NS 7000 Model 700 Series Hardware Manual

AUSPEX

Copyright

Trademarks

FCC Statement

WARNING: This equipment has been tested and found compliant 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 in which case the user will be required to correct the interference at their own expense.

Protection Against Electrostatic Discharge

To prevent damage to the system due to electrostatic discharge, always wear the antistatic wrist strap provided with your network server when you come in contact with the system.

Auspex Systems, Inc.
5200 Great America Parkway
Santa Clara, California 95054
Phone: (408) 986-2000
Fax: (408) 986-2020
Internet: info@auspex.com
World Wide Web: http://www.auspex.com

Declaration of Conformity

The NS 7000/700 Series NetServer meets the following safety and EMC standards pursuant to ISO/IEC Guide 22 and EN 45014:

NetServer Model Number	Standards
NS 7000/700 Series NetServer: NS 7000/700 (base cabinet) NS 7000/060 (expansion cabinet)	EN60950/1992 EN60950 A1/1993 EN60950 At2/1993 DIN VDE 0805 A1/11.91 EN55022 Class A (1985 Ed 1) EN50082-1 (Draft 1992) IEC801-2 (1991): ESD, 8 kv air, 4 kv contact IEC801-3 (1984): RS, 10 v/m, 1 kHz modulated IEC801-4 (1988): EFT, 2 kv A/C cables, 1 kv I/O cables IEC801-5 (Draft 1993): Surge, 2 kv diff, 4 kv comm
NS 7000/050 (expansion cabinet) NS 7000/052 (expansion cabinet)	EN60950/06.88 EN60950 A1/08.90 DIN VDE 0805 A1/11.91 EN55022 Class A (1985 Ed 1) EN50082-2 (Draft 1992) IEC801-2 (1991): ESD, 8 kv air, 4 kv contact IEC801-3 (1984): RS, 3 v/m, 1 kHz modulated IEC801-4 (1988): EFT, 2 kv A/C cables, 1 kv I/O cables IEC801-5 (Draft 1993): Surge, 1 kv diff, 2 kv comm

The NetServer complies with the requirements of the **Low Voltage Directive 73/23/EEC** and the **EMC Directive 89/336/EEC**. This equipment has been tested and found compliant pursuant to CISPR22/85 Class A.

Publication Change Record

The following table records all revisions to this publication. The first entry is always the publication's initial release. Each entry indicates the date of the release and the number of the system release to which the revision corresponds.

Part Number	Date	Description
85-0372 Rev A	March 1997	Version 1.9, first release

AUSPEX

Contents

AUSPEX

Figures

Tables

Preface

About This Manual

This manual describes the Auspex NS 7000™ Model 700 Series NetServer™ and provides procedures for installing hardware components and peripherals. It is intended for users who are familiar with computer equipment installation procedures and network cabling.

Before setting up the system or installing system components, Auspex recommends that you first read this entire manual to familiarize yourself with the server.

The manual covers the following:

- Overview of the NS 7000/700
- Unpacking and Setting Up the System
- Installation
- Power On and Shut Down
- Preventive Maintenance
- Drive Configuration Options
- Cable Specifications
- System Console Configurations

Applicable Documentation

For additional information relevant to managing the NetServer, refer to the following documents:

- *System Manager's Guide*, Auspex Systems, Inc.
- *Command Reference Guide*, Auspex Systems, Inc.
- Software Release Note, Auspex Systems, Inc.

Terminology

In this manual, the terms NS 7000 Model 700, NS 7000/700 NetServer, NetServer, and server refer to the NS 7000/700 Series NetServer. NS 7000/050, NS 7000/052, and NS 7000/060 refer to the companion expansion cabinets for the NS 7000/700. The NS 7000/052 expansion cabinet is an NS 7000/050 with redundant power supplies.

Typographical Conventions

In this manual, typefaces indicate different types of information. The following table lists these typographical conventions:

Font	Meaning
`Typewriter`	Indicates a literal screen message.
Bold	In a command line, indicates information to be entered exactly as shown. In text, indicates a command name or device name.
Italics	In a command line, indicates a nonliteral item or variable for which you may substitute an appropriate value. In text, indicates a path name or emphasizes a special term.

Special Messages

The following special messages are used in this manual:

Warning: Warnings alert you to the danger of personal injury and call attention to instructions you must follow for your personal safety.

Caution: Cautions call attention to instructions you must follow to prevent damage to system hardware or software or system data loss.

Note: Notes call attention to important information as you follow the procedures outlined in this manual.

Recommendation: Recommendations call attention to an item or procedure that is not required but might help improve performance, ease of use, or ease of installation or configuration.

Auspex Customer Service

North America Customers

Customer service for North America can be reached 24 hours a day by dialing 1-800-328-7739.

International Customers

Customer service for International can be reached 24 hours a day by dialing the provided telephone number:

Country or territory	Telephone number*
Australia	1-800-121-194
France	0800-26-38-22
Germany	0130-81-8306
Hong Kong	800-4803
Ireland	1800 55 3343
Israel	177 330 6910
Malaysia	800-4509
Philippines	1-800-116-0005
Poland	+33-1-41-07-95-05
Taiwan	0080-14-9580
United Kingdom	0800-89-5971

* All telephone numbers except Poland, are toll free. Customers not listed should contact their authorized Auspex distributor.

Electronic Mail Support

Customers can also obtain support through electronic mail at the following address:

support@auspex.com

To comment on the content of this guide, send electronic mail to Auspex Technical Publications at the following address:

techpubs@auspex.com

World Wide Web

To access information about Auspex Systems, Inc. and its products, use the following resource location on the World Wide Web:

http://www.auspex.com

1 Overview of the NS 7000/700

Overview

The Auspex NetServers provide highly responsive network file access and balanced compute service to many users on multiple networks. With a unique Functional Multiprocessor® (FMP®) architecture, the NetServer delivers high-speed network I/O performance. The NetServer's scalable FMP architecture and storage subsystems make it capable of operating efficiently under a variety of conditions and workloads. Figure 1-1 illustrates the NS 7000/700 Series NetServer.

Figure 1-1. NS 7000/700 Series NetServer

Table 1-1 lists the NetServer's hardware features.

Table 1-1. Hardware features

System architecture	▲	Functional Multiprocessor architecture with dedicated processors for network, file, UNIX, and storage processing.
	▲	Host Processor that includes an Mbus-based, 90-MHz or 125-MHz SPARC processor with up to 384 MB of memory. The Host Processor provides one SCSI, two serial, and three SBus connections (two masters and one slave).
	▲	Optional nonvolatile Write Accelerator for improved NFS write operations.
Enhanced VME backplane	▲	14-slot Enhanced VME backplane for connecting the processor boards. The VME transfer speed is up to 100 MB per second between Network Processor III (NP III), Network Processor IV (NP IV), and Storage Processor V (SP V) boards, and up to 55 MB per second between all other NP and SP board combinations.
Subsystems	▲	High-performance storage subsystems: disk, tape, and CD-ROM drives are organized in racks of five or seven drives, with multiple racks supported.
	▲	Disk, tape, and CD-ROM drives that can be removed or inserted while the NetServer is powered on.
	▲	Tape storage devices that can be attached to the HP or SP (refer to the *Storage Peripherals Manager's Guide* for more information).
Networking	▲	Connections for 10Base-T and 100Base-T Ethernet, FDDI, and ATM.
Redundancy operation	▲	Optional redundant power supply operation which improves the server's reliability in the event of a single power supply failure.
Auspex system console	▲	International ANSI-compatible ASCII terminal.

Figure 1-2 illustrates the hardware implementation of the NetServer's Functional Multiprocessing architecture. For a more detailed description of the system's operation, refer to the *System Manager's Guide*.

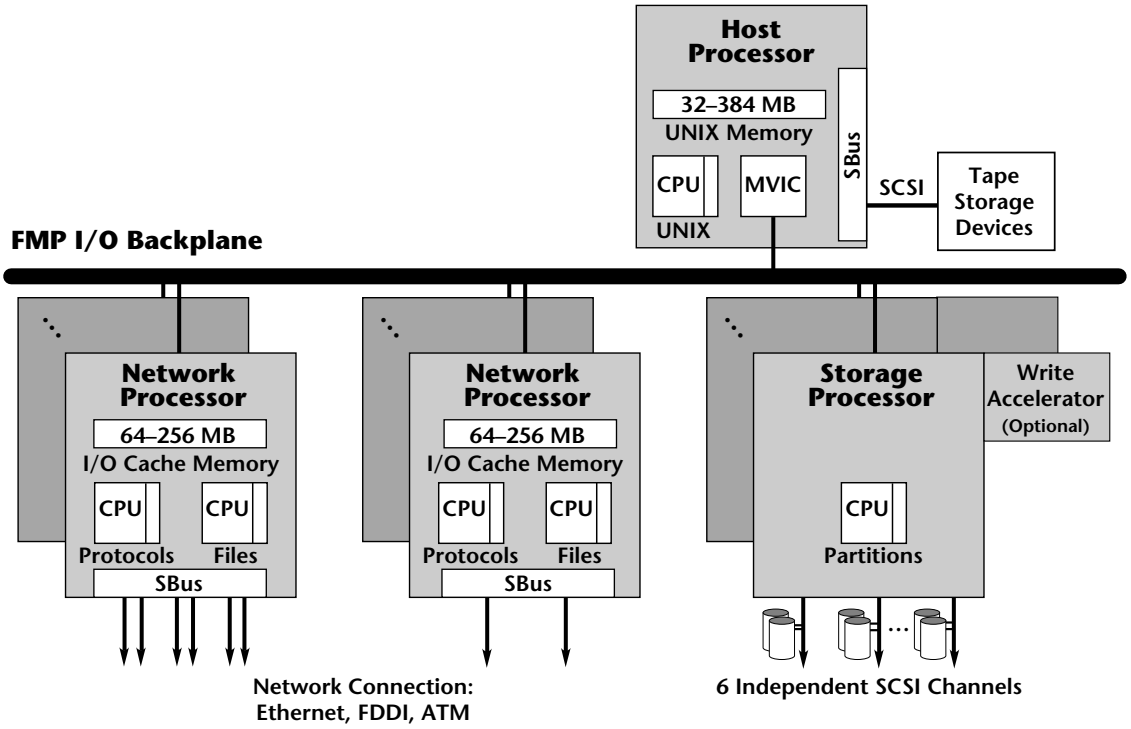

Figure 1-2. FMP architecture

Processor Board Configurations

Table 1-2 lists the processor board configuration options supported by Version 1.9 software.

Table 1-2. Processor board configuration options

Processor board	Minimum configuration	Maximum configuration	Comments
Host Processor (HP VIII)	1	1	The HP VIII includes a 125-MHz SPARC processor and supports up to 384 MB of onboard dynamic RAM. The HP also provides SCSI support for tape storage devices.
Network Processor (NP IV, NP III, NP II)	1	5	Each NP supports 10Base-T and 100Base-T Ethernet, FDDI, ATM, or combinations of these interfaces* (refer to Table 2-2 on page 2-20 for more information on supported interfaces). The FDDI networks support either DAS (fiber) or SAS (fiber or MLT-3). The ATM networks support fiber. In addition, each NP supports 64 to 256 MB of memory for protocol processing, file processing, and I/O cache memory.
Storage Processor (SP V, SP IV, SP III-E)	1	5	Each SP V and SP IV supports up to 42 disk, tape, or CD-ROM drives in any combination. Each SP III-E supports up to 20 disk, tape, or CD-ROM drives in any combination. The SP V supports the Write Accelerator III and II, which have 8 and 2 MB of cache memory, respectively. The SP IV and SP III-E support the Write Accelerator I, which has 1 MB of cache memory. In addition, the SP provides SCSI support for tape storage devices.

* ATM and 100Base-T Ethernet require optional software (refer to the documentation provided on the Auspex Premier Software Series CD-ROM for more information).

Disk Subsystems

The NetServer base cabinet supports 3.5-inch disk drives and 5.25-inch tape and CD-ROM drives. The base cabinet supports up to 42 drives in 6 drive racks. The NS 7000/060 expansion cabinet supports up to 84 drives in 12 drive racks. Each drive rack holds 7 drives.

The NS 7000/050 expansion cabinet supports 5.25-inch disk, tape, and CD-ROM drives. The NS 7000/050 expansion cabinet supports up to 40 drives in eight drive racks, with each drive rack holding 5 drives.

The NetServer supports tape storage devices (refer to the *Storage Peripherals Manager's Guide* for more information).

Install the drives in any combination of disk, tape, or CD-ROM drives, except one disk drive must be the root drive.

With the availability of both 3.5-inch and 5.25-inch disk drives, multiple configurations of NS 7000/050 and NS 7000/060 expansion cabinets are supported with the base cabinet. Table 1-3 lists the supported expansion cabinet configurations and maximum disk drive capacities.

Table 1-3. Supported expansion cabinet configurations and disk capacity

Cabinet configuration	Number of disk drives
Base cabinet NS 7000/050 expansion cabinet	42 4.2-GB disk drives
Base cabinet NS 7000/060 expansion cabinet	42 4.2-GB disk drives 84 4.2-GB disk drives
Base cabinet NS 7000/060 expansion cabinet NS 7000/050 expansion cabinet	42 4.2-GB disk drives 84 4.2-GB disk drives
Base cabinet Two NS 7000/060 expansion cabinets	42 4.2-GB disk drives 168 4.2-GB disk drives

Numbering Conventions

Table 1-4 describes the numbering conventions used to identify the various elements of the NetServer's scalable design.

Table 1-4. Numbering conventions

Element	How numbered	Comments
Card cage/VME backplane	1–14	The HP board is always installed in slots 1 and 2. All NP and SP boards are installed thereafter and occupy one double slot or two single slots. The slots are numbered left to right as you face the back of the server.
Processor boards	0–*n*	*n* varies with the type of processor board. For example, the NetServer software supports up to five SPs in the VME card cage (refer to Processor Board Slot Assignments on page 2-22 for more information).
Drive racks	1–*n*	*n* varies with the type of NetServer cabinet. The base cabinet drive racks are numbered 1–6, starting from the top rack at the front of the cabinet. The NS 7000/060 expansion cabinet drive racks are numbered 1–12, starting from the top rack at the front of the cabinet. The NS 7000/050 expansion cabinet drive racks are numbered 1–8, starting from the bottom.
Drive slots	0–*n*	The number of drive slots in a server depends on the number and type of drive racks installed and the type of expansion cabinet. Slots are numbered from left to right. The maximum range is 0–209. Slots 0–41 are located in the base cabinet. Each NS 7000/060 expansion cabinet supports up to 84 additional drive slots. The NS 7000/050 expansion cabinet supports up to 40 additional drive slots.
Drives	0–*n*	The drive number corresponds to the slot that the drive occupies in the server cabinet. For example, drives 0–41 install in slots 0–41.

For information about the specific location and setup of system components and subassemblies, see Chapter 2. For information on how the NetServer software numbers the network interfaces, refer to "Connecting the NetServer to the Network" on page 3-12.

Environmental Requirements

Operate the NetServer in a temperature-controlled, contaminant-free atmosphere within the recommended levels of humidity. Table 1-5 lists the necessary environmental conditions.

Table 1-5. Environmental requirements

	Minimum	Maximum
Operating temperature	5° C (40° F)	40° C (104° F)
Storage temperature	0° C (32° F)	65° C (150° F)
Operating altitude	0 m (0 ft.)	2,150 m (7,000 ft.)
Storage altitude	0 m (0 ft.)	12,000 m (40,000 ft.)
Operating humidity (noncondensing at 40° C)	20%	80%
Nonoperating humidity (noncondensing at 40° C)	10%	90%
Audible noise	N/A	75 dBA

The NetServer can operate at an altitude of up to 3,000 m (10,000 ft.). However, the maximum operating temperature at an altitude between 2,150 m (7,000 ft.) and 3,000 m (10,000 ft.) is 30° C (86° F). The 9-GB disk drive, supported in the NS 7000/050 expansion cabinet, has a maximum operating altitude of 1,800 m (6,000 ft.).

Space Requirements

Place the NetServer base cabinet in a location no less than three feet from the nearest wall or other equipment. Three feet of clearance allows easy access to the front and back of the server and permits adequate air circulation around the equipment.

If your server includes one or two expansion cabinets, you must allow enough space at the installation site, including three feet of clearance on all sides, for the base cabinet and the expansion cabinets to sit side by side, approximately two inches apart.

Table 1-6 gives the dimensions of the NetServer base cabinet and optional expansion cabinets. The weights shown are for a fully configured cabinet.

Table 1-6. Base cabinet and expansion cabinet dimensions

	Base cabinet	NS 7000/060 expansion cabinet	NS 7000/050 expansion cabinet
Height	197 cm (77 inches)	197 cm (77 inches)	197 cm (77 inches)
Width	61 cm (24 inches)	24 inches (61 cm)	61 cm (24 inches)
Depth	101 cm (39.5 inches)	39.5 inches (101 cm)	101 cm (39.5 inches)
Weight	840 lbs. (382 kg)	473 kg (1040 lbs.)	489 kg (1075 lbs.)

Electrical Requirements

This section describes the electrical requirements for the NetServer base cabinet, the NS 7000/060 expansion cabinet, and the NS 7000/050 expansion cabinet.

Caution: If you have expansion cabinets connected to the NetServer, each expansion cabinet should be powered from a different circuit than the NetServer.

The NetServer requires an electrical power source that is free of surges and must be adequately grounded to protect it from electrostatic interference during operation. Maintaining proper environmental humidity also helps reduce the risk of electrostatic damage.

Warning: The wiring at your site must provide for ground fault protection. Avoid installation or reconfiguration during lightning storms.

Base Cabinet and NS 7000/060 Expansion Cabinet

Table 1-7 and Table 1-8 list the electrical power requirements and specifications for the base cabinet and NS 7000/060 expansion cabinet.

Table 1-7. Electrical power requirements

Base cabinet (42 drives)	Expansion cabinet (84 drives)
2,800 W	2,250 W
2.800 KVA	2.250 KVA
9,600 BTUs/Hour	7,700 BTUs/Hour

Caution: The base cabinet and NS 7000/060 expansion cabinet only accept a nominal input voltage range of 200 to 240 VAC. The NS 7000/050 expansion cabinet accepts a nominal input voltage of 100 to 240 VAC.

Table 1-8. Electrical specifications

Nominal input voltage range	200–240 VAC
Operating input voltage range	180–264 VAC
Current rating	16 A
Input service rating	20 A
Frequency	50–60 ±3 Hz
Inrush current	20 A peak max per power supply (up to three power supplies supported)
Power factor	0.98
Turn-on time	AC to DC = 3 seconds
Electromagnetic Interference (EMI) filter (conducted)	Class A
Leakage current	2.5 mA with three power supplies

Caution: For proper air flow and EMI reduction, operate the NetServer with the doors closed and all access panels in place.

NS 7000/050 Expansion Cabinet

The power supply shipped with the NS 7000/050 expansion cabinet can accommodate a fully configured system. Refer to Table 1-9 and Table 1-10 for the electrical power requirements and electrical input specifications.

Caution: For proper air flow and reduction in EMI, operate the NS 7000/050 expansion cabinet with the doors closed.

Table 1-9. Electrical power requirements

Expansion cabinet (40 drives)
1,700 W 1.7 KVA 5,800 BTUs/Hour

Caution: The NS 7000/050 expansion cabinet accepts a nominal input voltage of 100 to 240 VAC. The base cabinet and NS 7000/060 expansion cabinet accept a nominal input voltage range of 200 to 240 VAC.

Table 1-10. Electrical input specifications

Input	Power supply
Nominal input voltage range	100–240 VAC
Operating input voltage range	90–264 VAC
Current rating	16 A
Frequency	50–60 Hz
Inrush current	
Nonredundant power supply	35 A peak max
Redundant power supply	87.5 A peak max per pair
Power factor	0.99
Turn-on time	DC power < 1 second
EMI filter (conducted)	FCC Level A, VDE Level A
Leakage current	1.5 mA

Power Cables

Two types of power cables are available with the NetServer.

North American

- Base Cabinet and NS 7000/060 Expansion Cabinet

  The North American configuration is shipped with a 3-12 gauge power cable that has an L6-20P plug. The L6-20P plug requires that your site uses 220 V. The wall receptacle for this configuration must be an L6-20R receptacle on a 16-amp circuit.

- NS 7000/050 Expansion Cabinet

  The North American configuration is shipped with a 3-12 gauge power cable that has an L5-20P plug. The L5-20 plug is available for sites that use 125 V. The wall receptacle for this configuration must be an L5-20R receptacle on a 20-amp circuit. An optional L6-20 plug is available for sites that use 220 V. The optional configuration requires an L6-20 receptacle on a 20-amp circuit.

Figure 1-3 shows the outline of the L6-20P and L5-20P plugs.

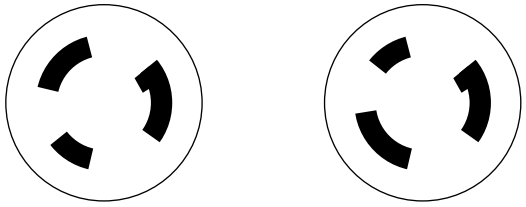

Figure 1-3. Outline of the L6-20P and L5-20P plugs

International (except for Canada and Mexico)

The power cable for the international configuration is a TUV-approved 3x1.50-mm cable meeting the specifications of HD21 code H05VVF3G1.50. The cable has no plug. It is the customer's responsibility to obtain a plug appropriate for the wall receptacle. The receptacle must be on a 16-amp circuit.

2 Unpacking and Setting Up the System

About This Chapter

This chapter provides instructions for unpacking and setting up the NetServer base cabinet and expansion cabinets and includes information to help you familiarize yourself with the NetServer's components.

The chapter covers the following sections:

- Unpacking the NetServer
- Unpacking the NetServer
- Stabilizing the Cabinet
- Opening the Cabinet Doors
- Basic Components
- NetServer Base Cabinet Subassemblies
- Expansion Cabinet Subassemblies
- Card Cage Components
- Processor Board Slot Assignments
- Power Supply Configurations

This chapter does not provide instructions for installing boards in the card cage or connecting expansion cabinets to the base cabinet. If you need to add a board to the card cage or connect an expansion cabinet to the base cabinet, contact your authorized Auspex service representative.

Unpacking the NetServer

This section provides unpacking instructions for the NetServer base cabinet and expansion cabinets. This procedure varies depending on the shipping method and packing materials used.

Servers sent to destinations within the continental United States are usually shipped by truck, uncrated but wrapped in cardboard packing material. Servers sent to destinations outside the continental United States are crated and shipped by air.

Instructions for unpacking and installing other NetServer components appear in Chapter 3.

Warning: Do not attempt to move or uncrate the base cabinet unless you have others to assist you. You need at least one person to help you uncrate the expansion cabinet. Any attempt by one person to uncrate the base or expansion cabinets could result in injury. When empty, the base cabinet weighs approximately 700 pounds. The expansion cabinet weighs approximately 500 pounds.

Tools

- Knife to open the packing boxes containing drives and accessories
- Wire cutter to cut tie-wraps (cut only red tie-wraps)
- Crescent wrench for lowering stabilizers

If the server is in a crate, you need the following:

- 9/16-inch wrench to remove the bolts securing the sides of the crate
- Band cutter or wire cutter to cut the straps securing the NetServer to the crate

Unpacking a NetServer Shipped by Truck

1. Place the NetServer base cabinet on the site prepared for it.

   For easy access and proper air circulation, make sure there is at least three feet of clearance between the server and any wall or other equipment (except the expansion cabinets). Also, make sure there is a wall receptacle within six feet of the server and a telephone jack (for modem users) within seven feet of the base cabinet. The wall receptacle must be on a 20-amp circuit.

2. Remove the packing material from the base cabinet by sliding it up and off the unit. To avoid damaging the unit, do not cut the plastic packing material with a knife.

3. If your NetServer includes expansion cabinets:

   a. Place the first expansion cabinet to the left of the base cabinet (when viewed from the front). If you are connecting a second expansion cabinet, place it to the right of the base cabinet (when viewed from the front).

Note: In a dual-expansion cabinet configuration with an NS 7000/050 expansion cabinet, the NS 7000/050 must be placed to the left of the base cabinet (when viewed from the front). Also, the NS 7000/050 must be plugged into a wall receptacle with at least 20 amps/110 volts.

b. Remove the packing material as described in step 2. To connect the expansion cabinets to the base cabinet, contact your authorized Auspex service representative.

Note: If the surface of the server becomes marked or smudged, use a nonabrasive stainless-steel cleaner to clean the surface.

Unpacking a NetServer Shipped by Air

Note: Be sure to allocate enough space for this procedure. You need at least 12 feet of unobstructed space on the side of the crate that is secured by metal clips, at least 8 feet of unobstructed space on the opposite side, and at least 3 feet on the remaining sides.

1. Use a 9/16-inch wrench to remove the seven bolts securing the side panels of the crate to its base.
2. Turn the six latch locks counterclockwise to release the locks securing the packing crate's front panel. After releasing the locks, carefully lower the panel to the ground. Keep the panel nearby. It will be used in step 5 as a ramp to roll the server off the base of the crate.
3. The remaining side panels of the crate are constructed as a single unit. Slide the panels off the server, and move them aside.
4. Cut and remove the straps that secure the server to the base of the crate.
5. Place the ramp (the panel removed in step 2) next to the edge of the crate, adjacent to the back panel of the server. At the lower end of the ramp, fold out the ramp extension to make a smooth transition from ramp to floor.
6. Carefully roll the server down the ramp to the floor.

Caution: Make sure that the high end of the ramp is slightly lower than the base of the crate, or the server's casters may move the ramp out of position as you roll it onto the ramp. Also, check that the leveling feet clear the upper edge of the ramp extension. If the feet catch on the extension, the cabinet can fall off the ramp.

7. Remove the plastic packing material from the server by sliding it up and off the unit.

   To avoid damaging the unit, do not cut the plastic packing material with a knife.
8. Before proceeding further, roll the server to the site prepared for it.

   For easy access and proper air circulation, make sure there is at least three feet of clearance between the server and any wall or other equipment (except the expansion cabinets). Also, make sure that there is a wall receptacle within six feet of the server and a phone jack (for modem users) within seven feet of the base cabinet. The wall receptacle must be on a 16-amp circuit.
9. If your NetServer includes expansion cabinets, repeat steps 1 through 8 to unpack each one. Place the first expansion cabinet to the left of the base cabinet (when viewed from the front). If you are connecting a second expansion cabinet, place it to the right of the base cabinet (when viewed from the front).

Note: In a dual-expansion cabinet configuration with an NS 7000/050 expansion cabinet, the NS 7000/050 must be placed to the left of the base

cabinet (when viewed from the front). Also, the NS 7000/050 must be plugged into a 20-amp circuit.

To connect the expansion cabinet to the base cabinet, contact your authorized Auspex service representative.

Note: If the surface of the server becomes marked or smudged, use a nonabrasive stainless-steel cleaner to clean the surface.

Stabilizing the Cabinet

Each cabinet is shipped resting on its casters so that you can easily roll it to its permanent site. Once you roll the server to its permanent site, you must level and stabilize it. The procedure is the same for both the base cabinet and expansion cabinet.

The following describes how to stabilize the cabinet:

1. Locate the four cabinet stabilizer feet underneath each corner of the cabinet.
2. Using an adjustable wrench, lower each foot by rotating the locking nut in a clockwise direction until the system is lifted 1/8 inch off the casters (see Figure 2-1).

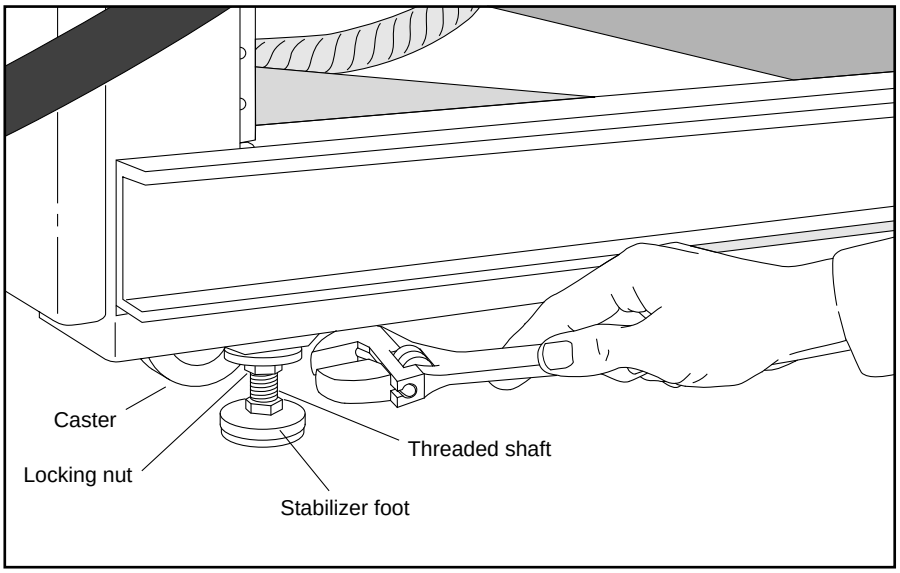

Figure 2-1. Stabilizing the cabinet

3. Turn the locking nut counterclockwise until it reaches the top of the threaded shaft, and tighten it to lock the stabilizer foot in position. Make sure the foot does not turn as you tighten the locking nut.

This concludes the procedure for stabilizing the cabinet.

Opening the Cabinet Doors

The NetServer doors are unlocked with a system key. Once unlocked, you can open and close the doors without a key.

Two duplicate keys are tie-wrapped to the NetServer power cord. The keys open both the front and back doors of the cabinet. If your NetServer includes expansion cabinets, the same keys also open their front and back doors.

Basic Components

This section describes the basic components shipped with your NetServer. After unpacking and stabilizing the NetServer, make sure you have the following:

- Disk drives (one minimum), packed separately in a foam-padded box, to install in the base cabinet
- CD-ROM (one minimum) and optional 8-mm tape drives to install in the base cabinet, packed separately in a foam-padded box
- Documentation set, including:
  - *NS 7000 Model 700 Series Hardware Manual* (this manual)
  - *System Manager's Guide*
  - *System Manager's Quick Reference*
  - *Command Reference Guide*
  - Software release note
- System console (shipped in a separate carton)
- One null-modem RS-232C console cable (shipped in a separate carton)
- One power cable (installed inside the base cabinet and secured with red tie-wraps)

Refer to Figure 2-2 on page 2-7 to identify system cables shipped with your NetServer. Some cables, such as the SCSI cables that connect the drives in the base cabinet to the Storage Processor, are already installed within the server and should not be removed.

Instructions for connecting cables appear in Chapter 3 in the sections "Grounding the NetServer," "Connecting the System Console to the Server," "Attaching a SCSI Device to the Host Processor," and "Connecting the NetServer to the Network."

If you ordered an expansion cabinet, make sure have the following:

- NetServer expansion cabinet
- Expansion cabinet connection kit
- Disk drives, packed separately in a foam-padded box, to install in the expansion cabinet
- Any additional tape or CD-ROM drives, packed separately in a foam-padded box, to install in the expansion cabinet
- One power cable (installed inside the expansion cabinet and secured with red tie-wraps)

Note: To connect an expansion cabinet to the base cabinet, contact your authorized Auspex service representative.

The NS 7000/060 expansion cabinet accepts the same type of disk, CD-ROM, and tape drives as the base cabinet. The NS 7000/050 expansion cabinet supports 5.25-inch disk, tape, and CD-ROM drives from Auspex.

The following cables are included in each expansion cabinet (installed within the system and secured with red tie-wraps):

- One power cable

- Twelve SCSI cables that connect the drives in the expansion cabinet to the Storage Processor IV or Storage Processor V boards in the base cabinet (NS 7000/060 only)
- Twelve SCSI drive cables that connect the drives in the expansion cabinet to the Storage Processor III-E boards in the base cabinet (NS 7000/050 only)

Instructions for connecting these cables appear in Chapter 3 in sections "Grounding the NetServer" and "Connecting the SCSI Drive Cables from the Expansion Cabinet."

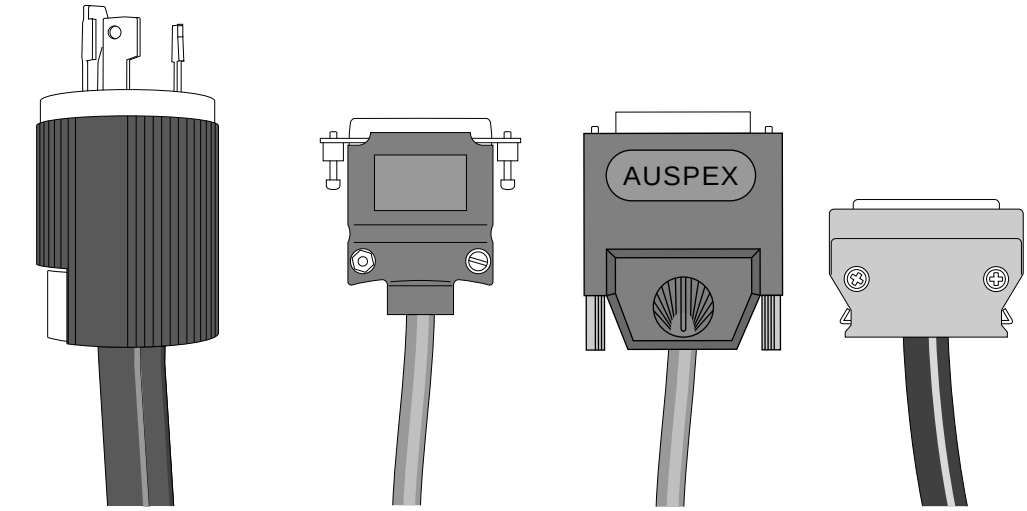

Figure 2-2. System cables

NetServer Base Cabinet Subassemblies

The NS 7000/700 base cabinet contains the following subassemblies:

- Extended card cage chassis
- Drive racks (up to six)
- Power distribution unit (PDU)
- Power supply enclosure with one to three power supplies installed offering a nonredundant or optional redundant configuration

Figures 2-3 and 2-4 show the front and the back views of the base cabinet with the subassemblies labeled. The cabinet in the Figure 2-3 has six drive racks (four in the front and two in the back).

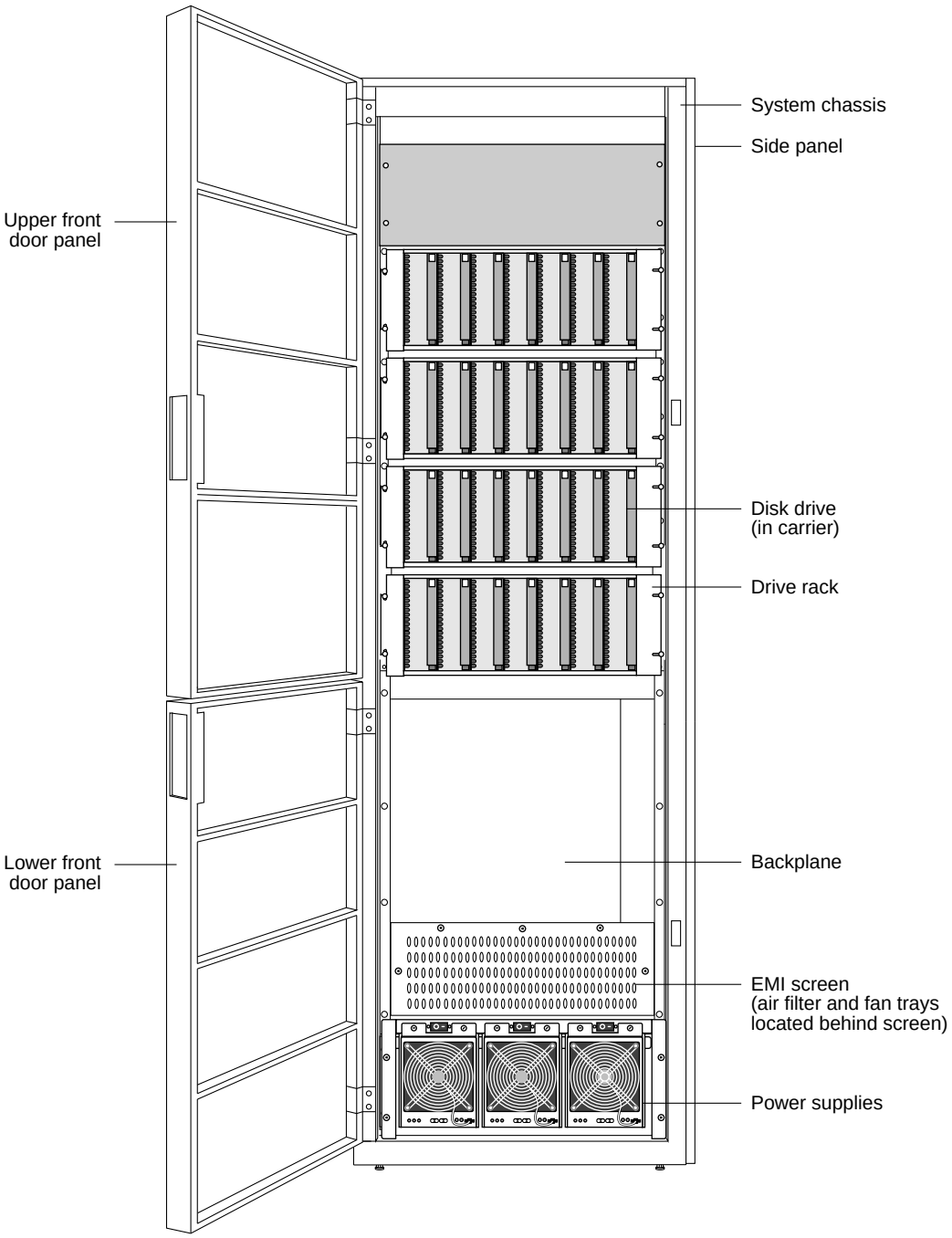

Figure 2-3. Base cabinet subassemblies (front view)

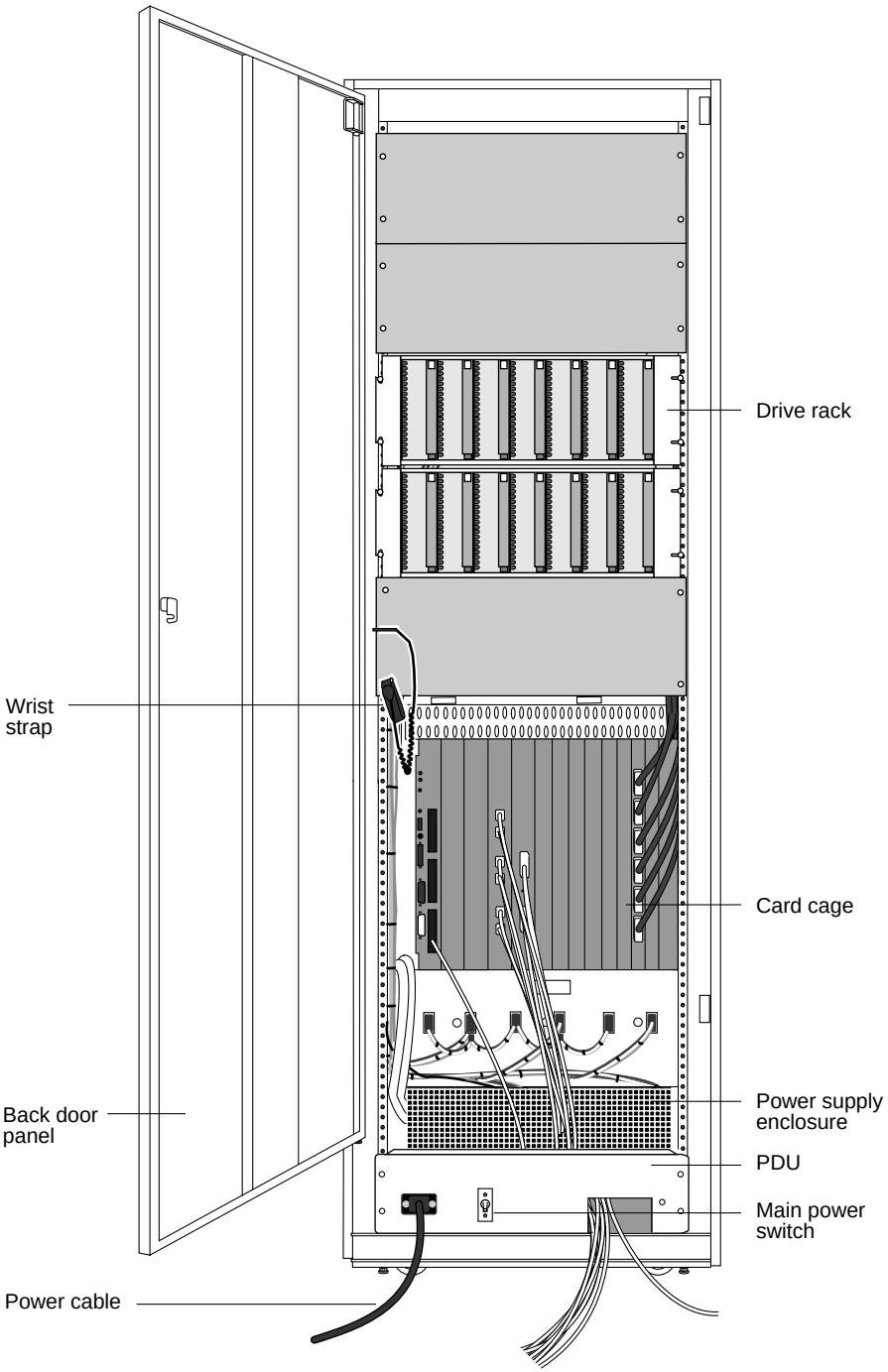

Figure 2-4. Base cabinet subassemblies (back view)

Expansion Cabinet Subassemblies

The NS 7000/050 and NS 7000/060 expansion cabinets contain the following subassemblies:

- Drive racks (up to 8 in the NS 7000/050 or up to 12 in the NS 7000/060)
- PDU
- NS 7000/060 power supply enclosure with one to three power supplies installed offering a nonredundant or optional redundant configuration
- NS 7000/050 power supply enclosure with power supply installed
- Optional redundant power supply enclosure with power supplies installed (NS 7000/052 only)

Figures 2-5 and 2-6 show the front and back views of an NS 7000/060 expansion cabinet with 12 drive racks.

Figures 2-7 and 2-8 show the front and back views of an NS 7000/050 expansion cabinet with eight drive racks.

Figures 2-9 and 2-10 show the front and back views of an NS 7000/052 expansion cabinet with eight drive racks and redundant power supplies.

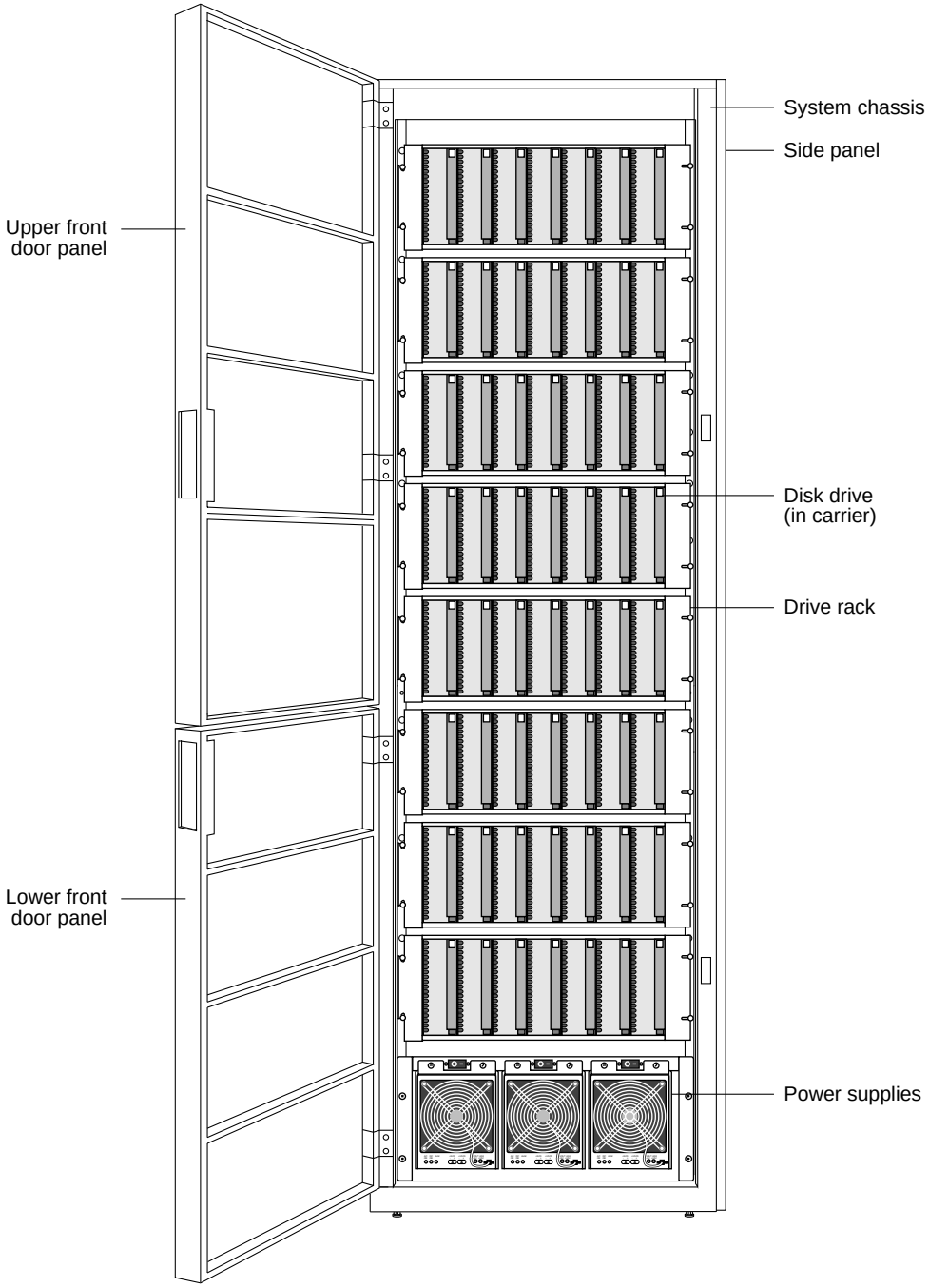

Figure 2-5. NS 7000/060 expansion cabinet (front view)

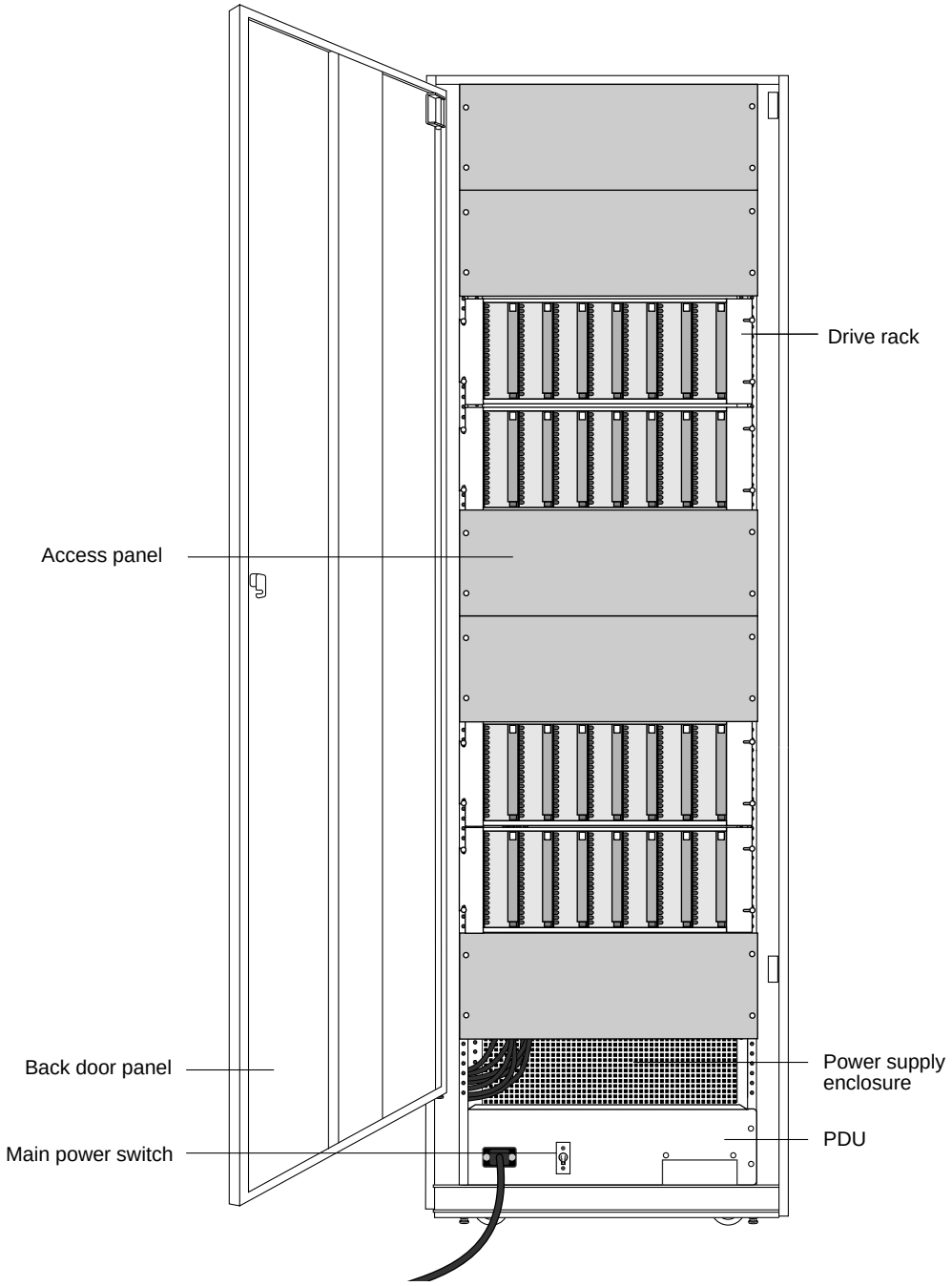

Figure 2-6. NS 7000/060 expansion cabinet (back view)

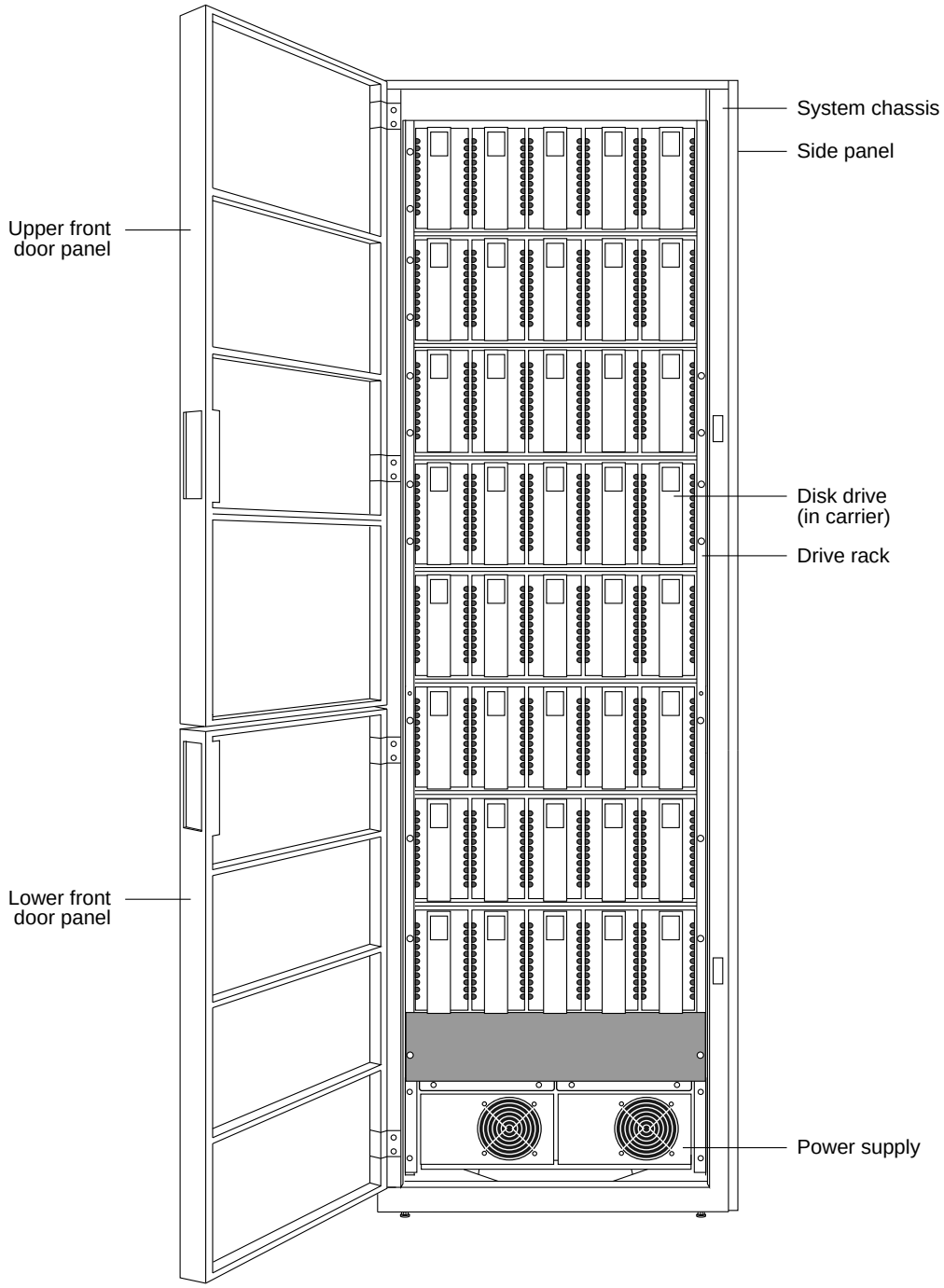

Figure 2-7. NS 7000/050 expansion cabinet (front view)

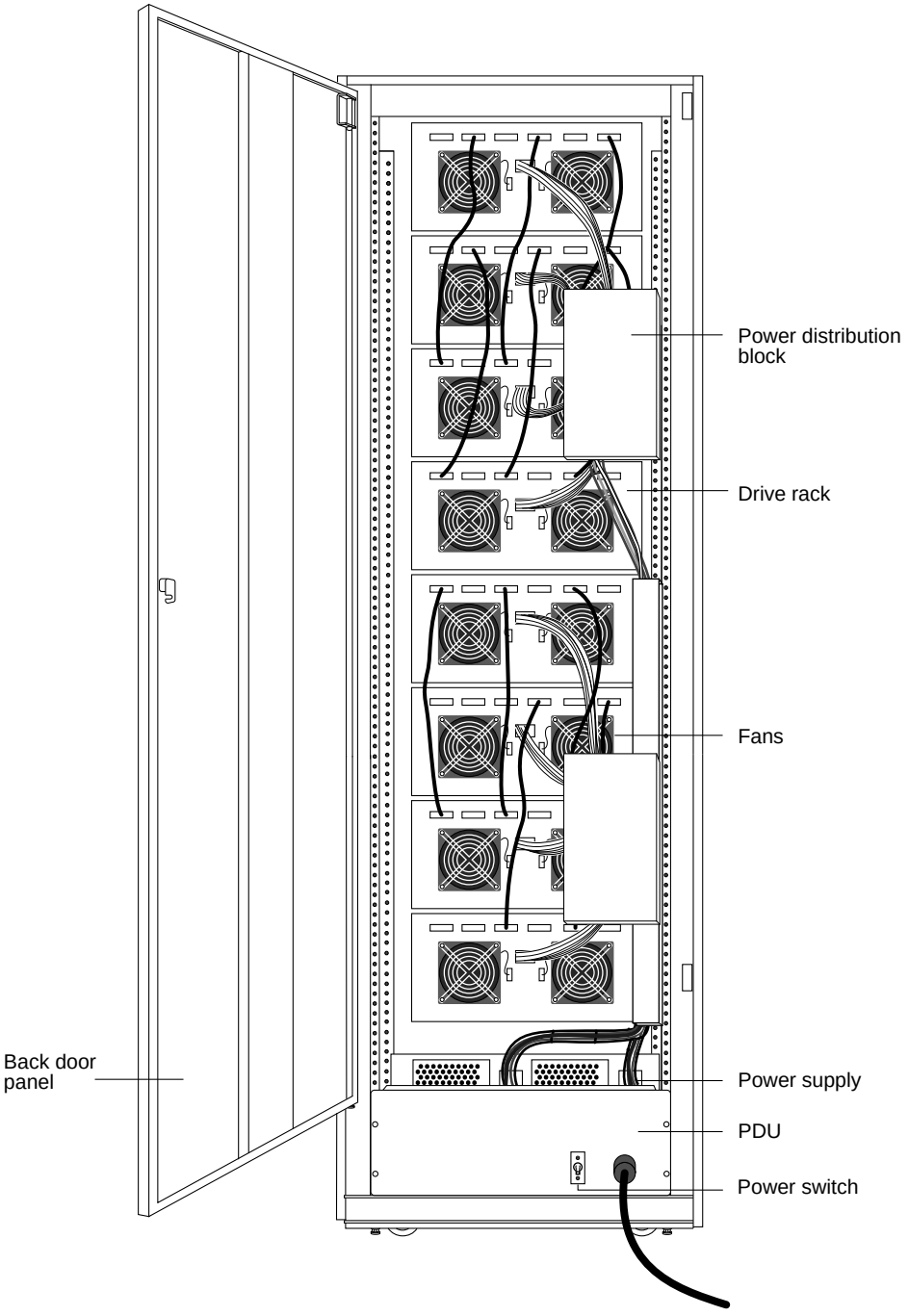

Figure 2-8. NS 7000/050 expansion cabinet (back view)

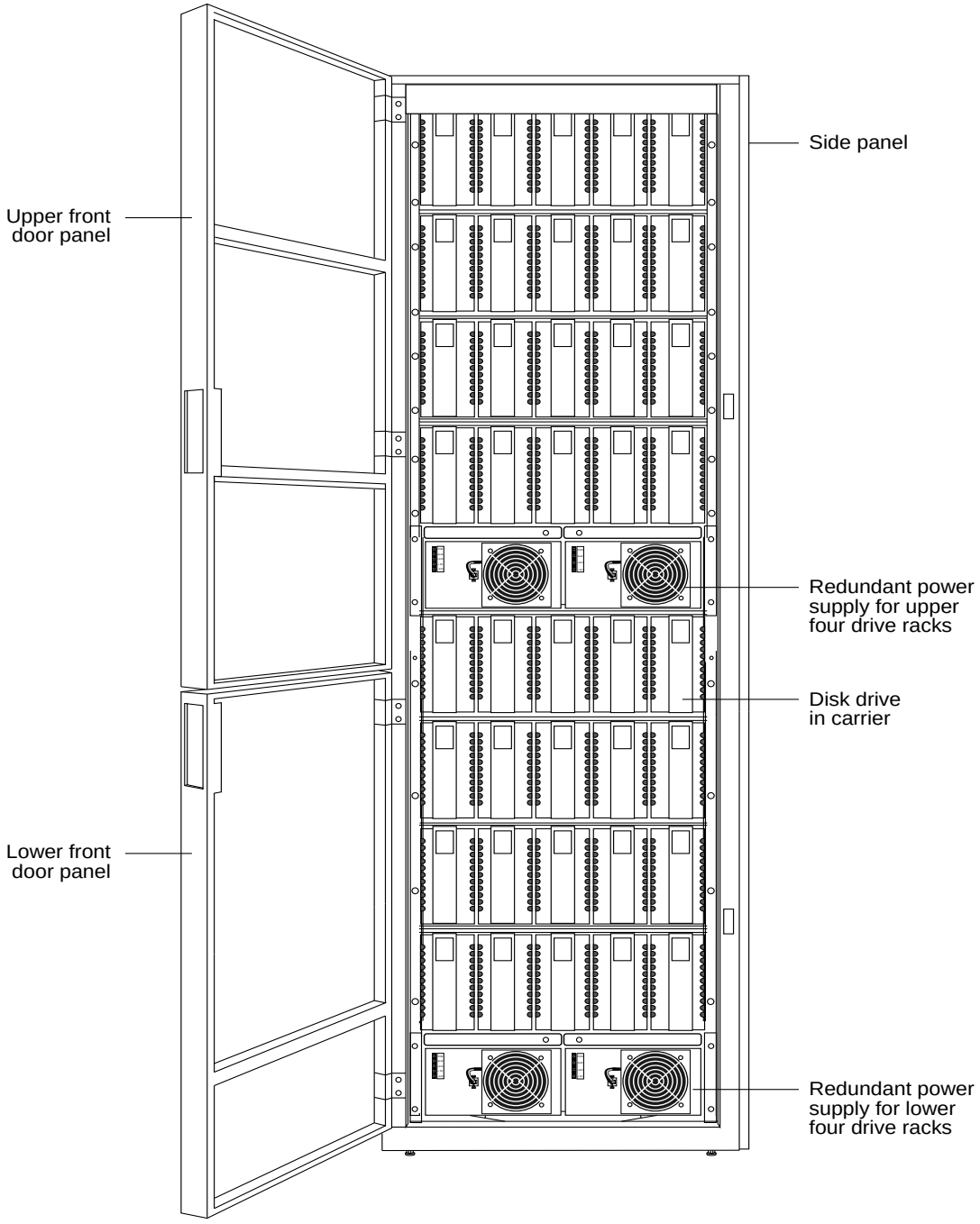

Figure 2-9. NS 7000/052 expansion cabinet (front view)

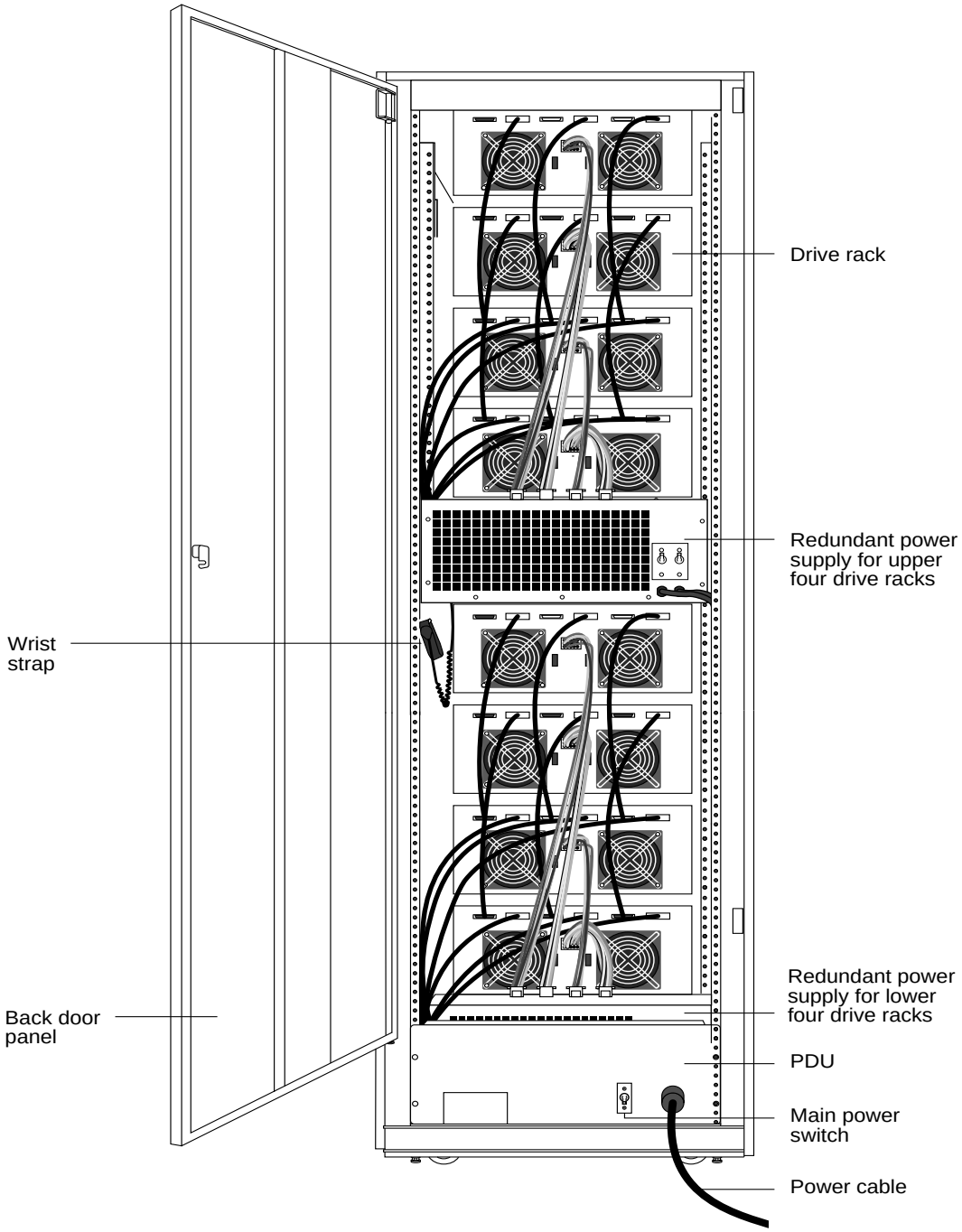

Figure 2-10. NS 7000/052 expansion cabinet (back view)

Card Cage Components

The NS 7000/700 card cage, houses the following VME compatible printed-circuit boards:

- HP (one)
- NP (up to five)
- SP (up to five)

Each of these boards, their functions, and minimum and maximum configurations are described as follows.

Host Processor

The NS 7000/700 has one HP VII or HP VIII with several features:

- 90-MHz (HP VII) or 125-MHz (HP VIII) SPARC processor
- Two or four memory modules of 16–128 MB each for up to 384 MB of host memory (see Table 2-1)

Table 2-1. Host Processor memory module configurations

Total memory (MB)	Number of 16-MB modules	Number of 32-MB modules	Number of 64-MB modules	Number of 128-MB modules
32	2	0	0	0
64	4	0	0	0
64	0	2	0	0
96	2	2	0	0
128	0	0	2	0
160	2	0	2	0
192	0	2	2	0
256	0	0	4	0
256	0	0	0	2
320	0	2	0	2
384	0	0	2	2

Caution: The HP does not support mixing single in-line memory modules (SIMMs). SIMMs must be installed in pairs of 16, 32, 64, or 128 MB.

- Accommodates up to three SBus cards, including three single, one double and one single, or one triple SBus card

Note: Contact your authorized Auspex service representative for information on supported SBus cards.

- Support for serial connections on ttya and ttyb
- Integrated Mbus design allowing for future upgrades of the HP CPU
- Support for up to seven Sun-supported SCSI devices on one SCSI port

- Support for tape storage devices

Figure 2-11 shows the front panel connectors on the Host Processor.

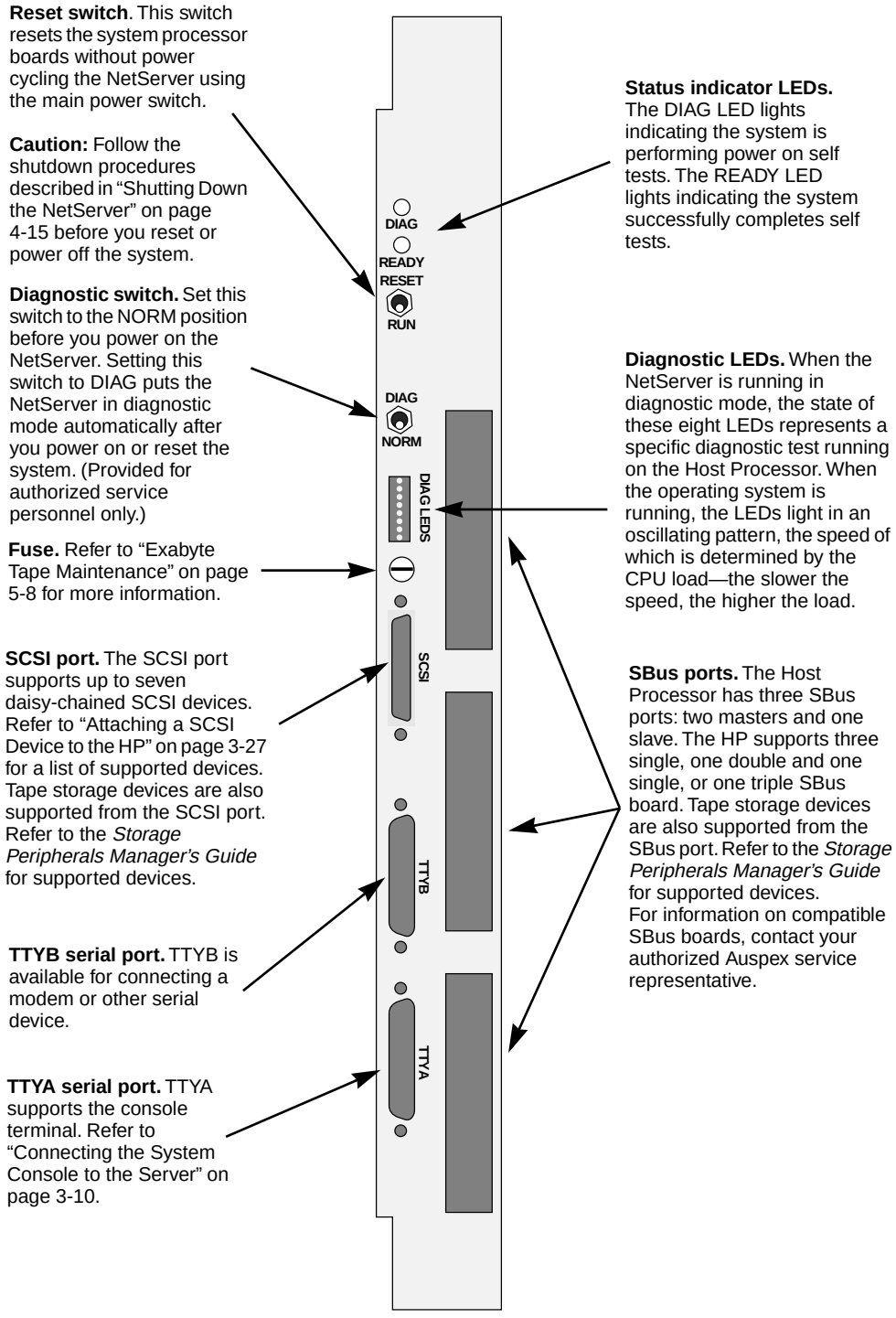

Figure 2-11. Host Processor front panel connectors

Network Processor

The NS 7000/700 uses one to five NP II, NP III, or NP IV boards, each supporting either Ethernet, FDDI, ATM, or any combinations of these interfaces.

Note: ATM and 100Base-T Ethernet require optional software. Refer to the documentation provided on the Auspex Premier Software Series CD-ROM for more information.

Table 2-2 shows an example of the supported network interfaces for the NP boards.

Table 2-2. Supported network interfaces

Number and type of interfaces supported	NP II	NP III	NP IV
2-Enet	Y	Y	Y
6-Enet	Y	Y	Y
1 FDDI, 4-Enet	Y	Y	Y
1 ATM, 4-Enet	Y	Y	Y
2 ATM, 2-Enet	Y	Y	Y
1 100BT, 4-Enet	Y	Y	Y
2 100BT, 2-Enet	Y	Y	Y
3 FDDI	N	Y	Y
3 ATM	N	Y	Y
3 Half-duplex 100BT	N	Y	Y
3 Full-duplex 100BT	N	Y	Y
2 Full-duplex 100BT, 2-Enet	Y	Y	Y
1 Full-duplex 100BT, 4-Enet	Y	Y	Y
1 Full-duplex 100BT, 1 FDDI	Y	Y	Y

Each NP has 64–256 MB of memory for protocol processing, file processing, and I/O cache memory. The NP III and NP IV have four or eight SIMMs of either 16 MB or 32 MB each. Memory must be installed in groups of four SIMMs of the same capacity. The NP II has one or two memory modules of either 64 MB or 128 MB each. Refer to Table 2-3 for supported memory configurations.

Table 2-3. Network Processor memory configurations

	NP IV/III		NP II	
Total memory (MB)	Number of 16-MB SIMMs	Number of 32-MB SIMMs	Number of 64-MB modules	Number of 128-MB modules
64	4	0	1	0
128	8	0	2	0
128	0	4	0	1
192	4	4	1	1
256	0	8	0	2

The NP III and NP IV have a VME transfer speed of up to 100 MB per second when operating in conjunction with an SP V board. The NP II has a VME transfer speed of up to 55 MB per second when operating in conjunction with either an SP IV or an SP V board.

Storage Processor

The NS 7000/700 uses one to five SP IV or SP V boards, each with six parallel SCSI channels for disk, tape, and CD-ROM drives. Each SP can have an optional Write Accelerator board added to enhance NFS write operations. The SP V supports the Write Accelerator II and Write Accelerator III, which have 2 and 8 MB of cache memory, respectively. The SP IV supports the Write Accelerator I, which has 1 MB of cache memory.

As an option, you can have up to two SP III-E boards, each with 10 parallel SCSI channels for disk, tape, and CD-ROM drives. The SP III-E has 1 MB of onboard memory for higher data throughput and supports the Write Accelerator I board.

The SP III-E and SP IV have a VME transfer speed of up to 55 MB per second when operating in conjunction with either an NP II, NP III, or NP IV. The SP V has a VME transfer speed of up to 100 MB per second when operating in conjunction with an NP III or NP IV.

Figure 2-12 shows a card cage configuration with network connections.

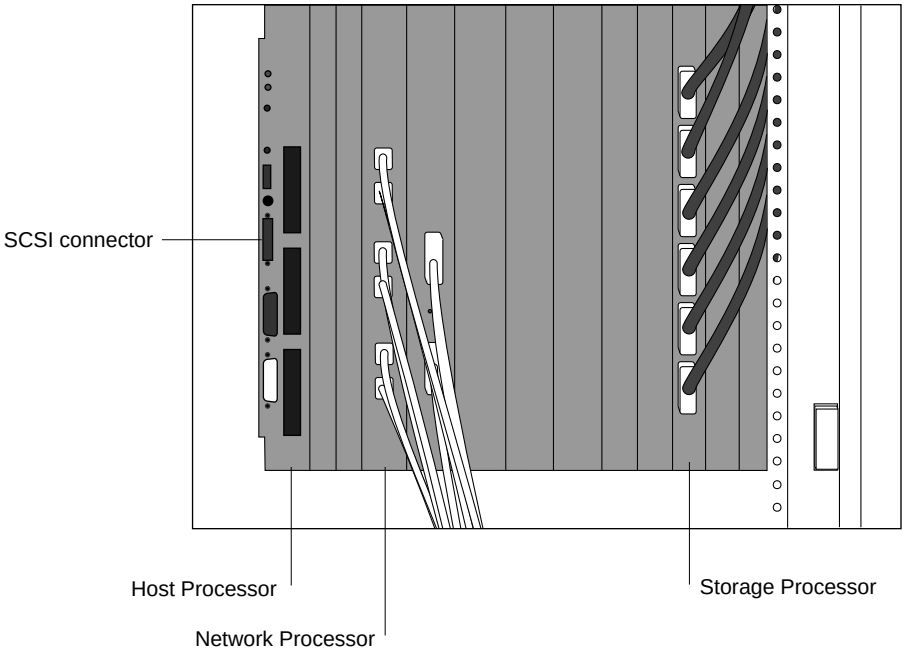

Figure 2-12. System processors

Processor Board Slot Assignments

This section explains the slot assignments for each processor board. For information on configurations, refer to "Processor Board Configurations" on page 1-5.

Table 2-4 shows the slot allocations listed for each processor board.

Table 2-4. Processor board slot allocations

	Slot													
Processor board	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Host Processor	■	■												
Network Processor					■	■	■	■	■	■				
Storage Processor			■	■								■	■	■

Caution: If you have a base cabinet with mixed expansion cabinets (that is, one NS 7000/060 expansion cabinet and one NS 7000/050 expansion cabinet), the SP III-E boards controlling the NS 7000/050 expansion cabinet are installed in slots 12 and 13. SP III-E boards *must* occupy higher-numbered slots than the NP boards to function properly.

If you have a base cabinet with one expansion cabinet

- The Host Processor board is installed in slots 1 and 2.
- Starting in slot 5, Network Processor boards are installed (up to five).
- Slot 11 is reserved for future use.
- Starting in slot 12, Storage Processor boards are installed (up to three).

Note: Slots 2 and 10 are not accessible individually. Slots 5, 6, 7, and 8 are double-width slots. Slots 9 and 10 serve as the fifth double-width slot for NP boards.

If you have a base cabinet with two expansion cabinets

- The Host Processor is installed in slots 1 and 2.
- The fourth and fifth Storage Processor boards are installed in slots 3 and 4 (numbered SP3 and SP4 by the system software).
- Starting in slot 5, Network Processor boards are installed (up to five).
- Slot 11 is reserved for future use.
- Starting in slot 12, the first three Storage Processor boards are installed (numbered SP0, SP1, and SP2 by the system software).

Note: Slots 2 and 10 are not accessible individually. Slots 5, 6, 7, and 8 are double-width slots. Slots 9 and 10 serve as the fifth double-width slot for NP boards.

Power Supply Configurations

This section describes the redundant and nonredundant power supply requirements for the base cabinet and NS 7000/060 expansion cabinet and the redundant configuration for the NS 7000/052 expansion cabinet.

In a redundant configuration, if one power supply fails, the remaining power supply keeps the NetServer operating. When this occurs, the failed power supply can be hot-plugged while the server is running off the remaining supply. Power supplies can also be hot-plugged when your configuration requires additional power.

Base Cabinet and NS 7000/060 Expansion Cabinet

The base cabinet and NS 7000/060 expansion cabinet support up to three power supplies each. These power supplies share the power requirements of the NetServer.

Note: If you need to install or replace a power supply, contact your authorized Auspex service representative.

Table 2-5 lists the number of power supplies needed to operate the base cabinet in a nonredundant state. For redundant operation, add an additional power supply.

Table 2-5. Base cabinet power supply configuration rules

	Number of power supplies required								
Number of drive racks installed	Number of processor boards installed								
	3	4	5	6	7	8	9	10	11
1	1	1	1	1	2	2	2	2	2
2	1	1	1	2	2	2	2	2	2
3	1	1	2	2	2	2	2	2	2
4	1	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2

Table 2-6 lists the number of power supplies needed to operate the NS 7000/060 expansion cabinet in nonredundant and redundant states.

Table 2-6. NS 7000/060 expansion cabinet power supply configuration rules

Number of drive racks installed	Number of power supplies needed	
	Nonredundant operation	Redundant operation
1	1	2
2	1	2
3	1	2
4	1	2
5	1	2
6	1	2
7	2	3
8	2	3
9	2	3
10	2	3
11	2	3
12	2	3

Empty power supply slots are covered with an access panel for proper air flow and EMI reduction.

For inspection procedures and maintenance instructions for the power supplies, refer to "Redundant Power Supply Operation" in Chapter 5.

NS 7000/052 Expansion Cabinet

The NS 7000/052 is configured at the factory with two or four power supplies (each pair supports an array of up to 20 drives). Two power supplies are located below the bottom drive rack (drive rack 1). They share the current demands of the drive arrays in the lower four drive racks. If one of the power supplies fail, the remaining supply keeps the system operating.

Note: Adding or replacing a power supply in the NS 7000/052 requires shutting down the NetServer.

If the upper four drive racks are installed in the expansion cabinet, two power supplies are located between drive racks 4 and 5 to provide power to the additional drive arrays (refer to Figure 2-9 on page 2-16 for power supply locations).

For more information on redundant supplies, refer to "Redundant Power Supply Operation" in Chapter 5.

3 Installation

About This Chapter

This chapter describes installing NetServer components. It does not describe installing card cage components, such as processor boards and memory modules.

This chapter covers the following sections:

- Grounding the NetServer
- Installing the Antistatic Wrist Strap
- Connecting the SCSI Drive Cables from the Expansion Cabinet
- Connecting the System Console to the Server
- Connecting the NetServer to the Network
- Installing Drives
- Attaching a SCSI Device to the HP

Note: The NetServer is configured at the factory to match your order. Additional processor boards, processor board memory, and drives are available as optional equipment. If you are adding or replacing a board or module in your NetServer, contact your authorized Auspex service representative for assistance.

Caution: Do not cut the black or white tie-wraps. The black and white tie-wraps hold bundles of cables together and keep them out of the way during system operation and drive installation. Throughout the procedures in this chapter, when you are instructed to cut tie-wraps to free needed cables or components, remember to cut only red tie-wraps.

For installation at sites with raised flooring, the base cabinet and expansion cabinet have a floor access panel that can be removed, allowing the NetServer cabling to pass through the hole in the floor of the cabinet. For assistance with removing the floor access panel, contact your authorized Auspex service representative.

Grounding the NetServer

This section provides instructions for grounding the base cabinet. You must plug in the power cord for each cabinet to create a ground path for the antistatic wrist strap.

Warning: The wiring at your site must provide for ground fault protection.

Tools

- Knife to open the packing boxes containing drives and accessories
- Wire cutter to cut tie-wraps (cut only red tie-wraps)
- 3/16-inch flat-blade screwdriver to attach the console cable
- 7/16-inch nut driver
- #2 Phillips screwdriver

1. Locate the main power switch on the PDU at the bottom of the base cabinet, and set it to OFF (O). Figure 3-1 shows the location of the switch in the base cabinet.

Caution: Use the main power switch on the PDU only. The switch at the top of each power supply should always be ON (—).

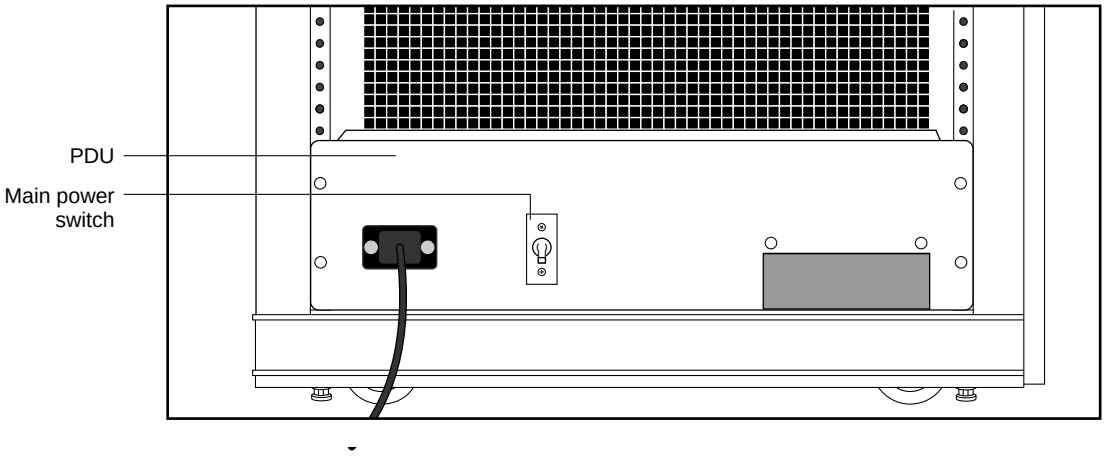

Figure 3-1. Main power switch (back view of base cabinet)

2. If your NetServer includes an expansion cabinet, locate the main power switch on the PDU at the bottom of the expansion cabinet. Set this switch to OFF (O). Figure 3-2 shows the location of the switch in the expansion cabinet.

Caution: Use the main power switch on the PDU only. For the NS 7000/060 expansion cabinet, the switch at the top of each power supply located should always be ON (—).

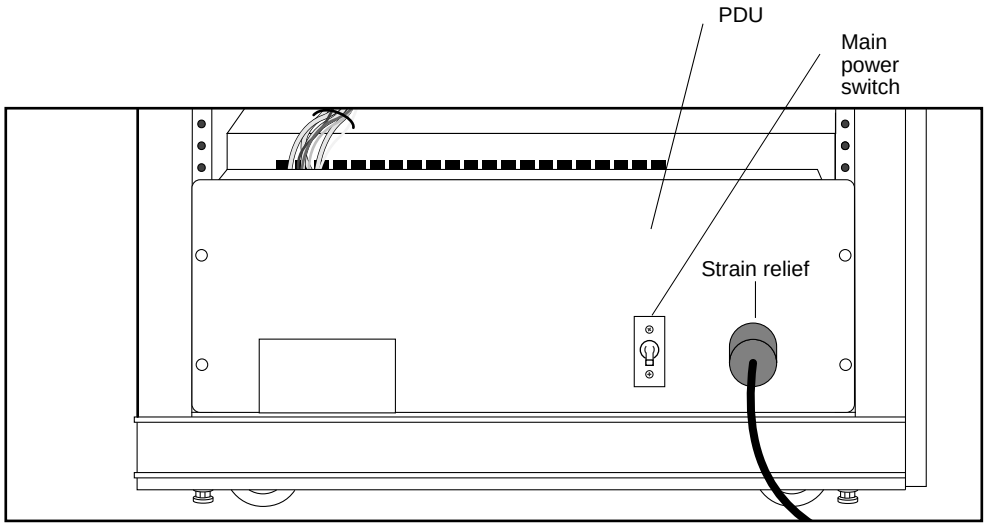

Figure 3-2. Main power switch (back view of expansion cabinet)

3. Locate the power cable for each cabinet.

   On the base cabinet, the cable is hanging on the left side of the cabinet, secured with red tie-wraps. On the expansion cabinet, the cable is coiled on top of the panel covering the power supply.

4. Cut the red tie-wraps to release the power cable, and plug the appropriate end to the back of the PDU.

5. Tighten the strain relief surrounding the plug at the PDU.

6. After ensuring the power to the system is off, route each power cable to a separate grounded outlet, and plug it in. The outlet must be on a 16 amp-rated circuit for the base cabinet and the NS 7000/060 expansion cabinet, and a 20 amp-rated circuit for the NS 7000/050 expansion cabinet.

Caution: Do not power on the server at this time. You connected the power cable only to provide a ground path for the antistatic wrist strap. Do not power on the NetServer until instructed to do so later in this manual.

This concludes the procedure for grounding the NetServer. Proceed to section “Installing the Antistatic Wrist Strap” on page 3-4.

Installing the Antistatic Wrist Strap

This section provides procedures for installing the antistatic wrist strap. To prevent electrostatic damage to the NetServer, always wear the antistatic wrist strap when you come in contact with electrostatic-sensitive equipment.

Note: The wrist strap cannot prevent electrostatic damage to system components until the power cable is plugged into a grounded power receptacle.

The base cabinet and expansion cabinets have two wrist strap jacks each, one on the left chassis frame rail inside the upper front door and one on the left chassis frame rail inside the back door.

One wrist strap is provided with each cabinet. On the base cabinet, the strap is attached to the back jack. On the expansion cabinet, the strap is attached to the front jack.

1. Cut the red tie-wraps holding the wrist strap to the chassis frame rail hook.
2. To use the wrist strap, remove the strap from the hook and slide it around your wrist, as shown in Figure 3-3.

Note: When you are not using the wrist strap, remember to hang it on the hook.

3. As you move between the front and back of the system, you can unplug the wrist strap from one jack into another.

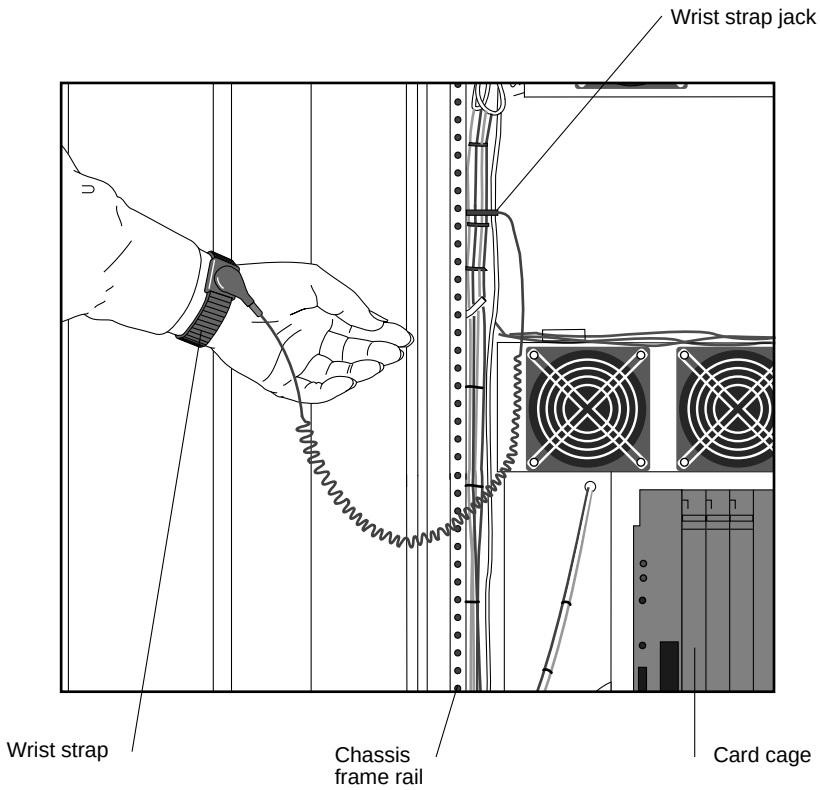

Figure 3-3. Antistatic wrist strap

Connecting the SCSI Drive Cables from the Expansion Cabinet

Optional expansion cabinets are available from Auspex. This section describes how to connect the cables to the Storage Processor boards in the base cabinet and how to route the SCSI cables from each expansion cabinet to the base cabinet. The procedure assumes that the base cabinet and the expansion cabinet are properly connected.

Note: If you need to connect an expansion cabinet to the base cabinet, contact your authorized Auspex service representative.

The SCSI cables from the NS 7000/060 expansion cabinet must be connected to an SP IV or SP V board in the base cabinet. The SCSI cables from the NS 7000/050 expansion cabinet must be connected to an SP III-E board.

NS 7000/060 Expansion Cabinet SCSI Cabling

The NS 7000/060 expansion cabinet is shipped with twelve SCSI cables installed inside the cabinet. The following procedure describes how to connect the SCSI cables to the SP IV or SP V board in the base cabinet. The procedure assumes that the base cabinet and the expansion cabinet are properly connected.

To connect SCSI cables to an SP IV or SP V board in the base cabinet

1. Locate the SCSI drive cables tie-wrapped to the left side of the expansion cabinet inside the back door.
2. Cut the red tie-wraps securing the cables.
3. Route the free end of each SCSI cable through the open side of the expansion cabinet and into the open side of the base cabinet.
4. Gently pull the cable in through the open side of the base cabinet, being careful to avoid bending it in a tight radius. Leave a small amount of slack in the cable inside the expansion cabinet.
5. Connect each cable to the SP IV or SP V connector indicated on the label affixed to the cable. Table 3-1 lists all the cable connections to the SP boards from drive racks in the first and second NS 7000/060 expansion cabinets.

   Refer to Appendix A for the drive rack numbering scheme. For more information on connecting SCSI cables, refer to Appendix B.

   Note: Verify that the SCSI cable has been routed from the proper expansion cabinet. The first expansion cabinet is to the right of the base cabinet when viewed from the back. The second expansion cabinet is to the left.

This concludes the procedure for connecting SCSI cables to an SP IV or SP V board in the base cabinet.

Table 3-1. Drive rack SCSI cable connections

NetServer cabinet	SCSI rack (bank)	SCSI cable connection: end 1	Storage Processor position in card cage*	Connection on Storage Processor board	SCSI cable connection: end 2
First expansion cabinet	1	Bank 1	Second SP (SP1)	J1	SP1J1/Bank1
	2	Bank 2	Second SP (SP1)	J2	SP1J2/Bank2
	3	Bank 3	Second SP (SP1)	J3	SP1J3/Bank3
	4	Bank 4	Second SP (SP1)	J4	SP1J4/Bank4
	5	Bank 5	Second SP (SP1)	J5	SP1J5/Bank5
	6	Bank 6	Second SP (SP1)	J6	SP1J6/Bank6
	7	Bank 7	Third SP (SP2)	J1	SP2J1/Bank7
	8	Bank 8	Third SP (SP2)	J2	SP2J2/Bank8
	9	Bank 9	Third SP (SP2)	J3	SP2J3/Bank9
	10	Bank 10	Third SP (SP2)	J4	SP2J4/Bank10
	11	Bank 11	Third SP (SP2)	J5	SP2J5/Bank11
	12	Bank 12	Third SP (SP2)	J6	SP2J6/Bank12
Second expansion cabinet	1	Bank 1	Fourth SP (SP3)	J1	SP3J1/Bank1
	2	Bank 2	Fourth SP (SP3)	J2	SP3J2/Bank2
	3	Bank 3	Fourth SP (SP3)	J3	SP3J3/Bank1
	4	Bank 4	Fourth SP (SP3)	J4	SP3J4/Bank4
	5	Bank 5	Fourth SP (SP3)	J5	SP3J5/Bank5
	6	Bank 6	Fourth SP (SP3)	J6	SP3J6/Bank6
	7	Bank 7	Fifth SP (SP4)	J1	SP4J1/Bank7
	8	Bank 8	Fifth SP (SP4)	J2	SP4J2/Bank8
	9	Bank 9	Fifth SP (SP4)	J3	SP4J3/Bank9
	10	Bank 10	Fifth SP (SP4)	J4	SP4J4/Bank10
	11	Bank 11	Fifth SP (SP4)	J5	SP4J5/Bank11
	12	Bank 12	Fifth SP (SP4)	J6	SP4J6/Bank12

* SP0, SP1, SP2, SP3, and SP4 are located in card cage slots 12, 13, 14, 3, and 4, respectively.

Figure 3-4 shows an NS 7000/060 expansion cabinet connected to an NS 7000/700 base cabinet.

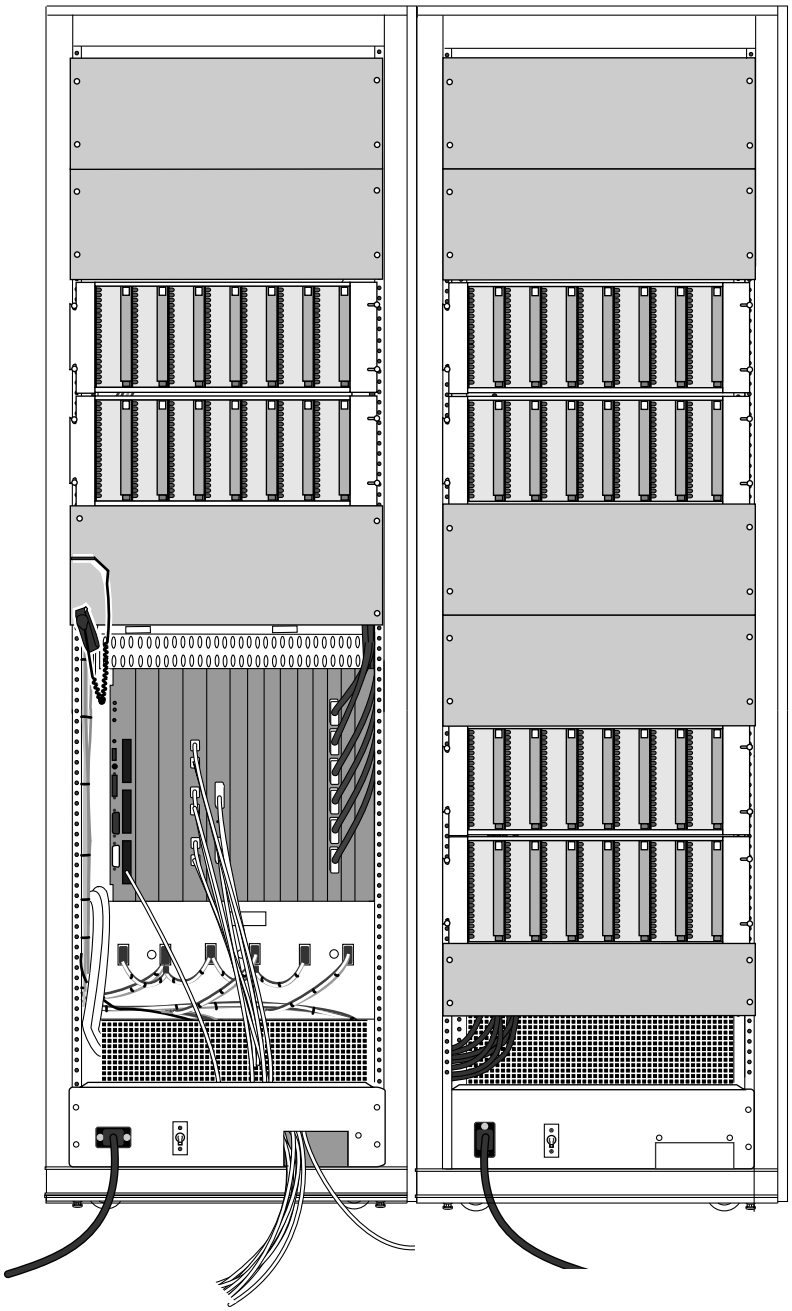

Figure 3-4. Back view of connected cabinets

NS 7000/050 Expansion Cabinet SCSI Cabling

The NS 7000/050 expansion cabinet is shipped with twelve SCSI cables installed inside the cabinet. The following procedure describes how to connect the SCSI cables to the SP III-E board in the base cabinet. The procedure assumes that the base cabinet and the expansion cabinet are properly connected.

Note: The NS 7000/050 expansion cabinet must be installed to the right of the base cabinet when viewed from the back.

To connect SCSI cables to an SP III-E board in the base cabinet

1. Locate the SCSI drive cables tie-wrapped to the left side of the expansion cabinet inside the back door.
2. Cut the red tie-wraps securing the cables.
3. Route the free end of each SCSI cable through the open side of the expansion cabinet and into the open side of the base cabinet.
4. Gently pull the cable in through the open side of the base cabinet, being careful to avoid bending it in a tight radius. Leave a small amount of slack in the cable inside the expansion cabinet.
5. Connect each cable to the SP III-E connector indicated on the label affixed to the cable. Table 3-2 lists all the cable connections to the SP III-E board from the drive racks in the NS 7000/050 expansion cabinet.

   Refer to Appendix A for the drive rack numbering scheme. For more information on connecting SCSI cables, refer to Appendix B.

Note: Verify that the SCSI cable has been routed from the proper expansion cabinet. The first expansion cabinet is to the right of the base cabinet when viewed from the back. The second expansion cabinet is to the left.

This concludes the procedure for connecting SCSI cables to an SP III-E board in the base cabinet.

Table 3-2. Connecting SCSI cables from the NS 7000/050

Drive rack connector on the NS 7000/050	Storage Processor III-E connector*
Rack 1 J0	SP1 J1
Rack 1 J2	SP1 J2
Rack 1 J4	SP1 J3
Rack 2 J0	SP1 J4
Rack 2 J2	SP1 J5
Rack 2 J4	SP1 J6
Rack 5 J0	SP2 J1
Rack 5 J2	SP2 J2
Rack 5 J4	SP2 J3
Rack 6 J0	SP2 J4

Table 3-2. Connecting SCSI cables from the NS 7000/050 (Continued)

Drive rack connector on the NS 7000/050	Storage Processor III-E connector*
Rack 6 J2	SP2 J5
Rack 6 J4	SP2 J6

* SP1 and SP2 are located in slots 13 and 14, respectively.

Note: Drive racks 3, 4, 7, and 8 are not listed in the table because they are daisy-chained from racks 1, 2, 5, and 6, respectively, and are not connected directly to an SP III-E board. Refer to Appendix B for more information.

Connecting the System Console to the Server

This section explains how to connect the system console to the NetServer. Auspex provides an ANSI-compatible DEC VT510 terminal with each NetServer for use as a system console. If you wish to use another type of terminal as a console, call your authorized Auspex service representative for information.

Table 3-3 lists the key setup parameters necessary to configure any console for use with the NetServer. The setup parameters are preconfigured for consoles purchased from Auspex.

Table 3-3. Console setup parameter values

Parameter	Value
Handshake	XON/XOFF
Mode	Full duplex
Data bits	8
Stop bit	1
Parity bit	None
Modem port	9600 bps
Compatible mode	ANSI

To connect the DEC VT510 console to the server

1. Place the packing box containing the console near the server.
2. Remove the console and its components from the packing box.
3. Attach the keyboard and power cable to the console, as described in the console's user manual.

Caution: Do not power on the console at this time.

4. Remove the console cable from its packing box.
5. Open the back door of the base cabinet, and put on the antistatic wrist strap.
6. Route one end of the console cable through the opening in the PDU at the back of the cabinet, as shown in Figure 3-5.

Note: In raised-floor environments, the cable can be routed through the floor panel of the server. Contact your authorized Auspex service representative for assistance.

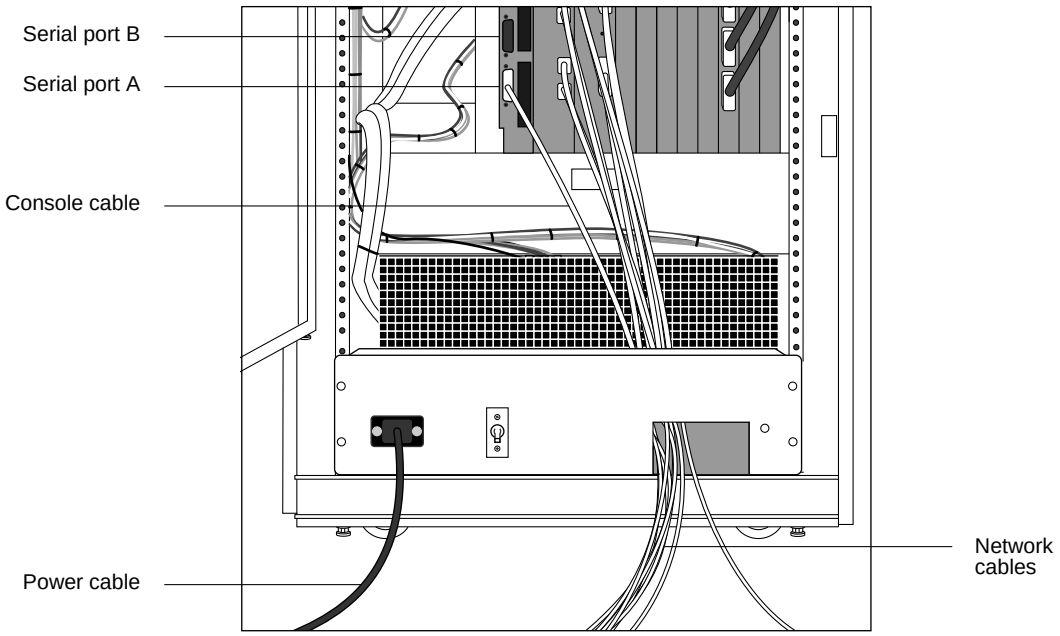

Figure 3-5. Routing cables to the NetServer

7. Attach the console cable to the connector on the HP labeled **TTYA** (serial port A).
8. Hang up the wrist strap, and close the back door of the base cabinet.
9. Attach the free end of the console cable to the left connector at the back of the console labeled **Comm 1**.
10. Make sure the console power cord is properly connected to the console, and plug it into a grounded power outlet.

Caution: Do not use the utility outlets on the back of the PDU to power peripherals such as the console unless the console can accept the same voltage as the wall receptacle. If there is a mismatch in voltage, you can damage the peripheral.

11. Power on the console.

Note: If you did not purchase your console from Auspex, you need to configure the console as described in Appendix C.

This concludes the procedure for connecting the system console to the NetServer. Proceed to the section "Connecting the NetServer to the Network" on page 3-12.

Connecting the NetServer to the Network

This section provides instructions for connecting the NetServer to your network. It assumes the appropriate network is already installed at your site.

Note: Auspex does not supply network cables. For network cable specifications, refer to Appendix B.

The NetServer supports NFS file service through Ethernet, FDDI, and ATM networks. The FDDI networks supported are fiber dual-attach station (DAS) and both fiber and MLT-3 single-attach station (SAS). The Ethernet networks supported are 10Base-T and 100Base-T (half or full duplex). The ATM networks supported are fiber.

Note: ATM and 100Base-T require optional software (refer to the documentation provided on the Auspex Premier Software Series CD-ROM for more information on these optional products).

Connecting Network Cables to the NetServer

To connect the network cables to the NetServer base cabinet

1. Open the back door of the base cabinet.
2. Attach the antistatic wrist strap to your wrist to protect against possible static damage to the equipment.
3. Route each network cable to the back of the NetServer, being careful not to bend the cable in a tight radius (see Figure 3-5 on page 3-11).

   In raised-floor environments, cables can be routed through the floor panel of the server. Contact your authorized Auspex service representative for assistance.
4. Attach each network cable to the appropriate connector on the NP boards. Leave a small amount of slack in the cable inside the cabinet.

   Note: The FDDI-SAS port for a fiber connection is a single-attach station of "Type S." Connect the FDDI-SAS only to a Type M FDDI concentrator port.

   The FDDI-DAS ports are a dual-attach station. You can connect directly to the primary and secondary FDDI rings or to "Type M" ports on two concentrators in a dual-attached configuration.

   Note: The ATM connector uses a 155 MB-per-second multimode fiber cable with an SC-type connector. If your site uses ST-type ATM cabling, you need an ST-to-SC converter.
5. Hang up the wrist strap, and close the back door of the base cabinet.

6. After powering on the NetServer as described in Chapter 4, you can test the connection between the NetServer and the network by running **NSconfig**.

Note: For more information on **NSconfig**, refer to your *System Manager's Guide*.

This concludes the procedure for connecting network cables to the NetServer.

Figures 3-6 through 3-13 show cable connections to network interfaces on the processor boards.

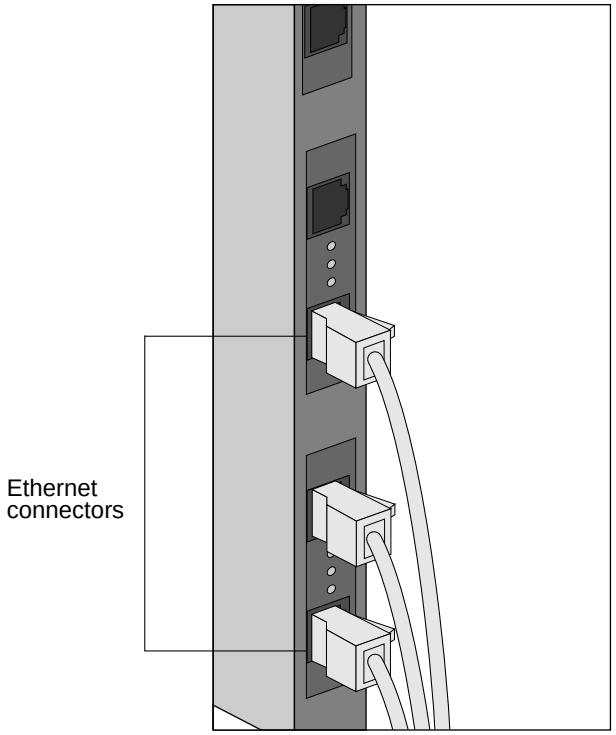

Figure 3-6. Connection to 10Base-T Ethernet ports

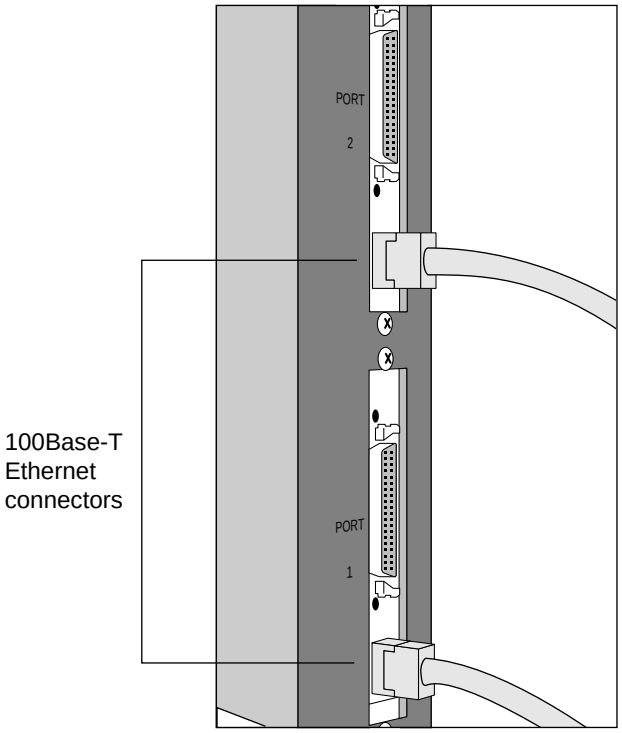

Figure 3-7. Connection to 100Base-T Ethernet ports

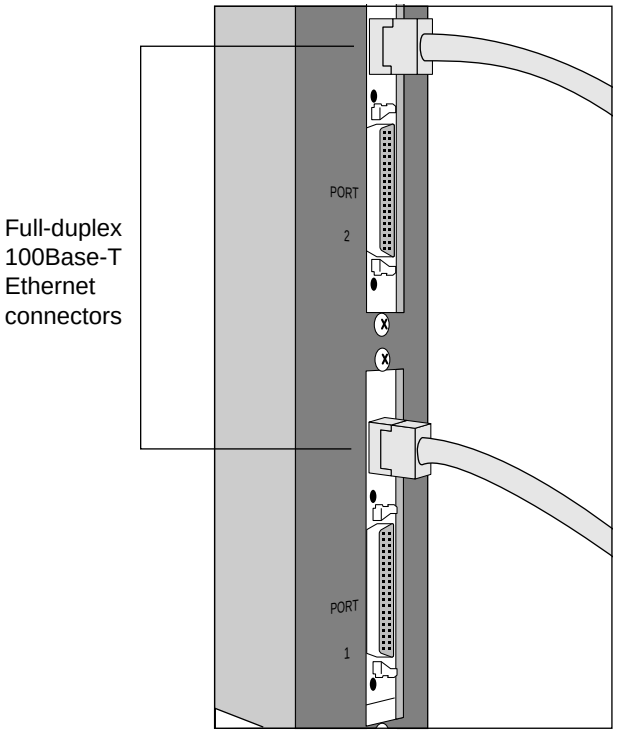

Figure 3-8. Connection to full-duplex 100Base-T ports

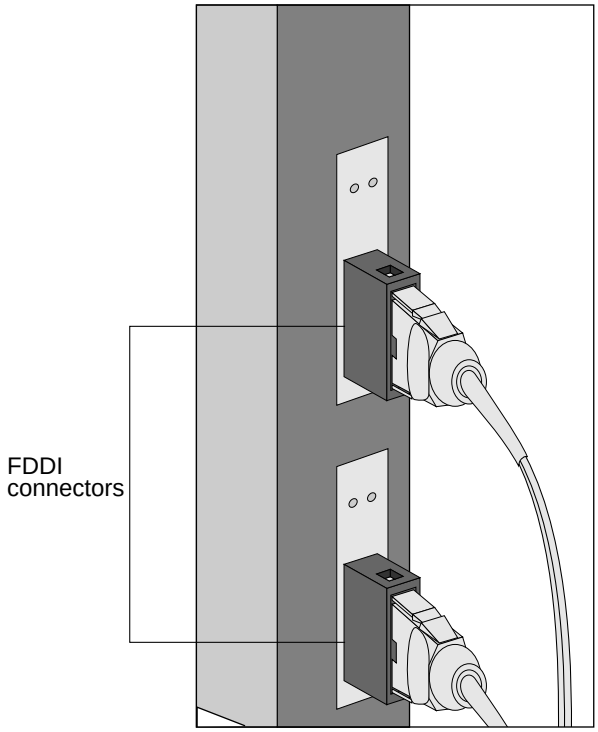

Figure 3-9. Connection to FDDI (fiber) ports

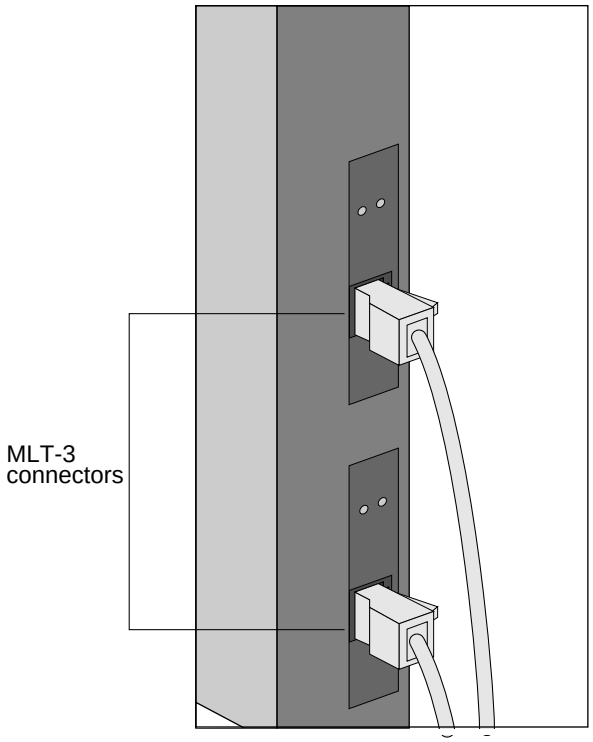

Figure 3-10. Connection to FDDI (MLT-3) ports

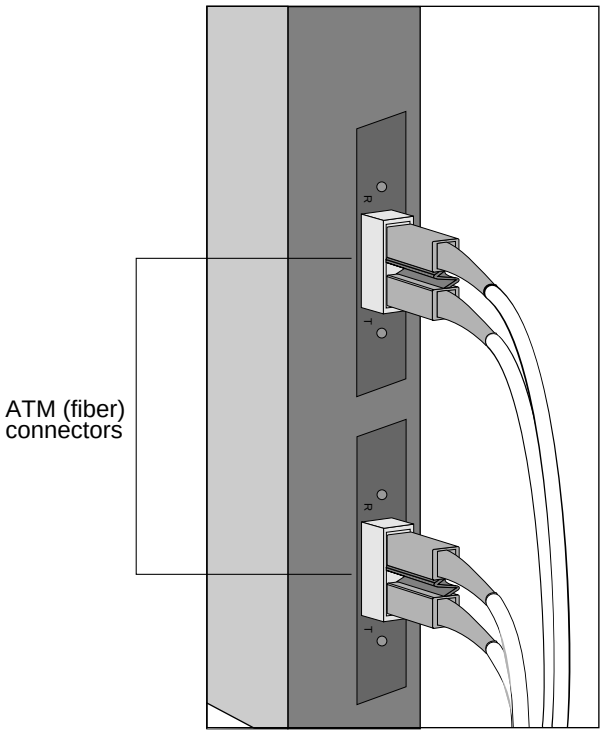

Figure 3-11. Connection to ATM (fiber) ports

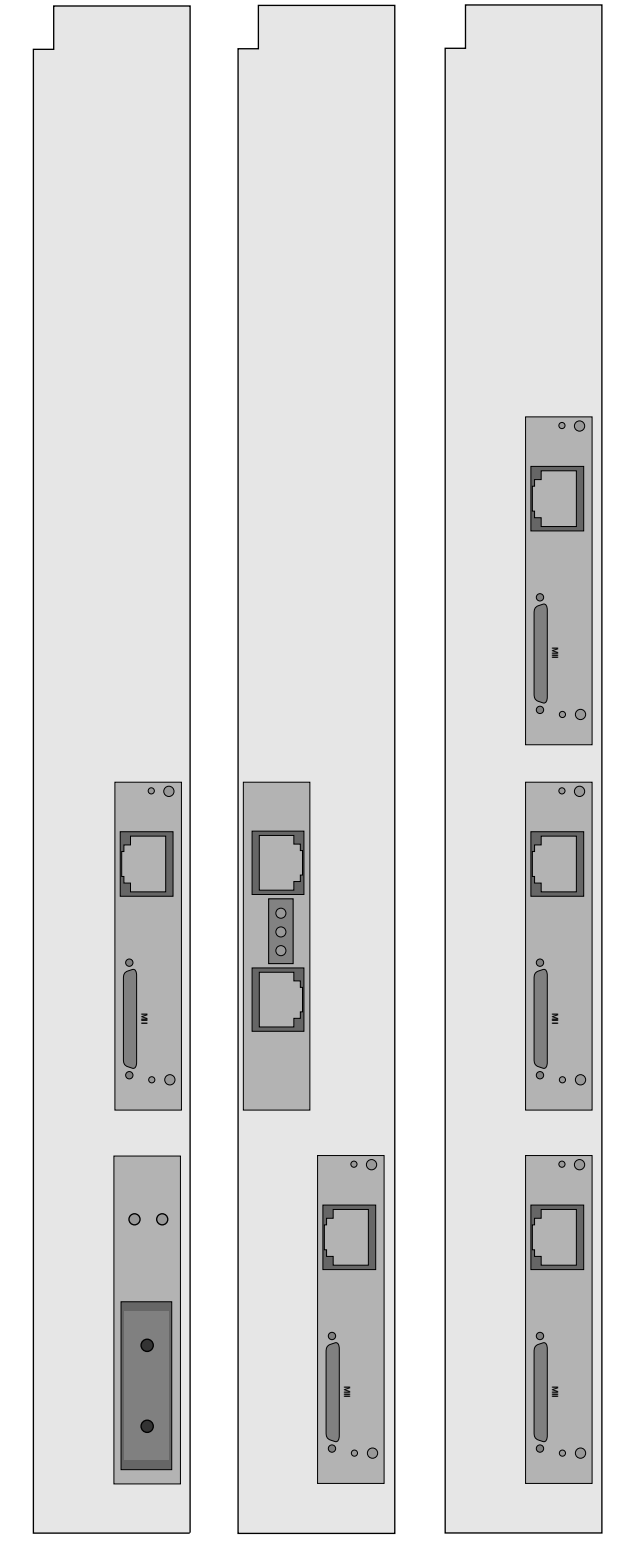

Figure 3-12. Mixed NP network interfaces

Network Interface Numbering

Each NetServer network interface has a unique identifier within each type of connection: 10Base-T or 100Base-T (half or full duplex) Ethernet, FDDI, and ATM. These interface numbers are used when configuring the system software. Each numbering scheme is described as follows.

10Base-T Ethernet	Interfaces are numbered within the range from ae0 to ae*n*, where 0 is the lower 10Base-T Ethernet port closest to the HP, and *n* is the upper 10Base-T Ethernet port farthest from the HP.
Half-duplex 100Base-T Ethernet	Interfaces are numbered within the range from afe0 to afe*n*, where 0 is the lower 100Base-T Ethernet port closest to the HP, and *n* is the upper 100Base-T Ethernet port farthest from the HP.
Full-duplex 100Base-T Ethernet	Interfaces are numbered within the range from ahme0 to ahme*n*, where 0 is the lower 100Base-T Full Duplex port closest to the HP, and *n* is the upper 100Base-T Full Duplex port farthest from the HP.
FDDI	Interfaces are numbered within the range from afddi0 to afddi*n*, where 0 is the lower FDDI port closest to the HP, and *n* is the upper FDDI port farthest from the HP.

Note: In DAS configurations, only one port is assigned an interface number although two ports exist on the FDDI-DAS board.

ATM	Each port has two kinds of interfaces: one primary interface (called the FORE IP interface) and four virtual interfaces. The primary interfaces are numbered within the range from afa0 to afa*n*, where 0 is the lower ATM port closest to the HP, and *n* is the upper ATM port farthest from the HP. The virtual interfaces are numbered within the range from aqa0 to aqa7.

Figure 3-13 shows an example of how network interfaces are numbered.

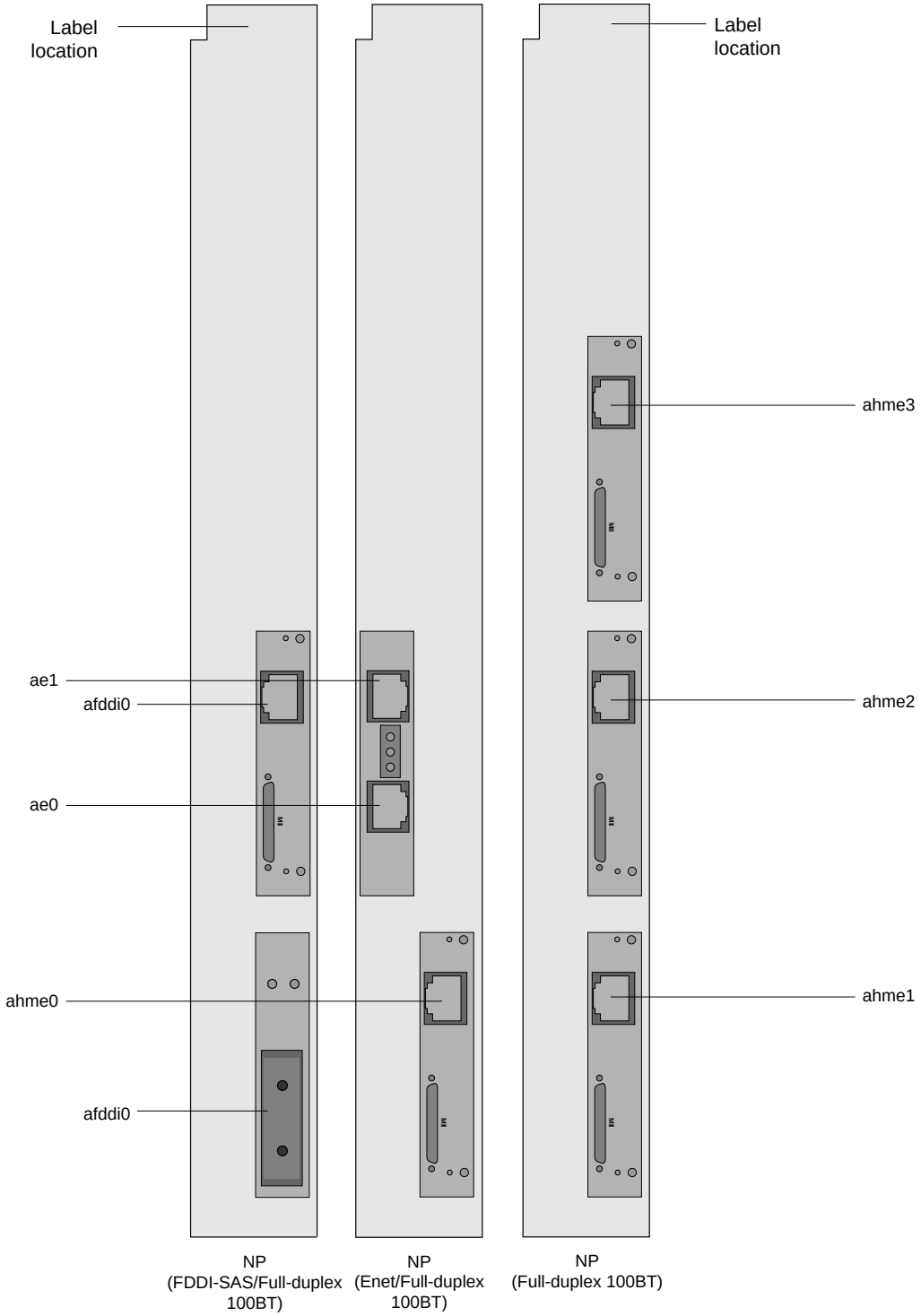

Figure 3-13. Mixed NP interface numbering

Ethernet Addresses

Each Ethernet port has a unique Ethernet address assigned at Auspex. At the top of each installed NP with Ethernet ports is a label that gives the serial number of the board and Ethernet address for the interface located at the bottom of the board (for example, ahme0 in Figure 3-13). This address ends with 0. This numbering scheme continues up to the top interface, which has a network address ending with 3.

All Auspex Ethernet addresses start with 00:00:3c.

Table 3-4 lists an example of network addresses for the full-duplex 100Base-T Ethernet interface in Figure 3-13.

Table 3-4. Ethernet address numbering scheme for full-duplex 100Base-T

Interface number	Network address
ahme3	00:00:3c:99:99:03
ahme2	00:00:3c:99:99:02
ahme1	00:00:3c:99:99:01
ahme0	00:00:3c:99:99:0*

* This address appears on the label

Installing Drives

The NetServer disk, tape, and CD-ROM drives are shipped separately. They must be unpacked and installed into the NetServer drive racks before you can use the system. This section describes how to install disks shipped with your NetServer. For instructions on removing drives and information on possible drive configurations, refer to Appendix A. For information on installing a DLT4000 tape drive, which requires a specially designed drive rack, refer to the *Storage Peripherals Manager's Guide*.

Note: The NetServer supports up to 210 disk, tape, or CD-ROM drives. It also supports tape storage devices off the HP and Storage Processor. Drive slot 0 in the base cabinet is reserved for the root disk drive, which contains the server's operating system software.

The drive slot numbering starts at the top front rack in the base cabinet and NS 7000/060 expansion cabinet. In the NS 7000/050, the drive slot numbering is reversed, starting from the bottom rack. Figures 3-14 through 3-16 illustrate slot numbering.

You received a set of labels to attach to any drives that you might install in your NetServer. Write down the slot number of the drive, as recognized by the system software, on each label (see "Drive Slot Numbering" for more information). Put the extra labels away in a safe place. You will need them when you expand your system.

Caution: To preserve data integrity, make sure that the system is powered off throughout this procedure.

For the NS 7000/050 expansion cabinet, the drives you received have been configured with the correct SCSI ID for the designated slot's rack. The drive slot number appears on the label taped to the drive. Refer to "Verifying and Changing Jumper Settings" in Appendix A if you decide to install a drive in a rack other than the one designated. It is not necessary to set the SCSI ID for drives in the base cabinet or the NS 7000/060 expansion cabinet.

Drive Slot Numbering

The system software recognizes slot numbers as a continuation from the base cabinet to the first expansion cabinet and then to the second expansion cabinet.

The slot numbering in the first and second expansion cabinets vary, depending on the type of expansion cabinet installed. The NS 7000/060 expansion cabinet supports up to 84 drives. The NS 7000/050 expansion cabinet supports up to 40 drives.

Figure 3-14 shows the slot and drive rack numbering for the base cabinet. Figure 3-15 shows the slot and drive rack numbering for a standalone NS 7000/060 expansion cabinet. Figure 3-16 shows the slot and drive rack numbering for a standalone NS 7000/050 expansion cabinet.

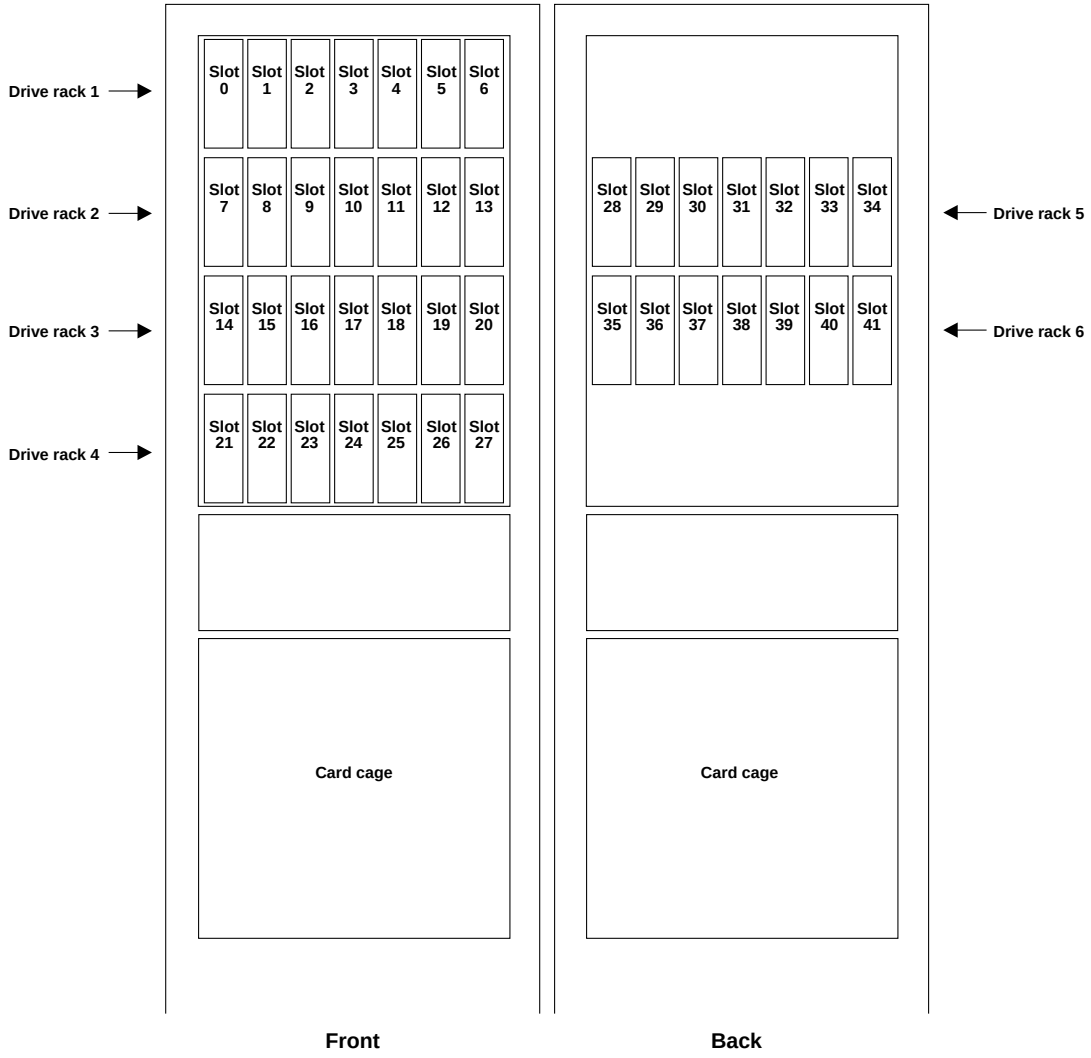

Figure 3-14. Base cabinet drive slot numbering

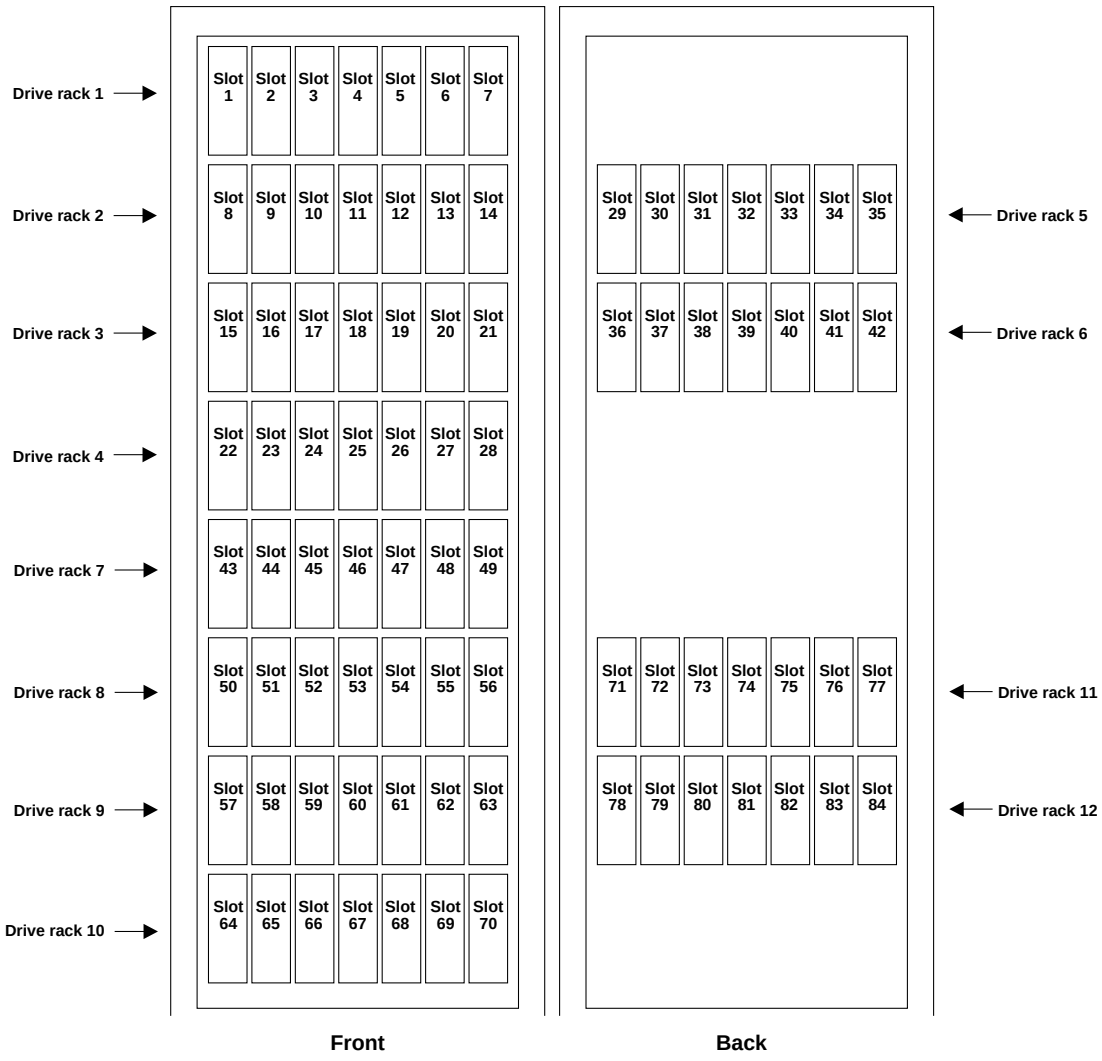

Figure 3-15. NS 7000/060 expansion cabinet drive slot numbering

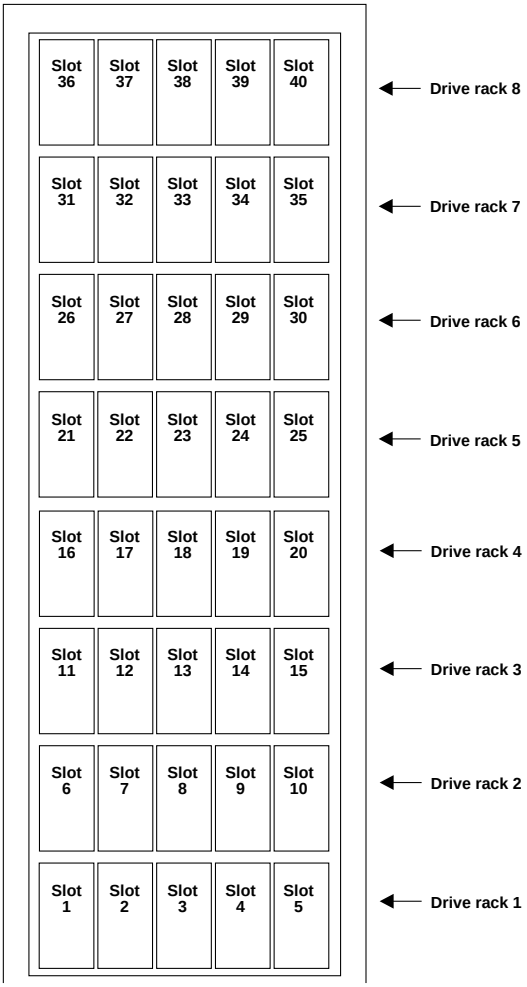

Figure 3-16. NS 7000/050 expansion cabinet drive slot numbering

Using addition, it is a simple process to determine the proper slot number recognized by the system software. Refer to the following examples:

Example 1

If a drive is in slot 54 of the first NS 7000/060 expansion cabinet, then the slot number recognized by the system software is equal to that slot number (54) plus the last slot number in the base cabinet (41). The system software recognizes the drive in slot 95 (54+41).

Example 2

If a drive is in slot 54 of the second NS 7000/060 expansion cabinet and the first expansion cabinet is also an NS 7000/060, then the slot number recognized by the system software is equal to that slot number (54) plus the total number of slots in the first expansion cabinet (84) and the last slot number in the base cabinet (41). The drive is in slot 179 (54+84+41).

Example 3

If a drive is in slot 54 of the second NS 7000/060 expansion cabinet and the first expansion cabinet is an NS 7000/050, then the slot number recognized by the system software is equal to that slot number (54) plus the total number of slots in the first expansion cabinet (40) and the last slot number in the base cabinet (41). The drive is in slot 135 (54+40+41).

Installing a Drive

Caution: The procedures in this section assume that the NetServer is powered off. If you want to remove or install a drive while the operating system is running, refer to the *System Manager's Guide*.

To install drives in the NetServer

1. Place the drive packaging within easy reach of the NetServer cabinet in which the drives will be installed.
2. Plug the antistatic wrist strap into the jack location on the front chassis frame, and wear the wrist strap to protect against electrostatic damage to the drives.
3. Use a knife to open the box carefully. Drives are packed in foam slots, in an antistatic wrapping.
4. Open the proper door of the NetServer to expose the drive rack slots.

   Note: The slots for the drives you ordered are empty. These unused slots are covered with filler panels, which are removed when the drives are installed.
5. Remove the disk drive from its antistatic wrapping. The disk drive has a label located at the front of the drive carrier.
6. Place the drive into the upper left slot of the base cabinet (slot 0) with the latch button toward the top of the drive carrier.
7. Holding the drive by the handle and cradling it with your other hand, gently slide it into the slot until the small latch button on the top of the drive carrier clicks into the hole in the drive slot. If this latch button obstructs the drive from sliding into the slot, depress the button at the top of the drive handle to retract the button and complete the installation.

   Caution: Do not slam drives into the slots. Slamming the drives into the slots can cause damage to the drives and connectors.

   Refer to Figure 3-17 for an example of installing a drive.

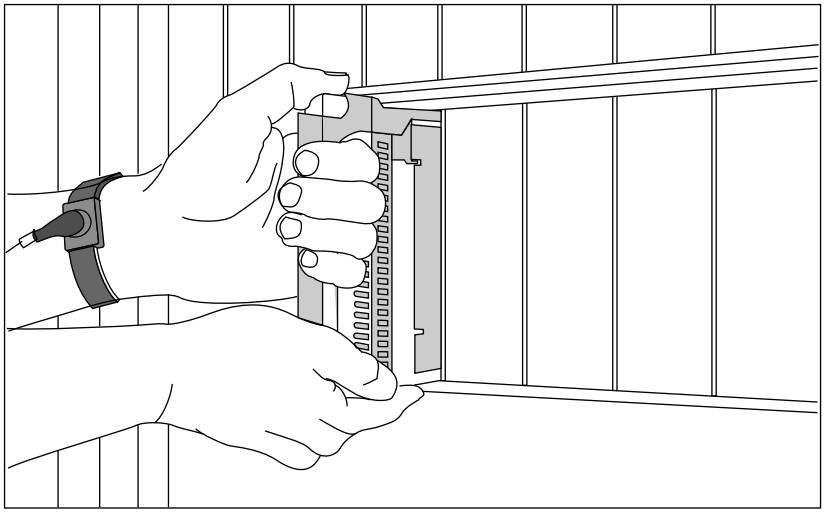

Figure 3-17. Installing a drive

Drives install in only one direction. If the drive you are installing does not slide in easily and the latch does not click into place, remove the drive and try again. Make sure the drive is in the correct position with the latch button at the top of the handle.

8. Install the remaining drives in their slots. Use the labels provided with your cabinet to write down the drive slot number of the drives, as recognized by the system software.

Recommendation: For optimum performance in the NS 7000/050 expansion cabinet, tape drives should be installed in drive slots assigned a SCSI ID of 1 (refer to Figure A-9 on page A-10).

This concludes the procedure for installing drives in your NetServer. If you wish to attach a SCSI device to your NetServer, proceed to the section "Attaching a SCSI Device to the HP" on page 3-27.

Attaching a SCSI Device to the HP

This section describes how to attach a SCSI device to the NetServer. The SCSI port on a HP supports the standard SunOS device drivers. You can attach seven Sun-supported SCSI devices to this port, which includes four disk drives, two tape drives, and one CD-ROM drive, and tape storage devices (refer to the *Storage Peripherals Manager's Guide* for more information).

Note: Devices attached to the HP SCSI port cannot be used as boot devices. Only Auspex devices attached to a Storage Processor are bootable devices. Auspex does not supply a SCSI cable for the HP SCSI port.

You must set the appropriate SCSI ID for each device attached to the HP, or the system cannot recognize the device. The SCSI IDs that you can use are listed in Table 3-5. Be sure that each device has a unique ID.

Table 3-5. HP SCSI IDs and device names

Device	SCSI ID	Device name
Disk 0	3	sd0
Disk 1	1	sd1
Disk 2	2	sd2
Disk 3	0	sd3
Tape 0	4	rst0
Tape 1	5	rst1
CD-ROM 0	6	sr0

Follow this procedure to connect a SCSI device:

1. If your system is running, follow the procedures in "Shutting Down the NetServer" on page 4-15 to halt the server's operation.
2. Open the back door of the server, and put on the antistatic wrist strap.
3. Verify that the device being attached has the correct SCSI ID.
4. Connect one end of the SCSI cable to the SCSI device, following the directions in the third-party vendor documentation for the device.
5. Route the free end of the cable through the opening in the PDU at the back of the server (see Figure 3-5 on page 3-11).
6. Connect the free end of the SCSI cable to the connector on the HP labeled *SCSI* (see Figure 2-11 on page 2-19).
7. Hang up the wrist strap, and close the back door of the server.

This concludes the procedure for adding SCSI devices to the HP.

4 Power On and Shut Down

About This Chapter

This chapter describes powering on and shutting down the server, and describes the LED status indicators on the HP and NP boards.

This chapter covers the following sections:

- Powering On the NetServer
- Power-On Self Test and Boot Sequence
- Processor Board LED Displays

Powering On the NetServer

Caution: Never cover the cooling vents on top of the NetServer. Covering the vents causes the NetServer to overheat and damages the server.

1. Verify the diagnostic switch on the HP is set to NORM.

   The diagnostic switch is the lower of the two switches located on the front panel of the HP. Push this switch down to set it to NORM (see Figure 2-11 on page 2-19).

2. Make sure the main power switch on the base and each expansion cabinet's PDU is set to OFF (O) (see Figure 3-1 on page 3-2).

   Caution: Use the main power switch on the PDU only.

   In the NetServer, the switch located at the top of each power supply located at the front of the cabinet should always be turned to ON (—).

3. Close the doors on the base and expansion cabinets.
4. Power up the console terminal.
5. Power on each expansion cabinet by setting its power switch to ON (**I**).
6. Power on each tape storage device, if present, by setting its power switch to ON (**I**).
7. Power on the base cabinet by setting its main power switch to ON (**I**).

Recommendation: Auspex recommends that you power on the expansion cabinets before you power on the base cabinet. If you power on the base cabinet first, power on the expansion cabinets within 10–15 seconds after powering on the base cabinet.

After powering on the NetServer, it runs a series of self tests and displays the results of these tests on the console screen. For a list of the power-on self tests and messages, refer to "Power-On Self Test and Boot Sequence" on page 4-3.

This concludes the procedure for powering on the NetServer.

Power-On Self Test and Boot Sequence

At power on, the NetServer performs a series of WarmStart self tests. A WarmStart bypasses lengthy power-on board-level hardware and memory test procedures, speeding up the overall boot time for the system. For information on additional boot options after the initial NetServer power on, refer to the *System Manager's Guide*.

If all tests pass, within 30 seconds after full power on you should see messages similar to the following on the system console:

```
IDPROM checksum test.

SPARC Processor (10-0107) Boot PROM Selftest.

POST RAM (Clear)
Setup MMU table
Copying PROM Data to RAM

EPROM Checksum Test
Sys Control Register Test
SW Interrupt 1 (level 1) Test
SW Interrupt 2 (level 6) Test
MPC Register Test
ECC Valid Access Test
Timer 0 Interrupt (level 10) Test
Timer 1 Interrupt (level 14) Test
Command Ready Interrupt Test
MMU PTE Reference Bit Test
MMU PTE Modified Bit Test
MMU PTE Valid Bit Test
MMU PTE Access Bit Test
MMU TLB Test
MMU Data Access Trap Test
MMU Probe Test
Cache Data RAM Test
Cache Tag RAM Test
Cache Write Miss Test
Cache Write Hit Test
NVRAM Battery Test GOOD BATTERY done
NVRAM Memory Test saving restoring checksum done
NVRAM Test, checksum=0x77
TOD Test127 119 95 127 123 127 95 127

POST complete: Pass = 1, Errors = 0

Initialize 64 MB of Memory ... Completed.
Test 0 MB of Memory (Address Test) ... Completed.

EEPROM boot device...ad(0,0,0)
```

By default, the system then boots automatically to multiuser mode, performing a file system check during the process. The time required to boot varies with the number of disks in the system. As the system boots, you should observe the display to verify the following:

- The version of the operating system (in the following example, NetServer software Version 1.9).
- All Auspex devices (both processor boards and drives) are listed in the display, indicating that the processors and drives are detected and initialized by the system startup routines.

The following example shows the typical NetServer boot messages on the system console.

Note: In the boot message, the term IOP is used to describe the NP board.

```
sp - status 70 71 f0
skipping SP loopback test
passed SP inquiry cmd to the boot device
passed SP test unit ready cmd to the boot device
sp found in slot = 12
Boot device: /mvic/vme/asp@6d,1180/ad@0,0:0 File and args:
0x4000
bootblock loaded
sp - status f0
skipping SP loopback test
passed SP inquiry cmd to the boot device
passed SP test unit ready cmd to the boot device
sp - status f0
skipping SP loopback test
passed SP inquiry cmd to the boot device
passed SP test unit ready cmd to the boot device
root on ad0a fstype 4.2
Boot: vmunix
Size: 1204224+248608+557640 bytes
m16u_npages_dvma = 358
m16u_net_interfaces = 15
VAC ENABLED in COPYBACK mode
Auspex 1.9A23/SunOS 4.1.4 (AUSPEX1.OPTIMIZED) #1: Tue Nov 5 02:59:30
PST 1996
Copyright 1989-1996 Auspex Systems, Inc.
Copyright 1983-1994 Sun Microsystems, Inc.
cpu = ASPX,Auspex SPARC Processor
mod0 = Ross,RT625 (mid = 2)
mem = 65536K (0x4000000)
avail mem = 56938496
dma0 at SBus slot 1 0x400000
esp0 at SBus slot 1 0x800000 pri 3
zs0 at obio 0x200000 pri 12
SP0 at Auspex VME slot 12
SP1 at Auspex VME slot 13
SP2 at Auspex VME slot 14
SP3 at Auspex VME slot 3
```

```
SP4 at Auspex VME slot 4
IOP0 at Auspex VME slot 6 VME address 0x10000000 memory 128 MB
ad0: <SEAGATE ST15150N        4606AUSPEX XX-XXXX; 4094 MBs>
ad2: <SEAGATE ST15150N        4606AUSPEX XX-XXXX; 4094 MBs>
ad4: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad5: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad6: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad7: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad8: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad9: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad10: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad11: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad12: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad13: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad14: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad15: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad16: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad17: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad18: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad20: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad21: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad22: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad24: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad25: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad26: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad27: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad28: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad29: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad30: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad31: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad32: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad34: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad35: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad36: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad37: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad38: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad41: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad42: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad43: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad44: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad45: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad46: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad47: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
ad51: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad52: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad53: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad54: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad55: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad56: <HP 2.0GB cyl 3818 alt 2 hd 16 sec 64>
ad57: <MICROP 3GB cyl 5764 alt 2 hd 16 sec 64>
```

```
ad60: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad61: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad62: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad63: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad64: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad65: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
                        .
                        .
                        .
ad135: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad136: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad137: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad138: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad139: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad140: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad141: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad142: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ad143: <Auspex 4GB cyl 4094 alt 1 hd 16 sec 128>
ASPX,buf-e unit 0 at iop0 SBus slot 0
ASPX,buf-e unit 1 at iop0 SBus slot 1
ASPX,buf-e unit 2 at iop0 SBus slot 2
ASPX,net-acc unit 0 at iop0 SBus slot 3
root on ad0a fstype 4.2
swap on ad0b fstype spec size 1024000K
dump on ad0b fstype spec size 1023988K
checking root and /usr filesystems
/dev/rad0a: 11163 files, 51077 used, 10538 free
/dev/rad0a: (58 frags, 1310 blocks, 0.1% fragmentation)
/dev/rad0g: is stable.
rc.auspex: Running ax_startup (download boards and start daemons).
waiting for SP1 in slot 13--status = 0x70
waiting for SP1 in slot 13--status = 0x71
running ax_chkdrive...
ad33: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ax_write_cache: SP0 initializing write cache.
ax_write_cache: SP3 initializing write cache.
ax_write_cache: SP4 initializing write cache.
ax_write_cache: SP0 enabling write cache.
ax_write_cache: SP0 write cache is 'ON'.
ax_write_cache: SP3 enabling write cache.
ax_write_cache: SP3 write cache is 'ON'.
ax_write_cache: SP4 enabling write cache.
ax_write_cache: SP4 write cache is 'ON'.
/usr/auspex/ax_enable: AXbackup enabled
/usr/auspex/ax_enable: AXraid enabled
rc.auspex: Running from rc.boot (start virtual partitions).
checking other filesystems
/dev/rad4c: is clean.
/dev/rad0f: is clean.
/dev/rvp1024: is clean.
```

```
/dev/rvp1032: is clean.
/dev/rard56a: is clean.
/dev/rad0d: is clean.
/dev/rvp1040: is clean.
/dev/rvp1025: is clean.
/dev/rad0h: is clean.
/dev/rvp1033: is clean.
/dev/rvp1041: is clean.
/dev/rard56b: is clean.
/dev/rad0e: is clean.
/dev/rvp1026: is clean.
/dev/rvp1034: is clean.
/dev/rard56d: is clean.
/dev/rvp1027: is clean.
/dev/rvp1035: is clean.
/dev/rard56e: is clean.
/dev/rvp1028: is clean.
/dev/rard56f: is clean.
/dev/rvp1036: is clean.
/dev/rard56g: is clean.
/dev/rvp1029: is clean.
/dev/rvp1037: is clean.
/dev/rard56h: is clean.
/dev/rvp1030: is clean.
/dev/rvp1038: is clean.
/dev/rvp1031: is clean.
/dev/rvp1039: is clean.
ifconfig: ioctl (SIOCSIFDSTADDR): Invalid argument
automatic reboot in progress...
Fri Nov 8 17:02:49 PST 1996
rc: mounting 4.2 and lfs file systems.
checking quotas: done.
rc.auspex: Running from rc (start more daemons).
NIS domain name is unknown
starting rpc port mapper.
starting RPC key server.
starting Auspex key daemon.
network interface configuration:
ae0: flags=42<BROADCAST,RUNNING>
        inet 0.0.0.0 netmask 0
        ether 0:0:3c:3:0:80
ae1: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.9 netmask ffffff00 broadcast 123.45.678.9
        ether 0:0:3c:3:0:81
ae2: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.9. netmask ffffff00 broadcast 123.45.678.9
        ether 0:0:3c:3:0:82
ae3: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.9 netmask ffffff00 broadcast 123.45.678.9
        ether 0:0:3c:3:0:83
```

```
ae4: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.9 netmask ffffff00 broadcast 123.45.678.9
        ether 0:0:3c:3:0:84
ae5: flags=63<UP,BROADCAST,NOTRAILERS,RUNNING>
        inet 123.45.678.9 netmask ffffff00 broadcast 123.45.678.9
        ether 0:0:3c:3:0:85
lo0: flags=49<UP,LOOPBACK,RUNNING>
        inet 123.45.678.9 netmask ff000000
running routing daemon.
starting additional services: biod.
        starting system logger
starting local daemons: auditd sendmail
ax_lfsd
exportfs -av
exported /disks/vp/lad0
exported /disks/vp/lad1
exported /disks/vp/lad2
exported /disks/vp/lad3
exported /disks/vp/lad4
exported /disks/vp/lad5
exported /disks/vp/lad6
exported /disks/vp/lad7
exported /disks/vp/lad8
exported /disks/vp/lad9
exported /disks/vp/lad10
exported /disks/vp/lad11
exported /disks/vp/lad12
exported /disks/vp/lad13
exported /disks/vp/lad14
exported /disks/vp/lad15
exported /disks/vp/lad16
exported /disks/vp/lad17
exported /disks/raid/normal1
exported /disks/raid/normal2
exported /disks/raid/normal3
exported /disks/raid/normal4
exported /disks/raid/normal5
exported /disks/raid/normal6
exported /disks/raid/normal7
starting NFS daemons: nfsd ax_nfsd mountd
mount -vat nfs
Nov 8 17:03:18 unknown syslog: ax_enable: AXraid licensed
Nov 8 17:03:18 unknown syslog: ax_enable: AXraid licensed
Nov 8 17:03:18 unknown syslog: ax_enable: AXbackup licensed
Nov 8 17:03:18 unknown syslog: ax_enable: AXbackup licensed
rarpd: interface-pid in /tmp/rarplog
rarpd bootparamd statd lockd.
link-editor directory cache
ax_isolated
checking for crash dump...
```

```
Running /etc/rc.local.domain name
preserving editor files
clearing /tmp
standard daemons: update cron uucp.
starting network daemons: inetd printer xdm.
Fri Nov 8 17:03:24 PST 1996

unknown login:
```

The system has booted successfully when the login prompt appears on the console. *Unknown* is replaced with the name of your system after you complete the necessary setup procedures in **NSconfig**. Refer to your *System Manager's Guide* for information on running **NSconfig**.

Note: If an error message appears during startup, refer to Appendix E in the *System Manager's Guide* for a list of system startup error messages and explanations.

Processor Board LED Displays

This section describes the LED displays on the HP and NP boards. The HP and NP have several LEDs, which represent power-on self tests and system activity. By monitoring these LEDs, you can determine if the HP is functioning properly and if you have proper network connectivity on the NP.

Host Processor

The HP has three LEDs:

- The DIAG LED lights green, indicating that the system is performing power-on self tests.
- The READY LED lights green after the system successfully completes self tests.
- The Diagnostic LEDs light green, representing a specific diagnostic test being run on the HP when the NetServer is running in diagnostic mode. When the operating system is running, the LEDs light in an oscillating pattern, the speed of which is determined by the CPU load—the slower the speed, the higher the load.

For LED locations, refer to Figure 2-11 on page 2-19.

Network Processor

The NP consists of network interfaces each having their own set of LED displays. The network LED functions are described as follows.

ATM LEDs

Each ATM SBus card has two LEDs:

- The Receive Status LED lights green when receiving data or red when there is no carrier. If the light is red, check to see if the cable is properly attached or if the other end is up and ready. The normal condition is off, meaning the device is idle and ready to receive.
- The Transmit Status LED lights green when transmitting data or yellow when a SONET alarm condition is declared. The SONET alarm indicates trouble with the receiving device. If the light is yellow, check to see if the cable is properly attached or if the other end is up and ready. The normal condition is off, meaning the device is idle and ready to transmit.

Figure 4-1 shows the location of the LED displays on the ATM SBus card.

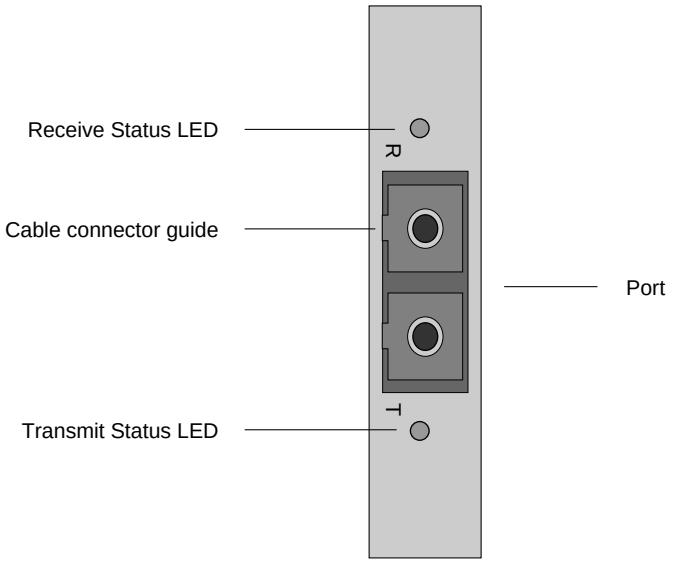

Figure 4-1. ATM (fiber) LED display

Ethernet LEDs

Each pair of 10Base-T Ethernet ports on a NP has three green LEDs:

- The Stat LED lights after the system has successfully booted and the card is operational.
- The Act B LED lights when indicating that activity is occurring through Connector B.
- The Act A LED lights when indicating that activity is occurring through Connector A.

Figure 4-2 shows the location of the LED displays for one pair of 10Base-T interfaces.

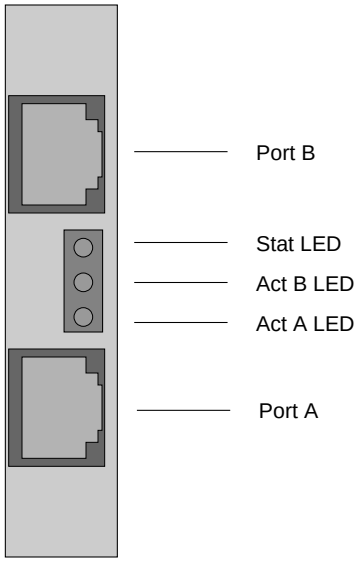

Figure 4-2. 10Base-T Ethernet LED display

FDDI-SAS LEDs

Each FDDI-SAS port has two LEDs:

- The Status LED lights green when the card passed internal diagnostics. The card functions properly only if it passed internal diagnostics.
- The RingOP LED lights green when the card is connected to the ring. If this LED is not lit, check if the cables are properly connected and you have followed the proper procedure for powering on the NetServer.

Figure 4-3 shows the location of the LEDs for the fiber FDDI-SAS port. Figure 4-4 shows the location of the LEDs for the MLT-3 FDDI-SAS port.

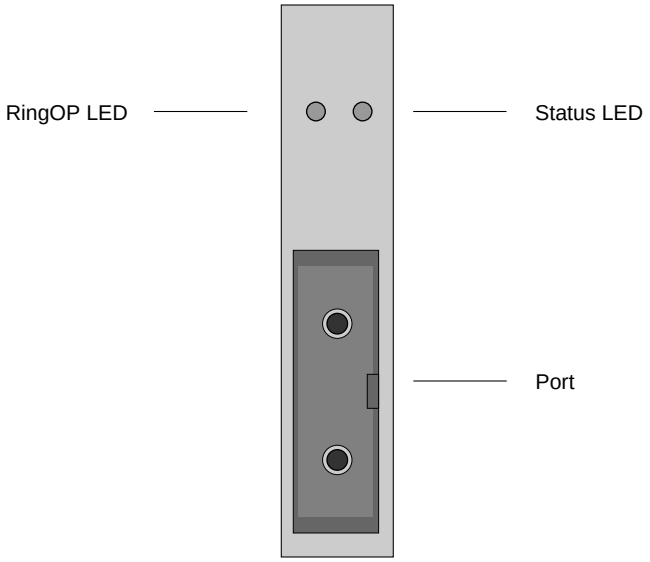

Figure 4-3. FDDI-SAS (fiber) LED display

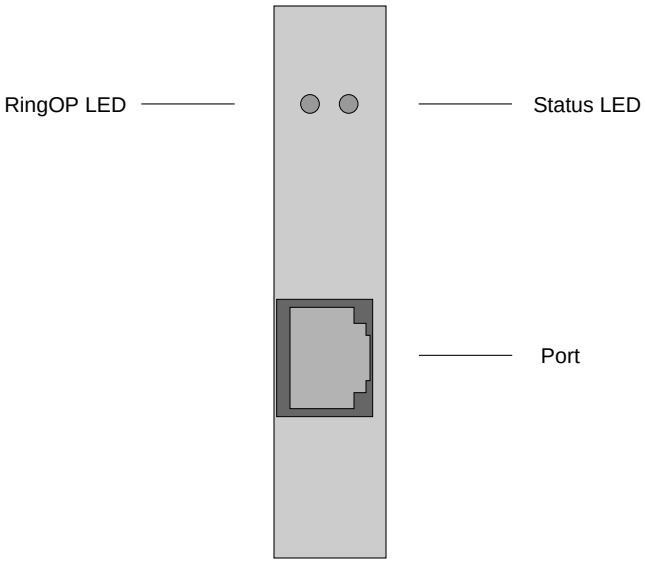

Figure 4-4. FDDI-SAS (MLT-3) LED display

FDDI-DAS LEDs

Each FDDI-DAS port has two LEDs:

- The STATUS LED lights green when the SBus card passed its internal diagnostics. This LED must be lit for the SBus card to function properly.
- The RingOP LED lights green when the card is connected to the ring. If this LED is not lit, check if the cables are properly connected and you have followed the proper procedure for powering on the NetServer.

Table 4-1 shows an example of LED states that may occur during operation.

Table 4-1. RingOP LED indicators on the FDDI-DAS SBus card

	RingOP B* - Off	**RingOP B - Green**	**RingOP B - Orange**
RingOP A* - Off	Ring is not operational	Station is in WRAP_B, ring is operational.	Ring is not operational. The station connected to the PHY B is attempting to connect but failed.
RingOP A - Green	Station is in WRAP_A, B is not connected.	Station is in THRU mode, ring is operational.	Station is in WRAP_A. The station connected to PHY B is attempting to connect but failed.
RingOP A - Orange	Ring is not operational. The station connected to PHY A is attempting to connect but failed.	Station is in WRAP_B. The station connected to PHY A is attempting to connect but failed.	Ring is not operational. The stations connected to PHYs A and B are attempting to connect but failed.

* RingOP A refers to the RingOP LED for port A. RingOP B refers to the RingOP LED for port B.

Figure 4-5 shows the locations of the LEDs for a FDDI-DAS connection.

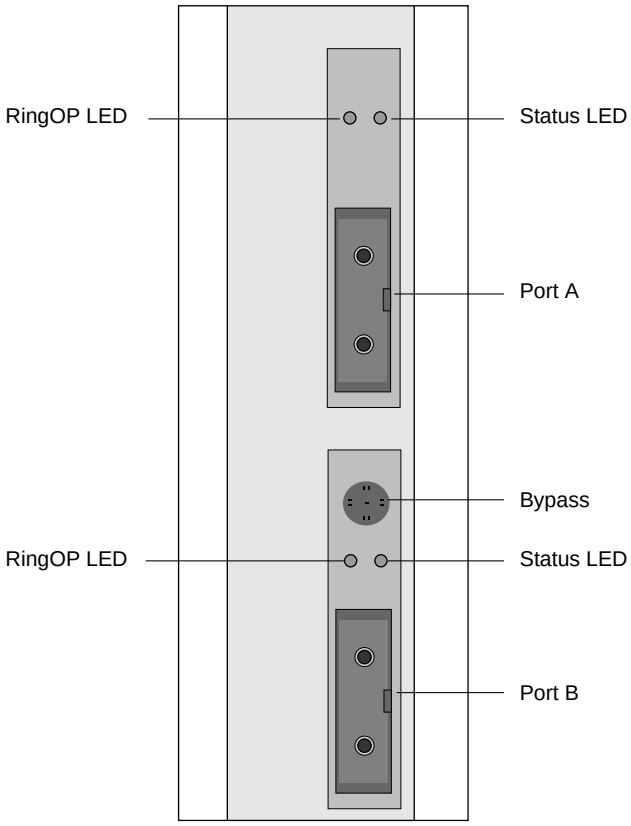

Figure 4-5. FDDI-DAS LED display

Shutting Down the NetServer

This section describes how to halt operation and shut down the NetServer.

To shut down the NetServer

1. At the root prompt, type the following command to halt the server's operation:

   # shutdown -lh +5 `"system shutdown in 5 minutes"`

   where **l** sends the warning message to users who are logged in, **h** halts the HP and causes the server to enter monitor mode, **+5** is the time in minutes before the NetServer operating system comes to a halt, and the text string informs users about the shutdown.

   Server clients are warned that the system is about to shut down and given time to exit their applications. Other users are prevented from logging in. If you want to halt the system operation immediately, do not specify a time in the **shutdown** command. After the operating system comes to a halt, the monitor prompt appears on the console terminal screen:

   ```
   HP>
   ```

2. Power off the server and base cabinet by setting the main power switches to OFF (O) (see Figure 3-1 on page 3-2).

This concludes the procedure for the shutting down the NetServer.

5 Preventive Maintenance

About This Chapter

This chapter provides preventive maintenance procedures for the NetServer air filter and Exabyte tape drives. It also covers redundant power supply operation, fan trays and LEDs, and replacing the fuse on the HP.

The chapter covers the following sections:

- Redundant Power Supply Operation
- Cleaning the NetServer Air Filter
- Fan Trays and LEDs
- Exabyte Tape Maintenance
- Replacing the Fuse on the HP

Redundant Power Supply Operation

This section describes the power-supply LEDs on the NetServer base cabinet, NS 7000/060 expansion cabinet, and NS 7000/052 expansion cabinet.

NetServer Base Cabinet and NS 7000/060 Expansion Cabinet

Each NetServer power supply has three LEDs. During normal operation, the AC and DC LEDs light green to indicate the system is receiving proper power. If the ALM LED lights yellow, the power supply failed. Contact your authorized Auspex service representative to replace the power supply. Figure 5-1 illustrates the power supply LEDs.

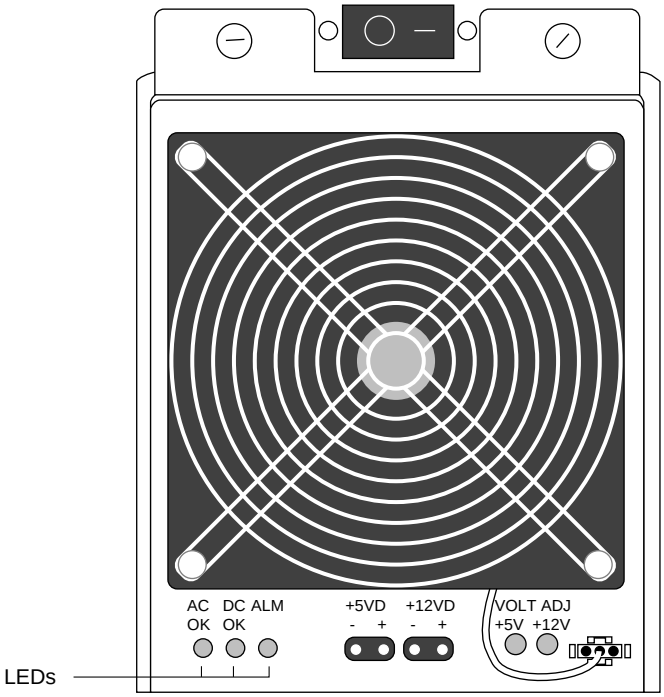

Figure 5-1. Power supply LEDs

Caution: The power switch at the top of each power supply should always be turned ON (—). Refer to "Shutting Down the NetServer" on page 4-15 for proper shutdown procedures.

Table 5-1 summarizes the actions required when the LEDs are on.

Table 5-1. NetServer power supply status indicators

LEDs that are on	Power supply status	Required action
Green LEDs only	Fully operational.	None.
Yellow LED only	Power supply failed.	Replace power supply.

Table 5-1. NetServer power supply status indicators

LEDs that are on	Power supply status	Required action
None	The power supply is not receiving AC power, or has a catastrophic failure.	Check the power cable connection and system power switch, or contact your authorized Auspex service representative.

Note: If you are running a redundant power supply configuration, the NetServer will operate normally on one power supply. However, the failed power supply should be replaced immediately to return to redundant state. For the NetServer base cabinet and NS 7000/060 expansion cabinet, a single failed power supply can be hot-plugged.

Warning: Contact your authorized Auspex service representative to replace a power supply.

NS 7000/052 Expansion Cabinet

The NS 7000/052 is an NS 7000/050 expansion cabinet with redundant power supplies. Each NS 7000/052 power supply is equipped with a yellow and green LED. Figure 5-2 illustrates the NS 7000/052 redundant power supplies.

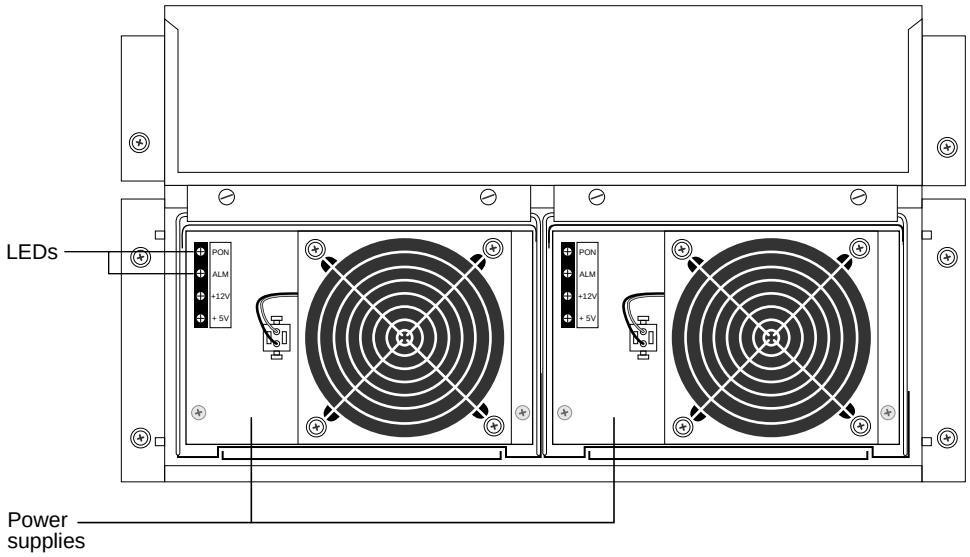

Figure 5-2. NS 7000/052 redundant power supplies and LEDs

During normal operation, the green LED on each power supply lights to indicate system is receiving AC power. The yellow LED indicates power supply failure. The malfunctioning power supply needs to be replaced immediately so the system can continue to have redundant power supplies.

Warning: Contact your authorized Auspex service representative to replace a power supply.

Table 5-2 describes NS 7000/052 power supply status.

Table 5-2. NS 7000/052 power supply status indicators

LEDs	Power supply status	Required action
Green LED only	Fully operational.	None.
Yellow LED only	Power supply failure.	Replace power supply.
None	The power supply is not receiving AC power, or has a catastrophic failure.	Check the power cable connection and system power switch, or contact your authorized Auspex service representative.

Note: If you are running a redundant power supply configuration, the NetServer will operate normally on one power supply. However, the failed power supply should be replaced immediately to return to redundant state. The NetServer must be shut down to replace the power supply.

Cleaning the NetServer Air Filter

Check the NetServer base cabinet air filter once a month, and clean if necessary. In environments where dust and dirt accumulate (such as during reconstruction or remodeling in or near the computer room), clean the air filter more frequently.

Caution: When handling the air filter, be careful not to damage the material.

To clean the NetServer air filter

1. Put on the antistatic wrist strap.
2. Open the front door panel.
3. Remove the screws securing the EMI screen with a Phillips screwdriver.
4. Lift the screen out of the slots at the bottom of the backplane. Refer to Figure 5-3 for location of EMI screen.

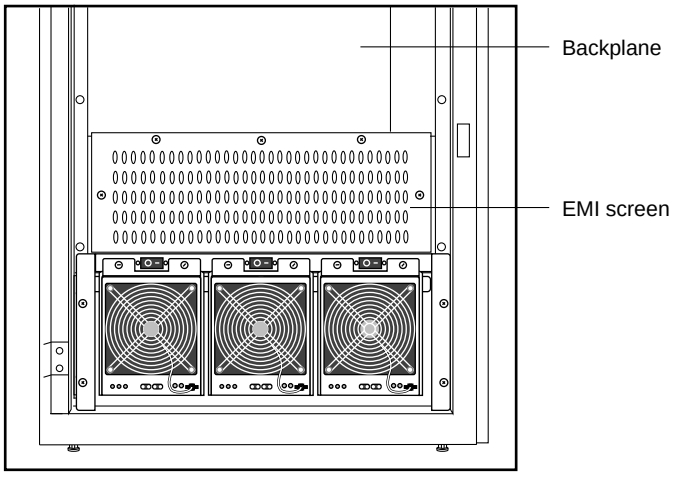

Figure 5-3. EMI screen location

5. Slide the air filter up until it slips free from the holding brackets (see Figure 5-4).

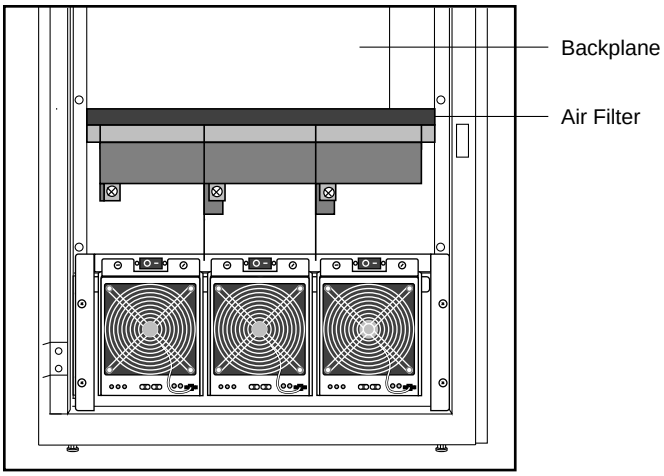

Figure 5-4. Air filter location (front view of base cabinet)

6. Vacuum the air filter thoroughly using the brush attachment of a household vacuum cleaner.

Note: Do not use a hand-held vacuum cleaner. Hand-held vacuum cleaners do not provide enough suction to clean the air filter adequately.

7. Slide the air filter back into its holder until the plastic frame is flush with the backplane.
8. Reattach the EMI screen.
9. Close the front door panel.

This concludes the procedure for cleaning the NetServer base cabinet air filter.

Fan Trays and LEDs

This section describes the fan trays and LEDs in the NetServer.

The fans in the base cabinet are located below the backplane, behind the EMI screen (see Figure 2-4 on page 2-10). The nine fans are mounted horizontally in three fan trays (three fans per tray) and face upward toward the drive racks.

Each fan tray has an LED indicating the operating status of the fan tray. The LEDs are located on the back of the fan trays and are visible from the back of the base cabinet. During normal operation, the green LED indicates the fan tray is operating properly. The red LED indicates the fan tray needs to be replaced. Figures 5-6 and 5-7 show the locations of the fan trays and LEDs.

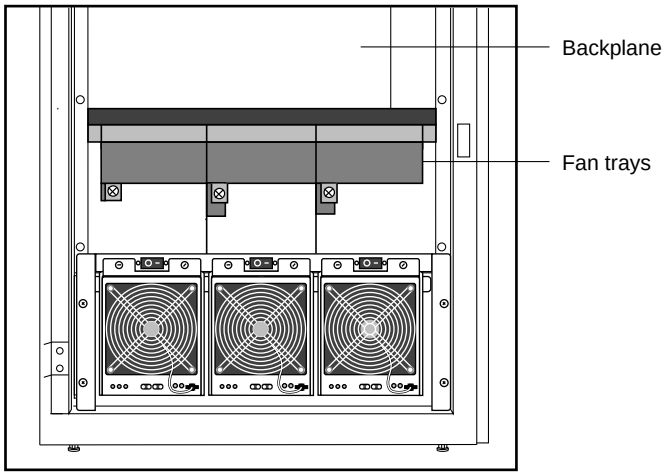

Figure 5-5. Fan trays (front view of base cabinet)

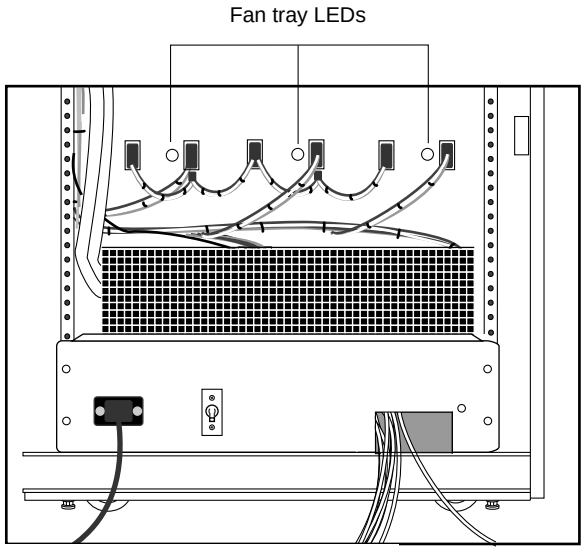

Figure 5-6. Fan tray LEDs (back view of base cabinet)

Exabyte Tape Maintenance

This section describes tape drive and media maintenance for the Exabyte 8-mm tape drive. For DLT4000 tape maintenance, refer to the *Storage Peripherals Manager's Guide*.

Operating a dirty tape drive can limit performance. The drive performs excess read or write operations to recover from media errors. In harsh application environments, where excessive debris, humidity, or temperatures can affect the tape drive, regular cleaning is required. To achieve maximum performance from your tape drive and media, follow the recommendations in this section.

Caution: If you do not maintain your tape drive head and media, you risk losing valuable data.

Cleaning the Tape Drives

The tape drive purchased with your Auspex NetServer requires regular cleaning and routine maintenance of the tape media. Clean the tape drive at least once a month or every 30 hours of use, whichever occurs first. When you purchase a NetServer with an 8-mm drive, Auspex supplies a cleaning cartridge that cleans both read and write heads of the drive. Refer to "LED Display on the Exabyte Tape Drive" on page 5-10 for more information on when to clean the tape drive. Additional cleaning cartridges are available from Exabyte at 1-800-392-2983 or from your data cartridge dealer.

Caution: Use only Exabyte cleaning cartridges. Other cleaning products, such as video cleaning cartridges, may contain abrasive materials that can permanently damage your tape drive. Do not use liquid cleaners. These products may void the warranty on your drive.

You can clean a tape drive at least 12 times using a single cleaning cartridge. To use the cleaning cartridge, insert it into the drive as you would any other tape. The cartridge automatically loads, runs for approximately 45 seconds, and ejects when done. Do not rewind the cartridge after each cleaning. If the cleaning cartridge immediately ejects after you insert it into the drive, the cartridge expired and needs to be replaced.

Maintaining the Tape Media

Handle and store the tape media as follows:

- Handle the tape cartridge carefully. Do not touch the tape itself.
- Keep the tape away from any magnetic field.
- Rewind each tape fully before storing it.
- Store the tape it in its case when not in use to protect from dust and debris.
- Retension the tape if it frequently generates errors, if it has been stored for a long time, or if it has been handled roughly.

Caution: Use only digital data-grade tapes.

Note: Refer to the manufacturer's guidelines for the life expectancy of the tape media.

Displaying Tape Statistics

This section describes how to use the **ax_tapestats** command to display and print tape statistics.

Statistics displayed are as follows:

- Number of kilobytes of space remaining on the tape
- Number of correctable ECC errors since the last time statistics were reset
- Number of kilobytes written to the tape since the last time the statistics were reset

To display the statistics, enter the command name followed by the name of the tape drive at the shell prompt:

```
# ax_tapestats tapename
```

The system displays the statistics in the format:

```
nnnnnKB remaining, mm ecc errors, xxxxxKB transferred
```

where *nnnnn*, *mm*, and *xxxxx* are numerical values.

The statistics reset to zero when the tape is changed, unloaded, or rewound. Statistics also reset to zero when a program starts reading from the tape after it has already written to the tape or when it starts writing to the tape after it has been read.

A high number of ECC errors increases the number of tape drive rewrites on a given tape. Tape rewrites that occur because of ECC errors mean a loss of tape capacity because the tape is not backspaced before the rewrite.

Recommendation: Auspex recommends changing the tape cartridge if the number of ECC errors reaches 10 percent or 12 ECC errors per megabyte of data transferred. Use Exabyte tapes only. Other tapes leave excessive debris in the drive and show an increase in ECC errors early in their useful life.

The tape media is certified up to 500 passes from end to end. If the drive uses smaller portions of the tape, such as during tape rewrites because of debris-induced errors, the number of passes might decrease.

NetServers independently monitor tape errors. If a NetServer detects excessive ECC errors, it prints the following messages:

```
xxxx recovered errors per MB transferred.
The tape may be wearing out or the head may need cleaning.
```

For more information regarding Exabyte tapes, refer to the *System Manager's Guide*.

LED Display on the Exabyte Tape Drive

The tape drive uses three LEDs to indicate operating conditions. The three LEDs are located on the left side of the front panel. Table 5-3 shows important combinations of LED conditions that may occur during operation. You can use these LED combinations to determine the tape drive's operating state, as follows:

- The top LED lights when the tape drive has an error or needs cleaning.
- The middle LED lights when SCSI bus activity is occurring and if the tape is in compressed or uncompressed format.
- The bottom LED lights when a cartridge is loaded. When this LED flashes, drive activity is occurring.

Note: After 30 hours of use, the tape drive needs cleaning. This is indicated by all three LEDs flashing simultaneously. After the tape drive is cleaned, the LEDs resume normal operation.

Table 5-3. Important LED combinations on the tape drive

	Ready—no tape loaded	Ready—tape loaded	Normal tape position	High-speed tape motion	SCSI bus reset	Error	Time to clean	Cleaning tape loaded
Top LED (errors)	o	o	o	o	•	* slow	* fast	o
Middle LED (SCSI)*	* irregular	* irregular	* irregular	* irregular	* irregular	* irregular	* irregular	* irregular
Bottom LED (motion)	o	•	* slow	* fast	•	o	* fast	* slow

* The amber LED indicates compressed format.
The green LED indicates uncompressed format.

Key for Table 5-3:

LED display	Meaning
•	The LED is on.
o	The LED is off.
*	The LED is flashing:
	* Slow = One flash per second.
	* Fast = Four flashes per second.
	* Irregular = Rate of flash varies with SCSI bus activity. If tape drive is not connected to the bus, the LED is off.

Replacing the Fuse on the HP

This section describes how to identify and replace a blown fuse on the HP.

Caution: Replace blown fuses with new fuses of the same size, type, and rating. Using incorrect fuses can result in damage to the HP.

Identifying a Blown Fuse

A fuse can blow for a number of reasons, including a faulty SCSI device, SCSI cable, or an incorrect SCSI cable connection to the SCSI port on the HP. If the fuse is blown at boot time, the system fails to boot and hangs at the following location:

```
POST complete: Pass = 1, Errors = 0

Auspex NetServer: SPARC
96 MB of memory installed, Hostid 1a0001cb
Part Number 10-0070, Rev AK, Serial #3
AUSPEX-VERSION 2.5_HP SUNMON 05/10/95 05:39

Initialize 96 MB of Memory ... Completed.
Test 0 MB of Memory (Address Test) ... Completed.
```

System hangs here

If a fuse blows while the system is operating, you may experience problems with any SCSI device connected to the SCSI port on the HP. If this occurs, reboot the machine and confirm the fuse failure with the boot message shown.

Replacing a Fuse

You need the following items to complete the procedure:

- Antistatic wrist strap
- Flat-head screwdriver

To replace a fuse on the HP

1. Put on the antistatic wrist strap.
2. Follow the instructions in Chapter 4 to shut down and power off the NetServer.
3. Remove and replace the fuse with a flat-head screwdriver. See Figure 5-7.

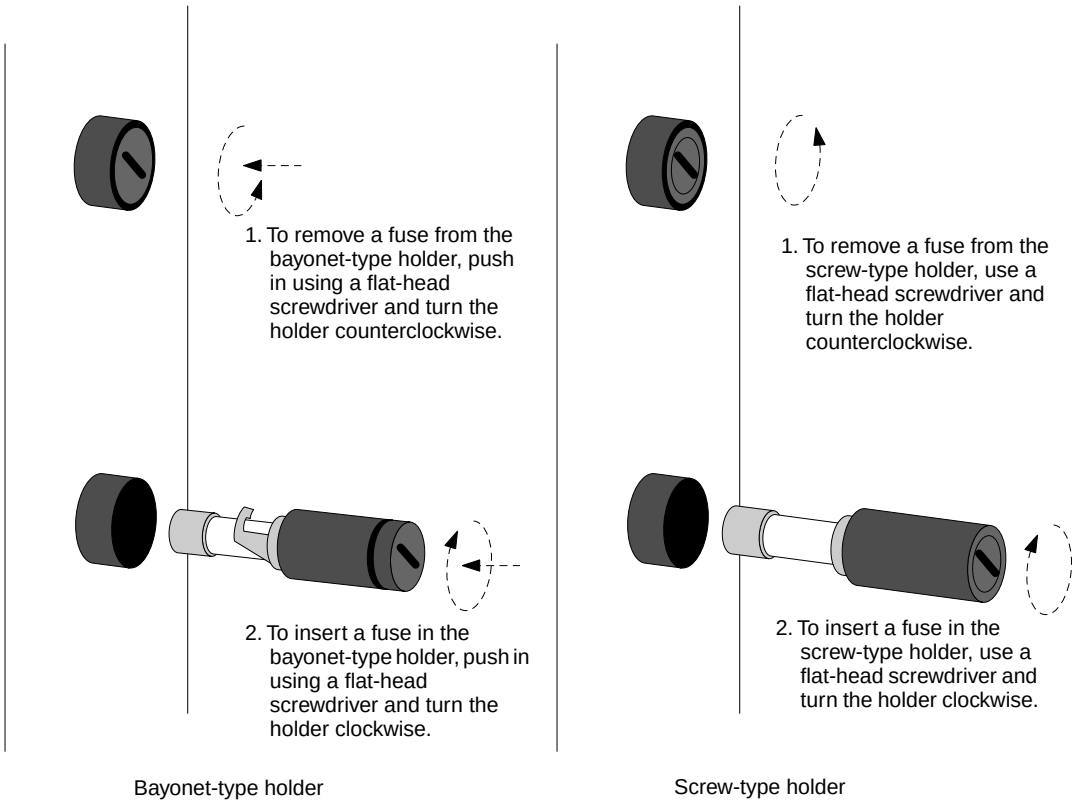

Figure 5-7. HP fuse holder types

This concludes the procedure for replacing a fuse on the HP.

Fuse Types

There are two types of fuses on the HP:

- Bayonet
- Screw-in

These fuses have the following specifications:

- 2-amp
- 125–250 V
- Quick acting (type F)
- 5x20 mm

A Drive Configuration Options

About This Appendix

This appendix provides guidelines and sample configurations for disk, tape, and CD-ROM drives.

This appendix covers the following sections:

- Drive Configuration Guidelines
- Drive Naming Conventions
- Sample Drive Configurations
- Verifying and Changing Jumper Settings
- Adding or Removing Drives
- Mapping SCSI Cables to Drives

Drive Configuration Guidelines

Auspex ships drives marked with a slot number indicating where to install the drives in your server. Add-on drives are not marked with a slot number. Use the following guidelines to determine where to install your new drives:

Acceptable drive types	The NetServer base cabinet and NS 7000/060 expansion cabinet drive racks consist of seven drive slots. These slots accept 3.5-inch disk drives, 5.25-inch 8-mm tape drives, and 5.25-inch CD-ROM drives. The NS 7000/050 drive rack consists of five drive slots. These slots accept 5.25-inch disk drives, 8-mm half-height tape drives, and CD-ROM drives.
Minimum and maximum configurations	In the base cabinet, the minimum configuration is one disk drive. The maximum configuration is 42 drives. You can have different combinations of tape, disk, and CD-ROM drives as long as you have one root disk drive and enough SP boards to support the drives (each SP IV and SP V supports up to 42 drives in the NetServer. Each SP III-E supports up to 20 drives in the NS 7000/050 expansion cabinet).
Drive locations	Drives are installed and numbered from left to right and, in the NetServer base cabinet and NS 7000/060 expansion cabinet, starting from the top rack to the bottom rack. The drives in the NS 7000/050 expansion cabinet are numbered from the bottom rack to the top. Drives are installed contiguously. However, this is not a requirement for system operation. If you need to remove a drive for any reason, its drive slot can be left empty. If the server is being booted from a CD-ROM drive, the drive must be installed in slot 1 of the base cabinet.
SCSI ID	The NS 7000/050 expansion cabinet requires that each drive have the proper SCSI ID. These drives are managed by an SP III-E. Drives in slots 1 through 10 and slots 21 through 30 are assigned SCSI ID 0. Drives in slots 11 through 20 and slots 31 through 40 are assigned SCSI ID 1 (see Figure 3-16 on page 3-24 for slot information). If you need to change the SCSI ID of a drive as a result of moving the drive, refer to section “Verifying and Changing Jumper Settings” on page A-11. The SCSI ID setting is not required for drives managed by an SP IV or SP V.

Drive Naming Conventions

A drive name is derived from the slot in which it is installed. The naming conventions differ with each type of base and expansion cabinet and each type of disk, tape, or CD-ROM drive. This section describes the different software commands for addressing each type of drive. For examples of different configurations, see "Sample Drive Configurations" on page A-4.

Disk Drive Naming Conventions

A disk drive name is derived from the slot in which it is installed. For example, disk drives in the base cabinet are addressed as **ad0** (the disk in slot 0) through **ad41** (the disk in slot 41). The device names in the expansion cabinets range from **ad42** to **ad209**.

In the NetServer base cabinet and NS 7000/060 expansion cabinet, disk drives are addressed consecutively from left to right starting with drive rack 1, located at the top of each cabinet. The continuation of the drive numbering crosses to the back of the cabinet (refer to section "Sample Drive Configurations" on page A-4). In the NS 7000/050 expansion cabinet, drives are addressed consecutively from left to right starting from the bottom rack.

Tape Drive Naming Conventions

Tape drives are numbered according to the drive slot they occupy. Tape devices are addressed as **rast*n***, where *n* is a drive slot number in the range of 0–209. Refer to the *Storage Peripherals Manager's Guide* for tape device naming conventions.

Recommendation: For optimum performance in the NS 7000/050 expansion cabinet, install all 5.25-inch tape drives in drive slots assigned SCSI ID 1. Drive racks 3, 4, 7, and 8 are assigned a SCSI ID of 1. Refer to Figure A-9 on page A-10 for the location of the drive racks and slots.

CD-ROM Drive Naming Conventions

CD-ROM drives are numbered according to the drive slot they occupy. However, in software commands, how you refer to a CD-ROM drive depends on the command type. Table A-1 shows CD-ROM drive naming conventions. The letter *n* corresponds to the drive slot in the range of 0–209. The letter *p* is the name of the partition.

Table A-1. CD-ROM drive naming conventions

Command	Naming convention	Examples
boot	ad*n*	b ad(0,1,1)
eject, **dumpfs**	acd*n*	eject acd1 dumpfs /dev/acd1
dkinfo	ad*n*	dkinfo ad1
mount (entire CD-ROM drive)	acd*n*	mount -t lfs -o fs=4.2 -r /dev/acd1 /mnt
mount (partition)	ad*np*	mount -t lfs -o fs=4.2 -r /dev/ad1a /mnt_ad1a

Sample Drive Configurations

The drive configuration in the NetServer can be configured to the requirements of your site. This section describes several common disk, tape, and CD-ROM drive configurations.

Note: Because there are several supported expansion and base cabinet combinations, it is very important to understand the proper drive slot numbering as recognized by the system software. Refer to "Installing Drives" on page 3-21 for additional information on drive slot numbering.

In the following figures, SP*n* refers to the Storage Processor controlling the specified drive array.

Figure A-1 shows a base cabinet with five disk drives, one tape drive, and one CD-ROM drive.

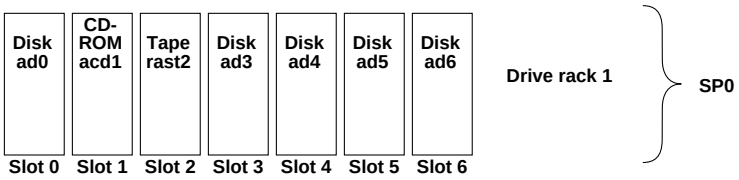

Figure A-1. Sample drive configuration

If you need more than seven drives, add slots to the base cabinet by including additional drive racks, as shown in Figure A-2.

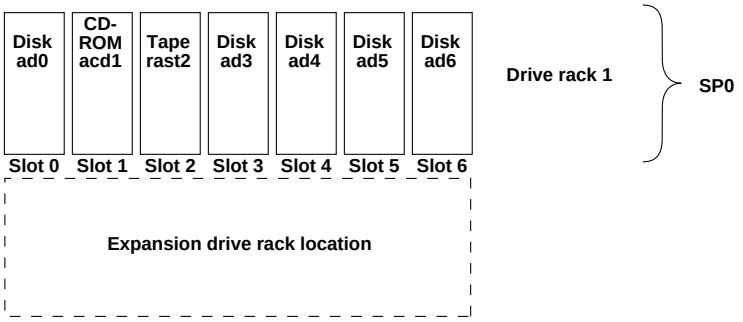

Figure A-2. Sample drive configuration with expansion rack

The base cabinet can have up to six drive racks, with four in the front and two in the back. The six drive racks accommodate up to 42 drives. Figure A-3 and Figure A-4 illustrate a full six-rack base cabinet. For convenient access, tape drives are in the right slots of drive rack 3.

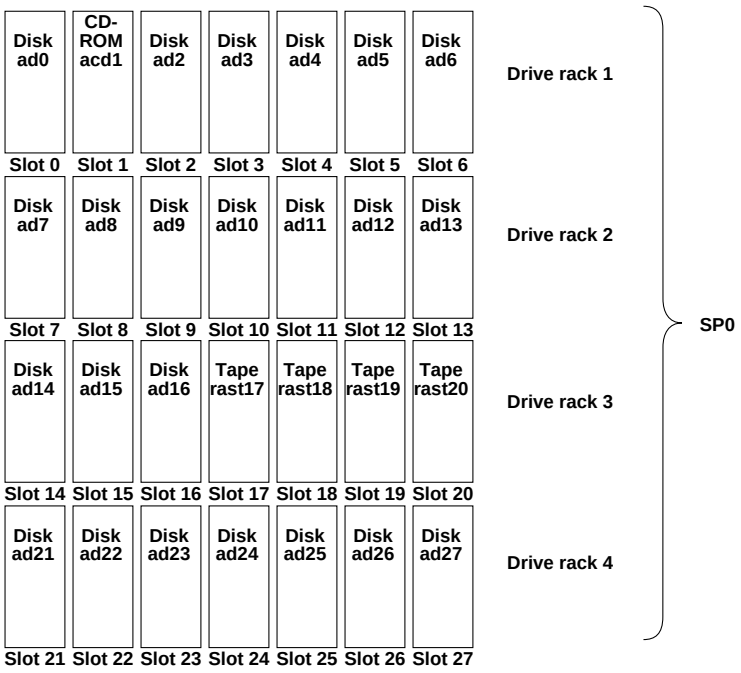

Figure A-3. Base cabinet drive names (front)

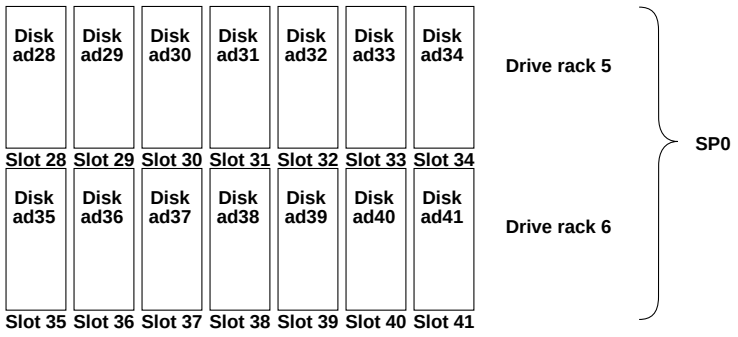

Figure A-4. Base cabinet drive names (back)

To increase storage capacity beyond 42 drives, add an expansion cabinet and one or two SP boards. The base cabinet supports up to two expansion cabinets. Each expansion cabinet supports up to 40 or 84 drives, depending on cabinet model.

Figure A-5 and Figure A-6 show the drive device names associated with the front and back racks of an NS 7000/060 installed as the first expansion cabinet.

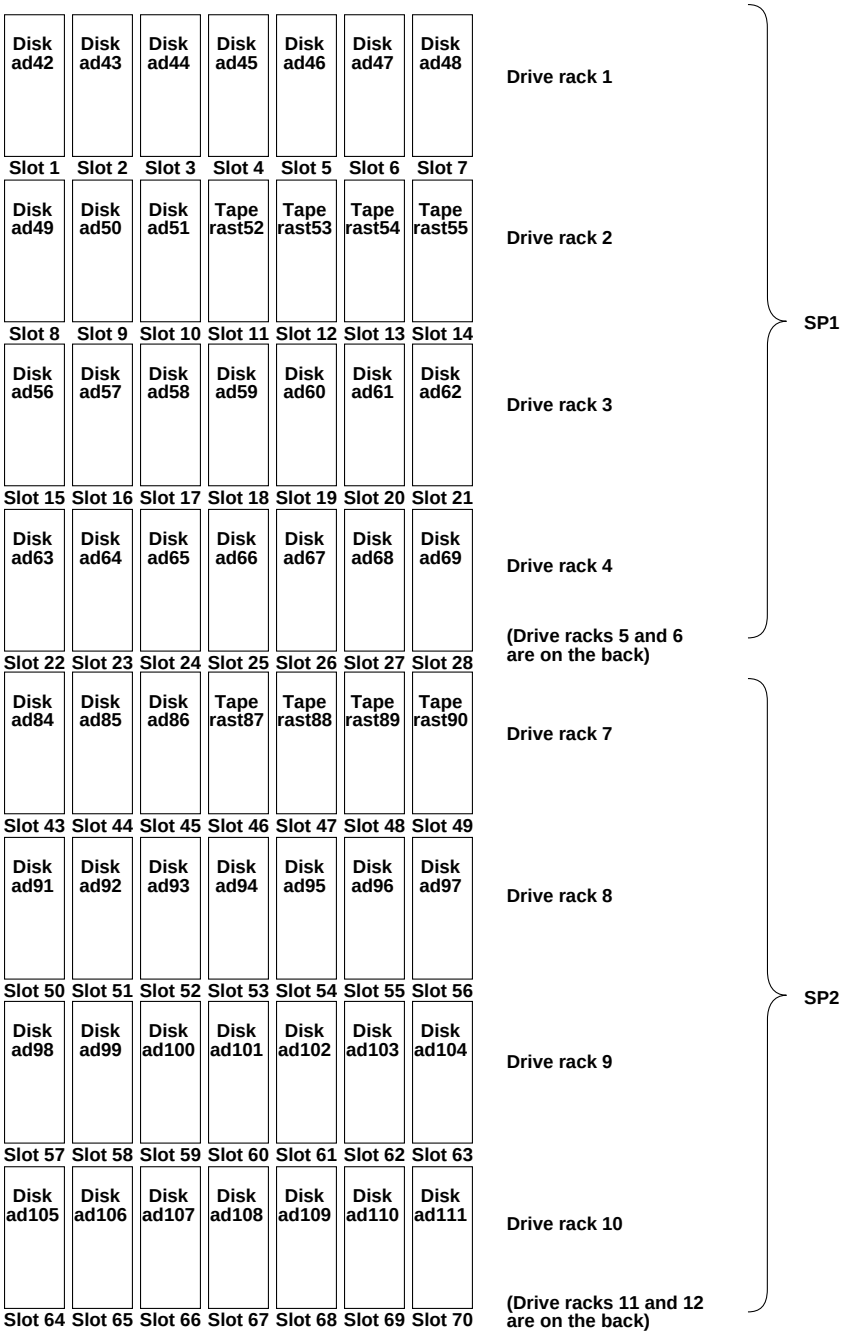

Figure A-5. First NS 7000/060 expansion cabinet drive names (front)

Note: The numbering in Figure A-5 is for an NS 7000/060 expansion cabinet connected to a base cabinet.

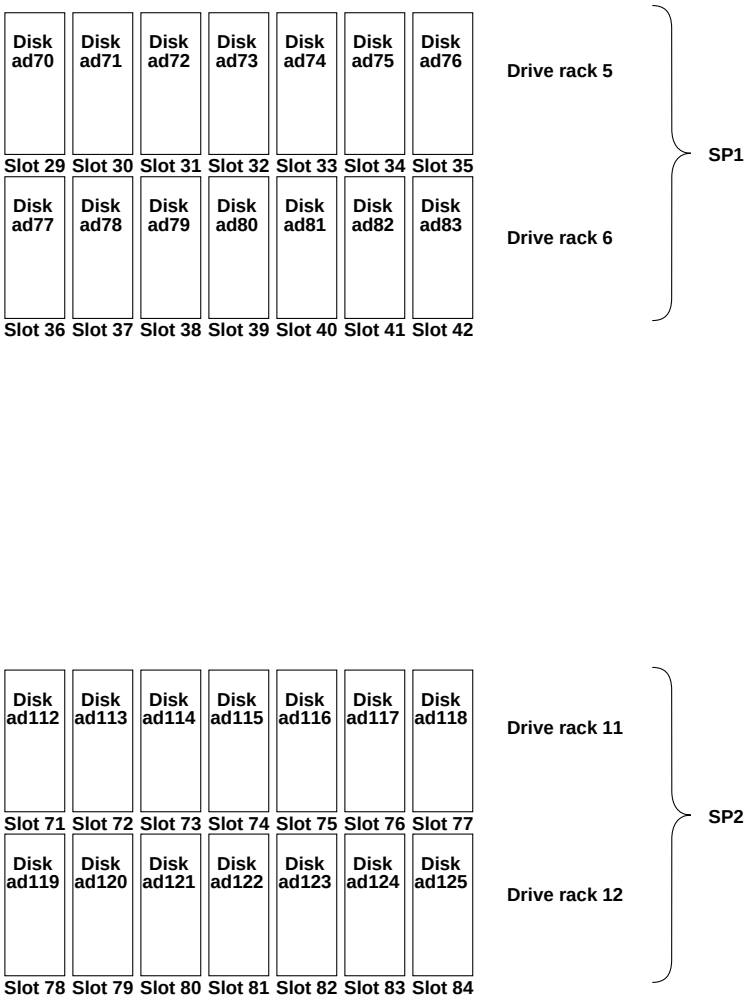

Figure A-6. First NS 7000/060 expansion cabinet drive names (back)

Note: The numbering in Figure A-6 is for an NS 7000/060 expansion cabinet connected to a base cabinet.

Figure A-7 and Figure A-8 show the drive device names associated with the front and back racks of an NS 7000/060 installed as the second expansion cabinet. The figure assumes that the first expansion cabinet is also an NS 7000/060.

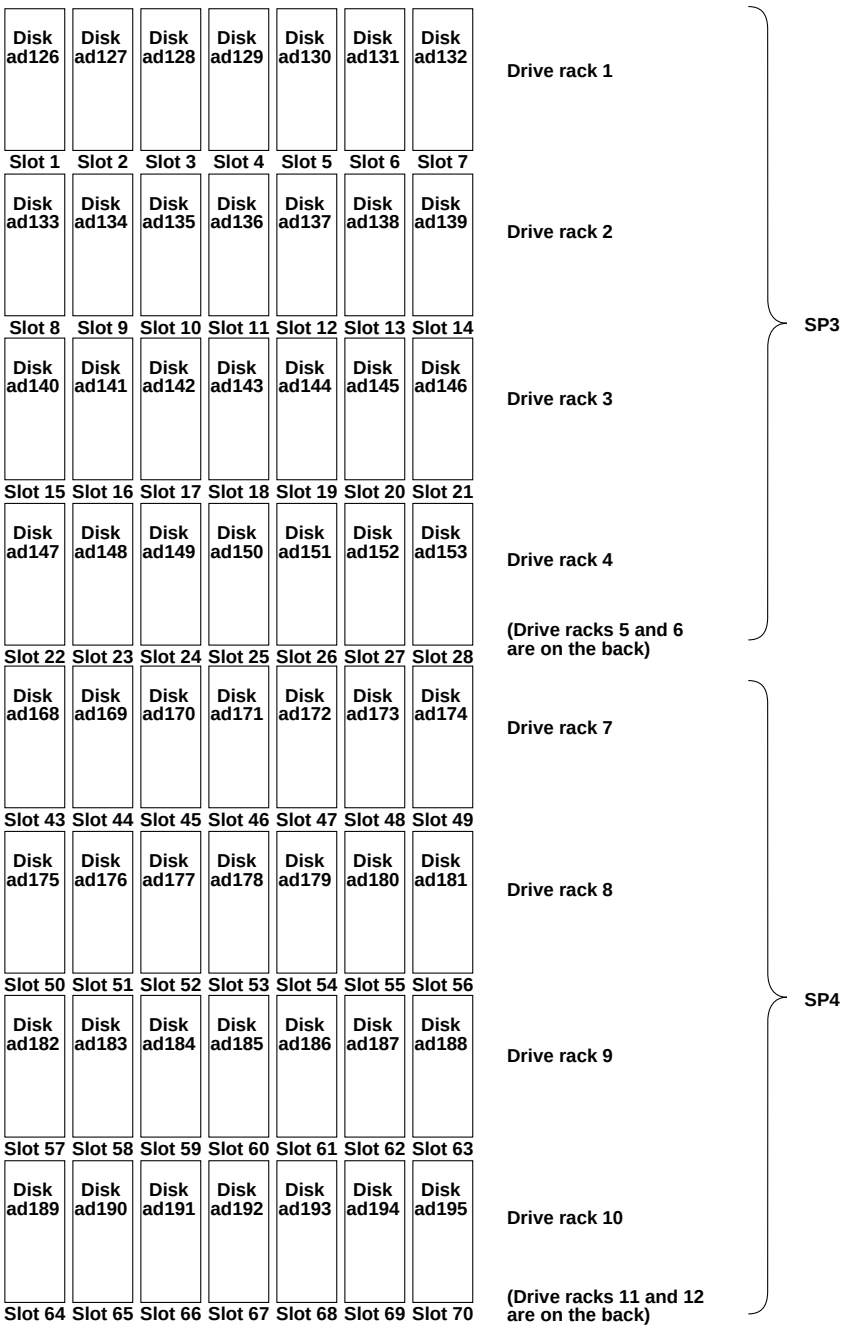

Figure A-7. Second NS 7000/060 expansion cabinet drive names (front)

Note: The numbering in Figure A-7 assumes the first expansion cabinet is an NS 7000/060 and both expansion cabinets are connected to a base cabinet.

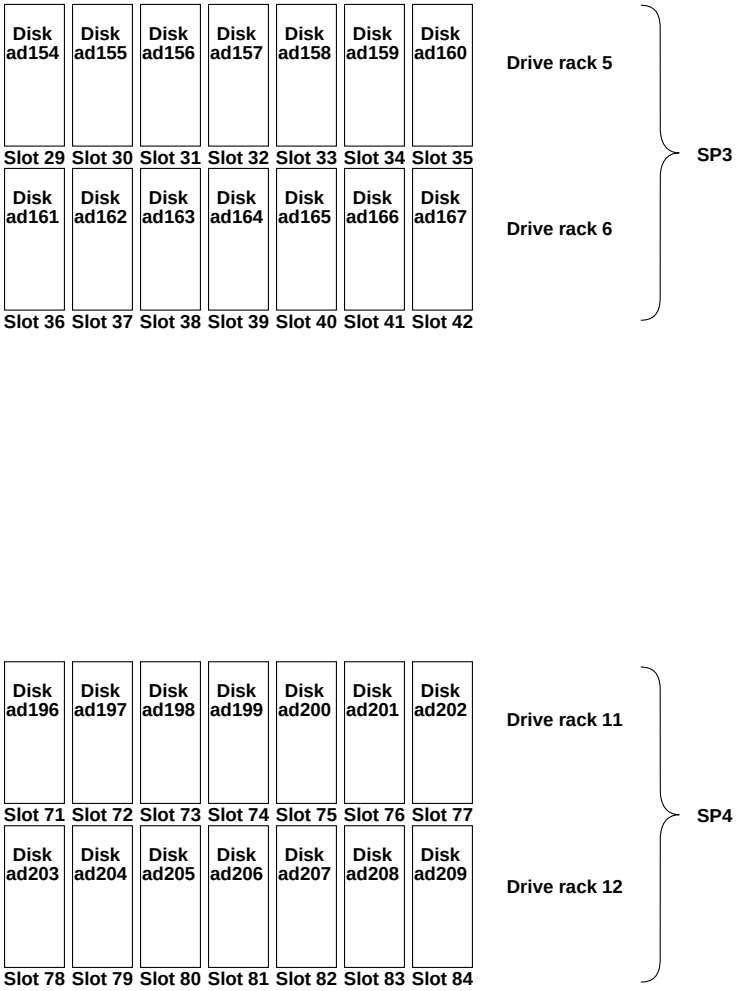

Figure A-8. Second NS 7000/060 expansion cabinet drive names (back)

Note: The numbering in Figure A-8 assumes the first expansion cabinet is an NS 7000/060 and both expansion cabinets are connected to a base cabinet.

Figure A-9 shows the disk drive device names associated with the NS 7000/050 expansion cabinet connected to a base cabinet. The NS 7000/050 is supported as the first expansion cabinet only, which is to the left of the base cabinet when viewed from the front.

Note: The drive rack and slot numbering begins at the bottom of the NS 7000/050 expansion cabinet.

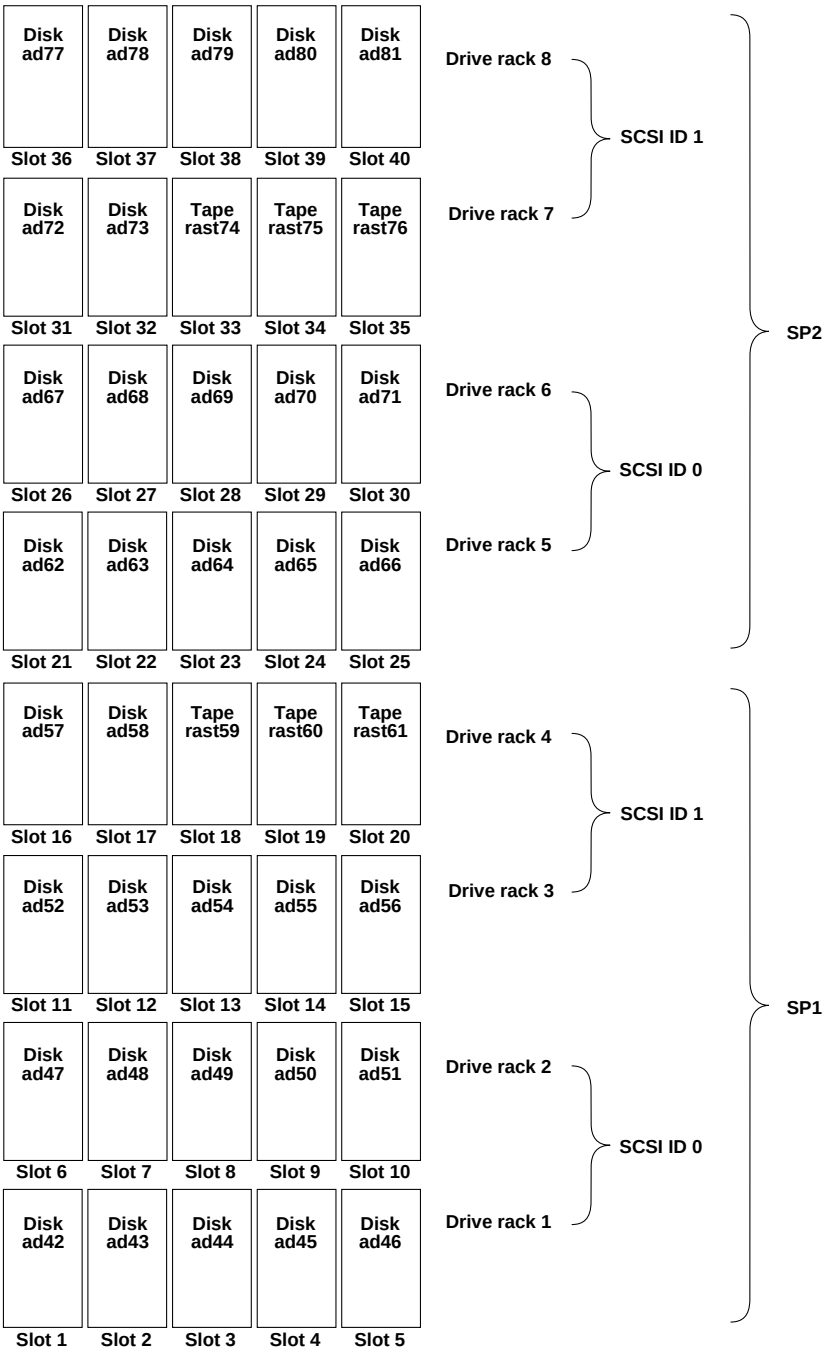

Figure A-9. NS 7000/050 expansion cabinet disk drive names

Verifying and Changing Jumper Settings

This section describes verifying and changing jumper or switch settings on disk, tape, or CD-ROM drives. Do not change settings that are not explained in this section. Each drive for the NS 7000/050 expansion cabinet contains a jumper or switch that specifies the SCSI ID of the drive.

Caution: Put on the antistatic wrist strap before handling a disk, tape, or CD-ROM drive.

When to Change the SCSI ID

Additional disk and tape drives are shipped with SCSI ID 1. If you install a drive in a drive rack with a SCSI ID 0, you must change the SCSI ID of the drive to 0. Also, change the SCSI ID of a drive when moving from one drive rack to another.

Set the SCSI ID to 0 if the drive is installed in rack 1, 2, 5, or 6. Set the SCSI ID to 1 if the drive is installed in rack 3, 4, 7, or 8 (see Figure A-9 on page A-10 for drive rack location).

Changing the SCSI ID of a Disk, Tape, or CD-ROM Drive

A label is attached to the back of each NS 7000/050 drive carrier identifying the configuration for the SCSI ID setting (see Figure A-10 for an example of the label). If the jumper plug is in place, or the switch is set to ON, the SCSI ID of the drive is 1. If the jumper plug is removed, or the switch is set to OFF, the SCSI ID of the drive is 0.

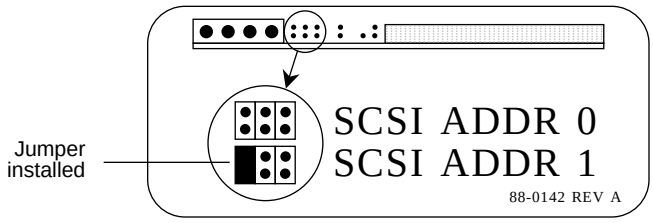

Figure A-10. Example of a SCSI ID label

Figure A-11 shows the general location of the label and SCSI ID jumper or switch on a drive. If no label is attached to the drive, refer to Figures A-12 through A-23 to determine location of the SCSI ID switch or jumper. The drives are shown with SCSI ID 1.

Note: The drives shown in Figures A-12 through A-23 provide a reference of drives shipped from Auspex. Not all drives shown are available.

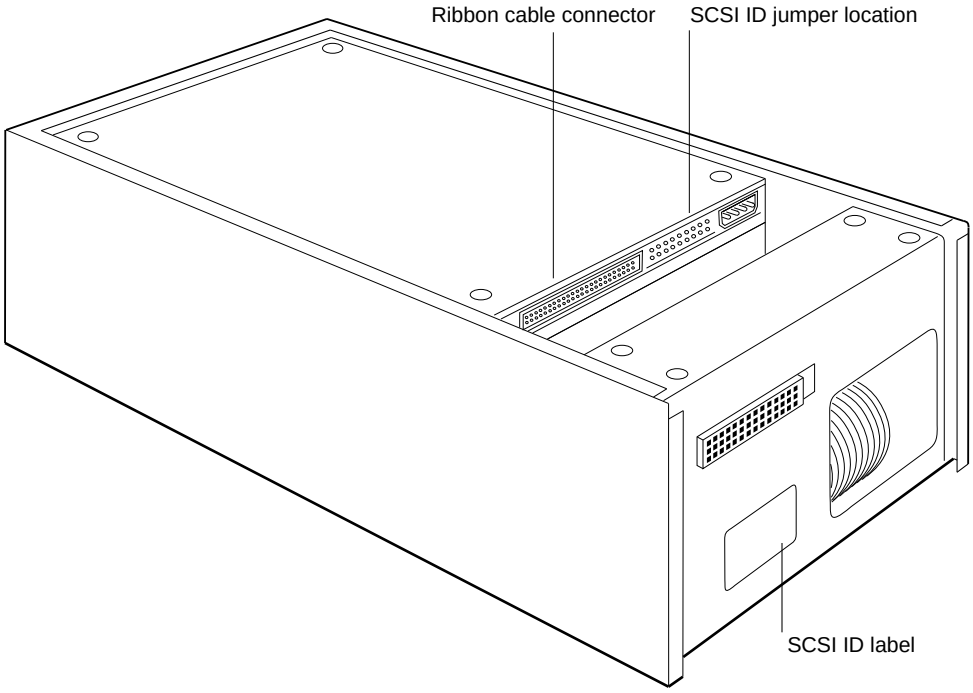

Figure A-11. Example of SCSI ID jumper location on a drive

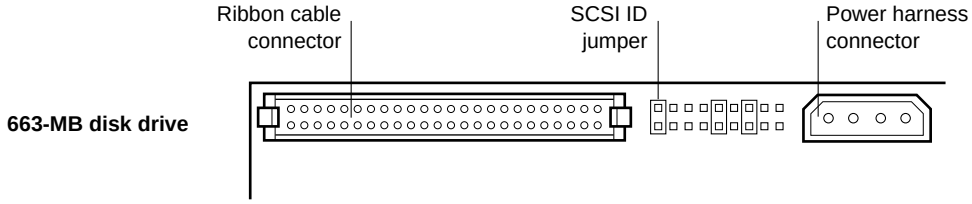

Figure A-12. 663-MB disk SCSI ID jumper (HP)

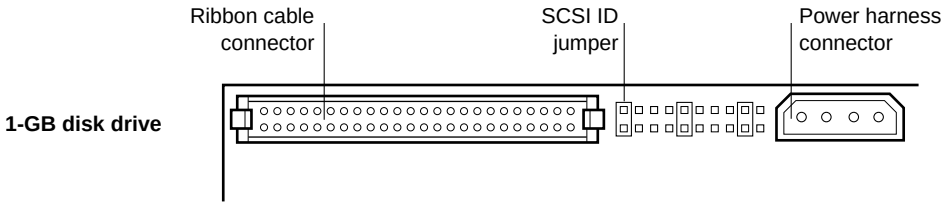

Figure A-13. 1-GB disk SCSI ID jumper (HP)

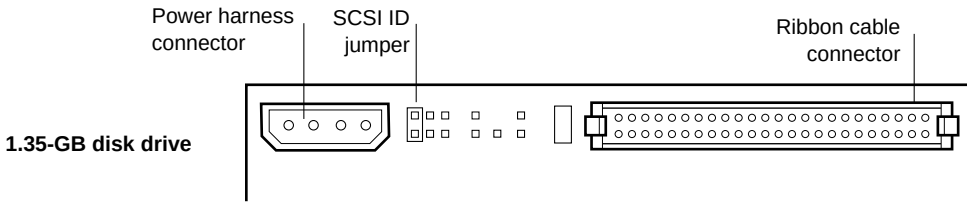

Figure A-14. 1.35-GB disk SCSI ID jumper (HP)

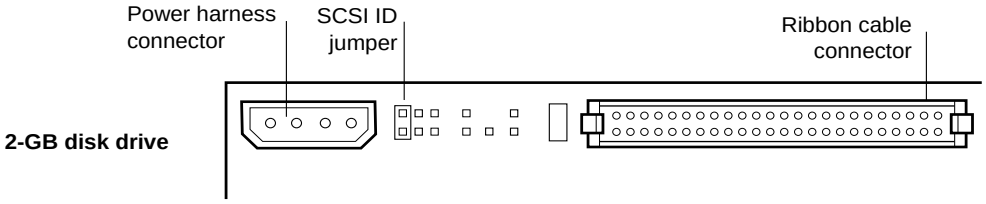

Figure A-15. 2-GB disk SCSI ID jumper (HP)

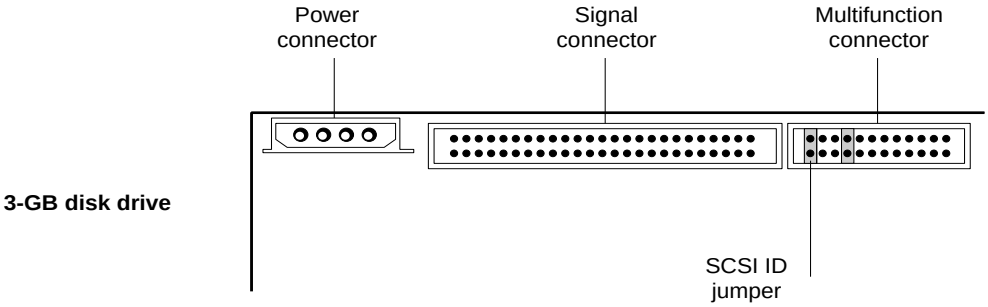

Figure A-16. 3-GB disk SCSI ID jumper (Micropolis)

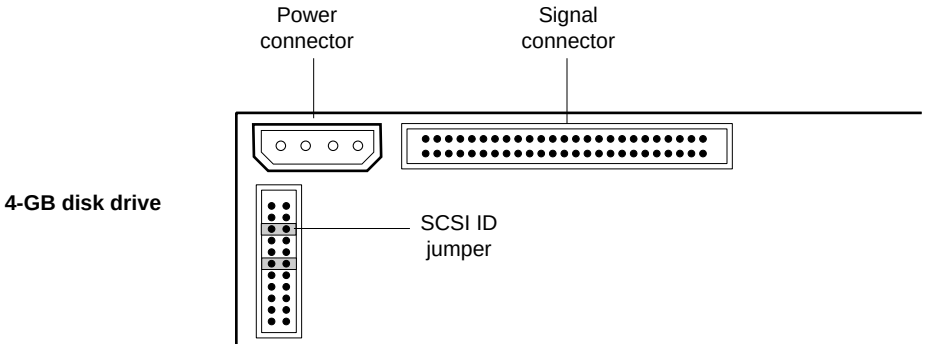

Figure A-17. 4-GB disk SCSI ID jumper (Seagate)

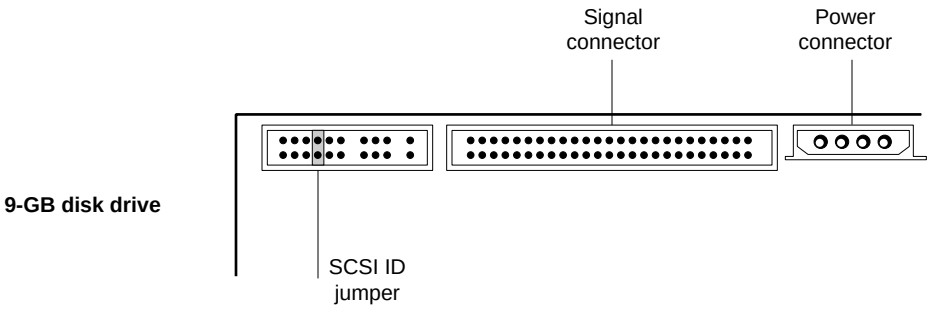

Figure A-18. 9-GB disk SCSI ID jumper (Seagate)

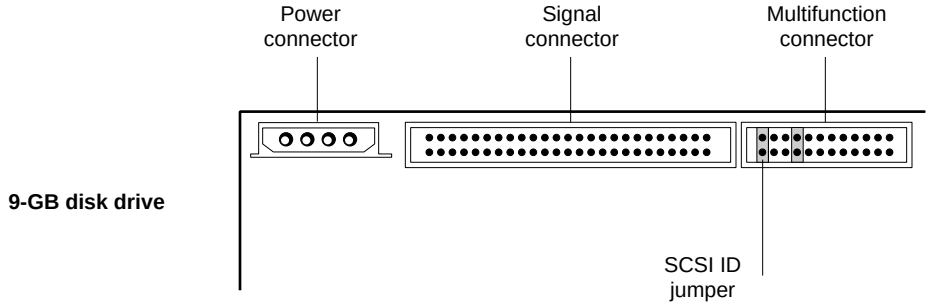

Figure A-19. 9-GB disk SCSI ID jumper (Micropolis)

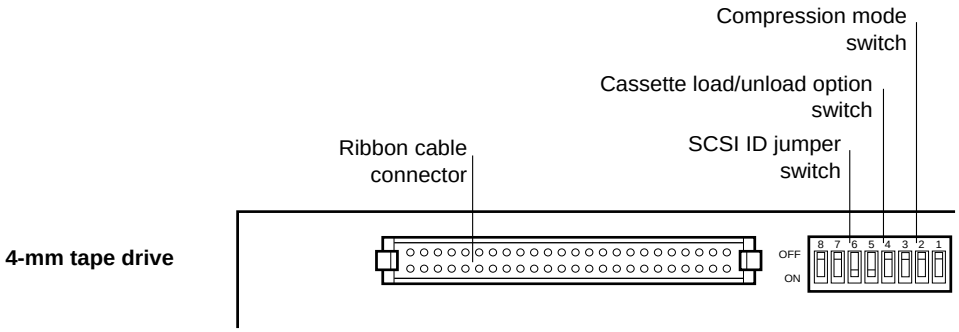

Figure A-20. 4-mm tape drive SCSI ID jumper (Wang DAT 2000)

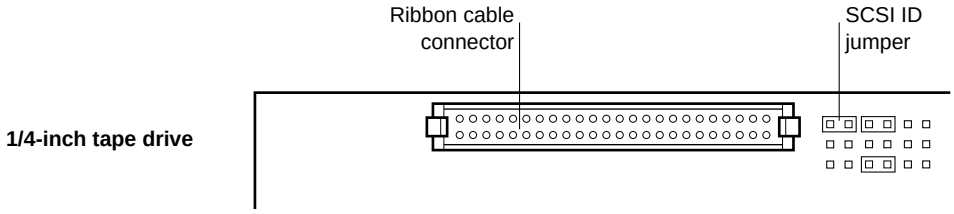

Figure A-21. 1/4-inch tape drive SCSI ID jumper

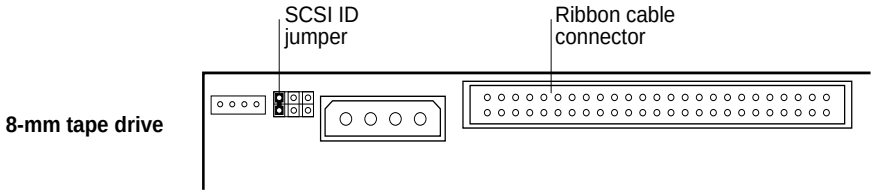

Figure A-22. 8-mm tape drive SCSI ID jumper (Exabyte 8505XL)

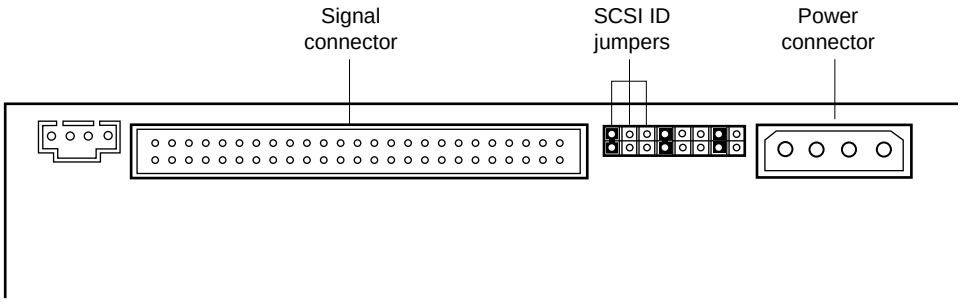

Figure A-23. CD-ROM drive SCSI ID jumper

Adding or Removing Drives

This section describes adding or removing drives. The drive slots accept disk, tape, and CD-ROM drives. Refer to "Drive Configuration Guidelines" on page A-2 and "Drive Naming Conventions" on page A-3 for guidelines on choosing a slot and configuration examples.

Caution: When removing disk drives, allow approximately 20 seconds for the drive to spin down before physically removing the drive from the drive slot. Removing a disk drive while it is still spinning may cause damage to the drive.

The procedures in this section assume that the NetServer is powered off. If you want to remove or install a drive while the operating system is still running, use the **ax_hot_plug**, **ax_remove_device**, and **ax_add_device** commands. Refer to the *System Manager's Guide* for instructions on how to use these commands.

Caution: The root disk drive, which contains the NetServer operating system software, can be installed or removed only when the NetServer is powered off.

Drives are installed in vacant slots in one of the drive racks. If you do not have enough vacant slots to accommodate the number of drives you want to add, you can install an additional drive rack (provided your server can accommodate more racks) or an expansion cabinet. You can arrange this upgrade through your authorized Auspex representative.

Caution: Because disk drives are addressed by their physical slot numbers, removing or relocating an existing disk drive affects the corresponding entries in */etc/fstab* and */etc/vpartab* and might affect other scripts and procedures. Refer to Chapter 4 of the *System Manager's Guide* for more information.

Removing a Drive

Follow this procedure if you want to remove a disk, tape, or CD-ROM drive with the NetServer powered off.

To remove a drive

1. Follow the instructions in Chapter 4 to shut down and power off the server.

   Caution: When handling drives, be sure to use the antistatic wrist strap to prevent electrostatic damage to the equipment.

2. Depress the latch button located at the top of the drive carrier handle (see Figure A-24).

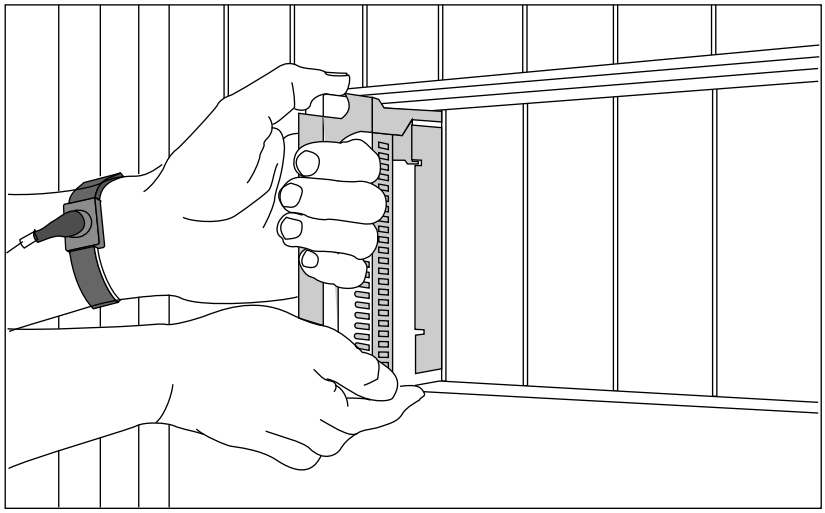

Figure A-24. Removing a drive

3. Slide the drive carrier out of its slot, supporting it with your other hand as you pull it out.

This concludes the procedure for removing a drive.

Adding or Relocating a Drive

Follow this procedure if you want to add or relocate a disk, tape, or CD-ROM drive with the NetServer powered off.

To add or relocate a drive

1. Follow the instructions in Chapter 4 to shut down and power off the server.

   Caution: When handling drives, be sure to use the antistatic wrist strap to prevent electrostatic damage to the equipment.

2. If you are relocating an existing drive, remove it now. Follow the procedures in "Removing a Drive" on page A-16.
3. If you need to remove an empty drive carrier or drive slot cover to accommodate a disk, tape, or CD-ROM drive, remove it now. If your NetServer contains empty drive carriers, follow the procedures in "Removing a Drive" on the previous page. If your server contains drive slot covers, use your fingers or a screwdriver to pinch the fold located at the top left of the cover to release it from the drive slot.
4. If you are adding a new drive, remove it from its packing material.
5. Place the label on the drive carrier that corresponds to the slot in which you are installing it (labels with all the possible drive numbers are shipped with the server).

   Note: If relocating a drive, place a new label on the drive carrier corresponding with the new drive slot number.

6. If you are installing a drive in an NS 7000/050, check and, if necessary, change the SCSI ID of the drive (refer to "Verifying and Changing Jumper Settings" earlier in this appendix for instructions).

   Set the SCSI ID to 0 if the drive is installed in rack 1, 2, 5, or 6; set the SCSI ID to 1 if the drive is installed in rack 3, 4, 7, or 8 (see Figure A-9 on page A-10 for drive rack location).

7. Hold the drive with its release button at the top of the handle, and insert the drive until you hear it snap into the drive slot (see Figure A-24).

8. Using the same method, add all other drives in their slots.

9. Power on the system. During the boot operation, the system displays a list of all the devices present. Make sure any new drives are listed in the start-up messages.

   

   Note: If you install an 8-mm tape drive in an NS 7000/050 with an incorrect SCSI ID in a SCSI channel that is shared with a disk drive, the server may not detect the drive when booting and does not generate any error messages (normally, if two SCSI devices with the same ID exist in the same channel, the system generates SCSI interface check messages at boot time). Therefore, if the list of devices displayed at boot time does not include the 8-mm tape drive you just installed, verify that its SCSI ID is set properly.

10. Follow the procedures outlined in the *System Manager's Guide* to label the new drive, initialize it, and mount file systems on it.

This concludes the procedure for adding or relocating a drive.

Mapping SCSI Cables to Drives

This section explains how SCSI cables are mapped to each individual drive from the Storage Processor boards in the base cabinet card cage.

Base Cabinet and NS 7000/060 Expansion Cabinet

In the NetServer base cabinet and NS 7000/060 expansion cabinet, there is a one-to-one correspondence between a single SCSI cable attached to a drive rack and a single SCSI port on the SP. Refer to "Connecting the SCSI Drive Cables from the Expansion Cabinet" on page 3-5 and Appendix B for more information.

NS 7000/050 Expansion Cabinet

Because each drive rack (which can contain five drives) in the NS 7000/050 is supported by three SCSI cables, there is no one-to-one correspondence between the cables and the drives. If you suspect that a drive problem is related to a faulty SCSI cable, refer to Figure A-25.

In this figure, drives are identified by slots and SCSI cables by the connectors to which they are attached. Each drive is affected by the SCSI cables shown below it, which are the cables in the same SCSI channel. Boxes illustrated with dotted lines represent the cables that are not present if the drive rack is not daisy-chained to another one.

Note: The purpose of this section is to show the drives and SCSI cables in each SCSI channel. It does not imply that all drive problems are caused by faulty SCSI cables.

Figure A-25 shows slot numbering for a standalone NS 7000/050 expansion cabinet. For an example of how the software numbers the drive slots, refer to "Sample Drive Configurations" earlier in this appendix. For instructions on connecting the SCSI cables to the Storage Processors, refer to "Connecting the SCSI Drive Cables from the Expansion Cabinet" on page 3-5.

To see how the SCSI cables connect the drive racks to the Storage Processors, refer to Appendix B, "SCSI Drive Cabling."

Drives on rack 8	Slot 40	Slot 39	Slot 38	Slot 37	Slot 36
Connectors on rack 8	J4		J2		J0
Connectors on rack 6	J4		J2		J0
Drives on rack 7	Slot 35	Slot 34	Slot 33	Slot 32	Slot 31
Connectors on rack 7	J4		J2		J0
Connectors on rack 5	J4		J2		J0
Drives on rack 6	Slot 30	Slot 29	Slot 28	Slot 27	Slot 26
Connectors on rack 6	J4		J2		J0
Connectors on rack 6	J5		J3		J1
Drives on rack 5	Slot 25	Slot 24	Slot 23	Slot 22	Slot 21
Connectors on rack 5	J4		J2		J0
Connectors on rack 5	J5		J3		J1
Drives on rack 4	Slot 20	Slot 19	Slot 18	Slot 17	Slot 16
Connectors on rack 4	J4		J2		J0
Connectors on rack 2	J4		J2		J0
Drives on rack 3	Slot 15	Slot 14	Slot 13	Slot 12	Slot 11
Connectors on rack 3	J4		J2		J0
Connectors on rack 1	J4		J2		J0
Drives on rack 2	Slot 10	Slot 9	Slot 8	Slot 7	Slot 6
Connectors on rack 2	J4		J2		J0
Connectors on rack 2	J5		J3		J1
Drives on rack 1	Slot 5	Slot 4	Slot 3	Slot 2	Slot 1
Connectors on rack 1	J4		J2		J0
Connectors on rack 1	J5		J3		J1

Figure A-25. Mapping SCSI cables to drives in the NS 7000/050 (back view)

B Cable Specifications

About This Appendix

This appendix lists the supported signals for the console cable and the SCSI port on the HP. It also illustrates the SCSI cable connections between the base cabinet and the expansion cabinet and provides specifications for Ethernet, FDDI, MLT-3, and ATM network cables.

This appendix covers the following sections:

- Console Cable
- HP SCSI Port
- SCSI Drive Cabling
- Network Cables

Console Cable

Figure B-1 shows the wiring of the RS-232C console cable and the signals the cable supports.

Note: Because the console cable and modem cable are wired differently, the two cables are not interchangeable. The Auspex console cable is labeled with the part number 45-0014.

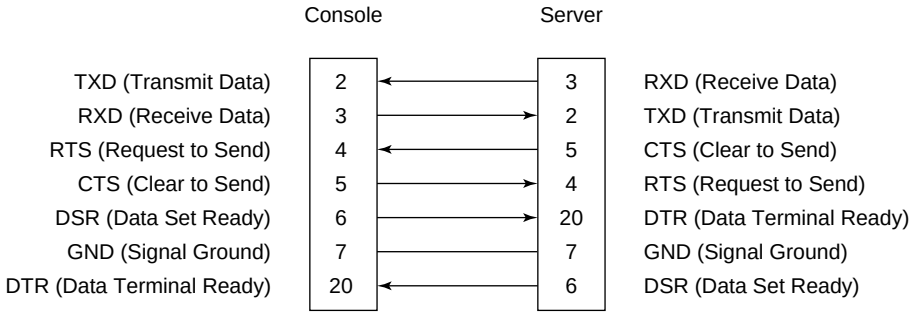

Figure B-1. Console cable pin diagram

HP SCSI Port

The HP SCSI port is a standard SCSI-2 connector. Table B-1 shows the pin diagram for the connector.

Table B-1. SCSI-2 cable pin diagram

Signal	Pin
GND (Ground)	1 through 11
GND (Ground)	15 through 25
SD0- (SCSI Data0)	26
SD1- (SCSI Data1)	27
SD2- (SCSI Data2)	28
SD3- (SCSI Data3)	29
SD4- (SCSI Data4)	30
SD5- (SCSI Data5)	31
SD6- (SCSI Data6)	32
SD7- (SCSI Data7)	33
SDP- (SCSI Parity)	34
GND (Ground)	35 and 36
TRMPWR (Terminator Power, +5 volts DC, Fused, 2 Amps)	38
GND (Ground)	40
ATN- (Attention)	41
BSY- (Busy)	43
ACK- (Acknowledge)	44
RST- (Reset)	45
MSG- (Message)	46
SEL- (Select)	47
CD- (Command/Data)	48
REQ- (Request)	49
IO- (Input/Output)	50

SCSI Drive Cabling

This section describes how to route SCSI cables from each drive rack to the Storage Processor boards in the card cage.

Base Cabinet and NS 7000/060 Expansion Cabinet

In the NS 7000/700 Series NetServer and the NS 7000/060 expansion cabinet, there is a simple one-to-one correspondence between a single SCSI cable attached to a drive rack and a single SCSI port on the SP IV or SP V.

Figure B-2 and Figure B-3 show the SCSI cabling between the NS 7000/700 base cabinet and the first and second NS 7000/060 expansion cabinets.

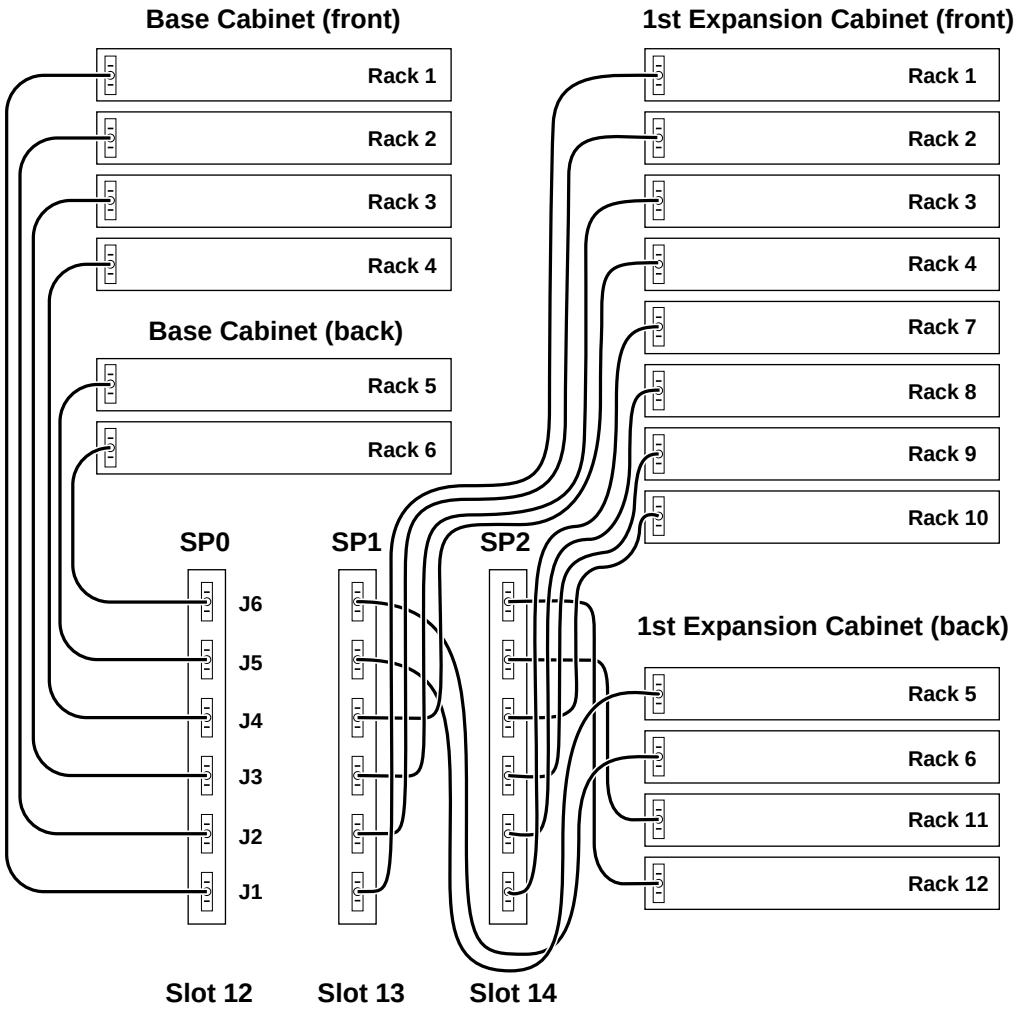

Figure B-2. SCSI cabling from the first NS 7000/060 expansion cabinet

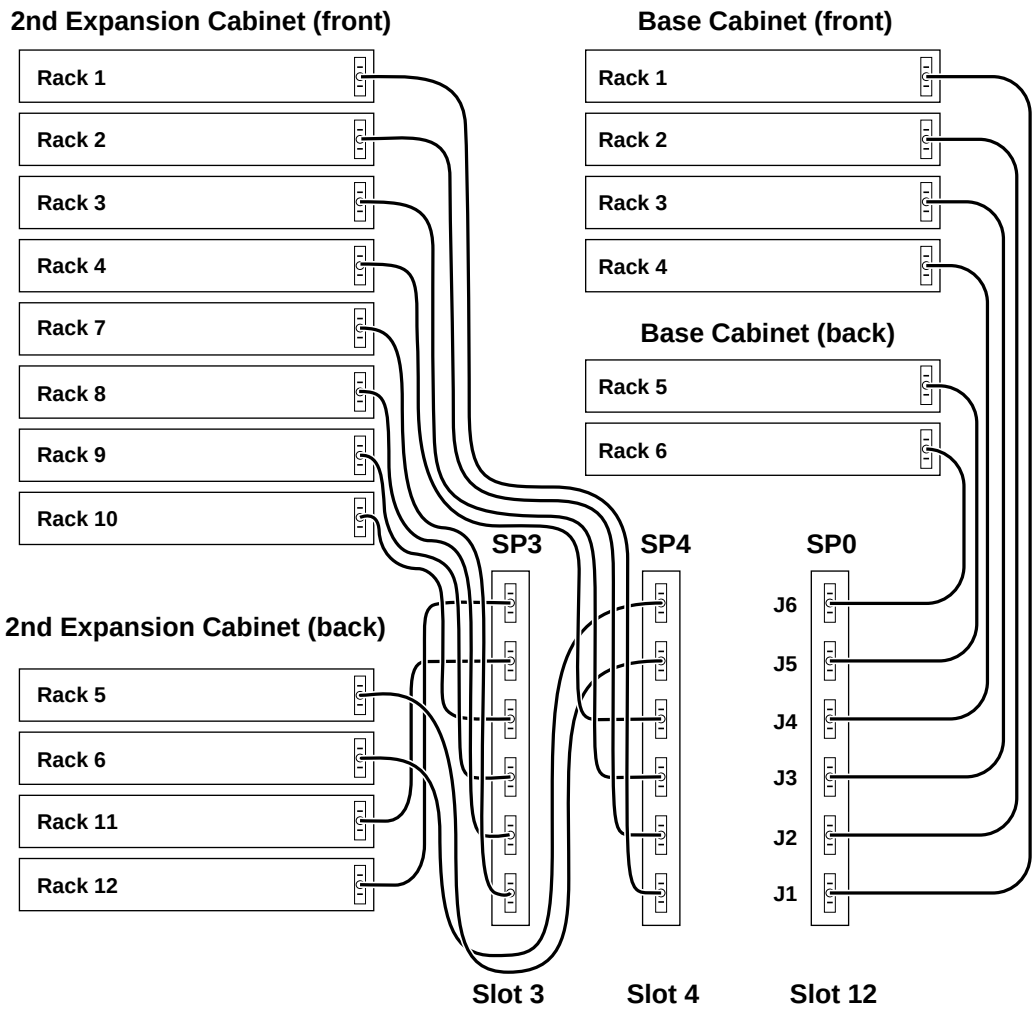

Figure B-3. SCSI cabling from the second NS 7000/060 expansion cabinet

NS 7000/050 Expansion Cabinet

This section describes the cable connections between the drive racks in the NS 7000/700 base cabinet, NS 7000/050 expansion cabinet, and the SP III-E boards.

Figure B-4 illustrates a fully configured NS 7000/050 expansion cabinet connected to a base cabinet. The six drive racks in the base cabinet are connected to Storage Processor 0 (SP0). Drive racks 1 and 2 in the expansion cabinet are cabled to Storage Processor 1 (SP1). Racks 3 and 4 are daisy-chained off racks 1 and 2. Drive racks 5 and 6 in the expansion cabinet are cabled to Storage Processor 2 (SP2). Racks 7 and 8 are daisy-chained off racks 5 and 6.

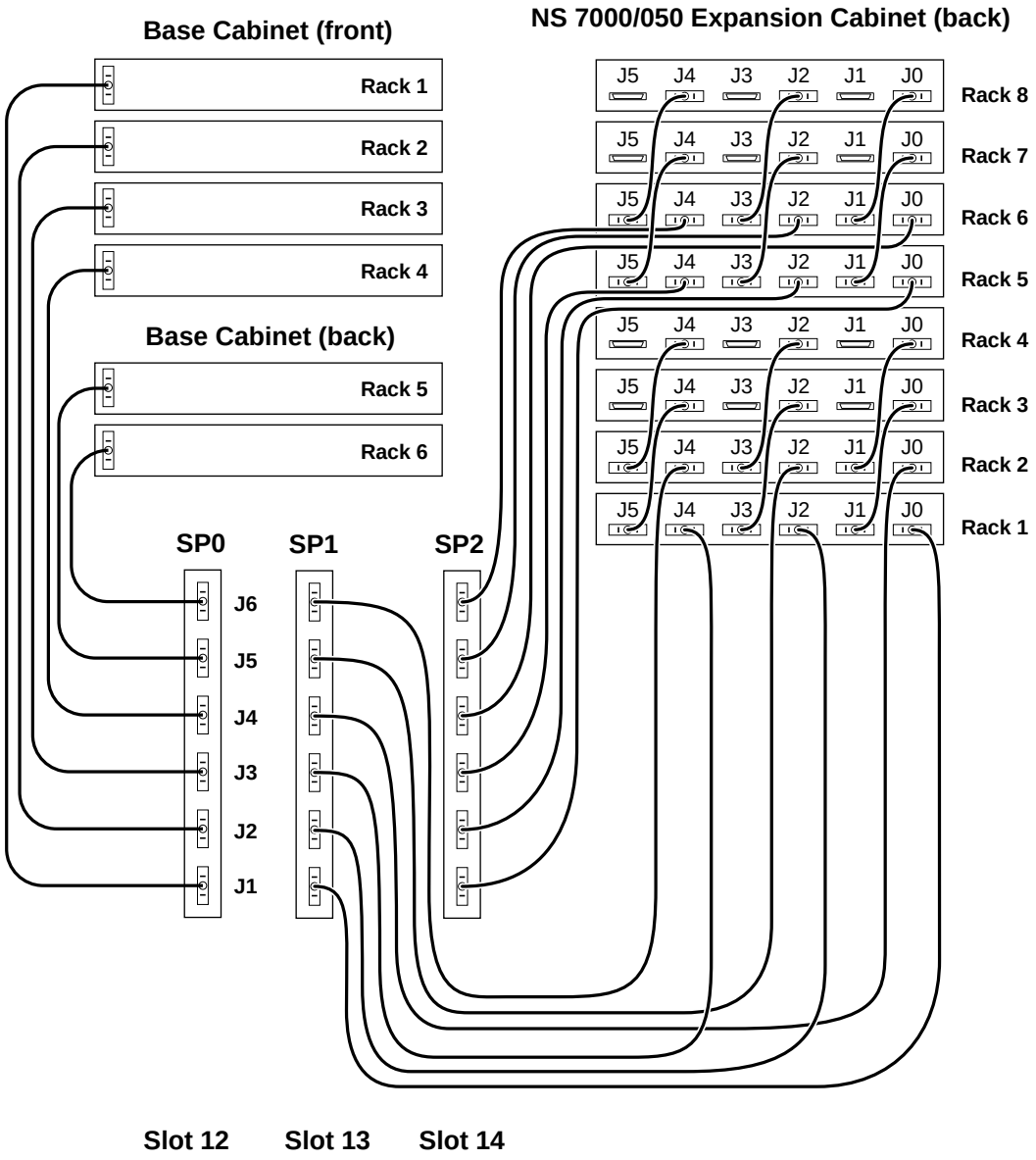

Figure B-4. SCSI cabling from the NS 7000/050 expansion cabinet

Table B-2 lists the connections for all SCSI cables for an NS 7000/050 expansion cabinet, organized by drive rack connector number. Each drive rack has six SCSI connectors, labeled J0 through J5. Each SP III-E has six SCSI connectors, labeled J1 through J6.

Table B-2. NS 7000/050 expansion cabinet SCSI drive cable connections

Rack no.	Connector no.	Connects to	Connector no.	Cable length (ft.)
1	J0	SP1	J1	5
	J1	Drive Rack 3	J0	2
	J2	SP1	J2	5
	J3	Drive Rack 3	J2	2
	J4	SP1	J3	5
	J5	Drive Rack 3	J4	2
2	J0	SP1	J4	5
	J1	Drive Rack 4	J0	2
	J2	SP1	J5	5
	J3	Drive Rack 4	J2	2
	J4	SP1	J6	5
	J5	Drive Rack 4	J4	2
3	J0	Drive Rack 1	J1	2
	J1	Not connected	–	–
	J2	Drive Rack 1	J3	2
	J3	Not connected	–	–
	J4	Drive Rack 1	J5	2
	J5	Not connected	–	–
4	J0	Drive Rack 2	J1	2
	J1	Not connected	–	–
	J2	Drive Rack 2	J3	2
	J3	Not connected	–	–
	J4	Drive Rack 2	J5	2
	J5	Not connected	–	–
5	J0	SP2	J1	5
	J1	Drive Rack 7	J0	2
	J2	SP2	J2	5
	J3	Drive Rack 7	J2	2
	J4	SP2	J3	5
	J5	Drive Rack 7	J4	2
6	J0	SP2	J4	5
	J1	Drive Rack 8	J0	2
	J2	SP2	J5	5

Table B-2. NS 7000/050 expansion cabinet SCSI drive cable connections (Continued)

Rack no.	Connector no.	Connects to	Connector no.	Cable length (ft.)
	J3	Drive Rack 8	J2	2
	J4	SP2	J6	5
	J5	Drive Rack 8	J4	2
7	J0	Drive Rack 5	J1	2
	J1	Not connected	–	–
	J2	Drive Rack 5	J3	2
	J3	Not connected	–	–
	J4	Drive Rack5	J5	2
	J5	Not connected	–	–
8	J0	Drive Rack 6	J1	2
	J1	Not connected	–	–
	J2	Drive Rack 6	J3	2
	J3	Not connected	–	–
	J4	Drive Rack 6	J5	2
	J5	Not connected	–	–

Network Cables

Network cabling specifications for Ethernet, FDDI, MLT-3, and ATM are provided for information only. Auspex does not supply cables to connect the NetServer to the network.

10Base-T Ethernet

The 10Base-T connectors use either 100-ohm, category 5, shielded twisted pair (STP) or unshielded twisted pair (UTP) cables, and attach to a network concentrator using standard RJ45 connectors.

If your 10Base-T cable uses an AUI connector, contact your authorized Auspex service representative for information on recommended AUI-to-RJ45 converters.

100Base-T Ethernet (half or full duplex)

The 100Base-T Ethernet full-duplex connectors use category 5, data grade, UTP cable or fiber cable over the Media Independent Interface (MII) and attach to a network concentrator using standard RJ45 or MII connectors.

FDDI

The FDDI connectors use 62.5/125-micron or 50/125-micron multimode cables with standard FDDI MIC connectors.

MLT-3

The MLT-3 connectors use either 100-ohm, category 5, STP or UTP cables and attach to a network concentrator using standard RJ45 connectors.

Auspex recommends using cables with the EIA/TIA 568B wiring scheme. Table B-3 lists the pin assignments for both connectors on the EIA/TIA 568B cable.

Table B-3. EIA/TIA 568B cable pin and pair assignments

Cable connectors			
Pin	**Pin**	**Pair**	**Color**
1	8	2	White/orange
2	7	2	Orange
3	6	3	White/green
4	5	1	Blue
5	4	1	White/blue
6	3	3	Green
7	2	4	White/brown
8	1	4	Brown

ATM

The ATM connector uses a 155 MB-per-second multimode fiber cable with an SC-type connector and attaches to a network concentrator using standard RJ45 connectors. If your site uses ST-type ATM cabling, you need an ST-to-SC converter.

C System Console Configurations

About This Appendix

This appendix describes the configuration options for the DEC VT510 system console.

This appendix covers the following sections:

- System Console Parameters
- System Console Break Function
- System Console Delete Key
- System Console PgUp and PgDn Keys
- Using Diacritics for Key Functions

Refer to the DEC VT510 console user's manual for additional information.

Note: The following procedures require you to access the Terminal Setup menu by pressing the Caps Lock and Print Screen/Sys Rq keys simultaneously. If this does not work, you can access the Terminal Setup menu by powering off the terminal, powering it on again, and pressing the F3 key.

System Console Parameters

System consoles shipped from Auspex are preconfigured and do not require additional steps. However, if you need to reset the parameters for the DEC VT510, follow this procedure.

To reset the parameters for the DEC VT510

1. Press the Caps Lock and the Print Screen/Sys Rq keys simultaneously to display the Terminal Setup menu. The currently selected field, **Actions**, is highlighted.

   

   Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Use the Right and Down Arrow keys to select **Restore factory defaults**, and press the Enter key.
3. Use the Left Arrow key to return to the main menu. Select **Save settings**, and press the Enter key.
4. Select **Exit Setup**, and press the Enter key.

This concludes the reset procedure for the DEC VT510 terminal.

System Console Break Function

To enter a break on the DEC VT510 system console, press the Caps Lock and Pause/Break keys simultaneously. This factory default setting cannot be disabled. However, you can add a different keystroke for the break function by following this procedure.

To enable the Break key on the DEC VT510 console

1. Press the Caps Lock and Print Screen/Sys Rq keys simultaneously to display the Terminal Setup menu.

   

   Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Select **Keyboard**, and press the Right Arrow key.
3. Select **Define key**, and press the Enter key.
4. At **Press key to be defined**, press the Pause/Break key.
5. Use the Down Arrow key to select **Unshifted** under the **Modifiers** field, and then press the Right Arrow key to enter the Select function menu.

   

   Note: You may choose another key combination, such as **Shifted**, to represent the Break function. **Unshifted** is used as an example.

6. Use the Up Arrow key, and select **Break**.
7. Press the Enter key.
8. Use the Left Arrow key to return to the **Modifiers** field.

9. Use the Down Arrow key to select **OK**, and press the Enter key.
10. Select **Save settings**, and press the Enter key.
11. Select **Exit Setup**, and press the Enter key.

This concludes the procedure for enabling the Break key on the DEC VT510 console.

To disable the Break key on the DEC VT510 console

1. Press the Caps Lock and Print Screen/Sys Rq keys simultaneously to display the Terminal Setup menu.

   Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Select **Keyboard**, and press the Right Arrow key.
3. Select **Define key**, and press the Enter key.
4. At **Press key to be defined**, press the Pause/Break key.
5. Use the Down Arrow key to select **Unshifted** under the **Modifiers** field, and then press the Right Arrow key to enter the Select function menu.

   Note: You may choose another key combination, such as **Shifted**, to represent the Break function. **Unshifted** is used as an example.

6. Use the Up Arrow key, and select **No function**.
7. Press the Enter key.
8. Use the Left Arrow key to return to the **Modifiers** field.
9. Use the Down Arrow key to select **OK**, and press the Enter key.
10. Select **Save settings**, and press the Enter key.
11. Select **Exit Setup**, and press the Enter key.

This concludes the procedure for disabling the Break key on the DEC VT510 console.

System Console Delete Key

The Delete key on the DEC VT510 system console does not work properly if you use a different *.login* file other than the standard one that is shipped with your system for *root*. For the Delete key to work properly, you must include one of the following commands in your nonstandard *.login* file:

```
stty dec
```

or

```
stty erase ^?
```

System Console PgUp and PgDn Keys

The PgUp and PgDn keys on the DEC VT510 system console are not configured to work with the **vi** editor.

To configure the PgUp and PgDn keys to work with the vi editor

1. Press the Caps Lock and Print Screen/Sys Rq keys simultaneously to display the Terminal Setup menu.

   

   Note: Use the Up and Down Arrow keys to select another line on the screen. Use the Right Arrow key to select a submenu. Use the Left Arrow key to return to the previous menu.

2. Select **Keyboard**, and press the Right Arrow key.
3. Select **Define key**, and press the Enter key.
4. When asked **Press key to be defined**, press the PgUp or PgDn key.
5. Use the Down Arrow key to select **Unshifted** under the **Modifiers** field, and then press the Right Arrow key to enter the Select function menu.
6. Select **UDK sequence**, and press the Enter key. The **UDK:** field appears.
7. Press Ctrl-B for the PgUp function or Ctrl-F for the page down function according to your selection in step 4.
8. Use the Down Arrow key to select the **Apply** field.
9. Use the Left Arrow key to select **OK**, and press the Enter key.
10. At this point, you have configured one of the PgUp and PgDn keys. Repeat steps 2 through 9 to configure the second key.
11. Select **Save settings**, and press the Enter key.
12. Select **Exit Setup**, and press the Enter key.

This concludes the procedure for configuring the PgUp and PgDn keys for the DEC VT510 console. You can test the PgUp and PgDn keys using the **vi** editor.

Using Diacritics for Key Functions

Auspex recommends that you do not assign diacritics as key functions because they may not function correctly in UNIX. Diacritics are described in the console setup menu under the Define Key Editor as nonspacing accents. Some diacritics include “~” (tilde), “¨” (dieresis), “˘” (breve), and “¸” (cedilla).

AUSPEX

Index

D

E

F

U

W