette drive cables (see Figure 4-20):

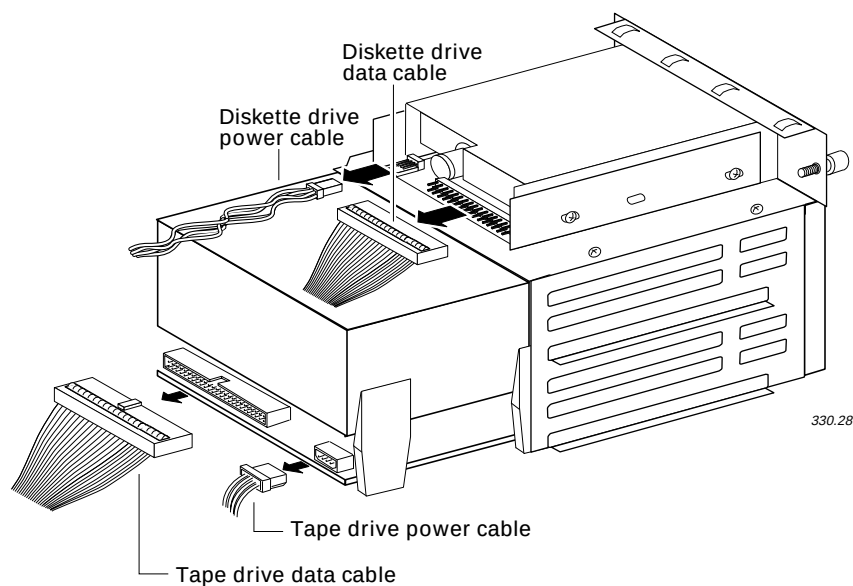


Figure 4-20. Disconnecting the tape and diskette drive cables

- a. Disconnect the tape drive power cable connector at the tape drive.
- b. Disconnect the tape drive SCSI cable at the tape drive.
- c. Disconnect the diskette drive power cable connector at the diskette drive.
- d. Disconnect the diskette drive data cable at the diskette drive.

4. Remove the four screws holding the diskette drive carrier to the tape drive carrier (see Figure 4-21).

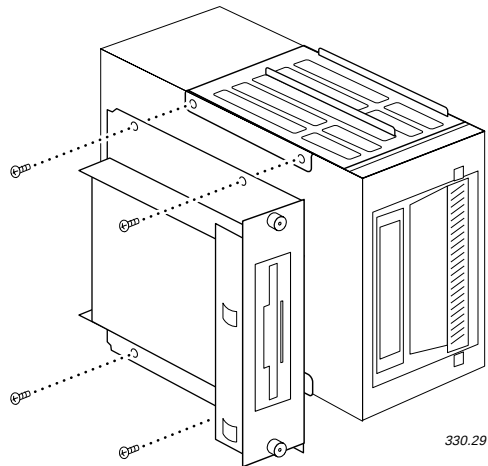


Figure 4-21. Separating tape drive carrier from diskette carrier

5. Remove the four screws holding the tape drive in the carrier and slide the tape drive out the front of the carrier (see Figure 4-22).

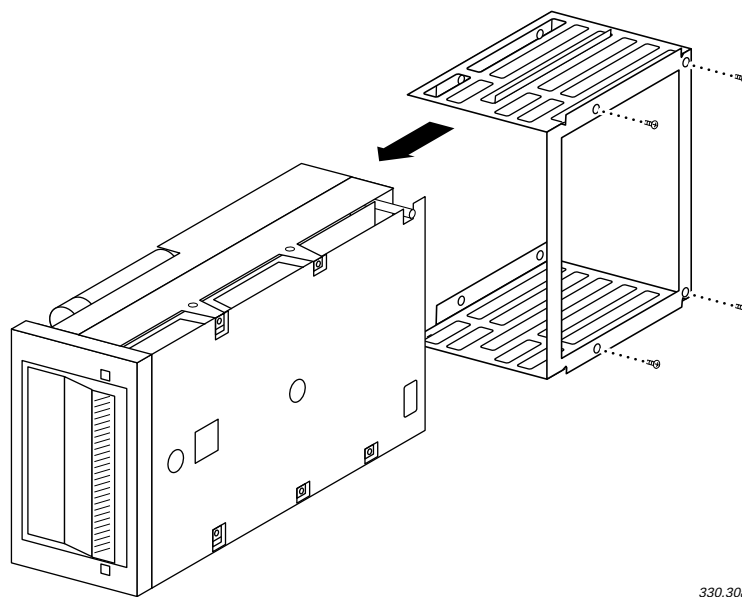


Figure 4-22. Removing the DLT drive from the carrier

6. Configure the new drive according to the instructions in "Preparing internal tape drives" on page 4-2.
7. Slide the replacement tape drive back side first into the carrier and secure it with the four screws removed in step 4 (see Figure 4-22).
8. Reconnect the tape and diskette drive cables (see Figure 4-20):
 - a. Plug the SCSI cable into the SCSI connector on the tape drive.
 - b. Plug the power cable into the power connector on the tape drive.
 - c. Plug the diskette drive data cable into the data cable connector on the diskette drive.

- d.** Plug the diskette drive power cable into the power cable connector on the diskette drive.
- 9.** Slide the diskette and tape drive carrier into the drive bays on the front of the cabinet and fasten the two thumbscrews to secure the diskette drive carrier to the cabinet front panel.
- 10.** Switch on power to the filer.

Chapter 5: **Power Supplies and Fans**

This chapter describes how to replace the power supply and the fan assembly in NetApp F200 and F300 series filers.



NOTE: This chapter uses illustrations of a NetApp F330 to clarify functional and physical descriptions of the filer models in the NetApp F200 and F300 series. From a field service point-of-view, NetApp F200 models differ from NetApp F300 models in only one respect: the number of expansion slots on the system board. The information provided in descriptions and illustrations applies to all of the models in the NetApp F200 and F300 series unless otherwise noted.

Replacing the power supply

The power supply module is inserted into a power supply bay in the left, rear corner of the chassis (see Figure 5-1). The power supply provides power for the system board, expansion cards, diskette drive, SCSI tape drive (when installed), and the fans.

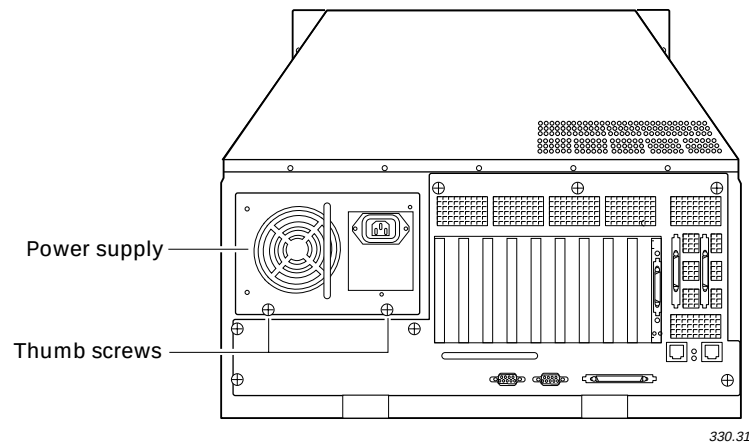


Figure 5-1. Power supply location in the cabinet



NOTE: To maintain UL, CSA, and TUV safety certifications, you must treat the power supply module as a unit. There are no user-serviceable parts inside the power supply module. Obtain the replacement power supply module from Network Appliance.

To replace a power supply, follow these steps:

1. Unplug the AC power cord from the power supply.
2. Unscrew the two thumbscrews that secure the power supply in the cabinet (see Figure 5-1).



NOTE: All thumbscrews are torqued to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you pull one of the power supply modules.

3. Use the handle to pull the power supply out of the cabinet (see Figure 5-2).

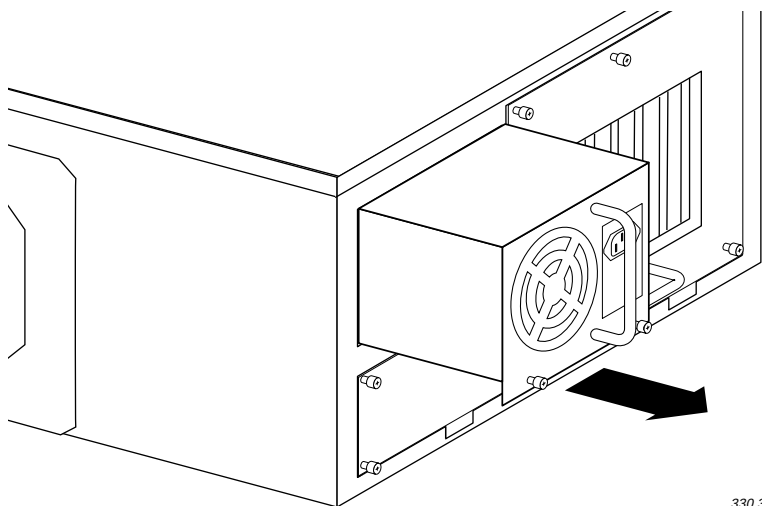


Figure 5-2. Removing the power supply

4. Insert the replacement power supply into the power supply bay and push it firmly into the cabinet until the self-aligning, blind-mating connectors are completely seated.
5. Insert and finger-tighten the two thumbscrews to secure the power supply.
6. Plug the AC power cord into the power supply.
7. Switch on power to the filer.

After replacing a filer power supply, use a direct current voltmeter to check the power supply output voltages at the system board power supply cable connectors. Refer to “Checking power supply output voltages” on page 5-4.

Checking power supply output voltages

After replacing a filer power supply, use a direct current voltmeter to check the power supply output voltages at the system board power supply cable connectors and at one device power supply cable connector.

Four 6-pin power cable connectors plug into four 6-pin connectors on the system board: J100 (red connector), J101 (black connector), J102 (white connector), and J103 (white connector). Figure 5-3 shows the wire colors and voltages on the system board power cable connectors.

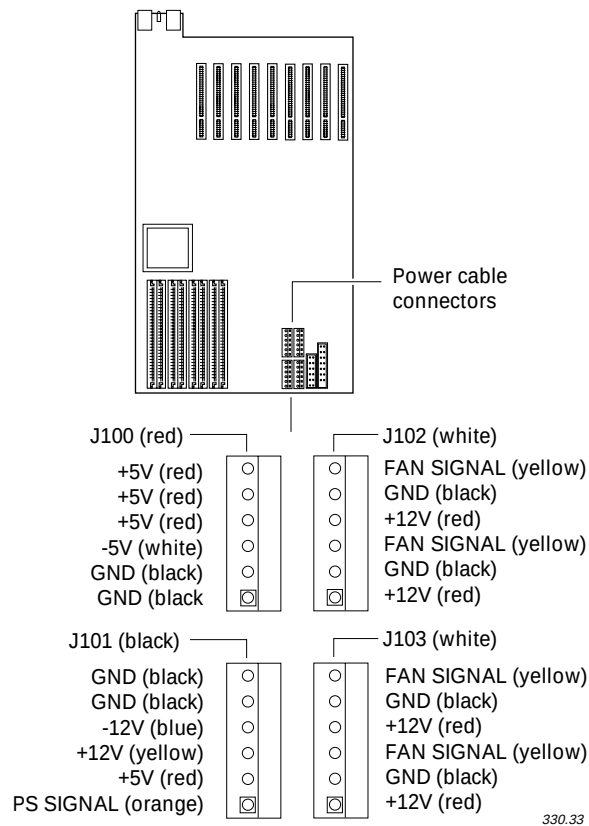


Figure 5-3. NetApp F300 series system board power connectors

Replacing the fans

The NetApp F200 and F300 cabinet uses four small muffin fans to circulate air through the cabinet. The fans are mounted on a perforated fan tray that is secured to the front panel of the cabinet by a thumbscrew (see Figure 5-4).

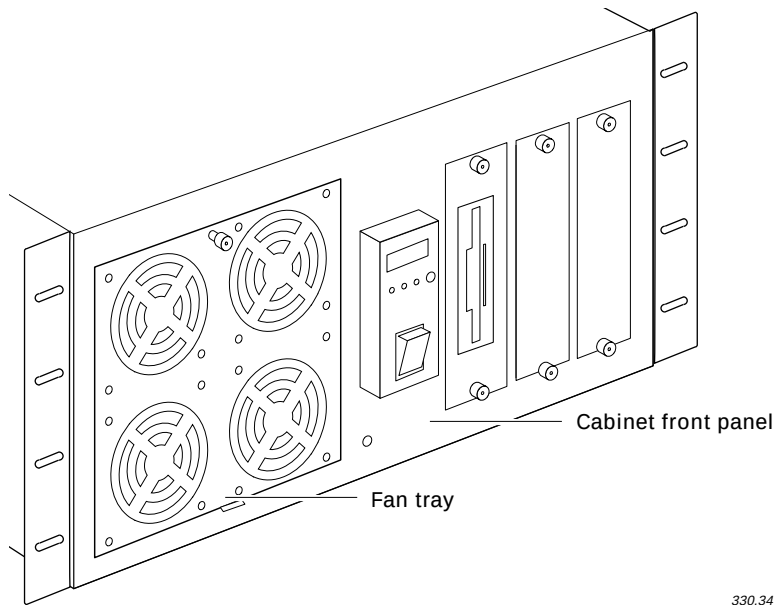


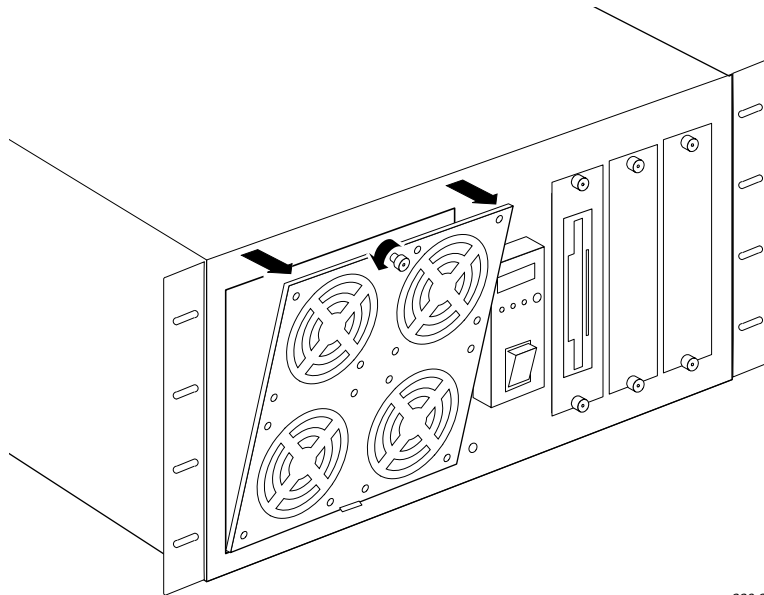
Figure 5-4. Cabinet fans



NOTE: To maintain UL, CSA, and TUV safety certifications, you must replace the fan assembly as a unit with a fan assembly from Network Appliance. Using unapproved replacement fans voids the safety certifications.

To remove and replace the fan, follow these steps:

1. Shut down the filer.
2. Remove the plastic grill that covers the fan bracket on the front panel of the cabinet.
3. Unscrew the captive thumbscrew that secures the fan tray to the front panel of the cabinet (see Figure 5-5).



330.35

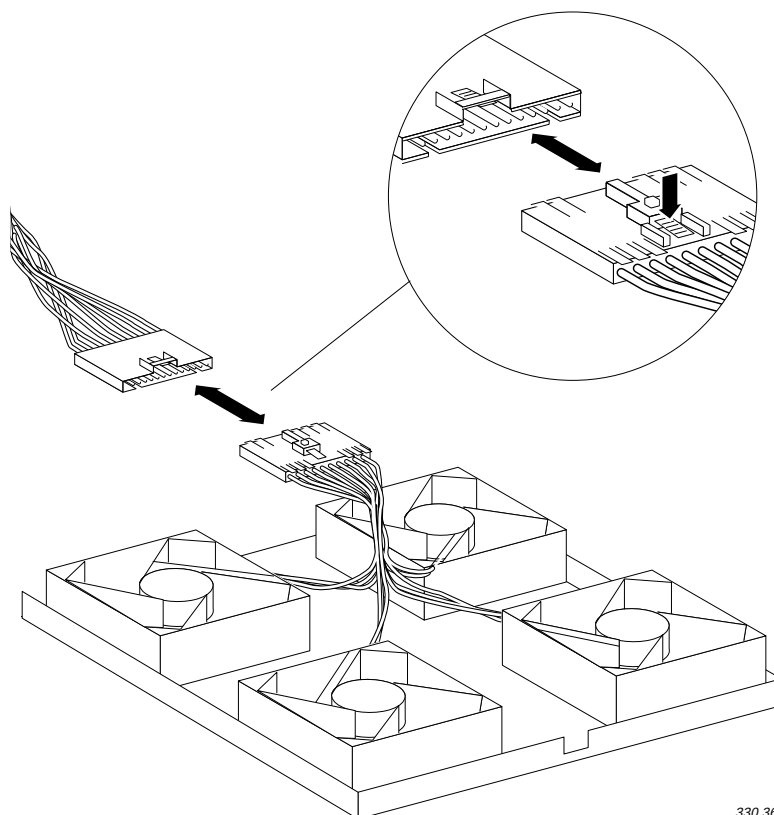
Figure 5-5. Removing the fan tray



NOTE: All thumbscrews are torqued to prevent them from coming loose during shipment. Use a Phillips screwdriver to loosen the thumbscrews the first time you pull one of the cabinet subsystems.

4. Tilt the fan tray out of the cabinet as shown in Figure 5-5.

5. Disconnect the power cable connector (see Figure 5-6) and set the failed fan assembly aside.



330.36

Figure 5-6. Disconnecting the fan tray power cable

6. Connect the power cable on the replacement fan assembly to the fan power cable inside the cabinet.
7. Set the bottom tabs of the replacement fan assembly in the fan bracket opening and tilt the fan bracket to its closed position.
8. Insert and finger-tighten the thumbscrew to secure the fan assembly.

9. Replace the plastic grill.
10. Restart the system and verify that the fans are operating.

Chapter 6: LCD Control Panel

This chapter describes how to remove and install the LCD control panel.



WARNING: You must shut down the filer and unplug the filer's AC power cord from the AC power outlet before you begin removing or installing the LCD control panel; otherwise, personal injury will occur. The shielded power cable on the LCD control panel is a live wire if the AC power cord is still plugged into the power outlet — even when the filer is turned off.

Figure 6-1 shows the LCD control panel location on the front panel of the filer. Figure 6-2 shows the connections to back of the LCD control panel.

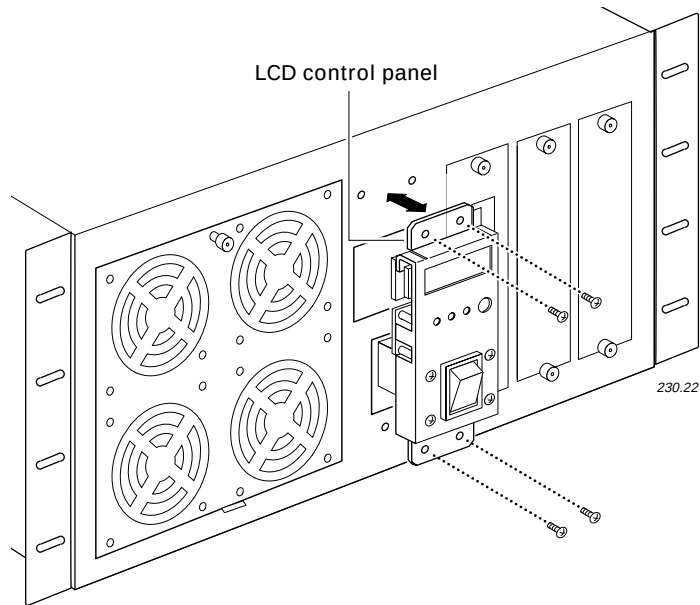


Figure 6-1. LCD control panel

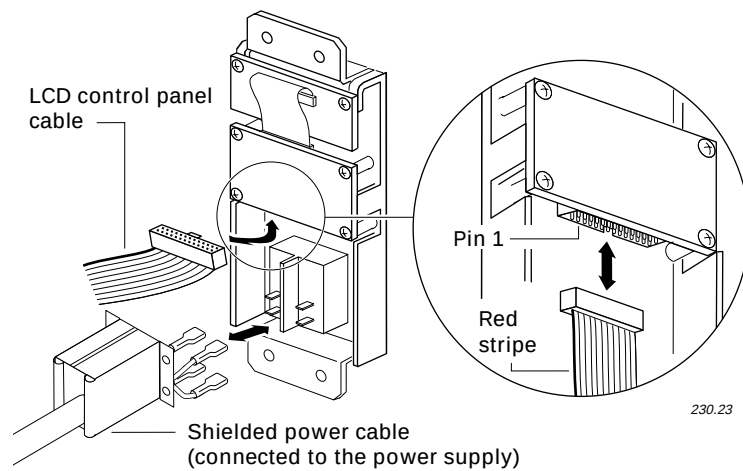


Figure 6-2. LCD control panel connections

Removing the LCD control panel

Follow these steps to remove the LCD control panel:

1. Shut down the filer.
2. Unplug the AC power cord from the power outlet.
3. Remove the front panel bezel.
4. Remove the four panhead screws on the LCD control panel (see Figure 6-1) and set the screws aside for reinstalling the unit.
5. Pull the LCD control panel far enough away from the filer front panel to get at the cables attached to the back of the LCD control panel.
6. Unplug the LCD control panel ribbon cable from its connector on the LCD panel (see Figure 6-2).
7. Remove the four power switch screws on the front of the LCD control panel (see Figure 6-3) and set the screws aside for reinstalling the power switch.

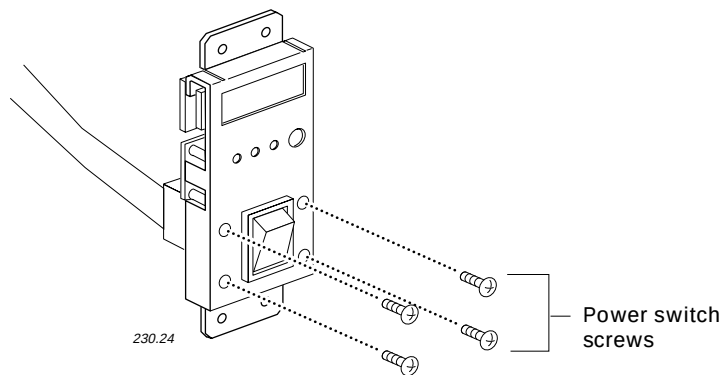


Figure 6-3. Removing the LCD control panel power switch screws

8. Slide the power cable shield away from the back of the power switch to gain access to the power cable spade connectors (see Figure 6-4).

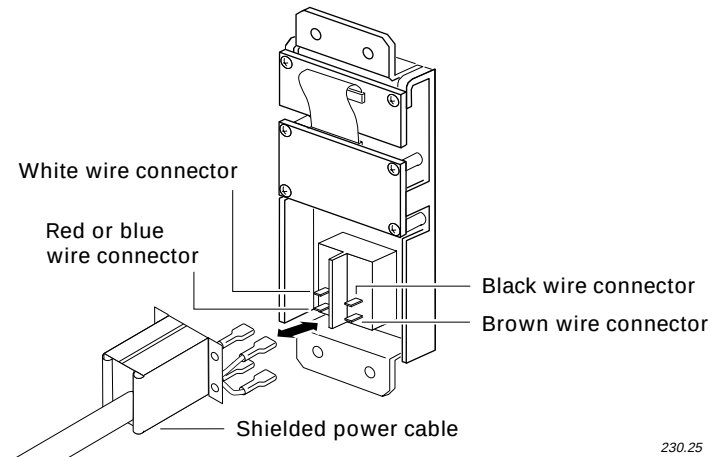


Figure 6-4. Disconnecting the power cable from the switch

9. Unplug the shielded power cable spade connectors from the four terminals on the back of the LCD control panel (see Figure 6-4).
10. Set the LCD control panel aside.

Installing the LCD control panel

Follow these steps to install the LCD control panel:

1. Looking at the four terminals on the back of the power switch on the LCD control panel, use Figure 6-4 to identify the wire colors that attach to the terminals on the switch.
2. Push the four shielded power cable spade connectors onto the four terminals on the back of the LCD control panel.

Verify that each spade connector on the shielded power cable is attached to the correct terminal.

3. Replace the four screws that secure the power cable shield to the back of the LCD control panel (see Figure 6-3).
4. Plug the LCD panel ribbon cable connector into the ribbon cable connector on the bottom edge of the LCD panel (see Figure 6-2).

The red stripe on the ribbon cable aligns with pin 1 on the cable connector.

5. Feed the cables back through their holes in the filer front panel as you push the LCD control panel against the filer front panel.
6. Replace the four panhead screws to secure the LCD control panel (see Figure 6-1).
7. Snap on the front panel bezel.
8. Plug the AC power cord into the power outlet.
9. Switch on the power to the filer.

Index

A

- adapter cards
 - Ethernet 3-2
 - FDDI-fiber and FDDI-TP 3-3
 - installing or replacing 3-9–3-13
 - SCSI, narrow 3-4

B

- batteries
 - insulator, NVRAM card 3-7
 - lithium 2-13, 3-3, 3-7

C

- cabinet
 - front panel 1-3
 - rear panel 1-6
- control panel 1-3
- conventions
 - keystroke combinations xiii
 - marginal icons in manual xiv
- CPU fan, replacing 2-14–2-16

D

- DAT drive settings 4-5–4-6
- Digital DLT drive
 - replacing 4-20
 - settings 4-7–4-9
- diskette drive, replacing 4-10

- DLT drive settings 4-7–4-9
- DRAM SIMMs, adding or replacing system board 2-6–2-11
- drive settings
 - Digital DLT drive 4-7–4-9
 - Exabyte EXB-8505XL tape drive 4-3–4-4
 - HP C1533A DAT drive 4-5–4-6
- drives, installing 4-10–4-24

E

- Exabyte EXB-8505XL tape drive
 - replacing 4-14
 - settings 4-3–4-4
- expansion cards
 - existing cards, replacing or removing 3-9–3-12
 - network adapters
 - Ethernet 3-2
 - FDDI and FDDI-TP 3-2
 - new cards, installing 3-12–3-13
- NVRAM card
 - battery insulator 3-7
 - lithium batteries, replacing 3-7–3-8
 - NVRAM, adding 3-5–3-7
- SCSI adapters
 - bus termination 3-4
 - described 3-2

F

- fans, replacing
 - CPU fan 2-14–2-16
 - filer cabinet 5-5–5-8
- filer
 - cabinet
 - front panel 1-3
 - rear panel 1-6
 - commands, entering xii

H

- HP C1533A DAT drive
 - replacing 4-17
 - settings 4-5–4-6

I

- internal tape drive, replacing 4-13

J

- jumper settings
 - Digital DLT drives 4-7–4-9
 - Exabyte EXB-8505XL tape drives 4-3–4-4
 - HP C1533A DAT drives 4-5–4-6
 - narrow SCSI adapter, active termination 3-4

L

- LCD control panel
 - installing 6-5
 - LCD panel 1-5
 - LED indicators 1-5
 - location 6-1
 - power switch 1-5
 - removing 6-3–6-4
- LED indicators 1-5

- lithium batteries 2-13, 3-3, 3-7

M

- memory
 - adding or replacing
 - NVRAM card 3-5–3-7
 - system board 2-6–2-11
 - configurations
 - NVRAM card 3-3, 3-5
 - system board 2-6

N

- network adapters
 - Ethernet 3-2
 - FDDI and FDDI-TP 3-2
- NVRAM card
 - battery insulator 3-7
 - lithium batteries, replacing 3-7–3-8
 - NVRAM, adding 3-5–3-7

O

- output voltages, checking 5-4
- overview 1-2–1-9

P

- power supply
 - output voltages, checking 5-4
 - replacing 5-2–5-3
- preparing internal drives
 - tape drives 4-2–4-9

R

- real-time clock module, replacing 2-11–2-13
- resistor pack, SCSI terminator

Exabyte EXB-8505XL tape drives
4-4

S

SCSI

adapters
 bus termination 3-4
 hot swap connection to system
 board 2-5, 2-24
 internal tape drive, cabling 2-19
bus termination
 Digital DLT drives 4-8
 Exabyte EXB-8505XL tape
 drives 4-4
 HP C1533A DAT drives 4-5
 SCSI adapter 3-4

ID

Digital DLT drives 4-7
Exabyte EXB-8505XL tape
 drives 4-3
HP C1533A DAT drives 4-5

SIMMs

adding or replacing
 NVRAM card 3-5–3-7
 system board 2-6–2-11
system board sockets 2-6
static RAM module, replacing
 2-11–2-13
system board
 replacing 2-17–2-33
 SIMM sockets 2-6
system memory 2-6–2-11

T

tape drives, replacing
 Digital DLT drive 4-20–4-24
 Exabyte EXB-8505XL 4-14–4-16
 HP C1533A DAT drive 4-17–4-19

termination, SCSI
 Digital DLT drives 4-8
 Exabyte EXB-8505XL tape drives
 4-4
 HP C1533A DAT drives 4-5

V

voltages, checking 5-4

