hp Integrity rx4640
Operation and Maintenance Guide

Regulatory Model Number: RSVLA-0201

Version 3.0

Manufacturing Part Number: rx4640_OpMaint
April 2004

U.S.A.

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Contents

Contents

Contents

Figures

Figures

1 About This Document

This document describes how to operate and maintain your hp Integrity rx4640 Server, Regulatory Model Number: RSVLA-0201.

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

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What's in This Document

The *hp Integrity rx4640 Operation and Maintenance Guide* contains these chapters:

- **Chapter 2, "Controls, Ports, and Indicators."** Use this chapter to learn about the front panel controls, rear panel ports and connectors, and all system LED locations and functions.
- **Chapter 3, "External Connectors."** Use this chapter to learn about all external connectors, plugs, and their pinouts.
- **Chapter 4, "Installing Additional Components and Configuring."** Use this chapter to learn how to install additional hot-swap power supplies, hot-swap disk drives, memory DIMMs, processors, and PCI-X cards. Also, learn how to configure your management processor and boot your HP Server.
- **Chapter 5, "Utilities."** Use this chapter to learn how to navigate in the EFI and management processor environments.
- **Chapter 6, "Troubleshooting."** Use this chapter to learn how to perform minimal troubleshooting of your system
- **Chapter 7, "Removing and Replacing Components."** Use this chapter to learn how to remove and replace all Field Replaceable Units (FRUs) in your system.
- **Chapter 8, "Parts Information."** Use this chapter to see a list of all FRUs.
- **Chapter 9, "Specifications."** Use this chapter to learn the basic mechanical specifications 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

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Information to Collect Before You Contact Support

Before you contact HP support, you should:

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

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

Step 2. Collect the following information:

- The model number of your server (for example, rx4640).
- The product number of your server. This can be found on the identification label, which is found at the front of the unit (typically A6837B A6838B, and so on).

- The serial number of your server. This can be found on the identification label.

Step 3. Become familiar with your system configuration:

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

Step 4. Determine the following:

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

2 Controls, Ports, and Indicators

Introduction

This chapter describes the controls, ports, and indicators found on the front panel, rear panel, and internal locations of the hp Integrity rx4640 Server. The hp Integrity rx4640 Server comes in either rack mount or pedestal configurations.

Front Panel

The front panel of the hp Integrity rx4640 Server provide the controls and indicators commonly used for operation.

Figure 2-1 Front View with Bezel

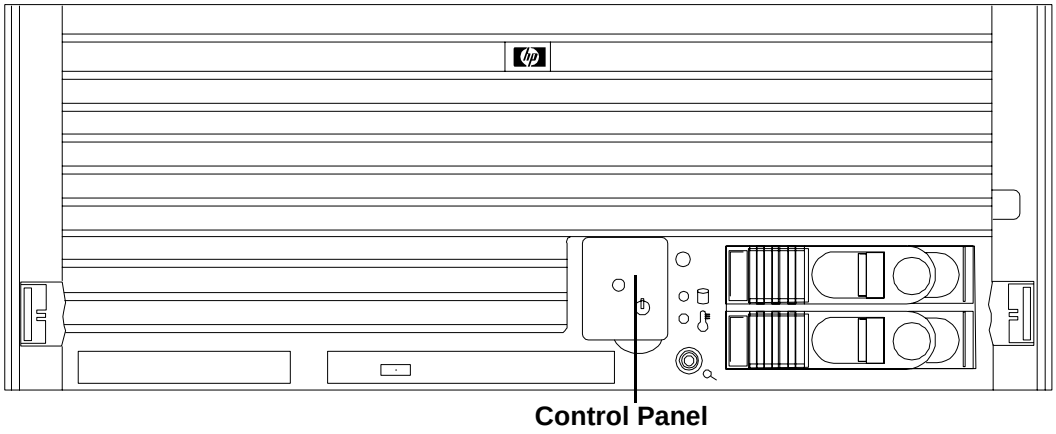


Figure 2-2 Accessing the Control Panel

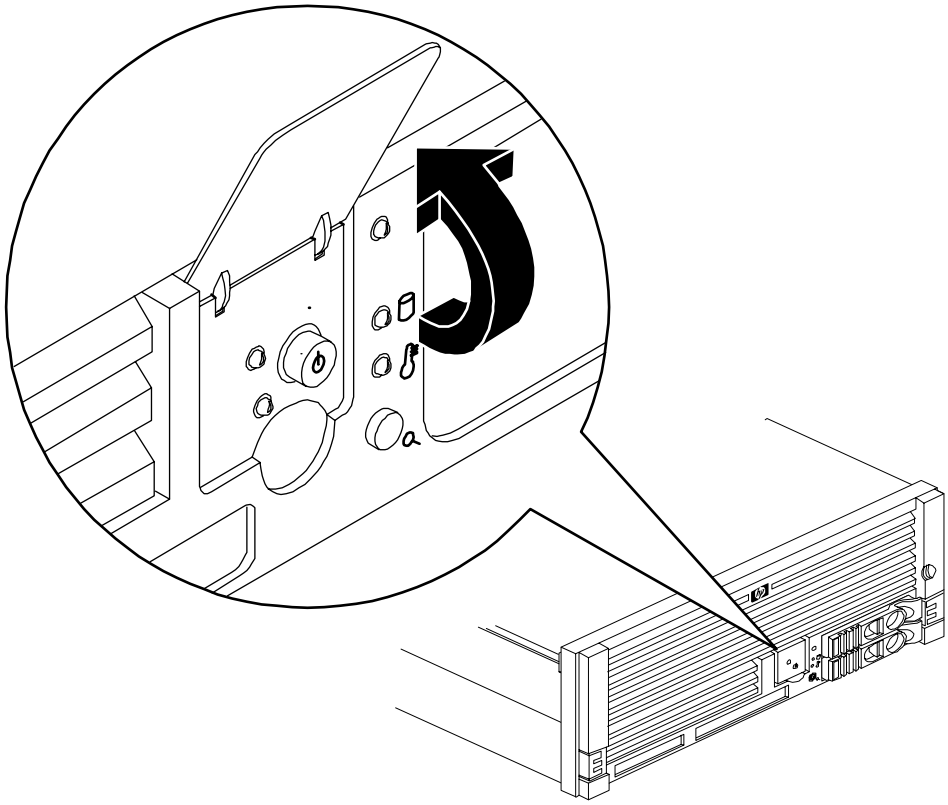


Figure 2-3 Control Panel

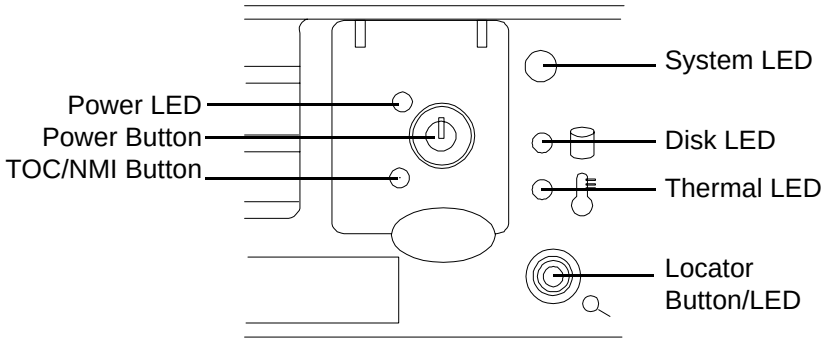


Table 2-1 Control Panel LED Definitions

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

Switch/Button and Front Control Panel LED Definitions

Table 2-2 Switch/Button LED Definitions

Button/Switch	Description
Power Button	The power switch turns the HP Server power on or off. If sleep states are available, it also transitions between power-on and sleep states. Sleep states are NOS dependent and only available if your NOS supports power management based on the ACPI (Advanced Configuration and Power Interface) standard.
NMI Button (Paper clip may be used to depress button.)	Press the nonmaskable interrupt (NMI) switch before restarting the system after a hung condition occurs. NMI provides crash dump capture capability. Obtain a system hardware status dump to use in root cause analysis and debugging.

Additional Controls and Indicators

Storage devices have additional LEDs showing their status.

Hot-Plug Disk Drive Indicators

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

- Drive Status LED - The drive status LED is tri-color and may display green, amber, or yellow at any given time. These colors indicate a normal, warning, or failure condition.
- Drive Activity LED - The drive activity LED is green and indicates disk drive activity. This LED is controlled by the disk drive directly and turns on when a drive is accessed.

Figure 2-4 Hot-Swap Disk Drive LED Indicators

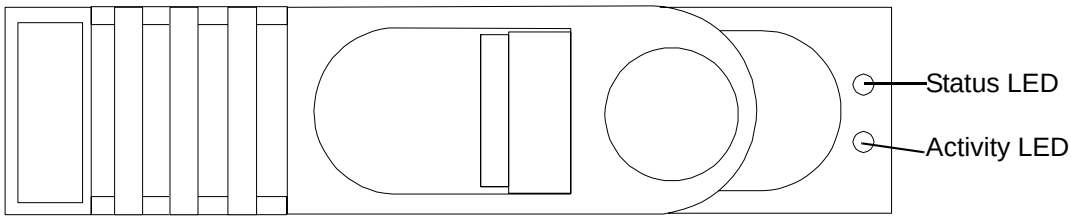


Table 2-3 Hot-Swap Disk Drive LED Definitions

LED		Description
Activity LED	Flashing green	Drive access under hard drive control.

Table 2-3 Hot-Swap Disk Drive LED Definitions (Continued)

LED		Description
Status LED	Solid Amber	Drive fault.
	Amber	Missing management board or jumper cable. For all HDD on SCSI bus A and/or B.
	Green	Drive/Slot normal (drive present).
	Blank	Pass through mode.

DVD–ROM/DVD-R/DVD-RW Drives

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

Figure 2-5 DVD–ROM Drive

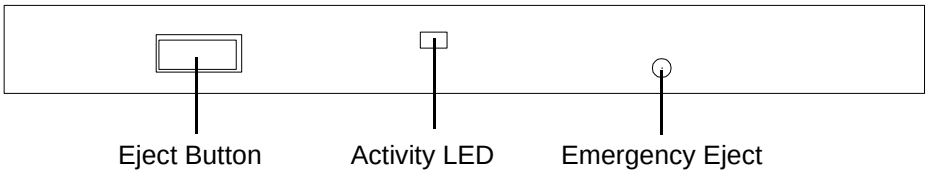


Table 2-4 DVD Drive LED Definitions

LED		Description
Activity LED	Flashing green	Drive access under hard drive control.

QuickFind Diagnostic Panel

The QuickFind diagnostic panel has 27 single color LEDs and one multi-color LED for temperature. The LEDs are normally off. The appropriate LED is turned on when an error is detected or a replacement part is required.

Accessing the QuickFind Diagnostic Panel

You can access the QuickFind diagnostic panel by removing the top cover. See “Removing the Top Cover” on page 147. You can use the QuickFind diagnostic panel as an aid in troubleshooting. For a complete description of QuickFind diagnostic LED states, see “QuickFind Diagnostic Panel LED Definitions” on page 130.

Figure 2-6 QuickFind Diagnostic Panel

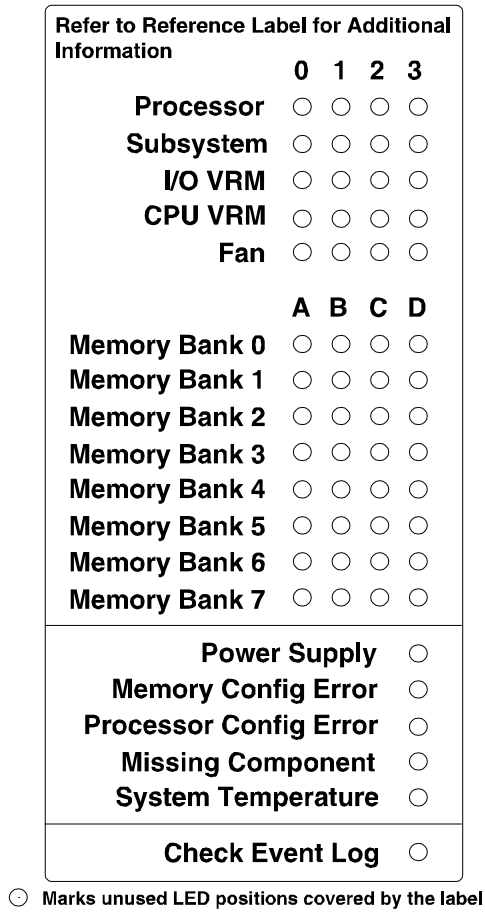


Table 2-5 QuickFind Diagnostic Panel LEDs

Item	LED 0	LED 1	LED 2	LED 3	Details
Processor	Socket 0	Socket 1	Socket 2	Socket3	If the System LED (on front panel) is in the attention or fault state and the processor LED is lit, then the processor or voltage regulator has failed—the processor module in the specified socket needs to be replaced. If the thermal LED is in the warning or critical state and the processor LED is lit, then the processor exceeded the warning or critical level.
Subsystem	CPU board	Memory board	I/O board	n/a	A soldered voltage regulator has failed—the specified board must be replaced.

Table 2-5 QuickFind Diagnostic Panel LEDs (Continued)

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

I/O Baseboard LED Indicators

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

Figure 2-7 I/O Baseboard LEDs, Buttons, and Sensors

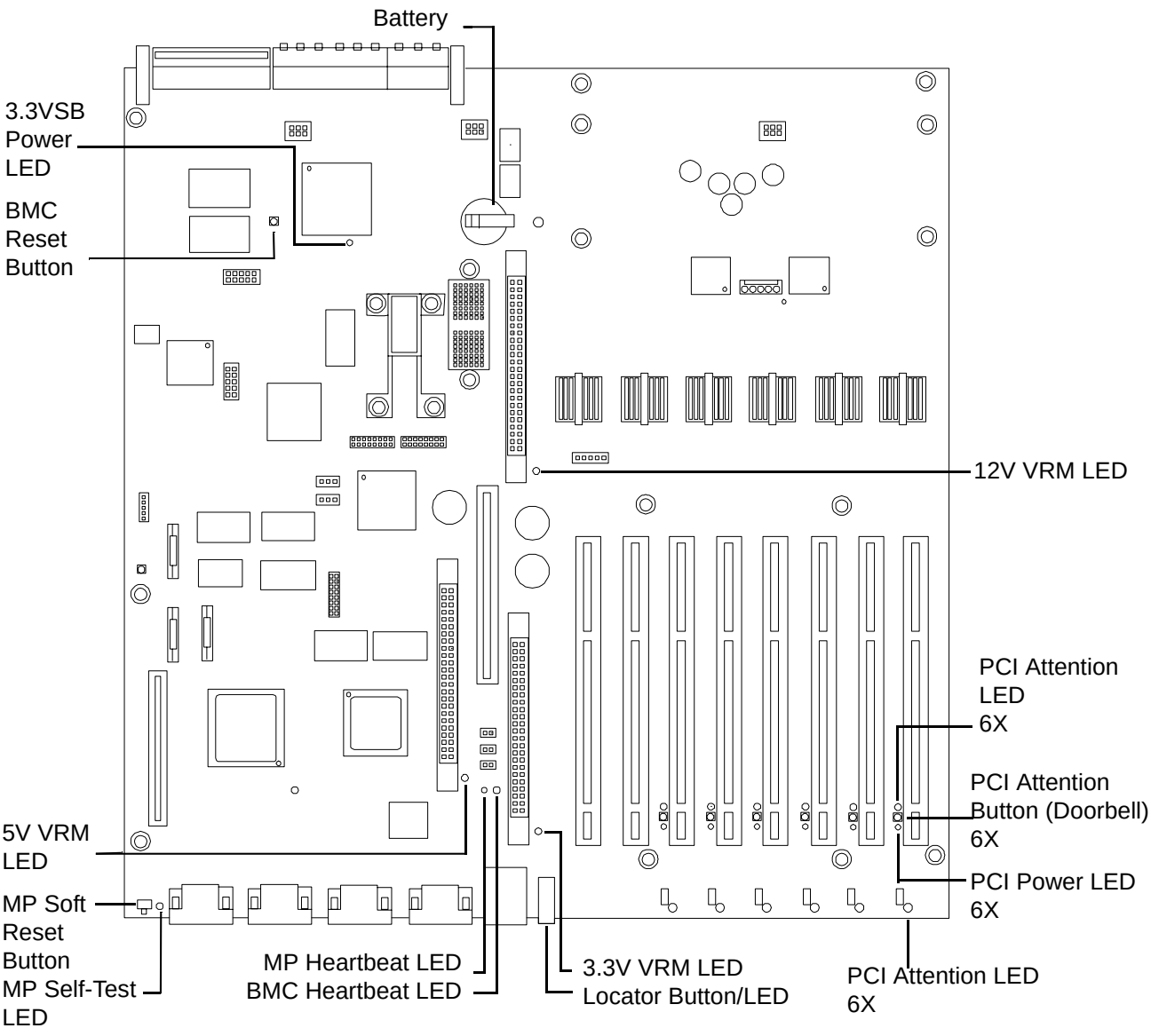


Table 2-6 I/O Baseboard LEDs, Buttons, and Sensors

LED/Button	Color	Status	Condition
12V VRM Power LED	Green	On	12V VRM is functioning.
5V VRM Power LED	Green	On	5V VRM is functioning.

Table 2-6 I/O Baseboard LEDs, Buttons, and Sensors (Continued)

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

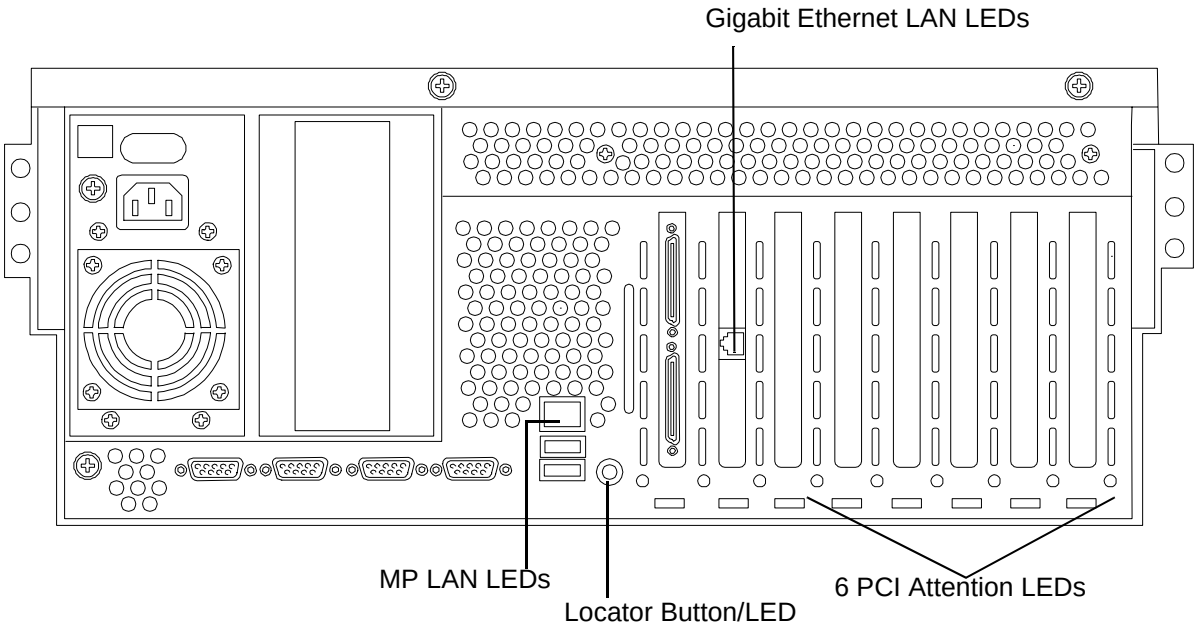
Rear Panel

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

- Power supplies
- Management processor LAN
- 2 Port Gigabit Ethernet card LAN

- PCI slots 3-8

Figure 2-8 Rack Mount and Pedestal Rear View



Power Supply Status LEDs

Each 200-240 VAC power supply unit has three status LEDs located on the power supply rear side. Consolidated status of all power supplies is reported by the front control panel by the power status LED.

Figure 2-9 Power Supply Status LED

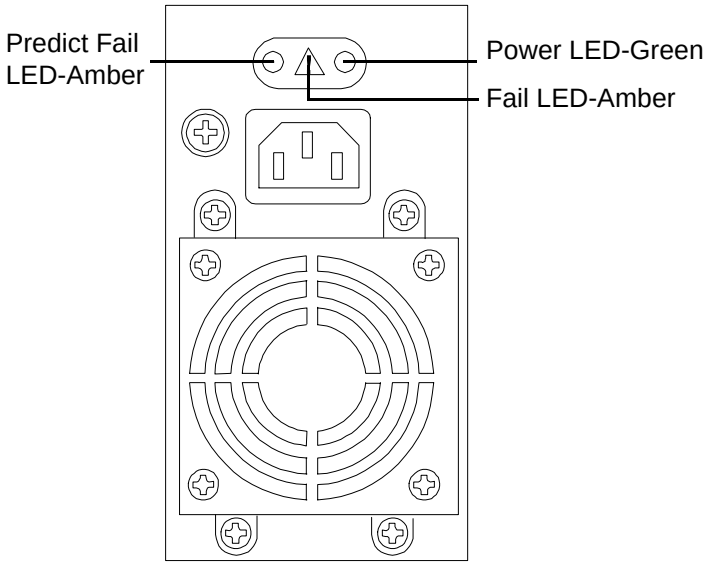


Table 2-7 Power Supply Status LED

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

Management Processor LAN LEDs

The internal management processor (MP) LAN uses an RJ-45 type connector. This connector has two LEDs (LAN link and LAN activity) that signal status and activity.

Figure 2-10 MP LAN LEDs

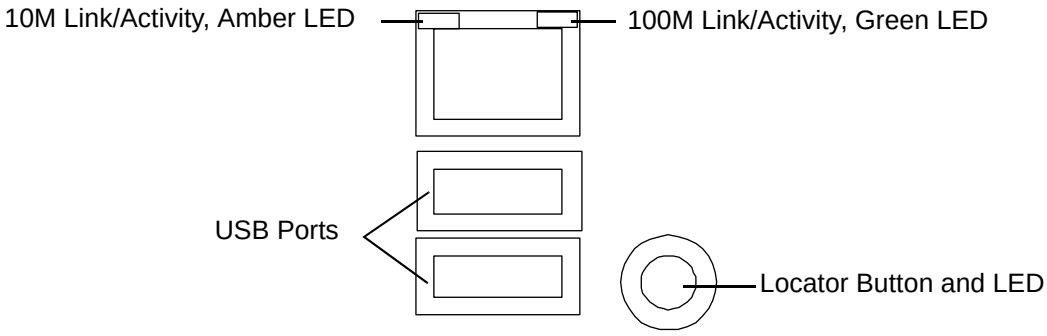


Table 2-8 MP LED Status Descriptions

LED	Condition	Status
10M amber	On	Linked at 10MBps—no activity
10M amber	Blinking	Linked at 10MBps—activity present
100M green	On	Linked at 100MBps—no activity
100M green	Blinking	Linked at 100MBps—activity present

Locator LED and Button

An LED and button is provided on the rear panel of the server. Another single blue LED and button is on the front control panel that enables/disables the locator function. See Figure 2-10, “MP LAN LEDs.”

Gigabit Ethernet Card LAN LEDs

(Core I/O)

The 2-Port core I/O Gigabit Ethernet card uses an RJ-45 LAN connector. This connector has 4 LEDs (3 LAN link and 1 LAN activity) that signal link speed and activity.

Figure 2-11 Core I/O LAN Port LEDs

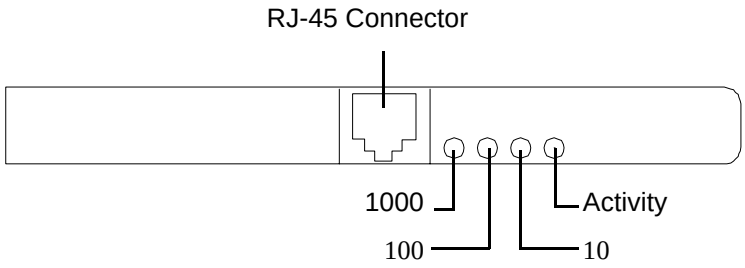


Table 2-9 Core LED Status Descriptions

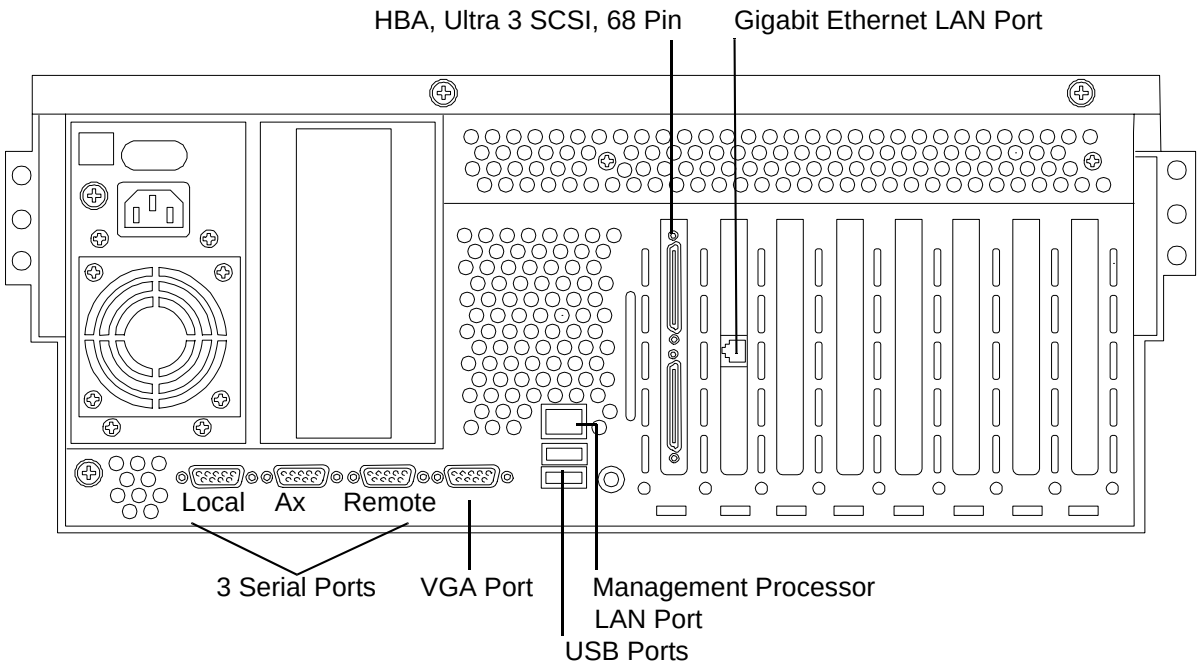
LED	Condition	Status
Activity	Green—on	Linked—no activity
Activity	Green—off	No link
Activity	Green—blinking	Linked—activity present
1000	Green—on	Link speed—1000 MBps
100	Green—on	Link speed—100 MBps
10	Green—on	Link speed—10 MBps

3 External Connectors

Connector Pinouts

The following ports and connectors are found on the rear panel of the hp Integrity rx4640 Server. The SCSI Host Bus Adapter card in slot 1 and the Gigabit Ethernet card in slot 2 are factory installed.

Figure 3-1 Rear View



Universal Serial Bus (USB) Ports

Figure 3-2 USB Port Connector

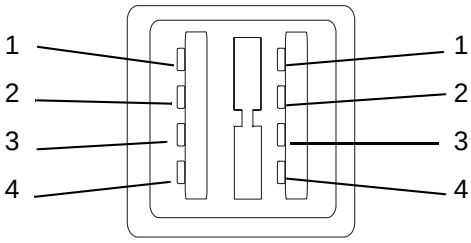


Table 3-1 USB Pinouts

Pin Number	Signal Description
1	+5VDC
2	MR

Table 3-1 USB Pinouts (Continued)

Pin Number	Signal Description
3	PR
4	Ground

VGA Port

Figure 3-3 Video Port Connector

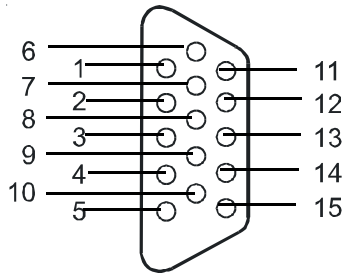


Table 3-2 Video Connector Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	Red	9	+5VDC
2	Green	10	Sync return (ground)
3	Blue	11	Not used
4	Not used	12	Monitor ID bit 1
5	Video Self Test (ground)	13	Horizontal sync (+)
6	Red return (ground)	14	Vertical sync (-)
7	Green return (ground)	15	Video ID bit 2
8	Blue return (ground)		

Serial Ports

Figure 3-4 Serial Port Connector

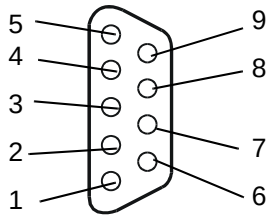


Table 3-3 Serial Port Pinouts

Pin Number	Signal Description
1	Data carrier detect
2	Receive data
3	Transmit data
4	Data Term ready
5	Ground
6	Data set ready
7	Request to send
8	Clear to send
9	Ring indicator

Management Processor LAN Port

Figure 3-5 Management Processor Port

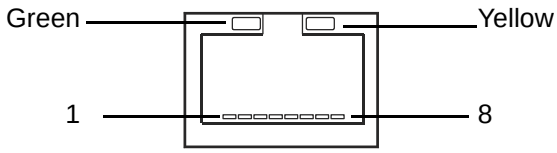


Table 3-4 Management Processor LAN Port Pinouts

Pin Number	Signal Description
1	TXP
2	TXN
3	RXP

Table 3-4 Management Processor LAN Port Pinouts (Continued)

Pin Number	Signal Description
4	Not used
5	Not used
6	RXN
7	Not used
8	Not used

Additional Ports on Accessory Boards

Gigabit Ethernet (LAN) Port

Figure 3-6 LAN Port

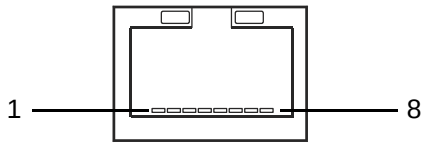


Table 3-5 LAN Port Pinouts

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

SCSI Port, Ultra 3, 68-Pin

Two Ultra 3, 68-pin SCSI connectors are located on the host bus adapter (HBA) located in PCI slot 1. The upper connector supports SCSI channel A and the lower connector supports SCSI channel B.

Figure 3-7 SCSI Port, Ultra 3, 68-Pin

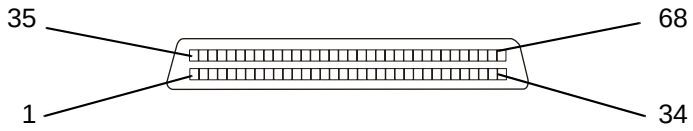


Table 3-6 SCSI Port Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	S1 (+DB 12)	35	S35 (-DB 12)
2	S2 (+DB 13)	36	S36 (-DB 13)
3	S3 (+DB 14)	37	S37 (-DB 14)
4	S4 (+DB 15)	38	S38 (-DB 15)
5	S5 (+DB P1)	39	S39 (-DB P1)
6	S6 (+DB 0)	40	S40 (-DB 0)
7	S7 (+DB 1)	41	S41 (-DB 1)
8	S8 (+DB 2)	42	S42 (-DB 2)
9	S9 (DB 3)	43	S43 (-DB 3)
10	S10 (+DB 4)	44	S44 (-DB 4)
11	S11 (+DB5)	45	S45 (-DB 5)
12	S12 (+DB 6)	46	S46 (-DB 6)
13	S13 (+DB 7)	47	S47 (-DB 7)
14	S14 (+DB P)	48	S48 (-DB P)
15	S15	49	S49
16	S16 (DIFFSENS)	50	S50
17	S17 (TERMPWR)	51	S51 (TERMPWR)
18	S18 (TERMPWR)	52	S52 (TERMPWR)
19	S19 (RESERVED)	53	S53 (RESERVED)
20	S20	54	S54

Table 3-6 SCSI Port Pinouts (Continued)

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

4 Installing Additional Components and Configuring

Installing Power Supplies and Disk Drives

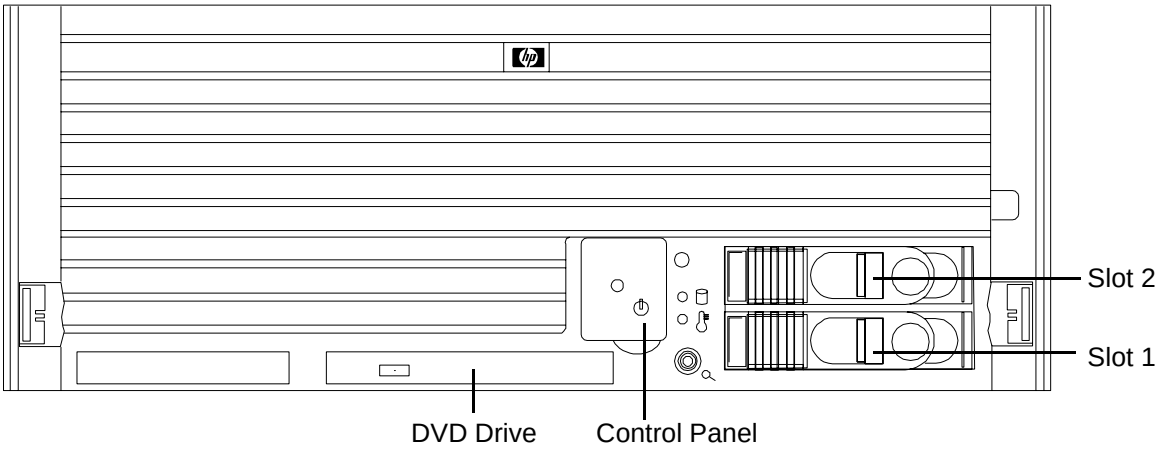
This section provides information about installing hot-swap power supplies and hot-plug disk drives. Hot- swap power supplies are located at the rear of the hp Integrity rx4640 Server and hot-plug disk drives are located behind the front bezel.

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

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

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

Figure 4-1 Front View



Installing Hot-Swap Power Supply Units (PSU)

Power Supply Load Order

The supported configuration of an hp Integrity rx4640 Server requires a minimum of one 200-240 VAC power supply unit to be installed. A second, optional hot-swap PSU, may be installed to provide N+1 capability.

The left side (viewing from the rear) hot-swap PSU is identified as P 0, and the second hot-swap power supply is identified as P 1. Each hot-swap PSU requires a separate power cord, installed in the appropriate power cord receptacle.

CAUTION The empty hot-swap PSU slot P 1 must remain closed, with the supplied metal cover, when a second power supply is not used. Your server may be damaged due to overheating if the cover does not remain in place.

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

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

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

Step 1. If rack mounted, slide the HP server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the metal cover from slot P 1. Grasp the metal cover and pull straight out.

Step 3. Supporting the PSU with both hands, slide it into slot P 1 until it plugs into the socket on the internal power supply board. Tighten thumbscrew hand-tight.

Step 4. Install the power cord into the PSU socket and secure it to the power cord bracket.

Step 5. Apply power to the new PSU; the LED should immediately turn on.

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

Figure 4-2 Hot-Swap Power Supply in P 0 Slot

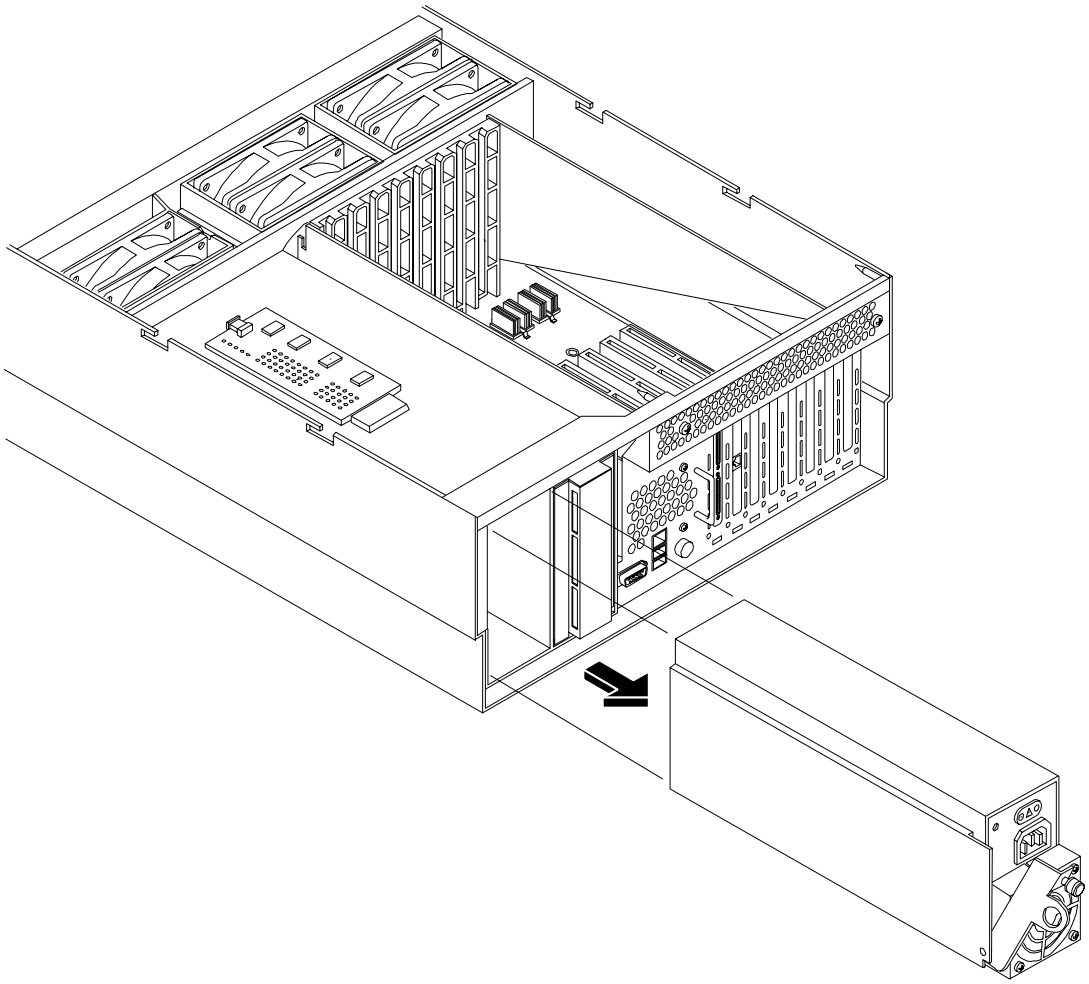
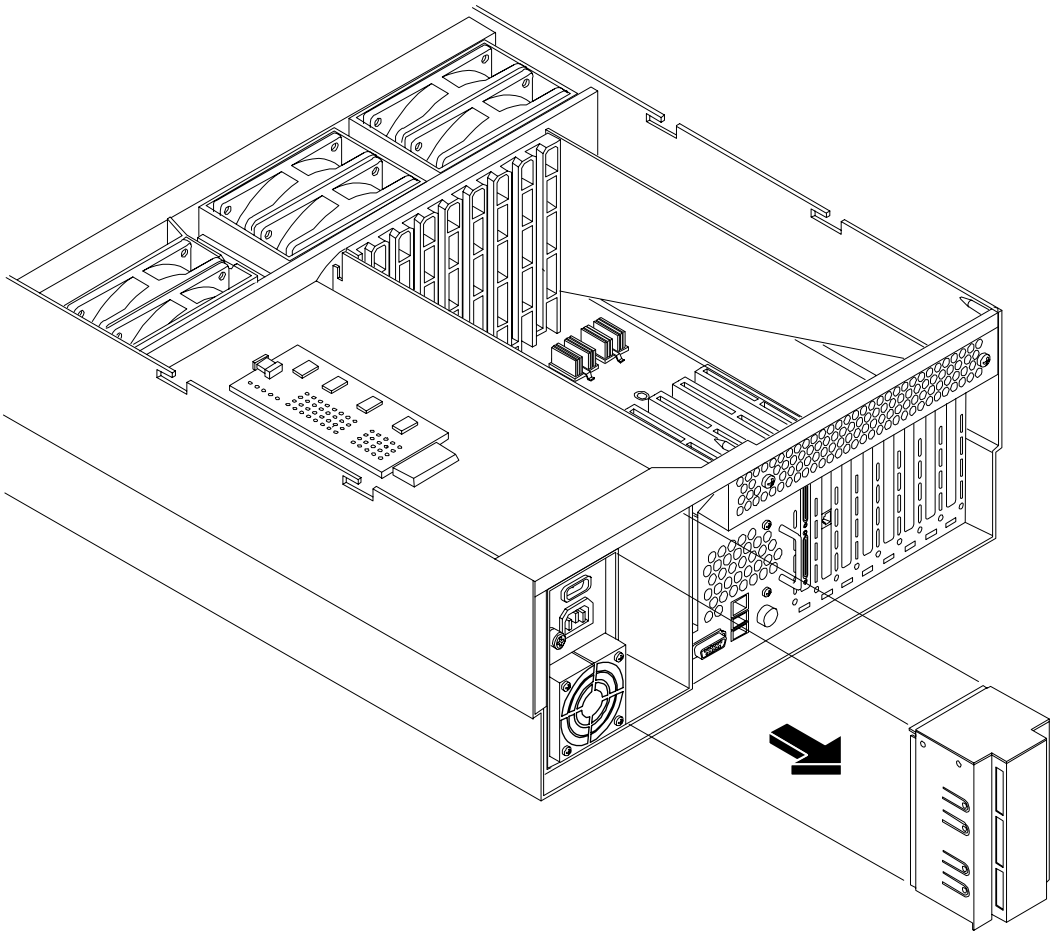


Figure 4-3 Metal Cover in Unused P 1 Slot



Installing Hot-Plug Disk Drives

One additional hot-plug disk drive may be added to your hp Integrity rx4640 Server in slot 2. Always use low profile disk drives (1.0" height) in your HP Server.

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

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

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

The hot-plug disk drive is now correctly installed.

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

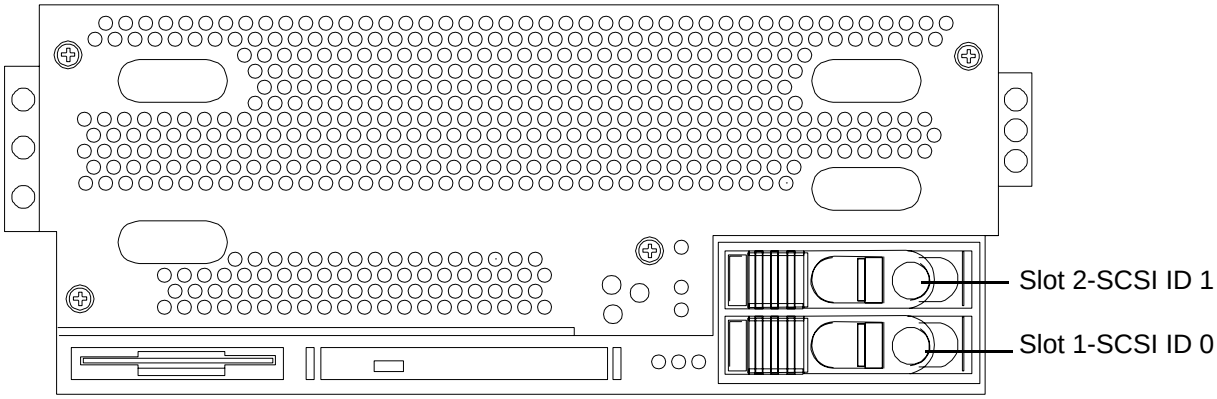


Figure 4-5 Disk Drive Installation in Slot 2

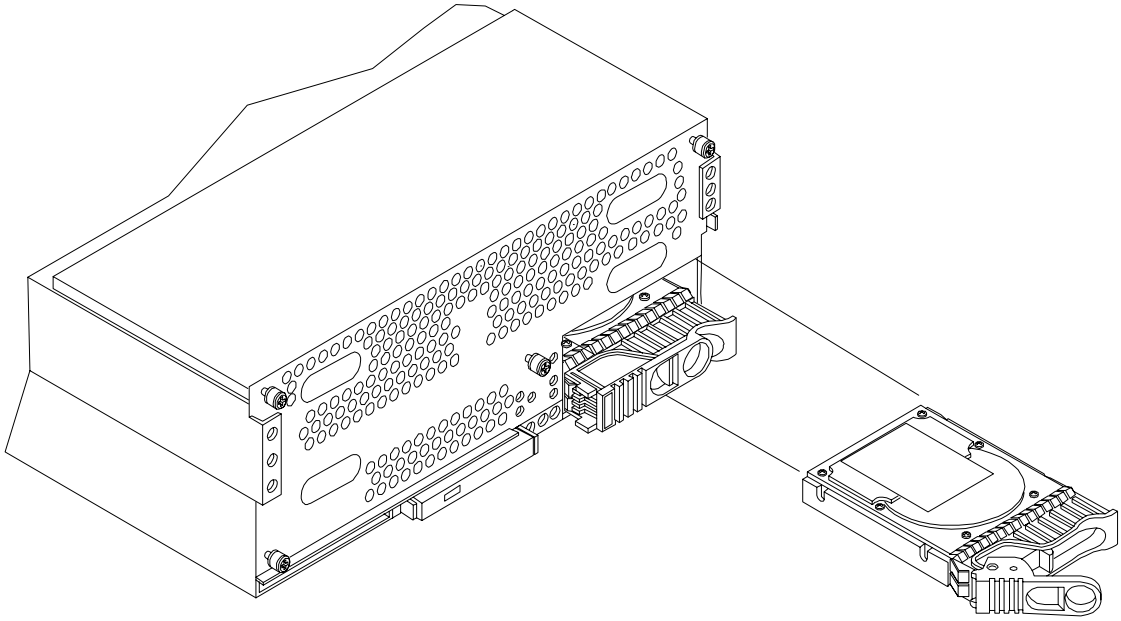
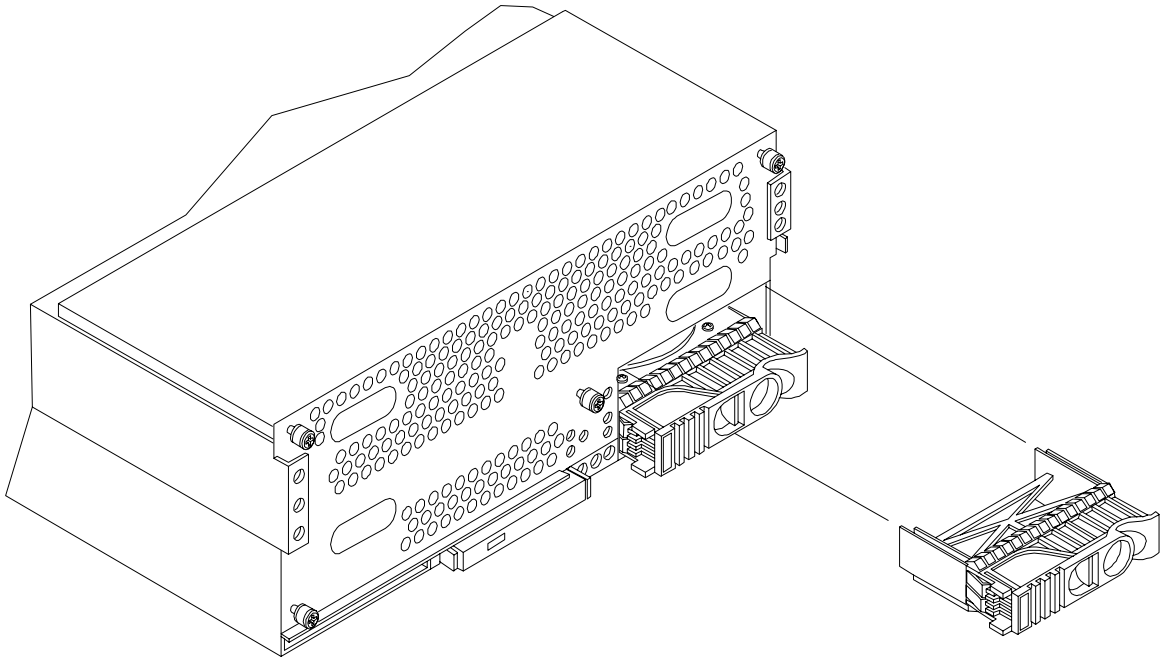


Figure 4-6 Volume Filler Installation in Slot 2



Installing Processors and Memory

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

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

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

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

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

Installing Processors

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

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

NOTE Additional CPUs come with a CPU installation wrench shown in Figure 4-11. Use the wrench to install CPUs.

Processor Load Order

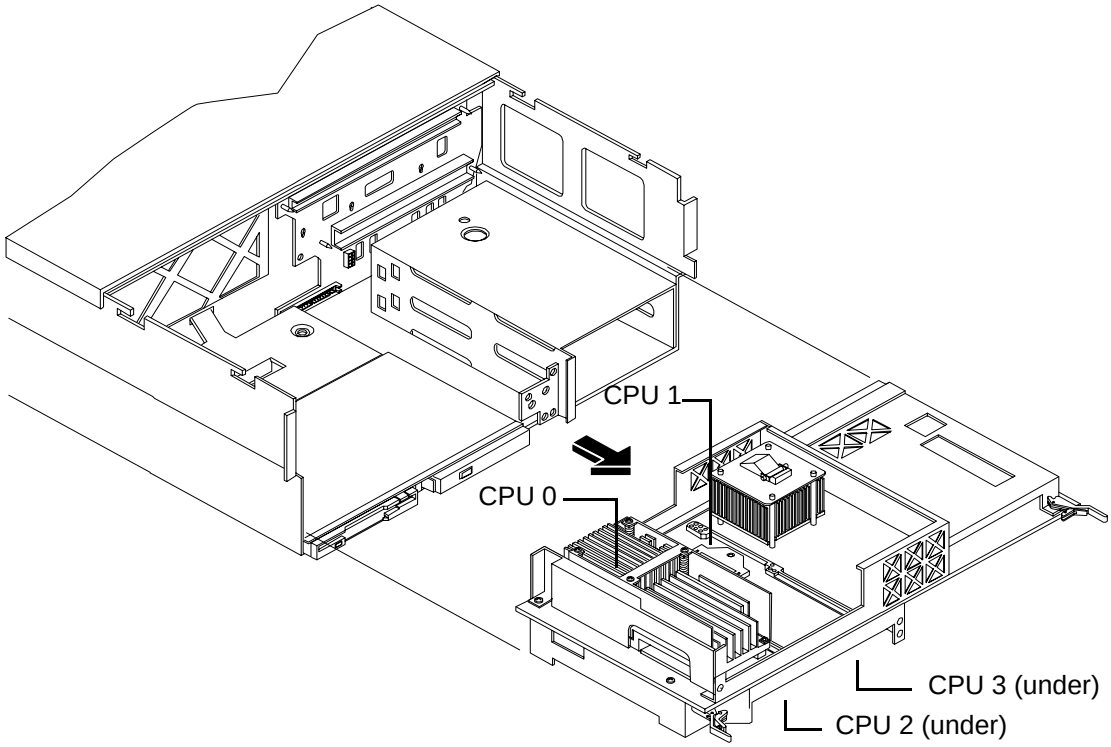
Processor modules are attached to the processor extender board, which is located under the top cover in the top service bay directly under the memory extender board. The processor extender board can hold between one and four processor modules. CPU 0 and CPU 1 are located on the top of the processor extender board and CPU 2 and CPU 3 are located on the bottom. Processor modules must be installed in a specific order. The processor installation order is shown in Table 3-1.

Table 4-1 Processor Load Order

Processor Module	Socket
First	CPU 0
Second	CPU 1
Third	CPU 2
Fourth	CPU 3

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

Figure 4-7 Removing the Processor Extender Board



Installing a Processor on the Extender Board

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

Prior to installing a processor into your system, read the following instructions carefully and refer to Figure 4-11, Installing Processor on Extender Board Example, for a complete understanding of this process.

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

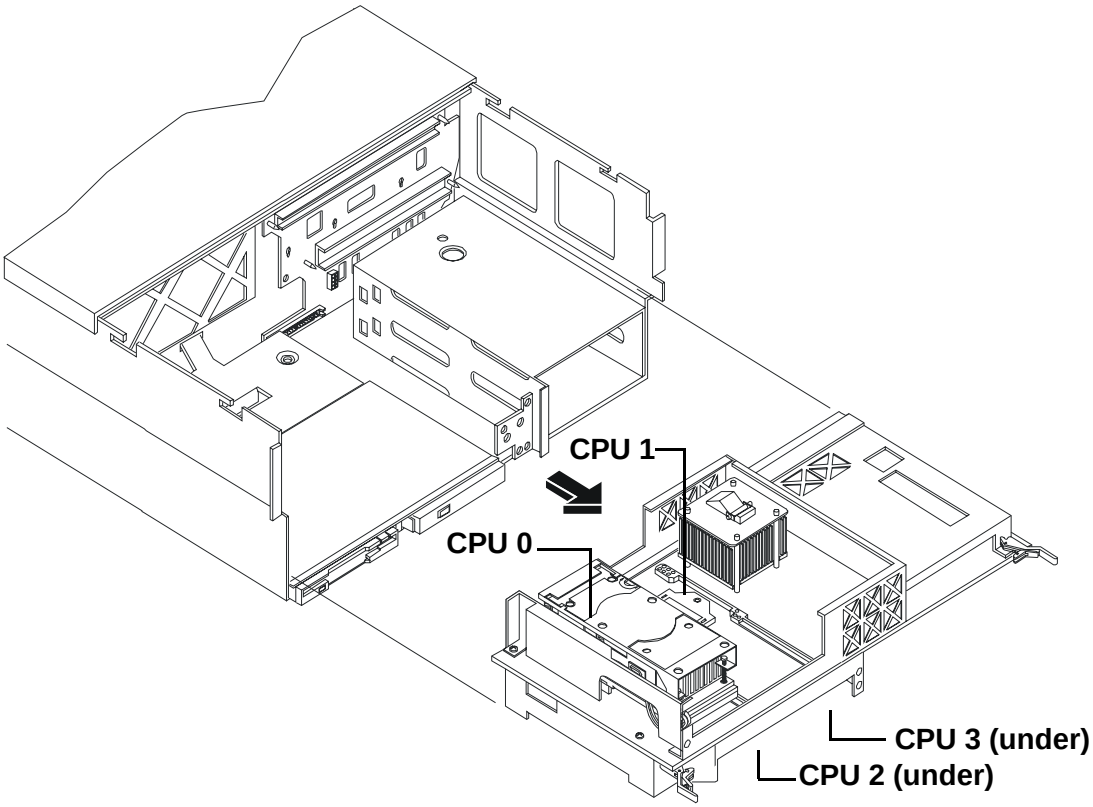
Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Removing the Front Cover” on page 145.

Step 4. Press the latch on each extraction lever located on each side of the processor extender board.

Step 5. Pull out on the extraction levers to unplug the processor extender board from the socket located on the midplane riser board and pull the extender board straight out, Figure 4-8.

Figure 4-8 Removing Processor Extender Board



Step 6. Using an antistatic wrist strap place the extender board ona grounding mat (Electrically Conductive Field Service Grounding Kit-HP 9300-1155).

Step 7. Ensure the cam on the processor socket lock is in the unlocked, counterclockwise position.

Step 8. Carefully lower the processor, without the sequencer clamp, onto the processor socket. Align the pins on the bottom of the heatsink to the slots in the retention frame on the extender board as shown in Figure 4-11, “Installing Processor on Extender Board Example.”

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

CAUTION Before locking the processor assembly into its socket, ensure that the power cable is not pinched between the heatsink and sheetmetal frame of the extender board. Also, ensure that the two power supply cable ends attached to the CPU assembly do not come unplugged from their sockets when you move the cable into place under the heatsink. See Figure 4-9, “Processor Cable Placed Correctly,” and Figure 4-10, “Processor Cable Placed Incorrectly.”

Figure 4-9 Processor Cable Placed Correctly

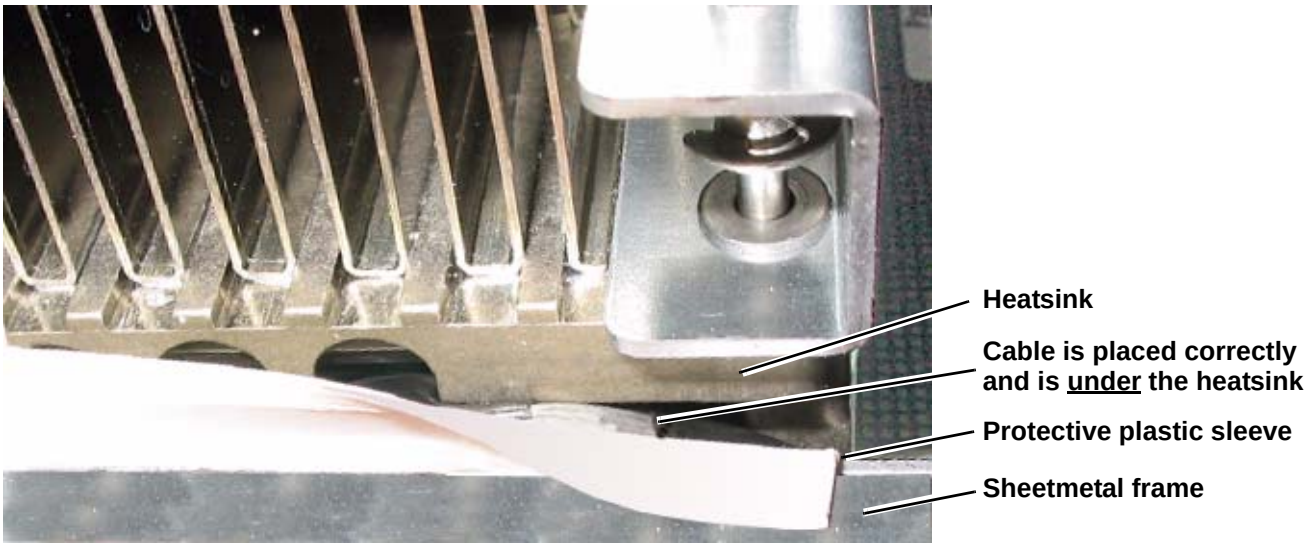
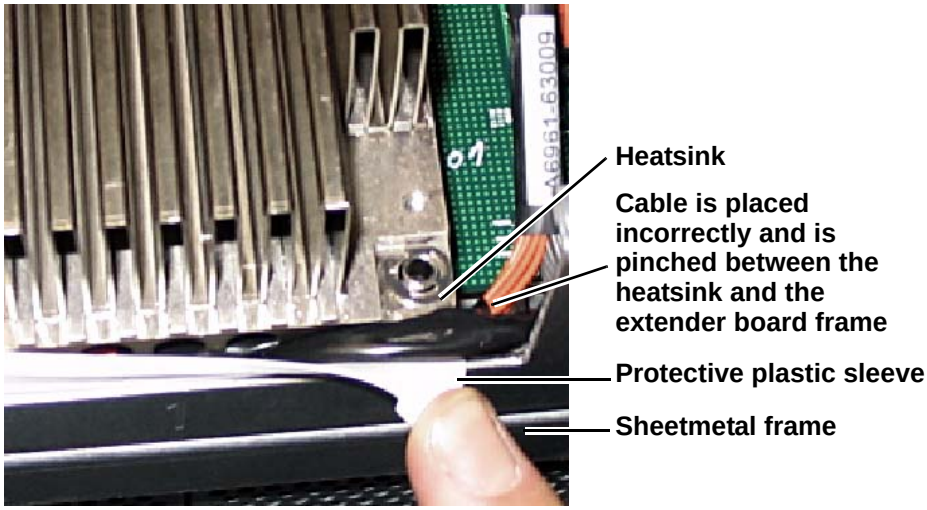


Figure 4-10 Processor Cable Placed Incorrectly



Step 9. Lock the assembly to the socket by rotating the cam on the socket 180 degrees clockwise, using a 2.5 mm driver (Allen wrench).

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

Step 10. Plug in the processor cable to its socket on the extender board.

Step 11. Place the sequencer frame over the processor.

Step 12. Using the supplied torx T15 driver, tighten the 6, T15 shoulder screws until they just bottom out. Follow the tightening sequence shown in Figure 4-11, “Installing Processor on Extender Board Example.”

CAUTION Do not overtighten the 6 shoulder screws—they may shear off if overtightened. Stop tightening the shoulder screws when you feel them just bottom out.

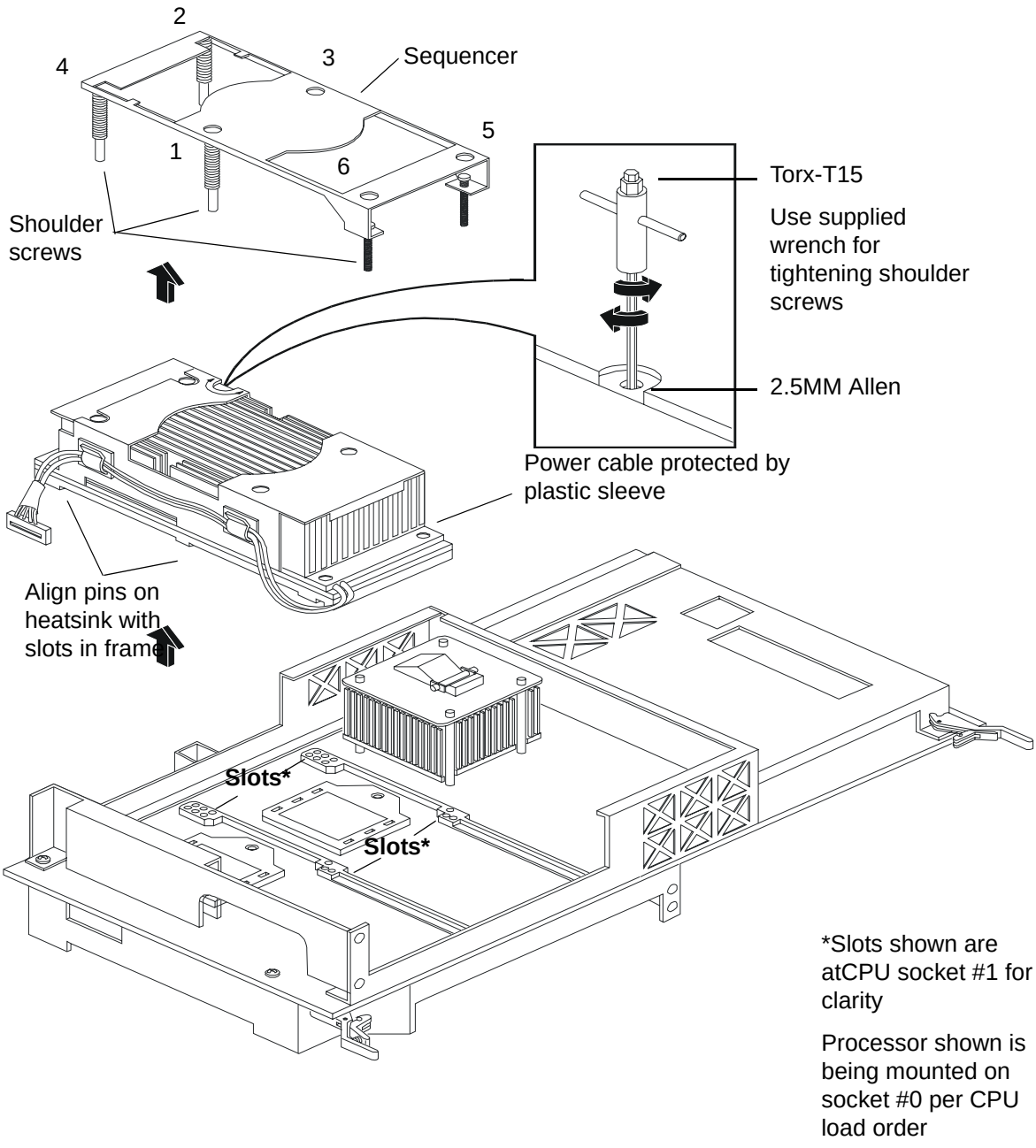
Step 13. Replace the extender board into the chassis.

Step 14. Replace the front cover.

Step 15. Replace the front bezel.

Step 16. If rack mounted, slide the HP Server into the rack until it stops.

Figure 4-11 Installing Processor on Extender Board Example



Installing Memory

Your hp Integrity rx4640 Server comes with a sixteen DIMM memory extender board that is minimally configured with 1GB of memory (four 256Mb DIMMs loaded in quad 0-(slots 0A, 0B, 0C, and 0D). See Figure 4-12, “16 DIMM Extender Board Minimum Configuration.”

An optional thirty-two DIMM memory extender board is available to replace the sixteen DIMM memory extender board and must also be minimally configured with 1GB in quad 0. See Figure 4-13, “32 DIMM Extender Board Minimum Configuration.”

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

Supported DIMM Sizes

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

DIMM Slot Fillers

Both the sixteen and thirty-two DIMM extender boards have DIMM slot filler boards placed over all unfilled DIMM slots. As you fill DIMM quads with additional memory you must remove the DIMM slot fillers covering the affected slots. All remaining DIMM fillers in unused slots must remain in place to maximize internal cooling. See Table 4-2 on page 48 and Table 4-3 on page 48.

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

Table 4-2 DIMM Filler Requirements for 16 DIMM Extender Board

16 DIMM Extender Board	
DIMMs Loaded	**Fillers Required**[a]
4 DIMMs in quad 0	6 fillers total: 2 fillers in quads 1, 2, and 3 (All quads filled)
8 DIMMs in quads 0 and 1	4 fillers total: 2 fillers in quads 2 and 3 (All quads filled)
12 DIMMs in quads 0, 1, and 2	2 fillers total: 2 fillers in quads 3 (All quads filled)
16 DIMMs in quads 0, 1, 2, and 3	No fillers required

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

Table 4-3 DIMM Filler Requirements for 32 DIMM Extender Board

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

Table 4-3 DIMM Filler Requirements for 32 DIMM Extender Board (Continued)

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

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

Figure 4-12 16 DIMM Extender Board Minimum Configuration

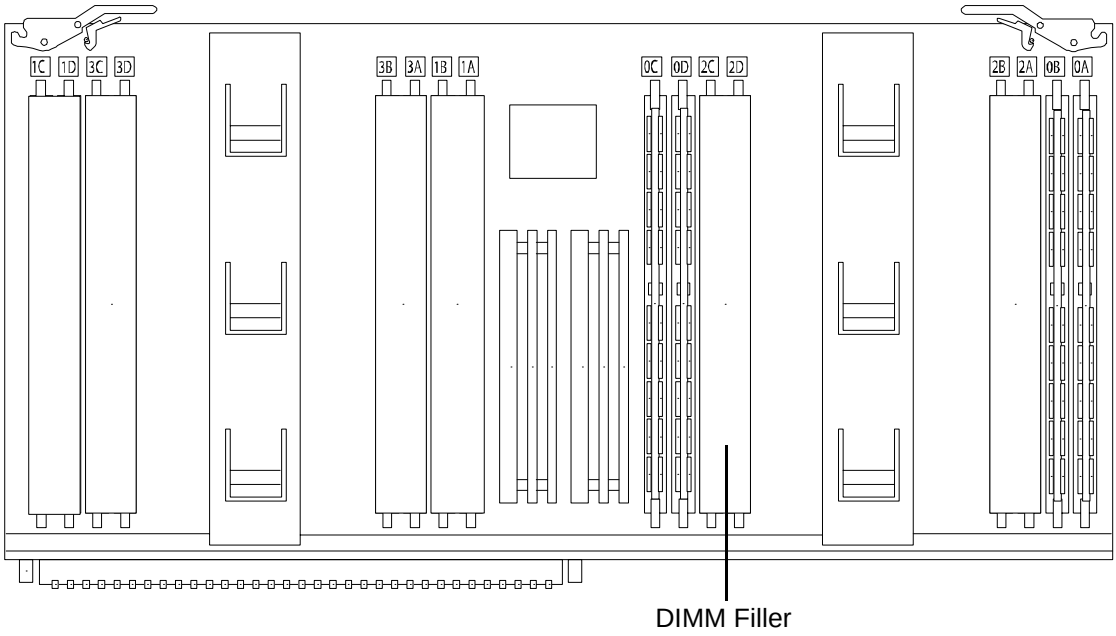
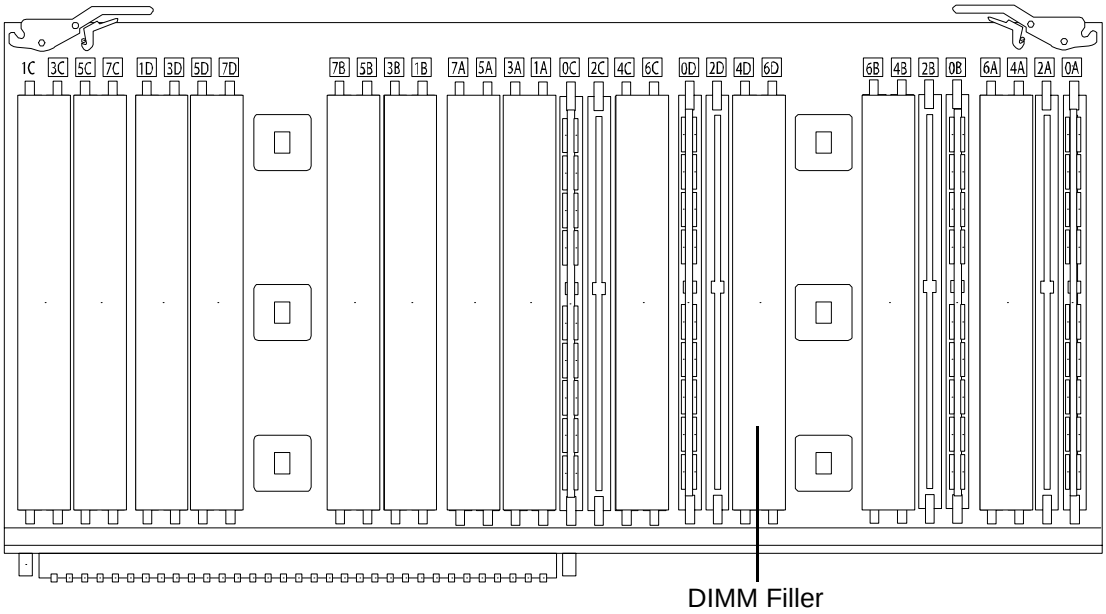


Figure 4-13 32 DIMM Extender Board Minimum Configuration



Removing a Memory Extender Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel from the chassis. See “Front Bezel” on page 144.

Step 3. Remove the front cover from the chassis. See “Removing the Front Cover” on page 145.

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

Step 5. Pull on the extraction levers to unplug the memory extender board from the socket located on the midplane riser board and remove the memory extender board from the chassis.

Installing DIMMs

To install DIMMs, perform the following steps:

Step 1. Align the DIMM with the socket located on the memory extender board.

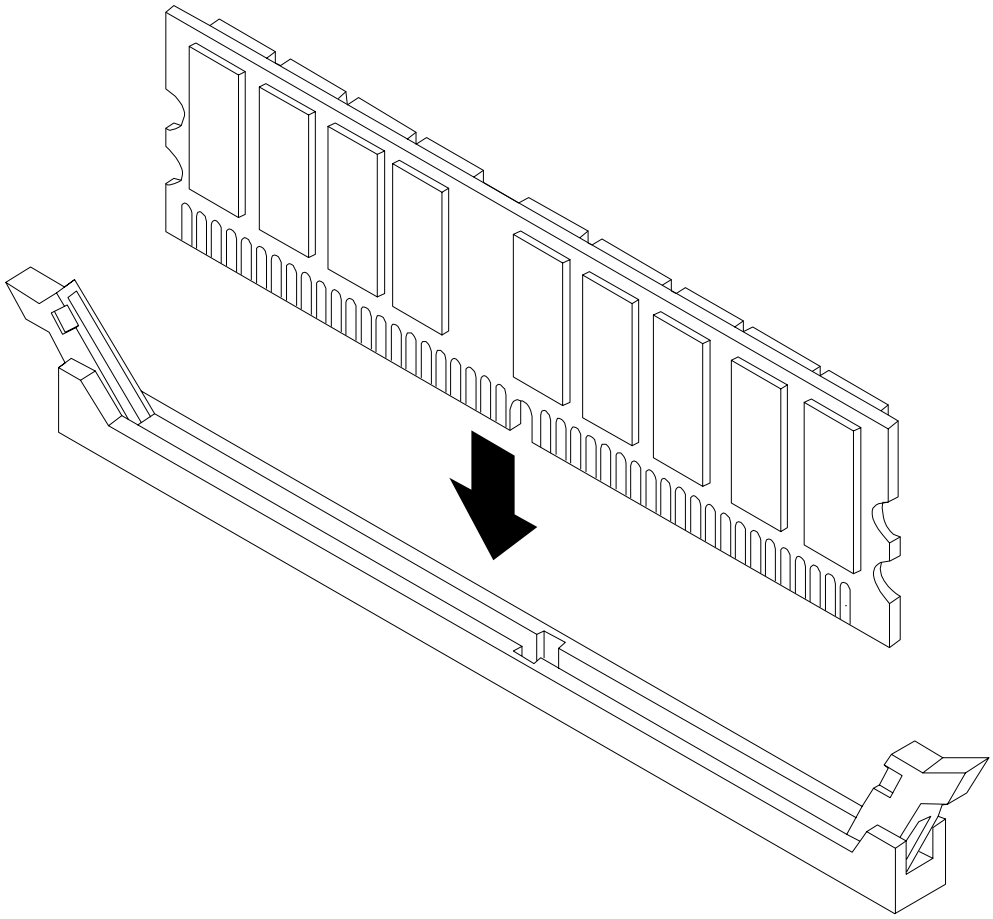
Step 2. Gently and evenly push on each side of the DIMM until it seats in the socket. Ensure that the extraction levers are in the closed position.

Step 3. Replace the front and top covers.

Step 4. Replace the front bezel.

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

Figure 4-14 Inserting DIMM into Extender Board Slot



Replacing a Memory Extender Board

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

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

Step 2. Align the memory extender board with the left and right chassis guide slots.

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

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

Step 5. Replace the front cover onto the chassis.

Step 6. Replace the front bezel onto the chassis.

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

Hot-Plug PCI-X

The hp Integrity rx4640 Server supports PCI-X hot-plug technology and offers 6 PCI-X, hot-plug capable slots.

Hot-Plug PCI-X Operations

PCI-X hot-plug technology enables the following hot-plug operations. For procedures with step-by-step instructions describing how to add, replace, delete, and locate PCI-X cards see “Hot-Plug Operation Procedures” on page 58.

- **Online Addition (OL-A)**

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

- **Online Replacement (OL-R)**

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

CAUTION A special OL-R requirement for HP-UX 11i v2 is that the card to be inserted (replaced) must be exactly the same as the removed card. This is also known as like-for-like replacement.

NOTE Windows Server 2003 Enterprise Edition does not support OL-R. Instead, you can perform a combination of an OL-D operation followed by an OL-A operation. This is the equivalent of an OL-R operation.

- **Online Deletion (OL-D)**

  You can remove an existing PCI-X expansion card. This operation is different from OL-R because there are no restrictions placed on the type of replacement card that you can use. In this operation, the drivers are also completely removed from the slot.

NOTE HP-UX 11i v2 does not support OL-D. It does support OL-R.

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

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

Operating System Support for Hot-Plug PCI-X Operations

The capability of each operating system to support hot-plug PCI-X operations is different. The following explanation details the capabilities of each operation system.

- **HP-UX 11i v2**

  HP-UX 11i v2 supports only OL-A, OL-R, and Locate hot-plug PCI-X operations.

  In OL-R, it is a requirement that the card to be inserted (replaced) be exactly the same as the card being removed. During this OL-R operation, HP-UX 11i v2 suspends the device driver and re-enables it upon completion of the OL-R operation.

  In HP-UX 11i v2, the Locate function is only available via the command line or web interface.

- **Windows Server 2003 Enterprise Edition**

  Windows Server 2003 Enterprise Edition supports only OL-A and OL-D hot-plug PCI-X operations.

  In OL-D, Windows Server 2003 Enterprise Edition will delete the device object after the card's successful removal from the slot. You do not have to re-install drivers for the deleted device on subsequent insertions or reboots.

  To perform a card replacement hot-plug PCI-X operation in Windows Server 2003, you must first perform an OL-D operation followed by an OL-A operation.

- **Linux Red Hat Advanced Server 2.1**

  At this time Linux Red Hat Advanced Server 2.1 does not support hot-plug PCI-X technology. Future releases will support hot-plug PCI-X technology.

The following table shows hot-plug operations that are available in HP-UX 11i v2, Windows Server 2003 Enterprise Edition, and Linux Red Hat Advanced Server 2.1 operating systems.

Table 4-4 Hot-Plug Operation and OS Compatibility

Hot-Plug Operation	HP-UX 11i v2	Windows Server 2003 Enterprise Edition	Linux Red Hat Advanced Server 2.1
OL-A	Yes	Yes	No
OL-R	Yes. HP-UX 11i v2 demands like-for-like replacement. A like-for-like card means that the new card is exactly the same as the card being replaced.	No. But, you can perform a combination of OL-D and OL-A to replace a card.	No
OL-D	Not supported by HP-UX 11i v2.	Yes	No
Locate	Yes. Only supported via the command line interface or the web interface.	No	No

PCI-X Hardware and Software Interfaces

The following table shows what hot-plug hardware and software interfaces are available on HP-UX 11i v2, Windows Server 2003 Enterprise Edition, and Linux Red Hat Advanced Server 2.1 operating systems.

Table 4-5 Hot-Plug Hardware and Software Interfaces, and OS Availability

Hot-Plug PCI-X Interface	HP-UX 11i v2	Windows Server 2003 Enterprise Edition	Linux Red Hat Advanced Server 2.1
Hardware interface comprised of: —Attention Button —Manual Retention Latch —Power LED —Attention LED —PCI-X card lock	Yes	Yes	No

Table 4-5 Hot-Plug Hardware and Software Interfaces, and OS Availability (Continued)

Hot-Plug PCI-X Interface	HP-UX 11i v2	Windows Server 2003 Enterprise Edition	Linux Red Hat Advanced Server 2.1
Graphical User Interface	Yes	Yes. You can use the **Safely Remove Hardware** icon in the tool tray or device manager to remove a device (OL-D). OL-A is only possible via the hardware interface.	No
Command Line Interface (CLI)	Yes `-olrad` command. Read *Interface Card OL* Support for HP-UX Servers and Workstations, olrad Command Line Interface, B2355-90804* at http://docs.hp.com.	No	No
Web Interface	Yes- `pdweb` command. Read *Interface Card OL* Support for HP-UX Servers and Workstations, pdweb-Peripheral Device tool Web Interface, B2355-90804* at http://docs.hp.com.	No	No

PCI-X Slot Locations and Configurations

PCI-X slots are numbered from 1 through 8 in your HP Server. See Figure 4-15, “Slot ID Numbering.”

The following describes configuration requirements for slots 1 through 8:

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

  Shared slots have card compatibility restrictions. If one of the shared slots is occupied then the card being added to the second slot is limited by the configuration of the occupied slot. If the new card has a slower capability than the current bus configuration, it will be rejected. If the new card has a faster capability than the current bus configuration, it will only run at the bus mode and frequency of the current bus configuration (slower).

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

NOTE If the system is rebooted in the new configuration, then both cards will initialize to run at 33 MHz. This is because the system firmware can only change the bus capability from 66 MHz down to 33 MHz.

2. If you have a 33 MHz card in slot 3, and you hot-plug insert a 66 Mhz card into slot 4, it will work but the new card will run at 33 MHz. This also applies to slots 5 and 6, as they are shared (both use a common bus).
3. If your unit is powered down, and you insert a 33 MHz card into slot 4 (that shares a 66 MHz card in slot 3), then both cards will run at 33 MHz when the unit is powered up. This also applies to slots 5 and 6, as they are shared (both use a common bus).

- Slots 7 and 8 are single slots. The maximum capability of each slot is PCI-X 133MH. Only slots 7 and 8 will allow 133 Mhz, PCI-X cards to run at full speed. These two slots are not limited by bus-mode, frequency-related incompatibilities.

Table 4-6 PCI-X Card vs. Slot Frequency/Bus Mode Compatibility for Shared Slots[a]

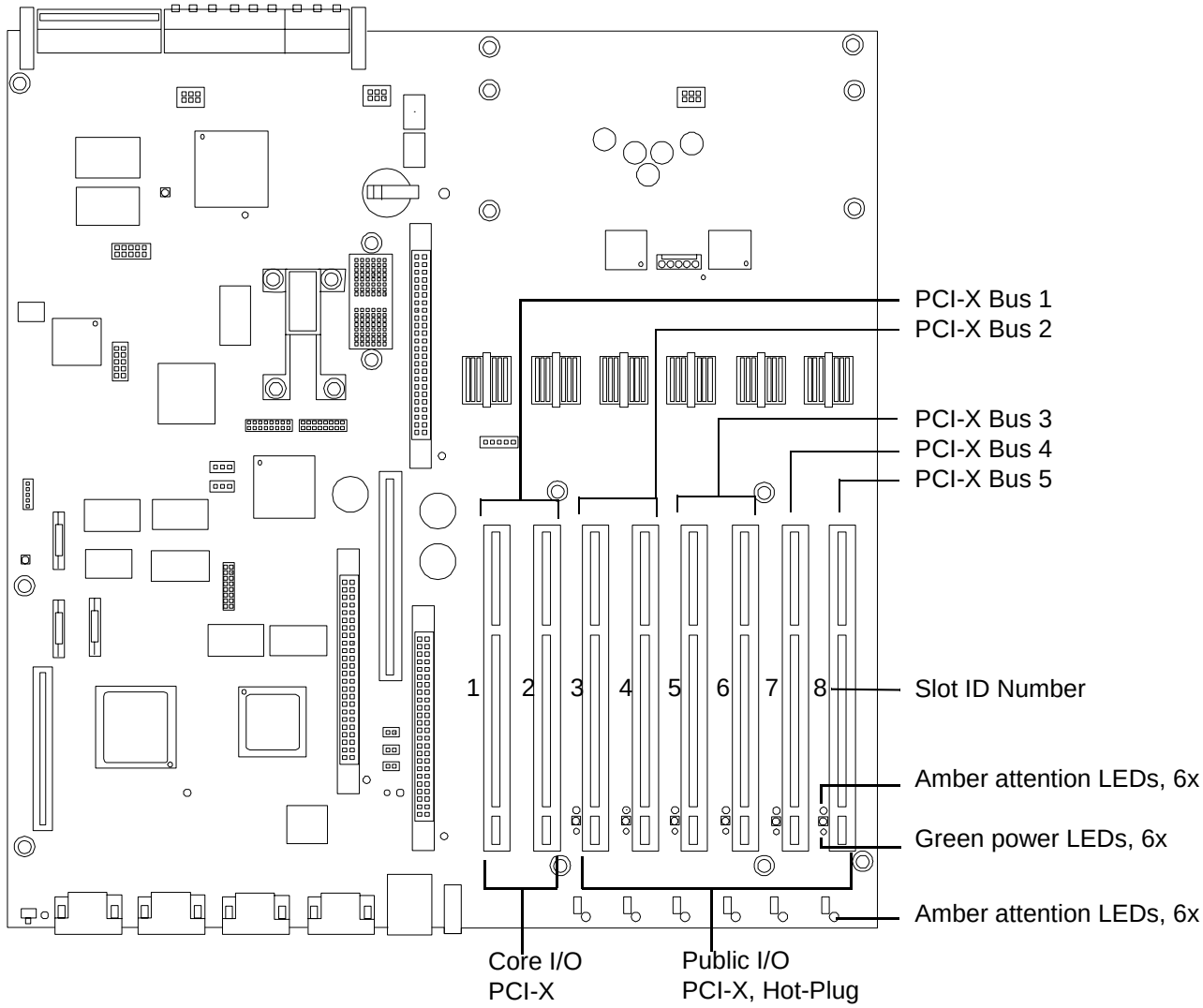
Current PCI Bus Mode and Frequency for the Shared Slot	Cards to be installed			
	PCI 33	**PCI 66**	**PCI-X 66**	**PCI-X 133**
PCI 33 MHz	Compatible[b]	Compatible (2nd note) New card running at PCI 33	Compatible (2nd note) New card running at PCI 33	Compatible (2nd note) New card running at PCI 33
PCI 66 MHz	Incompatible-Frequency[c]	Compatible (2nd note)	Compatible (2nd note) New card running at PCI 66	Compatible (2nd note) New card running at PCI 66
PCI-X 66 MHz	Incompatible-Frequency (3rd note)	Incompatible-Bus[d]	Compatible (2nd note)	Compatible (2nd note) New card running at PCI-X 66
PCI-X 133 MHz[e]	Incompatible-Frequency (3rd note)	Incompatible-Frequency (3rd note)	Compatible (2nd note) New card	Compatible (2nd note) New card running at PCI-X 66

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

CAUTION If you are using Linux Red Hat Advanced Server 2.1 operating system and you want to install a 1000b-Sx GigE card, do not install it into a slot that shares a bus with a 33 MHz card. In this configuration the Linux driver will not initialize the new card.

CAUTION Do not use more than 3 RAID cards in any of the slots on your hp Integrity rx4640 Server. System power limitations restrict the use of more than 3 RAID cards per system.

Figure 4-15 Slot ID Numbering



Hot-Plug Operation Procedures

The hot-plug procedures described in this section will use the hardware interface only. Software interface procedures are described in Table 4-5 on page 55. For a complete understanding of all HP-UX hot-plug techniques and concepts, it is recommended that you refer to *Interface Card OL* Support for HP-UX Servers and Workstations, B2355-90804* at http://docs.hp.com.

CAUTION Before adding or replacing a PCI-X card, determine if that card is critical to your system's operation. If you replace a card that is still operating and it is a critical resource to your system, you may cause undesired system downtime. Read *Interface Card OL* Support for HP-UX Servers and Workstations, Critical Resources, B2355-90804*, at http://docs.hp.com, prior to performing a hot-plug operation.

Online Addition-(OL-A)

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

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See "Accessing a Rack Mounted Server" on page 141.

Step 2. Remove the top cover from the chassis. See "Removing the Top Cover" on page 147.

Step 3. If the power LED is steady-on (power to slot is on), go to step 4. If the power LED is steady-off (power to slot is off), go to step 5.

Step 4. To turn off power to the slot, pull up on the manual retention latch (MRL) located on the OLX divider. The power LED goes to steady-off. See Figure 4-16 on page 60.

CAUTION Do not pull up on the MRL of a powered-on, occupied slot or your system will crash. This OL-A procedure is for powering down a powered-on, unoccupied slot only. For a detailed procedure on how to power down an occupied slot see "Online Replacement-(OL-R)" or "Online Deletion (OL-D)".

Step 5. Ensure that the MRL is already open and insert the PCI-X card to be added into the powered down slot. See Figure 4-17, "Inserting PCI-X Card."

CAUTION When inserting the PCI-X card, be careful you do not accidentally touch an attention button on the other OLX dividers—this will initiate an undesired shutdown of another PCI-X card/slot.

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

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

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

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

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

Step 9. Replace the top cover.

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

Figure 4-16PCI-X OLX Divider Layout

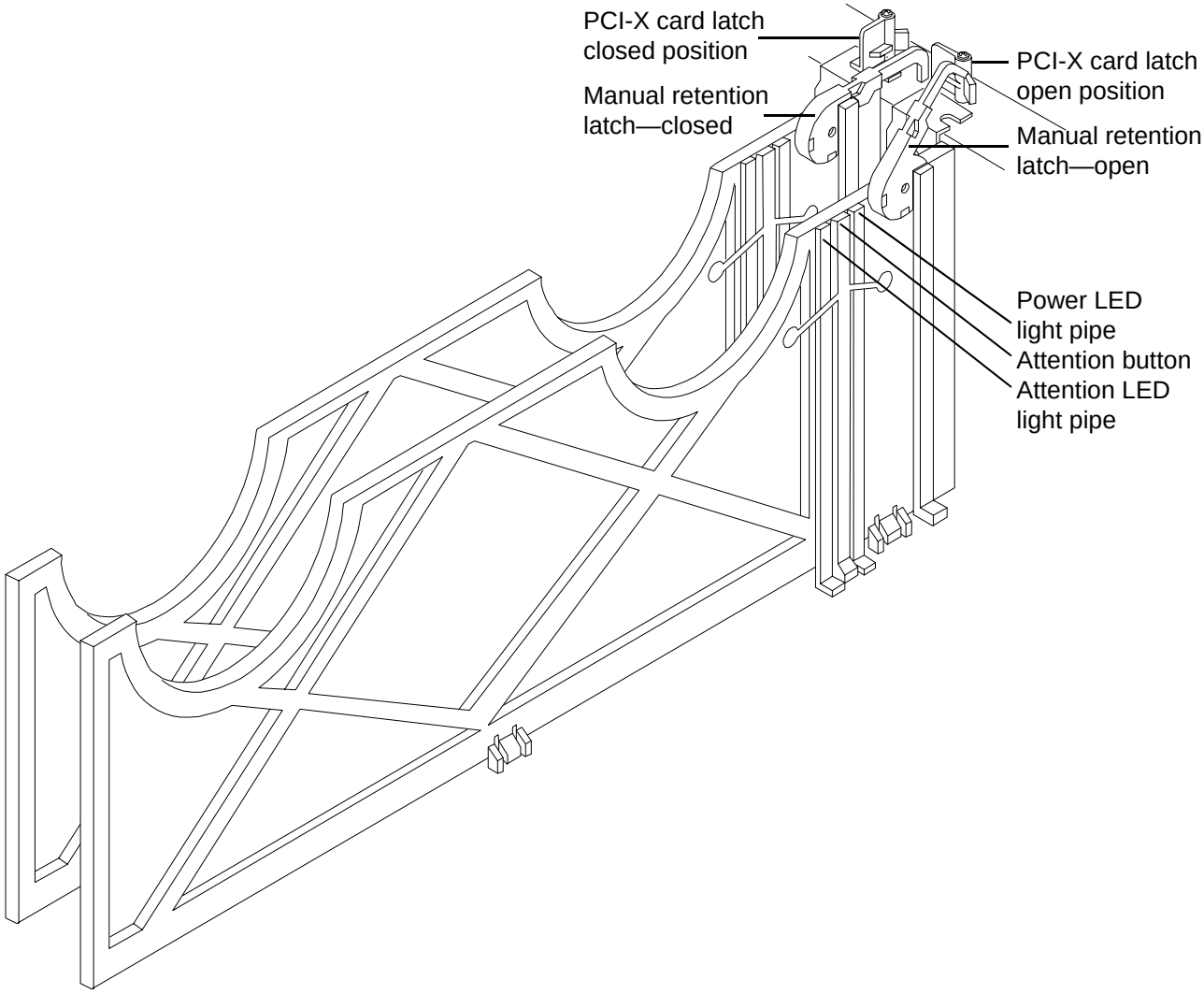
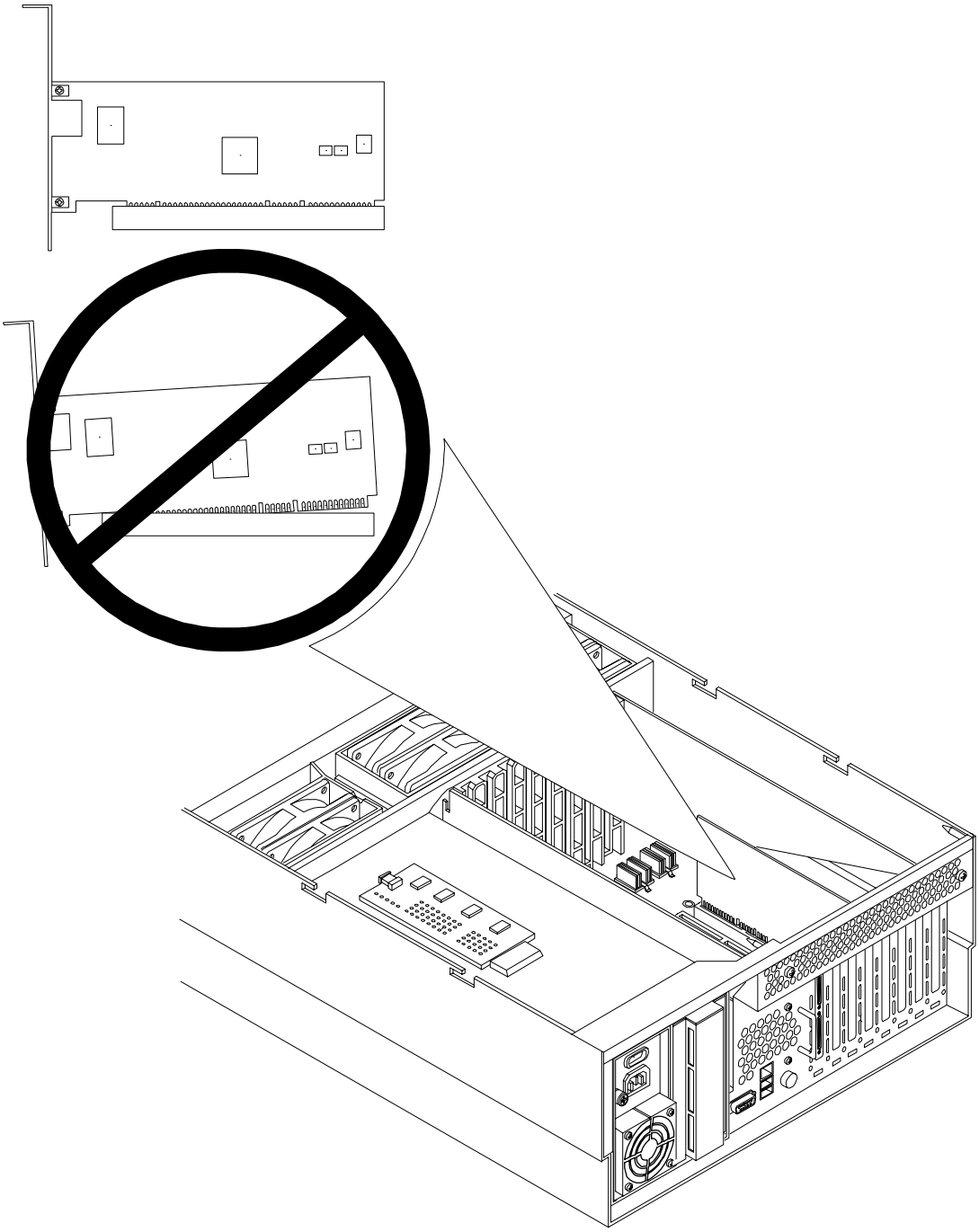


Figure 4-17 Inserting PCI-X Card



Online Deletion (OL-D)

To delete a PCI-X card from an occupied slot, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover from the chassis. See “Installing Processors and Memory” on page 40.

Step 3. Press the attention button located on the OLX divider that controls the affected slot—the power LED starts to blink. Wait until the power LED goes from blinking to steady-off.

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

Step 4. Turn the PCI-X card lock on the chassis until the manual retention latch (MRL) is free to pull up.

Step 5. At this point, the power to the slot is off; pull up on the manual retention latch located on the OLX divider. See Figure 4-16 on page 60.

Step 6. Remove the existing PCI-X card from the slot.

Step 7. Push the manual retention latch down until it seats against the chassis wall.

Step 8. Replace the top cover.

Step 9. Push the HP Server all the way back into the rack until it stops.

Online Replacement-(OL-R)

As discussed in the opening section, OL-R is a combination of an OL-D procedure followed by an OL-A procedure.

CAUTION For HP-UX 11i v2 only. You can only replace an existing card with a like card.

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover from the chassis. See “Installing Processors and Memory” on page 40.

Step 3. Press the attention button located on the OLX divider controls the affected slot—the power LED starts to blink. Wait until the power LED goes from blinking to steady-off.

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

Step 4. Turn the PCI-X card lock on the chassis until the manual retention latch (MRL) is free to pull up.

Step 5. At this point, the power to the slot is off; pull up on the manual retention latch located on the OLX divider. See Figure 4-16, “PCI-X OLX Divider Layout.”

Step 6. Remove the existing PCI-X card from the slot.

Step 7. Insert the new PCI-X card into the powered down slot. See Figure 4-17, “Inserting PCI-X Card.”

CAUTION When inserting the PCI-X card, be careful you do not accidentally touch an attention button on the other OLX dividers—this will initiate an undesired shutdown of another PCI-X card/slot.

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

Step 8. Push the manual retention latch down until it seats against the chassis wall.

Step 9. Turn the PCI-X card lock on the chassis to the closed position. This locks the PCI-X card into its slot and the manual retention latch into the closed position.

Step 10. Press the attention button—the power LED will start to blink.

Step 11. Wait for the power LED to stop blinking—the PCI-X card is now active.

Step 12. Replace the top cover.

Step 13. Push the HP Server all the way back into the rack until it stops.

Understanding LEDs and Hardware Errors

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

Table 4-7 Hot-Plug LED Descriptions

Power LED-Green	Condition	Description
	On	PCI-X slot is powered on.
	Blinking	Hot-plug operation in progress—do not touch the slot.
	Off	PCI-X slot is powered off.
Attention LED-Amber	**Condition**	**Description**
	On	Hardware operational fault. **NOTE:** If slot is powered on, it will not power off. If slot is powered off, it will not power on.
	Blinking	Slot location being indicated. **NOTE:** If you want to learn how to activate the attention LED into the blinking/indicator state, read *Interface Card OL* Support for HP-UX Servers and Workstations, Turning Attention LED to Blink or Off, B2355-90804* at http://docs.hp.com.
	Off	If power to slot is on, the slot is functioning normally.

Troubleshooting PCI-X Hot-Plug Operations

Sometimes a PCI-X card will not come online during a hot-plug operation due to a frequency mismatch between the PCI-X card and the slot bus or due to other hardware errors. To determine the type of error you are experiencing, observe the LED activity as described below. For a full understanding and description of HP-UX 11i v2 hardware errors, read *Interface Card OL* Support for HP-UX Servers and Workstations, Important Considerations, B2355-90804* at http://docs.hp.com.

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

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

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

2. **Hardware Operation Fault**

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

CAUTION If your card will not power up, the power loss may be due to the existing PCI-X expansion cards using all the available power. Check the power ratings of your existing PCI-X cards. A known cause of power loss is the use of more than 3 RAID cards in your system.

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

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

Converting SCSI From Simplex to Duplex

This section explains how to convert your hp Integrity rx4640 Server from simplex to duplex operation. The process involves removing a jumper cable, installing a duplex PCA card, and plugging in the stowed channel B cable to the appropriate sockets.

NOTE In simplex mode, you may remove the cover from channel B for connection of external SCSI devices.

The Windows operating system only supports duplex operation.

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.**

CAUTION Some restrictions apply to the mass storage devices that may be connected to your core I/O SCSI HBA. See “Core I/O Connections” on page 71. If you convert your system to duplex configuration, you may not install external SCSI devices to the SCSI HBA core I/O controller.

Accessing the SCSI Backplane Board

Prior to adding the accessories required to convert your hp Integrity rx4640 Server from simplex to duplex you must remove outer components to access the SCSI backplane board. To gain access to the SCSI backplane board perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

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

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Removing the Front Cover” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

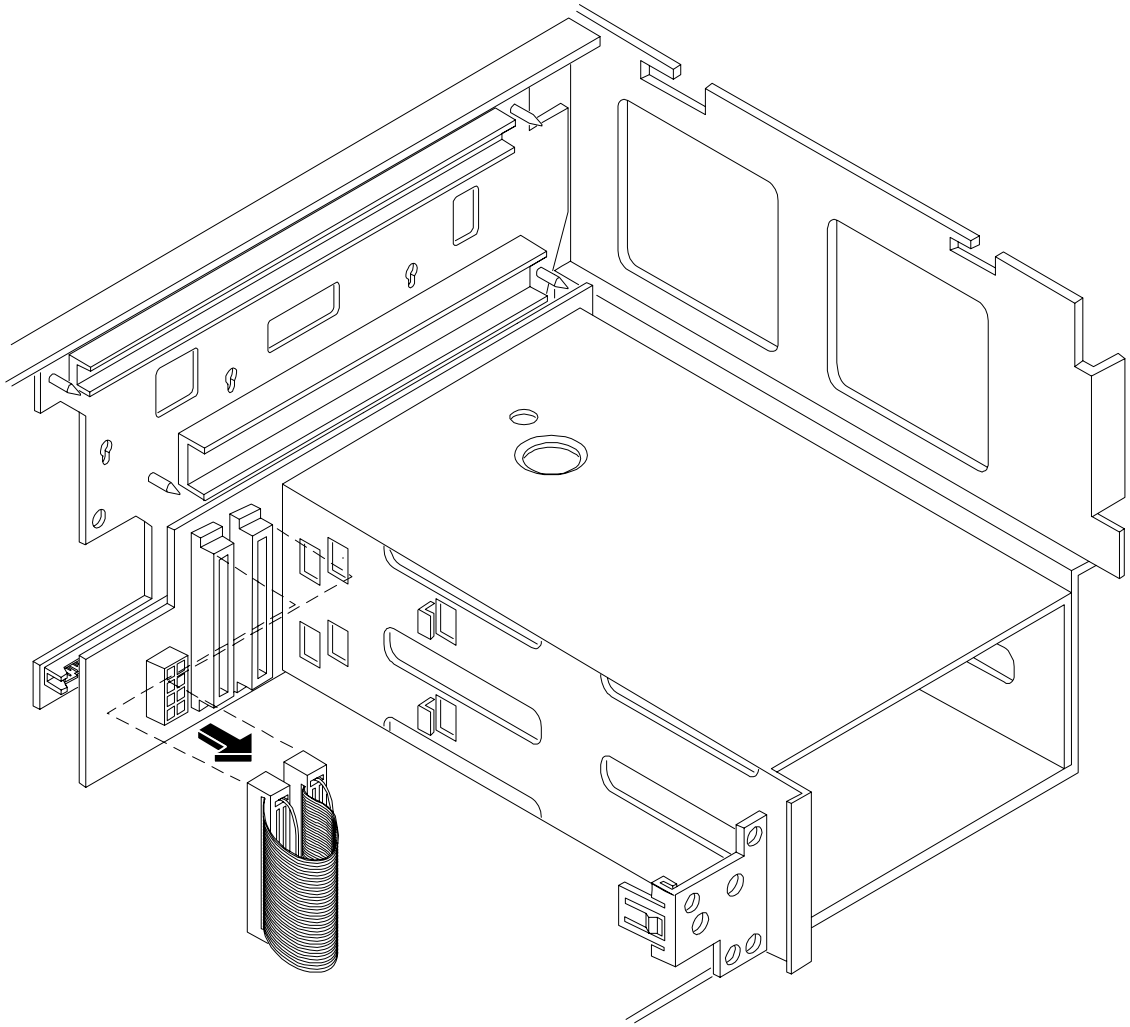
Step 5. Remove the processor extender board. See “Memory Extender Board” on page 151.

Convert to Duplex

To convert to duplex, perform the following steps:

Step 1. Remove the SCSI Jumper Cable. A SCSI jumper cable bridges the two SCSI connectors on the SCSI backplane when the server is configured for simplex operation. This jumper must be removed in order to install the duplex board and to connect the SCSI B cable. See Figure 4-18, “Removing the SCSI Jumper Cable.”

Figure 4-18Removing the SCSI Jumper Cable



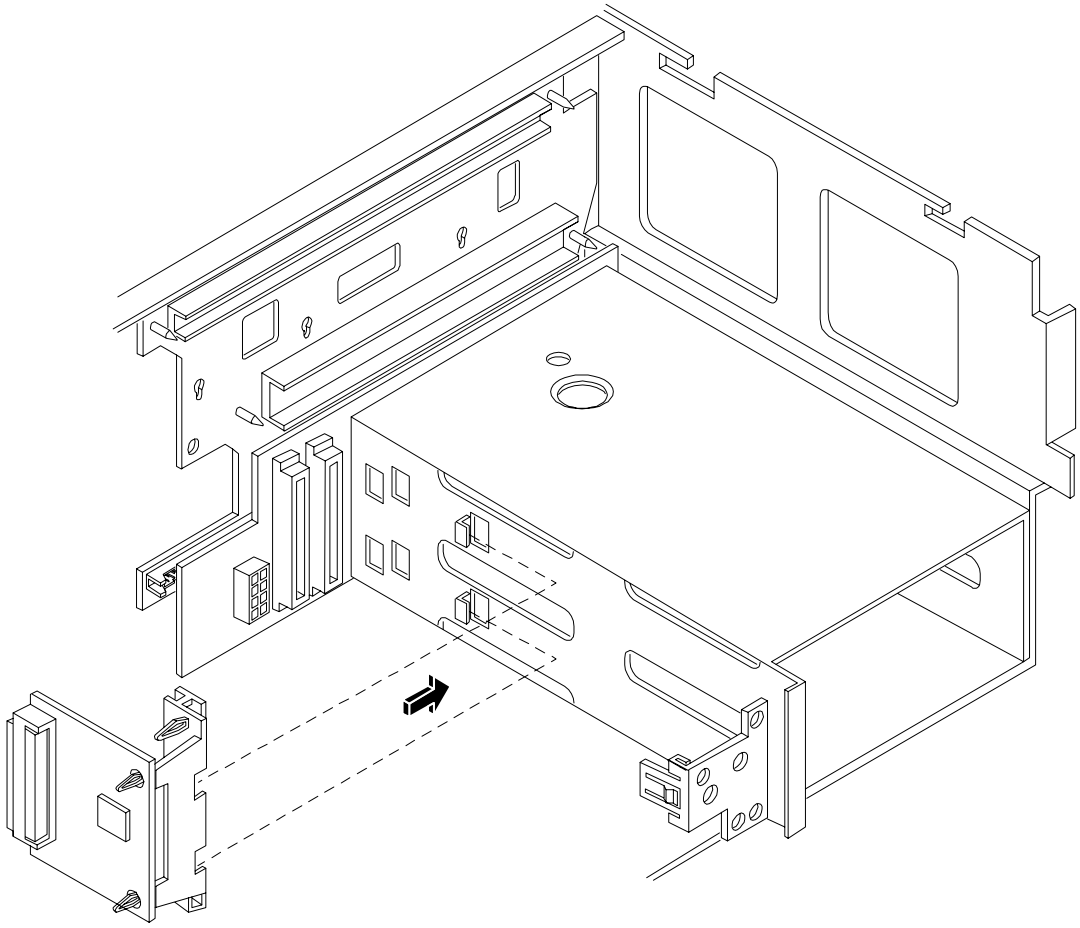
Step 2. Install the duplex board. The duplex board is installed in the SCSI connector located nearest the disk drive cage. The duplex board is shipped with a duplex board bracket attached. When the duplex board is properly installed, it is secured to the disk drive cage by the bracket and to the SCSI backplane board by the SCSI connector sockets. See Figure 4-19, “Installing the Duplex Board.”

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

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

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

Figure 4-19Installing the Duplex Board

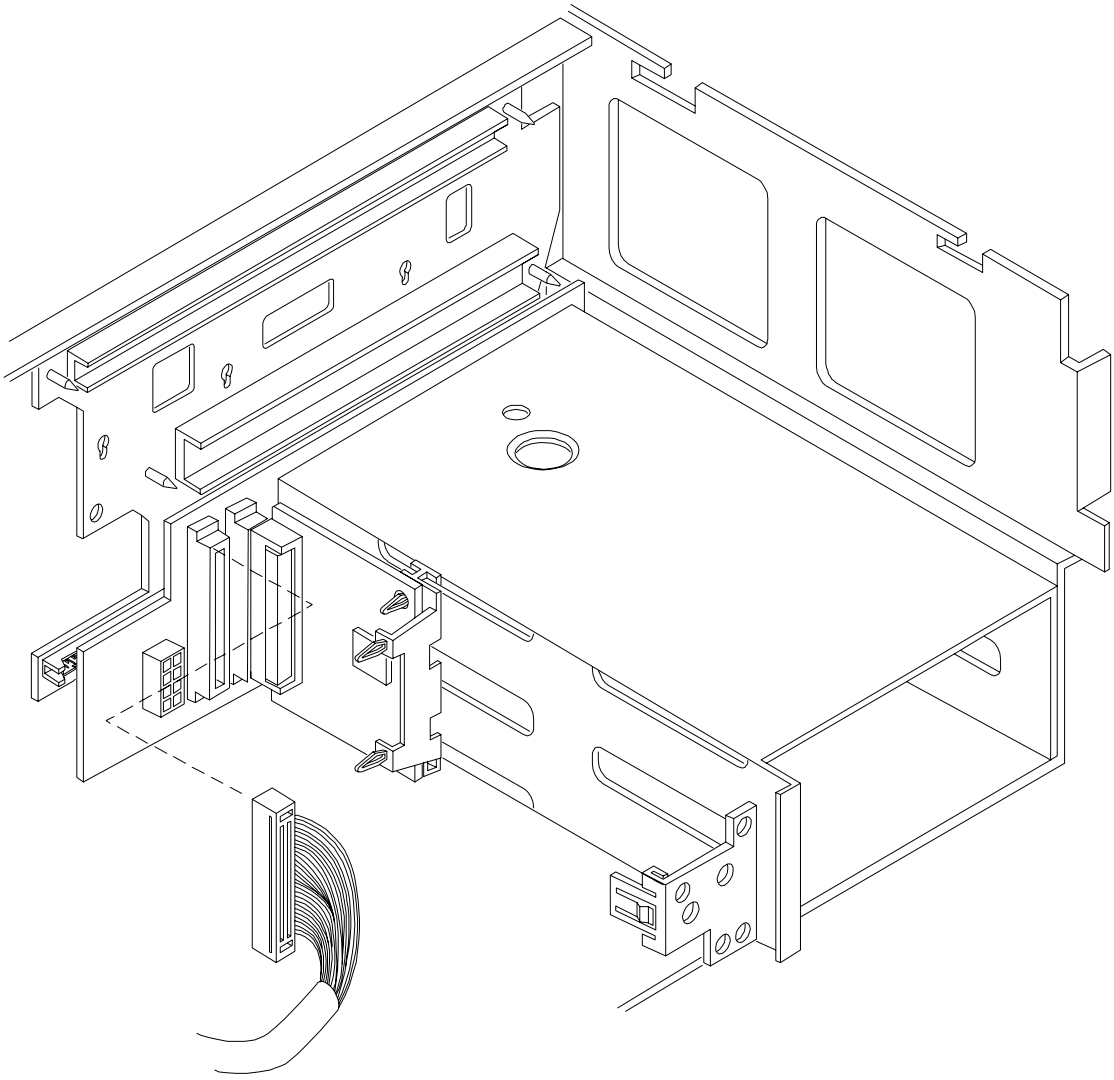


Step 3. Install the SCSI cable B to the SCSI backplane board. See Figure 4-20, “Installing SCSI Cable B to the SCSI Backplane.”

- Release the SCSI B cable from its stowed position within the chassis.

- Plug the SCSI cable B connector into the SCSI connector located on the backplane next to the duplex board installed in the previous step.

Figure 4-20Installing SCSI Cable B to the SCSI Backplane

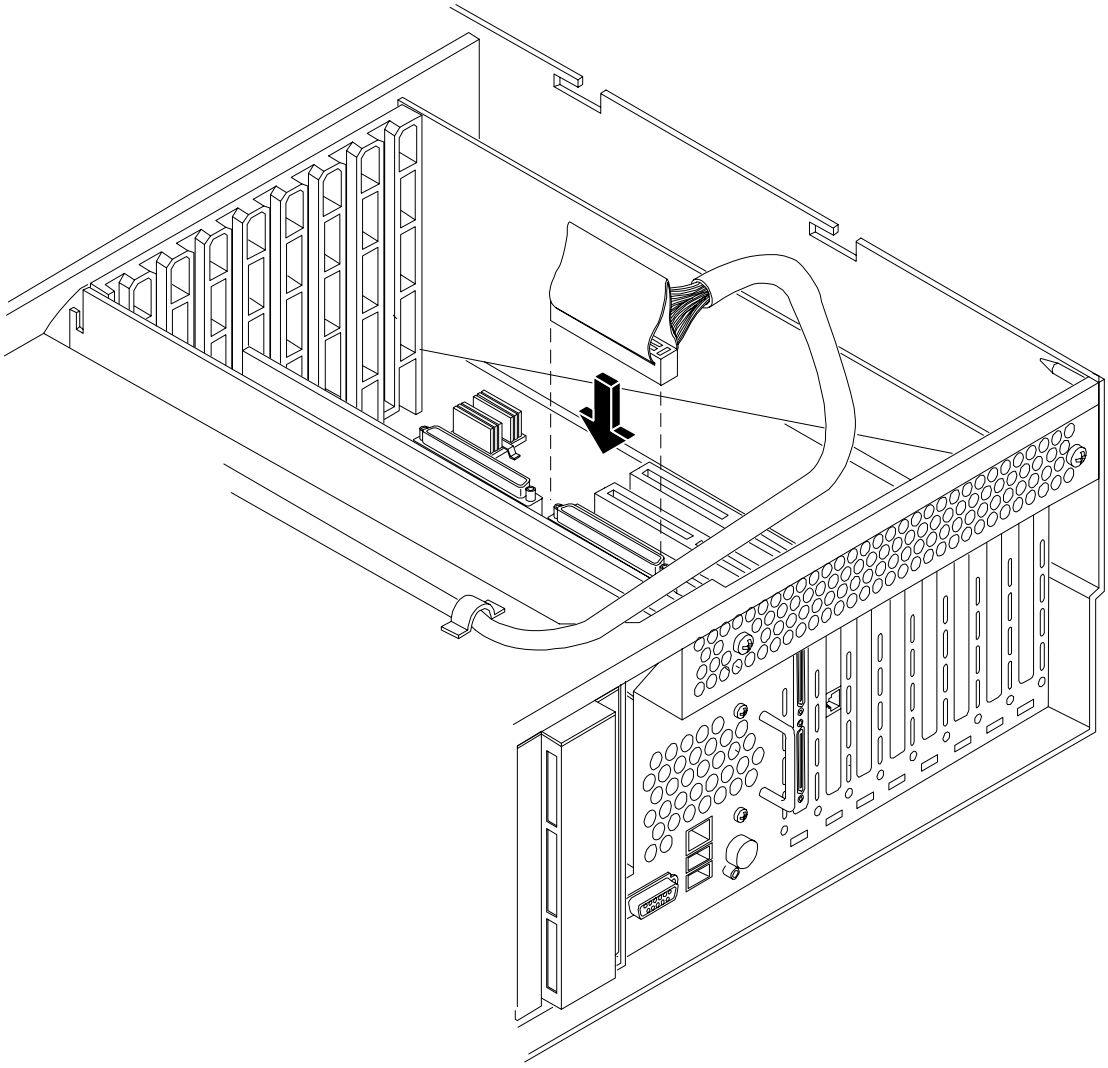


Step 4. The SCSI duplex conversion is completed by connecting the other end of SCSI cable B to the SCSI B channel connector on the SCSI adapter board. See Figure 4-21, “Installing SCSI Cable B to the SCSI Adapter Board.”

- Release the SCSI B cable from its stowed position within the chassis.

- Plug the SCSI cable B connector into the SCSI B channel connector located at the rear of the board.

Figure 4-21Installing SCSI Cable B to the SCSI Adapter Board



Replacing the Removed Modules

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

Step 1. Replace the processor extender board.

Step 2. Replace the memory extender board.

Step 3. Replace the front and top covers.

Step 4. Replace the front bezel.

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

Core I/O Connections

Each hp Integrity rx4640 Server core I/O includes:

- Two USB ports
- One UDMA-100 IDE port (40 pin IDE connector)
- SVGA controller (DE15S connector)
- One common server management (CSM)
  - — One 10/100 LAN-RJ45
  - — Three serial ports
- SCSI host bus adapter (HBA)
  - — The SCSI HBA board is required to attach SCSI external mass storage to the system.
  - — Connections to the SCSI board include the external SCSI channels for external mass storage devices.

CAUTION Some restrictions apply to external mass storage devices that you may want to connect to channel B of your core I/O SCSI HBA. External connections to channel B of your SCSI HBA controller are only supported in simplex configuration, when the internal cable between the SCSI backplane and the SCSI HBA card is disconnected. If you convert your system to duplex configuration (see “Converting SCSI From Simplex to Duplex” on page 65), you may not connect external SCSI devices to channel B of the SCSI HBA.

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

Management Processor (MP)

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

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

The management processor is available whenever the system is connected to a power source, even if the hp Integrity rx4640 Server main power switch is in the off position.

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

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

Accessing the Management Processor

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

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

Local Terminal Access to the Management Processor

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

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

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

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

Setting Terminal Parameters

After powering on the terminal, ensure the communications settings are as follows:

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

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

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

Step 2. Select Serial Port.

Step 3. Select Com1.

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

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

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

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

Step 7. Select a supported terminal type.

The preferred type is VT100.

Step 8. Click Apply.

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

Step 9. Click OK.

Network Access to the Management Processor

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

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

Step 1. Determine the medium access control (MAC) address of the management processor LAN interface by viewing the label located at the rear of the server

Step 2. Connect a LAN cable on your local subnet to the core I/O LAN port found directly above the two USB ports.

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

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

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

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

Interacting with the Management Processor

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

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

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

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

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

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

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

Step 2. Use the management processor menus and commands as needed. Main menu commands are shown in Figure 4-22, “The MP Main Menu.” Commands not displayed in the MP Main Menu can be accessed in command mode by first using the `CM` command at the `MP` prompt. A list of available commands is presented and can be displayed by using the management processor help function (enter **`HE`** followed by **`LI`** at the `MP>` prompt). You can return to the MP Main Menu by typing **CTRL+B**.

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

Figure 4-22The MP Main Menu

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

Configuring Management Processor LAN Information

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

To set the management processor LAN IP address:

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

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

The screen displays the default values and asks if you want to modify them. It is good practice to write down the information, as it may be required for future troubleshooting. See “The LC Command Screen”.

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

Step 3. The current `lc` data is displayed. When prompted to enter a parameter name, `A to modify All`, or `Q to Quit`, enter **`A`** to select all parameters.

Step 4. The current IP address is displayed. When prompted to enter a new value or `Q`, enter the new IP address.

Step 5. The current host name is displayed. When prompted to enter a new value or `Q`, enter the new management processor network name.

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

Step 6. The current subnet mask name is displayed. When prompted to enter a new value or `Q`, enter the new subnet mask name.

Step 7. The current gateway address is displayed. When prompted to enter a new value or `Q`, enter the new gateway address.

Step 8. The current web console port number is displayed. When prompted to enter a new value or `Q`, just hit **enter**. The message `-> Current Web Console Port Number has been retained` will be displayed.

Step 9. The current link state information is displayed. When prompted to enter a new value or `Q`, just press **enter**. The message `-> Current Link State has been retained` will be displayed.

Step 10. A new lc listing is displayed, including the values entered in the preceding steps. Verify that the desired values have been accepted. When prompted to enter a parameter for revision, Y to confirm, or Q to Quit, enter **Y** to confirm all parameters.

Step 11. Observe the following display:

```
> LAN Configuration has been updated

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

MP Host Name: name
```

(the name entered in step 5)

```
MP:CM>
```

Step 12. Enter **XD -reset** to reset the MP.

Step 13. After the MP resets, log into the MP again. Then enter the MP command mode (enter **CM** at the MP: prompt).

Step 14. At the MP:CM> prompt, enter **LS** to confirm the new LAN settings.

Step 15. Enter **SA** to enable/disable web console and telnet access after the MP has been reset.

Figure 4-23The LC Command Screen

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

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

Confirm? (Y/ {N}) : y

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

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

Management Processor Commands

Table 4-8 Management Processor Commands and Descriptions

Command	Description
BP	Reset BMC passwords

Table 4-8 Management Processor Commands and Descriptions (Continued)

Command	Description
CA	Configure serial port parameters
CE	Log a repair in the history buffer
CL	Display console history
CG	Certificate generator
CO	Return to redirected console mode
CSP	Connect to another service processor
CT	Configure trace
DATE	Display date
DC	Default configuration
DF	Display FRUID
DI	Disconnect remote or LAN console
FW	MP firmware upgrade
HE	Display help for menu or command
ID	System information
IT	Modify MP inactivity timers
LC	LAN configuration
LOC	Locater LED control
LS	LAN status
MA	Return to main menu
MR	Modem reset
MS	Modem status
PC	Remote power control
PG	Configure paging
PR	Power restore policy configuration
PS	Power management module status
RB	Reset BMC through toggle GPIO pin
RS	Request BMC to reset system through RST signal
SA	Configure remote/modem-LAN telnet and web access options
SE	Activate a system session on locator remote port

Table 4-8 Management Processor Commands and Descriptions (Continued)

Command	Description
SL	Show logs
SO	Security options and access control
SYSREV	Display all firmware revisions
SS	System status of processor modules
TC	Transfer of control-system reset through INIT signal
TE	Tell-send a message to other users
UC	User configuration
VT	Display software trace
VFP	Virtual front panel
WHO	Display connected management processor users
XD	MP diagnostics and/or reset

Fibre Channel (FC) Boot Configuration

The following procedure details how to restore a Fibre Channel (FC) disk to your boot environment.

NOTE The operator should be knowledgeable about navigating in the EFI shell environment to perform the following procedure.

The screen output shown in this procedure and the bold type that is selected in each of the steps is from a hypothetical test setup only; your screen output will show the actual configuration of your own hp Integrity rx4640 Server.

Step 1. Find the driver number for your FC disk(s). At the EFI shell enter the following command to display all devices and their associated drivers.

```
Shell> drivers

            T   D

D           Y C I

R           P F A

V  VERSION  E G G #D #C DRIVER NAME                          IMAGE NAME

== ======== = = = == == ================================== ==================

12 00000010 B - -  6 20 PCI Bus Driver                      PciBus

1D 01020000 B X X  2  3 LSI Logic Ultra160 SCSI Driver      PciRom Seg=00000000

1E 01020000 B X X  1  2 LSI Logic Ultra160 SCSI Driver      PciRom Seg=00000000

23 00000109 D X X  1  - HP Tachyon XL2 Fibre Channel Mass S  PciRom Seg=00000000

2A 00000110 D X X  1  - HP Tachyon XL2 Fibre Channel Mass S  PciRom Seg=00000000

2E 00000029 D - -  2  - Usb Ohci Driver                     UsbOhci

2F 00000010 B - -  2  3 USB Bus Driver                      UsbBus

30 00001010 D X -  1  - Usb Keyboard Driver                 UsbKb

31 00000010 D - -  2  - Usb Mouse Driver                    UsbMouse

32 00000010 ? - -  -  - Usb Bot Mass Storage Driver         UsbBot

33 00000010 ? - -  -  - Usb Cbi0 Mass Storage Driver        UsbCbi0

34 00000010 ? - -  -  - <UNKNOWN>                           UsbCbi1

35 00000010 ? - -  -  - Generic USB Mass Storage Driver     UsbMassStorage

36 00000010 ? - -  -  - UGA Console Driver                  GraphicsConsole

37 00000000 D - -  1  - PCI VGA Mini Port Driver            PciVgaMiniPort

38 00000010 D - -  1  - VGA Class Driver                    VgaClassDriver

39 00000010 B - -  1  1 Serial 16550 UART Driver            Serial16550

3A 00000010 B - -  1  1 Serial Terminal Driver              Terminal

3B 00000010 D - -  2  - Platform Console Management Driver  ConPlatform
```

```
3C 00000010 D - -  2  - Platform Console Management Driver   ConPlatform

3D 00000010 B - -  2  2 Console Splitter Driver              ConSplitter

3E 00000010 B - -  2  2 Console Splitter Driver              ConSplitter

3F 00000010 B - -  2  2 Console Splitter Driver              ConSplitter

40 00000010 B - -  2  2 Console Splitter Driver              ConSplitter

49 00000010 D - - 14  - Generic Disk I/O Driver             DiskIo

4A 00000010 B - -  3 10 Partition Driver(MBR/GPT/El Torito)  Partition

4B 00000010 D - -  3  - FAT File System Driver              Fat

4C 00000010 B X X  1  1 PCI IDE/ATAPI Bus Driver            Ide

4D 00000010 ? - -  -  - Intel(R) PRO 100 UNDI Driver        Undi

4E 00030007 B X X  3  3 Broadcom Gigabit Ethernet Driver    b75Undi64

4F 00000010 D - -  3  - Simple Network Protocol Driver      Snp3264

50 00000010 D - -  3  - PXE Base Code Driver                PxeBc

51 00000010 D - -  3  - PXE DHCPv4 Driver                   PxeDhcp4
```

Step 2. Determine the controller handle associated with each of the two listed drivers (23 and 2A) by typing the following command:

```
Shell> drvcfg -c 23

Configurable Components

  Drv[23]  Ctrl[29]  Lang[eng]Shell> drvcfg -c 2a

Configurable Components

  Drv[2A]  Ctrl[2C]  Lang[eng]
```

Step 3. Set the enumeration option for the driver 23 and controller 29 by typing the following command and selecting 1 from the enumeration policy menu:

```
Shell> drvcfg –s 23 29

Current policy: Enumerate all Fibre Channel devices

Please select the desired enumeration policy:

  0 : Enumerate all Fibre Channel boot devices in the boot option list

  1 : Enumerate all Fibre Channel devices

 Q : exit with no change

Policy > 1

Drv[23]  Ctrl[29]  Lang[eng] - Options set.  Action Required is None
```

Step 4. Set the enumeration option for the driver 2a and controller 2c by typing the following command and selecting 1 from the enumeration policy menu:

```
Shell> drvcfg –s 2a 2c

Current policy: Enumerate all Fibre Channel devices

Please select the desired enumeration policy:
```

```
  0 : Enumerate all Fibre Channel boot devices in the boot option list

  1 : Enumerate all Fibre Channel devices

  Q : exit with no change

Policy > 1

Drv[2A]  Ctrl[2C]  Lang[eng] - Options set.  Action Required is None
```

Step 5. Allow the FC devices to be scanned by typing the following command:

```
Shell> reconnect -r
```

Step 6. Allow the file systems to be mapped by typing the following command:

```
Shell> map -r

Device mapping table

  fs0   : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig11D3A260-CDCC-0
1C2-507B-9E5F8078F531)

  fs1   : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part1,Sig55A90000)

  fs2   : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Part1,Si
gF7D00000)

  fs3   : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)/HD(Part1,Si
g7D930000)

  fs4   : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part1,Sig70BEA120-E7EA-0
1C2-507B-9E5F8078F531)

  blk0  : Acpi(HWP0002,0)/Pci(3|0)/Ata(Primary,Master)

  blk1  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)

  blk2  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig11D3A260-CDCC-0
1C2-507B-9E5F8078F531)

  blk3  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part2,Sig11E8FF20-CDCC-0
1C2-F1B3-12714F758821)

  blk4  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part3,Sig2173E520-FDD5-0
1C2-A1F4-04622FD5EC6D)

  blk5  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part4,Sig8274F148-6685-1
1D7-8BC4-B6CD81B7B01F)

  blk6  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part5,Sig82757488-6685-1
1D7-8BC4-B6CD81B7B01F)

  blk7  : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)

  blk8  : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part1,Sig55A90000)

  blk9  : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part2,Sig55A90000)

  blkA  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)
```

```
  blkB  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Part1,Si
gF7D00000)
  blkC  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Part2,Si
gF7D00000)
  blkD  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)
  blkE  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)/HD(Part1,Si
g7D930000)
  blkF  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)/HD(Part2,Si
g7D930000)
  blk10 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN210000203760083D,Lun0)
  blk11 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020370FC9C0,Lun0)
  blk12 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN2100002037600863,Lun0)
  blk13 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A61C4,Lun0)
  blk14 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE6C1,Lun0)
  blk15 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A6215,Lun0)
  blk16 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)
  blk17 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part1,Sig70BEA120-E7EA-0
1C2-507B-9E5F8078F531)
  blk18 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part2,Sig70EC67E0-E7EA-0
1C2-F1B3-12714F758821)
  blk19 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part3,Sig7612C3E0-E7EA-0
1C2-D931-F8428177D974)
```

NOTE Record the path of your FC device(s) from the file system map, for later use in this procedure.

Step 7. Return to the EFI boot manager interface by typing the following command:

```
Shell> exit
```

Step 8. From the EFI boot manager menu, select Boot Option Maintenance Menu.

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 79.03 [4321]
Please select a boot option
EFI Shell [Built-in]
    Internal Bootable DVD
    Boot Option Maintenance Menu
    System Configuration Menu
Use ^ and v to change option(s). Use Enter to select an option
```

Step 9. From the boot maintenance manager select Add a Boot Option.

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation

Boot from a File

        Add a Boot Option

        Delete Boot Option(s)

        Change Boot Order

Manage BootNext setting

        Set Auto Boot TimeOut

Select Active Console Output Devices

        Select Active Console Input Devices

        Select Active Standard Error DevicesCold Reset

        Exit

Timeout-->[7] sec SystemGuid-->[BC3ED547-6466-11D7-B97D-2EC59A23C6E2]

    SerialNumber-->[A21596378           ]
```

Step 10. Select the volume to be added.

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Add a Boot Option.  Select a Volume

SHULERVOL [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,S

    IA64_EFI [Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part1,Si

    IA64_EFI [Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,L

    IA64_EFI [Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,L

    NO VOLUME LABEL [Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(P

    Removable Media Boot [Acpi(HWP0002,0)/Pci(3|0)/Ata(Primary,Maste

    Load File [EFI Shell [Built-in]]

    Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E39115D)]

    Load File [Acpi(HWP0002,200)/Pci(1|0)/Mac(001018042056)]

    Load File [Acpi(HWP0002,500)/Pci(1|0)/Mac(00101804205A)]

Exit
```

Step 11. Select the appropriate files to describe the address of the new FC boot option.

```
Select file or change to new directory:

04/15/03  11:25p <DIR>       4,096 EFI

       [Treat like Removable Media Boot]

    Exit

EFI Boot Maintenance Manager ver 1.10 [14.61]


Select file or change to new directory:
```

```
04/15/03  11:25p <DIR>       4,096 .
       04/15/03  11:25p <DIR>           0 ..
       04/15/03  11:25p <DIR>       4,096 HPUX
       04/15/03  11:25p <DIR>       4,096 Intel_Firmware
       04/15/03  11:25p <DIR>       4,096 DIAG
       04/15/03  11:25p <DIR>       4,096 HP
       04/15/03  11:25p <DIR>       4,096 TOOLS
    Exit
EFI Boot Maintenance Manager ver 1.10 [14.61]
Select file or change to new directory:
04/15/03  11:25p <DIR>       4,096 .
       04/15/03  11:25p <DIR>       4,096 ..
       05/05/03  04:54p           425,747 HPUX.EFI
       05/05/03  04:54p            24,576 NBP.EFI
    Exit
```

Step 12. Enter a description of the new FC boot device and the data type.

```
Filename: \EFI\HPUX\HPUX.EFI
  DevicePath: [Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Par
t1,SigF7D00000)/\EFI\HPUX\HPUX.EFI]
    IA-64 EFI Application 05/05/03  04:54p     425,747 bytes

Enter New Description:  FC Boot Disk
    New BootOption Data. ASCII/Unicode strings only, with max of 240 characters
    Enter BootOption Data Type [A-Ascii U-Unicode N-No BootOption] : n

    Save changes to NVRAM [Y-Yes N-No]: y
```

Step 13. The procedure is now complete and the FC disk will show up in the boot menu.

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 79.03 [4321]
Please select a boot option

    EFI Shell [Built-in]
    Internal Bootable DVD
    FC Boot Disk
    Boot Option Maintenance Menu
```

```
    System Configuration Menu

Use ^ and v to change option(s). Use Enter to select an option
```

Booting the Server

To boot the server, perform the following step.

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

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

If the autoboot function is enabled, the system will boot to the installed operating system. If autoboot is not enabled, the system will enter the EFI boot manager. The EFI boot manager allows you to control the server's booting environment. For more information about the EFI boot manager, review Chapter 5, "Utilities."

5 Utilities

Extensible Firmware Interface (EFI) Boot Manager

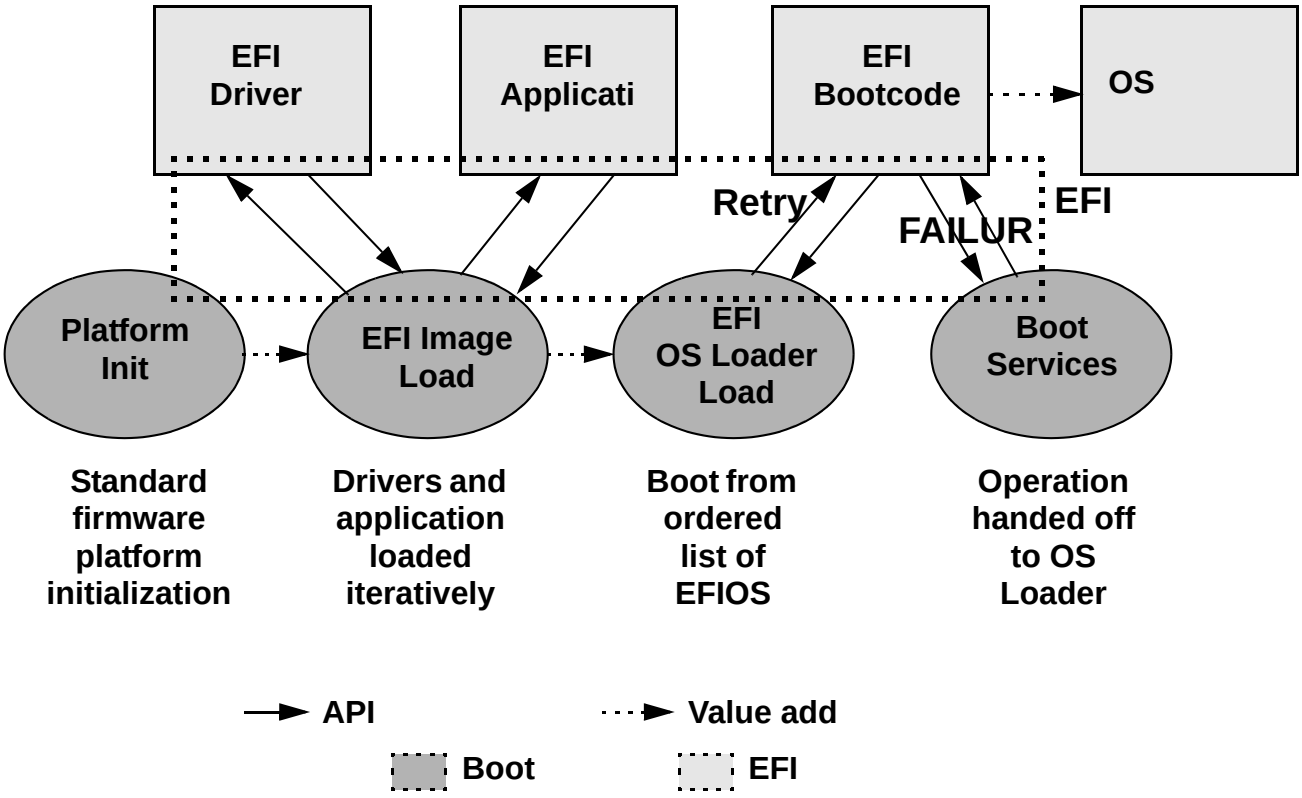
EFI (Extensible Firmware Interface) is an OS and platform-independent boot and preboot interface. EFI lies between the OS and platform firmware, allowing the OS to boot without having details about the underlying hardware and firmware. EFI supports boot devices; uses a flat memory model; and hides platform and firmware details from the OS.

NOTE EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

EFI consolidates boot utilities found in PA-RISC based systems, such as the Boot Console Handler (BCH), and platform firmware into a single platform firmware. EFI allows the selection of any EFI OS loader from any boot medium that is supported by EFI boot services. An EFI OS loader supports multiple options on the user interface.

EFI supports booting from media that contain an EFI OS loader or an EFI-defined System Partition. An EFI-defined System Partition is required by EFI to boot from a block device.

Figure 5-1 EFI Boot Sequence



The EFI boot manager loads EFI applications (including OS first stage loader) and EFI drivers from an EFI-defined file system or image loading service. NVRAM variables point to the file to be loaded. These variables contain application-specific data that is passed directly to the EFI application. EFI variables provides system firmware a boot menu that points to all the operating systems, even multiple versions of the same operating systems.

The EFI boot manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the boot manager presents you with different ways to bring up the system. For example, you can boot to the EFI shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance menu.

- *Boot from a File*—Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the system searches for an EFI directory. If the EFI directory is found, then it looks in each of the subdirectories below EFI. In each of those subdirectories, it looks for the first file that is an executable EFI application. Each of the EFI applications that meet this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. You can also launch a specific application without adding it as a boot option. In this case the EFI boot manager searches the root directories and the \EFI\TOOLS directories of all of the EFI system partitions present in the system for the specified EFI application.
- *Add a Boot Option*—Adds a boot option to the EFI boot manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI boot manager searches for the executable file in the same directories as described in "Boot from a File" option. When the file is found, it is executed.
- *Delete Boot Options*—Deletes a specific boot option or all boot options
- *Change Boot Order*—Controls the relative order in which the EFI boot manager attempts boot options. For help on the control key sequences you need for this option, refer to the help menu.
- *Manage BootNext Setting*—Selects a boot option to use one time (the next boot operation)
- *Set Automatic Boot Timeout*—Defines the value in seconds that pass before the system automatically boots without user intervention. Setting this value to zero disables the timeout feature.
- *Exit*—Returns control to the EFI boot manager main menu. This displays the active boot devices, including a possible integrated shell (if the implementation is so constructed).

EFI Commands

Table 5-1 lists EFI commands for the hp Integrity rx4640 Server. The equivalent BCH commands found in PA-RISC based systems are also listed.

Table 5-1 EFI Commands

EFI Shell Command	BCH Command Equivalent	BCH Command Parameters	Definition
These commands are found in all other menus			
info boot	Boot	[PRI|HAA|ALT|<path>]	Boot from specified path
help <command>	HElp	[<menu>|<command>]	Display help for specified command or menu
reset	RESET		Reset the system (to allow reconfiguration of complex
exit (at EFI shell)	MAin		Return to the main menu
MAin			

Table 5-1 EFI Commands (Continued)

EFI Shell Command	BCH Command Equivalent	BCH Command Parameters	Definition
EFI boot manager “change boot order”	PAth	[PRI|HAA|ALT|CON|KEY|<path>]	Display or modify a path
bcfg	SEArch	[ALL]	Search for boot devices
bcfg	SEArch	[DIsplay|IPL] [<path>]	Search for boot devices
many commands offer a [-b] parameter to cause 25 line breaks	ScRoll	[ON|OFF]	Display or change scrolling capability
COnfiguration			
autoboot	AUto	[BOot|SEarch|STart] [ON|OFF]	Display or set the auto start flag
info boot	BootID	[<processor #>[<bootid #>]]	Display or set processor boot identifier
EFI boot manager	Boot info		Display boot-related information
autoboot	BootTimer	[0-200]	Seconds allowed for boot attempt
cpuconfig	CPUconfig	[<proc>][ON|OFF]]	Config/deconfig processor
boottest	FastBoot	[ON|OFF] or [test] [RUN|SKIP]	Display or set boot tests execution
date	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the date
time	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the real time clock
INformation			
info all	ALL		Display all system information
info boot	BootINfo		Display boot-releated information
info cpu	CAche		Display cache information
info chiprev	ChipRevisions		Display revision number of major VLSI
MP command <df>	FRU		Display FRU information
info fw	FwrVersion		Display firmware version for PDC, ICM, and complex

Table 5-1 EFI Commands (Continued)

EFI Shell Command	BCH Command Equivalent	BCH Command Parameters	Definition
info io	IO		Display firmware version for PDC, ICM, and complex
LanAddress	LanAddress		Display core LAN station address
info mem	Memory		Display memory information
info cpu	PRocessor		Display processor information
SERvice			
errdump clear	CLEARPIM		Clear (zero) the contents of PIM
mm	MemRead	<addr> [<len>] [<type>]	Read memory locations scope of page deallocation
PDT	PDT		Display or clear the page deallocation table
errdump mca errdump cmc errdump init	PIM	[<proc>] [HPMC|LPMC|TOC|ASIC]]	Display PIM information (processor internal memory)

EFI/POSSE Commands

This section describes the EFI/POSSE commands developed for the server.

NOTE EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

help

Provides information on the EFI shell commands. It also has an additional feature to aid those familiar with the BCH menus to adjust to their equivalent functions in EFI.

Syntax

```
help [-b] <category>
help [-b] <cmd>
help [-b] bch <bchmenu> <bchcmd>
```

Parameters

```
-b              Enable page breaking
category        Category of commands to view help on commands
cmd             Shell command name on which to provide verbose information
bch             Display the list of BCH commands and their corresponding EFI
bchmenu         BCH menu name taken from the top level of the BCH menu
bchcmd          BCH command on which to display information
```

Operation

If help is invoked with no parameters, it displays a list of shell command categories. To list all of the commands within a category, the user should type **`help <category>`** (see examples). If invoked with the **`-b`** switch, any output longer than one page pauses after each page is displayed. If a shell command name is used as a parameter, verbose help is displayed for that command.

If help is invoked with the `bch` option, it displays a list of BCH commands and their corresponding EFI/POSSE commands. It instructs the user to repeat the command line followed by a menu name for more information on that menu. If help is invoked followed by **`bch`** and a menu name, it displays a list of commands that appear under that BCH menu. The user may then invoke help followed by **`bch`**, the menu name, and a BCH command name to display information on that command. This would point the user to the command that has taken the place of that BCH functionality, or will inform the user that the functionality no longer exists. As a shortcut, the user may enter help followed by **`bch`** and a BCH command name to go straight to that command.

Example 5-1 `help` Command

```
Shell> help
List of classes of commands:

boot          -- Booting options and disk-related commands
configuration -- Changing and retrieving system information
devices       -- Getting device, driver and handle information
memory        -- Memory related commands
shell         -- Basic shell navigation and customization
scripts       -- EFI shell-script commandsType "help" followed by a class name for a list of commands in
that class
Type "help" followed by command name for full documentation
```

Example 5-2 `help configuration` Command

```
Shell> help configuration
Configuration commands:

cpuconfig  -- Deconfigure or reconfigure cpus
date       -- Display or set date
err        -- Display or set error level
esiproc    -- Make an ESI call
errdump    -- View/Clear logs
info       -- Display hardware information
monarch    -- View or set the monarch processor
palproc    -- Make a PAL call
salproc    -- Make a SAL call
time       -- Display or set time
ver        -- Displays version info

Type "help" followed by command name for full documentationon that command.
Type "help -a" to display a list of all commands.
```

Example 5-3 `help cpuconfig` Command

```
Shell> help cpuconfig

CPUCONFIG [cpu] [on|off]

   cpu    Specifies which cpu to configure
   on|off Specifies to configure or deconfigure a cpu

   Notes:
        1. Cpu status will not change until next boot

   Examples:
       * To deconfigure CPU 0
       fs0:\> cpuconfig 0 off
       CPU will be deconfigured on the next boot

       * To display configuration status of cpus
       fs0:\> cpuconfig
       <CPU configuration data displayed>
```

Example 5-4 help bch Command

```
    COnfiguration         help bch co
    INformation           help bch in
    PAth                  help bch pa
    ScRool                help bch sr
    SEArch                help bch sea
    SERvice               help bch ser
    BOot                  help bch bo
    HElp                  help bch he
    RESET                 help bch reset
    MAin                  help bch ma

    For more help on one of the commands above, at the prompt type:
        help bch COMMAND
```

baud

Sets the baud rate and communication settings for a UART.

Syntax

```
baud <index> <baudrate>
```

Parameters

```
<index> 0 through the total number of UARTS minus one
<baudrate>      baud rate.
```

Operation

This command is used to change the speed for a UART in the system. This command works for all UARTs visible to EFI/POSSE. If the UART is part of PDH space and is initialized by the core firmware, this command communicates the settings to core firmware so the UART can be initialized with the new settings on the next boot. System default is 9600 baud.

Other Communication parameters are listed in Table 5-2.

Table 5-2 Communications Parameters

Parameter	Value
RECEIVE_FIFO_DEPTH	1
TIMEOUT	1000000
PARITY	No parity
DATA_BITS	8
STOP_BITS	1
CONTROL_MASK	0

boottest

Interacts with the speedy boot variable allowing it to be set appropriately.

Syntax

```
boottest                        Displays status of all speedy boot bits
boottest on                     Run all tests (for a normal boot time)
boottest off                    Skip all tests (for a faster boot time)
boottest [test]                 Displays status of specific Speedy Boot bit
boottest [test] [on|off]        Sets or clears a specific Speedy Boot bit
```

Parameters

```
[test]  Each test can be set or cleared:
        booting_valid   Enable/disable system firmware response to BOOTING
                        bit. If OS Speedy Boot aware set to on.
        early_cpu       Enable/disable early CPU selftests.
        late_cpu        Enable/disable late CPU selftests.
        platform        Enable/disable system board hardware tests.
        chipset         Enable/disable CEC tests.
        io_hw           Enable/disable EFI driver Core I/O tests.
        mem_init        Enable/disable memory initialization.
        mem_test        Enable/disable full destructive memory tests.
```

Example 5-5 `boottest` Command

```
Shell> boottest
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    ------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Run this test
   late_cpu         Run this test
   platform         Run this test
   chipset          Run this test
   io_hw            Run this test
   mem_init         Run this test
   mem_test         Run this test
```

Example 5-6 `boottest early_cpu off` Command

```
Shell> boottest early_cpu off
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    ------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Skip this test
   late_cpu         Run this test
   platform         Run this test
   chipset          Run this test
   io_hw            Run this test
   mem_init         Run this test
   mem_test         Run this test
```

cpuconfig

Displays the config/deconfig state of processors in the system and allows the user to configure or reconfigure processors.

Syntax

```
cpuconfig <cpu> <on|off>
```

Parameters

```
<cpu>           specify a processor
<on|off>        state to set the processor to
```

Operation

Issuing cpuconfig with no parameters displays the config/deconfig status of all processors. A user can reconfigure CPUs by specifying a CPU number and a state (on or off). If a valid state is entered and is different from the current state of a CPU, its status changes on the next boot. The last remaining configured CPU in a system cannot be deconfigured.

Example 5-7 `cpuconfig` Command

```
Shell>  cpuconfig
PROCESSOR INFORMATION
       # of                  L3     L4     Family/
CPU    Logical               Cache  Cache    Model           Processor
Slot   CPUs       Speed      Size   Size    (hex.)     Rev     State
---   -------    ---------  ----   -----   ------   ----    ----------
 0         1         1 GHz     3 MB   None   1F/00     B2          Active
 1         1         1 GHz     3 MB   None   1F/00     B2          Active
 2         1         1 GHz     3 MB   None   1F/00     B2          Active
 3         1         1 GHz     3 MB   None   1F/00     B2          Active
```

Example 5-8 `cpuconfig 2` Command

```
Shell> cpuconfig 2 off
CPU will be deconfigured on next boot.

Shell> cpuconfig
PROCESSOR INFORMATION
       # of                  L3     L4       Family/
CPU     Logical              Cache  Cache    Model           Processor
Slot    CPUs       Speed     Size   Size    (hex.)    Rev     State
---   -------    ---------   ----   -----   ------   ----    ----------
 0         1          1 GHz    3 MB   None    1F/00    B2          Active
 1         1          1 GHz    3 MB   None    1F/00    B2          Active
 2         1          1 GHz    3 MB   None    1F/00    B2    Sched Deconf
 3         1          1 GHz    3 MB   None    1F/00    B2          Active
```

default

Allows the user to restore NVM to default values and clear NVM storage values.

Syntax

```
default     [efi|sal]
default      clear [bmc|efi|sal]
```

Parameters

```
clear     clears NVM storage values
```

Operation

Default sets NVM and Stable Store values to predefined default values. To the normal user only a subset of values are available for default. Executing “default clear” resets the system.

errdump

Displays the contents of processor internal memory logged on the first MCA for all processors present in the system.

Syntax

```
errdump [mca | cpe | cmc | init | la | clear]
```

Parameters

```
mca               dumps the Machine Check Abort error log
cpe               dumps the Corrected Platform Error log
cmc               dumps the Corrected Machine Check log
init              dumps the Initialization log
la                dumps the Logic Analyzer log
clear            erases all of the logs (mca, cpe, cmc, init, la)
```

Operation

If a user enters no parameters, the usage is displayed. Otherwise, the specified error log is displayed. Adding -n to the clear parameter disables the confirmation prompt. (The `errdump` command can also be accessed via the System Configuration menu.)

info

Allows the user to display most system information.

Syntax

```
info [ -b] [target]
```

Parameters

```
target:         valid targets are:
        all        display everything
        cpu        display information on cpus
        cache     display information on cache
        mem        display information on memory
        io         display information on io
        boot       display boot-related information
        chiprev   display information on chip revisions
        fw         display firmware version information
        sys        display system information
        warning   display warning and stop boot information
```

Example 5-9 `info -b all` Command

```
Shell> info -b all
PROCESSOR INFORMATION

        # of                      L3       L4         Family/
CPU     Logical                 Cache    Cache      Model                Processor
Slot    CPUs        Speed       Size     Size       (hex.)       Rev     State
----    -------     --------    ------   ------      -------     ----    ------- -
 0         1          1 GHz       3 MB     None      1F/01        B2          Active
 1         1          1 GHz       3 MB     None      1F/01        B2           Active
 2         1          1 GHz       3 MB     None      1F/01        B2     Sched Deconf
 3         1          1 GHz       3 MB     None      1F/01        B2          Active

MEMORY INFORMATION
Extender 0:
         --- DIMM A -----    ---- DIMM B -----   ----DIMM C -----   ---- DIMM D -----
         DIMM    Current    DIMM    Current     DIMM    Current     DIMM    Current
---        ------ ----------    ------ -----------     ------ ----------    ----- -------------

 0     256 MB         Active    256 MB         Active      256 MB         Active   256 MB         Active
 1     ----                     ----                       ----                    ----
 2     ----                     ----                       ----                    ----
 3     ----                     ----                       ----                    ----
 4     ----                     ----                       ----                    ----
 5     ----                     ----                       ----                    ----
Extender 1:
         --- DIMM A -----    ---- DIMM B -----   ----DIMM C -----    ---- DIMM D -----
         DIMM    Current     DIMM    Current     DIMM    Current     DIMM    Current
---      ------ ----------   ------ -----------  ------ ----------   ----- -------------
 0       256 MB  Active      256 MB  Active      256 MB   Active     256 MB  Active
 1       ----                ----                ----                ----
 2       ----                ----                ----                ----
 3       ----                ----                ----                ----
 4       ----                ----                ----                ----
 5       ----                ----                ----                ----

    Active Memory    : 1024 MB
    Installed Memory : 1024 MB

I/O INFORMATION
```

```
BOOTABLE DEVICES
 Order   Media Type   Path
  ----   ---------- --------------------------------------------------------------------------------
          1  HARDDRIVE       Acpi(HWP0002,0)/Pci(2|0)/Scsi(Puno,Luno)/HD(Part1,Sig3D1F1
86A-846F-11D1-FB49BB94A768)
          2  HARDDRIVE       Acpi(HWP0002,0)/Pci(2|0)/Scsi(Pun2,Luno)/HD(Part1,Sig965900000
          3  CDROM                Acpi(HWP0002,0)/Pci(2|1)/Scsi(Pun4,Luno)/CDROM(Entry0)
          4  HARDDRIVE       Acpi(HWP0002,100)/Pci(1|0)/Pci(1|1)Scsi(Pun2,Luno)/HD(Part2,SigA45AC380-2588
-11D6-B48C-806D6172696F)
          5  HARDDRIVE       Acpi(HWP0002,100)/Pci(1|0)/Pci(1|1)/Scsi(Pun2,Luno)/HD(Part2,Sig9C82CD80-70D
2-4E88-A374-B029EBF1D8E4)
   Seg      Bus      Dev     Fnc      Vendor     Device       Slot
     #       #        #       #        ID         ID          #        Path
   ---      ---      ---     ---      ------     -------      ----      -------------
     00     00        01     00       0x103C     0x1290       01        Acpi(HWP0002,0)/Pci(1|0)
     00     00        01     01       0x103C     0x1048       01        Acpi(HWP0002,0)/Pci(1|1)
     00     00        02     00       0x1000     0x000B       01        Acpi(HWP0002,0)/Pci(2|0)
     00     00        02     01       0x1000     0x000B       01        Acpi(HWP0002,0)/Pci(2|1)
     00     00        04     00       0x1011     0x0026       02        Acpi(HWP0002,0)/Pci(4|0)
     00     01        04     00       0x1033     0x0035       02        Acpi(HWP0002,0)/Pci(4|0)/Pci(4|0)
     00     01        04     01       0x1033     0x0035       02        Acpi(HWP0002,0)/Pci(4|0)/Pci(4|1)
     00     01        04     02       0x1033     0x00E0       02        Acpi(HWP0002,0)/Pci(4|0)/Pci(4|2)
     00     01        05     00       0x1002     0x5159       02        Acpi(HWP0002,0)/Pci(4|0)/Pci(5|0)
     00     20        01     00       0x1014     0x01A7       03        Acpi(HWP0002,100)/Pci(1|0)
     00     21        01     00       0x1000     0x0021       03        Acpi(HWP0002,100)/Pci(1|0)/Pci(1|0)
     00     21        01     01       0x1000     0x0021       03        Acpi(HWP0002,100)/Pci(1|0)/Pci(1|1)
     00     21        04     00       0x14E4     0x1645       03        Acpi(HWP0002,100)/Pci(1|0)/Pci(4|0)

BOOT INFORMATION
  Monarch CPU :
  Current Preferred
 Monarch         Monarch     Possible Warnings
 -------         -------     ------------------
     0               0
 AutoBoot : ON - Timeout is : 7 sev
 Boottest    :
 OS is not speedy boot aware
 Selftest             Setting
 ---------            --------------------
 early_cpu            Skip this test
 late_cpu             Run this test
 platform             Run this test
 chipset              Run this test
 io_hw                Run this test
 mem_init             Run this test
 mem_test             Run this test

 LAN Address Information :
 Lan Address          Path
 -------------        ---------------------
*Mac(00306E05B950)    Acpi(HWP0002,100)/Pci(1|0)/Pci(4|0)/Mac(00306E05B950
 AWARE INFORMATION
  verscode      : 00.00 xxx
  datecode     :  xxxx
  built with : xxxxxxx
      Firmware Revision    : 2.01 (xxxx)
      PAL_A Revision    : 7.31
      PAL_B Revision    : 7.41
      SAL Spec Revision    : 7.31
      SAL_A Revision    : 7.41
      SAL_B Revision    : 7.31
      EFI Spec Revision    : 7.41
      EFI INTEL Drop Revision    : 7.31
      EFI Build Revision    : 7.41
```

```
      POSSE Revision    : 7.31
      ACPI Revision    : 7.41
      BMC Revision    : 7.31
      IPMI Revision    : 7.41
      SMBIOS Revision    : 7.31
      Management Processor Revision    : 7.41

WARNING AND STOP BOOT INFORMATION
 Warning [52] : A ROM revision is inconsistant with FIT or REVBLOCK

CHIP REVISION INFORMATION :
  CHIP                          Logical      Device          Chip
  Type                             ID          ID          Revision
  -------------                 -------      -------        ---------
  Memory Controller                0         122b             0022
  Root Bridge                      0         1229             0022
    Host Bridge                    0000      122e             0022
    Host Bridge                    0001      122e             0022
    Host Bridge                    0002      122e             0022
    Host Bridge                    0003      122e             0022
    Host Bridge                    0004      122e             0022
    Hot Plug Controller            0         0                0110
    Host Bridge                    0005      122e             0022
    Host Bridge                    0006      122e             0022
    Hot Plug Controller            0         0                0110
    Host Bridge                    7         0                0110
    Hot Plug Controller            0         0                0110
    Other Bridge                   0         0                0002
    Other Bridge                   0         0                0007
    Baseboard MC                   0         0                0130
```

Example 5-10 `info cpu` Command

```
Shell> info cpu
PROCESSOR INFORMATION

        # of                  L3      L4       Family/
CPU     Logical               Cache   Cache    Model            Processor


Slot    CPUs       Speed      Size    Size     (hex.)    Rev      State
---   -------    ---------   ------   ------   -------   ----    ------------
 0         1          1 GHz    3 MB     None     1F/01     B2          Active
 1         1          1 GHz    3 MB     None     1F/01     B2          Active
 2         1          1 GHz    3 MB     None     1F/01     B2    Sched Deconf
 3         1          1 GHz    3 MB     None     1F/01     B2          Active
```

Example 5-11 `info mem` Command

```
Shell> info mem
MEMORY INFORMATION
Extender 0:
       --- DIMM A -----  ---- DIMM B -----  ----DIMM C -----  ---- DIMM D -----
       DIMM   Current    DIMM   Current     DIMM   Current    DIMM   Current
---     ------ ----------   ------ ----------   ------ ----------  ----- -------------
 0     256 MB    Active   256 MB    Active    256 MB    Active   256 MB    Active
 1     ----              ----               ----               ----
 2     ----              ----               ----               ----
 3     ----              ----               ----               ----
 4     ----              ----               ----               ----
 5     ----              ----               ----               ----
Extender 1:
       --- DIMM A -----  ---- DIMM B -----  ----DIMM C -----  ---- DIMM D -----
       DIMM   Current    DIMM   Current     DIMM   Current    DIMM   Current
```

```
---     ------ ----------   ------ ----------   ------ ----------  ----- -------------
 0     256 MB    Active    256 MB    Active    256 MB    Active   256 MB    Active
 1     ----                ----                ----                ----
 2     ----                ----                ----                ----
 3     ----                ----                ----                ----
 4     ----                ----                ----                ----
 5     ----                ----                ----                ----

  Active Memory    : 1024 MB
  Installed Memory : 1024 MB
```

Example 5-12 `info io` Command

```
Shell> info io
BOOTABLE DEVICES
   Order  Media Type  Path
   -----  ----------  --------------------------------------------------------------------------
     1    HARDDRIVE   Acpi(HWP0002,0)/Pci(2|0)/Scsi(Pun0,Lun0)/HD(Part1,
Sig3D1F186A-846F-11D1-8780-FB49BB94A768)
     2    HARDDRIVE   Acpi(HWP0002,0)/Pci(2|0)/Scsi(Pun2,Lun0)/HD(Part1,Sig9659000)
     3    CDROM       Acpi(HWP0002,0)/Pci(2|1)/Scsi(Pun4,Lun0)/CDROM(Entry0)
     4    HARDDRIVE   Acpi(HWP0002,100)/Pci(1|0)/Pci(1|1)/Scsi(Pun2,Lun0)/HD(Part1,
SigA45AC380-2588-11D6-B48C-806D6172696F)
     5    HARDDRIVE   Acpi(HWP0002,100)/Pci(1|0)/Pci(1|1)/Scsi(Pun2,Lun0)/HD(Part1,
Sig9C82CD80-70D2-4E88-A374-B029EBF1D8E4)

Seg   Bus   Dev   Fnc    Vendor    Device   Slot
 #     #     #     #       ID        ID       #     Path
---   ---   ---   ---   --------  -------    ---    ----------
 00    00    01    00    0x103C    0x1290     01    Acpi(HWP0002,0)/Pci(1|0)
 00    00    01    01    0x103C    0x1048     01    Acpi(HWP0002,0)/Pci(1|1)
 00    00    02    00    0x1000    0x000B     01    Acpi(HWP0002,0)/Pci(2|0)
 00    00    02    01    0x1000    0x000B     01    Acpi(HWP0002,0)/Pci(2|1)
 00    00    04    00    0x1011    0x0026     02    Acpi(HWP0002,0)/Pci(4|0)
 00    01    04    00    0x1033    0x0035     02    Acpi(HWP0002,0)/Pci(4|0)/Pci(4|0)
 00    01    04    01    0x1033    0x0035     02    Acpi(HWP0002,0)/Pci(4|0)/Pci(4|1)
 00    01    04    02    0x1033    0x00E0     02    Acpi(HWP0002,0)/Pci(4|0)/Pci(4|2)
 00    01    05    00    0x1002    0x5159     02    Acpi(HWP0002,0)/Pci(4|0)/Pci(5|0)
 00    20    01    00    0x1014    0x01A7     03    Acpi(HWP0002,0)/Pci(1|0)
 00    21    01    00    0x1000    0x0021     03    Acpi(HWP0002,100)/Pci(1|0)/Pci(1|0)
 00    21    01    01    0x1000    0x0021     03    Acpi(HWP0002,100)/Pci(1|1)/Pci(1|1)
 00    21    04    00    0x14E4    0x1645     03    Acpi(HWP0002,100)/Pci(1|0)/Pci(4|0)
```

Example 5-13 `info boot` Command

```
Shell> info boot
BOOT INFORMATION
   Monarch CPU:

     Current  Preferred
     Monarch   Monarch    Possible Warnings
    --------  ---------   ------------------
            0           0

   AutoBoot: on - Timeout is : 7 SEC
   Boottest:
   boottest  Settings Default Variable
   OS is not speedy boot aware.

    Selftest       Setting
   ----------      -------------
    early_cpu      Skip this test
    late_cpu       Run this test
    platform       Run this test
```

```
    chipset        Run this test
    io_hw          Run this test
    mem_init       Run this test
    mem_test       Run this test

   LAN AddressInformation:

   LAN Address                Path
   -------------------      --------------
    *Mac(00306E05B950)      Acpi(HWP0002,100)/Pci(1|0)/Pci(4|0)/Mac(00306E05B950B)
```

lanaddress

Allows the user to display the core I/O MAC address.

Syntax:

```
lanaddress
```

Parameters

none

Example 5-14 `lanaddress` Command

```
Shell> lanaddress

LAN Address  Information
    LAN ADDRESS         Path
    ------------------  -------------------------
     *Mac(00306E05B950)   Acpi(HWP0002,100)/Pci(1|0)/Pci(4|0)/Mac(00306E05B950)
```

monarch

Displays or modifies the ID of the bootstrap processor. The preferred monarch number is stored in NVM.

Syntax

```
monarch <cpu>
```

Parameters

```
<cpu>      specifies a cpu
```

Operation

If specified with no parameters, **`monarch`** displays the Monarch processor for the system. Specifying a processor number alters the preferred Monarch processor. None of these changes takes affect until after a reboot.

Example 5-15 `monarch` Command

```
Shell> monarch
 Current   Preferred
 Monarch    Monarch     Possible Warnings
 -------   ---------    -----------------
       0           0
       0           0

To view monarch: fs0 :\ monarch
```

```
                 | Processor
-----------------+-----------
current status   |    0
next boot status |    0

To set the monarch processor to 1: fs0 :\ monarch 1

                 | Processor
-----------------+-----------
current status   |    0
next boot status |    1
```

pdt

Displays or clears the contents of the Page Deallocation Table.

Syntax

```
pdt (clear)
```

Parameters

```
<clear>      clears the pdt
```

Operation

With no options specified, the command displays the PDT information for the system. The PDT is cleared and a reboot is required for memory reallocation and safe booting.

Example 5-16 `pdt` Command

```
Shell> pdt
PDT Information
                Last Clear time: PDT has not been cleared
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error:  x0000000000000000
```

Example 5-17 `pdt clear` Command

```
Shell> pdt clear
Are you sure you want to clear the PDT? [y/N] y
Shell>

Shell> pdt
PDT Information

                Last Clear time: 10/21/01  5:00p
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error: 0x0000000000000000
```

sysmode

Display or modify the system mode.

Syntax

```
sysmode <normal | admin| service>
```

Parameters

```
<normal>     sets system mode to normal

<admin>      sets system mode to admin

<service>     sets system mode to service
```

Operation

If specified alone, sysmode displays the system mode. If a mode is specified as a parameter, then the system mode is changed. This new mode takes effect immediately. The system mode is retained on successive boots. Interaction with sysmode in a variety of scenarios is outlined below.

Example 5-18 `sysmode` Command

```
Shell> sysmode
System Mode: NORMAL

Shell> sysmode admin
You are now in admin mode.

Shell> sysmode service
You are now in service mode.

Shell> sysmode normal
You are now in normal mode
```

Specifying SCSI Parameters

The following SCSI parameters may be configured for the SCSI board:

- SCSI ID (SCSI initiator ID)
- Maximum data transfer rate (SCSI rate)
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)

Using the SCSI Setup Utility

Step 1. At the EFI shell prompt, type this command to map the parameters for all PCI cards installed in the system:

```
info io
```

A list of all the devices that are installed in the hp Integrity rx4640 Server and managed by EFI drivers is displayed. The output may look like this:

```
Seg  Bus  Dev  Fnc  Vendor  Device Slot
 #    #    #    #     ID      ID     #   Path
---  ---  ---  ---  ------  ------  ---  -----------
 00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)
 00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
 00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
 00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
 00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
 00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
 00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
 00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
 00   40   01   00  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|0)
00   40   01   01  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|1)
 00   60   01   00  0x1000  0x0021   02  Acpi(HWP0002,300)/Pci(1|0)
 00   60   01   01  0x1000  0x0021   02  Acpi(HWP0002,300)/Pci(1|1)
 00   80   01   00  0x8086  0x1229   01  Acpi(HWP0002,400)/Pci(1|0)
 00   C0   01   00  0x1000  0x0021   04  Acpi(HWP0002,600)/Pci(1|0)
 00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
 00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
 00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
```

In the example above, *two* SCSI boards are in the listing. The information for *both* channels of *both* SCSI boards is shown in **bold**, for highlighting purposes.

For each channel of the SCSI board, you need to note certain information. As an example, look at the information for the first SCSI board (the first two bold lines). For each channel of *this* SCSI board, note the following information:

- `Bus #`—identifies the bus the device is on; for the SCSI board, this is the same for both channels. In this example, the bus number is `40`.
- `Dev #`—the ID the device is assigned on the bus; for the SCSI board, this is the same for both channels. In this example, the SCSI board is device `01`.
- `Fnc #`—identifies the channel of the device (`00` for channel A, `01` for channel B, and so on). In this example, because the SCSI board has two channels, one channel is `00` and the other is `01`.

- `Vendor ID`—shows the device's vendor ID; for the SCSI board, this is the same for both channels. For all SCSI board HBAs, the ID is `0x1000`.
- `Device ID`—shows the device's device ID; for the SCSI board, this is the same for both channels. For all SCSI board HBAs, the ID is `0x0021`.
- `Slot #`—identifies the physical card slot in the system where the HBA is installed; for the SCSI board, this is the same for both channels. In this example, the HBA is in slot `03`.
- `Path`—identifies the device's path; for the SCSI board, this is the same for both channels. In this example, the HBA's path is `Acpi(HWP0002,200)/Pci(1|0)` for channel A and `Acpi(HWP0002,200)/Pci(1|1)` for channel B.

Using the SCSI board's information from the example above, the pieces of information that, combined, tell you this is a SCSI board are the following (shown in **bold**, for highlighting purposes):

```
00   40   01   00  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|0)
00   40   01   01  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|1)
```

Looking at all of the above information together, the vendor (**0x1000**) and device (**0x0021**) are the IDs for a SCSI board. Of the devices with those IDs, this device has two channels (Fnc # of **00** immediately followed by Fnc # of **01**). Also, this SCSI board has a numeric (non-XX) slot # (**03**, in this example).

Step 2. Still at the EFI shell prompt, type this command to obtain the controller's handle for the SCSI card:

```
devtree
```

A tree of all EFI-capable devices installed in the system is displayed. The output could look like this:

```
Device Tree
 Ctrl[02]
 Ctrl[04] Acpi(HWP0002,0)
   Ctrl[76] Acpi(HWP0002,0)/Pci(1|0)
   Ctrl[77] Acpi(HWP0002,0)/Pci(1|1)
   Ctrl[78] Acpi(HWP0002,0)/Pci(1|2)
   Ctrl[79] Acpi(HWP0002,0)/Pci(2|0)
     Ctrl[7B] Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
   Ctrl[7A] Acpi(HWP0002,0)/Pci(3|0)
     Ctrl[7C] Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E1ECE06)
 Ctrl[05] Acpi(HWP0002,100)
   Ctrl[32] Acpi(HWP0002,100)/Pci(2|0)
     Ctrl[33] Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E1E9EFA)
   Ctrl[7D] LSI Logic Ultra320 SCSI Controller
   Ctrl[7E] LSI Logic Ultra320 SCSI Controller
 Ctrl[06] Acpi(HWP0002,200)
   Ctrl[82] LSI Logic Ultra160 SCSI Controller
   Ctrl[83] LSI Logic Ultra160 SCSI Controller
 Ctrl[07] Acpi(HWP0002,300)
   Ctrl[91] LSI Logic Ultra160 SCSI Controller
   Ctrl[92] LSI Logic Ultra160 SCSI Controller
 Ctrl[08] Acpi(HWP0002,400)
   Ctrl[93] Acpi(HWP0002,400)/Pci(1|0)
     Ctrl[94] Acpi(HWP0002,400)/Pci(1|0)/Mac(0002B35BE064)
 Ctrl[09] Acpi(HWP0002,600)
   Ctrl[95] LSI Logic Ultra160 SCSI Controller
     Ctrl[0A] Acpi(HWP0002,700)
     Ctrl[96] Acpi(HWP0002,700)/Pci(1|0)
     Ctrl[97] Acpi(HWP0002,700)/Pci(1|1)
     Ctrl[98] Acpi(HWP0002,700)/Pci(2|0)
```

In the above example, *this* SCSI board's information is shown in **bold**, for highlighting purposes. You can tell the information is for this SCSI board because the path on the first line—Acpi(HWP0002,200)— is the HBA's path from the information displayed by the info io command. The next two lines are for the SCSI board's two channels, one line for each channel (they contain the SCSI board's description [LSI Logic Ultra160 SCSI Controller]). Note the value shown for Ctrl—82 and 83—at the beginning of each of those lines; this is the **controller's handle** for that channel. You need to know it for the next step.

NOTE The controller's handle values will change on every boot.

Step 3. Still at the EFI shell prompt, type this command to obtain the EFI driver's handle for the SCSI card:

```
drvcfg
```

A list of all EFI-capable configurable components in the system is displayed. The output may look like this:

```
Drv[26]   Ctrl[79]   Lang[eng]
Drv[34]   Ctrl[83]   Lang[eng]
Drv[35]   Ctrl[82]   Lang[eng]
Drv[36]   Ctrl[92]   Lang[eng]
Drv[37]   Ctrl[91]   Lang[eng]
Drv[38]   Ctrl[95]   Lang[eng]
Drv[71]   Ctrl[7D]   Lang[eng]
Drv[71]   Ctrl[7E]   Lang[eng]
```

This listing shows which driver controls which device (controller). In the above example, *this* SCSI board's information is shown in **bold**, for highlighting purposes. You can tell the information is for this SCSI board because the values shown for Ctrl—82 and 83—are the controller's handles for the SCSI board's two channels (from the information displayed by the devtree command).

NOTE The EFI driver's handle values will change on every boot.

TIP From this command (`drvcfg`), we recommend you record these two pieces of information for *each* channel of *each* SCSI board HBA you want to change the SCSI parameters for:

- `Drv` (the EFI driver's handle)
- `Ctrl` (the controller's handle)

Step 4. Using the information (the driver's handle [`Drv`] and the controller's handle [`Ctrl`]) from the `drvcfg` command, start the EFI SCSI Setup Utility for *one* channel of *this* SCSI board. Still at the EFI shell prompt, type this command:

drvcfg -s *drvr_handle cntrl_handle*

where

- *`drvr_handle`* is the handle of the driver that controls the channel whose SCSI ID you want to display or change
- *`cntrl_handle`* is the handle of the controller for the channel whose SCSI ID you want to display or change

So, continuing the example for *channel A* of *this* SCSI board, you would type:

```
drvcfg -s 35 82
```

Step 5. The EFI SCSI Setup Utility starts and its main menu is displayed, showing a list of all the EFI capable HBAs in the system.

TIP To move the cursor in the EFI SCSI Setup Utility, you can use these keys:

- Arrow keys: ↑ ↓ ← →
- Alternate keys:

  H = left

  J = down

  K = up

  L = right

  I = home

  O = end

Move the cursor to highlight *this* channel of *this* SCSI board; press **Enter**. (To determine which channel of the HBA to highlight, match the `PCI Bus`, `PCI Dev`, and `PCI Func` values on this screen to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command.)

CAUTION Do *not* select the `<Global Properties>` option on the main menu.

Step 6. The "Adapter Properties" screen for this channel of this SCSI board is displayed. If you like, you can make sure the utility is running for *this* channel of *this* SCSI board by comparing the values shown for `PCI Bus`, `PCI Device`, and `PCI Function` to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command.

CAUTION Do *not* change the value for *any* of these fields on the "Adapter Properties" screen:

- `Auto Termination`
- `SCSI Parity`
- `SCSI Bus Scan Order`
- `Spinup Delay (Secs)`

Changing any of these fields can cause unpredictable results.

CAUTION Do *not* change the value for *any* of these fields on the "Device Properties" screen:

- `Scan Id`
- `Scan LUNs > 0`
- `Disconnect`
- `SCSI Timeout`
- `Queue Tags`

- `Format`
- `Verify`

Changing any of these fields can cause unpredictable results.

Step 7. You may display (and optionally change) any SCSI parameters listed below for *this* channel of *this* SCSI board, or restore its SCSI parameters to their default values.

- SCSI ID
- Maximum data transfer rate
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)
- Restore Defaults

Step 8. Use the arrow keys to navigate to the appropriate SCSI parameter.

Step 9. Use the plus (**+**) and minus (**-**) keys to scroll through the values until the value you want is displayed.

Step 10. Press **Esc** to exit the "Adapter Properties" screen. You are given these choices:

- Cancel the exit from the screen (to stay in the "Adapter Properties" screen for *this* channel of *this* SCSI board)
- Save the changes you made and then exit the screen
- Discard the changes you made and then exit the screen

Step 11. Move the cursor to the action (cancel, save, or discard) you want to take; press **Enter**.

If you selected cancel, you remain in the "Adapter Properties" screen for *this* channel of *this* SCSI board. You can still change *this* channel's parameters listed above.

If you selected save or discard, you are placed in the EFI SCSI Setup Utility's main menu.

CAUTION Do *not* select the `<Global Properties>` option on the main menu.

Step 12. Press **Esc** to exit the main menu and the EFI SCSI Setup Utility.

Step 13. Select the option for exiting the utility.

Step 14. When you are prompted to, press **Enter** to stop *this* SCSI board; you are now back at the EFI shell prompt.

Step 15. At the EFI shell prompt, type this command:

```
reset
```

The system starts to reboot. This is **required** to cause the new SCSI setting.

Management Processor

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

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

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

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

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

Accessing the Management Processor

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

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

Interacting with the Management Processor

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

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

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

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

Management Processor Command Interface

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

Figure 5-2 MP Welcome Screen

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


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

MP commands are described in the following paragraphs.

Management Processor Commands

Table 5-3 Management Processor Commands and Descriptions

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

Table 5-3 Management Processor Commands and Descriptions (Continued)

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

Reset BMC Passwords

BP: Reset BMC Passwords

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

Configure Serial Port Parameters

CA: Configure local and remote serial port parameters

Set up the local serial port parameters as follows:

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

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

Set up the remote serial port parameters as follows:

- MODEM PROTOCOL: Bell or CCITT (CCITT is a European standard; RTS/CTS signaling is used, as well as the Ring signal. Bell is a U.S. or simple mode).
- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec.
- FLOW CONTROL: Hardware uses RTS/CTS; Software uses Xon/Xoff.
- TRANSMIT CONFIGURATION STRINGS: Disable this setting whenever the modem being used is not compatible with the supported modem (MT5634ZBA).
- MODEM PRESENCE: When the modem may not always be connected, set this parameter to “not always connected”.

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

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

Example 5-19 HP-UX

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

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

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

Certificate Generate

CG: Generate RSA key pair or Self Signed Certificate

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

Console Log

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

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

Command Mode

CM: Command Mode—enter command mode

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

Console

CO: COnsole—leave command mode and enter console mode

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

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

Connect to Service Processor

CSP: Connect to remote management processor over the LAN

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

Date

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

Default Configuration

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

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

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

There are three ways to reset passwords in the MP:

1. In the SO command, change individual users.
2. In the DC command choose “Reset Security Configuration”.
3. Forgotten passwords can be reset by pressing the reset button on the back panel of your HP Server. See Figure 2-7 on page 22. After the MP reboots, the local console terminal displays a message for five seconds. Responding to this message in time will allow a local user to reset the passwords.

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

Display FRUID

DF: Display FRUID information

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

Disconnect Remote or LAN Console

DI: DIsconnect remote/modem or LAN/WEB console

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

Front Panel Process

FP: Turn off front panel fault or attention LEDs

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

MP Firmware Update

FW: Activates MP firmware upgrade mode

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

Help

HE: Display help for menu or command

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

Display System ID

ID: Display/modify system information

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

- SNMP contact information
- SNMP server information
- SPU hostname

Inactivity Timeout

IT: Inactivity Timeout settings

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

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

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

Configure LAN Console

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

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

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

- Link State

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

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

LAN Status

LS: LAN Status

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

Return to Main Menu

MA: Return to MP Main Menu

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

Modem Reset

MR: Modem Reset

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

Modem Status

MS: Modem Status—Display modem status

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

Power Control

PC: Power Control—turn system power on and off

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

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

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

Configure Paging

PG: Paging parameter setup—configures pagers

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

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

Power Status

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

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

Reset BMC

RB: Reset BMC

This command resets the BMC by toggling a GPIO pin.

Reset System

RS: Reset system through RST signal

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

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

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

Set Access

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

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

Create Local Session

SE: Log into the system on local or remote port

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

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

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

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

Display Logs

SL: Display contents of the system status logs

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

- System Event Log (SEL)—High attention events and errors
- Forward progress—All events

- Current boot log—All events between “start of boot” and “boot complete”
- Previous boot log—The events from the previous boot

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

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

Navigate within the logs as follows:

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

Table 5-4 defines alert (or severity) levels.

Table 5-4 Alert Levels

Severity	Definition
0	Minor forward progress
1	Major forward progress
2	Informational
3	Warning
5	Critical
7	Fatal

Security Options

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

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

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

If the mode is single, the state is changed to `disabled` after the first login.

A disabled user’s login is not accepted.

Firmware Revision Status

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

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

System Status

SS: Displays the status of the system processors

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

Transfer Of Control

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

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

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

Tell

TE: TEll—sends a message to other terminals

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

User Configuration

UC: User Configuration—controls user access

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

Virtual Front Panel

VFP: Display Virtual Front Panel

When invoked, this command displays a current summary of system status, including the state of front panel LEDs.

There are two ways that the live display of events can be started:

1. Live Mode: Invoked from the VFP command at the MP prompt. To exit, type Q to quit the console.
2. Early Boot Mode: When the boot sequence for the system begins, the live VFP is invoked automatically. When boot finishes, you are automatically switched to console mode.

The LWED state reflects the state of the front panel LEDs. When system power is off, the remote LED shows “off” even thought remote access may be enabled with the EL or ER commands.

Who

WHO: Displays a list of MP connected users

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

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

Exit from MP

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

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

Diagnostics

XD: Diagnostics and/or Reset of MP

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

- MP Parameter Checksum
- Verify I^2C connection (get BMC Device ID)
- LAN connectivity test using ping
- Modem self-tests

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

Management Processor Help System

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

```
HE

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

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

                        MP Help System

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

    Enter a command at the help prompt:

           OVerview  : Launch the help overview

           LIst      : Show the list of MP commands

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

           TOPics    : Show all MP Help topics and commands

           HElp      : Display this screen

           Q         : Quit help
```

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

6 Troubleshooting

Troubleshooting Tips

WARNING **Before removing a cover to service components that cannot be hot-swapped, always disconnect the AC power cords and unplug telephone cables. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the AC power cords to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.**

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

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

Troubleshooting Methodology

Step 1. This is the entry point to the troubleshooting process. Here, you pick from a set of symptoms, ranging from very simple (System LED is blinking) to the most difficult Machine Check Abort (MCA) has occured. The following is a list of symptom examples:

- System LED blinking
- System Alert present on console
- System will not power-up
- System will not boot
- Event/Error Message received
- Machine Check Abort (MCA)

Step 2. This step narrows down the observed problem to the specific troubleshooting procedure required. Here you isolate the failure to a specific part of the server so that you can perform more detailed troubleshooting. For example:

- Problem-System LED blinking
  - — System Alert on console?
  - — Analyze the alert by using the system event log (SEL) to identify the last error logged by the baseboard management controller. Use either the EFI shell command line interface (CLI) or the optional management processor card is installed, use the MP commands to view the SEL.

Step 3. At this point you will have a good idea about which area of the system requires further analysis. For example, if the symptom was “system will not power-up” then the initial troubleshooting procedure may have indicated a problem with the DC power supply not coming up after the power switch was turned on.

Step 4. You have now reached the point where the failed Field Replaceable Unit (FRU or FRUs) have been identified and need to be replaced. You must now perform the specific remove-and-replace verification steps.

NOTE	If multiple FRUs are identified as part of the solution, a fix cannot be guaranteed unless all identified failed FRUs are replaced.

Step 5. There may be specific recovery procedures you need to perform to finish the repair. For example, if the display panel is replaced, you will need to restore customer-specific information.

Possible Problems

This section contains example HP Server problems and their possible solutions.

The system will not power-up.

Step 1. Review the installation procedures for the server. SeeChapter 4, “Installing Additional Components and Configuring.”

Step 2. Check all power connection cables.

Step 3. Verify that 200-240 VAC power is available at the AC power receptacle. Check the receptacle output with another device.

Step 4. Check the power supply fans to see if they are operating. The fans will operate off the DC voltage generated by the power supply.

Step 5. Check that the Power LED on Front Control Panel is illuminated. See“Front Control Panel LEDs” on page 128.

Step 6. Check all connections from the power supply to the power distribution module.

Step 7. Verify that all cables and modules are correctly connected. Especially check the display panel connection.

Step 8. If the system starts to power-on and then power-off, a voltage rail of the power supply may be out of specification. The BMC monitors voltages and prevents power-on when power values are out of specification.

The system will not boot.

Step 1. Examine the front panel LEDs for warning or fault indications. The system LED will be flashing yellow with a warning indication and flashing red with a fault indication. See “Front Control Panel LEDs” on page 128.

Step 2. Examine the QuickFind Diagnostic Panel for indications of specific warning or fault indications. The diagnostic LEDs present patterns that categorize the source of the warning or fault. See “QuickFind Diagnostic Panel LEDs” on page 130.

Step 3. Display and examine the system event log (SEL) and forward progress log (FPL) for further information relating to warning or fault isolation.

Step 4. Review the firmware revisions of all firmware.

Step 5. Use the MP command to cycle the system power: `pc off`, `pc on`.

Step 6. Turn the server off, wait at least twenty seconds, then turn the server back on to see if the failure can be cleared.

Step 7. Check that all DIMMs are seated properly.

Step 8. Check that the DIMM configuration on the system board matches those approved. A minimum of one DIMM pair must be installed.

Step 9. Verify that the DIMMs are fully seated. When the DIMM is fully seated in the mating connector, the retaining latches are closed (they should be flush with the front of the DIMM). If the latches are not closed, reseat the DIMM fully by engaging the retaining latches and closing them fully.

Step 10. Check that the processors are installed in the correct sockets and that each processor has a power pod installed. Also verify that the processors are of the same type.

Step 11. Check the boot order with the SCSI configuration utility.

Step 12. If there are no obvious errors, reflash the BMC firmware, Refer to the Utilities chapter in the *hp Integrity rx4640 Operations and Maintenance Guide*.

Step 13. If the system will still not boot, it may be necessary to replace the base unit.

The system has intermittent failures

Step 1. Examine the front panel LEDs for warning or fault indications. The system LED will be flashing yellow with a warning indication and flashing red with a fault indication. See “Front Control Panel LEDs” on page 128.

Step 2. Examine the QuickFind Diagnostic Panel for indications of specific warning or fault indications. The diagnostic LEDs present patterns that categorize the source of the warning or fault. See “QuickFind Diagnostic Panel LEDs” on page 130.

Step 3. Display and examine the system event log (SEL) and forward progress log (FPL) for further information relating to warning or fault indications.

Step 4. Make sure that the system fan assemblies are fully seated.

Step 5. Verify that the server is plugged into a power source that is within specifications described on the label of the power supply.

Step 6. Make sure that the internal SCSI chain is terminated and that termination is not enabled on any of the drives. Note that LVD SCSI termination is provided on the cable.

Step 7. Check that the processors are installed in the correct sockets and that terminators are installed in all unused sockets.

Step 8. Reset the main memory DIMMs.

Step 9. If date and time or customer settings are being cleared, the system board battery may need to be replaced.

The system LED or Diagnostic LEDs are not on and no error messages appear.

If the server does not work (with no LEDs illuminated) and no error messages appearing, check the following:

Step 1. Make sure that all cables and the AC power cord are plugged into their proper receptacles.

Step 2. Make sure that the AC outlet is working. If the server is plugged into a switched multiple-outlet box, make sure that the switch on the outlet box is turned on.

Step 3. Make sure that the server is turned on (the power-on light should be green and the fans should be on).

Step 4. Turn the server off, wait at least twenty seconds, then turn the server back on to see if the failure can be cleared.

Step 5. Make sure that all boards are installed properly and the processors are installed in the correct slot. They must be seated firmly in their slots and any cables must be connected firmly.

Step 6. If the server stopped working after you installed a new board, remove the board and turn on the server. If your server now works, check the installation instructions received with the new board for correct installation method. If the new board is preventing the server from powering on, it is likely to have a serious electrical problem.

Step 7. If the server still does not work, remove all boards and options that you have installed (do not remove the hard disk drives) and turn on the server.

Step 8. Add boards and options one at a time to determine which one is causing the problem.

Step 9. If you have added any memory, make sure that the DIMMs are seated properly in the board. Also check the DIMM configuration, and that the DIMMs are matched pairs.

Power goes off on the server and does not come back on

When certain critical conditions exist, the server shuts down all power.

The critical conditions that may shut down the server are:

- Critical temperature fluctuations or changes
- Voltage problems (external AC line)
- Power supply failure

If the server powers-off, and before you try a restart, do the following:

Step 1. Examine the front panel LEDs for warning or fault indications. The system LED will be flashing yellow with a warning indication and flashing red with a fault indication. See “Front Control Panel LEDs” on page 128.

Step 2. Examine the QuickFind Diagnostic Panel for indications of specific warning or fault indications. The diagnostic LEDs present patterns that categorize the source of the warning or fault. See “QuickFind Diagnostic Panel LEDs” on page 130.

Step 3. Check to make sure power is getting to the server. Plug a known working device into the power outlet.

Step 4. Check for proper ventilation for the server. The server should have at least three inches of space around the front and rear for proper airflow when installed in a rack.

NOTE Temperature problems may be caused by a fluctuating power supply.

Step 5. Check the system specifications and make sure the environmental temperature and voltage are in the specified guidelines.

Step 6. Monitor the system to make sure you are not experiencing further temperature and voltage problems.

Troubleshooting Using LED Indicators

Your hp Integrity rx4640 Server has LED indicators located on the front control panel and an internal QuickFind diagnostic panel that you can use to determine what repair action is required. For descriptions of all LEDs on your hp Integrity rx4640 Server see the *hp Integrity rx4640 Operation and Maintenance Guide* on the documentation CD included with your system.

Front Control Panel LEDs

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

Figure 6-1 Front Control Panel

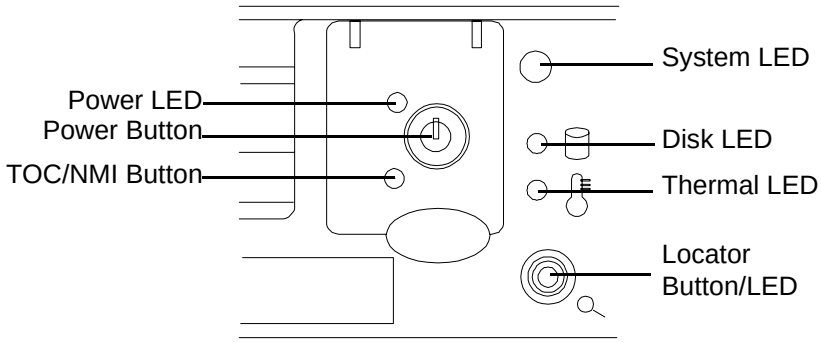


Table 6-1 Front Control Panel LED Definitions

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

QuickFind Diagnostic Panel LEDs

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

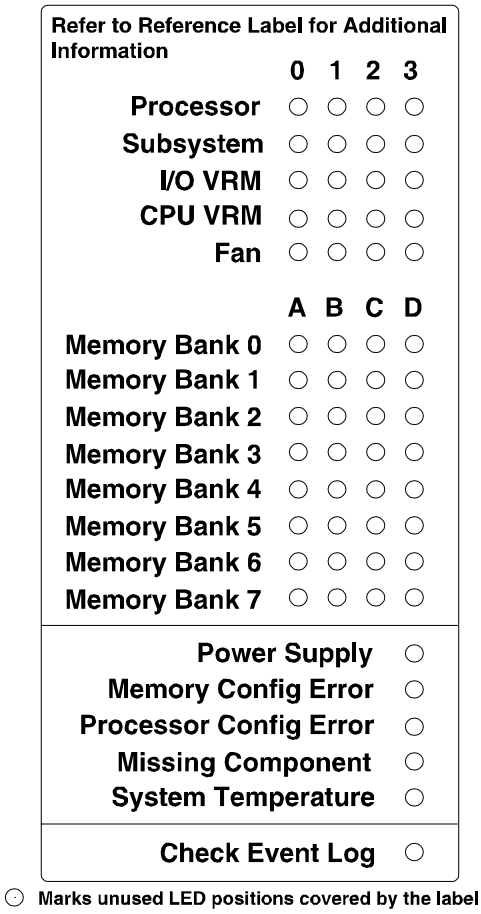
Table 6-2 QuickFind Diagnostic Panel LED Definitions

Item	LED 0	LED 1	LED 2	LED3	Details
Processor	Socket 0	Socket 1	Socket 2	Socket 3	If the System LED (on front panel) is in the attention or fault state and the processor LED is on, then the processor or voltage regulator has failed—the processor module in the specified socket needs to be replaced. If the thermal LED is in the warning or critical state and the processor LED is on, then the processor exceeded the warning or critical level.
Subsystem	CPU board	Memory board	I/O board	n/a	A soldered voltage regulator has failed—the specified board must be replaced.
I/O VRM	12 volt	5 volt	3 volt	n/a	A plug-in voltage regulator has failed—specific VRM must be replaced.
CPU VRM	n/a	n/a	n/a	n/a	n/a
Fan Module	0	1	2	n/a	One or both fans in a fan module have failed—the module must be replaced. Fan 2 is in front of the power supplies.
Memory Bank X (0-7)	DIMM xA	DIMM xB	DIMM xC	DIMM xD	The specified DIMM has failed—the DIMM must be replaced. If all the LEDs for a rank (0-7) are lit and the memory config error LED is lit, then the DIMMs in the specified rank are mismatched—replace mismatched DIMM.
Check Power Supply	n/a	n/a	n/a		One of the power supply or power supply fans have failed—replace the power supply. The faulty power supply LED (located on Power supply) will be lit.
Memory Config Error	n/a	n/a	n/a		The DIMMs in a rank are mismatched. All the DIMMs in the specified rank (0-7) will be lit.
Processor Config Error	n/a	n/a	n/a		The processors are mismatched—replace mismatched processor.
Missing Component	n/a	n/a	n/a		A required component(s) is not installed in the system and thus preventing “power-up.”
System Temp	n/a	n/a	n/a		The internal temperature of the server has exceeded the warning or critical level.

Table 6-2 QuickFind Diagnostic Panel LED Definitions (Continued)

Item	LED 0	LED 1	LED 2	LED3	Details
Check Event Log	n/a	n/a	n/a		An event has occurred that requires attention.

Figure 6-2 QuickFind Diagnostic Label



I/O Baseboard LED Indicators

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

Figure 6-3 I/O Baseboard LEDs, Buttons and Sensors

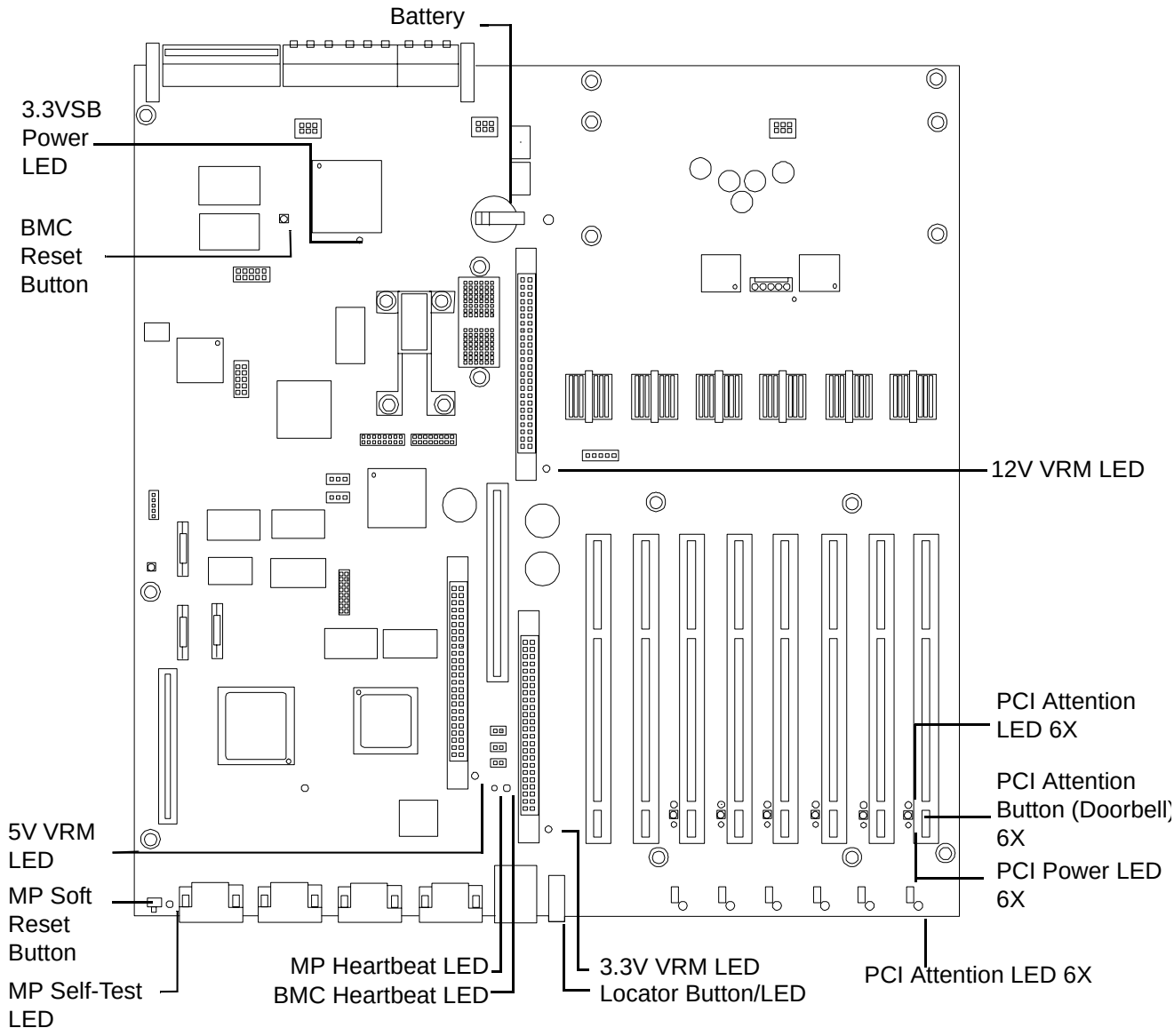


Table 6-3 I/O Baseboard LEDs, Buttons and Sensors

LED/Button	Color	Status	Condition
12V VRM Power LED	Green	On	12V VRM is functioning.
5V VRM Power LED	Green	On	5V VRM is functioning.

Table 6-3 I/O Baseboard LEDs, Buttons and Sensors (Continued)

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

Troubleshooting Using Online Support Tools

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

Support Tools Manager

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

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

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

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

To access the Support Tools Manager from a terminal console, perform the following steps:

Step 1. In a terminal window type the following at the command prompt:

```
fs0:\> cstm
```

The following message appears:

```
Support Tools Manager Version A.01.00

Type 'help' for a list of available commands

CSTM>
```

Step 2. To verify the system operation, type the following at the `CSTM>` prompt:

```
CSTM> verify all
```

Messages similar to the following appear:

```
Verification has started on device (CPU)

Verification has started on device (FPU)

CSTM> Verification of (FPU) has completed)

CSTM> Verification of (CPU) has completed)
```

Step 3. Press **Enter** to return to `CSTM>` prompt after all test results are reported.

Step 4. To exit the Support Tools Manager, type the following:

```
CSTM> exit
```

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:

- IA-64 core hardware monitor
- 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
```

Instant Support Enterprise Edition (ISEE)

ISEE is a remote monitoring software package that can operate on your hp Integrity rx4640. It can deliver, via the Internet, remote system monitoring and secure remote access from your machine to HP support engineers. It places a MAP (script) on your machine that can be turned on by HP support to gather system information. This software can be obtained at http://www.software.hp.com.

Troubleshooting Using Offline Support Tools

You can use offline support tools to troubleshoot your hp Integrity rx4640 Server.

- Offline Diagnostic Environment (ODE)—available on IPF Offline Diagnostics on the resource CD that comes with your HP Server.
- e-Diagtools—available from IPF Offline Diagnostics on the resource CD that comes with your server.

NOTE For machines using HP-UX the HP service partition is not available and the *IPF Offline Diagnostics CD* must be used.

- Management Processor (MP) event logs—available by logging on to the management processor via the MP LAN or MP remote serial connectors.

Offline Diagnostic Environment (ODE)

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

Step 1. Power on your HP Server and insert the *IPF Offline Diagnostics CD*.

Step 2. Do not permit the server to boot into an operating system and at the EFI boot manager, select EFI shell.

Step 3. Determine the file system that represents the CD and enter the appropriate command to access the CD.

e-Diagtools

e-Diagtools is used to evaluate the hardware integrity of your HP Server. To access e-Diagtools from the *IPF Offline Diagnostics CD*, perform the following steps:

Step 1. Power on your HP Server and insert the *IPF Offline Diagnostics CD*.

Step 2. Do not permit the server to boot into an operating system and at the EFI boot manager, select EFI shell.

Step 3. Determine the file system that represents the CD and enter the appropriate command to access the CD.

Step 4. After accessing the CD diagnostic menu, launch e-Diagtools for IPF and run the basic and advanced tests according to the menus.

Figure 6-4 Offline Diagnostic Main Menu

```
**************************************************************************
******                                                              ******
******            Offline Diagnostic Environment                    ******
******                                                              ******
******  (C) Copyright Hewlett-Packard Co 1993-2003                  ******
******                   All Rights Reserved                        ******
******                                                              ******
******  HP shall not be liable for any damages resulting from the   ******
```

```
******  use of this program.                                          ******
******                                                                ******
******               TC  Version B.00.10                              ******
******               SysLib Version B.00.06                           ******
******               Mapfile Version B.01.05                          ******
******                                                                ******
************************************************************************
Type HELP for command information.
ODE> ls
Modules on this boot media are:
filename      type   size     created   description
-------------------------------------------------------------------------
CIODIAG2.EFI  TM     642560   06/06/2003  Core IO diagnostic
CPUDIAG.EFI   TM     737280   06/06/2003  Processor diagnostic
IODIAG.EFI    TM     143872   06/06/2003  Runs selftests on I/O modules
MAPPER.EFI    TM     1653248  06/06/2003  System mapping utility
MEMDIAG.EFI   TM     263168   06/06/2003  Memory diagnostic
PERFVER.EFI   TM     814592   06/06/2003  Runs ROM-based selftests on peripherals
PLUTODIAG.EFI TM     514560   06/06/2003  SBA/LBA diagnostic
COPYUTIL.EFI  TM     1041920  06/06/2003  Disk-to-tape copy utility
DFDUTIL.EFI   TM     850432   06/06/2003  Disk firmware download utility
FCFUPDATE.EFI TM     608256   06/06/2003  FW Update Utility for Fibre Channel
ODE>
```

Management Processor (MP) Event Logs

The MP interface provides diagnostic and configuration capabilities. To access your MP interface, 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.

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

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

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

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

- System event

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

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

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 6-4 Disk and DVD Paths

Slot	Path
Slot 1	Acpi(HWP0002,100)/Pci(1|0)
Slot 2	Acpi(HWP0002,100)/Pci(1|1)
DVD	Acpi(HWP0002,0)/Pci(3|0)

Table 6-5 I/O Paths

I/O Slot	Path
Slot 1	Acpi(HWP0002,100)/Pci(2|0)
Slot 2	Acpi(HWP0002,100)/Pci(1|0)
Slot 3	Acpi(HWP0002,400)/Pci(2|0)
Slot 4	Acpi(HWP0002,400)/Pci(1|0)
Slot 5	Acpi(HWP0002,500)/Pci(2|0)
Slot 6	Acpi(HWP0002,500)/Pci(1|0)
Slot 7	Acpi(HWP0002,200)/Pci(1|0)
Slot 8	Acpi(HWP0002,600)/Pci(1|0)

Other Event Logs and General Diagnostic Tools

This section describes other general diagnostic tools that will be provided for your HP Server and how to generate other event logs for troubleshooting diagnosis.

- General diagnostic tools available to support your HP Server are:
  - MCA analyzer
- Event logs not generated by the management processor include:
  - Machine check abort log (MCA)

— Corrected machine check log (CMC)

— Corrected platform error log (CPE)

To access these logs type in at the `shell>`command line prompt:

```
errdump mca
errdump cmc
errdump cpe
```

Hypothetical Troubleshooting Scenario

The following describes a hypothetical troubleshooting scenario that might occur with your hp Integrity rx4640 Server.

1. This is the entry point to the troubleshooting process. Here, you pick from a set of symptoms, ranging from very simple (System LED is blinking) to the most difficult (MCA has occurred). The following is a list of symptom examples:
   - System LED blinking
   - System will not power up
   - System will not boot
   - EMS event message received
   - Machine check abort (MCA) occurred
2. This step narrows down the observed problem to the specific troubleshooting procedure required. Here, you isolate the failure to a specific part of the machine so that you can perform more detailed troubleshooting. For example:
   - Problem-System LED blinking

     If the LED is the system alert on the control console, analyze the last error logged by the management processor.
3. At this point you will probably know which component of your HP Server needs attention. For example, if the symptom was “System will not power up,” then the initial troubleshooting procedure may have led to a problem with the DC power supplies (48V) not coming up after the power switch was turned on.
4. You have now reached the point where the failed Field Replaceable Unit (FRU or FRUs) have been identified and need to be replaced. You must now perform the specific remove-and-replace and verification steps. See Chapter 7, “Removing and Replacing Components,” for remove-and-replace procedures on all FRUs in your HP Server.

NOTE If multiple FRUs are identified as part of the solution, a fix cannot be guaranteed unless all identified failed FRUs are replaced.

---

5. There may be specific recovery procedures you need to perform to finish the repair. For example, if the management processor is replaced, you will need to restore customer-specific information such as user profiles, network IDs, and passwords. See Chapter 4, “Installing Additional Components and Configuring,” for procedures on setting up your management processor.

7 Removing and Replacing Components

Safety Information

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

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

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

Service Tools Required

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

- Electrically Conductive Field Service Kit (P/N 9300-1155)
- 1/4 inch Flat Blade Screwdriver
- ACX-15 torx Screwdriver

Accessing a Rack Mounted Server

The hp Integrity rx4640 Server is designed to be rack mounted. The following procedure explains how to gain access to your hp Integrity rx4640 Server that is mounted in an approved rack. For rack installation instructions, review the document titled *Installation Guide, Mid-Weight Slide Kit, 5065-7291*. This document can be accessed at: http://www.hp.com/racksolutions.

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

Extend the Server from the Rack

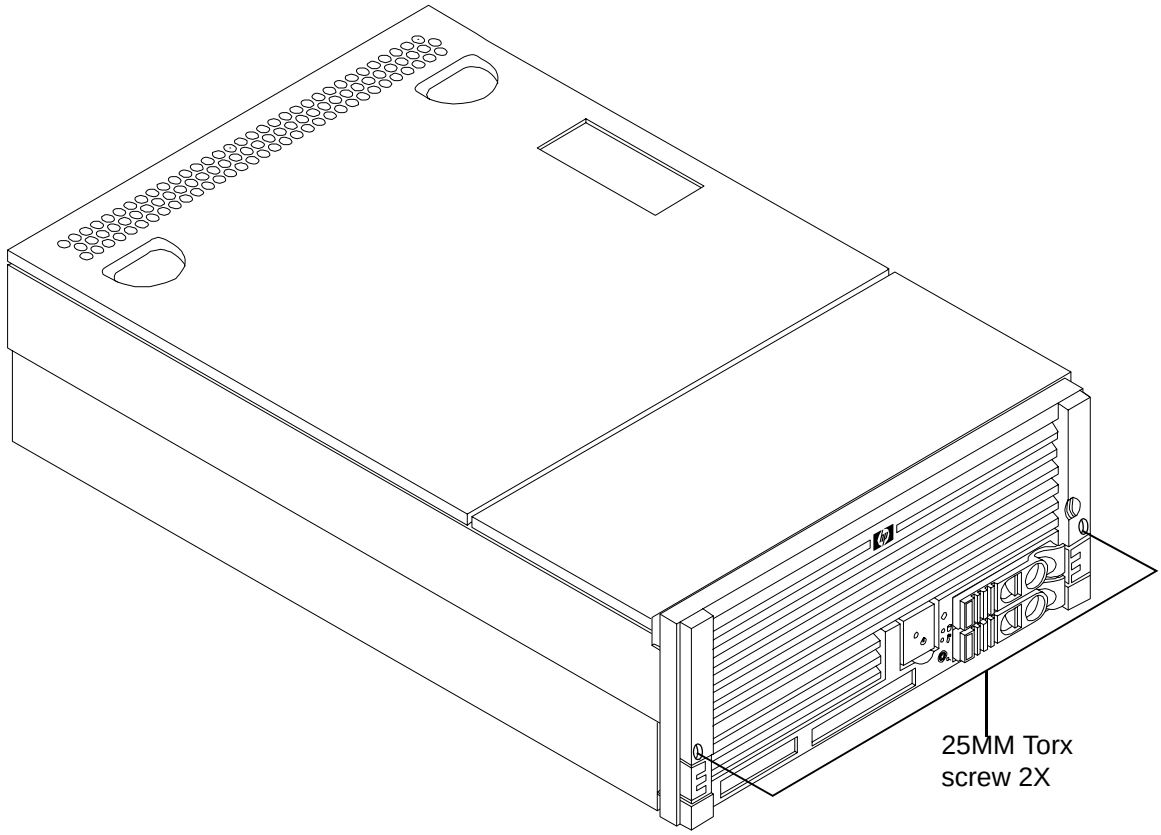
NOTE Ensure that there is enough area (Approximately 1.5 meters [4.5 ft.]) to fully extend the server out the front and work on it.

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

Step 1. Remove the T-25 screws that fasten the server to the rack. See Figure 7-1, “Accessing 25MM Torx Screws.”

Step 2. Flip out the two pull handles at either end of the front bezel and slowly pull the unit forward by the handles. The server is fully extended when the rail clips are locked in place. When fully extended, the front and top covers are fully accessible.

Figure 7-1 Accessing 25MM Torx Screws



Insert the Server into the Rack

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

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

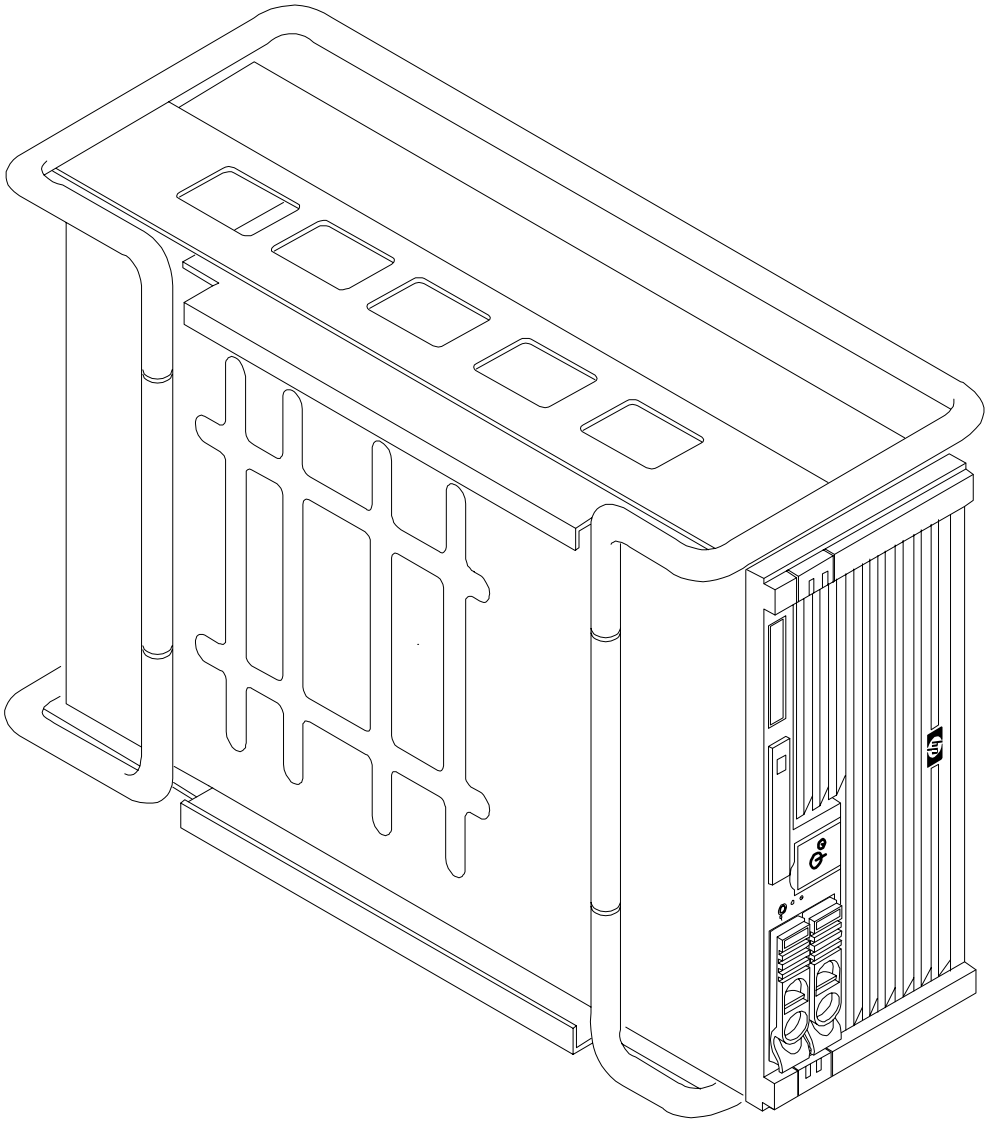
Step 2. Replace the T-25 screws that fasten the server to the rack.

Accessing a Pedestal Mounted Server

The hp Integrity rx4640 Server is also designed to be pedestal mounted. You do not need to remove the pedestal from the HP Server to gain access to internal components. The front bezel, front cover, and top cover may be removed with the pedestal attached to the HP Server.

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

Figure 7-2 Pedestal Mounted hp Integrity rx4640 Server



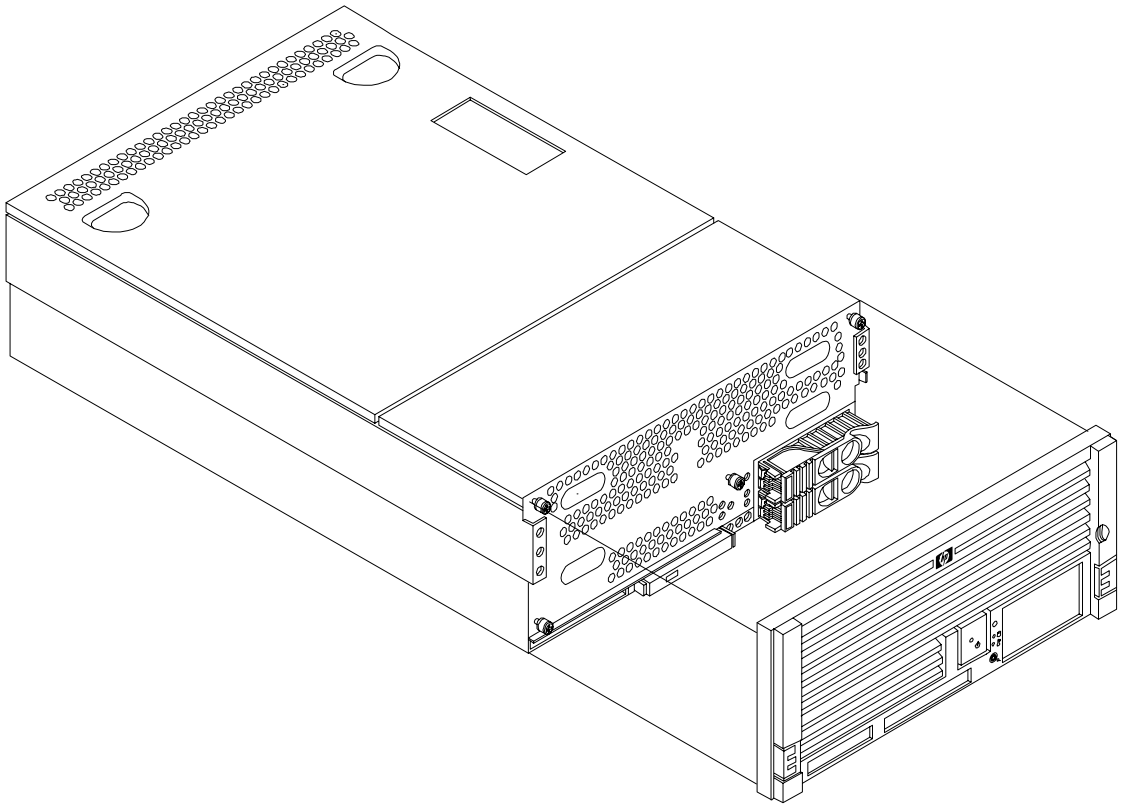
Front Bezel

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

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

- Power switch
- System LEDs

Figure 7-3 Removing and Replacing the Front Bezel



Removing the Front Bezel

To remove the front bezel, perform the following steps:

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

Replacing the Front Bezel

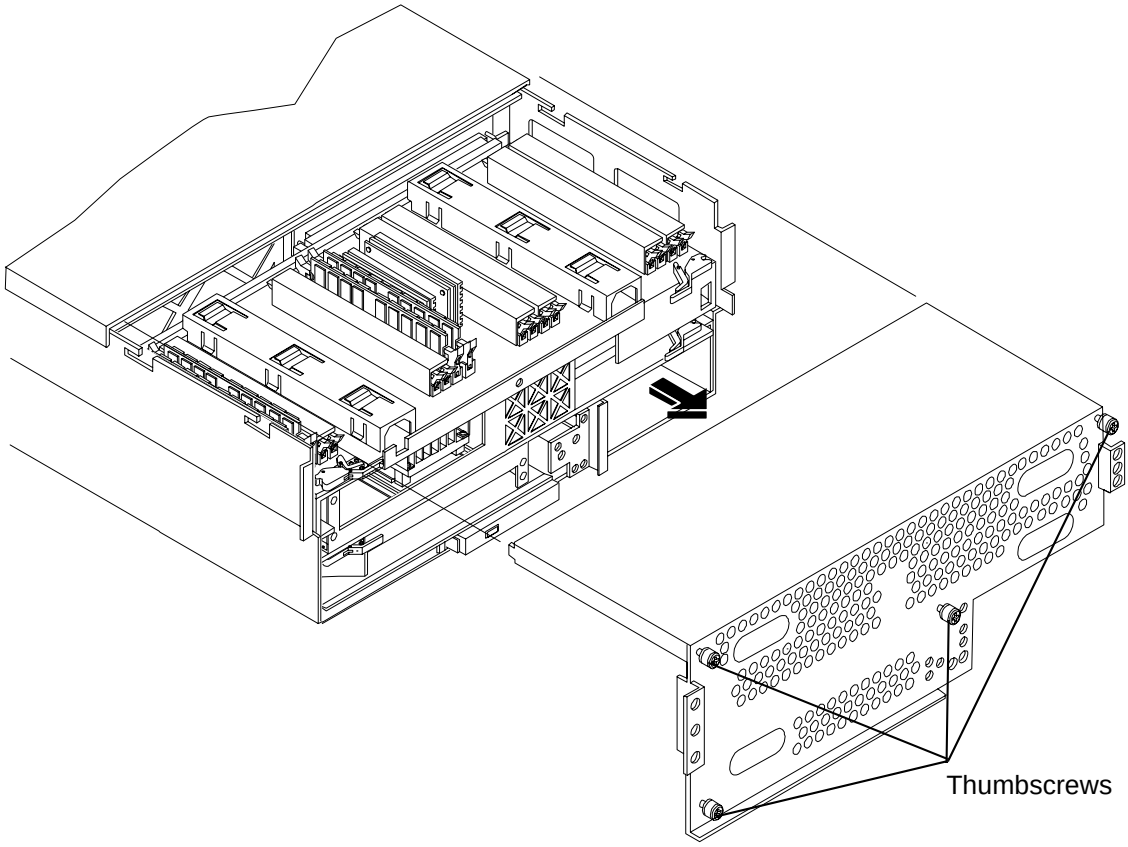
To Replace the front bezel, perform the following steps:

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

Front and Top Covers

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

Figure 7-4 Removing and Replacing the Front Cover



Removing the Front Cover

To remove the front cover, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Using a torx T15 driver, loosen the four captive thumbscrews that hold the front cover in place.

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

Replacing the Front Cover

To replace the front cover, perform the following steps:

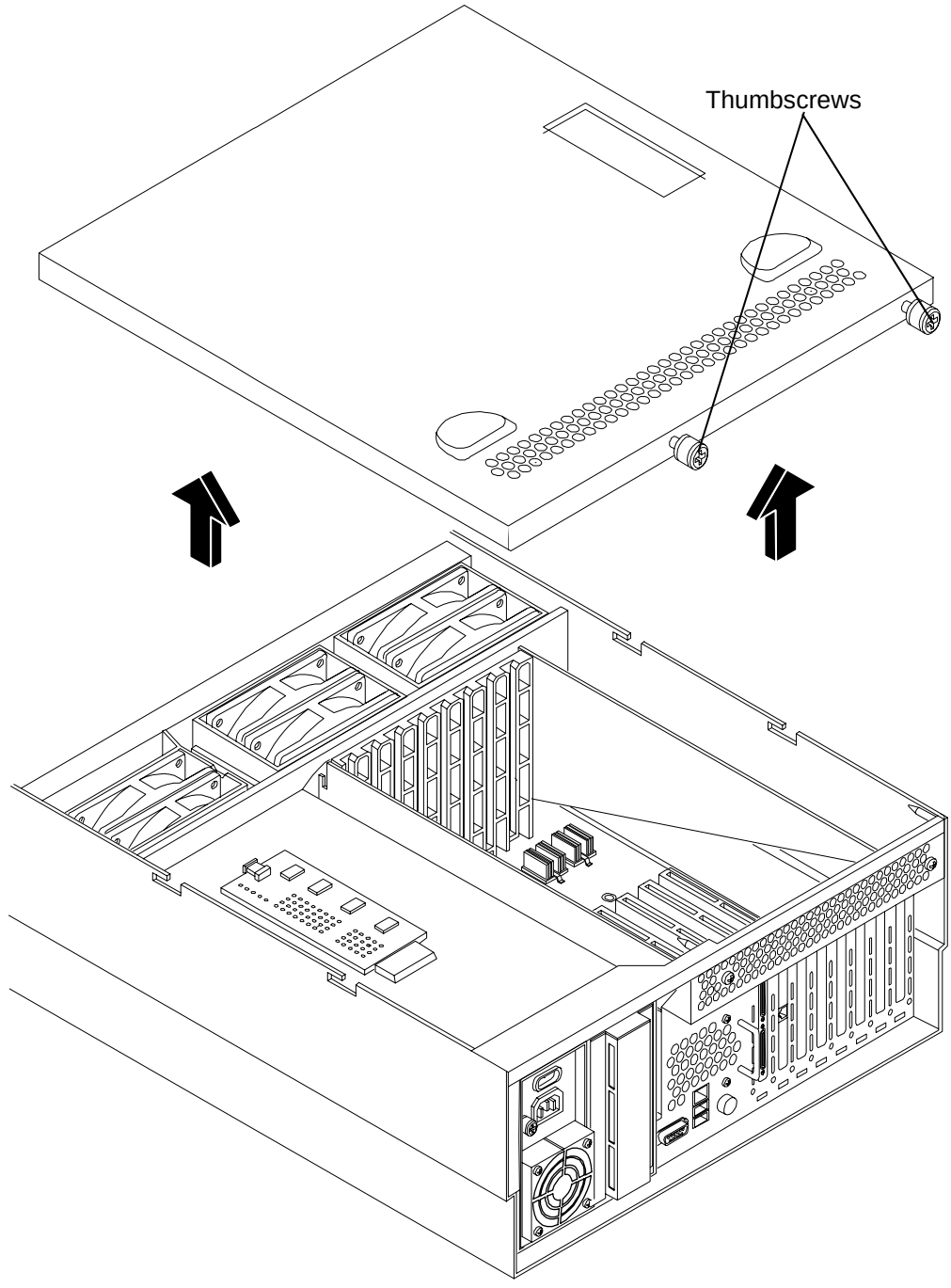
Step 1. Align the tabs at the rear of the front cover with the corresponding slots in the chassis and fully seat the tabs into the slots.

Step 2. Tighten the four thumbscrews securely.

Step 3. Replace the front bezel.

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

Figure 7-5 Removing and Replacing the Top Cover



Removing the Top Cover

To remove the top cover, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

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

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

Replacing the Top Cover

To replace the top cover, perform the following steps:

Step 1. Align the tabs at the rear of the top cover with the corresponding slots in the chassis, fully seat the tabs into the slots, and push forward until it seats.

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

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

System Battery

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

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover from the chassis. See “Front and Top Covers” on page 145.

Step 3. Remove the I/O baseboard assembly from the chassis. See “I/O Baseboard Assembly” on page 172.

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

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

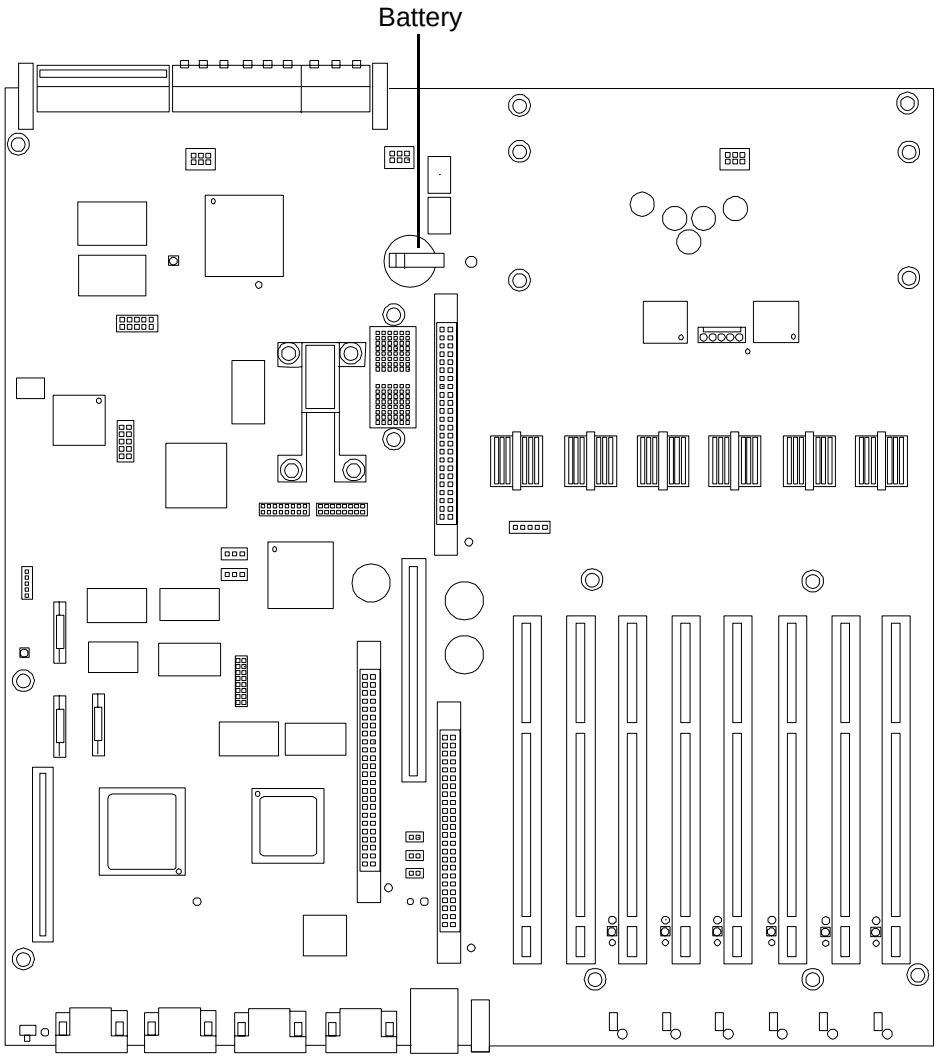
NOTE The positive terminal of the battery is designated by the “+” sign. The battery is installed with the “+” sign facing up.

Step 6. Replace the top cover.

Step 7. Replace the I/O baseboard assembly.

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

Figure 7-6 Battery Location on I/O Baseboard



Memory Extender Board

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

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

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

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

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

Removing a Memory Extender Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

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

Step 2. Remove the front bezel from the chassis. See “Front Bezel” on page 144.

Step 3. Remove the front cover from the chassis. See “Front and Top Covers” on page 145.

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

Step 5. Pull on the extraction levers to unplug the memory extender board from the socket located on the midplane riser board and remove the memory extender board from the chassis.

Figure 7-7 Memory Extender Board Latches

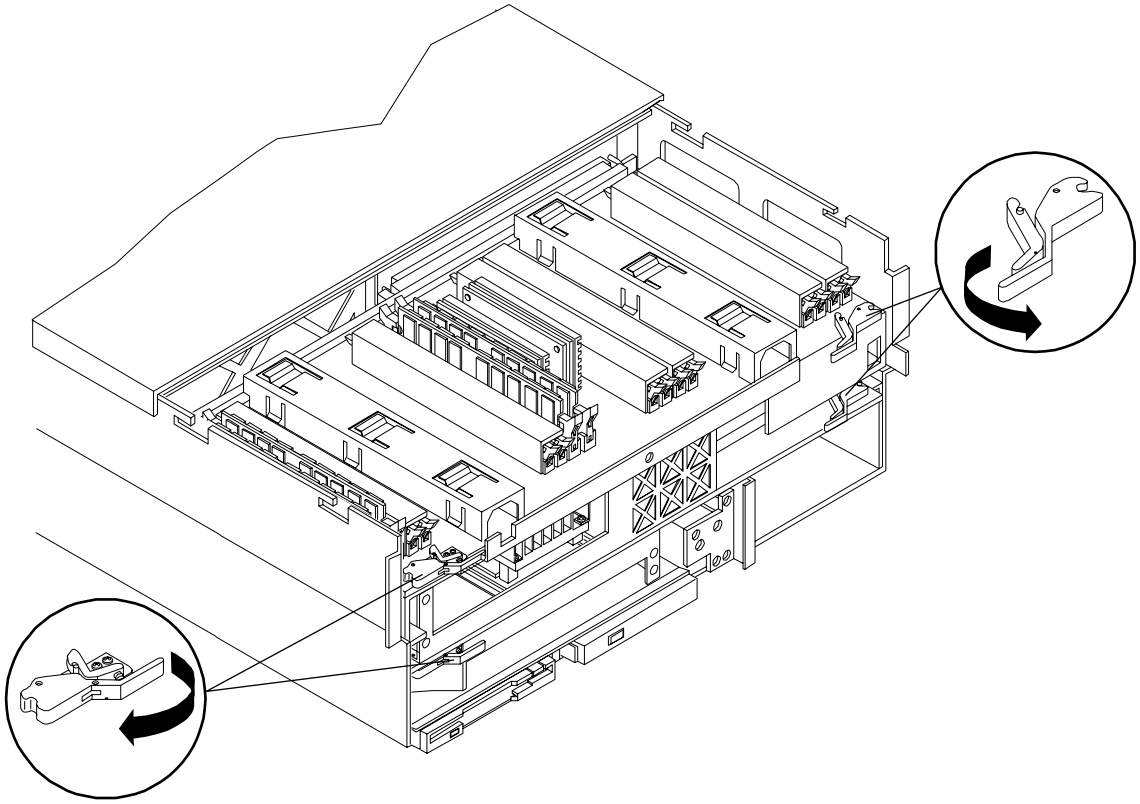
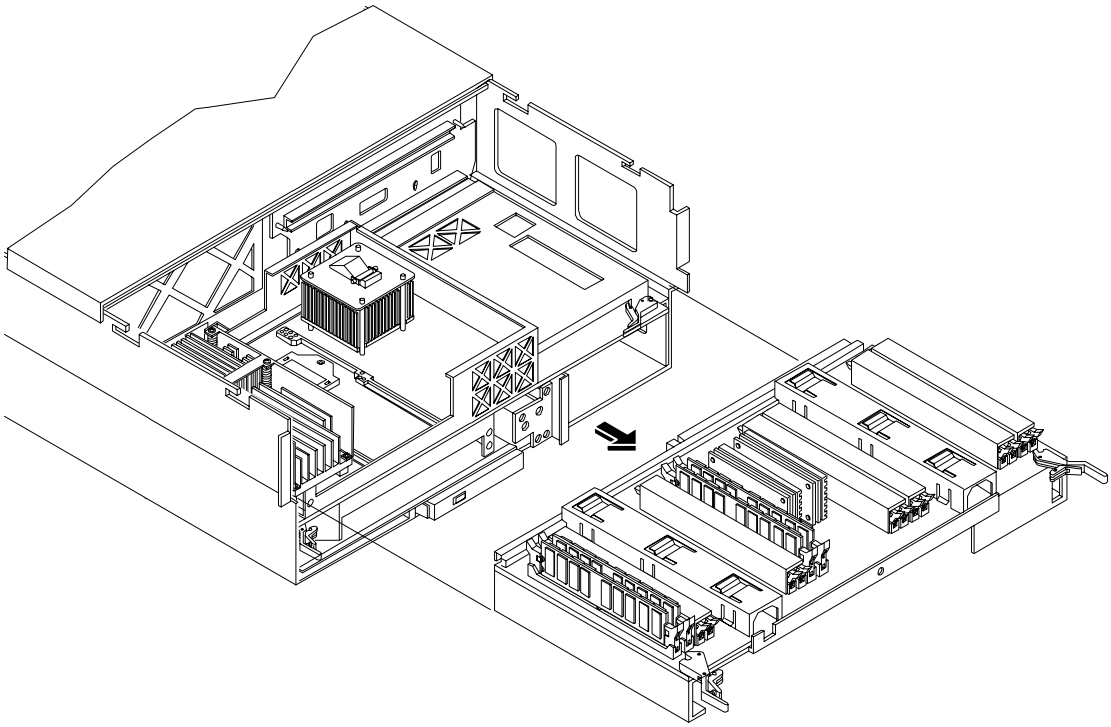


Figure 7-8 Memory Extender Board



Replacing a Memory Extender Board

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

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

Step 2. Align the memory extender board with the front and rear chassis guide slots.

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

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

Step 5. Replace the front cover.

Step 6. Replace the front bezel.

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

System Memory DIMMs

System memory DIMMs are located on the memory extender board.

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

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

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

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

Removing System Memory DIMMs

To remove system memory, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

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

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

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

Step 6. Remove the DIMM from the socket.

Installing Memory DIMMs

Your hp Integrity rx4640 comes with a sixteen DIMM memory extender board that is minimally configured with 1GB of memory [four 256Mb DIMMs loaded in quad 0 (slots 0A,0B,0C,and 0D)]. See Figure 7-9, “16 DIMM Extender Board Slot IDs.”

An optional thirty-two DIMM memory extender board is available to replace the sixteen DIMM memory extender board and must also be minimally configured with 1GB in quad 0. See Figure 7-10, “32 DIMM Extender Board Slot IDs.”

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

Supported DIMM Sizes

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

DIMM Slot Fillers

Both the sixteen and thirty-two DIMM extender boards have DIMM slot filler boards placed over all unfilled DIMM slots. As you fill DIMM quads with additional memory you must remove the DIMM slot fillers covering the affected slots. All remaining DIMM fillers in unused slots must remain in place to maximize internal cooling. See Table 7-1, “DIMM Filler Requirements for 16 DIMM Extender Board.”

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

Table 7-1 DIMM Filler Requirements for 16 DIMM Extender Board

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

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

Table 7-2 DIMM Filler Requirements for 32 DIMM Extender Board

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

Table 7-2 DIMM Filler Requirements for 32 DIMM Extender Board (Continued)

32 DIMM Extender Board	
DIMMs Loaded	**Fillers required[a]**
12 DIMMs in quads 0, 1, and 2	8 fillers total: 2 fillers in quads 4, 5, 6, and 7 (quad 3 remains unfilled)
16 DIMMs in quads 0, 1, 2, and 3	8 fillers total: 2 fillers in quads 4, 5, 6, and 7 (all quads filled)
20 DIMMs in quads 0, 1, 2, 3, and 4	4 fillers total: 2 fillers in quads 5, 7 quad 6 remains unfilled
24 DIMMs in quads 0, 1, 2, 3, 4, and 5	No fillers required
28 DIMMs in quads 0, 1, 2, 3, 4, 5, and 6	No fillers required
32 DIMMs in quads 0, 1, 2, 3, 4, 5, 6, and 7	No fillers required

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

Figure 7-9 16 DIMM Extender Board Slot IDs

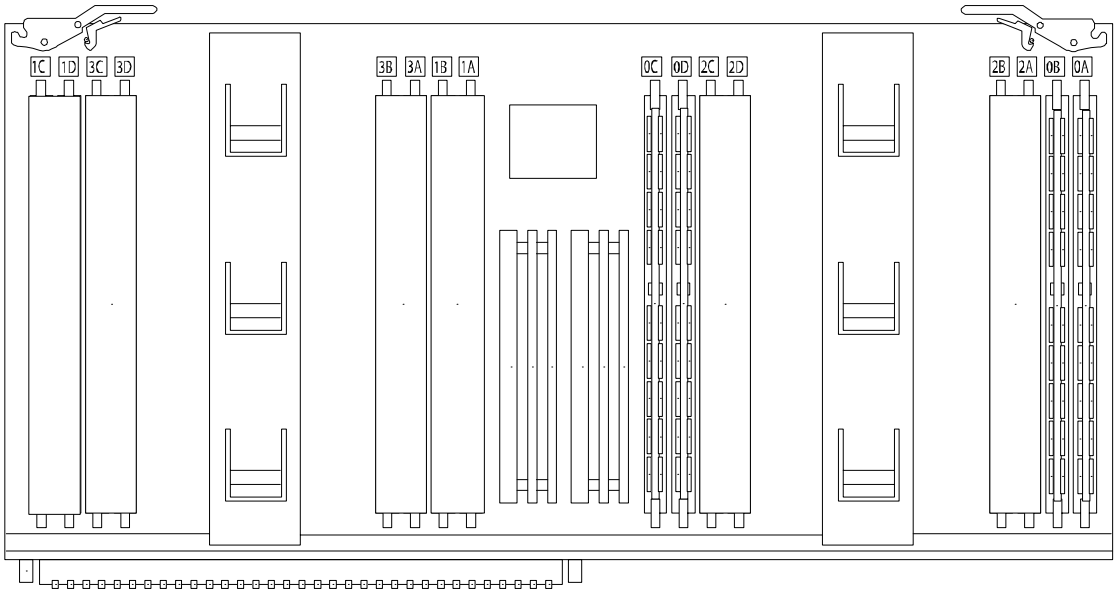
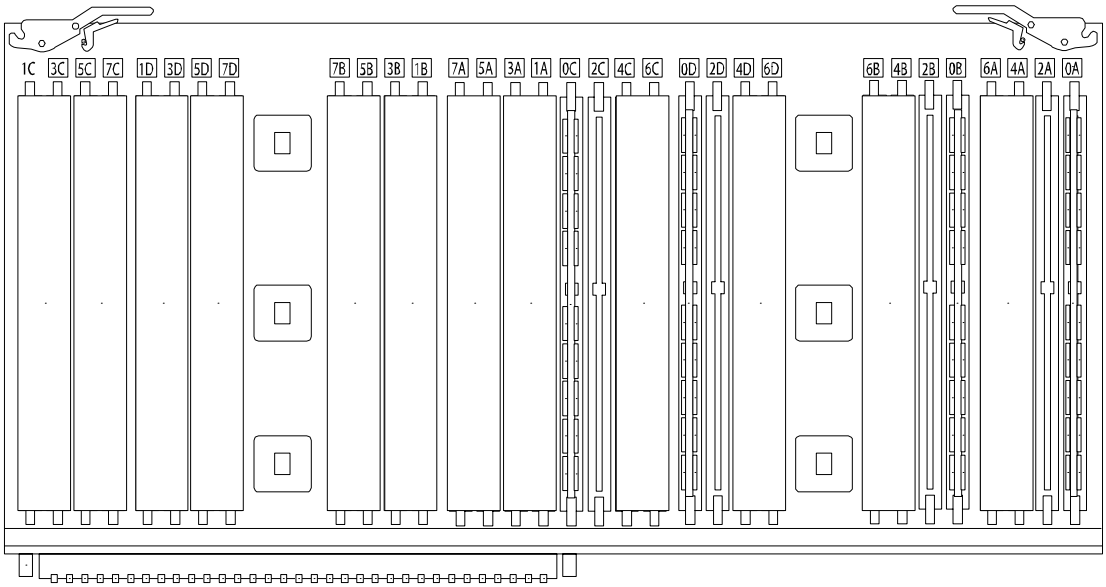


Figure 7-10 32 DIMM Extender Board Slot IDs



Installing DIMMs

To install DIMMs, perform the following steps:

Step 1. Align the DIMM with the socket located on the memory extender board.

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

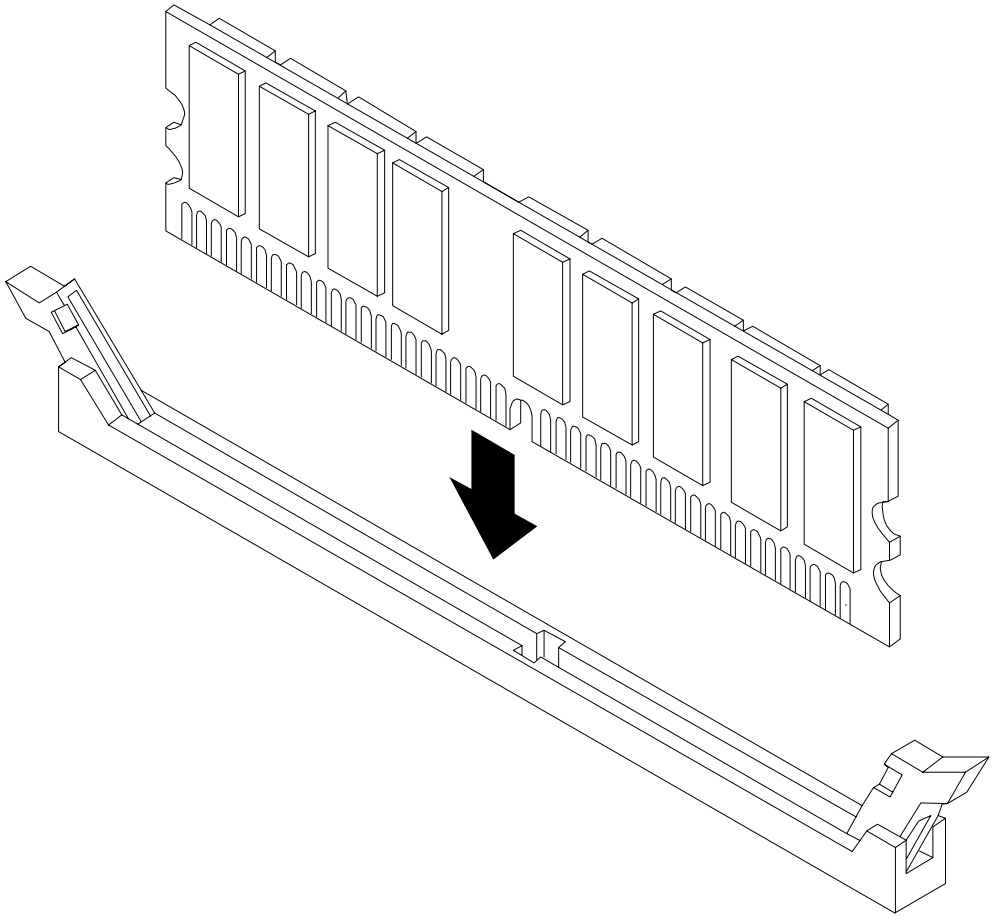
Step 3. Replace the memory extender board.

Step 4. Replace the top cover.

Step 5. Replace the front bezel.

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

Figure 7-11 Inserting DIMM into Extender Board Slot



Processor Extender Board

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

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

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

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

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

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

Removing the Processor Extender Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

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

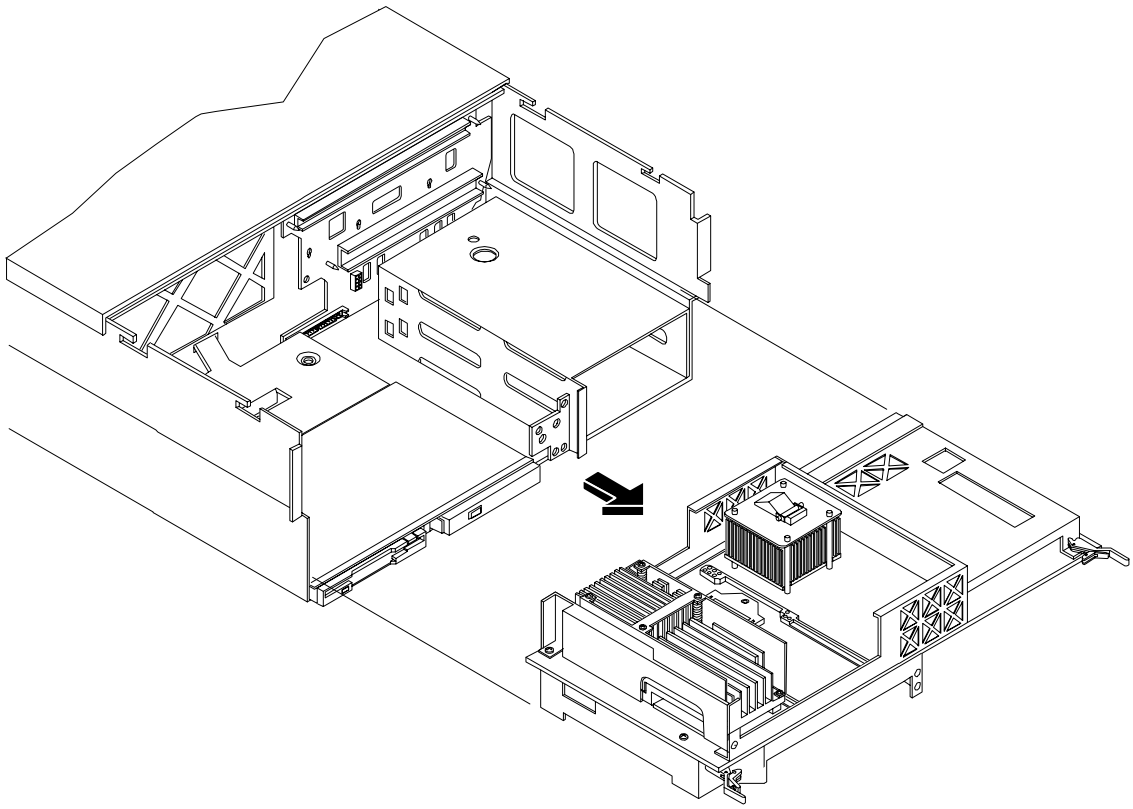
Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

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

Step 5. Pull out on the extraction levers to unplug the processor extender board from the socket located on the midplane riser board.

Figure 7-12 Processor Extender Board



Replacing the Processor Extender Board

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

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

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

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

Step 4. Push the extraction levers inward to the locked position in order to fully seat the processor extender board into the socket on the midplane riser board.

Step 5. Replace the front cover.

Step 6. Replace the front bezel.

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

Processors

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

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

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

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

Installing Processors

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

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

Processor Load Order

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

Table 7-3 Processor Load Order

Processor Modules	Socket
First	CPU 0
Second	CPU 1
Third	CPU 2
Fourth	CPU 3

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

Removing a Processor

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

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

Step 6. Using a torx T15 driver, loosen the 6, T15 shoulder screws that attach the sequencer frame on the heatsink, until the sequencer frame is free.

Step 7. Remove the sequencer frame from the heatsink.

Step 8. Unlock the assembly to the socket by rotating the cam on the socket 180 degrees counterclockwise, using a 2.5 MM driver (Allen wrench).

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

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

Replacing a Processor

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

Prior to installing a processor into your system, read the following instructions carefully and refer to Figure 7-15, “Installing Processor on Extender Board,” for a complete understanding of this process.

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

Step 5. Using an antistatic wrist strap place the extender board ona grounding mat (Electrically Conductive Field Service Grounding Kit-HP 9300-1155).

Step 6. Ensure the cam on the processor socket lock is in the unlocked, counterclockwise position.

Step 7. Carefully lower the processor, without the sequencer clamp, onto the processor socket. Align the pins on the bottom of the heatsink to the slots in the retention frame on the extender board.

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

CAUTION Before locking the processor assembly into its socket, ensure that the power cable is not pinched between the heatsink and sheetmetal frame of the extender board. Also, ensure that the two power supply cable ends attached to the CPU assembly do not come unplugged from their sockets when you move the cable into place under the heatsink. See Figure 7-13, “Processor Cable Placed Correctly,” and Figure 7-14, “Processor Cable Placed Incorrectly.”

Step 8. Lock the assembly to the socket by rotating the cam on the socket 180 degrees clockwise, using a 2.5 mm driver (Allen wrench).

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

Figure 7-13 Processor Cable Placed Correctly

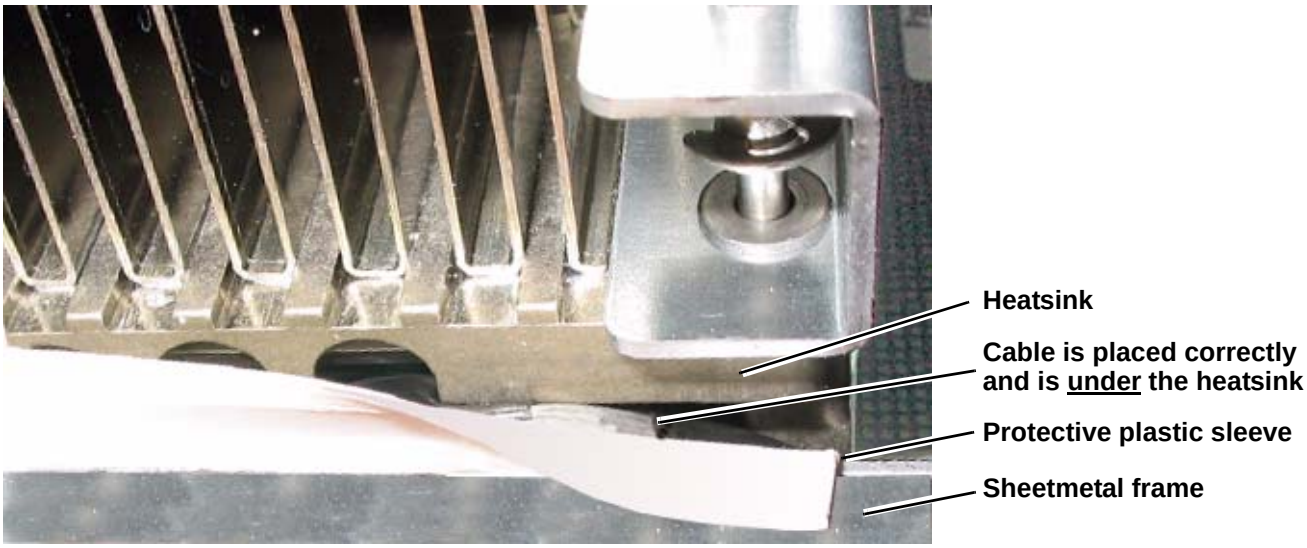
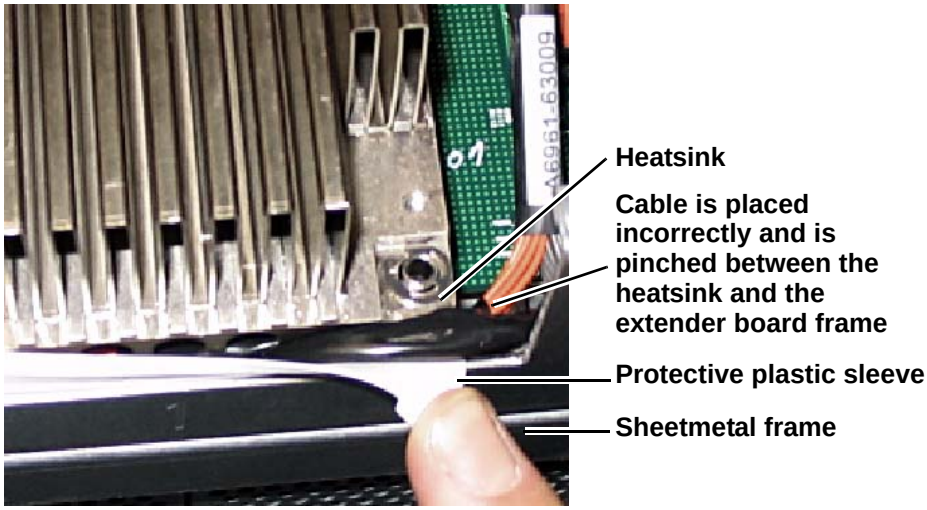


Figure 7-14 Processor Cable Placed Incorrectly



Step 9. Plug in the processor cable to its socket on the extender board.

Step 10. Place the sequencer frame over the processor.

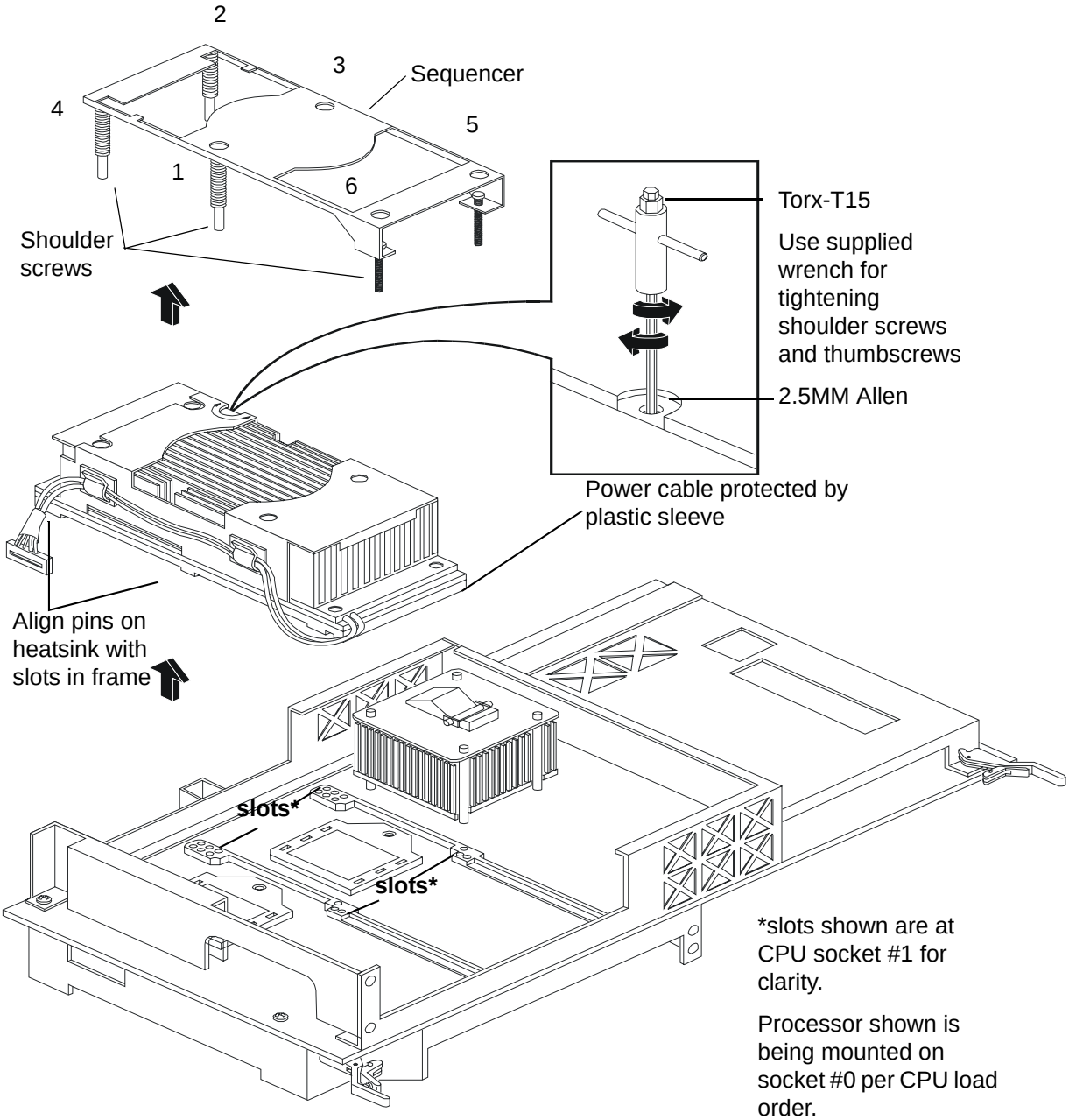
Step 11. Using the supplied torx T15 driver, tighten the 6 T15 shoulder screws until they just bottom out. Follow the tightening sequence shown in Figure 7-15, “Installing Processor on Extender Board.”

CAUTION Do not overtighten the 6 shoulder screws—they may shear off if overtightened. Stop tightening the shoulder screws when you feel them just bottom out.

Figure 7-15 Installing Processor on Extender Board

Tightening sequence for 6-shoulder screws is:
AB371A or AB372A: 1,2,3,4,5,6
AB373A: 3.4,1,2,5,6

DO NOT OVERTIGHTEN!



Hot-Swap Chassis Fan Unit

There are three hot-swap chassis fan units in the HP Server. Fan units 0, 1, and 2 are in the center of the chassis spanning the full chassis width. Fan units 0 and 1 are interchangeable and are in the left and center positions. Fan unit 2 is smaller and only fits into the right-most position (behind the power supply).

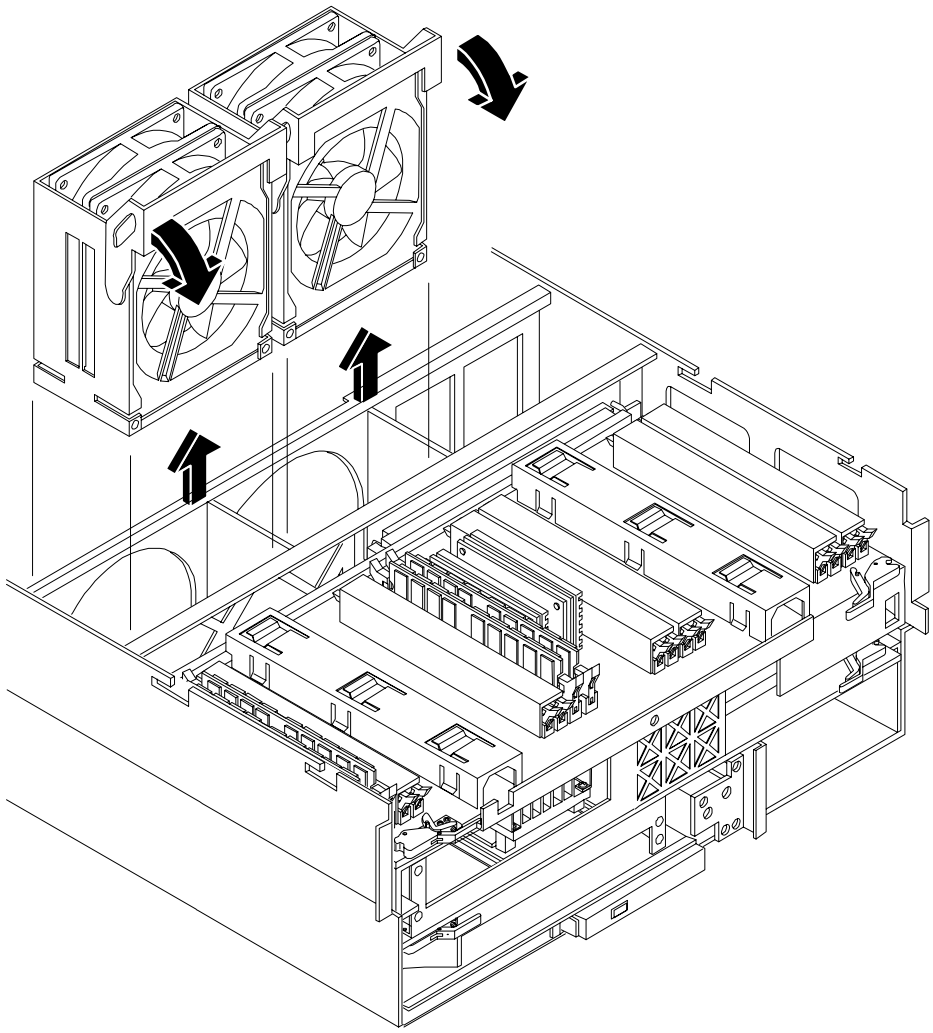
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

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

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

Removing a Hot-Swap Chassis Fan Unit

Figure 7-16 Hot-Swap I/O Chassis Fans Removal and Replacement



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

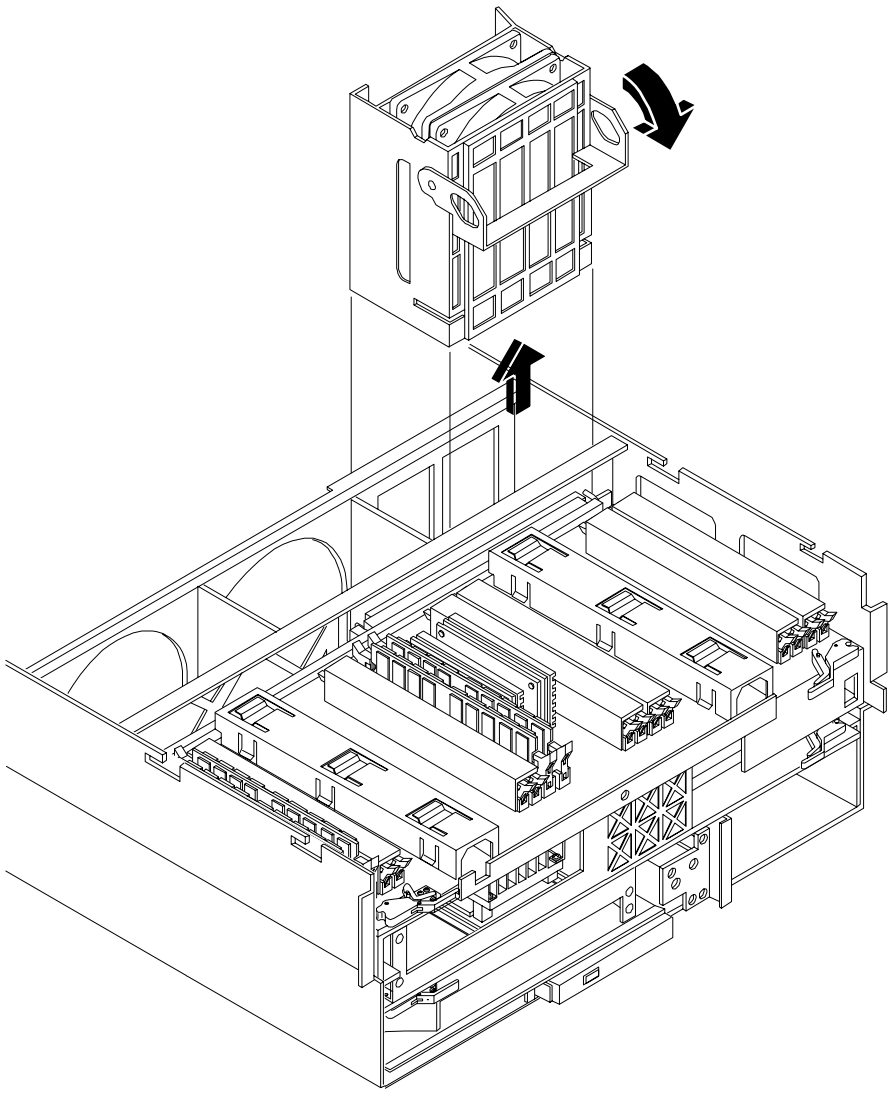
Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover. See “Front and Top Covers” on page 145.

Step 3. Grasp the fan unit locking handle, tilt it up, and pull out the fan from the chassis.

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

Figure 7-17 Hot-Swap Power Supply Chassis Fan Removal and Replacement



Replacing a Hot-Swap Chassis Fan Unit

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

Step 1. Orient the fan units by aligning the appropriate icon on the fan unit handle to the identical icon on the chassis wall. Fan units 0 and 1 have “triangle” icons and fan unit 2 has a “square” icon.

Step 2. Push the fan unit firmly into the housing and close the handle until flush to the top of the chassis—the fan unit will plug into the power outlet on the I/O baseboard.

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

Step 3. Check the QuickFind diagnostic board LED indicating the replaced fan unit.

- When the fan is functioning normally, the LED is off.
- When the fan fails, the LED is lit.

Step 4. Replace the top cover.

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

I/O Baseboard Assembly

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

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

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

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

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

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

Removing the I/O Baseboard Assembly

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover. See “Front and Top Covers” on page 145.

Step 3. Remove the three chassis fan units. See “Hot-Swap Chassis Fan Unit” on page 168.

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

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

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

Step 6. Twist open the thumbscrew on the rear left side of system I/O board. See Figure 7-19, “I/O Baseboard.”

Step 7. Lift up on the locking lever attached to the side of the Power Supply cage to unplug the I/O baseboard from the socket on the midplane riser board. See Figure 7-18, “I/O Board Locking Lever.”

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

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

Figure 7-18 I/O Board Locking Lever

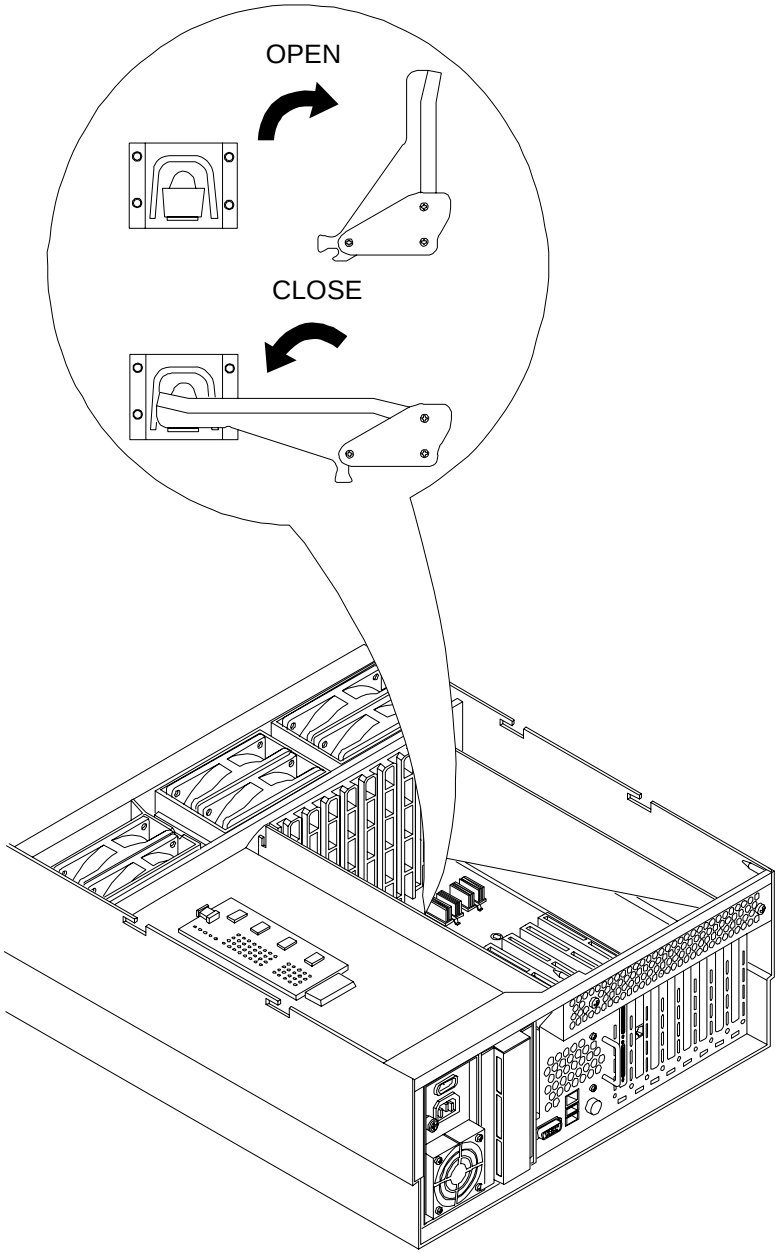
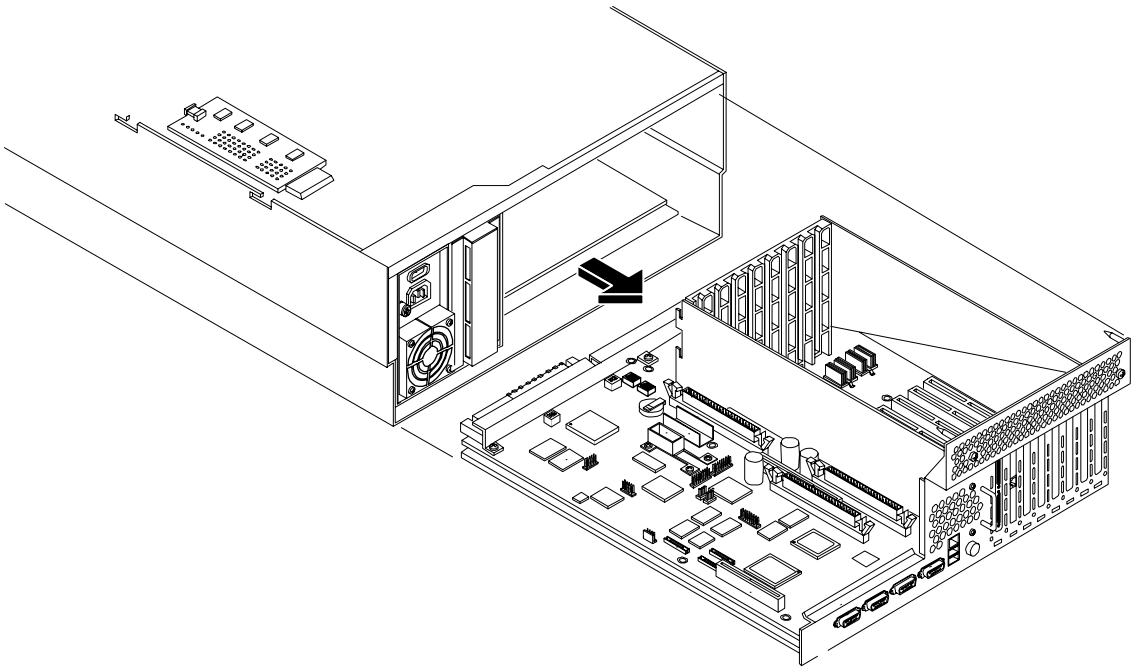


Figure 7-19 I/O Baseboard



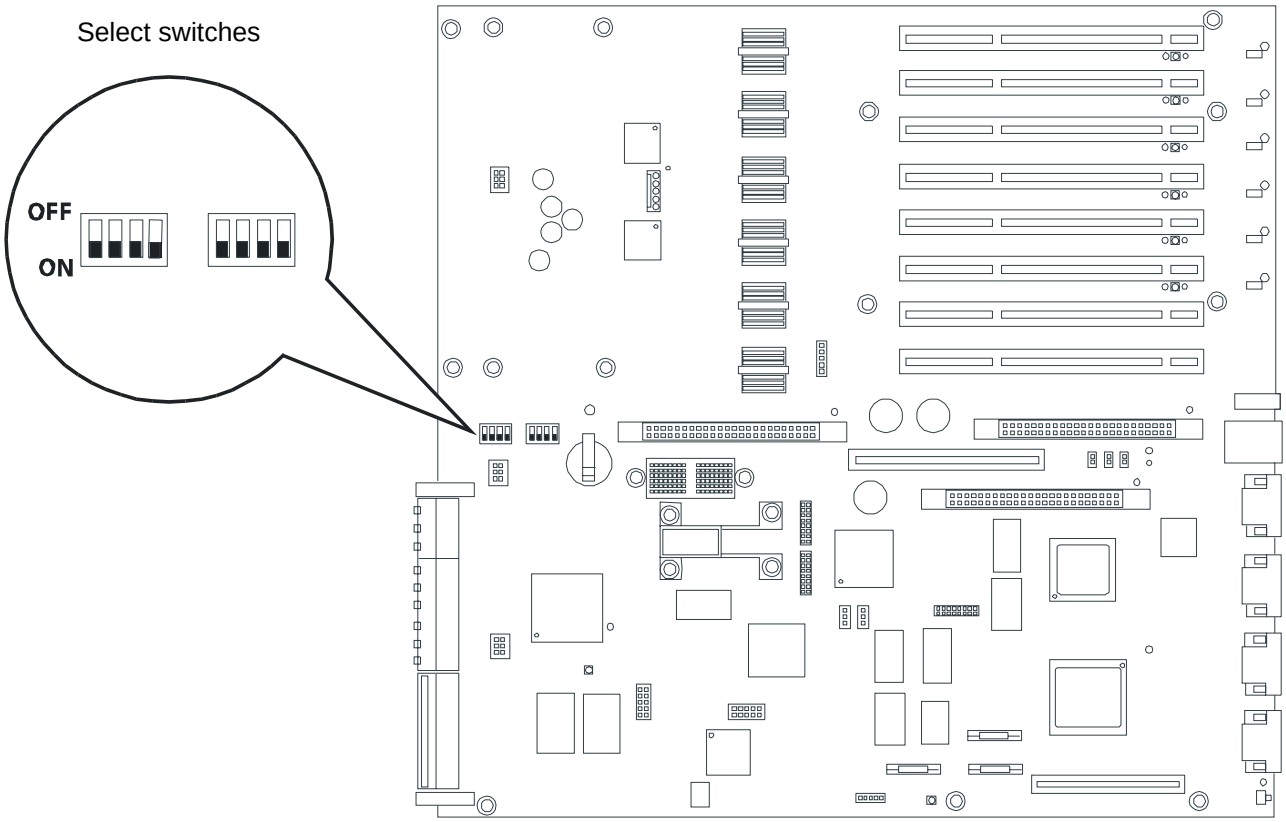
Replacing the I/O baseboard Assembly

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

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

Step 1. Set the I/O baseboard select switches as shown in

Figure 7-20I/O Baseboard Select Switches



Step 2. Align the I/O baseboard assembly rails with the chassis slots and slide the assembly into the chassis until it stops against the midplane riser board socket.

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

Step 3. With the I/O board flush against the midplane riser board socket, push down firmly on the locking lever until the I/O baseboard plugs all the way into the midplane riser board socket.

Step 4. Replace the three chassis fan units.

Step 5. Plug in all external cabling the rear ports of the I/O baseboard.

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

Step 6. Plug in the internal SCSI cable(s) to the HBA board in PCI slot 1.

Step 7. Replace the top cover.

Step 8. Replace the front bezel.

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

Step 10. Power up and boot to EFI.

Step 11. Respond YES to prompts regarding copying information onto the new board.

Step 12. Enter SERVICE mode.

```
Shell> sysmode service
   Current System Mode: ADMIN


   You are now in SERVICE mode.
```

Step 13. Use the 'sysset' command to enter the product data:

```
Shell> sysset prodname "server rx4640"
```

Step 14. Use the 'sysset' command to verify all values are set:

```
Shell> sysset
   System Information:
     Manufacturer: hp
     Product Name: server rx4640
     Product Number: A6961A
     Secondary Product Number is Identical
     Serial number: SGH43442VB
     Secondary Serial Number is Identical
     UUID: 3C33C58E-2E5A-11D8-A33B-4188C0AEFAE2 (Valid)
     Secondary UUID is Identical
     Product ID: 0x301
```

Step 15. Use the EFI 'date' and 'time' commands to set the correct local date and time.

Step 16. Boot the server and resume normal operation.

Hot-Plug PCI-X

The hp Integrity rx4640 Server supports PCI-X hot-plug technology and offers 6 PCI-X, hot-plug capable slots.

Hot-Plug PCI-X Operations

PCI-X hot-plug technology enables the following hot-plug operations. For procedures with step-by-step instructions describing how to add, replace, delete, and locate PCI-X cards see “Hot-Plug Operation Procedures” on page 182.

- **Online Addition (OL-A)**

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

- **Online Replacement (OL-R)**

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

CAUTION A special OL-R requirement for HP-UX 11i v2 is that the card to be inserted (replaced) must be exactly the same as the removed card. This is also known as like-for-like replacement.

NOTE Windows Server 2003 Enterprise Edition does not support OL-R. Instead, you can do a combination of an OL-D operation followed by an OL-A operation. This is the equivalent of an OL-R operation.

- **Online Deletion (OL-D)**

  You can remove an existing PCI-X expansion card. This operation is different from OL-R because there are no restrictions placed on the type of replacement card that you can use. In this operation, the drivers are also completely removed from the slot.

NOTE HP-UX 11i v2 does not support OL-D. It does support OL-R.

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

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

Operating System Support for Hot-Plug PCI-X Operations

The capability of each operating system to support hot-plug PCI-X operations is different. The following explanation details the capabilities of each operation system.

- **HP-UX 11i v2**

  HP-UX 11i v2 supports only OL-A, OL-R, and Locate hot-plug PCI-X operations.

  In OL-R, it is a requirement that the card to be inserted (replaced) be exactly the same as the card being removed. During this OL-R operation, HP-UX 11i v2 suspends the device driver and re-enables it upon completion of the OL-R operation.

  In HP-UX 11i v2, the Locate function is only available via the command line or web interface.

- **Windows Server 2003 Enterprise Edition**

  Windows Server 2003 Enterprise Edition supports only OL-A and OL-D hot-plug PCI-X operations.

  In OL-D, Windows Server 2003 Enterprise Edition will delete the device object, after the card's successful removal from the slot. You do not have to re-install drivers for the deleted device on subsequent insertions or reboots

  To perform a card replacement hot-plug PCI-X operation in Windows Server 2003, you must first perform an OL-D operation followed by an OL-A operation.

- **Linux Red Hat Advanced Server 2.1**

  At this time Linux Red Hat Advanced Server 2.1 does not support hot-plug PCI-X technology. Future releases will support hot-plug PCI-X technology.

The following table shows hot-plug operations that are available in HP-UX 11i v2, Windows Server 2003 Enterprise Edition, and Linux Red Hat Advanced Server 2.1 operating systems.

Table 7-4 Hot-Plug Operation and OS Compatibility

Hot-Plug Operation	HP-UX 11i v2	Windows Server 2003 Enterprise Edition	Linux Red Hat Advanced Server 2.1
OL-A	Yes	Yes	No
OL-R	Yes. HP-UX 11i v2 demands like-for-like replacement. A like-for-like card means that the new card is exactly the same as the card being replaced.	No. But, you can perform a combination of OL-D and OL-A to replace a card.	No
OL-D	Not supported by HP-UX 11i v2.	Yes	No
Locate	Yes. Only supported via the command line interface or the web interface.	No	No

PCI-X Hardware and Software Interfaces

The following table shows what hot-plug hardware and software interfaces are available on HP-UX 11i v2, Windows Server 2003 Enterprise Edition, and Linux Red Hat Advanced Server 2.1 operating systems.

Table 7-5 Hot-Plug Hardware and Software Interfaces and OS Availability

Hot-Plug PCI-X Interface	HP-UX 11i v2	Windows Server 2003 Enterprise Edition	Linux Red Hat Advanced Server 2.1
Hardware interface comprised of: —Attention Button —Manual Retention Latch —Power LED —Attention LED —PCI-X card lock	Yes	Yes	No

Table 7-5 Hot-Plug Hardware and Software Interfaces and OS Availability (Continued)

Hot-Plug PCI-X Interface	HP-UX 11i v2	Windows Server 2003 Enterprise Edition	Linux Red Hat Advanced Server 2.1
Graphical User Interface	Yes	Yes. You can use the **Safely Remove Hardware** icon in the tool tray or device manager to remove a device (OL-D). OL-A is only possible via the hardware interface.	No
Command Line Interface (CLI)	Yes `-olrad` command. Read *Interface Card OL* Support for HP-UX Servers and Workstations, olrad Command Line Interface, B2355-90804* at http://docs.hp.com.	No	No
Web Interface	Yes- `pdweb` command. Read *Interface Card OL* Support for HP-UX Servers and Workstations, pdweb-Peripheral Device tool Web Interface, B2355-90804* at http://docs.hp.com.	No	No

PCI-X Slot Locations and Configurations

PCI-X slots are numbered from 1 through 8 in your HP Server. See Figure 7-21, “Slot ID Numbering.”

The following describes configuration requirements for slots 1 through 8:

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

  Shared slots have card compatibility restrictions. If one of the shared slots is occupied then the card being added to the second slot is limited by the configuration of the occupied slot. If the new card has a slower capability than the current bus configuration, it will be rejected. If the new card has a faster capability than the current bus configuration, it will only run at the bus mode and frequency of the current bus configuration (slower).

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

NOTE If the system is rebooted in the new configuration, then both cards will initialize to run at 33 MHz. This is because the system firmware can only change the bus capability from 66 MHz down to 33 MHz.

2. If you have a 33 MHz card in slot 3, and you hot-plug insert a 66 Mhz card into slot 4, it will work but the new card will run at 33 MHz. This also applies to slots 5 and 6, as they are shared (both use a common bus).
3. If your unit is powered down and you insert a 33 MHz card into slot 4 (that shares a 66 MHz card in slot 3), then both cards will run at 33 MHz when the unit is powered up. This also applies to slots 5 and 6, as they are shared (both use a common bus).

- Slots 7 and 8 are single slots. The maximum capability of each slot is PCI-X 133MH. Only slots 7 and 8 will allow 133 Mhz, PCI-X cards to run at full speed. These two slots are not limited by bus mode frequency related incompatibilities.

Table 7-6 PCI-X Card vs. Slot Frequency/Bus Mode Compatibility for Shared Slots[a]

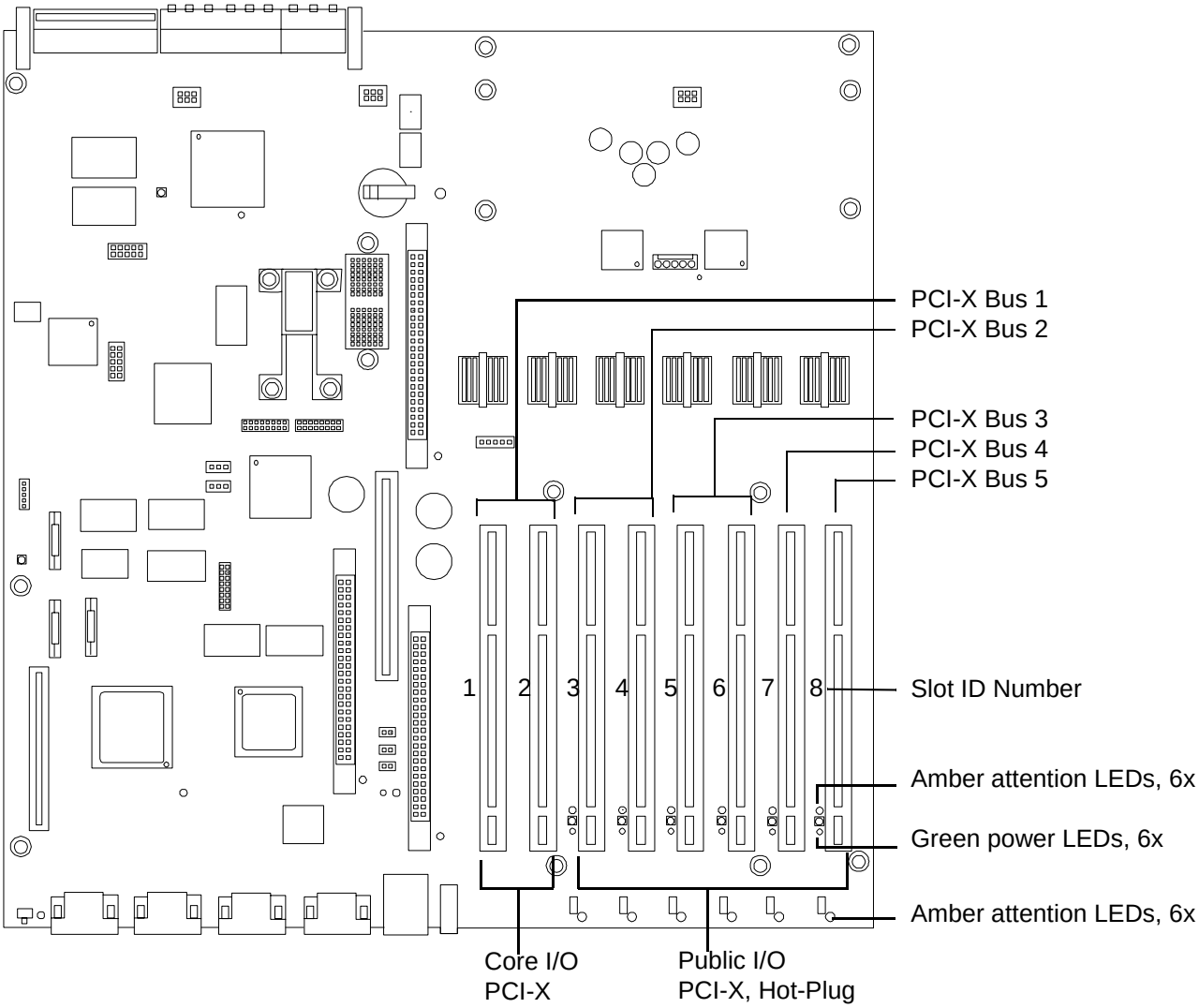
Current PCI Bus Mode and Frequency for the Shared Slot	Cards to be installed			
	PCI 33	**PCI 66**	**PCI-X 66**	**PCI-X 133**
PCI 33 MHz	Compatible[b]	Compatible (2nd note) New card running at PCI 33	Compatible (2nd note) New card running at PCI 33	Compatible (2nd note) New card running at PCI 33
PCI 66 MHz	Incompatible-Frequency[c]	Compatible (2nd note)	Compatible (2nd note) New card running at PCI 66	Compatible (2nd note) New card running at PCI 66
PCI-X 66 MHz	Incompatible-Frequency (3rd note)	Incompatible-Bus[d]	Compatible (2nd note)	Compatible (2nd note) New card running at PCI-X 66
PCI-X 133 MHz[e]	Incompatible-Frequency (3rd note)	Incompatible-Frequency (3rd note)	Compatible (2nd note) New card	Compatible (2nd note) New card running at PCI-X 66

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

CAUTION If you are using Linux Red Hat Advanced Server 2.1 operating system and you want to install a 1000b-Sx GigE card, do not install it into a slot that shares a bus with a 33 MHz card. In this configuration the Linux driver will not initialize the new card.

CAUTION Do not use more than 3 RAID cards in any of the slots on your hp Integrity rx4640 Server. System power limitations restrict the use of more than 3 RAID cards per system.

Figure 7-21 Slot ID Numbering



Hot-Plug Operation Procedures

The hot-plug procedures described in this section will use the hardware interface only. Software interface procedures are described in Table 7-5, "Hot-Plug Hardware and Software Interfaces and OS Availability." For a complete understanding of all HP-UX 11i v2 hot-plug techniques and concepts, it is recommended that you refer to *Interface Card OL* Support for HP-UX Servers and Workstations, B2355-90804* at http://docs.hp.com.

CAUTION Before adding or replacing a PCI-X card, determine if that card is critical to your systems operation. If you replace a card that is still operating and it is a critical resource to your system, you may cause undesired system downtime. Read *Interface Card OL* Support for HP-UX Servers and Workstations, Critical Resources, B2355-90804*, at http://docs.hp.com, prior to performing a hot-plug operation.

Online Addition-(OL-A)

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

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See "Accessing a Rack Mounted Server" on page 141.

Step 2. Remove the top cover from the chassis. See "Front and Top Covers" on page 145.

Step 3. If the power LED is steady-on (power to slot is on), go to step 4. If the power LED is steady-off (power to slot is off), go to step 5.

Step 4. To turn off power to the slot, pull up on the manual retention latch (MRL) located on the OLX divider. The power LED goes to steady-off. See Figure 7-22, "PCI-X OLX Divider Layout."

CAUTION Do not pull up on the MRL of a powered-on, occupied slot or your system will crash. This OL-A procedure is for powering down a powered-on, unoccupied slot only. For a detailed procedure on how to power down an occupied slot see "Online Replacement-(OL-R)" or "Online Deletion (OL-D)".

Step 5. Ensure that the MRL is already open and insert the PCI-X card to be added into the powered down slot. See Figure 7-23, "Inserting PCI-X Card."

CAUTION When inserting the PCI-X card, be careful you do not accidentally touch an attention button on the other OLX dividers—this will initiate an undesired shutdown of another PCI-X card/slot.

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

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

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

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

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

Step 9. Replace the top cover.

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

Figure 7-22PCI-X OLX Divider Layout

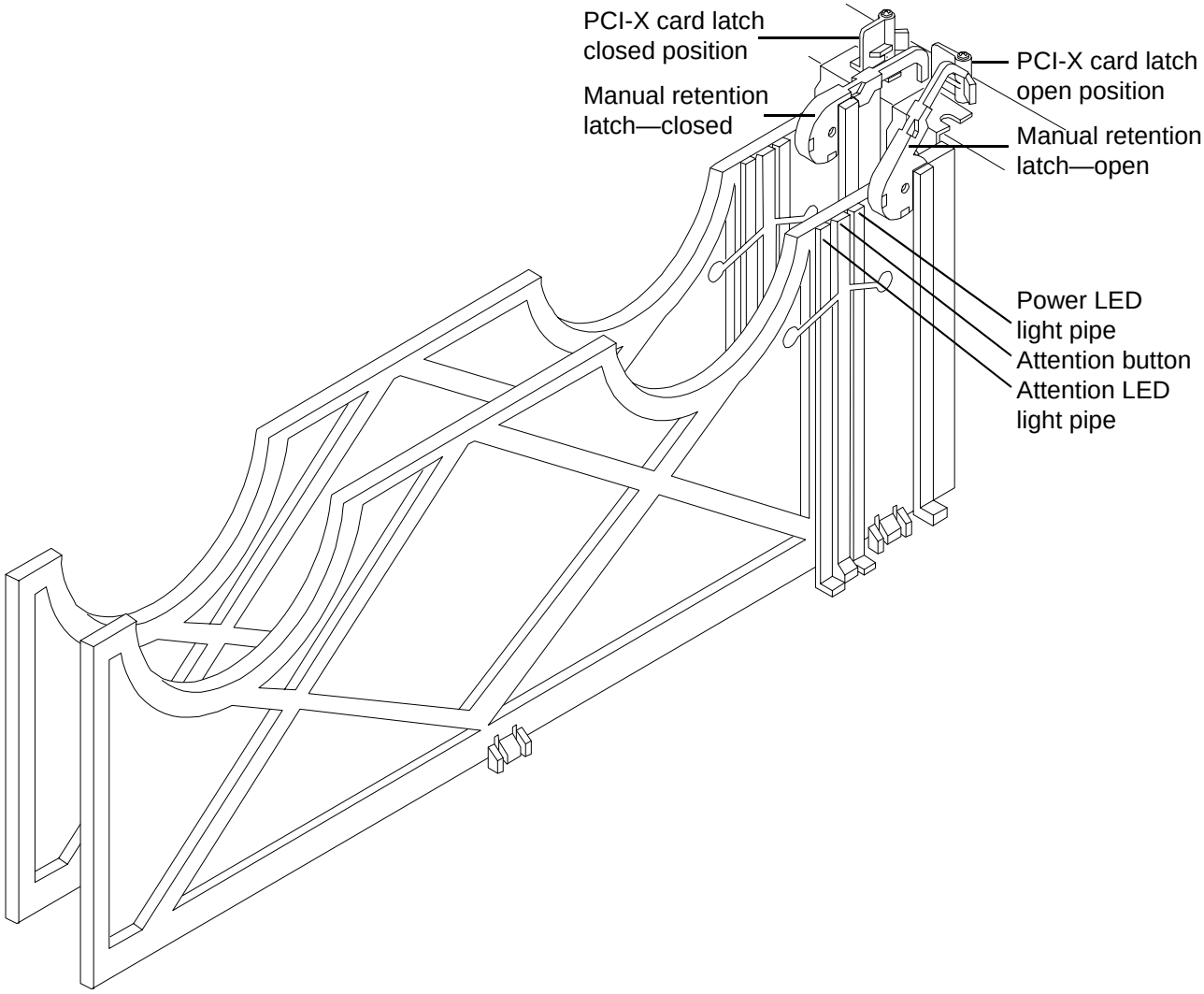
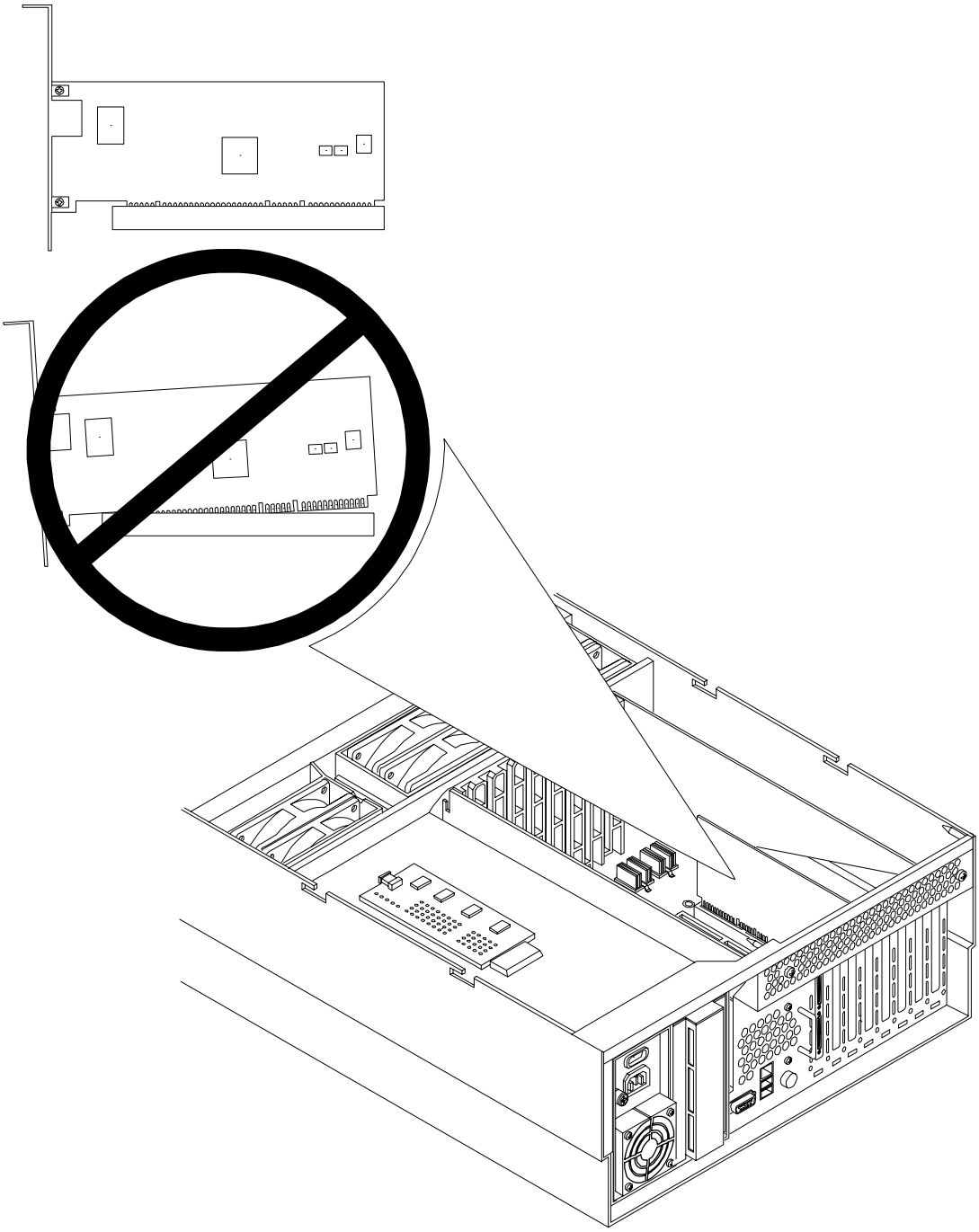


Figure 7-23 Inserting PCI-X Card



Online Deletion (OL-D)

To delete a PCI-X card from an occupied slot, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover from the chassis. See “Front and Top Covers” on page 145.

Step 3. Press the attention button located on the OLX divider that controls the affected slot—the power LED starts to blink. Wait until the power LED goes from blinking to steady-off.

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

Step 4. Turn the PCI-X card lock on the chassis until the manual retention latch (MRL) is free to pull up.

Step 5. At this point, the power to the slot is off; pull up on the manual retention latch located on the OLX divider. See Figure 7-22, “PCI-X OLX Divider Layout.”

Step 6. Remove the existing PCI-X card from the slot.

Step 7. Push the manual retention latch down until it seats against the chassis wall.

Step 8. Replace the top cover.

Step 9. Push the HP Server all the way back into the rack until it stops.

Online Replacement-(OL-R)

As discussed in the opening section, OL-R is a combination of an OL-D procedure followed by an OL-A procedure.

CAUTION For HP-UX 11i v2 only. You can only replace an existing card with a like card.

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover from the chassis. See “Front and Top Covers” on page 145.

Step 3. Press the attention button located on the OLX divider controls the affected slot—the power LED starts to blink. Wait until the power LED goes from blinking to steady-off.

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

Step 4. Turn the PCI-X card lock on the chassis until the manual retention latch (MRL) is free to pull up.

Step 5. At this point, the power to the slot is off; pull up on the manual retention latch located on the OLX divider. See Figure 7-22, “PCI-X OLX Divider Layout.”

Step 6. Remove the existing PCI-X card from the slot.

Step 7. Insert the new PCI-X card into the powered down slot. See Figure 7-23, “Inserting PCI-X Card.”

CAUTION When inserting the PCI-X card, be careful you do not accidentally touch an attention button on the other OLX dividers—this will initiate an undesired shutdown of another PCI-X card/slot.

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

Step 8. Push the manual retention latch down until it seats against the chassis wall.

Step 9. Turn the PCI-X card lock on the chassis to the closed position. This locks the PCI-X card into its slot and the manual retention latch into the closed position.

Step 10. Press the attention button—the power LED will start to blink.

Step 11. Wait for the power LED to stop blinking—the PCI-X card is now active.

Step 12. Replace the top cover.

Step 13. Push the HP Server all the way back into the rack until it stops.

Understanding LEDs and Hardware Errors

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

Table 7-7 Hot-Plug LED Descriptions

Power LED-Green	Condition	Description
	On	PCI-X slot is powered on.
	Blinking	Hot-plug operation in progress—do not touch the slot.
	Off	PCI-X slot is powered off.
Attention LED-Amber	**Condition**	**Description**
	On	Hardware operational fault. **NOTE:** If slot is powered on, it will not power off. If slot is powered off, it will not power on.
	Blinking	Slot location being indicated. **NOTE:** If you want to learn how to activate the attention LED into the blinking/indicator state, read *Interface Card OL* Support for HP-UX Servers and Workstations, Turning Attention LED to Blink or Off, B2355-90804* at http://docs.hp.com.
	Off	If power to slot is on, the slot is functioning normally.

Troubleshooting PCI-X Hot-Plug Operations

Sometimes a PCI-X card will not come online during a hot-plug operation due to a frequency mismatch between the PCI-X card and the slot bus or due to other hardware errors. To determine the type of error you are experiencing, observe the LED activity as described below. For a full understanding and description of HP-UX 11i v2 hardware errors, read *Interface Card OL* Support for HP-UX Servers and Workstations, Important Considerations, B2355-90804* at http://docs.hp.com.

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

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

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

2. **Hardware Operation Fault**

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

CAUTION If your card will not power up, the power loss may be due to the existing PCI-X expansion cards using all the available power. Check the power ratings of your existing PCI-X cards. A known cause of power loss is the use of more than 3 RAID cards in your system.

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

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

OLX Dividers

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

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

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

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

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

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

Figure 7-24 OLX Divider Removal and Replacement

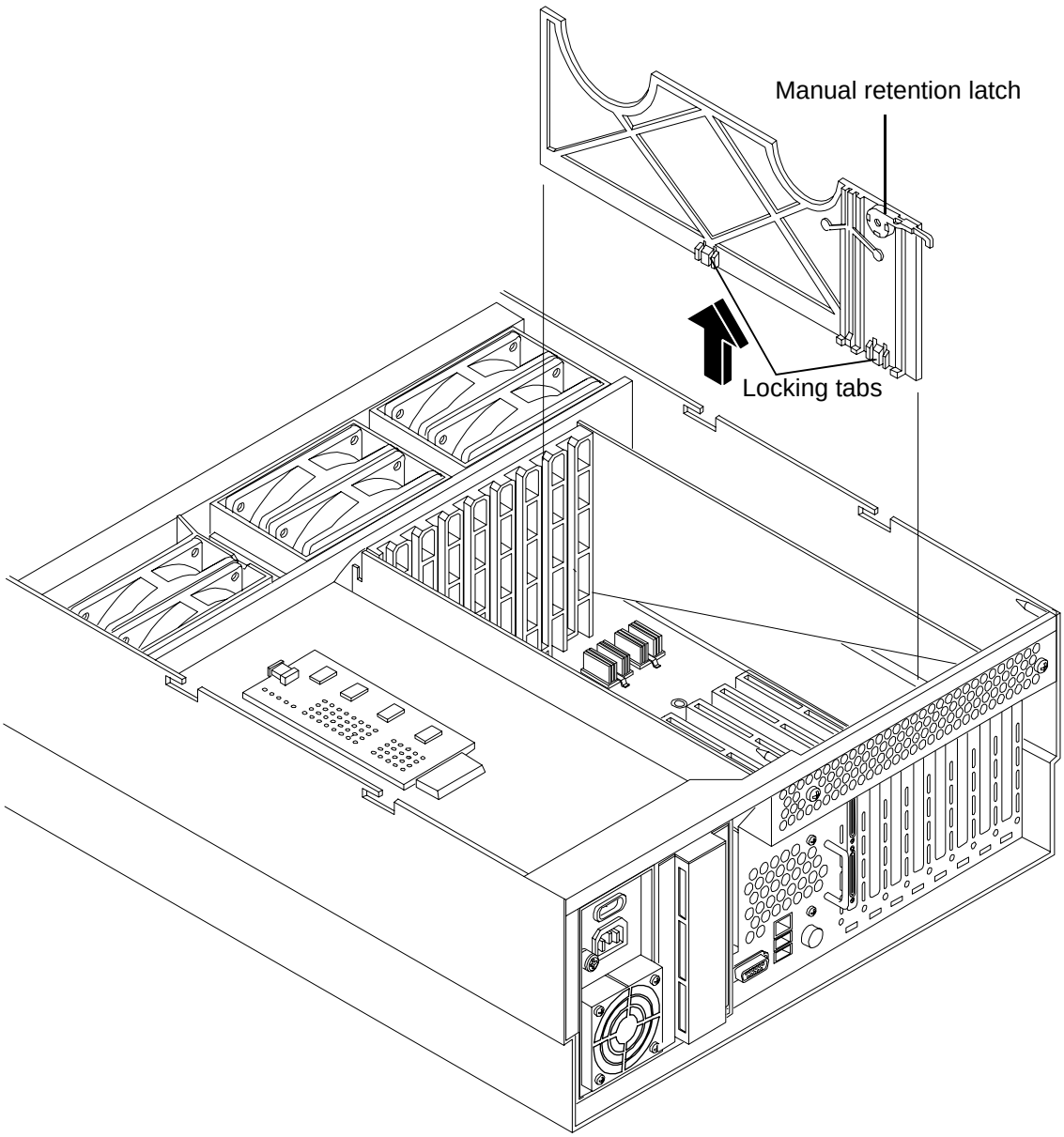
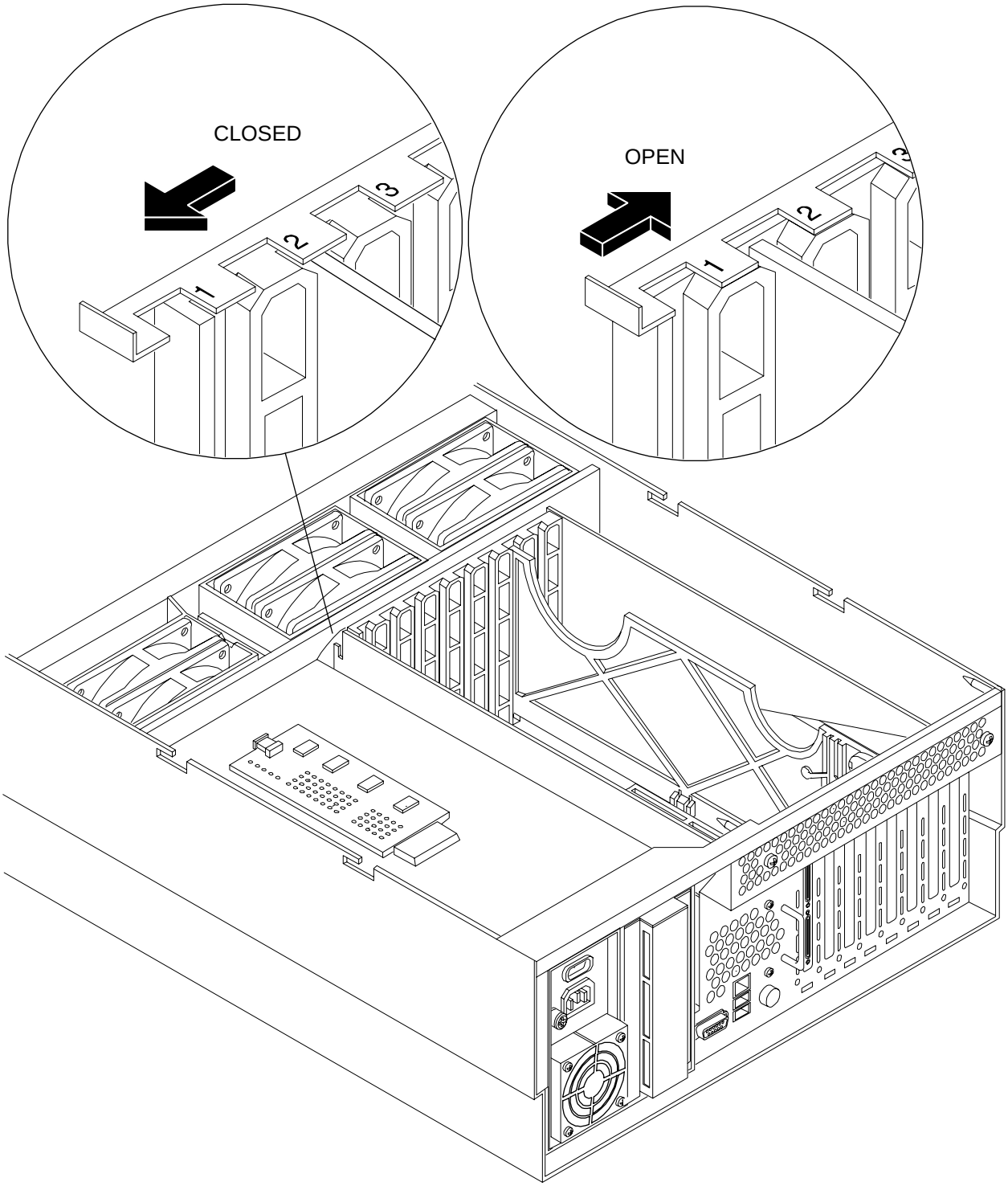


Figure 7-25 OLX Divider Latch



Removing an OLX Divider

To remove an OLX divider, perform the following steps:

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the top cover. See “Front and Top Covers” on page 145.

Step 4. Pull up on the manual retention latch to unlock it from the chassis wall. See Figure 7-24, “OLX Divider Removal and Replacement.”

Step 5. Slide open the latch on the rear PCI cage wall to unlock the rear edge of the PCI divider. See Figure 7-25, “OLX Divider Latch.”

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

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

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

Replacing an OLX Divider

To replace an OLX divider, perform the following steps:

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

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

Step 3. Slide the latch on the rear OLX divider wall closed, to lock the rear edge of the PCI divider.

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

Step 5. Replace the top cover.

Step 6. Replace the front bezel.

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

Voltage Regulator Modules (VRM)

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

- 3.3 Volts
- 5.0 Volts
- 12.0 Volts

CAUTION VRMs must be inserted into the slot with the corresponding voltage. Ensure VRMs are located in the proper slot by checking the voltage label on the I/O baseboard. See Figure 7-26, “VRM Board Remove and Replace.”

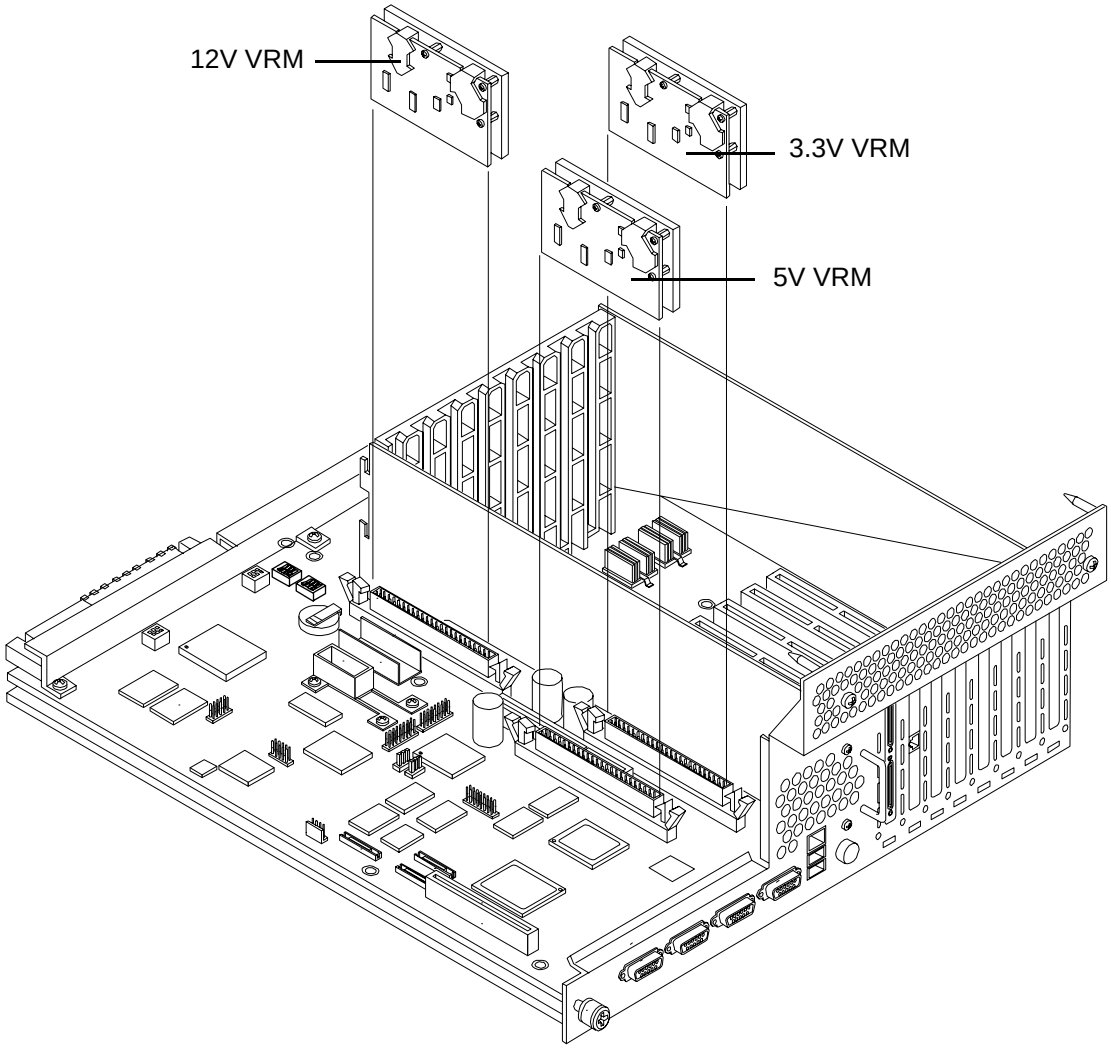
WARNING **Ensure that the system is powered down and all power sources have been disconnected from the server prior to removing or replacing a VRM.**

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

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

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

Figure 7-26 VRM Board Remove and Replace



Removing a Voltage Regulator Module (VRM)

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

Step 1. Remove the I/O baseboard from the chassis. See “I/O Baseboard Assembly” on page 172.

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

Replacing a Voltage Regulator Module (VRM)

To replace a VRM, perform the following steps:

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

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

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

Hot-Plug Disk Drives

The two hot-plug disk drives are located in the front of the HP Integrity rx4640.

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

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

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

Removing a Hot-Plug Disk Drive

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

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

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

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

Replacing a Hot-Plug Disk Drive

One additional hot-plug disk drive may be added to your HP Server in slot 2. Always use low profile disk drives (1.0” height) in your hp Integrity rx4640. See Figure 7-27, “Disk Drive Installation in Slots 1 and 2.”

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

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

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

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

Figure 7-27 Disk Drive Installation in Slots 1 and 2

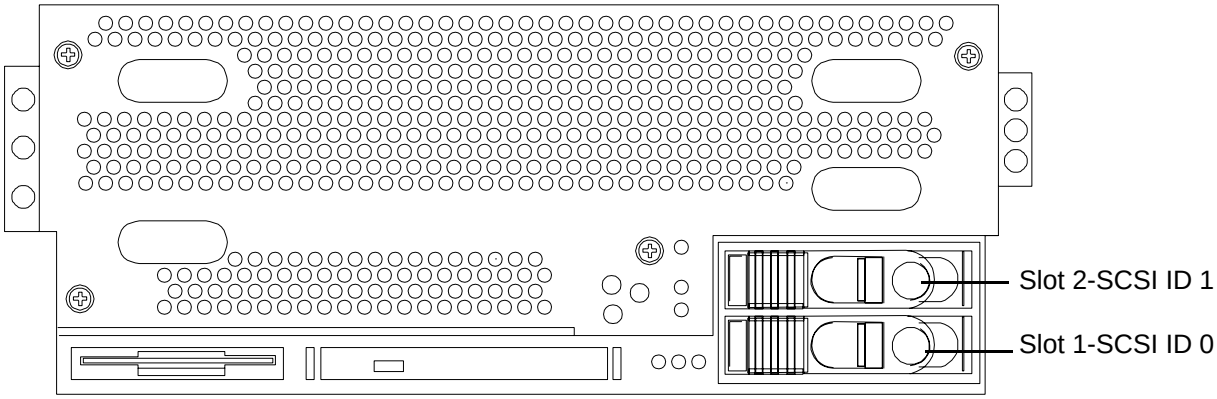


Figure 7-28 Disk Drive Installation in Slot 2

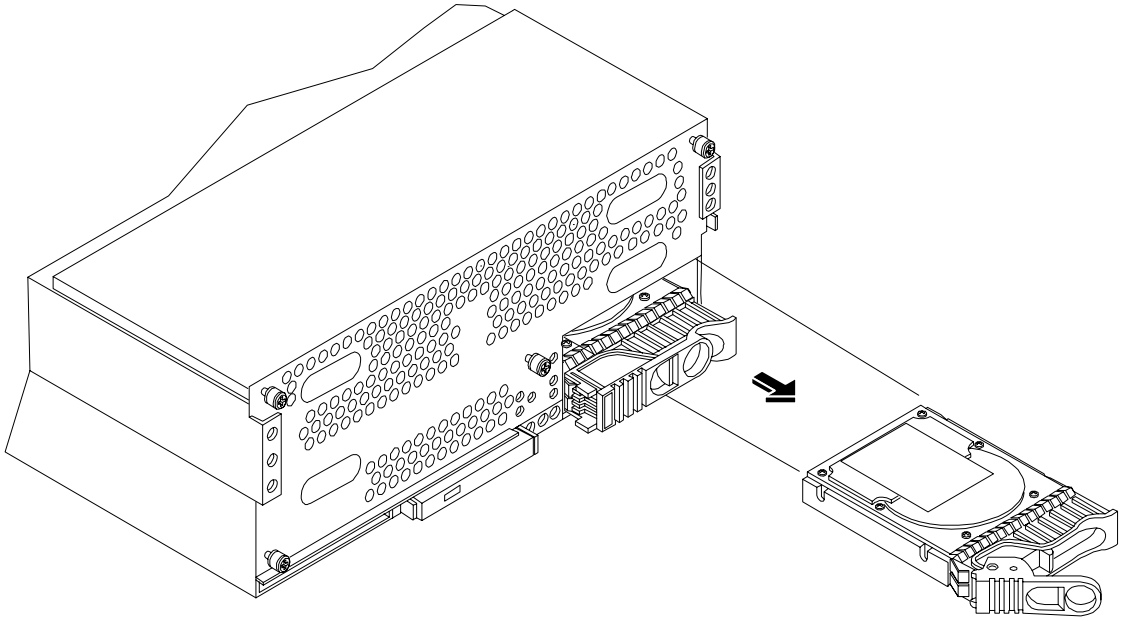
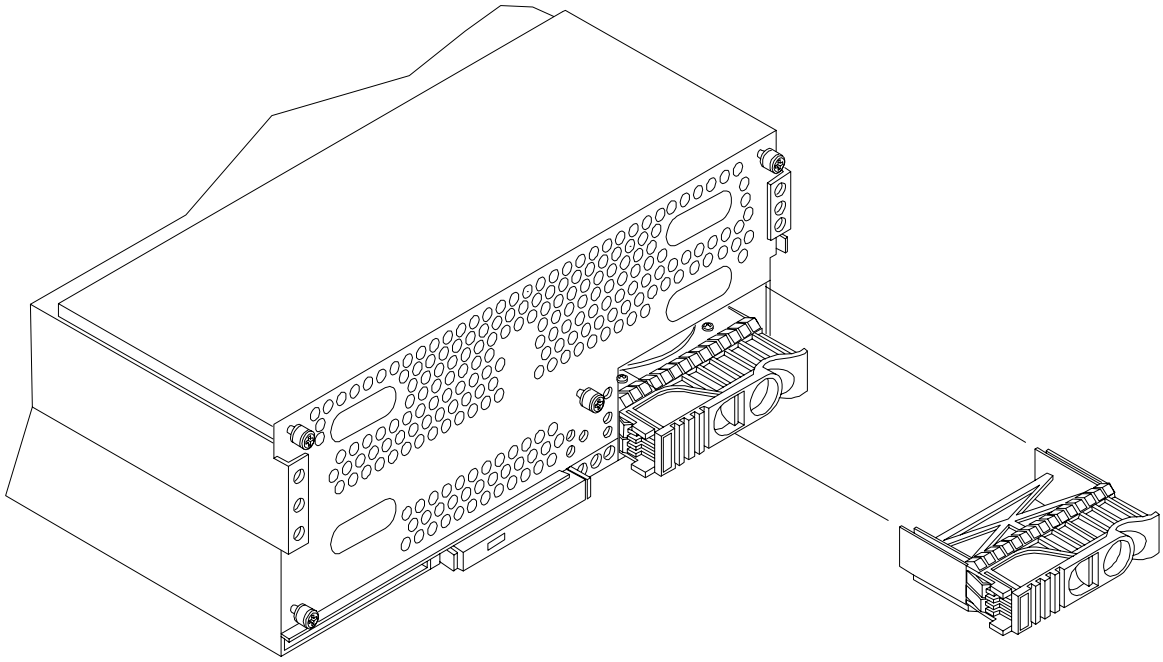


Figure 7-29 Volume Filler Installation in Slot 2



SCSI Backplane Board

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

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

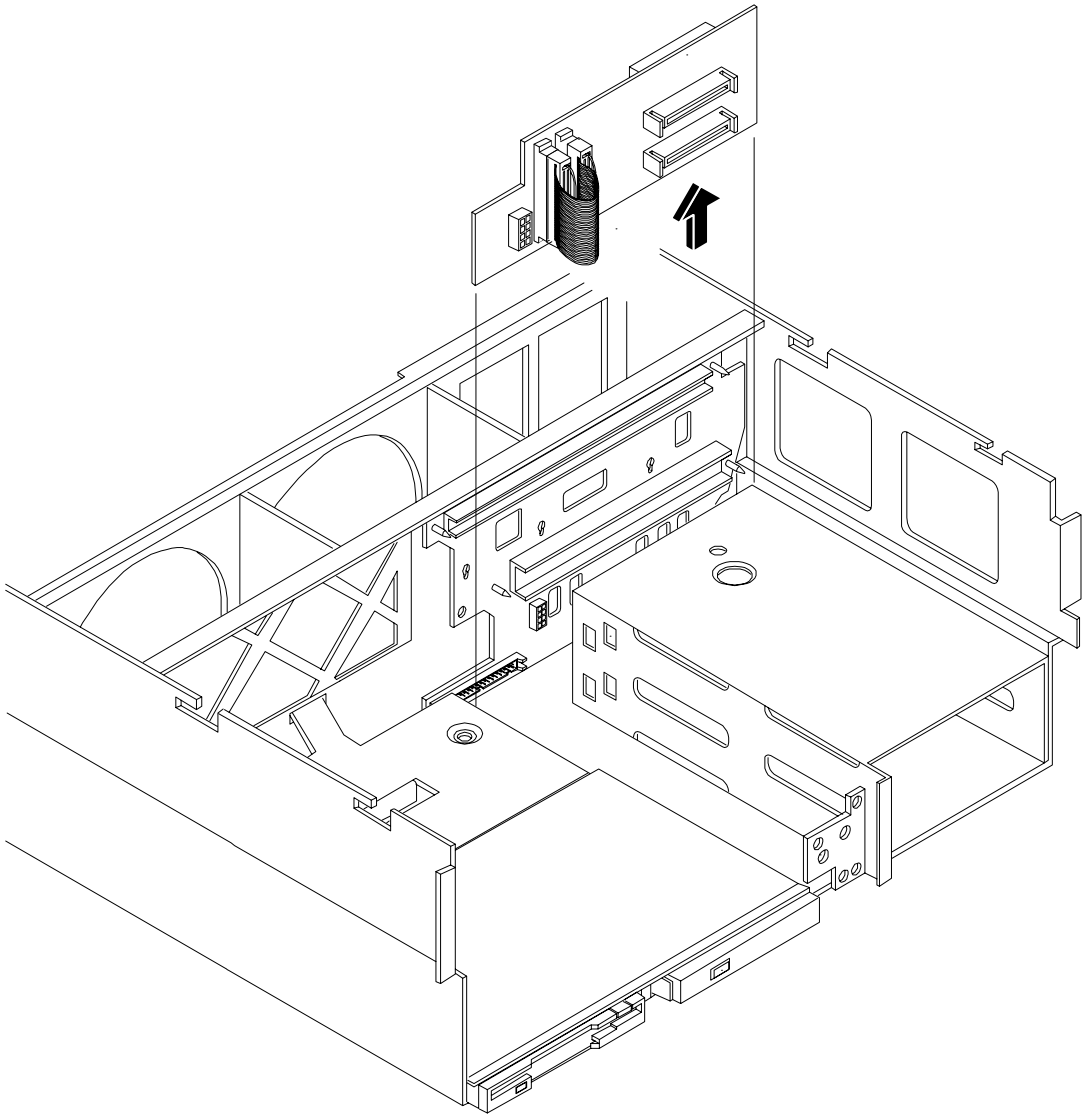
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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

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

Figure 7-30 SCSI Backplane Removal and Replacement



Removing the SCSI Backplane

To remove the SCSI backplane, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

Step 5. Remove the processor extender board. See “Processor Extender Board” on page 160.

Step 6. Remove the two hot-plug disk drives. See “Hot-Plug Disk Drives” on page 196.

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

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

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

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

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

Replacing the SCSI Backplane

To replace the SCSI backplane, perform the following steps:

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

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

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

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

Step 5. Replace the processor extender board.

Step 6. Replace the memory extender board.

Step 7. Replace the front cover.

Step 8. Replace the front bezel.

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

Midplane Riser Board

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

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

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

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

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

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

Removing the Midplane Riser Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front and top covers. See “Front and Top Covers” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

Step 5. Remove the processor extender board. See “Processor Extender Board” on page 160.

Step 6. Remove the 3 chassis hot-swap fan units. See “Hot-Swap Chassis Fan Unit” on page 168.

Step 7. Remove the I/O baseboard assembly. See “I/O Baseboard Assembly” on page 172.

Step 8. Remove the SCSI backplane board. See “SCSI Backplane Board” on page 199.

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

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

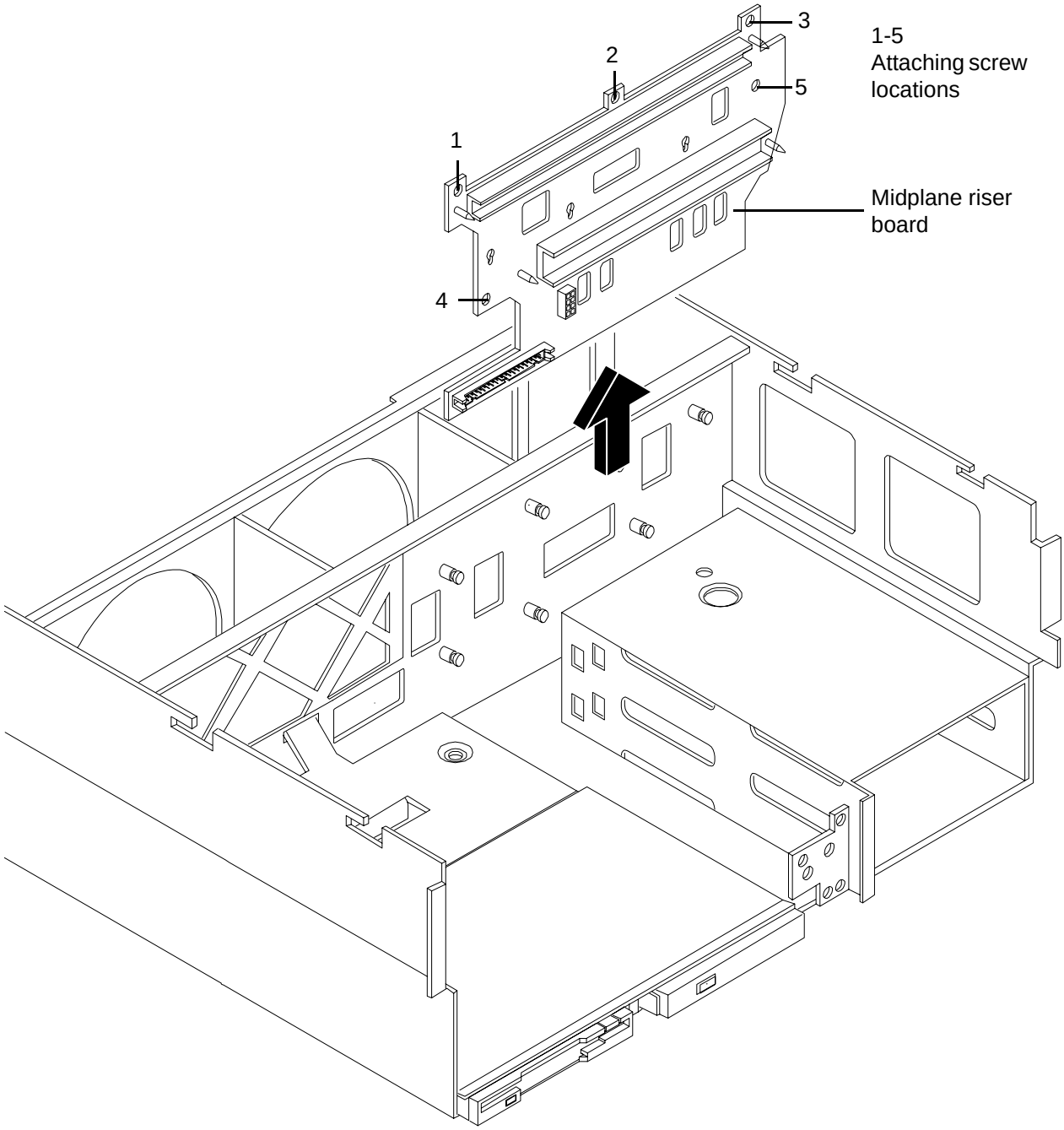
Step 11. Unplug the QuickFind diagnostic board cable from the midplane riser board.

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

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

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

Figure 7-31 Midplane Riser Board



Replacing the Midplane Riser Board

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

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

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

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

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

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

Step 6. Replace the SCSI backplane board.

Step 7. Replace the I/O baseboard assembly.

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

Step 9. Replace the processor extender board.

Step 10. Replace the memory extender board.

Step 11. Replace the front and top covers.

Step 12. Replace the front bezel.

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

Hot-Swap Power Supplies

The HP Integrity rx4640 Server has two 200-240 VAC hot-swap power supply units (PSU). These PSUs are located at the rear of the HP server. The supported configuration of the HP Integrity rx4640 Server requires a minimum of one PSU be installed.

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

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

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

Power Supply Load Order

The supported configuration of your hp Integrity rx4640 Server requires a minimum of one 200-240 VAC PSU. A second, optional hot-swap PSU, may be installed to provide N+1 capability. Each hot-swap requires a separate power cord.

The left side (viewing from the rear) hot-swap PSU is identified as P 0, the second hot-swap power supply is identified as P 1. Each hot-swap PSU requires a separate power cord be installed in the appropriate power cord receptacle and attached to a power cord support bracket.

CAUTION The empty hot-swap PSU slot P 1 must remain closed with the supplied metal cover when a second PSU is not used. Your server may be damaged due to overheating if the cover does not remain in place.

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

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

Removing a Hot-Swap Power Supply

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

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

Step 1. If rack mounted, slide the HP Server back out of the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the power cord plug from the power receptacle.

Step 3. Loosen the captive thumbscrew located at the top left of the PSU.

Step 4. Grasp the handle and pull the PSU out of the server.

Replacing a Hot-Swap Power Supply

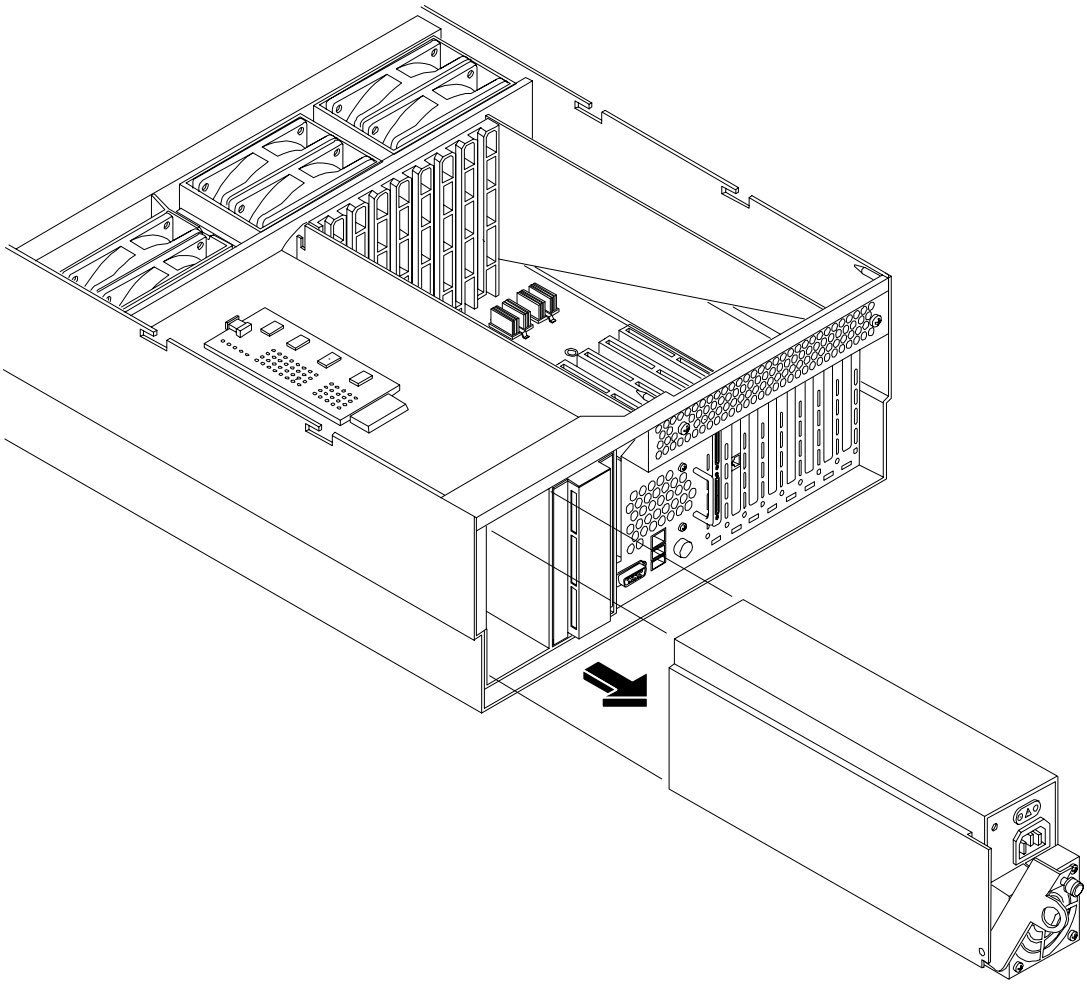
Step 1. Supporting the PSU with both hands, slide it into the empty slot until it plugs into the socket on the internal power distribution board. Tighten the thumbscrew hand-tight.

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

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

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

Figure 7-32 Hot-Swap Power Supply Removal and Replacement



Power Distribution Board

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

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

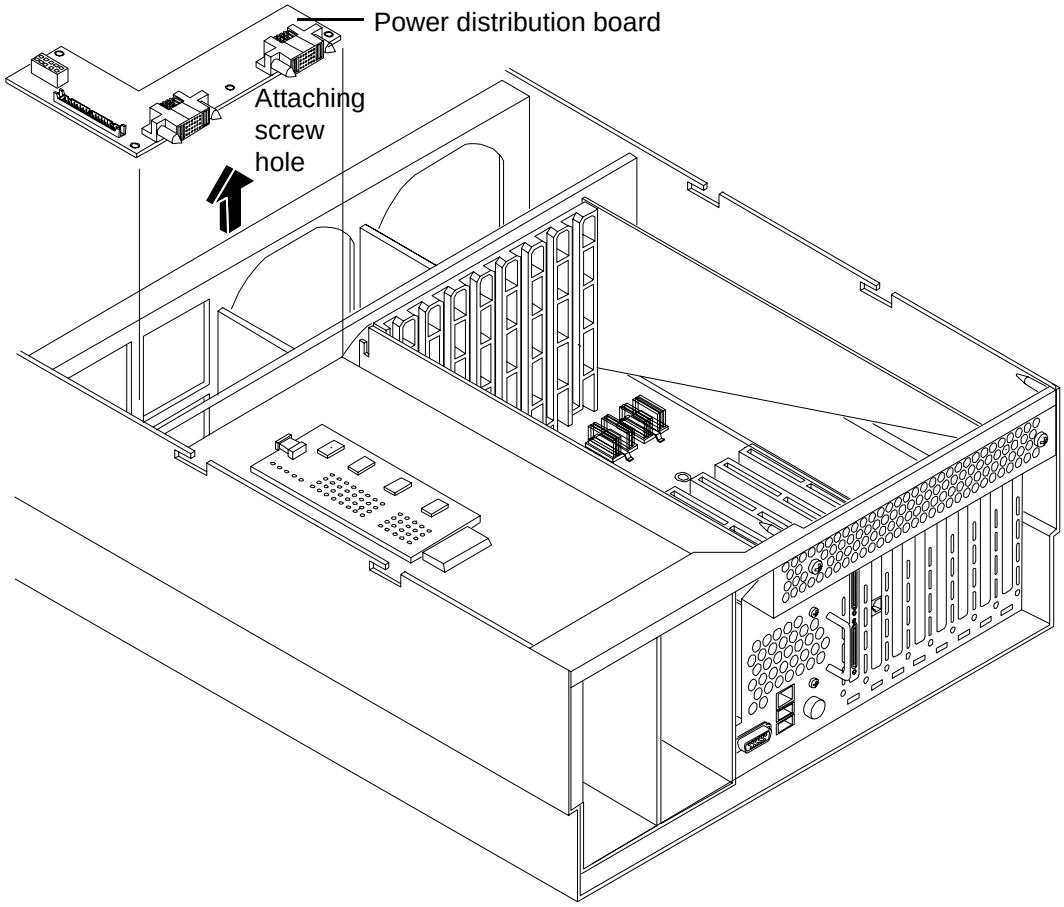
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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

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

Figure 7-33 Power Distribution Board Removal and Replacement



Removing the Power Distribution Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover. See “Front and Top Covers” on page 145.

Step 3. Remove the power supply fan unit from the chassis. See “Hot-Swap Chassis Fan Unit” on page 168.

Step 4. Remove the hot-swap power supply(s) from the chassis. See “Hot-Swap Power Supplies” on page 205.

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

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

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

Replacing the Power Distribution Board

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

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

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

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

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

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

Step 6. Replace the top cover.

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

DVD Drive

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

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

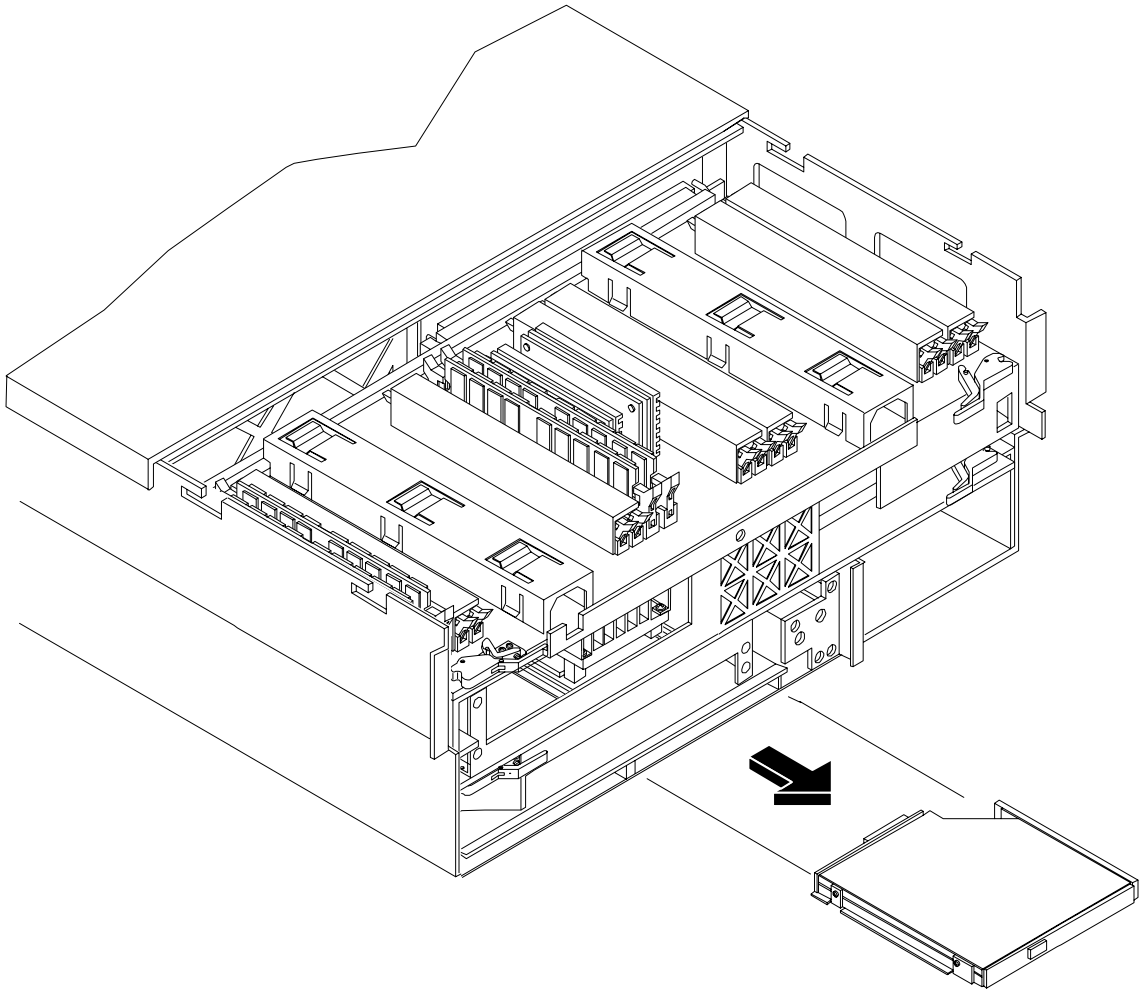
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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

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

Figure 7-34 DVD Drive Removal and Replacement



Removing a DVD Drive

To remove a DVD drive, perform the following steps:

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

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

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

Replacing a DVD Drive

To replace a DVD drive, perform the following steps:

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

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

Step 3. Replace the front bezel.

DVD I/O Board

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

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

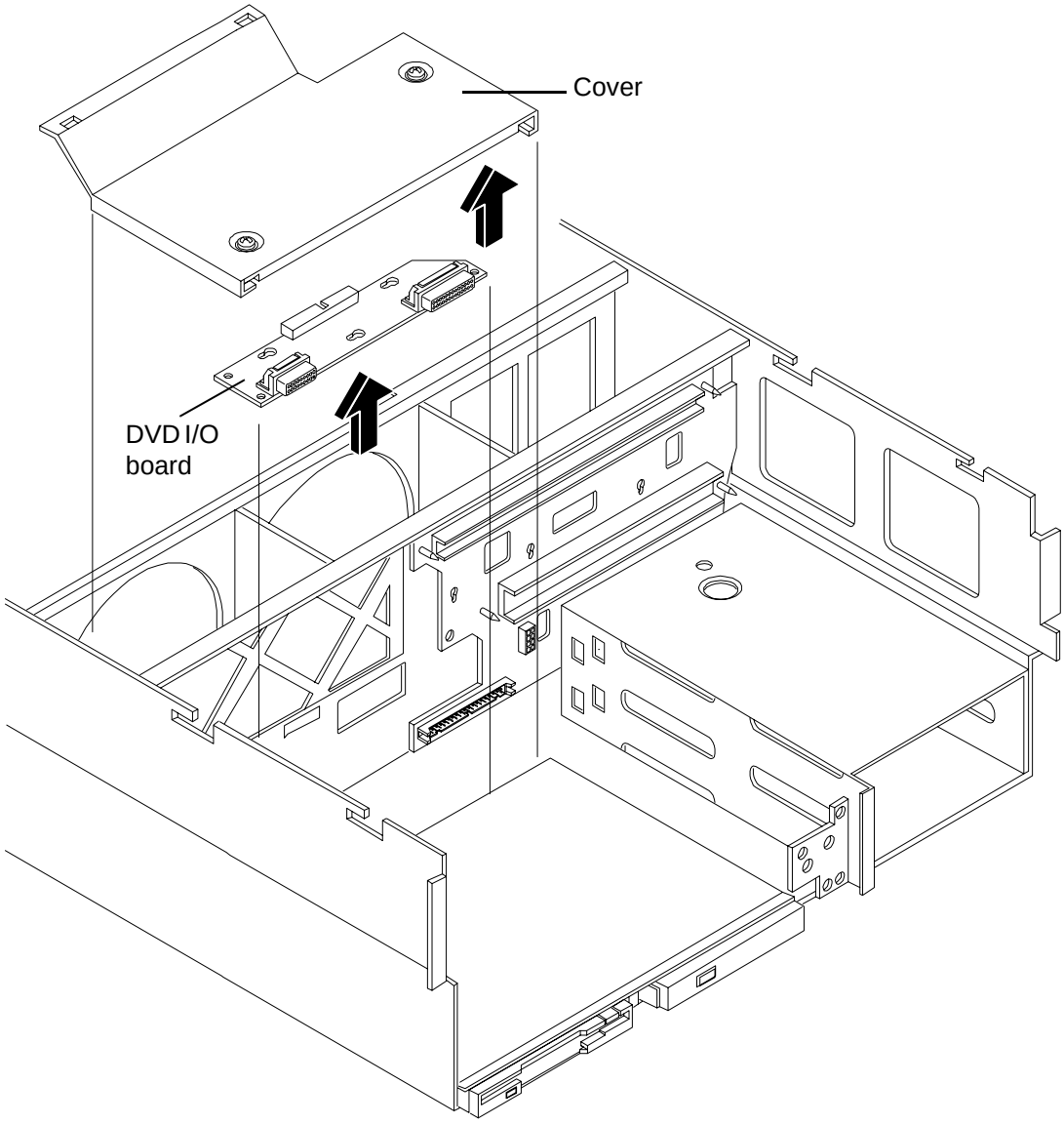
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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

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

Figure 7-35 DVD I/O Board Removal and Replacement



Removing a DVD I/O Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

Step 4. Remove the memory extender board. See “Memory Extender Board” on page 151.

Step 5. Remove the processor extender board. See “Processor Extender Board” on page 160.

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

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

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

Replacing a DVD I/O Board

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

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

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

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

Step 4. Replace the processor extender board.

Step 5. Replace the memory extender board.

Step 6. Replace the front and top covers.

Step 7. Replace the front bezel.

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

Display Board

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

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

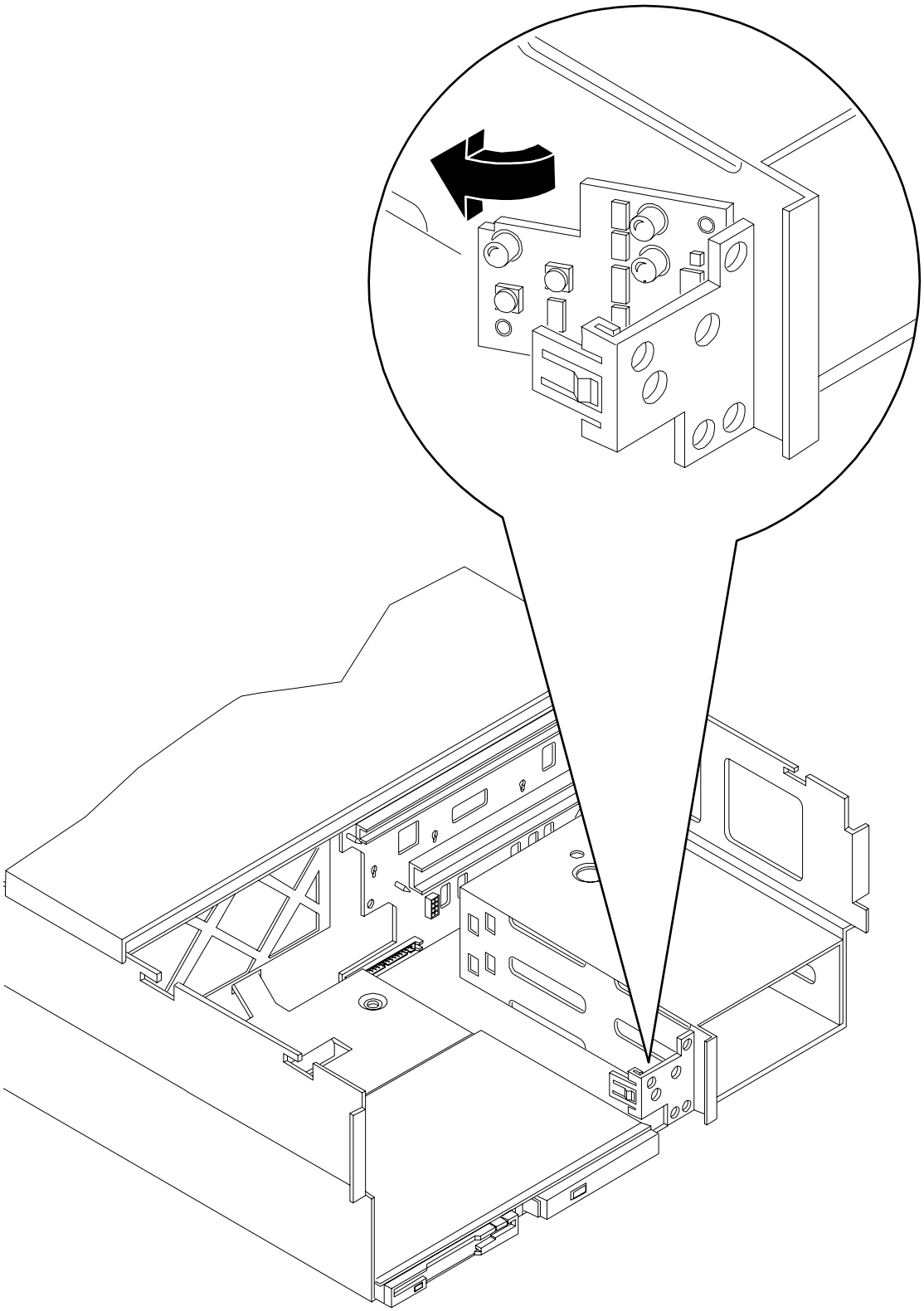
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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

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

Figure 7-36 Display Board Removal and Replacement



Removing the Display Board

To remove the display board, perform the following steps:

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the front bezel. See “Front Bezel” on page 144.

Step 3. Remove the front cover. See “Front and Top Covers” on page 145.

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

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

Replacing the Display Board

To replace the display board, perform the following steps:

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

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

Step 3. Replace the front cover.

Step 4. Replace the front bezel.

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

QuickFind Diagnostic Board

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

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

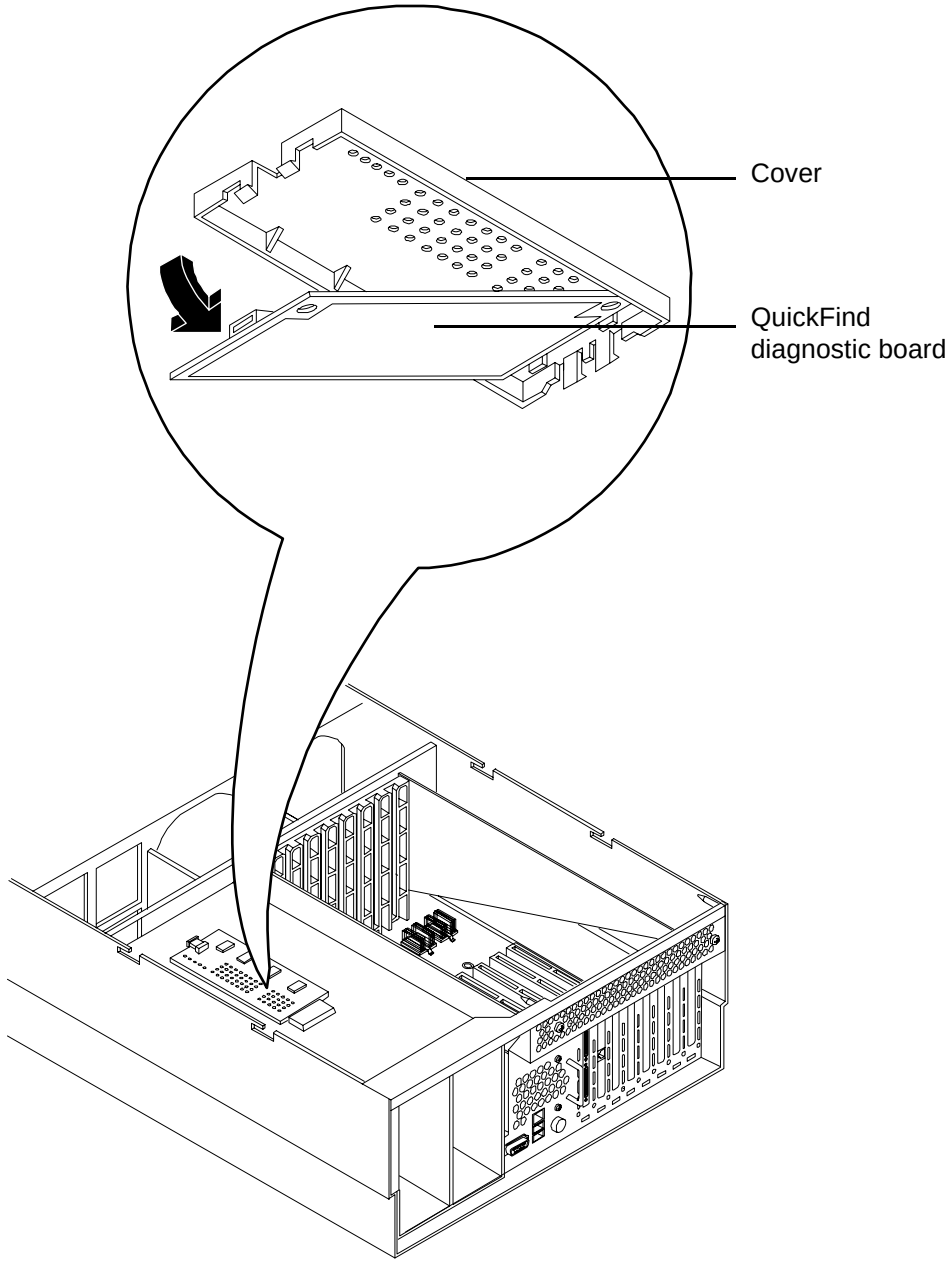
Voltages are present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position.

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

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

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

Figure 7-37 QuickFind Diagnostic Board Removal and Replacement



Removing the QuickFind Diagnostic Board

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

Step 1. If rack mounted, slide the HP Server out from the rack until it stops. See “Accessing a Rack Mounted Server” on page 141.

Step 2. Remove the top cover. See “Front and Top Covers” on page 145.

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

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

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

Replacing the QuickFind Diagnostic Board

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

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

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

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

Step 4. Replace the top cover.

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

8 Parts Information

Field Replaceable Parts (FRU) List

The items in this list and the corresponding item numbers are the Field replaceable Units (FRUs) for the hp Integrity rx4640 Server.

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

Table 8-1 Field Replaceable Parts (FRU) List

Item No.	Description	Part Number Replacement	Part Number Exchange
	Cable		
A6961-63006	Cable, Internal SCSI	A6961-63006	None
A6961-63005	Cable, QuickFind Diagnostic to Midplane	A6961-63005	None
A6961-63004	Cable, Power Distribution to Midplane Ribbon	A6961-63004	None
A6961-63003	Cable, Power Distribution to Midplane 10 pin	A6961-63003	None
A6961-63011	Cable, SCSI Controller Jumper (Simplex only)	A6961-63011	None
A6961-63008	Cable, SCSI Backplane to Midplane	A6961-63008	None
A6961-63002	Cable, Display to IDE to Midplane	A6961-63002	None
	PCA Boards		
A6961-60007	PCA, Processor Extender	A6961-67007	A6961-69007
A6961-60001	PCA, I/O baseboard (includes VRMs)	A6961-67001	A6961-69001
A6961-60201	PCA, I/O Baseboard (includes VRMs) supports Wake On Lan Note: Requires system firmware greater than 1.13	A6961-67201	A6961-69201
A6961-60004	PCA, 16 slot Memory Board	A6961-67004	A6961-69004
A6961-60104	PCA, 16 slot Memory Board, 4GB DIMM capable Note: Requires system firmware greater than 1.13	A6961-67104	A6961-69104
A7124-04001	PCA, 32 slot Memory Board	A7124-67001	A7124-69001
A6961-04005	PCA, 32 slot Memory Board, 4GB DIMM capable Note: Requires system firmware greater than 1.13		
A6961-60005	PCA, Midplane Riser Board	A6961-67005	None

Table 8-1 Field Replaceable Parts (FRU) List (Continued)

Item No.	Description	Part Number Replacement	Part Number Exchange
A6961-04057	PCA, SCSI Backplane/Management Assy, includes: Management board (A6961-60003) and SCSI Backplane board (A6961-60002)	A6961-67057	None
A6961-60006	PCA, SCSI Duplex Board	A6961-67006	None
A6961-60106	PCA, SCSI Duplex Board	A6961-67106	None
A6961-60008	PCA, Front Panel Display	A6961-67008	None
A6961-60009	PCA, QuickFind Diagnostic Board (includes plastic cover and label)	A6961-67009	None
A6961-60015	PCA, Power Distribution Board	A6961-67015	None
A6961-60013	PCA, I/O Board to DVD connectivity (IDE/USB)	A6961-67013	None
1818-8797	256MB DIMM	A6967-67001	None
1818-8795	512MB DIMM	A6968-67001	None
1818-8833	1GB DIMM	A6969-67001	A6969-69001
1818-8799	2GB DIMM	A6835-67001	A6835-69001
	Internal disks/removable media		
A9896-64001	36GB 15K RPM SCSI Disk (A986A)	5065-5286EO	A6848-69001
A7163-04001	73GB 15K RPM SCSI Disk (A987A)	0950-4381EO	A9761-69001
A9898-64001	146GB 15K RPM SCSI Disk (A9898A)	0950-4385EO	A7080-69001
A7163-04001	DVD-R/CD-R Drive	A7163-67001	None
A7007-04001	DVD-R/CD-RW Drive	A7007-67001	None
	Fans		
A6961-04001	I/O Fan	A6961-04055	None
A6961-04028	Power Supply Fan	A6961-04028	None
	Processors		
A7159-04001	1.3GHz Itanium 2 CPU	A7159-67001	A7159-69001
A7158-04001	1.5GHz Itanium 2 CPU	A7158-67001	A7158-69001
A9767-04013	hp mx2 dual processor module	A6797AX	A9730-69001
	Miscellaneous		
0950-4428	Power Supply	A6961-67016	None
0950-4419	DC-DC Converter (VRM 3.3V)	A6961-67017	None

Table 8-1 Field Replaceable Parts (FRU) List (Continued)

Item No.	Description	Part Number Replacement	Part Number Exchange
0950-4418	DC-DC Converter (VRM 5.0V)	A6961-67018	None
0950-4417	DC-DC Converter (VRM 12.0V)	A6961-67019	None
A6961-04047	PCI Card Divider (doorbell and latch included)	A6961-67020	None
A6961-40021	PCI Retention Clip	A6961-67021	None
1420-0386	System battery	1420-0386	None
	Rack solutions		
5069-3305	Rack Mount Hardware, Right (included with Left Bracket in kit)	A6977-67001	None
5069-3306	Rack Mount Hardware, Left (included with Right Bracket in kit)	A6977-67002	None
A6961-04043	Bezel-Rack Mount	A6977-67022	None
	Core I/O Cards		
A6825-60101	LAN Core I/O	A6825-67101	None
A6829-60101	U160 Core I/O	A6829-67001	None
309520-001	6402 U320 RAID Controller (Windows only)	None	None

9 Specifications

Introduction

This chapter provides the power requirements, operating conditions (environmental requirements), physical requirements, hardware specifications, and video resolutions of the hp Integrity rx4640. The following tables provide the specifications required for normal operation of the hp Integrity rx4640.

NOTE The specifications and requirements for the power supply and environment can vary if you install a mass storage device in the server that has more stringent environmental limits than required for the HP Server. Ensure that the operating environment for any mass storage devices you intend to install are compatible with the server environmental requirements.

Hardware Specifications

Table 9-1 Hardware Specifications

Micro-processors	Intel Itanium (up to 4 processors): 1.1 GHz dual processor module 32MB Level 4 cache. Up to 4 modules or 8 processors 1.3 GHz/3MB 1.5 GHz/6MB
Memory	Supports up to eight Double Data Rate (DDR) registered ECC Memory, in PC1600 DIMMs. Supported DDR DIMM sizes: 128MB, 256MB, 513MB, 1GB, and 2GB. Requires DIMMs to be added in quads of equal capacity.
Video	Embedded
SCSI	Integrated Ultra-3 SCSI dual channel controller; 80 MB/s transfer rate with two 68-pin connectors.
integrated hp raid controller	Optional.
LAN	PCI Gigabit, Fast Ethernet Controller; with Wake-on-LAN enabled/disabled via BIOS setup.
PCI Slots	Four 64-bit PCI slots, 66MHz slots Two 64-bit PCI-X slots, 133 MHz slots.
Core I/O	Three serial ports, 2 USB ports, Integrated RJ-45 LAN .
DVD-ROM	DVD-R/CD-ROM drive; IDE interface; 48x speed.
Mass Storage	Maximum Internal Storage: Two 73MB, 15K drive.
External Storage	2 external SCSI ports
Power Supply	N+1 configuration, redundant 200-240 VAC power supply (optional).

Dimensions and Weights

This section provides dimensions and weights of hp Integrity rx4640 Server components.

Server Component Dimensions

Table 9-2 Server Component Dimensions

Dimension	Value
Height	6.87 in. (17.46 cm)
Width	17.32 in. (44 cm)
Depth	27.1 in. (68.8 cm)
Weight	Unloaded 75 lbs (34 kg) Fully loaded <95 lbs (43 kg)