

Maintenance Guide

HP 9000 rp4410 and HP 9000 rp4440



Manufacturing Part Number: A9950_96001

Third Edition

April 2005

U.S.A.

© Copyright 2004-2005 Hewlett-Packard Development Company, L.P.

Legal Notices

Copyright Notices. © Copyright 2004-2005 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

1. Configuring the Server

Introduction	13
Core I/O Connections	13
Management Processor (MP)	14
Configuring the MP LAN Port IP Address	15
Accessing the Management Processor	16
Configuring the Management Processor LAN Information	18
MP Command Reference	21
Booting the Server	23

2. Troubleshooting

Troubleshooting Methodology	25
Using the Front Panel Power Button	25
Operating System Will Boot	26
Operating System Will Not Boot	26
Troubleshooting Using Online Support Tools	27
Support Tools Manager	27
Event Monitoring Service	27
Management Processor (MP)	28
Troubleshooting Using Offline Support Tools	30
Offline Diagnostic Environment (ODE)	30
Troubleshooting PCI/PCI-X Hot-Plug Operations	31
Troubleshooting Using LED Indicators	33
Front Control Panel LEDs	33
QuickFind Diagnostic Panel LEDs	35
I/O Baseboard LED Indicators	37
Memory Extender Boards	38

3. Removing and Replacing Components

Safety Information	41
Service Tools Required	41
Accessing a Rack Mounted Server	42
Extend the Server from the Rack	42
Insert the Server into the Rack	43
Accessing a Rackless Server	44
Front Bezel	45
Removing the Front Bezel	45
Replacing the Front Bezel	45
Front and Top Covers	46
Removing the Front Cover	46
Replacing the Front Cover	47
Removing the Top Cover	47
Replacing the Top Cover	48
Memory Extender Board	49
Removing a Memory Extender Board	49
Replacing a Memory Extender Board	51

Contents

System Memory DIMMs	52
Removing System Memory DIMMs	52
Installing Memory DIMMs	52
Processor Extender Board	57
Removing the Processor Extender Board	57
Replacing the Processor Extender Board	59
Replacing Dual Processor Modules	61
Installing Dual Processor Modules	61
Removing a Dual Processor Module	63
Installing a Dual Processor Module	65
Hot-Swap Chassis Fan Unit	70
Removing a Hot-Swap Chassis Fan Unit	71
Replacing a Hot-Swap Chassis Fan Unit	73
I/O Baseboard Assembly	74
Removing the I/O Baseboard Assembly	74
Replacing the I/O Baseboard Assembly	76
System Battery	80
Battery Notice	80
Replacing the System Battery	80
Removing and Replacing PCI/PCI-X Cards	82
PCI/PCI-X Configurations	82
Online Addition (OLA)	86
Online Replacement (OLR)	92
Offline Removal of a PCI/PCI-X Card (Power Off)	93
Offline Installation of a PCI Card (Power Off)	94
OLX Dividers	95
Removing an OLX Divider	98
Replacing an OLX Divider	98
U320 SCSI Enablement and Conversion Procedures	99
Introduction	99
Converting SCSI From Duplex to Simplex Operation	107
Removing and Replacing Core I/O Cards	114
Safety Information	114
Service Tools Required	114
Remove and Replace the LAN Core I/O Card	114
Remove and Replace the SCSI Core I/O Card	116
Hot-Plug Disk Drives	120
Removing a Hot-Plug Disk Drive	120
Replacing a Hot-Plug Disk Drive	120
SCSI Backplane Board	123
Removing the SCSI Backplane	124
Replacing the SCSI Backplane	125
Midplane Riser Board	126
Removing the Midplane Riser Board	126
Replacing the Midplane Riser Board	129
Hot-Swap Power Supplies	130

Power Supply Load Order	130
Removing a Hot-Swap Power Supply	131
Replacing a Hot-Swap Power Supply.....	131
Power Distribution Board	133
Removing the Power Distribution Board.....	134
Replacing the Power Distribution Board.....	135
DVD Drive	136
Removing a DVD Drive	137
Replacing a DVD Drive.....	137
DVD I/O Board	138
Removing a DVD I/O Board	140
Replacing a DVD I/O Board	140
Display Board.....	141
Removing the Display Board	143
Replacing the Display Board	143
QuickFind Diagnostic Board	144
Removing the QuickFind Diagnostic Board	146
Replacing the QuickFind Diagnostic Board	146

A. Parts Information

Field Replaceable Parts (FRU) List	147
--	-----

B. System Information

Features Summary.....	151
Processor	151
Memory	151
PCI Riser.....	151
Internal Core I/O.....	151
External Core I/O	152
Power Supply Unit	152
I/O Baseboard Manageability.....	152
Enhanced Server Manageability Using the Management Processor.....	152
Hard Disk Drives	152
Disk and I/O Path Logging.....	153
System I/O Board Switches and Jumpers.....	155

Index	159
--------------------	------------

Figure 2-1. PCI/PCI-X LEDs	31
Figure 2-2. Front Control Panel LEDs	33
Figure 2-3. QuickFind Diagnostic Label	36
Figure 2-4. I/O Baseboard LEDs, Buttons, and Sensors	37
Figure 2-5. 32 DIMM Memory Extender Board LEDs	39
Figure 2-6. 16 DIMM Memory Extender Board LEDs	40
Figure 3-1. Accessing 25-mm Torx Screws	43
Figure 3-2. Rackless HP 9000 rp4410 or HP 9000 rp4440 Server	44
Figure 3-3. Removing and Replacing the Front Bezel	45
Figure 3-4. Removing and Replacing the Front Cover	46
Figure 3-5. Removing and Replacing the Top Cover	48
Figure 3-6. Memory Extender Board Latches	50
Figure 3-7. Memory Extender Board	50
Figure 3-8. 16 DIMM Extender Board Slot IDs	55
Figure 3-9. 32 DIMM Extender Board Slot IDs	55
Figure 3-10. Inserting DIMM into Extender Board Connector	56
Figure 3-11. Processor Extender Board	58
Figure 3-12. Dip Switch Location	59
Figure 3-13. Dip Switch Setting for S5	60
Figure 3-14. Removing the Processor Extender Board	63
Figure 3-15. Removing Dual Processor Module from Processor Extender Board	64
Figure 3-16. Processor Cable Placed Correctly	66
Figure 3-17. Processor Cable Placed Incorrectly	66
Figure 3-18. Installing Dual Processor Module on Processor Extender Board	68
Figure 3-19. Hot-Swap I/O Chassis Fans Removal and Replacement	71
Figure 3-20. Hot-Swap Power Supply Chassis Fan Removal and Replacement	72
Figure 3-21. I/O Baseboard Locking Lever	75
Figure 3-22. I/O Baseboard Removal	76
Figure 3-23. Accessing S5102 Dip Switch	77
Figure 3-24. S5102 Dip Switch Setting	77
Figure 3-25. Battery Location on I/O Baseboard	81
Figure 3-26. Slot ID Numbering	85
Figure 3-27. PCI/PCI-X OLX Divider Layout	88
Figure 3-28. PCI-X Card Latch Opening Sequence	89
Figure 3-29. Inserting PCI/PCI-X Card	90
Figure 3-30. Slider Gate Latch	91
Figure 3-31. OLX Divider Removal and Replacement	96
Figure 3-32. OLX Slider Gate Bracket	97
Figure 3-33. SCSI Cable B Connection to the SCSI Backplane	101
Figure 3-34. Replacing the SCSI Duplex Board	102
Figure 3-35. Removing the SCSI Jumper Cable	103
Figure 3-36. SCSI Backplane Removal and Replacement	104
Figure 3-37. Installing the SCSI Duplex Board	105

Figures

Figure 3-38. Installing SCSI Cable B to the SCSI Adapter Board.....	106
Figure 3-39. Unplugging SCSI B Cable from the SCSI Backplane	109
Figure 3-40. Unplugging SCSI B Cable from the SCSI Adapter Board.....	110
Figure 3-41. Removing the Duplex Board	111
Figure 3-42. Installing the SCSI Jumper Cable	112
Figure 3-43. LAN I/O Card Latch Location	115
Figure 3-44. Inserting LAN I/O Card.....	116
Figure 3-45. Slot ID Numbering	117
Figure 3-46. SCSI I/O Card latch Location	118
Figure 3-47. Inserting SCSI I/O Card	119
Figure 3-48. Disk Drive Installation in Slots 1 and 2	121
Figure 3-49. Disk Drive Installation in Slot 2	121
Figure 3-50. Volume Filler Installation in Slot 2	122
Figure 3-51. SCSI Backplane Removal and Replacement.....	124
Figure 3-52. Midplane Riser Board	128
Figure 3-53. Hot-Swap Power Supply Removal and Replacement	132
Figure 3-54. Power Distribution Board Removal and Replacement	134
Figure 3-55. DVD Drive Removal and Replacement	137
Figure 3-56. DVD I/O Board Removal and Replacement.....	139
Figure 3-57. Display Board Removal and Replacement.....	142
Figure 3-58. QuickFind Diagnostic Board Removal and Replacement.....	145

Preface

This preface contains the following sections:

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

Intended Audience

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

What's New?

- The layout of this document was changed to improve usability.
- Added U320 SCSI Enablement and Conversion Procedures to “Removing and Replacing Parts”
- Added Removing and Replacing Core I/O Cards procedures to “Removing and Replacing Parts”
- Added dip switch information to “Removing and Replacing Parts”

Notational Conventions

The following notational conventions are used in this publication.

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

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

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

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

Example:

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

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

Examples:

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

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

Example:

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

- Example screen output is represented using this font.

Reader Comments and Feedback

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

Related Information

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

Web Site for HP Technical Documentation:

<http://docs.hp.com>

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

Server Hardware Information:

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

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

Windows Operating System Information

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

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

Diagnostics and Event Monitoring: Hardware Support Tools

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

Web Site for HP Technical Support:

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

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

Books about HP-UX Published by Prentice Hall

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

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

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

Printing History

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

Second Edition	July 2003
Third Edition	April 2005

1 Configuring the Server

Introduction

This chapter provides information about interface connections, configuring the server management processor (MP), and booting the HP 9000 rp4410 and HP 9000 rp4440 servers.

Core I/O Connections

The core I/O of the HP 9000 rp4410 and HP 9000 rp4440 servers include:

- Two USB ports
- One management processor (MP)
 - One 10/100 LAN-RJ45
 - Three serial ports
- SCSI host bus adapter (HBA)
 - The SCSI HBA board is used to attach SCSI external mass storage to the system
 - Connections to the SCSI board include the external SCSI channels for external mass storage devices

CAUTION Some restrictions apply to 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 *HP 9000 rp4410 and HP 9000 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 or two 10/100/1000 Base-T LAN RJ45 connectors
 - New cards may be available for use in the server. Refer to <http://hp.com>.

Management Processor (MP)

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

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

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

Once you update the firmware to version E.03.13, the following features in the iLO MP are activated:

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

- Licensing
- iLO Advanced Pack features, such as secure shell (SSH) access, group actions capability, and lightweight directory access protocol (LDAP)

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

Configuring the MP LAN Port IP Address

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

If you are using a DHCP server, and it provides the Domain Name, and if the primary DNS server accepts dynamic DNS (DDNS) updates or has been configured through the DHCP server, then you can use a default host name to connect to the MP through telnet. The default host name is 14 characters long, consisting of the letters “mp” followed by the 12 characters of the Media Access Protocol (MAC). See “Configure an IP Address” on page 16 to determine the MAC address. If no DNS access is available, the telnet session can use the assigned IP address.

If you are using DHCP, proceed to “Accessing the Management Processor” on page 16. For more information on configuring DHCP, see “Configuring the Management Processor LAN Information” on page 18. For a non-DHCP implementation, perform the following steps to configure a static IP address.

Configuring a Static IP Address (Non-DHCP)

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

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

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

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

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

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

Step 2. Choose **Serial Port**.

Step 3. Choose **Com1**.

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

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

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

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

Step 7. Choose a supported terminal type.

The preferred type is VT100.

Step 8. Click **Apply**.

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

Step 9. Click **OK**.

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

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

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

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

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

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

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

Accessing the Management Processor

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

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

Local Terminal Access to the Management Processor

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

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

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

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

Interacting with the Management Processor

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

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

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

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

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

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

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

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

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

MP Main Menu

Following are the MP Main Menu commands:

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

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

Configuring the Management Processor LAN Information

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

To configure the management processor LAN IP address:

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

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

The screen displays the default values and asks if you want to modify them. It is good practice to write down the information, because you might need it for future troubleshooting. See “The LC Command Screen” on page 19.

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

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

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

To disable DHCP from the local serial port:

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

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

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

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

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

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

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

NOTE The host name is not case sensitive.

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

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

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

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

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

The LC Command Screen

The following screen shows LC command output:

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

Configuring the Server Management Processor (MP)

Web Console Port Number : 2023

SSH Access Port Number : 22

IPMI/LAN Port Number : 626

LAN status: UP and RUNNING

-> Command successful.

MP:CM>

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

MP Command Reference

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

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

MP Main Menu Commands

Commands are listed in Table 1-1.

Table 1-1 MP Main Menu Commands and Descriptions

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

Command Menu Commands

Commands are listed in Table 1-2.

Table 1-2 Command Menu Commands and Descriptions

Command	Description
BP	Reset BMC passwords
CA	Configure async or serial ports
DATE	Display the current date
DC	Default configuration
DF	Display field replaceable unit (FRU) information
DI	Disconnect remote or LAN console
DNS	Set DNS configuration
FW	Upgrade MP firmware
HE	Display help for menu or command
ID	Display or modify system information

Table 1-2 Command Menu Commands and Descriptions (Continued)

Command	Description
IT	Modify MP inactivity timers
LC	LAN configuration
LDAP	LDAP configuration
LM	License management
LOC	Display and configure locator LED
LS	LAN status
MR	Modem reset
MS	Modem status
PC	Remote power control
PG	Paging parameter setup
PR	Power restore
PS	Power management module status
RB	Reset BMC
RS	Reset system through RST signal
SA	Set access options
SO	Configure security options
SS	Display system processor status
SYSREV	Display all firmware revisions
TC	Reset via transfer of control (TOC)
TE	Tell (send a message to other users)
UC	User configuration
VDP	Display virtual diagnostic panel LEDs
WHO	Display connected management processor users
XD	Diagnostics or reset of management processor

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 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 boots to the installed operating system. If autoboot is not enabled, the system enters 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 *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide*.

2 Troubleshooting

Troubleshooting Methodology

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

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

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

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

To troubleshoot your server with online diagnostic tools, you must be familiar with the HP-UX operating system. You should also be familiar with the Offline Diagnostics Environment (ODE). Install both online and offline troubleshooting programs on your system before trouble is suspected. Descriptions and user information about offline troubleshooting tools are available at <http://docs.hp.com>.

Use the online diagnostic tools if you can boot your system. Online troubleshooting programs area available on the HP-UX operating system CD.

If you can not boot your system, run offline troubleshooting tool from the ODE CD that ships with your server. ODE CDs are platform-specific for Integrity and PA-RISC servers.

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. Table 2-1 shows the power button functions.

Table 2-1 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 rp4410 and HP 9000 rp4440 servers
	More than 5 seconds	Hard shutdown

Table 2-1 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 rp4410 and 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 rp4410 and HP 9000 rp4440 servers
	More than 5 seconds	Hard shutdown
OS running	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers
	More than 5 seconds	Hard shutdown

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: (See “Troubleshooting Using Online Support Tools” on page 27.)

- 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: (See “Troubleshooting Using Offline Support Tools” on page 30.)

- 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 the 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/sbin/monconfig
```

From the list of Main Menu selections, choose:

```
(E) Enable Monitoring
```

Management Processor (MP)

For complete information on the MP see “Management Processor (MP)” on page 28.)

The following information provides MP troubleshooting steps.

Accessing MP Interface and System Logs

To access your MP interface and system logs, perform the following steps:

- 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 **c1** to display the console logs. This log displays console history from oldest to newest.
- Step 4.** Enter **s1** to display the system logs. The system logs consist of:
 - System event log
 - Forward progress log
 - Current boot log
 - Previous boot log
 - Live events log

System Event Logs (SEL)

- Step 1.** Access the management processor command prompt.
- Step 2.** Enter the **s1** command. The Event Log Viewer menu displays:

```
SL
Event Log Viewer Menu:
-----
Log Name                Entries    % Full    Latest Timestamped Entry
-----
E - System Event        39         3 %       01 Nov 2004 17:15:03
F - Forward Progress    1307       32 %
B - Current Boot        299        99 %
P - Previous Boot       0
C - Clear All Logs
L - Live Events

Enter menu item or [Ctrl-B] to Quit:
```

- Step 3.** Enter **e** to review the events. The Event Log Navigation menu displays:

```
-----
Log Name                Entries    % Full    Latest Timestamped Entry
-----
E - System Event        39         3 %       01 Nov 2004 17:15:03

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
H       View mode configuration - hex
K       View mode configuration - keyword
T       View mode configuration - text
A       Alert Level Filter options
U       Alert Level Unfiltered
?       Display this Help menu
Q       Quit and return to the Event Log Viewer Menu
Ctrl-B  Exit command and return to the MP Main Menu
```

Step 4. Enter **t** to select text mode.

Step 5. Enter **d** to dump the log to the screen. (If desired, save this file for reference.)

Step 6. To decode the blinking state of the 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

Use the *ODE CD* to troubleshoot your HP 9000 rp4410 or HP 9000 rp4440 server by accessing the offline diagnostic environment (ODE).

Offline Diagnostic Environment (ODE)

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

Step 1. Power on your HP server and insert the *ODE 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 *ODE 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:

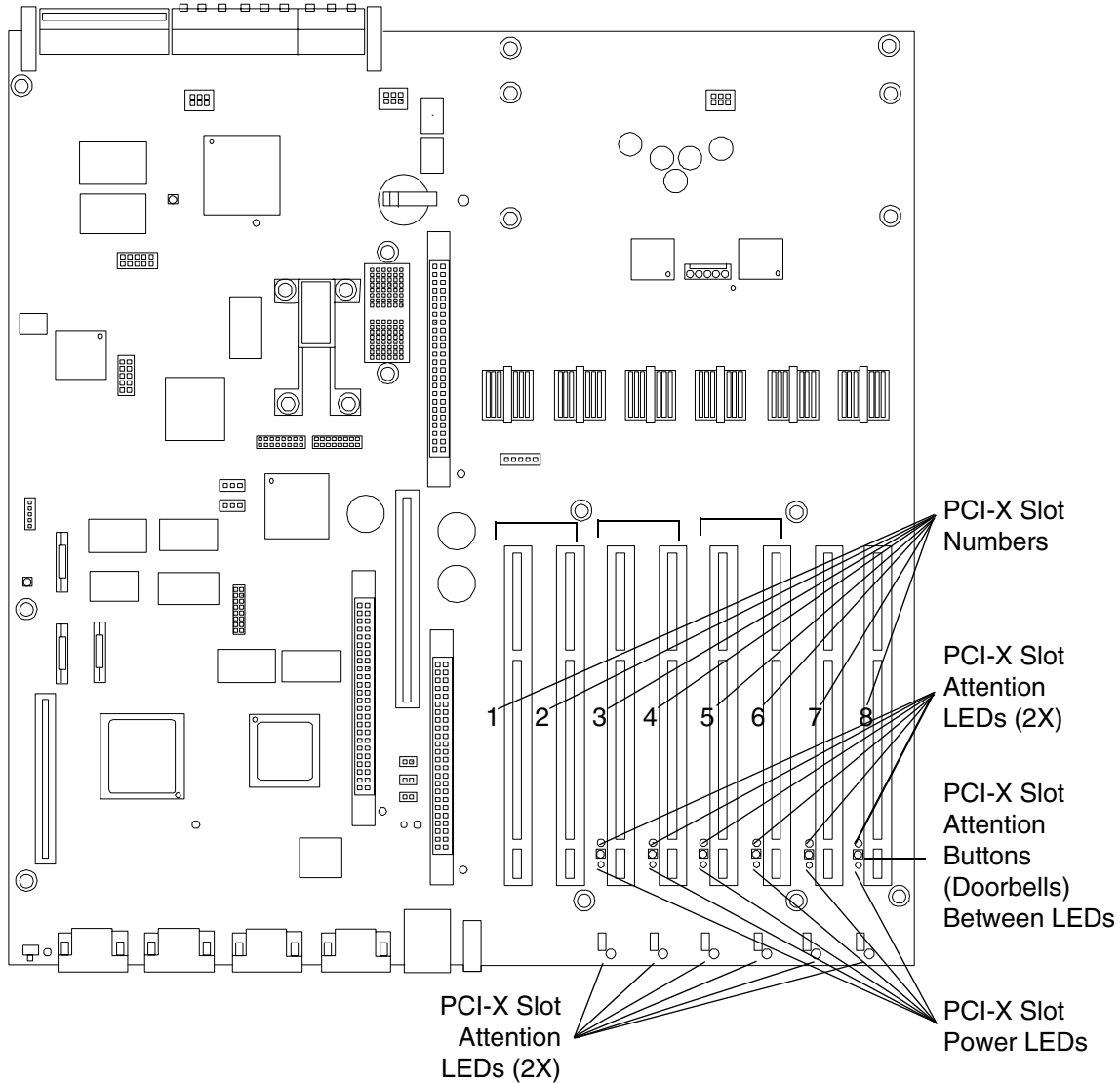
Table 2-2 ODE Commands

Command	Description
<code>help</code>	Displays a list and description of the available commands
<code>help <command></code>	Displays the additional information
<code>help <var></code>	Displays the additional information
<code>ls</code>	Lists the ODE modules that will run on your computer
<code><module_name></code>	Runs an ODE module interactively
<code>run <module_name></code>	Runs an ODE module non-interactively

Troubleshooting PCI/PCI-X Hot-Plug Operations

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

Figure 2-1 PCI/PCI-X LEDs



PCI/PCI-X Bus Mode or Frequency Mismatch

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

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

Hardware Operation Fault

A hardware Operation Fault is likely caused by an incorrectly seated or defective PCI/PCI-X card. If this occurs, the attention LED turns steady-on and the power LED turns steady-off.

CAUTION If the power draw for the newly installed PCI/PCI-X card is excessive (when combined with that of the existing PCI/PCI-X expansion cards), the server powers down. If this occurs, check the power ratings of all installed PCI/PCI-X cards. A known cause of power loss is the use of more than three PCI/PCI-X RAID cards in your system.

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

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

Troubleshooting Using LED Indicators

Your HP 9000 rp4410 or 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 2-2 Front Control Panel LEDs

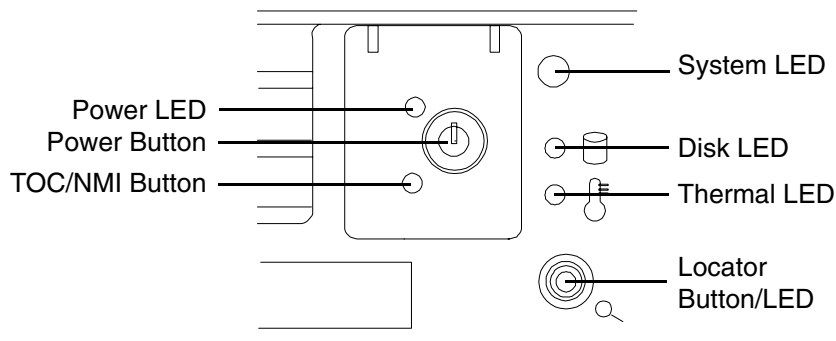


Table 2-3 Front Control Panel LED Definitions

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

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

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

QuickFind Diagnostic Panel LEDs

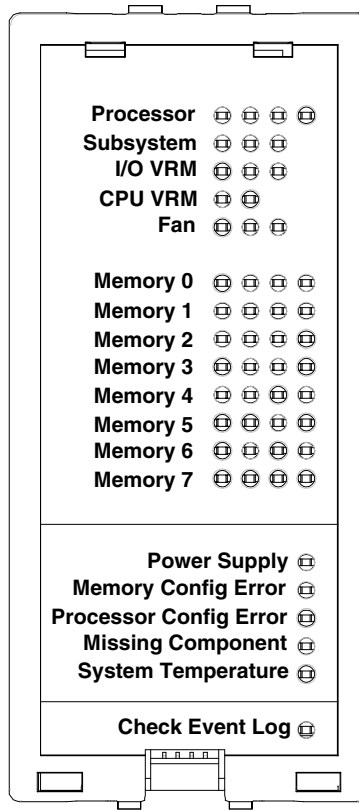
The QuickFind diagnostic panel is located under the top cover and is attached to the top of the power supply cage. The following definitions describe the status of the various LEDs and what is wrong with the indicated component.

NOTE LED behavior is based on your firmware. Refer to server firmware release notes for changes in LED behavior.

Table 2-4 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	n/a	n/a	n/a	n/a	A plug-in voltage regulator has failed—I/O baseboard 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) lights
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) lights
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
Check event log	n/a	n/a	n/a		An event has occurred that requires attention

Figure 2-3 QuickFind Diagnostic Label



I/O Baseboard LED Indicators

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

Figure 2-4 I/O Baseboard LEDs, Buttons, and Sensors

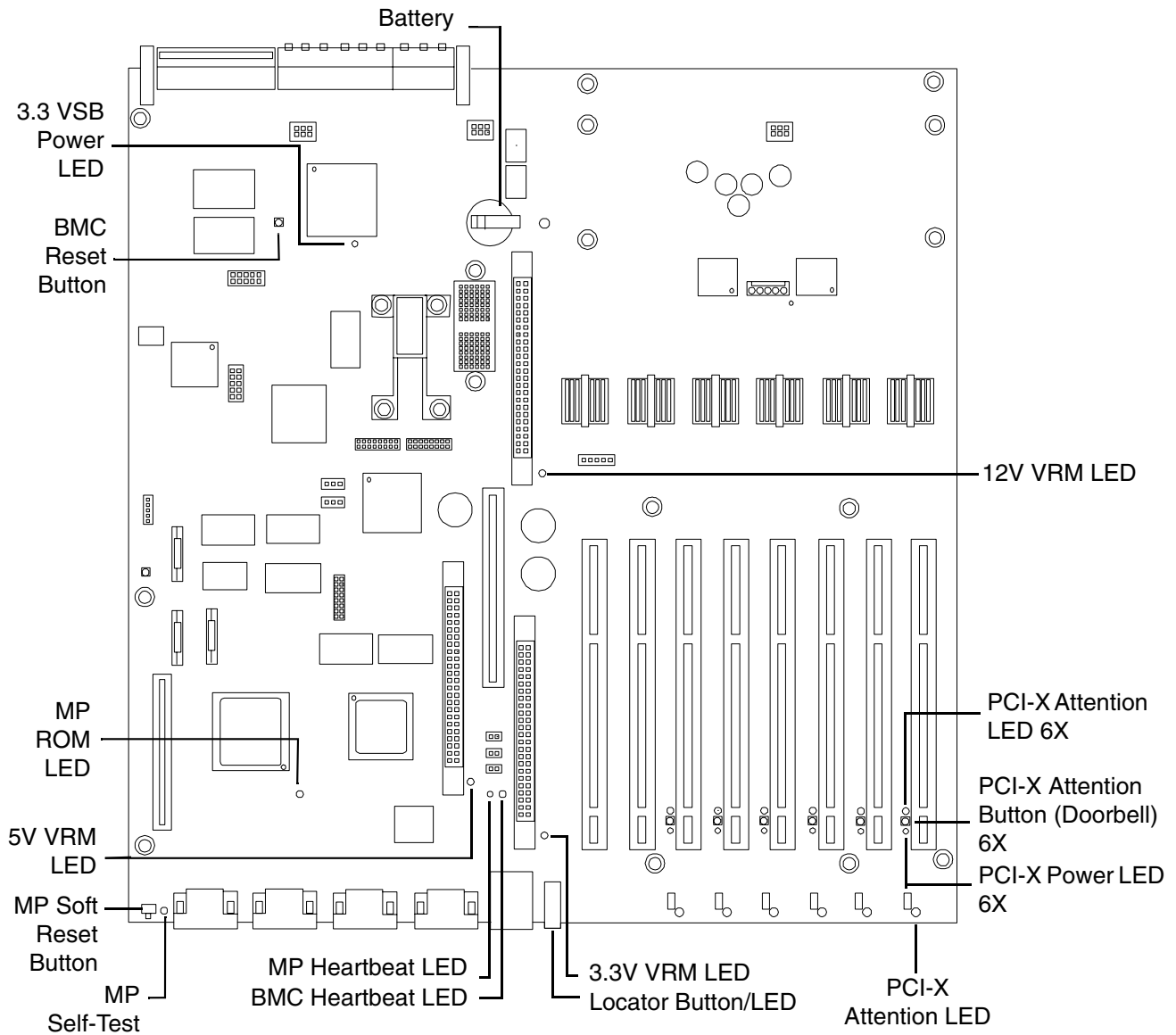


Table 2-5 I/O Baseboard LEDs, Buttons, and Sensors

LED/Button	Legend	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	The management processor is executing the internal self test
			Off	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 (Figure 2-5). 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 two 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 2-5 32 DIMM Memory Extender Board LEDs

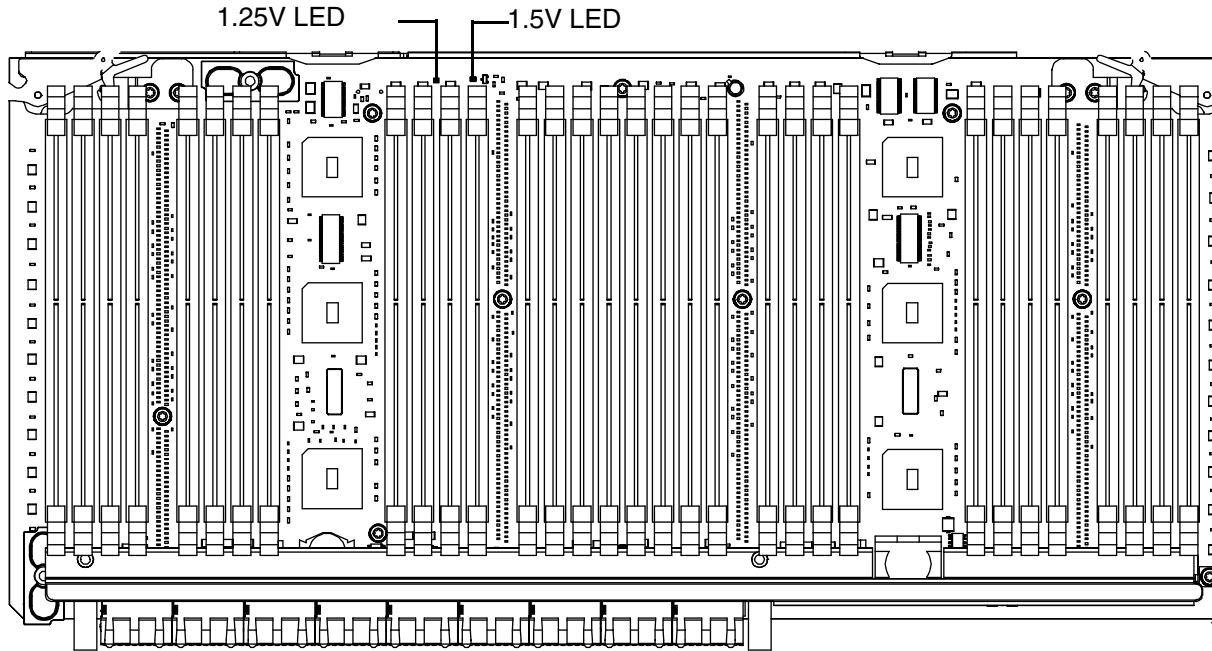


Table 2-6 32 DIMM Memory Extender Board

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

Figure 2-6 16 DIMM Memory Extender Board LEDs

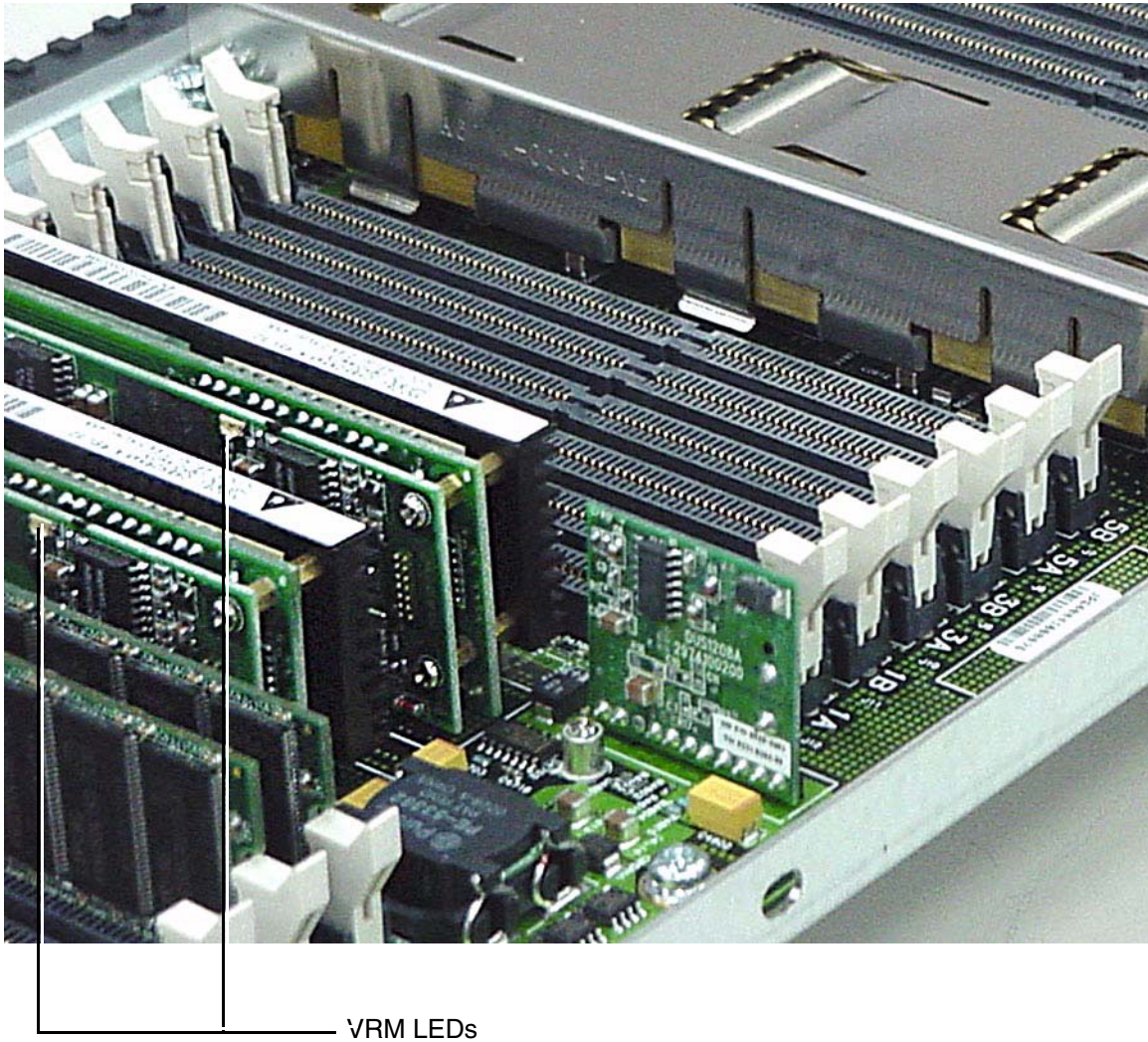


Table 2-7 16 DIMM Memory Extender Board

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

3 Removing and Replacing Components

Safety Information

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

Follow the procedures listed below to ensure safe handling of components, to prevent injury, and to prevent damage to the HP server:

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

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

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

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

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

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 rp4410 and HP 9000 rp4440 servers are 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

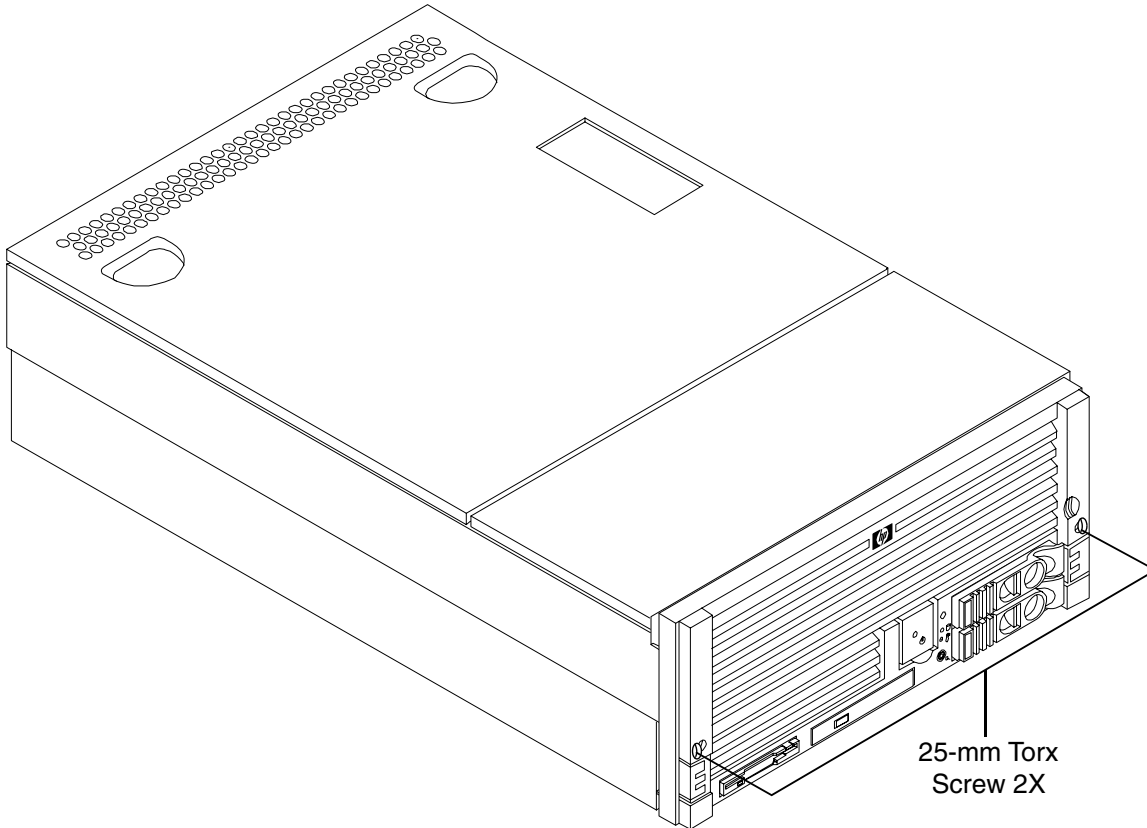
NOTE Ensure that there is enough area (Approximately 1.5 meters [4.5 ft.]) to fully extend the server out the front and work on it.

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 (Figure 3-1).

- 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 3-1 **Accessing 25-mm Torx Screws**



Insert the Server into the Rack

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

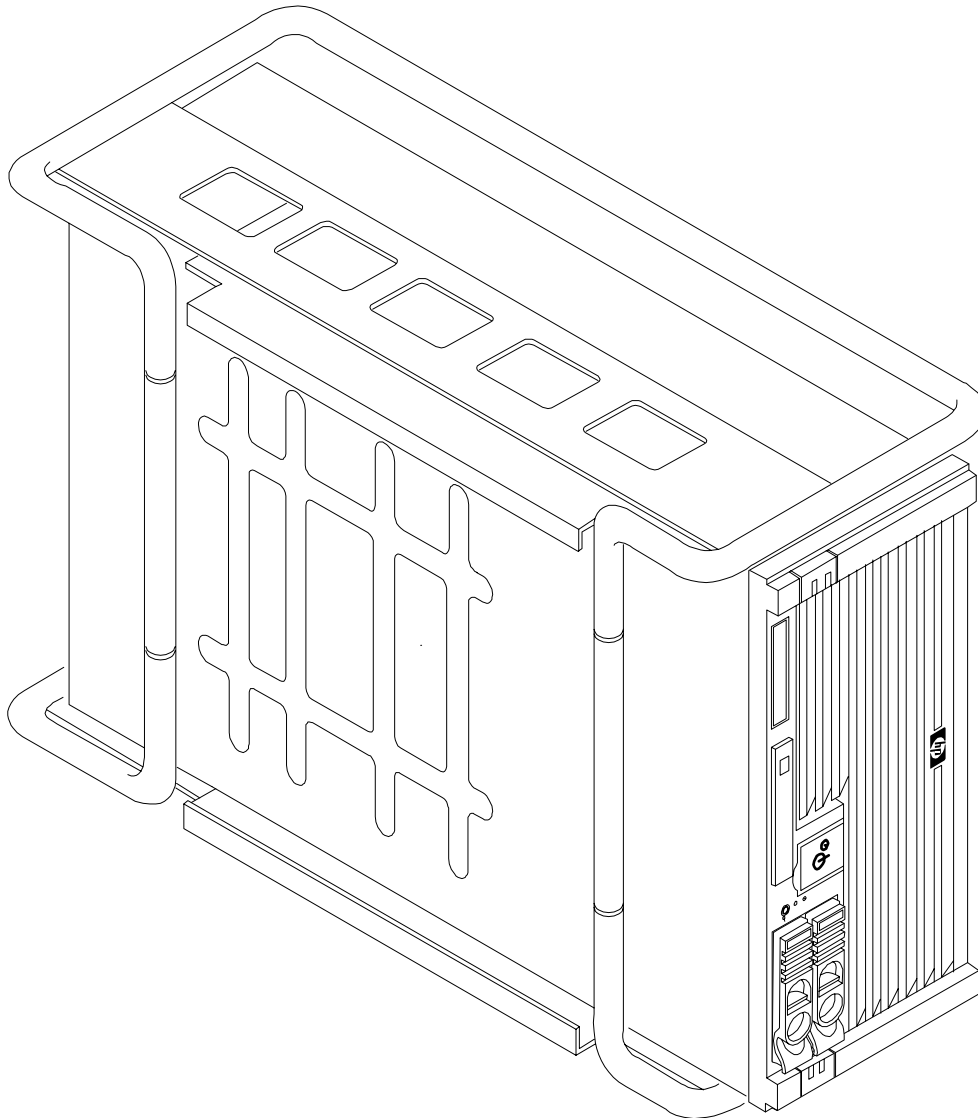
- Step 1.** Press the rail clips on either side of the server inward and push the server into the rack until it stops.
- Step 2.** Replace the T-25 screws that fasten the server to the rack.

Accessing a Rackless Server

The HP 9000 rp4410 and HP 9000 rp4440 servers are also designed for use in a stand-alone (rackless) environment. A tubular stand is available for use with your HP server in a floor- or pedestal-mount configuration. 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 3-2 Rackless HP 9000 rp4410 or HP 9000 rp4440 Server



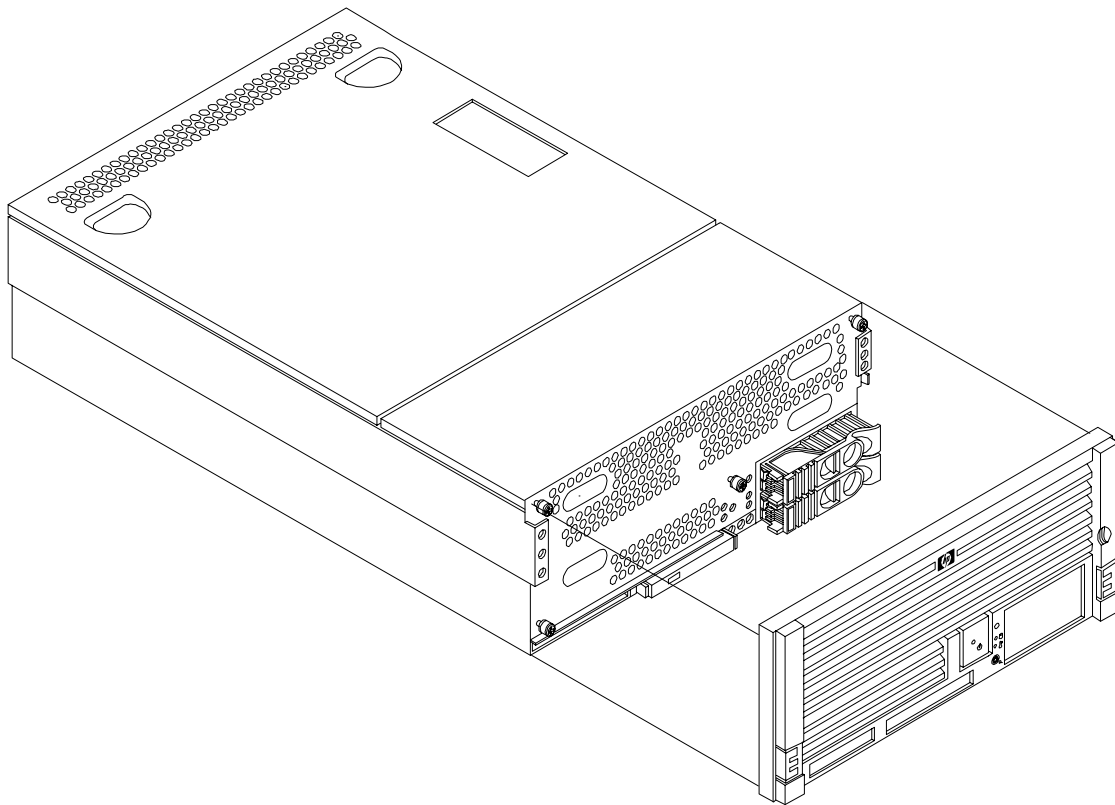
Front Bezel

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 3-3 **Removing and Replacing the Front Bezel**



Removing the Front Bezel

Remove the front bezel by grasping the outer edges of the front bezel and pulling straight out.

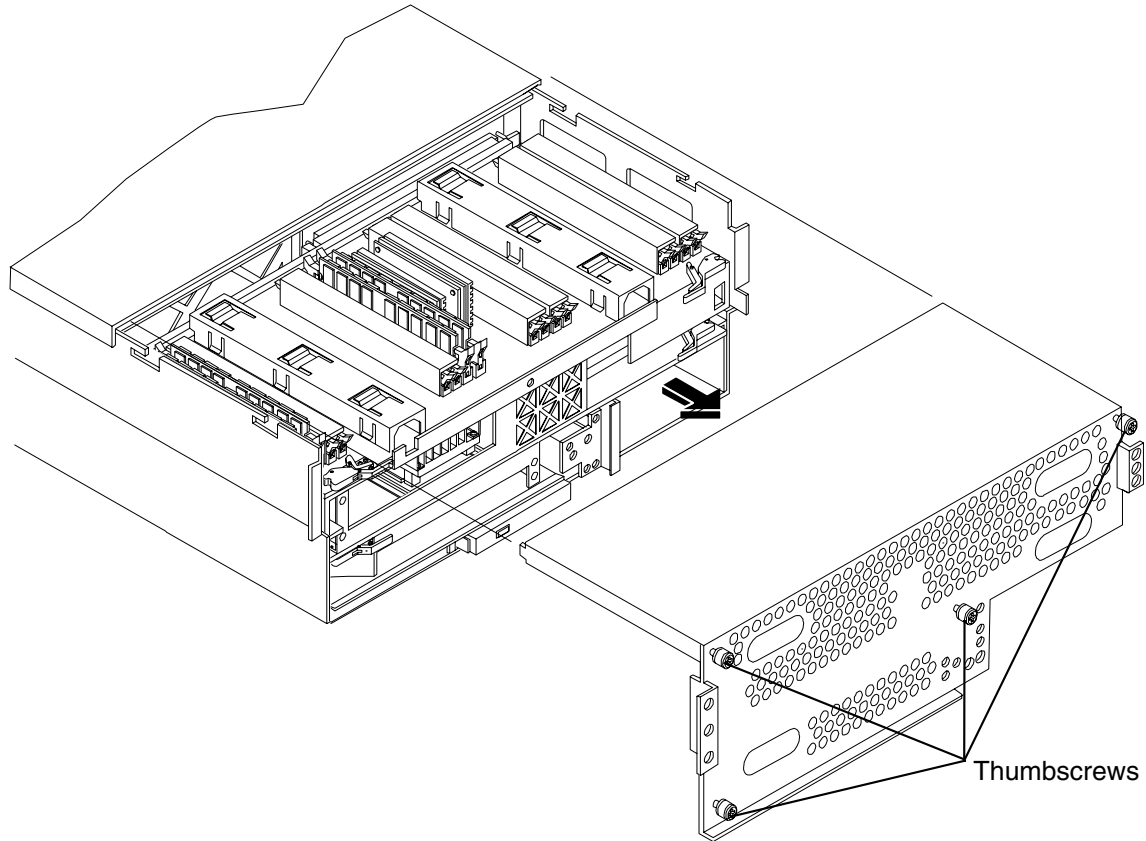
Replacing the Front Bezel

Replace the front bezel by pushing 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 3-4 Removing and Replacing the Front Cover



Removing the Front Cover

To remove the front cover, perform the following steps:

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

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

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

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- 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. (See “Replacing the Front Bezel” on page 45.)

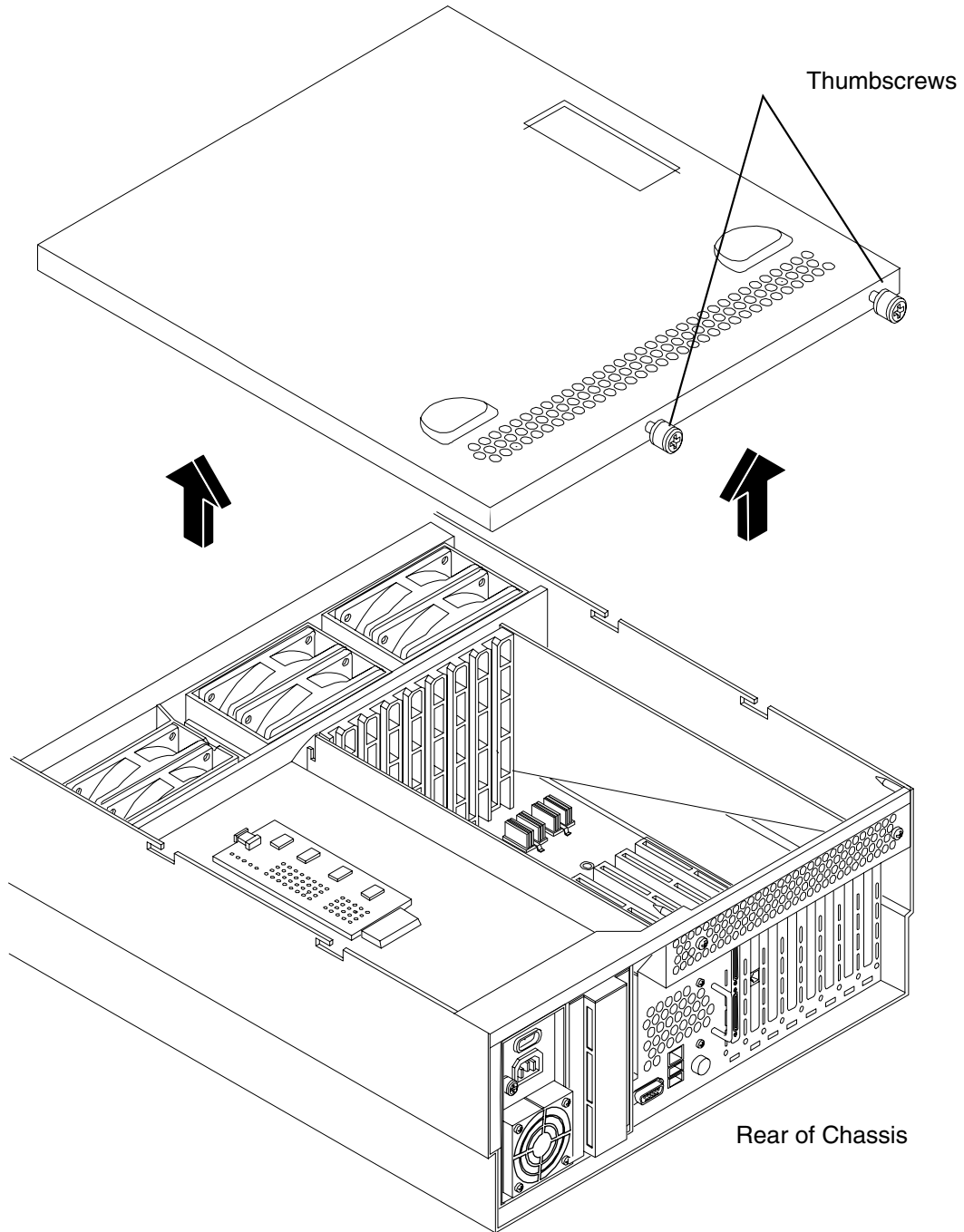
Removing the Top Cover

To remove the top cover, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Loosen the two captive thumbscrews that hold the top cover in place.

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

Figure 3-5 Removing and Replacing the Top Cover



Replacing the Top Cover

To replace the top cover, perform the following steps:

- Step 1.** Align the tabs at the rear of the top cover with the corresponding slots in the chassis, 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.

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 optional 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. (See “Accessing a Rack Mounted Server” on page 42.)

NOTE The memory extender board may be removed without removing the HP server from the rack.

- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 3.** Remove the front cover. (See “Front and Top Covers” on page 46.)
- Step 4.** Press the latches on the 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 3-6).

Figure 3-6 Memory Extender Board Latches

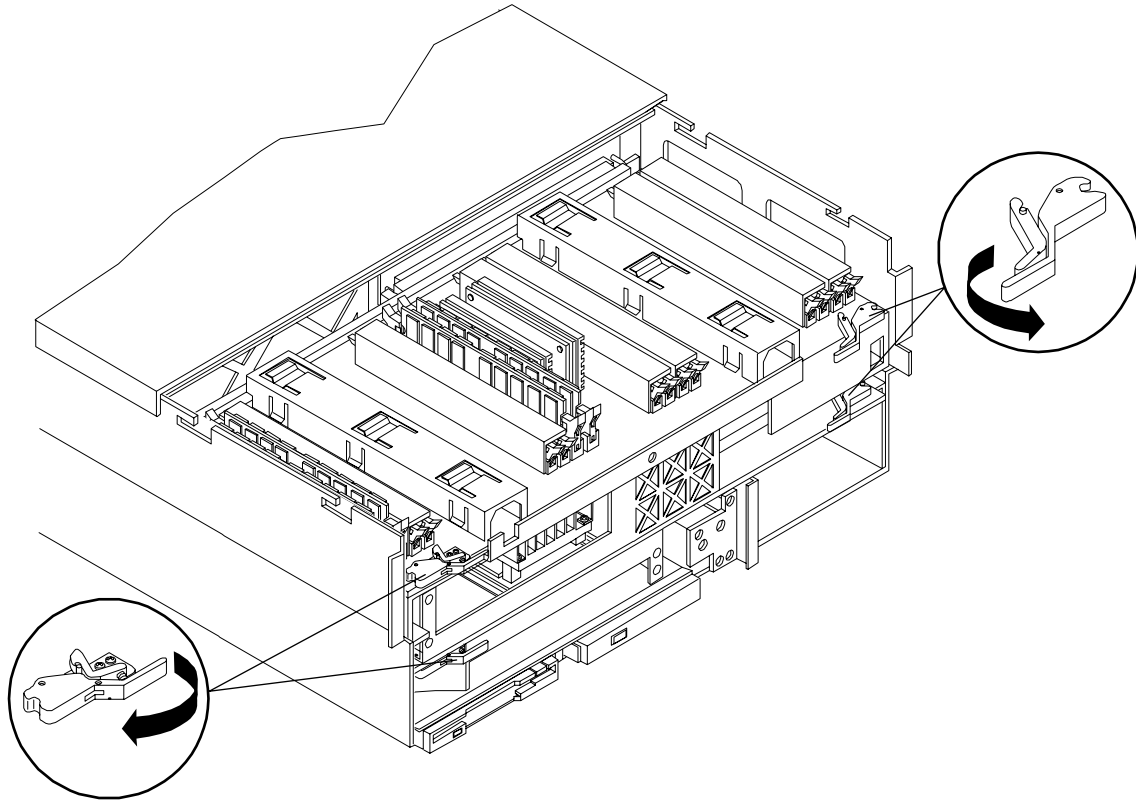
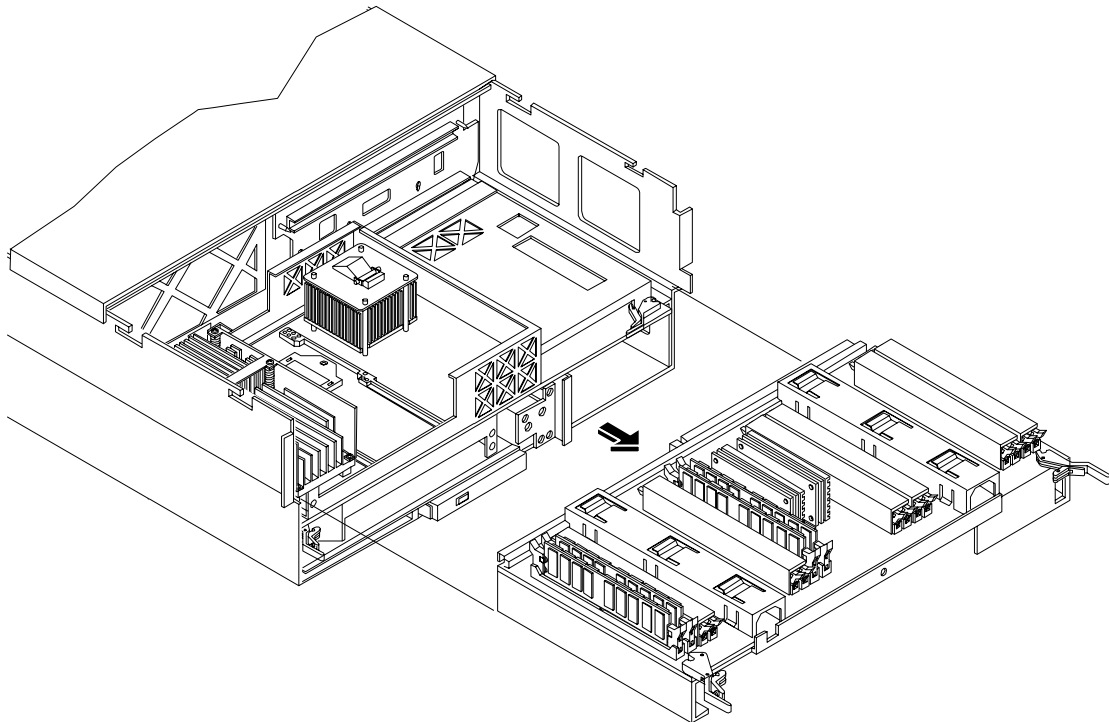


Figure 3-7 Memory Extender Board



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 the memory extender board into the midplane riser board.
- Step 5.** Replace the front cover. (See “Replacing the Front Cover” on page 47.)
- Step 6.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

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. (See “Accessing a Rack Mounted Server” on page 42.)

NOTE The memory extender board may be removed without removing the HP server from the rack.

Step 2. Remove the front bezel. (See “Removing the Front Bezel” on page 45.)

Step 3. Remove the front cover. (See “Front and Top Covers” on page 46.)

Step 4. Remove the memory extender board. (See “Removing a Memory Extender Board” on page 49.)

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 ejects from the slot.

Step 6. Remove the DIMM from the socket.

Installing Memory DIMMs

The standard configuration of HP 9000 rp4410 and HP 9000 rp4440 servers includes a 16-DIMM memory extender board. This extender board must contain a minimum of one GB of memory (four 256 MB DIMMs loaded in quad 0 [connectors 0A, 0B, 0C, and 0D]) (Figure 3-8).

An optional 32-DIMM memory extender board is available to replace the 16-DIMM memory extender board. This extender board must contain a minimum of one GB of memory [four 256 MB DIMMs loaded in quad 0 (connectors 0A, 0B, 0C, and 0D)] (Figure 3-9).

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

Supported DIMM Sizes

Supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB. Dissimilar DIMM sizes may be used across the entire extender board but all four DIMMs in each quad must match. For cooling purposes, DIMM fillers must be used in some unused connectors.

DIMM Slot Fillers

Both the 16- and 32-DIMM extender boards have DIMM slot filler boards placed over all unfilled DIMM connectors. As you fill DIMM quads with additional memory you must remove the DIMM slot fillers covering the affected connectors. All remaining DIMM fillers in unused connectors must remain in place to maximize internal cooling (Table 3-1).

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

Table 3-1 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 quad 3 (all quads filled)
16 DIMMs in quads 0, 1, 2, and 3	No fillers required

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

Table 3-2 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 connectors.

Figure 3-8 16 DIMM Extender Board Slot IDs

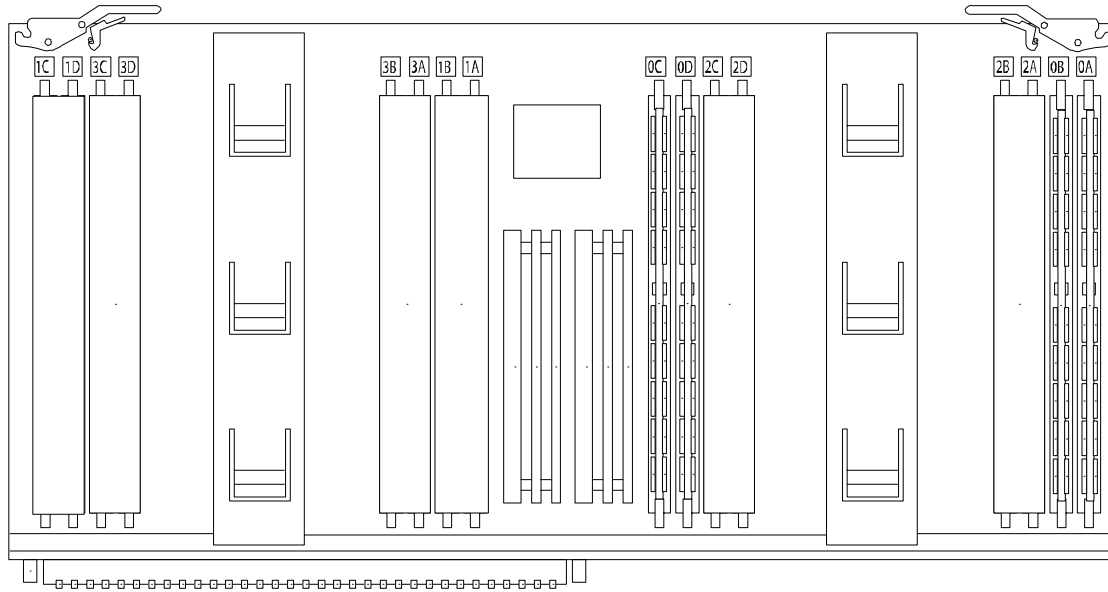
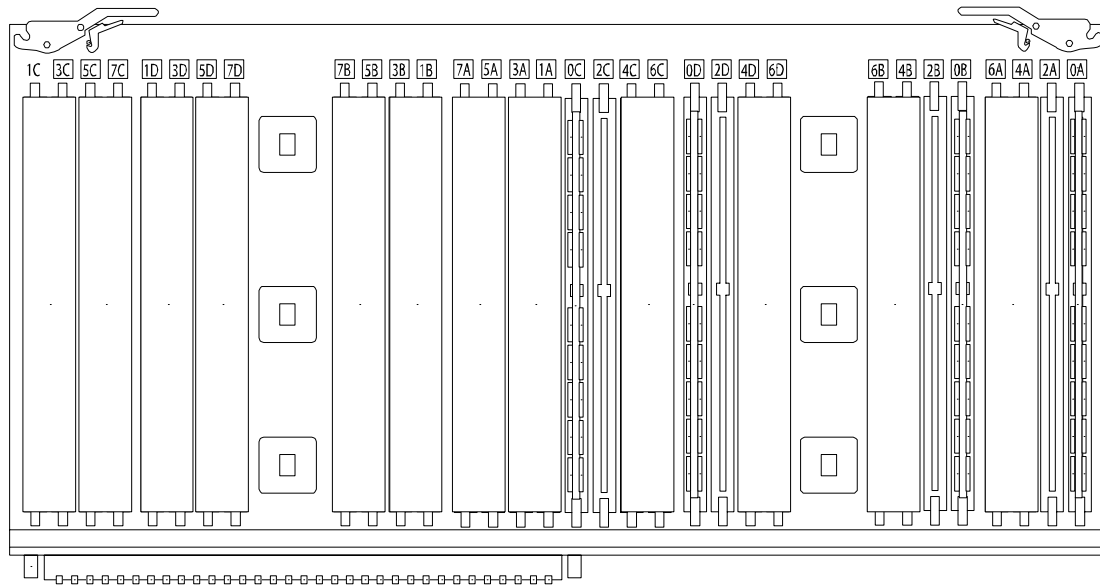


Figure 3-9 32 DIMM Extender Board Slot IDs

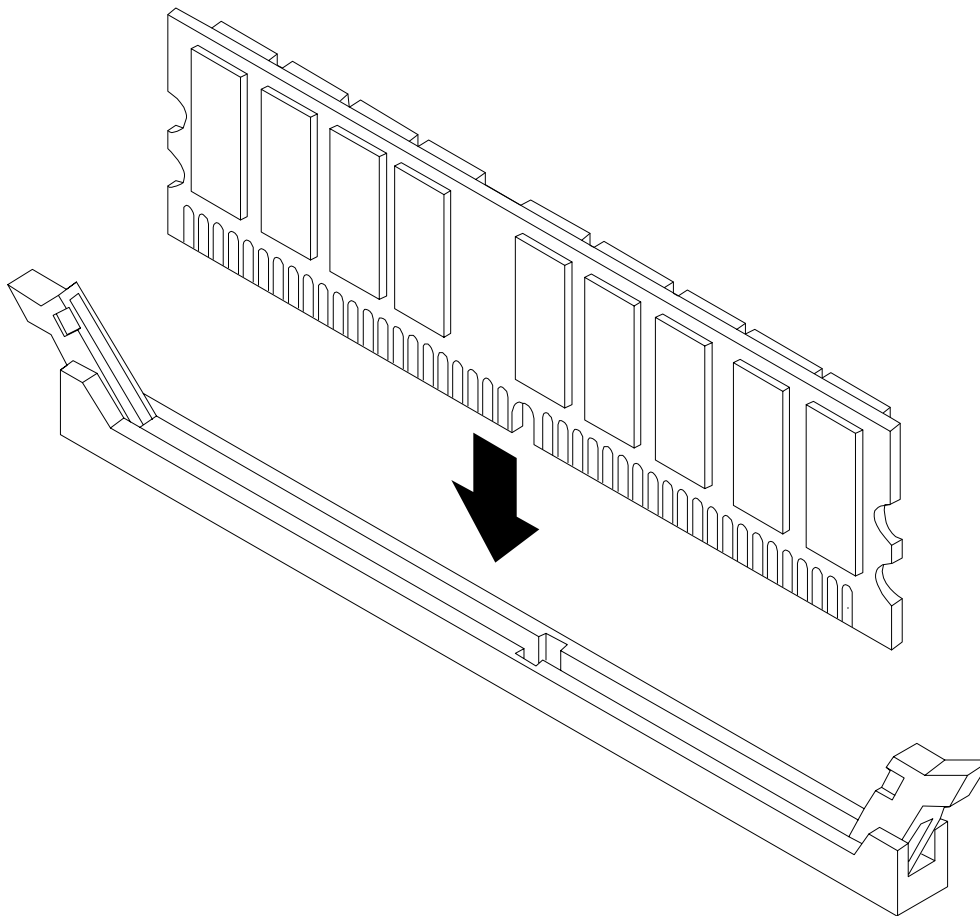


Installing DIMMs

To install DIMMs, perform the following steps:

- Step 1.** Align the DIMM with the socket located on the memory extender board; and align key in connector with the notch in the DIMM.
- Step 2.** Firmly and evenly push on each end of the DIMM until it seats in the socket. Ensure that the extraction levers are in the closed position.
- Step 3.** Replace the memory extender board in the chassis. (See “Replacing a Memory Extender Board” on page 51.)
- Step 4.** Replace the front cover. (See “Replacing the Front Cover” on page 47.)
- Step 5.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

Figure 3-10 **Inserting DIMM into Extender Board Connector**



Processor Extender Board

The processor extender board is located under the front cover, directly beneath the memory extender board. The processor extender board can hold between one and four dual processor modules.

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. (See “Accessing a Rack Mounted Server” on page 42.)

NOTE The processor extender board may be removed without removing the HP server from the rack.

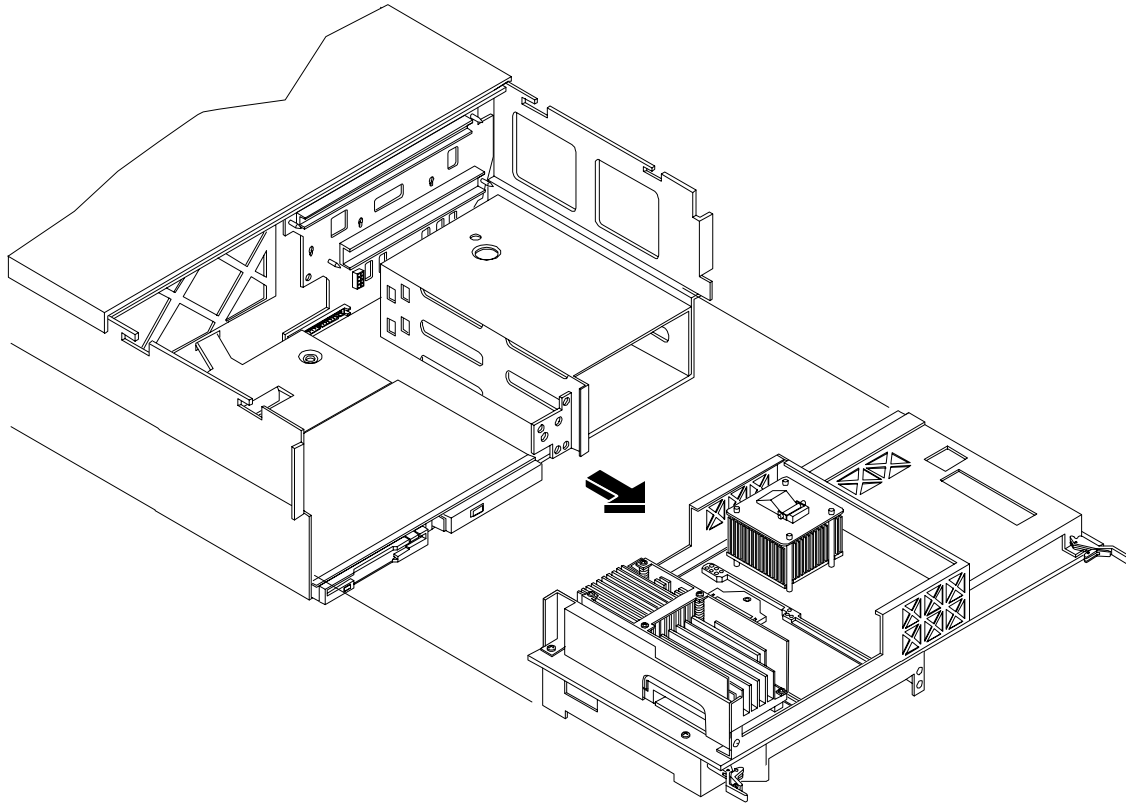
Step 2. Remove the front bezel. (See “Removing the Front Bezel” on page 45.)

Step 3. Remove the front cover. (See “Removing the Front Cover” on page 46.)

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 3-11 Processor Extender Board



Replacing the Processor Extender Board

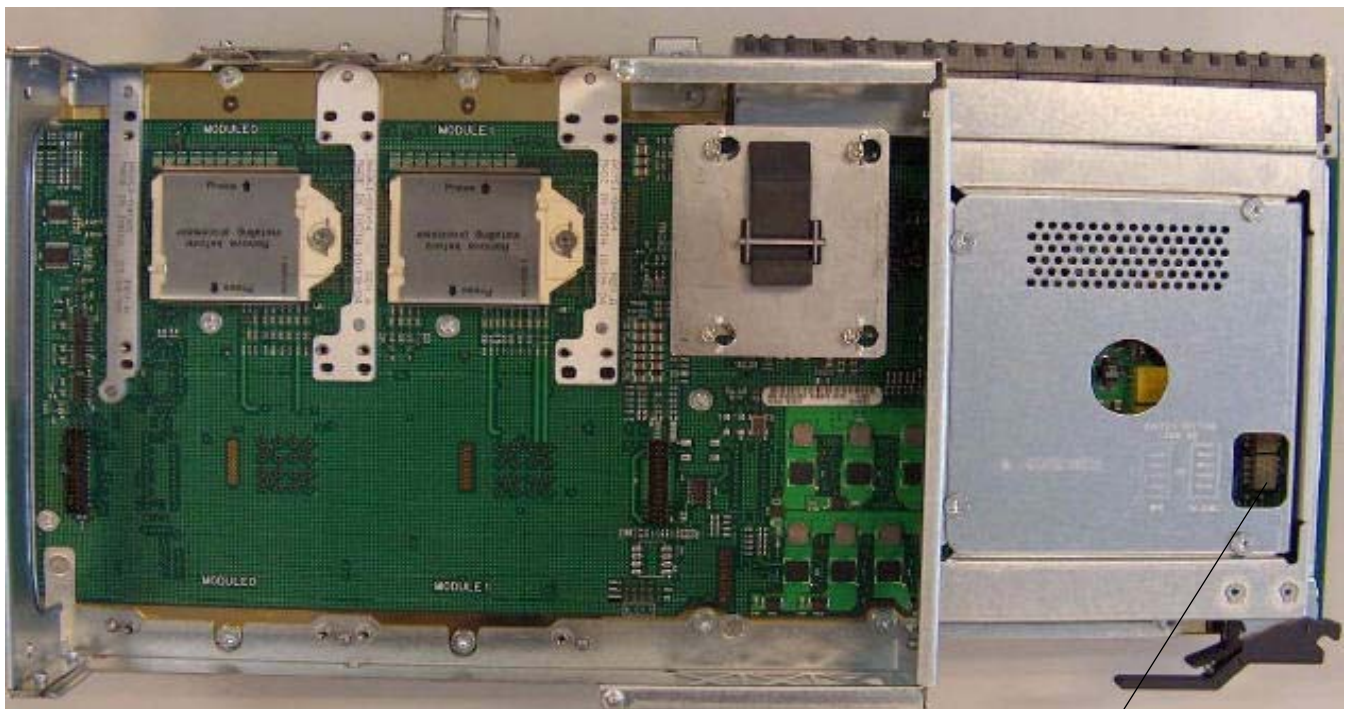
To replace the processor extender board, perform the following steps:

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

Step 1. Position the processor extender board as in Figure 3-12.

Step 2. There are two switch blocks. The switch block you set is the lower of the two blocks (when the processor carrier is oriented with the extractor handles toward you) (Figure 3-12).

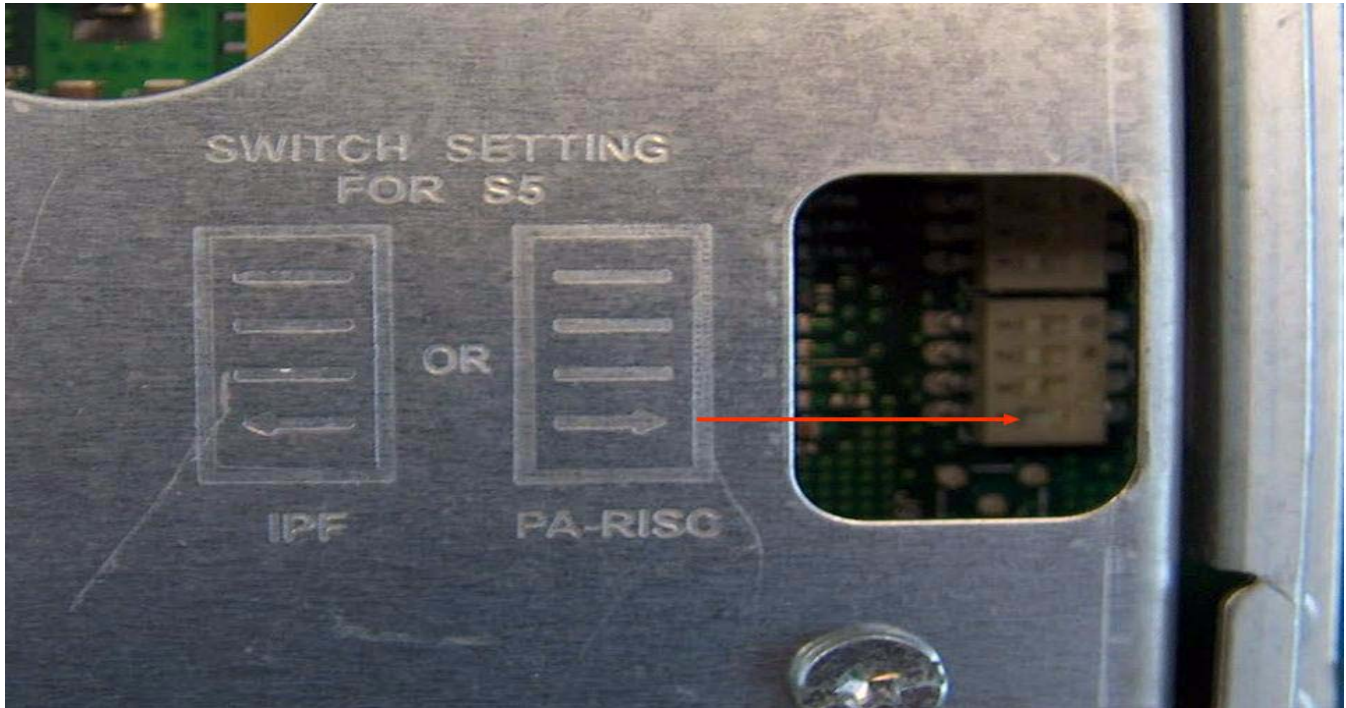
Figure 3-12 Dip Switch Location



Lower switch block

- Step 3.** Set the dip switch to the right (ON) position for PA-RISC (Figure 3-13). Do not disturb switch banks 1 through 4 beneath the sheet metal. These switches determine which processors are enabled.

Figure 3-13 Dip Switch Setting for S5



- Step 4.** Align the processor extender board with the front and rear card guides.
- Step 5.** Slide the processor extender board down until it begins to seat in the socket located on the midplane riser board.
- Step 6.** 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 7.** Replace the front cover. (See “Replacing the Front Cover” on page 47.)
- Step 8.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

Replacing Dual Processor Modules

Dual processor modules 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 Dual Processor Modules

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

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

Dual Processor Modules

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

Processor Load Order

Up to four dual processor modules are installed on the processor extender board, which is located under the front cover in the top service bay, directly under the memory extender board. If fewer than the maximum number of dual processor modules are to be installed (one in the HP 9000 rp4410 server or fewer than four in the HP 9000 rp4440 server), they must be installed in the designated locations on the processor extender board.

The connectors (slots) on the processor extender board are labeled CPU0 through CPU3. CPU0 and CPU1 connectors are located on the top of the processor extender board and CPU2 and CPU3 connectors are located on the bottom. If only one dual processor module is to be installed, it must be installed in the CPU0 socket.

Similarly, the second dual processor module must be installed in the CPU1 socket. The third and fourth dual processor modules must be installed in sockets CPU2 and CPU3, respectively. The load sequence is described Table 3-3.

Table 3-3 Processor Load Order

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

CAUTION Change only the user-configurable settings of the dip switches on the processor extender board as described in the appendix.

Tools Required

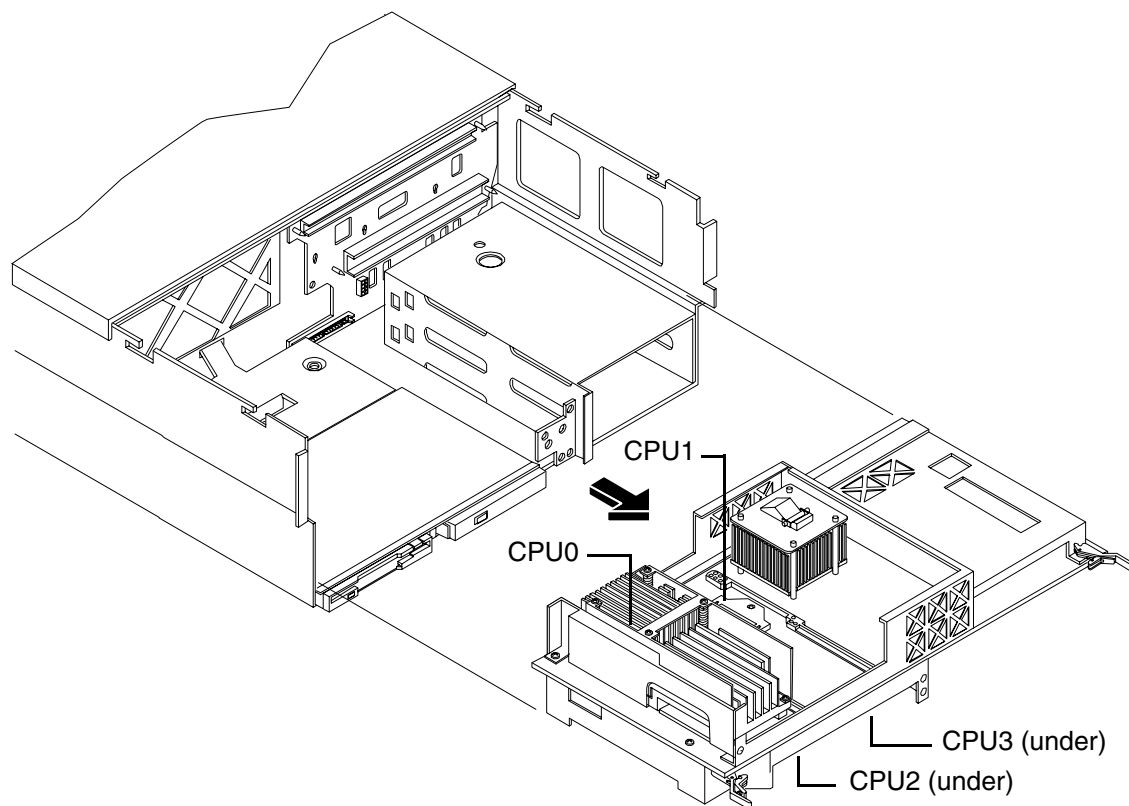
To install processors in your HP server, you must use the CPU Install Kit, 5069-5441.

This toolkit consists of:

- 1 A3024-80004, Disposable ESD Kit
- 1 A7231-04046, 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 only. Failure to observe this caution will result in system failure.

Figure 3-14 Removing the Processor Extender Board



Removing a Dual Processor Module

To remove a dual processor module from the processor extender board, perform the following steps:

Step 1. If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)

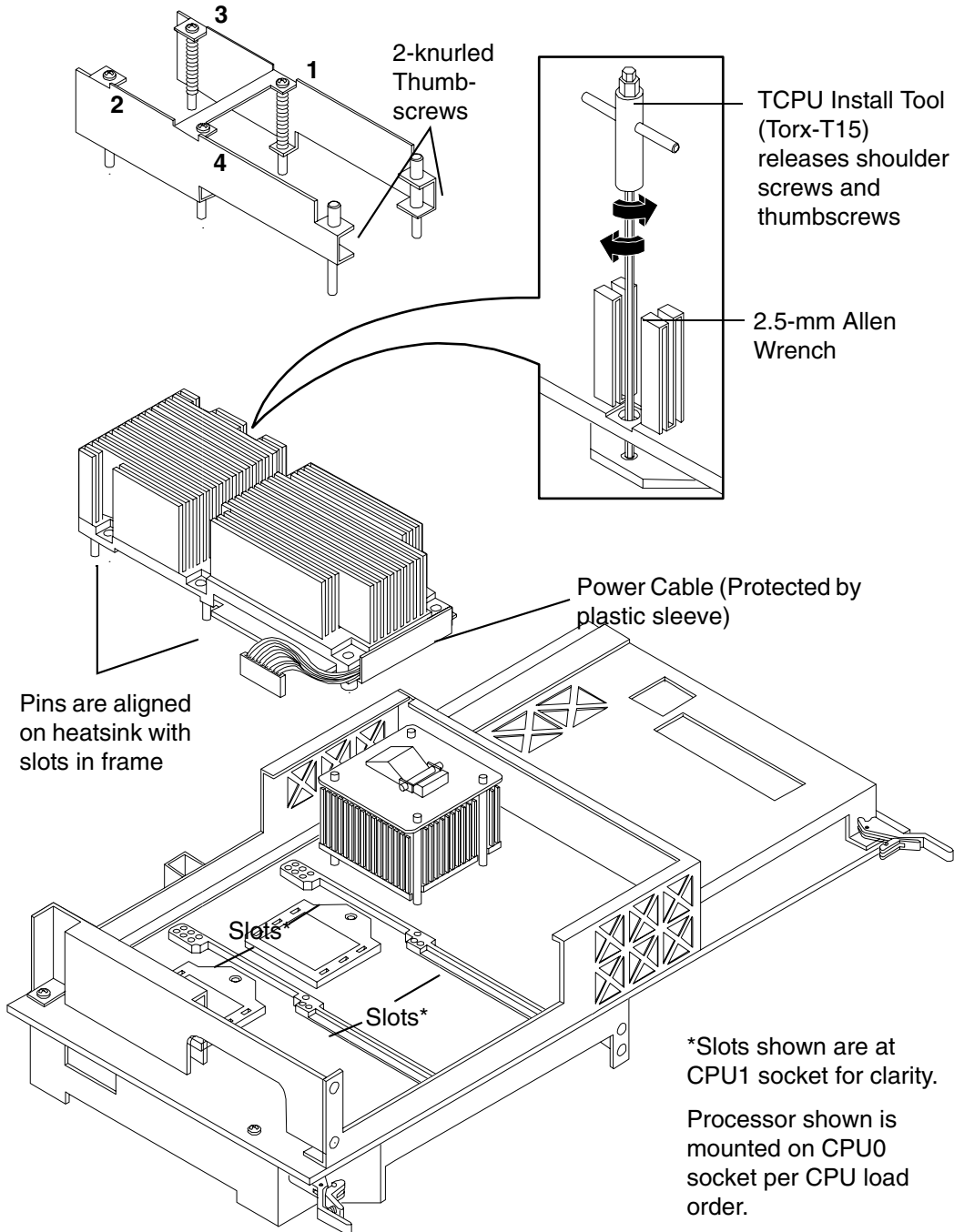
Step 2. Remove the front bezel. (See “Removing the Front Bezel” on page 45.)

Step 3. Remove the front cover. (See “Removing the Front Cover” on page 46.)

Step 4. Remove the processor extender board from the chassis. (See “Removing the Processor Extender Board” on page 57.)

Figure 3-15 Removing Dual Processor Module from Processor Extender Board

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



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 four T15 shoulder screws and the two 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 from the socket by rotating the cam on the socket 180 degrees counter-clockwise.
- Step 9.** Ensure the cam on the processor socket lock is in the unlocked, counter-clockwise position.
- Step 10.** Carefully remove the dual processor module from the processor socket. If protective pin covers are available, install the cover on processor connectors to shield connector pins. Place the dual processor module in an anti-static container.

Installing a Dual Processor Module

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

NOTE Prior to installing a dual processor module into your system, read the following instructions carefully and refer to Figure 3-18, “Installing Dual Processor Module on Processor Extender Board,” for a complete understanding of this process.

- Step 1.** Remove the processor extender board from the server and place it on an anti-static mat. (See “Removing the Processor Extender Board” on page 57.)
- Step 2.** Locate the socket (CPU0, CPU1, CPU2, or CPU3) where you will install the dual processor module as shown in a Figure 3-14.
- Step 3.** Ensure that the cam on the processor socket lock is in the unlocked, counter-clockwise position.
- Step 4.** Remove any protective packaging from the processor module.

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

- Step 5.** Carefully lower the processor, without the sequencer frame, onto the processor socket. Align the pins on the bottom of the heatsink to the slots in the retention frame on the extender board.

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

Before locking the processor assembly into its socket, ensure that the power cable is not pinched between the heatsink and sheet metal frame of the extender board. Also, ensure that the two power cable ends attached to the dual processor module do not come unplugged from their sockets when you move the cable into place under the heatsink (Figure 3-16 and Figure 3-17).

Figure 3-16 Processor Cable Placed Correctly

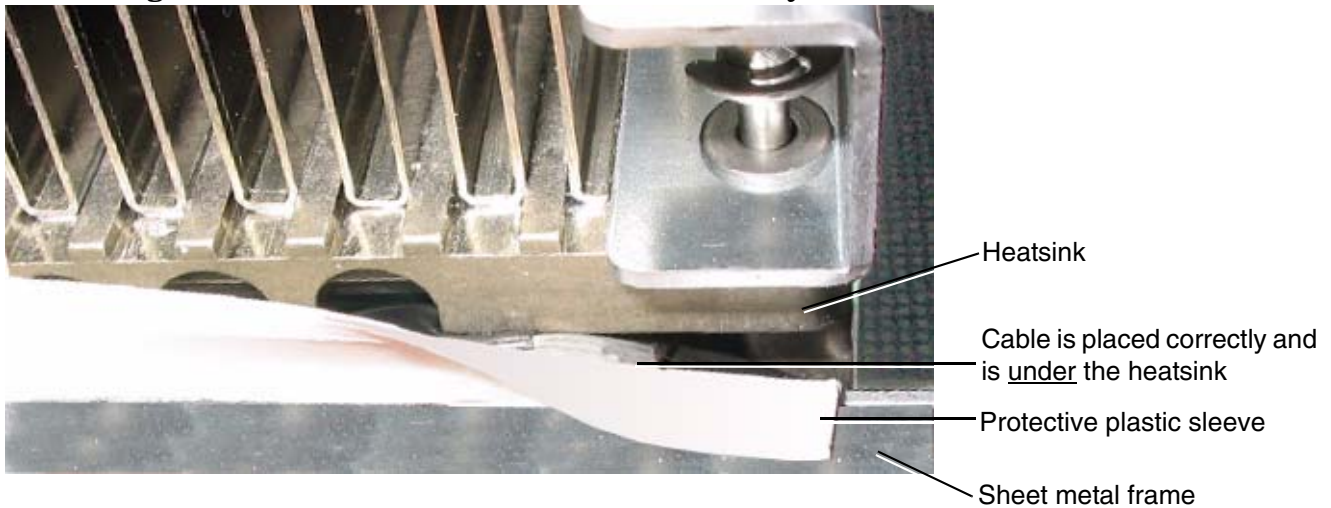
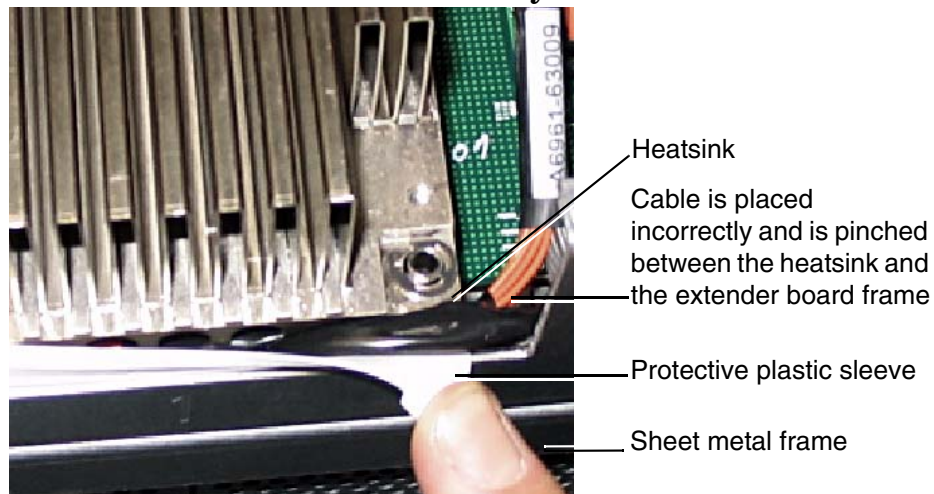


Figure 3-17 Processor Cable Placed Incorrectly



Step 6. 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 7. Plug the processor cable into its socket on the extender board.

Step 8. Place the sequencer frame over the processor.

Step 9. Using your fingers, hand-tighten the two knurled thumbscrews on the sequencer frame just until the screw stops turning.

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

Step 10. Using a CPU install tool (Torx T15 driver), tighten the four remaining T15 shoulder screws until they just bottom out. Follow the tightening sequence shown in Figure 3-18, “Installing Dual Processor Module on Processor Extender Board.”

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

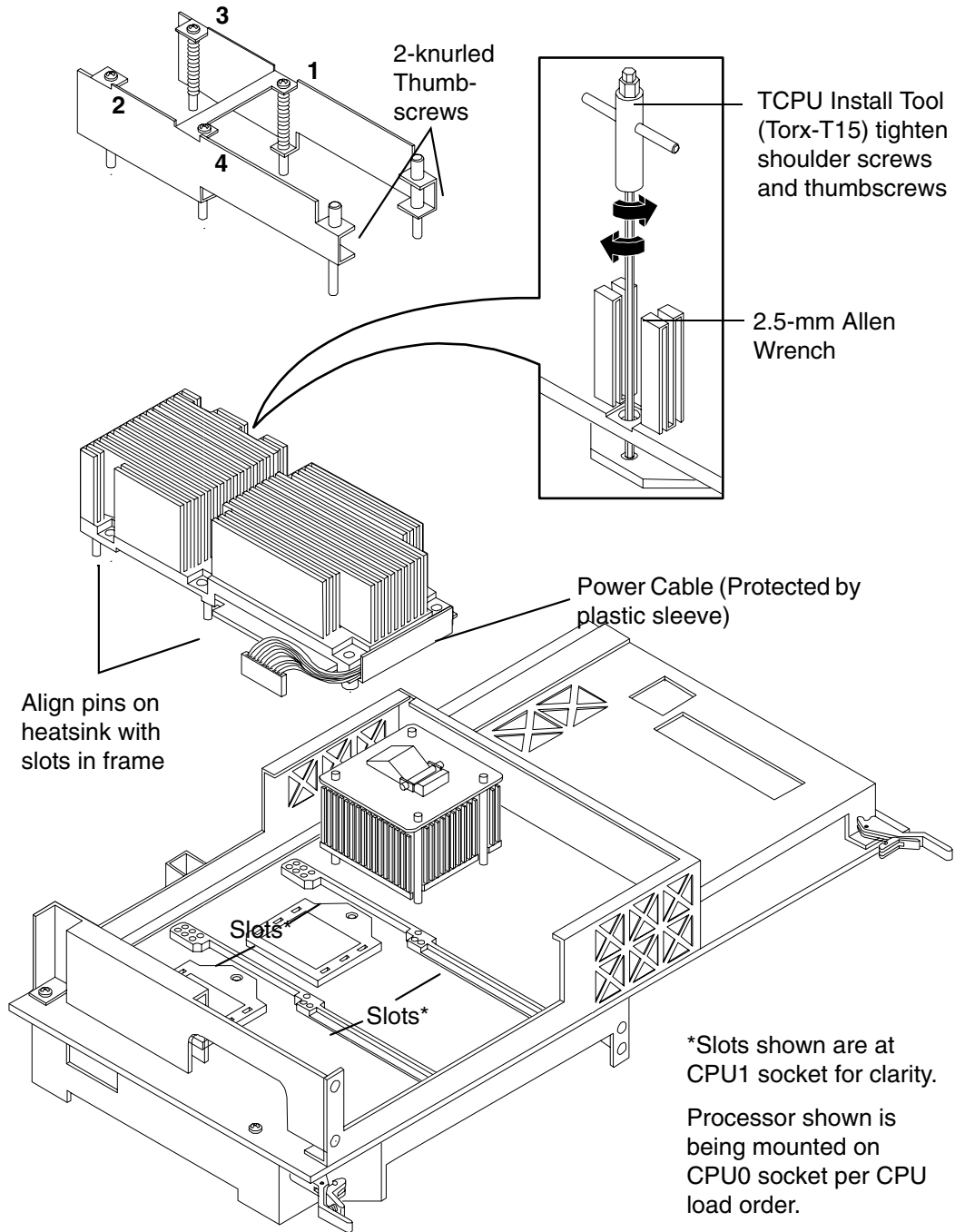
Step 11. Using the Torx T15 driver, finish tightening the two thumbscrews.

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

Figure 3-18 Installing Dual Processor Module on Processor Extender Board

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

DO NOT OVERTIGHTEN! See Step 7.



Step 12. Replace the processor extender board in the server. (See “Replacing the Processor Extender Board” on page 59.)

- Step 13.** Replace the front cover. (See “Replacing the Front Cover” on page 47.)
- Step 14.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)
- Step 15.** Verify processor replacement and operation by using the system utilities. (Refer to the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for additional information.)
- Use the MP commands to verify operation
 - Use the BCH commands to verify operation
 - Use MAKODIAG provided by the ODE to exercise the processor

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). The hot-swap fans may be replaced using the procedures in this section when power is on or off.

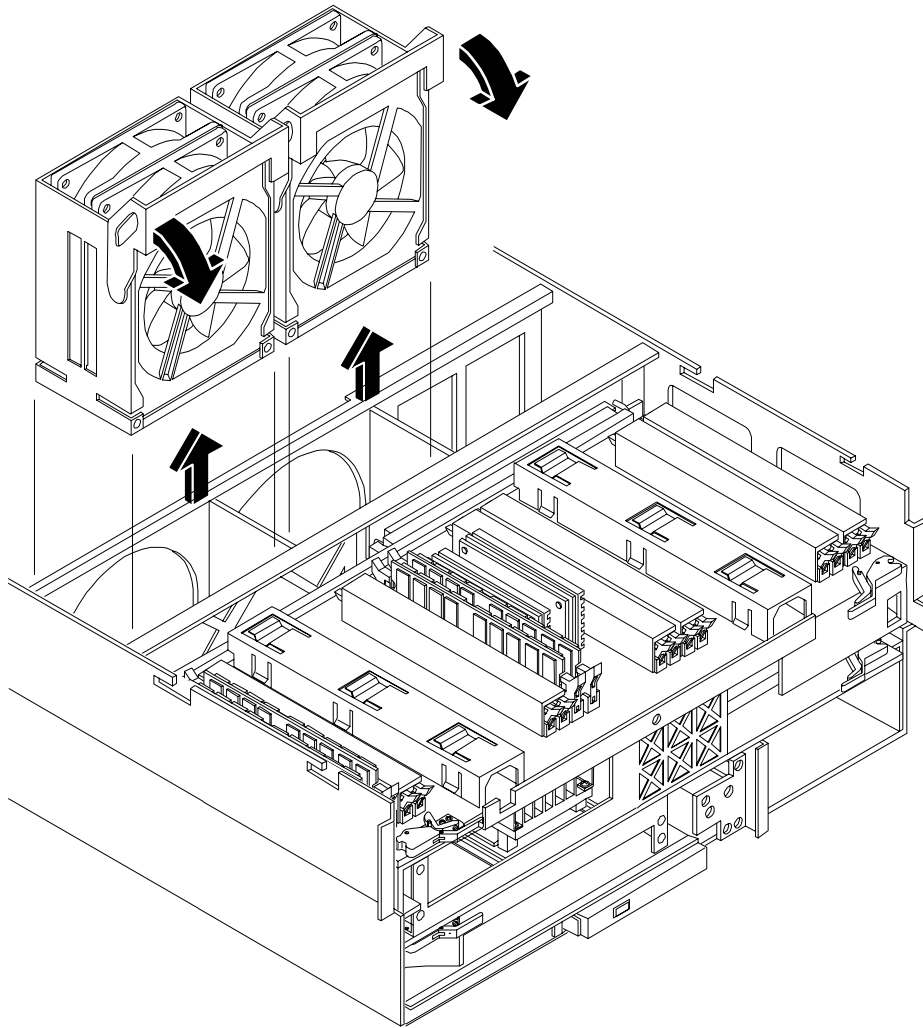
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

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 3-19 Hot-Swap I/O Chassis Fans Removal and Replacement

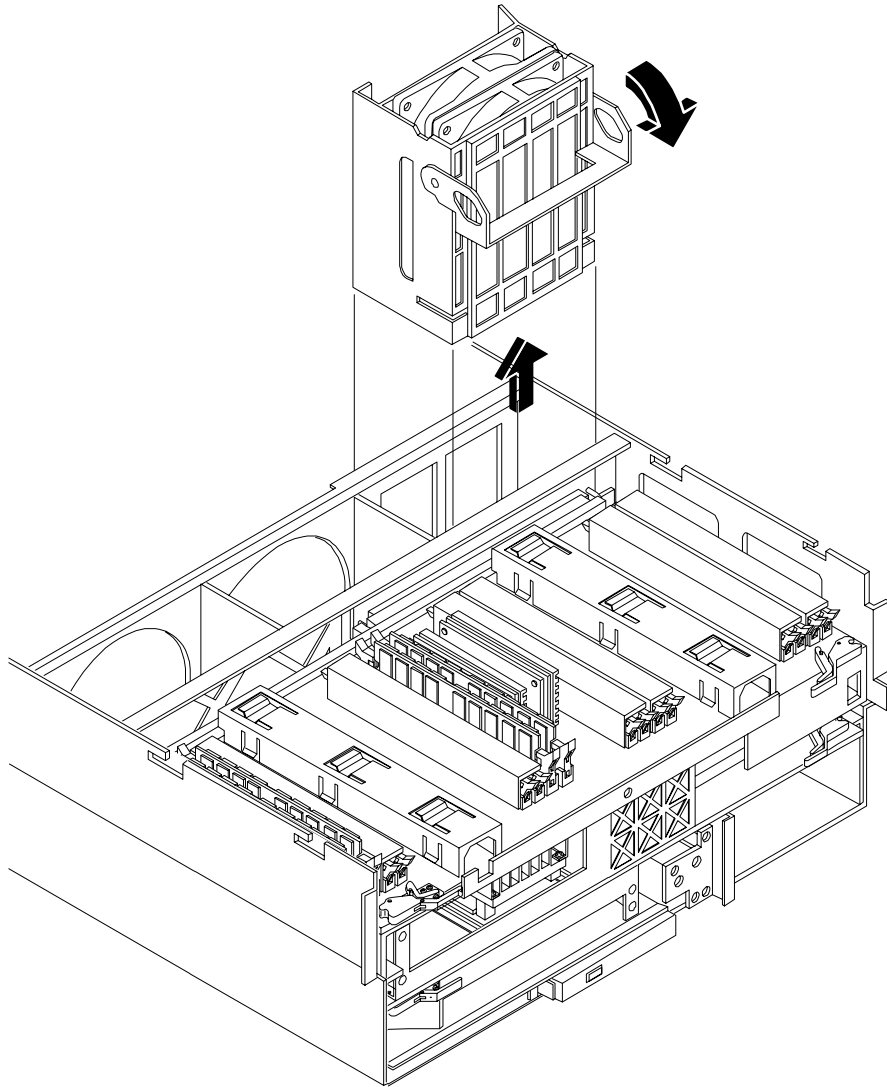


To remove a hot-swap chassis fan unit, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 47.)
- Step 3.** Grasp the fan unit locking handle, tilt it up, and pull out the fan from the chassis.

NOTE When one fan unit is removed from the server, the remaining fan units operate at full speed. Operation will continue until an overtemperature condition is detected. If an overtemperature condition occurs, the server will shut down.

Figure 3-20 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 unit by aligning the appropriate icon on the fan unit handle to the identical icon on the chassis wall. Fan units 0 and 1 have “circle” 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 plugs 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. (See “Replacing the Top Cover” on page 48.)

I/O Baseboard Assembly

System information is stored on the I/O baseboard assembly. If you are installing a new I/O baseboard assembly, you must write serial number and model string information to the I/O baseboard after installation.

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

NOTE PA 8900 CPUs require PDC greater than 44.21 which is loaded on A6961-67401 and A6961-69401 repair parts. A6961-67301 and A6961-69301 repair parts allows the system to boot to BCH where PDC must be updated to greater than 44.21.

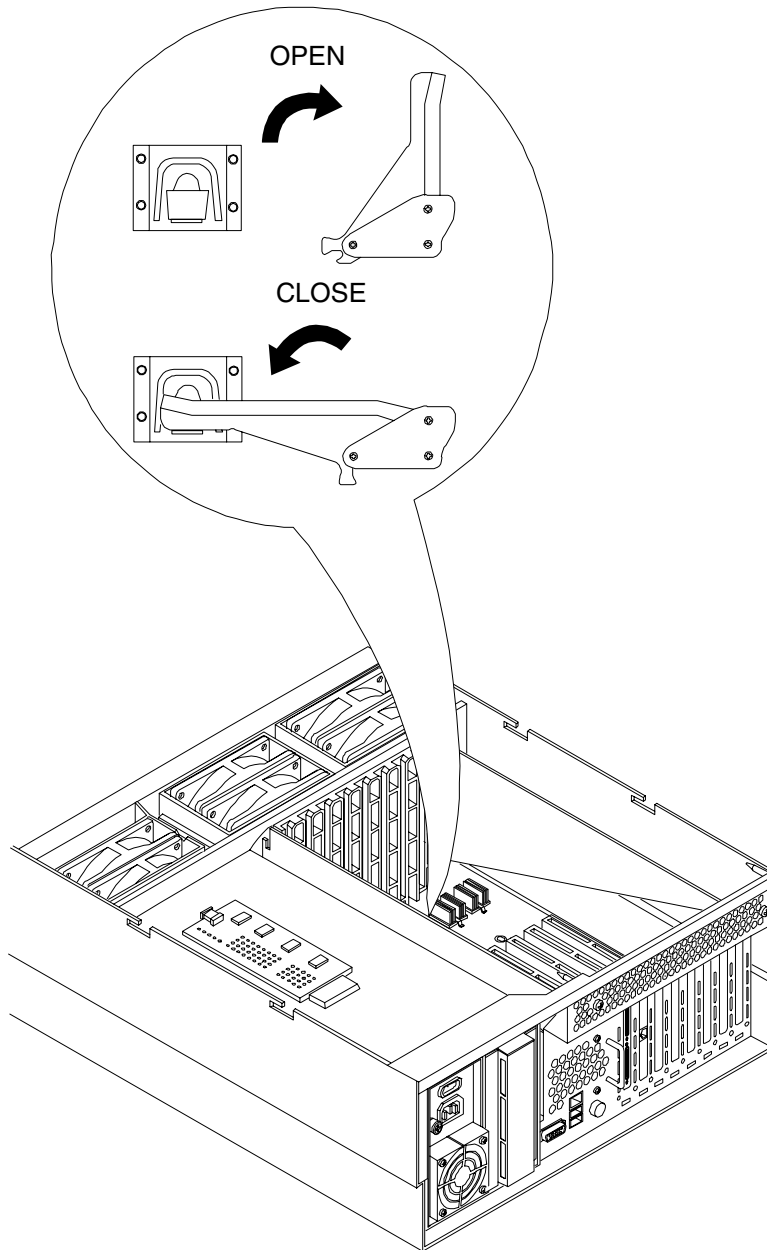
To remove the I/O baseboard assembly, perform the following steps:

- Step 1.** Save (record) the boot configuration settings. (The settings can be found using the BCH command INFO ALL.) You may need to reset the MP and boot configuration settings after replacing the I/O baseboard assembly.)
- Step 2.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 3.** Remove the top cover. (See “Removing the Top Cover” on page 47.)
- Step 4.** Remove the three chassis fan units. (See “Removing a Hot-Swap Chassis Fan Unit” on page 71.)
- Step 5.** Unplug all external cabling attached to ports at the rear of the chassis.
- Step 6.** Unplug the SCSI cables attached to the host bus adapter (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 7. 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 (Figure 3-21).

Figure 3-21 I/O Baseboard Locking Lever

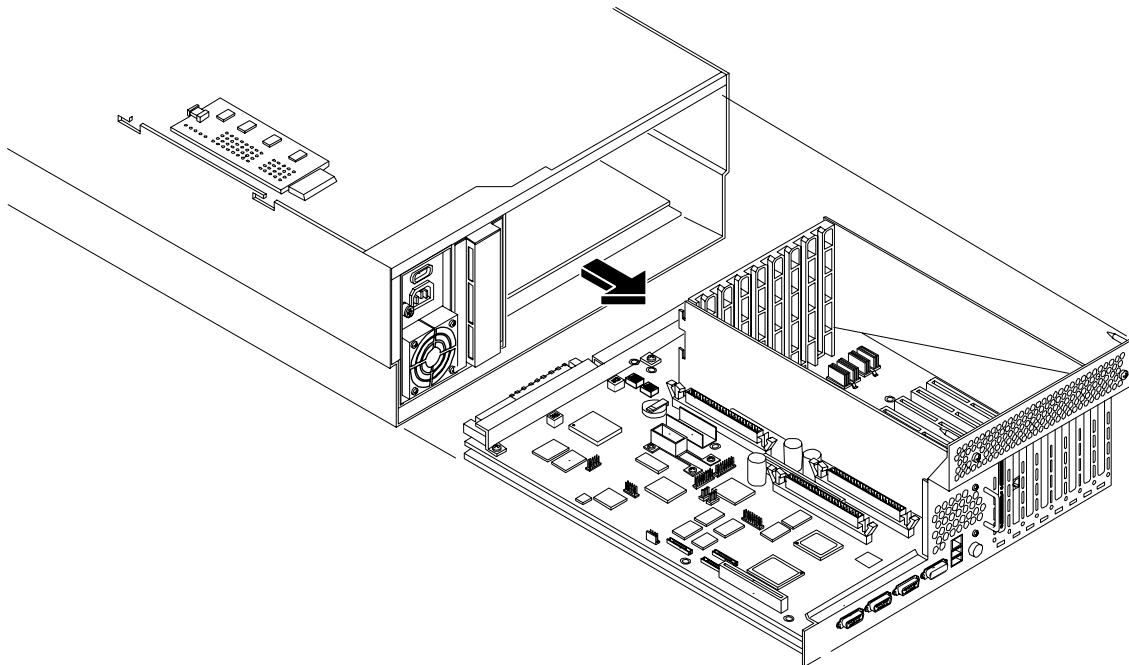


Step 8. Slide the I/O baseboard assembly all the way to the rear until free from chassis.

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

NOTE If you are going to replace the I/O baseboard with a new assembly, remove the cover from the VGA port at the rear of the I/O board and save it to put on the VGA port of the new baseboard. This VGA graphics port is not supported in the HP 9000 rp4410 and HP 9000 rp4440 servers.

Figure 3-22 I/O Baseboard Removal



Replacing the I/O Baseboard Assembly

CAUTION Before installing your replacement I/O baseboard, check the dip switch S5102 located on top of the I/O baseboard (Figure 3-23). Dip switch bit 1 must be in the OFF position to disable the on-board Radeon graphics chip (Figure 3-24). If you do not disable the Radeon graphics chip, it will appear as “unknown-unclaimed” when performing the `ioscan` command.

Step 1. Set the S5102, #1 VGA dip switch to the OFF position.

Figure 3-23 Accessing S5102 Dip Switch



rp44x0 with top cover and center fan (fan #1)
removed to allow access to I/O baseboard
VGA/CPU dip switches

Figure 3-24 S5102 Dip Switch Setting



S5102 (Switch #1) VGA Dip Switch
“Off” = rp44x0

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

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

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 (Figure 3-21).

Step 3. Replace the three chassis fan units. (See “Replacing a Hot-Swap Chassis Fan Unit” on page 73.)

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

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

Step 6. Replace the top cover. (See “Replacing the Top Cover” on page 48.)

Step 7. Reconnect all power and external cables and turn on the system.

Step 8. If you have installed a new I/O baseboard assembly, you must write serial number and model string data to the new I/O board. Perform the following steps:

- a.** Locate the system serial number and note it for use in the following steps. The system serial number can be found in two places:
 - At the right of the front bezel, above and immediately to the right of the disk drives, locate the pull tab and extend the tab from the server to display product information. A label containing the system serial number is attached to the pull tab
 - A label containing the system serial number is located on the right side of the chassis, as you face the server
- b.** Monitor system startup on a terminal. At the BCH prompt, enter the command **ser** to call up the service menu. (Refer to the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for additional information about BCH.)
- c.** Enter the **SS_UPDATE** command to access server information.
 - Use the **SERN** command to enter the original product and serial number.
 - For PRODUCT NUMBER, enter the appropriate number (typically A9956A, A9951A, and so on).
 - For SYSTEM SERIAL NUMBER, enter the serial number from the pull tab or from the side of the chassis.
 - For MODEL STRING, enter the model string value applicable to your system. Valid choices are:

- 9000/800rp4440 PA8800 DC
 - 9000/800rp4440 PA8900 DC
 - 9000/800rp4410 PA8900 DC- Max 4 Core
 - 9000/800rp4410#1 PA8900 DC- 1 Core
 - When prompted for approval of the data entry, enter **y**.
- d.** Enter the **reset** command to reset the system.
- e.** Reset the server time and date, and restore the MP configuration settings as described in the following step.
- Step 9.** If you have installed a new battery on the I/O baseboard assembly or installed a new I/O baseboard assembly, you may need to set the server time and date, and restore the MP configuration settings. Proceed as follows:
- a.** Using the system console, set the system time and date using the BCH date command.
 - b.** Using the system console, configure the MP. Incorporate settings saved before removing the I/O baseboard assembly or set up the MP as needed. (Refer to the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for additional information about using the MP.)
- Step 10.** Verify the system board replacement and operation by using the system utilities. (Refer to the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for additional information.) If you have set the time and date, and configured the MP, the I/O baseboard assembly is installed and operating correctly. If you have not yet set the time and date, or configured the MP:
- Use the MP commands to verify operation.
 - Use the BCH commands to verify operation.

System Battery

Battery Notice

This product contains a Lithium battery (part number 1420-0386).

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

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

Replacing the System Battery

The system battery is located on the I/O baseboard.

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

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

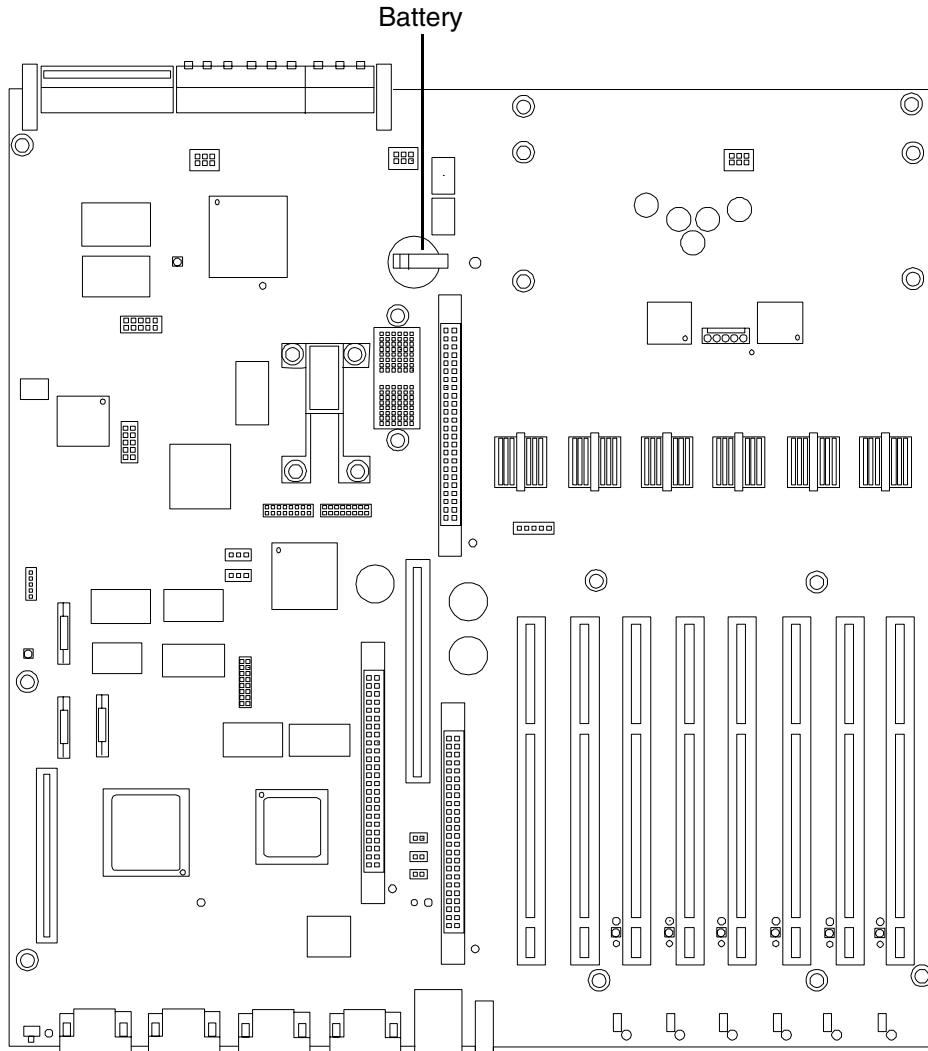
- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See "Accessing a Rack Mounted Server" on page 42.)
- Step 2.** Remove the top cover from the chassis. (See "Removing the Top Cover" on page 47.)
- Step 3.** Remove the I/O baseboard assembly from the chassis. (See "Removing the I/O Baseboard Assembly" on page 74.)
- Step 4.** Locate the system battery on the I/O baseboard.
- Step 5.** Lift up on the battery holder retaining clip with a flat-head screwdriver and slide the battery out of its socket.
- Step 6.** Install the new battery by lifting up on the battery holder retaining clip with a flat-head screwdriver and sliding the battery into its socket.

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

- Step 7.** Replace the I/O baseboard assembly. (See "Replacing the I/O Baseboard Assembly" on page 76.)
- Step 8.** Replace the top cover. (See "Replacing the Top Cover" on page 48.)
- Step 9.** Reset the server time and date, and restore the MP configuration settings. Proceed as follows:
 - a.** Using the system console, set the system time and date using the BCH date command.

- b. Using the system console, configure the MP. Incorporate settings saved before removing the I/O baseboard assembly or set up the MP as needed. (Refer to the Utilities chapter of the *HP 9000 rp4410 and HP 9000 rp4440 Operations Guide* for additional information about using the MP.)

Figure 3-25 Battery Location on I/O Baseboard



Removing and Replacing PCI/PCI-X Cards

The HP 9000 rp4410 and HP 9000 rp4440 servers may contain up to eight PCI/PCI-X cards. PCI/PCI-X cards are located on the I/O baseboard assembly, under the top cover. Two of these cards are dedicated to I/O functions and require that the server be powered down for card replacement. The remaining six PCI/PCI-X cards can be hot plugged (replaced while power is on and the system is operating). This section describes hot-plug operations and PCI/PCI-X card replacement. Included here are:

- **PCI/PCI-X Configurations**

Describes PCI/PCI-X capabilities and relates card functions and capabilities to specific slots.

- **Online Addition (OLA)**

Installation of new PCI/PCI-X expansion cards in previously empty slots without powering down the server.

- **Online Replacement (OLR)**

Replacement of a PCI/PCI-X card without powering down the server. This action requires suspending the associated driver. The existing driver for the old card must be compatible with the new card.

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

- **Offline Removal**

Removal of a PCI/PCI-X card after powering down the server

- **Offline Installation**

Installation of a PCI/PCI-X card after powering down the server

PCI/PCI-X Configurations

PCI/PCI-X slots are numbered from 1 through 8 in your HP server (Figure 3-26).

The following describes configuration requirements for slots 1 through 8:

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

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

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

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

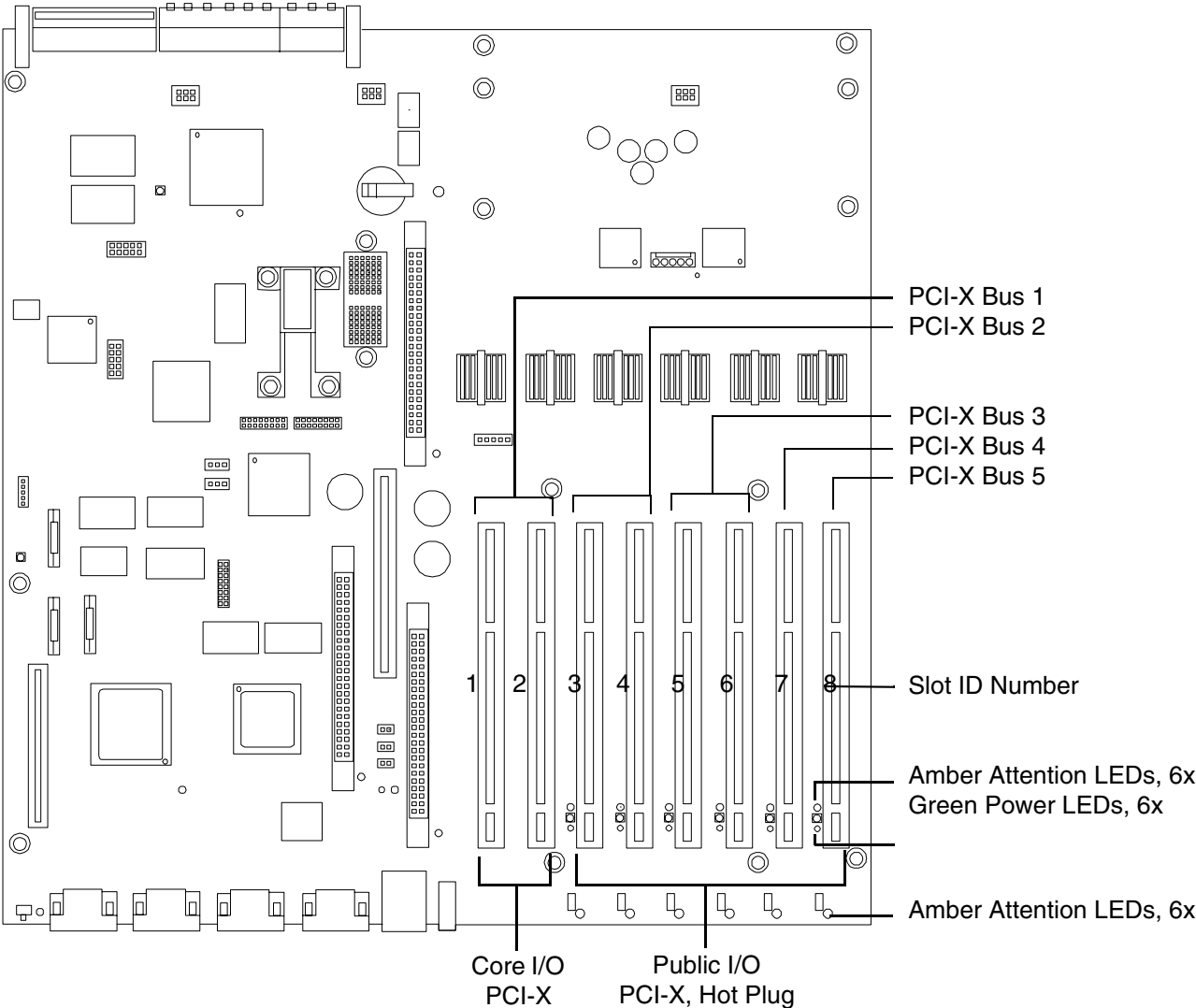
2. If you have a 33 MHz card in slot 3, and you hot-plug insert a 66 MHz card into slot 4, it will work but the new card will run at 33 MHz. This also applies to slots 5 and 6, as they are shared (both use a common bus).
 3. If your unit is powered-down, and you insert a 33 MHz card into slot 4 (that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

Table 3-4 PCI/PCI-X Card vs. Slot Frequency/Bus Mode Compatibility for Shared Slots^a

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

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

Figure 3-26 Slot ID Numbering



PCI/PCI-X Card Path Logging

Some PCI/PCI-X 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 PCI slot paths for your HP server.

Table 3-5 PCI I/O Paths

Slot	Function Associated with Path	Location	ACPI Path
Slot 1 (core I/O SCSI)	Ultra 160/320 dual channel SCSI or RAID HBA	Left-most slot (nearest to center of baseboard)	0/1/1/0 Channel A 0/1/1/1 Channel B
Slot 2 (core I/O LAN)	Single/Dual port Gigabit LAN	2nd from left	0/1/2
Slot 3	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 4)	3rd from left	0/4/1
Slot 4	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 3)	4th from left	0/4/2
Slot 5	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 6)	5th from left	0/5/1
Slot 6	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 5)	6th from left	0/5/2
Slot 7	I/O with 133 MHz/ 64 bit PCI-X card	7th from left	0/2/1
Slot 8 (right)	I/O with 133 MHz/ 64 bit PCI-X card	Right-most slot (nearest to edge of baseboard)	0/6/1

Online Addition (OLA)

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

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

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

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

Step 1. If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)

Step 2. Remove the top cover from the chassis. (See “Removing the Top Cover” on page 47.)

CAUTION Do not pull up on the manual retention latch (MRL) of a powered-on, occupied slot or your system will crash.

Step 3. Choose an empty slot and pull up on the MRL located on the OLX divider approximately 75 degrees (Figure 3-27).

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

Also, ensure that you fully seat the card into the slot or undesired results may occur after power is reapplied to the slot.

Step 4. Ensure that the MRL and the card latch on the OLX divider are already open and insert the PCI/PCI-X card to be added into the empty slot (Figure 3-29).

Step 5. If the PCI/PCI-X card is full size, close the slider gate latch to secure the end of the card (Figure 3-30).

Step 6. Push the manual retention latch down until it seats against the chassis wall.

Step 7. Turn the PCI/PCI-X card latch to the closed position to capture the PCI/PCI-X card and manual retention latch into the closed position.

Step 8. Press the attention button (doorbell) and the power LED starts to blink. Wait until the power LED goes from blinking to steady-on.

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

Step 9. Replace the top cover. (See “Replacing the Top Cover” on page 48.)

Step 10. Push the HP server all the way back into the rack until it stops.

Figure 3-27 PCI/PCI-X OLX Divider Layout

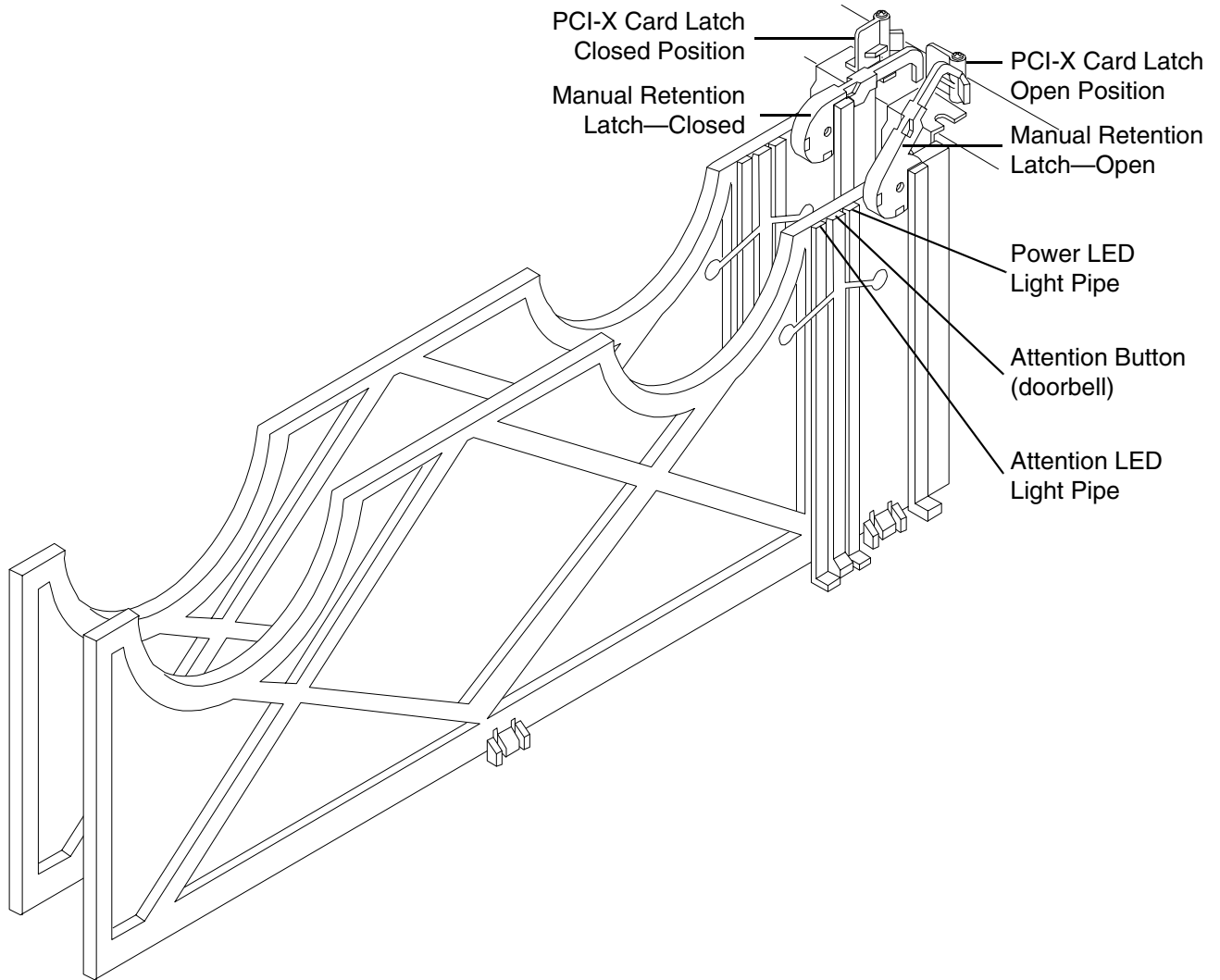


Figure 3-28 PCI-X Card Latch Opening Sequence

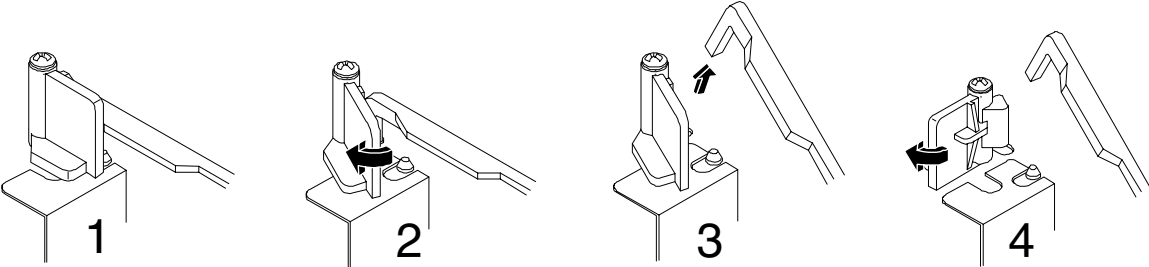


Figure 3-29 **Inserting PCI/PCI-X Card**

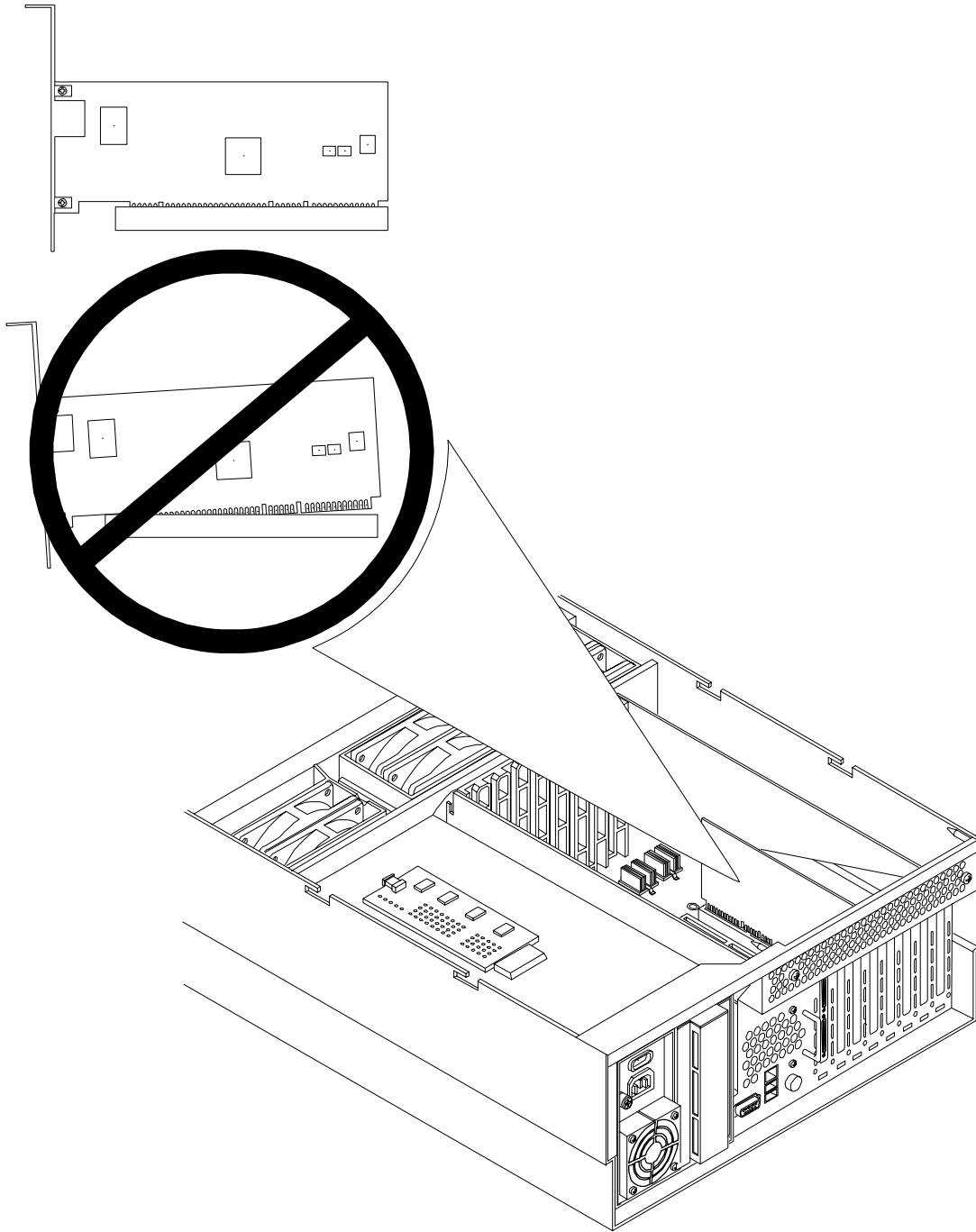
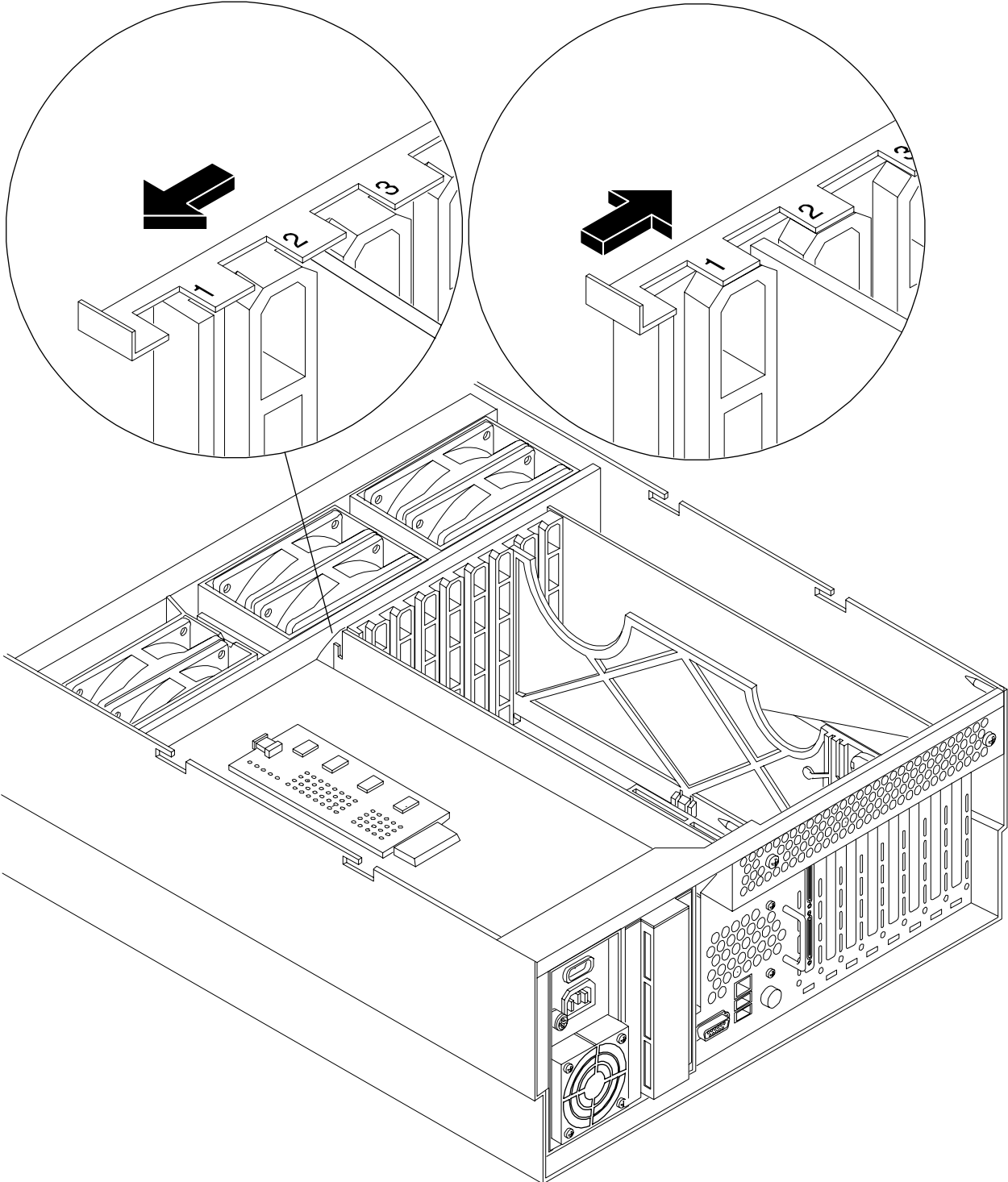


Figure 3-30 **Slider Gate Latch**



Online Replacement (OLR)

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

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

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the top cover from the chassis. (See “Removing the Top Cover” on page 47.)
- Step 3.** Disconnect all external and internal cables attached to the PCI card in the side service bay.
- Step 4.** Press the attention button (doorbell) located on the OLX divider that controls the affected slot—the power LED starts to blink. Wait until the power LED goes from blinking to steady-off.

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

- Step 5.** Turn the PCI/PCI-X card latch approximately 45 degrees on the chassis until the manual retention latch (MRL) is free to pull up.
- Step 6.** Pull up on the manual retention latch located on the OLX divider to turn off power to the slot (Figure 3-27).
- Step 7.** Turn the PCI/PCI-X card latch on the chassis approximately 45 degrees clockwise to completely expose the PCI/PCI-X bulkhead (Figure 3-27).
- Step 8.** If the PCI/PCI-X card is full size, open the slider gate latch to release the end of the card (Figure 3-30).
- Step 9.** Grasp the top edge of the PCI/PCI-X card and remove from the slot.

NOTE There is not an ejection lever to remove PCI/PCI-X cards as there was on previous server models. You must remove the PCI/PCI-X card manually. Cutouts in the OLX dividers allow access for grasping the PCI/PCI-X cards.

- Step 10.** Insert the new PCI/PCI-X card into the powered-down slot (Figure 3-29).

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

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

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

- Step 11.** If the PCI/PCI-X card is full size, close the slider gate latch to secure the end of the card (Figure 3-30).
- Step 12.** Push the manual retention latch down until it seats against the chassis wall.
- Step 13.** Turn the PCI/PCI-X card latch on the chassis to the closed position. This locks the PCI/PCI-X card into its slot and the manual retention latch into the closed position.
- Step 14.** Press the attention button (doorbell); the power LED will start to blink.
- Step 15.** Wait for the power LED to stop blinking; the PCI/PCI-X card is now active.
- Step 16.** Reconnect all the cables.
- Step 17.** Replace the top cover. (See “Replacing the Top Cover” on page 48.)
- Step 18.** Push the HP server all the way back into the rack until it stops.

Offline Removal of a PCI/PCI-X Card (Power Off)

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

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

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

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

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

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.

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. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 47.)

- 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 approximately 45 degrees clockwise to free up the manual retention latch (MRL) (Figure 3-27).
- Step 5.** Pull up on the MRL until it stops.
- Step 6.** Turn the PCI/PCI-X card latch another 45 degrees clockwise to completely expose the PCI-PCI-X card bulkhead (Figure 3-27).
- Step 7.** If the PCI/PCI-X card is full size, open the slider gate bracket to allow PCI/PCI-X card removal (Figure 3-30).
- 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.

Offline Installation of a PCI Card (Power Off)

To replace a PCI card, perform the following steps:

- Step 1.** Insert the card into the appropriate slot (Figure 3-26).
- Step 2.** Turn the PCI/PCI-X card latch on the chassis to approximately 45 degrees counter-clockwise to allow closing of the manual retention latch (MRL) (Figure 3-27 and Figure 3-28).
- Step 3.** Push down on the MRL until it stops against the chassis wall (Figure 3-27).
- Step 4.** Turn the PCI/PCI-X card latch on the chassis another 45 degrees counter-clockwise 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 (Figure 3-30).
- Step 6.** Reconnect all internal and external cables to the PCI/PCI-X card.
- Step 7.** Replace the top cover. (See “Replacing the Top Cover” on page 48.)
- Step 8.** Slide the HP server all the way back into the rack until it stops.
- Step 9.** Turn on power by plugging the AC power cords into power supply unit(s).

OLX Dividers

OLX dividers are located on the I/O baseboard assembly, 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 3-31 OLX Divider Removal and Replacement

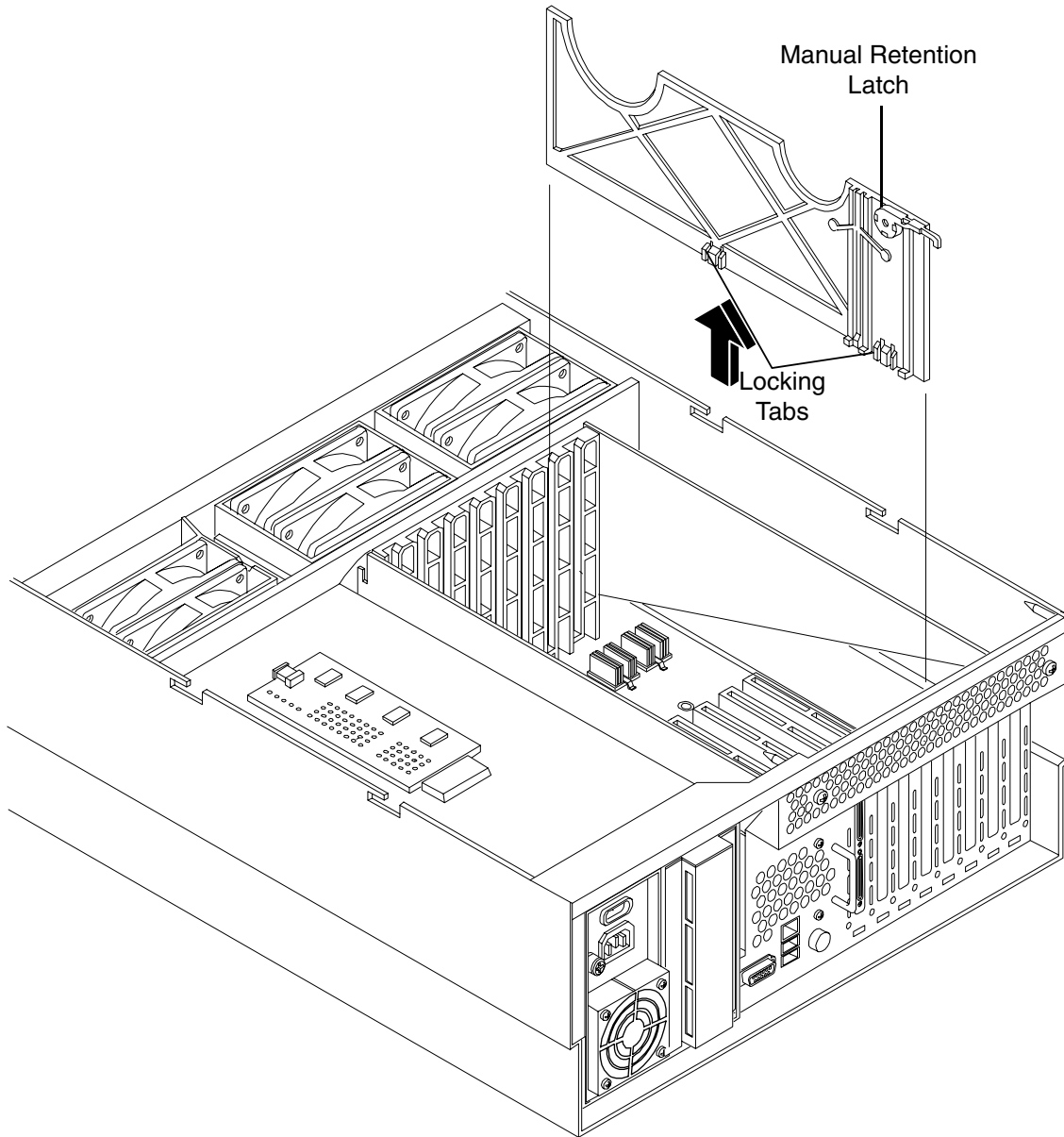
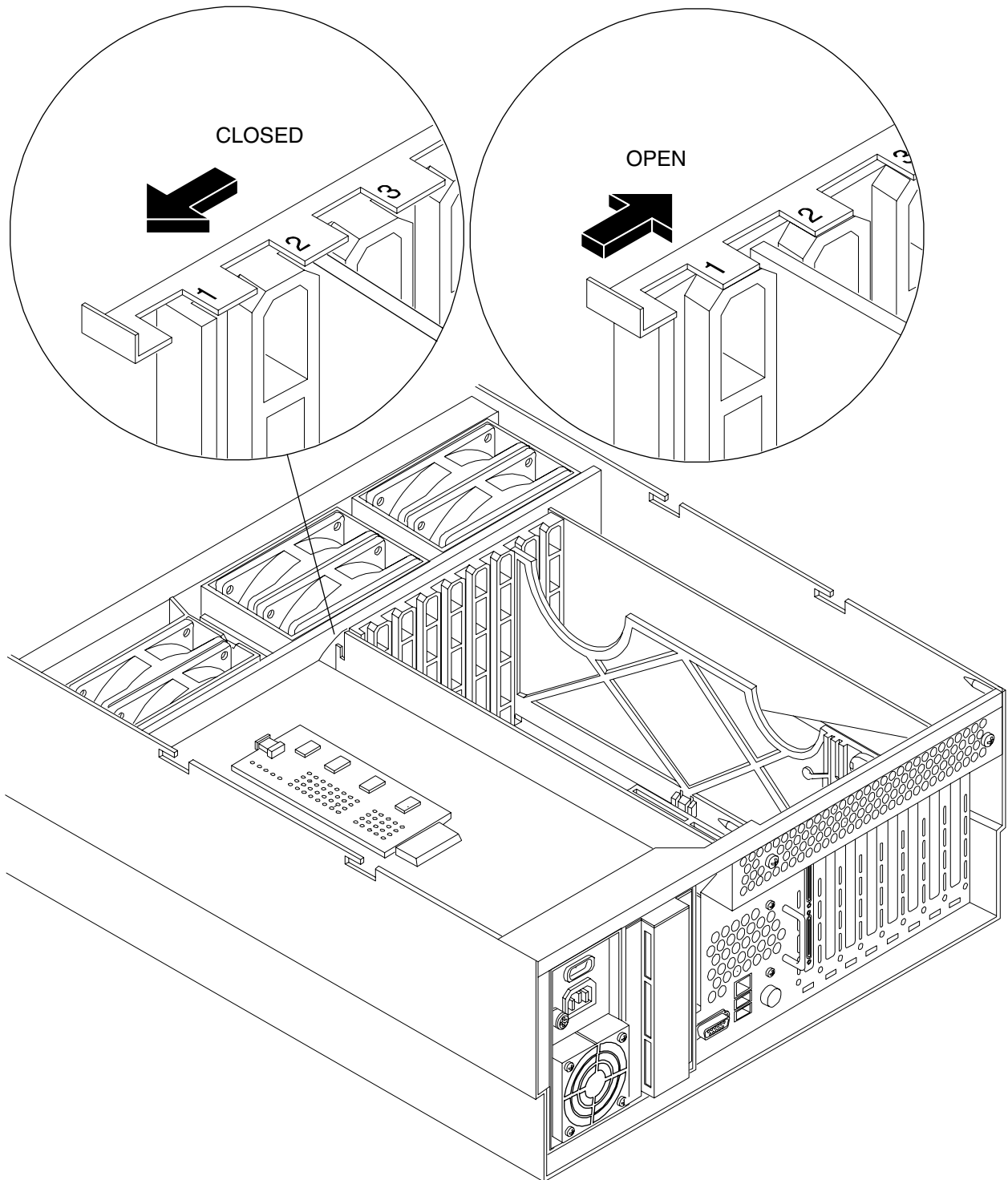


Figure 3-32 OLX Slider Gate Bracket



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 assembly, 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 four Torx T15 fasteners.

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 47.)
- Step 3.** Pull up on the manual retention latch to unlock the OLX divider from the chassis wall (Figure 3-31).
- Step 4.** Slide open the latch on the slider gate bracket to unlock the rear edge of the PCI divider (Figure 3-32).
- Step 5.** At this point, if you are removing the entire OLX divider rack, remove the four T15 fasteners attaching the rack to the I/O baseboard assembly.
- Step 6.** 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 onto the I/O baseboard, replace the four 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. (See “Replacing the Top Cover” on page 48.)

U320 SCSI Enablement and Conversion Procedures

Introduction

This section explains how to upgrade the SCSI cards to enable U320 operation and how to optionally change the SCSI configuration (duplex to simplex) in your HP server. The U320 enablement process involves replacing the duplex PCA card (duplex configuration only) and the SCSI backplane (simplex and duplex configurations). Refer to the *HP 9000 rp4410 and HP 9000 rp4440 Server Installation Guide* for instructions to convert your server from simplex to duplex operation. After performing these procedures, you will be directed to start up your server and resume operation.

The embedded backplane for internal SCSI hard disks drives in the HP 9000 rp4410 and HP 9000 rp4440 servers may be configured in either simplex or duplex mode.

In simplex mode, both embedded internal hard disks are on SCSI channel A. SCSI channel B may be used for external devices. Remove the cover from channel B prior to connecting external devices. Do not connect external devices to SCSI channel A.

In duplex mode, each hard disk is on a separate SCSI bus. Do not connect external devices to either SCSI channel A or B.

Time Required

Upgrading your HP server may require several hours, depending on preparatory time, but you should plan for an hour of system downtime. Preparatory time includes checking the upgrade kit, preparing an ESD-safe work station, and backing up your data.

Upgrade Tasks

Upgrade tasks depend on whether the server is configured for simplex or duplex operation. The upgrade procedures are accomplished as follows:

Simplex Configuration Upgrade

- Back up your data
- Shutdown your server (disconnect AC power)
- Remove server components
- Replace SCSI backplane board
- Install server components
- Verify the upgrade installation

Duplex Configuration Upgrade

- Back up your data
- Shutdown your server (disconnect AC power)
- Remove server components
- Remove the SCSI duplex board
- Replace SCSI backplane board
- Install the replacement SCSI duplex board

- Install server components
- Verify the upgrade installation

Back Up Your System

Before performing the server upgrade, protect yourself by backing up all data and your server OS. In the event of interruptions (i.e. power failure, interference, etc.), it may be necessary to resume operation in the old configuration before upgrading the server.

Back Up Your Data Back up your data in accordance with local procedures.

Back Up the Operating System

Always keep a backup copy of the current operating system (OS) available for emergency use. The OS was provided on CD with your server. You can obtain a copy from your HP-Information Resource Center (ITRC).

Removing Server Components

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

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.

To upgrade the server, remove the following components:

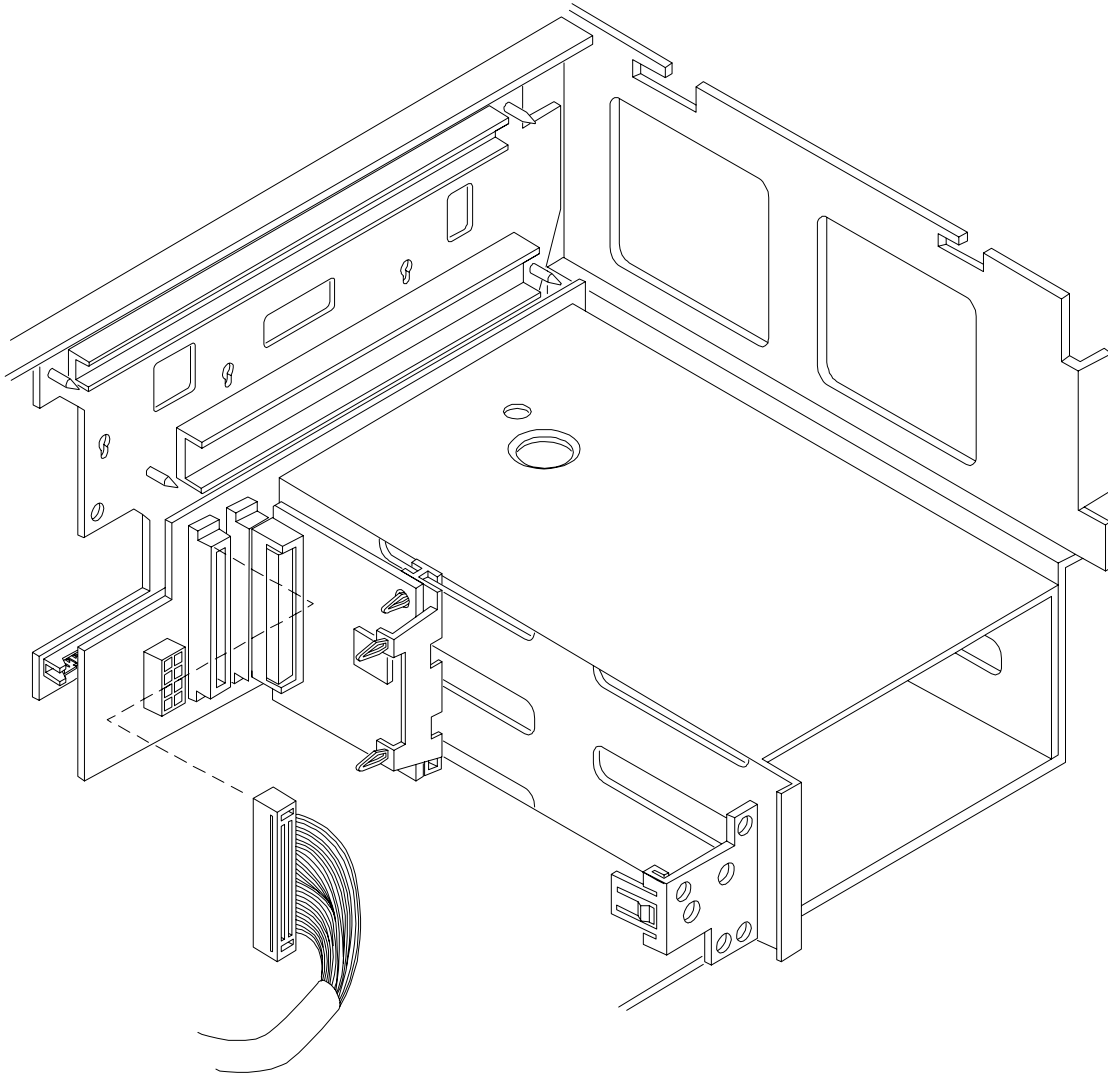
- Step 1.** Make sure all users are logged off and that the server is not in use.
- Step 2.** Perform an orderly shutdown of the server operating system.
- Step 3.** Press the power switch on the server front panel. Verify that the power LED goes off.
- Step 4.** Disconnect the AC power cords from the server rear panel.
- Step 5.** Extend the server from the rack. (See “Extend the Server from the Rack” on page 42.)
- Step 6.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 7.** Remove the front cover. (See “Removing the Front Cover” on page 46.)
- Step 8.** Remove the memory extender board. (See “Removing a Memory Extender Board” on page 49.)
- Step 9.** Remove the processor extender board. (See “Removing the Processor Extender Board” on page 57.)

Removing the SCSI Duplex Board

The SCSI Duplex board is only installed if the server is configured for duplex operation. The duplex board is secured to the disk drive cage by a bracket and connected to the SCSI backplane board. To remove the SCSI duplex board, perform the following steps:

- Step 1.** Disconnect the SCSI cable B to the SCSI backplane board (Figure 3-33).

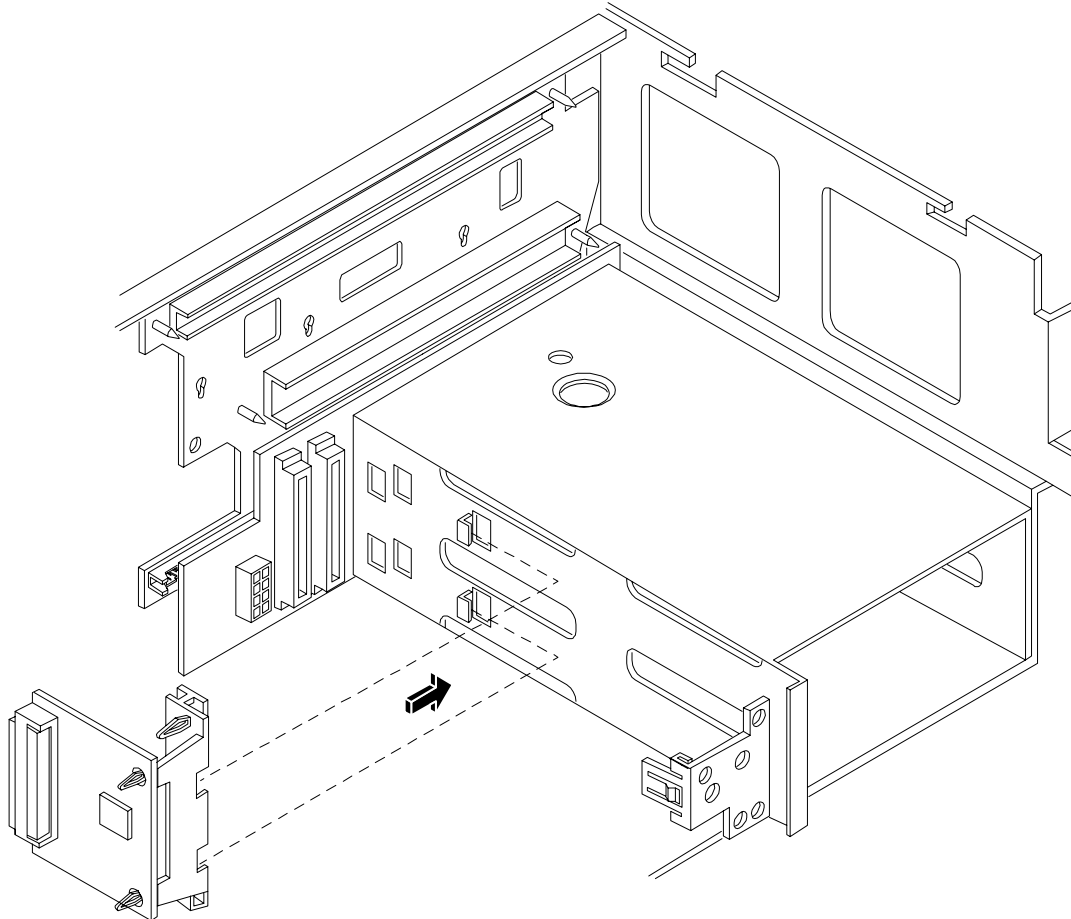
Figure 3-33 SCSI Cable B Connection to the SCSI Backplane



- Step 2.** Remove the duplex board. Pull the SCSI duplex board forward to disconnect the backplane connector and release it from the disk drive cage (Figure 3-34).

Step 3. Continue the upgrade by replacing the SCSI backplane board. The upgrade SCSI duplex board is installed after the SCSI backplane board is replaced. The new SCSI duplex board is P/N A6961-60106.

Figure 3-34 Replacing the SCSI Duplex Board



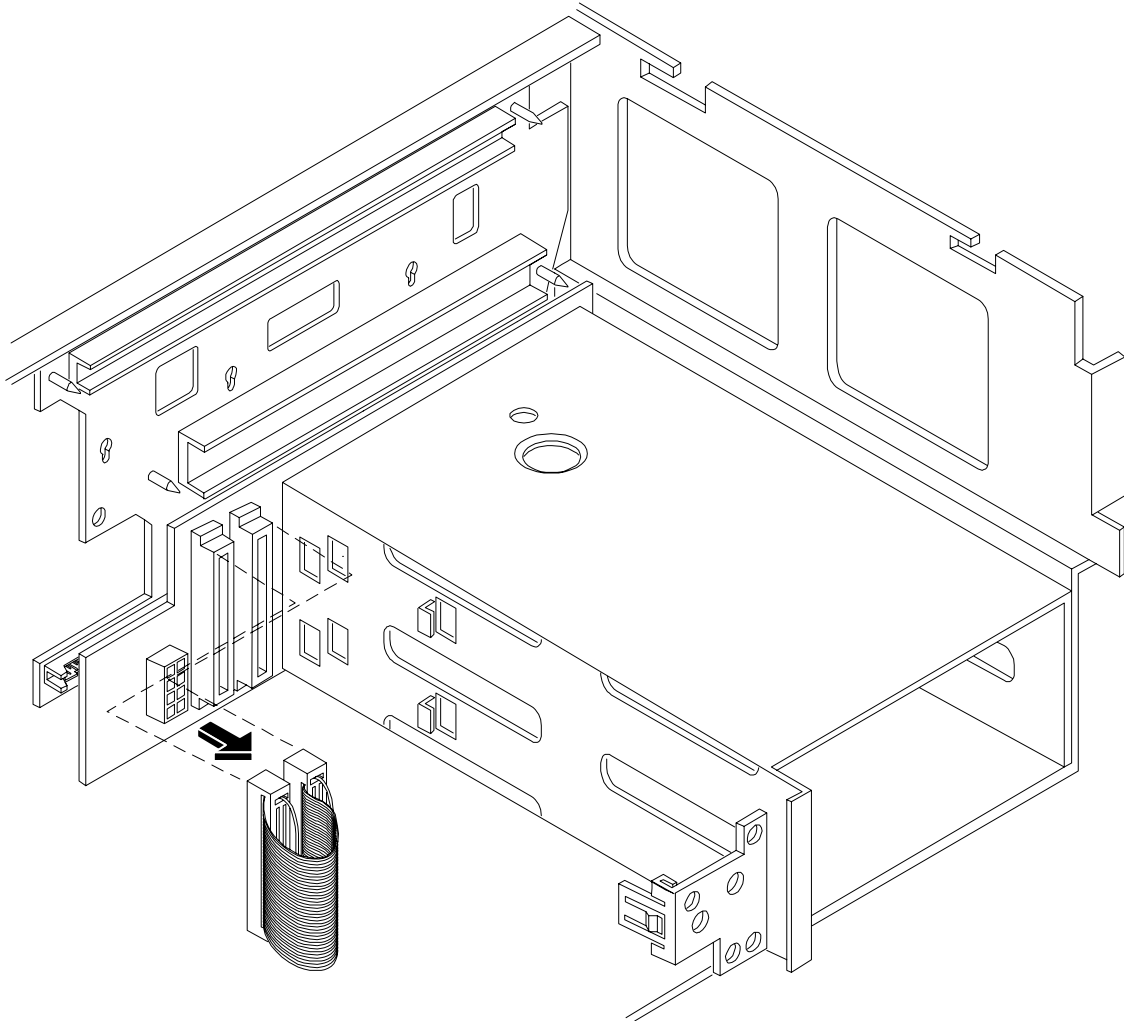
Removing the SCSI Backplane Board

The SCSI backplane board is replaced for both simplex and duplex configurations. To remove the SCSI backplane, perform the following steps:

- Step 1.** Unplug the internal SCSI cable(s) from the SCSI backplane board.
- Step 2.** Unplug the SCSI backplane-to-midplane riser cable from the SCSI backplane.
- Step 3.** If the server is configured for simplex operation, remove the SCSI Jumper Cable (Figure 3-35).

NOTE The SCSI jumper cable bridges the two SCSI connectors on the SCSI backplane when the server is configured for simplex operation. The SCSI jumper cable is not installed in duplex configurations.

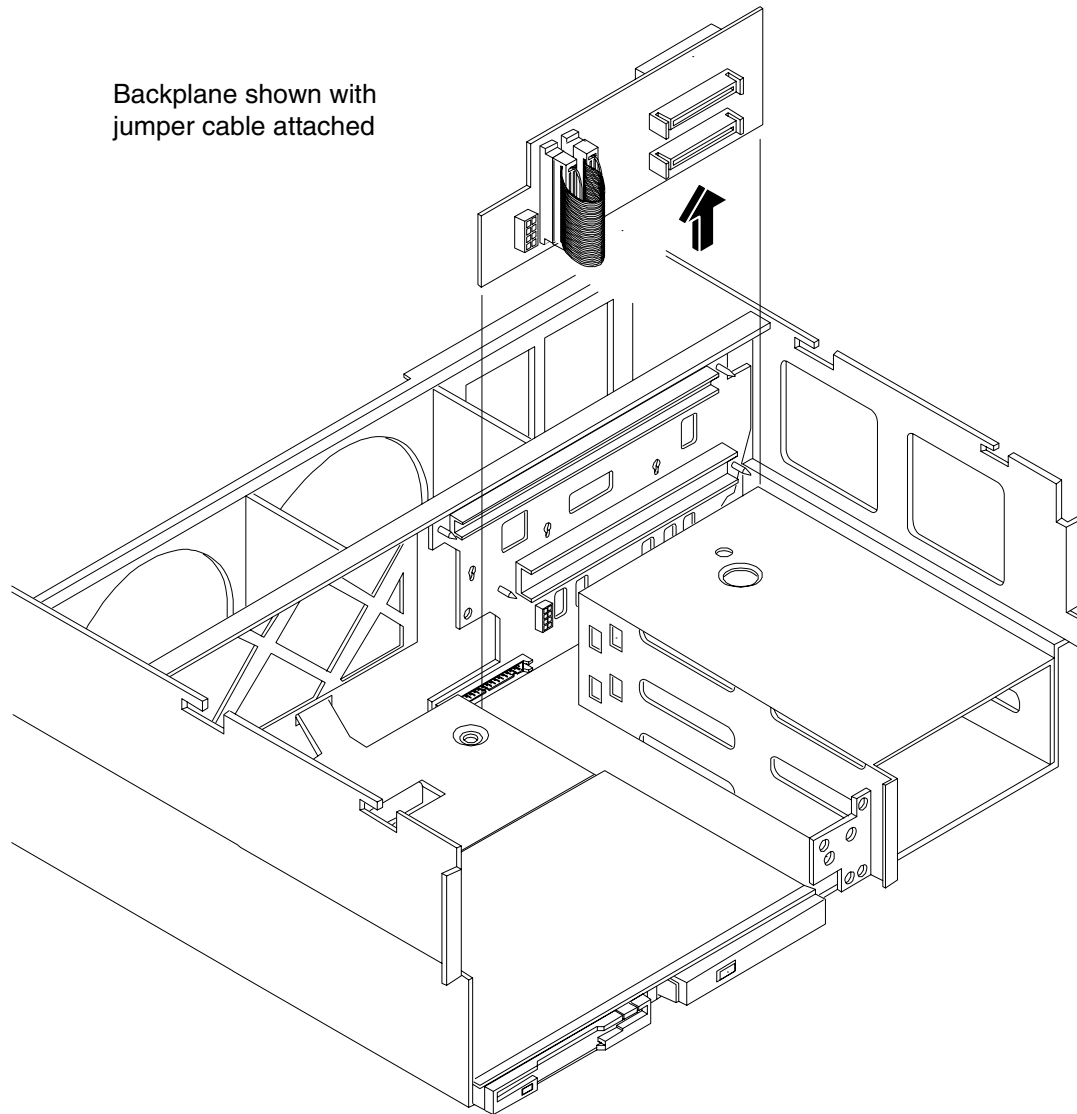
Figure 3-35 Removing the SCSI Jumper Cable



- Step 4.** Remove the hot-plug disk drives. (See “Removing a Hot-Plug Disk Drive” on page 120.)
- Step 5.** 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 6.** 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 7. Push the SCSI backplane board away from the disk drive cage and lift it up and out of the chassis.

Figure 3-36 SCSI Backplane Removal and Replacement



Replacing the SCSI Backplane Assembly

To replace the SCSI backplane assembly, perform the following steps:

- Step 1.** Replace the SCSI backplane assembly to the rear of the disk drive cage. The part number of the new SCSI backplane assembly is A6961-04075.
- Step 2.** If your system is configured for simplex operation, connect the SCSI jumper cable to the SCSI backplane connectors.
- 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.

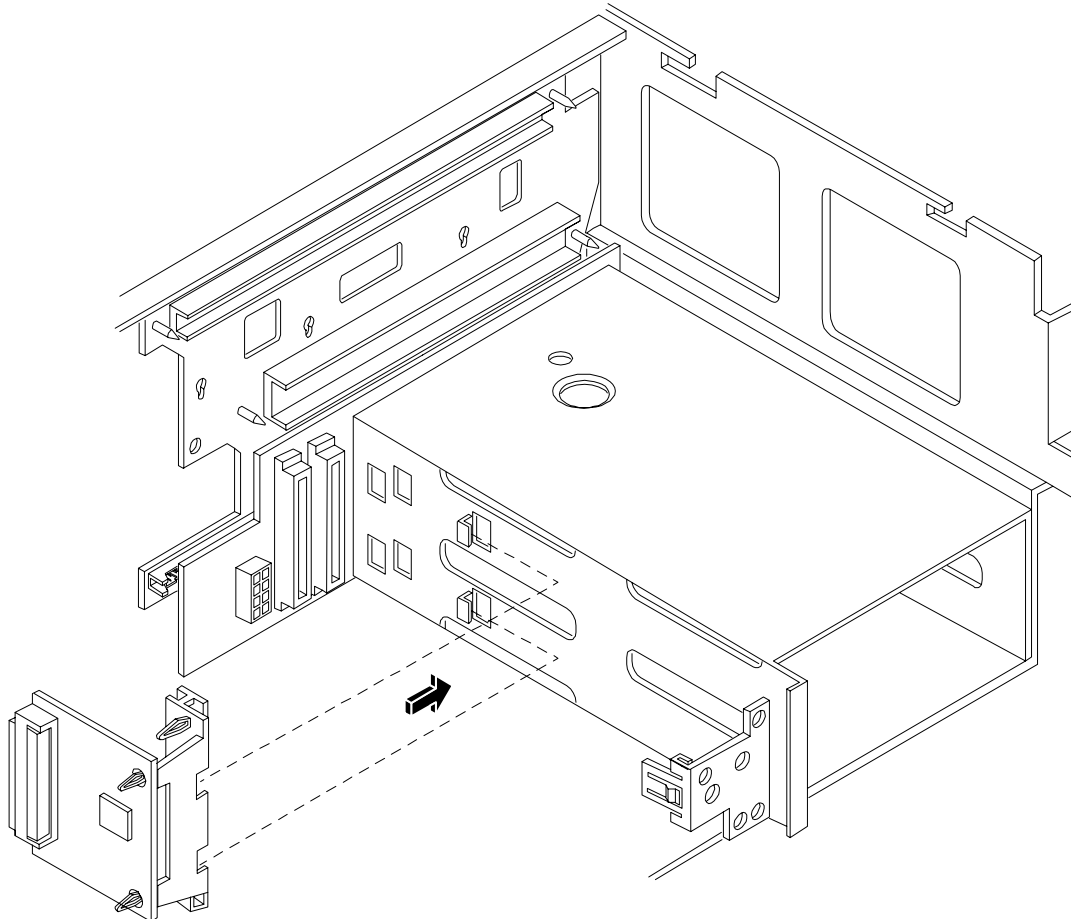
If your server is configured for simplex operation, continue the upgrade at “Installing the Server Components” on page 106

Installing the SCSI Duplex Board

Install the SCSI duplex board only if your system is configured for duplex operation. To install the duplex board, perform the following steps:

Step 1. Align the bracket tabs with the slots on the side of the disk drive cage (Figure 3-37).

Figure 3-37 Installing the SCSI Duplex Board



Step 2. Press the bracket against the disk drive cage until the bracket locks into place.

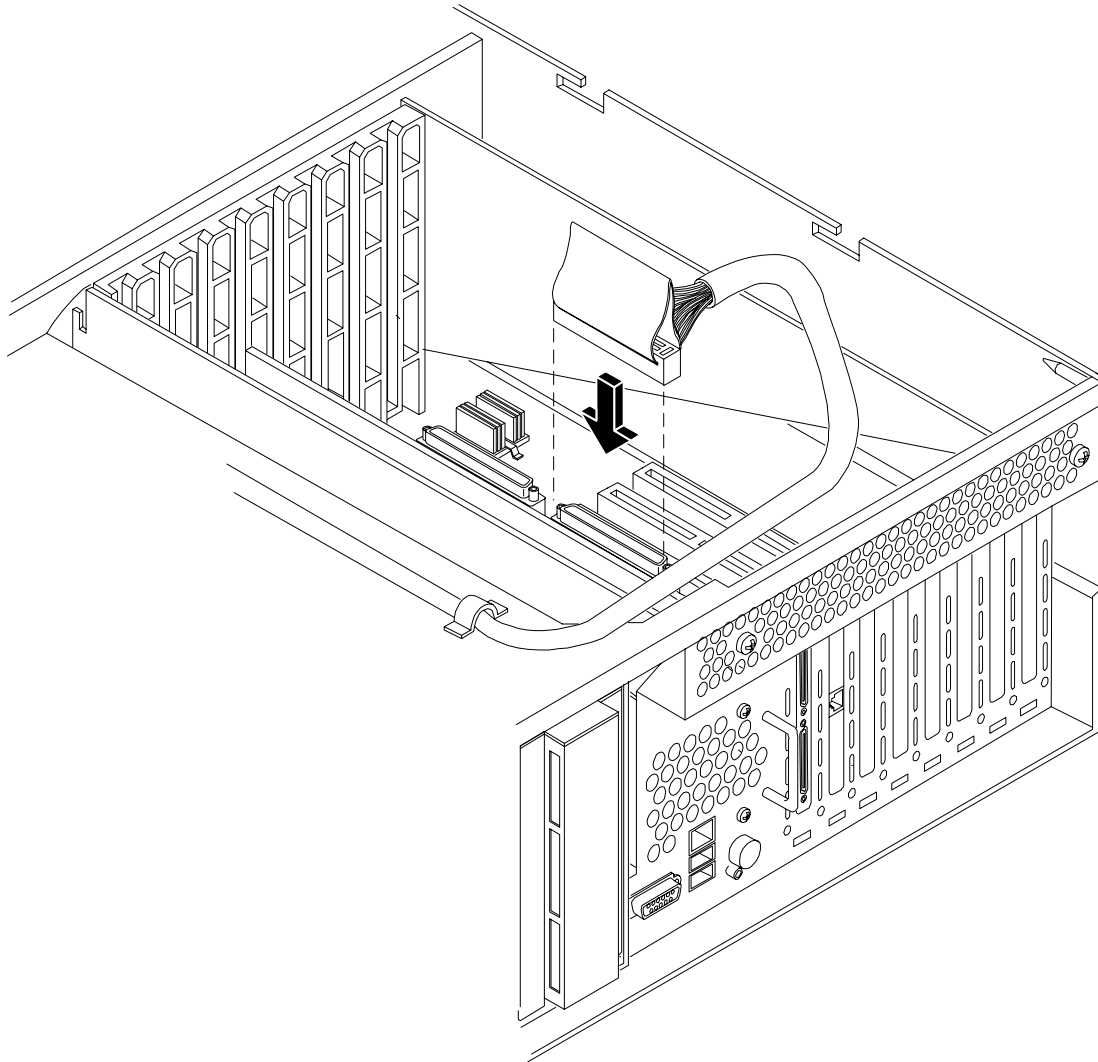
Step 3. Align the connector of the duplex board with the connector on the SCSI backplane.

Step 4. Press the board connector into the backplane connector.

Step 5. Plug the SCSI cable B connector into the SCSI connector located on the backplane next to the duplex board (Figure 3-33).

- Step 6.** Verify the other end of SCSI cable B is connected to the SCSI B channel connector on the SCSI adapter board (Figure 3-38).

Figure 3-38 Installing SCSI Cable B to the SCSI Adapter Board



- Step 7.** Close the swivel latch on top of the hot-plug disk drive cage.

- Step 8.** Replace the two hot-plug disk drives into the disk drive cage.

Installing the Server Components

Install the following components in the server chassis:

- Step 9.** Install the processor extender board. See “Replacing the Processor Extender Board” on page 59.

- Step 10.** Install the memory extender board. See “Replacing a Memory Extender Board” on page 51 .

- Step 11.** Install the front cover. See “Replacing the Front Cover” on page 47.

- Step 12.** Install the front bezel. See “Replacing the Front Bezel” on page 45.

Verification of Upgrade Installation

After completing the upgrade, verify that the sever is ready for operation as follows:

- Step 13.** Reconnect AC power to rear panel connectors.
- Step 14.** Press the front panel power switch to power on the server.
- Step 15.** Wait for completion of the power-on-self-test. Verify that no errors have been detected.
- Step 16.** At the BCH prompt, enter the `in io` command. Verify that all installed disk drives are recognized and operating correctly.
- Step 17.** Initiate the OS and monitor operation. Check for error messages. Check the System Event Log for erroneous system events

Converting SCSI From Duplex to Simplex Operation

If you are converting your SCSI from duplex to simplex, this section explains how to convert your server. The procedure requires unplugging and stowing the SCSI B cable, removing the SCSI duplex board, and installing a jumper cable on the SCSI backplane.

Safety Information

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

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

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

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.

Accessing the SCSI Backplane Board

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

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)

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

Step 2. Remove the front bezel. (See “Front Bezel” on page 45.)

Step 3. Remove the front cover. (See “Removing the Front Cover” on page 46.)

Step 4. Remove the memory extender board. (See “Memory Extender Board” on page 49.)

Step 5. Remove the processor extender board. (See “Processor Extender Board” on page 57.)

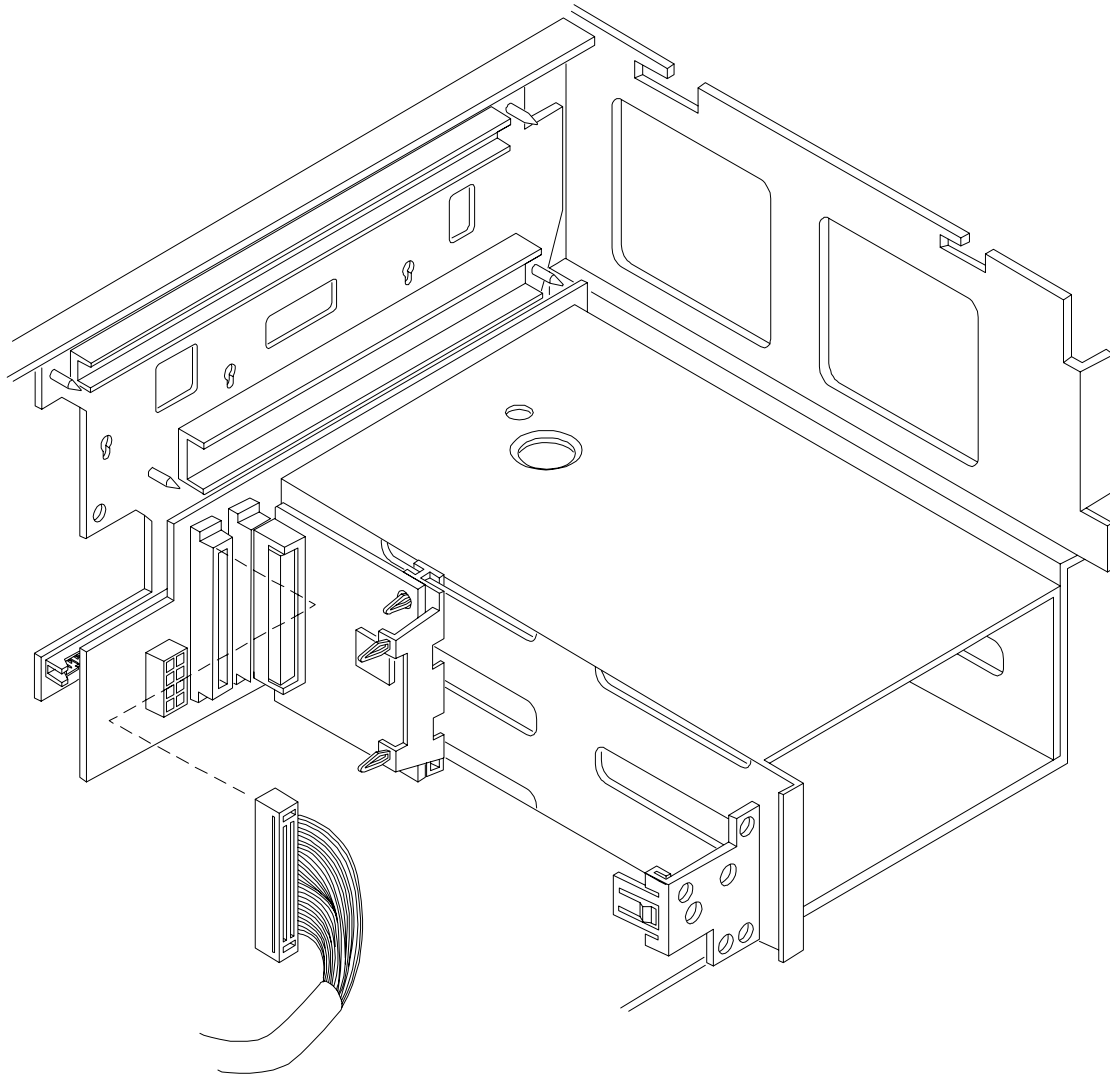
Step 6. Remove the top cover from the chassis. (See “Removing the Top Cover” on page 47 .)

Convert to Simplex

To convert to simplex, perform the following steps:

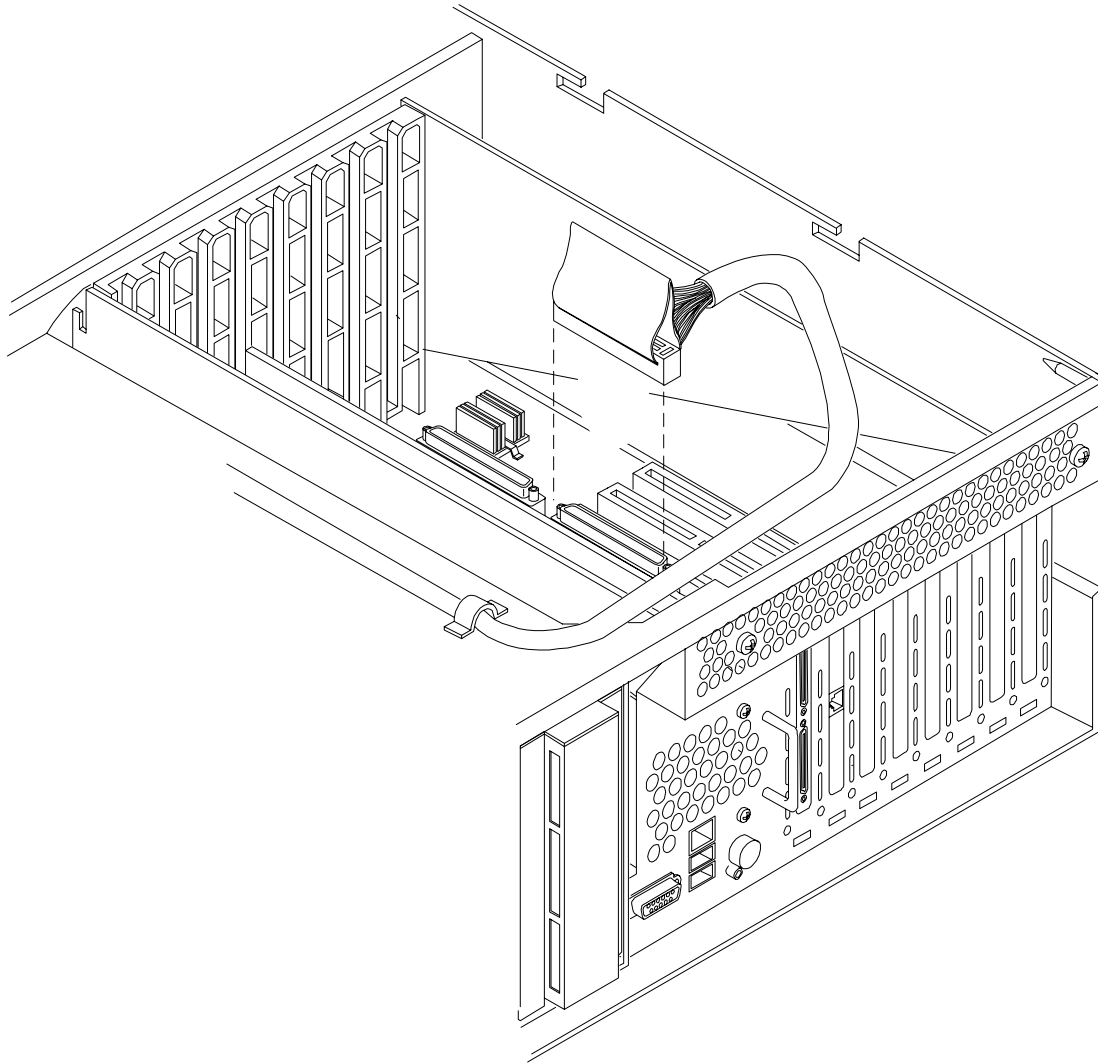
Step 1. Unplug the SCSI B cable from the SCSI backplane (Figure 3-39).

Figure 3-39 Unplugging SCSI B Cable from the SCSI Backplane



Step 2. Unplug the SCSI B cable connector from the SCSI Adapter board (Figure 3-40).

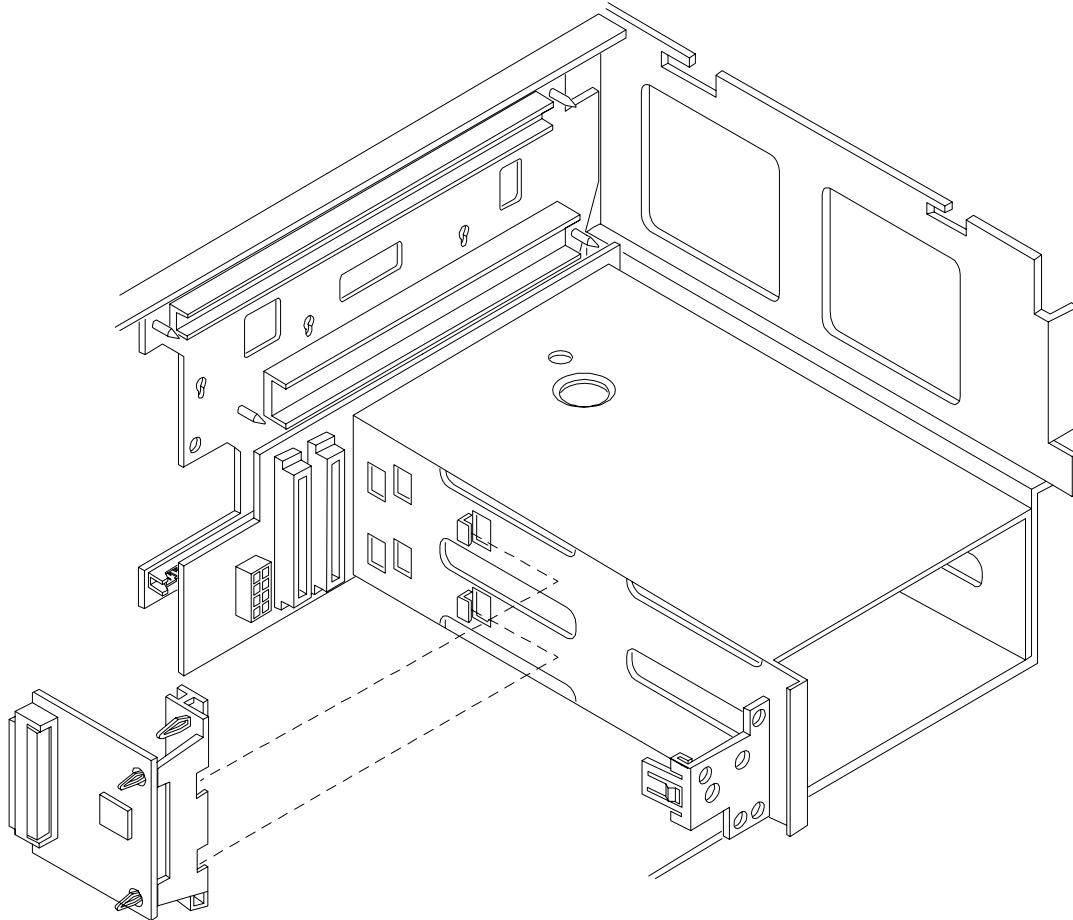
Figure 3-40 Unplugging SCSI B Cable from the SCSI Adapter Board



Step 3. Secure the SCSI Channel B cable within the chassis.

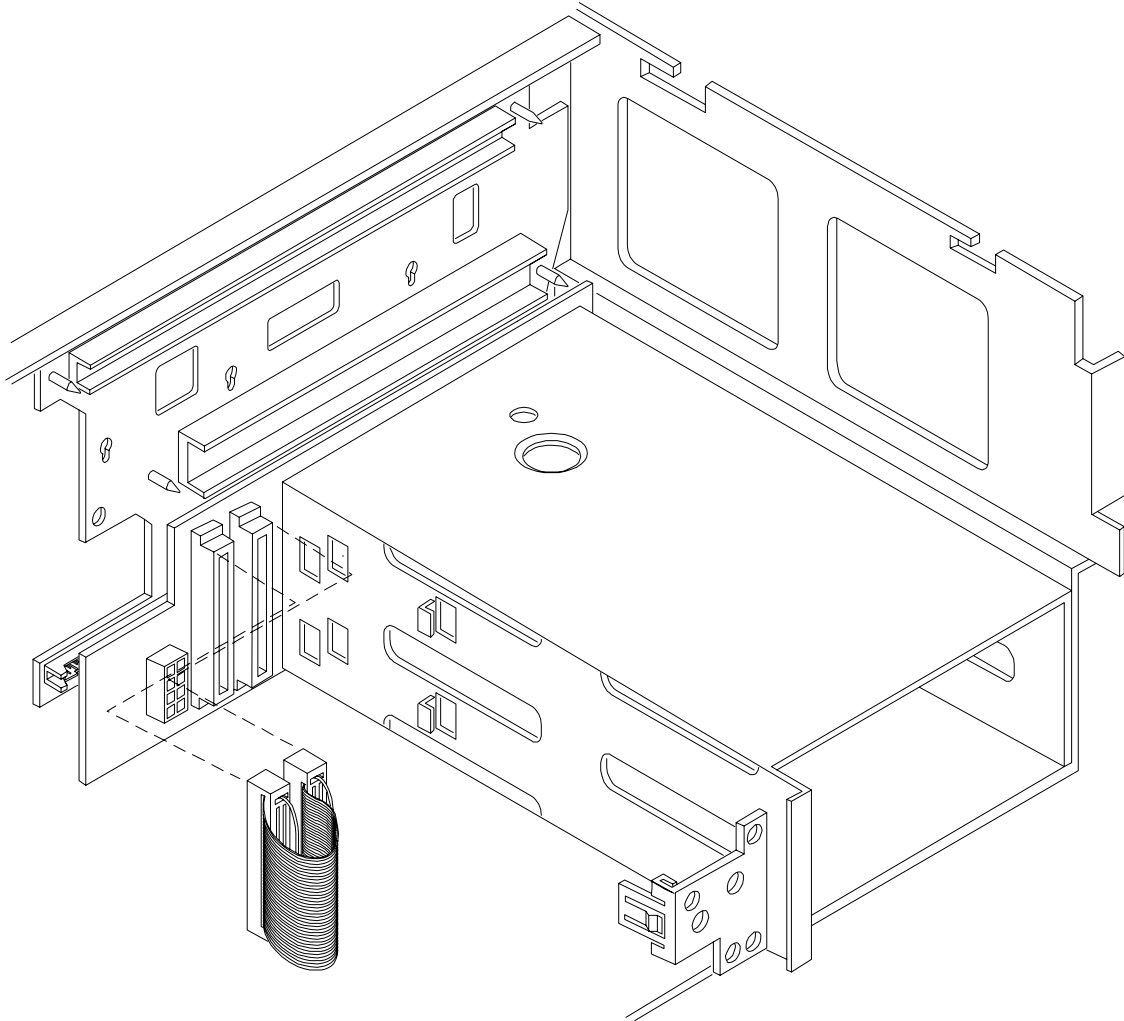
- Step 4.** Remove the SCSI duplex board. Pull the SCSI duplex board forward to disconnect the backplane connector and release it from the disk drive cage (Figure 3-41).

Figure 3-41 Removing the Duplex Board



Step 5. Connect the SCSI jumper cable to the SCSI backplane connectors (Figure 3-42).

Figure 3-42 Installing the SCSI Jumper Cable



Installing Server Components

Install the following components in the server chassis:

- Step 6.** Install the processor extender board. See “Replacing a Memory Extender Board” on page 51.
- Step 7.** Install the memory extender board. See “Replacing the Processor Extender Board” on page 59.
- Step 8.** Install the front and top covers. See “Front and Top Covers” on page 46.
- Step 9.** Install the front bezel. See “Replacing the Front Bezel” on page 45.

Verification of Upgrade Installation

After completing the upgrade, verify that the sever is ready for operation as follows:

- Step 10.** Reconnect AC power to rear panel connectors.
- Step 11.** Press the front panel power switch to power on the server.

- Step 12.** Wait for completion of the power-on-self-test. Verify that no errors have been detected.
- Step 13.** At the BCH prompt, enter the `in io` command. Verify that all installed disk drives are recognized and operating correctly.
- Step 14.** Initiate the OS and monitor operation. Check for error messages. Check the System Event Log for erroneous system events

Removing and Replacing Core I/O Cards

Safety Information

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

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

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

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.

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

Remove and Replace the LAN Core I/O Card

The HP 9000 rp4410 and HP 9000 rp4440 server has two I/O card slots that are dedicated for core I/O cards.

PCI Slot Locations and Configurations

PCI slots are numbered from 1 through 8 in your HP server. The dedicated core I/O card slots are slots 1 and 2.

The following describes configuration requirements for slots 1 and 2:

- PCI slot 1 is dedicated for use by a SCSI HBA card. Slot 1 **is not** hot-plug capable. Additional PCI expansion cards **may not** be placed in slot 1.
- PCI slot 2 is dedicated for use by a LAN card. Slot 2 **is not** hot-plug capable. Additional PCI expansion cards **may not** be placed in slot 2.

Removing the LAN Core I/O Card

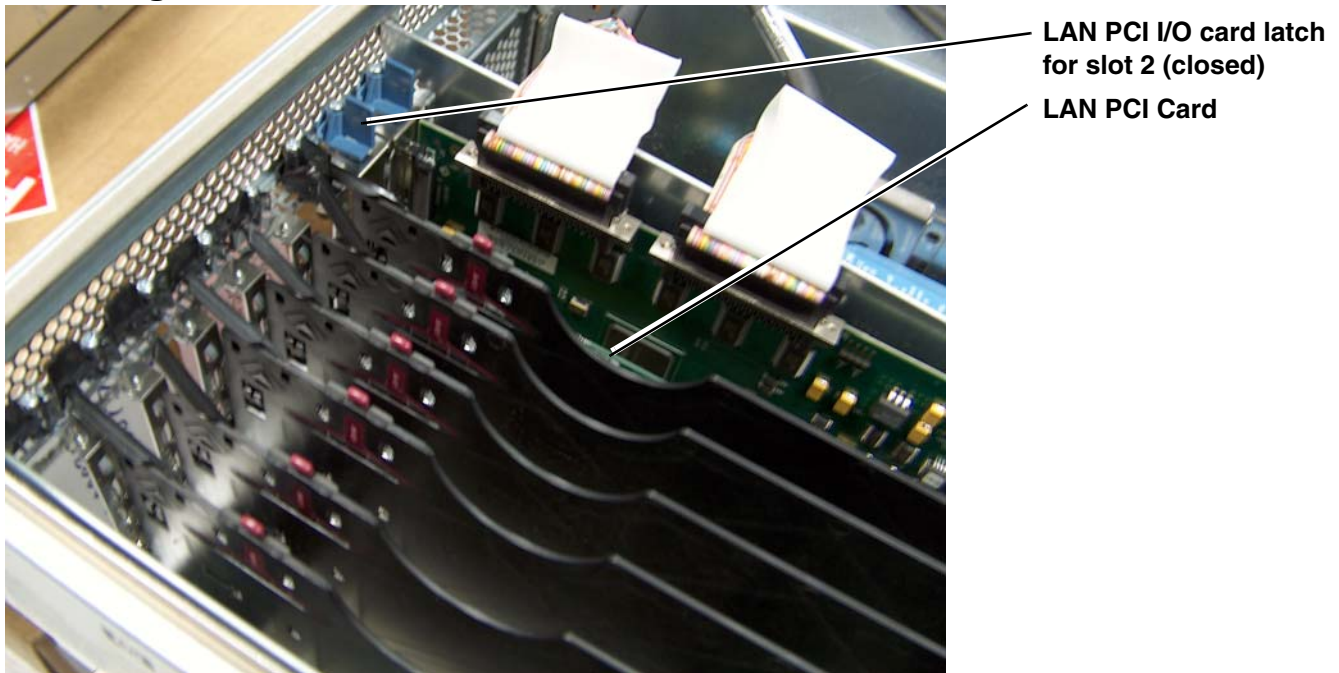
To remove the LAN core I/O card in slot 2, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 42.
- Step 2.** Remove the top cover from the chassis. See “Removing the Top Cover” on page 47.
- Step 3.** Disconnect any LAN cables connected to the LAN core I/O card.

IMPORTANT Before disconnecting cables, note the cable configuration. Cables must be attached to the correct connectors to ensure proper functionality.

- Step 4.** Open the blue PCI card latch for slot 2 by twisting it clockwise.

Figure 3-43 LAN I/O Card Latch Location

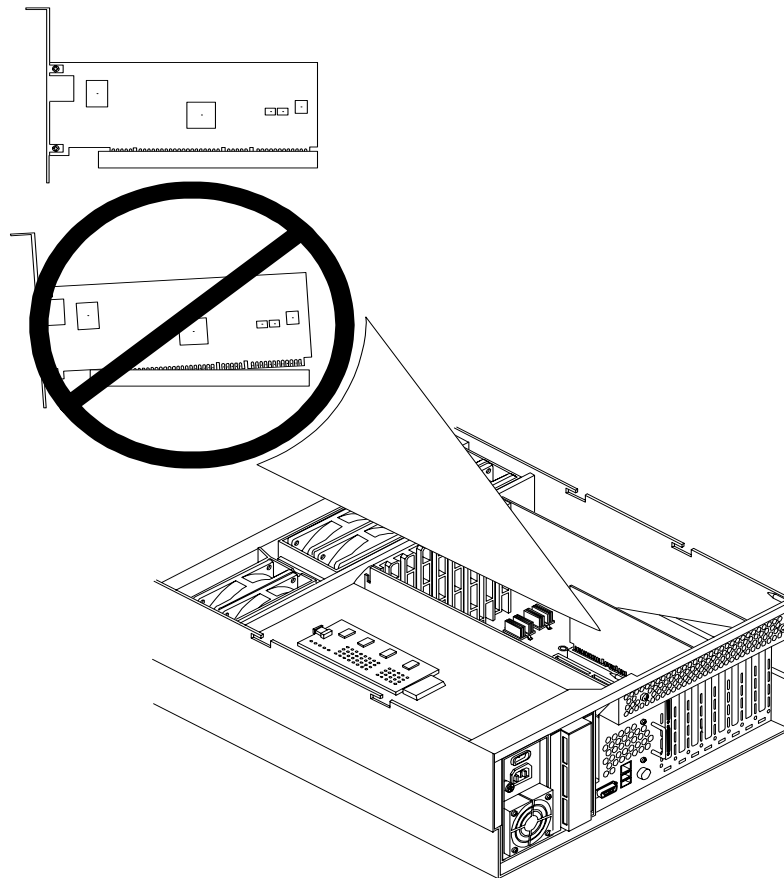


- Step 5.** Remove LAN core I/O card. (See “Removing and Replacing PCI/PCI-X Cards” on page 82.)
- Step 6.** Install replacement LAN core I/O card. (See “Removing and Replacing PCI/PCI-X Cards” on page 82.)

CAUTION Always handle I/O cards by their edges. Failure to comply with this precaution may result in damage to the card.

Ensure that you fully seat the card into the slot or the card may be damaged when power is re-applied to the slot.

Figure 3-44 Inserting LAN I/O Card



Step 7. Close the blue PCI card latch for slot 2 by twisting it counter-clockwise.

Step 8. Reconnect the LAN cable(s) to the LAN core I/O card. Be sure to attach cables to their original connectors.

Step 9. Replace the top cover.

Step 10. Push the HP server back into the rack until it stops.

Remove and Replace the SCSI Core I/O Card

The HP 9000 rp4410 and HP 9000 rp4440 servers has two I/O card slots that are dedicated for core I/O cards.

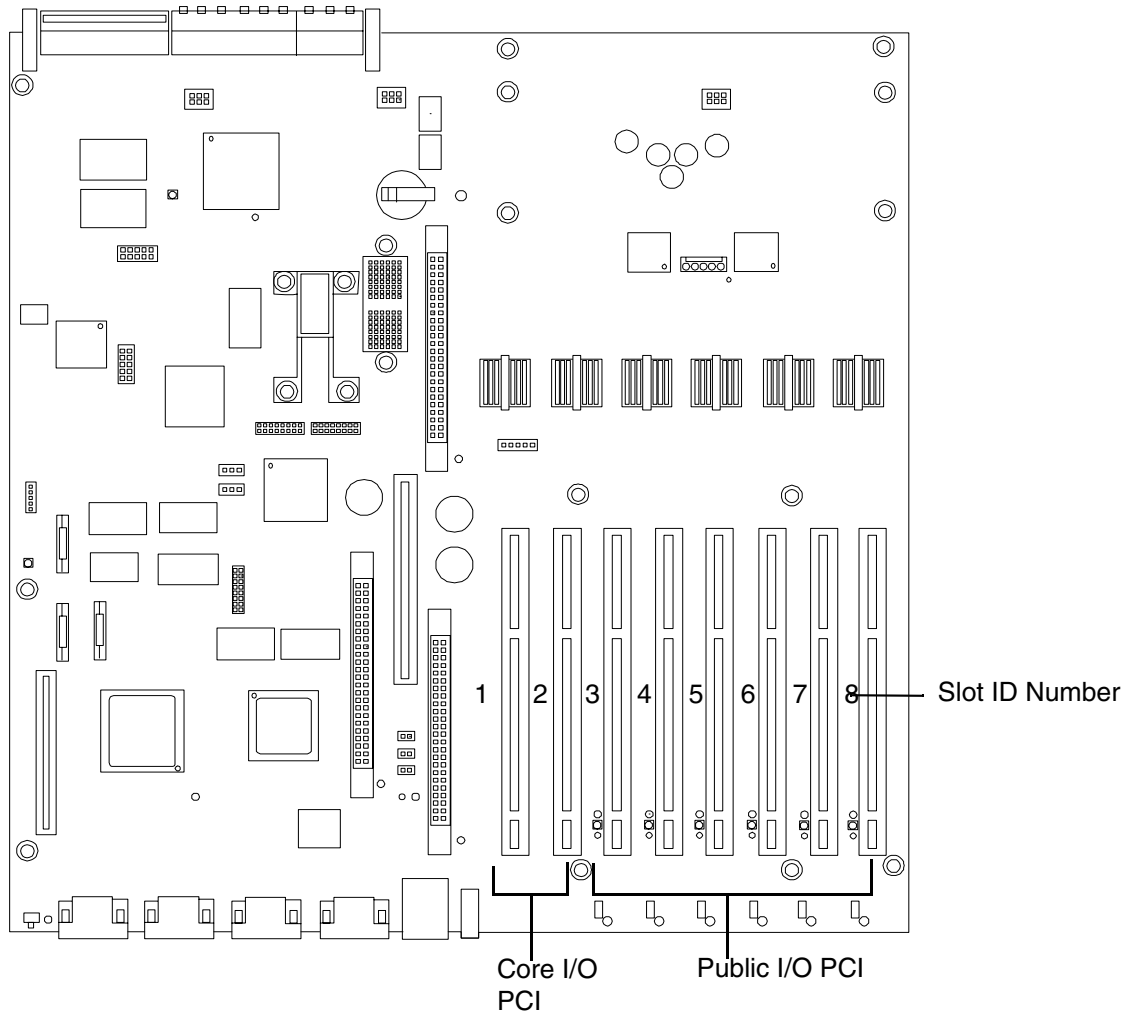
PCI Slot Locations and Configurations

PCI slots are numbered from 1 through 8 in your HP server (Figure 3-45). The dedicated core I/O card slots are slots 1 and 2.

The following describes configuration requirements for slots 1 and 2:

- PCI slot 1 is dedicated for use by a SCSI HBA card. Slot 1 **is not** hot-plug capable. Additional PCI expansion cards **may not** be placed in slot 1.
- PCI slot 2 is dedicated for use a LAN card. Slot 2 **is not** hot-plug capable. Additional PCI expansion cards **may not** be placed in slot 2.

Figure 3-45 Slot ID Numbering



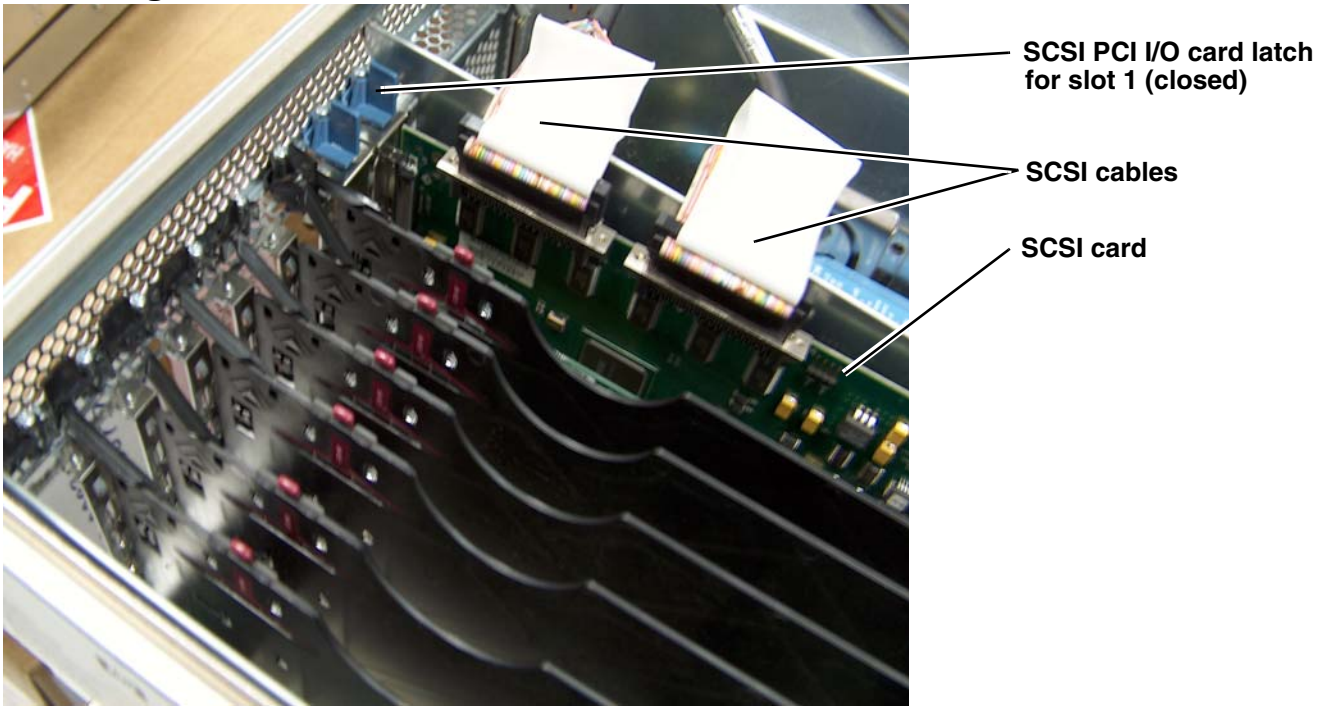
Removing the SCSI Core I/O Card

To remove the SCSI core I/O card in slot 1, perform the following steps:

- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 42.
- Step 2.** Remove the top cover from the chassis. See “Removing the Top Cover” on page 47.
- Step 3.** Disconnect any internal and external SCSI cables connected to the SCSI core I/O card.

Step 4. Open the blue PCI card latch for slot 1 by twisting it clockwise.

Figure 3-46 SCSI I/O Card latch Location



Step 5. Remove the internal and external SCSI cable(s) from the SCSI core I/O card.

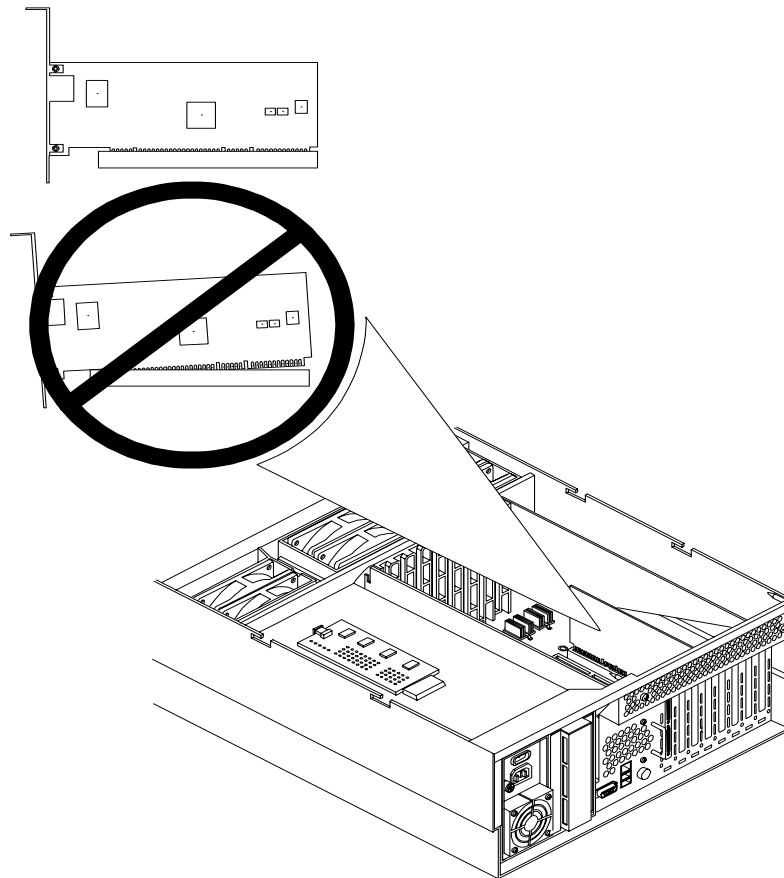
Step 6. Remove SCSI core I/O card.

Step 7. Install replacement SCSI core I/O card.

CAUTION Always handle I/O cards by their edges. Failure to comply with this precaution may result in damage to the card.

Ensure that you fully seat the card into the slot or the card may be damaged when power is re-applied to the slot.

Figure 3-47 Inserting SCSI I/O Card



- Step 8.** Close the blue PCI card latch for slot 1 by twisting it counter-clockwise.
- Step 9.** Reconnect the internal and external SCSI cable(s) to the SCSI core I/O card.
- Step 10.** Replace the top cover.
- Step 11.** Push the HP server back into the rack until it stops.

Hot-Plug Disk Drives

The two hot-plug disk drives are located in the front of the HP 9000 rp4410 and HP 9000 rp4440 servers. The hot-plug disk drives are replaced using the procedures in this section when power is on or off.

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 of the latch on the selected disk drive.
- Step 2.** Push the tab toward the latch and pull the latch out; 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 the HP 9000 rp4410 and HP 9000 p4440 servers (Figure 3-48).

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

- Step 1.** Slide the hot-plug hard disk drive 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 3-48 Disk Drive Installation in Slots 1 and 2

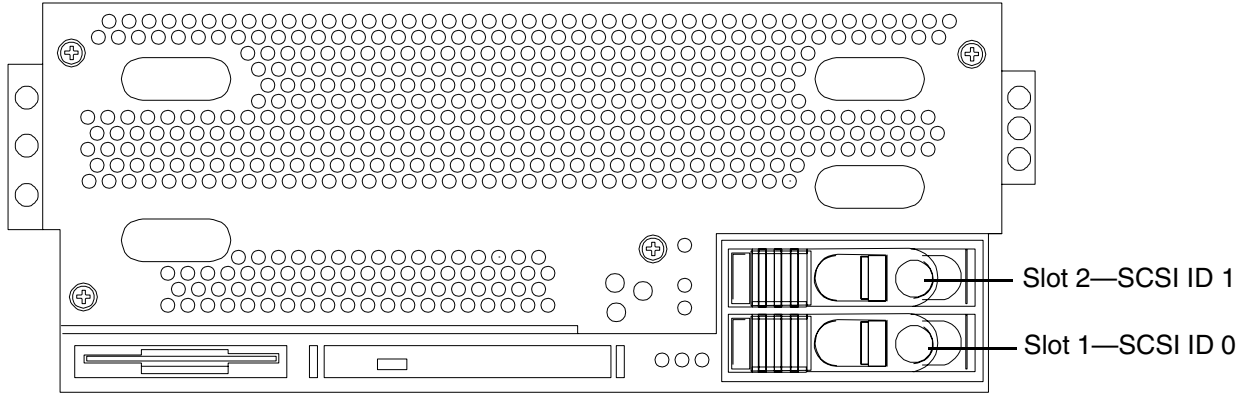


Figure 3-49 Disk Drive Installation in Slot 2

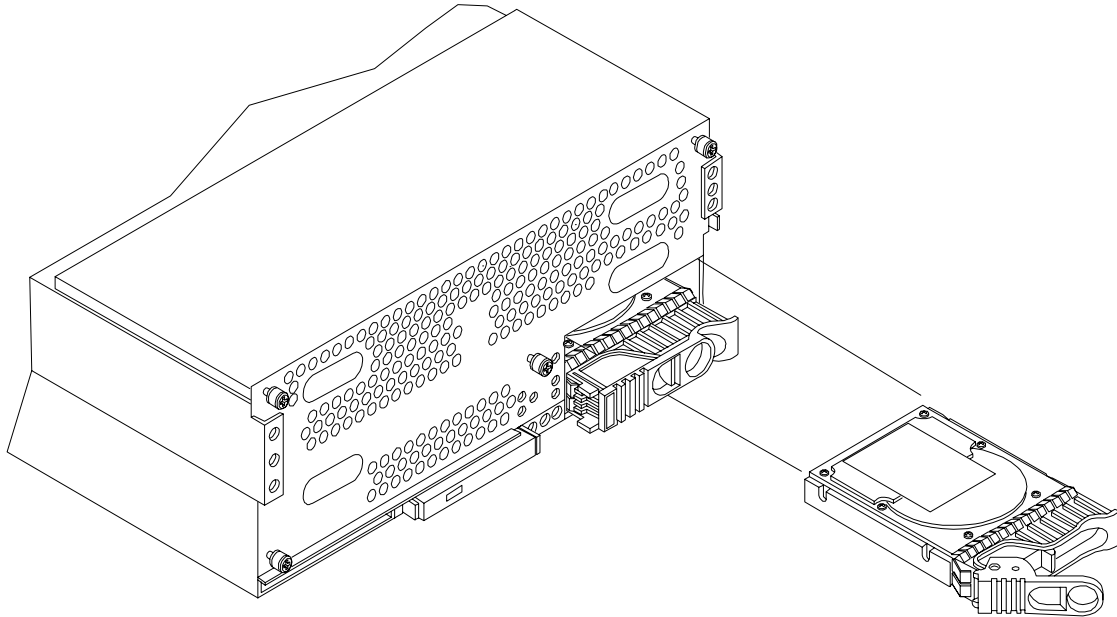
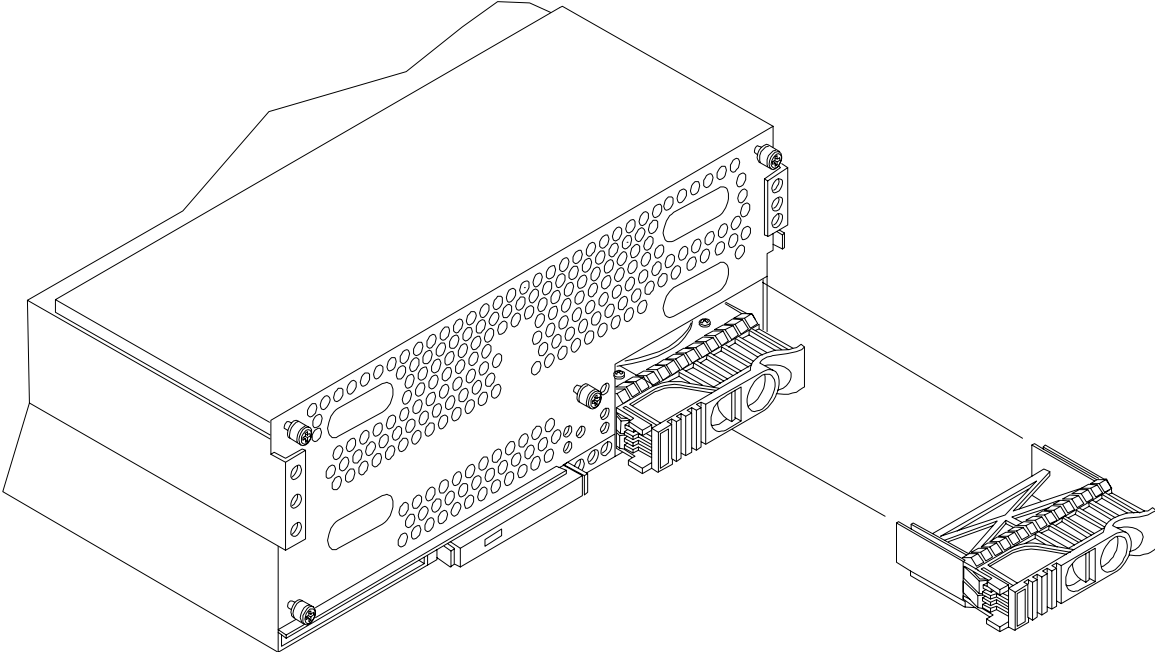


Figure 3-50 **Volume Filler Installation in Slot 2**



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.**

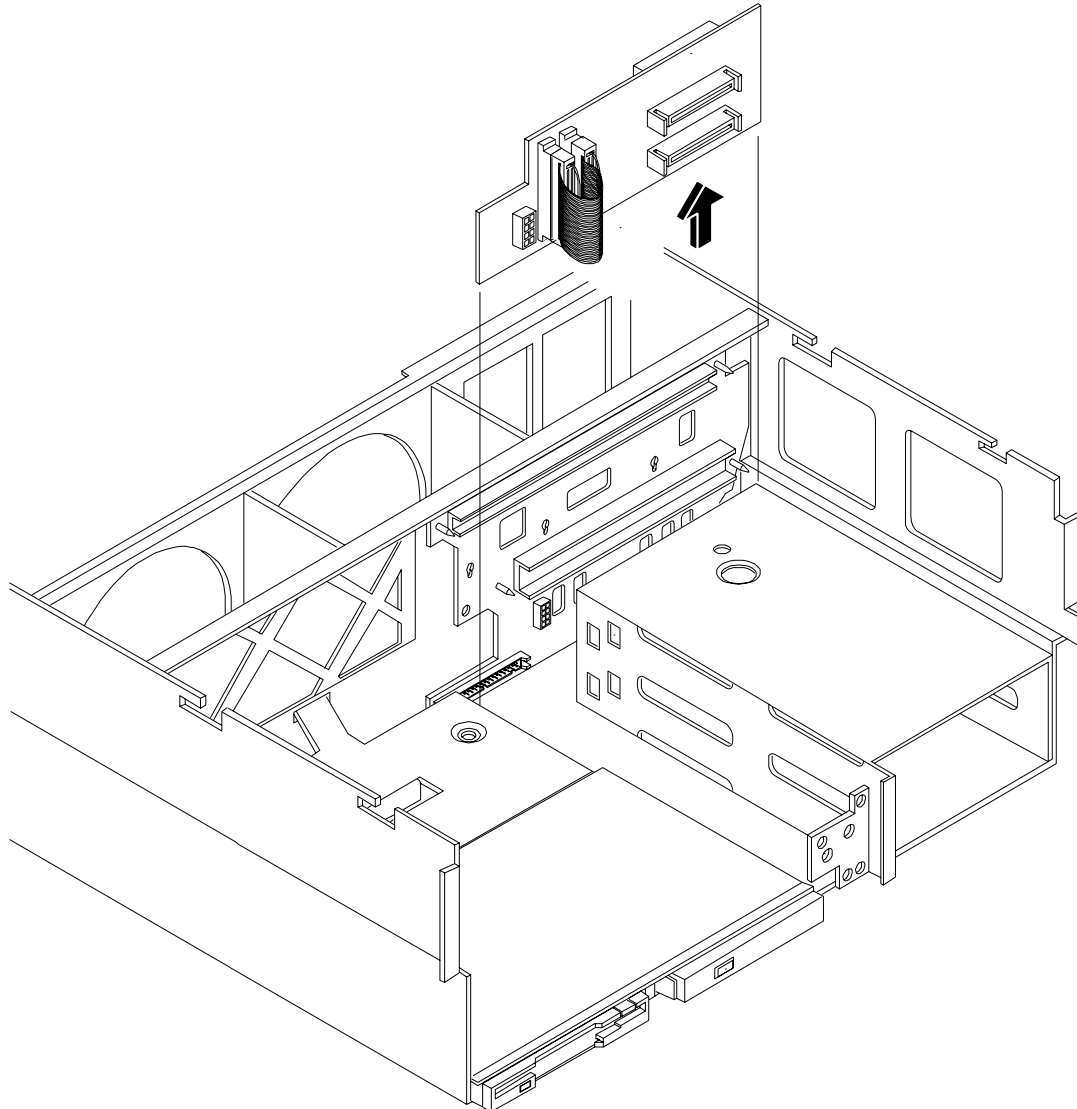
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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 3-51 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. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 3.** Remove the front cover. (See “Removing the Front Cover” on page 46.)
- Step 4.** Remove the memory extender board. (See “Removing a Memory Extender Board” on page 49.)
- Step 5.** Remove the processor extender board. (See “Removing the Processor Extender Board” on page 57.)
- Step 6.** Remove the two hot-plug disk drives. (See “Hot-Plug Disk Drives” on page 120.)

- 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.** Remove the hot plug disk drives. (See “Removing a Hot-Plug Disk Drive” on page 120.)
- Step 10.** Turn the swivel latch on top of the hot-plug hard disk drive cage to unlatch the SCSI backplane board from the cage.
- Step 11.** 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 12.** 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.** Turn the swivel latch on top of the hot-plug hard disk drive cage to latch the SCSI backplane board to the cage.
- Step 3.** Replace the two hot-plug disk drives into the disk drive cage. (See “Hot-Plug Disk Drives” on page 120.)
- Step 4.** Re-plug the SCSI backplane-to-midplane cable back into the SCSI backplane.
- Step 5.** Re-plug the internal SCSI cable(s) into the SCSI back plane.
- Step 6.** Replace the processor extender board. (See “Replacing the Processor Extender Board” on page 59.)
- Step 7.** Replace the memory extender board. (See “Replacing a Memory Extender Board” on page 51.)
- Step 8.** Replace the front cover. (See “Replacing the Front Cover” on page 47.)
- Step 9.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

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:

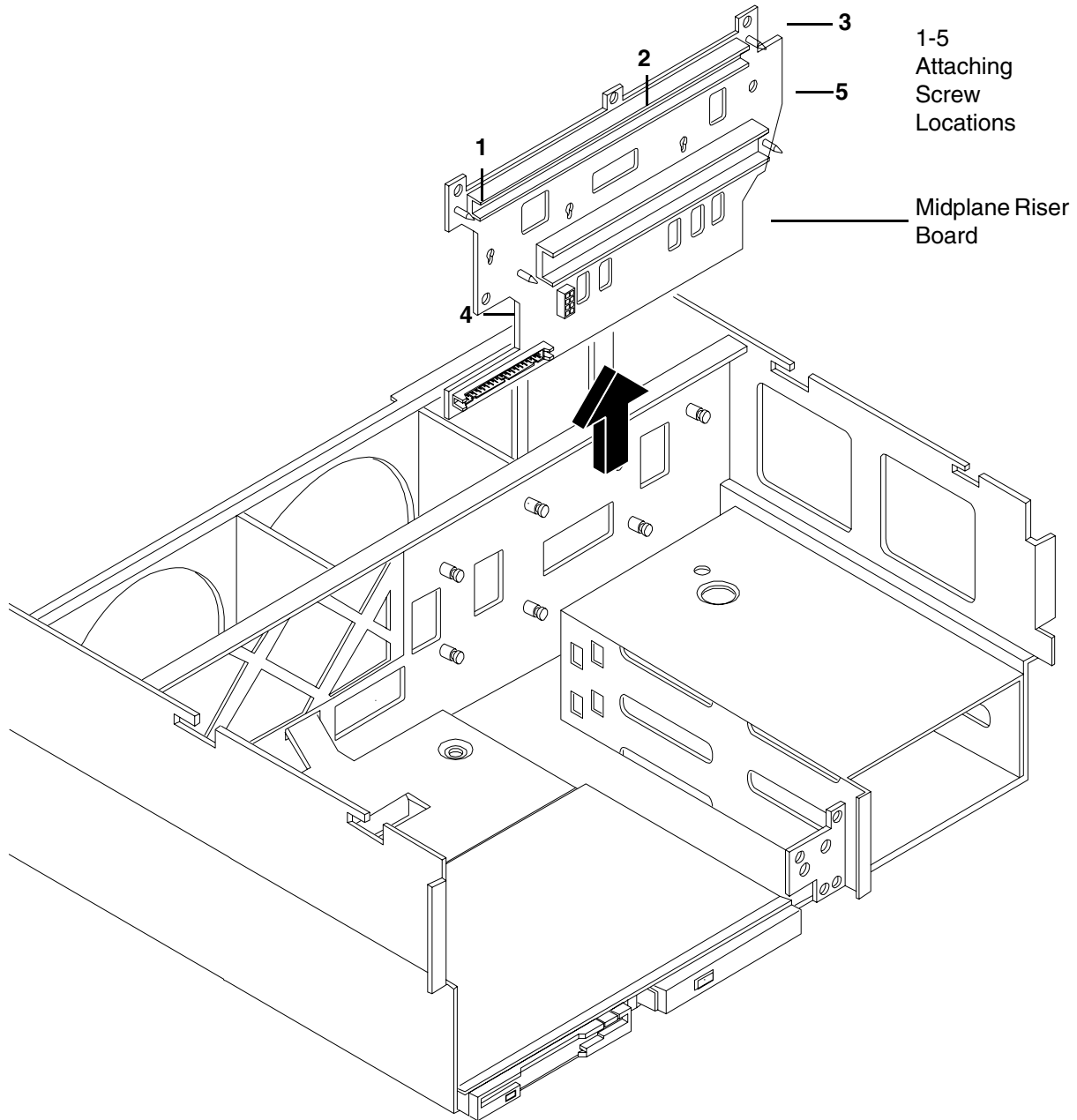
- Step 1.** If rack mounted, slide the HP server out from the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 3.** Remove the front and top covers. (See “Front and Top Covers” on page 46.)
- Step 4.** Remove the memory extender board. (See “Removing a Memory Extender Board” on page 49.)
- Step 5.** Remove the processor extender board. (See “Removing the Processor Extender Board” on page 57.)
- Step 6.** Remove the three hot-swap chassis fan units. (See “Hot-Swap Chassis Fan Unit” on page 70.)
- Step 7.** Remove the I/O baseboard assembly. (See “Removing the I/O Baseboard Assembly” on page 74.)
- Step 8.** Remove the SCSI duplex board from the SCSI backplane board. (See “Removing the SCSI Duplex Board” on page 101.)
- Step 9.** Remove the SCSI backplane board. (See “Removing the SCSI Backplane” on page 124.)
- Step 10.** Unplug the power distribution board power cable and signal cable from the midplane riser board.
- Step 11.** Remove the air baffle (A6961-0407).
- Step 12.** Release the latches on the DVD I/O board cover and front panel display board cable to disconnect the cable from the midplane riser board.
- Step 13.** 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 14. Using a Torx #15 driver, remove the five Torx screws attaching the midplane riser board to the chassis.

Step 15. 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 3-52 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 five Torx screws attaching the midplane riser board to the chassis.
- Step 3.** Plug the DVD relay board and front panel display board cable into the midplane riser board.
- Step 4.** Replace the air baffle.
- Step 5.** Plug the power distribution board power cable and signal cable into the midplane riser board.
- Step 6.** Plug the QuickFind diagnostic board cable into the midplane riser board.
- Step 7.** Replace the SCSI backplane board. (See “Replacing the SCSI Backplane” on page 125.)
- Step 8.** Replace the duplex board on the SCSI backplane board.
- Step 9.** Replace the I/O baseboard assembly. (See “Replacing the I/O Baseboard Assembly” on page 76.)
- Step 10.** Replace the three hot-swap chassis fan units. (See “Hot-Swap Chassis Fan Unit” on page 70.)
- Step 11.** Replace the processor extender board. (See “Replacing the Processor Extender Board” on page 59.)
- Step 12.** Replace the memory extender board. (See “Replacing a Memory Extender Board” on page 51.)
- Step 13.** Replace the front and top covers. (See “Front and Top Covers” on page 46.)
- Step 14.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

Hot-Swap Power Supplies

The HP 9000 rp4410 and HP 9000 rp4440 servers include one or two hot-swap power supply units (PSUs). 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. A hot-swap power supply may be replaced using the procedures in this section when power is on or off.

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 rp4410 or 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 power supply 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:

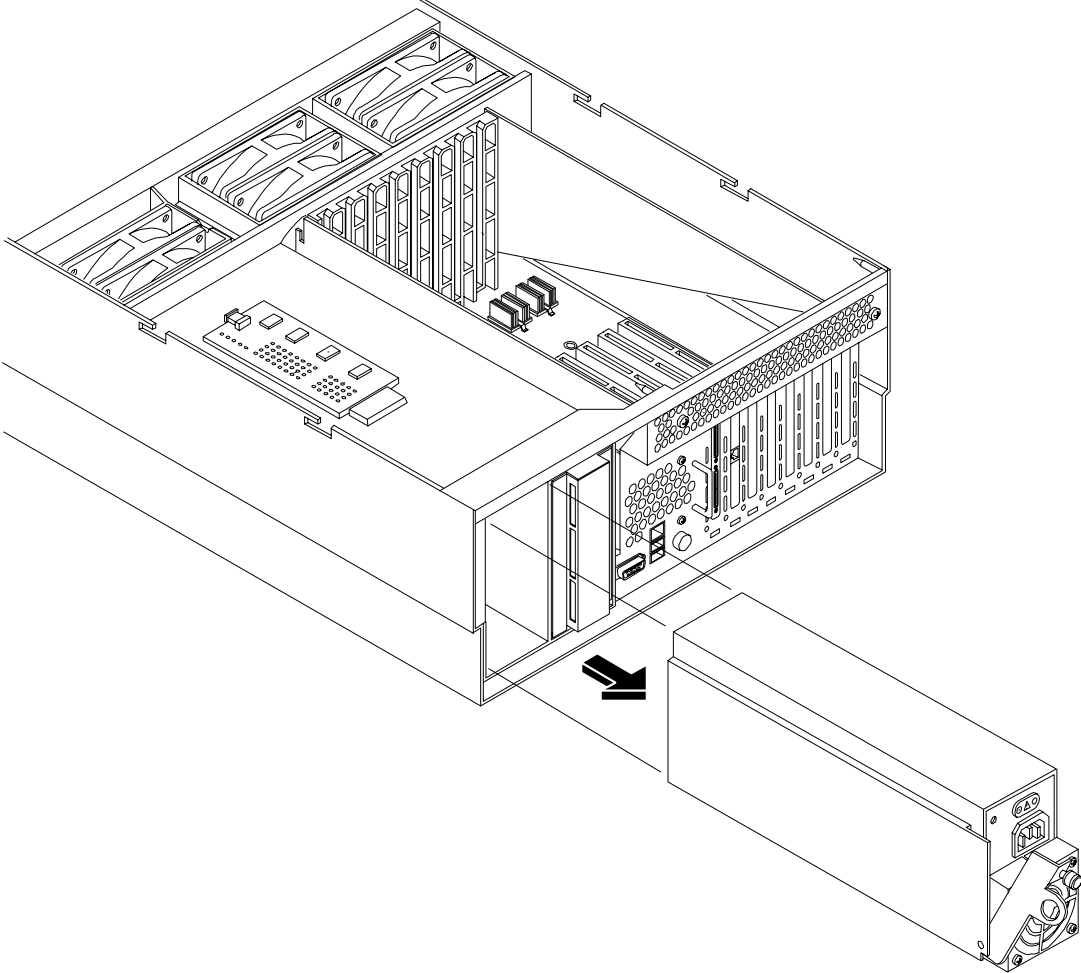
CAUTION Be careful when removing the hot-swap power supply. It is heavier than it appears.

- Step 1.** If rack mounted, slide the HP server back out of the rack until it stops. (See “Accessing a Rack Mounted Server” on page 42.)
- 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. Hand-tighten the thumbscrew.
- 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.

Figure 3-53 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.

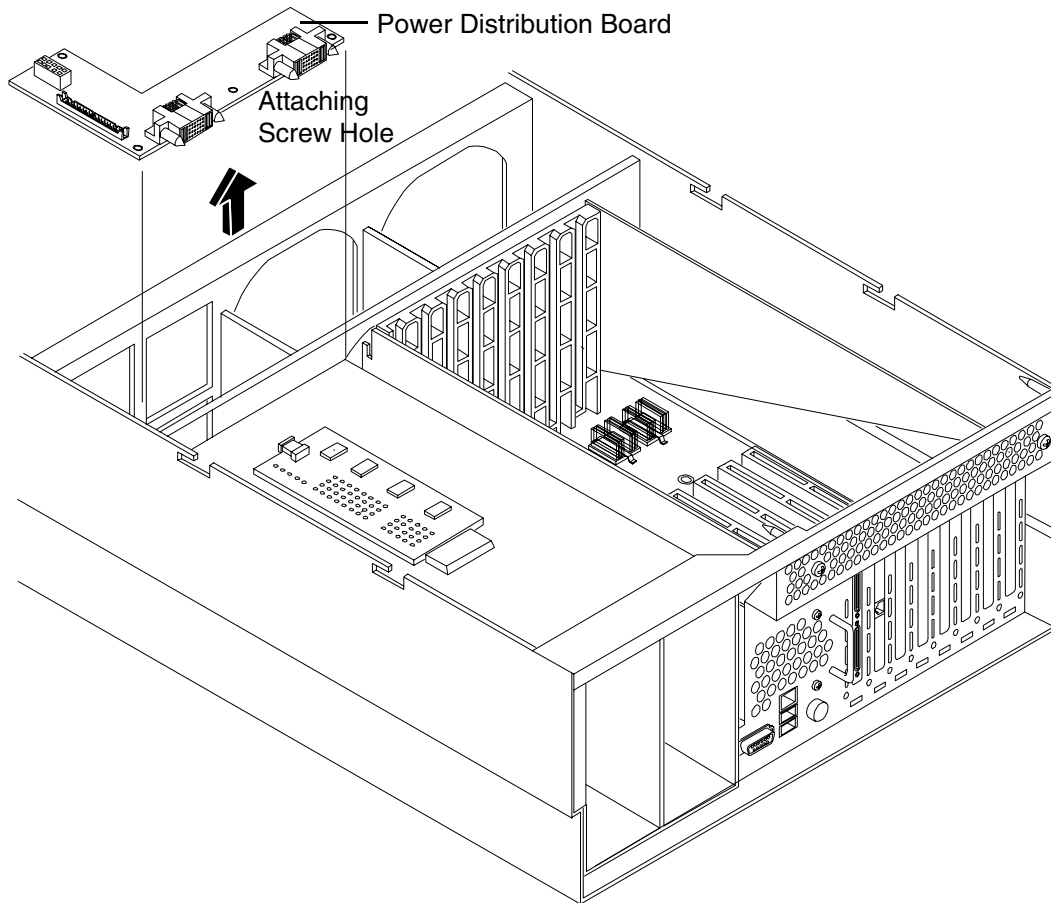
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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 3-54 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. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 47.)
- Step 3.** Remove the power supply fan unit from the chassis. (See “Removing a Hot-Swap Chassis Fan Unit” on page 71.)
- Step 4.** Remove the hot-swap power supply(s) from the chassis. (See “Removing a Hot-Swap Power Supply” on page 131.)
- Step 5.** Unplug the power cable and the signal cable from the midplane riser board.
- Step 6.** Unplug the QuickFind diagnostic board cable.
- Step 7.** Using a Torx #15 driver, loosen the one Torx screw attaching the power distribution board to the chassis.

- Step 8.** 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 and hand tightening.
- 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. (See “Replacing a Hot-Swap Power Supply” on page 131.)
- Step 5.** Replace the power supply fan unit into the chassis. (See “Replacing a Hot-Swap Chassis Fan Unit” on page 73.)
- Step 6.** Replace the top cover. (See “Replacing the Top Cover” on page 48.)

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.**

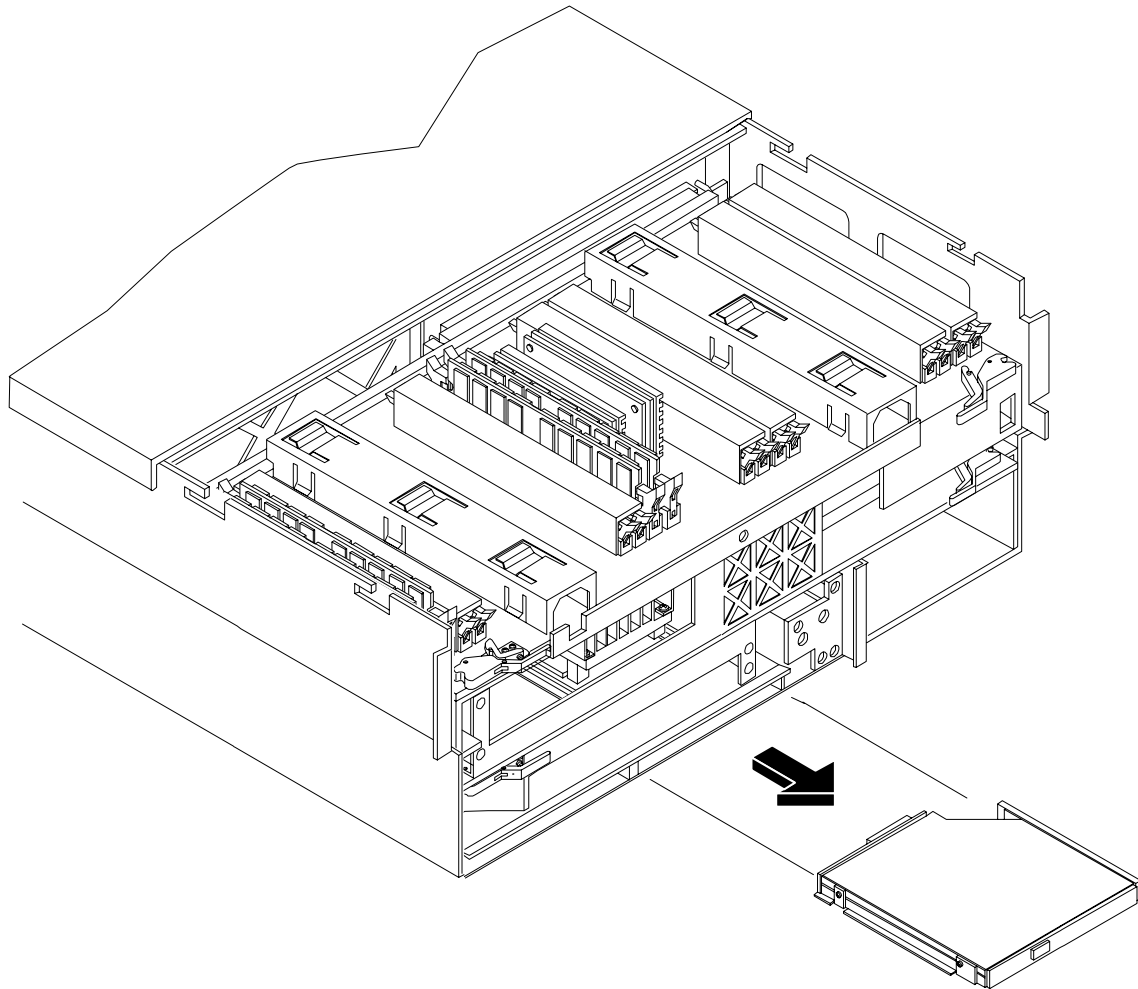
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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 3-55 DVD Drive Removal and Replacement



Removing a DVD Drive

To remove a DVD drive, perform the following steps:

- Step 1.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 2.** Grasp the front of the DVD drive and squeeze in on the locking tab to release the drive.
- 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. (See “Replacing the Front Bezel” on page 45.)

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.**

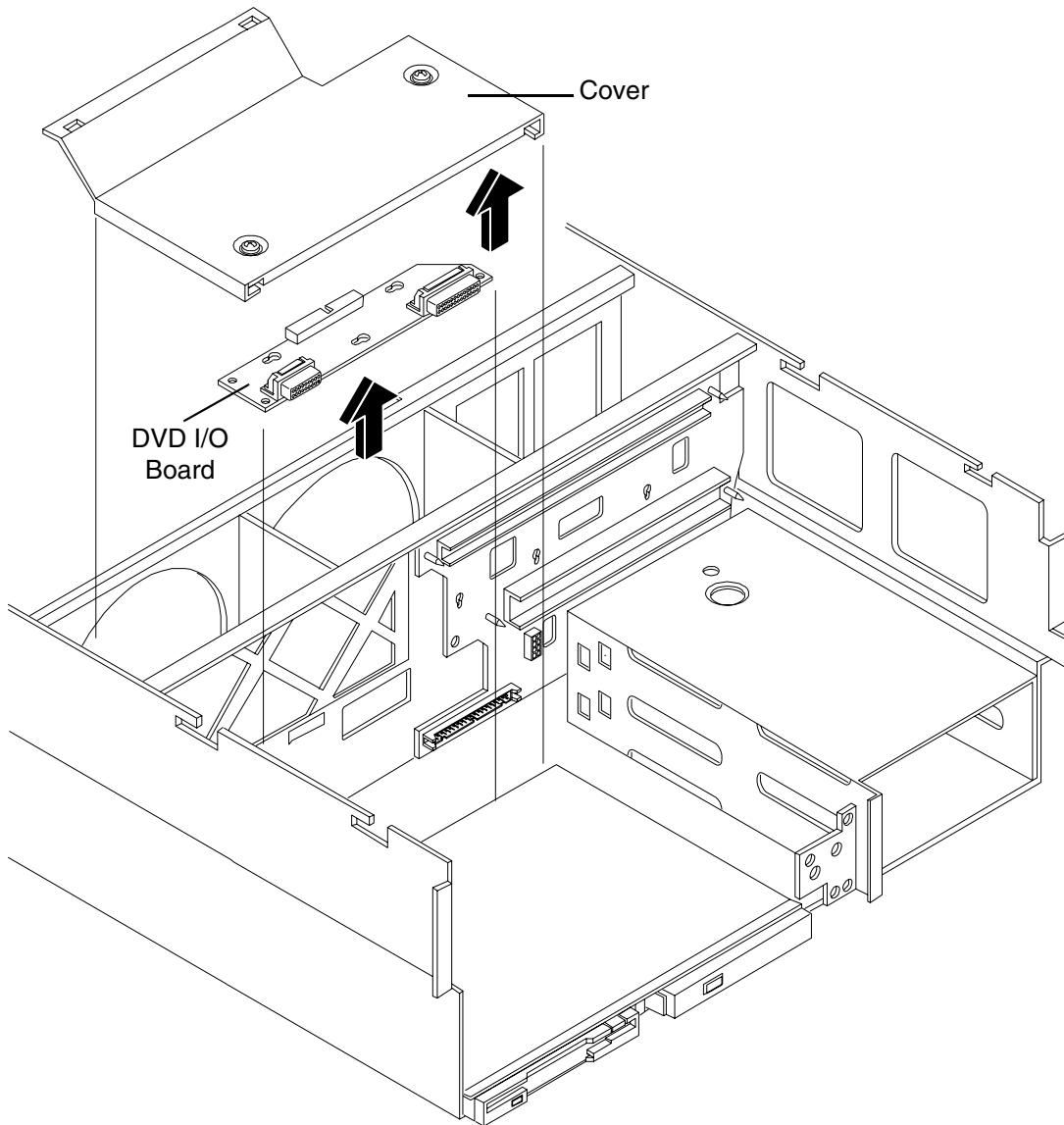
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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 3-56 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. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 3.** Remove the front cover. (See “Removing the Front Cover” on page 46.)
- Step 4.** Remove the memory extender board. (See “Removing a Memory Extender Board” on page 49.)
- Step 5.** Remove the processor extender board. (See “Removing the Processor Extender Board” on page 57.)
- 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.
- 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. (See “Replacing the Processor Extender Board” on page 59.)
- Step 5.** Replace the memory extender board. (See “Replacing a Memory Extender Board” on page 51.)
- Step 6.** Replace the front cover. (See “Replacing the Front Cover” on page 47.)
- Step 7.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

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.**

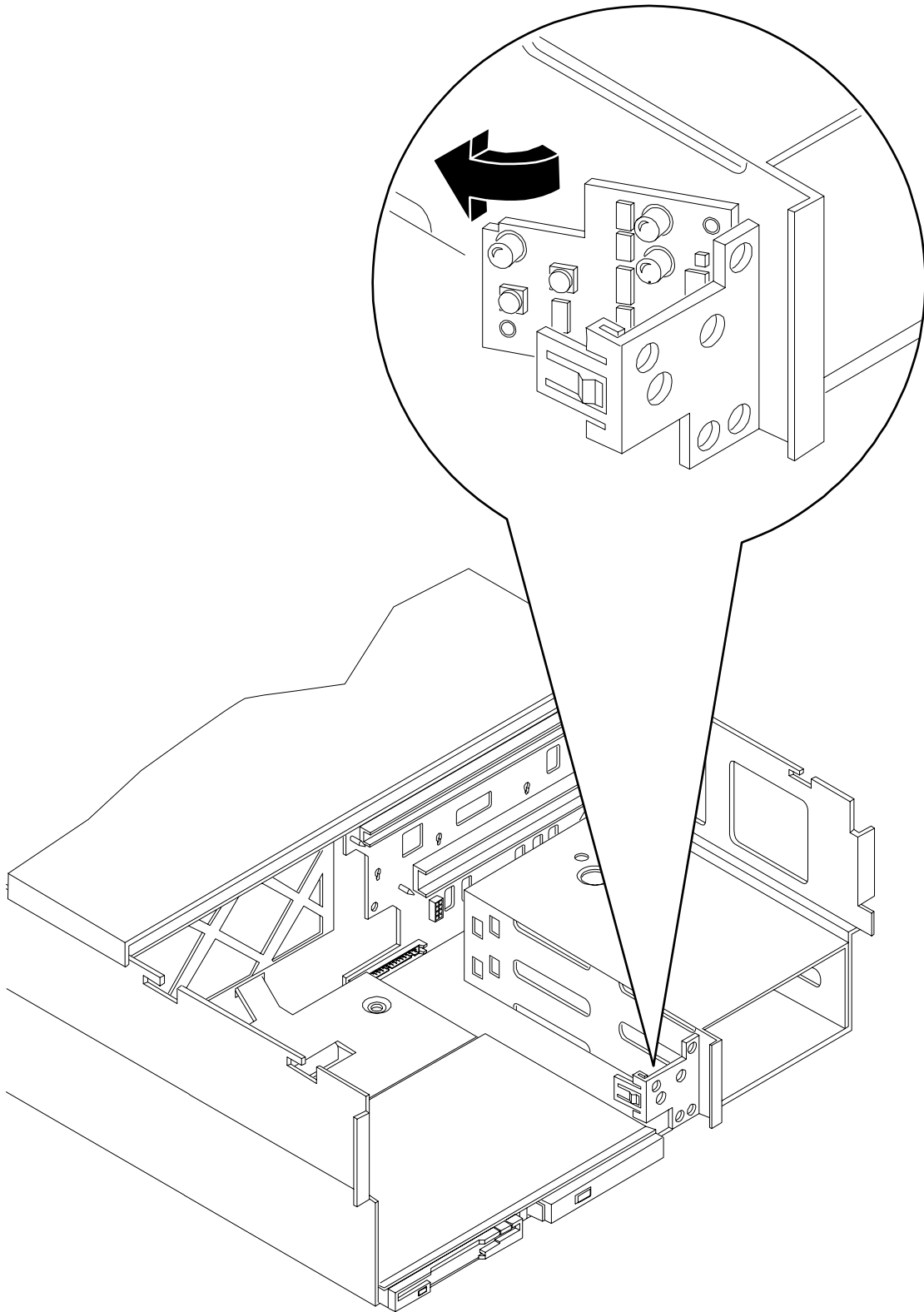
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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 3-57 **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. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the front bezel. (See “Removing the Front Bezel” on page 45.)
- Step 3.** Remove the front cover. (See “Removing the Front Cover” on page 46.)
- Step 4.** Remove the memory extender board. (See “Removing a Memory Extender Board” on page 49.)
- Step 5.** Remove the processor extender board. (See “Removing the Processor Extender Board” on page 57.)
- Step 6.** Slightly pull out the retaining tab on the chassis that holds the display board in position.
- Step 7.** Gently unplug the midplane riser board connector cable from the display board and remove the board from the chassis as shown in Figure 3-57.

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. (See “Replacing the Front Cover” on page 47.)
- Step 4.** Replace the front bezel. (See “Replacing the Front Bezel” on page 45.)

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.

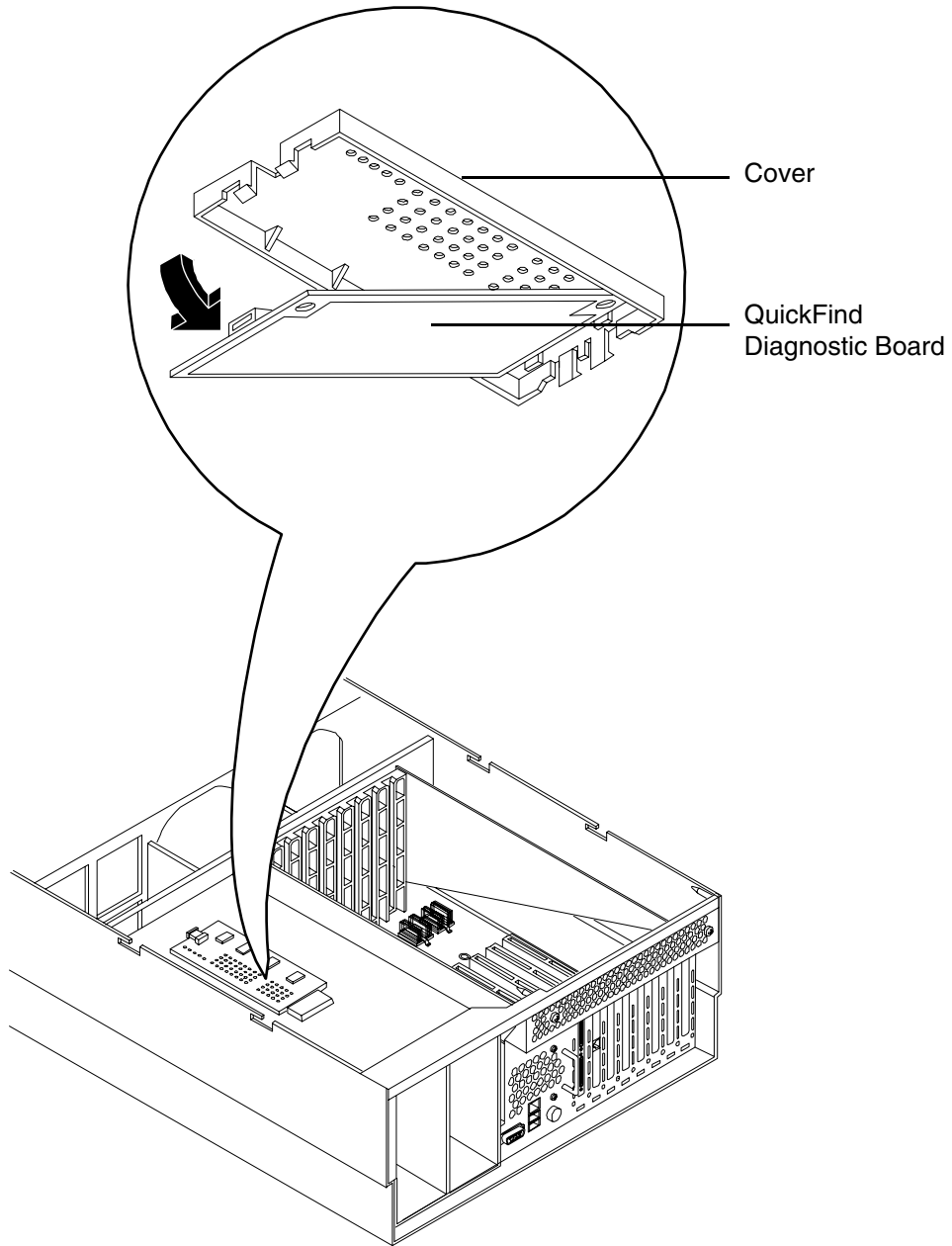
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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 3-58 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. (See “Accessing a Rack Mounted Server” on page 42.)
- Step 2.** Remove the top cover. (See “Removing the Top Cover” on page 47.)
- 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 as shown in Figure 3-58.
- 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. (See “Replacing the Top Cover” on page 48.)

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 rp4410 and HP 9000 rp4440 servers.

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

Mfg. Part No.	Description	Part Number Replacement	Part Number Exchange
Cable			
A6961-63006	Cable, Internal SCSI	A6961-63006	N/A
A6961-63005	Cable, QuickFind Diagnostic to Midplane	A6961-63005	N/A
A6961-63004	Cable, Power Distribution to Midplane Ribbon	A6961-63004	N/A
A6961-63003	Cable, Power Distribution to Midplane 10 pin	A6961-63003	N/A
A6961-63011	Cable, SCSI Controller Jumper (Simplex only)	A6961-63011	N/A
A6961-63008	Cable, SCSI Backplane to Midplane	A6961-63008	N/A
A6961-63002	Cable, Display to IDE to Midplane	A6961-63002	N/A
A7231-63024	Single channel internal SCSI cable	A7231-63024	N/A
A7231-63025	Dual channel internal SCSI cables (2)	A7231-63025	N/A
PCA Boards			
A6961-60007	PCA, Processor Extender	A6961-67007	A6961-69007
A6961-60001	PCA, I/O Baseboard (includes VRMs)	A6961-67401	A6961-69401
A6961-60204	PCA, 16 slot Memory Board	A6961-67204	A6961-69204
A7124-04006	PCA, 32 slot Memory Board	A9739-67007	A9739-69007
A6961-60005	PCA, Midplane Riser Board	A6961-67005	N/A
A6961-04075	PCA, SCSI Backplane/Management Assy, includes: Management Board (A6961-60103) and SCSI Backplane Board (A6961-60002)	A6961-67024	N/A
A6961-60106	PCA, SCSI Duplex Board (HP-UX)	A6961-67106	N/A

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

Mfg. Part No.	Description	Part Number Replacement	Part Number Exchange
A6961-60008	PCA, Front Panel Display	A6961-67008	N/A
A6961-60009	PCA, QuickFind (visual) Diagnostic Board (includes plastic cover and label)	A6961-67009	N/A
A6961-60015	PCA, Power Distribution Board	A6961-67015	N/A
A6961-60013	PCA, I/O Board to DVD connectivity (IDE/USB)	A6961-67113	N/A
A6967AX	256 MB DIMM	A6967AX	N/A
A6968AX	512 MB DIMM	A6968AX	N/A
A6969AX	1 GB DIMM	A6969AX	A6969-69001
A6970AX	2 GB DIMM	A6970AX	A6835-69001
AB475AX	4 GB DIMM	AB475AX	AB475-69001
Internal Disks/Removable Media			
A9896-64001	36 GB 15K RPM SCSI Disk (A9776A)	5065-5286EO	A9896-69001
A9897-64001	73 GB 15K RPM SCSI Disk (A9777A)	0950-4381EO	A9897-69001
A9898-64001	146 GB 10K RPM SCSI Disk (A9778A)	0950-4385E0	A9898-69001
	300 GB 10K RPM HotPlug Ultra320 SCSI LP Drive	0950-4532E0	A7384-69001
A7163-04001	DVD-R/CD-R Drive	A7163-67001	N/A
A7007-04001	DVD-R/CD-RW Drive	A7007-67001	N/A
AB349-62001	DVD-R/CD-RW Drive	AB349-67001	N/A
Fans			
A6961-04055	I/O Fan	A6961-04055	N/A
A6961-04028	Power Supply Fan	A6961-04028	N/A
Processor Modules/Assemblies			
A7125-04004	800 MHz CPU Assembly with 32 MB L2 Cache	A7125AX	A7125-69002
AB526-62001	800 MHz PA8900 CPU Assembly with 64 MB L2 Cache. Requires PDC greater than 44.21.	AD059A	AD059-69001
A7135-04004	1 GHz CPU Assembly with 32 MB L2 Cache	A7135AX	A7135-69002
AB527-62001	1 GHz PA8900 CPU Assembly with 64 MB L2 Cache. Requires PDC greater than 44.21.	AD060A	AD060-69001
Miscellaneous			
0950-4428	Power Supply	A6961-67016	N/A

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

Mfg. Part No.	Description	Part Number Replacement	Part Number Exchange
A6961-04047	PCI Card Divider (doorbell and latch included)	A6961-67020	N/A
A6961-40021	PCI Retention Clip	A6961-67021	N/A
1420-0386	System Battery	1420-0386	N/A
A6961-40034	Filler, Memory Air Blocker	A6961-40034	N/A
Rack Solutions			
5069-3305	Rack Mount Hardware, Right (included with Left Bracket in kit)	A6977-67001	N/A
5069-3306	Rack Mount Hardware, Left (included with Right Bracket in kit)	A6977-67002	N/A
A7124-04004	Bezel, Rack Mount (rp4440)	A7124-04004	N/A
A9955-4001	Bezel, Rack Mount (rp4410)	A9955-04001	N/A
A6979-04001	Rackless kit	A6979-04001	N/A
Parts Shared with Other Products			
A6825-60101	Single Port GigE LAN card (PA8800 only) N/A	A6825-67101	N/A
AB352-60001	Dual Port GigE LAN card (PA8900 only)	AB352-67001	N/A
A6829-60101	U160 Core I/O (PA8800 only)	A6829-67001	N/A
A6961-60011	U320 Dual Port SCSI (PA8900 only)	A6961-67011	N/A
309520-001N	SPS-BD, CNTRL, SMART ARRAY, 2/4CSPS (A9890A)	N/A	309520-001
309521-001N	BD, MEM, 128M, 72BT, DDR, W/BTY	309521-001	N/A

Parts Information
Field Replaceable Parts (FRU) List

B System Information

Features Summary

The following features comprise the HP 9000 rp4410 and HP 9000 rp4440 server.

Processor

- 800 MHz/1.5 GB cache or 1 GHz/1.5 GB cache per CPU
- Both processors are available with 32 MB or 64 MB L2 cache per dual processor module
- HP 9000 rp4410 server may be 1-way (one processor enabled), 2-way (both processors of a single dual processor module enabled), or 4-way (two processors enabled in each of two dual processor modules)
- HP 9000 rp4440 server may be 2-way, 4-way, 6-way, or 8-way

Memory

- 16 DIMM slots on standard memory extender board
- 32 DIMM slots on optional memory extender board
- Maximum memory size of 128 GB (4 GB DIMMs on 32-slot memory extender board)
- 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB standard 184 pins 2.5V DDR266, CL2, registered, ECC
- 133 MHz memory bus frequency, 266MT/s data, 8.5 GB/s peak data bandwidth
- DIMMs loaded by quads enable interleaved mode and chip spare

PCI Riser

- 2 dedicated PCI slots for core I/O. Slot 1 is for SCSI; slot 2 is for LAN
- 4 hot-plug PCI-X 66 MHz 64-bit 3.3V 25W slots with shared busses and I/O. Slots 3 and 4 share capabilities and slots 5 and 6 share capabilities
- 2 hot-plug PCI-X 133 MHz 64-bit 3.3V 15W slots

Internal Core I/O

- Dual channel SCSI U320 or U160 (PA8800 only) interface or RAID, two internal 68-pin connectors, two 68-pin external connectors
- The SCSI backplane is configured as either one or two channels
- One internal IDE connector for a slim-line optical device (CD and DVD)
- No floppy connector
- Optional dual channel U320 RAID controller, two internal 68-pin connectors, two 68-pin external connectors; replaces SCSI interface

External Core I/O

- Three external serial ports
- Two external USB ports
- Two SCSI U320 or U160 68-pin connectors (U160 for PA8800 only)
- Two or one 10/100/1000Base-T ethernet LAN connector for copper cable
- Two USB 2.0 ports
- Three DB-9 ports (Console, UPS, and Modem)
- Optional dual channel U320 RAID controller, two 68-pin external connectors; replaces SCSI interface

Power Supply Unit

- 1200W output power
- Redundant and hot-swap power supplies

I/O Baseboard Manageability

- Baseboard Management Controller (BMC)
- Temperature monitoring and fans regulation by BMC
- Includes diagnostic panel LED display that shows system health
- Hardware diagnostics by BMC displayed by diagnostic panel LED
- IPMI protocol for communication between BMC/system/MP card
- Locator front/rear LEDs
- Field replacement units monitoring by BMC

Enhanced Server Manageability Using the Management Processor

- LAN telnet console
- Web GUI
- Serial port for local console
- Serial port for modem console
- Duplication of console screen content across all consoles

Hard Disk Drives

- Two, half-height hard disk drives (1-inch height)

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 B-1 Internal Disk and DVD Paths

Slot	Function Associated with Path	Location	Path(s)
Disk slot 1 (SCSI ID = 0)	SCSI I/O for bottom removable disk	Bottom disk	0/1/1/0.0.0 (simplex mode) 0/1/1/1.0.0 Channel B (duplex mode)
Disk slot 2 (SCSI ID = 1)	SCSI I/O for top removable disk	Top disk	0/1/1/0.1.0 Channel A (duplex mode)
DVD slot	IDE I/O for DVD	DVD slot	0/0/3/0.0

Table B-2 Extended Core I/O Paths

Slot	Function Associated with Path	Location	Path(s)
Core I/O	RS-232 Connector Port (communications controller)	Rear-panel bulkhead connector (labeled MP local and auxiliary)	0/0/1/0
Core I/O	MP Local and Remote ports (serial controller)	Rear-panel bulkhead connector (labeled Remote)	0/0/1/1
Core I/O	Ultra 3 (U160/320) external SCSI port	Rear-panel SCSI connector (upper connector)	0/1/1/1.x.y
Core I/O	USB port	Upper rear-panel bulkhead connector (labeled USB1)	0/0/2/0
Core I/O	USB port	Lower rear-panel bulkhead connector (labeled USB2)	0/0/2/1
Core I/O	IDE controller	On I/O backplane	0/0/3/0
Core I/O	VGA controller	Rear-panel bulkhead connector (labeled VGA)	0/0/4/0

Table B-3 PCI I/O Paths

Slot	Function Associated with Path	Location	ACPI Path
Slot 1 (core I/O SCSI)	Ultra 160/320 dual SCSI channel	Left-most slot (nearest to center of baseboard)	0/1/1/0 Channel A 0/1/1/1 Channel B
Slot 2 (core I/O LAN)	Gigabit LAN	2nd from left	0/1/2 0/1/2/1 (dual port LAN only)
Slot 3	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 4)	3rd from left	0/4/1
Slot 4	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 3)	4th from left	0/4/2
Slot 5	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 6)	5th from left	0/5/1
Slot 6	I/O with 66 MHz/ 64 bit PCI-X card (shared with slot 5)	6th from left	0/5/2
Slot 7	I/O with 133 MHz/ 64 bit PCI-X card	7th from left	0/2/1
Slot 8 (right)	I/O with 133 MHz/ 64 bit PCI-X card	Right-most slot (nearest to edge of baseboard)	0/6/1

System I/O Board Switches and Jumpers

The following descriptions are for reference only.

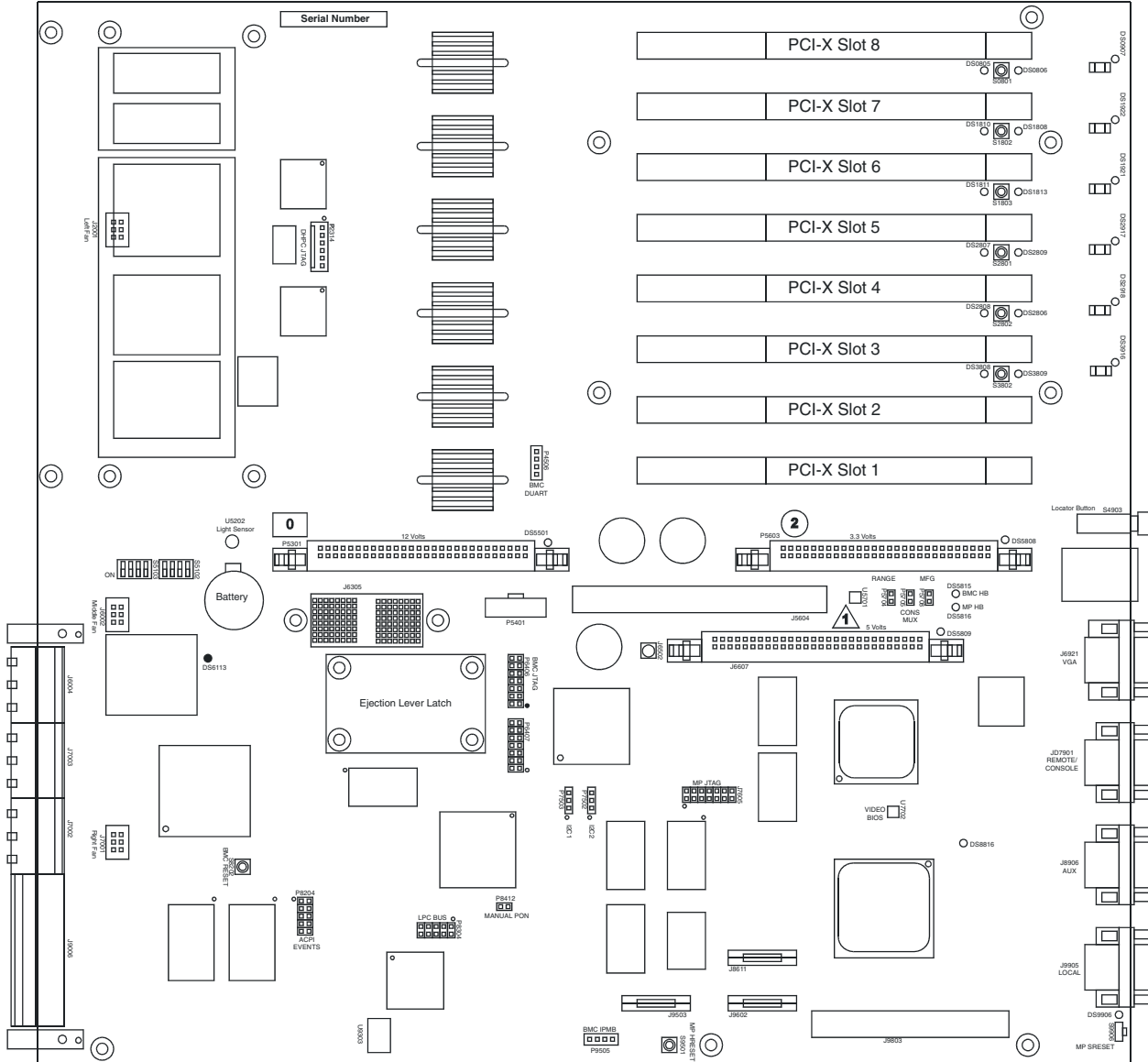


Table B-4 System I/O Board Indicators, Connectors, and Jumpers

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 Off-rp4410/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	N/A
DS2918	Slot 4 attn	P7503	12C bus 1 header		

Table B-4 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 for ropes		
		J5910	Dual USB and MP card 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		

A

Accessing a Rack Mounted HP Server, 42
 Accessing a Rackless HP Server, 44
 Antistatic Wrist Strap, 41
 antistatic wrist strap, 114

B

Backplane, SCSI
 Remove, 124
 Replace, 125
 Battery, Replacement, 80
 Bootring the Server, 23

C

command interface *See also* MP Main Menu
 commands, 21
 Command Menu commands, 21, 21-??
 Commands
 ODE, 30
 Control Panel, Front, LEDs, 33
 Core I/O
 External, 152
 Internal, 151
 Core I/O Connections, 13
 Core PCI cards
 installing, 114, 116
 Cover, Top
 Remove, 47
 Replace, 48

D

DIMM Memory
 Installing, 52
 Disk Drive Backplane
 Features, 152
 Disk Drive, Hot-Plug, 120
 Remove, 120
 Replace, 120
 Display Board
 Remove, 143
 Replace, 143
 DVD Drive
 Remove, 137
 Replace, 137
 DVD I/O Board
 Remove, 140
 Replace, 140
 dynamic DNS *See* DDNS

E

Event Monitoring Service (EMS), 27
 Extender Board, Memory
 16-DIMM, 40
 32-DIMM, 39
 Remove, 49
 Replace, 51
 Extender Board, Processor
 Remove, 57
 Replace, 59

External Core, Features I/O, 152

F

Fan, Hot-Swap
 Remove, 71
 Replace, 73
 Features
 External Core I/O, 152
 Internal Core I/O, 151
 Memory, 151
 Motherboard Manageability, 152
 PCI Riser, 151
 Power Supply Unit, 152
 Processor, 151
 Field Replaceable Unit (FRU) List, 147
 Front and Top Cover, Remove and Replace, 46
 Front Bezel
 Remove, 45
 Replace, 45

H

Hard Drive
 Features, 152
 Hot-Plug
 OLA, 82
 OLR, 82
 Hot-Swap Fan, 70
 HyperTerm, 15

I

I/O Baseboard
 LEDs, 37
 Remove, 74
 Replace, 76
 I/O, External Core, 152
 I/O, Internal Core, 151
 iLO
 overview, 14-??
 iLO *See also* MP
 Integrated Lights-Out Management Processor *See*
 iLO
 Internal Core I/O, Features, 151

J

Jumpers and Switches, System I/O Board, 151

L

LAN port
 configuring a static IP address (non-DHCP), 15
 configuring the IP address, 15-16
 LEDs
 Control Panel, 33
 I/O Baseboard, 37
 Memory Extender Board, 38
 QuickFind Diagnostic Panel, 35
 Troubleshooting, 33

Index

M

management processor *See* iLO

Memory

Features, 151

Memory Extender Boards

LEDs, 32-DIMM, 39

Remove, 52

Replace, 52

Memory, DIMM, 52

Description, 151

Midplane Riser

Remove, 126

Replace, 129

MP

accessing, 16

commands, 19

configuring for LAN, 18

interacting with, 17

local terminal access to, 16

Main Menu, 17

MP LAN port IP address

configuring a static IP address (non-DHCP), 15

configuring an IP address (DHCP), 18

LC command, 19

MP Main Menu commands, 21–??

MP *See also* iLO

O

Offline Diagnostic Environment (ODE), 30

Commands, 30

OLX Divider

Remove, 98

Replace, 98

P

Parts List (FRU), 147

PCI Card

Replace, 94

PCI Cards

Remove, 93

PCI Riser

Features, 151

Power Button, 25

Power Distribution Board

Remove, 134

Replace, 135

Power Supply, Hot-Swap, 130

Features, 152

Load Order, 130

Remove, 131

Replace, 131

Processor

Load Order, 61

Remove, 63

Replace, 65

Processor Extender Board

Remove, 57

Replace, 59

Processor Module

Description, 151

Features, 151

Processors

Installing, 61

Putty, 15

Q

QuickFind Diagnostic Board

LEDs, 35

Remove, 146

Replace, 146

R

Reflection 1, 15

Remove and Replace

Accessing a Rack Mounted HP Server, 42

Accessing a Rackless HP Server, 44

Battery, 80

Bezel, Front, 45

DIMMs, 52

Disk Drive, Hot-Plug, 120

Display Board, 141

DVD Drive, 136

DVD I/O Board, 138

Extend HP Server from Rack, 42

Extender Board, Memory, 49

Fan, Hot-Swap, 70

I/O Baseboard, 74

Memory Extender Board, 49

Midplane Riser Board, 126

OLX Dividers, 95

Panel, Front, 46

PCI/PCI-X Cards, 82

Power Supply, Hot-Swap, 130

Processor, 61

Processor Extender Board, 57

QuickFind Diagnostic Board, 144

SCSI Backplane, 123

Tools Required, 41

Riser, Midplane

Remove, 126

Replace, 129

S

SCSI

duplex, converting from, 107

duplex, converting to, 107

simplex to duplex, 99, 107

SCSI Backplane

Remove, 124

Replace, 125

Service Tools, 114

static IP address (non-DHCP)

configuring, 16

configuring the MP LAN port, 15

set up local terminal access, 15

Support Tools Manager (STM), 27

Switches and Jumpers, System I/O Board, 151

System Event Log, 28

System I/O Board, 151

T

terminal access, 15

Tools Required for Removal and Replacement, 41

Troubleshooting

Management Processor, 28

Methodology, 25

System Event Logs (SEL), 28

Using LEDs, 33

Using Offline Support Tools, 30

Offline Diagnostic Environment (ODE), 30

Using Online Support Tools, 27

Event Monitoring Service (EMS), 27

Support Tools Manager (STM), 27