HP Netserver LP 2000r
User Guide

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Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Contents

1 Controls, Ports, and Indicators

Introduction

Before operating the HP Netserver LP 2000r, familiarize yourself with the Netserver's controls, ports, and indicators, as shown in Figures 1-1 through 1-3.

Front Panel

The front panel of the HP Netserver provides the controls and indicators commonly used when operating the Netserver.

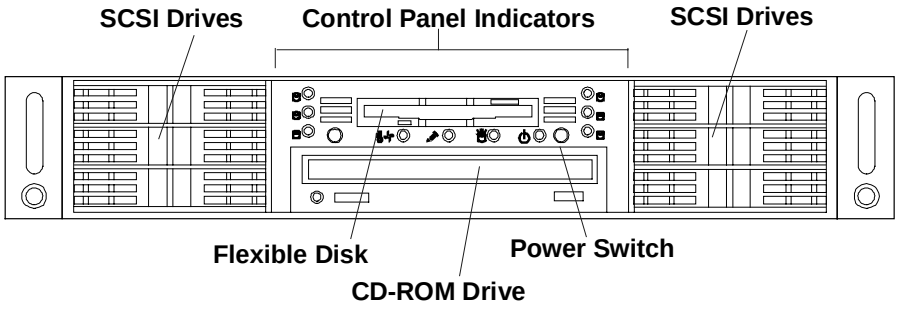


Figure 1-1. Front Panel

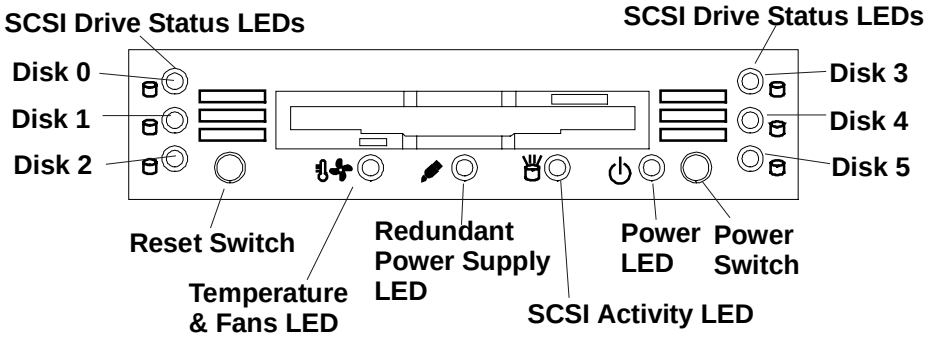


Figure 1-2. Control Panel Indicators

Table 1-1. Control Panel Switches and Indicators

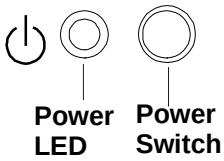
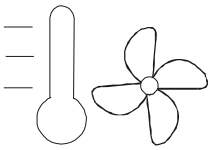
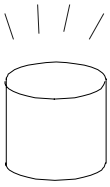
Control/Indicator	Description
Power On/Off/Sleep Switch & LED  	The power switch turns the Netserver power On or Off. If sleep states are available, it also transitions between Power On and sleep states. Sleep states are NOS dependent and only available if your NOS supports power management based on the ACPI (Advanced Configuration and Power Interface) standard. Refer to "Applying Power to the HP Netserver" and "Sleep States (ACPI)" later in this chapter. The LED indicates the power state of the Netserver: • **Steady Green** indicates the Netserver is operating normally. • **Blinking Green** indicates the Netserver is in a sleep state and under ACPI control. • **Off** (unlit) indicates the Netserver is powered off or in standby mode.
Reset Switch  	This switch creates a hard system reset, which is equivalent to a power-on reset.

Table 1-2. Component Indicators

LED ICON	Description
Temperature/Fan LED 	This LED indicates the system temperature and fan speed status: • **Steady Green** indicates normal temperature and fan speed. • **Alternating Red/Green** indicates temperature has exceeded the warning threshold or the fan speed has fallen below the warning threshold. • **Steady Red** indicates temperature has exceeded the critical threshold or the fan speed has fallen below the critical threshold.
RPS LED 	This LED indicates the status of the Redundant Power Supply system: • **Steady Green** for normal operation. • **Alternating Red/Green** for warning condition indicating that the power supply system is not functioning correctly. • **Steady Red** indicates a bad power supply.
SCSI Drive Status LEDs 	These LEDs indicate the state of the respective SCSI disk drive: • **Off** for SCSI drive not present. • **Steady Green** for SCSI drive present. • **Alternating Red/Green** (slow blink) for a SCSI drive rebuild. • **Alternating Red/Green** (fast blink) for a SCSI drive identify. • **Steady Red** for SCSI drive failure.
SCSI Activity LED 	This LED indicates SCSI Hard Disk activity: • **Flickering Green** when there is SCSI activity. • **Off** when there is no power or SCSI activity.

Rear Panel

The ports and connectors at the rear are listed below and shown in Figure 1-3.

- The power connector accepts a standard power cable to connect the HP Netserver LP 2000r with a UPS or the site power source. A second power supply for redundancy is optional. Each power supply has its own power cord connection.
- The mouse port accepts a standard mouse with a PS/2 connector.
- The keyboard port accepts a standard keyboard with a PS/2 connector.
- The USB (2) ports are provided for devices other than the keyboard or mouse.
- The Parallel Port is a standard parallel port, which supports Extended Capabilities Port (ECP)/Enhanced Parallel Port (EPP).
- The Serial/Management Port is a standard serial port, which can be used for a serial devices or management functions. For more information about management functions, refer to the *Server Management Reference Guide*.
- The dedicated serial port is a standard serial port.
- The Video Port interface specifications are listed in Table A-4, "HP Netserver Hardware Specifications" and Table A-5, "Video Display Modes" of Appendix A, "Specifications."
- The two LAN ports (LAN A and LAN B) are for the embedded controllers based on Intel's 82559 10/100 BaseT Fast Ethernet controller. Only LAN A can be used for the LAN A Power On/Off remote management function. Each LAN port has a RJ-45 LAN connector and two LEDs to indicate LAN speed and valid connection or activity. Table 1-3 describes LAN LED indicators. Refer to Chapter 10, "Configuring the HP Netserver," to change configuration settings.
- The external SCSI port provides access to external SCSI devices, typically an external SCSI tape backup device.

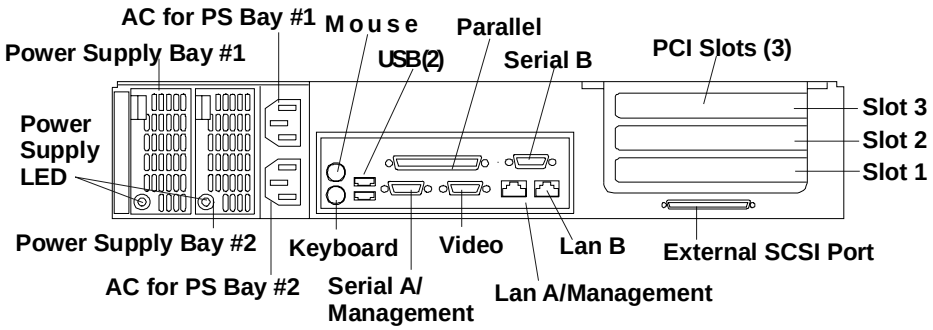
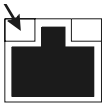
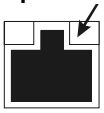


Figure 1-3. Rear Panel and Ports

Table 1-3. Rear Panel LED Indicators

Indicator	Definition
Power Supply LED 	Each power supply module has a status LED: • **Steady Green** indicates the power supply module is powered up and operating normally. • **Flashing Green** indicates that AC current is present and the power supply module is in standby mode (HP Netserver is powered off). • **Steady Amber** may indicate a power module failure, a system over-current condition, a blown fuse in the power supply module or cage, or that no AC is present. • **Off** indicates the AC line cord is unplugged from all installed power modules.
Link LED 	This LED is the activity/link indicator: • **Steady Green** indicates a valid LAN link. • **Flashing Green** indicates there is LAN activity.
LAN Speed LED 	This LED is the LAN speed indicator: • **Steady Amber** shows LAN is operating at 100 Mbps LAN speed. • **Off** shows LAN is operating at 10 Mbps LAN speed.

Applying Power to the HP Netserver

Powering-Up the HP Netserver

1. Turn on power to the monitor connected to the HP Netserver.

   Turning on the monitor first ensures that video output auto-configures properly as the Netserver boots up.

2. Press the Power push-button on the front control panel. See Figure 1-1.

   When you press the power button, the Netserver powers up and loads the operating system. The system runs a set of power-on self tests (POST) during this process. For details refer to Chapter 12, "Troubleshooting."

Powering-Down the HP Netserver

1. Log off all users and, if necessary, back up files.

   ◊ Schedule the power-down for a time when the Netserver being down will affect the fewest users.

   ◊ If you will be performing a hardware or software upgrade, ensure the Netserver's data has been backed up.

   ◊ Follow instructions in your network operating system (NOS) documentation to shut down all networking software and applications.

WARNING	The power supply will continue to provide standby current to the Netserver until the power cable is disconnected from the rear panel.

2. Press the power switch on the HP Netserver control panel when prompted by the operating system.

   Normally this completes the power-down procedure.

Connecting AC Power to Multiple-Server Configurations

The HP Netserver temporarily draws a large "inrush current," when first connected to an AC power source. The inrush current is much greater than the Netserver's normal operating current and generally, the AC power source can handle the normal inrush current.

However, if you install several HP Netservers on one circuit, precautions are necessary. If there is a power failure and power is then restored, all the servers immediately begin to draw inrush current at the same time. If the circuit breakers on the incoming power line have insufficient capability, the breaker may trip and prevent the servers from powering up.

When preparing your site for installation, allow for the additional inrush current. Refer to Table A-1, "Power Supply Specifications" in Appendix A, "Specifications."

Sleep States (ACPI)

The HP Netserver supports the ACPI (Advanced Configuration and Power Interface) standard, which is a key component of a NOS's directed power management. The supported features are only available when an ACPI-compliant NOS is installed on the Netserver. The term "sleep state" refers to any of several reduced power consumption states in which normal NOS activity has ceased.

The Netserver supports several sleep states. One of these is a "standby" or "suspend" sleep state, which has a short wake-up time. In this sleep state, the Netserver appears to be off – the monitor appears blank and there is no CD-ROM or SCSI hard drive activity, however, the front panel power LED flashes slowly and the fans continue to operate.

The Netserver also supports another sleep state with a slower wake-up time, sometimes referred to as "hibernate" by various operating systems. In this sleep state, the Netserver appears to be off as described earlier, but the fans and the front panel power LED are also turned off. The unique feature of this sleep state (and the reason for its slower wake-up time) is that information about the Netserver's NOS state (open applications, screens, and so on) is saved to disk before the Netserver is placed in the sleep state. Upon wake-up, this information must be restored from disk. This method of restoring the Netserver's operation is much faster than a complete rebooting of the Netserver. It still requires running all the start-up self-tests before starting the NOS, but loading the NOS and all the previously opened applications is much faster.

The Netserver supports certain types of system activity, which is used as wake-up events from these sleep states. These wake-up events can be generated from the power button, LAN activity, and scheduled events.

NOTE The HP Netserver's power management policies (transitions between various power states) and the user options are specific to the particular ACPI-compliant NOS installed on the Netserver. If your NOS is ACPI-compliant, refer to the power management features in the instructions provided for more information.

The HP Netserver's power button can be configured to initiate a graceful shutdown of the NOS rather than an immediate shutdown of the power supply. The power button configurations are dependent on the user interface provided by the ACPI-compliant NOS. While power management is under the control of the ACPI-compliant NOS, the HP Netserver's power button is capable of an override in case of a non-responsive NOS.

NOTE The HP Netserver power button will force a power-down without waiting for the NOS to gracefully shut down the Netserver, if the power button is pressed and held more than four seconds.

CAUTION If the power button override is used, there is a strong possibility that data will be corrupted or lost.

2 Opening and Closing the HP Netserver

Introduction

This chapter describes how to the remove the front bezel, top cover, and air flow guide from the HP Netserver LP 2000r.

WARNING	Before removing the cover, always disconnect the power cord and unplug cables. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. Disconnect cables to avoid exposure to shock hazard.

Removing the Front Bezel

You need to remove the front bezel in order to install mass storage devices or media. You do not need to turn off power to remove the front bezel.

1. Hold the bezel at the opening in the center and pull towards you to release the top edge of the bezel.

   The bezel rests on two pins and is held in place by spring latches at the top. It rotates down to an 80° angle.

2. Lift the bezel out toward you to remove it from the chassis. See Figure 2-1.

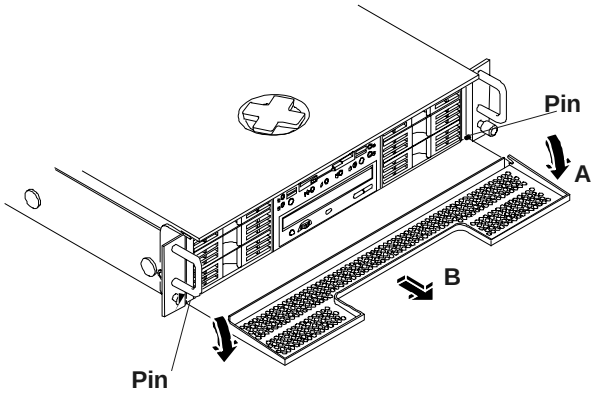


Figure 2-1. Removing the Front Bezel

Replacing the Front Bezel

1. Hook the bottom edge of the bezel onto the pins at the front of the chassis. See Figure 2-1.
2. Close the bezel and press the top corners to snap it into place.

Removing the Top Cover

You do not need to remove the front bezel to remove the top cover of the Netserver.

1. If the HP Netserver is operating, log off all users and shut down the operating system.
2. Pull out the anti-tip foot at the bottom of the rack. Then slowly slide the HP Netserver chassis out from the rack.
3. Disconnect the power cord and unplug cables.
4. Release the top cover by turning the knob at the front of the chassis in a clockwise direction. See Figure 2-2.
5. Slide the top cover about ½ inch (13mm) toward the front of the Netserver and then lift it off the chassis.

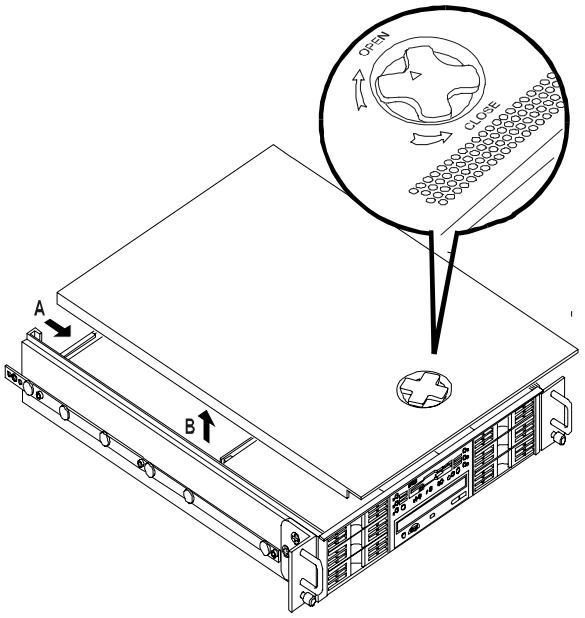


Figure 2-2. Removing the Top Cover

Replacing the Top Cover

To replace the cover, follow these steps.

1. Ensure the knob on the cover is turned to the Open position (clockwise). See Figure 2-3.
2. Place the rear edge of the top cover near the rear edge of the chassis, angling the cover slightly to engage the hooks at the rear of the chassis. Then lay the cover down on the chassis.

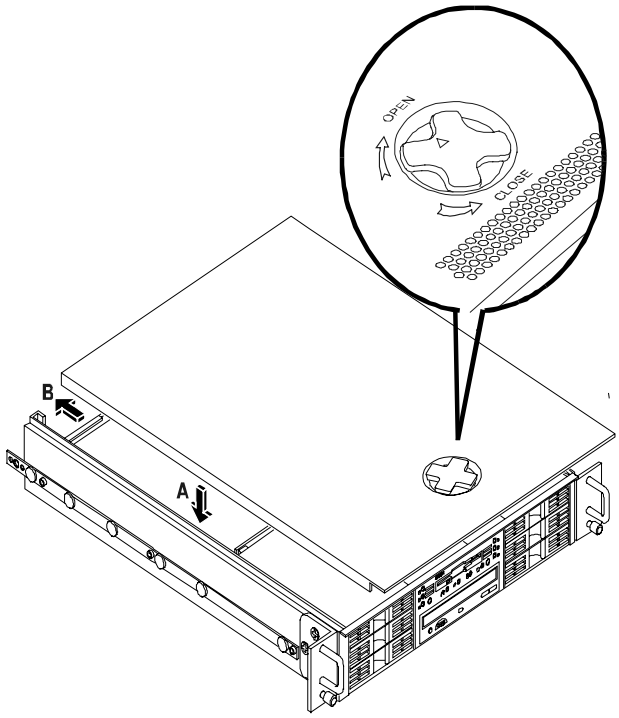


Figure 2-3. Replacing the Cover

3. Turn the knob to the Closed position (counter-clockwise). See Figure 2-3.
4. Slide the Netserver back into the rack.

Removing the Air Flow Guide

The air flow guide directs air onto the processor heatsinks. The air flow guide sits directly over the DIMMs and must be removed to install or remove DIMMS.

1. Unplug the air flow guide fan cable from the system board. See Figure 2-4.
2. Lift up the air flow guide to remove it. See Figure 2-4.

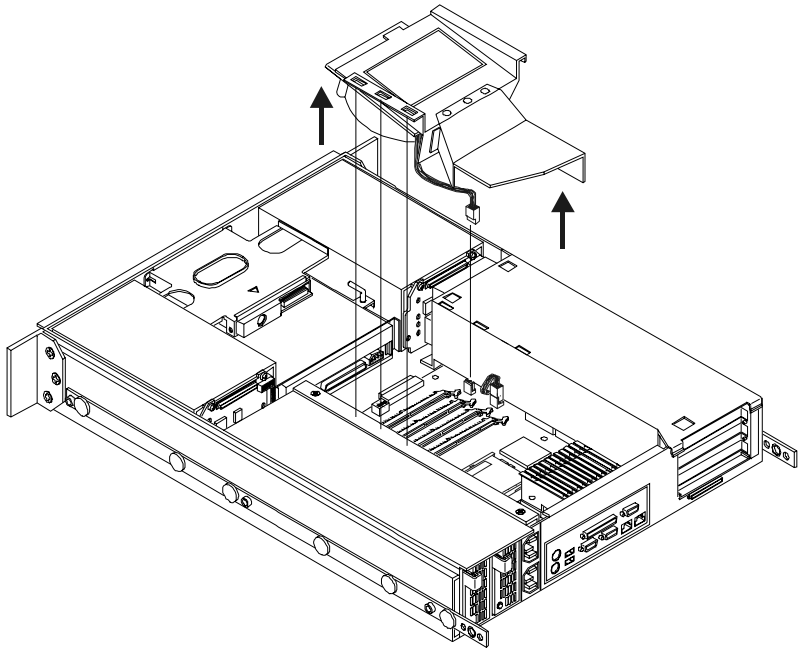


Figure 2-4. Removing the Air Flow Guide

Replacing the Air Flow Guide

To replace the air flow guide, simply reverse the steps described in the preceding procedure.

Removing the PCI Card Cage

The PCI card cage contains the 3 PCI card slots on a riser board, and must be removed in order to access PCI cards. Remove the air flow guide before removing the PCI card cage (see “Removing the Air Flow Guide” earlier in this chapter).

1. Disconnect the PCI card cage fan from the system board. See Figure 2-5.
2. Grip the PCI card cage by the fan and back edge, and firmly lift the cage *straight* up to remove it. See Figure 2-5.

   In lifting the card cage, you will feel initial resistance as the riser card disconnects from the system board.

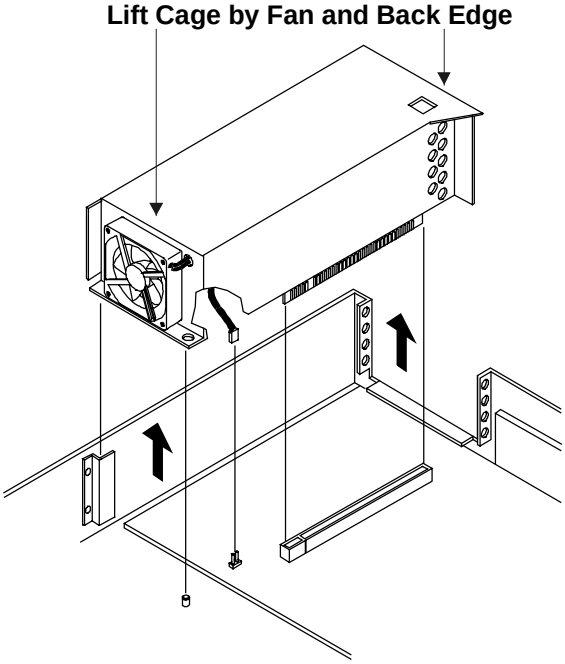


Figure 2-5. Removing the PCI Card Cage

Replacing the PCI Card Cage

Follow these steps to replace the PCI card cage and reconnect the card cage fan to the system board.

1. Align the PCI card cage with the guides on the and left side of the chassis. Lower the PCI card cage and plug the fan into the connector on the system board. See Figure 2-6.
2. Press down on the top of the card cage to plug the riser card into the motherboard.
3. Make sure that the front edge of the PCI card cage is seated on the guide pin. See Figure 2-6.

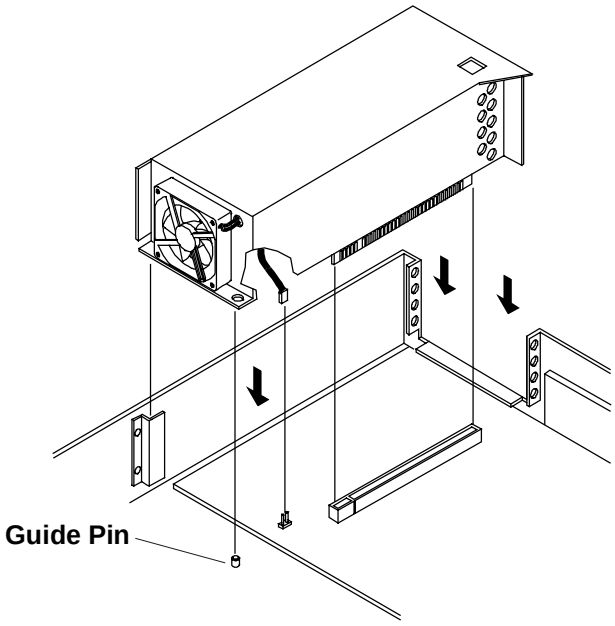


Figure 2-6. Replacing the PCI Card Cage

3 Installing Mass Storage Devices

Introduction

The HP Netserver LP 2000r comes standard with an IDE CD-ROM and a slim-line flexible disk drive, and can accommodate up to six Hot Swap SCSI hard drives. A SCSI tape backup drive may be connected as an option to the external SCSI connector at the rear.

Tools Required

No tools are required to install a SCSI drive in the Netserver. If the SCSI drive is not pre-mounted in its tray, you will need the following tools for this task:

- Phillips size 1 screwdriver
- Check the documentation that came with the drive for additional tool requirements

Mass Storage Guidelines

- General Guidelines
  - ◊ Use care when unpacking and handling the SCSI disk drives. The hard disk drives are very susceptible to mechanical shock and can be easily damaged by a drop as short as one-quarter of an inch.
  - ◊ Do not stack drives.
  - ◊ The Netserver may have up to 6 Hot Swap SCSI hard disk drives (HDD). A flexible disk drive and CD-ROM drive are standard on all models of the HP Netserver LP 2000r. See Figure 3-1.
  - ◊ If a backup tape drive is used, it must be connected externally using the external 68-pin SCSI connector at the rear of the Netserver.
- IDE Devices
  - ◊ The embedded IDE controller is an Enhanced-IDE dual channel controller and provides two connectors (IDE-1 and IDE-2) for IDE devices. Refer to "System Board Layout" in Appendix A, "Specifications."
  - ◊ The IDE CD-ROM has only one connector on the cable from the primary channel (IDE-1) connector.

- ◊ A secondary IDE connector (IDE-2) is available on the system board, but is not used.

- SCSI Device Selection
  - ◊ Use only HP LVD low-profile (1 inch) SCSI 3.5-inch hard disk drives in the Hot Swap drive slots.
  - ◊ Ensure the SCSI devices you install in Hot Swap slots do not have terminations installed. The Hot Swap backplane provides automatic termination for any unused slots. The HP Hot Swap SCSI drives come set without device ID or termination. Do not change these settings.
  - ◊ Do not use high voltage differential (HVD) SCSI devices on either of the SCSI channels. Using these devices will damage the backplane and render the SCSI drive slots inoperable.
  - ◊ The embedded dual-channel Ultra-160M SCSI controller includes connectors for SCSI channels A and B.
  - ◊ Channel A is used for connecting to the two SCSI backplane boards. The standard SCSI cable has one 68-pin, high-density connector for connecting to SCSI backplanes.
  - ◊ Channel B is used to control external mass storage devices, including an external backup tape drive. Channel B is connected to the external 68-pin SCSI connector on the rear of the Netserver. It can also be connected to internal backplanes and used for duplex mode. For information about duplexing, see “Duplexing Using Internal SCSI Channels” later in this chapter.
- SCSI Drive Addressing
  - ◊ The SCSI drives in the Hot Swap slots are automatically assigned SCSI addresses according to their drive slot location-not on SCSI addresses you may set (see Figure 3-1). This is also the case if you are using a RAID controller board. Do not set SCSI ID software settings or jumpers on the SCSI drive’s controller board.
- SCSI Device Installation Order
  - ◊ The six Hot Swap drive slots support various SCSI HDD configurations. Start from the top left side when adding Hot Swap SCSI hard drives in the HP Netserver.
- Filler Panels
  - ◊ Ensure that the empty SCSI HDD slots in the chassis have filler panels inserted before powering on the Netserver to ensure proper airflow. See Figure 3-2.

> **CAUTION** Thermal damage or excessive electromagnetic radiation may result if you operate the HP Netserver without filler panels inserted in empty SCSI HDD slots.

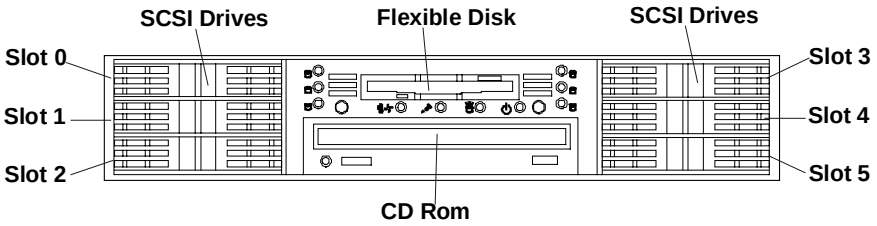


Figure 3-1. HP Netserver Mass Storage Drives

Boot Priority

The Netserver's boot order should be considered when selecting a boot device. This is especially important if you are installing a board that requires a high priority in the boot order. The board's boot priority is set by its location in the boot order.

By default the Netserver searches for boot devices in this order:

1. IDE CD-ROM drive
2. Flexible disk drive
3. Embedded SCSI A channel (Hot Swap SCSI Drives), starting with SCSI ID 0
4. Embedded SCSI B channel (external SCSI Devices)
5. PCI slots 1, 2, and 3 (in that order)
6. Network connection

The embedded SCSI controller consists of two channels, A and B. Channel A is used to control the Hot Swap SCSI hard drives (6). Channel B is used to control the external SCSI devices. On each SCSI channel, the controller scans for a boot device starting at device ID 0 and works through the ID numbers. The Netserver's embedded controller is always SCSI ID 7.

For information about booting off of a hard disk connected to an accessory board, see "Installing a Disk Array Controller Board" in Chapter 5, "Installing Additional Boards." For information about using Channel B for duplex mode, see "Duplexing Using Internal SCSI Channels" later in this chapter.

NOTE The boot order can be changed using the Netserver's (BIOS) Setup Utility and the SCSI Select Utility. Refer to Chapter 8, "Configuring the HP Netserver," for more information.

Installed Mass Storage Devices

Table 3-1 lists the number and types of mass storage devices that may be installed in the HP Netserver LP 2000r.

Table 3-1. SCSI Mass Storage Device Types

Interface Types	Max Number of Devices	Installed Devices and Addresses
Flexible disk drive	1	Factory installed flexible disk drive
IDE-1	1*	Factory installed CD-ROM drive (Primary IDE connector)
Ultra-160M SCSI Channel A	up to 6 **	• Up to 6 Hot Swap SCSI hard disk drives (address = ID 0, 1, 2, 3, 4, 5) • Embedded SCSI controller (address = ID 7)
Ultra-160M SCSI Channel B	up to 15 **	• Control of up to 15 external SCSI devices

* The primary IDE (IDE-1) cable is connected to the factory-installed CD-ROM drive. A secondary IDE connector (IDE-2) is available on the system board, but not supported by Hewlett-Packard.

** Both SCSI channels (A and B) can each support up to 15 devices; however, there are only enough internal storage slots for six Hot Swap SCSI hard drives. Channel B is used to control external SCSI devices, typically a SCSI tape backup device.

Hardware Mirroring

You may choose to mirror hard drives (RAID 1) in the HP Netserver's hot swap slots. Hardware mirroring can help speed up disk access time.

To mirror hard drives, you need to install the HP NetRAID Controller board and use an additional SCSI cable to connect the NetRAID board to the SCSI backplane connector. If you do not use HP's NetRAID Controller board, be sure to use a DAC with an LVD interface.

CAUTION	To prevent damage to the Hot Swap SCSI hard disk drives, do not use a HVD (high voltage differential) DAC controller.

If you are mirroring hard drives using the HP NetRAID Controller board, refer to "Duplexing SCSI Hard Disk Drives" later in this chapter for instructions on how to install the SCSI cable to the SCSI backplane connector. Refer to the documentation provided by the HP NetRAID PCI Controller board for external cabling requirements.

Installing Hot Swap Hard Drives

Use this section to install Hot Swap hard drives in the Hot Swap drive slots.

CAUTION	Protect the drive from static electricity: • Leave the drive it in the anti-static bag until you are ready to install it. • Before handling the drive, touch an unpainted metal surface to discharge static electricity. • Handle the drive only by its frame. Place the drive on the anti-static bag whenever you set it down. • Do not touch the electrical components.

1. Remove the filler panel from the drive slot. See Figure 3-2.

   Press the tab latches on the sides of the filler panel, and pull straight out to remove it from the slot. Save the filler panel for future use.

CAUTION	Operating the HP Netserver without filler panels in empty SCSI drive slots may cause the HP Netserver to suffer thermal damage and/or excessive EMI.

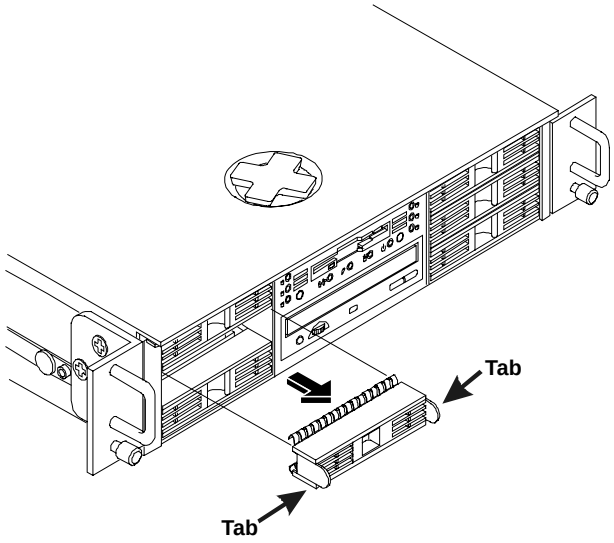


Figure 3-2. Removing a Filler Panel

2. Remove the SCSI drive from its protective packaging and open the ejector arms, as shown in Figure 3-3.
3. Slide the SCSI drive into the slot until you feel resistance. Then press in firmly until the drive is fully seated into the connector on the SCSI back plane. See Figure 3-3.

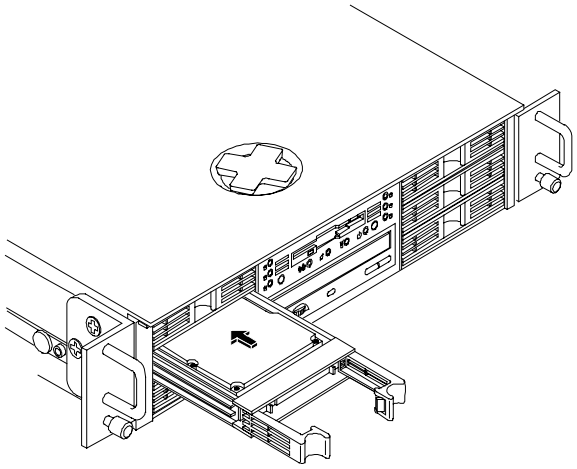


Figure 3-3. Inserting a SCSI Drive

4. Make sure the drive is pushed in completely. Close the ejector arms and press them in until the latch clicks into place. See Figure 3-4.

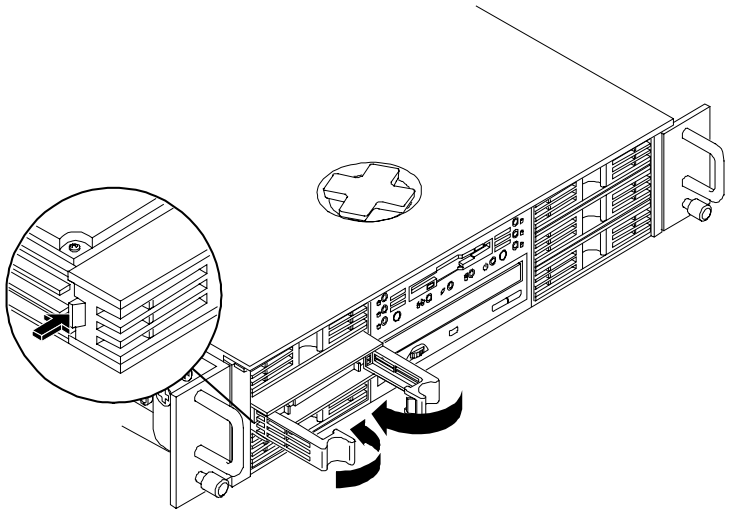


Figure 3-4. Closing Drive Ejector Arms

5. Verify that the drive is flush with the other drives. If the drive is not flush, it is not seated properly in the drive slot. Open the ejector arms and repeat Step 3 and 4.

   Make sure that you open the ejector arms wide before inserting the drive in the slot. Push the drive in completely before attempting to close the ejector arms.

Removing Hot Swap Hard Drives

CAUTION	*Remove the drive slowly. Wait for the drive heads to park before completely removing the drive.* Follow the instructions carefully to prevent damage to the drive head and head actuator.

1. To unlock the drive, insert your thumb into the opening at the center of the drive and pull the ejector arms outward until they click into the open position. See Figure 3-5.

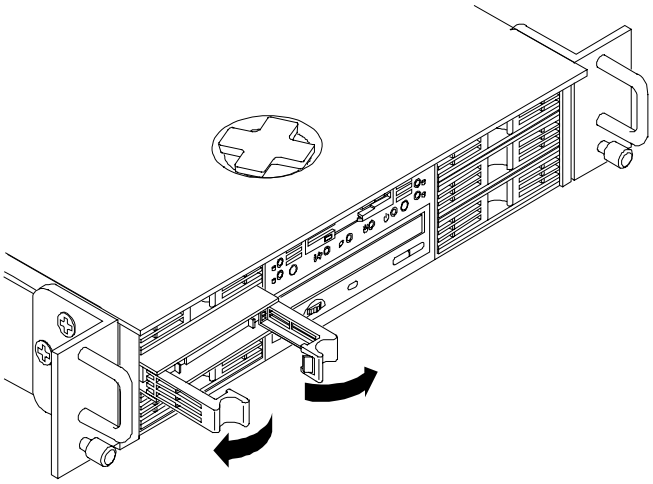


Figure 3-5. Opening Drive Ejector Arms

2. Remove the drive:
   a. Using both hands, grasp the ejector arms and firmly pull the drive out about an inch to disengage the connection on the backplane. See Figure 3-6.
   b. Wait about 30 seconds for the drive to stop spinning and for the drive heads to park.
   c. Use your hand to support the bottom of the drive, while you slowly pull the drive straight out. *Do not allow the drive to fall.*
3. Place the drive in an electrostatic protected container. *Do not stack drives.*

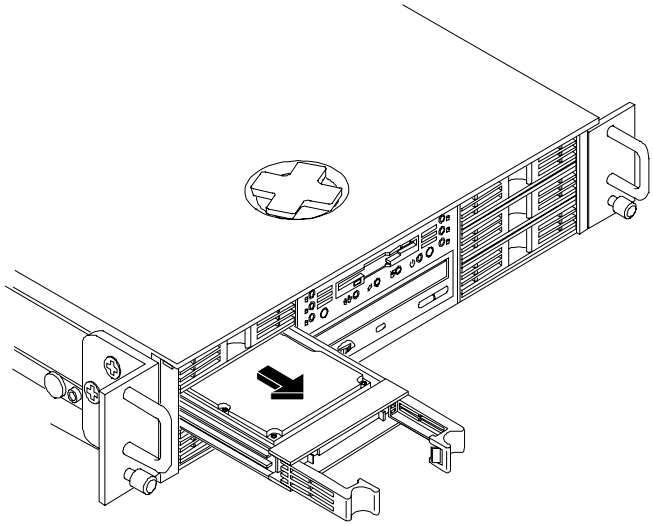


Figure 3-6. Removing a SCSI Drive

Duplexing SCSI Hard Disk Drives

This section provides instructions for duplexing SCSI hard drives by using internal SCSI channels (see Figure 3-8) or a SCSI host bus adapter card, such as the HP NetRAID Controller board (see Figure 3-9). If you are duplexing using a SCSI host bus adapter card, you will need to install the optional SCSI accessory cable. Figure 3-7 shows the default SCSI cable configuration.

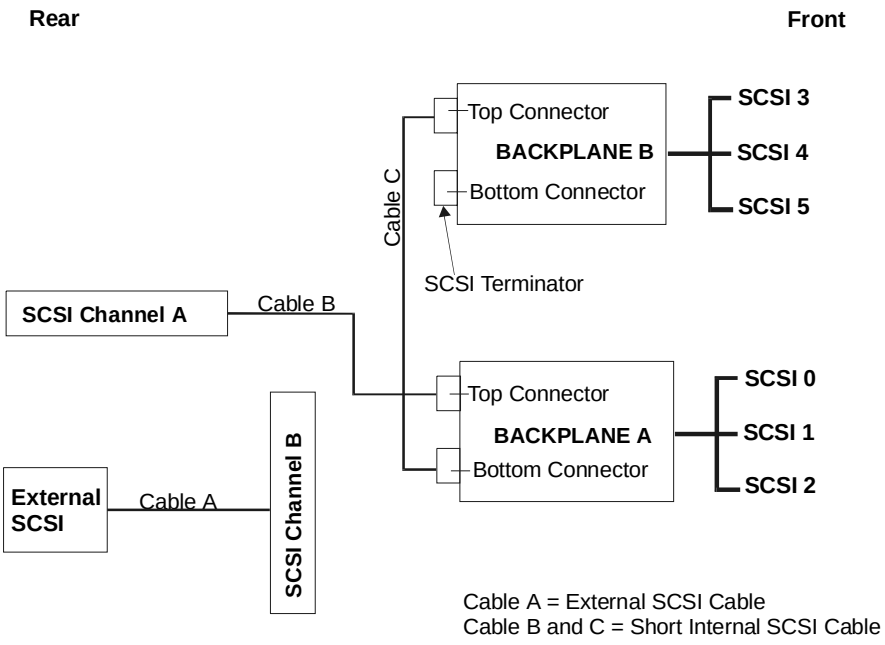


Figure 3-7. Default SCSI Cable Configuration

Duplexing Using Internal SCSI Channels

Follow these steps to duplex the SCSI hard drives using internal SCSI channels (see Figure 3-8).

1. Remove Cable A connecting SCSI Channel B and the External SCSI port. Store the cable for future use.
2. Disconnect Cable C from the bottom connector on Backplane A and connect it to SCSI Channel B.
3. Plug a SCSI terminator into the bottom connector on Backplane A.

NOTE	Ensure the cables do not block airflow or obstruct the PCI card cage fan.

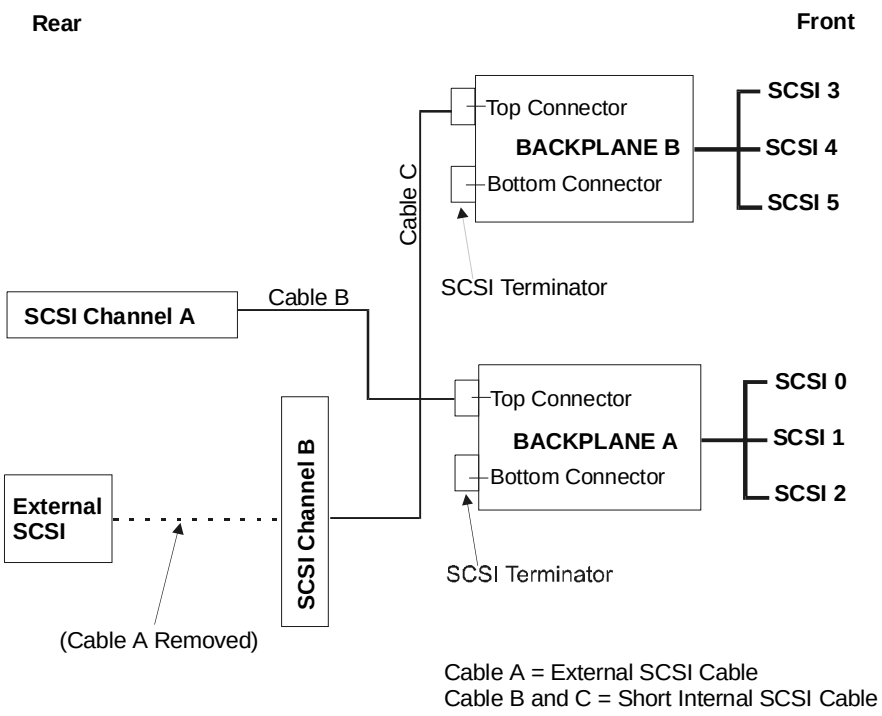


Figure 3-8. Duplexing Using Internal SCSI Cables

Duplexing with a SCSI Host Bus Adapter Card

Follow these steps to duplex the SCSI hard drives using a SCSI Host Bus Adapter card (see Figure 3-9).

1. Remove Cable C connecting Backplanes A and B. Store the cable for future use.
2. Disconnect Cable B from SCSI Channel A (on the system board), and connect it to Channel 0 on the SCSI host bus adapter card.

   Ensure the cable is not looped at the Channel 0 connection. The cable should appear as shown in Figure 3-10.
3. Connect Cable D (the optional SCSI accessory cable) to the top connector on Backplane B, and to Channel 1 on the SCSI Host Bus Adapter Card.

   Ensure the cable is not looped at the Channel 1 connection. The cable should appear as shown in Figure 3-10.

4. Plug a SCSI terminator into the bottom connector on Backplane A and Backplane B.
5. Fold the cables in the PCI card cage as shown in Figure 3-11.

NOTE Ensure the cables do not impede airflow or obstruct the PCI card cage fan.

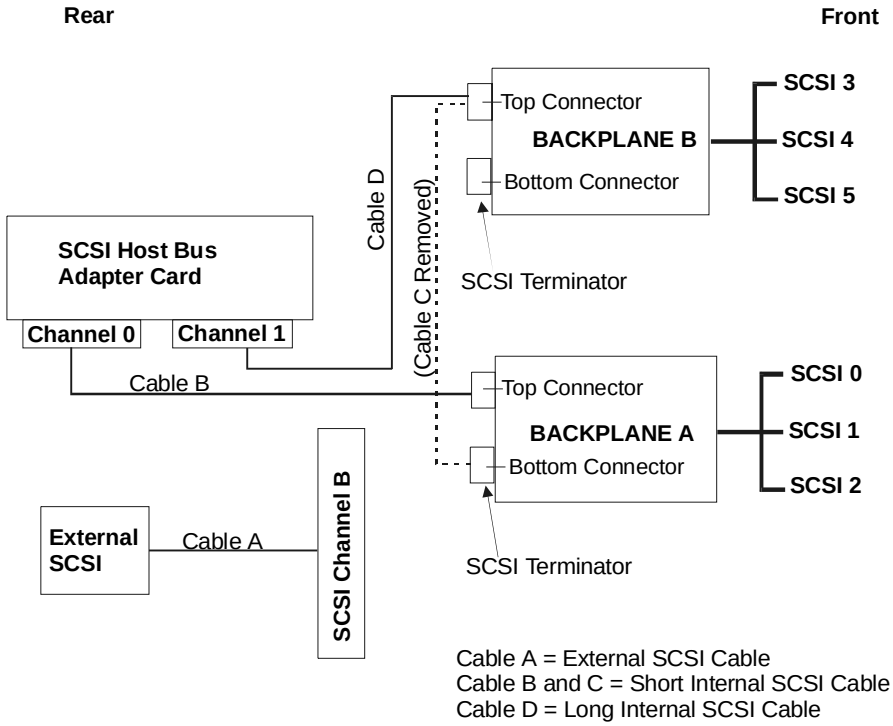


Figure 3-9. Duplexing Using SCSI Host Bus Adapter Card

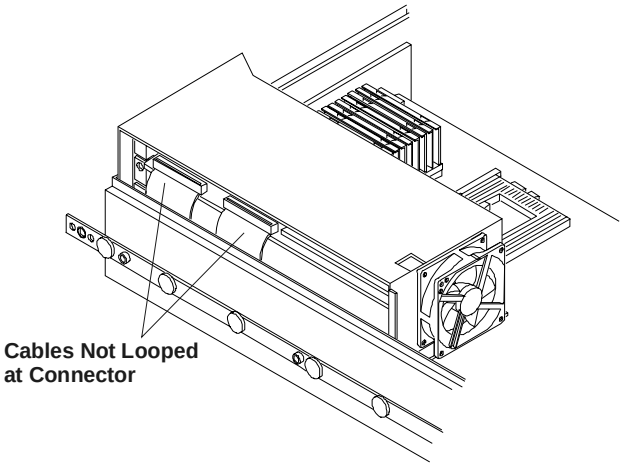


Figure 3-10. Channel 0 and Channel 1 Connectors

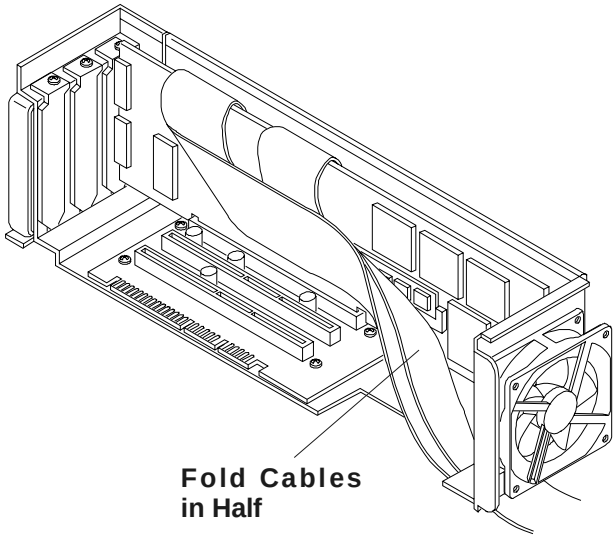


Figure 3-11. Folding Cables within the PCI Card Cage

4 Installing Additional Memory

Introduction

The HP Netserver LP 2000r's main memory is implemented using four memory slots on the system board which support up to 4 GB (1 GB x 4) of memory. The Netserver uses only 3.3V, 168-pin, 133 MHz SDRAM DIMMs and ships with at least one 256 MB DIMM. The embedded video controller is provided with 4 MB standard video memory and cannot be upgraded.

NOTE	Use only PC 133 (133 MHz) SDRAM DIMMs acquired from Hewlett-Packard. The EDO DIMMs and PC 100 SDRAM DIMMs from earlier HP Netserver models will fit into the DIMM slots in the Netserver, but the EDO DIMMs and PC 100 SDRAM will not function properly.

To ensure you have the correct DIMMs before installation, refer to one of the following for a list of qualified DIMMs:

- HP Order Assistant on the HP web site at:

  `http://www.hp.com/netserver`

- HP Customer Service

Tools Required

The following tools are required to install DIMMs in the HP Netserver.

- An anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Memory Installation Guidelines

- The HP Netserver LP 2000r only uses PC 133 (133 MHz) SDRAM DIMMs, which are electrically different from the EDO and PC100 SDRAM memory modules used in previous HP Netserver models.
- DIMMs sizes supported are 128 MB, 256 MB, 512 MB, or 1 GB in any combination.
- Supported memory capacity ranges from 128 MB to 4 GB maximum (1 GB DIMM in each of the 4 DIMM slots).
- DIMM sizes may be mixed on the system board and may be loaded in any order (0 through 3). However, HP recommends starting at slot 0 and filling the slots in order with the largest size first: 0, 1, 2, and 3.
- Open slots between DIMMs are permitted.
- When handling DIMMs, observe anti-static precautions to avoid damage.

Installing Additional DIMMs

1. Log off all users, back up files, and power down the HP Netserver.

   For detailed instructions, see "Powering-Down the HP Netserver," in Chapter 1, "Controls, Ports and Indicators."

2. Pull out the anti-tip foot at the bottom of the rack. Then extend the HP Netserver chassis out from the rack.

   It is not necessary to remove the HP Net Server from the rack to install DIMMs.

3. Disconnect the power cables and any external cables connected to the system.

   If necessary, label each one to expedite reassembly.

WARNING	The power supply will continue to provide standby current to the HP Netserver LP 2000r until the power cable is disconnected.

4. Remove the top cover.

   Refer to "Removing the Top Cover" in Chapter 2, "Opening and Closing the HP Netserver."

5. Remove the air flow guide. See Figure 4-1.

   Refer to "Removing the Air Flow Guide" in Chapter 2, "Opening and Closing the HP Netserver."

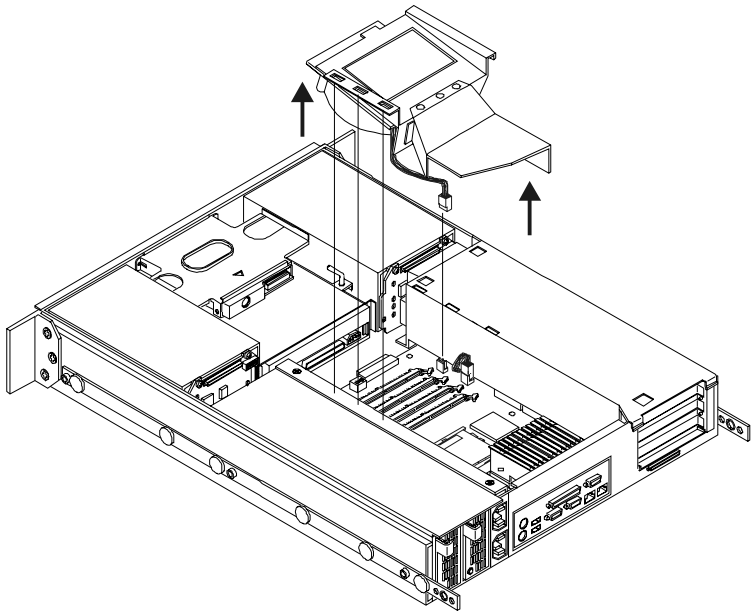


Figure 4-1. Removing the Air Flow Guide

6. Locate the DIMM slots on the system board, and choose an empty slot to install a DIMM. See Figure 4-2.

   DIMMs may be installed in any combination, in any slot, but HP recommends starting at slot 0 and filling the slots in order, with the largest size first.

CAUTION	Use only HP PC133 (133 MHz) SDRAM DIMMs.

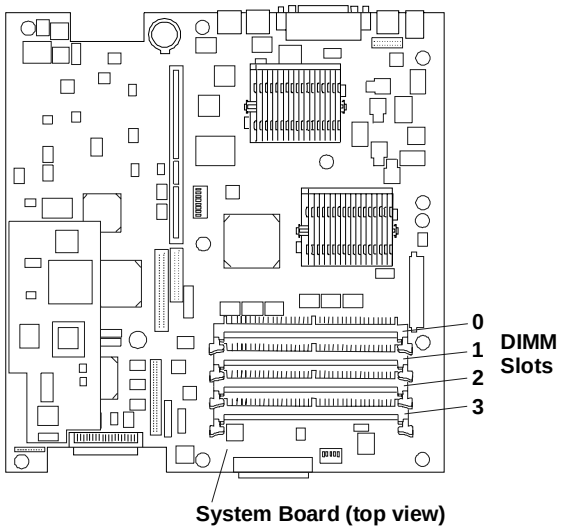


Figure 4-2. DIMM Locations on System Board

7. Spread the two retaining latches on the slot outward. See Figure 4-3.
8. Remove a DIMM from its container, handling the module by its edges.

CAUTION

- Leave the memory module in the anti-static container until you are ready to install it.
- Always use an anti-static wrist strap and a grounding mat.
- Before removing a DIMM from the anti-static container, touch a grounded, unpainted metal surface to discharge static electricity.

9. Align the notches on the DIMM with the keys on the slot. See Figure 4-3.

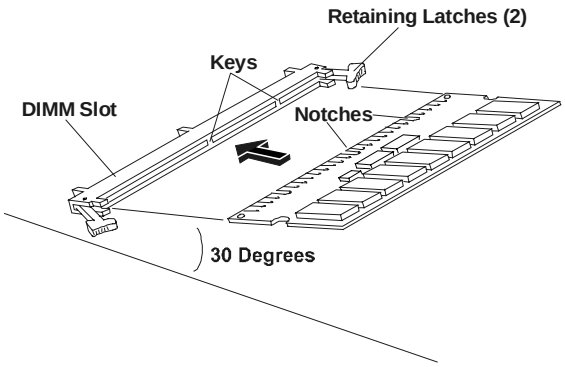


Figure 4-3. Aligning the DIMM

10. Hold the DIMM at approximately 30 ° to the system board and press the DIMM *firmly and evenly* into the slot until the retaining latches close. See Figures 4-3 and 4-4.

    It is important to hold the DIMM firmly with both hands and use even pressure so as not to bend or break the DIMM connector during installation. If the latches do not close, the DIMM is not inserted correctly.

11. Repeat Steps 7-10 to install additional DIMMs for your memory configuration.

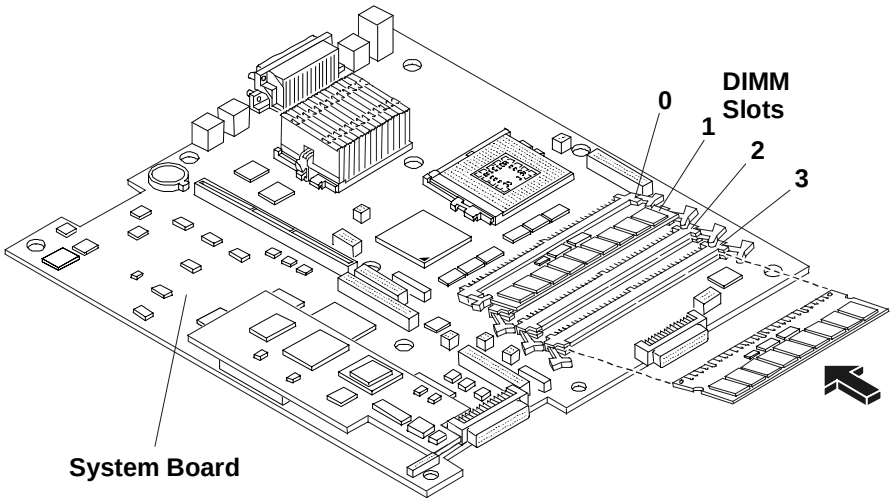


Figure 4-4. Inserting DIMMs

Removing DIMMs

You may need to remove a DIMM module to downsize your memory configuration or to replace a defective DIMM.

1. Log off all users, back up files, and power down the HP Netserver.

   For detailed instructions, see "Powering-Down the HP Netserver," in Chapter 1, "Controls, Ports and Indicators."

2. Pull out the anti-tip foot at the bottom of the rack. Then slowly slide the HP Netserver chassis out from the rack as far as it can be extended.

   It is not necessary to remove the HP Net Server from the rack to install DIMMs.

3. Disconnect the power cables and all external cables.

   If necessary, label each one to support re-assembly.

WARNING	The power supply will continue to provide standby current to the HP Netserver until the power cable is disconnected.

4. Remove the top cover.

   Refer to "Removing the Top Cover" in Chapter 2, "Opening and Closing the HP Netserver."

5. Remove the air flow guide. See Figure 4-1.

   Refer to "Removing the Air Flow Guide" in Chapter 2, "Opening and Closing the HP Netserver."

6. Locate the DIMM slots on the system board. See Figure 4-2.
7. Open the retaining latches.
8. Lift the DIMM completely away from the slot.
9. Place the DIMM in its anti-static container.
10. Repeat Steps 6-9 for as many DIMMs as you need to remove.

NOTE	If you power up the HP Netserver when there are no DIMMs installed, the screen displays an error message or appears blank and sounds beep codes.

5 Installing Additional Boards

Introduction

The HP Netserver LP 2000r provides three 64-bit PCI slots connected to a riser board contained in the PCI card cage. The slots will accept full-length 32-bit or 64-bit PCI accessory boards.

Tested PCI Boards

For a list of tested PCI boards, check for compatibility in Configuration Assistant on the Navigator CD-ROM or look for the Hardware Tested Products list for the HP Netserver LP 2000r under the Service and Support topic for the specific NOS used in the Netserver at HP's web site:

`http://www.hp.com/netserver/support/`

All Hewlett-Packard accessory boards comply with the U.S. National Electrical code (NFPA 70) Class 2.

For additional information, refer to the Readme file and Configuration Advisor on your *HP Netserver Navigator CD-ROM*. Refer to Chapter 10, "Configuring the HP Netserver," for instructions.

CAUTION	Some accessory board outputs may exceed U.S. National Electrical code (NFPA 70) Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the National Electrical Code.

Tools Required

You will need the following tools to add or remove accessory boards:

- ¼-inch Phillips screwdriver (for removing the slot cover)
- An anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Accessory Board Installation Guidelines

The following sections provide guidelines for installing PCI accessory boards into the HP Netserver 2000r.

IRQ Settings

The HP Netserver uses the Plug and Play feature of the PCI board to automatically assign IRQ settings to its resources.

Boot Priority

The HP Netserver's boot priority (BIOS search order for a boot drive) should be considered when selecting a boot device. This is especially important if you are installing a board that requires an early number in the boot order. The board's boot priority is determined by its PCI slot location. See Figure 5-1.

The embedded SCSI controller consists of two channels, A and B. Channel A is used to control the internal Hot Swap SCSI drives. Channel B is used to control the external SCSI devices, including a backup tape drive. On each SCSI channel, the HP Netserver scans for a boot device starting at device ID 0 and works up from there.

By default the HP Netserver searches for boot devices in this order:

1. IDE CD-ROM drive
2. Flexible disk drive
3. SCSI A channel (Hot Swap SCSI HDD)
4. SCSI B channel (external SCSI devices)
5. PCI slots 1, 2, and 3 (32-bit or 64-bit slot)
6. Network connection

Installing a Disk Array Controller Board

Adding a disk array controller board provides additional fault tolerance to your internal or external mass storage devices. HP recommends installing the HP NetRAID-4M PCI board in the HP Netserver LP 2000r. When installing a disk array controller board, you may alter the Netserver's boot order to allow the Netserver to boot off one of the array's drives. This boot order can be changed under the Configuration menu of the Netserver's (BIOS) Setup Utility and in the SCSI Configuration Utility.

Remote Control Card

The HP Netserver LP2000r supports the HP Remote Control card, which uses the HP TopTools remote management software. The Remote Control card requires an I^2C connection to the system board, provided by the I^2C connector on the daughter board (Integrated Remote Assistant circuitry) that is installed on the system board. See Figure 5-1 and Figure 5-2.

For more information on the HP TopTools remote management function, refer to Chapter 10, "Configuring the HP Netserver" and Chapter 11, "HP Netserver Online Documentation CD-ROM."

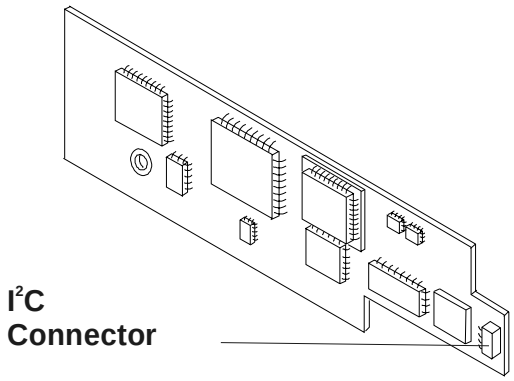


Figure 5-1. Location of I^2C Connector on Integrated RA Board

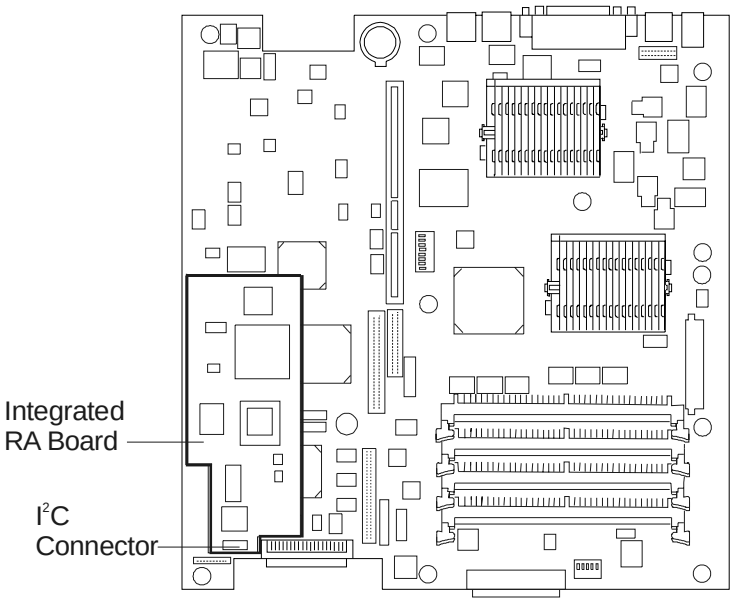


Figure 5-2. Integrated RA Board Location

Installing an Accessory Board

Use this procedure to install the accessory board.

NOTE	For information about a specific PCI board type, refer to the Readme file, Tested Products List, or Configuration Advisor on your *HP Netserver Navigator CD-ROM*.

1. Log off all users and, if necessary, back up files.

   For detailed instructions, see "Powering Down the HP Netserver," in Chapter 1, "Controls, Ports and Indicators."

2. Press the power switch on the HP Netserver control panel to turn off power when prompted by the operating system.

3. Pull out the anti-tip foot at the bottom of the rack. Then slowly slide the HP Netserver chassis out from the rack as far as it can be extended.

   It is not necessary to remove the HP Netserver from the rack to install an accessory board.

4. Disconnect the power cables and any external cables connected to the system.

   If necessary, label each one to expedite reassembly.

WARNING	The power supply will continue to provide standby current to the HP Netserver LP 2000r until the power cable is disconnected.

5. Remove the top cover.

   Refer to Chapter 2, "Opening and Closing the HP Netserver."

CAUTION	Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist-strap contacts your skin.

6. Read the documentation included with the accessory board and follow any special instructions.

NOTE	Adding a PCI-to-PCI bridge board to the HP Netserver may alter the Netserver's boot order. This boot order can be changed using the Setup Utility (press [F2] during the boot process). Refer to "Boot Priority" earlier in this chapter.

7. Remove the PCI card cage:

   a. Disconnect the PCI card cage fan from the system board. See Figure 5-3.

   b. Grip the PCI card cage by the fan and back edge, and firmly lift the cage *straight* up to remove it. See Figure 5-3.

      In lifting the card cage, you will feel initial resistance as the riser card disconnects from the system board.

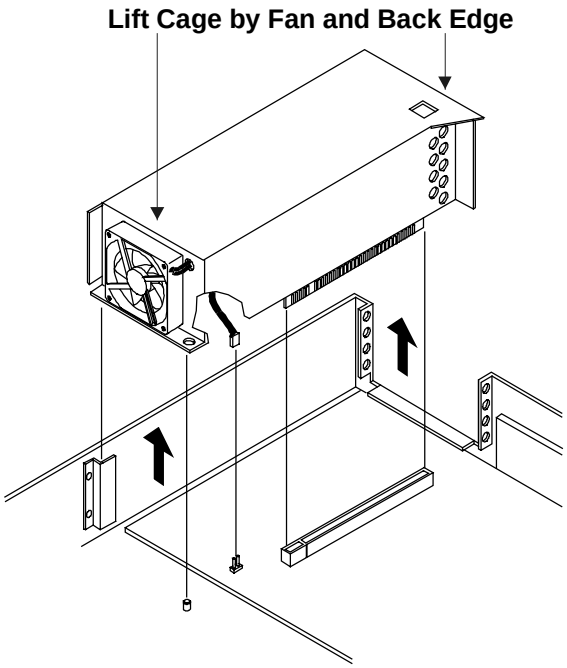


Figure 5-3. Removing the PCI Card Cage

8. Install the PCI card:
   a. Use a Phillips screwdriver to remove the slot cover. See Figure 5-4.
   b. Slide the PCI card into the PCI slot. See Figure 5-5.

NOTE	Slot 1 does not support the HP NetRAID-4M PCI board. Avoid using slot 1 for full-length cards. Slots 2 and 3 may be used for any card.

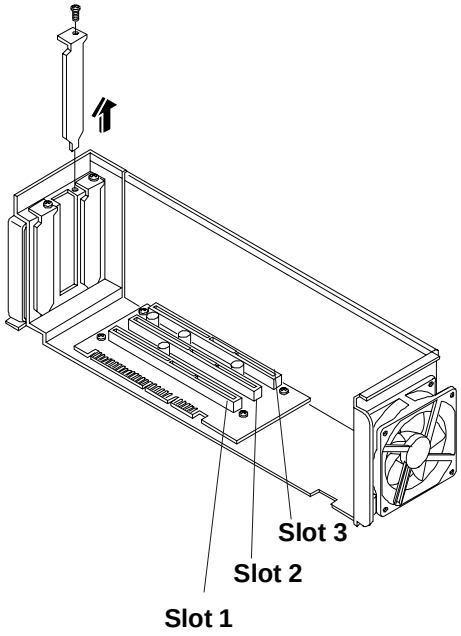


Figure 5-4. Removing the Slot Cover

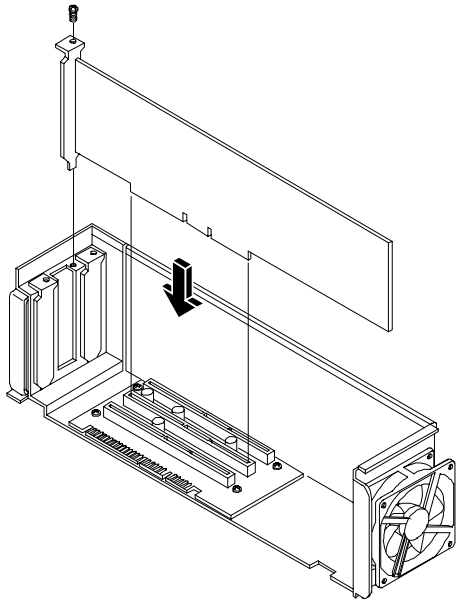


Figure 5-5. Inserting a PCI Card

9. When you have completed the PCI card installation, replace the PCI card cage and reconnect the card cage fan to the system board:

   a. Align the PCI card cage with the guides on the and left side of the chassis. Lower the PCI card cage and plug the fan into the connector on the system board. See Figure 5-6.

   b. Press down on the top of the card cage to plug the riser card into the motherboard.

   c. Make sure that the front edge of the PCI card cage is seated on the guide pin. See Figure 5-6.

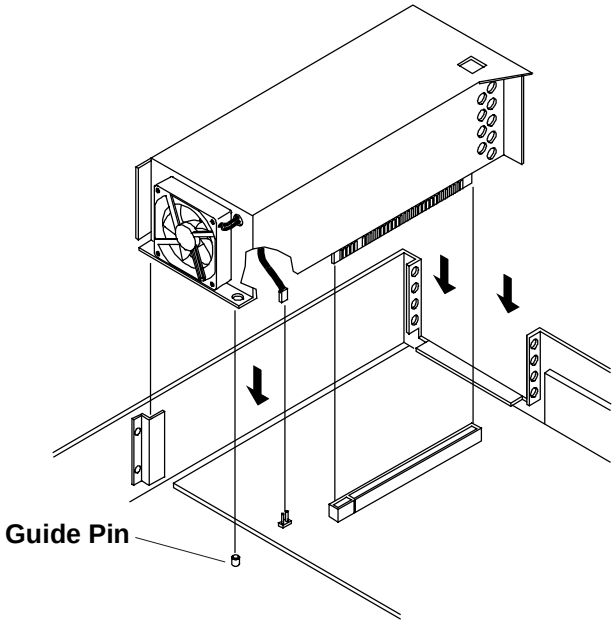


Figure 5-6. Replacing the PCI Card Cage

10. Replace the top cover on the HP Netserver and push the Netserver back into the rack.

    Once the HP Netserver is returned to normal operation, you may need to install software drivers.

    The drivers for the new PCI board are either part of your existing system software or included on a flexible diskette or CD-ROM provided with the accessory board.

Removing an Accessory Board

Follow the steps in the preceding section “Installing an Accessory Board,” but instead of installing a card, remove the PCI card and replace the slot cover.

6 Installing an Additional Processor

Introduction

The HP Netserver LP 2000r ships with at least one processor installed. Both primary and secondary processor sockets are located on the system board (the primary socket is CPU 1). The voltage regulator modules (VRMs) are embedded in the system board.

Tools Required

The following tools are required to access, install, or remove the processors:

- ¼-inch flat blade screwdriver
- An anti-static service kit (3M™ 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Processor Configuration Guidelines

The HP Netserver LP 2000r supports processor speeds of 866 MHz, 933 MHz, and 1 GHz, with a front side bus (FSB) speed of 133 MHz. For the most recent support information, visit the HP web site:

`http:/www.hp.com/netserver`

- Both processors must be the same type and have the same product number, which insures the same clock speed, cache size, and FSB speed.
- The processors must operate at the designated speed stated by the product type on the processor.
- Use only processor upgrade kits with the same HP product number. This ensures the processor type, clock speed, and cache size are the same.
- Install the second processor in the secondary socket (CPU 2).
  See Figure 6-1.

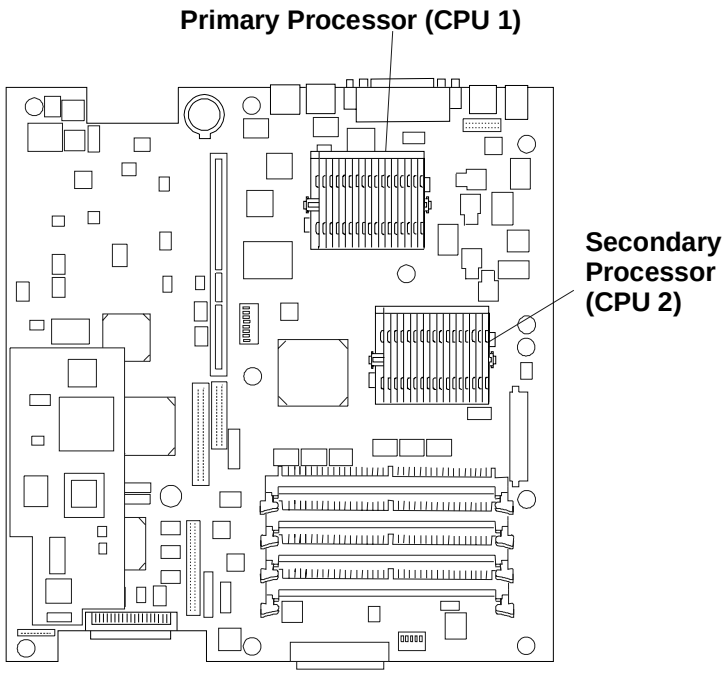


Figure 6-1. System Board (top view)

Installing a Second Processor

This section provides the instructions for installing a second processor and its heatsink on the system board. Figure 6-1 indicates the location of the primary and secondary processors.

CAUTION Take the following precautions when installing processors:

- Leave the processor in the anti-static bag until you are ready to install it.
- Wear an anti-static wrist strap and use a static-dissipating work surface or grounding mat connected to the chassis when handling components.
- Before removing a processor from the anti-static bag, touch a grounded, unpainted metal surface to discharge static electricity.

1. Unpack the processor shipping box and check the contents against the packing list.

CAUTION	Do not unseal the anti-static bag, or remove the processor until you are ready to install it.

2. Log off all users, backup files, and shut down the NOS according to the instructions in your NOS documentation.
3. Press the power switch on the HP Netserver control panel when prompted by the operating system.

   Normally, this completes the shutdown procedure.

WARNING	Power supplies continue to provide standby current to the Netserver until the power cables are disconnected.

4. Disconnect the AC power cord.
5. Gain access to the system board:
   a. Pull out the anti-tip foot at the bottom of the rack. Then slowly slide the HP Netserver chassis out from the rack as far as it can be extended.
   b. Remove the cover. Refer to Chapter 2, "Opening and Closing the HP Netserver."
   c. Remove the air flow guide. Refer to Chapter 2, "Opening and Closing the HP Netserver."
6. Ensure the processor speed of the second processor (CPU 2) is the same as the primary processor.

   If you are upgrading the second processor to a faster processor speed than the primary processor, the primary processor must also be changed. Both processors must have the same product number, which includes the same clock speed, cache size, and FSB speed.

   The supported processors only perform at the rated speed indicated on the processor in the HP Netserver.

CAUTION	Always wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

7. Open the ZIF (Zero Insertion Force) lever. Then lift the terminator out of the socket and place it on anti-static surface or container. See Figure 6-2.

   To open the ZIF lever, pull the lever out away from the ZIF socket and raise it 90° to the system board.

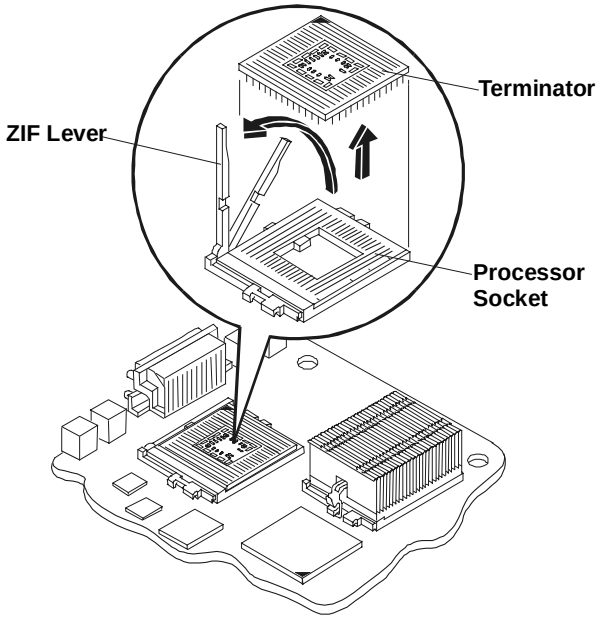


Figure 6-2. Removing the Terminator

NOTE	Keep the terminator for future use. The terminator must be installed in the secondary processor socket when only one processor is used or the HP Netserver will not operate properly.

8. Align the second processor over the empty processor socket, as shown in Figure 6-3.

CAUTION	Ensure that you the align pin-1 of the processor with pin-1 of the processor socket or pin damage will occur.

9. Insert the second processor into the socket and close the ZIF lever to fully seat the processor.

   You should hear the ZIF lever click when it closes properly.

NOTE	No speed switch settings are required for the supported 866 MHz, 933 MHz, or 1GHz processors. These processors rely on their own internal switch settings, and not on system board switch settings.

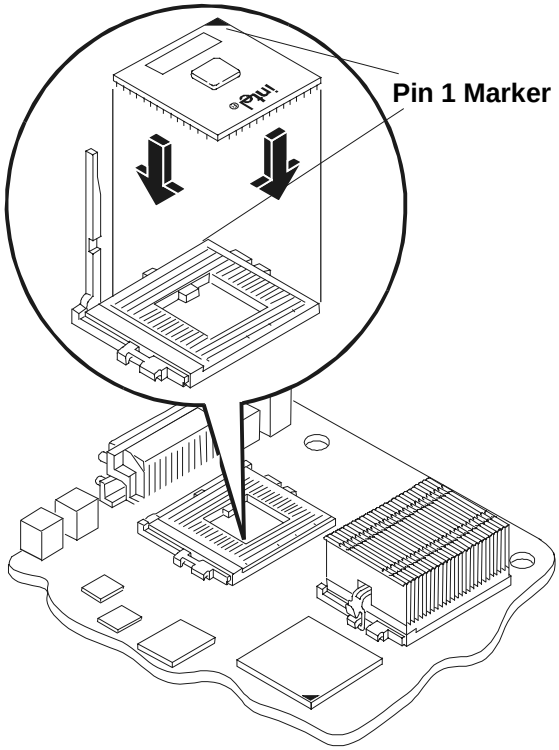


Figure 6-3. Installing the Processor on the System Board

Installing the Heatsink

After installing a new processor, you need to install a heatsink on top of the processor. The thermal patch on the bottom of the heatsink provides thermal bonding between the two components. The patch must be replaced if the heatsink is removed (even temporarily) from the processor.

1. Remove the heatsink from the shipping container.
2. Inspect the thermal patch. Replace the patch if it is damaged:
   a. Ensure that you are grounded with a static-dissipating wrist strap.
   b. Remove the damaged patch. If you are reinstalling a heatsink on a processor, use a lint-free cloth to remove any thermal material remaining on top of the processor chip.
   c. To install a new thermal patch, peel off the backing, and place the patch in the area marked at the center of the heatsink.

> **CAUTION** Heatsinks are not reusable unless the thermal patch is replaced *each time* the heat sink is removed, even if it is temporarily removed and reinstalled on the same processor.

3. Install the heatsink:
   a. Orient the heatsink with the tool latch is facing left, as shown in Figure 6-4 and Figure 6-5. Then lower the heatsink squarely onto the processor.

> **CAUTION** Ensure the heatsink is seated properly on the processor. If the heatsink is offset, there will be insufficient thermal contact with the processor, which may result in overheating, data corruption, and permanent damage to the processor.

   b. Hold the heatsink steady with one hand and press the hook latch down to connect it to the tab. Then insert a flat-head screwdriver into the tool latch and press the latch down to connect it to the tab.
   See Figure 6-5.
4. Replace the air flow guide. Refer to Chapter 2, "Opening and Closing the HP Netserver."

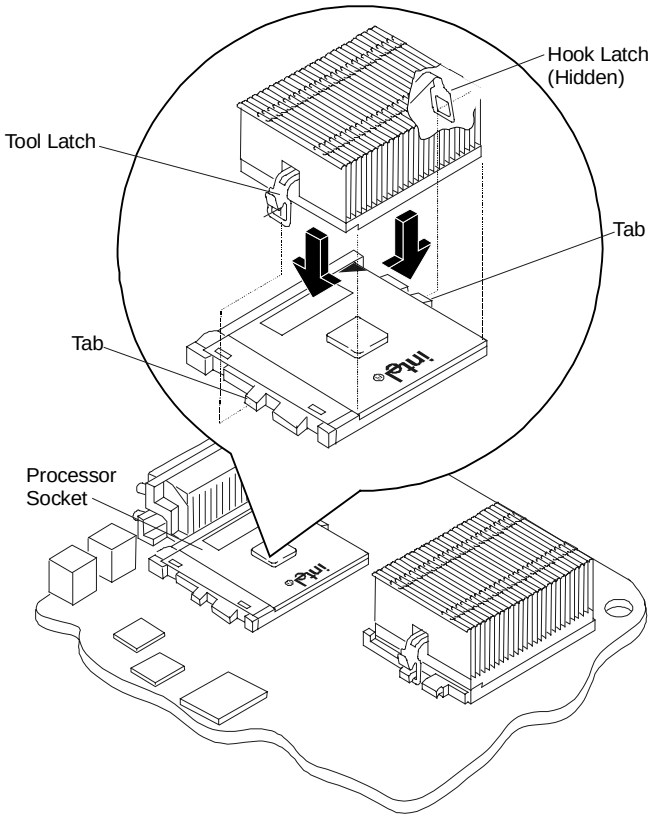


Figure 6-4. Placing the Heatsink on the Processor

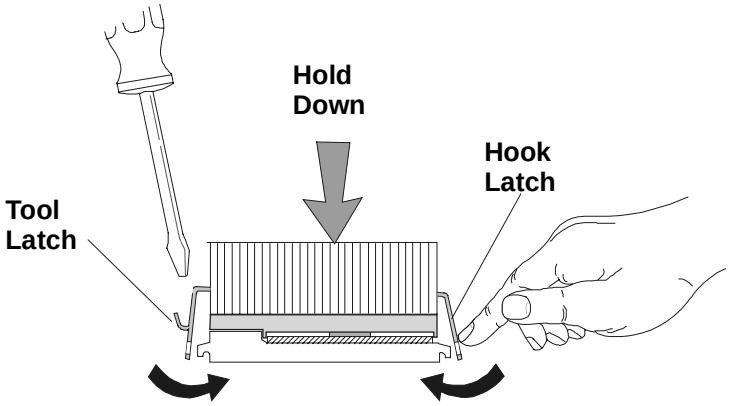


Figure 6-5. Setting the Latches

Firmware and Software Changes

This section deals with the firmware changes provided by the *HP Netserver Navigator CD-ROM* and the possible reinstalling of the NOS to recognize the second processor.

Upgrading the Firmware

If your processor included a new *HP Netserver Navigator CD-ROM*, insert the CD into the HP Netserver LP 2000r CD-ROM drive and power on the Netserver. Follow the instructions provided on screen to ensure the system BIOS is up-to-date. The system BIOS on the CD will be compared to the Netserver's current BIOS and will indicate if the BIOS needs to be updated. For more information, see Chapter 10, "Configuring the HP Netserver."

Reinstalling the NOS

You may need to reconfigure or reinstall your NOS in order to use the additional processor you have installed. If you have gone from a single-processor to dual-processor configuration, check your NOS documentation or the Readme file and Configuration Advisor utilities on the *HP Netserver Navigator CD-ROM*.

Removing a Processor and Heatsink

Use this procedure to remove a processor and its heatsink (the heatsink must be removed before the processor).

CAUTION Take the following precautions when removing processors:

- Wear an anti-static wrist strap and use a static-dissipating work surface or grounding mat connected to the chassis when handling components.
- Before removing the processor, touch a grounded unpainted metal surface on the HP Netserver to discharge static electricity.

1. Remove the air flow guide. See Chapter 2, "Opening and Closing the HP Netserver."
2. Use a flathead screwdriver or similar tool to unhook the tool latch on the heatsink. See Figure 6-6.

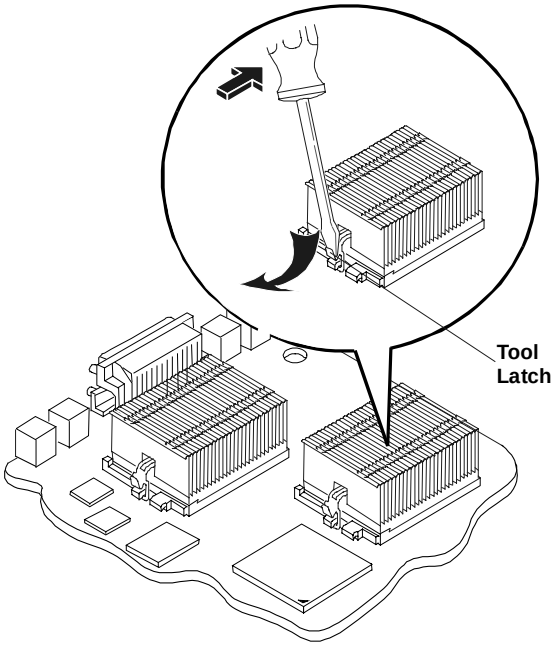


Figure 6-6. Removing the Heatsink

3. Tilt the heatsink back towards the hook latch and release the hook latch. Then, lift the heatsink away from the processor and out of the Netserver.
4. Open the ZIF lever to allow removal of the processor. See Figure 6-2.
5. Hold the processor by its edges and lift it out of the socket. Place it on a static-dissipating work surface or into an anti-static bag.
6. If you are not replacing the processor with a new or replacement processor, install the terminator into the empty processor socket. See Figure 6-2.

CAUTION	If you are using a single processor, you must install a terminator on the empty processor socket in order for the Netserver to operate reliably.

7. If you intend to use the heatsink again for a new or replacement processor, you must install a new thermal patch on the bottom of the heatsink.

   Refer to “Installing the Heatsink” earlier in this chapter.

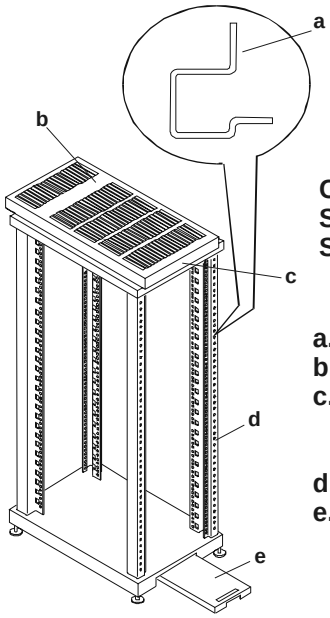
CAUTION	Heatsinks are not reusable unless the thermal patch is replaced each time the heatsink is removed, even if the heatsink is reinstalled on the same processor.

7 Rack Mounting the HP Netserver (4-Post)

Introduction

This chapter provides instructions for mounting the HP Netserver in 4-post HP System/E or System/U racks (shown in Figure 7-1) and third-party non-threaded 4-post racks. If you have the older 4-post HP Systems rack, see Chapter 13, "Alternative Rack Mounting," for instructions. If you have a 2-post non-HP rack, see Chapter 8, "Rack Mounting the HP Netserver (2-Post)," or refer to the documentation in the appropriate rack accessory kit. If you want to install the HP Netserver in a third-party rack not covered in this guide, you may find relevant documentation on HP's web site at the following URL:

http://www.hp.com/netserver/support



Characteristics of System E and Sustem U racks:

a. **5-Cornered Columns**
b. **Full Panel Vent**
c. **"HP Rack System/E" or "HP Rack System/U" Nameplate.**
d. **Numbered EIA Units**
e. **Anti-tip Foot extends in front or back (on System E Rack)**

Figure 7-1. HP System/E and System/U Rack Features

The HP Netserver LP 2000r rack mount kit requires two EIA units of space in the rack. Before mounting the Netserver, plan the Netserver's location in the rack relative to other rack components. Proper placement is vital both for safety and

operating efficiency. For more information, see “Rack Configuration Tools” later in this chapter.

Tools Required

The rack-mounting kit provides tool-less assembly. The following items are used to mark the rack columns prior to mounting the slide mechanism in the rack.

- Marking pen or masking tape

HP Netserver Rack Mount Parts List

Ensure the rack-mounting kit provided with the HP Netserver contains the following parts:

Table 7-1. Parts for Rack Mount Kit

Quantity	Description
2	Slide mechanisms

Rack Configuration Tools

The HP rack configuration tools (including white papers) are on HP's web site at the following URL:

`http://www.hp.com/netserver`

At the Web site, search for the following:

- Configuration tools
- High density rack solutions
- Rack Assistant, Rack Configuration
- Order Assistant
- *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)*

You can read about the tools or download copies for installation. These tools can be used to plan a rack configuration for the components in your system.

The white papers, particularly the *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)*, provide rack information for HP Netservers in high density racks and additional information for rack systems not listed in this manual. You will need this information to complete a rack system installation.

Safety Precautions

Always keep the following safety and environmental issues in mind, especially if you install the HP Netserver in a non-HP rack environment:

- **Optimum Operating Environment -** The optimum operating conditions for the HP Netserver is in an environmental controlled computer room with a temperature range of 20 to 22°C (68 to 72°F) at 40 to 60% relative humidity.
- **Maximum Ambient Temperature -** Ensure the maximum ambient temperature does not exceed 35°C (95° F).
- **Elevated Operating Ambient Temperature -** The ambient operating temperature within a closed or multi-unit rack assembly is likely to exceed the room's ambient temperature. Ensure the temperature within the rack itself does not exceed 35°C (95°F).
- **Reduced Air Flow -** As you mount equipment in the rack, ensure you allow enough air flow for safe operation of the equipment. The Netserver's fans will only operate correctly if both front and rear doors of the rack allow free air flow (perforated openings), or are removed.
- **Mechanical Loading -** Uneven mechanical loading within the rack can cause hazardous conditions. To prevent this in your installation plans, place the heaviest components in the bottom of the rack, mounting all components as low in the rack as is practical.
- **Circuit Overloading -** Ensure the total configuration of equipment in the rack does not overload the supply circuit. Check the nameplate ratings on all equipment. Consider the effect of circuit overloading on overcurrent protection and supply wiring.
- **Reliable Earth Grounding -** Ensure rack-mounted equipment is reliably grounded. Give particular attention to supply connections that are not direct connections to the branch circuit (for example, use of non-HP power strips).

Marking Rack Columns

To make it easier to install the slides in the rack, you may want to mark the rack columns to indicate the server placement.

Use the *HP Rack Configuration Tools* to determine where in the rack to mount the HP Netserver. The tools are available at:

`http://www.hp.com/netserver/support`

1. Use a marking pen or masking tape to mark the server position on the face of the front columns and the inside of the rear columns. The example in Figure 7-2 shows a HP System /E or /U rack.

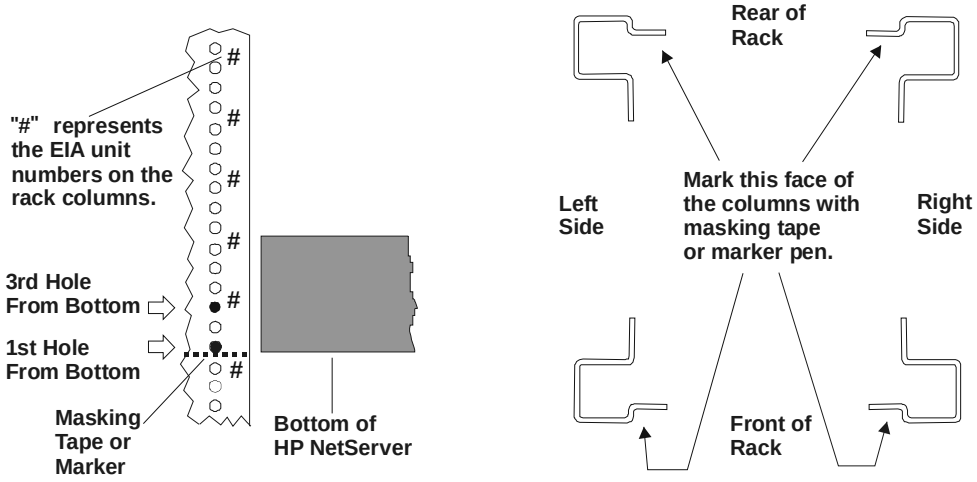


Figure 7-2. Marking Rack Columns

Installing Slides in the Rack

1. Ensure the rack is stabilized.

   For HP system /E or /U racks, pull the anti-tip foot forward out of the bottom of the rack and lower the leveler screws to make firm contact with the floor. See Figure 7-3.

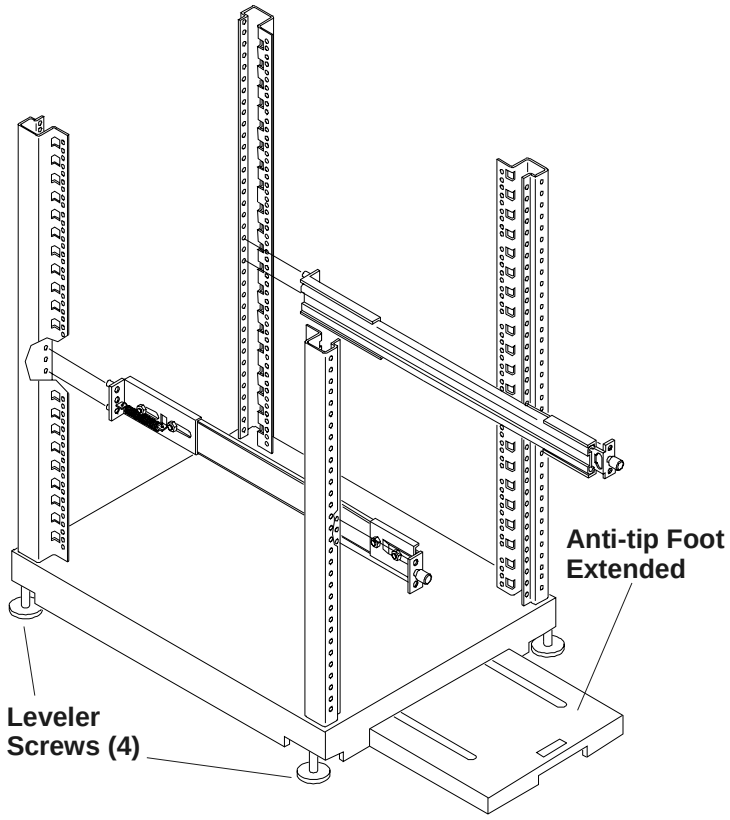


Figure 7-3. Installing Slides in the Rack

2. Insert the rear slide mounting pins into holes you have marked on the rear column. Then push in on the front of the slide and snap the front mounting pins into holes marked on the front column.

The slide mounting pins insert into the *inside* face of the rear column and the *front* face of the front column. See Figure 7-3.

Removing Slides from the Rack

Follow these steps if you need to release the outer slide assembly after it is installed in the rack.

1. Place your finger inside the slide to release the spring tab, as shown in the example in Figure 7-4.
2. Press in on the spring tab and pull the outer slide assembly toward you at the front of the rack.

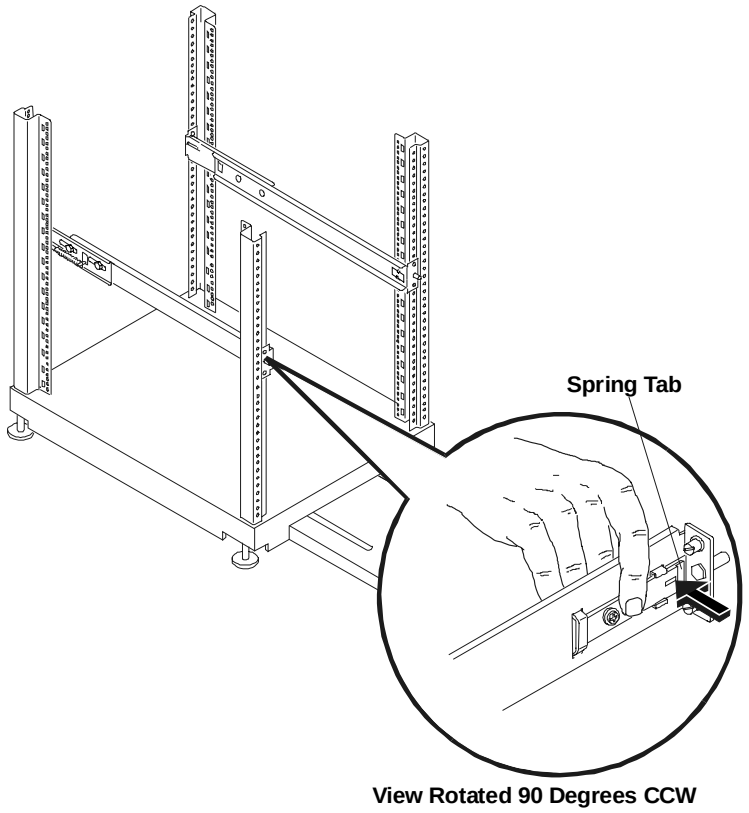


Figure 7-4. Releasing the Outer Slide Assembly

Mounting the HP Netserver on the Slides

Follow these steps to mount the HP Netserver on the slides in the rack. Once the Netserver is in the rack, you can connect the cables to the rear of the Netserver.

NOTE	If other rack components are to be mounted in the rack below the HP Netserver, install them before mounting the Netserver.

WARNING	To prevent injury or equipment damage, ensure the anti-tip foot (at the bottom of the rack) is pulled out and the leveler screws on the rack's corners are in firm contact with the floor.

1. Ensure the rack is stabilized.

   For HP system /E or /U racks, pull the anti-tip foot forward out of the bottom of the rack and lower the leveler screws to make firm contact with the floor. See Figure 7-3.

CAUTION	The HP Netserver LP 2000r weighs 38 lbs. (17.3 kg) fully loaded. To avoid an accident, use two people when placing the HP Netserver into the rack.

2. Mount the HP Netserver on the slides:
   a. With the help of at least one other person, lift the HP Netserver by its four corners off the floor or pallet.
   b. Slowly insert the HP Netserver chassis into the slides and push it into the rack until you feel resistance. See Figure 7-5.
   c. Pull the HP Netserver out several inches, then press the stop release on both slides to allow the Netserver to slide completely into the rack. See Figure 7-6.
3. Secure the HP Netserver chassis to the rack with the thumbscrews.

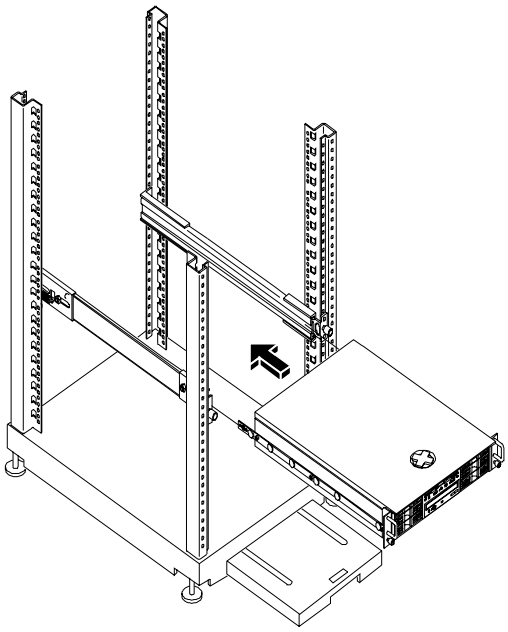


Figure 7-5. Mounting the HP Netserver on the Slides

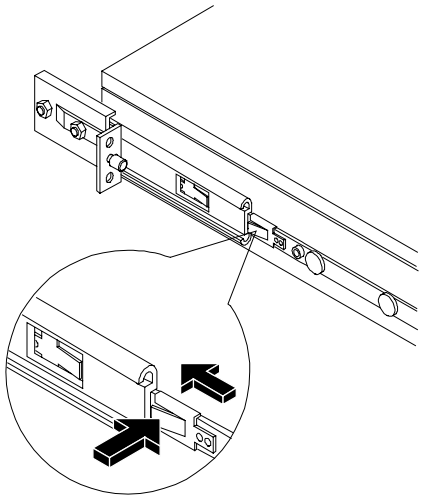


Figure 7-6. Pressing the Stop Release

Attaching the Front Bezel

1. Hook the bottom edge of the bezel onto the pins at the front of the chassis. See Figure 7-7.
2. Close the bezel and press the top corners to snap it into place.

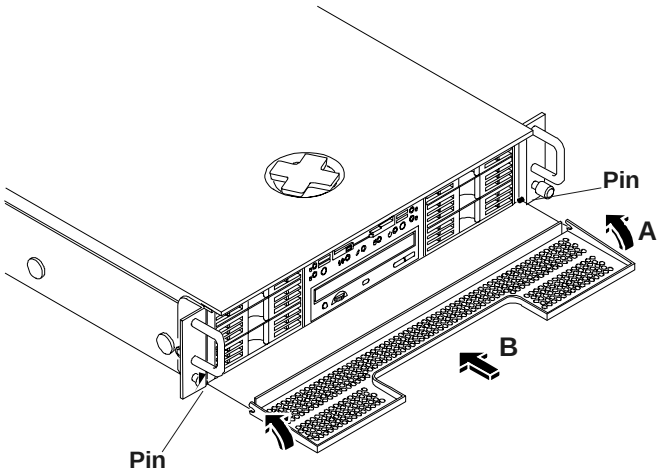


Figure 7-7. Attaching the Bezel

Cabling Rack Components

After installing the HP Netserver in the rack, refer to the white paper entitled *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)* to cable the components in the rack enclosure. The white paper is available on HP's web site at the following URL:

`http://www.hp.com/netserver/support`

After cables are attached to the HP Netserver you can attach the Cable Management Arm, as described in the next section.

Attaching the Cable Management Arm

The Cable Management Arm (CMA) allows the cables and power cord to move in and out with the HP Netserver chassis without being accidentally disconnected. The Cable Management Arm installation is tool-less.

1. Ensure the HP Netserver is pushed all the way into the rack.
2. Attach the Cable Management Arm to the rack:
   a. Mount the outer flange of the Cable Management Arm on the pins on the left slide rear bracket.
   b. Tighten the thumbscrew on the flange to secure the Cable Management Arm to the rack. See the example in Figure 7-8.

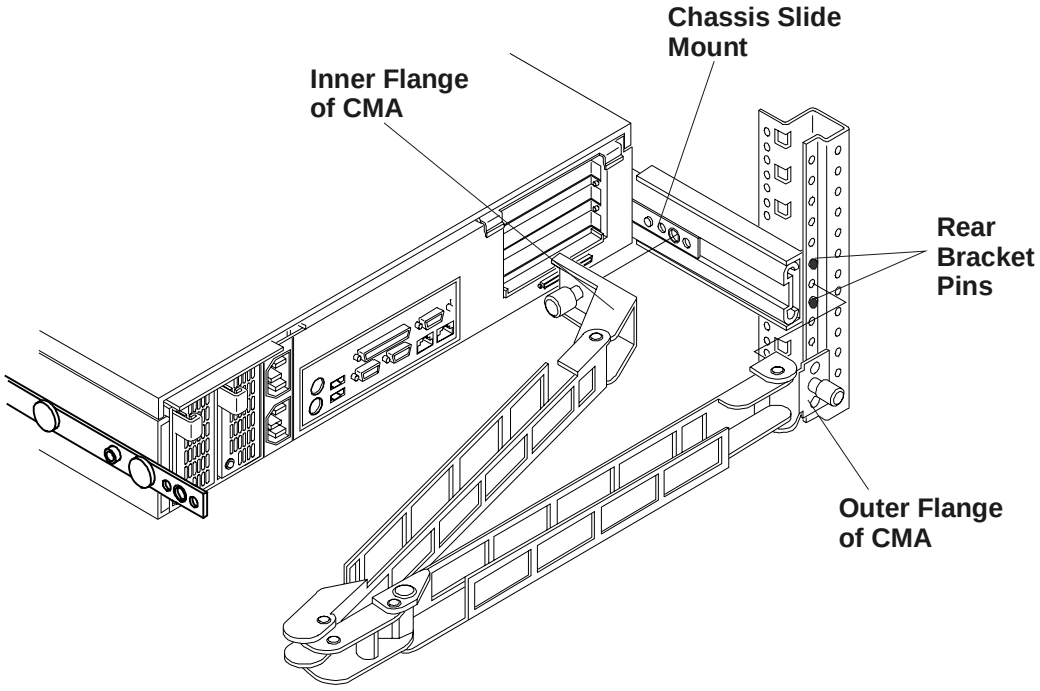


Figure 7-8. Attaching the Cable Management Arm (CMA)

3. Attach the Cable Management Arm to the HP Netserver:
   a. Insert the thumbscrew on the inner flange of the Cable Management Arm into the hole in the chassis slide mount.
   b. Tighten the thumbscrew to secure the Cable Management Arm. See Figure 7-8.
4. Extend the HP Netserver out of the rack to ensure the Cable Management Arm moves with the chassis without binding.
5. Dress the cables in the Cable Management Arm, and then slide the HP Netserver into the rack to verify that the cables do not bind in the tray.

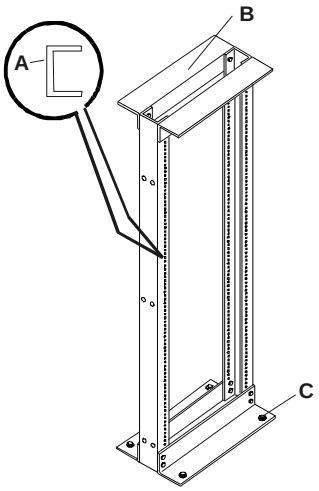
8 Rack Mounting the HP Netserver (2-Post)

Introduction

This chapter provides instructions for mounting the HP Netserver in a two-post non-HP rack. The illustration below shows the characteristics of the 2-post (CPI – Chatsworth Products Inc.) rack.

If you have the 4-post HP System/E or System/U rack, or a third-party 4-post rack, see Chapter 7, "Rack Mounting the HP Netserver (4-Post)," for instructions. If you have the older 4-post HP systems rack, see Chapter 13, "Alternative Rack Mounting." If you want to install the HP Netserver in a third-party rack not covered in this guide, you may find relevant documentation on HP's web site at the following URL:

`http://www.hp.com/netserver/support`



Characteristics of 2-Post Rack:

A. U-shaped column for easy access

B. Top is secured to ceiling to hold additional weight.

C. Base is bolted to floor.

Figure 8-1. Features of 2-Post Rack

The HP Netserver LP 2000r rack mount kit requires two EIA units of space in the rack. Before mounting the Netserver, plan the Netserver's location in the rack relative to other rack components. Proper placement is vital both for safety and

operating efficiency. For more information, see “Rack Configuration Tools” later in this chapter.

Tools Required

You will need the following tools to install the HP Netserver in a 2-post rack:

- Standard Phillips screwdriver
- Marking pen or masking tape

HP Netserver Rack Mount Parts List

Ensure the rack-mounting kit provided with the HP Netserver contains the following parts:

Table 8-1. Parts for Rack Mount Kit

Quantity	Description
2	Flush mount brackets (one left and one right side)
2	Center mount brackets (one left and one right side)
8	Screws for Brackets (standard Phillips)

Rack Configuration Tools

The HP rack configuration tools, including white papers, are on HP's web site at the following URL:

`http://www.hp.com/netserver`

At the Web site, search for the following:

- Configuration tools
- High density rack solutions
- Rack Assistant, Rack Configuration
- Order Assistant
- *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)*

You can read about the tools or download copies for installation. These tools can be used to plan a rack configuration for the components in your system.

The white papers, particularly the *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r),* provide rack information for HP Netservers

in high-density racks and additional information for rack systems not listed in this manual. You will need this information to complete a rack system installation.

Safety Precautions

Always keep the following safety and environmental issues in mind, especially if you install the HP Netserver in a non-HP rack environment:

- **Optimum Operating Environment -** The optimum operating conditions for the HP Netserver is in an environmental controlled computer room with a temperature range of 20 to 22°C (68 to 72°F) at 40 to 60% relative humidity.
- **Maximum Ambient Temperature -** Ensure the maximum ambient temperature does not exceed 35°C (95° F).
- **Elevated Operating Ambient Temperature -** The ambient operating temperature within a multi-unit rack assembly is likely to exceed the room's ambient temperature. Ensure the temperature around the rack itself does not exceed 35°C (95°F).
- **Reduced Air Flow -** As you mount equipment in the rack, ensure you allow enough air flow for safe operation of the equipment. The HP Netserver's fans will only operate correctly if both front and rear of the rack allow free air flow.
- **Mechanical Loading -** Uneven mechanical loading within the rack can cause hazardous conditions. To prevent this in your installation plans, place the heaviest components in the bottom of the rack, mounting all components as low in the rack as is practical.
- **Circuit Overloading -** Ensure the total configuration of equipment in the rack does not overload the supply circuit. To this end, check the nameplate ratings on all equipment. Consider the effect of circuit overloading on overcurrent protection and supply wiring.
- **Reliable Earth Grounding –** Ensure rack-mounted equipment is reliably grounded. Give particular attention to supply connections that are not direct connections to the branch circuit (for example, use of non-HP power strips).

Marking the Columns

To make it easier to mount the HP Netserver in the rack, you may want to mark the column holes that will be used by the Netserver. The Netserver may be mounted using either flush-mount or center-mount brackets that attach to the front side of the two columns. Use a marking pen or masking tape to mark the columns.

Use the *HP Rack Configuration Tools* to determine where in the rack to mount the HP Netserver. The tools are available at:

`http://www.hp.com/netserver/support`

1. Use the marking pen or masking tape to mark the server position on the front of both columns. See Figure 8-2.

   The two brackets are mounted at the 1st and 5th holes on the columns, relative to the bottom of the HP Netserver.

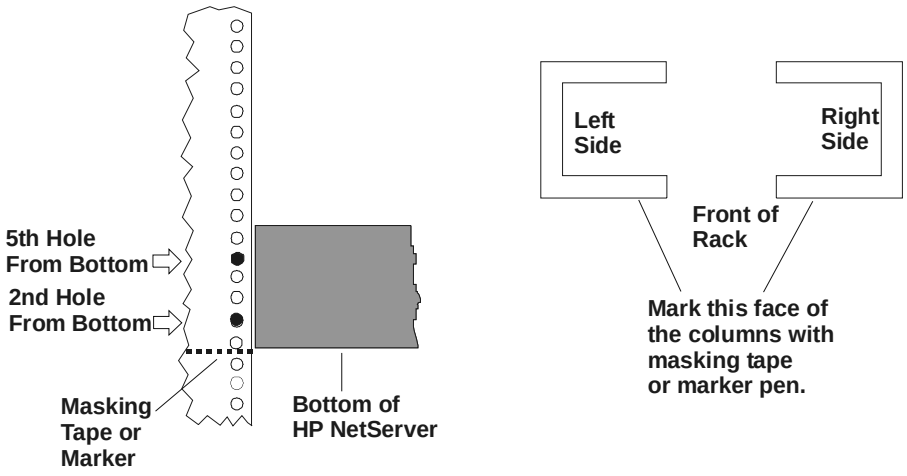


Figure 8-2. Location Marks on the Rack's Front Columns

Preparing the HP Netserver

Before the HP Netserver can be mounted in the rack, you need to remove the factory-installed chassis slides from the Netserver and install the flush-mount or center-mount brackets.

1. Lay the HP Netserver on a flat surface.
2. Remove the slides from the sides of the chassis. See Figure 8-3.

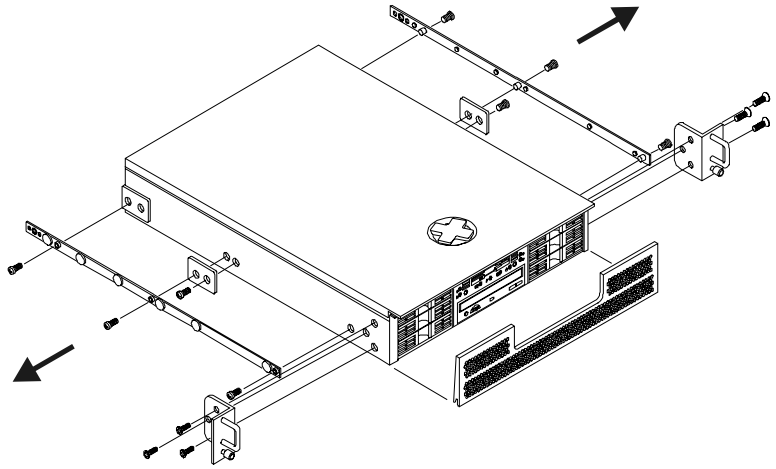


Figure 8-3. Removing Existing Hardware

3. If you are center-mounting the HP Netserver, remove the center spacers (attached to the chassis under the slides). See Figure 8-3.
4. If you are flush-mounting the HP Netserver, remove front bezel and the front brackets. See Figure 8-3.

   Do not remove the front brackets if you are center-mounting the HP Netserver. In this case, the front brackets are needed to attach the bezel.
5. Attach the appropriate mounting brackets to the chassis, using the four screws provided for each bracket:

   ◊ *If you are flush-mounting the HP Netserver,* attach the two flush-mount brackets, as shown in Figure 8-4.

   ◊ *If you are center-mounting the HP Netserver,* attach the two center-mount brackets, as shown in Figure 8-5.

   NOTE The flush-mount brackets have pins for connecting the front bezel; the center-mount brackets do not have pins.

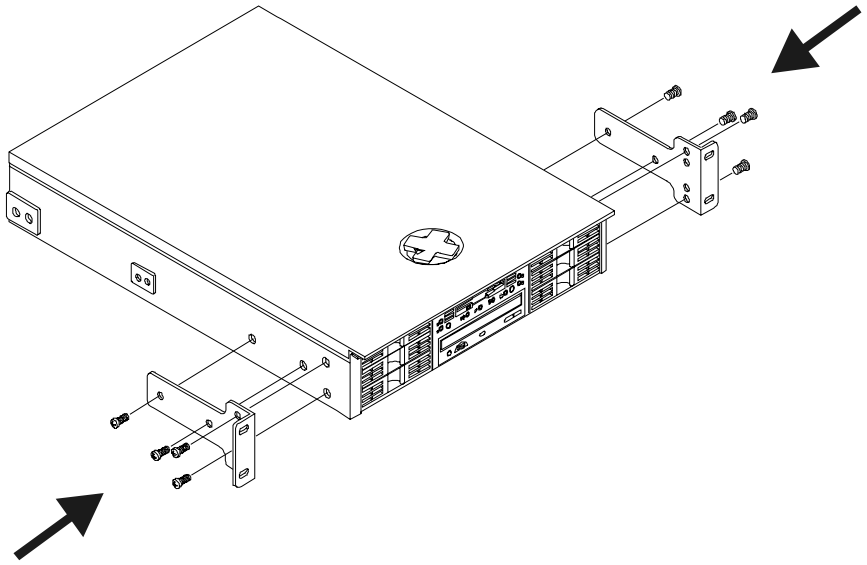


Figure 8-4. Attaching Flush-Mount Brackets

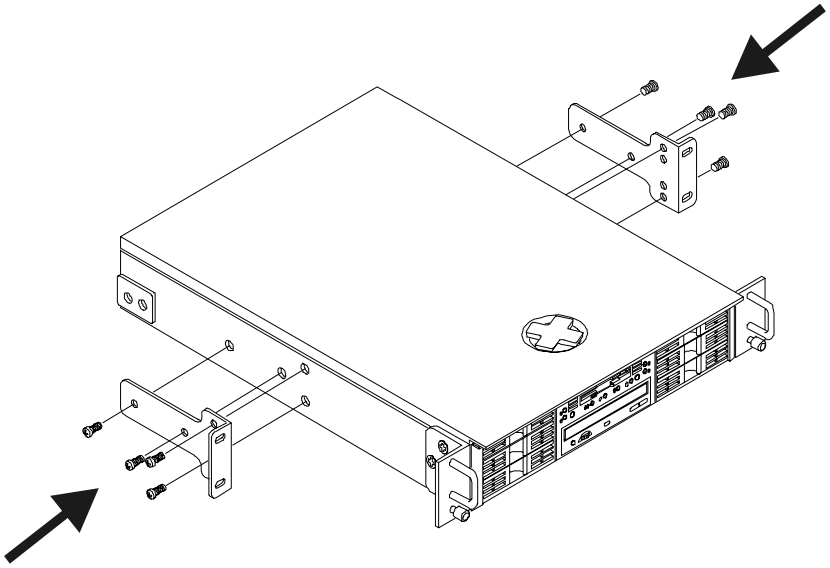


Figure 8-5. Attaching Center-Mount Brackets

Mounting the HP Netserver in the Rack

Follow these steps to mount the HP Netserver in the rack and secure it in place. Once that is done, you can connect the front bezel to the Netserver chassis and attach cables.

NOTE If other rack components are to be mounted in the rack below the HP Netserver, install them before mounting the Netserver.

WARNING The HP Netserver LP 2000r weighs 38 lbs. (17.3 kg.) fully loaded. To prevent an accident, use two people when placing the Netserver into the rack.

1. With the help of at least one other person, lift the HP Netserver off the table or pallet.
2. Position the mounting brackets over the holes (2nd & 5th) that you have marked on the face of the two columns.
3. Insert a screw through the bottom hole on each bracket and tighten the screws sufficiently to hold the HP Netserver in place while you insert and tighten the remaining screws. See Figure 8-6 or Figure 8-7.

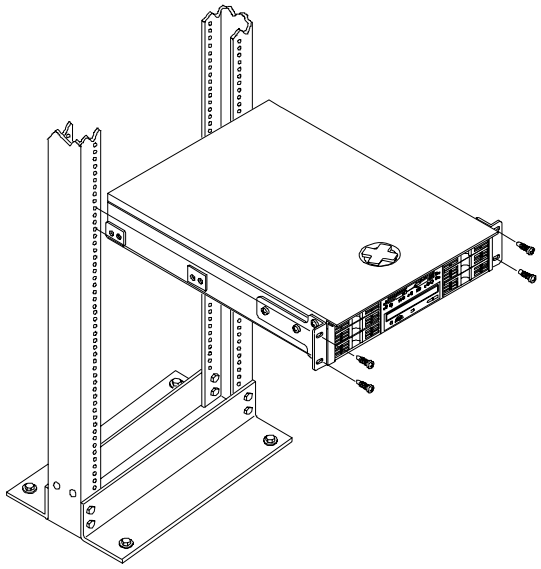


Figure 8-6. Flush Mounting the HP Netserver

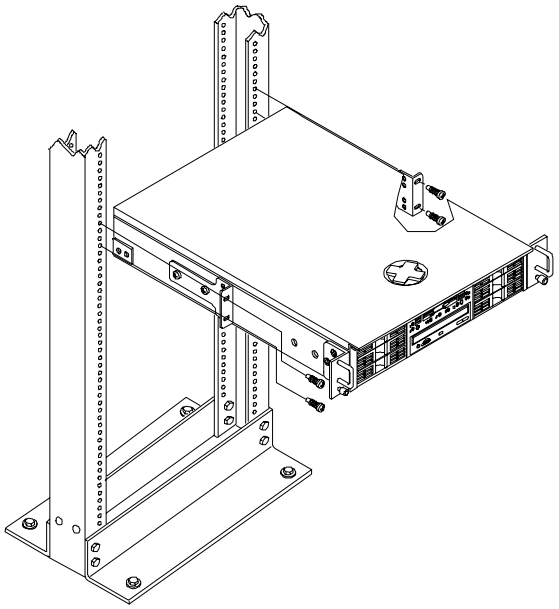


Figure 8-7. Center Mounting the HP Netserver

Attaching the Front Bezel

The bezel attaches to the brackets on the front of the HP Netserver.

1. Hook the bottom edge of the bezel onto the pins on the brackets. See Figure 8-8 (figure shows flush-mount brackets).
2. Close the bezel and press the top corners to snap it into place.

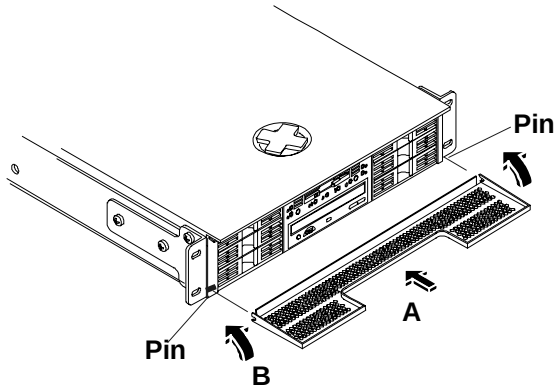


Figure 8-8. Attaching the Front Bezel

Cabling Rack Components

After installing the HP Netserver in the rack, refer to the white paper entitled *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)* to cable the Netserver in the rack enclosure. The white paper is available on HP's web site at the following URL:

`http://www.hp.com/netserver/support`

9 Connecting the Monitor, Keyboard, Mouse, and Power Supplies

Introduction

Use the procedures in this chapter to connect the peripheral devices to the HP Netserver LP 2000r, and install or remove the power supply module.

Connecting the Monitor, Keyboard and Mouse

1. Connect the monitor, keyboard, and mouse to the HP Netserver LP 2000r using the connections provided on the rear of the chassis. See Figure 9-1.

   The two USB connectors are reserved for peripherals other than the keyboard or mouse.

   If you have a console switch box, refer to the switch box user guide for instructions on connecting the keyboard, mouse, and monitor.

2. If a LAN cable is provided, you may connect it now or wait until you have verified the HP Netserver's operation.

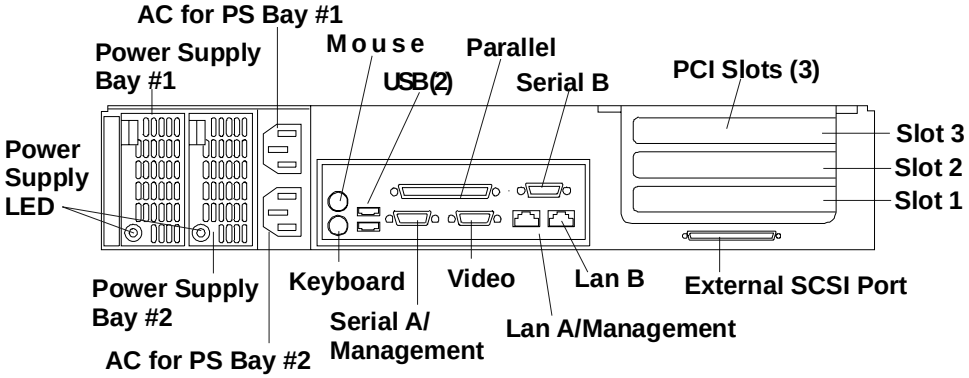


Figure 9-1. Rear Panel Ports

CAUTION	The Keyboard and Mouse PS/2 ports cannot be used interchangeably. Plugging the keyboard into the Mouse port (or the mouse into the Keyboard port) produces an error message and causes the system to stop the boot process.

Installing a Power Supply Module

The HP Netserver LP 2000r comes with one power supply module. A second power supply module for redundancy is optional. If only one power supply module is used, it must be installed in power supply bay 2, and a power supply filler panel must be installed in the empty bay 1. Each power supply has its own power cord (see Figure 9-2).

CAUTION	Operating the HP Netserver without a power supply filler panel in an empty power supply bay could cause excessive EMI or thermal damage to the Netserver.

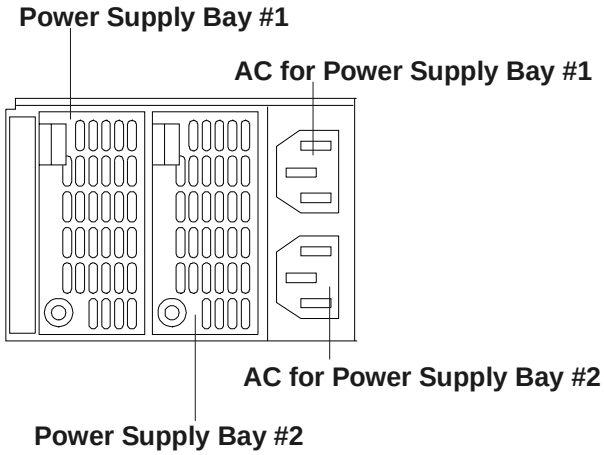


Figure 9-2. Power Supply Connectors

1. Remove the power supply filler panel from the empty power supply bay:
   a. Pinch the release lever on the filler panel and pull the lever down.
   b. Slide the filler panel out of the power bay. See Figure 9-3.

      Save the power supply filler panel for future use. The filler panel must be used in the empty power supply bay whenever you operate the HP Netserver with a single power supply module.

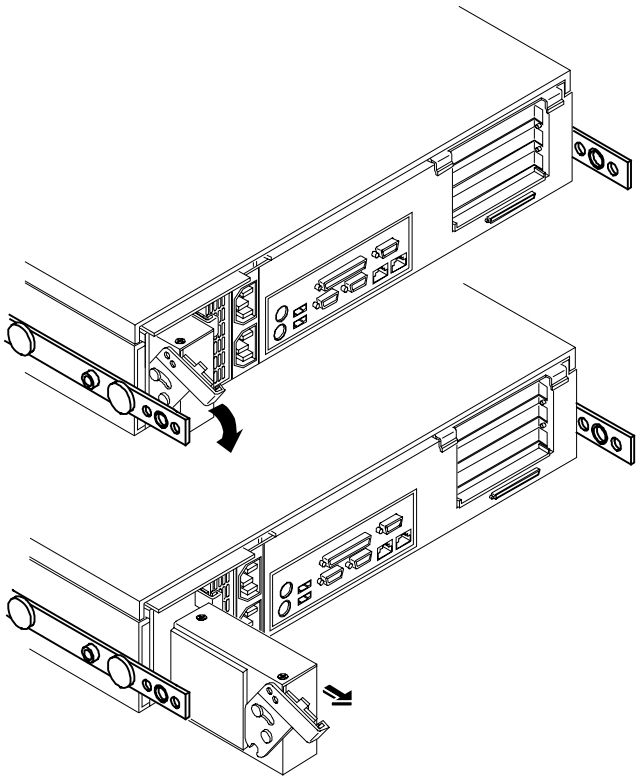


Figure 9-3. Removing the Power Supply Filler Panel

2. Before installing the new power supply module, pinch the release and pull it down. See Figure 9-4.

NOTE	The release lever on the power supply module must be in the down position in order to install the module.

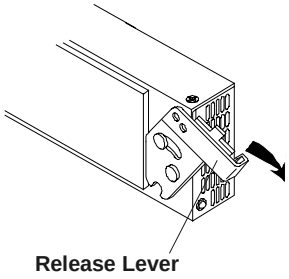


Figure 9-4. Moving Release Lever Down

3. Slide the module into the power bay and press the release lever in until it clicks into place. See Figure 9-5.

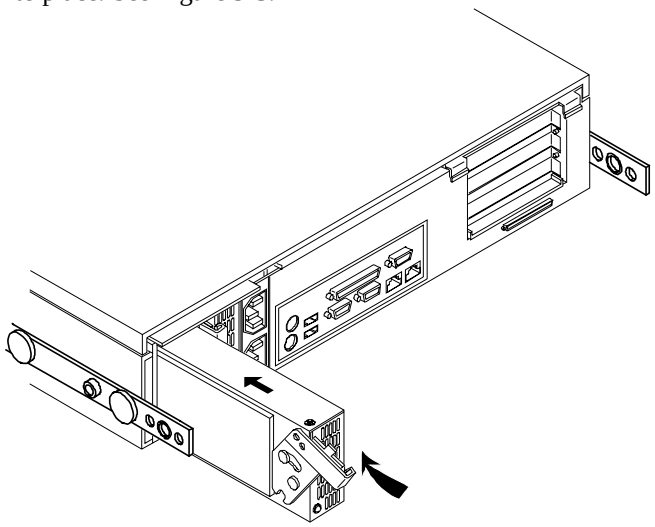


Figure 9-5. Installing a Power Supply Module

4. Plug in the power cord for the power supply module. See Figure 9-2.

Removing a Power Supply Module

If only one power supply module is used, it must be installed in power supply bay 2, and a power supply filler panel must be inserted in the empty bay 1.

CAUTION	Operating the HP Netserver without a power supply filler panel in an empty power supply bay could cause excessive EMI or thermal damage to the Netserver.

1. Pinch the release lever on the power supply module and pull on the lever to slide module out of the power bay. See Figure 9-6.

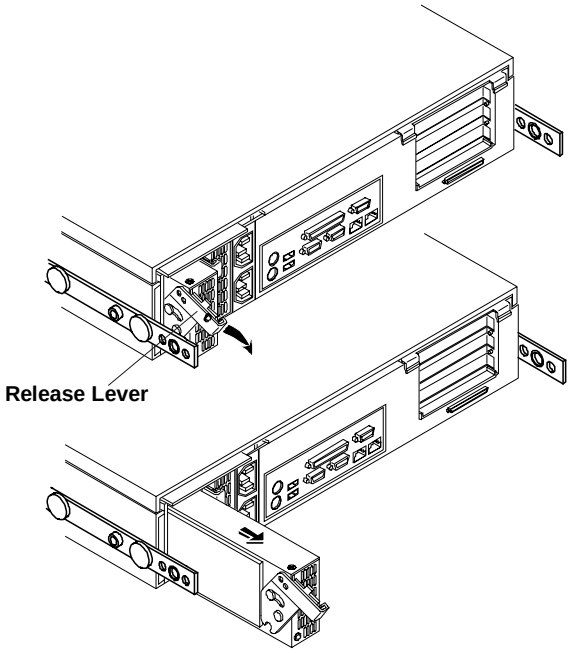


Figure 9-6. Removing a Power Supply Module

2. If you are not replacing the power supply module, insert the power supply filler panel into the empty power supply bay:
   a. Pinch the release lever on the filler panel and pull the lever down.
   b. Slide the filler panel into the power bay. See Figure 9-7.
   c. Press the release lever in until it clicks into place.

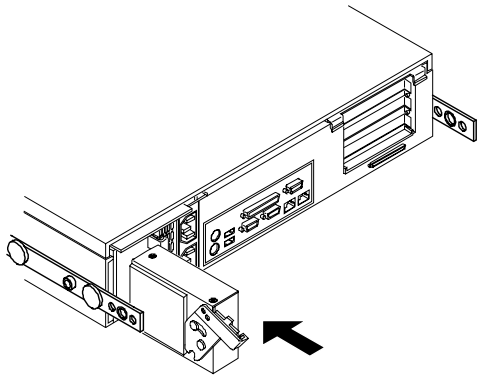


Figure 9-7. Inserting the Power Supply Filler Panel

Connecting the Uninterruptible Power Supply

1. If you have an Uninterruptible Power Supply (UPS) installed in the rack, turn it on.
2. Connect the serial cable between the UPS and the HP Netserver.

   Refer to the user guide included with the UPS for additional information.

   The HP Netserver LP 2000r performs a diagnostic test when the power switch is turned on. If an error condition occurs, refer to Chapter 12, "Troubleshooting."

10 Configuring the HP Netserver

Introduction

This chapter describes how to configure the HP Netserver LP 2000r with the help of the *HP Netserver Navigator CD-ROM*, which is shipped with your Netserver. This CD-ROM also provides the latest information concerning your Netserver.

As you configure the Netserver, it's important to have the very latest configuration information. The CD-ROM will inform you of any applicable compatibility issues, and provide you with a current list of HP-tested peripherals and accessories. Refer to the "Tested Products List" on the *HP Netserver Navigator CD-ROM* or on the HP web site at:

`http://www.hp.com/netserver/`

You should also be familiar with HP DiagTools (on the *HP Netserver Navigator CD-ROM*) and the *HP Netserver Online Documentation CD-ROM* to help you configure the Netserver.

HP Netserver Navigator CD-ROM

The *HP Netserver Navigator CD-ROM* provides you with two modes for running the CD-ROM and accessing its configuration utilities and resource information.

- **Setup mode:** insert the Navigator CD-ROM in your HP Netserver and boot from it. Use the Navigator interface to configure your system, view important information, and obtain drivers and utilities to setup your HP Netserver through the installation of the Network Operating System (NOS).
- **Resource mode:** insert the Navigator CD-ROM in a Microsoft Windows PC. The CD will autorun to display the Navigator interface. Use the Navigator interface to view online information resources and obtain drivers and software utilities.

Contents of the HP Netserver Navigator CD-ROM

The Main Menu of the Navigator CD directs you to modules where you can perform the required configuration tasks, or access the utilities used in the configuration process. These tasks include:

- Configuring the Netserver hardware (Setup mode only)
- Preparing the Netserver for NOS installation (Setup mode only)
- Viewing information about the Netserver (such as Readme file, Configuration Advisories, Tested Products List)
- Obtaining software and drivers for the Netserver

Before the HP Navigator Main Menu is displayed initially, you may be prompted to set the language, time, date and select an Network Operating System (NOS) to be used throughout the session.

If you have questions about the how to use the Navigator CD, refer to the instructions provided with the Navigator CD-ROM or the Help menu.

Obtaining HP Netserver Navigator Release History

The release history (archive) of the *HP Netserver Navigator CD-ROM* provides you with a list in numerical order of the firmware upgrades and software drivers for the HP Netserver. The release history is updated in the archive for each new release of the *HP Netserver Navigator* CD-ROM. The most current Status Report provides the latest information for your particular HP Netserver. To ensure you have the latest versions of the HP Netserver Navigator software, obtain the current *HP Netserver Navigator CD-ROM* release history in the archive.

The following items are contained in the Status Report for each CD-ROM release:

- Version number (HP Netserver model specific)
- HP models supported
- Release date
- Document Number
- Part number of the HP Navigator CD-ROM
- Major changes to the HP Navigator CD-ROM made for a specific release

  The Status Report for your specific *HP Netserver Navigator CD-ROM* describes in detail any software updates between this version of the CD-ROM and the previous version.

Status Report Identification

You must compare the Document Number on your *HP Netserver Navigator CD* with the most current Status Report's Document Number for your HP Netserver model.

- Each version of the *HP Netserver Navigator CD-ROM* has a four-digit Document Number, such as 77xx, corresponding to a Status Report, printed on the disk.
- Each Status Report has a different Document Number.

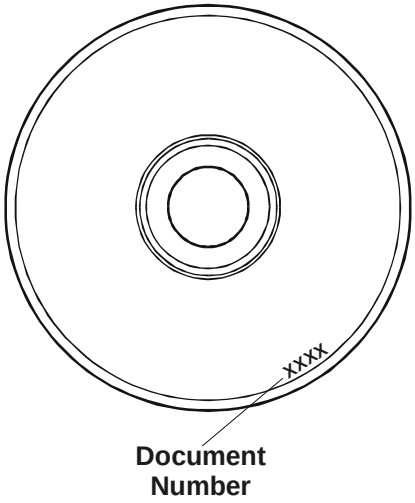


Figure 10-1. Location of Document Number on Navigator CD

You can obtain the release history (archive) and Status Report for your CD-ROM in one of these ways:

- Internet WWW-- **`http://netserver.hp.com/Netserver/support/`**
- Internet FTP--**`ftp://ftp.hp.com/pub/servers`**

Once on the web site, select from the following items:

1. Under Support Offerings and Support Categories, click on HP Netserver Navigator CD.

   HP Netserver Navigator CD >> Latest information for your HP Netserver

2. Click on CD Status Report to view the latest information or the CD Archive to view the release history.

   Netserver Navigator CD Status Report >> Ensures the latest documentation for your HP Netserver

   Netserver Navigator CD Archive >> HP Netserver Navigator CD Status reports are arranged with the most recent archived version first

3. Click on the Document ID number to view the latest Status Report (Release Notes).

HP Management Solutions

HP Management Solutions is a comprehensive suite of utilities, applications, and built-in features to manage Netservers locally or from remote locations. If you are unfamiliar with these products or concepts,

- Go to the Management Web site on the HP Web Site at:

  `http://www.hp.com/go/netserver_mgmt`

  to view information on HP TopTools and all Netserver management options for your HP Netserver.

The following management options, briefly described here, are available for the HP Netserver LP 2000r. Read the *HP Netserver Server Management Reference Guide* included with your Netserver for more information. This guide covers TopTools and all Netserver management utilities and options for the Netserver.

- HP TopTools Software – This is the HP browser-based management software that provides remote administration and monitoring of critical Netserver components.
- HP TopTools Remote Control Card – This is an accessory PCI board that provides a connection for remote LAN or modem-based server management software (HP TopTools) when installed into the Netserver.
- Integrated Remote Assistant – This is an embedded product called HP Integrated Remote Assistant (also referred to as Integrated RA). Integrated RA combines intelligent hardware and software to provide administrators with instant notification of Netserver operations and events.
- LAN A Power On/Off and Wake-on-LAN (WOL) – These options allow simple remote server power management through the Embedded LAN A port. This feature allows the administrator to remotely power off, on, reset or power cycle the Netserver. To use the AOL2 and WOL options, each

one must be enable in the Netserver's (BIOS) Setup Utility under Embedded LAN Controllers in the LAN A submenu (Configuration > Embedded LAN Controllers > LAN A).

You must also install the Netserver Agent software from the *HP Netserver Navigator CD*, and the AOL2 client software. Refer to the Netserver Alert On LAN 2 User Guide available online on the *HP Netserver Online Documentation CD-ROM* included with your system.

DiagTools

This utility provides an easy-to-use hardware diagnostic for Netserver verification, burn-in, and rapid troubleshooting. It must first be copied to diskettes and then executed from the diskettes.

NOTE	HP recommends using the HP DiagTools utility to verify all Netserver functions are operating correctly, after completing all the configuration topics. The HP DiagTools utility also generates a text file containing the hardware detected and the DiagTools test results. This text file, called a support ticket, should be saved to a diskette and used for future reference, especially by your support provider.

Setup (BIOS) Utility

The HP Netserver (BIOS) Setup Utility is used to configure the following Netserver options:

- User Preferences
- Security
- Configuration
- Exit

Accessing the Setup Utility

The (BIOS) Setup Utility menu offers the choices listed above, and the corresponding items are described in the topics below.

1. Turn on the monitor and the HP Netserver.
2. Start the Setup Utility by pressing the [F2] key, when the following message appears on the boot screen.

   ```
   Press <F2> to enter SETUP
   ```

Menu Bar

The Setup Utility provides a menu bar with several menu selections. The menu bar choices are:

- **User Preferences** - Use this menu option to set the Netserver time, date and keyboard functions.
- **Security** - Use this menu option to set Power-on password protections and hardware security options. Two choices are available under Security:
  - ◊ Power-On Password - Use this option to set the power-on password, which will require a password to enter the Setup Utility or complete the boot process.
  - ◊ Hardware Security - Use the options under this head to enable or disable writing to flexible disk connected to the embedded controller. Also found here are switches for allowing booting from the flexible disk drive, hard disk drive, and CD-ROM.
- **Configuration** - Use this menu option to configure I/O ports, I/O addressing, interrupts, PCI slot masters, IRQ interrupt locking, and boot device ordering. These menu selections also provide access to enable/ disable specific options or features, such as the LAN Power On/Off.
  - ◊ Integrated I/O Port - Configure ports for serial and parallel, assign base addresses and interrupts, pointing devices (mouse), and console redirection for remote control.
  - ◊ Flexible Disk Drive - Enable or disable the flexible disk drive controller.
  - ◊ CPU and Memory - Enable or disable memory cache, memory hole, and processor serial number.
  - ◊ IDE Devices - Set primary master/slave, secondary master/slave relationships on IDE devices, and set the local bus IDE adapter.
  - ◊ PCI Slot Devices - Set a PCI slot as master and PCI IRQ locking. The BIOS warns of conflicts.
  - ◊ Embedded LAN Controllers - Enable or disable the embedded LAN controllers and the available features. The LAN Power On/Off and Wake-on-LAN features are enabled/disabled under the embedded LAN A submenu.
  - ◊ Boot Device Ordering - Set the boot order, including bootable boards.

- **Exit** – Exit the Setup Utility by saving changes or exit without saving changes, which reverts to previous settings. When you exit, the HP Netserver reboots.

Using the Setup Screens

Online help explains the settings displayed on the Setup Utility screens. Instructions are also provided for navigating between the screens and entering or changing the setup data.

- Press the right-arrow and left-arrow keys to move between selections on the menu bar. The menu bar is present at the top of the main selections.
- Press the up-arrow and down-arrow keys to move between fields on each screen. The currently-selected field will be highlighted.
- Certain fields ask you to choose from a list of entries. In such cases, press the plus (+) or minus (-) keys repeatedly to display each possible entry, or the **Enter** (or **Return**) key to choose from a pop-up menu.
- Small arrow points (➢) precede some field names. This means the field is actually a submenu. To visit the submenu, select it with the arrow keys and press the **Enter** key. The submenu then appears in place of the current screen.
- The **Esc** key is the exit key. If you press the **Esc** key on one of the top-level screens, the Exit menu appears. If you press **Esc** on a submenu, the previous screen appears. When you are making selections from a pop-up menu, use the **Esc** key to close the pop-up without making a selection.

Changing the System Date and Time

Use this topic to change the HP Netserver's date and time and refer to the following procedure.

1. To reach the Setup Utility, boot or reboot the system and press **F2** when prompted.
2. If necessary, use the left-arrow key to select **User Preferences** from the menu bar at the top of the screen.

   Once in the Setup Utility, the menu bar appears at the top of the screen with " User Preferences, Security, Configuration, and Exit" shown. The User Preferences menu is the default menu and should be the highlighted selection at the left of the menu bar when the Setup Utility first opens.

3. If necessary, use the up-arrow key to move to the **System Time** field.

   The "System Time" field is highlighted by default when the "User Preferences" menu is selected. This field actually consists of three sub-fields enclosed in brackets [xx:xx:xx]: hours to the left (24-hour clock), minutes in the middle, and seconds to the right.

4. Type in the hour and press **Enter** to move to the minutes field.
5. Then type in the minutes and press **Enter** again to move to the seconds field.
6. Type in the seconds and press **Enter,** then use the arrow keys to leave this field.
7. Scroll to **System Date** field to enter the system date in the field.

   The dates are entered in the "System Date" field in the same way as the time is entered in the "System Time" field. This field also has three separate sub-fields for month, day, and year enclosed in brackets [xx/xx/xxxx].

8. Type in the month and press **Enter** to move to the day field.
9. Then type in the day and press **Enter** again to move to the year field.
10. Type in the year and press **Enter**, and then use the arrow keys to leave this field.

    Ensure you enter all four digits for the year.

11. Use the right-arrow or left-arrow key to select the **Exit** menu.
12. Choose **Exit Saving Changes** from the list of exit options, then press **Enter**.

    A dialog appears and asks you to confirm your decision.

13. Choose **Yes** and then press **Enter**.

    Then the HP Netserver reboots.

Setting the HP Netserver's Power-On Passwords

Use this topic to set a password to boot the HP Netserver.

To configure the HP Netserver for a password, which will require a password on boot-up, refer to the following procedure.

1. If not already in the Setup Utility, boot or reboot the system and press **F2** when prompted.

2. Use the right-arrow or left-arrow key to select **Security** from the menu bar.

   As soon as it is selected, the selections for the Security menu appear as shown below.

   ➢**Power-On Password**

   ➢**Hardware Security**

   The arrowhead ➢ indicates there is a submenu to select from.

3. If necessary, use the arrow key to move to the **Power-On Password** menu selection and press **Enter**.

   The Power-On Password is highlighted by default when the Security menu is selected.

   The first line in the menu is, "Power-on password is [Set or Not Set]"

   ◊ If no password has been set, then "Not Set" will appear in the field. If this is the case, then you can boot the Netserver without a password.

   The Power-on password controls access to the Setup Utility and its settings, but will not be in effect until you reboot the Netserver.

   ◊ If "Set" is in the field, then you can change the password or remove the password, if you know the existing password. If you do not know the existing password, then refer to "Resetting a Lost Password" in Chapter 12, "Troubleshooting."

NOTE	You must set the Power-on Password to configure the HP Netserver to boot with a password.

4. Press the **Enter** key to enter a new password or change the old one.

   A pop-up menu appears titled, "Set Power-On Password." If no password has been entered, the field "Enter new password: [ ]" is highlighted. If a previous password has been entered, the field "Enter old password: [ ]" is highlighted.

NOTE	To leave the pop-up menu without entering a password, press the **Esc** key at any time.

5. Enter the password (new or old) in the appropriate field and press **Enter.**

   The password is accepted and the next field just below it, "Re-enter new password: [ ]" or "Enter new password: [ ]" field is highlighted. For security reasons, the password does not appear on the screen.

6. Enter the new password in the "Enter new password: [ ]" field.

NOTE	Entering nothing in the "Enter new password" field followed by entering nothing in the "Re-enter new password" field will turn off the password setting, changing it to "Not Set."

7. Enter the new password again in the "Re-enter new password: [ ]" field.

   The "Power-on Password is" field changes to "Set" and on the next boot the HP Netserver will requests a password to access the Setup Utility and complete the boot process.

8. Press **Esc** to exit the menu and scroll to Exit to exit and save changes.

   The Netserver will reboot and you will be required to use your new password to enter the Setup Utility or complete the boot process. If you forget your password, refer to "Resetting a Lost Password" in Chapter 12, "Troubleshooting."

SCSI Configuration Utility

The HP Netserver uses the Symbios SCSI Configuration Utility to verify or modify the embedded SCSI controller settings for the devices connected to the two SCSI channel connectors on the system board. If you need to verify or modify SCSI host adapter settings, or if you need to low-level format SCSI disks or verify SCSI disk media, run the Symbios Configuration utility.

NOTE	You typically would not need to use this utility unless you are an experienced administrator or requested to do so by a support provider.

During the boot process the message "SCSI BIOS successfully loaded" will appear if there are devices connected to the SCSI controller. The SCSI controller can provide the bus, device, and channel configurations when active on screen.

To access the Symbios SCSI Configuration Utility, refer to the following instructions.

1. Reboot the HP Netserver.

   If you are already in the boot process, you should see the following message appear.

   ```
   Press <Ctrl C> to start Symbios Configuration
   Utility...
   ```

2. Press <Ctrl>+<C> keys to enter the utility.
3. Use the arrow keys to move the cursor, press **Enter** to select an option, and press **Esc** to exit.
4. To change adapter settings:
   - ◊ Select an adapter from the list in the main menu.
   - ◊ Select **Adapter Setup**.

     This option configures the SCSI ID setting and other advanced adapter settings.
5. To format a hard disk or change hard disk parameters:
   - ◊ Select an adapter from the list in the main menu.
   - ◊ Select **Device Selections**.
   - ◊ Select the hard disk to format.
   - ◊ Select **Format** menu option.

CAUTION	Low-level formatting of a SCSI disk drive will destroy all of its data.

11 HP Netserver Online Documentation CD-ROM

Overview

The *HP Netserver Online Documentation CD-ROM* contains the entire set of documentation for your HP Netserver LP 2000r. The *Online Documentation CD* provides a web-based interface that allows you to quickly locate information, including:

- Complete documentation of your HP Netserver and accessories
- Important information on installing your NOS
- Error message and beep code descriptions
- Available diagnostics and servicing information
- Parts lists
- Available management software options and documentation

Using the Online Documentation CD

The *HP Netserver Online Documentation CD-ROM* contains all your system documentation online. To use this CD you must have a browser (either Microsoft Internet Explorer 4.x (or greater), or Netscape Navigator version 4.x (or greater)) and the Adobe Acrobat Reader version 3.x or greater.

The CD may be accessed in one of the following ways:

- The CD will start automatically when inserted into a PC running Microsoft Windows 95, 98 or NT 4.0.
- Or, point your browser to **index.htm** under the **start** directory of the CD-ROM.

12 Troubleshooting

Introduction

If you are having problems installing your HP Netserver, there are a number of tools available for troubleshooting, including the information provided in this chapter.

- *HP Netserver Online Documentation CD-ROM* contains the following information in the *HP Netserver LP 2000r Service Manual*:
  - ◊ Troubleshooting Information
  - ◊ Parts Information
  - ◊ List of Error Messages
  - ◊ List of Beep Error Messages
- Navigator CD-ROM provides several utilities for troubleshooting purposes.

  At the Main Menu, select "Troubleshooting" to use the following tools:
  - ◊ Diskette Library - A collection of diskette images representing drivers, utilities and BIOS updates, which enables you to conveniently generate any flexible diskette available on the *HP Netserver Navigator CD-ROM*. For example, you can create the following diskettes: BIOS Update and NOS Drivers.
  - ◊ HP DiagTools Utility - An easy-to-use hardware diagnostic for Netserver verification, burn-in, and rapid troubleshooting. Use this icon to copy DiagTools to two (2) flexible diskettes from the *HP Netserver Navigator CD-ROM*, and then execute from the flexible diskette.

Tools Required

Check the documentation provided with the NOS and accessory boards for additional tool requirements.

- ¼-inch flat blade screw driver (for battery replacement)

Common Installation Problems

The following sections contain general procedures to help you locate installation problems. If you need assistance, HP recommends contacting your reseller first. If you need to get assistance from Hewlett-Packard, refer to the Warranty and Support document provided with the Netserver.

WARNING	Before removing the cover, always disconnect the power cord and unplug telephone cables. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

Troubleshooting Sequence

To troubleshoot problems during installation, do the following:

- First, ensure the HP Netserver is configured properly.

  Most Netserver problems are the result of incorrect Netserver and SCSI configurations.

- Verify all cables and boards are securely plugged into the appropriate connectors or slots.

- If it is a network-related error, determine if the Netserver has enough memory and hard disk drive capacity.

  Refer to the network operating system (NOS) manual.

- Remove all added options to ensure you have isolated the problem to basic Netserver or its options.

  Always replace one option, and only one option, at a time.

NOTE	If the Netserver has a large amount of memory installed, it may take 30 seconds for the first screen to display.

Netserver Will Not Power On

Follow these steps if the power/activity light does not light green after you press the power-on button, or the Netserver will not power on properly.

NOTE	If the heatsink is not properly installed on the processor, the processor may overheat, causing intermittent or unreliable operation which may lead to a system crash and permanent damage to the processor.

1. Remove the AC power cord, wait 15 seconds, reconnect the power cord, and try again.
2. Ensure all cables and the power cord are firmly plugged into the proper receptacles.
3. If the Netserver is plugged into a switched multiple-outlet box, ensure the switch on the outlet box is turned on.
4. Plug a different electrical device (such as a printer) into the power outlet, and turn it on to verify if the fault is with the power supply.
5. Verify the power supply is connected to the system board.
6. Verify the front power switch is connected to the system board.

Problems after Netserver is Powered On

If you think it is a hardware error, follow these steps and refer to "Hardware Problems" later in this chapter.

1. Log users off the network and power down the HP Netserver.
2. Remove the Netserver's cover.

WARNING	Before removing the cover, always unplug telephone cables and disconnect the power cord. Unplug telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

3. Simplify the HP Netserver configuration to the required minimum, removing all third-party options.

For example, reduce the Netserver to the monitor, one flexible disk drive, one CD-ROM drive, one SCSI hard disk drive, keyboard, mouse, and one NIC.

4. Power on the Netserver to start the boot process.
5. If the Netserver will not complete the boot process:
   a. Consult the troubleshooting steps in the section "Hardware Problems" later in this chapter.
   b. If you get an error message or beep code refer to the *HP Netserver LP 2000r Service Manual* on the HP Web site at:

      `http://www.hp.com/netserver/`

   c. Clear the CMOS memory and reboot.

      Refer to the following procedure, "Clearing the CMOS Configuration."
6. If you have completed a boot of the Netserver successfully, reinstall the third-party options one at a time, checking the Netserver after installing each option.

Clearing the CMOS Configuration

You may need to clear the CMOS configuration if the configuration has been corrupted, or if incorrect settings made in the Setup Utility have caused error messages to be unreadable.

To clear the configuration:

1. Turn off power to the Netserver and remove the cover.
2. Move switch 4 in the configuration switch on the system board (labeled "Clear CMOS") to the ON position. See Figures 12-1 and 12-2.
3. Turn on power to the Netserver.

   A message displays indicating the configuration has been cleared.
4. Turn off power to the Netserver.
5. Return switch 4 on the system board to the OFF position.
6. Replace the cover.
7. Turn on power to the Netserver and the following message displays:

   ```
   Incorrect System Configuration
   ```
8. Press <F2> to run the Setup Utility when **<F2=Setup>** appears.

9. Make any configuration changes required.
10. Choose the Exit option and save the changes to save the configuration and exit the Setup Utility.

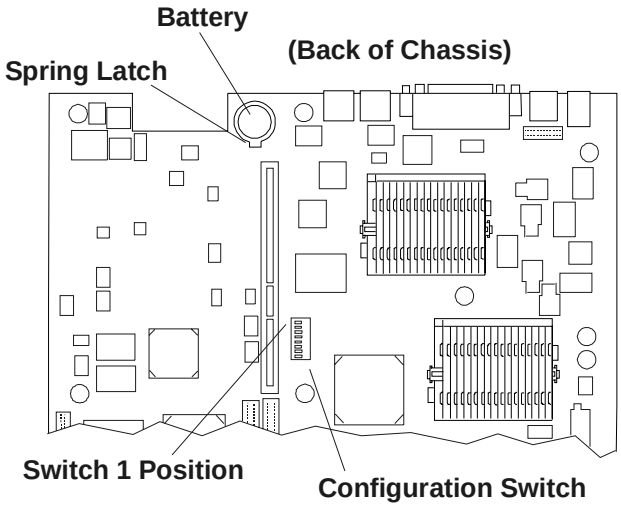


Figure 12-1. Configuration Switch Location

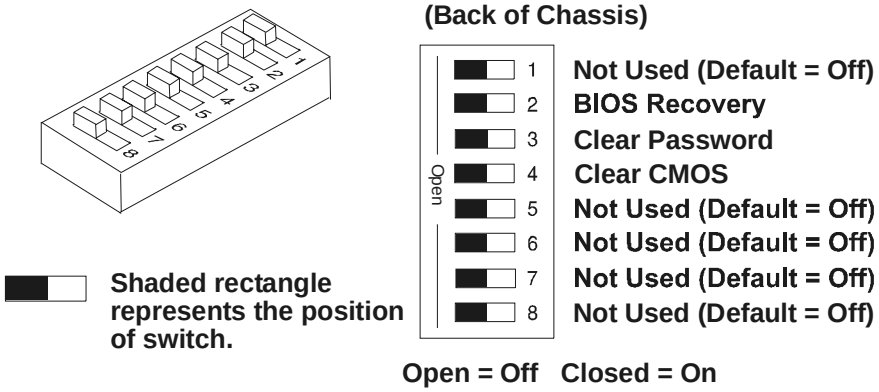


Figure 12-2. Configuration Switch Positions

Resetting a Lost Password

If you have forgotten the Power-on password, you can reset it using the configuration switch on the system board.

NOTE	If you have forgotten the Power-on password, your Netserver will function normally, but you will not be able to access the configuration settings in the Setup Utility or complete the boot process if you reboot the Netserver.

1. Turn off power to the HP Netserver.
2. Remove the cover.
3. Move switch 3 in the configuration switch on the system board (labeled "Clear Password") to the ON position. See Figures 12-1 and 12-2.
4. Turn on power to the Netserver and allow it to complete its startup routine.

   The old password will be erased.
5. Turn off power to the Netserver.
6. Return switch 3 on the system board to the OFF position.
7. Replace the Netserver cover.
8. Turn on power to the Netserver and allow it to begin its startup routine.
9. If you wish to set a password again, press <F2> to start the Setup Utility.
10. Set the new password.
11. Choose the Exit option and save the changes to save the new password.

Hardware Problems

This section describes what to do if you have problems with your monitor, mass storage devices, printer, accessory boards, keyboard, or mouse.

Monitor Does Not Work

NOTE	If the Netserver has a large amount of memory installed, it may take 30 seconds for the first screen to display.

1. If nothing is displayed on the screen, but the Netserver starts and you have verified the keyboard, disk drives, and other peripheral devices are functioning properly:
   - ◊ Verify the monitor is plugged in and power is turned on.
   - ◊ Verify the brightness and contrast controls of the monitor are properly set.
   - ◊ Verify the monitor video cable is securely connected to the Netserver.
   - ◊ Turn off the monitor and Netserver and unplug each one from the power outlet.
   - ◊ Disconnect the video cable from the Netserver and examine the video cable connector pins to see if any are bent.

     If any of the pins are bent, carefully straighten each one.
   - ◊ If you have manually configured any accessories, verify each one does not use the same I/O address as the integrated video interface (03B0h to 03DFh).

     Refer to the documentation supplied with the accessory for more information.
2. If the display image does not align with the screen (usually after you have changed resolutions), use the display's controls to center the image.

   Refer to the monitor manual for information about the controls.
3. If the screens generated by the NOS do not look right, check the operating system manual to find out which video standard is required.

   Also check your monitor manual to find out which refresh rate is required.
4. If the screen goes blank after the NOS has booted, contact your HP support organization.

Keyboard or Mouse Does Not Work

1. Verify the keyboard and mouse are connected to the correct connectors.

   Refer to the I/O panel label on the rear panel of the Netserver.

2. Verify the mouse is correctly defined in the control options of your NOS.
3. Clean the mouse ball and rollers using a lint-free cloth.

CD-ROM Drive Does Not Work

1. Verify a CD is inserted in the drive.
2. Verify the power and data cables are correctly connected to the device.
3. Verify the CD-ROM is configured correctly in the menu located under the Security menu in the Setup Utility.
4. If you intend to boot from the CD, ensure the option is enabled in the Setup Utility.
5. For further information, refer to your CD-ROM documentation.

SCSI Device Does Not Work

If error messages display on the monitor indicating a failure of a SCSI hard disk or tape backup device, perform these checks:

1. Verify the power cable is securely connected to the drive, and the flat cable is securely connected to the drive and to the SCSI connector on the system board.
2. Verify all SCSI devices have unique IDs.
3. Ensure your SCSI device is not terminated.
4. Ensure connector pins are not displaced or distorted.

Replacing a Battery

If your HP Netserver repeatedly loses its configuration or the processor clock stops, you should replace the battery.

WARNING	There is danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn the old battery. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

1. Power down the HP Netserver and unplug power cord.
2. Extend the Netserver out from the rack.
3. Remove the Netserver cover and the air flow guide. Refer to Chapter 2, "Opening and Closing the HP Netserver."
4. Remove the PCI card cage. Refer to Chapter 2.
5. Insert a small flatblade screwdriver or similar tool between the battery and spring latch. See Figure 12-3.
6. Push the spring latch away from battery to release the battery and then remove the battery.

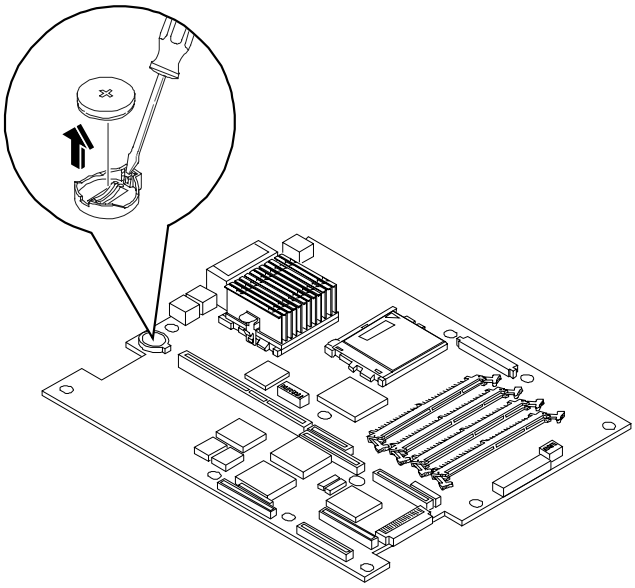


Figure 12-3. Battery on System Board

7. Insert the new battery with the positive sign (+) facing up. Push the battery down into the socket.

   The battery should snap into place. Ensure the spring latch holds the battery firmly.

8. Replace the PCI card cage, processor cooling fan, and cover.
9. Power on the Netserver.
10. Press <F2> to run the Setup Utility and reset the CMOS settings. Refer to “Setup (BIOS) Utility” in Chapter 10, "Configuring the HP Netserver."

Problems Running the Setup Utility

If you cannot run the Setup Utility, the HP Netserver's configuration in CMOS memory may have become corrupt. The only way to recover from a corrupted configuration is to clear it. Refer to "Clearing the CMOS Configuration," earlier in this chapter.

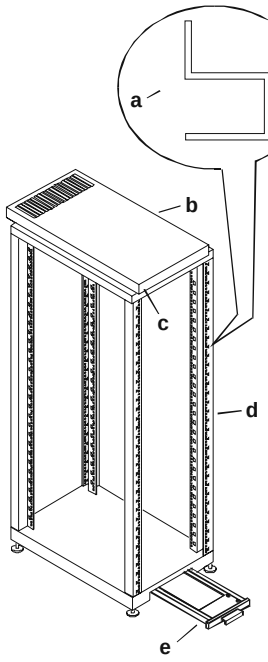
13 Alternative Rack Mounting (4-Post)

Introduction

This chapter provides the instructions for mounting the HP Netserver in an older 4-post HP Systems rack, as shown in Figure 13-1. If you have the newer 4-post HP System/E or System/U rack or a third-party non-threaded 4-post rack, see Chapter 7, "Rack Mounting the HP Netserver (4-Post)." If you are mounting the Netserver in a 2-post non-HP rack, see Chapter 8, "Rack Mounting the HP Netserver (2-Post)," or refer to the documentation in the appropriate rack accessory kit.

If you want to install the HP Netserver in a third-party rack not covered in this guide, you may find relevant information on HP's web site at the following URL:

`http://www.hp.com/netserver/support`



Characteristics of HP System Rack:

a. 3-Cornered Columns
b. Fan-Only Vent
c. "HP Systems" Name Plate
d. EIA Units Marked by Triangles
e. Anti-Tip Foot Extends Out Front Only

Figure 13-1. HP System Rack

The HP Netserver LP 2000r rack mount kit requires two EIA units of space in the rack. Before mounting the Netserver, plan for the Netserver's location in the rack relative to other rack components. Proper placement is vital both for safety and

operating efficiency. For more information, see “Rack Configuration Tools” later in this chapter.

Tools Required

The following tools are required to rack-mount the HP Netserver.

- M10 socket Torx 25 driver
- Marking pen or masking tape (optional for marking the columns)

HP Netserver Rack Mount Parts List

Ensure the rack-mounting kit provided with the HP Netserver contains the following parts:

Table 13-1. Parts for Rack Mount Kit

Quantity	Description
2	Slides
1	Hardware kit for HP System racks

Rack Configuration Tools

The HP rack configuration tools, including white papers, are on HP's web site at the following URL:

`http://www.hp.com/netserver`

At the Web site, search for the following:

- Configuration tools
- High density rack solutions
- Rack Assistant, Rack Configuration
- Order Assistant
- *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)*

You can read about the tools or download copies for installation. These tools can be used to plan a rack configuration for the components in your system.

The white papers, specifically *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r),* provide rack information for HP Netservers in the high density racks and additional information for rack systems not listed in this manual. You will need this information to complete a rack system installation.

Safety Precautions

Always keep the following safety and environmental issues in mind, especially if you install the HP Netserver in a non-HP rack environment:

- **Optimum Operating Environment** – The optimum operating conditions for the HP Netserver is in an environmental controlled computer room with a temperature range of 20 to 22°C (68 to 72°F) at 40 to 60% relative humidity.
- **Maximum Ambient Temperature** – Ensure the maximum ambient temperature does not exceed 35°C (95° F).
- **Elevated Operating Ambient Temperature** – The ambient operating temperature within a closed or multi-unit rack assembly may exceed the room's ambient temperature. Ensure the temperature within the rack itself does not exceed 35°C (95° F).
- **Reduced Air Flow** – As you mount equipment in the rack, ensure you allow enough air flow for safe operation of the equipment. The Netserver's fans will only operate correctly if both front and rear doors of the rack allow free air flow (perforated openings), or are removed.
- **Mechanical Loading** – Uneven mechanical loading within the rack can cause hazardous conditions. To prevent this in your installation plans, place the heaviest components in the bottom of the rack, mounting all components as low in the rack as is practical.
- **Circuit Overloading** – Ensure the total configuration of equipment in the rack does not overload the supply circuit. To this end, check the nameplate ratings on all equipment. Consider the effect of circuit overloading on overcurrent protection and supply wiring.
- **Reliable Earth Grounding** – Ensure rack-mounted equipment is reliably grounded. Give particular attention to supply connections that are not direct connections to the branch circuit (for example, use of non-HP power strips).

Marking the Columns

To make it easier to install the slides in the rack, you may want to mark the columns to indicate the server placement. Use the *HP Rack Configuration Tools* to determine where in the rack to mount the HP Netserver. The tools are available at the following URL:

`http://www.hp.com/netserver/support`

1. Use a marking pen or masking tape to mark the server position on the inside of the front and rear columns, as shown in Figure 13-2.

   The slides will use the second column hole, counting from the base of the HP Netserver.

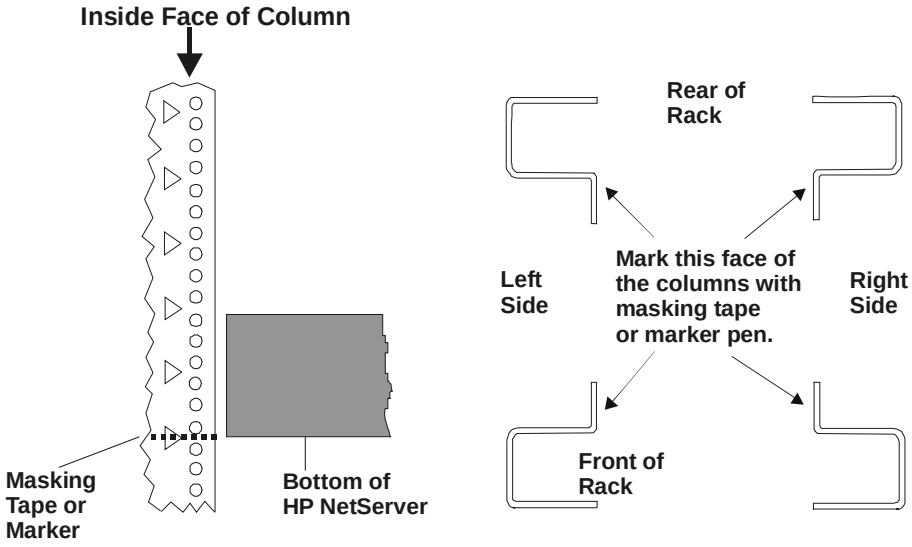


Figure 13-2. Marking Server Placement

Installing the Slides in the Rack

1. Prepare both slides for installation:

   a. Remove the spring from the slide's rear bracket. See Figure 13-3.

   b. Remove the nuts holding the front and rear slide brackets and remove the brackets from the slides.

      Save the nuts. You will use them in Step 3.

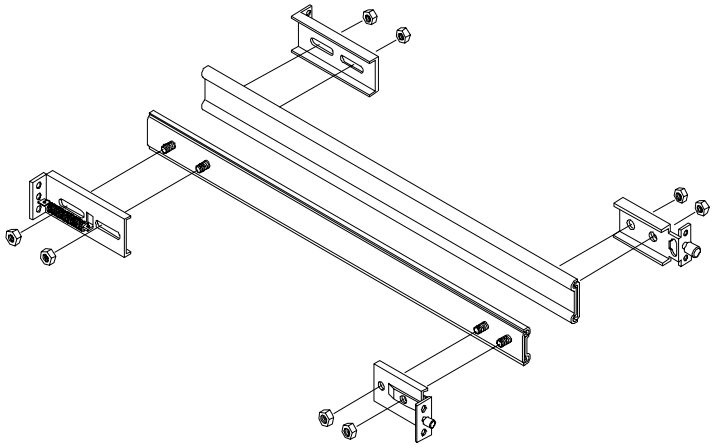


Figure 13-3. Removing Brackets from Slides

2. Attach the brackets to the front columns, using the two screws provided in the hardware kit. See Figure 13-4.

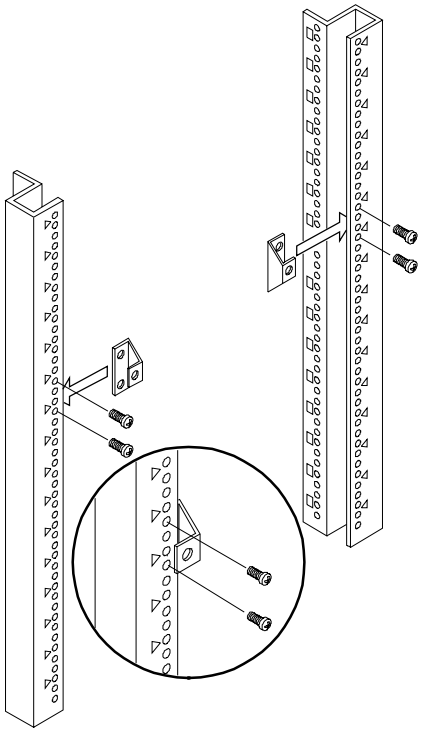


Figure 13-4. Attaching the Front Brackets to the Rack

3. Install the slides in the rack:

   a. Insert the slide into the rack at the location you have marked on the front and rear columns.

      The slide bolts insert into the 2nd hole, counting from the base of the HP Netserver.

   b. Tighten the nuts (saved from Step 1) onto the slide bolts to secure the slides to the columns. Use the M10 socket Torx driver to tighten the nuts. See Figure 13-5.

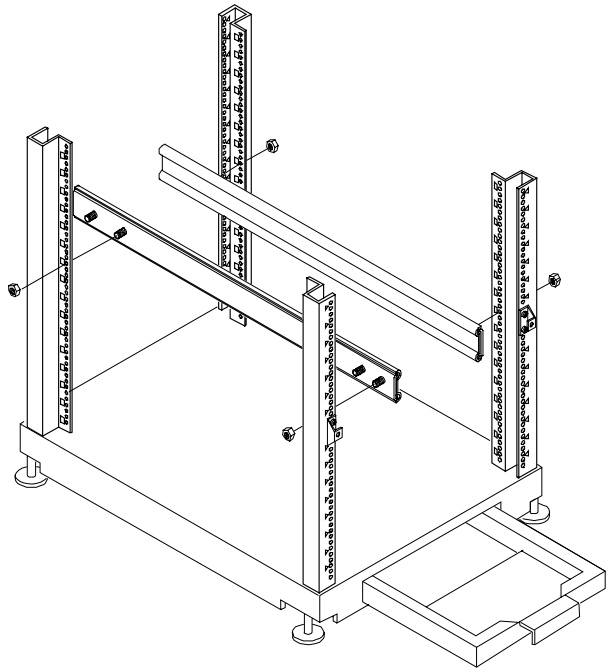


Figure 13-5. Installing the Slides in the Rack

Mounting the HP Netserver on the Slides

Use this procedure to insert the HP Netserver into the slides mounted in the rack. Once the Netserver is in the rack, you can connect the cables to the rear of the Netserver.

WARNING	To prevent rack instability while mounting the HP Netserver LP 2000r, ensure the anti-tip foot (at the bottom of the rack) is pulled out and the leveler screws on the rack's lower four corners are in firm contact with the floor (see Figure 7-3). Failure to do so could result in injury and equipment damage.

1. Ensure the leveler screws on the rack's corners make firm contact with the floor. Extend the anti-tip foot from the rack. See Figure 13-1.

CAUTION	The HP Netserver LP 2000r weighs 38 lbs (17.3 kg) fully loaded. To avoid accidents, use two people when placing the HP Netserver into the rack.

2. Mount the HP Netserver on the slides:
   a. With the help of at least one other person, lift the Netserver by its four corners off the floor or pallet.
   b. Slowly insert the Netserver chassis into the slides and push it into the rack until you feel resistance. See Figure 13-6.
   c. Pull the HP Netserver out several inches, then press the stop release on both slides to allow the Netserver to slide completely into the rack. See Figure 13-7.
3. Secure the HP Netserver chassis to the rack with thumbscrews.

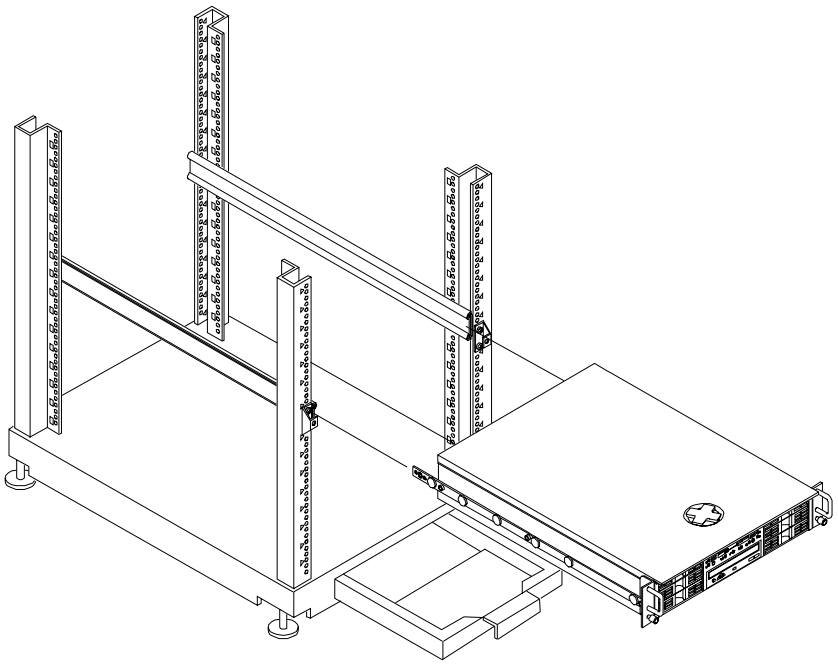


Figure 13-6. Mounting the HP Netserver on the Slides

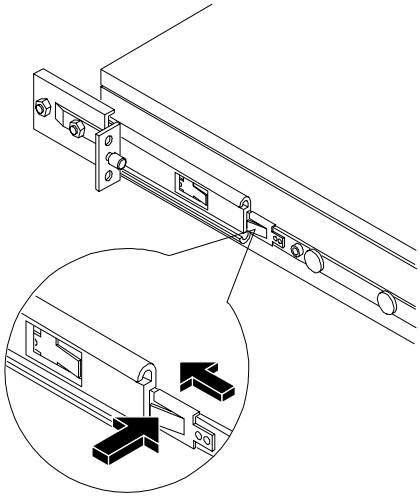


Figure 13-7. Pressing the Stop Release

Attaching the Front Bezel

1. Position the bezel in front of the HP Netserver LP 2000r, as shown in Figure 13-8.
2. Hook the bottom edge of the bezel onto the chassis pins.
3. Close the bezel and press the top corners to engage the spring latches.

   The spring latches should click when engaged.

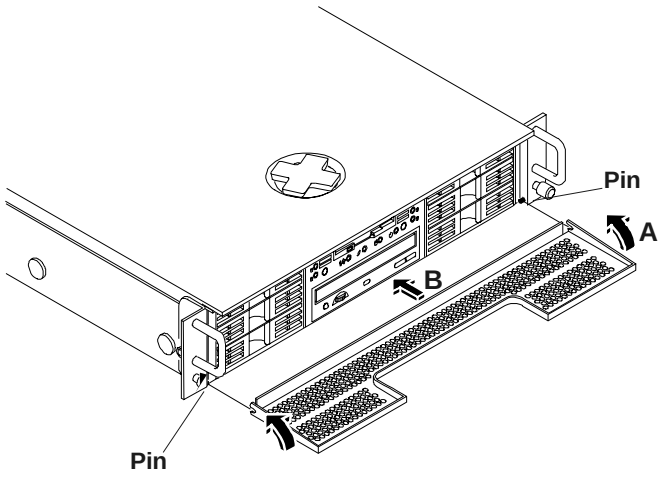


Figure 13-8. Attaching the Bezel to the HP Netserver

Cabling Rack Components

After installing the HP Netserver in the rack, refer to the white paper entitled *HP Netserver High Density Rack Solutions Overview (LP 1000r and LP 2000r)* to cable the components in the rack enclosure. The white paper is available on HP's web site at the following URL:

`http://www.hp.com/netserver/support`

After cables are attached to rack components you can attach the Cable Management Arm, as described in the next section.

Attaching the Cable Management Arm

The Cable Management Arm (CMA) allows the cables and power cord to move in and out with the HP Netserver chassis without being accidentally disconnected. The Cable Management Arm installation is tool-less.

1. Ensure the HP Netserver is pushed all the way into the rack.
2. Attach the Cable Management Arm to the rack:
   a. Attach the clip nuts to the 1st and 2nd holes of the rear right column (counting from the base of the HP Netserver). See Figure 13-9.
   b. Insert the outer flange thumbscrew into the 2nd hole, and tighten it.
   c. Insert the screw into the 1st hole, and tighten it using the Torx driver.

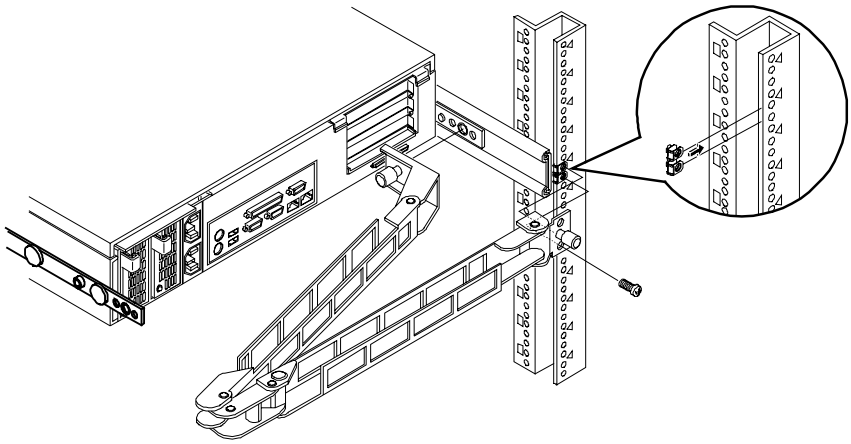


Figure 13-9. Attaching the Cable Management Arm

3. Attach the Cable Management Arm to the HP Netserver:
   a. Insert the inner flange thumbscrew into the hole in the chassis slide mount. See Figure 13-9.
   b. Tighten the thumbscrew to secure the Cable Management Arm.
4. Extend the HP Netserver out of the rack to ensure the Cable Management Arm moves with the chassis without binding.
5. Plug the HP Netserver's power cable and any data cables into the back of the HP Netserver.
6. Dress the cables in the Cable Management Arm, and then slide the HP Netserver into the rack to verify that the cables do not bind in the tray.

A Specifications

Introduction

This appendix provides the power requirements, operating conditions (environmental requirements), physical requirements, hardware specifications, and video resolutions of the HP Netserver LP 2000r. The system board layout and the unused connectors are also provided. See Figures A-1 and A-2.

Requirements

The following tables provide the specifications required for normal operation of the HP Netserver LP 2000r.

Table A-1. Power Supply Specifications

Parameter	Characteristics
Input Type	Universal input
Input Range	100 to 240VAC at 50/60 Hz
Operating Current	100-127 VAC: 4.3 A
	200-240 VAC: 2.2 A
In-rush Current	60 A
Operating Power	260W Maximum Continuous power

Table A-2. Environmental Requirements

Parameter	Conditions
Temperature	
Operating	5° to 35° C (41° to 95° F)
Non-operating	-40° to +65° C (-40° to +149° F)
Humidity	
Operating	20% to 80% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing
Altitude	
Operating	-30 to 3,045 m (10,000 ft)
Non-operating	-30 to 12,180 m (40,000 ft)
Thermal Output	
Maximum Operating	1,365 BTU/hr

NOTE The specifications and requirements listed above can vary if you install a mass storage device in the HP Netserver that has more stringent environmental limits than required for the Netserver. Ensure the operating environment for any mass storage devices you intend to install are compatible with the Netserver's environmental requirements.

Table A-3. Weight and Dimensions

Weight	38 lbs. (17.3 kg.) fully loaded (6 SCSI HDDs, 2 processors, and 4 DIMMs); excludes keyboard, mouse, and monitor
Height	3.36 inches (85.4 mm)
Width	16.8 inches (428 mm)
Depth	23.3 inches (591 mm)

Table A-4. HP Netserver Hardware Specifications

Processors	Intel Pentium III (up to 2 processors) processors, at supported speeds of 866, 933 MHz; and 1 GHz, with 256 KB level 2 cache on processor.
Chipset	Serverworks LE chip set with 133 MHz bus speed support.
Memory	Supports up to four SDRAM DIMMS (168 pin) for a maximum of 4 GB. Supported DIMM types: 128 MB, 256 MB, 512 MB and 1 GB, PC 133 running at 133 MHz, 72 bits wide, ECC single-bit correcting, multi-bit detecting.
Video	Embedded ATI Rage XL chip video with 4 MB SGRAM/SDRAM. Supports up to 1600x1200, @ 65K colors, with onboard standard video connector. Refer to Table A-5, "Video Display Modes" for more details.
SCSI	Embedded Symbios Ultra-3 SCSI dual channel controller; Ultra 160 MB/s transfer rate with two 68-pin connectors.
IDE	Embedded Enhanced-IDE dual channel controller.
LAN	Two Embedded Intel 82559 10/100 PCI Fast Ethernet Controllers with onboard standard LAN connectors (LAN Power On/Off and Wake on LAN is enabled or disabled on LAN A via BIOS setup).
PCI Bus	Three 32/64-bit, 33 MHz speed, 5 volt PCI slots on riser board within PCI card cage.
I/O	Two Serial ports (including one Management/Serial) and one bi-directional parallel port with ECP/EPP high-speed support; one PS/2 mouse, one PS/2 keyboard, and two USB connectors.
CD-ROM	One standard CD-ROM drive; IDE interface; 48x speed.

Table A-5. Video Display Modes

Resolution	Max. Refresh Rate @ 256 Colors	Max. Refresh Rate @ 65K Colors	Max. Refresh Rate @ 16.7M Colors
640x480	200 Hz	200 Hz	200 Hz
800x600	200 Hz	200 Hz	160 Hz
1024x768	150 Hz	150 Hz	120 Hz
1152x864	120 Hz	120 Hz	85 Hz
1280x1024	100 Hz	100 Hz	85 Hz
1600x1200	76 Hz	76 Hz	Not available

System Board Layout

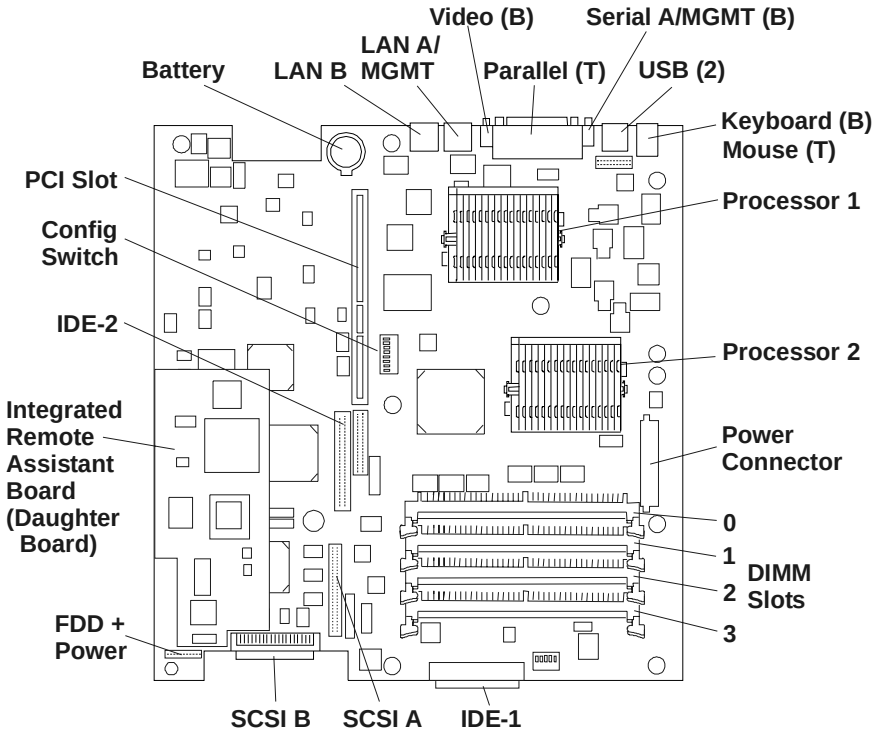


Figure A-1. System Board Components and Connectors

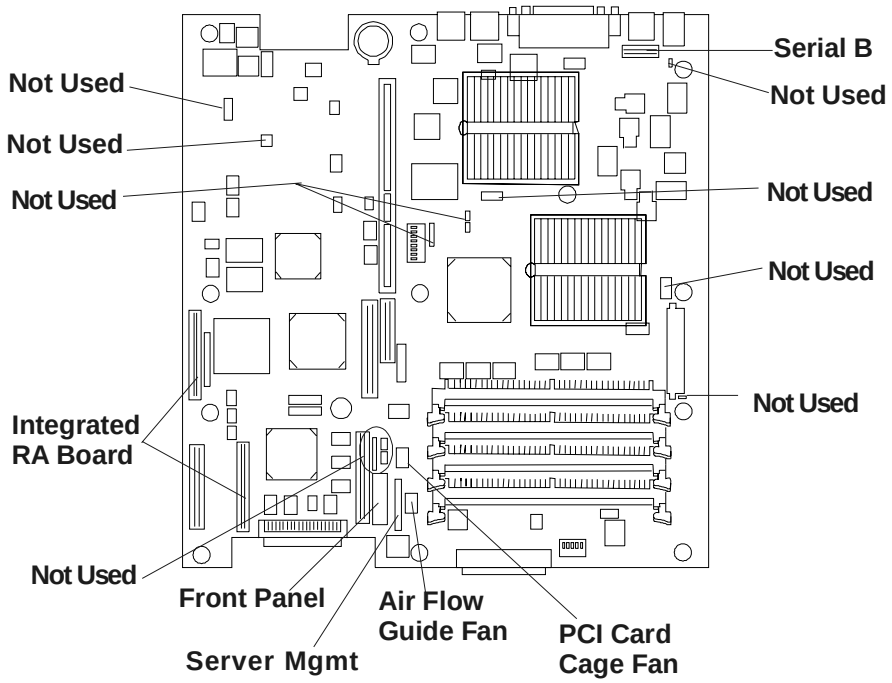


Figure A-2. System Board Connectors (Used/Unused)

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