hp 9000 rp3410 and rp3440 Maintenance Guide

Regulatory Model Number: FCLSA-0201

Version 2.0

Manufacturing Part Number: rp3410_rp3440_maint
June 2004

U.S.A.

Legal Notices

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

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

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

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

Contents

Contents

Figures

Figures

Figures

1 About This Document

This document describes how to 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.

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

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

NOTE Additional information about the hp 9000 rp3410 or rp3440 Server is provided in the associated User Guides. These guides are available on the *HP Server Documentation CD-ROM* and online at http://docs.hp.com.

What's in This Document

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

- **Chapter 2, "Troubleshooting."** Use this chapter to learn how to perform minimal troubleshooting of your system
- **Chapter 3, "Removing and Replacing Components."** Use this chapter to learn how to remove and replace all Field Replaceable Units (FRUs) in your system
- **Appendix A, "Parts Information."** Use this appendix to identify FRU part numbers
- **Appendix B, "System 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*, *Installation,* and *Operations* guides, which contain in-depth installation and troubleshooting information.

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

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

2 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.

Using the Front Panel Power Button

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

Table 2-1 Power Button Functions

System State	Switch Pressed Time	Result
Power connected to power supplies—system power off	1 second or less	System power on
	More than 1 second	No effect
System at ISL	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown
System at BCH	Less than 1 second	Hard shutdown
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown
Power on—OS shut down	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown
OS running	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown

Operating System Will Boot

If your operating system is running and you are experiencing problems, use the following online tools to help solve your problem:

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

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

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 refer to the Utilities chapter of the *hp 9000 rp3410 and rp3440 Operations Guide*.

System Event Logs (SEL)

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 tool 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 the ODE from your *Support Plus CD*, perform the following steps:

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

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

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

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

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

```
p3
```

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

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

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

The following commands are available at the ODE prompt:

Table 2-2 ODE Commands

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

Disk and I/O Path Logging

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

Table 2-3 Internal Disk and DVD Paths

Slot	Path
Slot 2 (top)	0/1/1/1.2
Slot 1 (middle)	0/1/1/0.1
Slot 0 (bottom)	0/1/1/0.0
DVD	0/0/2/0.0

Table 2-4 Extended Core I/O Paths

Function	Path
Console Port	0/7/1/1.0
Remote Port	0/7/1/1.2
UPS Port	0/7/1/0.0
VGA Port	0/7/2/0 (disabled)

Table 2-5 PCI I/O Paths

I/O Slot	Path
Slot 1	0/4
Slot 2	0/3
Slot 3	0/2 (Active for rp3440 only)
Slot 4	0/6 (Active for rp3440 only)

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

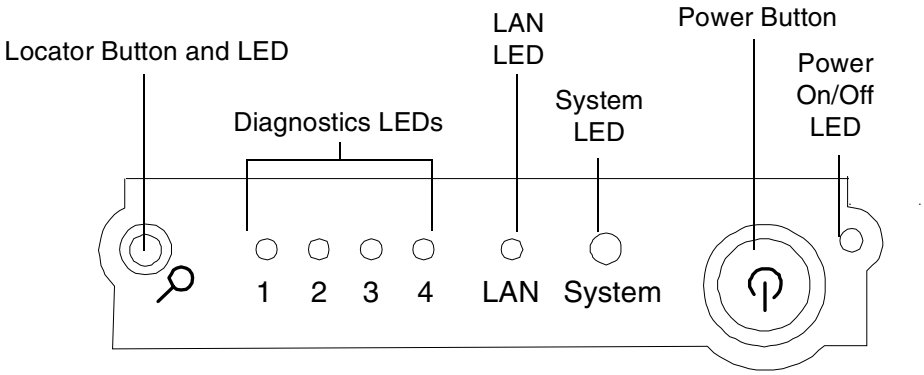
Troubleshooting Using LEDs

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 28).

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 2-1 Control Panel LEDs



Power and System LEDs

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

Table 2-6 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

Table 2-6 System LED States (Continued)

System LED	State
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 2-7 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 2-8 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

Table 2-9 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 the *hp9000 rp3410 and rp3440 Installation Guide*
Flashing Yellow	Red	Off	Green	Green	Memory thermal load order	Review the information on installing memory in the *hp9000 rp3410 and rp3440 Installation Guide*

Table 2-9 Memory Warnings (Continued)

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Green	Green	Green	Bad SPD information (can't detect type)	View the SEL for additional information

Table 2-10 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 2-11 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
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 2-12 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 2-13 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 2-14 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 2-15 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 2-16 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

Table 2-17 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 the *hp9000 rp3410 and rp3440 Installation Guide*
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 2-18 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

Table 2-19 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
Flashing Red	Green	Off	Red	Off	VRM undervoltage	View the SEL for additional information

Table 2-20 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

Table 2-20 Fan Faults (Continued)

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
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 2-21 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 2-22 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 2-23 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 2-24 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 2-25 10/100/1000 base-T Ethernet LAN Connector LEDs

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

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

Table 2-26 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
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 2-2 Location of the STBY, F/W and BMC LEDs

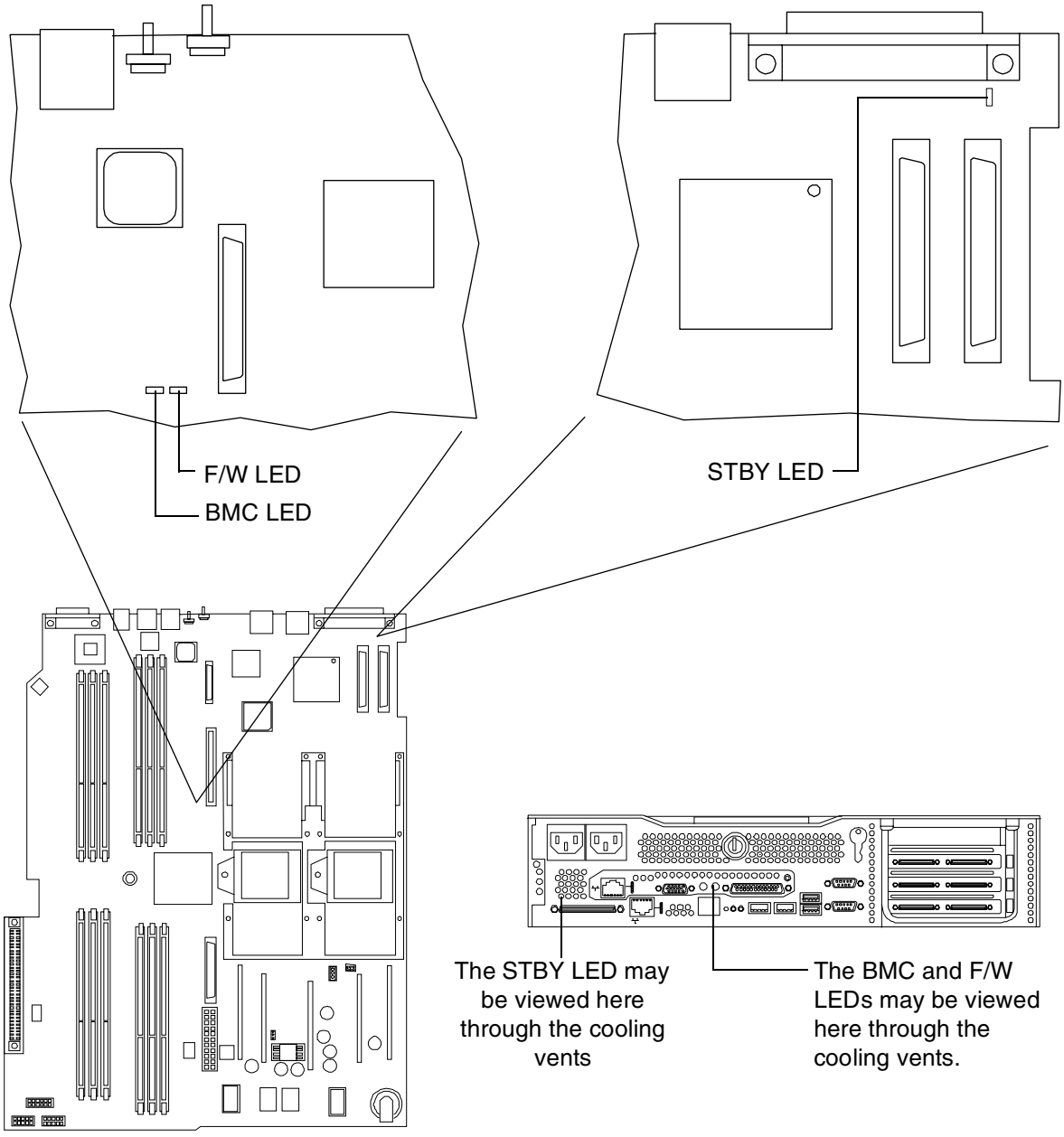


Table 2-27 System Board LEDs

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

The following table identifies 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 2-28 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.

3 Removing and Replacing Components

Safety Information

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

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

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

Service Tools Required

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

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

Location of Internal Components and Connectors

Figure 3-1 Internal Physical Layout

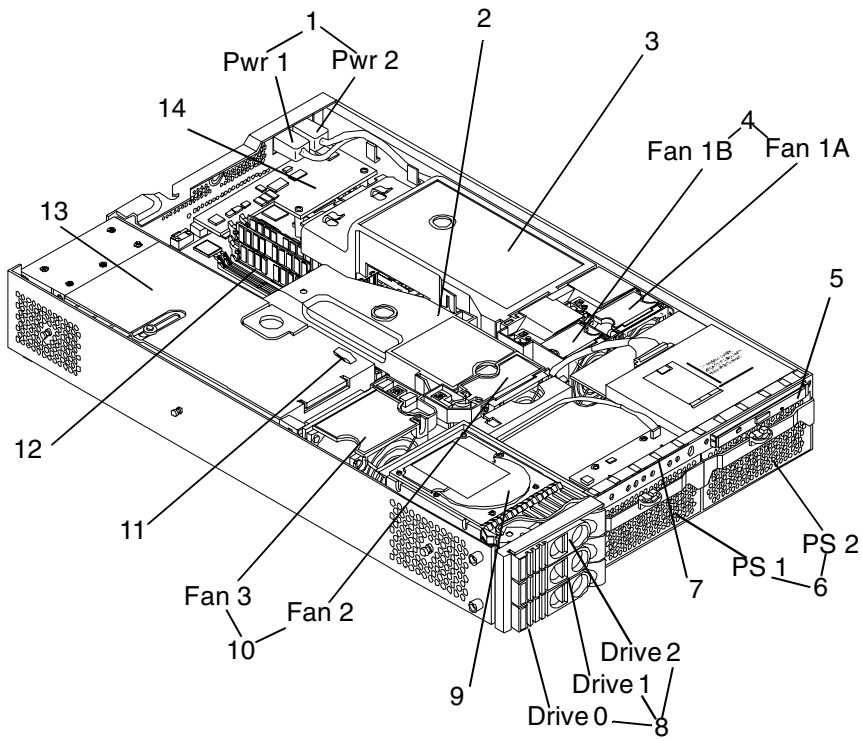


Table 3-1 Component Locations

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 3-2 System Board Connectors and Slots

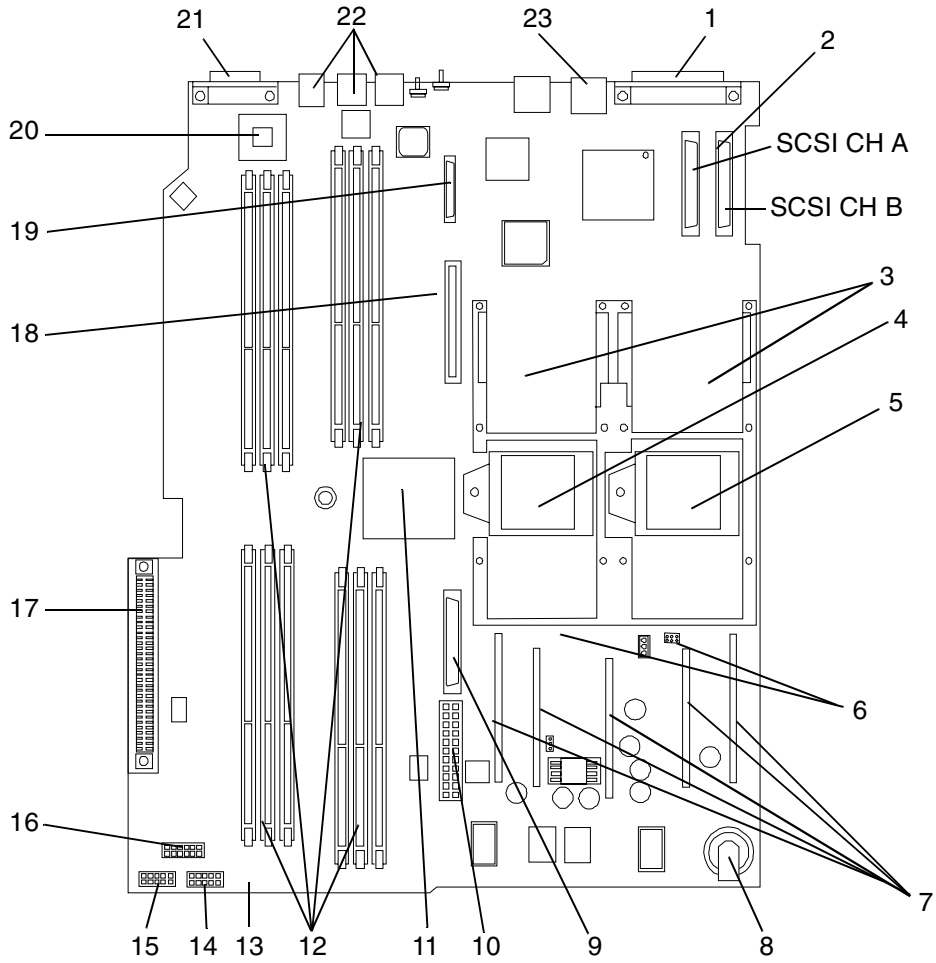


Table 3-2 Connector Locations

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 connector
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.

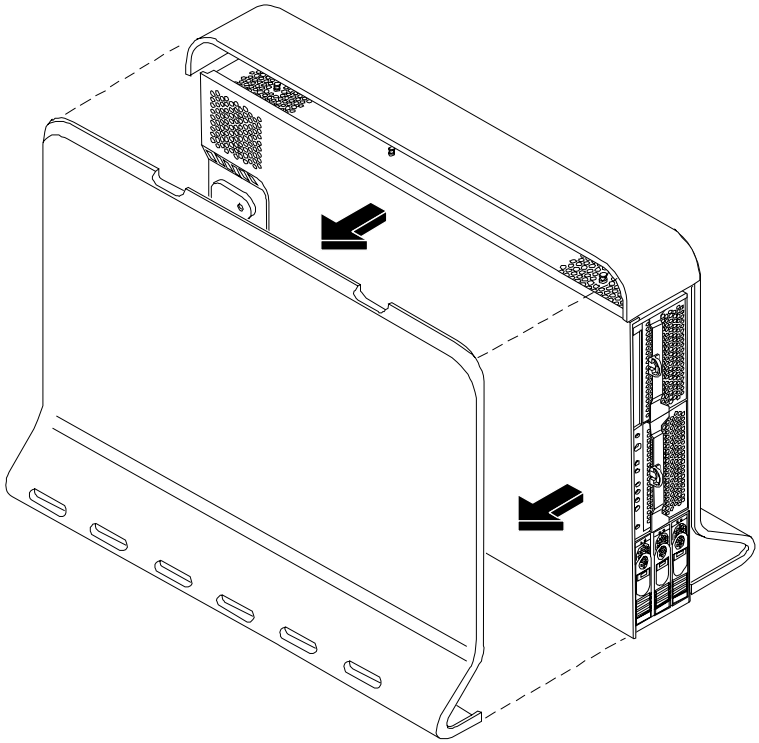
NOTE If you are removing only a hot-swappable system fan, you can leave the system on and the power cables connected.

Step 2. Remove the plastic cover.

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

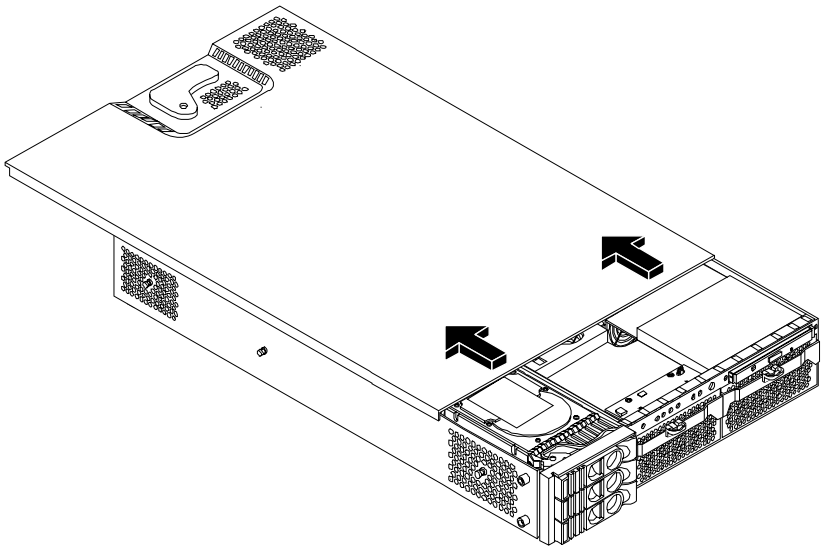
b. Lift the plastic cover off of the system chassis.

Figure 3-3Removing the Plastic Cover



Step 3. Remove the metal cover.

Figure 3-4Removing 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.

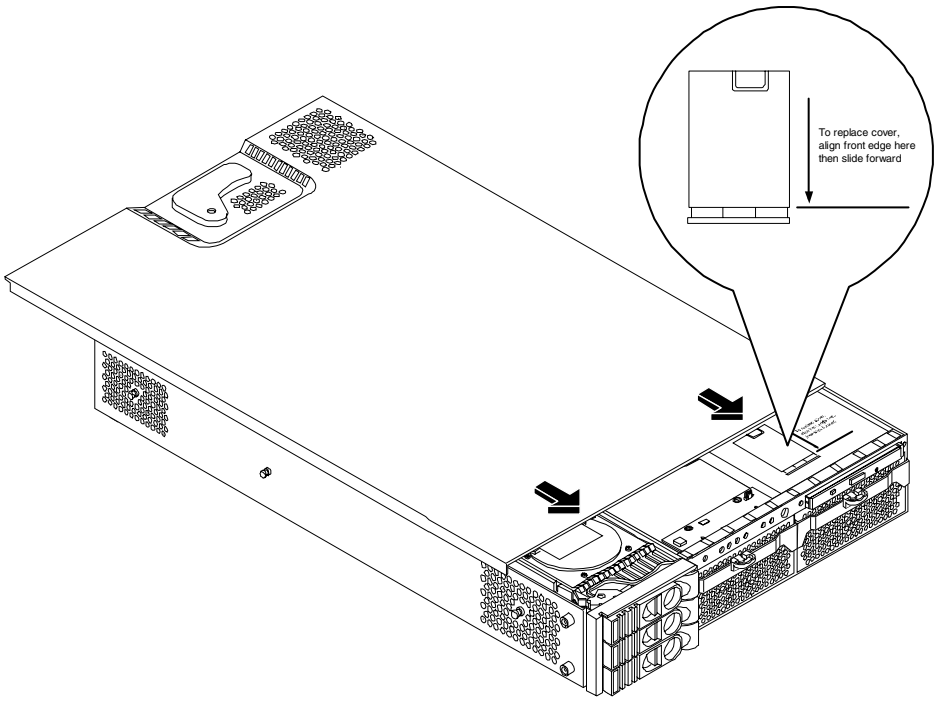
Replacing the Side Covers

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.

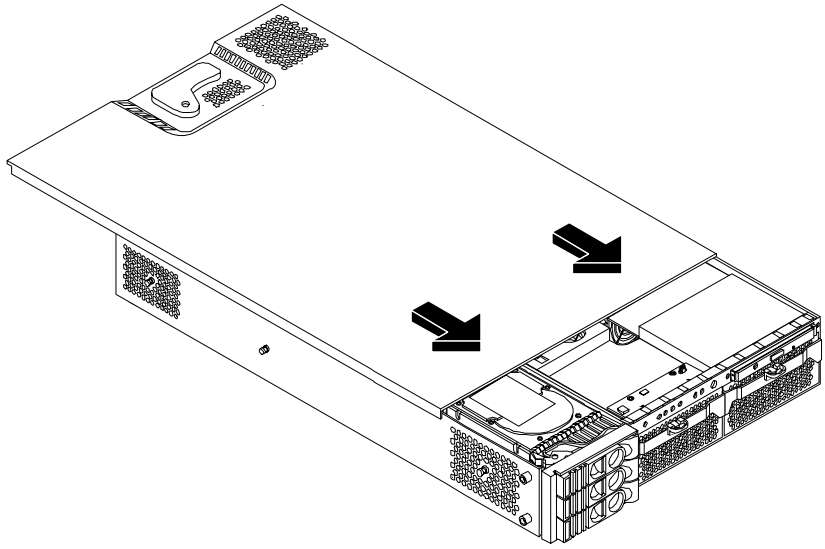
a. Align the front edge of the metal cover with the alignment mark on the optical drive bay.

Figure 3-5Metal 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 3-6Replacing the Metal Cover

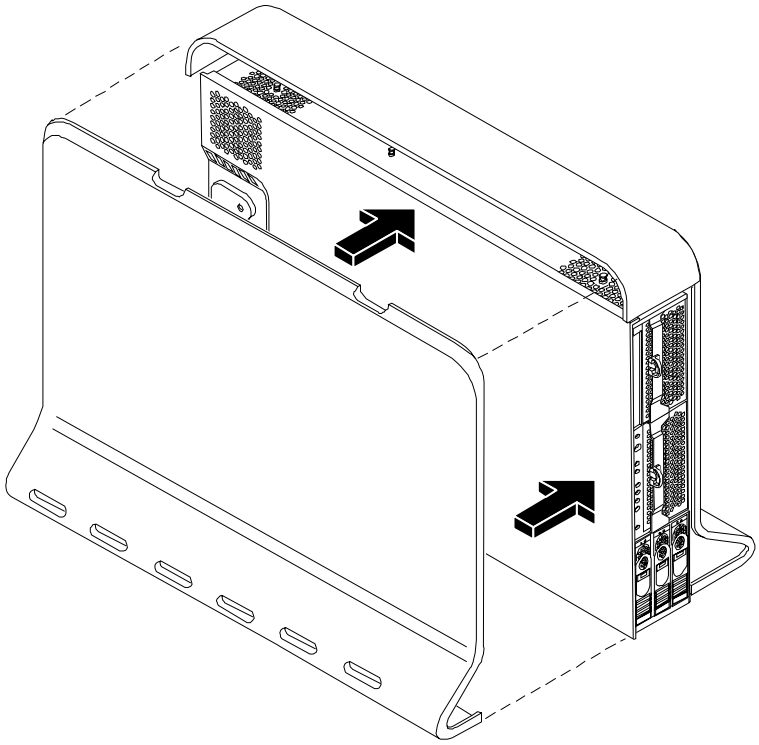


Step 2. Replace the plastic cover:

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.

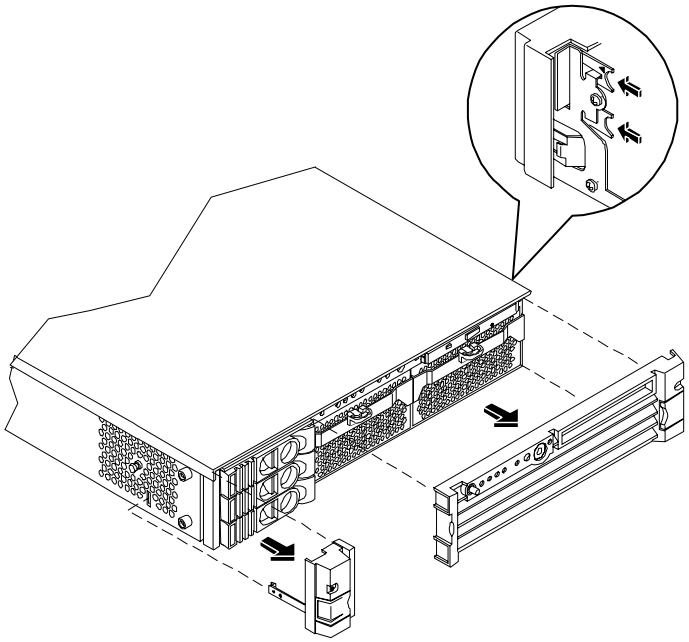
Figure 3-7Replacing the Plastic Cover



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 3-8 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.

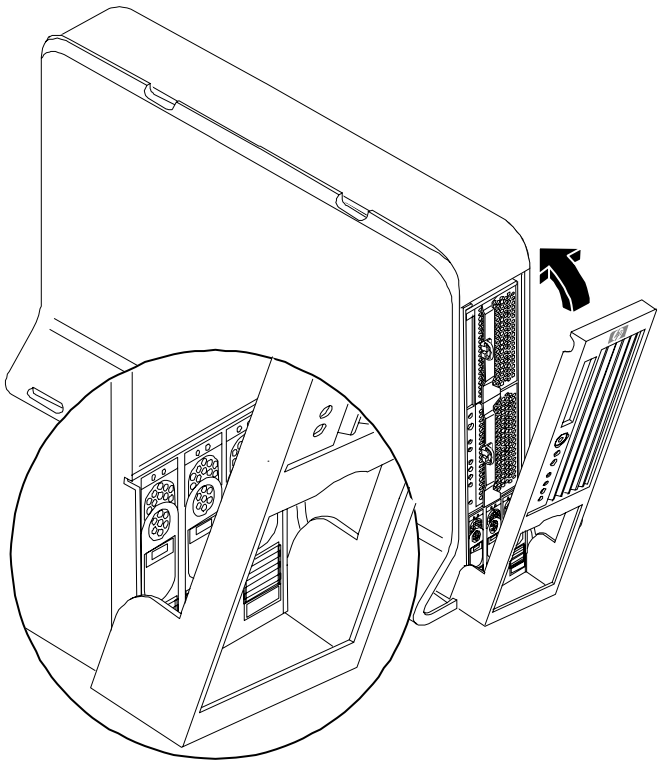
Replacing the Front Bezel

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 3-9 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

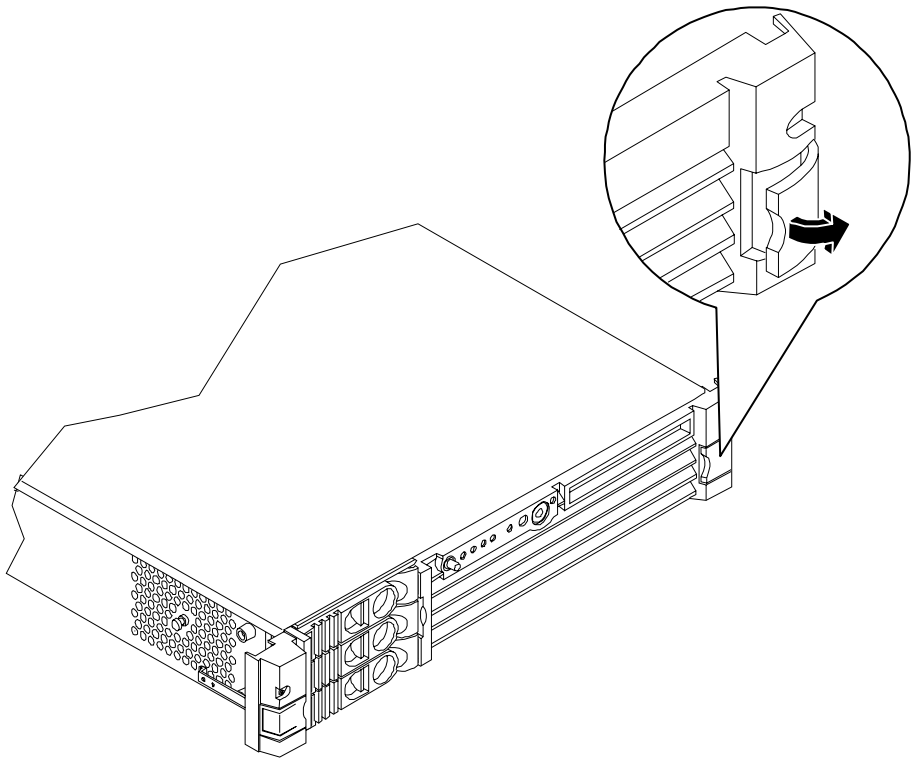
NOTE Ensure that there is enough area (approximately 1.5 meters [4.5 ft.]) to fully extend the server out the front and work on it.

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 3-10Release 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

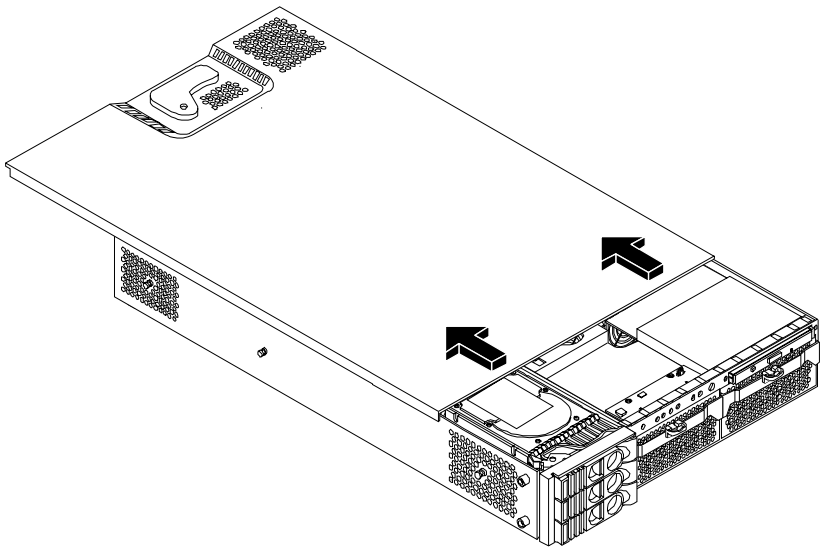
Removing the Metal Cover

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 3-11Removing and Replacing the Metal Cover



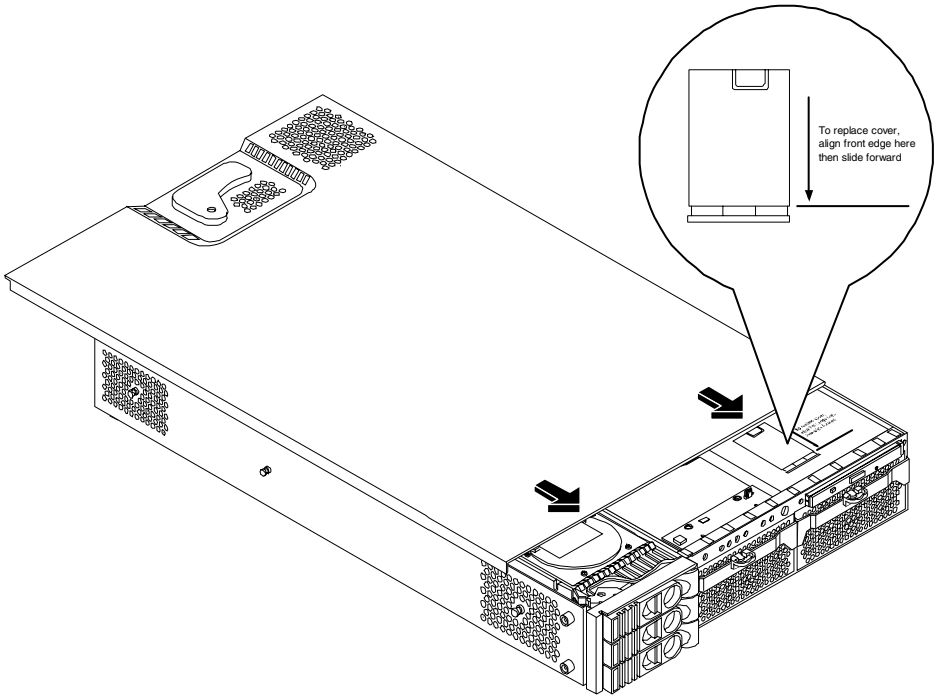
Step 3. Lift the cover off the system chassis.

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.

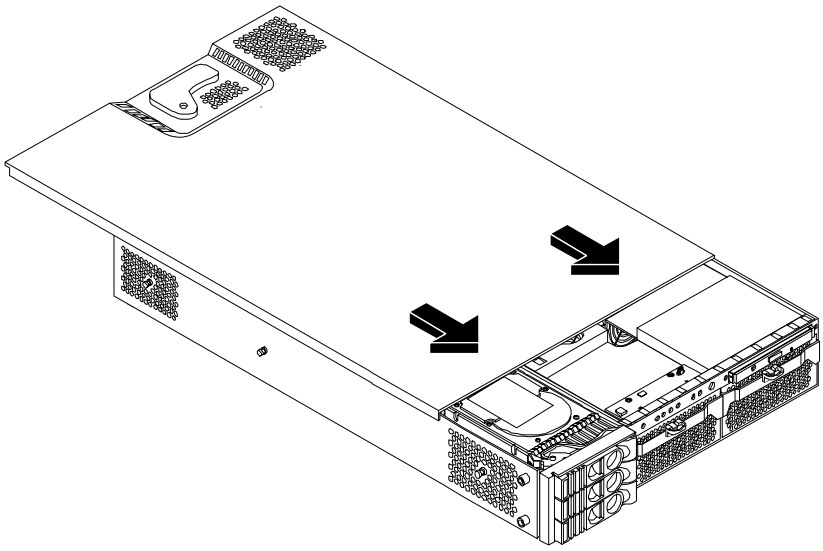
Step 1. Align the front edge of the cover with the alignment mark on the optical drive bay.

Figure 3-12Aligning 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 3-13Closing the Metal Cover



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

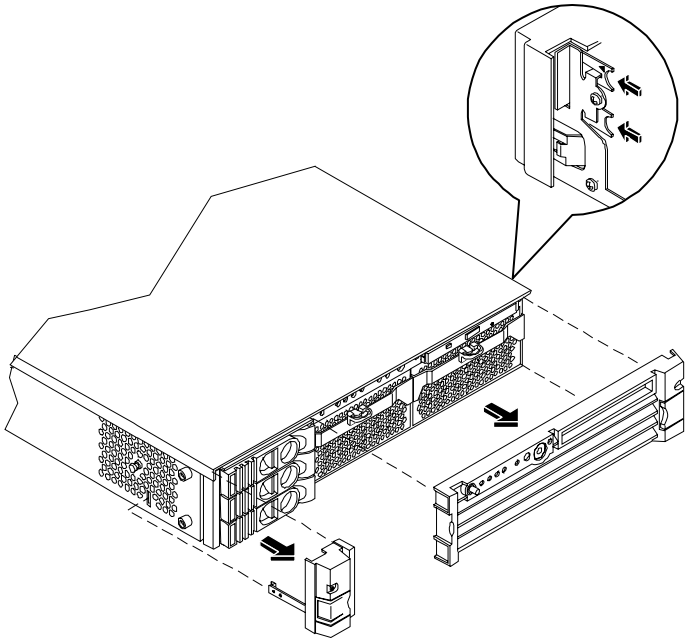
Removing and Replacing the Front Bezel

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 3-14Front Bezel Retaining Clip



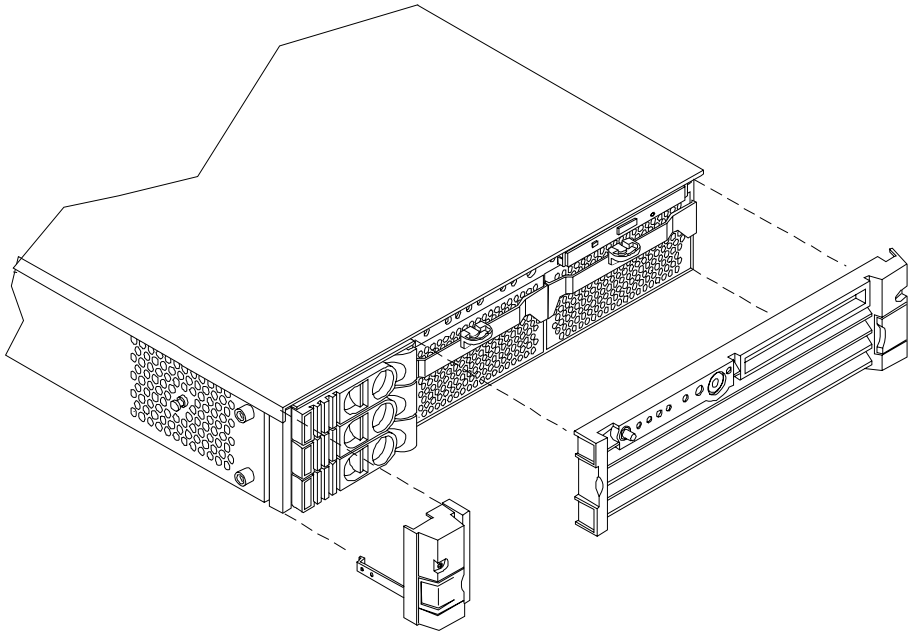
Step 2. Rotate the front panel outward and lift it off the system chassis.

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 3-15Replacing 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 3-16Fan 1A or Fan 1B Removal

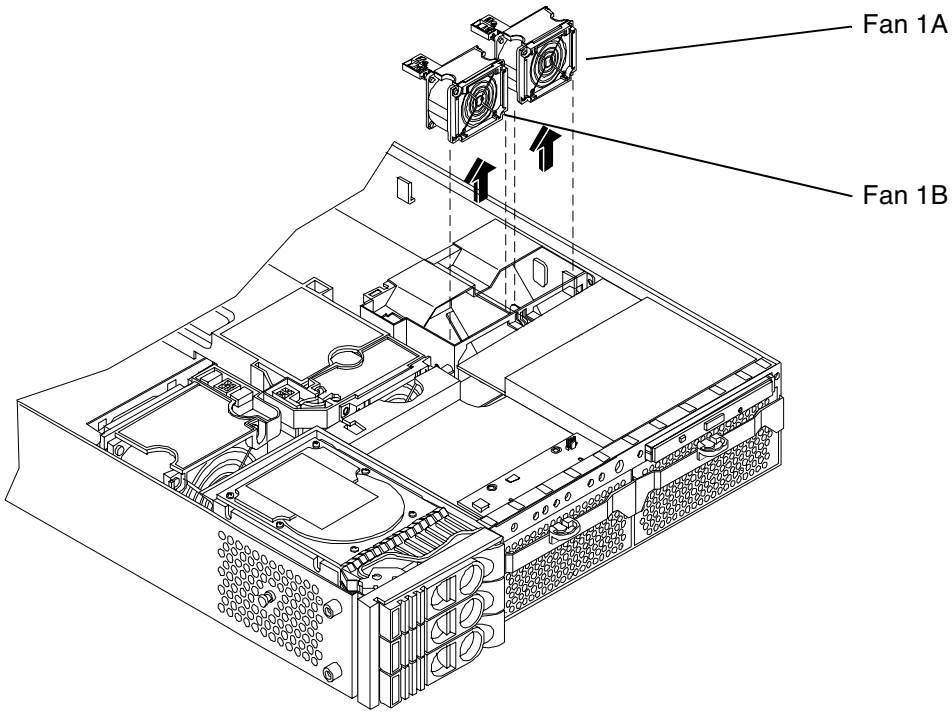


Figure 3-17Fan 2 Removal

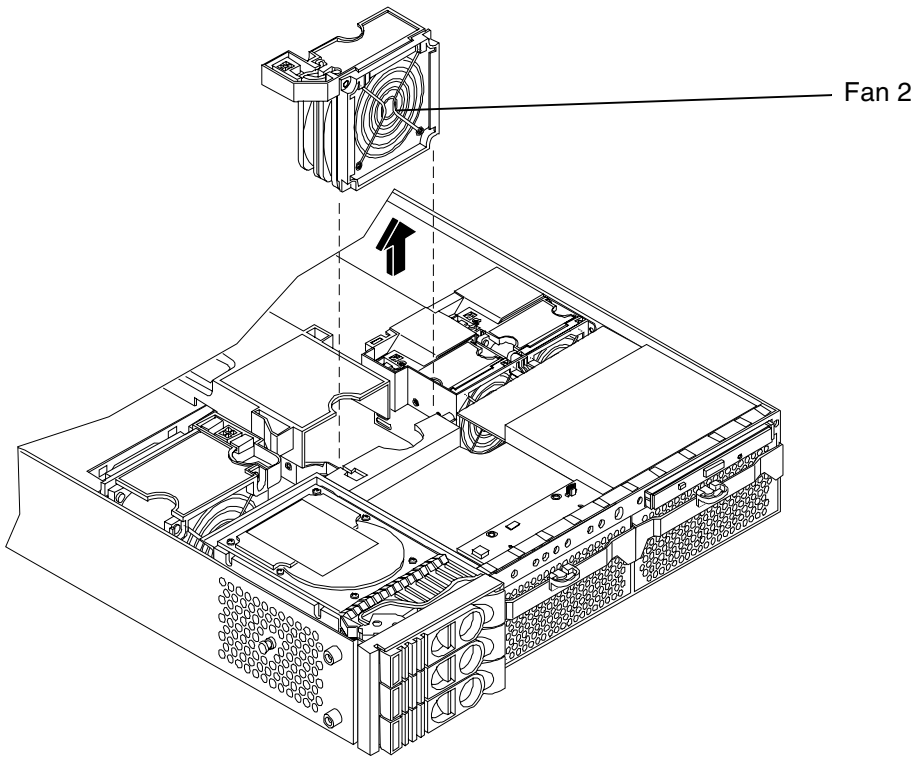
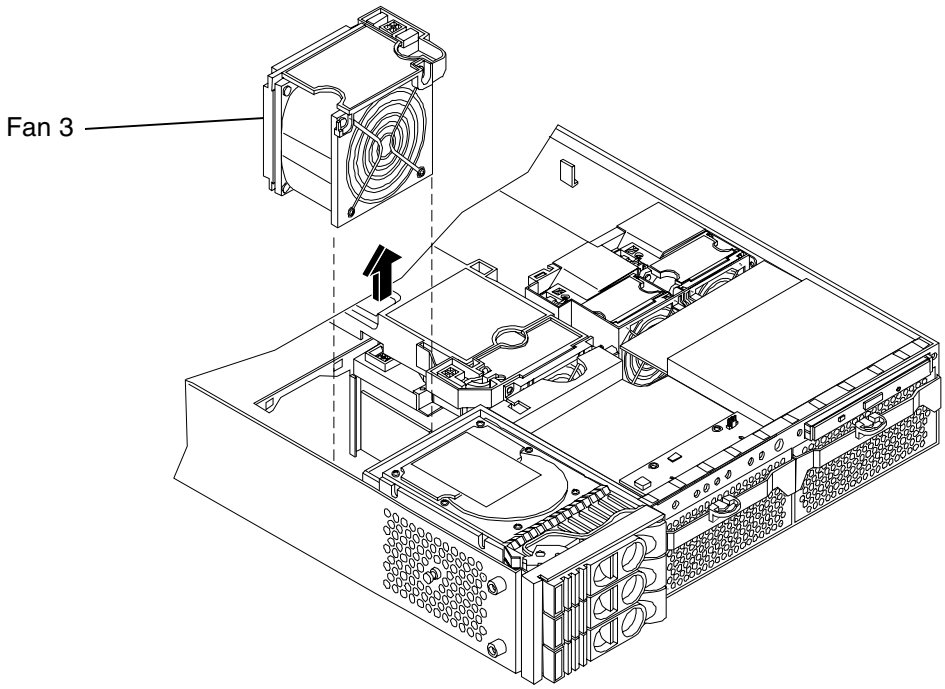


Figure 3-18Fan 3 Removal



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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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.

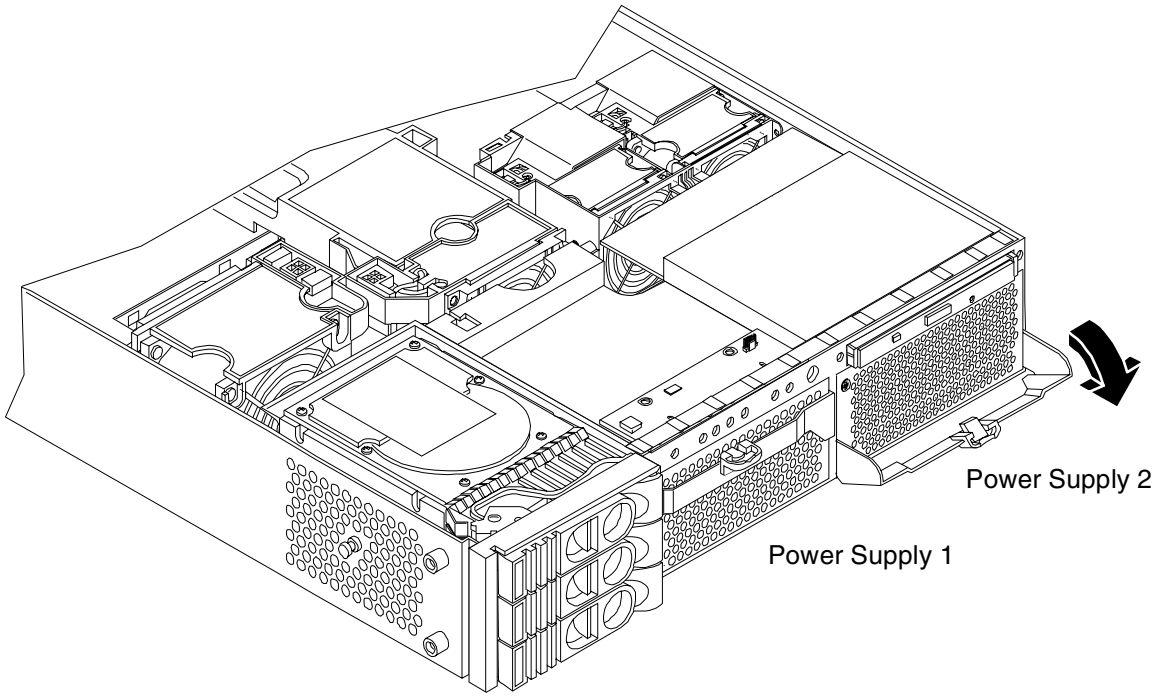
Removing the Power Supply

To remove the power supply, perform the following steps:

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

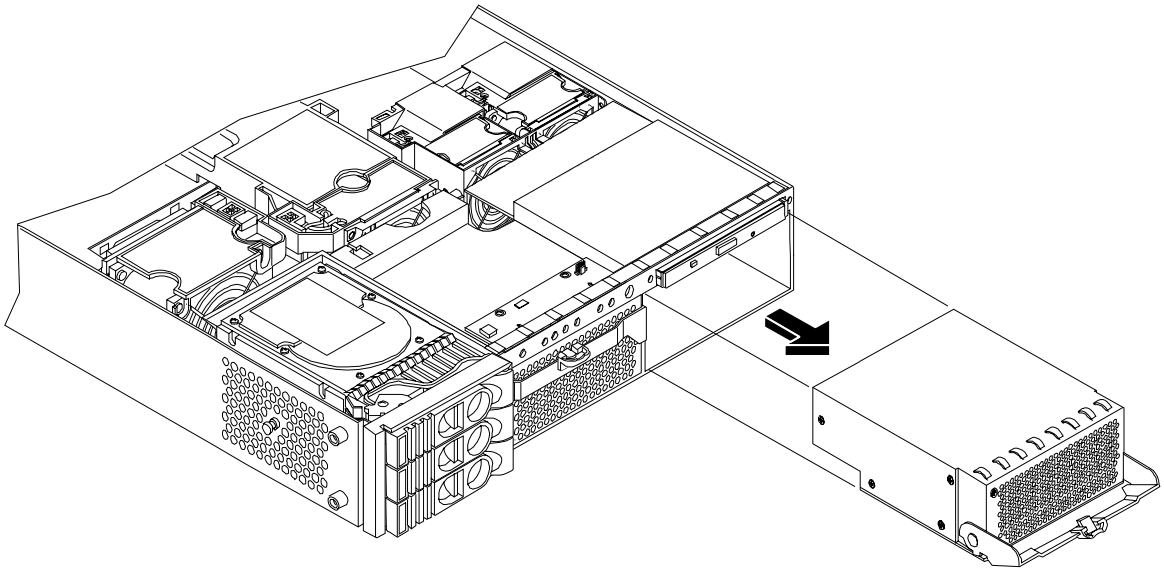
Step 2. Press the power supply retaining clip to unlatch the power supply release lever.

Figure 3-19Releasing the Power Supply Retaining Clip



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

Figure 3-20Removing the Power Supply



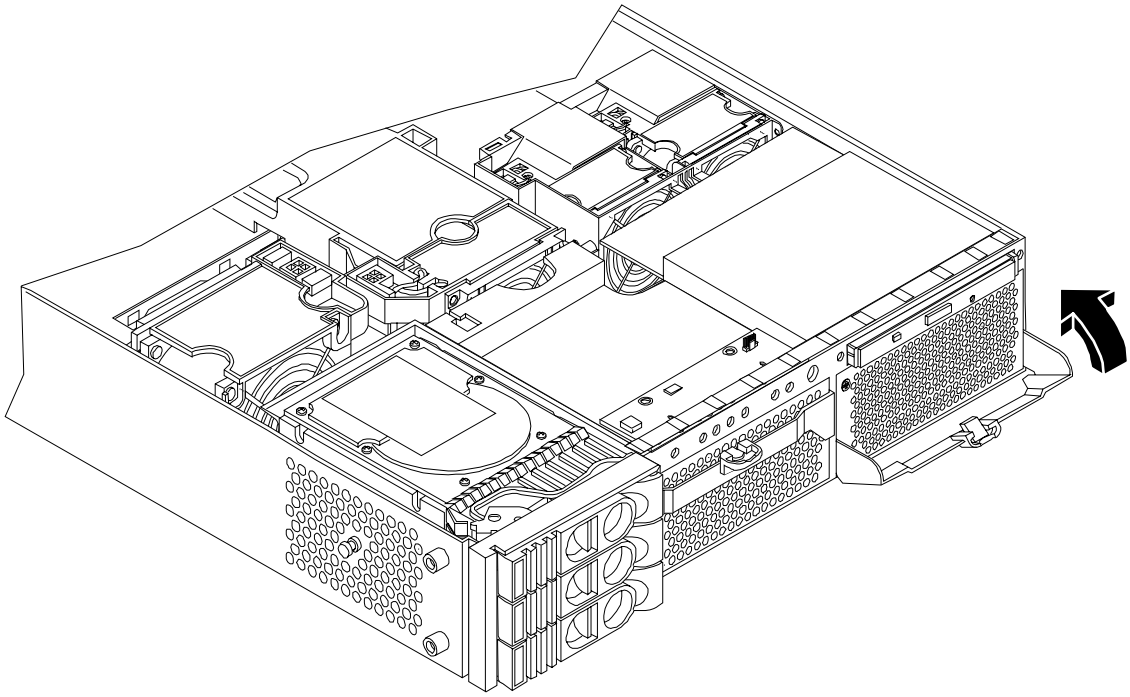
Replacing the Power Supply

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 3-21Replacing 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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:

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

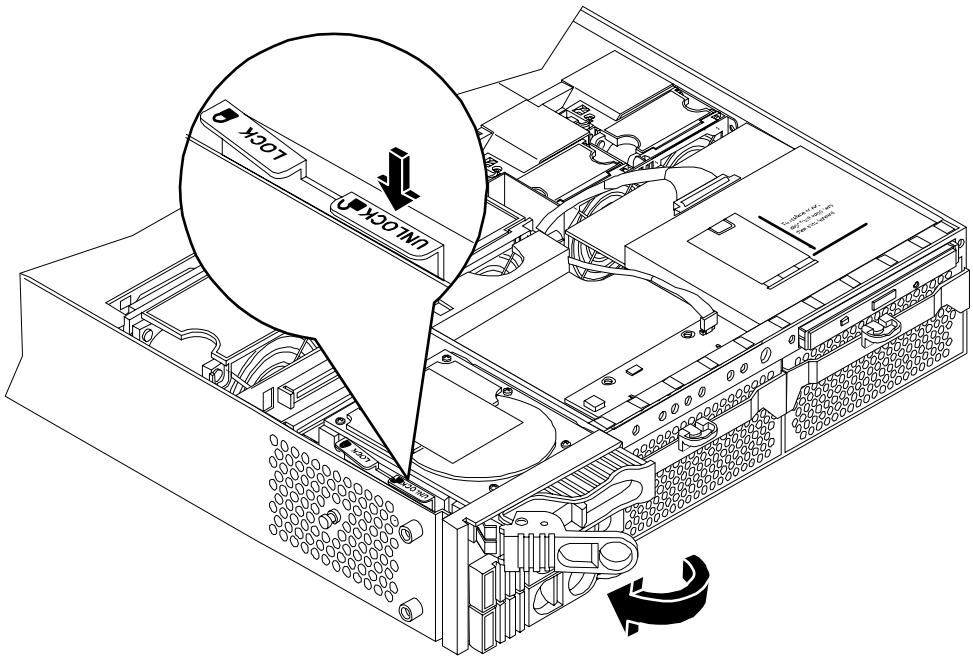
Step 2. If you have locked your hard drives, you must unlock them before removing or replacing a drive:

a. Remove the cover(s).

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

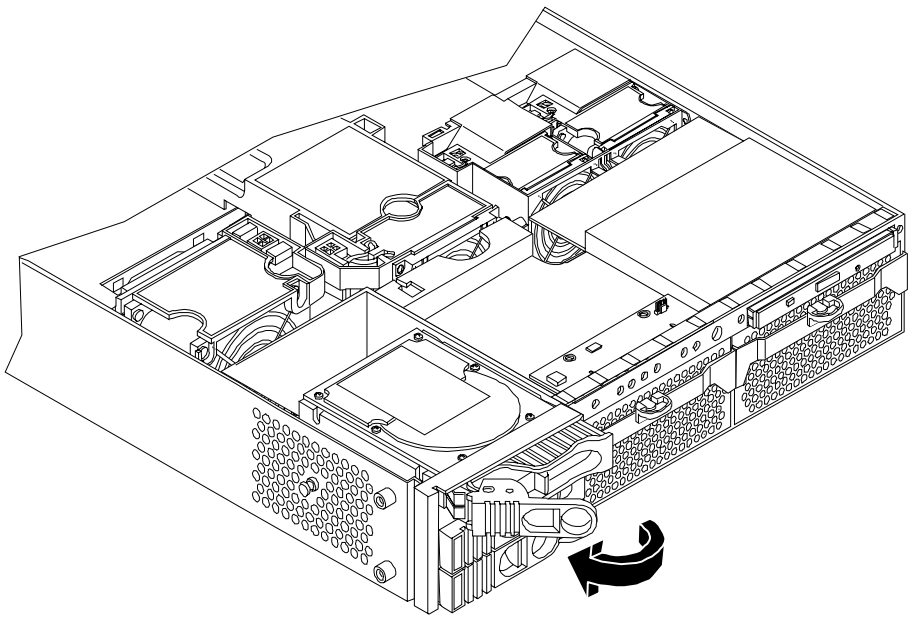
CAUTION If you try to remove a hard disk drive without unlocking it from the system, you will damage the hard drive bay.

Figure 3-22Unlocking the Disk Drive



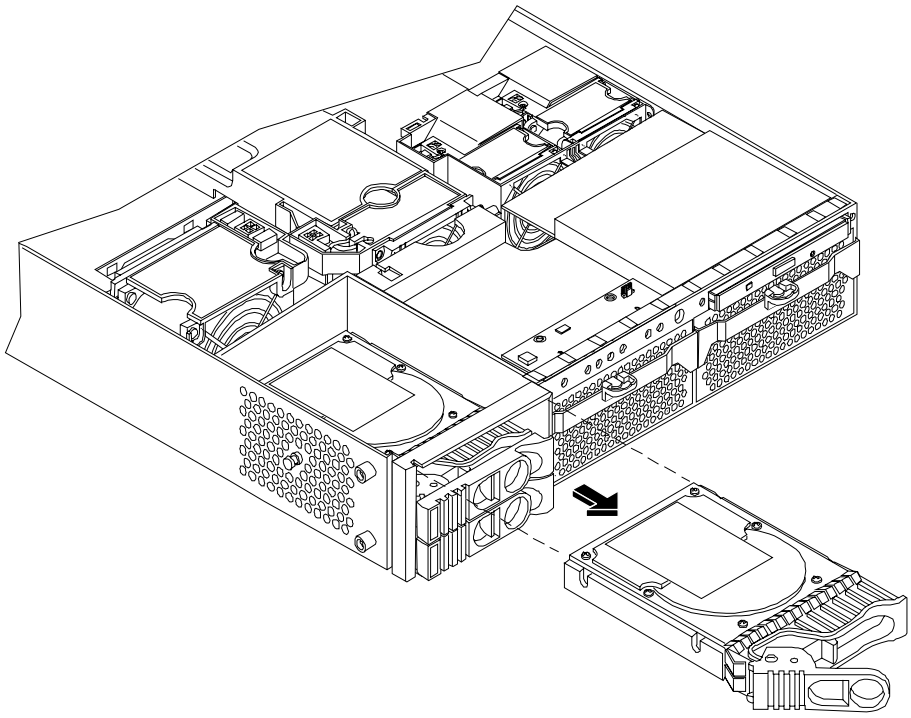
Step 3. Squeeze inward on the colored release clip on the hard drive release lever.

Figure 3-23Releasing the Disk Drive



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

Figure 3-24Removing the Disk Drive



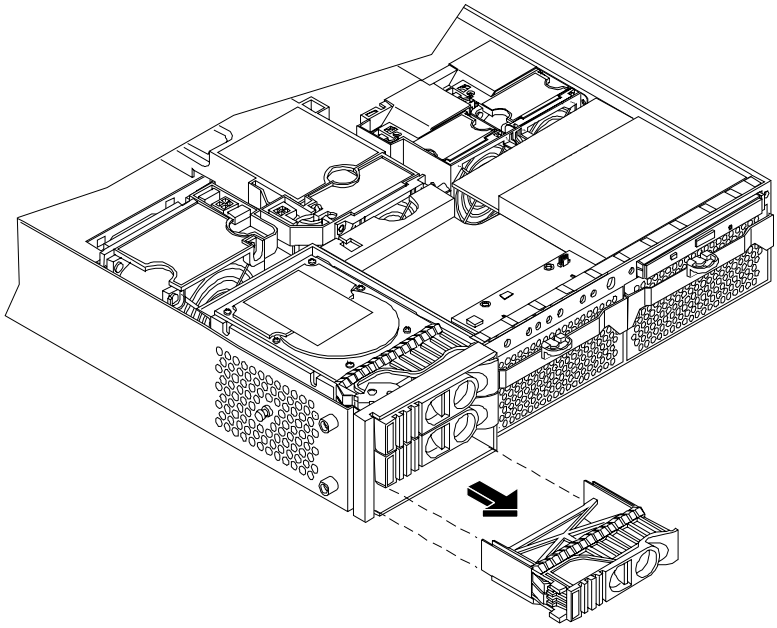
Replacing a Hard Disk Drive

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. Refer to your OS documentation for instructions on preparing the OS for removing and inserting hard drives.

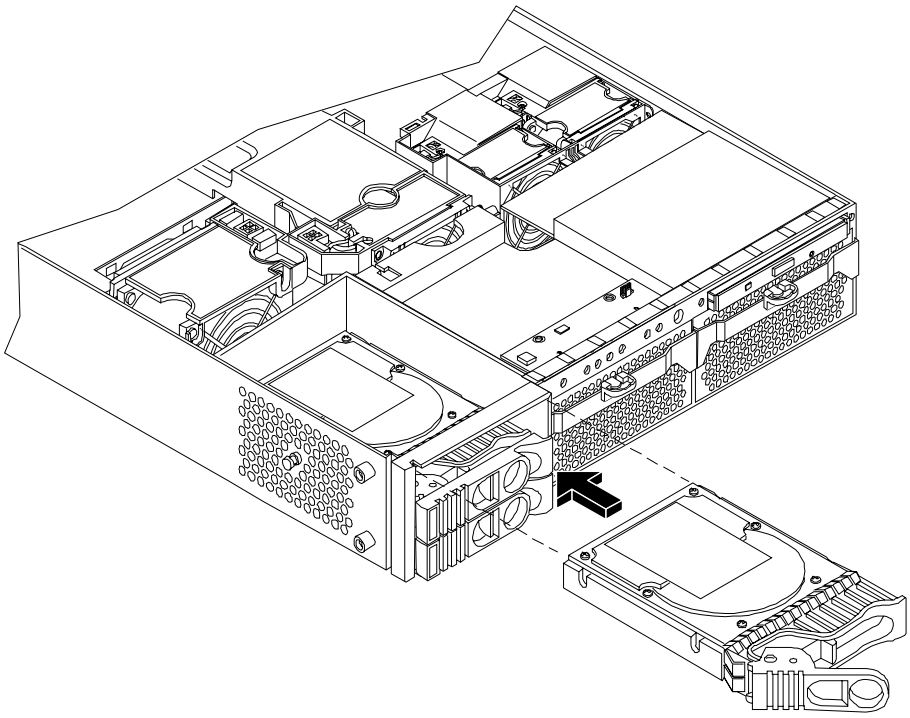
Step 2. Insert the hard disk drive into the drive bay from which you removed the drive and push inward on the release lever until the drive no longer slides forward. You must leave the release lever in the open position, as shown, when you push the drive into the system.

Figure 3-25Removing 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 3-26Hard 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- Use the MP commands to verify operation
- Use the BCH commands to verify operation
- Use diagnostics provided by the ODE to exercise the newly installed module

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:

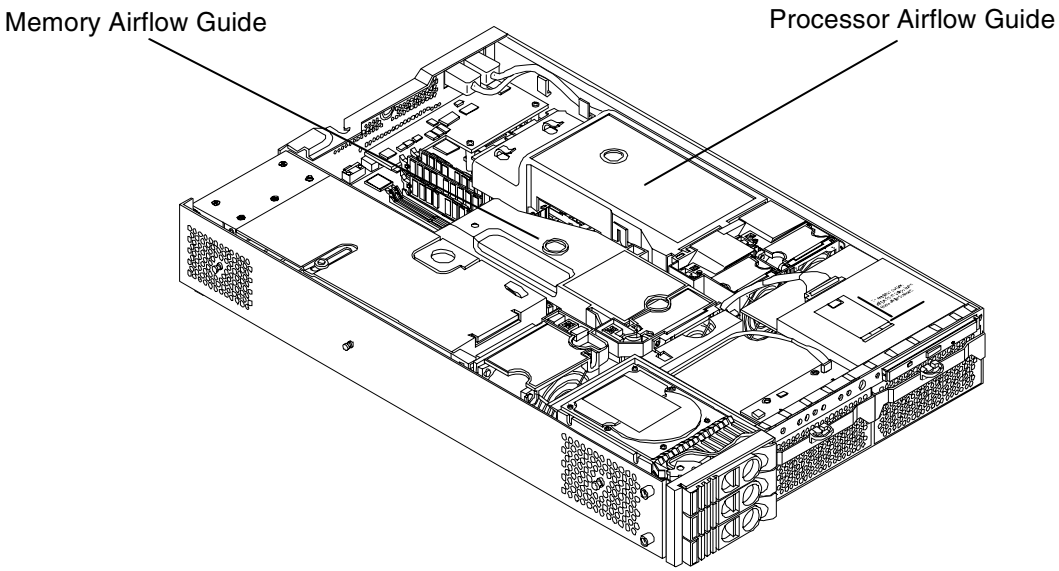
  - If it is damaged to the point that airflow across the processor module(s) is restricted
  - To access components under the airflow guide
- The memory airflow guide ensures that the proper volume of air flows over the memory DIMMs to cool them

  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 3-27 Airflow Guides Locations



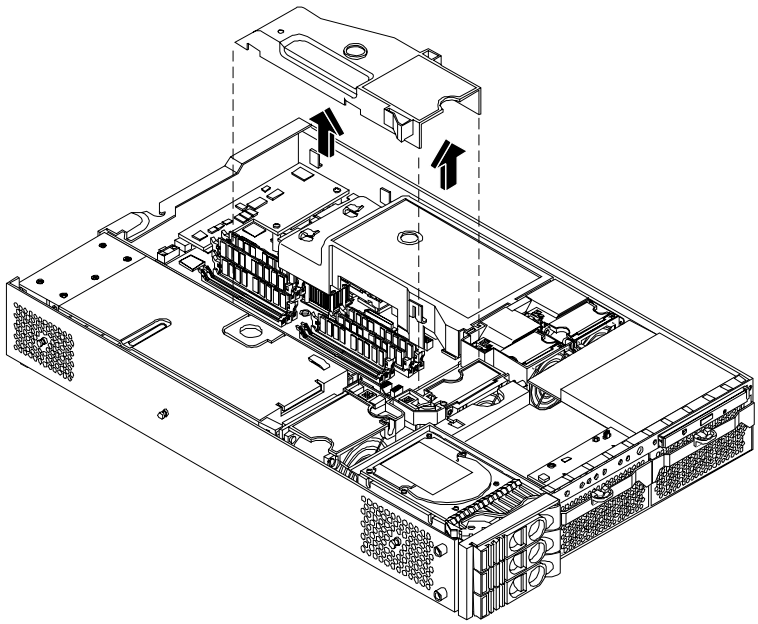
Removing and Replacing the Memory Airflow Guide

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 3-28Removing 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).

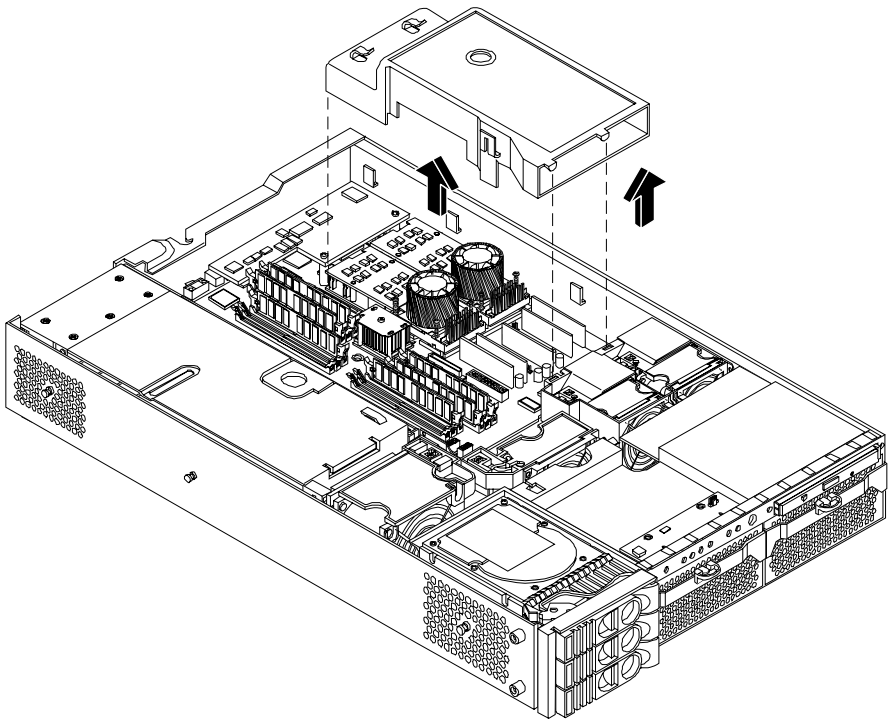
Step 2. Remove the IDE cable and power module cables from the processor airflow guide cable clips.

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 3-29Removing the Processor Airflow Guide

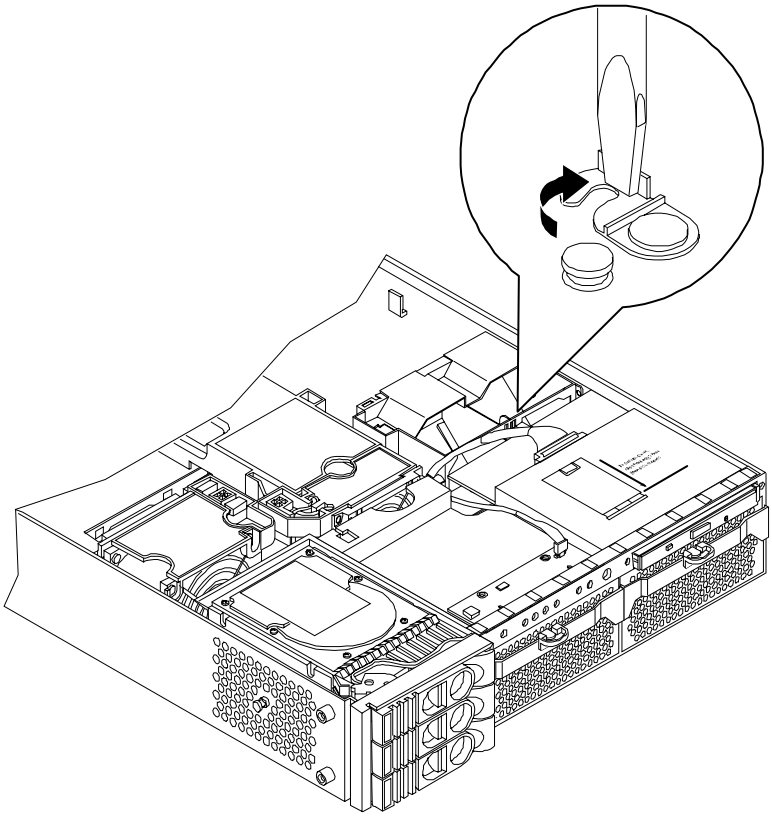


Step 4. Remove the front portion of the airflow guide:

a. Remove system fans 1A and 1B.

b. Rotate the clip clockwise to release the latch.

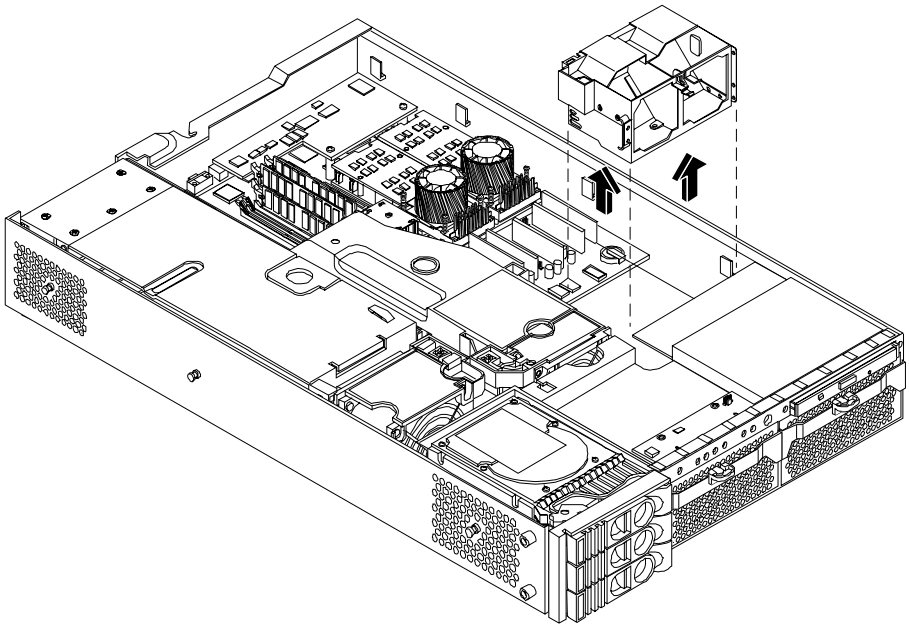
Figure 3-30Open the Release Clip



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 3-31Remove 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 up to 6 GB (hp9000 rp 3410) or up to 24 GB (hp9000 rp3440).

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.

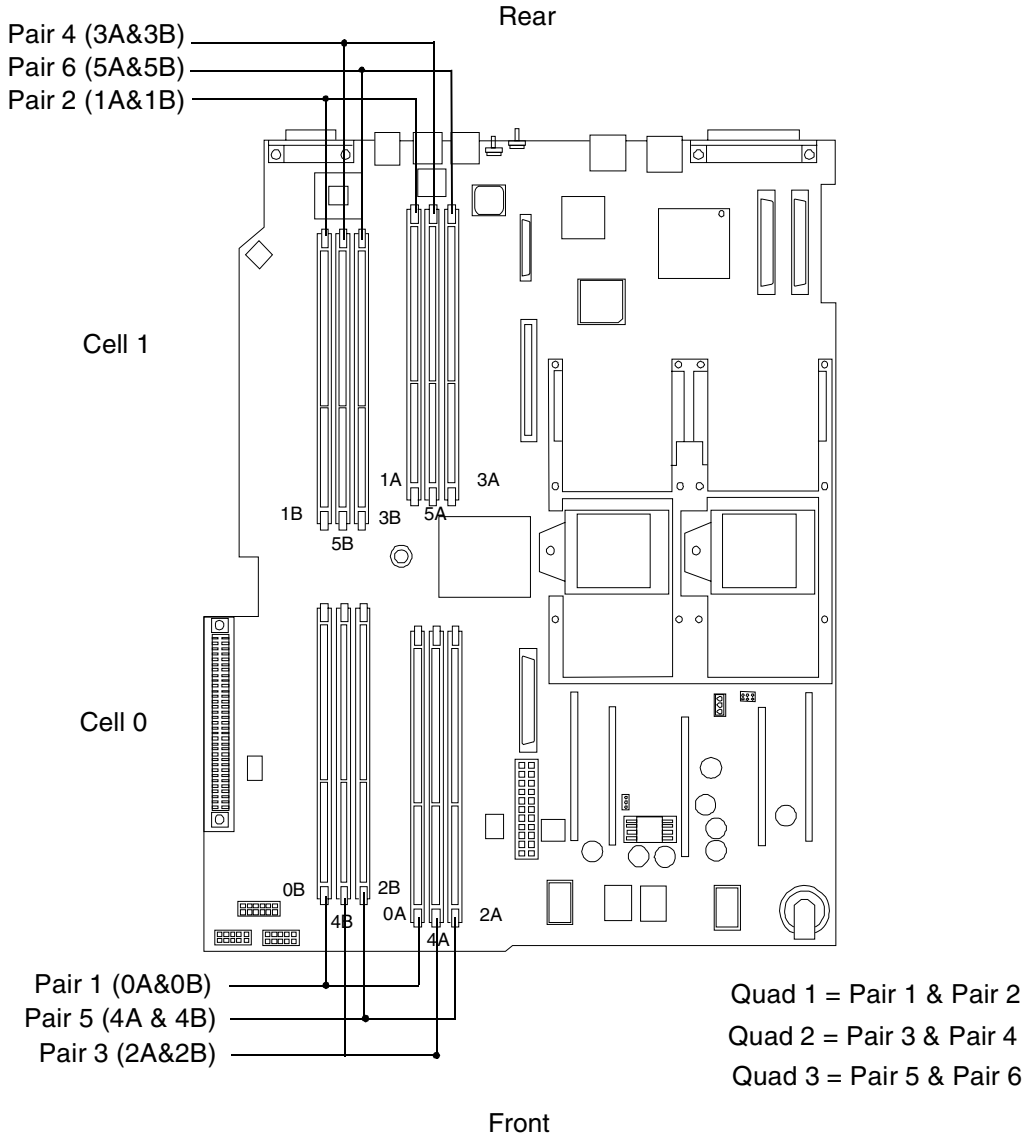
Failure to observe this warning could result in personal injury or damage to equipment.

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 256 MB and 512 MB (hp9000 rp3410) and 256 MB, 512 MB, 1 GB, and 2 GB (hp9000 rp3440). Dissimilar DIMM sizes may be used across the entire system board but all DIMMs in each quad must be identical.

Figure 3-32 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, the first four DIMMs must be installed as ordered pairs of equal size. The DIMM in socket 0A must match the DIMM in socket 0B. If a second pair is added (sockets 1A and 1B), the DIMMs must match the DIMMs in sockets 0A and 0B. Additional DIMMs (DIMM sockets 5 through 12) must be installed as quads (groups of four—two matched pairs). This requirement is summarized as:
  - 0A and 0B must be identical pair
  - 1A and 1B must be identical to the pair in sockets 0A and 0B
  - 2A, 2B and 3A, 3B must be identical quad (2 pairs)
  - 4A, 4B and 5A, 5B must be identical quad (2 pairs)
- 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 quad (2 pairs)
  - 2A, 2B and 3A, 3B must be identical quad (2 pairs)
  - 4A, 4B and 5A, 5B must be identical quad (2 pairs)

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

Module sizes can be mixed, as long as DIMMs in each quad match. For example:

- On hp 9000 rp3410 Server, it is acceptable to load four 256 MB DIMMs in sockets 0A, 0B, 1A, and 1B and four 512 MB DIMMs in sockets 2A, 2B, 3A, and 3B
- 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.

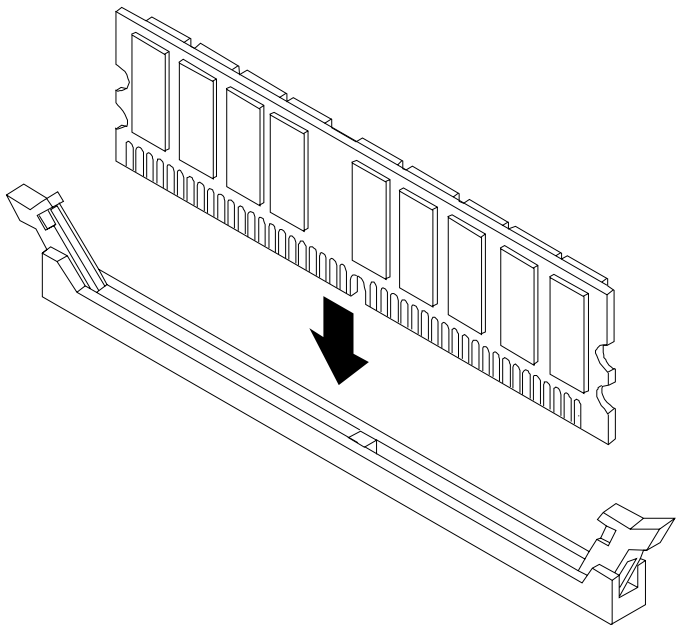
Step 3. Gently and evenly push on each side of the DIMM until it seats in the socket. Ensure the extraction levers are in the closed position.

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

Step 5. Verify the memory replacement and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- Use the MP commands to verify operation
- Use the BCH commands to verify operation
- Use diagnostics provided by the ODE to exercise the newly installed memory

Figure 3-33 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.

NOTE Processor tool kit, HP P/N 5069-5441 is required for removal and installation of a processor module.

Removing a Processor Module

To remove a processor module, perform the following steps:

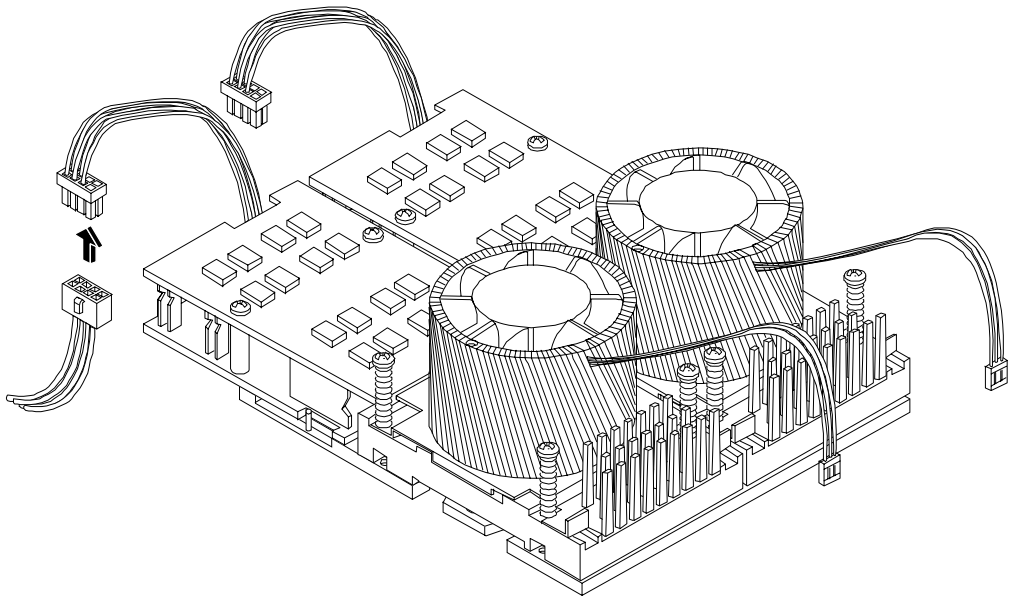
Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

Step 3. Remove the processor airflow guide and cables.

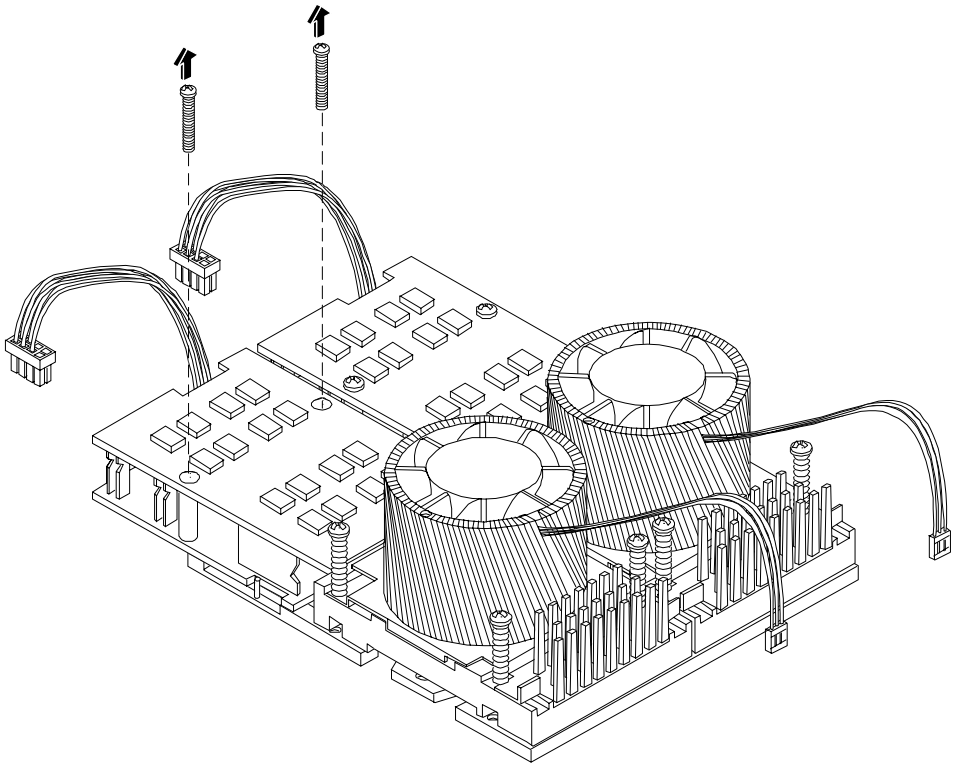
Step 4. Disconnect the power pod cable from the power connector on the system board.

Figure 3-34Disconnect Power Pod Cable



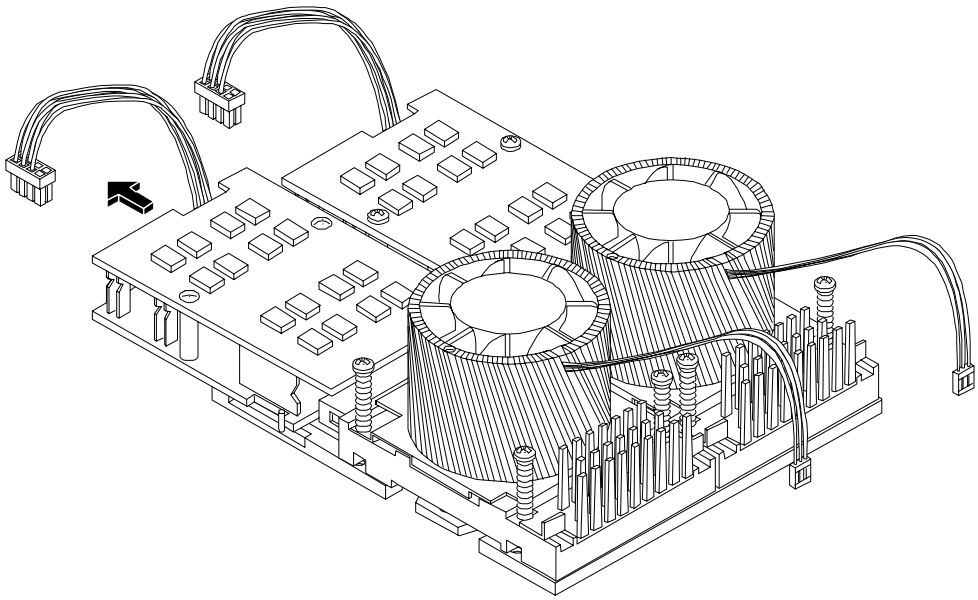
Step 5. Remove the two power pod mounting screws.

Figure 3-35Remove Power Pod Mounting Screws



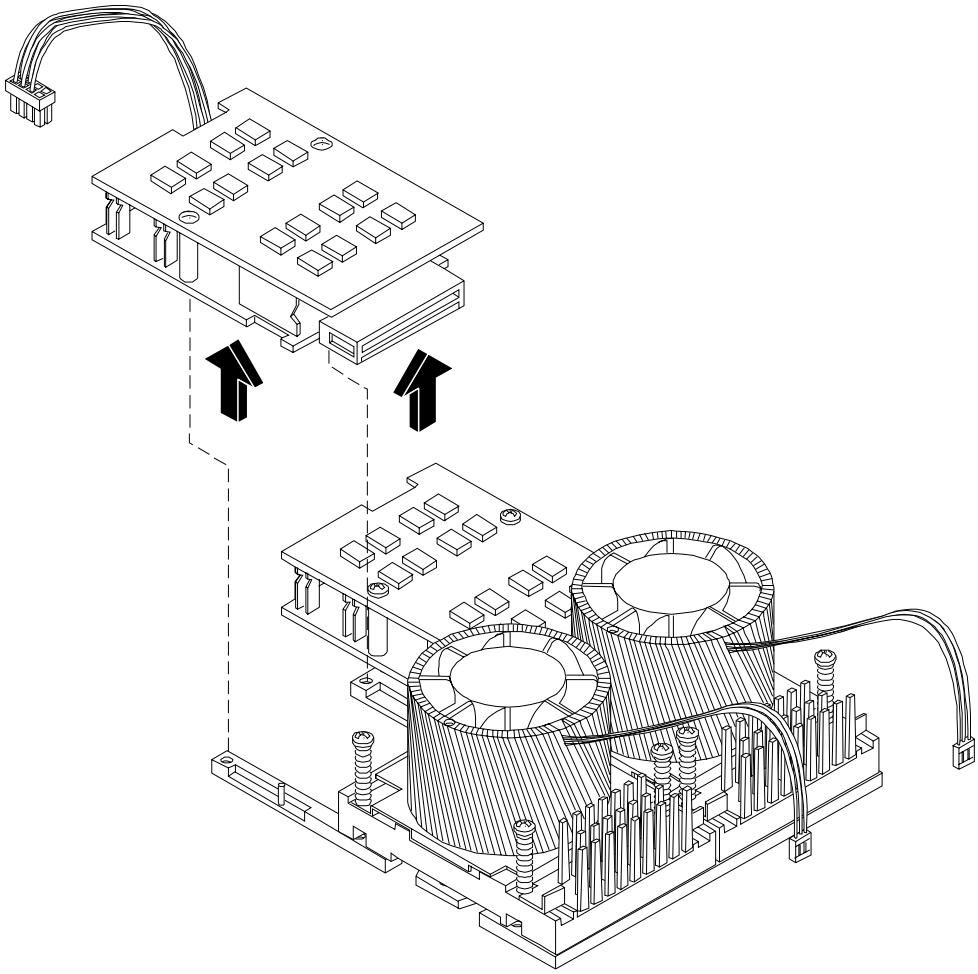
Step 6. Slide the power pod toward the rear of the system board so that the power pod connector disconnects from its connector on the processor module.

Figure 3-36Disconnect Power Pod from Processor Module



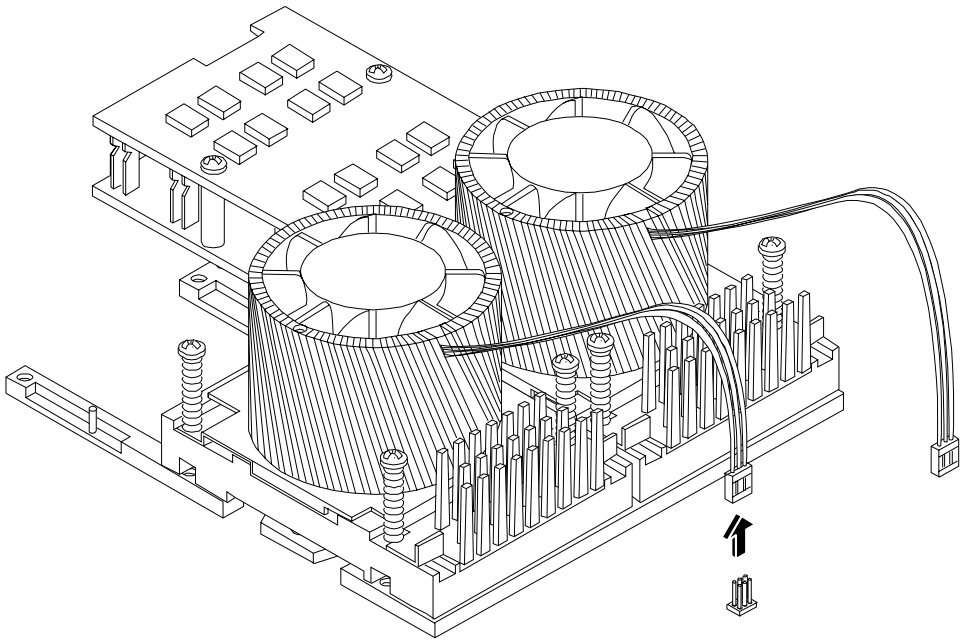
Step 7. Lift the power pod up and out of the chassis. Place the power pod into an anti-static container.

Figure 3-37Remove Power Pod



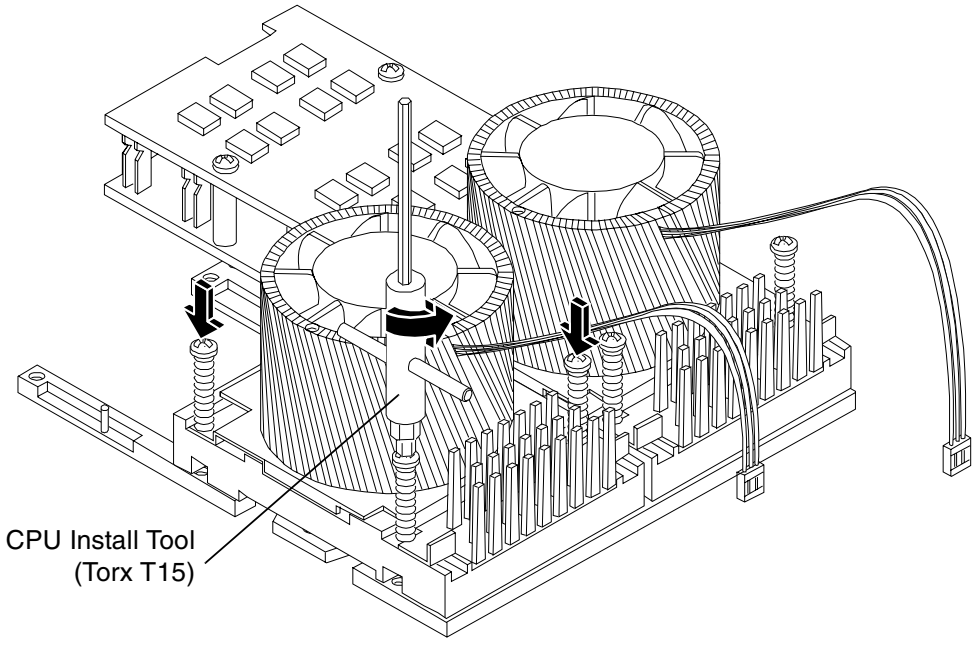
Step 8. Disconnect the processor module turbo fan power cable.

Figure 3-38Disconnect the Turbo Fan Cable



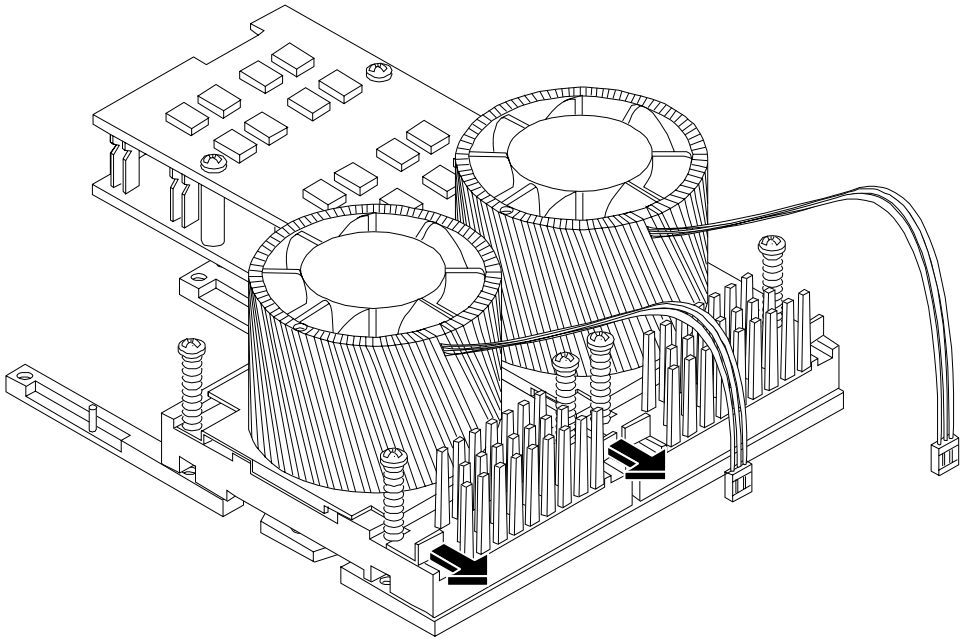
Step 9. Release the four heatsink captive screws on the processor module heat sink.

Figure 3-39Release Heatsink Captive Screws



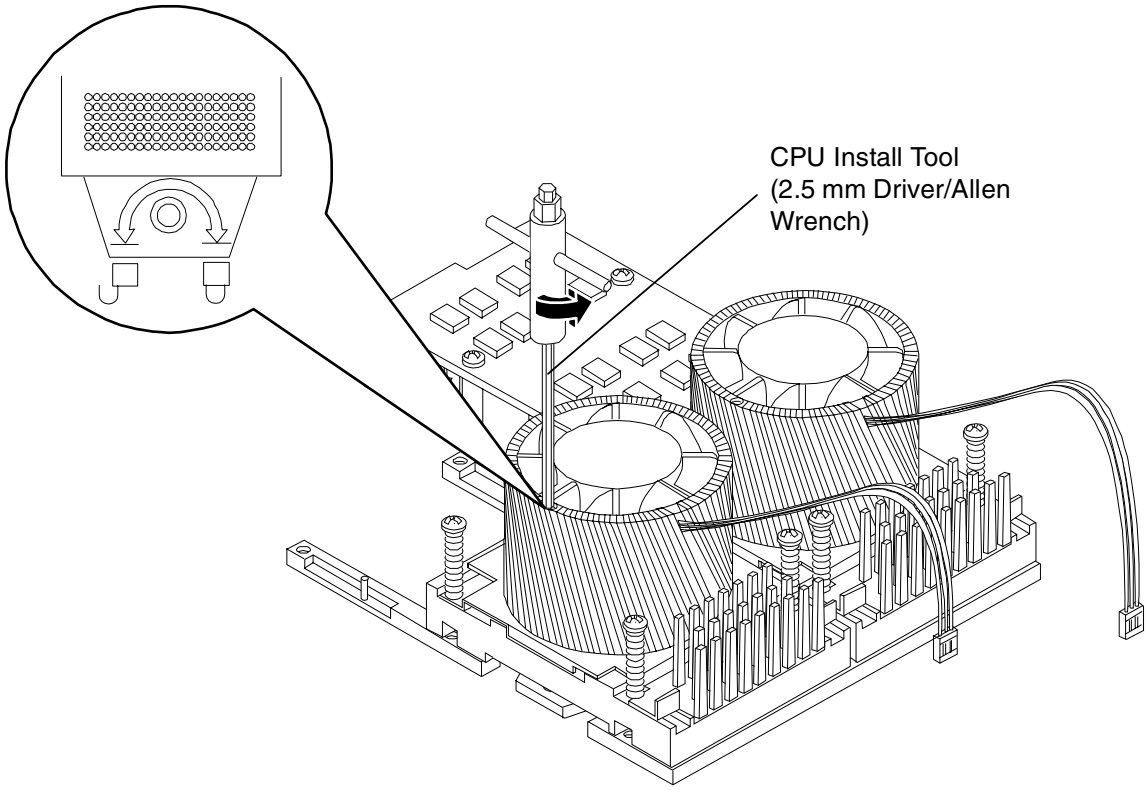
Step 10. Slide the sequencing retainer plate toward the back of the system to open the hole in the edge of the heatsink for insertion of the special processor tool into the processor module locking mechanism.

Figure 3-40Slide Sequencing Retainer Plate



Step 11. Unlock the processor module locking mechanism using the CPU install tool. 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 3-41Unlock 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 3-42Remove Processor Module

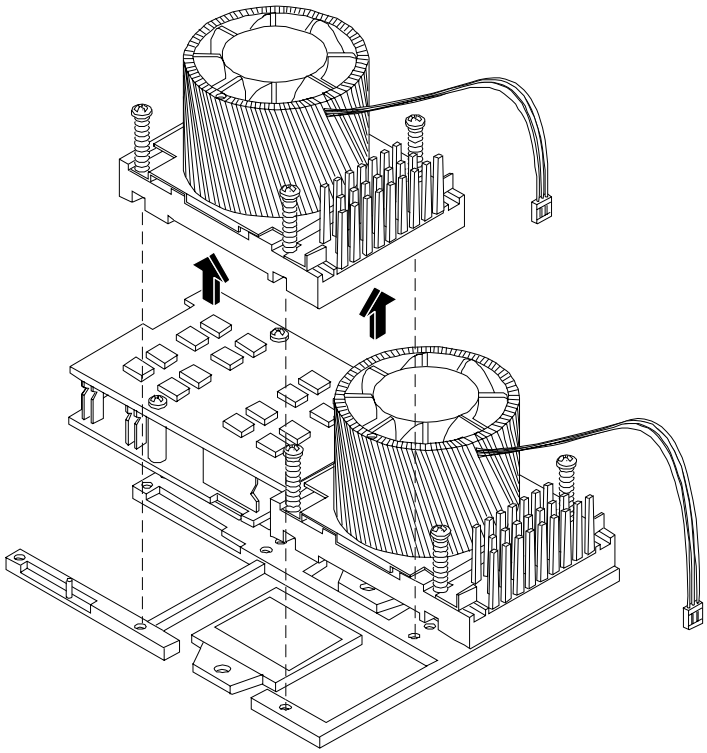
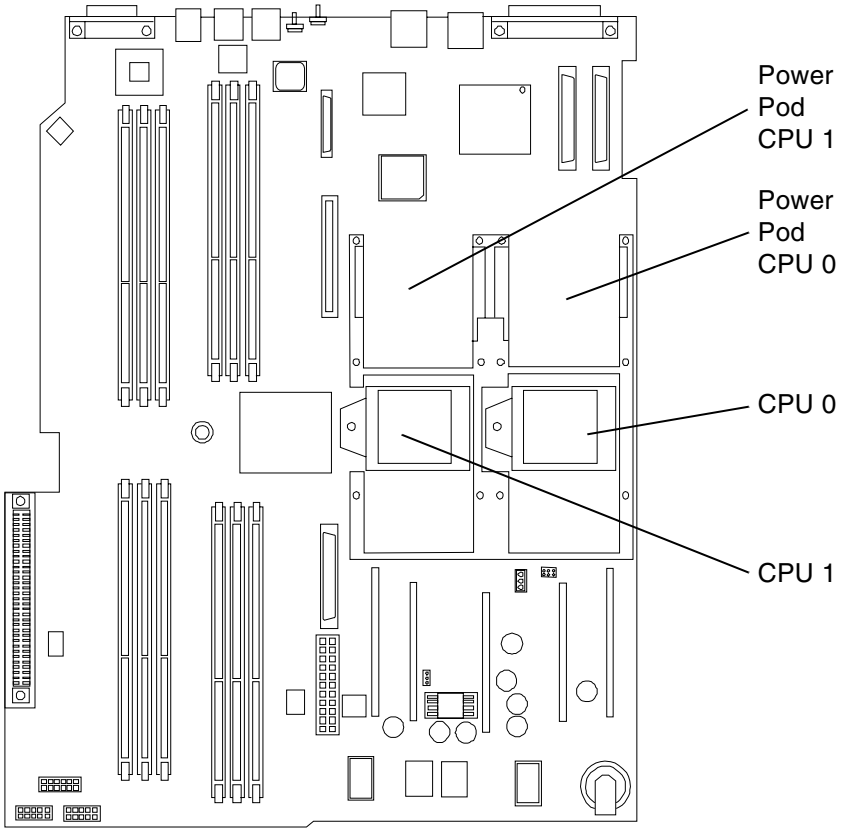


Figure 3-43 Processor Module Removal/Replacement



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.

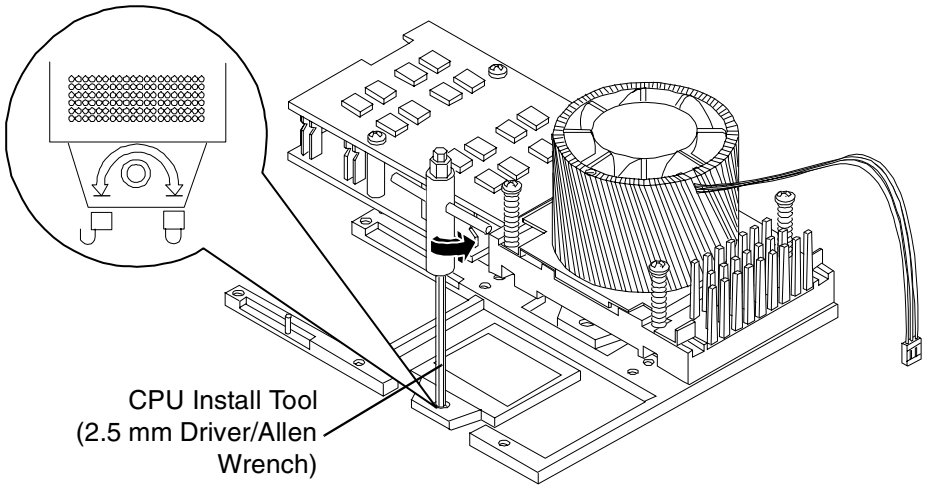
Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

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

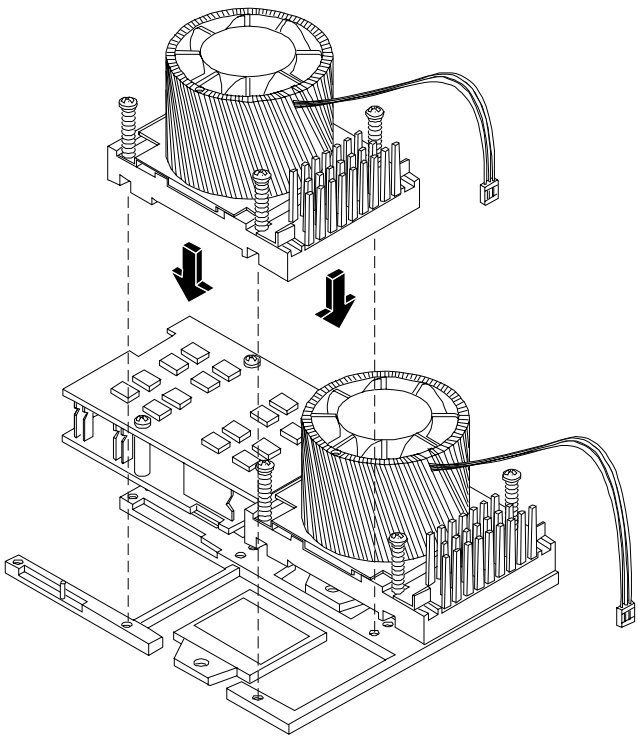
Step 4. Unlock the processor module locking mechanism using the CPU install tool. Insert the tool into the hole that runs down through the edge of the heatsink and rotate the special processor tool 180 degrees counterclockwise. Verify that the processor module socket locking mechanism is rotated into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

Figure 3-44Unlocking the Processor Module Locking Mechanism



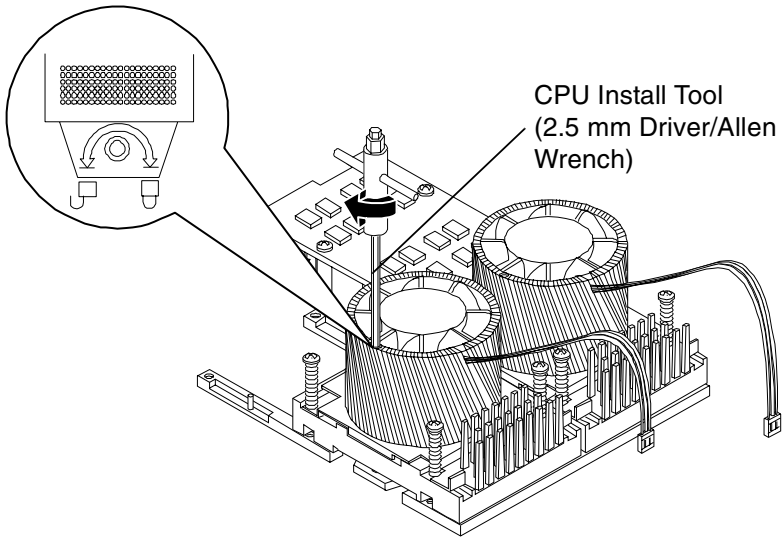
Step 5. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the fan and processor module on the system board. The four locator posts will fit in locator holes on the system board processor module mount. The turbo fan power cable must be positioned so that it is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

Figure 3-45Aligning the Processor Module



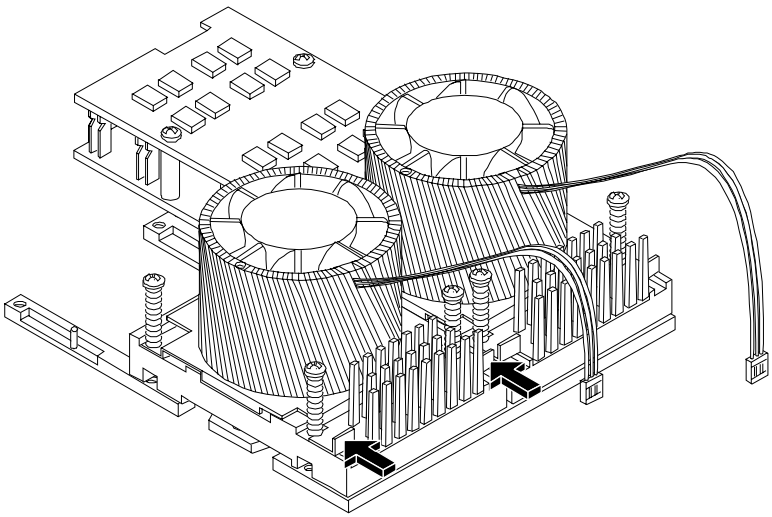
Step 6. Use the special processor tool to lock the processor module in place on the system board. To do this, insert the special processor tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees.

Figure 3-46Locking the Processor Module in Place



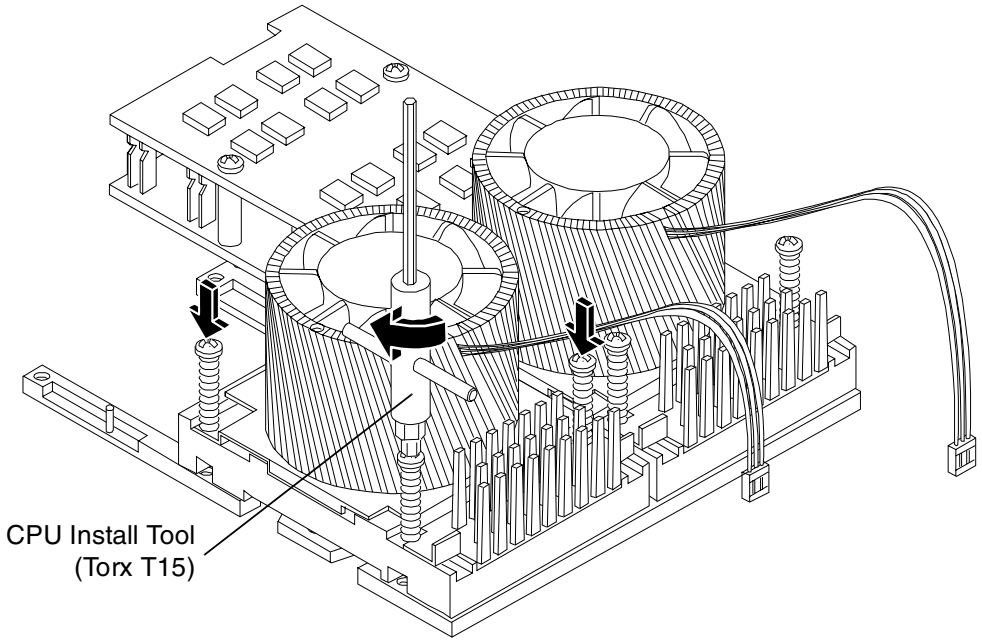
Step 7. Slide the sequencing retainer plate toward the front of the system.

Figure 3-47Slide the Sequencing Retainer Plate



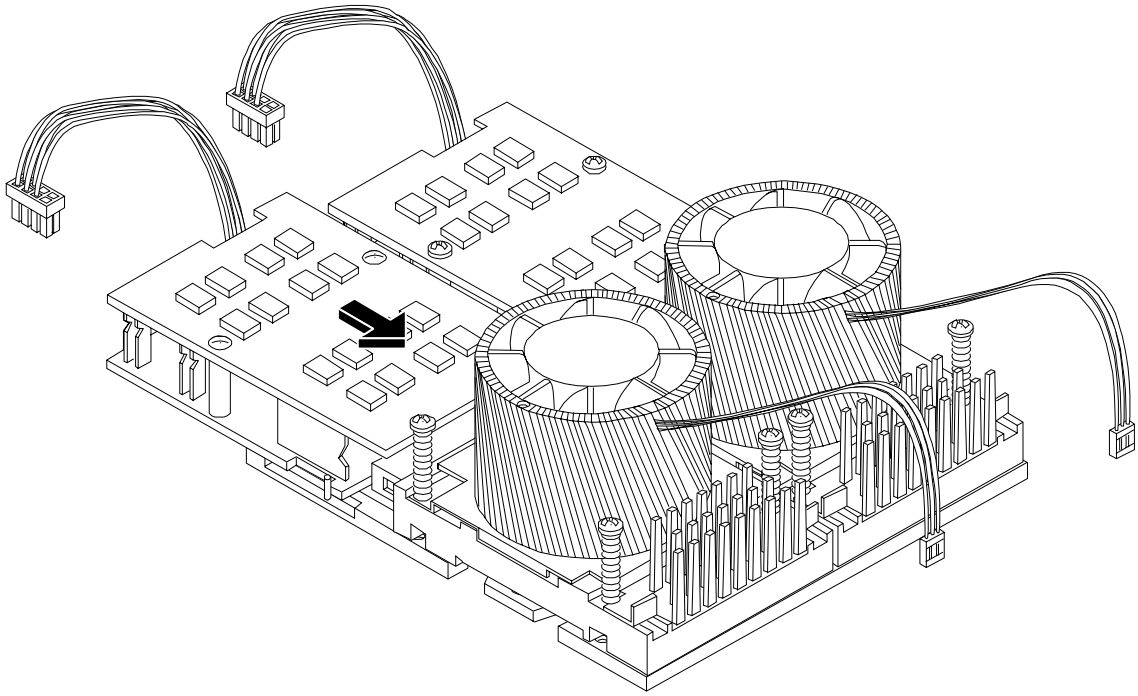
Step 8. Screw in the four heatsink captive screws.

Figure 3-48Secure the Captive Screws



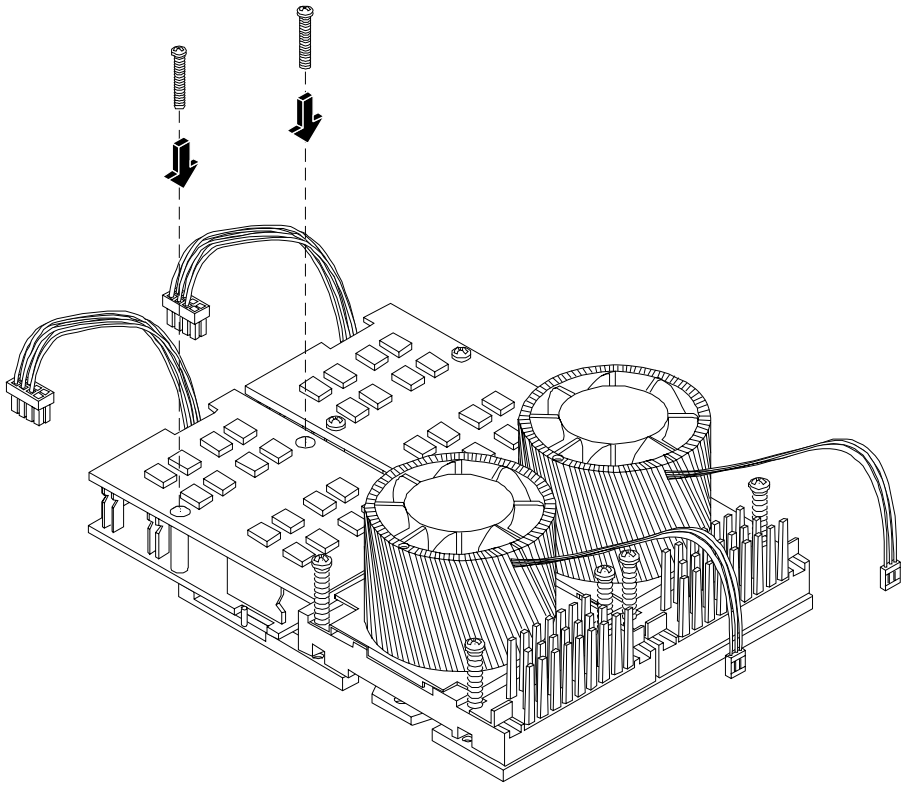
Step 9. Slide the power module on the system board metal mounting bracket so that the power module connector connects with its connector on the processor module.

Figure 3-49Aligning 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.

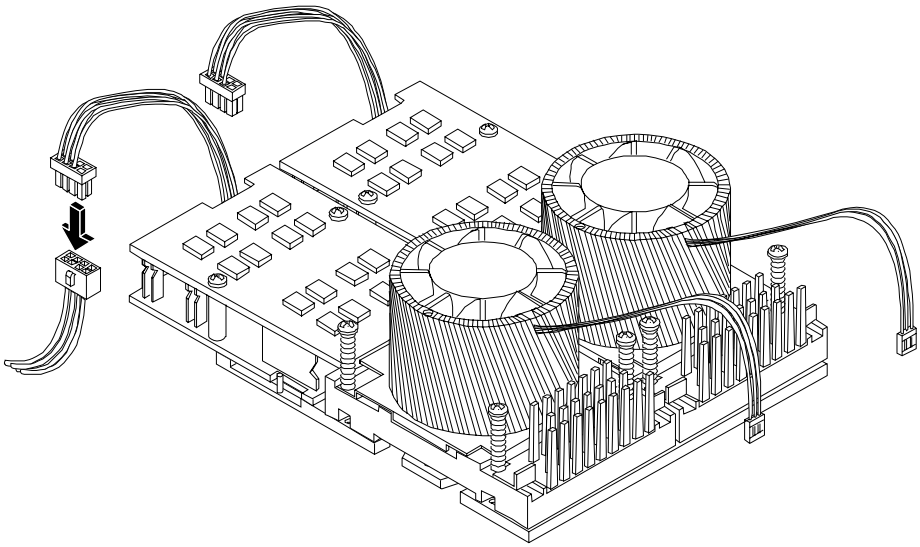
Figure 3-50Install the Processor Module Power Pod Mounting Screws



Step 11. Replace the processor airflow guide.

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

Figure 3-51Connecting the Power Pod Cable



Step 13. Replace the cover.

Step 14. Verify the processor replacement and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- Use the MP commands to verify operation
- Use the BCH commands to verify operation
- Use diagnostics provided by the ODE to exercise the newly installed processor

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

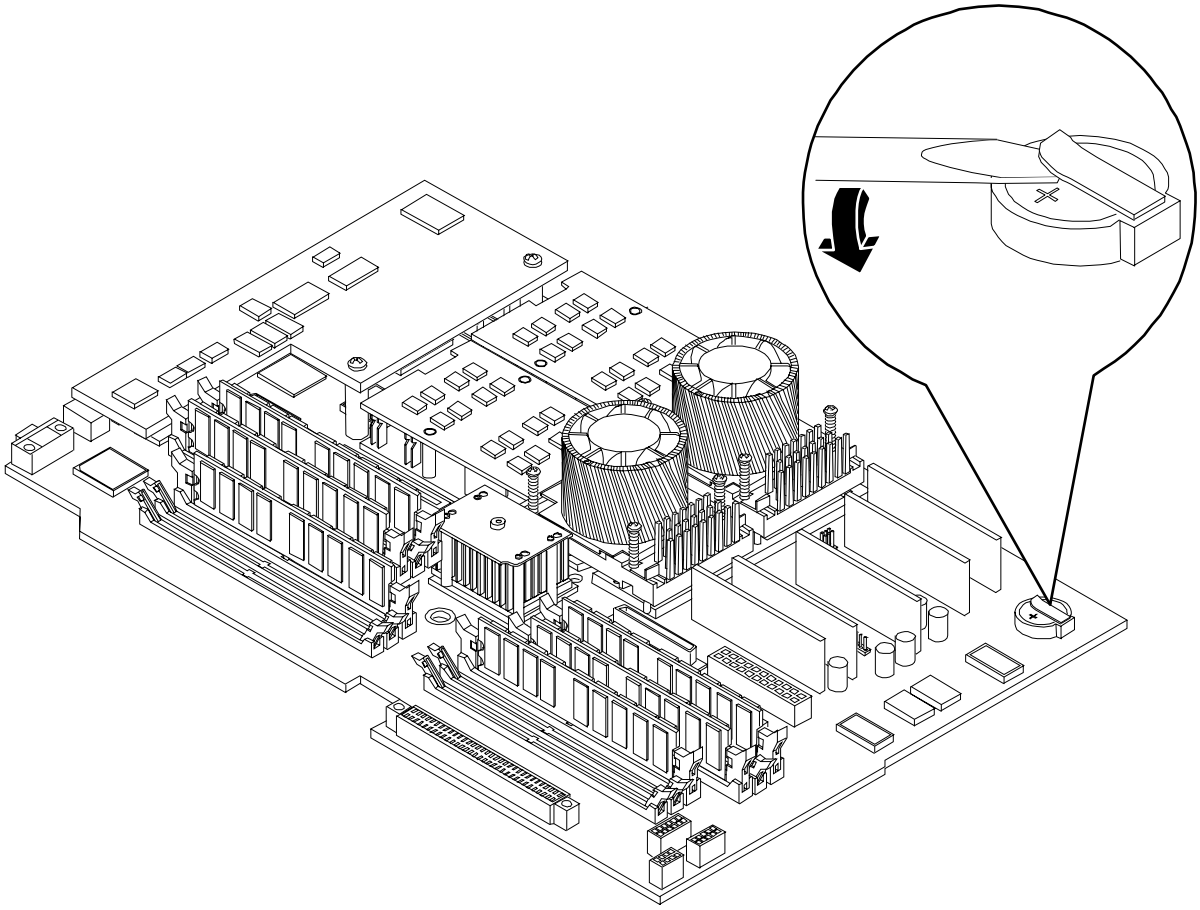
Step 1. Turn off the system and disconnect all cables.

Step 2. Remove the cover. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

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 3-52Removing 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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.

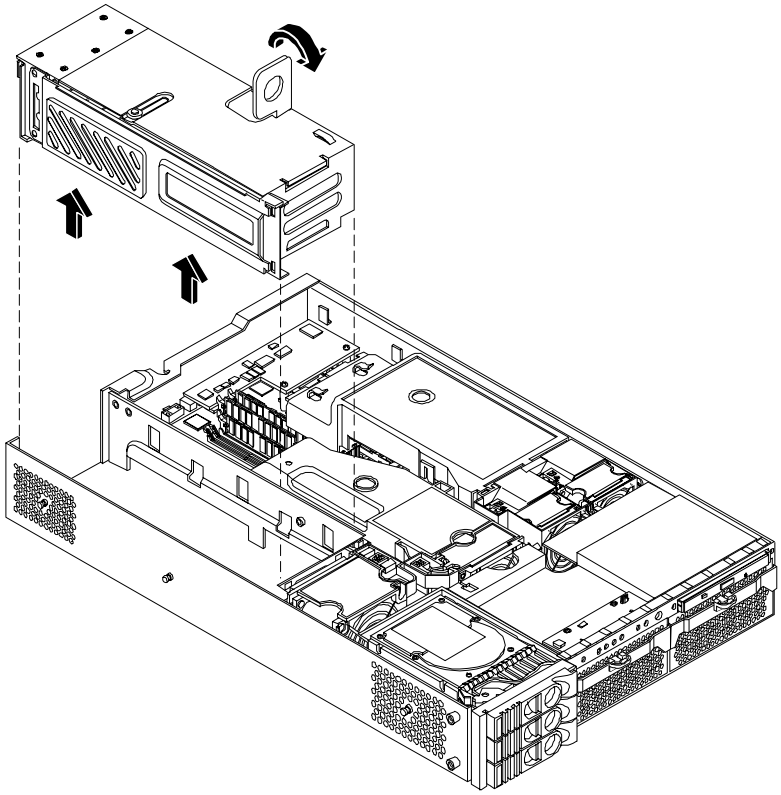
Removing the PCI Cage

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

Step 1. Remove the cover. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

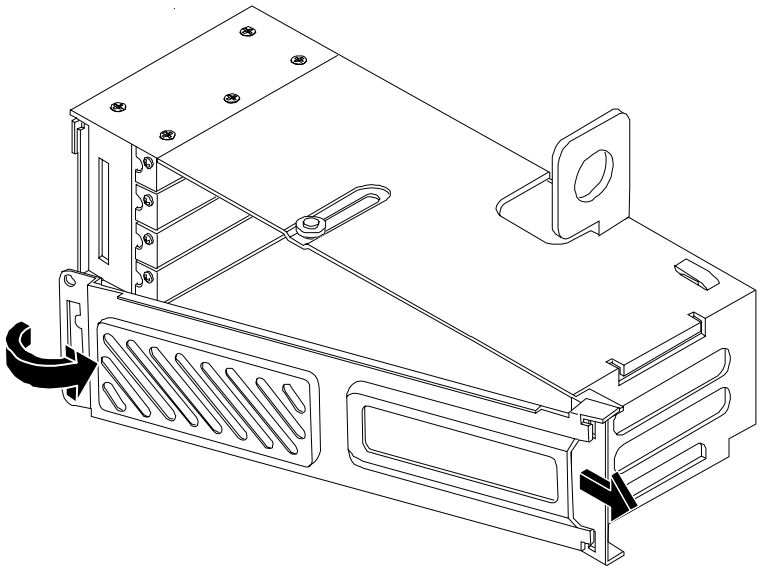
Step 2. Lift up on the PCI cage release lever and the back edge of the PCI cage and lift the PCI cage out of the system.

Figure 3-53Removing 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 3-54Removing 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 provides two 64-bit, 133 MHz PCI-X card sockets and the hp 9000 rp3440 Server provides 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 through 4. 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. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

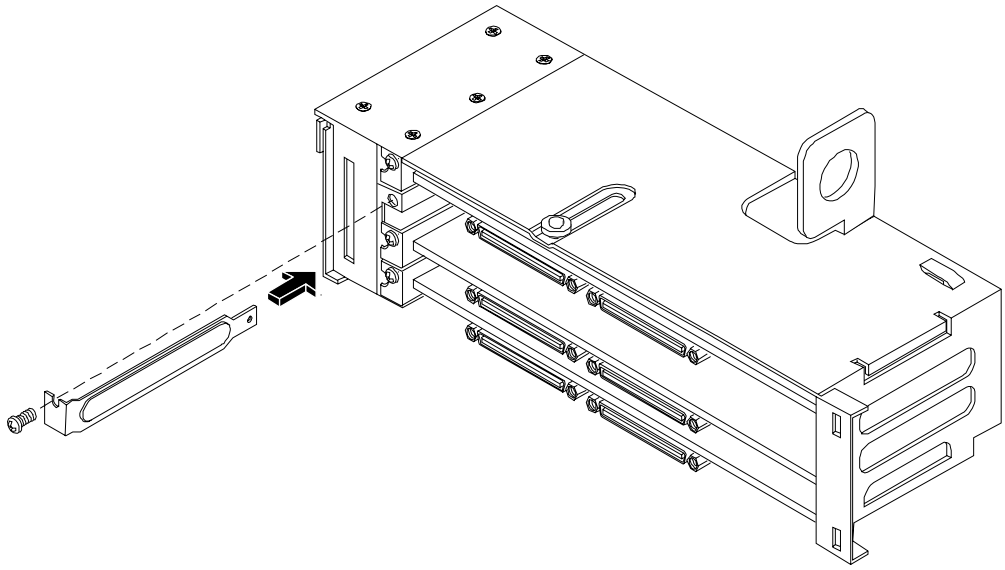
Step 2. Perform the procedure for removing the PCI cage described in the previous section.

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 3-55Installing a PCI Slot Cover



Replacing a PCI or Graphics Card

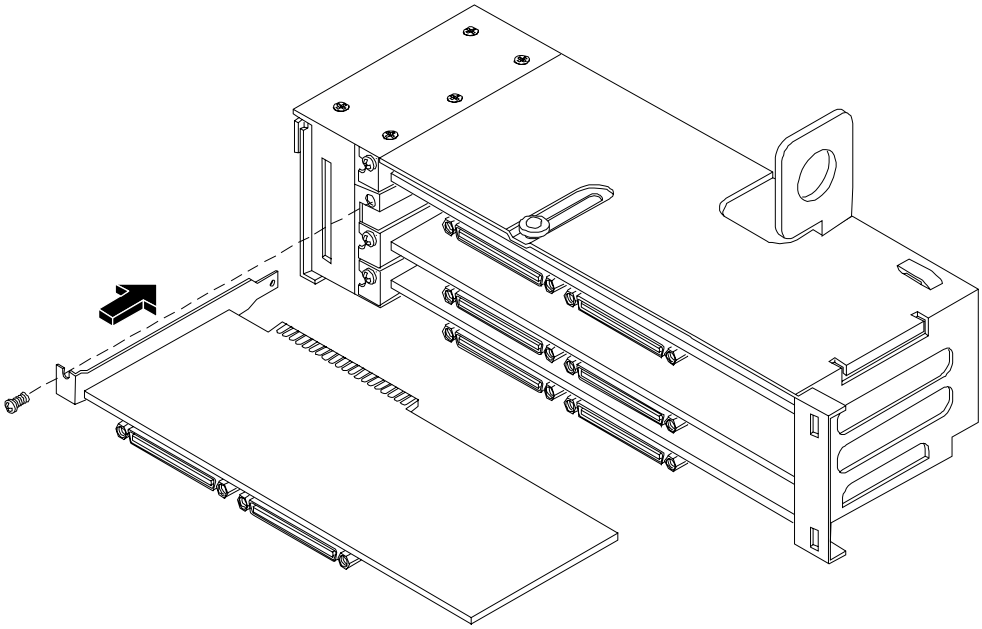
Step 1. Remove the cover. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

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 3-56Installing 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. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

Step 8. Verify the PCI card replacement and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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.

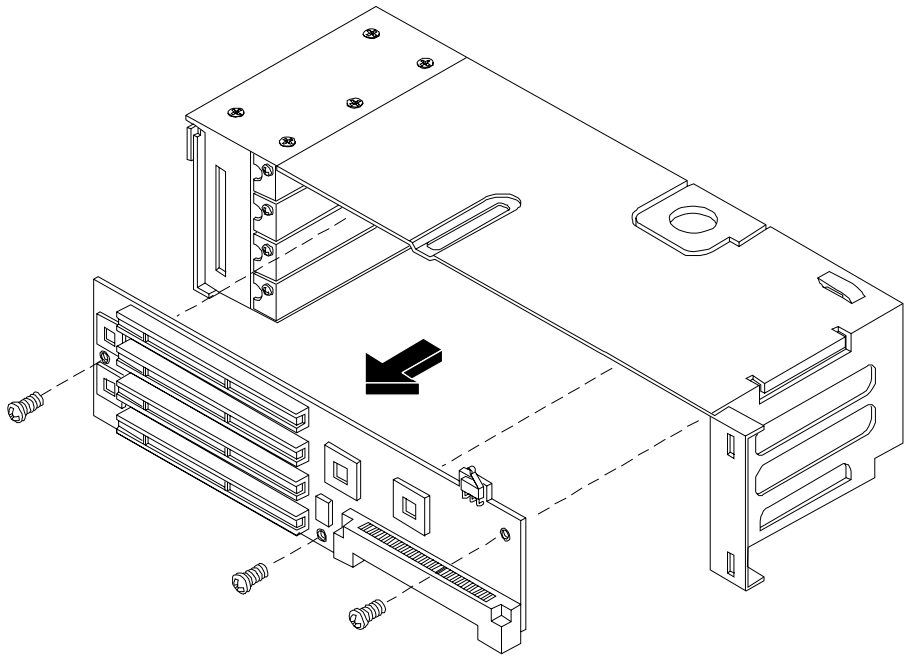
Removing the PCI Backplane

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 3-57Removing the PCI Backplane

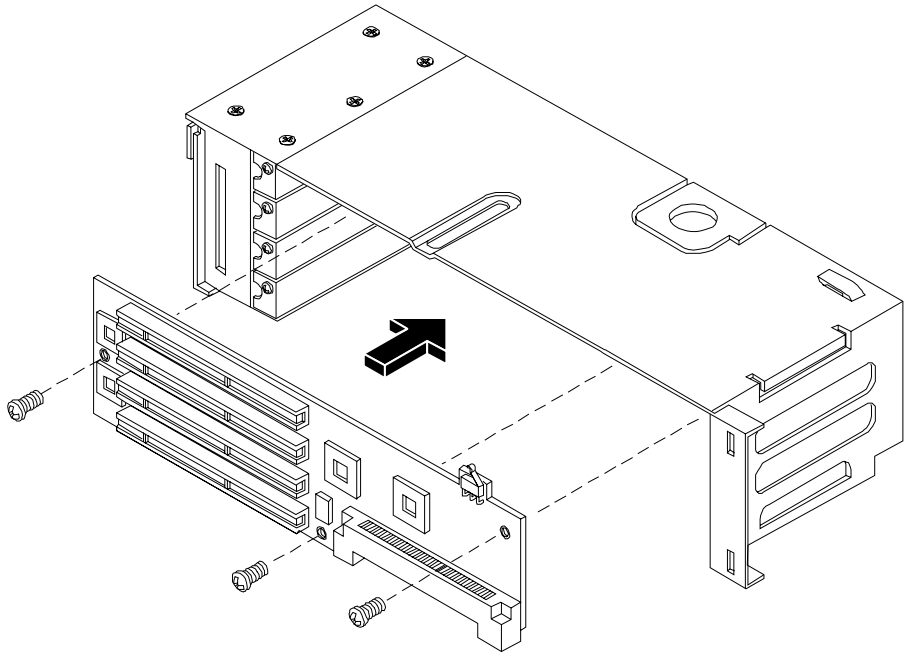


Replacing the PCI Backplane

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 3-58Replacing the PCI Backplane



Step 3. Replace any accessory and graphics cards.

Step 4. Verify the backplane replacement and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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.

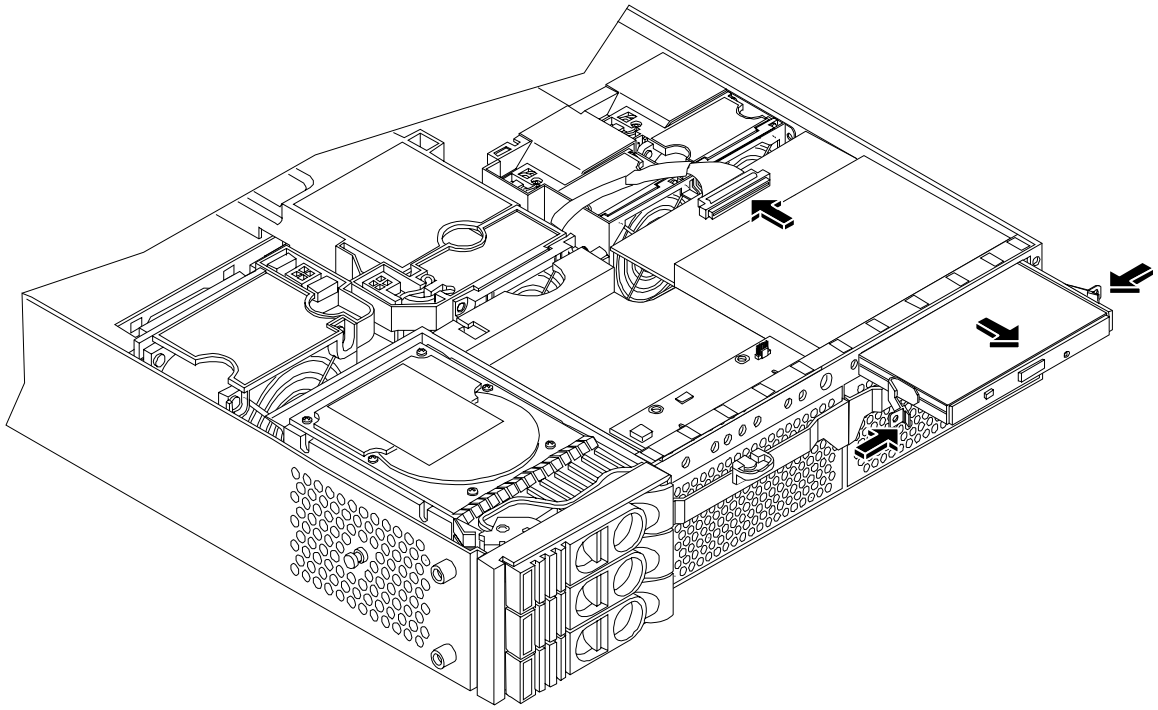
WARNING **Ensure that the system is powered-down and all power sources have been disconnected from the server prior to removing or replacing a removable media drive.**

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 3-59 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. (Refer to “Removing and Replacing the Metal Cover” on page 40 for instructions.)

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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- Use the MP commands to verify operation
- Use the BCH commands to verify operation
- Use diagnostics provided by the ODE to exercise the newly installed module

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.

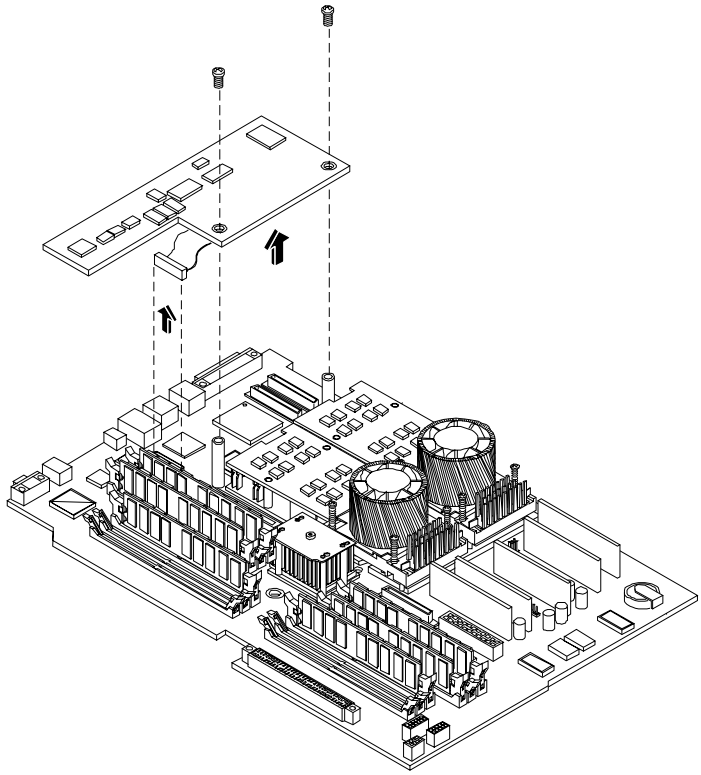
Removing the Management Processor Card

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 3-60Removing the Management Processor

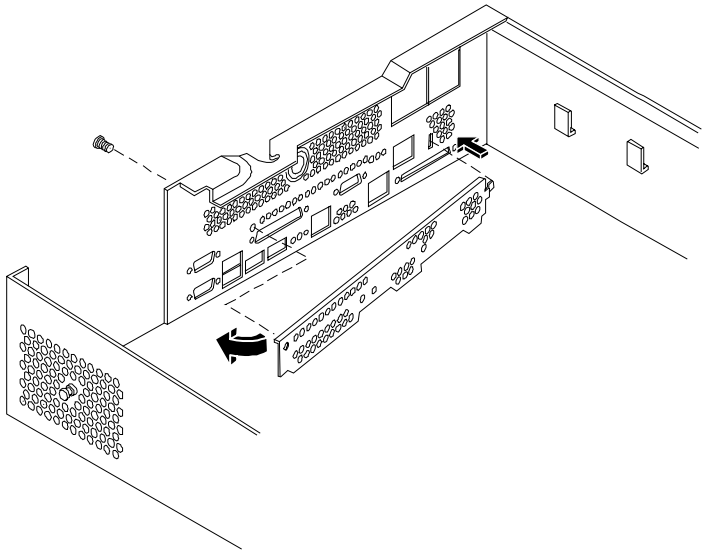


Step 4. Disconnect the management processor card connector.

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 3-61Replace 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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

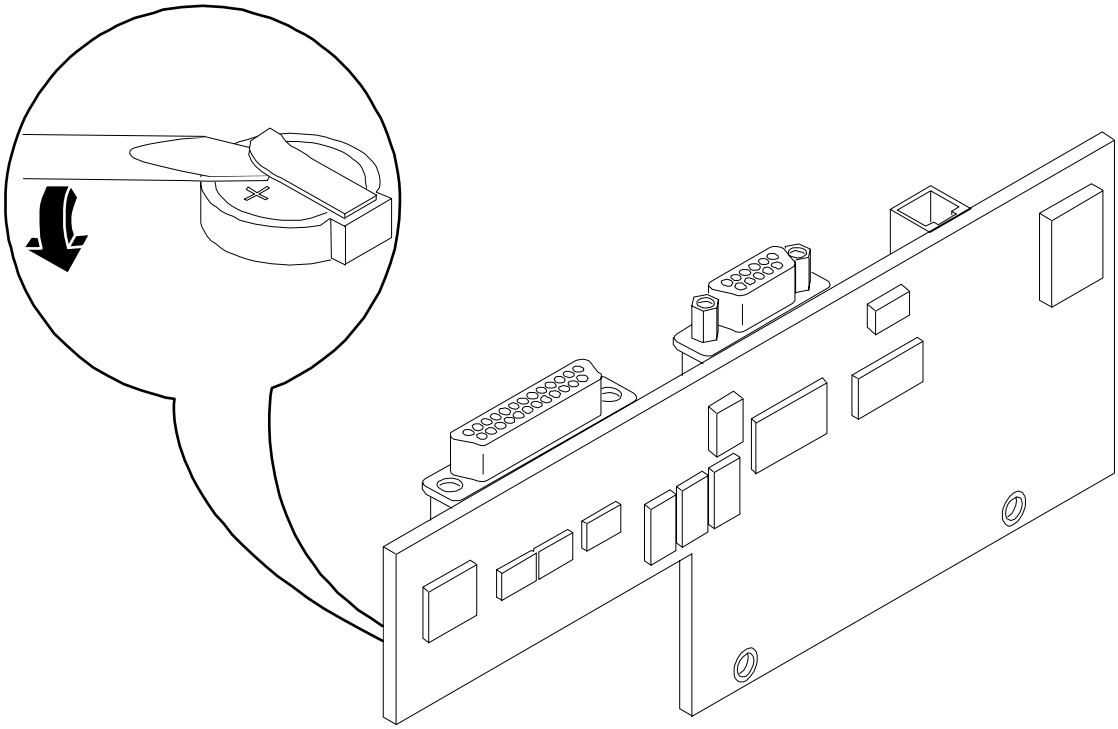
Step 1. Perform all of the steps described in the procedure for removing the management processor card.

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 3-62Removing 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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.

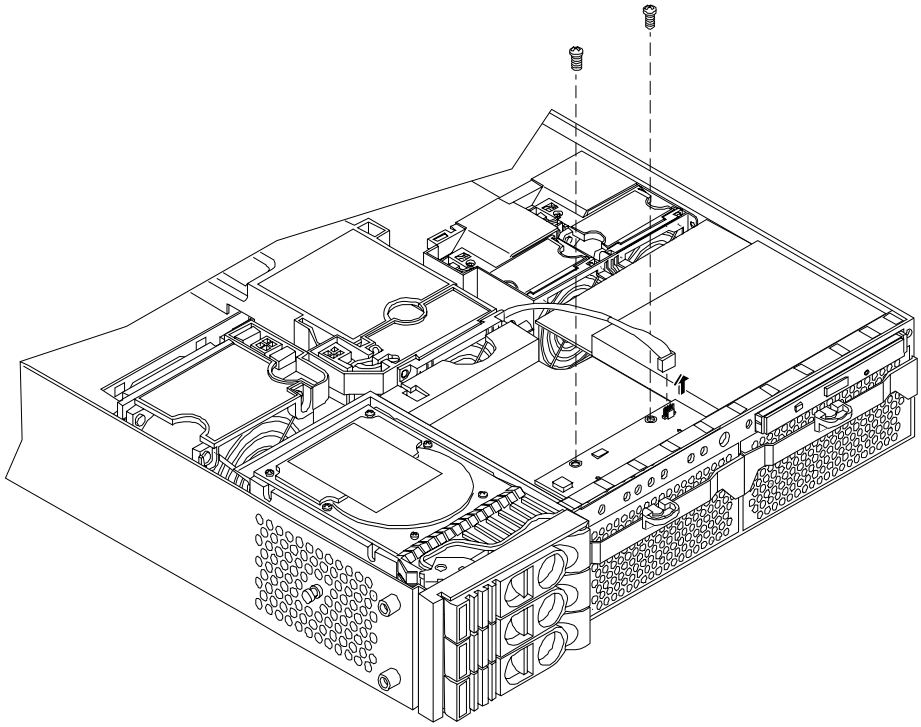
Removing the LED Status Panel

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 3-63Removing 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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)

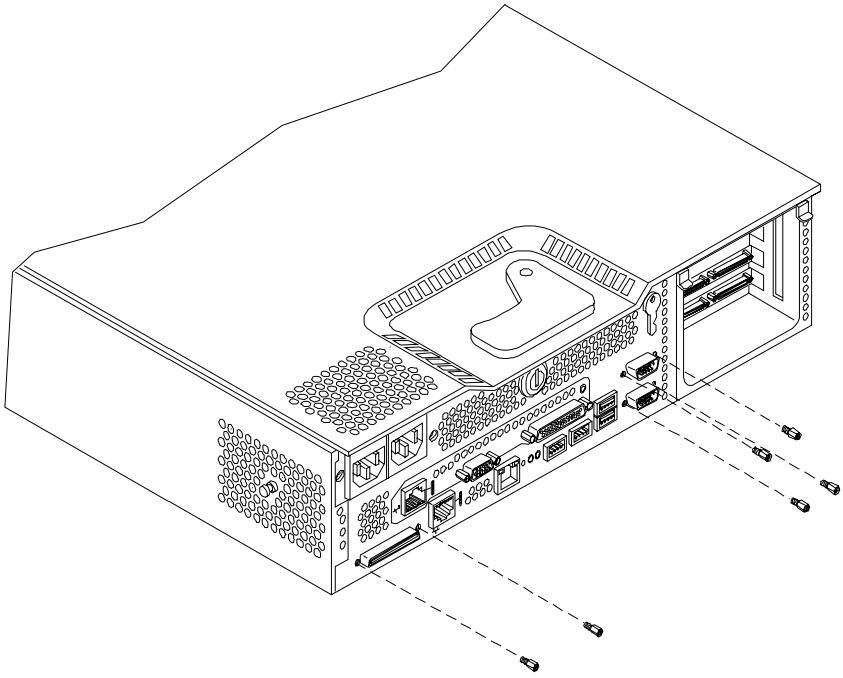
Step 3. If the system does not have a management card installed, remove the power connector plate.

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

b. 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 3-64Remove System Board Mounting Screws

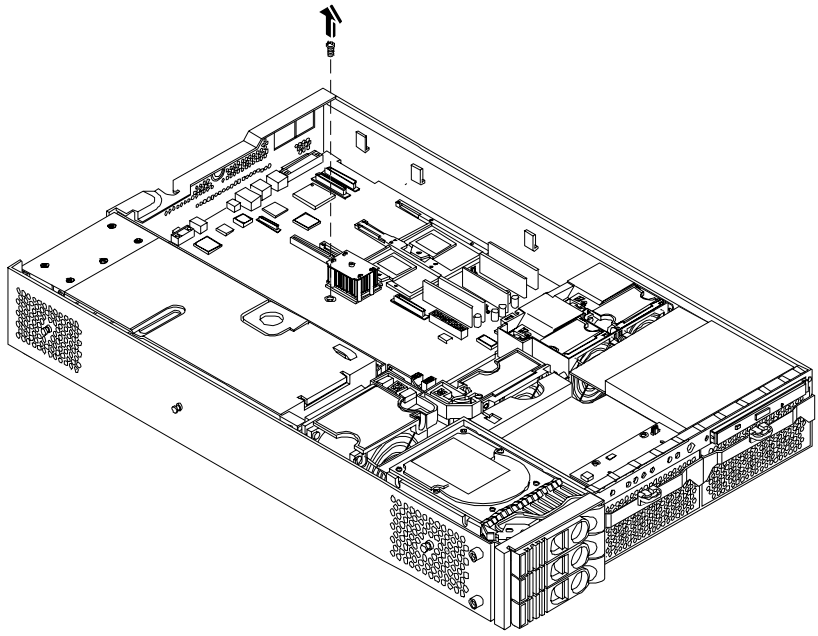


Step 5. Disconnect all cables that are connected to the system board. To help with re-assembly, make note of which cables were connected to which connector.

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 3-65Remove the System Board Mounting Screw

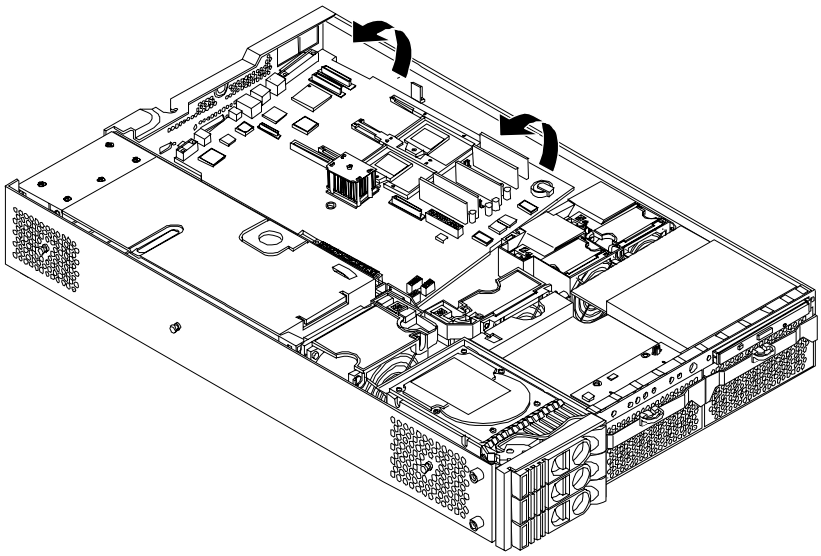


Step 7. Remove the system board:

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 3-66Remove the System Board



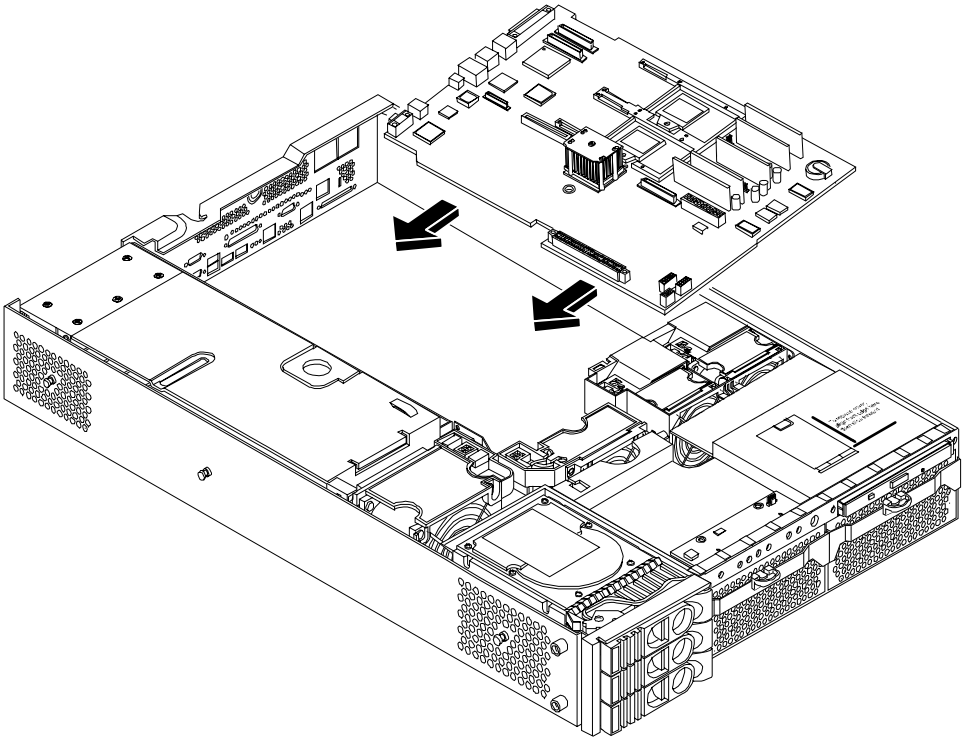
Replacing the System Board

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.

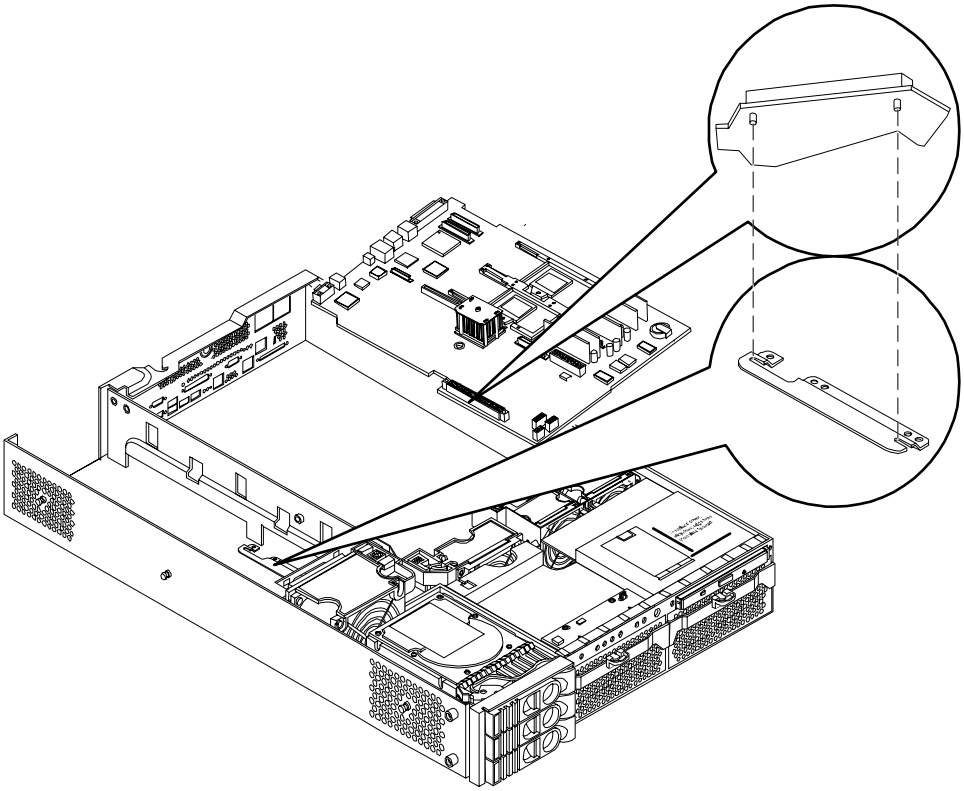
Figure 3-67Slide System Board into Chassis



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

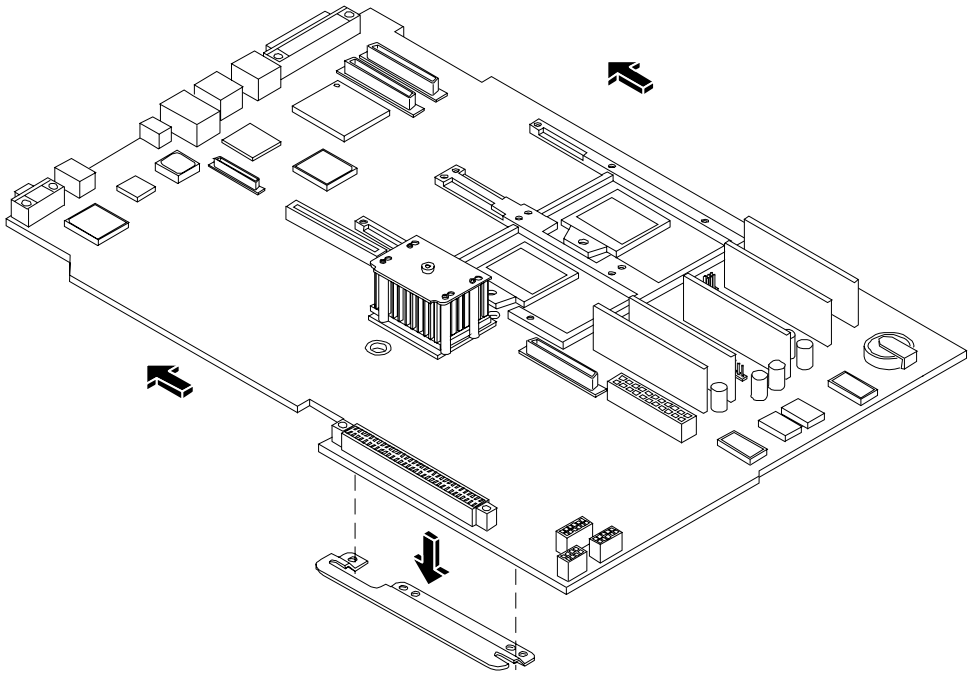
c. Slide the PCI connector posts on the system board into their slots on the system chassis.

Figure 3-68Align 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 3-69Slide System Board in Chassis

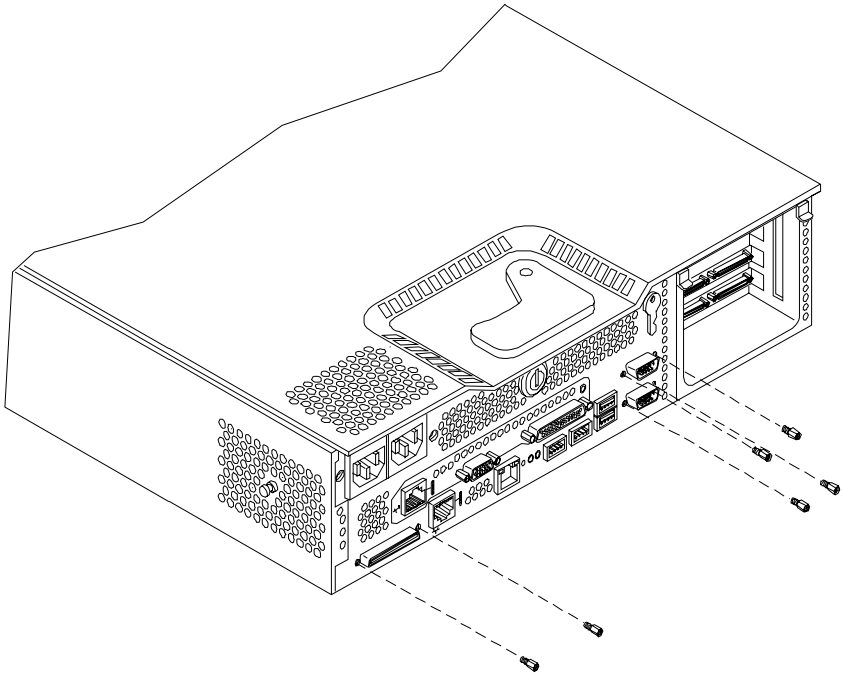


Step 4. Screw in the system board mounting screw.

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

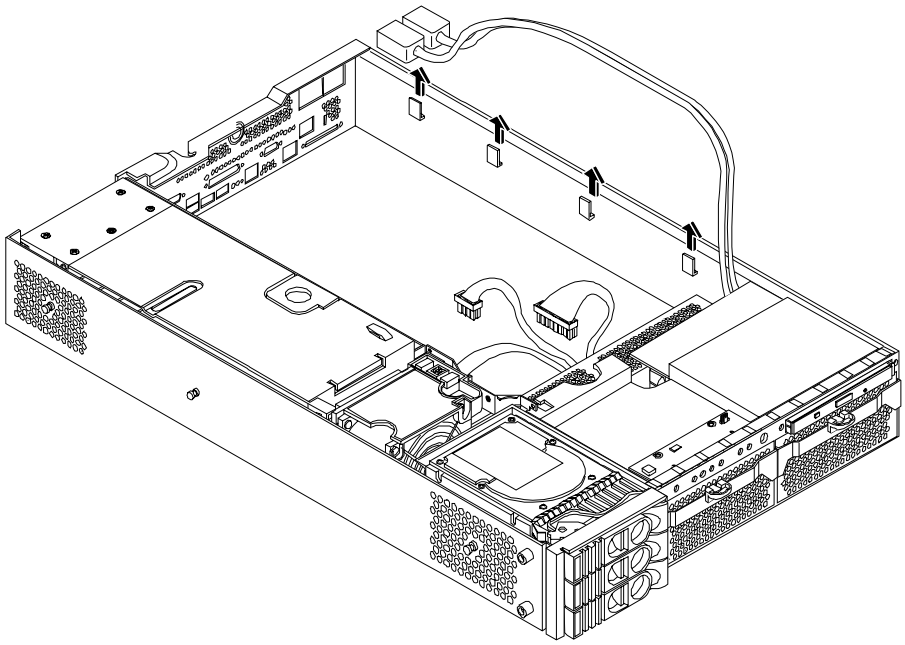
Step 6. Screw in the six rear backplane system board mounting screws.

Figure 3-70Install the Rear Panel Mounting Screws



Step 7. If your 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 3-71Reinstall 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- Use the MP commands to verify operation
- Use the SS_UPDATE command to change the model string if necessary
- 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.

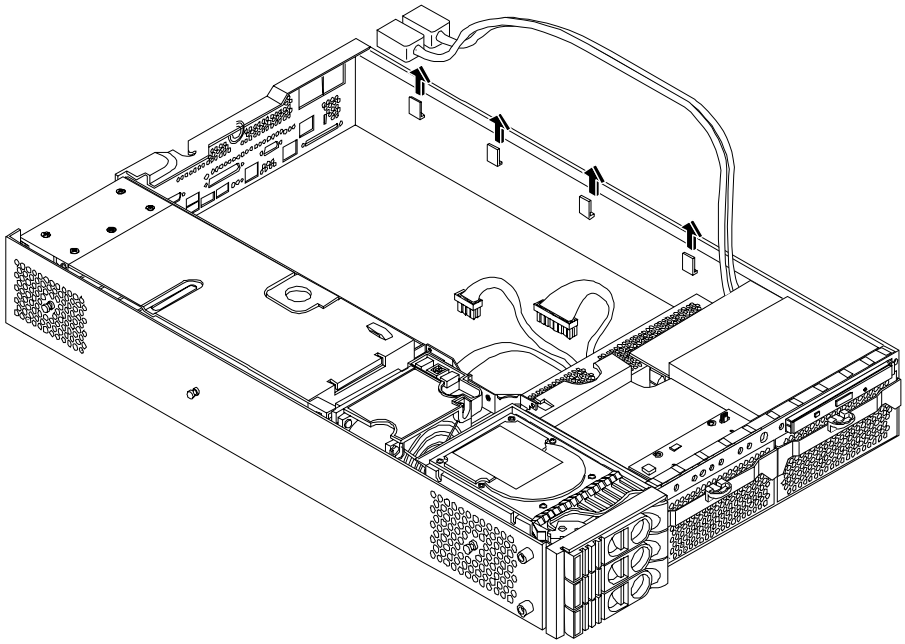
Removing the Power Supply Interface Module

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 3-72Power Cables and Holding Clips



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

Figure 3-73Remove the Mounting Screw

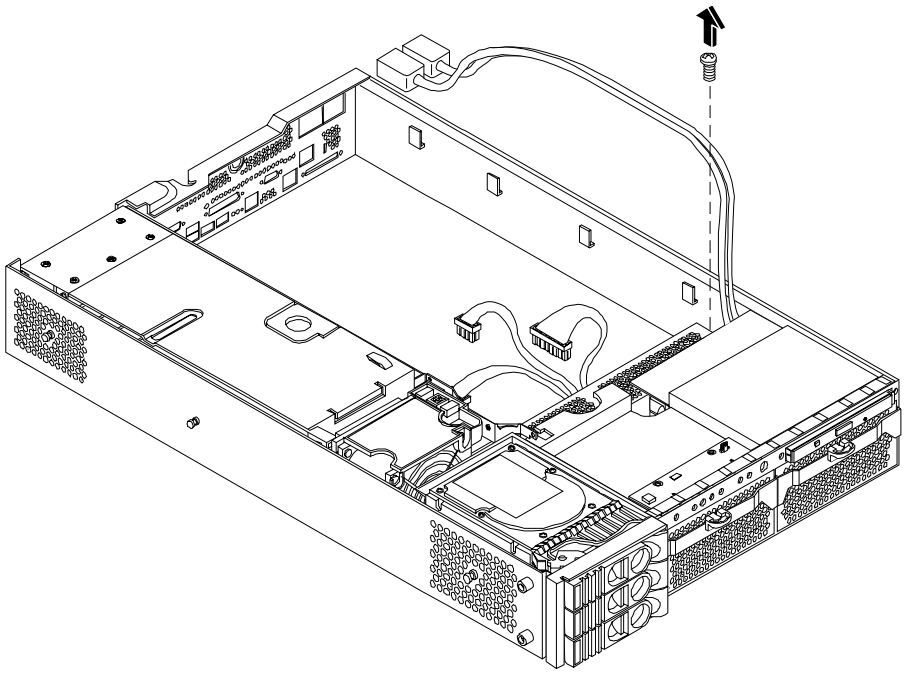
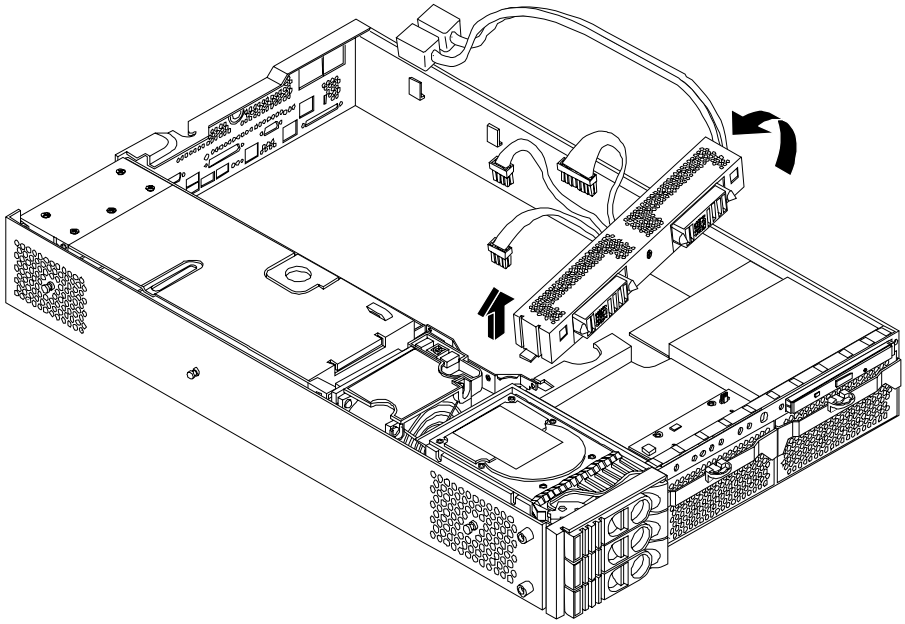


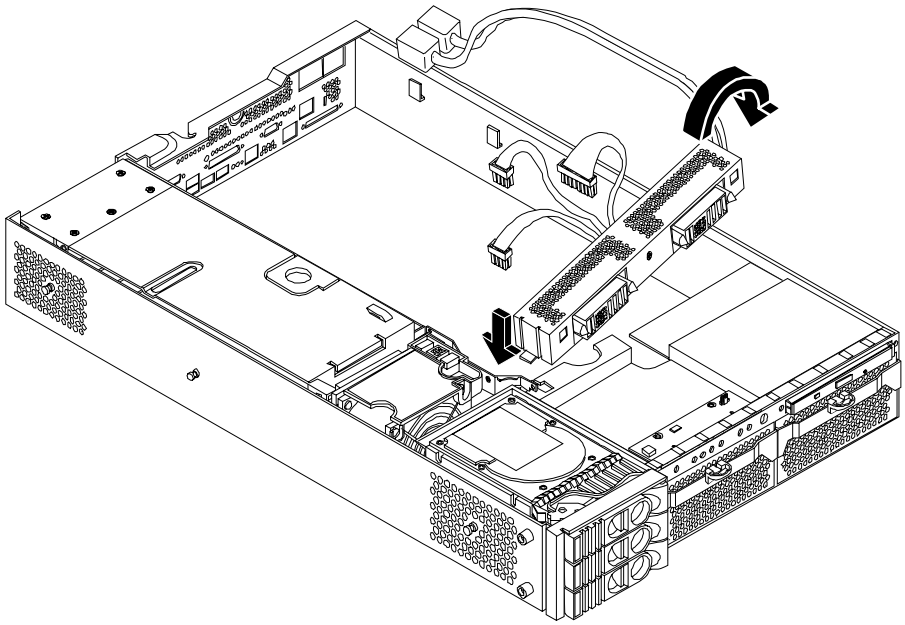
Figure 3-74Remove the PSI Interface Module



Replacing the Power Supply Interface Module

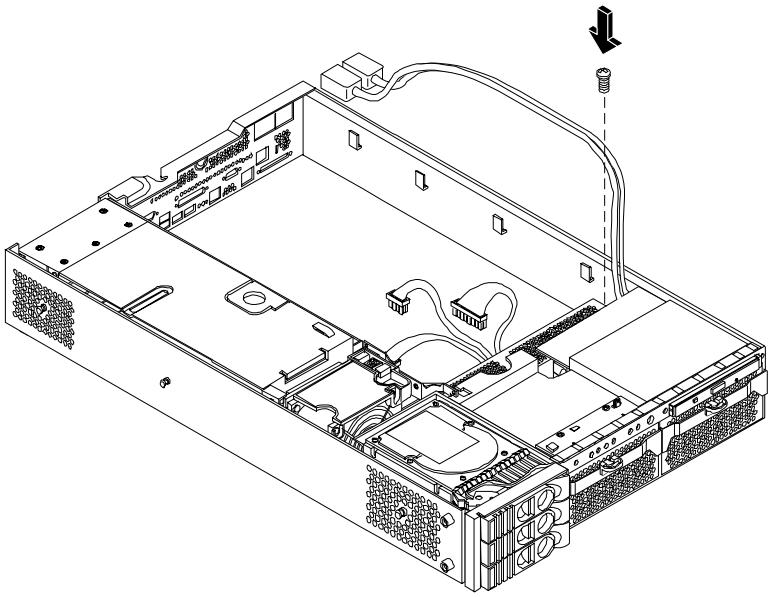
Step 1. Place the PSI module into the chassis by sliding the module retaining tab into the socket on the hard disk drive bay wall.

Figure 3-75Replacing the Power Supply Interface Module



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

Figure 3-76Securing 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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

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

Removing and Replacing the Hard Disk Drive (SCSI) Backplane

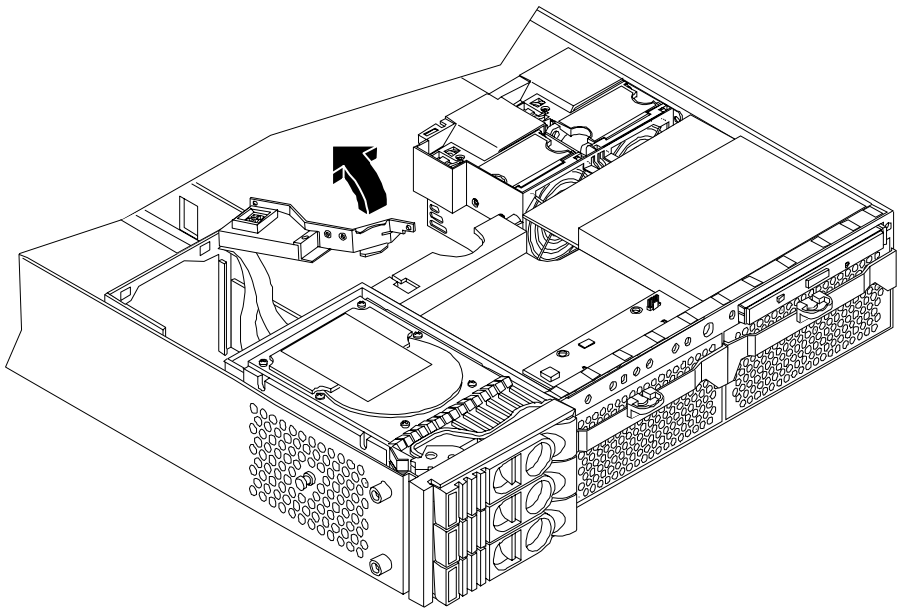
Removing the Hard Drive Disk SCSI Backplane

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 and disconnect the backplane power cable.

Figure 3-77Open the Fan Power Bridge



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

Figure 3-78Disconnect SCSI Cables

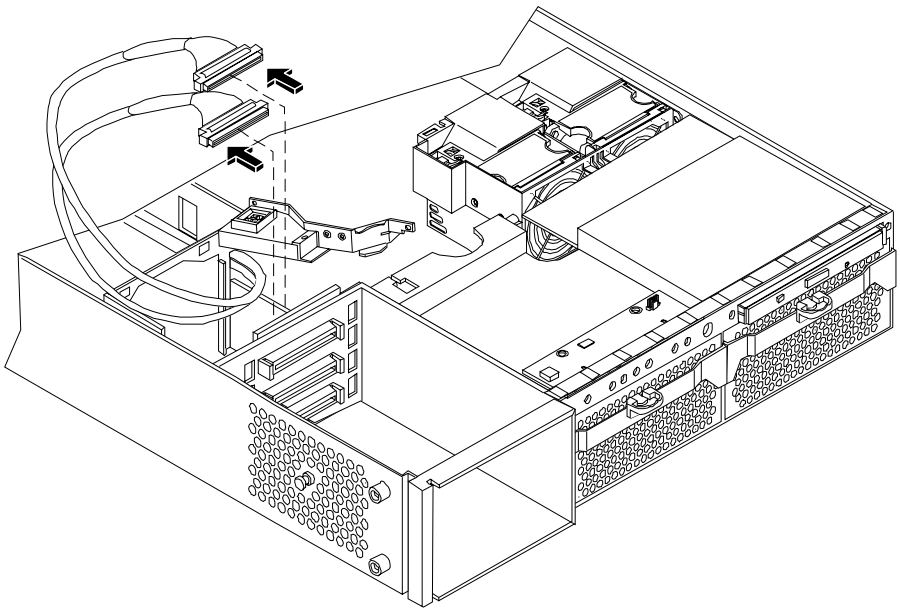
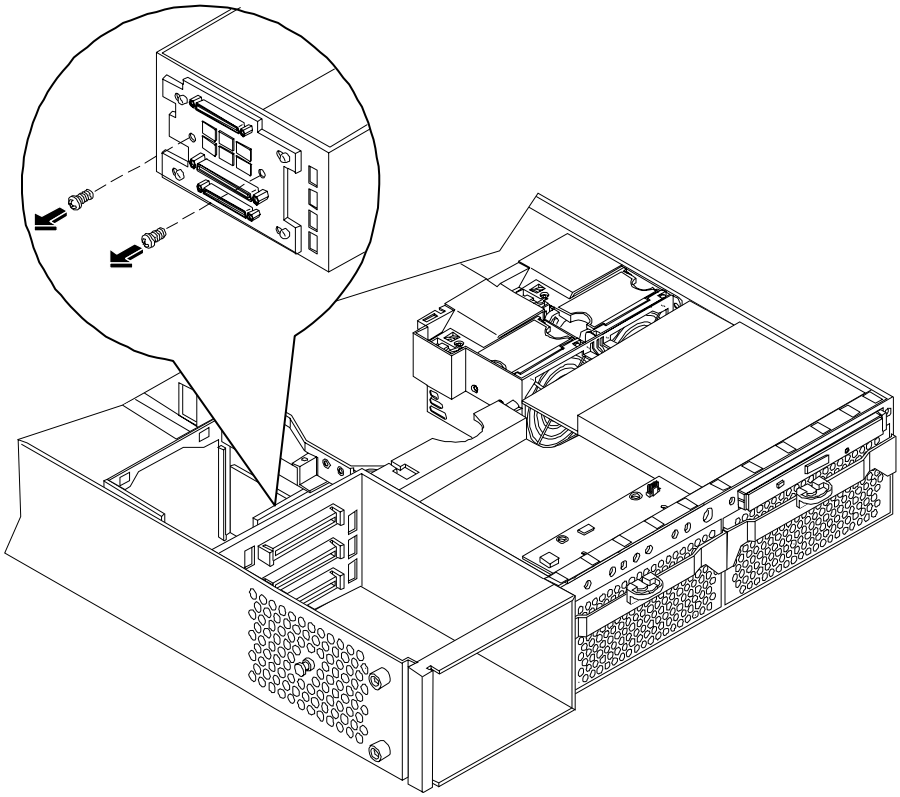


Figure 3-79Remove Mounting Screws



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

Figure 3-80Remove the SCSI Backplane

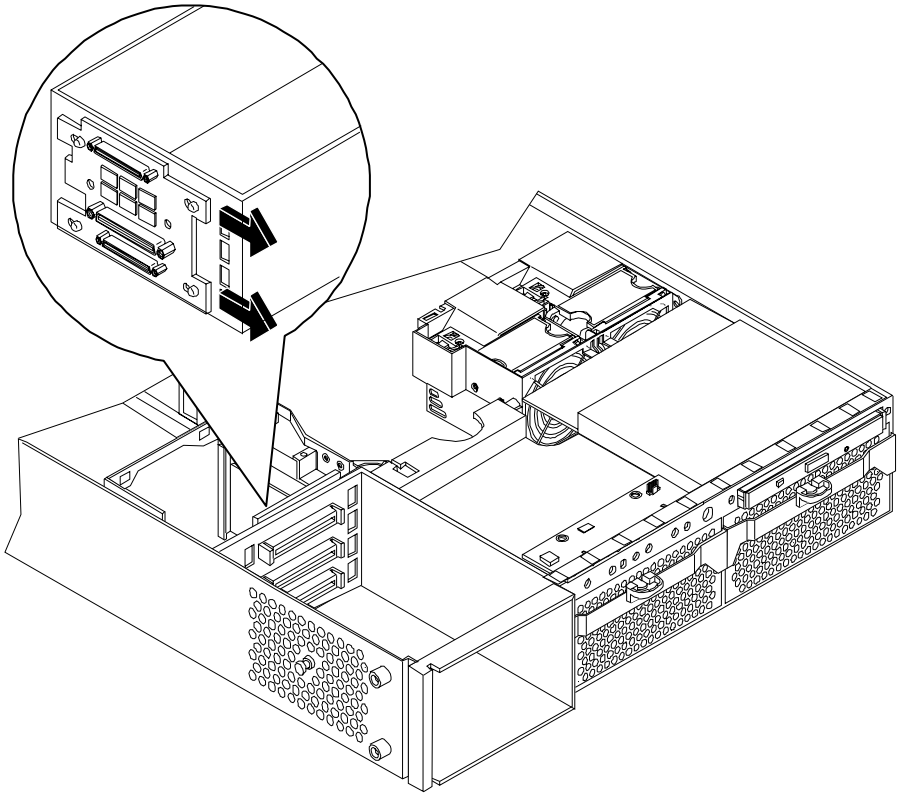
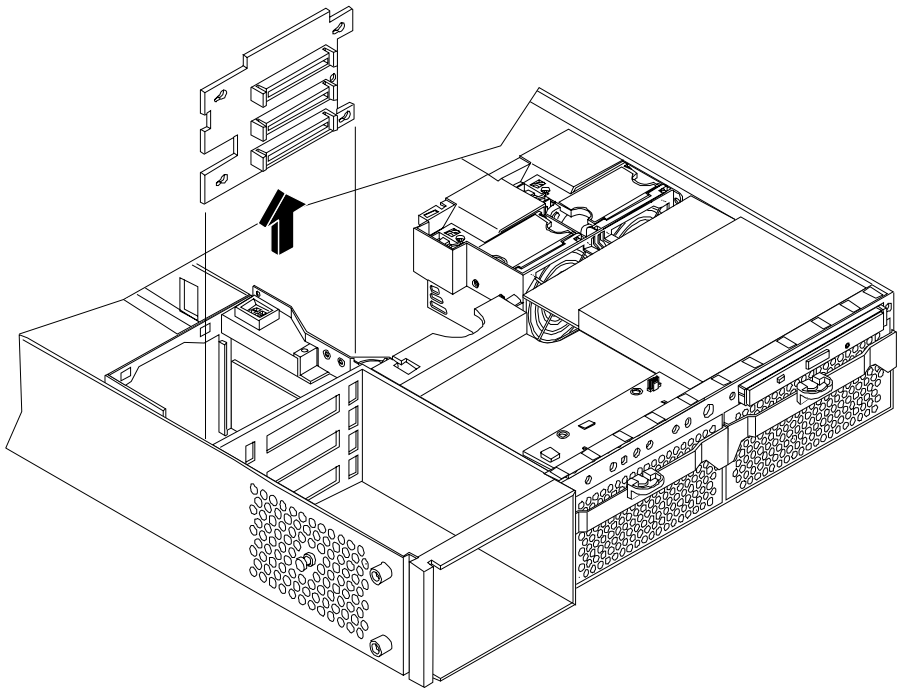


Figure 3-81Remove the SCSI Backplane from Chassis



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 and operation by using the system utilities. (Refer to the Utilities chapter of the *hp9000 rp3410 and rp3440 Operations Guide* for additional information.)

- 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

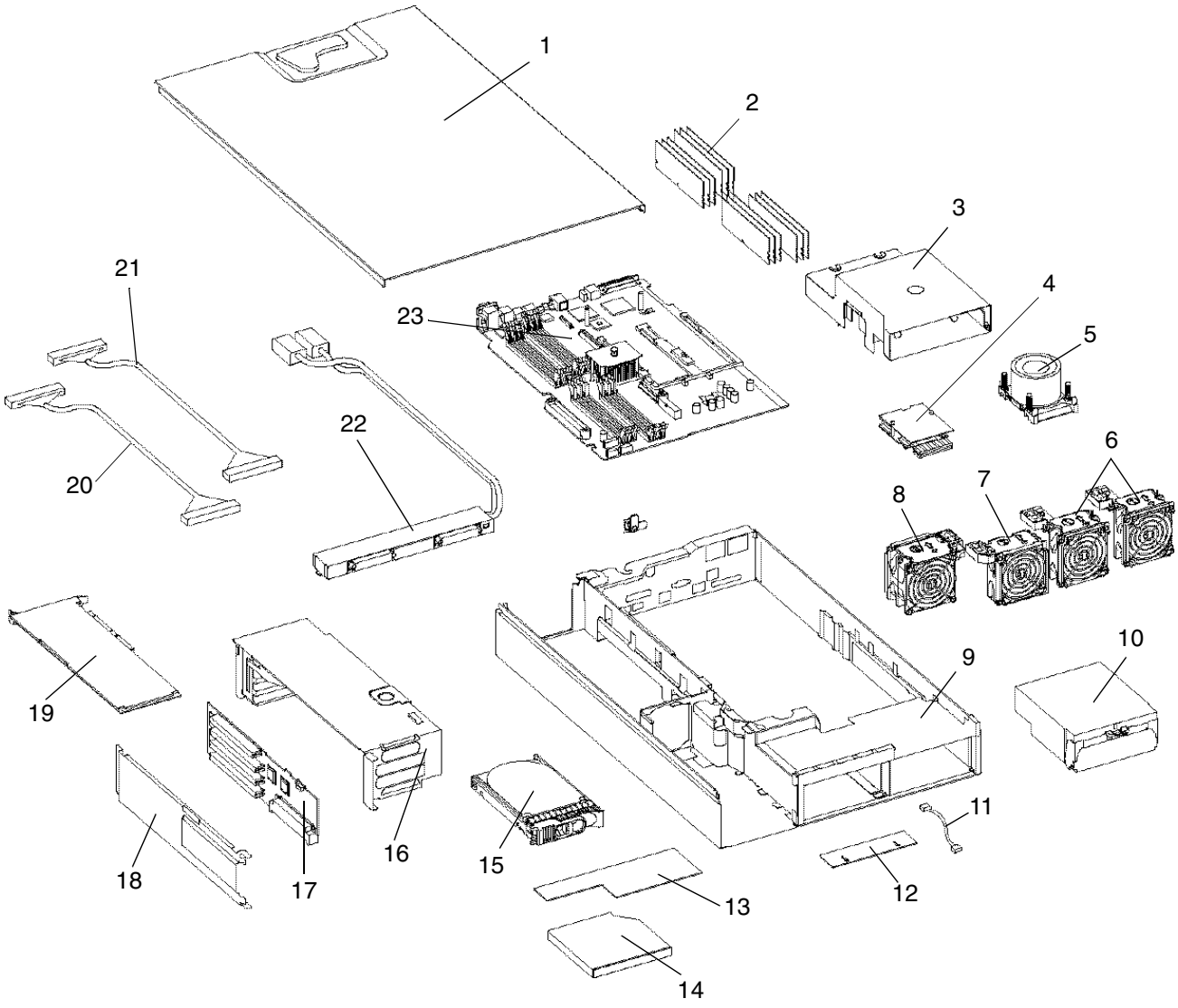
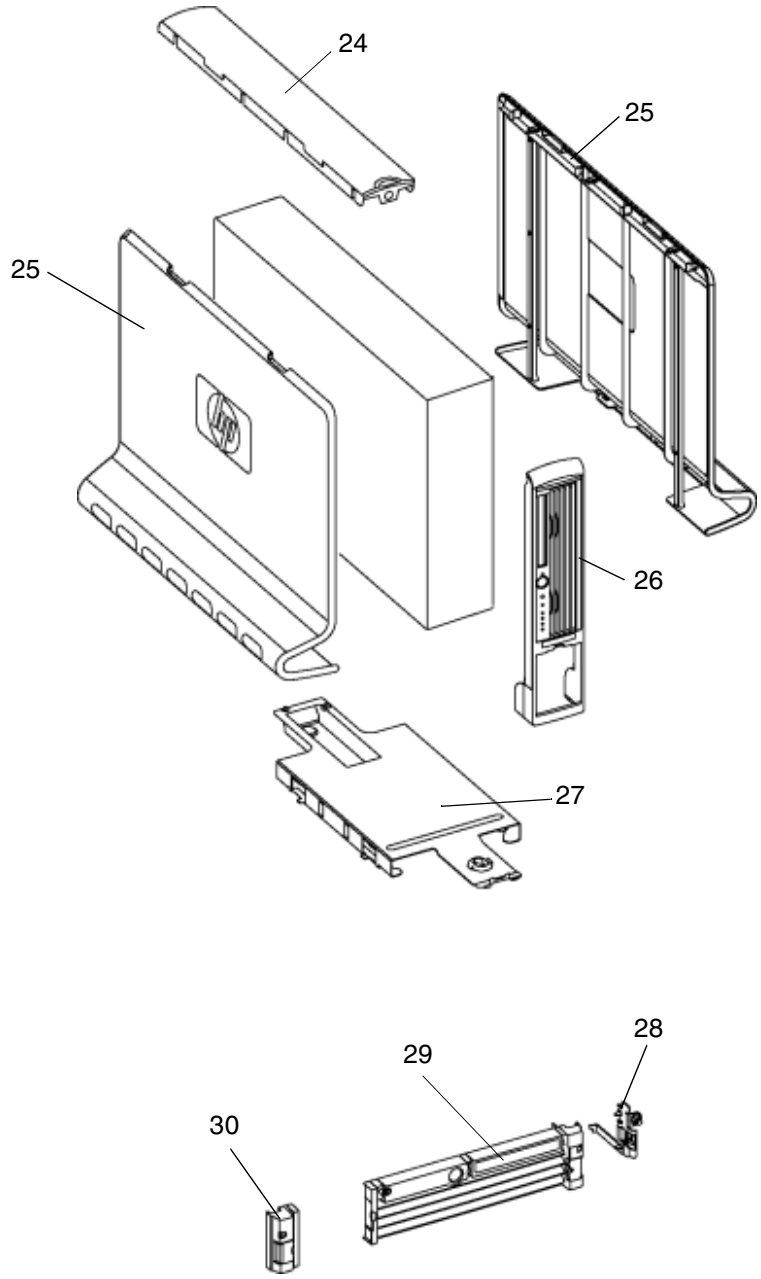


Figure A-2 Tower Parts



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)	A7136-67001	A7136-69001
17	PCI backplane	A7231-66530	
12	Display panel	A7231-66550	
	Remote management board (ECI/Management Processor board)	A7231-66580	
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	1 GB DDR-SDRAM, pc2100 (rp3440 (A6834-60001)) (A9910A)	A6834AX	A6834-69001
2	2 GB DDR-SDRAM, pc2100 (rp3440 (1818-8799)) (AB228A)	A6970AX	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

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

Item No.	Description	Part Number Replacement	Part Number Exchange
15	146GB, 10K RPM Ultra320 SCSI HotPlug disk (A9978A)	A9898-64001	A9898-69001
Fans			
6	Assembly—Super 80 mm fan (fan 1a/1b)	A7231-04014	
7	Assembly—Thin 80 mm fan (fan 2)	A7231-04015	
8	Assembly—Dual fan (fan 3)	A7231-04033	
Processors			
5	Processor, 800 MHz, 1.5 MB cache, module (A7138-62002) (A7138A))	A7138-67002	A7138-69002
5	Processor, 1 GHz, 3 MB cache assembly (AB354-62001) (AB354A)	AB354-67001	AB354-69001
4	Assembly—Power Pod	0950-4294	
	Processor tool kit (A9901A)	5069-5441	
	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	

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

Item No.	Description	Part Number Replacement	Part Number Exchange
	Server rack nameplate (rp3410)	A7136-40002	
	Server rack nameplate (rp3440)	A7136-40001	
	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 management 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

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

Item No.	Description	Part Number Replacement	Part Number Exchange
	PWR CORD SWITZERLAND 250 VAC	8120-2104	None
	PWR CORD U.K. 250 VAC	8120-1351	None

B System Information

Features Summary

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

Processor

- 800 MHz/1.5 GB cache
- 1 GHz/1.5 GB cache (hp9000 rp3440 only)
- rp3410 processors may be 1-way and 2-way
- rp3440 processors may be 1-way, 2-way, and 4-way

Memory

- 12 memory DIMM slots
- Maximum memory size of 6 GB (hp9000 rp3410) or 24 GB (hp9000 rp3440)
- 256 MB and 512 MB (hp9000 rp3410) standard 184 pins 2.5V DDR266, CL2, registered, ECC
- 256 MB, 512 MB, 1 GB and 2 GB (hp9000 rp3440) standard 184 pins 2.5V DDR266, CL2, registered, ECC
- 133 MHz memory bus frequency, 266MTransfers/s data, 8.5 GB/s peak data bandwidth
- Upgrades must be made by pairs of DIMMs minimum
- DIMMs loaded by quads enable interleaved mode and chip spare

PCI Riser

- 2 (hp9000 rp3410) or 4 (hp9000 rp3440) independent PCI-X 133 MHz 64-bit 3.3V 15W slots. No 5V card and hot-plug support

Internal Core I/O

- Dual channel SCSI U160 interface, 2 internal 68-pin 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 80-pin type and provide drive electrical hot-plug capability
- The SCSI backplane has been designed to support a SCSI management piggy board accessory that provides 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 68-pin connector
- 1-10/100/1000Base-T ethernet LAN connectors for copper cable
- 4-USB 2.0 ports
- 3 DB-9 ports (Console, UPS, and Modem) via 3-connector M cable

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
- Locator front/rear LEDs
- Field replacement units monitoring by BMC

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

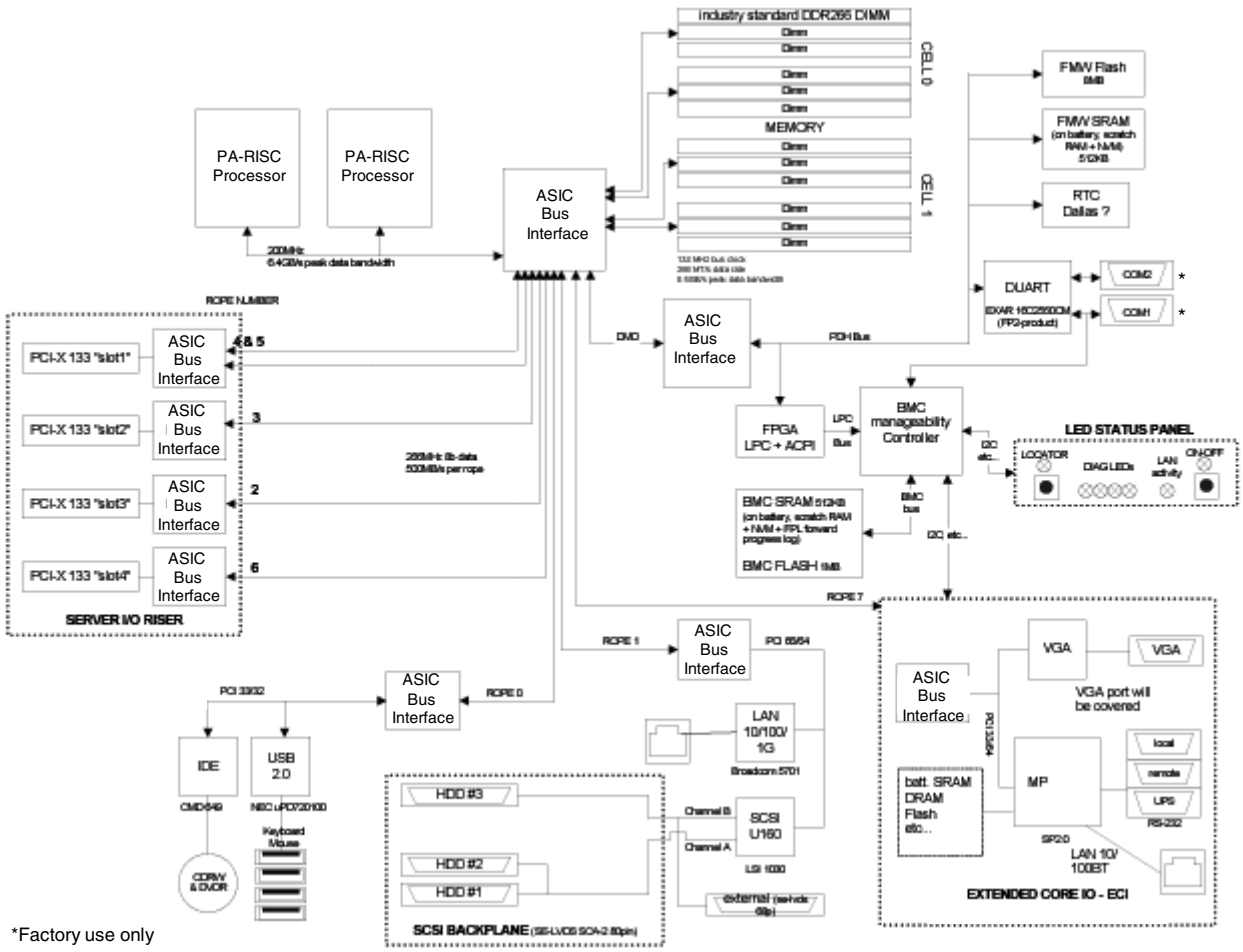
Hard Disk Drives

- 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 B-1 System Block Diagram



*Factory use only

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 PCI bus controller
- Processor dependent hardware controller
- Field processor gate array controller

- Baseboard management controller
- SCSI controller
- IDE controller
- USB controller
- 10/100/1000 LAN

PA RISC Processor

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

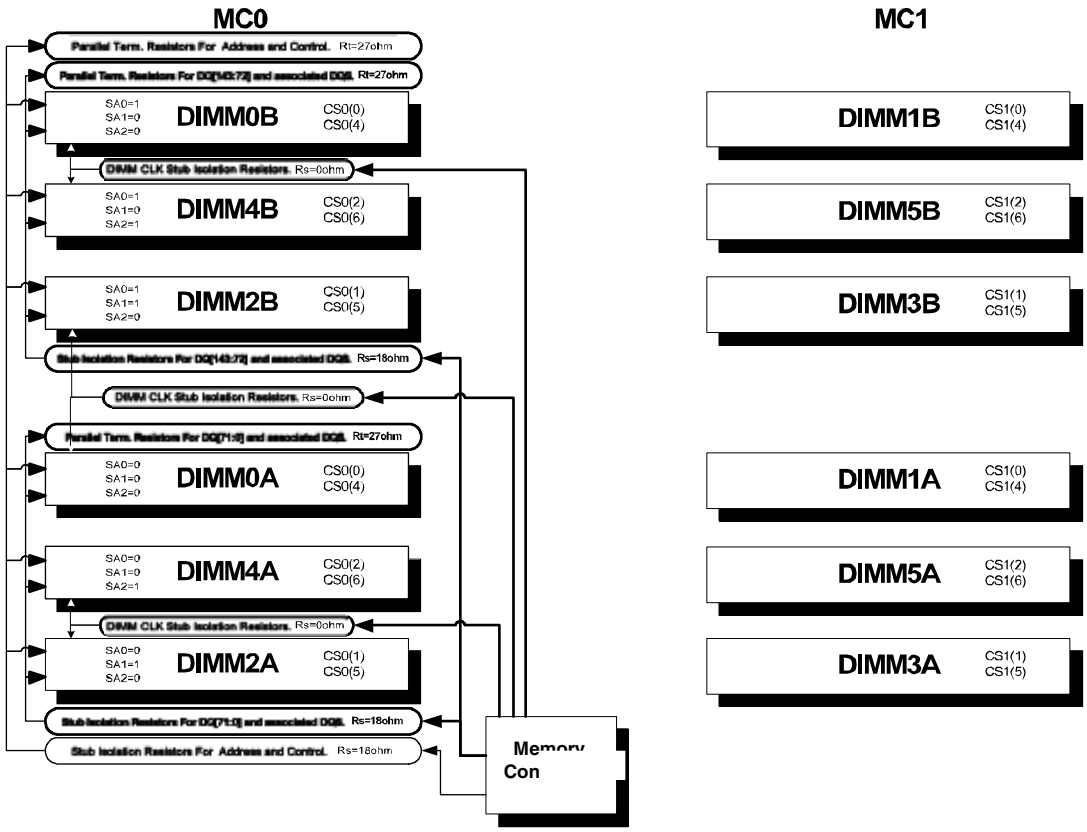
Memory

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 133 MHz, 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 8.5 GB/s. DIMMs must be loaded in quads with qualified modules, with the exception of 256 MB 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 512 MB (2-256 MB modules). The maximum amount of memory that can be installed is dependent on the largest DIMM size (2 GB). When the product is initially released, 24 GB will be that maximum memory size.

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

Figure B-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 256 MB 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 Size	Single DIMM Size	DDR SDRAM Count, Type and Technology
• 0.5 GB / 3 GB	256 MB DIMM	18 x 32 MB x 4 DDR SDRAMs (128 MB)
• 2 GB / 6 GB	512 MB DIMM	36 x 32 MB x 4 DDR SDRAMs (128 MB)
• 4 GB / 12 GB	1024 MB DIMM	36 x 64 MB x 4 DDR SDRAMs (256 MB)
• 8 GB / 24 GB	2048 MB DIMM	36 x 128 MB x 4 DDR SDRAMs (512 MB)

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 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.

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 I^2C 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 I^2C bus.

I/O Bus Interface

The I/O bus interface has these features:

- Provides industry standard PCI 33 MHz and 66 MHz, PCI-X 66 MHz to 133 MHz, 32 or 64 data bit support
- Uses 3.3V PCI only, and it does not support 5V PCI
- Optimizes for DMA performance
- Supports 3.3V or universal-keyed PCI cards. 5V-keyed PCI cards are not supported

Processor Dependent Hardware (PDH) Controller

The Processor Dependent Hardware (PDH) controller 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

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 of 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 a 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 16 MHz (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.

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