hp 9000 rp3410 and rp3440 Operation and Maintenance Guide

Regulatory Model Number: FCLSA-0201

Version 2.0

Manufacturing Part Number: rp3410_rp3440_opmaint
January 2004

U.S.A.

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1 About This Document

This document describes how to operate and maintain your hp 9000 rp3410 or hp 9000 rp3440 Server, Regulatory Model Number: FCLSA-0201.

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

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What's in This Document

The *hp 9000 rp3410 and hp 9000 rp3440 Operation and Maintenance Guide* contains these chapters:

- **Chapter 2, "Controls, Ports and Indicators."** Use this chapter to learn about the front panel controls, rear panel ports and connectors, and all system LED locations and functions.
- **Chapter 3, "External Connectors."** Use this chapter to learn about all external connectors, plugs, and their pinouts.
- **Chapter 4, "Installing and Configuring."** Use this chapter to learn how to install additional hot-swap disk drives and an additional hot-swap power supply. Installation procedures for additional memory (DIMMs), PCI-X cards, and an additional processor module are provided for powered down servers. Also, learn how to configure your management processor card and boot your HP Server.
- **Chapter 5, "Utilities."** Use this chapter to learn how to navigate in the boot console handler (BCH) and management processor environments.
- **Chapter 6, "Troubleshooting."** Use this chapter to learn how to perform minimal troubleshooting of your system.
- **Chapter 7, "Removing and Replacing Components."** Use this chapter to learn how to remove and replace all Field Replaceable Units (FRUs) in your system.
- **Appendix A, "Parts Information."** Use this appendix to see a list of all FRUs.
- **Appendix B, "Specifications."** Use this appendix to learn the basic mechanical specifications of your HP Server.
- **Appendix C, "System Information."** Use this appendix to learn the basic system information of your HP Server.

Typographical Conventions

This document uses the following conventions.

Title	The title of a document or a CD.
KeyCap	The name of a keyboard key. Note that **Return** and **Enter** both refer to the same key.

Emphasis	Text that is emphasized.
Bold	Text that is strongly emphasized, such as the summary text in bulleted paragraphs.
`ComputerOut`	Text displayed by the computer.
`UserInput`	Commands and other text that you type.
`Command`	A command name or qualified command phrase.

Related Documents

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

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For the latest information on HP-UX patches, check the HP IT Resource Center at http://itrc.hp.com.

Information to Collect Before You Contact Support

Before you contact HP support, you should:

Step 1. Check information on troubleshooting and attempt to solve the problem. See Chapter 6, “Troubleshooting.”

- Note failure symptoms and error indications (LEDs and messages) by checking the SEL and FPL logs.
- Try to determine precisely what did or did not happen.

Step 2. Collect the following information:

- The model number of your server (for example, rp3410).
- The product number of your server. This can be found on the identification label, which is found at the front of the unit (typically A6837B A6838B, and so on).
- The serial number of your server. This can be found on the identification label.

Step 3. Become familiar with your system configuration:

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

Step 4. Determine the following:

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

2 Controls, Ports and Indicators

This chapter describes the controls, ports, and indicators found on the front panel and rear panel locations of the hp 9000 rp3410 or hp 9000 rp3440 Server. The hp 9000 rp3410 or hp 9000 rp3440 Server is designed to be rack mounted.

Control Panel

The control panel of the hp 9000 rp3410 or hp 9000 rp3440 Server provides the controls and indicators commonly used for operation.

Figure 2-1 Front View

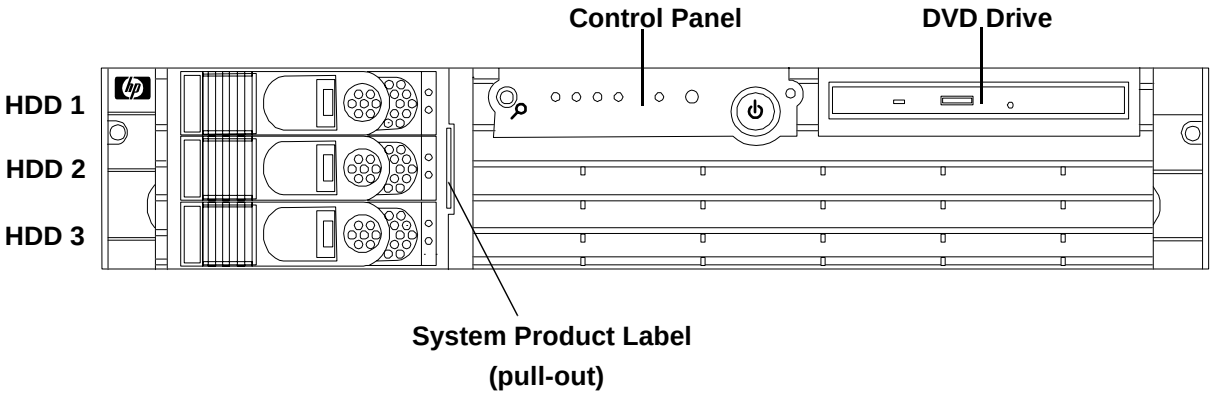


Figure 2-2 Control Panel

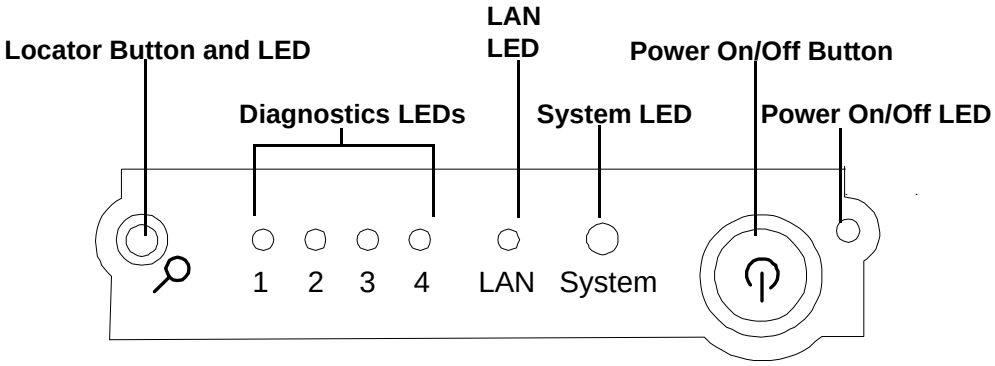


Table 2-1 Control Panel LEDs and Switches

Name	Function
Power On/Off LED	The green on/off LED is illuminated when the power is on.
Power On/Off Button	This is the power on/off switch for the server.
System LED	The System LED provides information about the system status. When operation is normal, the LED is green. When there is a system warning, the LED is flashing yellow. When there is a system fault, the LED is flashing red.[a]
LAN LED	The LAN LED provides status information about the LAN interface. When the LAN LED is flashing, there is activity on the LAN.
Diagnostic LED 1	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system.[a]
Diagnostic LED 2	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system.[a]
Diagnostic LED 3	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system.[a]
Diagnostic LED 4	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system.[a]
Locator Button and LED	The locator button and LED are used to help locate this server within a rack of servers. When the button is engaged, the blue LED illuminates and an additional blue LED on the rear panel of the server illuminates. This function may be remotely activated.

a. See Chapter 6, Troubleshooting, for details on information provided by the system and diagnostic LEDs.

Additional Controls and Indicators

The hp9000 rp3410 or hp 9000 rp3440 Server can have up to three low-voltage differential (LVD), 3.5 inch form factor hard disk drives (HDDs) installed. These hard disk drives have LEDs that provide status and activity information.

Hard Disk Drive Indicators

The hard disk drives have two LEDs per drive, as described below.

- Status LED—The Drive Status LED is tri-color and may display green, yellow, or red at any given time. These colors indicate a normal, warning, or failure condition.

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

Figure 2-3 Hard Disk Drive LED Indicators

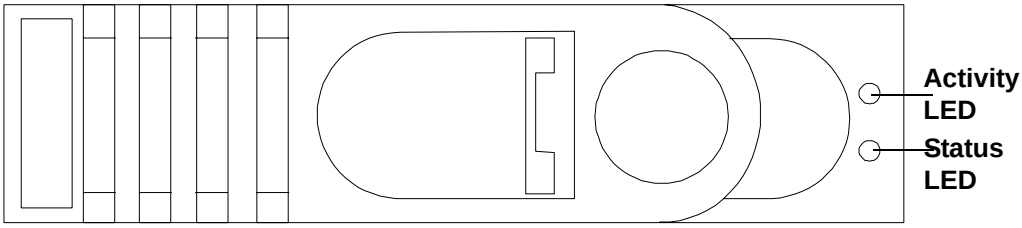


Table 2-2 Hard Disk Drive LED Definitions

LED	Activity	Description
Activity LED	Flashing green	Drive access under hard drive control
Status LED	Solid red	Drive fault
	Slow flashing yellow	Drive predictive fault
	Green	Drive/slot normal (drive present)
	Blank	Pass through mode

Optional Removable Media Drive

The hp 9000 rp3410 or hp 9000 rp3440 Server is delivered without a removable media drive. Either a DVD-ROM or CD-RW/DVD-ROM drive may be added. Each of these optional devices has one activity LED.

Figure 2-4 DVD–ROM

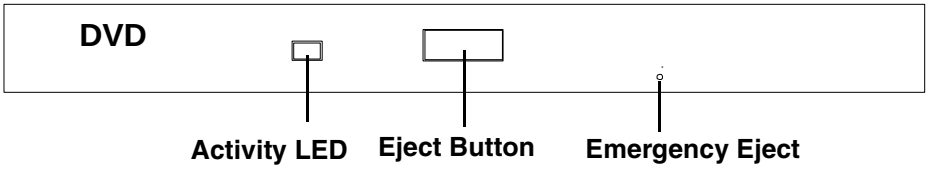


Table 2-3 DVD Drive LED Definitions

LED		Description
Activity LED	Flashing green	Drive activity

Rear Panel

The hp 9000 rp3410 or hp 9000 rp3440 Server rear panel includes communication ports, I/O ports, AC power connector, and the locator LED/button. Additional LEDs located on the rear panel of the hp 9000 rp3410 or hp 9000 rp3440 Server signal the operational status of:

- Management Processor Card LAN

Figure 2-5 Rear View

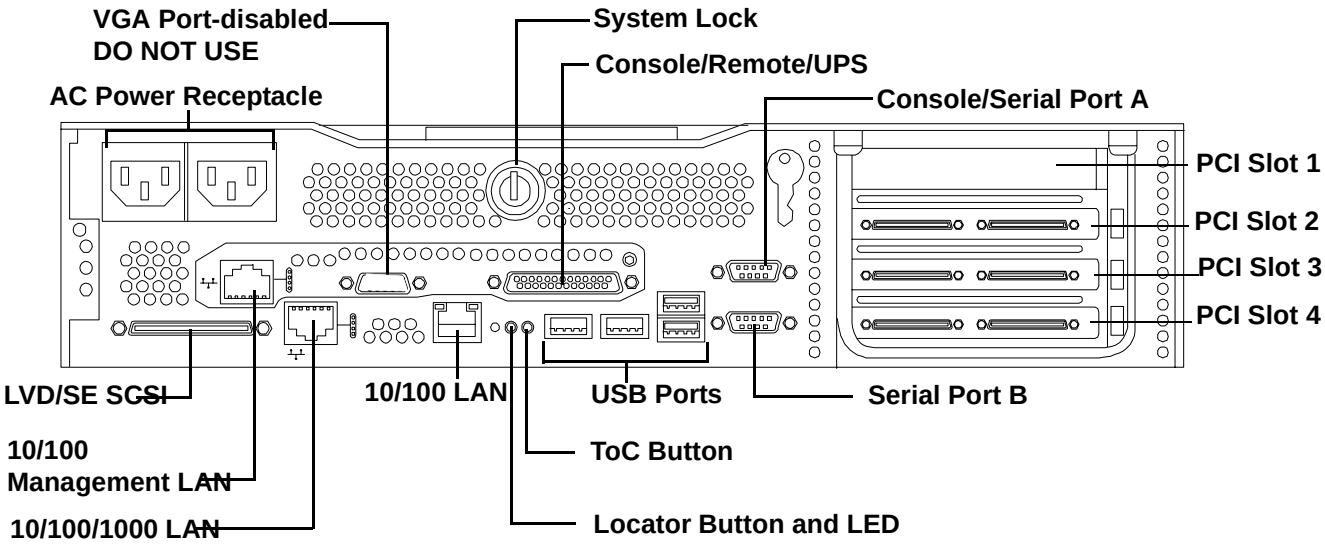


Table 2-4 Rear Panel Connectors and Switches

Connector/Switch	Function
AC Power	Primary power connection for the server
LVD/SE SCSI	68-pin, low-voltage differential, single-ended U320 SCSI. This connector provides external SCSI connection on SCSI Channel B.
(1 Gb) 10/100/1000 LAN	10/100/1000 base-T ethernet LAN connector
10/100 Standard Management LAN	10/100 base-T ethernet LAN connector Wake-on-LAN, Alert-on-LAN capabilities
Serial A (console) & Serial B	9-pin male serial connectors
USB	Four universal serial bus (USB 2.0) connectors
ToC	Transfer of control button. Halts all system processing and I/O activity and restarts the computer system.

Table 2-4 Rear Panel Connectors and Switches (Continued)

Connector/Switch	Function
Locator Button and LED	The locator button and LED are used to help locate a server within a rack of servers. When the button is engaged, the blue LED illuminates and an additional blue LED on the front panel of the server illuminates. This function may be remotely activated.
Video (not used)	15-pin female video connector. DISABLED-DO NOT USE. To enable video capability you must obtain the supported A6150 video PCI card. See enclosed ReadMe, A6150-90001.
Console/Remote/UPS	25-pin female serial data bus connector for the management processor card
10/100 MP LAN	10 Mb/100 Mb LAN connector for the management processor card

10/100/1000 base-T ethernet LAN Connector

The rear panel 10/100/1000 base-T ethernet LAN connector has the following status and activity LEDs.

Figure 2-6 10/100/1000 base-T ethernet LAN Connector LEDs

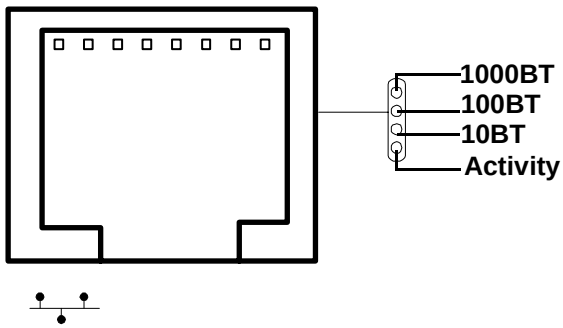


Table 2-5 10/100/1000 base-T ethernet LAN Connector LEDs

LED	Description
1000BT	Blinking green—the 1000MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
100BT	Blinking green—the 100MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
10BT	Blinking green—the 10MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
Activity	Blinking green—LAN activity

10/100 base-T ethernet LAN Connector

The rear panel 10/100 base-T ethernet LAN connector has the following status and activity LEDs.

Figure 2-7 10/100 base-T ethernet LAN Connector LEDs

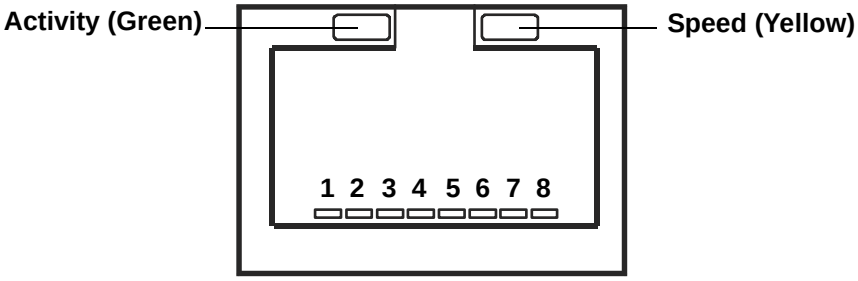


Table 2-6 10/100 base-T ethernet LAN Connector LEDs

LED	Description
Speed (yellow)	Off—port linked at 10Mbps, On—port linked at 100Mbps
Activity (green)	Off—no link established, On—port linked

Management Processor Card LAN LEDs

The management processor LAN uses an RJ-45 type connector. This connector has four LEDs that signal status and activity.

Figure 2-8 Management Processor Card LAN LEDs

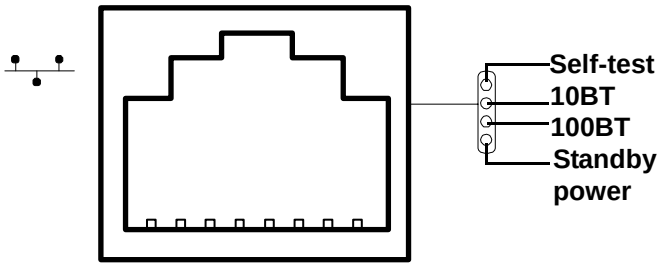


Table 2-7 Management Processor Card LAN LEDs

LED	Description
Self-test	Yellow—MP is running self-test or error detected
10BT	Green—10BT link established, blinking green—10BT link activity, off—no link
100BT	Green—100BT link established, blinking green—100BT link activity, off—no link

Table 2-7 Management Processor Card LAN LEDs (Continued)

LED	Description
Standby Power	Green - Standby power on, off - standby power off

3 External Connectors

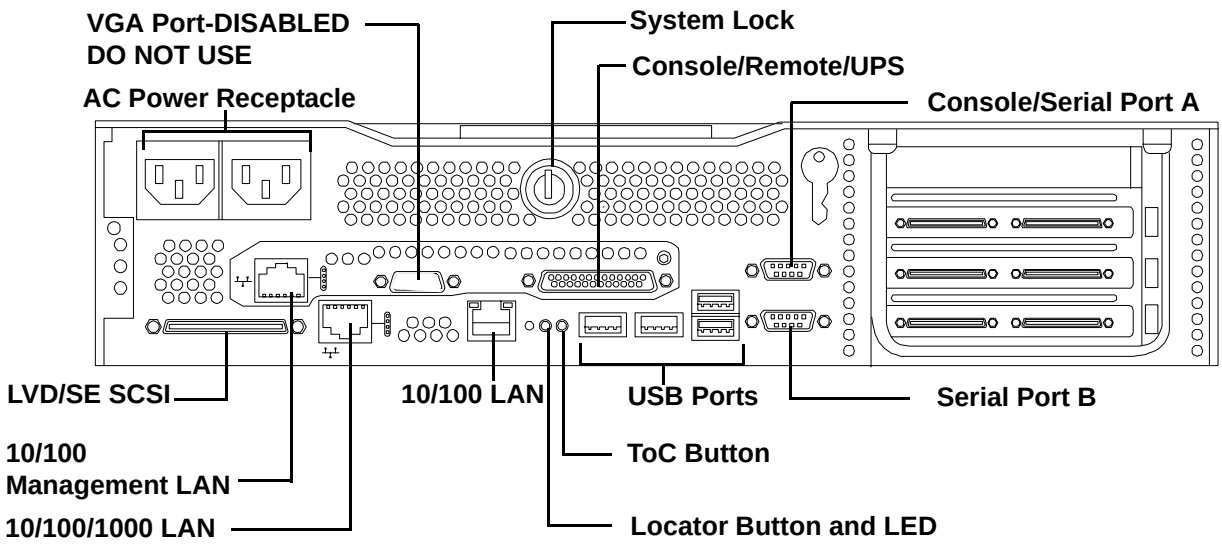
This chapter describes the external connectors provided on the hp 9000 rp3410 or hp 9000 rp3440 Server.

Connector Pinouts

The following ports and connectors are found on the rear panel of the hp 9000 rp3410 or hp 9000 rp3440 Server.

- Dual USB 2.0
- Serial A (console) and Serial B
- 68-pin LVD, SE U320 SCSI
- 10/100 LAN
- 10/100/1000 LAN

Figure 3-1 Rear View of Server



Universal Serial Bus (USB 2.0) Ports

Figure 3-2 Dual USB Port Connector

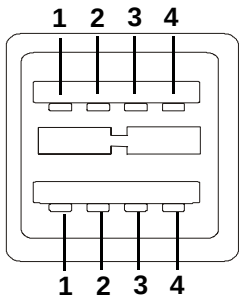


Figure 3-3 Single USB Port

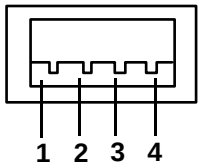


Table 3-1 USB Pinouts

Pin Number	Signal Description
1	+5VDC
2	MR
3	PR
4	Ground

Serial Port A (console) and Serial Port B

Figure 3-4 Serial Port Connector

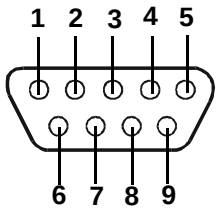


Table 3-2 Serial Port Pinouts

Pin Number	Signal Description
1	Data Carrier Detect
2	Receive Data
3	Transmit Data
4	Data Term Ready
5	Ground
6	Data Set Ready
7	Request to Send
8	Clear to Send
9	Ring Indicator

SCSI Port, Ultra 3, 68-Pin

A single, Ultra 3, 68 pin SCSI connector is located at the rear panel of the server. The external connector supports SCSI channel “B.”

Figure 3-5 SCSI Port, Ultra 3, 68-Pin

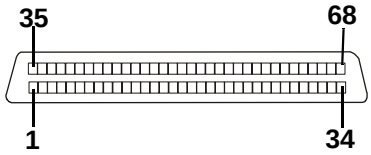


Table 3-3 SCSI Port Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	S1 (+DB 12)	35	S35 (-DB 12)
2	S2 (+DB 13)	36	S36 (-DB 13)
3	S3 (+DB 14)	37	S37 (-DB 14)
4	S4 (+DB 15)	38	S38 (-DB 15)
5	S5 (+DB P1)	39	S39 (-DB P1)
6	S6 (+DB 0)	40	S40 (-DB 0)
7	S7 (+DB 1)	41	S41 (-DB 1)
8	S8 (+DB 2)	42	S42 (-DB 2)
9	S9 (DB 3)	43	S43 (-DB 3)
10	S10 (+DB 4)	44	S44 (-DB 4)
11	S11 (+DB5)	45	S45 (-DB 5)
12	S12 (+DB 6)	46	S46 (-DB 6)
13	S13 (+DB 7)	47	S47 (-DB 7)
14	S14 (+DB P)	48	S48 (-DB P)
15	S15	49	S49
16	S16 (DIFFSENS)	50	S50
17	S17 (TERMPWR)	51	S51 (TERMPWR)
18	S18 (TERMPWR)	52	S52 (TERMPWR)
19	S19 (RESERVED)	53	S53 (RESERVED)

Table 3-3 SCSI Port Pinouts (Continued)

Pin Number	Signal Description	Pin Number	Signal Description
20	S20	54	S54
21	S21 (+ATN)	55	S55 (-ATN)
22	S22	56	S56
23	S23 (+BSY)	57	S57 (-BSY)
24	S24 (+ACK)	58	S58 (-ACK)
25	S25 (+RST)	59	S59 (-RST)
26	S26 (+MSG)	60	S60 (-MSG)
27	S27 (+SEL)	61	S61 (-SEL)
28	S28 (+C/D)	62	S62 (-C/D)
29	S29 (+REQ)	63	S63 (-REQ)
30	S30 (+I/O)	64	S64 (-I/O)
31	S31 (+DB 8)	65	S65 (-DB 8)
32	S32 (+DB 9)	66	S66 (-DB 9)
33	S33 (DB 10)	67	S67 (-DB 10)
34	S34 (DB 11)	68	S68 (-DB 11)

10/100 LAN Connector

Figure 3-6 10/100 LAN Connector

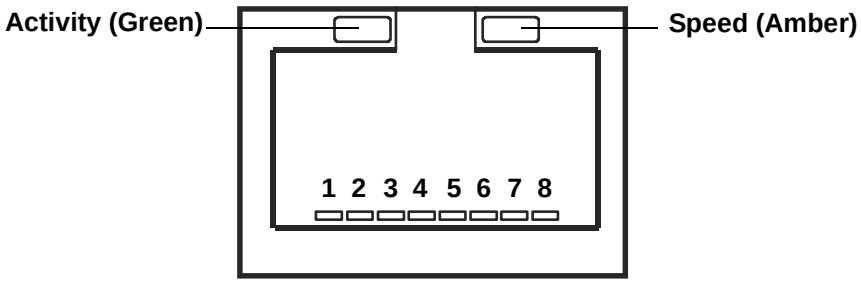


Table 3-4 10/100 LAN Connector Pinouts

Pin Number	Signal Description
1	TXP
2	TXN
3	RXP
4	Not used
5	Not used
6	RXN
7	Not used
8	Not used

10/100/1000 LAN Connector

Figure 3-7 10/100/1000 LAN Connector

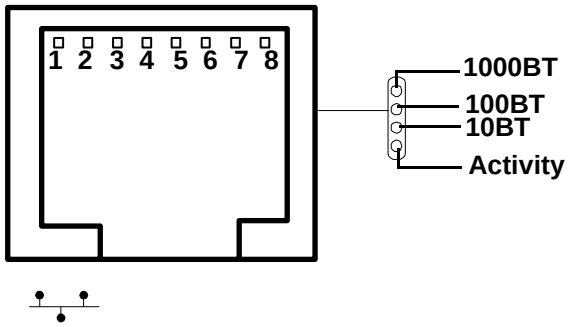


Table 3-5 10/100/1000 LAN Connector Pinouts

Pin Number	Signal Description
1	TXP
2	TXN
3	RXP
4	Not used
5	Not used
6	RXN
7	Not used
8	Not used

4 Installing and Configuring

This chapter provides instructions required in installing additional components and configuring the hp 9000 rp3410 or hp 9000 rp3440 Server.

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

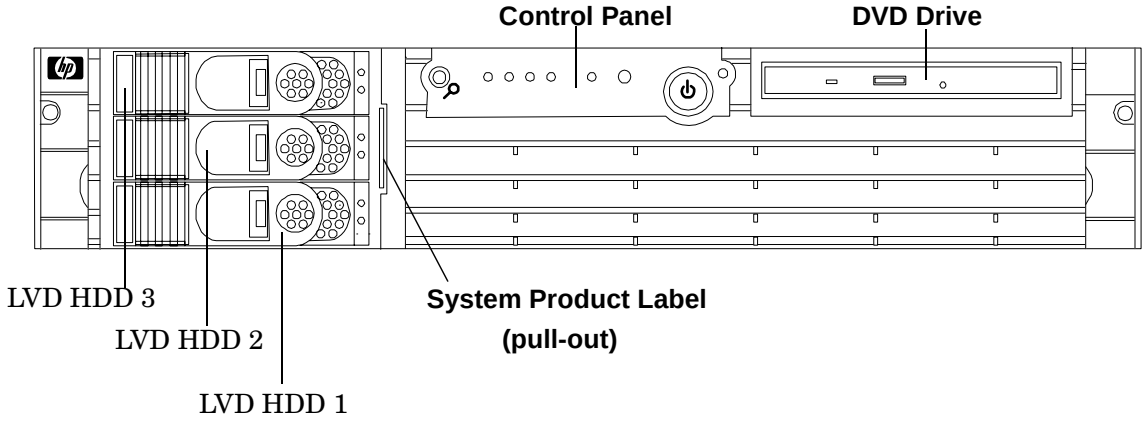
- Internal Hard Disk Drives
- Memory DIMMs
- PCI Cards
- Power Supply
- Processor Module

Installing Internal Hard Disk Drives

This section provides information about installing additional internal hard disk drives.

CAUTION A hot-plug device may require interaction with the operating system before the device can be safely installed into the server. Verify that the operating system supports installing disk drives while the operating system is running. If the operating system does not support this feature, shut down the operating system before attempting this procedure. Failure to observe this caution will result in system failure.

Figure 4-1 Front View of the hp 9000 rp3410/hp 9000 rp3440 Server



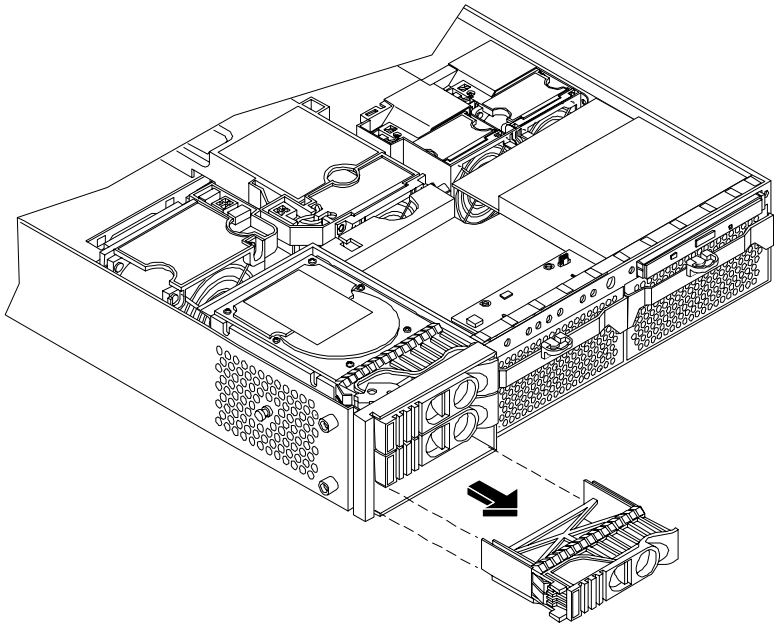
Two additional hard disk drive may be added to your HP Server in slots 2 and 3. Always use low profile disk drives (1.0” height) in your hp 9000 rp3410 and the hp 9000 rp3440 Server.

To install a hard disk drive, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops.

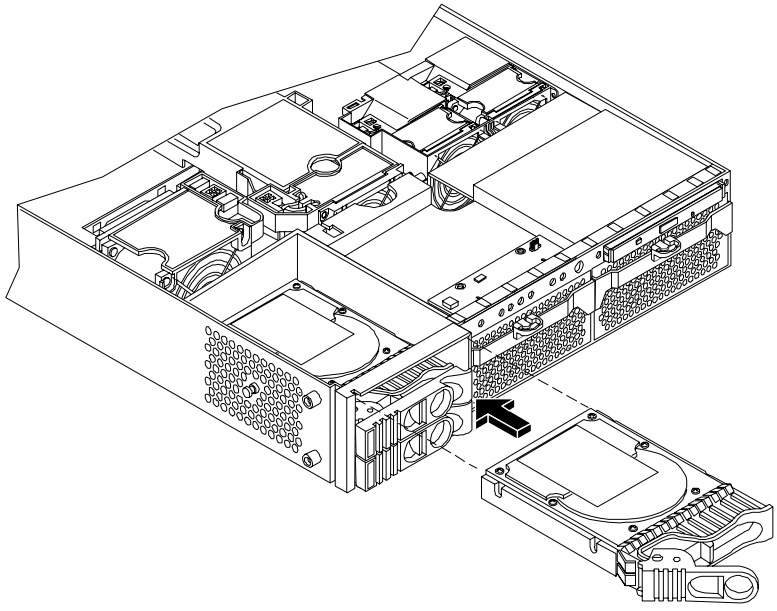
Step 2. Remove the slot filler that is installed in slot where the additional drive is to be installed.

Figure 4-2Filler Removal from Slot



Step 3. Slide the hard disk drive into the slot until it is seated.

Figure 4-3Disk Drive Installation in Slot 1



Step 4. Close the drive ejector handle by pushing it down until it clicks.

Step 5. The hard disk drive is now correctly installed.

Step 6. Verify the drive installation by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

- Use diagnostics provided by the ODE to exercise the module added.

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

Step 8. Check the installation of the hard disk drive by powering on the server and checking the VFP and SEL for correct status for the hard disk drive.

Installing Additional System Memory

Your system has 12 memory sockets for installing DDR SDRAM memory modules. These memory modules can either be 256 MB, 512 MB, 1 GB or 2 GB. The system supports combinations from 512 MB (hp 9000 rp3410) or 1 GB (hp 9000 rp3440 Server) up to 24 GB (both models).

System memory DIMMs are located on the system 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.**

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.

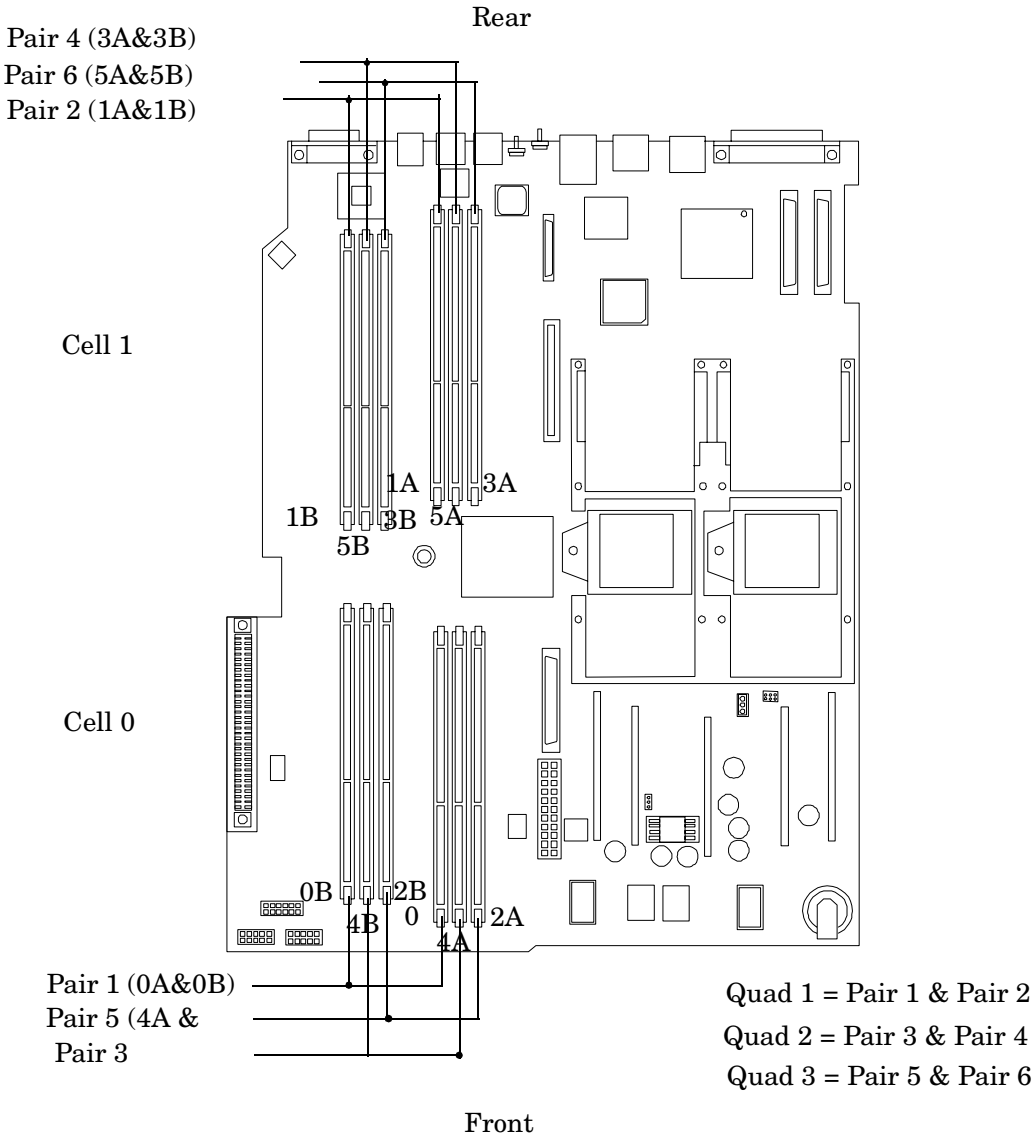
Failure to observe this warning could result in personal injury or damage to equipment.

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

Supported DIMM Sizes

Supported DIMM sizes are 256MB, 512MB, 1GB, and 2GB. Dissimilar DIMM sizes may be used across the entire system board but both DIMMs in each pair must match.

Figure 4-4 DIMM Slot Identification



Installing System Memory

Memory modules must be loaded in the correct order:

- In the hp 9000 rp3410 Server, DIMMs must be installed as ordered pairs of equal size. For example, the DIMM in socket 0A must match 0B, 1A must match 1B, and so forth.
- In the hp 9000 rp3440 Server, DIMMs must be installed in matched quads. Two matched memory card pairs of equal size (that is, four identical DIMMs) must be installed, one pair per memory cell, as listed below:
  - 0A, 0B and 1A, 1B identical pairs
  - 2A, 2B and 3A, 3B must be identical pairs
  - 4A, 4B and 5A, 5B must be identical pairs

NOTE DIMMs match if they have the same HP part number. Non-HP DIMMs match if they are from the same vendor and have the same characteristics.

Module sizes can be mixed, as long as DIMMs in each pair (hp 9000 rp3410) or quad (hp 9000 rp3440 Server) match. For example:

- On hp 9000 rp3410 Server, it is acceptable to load a pair of 256 MB DIMMs in sockets 0A and 0B, and a pair of 1 GB DIMMs in sockets 1A and 1B.
- On hp 9000 rp3440 Servers, it is acceptable to load a quad of 256 MB DIMMs in sockets 0A, 0B, 1A and 1B, and a quad of 1 GB DIMMs in sockets 2A, 2B, 3A and 3B.

The memory subsystem supports chip spare functionality. Chip spare enables an entire SDRAM chip on a DIMM to be bypassed (logically replaced) in the event that a multi-bit error is detected on that SDRAM.

In order to use the chip spare functionality, only DIMMs built with x4 (configuration width) SDRAM parts can be used, and these DIMMs must be loaded in quads (2 DIMMs per memory cell, loaded in the same location in each memory cell).

Each DIMM within a quad must be identical to all the other DIMMs in the quad.

To install DIMMs, perform the following steps:

Step 1. Turn off the system, disconnect all cables, and remove the system cover(s).

CAUTION To ensure that memory modules are not damaged during removal or installation, power off the server and unplug the power cord from the AC power outlet. Wait until the LED on the back of the power supply turns off before removing or installing memory.

Step 2. Holding the memory module by its left and right edges, insert the module into the socket.

The memory modules are keyed and can only be inserted in one direction. When the module is correctly seated, the retainer clips will return to their fully upright position. Snap the clips firmly into place to ensure that the DIMMs are seated properly.

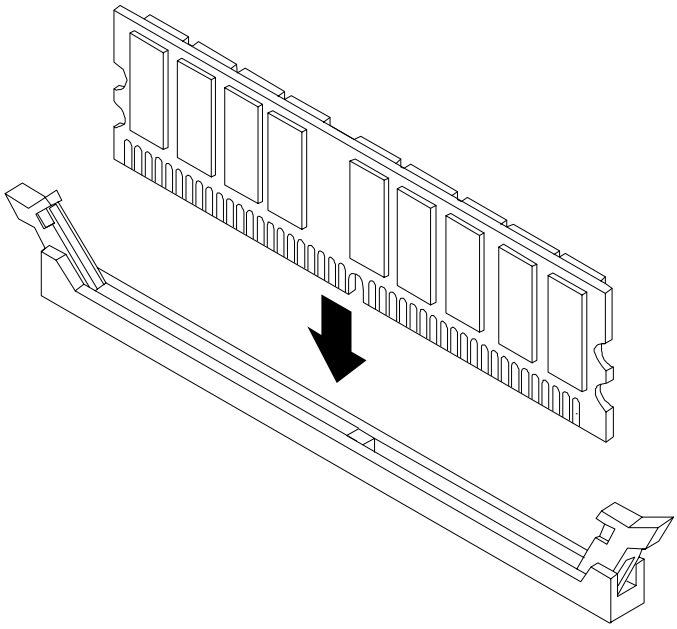
Step 3. Gently and evenly push on each side of the DIMM until it seats in the socket. Ensure the extraction levers are in the closed position.

Step 4. Replace the system cover(s), reconnect all cables and turn on the system.

Step 5. Verify the memory installation by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the memory added.

Figure 4-5 Inserting DIMM into Slot



Installing Additional PCI Cards

Accessory cards are installed in a removable PCI cage. This section explains how to access the PCI cage, as well as how to install accessory cards.

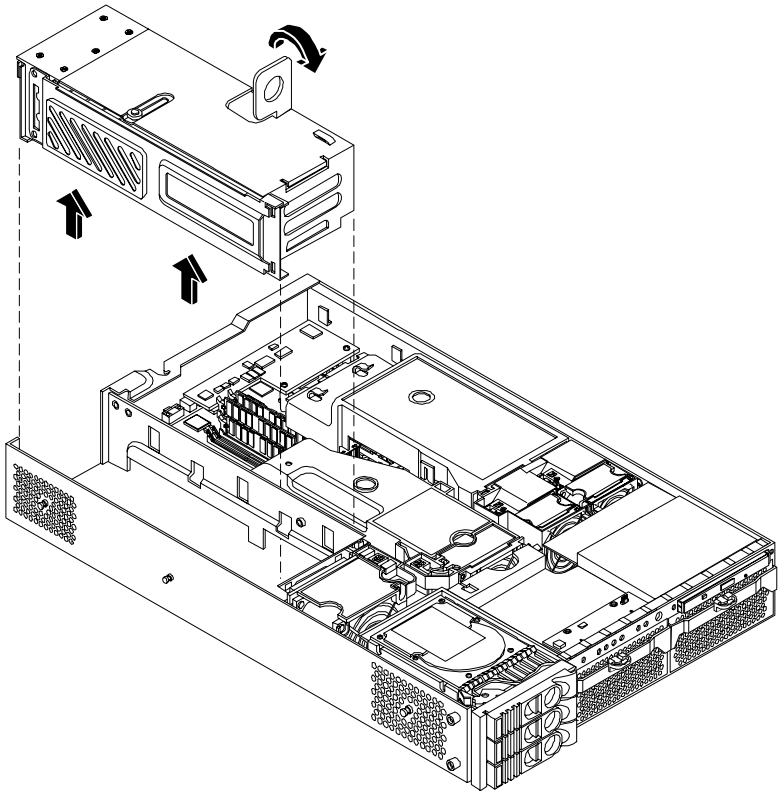
Removing the PCI cage

To remove the PCI cage from the server, perform the following steps:

Step 1. Remove the cover.

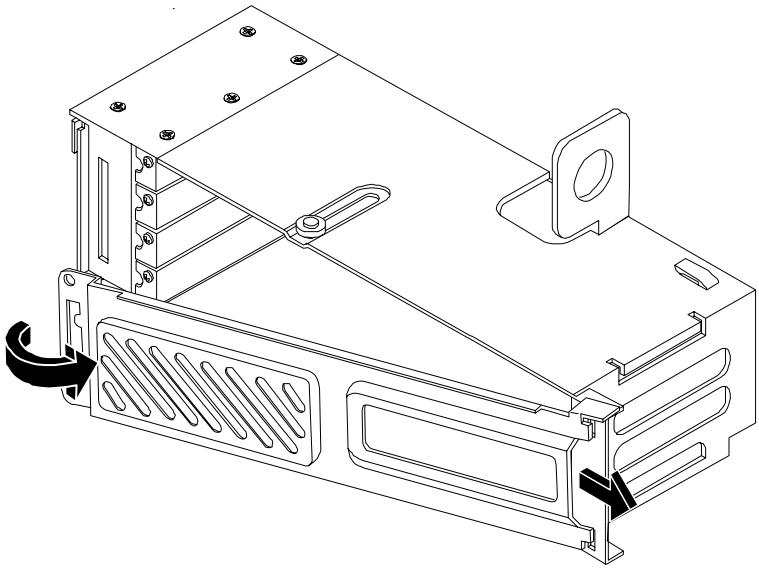
Step 2. Lift up on the PCI cage release lever and the back edge of the PCI cage and lift the PCI cage out of the system.

Figure 4-6Removing the PCI Cage



Step 3. Grasp the PCI cage cover and slide it away from the bulkhead end of the cage, then lift the cover off.

Figure 4-7Removing the PCI Cage Cover



Step 4. Unscrew the bulkhead screw that holds the accessory card in place.

Step 5. The PCI slots are now accessible for installation of additional cards.

Installing PCI Cards

The server may contain up to 4 PCI cards. PCI cards are located in the PCI cage.

The hp 9000 rp 3410 and the hp 9000 rp3440 Server have the following accessory card sockets:

- Four 64-bit, 133 MHz PCI-X card sockets

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.**

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.

Carefully read the following information concerning PCI slot configuration. Inserting a PCI card into a slot that is not configured to accept it, may cause operation failure or the PCI card to operate at less than optimum speed. PCI slots are numbered 1 (top of cage) through 4 (bottom of cage). See the labels on the rear panel of the chassis for correct PCI slot number identification.

Installing a PCI Card

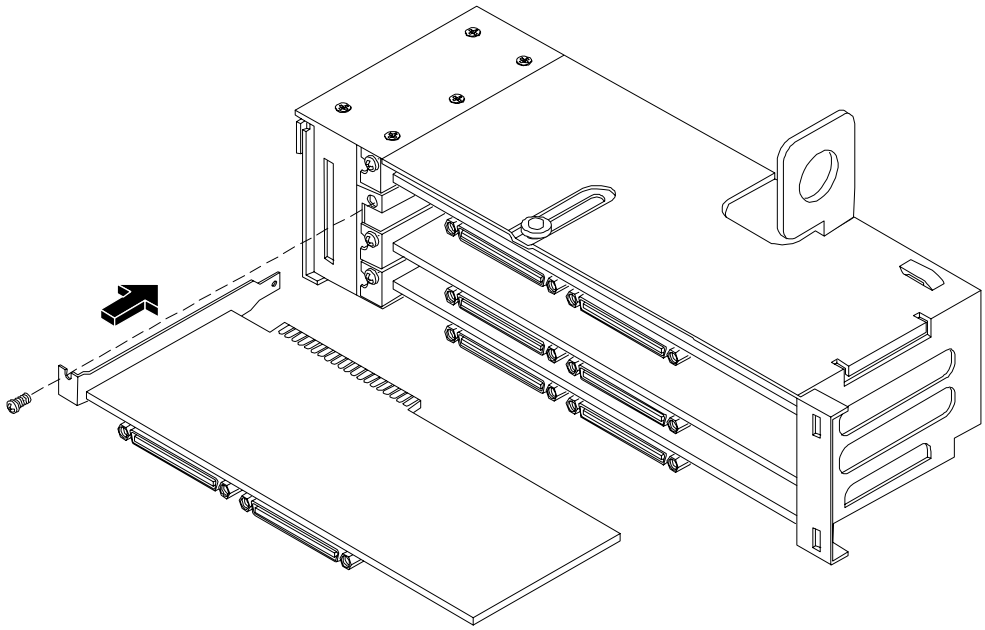
Step 1. Remove the cover.

Step 2. Remove the PCI cage.

Step 3. Open the PCI cage as described in the previous section.

Step 4. Grasp the edges of the PCI card to be installed and gently press the card into the PCI backplane connector.

Figure 4-8Installing a PCI Card



Step 5. Connect any cables that are required by the PCI card.

Step 6. Reinstall the PCI cage.

Step 7. Replace the cover.

Step 8. Verify the PCI card installation by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the card added.

Installing an Additional Power Supply

The supported configuration of a hp 9000 rp3410 and the hp 9000 rp3440 Server requires a minimum of one power supply unit (PSU) to be installed. A second, optional hot-swap PSU, may be installed to provide redundant (N+1) capability.

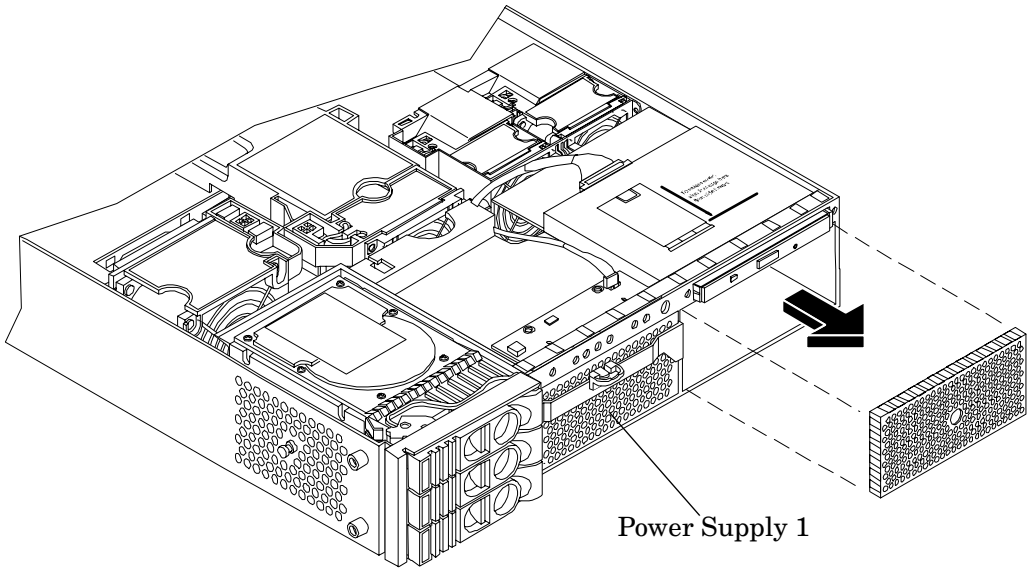
The power supplies in the HP Server are hot-swappable, that is if one power supply stops working or exhibits voltage problems, the remaining supply can support the system until the failed unit is replaced. A power supply can be removed and replaced without turning off the system on systems with two power supplies.

CAUTION Before removing a power supply, make sure the second power supply is functioning properly. The two green LEDs inside the supply must both be illuminated on the second supply before the failed power supply can be safely removed.

To replace the power supply, perform the following steps:

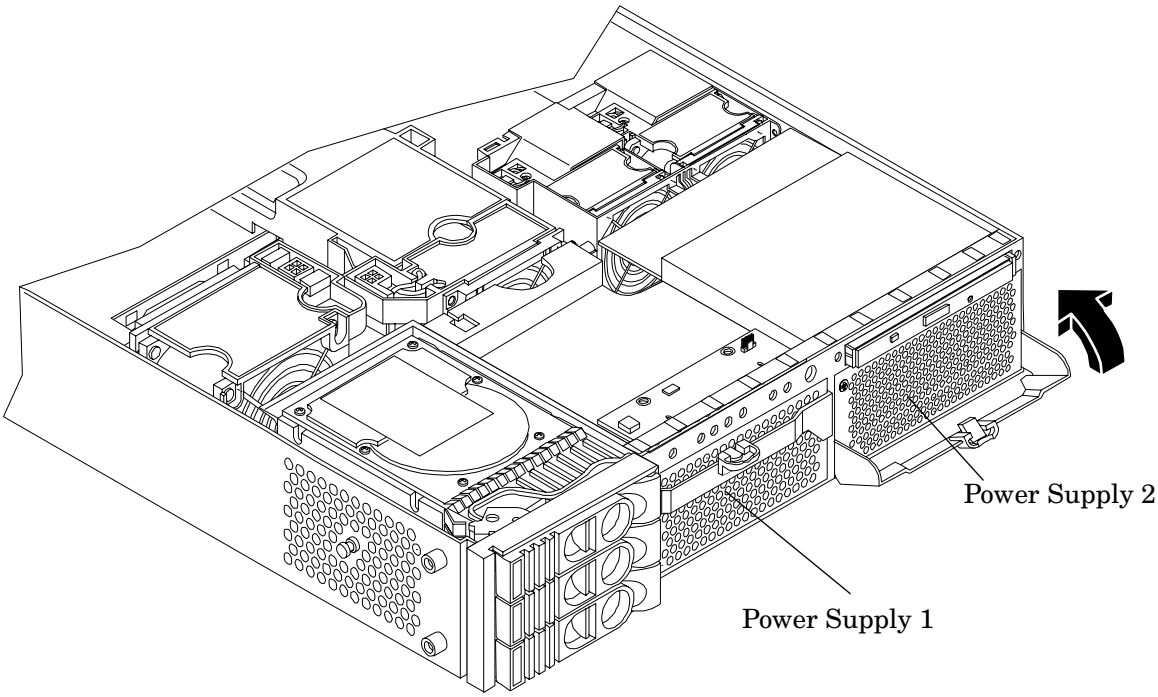
Step 1. Remove the front bezel from the system and remove the power supply filler panel if you have not already done so.

Figure 4-9Removing the Power Supply Filler Panel



Step 2. Open the power supply release lever and slide the power supply into place.

Figure 4-10Replacing the Power Supply



Step 3. Push in on the power supply release lever to lock the retaining clip in place.

Step 4. Replace the front bezel.

Step 5. Verify the power supply installation by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Installing an Additional Processor Module

This section provides information about installing processor modules. The processor modules are located on the system board which is accessible by removing the system cover.

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

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.

Processor Modules are located on the system board. The system board can support either one or two Processor Modules. CPU 0 socket is located to the right of the system board and CPU 1 socket is located on the left of the system board next to the bridge assembly. In a single CPU configuration, the single Processor Module must be installed in CPU 0 socket.

Each Processor Module has an associated power pod that is required by the Processor Module.

Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover.

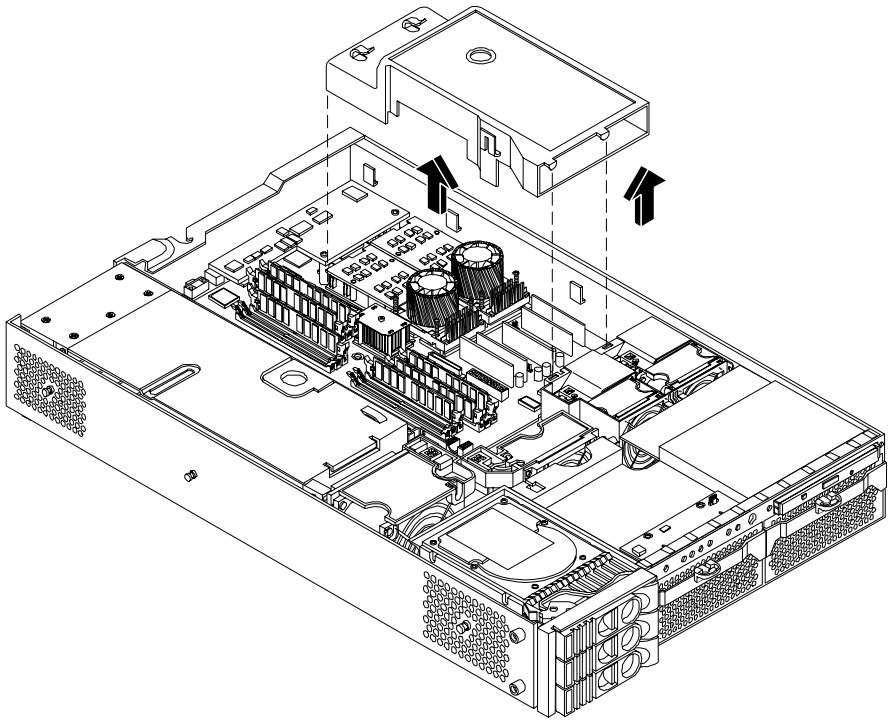
Step 3. Remove the processor airflow guide.

a. Remove the IDE cable and power module cables from the processor airflow guide cable clips.

b. Hold the guide using the opening on top of the guide.

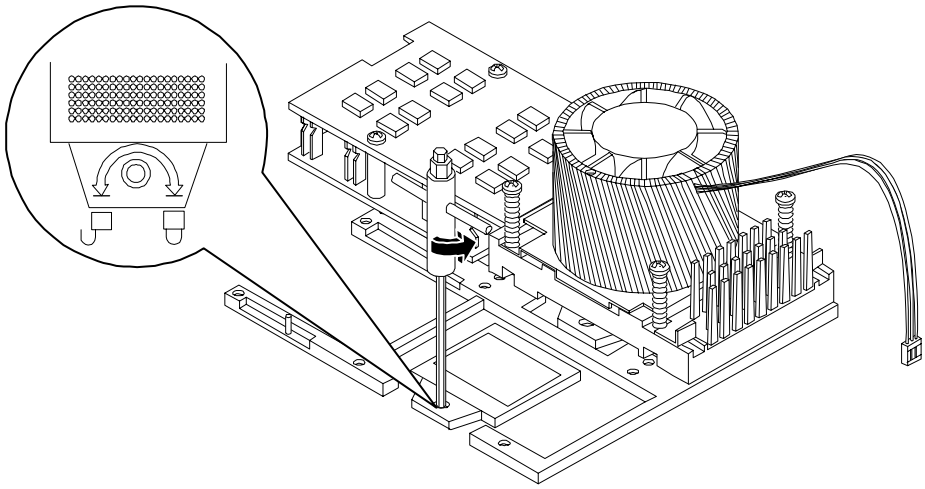
c. At the same time, grasp the back end of the airflow guide and lift the guide out of the system.

Figure 4-11Removing the Processor Airflow Guide



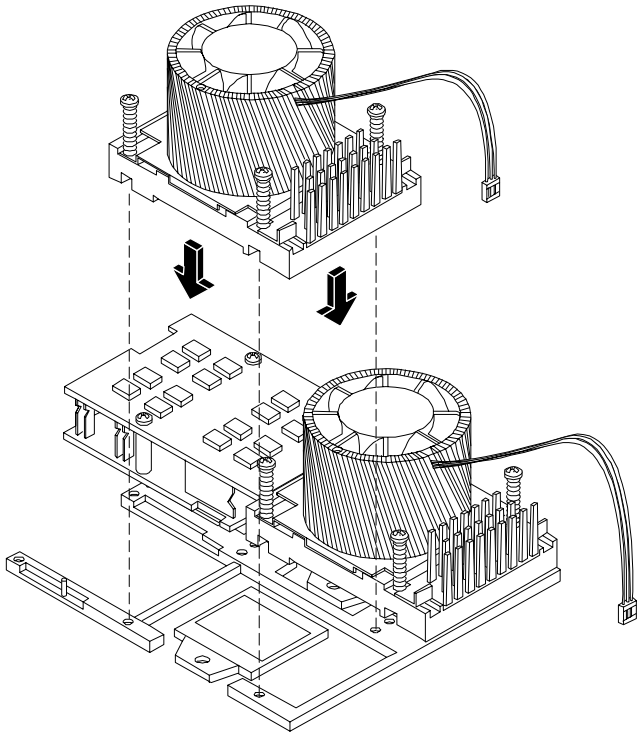
Step 4. Unlock the processor module locking mechanism using the special processor tool shipped with your replacement processor module. Insert the tool into the hole that runs down through the edge of the heatsink and rotate the special processor tool 180 degrees counterclockwise. Verify that the processor module socket locking mechanism is rotated into the unlocked position.

Figure 4-12Unlocking the Processor Module Locking Mechanism



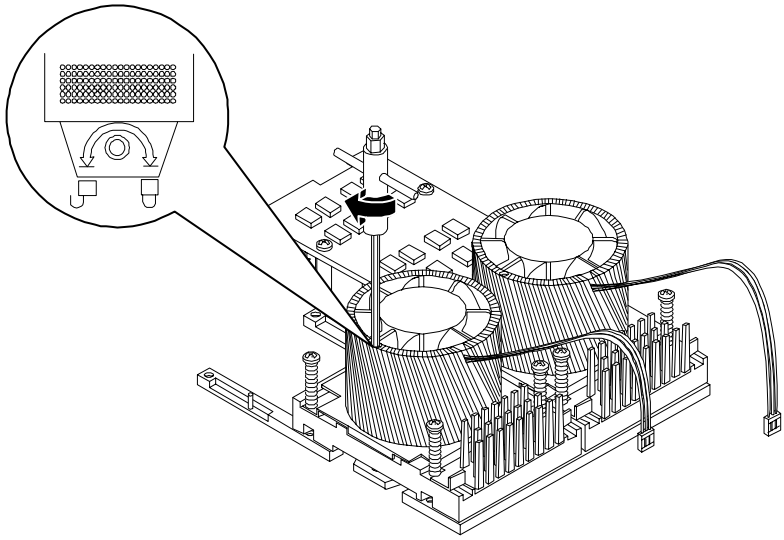
Step 5. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the fan and processor module on the system board. The four locator posts will fit in locator holes on the system board processor module mount. The turbo fan power cable must be positioned so that it is located on the side of the heatsink that faces the front of the system.

Figure 4-13Aligning the Processor Module



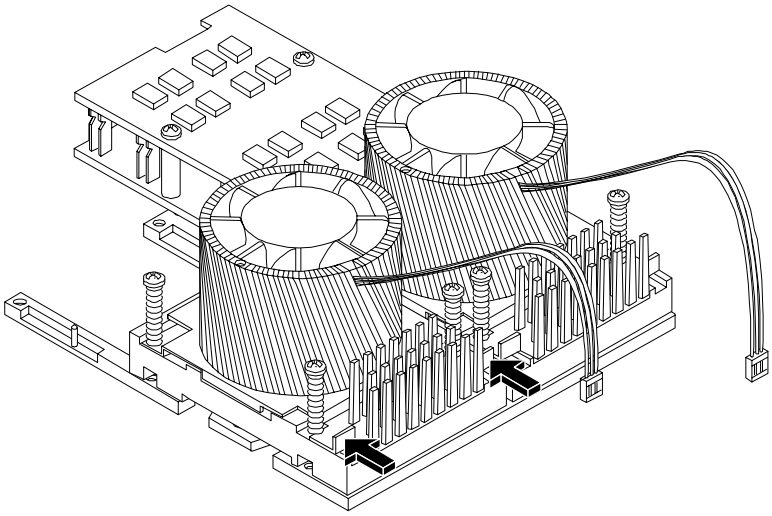
Step 6. Use the special processor tool shipped with your replacement processor module to lock the processor module in place on the system board. To do this, insert the special processor tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees.

Figure 4-14Locking the Processor Module in Place



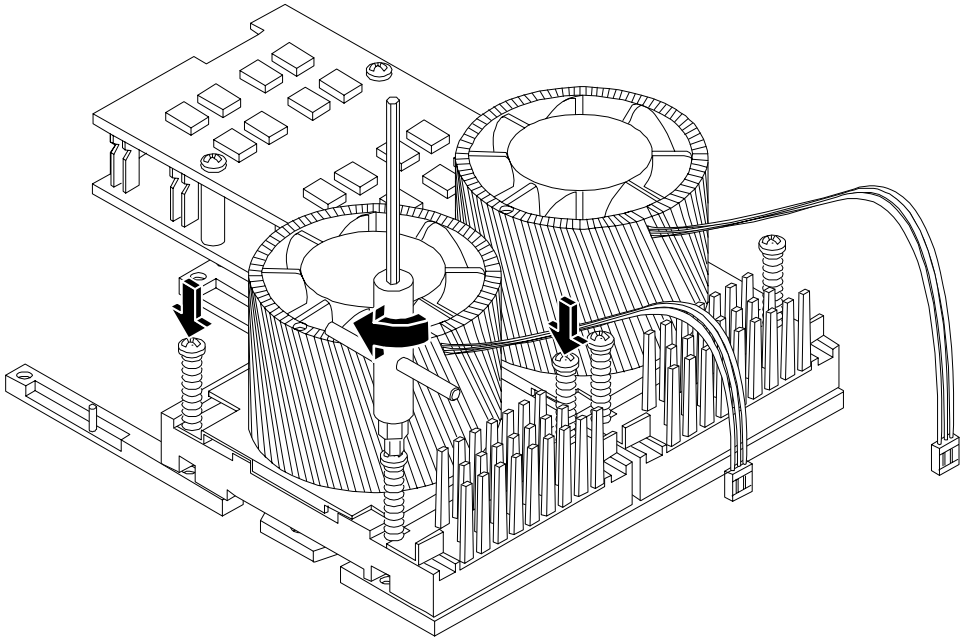
Step 7. Slide the sequencing retainer plate toward the front of the system.

Figure 4-15Slide the Sequencing Retainer Plate



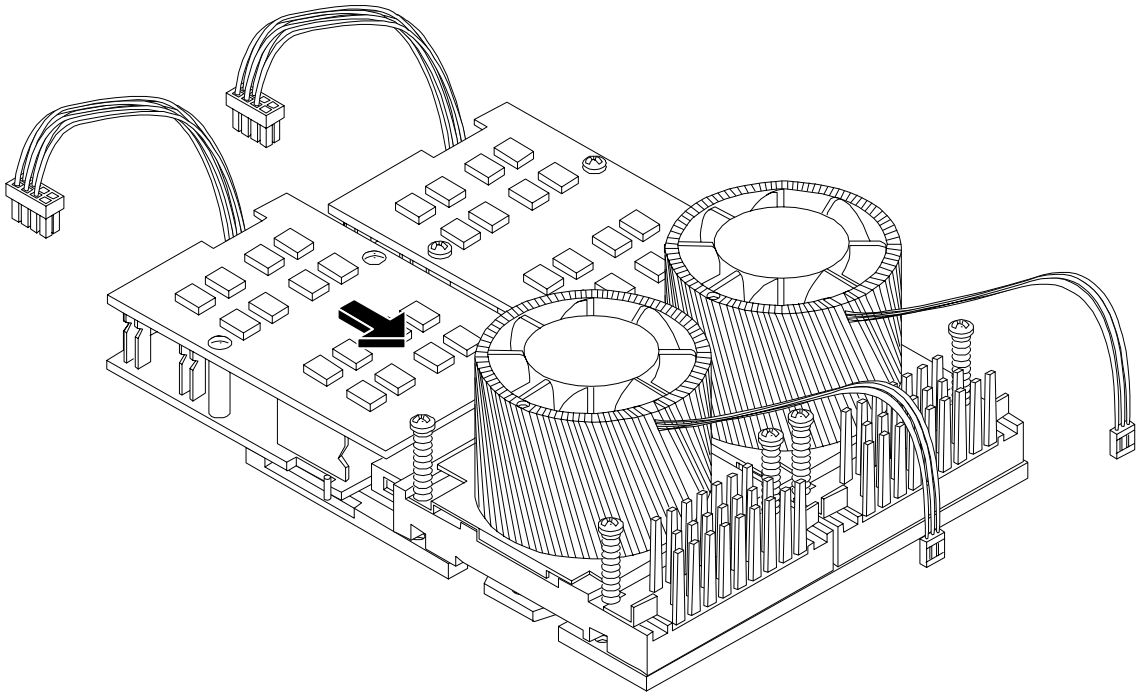
Step 8. Screw in the four heatsink captive screws.

Figure 4-16Secure the Captive Screws



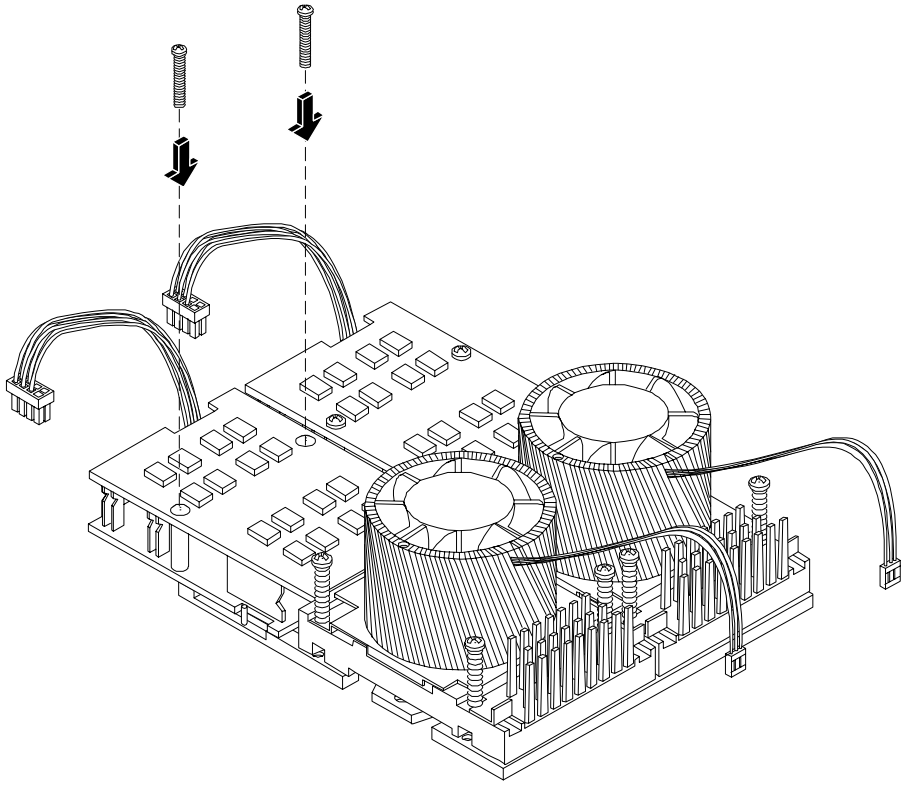
Step 9. Slide the power module on the system board metal mounting bracket so that the power module connector connects with its connector on the processor module.

Figure 4-17Aligning the Processor Module Power Pod



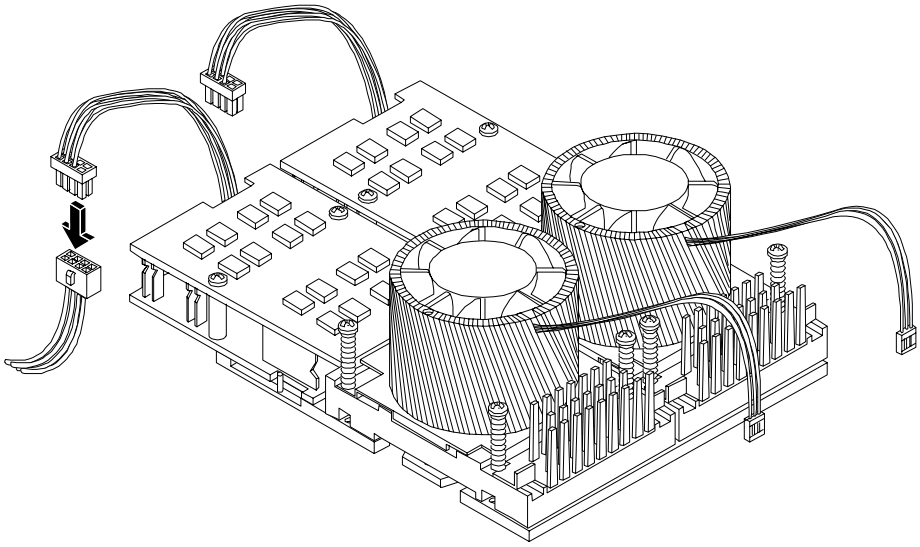
Step 10. Align the two mounting screw holes on the power module with their screw holes on the system board's metal mounting bracket. Screw in the power module mounting screws.

Figure 4-18Install the Processor Module Power Pod Mounting Screws



Step 11. Connect the power pod cable to the power connector on the system board.

Figure 4-19Connecting the Power Pod Cable



Step 12. Replace the processor airflow guide.

Step 13. Replace the cover.

Step 14. Verify the processor installation by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the processor added.

Configuring the hp9000 rp3410 or hp9000 rp3440 Server

Configuring the hp9000 rp3410 or hp9000 rp3440 Server requires the use of the system utilities to set up user desired configuration parameters.

In order to configure the system, the following utilities are available:

- Boot Console Handler (BCH)
- Management Processor (MP)
- Baseboard Management Controller (BMC)

The capabilities of these utilities and their use is described in Chapter 5, “Utilities.”

5 Utilities

Boot Console Handler (BCH)

The boot console handler (BCH) is separate code in processor dependent code (PDC). It has two purposes:

- It lets the bootstrap code know which path to boot from.
- It allows you to interact with PDC to view and/or modify a set of specific system parameters.

Booting is accomplished in the standard PA RISC manner but may be transparent [depending on the state of the autoflags (boot, search, and start)]. If the autoflags are clear and you override autobooting, a boot sequence will end up in the interactive portion of BCH where modification and/or viewing of some system parameters is possible.

NOTE When the `autostart` flag is off, autoboots will be interrupted if a configuration change occurs which causes reduced performance; thus requiring you to intervene prior to booting to the internal system loader (ISL).

The auto boot will halt at the BCH prompt and you may continue booting by entering `boot`.

BCH Commands

In the interactive portion of BCH there is a Main Menu and five submenus.

Table 5-1

Submenu	Description
`BOot [PRI|ALT|<path>]`	Boot from a specified path
`DIsplay`	Redisplay the current menu
`HElp [<menu>|<ommand.>`	Display help for specified command or menu
`RESET`	Restart the system
`MAin`	Return to the Main Menu

Main Menu

The following commands are available in the main menu:

```
---- Main Menu ---------------------------------------------------------------


     Command                            Description

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

     BOot [PRI|ALT|<path>]              Boot from specified path

  ** PAth [PRI|ALT|CON|KEY] [<path>]    Display or modify a path

     SEArch [DIsplay|IPL] [<path>]      Search for boot devices
```

```
     COnfiguration menu                Displays or sets boot values
     INformation menu                  Displays hardware information
     SERvice menu                      Displays service commands
   * DeBug menu                        Displays debug commands



     DIsplay                           Redisplay the current menu
     HElp [<menu>|<command>]           Display help for menu or command
     RESET                             Restart the system
----
Main Menu: Enter command or menu >
```

* Not accessible to user.

** You cannot modify the Keyboard path.

Configuration Menu

The following commands are available in the configuration menu:

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


---- Configuration Menu -------------------------------------------------------


     Command                           Description
     -------                           -----------
     AUto [BOot|SEArch|STart] [ON|OFF] Display or set specified flag
     BootID [<proc>] [<bootid>]        Display or set Boot Identifier
     BootINfo                          Display boot-related information
     BootTimer [0 - 200]               Seconds allowed for boot attempt
     CPUconfig [<proc>] [ON|OFF]       Config/Deconfig processor
     DEfault                           Set the system to predefined values
     FAn [HI|NORmal]                   Display or change fan speed
     FastBoot [ON|OFF]                 Display or set boot tests execution
     PAth [PRI|ALT] [<path>]           Display or modify a path
```

```
     SEArch [DIsplay|IPL] [<path>]     Search for boot devices

     TIme [c:y:m:d:h:m:[s]]            Read or set the real time clock in GMT


     BOot [PRI|ALT|<path>]             Boot from specified path

     DIsplay                           Redisplay the current menu

     HElp [<command>]                  Display help for specified command

     RESET                             Restart the system

     MAin                              Return to Main Menu

----

Configuration Menu: Enter command >
```

The configuration default command sets the following values:

```
 Primary boot path:    0/0/1/0.0

   Alternate boot path:  0/0/2/0

   Console path:         0/0/1/0.0

   Keyboard path:        0/0/4/0.0

   Autoboot:             ON

   Autosearch:           ON

   Autostart:            OFF

   BootTimer             0
```

Information Menu

The following commands are available from the information menu:

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


---- Information Menu -------------------------------------------------------


     Command                           Description

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

     ALL                               Display all system information

     BootINfo                          Display boot-related information

     CAche                             Display cache information

     ChipRevisions                     Display revisions of major VLSI

     COprocessor                       Display coprocessor information
```

```
     FRU                              Display FRU information

     FwrVersion                       Display firmware version

   * IO                               Display I/O interface information

     LanAddress                       Display Core LAN station address

     MEmory                           Display memory information

  ** PRocessor                        Display processor information

 *** WArnings                         Display selftest warning messages


     BOot [PRI|ALT|<path>]            Boot from specified path

     DIsplay                          Redisplay the current menu

     HElp [<command>]                 Display help for specified command

     RESET                            Restart the system

     MAin                             Return to Main Menu
----

Information Menu: Enter command >
```

* The PCI device information displayed here will include Description, Path. VendorID, DeviceID, Slot#, and bus#.

** Processor command displays system model string

***Warnings displayed are:

- System serial number not set
- Support Bus Controller initialization failure
- WARNING: Card in unsupported PCI slot for __system.
- WARNING: Too many cpus for a __ system. System will not boot.
- WARNING: Too much memory for a ____system.
- WARNING: A fatal error has occurred-system cannot boot. Review warning messages in the information menu

Info PR Example This command displays processor information on the console.

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

Model: hp server . (model string 9000/800/rp3410)

PROCESSOR INFORMATION

HVERSION SVERSION Processor

Processor Speed Model Model/Op CVERSION State

--------- -------- -------- -------- -------- -------------
```

```
0 900 MHz 0x0886 0x0491 3.0 Active

1 900 MHz 0x0886 0x0491 0.0 Unknown

Central Bus Speed (in MHz) : 200

Software ID (dec) : 4468297807722676169

Software ID (hex) : 0x3e02952e9bf77fc9

Software Capability : 0x01f0
```

Service Menu

The following commands are available from the service menu:

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


---- Service Menu ------------------------------------------------------------


     Command                           Description

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

     CLEARPIM                          Clear (zero) the contents of PIM

     SCSI [option] [<path>] [<val>]    Display or set SCSI controller values

     MemRead <address> [<len>]         Read memory and I/O locations

     PDT [CLEAR]                       Display or clear the PDT

     PIM [<proc>] [HPMC|LPMC|TOC]      Display PIM information

     ProductNum <O|C> [<number>]       Display or set Product Number

     ScRoll [ON|OFF]                   Display or change scrolling ability

     SELftests [ON|OFF]                Enable/disable self test execution


     BOot [PRI|ALT|<path>]             Boot from specified path

     DIsplay                           Redisplay the current menu

     HElp [<command>]                  Display help for specified command

     RESET                             Restart the system

     MAin                              Return to Main Menu

----

Service Menu: Enter command > e
```

The ProductNum command is for setting up the Original and/or Current Product Number. The Software Identification (SWID) doesn't get updated automatically on change of the Original Product Number but it can be generated by executing the default command from the Configuration SubMenu.

The `SCSI` command is for displaying/setting the SCSI controller parameters like initiator ID and speed. These parameters are used by the OS device drivers to program the controller(s).

Management Processor

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

The management processor controls power, reset, Transfer of Control (TOC) capabilities, provides console access, displays and records system events, and can display detailed information about the various internal subsystems. The management processor also provides a virtual front panel that can be used to monitor system status and see the state of front panel LEDs. All MP functions are available via the LAN, local RS-232 and remote RS-232 ports.

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

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

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

Accessing the Management Processor

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

- The **local RS-232C port** using a local terminal
- The **remote RS-232C port** using external modem (dial-up) access, if remote modem access is configured
- The **management processor LAN port** using Web Console or telnet if login access through the management processor LAN is enabled

Interacting with the Management Processor

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

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

NOTE If the management processor is not displaying the MP Main Menu, use **CTRL+B** to access the MP Main Menu and the management processor (MP) prompt.

Step 2. Use the management processor menus and commands as needed. A list of available commands can be displayed by using the management processor help function (in the MP Main Menu, enter **HE** followed by **LI** at the MP HELP: prompt). Log out using the X command (in the MP Main Menu, enter **X** at the MP> prompt) when done.

Management Processor Command Interface

Use the management processor menus and commands as needed. The login screen, which includes the Main Menu, is shown below. Main Menu commands (CO, VFP, CM, CL, CSP, SE, SL, HE, and X) can be entered after the MP prompt. Commands not displayed in the MP Main Menu can be accessed in command mode by first using the CM command at the MP prompt. (A list of available commands can be displayed by using the management processor help function. Display the list of commands as follows: in the MP Main Menu, enter **HE** after the MP> prompt, then enter **LI** after the MP HELP: prompt.) You can return to the MP Main Menu by typing **CTRL+B**.

MP Welcome Screen

MP Welcome screen commands:

```
MP Login: Admin
MP password: *****
Hewlett-Packard Management Processor
(C) Copyright Hewlett-Packard Company 1999-2003. All rights reserved
System Name: xxxxxxxxx


MP MAIN MENU:
CO:Console
VFP:Virtual Front Panel
CM:Command Menu
CL:Console Log
SL:Show Event Logs
CSP:Connect to Service Processor
```

MP commands are described in the following paragraphs.

Management Processor Commands

Table 5-2 Management Processor Commands and Descriptions

Command	Description
BP	Reset BMC passwords
CA	Configure asynch/serial ports
CG	Certificate generator
CL	View console log
CM	Select command mode
Ctrl+B	Return to MP main menu
CO	Select console mode
CSP	Connect to service processor
DATE	Date display
DC	Default configuration
DF	Display FRU information
DI	Disconnect remote or LAN console
FW	Upgrade MP firmware
HE	Display help for menu or command
ID	System information
IT	Inactivity timeout settings
LC	LAN configuration
LOC	Locator LED display and configuration
LS	LAN Status
MR	Modem reset
MS	Modem status
PC	Remote power control
PG	Paging parameter setup
PS	Power management module status
RB	Reset BMC
RS	Reset system through RST signal
SA	Set access
SE	Enter OS session
SL	Show event logs

Table 5-2 Management Processor Commands and Descriptions (Continued)

Command	Description
SO	Security options
SS	System processor status
SYSREV	Current system firmware revisions
TC	Reset via transfer of control (TOC)
TE	Tell- send a message to other users
UC	User configuration
VFP	Virtual front panel
WHO	Display connected management processor users
X	Exit management processor and disconnect
XD	Diagnostics and/or reset of management processor

Reset BMC Passwords

BP: Reset BMC Passwords

This command resets BMC passwords (both USER and ADMIN passwords).

Configure Serial Port Parameters

CA: Configure local and remote serial port parameters

Set up the local serial port parameters as follows:

- TERMINAL TYPE: Vt100 vs HPterm
- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec.
- FLOW CONTROL: Hardware uses RTS/CTS; Software uses Xon/Xoff.
- TRANSMIT CONFIGURATION STRINGS: Disable this setting whenever the modem being used is not compatible with the supported modem (MT5634ZBA).

IMPORTANT Do not mix HP and vt100 terminal types at the same time.

Set up the remote serial port parameters as follows:

- MODEM PROTOCOL: Bell or CCITT (CCITT is a European standard; RTS/CTS signaling is used, as well as the Ring signal. Bell is a U.S. or simple mode).
- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec.
- FLOW CONTROL: Hardware uses RTS/CTS; Software uses Xon/Xoff.

- TRANSMIT CONFIGURATION STRINGS: Disable this setting whenever the modem being used is not compatible with the supported modem (MT5634ZBA).
- MODEM PRESENCE: When the modem may not always be connected, set this parameter to “not always connected”.

  For example: A modem attached through a switch. In mode “not always connected,” no dial-out functions are allowed: DIAL-BACK is disabled, and PAGING is not possible.

The MP mirrors the system console to the MP local, remote/modem, and LAN ports. One console output stream is reflected to all of the connected console users. If several different terminal types are used simultaneously by the users, some users may see strange results.

Example 5-1 HP-UX

Applications that care about the terminal type (install, SAM, vi, and so on) running on HP-UX use three methods to determine the terminal type:

1. The application takes the terminal information from the OS. This value is set in the CA command and takes effect for all MP ports.
2. The $TERM shell environment variable.
3. The application directly queries the terminal (in this case, the write enabled terminal establishes the terminal type).

Make sure that settings #1 and #2 agree with your terminal type.

Certificate Generate

CG: Generate RSA key pair or Self Signed Certificate

This command generates a new RSA key pair and self signed certificate.

Console Log

CL: Console Log—view the history of the Console output

This command displays up to 60 Kilobytes of logged console data (about 60 pages of display in text mode) sent from the system to the Console path.

Command Mode

CM: Command Mode—enter command mode

This command switches the console terminal from the MP Main Menu to mirrored command interface mode. If the current mux authority is administrator and the new login is as an operator, the command mux will be denied (remains in MP Main Menu mode). If a command is in progress, a message will be displayed warning the new user of system status.

Console

CO: COnsole—leave command mode and enter console mode

This command switches the console terminal from the MP Main Menu to mirrored/redirected console mode. All mirrored data is displayed. Type **CTRL+B** to return to the MP command interface.

For VT100 and HPTERM, verify that the MP setting in the CA command is correct and all mirrored consoles are of the same terminal type for proper operation.

Connect to Service Processor

CSP: Connect to remote management processor over the LAN

This command allows the local or remote port user to connect over the MP LAN to another MP on the network. The user that launches the command is given a private connection to the other MP over the LAN. To return to the original MP, type **CTRL+]** to disconnect the CSP session.

Date

DATE: Displays the current date, as generated in the MP real-time clock.

Default Configuration

DC: Default Configuration—reset all MP parameters to the default configuration

This command sets all MP parameters back to their default values. The user may reset all or a subset of the following parameters:

- IP configurations
- Modem configuration
- Paging configuration
- Command Interface configuration
- Disable remote access, security configuration
- Session configuration. For example: setting the security configuration to default erases all users and passwords.

There are three ways to reset passwords in the MP:

1. In the SO command, change individual users.
2. In the DC command choose “Reset Security Configuration”.
3. Forgotten passwords can be reset by pressing the MP reset button on the back panel of your HP Server. After the MP reboots, the local console terminal displays a message for five seconds. Responding to this message in time will allow a local user to reset the passwords.

Notice that all user information (logins, passwords, and so on) is erased in methods 2 and 3.

Display FRUID

DF: Display FRUID information

This command displays FRUID information from the BMC for FRU devices. Information provided includes serial number; part number; model designation; name and version number; and manufacturer.

Disconnect Remote or LAN Console

DI: DIsconnect remote/modem or LAN/WEB console

This command disconnects (hang up) the remote/modem or LAN/WEB users from MP. It does not disable the ports. The remote console is no longer mirrored.

Front Panel Process

FP: Turn off front panel fault or attention LEDs

This command allows the user to control the state of front panel fault and attention LEDs, individually or together.

MP Firmware Update

FW: Activates MP firmware upgrade mode

This command is available from either the LAN or local serial port. This command activates firmware upgrade mode, which loads new firmware through the MP LAN by FTP (which must be operational). An MP Reset is generated after the upgrade is complete.

Help

HE: Display help for menu or command

This command displays the MP hardware and firmware version identity, and the date and time of firmware generation. If executed from the MP Main Menu, general information about the MP, and those commands displayed in the MP Main Menu, will be displayed. If executed in command mode, this command displays a list of command interface commands available to the user. It also displays detailed help information in response to a topic or command at the help prompt.

Display System ID

ID: Display/modify system information

This command allows the user to display and modify the following:

- SNMP contact information
- SNMP server information
- SPU hostname

Inactivity Timeout

IT: Inactivity Timeout settings

The session inactivity timeout is up to 1,440 minutes—default is 60 minutes. This timeout prevents sessions to the system from being inadvertently left open. A session can be started by the SE command. An open session can prevent users from logging onto the MP through a port and can also prevent system applications from initiating an outbound connection.

MP inactivity timeout is up to 1,440 minutes—default is 5minutes. This timeout prevents a user from inadvertently keeping the MP locked in a MP Command Interface mode preventing other users from looking at the console output. The MP Command Interface inactivity. timeout may not be deactivated.

Flow control timeout is 0 to 60 minutes. If set to 0, no timeout is applied. This timeout prevents mirrored flow control from blocking other ports when inactive.

Configure LAN Console

LC: LAN configuration (IP address, and so on)

This command displays and allows modification of the LAN configuration. Configurable parameters include:

- MP IP Address
- MP Host Name
- Subnet Mask
- Gateway Address
- Web Console port number
- Link State

The MP Host Name set in this command is displayed at the MP command interface prompt. Typically the DNS name for the LAN IP is entered.

This field can be programmed to any useful name or phrase. For clarity, it is useful to enter **MP-on-SYSTEM** as the MP Host name, so both names show up in the prompt (limit 19 characters, no spaces allowed.) The web access port number is also set by this command.

LAN Status

LS: LAN Status

This command displays all parameters and the current status of the MP LAN connections. The LAN parameters are not modified by the execution of this command.

Return to Main Menu

MA: Return to MP Main Menu

This command makes the MP return to the nonmirrored MP Main Menu. This is the same as executing CTRL+B.

Modem Reset

MR: Modem Reset

This command makes the MP send an AT Z command to the modem, which resets it. Any modem connections are lost. The initialization results can be viewed via the MS command.

Modem Status

MS: Modem Status—Display modem status

The MS command displays the state of the modem lines connected to the remote/modem serial port. The display can be updated by pressing **Enter**. The current state of the status signals DCD, CTS, DSR, RI and the last state of the control signals DTR, RTS set by the firmware are displayed.

Power Control

PC: Power Control—turn system power on and off

For proper system shutdown, shutdown the OS before issuing this command or use the commands graceful shutdown option.

This command allows you to switch the system power on or off. the user can have the action take place immediately or after a specified delay.

Notice this is roughly the equivalent to turning the system power off at the front panel switch. There is no signal sent to the OS to bring the software down before power is turned off. To turn the system off properly. you must ensure that the OS is in the proper shutdown state before issuing this command. Use the proper OS commands or use the graceful shutdown option of the remote power control command.

Configure Paging

PG: Paging parameter setup—configures pagers

This command allows the user to configure the pagers and set triggering events.

A string description of the triggering event will be sent with the page.

Power Status

PS: Power status—display the status of the power management module

This command displays on the console the status of the power management module.

Reset BMC

RB: Reset BMC

This command resets the BMC by toggling a GPIO pin.

Reset System

RS: Reset system through RST signal

IMPORTANT Under normal operation, shut down the OS before issuing this command.

This command causes the system (except the MP) to be reset through the RST signal.

Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system. The effect of this command is very similar to cycling the system power. The OS is not notified, no dump is taken on the way down, and so on.

Set Access

SA: Set access options—configures access for LAN and remote/modem ports

This command will disconnect modem, LAN, and web users if access is disabled.

Create Local Session

SE: Log into the system on local or remote port

Only valid from the local or remote/modem port, SE allows the user to leave the MP Command Interface and enter a system session. Other mirrored MP users are placed in console mode. The session user returns to the mirrored MP session on exit.

The MP regularly checks the activity of the session, closes the connection with the system, and, if the timeout period has elapsed, returns the port to mirroring. The timeout period is set with the IT command. On HP-UX, the SE command works on the local and remote ports.

In HP-UX, use the System Administration Manager (SAM) to add modem device files for the session UARTS. The modem type, CCITT or Bell must agree with the remote port settings for the remote session port and always be Bell mode for the local session port.

If the system and the MP Command Interface local or remote ports have been configured with different port speeds, the baud rate changes to the rate specified by the OS for the duration of the session.

Display Logs

`SL`: Display contents of the system status logs

This command displays the contents of the event logs that have been stored in nonvolatile memory.

- System Event Log (SEL)—High attention events and errors
- Forward progress—All events
- Current boot log—All events between “start of boot” and “boot complete”
- Previous boot log—The events from the previous boot

Reading the system event log turns off the attention LED. Accessing this log is the only way to turn off the attention LED when it is flashing and alerts have not been acknowledged at the alert display level.

Events are encoded data that provide system information to the user. Some well-known names for similar data would be Chassis Codes or Post Codes. Events are produced by intelligent hardware modules, the OS, and system firmware. Use VFP to view the live events. Use `SL` to view the event log.

Navigate within the logs as follows:

- + — View the next block (forward in time)
- - — View the previous block (backward in time)
- Enter (<CR>) — View the next block in the previously selected direction (forward or backward in time)
- D — Dump the entire log for capture or analysis
- F — First entry
- L — Last entry
- J — Jump to entry number __
- V — View mode configuration (text, keyword, hex)
- ? — Display this help menu
- Q — Quit

Table 5-3 defines alert (or severity) levels.

Table 5-3 Alert Levels

Severity	Definition
0	Minor forward progress
1	Major forward progress
2	Informational
3	Warning

Table 5-3 Alert Levels (Continued)

Severity	Definition
5	Critical
7	Fatal

Security Options

SO: Configure security options and access control (users, passwords, and so on)

This command modifies the security parameters of the MP, which include login timeouts and allowed password faults.

If configured, when you access the MP via the modem port, the MP hangs up and dials the user back. This does not work if `Modem Presence` is set to `not always connected` with the `CA` command.

If the mode is Single, the State is changed to `disabled` after the first login.

A disabled user's login is not accepted.

Firmware Revision Status

SYSREV: Displays the revision status of firmware in the system processors

This command displays the revision status of firmware in the system processors.

System Status

SS: Displays the status of the system processors

The `SS` command displays the status of the system processors and which processor is the monarch.

Transfer Of Control

TC: System reset through INIT or TOC (Transfer of Control) signal

Under normal operation, shut down the OS before issuing this command.

This command causes the system to be reset through the INIT (or TOC) signal. Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system. It is different from the RS command in that the processors are signaled to dump state on the way down.

Tell

TE: TEll—sends a message to other terminals

Up to 80 characters can be typed in. The message is broadcast to the other mirrored clients. Users in a session or CSP are not shown the message.

User Configuration

UC: User Configuration—controls user access

This command allows an administrator to add, modify, re-enable, or delete user logins. The administrator can also enable or disable security warnings and change passwords.

Virtual Front Panel

VFP: Display Virtual Front Panel

The VFP command presents a summary of the system by using direct console addressing. If the terminal is not recognized by the MP, VFP mode will be rejected. Each individual user will get this summary in order to avoid issues related to terminal type and screen display mode.

This command is executed from the Main Menu. When accessed, VFP displays the current state of the system including current LED status. The display refreshes at one second intervals.

Who

WHO: Displays a list of MP connected users

This command displays the login name and operating mode (Main Menu, command, and so on) of the connected console client users, and the port on which they are connected. For the LAN and WEB console clients the remote IP address is also displayed.

If the local console client user did not originate the MP command interface session, there is always one default user listed for the local serial port: local user i. If the local console operator types **CTRL+B**, then the login name that the local operator used is displayed instead.

Exit from MP

X: Exit from MP command interface and disconnect from the system

This command disconnects the executing user from the system. This command is available from the local port.

Diagnostics

XD: Diagnostics and/or Reset of MP

This command allows the user to perform some simple checks to confirm the MP's health and its connectivity status. The following tests are available:

- MP Parameter Checksum
- Verify I2C connection (get BMC Device ID)
- LAN connectivity test using ping
- Modem self-tests

Also, the MP can be reset from this command. A MP reset can be safely performed without affecting the operation of the server.

Management Processor Help System

The MP has a robust help system. To invoke MP HELP, enter **he** after the MP> prompt. The following is displayed:

```
HE

==== MP Help: Main Menu ============================================(Administrator)===

Hardware Revision a1 Firmware Revision E.02.20 May 30 2003,15:18:47

                        MP Help System
```

```
Use Ctrl-B to exit MP command interface and return to the main MP menu:

Enter a command at the help prompt:

       OVerview  : Launch the help overview

       LIst      : Show the list of MP commands

       <COMMAND> : Enter the command name for help on individual command

       TOPics    : Show all MP Help topics and commands

       HElp      : Display this screen

       Q         : Quit help
```

Enter one of the commands described above: **OV, LI, <command>, TOP, HE, Q**

Accessing the Baseboard Management Controller (BMC)

To log in to the BMC command line interface, use a serial connection and terminal emulation software:

NOTE The default terminal emulation type is VT100+. Terminal emulation for the BMC cannot be changed. The default baud rate is 9600. This setting can be changed from the EFI Boot Options Maintenance Menu

1. With the system turned off, connect a null-modem cable to Serial Port 1 on the rear panel of the system, and to your remote device.
2. Configure the terminal emulation software with these settings:
   - Baud rate: 9600
   - Bits: 8
   - Parity: None
   - Stop Bits: 1 (one)
   - Flow Control: XON/XOFF
3. Using the terminal emulation, connect to the system with a direct connection.
4. Turn on the system. The EFI menu displays in the terminal window.
5. To access the BMC command line interface, press: **Esc (**

   For example, on a U.S. QWERTY keyboard, press **Esc**, then press **Shift** and **9** at the same time.

NOTE If AC power is connected to the system, this command activates the BMC command line interface even if the system power is off.

6. If prompted, enter the user or admin password at the login prompt:

   ```
   login>
   ```

   You are not prompted for a password if none has been defined.)

7. The BMC prompt displays. If you entered the admin password, you have full access. If you entered the user password, you have restricted access

   ```
   Admin Session Initiated

    cli>
   ```

   or

   ```
   User Session Initiated

   cli>
   ```

Using the BMC Command Line Interface (CLI)

The baseboard management controller (BMC) supports the industry-standard Intelligent Platform Management Interface specification (IPMI 1.0 with Extensions). This specification describes the management features that have been built into the system board. These features include

- Diagnostics (local and remote)
- Console support
- Configuration management
- Hardware management
- Troubleshooting

There are two categories of BMC commands:

- Simple commands
- Intelligent Platform Management Interface (IPMI) commands

This section provides a brief overview of the available commands. For detailed information, see the Intel® web site: http://www.intel.com/design/servers/ipmi.

Executing BMC Commands

To execute BMC commands at the command prompt:

1. Type the command and any required parameters after the `cli>` prompt

   Use the **Backspace** key to correct mistakes.

2. Press **Enter** to execute the command.

Logging Out of the BMC Command Line Interface

When you are finished using the BMC CLI:

1. If you have a system password set, to log out of the BMC without returning to the system console, execute:

   Q

   The BMC login prompt displays:

   ```
   login>
   ```

2. To log out of the BMC and return to the system console, press **Esc Q** (press **Esc**, then press **Shift** and **Q** at the same time).

Simple Commands

Simple IPMI commands allow you to control the BMC interface, view logs, get help, and change your password.

To execute simple BMC commands:

1. Type the command, followed by any required options. For example, to execute the Change Password command, type **C**.
2. Press **Enter**.
3. If prompted, enter the additional information, such as a new password, and press **Enter.** For example:

```
cli> c

Type the new password> ****

Retype the new password> ****

New password confirmed.

cli>
```

Table 5-4 BMC Commands

Command syntax	Options	Mode	Description
C	Prompts user for new password	User	Allows user to change the password.
FPL	N/A	User	Reads the forward progress log. This log is encoded and can be used by HP support representatives.
H	N/A	User	Displays list of BMC commands.
INFO	N/A	User	Displays the BMC firmware revision.
LOC [0, 1]	0=off 1=on	User	Turns the system locator LED on or off.
P [0, 1]	0=off 1=on	User	Forces system power on or off; does not shut down using OS procedures. If you do not enter a parameter, displays the current power state.
Q	N/A	User	Logs out user; does not close BMC session.
RS	N/A	User	Resets the system.
SD	N/A	User	Displays the SDR repository. This data is encoded according to the IPMI spec and can be used by HP support representatives.

Table 5-4 BMC Commands (Continued)

Command syntax	Options	Mode	Description
SE	N/A	User	Displays system event log (SEL). This log is encoded and can be used by HP support representatives.

IPMI Commands

IPMI commands allow you to communicate with and configure various components of the system. IPMI commands are available only to users with Admin level access.

CAUTION DO NOT run BMC IPMI commands unless you are experienced with the IPMI specification. If you make mistakes running these commands, you can accidentally delete or modify data and cause your system to operate unpredictably or fail to operate.

All IPMI commands require a sequence of hex codes used as parameters. Each command may include some or all of the following parameters:

- Network Function and Lun (NetFnLun). The NetFn parameter identifies the message category. The LUN value is always 0.
- *Command.* The messages specified in this document contain a one-byte command field. Commands within each category are unique. Command values can range from 00h through FDh. FEh is reserved for future extension of the specification, and FFh is reserved for message interface level error reporting on potential future interfaces
- *Data.* The Data field carries the additional parameters for a request or a response, if any

  The IPMI commands can be entered in long or short forms. The associated response from the BMC matches the form of the command.

For example:

- Short format, or `ipmi`, command:
  - Syntax:

    ```
    ipmi NetFnLun Cmd Data1 Data2 ... DataN
    ```

  - Sample command and system response

    ```
    cli> ipmi 18 04

    00 55 00

    cli>
    ```

- Long format, or `i`, command
  - Syntax:

    ```
    i 0 NetFnLun 0 0 0 Cmd Data1 Data2 ... DataN 0
    ```

  - Sample command and system response:

    ```
    cli> i 20 18 C8 f0 04 04 08

    F0 1C F4 20 04 04 00 55 00 83

    cli>
    ```

Long format IPMI commands (“I”) use an ASCII transcription of the IPMI data format. The following examples illustrate how IPMI commands and responses are structured

NOTE All noncommand bytes can be replaced with 0.

Table 5-5 Long Format IPMI Command Data Structure Example

	Bits		Byte
7-2		**1-0**	
	rsSa = 0x20		0x20
NetFn = 0x07		rsLUN = 0x00	0x18
	Checksum = 0xC8		0xC8
	rqSWID = 0xF0		0xF0
rqSeq = 0x01		rqLUN = 0x00	0x04
	Cmd = 0x04		0x04
	Checksum = 0x08		0x08

Table 5-6 Long Format IPMI Response Data Structure Example

	Bits		Byte
7-2		**1-0**	
	rqSWID = 0xF0		0xF0
NetFn = 0x07		rsLUN = 0x00	0x1C
	Checksum = 0xF4		0xF4
	rsSA = 0x20		0x20
rqSeq = 0x01		rsLUN = 0x00	0x04
	Cmd = 0x04		0x04
	Data byte 1 = 0x00 (completion code)		0x00
	Data byte 2 = 0x55 (result = no error)		0x55
	Data byte 3 = 0x00 (details)		0x00
	Checksum = 0x83		0x83

The BMC supports the version 1.0 IPMI categories and commands listed in the following tables. For detailed information on the IPMI specification and commands, see the Intel web site: http://www.intel.com/design/servers/ipmi.

Table 5-7 Command Categories

NetFn	NetFN<<2	Description
00, 01	00, 04	Chassis
04, 05	10, 14	Sensor/Event (S/E)
06, 07	18, 1C	Application
0A, 0B	28, 2C	Storage
32, 33	C8, CC	HP Custom (proprietary)

Table 5-8 Chassis Commands

Command	Description
01h	Get chassis status
02h	Chassis control
0Fh	Get Power-on Hours (POH) counter
06h	Set Power Restore Policy

Table 5-9 Sensor/Event Commands

Command	Description
01h	Get event receiver
02h	Platform event (a.k.a. “Event Message”)
28h	Set sensor event enable
29h	Get sensor event enable
2Ah	Re-arm sensor events
2Dh	Get sensor reading

Table 5-10 Application Commands

Command	Description
IPM Device “Global” Commands	
01h	Get device ID
02h	Cold reset
03h	Warm reset
04h	Get self test results

Table 5-10 Application Commands (Continued)

Command	Description
Broadcast Commands	
01h	Broadcast ‘Get Device ID’
System Interface Commands	
2Eh	Set BMC global enables
2Fh	Get BMC global enables
30h	Clear message flags
31h	Get message flags
32h	Enable message channel receive
33h	Get message
34h	Send message
35h	Read event message buffer
36h	Get BT interface capabilities

Table 5-10 Application Commands (Continued)

Command	Description
BMC Watchdog Timer Commands	
22h	Reset watchdog timer
24h	Set watchdog timer
25h	Get Watchdog timer

Table 5-11 Storage Commands

Command	Description
SEL Commands	
40h	Get SEL info
41h	Get SEL allocation info
42h	Reserve SEL
43h	Get SEL entry
44h	Add SEL entry
47h	Clear SEL
48h	Get SEL time
49h	Set SEL time
SDR Repository Commands	
20h	Get SDR repository info
21h	Get SDR repository allocation info
22h	Reserve SDR repository
23h	Get SDR
28h	Get SDR repository time
29h	Set SDR repository time
FRU Inventory Device Commands	
10h	Get FRU inventory area info
11h	Read FRU inventory data
12h	Write FRU inventory data

6 Troubleshooting

This chapter provides troubleshooting instructions for maintaining your hp 9000 rp3410 or hp 9000 rp3440 Server.

Troubleshooting Methodology

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

CAUTION Do not operate the HP Server for more than 5 minutes with any cover (including disk drives) removed. Damage to system components may result due to improper cooling airflow.

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

Online troubleshooting programs are available on your HP-UX operating system. Offline troubleshooting programs are available on the resource CD that is shipped with your HP Server. Descriptions and user information about offline troubleshooting tools are available at http://docs.hp.com. The offline tools are available for downloading at http://software.hp.com.

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:

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

Support Tools Manager

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

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

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

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

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

Event Monitoring Service

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

The following monitors are available:

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

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

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

From the list of main menu selections, choose:

```
(E) Enable Monitoring
```

Management Processor

The management processor (MP) interface provides access to the baseboard management controller system information and provides some configuration capabilities. By viewing the system logs by way of the MP you can view information that can assist in solving problems affecting your computer. To access your MP interface and system logs, perform the following steps:

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

NOTE At publication, the current version of the Management Processor Revision is E.02.25.

Check the HP website for the latest revision.

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

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

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

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

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

Step 5. For a complete explanation of the management processor and all commands see Chapter 5, "Utilities."

System Event Logs (SEL) Logs

Step 1. Access the management processor command prompt.

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

```
SL

Event Log Viewer:


Log Name            Entries    % Full         Latest Entry

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

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

F - Forward Progress      129         3 %

B - Current Boot           82

P - Previous Boot           0

L - Live Events

C - Clear All Logs


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

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

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

(N)

       Log Name            Entries    % Full         Latest Entry

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

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

```
Event Log Navigation Help:


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

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

   <CR>    Continue to the next or previous block

   D       Dump the entire log for capture and analysis

   F       First entry

   L       Last entry

   J       Jump to entry number

   V       View mode configuration (text, keyword, hex)

   ?       Display this Help menu

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

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

```
Display Mode Configuration:

               H - Hex mode

   Current -> K - Keyword mode

               T - Text mode

Enter new value, or [Q] to Quit:

T
```

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

For example:

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

Alert Level 3: Warning

Keyword: Type-02 1b0800 1771520

Hot Swap Cage: SCSI cable removed

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

Data1: Device Removed/Device Absent

0x203E4D0AC6020220 FFFF0008F61B0300


Log Entry 73: 00:00:12

Alert Level 3: Warning
```

```
Keyword: Type-02 050301 328449

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

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

Data1: State Asserted

0x200000000C020570 FFFF010302050300
```

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:

- Offline Diagnostic Environment (ODE)

Offline Diagnostic Environment (ODE)

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

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

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

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

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

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

```
p3
```

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

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

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

The following commands are available at the ODE prompt:

Table 6-1 ODE Commands

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

Table 6-1 ODE Commands (Continued)

Command	Description
<*module_name*>	To run an ODE module interactively
`run` <*module_name*>	To run an ODE module non-interactively

Identifying and Diagnosing Hardware Problems

Should a hardware failure occur, the system LED, diagnostic LEDs and the system event log (SEL) will help you identify the problem:

- LEDs. The lights on the front bezel of the server change color and blink in different patterns to help identify specific hardware problems. LEDs on the rear panel of the server display LAN status.
- The System Event Log (SEL) provides detailed information about the errors identified by the LEDs.

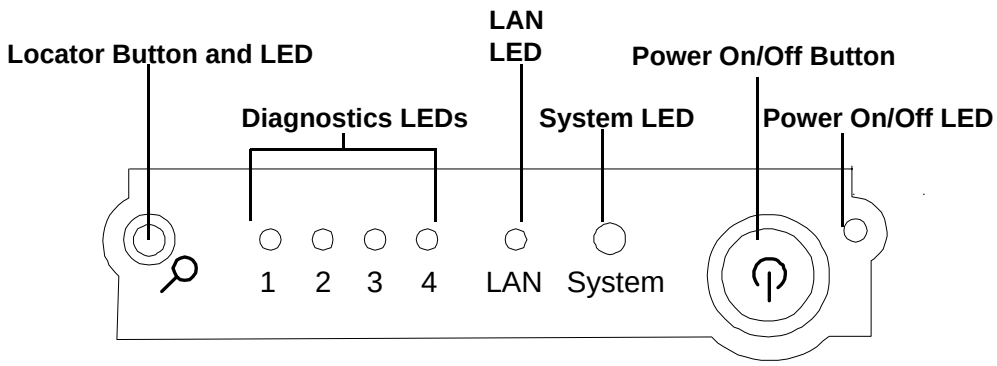
Troubleshooting Using LEDs

Four diagnostic LEDs, one power LED, and one system LED are located on the control panel of the system. The following sections describe their functions. Additional diagnostic LEDs are provided on the system board (See “System Board Diagnostic LEDs” on page 90.

If the system has no management processor (MP) card installed, the four diagnostic LEDs on the front panel warn of impending failures and allow you to take preventive action. For example, you may want to back up your data or replace a component before it fails.

- If no management processor card is installed, the boot progress is monitored by diagnostic LEDs 1 through 4. During the boot-up the LEDs will turn on in sequence until the BCH prompt is reached.
- If a management processor card is installed, the boot process will be monitored by the management processor card. The LEDs will be off.

Figure 6-1 Control Panel LEDs



Power and System LEDs

The Power and System LED indicate the state of the system. When the system LED is blinking yellow or red, a problem exists.

Table 6-2 System LED States

System LED	State
Off	AC power off if Power LED is off.
Solid green	Running OS
Blinking green	Booting or running EFI
Blinking yellow (1/sec.)	Attention: Alerts of levels 3-5 detected in the management processor logs. The LED will turn off once the event log has been read.
Blinking red (2/sec.)	Fault: System Alert 7 Detected, LED will blink until the problem is resolved and the system boots successfully or until it is manually turned off with the management processor `dc` command. Fatal hardware error detected by BMC, LED will blink until problem is corrected.

For system alerts of levels 3-5, the attention condition on the LED can be cleared by accessing the logs using the `sl` command available in the management processor command mode.

The fault condition for system alerts of level 7 can only be cleared with the `dc` command unless hardware replacement is necessary. Refer to the SL error logs for additional error information.

NOTE Always check the management processor status logs in the case of a blinking yellow or red System LED before replacing any hardware.

Diagnostic LEDs The four diagnostic LEDs on the front bezel of the system are used for diagnosing the health of the system. Refer to the SEL and FPL logs for specific information about the warning or failure indicated by the diagnostics LEDs.

These LEDs warn of impending hardware failures and allow you to take preventive action, such as making a system backup or replacing a component before it fails. These diagnostic LEDs are labeled 1, 2, 3 and 4.

The location of red LEDs can be used to identify the category of the fault or warning. For example, if LED one is red, there is a problem with memory. However, if LEDs one and two are both red, there is a problem with the system processor.

If the diagnostic LEDs indicate an error, check the SEL for a more detailed explanations of the failure.

- The System LED indicates the severity of the error. Check this LED before proceeding to analyze the sequence of diagnostic LEDs:
  - Blinking yellow indicates a WARNING.

  - Blinking red indicates a FAULT.
- The Diagnostic LEDs provide details about the specific error:
  - Solid red indicates the failing part or subsystem.
  - Off or solid green diagnostic LEDs provide additional details about the failure.

The faults and warnings fall into several general categories.

Table 6-3 Diagnostic LEDs Fault and Warning Categories

LED 1	LED 2	LED 3	LED 4	Category
Red	Any[a]	Any[a]	Any[a]	Memory
Any[a]	Red	Any[a]	Any[a]	Firmware
Any[a]	Any[a]	Red	Any[a]	System Board
Any[a]	Any[a]	Any[a]	Red	Fan
Red	Red	Any[a]	Any[a]	Processor
Red	Any[a]	Red	Any[a]	BMC
Red	Any[a]	Any[a]	Red	Temperature
Any[a]	Red	Any[a]	Red	Power Supply
Red	Red	Red	Red	Unknown

a. This LED can display any color other than red (for example, green or off).

Warnings

The following tables provide additional information about each specific warning associated with the various possible LED lighting sequences when **the system LED is yellow**.

Table 6-4 Unknown Warning

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Red	Red	Red	Unknown warning	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

Table 6-5 Memory Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Green	Off	Off	Mismatched memory pairs.	Review the information on installing memory in Chapter 4, “Installing and Configuring.”
Flashing Yellow	Red	Off	Green	Green	Memory thermal load order	Review the information on installing memory in Chapter 4, “Installing and Configuring.”
Flashing Yellow	Red	Green	Green	Green	Bad SPD information (can't detect type).	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

Table 6-6 System Board Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Green	Green	Red	Off	Battery voltage low	Replace the system board battery.

Table 6-7 Fan Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Green	Off	Off	Red	Fan 1A is not functioning properly	Replace the fan that is not functioning.
Flashing Yellow	Off	Green	Off	Red	Fan 1B is not functioning properly	Replace the fan that is not functioning.
Flashing Yellow	Off	Off	Green	Red	CPU fan 0 is not functioning properly	Replace the fan that is not functioning.
Flashing Yellow	Green	Green	Off	Red	CPU fan 1 is not functioning properly	Replace the fan that is not functioning. If a processor fan has failed, you must replace the CPU.

Table 6-7 Fan Warnings (Continued)

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Off	Green	Green	Red	Fan module 2 (memory) is not functioning properly	Replace the fan that is not functioning. If a processor fan has failed, you must replace the CPU.
Flashing Yellow	Green	Green	Green	Red	Fan module 3 (memory) is not functioning properly	Replace the fan that is not functioning.

Table 6-8 Processor Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Red	Green	Off	Processor 0 temperature exceeds limit	View the SEL for additional information. Make sure nothing is blocking the processor's airflow.
Flashing Yellow	Red	Red	Off	Green	Processor 1 temperature exceeds limit	View the SEL for additional information. Make sure nothing is blocking the processor's airflow.

Table 6-9 Temperature Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Green	Green	Red	External air temperature too high	Make sure nothing is blocking the system's airflow and place your system in an air-conditioned room.

Table 6-10 Video Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Off	Red	Red	Off	No video adapter present	Install a video adapter. See the installation instructions shipped with the video adapter.

Table 6-11 Power Supply Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Green	Red	Off	Red	Power supply 1 fault	Replace the power supply.
Flashing Yellow	Off	Red	Green	Red	Power supply 2 fault	Replace the power supply.

Faults The following tables provide additional information about each specific fault associated with the various possible LED lighting sequences **when the system LED is red**.

Table 6-12 Unknown Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Red	Red	Red	Unknown fault.	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

Table 6-13 Memory Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Green	Off	Off	Mismatched memory pairs.	Review the information on installing memory in Chapter 4, “Installing and Configuring.”
Flashing Red	Red	Off	Off	Green	Uncorrectable memory error.	Replace memory.
Flashing Red	Red	Green	Green	Off	No memory installed.	Install memory.
Flashing Red	Red	Green	Green	Green	Bad Memory. One or more DIMMs are bad or not seated properly.	Reseat the DIMMs. If the error persists, replace them.

Table 6-14 Firmware Errors

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Off	Red	Off	Off	System firmware hang or system fault	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

Table 6-15 System Board Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Off	Green	Red	Off	VRM overvoltage	View the SEL for additional information. For further assistance, contact your HP Support Engineer.
Flashing Red	Green	Off	Red	Off	VRM undervoltage	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

Table 6-16 Fan Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Green	Off	Off	Red	Cooling unit 1 fault (power)	Replace the fan that is not functioning.
Flashing Red	Off	Green	Off	Red	Cooling unit 2 fault (memory)	Replace the fan that is not functioning.
Flashing Red	Off	Off	Green	Red	Cooling unit 3 fault (Disks/PCI)	Replace the fan that is not functioning.

Table 6-17 Processor Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Red	Off	Green	Processor 0 temperature exceeds limit	If a processor fan has failed, you must replace the CPU.
Flashing Red	Red	Red	Off	Off	Processor 1 temperature exceeds limit	If a processor fan has failed, you must replace the CPU.
Flashing Red	Red	Red	Green	Green	No processor detected.	Install processor.

Table 6-18 BMC Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Green	Red	Off	BMC firmware is damaged	Turn off and unplug the system. Wait 20 seconds, then plug in and restart the system. If the error repeats, replace the system board.
Flashing Red	Red	Green	Red	Green	System board FRU inventory device inaccessible	Replace the system board.

Table 6-19 Temperature Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Green	Green	Red	External air temperature too high	Make sure nothing is blocking the system's airflow and place your system in an air-conditioned room.

Table 6-20 Power Supply Errors

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Off	Red	Off	Red	VRM or power pod fault	View the SEL for additional information.
Flashing Red	Green	Red	Off	Red	Power supply fault	View the SEL for additional information. Replace the power supply if necessary.
Flashing Red	Green	Red	Green	Red	12V out of range (power supply interface fault)	View the SEL for additional information. If the power supply interface has failed it is necessary to replace the base unit.

LAN LEDs

The front panel LAN LED indicates the system is communicating over the Gigabit or system management LAN:

- Blinking green, the system is communicating over the LAN
- Solid green, LAN link is established, no current LAN activity
- Not green, no LAN cable attached, LAN network dead or the system is off

10/100/1000 LAN LEDs are on the rear panel:

Table 6-21 10/100/1000 base-T ethernet LAN Connector LEDs

LED	Description
1000BT	Blinking green—the 1000MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
100BT	Blinking green—the 100MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
10BT	Blinking green—the 10MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
Activity	Blinking green—LAN activity

One System Management 10/100 LAN port on the rear panel provides the following LEDs:

Table 6-22 System Management 10/100 LAN LEDs

LAN LED	Location	Color	State
Speed	Top	On	Port linked at 100 Mb/s
		Off	Port linked at 10 Mb/s
Activity	Bottom	On	Port linked
		Off	No link established

Four management processor LAN LEDs are also on the rear panel if the system has a management processor card installed:

Table 6-23 Management Processor Card LAN LEDs

LAN LED	Location	Color	State
Self-test	Top	Yellow	Management processor running selftest or error
		Off	Management processor has booted

Table 6-23 Management Processor Card LAN LEDs (Continued)

LAN LED	Location	Color	State
10BT	2nd from top	Green	10BT link established
		Blinking green	10BT activity
		Off	No link or 100BT link
100BT	2nd from bottom	Green	100BT link established
		Blinking green	100BT activity
		Off	No link or 10BT link
Standby Power	Bottom	Green	Standby power on
		Off	Standby power off

System Board Diagnostic LEDs

There are three additional LEDs that can help when troubleshooting the system. These LEDs are located on the system board close to the back of the system and can be viewed through the small cooling holes in the system case.

Figure 6-2 Location of the STBY, F/W and BMC LEDs

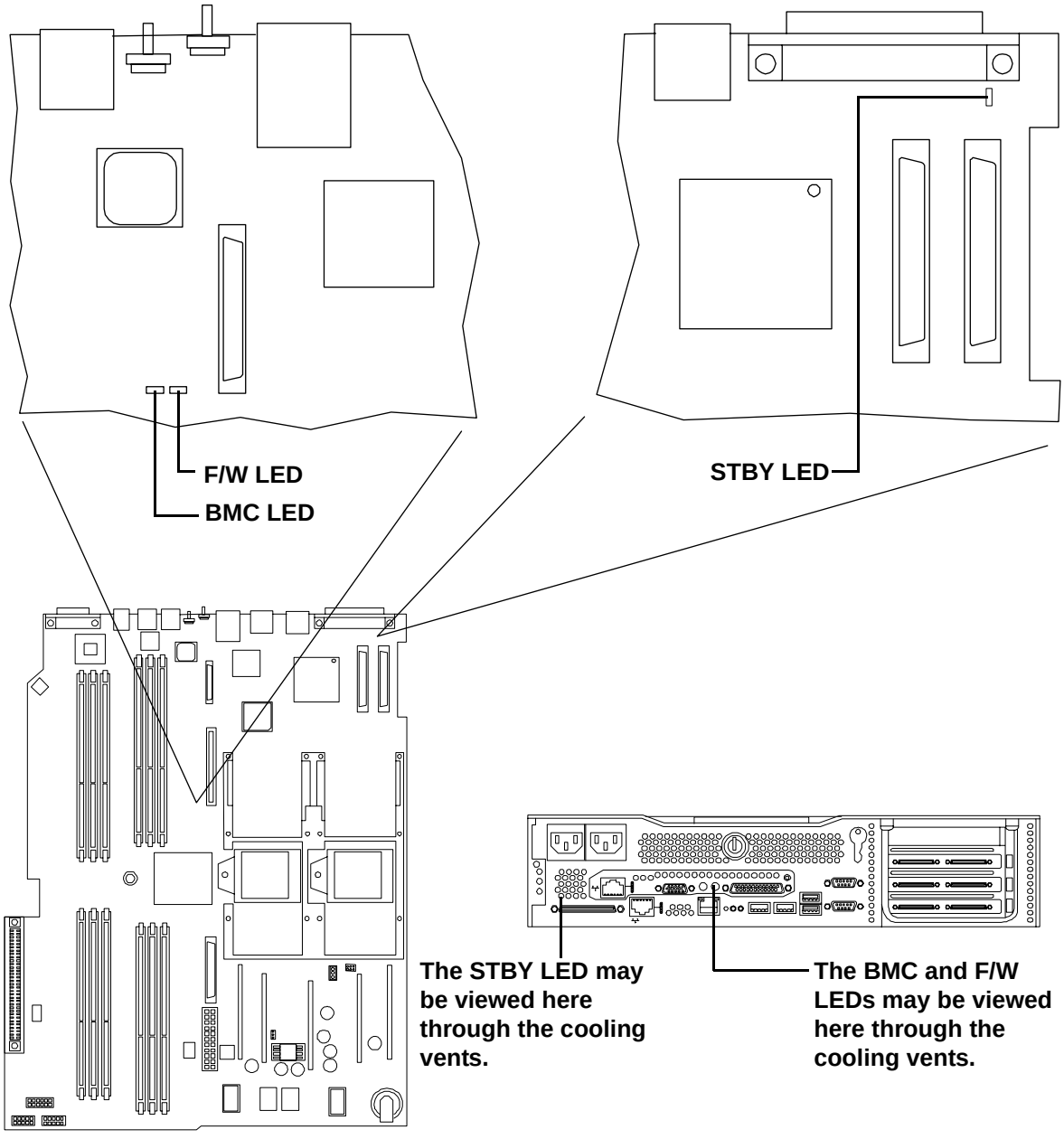


Table 6-24 System Board LEDs

LED	Description
STBY	This standby LED comes on as soon as the system's power cord is plugged in. If this light is off when you plug it in, reseat the power supply, and if this does not work, replace the power supply.
BMC	A few seconds after the system is plugged in this LED starts blinking, which means that the Baseboard Management Controller is alive.
F/W	A few seconds after the system button is pressed in, the system firmware code fetch LED comes on, indicating that the firmware has started the boot process.

Cleaning Procedures

Refer to the following table for cleaning procedures for this hp 9000 rp3410 or hp 9000 rp3440 Server. Be sure to turn off power to the server when cleaning it.

Table 6-25 Cleaning

Component	Time Frame	Cleaning Procedure
Keyboard	Regularly	Dust with damp, lint-free cloth.
Monitor screen	Regularly	Use the HP Video Screen Cleaning Solution found in 92193M Master Clean Kit.
Mouse	Regularly	Refer to the mouse's manual for mouse maintenance procedures.
Cooling fans and grilles	6 Months	Check functions of cooling fans and clean the intake openings on the chassis of dust, lint, and other obstructions to airflow.

CAUTION DO NOT use petroleum-based cleaners (such as lighter fluid) or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone. These chemicals could damage all plastic and painted surfaces.

7 Removing and Replacing Components

This chapter provides information on:

- Safety information and tools required
- Location of internal components and connectors
- Remove/replace prerequisites
- System covers and bezel
- Removing/replacing hot-swap and hot-plug devices
- Removing/replacing internal components

Safety Information

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

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

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

Service Tools Required

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

- Electrically Conductive Field Service Kit (P/N 9300-1155)
- 1/4 inch Flat Blade Screwdriver
- ACX-15 Torx® Screwdriver
- Special Processor Tool, HP P/N 5069-4551

Location of Internal Components and Connectors

Figure 7-1 Internal Physical Layout

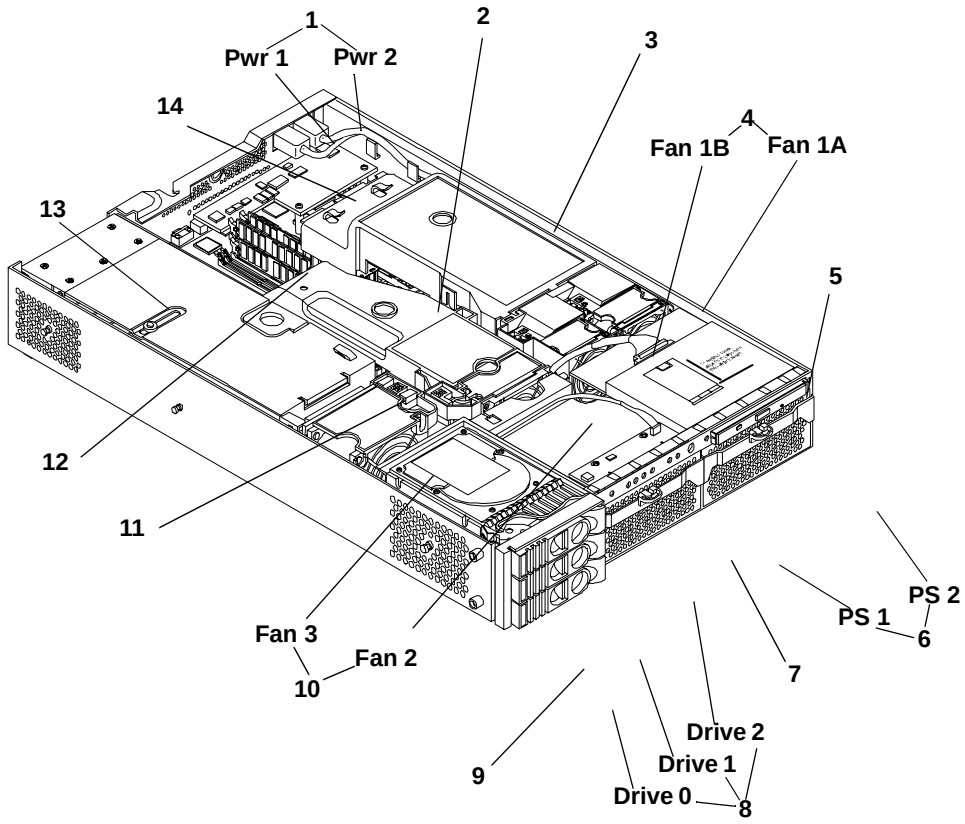


Table 7-1 Component Locations

1 Power receptacles (PWR1 right, PWR2 left)	8 Hot-pluggable hard drives (up to 3)
2 HP ZX1 memory and I/O controller	9 Hard disk lock
3 Processor airflow guide	10 System fans (Fan 2 center, Fan 3 PCI cage)
4 System fans (Fan 1A right, Fan 1B left)	11 Intrusion switch
5 Slimline optical drive	12 Memory sockets
6 Power supplies (PSU1 center, PSU2 under optical drive)	13 PCI cage
7 Status panel board	14 Management controller card

Figure 7-2 System Board Connectors and Slots

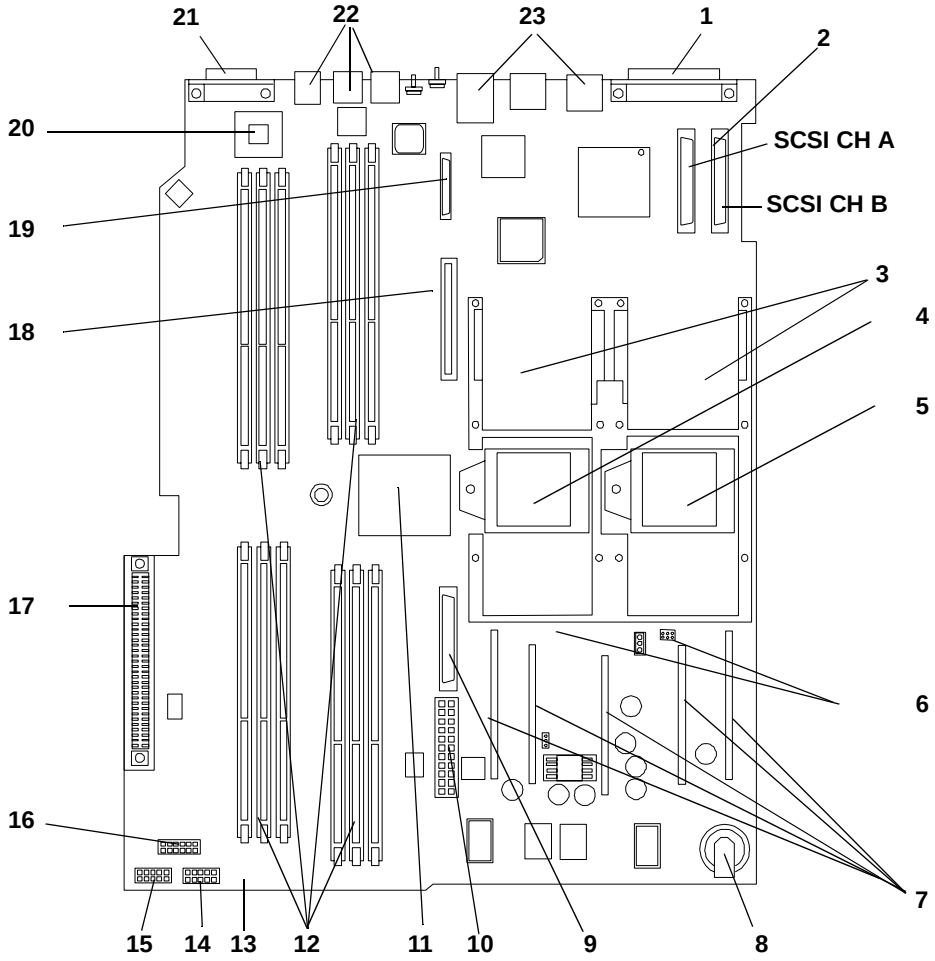


Table 7-2 Connector Locations

1 External SCSI Connector	9 Memory and Power Supply Fan Connectors	17 PCI Backplane Connector
2 SCSI Connectors A & B	10 Power Module Power Connector	18 Optical Drive Connector
3 CPU Power Pods	11 HP ZX1 Memory and I/O Controller (under heatsink)	19 MP Card connector
4 CPU 1	12 Memory Sockets	20 HP ZX1 I/O Adapter
5 CPU 0	13 Status Panel Connector	21 Serial Ports (2)
6 Turbo Fan Power Connectors	14 Power Module Auxiliary Connector	22 USB Connectors (4)
7 Five VRM Cards	15 SCSI Backplane Power Connector	23 LAN Connectors (2)
8 Battery	16 PCI/Memory Fan Cable Connector	

Removing and Replacing System Covers and Bezels

To upgrade, remove, or replace most system components, you must first remove the covers from the system chassis. This section explains how to remove and replace the covers for both tower and rackmount configurations.

WARNING **Do not remove the system cover(s) without first turning the system off and unplugging the power cord from the outlet or power protection device unless you are only replacing a hot-swappable fan. Always replace the cover(s) before turning the system on.**

Tower Configuration

Either version of the HP Server, hp 9000 rp3410 or hp 9000 rp3440 Server is available in a tower configuration or may be converted from a rack to tower configuration. To access the internal components on a tower system, you must remove the plastic and metal left-side covers.

Removing the Side Covers

Step 1. Turn off the system and disconnect the power cable and all other cables from the back of the system.

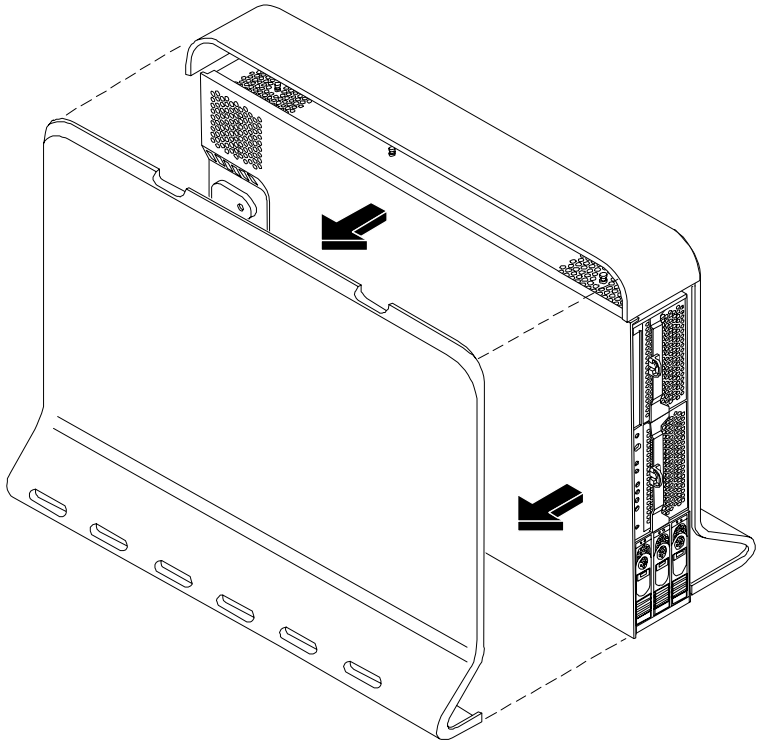
NOTE If you are removing only a hot-swappable system fan, you can leave the system on and the power cables connected.

Step 2. Remove the plastic cover.

a. Grasp both indentations at the top of the side panel and pull outward.

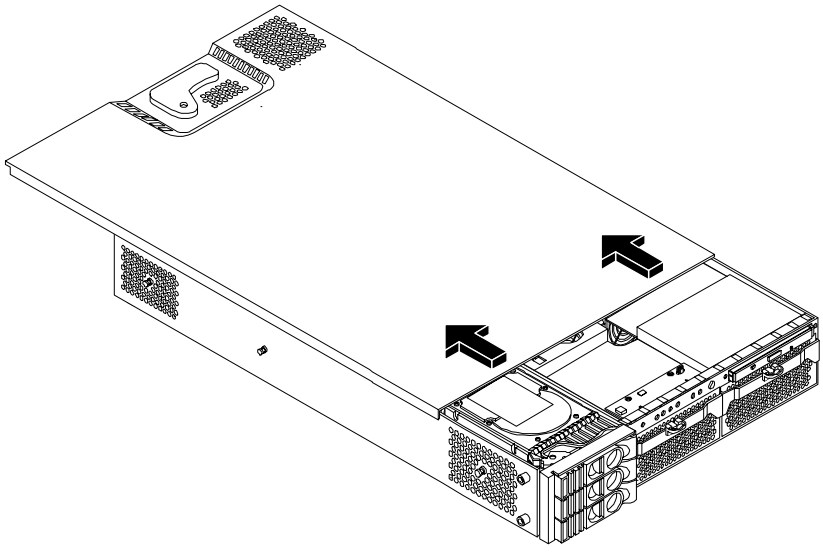
b. Lift the plastic cover off of the system chassis.

Figure 7-3Removing the Plastic Cover



Step 3. Remove the metal cover.

Figure 7-4Removing the Metal Cover



a. Turn the top cover lock keyswitch to the unlocked position.

b. Rotate the blue release handle to release the latch.

c. Slide the cover toward the back of the chassis, then lift it off.

CAUTION The HP Server depends on the access panels being closed for proper cooling of internal components. Operating the system with the side cover removed can cause the system to quickly overheat.

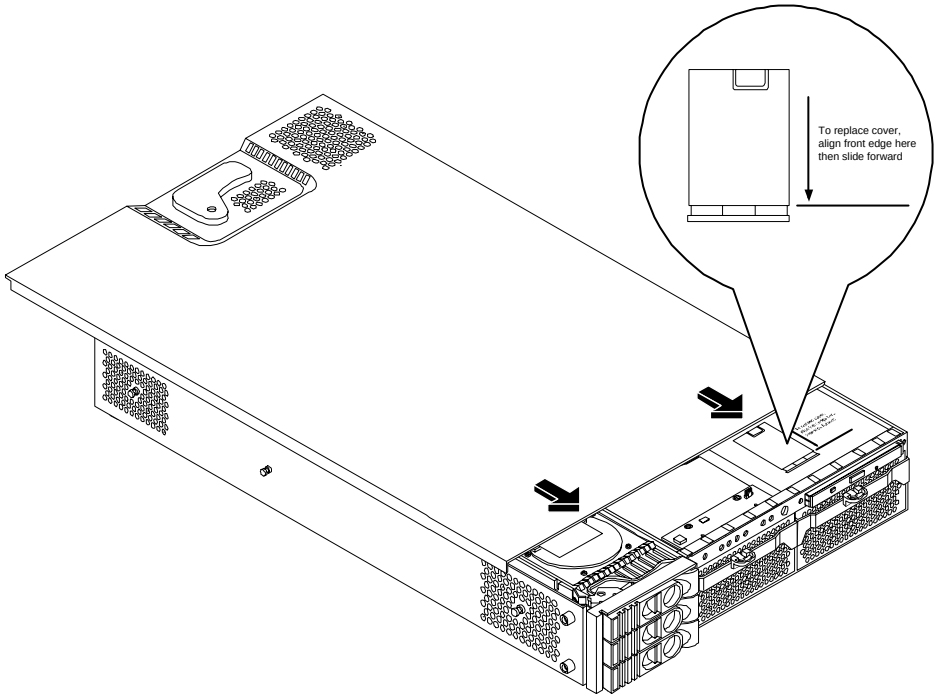
Replacing the Side Covers

Step 1. Replace the metal cover:

CAUTION Secure any wires or cables in your system so they do not get cut or interfere with the replacement of the cover.

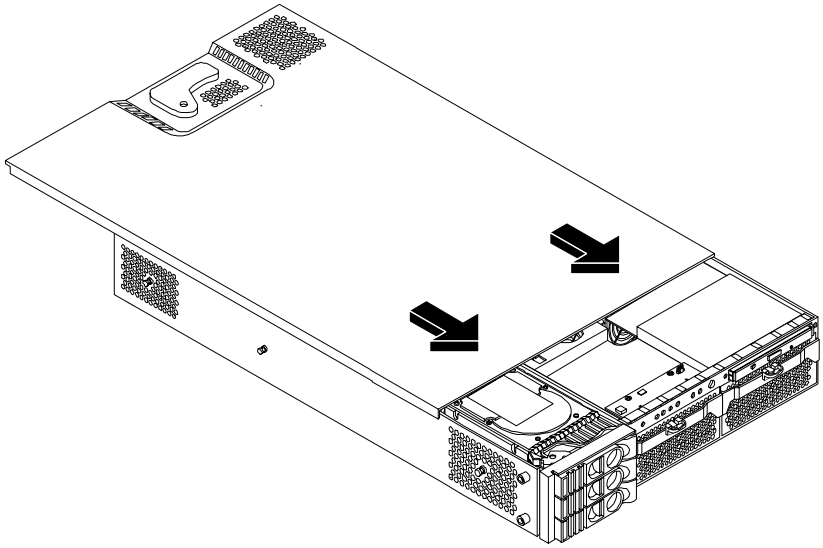
a. Align the front edge of the metal cover with the alignment mark on the optical drive bay.

Figure 7-5Metal Cover Alignment Mark



b. Place the metal cover on the chassis and slide it toward the front of the system until the blue release lever snaps in place.

Figure 7-6Replacing the Metal Cover

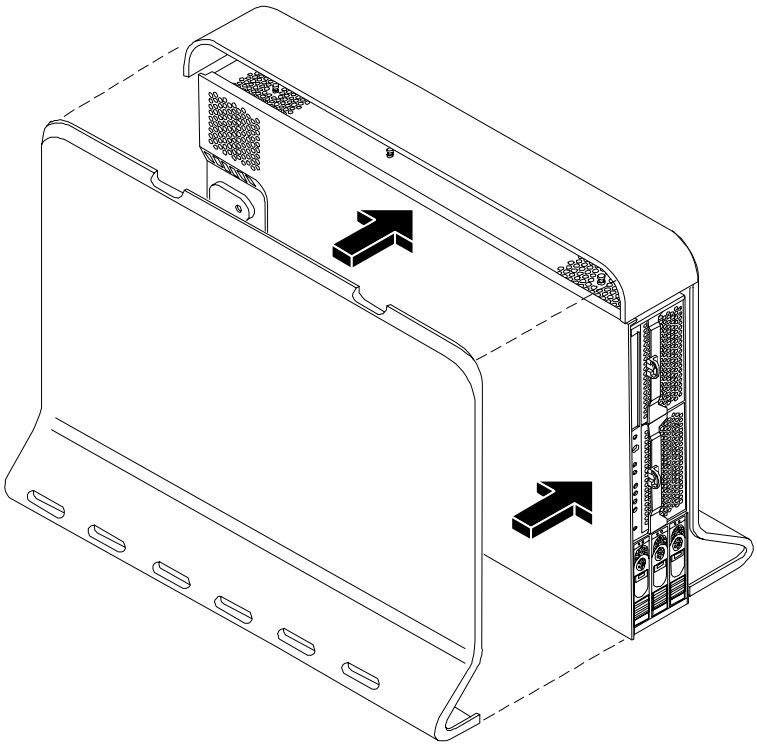


Step 2. Replace the plastic cover:

a. Align the cover's mounting holes with the matching tabs on the system chassis.

b. Close the cover until it snaps onto the system chassis.

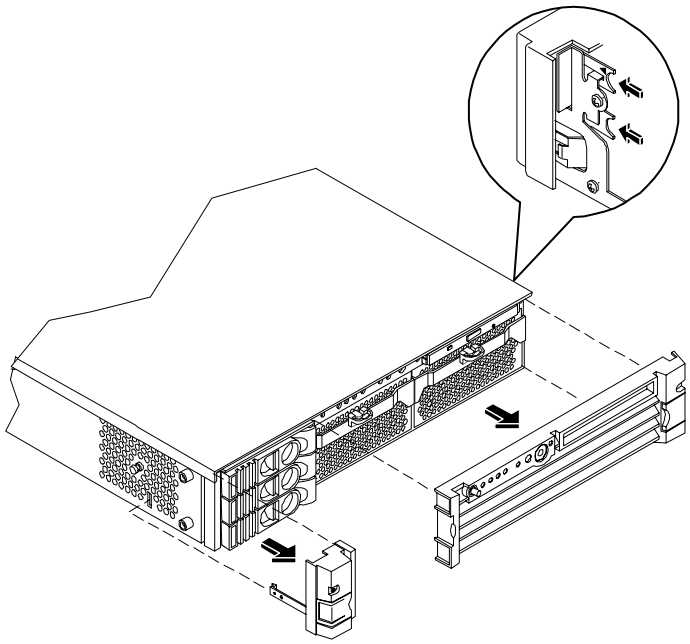
Figure 7-7Replacing the Plastic Cover



Removing and Replacing the Rackmount Front Bezel

You must remove the front bezel from the chassis to remove or replace the power supplies or the optical drive.

Figure 7-8 Front Bezel



Removing the Front Bezel

To remove the front bezel parts, perform the following steps:

Step 1. Press in on the retaining clips located on the right-side of the front panel.

Step 2. Firmly grasp the finger grip at the top of the bezel and pull forward until the bezel snaps open.

Step 3. Lift the bezel off of the chassis.

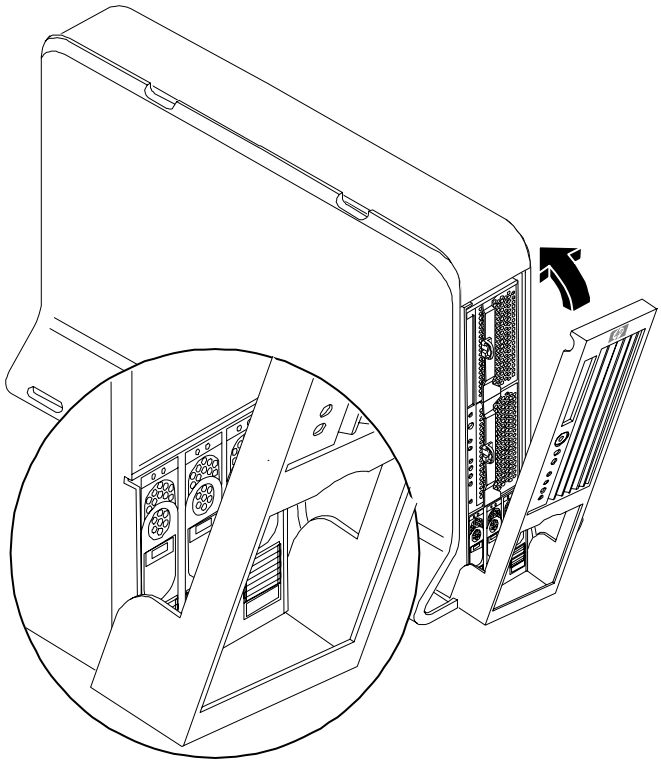
Replacing the Front Bezel

To replace the front bezel parts, perform the following steps:

Step 1. Insert the bezel's latches into the matching slots on the system chassis.

Step 2. Close the bezel and push toward the front of the system until it locks into place.

Figure 7-9 Aligning the Tower Front Bezel



Rack-Mount System

To access the internal components on a rack-mounted system, pull the system out on the rail guides and remove the metal cover.

Accessing a Rack Mounted Server

The hp 9000 rp3410 and rp3440 Servers are designed to be rack mounted. The following procedure explains how to gain access to a server that is mounted in an approved rack. For rack installation instructions, review the document titled *Installation Guide, Mid-Weight Slide Kit, 5065-7291*.

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

Extend the Server from the Rack

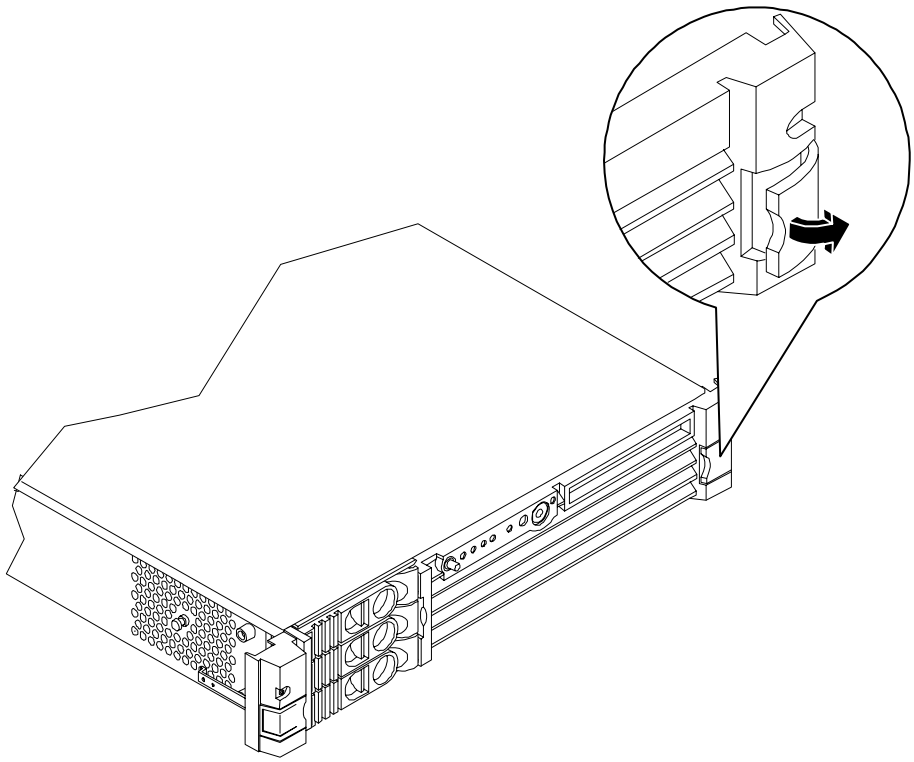
NOTE Ensure that there is enough area (approximately 1.5 meters (4.5 ft.) to fully extend the server out the front and work on it.

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

Step 1. Turn off the system and disconnect the power cable and all other cables from the back of the system.

Step 2. Release the rack latches by rotating them outward.

Figure 7-10Release the Rack Latches



Step 3. Slide the system out of the rack until the guide-rail release clips are visible.

Insert the Server into the Rack

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

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

Step 2. Verify that the rack latches are closed.

Removing and Replacing the Metal Cover

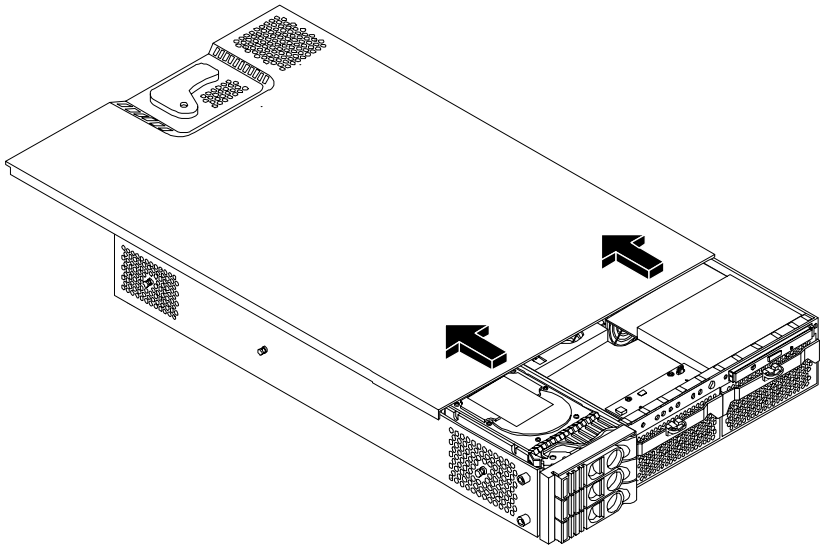
Removing the Metal Cover

Step 1. Turn off the system and disconnect the power cable and all other cables from the back of the system.

NOTE If you are removing only a hot-swappable system fan, you can leave the system on and the power cables connected.

Step 2. Ensure the top cover lock keyswitch is in the unlocked position. Rotate the blue release lever toward the back of the system and slide the cover toward the back of the system.

Figure 7-11Removing and Replacing the Metal Cover



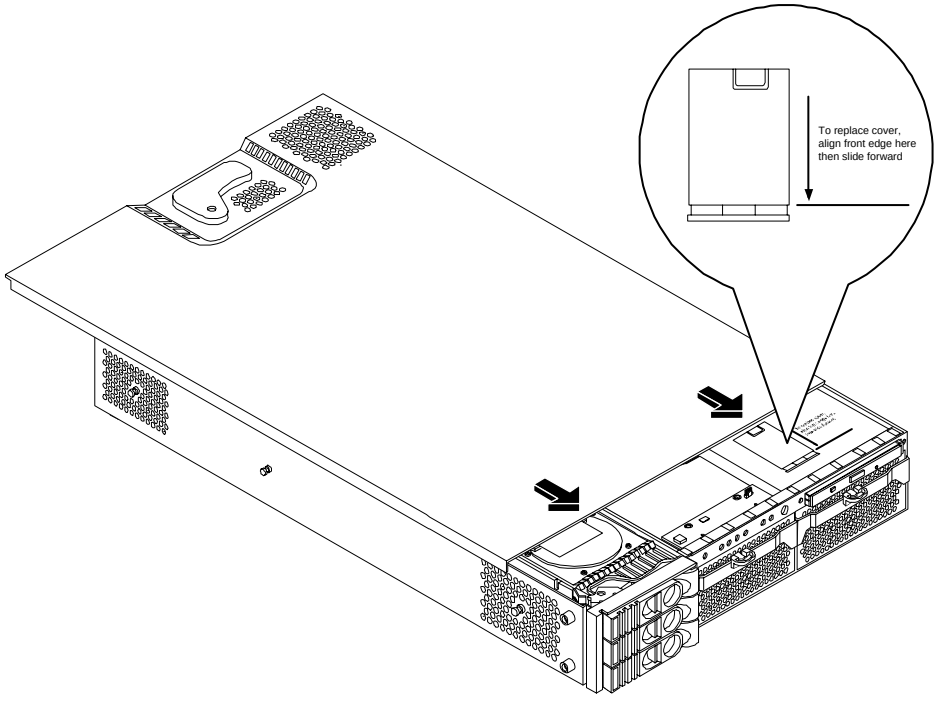
Step 3. Lift the cover off the system chassis.

Replacing the Cover

CAUTION Secure any wires or cables in your system so they will not get cut or interfere with the replacement of the cover.

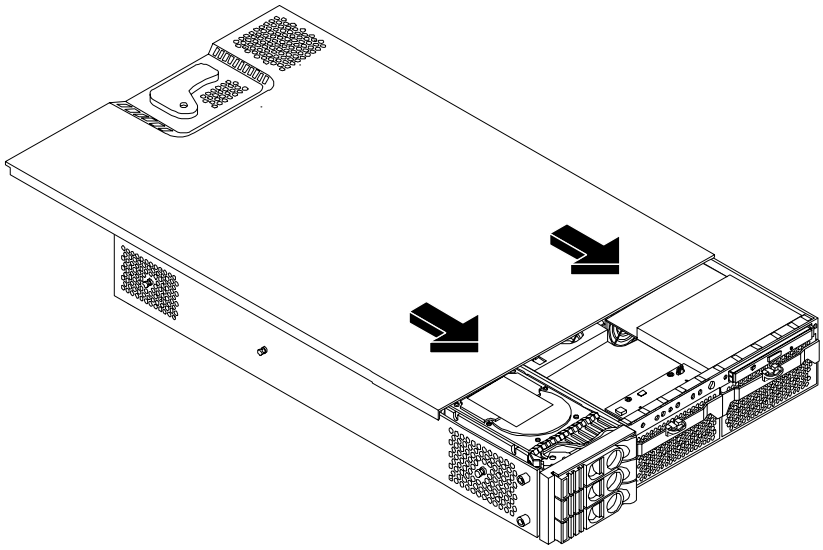
Step 1. Align the front edge of the cover with the alignment mark on the optical drive bay.

Figure 7-12Aligning the Metal Cover



Step 2. Grasp the blue release lever and slide the cover toward the front of the system until the lever snaps into place.

Figure 7-13Closing the Metal Cover



Step 3. Slide the system into the rack enclosure and reconnect the power cables.

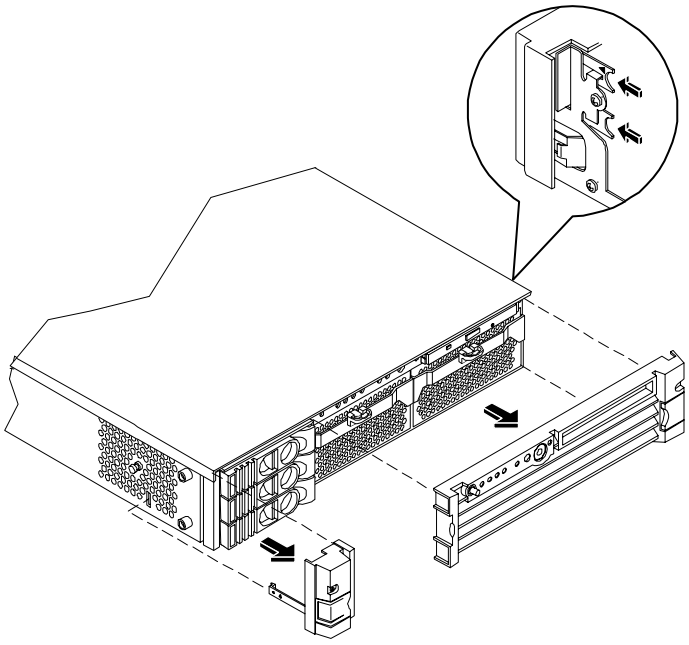
Removing and Replacing the Front Bezel

You must remove the front bezel from the chassis to remove or replace the power supplies or the optical drive.

Removing the Front Bezel

Step 1. Press in on the retaining clips located on the right-side of the front panel.

Figure 7-14Front Bezel Retaining Clip



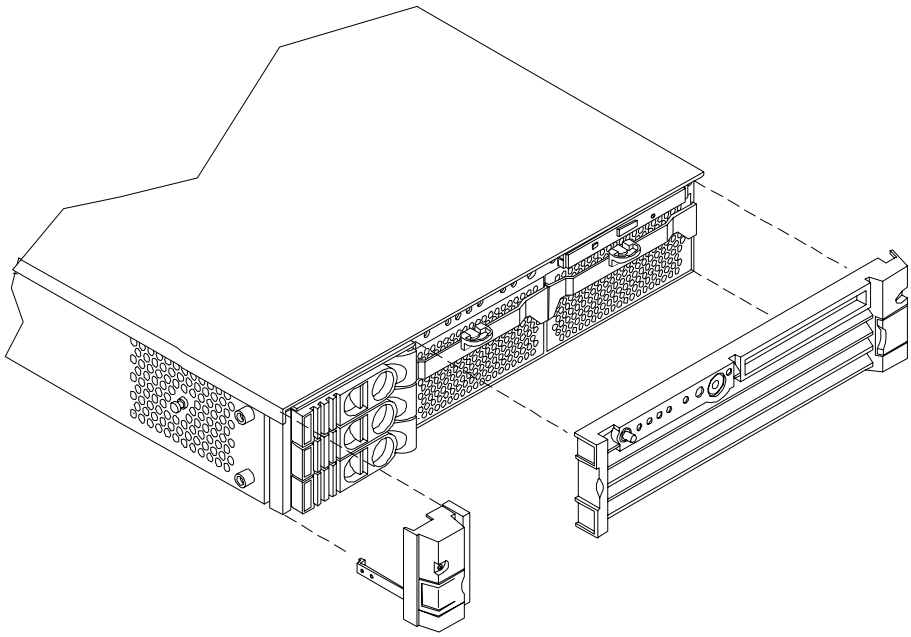
Step 2. Rotate the front panel outward and lift if off the system chassis.

Replacing the Front Bezel

Step 1. Insert the bezel latches into the matching slots on the system chassis.

Step 2. Close the bezel and push toward the front of the system until it locks into place.

Figure 7-15Replacing the Front Bezel



Removing and Replacing Hot-swap and Hot-plug Devices

The hp 9000 rp3410 and hp 9000 rp3440 Server have hard disk drives that are hot-pluggable and power supplies and fans that are hot-swappable. This section explains how to swap the following devices while the system is running:

- System fans
- Power supplies
- Hard drives

Removing and Replacing System Fans

There are four system fans to keep the system cool when it is running. The system fans are hot-swappable, allowing you to replace a fan while the system is running.

CAUTION When the system is running, the metal cover must be replaced within five minutes to prevent components from overheating.

Removing a System Fan

Step 1. Remove the system cover(s).

Step 2. Remove the fan.

a. To remove fan 1A, 1B, 2 or 3 from a rack-mounted system, or fan 3 from a tower system, grasp the appropriate fan and lift it out of the fan socket.

Figure 7-16Fan 1A or Fan 1B Removal

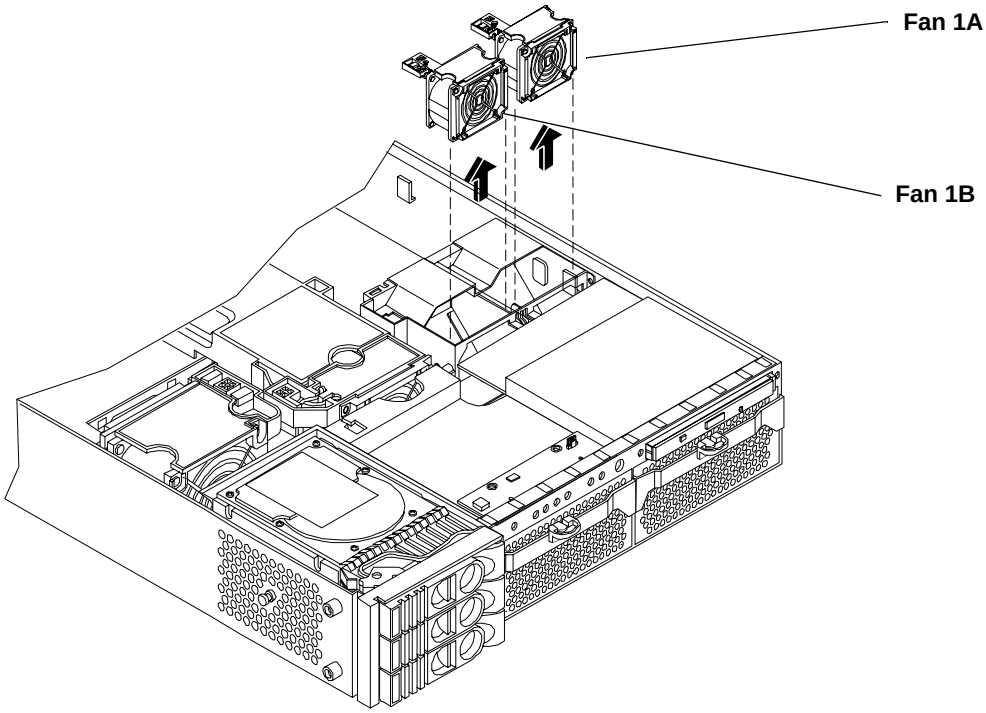


Figure 7-17Fan 2 Removal

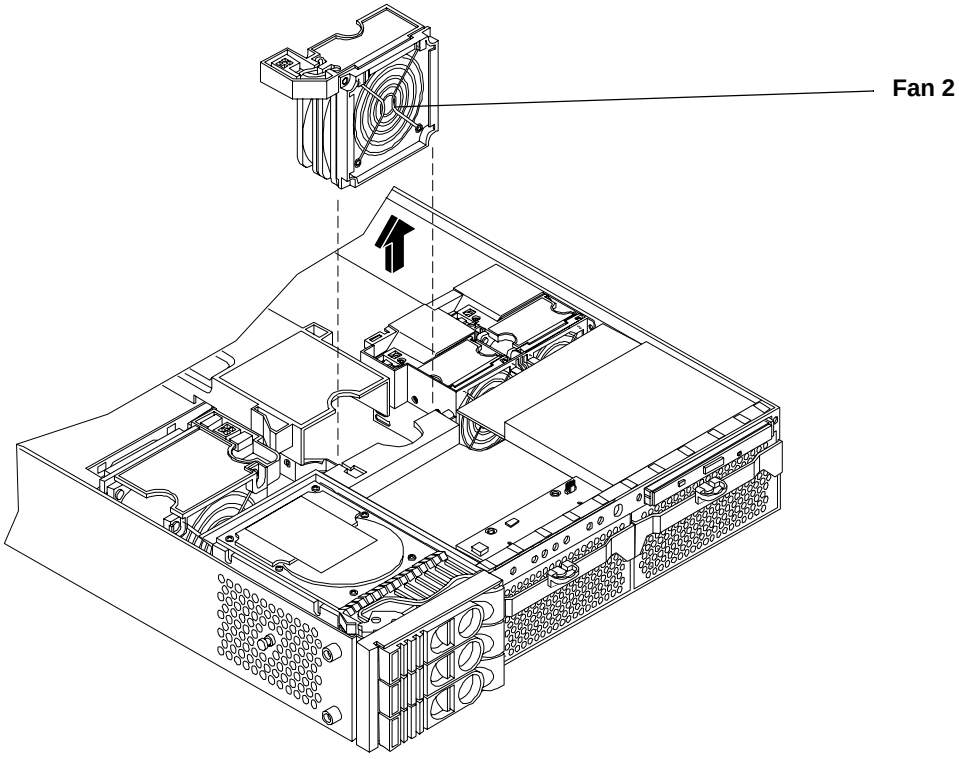
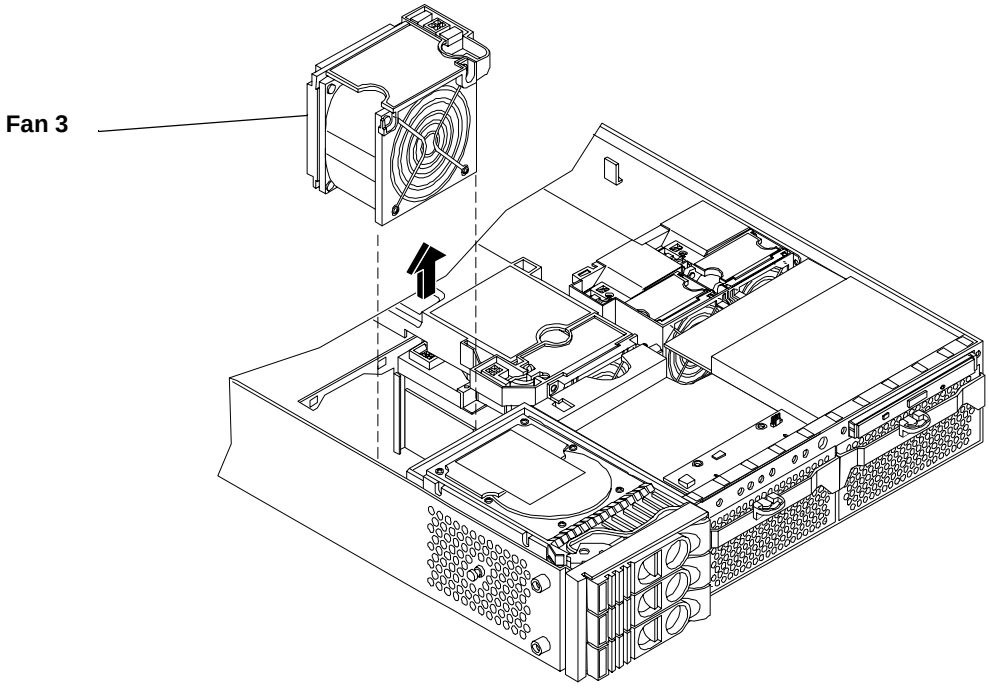


Figure 7-18Fan 3 Removal



Replacing a System Fan

Step 1. Grasp the replacement fan module and insert it into its fan socket.

CAUTION Replace the metal cover within four minutes to prevent damage to the system components.

Step 2. Verify the fan replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing the Power Supply

The power supplies in the HP Server are hot-swappable, that is if one power supply stops working or exhibits voltage problems, the remaining supply can support the system until the failed unit is replaced. A power supply can be removed and replaced without turning off the system on systems with two power supplies.

CAUTION Before removing a power supply, make sure the second power supply is functioning properly. The two green LEDs inside the supply must both be illuminated on the second supply before the failed power supply can be safely removed.

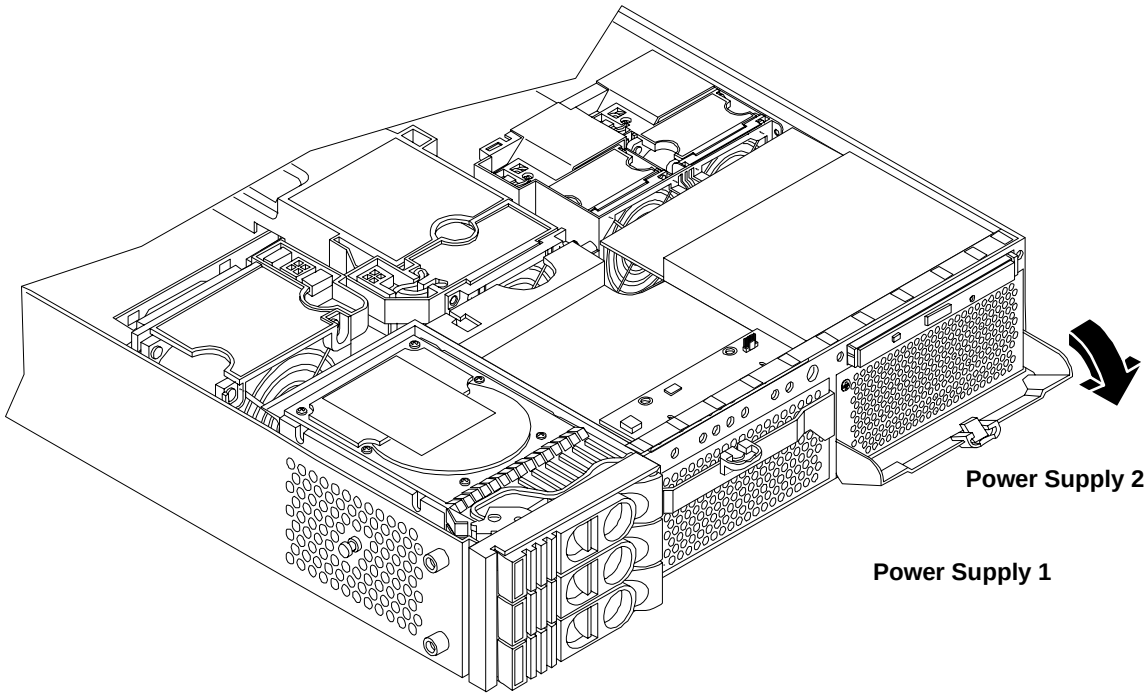
Removing the Power Supply

To remove the power supply, perform the following steps:

Step 1. Remove the front bezel from the HP Server.

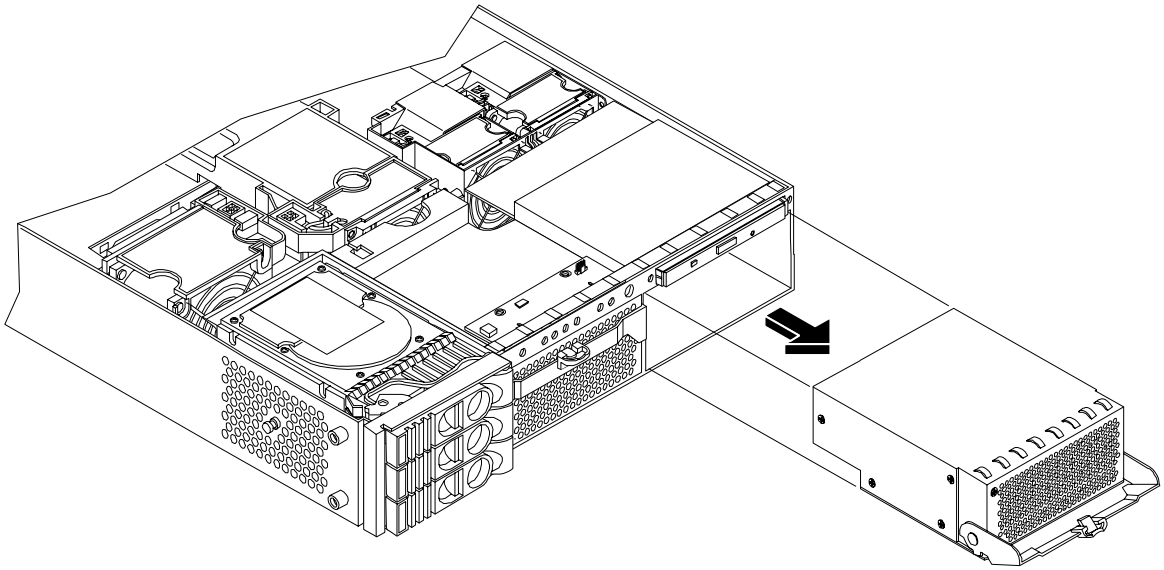
Step 2. Press the power supply retaining clip to unlatch the power supply release lever.

Figure 7-19Releasing the Power Supply Retaining Clip



Step 3. Depress the power supply release lever and slide the power supply out of the system.

Figure 7-20Removing the Power Supply



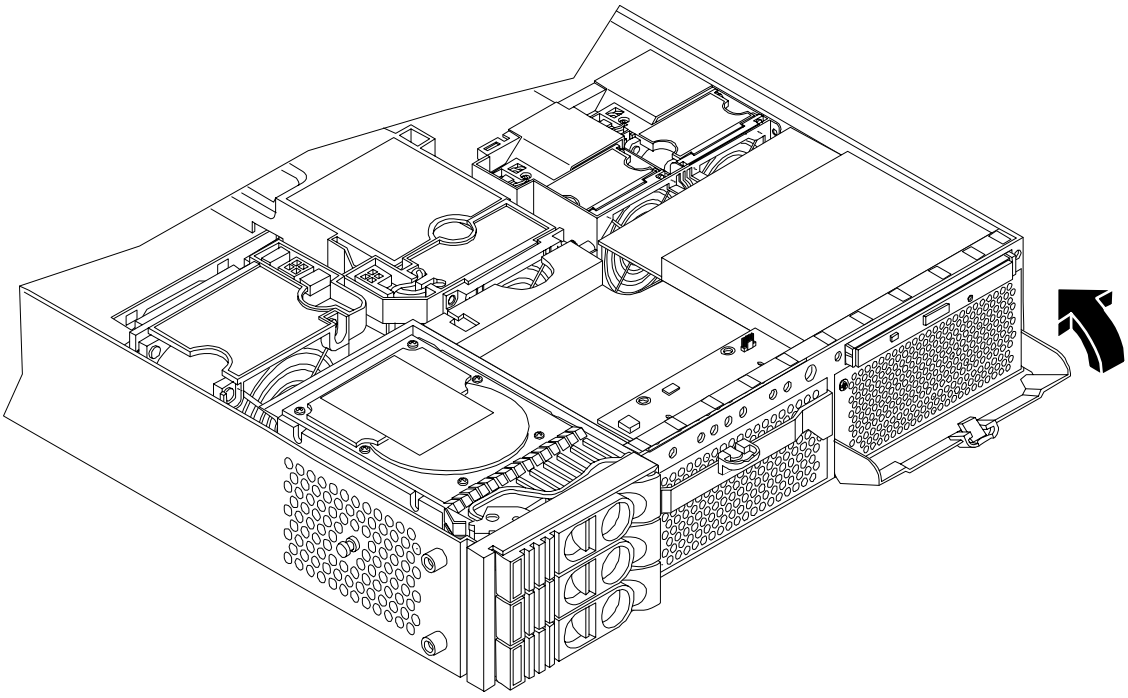
Replacing the Power Supply

To replace the power supply, perform the following steps:

Step 1. Remove the front bezel from the system and remove the defective power supply if you have not already done so.

Step 2. Open the power supply release lever and slide the power supply into place.

Figure 7-21Replacing the Power Supply



Step 3. Push in on the power supply release lever to lock the retaining clip in place.

Step 4. Replace the front bezel.

Step 5. Verify that both power supply LEDs are illuminated.

Step 6. Verify the power supply replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing an Internal Hard Disk Drive

This section provides information about removing and replacing internal hard disk drives.

The hp 9000 rp3410 or hp 9000 rp3440 Server system can support up to three hot-pluggable, Low-Voltage Differential (LVD) hard disk drives. These hard disk drives are 3.5-inch form factor, 10K RPM devices that connect to Ultra 320 Wide LVD (Low Voltage Differential) SCSI interfaces on the disk cage backplane.

There is a significant difference between the terms hot-pluggable and hot-swappable:

- Hot-swapping happens at the device level; that is, a hot-swappable device manages insertion/removal on its own without assistance from operating system commands.
- The hot-plug process allows you to replace a defective disk drive in a high-availability system while it is running.

CAUTION The disk drives in the hp9000 rp3410 and hp 9000 rp3440 Server are not hot-swappable; they are merely hot-pluggable. A manual software procedure must be done in order to safely remove or insert disk drives while the system is running. To avoid damage to the hard drives:

- See the documentation provided with the drive for additional details on inserting/removing a disk drive.
- See your OS documentation for instructions on preparing the OS for inserting/removing a hard drive.

Removing a Hard Disk Drive

To remove a hard disk drive, perform the following steps:

Step 1. If the server is powered on and the OS is running, prepare the OS to have the disk drive removed. Shut down the OS. See your OS documentation for instructions on preparing the OS for removing and inserting hard drives.

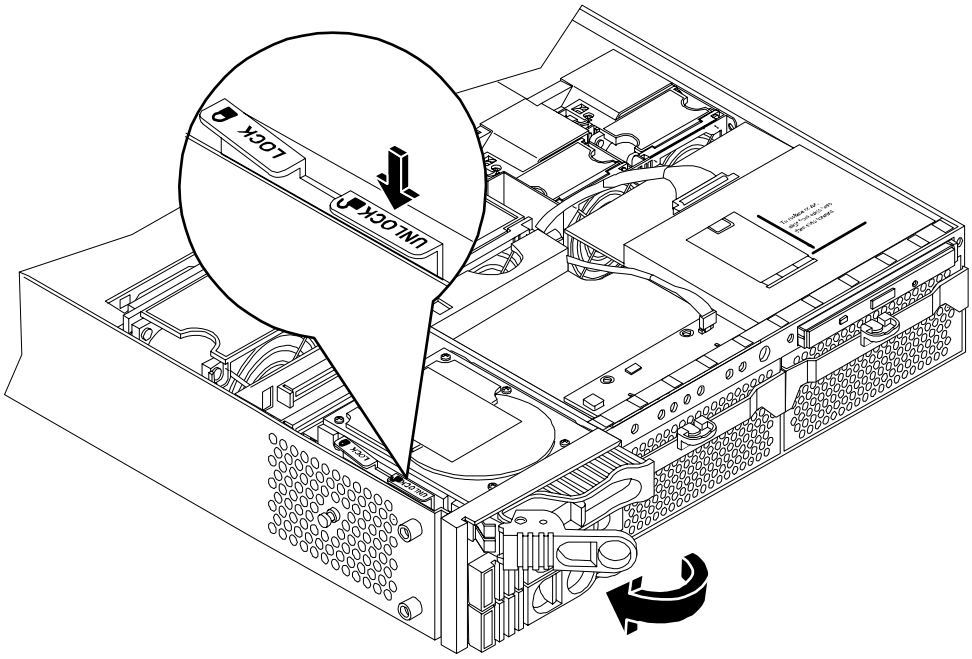
Step 2. If you have locked your hard drives, you must unlock them before removing or replacing a drive:

a. Remove the cover(s).

b. Press down on the unlock lever to unlock the drive.

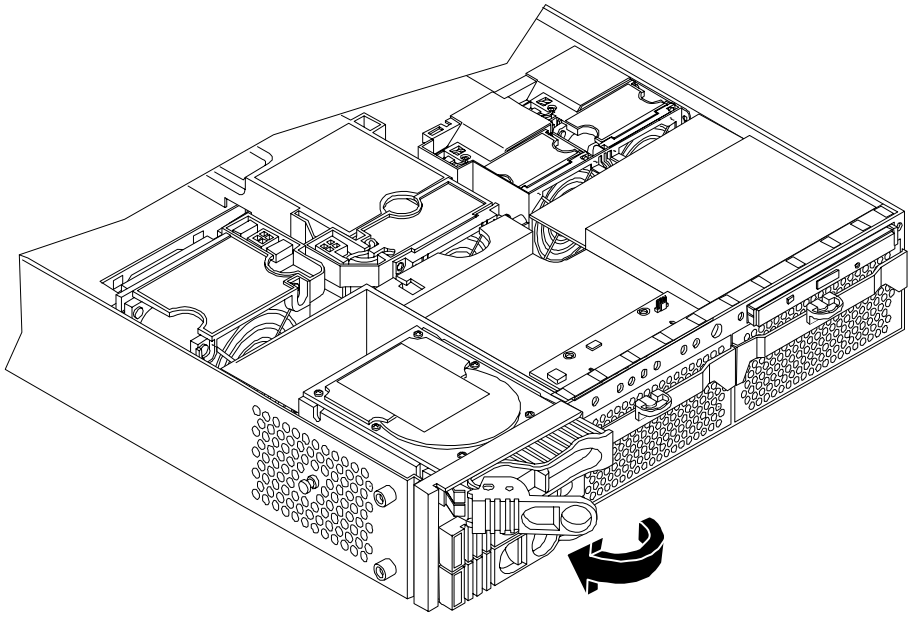
CAUTION If you try to remove a hard disk drive without unlocking it from the system, you will damage the hard drive bay.

Figure 7-22Unlocking the Disk Drive



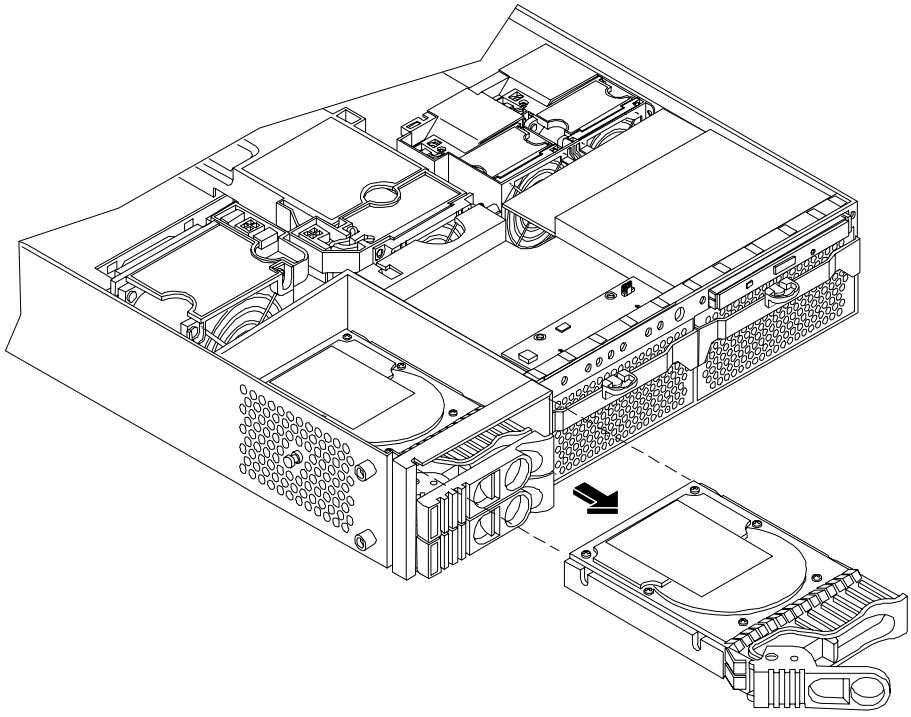
Step 3. Squeeze inward on the colored release clip on the hard drive release lever.

Figure 7-23Releasing the Disk Drive



Step 4. Pull outward on the release lever to remove the drive from the system.

Figure 7-24Removing the Disk Drive



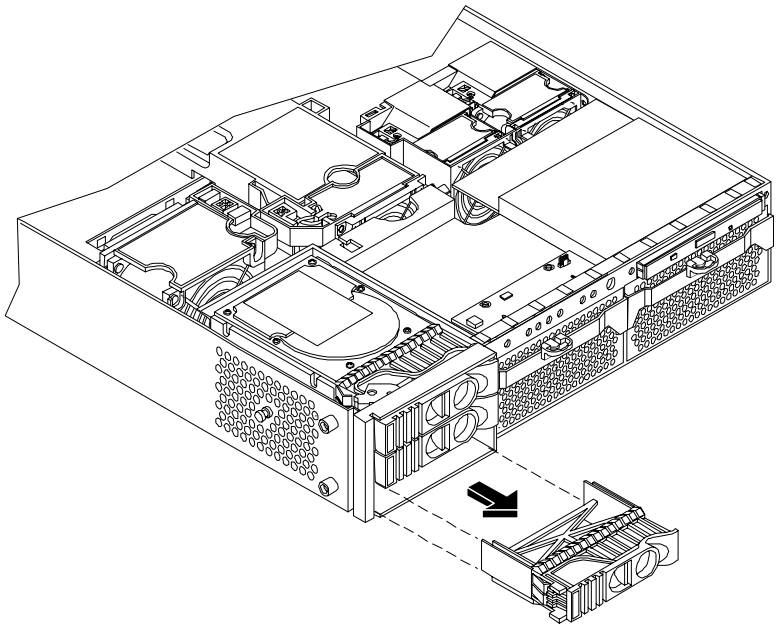
Replacing a Hard Disk Drive

To install or replace a hard disk drive, perform the following steps:

Step 1. If the server is powered on and the OS is running, prepare the OS to have the disk drive removed. Shut down the OS. See your OS documentation for instructions on preparing the OS for removing and inserting hard drives.

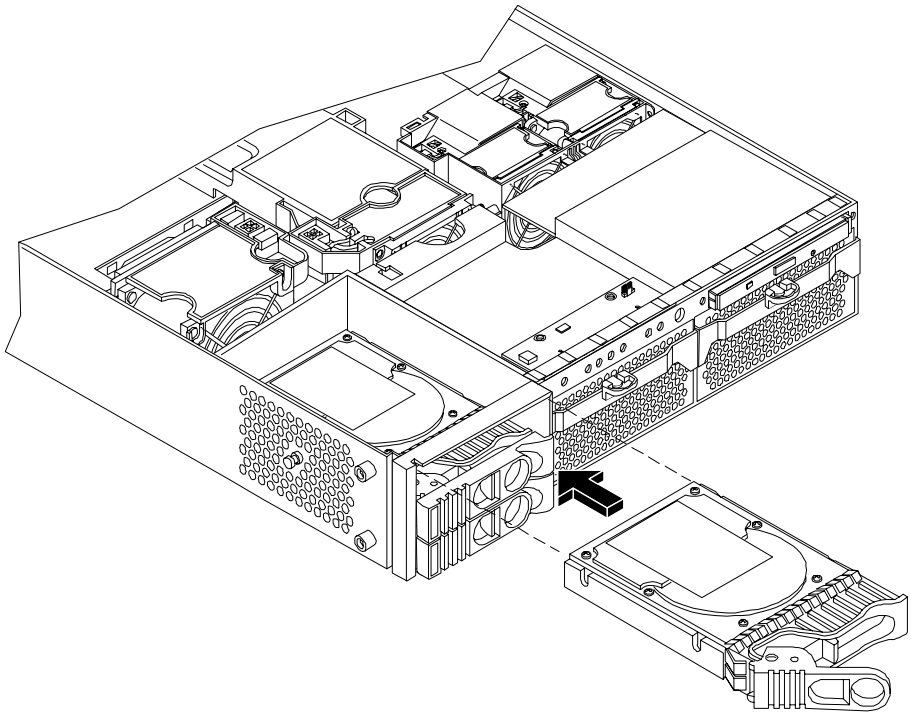
Step 2. Insert the hard disk drive into the drive bay from which you removed the drive and push inward on the release lever until the drive no long slides forward. You must leave the release lever in the open position, as shown, when you push the drive into the system.

Figure 7-25Removing Disk Drive Slot Filler



Step 3. Push in on the release lever to secure the drive in the bay and to ensure that the drive connector is seated properly.

Figure 7-26Hard Disk Drive Installation



Step 4. If desired, lock the hard drives in place. Replace the server covers if they were removed to unlock drives.

Step 5. Verify the drive replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the module replaced.

Step 6. Reset the system to the EFI Boot Maintenance Menu to rescan the hard drives.

Removing and Replacing Internal Components

To upgrade, remove, or replace most system components, you must first remove the covers from the system chassis.

WARNING **Do not remove the system cover(s) without first turning the system off and unplugging the power cord unless you are only replacing a hot-swappable system fan. Always replace the cover(s) before turning the server on.**

Removing and Replacing Airflow Guides

The system has the following airflow guides:

- The processor airflow guide ensures that the proper volume of air for cooling the processor module power pods, processor module(s), and voltage regulator module(s) flows over these components.

  You must remove the processor airflow guide:

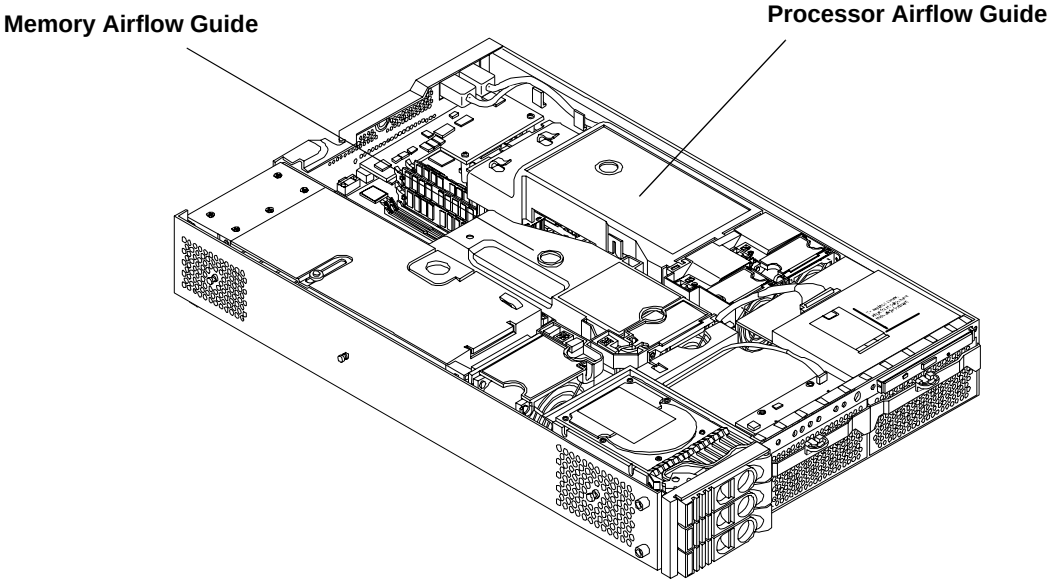
  - If it is damaged to the point that airflow across the processor module(s) is restricted
  - To access components under the airflow guide
- The memory airflow guide ensures that the proper volume of air flows over the memory DIMMs to cool them.

  You must remove the memory airflow guide:

  - If it is damaged to the point that airflow across the memory DIMMs is restricted
  - To access memory DIMMs and sockets

NOTE Air flows through the system from front to back.

Figure 7-27 Airflow Guides Locations



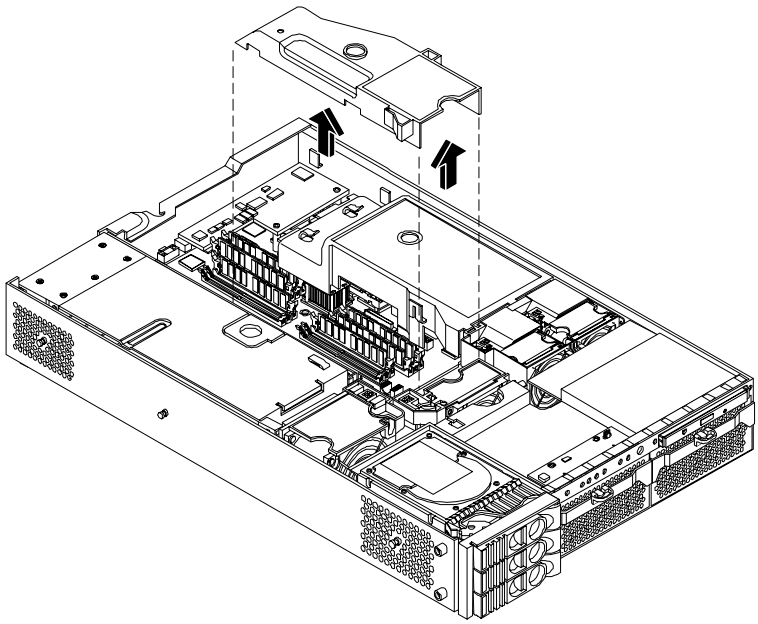
Removing and Replacing the Memory Airflow Guide

Removing the Memory Airflow Guide

Step 1. Turn off the system, disconnect all power cables and remove the cover(s).

Step 2. Grasp the memory airflow guide and lift it out of the system.

Figure 7-28Removing the Memory Airflow Guide



Replacing the Memory Airflow Guide

Step 1. Align the guides on both sides of the airflow guide with the slots on the chassis.

Step 2. Insert the memory airflow guide in the slots.

Step 3. Replace the cover(s) and reconnect all of the power cables.

Removing and Replacing the Processor Airflow Guide

Removing the Processor Airflow Guide

Step 1. Turn off the system, disconnect all power and external cables and remove the system cover(s).

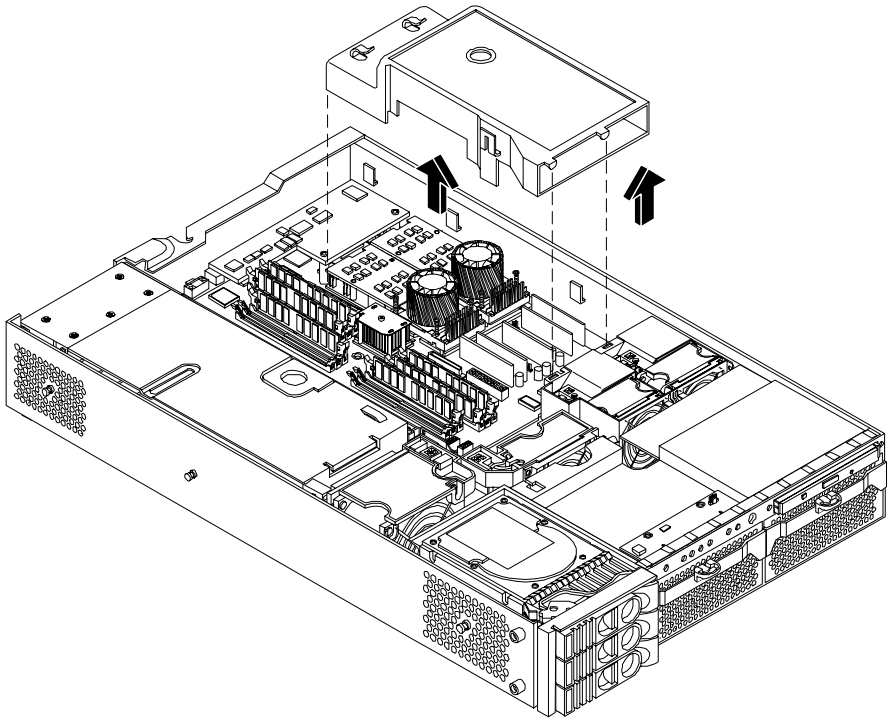
Step 2. Remove the IDE cable and power module cables from the processor airflow guide cable clips.

Step 3. Remove the main portion of the airflow guide:

a. Hold the guide using the opening on top of the guide.

b. At the same time, grasp the back end of the airflow guide and lift the guide out of the system.

Figure 7-29Removing the Processor Airflow Guide

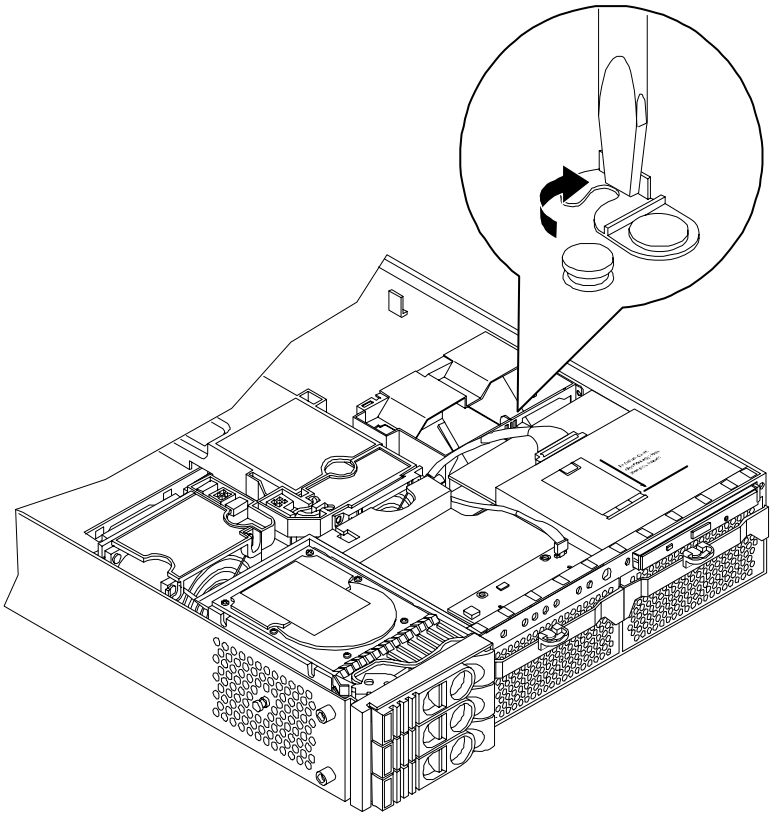


Step 4. Remove the front portion of the airflow guide:

a. Remove system fans 1A and 1B.

b. Rotate the clip clockwise to release the latch.

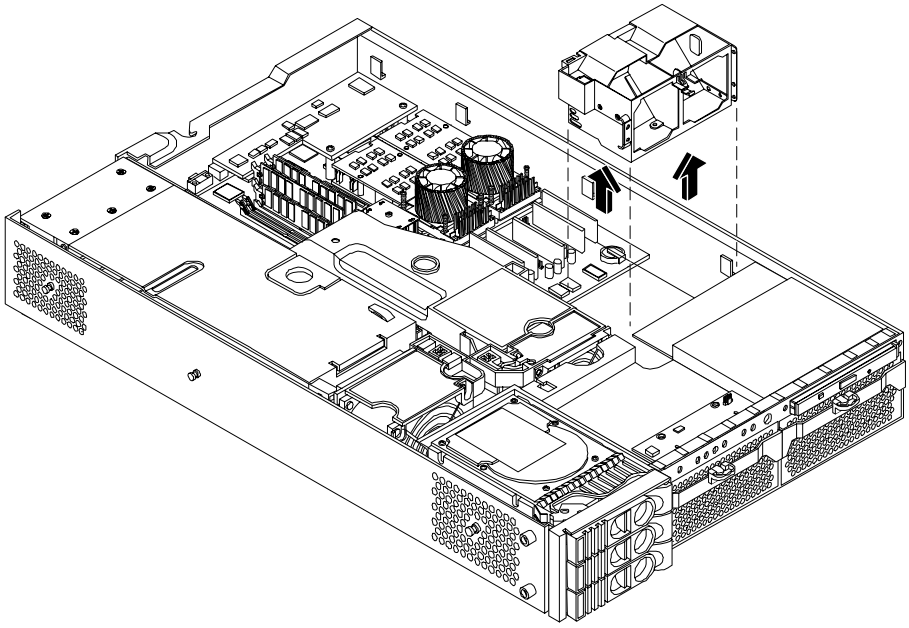
Figure 7-30Open the Release Clip



Step 5. Disconnect the power cable connected to the guide from the system board.

Step 6. Lift the front portion of the airflow guide out of the system.

Figure 7-31Remove the Front Airflow Guide



Replacing the Processor Airflow Guide

Step 1. Replace the front portion of the airflow guide:

a. Align the release latch of the front half of the airflow guide over the release latch post and snap it in place.

b. Connect power connector on the front portion of the guide to the connector on the system board.

c. Replace system fans 1A and 1B.

Step 2. Replace the main portion of the airflow guide:

a. Hold the opening on top of the processor airflow guide.

b. At the same time, grasp the back end of the airflow guide and insert the airflow guide into the system.

c. Connect the power module cable and place the power and IDE cables in the cable clips.

d. Insert the two airflow guide retaining tabs into the two slots on the front half of the airflow guide.

Step 3. Replace the system cover(s). Reconnect cables.

Removing and Replacing System Memory

Your system has 12 memory sockets for installing DDR SDRAM memory modules. These memory modules can either be 256 MB, 512 MB, 1 GB or 2 GB. The system supports combinations from 512 MB (hp 9000 rp3410) or 1 GB (hp 9000 rp3440 Server) up to 24 GB (both models).

System memory DIMMs are located on the system 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.**

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.

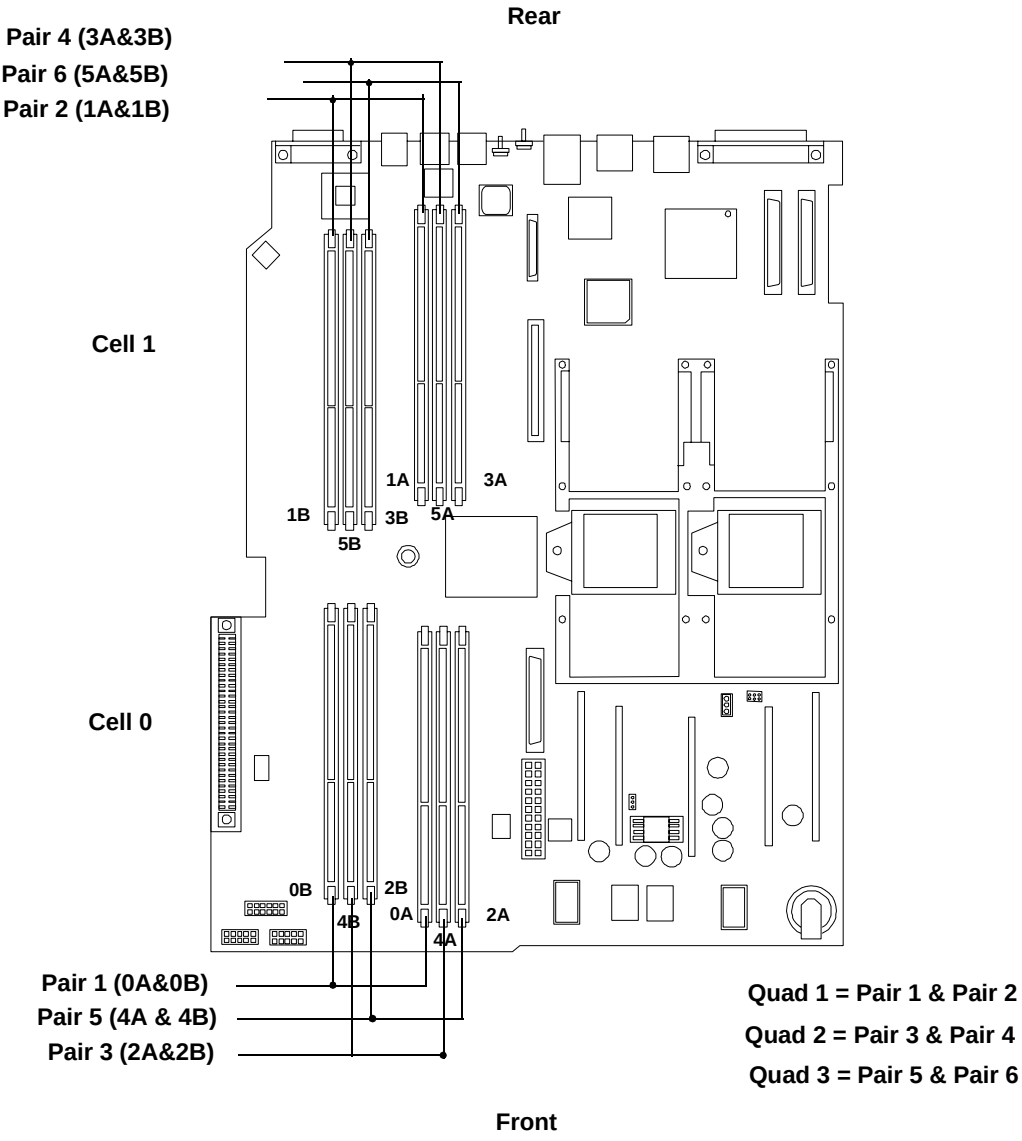
Failure to observe this warning could result in personal injury or damage to equipment.

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

Supported DIMM Sizes

Supported DIMM sizes are 256MB, 512MB, 1GB, and 2GB. Dissimilar DIMM sizes may be used across the entire system board but both DIMMs in each pair must match.

Figure 7-32 DIMM Slot Identification



Removing System Memory

To remove system memory, perform the following steps:

Step 1. Turn off the system, disconnect power, LAN and telecommunications cables, and remove the cover(s).

Step 2. Identify the DIMM to be removed and push the appropriate extraction levers found on either side of the DIMM slot outward to the open position. The DIMM will eject from the slot.

Step 3. Remove the DIMM from the socket. If the removed memory is functional, store it in a static-free container for future use.

Installing System Memory

Memory modules must be loaded in the correct order:

- In the hp 9000 rp3410 Server, DIMMs must be installed as ordered pairs of equal size. For example, the DIMM in socket 0A must match 0B, 1A must match 1B, and so forth.
- In the hp 9000 rp3440 Server, DIMMs must be installed in matched quads. Two matched memory card pairs of equal size (that is, four identical DIMMs) must be installed, one pair per memory cell, as listed below:
  - 0A, 0B and 1A, 1B must be identical pairs
  - 2A, 2B and 3A, 3B must be identical pairs
  - 4A, 4B and 5A, 5B must be identical pairs

NOTE DIMMs match if they have the same HP part number.

Module sizes can be mixed, as long as DIMMs in each pair (hp 9000 rp3410) or quad (hp 9000 rp3440 Server) match. For example:

- On hp 9000 rp3410 Server, it is acceptable to load a pair of 256 MB DIMMs in sockets 0A and 0B, and a pair of 1 GB DIMMs in sockets 1A and 1B.
- On hp 9000 rp3440 Servers, it is acceptable to load a quad of 256 MB DIMMs in sockets 0A, 0B, 1A and 1B, and a quad of 1 GB DIMMs in sockets 2A, 2B, 3A and 3B.

To install DIMMs, perform the following steps:

Step 1. Turn off the system, disconnect all cables, and remove the system cover(s).

CAUTION To ensure that memory modules are not damaged during removal or installation, power off the server and unplug the power cord from the AC power outlet. Wait until the LED on the back of the power supply turns off before removing or installing memory.

Step 2. Holding the memory module by its left and right edges, insert the module into the socket.

The memory modules are keyed and can only be inserted in one direction. When the module is correctly seated, the retainer clips will return to their fully upright position. Snap the clips firmly into place to ensure that the DIMMs are seated properly.

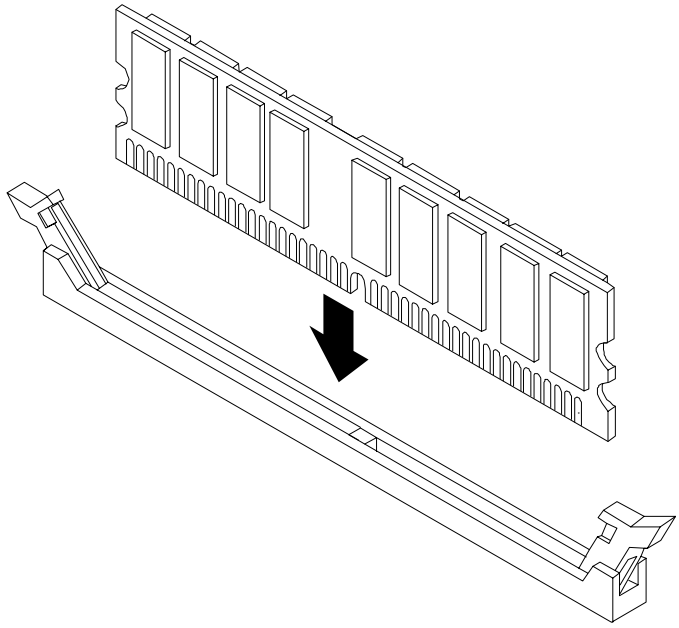
Step 3. Gently and evenly push on each side of the DIMM until it seats in the socket. Ensure the extraction levers are in the closed position.

Step 4. Replace the system cover(s), reconnect all cables and turn on the system.

Step 5. Verify the memory replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the memory replaced.

Figure 7-33 Inserting DIMM into Slot



Removing and Replacing a Processor Module

This section provides information about installing processor modules. The processor modules are located on the system board which is accessible by removing the system cover.

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

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 a Processor Module

To remove a processor module, perform the following steps:

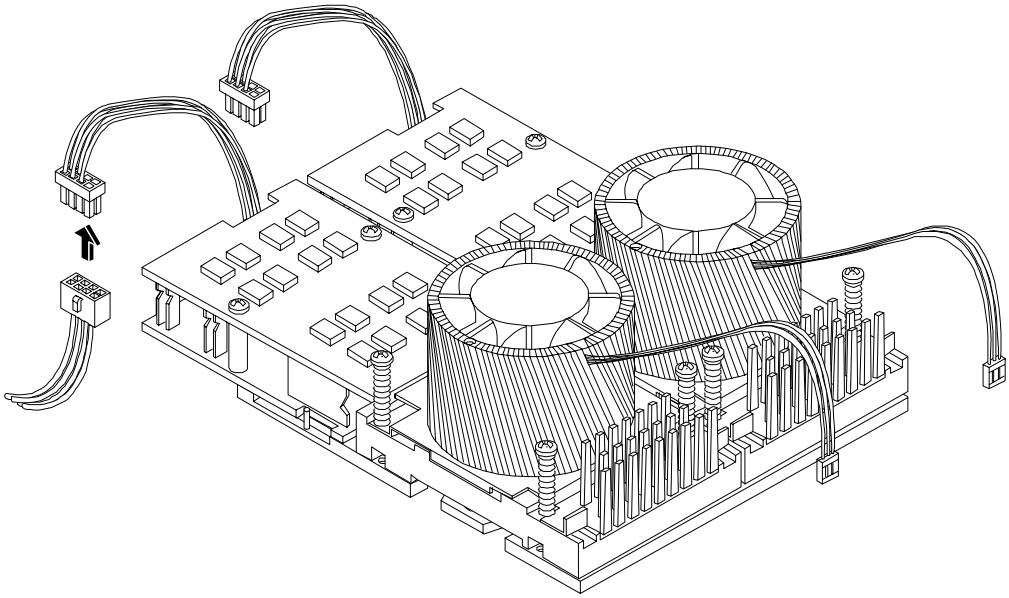
Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. See “Removing and Replacing the Metal Cover”.

Step 3. Remove the processor airflow guide and cables.

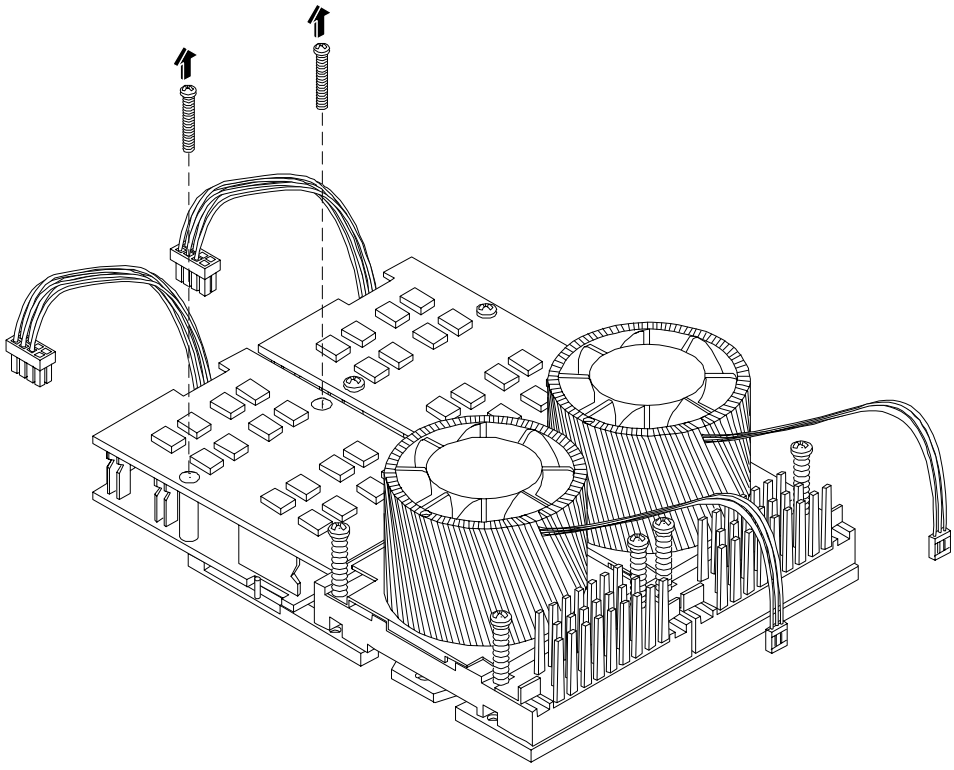
Step 4. Disconnect the power pod cable from the power connector on the system board.

Figure 7-34Disconnect Power Pod Cable



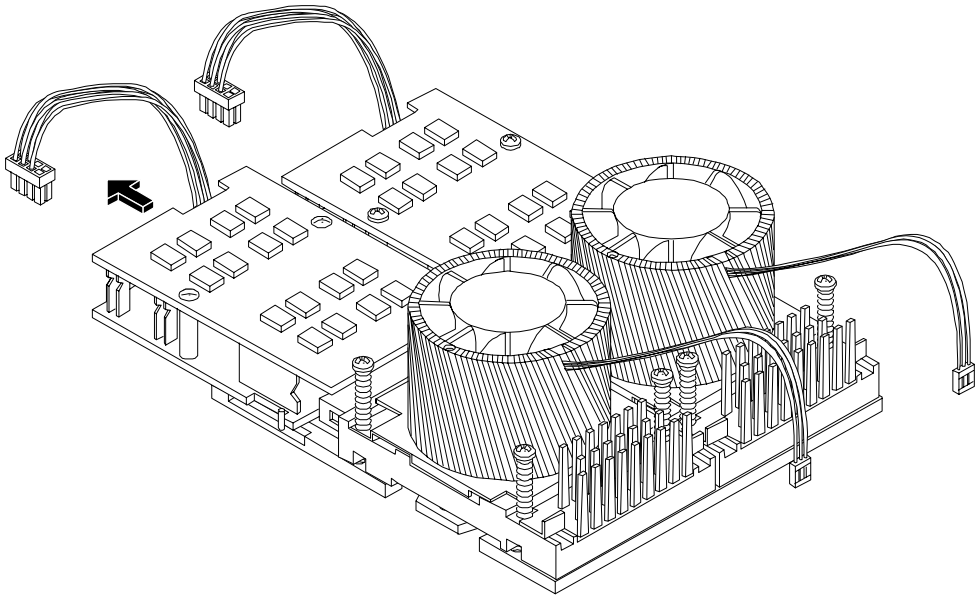
Step 5. Remove the two power pod mounting screws.

Figure 7-35Remove Power Pod Mounting Screws



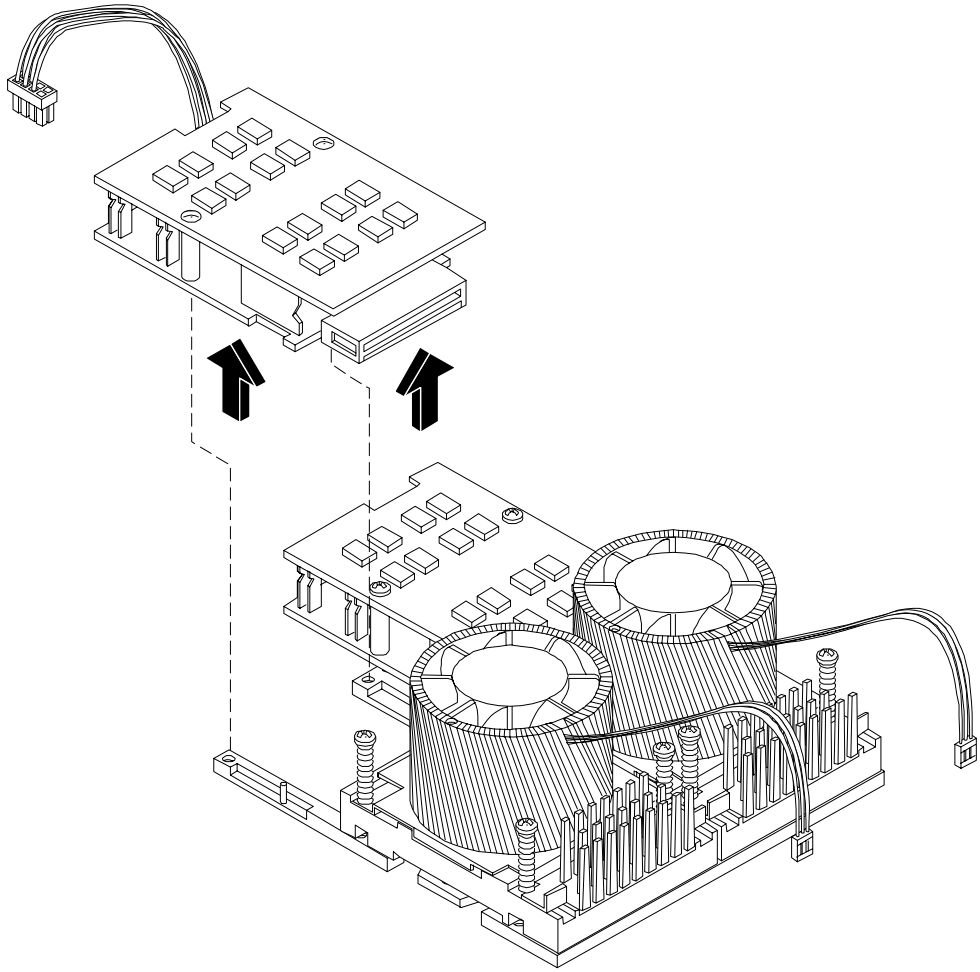
Step 6. Slide the power pod toward the rear of the system board so that the power pod connector disconnects from its connector on the processor module.

Figure 7-36Disconnect Power Pod from Processor Module



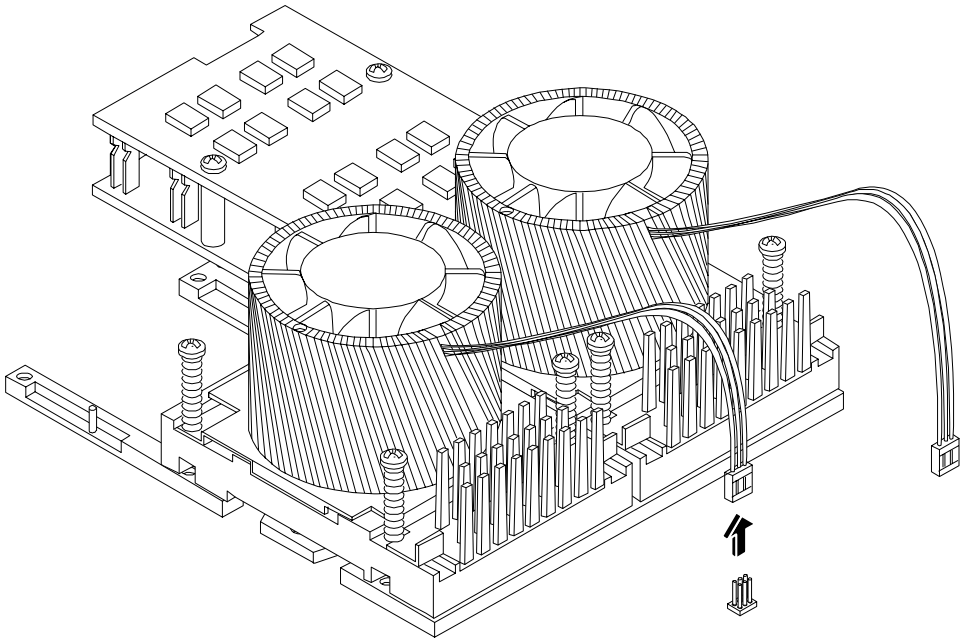
Step 7. Lift the power pod up and out of the chassis. Place the power pod into an anti-static container.

Figure 7-37Remove Power Pod



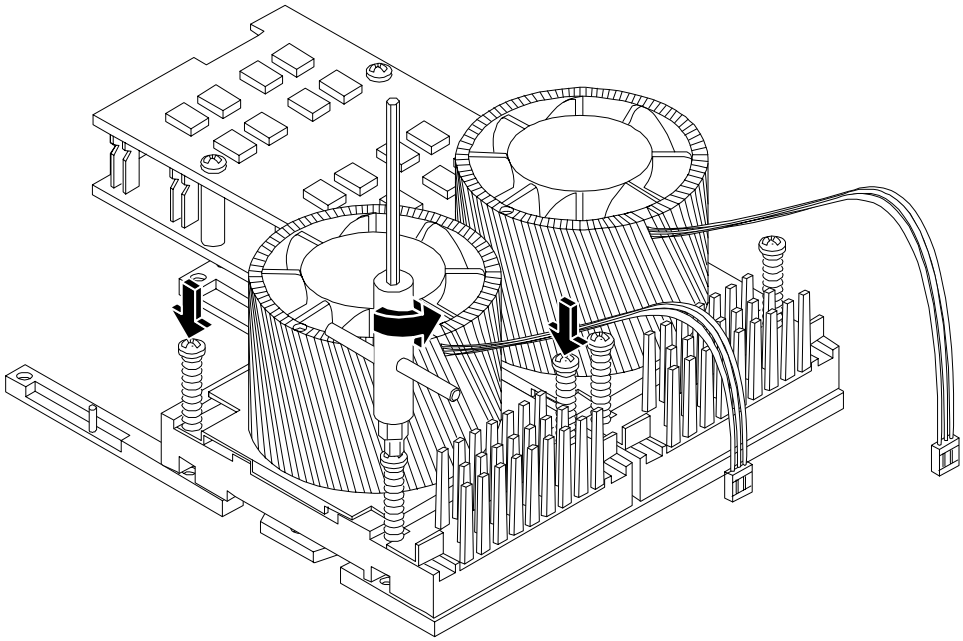
Step 8. Disconnect the processor module turbo fan power cable.

Figure 7-38Disconnect the Turbo Fan Cable



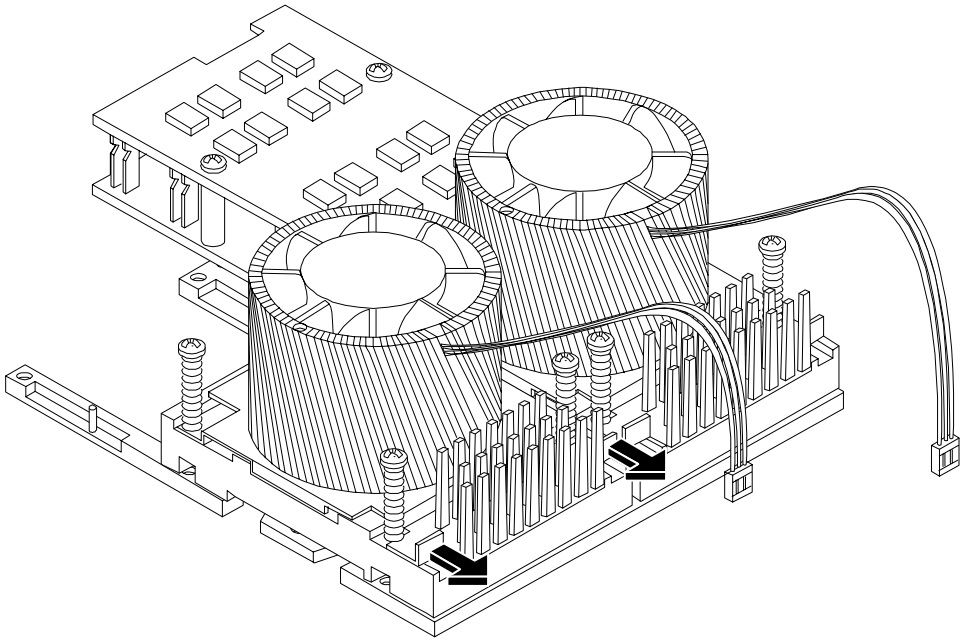
Step 9. Release the four heatsink captive screws on the processor module heat sink.

Figure 7-39Release Heatsink Captive Screws



Step 10. Slide the sequencing retainer plate toward the back of the system to open the hole in the edge of the heatsink for insertion of the special processor tool into the processor module locking mechanism.

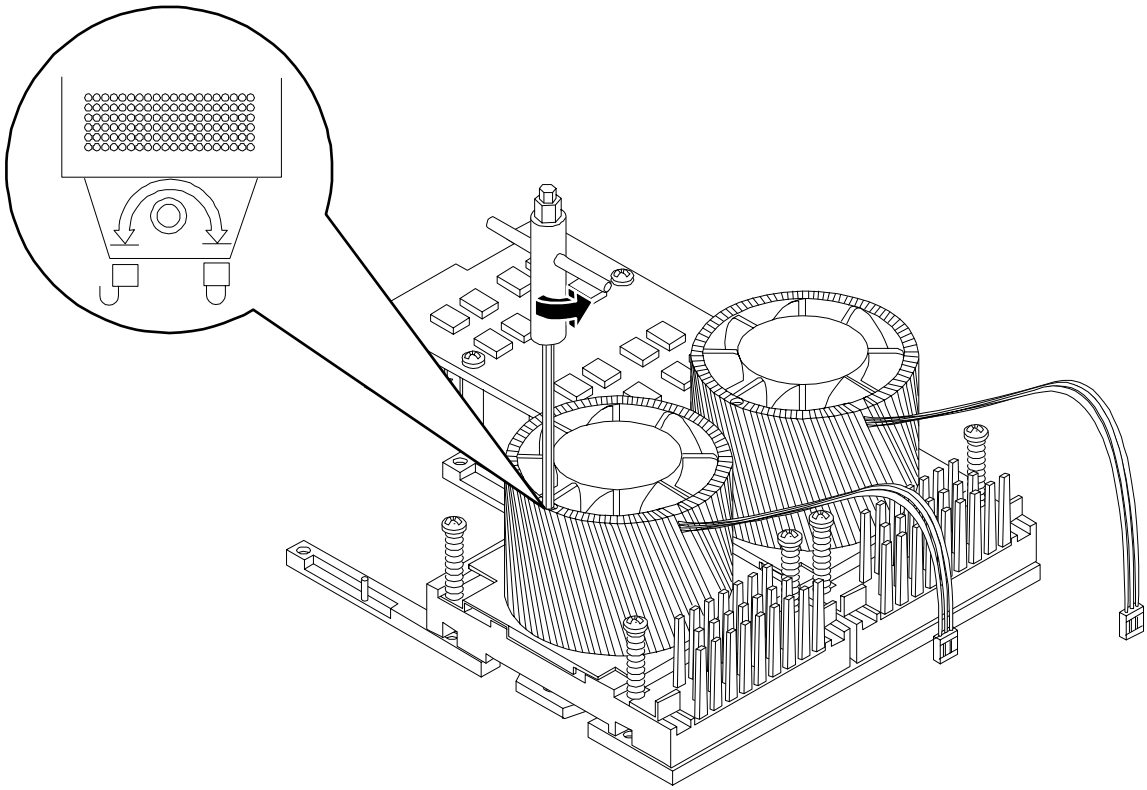
Figure 7-40Slide Sequencing Retainer Plate



Step 11. Unlock the processor module locking mechanism using the special processor tool shipped with your replacement processor module.

Insert the tool into the hole that runs down through the edge of the turbo fan heatsink and rotate the special processor tool 180 degrees counterclockwise.

Figure 7-41Unlock Processor Module Locking Mechanism



Step 12. Lift the processor module and the turbo fan assembly up and out of the chassis. Place the processor module into an anti-static container.

Figure 7-42Remove Processor Module

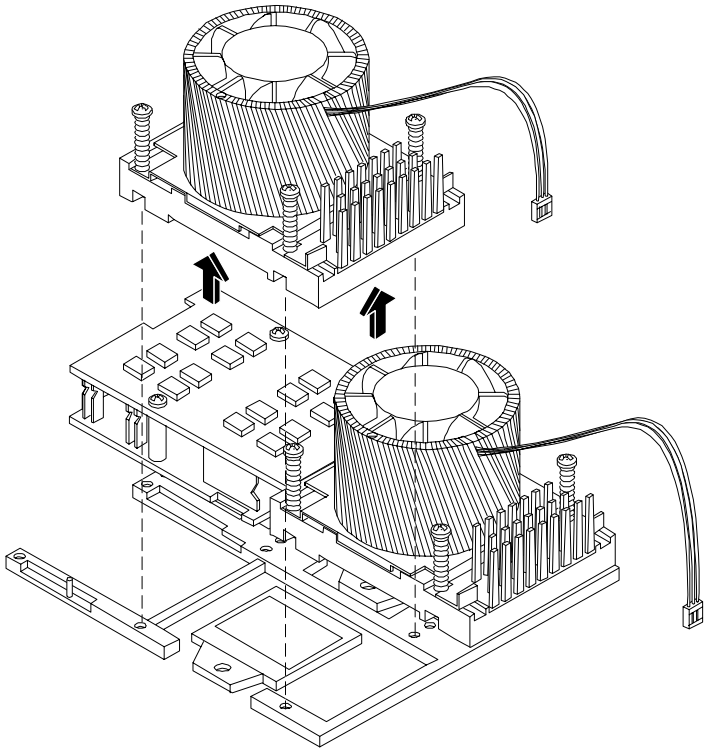
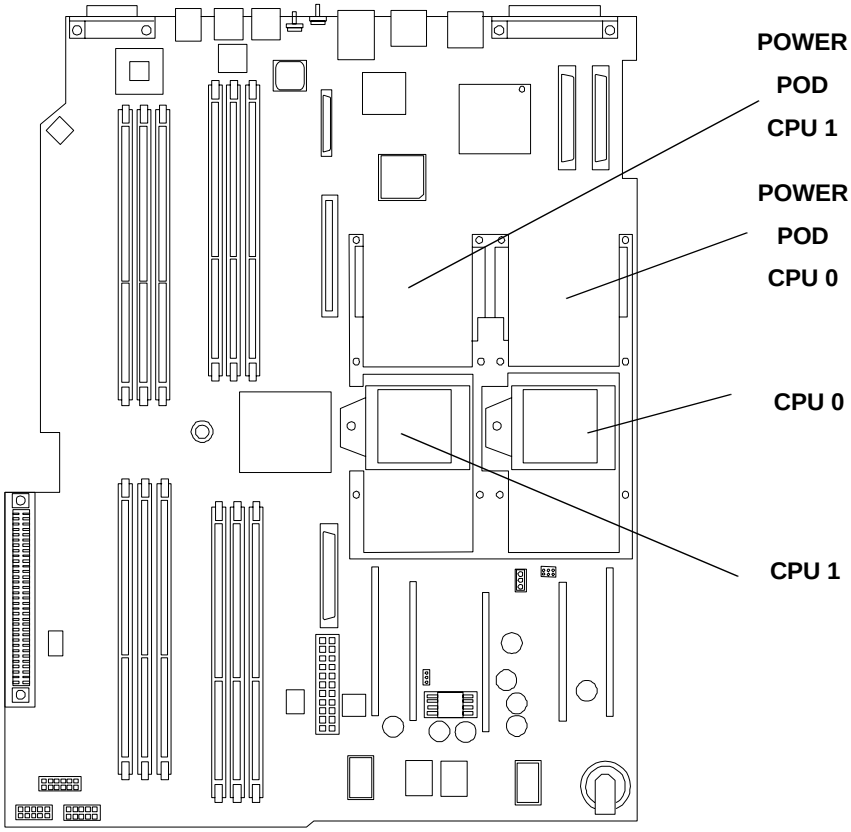


Figure 7-43 Processor Module Removal/Replacement



Replacing a Processor Module

Processor Modules are located on the system board. The system board can support either one or two Processor Modules. CPU 0 is located to the right of the system board and CPU 1 (when installed) is located on the left of the system board next to the bridge assembly. In a single CPU configuration, the single Processor Module must be installed in CPU 0 slot.

Each Processor Module has an associated power pod that is required by the Processor Module.

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

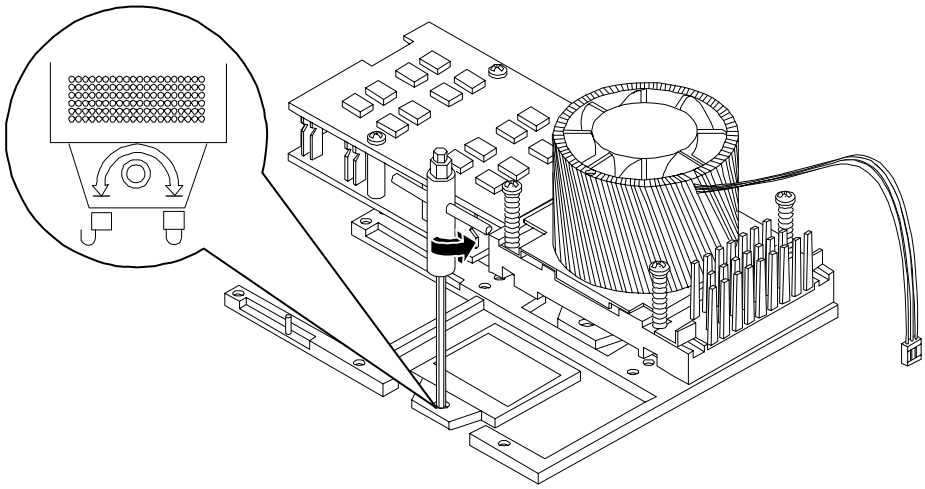
Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. See “Removing and Replacing the Metal Cover”

Step 3. If you are replacing a processor module, remove the old processor module as described in the previous procedure.

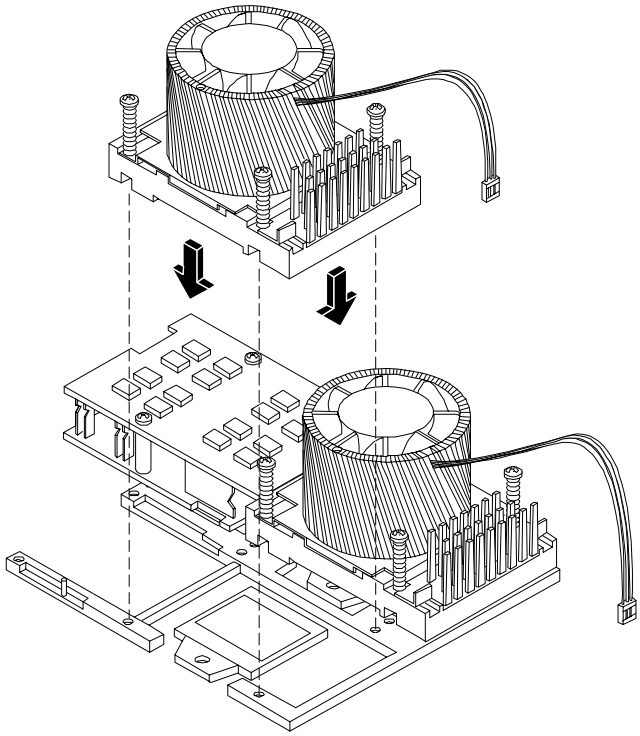
Step 4. Unlock the processor module locking mechanism using the special processor tool shipped with your replacement processor module. Insert the tool into the hole that runs down through the edge of the heatsink and rotate the special processor tool 180 degrees counterclockwise. Verify that the processor module socket locking mechanism is rotated into the unlocked position.

Figure 7-44Unlocking the Processor Module Locking Mechanism



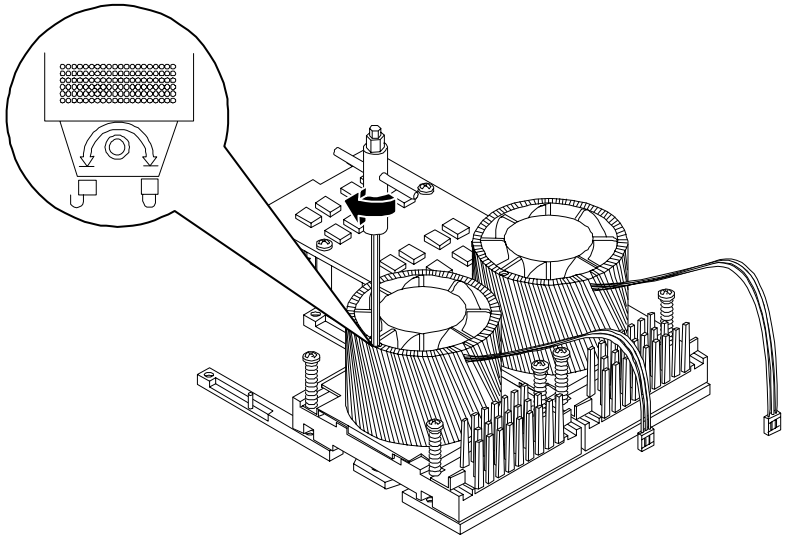
Step 5. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the fan and processor module on the system board. The four locator posts will fit in locator holes on the system board processor module mount. The turbo fan power cable must be positioned so that it is located on the side of the heatsink that faces the front of the system.

Figure 7-45Aligning the Processor Module



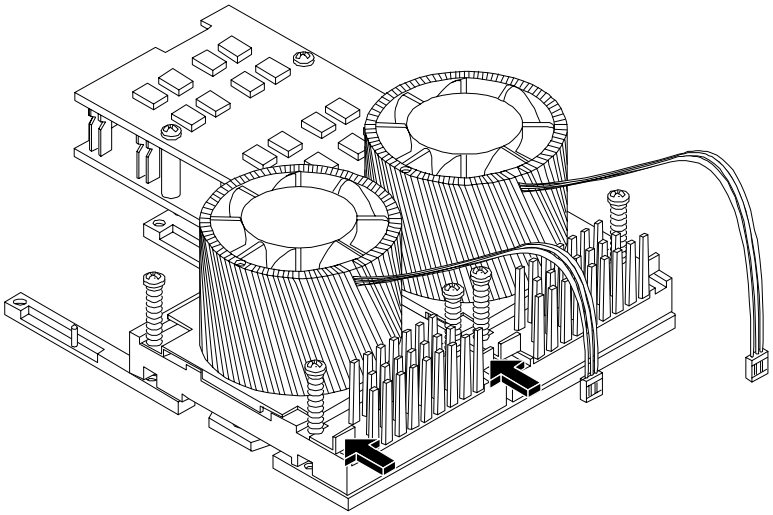
Step 6. Use the special processor tool shipped with your replacement processor module to lock the processor module in place on the system board. To do this, insert the special processor tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees.

Figure 7-46Locking the Processor Module in Place



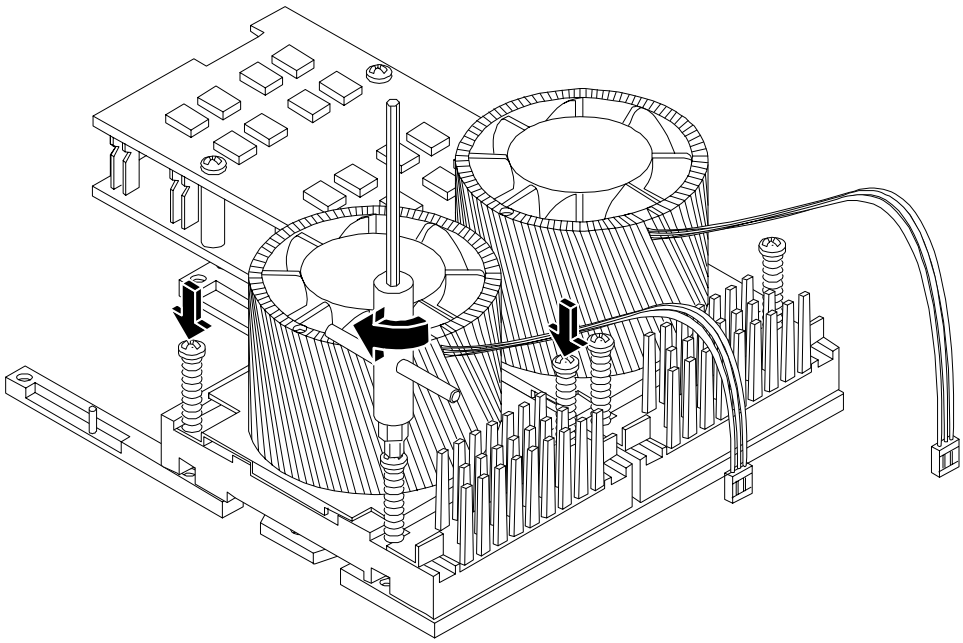
Step 7. Slide the sequencing retainer plate toward the front of the system.

Figure 7-47Slide the Sequencing Retainer Plate



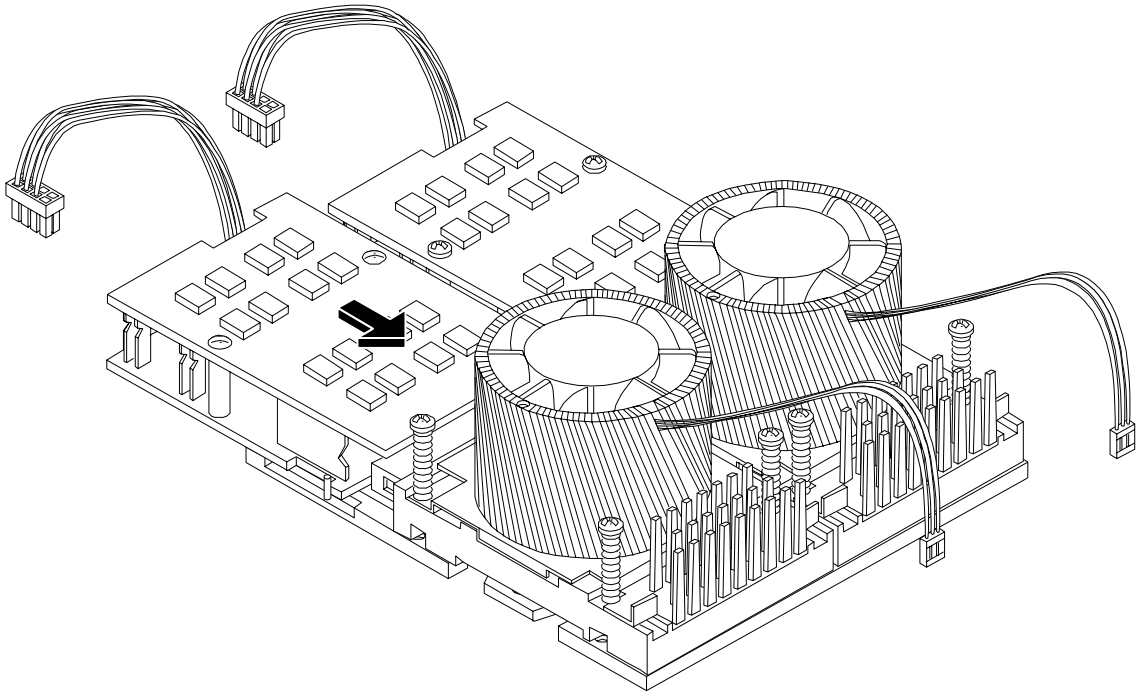
Step 8. Screw in the four heatsink captive screws.

Figure 7-48Secure the Captive Screws



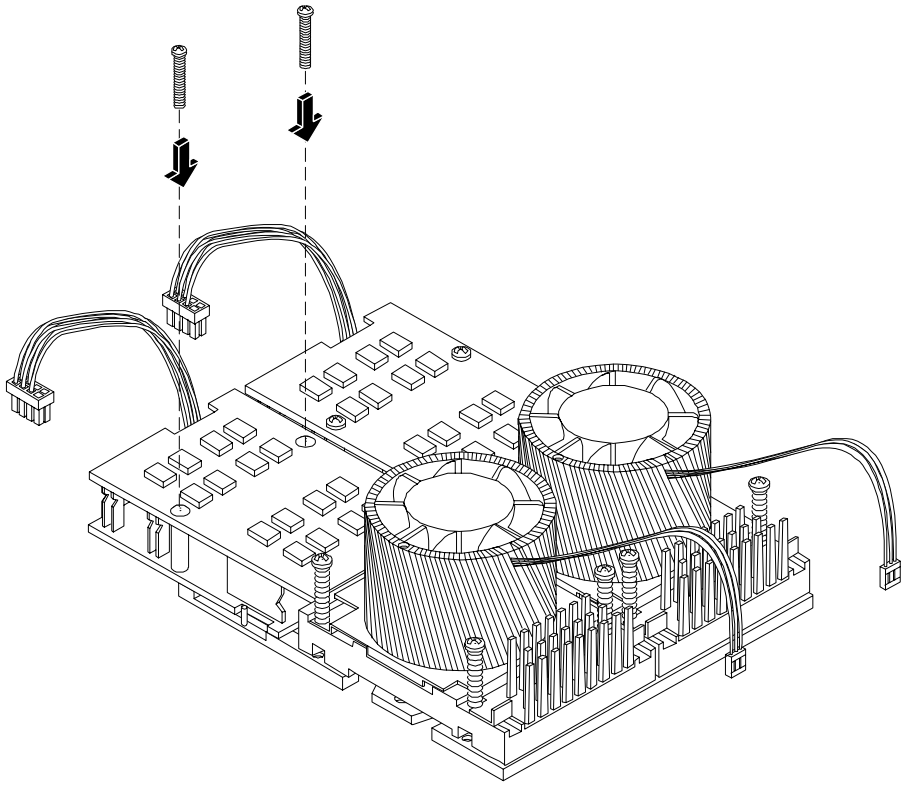
Step 9. Slide the power module on the system board metal mounting bracket so that the power module connector connects with its connector on the processor module.

Figure 7-49Aligning the Processor Module Power Pod



Step 10. Align the two mounting screw holes on the power module with their screw holes on the system board's metal mounting bracket. Screw in the power module mounting screws.

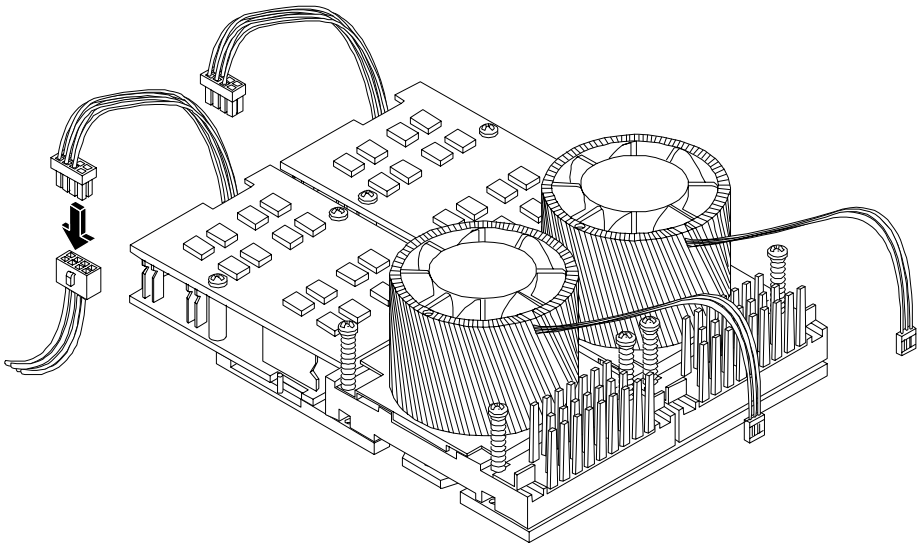
Figure 7-50Install the Processor Module Power Pod Mounting Screws



Step 11. Replace the processor airflow guide.

Step 12. Connect the power pod cable to the power connector on the system board.

Figure 7-51Connecting the Power Pod Cable



Step 13. Replace the cover.

Step 14. Verify the processor replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the processor replaced.

Removing and Replacing the System Battery

Systems with a management processor card have two batteries. Systems with no management processor card have only one battery. The main system battery is located on the system board.

Removing the System Battery

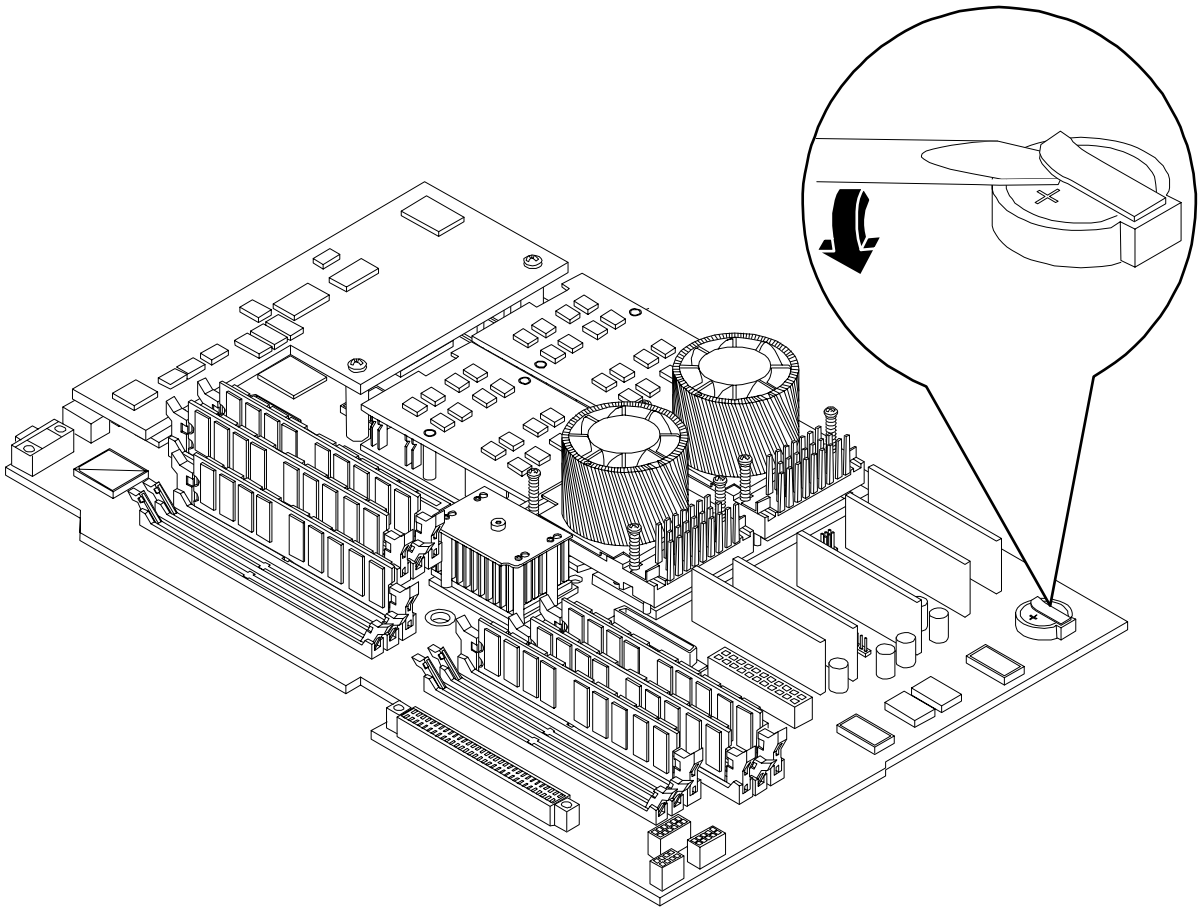
Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. See “Removing and Replacing the Metal Cover”

Step 3. Lift up on the battery and push on the back of it with a flat-head screwdriver to remove the battery from its holder.

CAUTION Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip may damage the clip.

Figure 7-52Removing the System Battery



Replacing the System Battery

Step 1. Perform system battery removal described above.

Step 2. Lift up on the battery holder retaining clip with a flat-head screwdriver and slide the battery into the holder. The positive (+) terminal of the battery faces up.

CAUTION Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip may damage the clip.

Step 3. Replace the cover.

Step 4. Reconnect all of the power and external cables and turn on the system.

Step 5. Verify the battery replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Step 6. You may need to reset the system time and date using the BCH time and date commands. Once you have set the time, turn the system off, unplug the power cord, and wait for a minute before turning it back on. Execute the time and date commands again. If the time and date are now correct, you have installed the battery correctly.

Removing and Replacing PCI and Graphics Cards

Accessory cards are installed in a removable PCI cage. This section explains how to access the PCI cage, as well as how to remove and install accessory cards.

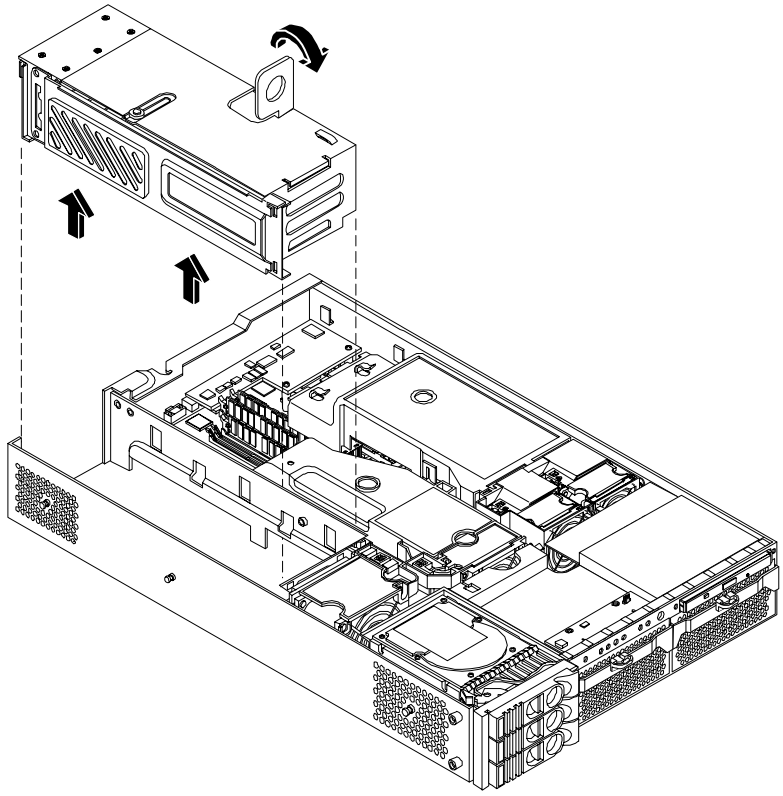
Removing the PCI cage

To remove the PCI cage from the server, perform the following steps:

Step 1. Remove the cover. See “Removing and Replacing the Metal Cover”

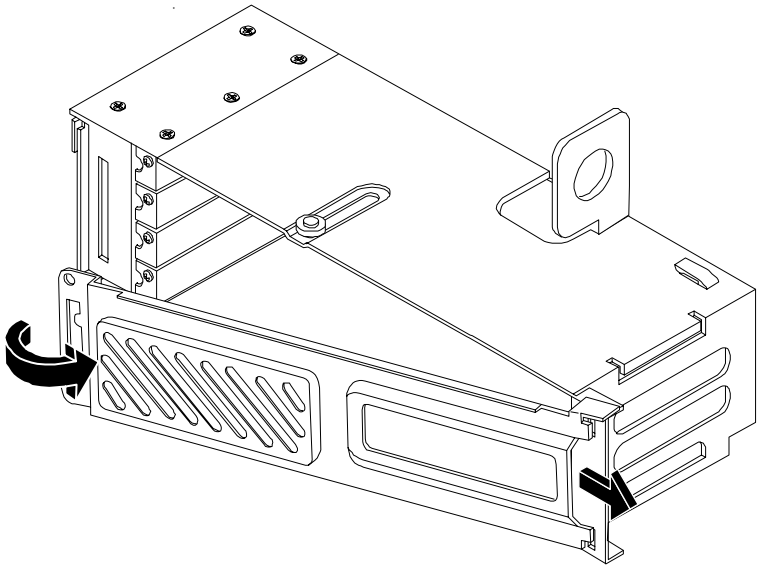
Step 2. Lift up on the PCI cage release lever and the back edge of the PCI cage and lift the PCI cage out of the system.

Figure 7-53Removing the PCI Cage



Step 3. Grasp the PCI cage cover and slide it away from the bulkhead end of the cage, then lift the cover off.

Figure 7-54Removing the PCI Cage Cover



Step 4. Unscrew the bulkhead screw that holds the accessory card in place.

Step 5. The PCI cards are now accessible for removal and replacement.

Removing and Replacing PCI Cards

The server may contain up to 4 PCI cards. PCI cards are located in the PCI cage.

The hp 9000 rp3410 and the hp 9000 rp3440 Server have the following accessory card sockets:

- Four 64-bit, 133 MHz PCI-X card sockets

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.**

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.

Carefully read the following information concerning PCI slot configuration. Inserting a PCI card into a slot that is not configured to accept it, may cause operation failure or the PCI card to operate at less than optimum speed. PCI slots are numbered 1 and 2. See the labels on the rear panel of the chassis for correct PCI slot number identification.

Removing a PCI Card

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

CAUTION Record the location of all PCI cards as they are installed. Depending on the operating system, replacing the PCI card in a different location might cause boot failure.

Step 1. Remove the cover. See “Removing and Replacing the Metal Cover”

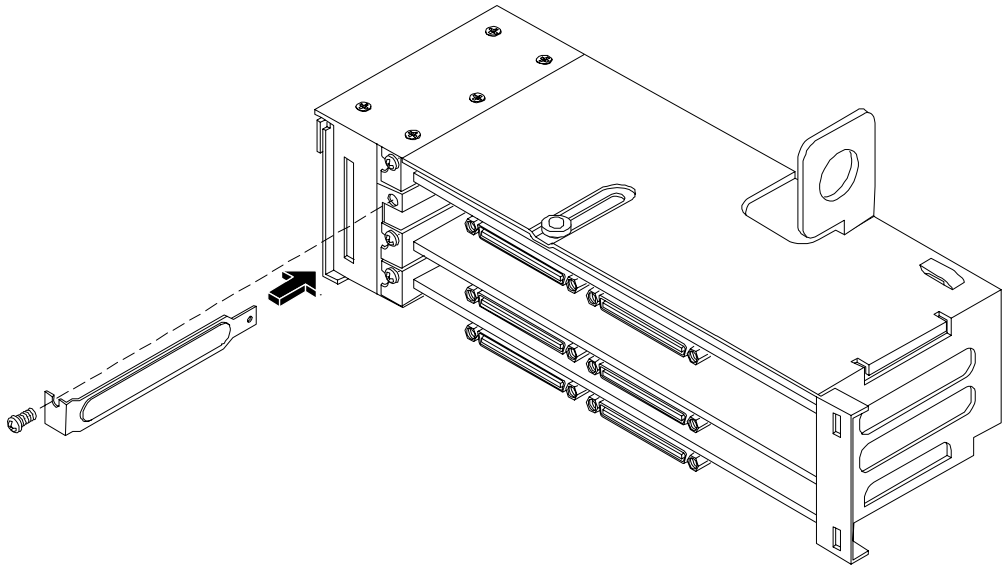
Step 2. Perform the procedure for removing the PCI cage described in the previous section.

Step 3. Disconnect any cables that are connected to the PCI card.

Step 4. Grasp the edges of the PCI card being removed and gently rock the card releasing the connector from the PCI backplane connector. Place the removed PCI card in an electrostatic container.

Step 5. Install a PCI slot cover to close the cavity left by the removal of the PCI card. This will maintain the proper airflow within the chassis.

Figure 7-55Installing a PCI Slot Cover



Replacing a PCI or Graphics Card

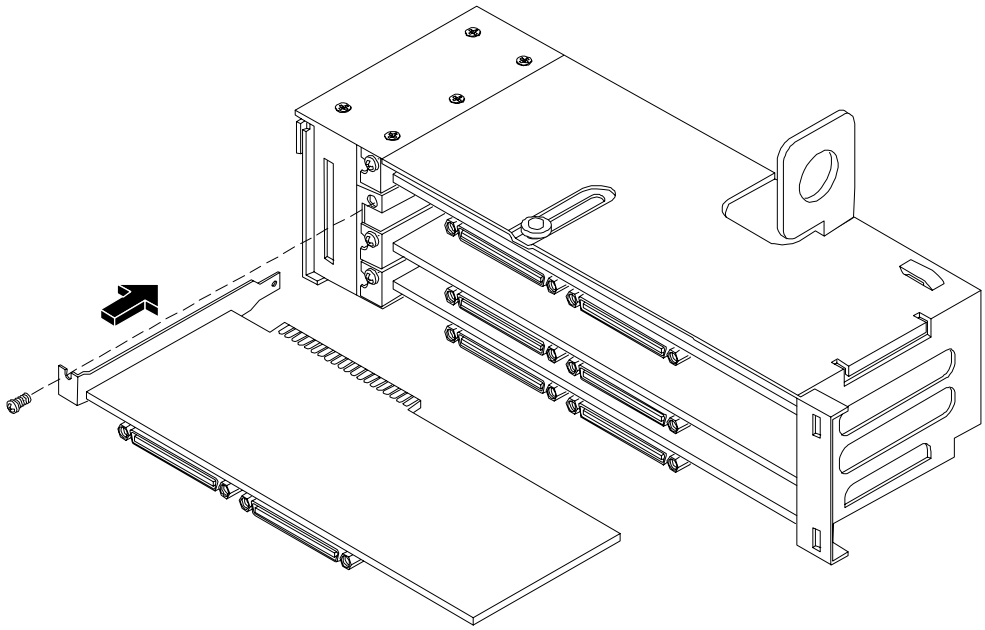
Step 1. Remove the cover. See “Removing and Replacing the Metal Cover”

Step 2. Remove the PCI cage.

Step 3. Open the PCI cage as described in the previous section.

Step 4. Grasp the edges of the PCI card to be installed and gently press the card into the PCI backplane connector.

Figure 7-56Installing a PCI Card



Step 5. Connect any cables that are required by the PCI card.

Step 6. Reinstall the PCI cage.

Step 7. Replace the cover. See “Removing and Replacing the Metal Cover”

Step 8. Verify the PCI card replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing the PCI Backplane

The hp 9000 rp 3410 and the hp 9000 rp3440 Server system backplane is called the PCI backplane and provides four PCI card sockets. The removal process is the same for both.

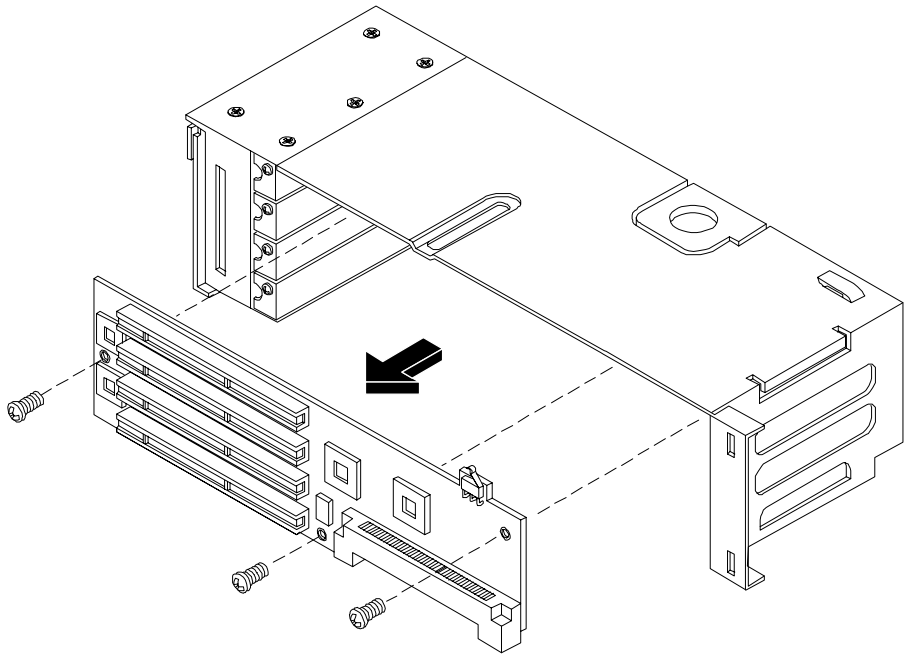
Removing the PCI Backplane

Step 1. Remove all accessory and graphics cards.

Step 2. Unscrew the backplane mounting screws and slide the backplane board toward the bulkhead end of the PCI cage. This unlocks the backplane from its standoffs.

Step 3. Lift the backplane over the top of the standoffs and slide it out of the cage.

Figure 7-57Removing the PCI Backplane

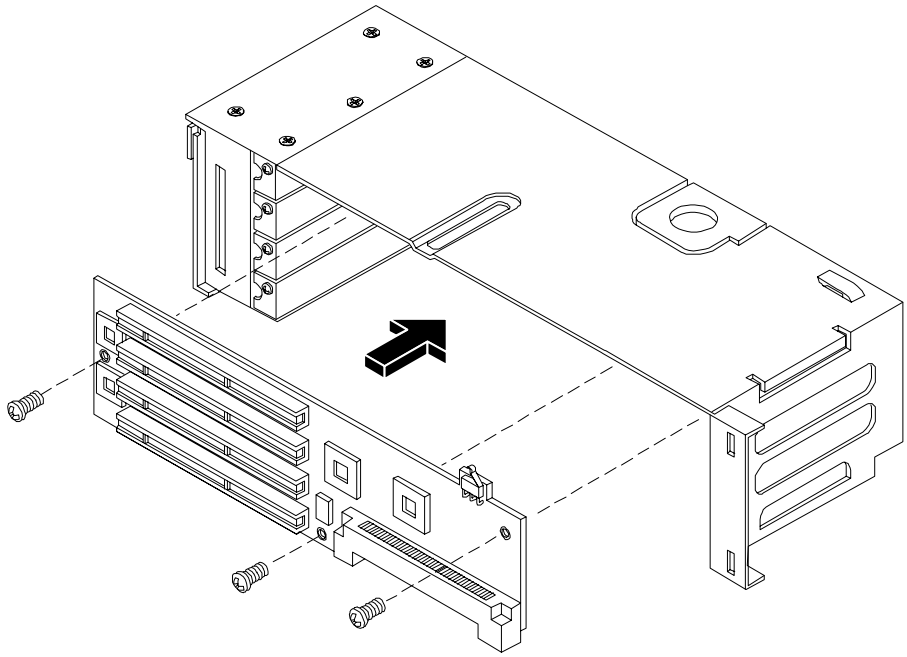


Replacing the PCI Backplane

Step 1. Place the backplane in the cage by aligning the cage standoffs with the holes on the backplane and slide it into place.

Step 2. Secure the PCI backplane by screwing in its mounting screws.

Figure 7-58Replacing the PCI Backplane



Step 3. Replace any accessory and graphics cards.

Step 4. Verify the backplane replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing a Removable Media Drive

The Removable Media Drive is located behind the Front bezel.

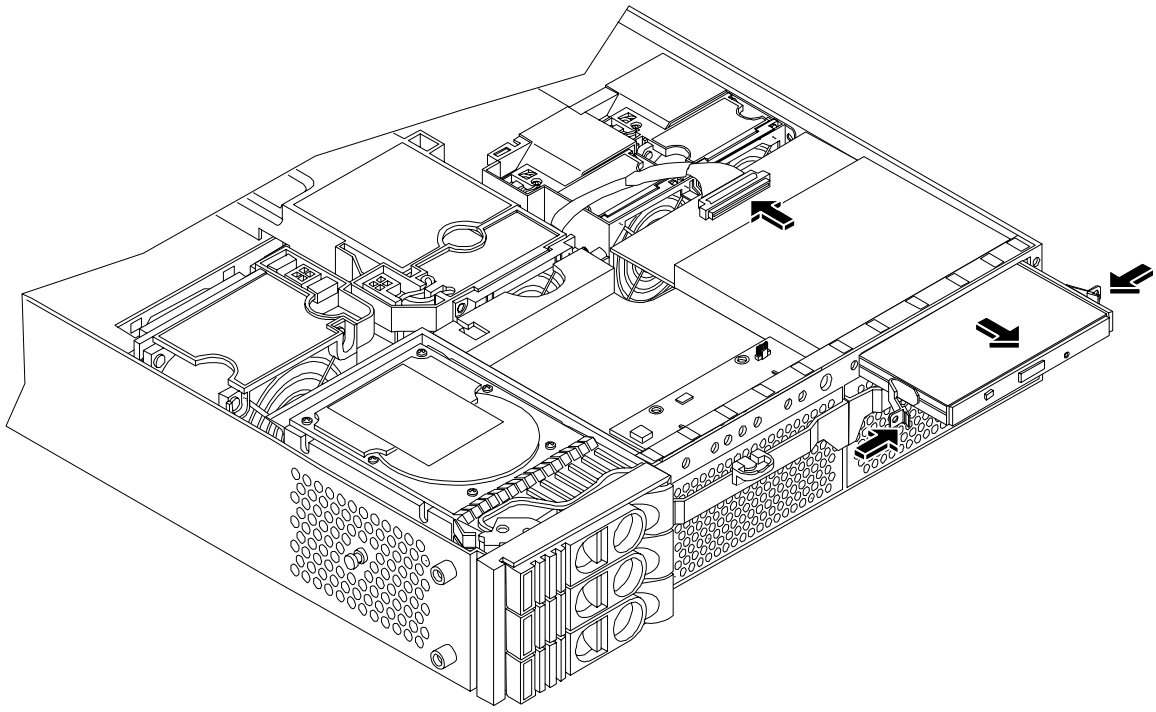
WARNING **Ensure that the system is powered-down and all power sources have been disconnected from the server prior to removing or replacing a removable media drive.**

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

Figure 7-59 Removable Media Drive Removal/Replacement



Removing a Removable Media Drive

To remove a Removable Media Drive, perform the following steps:

Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. See “Removing and Replacing the Metal Cover”

Step 3. Disconnect the IDE cable from the back of the drive.

Step 4. Grasp the front of the DVD drive and squeeze in on the locking tab to release the drive.

Step 5. Pull the drive straight out to remove it from the chassis.

Replacing a Removable Media Drive

To replace the removable DVD drive, perform the following steps:

Step 1. If a removable media drive has not previously been installed in the server, the drive slot will be covered with a DVD drive filler. Remove the DVD drive filler.

Step 2. Slide the replacement drive into the drive bay until it stops sliding and the retaining clips on both sides of the drive snap into place.

Step 3. Connect the IDE cable on the back of the drive.

Step 4. Replace the cover.

Step 5. Reconnect the power and external cables and turn on the system.

Step 6. Verify the drive replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.
- Use diagnostics provided by the ODE to exercise the module replaced.

Removing and Replacing the Management Processor Card

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

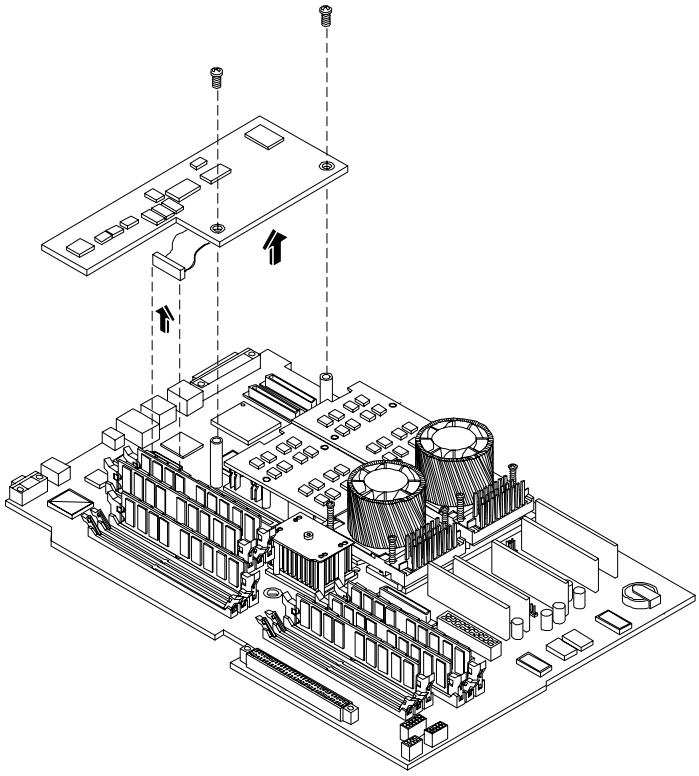
Removing the Management Processor Card

Step 1. Turn off the system, disconnect all power and external cables and remove the system cover(s).

Step 2. Record the network settings from your management processor card before beginning this task.

Step 3. Unscrew the two mounting screws that connect the management processor card to the internal chassis post and the two external mounting screws that are located on both sides of the 25-pin serial connector.

Figure 7-60Removing the Management Processor

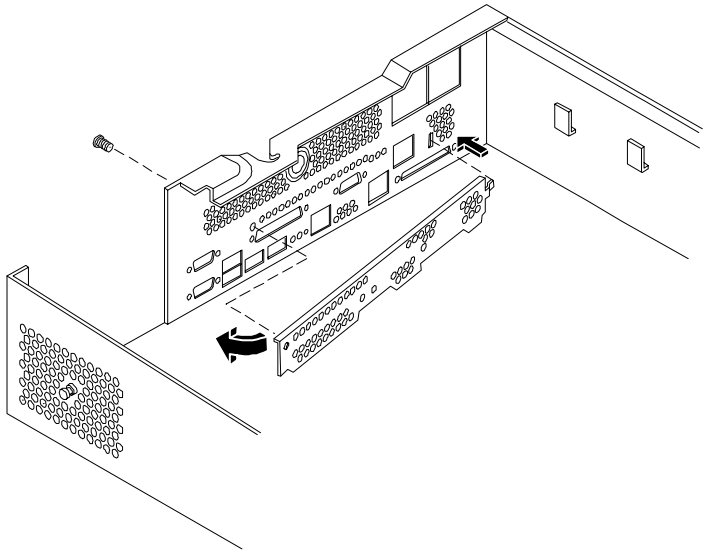


Step 4. Disconnect the management processor card connector.

Step 5. Remove the management processor card from the system by grasping it by its edges.

Step 6. Replace the management processor card blank, if available, on the chassis. This blank is used to fill the holes left by the 10/100 management LAN, 15-pin VGA and 25-pin serial connectors.

Figure 7-61Replace the Management Processor Blank



Step 7. Push the management processor card blank against the inside of the chassis and screw in the blank's mounting screw on the external connector side of the system's chassis.

Step 8. Replace the cover (s) and reconnect the power and external cables.

Replacing the Management Processor Card

Step 1. Turn off the system, disconnect all power and external cables and remove the system cover(s).

Step 2. If you are installing a new card, remove the management processor card blank.

Step 3. Unscrew the mounting screw for the management processor card blank, located on the external connector side of the system chassis.

Step 4. Remove the blank retaining tab out of its socket on the system chassis and remove the blank from the system.

Step 5. Insert the management processor card in the system.

Step 6. Grasp its edges and place it on the two management processor card posts.

Step 7. Push the 10/100 management LAN, 15-pin VGA and 25-pin serial connectors through their openings on the back of the system

Step 8. Connect the management processor card:

- Connect the management processor card cable to its connector on the system board.
- Screw in the two mounting screws that connect the management processor card to the internal chassis post.
- Screw in the two external mounting screws that are located on both sides of the 25-pin serial connector.

Step 9. Replace the power connector.

Step 10. Verify the card replacement by using the utilities identified in Chapter 5, "Utilities."

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing the Management Processor Card Battery

Systems with a management processor card have two batteries. Systems with no management processor card have only one battery. The main system battery is located on the system board. The management processor battery is located on the management processor card.

Removing the Management Processor Card Battery

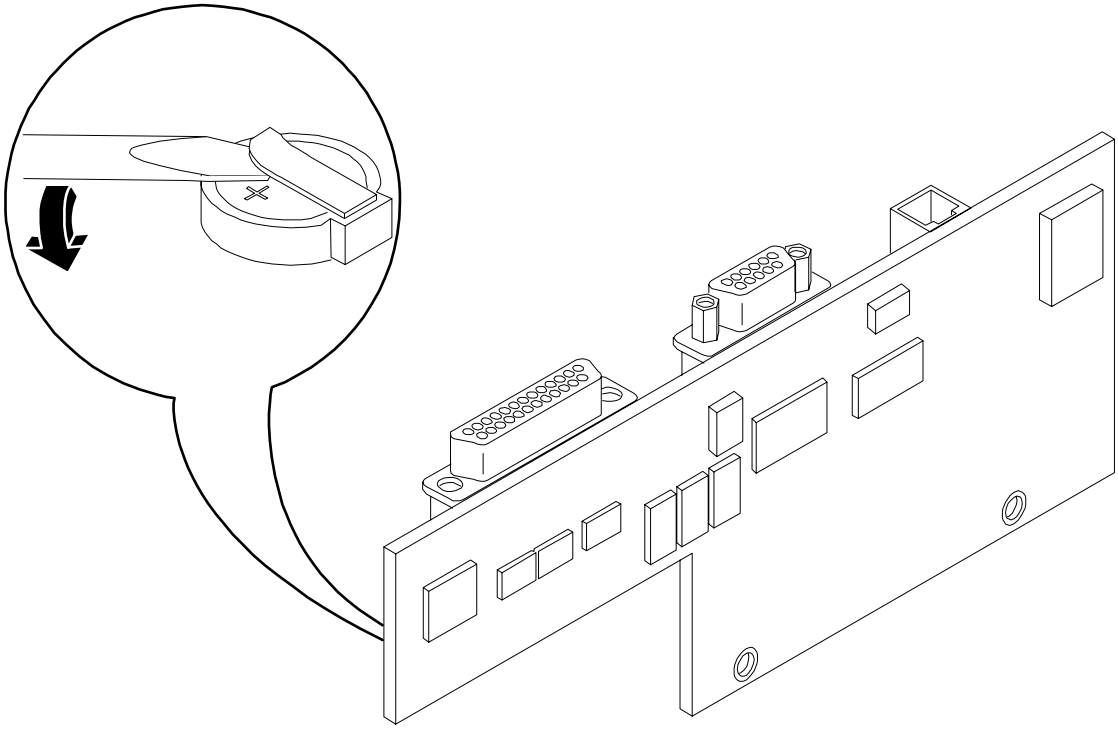
Step 1. Perform all of the steps described in the procedure for Removing the Management Processor Card.

Step 2. The battery for the management processor is located on the bottom of the card.

Step 3. Lift up on the battery and push on the back of it with a flat-head screwdriver to remove the battery from its holder.

CAUTION Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip may damage the clip.

Figure 7-62Removing the Management Processor Battery



Replacing the Management Processor Card Battery

Step 1. Lift up on the battery holder retaining clip with a flat-head screwdriver and slide the battery into the holder. The positive (+) terminal of the battery faces up.

CAUTION Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip may damage the clip.

Step 2. Perform all of the steps described in the procedure for Replacing the Management Processor Card.

Step 3. Verify the battery replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing the LED Status Panel

The LED status panel card contains the system LEDs and diagnostic LEDs.

CAUTION Some system settings are saved to the LED status panel. If you are replacing both the LED status panel and the system board, they must be replaced one at a time to avoid loss of system settings. First replace one component, then turn on the system and boot to the EFI prompt. After confirming that the first component has been replaced successfully, shut down the system and replace the second component.

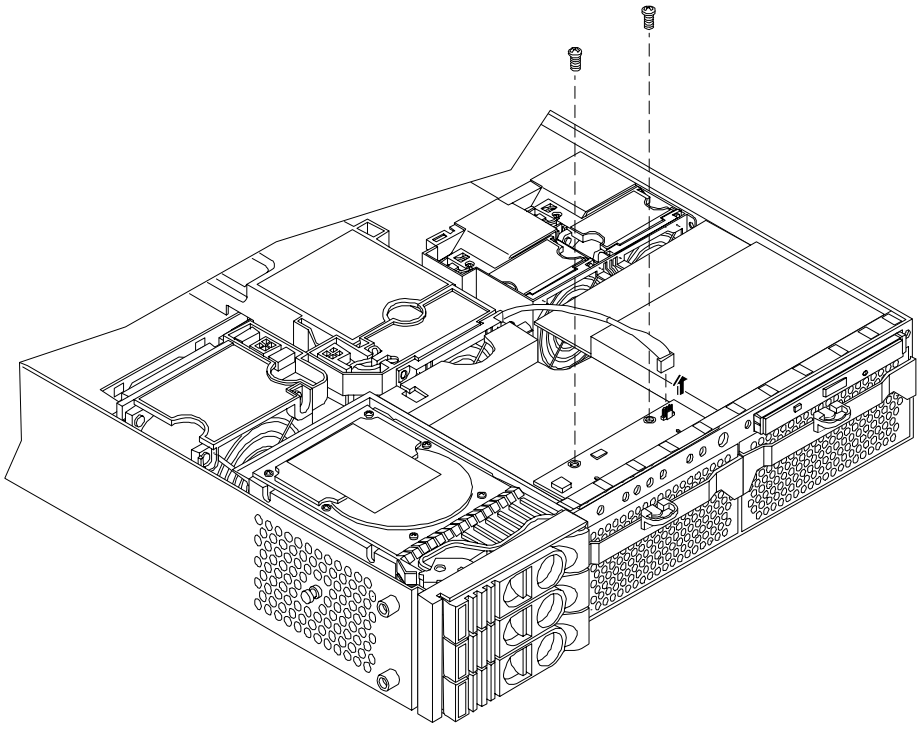
Removing the LED Status Panel

Step 1. Turn off the system, disconnect all power cables, and remove the system cover(s).

Step 2. Disconnect the LED status panel's controller cable.

Step 3. Unscrew the two LED status panel mounting screws and remove the panel.

Figure 7-63Removing the LED Status Panel



Replacing the LED Status Panel

Step 1. Replace the LED status panel in the system and screw in the two LED status panel mounting screws.

Step 2. Connect the LED status panel controller cable.

Step 3. Replace the system cover(s) and reconnect all power cables. Turn on the system and verify that the system and power LEDs light up.

Step 4. Copy a valid UUID to the new status panel.

NOTE If resetting the UUID does not work successfully, contact your HP support representative.

Step 5. Verify the display panel replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Removing and Replacing the System Board

CAUTION Some system settings are saved to the LED status panel. If you are replacing both the LED status panel and the system board, they must be replaced one at a time to avoid loss of system settings. First replace one component, then turn on the system and boot to the EFI prompt. After confirming that the first component has been replaced successfully, shut down the system and replace the second component.

Removing the System Board

Step 1. Turn off the system, disconnect all power and external cables and remove the system cover(s).

Step 2. Remove these components from the system board:

- Memory (DIMMs)
- Processor airflow guide and processor module(s)
- Management card (if installed)

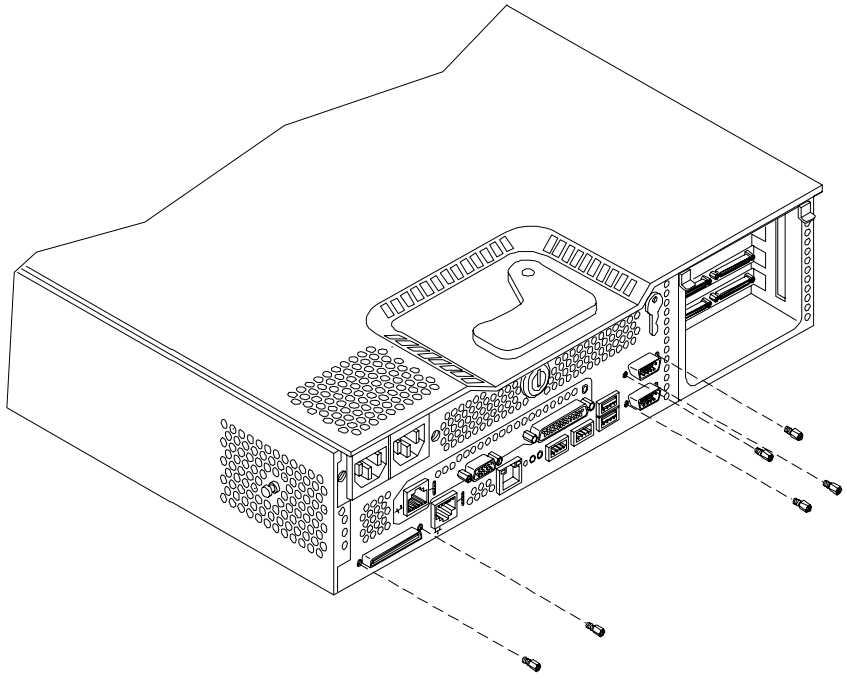
Step 3. If the system does not have a Management card installed, remove the power connector plate.

a. Unscrew the two power connector mounting screws on the back of the system

b. and reach inside the system to remove the power connectors from the socket. The power connectors will still be connected to their cables.

Step 4. Unscrew the six backplane system board mounting screws that connect the system board to the rear of the system chassis.

Figure 7-64Remove System Board Mounting Screws

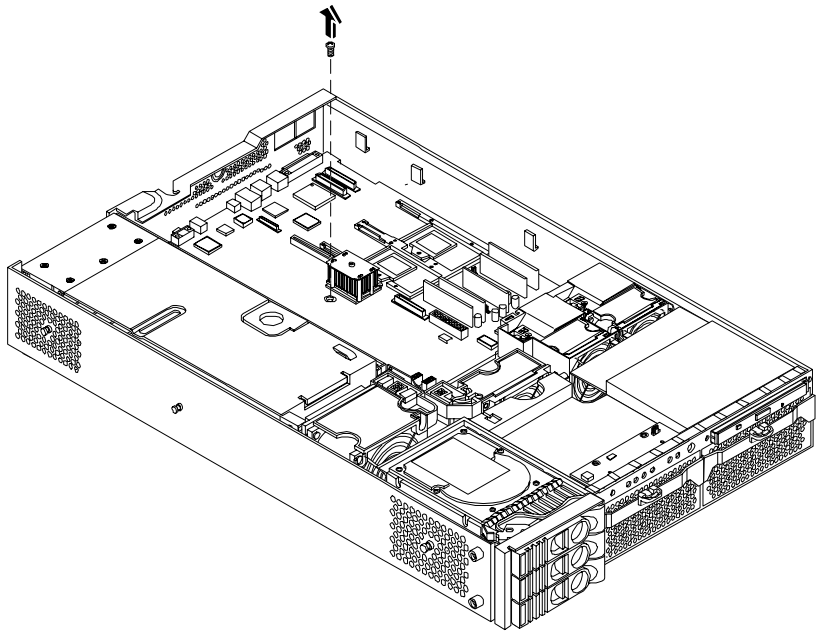


Step 5. Disconnect all cables that are connected to the system board. To help with re-assembly, make note of which cables were connected to which connector.

NOTE To access the three power cables near the PCI cage, you must lift up the connector bridge for the PCI cage fan.

Step 6. Unscrew the system board mounting screw. A screw symbol is adjacent to the mounting screw.

Figure 7-65Remove the System Board Mounting Screw

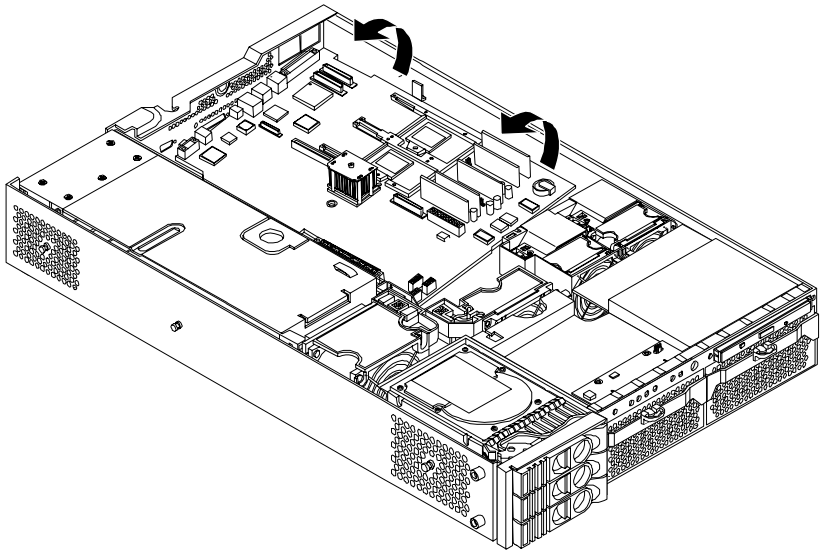


Step 7. Remove the system board:

a. Grasp the memory controller chip heatsink and the processor module heatsink and slide the system board toward the front of the system. This releases the system board from its chassis standoffs.

b. Lift up the processor module side of the system board and slide it free of the PCI cage bay.

Figure 7-66Remove the System Board



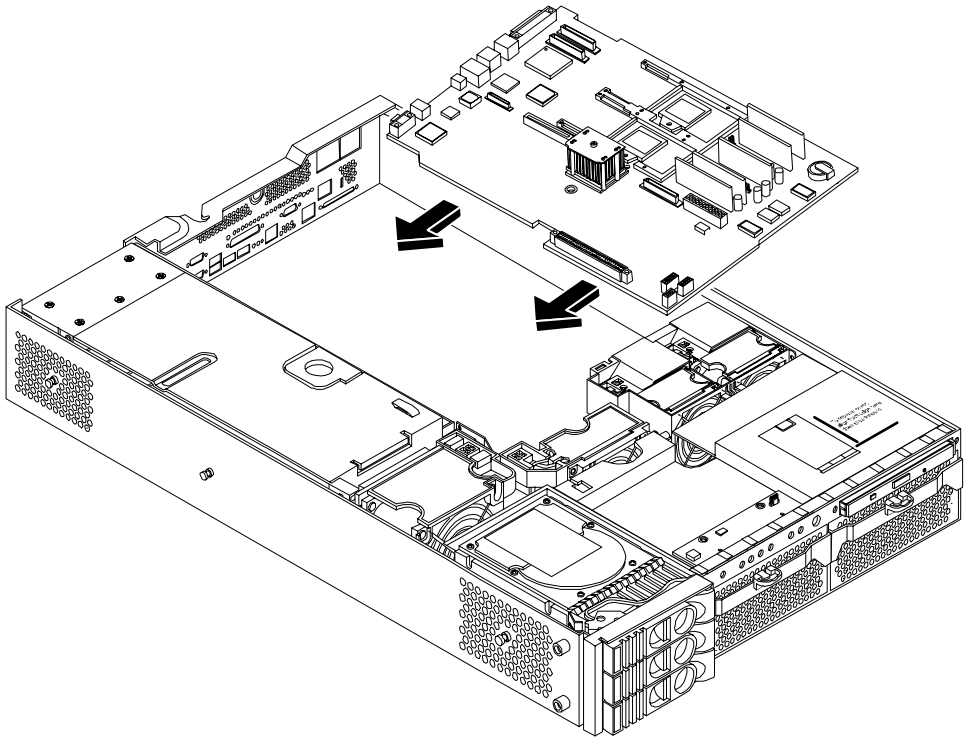
Replacing the System Board

Step 1. Remove the old system board.

Step 2. Grasp the new system board by its edges and carefully align it in the system:

a. Angle the board to allow the PCI connector to slide into the PCI cage bay area.

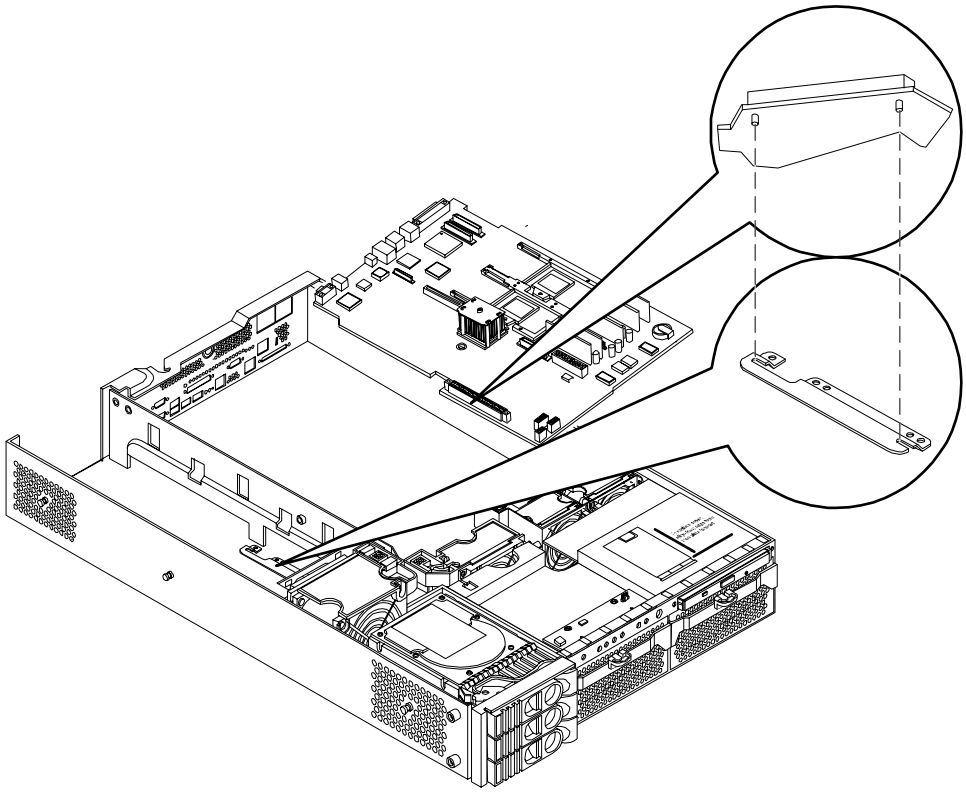
Figure 7-67Slide System Board into Chassis



b. Align the system board keyholes with their standoffs on the chassis.

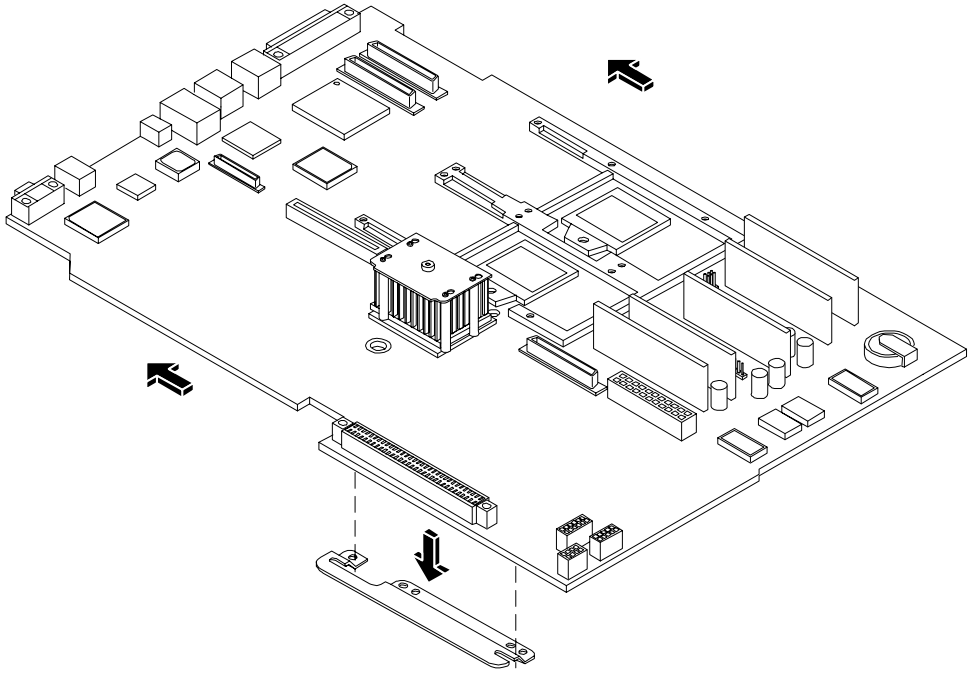
c. Slide the PCI connector posts on the system board into their slots on the system chassis.

Figure 7-68Align the System Board PCI Connector



Step 3. Slide the system board back toward the rear of the system to secure the system board on its standoffs.

Figure 7-69Slide System Board in Chassis

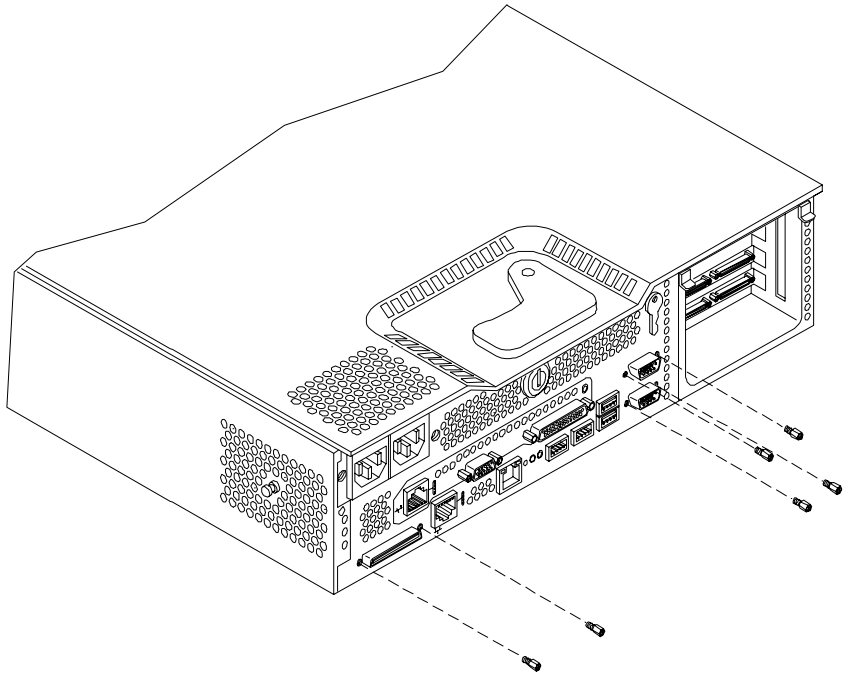


Step 4. Screw in the system board mounting screw.

Step 5. Connect all cables to their appropriate connectors on the system board.

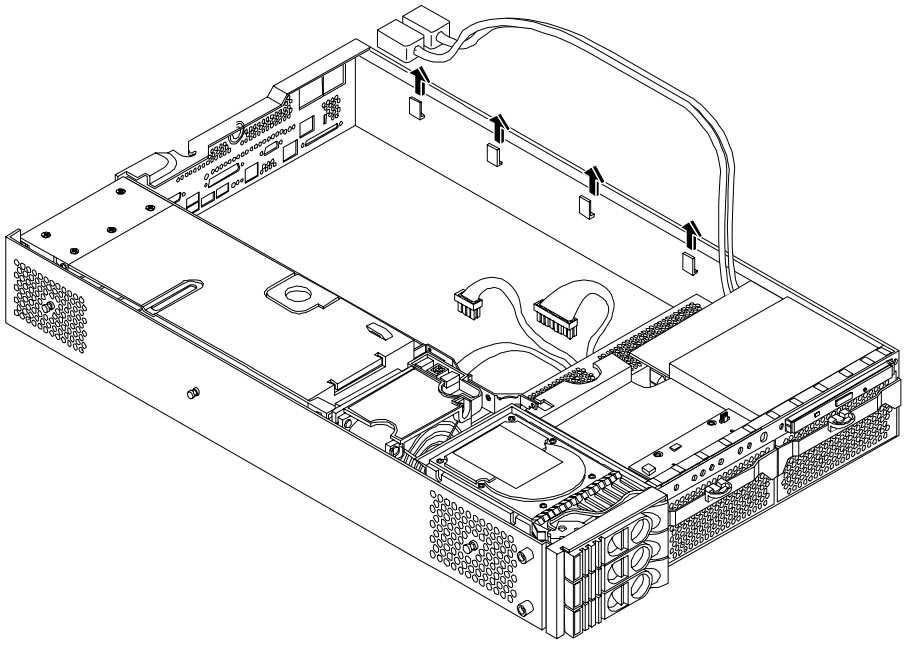
Step 6. Screw in the six rear backplane system board mounting screws.

Figure 7-70Install the Rear Panel Mounting Screws



Step 7. If you system does not have a Management Card, replace the power connectors in their slots on the back of the system and screw in the power connector mounting screws.

Figure 7-71Reinstall the Power Connectors



Step 8. Replace the following system components:

- Management card
- Processor airflow guide
- System fans
- PCI card cage
- Memory

Step 9. Replace the system cover(s), reconnect all of the power and external cables and turn on the system.

Step 10. Verify the system board replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

Step 11. Review the system configuration in the EFI shell and reconfigure settings as necessary.

Removing and Replacing the Power Supply Interface Module

The power supply interface (PSI) module supports up to two redundant power supplies.

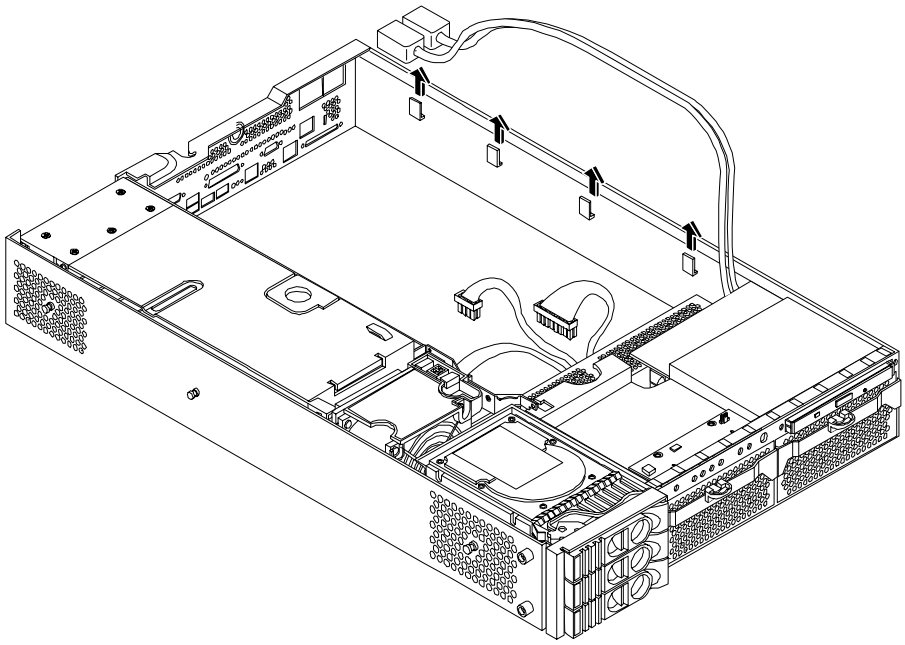
Removing the Power Supply Interface Module

Step 1. Turn off the system, disconnect all power and external cables, and remove the system cover(s).

Step 2. Remove the system board.

Step 3. Lift the power cables out of their metal holding clips.

Figure 7-72Power Cables and Holding Clips



Step 4. Unscrew the PSI mounting screw and remove the PSI module from the system.

Figure 7-73Remove the Mounting Screw

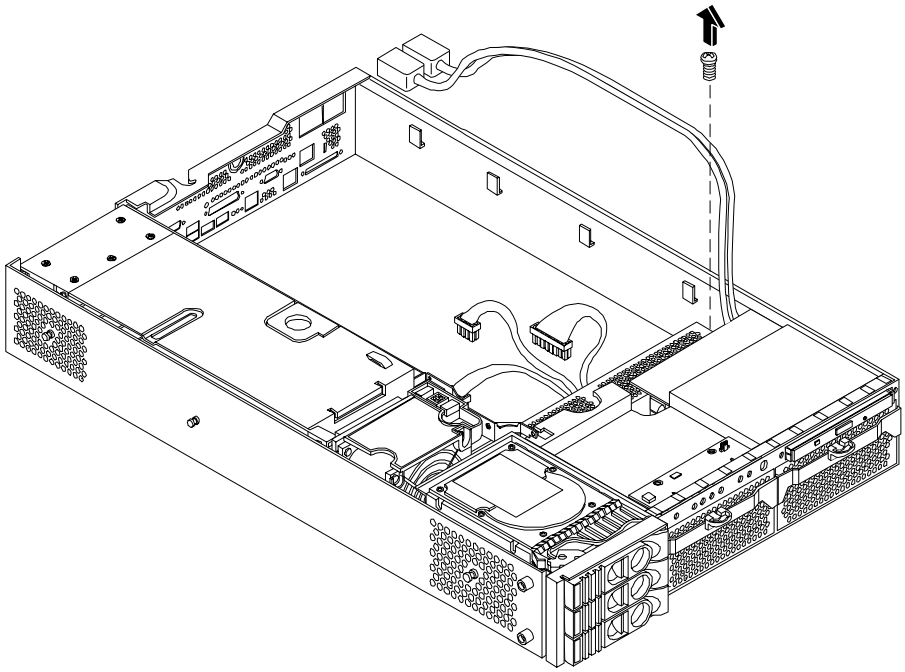
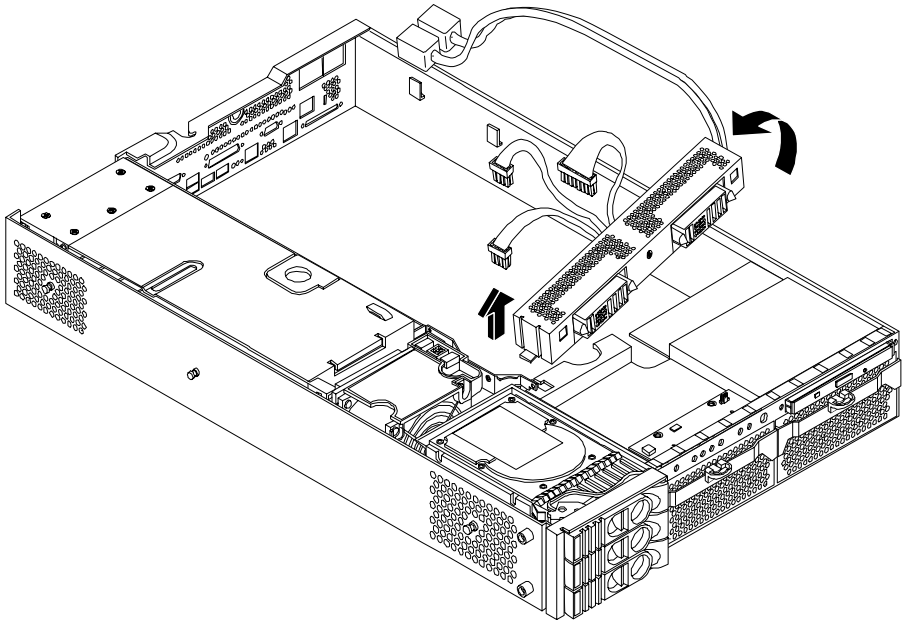


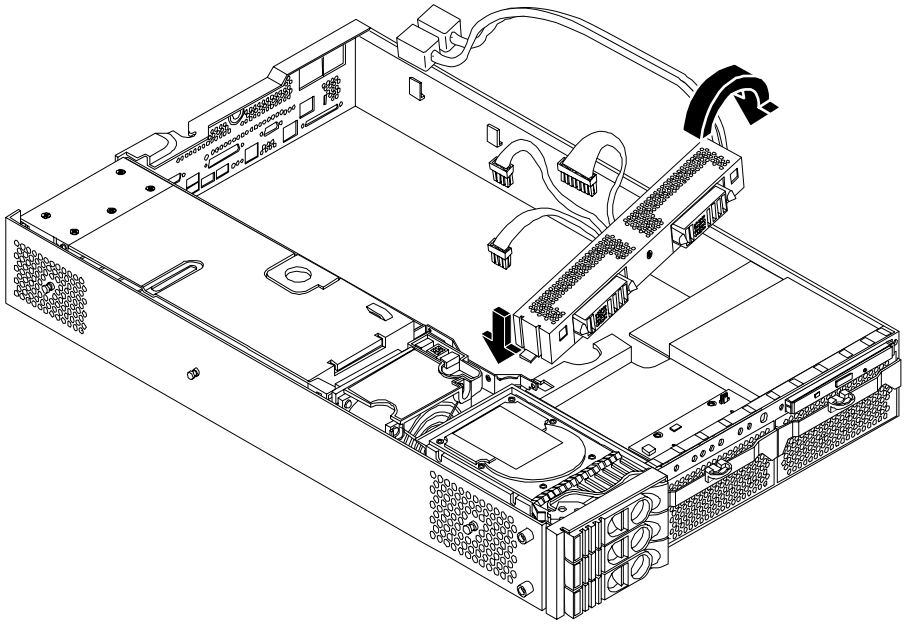
Figure 7-74Remove the PSI Interface Module



Replacing the Power Supply Interface Module

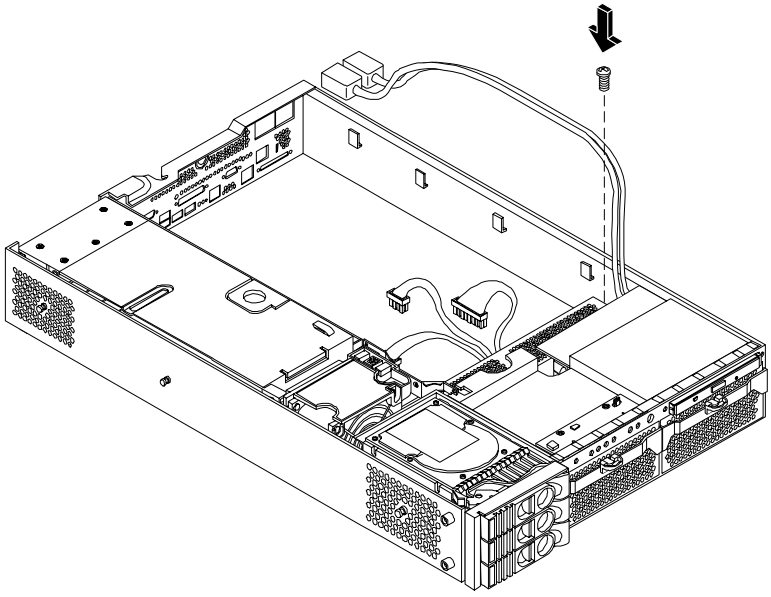
Step 1. Place the PSI module into the chassis by sliding the module retaining tab into the socket on the hard disk drive bay wall.

Figure 7-75Replacing the Power Supply Interface Module



Step 2. Screw in the PSI module mounting screw 1 and secure the power cables behind the holding clips 2.

Figure 7-76Securing the Power Supply Interface Module and Cables



Step 3. Replace the system board.

Step 4. Replace the system cover(s), and reconnect all of the power and external cables.

Step 5. Verify the PSI replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.

- Use the BCH commands to verify operation.

Removing and Replacing the Hard Disk Drive (SCSI) Backplane

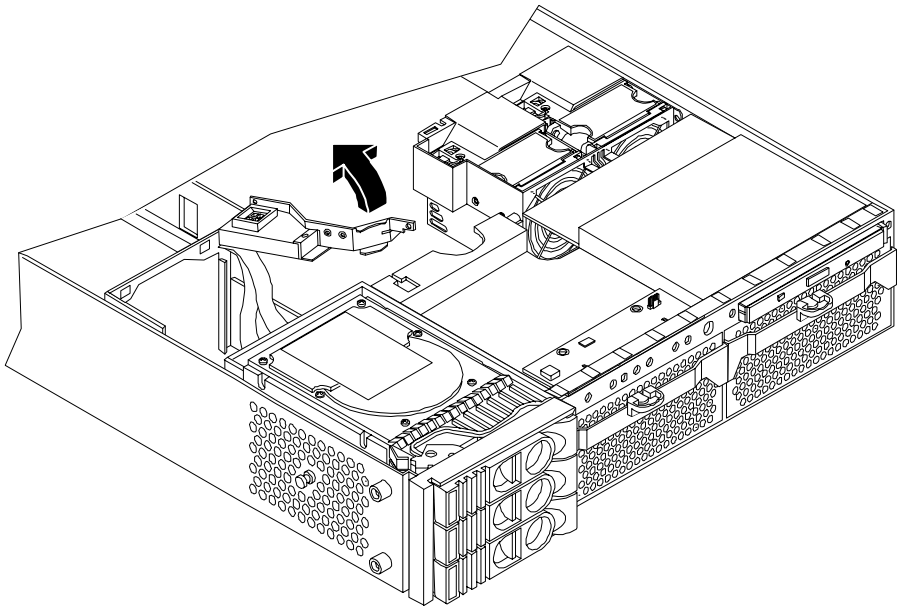
Removing the Hard Drive Disk SCSI Backplane

Step 1. Turn off the system, disconnect all power and external cables, and remove the system cover(s).

Step 2. Lift up on the PCI cage release lever and the back edge of the PCI cage and lift the PCI cage out of the system.

Step 3. Lift up on the fan power bridge 1 and disconnect the backplane power cable 2.

Figure 7-77Open the Fan Power Bridge



Step 4. Disconnect the SCSI cables 1 and unscrew the backplane mounting screws 2.

Figure 7-78Disconnect SCSI Cables

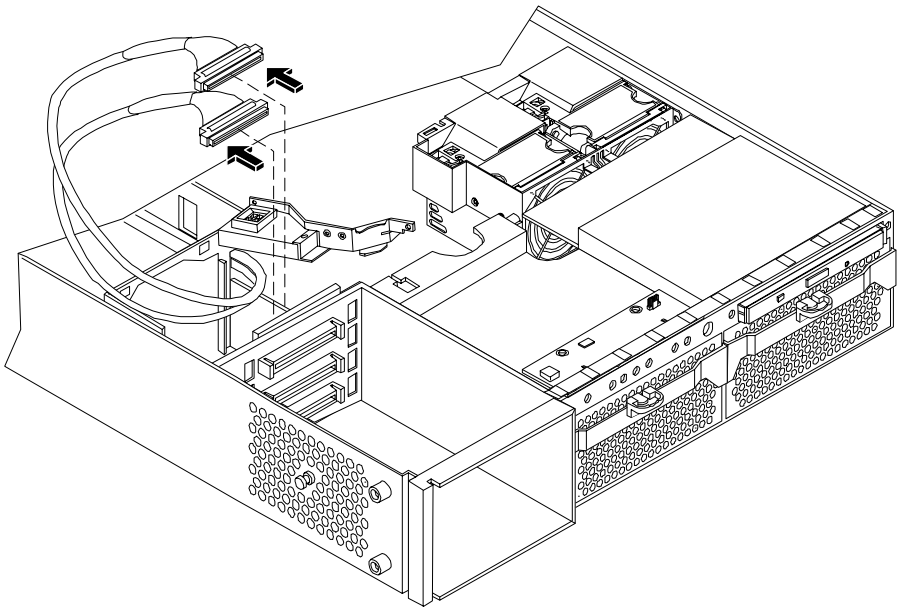
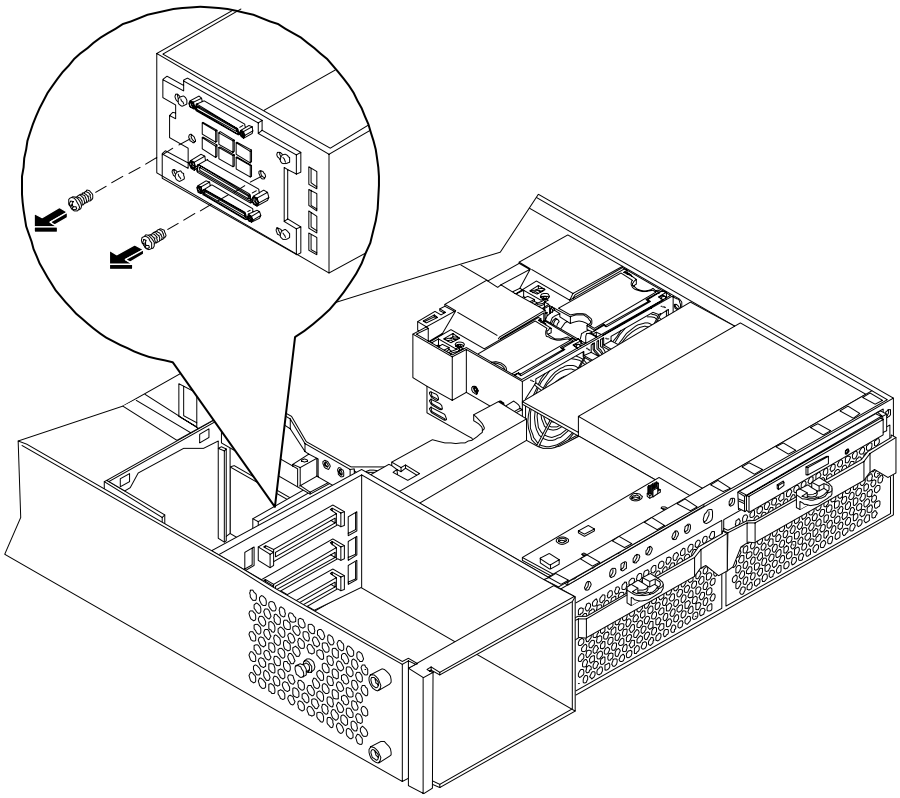


Figure 7-79Remove Mounting Screws



Step 5. Remove the hard drive backplane by sliding it in the direction of the arrow 1 and pulling it outward from its standoff posts 2.

Figure 7-80Remove the SCSI Backplane

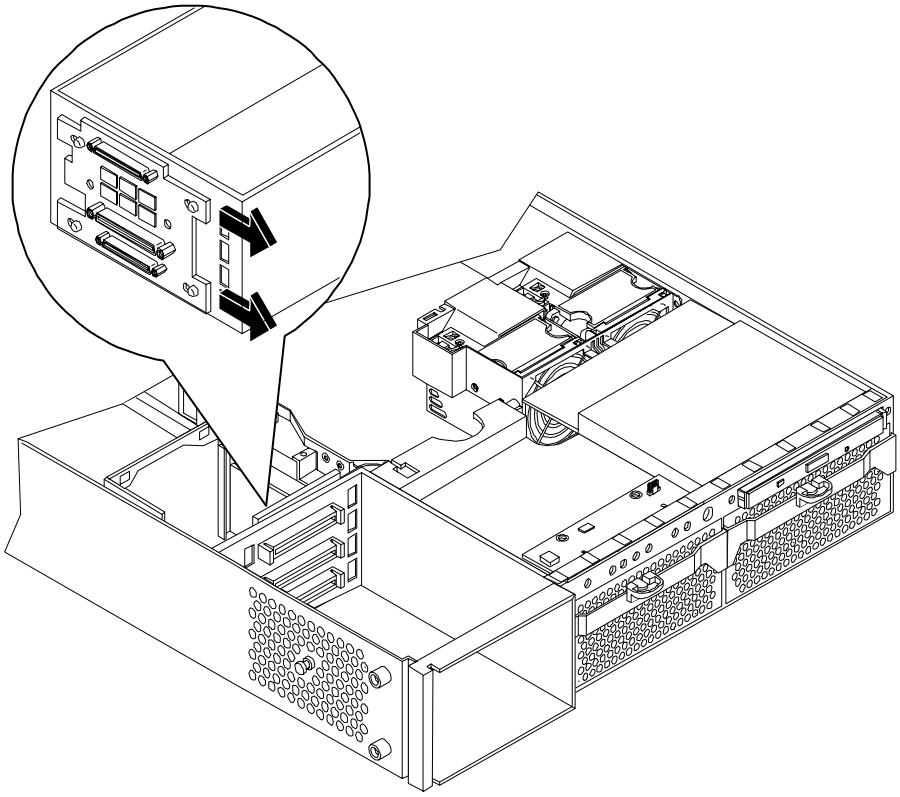
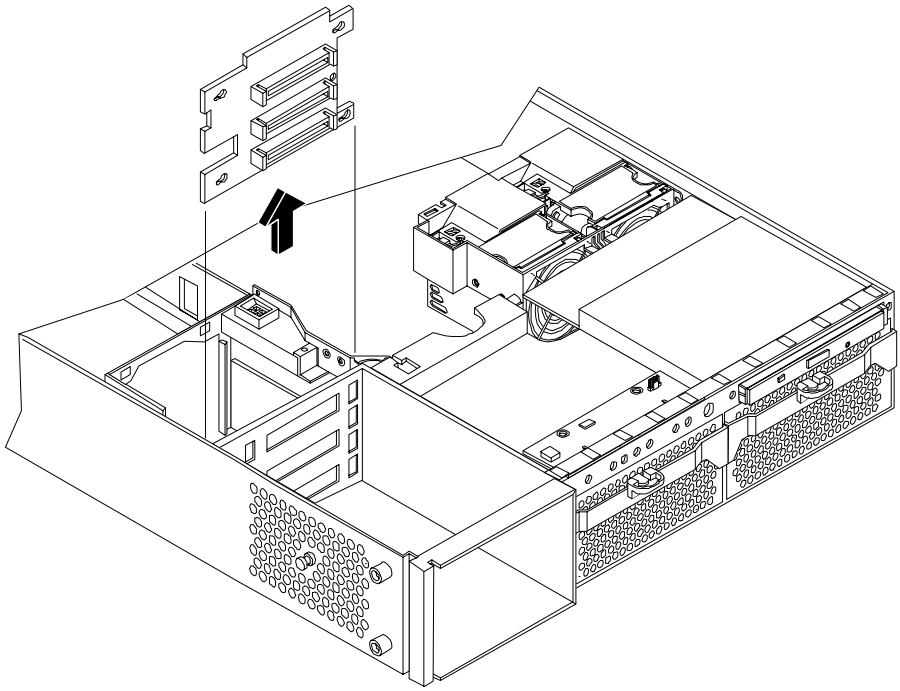


Figure 7-81Remove the SCSI Backplane from Chassis



Replacing the Hard Disk Drive SCSI Backplane

Step 1. Insert the hard drive backplane onto its four chassis standoffs and slide it to the left as you face it. This locks the hard drive backplane in place.

Step 2. Screw in the two backplane mounting screws and connect the two SCSI cables.

Step 3. Connect the backplane power cable and lower the fan power bridge until it snaps in place.

Step 4. Replace the PCI cage in the system and secure it.

Step 5. Replace the system cover(s), and reconnect all of the power and external cables.

Step 6. Verify the backplane replacement by using the utilities identified in Chapter 5, “Utilities.”

- Use the MP commands to verify operation.
- Use the BCH commands to verify operation.

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 hp9000 rp3410 and hp9000 rp3440 Servers.

Figure A-1 Parts Identification

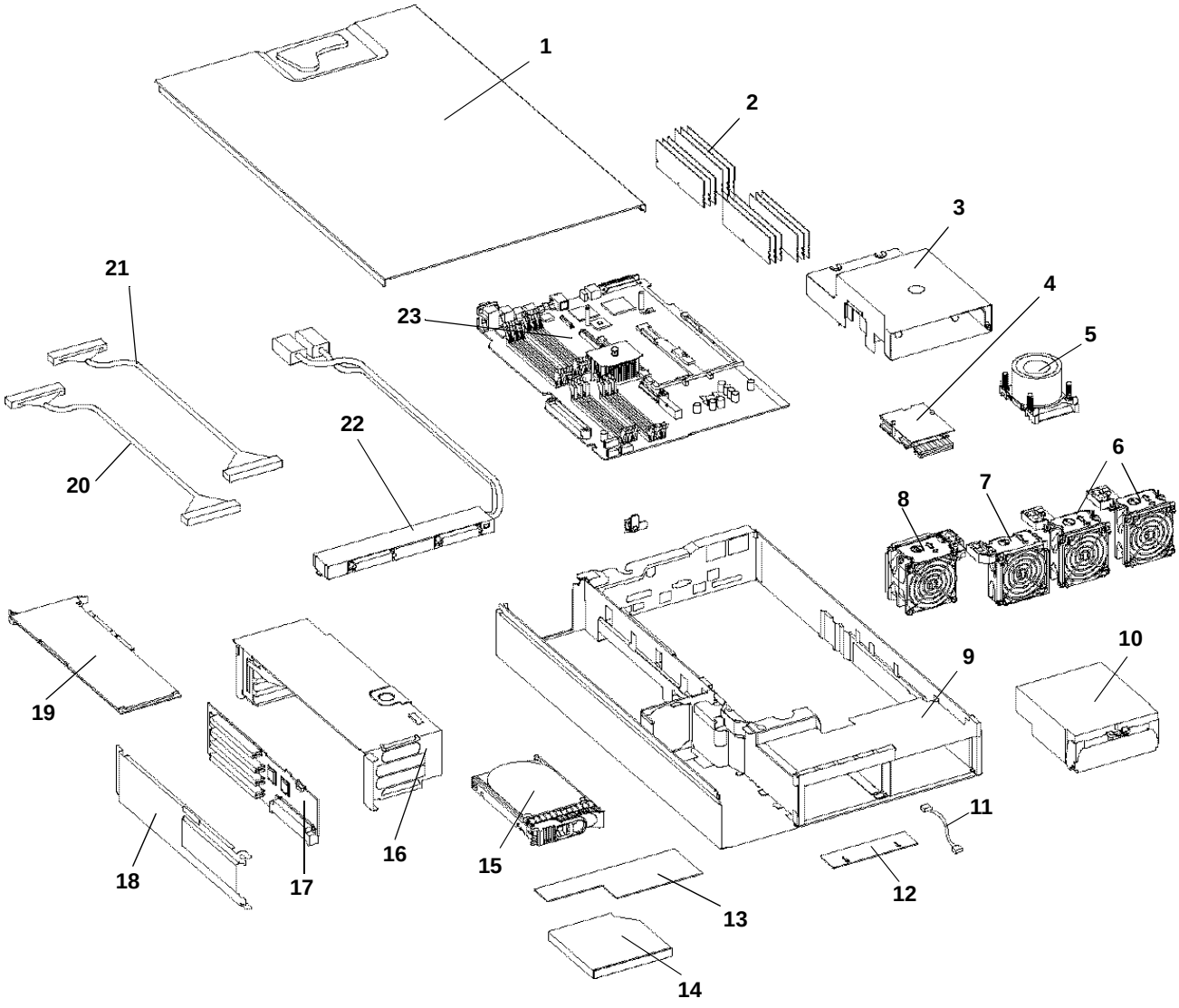
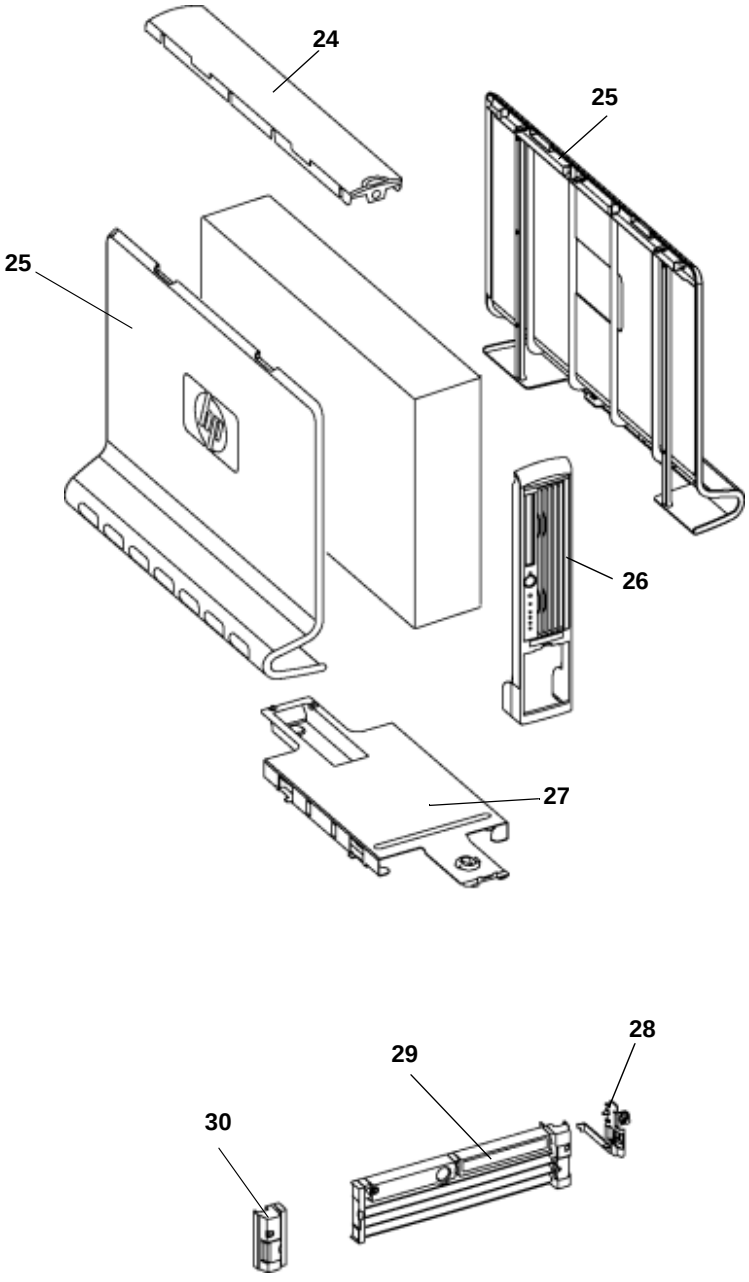


Figure A-2 Tower Parts



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

Table A-1 Field Replaceable Parts (FRU) List

Item No.	Description	Part Number Replacement	Part Number Exchange
	PCA Boards		
22	Power Supply Interface module	A7231-04018	
	SCSI backplane	A7231-66520	A7231-69520
23	System Board (mfg PN A7136-60001)	A7136-69001	A7136-69001
17	PCI backplane	A7231-66530	
12	Display panel	A7231-66550	
	Optical Devices		
14	DVD-ROM Drive, Slimline (A9919A)	A7231-62012	A7231-69012
14	CD-RW/DVD-ROM Combo Drive, Slimline (A9920A)	A7231-62014	A7231-69014
	Memory		
2	256 DDR-SDRAM DIMM (rp3440, rp3410 (A6833-60001)) (A9908A)	A6833AX	A6833-69001
2	512 DDR-SDRAM DIMM, pc2100 (rp3440, rp3410 (A6746-60001)) (A9909A0	A6746AX	A6746-69001
2	1GB DDR-SDRAM, pc2100 (rp3440 (A6834-60001)) (A9910A)	A6834AX	A6834-69001
2	2 GB DDR-SDRAM, pc2100 (rp3440 (1818-8799)) (AB228A)	A6835AX	A6835-69001
	Internal disks/removable media		
15	36 GB, 15K RPM Ultra320 SCSI HotPlug Disk (A9796A)	A9896-64001	A9896-69001
15	73 GB, 15K RPM Ultra320 SCSI HotPlug Disk (A9977A)	A9897-64001	A9897-69001
15	146GB, 10K RPM Ultra320 SCSI HotPlug Disk (A9978A)	A9898-64001	A9898-69001
	Fans		
7	Assembly—Super 80mm Fan	A7231-04014	

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

Item No.	Description	Part Number Replacement	Part Number Exchange
	Assembly—Thin 80mm Fan tower model	A7231-04015	
8	Assembly—Dual fan	A7231-04033	
6	Assembly—Standard 80mm Fan	A7231-04017	
	Processors		
5	Processor,800 MHz,1.5MB cache,Module (A7138-62002) (A7138A)	A7138-67002	A7138-69002
5	Processor,900 MHz,3MB cache assembly (A7139-62002) (A7139A)	A7139-67002	A7139-69002
4	Assembly—McPod II (Power Pod)	0950-4294	
	Processor tool Kit (same as Nemesis (A9901A))	5069-4551	
	Processor (label-less) hex tool	A9901-04007	
	Disposable wrist strap	A3024-80004	
	Power Supply		
10	Power supply,650 watts,redundant hotswap (A6874)	A6874-63000	A6874-69000
	Rack Solution Kits		
	Tower Kit (A6940A)		
27	Deskside Pedestal	A7231-04028	
26	Assembly—Deskside Front Panel	A7231-04054	
24	Deskside top panel	A7231-40052	
25	Assembly—Deskside Side Panel	A7231-04051	
	Deskside Nameplate—(rp3410)	A7137-40003	
	Deskside Nameplate—(rp3440)	A7137-40001	
	Field Rack Kit, kit-std.slide mid weight (A6939A)	5064-9670	
	Field Rack Kit, Cable management arm (A6939A)	5065-5963	
	Rack Server		
28	Server—Assembly—Rack Latch Right	A7231-04023	
29	Server—Assembly—Rack Bezel Right	A7231-04053	
30	Server—Assembly—Rack Left Bezel with Rack Latch	A7231-04055	
	Server Rack Nameplate (rp3410)	A7136-40002	
	Server Rack Nameplate (rp3440)	A7136-40001	

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

Item No.	Description	Part Number Replacement	Part Number Exchange
	Plastic and Metal Parts		
	Filler,Slimline carbon	A7231-40027	
	Filler,Slimline gray	A7231-40026	
	HDD Filler—Carbon	A6198-60003	
	HDD Filler—gray	A6198-60002	
	Assembly—Fan Cage	A7231-04004	
16	Assembly—PCI Cage	A7231-04006	
3	Assembly—Plastic Turbocooler Duct	A7231-04034	
	ECI Cover Plate	A7231-00072	
1	Assembly—Top Cover	A7231-04003	
	Assembly- Memory air flow guide	A7231-04049	
	Cables		
	IDE Cable	A7231-63002	None
	Status Panel Cable	A7231-63003	None
	Disk Power	A7231-63004	None
	Cable—SCSI—Channel A	A7231-63017	None
	Cable—SCSI—Channel B	A7231-63018	
	Cable—Super 80 mm Fan	A7231-63005	
	Cable—80 mm Fan	A7231-63006	
	Management Processor M cable	A6144-63001	
	Flex cable for the managent processor card	A7231-63008	
	Audio Cable	8121-0808	
	Headphone	5183-9500	
	PWR CORD U.S. CANADA 125 VAC	8120-1378	
	PWR CORD CONT. EUROPE 250 VAC	8120-1689	
	Chinese Power Cord, straight	8120-8376	
	PWR CORD JAPAN 125 VAC	8120-4753	None
	PWR CORD SWITZERLAND 250 VAC	8120-2104	None
	PWR CORD U.K. 250 VAC	8120-1351	None

B Specifications

This appendix provides the hardware specifications of the hp 9000 rp3410 and rp 3440 Server. The following tables provide the specifications required for normal operation of the hp 9000 rp3410 or hp 9000 rp3440 Server.

Hardware Specifications

Table B-1 Hardware Specifications

Component	rp3410	rp3440
Micro-processors	1 or 2 PA RISC 800 MHz/1.5MB cache.	4 PA RISC 900 MHz/3MB cache
Memory	Supports up to eight Double Data Rate (DDR) registered ECC Memory, in PC2100 DIMMs. Supported DDR DIMM sizes: 128MB, 256MB, 513MB, 1GB, and 2GB.	Supports up to eight Double Data Rate (DDR) registered ECC Memory, in PC2100 DIMMs. Supported DDR DIMM sizes: 128MB, 256MB, 513MB, 1GB, and 2GB.
HDDs	None	3-36 GB, 15K RPM Ultra320 SCSI HotPlug Disk or 3- 73 GB, 15K RPM Ultra320 SCSI HotPlug Disk or 3-146GB, 10K RPM Ultra320 SCSI HotPlug Disk
Video	A6150 PCI card (optional)	A6150 PCI card (optional)
SCSI	Integrated Ultra-3 SCSI dual channel controller; 80 MB/s transfer rate with one internal 68-pin connector and one external 68-pin connector.	Integrated Ultra-3 SCSI dual channel controller; 80 MB/s transfer rate with one internal 68-pin connector and one external 68-pin connector.
LAN	PCI Gigabyte, fast ethernet controller	PCI Gigabyte, fast ethernet controller
PCI Slots	Four 64-bit PCI-X slots, 133 MHz, 3.3V slots.	Four 64-bit PCI-X slots, 133 MHz, 3.3V slots.
Core I/O	Three serial ports, 4 USB 2.0 ports, integrated RJ-45 LAN on Management Processor card.	Three serial ports, 4 USB 2.0 ports, integrated RJ-45 LAN on Management Processor card.
DVD-ROM	None.	IDE interface; 48x speed.
External Storage	Optional.	Optional.
Power Supply	1-400W power supply.	2-400W power supply.

Dimensions and Weights

This section provides dimensions and weights of hp 9000 rp3410 and rp3440 Server components.

Component Dimensions

Table B-2 Server Component Dimensions

Dimension	Value
Rack Dimensions (Depth x Width x Height)	67.9 cm (26.8 in.) maximum x 48.3 cm (19.0 in.) x 8.6 cm (3.4 in.)
Tower Dimensions (Depth x Width x Height)	67.5 cm (26.6 in.) x 29.5 cm (11.6 in.) x 49.4 cm (19.5 in.)
Rack Weight	Min: 17.5 kg (38.6 lb.) Max: 22.2 kg (49.0 lb.)
Tower weight	Min: 22.4 kg (49.4 lb.) Max: 25.5 kg (56.3 lb.
Tower Footprint	0.2 m2 (2.1 sq. ft.)
Rack Units	2U

C System Information

Features Summary

The following features comprise the hp 9000 rp 3410 and rp3440 Server.

Processor

- 800MHz/1.5GB cache
- 900MHz/3.0GB cache
- rp 3410 processors may be 1-way and 2-way
- rp3440 processors are 4-way

Memory

- 12 memory DIMM slots
- 256MB, 512MB, 1GB, 2GB standard 184 pins 2.5V DDR266, CL2, registered, ECC
- 133MHz memory bus frequency, 266MTransfers/s data, 8.5GB/s peak data bandwidth
- Maximum memory size of 24GB at intro with stacked 2GB modules
- Upgrades must be made by pairs of DIMMs minimum
- DIMMs loaded by quads enable interleaved mode and chip spare

PCI Riser

- 4 independent PCI-X 133MHz 64bit 3.3V 15W slots. No 5V card and hot-plug support

Internal Core I/O

- Dual channel SCSI U160 interface, 2 internal 68pin connectors, 1 68-pin external connector
- The SCSI backplane is configured either as 2 channels with 2+1 drives. A SAF-TE accessory (currently not available) is required to configure the SCSI backplane as 1 channel with 3 drives
- The three internal SCSI drive connectors are of the 80pin type and provide drive electrical hot-plug capability
- The SCSI backplane has been designed to support a SCSI management piggy board accessory that provide a SCSI management SAF-TE chip and shunts the backplane's channels A and B to provide 3 disks on channel A and leave only the external connector on channel B. This accessory is currently not available.
- 1 internal IDE connector for a slim-line optical device (CD and DVD)
- No floppy connector

External Core I/O

- 1-SCSI U160 68pin connector

- 1-10/100/1000Base-T ethernet LAN connectors for copper cable
- 4-USB 2.0 ports
- 2 general purpose or console/debug/headless 9 pins serial ports, 16550 compatible

Power Supply Unit

- 650W output power
- The power supply is split in a front end block (the actual power supply case) that converts the line voltage into a high DC voltage and back end voltage regulation modules (on the motherboard) that step down the front end DC voltage to the required voltages
- Redundant and hot-plug power supplies (front end block only)

Motherboard Manageability

- Baseboard Management Controller (BMC)
- Temperature monitoring and fans regulation by BMC
- BMC manageability console shared with system console/general purpose serial port
- IPMI protocol for communication between BMC/system/MP card
- Hardware diagnostics by BMC displayed on the front status panel
- E-buzzer remote hardware diagnostics on phone lines for Support
- Locator front/rear LEDs
- Field Replacement Units monitoring by BMC
- Serial port for local and modem console
- Wake-on-LAN and Alert-on-LAN capabilities from the 10/100BT LAN port

Enhanced Server Manageability Using Management Processor

- LAN telnet console
- Web console
- Serial port for local console
- Serial port for modem console
- Duplication of console screen content across all consoles
- VGA and 2D graphics display

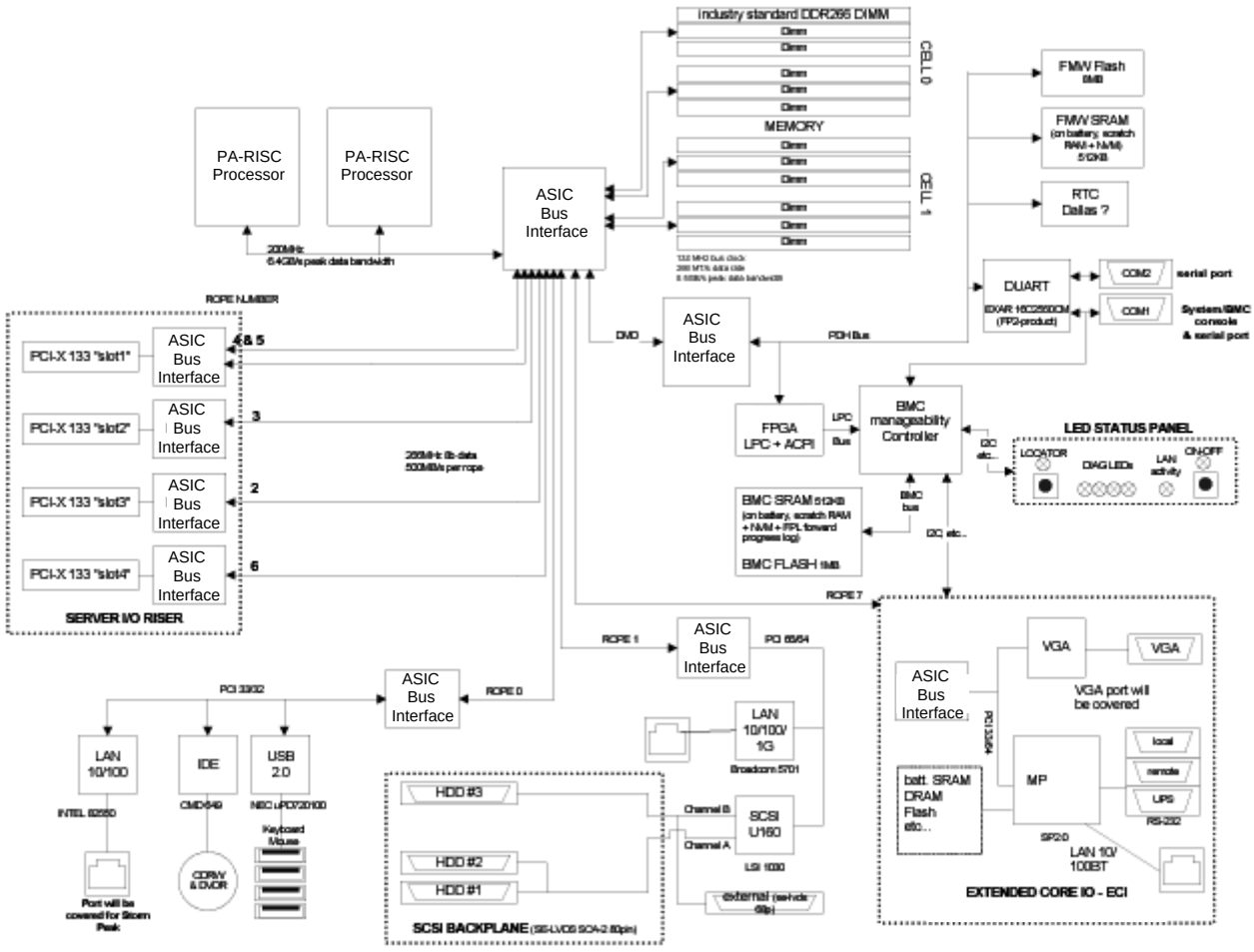
Hard Disk Drives

- rp3410—no HDDs
- rp3440—Three, 1/2 inch hard disk drives (1 inch height)-rp3413

System Board

This section provides a block diagram of the system board and descriptions of key components (integrated circuits) on the board.

Figure C-1 System Block Diagram



System Board Components

The following describes the main components of the system board:

- PA-RISC Processor (one or two processors supported)
- ZX1 I/O and Memory Controller
- ZX1 AGP/PCI Bus Controller
- Processor Dependent Hardware Controller
- Dual Serial Controller

- Field Processor Gate Array Controller
- Field Processor Gate Array Controller
- Baseboard Management Controller
- SCSI Controller
- IDE Controller
- USB Controller
- 10/100BT Standard/Management LAN
- 10/100/1000 LAN

PA RISC Processor

The system board consists of two ZIF (Zero Insertion Force) processor sockets, the CEC (Core Electronic Complex), and circuitry for clock and power generation and distribution, boundary Scan, ITP (In-target Probe), and debug.

The Front Side Bus (FSB) is the IA64 processor bus based on bus protocol from Intel. Unlike previous PA-RISC microprocessors that utilized HP's proprietary processor bus, this processor is designed to utilize the FSB. This allows processor FRUs (Field Replaceable Units) to be dropped in, provided that electrical/ mechanical compatibility and support circuitry exist. For the purposes of this document, a FRU consists of a single processor module, a y power pod, and the y heatsink assembly

One end of the FSB is terminated with an I/O ASIC. The other end of the bus is terminated with a FRU. In the middle, an additional FRU can be loaded. For the system to function properly, the processor farthest away from the I/O ASIC must be loaded at all times to electrically terminate the FSB.

Each processor module plugs directly into and is powered by its own 12V to 1.2V power-pod. Other power for the system board comes from multiple on-board DC/DC converters. Each processor module is attached to the board through a ZIF socket and the entire FRU secured down by a heatsink bolster plate

Processor Bus

The processor bus (Front Side Bus, FSB) in this product runs at 200 MHz. Data on the FSB are transferred at a double data rate, which allows a peak FSB bandwidth of 6.4 GB/sec

ZX1 I/O and Memory Controller

The rp3410 and rp3440 Servers support the following features of the ZX1 I/O and memory controller chip

- 3.3 GB/s peak IO bandwidth
- provides 7 communication paths
- Peak memory bandwidth of 8.5 GBs
- 2 memory cells, 144 data bits each

Memory

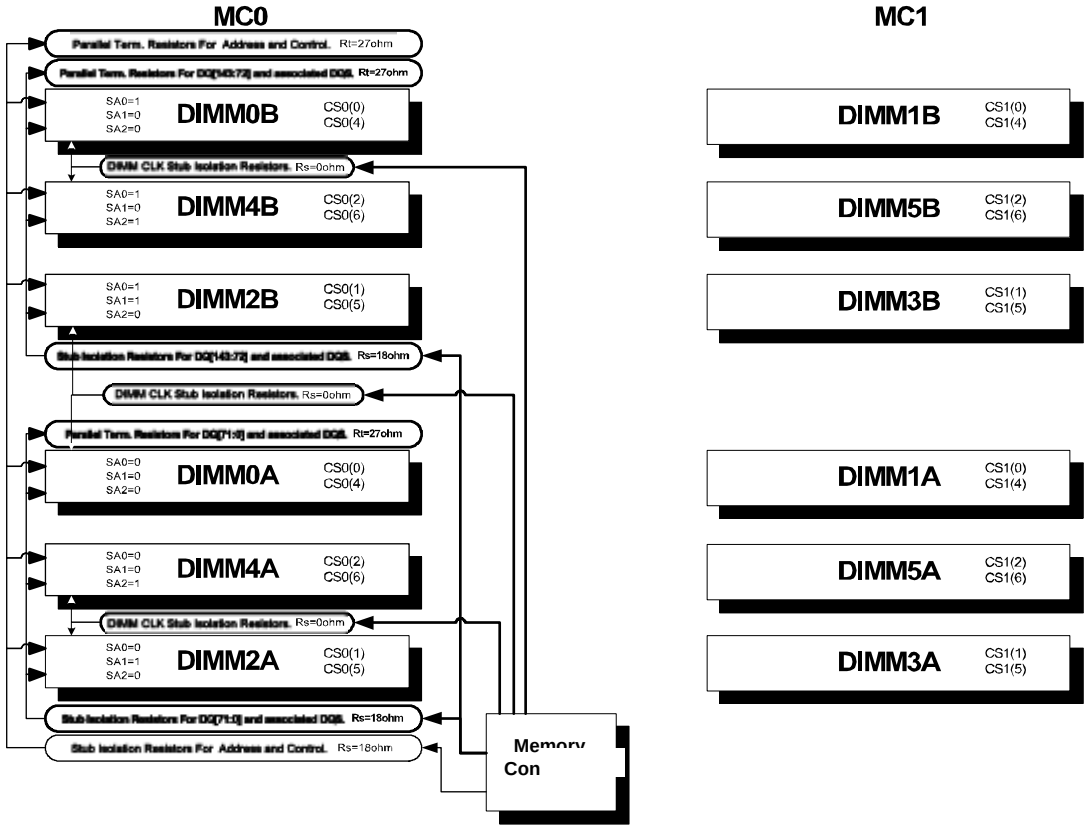
The memory subsystem provides two memory cells, each of which is 144 data bits wide. Each cell has 6 DIMM slots, which means a total of 12 DIMM slots are available. The memory bus clock speed is 133MHz, and the data transfer rate is 266Mtransfers/second as data is clocked on both edges of the clock. The peak data

bandwidth for this memory subsystem design is 8.5GB/s. DIMMs must be loaded in quads with qualified modules, with the exception of 256MB DIMMs which can be loaded in pairs. Memory is protected by data ECC, and the hardware implementation supports the chip-spare (similar to IBM's capital) feature

The minimum amount of memory that can be installed is 512MB (2-256MB modules). The maximum amount of memory that can be installed is dependent on the largest DIMM size (2GB). When the product is initially released, 24GB will be that maximum memory size.

This design does not support any non industry standard DDR DIMMs. Only qualified DIMMs are supported

Figure C-2 Memory Block Diagram



Memory Architecture

The I/O ASIC memory interface supports two DDR cells, each of which is 144 data bits wide. The memory subsystem physical design uses a comb-filter termination scheme for both the data and address/control buses. This part of the topology is similar to other DDR designs in the computer industry. Clocks are distributed directly from the I/O ASIC; each clock pair drives 2 DIMMs.

Memory data is protected by ECC (Error Correction Code). 8 ECC bits per DIMM protect 64 bits of data. The use of ECC allows correction of single-bit errors, and detection of multi-bit errors. Only DIMMs with ECC will be qualified or supported.

DIMMs

The memory subsystem will only support DDR SDRAM (Double Data Rate Synchronous Dynamic Random Access Memory) technology utilizing industry-standard PC-1600 type DDR SDRAM DIMMs, 1.2" tall. This is expected to be the standard height available at first release and is currently being used by high-volume products. The DIMMs use a 184-pin JEDEC standard connector.

DIMMs are loaded in groups of four, known as a rank (except for 256MB DIMMs, which can be loaded in pairs). All four DIMMs in a rank must be the same size. The following table summarizes the memory solutions

Memory Array Capacities

Min / Max Memory SizeSingle DIMM SizeDDR SDRAM Count, Type and Technology

- 0.5GB / 3GB256MB DIMM18 x 32Mb x 4 DDR SDRAMs (128Mb)
- 2GB / 8GB512MB DIMM36 x 32Mb x 4 DDR SDRAMs (128Mb)
- 4GB / 12GB1024MB DIMM36 x 64Mb x 4 DDR SDRAMs (256Mb)
- 8GB / 24GB 2048MB DIMM36 x 128Mb x 4 DDR SDRAMs (512Mb)

Chip Spare Functionality

Chip spare enables an entire DDR SDRAM chip on a DIMM to be bypassed in the event that a multi-bit error is detected on the DDR SDRAM. In order to use the chip spare functionality on your system, only DIMMs built with ×4 DDR SDRAM parts can be used, and these DIMMs must be loaded in quads

The memory subsystem design supports the I/O ASIC chip's spare functionality. Chip spare enables an entire SDRAM chip on a DIMM to be bypassed/replaced in the event that a multi-bit error is detected on that SDRAM. In order to use the chip spare functionality on, only DIMMs built with x4 SDRAM parts can be used, and these DIMMs must we loaded in quads (2 DIMMs per memory cell, loaded in the same location in each memory cell). Each DIMM within a quad must be identical to all the other DIMMs in the quad

Using the DIMM loading order figure from above, chip spare can be achieved if 4 identical DIMMs are loaded in the slots labeled "1st" and "2nd." If more DIMMs are added, they must be loaded in quads in order to maintain the chip spare functionality. So, if more DIMMs are added in to the example case, 4 identical DIMMs (identical to each other, but can be different from the original quad that was loaded) must be loaded in the slots labeled "3rd" and "4th."

Serial Presence Detect

Each DIMM contains an I2C EEPROM whose content describes the module's characteristics: speed, techno, revision, vendor, etc. This feature is called serial presence detect (SPD). Firmware typically uses this information to detect unmatched pairs of DIMMs, and configure certain memory subsystem parameters. The SPD information for DIMMs loaded in the system will also be accessible to the baseboard management controller (BMC) through the I2C bus.

I/O Bus Interface

The I/O bus interface provides these features:

- Provides industry standard AGP 1× and 2× support for legacy graphics, and AGP 4× for current high performance graphics
- Provides industry standard PCI 33MHz and 66MHz, PCI-X 66MHz to 133MHz, 32 or 64 data bit support
- Uses 3.3V PCI only, and it does not support 5V PCI
- Optimizes for DMA performance

- Supports AGP fast writes (only to addresses less than 4 GB)
- Supports 3.3V or universal-keyed PCI cards. 5V-keyed PCI cards are not supported
- Uses peer-to-peer (P2P) subset that is required by the AGP specification (write-only, PCI cycles)
- Supports up to four PCI sockets

Processor Dependent Hardware (PDH) Controller

The processor dependent hardware controller (PDH) provides these features:

- 16-bit PDH bus with reserved address space for
  - Flash memory
  - Nonvolatile memory
  - Scratch RAM
  - Real Time Clock
  - UARTs
  - External Registers
  - Firmware read/writable registers
  - Two general purpose 32-bit registers
  - Semaphore registers
  - Monarch selection registers
  - Test and Reset register
- Reset and INIT generation

Dual Serial Controller

The dual serial controller is a dual universal asynchronous receiver and transmitter (DUART). This chip provides enhanced UART functions with 16-byte FIFOs, a modem control interface. Registers on this chip provide onboard error indications and operation status. An internal loopback capability provides onboard diagnostics.

Features include:

- Data rates up to 115.2kbps
- 16550A fully compatible controller
- A 16-byte transmit FIFO to reduce the bandwidth requirement of the external CPU
- A 16-byte receive FIFO with four selectable interrupt trigger levels and error flags to reduce the bandwidth requirement of the external CPU
- UART control that provides independent transmit and receive
- Modem control signals (-CTS, -RTS, -DSR, -DTR, -RI, -CD, and software controllable line break)
- Programmable character lengths (5, 6, 7, 8) with even, odd or no parity
- A status report register

Field Programmable Gate Array (FGPA)

The field programmable gate array (FPGA) provides ACPI and LPC support for the PDH bus and provides these features:

- ACPI 2.0 interface
- LPC bus interface to support BMC
- Decoding logic for PDH devices

Baseboard Management Controller (BMC)

The baseboard management controller supports the industry-standard Intelligent Platform Management Interface (IPMI) specification. This specification describes the management features that have been built into the system board. These features include: diagnostics (both local and remote) console support, configuration management, hardware management and troubleshooting

The baseboard management controller provides the following

- Compliance with Intelligent Platform Management Interface 1.0
- Tachometer inputs for fan speed monitoring
- Pulse width modulator outputs for fan speed control
- Push-button inputs for front panel buttons and switches
- One serial port, multiplexed with the system console port
- Remote access and intelligent chassis management bus (IC MB) support
- Three I^2C master/slave ports (one the ports is used for IPMB
- Low pin count (LPC) bus provides access to three keyboard controller style (KCS) and one-block transfer (BT) interface
- 32-bit ARM7 RISC processor
- 160-pin low profile flat pack (LQFP) package
- Firmware is provided for the following interfaces:
  - — Intelligent platform management interface (IPMI)
  - — Intelligent platform management bus (IPMB)

SCSI Controller

The SCSI controller is an LSI Logic 53C1030 chip. This chip is fully compliant with the SCSI Peripheral Interface-4 Specification (SPI-4). It has two independent SCSI channels supporting devices at speeds up to 320 MB/sec each. The 53C1030 adheres to the PCI-X addendum to the PCI Local Specification and is hard-wired to PCI ID 1 which corresponds to bit 17 of the PCI AD bus.

IDE Interface

The IDE controller (PCI649) supports the ATAPI zero (0) to five (5) modes (from 16 to 100 MB/s). The usable speed on this system is limited to 16MHz (ATA-33 mode, 33 MB/s) because the slimline CD/DVD devices do not support the ATA-66 and 100 modes.

The primary IDE channel is the only channel that is implemented. The IDE cable provides only one drive connector, of the Master type, for the optical storage peripheral.

10/100 BT Standard/Management LAN

The 10/100 LAN port provides:

- Basic remote manageability features on the core system.
- A management LAN interface for operating system level manageability applications.
- The LAN controller is an Intel® 82550 chip.
- Power-On-LAN is an additional feature that the LAN controller provides. Power-On-LAN allows you the ability to power up a system remotely through the LAN by sending special LAN packets to the system to be powered on.

1Gb System LAN

The 1Gb System LAN port provides:

- Main system LAN
- 10/100/1000 Mb capable

USB Connectors

The USB connectors provide:

- High speed 480 Mb/sec. capable
- Full speed 12 Mb/sec. and low speed 1.5 Mb/sec
- Support for USB keyboard and mouse:
- HP-UX supports HP USB keyboard and mouse