

# **NS 7000 Model 150/250 Series Hardware Manual**



AUSPEX

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## **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.

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## Declaration of Conformity

The NS 7000 150/250 Series NetServers meet the following safety and EMC standards pursuant to ISO/IEC Guide 22 and EN 45014:

| NetServer Model Number          | Standards   |
|---------------------------------|---|
| NS 7000/150 NetServer:          | EN60950/08.92   |
| NS 7000/150 (base cabinet)      | EN60950 A1/01.93  |
| NS 7000/010 (expansion cabinet) | EN55022 Class A (1985 Ed 1)<br>EN50082-2 (Draft 1992)<br>EN60555 PT2 (1987): Harmonics<br>IEC801-2 (1991): ESD, 8 kv air, 4 kv contact<br>IEC801-3 (1984): RS, 10 v/m, 1 kHz modulated<br>IEC801-4 (1988): EFT, 4 kv A/C cables, 2 and 4 kv I/O cables<br>IEC801-5 (Draft 1993): Surge, 1 kv diff, 2 kv comm  |
| NS 7000/200 Series NetServer:   | EN60950/08.92   |
| NS 7000/200 (base cabinet)      | EN60950 A1/01.93  |
| NS 7000/010 (expansion cabinet) | EN55022 Class A (1985 Ed 1)<br>EN50082-2 (Draft 1992)<br>EN60555 PT2 (1987): Harmonics<br>IEC801-2 (1991): ESD, 8 kv air, 4 kv contact<br>IEC801-3 (1984): RS, 10 v/m, 1 kHz modulated<br>IEC801-4 (1988): EFT, 4 kv A/C cables, 2 and 4 kv I/O cables<br>IEC801-5 (Draft 1993): Surge, 1 kv diff, 2 kv comm  |
| NS 7000/250 (base cabinet)      | EN60950/08.92<br>EN60950 A1/01.93<br>EN55022 Class A<br>EN50082-1: Residential, commercial, and light industry<br>EN60555 PT2 (1987): Harmonics<br>IEC1000-4-2: ESD, 8 kv air, 4 kv contact<br>EN61000-4-8: RS, 3 v/m<br>IEC1000-4-4: EFT, 1 kv A/C cables, 0.5 kv I/O cables<br>ENV50142: Surge, 0.5 kv diff, 1 kv comm<br>EN61000-4-11: Mains voltage dips and dropouts<br>ENV50141: Conducted immunity, 3 v<br>ENV50140: Electromagnetic immunity, 3 v/m |

The NetServers comply 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.

| <b>Part Number</b> | <b>Date</b> | <b>Description</b>         |
|--------------------|-------------|----------------------------|
| 85-0337 Rev A      | March 1997  | Release 1.9, first release |

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# Preface

## About This Manual

This manual describes the Auspex NS 7000™ Model 150 Series and Model 250 Series NetServer, and provides procedures for installing the 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.

This manual covers the following:

- ▲ Overview of the NS 7000/150 and NS 7000/250
- ▲ Unpacking and Setting Up the System
- ▲ Installation
- ▲ Power Up and Shut Down
- ▲ Preventive Maintenance
- ▲ Drive Configuration Options
- ▲ Cable Specifications
- ▲ System Console Configurations

## Applicable Documentation

For additional information relevant to managing the NetServer, you should 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 150, NS 7000/150, NS 7000/151, and NS 7000/152, all refer to the NS 7000/150 Series NetServer. NS 7000 Model 250, NS 7000/250, NS 7000/251, and NS 7000/252, all refer to the NS 7000/250 Series NetServer. The terms NetServer and server refer to both the NS 7000/150 Series NetServer and NS 7000/250 Series NetServer.

The NS 7000/150 consists of a base cabinet. The NS 7000/151 consists of an NS 7000/150 base cabinet and one expansion cabinet. The NS 7000/152 consists of an NS 7000/150 base cabinet and two expansion cabinets.

The NS 7000/250 consists of a base cabinet. The NS 7000/251 consists of an NS 7000/250 base cabinet and one expansion cabinet. The NS 7000/252 consists of an NS 7000/250 base cabinet and two expansion cabinets.

## Typographical Conventions

In this manual, typefaces indicate different types of information. The table below explains these typographical conventions.

| Font           | Meaning   |
|----------------|---|
| Typewriter     | Indicates a literal screen message.   |
| <b>Bold</b>    | In a command line, indicates information to be entered exactly as shown. In text, indicates a command name or device name.  |
| <i>Italics</i> | In a command line, indicates a nonliteral item or variable for which you should 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 loss of system data.



**Note:** Notes call attention to important information you should be aware of 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, ease of installation or configuration.

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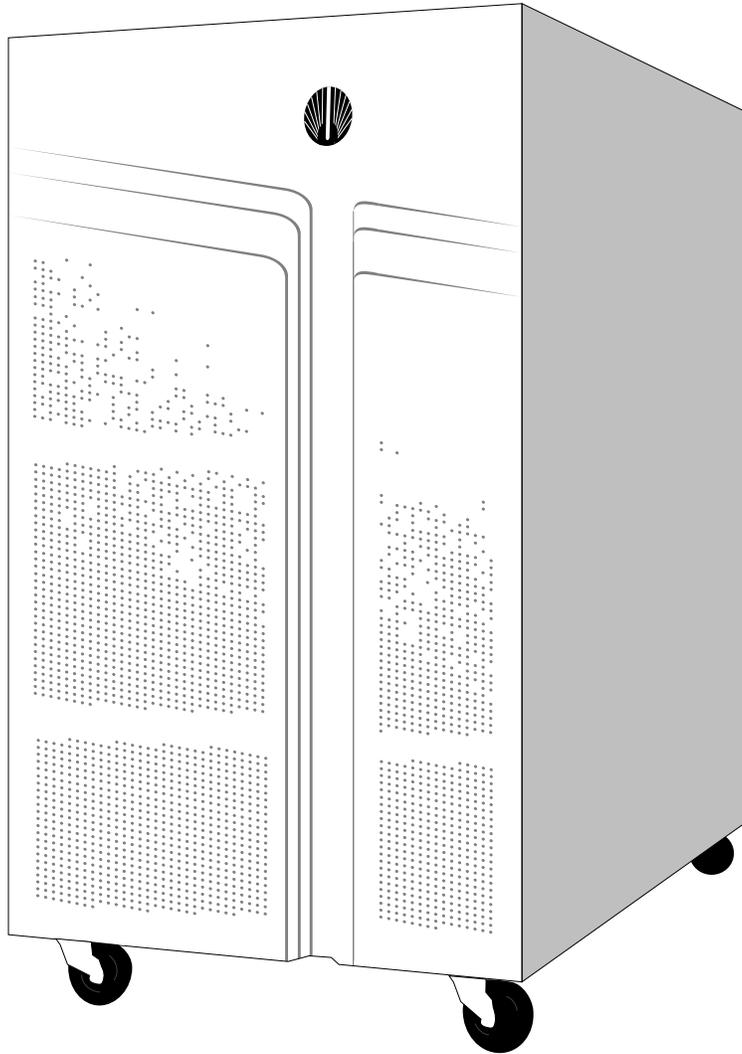
# 1 Overview of the NS 7000/150 and NS 7000/250

## Overview

The Auspex NetServer provides highly responsive network file access and balanced compute service to many users on multiple networks. With a unique Functional Multiprocessor<sup>®</sup> (FMP<sup>®</sup>) 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 Model 150 and Model 250 Series NetServer.

This chapter covers the following sections:

- ▲ Disk Subsystems
- ▲ Numbering Conventions
- ▲ Environmental Requirements
- ▲ Electrical Requirements
- ▲ Installation Overview
- ▲ Space Requirements



**Figure 1-1. NS 7000 Model 150 and Model 250 Series NetServer**

Table 1-1 lists the hardware features.

**Table 1-1. NetServer hardware features**

|                        |  |
|------------------------|--|
| System architecture    | <ul style="list-style-type: none"> <li>▲ Functional Multiprocessor architecture with dedicated processors for network, file, UNIX, and storage processing.</li> <li>▲ Host Processor that includes an Mbus-based, 90-MHz or 125-MHz Superscalar 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).</li> <li>▲ Optional nonvolatile Write Accelerator for improved NFS write-operation performance.</li> </ul>  |
| Enhanced VME backplane | <ul style="list-style-type: none"> <li>▲ 4-slot enhanced VME backplane for connecting dedicated processor boards. The VME transfer speed is up to 100 MB per second between Network Processor IV (NP IV), Network Processor III (NP III), and Storage Processor V (SP V) boards, and up to 55 MB per second between all other NP and SP board combinations.</li> </ul>   |
| Subsystems             | <ul style="list-style-type: none"> <li>▲ High-performance storage subsystems: disk, tape, and CD-ROM drives are organized in racks of seven drives, with one rack in the base cabinet and two racks in each optional expansion cabinet (up to two expansion cabinets supported).</li> <li>▲ Auto-configured SCSI ID that allows drives to be added in any drive slot without having to change the SCSI ID settings.</li> <li>▲ Tape storage devices that can be attached to the NetServer through the HP or SP (refer to the <i>Storage Peripherals Manager's Guide</i> for more information).</li> <li>▲ Drives that can be hot-plugged; that is, removed or inserted while the NetServer is powered on.</li> </ul> |
| Network connections    | <ul style="list-style-type: none"> <li>▲ Connections for 10Base-T and 100Base-T Ethernet, FDDI, and ATM.</li> </ul>  |
| Auspex system console  | <ul style="list-style-type: none"> <li>▲ International ANSI-compatible ASCII terminal.</li> </ul>  |

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

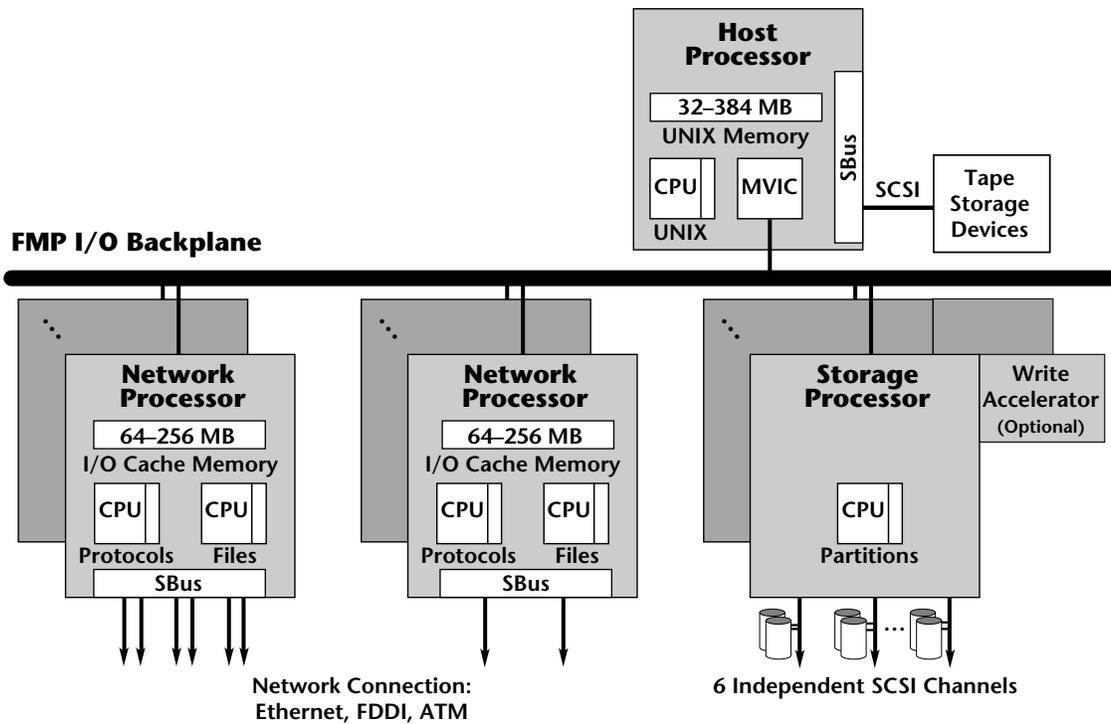


Figure 1-2. FMP architecture

## Processor Board Configuration

Table 1-2 lists the processor board configuration options supported by Version 1.9 software for the NS 7000 150/250 Series NetServers.

**Table 1-2. Processor board configuration**

| Processor board                          | Minimum configuration | Maximum configuration | Comments  |
|--|-----------------------|-----------------------|---|
| Host Processor (HP VIII)                 | 1                     | 1                     | <p>The HP VIII includes a 125-MHz SPARC processor and supports up to 384 MB of onboard dynamic RAM.</p> <p>The HP also provides SCSI support for tape storage devices.</p>  |
| Network Processor (NP IV, NP III, NP II) | 1                     | 2                     | <p>The NP supports 10Base-T Ethernet, 100Base-T Ethernet, FDDI, ATM, or combinations of these interfaces. For more information on supported interfaces, refer to Table 2-3 on page 2-13.</p> <p>Each NP supports 64–256 MB of memory for protocol processing, file processing, and I/O cache memory.</p>  |
| Storage Processor (SP V, SP IV)          | 1                     | 1                     | <p>The SP V board supports the Write Accelerator III and II, which have 8 and 2 MB of cache memory, respectively. The SP IV board supports the Write Accelerator I, which has 1 MB of cache memory.</p> <p>The SP supports disk, tape, and CD-ROM drives in any combination.</p> <p>The SP board also provides SCSI support for tape storage devices.</p> |

## Disk Subsystems

The maximum drive configuration requires one base cabinet, two expansion cabinets, and one tape storage device.

The base cabinet consists of one drive rack, holding up to 7 drives. Each expansion cabinet consists of two drive racks, holding up to 14 drives.

The drives can be installed in any combination of disk, 8-mm tape, or CD-ROM drives, except one disk drive must be the root drive. The root disk drive must be installed in slot 0, which is the top slot in the base cabinet.

## Numbering Conventions

Table 1-3 describes the numbering conventions used to identify the various elements of the NetServer's scalable design.

**Table 1-3. Numbering conventions**

| Element                 | How numbered | Comments   |
|-------------------------|--------------|--|
| Card cage/VME backplane | 1–4          | The HP board occupies the first slot in the card cage. The NP boards occupy the next two slots in the card cage. The slots are numbered left to right as you face the back of the server. The HP <i>must</i> always occupy slot 1.   |
| Drive racks             | 1–5          | Rack 1 is installed in the base cabinet. Racks 2 and 3 are installed in the first expansion cabinet with rack 2 on the left side and rack 3 on the right side when viewing the expansion cabinet from the front. Racks 4 and 5 are installed in the second expansion cabinet with rack 4 on the left side and rack 5 on the right side when viewing the expansion cabinet from the front.  |
| Drive slots             | 0–34         | <p>The number of drive slots in a server depends on the number of installed cabinets. Each drive rack has seven slots (one drive rack in the base cabinet and two drive racks in each optional expansion cabinet):</p> <ul style="list-style-type: none"> <li>• Slots 0–6 require rack 1.</li> <li>• Slots 7–20 require racks 2 and 3.</li> <li>• Slots 21–34 require racks 4 and 5.</li> </ul> <p>Slots are numbered from top to bottom. When viewing the expansion cabinets from the front, slot numbers begin in the left drive rack (racks 2 and 4).</p> |
| Drives                  | 0–34         | The drive number corresponds to the slot that the drive occupies in the server cabinet. For example, drives 0–6 install in slots 0–6.  |

## Environmental Requirements

Operate the NetServer in a temperature-controlled, contaminant-free atmosphere within the recommended levels of humidity. Table 1-4 lists the necessary environmental conditions for the NetServer.

**Table 1-4. 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<br>(noncondensing at 40° C)    | 20%          | 80%                   |
| Nonoperating humidity<br>(noncondensing at 40° C) | 10%          | 90%                   |
| Audible noise                                     | N/A          | 60 dBA                |



**Note:** 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).

## Space Requirements

Place the NetServer base cabinet in a location no less than two feet from the nearest wall or other equipment. Two 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 for the base cabinet and the expansion cabinets to sit side by side, approximately two inches apart. Allow space to easily open the front and back doors of each cabinet.

Table 1-5 gives the dimensions of the NetServer base cabinet and optional expansion cabinets. The weights shown are calculated with no drives installed, and increase as additional drives are added.

**Table 1-5. Base cabinet and expansion cabinet dimensions**

|        | Base cabinet      | Expansion cabinet |
|--------|-------------------|-------------------|
| Height | 77 cm (30 inches) | 77 cm (30 inches) |
| Width  | 41 cm (16 inches) | 41 cm (16 inches) |
| Depth  | 82 cm (32 inches) | 82 cm (32 inches) |
| Weight | 80 kg (175 lbs.)  | 70 kg (153 lbs.)  |

## Electrical Requirements



**Caution:** If you have expansion cabinets connected to the NetServer, each expansion cabinet must 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.

The power supply shipped with the server can accommodate a fully configured system. Table 1-6 and Table 1-7 list the electrical power requirements and input specifications.

**Table 1-6. Electrical power requirements**

| Base cabinet (7 drives) | Each expansion cabinet (14 drives) |
|-------------------------|------------------------------------|
| 705 W                   | 410 W                              |
| .705 KVA                | .410 KVA                           |
| 2,410 BTUs/Hour         | 1,400 BTUs/Hour                    |

**Table 1-7. Electrical input specifications**

| Input   | Power Supply                  |
|---|-------------------------------|
| Nominal input voltage range                       | 100–240 VAC                   |
| Operating input voltage range                     | 90–264 VAC                    |
| Current rating                                    | 6-3 A                         |
| Input service rating                              | 15 A                          |
| Frequency   | 50–60 ±3 Hz                   |
| Inrush current                                    | 40 A peak max                 |
| Efficiency  | >75% typical                  |
| Power factor                                      | >.96 (115 VAC)                |
| Turn-on time                                      | DC power = 1 second           |
| Electromagnetic Immunity (EMI) filter (conducted) | FCC and VDE Level A           |
| Total Harmonic Distortion                         | Nominal line (110 V) under 6% |
| Leakage current                                   | 2 mA                          |

## Power Cable Configurations

There are two power cable configurations for the NetServer.

### North American

The North American configuration is shipped with an 18-3 gauge power cable that has a molded wall plug. The wall receptacle for this configuration must be on a circuit with a minimum capacity of 15 amps.

### International (except Canada and Mexico)

The international configuration is a TUV-approved 3x1.00-mm cable that is compliant with the specifications of HD21 code H05VVF3G1.00. The cable is shipped with no plug. Your authorized Auspex service representative provides a plug appropriate for the wall receptacle. The wall receptacle must be on a circuit appropriate to the voltage.

## Installation Overview

This section provides an overview of installation procedures required to set up your NetServer. For detailed information, refer to the chapter listed with each procedure.



**Caution:** To prevent electrostatic damage to the server, always wear the antistatic wrist strap when working with electrostatic-sensitive equipment.

### Unpacking the base cabinet

1. Unpack the NetServer (Chapter 2).
2. Lock the four casters (Chapter 2).
3. With power set to OFF, plug the power cable into a grounded outlet (Chapter 3).

### Unpacking expansion cabinets

1. Unpack each expansion cabinet (Chapter 2).
2. Connect the expansion cabinets to the base cabinet (Chapter 3).
3. Lock the four wheels on each expansion cabinet (Chapter 2).
4. With power set to OFF, plug the power cable from each expansion cabinet into a separate grounded outlet (Chapter 3).
5. Connect the SCSI cables from the expansion cabinets to the base cabinet (Chapter 3).

### Setting up your system

1. Connect the console to the Host Processor in the base cabinet (Chapter 3).
2. Attach the NetServer to your network (Chapter 3).
3. Install the drives shipped with your system with the root drive occupying slot 0, which is the top slot in the base cabinet (Chapter 3).

### Powering on the NetServer

1. Power on the system console (Chapter 4).
2. Power on the expansion cabinets and tape storage device, if present (Chapter 4).
3. Power on the base cabinet (Chapter 4).



# 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.

This chapter covers the following sections:

- ▲ Unpacking the NetServer
- ▲ Locking the Casters
- ▲ Opening the Cabinet Doors
- ▲ Basic Components
- ▲ NetServer Base Cabinet Subassemblies
- ▲ Expansion Cabinet Subassemblies
- ▲ Card Cage Components

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, contact your authorized Auspex service representative. If you need to connect an expansion cabinet to the base cabinet, refer to "Attaching Expansion Cabinets" on page 3-5.

## Unpacking the NetServer

This section provides unpacking instructions for the NetServer base cabinet and expansion cabinets. Instructions for unpacking and installing other NetServer components appear in Chapter 3 in the sections “Connecting the System Console to the NetServer” “Installing Drives” and “Attaching a SCSI Device to the HP”.



### Tools

- ▲ Knife to open the packing boxes containing drives and accessories
- ▲ Wire cutter to cut tie-wraps (cut only red tie-wraps)
- ▲ Adjustable wrench to remove wooden lag bolts
- ▲ Band cutter to open the shipping container

### To unpack the NetServer

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 two feet of clearance between the server and any wall or other equipment (except the expansion cabinet). Also, make sure there is an appropriate wall receptacle within six feet of the server.

2. Use a band cutter to cut and remove the straps that secure the wooden ramp located on top of the server. You use this ramp in step 6.
3. Remove the protectors from each corner of the server.
4. Remove the corrugated sleeve from the base pallet by sliding it up and off the unit. To avoid damaging the unit, do not cut the corrugated sleeve with a knife.
5. Use an adjustable wrench to remove the two lag bolts from the base pallet and remove the wooden stop marked “FRONT.”
6. Place the ramp (the panel removed in step 2) in position next to the edge of the pallet, adjacent to the front panel of the server.
7. Carefully roll the server down the ramp to the floor.



**Caution:** Be 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.

8. 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.
9. Roll the server to the site prepared for it.
10. If your NetServer includes expansion cabinets:
  - a. Repeat steps 1 through 8.
  - b. Place the first expansion cabinet to the right of the base cabinet (as viewed from the front). Place the second expansion cabinet to the left of the base cabinet (as viewed from the front). To connect the expansion cabinets to the base cabinet, refer to “Attaching Expansion Cabinets” on page 3-5.



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

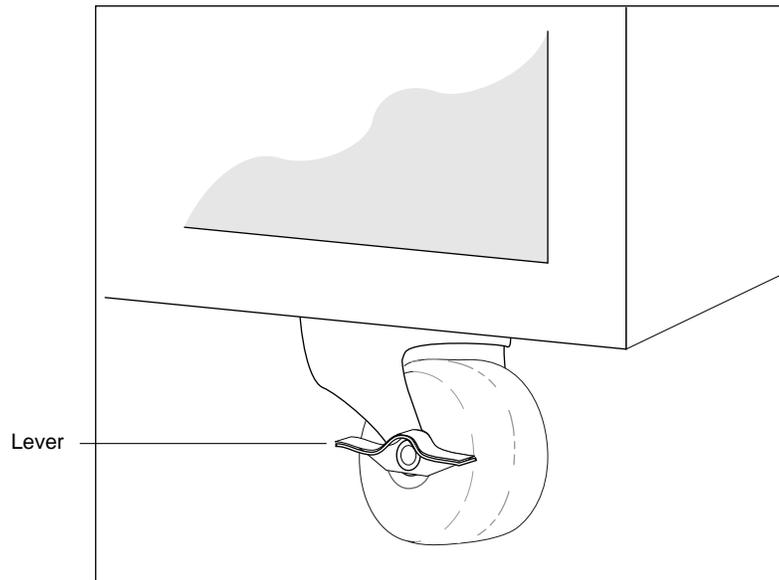
This concludes the instructions for unpacking the NetServer and expansion cabinets. Proceed to section “Locking the Casters” on page 2-3.

## Locking the Casters

Each cabinet has casters so that you can easily roll it to its permanent site. Once you have rolled the server to its permanent site, lock the casters. The procedure is the same for both the base cabinet and expansion cabinet.

### *To lock the casters*

1. Locate the four casters. There is one caster underneath each corner of the cabinet.
2. On each caster, turn the locking lever until the lever is horizontal (see Figure 2-1). This prevents the system from rolling and potentially disconnecting cables.



**Figure 2-1. Locking the casters**

This concludes the procedure for locking the casters.

## 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 cable. 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 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 150/250 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 25-foot null-modem RS-232C console cable (shipped in a separate carton)

Refer to Figure 2-2 on page 2-5 to identify system cables shipped with your NetServer. Some components, such as the SCSI cable that connects 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 you have the following:

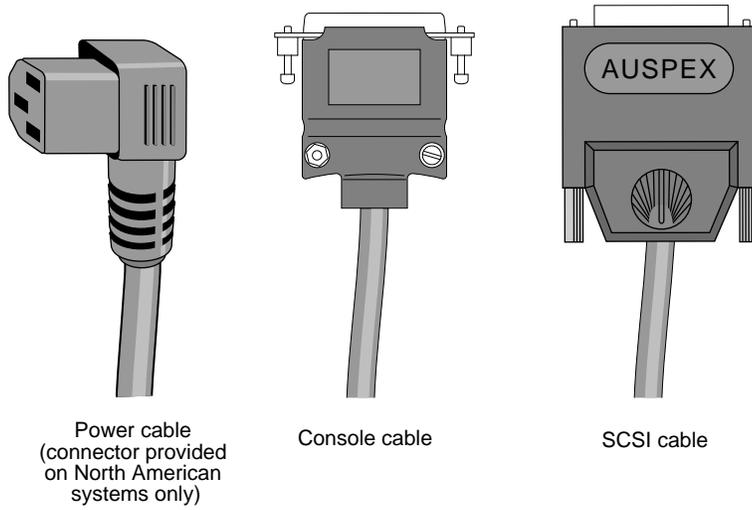
- ▲ Expansion cabinet connection kit
- ▲ Disk drives, packed separately in a foam-padded box, to install in the expansion cabinet
- ▲ Any additional tape or CD-ROM drives, packed separately in a foam-padded box, to install in the expansion cabinet
- ▲ One power cable (installed inside the expansion cabinet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

Each expansion cabinet accepts the same type of disk, tape, and CD-ROM drives as the base cabinet.

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

- ▲ One power cable
- ▲ Two 5-foot SCSI drive cables that connect the drives in the expansion cabinet to the Storage Processor board in the base cabinet

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



**Figure 2-2. System cables**

# NetServer Base Cabinet Subassemblies

The base cabinet contains the following subassemblies:

- ▲ Card cage chassis with four slots
- ▲ Disk drive rack
- ▲ Power systems unit (PSU)

Figures 2-3 and 2-4 show the front and the back views of the base cabinet with the subassemblies labeled.

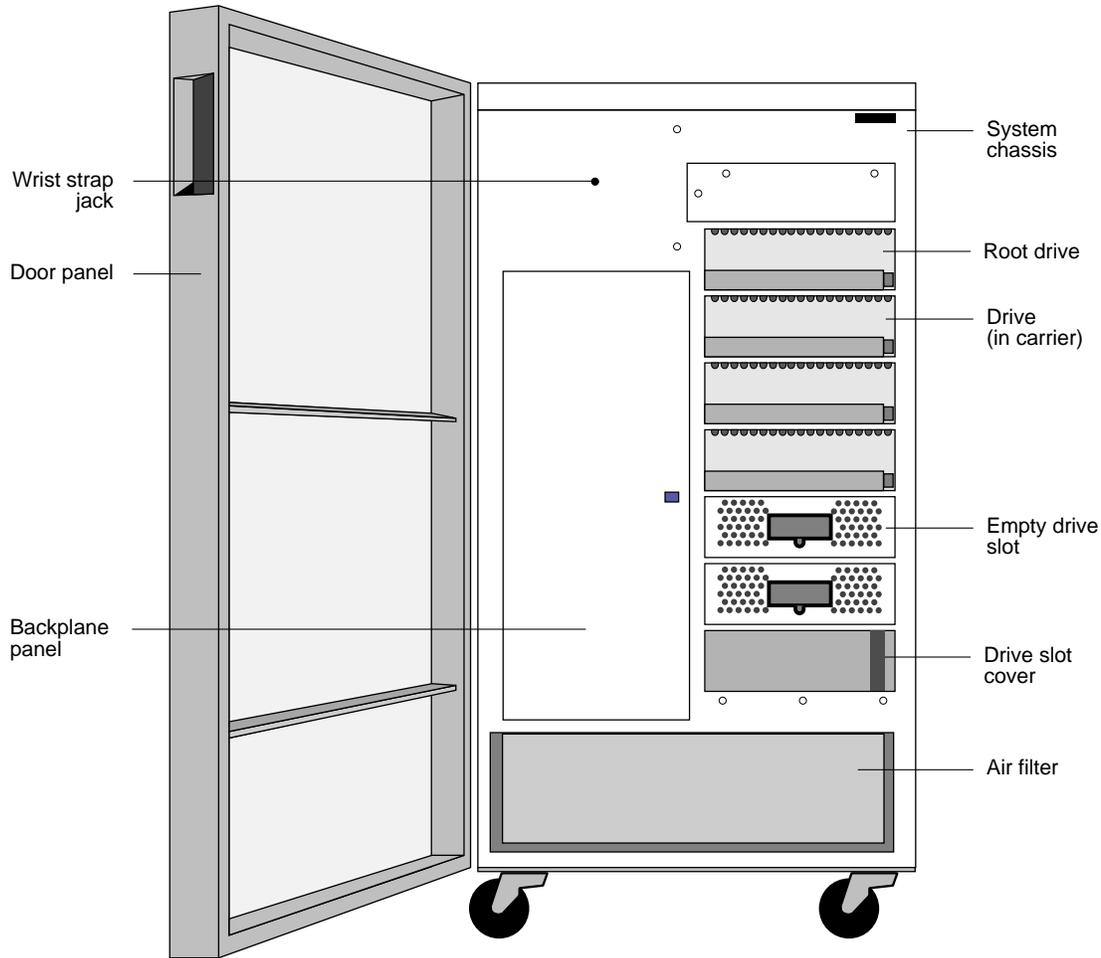


Figure 2-3. Base cabinet subassemblies (front view)

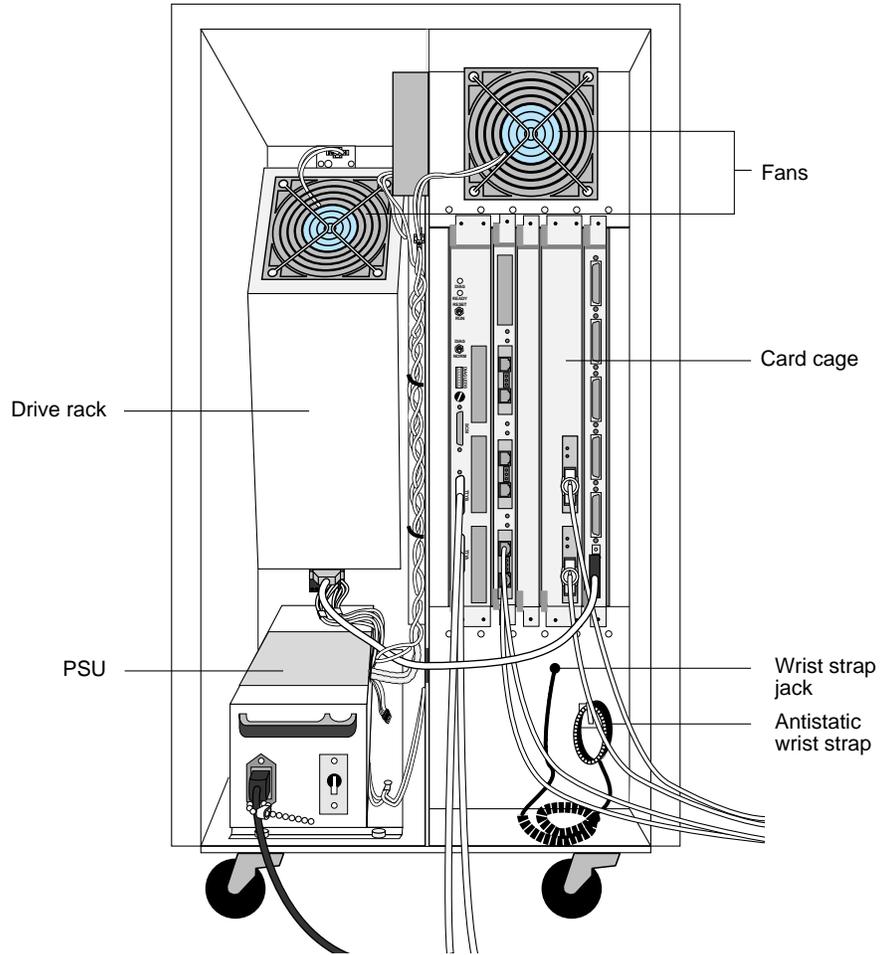


Figure 2-4. Base cabinet subassemblies (back view)

## Expansion Cabinet Subassemblies

The expansion cabinet contains the following subassemblies:

- ▲ Two disk drive racks
- ▲ PSU

Figures 2-5 and 2-6 show the front and back views of the expansion cabinet.

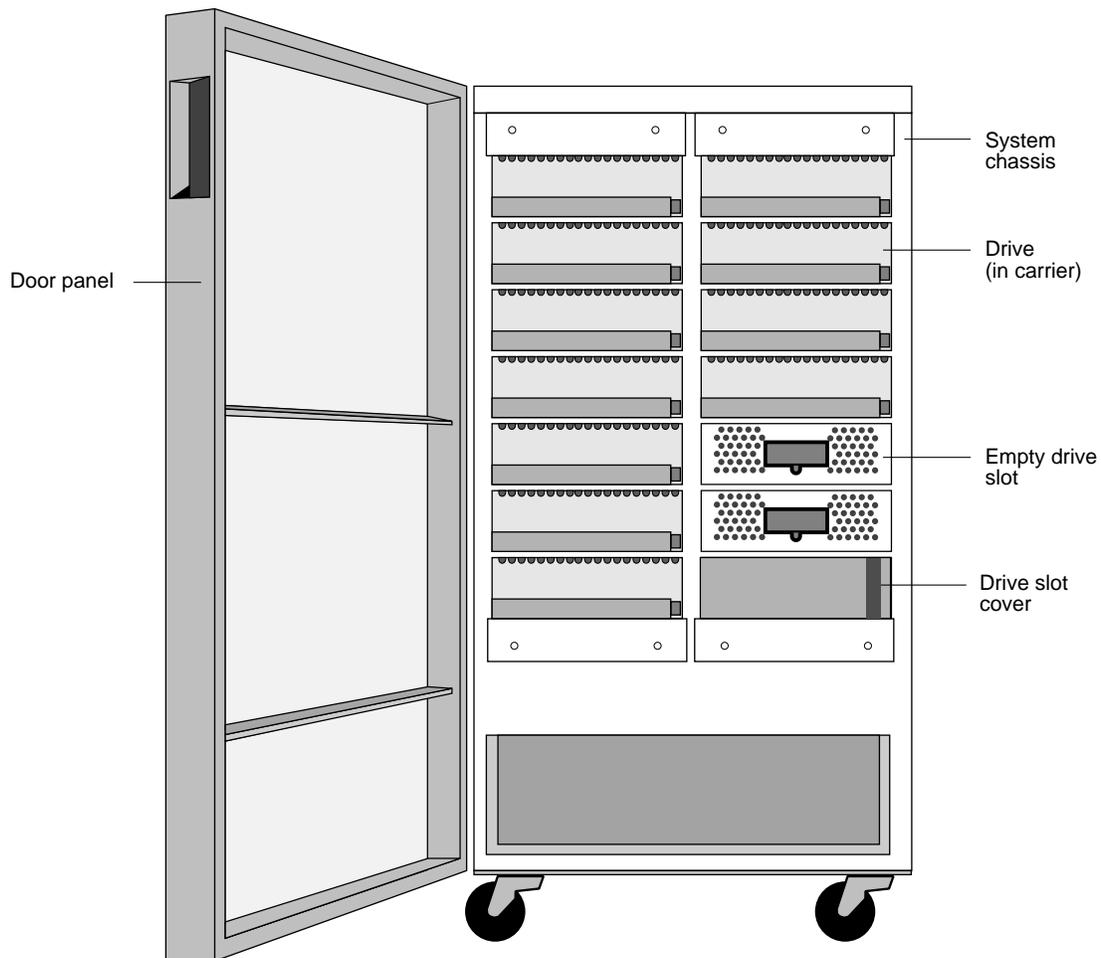


Figure 2-5. Expansion cabinet (front view)

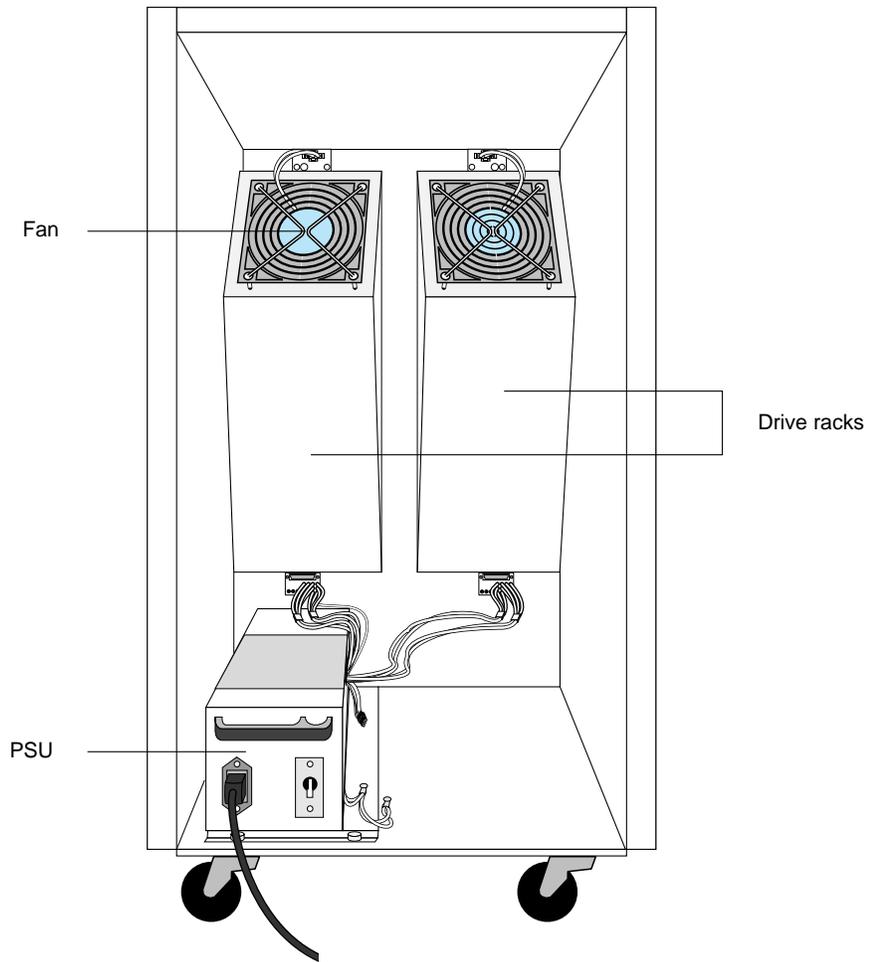


Figure 2-6. Expansion cabinet (back view)

## Card Cage Components

The NetServer card cage houses the following VME-compatible printed circuit boards:

- ▲ HP (one)
- ▲ NP (up to two)
- ▲ SP (one)

Each of these boards, their functions, and the minimum and maximum configurations are described in the following sections.

Table 2-1 lists the slot assignments for each processor board type. The slots are numbered from left to right when viewed from the back of the cabinet.

**Table 2-1. Processor board slot assignments**

| Slot number | Board assignment               |
|-------------|--------------------------------|
| 1           | Host Processor                 |
| 2           | Network Processor              |
| 3           | Network Processor (if present) |
| 4           | Storage Processor              |

### Host Processor

The NetServer has one HP VIII or HP VII board with several features:

- ▲ 125-MHz (HP VIII) or 90-MHz (HP VII) SPARC processor.
- ▲ Two or four Single In-Line Memory Modules (SIMMs) of 16–128 MB each for up to 384 MB of host memory (see Table 2-2).

**Table 2-2. HP memory module configurations**

| Total memory (MB) | Number of 16-MB SIMMs | Number of 32-MB SIMMs | Number of 64-MB SIMMs | Number of 128-MB SIMMs |
|-------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 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 SIMMs. HP SIMMs must be installed in pairs of 16, 32, 64, or 128 MB.

- ▲ Support for 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 which allows future upgrades to the HP CPU.
- ▲ Support for up to seven Sun-supported SCSI devices on one SCSI port.
- ▲ Support for tape storage devices.

Figure 2-7 shows the front panel connectors on the HP.

**Reset switch.** This switch resets the system processor boards without power cycling the NetServer using the main power switch.

**Caution:** Follow the shutdown procedures described in "Shutting Down the NetServer" on page 4-15 before you reset or power off the system.

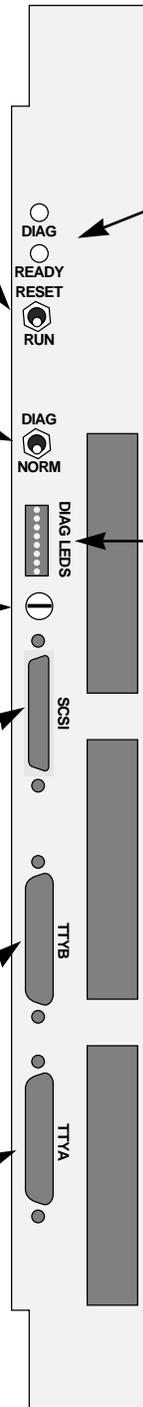
**Diagnostic switch.** Set this switch to the NORM position before you power on the NetServer. Setting this switch to DIAG puts the NetServer in diagnostic mode automatically after you power on or reset the system. (Provided for authorized service personnel only.)

**Fuse.** Refer to "Exabyte Tape Maintenance" on page 5-8 for more information.

**SCSI port.** The SCSI port supports up to seven daisy-chained SCSI devices. Refer to "Attaching a SCSI Device to the Host Processor" on page 3-27 for a list of supported devices. Tape storage devices are also supported from the SCSI port. Refer to the *Storage Peripherals Manager's Guide* for supported devices.

**TTYB serial port.** TTYB is available for connecting a modem or other serial device.

**TTYA serial port.** TTYA supports the console terminal. Refer to "Connecting the System Console to the Server" on page 3-10.



**Status indicator LEDs.**

The DIAG LED lights indicating the system is performing power-on self tests. The READY LED lights indicating the system successfully completed self tests.

**Diagnostic LEDs.** When the NetServer is running in diagnostic mode, the state of these eight LEDs represents a specific diagnostic test running on the HP. 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.

**SBus ports.** The HP has three SBus ports: two masters and one slave. The HP supports three single, one double and one single, or one triple SBus board. Tape storage devices are also supported from the SBus port. Refer to the *Storage Peripherals Manager's Guide* for supported devices. For information on compatible SBus boards, contact your authorized Auspex service representative.

Figure 2-7. HP front panel connectors

## Network Processor

The NetServer has one to two NP IV, NP III, or NP II boards, supporting either Ethernet, FDDI, ATM, or combinations of these interfaces.



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

Table 2-3 lists examples of supported network interfaces for the NP boards.

**Table 2-3. 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 2-4 for supported memory configurations.

**Table 2-4. NP memory configurations**

| Total memory (MB) | NP IV/III             |                       | NP II                   |                          |
|-------------------|-----------------------|-----------------------|-------------------------|--------------------------|
|                   | 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 NetServer uses one SP IV or SP V board, each with six parallel SCSI channels for disk, tape, and CD-ROM drives.

The SP IV has 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 2-8 shows a card cage configuration with network connections.

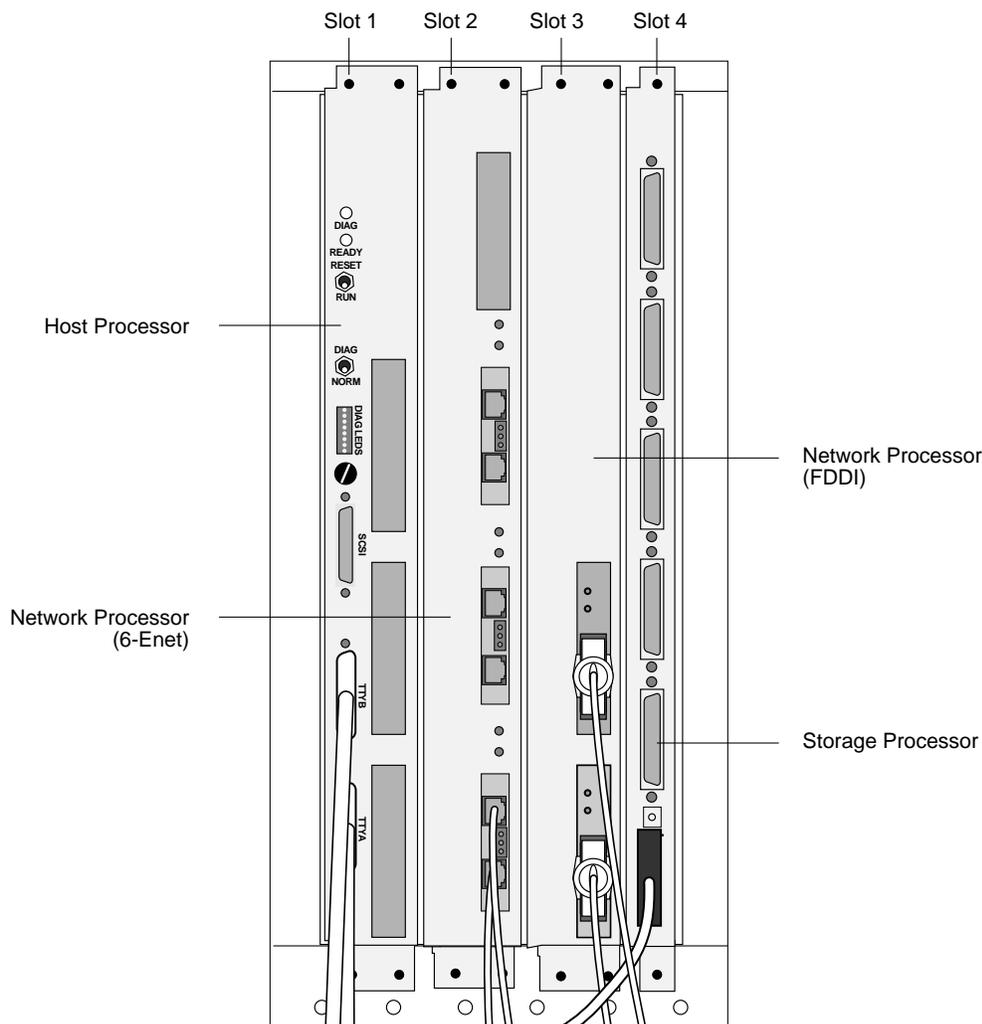


Figure 2-8. System processors

# 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
- ▲ Attaching Expansion Cabinets
- ▲ Connecting SCSI Cables from the Expansion Cabinet
- ▲ Connecting the System Console to the NetServer
- ▲ Connecting the NetServer to the Network
- ▲ Installing Drives
- ▲ Attaching a SCSI Device to the HP



**Note:** The NetServer has been configured at the factory to match your order; however, an additional processor board, processor board memory, and drives are available as optional equipment. This manual does not provide instructions for installing any card cage components, such as processor boards and memory modules. If you are adding or replacing a board or module in your NetServer, contact your authorized Auspex service representative for assistance.



**Caution:** 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. Do not cut 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.

## 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.

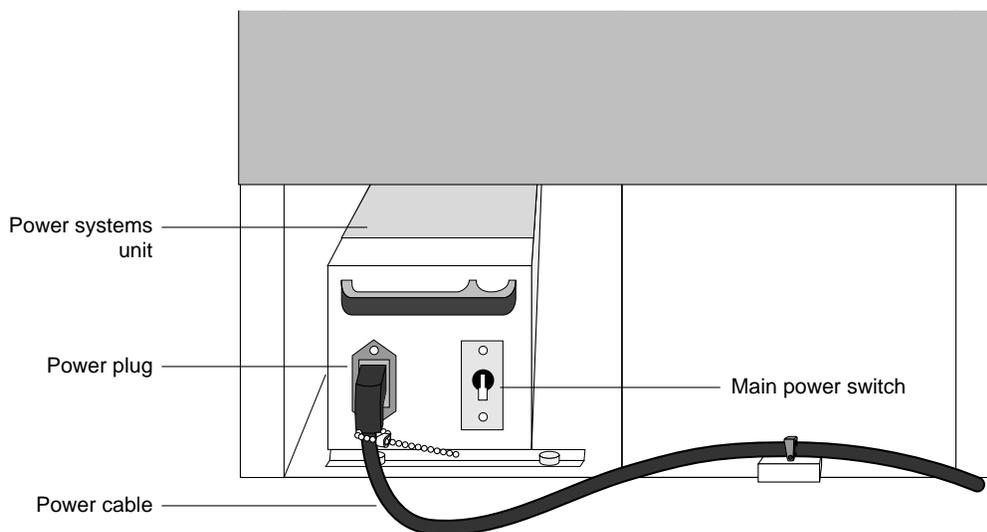


**Warning:** The wiring at your site must provide for ground fault protection.



### 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-head screwdriver to attach the console cable
1. Locate the main power switch on the PSU below the back door of the base cabinet. Set the switch to OFF (O) (see Figure 3-1).



**Figure 3-1. Main power switch (back view of NetServer)**

2. If your server includes expansion cabinets, locate the main power switch on the PSU below the back door of each expansion cabinet. Set this switch to OFF (O) (see Figure 3-1).
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 for each cabinet.
5. After ensuring that power to the system is off, route each power cable to a separate grounded outlet. Plug each cable into a receptacle (each outlet must be on a circuit with a minimum capacity of 15 amps).



**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 server 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

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. Refer to the previous section for information on grounding the server.

The base cabinet has two wrist strap jacks, one below the card cage in the back of the cabinet and one above the drive rack area in the front of the cabinet. One wrist strap is provided with the base cabinet (attached to the rear jack).



**Note:** The expansion cabinets do not have wrist strap jacks. Use the base cabinet wrist strap for both the base cabinet and expansion cabinets.

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



**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 and plug it into the other.

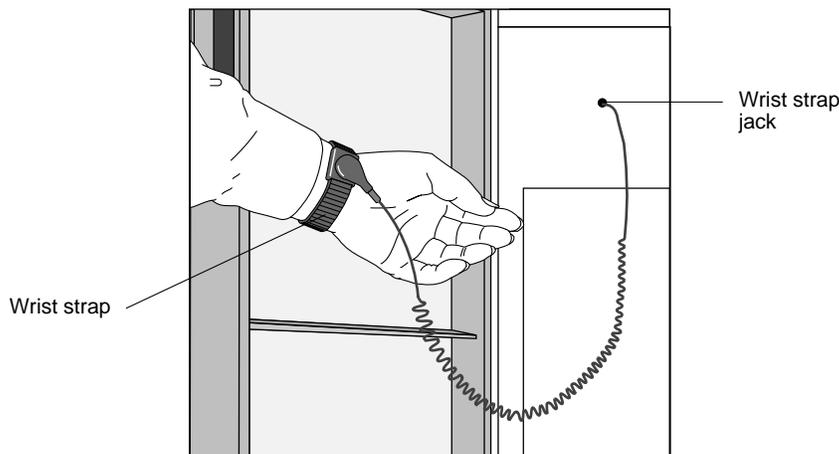


Figure 3-2. Antistatic wrist strap

This concludes the procedure for installing the antistatic wrist strap. If you wish to add expansion cabinets, proceed to section “Attaching Expansion Cabinets” on page 3-5.

## Attaching Expansion Cabinets

After setting up the base cabinet and positioning the expansion cabinets, connect them using the procedures in this section.

A kit is packaged with the expansion cabinet for attaching the expansion cabinet to the base cabinet. To attach the cabinets, you must install U-shaped brackets.

### Expansion Kit Components

Attaching one expansion cabinet requires two U-shaped brackets (one in the front and one in the back) and eight screws. The expansion kit contains the necessary parts for attaching two expansion cabinets to the base cabinet. Table 3-1 lists the parts contained in the kit; inspect the contents to make sure all items in the table are included with the expansion kit received. If a part is missing, contact Auspex Customer Service for replacement.

**Table 3-1. Expansion kit contents**

| Quantity | Part                               | Part number |
|----------|------------------------------------|-------------|
| 4        | 3-inch (75 mm)<br>U-shaped bracket | 52-0339     |
| 16       | 4x0.7x8-mm<br>screws               | 70-0073     |

### Installing the U-shaped Brackets

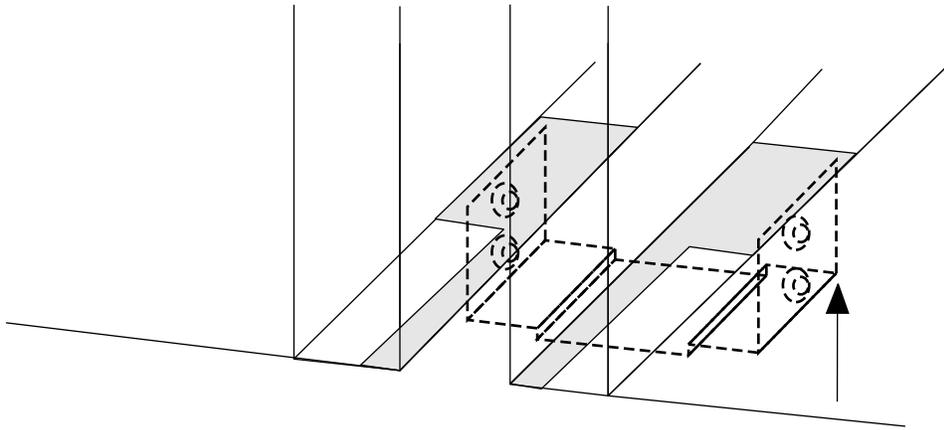
The U-shaped brackets attach to the inside of the rails on the sides of the cabinets. The following procedure leads you through the installation.



**Caution:** This procedure assumes you are installing an expansion cabinet during a first-time installation. If the base cabinet is already installed and operating, power down the NetServer before attaching the expansion cabinet.

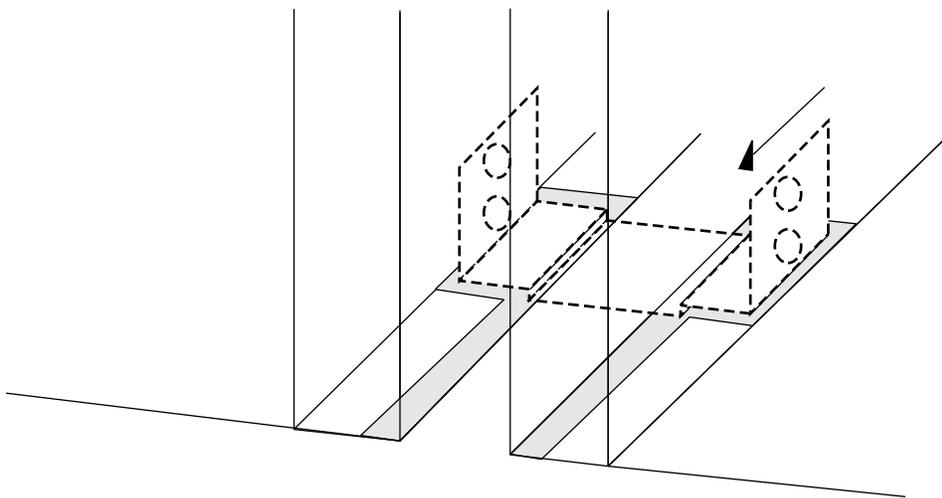
#### *To install the U-shaped brackets*

1. Position the expansion cabinet next to the base cabinet so that the sides are approximately 3 inches (75 mm) apart.  
When viewed from the front, the first expansion cabinet should be to the right of the base cabinet. The second expansion cabinet should be to the left of the base cabinet.
2. Open the base cabinet and expansion cabinet front doors.
3. Put on the antistatic wrist strap.
4. Remove the air filter from its holder in the base and expansion cabinet to expose the screw holes on the side.
5. Slide your hand along the bottom of the side rails to locate the bracket attachment openings.
6. Push the top of the bracket up into the opening on both cabinets (see Figure 3-3).



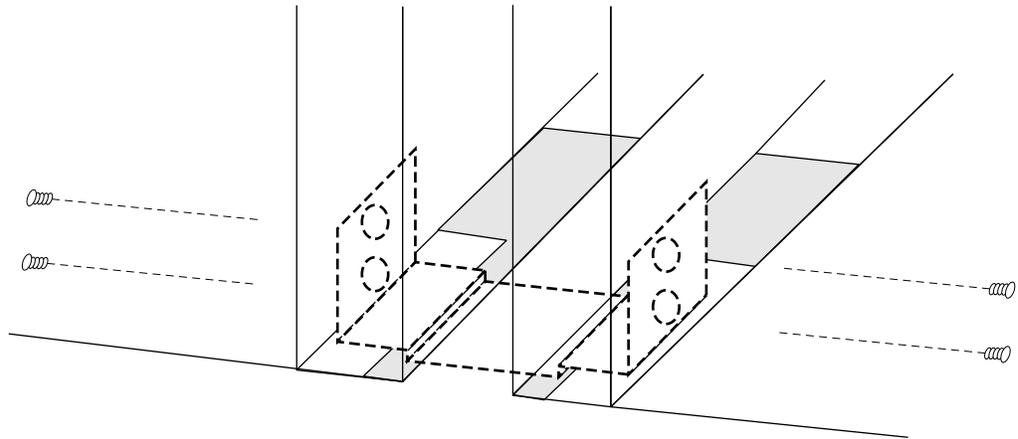
**Figure 3-3. Lining up the U-shaped bracket**

7. Push the bracket forward until it locks into position (see Figure 3-4).



**Figure 3-4. Installing the U-shaped bracket**

- Secure the front bracket with the four screws provided (see Figure 3-5).



**Figure 3-5. Attaching the U-shaped bracket**

- Replace the air filter removed in step 4.
- Close the front doors.
- Move to the back of the cabinet, and open the doors.
- Install the back bracket by repeating steps 5 through 8.

Because of the location of the power supply, there is limited room for inserting the screws into the back bracket.

- Start the screws with your fingers, then tighten them down with a screwdriver.
- Close the back doors.

This concludes the procedure for attaching expansion cabinets. Proceed to section "Connecting SCSI Cables from the Expansion Cabinet" on page 3-8.

# Connecting SCSI Cables from the Expansion Cabinet

Optional expansion cabinets are available from Auspex. Each expansion cabinet is shipped with two SCSI cables.

## *To connect SCSI cables from expansion cabinet*

1. Open the back doors of the base and expansion cabinets.
2. Locate the SCSI drive cables tie-wrapped to the left side of each expansion cabinet inside the back door.
3. Cut the red tie-wraps securing the cables.
4. Route the free end of each SCSI cable out the back of the expansion cabinet and into the back of the base cabinet. Avoid bending the cable in a tight radius. Leave a small amount of slack in the cable inside the expansion cabinet.
5. Attach the cable to the SP connector indicated on the label affixed to the cable. Tighten the two jack screws located on the SCSI cable connector until the connector is firmly seated to the SP. Gently pull the cable to verify that the cable is connected properly. Figure 2-2 on page 2-5 shows the SCSI cable connector.

Table 3-2 lists the cable connections from each drive rack to the SP board. Rack 1 is located in the base cabinet. Racks 2 and 3 are located in the first expansion cabinet. Racks 4 and 5 are located in the second expansion cabinet. When viewing the first and second expansion cabinets from the back, racks 2 and 4 are on the right side of each cabinet and racks 3 and 5 are on the left side of each cabinet.



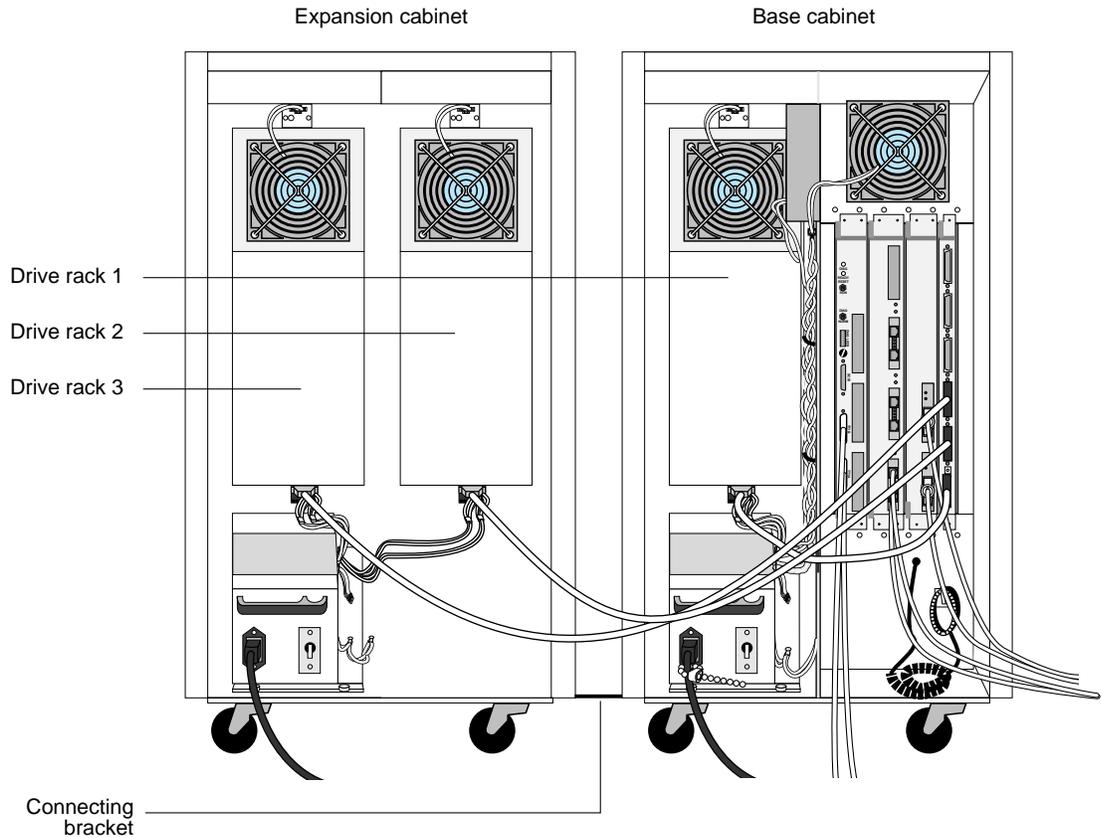
**Note:** When viewing the server from the back, the first expansion cabinet is located to the left of the base cabinet and the second expansion cabinet, if present, is located to the right of the base cabinet.

**Table 3-2. SP cable connections from each drive rack**

| Drive rack | SP connector* |
|------------|---------------|
| Rack 1     | J1            |
| Rack 2     | J2            |
| Rack 3     | J3            |
| Rack 4     | J4            |
| Rack 5     | J5            |

\* SP connectors are labeled from the bottom connector, J1, to the top connector, J6.

Figure 3-6 shows one expansion cabinet connected to a base cabinet.



**Figure 3-6. Back view of connected cabinets**

This concludes the procedure for connecting the SCSI drive cables from the expansion cabinet. Proceed to section "Connecting the System Console to the NetServer" on page 3-10.

## Connecting the System Console to the NetServer

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 baud rate | 9600        |
| Compatible mode      | ANSI        |

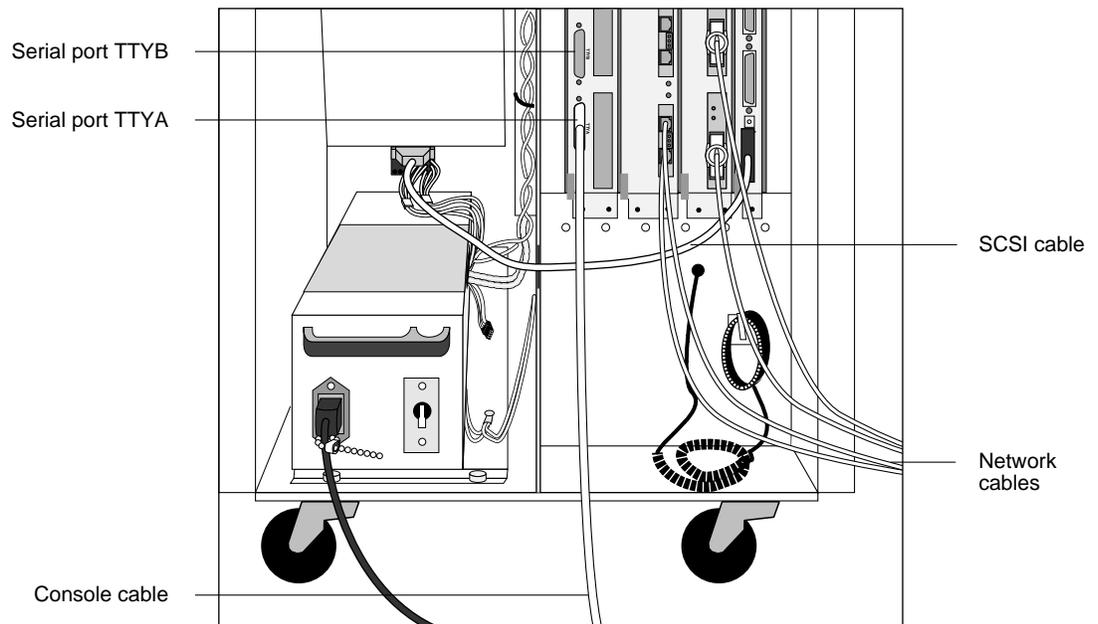
### ***To connect the DEC VT510 console to the server***

1. Place the packing box containing the console near the server.
2. Remove the console and its associated 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 to the back of the NetServer cabinet, as shown in Figure 3-7.



**Figure 3-7. 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 power cord is properly connected to the console, and plug it into a grounded power outlet.
11. Power on the console.

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



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

## 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 information on network cables, 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.



**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 3-7 on page 3-11).
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-homed configuration.



**Note:** The ATM connector uses a 155 MB-per-second multimode fiber cable with an SC-type connector, or UTP cable with a standard RJ45 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 3-8 through 3-16 show cable connections to network interfaces on the processor boards.

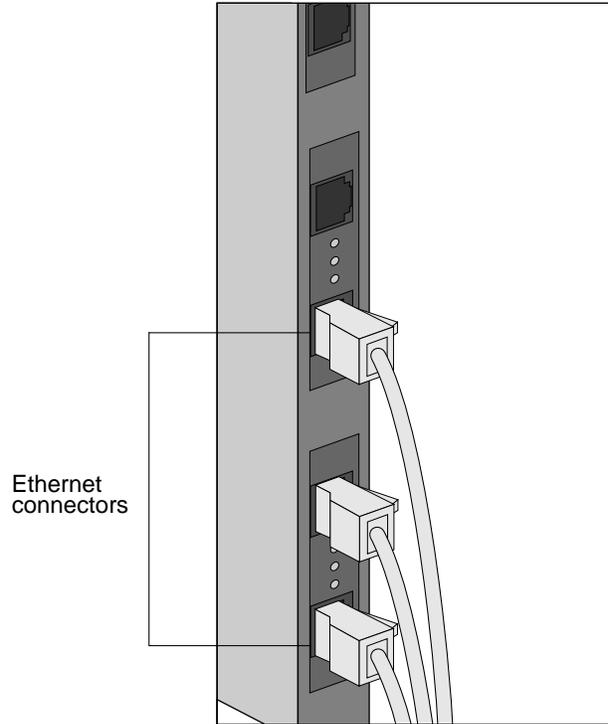


Figure 3-8. Connection to 10Base-T Ethernet ports

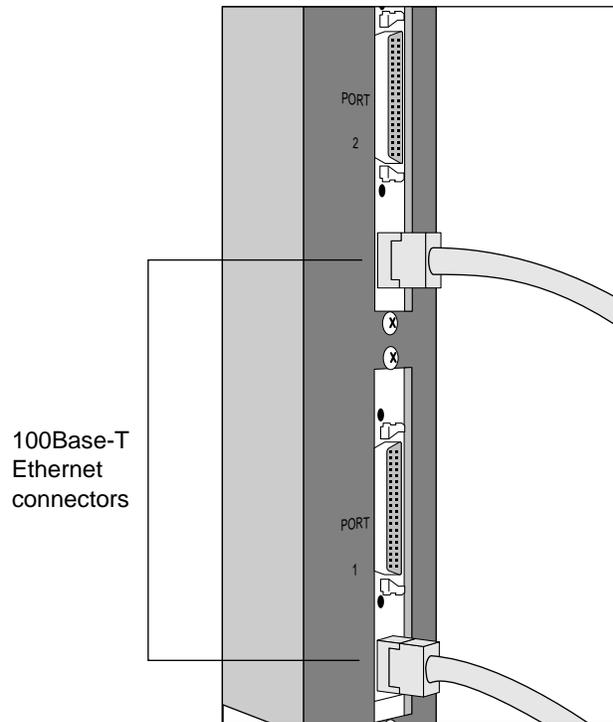
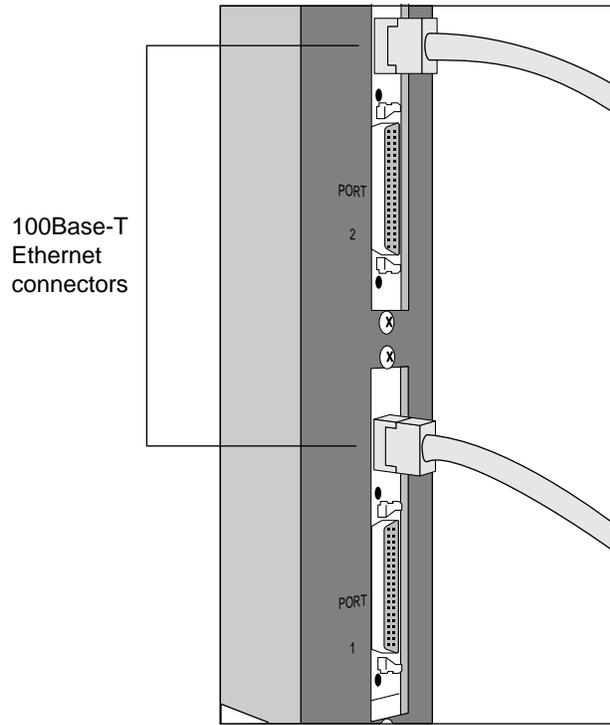
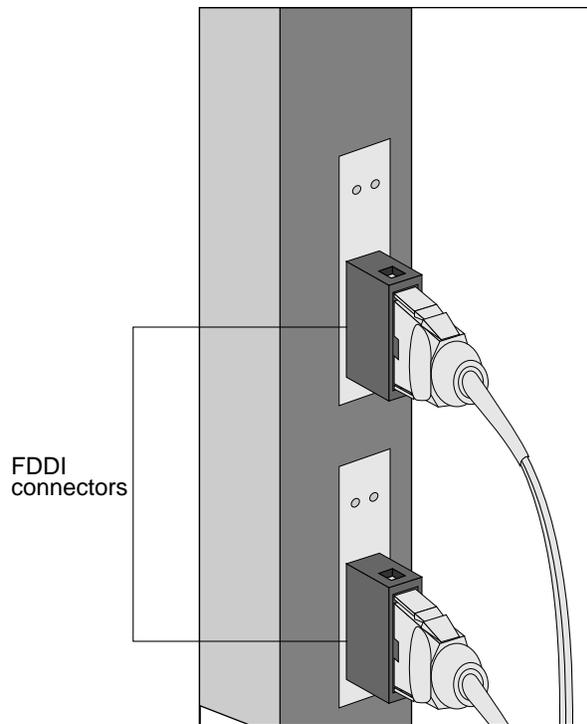


Figure 3-9. Connection to 100Base-T (half duplex) Ethernet ports



**Figure 3-10. Connection to 100Base-T (full duplex) ports**



**Figure 3-11. Connection to FDDI (fiber) ports**

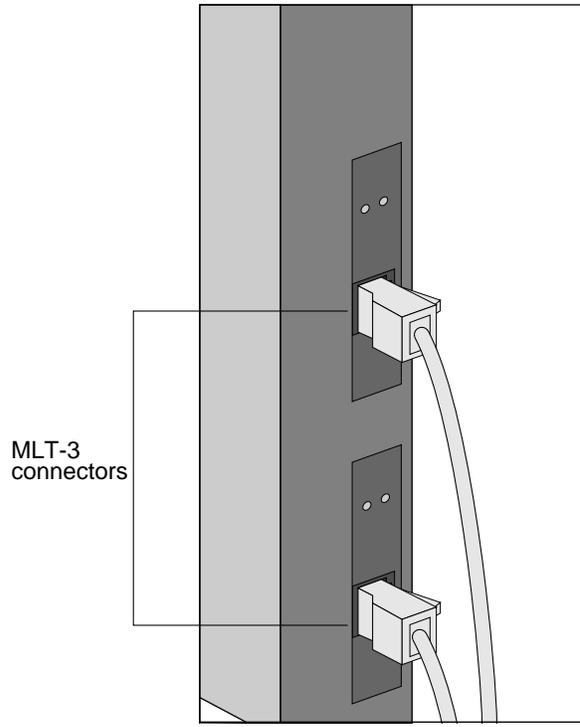


Figure 3-12. Connection to FDDI (MLT-3) ports

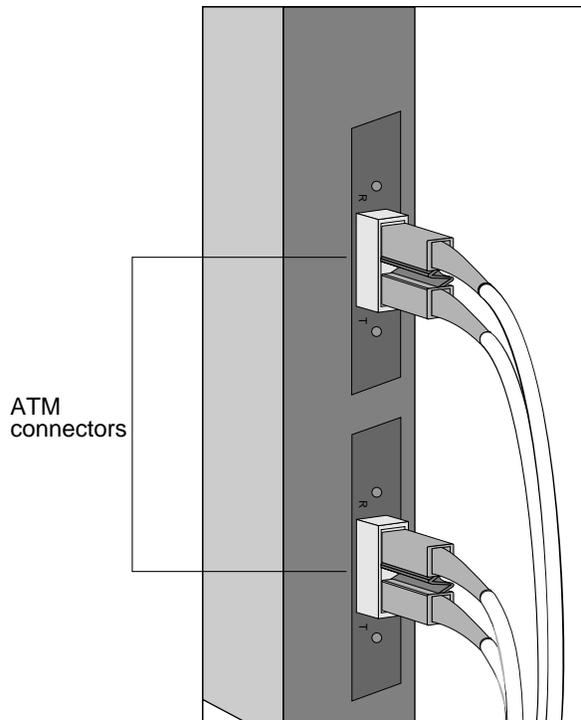


Figure 3-13. Connection to ATM (fiber) ports

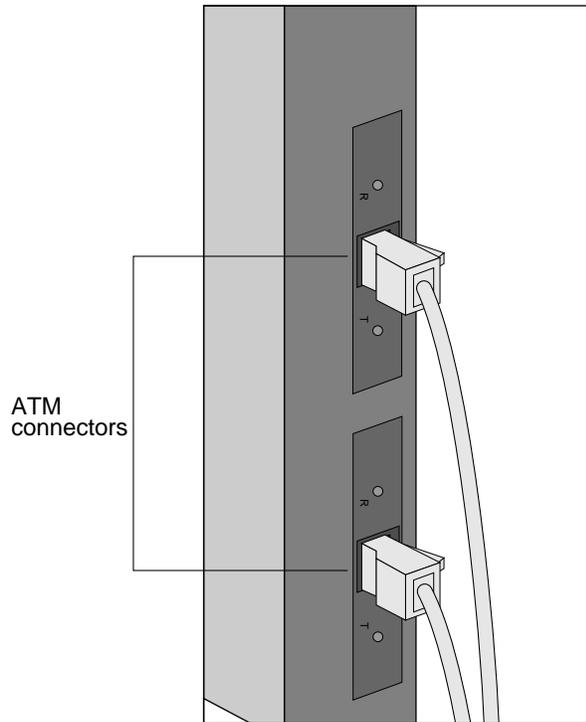


Figure 3-14. Connection to ATM (UTP) ports

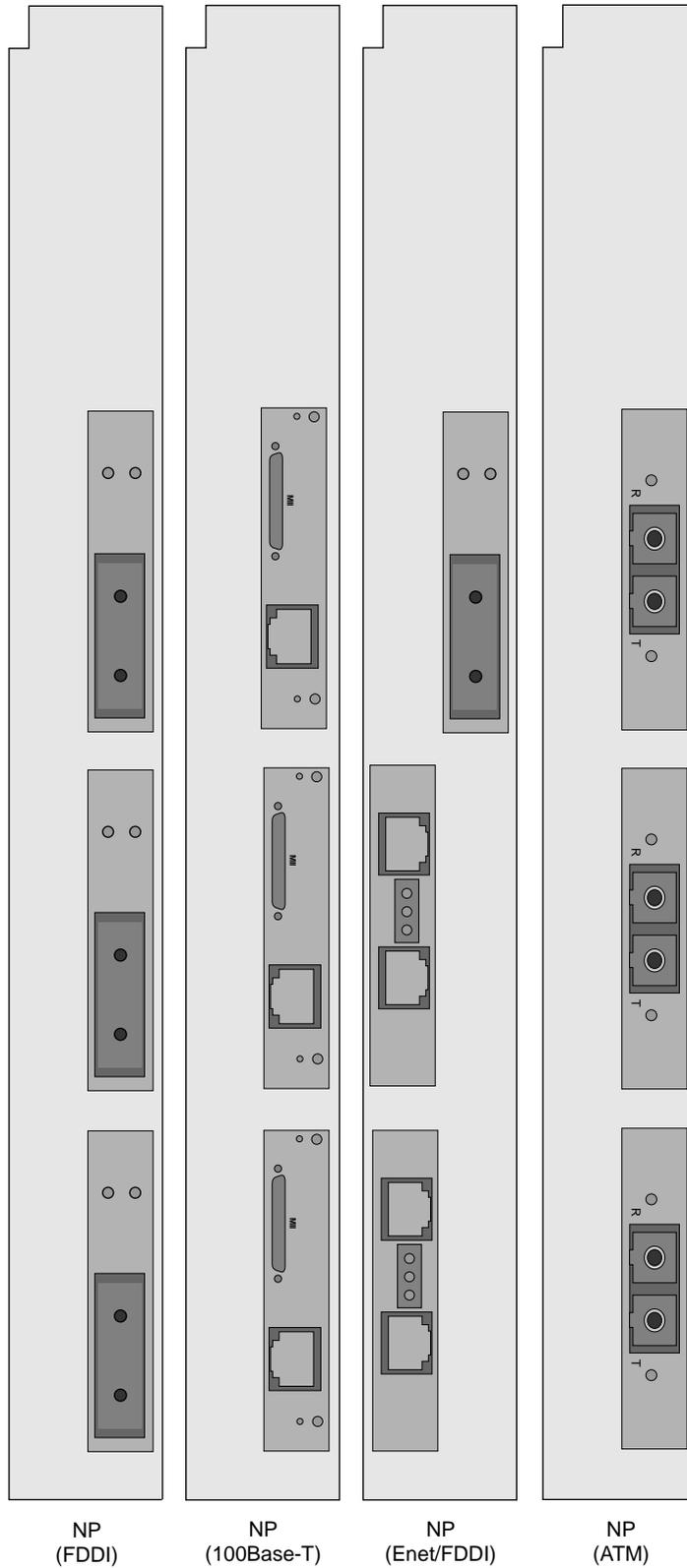


Figure 3-15. Location of network ports on mixed NP boards

## Network Interface Numbering

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

**10Base-T** 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.

**100Base-T (half duplex)** 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.

**100Base-T (full duplex)** Interfaces are numbered within the range from  $ahme0$  to  $ahme_n$  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.

**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 even though 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  $afan$  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  $aqa15$ .

Figure 3-16 shows an example of how network interfaces are numbered.

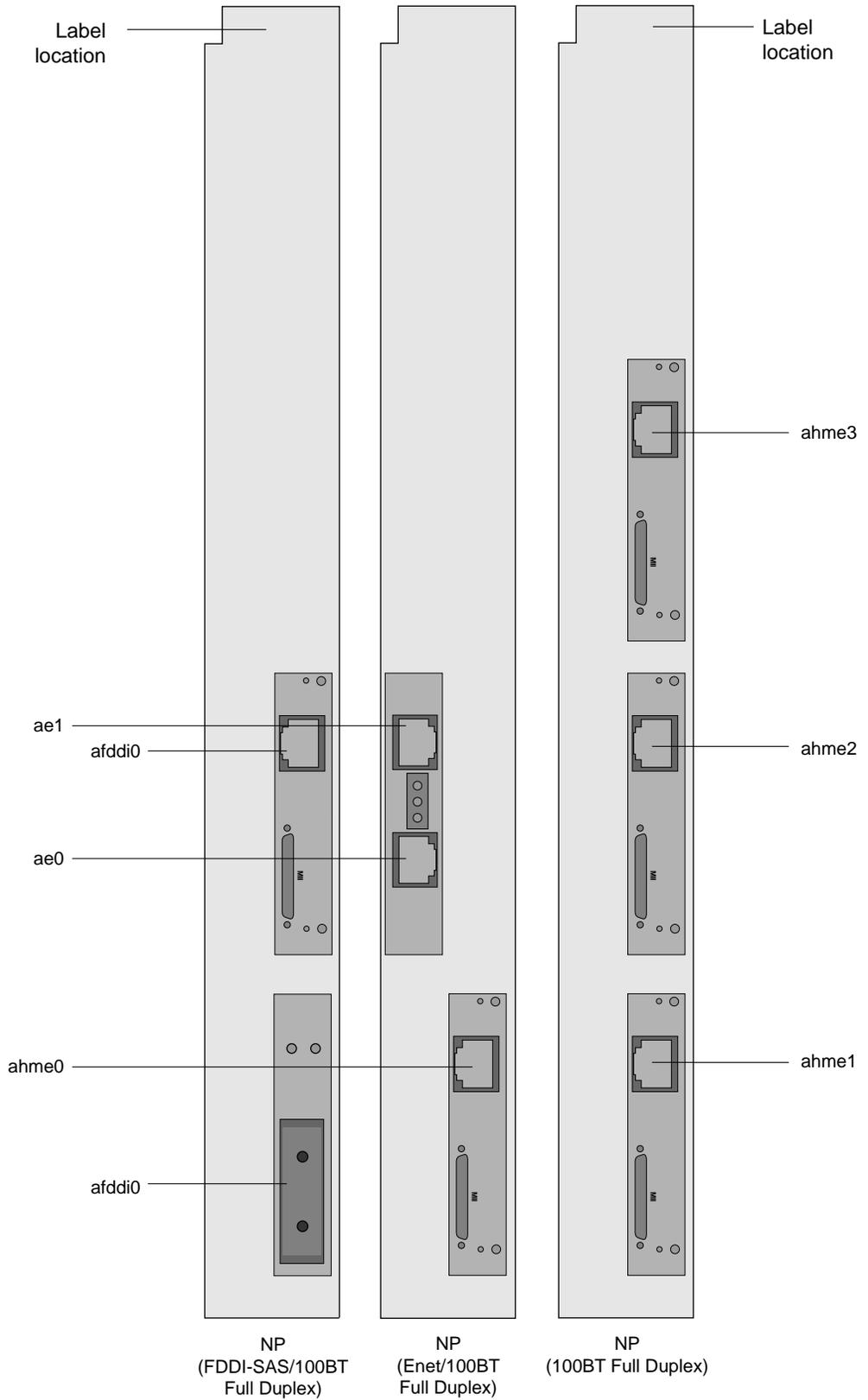


Figure 3-16. Example of network interface numbering

## Ethernet Addresses

Each 10Base-T and 100Base-T port has a unique Ethernet address assigned at Auspex Systems. At the top of each installed NP with Ethernet ports is a label that gives the serial number of the board and the Ethernet address for the interface located at the bottom of the board (for example, ahme0 in Figure 3-16). This address ends with 0. For 100Base-T full duplex, 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 is an example of Ethernet network addresses for the Ethernet interfaces in Figure 3-16.

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

| <b>Interface number</b> | <b>Network address</b> |
|-------------------------|------------------------|
| 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:99:99:00*     |

\* 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 the system can be used. Each drive rack can hold up to seven disk, tape, or CD-ROM drives. 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.



**Note:** The NetServer supports up to 35 disk or CD-ROM drives with two additional tapes. Drive slot 0 in the base cabinet is reserved for the root disk drive, which contains the server's operating system software. Use disk, tape, and CD-ROM drives specifically designed for use with your NetServer.

You received a set of labels to attach to 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. Put the extra labels away in a safe place. You need them when you expand your system.



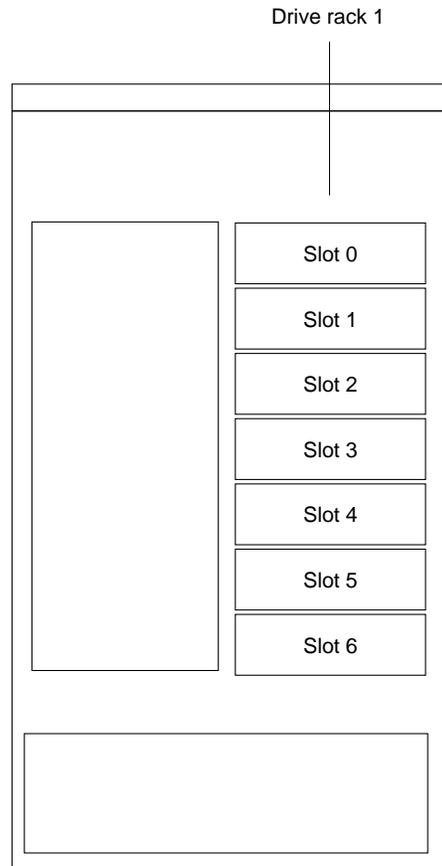
**Caution:** To preserve data integrity, make sure the system is powered off throughout this procedure.

### ***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 above the drive rack area and wear the wrist strap to protect against electrostatic damage to the drives.
3. Use a knife to carefully open the box. 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. Unused slots are covered with blanking panels, which are removed when drives are installed.

Figure 3-17 shows slot and drive rack numbering for the base cabinet. Figures 3-18 and 3-19 show slot and drive rack numbering for the first and second expansion cabinets, respectively. The slots are not labeled on the system chassis of the cabinets.



**Figure 3-17. Base cabinet drive slot numbering**

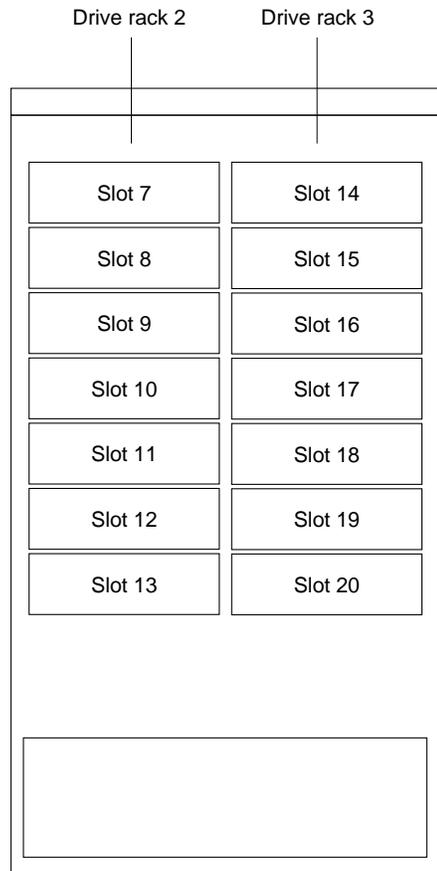
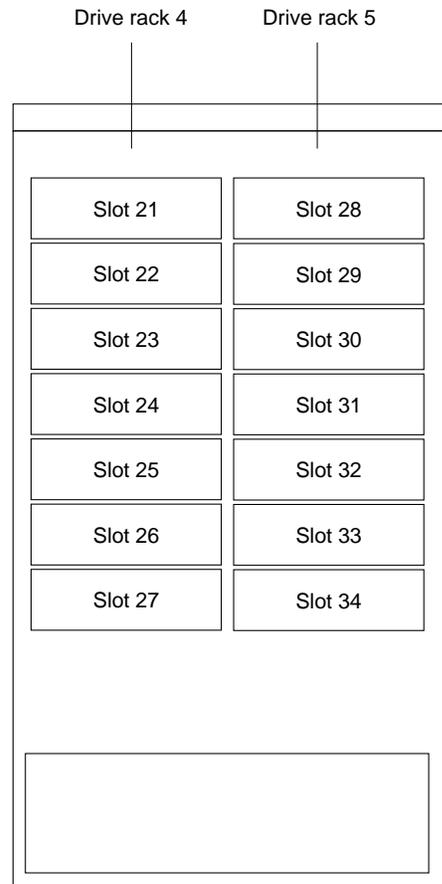


Figure 3-18. First expansion cabinet drive slot numbering



**Figure 3-19. Second expansion cabinet drive slot numbering**

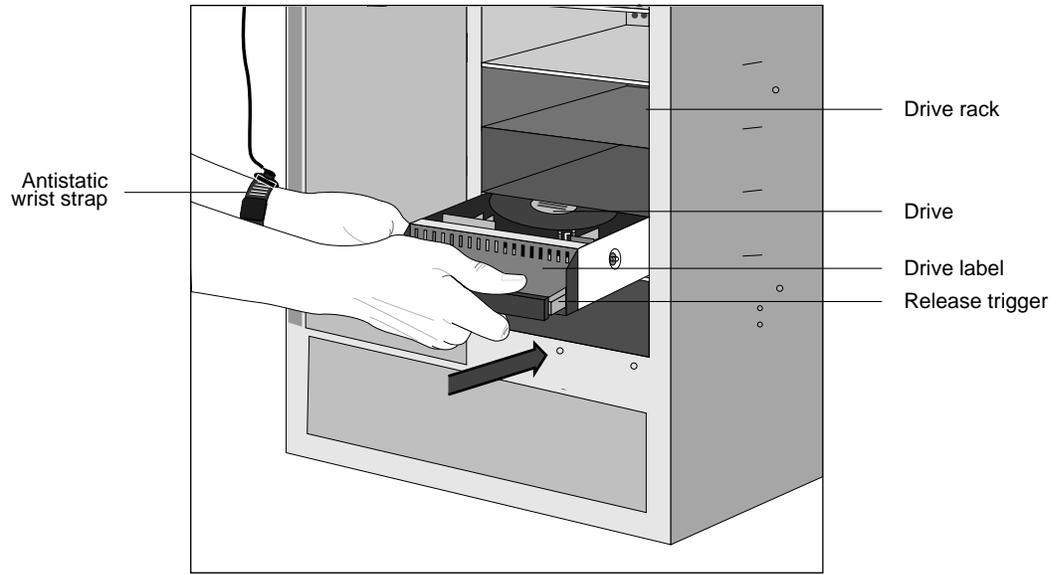
5. Remove the root disk drive from its antistatic wrapping. The root disk drive has a root disk drive label located at the front of the drive carrier.
6. Place the root drive into the top slot of the base cabinet (slot 0), with the numbered label located on the right side of the drive handle.

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 right side 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 on the right side of the drive handle to retract the button and complete the installation.



**Caution:** Do not slam the drives into the slots. This causes damage to the drives and connectors.

Refer to Figure 3-20 for an example of installing a drive.



**Figure 3-20. 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 release trigger to the right side of the handle.

7. 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.

This concludes the procedure for installing drives in your NetServer. If you wish to attach a SCSI device to your NetServer, proceed to section "Attaching a SCSI Device to the HP" on page 3-26.

# 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.



**Note:** Devices attached to the HP SCSI port cannot be used as boot devices. Only Auspex devices attached to an SP 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 you can use are listed in Table 3-5. Make sure 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         |

## **To connect a SCSI device to the HP**

1. If your system is running, follow the procedures in "Shutting Down the NetServer" on page 4-13 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 to the back of the server.
6. Connect the free end of the SCSI cable to the connector on the HP labeled **SCSI** (see Figure 2-7 on page 2-12).
7. Hang up the wrist strap, and close the back door of the server.

This concludes the procedure for attaching a SCSI device to the HP.

# 4 Power Up 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 Up the Server
- ▲ Power-On Self Test (POST) and Boot Sequence
- ▲ Processor Board LED Displays

## Powering Up the Server

1. Verify that 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 2-7 on page 2-12).

2. Make sure the main power switches on the base cabinet and expansion cabinets are set to OFF (O) (see Figure 3-1 on page 3-2).
3. Close the doors on the base and expansion cabinets.
4. If the server console is off, power up the console terminal.
5. Power on each expansion cabinet by setting the power switches to ON (I).
6. Power on the tape storage device, if present, by setting the power switch to ON (I).
7. Power on the base cabinet by setting the main power switch to ON (I).



**Note:** Auspex recommends powering on the expansion cabinets before powering on the base cabinet. If the base cabinet is powered on 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 on the console screen. For a list of the power-on tests and messages, refer to “Power-On Self Test (POST) and Boot Sequence” on page 4-3.

## Power-On Self Test (POST) and Boot Sequence

Upon 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, messages similar to the following appear 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 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, observe the display to verify the following:

- ▲ The version of the operating system (in the example below, NetServer software Version 1.9).
- ▲ All Auspex devices are listed in the display, indicating that 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
ml6u_npages_dvma = 358
ml6u_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
IOP0 at Auspex VME slot 6 VME address 0x10000000 memory 128 MB
ad0: <SEAGATE ST15150N          4606AUSPEX XX-XXXX; 4094 MBs>
ad1: <SEAGATE ST15150N          4606AUSPEX XX-XXXX; 4094 MBs>
ad2: <SEAGATE ST15150N          4606AUSPEX XX-XXXX; 4094 MBs>

```

```
ad3: <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>
ad19: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
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>
ad23: <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>
ad33: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ad34: <Auspex 9GB cyl 8668 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).
running ax_chkdrive...
ad33: <Auspex 9GB cyl 8668 alt 1 hd 16 sec 128>
ax_write_cache: SP0 initializing write cache.
ax_write_cache: SP0 enabling write cache.
ax_write_cache: SP0 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/rad0h: is clean.
/dev/rad0e: 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 auspex daemons).
NIS domain name is unknown.auspex.com
starting rpc port mapper.
starting NIS services: ypserv ypxfrdypbind -ypsetme: allowing local
ypset!
(this is insecure)
ypbind ypupdated.
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 ffffffff0 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 ffffffff0 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 ffffffff0 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 ffffffff0 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 ffffffff0 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 domain name syslog: ax_enable: AXraid licensed
Nov 8 17:03:18 domain name syslog: ax_enable: AXraid licensed
Nov 8 17:03:18 domain name syslog: ax_enable: AXbackup licensed
Nov 8 17:03:18 domain name 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 booted successfully when the login prompt appears on the console. *Unknown* will be replaced with the name of your system after you have completed 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 HP and NP boards. The HP and NP have several LEDs, which represent POST 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 sets of LEDs:

- ▲ The DIAG LED lights green, indicating the system is performing POSTs.
- ▲ 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.

Refer to Figure 2-7 on page 2-12 for location of the LEDs.

### Network Processor

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

#### ATM LEDs

The 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 connected. The normal condition is off, meaning 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 cable is properly connected. The normal condition is off, meaning device is idle and ready to transmit.

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

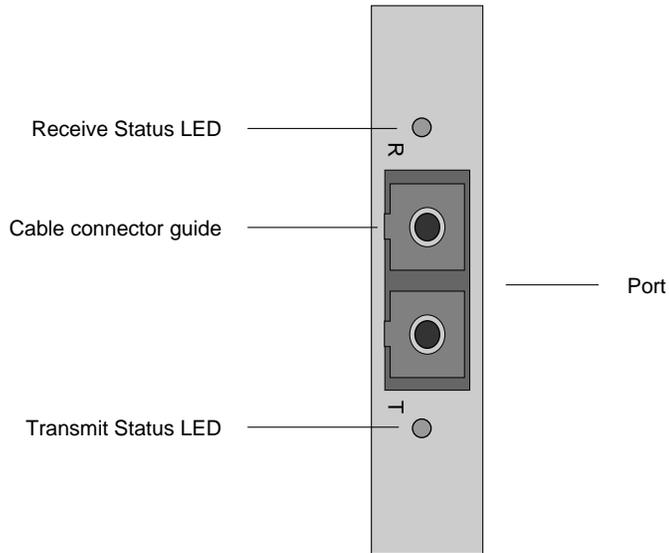


Figure 4-1. ATM (fiber) LED display

### 10Base-T Ethernet LEDs

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

- ▲ The Stat LED lights to indicate system has successfully booted and card is operational.
- ▲ The Act B LED lights to indicate activity occurring through Connector B.
- ▲ The Act A LED lights to indicate activity occurring through Connector A.

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

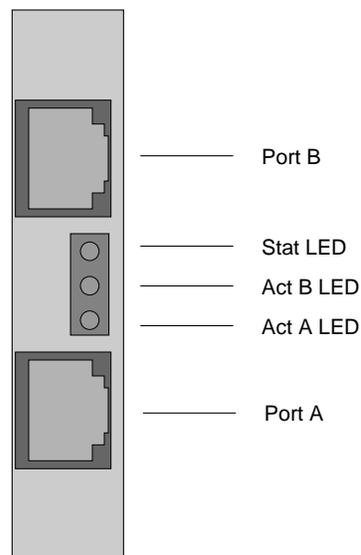


Figure 4-2. 10Base-T Ethernet LED display

## FDDI-SAS LEDs

Each FDDI-SAS port has two LEDs:

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

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

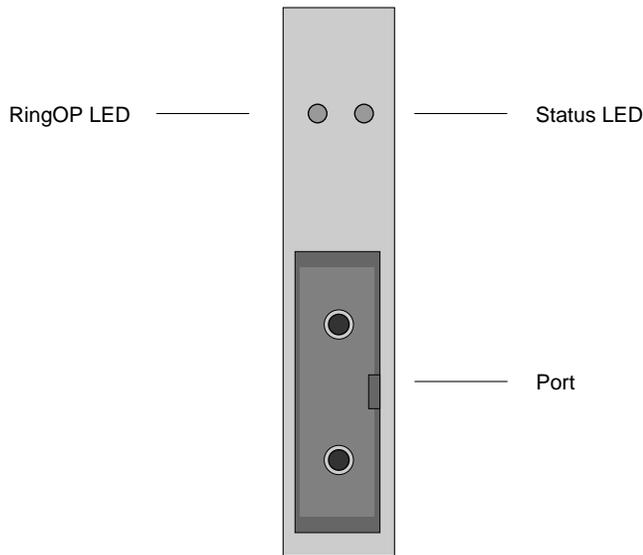


Figure 4-3. FDDI-SAS (fiber) LED display

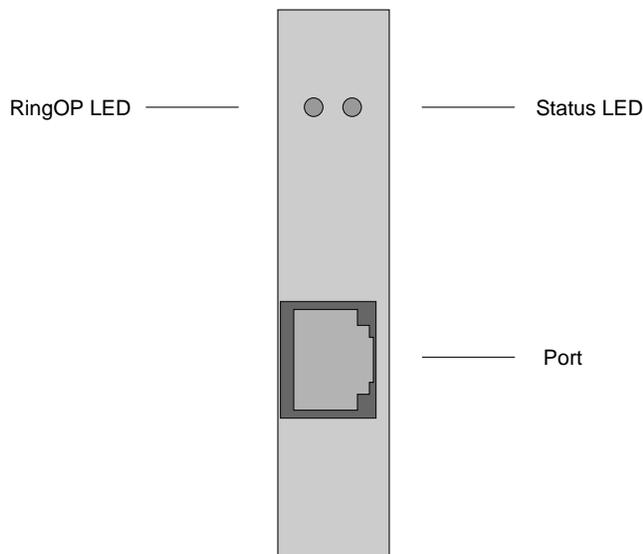


Figure 4-4. FDDI-SAS (MLT-3) LED display

## FDDI-DAS LEDs

Each FDDI-DAS port has two LEDs:

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

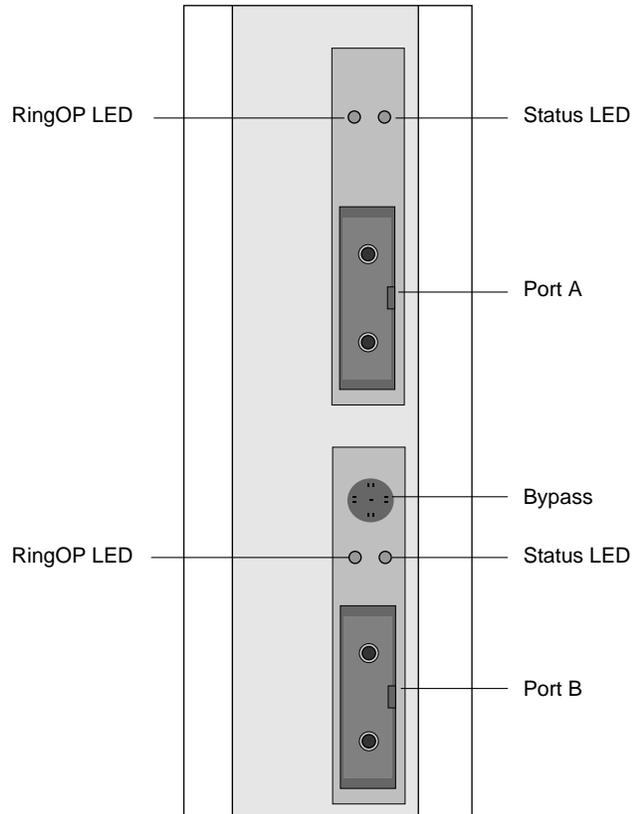
Table 4-1 shows an example of LED states that can occur during operation.

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

|                          | RingOP B* - Off  | RingOP B - Green  | RingOP B - Orange  |
|--------------------------|--|---|--|
| <b>RingOP A* - Off</b>   | Ring is not operational.   | Station is in WRAP_B, ring is operational.  | Ring is not operational. The station connected to the PHY B attempted to connect but failed.     |
| <b>RingOP A - Green</b>  | 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 attempted to connect but failed.            |
| <b>RingOP A - Orange</b> | Ring is not operational. The station connected to PHY A attempted to connect but failed. | Station is in WRAP_B. The station connected to PHY A attempted to connect but failed. | Ring is not operational. The stations connected to PHYs A and B attempted 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 warning message to users logged in, **h** halts the HP and changes the server to 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).

This concludes the procedure for the shutting down the NetServer.



# 5 Preventive Maintenance

## About This Chapter

This chapter provides preventive maintenance procedures for the 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:

- ▲ Cleaning the NetServer Air Filter
- ▲ Exabyte Tape Maintenance
- ▲ Replacing the Fuse on the HP

## Cleaning the NetServer Air Filter

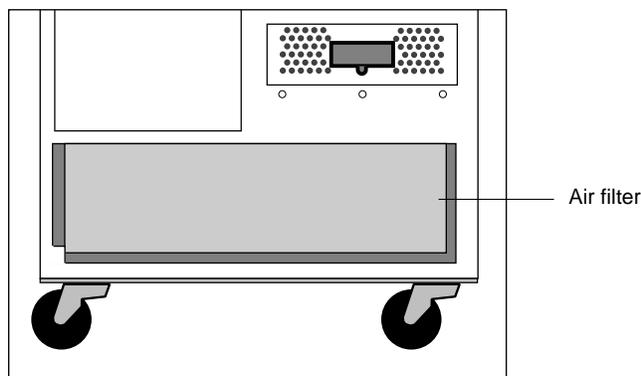
The NetServer base cabinet air filter should be checked once a month and cleaned if necessary. In environments where dust and dirt accumulate (such as during reconstruction or remodeling in or near the computer room), the air filter is cleaned more frequently.



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

### *To clean the NetServer air filter*

1. Open the front door panel.
2. Remove the air filter from its holder (see Figure 5-1). The air filter fits in vertical brackets below the drive rack enclosure. Slide the air filter up until it slips free of the brackets.



**Figure 5-1. Air Filter location (front view of base cabinet)**

3. 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.

4. Replace the air filter in its holder, sliding it down until it rests on the bottom bracket.
5. Close the front door panel.

This concludes the procedure for cleaning the NetServer air filter.

## 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 cause performance to degrade as 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:** Use only digital data-grade tapes. 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 Displays on the Exabyte Tape Drive" on page 5-5 for more information. 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 drive at least 12 separate times using a single cleaning cartridge. To use the cleaning cartridge, insert it into the drive as you would any other tape. The cartridge will automatically load, run for approximately 45 seconds, and eject 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 has 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 tapes away from any magnetic field.
- ▲ Rewind tapes completely before storing.
- ▲ Store tapes in their cases when not in use to protect from dust and debris.
- ▲ Retention tapes if they frequently generate errors, are stored for a long time, or are handled roughly.



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

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

```
# ax_tapestats tapename
```

The system displays statistics in the format

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

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

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 due to ECC errors mean 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 MB 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 due to 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 Displays on the Exabyte Tape Drive

The Exabyte tape drive has three LEDs to indicate operating conditions. The three LEDs are located on the left of the front panel. Table 5-1 shows important combinations of LED conditions that may occur during operation. You can use these LED combinations to determine the tape drive's operating condition, as follows:

- ▲ The Top LED lights when the tape drive has an error or needs cleaning.
- ▲ The Middle LED lights when SCSI bus activity occurs. This LED also displays if the tape is in compressed or uncompressed format.
- ▲ The Bottom LED lights when a data 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 has been cleaned, the LEDs resume normal operation.

**Table 5-1. Important LED combinations on the tape drive**

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

\* The Amber LED indicates compressed format.  
The Green LED indicates uncompressed format.

Key for Table 5-1:

| LED display | Meaning  |
|-------------|--|
| •           | The LED is on.   |
| o           | The LED is off.  |
| *           | The LED is flashing:<br><br>* slow = 1 flash per second.<br><br>* fast = 4 flashes per second.<br><br>* irregular = Rate of flash varies with SCSI bus activity. If the tape drive is not connected to the bus, the LED will be 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
96MB 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 above.

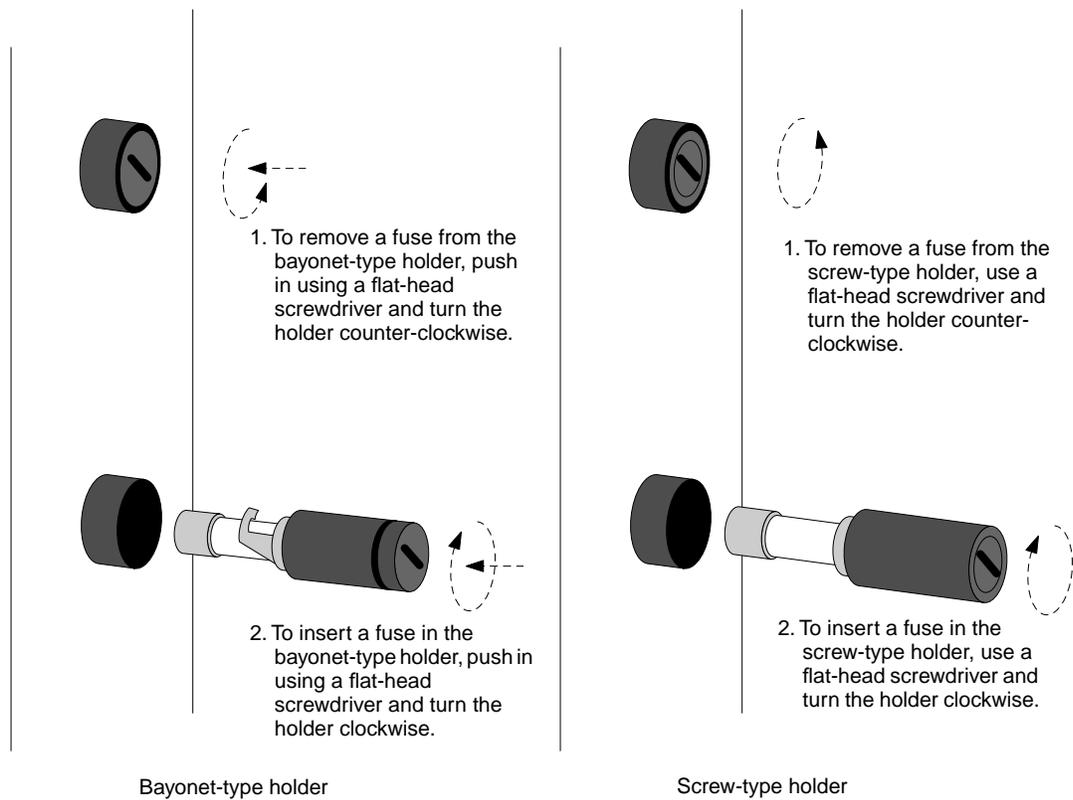
### Replacing a Fuse

The following items are needed 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 server.
3. Using a flat-head screwdriver, remove and replace the fuse as shown in Figure 5-2.



**Figure 5-2. 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

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## 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
- ▲ Removing or Adding 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 standard NetServer base cabinet drive rack consists of seven drive slots. These slots accept standard 3.5-inch, 5.25-inch CD-ROM drives, and 5.25-inch 8-mm tape drives.   |
| Minimum and maximum configurations | <p>In the base cabinet, the minimum configuration is one disk drive. The maximum configuration is seven drives.</p> <p>The maximum configuration using a base cabinet, two expansion cabinets, and one tape storage device is 37 drives.</p> <p>You can have different combinations of tape, disk, and CD-ROM drives as long as you have one root disk drive.</p>  |
| Drive locations                    | <p>Drives are installed and numbered from top to bottom. When viewing the expansion cabinets from the front, the numbering begins at the top of the left-side drive rack and ends at the bottom of the right-side drive rack. Auspex recommends that you add drives in the same order.</p> <p>Drives are usually installed contiguously. However, this is not a requirement for system operation. If you need to remove a drive for any reason, its slot can be left empty.</p> <p>The root disk drive must be installed in slot 0. If the server is being booted from a CD-ROM drive, the CD-ROM drive must be installed in slot 1 of the base cabinet.</p> |

## Drive Naming Conventions

A drive name is derived from the slot in which the drive is installed. The naming conventions differ with 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 device name is derived from the slot in which the disk is installed. For example, disk drives in the base cabinet are addressed as **ad0** (the disk in slot 0) through **ad6** (the disk in slot 6). The device names in the first expansion cabinet range from **ad7** to **ad20**. The device names in the second expansion cabinet range from **ad21** to **ad34**.

Drives are addressed consecutively from top to bottom starting with rack 1 in the base cabinet.

### Tape Drive Naming Conventions

Tape drives are numbered in the same way as disk drives; that is, they are numbered according to the drive slot they occupy. Tape storage devices are addressed as **rastr $n$**  where  $n$  is a drive slot number in the range 1–34. Refer to the *Storage Peripherals Manager’s Guide* for tape storage device naming conventions.

### CD-ROM Drive Naming Conventions

CD-ROM drives are numbered in the same way as disk and tape drives. However, in software commands, how you refer to a CD-ROM drive depends on the command type. Table A-1 shows the name for the CD-ROM drive in various commands. The letter  $n$  in the table corresponds to the drive slot and is in the range 1–34. The letter  $p$  is the name of the partition.

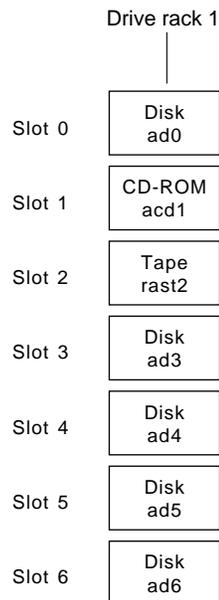
**Table A-1. CD-ROM naming conventions**

| Command                               | Naming convention | Examples                                      |
|---------------------------------------|-------------------|---|
| <b>boot</b>                           | $adn$             | b ad(0,1,1)                                   |
| <b>eject, dumpfs</b>                  | $acdn$            | eject acd1<br>dumpfs /dev/acd1                |
| <b>dkinfo</b>                         | $adn$             | dkinfo ad1                                    |
| <b>mount</b> (an entire CD-ROM drive) | $acdn$            | mount -t lfs -o fs=4.2 -r /dev/acd1 /mnt      |
| <b>mount</b> (a partition)            | $adnp$            | mount -t lfs -o fs=4.2 -r /dev/ad1a /mnt_ad1a |

## Sample Drive Configurations

This section describes several common disk, tape, and CD-ROM drive configurations.

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



**Figure A-1. Seven-drive configuration**

If you need to increase the storage capacity beyond seven drives, you must add one or two expansion cabinets. Each expansion cabinet allows you to add up to fourteen drives.

Figure A-2 shows a fully configured first expansion cabinet. When viewing the NetServer from the front, the first expansion cabinet is to the right of the base cabinet. Figure A-3 shows a fully configured second expansion cabinet. When viewing from the front, the second expansion cabinet is to the left of the base cabinet.

In these examples the first expansion cabinet has ten disk drives and four tape drives. The second expansion cabinet has fourteen disk drives.

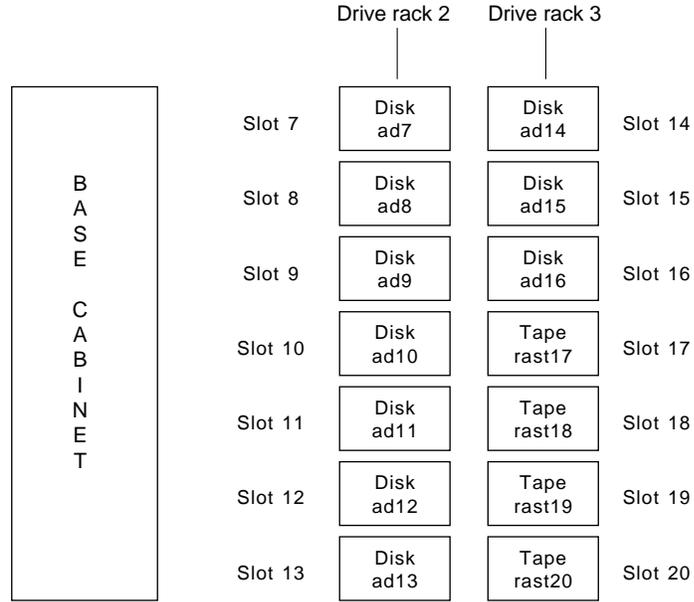


Figure A-2. First expansion cabinet with fourteen drives (front)

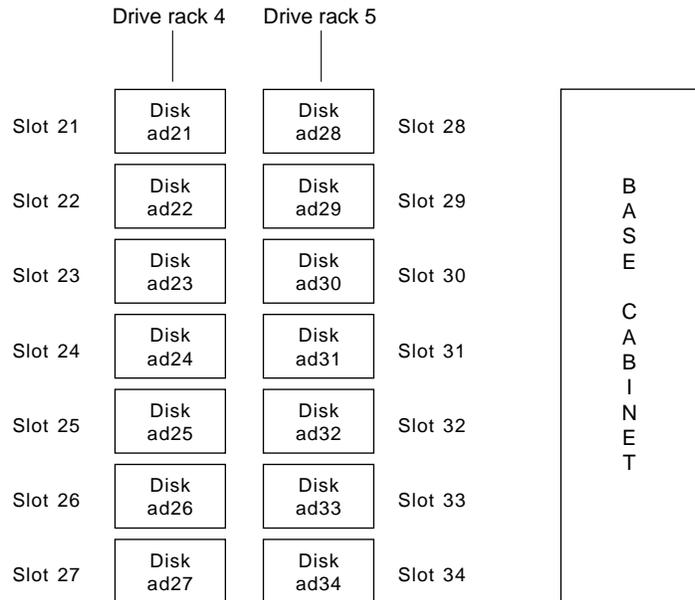


Figure A-3. Second expansion cabinet with fourteen drives (front)

## Removing or Adding Drives

This section describes installing or removing drives. The drive slots accept disk, tape, and CD-ROM drives. Refer to the first two sections of this appendix for guidelines for choosing a slot and for configuration examples.



**Caution:** When removing disk drives, allow approximately 20 seconds after powering down the cabinet 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 damage 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, refer to the *System Manager's Guide* for instructions on how to use the `ax_hot_plug`, `ax_remove_device`, and `ax_add_device` 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 located in the base cabinet's drive rack. If you do not have enough vacant slots to accommodate the number of drives you want to add, you can install up to two expansion cabinets, each supporting up to 14 drives. You can arrange this upgrade through your authorized Auspex sales representative.



**Caution:** Since 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.

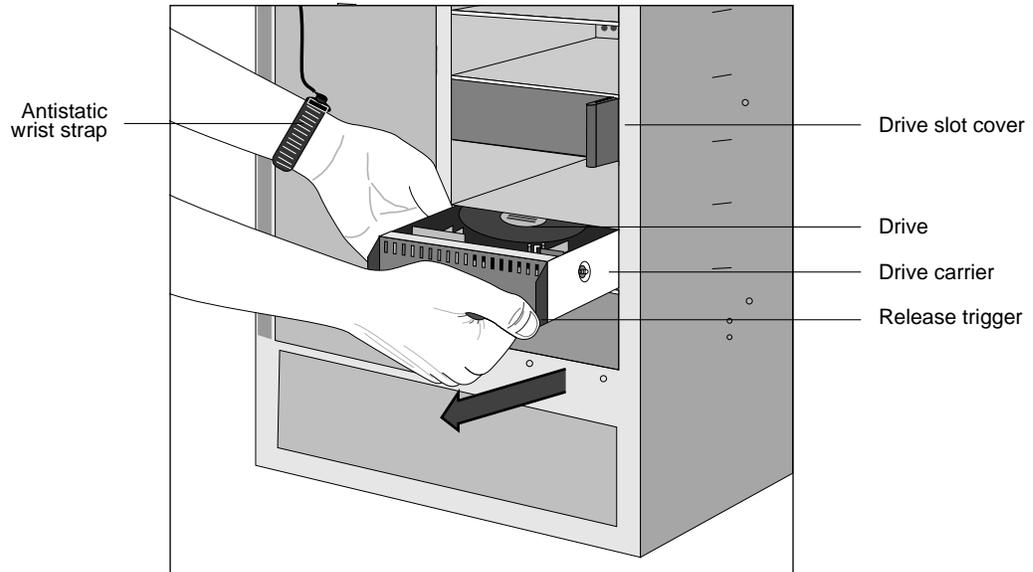
#### **To remove a drive**

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. Release the latch button by depressing the trigger on the drive (see Figure A-4).



**Figure A-4. 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-6.
3. If you need to remove a drive slot cover to accommodate a disk, tape, or CD-ROM drive, remove it now. Using your fingers or a screwdriver, pinch the fold on the right side of the cover to release it from the drive slot (see Figure A-4).
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.



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

6. Hold the drive with its release trigger to the right side of the handle and insert the drive until you hear it snap into the drive slot (see Figure 3-20 on page 3-25).

7. Using the same method, add all other drives in their slots.
8. 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.
9. 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.

# B Cable Specifications

---

## About This Appendix

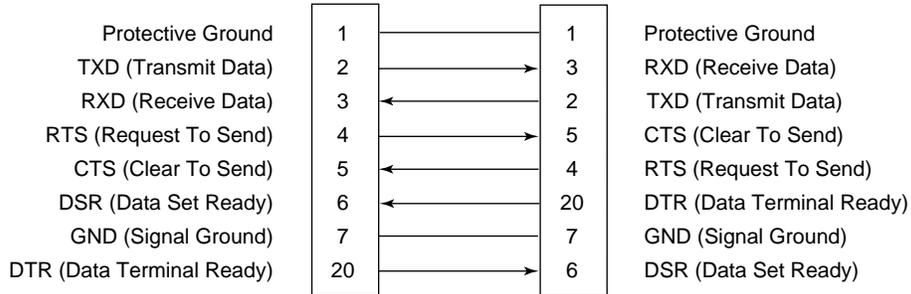
This appendix lists the supported signals for the console cable and the SCSI connector on the HP board. It also includes information on Ethernet, FDDI, MLT-3, and ATM network cables.

This appendix covers the following sections:

- ▲ Console Cable
- ▲ SCSI Cable for the HP
- ▲ Network Cables

# Console Cable

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



**Figure B-1. Console cable pin diagram**

## SCSI Cable for the HP

The SCSI port on the HP is a standard SCSI-2 port. Table B-1 shows an example of a SCSI-2 cable pin diagram.



**Note:** Auspex does not supply a SCSI cable for the HP.

**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,<br>+5 volts DC, Fused, 2 Amps) | 38            |
| GND (Ground)   | 40            |
| ATN- (Attention)   | 41            |
| GND (Ground)   | 42            |
| 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            |

# Network Cables

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

## 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 and 100Base-T Ethernet Full Duplex

Both the 100Base-T Ethernet and 100Base-T Ethernet full duplex connectors use a 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, shielded twisted pair (STP) or unshielded twisted pair (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-2 lists the pin assignments for both connectors on the EIA/TIA 568B cable.

**Table B-2. EIA/TIA 568B cable pin and pair assignments**

| 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. 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).

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