

Installation Guide

HP 9000 rp4410 and HP 9000 rp4440



Manufacturing Part Number: A9950-96005

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U.S.A.

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Preface

This preface contains the following sections:

- Intended Audience
- What's New?
- Notational Conventions
- Reader Comments and Feedback
- Related Information
- Printing History

Intended Audience

This document is intended to provide technical product and support information for authorized service providers, customer system administrators, and HP support personnel.

What's New?

The layout of this document was changed to improve usability.

Notational Conventions

The following notational conventions are used in this publication.

WARNING A warning lists requirements that you must meet to avoid personal injury.

CAUTION A caution provides information required to avoid losing data or avoid losing system functionality.

NOTE A note highlights useful information such as restrictions, recommendations, or important details about HP product features.

- Commands and options are represented using this font.
- **Text that you type exactly as shown** is represented using **this font**.
- *Text to be replaced with text that you supply* is represented using *this font*.

Example:

“Enter the `ls -l filename` command” means you must replace *filename* with your own text.

- **Keyboard keys and graphical interface items (such as buttons, tabs, and menu items)** are represented using **this font**.

Examples:

The **Control** key, the **OK** button, the **General** tab, the **Options** menu.

- **Menu** → **Submenu** represents a menu selection you can perform.

Example:

“Select the **Partition** → **Create Partition** action” means you must select the **Create Partition** menu item from the **Partition** menu.

- Example screen output is represented using this font.

Reader Comments and Feedback

HP welcomes your feedback on this publication. Please address your comments to edit@presskit.rsn.hp.com and note that you will not receive an immediate reply. All comments are appreciated.

Related Information

You can find other information on HP server hardware management, Microsoft® Windows®, and diagnostic support tools in the following publications.

Web Site for HP Technical Documentation:

<http://docs.hp.com>

The main Web site for HP technical documentation is <http://docs.hp.com>, which has complete information available for free.

Server Hardware Information:

<http://docs.hp.com/hpux/hw/>

The <http://docs.hp.com/hpux/hw/> Web site is the systems hardware portion of the docs.hp.com and provides HP nPartition server hardware management details, including site preparation, installation, and more.

Windows Operating System Information

You can find information about administration of the Microsoft® Windows® operating system at the following Web sites, among others:

- http://docs.hp.com/windows_nt/
- <http://www.microsoft.com/technet/>

Diagnostics and Event Monitoring: Hardware Support Tools

Complete information about HP's hardware support tools, including online and offline diagnostics and event monitoring tools, is at the <http://docs.hp.com/hpux/diag/> Web site. This site has manuals, tutorials, FAQs, and other reference material.

Web Site for HP Technical Support:

<http://us-support2.external.hp.com>

HP's IT resource center Web site at <http://us-support2.external.hp.com/> provides comprehensive support information for IT professionals on a wide variety of topics, including software, hardware, and networking.

Books about HP-UX Published by Prentice Hall

The <http://www.hp.com/hpbooks/> Web site lists the HP books that Prentice Hall currently publishes, such as HP-UX books including:

- *HP-UX 11i System Administration Handbook*
http://www.hp.com/hpbooks/prentice/ptr_0130600814.html
- *HP-UX Virtual Partitions*
http://www.hp.com/hpbooks/prentice/ptr_0130352128.html

HP Books are available worldwide through bookstores, online booksellers, and office and computer stores.

Printing History

The Printing History below identifies the edition dates of this manual. Updates are made to this publication on an unscheduled, *as needed*, basis. The updates will consist of a complete replacement manual and pertinent on-line or CD-ROM documentation.

| | | |
|----------------|-------|------------|
| Fourth Edition | | July 2004 |
| Fifth Edition | | April 2005 |

1 Server Overview and Unpacking

Server Overview

The HP 9000 rp4410 and HP 9000 rp4440 servers are 1-, 2-, 4-, 6-, or 8-way servers based on the PA-RISC processor family architecture. The HP server accommodates up to 32 DIMMs and internal peripherals including hard disks and a DVD-ROM drive. Its high availability features include hot-swap fans, hot-swap power supplies, hot-plug disk drives, and hot-plug PCI-X cards. The supported operating system is HP-UX 11i v1 (and newer HP-UX versions that support PA-RISC systems).

Figure 1-1 HP 9000 rp4410 and HP 9000 rp4440 Server

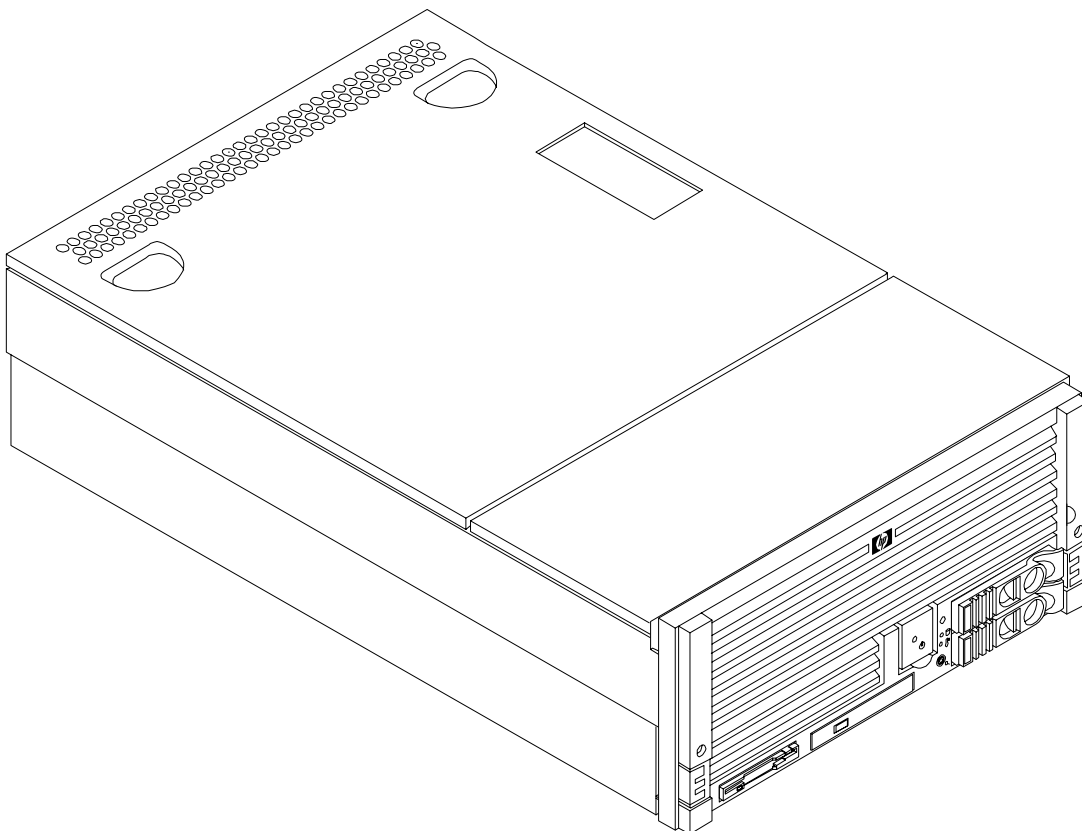


Figure 1-2 HP 9000 rp4410 and HP 9000 rp4440 Server with Bezel Removed

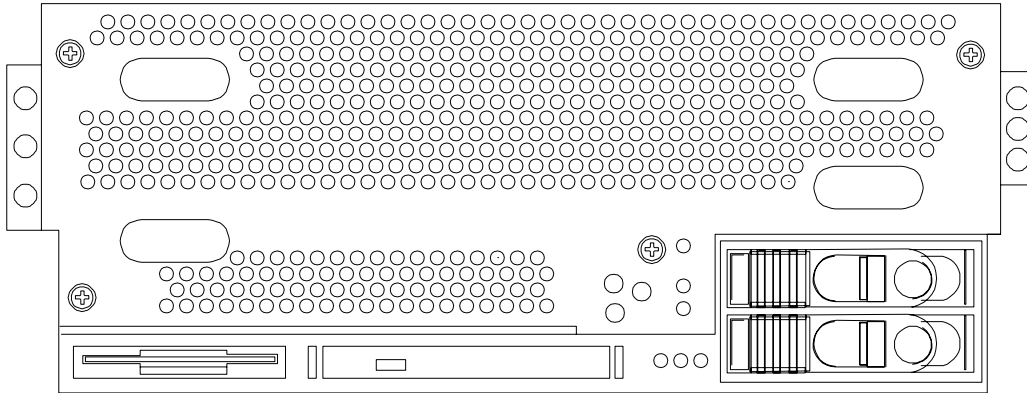
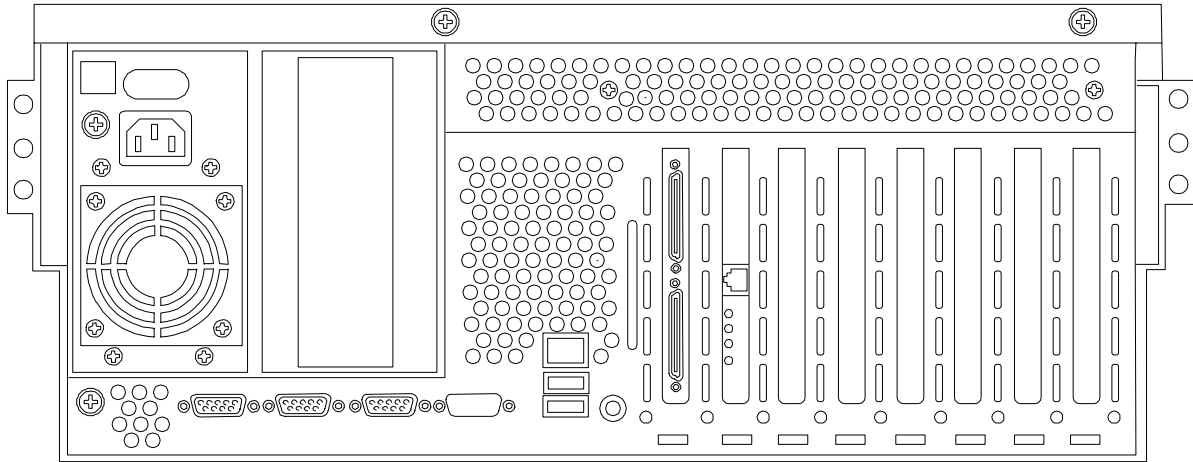


Figure 1-3 HP 9000 rp4410 and HP 9000 rp4440 Server (rear view)



Unpacking the Server

HP shipping containers protect their contents under normal shipping conditions. After the equipment arrives, carefully inspect each carton for signs of shipping damage. A tilt indicator is installed on each carton shipped. The beads in the indicator roll to the upper position if the container is tilted to an angle that could cause equipment damage. The tilt indicator itself has two windows and each window under normal conditions shows four beads present. If a carton is mishandled, accidentally dropped, or knocked against something, the tilt indicator indicates missing beads. If damage is found, document the damage with photographs and contact the transport carrier immediately.

If the equipment has any damage, you must obtain a damage claim form from the shipping representative. You must complete the form and return it to the shipping representative.

Unpacking a Non-Racked Server

NOTE HP recommends the use of a lifter, such as a RonI Company model 17000 SP 400 lifting device, when moving a non-racked system.

Unloading with a Lifter

To unload the server from the pallet using a lifter, perform the following steps:

WARNING Use caution when using a lifter. Because of the weight of the HP 9000 rp4410 and HP 9000 rp4440 servers, they must be centered on the lifter forks before lifting them off the pallet to avoid injury.

- Step 1.** Follow the instructions on the outside of the server packaging to remove the banding and carton top from the server pallet.
- Step 2.** Remove all cartons from the pallet, leaving only the server.
- Step 3.** Lower the cardboard from the side on which the lifter will be inserted and slide the server as close as possible to the edge of the pallet.
- Step 4.** Break off any foam packaging which could prevent the lifter from being fully inserted under the server. Do not remove the foam packaging from the corners of the server. This foam is required to elevate the system and allow the forks of the lifter to be placed under the server.
- Step 5.** Insert the lifter forks under the server.
- Step 6.** Carefully roll the lift forward until it is fully positioned against the side of the server.
- Step 7.** Slowly raise the server off the pallet until it clears the pallet cushions.
- Step 8.** Carefully roll the lifter and server away from the pallet. Do not raise the server any higher than necessary when moving it over to the rack.

Installing the HP Server into a Rack

HP Rack

All HP 9000 rp4410 and HP 9000 rp4440 servers that are installed into racks are shipped with equipment mounting slides. With every set of slides comes an installation guide: *Installation Guide, Mid-Weight Slide Kit, 5065-7291*. Follow the steps in this installation guide to determine where and how to place the server into the rack.

Non-HP Rack

There is a guide for evaluating the installation of HP equipment in non-HP racks. This document should be utilized when there is a need to evaluate and qualify whether any HP equipment can be installed, maintained, and serviced in a non-HP rack.

The guide is located on the Web at <http://www.hp.com/racksolutions>.

Once there, select “mounting information” from the menu on the left side, then select the guide titled *Mounting in non-HP racks*.

Installing a Tubular Stand on the HP Server

If you ordered your HP 9000 rp4410 or HP 9000 rp4440 server as rackless, it has a tubular stand pre-installed at the factory. If you wish to change your HP server from a rack mount to rackless you need an HP 9000 rp4440 Server Rackless Mount Kit. Your rackless mount kit comes with an installation guide: *Converting Your Rack Server to a Rackless Mount, A6979-96001*. Follow the steps in this installation guide to attach the tubular stand to your server.

2 Installing Additional Components

This chapter provides information on the controls and indicators of the HP server and instructions required when installing additional components in your HP 9000 rp4410 or HP 9000 rp4440 server.

The following additional components may be added to the HP server:

- Hot swap power supplies
- Hot plug disk drives
- Processors (dual processor modules)
- Memory (DIMMs)
- Hot plug PCI/PCI-X cards

In addition, instructions are provided for conversion of your HP server from simplex to duplex (SCSI) operation.

Safety Information

This chapter describes installing additional or optional hardware to your HP 9000 rp4410 and HP 9000 rp4440 servers. Use care to prevent injury and equipment damage when performing these procedures. Voltages may be present within the server. Many assemblies are sensitive to damage by electrostatic discharge.

To ensure safe handling of components and to prevent injury and damage to the HP server, follow these procedures:

- If removing or installing a hot-swap item, follow the instructions provided in this guide
- If installing a hot-swap item when power is applied (fans are running), reinstall the server cover(s) immediately to prevent overheating
- If installing an assembly that is not hot-swappable, disconnect the power cable(s) from the server external power connector(s)

WARNING Ensure that the system is powered down and all power sources have been disconnected from the server prior to working within the server.

Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

Failure to observe this warning could result in personal injury or damage to equipment.

-
- Do not wear loose clothing that may snag or catch on the server or on other items
 - Do not wear clothing subject to static charge build-up, such as wool or synthetic materials
 - If installing an internal assembly, wear an antistatic wrist strap and use a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit (P/N 9300-1155)

Safety Information

- Handle accessory boards and components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards

Service Tools Required

Service of this product may require one or more of the following tools:

- Electrically Conductive Field Service Kit (P/N 9300-1155)
- 1/4 inch flat blade screwdriver
- ACX-15 Torx® screwdriver
- Special processor tool kit P/N 5069-5441

Accessing a Rack Mounted Server

The HP 9000 rp4410 and 9000 rp4440 servers are designed to be rack mounted. The following procedure explains how to gain access to an HP server that is mounted in an approved rack.

WARNING Ensure that all anti-tip features (front and rear anti-tip feet installed; adequate ballast properly placed, and so on) are employed prior to extending the server.

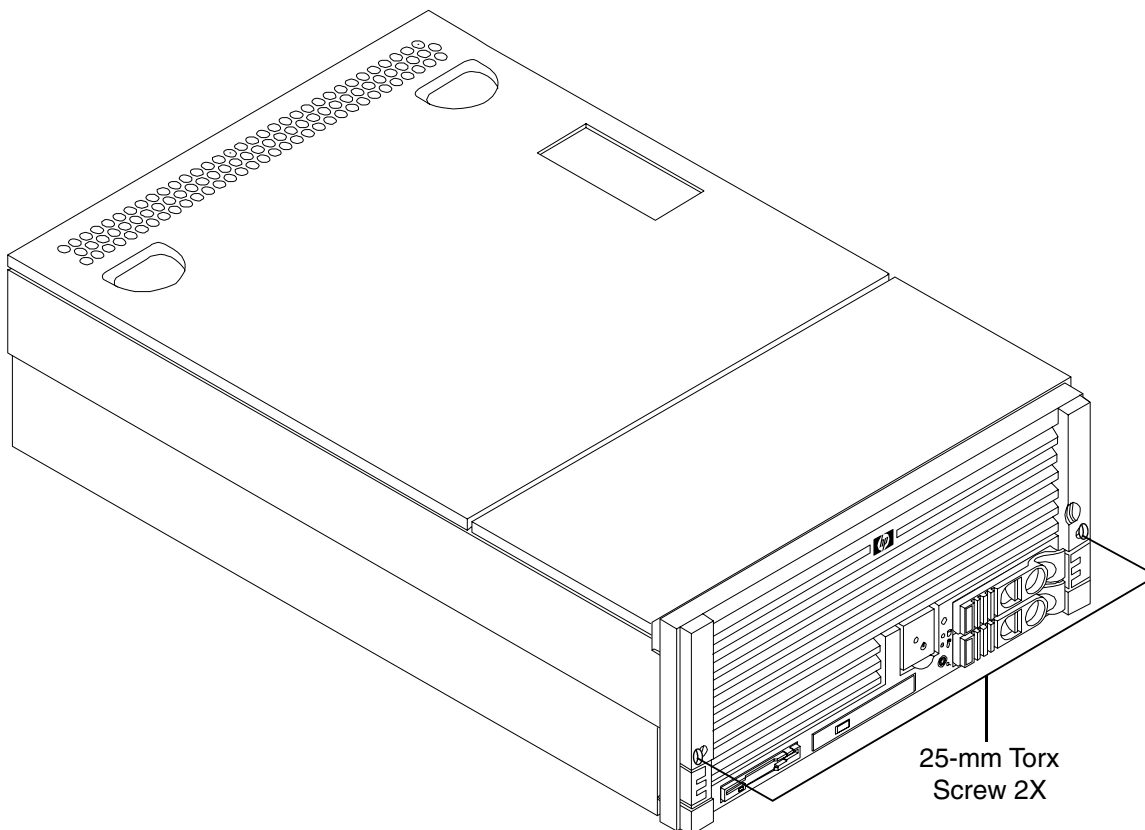
Extend the Server from the Rack

NOTE Ensure that there is enough area (approximately 1.5 meters [4.5 ft.]) to fully extend the server out the front and work on it.

To extend the server from the rack, perform the following steps:

- Step 1.** Remove the T-25 screws that fasten the server to the rack.
- Step 2.** Flip out the two pull handles at either end of the front bezel and slowly pull the unit forward by the handles. The server is fully extended when the rail clips are locked in place. After your server is fully extended, the front and top covers are accessible.

Figure 2-1 Accessing 25-mm Torx Screws



Insert the Server into the Rack

To insert the server into the rack, perform the following step:

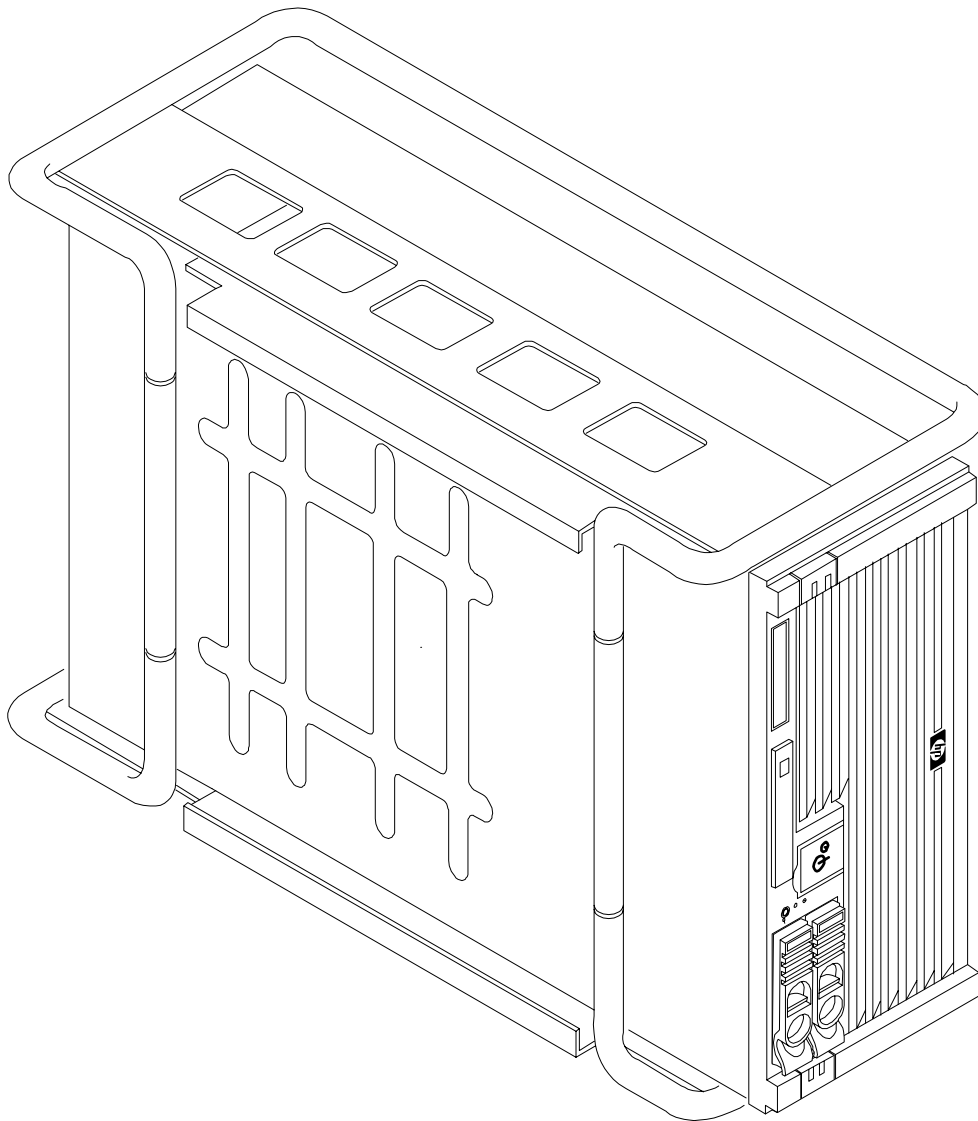
- Step 1.** Press the rail clips on either side of the server inward and push the server into the rack until it stops.
- Step 2.** Replace the T-25 screws that fasten the server to the rack.

Accessing a Rackless Server

The HP 9000 rp4410 and HP 9000 rp4440 servers are also designed to be rackless mounted. You do not need to remove the tubular stand from the HP server to gain access to internal components. The front bezel, front cover, and top cover may be removed with the tubular stand attached to the HP server.

WARNING Ensure that the HP server is properly grounded when performing remove and replace procedures. Use an antistatic wrist strap and grounding mat similar to those found in the HP Electrically Conductive Field Service Kit.

Figure 2-2 Rackless Mounted HP 9000 rp4410 and HP 9000 rp4440 Server



Front Panel Controls and Indicators

The front panel of the HP 9000 rp4410 and HP 9000 rp4440 servers provide the controls and indicators commonly used for operation.

Figure 2-3 Front View with Bezel

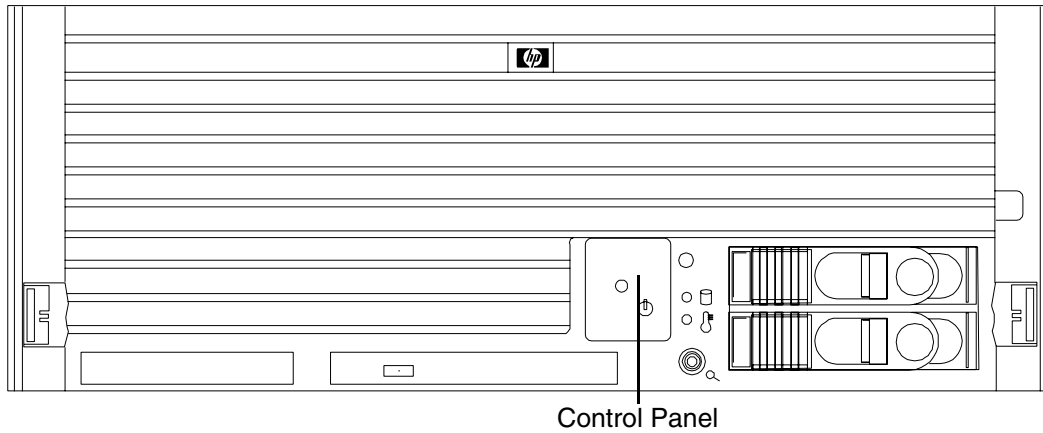


Figure 2-4 Accessing the Control Panel

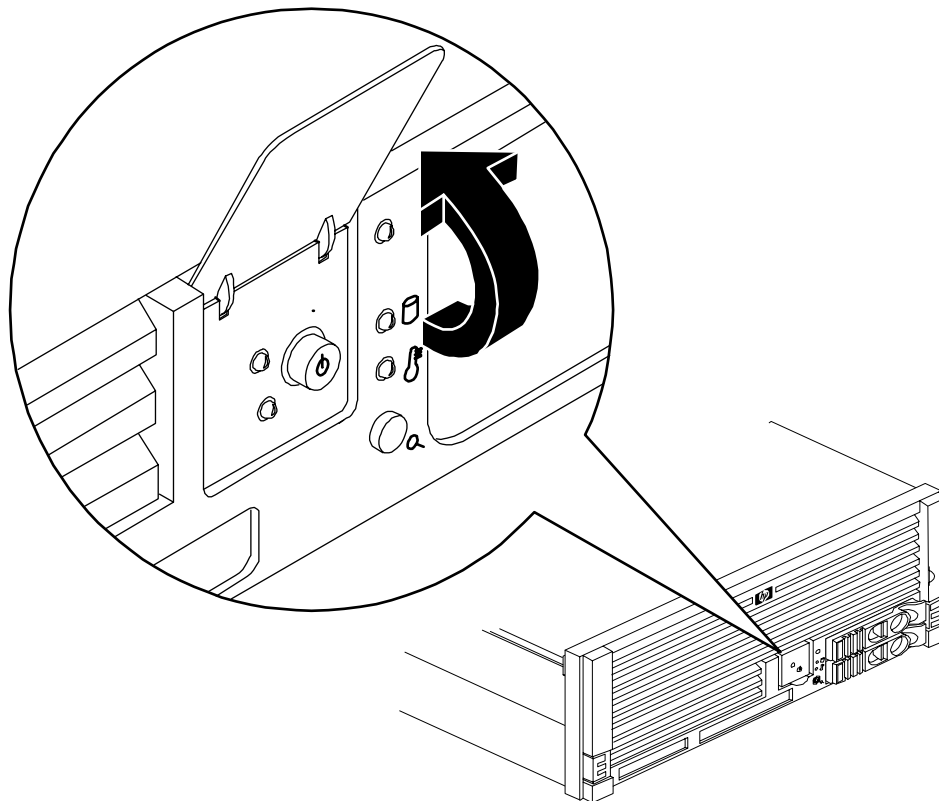


Figure 2-5 Control Panel

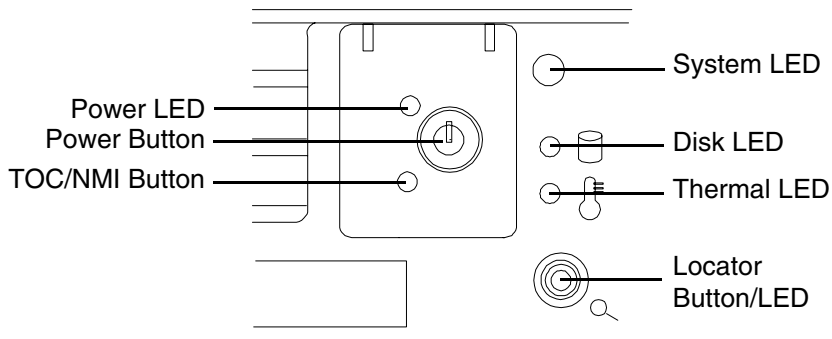


Table 2-1 Control Panel LED Definitions

| LED/ Button | State | Flash Rate | Color | Description |
|--------------------|-----------|-----------------------------------|--------|---------------------------------------------------------------------------------------------|
| System | Running | Steady | Green | Green: System normal—OS up and running |
| System | Booting | Flashing at 0.5 Hz | Green | Flashing Green: OS booting or at BCH |
| System | Attention | Flashing at 1 Hz | Yellow | Flashing Yellow: Warning—System needs attention. Redundancy lost, component failure pending |
| System | Fault | Flashing at 2 Hz | Red | Flashing Red: Hard fault. System halted |
| System | Off | Off | N/A | Off: System off |
| Power | On | Steady | Green | Green: Power normal |
| Power | On | Flashing at 1 Hz | Yellow | Flashing Yellow: Housekeeping voltage present |
| Power | Off | Off | Off | Off: Power off |
| Disk LED | | Flashing at rate of disk activity | Green | Flashing Green: Disk activity |
| Thermal LED | OK | Steady | Green | Green: Thermal OK |
| Thermal LED | Warning | Flashing at 1 Hz | Yellow | Flashing Yellow: Thermal warning |
| Locator LED/button | | Flashing at 1 Hz | Blue | Flashing Blue: System locator LED may be remotely or locally activated/deactivated |

Switch/Button and Front Control Panel LED Definitions

Table 2-2 Switch/Button LED Definitions

| Button/Switch | Description |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power button | <p>Controls the power supply (turns system power on or off) if power is available to the power supply. (Controls both power supplies if two are installed)</p> <p>If power is off but power is available to the power supplies, pressing the Power button:</p> <ul style="list-style-type: none"> • Momentarily (less than 1 second) turns on the power supplies and applies power to server circuits • For more than 1 second and then released, has no effect <p>If power is on and the system is at initial system loader, pressing the Power button:</p> <ul style="list-style-type: none"> • Momentarily (less than 1 second) has no effect • For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers • For more than 5 seconds (and then released) causes an immediate and hard power down <p>If power is on and the system is at boot console handler (BCH), pressing the Power button:</p> <ul style="list-style-type: none"> • Momentarily (less than 1 second) causes a immediate and hard power down • For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers • For more than 5 seconds (and then released) causes an immediate and hard power down <p>If power is on but the OS has been shut down, pressing the Power button:</p> <ul style="list-style-type: none"> • Momentarily (less than 1 second) has no effect • For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers • For more than 5 seconds (and then released) causes an immediate and hard power down <p>If the OS is running, pressing the Power button:</p> <ul style="list-style-type: none"> • Momentarily (less than 1 second) has no effect • For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers • For more than 5 seconds (and then released) causes an immediate and hard power down |

Table 2-2 Switch/Button LED Definitions (Continued)

| Button/Switch | Description |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NMI button (Paper clip may be used to press button) | Press the nonmaskable interrupt (NMI) switch before restarting the system after a hung condition occurs. NMI provides crash dump capture capability. Obtain a system hardware status dump to use in root cause analysis and debugging ^a |

a. The same function is available by using the Management Processor command: `CM>TC`.

Additional Controls and Indicators

Storage devices have additional LEDs showing their status.

Hot-Plug Disk Drive Indicators

The hot-plug disk drives have two LEDs per drive, as described below.

- Drive Status LED—The drive status LED is green when power is applied to drive circuits
- Drive Activity LED—The drive activity LED is green and indicates disk drive activity. This LED is controlled by the disk drive directly and turns on when a drive is accessed

Figure 2-6 Hot-Plug Disk Drive LED Indicators

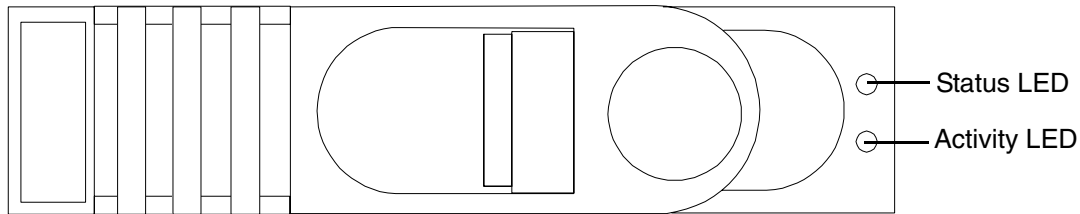


Table 2-3 Hot-Plug Disk Drive LED Definitions

| LED | State | Description |
|--------------|----------------|------------------------------------|
| Activity LED | Flashing green | Drive is active |
| Status LED | Green | Drive is operating (power applied) |

DVD-ROM/DVD-R/DVD-RW Drives

The HP server is delivered with one DVD-ROM drive (DVD-R and DVD-RW optional). Each of these devices has one activity LED.

Figure 2-7 DVD-ROM or CD-RW/DVD-ROM LED Indicators

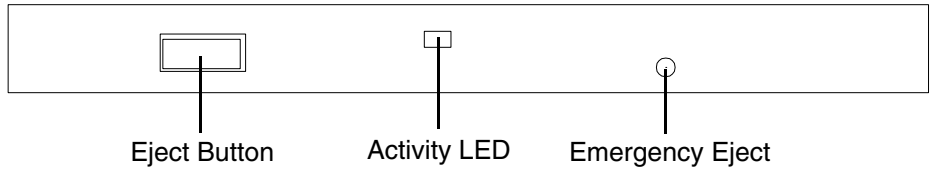


Table 2-4 DVD Drive LED Definitions

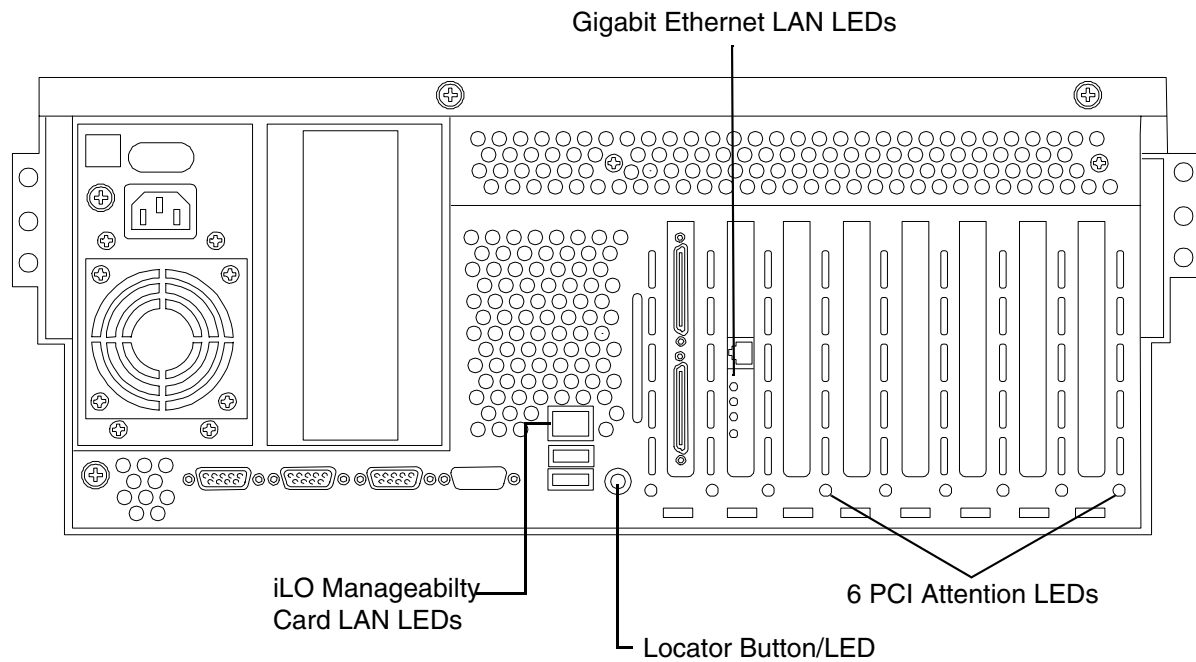
| LED | State | Description |
|--------------|----------------|-----------------|
| Activity LED | Flashing green | Drive is active |

Rear Panel

The HP server rear panel includes communication ports, I/O ports, AC power connectors, two power supply bays, attention LED indicators for the hot-plug PCI boards, and the locator LED/button. LEDs located on the rear panel of the HP server signal the operational status of:

- Power supplies
- iLO Manageability card LAN
- Gigabit Ethernet card LAN
- PCI slots 3-8

Figure 2-8 Rack Mount and Rackless Rear View



Power Supply Status LEDs

Each power supply unit has three status LEDs located on the power supply rear side. Consolidated status of all power supplies is reported by the front control panel by the power status LED.

Figure 2-9 Power Supply Status LED

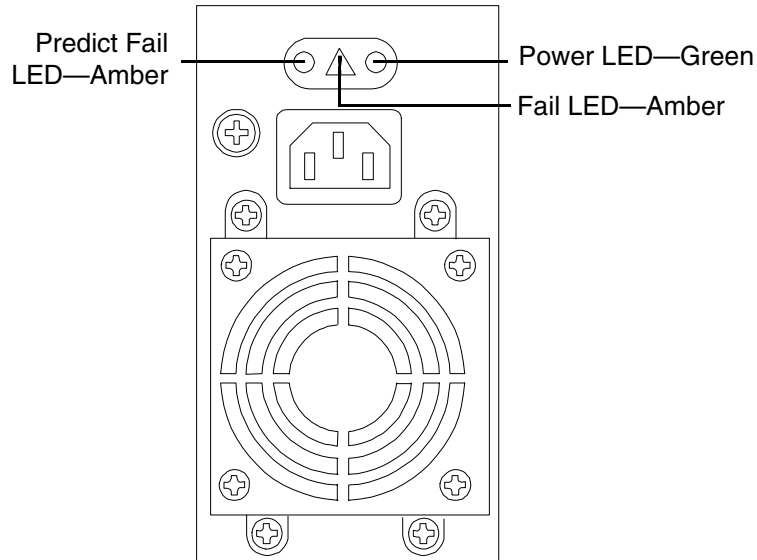


Table 2-5 Power Supply Status LED

| Power LED—Green | Predict Fail LED—Amber | Fail LED—Amber | Status |
|------------------------|-------------------------------|-----------------------|-----------------------------------------------------------------------|
| Off | Off | Off | No AC power applied to all PSUs |
| Off | Off | On | No AC power applied to this PSU only |
| Blinking | Off | Off | AC present/standby outputs on |
| On | Off | Off | Power supply unit DC outputs on and OK |
| Off | Off | On | Power supply failure |
| On | Blinking | Off | Predictive failure—PSU about to fail because of poorly performing fan |
| On | Off | Blinking | Current limit on 48 VDC output |

iLO Manageability Card LAN LEDs

The internal iLO Manageability Card iLO manageability card LANLAN uses an RJ-45 type connector. This connector has two LEDs (LAN link and LAN activity) that signal status and activity.

Figure 2-10 iLO manageability card LAN LEDs

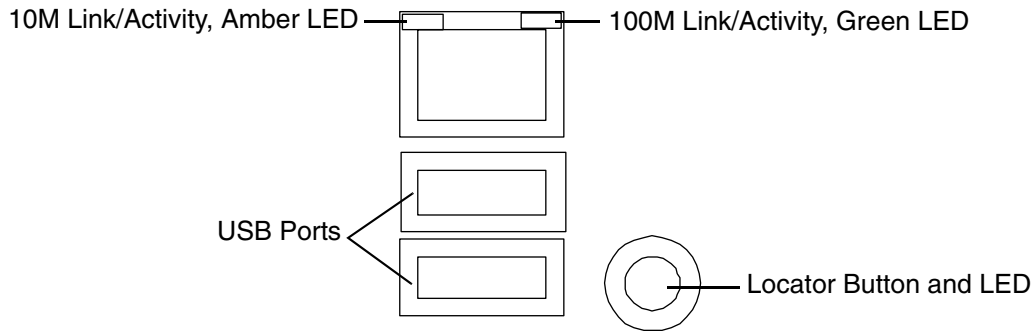


Table 2-6 iLO Manageability Card LAN LED Status Descriptions

| LED | Condition | Status |
|------------|-----------|--------------------------------------|
| 10M amber | On | Linked at 10 MB/s, no activity |
| 10M amber | Blinking | Linked at 10 MB/s, activity present |
| 100M green | On | Linked at 100 MB/s, no activity |
| 100M green | Blinking | Linked at 100 MB/s, activity present |

Locator LED and Button

An LED and button is provided on the rear panel of the server. Another single blue LED and button is on the front control panel that enables or disables the locator function. (See Figure 2-10)

Gigabit Ethernet Card LAN LEDs

Core I/O

The core I/O Gigabit Ethernet card uses an RJ-45 LAN connector. This connector has four LEDs (three LAN link and one LAN activity) that signal link speed and activity.

Figure 2-11 Core I/O LAN Port LEDs

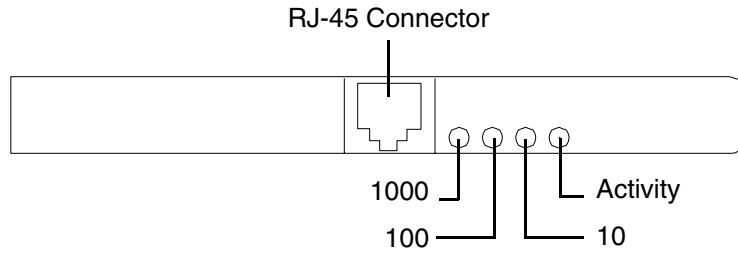


Table 2-7 Core LED Status Descriptions

| LED | Condition | Status |
|----------|----------------|-------------------------|
| Activity | Green—on | Linked—no activity |
| Activity | Green—off | No link |
| Activity | Green—blinking | Linked—activity present |
| 1000 | Green—on | Link speed—1000 MBps |
| 100 | Green—on | Link speed—100 MBps |
| 10 | Green—on | Link speed—10 MBps |

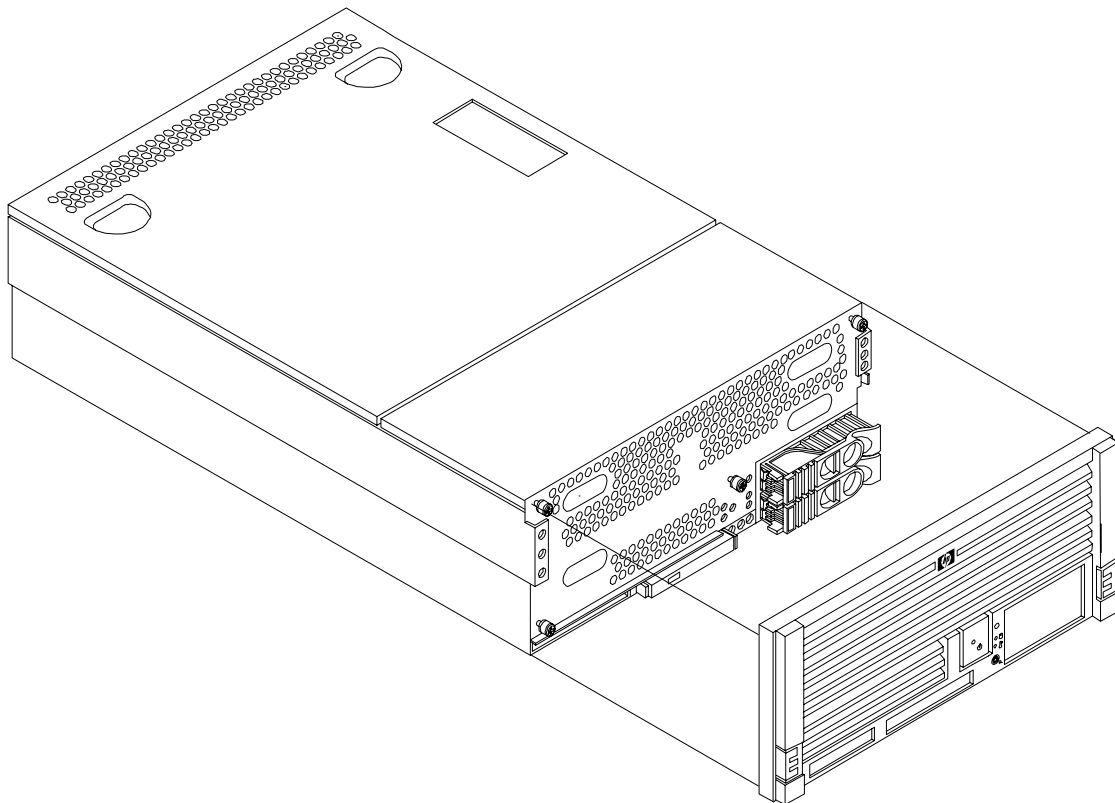
Front Bezel

The server does not have to be turned off to remove the front bezel.

Opening the control panel door provides access to the following components:

- Power switch
- System LEDs

Figure 2-12 Removing and Replacing the Front Bezel



Removing the Front Bezel

To remove the front bezel, grasp the front bezel at the outer edges and pull straight out.

Replacing the Front Bezel

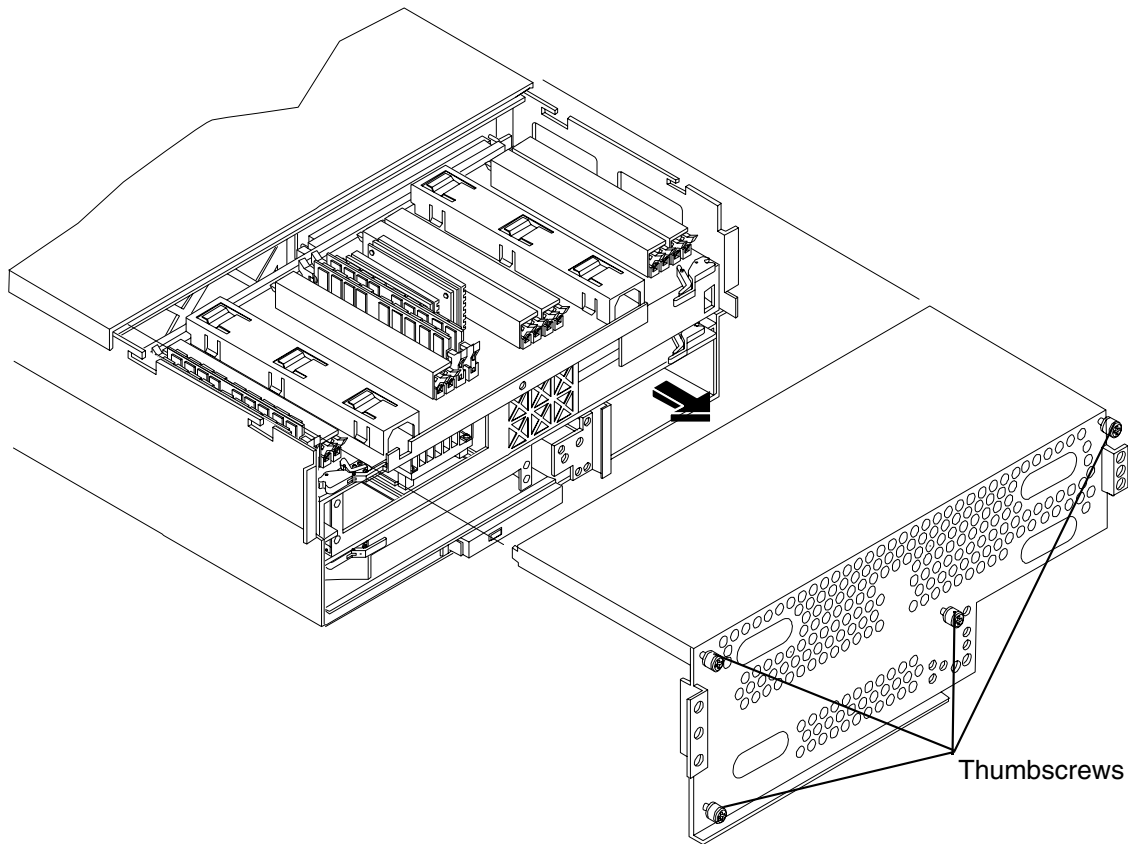
To replace the front bezel, hold the bezel in mounting position and push the bezel straight into the chassis until it snaps into place.

Front and Top Covers

CAUTION Do not operate the server without the front and top covers in place. Operation of the HP server without the front and top covers in place will make the server susceptible to electromagnetic interference (EMI) and overheating problems which will result in system failure.

Observe all electrostatic discharge (ESD) safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Figure 2-13 Removing and Replacing the Front Cover



Removing the Front Cover

To remove the front cover, perform the following steps:

CAUTION Turn off power prior to removing the front cover. All components accessible behind the front cover are cold-swap and require power to be turned off.

Step 1. If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)

Step 2. Remove the front bezel. (See “Removing the Front Bezel” on page 31.)

Step 3. Loosen the four captive thumbscrews that hold the front cover in place.

Step 4. Raise the cover slightly, and pull the cover toward the front of the server to free the tabs from the slots in the center of the chassis.

Replacing the Front Cover

To replace the front cover, perform the following steps:

Step 1. Align the tabs at the rear of the front cover with the corresponding slots in the chassis and fully seat the tabs into the slots.

Step 2. Tighten the four thumbscrews securely.

Step 3. Replace the front bezel. (See “Replacing the Front Bezel” on page 31.)

Removing the Top Cover

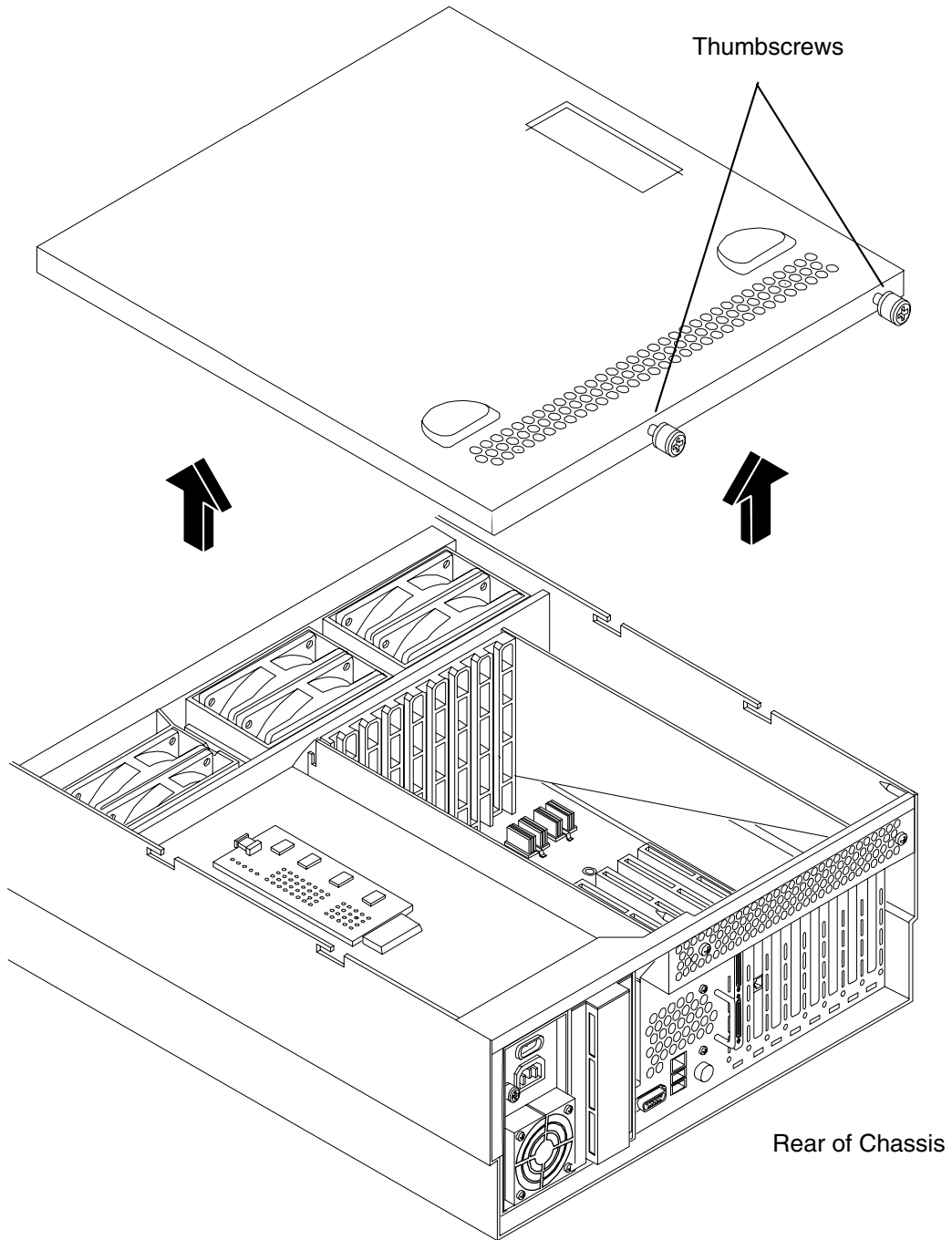
To remove the top cover, perform the following steps:

Step 1. If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)

Step 2. Loosen the two captive thumbscrews that hold the top cover in place.

Step 3. Pull the cover toward the rear of the server to free the tabs from the slots in the center of the chassis and lift it straight up.

Figure 2-14 Removing and Replacing the Top Cover



Replacing the Top Cover

To replace the top cover, perform the following steps:

- Step 1.** Align the tabs at the rear of the top cover with the corresponding slots in the chassis and fully seat the tabs into the slots and push forward until it seats.
- Step 2.** Tighten the two thumbscrews securely.

Hot-Swap Chassis Fan Units

There are three hot-swap chassis fan units in the HP server. Fan units 0, 1, and 2 are in the center of the chassis, spanning the full chassis width. Fan units 0 and 1 are interchangeable and are in the left and center positions. Fan unit 2 is smaller and fits into the right-most position (behind the power supply). Fan unit 2 cannot be installed in the left and center positions.

CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

NOTE A hot-swap device does not require interaction with the operating system before the device is removed from or installed into the server.

The AC power to the server does not have to be off to remove or replace a hot-swap chassis fan unit.

Removing a Hot-Swap Fan Unit

Figure 2-15 Hot-Swap I/O Fans

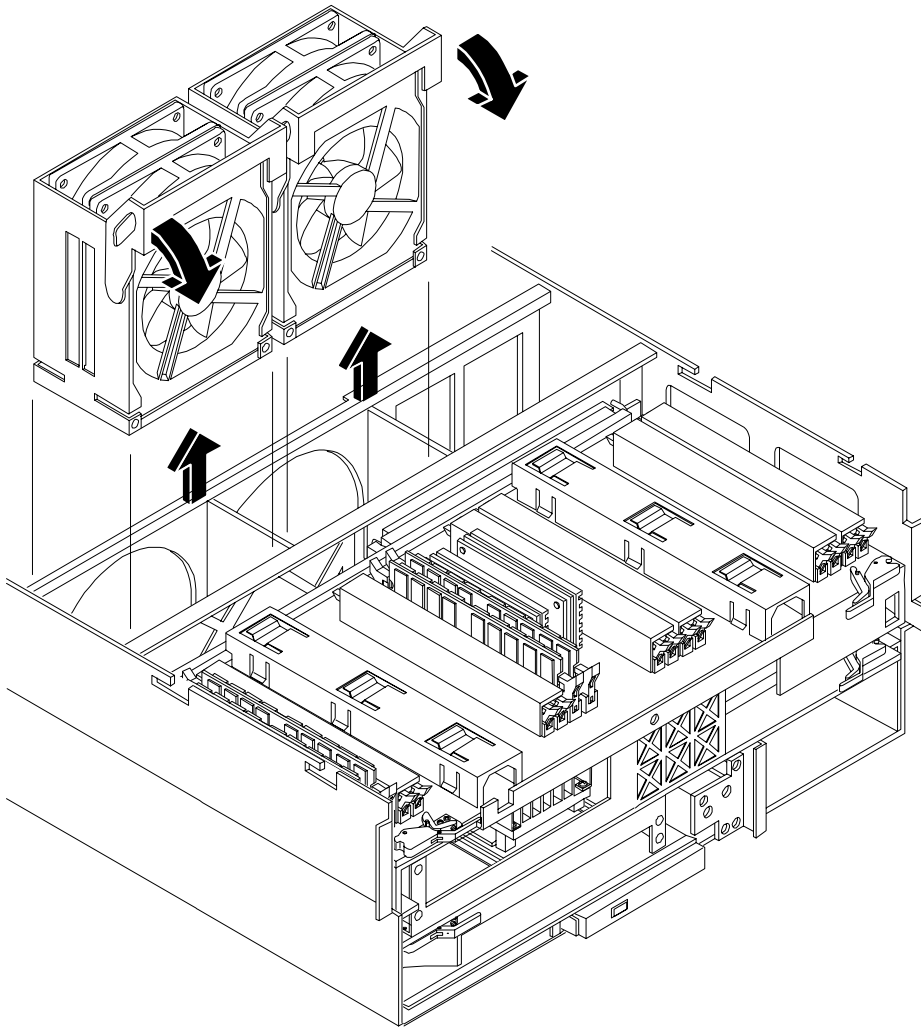
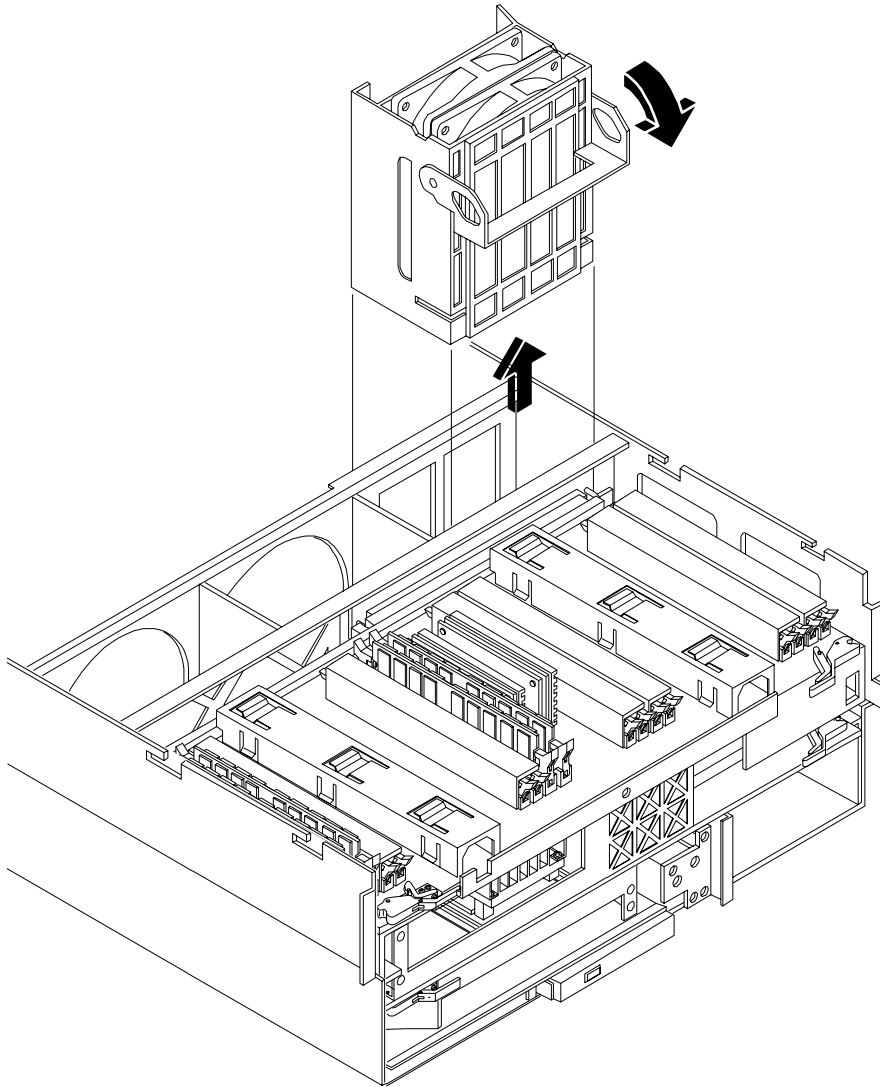


Figure 2-16 Hot-Swap Power Supply Fan



To remove an I/O or power supply fan unit, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 33.)
- Step 3.** Grasp the fan unit locking handle, tilt it up and pull out the fan from the chassis.

NOTE When one fan unit is removed from the server, the remaining fan units operate at full speed for two minutes. After two minutes a “soft-shutdown” will occur.

Replacing a Hot-Swap Fan Unit

To replace a hot-swap I/O or power supply fan unit, perform the following steps:

- Step 1.** Orient the fan units by aligning the appropriate icon on the fan unit handle to the identical icon on the chassis wall.
- Step 2.** Push the fan unit firmly into the housing and close the handle until flush to the top of the chassis. The fan unit will plug into the power outlet on the system I/O board.

CAUTION If the fan unit handle does not close completely it is misaligned. Remove the fan unit and check that the alignment icons are oriented correctly.

- Step 3.** Check the QuickFind diagnostic board LED indicating the replaced fan unit.
- When the fan is functioning normally, the LED is off
 - When the fan fails, the LED is lit
- Step 4.** Replace the top cover. (See “Replacing the Top Cover” on page 34.)

I/O Baseboard Assembly

WARNING Ensure that the system is powered-down and all power sources have been disconnected from the server prior to removing or replacing the I/O baseboard assembly.

Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

Failure to observe this warning could result in personal injury or damage to equipment.

CAUTION Failure to properly complete the steps in this procedure will result in erratic system behavior or system failure. For assistance with this procedure contact your local HP Authorized Service Provider.

Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Removing the I/O Baseboard Assembly

To remove the I/O baseboard assembly, perform the following steps:

CAUTION Before removing your I/O baseboard assembly, record all boot configuration settings. (The settings are found using the BCH command INFO ALL.) These values may need to be reset after replacing your I/O baseboard assembly.

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 33.)
- Step 3.** Remove the three chassis fan units. (See “Removing a Hot-Swap Fan Unit” on page 36.)
- Step 4.** Unplug all external cabling attached to the ports at the rear of the I/O chassis.
- Step 5.** Unplug the internal SCSI cables attached to the top of the host bus adapter (HBA) board in PCI slot 1.
- Step 6.** Lift up on the locking lever attached to the side of the power supply cage to unplug the I/O baseboard assembly from the socket on the midplane riser board. (See Figure 2-17)

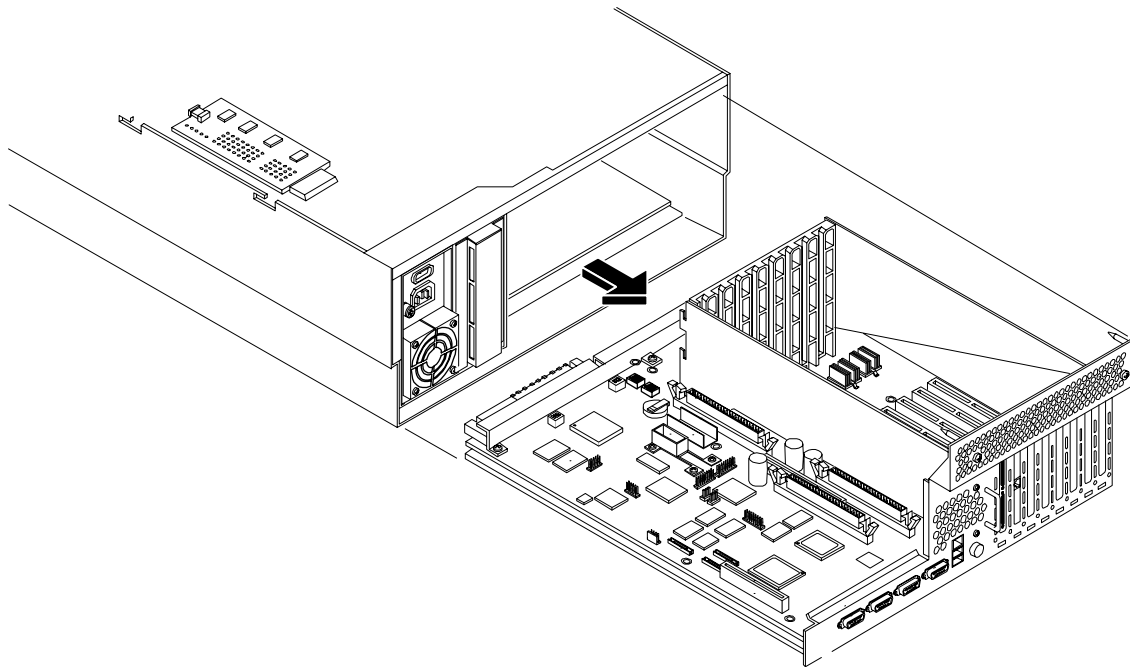
Figure 2-17 I/O Baseboard Locking Lever



Step 7. Slide the system I/O baseboard assembly all the way to the rear until removed from chassis.

NOTE The I/O baseboard assembly is large; be careful when lifting it out of the server chassis.

Figure 2-18 I/O Baseboard Assembly Removal



Replacing the I/O Baseboard Assembly

NOTE The I/O baseboard assembly replacement procedure assumes that you are reinstalling the assembly which was previously removed from a configured server. If you are installing a new or different I/O baseboard assembly, or if the battery has been replaced, refer to the *HP 9000 rp4410 and HP 9000 rp4440 Maintenance Guide* for instructions.

To replace the I/O baseboard assembly, perform the following steps:

Step 1. Align the I/O baseboard assembly rails with the chassis slots and slide the assembly into the chassis until it stops against the midplane riser board socket.

CAUTION The I/O baseboard assembly is large; use care when sliding it into the server chassis.

Ensure the I/O baseboard locking lever is in the “up” position to engage correctly with the midplane riser board socket.

Also, ensure that all fan modules are removed from the chassis prior to sliding in the I/O baseboard assembly or the fans and the I/O baseboard may be damaged.

Step 2. With the I/O baseboard flush against the midplane riser board socket, push down firmly on the locking lever until the I/O baseboard plugs all the way into the midplane riser board socket and the locking lever clicks into place on the chassis wall. (See Figure 2-17)

Step 3. Replace the three chassis fan units. (See “Replacing a Hot-Swap Fan Unit” on page 38.)

Step 4. Plug all external cabling into the ports at the rear of the chassis.

Step 5. Plug the internal SCSI cable(s) into the HBA board in PCI slot 1.

Step 6. Replace the top cover. (See “Replacing the Top Cover” on page 34.)

System Battery

Battery Notice

This product contains a Lithium battery (P/N 1420-0386).

WARNING **Lithium batteries may explode if mistreated. Do not recharge, disassemble, or dispose of in a fire. Failure to observe this warning could result in personal injury or damage to equipment.**

Replace with the identical or equivalent battery. Follow the manufacturer's recommendations. Dispose of used batteries according to the manufacturer's instructions.

Replacing the System Battery

You may replace the system battery by removing the top cover and accessing the I/O baseboard assembly.

CAUTION Before replacing the system battery, record all boot configuration settings. (The settings are found using the BCH command INFO ALL.) These values need to be reset after installing a battery.

To remove and replace the system battery, perform the following steps:

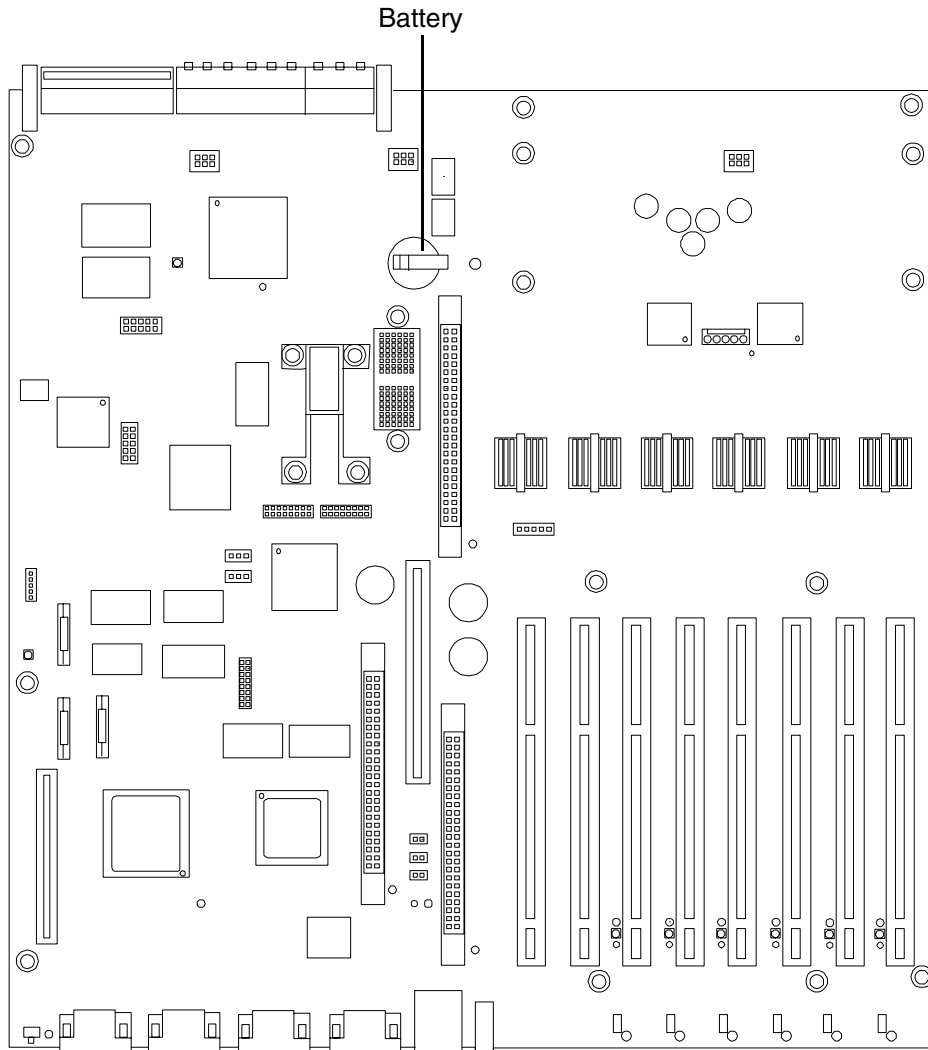
- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See "Extend the Server from the Rack" on page 18.)
- Step 2.** Remove the top cover from the chassis. (See "Removing the Top Cover" on page 33.)
- Step 3.** Remove the I/O baseboard assembly from the chassis. (See "Removing the I/O Baseboard Assembly" on page 39.)
- Step 4.** Locate the system battery on the I/O baseboard.
- Step 5.** Lift up the battery holder retaining clip with a flat-head screwdriver and push on the back of the battery to remove the battery from its socket.
- Step 6.** Lift up the battery holder retaining clip with a flat-head screwdriver and slide the battery into the holder.

NOTE The positive terminal of the battery is designated by the + sign. The battery is installed with the + sign facing up.

- Step 7.** Replace the I/O baseboard assembly. (See "Replacing the I/O Baseboard Assembly" on page 41.)
- Step 8.** Replace the top cover. (See "Replacing the Top Cover" on page 34.)
- Step 9.** You must reset the system time and date using the BCH date command. Once you set the time and date, turn off the system, unplug the power cord, and wait for a minute before turning it back on. Execute the date command again. If the time and date are now correct, you installed the battery correctly.

Step 10. You may need to reconfigure the MP. Refer to the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for detailed information.

Figure 2-19 Battery Location on I/O Baseboard



Installing Power Supplies and Disk Drives

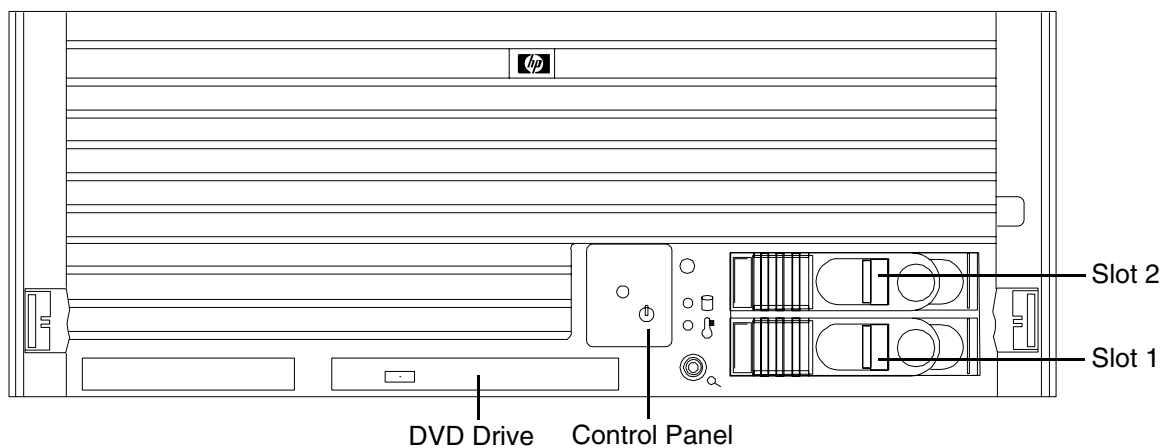
This section provides information about installing hot-swap power supplies and hot-plug disk drives. Hot-swap power supplies are located at the rear of the HP 9000 rp4410 and HP 9000 rp4440 servers and hot-plug disk drives are located behind the front bezels.

CAUTION A hot-plug device may require interaction with the operating system before the device is safely installed into the server. Verify that the operating system supports installing disk drives while the operating system is running. If the operating system does not support this feature, shut down the operating system before attempting this procedure. Failure to observe this caution will result in system failure. For more information on hot-plug procedures. (See “Hot-Plug PCI/PCI-X” on page 65.)

NOTE A hot-swap device does not require interaction with the operating system before the device is removed from or installed into the server.

The AC power to the server does not have to be off to install a hot-swap power supply.

Figure 2-20 Front View



Installing Hot-Swap Power Supply Units (PSU)

Power Supply Load Order

The supported configuration of an HP 9000 rp4410 or HP 9000 rp4440 server requires a minimum of one power supply unit. You may install a second, optional hot-swap PSU, to provide N+1 capability. Each power supply requires a separate power cord.

The left side (viewing from the rear) hot-swap PSU is identified as P0, and the second hot-swap power supply is identified as P1. Each hot-swap PSU requires a separate power cord, installed in the appropriate power cord receptacle and attached to a power cord support bracket.

CAUTION The empty hot-swap PSU slot P1 must remain closed, with the supplied metal cover, when a second power supply is not used. Your server may be damaged due to overheating if the cover does not remain in place.

WARNING **Be careful when installing a hot-swap power supply. It is heavier than it appears.**

CAUTION If the system is powered-down, install the hot-swap PSU into the server before attaching the new power cord at the rear of the system. Failure to observe this caution will result in damage to the server.

To install a hot-swap power supply, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the cable management arm from the rackslide nearest the PSUs. The cable management arm does not have to be completely removed, but moved just enough to allow access to the PSUs.
- Step 3.** Remove the metal cover from slot P1. Grasp the metal cover and pull straight out.
- Step 4.** Supporting the PSU with both hands, slide it into slot P1 until it plugs into the socket on the internal power supply board. Hand tighten the thumbscrew.
- Step 5.** Install the power cord into the PSU socket and secure it to the power cord bracket.
- Step 6.** Apply power (200 - 240 VAC) to the new PSU. The LED immediately turns on.

Figure 2-21 Hot-Swap Power Supply in Slot P0

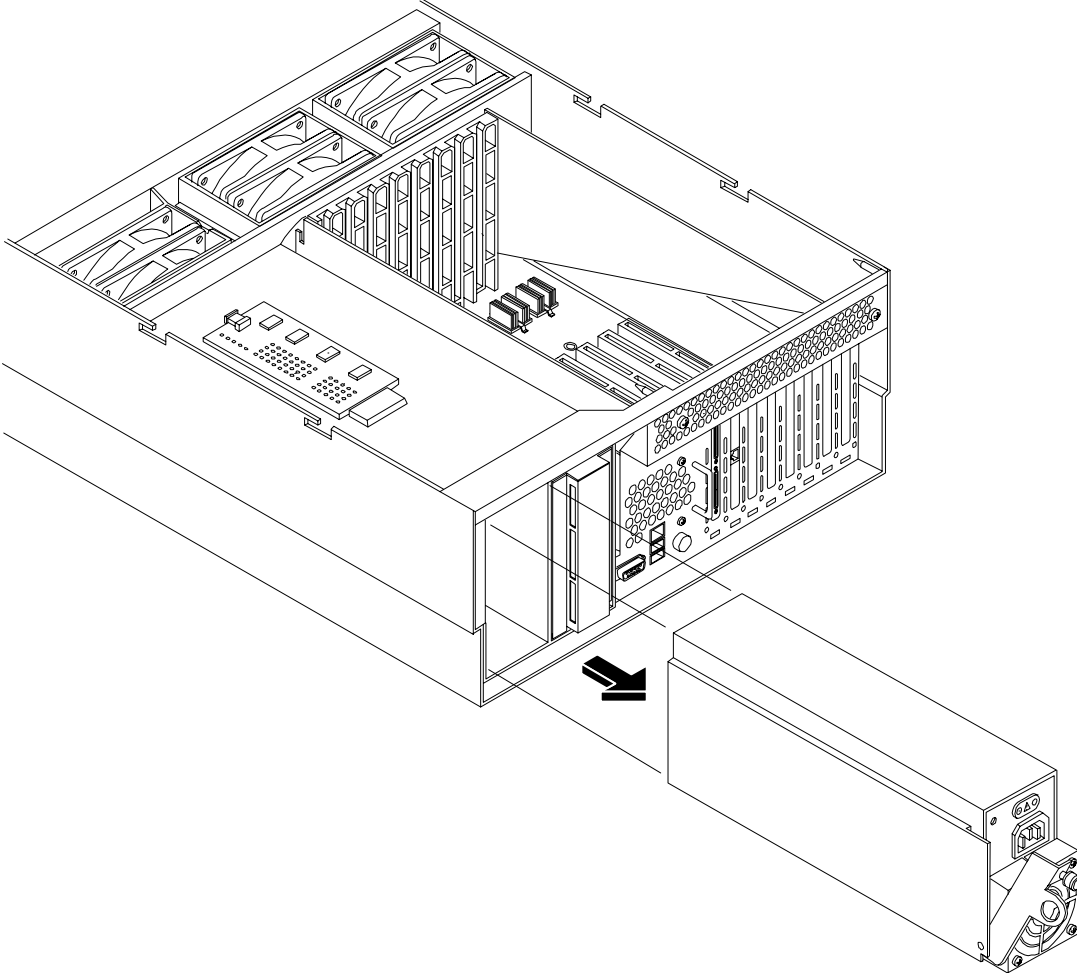
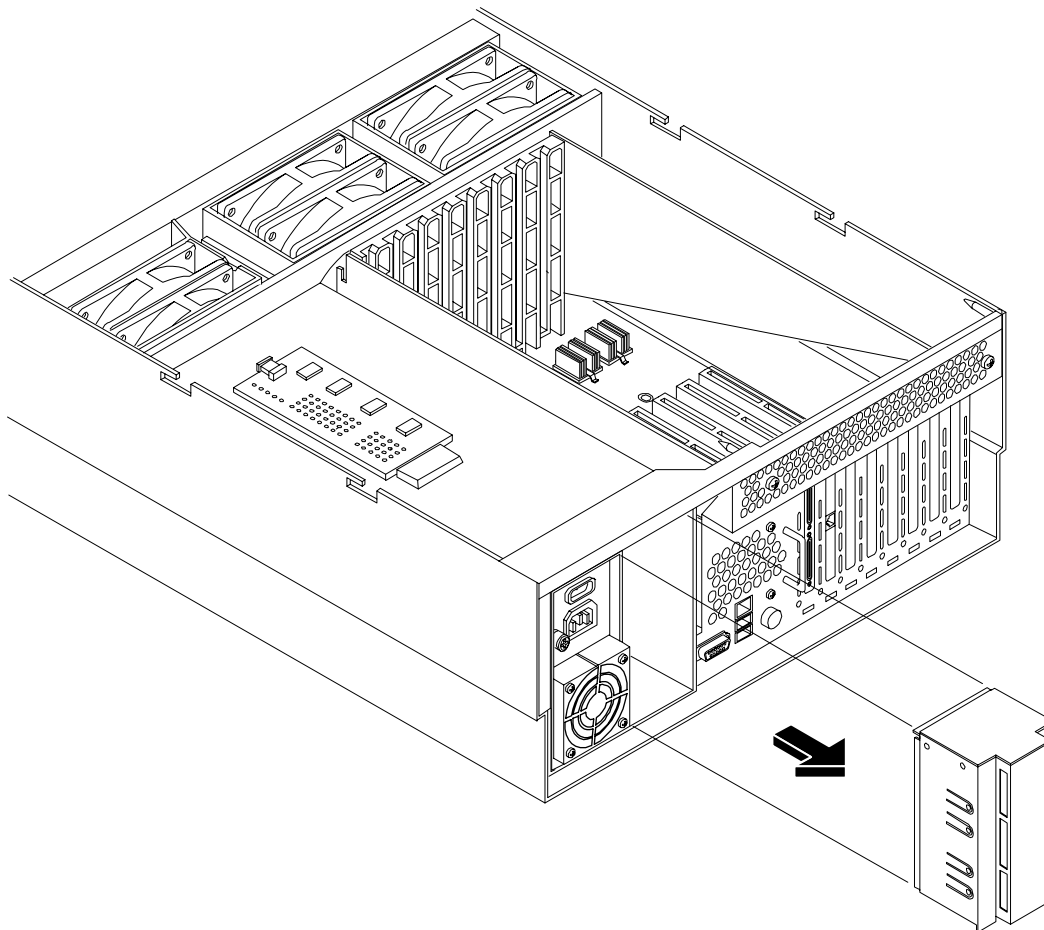


Figure 2-22 Metal Cover in Unused Slot P1



Installing Hot-Plug Disk Drives

One additional hot-plug disk drive may be added to your HP server in slot 2. Always use low profile disk drives (1.0" height) in your HP server.

To install a hot-plug disk drive, perform the following steps:

Step 1. Remove the volume filler from slot 2. (See Figure 2-24)

NOTE For cooling purposes, always leave the volume filler in slot 2 if you do not use a second disk drive.

Step 2. Slide the hot-plug hard disk into slot 2 until it is seated.

Step 3. Close the drive ejector handle by pushing it down until it clicks.

Step 4. The hot-plug disk drive is now correctly installed.

Figure 2-23 Disk Drive Installation in Slots 1 and 2

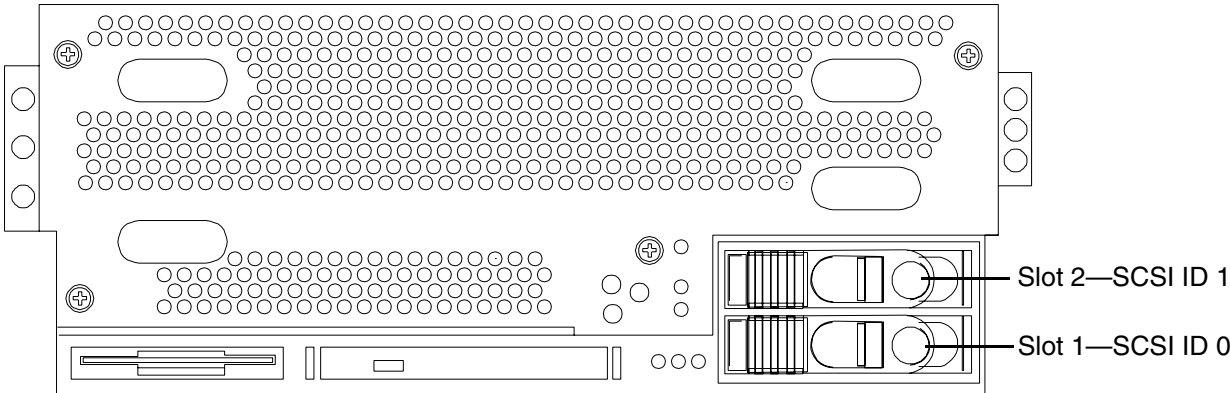


Figure 2-24 Disk Drive Installation in Slot 2

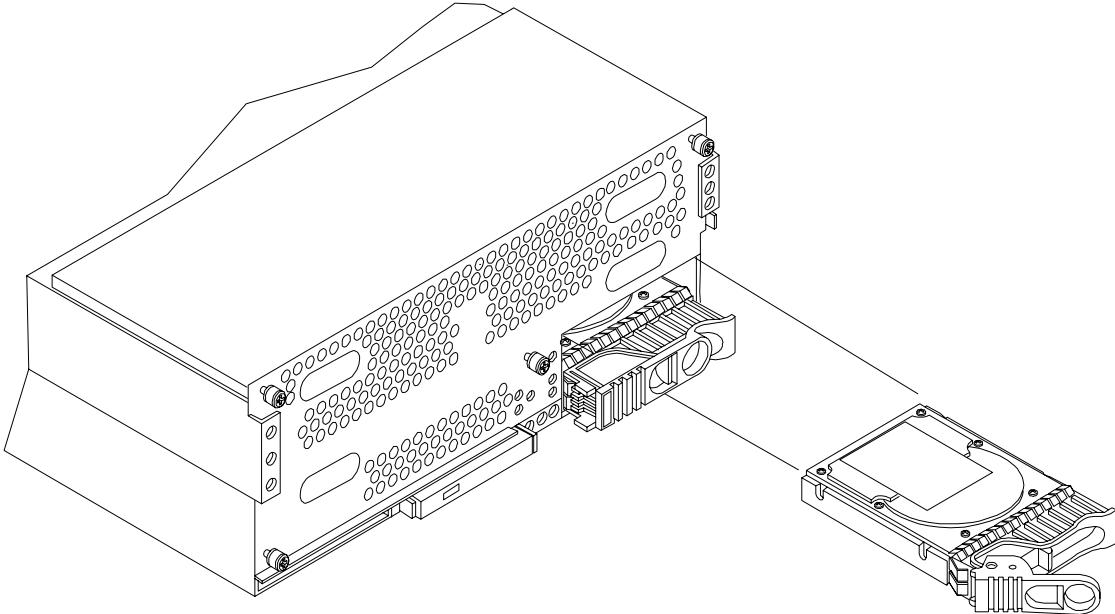
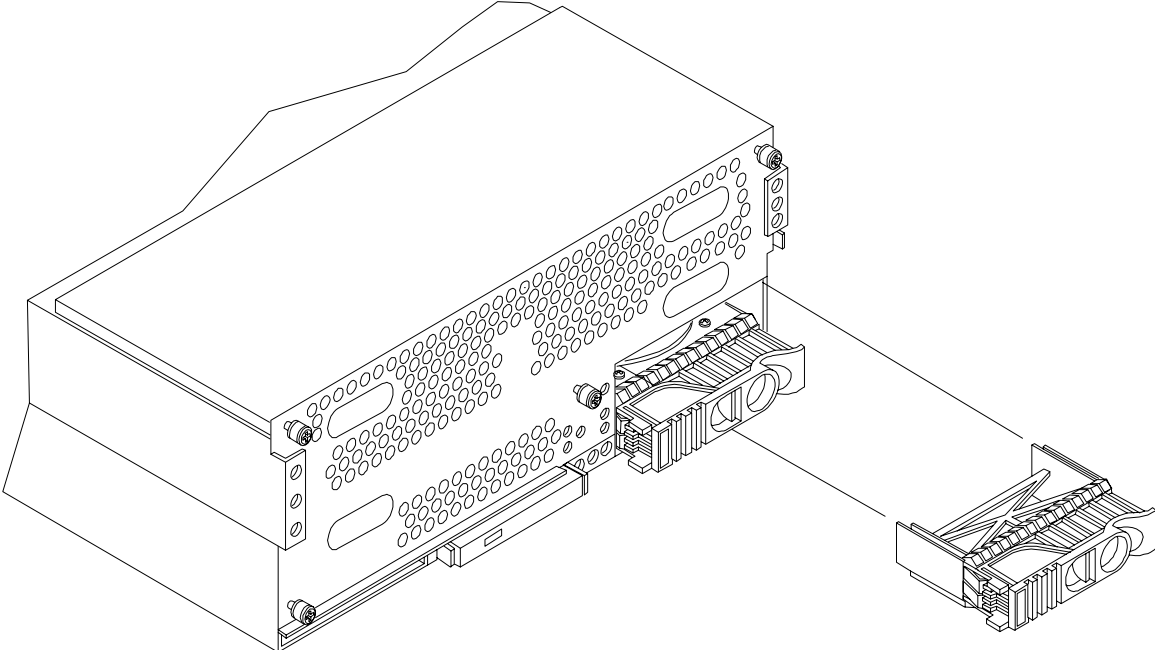


Figure 2-25 **Volume Filler Installation in Slot 2**



Installing Processors and Memory

This section provides information about installing processors and memory. The processors and memory extender boards are located under the front cover.

WARNING Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

Ensure that the system is powered-down and all power sources have been disconnected from the server prior to attempting the following procedures.

Failure to observe this warning could result in personal injury or damage to equipment.

Installing Processors

CAUTION Ensure that processor speed and cache size are identical for all processors. Failure to observe this caution will result in performance degradation or system failure.

The easiest way to ensure compatibility is by using dual processor modules with identical part numbers.

CAUTION Your processor extender board may be used in PA RISC or Itanium (IPF) processor based systems. A dipswitch is provided to configure processor extender board circuits. Ensure that the PA RISC/IPF dipswitch is set to PA RISC for your HP 9000 rp4410 and HP 9000 rp4440 servers. If this switch is incorrectly set, the system will not enter into self test.

Refer to the *HP 9000 rp4410 and HP 9000 rp4440 Maintenance Guide* for dipswitch setting information.

Tools Required

To install processors in your HP server, you must use the CPU Install Kit, P/N 5069-5441.

This tool kit consists of:

- A3024-80004, Disposable ESD Kit
- A7231-04046, CPU Install Tool

Dual Processor Modules

The HP 9000 rp4410 and HP 9000 rp4440 servers utilize dual processor modules. Each module contains two processors. When only one processor has been activated (a 1-way configuration of the HP 9000 rp4410 server), the second processor is installed but not enabled and is available for future use. The HP 9000 rp4410 server may contain one or two dual processor modules to provide 1-, 2- or 4-way configurations. The HP 9000 rp4440 server may contain one, two, three, or four dual processor modules to provide 2-, 4-, 6- or 8-way configurations. If you are installing fewer than the maximum number of dual processor modules, the modules must be installed in the appropriate sockets/connectors.

Processor Load Order

You can install up to four dual processor modules on the processor extender board, which is located under the front cover in the top service bay, directly under the memory extender board. If you are installing fewer than the maximum number of dual processor modules (one in the rp4410 server or fewer than four in the rp4440 server), they must be installed in the designated locations on the processor extender board.

The connectors (slots/sockets) on the processor extender board are labeled CPU0 through CPU3. CPU0 and CPU1 connectors are located on the top of the processor extender board and CPU2 and CPU3 connectors are located on the bottom. If you are installing only one dual processor module, it must be installed in the CPU0 socket. Similarly, the second dual processor module must be installed in the CPU1 socket. The third and fourth dual processor modules must be installed in socket CPU2 and CPU3, respectively. The load sequence is described in Table 2-8.

Table 2-8 Dual Processor Module Load Order

| Server | Dual Processor Module | Connector /Socket |
|------------------|-----------------------|-------------------|
| rp4410 or rp4440 | 1 | CPU0 |
| rp4410 or rp4440 | 2 | CPU1 |
| rp4440 only | 3 | CPU2 |
| rp4440 only | 4 | CPU3 |

Figure 2-26 Extender Board Latches

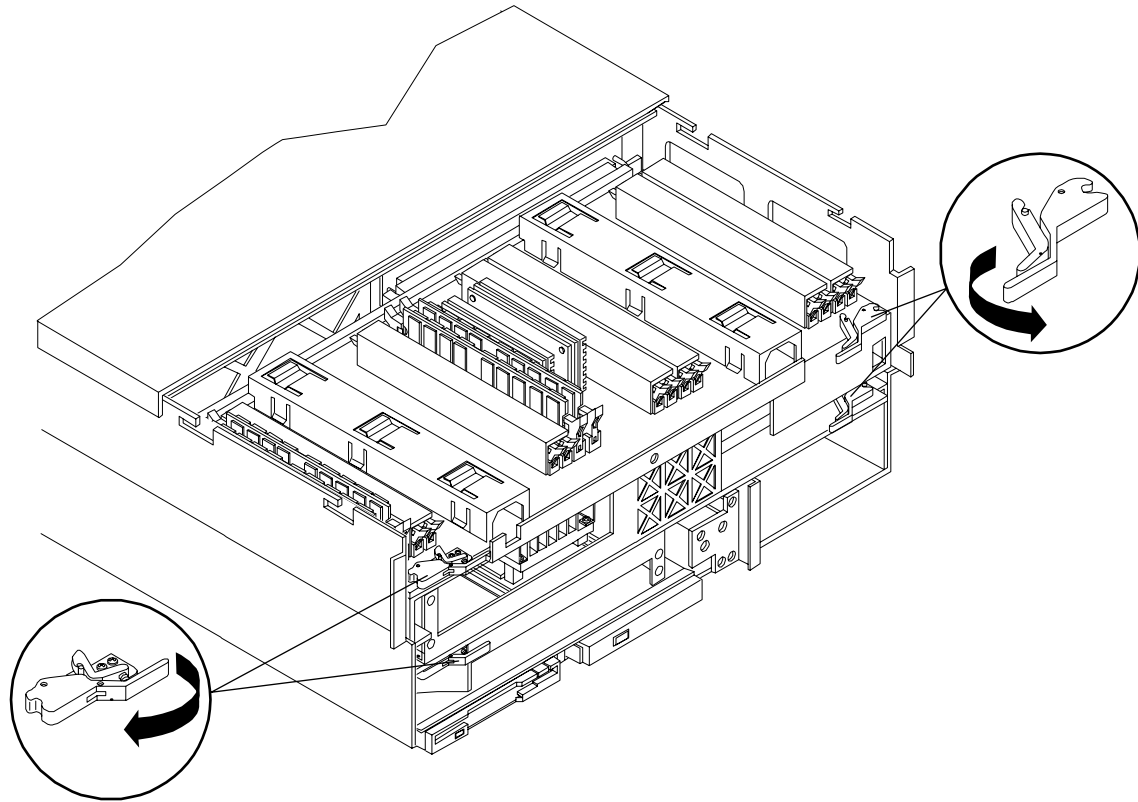
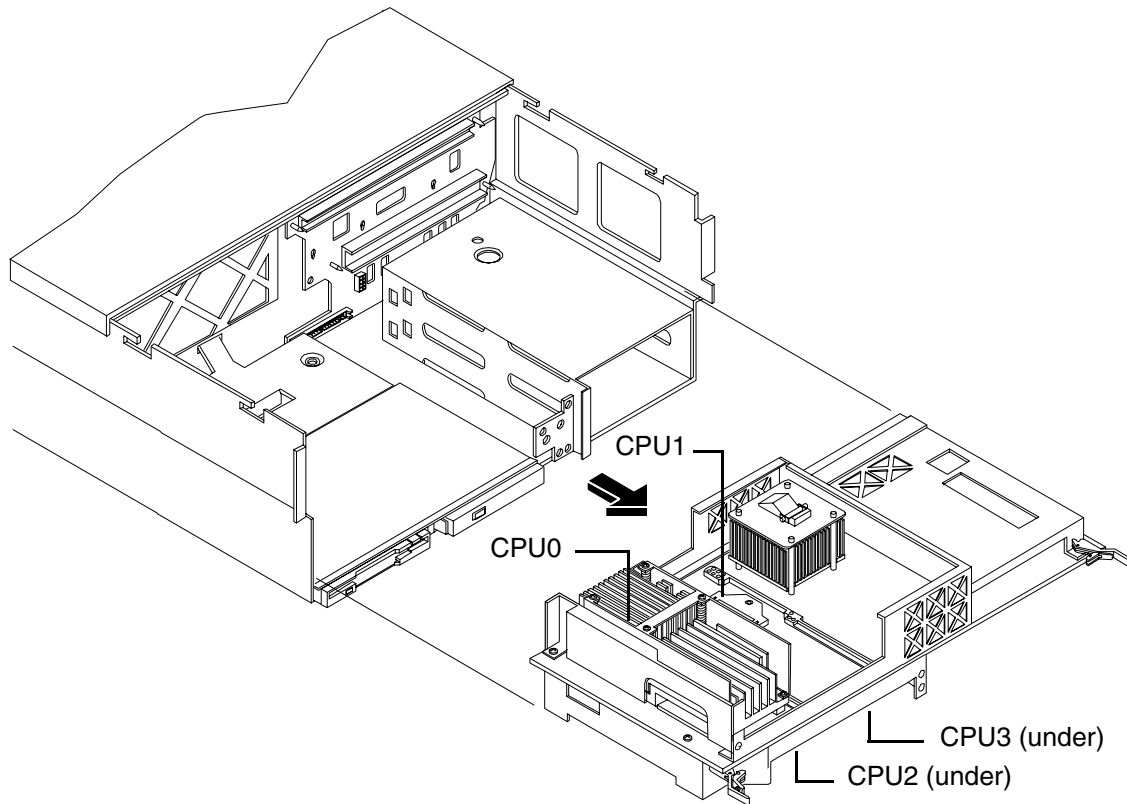


Figure 2-27 Removing the Processor Extender Board



Removing the Processor Extender Board

To remove the processor extender board, perform the following steps:

WARNING Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing the processor extender board. Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position. Failure to observe this warning could result in personal injury or damage to equipment.

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 31.)
- Step 3.** Remove the front cover. (See “Removing the Front Cover” on page 32.)
- Step 4.** Press the latch on each extraction lever located on each side of the processor extender board.
- Step 5.** Pull out on the extraction levers to unplug the processor extender board from the socket located on the midplane riser board.

CAUTION Your processor extender board may be used in PA RISC or Itanium (IPF) processor based systems. A dipswitch is provided to configure processor extender board circuits. Ensure that the PA RISC/IPF dipswitch is set to PA RISC for your HP 9000 rp4410 and HP 9000 rp4440 servers. If this switch is incorrectly set, the system will not enter into self test.

Refer to the *HP 9000 rp4410 and HP 9000 rp4440 Maintenance Guide* for dipswitch setting information.

Installing a Processor on the Extender Board

CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

To install a processor on the extender board, perform the following steps:

NOTE Prior to installing a processor into your system, read the following instructions carefully and see Figure 2-30 for a complete understanding of this process.

Step 1. Locate the socket (CPU1, CPU2, or CPU3) where you will install the dual processor module. (See Figure 2-27 on page 54 and see “Processor Load Order” on page 52.)

Step 2. Ensure that the cam on the processor socket lock is in the unlocked, counterclockwise position.

Step 3. Remove any protective packaging from the processor module.

NOTE Protective covers may be installed to protect connector pins. These covers can be saved for future use.

Step 4. Carefully lower the processor, without the sequencer frame, onto the processor socket. Align the pins on the bottom of the heatsink to the slots in the retention frame on the extender board.

CAUTION Test the alignment of the assembly to the socket by gently moving the assembly back and forth with the palm of your hand—you should feel little or no sideplay. However, because the assembly is not yet tightened, it may tilt slightly toward the center of the extender board; this is acceptable.

CAUTION Before locking the processor assembly into its socket, ensure that the power cable is not pinched between the heatsink and sheet metal frame of the extender board. Also, ensure that the two power cable ends attached to the dual processor module do not come unplugged from their sockets when you move the cable into place under the heatsink. See Figure 2-28 and Figure 2-29

Figure 2-28 Processor Cable Placed Correctly

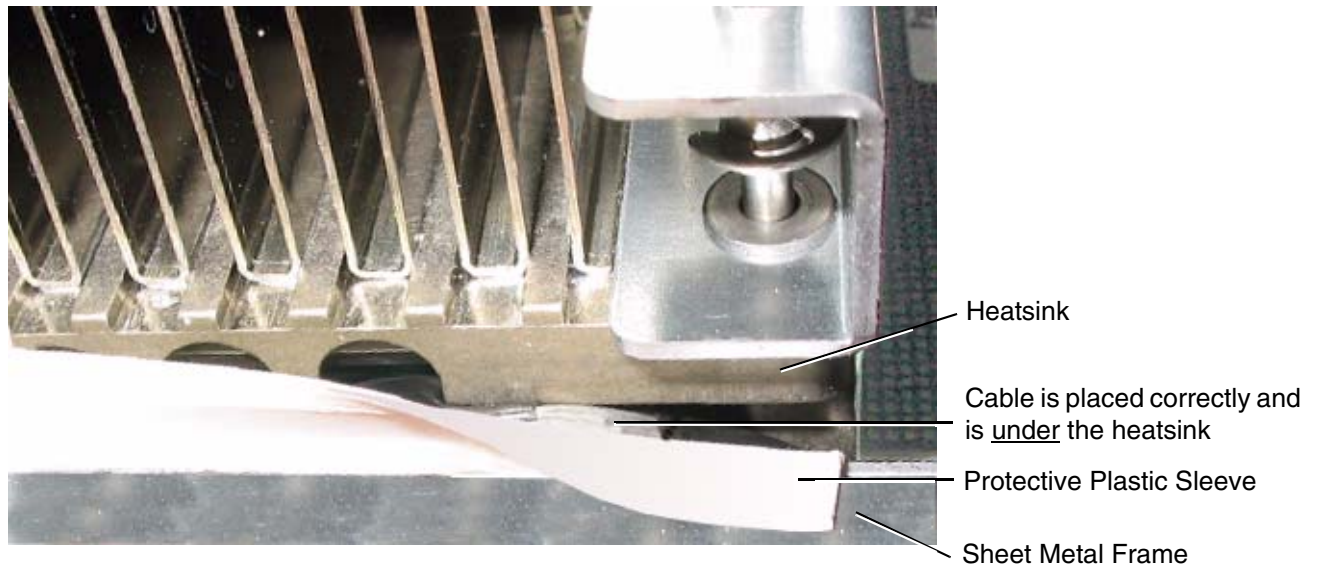
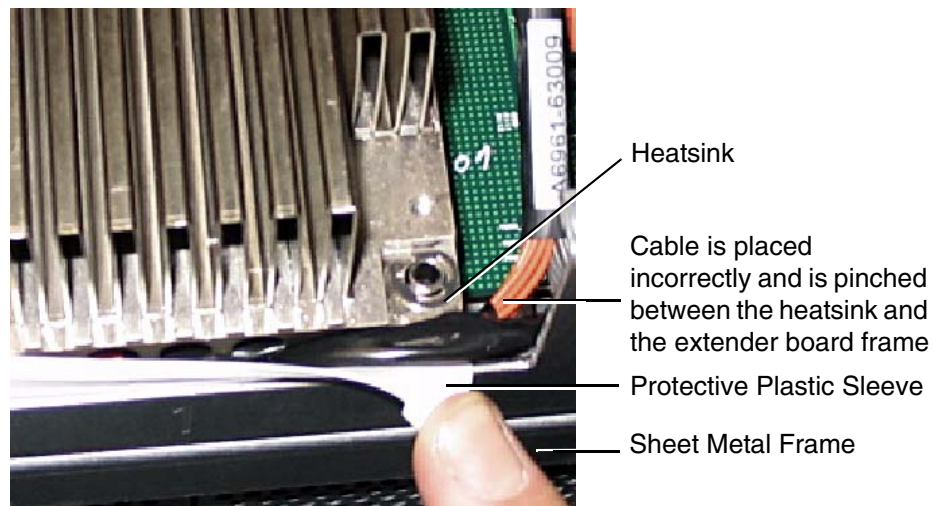


Figure 2-29 Processor Cable Placed Incorrectly



Step 5. Lock the assembly to the socket by rotating the cam on the socket 180 degrees clockwise, using a CPU Install tool (or 2.5 MM. Allen wrench).

CAUTION When rotating the locking cam, hold the palm of your hand on top of the assembly and exert light pressure. This ensures that the assembly stays flush and level to the socket while it is being tightened.

Step 6. Plug the processor cable into its socket on the extender board.

Step 7. Place the sequencer frame over the processor.

Step 8. Hand tighten the two knurled thumbscrews on the sequencer frame.

CAUTION Do not tighten the other four shoulder screws until you have first hand-tightened the two knurled thumbscrews.

Step 9. Using a CPU Install tool (Torx T15 driver), tighten the four remaining T15 shoulder screws until they bottom out. Follow the tightening sequence shown in Figure 2-30

CAUTION Do not overtighten the four shoulder screws—they may shear off if overtightened. Stop tightening the shoulder screws when you feel them bottom out.

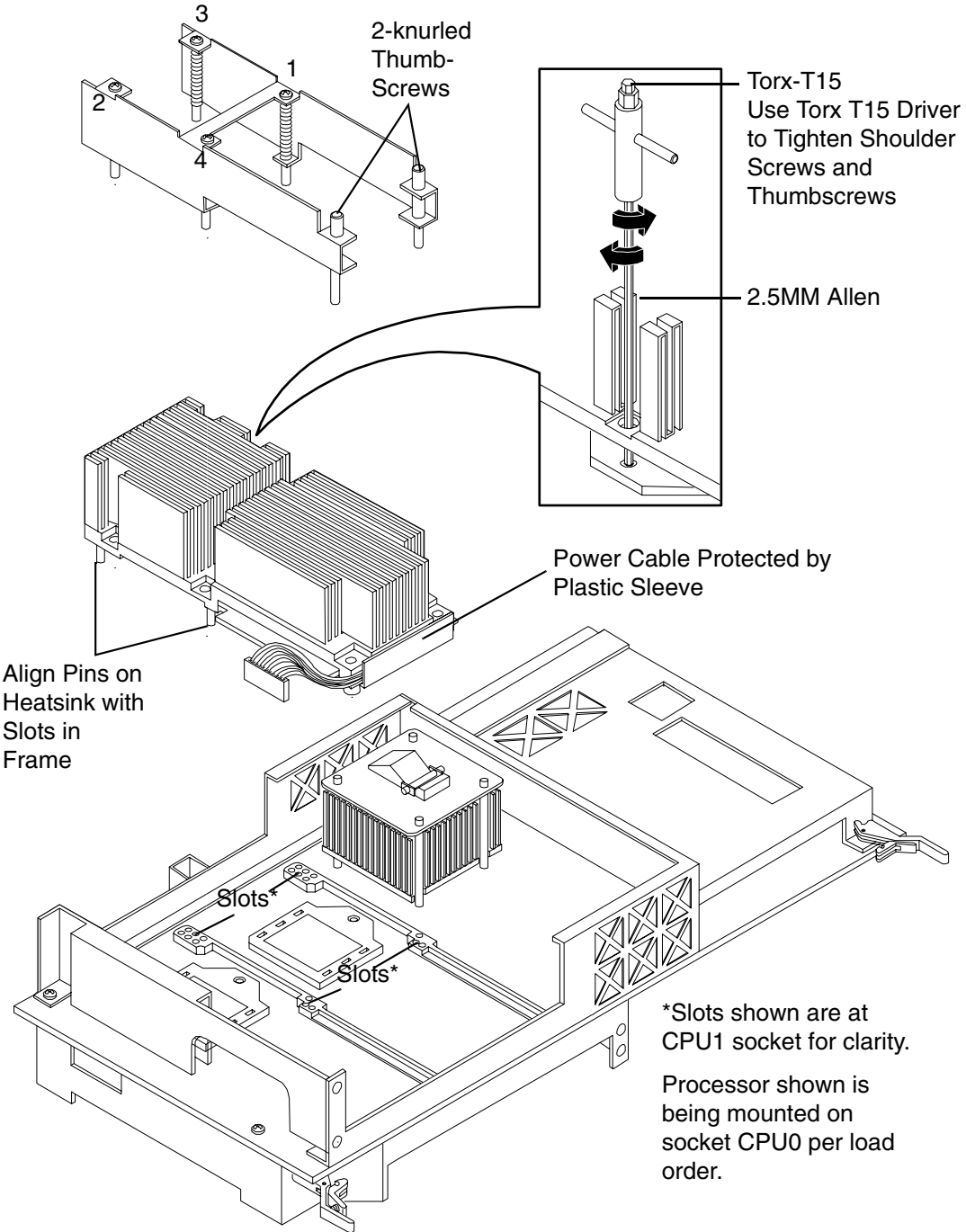
Step 10. Using the CPU Install tool (Torx T15 driver), finish tightening the two thumbscrews.

CAUTION Do not overtighten the two thumbscrews; they may shear off if overtightened. Tightening the thumbscrews by 1/4 turn will tighten them sufficiently.

Figure 2-30 **Installing Processor on Extender Board**

Tightening Sequence for 4-Shoulder
Screws is 1, 2, 3, 4

DO NOT OVERTIGHTEN! See Step 7



Extender Board Switches and Jumpers

The processor extender board includes switches and jumpers. These switches are factory preset and should not be altered except by your HP Service Representative.

Replacing the Processor Extender Board

To replace the processor extender board, perform the following steps:

- Step 1.** Ensure that the extraction levers are positioned in the outward, unlocked position.
- Step 2.** Align the processor extender board with the left and right card guides.
- Step 3.** Slide the processor extender board in until it begins to seat in the socket located on the midplane riser board.
- Step 4.** Push the extraction levers inward to the locked position in order to fully seat the processor extender board into the midplane riser board socket.
- Step 5.** Replace the front cover and front bezel.
- Step 6.** Verify processor operation by using the system utilities. (Refer to the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for additional information.)
 - Use the MP commands and the BCH commands to verify operation
 - Use MAKODIAG provided by the offline diagnostic environment to exercise the processor

Installing Memory

The standard configuration of HP 9000 rp4410 and HP 9000 rp4440 servers includes a 16-DIMM memory extender board. This extender board must contain a minimum of 1 GB of memory (four 256 MB DIMMs loaded in quad 0 [connectors 0A, 0B, 0C, and 0D]). (See Figure 2-31)

An optional 32-DIMM memory extender board is available to replace the 16-DIMM memory extender board. This extender board must contain a minimum of 1 GB of memory (four 256 MB DIMMs loaded in quad 0 [connectors 0A, 0B, 0C, and 0D]). (See Figure 2-32)

You may insert additional DIMMs into both 16- and 32-DIMM boards. When adding DIMMs, you must use a minimum of four like-sized DIMMs in the next available quad.

Supported DIMM Sizes

Up to 128 GB of memory can be installed in your HP server. Supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB. Dissimilar DIMM sizes may be used across the entire extender board but all four DIMMs in each quad must match. For cooling purposes, you must install DIMM fillers into unused connectors.

DIMM Slot Fillers

Both the 16- and 32-DIMM extender boards must have DIMM slot filler boards placed over all unfilled DIMM connectors. As you fill DIMM quads with additional memory you must remove the DIMM slot fillers covering the connectors. All remaining DIMM fillers in unused connectors must remain in place to maximize internal cooling. (See Table 2-9 on page 60 and Table 2-10 on page 60.)

NOTE One DIMM filler board covers two adjacent DIMM connectors. As a general rule, only remove DIMM slot fillers as you add memory and you will always retain the correct configuration.

Table 2-9 DIMM Filler Requirements for 16 DIMM Extender Board

| 16 DIMM Extender Board | |
|----------------------------------|------------------------------------------------------------------------------|
| DIMMs Loaded | Fillers Required^a |
| 4 DIMMs in quad 0 | 6 fillers total: 2 fillers in quads 1, 2, and 3 (all quads filled) |
| 8 DIMMs in quads 0 and 1 | 4 fillers total: 2 fillers in quads 2, and 3 (all quads filled) |
| 12 DIMMs in quads 0, 1, and 2 | 2 fillers total: 2 fillers in quad 3 (all quads filled) |
| 16 DIMMs in quads 0, 1, 2, and 3 | No fillers required |

a. One DIMM filler board covers two adjacent DIMM connectors.

Table 2-10 DIMM Filler Requirements for 32 DIMM Extender Board

| 32 DIMM Extender Board | |
|-------------------------------|----------------------------------------------------------------------------------------------|
| DIMMs Loaded | Fillers required^a |
| 4 DIMMs in quad 0 | 12 fillers total: 2 fillers in quads 1, 3, 4, 5, 6 and 7 (quad 2 remains unfilled) |
| 8 DIMMs in quads 0 and 1 | 8 fillers total: 2 fillers in quads 4, 5, 6 and 7 (quads 2 and 3 remain unfilled) |
| 12 DIMMs in quads 0, 1, and 2 | 8 fillers total: 2 fillers in quads 4, 5, 6 and 7 (quad 3 remains unfilled) |

Table 2-10 DIMM Filler Requirements for 32 DIMM Extender Board (Continued)

| 32 DIMM Extender Board | |
|----------------------------------------------|----------------------------------------------------------------------------|
| 16 DIMMs in quads 0, 1, 2, and 3 | 8 fillers total: 2 fillers in quads 4, 5, 6 and 7 (all quads filled) |
| 20 DIMMs in quads 0, 1, 2, 3, and 4 | 4 fillers total: 2 fillers in quads 5, 7 (quad 6 remains unfilled) |
| 24 DIMMs in quads 0, 1, 2, 3, 4, and 5 | No fillers required |
| 28 DIMMs in quads 0, 1, 2, 3, 4, 5 and 6 | No fillers required |
| 32 DIMMs in quads 0, 1, 2, 3, 4, 5, 6, and 7 | No fillers required |

a. One DIMM filler board covers two DIMM adjacent connectors.

Figure 2-31 16 DIMM Extender Board Minimum Configuration

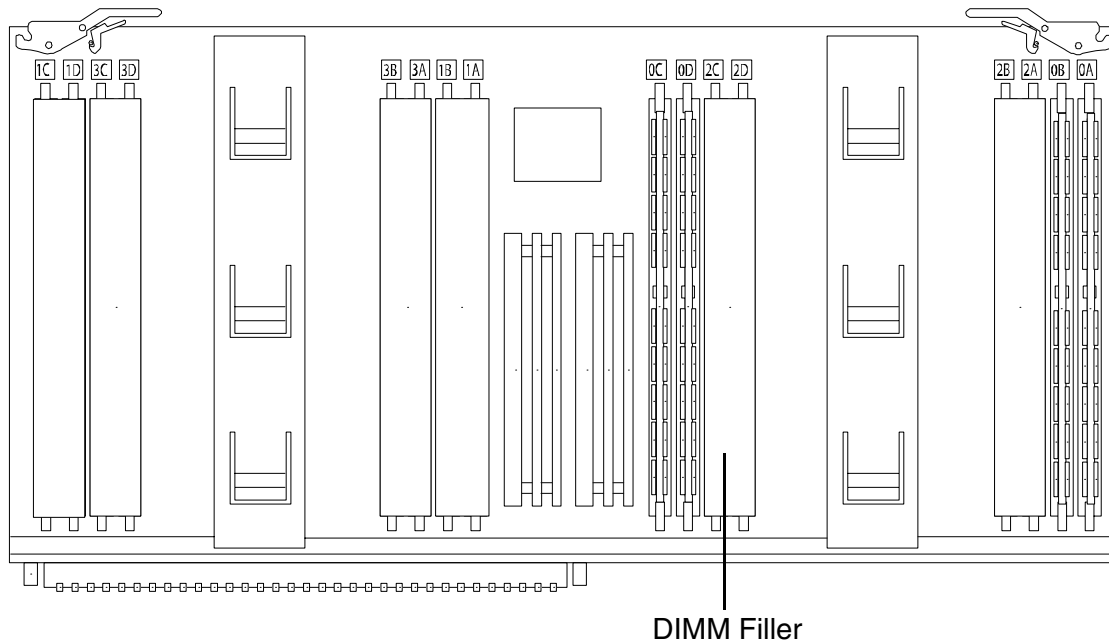
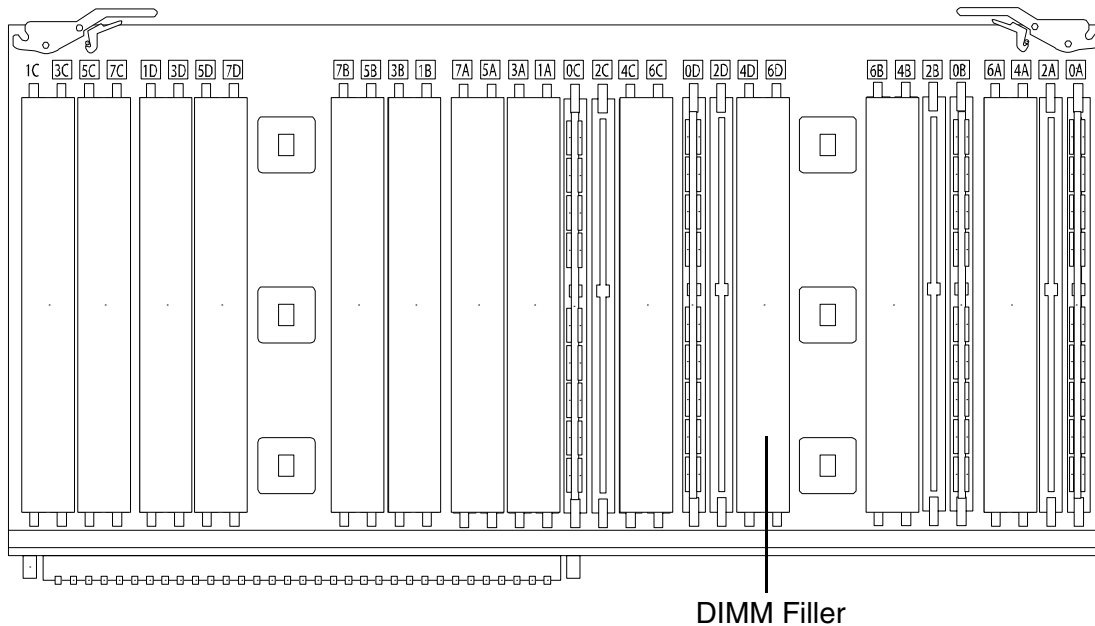


Figure 2-32 32 DIMM Extender Board Minimum Configuration



Removing a Memory Extender Board

To remove a memory extender board, perform the following steps:

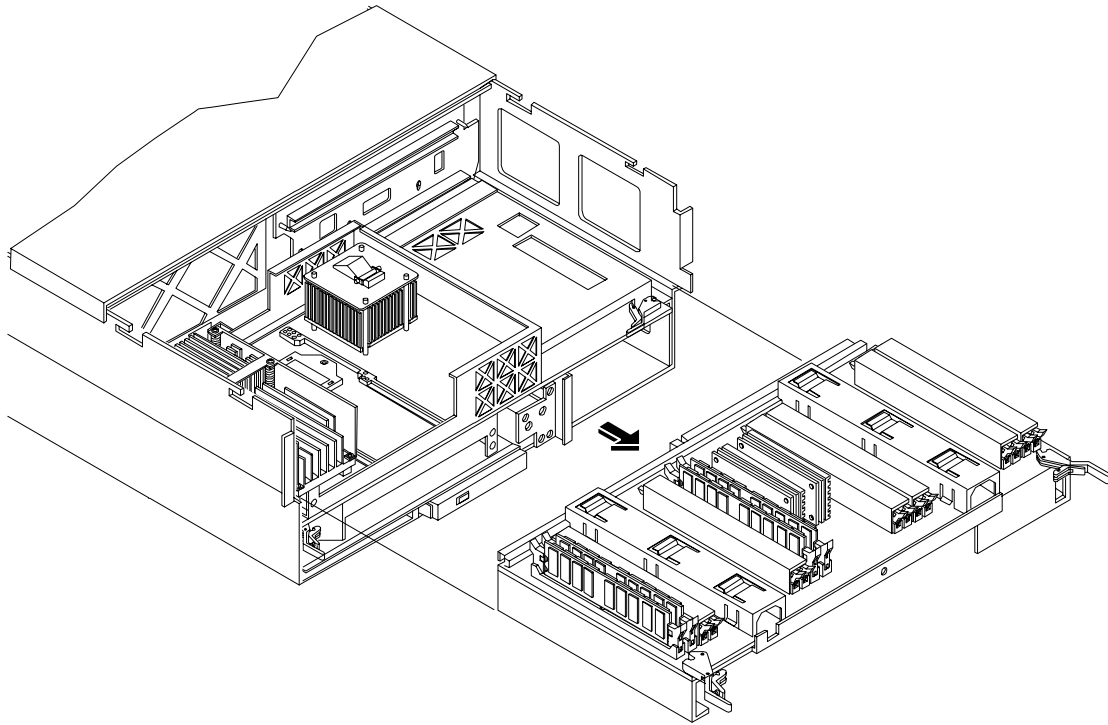
WARNING Ensure that the system is powered down and all power sources have been disconnected from the server prior to working within the server.

Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

Failure to observe this warning could result in personal injury or damage to equipment.

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the front bezel from the chassis. (See “Removing the Front Bezel” on page 31.)
- Step 3.** Remove the front cover from the chassis. (See “Removing the Front Cover” on page 32.)
- Step 4.** Press the latches on the extraction levers located on each side of the memory extender board. (See Figure 2-26)
- Step 5.** Pull on the extraction levers to unplug the memory extender board from the socket located on the midplane riser board and remove the memory extender board from the chassis. (See Figure 2-33)

Figure 2-33 **Removing the Memory Extender Board**

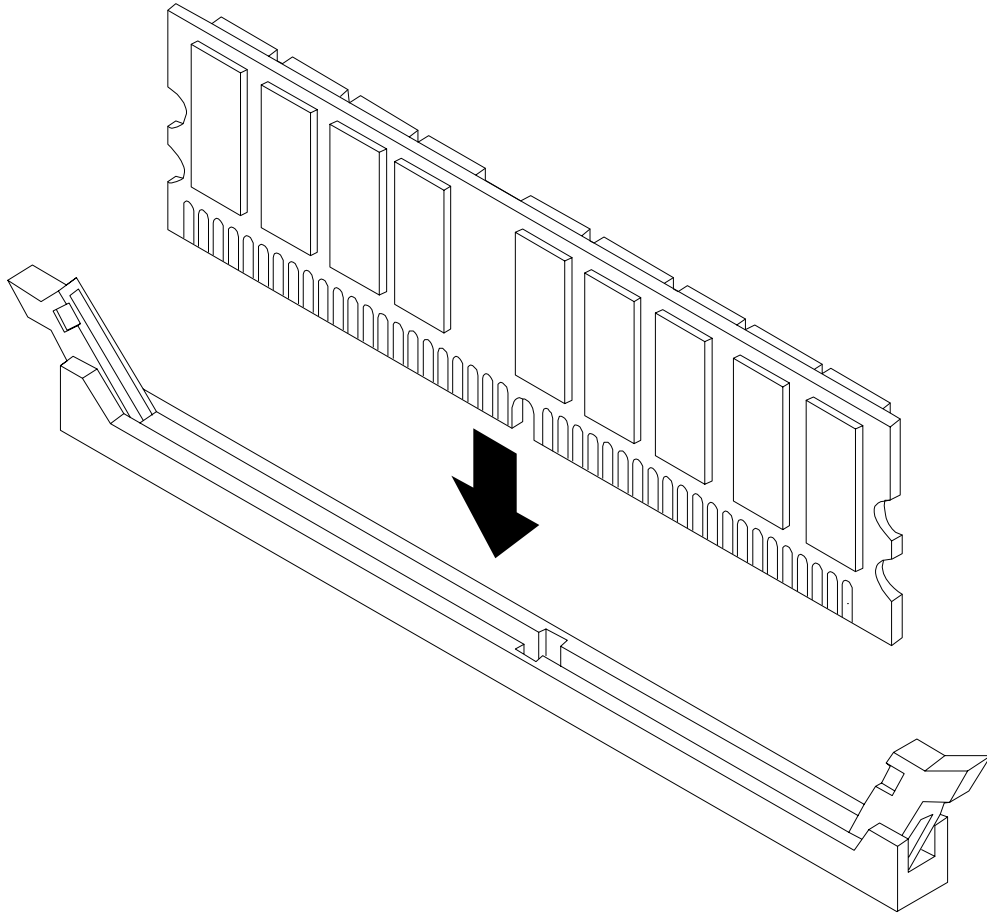


Installing DIMMs

To install DIMMs, perform the following steps:

- Step 1.** Align the DIMM with the socket located on the memory extender board. (Align the notch in the DIMM with the tab in the connector.)
- Step 2.** Firmly and evenly push on each end of the DIMM until it seats in the socket. Ensure that the extraction levers are in the closed position.

Figure 2-34 **Inserting DIMM into Extender Board Connector**



Replacing a Memory Extender Board

To replace the memory extender board, perform the following steps:

- Step 1.** Ensure the extraction levers are positioned in the outward, unlocked position.
- Step 2.** Align the memory extender board with the left and right chassis guide slots.
- Step 3.** Slide the memory extender board in until it begins to seat in the socket located on the midplane riser board.
- Step 4.** Push the extraction levers inward to the locked position in order to fully plug the memory extender board into the midplane riser board.
- Step 5.** Replace the front cover onto the chassis. (See “Replacing the Front Cover” on page 33.)
- Step 6.** Replace the front bezel onto the chassis. (See “Replacing the Front Bezel” on page 31.)

Hot-Plug PCI/PCI-X

The HP 9000 rp4410 and HP 9000 rp4440 servers support PCI/PCI-X hot-plug technology and includes six PCI/PCI-X, hot-plug capable slots.

Hot-Plug PCI/PCI-X Operations

PCI/PCI-X hot-plug technology enables the following operations. For procedures with step-by-step instructions describing how to add, replace, delete, and locate PCI/PCI-X cards. (See “Hot-Plug Operation Procedures” on page 69.)

- **Online Addition (OLA)**

You can install new PCI/PCI-X expansion cards in previously empty slots without powering down the server

- **Online Replacement (OLR)**

You can replace a previously occupied slot with a new PCI/PCI-X expansion card by suspending the driver. This operation combines removing an active card and replacing it with an equivalent capability card. The existing driver for the old card must be compatible with the new card.

CAUTION A special OLR requirement for HP-UX 11i v1 (and later) is that the card to be inserted (replaced) must be exactly the same as the removed card. This is also known as like-for-like replacement.

- **PCI/PCI-X Slot Locate (Locate)**

To easily locate the PCI/PCI-X slot at which you wish to perform a hot-plug operation, you can command the attention LEDs, on the OLR divider and the I/O baseboard, to blink and act as visual cues to the active slot location. This operation is always initiated through a software or Web interface, and is optional to the operating system on your HP server.

PCI/PCI-X Hardware and Software Interfaces

The following table shows what hot-plug hardware and software interfaces are available on HP-UX 11i v1 (and later).

Table 2-11 Hot-Plug Hardware and Software Interfaces, and OS Availability

| Hot-Plug PCI/PCI-X Interface | Supported |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Hardware interface comprised of: —Attention button (doorbell) —Manual retention latch —Power LED —Attention LED —PCI/PCI-X card latch | Yes |
| Graphical User Interface | Yes |
| Command Line Interface (CLI) | Yes. rad command |

Table 2-11 Hot-Plug Hardware and Software Interfaces, and OS Availability

| Hot-Plug PCI/PCI-X Interface | Supported |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Administration Manager (SAM) | Yes. <code>sam</code> command. Performing hot-plug operations in the System Administration Manager is preferred. For a complete description of SAM, read the HP-UX Reference Guide at http://docs.hp.com |

PCI/PCI-X Slot Locations and Configurations

PCI/PCI-X slots are numbered from 1 through 8 in your HP server. See Figure 2-35, “Slot ID Numbering.”

The following describes configuration requirements for slots 1 through 8:

- PCI slots 1 and 2 are dedicated for use by the core I/O cards—SCSI HBA card in slot 1 and Gigabit Ethernet LAN card in slot 2. Slots 1 and 2 **are not** hot-plug capable. Additional PCI/PCI-X expansion cards **must not** be placed in slots 1 or 2.
- Slots 3 and 4 share a PCI bus, and slots 5 and 6 share a PCI bus. The maximum capability of each of the shared slots is PCI/PCI-X 66 MHz. If a PCI/PCI-X 133 MHz card is placed in a shared slot, then the maximum capability the PCI/PCI-X 133 MHz card runs at is PCI/PCI-X 66 MHz. If different modes (PCI vs. PCI-X) or slower speeds (33 MHz) are used, the slot you use automatically downgrades to accept the change.

Shared slots have card compatibility restrictions. If one of the shared slots is occupied, the card being added to the second slot is limited by the configuration of the occupied slot. If the new card has a slower capability than the current bus configuration, it will not work. If the new card has a faster capability than the current bus configuration, it only runs at the bus mode and frequency of the current bus configuration (slower).

1. If you have a 66 MHz card in slot 3, and you hot-plug insert a 33 MHz card into slot 4, then the operation will not succeed. The new 33 MHz card will not initialize and the slot will power-down because you cannot change bus speed during hot-plug operations.

| | |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOTE | If you reboot the system in the new configuration, both cards will initialize to run at 33 MHz. This is because the system firmware can only change the bus capability down to the lowest common value. |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

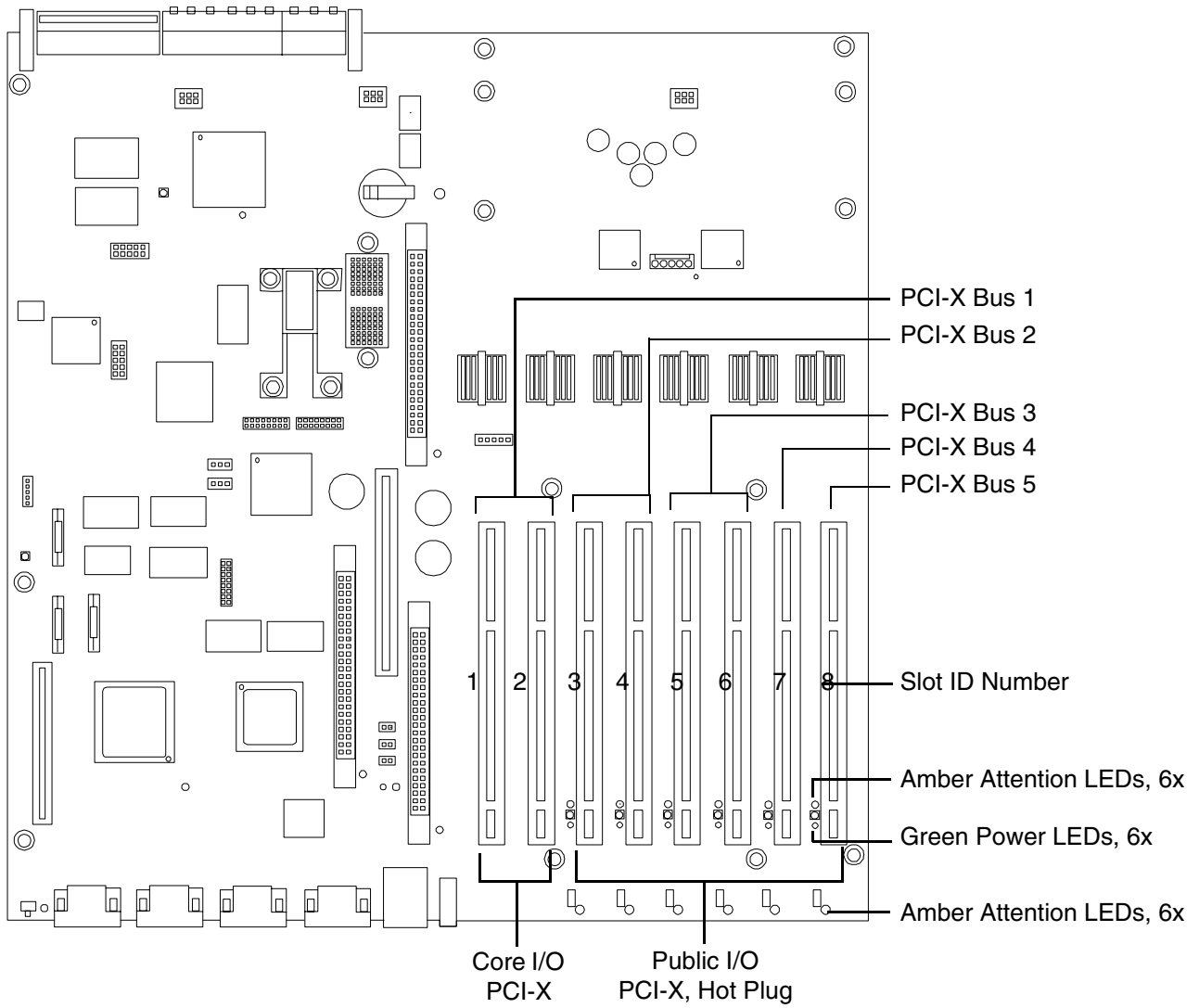
2. If you have a 33 MHz card in slot 3, and you hot-plug insert a 66 MHz card into slot 4, it will work but the new card will run at 33 MHz. This also applies to slots 5 and 6, since they are shared (both use a common bus).
 3. If your unit is powered-down, and you insert a 33 MHz card into slot 4 (that shares a 66 MHz card in slot 3), then both cards will run at 33 MHz when the unit is powered-up. This also applies to slots 5 and 6, as they are shared (both use a common bus).
- Slots 7 and 8 are single slots. The maximum capability of each slot is PCI/PCI-X 133 MHz. Only slots 7 and 8 allow 133 MHz, PCI/PCI-X cards to run at full speed. These two slots are not limited by bus-mode, frequency-related incompatibilities.

Table 2-12 PCI/PCI-X Card vs. Slot Frequency/Bus Mode Compatibility for Shared Slots^a

| Current PCI Bus Mode and Frequency for the Current Card in a Shared Slot | Cards to be installed | | | |
|--------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------|
| | PCI 33 | PCI 66 | PCI-X 66 | PCI-X 133 |
| PCI 33 MHz | Compatible ^b | Compatible ^b New card running at PCI 33 | Compatible ^b New card running at PCI 33 | Compatible ^b New card running at PCI 33 |
| PCI 66 MHz | Incompatible-frequency ^c | Compatible ^b New card running at PCI 66 | Compatible ^b New card running at PCI 66 | Compatible ^b New card running at PCI 66 |
| PCI-X 66 MHz | Incompatible-frequency ^c | Incompatible-bus ^d | Compatible ^b New card running at PCI 66 | Compatible ^b New card running at PCI-X 66 |
| PCI-X 133 MHz^e Running at PCI-X 66 MHz) | Incompatible-frequency ^c | Incompatible-frequency ^c | Compatible ^b New card running at PCI-X 66 | Compatible ^b New card running at PCI-X 133 |

- a. The conditions described in this table apply only to shared slots (slots 3 and 4 on bus number 2, slots 5 and 6 on bus number 3). Slots 7 and 8 are not shared slots.
- b. Compatible: card is accepted and runs at frequency shown.
- c. Incompatible-frequency: card will not work. The new card will not initialize and will power-down due to frequency mismatch.
- d. Incompatible-bus: Card will not work. The new card will not initialize and will power-down due to bus mode mismatch.
- e. Maximum bus mode and frequency supported on shared slots is PCI-X 66 MHz.

Figure 2-35 Slot ID Numbering



Hot-Plug Operation Procedures

The hot-plug procedures described in this section use the hardware interface only. Software interface procedures are described in Table 2-11 on page 65.

CAUTION Before adding or replacing a PCI/PCI-X card, determine if that card is critical to your system's operation. If you replace a card that is still operating and it is a critical resource to your system, you may cause undesired system downtime.

Online Addition (OLA)

Before installing a PCI/PCI-X card, ensure that the proper drivers for that PCI/PCI-X card are installed.

NOTE If you are installing the Graphics Kit A6150B, use slots 3-8. However, DO NOT install the included USB card. Your HP server currently supports USB and the ports are already located on the rear of your HP server.

If you are installing the RAID card A7143A, you must install it into slot 8. If you install this card in any other slot it will interfere with the manual retention latch (MRL) on the OLX divider in the next higher slot. Because of this interference you are restricted to only two RAID cards in your system—slot 1 and slot 8.

To add a PCI/PCI-X card into an empty slot, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the top cover from the chassis. (See “Removing the Top Cover” on page 33.)
- Step 3.** Choose an empty slot and pull up on the manual retention latch (MRL) located on the OLX divider approximately 75 degrees. (See Figure 2-36.)

CAUTION Do not pull up on the MRL of a powered-on, occupied slot or your system will crash. For a detailed procedure on how to power-down an occupied slot. (See “Online Replacement (OLR)” on page 73.)

- Step 4.** Ensure that the MRL and the card latch on the OLX divider are already open and insert the PCI/PCI-X card into the empty slot. (See Figure 2-37) If PCI/PCI-X card is full size, open the slider gate latch to access card slot (See Figure 2-38)

CAUTION When inserting the PCI/PCI-X card, be careful you do not accidentally touch an attention button (doorbell) on the other OLX dividers—this will initiate an undesired shutdown of another PCI/PCI-X card/slot. If you accidentally initiate slot shut down, you have 5 seconds to push the attention button (doorbell) again to cancel the shutdown.

Ensure that you fully seat the card into the slot or undesired results may occur after power is re-applied to the slot.

- Step 5.** If the PCI/PCI-X card is full size, close the slider gate latch to secure the end of the card. (See Figure 2-38)

- Step 6.** Push the MRL down until it seats against the chassis wall.
- Step 7.** Turn the PCI/PCI-X card latch to the closed position to capture the PCI/PCI-X card and MRL into the closed position.
- Step 8.** Press the attention button (doorbell) and the power LED starts to blink. Wait until the power LED goes from blinking to steady-on.

NOTE After pushing the attention button (doorbell), you have 5 seconds to cancel the operation by pushing the attention button again. After 5 seconds, pressing the attention button (doorbell) will initiate slot powerdown for online replacement (OLR) of the card.

- Step 9.** Replace the top cover. (See “Replacing the Top Cover” on page 34.)
- Step 10.** Push the HP server all the way back into the rack until it stops.

Figure 2-36 PCI/PCI-X OLX Divider Layout

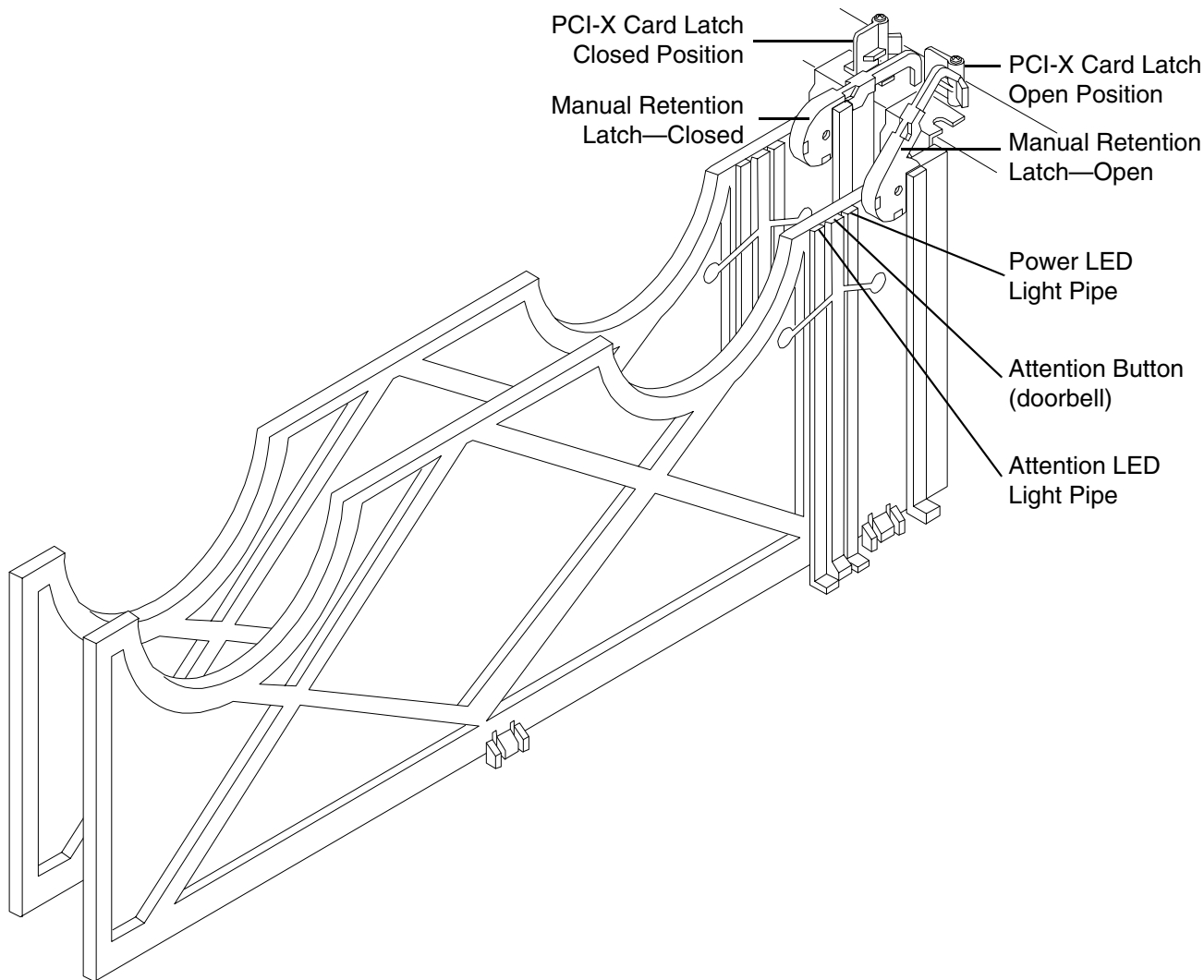


Figure 2-37 **Inserting PCI/PCI-X Card**

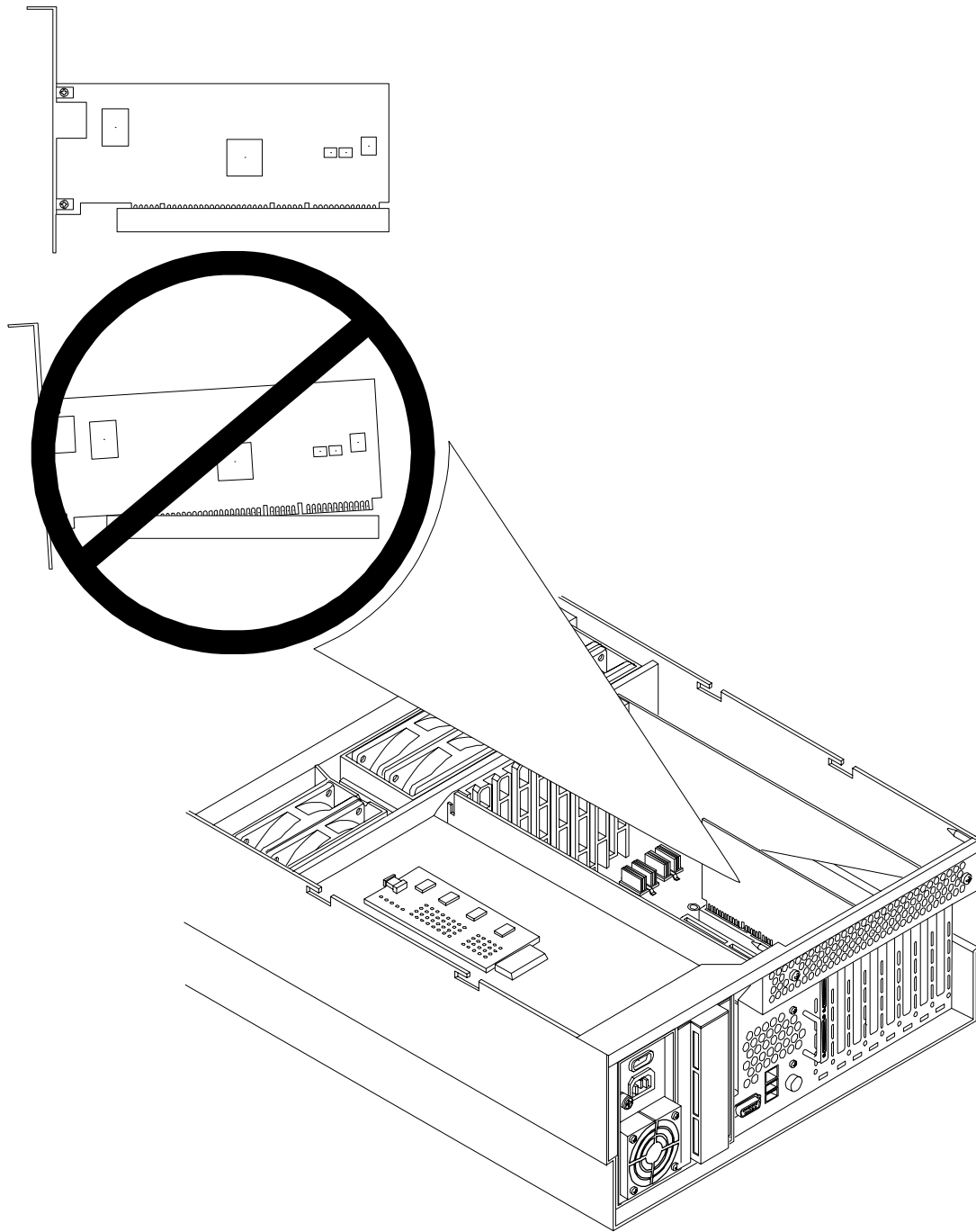
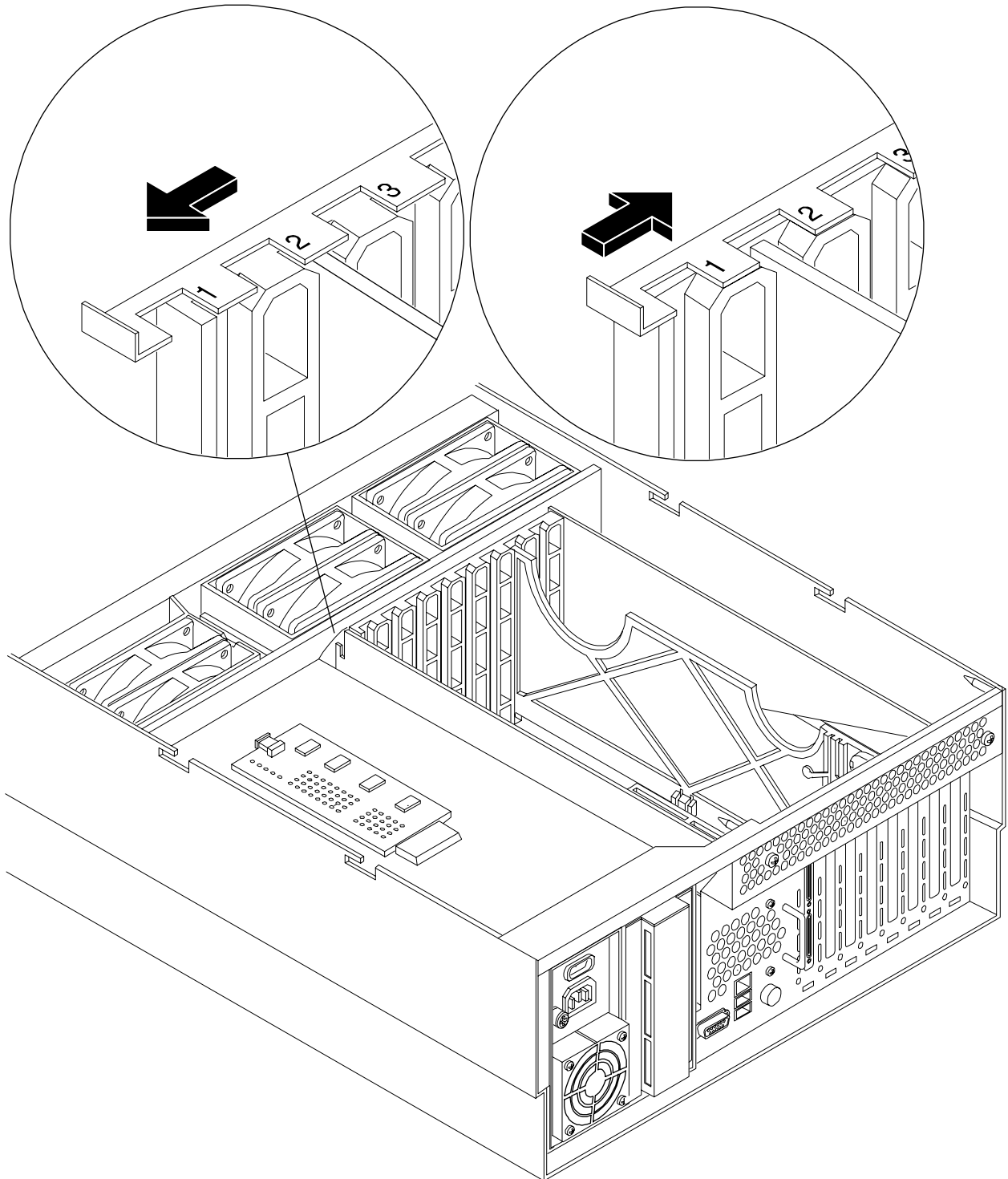


Figure 2-38 **Slider Gate Latch**



Online Replacement (OLR)

CAUTION For HP-UX 11i v1 (and later), you must replace an existing card with a like card.

To remove and replace a PCI/PCI-X card into a populated slot, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Extend the Server from the Rack” on page 18.)
- Step 2.** Remove the top cover from the chassis. (See “Removing the Top Cover” on page 33.)
- Step 3.** Disconnect all external and internal cables attached to the PCI card in the side service bay.
- Step 4.** Press the attention button (doorbell) located on the OLX divider that controls the affected slot—the power LED starts to blink. Wait until the power LED goes from blinking to steady-off.

NOTE After pushing the attention button (doorbell), you have 5 seconds to cancel the operation by pushing the attention button again.

- Step 5.** Turn the PCI/PCI-X card latch approximately 45 degrees on the chassis until the MRL is free to pull up.
- Step 6.** Pull up on the manual retention latch located on the OLX divider to turn off power to the slot. (See Figure 2-36)
- Step 7.** Turn the PCI/PCI-X card latch on the chassis approximately 90 degrees to completely expose the PCI/PCI-X bulkhead.
- Step 8.** If the PCI/PCI-X card is full size, open the slider gate latch to release the end of the card. (See Figure 2-38)
- Step 9.** Grasp the top edge of the PCI/PCI-X card and remove from the slot.

NOTE There is no ejection lever to remove PCI/PCI-X cards as on previous server models. You must remove the PCI/PCI-X card manually. Cutouts in the OLX dividers allow access for grasping the PCI/PCI-X cards.

- Step 10.** Insert the new PCI/PCI-X card into the powered-down slot. (See Figure 2-37)

CAUTION When inserting the PCI/PCI-X card, be careful you do not accidentally touch an attention button (doorbell) on the other OLX dividers—this will initiate an undesired shutdown of another PCI/PCI-X card/slot. If you accidentally initiate slot shut down, you have 5 seconds to push the attention button (doorbell) again to cancel the shutdown.

Ensure that you fully seat the card into the slot or undesired results may occur after power is re-applied to the slot.

- Step 11.** If the PCI/PCI-X card is full size, close the slider gate latch to secure the end of the card. (See Figure 2-38)
- Step 12.** Push the manual retention latch down until it seats against the chassis wall.

Hot-Plug PCI/PCI-X

- Step 13.** Turn the PCI/PCI-X card latch on the chassis to the closed position. This locks the PCI/PCI-X card into its slot and the manual retention latch into the closed position.
- Step 14.** Press the attention button (doorbell)—the power LED will start to blink.
- Step 15.** Wait for the power LED to stop blinking—the PCI/PCI-X card is now active.
- Step 16.** Reconnect all cables.
- Step 17.** Replace the top cover. (See “Replacing the Top Cover” on page 34.)
- Step 18.** Push the HP server all the way back into the rack until it stops.

Understanding LEDs and Hardware Errors

The following table describes the hot-plug LED error conditions.

Table 2-13 Hot-Plug LED Descriptions

| Power LED—Green | Condition | Description |
|----------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| | On | PCI/PCI-X slot is powered-on |
| | Blinking | Hot-plug operation in progress—do not touch the slot |
| | Off | PCI/PCI-X slot is powered-off |
| Attention LED—Amber | Condition | Description |
| | On | Hardware operational fault NOTE: If slot is powered-on, it will not power-off. If slot is powered-off, it will not power-on |
| | Blinking | Slot location being indicated |
| | Off | If power to slot is on, the slot is functioning normally |

Troubleshooting PCI/PCI-X Hot-Plug Operations

Sometimes a PCI/PCI-X card will not come online during a hot-plug operation due to a frequency mismatch between the PCI/PCI-X card and the slot bus or due to other hardware errors. To determine the type of error you are experiencing, observe the LED activity as described below.

1. PCI/PCI-X Bus Mode or Frequency Mismatch

After you insert a PCI/PCI-X card into the slot and push the attention button (doorbell), the power LED goes from blinking to steady-off and stays at steady-off; this means that the system firmware has rejected the PCI/PCI-X card and indicates either bus-frequency or bus-mode mismatch.

NOTE After pushing the attention button (doorbell), ensure that you wait the full duration of the 5 second operation cancellation window before taking further action.

2. Hardware Operation Fault

If the PCI/PCI-X card cannot be powered-on during a hot-plug addition operation, the attention LED will turn steady-on and the power LED will go steady-off.

CAUTION If the power draw for a newly installed PCI/PCI-X card is excessive (when combined with that of the existing PCI/PCI-X expansion cards), the server will power down. If this occurs, check the power ratings of all installed PCI/PCI-X cards. A known cause of power loss is the use of more than three PCI/PCI-X RAID cards in your system. Further restrictions for RAID cards also apply; see NOTE on page 69

If the PCI/PCI-X card cannot be powered-off during a hot-plug removal operation, the attention button (doorbell) will turn steady-on and the power LED will remain steady-on. A possible cause of this condition is that a user application or process is using the card you are trying to remove. You can determine if the card is in use by checking the operating system logs.

CAUTION If your slot does not power-off during a hot-plug removal operation, do not open the MRL on the OLX divider. This action causes system failure or operating system crashes.

Converting SCSI From Simplex to Duplex

This section explains how to convert your HP 9000 rp4410 or HP 9000 rp4440 server from simplex to duplex operation. The process involves removing a jumper, installing a duplex PCA card, and plugging in the stowed channel B cable to the appropriate sockets.

Safety Information

Follow the procedures listed below to ensure safe handling of components and to prevent harm to both you and the HP server:

- Use an antistatic wrist strap and a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit (HP 9300-1155)
- Handle accessory boards and components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards
- Do not wear clothing subject to static charge build-up, such as wool or synthetic materials

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to working within the server.**

CAUTION Some restrictions apply to the mass storage devices that may be connected to your core I/O SCSI HBA. (See “Management Processor (MP)” on page 92.) If you convert your system to duplex configuration, you may not install external SCSI devices to the SCSI HBA core I/O controller.

Accessing the SCSI Backplane Board

Prior to adding the accessories required to convert your HP 9000 rp4410 or HP 9000 rp4440 server from simplex to duplex you must remove outer components to access the SCSI backplane board. To gain access to the SCSI backplane board perform the following steps:

Step 1. If rack mounted, slide the HP server out from the rack until it stops. See “Extend the Server from the Rack” on page 18.

NOTE If your HP server is rackless mounted, you need not remove the tubular stand to perform the simplex to duplex conversion. Proceed directly to the next step.

Step 2. Remove the front bezel. (See “Removing the Front Bezel” on page 31.)

Step 3. Remove the front cover. (See “Removing the Front Cover” on page 32.)

Step 4. Remove the memory extender board. (See “Removing a Memory Extender Board” on page 62.)

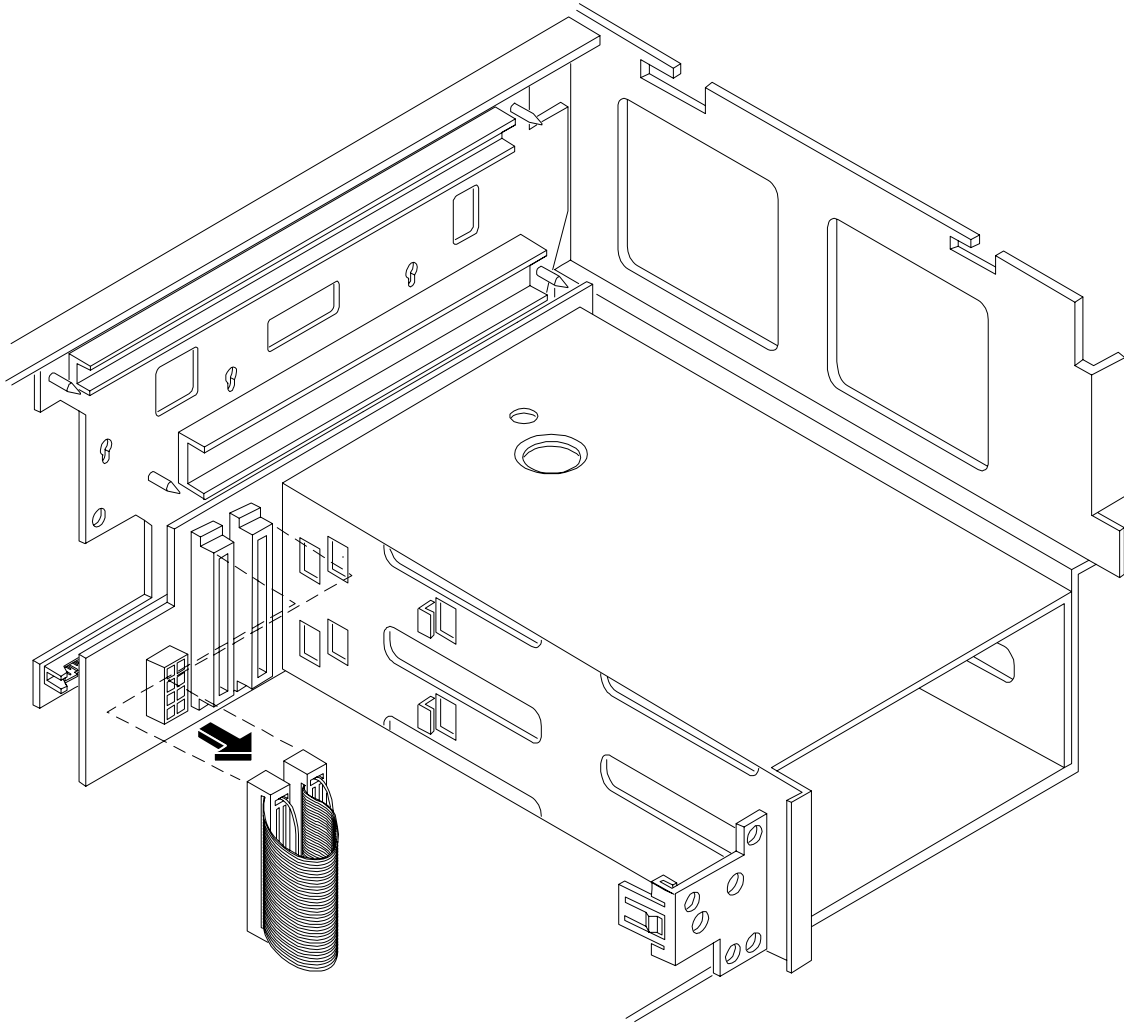
Step 5. Remove the processor extender board. (See “Removing the Processor Extender Board” on page 54.)

Convert to Duplex

To convert to duplex, perform the following steps:

- Step 1.** Remove the SCSI jumper cable. A SCSI jumper cable bridges the two SCSI connectors on the SCSI backplane when the server is configured for simplex operation. This jumper must be removed in order to install the duplex board and to connect the SCSI B cable. (See Figure 2-39)

Figure 2-39 Removing the SCSI Jumper Cable



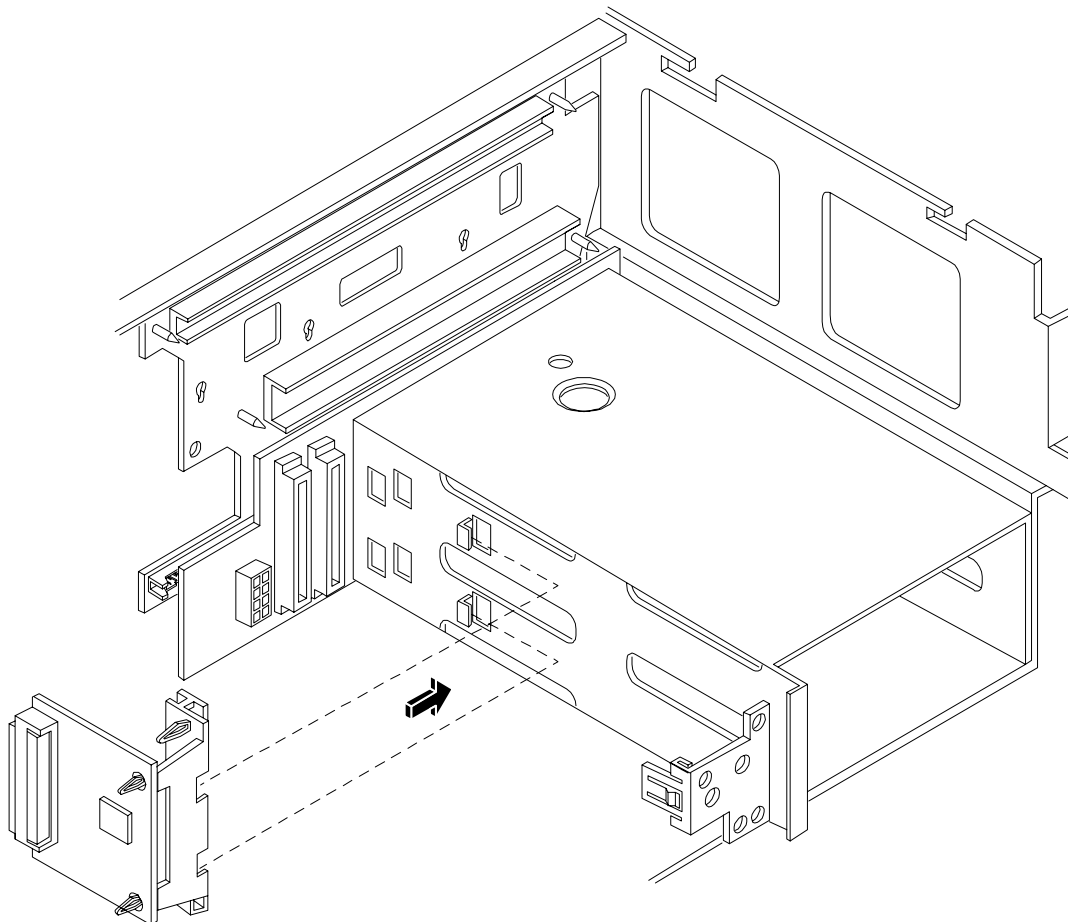
- Step 2.** Install the duplex board. The duplex board is installed in the SCSI connector located nearest the disk drive cage. The duplex board is shipped with a duplex board bracket attached. When the duplex board is installed properly, it is secured to the disk drive cage by the bracket and to the SCSI backplane board by the SCSI connector sockets. (See Figure 2-40)

NOTE In simplex mode, both hard disk drives, slot 0 and slot 1, are driven by SCSI channel A. When the duplex board is installed, slot 1 hard disk drive is now driven by SCSI channel B. If HP-UX was previously installed and “whole disk vxfs” was not used, the system will no longer boot. Refer to the *HP-UX Installation Guide* for further information.

- Align the bracket tabs with the slots on the side of the disk drive cage
 - Press the bracket against the disk drive cage until the bracket locks into place
 - Align the connector of the duplex board with the connector on the SCSI backplane
 - Press the board connector into the backplane connector
-

NOTE When the duplex board is installed properly, the board is secured in the duplex board bracket. The SCSI B cable is connected to the connector at the immediate left of the duplex board.

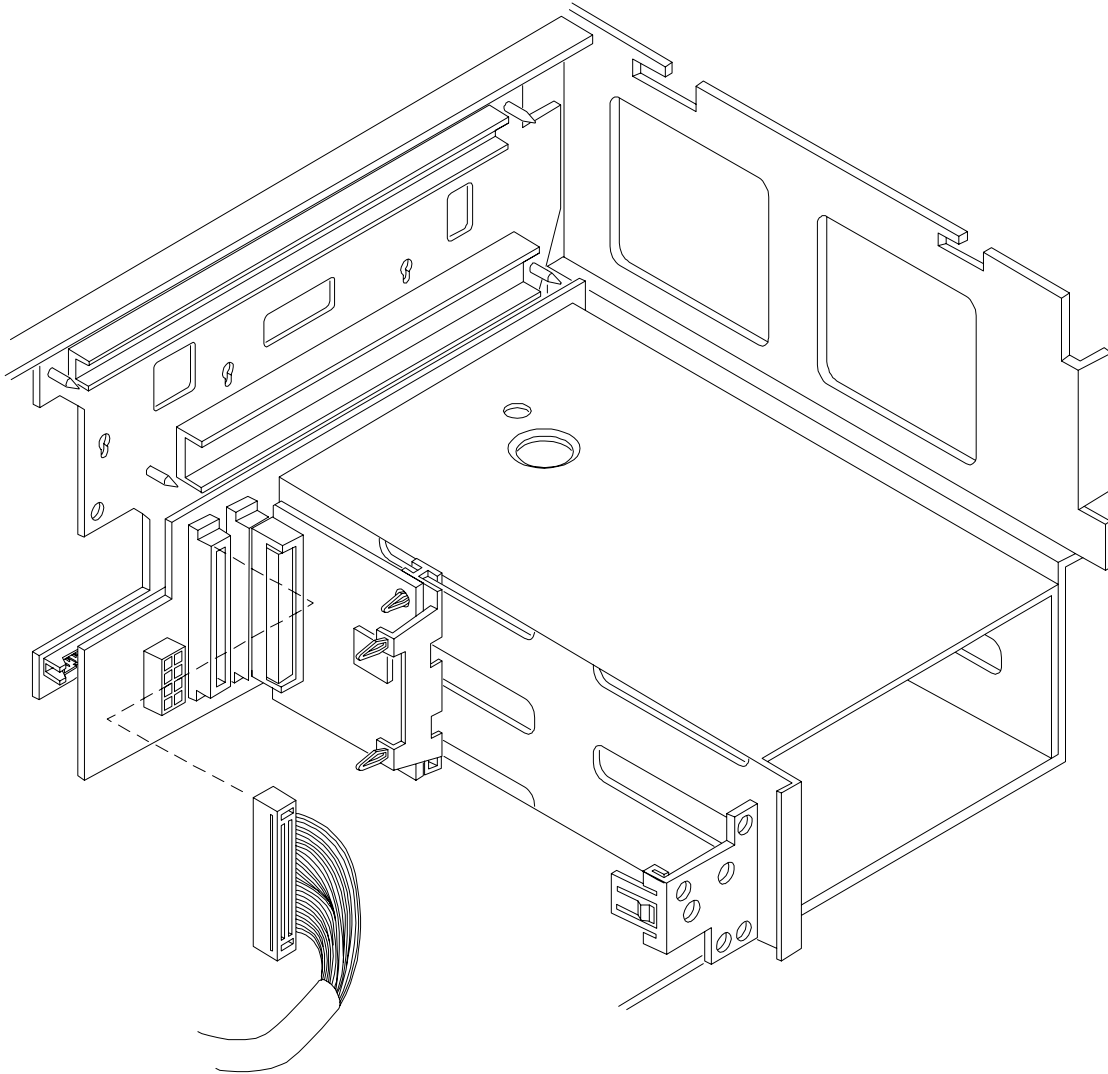
Figure 2-40 Installing the Duplex Board



Step 3. Install SCSI Cable B on the SCSI backplane board. (See Figure 2-41)

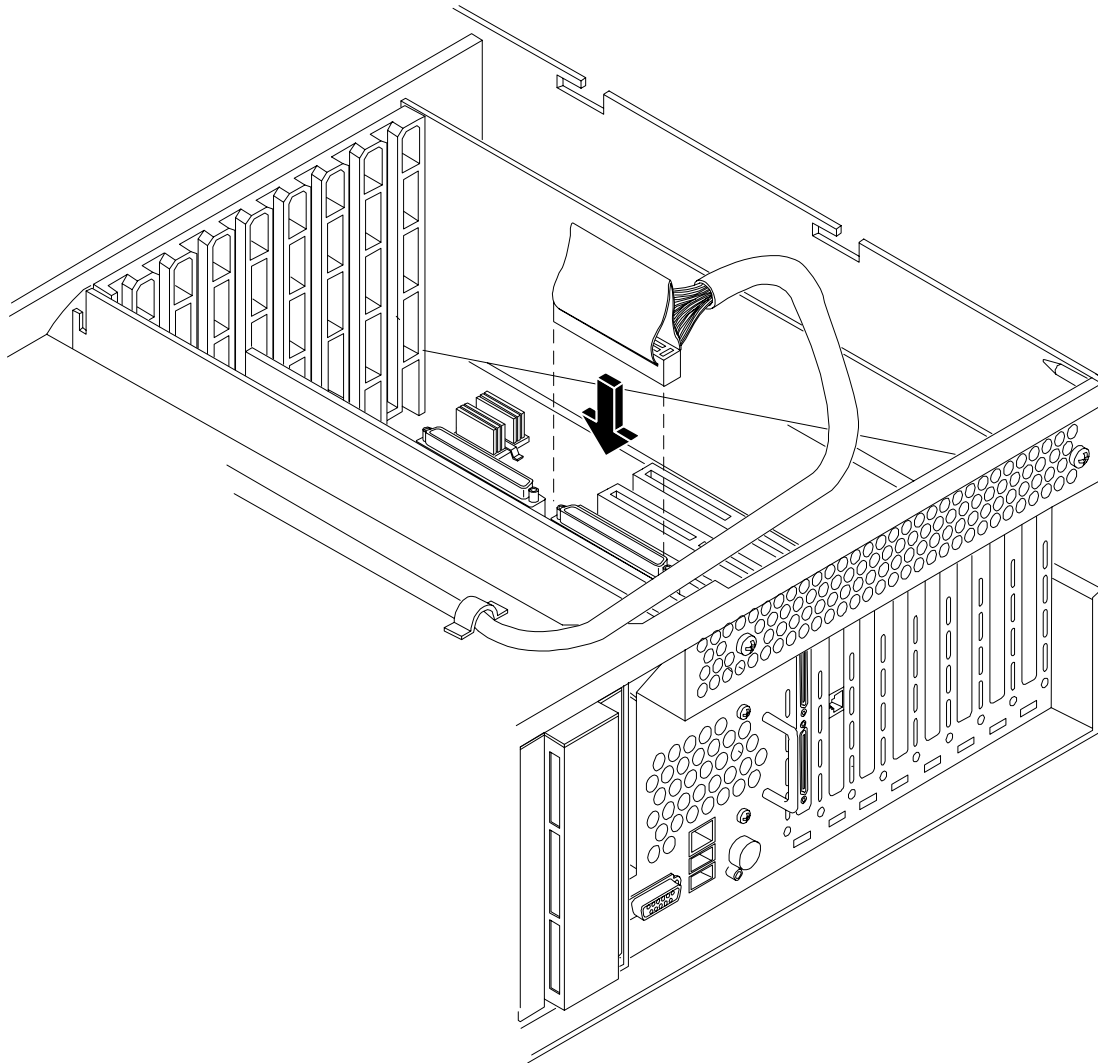
- Release the SCSI Cable B from its stowed position within the chassis
- Plug the SCSI Cable B connector into the SCSI connector located on the backplane next to the duplex board installed in the previous step

Figure 2-41 Installing SCSI Cable B to the SCSI Backplane



- Step 4.** Complete the SCSI duplex conversion by connecting the other end of SCSI Cable B to the SCSI B channel connector on the SCSI adapter board. (See Figure 2-42)
- Release SCSI Cable B from its stowed position within the chassis
 - Plug SCSI Cable B connector into the SCSI B channel connector located at the rear of the board

Figure 2-42 Installing SCSI Cable B to the SCSI Adapter Board



Replacing the Removed Modules

To return the server to operational configuration, perform the following steps:

- Step 1.** Replace the processor extender board. (See “Replacing the Processor Extender Board” on page 59.)
- Step 2.** Replace the memory extender board. (See “Replacing a Memory Extender Board” on page 64.)
- Step 3.** Replace the top cover. (See “Replacing the Top Cover” on page 34.)
- Step 4.** Replace the front cover. (See “Replacing the Front Cover” on page 33.)
- Step 5.** Replace the front bezel. (See “Replacing the Front Bezel” on page 31.)
- Step 6.** If rack mounted, slide the HP server back into the rack until it stops. (See “Insert the Server into the Rack” on page 19.)

3 Troubleshooting

This chapter provides troubleshooting instructions for your HP 9000 rp4410 and HP 9000 rp4440 servers.

Information to Collect Before You Contact Support

Before you contact HP support, you should:

Step 1. Check information on troubleshooting and attempt to solve the problem.

- Note failure symptoms and error indications (LEDs and messages) by checking the system event log log. Refer to the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for information about checking the system event log logs.
- Try to determine precisely what did or did not happen.

Step 2. Collect the following information:

- The model number of your server (for example, HP 9000 rp4440)
- The product number of your server. This is found on the identification label, which is found at the front of the unit (typically A9956A, A9951A, and so on).
- The serial number of your server. This is found on the identification label.

Step 3. Become familiar with your system configuration:

- Are you using the LAN, RS232, or Web interface to monitor the server?
- How many processors, DIMMs, and PCI cards have been installed?
- What versions of processor, memory, and PCI cards are used and where are they installed?
- What accessories are installed?

Step 4. Determine the following:

- Which firmware versions are in use?
- When did the problem start?
- Have recent changes been made to the system?
- Which operating system and version is in use?

Troubleshooting Methodology

WARNING Ensure that the system is powered down and all power sources have been disconnected from the server prior to working within the server.

Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

Failure to observe this warning could result in personal injury or damage to equipment.

CAUTION Do not operate the HP server for more than 10 minutes with any cover (including power supplies and disk drives) removed. If you are hot-swapping a fan, reinstall the cover within 10 minutes to prevent overheating. Otherwise, damage to system components may result due to improper cooling airflow.

This chapter provides limited information to support troubleshooting during installation. Refer to the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for detailed troubleshooting information and instructions for using the MP and online or offline troubleshooting tools.

Using the Front Panel Power Button

The server power button on the front panel operates differently, depending on how long the button is held in and on what the system is doing when the button is pressed. You must be aware of its uses to properly troubleshoot the system. Power button functions are described in the following table.

Table 3-1 Power Button Functions

| System State | Switch Pressed Time | Result |
|----------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Power connected to power supplies—system power off | 1 second or less | System power on |
| | More than 1 second | No effect |
| System at initial system loader | Less than 1 second | Hard shutdown |
| | More than 1 second but less than 5 seconds | Not used. This selection initiates E-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers |
| | More than 5 seconds | Hard shutdown |
| System at BCH | Less than 1 second | Hard shutdown |
| | More than 1 second but less than 5 seconds | Not used. This selection initiates E-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers |
| | More than 5 seconds | Hard shutdown |

Table 3-1 Power Button Functions (Continued)

| System State | Switch Pressed Time | Result |
|-----------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Power on—OS shut down | Less than 1 second | No effect |
| | More than 1 second but less than 5 seconds | Not used. This selection initiates E-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers |
| | More than 5 seconds | Hard shutdown |
| OS running | Less than 1 second | No effect |
| | More than 1 second but less than 5 seconds | Not used. This selection initiates E-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers |
| | More than 5 seconds | Hard shutdown |

Troubleshooting Using LED Indicators

If you suspect a hardware failure during installation, the system LEDs help you identify the problem. Front control panel LEDs and QuickFind Diagnostic Panel LEDs provide system and subassembly status information that assist in identifying failing items. The following sections describe these LEDs.

Front Control Panel LEDs

The front panel LEDs show the system status at a glance. If warning or attention lights are flashing, check the QuickFind diagnostic panel for further information.

Figure 3-1 Front Control Panel LEDs

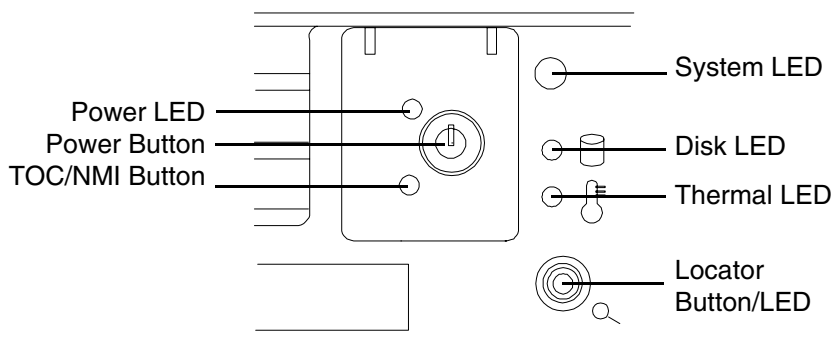


Table 3-2 Front Control Panel LED Definitions

| LED/ Button | State | Flash Rate | Color | Description |
|-------------|-----------|--------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| System | Running | Steady | Green | Green: System normal—OS up and running |
| System | Booting | Flashing at 0.5 Hz | Green | Flashing green: OS booting or at BCH |
| System | Attention | Flashing at 1 Hz | Yellow | Flashing yellow: Warning—System needs attention. Redundancy lost, component failure pending. (Additional information can be found in the System Log) |
| System | Fault | Flashing at 2 Hz | Red | Flashing red: Hard fault, system halted |
| System | Off | Off | N/A | Off: System off |
| Power | On | Steady | Green | Green: Power normal |
| Power | On | Flashing at 1 Hz | Yellow | Flashing yellow: Housekeeping voltage present |
| Power | Off | Off | Off | Off: Power off |

Table 3-2 Front Control Panel LED Definitions (Continued)

| LED/ Button | State | Flash Rate | Color | Description |
|------------------------|--------------|-----------------------------------|--------------|------------------------------------------------------------------------------------|
| Disk LED | | Flashing at rate of disk activity | Green | Flashing green: Disk activity |
| Thermal LED | OK | Steady | Green | Green: Thermal OK |
| Thermal LED | Warning | Flashing at 1 Hz | Yellow | Flashing Yellow—Thermal warning |
| Locator LED/button | | Flashing at 1 Hz | Blue | Flashing Blue: System locator LED may be remotely or locally activated/deactivated |

QuickFind Diagnostic Panel LEDs

The QuickFind diagnostic panel is located under the top cover and is attached to the top of the power supply cage. This panel contains LEDs that illuminate to show the status of associated components and assemblies. Table 3-3 lists the various LEDs and display combinations that you may encounter, and recommends the appropriate maintenance action.

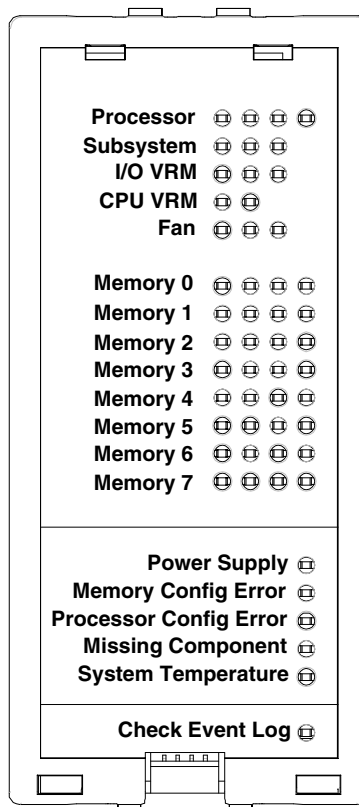
Table 3-3 QuickFind Diagnostic Panel LED Definitions

| Item | LED 0 | LED1 | LED2 | LED3 | Details |
|------------------------|-----------|--------------|-----------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processor | Socket 0 | Socket 1 | Socket 2 | Socket 3 | Check that recently installed items are correctly installed. Refer to the <i>HP 9000 rp4410 and HP 9000 rp4440 Operations Guide</i> for additional information |
| Subsystem | CPU board | Memory board | I/O board | n/a | Check that the indicated board is correctly seated |
| I/O VRM | 12 volt | 5 volt | 3 volt | n/a | Check that recently installed items are correctly installed. Suspect the plug-in voltage regulator and related assemblies |
| CPU VRM | n/a | n/a | n/a | n/a | n/a |
| Fan module | 0 | 1 | 2 | n/a | Check for a fan that is not functioning. Look for loose connections or missing items |
| Memory bank X (0-7) | DIMM xA | DIMM xB | DIMM xC | DIMM xD | The specified DIMM has failed—reseat or replace the memory board and DIMM If all the LEDs for a rank (0-7) are lit and the memory config error LED is lit, then the DIMMs in the specified rank are mismatched—review the information on installing memory in Chapter 2, Installing Additional Components |
| Check power supply | n/a | n/a | n/a | | The faulty power supply LED (located on Power supply) is lit. Reseat the power supply. Refer to the <i>HP 9000 rp4410 and HP 9000 rp4440 Operations Guide</i> for additional information |
| Memory config error | n/a | n/a | n/a | | The DIMMs in a rank are mismatched—review the information on installing memory in Chapter 2, Installing Additional Components |
| Processor config error | n/a | n/a | n/a | | The processors are mismatched—review the information on installing processors in Chapter 2, Installing Additional Components |

Table 3-3 QuickFind Diagnostic Panel LED Definitions (Continued)

| Item | LED 0 | LED1 | LED2 | LED3 | Details |
|-------------------|-------|------|------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Missing component | n/a | n/a | n/a | | A required component(s) is not detected. Check that recently installed items are correctly installed. Refer to the <i>HP 9000 rp4410 and HP 9000 rp4440 Operations Guide</i> for additional information |
| System temp | n/a | n/a | n/a | | Make sure nothing is blocking server airflow. Check that recently installed items are correctly installed. Refer to the <i>HP 9000 rp4410 and HP 9000 rp4440 Operations Guide</i> for additional information |
| Check event log | n/a | n/a | n/a | | An event has occurred that requires attention. Refer to the <i>HP 9000 rp4410 and HP 9000 rp4440 Operations Guide</i> for additional information |

Figure 3-2 QuickFind Diagnostic Label



4 Cable Connections

AC Input Power

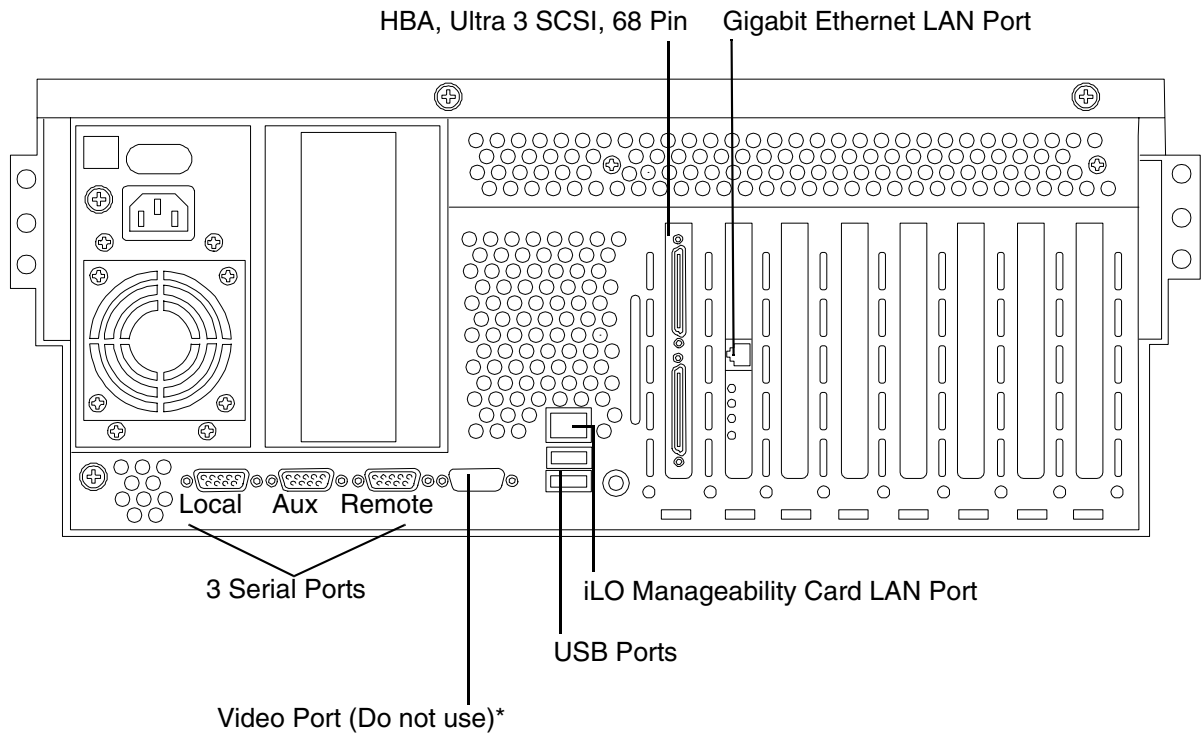
The HP 9000 rp4410 and HP 9000 rp4440 servers come with one or two power supplies installed. A power supply includes an AC input connector which is rated for 200 to 240 VAC at 13 amps. If two power supplies are installed, both power supplies must be connected separately to an AC power source.

WARNING **Ensure that the system is powered-down and all power sources have been disconnected from the server prior to attempting the following procedures.**

Voltage is present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

Failure to observe this warning could result in personal injury or damage to equipment.

Figure 4-1 HP 9000 rp4410 and HP 9000 rp4440 Server (rear view)



Video Port (Do not use)*
*For graphics capability, order graphics
PCI kit A6150B.

Install only the graphics card supplied with
this kit. DO NOT install the USB card.

See the On Line Addition (OLA) section in
this manual, for procedures on installing
PCI/PCI-X cards in your HP server.

Core I/O Connections

Each HP 9000 rp4410 and HP 9000 rp4440 server core I/O includes:

- Two USB ports
- One Management Processor (MP)
 - One 10/100 LAN-RJ45
 - Three serial ports
- SCSI Host Bus Adapter (HBA)
 - The SCSI HBA board is used to attach SCSI external mass storage to the system
 - Connections to the SCSI board include the external SCSI channels for external mass storage devices

CAUTION Some restrictions apply to the mass storage devices that may be connected to your core I/O SCSI HBA. External connections to the SCSI HBA core I/O controller are only supported when the internal cable between the SCSI backplane and the SCSI HBA core I/O card is disconnected. Your system is shipped in simplex configuration which supports external devices. If you convert your system to duplex configuration, (see to “Converting SCSI From Simplex to Duplex” on page 76), you may not install external SCSI devices.

- LAN Connection
 - The LAN board provides the basic external I/O connectivity for the system
 - Connections to the LAN card include one 10/100/1000 Base-T LAN RJ45 connector

Management Processor (MP)

Integrated Lights-Out (iLO) offers remote server management through an independent management processor (MP). It provides a way for you to connect to a server and perform administration or monitoring tasks for the server hardware. iLO is available whenever the system is connected to a power source, even if the server main power switch is in the off position.

iLO controls power, reset, and Transfer of Control (TOC) capabilities; provides console access; displays and records system events; and can display detailed information about the various internal subsystems. iLO also provides a virtual front panel that you can use to monitor system status and see the state of front panel LEDs. All iLO functions are available through the server LAN and the local RS-232 and remote RS-232 ports. Access to local and remote ports, telnet, and secure shell (SSH) is through the iLO text interface, while Web access is through a graphical user interface (GUI).

iLO was introduced into most Integrity Entry Class servers in late 2004. Prior to that, embedded remote server management was referred to as MP functionality. All legacy MP functionality has been carried forward and combined with new features, all under the heading of "iLO". Therefore, "iLO" and "MP" mean the same thing for Entry Class servers.

Once you update the firmware to version E.03.13, the following features in the Integrated Lights-Out MP are activated:

- Always-on capability: iLO is active as long as the power cord is plugged in
- Multiple access methods: Local, remote, telnet, and SSH use the iLO text interface. Web access uses a GUI.
 - Local Serial Port: Use a terminal or laptop computer for direct connection.
 - Remote/Modem Serial Port: Use a dedicated modem RS-232 port and external modem.
 - LAN: Use telnet, Web, or SSH to access iLO LAN.
- Remote power cycle; power on or power off; reset
- Mirrored console: The system console output stream is reflected to all connected console users, and any user can provide input.
- Independent, non mirrored sessions (from local and modem ports)
 - Direct session with OS using the MP command `SE`
 - Connection to another iLO using the MP command `CSP`
- Display of information about various internal subsystems
 - Field replaceable unit (FRU) information
 - System power state, temperature information, and fan status
 - Status of processors
- Logging, display, and keyword search of:
 - System console history
 - System events
- User access control
- DHCP and DNS support

- IPMI over LAN
- Licensing
- iLO Advanced Pack features, such as SSH access, group actions capability, and LDAP

NOTE A complete description of the MP is provided in the *HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide*.

Configuring the MP LAN Port IP Address

By connecting the MP LAN port to an active network, you have two options for configuring an IP address. The first option is to use a DHCP server, which automatically assigns an IP address, and the other is to use the ping command from another host on the same subnet to set a static IP address for the MP. After the IP address has been set, you can establish a telnet session to configure additional parameters.

If you are using a DHCP server, and it provides the Domain Name, and if the primary DNS server accepts dynamic DNS (DDNS) updates or has been configured through the DHCP server, then you can use a default host name to connect to the MP through telnet. The default host name is 14 characters long, consisting of the letters “mp” followed by the 12 characters of the Media Access Protocol (MAC). See “Configure an IP Address” on page 94 to determine the MAC address. If no DNS access is available, the telnet session can use the assigned IP address.

If you are using DHCP, proceed to “Accessing the Management Processor” on page 94. For more information on configuring DHCP, see “Configuring the Management Processor LAN Information” on page 96. For a non-DHCP implementation, perform the following steps to configure a static IP address.

Configuring a Static IP Address (Non-DHCP)

To configure a static IP address for the MP LAN port, follow these steps:

1. Set up local terminal access.
2. Configure the IP address.

Set Up Local Terminal Access After powering on the terminal, ensure the communications settings are as follows:

- 8/none (parity)
- 9600 baud
- None (receive)
- None (transmit)

If the terminal is a PC using Reflection 1, check or change these communications settings by performing the following steps:

Step 1. From the Reflection 1 Main screen, pull down the Connection menu and choose **Connection Setup**.

Step 2. Choose **Serial Port**.

Step 3. Choose **Com1**.

Step 4. Check the settings and change, if required.

Go to More Settings to set Xon/Xoff. Click **OK** to close the More Settings window.

Step 5. Click **OK** to close the Connection Setup window.

Step 6. Pull down the Setup menu and choose **Terminal** (under the Emulation tab).

Step 7. Choose a supported terminal type.

The preferred type is VT100.

Step 8. Click **Apply**.

This option is not highlighted if the terminal type you want is already selected.

Step 9. Click **OK**.

Configure an IP Address To configure the MP LAN static IP address, perform the following steps:

Step 1. Determine the Media Access Control (MAC) address of the MP LAN interface by viewing the label located at the rear of the server.

Step 2. Connect a LAN cable on your local subnet to the core I/O LAN port.

Step 3. Add an Address Resolution Protocol (ARP) table entry to another host located on your local subnet. This ARP table entry maps the MAC address of the core I/O LAN interface to the IP address chosen for that interface.

NOTE Adding an entry to the ARP table is typically done using the ARP command with the appropriate option. For example, **arp -s** is used with Windows. Consult your operating system documentation for more information.

Step 4. Use the **ping** command from the host that has the new ARP table entry. The destination address is the IP address that is mapped to the MAC address of the MP. The MP LAN port should now be configured with the appropriate IP address.

Step 5. Use the **telnet** command to connect to the MP from a host on the local subnet.

Accessing the Management Processor

You can connect to the management processor using the following methods:

- The local serial port using a local terminal
- The remote Customer Service Modem (CSM) port using external modem (dial-up) access, if remote modem access is configured
- The MP LAN port using the Web interface, telnet, or SSH, if login access through the MP LAN is enabled

Local Terminal Access to the Management Processor

You establish communication with the MP by connecting a terminal to the local CSM I/O serial port.

You can establish a terminal session using a standalone terminal or using terminal emulation software, such as HyperTerm, Putty, or Reflection 1 running on a PC.

During installation, communicating with the MP enables such tasks as:

- Verifying that the components are present and installed correctly
- Configuring the LAN port

Interacting with the Management Processor

To interact with the MP command line interface, perform the following steps:

NOTE On initial system installation, the MP has two default user accounts:

- All Rights (Administrator) level user; login = Admin, password = Admin (both are case sensitive).
- Console Rights (Operator) level user; login = Oper, password = Oper (both are case sensitive).

For security reasons, HP recommends that you use the UC command during the initial logon session to modify default passwords (enter **CM** at the MP> prompt, and enter **UC** at the MP:CM> prompt).

IMPORTANT Deleting default users such as Admin prevents you from using the HP Systems Insight Manager group actions feature.

Step 1. Log in using your MP user account name and password.

NOTE If you are logged in, the MP Main Menu displays. To follow this procedure, make sure you are at the MP Main Menu. Use **Ctrl-B** to return to the MP Main Menu.

Step 2. Use the MP menus and commands as needed. Main Menu commands are shown in “MP Main Menu”. You can access commands not displayed in the MP Main Menu in command mode by first using the CM command at the MP prompt. You can display a list of available commands using the MP help function. Invoke the help function from either the MP Main Menu or the Command Menu prompts by entering **HE** followed by **LI**. You can return to the MP Main Menu by pressing **Ctrl-B**.

Step 3. Log out using the X command (enter **X** at the MP> prompt) after returning to the MP Main Menu.

MP Main Menu

Following are the MP Main Menu commands:

```
MP MAIN MENU:
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Logs
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Create OS Session
HE: Main Menu Help
X: Exit Connection
```

NOTE The previous example shows the Main Menu screen accessed through the local serial or remote modem ports. The list of commands displayed might be different and depends on your method of access to the MP.

Configuring the Management Processor LAN Information

LAN information includes the management processor network name, IP address information, and configuring DHCP and DNS service information.

To configure the management processor LAN IP address:

Step 1. At the MP Main Menu prompt (MP>), enter **CM** to choose command mode.

Step 2. At the command mode prompt (MP:CM>), enter **LC** (for LAN configuration).

The screen displays the default values and asks if you want to modify them. It is good practice to write down the information, because you might need it for future troubleshooting. See “The LC Command Screen” on page 97.

NOTE The default value in the “IP address” field is set at the factory. You must configure the actual MP LAN IP address.

Step 3. The screen displays the current LC data. When prompted to enter a parameter name, **A** to modify All, or **Q** to Quit, enter **A** to choose all parameters.

Step 4. The screen displays the current DHCP status. If DHCP is used to acquire IP address information, enter **E** to enable, **D** to disable, or **Q** unless you are using the local serial port.

To disable DHCP from the local serial port:

- a. Use the **LC** command to disable DHCP.
- b. Commit the DHCP change.
- c. Use the **LC** command again to set network parameters.

CAUTION Modifying the DHCP, IP address, gateway IP address, or subnet mask parameters will drop all present LAN and Web connections.

NOTE Changing DHCP status to Enabled or Disabled resets IP address, gateway IP address, and subnet mask parameters to factory default values.

NOTE If the IP address, gateway IP address, and subnet mask are obtained through DHCP, you cannot change them without first disabling DHCP.

Step 5. The screen displays the current IP address. When prompted to enter a new value or **Q**, enter the new IP address.

Step 6. The screen displays the current host name. When prompted to enter a new value or **Q**, enter the new MP network name.

This is the host name for the MP LAN displayed at the command prompt. It is also used to identify the MP LAN interface in a DNS database. The name can be up to 64 characters in length, and must start with a letter, end with a letter or number, and contain only letters, numbers, or dashes.

NOTE The host name is not case sensitive.

- Step 7.** The screen displays the current subnet mask name. When prompted to enter a new value or **Q**, enter the new subnet mask name.
- Step 8.** The screen displays the current gateway address. When prompted to enter a new value or **Q**, enter the new gateway address.
- Step 9.** The screen displays the current link state information. When prompted to enter a new value or **Q**, press **enter**. The message -> Current Link State has been retained displays.
- Step 10.** The screen displays the current Web console port number. When prompted to enter a new value or **Q**, press **enter**. The message -> Current Web Console Port Number has been retained displays.
- Step 11.** The screen displays the current SSH console port number. When prompted to enter a new value or **Q**, press **enter**. The message -> Current SSH Console Port Number has been retained displays.

NOTE SSH settings will not display if you do not have Integrated Lights-Out Advanced Pack licensing.

- Step 12.** The screen displays a new LC listing, including the values entered in the preceding steps. Verify that the desired values have been accepted. When prompted to enter a parameter for revision, **Y** to confirm, or **Q** to Quit, enter **Y** to confirm all parameters.

```
> LAN Configuration has been updated
-> Reset MP (XD command option 'R') for configuration to take effect.
MP Host Name: mpserver
```

- Step 13.** Enter **XD -reset** to reset the MP.
- Step 14.** After the MP resets, log in to the MP again. Then enter the MP command mode (enter **CM** at the MP: prompt).
- Step 15.** At the MP:CM> prompt, enter **LS** to confirm the new LAN settings.
- Step 16.** Enter **SA** to enable or disable Web console and telnet access after the MP has been reset.

The LC Command Screen

The following screen shows LC command output:

```
MP:CM> LC -nc
Current LAN Configuration:
MAC Address           : 0x0060b0f54c51
DHCP Status           : Enabled
IP Address             : 127.1.1.1
MP Host Name          : maestro
Subnet Mask           : 255.255.248.0
Gateway Address       : 127.1.1.1
Link State            : Auto Negotiate
```

```
Web Console Port Number : 2023
SSH Access Port Number  : 22
IPMI/LAN Port Number    : 626
LAN status: UP and RUNNING
-> Command successful.
MP:CM>
```

NOTE The SSH console port number does not display if you do not have Integrated Lights-Out Advanced Pack licensing.

MP Command Reference

There are two menus from which commands are executed: the MP Main Menu and the Command Menu. You access the Command Menu by first using the CM command at the MP> prompt.

The following tables provide a reference for commands available through the command line interface.

MP Main Menu Commands

Commands are listed in Table 4-1.

Table 4-1 MP Main Menu Commands and Descriptions

| Command | Description |
|---------|--------------------------------------|
| CL | View console log |
| CM | Enter command mode |
| CO | Select console mode |
| CSP | Connect to another service processor |
| HE | Display help for menu or command |
| SE | Enter OS session |
| SL | Show event logs |
| VFP | Display virtual front panel |
| X | Exit |

Command Menu Commands

Commands are listed in Table 4-2.

Table 4-2 Command Menu Commands and Descriptions

| Command | Description |
|---------|---------------------------------|
| BP | Reset BMC passwords |
| CA | Configure async or serial ports |
| DATE | Display the current date |

Table 4-2 Command Menu Commands and Descriptions (Continued)

| Command | Description |
|----------------|--------------------------------------------------|
| DC | Default configuration |
| DF | Display field replaceable unit (FRU) information |
| DI | Disconnect remote or LAN console |
| DNS | Set DNS configuration |
| FW | Upgrade MP firmware |
| HE | Display help for menu or command |
| ID | Display or modify system information |
| IT | Modify MP inactivity timers |
| LC | LAN configuration |
| LDAP | LDAP configuration |
| LM | License management |
| LOC | Display and configure locator LED |
| LS | LAN status |
| MR | Modem reset |
| MS | Modem status |
| PC | Remote power control |
| PG | Paging parameter setup |
| PR | Power restore |
| PS | Power management module status |
| RB | Reset BMC |
| RS | Reset system through RST signal |
| SA | Set access options |
| SO | Configure security options |
| SS | Display system processor status |
| SYSREV | Display all firmware revisions |
| TC | Reset via transfer of control (TOC) |
| TE | Tell (send a message to other users) |
| UC | User configuration |
| VDP | Display virtual diagnostic panel LEDs |

Table 4-2 Command Menu Commands and Descriptions (Continued)

| Command | Description |
|----------------|----------------------------------------------|
| WHO | Display connected management processor users |
| XD | Diagnostics or reset of management processor |

Booting the Server

To boot the server, perform the following step.

Step 1. Press the power switch located to the left of the front panel LEDs.

NOTE If the front bezel is attached and in the closed position, you will need to open the small door on the front bezel to gain access to the power switch.

If the autoboot function is enabled, the system will boot to the installed operating system. If autoboot is not enabled, the system will enter the BCH boot console handler. The BCH allows you to control the server's booting environment. For more information about the BCH, review the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide*.

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