hp 9000 rp4440
Maintenance Guide

Regulatory Model Number: RSVLA-0201

Manufacturing Part Number: rp4440_maint
July 2004

U.S.A.

Legal Notices

Related Documents. The *HP Server Documentation CD-ROM* contains the documentation set for the server, including localized versions of key documents. Included on the CD-ROM are the *Site Preparation*, *Installation*, and *Operations* guides, which contain installation and in-depth troubleshooting information.

The CD will autorun when you insert it into a Windows® workstation, or, point your browser at the index.htm file located under the **Start** directory of the CD. All users, including UNIX®/Linux, can access the manual set by viewing the directory **manuals**. The manuals are in Adobe® Acrobat® Reader (pdf) format.

In addition, the latest versions of these documents, and any updates to these documents, are posted under the appropriate server at http://docs.hp.com.

For online access to technical support information, self-solve tools, online assistance, community forums of IT experts, broad multivendor knowledge base, and monitoring and diagnostic tools, go to http://www.hp.com/support.

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1 About This Document

This document provides maintenance information for the hp 9000 rp4440 Server, Regulatory Model Number: RSVLA-0201.

The document printing date and part number indicate the document's current edition. The printing date will change when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The document part number will change when extensive changes are made.

Document updates may be issued between editions to correct errors or document product changes. To ensure that you receive the updated or new editions, you should subscribe to the appropriate product support service.

The latest version of this document can be found online at http://docs.hp.com.

NOTE Additional information about the hp 9000 rp4440 Server is provided in the associated User Guides. These guides are available on the *HP Server Documentation CD-ROM* and online at http://docs.hp.com.

What's in This Document

The hp 9000 rp4440 Maintenance Guide contains these chapters:

- **Chapter 2, "Configuring the Server."** Use this chapter to learn how to install additional hot-swap power supplies, hot-swap disk drives, memory DIMMs, processors, and PCI-X cards. Also, learn how to configure your management processor and boot your HP Server
- **Chapter 3, "Troubleshooting."** Use this chapter to learn how to perform minimal troubleshooting of your system
- **Chapter 4, "Removing and Replacing Components."** Use this chapter to learn how to remove and replace all Field Replaceable Units (FRUs) in your system
- **Appendix A, "Parts Information."** Use this appendix to identify FRU part numbers
- **Appendix B, "System I/O Board Switches and Jumpers."** Use this appendix as a reference to system I/O board indicators, connectors, and jumpers

Typographical Conventions

This document uses the following conventions.

Title	The title of a document or a CD.
KeyCap	The name of a keyboard key. Note that **Return** and **Enter** both refer to the same key.
Emphasis	Text that is emphasized.
Bold	Text that is strongly emphasized, such as the summary text in bulleted paragraphs.
`ComputerOut`	Text displayed by the computer.
`UserInput`	Commands and other text that you type.
`Command`	A command name or qualified command phrase.

Related Documents

The *HP Server Documentation CD-ROM* has been provided with your server. It contains the User documentation set for the server, including localized versions of key documents. Included on the CD-ROM are the *Site Preparation, Installation,* and *Operations* guides, which contain installation and in-depth troubleshooting information.

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2 Configuring the Server

Introduction

This chapter provides information about interface connections, configuring the server management processor (MP), and booting the HP Server.

Core I/O Connections

Each hp 9000 rp4440 Server core I/O includes:

- Two USB ports
- One UDMA-100 IDE port (40-pin IDE connector)
- One common server management (CSM)
  - — One 10/100 LAN-RJ45
  - — Three serial ports
- SCSI host bus adapter (HBA)
  - — The SCSI HBA board is required 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 external mass storage devices that you may want to connect to channel B of your core I/O SCSI HBA. External connections to channel B of your SCSI HBA controller are only supported in simplex configuration, when the internal cable between the SCSI backplane and the SCSI HBA card is disconnected. If your system has been converted to the duplex configuration, you may not connect external SCSI devices to channel B of the SCSI HBA. (Instructions and information about converting the server to duplex or simplex are provided in the *hp9000 rp4440 Installation* Guide.)

- 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)

The management processor is an independent support system for the server. It provides a way for you to connect to your HP Server and perform administration or monitoring tasks for the server hardware.

The management processor controls power, reset, transfer of control (TOC) capabilities, provides console access, displays and records system events, and can display detailed information about the various internal subsystems. The management processor also provides a virtual front panel that can be used to monitor the front panel LEDs from a remote location.

The management processor is available whenever the system is connected to a power source, even if the hp 9000 rp4440 Server main power switch is in the off position.

Access to the management processor can be restricted by user accounts. User accounts can be password-protected and provide a specific level of access to the server and management processor commands.

Multiple users can interact with the management processor. From the MP Main Menu users can select any of the following options: enter management processor command mode, enter console, view event logs, view console history, display virtual front panel, enter console session, or connect to another management processor. Multiple users can select different options from the MP Main Menu at the same time. However, management processor command mode and console mode are mirrored. The MP allows only one user at a time to have write access to the shared console.

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 console server management port (CSM) using external modem (dial-up) access, if remote modem access is configured
- The management processor LAN port using web console or telnet, if login access through the management processor LAN is enabled

Local Terminal Access to the Management Processor

Communication with the management processor is established by connecting a terminal to the local CSM I/O serial port.

A terminal session may be established using a standalone terminal, or using terminal emulation software such as Reflection 1 running on a PC.

During installation, communicating with the management processor enables such tasks as:

- Verifying that the components are present and installed correctly
- Setting the LAN IP addresses

Setting Terminal Parameters

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 select Connection Setup.

Step 2. Select Serial Port.

Step 3. Select 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 select Terminal (under the emulation tab).

Step 7. Select 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.

Network Access to the Management Processor

By connecting the management processor LAN port to an active network, another host on the same subnet can set the management processor IP address via the `ping` command. After the IP address has been set, a telnet session can be established to configure additional parameters.

To configure the management processor LAN IP address, perform the following steps:

Step 1. Determine the Medium Access Control (MAC) address of the management processor 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 found directly above the two USB ports.

Step 3. Add an address resolution protocol (ARP) table entry to another host located on your local subnet. This ARP table entry will map 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 management processor. The management processor LAN port should now be configured with the appropriate IP address.

Step 5. Use the `telnet` command to connect to the management processor from a host on the local subnet.

Interacting with the Management Processor

To interact with the management processor, perform the following steps:

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

1. Administrator level user; login=Admin, password=Admin (both are case sensitive).

2. Operator level user; login=Oper, password=Oper (both are case sensitive).

For security reasons, it is recommended that the UC command be used during the initial logon session (enter **CM** at the MP> prompt, and enter **UC** at the MP:CM> prompt) to modify default passwords or to delete and create user accounts.

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

NOTE The management processor will start with the MP Main Menu displayed. To follow these steps, make sure you are at the Main Menu. If you are not at the Main Menu, use **CTRL+B** to return to the Main Menu.

Step 2. Use the management processor menus and commands as needed. Main Menu commands are shown in the Main MP Menu. Commands not displayed in the MP Main Menu can be accessed in command mode by first using the CM command at the MP prompt. A list of available commands is presented and can be displayed by using the management processor help function (enter **HE** followed by **LI** at the MP> prompt). You can return to the MP Main Menu by typing **CTRL+B**.

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

The MP Main Menu

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
```

Configuring Management Processor LAN Information

LAN information includes the management processor network name, the management processor IP address, the management processor subnet mask, the management processor gateway address, and the web console port number.

To set the management processor LAN IP address:

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

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

NOTE The value in the "IP address" field is set at the factory. The customer must provide the actual management processor LAN IP address.

Step 3. The screen displays the default values and asks if you want to modify them. It is good practice to write down the information, as it may be required for future troubleshooting. (See The LC Command Screen for a typical display.)

Step 4. The current `lc` data is displayed. When prompted to enter a parameter name, `A to modify All`, or `Q to Quit`, enter **A** to select all parameters.

Step 5. The current IP address is displayed. When prompted to enter a new value or `Q`, enter the new IP address.

Step 6. The current host name is displayed. When prompted to enter a new value or `Q`, enter the new management processor network name.

This is the host name for the management processor LAN. The name can be up to 64 characters in length, and can include dashes, underlines, periods, and spaces.

Step 7. The current subnet mask name is displayed. When prompted to enter a new value or `Q`, enter the new subnet mask name.

Step 8. The current gateway address is displayed. When prompted to enter a new value or `Q`, enter the new gateway address.

Step 9. The current web console port number is displayed. When prompted to enter a new value or `Q`, just hit **enter**. The message `-> Current Web Console Port Number has been retained` will be displayed.

Step 10. The current link state information is displayed. When prompted to enter a new value or `Q`, just press **enter**. The message `-> Current Link State has been retained` will be displayed.

Step 11. A new lc listing is displayed, 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.

Step 12. Observe the following display:

```
> LAN Configuration has been updated

-> Reset MP (XD command option 'R') for configuration to take effect.

MP Host Name: name
```

(the name entered in step 5)

```
MP:CM>
```

Step 13. Enter **`XD -reset`** to reset the MP.

Step 14. After the MP resets, log into 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/disable web console and telnet access after the MP has been reset.

The LC Command Screen

LC commands:

```
MP:CM> lc -ip 127.0.0.1 -host uninitialized -mask 255.255.255.0 -gate 127.0.0.1 -web 2003

New LAN Configuration (* modified value):
* IP Address: 127.0.0.1
* MP Host Name: uninitialized
* Subnet Mask: 255.255.255.0
* Gateway Address: 127.0.0.1
  Link State: Auto Negotiate
* Web Console Port Number: 2023

Confirm? (Y/ {N}) : y

-> LAN configuration has been updated
-> Reset the MP (XD command option 'R' ) for confirmation to take effect.

MP Host Name : uninitialized
MP:CM> xd -reset
```

Management Processor Commands

Table 2-1 Management Processor Commands and Descriptions

Command	Description
BP	Reset BMC passwords
CA	Configure serial port parameters
CE	Log a repair in the history buffer
CL	Display console history
CG	Certificate generator
CO	Return to redirected console mode
CSP	Connect to another service processor
CT	Configure trace
DATE	Display date
DC	Default configuration
DF	Display FRUID
DI	Disconnect remote or LAN console

Table 2-1 Management Processor Commands and Descriptions (Continued)

Command	Description
FW	MP firmware upgrade
HE	Display help for menu or command
ID	System information
IT	Modify MP inactivity timers
LC	LAN configuration
LOC	Locater LED control
LS	LAN status
MA	Return to main menu
MR	Modem reset
MS	Modem status
PC	Remote power control
PG	Configure paging
PR	Power restore policy configuration
PS	Power management module status
RB	Reset BMC through toggle GPIO pin
RS	Request BMC to reset system through RST signal
SA	Configure remote/modem—LAN telnet and web access options
SE	Activate a system session on locator remote port
SL	Show logs
SO	Security options and access control
SYSREV	Display all firmware revisions
SS	System status of processor modules
TC	Transfer of control—system reset through INIT signal
TE	Tell—send a message to other users
UC	User configuration
VT	Display software trace
VFP	Virtual front panel
WHO	Display connected management processor users
XD	MP diagnostics and/or reset

Booting the Server

To boot the server, 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 boot console handler (BCH). The BCH allows you to control the server's booting environment. For more information about the BCH, refer to the Utilities chapter of the *hp9000 rp4440 Operations* Guide.

3 Troubleshooting

Troubleshooting Methodology

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

CAUTION Do not operate the HP Server for more than 10 minutes with any cover (including power supplies and disk drives) removed. Otherwise, damage to system components may result due to improper cooling airflow.

However, you can safely remove a cover while the HP Server is running to remove and replace PCI hot-plug boards. For any other service activity requiring access to the system board or power distribution board, power down the HP Server and observe all safety precautions.

To troubleshoot your system you must be familiar with the HP-UX operating system and be able to start and stop testing processes. You should also be familiar with Support Tools Manager (STM), which runs in HP-UX, and the Offline Diagnostics Environment (ODE).

Online troubleshooting programs are available on your HP-UX operating system. Offline troubleshooting programs are available on the resource CD that is shipped with your HP Server. Both online and offline troubleshooting tools are also available for downloading at http://docs.hp.com.

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 ISL	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 rp4440 servers
	More than 5 seconds	Hard shutdown

Table 3-1 Power Button Functions (Continued)

System State	Switch Pressed Time	Result
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 rp4440 servers
	More than 5 seconds	Hard shutdown
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 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 rp4440 servers
	More than 5 seconds	Hard shutdown

Operating System Will Boot

If your operating system is running and you are experiencing problems, use the following online tools to help solve your problem: Refer to “Troubleshooting Using Online Support Tools” on page 21.

- Support Tools Manager (STM)
- Event Monitoring Service (EMS)
- Management Processor (MP)

Operating System Will Not Boot

If your operating system will not boot, but you are able to reach the BCH (from either the main disk partition or CD), then use the following offline tools to help solve your problem: Refer to “Troubleshooting Using Offline Support Tools” on page 25.

- Offline Diagnostic Environment (ODE)
- Management Processor (MP)

Troubleshooting Using Online Support Tools

The following online support tools are available from the HP-UX environment.

Support Tools Manager

Support Tools Manager (STM) is available in three user interfaces:

- Graphical interface for X-based terminals (XSTM)
- Menu interface for ASCII terminals (MSTM)
- Command line interface for all ASCII terminals (CSTM)

You can use the graphical and menu interfaces intuitively and you can use the command line interface to drive STM using scripts.

You can use diagnostics to thoroughly test a device and isolate failures down to the suspected Field Replaceable Unit (FRU).

For complete documentation on how to access and use STM go to http://docs.hp.com. Under Topics menu go to Diagnostics and look for Support Tools Manager.

Event Monitoring Service

Event Monitoring Service (EMS) is the framework for monitoring hardware and reporting events. You can use EMS to eliminate most undetected hardware failures that cause data loss or interruptions of system operation. You can monitor a hardware device (such as a disk) for the occurrence of any unusual activity (called an event). When an event occurs, it is reported by a variety of notification methods such as e-mail. Event detections are handled automatically with minimal involvement on your part.

The following monitors are available:

- CMC monitor
- UPS monitor
- FC hub monitor
- FC switch monitor
- Peripheral status monitor
- Memory monitor

EMS comes with your HP-UX operating system. To bring up the event monitoring main menu, execute the following command at the shell prompt:

```
/etc/opt/resmon/lbin/monconfig
```

From the list of main menu selections, choose:

```
(E) Enable Monitoring
```

Management Processor

The management processor (MP) interface provides diagnostic and configuration capabilities. By viewing the system logs you can determine and solve problems affecting your server. To access your MP interface and system logs, perform the following steps:

NOTE The MP interface must be accessed from a terminal console that is attached to the MP via the MP LAN or MP remote serial connector. The MP is always available for troubleshooting, regardless of the state of your system, as long as there is AC power applied to your server.

Step 1. If necessary, press **CTRL+B** to access the MP interface.

Step 2. Log in with proper user name and password.

Step 3. Enter **cl** to display the console logs. This log displays console history from oldest to newest.

Step 4. Enter **sl** to display the system logs. The system logs consist of:

- System event
- Forward progress
- Current boot
- Previous boot
- Live events
- Clear SEL/FPL logs

Step 5. For a complete explanation of the management processor and all commands, refer to the Utilities chapter of the *hp9000 rp4440 Server Operations Guide*.

System Event Logs (SEL)

To access the system event logs perform the following steps:

Step 1. Access the optional management processor command prompt.

Step 2. Run the `sl` command. The Event Log Viewer menu will display:

```
SL

Event Log Viewer:


Log Name            Entries    % Full         Latest Entry

-------------------------------------------------------------------

E - System Event            9         1 %      29 Oct 2002 19:15:05

F - Forward Progress      129         3 %

B - Current Boot           82

P - Previous Boot           0

L - Live Events

C - Clear All Logs


Enter your choice or [Q] to Quit:
```

Step 3. Select **e** to review the events. The Event Log Navigation menu will display:

```
Set up alert filter options on this buffer? (Y/[N])

(N)

       Log Name            Entries    % Full         Latest Entry

-------------------------------------------------------------------

E - System Event          410        47 %      18 Feb 2003 09:38:10


Event Log Navigation Help:


   +       View next block     (forward in time,  e.g. from 3 to 4)

   -       View previous block (backward in time, e.g. from 3 to 2)

   <CR>    Continue to the next or previous block

   D       Dump the entire log for capture and analysis
```

```
F       First entry

L       Last entry

J       Jump to entry number

V       View mode configuration (text, keyword, hex)

?       Display this Help menu

Ctrl-B  Quit and return to the Main Menu
```

Step 4. Select **v**, then **t** to change the display to text mode:

```
Display Mode Configuration:

             H - Hex mode

Current -> K - Keyword mode

             T - Text mode

Enter new value, or [Q] to Quit:

T
```

Step 5. To decode the blinking state of System LED, review the entire SEL and look at events with alert level 3 and above.

For example:

```
Log Entry 24: 14 Feb 2003 15:27:02

Alert Level 3: Warning

Keyword: Type-02 1b0800 1771520

Hot Swap Cage: SCSI cable removed

Logged by: BMC;  Sensor: Cable / Interconnect - SCSI ChExt Cable

Data1: Device Removed/Device Absent

0x203E4D0AC6020220 FFFF0008F61B0300


Log Entry 73: 00:00:12

Alert Level 3: Warning

Keyword: Type-02 050301 328449

The server's built-in sensors have detected an open chassis door.

Logged by: BMC;  Sensor: Physical Security - Chassis Open

Data1: State Asserted

0x200000000C020570 FFFF010302050300
```

Troubleshooting Using Offline Support Tools

You can use the *Support Plus CD* to troubleshoot your hp 9000 rp4440 Server by accessing the offline diagnostic environment ODE.

Offline Diagnostic Environment (ODE)

ODE is used to evaluate specific hardware components via a command line interface. To access ODE from your *Support Plus CD*, perform the following steps:

Step 1. Power on your HP Server and insert the *Support Plus CD*.

Step 2. Boot the system to the PDC prompt (BOOTADMIN, BCH, etc.). PDC prompts may differ on some computer models.

```
Main Menu: Enter command or menu>
```

Step 3. List the bootable devices by entering search: `search`

Step 4. Select the CD device that contains the *Support Plus CD*, for example:

```
p3
```

Step 5. Boot from that device by entering boot p3: **`boot p3`**

Step 6. You are asked to interact with the Initial System Loader (ISL) prompt. Enter yes: **`y`**

Step 7. From the ISL prompt, start the Offline Diagnostics Environment by entering ODE: **`ODE`**

The following commands are available at the ODE prompt:

Table 3-2 ODE Commands

Command	Description
`help`	To display a list and description of the available commands
`help` <*command*>	To display the additional information
`help` <*var*>	To display the additional information
`ls`	To list the ODE modules that will run on your computer
<*module_name*>	To run an ODE module interactively
`run` <*module_name*>	To run an ODE module non-interactively

Disk and I/O Path Logging

Some failures result in I/O path logging. These paths help to indicate the source of the error and may be included in the error message or logged into console or event logs. The following table describes the disk drive and PCI slot paths for your HP Server.

Table 3-3 Internal Disk and DVD Paths

Slot	Path
Slot 1 (top)	0/1/1/0.1 Channel A (Duplex Mode)
Slot 2 (bottom)	0/1/1/1.0 Channel B (Duplex Mode)
DVD	0/0/3/0.0

Table 3-4 Core I/O Paths

Function	Path
Console Port	0/0/1/1.0
Remote Port	0/0/1/1.2
UPS Port	0/0/1/0.0
USB Ports	0/0/2/0 Top 0/0/2/1 Bottom

Table 3-5 PCI I/O Paths

Slot	Path
Slot 1 (Core I/O SCSI)	0/1/1/0 Channel A 0/1/1/1 Channel B
Slot 2 (Core I/O LAN)	0/1/2/0
Slot 3	0/4/1
Slot 4	0/4/2
Slot 5	0/5/1
Slot 6	0/5/2
Slot 7	0/2/1
Slot 8 (right)	0/6/1

Troubleshooting Using LED Indicators

Your hp 9000 rp4440 Server has LED indicators located on the front control panel and an internal QuickFind diagnostic panel that you can use to determine what repair action is required.

Front Control Panel LEDs

The front control panel LEDs show you the system status at a glance. If warning or attention lights are flashing, then you should query the QuickFind diagnostic panel or management processor for further information.

Figure 3-1 Front Control Panel LEDs

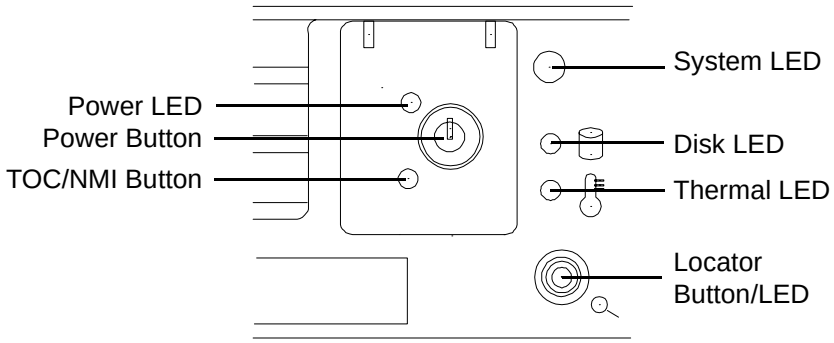


Table 3-6 Front Control Panel LED Definitions

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
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	Steady	Yellow	Flashing yellow: Housekeeping voltage present
Power	Off	Off	Off	Off: Power off
Disk LED	Active	Flashing at rate of disk activity	Green	Flashing green: Disk activity

Table 3-6 Front Control Panel LED Definitions (Continued)

LED/ Button	State	Flash Rate	Color	Description
Thermal LED	OK	Steady	Green	Green: Thermal OK
Thermal LED	Warning	Flashing at 1 Hz	Yellow	Flashing Yellow: Thermal warning
Locator LED/Button	Active	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. The following definitions describe the status of the various LEDs and what is wrong with the indicated component.

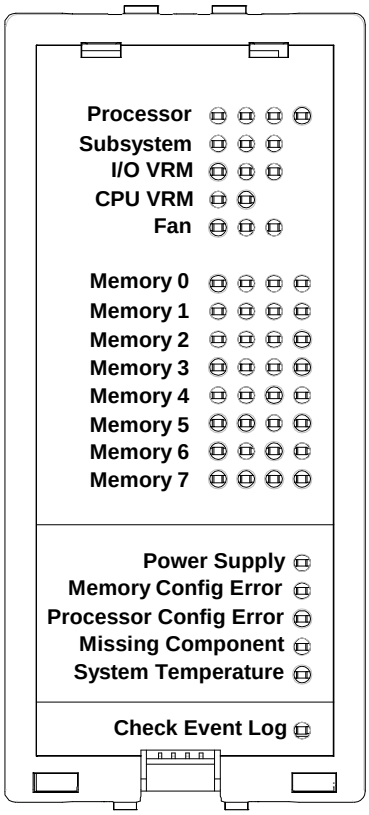
Table 3-7 QuickFind Diagnostic Panel LED Definitions

Item	LED 0	LED 1	LED 2	LED 3	Details
Processor	Socket 0	Socket 1	Socket 2	Socket 3	If the System LED (on front panel) is in the attention or fault state and the processor LED is on, then the processor or voltage regulator has failed—the processor module in the specified socket needs to be replaced If the thermal LED is in the warning or critical state and the processor LED is on, then the processor exceeded the warning or critical level
Subsystem	CPU board	Memory board	I/O board	n/a	A soldered voltage regulator has failed—the specified board must be replaced
I/O VRM	12 volt	5 volt	3 volt	n/a	A plug-in voltage regulator has failed—specific VRM must be replaced
CPU VRM	n/a	n/a	n/a	n/a	n/a
Fan Module	0	1	2	n/a	One or both fans in a fan module have failed—the module must be replaced Fan 2 is in front of the power supplies
Memory Bank X (0-7)	DIMM xA	DIMM xB	DIMM xC	DIMM xD	The specified DIMM has failed—the DIMM must be replaced 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—replace mismatched DIMM
Check Power Supply	n/a	n/a	n/a		One of the power supplies or power supply fans have failed—replace the power supply. The faulty power supply LED (located on Power supply) will be lit
Memory Config Error	n/a	n/a	n/a		The DIMMs in a rank are mismatched. All the DIMMs in the specified rank (0-7) will be lit
Processor Config Error	n/a	n/a	n/a		The processors are mismatched—replace mismatched processor
Missing Component	n/a	n/a	n/a		A required component(s) is not installed in the system and thus preventing power up
System Temp	n/a	n/a	n/a		The internal temperature of the server has exceeded the warning or critical level

Table 3-7 QuickFind Diagnostic Panel LED Definitions (Continued)

Item	LED 0	LED 1	LED 2	LED 3	Details
Check Event Log	n/a	n/a	n/a		An event has occurred that requires attention

Figure 3-2 QuickFind Diagnostic Label



I/O Baseboard LED Indicators

Various LEDs, sensors, and reset or attention buttons are found on the I/O baseboard.

Figure 3-3 I/O Baseboard LEDs, Buttons, and Sensors

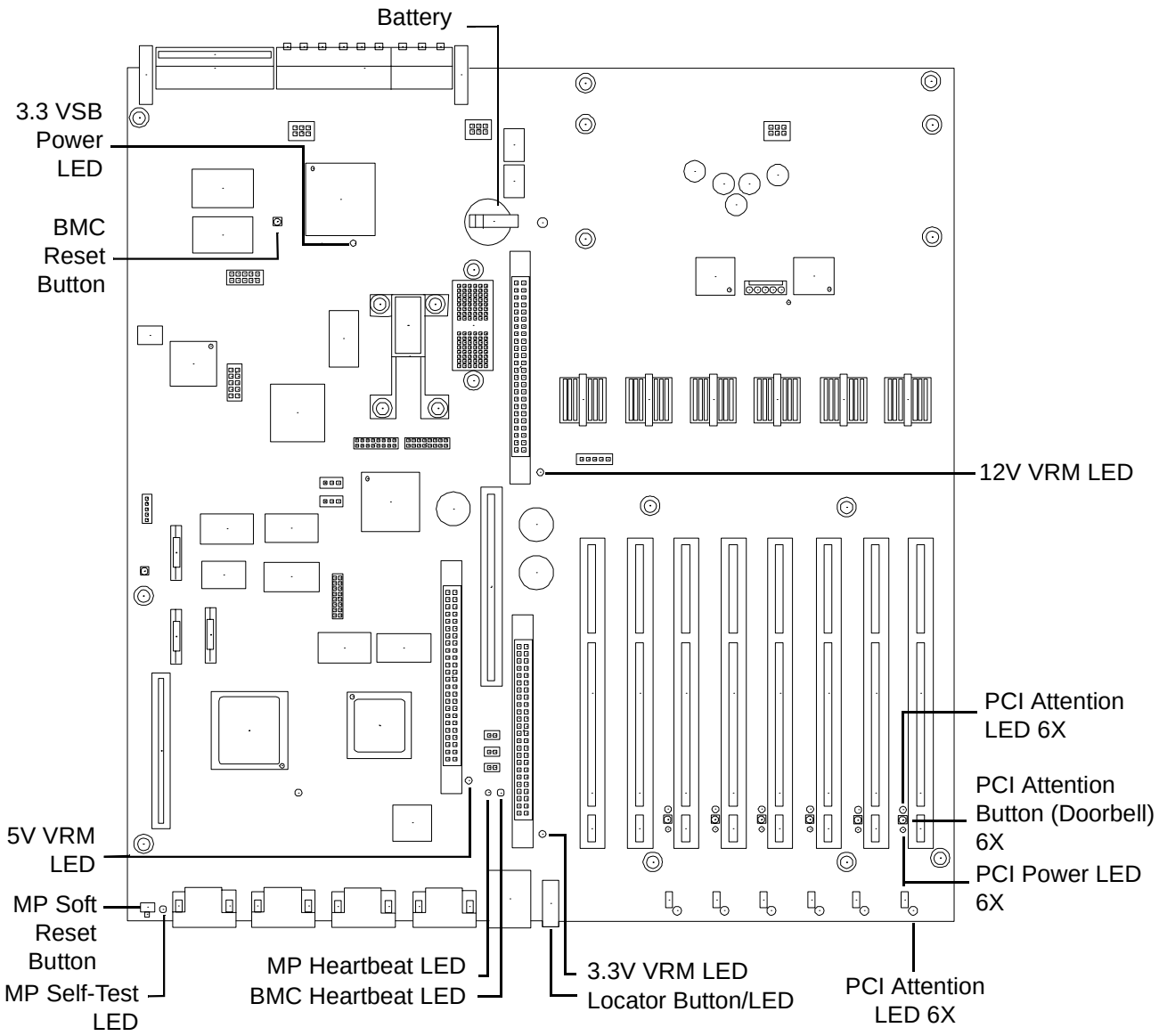


Table 3-8 I/O Baseboard LEDs, Buttons, and Sensors

LED/Button	Color	Status	Condition
12V VRM Power LED	Green	On	12V VRM is functioning
5V VRM Power LED	Green	On	5V VRM is functioning
3.3V VRM Power LED	Green	On	3.3V VRM is functioning
MP Heartbeat	Green	Blinking	The management processor is functioning correctly
MP Self Test LED	Amber	On Off	The management processor is executing the internal self test The management processor has passed the internal self test
BMC Heartbeat	Green	Blinking	The baseboard management controller is functioning correctly
3.3 VSB Power LED	Green	On	Standby power is available
MP Soft Reset Button	N/A	Press	Resets the management processors values

Memory Extender Boards

The 32 DIMM memory extender board has two power status LEDs-1.25V and 1.5V. See Figure 3-4 on page 33.When the LEDs are on, each respective voltage is present on the memory extender board.

The 16 DIMM memory extender board has one condition LED on each of the 2 VRMs. If either condition VRM LED is on, there is a problem with that VRM. You must replace the entire extender board in this case; the VRMs are not Field Replaceable Units (FRUs).

Figure 3-4 32 DIMM Memory Extender Board LEDs

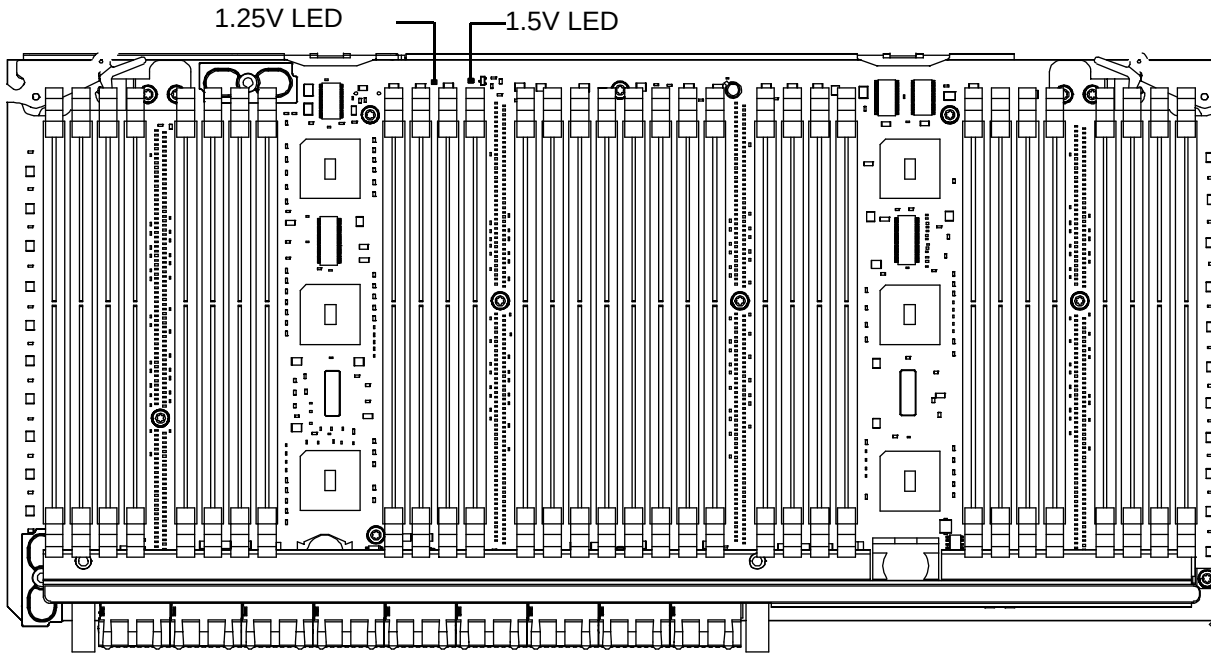


Table 3-9 32 DIMM Memory Extender Board

LED	Color	Status	Condition
1.25V Power	Green	On	Power OK
1.5V Power	Green	On	Power OK

Figure 3-5 16 DIMM Memory Extender Board LEDs

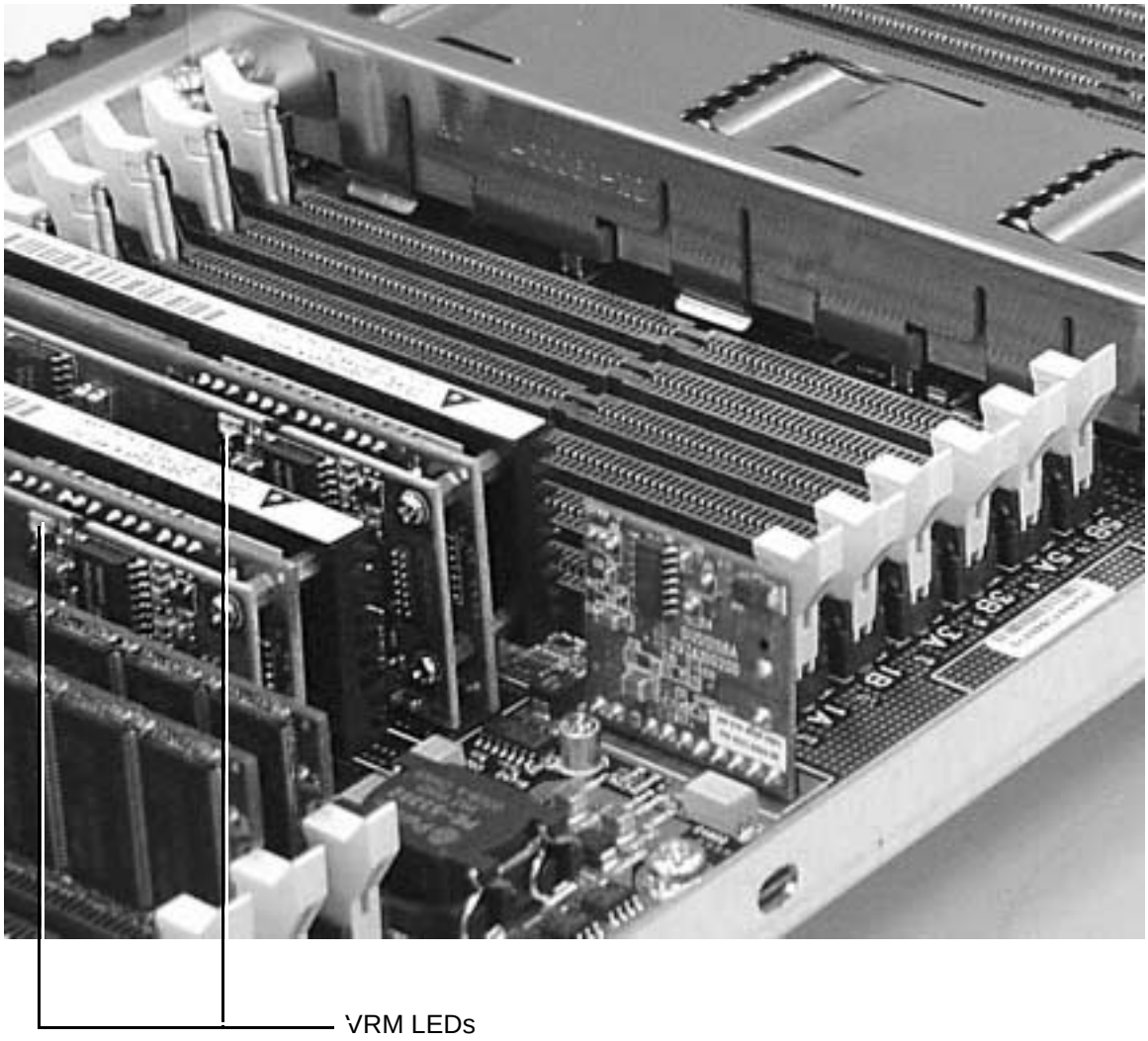


Table 3-10 16 DIMM Memory Extender Board

LED	Color	Status	Condition	Action
VRM Status	Green	On	VRM is bad	Replace memory extender board

4 Removing and Replacing Components

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 **Hazardous voltages are present inside the HP Server. Always remove AC power from the server and associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.**

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

Accessing a Rack Mounted Server

The hp 9000 rp4440 Server is designed to be rack mounted. The following procedure explains how to gain access to your HP Server that is mounted in an approved rack. For rack installation instructions, review the document titled *Installation Guide, Mid-Weight Slide Kit, 5065-7291*. This document can be accessed at http://www.hp.com/racksolutions.

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

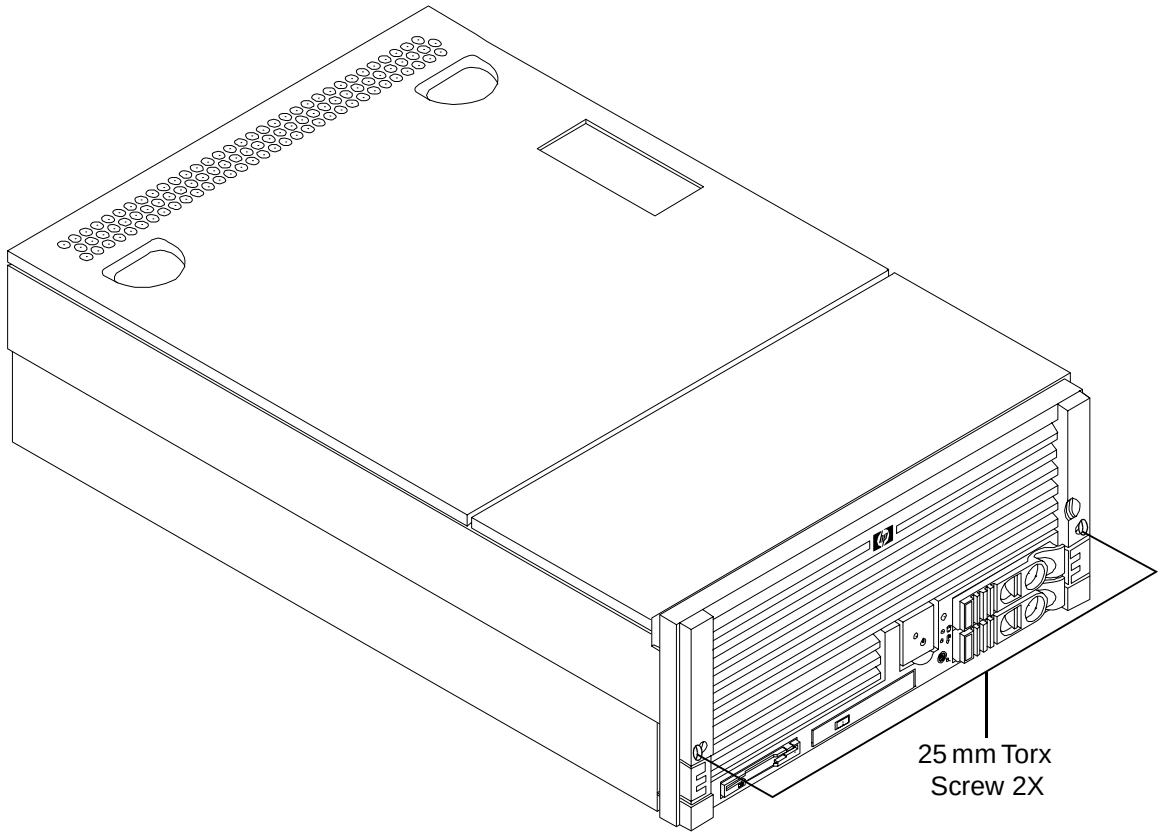
NOTE Ensure that there is enough area (Approximately 1.5 meters [4.5 ft.]) to fully extend the server out the front and work on it.

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. See Figure 4-1, "Accessing 25 mm Torx Screws."

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. When fully extended, the front and top covers are fully accessible.

Figure 4-1 Accessing 25 mm Torx Screws



Insert the Server into the Rack

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

Step 1. Press the rail clips on either side of the server inward and push the server into the rack until it stops.

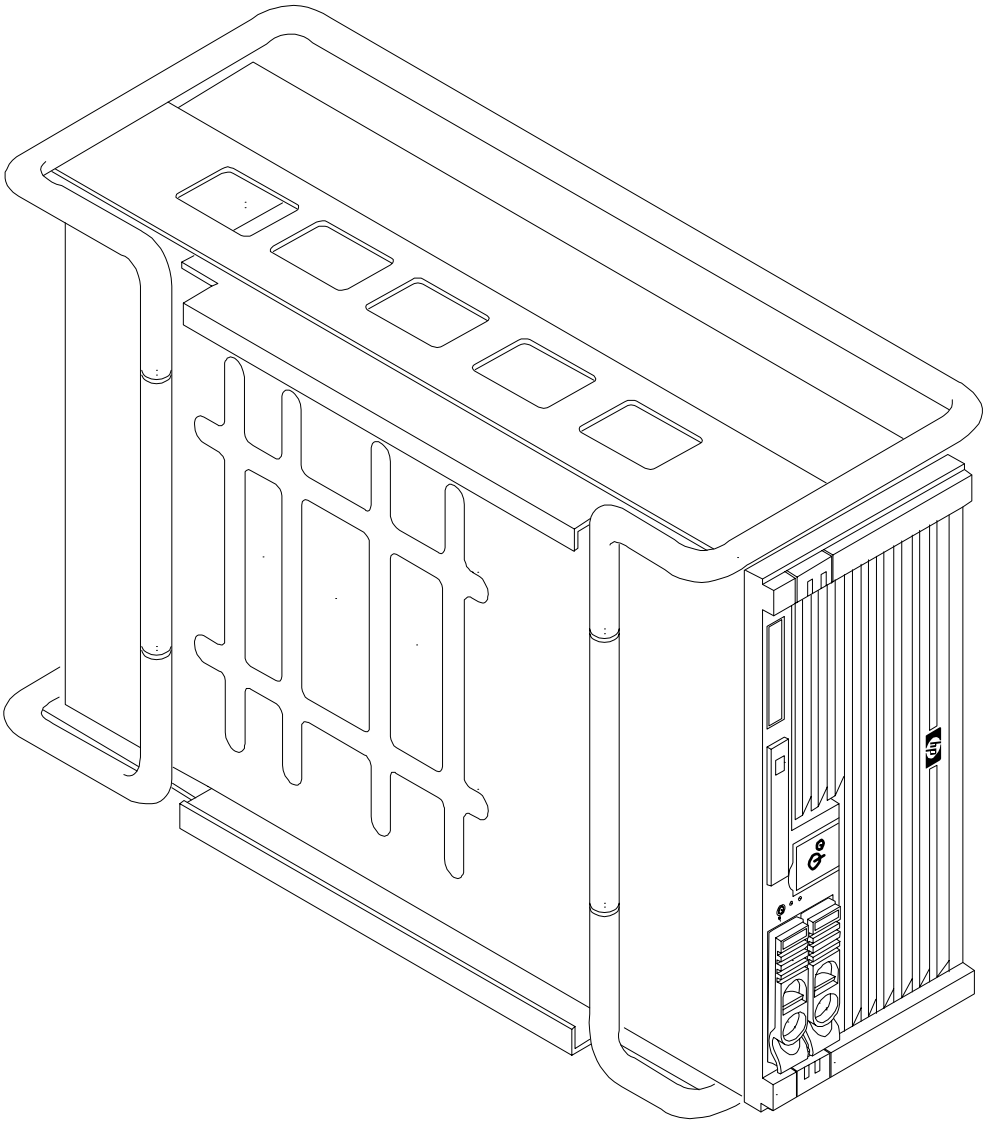
Step 2. Replace the T-25 screws that fasten the server to the rack.

Accessing a Rackless Server

The hp 9000 rp4440 Server is also designed to be rackless. 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 4-2 Rackless hp 9000 rp4440 Server



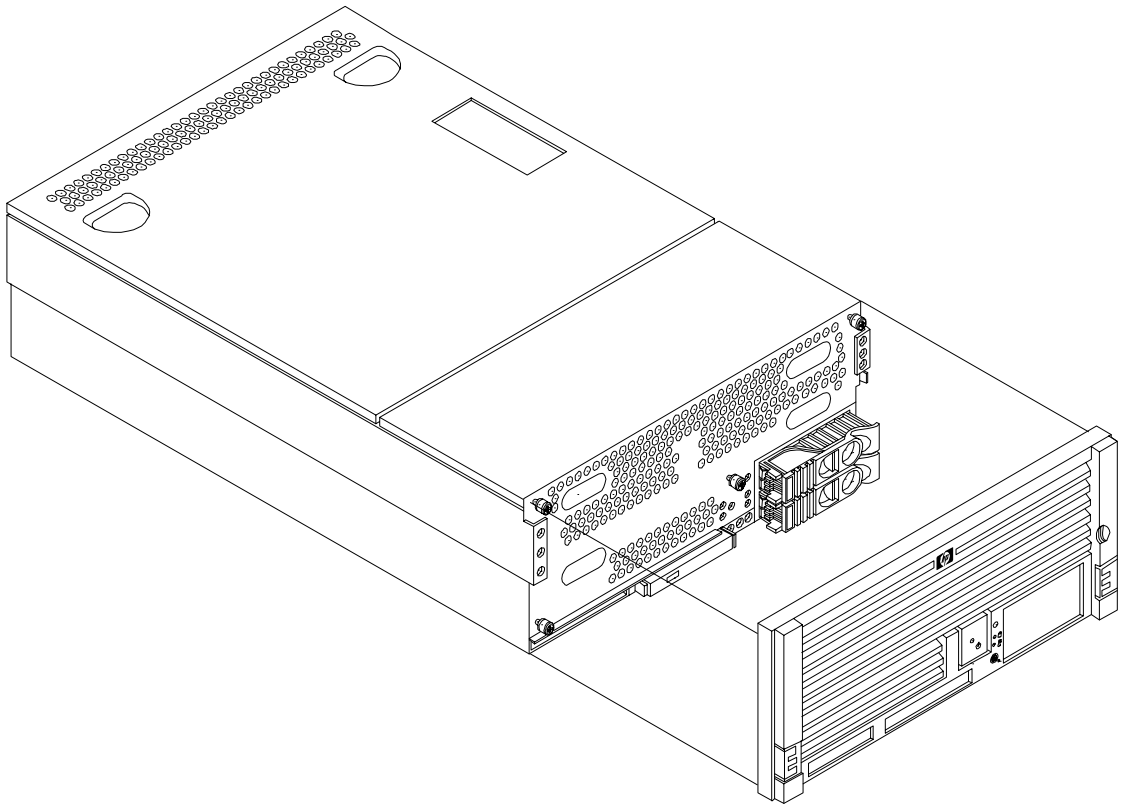
Front Bezel

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 4-3 Removing and Replacing the Front Bezel



Removing the Front Bezel

To remove the front bezel, perform the following step:

Step 1. Grasp the front bezel at the outer edges and pull straight out.

Replacing the Front Bezel

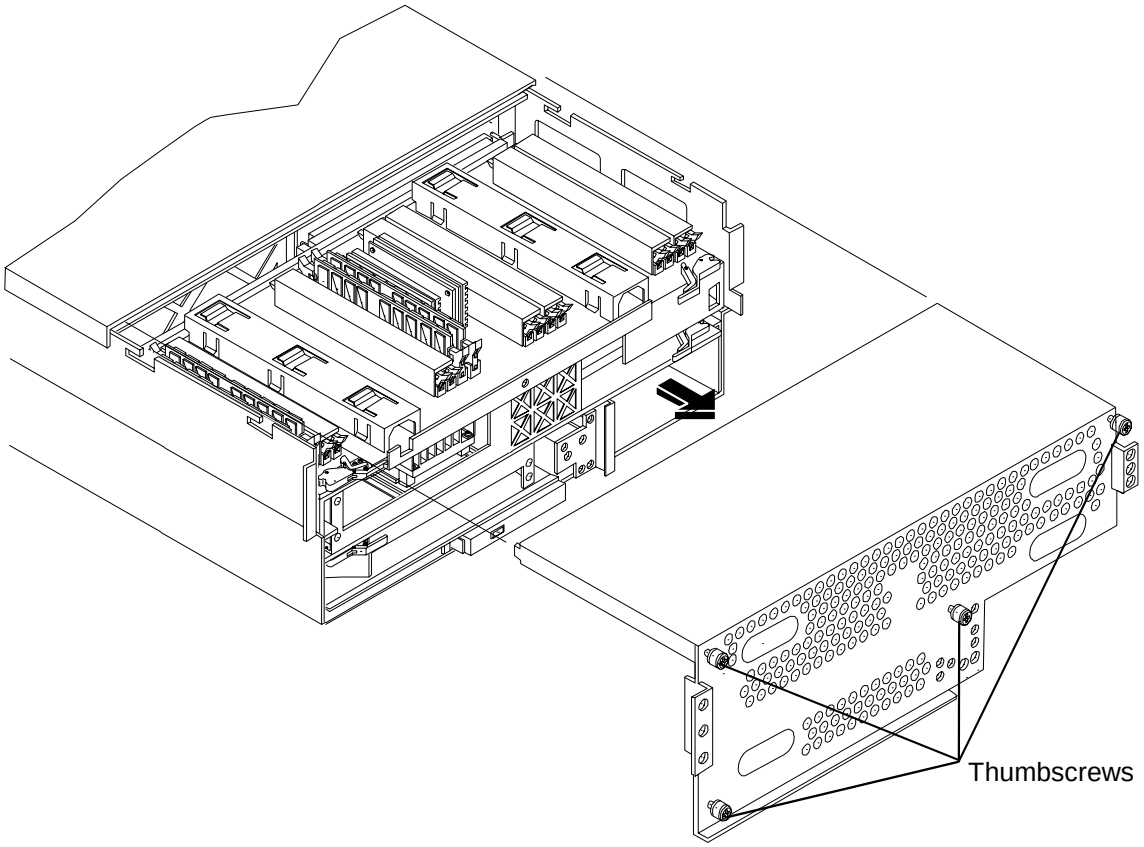
To Replace the front bezel, perform the following step:

Step 1. Push the front bezel straight into the chassis until it snaps into place.

Front and Top Covers

NOTE When the front or top cover is removed the chassis fan units increase to high speed to assist cooling. When the top cover is replaced at the end of the operation, the chassis fans return to normal speed.

Figure 4-4 Removing and Replacing the Front Cover



Removing the Front Cover

To remove the front cover, perform the following steps:

WARNING **Hazardous voltages are present inside the HP Server. Always remove the AC power cords from the server and associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.**

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Using a Torx T15 driver, 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:

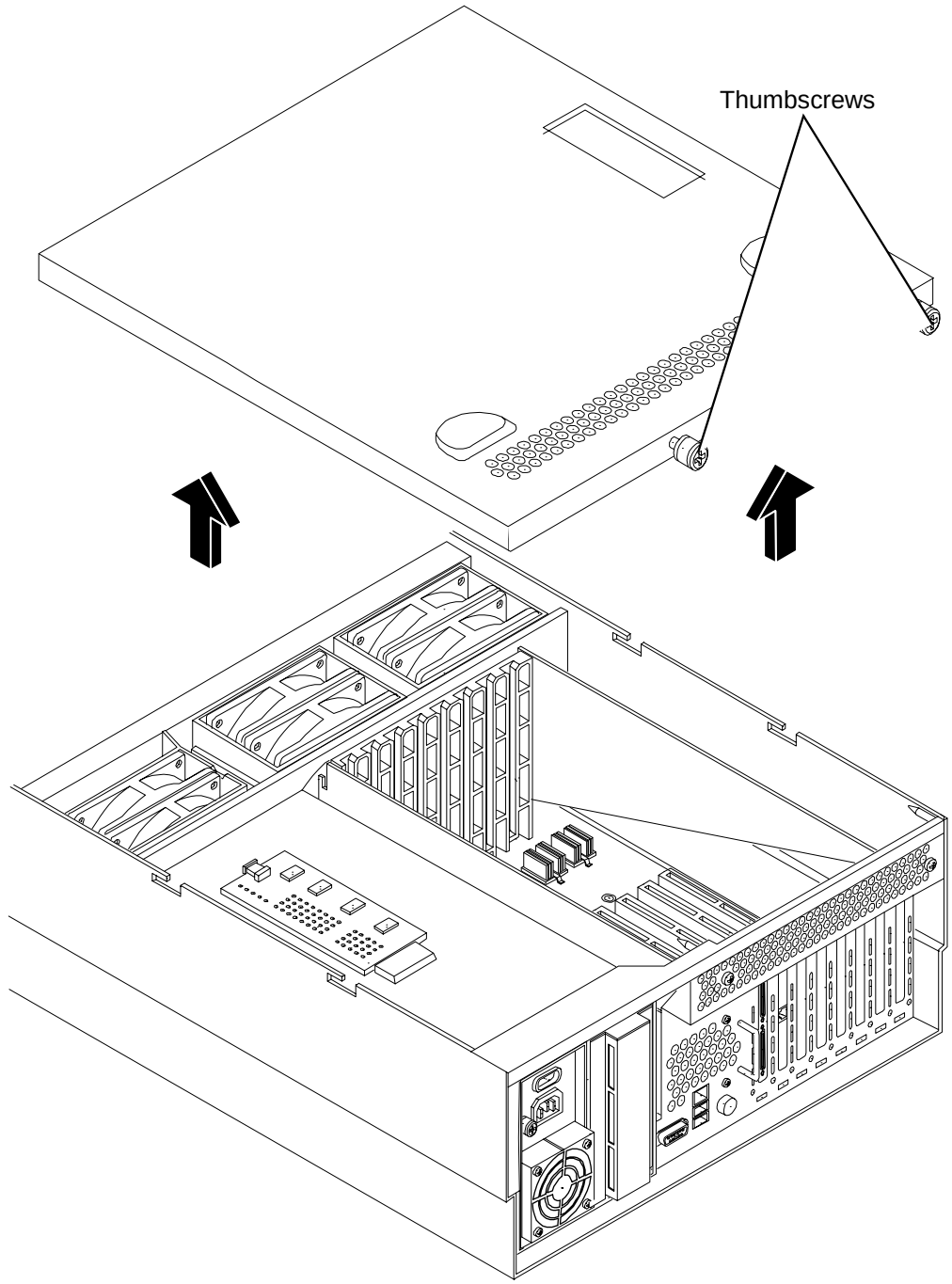
Step 1. Align the tabs at the rear of the front cover with the corresponding slots in the chassis and fully seat the tabs into the slots.

Step 2. Tighten the four thumbscrews securely.

Step 3. Replace the front bezel.

Step 4. If rack mounted, slide the HP Server into the rack until it stops.

Figure 4-5 Removing and Replacing the Top Cover



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. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

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.

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, fully seat the tabs into the slots, and push forward until it seats.

Step 2. Using a Torx T15 driver, tighten the two thumbscrews securely.

Step 3. If rack mounted, slide the HP Server into the rack until it stops.

System Battery

The system battery may be replaced by removing the top cover and accessing the I/O baseboard.

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

CAUTION Before changing your battery, save all boot configuration settings. These values will need to be reset after changing your battery.

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the top cover from the chassis. (Refer to "Front and Top Covers" on page 39.)

Step 3. Remove the I/O baseboard assembly from the chassis. (Refer to "I/O Baseboard Assembly" on page 67.)

Step 4. Locate the system battery on the I/O baseboard. Remove the battery by lifting the retaining clip and pull the battery from its socket.

Step 5. Install the new battery and replace the retaining clip.

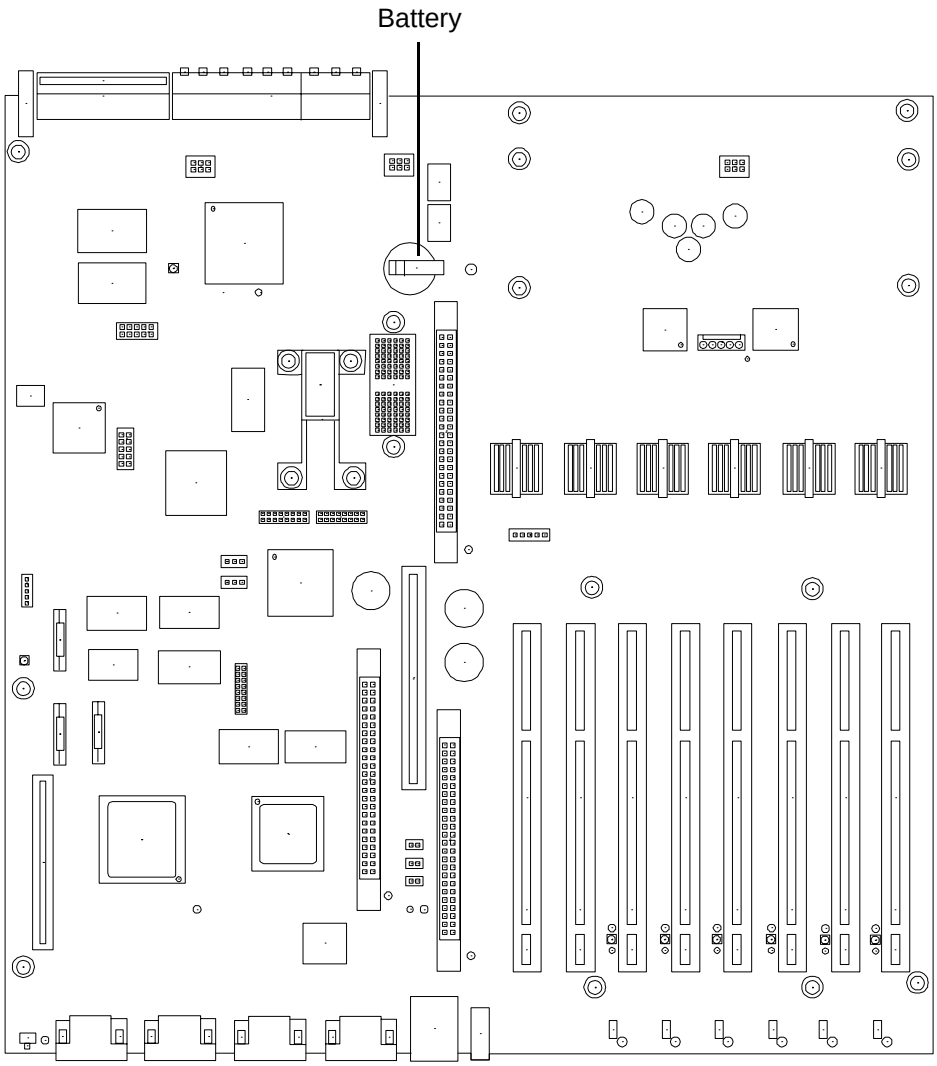
NOTE The positive terminal of the battery is designated by the "+" sign. The battery is installed with the "+" sign facing up.

Step 6. Replace the top cover.

Step 7. Replace the I/O baseboard assembly.

Step 8. If rack mounted, slide the HP Server all the way in until it stops.

Figure 4-6 Battery Location on I/O Baseboard



Memory Extender Board

The memory extender board is located directly under the front cover of the chassis. The standard memory extender board can hold up to 16 DIMMs. The high capacity memory extender board can hold up to 32 DIMMs.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a memory 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.

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

Removing a Memory Extender Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

NOTE If desired, the memory extender board may be removed without removing the HP Server from the rack.

Step 2. Remove the front bezel from the chassis. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover from the chassis. (Refer to “Front and Top Covers” on page 39.)

Step 4. Press each latch on the two extraction levers located on each side of the memory extender board.

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.

Figure 4-7 Memory Extender Board Latches

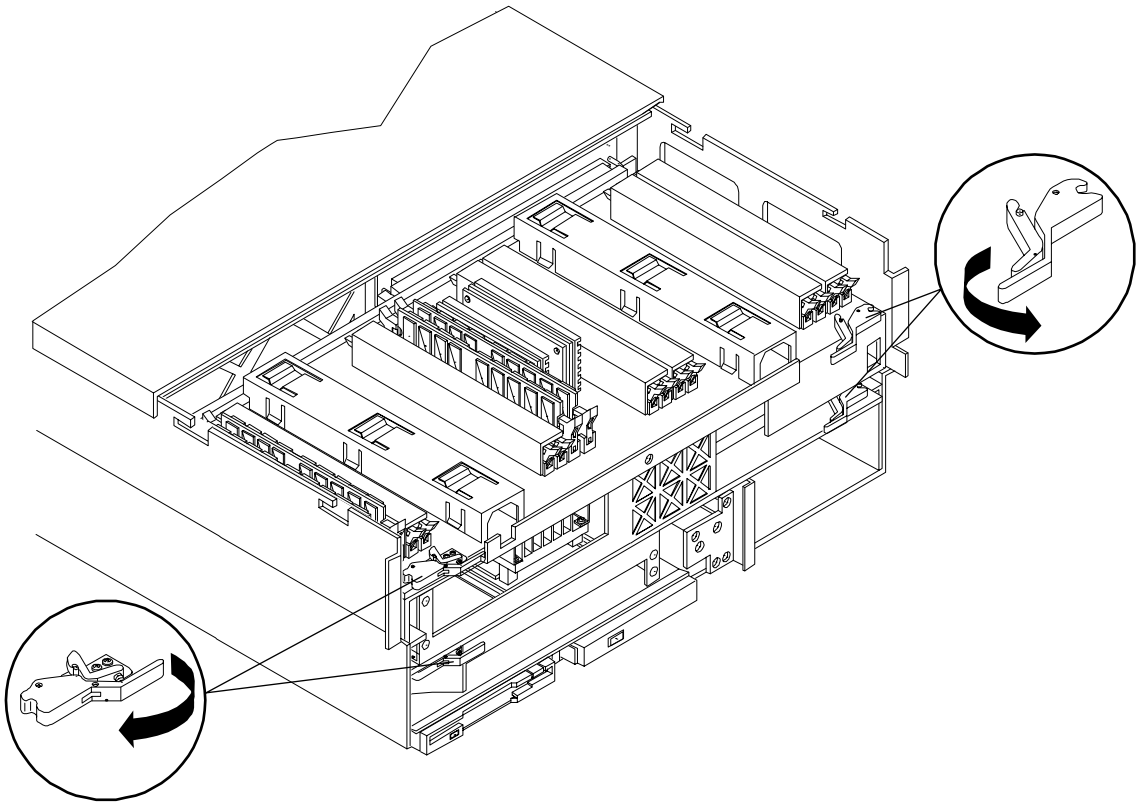
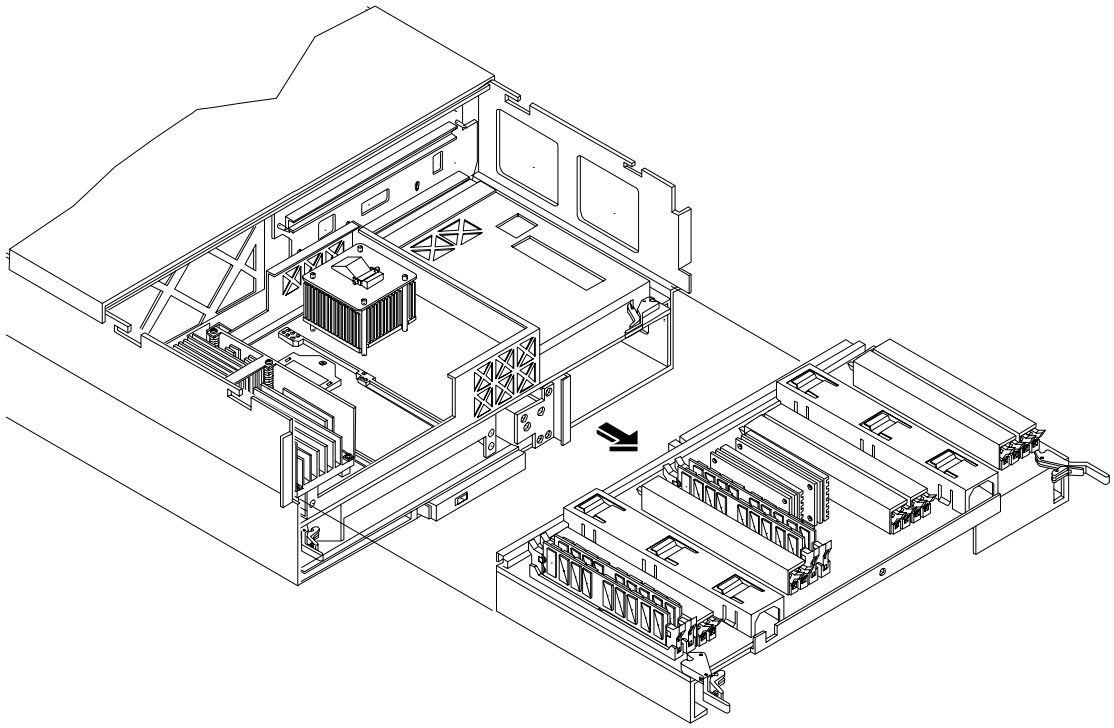


Figure 4-8 Memory Extender Board



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 front and rear chassis guide slots.

Step 3. Slide the memory extender board in until it begins to seat in the socket located on the midplane board.

Step 4. Push the extraction levers inward to the locked position in order to plug in the memory extender board into the midplane riser board.

Step 5. Replace the front cover.

Step 6. Replace the front bezel.

Step 7. If rack mounted, slide the HP Server into the rack until it stops.

System Memory DIMMs

System memory DIMMs are located on the memory extender board.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing system memory DIMMs.**

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

Removing System Memory DIMMs

To remove system memory, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

NOTE If desired, the processor extender board may be removed without removing the HP Server from the rack.

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Remove the memory extender board. (Refer to “Memory Extender Board” on page 45.)

Step 5. Identify the DIMM to be removed and push the appropriate extraction levers found on either side of the DIMM slot outward to the open position. The DIMM will eject from the slot.

Step 6. Remove the DIMM from the socket.

Installing Memory DIMMs

Your hp 9000 rp4440 Server comes with a sixteen DIMM memory extender board that is minimally configured with 1 GB of memory [four 256 MB DIMMs loaded in quad 0 (slots 0A,0B,0C,and 0D)]. See Figure 4-9, “16 DIMM Extender Board Slot IDs.”

An optional thirty-two DIMM memory extender board is available to replace the sixteen DIMM memory extender board and must also be minimally configured with 1 GB in quad 0. See Figure 4-10, “32 DIMM Extender Board Slot IDs.”

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

Supported DIMM Sizes

Supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB. Dissimilar DIMM sizes may be used across the entire extender board but all four DIMMs in each quad must match. For cooling purposes, DIMM fillers must be used in some unused slots.

DIMM Slot Fillers

Both the sixteen and thirty-two DIMM extender boards have DIMM slot filler boards placed over all unfilled DIMM slots. As you fill DIMM quads with additional memory you must remove the DIMM slot fillers covering the affected slots. All remaining DIMM fillers in unused slots must remain in place to maximize internal cooling. See Table 4-1, "DIMM Filler Requirements for 16 DIMM Extender Board."

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

Table 4-1 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 quads 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 slots.

Table 4-2 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)
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 slots.

Figure 4-9 16 DIMM Extender Board Slot IDs

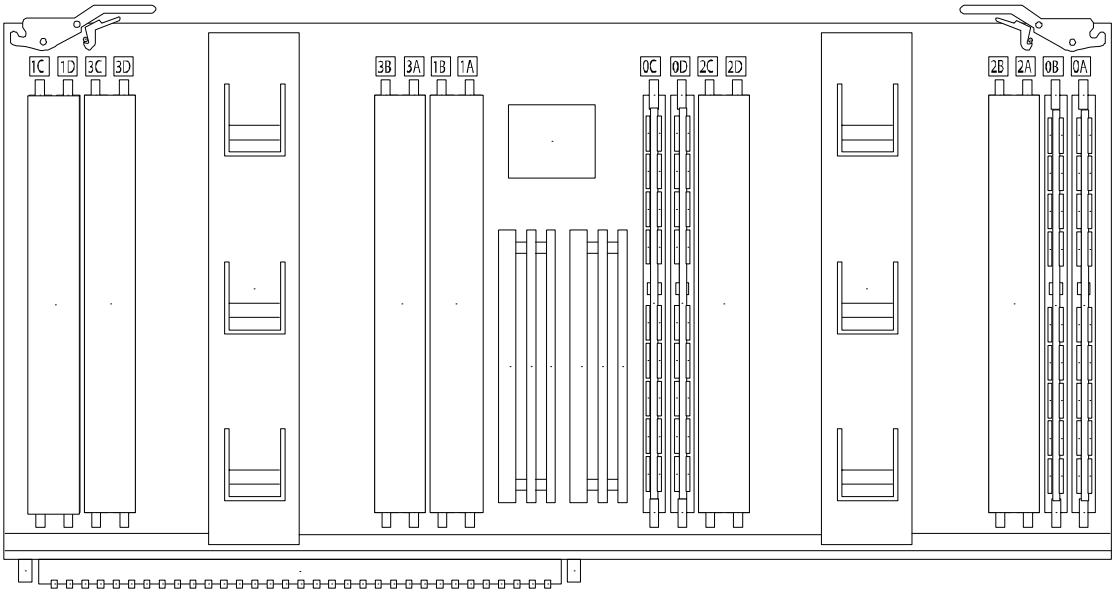
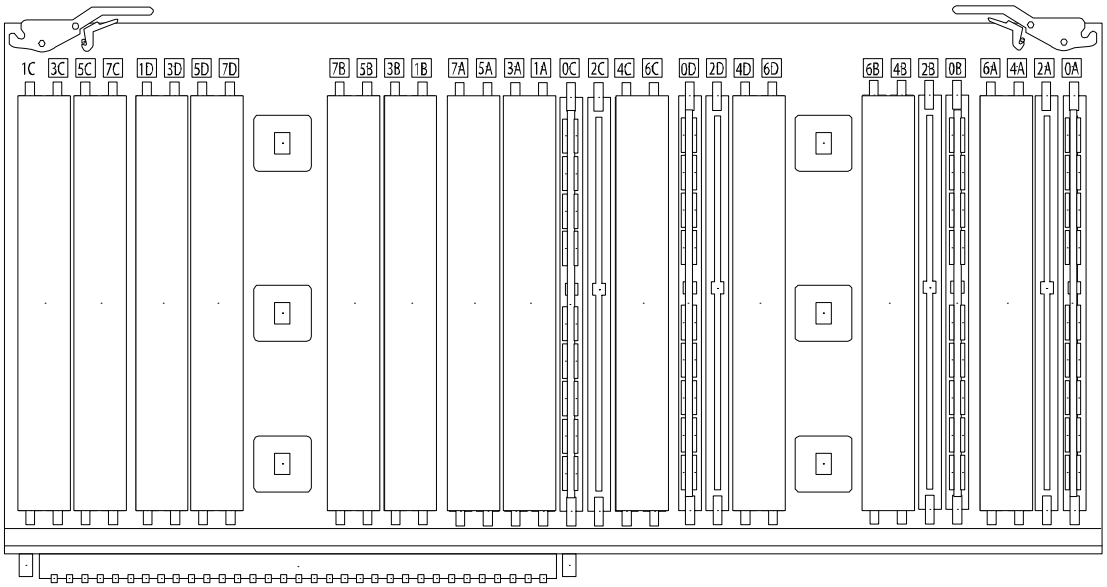


Figure 4-10 32 DIMM Extender Board Slot IDs



Installing DIMMs

To install DIMMs, perform the following steps:

Step 1. Align the DIMM with the socket located on the memory extender board. (Align key in slot with the notch in the DIMM.)

Step 2. Gently and evenly push on each side of the DIMM until it seats in the socket. Ensure that the extraction levers are in the closed position.

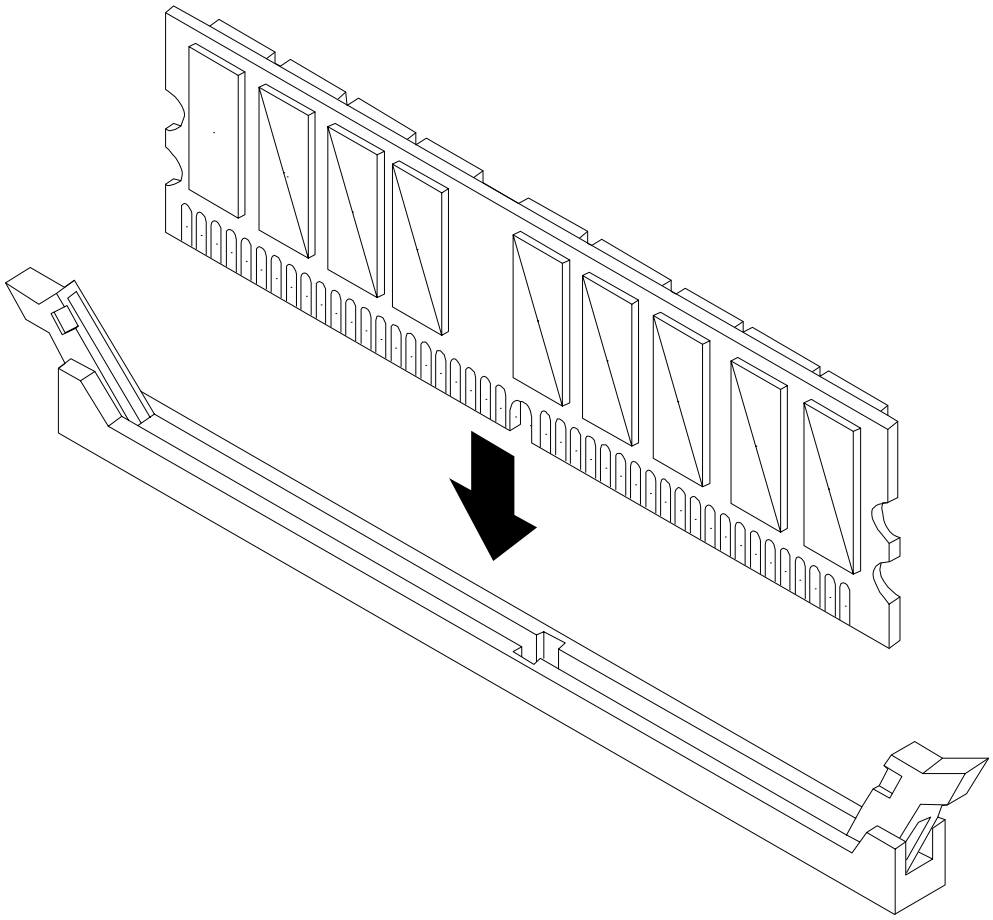
Step 3. Replace the memory extender board.

Step 4. Replace the top cover.

Step 5. Replace the front bezel.

Step 6. If rack mounted, slide the HP Server into the rack until it stops.

Figure 4-11 Inserting DIMM into Extender Board Slot



Processor Extender Board

The processor extender board is located directly under the memory extender board. The processor extender board can hold between one and four processors.

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

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 Processor Extender Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

NOTE If desired, the processor extender board may be removed without removing the HP Server from the rack.

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Press the latch on the extraction levers 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.

Figure 4-12 Processor Extender Board

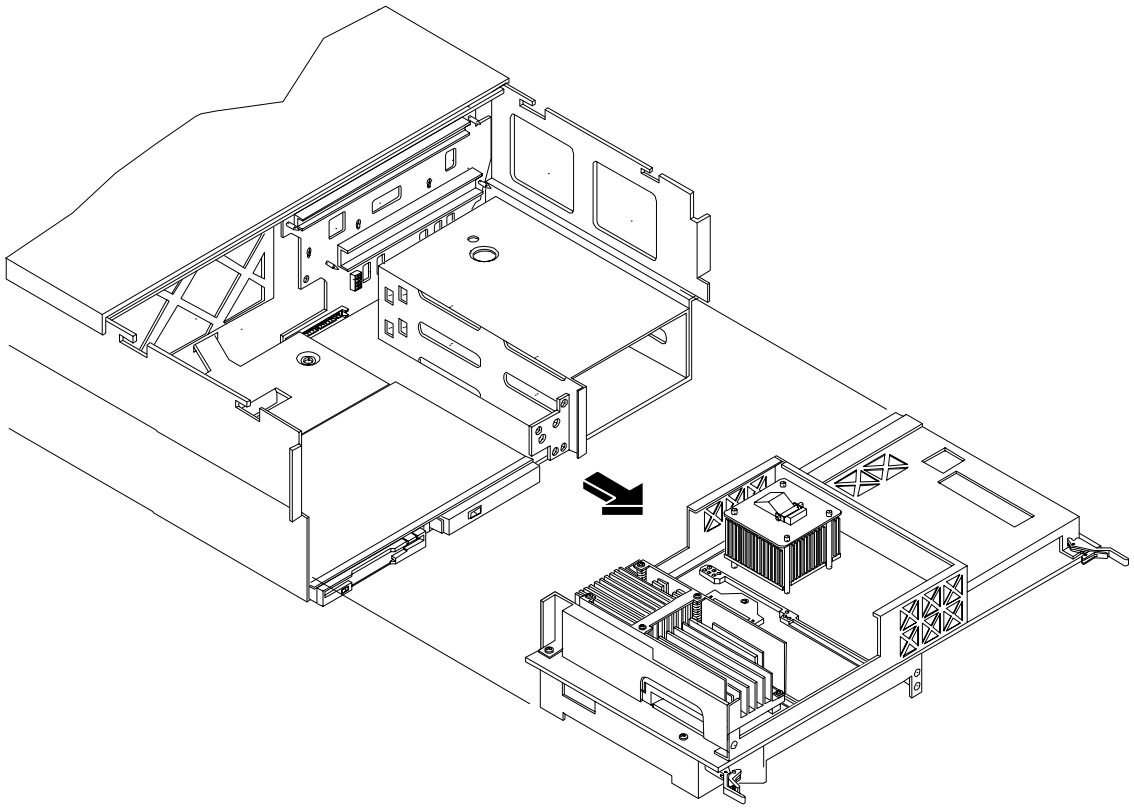
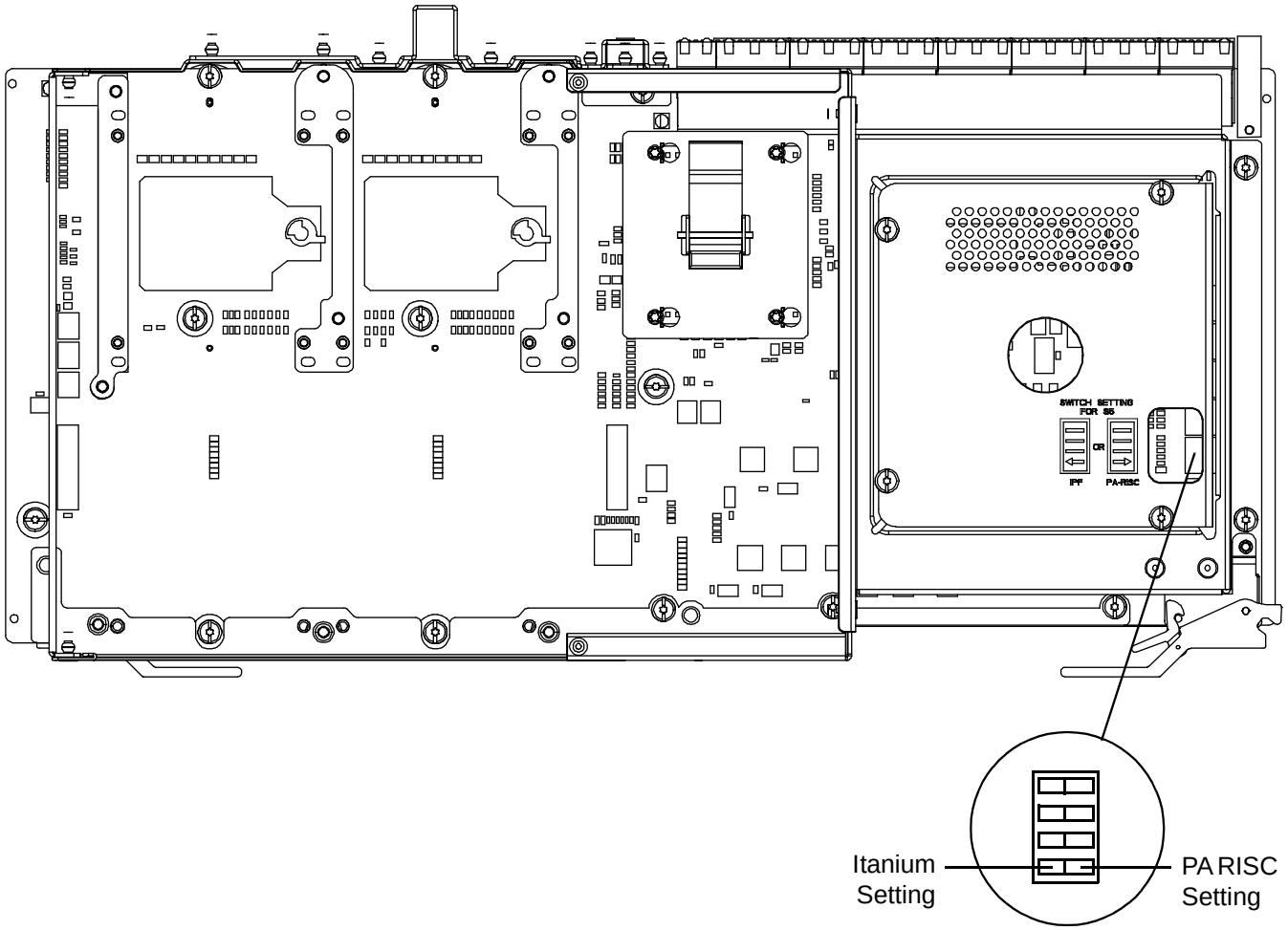


Figure 4-13 Settings for PA RISC/IPF Dipswitch



Replacing the Processor Extender Board

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

CAUTION Your processor extender board may be used in either Itanium (IPF) or PA RISC processor based systems. Ensure that the PA RISC/IPF dipswitch is set to PA RISC for proper functioning of your system. See Figure 4-13 on page 55 for the correct dipswitch settings.

Step 1. Ensure the extraction levers are positioned in the outward, unlocked position.

Step 2. Align the processor extender board with the front and rear card guides.

Step 3. Slide the processor extender board down 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 socket on the midplane riser board.

Step 5. Replace the front cover.

Step 6. Replace the front bezel.

Step 7. If rack mounted, slide the HP Server into the rack until it stops.

Processors

Processors are located on the top and bottom surfaces of the processor extender board.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a processor.**

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.

Installing Processors

CAUTION Ensure that the cache size is identical for all processors. Failure to observe this caution will result in system failure.

Ensure that all processors are rated for use at the same speed. Failure to observe this caution will result in performance degradation.

Processor Load Order

Processors are housed on the processor extender board located under the top cover in the top service bay. The processor extender board can hold between one and four processors. CPU 0 and CPU 1 are located on the top of the processor extender board and CPU 2 and CPU 3 are located on the bottom. Processors must be installed in a specific order.

Table 4-3 Processor Load Order

Processor	Socket
1	CPU 0
2	CPU 1
3	CPU 2
4	CPU 3

CAUTION Do not modify the settings of the DIP switches located on the processor extender board. These switches are for factory use. Failure to observe this caution will result in system failure.

Tools Required

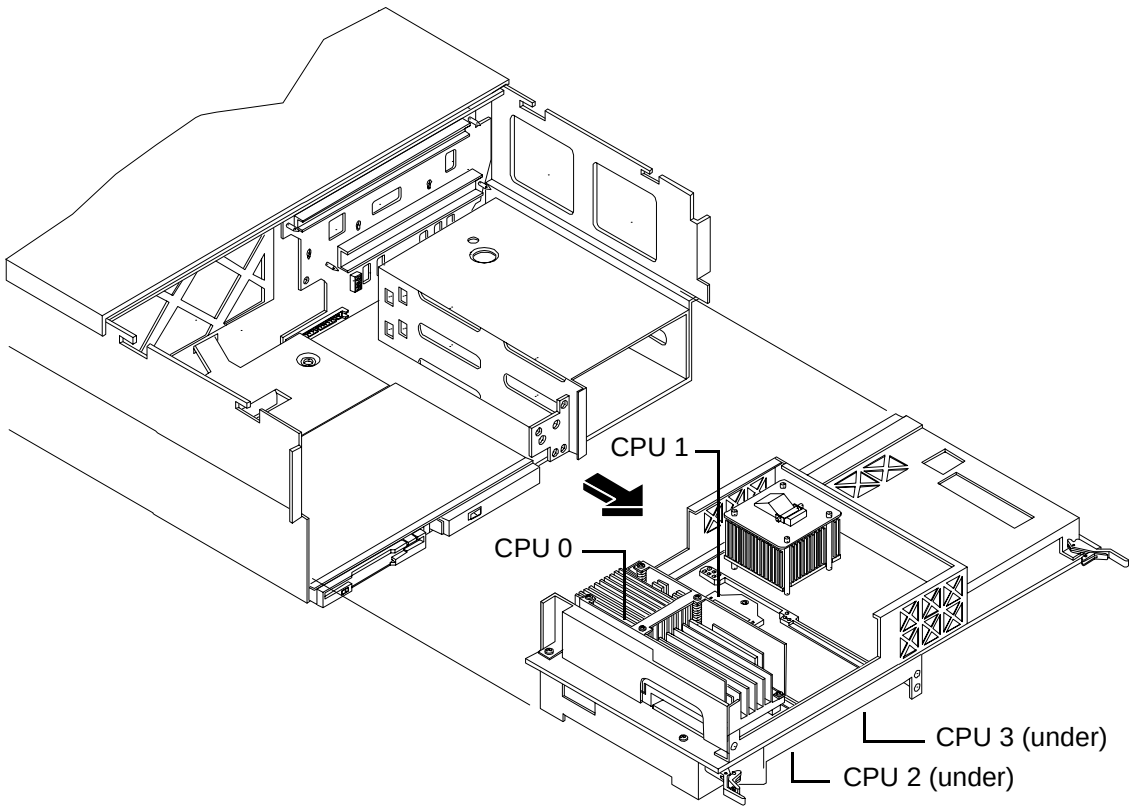
To install processors in your HP Server, you must use the IPF CPU Install Kit, 5069-5441.

This toolkit consists of:

- 1 ea., A3024-80004, Disposable ESD Kit
- 1 ea., A7231-04046, Label-less CPU Install tool

CAUTION Do not modify the settings of the DIP switches located on the processor extender board. These switches are for factory use. Failure to observe this caution will result in system failure.

Figure 4-14 Removing the Processor Extender Board



Removing a Processor

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Remove the processor extender board. (Refer to “Processor Extender Board” on page 53.)

Step 5. Unplug the processor cable from its socket on the extender board.

Step 6. Using a CPU install tool (Torx T15 driver), loosen the 4, T15 shoulder screws and the 2 knurled thumbscrews that attach the sequencer frame on the heatsink, until the sequencer frame is free.

Step 7. Remove the sequencer frame from the heatsink.

Step 8. Using a CPU install tool (2.5 mm driver or Allen wrench), unlock the assembly to the socket by rotating the cam on the socket 180 degrees clockwise.

Step 9. Ensure the cam on the processor socket lock is in the unlocked, counterclockwise position.

Step 10. Carefully remove the processor, from the processor socket.

Replacing a Processor

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

Prior to installing a processor into your system, read the following instructions carefully and refer to Figure 4-17, “Installing Processor on Extender Board,” for a complete understanding of this process.

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Remove the processor extender board and place on anti-static mat. (Refer to “Processor Extender Board” on page 53.)

Step 5. Ensure the cam on the processor socket lock is in the unlocked, counterclockwise position.

Step 6. Carefully lower the processor, without the sequencer clamp, 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 towards 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 CPU assembly do not come unplugged from their sockets when you move the cable into place under the heatsink. See Figure 4-15 on page 60and Figure 4-16 on page 60.

Figure 4-15 Processor Cable Placed Correctly

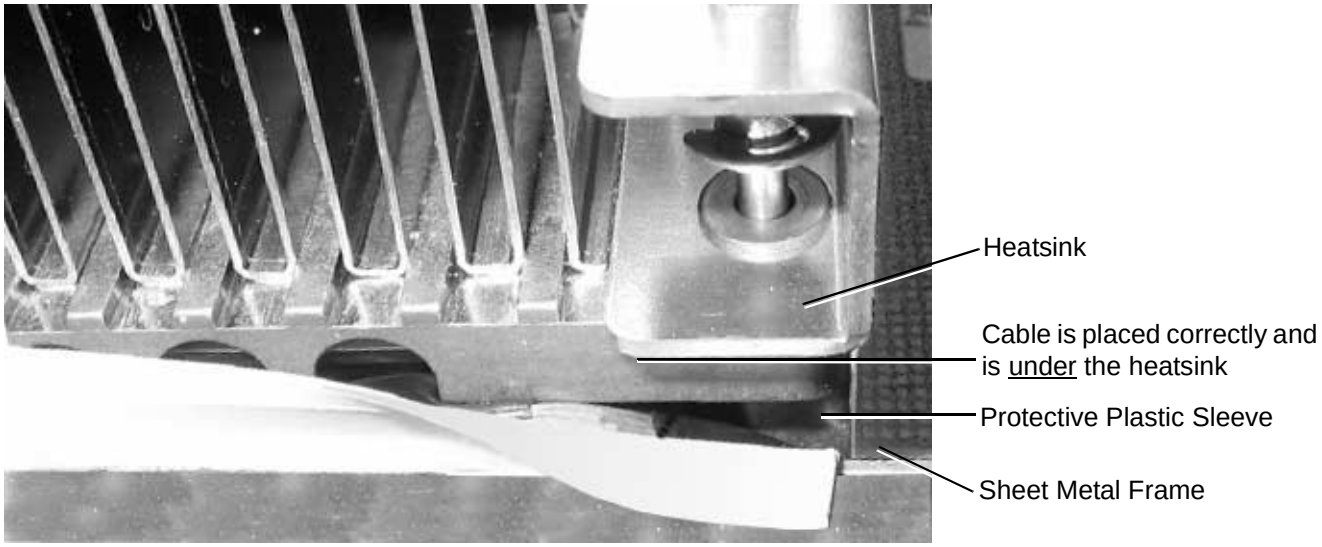
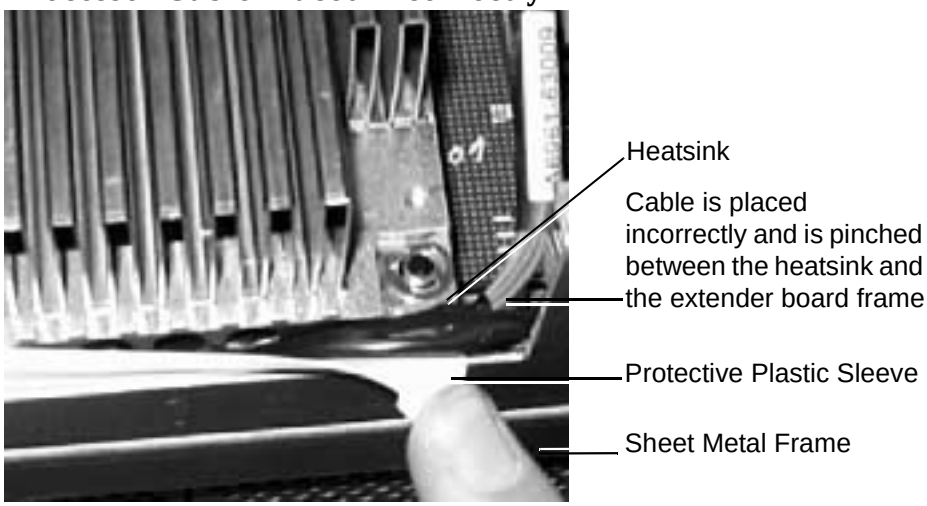


Figure 4-16 Processor Cable Placed Incorrectly



Step 7. Using a CPU install tool (2.5 mm driver or Allen wrench), lock the assembly to the socket by rotating the cam on the socket 180 degrees clockwise.

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 8. Plug in the processor cable to its socket on the extender board.

Step 9. Place the sequencer frame over the processor.

Step 10. Using your fingers, hand-tighten the 2 knurled thumbscrews on the sequencer frame just until the screw stops turning.

CAUTION Do not tighten the other 4 shoulder screws until you have first hand-tightened the 2 knurled thumbscrews.

Step 11. Using a CPU install tool (Torx T15 driver), tighten the 4 remaining T15 shoulder screws until they just bottom out. Follow the tightening sequence shown in Figure 4-17, “Installing Processor on Extender Board.”

CAUTION Do not overtighten the 4 shoulder screws—they may shear off if overtightened. Stop tightening the shoulder screws when you feel them just bottom out.

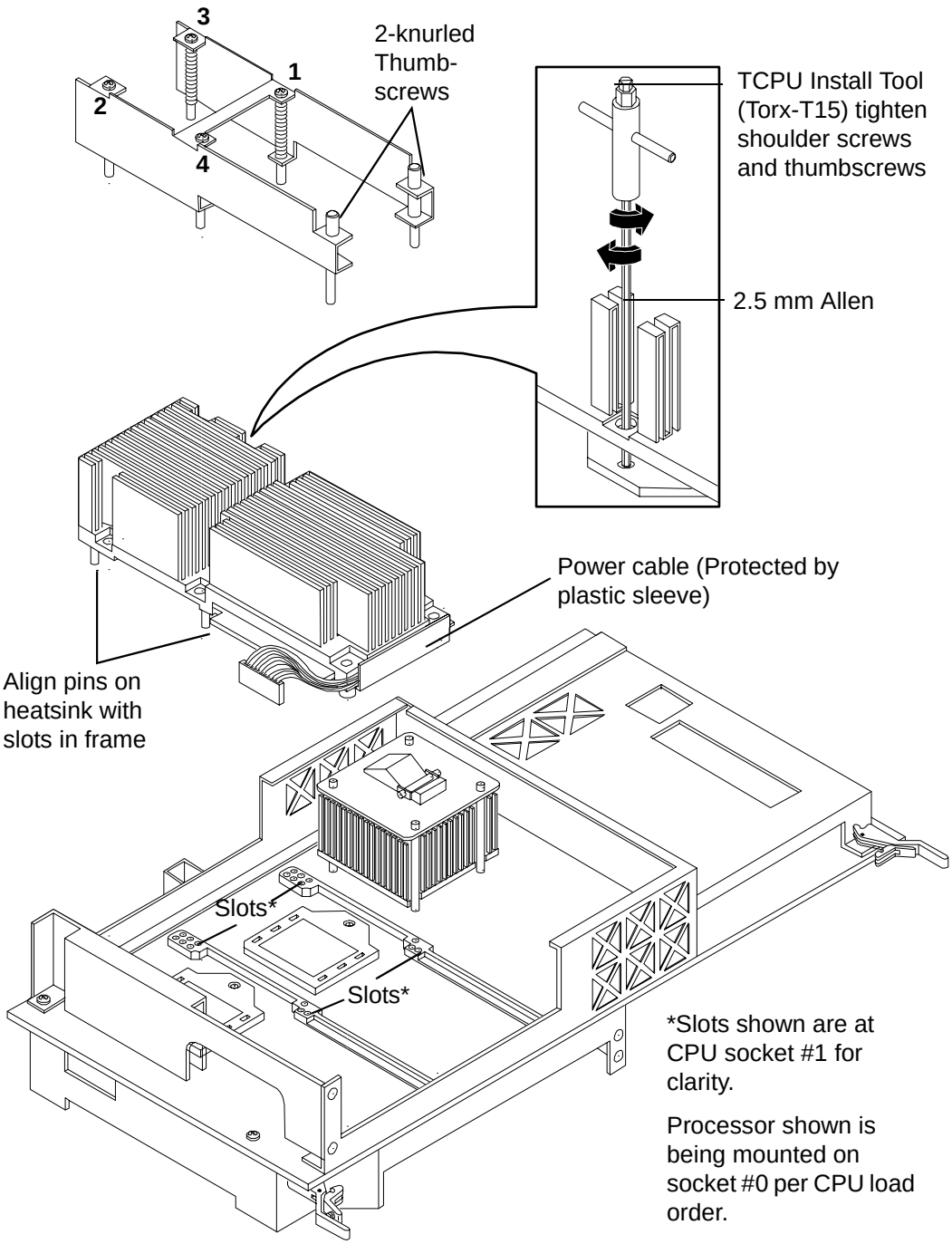
Step 12. Using the Torx T15 driver, finish tightening the 2 thumbscrews.

CAUTION Do not overtighten the 2 thumbscrews—they may shear off if overtightened. Tightening the thumbscrews 1/4 turn will tighten them sufficiently.

Figure 4-17 Installing Processor on Extender Board

Tightening sequence for 4-shoulder screws is 1, 2, 3, 4.

DO NOT OVERTIGHTEN! See Step 7.



Hot-Swap Chassis Fan Unit

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 only fits into the right-most position (behind the power supply).

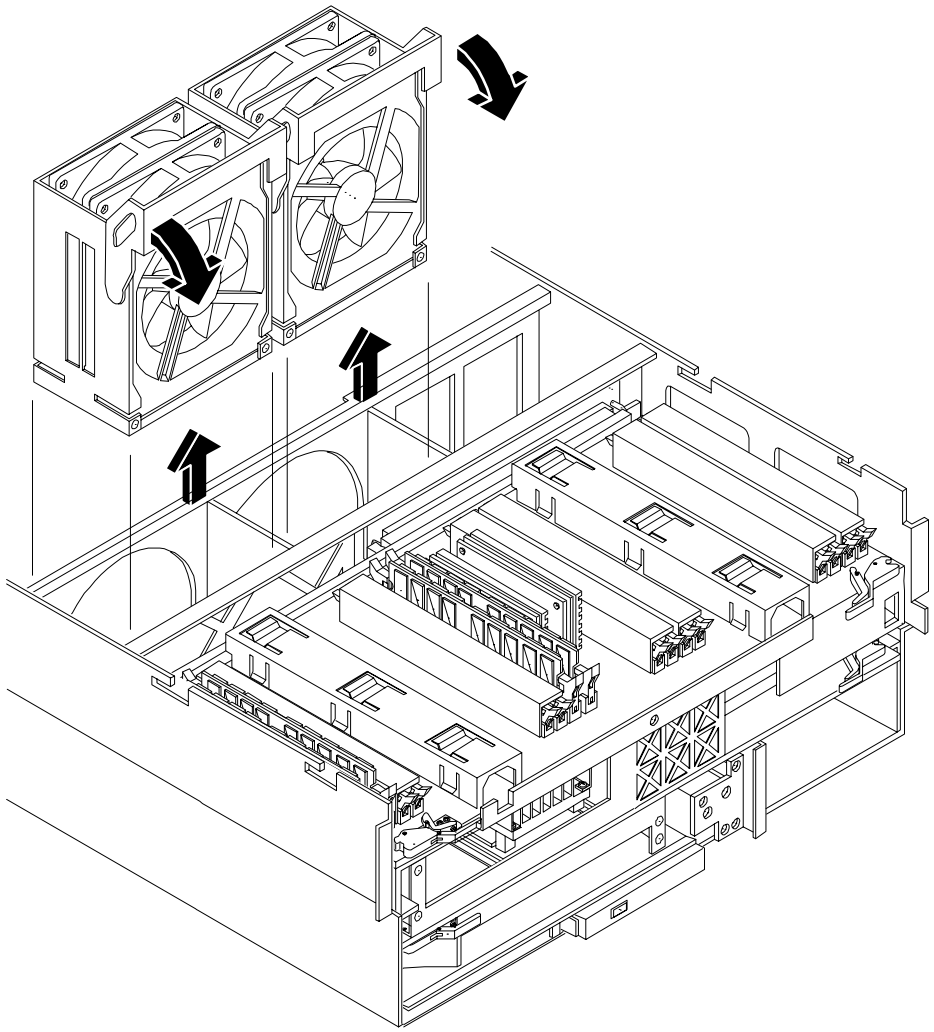
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

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 Chassis Fan Unit

Figure 4-18 Hot-Swap I/O Chassis Fans Removal and Replacement



To remove a hot-swap chassis fan unit, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

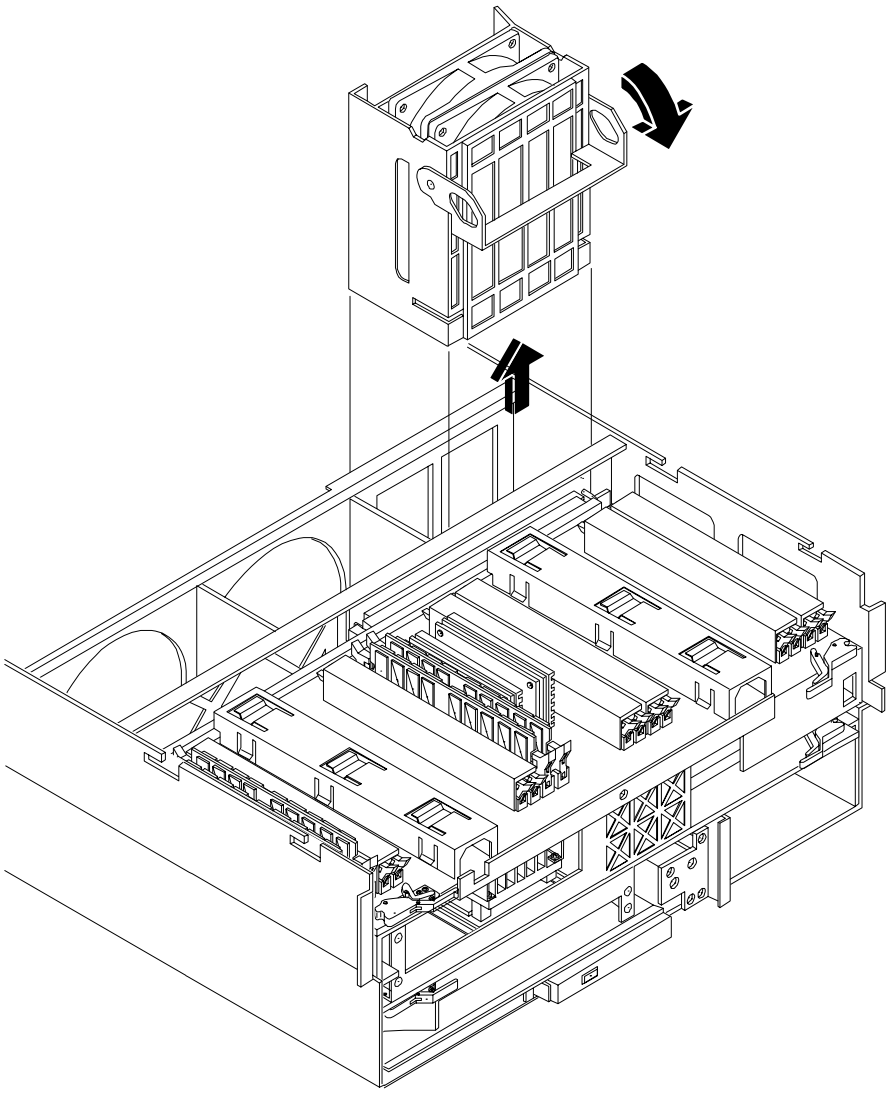
Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the top cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. 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. Operation will continue until an overtemperature condition is detected. If an overtemperature condition occurs, the server will shutdown.

Figure 4-19 Hot-Swap Power Supply Chassis Fan Removal and Replacement



Replacing a Hot-Swap Chassis Fan Unit

To replace a hot-swap chassis 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. Fan units 0 and 1 have “triangle” icons and fan unit 2 has a “square” icon.

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 I/O baseboard.

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.

Step 5. Replace the front bezel.

Step 6. If rack mounted, slide the HP Server into the rack until it stops.

I/O Baseboard Assembly

The I/O baseboard assembly is located in the rear service bay.

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, save all boot configuration settings. These values will 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. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the top cover. (Refer to “Front and Top Covers” on page 39.)

Step 3. Remove the three chassis fan units. (Refer to “Hot-Swap Chassis Fan Unit” on page 63.)

Step 4. Unplug all external cabling attached to ports at the rear of the I/O baseboard.

Step 5. Unplug the SCSI cables attached to the HBA board in PCI slot 1.

CAUTION When unplugging the SCSI cables, note the labeling on the SCSI A and SCSI B channel cables. When re-plugging in these cables, you must match each cable with its appropriate socket on the SCSI HBA. If the cables are mismatched your system may not reboot. Both cables and sockets are clearly marked with the correct channel.

Step 6. Lift up on the locking lever attached to the side of the power supply cage to unplug the I/O baseboard from the socket on the midplane riser board. See Figure 4-20, “I/O Board Locking Lever.”

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

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

NOTE	If you are going to replace the I/O board with a new board, remove the cover from the VGA port at the rear of the I/O board and save it to put on VGA port of the new board. This VGA graphics port is not supported on your hp 9000 rp4440 Server.

Figure 4-20 I/O Board Locking Lever

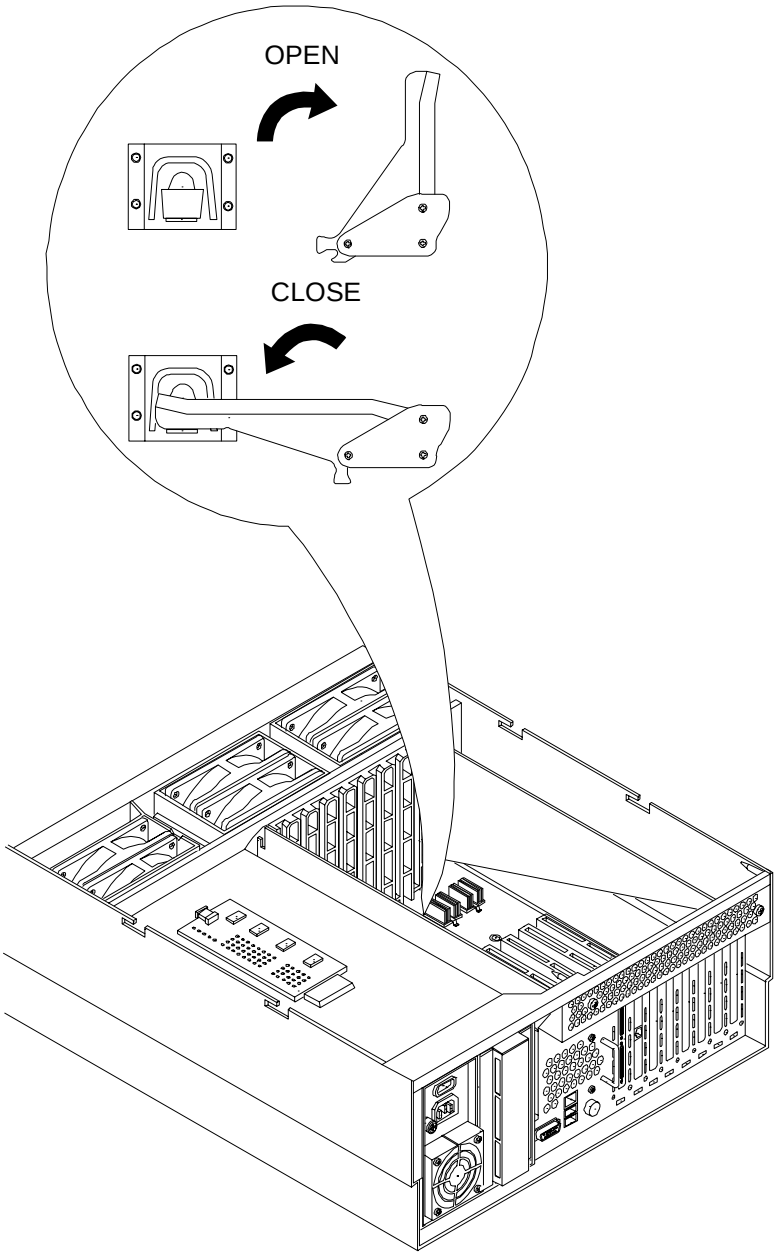
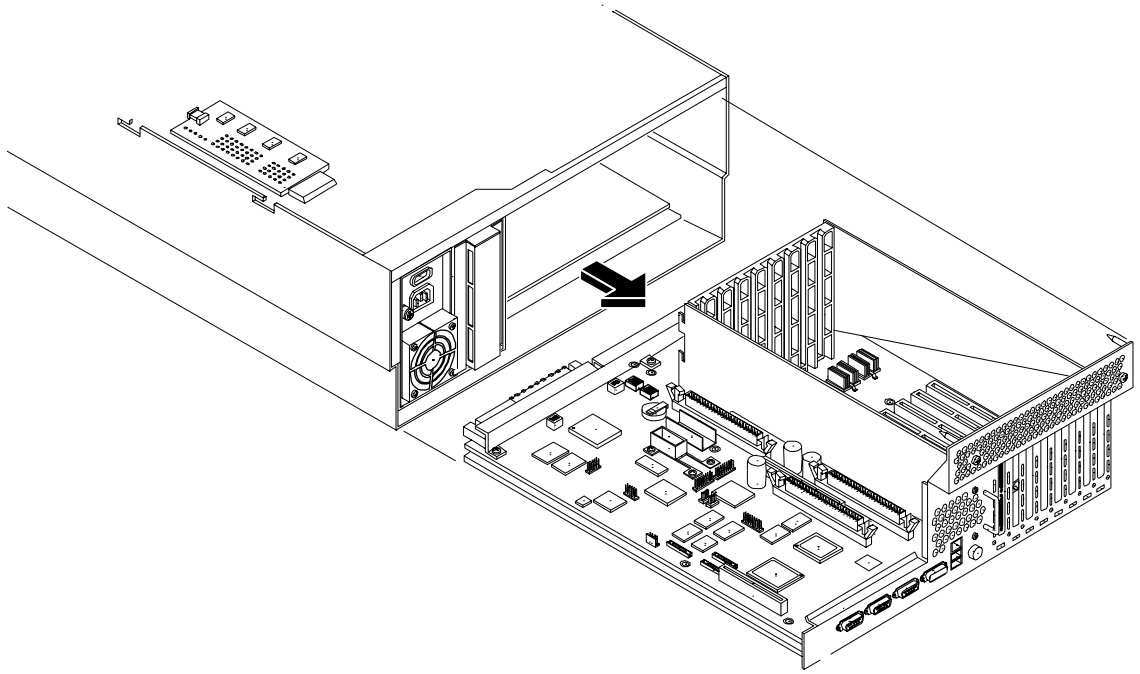


Figure 4-21 I/O Baseboard



Replacing the I/O Baseboard Assembly

NOTE The I/O baseboard is large, so use care when sliding it into the server chassis.

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 Ensure the I/O board locking lever is in the "up" position or the I/O board will hang up before engaging the midplane riser board socket.

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

CAUTION Before installing your replacement I/O board, check dipswitch S5102 on located on top of the I/O board. Dipswitch position bit 1 must be in the OFF position to disable the on-board Radeon graphics chip. If you do not disable the Radeon graphics chip it will appear as "unknown-unclaimed" when performing the `ioscan` command. See Figure 4-22 on page 72.

Remember to replace the VGA port cover on the new board that you saved when removing the old I/O board. This VGA graphics port is not supported on your hp 9000 rp4440 Server.

Step 2. With the I/O board 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 4-20 on page 69.

Step 3. Replace the three chassis fan units.

Step 4. Plug in all external cabling to the rear ports of the I/O baseboard.

CAUTION When re-plugging the SCSI cables, note the labeling on the SCSI A and SCSI B channel cables. You must match each cable with its appropriate socket on the SCSI HBA. If the cables are mismatched your system may not reboot. Both cables and sockets are clearly marked with the correct channel.

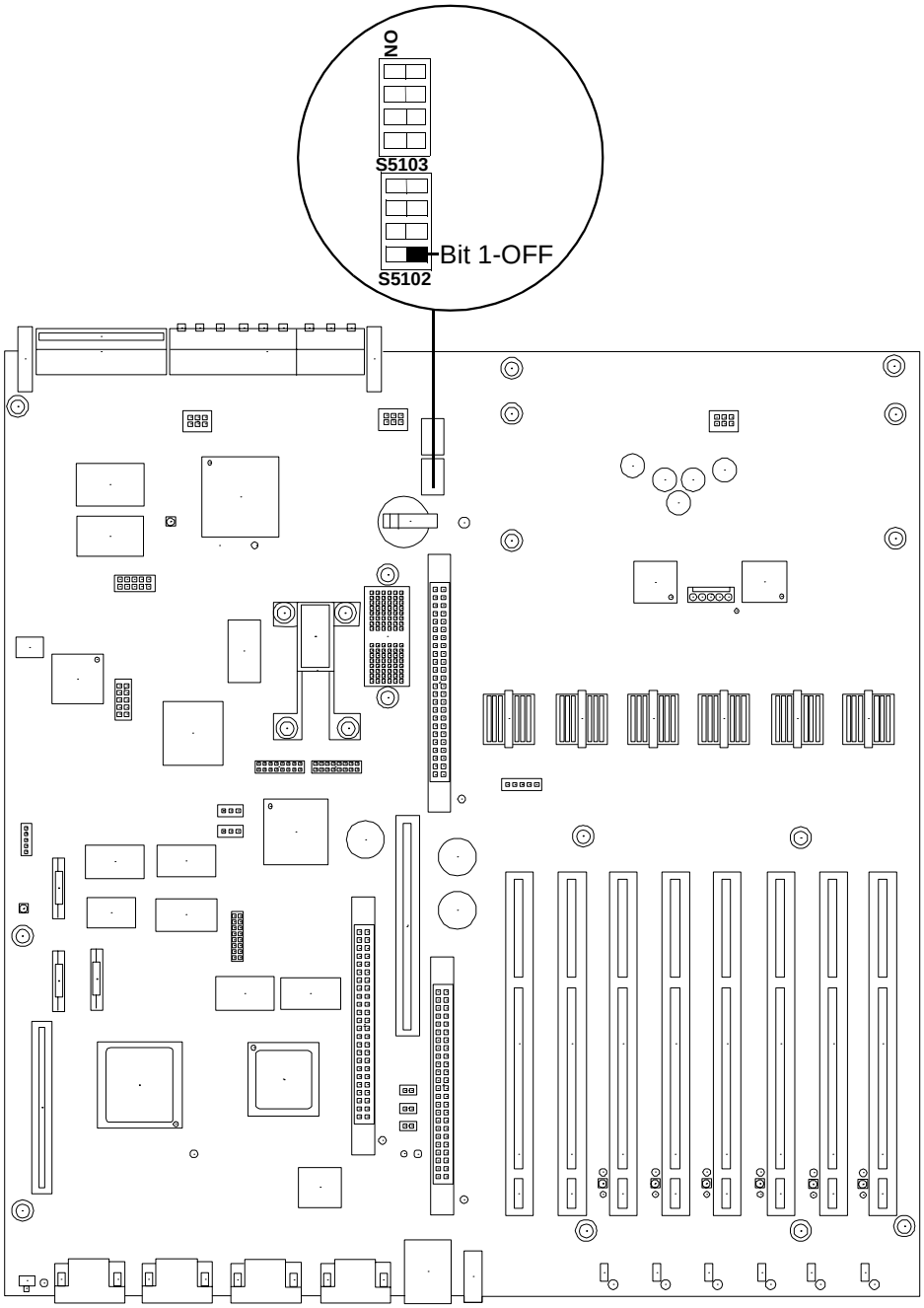
Step 5. Plug in the internal SCSI cable(s) to the HBA board in PCI slot 1.

Step 6. Replace the top cover.

Step 7. Replace the front bezel.

Step 8. If rack mounted, slide the HP Server into the rack until it stops.

Figure 4-22 S5102 Dipswitch



Removing and Replacing PCI/PCI-X Cards

The server may contain up to 8 PCI/PCI-X cards. PCI/PCI-X cards are located on the I/O baseboard, under the top cover.

WARNING **Ensure that the system is powered-down and all power sources have been disconnected from the server prior to removing or replacing a PCI/PCI-X card.**

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.

This is not a hot-plug operation. Power must be turned off to the entire system prior to removing and replacing PCI/PCI-X cards in your HP Server.

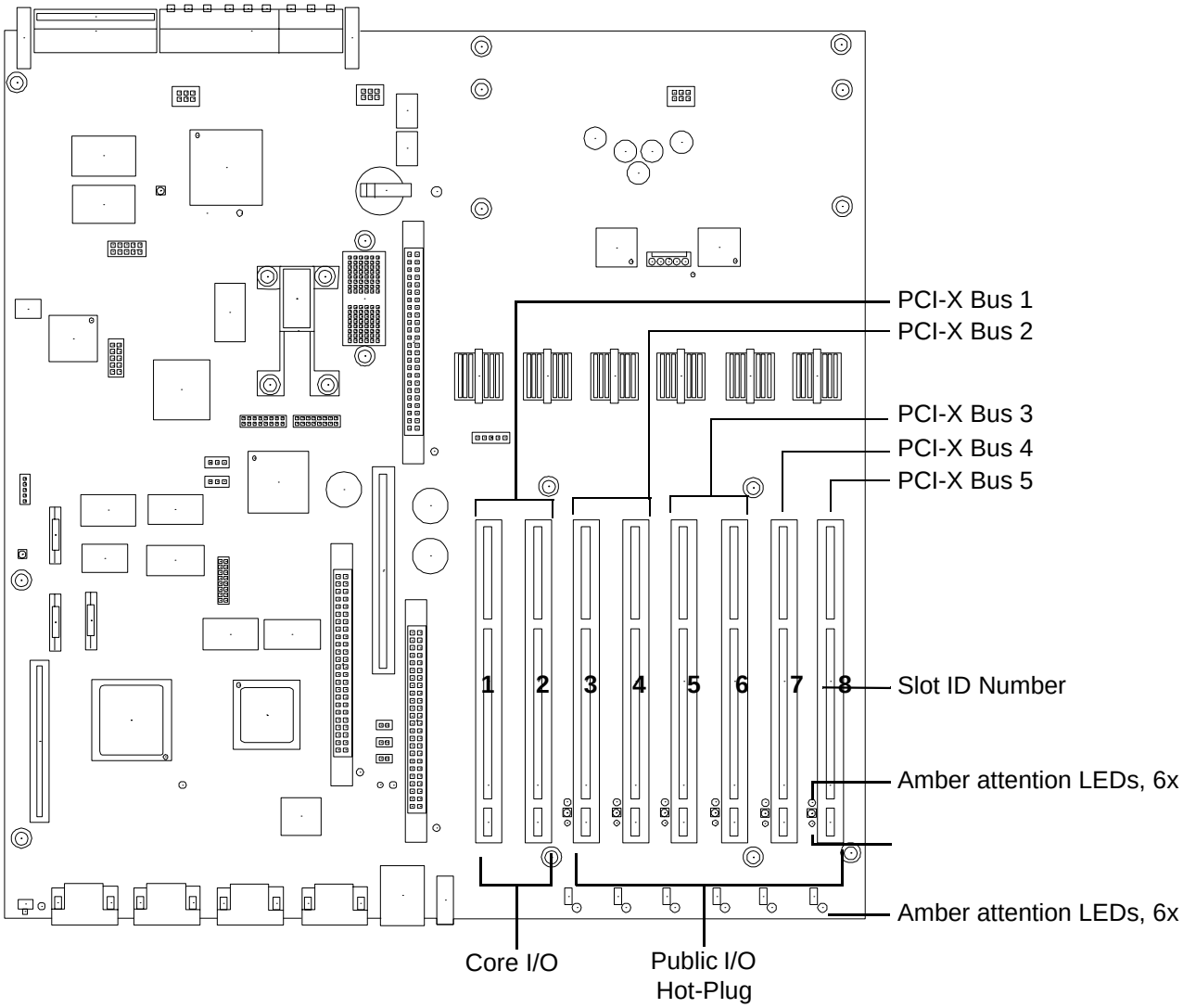
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

NOTE PCI/PCI-X slots are numbered from 1 through 8, reading left-to-right when looking at the rear of your HP Server. PCI slots 1 and 2 are dedicated for use by the core I/O cards. The core I/O functions are shared between two cards; a SCSI HBA card which must be located in slot 1, and a Gigabit Ethernet LAN which must be located in slot 2. (See Figure 4-23.)

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.

Figure 4-23 PCI Cards Locations



Removing a PCI/PCI-X Card

To remove a PCI card from the server, perform the following steps:

CAUTION Record the slot location of all PCI cards as they are removed. Depending on the operating system, replacing the PCI cards in a different location might require system reconfiguration and could cause boot failure.

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the top cover. (Refer to "Front and Top Covers" on page 39.)

Step 3. Disconnect all external and internal cables attached to the PCI card in the side service bay.

Step 4. Turn the PCI/PCI-X card latch on the chassis to ~45 degrees CW to free up the manual retention latch (MRL).

Step 5. Pull up on the MRL until it stops.

Step 6. Turn the PCI/PCI-X card latch another 45 degrees CW to completely expose the PCI-PCI-X card bulkhead. See Figure 4-25 on page 76.

Step 7. If the PCI/PCI-X card is full size, open the slider gate bracket to allow PCI/PCI-X card removal. See Figure 4-26 on page 78.

Step 8. Remove the card from the slot by grasping the top edges of the card and pulling up. The notches in the OLX dividers provide access to the PCI card for removal.

Figure 4-24 PCI-X Card Latch Opening Sequence

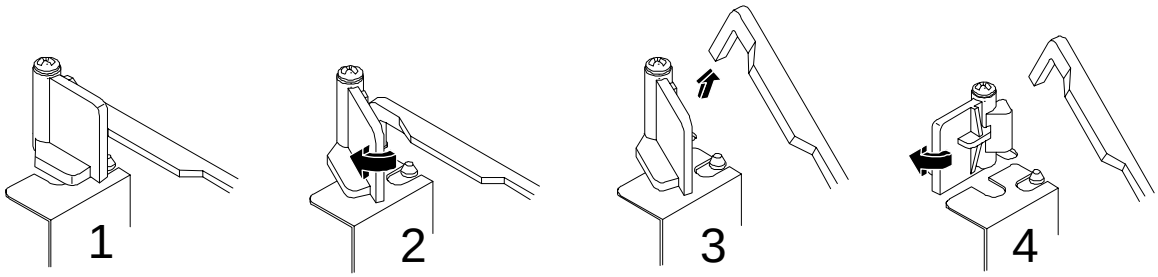
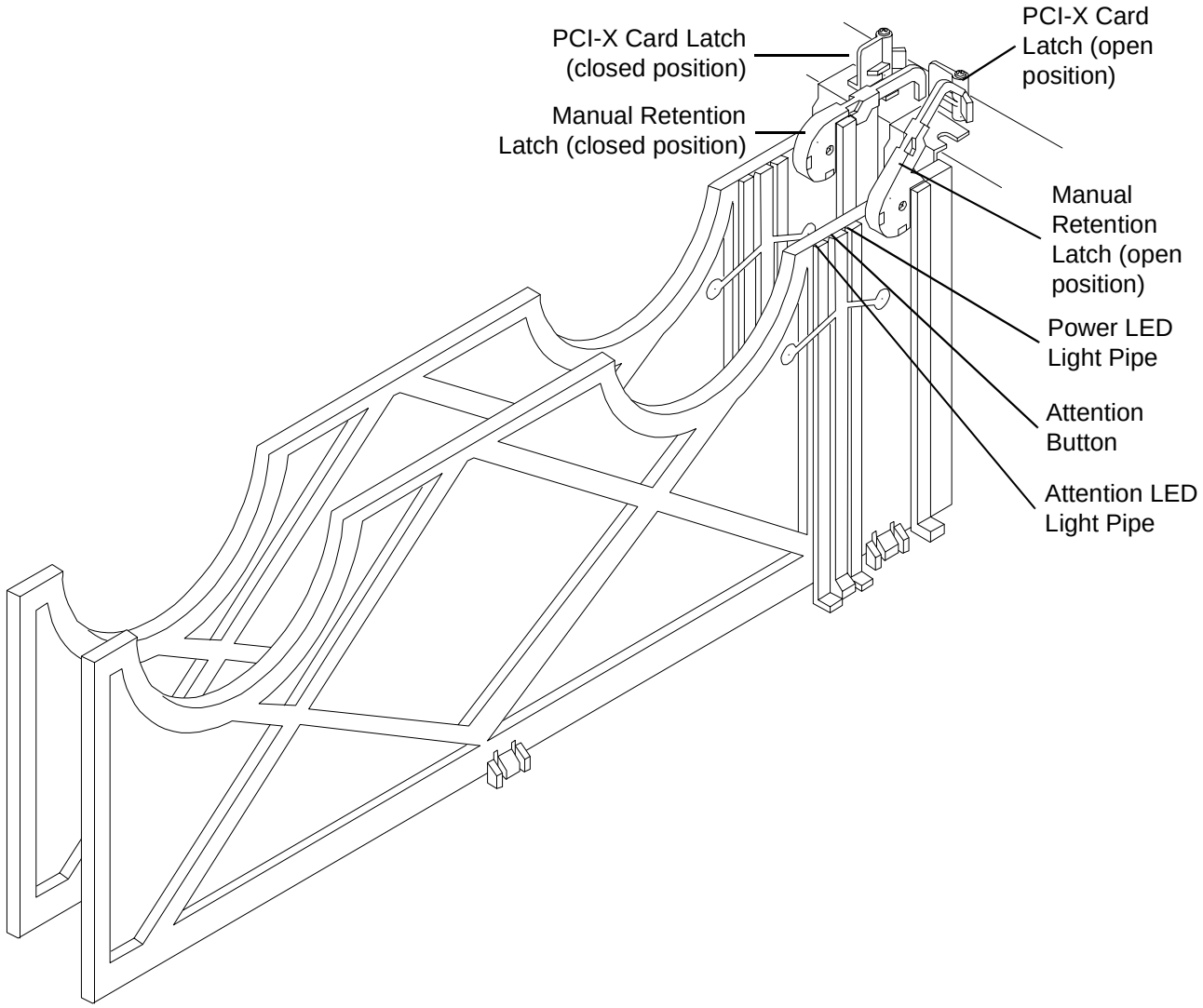


Figure 4-25 OLX Divider



Replacing a PCI Card

To replace a PCI card, perform the following steps:

Step 1. Insert the card into the appropriate slot. See Figure 4-26 on page 78.

Step 2. Turn the PCI/PCI-X card latch on the chassis to ~45 degrees CCW to allow closing of the manual retention latch (MRL).

Step 3. Push down on the MRL until it stops against the chassis wall.

Step 4. Turn the PCI/PCI-X card latch on the chassis another 45 degrees CCW to lock the PCI/PCI-X card into position.

Step 5. If the PCI/PCI-X card is full size, close the slider gate bracket to secure the card. See Figure 4-26 on page 78.

Step 6. Reconnect all internal and external cables to the PCI/PCI-X card.

Step 7. Replace the top cover.

Step 8. Slide the HP Server all the way back into the rack until it stops.

Step 9. Turn on power by plugging in AC power cords to power supply unit(s).

Figure 4-26 PCI/PCI-X Card Installation

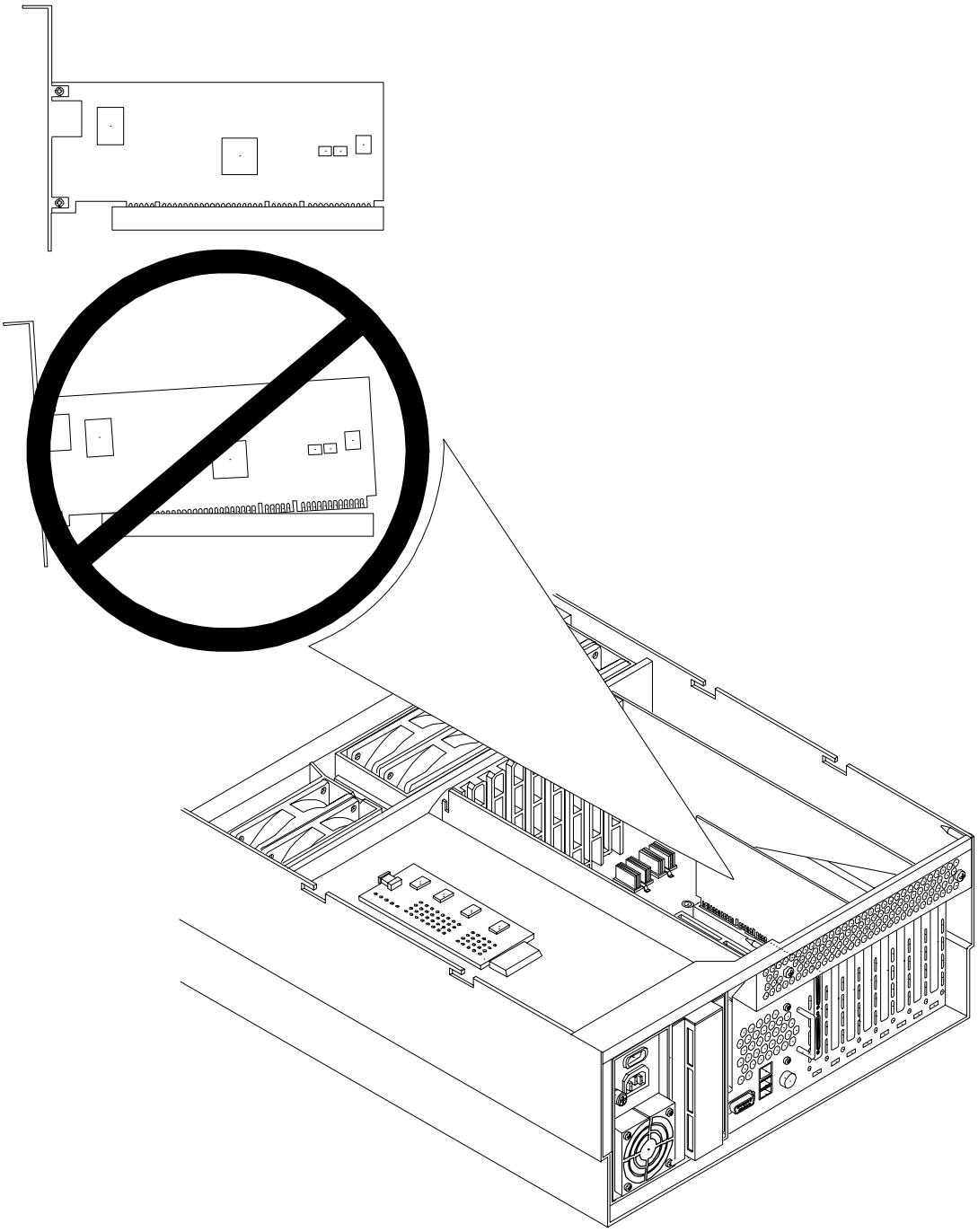


Figure 4-27 PCI-X Card Latch Closing Sequence

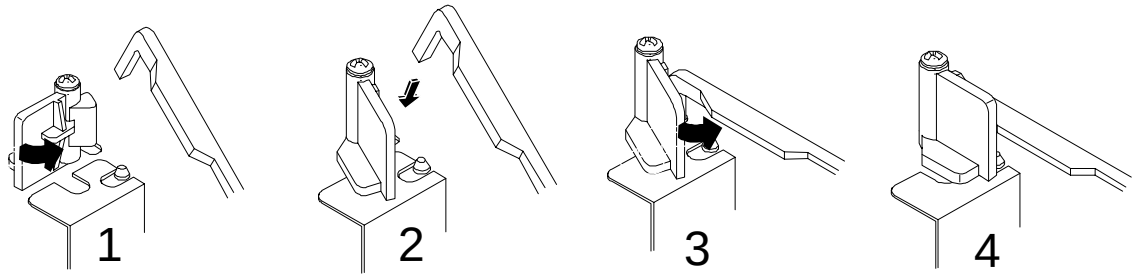
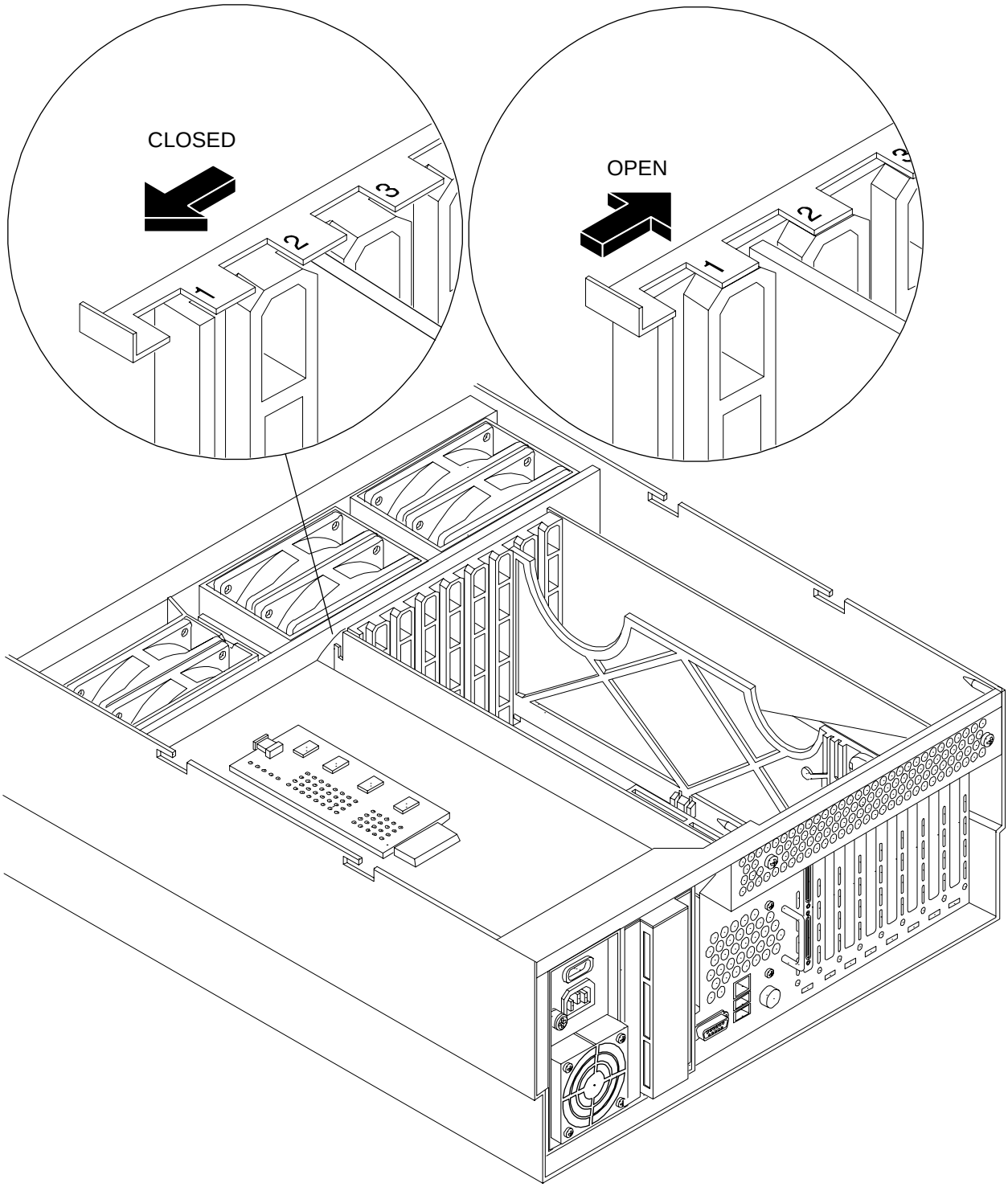


Figure 4-28 Slider Gate Bracket



OLX Dividers

OLX dividers are located on the I/O baseboard, between the PCI cards. Six OLX dividers provide short circuit protection to the hot-plug PCI accessory boards by preventing inadvertent contact between boards during the replacement or addition of a board.

Additionally, each OLX divider has two light pipes that transfer illumination from one green power LED and one amber attention LED, mounted on the I/O baseboard, to the top of the divider. The light pipes allow the LED status to be easily viewed when the top cover is removed.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a PCI card divider.**

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

Figure 4-29 OLX Divider Removal and Replacement

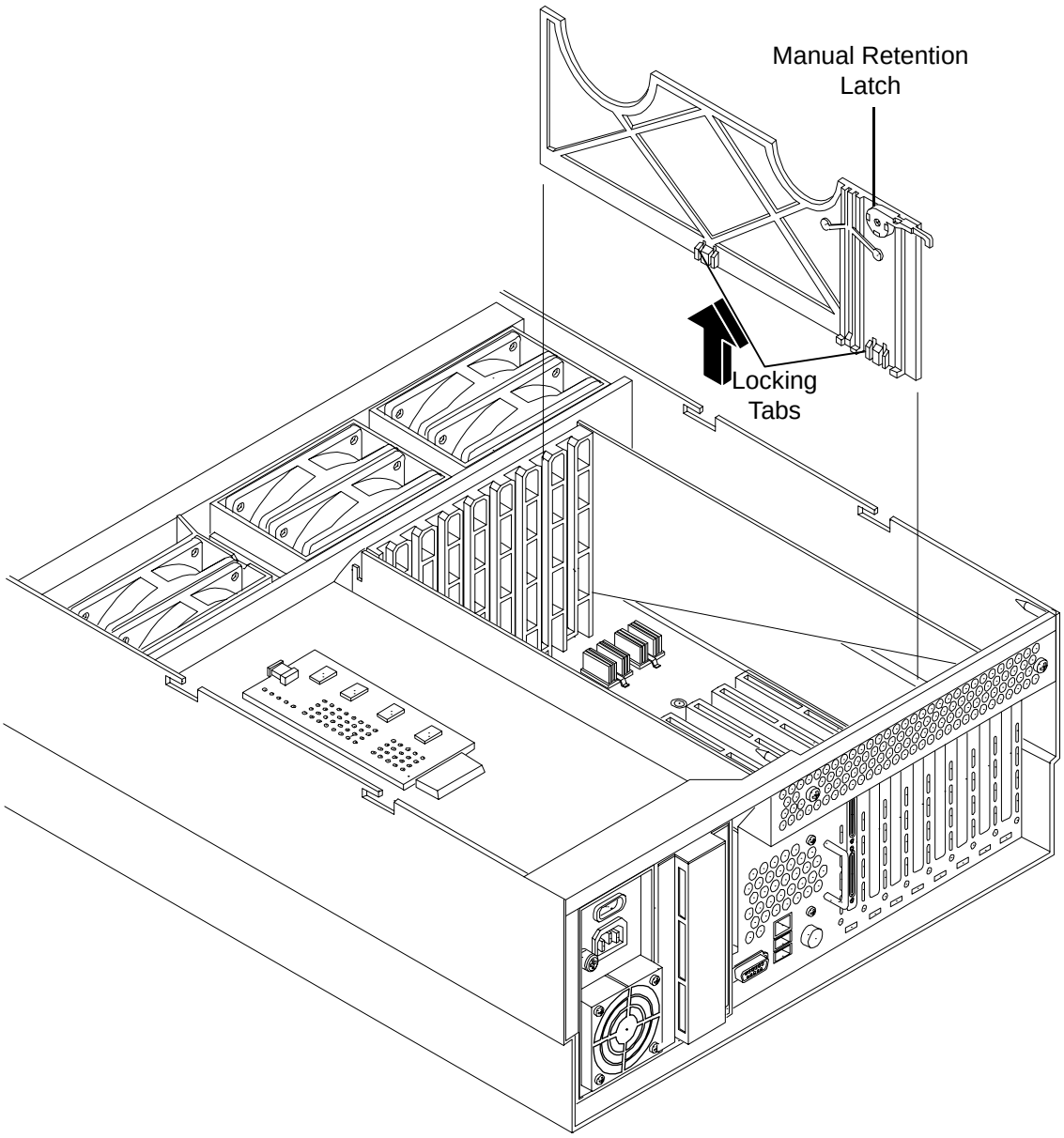
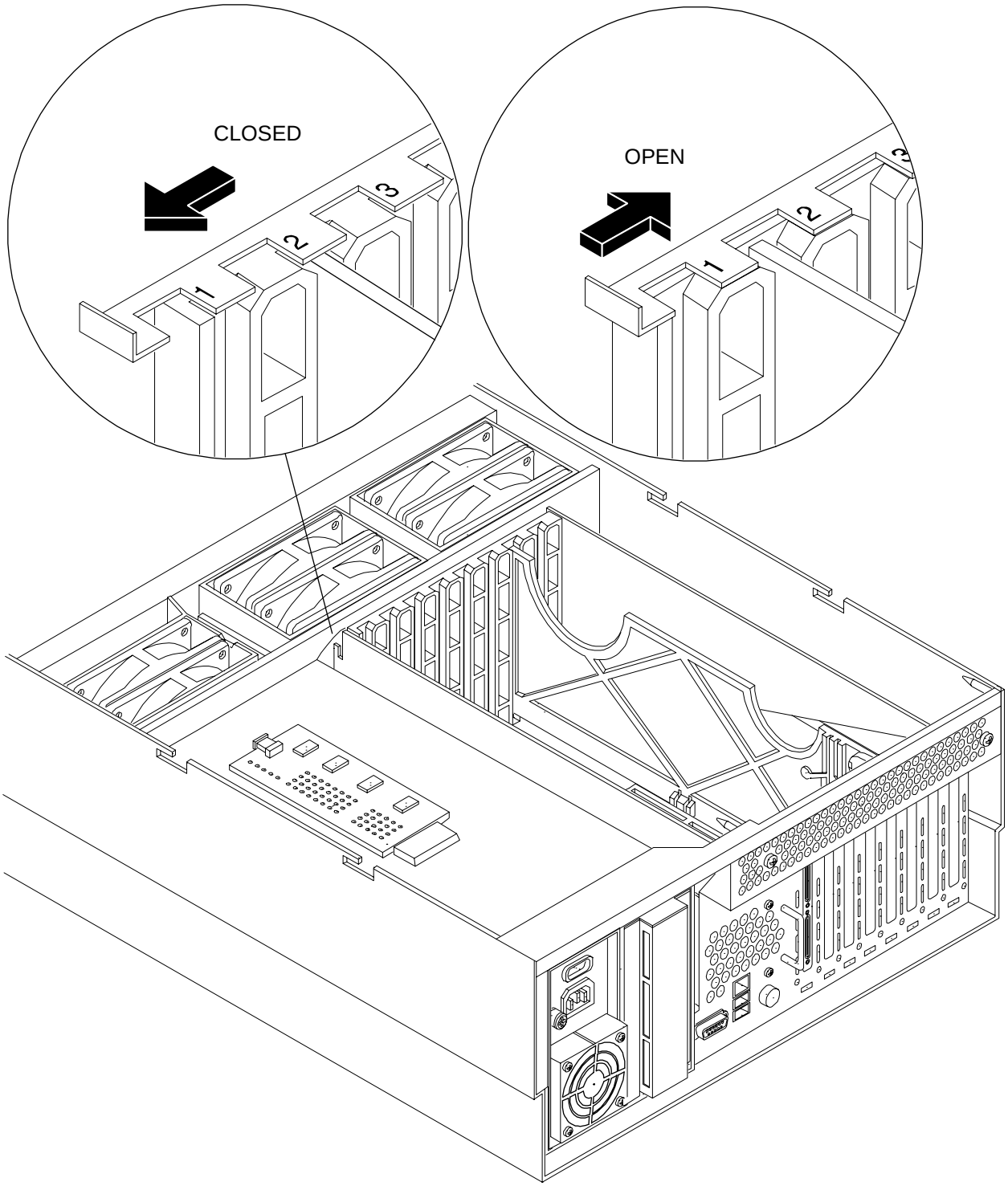


Figure 4-30 OLX Slider Gate Bracket



Removing an OLX Divider

To remove an OLX divider, perform the following steps:

NOTE An alternative method of removing OLX dividers individually is to remove all OLX dividers at once by removing the rack they are mounted in from the I/O baseboard, then removing or replacing the individual OLX divider, and then replacing the rack back on the I/O baseboard. The OLX divider rack is attached to the I/O baseboard with 4 Torx T15 fasteners.

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to "Front Bezel" on page 38.)

Step 3. Remove the top cover. (Refer to "Front and Top Covers" on page 39.)

Step 4. Pull up on the manual retention latch to unlock it from the chassis wall. See Figure 4-29, "OLX Divider Removal and Replacement."

Step 5. Slide open the latch on the slider gate bracket to unlock the rear edge of the PCI divider. See Figure 4-30, "OLX Slider Gate Bracket."

Step 6. At this point, if you are removing the entire OLX divider rack, remove the 4 T15 fasteners attaching the rack to the I/O baseboard.

Step 7. Using your fingers, push the two tabs that attach the OLX divider to the I/O baseboard and pull the OLX divider up sharply to disengage it from the I/O baseboard.

CAUTION When extracting the OLX divider, ensure that you release the locking tabs completely or you may damage them. If you damage the tabs, the OLX divider will not seat properly when you reinsert it.

Replacing an OLX Divider

To replace an OLX divider, perform the following steps:

Step 1. Insert the OLX divider into the available slots on the I/O baseboard and push down firmly to seat it into the slots.

Step 2. At this point, if you are replacing the entire OLX divider rack on to the I/O baseboard, replace the 4 Torx T15 fasteners.

Step 3. Slide the latch on the slider gate bracket closed, to lock the rear edge of the PCI divider.

Step 4. Push down on the manual retention latch until it locks into the chassis wall.

Step 5. Replace the top cover.

Step 6. Replace the front bezel.

Step 7. If rack mounted, slide the HP Server into the rack until it stops.

Voltage Regulator Modules (VRM)

The server contains 3 VRMs that are located on the I/O baseboard. Each is labeled with one of the following voltages:

- 3.3 volts
- 5.0 volts
- 12.0 volts

CAUTION VRMs must be inserted into the slot with the corresponding voltage. Ensure VRMs are located in the proper slot by checking the voltage label on the I/O baseboard. See Figure 4-31, “VRM Board Remove and Replace.”

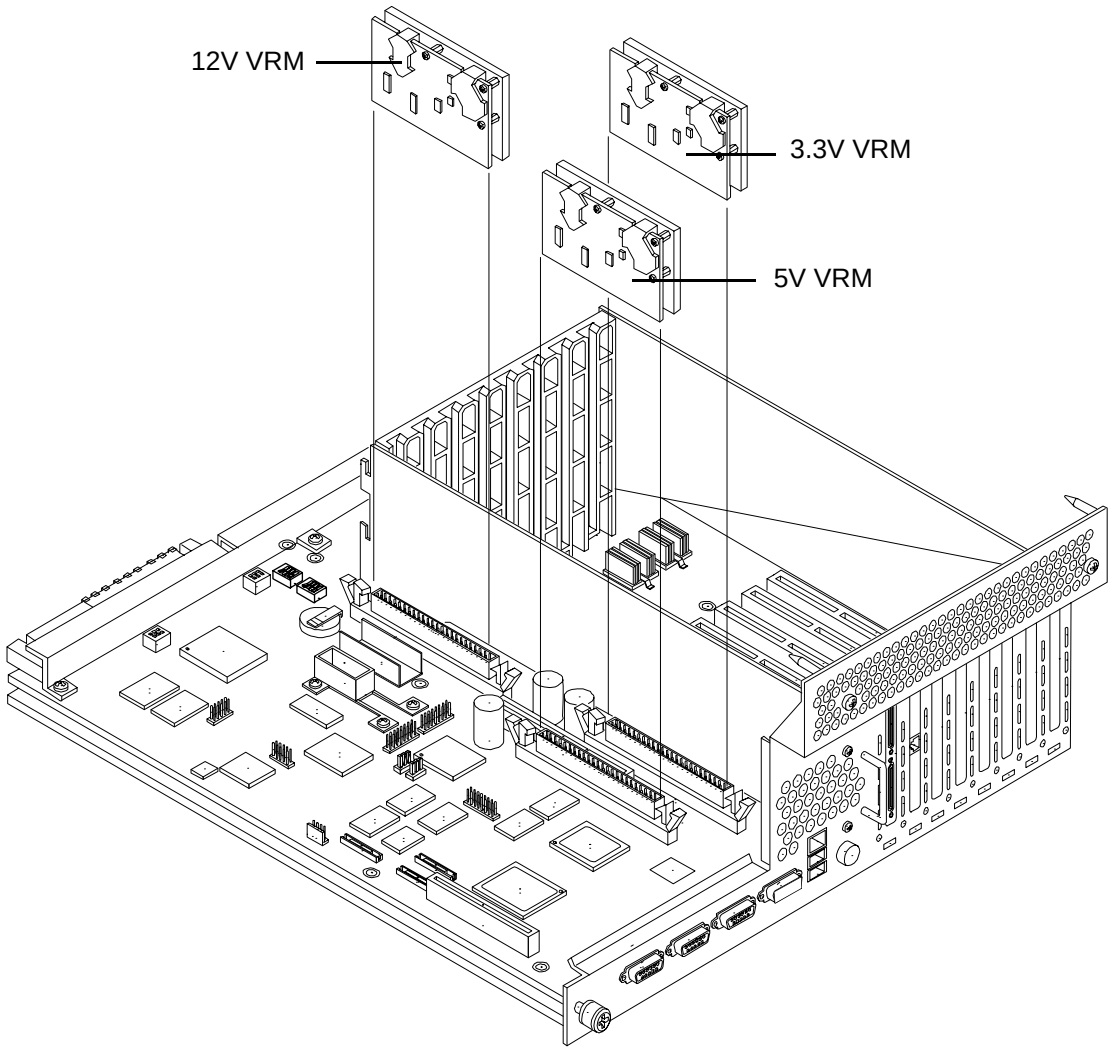
WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a VRM.**

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

Figure 4-31 VRM Board Remove and Replace



Removing a Voltage Regulator Module (VRM)

To remove a VRM from the server, perform the following steps:

Step 1. Remove the I/O baseboard from the chassis. (Refer to “I/O Baseboard Assembly” on page 67.)

Step 2. Push out the locking tabs at the end of the VRM slot to release it, then pull the VRM straight out of the I/O baseboard.

Replacing a Voltage Regulator Module (VRM)

To replace a VRM, perform the following steps:

Step 1. Push the VRM straight into the slot until it stops, then push in the two locking tabs on either side of the slot to lock the VRM into position.

CAUTION Ensure that the VRM and slot voltages match up and also check that the heatsink on the VRM faces the PCI card rack after installation. If the VRM is inserted backwards the system will halt during the boot process.

Step 2. Replace the I/O baseboard in the chassis.

Hot-Plug Disk Drives

The two hot-plug disk drives are located in the front of the hp 9000 rp4440 Server.

CAUTION A hot-plug device may require interaction with the operating system before the device can be safely removed from or installed into the server. Verify that the operating system supports removing/replacing 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.

NOTE The replacement disk drive must be the same product ID as the disk drive that is being replaced.

HP often uses different manufacturers for disks that have the same product number. The replacement disk drive will have the same capacity and block size as the defective disk because they have the same product number.

Removing a Hot-Plug Disk Drive

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

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

Step 1. Grasp the tab at the bottom of the latch on the selected disk drive.

Step 2. Push the button inside the latch and pull the latch out and up; the disk will unlock.

Step 3. Pull gently until the hot-plug disk drive slides out of the chassis.

Replacing a Hot-Plug Disk Drive

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 9000 rp4440 Server. See Figure 4-32, “Disk Drive Installation in Slots 1 and 2.”

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

Step 1. Slide the hot-plug hard disk into slot 1 until it is seated.

Step 2. Close the drive-ejector handle by pushing it down until it clicks.

Step 3. The hot-plug disk drive is now correctly installed.

Figure 4-32 Disk Drive Installation in Slots 1 and 2

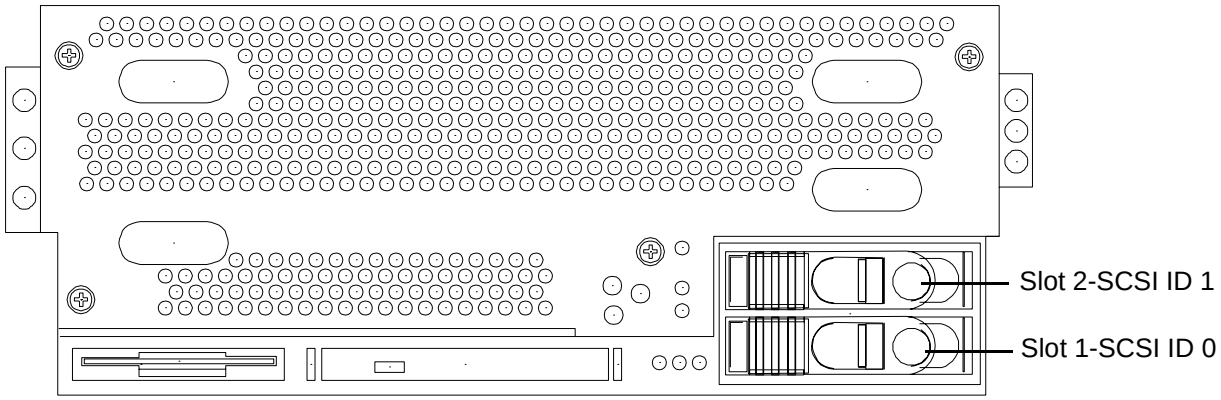


Figure 4-33 Disk Drive Installation in Slot 2

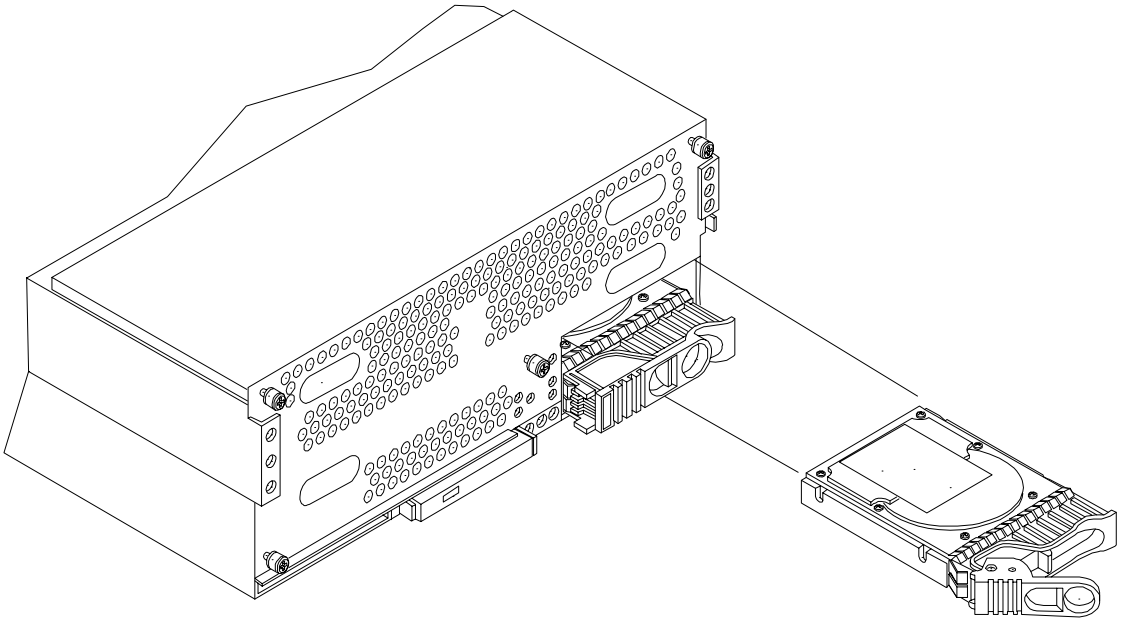
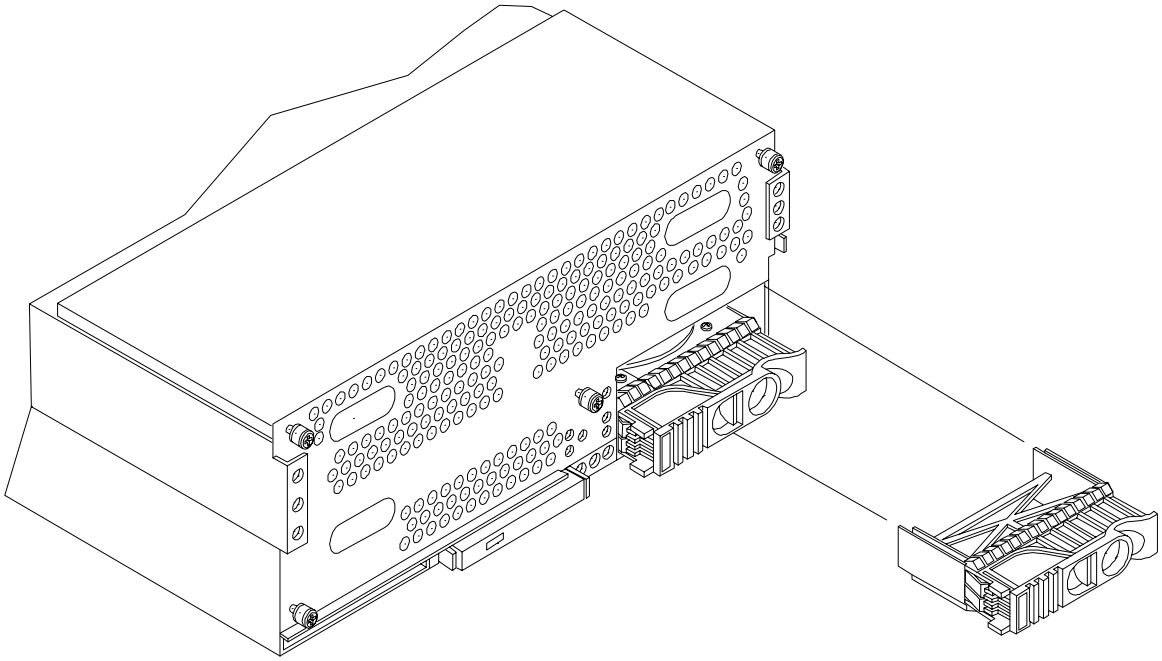


Figure 4-34 Volume Filler Installation in Slot 2



SCSI Backplane Board

The SCSI backplane board is attached to the rear of the disk media housing at the front, right side of the chassis.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing the SCSI backplane.**

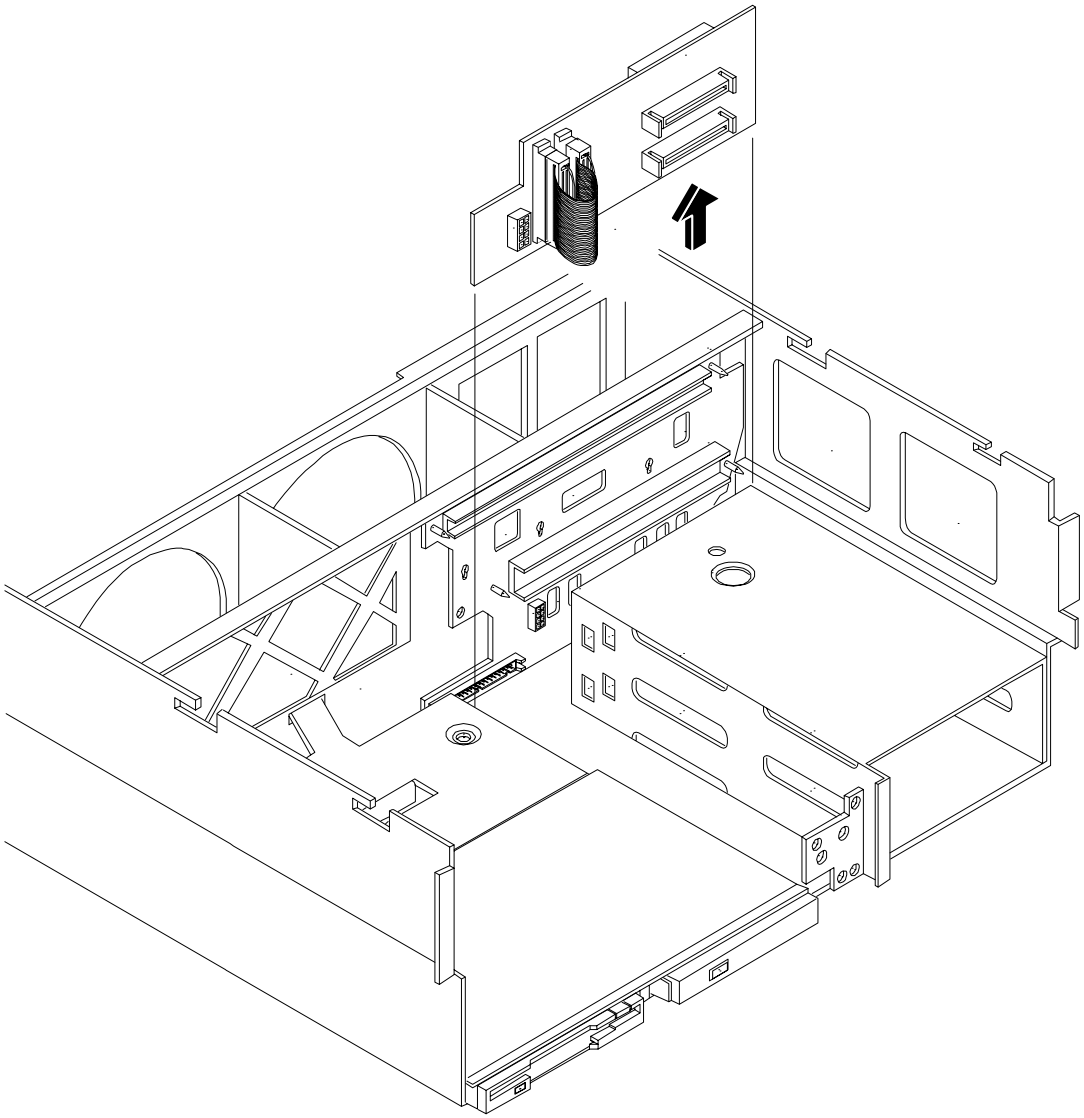
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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.

Figure 4-35 SCSI Backplane Removal and Replacement



Removing the SCSI Backplane

To remove the SCSI backplane, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Remove the memory extender board. (Refer to “Memory Extender Board” on page 45.)

Step 5. Remove the processor extender board. (Refer to “Processor Extender Board” on page 53.)

Step 6. Remove the two hot-plug disk drives. (Refer to “Hot-Plug Disk Drives” on page 88.)

Step 7. Unplug the internal SCSI cable(s) from the SCSI backplane board.

Step 8. Unplug the SCSI backplane-to-midplane riser cable from the SCSI backplane.

Step 9. Using your finger, turn the swivel latch on top of the hot-plug hard disk drive cage to unlatch the SCSI backplane board from the hard disk cage.

Step 10. Grasp the top edge of the SCSI backplane board and pull up until it releases from the keyway slots on the back of the hot-plug disk drive cage.

Step 11. Push the SCSI backplane board away from the disk drive cage and lift it up and out of the chassis.

Replacing the SCSI Backplane

To replace the SCSI backplane, perform the following steps:

Step 1. Replace the SCSI backplane to the rear of the disk drive cage.

Step 2. Replace the two hot-plug disk drives into the disk drive cage.

Step 3. Re-plug the SCSI backplane-to-midplane cable back into the SCSI backplane.

Step 4. Re-plug the internal SCSI cable into the SCSI back plane.

Step 5. Replace the processor extender board.

Step 6. Replace the memory extender board.

Step 7. Replace the front cover.

Step 8. Replace the front bezel.

Step 9. If rack mounted, slide the HP Server back into the rack until it stops.

Midplane Riser Board

The midplane riser board is attached to the main bulkhead in the center of the chassis.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing the midplane riser backplane.**

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 Midplane Riser Board

To remove the midplane riser board, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front and top covers. (Refer to “Front and Top Covers” on page 39.)

Step 4. Remove the memory extender board. (Refer to “Memory Extender Board” on page 45.)

Step 5. Remove the processor extender board. (Refer to “Processor Extender Board” on page 53.)

Step 6. Remove the 3 chassis hot-swap fan units. (Refer to “Hot-Swap Chassis Fan Unit” on page 63.)

Step 7. Remove the I/O baseboard assembly. (Refer to “I/O Baseboard Assembly” on page 67.)

Step 8. Remove the SCSI backplane board. (Refer to “SCSI Backplane Board” on page 91.)

Step 9. Unplug the power distribution board power cable and signal cable from the midplane riser board.

Step 10. Unplug the DVD relay board and front panel display board cable from the midplane riser board.

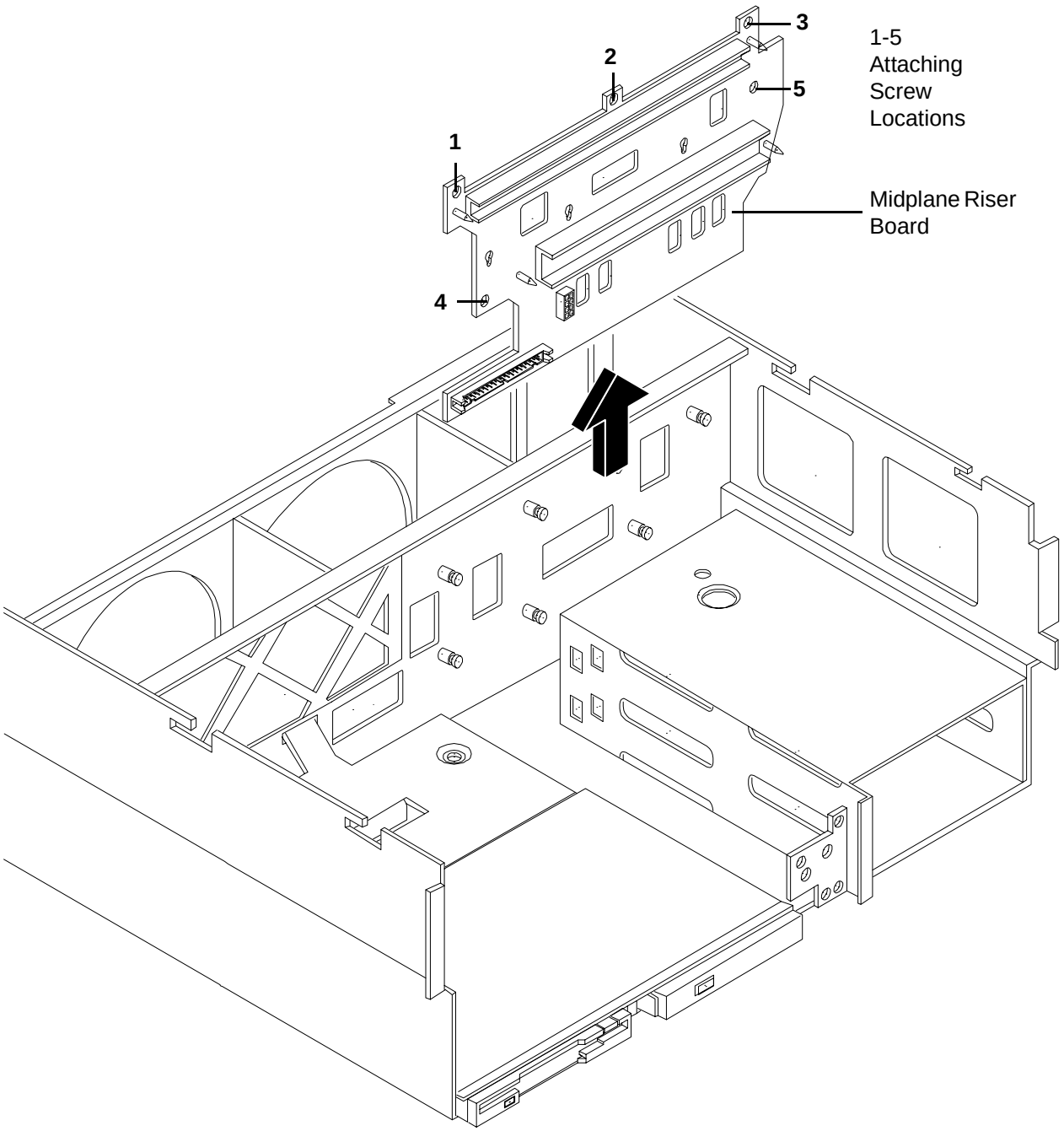
Step 11. Unplug the QuickFind diagnostic board cable from the midplane riser board.

NOTE At this point, all cables and connectors should be unplugged from the midplane riser board.

Step 12. Using a Torx #15 driver, remove the five Torx screws attaching the midplane riser board to the chassis.

Step 13. Grasp the top edge of the midplane riser board and lift straight up to release it from the keyway slots on the chassis. Then pull straight out and up to remove the midplane riser board from the chassis.

Figure 4-36 Midplane Riser Board



Replacing the Midplane Riser Board

To replace the midplane riser board, perform the following steps:

Step 1. Replace the midplane riser board onto the keyway slots on the chassis wall. Then push straight down until it seats onto the locking studs.

Step 2. Using a Torx #15 driver, replace and tighten the 5 Torx screws attaching the midplane riser board to the chassis.

Step 3. Plug in the QuickFind diagnostic board cable to the midplane riser board.

Step 4. Plug in the DVD relay board and front panel display board cable to the midplane riser board.

Step 5. Plug in the power distribution board power cable and signal cable to the midplane riser board.

Step 6. Replace the SCSI backplane board.

Step 7. Replace the I/O baseboard assembly.

Step 8. Replace the three chassis hot-swap fan units.

Step 9. Replace the processor extender board.

Step 10. Replace the memory extender board.

Step 11. Replace the front and top covers.

Step 12. Replace the front bezel.

Step 13. If rack mounted, slide the HP Server back into the rack until it stops.

Hot-Swap Power Supplies

The hp 9000 rp4440 Server has two hot-swap power supply units (PSU). These PSUs are located at the rear of the HP Server. The supported configuration of the HP Server requires a minimum of one PSU be installed.

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 power supply.

Power Supply Load Order

The supported configuration of your hp 9000 rp4440 Server requires a minimum of one PSU. A second, optional hot-swap PSU, may be installed to provide N+1 capability. Each hot-swap requires a separate power cord.

The left side (viewing from the rear) hot-swap PSU is identified as P0, the second hot-swap power supply is identified as P1. Each hot-swap PSU requires a separate power cord be 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 PSU 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.

Removing a Hot-Swap Power Supply

To remove a hot-swap PSU, perform the following steps:

CAUTION Be careful when removing the hot-swap power supply. It is heavier than it appears.

Step 1. If rack mounted, slide the HP Server back out of the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

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 power cord plug from the power receptacle.

Step 4. Loosen the captive thumbscrew located at the top left of the PSU.

Step 5. Grasp the handle and pull the PSU out of the server.

Replacing a Hot-Swap Power Supply

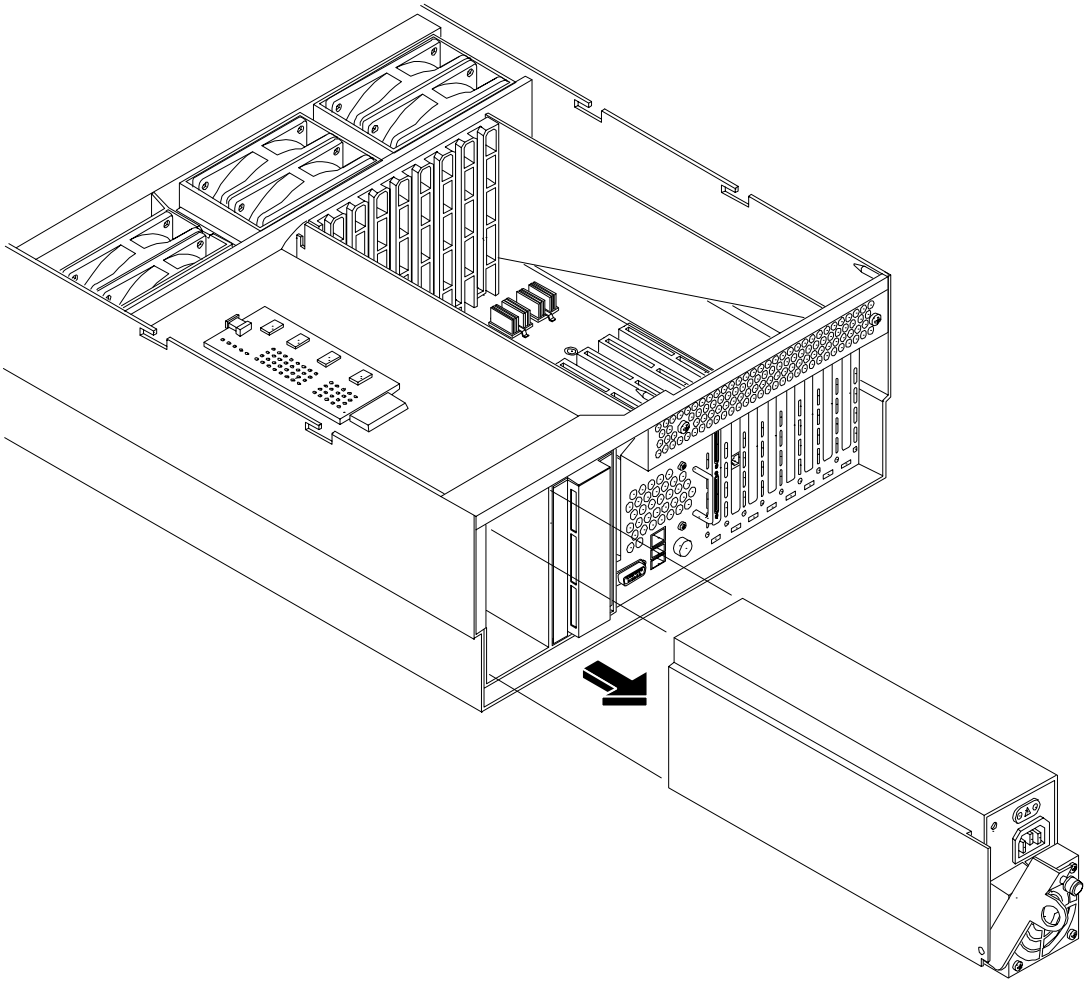
Step 1. Supporting the PSU with both hands, slide it into the empty slot until it plugs into the socket on the internal power distribution board. Tighten the thumbscrew hand-tight.

Step 2. Install the power cord into the PSU socket.

Step 3. Apply power to the new PSU and the LED should immediately turn on.

Step 4. If rack mounted, slide the HP Server back into the rack until it stops.

Figure 4-37 Hot-Swap Power Supply Removal and Replacement



Power Distribution Board

The power distribution board is attached to the rear power supply cage, underneath the hot-swap power supply fan unit.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing the power distribution board.**

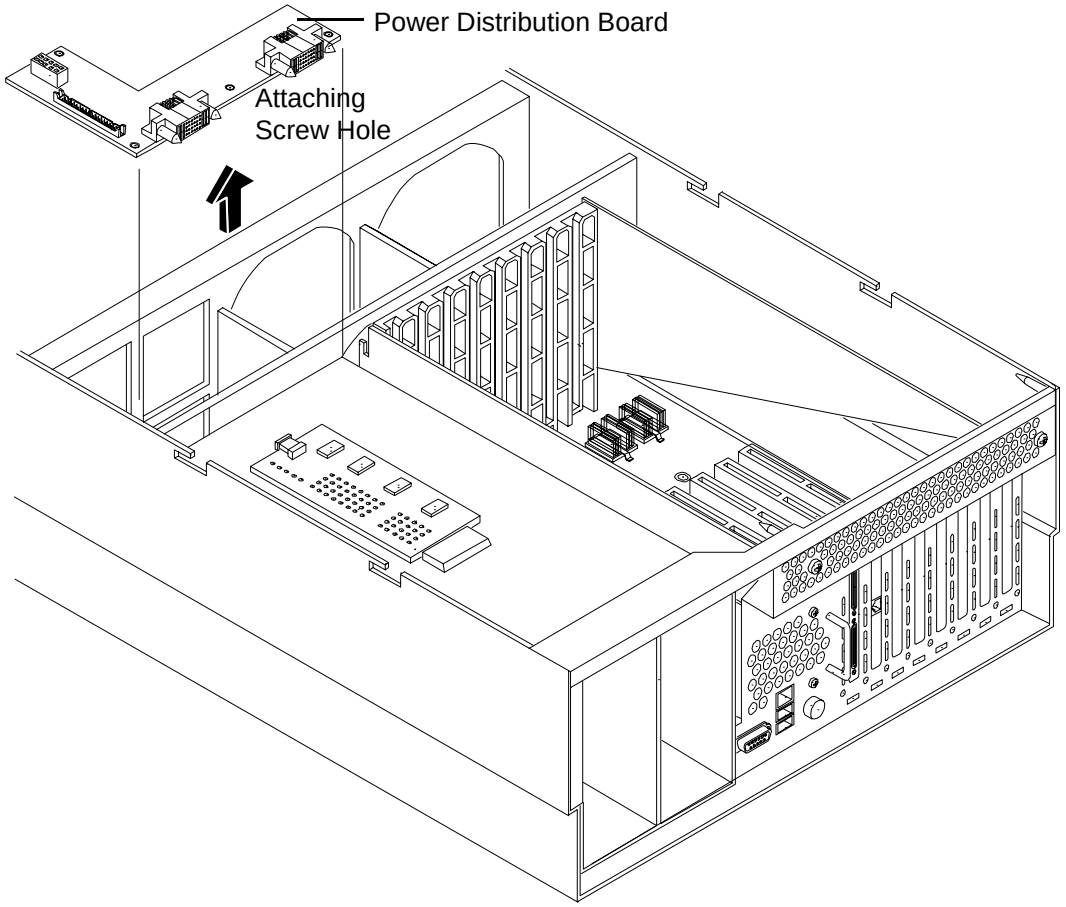
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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.

Figure 4-38 Power Distribution Board Removal and Replacement



Removing the Power Distribution Board

To remove the power distribution board, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the top cover. (Refer to “Front and Top Covers” on page 39.)

Step 3. Remove the power supply fan unit from the chassis. (Refer to “Hot-Swap Chassis Fan Unit” on page 63.)

Step 4. Remove the hot-swap power supply(s) from the chassis. (Refer to “Hot-Swap Power Supplies” on page 97.)

Step 5. Unplug the power cable and the signal cable from the midplane riser board.

Step 6. Using a Torx #15 driver, loosen the one Torx screw attaching the power distribution board to the chassis.

Step 7. Push the power distribution board towards the center of the chassis to release it from the keyway slots. Pull it off the keyway slots and up and out of the chassis.

Replacing the Power Distribution Board

To replace the power distribution board, perform the following steps:

Step 1. Replace the power distribution board over the keyway slots and push it towards the side of the chassis to lock it onto the studs.

Step 2. Reattach the power distribution board to the chassis bulkhead by replacing the one Torx #15 screw. Tighten hand-tight.

Step 3. Replug the power and signal cables back into the midplane riser board.

Step 4. Replace the hot-swap power supply(s) into the chassis.

Step 5. Replace the power supply fan unit into the chassis.

Step 6. Replace the top cover.

Step 7. If rack mounted, slide the HP Server back into the rack until it stops.

DVD Drive

The DVD drive is located on the front of the HP Server.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a DVD drive.**

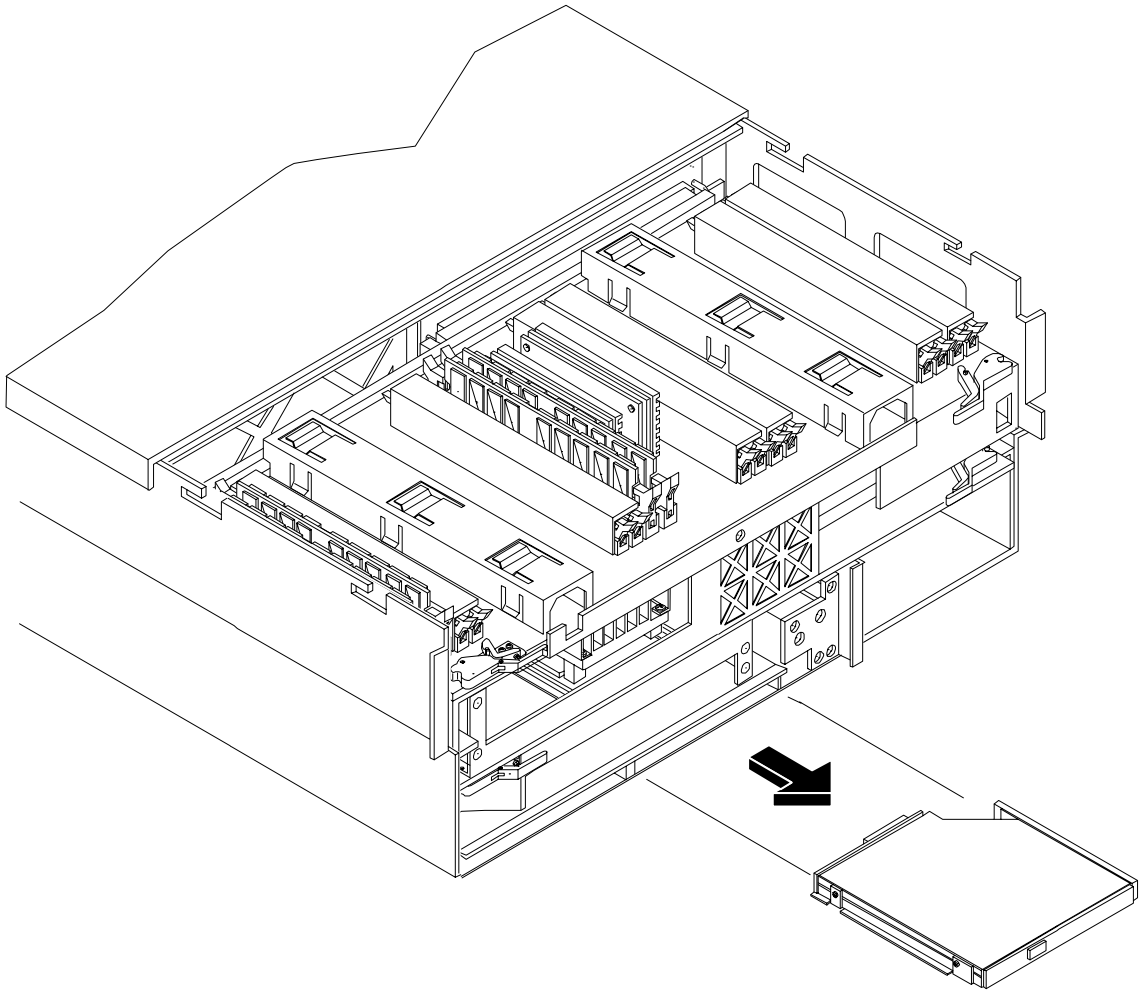
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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.

Figure 4-39 DVD Drive Removal and Replacement



Removing a DVD Drive

To remove a DVD drive, perform the following steps:

Step 1. Grasp the front of the DVD drive and squeeze in on the locking tab to release the drive.

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Pull the drive straight out to remove it from the chassis.

Replacing a DVD Drive

To replace a DVD drive, perform the following steps:

Step 1. Grasp the front of the DVD drive and squeeze in on the locking tab to release the drive.

Step 2. Push the drive straight into the drive bay until the locking tab clicks into place.

Step 3. Replace the front bezel.

DVD I/O Board

The DVD I/O board is located under a metal cover that is directly above the DVD location at the front left of the chassis.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a DVD I/O board.**

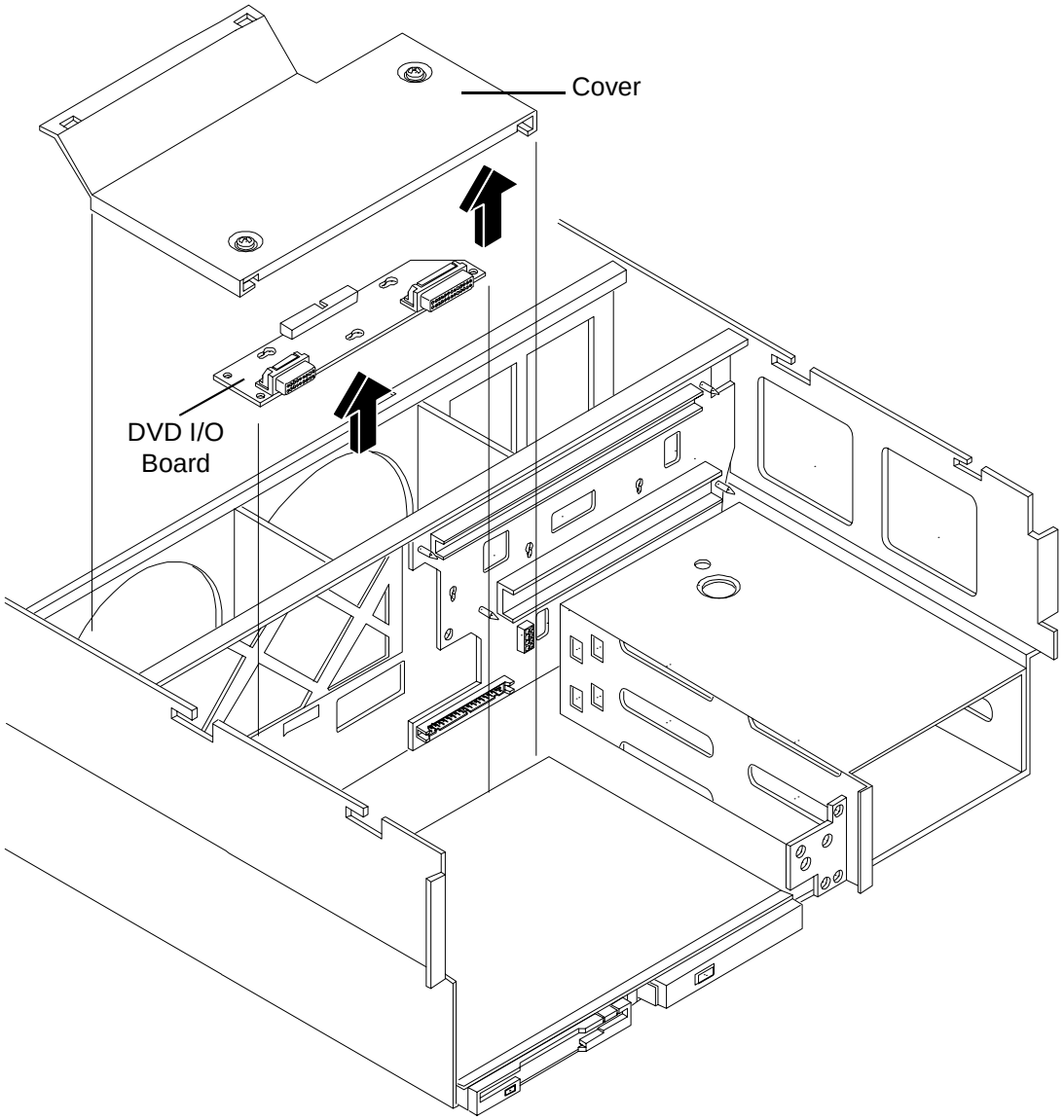
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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.

Figure 4-40 DVD I/O Board Removal and Replacement



Removing a DVD I/O Board

To remove a DVD I/O board, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Remove the memory extender board. (Refer to “Memory Extender Board” on page 45.)

Step 5. Remove the processor extender board. (Refer to “Processor Extender Board” on page 53.)

Step 6. Using a Torx #15 driver, remove the two Torx screws holding the DVD I/O board cover plate to the chassis and remove the cover plate.

Step 7. Unfasten the release clip attaching the DVD I/O board to the chassis, and remove the I/O board from the chassis.

Step 8. Lift out the DVD I/O board and remove the midplane riser board connector cable and remove the DVD I/O board from the chassis.

Replacing a DVD I/O Board

To replace a DVD I/O board, perform the following steps:

Step 1. Replace the DVD I/O board into the chassis and plug in the midplane riser board connector cable.

Step 2. Replace DVD I/O board to the chassis by refastening the release clip.

Step 3. Replace the cover plate using the two Torx #15 screws and a Torx #15 driver.

Step 4. Replace the processor extender board.

Step 5. Replace the memory extender board.

Step 6. Replace the front and top covers.

Step 7. Replace the front bezel.

Step 8. If rack mounted, slide the HP Server into the rack until it stops.

Display Board

The display board is located behind the control panel and under the front cover. The display board contains the server's on/off switch and three LEDs that indicate server status.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing the display board.**

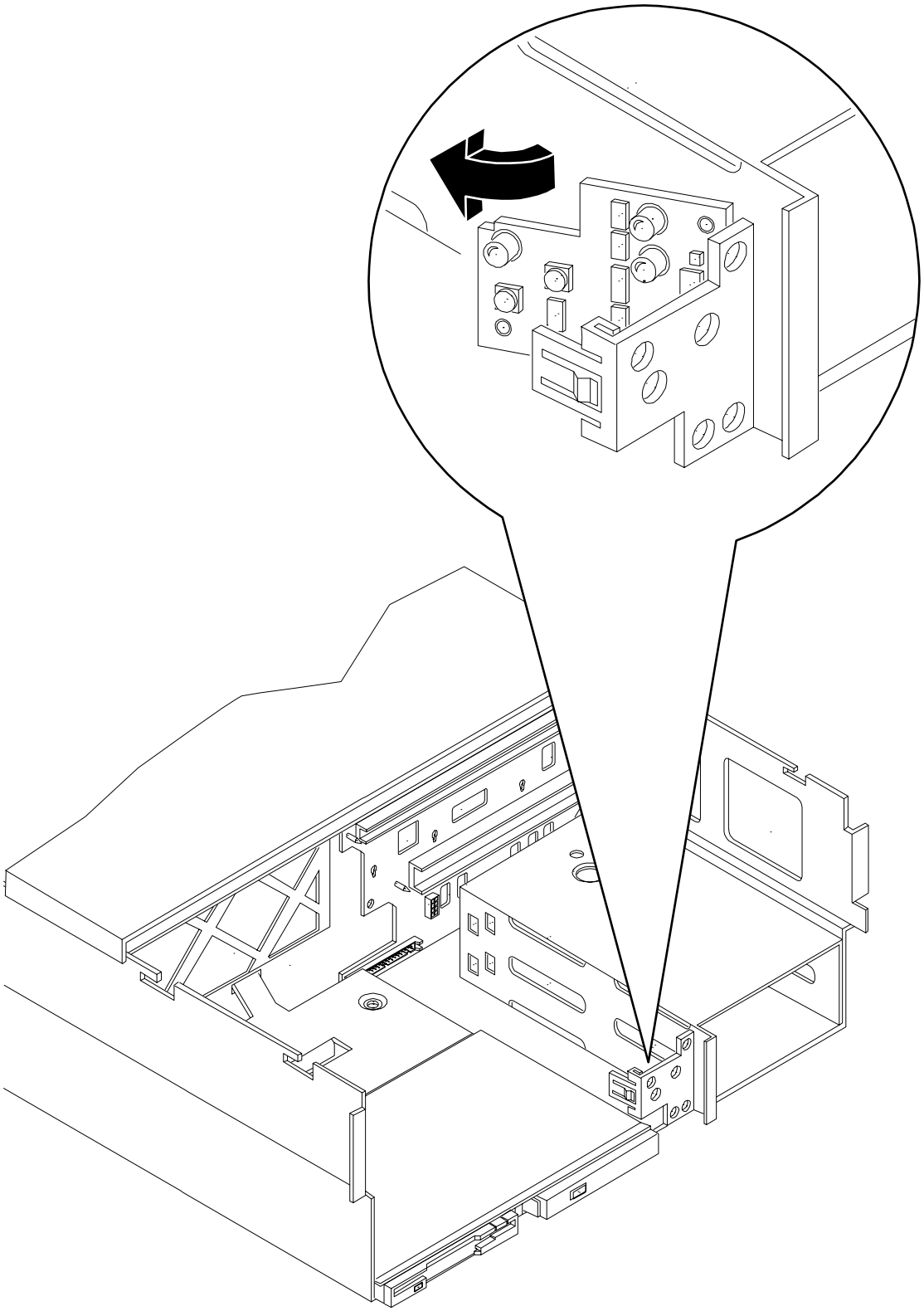
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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.

Figure 4-41 Display Board Removal and Replacement



Removing the Display Board

To remove the display board, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the front bezel. (Refer to “Front Bezel” on page 38.)

Step 3. Remove the front cover. (Refer to “Front and Top Covers” on page 39.)

Step 4. Using your finger, slightly pull out the retaining tab on the chassis that holds the display board in position.

Step 5. Gently unplug the midplane riser board connector cable from the display board and remove the board from the chassis.

Replacing the Display Board

To replace the display board, perform the following steps:

Step 1. Gently plug the midplane riser board cable into the display board.

Step 2. Hold the display board in position near the chassis and rotate it into the retaining clip until it clicks into place.

Step 3. Replace the front cover.

Step 4. Replace the front bezel.

Step 5. If rack mounted, slide the HP Server into the rack until it stops.

QuickFind Diagnostic Board

The QuickFind diagnostic board is located on top of the power supply cage, underneath the top cover.

WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing the QuickFind diagnostic board.**

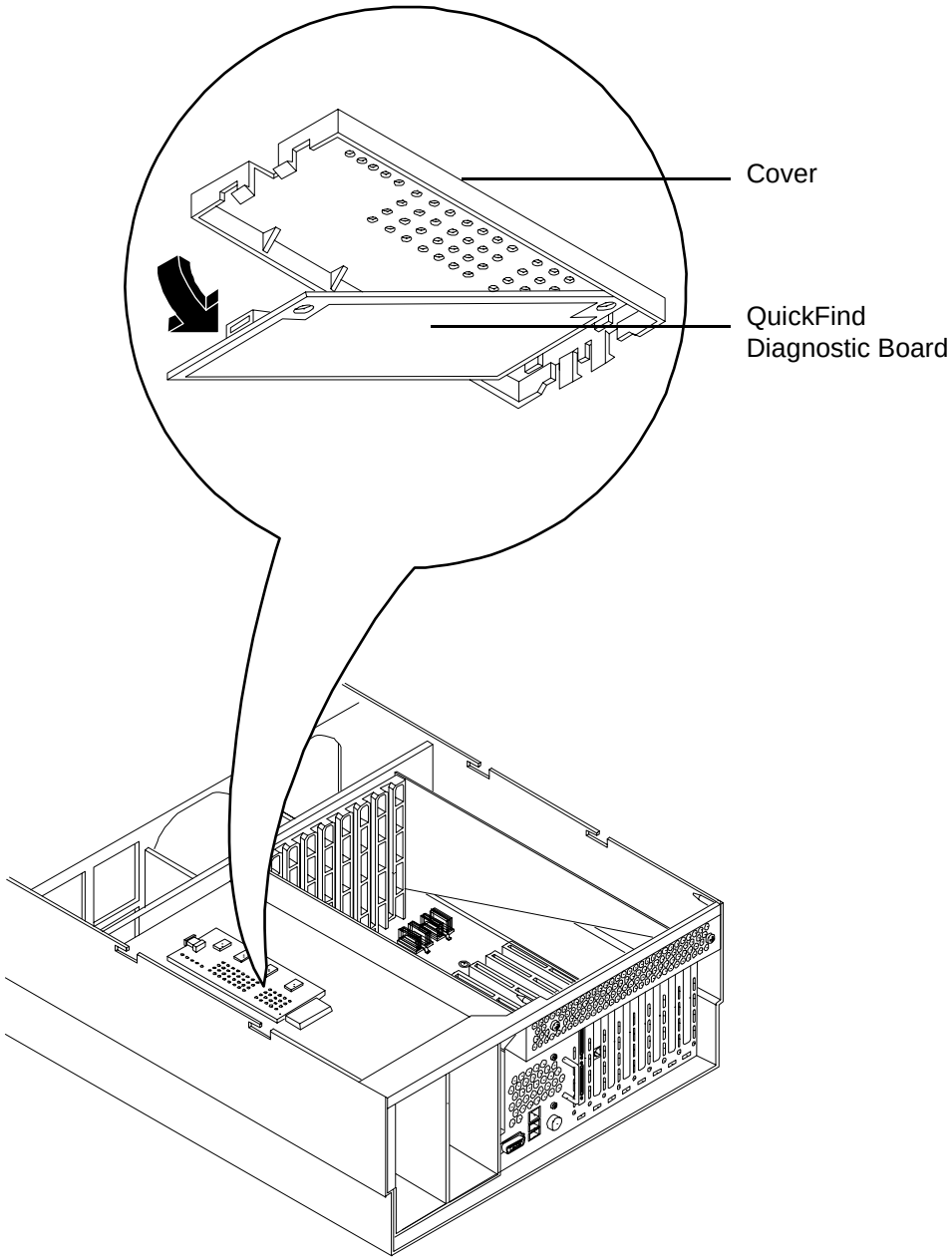
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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.

Figure 4-42 QuickFind Diagnostic Board Removal and Replacement



Removing the QuickFind Diagnostic Board

To remove the QuickFind diagnostic board, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. (Refer to the *hp9000 rp4440 Installation* Guide for additional information.)

Step 2. Remove the top cover. (Refer to “Front and Top Covers” on page 39.)

Step 3. Gently squeeze the cover surrounding the QuickFind diagnostic board and remove the cover/board assembly from the top of the power supply cage.

Step 4. Turn this assembly upside down and remove the QuickFind diagnostic board from the cover.

Step 5. Unplug the cable from the connector on the QuickFind diagnostic board and remove the board from the chassis.

Replacing the QuickFind Diagnostic Board

To replace the QuickFind diagnostic board, perform the following steps:

Step 1. Gently plug the cable into the QuickFind diagnostic board connector.

Step 2. Replace the QuickFind diagnostic board into the cover by snapping it into place.

Step 3. Turn the assembly over and snap into place on top of the power supply cage.

Step 4. Replace the top cover.

Step 5. If rack mounted, slide the HP Server into the rack until it stops.

A Parts Information

Field Replaceable Parts (FRU) List

The items in this list and the corresponding item numbers are the Field replaceable Units (FRUs) for the hp 9000 rp4440 Server.

NOTE The item numbers listed below are used with the part illustrations in order to identify the nomenclature of the part. Part numbers are found by using the part nomenclature from this list to select the correct part from the HP Partsurfer. If a system board needs to be replaced, remove processors, DIMMs, and adapter boards and transfer these to the new board. Ensure all jumper and switch settings on the old board are transferred to the new board.

Table A-1 Field Replaceable Parts (FRU) List

Item No.	Description	Part Number Replacement	Part Number Exchange
Cable			
A6961-63006	Cable, Internal SCSI	A6961-63006	None
A6961-63005	Cable, QuickFind Diagnostic to Midplane	A6961-63005	None
A6961-63004	Cable, Power Distribution to Midplane Ribbon	A6961-63004	None
A6961-63003	Cable, Power Distribution to Midplane 10 pin	A6961-63003	None
A6961-63011	Cable, SCSI Controller Jumper (Simplex only)	A6961-63011	None
A6961-63008	Cable, SCSI Backplane to Midplane	A6961-63008	None
A6961-63002	Cable, Display to IDE to Midplane	A6961-63002	None
PCA Boards			
A6961-60007	PCA, Processor Extender	A6961-67007	A6961-69007
A6961-60001	PCA, I/O Baseboard (includes VRMs)	A6961-67001	A6961-69001
A6961-60004	PCA, 16 slot Memory Board	A6961-67004	A6961-69004
A7124-04001	PCA, 32 slot Memory Board	A9739-67006	A7124-69001
A6961-60005	PCA, Midplane Riser Board	A6961-67005	None
A6961-04057	PCA, SCSI Backplane/Management Assy, includes: Management Board (A6961-60003) and SCSI Backplane Board (A6961-60002)	A6961-67057	None
A6961-60006	PCA, SCSI Duplex Board (HP-UX)	A6961-67006	None
A6961-60008	PCA, Front Panel Display	A6961-67008	None

Table A-1 Field Replaceable Parts (FRU) List (Continued)

Item No.	Description	Part Number Replacement	Part Number Exchange
A6961-60009	PCA, QuickFind (visual) Diagnostic Board (includes plastic cover and label)	A6961-67009	None
A6961-60015	PCA, Power Distribution Board	A6961-67015	None
A6961-60013	PCA, I/O Board to DVD connectivity (IDE/USB)	A6961-67013	None
A6967AX	256 MB DIMM	A6967AX	None
A6968AX	512 MB DIMM	A6968AX	None
A6969AX	1 GB DIMM	A6969AX	A6969-69001
A6970AX	2 GB DIMM	A6970AX	A6835-69001
Internal Disks/Removable Media			
A9896-64001	36 GB 15K RPM SCSI Disk (A6981A)	5065-5286EO	A9896-69001
A9897-64001	73 GB 15K RPM SCSI Disk (A6983A)	0950-4381EO	A9897-69001
A9898-64001	146 GB 10K RPM SCSI Disk (A6984A)	0950-4385EO	A9898-69001
A7163-04001	DVD-R/CD-R Drive	A7163-67001	None
A7007-04001	DVD-R/CD-RW Drive	A7007-67001	None
Fans			
A6961-04055	I/O Fan	A6961-04055	None
A6961-04028	Power Supply Fan	A6961-04028	None
Processor Module			
A7125-04004	800 MHz PA-RISC CPU	A7125AX	A7125-69002
A7135-04003	1GHz PA-RISC CPU	A7135AX	A7135-69002
Miscellaneous			
0950-4428	Power Supply	A6961-67016	None
0950-4419	DC-DC Converter (VRM 3.3V)	A6961-67017	None
0950-4418	DC-DC Converter (VRM 5.0V)	A6961-67018	None
0950-4417	DC-DC Converter (VRM 12.0V)	A6961-67019	None
A6961-04047	PCI Card Divider (doorbell and latch included)	A6961-67020	None
A6961-40021	PCI Retention Clip	A6961-67021	None
1420-0386	System Battery	1420-0386	None
A6961	Filler, Memory Air Blocker	A6961-40034	None

Table A-1 Field Replaceable Parts (FRU) List (Continued)

Item No.	Description	Part Number Replacement	Part Number Exchange
Rack Solutions			
5069-3305	Rack Mount Hardware, Right (included with Left Bracket in kit)	A6977-67001	None
5069-3306	Rack Mount Hardware, Left (included with Right Bracket in kit)	A6977-67002	None
A6979-04001	Rackless kit	A6971-04001	None
Parts Shared with Other Products			
A6825-60101	LAN Core I/O	A6825-67101	None
A6829-60101	U160 Core I/O	A6829-67001	None

B System I/O Board Switches and Jumpers

The following descriptions are for reference only.

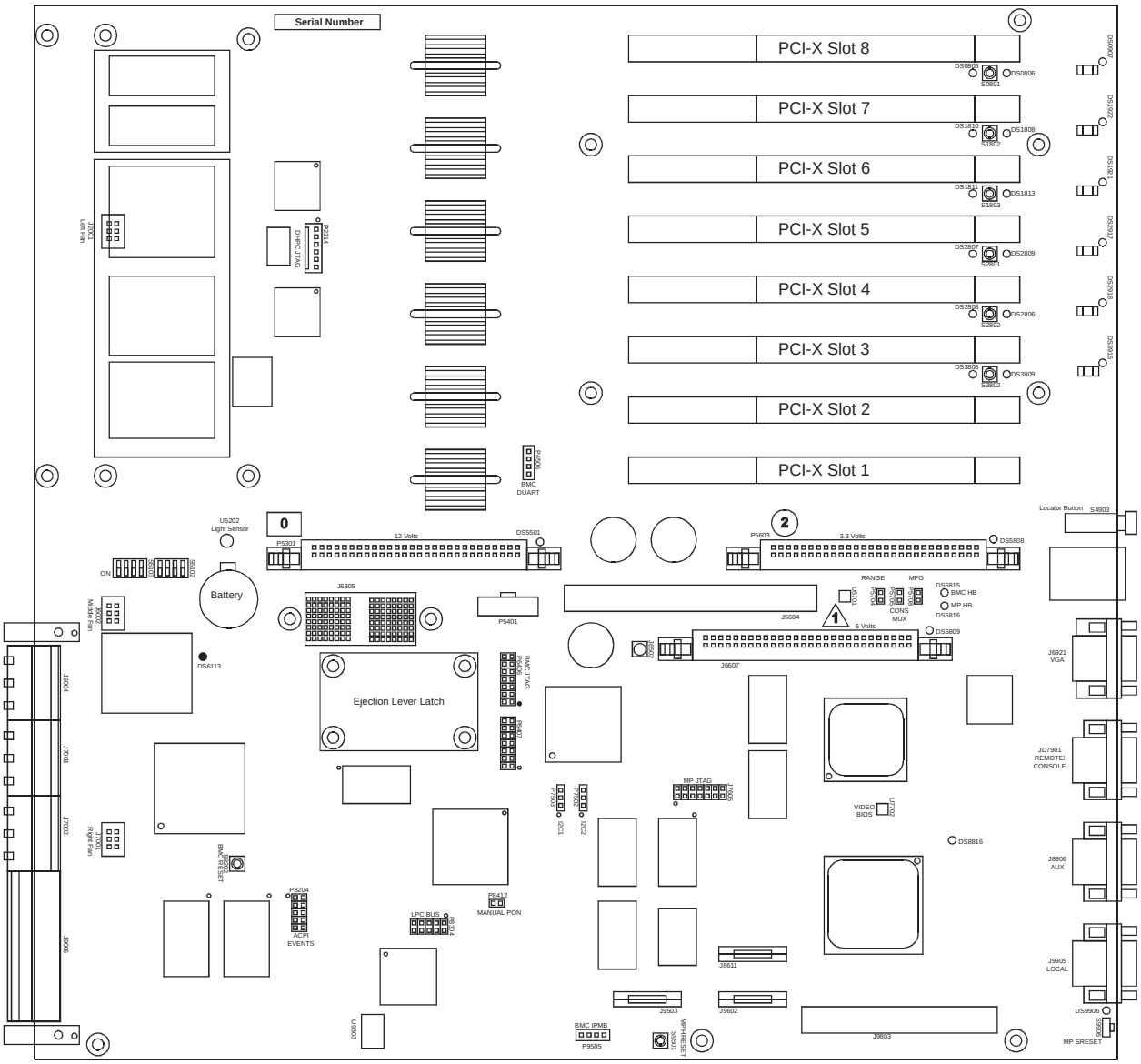


Table B-1 System I/O Board Indicators, Connectors, and Jumpers

LED Indicators		Connectors		Jumpers	
Ref Des	**Function**	**Ref Des**	**Function**	**Ref Des**	**Function**
DS0907	Slot 8 Attn	P2314	DHPC JTAFG	P5704	AC Range-Off
DS0805	Slot 8 Attn	P4506	BMC DUART	P5705	Console Mux-Off
DS0806	Slot 8 Power	P5301	12V VRM Module	P5708	Mfg/Schmoo-Off
DS1922	Slot 7 Attn	P5603	3.3V VRM Module	P8412	Manual Power On-Off
DS1810	Slot 7 Attn	J6607	5V VRM Module	S5102 Pos 1	VGA Enable On-rx4640 Off-rp4440
DS1808	Slot 7 Power	J6305	PDH Monitor Connector	S5102 Pos 2	N/A
DS1921	Slot 6 Attn	P5401	RiLoe Connector	S5102 Pos 3	N/A
DS1811	Slot 6 Attn	J5604	Scan Connector	S5102 Pos 4	N/A
DS1813	Slot 6 Power	P6406	BMC JTAG	S5103 Pos 1	
DS2917	Slot 5 Attn	P6407	BMC Test Header	S5103 Pos 2	
DS2807	Slot 5 Attn	J7605	MP JTAG	S5103 Pos 3	
DS2809	Slot 5 Power	P7502	12C Bus 2 Header	S5103 Pos 4	Don’t care
DS2918	Slot 4 Attn	P7503	12C Bus 1 Header		

Table B-1 System I/O Board Indicators, Connectors, and Jumpers (Continued)

LED Indicators		Connectors		Jumpers	
Ref Des	**Function**	**Ref Des**	**Function**	**Ref Des**	**Function**
DS2808	Slot 4 Attn	P8204	ACPI Events		
DS2806	Slot 4 Power	P8304	LPC Bus Header		
DS3916	Slot 3 Attn	J9503	MP Data Bus Debug Header		
DS3808	Slot 3 Attn	J98611	MP Data Bus Debug Header		
DS3809	Slot 3 Power	J9602	MP Data Bus Debug Header		
DS5501	12V Power	P9505	IPMB Bus between BMC and MP		
DS5808	3.3V Power	J9803	Core I/O Debug Connector		
DS6113	3.3 VSB Power	J2001	Left Fan or Fan 0		
DS5809	5V Power	J6002	Middle Fan or Fan 1		
DS5815	BMC Heartbeat	J7001	Right Fan or Fan 2		
DS5816	MP Heartbeat	J6004	Hi-Speed Backplane for Ropes		
DS8816	MP ROM Error	J7003	Hi-Speed Backplane for Ropes		
DS9906	MP Selftest	J7002	Hi-Speed Backplane for Ropes		
		J9006	Low-Speed Backplane Signals		
		J5910	Dual USB and MP LAN		
		J6921	DB-15 Analog Video		
		JD7901	DB-9 Remote/Console RS-232		
		J8906	DB-9 Auxillary RS-232		
		J9905	DB-9 Local RS-232		
		J6502	Frequency Input for Margin		