

hp server rx4610

Service Manual



i n v e n t

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Audience Assumptions

This guide is for the person who services LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

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1 General Information

Notice to Service Technicians

This is the service document for the HP Server rx4610. You may also need to access the *hp server rx4610 Installation Guide*, the *hp server rx4610 User Guide* or *hp server rx4610 Service Manual* that are available on the Network Server Division WEB site:

<http://www.hp.com>

The *hp server rx4610 Installation Guide* contains additional information on the installation process, which the end users follow. All documents are needed for complete servicing information.

Front Panel Control and Indicators

The chassis front exposes power supplies, fans, and the system controls and indicators. Figure 1 and Table 1 provide detail on the components, controls, and indicators visible from the front of the chassis.

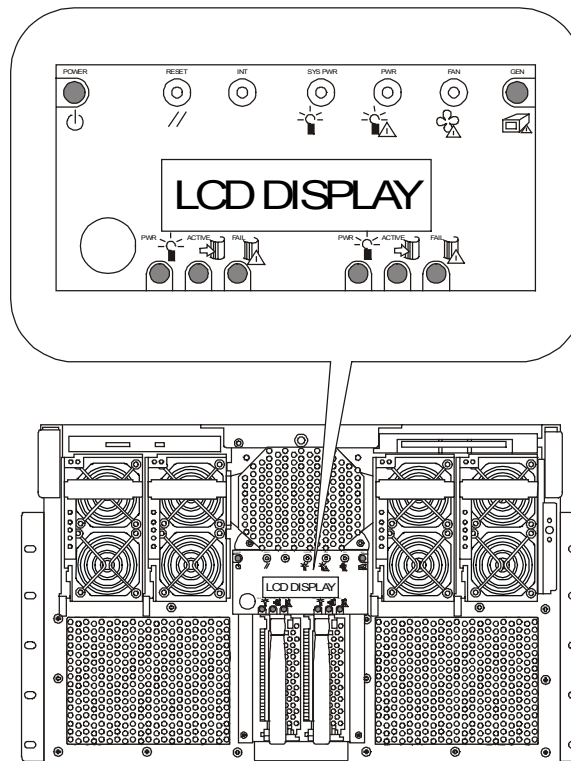


Figure 1. Chassis Front View

Table 1 System Controls and Indicators (Front Side)

Item	Feature	Description
DVD Drive		
1	Open/close button	When pressed, it opens or closes the DVD tray.
2	Activity LED	When lit, it indicates the drive is in use.
Floppy Diskette Drive		
3	Activity LED	When lit, it indicates the drive is in use.
4	Ejector button	When pressed, it ejects the diskette.
Front Panel		
5	Power switch	When pressed, it turns on or off the server. The +12 V standby voltage is ON whenever the server power cords are plugged in.
6	Reset switch	When pressed, it resets the server and causes the power-on self test (POST) to run.
7	INIT switch	When pressed, the system performs a crash dump provided the dump is supported by the operating system.
8	System Power LED (green)	When lit continuously, it indicates the presence of DC power in the server. When not lit, it indicates power is turned off or power source is disrupted.
9	Power Fail LED (amber)	When lit continuously, it indicates a power failure.
10	Fan Fail LED (amber)	When flashing, it indicates a fan failure.
11	General Fault LED (amber)	When lit continuously, it indicates a hot plug PCI fault.
12	Front panel LCD	Displays information about processor type and POST codes.
Status LEDs for SCSI Drives		
13	Drive Power LED (green)	When lit continuously, it indicates the presence of the drive and power to the drive.
14	Drive Active LED (green)	Indicates drive activity.
15	Drive Fail LED (amber)	When lit continuously, it indicates an asserted fault status on one or more hard disk drives. When flashing, it indicates drive reset in progress.
Status LEDs for Power Supplies		
16	Power LED (green)	When lit continuously, it indicates the power supply DC outputs are on and OK. Blinking indicates the power supply is on standby. Off indicates there is no power to the power supply.
17	Predictive Fail LED (amber)	Blinking indicates that the power supply will soon fail.
18	Fail LED (amber)	When lit continuously, it indicates that the power supply has failed and is not supplying output. When blinking, it indicates that the power supply has reached its current limit.

System Controls, Indicators, and Features (Rear Side)

The back of the rx4610 exposes connectors, ports, slots, and a Legacy I/O Panel. Figure 2 details the back of the chassis, while Figure 3 details the Legacy I/O Panel that resides in the upper-right corner of the chassis rear.

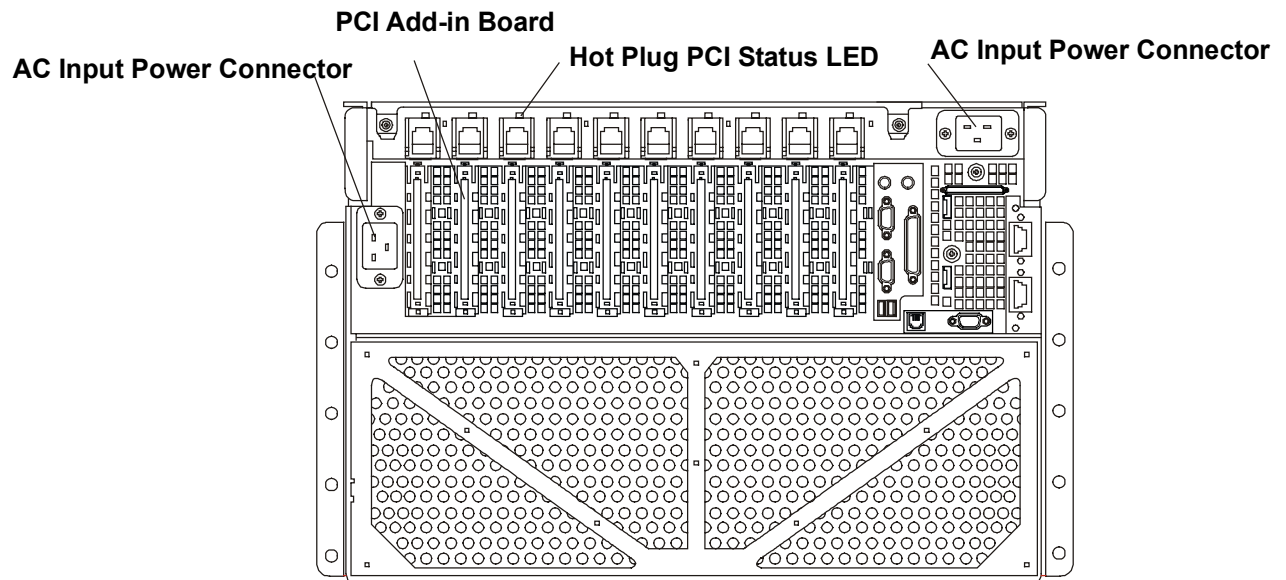


Figure 2. Chassis Back View

1. AC Input Power Connector
2. PCI Add-In Board Expansion Slots
3. Hot Plug PCI Status LEDs
4. AC Input Power Connector

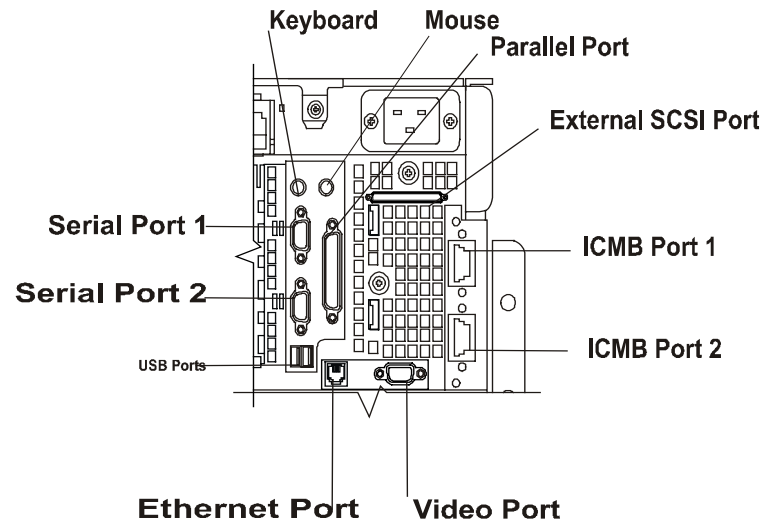


Figure 3. Legacy I/O Panel

1. Keyboard
2. Mouse
3. Parallel Port
4. External SCSI
5. ICMB Port 2
6. ICMB Port 1
7. Video Port
8. Ethernet Port
9. USB Ports
10. Serial Port 2
11. Serial Port 1

Peripherals

IDE Diskette Drive

The server supports a slimline IDE diskette drive for 1.44 MB and 120 MB media. This half-inch slimline peripheral mounts directly above the top-right power bay on the front of the chassis. The drive is mounted on a removable tray that facilitates system assembly and service.

Hard Drives

The server supports up to two hot-swap drive carriers that support standard 1-inch high by 3.5-inch-wide LVDS SCSI hard drives.

As part of the hot-swap implementation, drive carriers with integral heat sinks house the drives. Each drive is mounted in a carrier with four fasteners and the carrier snaps into the hard drive bay. When a carrier is seated properly in the bay, it snaps into place and leaves the locking handle exposed to the front of the chassis. Drives can consume up to 24 watts of power and must be specified to run at a maximum ambient temperature of 40 ° C (104 ° F).

DVD Drive

The server supports a slimline IDE DVD drive. This peripheral mounts directly above the top-left power bay on the front of the chassis. The drive is mounted on a removable tray that facilitates system assembly and service.

Power Supplies

The server is shipped with four power supplies. However, the server can operate with only three power supplies. The third power supply provides redundancy. Each power supply has a dual rating of 800W minimum over an input range of 180-264VAC and 700W minimum over an input range of 90-132VAC. Each supply is designed to minimize EMI and RFI. Each power supply also has self-contained fans for cooling.

The DC output voltages of each power supply are:

- +48 V
- +12 V standby

Each supply docks to a 28-pin connector on the front of the Power Distribution Board (T-Docking board).

Figure 4 shows an rx4610 server with four power supplies. The power supply bays are numbered one through four as you face the front of the chassis. However, installation order for the power supplies is as shown in Figure 4 beginning with 1 and ending with 4. Thus, a system with only three power supplies has an empty bay three (4 in the figure). Blanks must be installed in any bays that do not have a power supply.

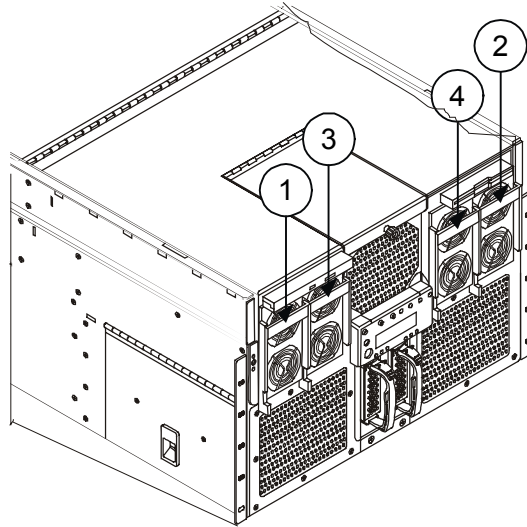


Figure 4. Power Supply Order

Powering-Up the HP Server

NOTE Turn on power to the monitor connected to the server before you power-on the rx4610. This allows proper auto-configuration of video output of the rx4610 as it boots up.

To power-up the HP Server rx4610, complete the following procedure:

1. Make sure that the monitor, keyboard, and mouse have been connected to the proper ports on the rear panel of the server.
2. Remove the drive protection card, if present, from the diskette drive.
3. Plug in the power cord for the monitor and turn it on.
4. Plug the female ends of the server AC power cords into the input receptacle on the back of the chassis.
5. Plug the male ends of the server AC power cords into grounded, three-pronged AC power outlet.
6. Slide the server into the rack.
7. If the server does not come on when you plug it into the AC outlet, press the on/off power switch on the front panel.
8. Verify that the power-on light on the front panel is lit. After a few seconds, the power-on self test (POST) begins.

When you press the power button on the control panel, the HP Server powers up and loads the operating system. The system runs a set of power on self tests (POST) during this process. For details refer to Chapter 4, "Diagnostics."

Powering-Down the HP Server

1. Log off all users and if necessary, back-up files.
 - ◆ Schedule the power down for a time when the fewest users will be affected by the HP Server's downtime.
 - ◆ If you will be doing any kind of hardware or software upgrade, be sure your HP Server's data has been backed up.
 - ◆ Follow instructions in your network operating system (NOS) documentation to gracefully shut down all networking software and applications.
2. Press the power switch on the HP Server's control panel when prompted by the operating system.

Normally this completes the power down procedure.

NOTE The power supply will continue to provide standby current to the HP Server until the power cable is disconnected from the rear panel.

2 System Information

Introduction

This chapter provides information on mass storage, connector pin-outs, accessory guidelines and system specifications.

Mass Storage

Mass Storage Guidelines

- General Guidelines
 - ◊ Use care when unpacking and handling the SCSI disk drives.◊
 - ◊ The hard disk drives are very susceptible to mechanical shock and can be easily damaged by a drop as short as one-quarter of an inch. If the drop would crack an egg, it will damage the drive.
 - ◊ Do not stack drives.
 - ◊ The HP Server is internally limited to 2 mass storage devices.
- IDE Devices
 - ◊ The IDE diskette drive and DVD drive are standard on all models of the HP Server. They are housed in two piece drive carrier assemblies that rest on the chassis surface. They are accessible when the top cover is removed. See Figures 4-3 and 4-4.
 - ◊ The Legacy I/O board contains the PCI-enhanced IDE interface with two IDE buses. The primary IDE 0 bus supports the IDE diskette drive and the secondary IDE 1 bus supports the DVD drive.
 - ◊ Refer to "System Board Layout" in Appendix A, "Specifications."
- SCSI Device Selection
 - ◊ A Qlogic ISP12160A Ultra3 SCSI chip is a highly integrated bus master, dual-channel SCSI I/O processor for SCSI initiator and target applications. The chip supports dual channel, Ultra3 (Ultra 160) SCSI functionality and is pin compatible with QLogic's ISP12160 Ultra3 SCSI processor as well as QLogic's ISP1280 dual SCSI processor.
 - ◊ Use only low-voltage differential (LVD) SCSI devices.
 - ◊ Do not use high voltage differential (HVD) devices on either of the SCSI channels or damage will occur.
 - ◊ The Ultra SCSI controller supports dual channel Ultra3 functionality and is pin compatible with Qlogic's IPS12160 Ultra3 processor and Qlogic's ISP1280 dual SCSI processor.
 - ◊ Channel B may be used in a duplexing arrangement or to control an external mass storage solution. At least two SCSI hard disk drives are required if the duplexing option is used.

Memory Guidelines

Each Memory Board can support from 1 GB to 32 GB. The server supports up to 64 GB of system memory.

- Use only HP DIMMs, which are 3.3V, 168-pin, PC100, buffered SDRAM DIMMs in 256 MB, 512 MB, or 1 GB modules.
- DIMMs must be installed in the order indicated by the numbered slots on the memory board in groups of four. Verify that the same size DIMM is used in any given row by using the same HP part number.
- To ensure optimum performance when two boards are installed, the memory on each board should be equal, that is, the DIMMs must be the same type and quantity.
- Ensure both latches close on the DIMM when completely installed.
- When handling DIMMs, observe anti-static precautions to avoid damage.

Accessory Board Guidelines

Tested PCI Boards

For a list of tested PCI boards, check for compatibility under the Hardware Tested Products list for the HP Server rx4610 under the Service and Support topic for the specific NOS used in the server at HP's web site:

<http://www.hp.com/>

CAUTION Some accessory board outputs may exceed U.S. National Electrical code (NFPA 70) Class 2 or limited power source limits and must use appropriate inter-connecting cabling in accordance with the National Electrical Code. (All HP boards comply with Class 2.)

Technical Specifications

The specifications listed below vary if you install a mass storage device in your server that has more stringent environmental limits. Ensure the operating environment for your server is suitable for all of the mass storage devices being used.

Environment

Temperature

Operating	5° to 35° C (41° to 95° F)
Non-operating	-40° to +65° C (-40° to +149° F)

Humidity

Operating	20% to 80% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing

Altitude

Operating	-30 to 3,000 m (~ 10,000 ft)
Non-operating	-30 to 12,000 m (~ 40,000 ft)

Thermal Output

Maximum Operating	1007 BTU/hr
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Weight and Dimensions

Specification	Value
Height	31.12 cm (12.25 inches, 7u)
Width	44.45 cm (17.5 inches)
Depth	71.12 cm (28.0 inches)
Weight	68.1 kg (150 lbs.)
Required front clearance	3 inches
Required rear clearance	8 inches
Heat Dissipation	6174 BTU/hr

Hardware

Feature	Comment
Power system	Four 800-watt, 208/110 VAC autoranging power supplies include integrated fans for cooling. The rx4610's standard configuration is shipped with four power supplies. The server requires a minimum of three power supplies to operate properly. LEDs on the power supplies indicate power-on, failure, and predictive failure.
Server chassis	The peripherals are: One IDE DVD drive in a ½-inch carrier. One IDE diskette drive in a ½-inch carrier. Two 3.5-inch wide by 1.0-inch low-voltage differential SCSI (LVDS) hard disk drives mounted side-by-side. Eight 64-bit/66 MHz Hot Plug PCI I/O expansion slots. Two 64-bit/33 MHz Non-hot Plug PCI expansions slots.
Cooling system	Four 172 mm fans and two 120 mm fans circulate cooling air through the server. The server requires a minimum of five fans to function properly. An LED indicator mounted on each fan assembly identifies a failed unit. Integrated power supply fans cool and circulate air through the power supplies and the upper level of the chassis.
Miscellaneous	Integrated circuit bus (I ² C) for diagnostic and intrachassis communication. Real-time clock/calendar (RTC) System controls and indicators (LEDs) on the front side of the chassis. Basic Input/Output System (BIOS), Power on Self Test (POST), and Setup Utility stored in a flash memory device. QLogic SCSI Utility Field Replacement Unit (FRU) and Sensor Data Record (SDR) view utility.

Processor/Memory Set:

Feature	Description
Processor board	The processor board supports up to four Intel® Itanium™ processors and 48V power pods.
Intel® Itanium™ microprocessor packaged in a Slot M lift socket.	Installed: Up to four Intel® Itanium™ processors, packaged in Slot M pin array cartridges.
Memory boards	Two plug-in boards containing main memory supporting PC100 Version 1.2 buffered SDRAM. Each memory board supports from 1 GB to 32 GB of error correction code memory using 32 72-bit dual inline memory modules. The boards interface to the processors via connectors on each side of the processor board.
I/O baseboard	<p>Eight 64-bit/66 MHz Hot Plug PCI slots. Two 64-bit/33 MHz Non-hot Plug PCI slots.</p> <p>ATI RAGE† XL PCI super video graphics array controller with 16 MB of video memory.</p> <p>The QLogic† ISP 12160 LVDS SCSI controller supports two LVDS channels. One channel is used internally to provide support for the internal SCSI drives (connected to the LVDS disk backplane). The second LVDS channel is routed to the rear of the chassis to support external devices.</p>
Legacy I/O board	<p>This board contains all legacy I/O connections and plugs into an edge connector on the I/O baseboard.</p> <p>PS/2-compatible keyboard and mouse ports. PS/2-compatible parallel port.</p> <p>The PCI-enhanced Integrated Drive Electronics interface has two IDE buses, supporting the diskette drive (Primary IDE 0) and DVD drive (Secondary IDE 1).</p> <p>Two universal serial bus ports. Two PS/2-compatible, 9-pin serial ports.</p>
SCSI Hot Swap backplane	This backplane supports up to two 1-inch SCA2-type LVDS SCSI drives, mounted in carriers.
Front panel board	<p>The front panel board provides the user interface to the server.</p> <p>Push-button switches control power-up, reset, and initialization functions.</p> <p>LEDs indicate power on, power supply failure, hard drive failure, or a fan failure.</p> <p>An LCD panel provides information about boot status, available number of processors.</p>
Sideplane Board	<p>The Sideplane board:</p> <p>Electrically connects the processor board and I/O baseboard. Interconnects to the Power Distribution board.</p> <p>Contains the sockets for the 5 V and 3.3 V DC-to-DC converters.</p> <p>Distributes DC power to the power bay, I/O bay, and docking board.</p>
Power Distribution Board	Distributes the power load of the server among four 800-watt autoranging power supplies.

Feature	Description
	Contains the socket for the 12V DC-to-DC converter for the LVDS drives.

Video Display Modes

Resolution	Max. Refresh Rate @ 256 Colors	Max. Refresh Rate @ 65K Colors	Max. Refresh Rate @ 16.7M Colors
640x480	200 Hz	200 Hz	200 Hz
800x600	200 Hz	200 Hz	160 Hz
1024x768	150 Hz	150 Hz	120 Hz
1152x864	120 Hz	120 Hz	85 Hz
1280x1024	100 Hz	100 Hz	85 Hz

Power Supply Specifications

Parameter	Characteristics
Input Type	Auto-ranging
Input – Maximum Range	100 to 127 VAC 5.0 A at 50/60 Hz 200 to 240 VAC 2.8 A at 50/60 Hz
Operating Current	100 VAC 5.3 A 120 VAC 4.6 A 200/208 VAC 3.2 A 220/230 VAC 2.8 A
In-rush Current	25 A
Operating Power	256 W Continuous

Connector Pinouts

Unless otherwise noted, the following features apply to all models. Some features are factory installed; others are optional.

Mini-DIN (PS/2) Connectors

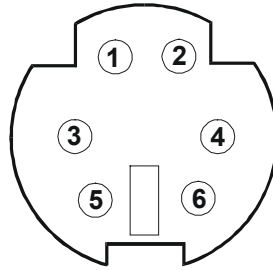


Figure 5. Mini-DIN Connector

Mini-DIN Connector Pinouts for the Mouse and Keyboard (female)

Pin Number	Signal Description
1	Data signal
2	Not used
3	Ground
4	Power (+5 V dc)
5	Clock signal
6	Not used

Serial Port Connector

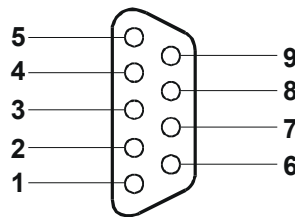


Figure 6. Serial Port Connector

Serial Port Connector (male) Pinouts

Pin Number	Signal Description
1	Data carrier detect
2	Receive data
3	Transmit data
4	Data term ready
5	Signal ground
6	Data set ready
7	Request to send

Pin Number	Signal Description
8	Clear to send
9	Ring indicator

Parallel Port Connector

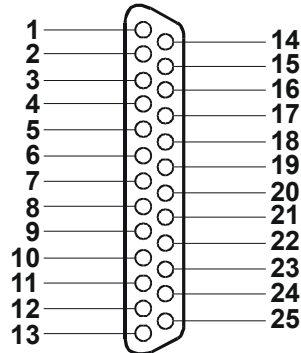


Figure 7. Parallel Port Connector

Parallel Port Connector (female) Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	Strobe ⁵	10	Acknowledge ^b
2	Data bit 0 ^a	11	Busy
3	Data bit 1 ^a	12	Paper end
4	Data bit 2 ^a	13	Select
5	Data bit 3 ^a	14	Auto line feed ^b
6	Data bit 4 ^a	15	Error1
7	Data bit 5 ^a	16	Initialize printer ^b
8	Data bit 6 ^a	17	Select in ^b
9	Data bit 7 ^a	18-25	Signal ground

a. All data bits are sent to a printer in an 8-bit parallel format.

b. The signal is active low.

USB Connector

NOTE Use of the USB port is supported for printers, scanners, and external modems.

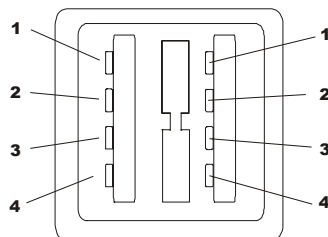


Figure 8. Universal Serial Bus Connector

Universal Serial Bus Connector Pinouts

Pin Number	Signal Description
1	VBUS
2	D+
3	D-
4	GND

Video Connector – Accessory Board

The built-in video uses the standard 15-pin analog display pinout configuration. The pinouts for your monitor may vary. For the pinouts for your monitor, refer to the manual provided with your monitor.

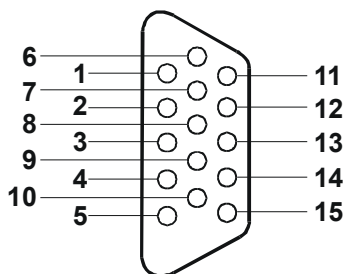


Figure 9. Video Connector

Video Connector (female) Pinouts

Pin Number	Function	Pin Number	Function
1	Red	9	Key (no pin)
2	Green	10	Sync return (ground)
3	Blue	11	Monitor ID bit 0
4	Monitor ID bit 2	12	Monitor ID bit 1
5	Monitor self test (ground)	13	Horizontal sync (+)
6	Red return (ground)	14	Vertical sync (-)
7	Green return (ground)	15	Not used
8	Blue return (ground)		

LAN Connector – Accessory Board

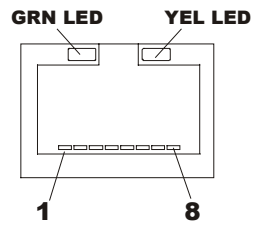


Figure 10. LAN Connector

LAN Connector Pinouts

Pin Number	Signal Description
1	Data signal
2	Not used
3	Ground
4	Power (+5 V dc)
5	Clock signal
6-8	Not used

Connector Pinouts and Boardset Locations

VGA Video Port

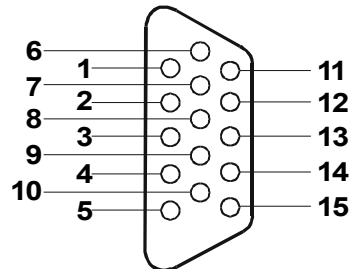


Figure 11. Video Port Connector Pinout

Table 2 Video Port Connector Pinout

Pin	Signal	Pin	Signal
1	Red	9	N/C
2	Green	10	GND
3	Blue	11	NC
4	N/C	12	DDCDAT
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

Keyboard and Mouse

The PS/2-compatible connectors share a common housing; but they are not functionally equivalent.

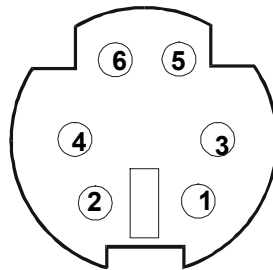


Figure 12. Keyboard and Mouse Connector Pinouts

Table 3 Keyboard and Mouse Connector Pinouts

Pin	Keyboard signal	Pin	Mouse signal
1	KEYDAT	1	MSEDAT
2	NC	2	NC
3	GND	3	GND
4	FUSED_VCC (+5 V)	4	FUSED_VCC (+5 V)
5	KEYCLK	5	MSECLK

Pin	Keyboard signal	Pin	Mouse signal
6	NC	6	NC

SCSI

There is one external SCSI connector on the back of the server.

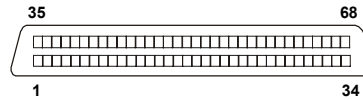


Figure 13. SCSI Connector

Table 3. Wide SCSI Connector Pinout

Pin	Signal	Pin	Signal
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
21	S21 (+ATN)	55	S55 (-ATN)
22	S22 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)

Pin	Signal	Pin	Signal
32	S32 (+DB 9)	66	S66(-DB 9)
33	S33 (DB 10)	67	S67 (-DB 10)
34	S34 (DB 11)	68	S68 (-DB 11)

Video Modes

The ATI RAGE 128 integrated video controller provides VGA modes for resolutions of 1280 x 1024 and below. The following table shows what is supported and what is unsupported. Areas of the table that appear in gray are unsupported.

2D Modes for 64-bit SDR SD/SGRAM (100 MHz)

Display Mode	Refresh Rate Hz	Buffer Memory (MB)																
		4				8				16				32				
		Color Depth (bpp)																
		8	16	24	32	8	16	24	32	8	16	24	32	8	16	24	32	
640 x 480	60 - 200																	
800 x 600	48 - 180																	
1024 x 768	43 - 140																	
1152 x 864	43 - 100																	
1280 x 1024	43																	
	47																	
	60																	
	70																	
	74																	
	75																	
	85																	
	90																	
100																		

2D Modes for 64-bit SDR SD/SGRAM (100 MHz) (cont.)

Display Mode	Refresh Rate Hz	Buffer Memory (MB)													
		4				8				16				32	
		Color Depth (bpp)													
		8	16	24	32	8	16	24	32	8	16	24	32	8	16
1024 x 768	43														
	60														
	70														
	72														
	75														
	85														
	90														
	100														
1152 x 864	43														
	47														
	60														
	70														
	74														
	75														
	85														
	100														
1280 x 1024	43														
	47														
	60														
	70														
	74														
	75														
	85														
	100														

3 Parts Information

Exploded View – Hot Swap and Display

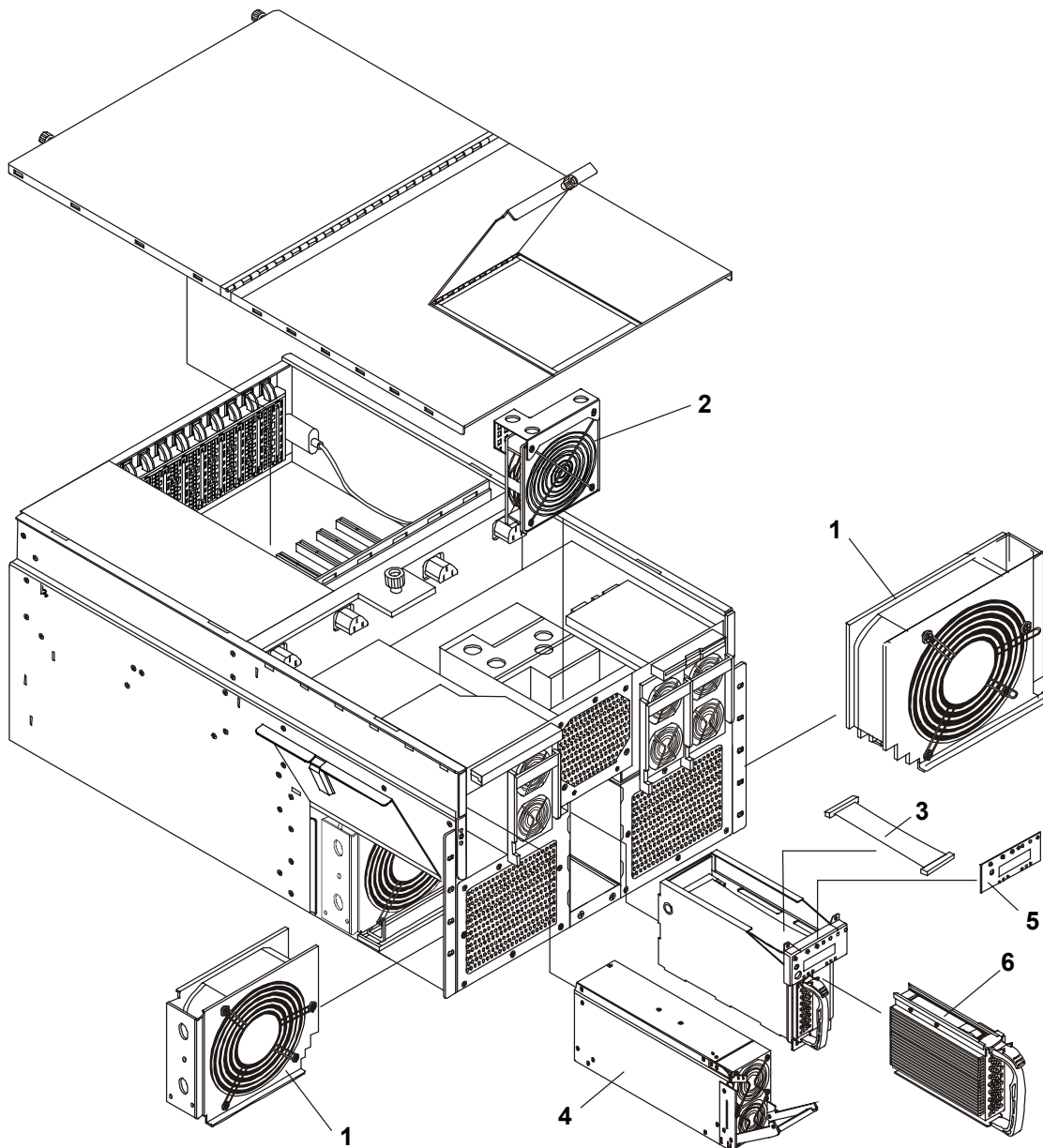


Figure 14. Hot Swap Components

Exploded View – Processor/Memory Access

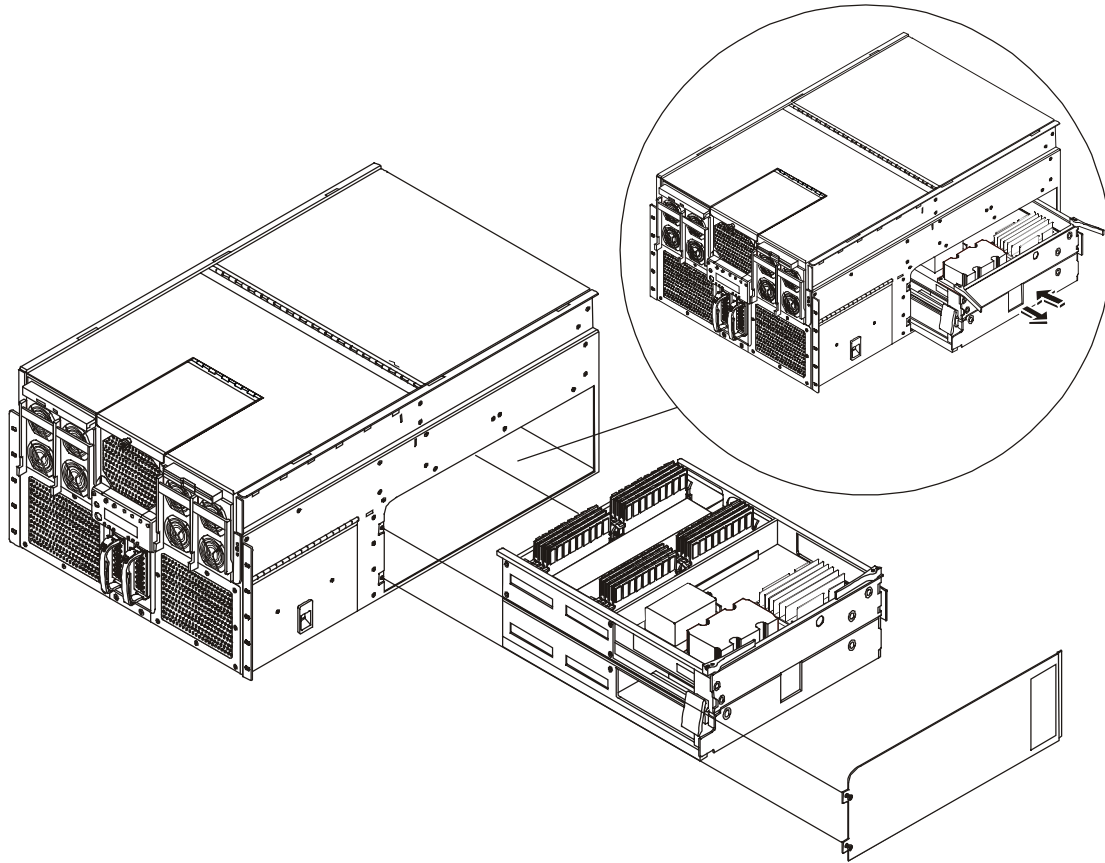


Figure 15. Processor/Memory Complex Access

Exploded View – Processor/Memory Complex

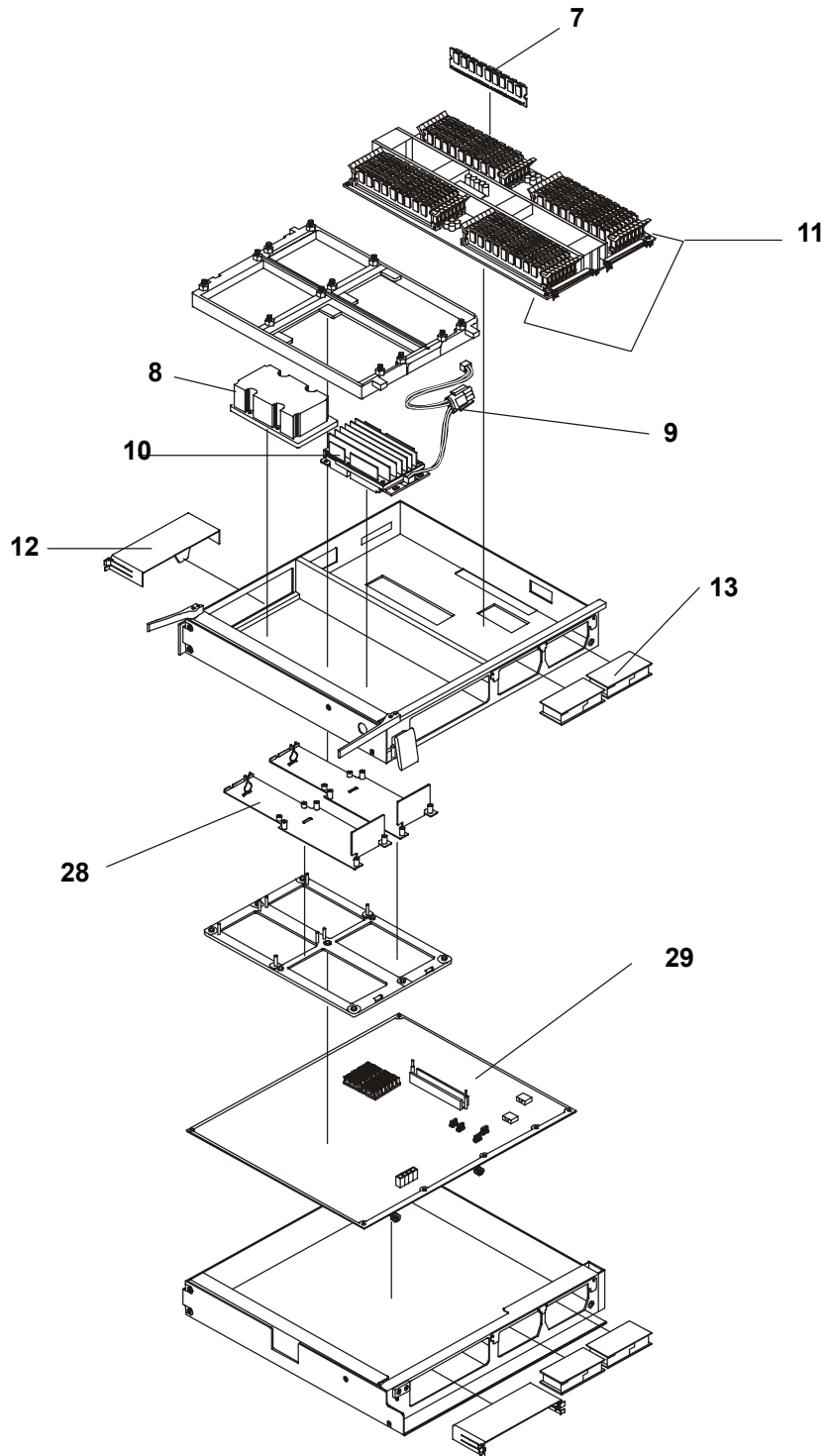


Figure 16. Processor/Memory Complex

Exploded View – Server Management Boards

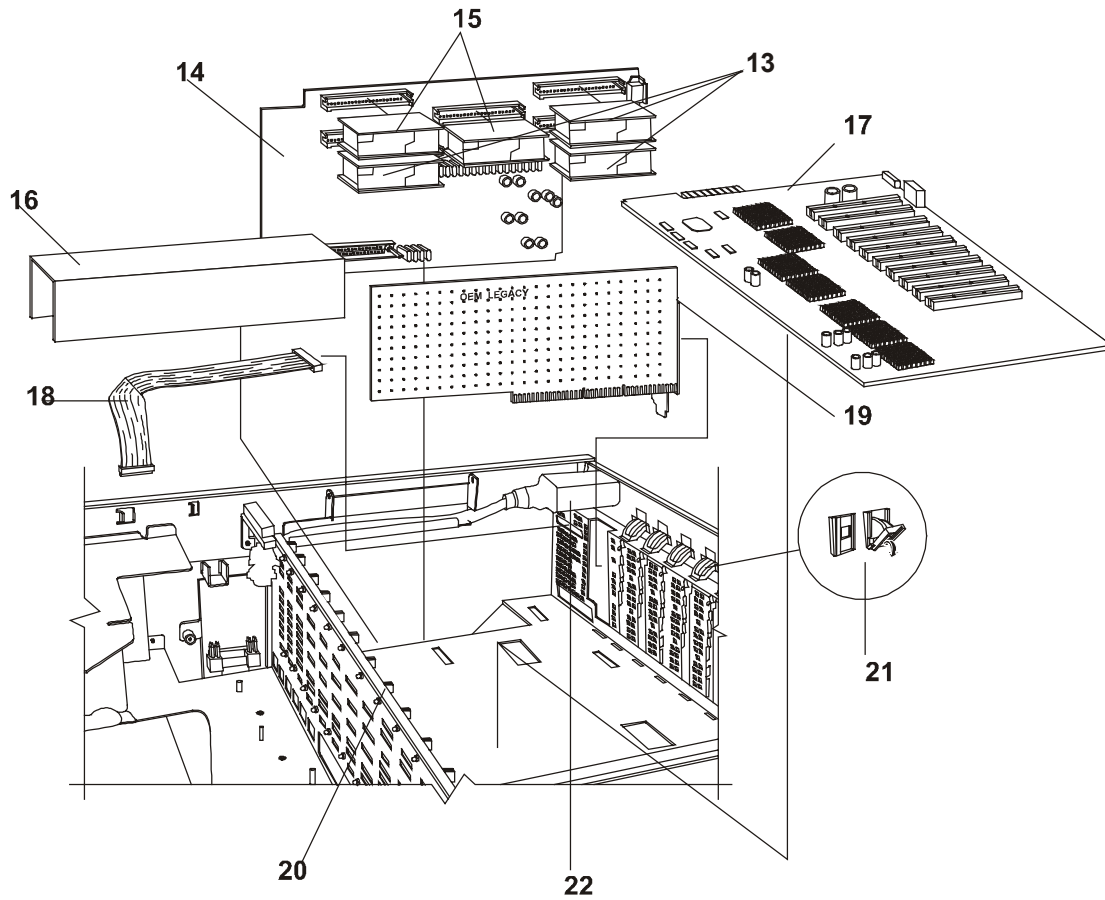


Figure 17. Server Management Boards – Exploded View

Exploded View – Power Distribution Board and IDE Drives

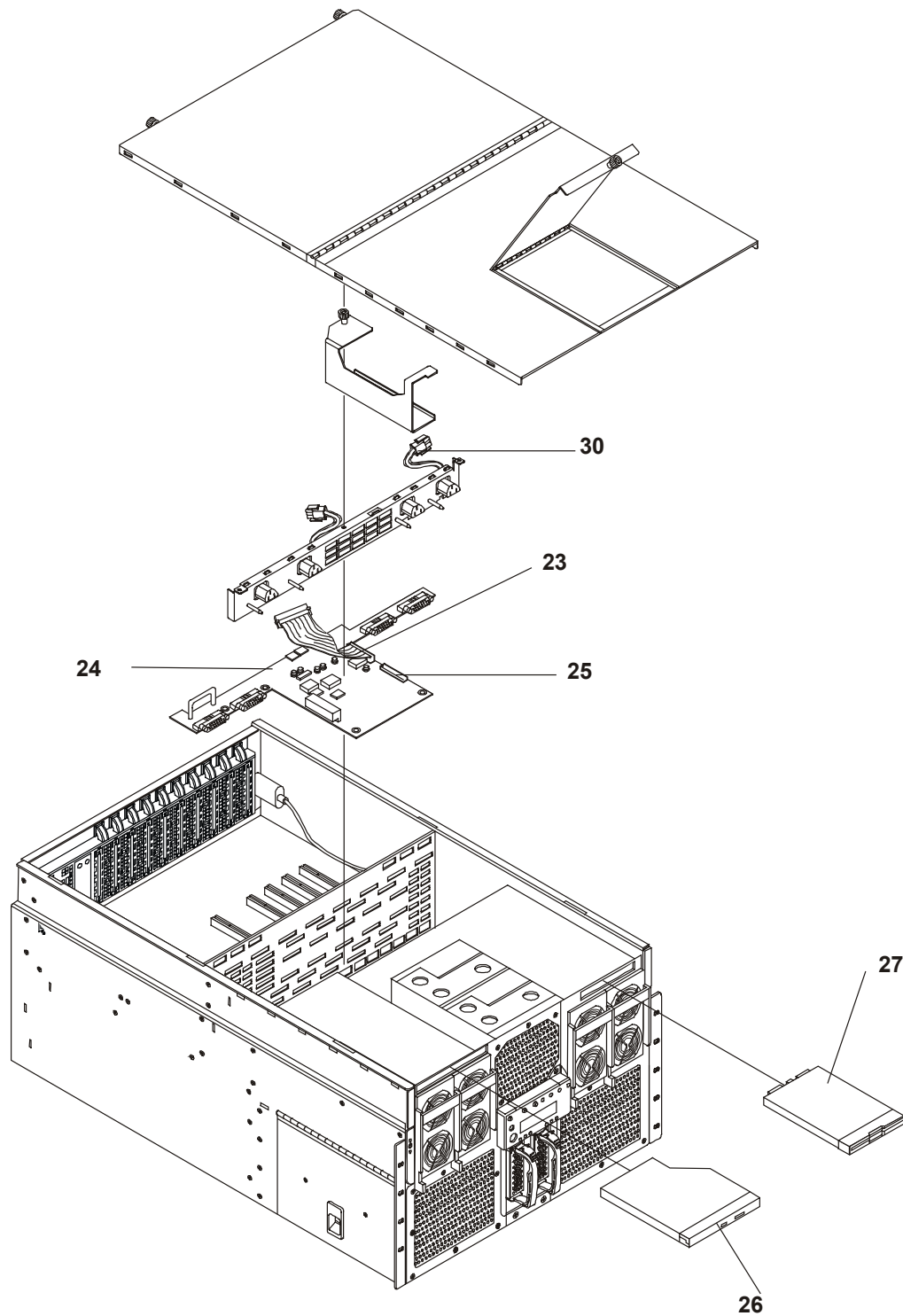


Figure 18. T-Docking Board and IDE Drives

Replaceable Parts List

The items in this list and the corresponding item numbers in the respective Exploded Views apply to the HP Server, except where noted.

NOTE The item numbers listed below are used with the part illustrations in order to identify the nomenclature of the part. If a system board needs to be replaced, remove processor modules, DIMMs, or 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. Use the tables below to obtain the correct name and location of the part you need. Then go to the HP PartSurfer site to order the part: <http://outfield.external.hp.com/cgi-bin/spi/main.pl>

* This part is not on an exploded view

Parts List Identifier

Figure 14. Hot Swap Components

Item No.	Part Description
1	172 mm Fan Assy
2	120 mm Fan Assy
3	Front Panel Cable
4	Power Supply
5	Front Panel Board
6	HDD Assy
*	SCSI Backplane Board (HSBP)
*	172mm Fan Cable
*	120mm Fan Cable

Figure 15. Processor/Memory Complex Access

Figure 16. Processor/Memory Complex

Item No.	Part Description
7	256MB DIMM 512MB DIMM 1GB DIMM
8	733MHz/2MB CPU Assy 800MHz/4MB CPU Assy
9	Y-Cable
10	CPU Power Pod
11	Memory Board
12	Thermal Sheetmetal Kit (includes D2D cover, CPU Airflow Baffle, Power Supply Filler Panel)
13	3.3V D2D
28	CPU Thermal Dummy
29	CPU Board

Figure 17. Server Management Boards

Item No.	Description
14	Sideplane Board
15	5V D2D
16	Thermal Sheetmetal Kit (includes D2D cover, CPU Airflow Baffle, Power Supply Filler Panel)
17	I/O Baseboard
18	External SCSI Cable
19	Legacy I/O Board
20	I/O Card Guide
21	Rocker Switch
22	RH AC Inlet Cable
30	Internal Power Cable
*	LH AC Inlet Cable
*	I/O Baseboard Cover
*	I/O Card Divider

Figure 18. Power Distribution Board and IDE Drives

Item No.	Description
23	Internal SCSI Cable
24	Power Dist. Board (T-Dock)
25	Server Mgmt Cable
26	DVD Assy
27	LS-120 Assy
*	12V D2D
*	LS-120 Connector Board
*	DVD Connector Board
*	Hot Plug PCI Board
*	DVD Cable
*	LS-120 Cable
*	HPI Cables
Racking	
Item No.	Part Description
*	Rack Kit (Rail Kit)
*	Front Bezel
*	Side Handles Kit
*	Front Handles Kit
Other Cables	
Item No.	Part Description
*	Power Cords

4 Diagnostics

Diagnostic Tests

When the server boots, a series of tests are displayed on the screen. The number of tests displayed depends on the configuration of the server. The following are the kinds of errors a user might get with the HP Server:

- Built-in diagnostic error messages.
- BIOS and other error messages. These are errors detected by the system BIOS outside the built-in diagnostics or application errors.

To see the Power On Self-Tests (POST):

- The HP Server must be functionally able to run the diagnostics.
- The video subsystem must be functional.
- The keyboard must be functional.

NOTE BIOS ROM version number is displayed on the monitor screen during power-up.

Platform Diagnostic Tests

The rx4610 Platform Diagnostic Tests allow you to quickly assess the server's hardware status, view test logs, and determine the server's current configuration. You can run the Diagnostic Tests from within the EFI environment. Please refer to the HP website for the latest Diagnostic Tests and Utilities:

<http://www.hp.com/>

Quick Start

Use the following steps to quickly setup and run tests. For more detailed information on any of the steps, refer to subsequent sections.

1. Boot to the Extensible Firmware Interface (EFI) shell.
2. Create a directory called `efi\intel\service\diagnostics` on the target hard drive.
3. Copy the distributed FieldDiags binary file (`fielddiags.efi`) to the root directory of the target.
4. Execute the distributed FieldDiags binary file by typing:

```
fielddiags -d \efi\Intel\service\diagnostics
```

Execution of this file unpacks and installs the Preboot Platform Diagnostic Test software.
5. Change your working directory to `efi\intel\service\diagnostics`. The working directory must be on the same hard drive as the test software.
6. Load and run the diagnostic tests by typing:

```
\efi\intel\service\diagnostics\fielddiags
```

Entering the command with the full pathname causes the tests to run regardless of your current working directory.
7. Enable the set of tests you want to execute by using the arrow keys to highlight each test and pressing the `<Space Bar>` to enable that test.
8. Use the arrow keys to highlight `Run Quick Test` and then press the `<Enter>` key.
9. Refer to the Pass and Fail columns to interpret the test results.

In addition to running tests, you can display system configuration information or the current test log. To do either, highlight the appropriate option and press the <Enter> key.

Installing the Diagnostic Software

To install the Diagnostic Software from the CD, complete the following steps:

1. Boot to the Extensible Firmware Interface (EFI) shell on the target system.
2. Copy the distributed FieldDiags binary file (fielddiags.efi) from the media to the root directory of the target.
3. Execute the distributed FieldDiags binary file by entering the following command:

```
fielddiags -d \efi\intel\service\diagnostics
```

Execution of this file unpacks and installs the rx4610 Platform Diagnostic Tests software. If the directory on the target drive does not exist, it will be automatically created during the execution of the command.

Invoking the Application

Follow these steps to invoke the rx4610 Platform Diagnostic Tests:

1. Boot the server to the Extensible Firmware Interface (EFI) shell.
2. Change to the `efi\intel\service\diagnostics` directory. Depending on your system, this directory could be on a hard drive, the Service Partition, or on media in the diskette drive. If the directory does not exist, refer to "Installing the Diagnostic Software" for instructions on how to setup the diagnostic software.
3. Enter the following command to start the application:

```
fielddiags
```

Command Syntax

The field diagnostics test Command-line syntax is as follows:

```
[path]FIELDDDIAGS [LOG [path]logfile[.log]] [CFG [path]configfile[.cfg]]
```

Where:

Items enclosed within square brackets are optional.

Items that appear in upper-case characters must be typed exactly as shown.

Supply values for the items shown in lower-case characters as follows:

path	Any valid absolute or relative pathname.
logfile	The name of the log file generated during this diagnostic test session. By default, the software creates a log file named "FIELDDDIAGS.LOG" and keeps it in "\EFI\INTEL\SERVICE\DIAGNOSTICS". If you use the LOG command-line option, you can name and place the log file. If you do not supply a filename extension, ".log" is used.
configfile	The name of the configuration file used to populate the interface with tests. By default, the software uses the file named: <code>\efi\intel\service\diagnostics\fielddiags\fielddiags.cfg</code> -line option, you can use a custom configuration file to populate the diagnostic test interface with tests. If you do not use a filename extension, ".cfg" is used.

Following are some examples that show how to start a field diagnostics test session.

Command Examples

Example 1:

This first example works regardless of your current working directory. The software uses the default configuration file and creates a default log file.

```
\efi\intel\service\diagnostics\fielddiags
```

Example 2:

This next example assumes your working directory is "\efi\intel" and specifies a custom configuration file named "MYCONFIG.CFG" located in a directory named "mydir":

```
service\diagnostics\fielddiags cfg diagnostics\mydir\myconfig
```

Example 3:

This last example assumes your working directory is in the same directory as the test software and you are using the custom configuration file used in the previous example. This example also creates a log file named "MYLOGFILE.LG1" in a directory named "mydir":

```
fielddiags log ..\mydir\mylogfile.lg1 cfg ..\mydir\myconfig
```

Understanding the General User Interface

The rx4610 Platform Diagnostic Tests use a single screen from which you can choose execution options, enable or disable tests for execution, and define test parameters. The screen consists of four areas from top to bottom:

- Execution Options
- Test Selection and Results
- Test Parameters
- User Interface Help

The keys used to navigate the application are listed in Table 4-1 below.

Table 4-1. Navigation Keys

Key	Description
↑ and ↓	Navigate vertically through all areas of the screen except for the User Interface Help area. During navigation, items that you can modify become highlighted.
← and →	Navigate horizontally through the Execution Options and the Test Parameters areas. During navigation, items that you can modify become highlighted.
<Enter>	Causes highlighted actions to occur. Also, causes data to be entered if you are viewing a dialog box.
<F1>	Causes on-line help to appear for a highlighted test.
<ESC>	Dismisses on-line help and dialog boxes.
<Space Bar>	Enable or disable a test.

Understanding Application Options

The Platform Diagnostic Tests options are described in Table 4-2.

Table 4-2. Application Options

Option	Description
Run Quick Test	Runs a partial set of a test's subtest list, or runs the complete subtest list but uses fewer built-in test parameters.
Run Comprehensive Test	Runs a test's complete subtest list and uses a comprehensive set of built-in test parameters.
View System Configuration	Displays information about the server's configuration.
View Complete Test Log	Displays the current test log.

Enabling Tests for Execution

To enable one or more tests for execution, use the up and down arrows to first highlight a test, and then press the <Space Bar> to enable the test. Pressing the <Space Bar> multiple times toggles the test between enabled and disabled. When a test is enabled, the word Yes appears next to the test under the Enabled column. If a test is disabled, the word No appears under the Enabled column.

Because of space limitations, the test area of the screen displays only eight of the ten tests available. Using the arrow keys will cause the test display to scroll completely through the list.

Setting Test Parameters

Test execution has two parameters: loops and test time. A loop completes when all enabled tests execute once. Test time starts with execution of the first loop and runs continuously as long as tests are being executed.

To set the loop count or execution time, use the arrow keys to highlight the appropriate parameter and then press the <Enter> key. The application presents a dialog box in which you can enter the data (number of loops or time in minutes). Entering a zero for either parameter causes the application to ignore the parameter.

Running a set of selected tests always causes the application to complete at least one loop. Upon completion of each loop, the application checks to see if more loops are required and also checks to see if execution time has exceeded the test time parameter. If all loops have been executed or if execution time has exceeded the test time parameter, test execution halts.

Interpreting Results

Test results appear next to the enabled tests in the test area of the screen. Each time a test passes or fails during a loop, the appropriate pass or fail count increments. For failed tests, Field Replaceable Unit (FRU) information also appears under the Details column. To obtain greater detail for the test run, view the test log file. To clear test results, you must exit the test application.

Getting Help on Individual Tests

To display on-line help text files for a particular test, use the arrow keys to highlight the desired test and then press the <F1> key. The application presents a scrollable text file that describes the subtests for the highlighted test.

Viewing System Configuration

To view system configuration, use the arrow keys to highlight the View System Configuration option and press <Enter>. After pressing <Enter>, the application displays a scrollable information box that contains system information. It does not matter if you have tests enabled when you view system configuration.

Viewing the Test Log

To view the test log, use the arrow keys to highlight the View Complete Test Log option and press <Enter>. After pressing the <Enter> key, the application displays a scrollable information box that contains the sessions test log. It does not matter if you have tests enabled when you view the test log.

After pressing the <Enter> key, the application displays a scrollable information box that contains the sessions test log. Because the log file is a Unicode file, you can also view it in the EFI shell by using the "type -u" command, and in the Windows operating system using the Notepad application.

Using the View Complete Test Log option causes the system to create a file named **FieldDiags.log** located at `\\efi\\intel\\service\\diagnostics\\efimta`. When you run subsequent tests within the same diagnostic test session the software appends information to the existing log file. The system deletes this file in preparation for creating a new log each time you start the diagnostic application. If desired, you can save a previously generated test log and then view it at anytime by using the `type` command from within the EFI Shell.

As an alternative to renaming or moving a default log file, you can use the LOG command-line option when you invoke the diagnostic test software to create and place the generated log file.

Diagnostics Description: POST

The diagnostics (Power-On Self-Test "POST") run automatically each time the HP Server is powered on. These diagnostics, which reside in the BIOS ROM, isolate server-related logic failures and indicate the board or component that needs to be replaced, as indicated by the Error Messages. Most HP Server hardware failures will be accurately isolated by the POST diagnostics.

WARNING You should always turn off the power and disconnect the power cord to the HP Server before attempting to remove the cover and touch the internal components. Failing to do so can expose you to electric shock and the server's components to damage. The power switch does NOT turn off standby power, so disconnect the power cord to turn off standby power.

SEL Data Tables

The tables in this appendix provide information on the SEL viewer data on the HP Server rx4610 server platform.

HP Server rx4610 Generator ID Codes

Generator ID	Description
20 00	BMC
28 00	CBC
C0 00	HSC

Sensor Codes

Sensor Type	Sensor Number	Sensor Name
00		Spare Sensor
	09	Spare Sensor 1
	14	Spare Sensor 2
01		Temperature

Sensor Type	Sensor Number	Sensor Name
	01	Backplane (HSC TeeDock) Temperature
	02	HSC SCSI Backplane Temperature
	21	Processor 0 Core Temperature
	22	Processor 1 Core Temperature
	23	Processor 2 Core Temperature
	24	Processor 3 Core Temperature
	25	Upper Memory Board Temperature
	26	Lower Memory Board Temperature
	27	Sideplane Temperature
	28	I/O Board Temperature
	29	Processor Board Temperature 1
	2A	Processor Board Temperature 2
02		Voltage
	07	Baseboard +1.5 Volt
	08	Baseboard +1.8 Volt
	0A	Baseboard +2.8 Volt
	0B	Baseboard +3.3 Volt
	0C	Baseboard +3.3 Volt SB
	0D	Baseboard +5 Volt
	0E	Baseboard +5 Volt SB
	0F	Baseboard +12 Volt
	10	Baseboard -12 Volt
	11	Processor Board +1.5 Volt
	12	Processor Board +1.8 Volt
	13	Processor Board +3.3 Volt
	15	SCSI TERM Volt 00
	16	SCSI TERM Volt 01
	17	SCSI TERM Volt 02
	18	SCSI TERM Volt 10
	19	SCSI TERM Volt 11
	1A	SCSI TERM Volt 12
	41	Processor 0 Power Good
	42	Processor 1 Power Good
	43	Processor 2 Power Good
	44	Processor 3 Power Good
	45	Processor Board 1.5 Volt Power Good
	46	Processor Board 1.5 Volt FOK
	47	Processor Board 1.8 Volt Power Good
	48	Processor Board 1.8 Volt FOK

Sensor Type	Sensor Number	Sensor Name
	49	Processor Board Sys Power Good
	4A	Processor Board Chipset
	4B	Power Supply Power OK
	4C	Upper Memory Board Power Good
	4D	Lower Memory Board Power Good
	60	Hot Swap 48 Volt FOK
04		Fan
	1B	F172 Tach Fan 1 (left front)
	1C	F172 Tach Fan 2 (left rear)
	1D	F172 Tach Fan 3 (right front)
	1E	F172 Tach Fan 4 (right rear)
	1F	F120 Tach Fan 5 (top rear)
	20	F120 Tach Fan 6 (top front)
06		Security Violation Attempt
	04	Secure Mode Violation Attempt
07		Processor
	35	Processor 0 Status
	36	Processor 1 Status
	37	Processor 2 Status
	38	Processor 3 Status
08		Power Supply
	4E	Power Supply 1
	4F	Power Supply 2
	50	Power Supply 3
	51	Power Supply 4
	52	Upper Memory Board D2D_0
	53	Upper Memory Board D2D_1
	54	Lower Memory Board D2D_0
	55	Lower Memory Board D2D_1
	56	SP 3.3 Volt CPU
	57	SP 3.3 Volt_1 D2D
	58	SP 3.3 Volt_2 D2D
	59	SP 5 Volt_1 D2D
	5A	SP 5 Volt_2 D2D
	5B	Hot Swap 12 Volt D2D

Sensor Type	Sensor Number	Sensor Name
09		Power Unit
	01	Power Unit Status
	02	Power Unit Redundancy
0D		Hot Swap Drive
	03	Hot Swap Drive 1 Status
	04	Hot Swap Drive 2 Status
	05	Hot Swap Drive 1 Present (left HDD)
	06	Hot Swap Drive 2 Present (right HDD)
0F		POST Error
	05	BIOS POST code
13		Critical Interrupt
	06	FP NMI (Front Panel Diag Int)
15		Module / Board
	5D	Processor Board Present
	5E	Upper Memory Board Present
	5F	Lower Memory Board Present
21		Slot / Connector
	39	Hot Plug PCI Slot 3
	3A	Hot Plug PCI Slot 4
	3B	Hot Plug PCI Slot 5
	3C	Hot Plug PCI Slot 6
	3D	Hot Plug PCI Slot 7
	3E	Hot Plug PCI Slot 8
	3F	Hot Plug PCI Slot 9
	40	Hot Plug PCI Slot 10
	23	
03		BMC Watchdog
C7		OEM C7
	2B	Processor 0 Fan Boost Temperature
	2C	Processor 1 Fan Boost Temperature
	2D	Processor 2 Fan Boost Temperature
	2E	Processor 3 Fan Boost Temperature
	2F	Upper Memory Board Fan Boost Temperature

Sensor Type	Sensor Number	Sensor Name
	30	Lower Memory Board Fan Boost Temperature
	31	Sideplane Fan Boost Temperature
	32	I/O Board Fan Boost Temperature
	33	Processor Board 1 Fan Boost Temperature
	34	Processor Board 2 Fan Boost Temperature
	35	TeeDock Board Fan Boost Temperature

Event Description Codes

The purpose of the Event Description field varies, depending on the Generator ID. When the Generator ID is:

1. 20 00
2. 28 00
3. C0 00

The first byte of the Event Description is used to indicate the type of event that occurred, such as the crossing of a threshold or the removal of a device.

Event Description	Event Type	Definition
01 — — —	N/A	Threshold crossed
02 — — —	N/A	Transition to idle, active, or busy
03 — — —	N/A	State asserted or deasserted
04 — — —	N/A	Predictive failure asserted or deasserted
05 — — —	N/A	Limit exceeded
06 — — — ¹	N/A	Performance lag
07 — — — ¹	N/A	Presence, Disabled, IERR, Thermal Trip, or FRB3
08 — — —	N/A	Device added or removed
09 — — —	N/A	Device enabled or disabled
0A — — —	N/A	Transition to running or test, on or off-line

¹ The PHP sensors will have an Event Description beginning with either E6 or E7 with an offset of 00 or 05 (hexadecimal view). This may be translated as follows:

Event Description	Offset	Definition
06	00	PHP slot fault de-asserted
06	05	PHP slot powered on
07	00	PHP slot fault asserted
07	05	PHP slot powered off

BIOS Error Codes\Messages

The following list defines the BIOS error codes on the HP Server rx4610 server system. All BIOS error codes\messages, when encountered, appears on the video and are logged in the SEL unless it is full.

The system event log record for these BIOS error codes has a sensor type of '0F'. To decode a BIOS error codes\message, use the last two bytes in the event description to identify the specific error.

- 0100: Timer Error
- 0103: CMOS Battery Low
- 0104: CMOS Settings Wrong
- 0105: CMOS/GPNV Checksum Bad
- 0106: CMOS Display Type Wrong
- 0108: Unlock Keyboard
- 0109: Keyboard Error
- 010A: KB/Interface Error
- 010B: Memory Size Decrease
- 010E: Cache Memory Error
- 0117: Pri Master Drive - ATAPI Incompatible
- 0118: Pri Slave Drive - ATAPI Incompatible
- 0119: Sec Master Drive - ATAPI Incompatible
- 011A: Sec Slave Drive - ATAPI Incompatible
- 011B: CMOS Date/Time Not Set
- 011E: Cache Memory Error
- 0120: NVRAM cleared By jumper
- 0121: Password cleared By jumper
- 0141: PCI Memory Conflict
- 0142: PCI IO Conflict
- 0143: PCI IRQ Conflict
- 0144: Shadow of PCI ROM Failed
- 0145: PCI ROM not found, May Be OK For This Card
- 0146: Insufficient Memory to Shadow PCI ROM
- 8100: BIST Failure : Processor in socket M0
- 8101: BIST Failure : Processor in socket M1
- 8102: BIST Failure : Processor in socket M2
- 8103: BIST Failure : Processor in socket M3
- 8110: Internal error(IERR): Processor in socket M0
- 8111: Internal error(IERR): Processor in socket M1
- 8112: Internal error(IERR): Processor in socket M2
- 8113: Internal error(IERR): Processor in socket M3
- 8120: Thermal trip failure: Processor in socket M0

- 8121: Thermal trip failure: Processor in socket M1
- 8122: Thermal trip failure: Processor in socket M2
- 8123: Thermal trip failure: Processor in socket M3
- 8130: Processor in socket M0 Disabled
- 8131: Processor in socket M1 Disabled
- 8132: Processor in socket M2 Disabled
- 8133: Processor in socket M3 Disabled
- 8140: Processor in socket M0: failed FRB level 3 timer
- 8141: Processor in socket M1: failed FRB level 3 timer
- 8142: Processor in socket M2: failed FRB level 3 timer
- 8143: Processor in socket M3: failed FRB level 3 timer
- 8150: Processor in socket M0: failed initialization on last boot
- 8151: Processor in socket M1: failed initialization on last boot
- 8152: Processor in socket M2: failed initialization on last boot
- 8153: Processor in socket M3: failed initialization on last boot
- 8190: Watchdog timer failed on last boot
- 8191: 2:1 core to bus speed ratio: Processor L2 cache disabled
- 8192: L2 cache size mismatch
- 8193: CPUID, Processor stepping are different
- 8194: CPUID, Processor family are different
- 8195: Front side bus speed mismatch. System Halted
- 8196: CPUID, Processor model are different
- 8300: Baseboard Management Controller failed to function
- 8305: Hotswap Controller failed to function
- 84F1: Intelligent System Monitoring Forced Shutdown
- 84F2: Server Management Interface Failed
- 84F3: Baseboard Management Controller in Update Mode
- 84F4: Sensor Data Record Empty
- 84FF: System Event Log Full
- 8C02: ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT ON THE NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM NOW. ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM BEHAVIOR AND/OR HARD DISK CORRUPTION.
- 8C51: Error in memory subsystem: Lower Board, DIMM 1
- 8C52: Error in memory subsystem: Lower Board, DIMM 2
- 8C53: Error in memory subsystem: Lower Board, DIMM 3
- 8C54: Error in memory subsystem: Lower Board, DIMM 4
- 8C55: Error in memory subsystem: Lower Board, DIMM 5

8C56: Error in memory subsystem: Lower Board, DIMM 6
8C57: Error in memory subsystem: Lower Board, DIMM 7
8C58: Error in memory subsystem: Lower Board, DIMM 8
8C59: Error in memory subsystem: Lower Board, DIMM 9
8C5A: Error in memory subsystem: Lower Board, DIMM 10
8C5B: Error in memory subsystem: Lower Board, DIMM 11
8C5C: Error in memory subsystem: Lower Board, DIMM 12
8C5D: Error in memory subsystem: Lower Board, DIMM 13
8C5E: Error in memory subsystem: Lower Board, DIMM 14
8C5F: Error in memory subsystem: Lower Board, DIMM 15
8C60: Error in memory subsystem: Lower Board, DIMM 16
8C61: Error in memory subsystem: Lower Board, DIMM 17
8C62: Error in memory subsystem: Lower Board, DIMM 18
8C63: Error in memory subsystem: Lower Board, DIMM 19
8C64: Error in memory subsystem: Lower Board, DIMM 20
8C65: Error in memory subsystem: Lower Board, DIMM 21
8C66: Error in memory subsystem: Lower Board, DIMM 22
8C67: Error in memory subsystem: Lower Board, DIMM 23
8C68: Error in memory subsystem: Lower Board, DIMM 24
8C69: Error in memory subsystem: Lower Board, DIMM 25
8C6A: Error in memory subsystem: Lower Board, DIMM 26
8C6B: Error in memory subsystem: Lower Board, DIMM 27
8C6C: Error in memory subsystem: Lower Board, DIMM 28
8C6D: Error in memory subsystem: Lower Board, DIMM 29
8C6E: Error in memory subsystem: Lower Board, DIMM 30
8C6F: Error in memory subsystem: Lower Board, DIMM 31
8C70: Error in memory subsystem: Lower Board, DIMM 32
8C71: Error in memory subsystem: Upper Board, DIMM 1
8C72: Error in memory subsystem: Upper Board, DIMM 2
8C73: Error in memory subsystem: Upper Board, DIMM 3
8C74: Error in memory subsystem: Upper Board, DIMM 4
8C75: Error in memory subsystem: Upper Board, DIMM 5
8C76: Error in memory subsystem: Upper Board, DIMM 6
8C77: Error in memory subsystem: Upper Board, DIMM 7
8C78: Error in memory subsystem: Upper Board, DIMM 8
8C79: Error in memory subsystem: Upper Board, DIMM 9
8C7A: Error in memory subsystem: Upper Board, DIMM 10

8C7B: Error in memory subsystem: Upper Board, DIMM 11
8C7C: Error in memory subsystem: Upper Board, DIMM 12
8C7D: Error in memory subsystem: Upper Board, DIMM 13
8C7E: Error in memory subsystem: Upper Board, DIMM 14
8C7F: Error in memory subsystem: Upper Board, DIMM 15
8C80: Error in memory subsystem: Upper Board, DIMM 16
8C81: Error in memory subsystem: Upper Board, DIMM 17
8C82: Error in memory subsystem: Upper Board, DIMM 18
8C83: Error in memory subsystem: Upper Board, DIMM 19
8C84: Error in memory subsystem: Upper Board, DIMM 20
8C85: Error in memory subsystem: Upper Board, DIMM 21
8C86: Error in memory subsystem: Upper Board, DIMM 22
8C87: Error in memory subsystem: Upper Board, DIMM 23
8C88: Error in memory subsystem: Upper Board, DIMM 24
8C89: Error in memory subsystem: Upper Board, DIMM 25
8C8A: Error in memory subsystem: Upper Board, DIMM 26
8C8B: Error in memory subsystem: Upper Board, DIMM 27
8C8C: Error in memory subsystem: Upper Board, DIMM 28
8C8D: Error in memory subsystem: Upper Board, DIMM 29
8C8E: Error in memory subsystem: Upper Board, DIMM 30
8C8F: Error in memory subsystem: Upper Board, DIMM 31
8C90: Error in memory subsystem: Upper Board, DIMM 32
8C91: DIMMs mapped out: Lower Board, 1 - 4
8C92: DIMMs mapped out: Lower Board, 9 - 12
8C93: DIMMs mapped out: Lower Board, 17 - 20
8C94: DIMMs mapped out: Lower Board, 25 - 28
8C95: DIMMs mapped out: Lower Board, 5 - 8
8C96: DIMMs mapped out: Lower Board, 13 - 16
8C97: DIMMs mapped out: Lower Board, 21 - 24
8C98: DIMMs mapped out: Lower Board, 29 - 32
8C99: DIMMs mapped out: Upper Board, 1 - 4
8C9A: DIMMs mapped out: Upper Board, 9 - 12
8C9B: DIMMs mapped out: Upper Board, 17 - 20
8C9C: DIMMs mapped out: Upper Board, 25 - 28
8C9D: DIMMs mapped out: Upper Board, 5 - 8
8C9E: DIMMs mapped out: Upper Board, 13 - 16
8C9F: DIMMs mapped out: Upper Board, 21 - 24

8CA0: DIMMs mapped out: Upper Board, 29 - 32

FFFE: Invalid Error Number

FFFF: Reached Termination during Error Processing

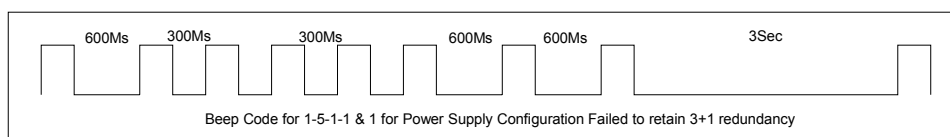
Beep Codes

Beep Codes and Interpretation

Speaker beep code generation is supported on standby and when the system is powered up. The BMC may emit the beep codes listed in the table below. The waveform below describes the timing and the sequence of the Beep code 1-5-1-1---1 for power supply configuration failed to retain 3+1 redundancy.

BMC Beep Codes

Code	Description
1-5-1-1	FRB failure (processor failure)
1-5-2-1	No processors installed/detected
1-5-4-2	Power control fault. Power-good dropped out. This beep code occurs during run time
1-5-4-4	PWRGD-BUF failure. System did not assert power-good on power-up. Check installed D2D configuration, verify processors seated, processor power pods are connected, and Legacy cable connector is secure with no bent pins. This beep code occurs during system power on.
1-5-5-1	CPU board interlock failure. Verify CPU board inserted fully.
1-5-4-2 OR 1-5-4-4	1 Power Supply Configuration Failed to retain 3+1 redundancy (1 Redundant)
	2-1 Processor1 Power Good failed due to power pod failure or not connected to 48V
	2-2 Processor2 Power Good failed due to power pod failure or not connected to 48V
	2-3 Processor3 Power Good failed due to power pod failure or not connected to 48V
	2-4 Processor4 Power Good failed due to power pod failure or not connected to 48V
	3-1 Upper Memory board power good failed.
	3-1 Lower Memory board power good failed.
	4 12V D2D Power Good failure.
	5-1 I/O 5V A D2D Power Good failure.
	5-2 I/O 5V B D2D Power Good failure.
	6 PROC 3.3V D2D Power Good failure.
	7-1 I/O 3.3V A D2D Power Good failure.
	7-2 I/O 3.3V B D2D Power Good failure.
	8-1 1.8V D2D Power Good failure (processor board only).



Types of Memory Tests

The HP Server rx4610 platform memory test is separated into the following three individual tests:

First Row Memory Test

Base Memory Test

Extended Memory Test

Each of these tests have different functions and are explained separately.

First Row Memory Test

Description

The First Row Memory Test will test the first 64 MB of the first populated row of memory configured. The scanning order for the first row of memory is described below:

First Row Detection Order			
Order	Row	Board	DIMM
1	C	Upper	5-8
2	D	Upper	13-16
3	E	Upper	21-24
4	F	Upper	29-32
5	8	Upper	1-4
6	9	Upper	9-12
7	A	Upper	17-20
8	B	Upper	25-28
9	4	Lower	5-8
10	5	Lower	13-16
11	6	Lower	21-24
12	7	Lower	29-32
13	0	Lower	1-4
14	1	Lower	9-12
15	2	Lower	17-20
16	3	Lower	25-28

Upon completion of the first row memory test, the memory testing continues with the base memory test.

If the first row test fails, there are several possible failing cases. Two failing scenarios are described in the following sections.

Case 1

The first row memory test encounters a MBE (Multi Bit Error) in the first populated row of memory configured. Irrespective of the number of DIMMs populated in the system, if the first row test encounters a MBE, the BIOS will display an error message on the front panel LCD and halt the system.

User Notification

This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel.

```
"First row test"
"Failed, sys halt"
```

User Action

This memory failure must be fixed and can only be fixed by replacing the bad row of DIMMs.

1. Replace the first row of DIMMs. Determine the location of the defective row using Table 11-2. Starting with #1 in the "Order" column, determine the "DIMM" locations (5-8 in this example) and memory board (upper in this example). If memory is populated in these DIMM locations then this is the first row and has defective memory. If not, the next set, if populated, becomes the first row. Repeat until you have determined the first memory row. On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system.

Error Logging

The defective row/DIMM(s) found during this test cannot be logged to the SEL or reported on screen.

Case 2

The system is populated with only one row of memory and the first row memory test encounters a SBE (Single Bit Error). In this case, the BIOS will write these rows into CMOS history, map out the only row of DIMMs, and halt the system.

User Notification

This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel and the system will halt.

"First row test" - displayed on the upper LCD line
 "0064MB" - displayed on the lower LCD line

"ALL DIMM MAP OUT" - displayed on the upper LCD line

Example 1: Consider a system that is populated with only one row of 256 MB DIMMS in the upper board row 1-4. If an SBE was detected in DIMM 1 during the first row memory test, the following message will appear on the LCD:

"First row test" - displayed on the upper LCD line
 "0064 MB" - displayed on the lower LCD line

"ALL DIMM MAP OUT" - displayed on the upper LCD line

User Action

1. Replace the first row of DIMMs. On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system.

Error Logging

The defective row/DIMM(s) found during this test case cannot be logged to the SEL or reported on screen.

Base Memory Test**Description**

The Base Memory Test will take effect after the completion of the first row test with no errors, or with single bit errors, and if the system contains more memory to test. The base memory test will test the first 2 GB of

memory. If this memory is found to be defective, the BIOS will detect the defective memory row(s), write these rows into CMOS for further processing, and display an appropriate error message on the front panel LCD. The BIOS will then force a reset of the system. During the next boot, this written history will be read from CMOS and the defective rows will be mapped out of the data path. The BIOS does not differentiate between SBEs and MBEs. In both cases the system will reset and map out the defective row, upon detection.

Combining the memory errors encountered in the first row test with base memory test leads to several possible cases. Some failing cases are described below.

Case 1

The system is populated with more than one row of memory and the first row memory test encounters a SBE (Single Bit Error). In this case, the BIOS will write these rows into CMOS history and map out the first row of DIMMs and continues with base memory testing. If the base memory test does not encounter any memory errors, then the system will continue to boot.

User Notification

The first row that contains the defective DIMM will be mapped out and the system will continue to boot with the remaining memory. An error message will be displayed to video for the mapped out defect DIMM.

"First row test" - displayed on the upper LCD line during first row test
"0064MB" - displayed on the lower LCD line during first row test

"Base memory test" - displayed on the upper LCD line and sometimes this message can go by very fast
Later an error message for the defective DIMM will be displayed on the video as follows:

8C9X: "DIMMS mapped out: Upper Board, n-n+3".

Where 'n' refers to the DIMM number.

Example: Consider a system that is populated with two rows of 256 MB DIMMS in the upper board rows 1-4 and 5-8. If a single bit memory error was detected in DIMM 5 during the first row memory test and if no errors were found during the base memory test, the following message will appear on the video during POST:

```
2048 MB Total Memory Installed
1024 MB Configured
1024 MB Tested
```

The first line is the total memory installed (regardless of condition). The second line is the total memory useable (and is less than the first line, only if defective DIMMS were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line.

The following error message for the defective DIMM 5 will be displayed on the video as follows:

"8C95: DIMMs mapped out: Lower Board, 5 - 8"

User Action

If the user is satisfied with the configured memory on the system, no action is required. Otherwise, follow these steps:

1. Determine the location of the row of defective DIMMs from the error message or by running the EFI based SELViewer Utility or by running either the Intel Server Control (ISC) or Direct Platform Control (DPC) to read the System Event Log (SEL). Replace the defective DIMMs (in the example it is 5-8). On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous bad DIMM history.
3. Power on the system to continue.

Error Logging

The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on the screen.

Case 2

The system is populated with more than one row of memory and the first row memory test encounters a SBE (Single Bit Error). The base row test encounters memory errors on all the rows. In this case, the BIOS will write the failing row from first row test into CMOS history, map out the first row of DIMMs, and continues with base memory testing. The base memory test will write the failing rows into CMOS history and map out the defective rows upon reset. If all the memory in base memory (< 2 GB) is mapped out due to memory errors, then the system will display a message on the LCD and halt the system.

User Notification

This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel and the system will halt.

"First row test" - displayed on the upper LCD line
 "0064 MB" - displayed on the lower LCD line

"BASE MEMORY TEST" - displayed on the upper LCD line
 "ERRORS IN MEMORY" - displayed on the upper LCD line
 "RESETTING SYSTEM" - displayed on the lower LCD line (prior to resetting if an error was found)

Upon reset, you will see the following messages on the LCD:

"First row test" - displayed on the upper LCD line
 "0064 MB" - displayed on the lower LCD line

"ALL DIMM MAP OUT" - displayed on the upper LCD line

Example: Consider a system is populated with two rows of 256 MB DIMMS in the upper board row 1-4 and row 5-8. If an SBE was detected in DIMM 5 during the first row test and an SBE/IMBE was detected in DIMM 1 during the base memory test, then the following message will appear on the LCD:

"First row test"
 "0064 MB"

 "BASE MEMORY TEST"
 "ERRORS IN MEMORY"
 "RESETTING SYSTEM"

Upon reset, you will see the following messages on the LCD and the system will halt:

"First row test"
 "0064 MB"

 "ALL DIMM MAP OUT"

User Action

1. Determine the first row of DIMMs using the scanning order defined in Table 11-2. Replace the first row of DIMMs with known good DIMMs. On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system.

NOTE: The defective rows of DIMM found during base memory test can be determined once the system boots from the "DIMMs mapped out" message. Then, those DIMMs can be replaced, if needed.

Error Logging

The defective row/DIMM(s) found during the base memory test will be logged to the SEL. This includes both single-bit errors (SBE) and multi-bit errors (MBE).

Case 3

The system is populated with more than one row of memory, the first row memory test encounters a SBE (Single Bit Error), and the base row test encounters memory errors but not on all the rows. In this case, the BIOS will write the failing row from first row test into CMOS history, map out the first row of DIMMs, and continues with base memory testing. The base memory testing will write the failing rows into CMOS and map out the defective rows upon reset. Since not all the memory in base memory test (< 2 GB) gets mapped out, then the system will continue to boot with the remaining good memory found during the base memory test.

User Notification

The defective rows found during first row test and base memory test will be mapped out and the system will continue to boot with the remaining base memory. An error message will be displayed to video for the mapped out defect DIMM.

Example: Consider a system that is populated with three rows of 256 MB DIMMS in the upper board rows 1-4, row 5-8, and row 9-12. If a memory error was detected in DIMM 5 during the first row memory test and a memory error was encountered in DIMM 1 during base test, the following messages will appear on the LCD:

```

"First row test"      - displayed on the upper LCD line
"0064 MB"            - displayed on the lower LCD line

"BASE MEMORY TEST"   - displayed on the upper LCD line
"ERRORS IN MEMORY"   - displayed on the upper LCD line
"RESETTING SYSTEM"   - displayed on the lower LCD line (prior to resetting if an error was found)

```

Upon reset, you will see the following messages on the LCD:

```

"First row test"      - displayed on the upper LCD line
"0064 MB"            - displayed on the lower LCD line

```

```

"BASE MEMORY TEST"   - displayed on the upper LCD line

```

The system will continue to boot and the following messages will appear on the screen during POST:

```

3072 MB Total Memory Installed
1024 MB Configured
1024 MB Tested

```

The first line is the total memory installed (regardless of condition). The second line is the total memory useable (and is less than the first line, only if defective DIMMS were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line.

```

8C99: DIMMs mapped out: Upper Board, 1 - 4
8C9D: DIMMs mapped out: Upper Board, 5 - 8

```

User Action

If the user is satisfied with the configured memory on the system, no action is required. Otherwise, follow these steps:

1. Determine the location of the row of defective DIMMs from the error message or by running the EFI based SELViewer Utility or by running either the Intel Server Control (ISC) or Direct Platform Control (DPC) to read the System Event Log (SEL). Replace the defective DIMMs (in the example it is 5-8). On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system to continue.

Error Logging

The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on the screen.

Case 4

This is a special case where memory errors encountered in the first row test and base memory test can lead to an infinite loop of system resets. This special case occurs under the following conditions:

1. First row test encounters an SBE, base memory test encounters memory errors and the jumper is set to 'clear CMOS' position
2. First row test encounters an SBE, base memory test encounters memory errors and a front panel button combination to clear CMOS has been completed.

OR

3. First row test encounters an SBE, base memory test encounters memory errors and a bad CMOS checksum was seen by BIOS.

User Notification

The BIOS will try to map out defective rows found during base memory test but will end up in an infinite reset loop.

"First row test" - displayed on the upper LCD line

"0064 MB" - displayed on the lower LCD line

"BASE MEMORY TEST" - displayed on the upper LCD line

"ERRORS IN MEMORY" - displayed on the upper LCD line

"RESETTING SYSTEM" - displayed on the lower LCD line (prior to resetting)

Upon reset, the above messages will display again on the LCD and will keep repeating in an infinite loop.

User Action

1. Use the out-of-band mechanism of reading System Event Log (Intel's Server Management software, specifically DPC, can be used for this) to determine the location of the row of defective DIMMs from the SELViewer Utility or by running either the Intel Server Control (ISC) or Direct Platform Control (DPC) to read the System Event Log (SEL). Replace the defective DIMMs (in the example it is 5-8). On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system to continue.

Error Logging

The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on screen.

Extended Memory Test

The extended memory test takes effect after both the first row test and the base memory test have passed. The Extended Memory Test will test the physical memory above 2 GB to a maximum of the total installed memory. Any errors found will be detected to the failing memory row and recorded into the CMOS history bits for processing during the next reset. Since this occurs after system POST, the BIOS will not reset the system. Instead, error messages will be displayed on the video screen.

There is a 2 GB fixed gap between the memory address 2 GB to 4 GB that is reserved for PCI. This 2 GB of memory addresses, as seen by the processor, will not be tested.

User Notification

There are two sets of messages associated with this test. The first occurs when the test is being performed. The message is as follows:

```
XXXXXX MB Total Memory Installed
XXXXXX MB Configured
XXXXXX MB Tested
```

Memory Errors Detected (will appear only if extended memory test finds errors).

The first line is the total memory installed (regardless of condition). The second line is the total memory useable (and is less than the first line, only if defective DIMMS were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line. A fourth line, "Memory Errors Detected", will occur only if the memory test found errors on this latest test pass. It will not occur if the memory test found errors on previous boots; however, in that case, the size in the second line will be smaller than the first line.

NOTE: There is a 2 GB fixed gap between the memory address 2 GB to 4 GB, which is occupied by PCI gap, system flash address, and other fixed addresses. This 2 GB of memory address space will not be available for 'Configured' memory. For example, if a system has total installed memory of 64 GB, the maximum useable memory in the system will be (64 GB – 2 GB) = 62 GB. In this case, the "Configured" line will read 62 GB. As mentioned above, the "Tested" line will count up and its final value will always be equal to the "Configured" line (assuming all the memory is good, this will be 62 GB in this example).

A second set of messages will be seen later in the POST, which indicates where the memory test found errors. The sequence is as follows:

```
Error in memory subsystem: (Lower/Upper) Board, DIMM XX
ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT ON
THE NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM
NOW.
ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM
BEHAVIOR AND/OR HARD DISK CORRUPTION.
Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue
```

Examples

The following examples assume that the total memory installed is 32 GB (32768 MB).

Example #1

The system boots with 32 GB of memory installed and, no defects found, will report the following:

```
32768 MB Total Memory Installed
32768 MB Configured
32768 MB Tested
```

Example #2

Consider a system populated that has the entire upper board memory slots with 1 GB DIMMs. The first row test and the base row test passed without errors. The extended memory test detected a memory error in DIMM 17. The following messages will appear:

```
32768 MB Total Memory Installed
32768 MB Configured
32768 MB Tested
Memory Errors Detected
```

A second set of messages will be seen later in the POST that indicates where the memory test found errors. The sequence is as follows:

```
8C81: Error in memory subsystem: Upper Board, DIMM 17
```

```
8C82: Errors found in memory subsystem. Failing rows will be mapped
out on the next reset. It is strongly suggested that you reset the
system now. Allowing the system to continue to BOOT may result in
unstable system behavior and/or hard disk corruption.
```

Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue
The first line will be seen for each DIMM that on which the extended memory test has found an error. This message will NOT be seen on subsequent POSTs.

The second and the third line will be seen each time a memory error was found by the extended memory test.

User Action

Upon getting the notification of memory errors during extended memory testing, HP strongly recommends that the server be reset by pressing the reset button. On the subsequent boot, the defective DIMMs, found during extended memory testing, will be mapped out and will not be available as part of the useable memory. Failure to do the reset would result in an unstable behavior of the system.

Under 'User Notification' in Example #2, the following error message can be seen if the system is reset.

```
32768 MB Total Memory Installed
30720 MB Configured
30720 MB Tested

8C9B: DIMMs mapped out: Upper Board, 17-20
```

NOTE: On the above example, we do NOT see "Memory Errors Detected", because the defective memory has been mapped out. This is shown because the second line configured size is less than the first.

Error Logging

For the extended memory test, four error records will be written for multi-bit errors, one for each DIMM. For single-bit-errors during the extended memory test, error records will be one per DIMM. By specifications, the DIMM number will be one less than the silk-screened number on the printed-circuit board. Please refer to *Error Log Format Specification Version 0.7* for details on the format of the error records.

Memory Test Duration

The time it takes for memory test depends on the size of memory and the exact population scheme. The more memory that is tested, the longer this test takes, with a full test taking a significant amount of time. To alleviate this problem, skipping memory locations can be done, but this does not exercise the entire memory subsystem. To reach a compromise, there will be CMOS Setup options available to the user. These CMOS options will allow a user to select a quick memory test or an exhaustive one. Refer to the section on "Setup Dialog" section below for more information on the options.

Aborting the Memory Test

Users are given the option to abort the memory test by pressing the spacebar. The following string will appear on the bottom of the screen when executing the extended memory test:

```
Press spacebar to abort memory test.
```

However, this method will only work for the extended memory test, but not for the first row or base memory tests. The total amount of memory installed in the system will still be reported on the video screen.

Setup Dialog

The BIOS setup (F2) menu has the following selections:

```
->Advanced->Chipset Configuration->Memory Related Items:
```

Table 4-4. Memory Test Setup Items

Name	Selection	Comments
System ECC	Enabled	Default
	Disabled	
First Row Test Interval	4 cache line per 16 MB	Default
	Every location	
Base Memory Test Interval	4 cache line per 16 MB	Default
	Every location	
Extended Memory Test Interval	4 cache line per 16 MB	Default
	Every location	
Defective DIMM Mapout	Enabled	Default - Enables map out
	Disabled	Disables map out – NOT RECOMMENDED
Clear Bad Memory Row Info	Disabled	Default - Don't clear history
	Enabled	Clear history

The test interval entries determine how much of the target memory is tested. The default in all cases is 4 cache line per 16 MB (fastest mode). In the alternate mode, each cache line is tested.

The 'Defective DIMM Mapout' is used to turn off mapout completely. If this is disabled, defective DIMMs will be detected, but not mapped out on the next BOOT. This may lead to data corruption and loss and HP DOES NOT RECOMMEND that this feature be disabled in the BIOS.

The 'Clear Bad Memory Row Info' is used to clear the history, and retest all memory. This option is used when defective memory has been replaced, and the user wishes to place it in service again. This option automatically goes back to 'disabled' after the next boot.

Memory Testing Error Codes\Messages

- 8C51: Error in memory subsystem: Lower Board, DIMM 1
- 8C52: Error in memory subsystem: Lower Board, DIMM 2
- 8C53: Error in memory subsystem: Lower Board, DIMM 3
- 8C54: Error in memory subsystem: Lower Board, DIMM 4
- 8C55: Error in memory subsystem: Lower Board, DIMM 5
- 8C56: Error in memory subsystem: Lower Board, DIMM 6
- 8C57: Error in memory subsystem: Lower Board, DIMM 7
- 8C58: Error in memory subsystem: Lower Board, DIMM 8
- 8C59: Error in memory subsystem: Lower Board, DIMM 9
- 8C5A: Error in memory subsystem: Lower Board, DIMM 10
- 8C5B: Error in memory subsystem: Lower Board, DIMM 11
- 8C5C: Error in memory subsystem: Lower Board, DIMM 12
- 8C5D: Error in memory subsystem: Lower Board, DIMM 13

8C5E: Error in memory subsystem: Lower Board, DIMM 14
8C5F: Error in memory subsystem: Lower Board, DIMM 15
8C60: Error in memory subsystem: Lower Board, DIMM 16
8C61: Error in memory subsystem: Lower Board, DIMM 17
8C62: Error in memory subsystem: Lower Board, DIMM 18
8C63: Error in memory subsystem: Lower Board, DIMM 19
8C64: Error in memory subsystem: Lower Board, DIMM 20
8C65: Error in memory subsystem: Lower Board, DIMM 21
8C66: Error in memory subsystem: Lower Board, DIMM 22
8C67: Error in memory subsystem: Lower Board, DIMM 23
8C68: Error in memory subsystem: Lower Board, DIMM 24
8C69: Error in memory subsystem: Lower Board, DIMM 25
8C6A: Error in memory subsystem: Lower Board, DIMM 26
8C6B: Error in memory subsystem: Lower Board, DIMM 27
8C6C: Error in memory subsystem: Lower Board, DIMM 28
8C6D: Error in memory subsystem: Lower Board, DIMM 29
8C6E: Error in memory subsystem: Lower Board, DIMM 30
8C6F: Error in memory subsystem: Lower Board, DIMM 31
8C70: Error in memory subsystem: Lower Board, DIMM 32
8C71: Error in memory subsystem: Upper Board, DIMM 1
8C72: Error in memory subsystem: Upper Board, DIMM 2
8C73: Error in memory subsystem: Upper Board, DIMM 3
8C74: Error in memory subsystem: Upper Board, DIMM 4
8C75: Error in memory subsystem: Upper Board, DIMM 5
8C76: Error in memory subsystem: Upper Board, DIMM 6
8C77: Error in memory subsystem: Upper Board, DIMM 7
8C78: Error in memory subsystem: Upper Board, DIMM 8
8C79: Error in memory subsystem: Upper Board, DIMM 9
8C7A: Error in memory subsystem: Upper Board, DIMM 10
8C7B: Error in memory subsystem: Upper Board, DIMM 11
8C7C: Error in memory subsystem: Upper Board, DIMM 12
8C7D: Error in memory subsystem: Upper Board, DIMM 13
8C7E: Error in memory subsystem: Upper Board, DIMM 14
8C7F: Error in memory subsystem: Upper Board, DIMM 15
8C80: Error in memory subsystem: Upper Board, DIMM 16
8C81: Error in memory subsystem: Upper Board, DIMM 17
8C82: Error in memory subsystem: Upper Board, DIMM 18

8C83: Error in memory subsystem: Upper Board, DIMM 19
8C84: Error in memory subsystem: Upper Board, DIMM 20
8C85: Error in memory subsystem: Upper Board, DIMM 21
8C86: Error in memory subsystem: Upper Board, DIMM 22
8C87: Error in memory subsystem: Upper Board, DIMM 23
8C88: Error in memory subsystem: Upper Board, DIMM 24
8C89: Error in memory subsystem: Upper Board, DIMM 25
8C8A: Error in memory subsystem: Upper Board, DIMM 26
8C8B: Error in memory subsystem: Upper Board, DIMM 27
8C8C: Error in memory subsystem: Upper Board, DIMM 28
8C8D: Error in memory subsystem: Upper Board, DIMM 29
8C8E: Error in memory subsystem: Upper Board, DIMM 30
8C8F: Error in memory subsystem: Upper Board, DIMM 31
8C90: Error in memory subsystem: Upper Board, DIMM 32
8C91: DIMMs mapped out: Lower Board, 1 - 4
8C92: DIMMs mapped out: Lower Board, 9 - 12
8C93: DIMMs mapped out: Lower Board, 17 - 20
8C94: DIMMs mapped out: Lower Board, 25 - 28
8C95: DIMMs mapped out: Lower Board, 5 - 8
8C96: DIMMs mapped out: Lower Board, 13 - 16
8C97: DIMMs mapped out: Lower Board, 21 - 24
8C98: DIMMs mapped out: Lower Board, 29 - 32
8C99: DIMMs mapped out: Upper Board, 1 - 4
8C9A: DIMMs mapped out: Upper Board, 9 - 12
8C9B: DIMMs mapped out: Upper Board, 17 - 20
8C9C: DIMMs mapped out: Upper Board, 25 - 28
8C9D: DIMMs mapped out: Upper Board, 5 - 8
8C9E: DIMMs mapped out: Upper Board, 13 - 16
8C9F: DIMMs mapped out: Upper Board, 21 - 24
8CA0: DIMMs mapped out: Upper Board, 29 - 32

5 Troubleshooting

Preventive Maintenance Procedures

Refer to this table for preventive maintenance procedures for this HP Server. Be sure to turn off power to the HP Server when cleaning it.

Preventative Maintenance Procedures

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

CAUTION Do NOT use petroleum-based cleaners (such as lighter fluid) or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone. These chemicals could damage the keyboard's plastic surfaces.

HP recommends the periodic cleaning of tape heads, capstans, and guides on HP drive units and those products using high-density data cartridges and mini-data cartridges. This maintenance procedure prolongs tape and head life and helps reduce read/write errors due to dust and oxidation.

Troubleshooting Tips

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

- For general information on management products, refer to <http://www.hp.com/> and search for "management."

Troubleshooting Checklist

To troubleshoot an installation problem, do the following:

- First, ensure the HP Server is configured properly.
Most HP Server problems are the result of incorrect BIOS and SCSI configurations.
- If it is a network-related error, determine if the HP Server has enough memory and hard disk drive capacity.
Consult your network operating system manual and its requirements.
- Verify all cables and boards are securely plugged into the appropriate connectors or slots.
- Remove all options added since the HP Server was received and then add one option, and only one option, at a time.

NOTE If the HP Server has a large amount of memory installed, it may take 30 seconds for the first screen to display.

If it is a hardware error, follow these steps:

1. Log users off the LAN and power down the HP Server.
2. Remove the HP Server's cover.

<p>WARNING Before removing the cover, always unplug telephone cables and disconnect the power cord. Unplug telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.</p>
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3. Simplify the HP Server configuration to the minimum required:
A monitor, one flexible disk drive, one DVD drive, one hard disk drive, keyboard, mouse, and NIC. Remove all third-party options, and reinstall one at a time, checking the HP Server after each installation.
4. Boot the HP Server.
 - ◇ If the HP Server does not function, consult the troubleshooting steps in the section "Hardware Problems."
 - ◇ If you get an error message, see the section "Error Messages" below.
5. If the HP Server still will not boot, clear the CMOS memory and reboot. See "Clearing the CMOS Configuration".

If the HP Server Will Not Power On

Use these steps to check for power related problems:

1. On the control panel, verify the LCD screen's backlight is lit (green glow).
If it is lit, the HP Server is receiving AC power.
If it is not lit, ensure the HP Server's power cord is connected.
2. Check the HP Server's power supplies.
 - a. Check that at least two power supplies and both power cords are plugged in to the chassis.
 - b. Each power supply has three LEDs and the top LED is the Power (PWR) LED.

- * The top PWR LED glows a steady green when the HP Server's DC power has been switched on.
 - * The PWR LED will blink green, if the DC power is switched off, but AC power is properly connected.
3. If the PWR LED on any power supply is not a steady green, reseal the power supply.
 4. You can release the lever and then reset it, or remove the power supply from the HP Server.
 5. If all power supply LEDs are still blinking green, the HP Server might be in a sleep state.
Refer to your NOS's instructions concerning sleep states.
 6. Check that the boards are properly seated.
 7. Check that the Server Management Cable is properly connected to the Power Distribution Board and the Legacy I/O Board.
 8. Check that the DC-DC Converters are properly seated.

If the HP Server System Fans Come on but then Shutdown After 5 Seconds

Use these steps to check for system fan related problems:

1. Check for Memory Board DC-DC Converter failure:
DC-DC converters are installed in a valid configuration.
DC-DC converters are of the proper voltages.
2. Check the embedded regulator on the Processor Baseboard for failure.
3. Check that the DC-DC Converter on the Power Distribution Board is properly installed.
4. Check that the DC-DC Converter on the I/O Baseboard is plugged into the 3.3V number one connector.
5. Check for a Power Pod failure on a Processor.

If the HP Server Powers On but then Shuts Down with a Fault Light

Use this checklist to check for the following problems when the HP Server powers on and then off:

1. Check that a conductive item has not been dropped or left inside the server chassis.
2. Check the connections on all boards and DC-DC Converters.
3. Check the cables for bent pins.
4. Check the processors for bent pins.

If the HP Server Powers On but Fails POST (Power-On Self Test)

Use this checklist to check for the following problems when the HP Server fails POST:

1. Attempt a recovery boot.
2. Verify that the FSB to CPU core ratio is properly set for the processors. Do not overclock.
3. Clear CMOS and see if the HP Server boots.
Check the HP Server's reference label for instructions on clearing CMOS.
4. If the monitor is working, check the POST pass code it displays.
If the code is between #0 and 3Ah, and the code does not change,
Swap out the Legacy I/O Board and reboot the HP Server.
If the Server still does not boot, swap out the Processor Baseboard and attempt to reboot.
c. Finally, reseal the HP Server's memory boards and then reboot the HP Server.

5. If clearing the CMOS does not solve the problem, refer to "If the HP Server Passes the Post but Will Not Function" later in this chapter.
6. Run the SEL Viewer Utility.

If the HP Server Hangs at POST Codes F0-F2

Use these steps to solve the POST error problems:

1. Inspect the Memory Board for defects.
2. Ensure that all of the DIMMs are properly seated.
3. Swap out the DIMMs and reboot the HP Server. If this does not resolve the problem, swap out the Memory Board.

If the HP Server Passes POST but Will Not Function

Use these steps to solve POST error problems.

1. If an error message displays on the screen, read the error message text for recommended actions to take.
2. If the actions do not solve your problem, contact your reseller.
3. If there is no error message, follow these steps:
 - a. Turn off the HP Server and remove all external peripherals, except the monitor and keyboard.
 - b. Boot from an internal hard drive and verify that the HP Server becomes operational.
 - c. If the HP Server still is not operational, turn off the monitor, the HP Server, and all external devices, and check the internal hardware, as follows:
 - i. Unplug the power cord and all telephone cables.
 - ii. Swap out the Legacy I/O Card and reboot the HP Server.
 - iii. Check that all accessory boards, DC-DC Converters, power pods, and processors are firmly seated in their slots.
 - iv. Verify that the DIMMs are inserted in the proper order and firmly seated on the memory board.
 - v. Verify that the DIMMs in any given row are the same size and have the same Hewlett-Packard part number.
 - vi. Ensure all disk drive power and data cables are securely and properly connected, at the rear of each drive.
 - vii. Verify the mass storage configuration with the cabling and switch diagrams.
 - viii. Replace the HP Server cover.
 - ix. Replace all power cords and power cables.
 - x. Turn on the monitor.
 - xi. Turn on the HP Server at the control panel.
 - xii. Check for error messages.

If the HP Server Passes POST but a Processor is Disabled or Not Recognized

If a processor is not recognized by the Server, check the following items:

1. Verify that the pins on the processors are not bent and that the processor is properly seated.

2. Verify that the power pod is fully engaged into the processor and seated properly.
3. Check the power cable from the Processor Baseboard to the power pod connectors.

If steps one to three above are complete and the processor is still disabled during the HP Server's power-on self-test (POST), you can re-enable it through the BIOS Setup Utility:

4. Power up the server.
5. Start the BIOS Setup Utility by pressing F2.
6. Under the Main menu, enable Processor Retest.

The next time the system is booted, the BIOS retests all processors and enables them. On a subsequent boot, Processor Retest is automatically disabled.

If the 172 mm or 120 mm Fans Do Not Operate

Check the following items if the fans do not operate:

1. Check the 48V fuse on the Power Distribution Board.
2. Verify that the fan cables are properly connected.

If the HP Server Has No Video and POST is Stuck in Reset

Check the following if there is no video display:

1. Check that all accessory boards, DC-DC Converters, power pods, and processors are firmly seated in their slots.
2. Replace the Power Pod.
3. Replace the DC-DC Converters.

If the HP Server's SCSI Drives Are Not Recognized

Check the following if the SCSI drives are not recognized during POST:

1. Check the seating of the Internal SCSI Cable between the I/O Board and the Power Distribution Board (T-Docking).
2. Check that the SCSI drives are enabled in the BIOS Setup.

If the HP Server's IDE Drives Are Not Recognized

Check the following if the IDE drives are not recognized during POST:

1. Check the seating of the IDE cables and power cables.
2. Check that the IDE drives are enabled in the BIOS Setup.

BIOS Recovery

If the BIOS becomes corrupted, it is possible to perform a BIOS recovery to correct the condition. To recover the BIOS, complete the following procedure:

1. Prior to attempting recovery for the first time either use a brand new diskette or format the diskette using Windows NT 2000 or Windows NT 4.0 Service Pack 6.0 or above. Use the full format option. Do not use the Quick Format feature.
2. Using Windows Explorer, unzip the BIOS recovery image from the RECBIOS directory on the HP Server rx4610 Resource CD and copy the following files to the diskette:

*.rvc

Startup.nsh

*.bin

lflash64.efi

With the system powered down (OFF) and the AC power cords disconnected:

- a. Place jumper J7A1, RCOV*BOOT on the Legacy I/O Board for bootblock recovery. Refer to the *HP Server rx4610 User Guide* for the jumper location.
- b. Place the recovery diskette in the IDE drive.

Turn the machine on.

4. The following processes occur without further user action:
 - a. The LCD displays:

```
First Row Test 0064MB.  
LS120 disk activity started
```
 - b. The *.rcv files begin to load from disk to memory after one full beep.
 - c. In the next three minutes, diskette drive activity occurs for the first 2.5 minutes.
 - d. When the lflash64 is successfully completed, three full beeps occur. There may be a wait period of up to four minutes without any indication of processing occurring during this time.
5. Remove the recovery diskette from the drive.
6. Power down the system.
7. Remove the recovery jumper.
8. Power on the system as indicated in the updated BIOS release notes-clear the CMOS for the first time.

Password Problems

This section describes some common password problems.

Resetting Lost Passwords

If you have forgotten the User or Administrator password, you can reset each one. The User password can be reset if you know the Administrator password, but the Administrator password can only be reset by a switch on the system board.

User Password

If you have forgotten the User password, but the Administrator password is known, perform the following steps:

1. Restart the HP Server.
2. During the boot process, press **[F2]** to start the Setup program.
3. Enter the Administrator password and then access the Security menu of the Setup Utility.
4. Scroll to the "User Password is" field and press **Enter**.
5. Enter the Administrator password as the old password and press **Enter**.
This will replace the old, forgotten password.
6. Enter the new password in the "Enter new password: []" field and press **Enter**.

NOTE

Entering nothing or "blank" in the "Enter new password" field followed by entering nothing or "blank" in the "Re-enter new password" field will turn off the password setting, changing it to "Not Set."

7. Enter the new password again in the "Re-enter new password: []" field and press **Enter**.
8. Press **Esc** and scroll to the Exit menu and save the changes to save the new password.

Administrator Password

You can only reset a forgotten Administrator password by using the configuration switch on the system board. If you have forgotten the Administrator password, your HP Server will function normally, but you will not be able to access the Setup Utility or complete the boot process, if you reboot the HP Server. To reset the Administrator password, refer to the following procedure.

1. Turn off power to the HP Server.
2. Remove the cover.
3. Move switch 3 in the configuration switch on the system board (labeled "Clear Password") to the ON position.
4. Turn on power to the HP Server and allow it to complete its startup routine.
The old password will be erased.
5. Turn off power to the HP Server.
6. Return switch 3 in the configuration switch on the system board to the OFF position.
7. Replace the HP Server cover.
8. Turn on power to the HP Server and allow it to begin its startup routine.
9. If you wish to set a password again, press **[F2]** to start the Setup Utility.
10. Set the new Administrator password.
11. Choose the Exit option and save the changes to save the new password.

General HP Server Problems

No lights are on and no error message appears

If the HP Server does not work (no lights are on, including backlighting on models with LCDs) and no error message appears, check the following:

1. Verify that power is good and available.
2. Make sure that the HP Server is turned on (the power-on light should be green and the fans should be on).
3. Turn the HP Server off. Unplug the power cords. Wait 30 seconds and plug the power cords in and turn the HP Server on. Verify the failure.
4. Verify that all boards are installed properly and seated firmly in the slots with cables firmly connected.
5. If the HP Server stopped working after you installed a new accessory, remove the accessory and turn on the server. If the HP Server now works, go to step 8.
6. If the HP Server still does not work, remove all accessory that you have installed (do not remove the flexible or hard disk drives) and turn on the server.
7. If the HP Server now works, turn off the HP Server; add one accessory at a time to determine which one is causing the problem. Turn on the HP Server after installing each board or option. When the problem returns, the last board or option installed is defective.
8. If you have added any memory, make sure that the modules are seated properly on the processor board.

The application or operating system is not responding properly

1. In HP Server models with accessible cache feature, determine if the memory cache feature is turned on or off.

Memory cache may need to be turned off for some older software. It may also need to be turned off for those accessory boards that have on-board firmware, and for those boards that use memory-mapped I/O.

2. If necessary, turn off the memory cache feature. Check the state of memory cache and, if necessary, disable it:
 - a. Push **F2** during the boot process
 - b. Go to configuration and turn off Memory Caching

The HP Server stops working (hangs)

Typically, if the HP Server hangs before the end of the **POST** completes, the problem is probably a hardware failure. If the HP Server hangs after the **POST** completes, the problem is probably due to an incorrectly configured or corrupt driver, operating system, or application program, or a media (disk drive) error.

If the HP Server stops working, try the following:

1. Review the **Troubleshooting Checklist** before you continue.
2. Turn the HP Server off and unplug the power cords. Wait 30 seconds and plug the power cords in and turn it on. Verify the failure.
3. If the problem persists, replace the system board.
4. Once a problem has been found with a part, verify that it is the problem (or the only problem) by reinstalling the part and replicating the error.

The HP Server does not start (boot)

Locate the memory modules (SIMMs/DIMMs).

NOTE The POST error messages reflect which modules are defective and should be replaced.

1. Review the **Troubleshooting Checklist** before you continue.
2. Power the HP Server off and on (rather than using Ctrl-Alt-Del) as it is a more complete system reset.
3. On HP Servers with diagnostic LEDs near the DIMM sockets, note any blink codes.
4. If the POST reports a problem, check the error against the Error Messages and correct the problem.
5. Verify the video subsystem is configured correctly.
6. Verify the memory DIMMs are all of the same (specified) speed.
7. Verify the memory DIMMs are installed and configured correctly:
 - a. Make sure only HP-supported DIMMs are used.
 - b. Remove the system board, install a known good memory module, and reboot. If you still receive an error, replace the system board.

If the error goes away, add another module and reboot again. Continue this process until you have installed all memory modules or you experience a failure. Replace the defective module(s).

8. Remove one accessory board at a time and reboot the HP Server. Verify the problem.
9. Once a suspect part has been found, verify that it is the problem by reinstalling the part and duplicating the error.

Power Problems

Symptoms:

- A fan is not working
- The power LED does not light

To isolate and resolve the power outage, complete the following procedures:

1. Review the **Troubleshooting Checklist** before you continue.
2. Verify the AC power source is good:
 - a. If the HP Server fans are audible or a control panel light is on, the power is on.
 - b. Verify the circuit breaker for the AC power outlet.
 - c. If the breaker was off, check that all devices connected the HP Server share the same circuit breaker and are the only devices on it. Reset the circuit breaker after reconfiguring the devices, if need be.
 - d. Verify the AC power outlet is not faulty. Test it by plugging in a known-good device.
 - e. Verify the third-wire ground is isolated from other grounds and is at ground potential.
3. Verify all cable connections:
 - ◇ AC power cords from AC source outlet to server
 - ◇ DC Power supply cables to all HP Server PCBs
 - ◇ DC power supply cables to disk drives and/or mass storage cages
4. If the fans aren't audible and the above steps are verified, check that power is getting to all fans. Servers have multiple fans. All fans run when power is turned on; all are off when the power is off.
5. With the power supply connected to the system board, check the power supply's voltages.

If voltages are not present:

 - a. Turn off AC power.
 - b. Disconnect the power cords for 5 minutes in order to reset the power supply's circuitry.

Turn on AC power again. If power is still not getting to the system board, replace the power supply (or power supply module on some HP Server models).
6. If power is getting to the fan but the fan isn't working, replace the fan (or replace the power supply in HP Server models with fans incorporated in the power supply).
7. If the problem continues, replace the power supply module.
8. If, after replacing the power supply, the problem persists:
 - a. Remove all accessory boards, including any hard disk drive controller board or the video board the customer might have installed, and reboot the HP Server.
 - b. Disconnect all mass storage power cords and cables (except those to the boot device) and reboot the HP Server.
9. If the problem goes away, reinstall the original suspected part to verify that it is causing the problem.

Video/Monitor Problems

Symptoms:

- Nothing is displayed on the monitor.
- The monitor is blank.
- The wrong size characters appear on the monitor.
- Colors are wrong or there are no colors on the monitor.

If you installed a video board and are not using the built-in video system, go to Step 12. If you have two video monitors connected, test the monitors to make sure they are working (Step 1-4) then go to Step 10.

1. Review the **Troubleshooting Checklist** before you continue.
2. Check the contrast and brightness controls to ensure each is adjusted.
3. Verify the video and power cords are connected to the monitor.
4. Ensure there is adequate power:
 - a. Verify the display power switch is turned on.
 - b. Verify the display power cord is connected to an AC power outlet and the video cable connected to the server's video connector.
 - c. Plug in a known working device to ensure there is power to the outlet or use the proper testing device to check the power outlet.
 - d. Turn the monitor off and on, and if the monitor has an on/off LED, see if it lights.
 - e. Turn the Clear Configuration switch on the system board to OFF and reboot the HP Server. Check if the problem persists.
5. Turn on the HP Server and wait a full 2 minutes. Verify the monitor starts displaying normally.
6. If the problem persists, and if the power cord is detachable, try a known good power cord.
7. Unplug the power cord and wait 30 seconds. Plug in the power cord and turn on the HP Server. Wait a full 2 minutes. Check that the monitor starts displaying normally.
8. Check the monitor display to see if the system memory count takes place correctly.
 - a. Turn the HP Server off and then on. Check to see if the memory is counted during the HP Server boot. If no count occurs, go to Step 10.
 - b. Check to see if the count occurs in the color appropriate for the monitor.

If the count occurs in the wrong color, the problem may be with the video subsystem, the monitor, or the monitor cable. (Continue with the troubleshooting steps.)
9. If you are using a video screen saver utility and the screen goes blank while using the keyboard, you may be using an application that turns off the screen even when you are using the keyboard. Refer to the manual that came with the screen saver utility.
10. Ensure the memory modules (DIMMs) are correctly seated in their slots. You may want to remove and reinstall each memory module to ensure it does not cause the problem. Verify the correct type, size, and combinations of modules for this model HP Server are installed.
11. To see if the display is functioning:
 - a. Turn off the monitor and the server.
 - b. Disconnect the video cable from the video connector.
 - c. Turn on the monitor.

Monitor Notes:

- ◇ When most VGA monitors are disconnected from the video connector, if the monitor is working, the screen is white.
 - ◇ When some monitors (such as HP high-resolution monitors) are disconnected from the video connector, the monitor may be working, although the screen is black.
 - ◇ If the display is black or white when it should be in color, check the monitor cable to see if a pin is bent. If a pin is bent, slowly but carefully straighten the pin. Replace the cable if the pin cannot be straightened successfully.
 - ◇ If a monitor tester is available, use it to check the display.
 - ◇ If you suspect the monitor is faulty, replace it with a known good monitor. Then reinstall the original monitor and duplicate the error.
12. Verify the monitor is working by plugging it into a know-good HP Server or computer.
 13. Check to see if the monitor connector's pins are bent. If the pins are bent, slowly but carefully straighten each pin.
 14. Connect the monitor cable to the HP Server video connector and turn on the HP Server. If there is a display, but characters are the wrong size or the display is the wrong color:
 - a. Check whether the monitor is a color or monochrome monitor.
 - b. Verify the video cable is properly inserted in the connector on the back of the computer.
 - c. Check for bent pins on the connectors.
 15. If the customer has installed a video board instead of using the built-in video, make sure all jumpers and switches are set properly on the installed video board. (See the manual for the video board.)
 16. If the monitor displays a badly scrambled image that looks to be the current screen image, then the monitor is not synchronizing correctly.
 - ◇ If a video board is installed, replace it with a known good one. The video timing setting on the board may be bad.
 - ◇ If it is the on-board video, replace the system board.
 17. If a video board is installed and the built-in video is used:
 - a. Make sure the video board/built-in video combination is supported. Usually, two video systems (for example, internal video and a video adapter board) cannot be used at the same time.
 - b. If there is still a problem, make sure the board is seated correctly.
 - c. If there is still a problem, remove the video adapter board, and enable the internal video system. Verify the problem.
 18. If a message appears such as "INVALID CONFIGURATION", run the **Setup Utility** and press **[F2]** during the boot process to confirm the HP Server video configuration. Make sure other accessory boards do not use the same memory addresses as the HP video system.
 19. If the problem is isolated to the built-in video system, replace the system board.
 20. Once a suspect part has been found, verify it is the problem by reinstalling the part and duplicating the error.

Configuration Problems

Symptom:

- An installed driver cannot find a PCI board

Installing a PCI board which bridges the two system PCI buses (certain adapter boards provide this feature) can cause previously installed PCI drivers to not recognize their adapter board(s).

To resolve the configuration problem, move the PCI board that has bridging capability to a primary PCI slot.

Symptom:

- The configuration cannot be saved and the battery loses power

Refer to this section if the HP Server frequently loses date and time that may be caused by the battery losing power.

1. Review the **Troubleshooting Checklist** before you continue.
2. If the HP Server frequently loses the time and date, replace the battery. The battery is attached to the system board.
3. Set the new date and time, and reset the configuration parameters using the Setup Utility, if necessary.
4. Turn off AC power to the HP Server, then reboot to see if the date and time was saved.
5. If date and time are still requested, and the battery is good, perform the next procedure, below.

If your Server repeatedly loses its configuration or the clock stops, you should replace the battery or install an external battery.

WARNING	There is a danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn the old battery. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
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Symptom:

- The configuration information is frequently lost and the battery is good

If the battery is good and you cannot save system configuration, do the following

1. Review the **Troubleshooting Checklist** before you continue.
2. Configuration information is saved in the CMOS. If you continue to lose configuration information and the battery is good, or you cannot save the information to the CMOS:
 - a. If possible, using the configuration utility, save the current configuration to a diskette.
 - b. Replace the system board.

Printer/Datacomm Problems

NOTE	Microsoft windows 64-bit Advanced Server Beta 2 do3s not currently support the parallel port on the HP Server rx4610.
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Symptom:

- A printer does not print or datacomm devices are not working

If the printer does not work, or the datacomm devices are not working, do the following:

1. Review the **Troubleshooting Checklist** before you continue.

2. Verify correct cables have been used, the cables are connected properly, and the cable pins are not bent.
Check the cable for continuity, or try a known good cable. Refer to the peripheral's manual.
3. Verify the AC power cord is plugged into the power source and the printer.
4. Ensure the printer power switch is on.
5. Ensure the AC outlet is working. If the printer is plugged into a multiple-outlet box, make sure the switch on the outlet box is turned on, and the circuit breaker (if equipped) is not tripped.
6. Ensure the printer is on-line.
7. Examine the printer for a paper jam.
8. Run the printer internal self-test (if it has one) to make sure that the printer is functional. Refer to the printer's manual for instructions.
9. Ensure you have selected the correct port setting when you configured the printer. The printer must be configured correctly for the HP Server and for the application. You may need to change some switch settings on the printer.
10. Ensure you have not disabled the I/O ports. Run the Setup Utility (press **[F2]** during the boot process) and verify the I/O port status.
11. Ensure the server's printer port is working properly by running another peripheral from that port.
12. If the printer still does not work, it may have a resource conflict with another board or accessory. Remove boards and accessories (except the hard disk drive) one at a time to isolate the conflict. Check the printer for proper operation after you remove each board or accessory.
13. If an error message appears on the screen, refer to **Error Messages** and the printer's manual for help.
14. If the HP Server was working before you installed the accessory, remove the accessory and restart the HP Server.
15. If the problem persists, replace the system board.

Keyboard and Mouse Problems

Symptoms:

- The keyboard does not work
- A character is not displayed when a key is pressed

The keyboard and monitor must be connected before the Server is powered on. Perform the following steps to identify and resolve the keyboard/mouse problem:

1. Review the **Troubleshooting Checklist** before you continue.
2. Ensure the keyboard is not locked.
3. Ensure the keyboard cable connections at the rear of the HP Server and at the back of the keyboard are securely and correctly attached.
4. If a keyboard/monitor switchbox is used with this HP Server, plug the keyboard directly into the keyboard port of the HP Server. Verify the problem.
5. If the problem persists, turn off the HP Server and back on by using the power button.
6. Try replacing the keyboard with a known good keyboard.
7. If the problem persists, check the keyboard cable for continuity, or try a known good cable.
8. If the problem persists, replace the system board.
9. Once a suspect part has been found, verify that it is the problem by reinstalling the part and duplicating the error.

Symptom:

- The mouse does not work or is intermittent

The HP Server automatically detects a mouse when one is installed. If the mouse or other input device is not working, perform the following:

1. Review the **Troubleshooting Checklist** before you continue.
2. Check that the mouse cable is properly and securely connected to the server.
3. If a keyboard/monitor switchbox is used with this HP Server, plug the mouse directly into the keyboard port of the HP Server. Verify the problem.
4. Ensure mouse's port does not have a resource conflict. Use the Setup Utility (press [F2]).
5. Ensure correct mouse driver has been installed onto the boot drive. Refer to the mouse installation manual or the operating system manual.
6. Replace the mouse with a known-good unit.
7. If the problem persists, replace the system board.
8. Once a suspect part has been found, verify that it is the problem by reinstalling the part and duplicating the error.

Flexible Disk Drive Problems

Symptoms:

- There are lost clusters
- There are read/write errors
- The HP Server will not start from a diskette

If you cannot boot from, write to, or format the flexible disk, do the following:

1. Review the **Troubleshooting Checklist** and read about **Boot Device Priority** before you continue.
2. Try booting from a good known flexible disk.
3. Check to see if boot from the flexible disk drive is enabled and if there is a bootable diskette in the flexible disk drive.
4. Select the Setup Utility (press [F2] during the boot process and check that the HP Server's mass storage configuration is correct. If for some reason you cannot run the Setup, you can clear CMOS and reconfigure the server.
Try to reboot.
5. If you cannot format or write to a flexible disk:
 - ◇ Ensure diskette is not write protected.
 - ◇ Ensure disk drive is properly configured with the Setup utility. Make sure that "Start from Flexible Disk" option is disabled.
6. Verify all internal drive cables are securely attached and functional. Inspect the cables and reseal the connectors at both ends.
7. If the cables are securely attached, and the drive still does not work, replace the cables with known good cables, one at a time.
8. If the problem persists, and/or there is an error code, replace the faulty part (the drive, the system board, etc.)
9. If the problem persists, check for environmental problems that can damage disk media and disk drive heads.

Environmental problems result from:

- ◇ **Radiated Interference:** Sources include communications and radar installations (such as at an airport), radio/TV broadcast transmitters, and hand-held receivers.
- ◇ **Airborne Contaminants:** Sources include dust, smoke, and ashes. Steam from duplication equipment may result in intermittent disk errors.

DVD Problems

Symptom:

- The DVD drawer will not open

If the DVD drawer fails to open when you press the Eject Button or with software commands, do the following:

1. Turn off all power to the computer.
2. To open the drawer, insert a pointed object, such as a paper clip, into the emergency eject hole and push in about 1.75 inches (40 mm).
3. Remove the disk and close the drawer.
4. After you remove the disk, start the computer and try to open the drawer again with the Eject Button or software commands.
5. If the drawer still will not open, replace the DVD drive with a working unit.

Symptom:

- The DVD drive is not working properly

If the DVD drive does not work, do the following:

1. Verify correct drivers are installed.
2. Verify a CD-ROM/DVD disk is in the DVD drive.
3. Verify that all internal drive cables are securely attached and functional.
4. If the drive is a Hewlett-Packard DVD drive, review the *DVD Installation Guide* for any special installation instructions.
5. Try installing a known good DVD drive
6. If the problem persists, check for environmental problems that can damage disk media and disk drive heads. Environmental problems result from:
 - ◇ Radiated Interference: Sources include communications and radar installations, radio/TV broadcast transmitters, and hand-held receivers.
 - ◇ Airborne Contaminants: Sources include dust, smoke, and ashes. Steam from duplication equipment may result in intermittent disk errors.

Symptom:

- The HP Server won't boot from the DVD

Use the Setup Utility to make sure the DVD drive is bootable:

1. Review the **Troubleshooting Checklist** and **Boot Device Priority**
2. Run the Setup Utility.
3. Enable support for bootable DVD.
4. Save and exit the utility.

SCSI Problems

Symptom:

- The external SCSI subsystem does not work after installation

If the external SCSI subsystem does not work after installation, do the following:

1. Review the **Troubleshooting Checklist** and read **Mass Storage Guidelines**.
2. Refer to the documentation that came with the SCSI devices for any specific information on installing them.
3. Ensure all installed SCSI controllers are installed and configured correctly.
4. Check the SCSI cables for problems that may have been caused by recent computer maintenance, hardware upgrades, or physical damage.
5. Check the ROM BIOS version to make sure it is the most recently issued version.
6. Check that the external SCSI subsystem BIOS is being executed properly.
 - ◊ When you start the server, the incrementing count of the RAM appears on the screen. Then the external SCSI BIOS displays a banner and a copyright notice.
 - ◊ The BIOS then checks for valid devices on the SCSI bus, and reports which devices are found. If you have installed and configured the SCSI devices correctly, you will see a list confirming all SCSI devices installed in the HP Server.
 - ◊ If the banner is not displayed, the external SCSI controller is not recognized.
7. Verify the SCSI bus is terminated at both ends. By default, HP SCSI controllers are terminated. When a device is connected to a connector on the controller, bus termination for that connector is disabled. Verify that the last device on the bus is terminated.
8. Ensure no device is set to SCSI ID7; this is the SCSI ID used by the SCSI controller.
9. Verify all SCSI devices are either single-ended or differential SCSI devices (depending on the HP Server model), and that any bus does not contain both types.
10. Verify the SCSI hard disk drive that loads the operating system is set to the lowest SCSI address (usually set to 0).
11. Disconnect all SCSI devices except the integrated SCSI adapter and the drive at SCSI address 0, and try again. If this fails, try substituting a known good SCSI adapter board and a good hard disk drive.

Symptom:

- The SCSI BIOS has trouble loading

If the HP Server has trouble loading the SCSI BIOS, do the following:

1. Review the **Troubleshooting Checklist** before you continue.
2. If you installed more than one SCSI controller, make sure that the BIOS of all SCSI controllers are disabled except for the boot controller. This lets the SCSI BIOS for the boot controller load.
Determine what the boot device priority is for the HP Server model. Verify that the boot device is in the right place in the priority.

Symptom:

- The SCSI subsystem does not work at installation

An incorrect configuration and not faulty hardware cause many SCSI problems. If the SCSI subsystem does not work after installation, do the following:

1. Review the **Troubleshooting Checklist** and **Mass Storage Guidelines** before you continue.

2. If you don't see the SCSI BIOS banner during HP Server start:
 - ♦ Check the cable connections.
 - ♦ Check the SCSI termination.
3. Run the Setup Utility or SCSI Configuration Utility and verify the SCSI host bus adapter (HBA) is properly configured.

The HBA is usually SCSI ID 7.
4. If you installed more than one SCSI adapter, verify each adapter is set to a separate BIOS address; or disable the BIOS on all of the adapters except one.
5. For each device, verify;
 - ♦ The device has a unique SCSI address.
 - ♦ In general, when selecting an address for a drive (default address is 0), select as low a SCSI address as possible.
 - ♦ The device's jumpers are set according to the device documentation.
 - ♦ The hard disk activity light cable (for non-hot-swap devices) is properly installed.
6. Check that the primary SCSI hard disk drive is set to the lowest address (usually set to 0). Each device (the HBA is also a device) must have a unique and separate SCSI ID number. To solve this problem, simply set the device ID to something other than that of the HBAs SCSI ID (7). If the device is a boot drive, then the SCSI ID should be set at 0.
7. If another hard disk drive is connected to the SCSI bus, check it for unique address, SCSI cable connection, and power connection.
8. Check the SCSI bus cable for correct orientation, alignment, and seating on the SCSI adapter and the SCSI device.
9. Check for the correct internal and external SCSI cables.
10. Check that all SCSI devices are connected to power, and power-on all SCSI devices before or at the same time as the HP Server to ensure a stable SCSI bus.
11. Watch the boot screen for all SCSI devices to be displayed. For example, in a HP Server with 1 SCSI controller and 2 hard disk drives (one with ID 0 and one with ID 1), if a valid device is found at device address 0, but not at address 1, you would see these device validation lines on the boot screen:

```
Channel x, SCSI ID #n - id info - Drive C: (80h)
```

If you see this message:

 - a. Verify that the SCSI hard disk drive is set to address 1.
 - b. Check the SCSI bus cable for correct orientation, alignment, and seating on the host adapter and the hard disk drive.
 - c. Verify that terminators are installed at each end of the SCSI bus, but not on any other devices. The hot swap cage printed circuit board has automatic termination that disconnects when a cable is attached.
 - d. Verify all SCSI devices on the bus are appropriate for that bus (only single-ended SCSI devices on the single-ended bus; only differential SCSI devices on the differential bus).
12. If the HP Server still fails to recognize the SCSI drive, disconnect all SCSI devices except the host adapter and the drive at SCSI address 0 and try again. If the HP Server fails, try substituting a known good hard disk drive.
13. If the SCSI BIOS has properly identified device 0 and has installed it as drive C, but cannot find a device at address 1, and in addition, if no further messages are displayed, it indicates the HP Server cannot load the operating system from device 0, check the following:

- a. If a second hard disk drive is connected to the SCSI bus, check it for proper address selection, SCSI cable connection, and proper power.
 - b. Partition the hard disk drive if required.
14. Verify all SCSI devices on the bus are appropriate for that bus (only single-ended SCSI devices on the single-ended bus; only differential SCSI devices on the differential bus).
 15. Disconnect all SCSI devices except the SCSI adapter and the drive at SCSI address 0, and try again. If this fails, try substituting a known good SCSI adapter and disk drive.
 16. Use the Setup Utility to check for resource conflicts, especially if new boards or accessories have been added.

Symptom:

- The SCSI subsystem stops working

If the SCSI subsystem should stop working, do the following:

1. Review the **Troubleshooting Checklist** and **Mass Storage Guidelines** before you continue.
2. Verify that the SCSI ID and other switch settings are correct and get specific information or verification that the problem is the SCSI bus.
3. If an accessory board was added recently, check if there is a resource conflict between the new board and an existing accessory board. Also, if you have changed the options on an existing board, there may be a resource conflict.
 - a. Remove the new board and restart the server. If this corrects the problem, the board is either defective or it is trying to use a system resource used by the SCSI subsystem.
 - b. Check if the board is using memory, I/O addresses, or interrupt lines that are also used by the SCSI subsystem.
4. Check to see if there have been recent changes to any software. For example, has anyone moved, removed, or changed the configuration files or drivers? Refer to the software documentation for more information.
5. If you suspect hardware failure and there are no system error messages, check each component associated with the failure. Equipment failure is probably the most unlikely reason for a SCSI subsystem failure.

Processor Problems

NOTE Bad processors are mapped out by the BIOS and are not tested again at power-up of the server. To retest a processor, enable Processor Retest through the BIOS Setup Utility.

If a problem exists with the HP Server processor;

1. Remove and reseal the processor module(s).
2. Remove and reseal the CPU Power Pod(s).
3. Check the System Event Log (SEL) for any processor errors.
4. Check the System Event Log (SEL) for any CPU board errors.
5. Run Platform Diagnostics to test the processors.
6. Replace each of these components, one-at-a-time, with a known-good component, and retest the HP Server:
 - ◆ Processor
 - ◆ CPU Power Pod
 - ◆ Y-Cable

CAUTION Do not push on the processor components; push only on the edge. Pushing on the device may damage it.

3. If the fault persists, replace the CPU board.

Memory Problems

The memory modules are DIMMs.

NOTE If the **POST** (displayed at power-on time) indicates a defective memory module, replace it.

1. Review the **Troubleshooting Checklist** before you continue.
2. If memory problems are being experienced, power the HP Server off and on. This performs a "cold" restart, rather than a "warm" restart (as it does when you press **Ctrl+Alt+Del**).

Check the System Event Log (available on certain HP Server models) for messages indicating memory errors.

4. Check the status of the memory modules through Intel Server Control (ISC), if applicable.
5. Run the Platform Diagnostic test.
6. Reseat the memory modules.
7. To check that the modules are installed and configured correctly:
 - a. Remove all of the installed memory.
 - b. Install one set of known good DIMMs (4 in a row). If you still receive an error, replace the memory board.

If the error goes away, add another set of DIMMs (4 in a row) and reboot again. Continue this process until you have installed all DIMMs or you experience a failure.

Replace the defective DIMM.

7. Once a suspect part has been found, verify the cause of the problem by reinstalling the part and attempting to duplicate the error. Also install it in another memory socket to confirm whether or not the socket is defective.

Network Interface Card Problems

See the appropriate Network Interface Card documentation.

Symptom:

- If the adapter can't connect to the network
 1. Make sure the cabling is installed properly.
 2. Most hub and switch connections require straight-through cable; consult their documentation. If you're directly connecting two computers (with no hub or other device), use a "crossover" cable.
 3. Verify there are no resource conflicts between the NIC and any other accessories in the HP Server. Check the Setup Utility.
 4. Check the LEDs on the adapter at the back of the computer to see if any show activity. No lit LEDs probably indicate a bad network cable, hub connection or other network error.
 5. Ensure you're using the latest and correct drivers. Verify the drivers are intended for this adapter.
 6. Ensure the port on the switch or hub (or other device) has the same duplex setting as the adapter.
 7. If you configured the adapter for full duplex, make sure the switch port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.
 8. Test the adapter as directed in the installation tasks for each operating system. Also check the "README" files on the support disk.

6 Replacing Parts

Safety Information

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

- Use an anti-static 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 server. Always remove AC power from the CPU and other associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.
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Tools and Supplies Needed

- Phillips (cross-head) screwdriver (#2).
- Small flat-bladed screwdriver.
- Jumper-removal tool or needle-nosed pliers.
- Antistatic wrist strap and conductive foam pad (recommended).
- Pen or pencil.
- Equipment log: as you integrate new parts into the system, add information about them to your equipment log. Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system.

Safety: Before You Remove Server Covers

Before removing covers at any time to work inside the system, observe these safety guidelines.

Turn off all peripheral devices connected to the system.

Turn off the system by using the push-button on/off power switch on the front of the system.

Unplug the AC power cords from the system or wall outlet.

Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.

Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove covers of the system. Only a technically qualified person should integrate, configure, or service the system.

WARNING

System power on/off: The on/off button (a convex button) on the front of the chassis DOES NOT turn off the system AC power. To remove power from system, you must unplug the two AC power cords from the wall outlets or the system.

Hazardous conditions, power supply: Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by technically qualified personnel.

Hazardous conditions, devices, and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the power cords, telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.

Hazardous conditions, processors and power pods: Thermal conditions may be present in the processor/memory complex. Allow all fans to continue to run until they shut down on their own after power has been turned off. After the fans stop, the power cords can be removed.

CAUTION

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you do all procedures in this chapter only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place it component-side UP on a grounded, static-free surface. If you place the I/O carrier on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Use a conductive foam pad if available but NOT the board wrapper. Do not slide board over any surface.

Cooling and airflow: For proper cooling and airflow, always install the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts.

Removing and Installing the Top Cover

The server comes with a removable top cover. Removal of this cover is necessary when installing or removing many components. You do not have to remove the top cover when removing or installing PCI hot plug and non-hot plug adapter boards, the Legacy I/O board, fans, hard drives, power supplies, or components inside the Processor/Memory Complex.

CAUTION For proper cooling and airflow, do not operate the server with the cover removed. Always reinstall them before turning on the server.

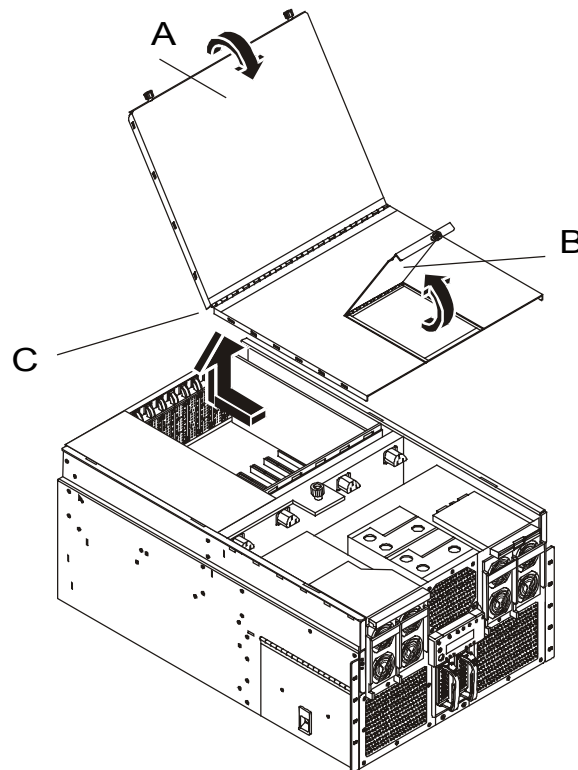


Figure 19. rx4610 Covers

Rear half of the cover
120 mm fan cover
Top cover

Removing the Top Cover

To remove the cover, follow these steps:

1. Turn off all peripheral devices connected to the server.
2. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds.
3. Disconnect the power cord and any Ethernet line.
4. Pull the server out of the rack.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

5. Loosen the thumbscrew at the front of the chassis that secures the 120 mm fan bay and fold the fan cover open.
6. Loosen the two thumbscrews that secure the top cover to the rear of the chassis and fold the rear half of the top cover open.
7. Loosen the screw that secures the non-hot plug PCI adapter board cover and remove that cover.
8. Place your hands on the sides of the chassis near the hinge of the rear part such that your thumbs can aggressively slide the entire top cover toward the rear of the chassis. Sliding the cover in this direction disengages the hooks on both sides of the top cover from the chassis housing.
9. Lift the top cover off the chassis.

Installing the Top Cover

To replace the cover, complete these steps:

1. Provide ESD protection by wearing an antistatic wrist strap attached to chassis ground of the system when handling components.
2. Before installing the top cover, check that you have not left loose tools or parts inside the system.
3. Check that cables, add-in boards, and other components are properly installed.
4. Make sure that the 120 mm fan cover is lifted and open.
5. Fold the rear part of the top cover open and set it down on the chassis, aligning the hooks on both sides of the front half of the cover.
6. Place your hands on the sides of the chassis near the hinge of the rear part such that your thumbs can aggressively slide the entire top cover toward the front of the chassis. Sliding the cover in this direction engages the hooks on both sides of the top cover into the chassis housing.
7. Close the 120 mm fan cover and tighten the thumbscrew. If the door does not close then the top cover hooks have not fully engaged into the chassis.
8. Replace the PCI adapter board cover and install the screw that secures it to the top cover.
9. Close the rear half of the top cover and tighten the two thumbscrews.
10. Push the chassis back into the rack.
11. Connect the keyboard, mouse, and monitor before powering up the system.
12. Power on the system.
13. Power on any peripherals connected to the server that you shut down.

Replacing Hot-Swap Components

Hot Swapping the 172 mm Fans

The four 172 mm cooling fans are mounted in pairs on each side of the chassis. You can hot-swap these fans without turning the server system power off. Each fan uses an amber LED located on the fan's casing to indicate the fan has failed. If it is a failed fan, the amber LED will be illuminated on the front panel, and the amber LED on the failed fan itself will be illuminated. The individual fan LEDs may be seen through view-ports in the fan covers.

Removing the 172 mm Fans

To remove the 172 mm fan, complete the following steps:

1. Observe all standard safety and ESD precautions.
2. Slide the server out of the rack far enough to expose the fan-access doors near the front sides of the chassis.

CAUTION Do not leave the door open for an extended time. Cooling of the system could be reduced.

3. Slide the plastic latch on the fan cover upwards and pull the door open.
4. Grasp the fan assembly with the finger holes and pull it out.

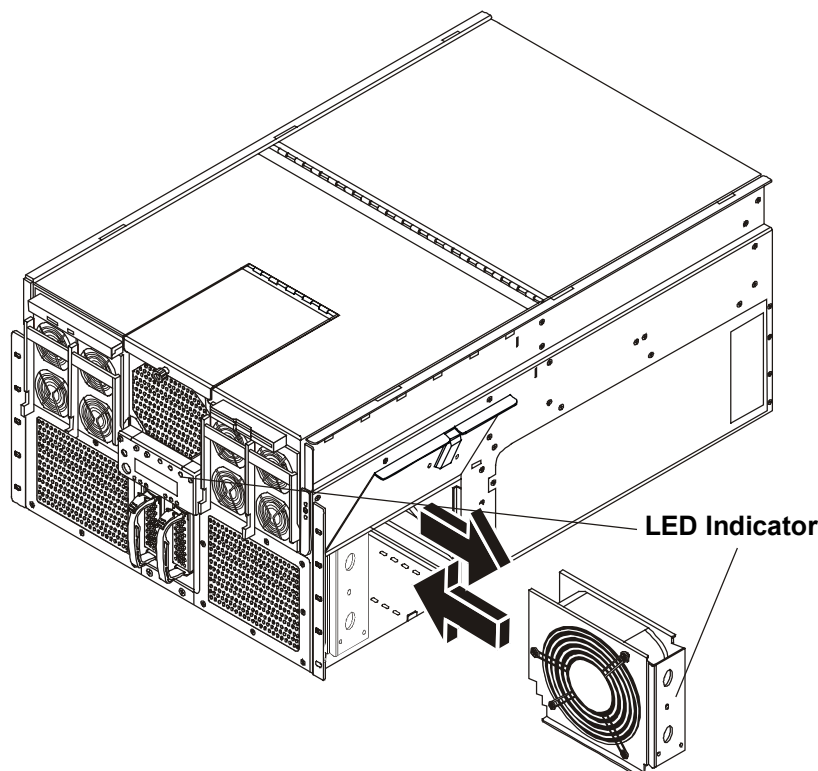


Figure 20. Removing the 172 mm Fans

Installing the 172 mm Fans

To install the 172 mm fan, complete the following procedure:

1. Lift the latch on the fan-access door and open the door.

NOTE Verify the connector orientation prior to installing the new fan.

2. Slide the new fan into place with the connector oriented to engage the socket inside of the fan enclosure.
3. Push the fan assembly firmly into the enclosure to seat the connector.
4. Close the fan-access door and engage the latch by pushing it downward.
5. Slide the chassis back into the rack.

Hot Swapping the 120 mm Fans

The two 120 mm cooling fans are mounted on the top front of the chassis. These fans can be replaced without shutting down power to the system. If it is a failed fan, the amber LED will be illuminated on the front panel, and the amber LED on the failed fan itself will be illuminated. The individual fan LEDs may be seen through view-ports in the fan covers.

Removing the 120 mm Fans

To remove the 120mm fan, complete the following procedure:

1. Slide the server out of the rack far enough to expose the fan-access door on the top of the chassis.
2. Unscrew the thumbscrew on the front of the fan-access door and lift the door open. If a fan has failed, the amber LED light is illuminated.

CAUTION Do not leave the door open for an extended time. Cooling of the system could be reduced.

3. Grasp the fan assembly through the finger holes and pull the assembly out.

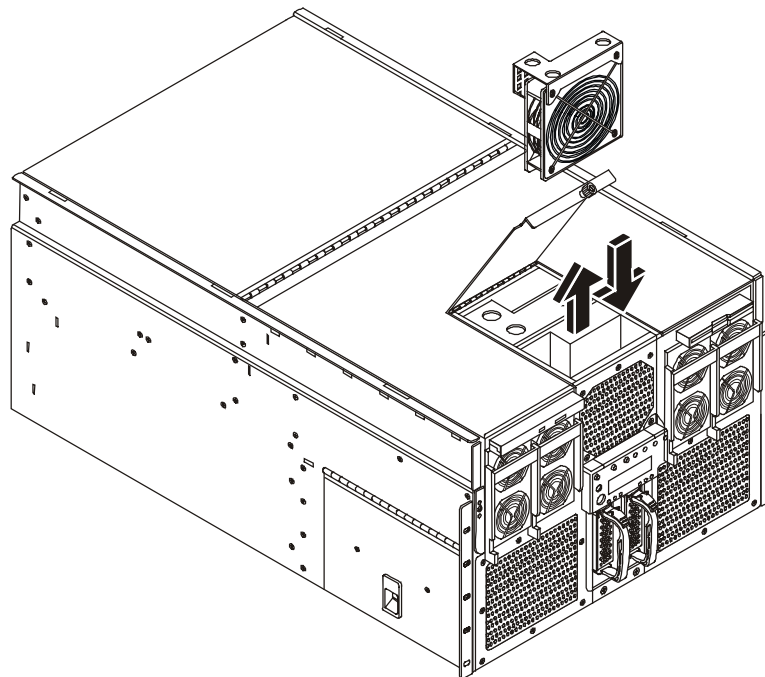


Figure 21. Removing the 120 mm Fans

Installing the 120 mm Fans

Follow these steps to install a 120 mm fan:

1. Slide the server out of the rack far enough to expose the fan-access door on the top of the chassis.
2. Unscrew the thumbscrew on the front of the fan-access door and lift the door open.
3. Slide the new fan into place, with the connector oriented to engage the socket inside of the fan enclosure.
4. Push the fan assembly firmly into the enclosure to seat the connector.
5. Close the fan-access door and tighten the thumbscrew.
6. Slide the chassis back into the rack.

Hot Swapping a Hard Drive

The HP Server supports a variety of single-ended SCSI SCA-type hard disk drives. The area of the chassis below the system's controls and indicators on the front panel houses up to two 3.5-inch bays. Each bay can contain a single industry-standard SCSI-2 or SCSI-3, one-inch high hard disk drive from the factory. The procedures in this section describe how to determine drive status, remove a faulty drive, and install a new drive.

Determining Drive Status

Status LEDs arranged in sets of three over each of the two Hard Disk Bays monitor the status of each drive.

Table 4-1. SCSI Drive Status LED Descriptions

SCSI drive present with power on Green LED Left	SCSI drive active Green LED Middle	SCSI drive faulty* Amber LED Right	Description and Action (If Required)
On	Off	Off	Drive is present with power.
On	Blinking	Off	Drive is present with power and is being accessed.
Off	Off	On	Steady amber fault light indicates drive has a problem.
On	Off	Slow Blinking	Drive SHOULD NOT be replaced at this time. A slowly blinking amber fault light indicates that a drive that has just been replaced is in recovery mode (drive array being rebuilt). Power to drive is on.
Off	Off	Off	There is no drive installed in the bay.

Removing a Hard Disk Drive

To remove a hard disk drive from the disk bay, complete the following procedure:

1. Look at the amber LEDs above the hard disk bays to determine which drive is bad. See Table 4-1 for information on how to interpret the LEDs.
2. Remove the plastic bezel on the front of the server.
3. Depress the drive carrier latch of the bad drive, and use the handle to pull the assembly toward you to disengage the drive from the backplane connector.

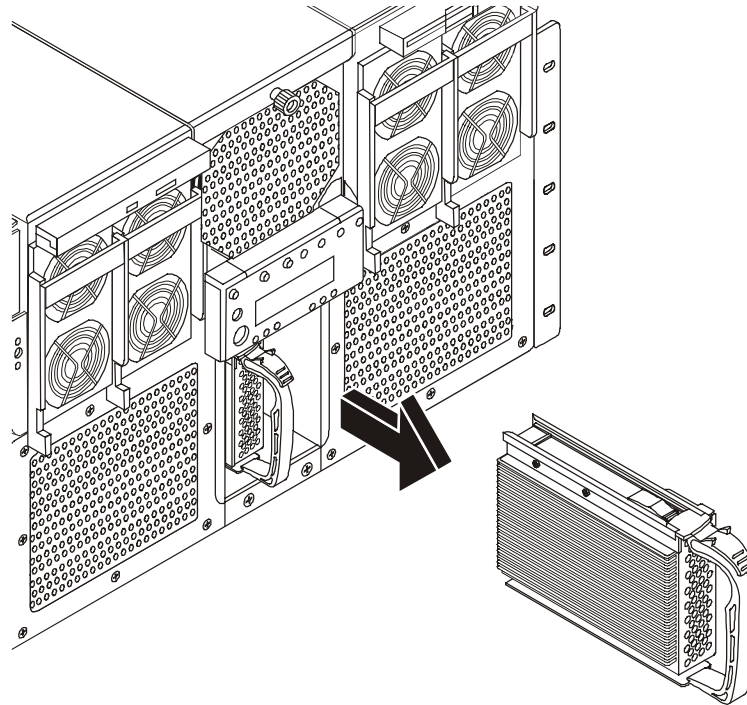


Figure 22. Removing a Hard Disk Drive

4. Carefully slide the assembly out of the bay, and place it on an antistatic surface.

Installing a Hard Disk Drive

Hard disk drives are packaged in their drive carriers for immediate installation. They require no assembly and may be installed without the use of any tools. To install the hard disk drive, complete the following procedure:

1. Remove the plastic bezel on the front of the server.
2. Orient the new drive's carrier and drive assembly in front of the bay guide rails so that the latch is toward the top. Make sure that the carrier is placed correctly into the guide rails to avoid damage.

CAUTION	Do not press on the perforated metal bracket of the carrier when you push the assembly into the bay, or you may damage the metal fingers of the bracket.
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While grasping only the drive carrier handle, firmly push the assembly into the bay until the drive docks with the backplane connector and the carrier latch locks.

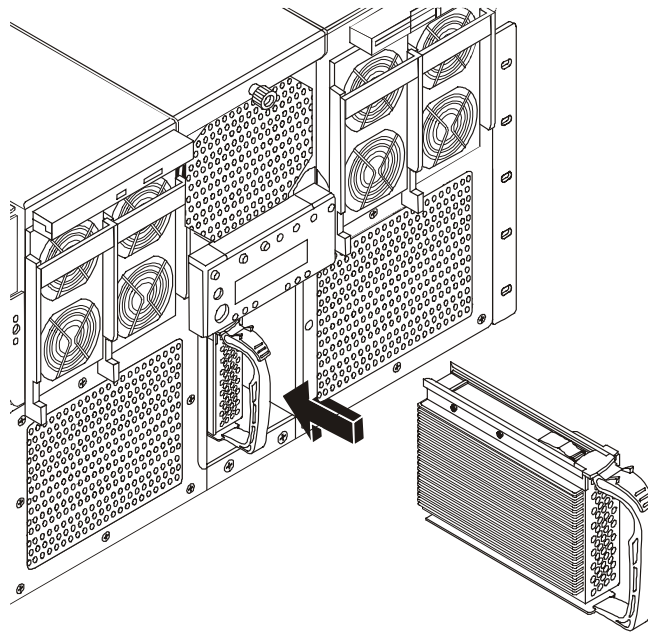


Figure 23. Hot Swapping a SCSI Drive

Replace the plastic bezel on the front of the server.

Mounting a Hard Disk Drive in a Carrier

The rx4610 server supports a maximum of two hot swap drive carriers. Each carrier can house a standard one inch high by three and half inch wide SCSI-2 or SCSI-3 hard drive. The drives are shipped mounted in the carrier. If the drive must be mounted in the carrier, it uses four screws. This arrangement allows for easy installation and removal of hard drives.

To mount a hard drive to a carrier, follow these steps:

Remove the 3.5-inch hard disk drive from the protective wrapper, and place it on an antistatic surface.

Record the model and serial numbers of the drive in your equipment log.

Orient the drive carrier so that the handle is toward your left and the metal EMI/ESD fingers are toward your right.

Orient the drive so that both the following are true:

- ◆ The drive's label faces away from the carrier heatsink, toward the carrier fingers
- ◆ The drive's connector faces away from the carrier handle

CAUTION Be careful not to bend or damage the carrier's metal fingers as you attach the drive to the carrier.

5. Position the drive in the end of the carrier away from the handle, then slide the drive toward the handle.
6. Place the drive and carrier assembly on an antistatic surface of a table or a workbench so that the drive handle and fingers overlap the edge of the table or the workbench.
7. Using four screws of the appropriate size and length (not supplied), attach the carrier to the drive.

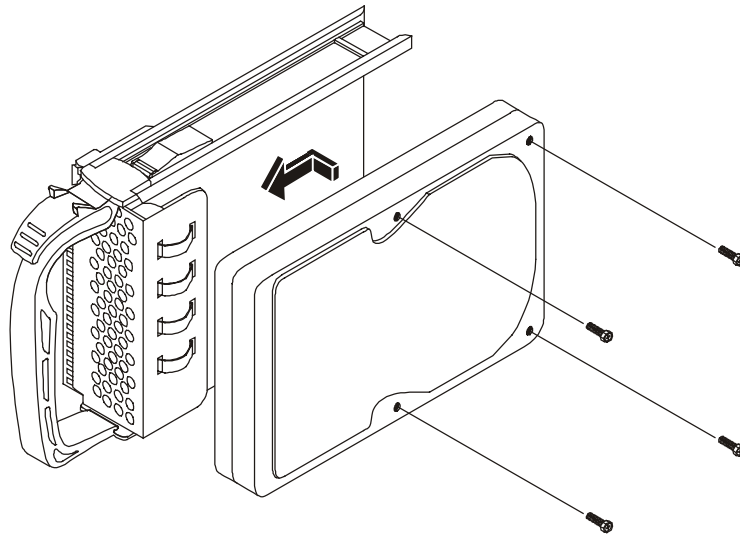


Figure 24. Hard Disk Carrier

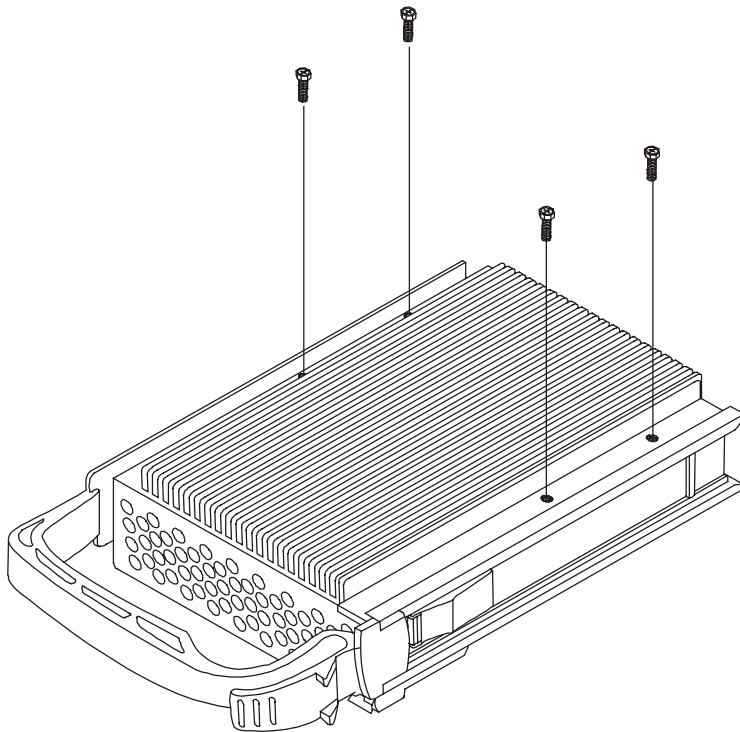


Figure 25. Mounting Hard Disk Drive to Carrier Assembly

Hot Swapping Power Supplies

In a fully configured system, the power system contains four 800-watt autoranging power supplies. The third bay's power supply serves a redundancy function for the server's power supply requirements.

CAUTION Because of chassis airflow disruption, the power supply bay should not be vacant for more than five minutes when server power is on. Exceeding the five-minute limit might cause system cooling to fall below the minimum required level and possibly cause damage to system components.

NOTE If you have only three supplies installed, they must occupy the first, second, and fourth power supply bays as you face the chassis. Figure 26 shows the power supply installation order.

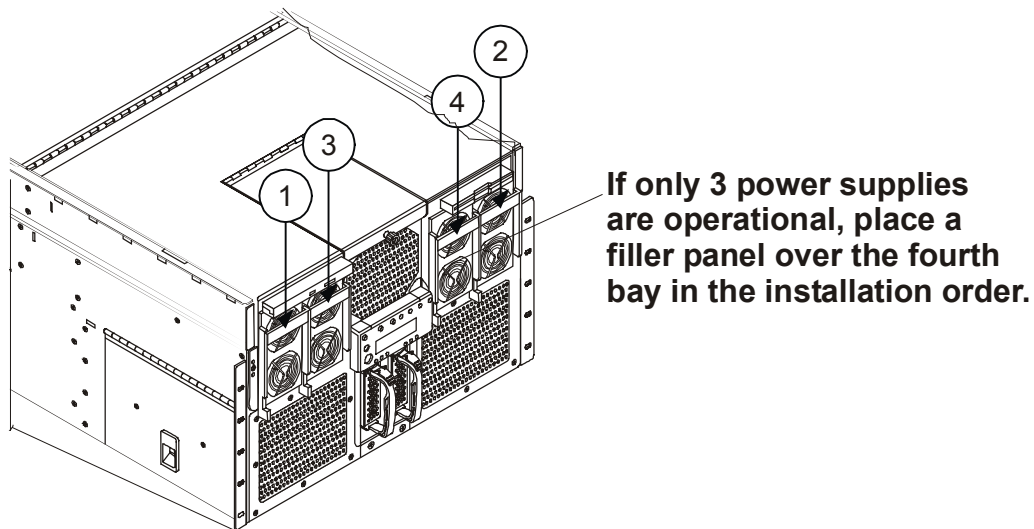


Figure 26. Power Supply Installation Order

Determining Power Supply Status

When the amber power supply failure LED on the front of the chassis turns on, determine which power supply is defective by checking the three status LEDs on each supply. Each power supply has three LEDs that both indicate whether power is supplied to the power supply and the health of the power supply. The LEDs are ordered top to bottom on each power supply. Table 6-1 illustrates the states indicated by the three LEDs.

Table 6-1. Power Supply LEDs

Power Supply Status	PWR (Green) (Top Position)	PFAIL (Amber) (Middle Position)	FAIL (Amber) (Bottom Position)
No AC power to any power supplies	Off	Off	Off
No AC power to a specific power supply	Off	Off	On
AC present / Standby output on	Blinking	Off	Off
DC outputs on and	On	Off	Off

Power Supply Status	PWR (Green) (Top Position)	PFAIL (Amber) (Middle Position)	FAIL (Amber) (Bottom Position)
okay			
Power supply failure	Off	Off	On
Current limit	On	Off	Blinking
Predictive failure	On	Blinking / Latched	Off

Removing a Power Supply

To remove a power supply, complete the following procedure:

1. Locate the power supply you want to remove.
2. Push the thumb latch to unlock the power supply handle and pull the handle down to undock the supply.

CAUTION Any unused power supply slots must be covered with a blanking plug. Uncovered slots can disrupt the air flow used for cooling the system.

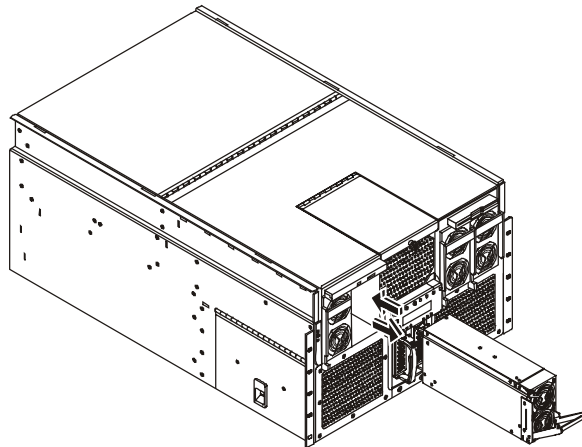


Figure 27. Removing a Power Supply

3. Pull the power supply straight forward, out of the chassis. Set it aside.

Installing a Power Supply

The power supply bay should not be vacant for more than five minutes when server power is on. Disruption of the airflow may cause system cooling to fall below acceptable levels. To install the new power supply, complete the following procedure:

1. Remove the new power supply from the protective packaging, and place it on an antistatic surface.
2. Record the model and serial numbers of the power supply in your equipment log.
3. With the handle in the open position (pulled down), slide the replacement power supply into the power supply bay until it stops.
4. Rotate the handle up and in to lock the power supply into place.

Check the new power supply LEDs to verify proper functioning.

Replacing Hot Plug PCI I/O Boards

The HP Server has eight hot swap PCI board slots and two non-hot swap PCI board slots. Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the system. The following procedures detail the steps required to install both types of boards.

Removing a Hot Plug PCI Board

To remove a hot plug PCI board, complete the following steps:

1. Observe standard safety precautions when working with the server.
2. If your server is operating, use your operating system or GUI application to power down the PCI slot that contains the board you are going to remove.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.
----------------	---

3. Pull the chassis out of the equipment rack as far as it will go.
4. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
5. Lift the rear cover to expose the hot plug PCI slots.
6. Disconnect any cables attached to the board you are removing.
7. Press the center of the rocker switch that secures the end of the board nearest the rear of the chassis. When the mechanism clicks open, position it all the way down by rotating it from the outside of the chassis.
8. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
9. Carefully grasp the adapter board and gently slide it up and out of the system. Make sure that you do not scrape the board against other components.
10. Store the board in an antistatic protective wrapper.
11. Install an expansion slot over the vacant slot by aligning the cover with the slot from the rear of the chassis and pressing the cover into the slot.
12. Close the rear part of the chassis top cover and tighten the two thumbscrews.
13. Push the system back into the cabinet rack.

Installing a Hot Swap PCI Board

The HP Server has eight hot plug PCI I/O slots in the I/O Baseboard. You can replace a hot plug PCI I/O board without shutting down the server. However, you must use the operating system or a resident GUI to shut down or power off the PCI I/O board before you replace it.

The PCI hot-plug (PHP) is a rotating plastic mechanism that actuates a switch located on the PCI hot plug LED board. Each PCI slot has four indicator LEDs: two on the outside and two on the inside of the system. The LEDs operate differently depending upon the operating system installed. Please refer to your operating system's manual.

To install a hot swap hot plug PCI I/O board, complete the following steps:

1. If your server is operating, use your operating system or GUI application to make sure the PCI slot that you are installing the board into is powered down.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

2. Pull the chassis out of the rack as far as it will go.
3. Loosen the two thumbscrews in the back of the chassis that secure the rear part of the top cover.
4. Lift the rear cover to expose the hot plug PCI slots.

CAUTION Do not touch the components or gold edge connectors on the add-in board as this may damage the connectors causing erratic performance.

5. Remove the card from its protective wrapper, and place it component-side up on a nonconductive, antistatic surface.
6. Record in your log the serial number of the board and any jumpers or switch settings according to the board manufacturer's instructions. See Appendix B for the equipment log form.
7. Skip to step 8 if you are installing a board in an empty slot. To replace a board or install a different board in an occupied slot, after the LED shows which slot is powered down, press the center of the PHP mechanism to disengage it from the LED board.
8. Be sure that the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis is open so that it will allow a board to be removed/inserted.

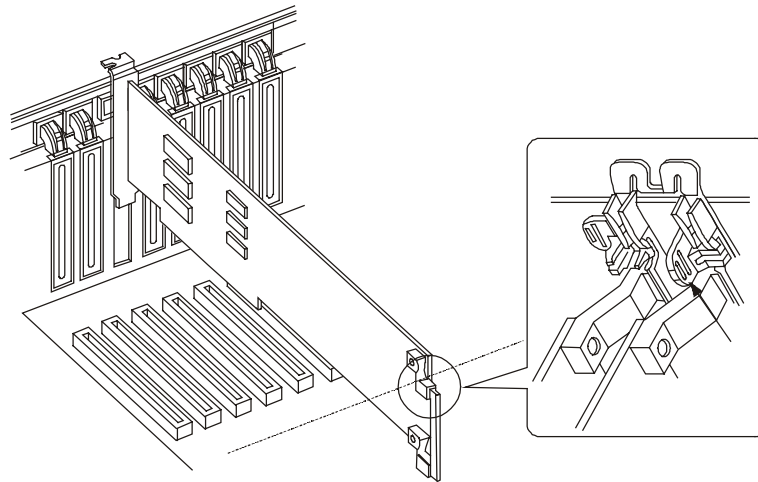


Figure 28. Open the Plastic Retaining Mechanism Towards the Front of the Server

9. Be sure that the plastic PCI hot plug (PHP) mechanism that secures the end of the board nearest the rear of the chassis is in the open position. If not, press the center of the PHP until it clicks open and then rotate the mechanism downward from outside the chassis.

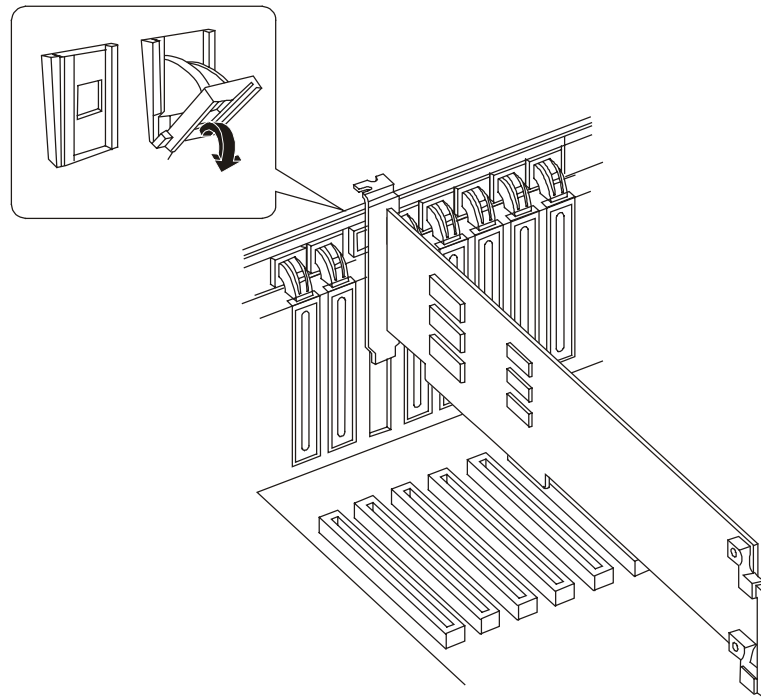


Figure 29. Open the PCI PHP Mechanism Securing the Board at the Rear of the Chassis

10. If you are adding a new board, remove the perforated rear panel cover in the slot you're using by pushing it out from inside the chassis.
11. Press the PCI board down firmly until it seats in its slot.

CAUTION

Some accessory/option board outputs exceed Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the national electric code during installation.

12. Close the plastic latching mechanism that secures the end of the board nearest the front of the chassis.
13. Rotate the PHP mechanism near the rear of the chassis up until it clicks into place. This position both secures the end of the board and allows it to be activated with the operating system or GUI application.
14. Close the rear part of the top cover and tighten the two thumbscrews.
15. Connect any required cabling to the add-in board.
16. If your server is operating, use the operating system or GUI application to power up the PCI I/O slot into which you installed the PCI I/O board.
17. Push the system back into the equipment rack.

Replacing Non-Hot Plug PCI I/O Boards

The HP Server has eight hot swap PCI board slots and two non-hot swap PCI board slots. You can remove a hot plug PCI I/O board without shutting down the server, but you must use the operating system or a resident GUI to shut down or power off the PCI I/O board before removing it. The HP Server must be shut down before installing a non-hot plug PCI board.

CAUTION Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the system.

Removing a Non-Hot Plug PCI Board

To remove a non-hot plug PCI board, complete the following steps:

1. Observe the safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Remove both AC power cords. Removing the power cords ensures that the server is not under standby power.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Pull the chassis out of the rack as far as it will go.
5. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
6. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
7. Loosen the screw that secures the non-hot plug PCI adapter board cover.
8. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover by unseating the slot hinge. Access is now available to the two non-hot plug PCI slots and the Legacy I/O board.
9. Label and disconnect all peripheral cables attached to the board you are going to remove.
10. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
11. Press the center of the rocker switch that secures the end of the board nearest the rear of the chassis. When the mechanism clicks open, rotate it all the way down from the outside of the chassis.

Carefully grasp the adapter board and gently slide it up and out of the system. Be sure not to allow the board's components to touch any neighboring boards as you lift the board out of the system.

13. Place the board component side up on a nonconductive, antistatic surface.

Installing a Non-Hot Plug PCI Board

Use this procedure to install a non-hot plug PCI accessory board. Observe the safety guidelines listed earlier. The server must be shut down before installing a non-hot plug PCI board.

1. If the HP Server is already installed and working, power down the HP Server.

WARNING The power supply will continue to provide standby current to the HP Server until the power cable is disconnected.

2. Disconnect the power cables and any external cables connected to the HP Server. If necessary, label each one to expedite re-assembly.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

3. Pull the chassis out of the rack.

CAUTION Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist-strap contacts your skin.

4. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
5. Read the documentation included with the accessory board and follow any special instructions.
6. Identify the accessory slot number to be used. See Figure 30.

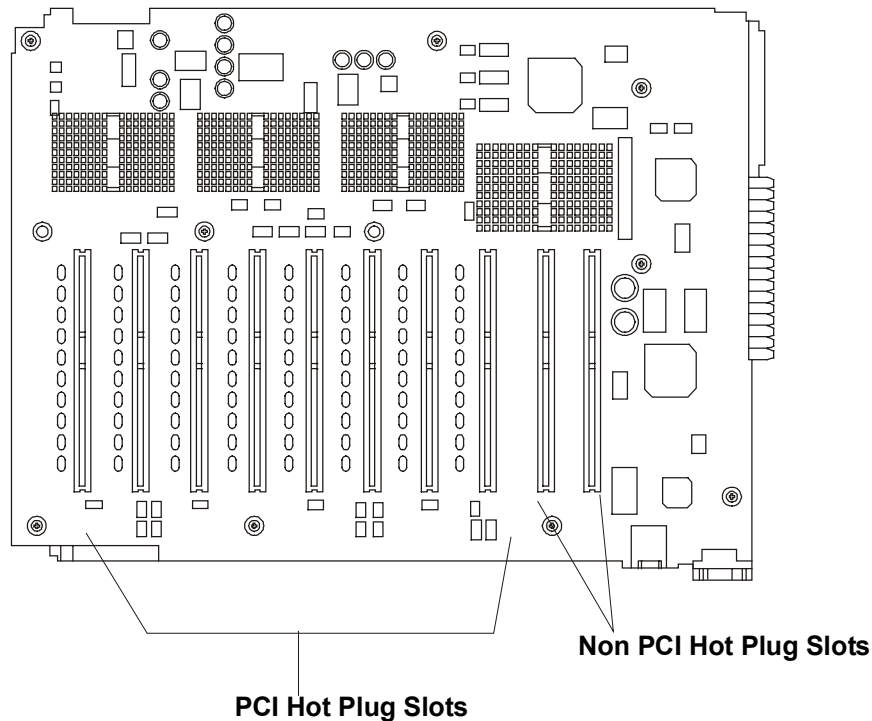


Figure 30. Accessory Slots

NOTE Refer to the Readme file for the Tested Products List that shows specific slot recommendations for a particular PCI board type.

7. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
8. Loosen the screw that secures the non-hot plug PCI adapter board cover.
9. Grasp the cover by its exposed, long side and lift the cover over the non-hot plug boards away from the chassis. You can completely remove the cover if you want by unseating the slot hinge. Access is now available to the two non-hot plug PCI slots and the Legacy I/O board.

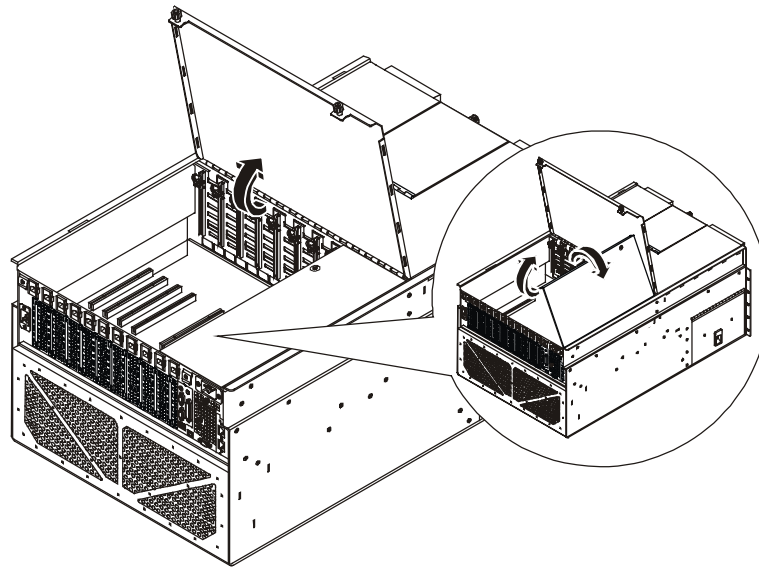


Figure 31. Accessing the Non-Hot Plug Boards

10. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis so that it will allow a board to be inserted
11. Be sure that the rocker switch that secures the end of the board nearest the rear of the chassis is in the open position. If not, press the center of the rocker switch until it clicks open and then rotate the mechanism downward from outside the chassis.
12. If you are adding a new board, remove the perforated rear panel cover in the slot you're using by pushing it out from inside the chassis.

NOTE

Ensure you save the slot covers for use later to prevent EMI interference. These slot covers make a better metal-to-metal contact than previous slot cover designs.

13. Being careful not to touch the components or gold edge connectors on the add-in board, remove it from its protective wrapper and place it component-side up on a nonconductive, antistatic surface.
14. Record the serial number of the board in your equipment log. See Appendix B for the equipment log.
15. Press the PCI adapter board down firmly until it seats in its slot.
16. Close the plastic latching mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
17. Rotate the rocker switch near the rear of the chassis up until it clicks into place.
18. Install the non-hot plug PCI adapter board cover by aligning the slotted hinge into the chassis housing, closing the cover, and securing the cover screw.
19. Attach any cables to the PCI adapter board you just installed.
20. Close the rear part of the top cover and tighten the two thumbscrews.
21. Attach the power cords.
22. Push the system back into place into the equipment rack.
23. Power on any attached peripheral devices.
24. Power on the system.

25. Once the accessory board is installed, you may need to install software drivers. The drivers for the new board are either part of your existing system software or included on a flexible diskette provided with the accessory board.

Removing and Installing the Hard Disk Bay

The Hard Drive Bay provides mounting features for two hot swap hard drives, the Front Panel Interface board, and the Hot Swap Backplane board. You can easily remove and install the bay from the chassis by removing the front bezel and four mounting screws.

Removing the Hard Disk Bay

To remove the Hard Disk Bay, complete the following procedure:

1. Turn off the system by using the power on/off switch on the front of the chassis and remove both AC power cords.
2. Remove the front bezel.
3. Remove each hard disk drive from the drive bay by first grasping its handle and depressing the drive locking tab, and then sliding the drive out of the bay.
4. Remove the four #2 Phillips screws from the top and bottom of the drive bay.
5. Grasp the bay by the Front Panel display housing and gently pull the drive bay out of the chassis.

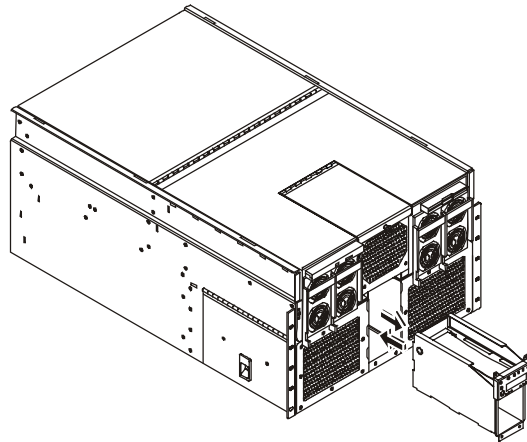


Figure 32. Hard Disk Bay

Installing the Hard Disk Bay

To install the Hard Disk Bay, complete the following steps:

1. Turn off the system by using the power on/off switch on the front of the chassis and remove both AC power cords.
2. If the front bezel is not already removed, remove the bezel.
3. Align the Hard Disk Bay such that the connector side is facing into the chassis and push the bay into the front of the chassis.
4. Ensure the drive bay seats into the front connector on the Power Distribution Board (T-Docking Board).
5. Replace the four screws at the top and bottom of the bay.
6. Replace any disk drives into drive bay as required.

7. Replace the Front Bezel.

Installing the Front Panel Board

The Front Panel Board displays server information. The module is attached to the front of the Hard Disk Bay, which must first be removed to gain access to the Front Panel Board.

Removing the Front Panel Module

To remove the Front Panel module, complete the following procedure:

1. Turn off the system by using the power on/off switch on the front of the chassis and remove both AC power cords.
2. Remove the Hard Disk Bay from the chassis as described in “Removing the Hard Disk Bay” earlier in this chapter.
3. Disconnect the cable to the Front Panel Board that is attached to the front of the Hard Disk Bay by squeezing the cable retention levers together. You do not have to remove the rear part of the cable.
4. Remove the two screws securing the Front Panel Board to the front panel mounting on the Hard Disk Bay. These screws are located on the inside of the Front Panel Board.
5. Remove the Front Panel Board from the Hard Disk Bay assembly and place it on an ESD protected work surface.

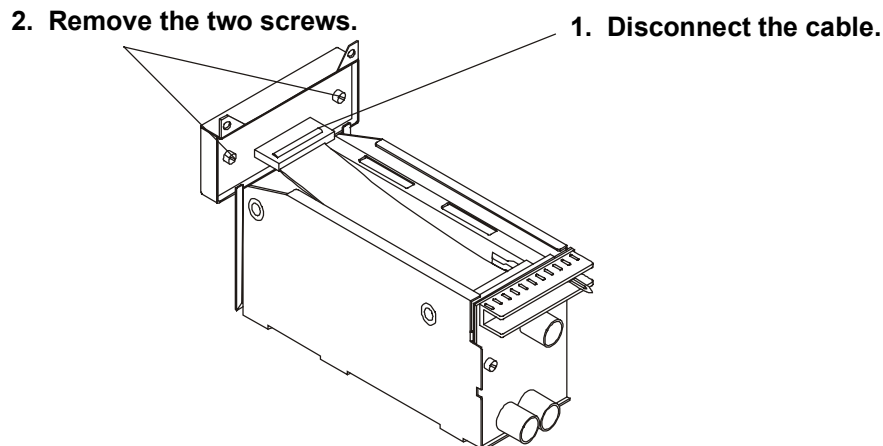


Figure 33. The Front Panel Board

Installing the Front Panel Board

To install the new Front Panel Board, complete the following steps:

1. Using two Phillips screws, secure the new Front Panel Board to the Hard Disk Bay.
2. Connect the front part of the Front Panel Board data cable to the connector on the new Front Panel Board.
3. Install the Hard Disk Bay into the chassis as described in “Installing the Hard Disk Bay” above.

Installing Non-Hot Swap Drives

The HP Server supports a slimline IDE diskette drive for 1.44 MB and 120 MB media and a DVD drive. Both drives are part of the standard configuration and mount directly above the power bays on the front of the chassis. The drives are mounted on removable trays that facilitate system assembly and service. The server must be powered down to install these drives.

Installing the Floppy Disk Drive

The floppy disk drive is housed in a two-piece drive carrier assembly that rests on the chassis surface. The assembly is accessible when the top cover is removed. The following procedures describe how to remove and install the drive.

Removing the Floppy Diskette Drive

To remove the floppy diskette drive, complete the following procedure:

1. Observe all safety and ESD precautions whenever you remove the cover from the HP Server.

WARNING

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

The power switch does NOT turn off the standby power. Disconnect the power cord from the HP Server before handling components.

2. Remove the top cover as described in “Removing and Replacing the HP Server’s Main Cover” in Chapter 2.
3. Disconnect the drive’s data and power cables from cable adapter PCB at the rear of the drive.
4. Loosen the thumbscrew found at the rear of the drive carrier assembly.
5. Slide the drive and the drive carrier assembly toward the rear of the chassis so that the front part of the drive clears the opening in the chassis.
6. Remove the drive carrier assembly with the drive in it from the chassis.
7. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.

Installing the Floppy Disk Drive

To install the new floppy diskette drive, complete the following steps:

1. Remove the new drive assembly from its protective wrapper, and place it component-side up on an antistatic surface.
2. Record the drive model and serial numbers in your equipment log.
3. Pick up the entire drive carrier assembly, being careful that you keep the pieces together, and place it on the chassis surface just inside the drive slot.
4. Grasp the sides of the drive and drive carrier assembly and slide it forward such that the front part of the drive comes through the opening in the chassis. Make sure that the thumbscrew at the rear of the drive carrier assembly aligns with the hole in the surface of the chassis.

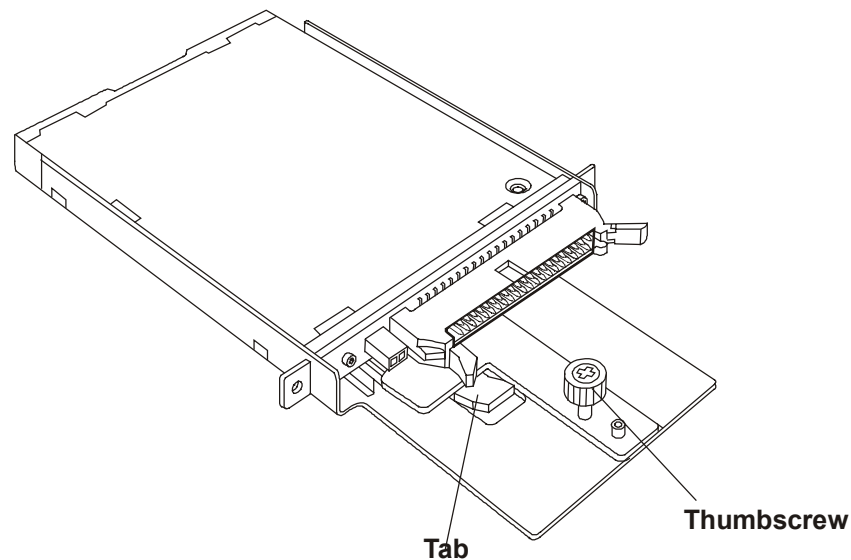


Figure 34. Diskette Drive

5. Tighten the thumbscrew at the rear of the drive carrier assembly.
6. Install the drive's data and power cables into the cable adapter PCB.
7. Install the top cover.

Installing the DVD Drive

The DVD Drive is housed in two-piece drive carrier assembly that rests on the chassis surface. The drive carrier assembly is accessible when the top cover is removed. The following sections describe how to remove and install the drive.

Removing the DVD Drive

To remove the DVD drive, complete the following procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the top cover as described in "Removing and Replacing the HP Server's Main Cover" in Chapter 2.
3. Disconnect the drive's data and power cables from the drive cable adapter PCB at the rear of the drive.
4. Loosen the thumbscrew found at the rear of the drive carrier assembly.
5. Slide the drive and drive carrier assembly towards the rear of the chassis so that the front part of the drive clears the opening in the chassis.
6. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.

Installing the DVD Drive

To install the new DVD drive, complete the following steps:

1. Remove the new drive from its protective wrapper, and place it face down on an antistatic surface.
2. Record the drive model and serial numbers in your equipment log.
3. Pick up the DVD drive and drive carrier assembly and place it face up (carrier side down) on the chassis such that the front of the drive is aligned with the opening in the front of the chassis.

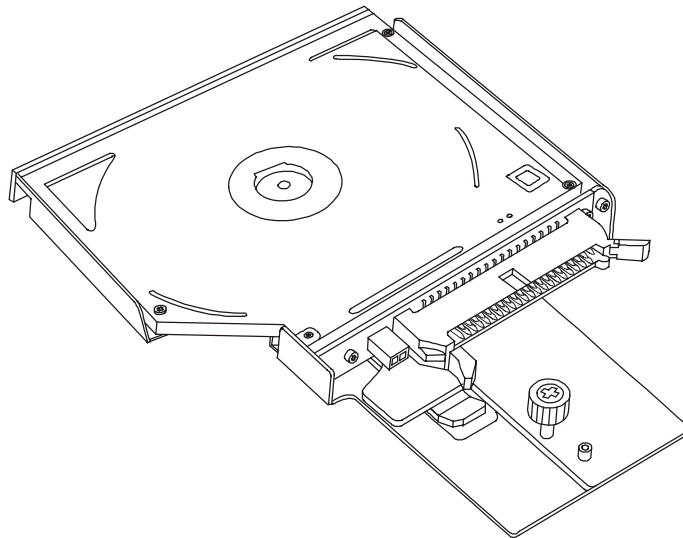


Figure 35. Installing the DVD

4. Grasp the sides of the drive and drive carrier assembly and slide it forward such that the front part of the drive comes through the opening in the chassis. Make sure that the thumbscrew at the rear of the drive carrier assembly aligns with the hole in the surface of the chassis.
5. Tighten the thumbscrew at the rear of the drive carrier assembly.
6. Connect the drive's data and power cables.
7. Install the top cover as described in "Removing and Replacing the HP Server's Main Cover."

Connecting External SCSI Devices

The second SCSI channel B is connected directly to the external VHD (Very High Density) 68-pin SCSI connector on the rear panel. All external SCSI devices are connected to the HP Server using this external connector, but the external SCSI devices must provide the necessary termination at the end of the SCSI chain. If no external devices are connected, then no termination is required. The internal SCSI controller terminates channel B electrically, if no external devices are sensed at the connector. Please consult the product update information for the latest approved adapters on the following HP website:

<http://www.hp.com>

Removing and Installing the Processor/Memory Complex

The Processor/Memory Complex mounts memory boards to the processor board and forms a module that you can remove from the main system chassis. To access this module, you need to remove the access door on the side of the chassis and remove the four screws on the left side of the chassis to slide the Processor/Memory Complex out of the system.

Removing the Processor/Memory Complex

1. If the system is already installed and working, power down the system.

WARNING The power supply will continue to provide standby current to the HP Server until the power cable is disconnected. Before removing the cover, always disconnect the power cord and unplug the Ethernet cables. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

2. Disconnect the power cables and any external cables connected to the system.

If necessary, label each cable to expedite re-assembly.

WARNING Make sure that the rack is anchored securely so that it does not tip when the server is extended from the rack.

3. Pull the chassis out of the rack to expose the Processor/Memory Bay on the right side of the chassis as you face its front.
4. Loosen the two-quarter turn screws on the left side of the Processor/Memory Complex cover such that the cover springs open.
5. Grasp the cover and press it back toward the chassis as you shift the cover to the left. Shifting the cover to the left clears the right side of the cover from behind the chassis side.
6. Once the cover is clear, set it aside.

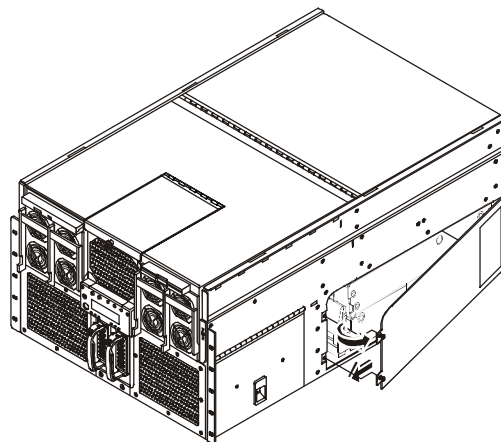


Figure 36. Opening the Processor/Memory Complex Bay Cover

7. Remove the four screws that secure the complex to the chassis. These screws are located on the left side of the chassis as you face the front of the system.
8. Rotate the two extraction levers on the sides of the module to eject it from the Sideplane board connector.

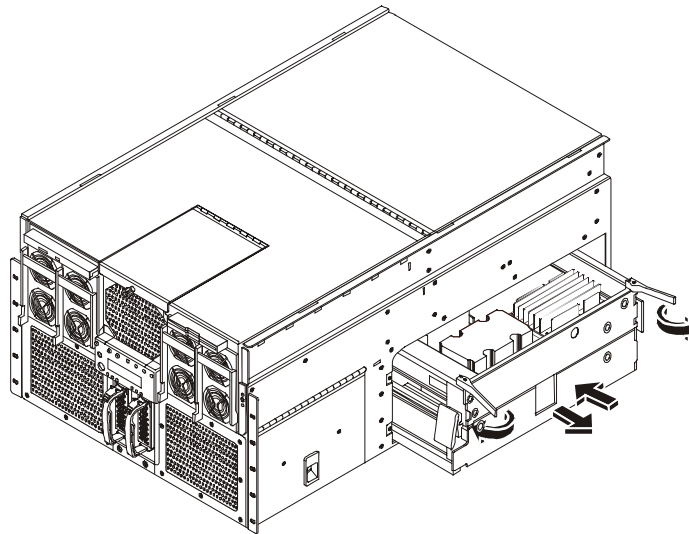


Figure 37. Removing the Processor/Memory Complex

WARNING

Fully loaded, the Processor/Memory Complex weighs 36 pounds (16.33 kg). Minimally configured, this complex weighs 24 pounds (10.80 kg). Exercise caution when lifting the complex out of the system.

9. Remove the complex from the bay and place it on a clean ESD protected surface.

Installing the Processor/Memory Complex

To replace the Processor/Memory Complex, complete the following procedure:

1. Orient the Processor/Memory Complex so that the high density connector is positioned to slide into the Processor/Memory Bay and connect to the Sideplane board.
2. With the two extraction levers on the top and pointed towards you, slide the Complex into the bay.
3. Push the extraction levers toward the chassis so that they are engaged at the same time, seating the Complex into the Sideplane board.
4. Fasten the four screws on the left side of the chassis to hold the Processor/Memory Complex in place.
5. Locate the Processor/Memory Complex Cover and orient it such that the right side of the cover is just to the left of the right side of the bay.
6. Press the cover's edge past the chassis and slide the cover to the right such that the edge of the cover slips in behind the chassis frame.
7. Press the left side of the cover toward the chassis and secure the two screws at the left of the cover.
8. Slide the unit into the rack.

Handling the Intel® Itanium™ Processor

The Intel Itanium Processor requires special shipping and handling procedures. Processors are shipped in clear plastic packaging often referred to as a “clamshell” that is enclosed in a cardboard box. The packaging has a maximum capacity of 10 processors. Be sure to follow these guidelines when handling the processors

- Be sure that you are grounded with a heel or wrist strap. It is recommended that you also use an anti-static smock.
- Remove processors from the packaging at an ESD safe workstation that has a flat surface.
- Processors are secured in separate slots in the packaging. Contact your Intel representative if there are any incoming quality concerns.
- When removing processors from the packaging, first remove the clamshell from the cardboard box. Then, carefully separate each locking feature along the perimeter of the clamshell. It is important to keep the package flat on the surface while you open it so that no processors fall out of the packaging.
- Remove processors one at a time by using two fingers to touch the black plastic and the metal plate. Pick up the processor closer to the end with the white label.
- Hold processors by their sides with the pins facing down after they have been removed from the packaging. Also, to avoid mechanical and/or ESD damage, do not touch the cartridge pin array, power tab edge connector, or PCB components.
- When placing processors on the flat, clean ESD surface, place them with their pins facing down. Do not stack cartridges on top of each other.
- Use an ESD-safe bin to transfer processors between workstations.
- To ship processors, place them into the clamshell and the cardboard box. Be sure that all pins face the center. For partial shipments, load toward the center of the clamshell. Finally, be sure that all locking features are fully mated along the perimeter of the clamshell.

Attaching a Heat Sink to a Microprocessor

The Intel Itanium Processor requires a heat sink to dissipate energy. The heat sink resides on top of the processor. Before adding a Microprocessor to your system, you need to be sure the heat sink is attached to the top of the Microprocessor.

CAUTION	When shipping, unpacking, or handling Intel Itanium Processors, be sure to follow the guidelines.
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To attach the heat sink to the microprocessor, complete the following steps:

1. Locate the Microprocessor and the heat sink. Be sure to follow the processor handling cautions outlined earlier.
2. Place the Microprocessor on a clean, flat, ESD-safe work surface.
3. If a blue thermal interface liner is attached to your heat sink, remove it. Attaching the heat sink to your Microprocessor without removing this liner will damage the Microprocessor.
4. Place the heat sink onto the Microprocessor. Align the edges of the heat sink with the edges of the Microprocessor.
5. Locate the four M2.5 screws used to secure the heat sink to the Microprocessor.
6. Place and tighten the four screws to 4 inch pounds. Use a cross-tightening pattern to evenly apply pressure.
7. Examine the assembly and be sure that all the screws are evenly tightened and that the heat sink is uniform on all sides. If so, the Microprocessor and heat sink assembly are ready for installation into the system.

Removing and Installing Microprocessors or CPU Thermal Dummies

The HP Server may have from two to four processors. Each processor is paired with an associated power pod. If your server has two processors, they must both reside on the top half of the Processor/Memory Complex. In this case, the bottom half of the complex contains CPU Thermal Dummies.

CAUTION If a processor slot does not have a processor installed, it must have a CPU Thermal Dummy installed to direct cooling air flow properly.

Removing the CPU Thermal Dummy

CPU thermal dummies must be installed where a processor is absent to properly direct cooling airflow. Therefore, the CPU thermal dummy must be removed before installing an additional processor.

Complete the following procedure to remove the CPU thermal dummy:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Processor/Memory Complex.
3. Orient the complex such that you have access to the surface from which you are removing processors or CPU thermal dummies.
4. Loosen the four captive screws that secure the triple-beam to the sides of the Processor/Memory Complex.
5. Remove the sheet metal baffle located to the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To remove the baffle, press the flexible retaining tabs in as you slide the baffle out. You need this sheet metal baffle out of the way to access some of the captive screws in the next step.
6. Loosen the captive screws in the top of the triple-beam and lift it up and away from the Processor/Memory Complex.
7. Lift the blanks out of the complex.

Removing a Processor

Use this procedure to remove a processor and its heatsink. The heatsink is attached to the back of the processor. If a processor is not replaced, a CPU thermal dummy must fill the slot to ensure proper cooling of the unit.

CAUTION Always wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

Before you touch the processor to remove it, touch a grounded unpainted metal surface on the HP Server to discharge static electricity.

To remove an existing processor, complete the following procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Processor/Memory Complex.
3. Orient the complex such that you have access to the surface from which you are removing processors.
4. Remove the sheet metal baffle located at the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To remove the baffle, press the flexible retaining tabs in as

you slide the baffle out. You need this sheet metal baffle out of the way to access some of the captive screws in the next step.

5. Remove the Y cable to the power pods.
6. Loosen the four thumbscrews that secure the triple-beam to the sides of the Processor/Memory Complex.
7. Loosen the captive screws in the top of the triple-beam and lift it up and away from the Processor/Memory Complex.
8. Remove the power pod associated with the processor to be removed by pulling it back to disengage it from its connector, and then lifting it out of the system.
9. Press the black extraction lever next to the processor cartridge to eject the pin array cartridge from its socket.
10. Lift the processor cartridge from its socket and remove it from the system.
11. Place the cartridge on a clean ESD-protective surface.

Installing a CPU Thermal Dummy

CPU thermal dummies must be installed where a processor is absent to properly direct cooling airflow. Complete the following procedure to install a CPU thermal dummy:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. If you are installing a CPU thermal dummy, position the blank into place over the four posts on the Processor Baseboard.

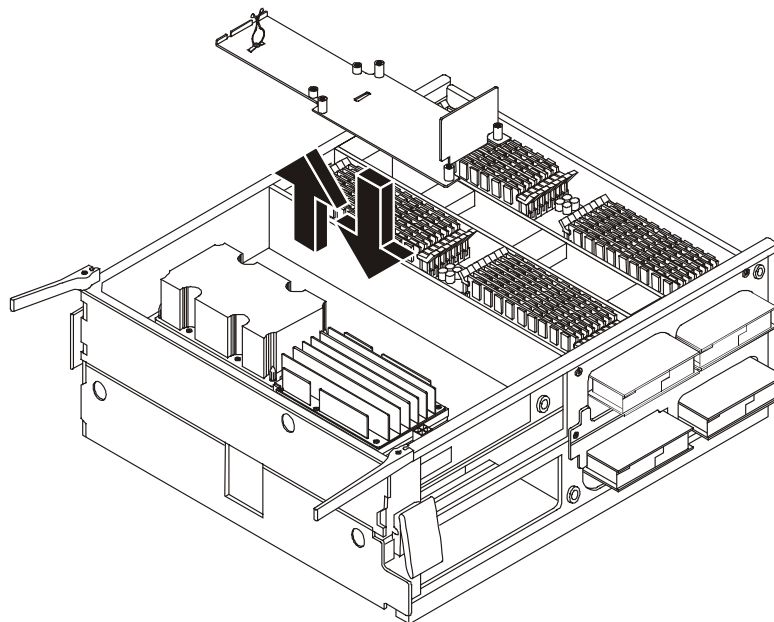


Figure 38. Inserting a CPU Thermal Dummy

3. Secure the triple beam into place by tightening the captive screws on top of the beam and then the four thumbscrews on the end of the beam.
4. Insert the sheet metal baffle located at the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To insert the baffle, press the flexible retaining tabs in as you slide the baffle into place
5. Insert the Processor/Memory Complex into the chassis.

Installing an Additional Processor

This section provides the instructions for installing an additional processor. If only two processors are to reside in the server, both processors must reside on the top half of the Processor/Memory Complex.

- CAUTION** The processor is sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the accessory kit:
- Leave the processor in the anti-static container until you are ready to install it.
 - Wear an anti-static wrist strap and use a static-dissipating work surface or grounding mat connected to the chassis when handling components.
 - Before you remove a processor from the anti-static container, touch a grounded, unpainted metal surface on the HP Server to discharge static electricity.

Complete the following steps to install an additional processor:

1. Unpack the processor shipping box and check the contents against its packing list.
2. If the HP Server is already installed and operating, shut down the NOS according to directions in your NOS documentation.
3. Press the power switch on the HP Server's control panel when prompted by the operating system. Normally, this completes the shutdown procedure.

- WARNING** Power supplies will continue to provide standby current to the HP Server until the power cables are disconnected.

4. Disconnect the AC power cord.

- WARNING** Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

5. Pull the chassis out of the rack.
6. Remove the Processor/Memory Complex.
7. Ensure the processor speed of the second processor (CPU 2) is the same as the existing processor before installing the second processor.
8. Make sure that the metal ejector pin in the LIF socket is flush in the socket.
9. Position the microprocessor inside the four posts on the Processor Baseboard, pins toward the rear and over the LIF socket. Gently press the processor into position.

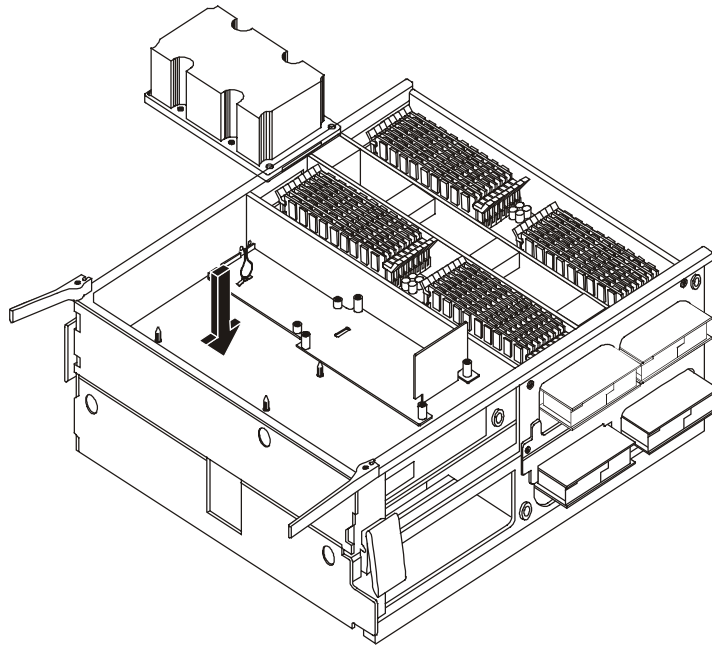


Figure 39. Installing the Microprocessor

10. Place the power pod into position on the Processor Baseboard. Ensure that the engaging tab is to the rear of the retention module (RM) and then slide it forward to engage its connector on the processor.

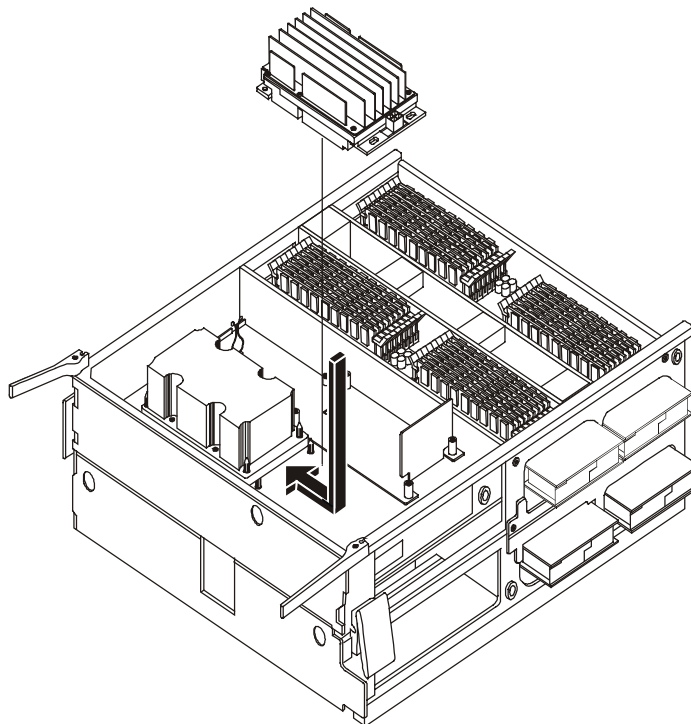


Figure 40. Connecting the Power Pod

11. Place the triple beam into position by lowering it down over the processors/power pod or the CPU thermal dummy.

12. Secure the triple beam into place by tightening the top captive screws and then the four thumbscrews on the end of the beam.

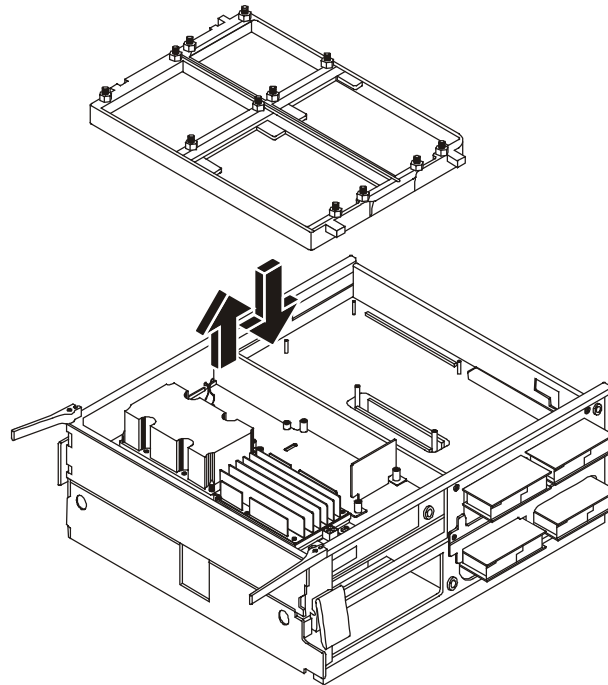


Figure 41. Placing the Triple Beam Over the Processors

12. If you are installing a CPU thermal dummy, skip this step. Otherwise, connect the Y-cable to each power pod.
13. Insert the sheet metal baffle at the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To insert the baffle, press the flexible retaining tabs in as you slide the baffle into place.
14. Be sure to close the plastic latch to secure the Processor/Memory Complex halves.
15. Insert the Processor/Memory Complex into the chassis.

Firmware and Software Changes

Adding a processor may require firmware changes and the possible re-installation of the NOS to recognize the additional processor.

Upgrading the Firmware

If your processor included a new *CD*, insert the CD into the HP Server DVD drive and power on the HP Server. Follow the instructions provided on screen to ensure the system BIOS is up-to-date. The system BIOS on the CD will be compared to the HP Server's current BIOS, and if necessary, will indicate to you that the BIOS needs to be updated.

Reinstalling the NOS

You may have to reconfigure or reinstall your NOS in order to use the additional processor. Check your NOS documentation or the Readme file to determine if your NOS requires a reinstall in order to recognize the new processor(s).

Removing and Installing Memory Boards

Two Memory Boards reside in the Processor/Memory Complex: one is on top of the complex and the other underneath. You can remove or install these memory boards.

Removing Memory Boards

Two memory boards exist, one plugged in to each side of the processor board (the top and the underside of the Processor/Memory Complex). The following procedure describes the removal process for either memory board. To remove the memory board, complete the following procedure:

1. Open and remove the Processor/Memory Complex.
2. If desired, remove the DIMMs from the memory board you are removing.
3. Remove the DC-DC converters from the memory board as described in "Removing the Memory Board DC-DC Converters".
4. Loosen the two captive screws holding the sides of the memory board to the processor board. Each of these screws secures a board clamp that runs along the length of the memory board.
5. Lift the board clamps out of the Processor/Memory Complex.
6. Loosen the two captive screws in the handle that spans the middle of the Memory Board.
7. Remove the bracket with the thumbscrew that locks the extraction levers.
8. Pull up on the extraction levers to disengage the memory board from the processor board.

NOTE Both extraction levers must be raised evenly while disengaging the memory from the Processor Baseboard. The memory board must remain parallel to the Processor Baseboard during extraction.

9. Place the memory board on a clean ESD-protected surface.

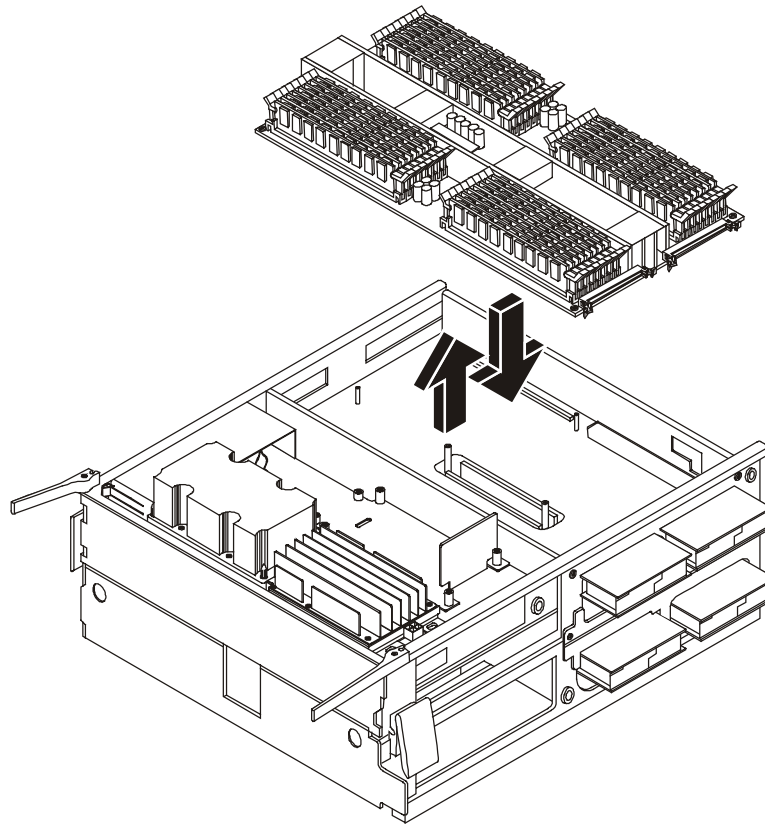


Figure 42. Memory Boards

Installing Memory Boards

Two memory boards exist, one plugged into each side of the Processor Baseboard (the top and the underside of the Processor/Memory Complex). This procedure describes the installation process for either memory board. To re-install the memory board or install a new board, complete the following procedure:

1. Observe all safety and ESD precautions.
2. Remove the Processor/Memory Complex.
3. With both extraction levers raised to engage the guide pins, place the memory board over the Processor Baseboard connector and guide pins
4. Engage both guide pins at the same time. Ensure that the memory board remains parallel to the Processor Baseboard.

NOTE Both extraction levers must be depressed evenly while inserting the Memory Board. The Memory Board must remain parallel to the Processor Baseboard during insertion.

5. Slowly depress the levers until the Memory Board connector fully engages.
6. Tighten the two captive screws that secure the extraction handle assembly.
7. Place the two board clamps along the sides of the memory board such that the screws align with their respective holes.
8. Secure the two board clamps with the two board clamp screws.
9. Place the bracket with the thumbscrew that locks the extraction lever over the extraction levers and tighten the screw.

10. Replace the DC-DC converters as described in “Installing the Memory Board DC-to-DC Converters.”
 11. If you removed any DIMMs replace them as described in “Installing DIMMs”.
- Replace the Processor/Memory Complex.

Installing and Removing DIMMs

The BIOS automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs. It reports the memory size and allocation to the system through the configuration registers. DIMMs reside in the Processor/Memory Complex and are accessible inside the server chassis. To remove or install DIMMs you need to access the complex and follow the installation order and groupings required for the DIMMs. It is not necessary to remove the memory board from the complex.

Memory Guidelines

Each Memory Board can support from 1 GB to 32 GB. The server supports up to 64 GB of system memory.

- Use only HP DIMMs, which are 3.3V, 168-pin, PC100, buffered SDRAM DIMMs in 256 MB, 512 MB, or 1 GB modules.
- DIMMs must be installed in the order indicated by the numbered slots on the memory board in groups of four. Verify that the same size DIMM is used in any given row by using the same HP part number.
- To ensure optimum performance when two boards are installed, the memory on each board must be equal, that is, the DIMMs must be the same type and quantity.
- Ensure both latches close on the DIMM when completely installed.
- When handling DIMMs, observe anti-static precautions to avoid damage.

Installing DIMMs

To install DIMMs, complete the following procedure:

CAUTION	The memory modules are sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the accessory kit: <ul style="list-style-type: none">• Leave the memory module in the anti-static container until you are ready to install it.• Always use an anti-static wrist strap and a grounding mat.• Before you remove a memory module from the anti-static container, touch a grounded, unpainted metal surface on the HP Server to discharge static electricity.
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1. If the system is already installed and working, power down the system.

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected.
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2. Disconnect the power cables and all external cables.
If necessary, label each one to aid in the re-assembly of the unit.
3. Remove the top cover from the HP Server.
4. Observe safety and ESD precautions when working with DIMMs.

- Expose the memory boards by removing the Processor/Memory complex as described in “Removing the Processor/Memory Complex.”

CAUTION DIMM slots on the memory module must be installed only in certain configurations. The number next to each DIMM slot corresponds to installation sequence. DIMMs must be installed by groups of four and must be inserted in the indicated sequence.

Remove the DIMM from its antistatic package. Align the two notches in the bottom edge of the DIMM with the keyed socket on the memory board.

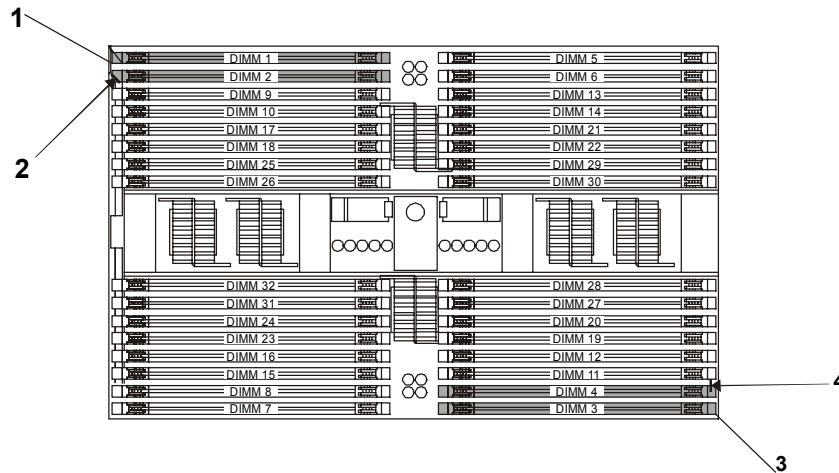


Figure 43. DIMM Installation Sequence

- Insert the bottom edge of the DIMM into the socket and press down firmly until the DIMM is seated correctly.
- Push the plastic ejector levers on the socket ends to the upright position. Repeat the DIMM installation steps for each DIMM you wish to install.

Removing DIMMs

You may need to remove a DIMM module to downsize your memory configuration or to replace a defective DIMM.

- If the system is already installed and working, power down the system.

WARNING The power supply will continue to provide standby current to the HP Server until the power cable is disconnected.

- Disconnect the power cables and all external cables.
If necessary, label each one to support re-assembly.
- Remove the top cover from the HP Server.
- Remove the existing DIMM from its socket by gently pushing the plastic ejector levers out and down.
- Hold the DIMM only by its upper edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket
- Place the DIMM in its anti-static container.

Removing and Installing the Memory Board DC-to-DC Converters

The Memory Board DC-DC Converters reside on the side of the Processor/Memory Complex inside the system chassis. The server uses four converters to supply regulated power to the Processor/Memory Complex. You can access them by removing the Processor/Memory Complex and working from its side. The Memory Board DC-to-DC Converters must be removed before the Memory Board can be replaced.

Removing the Converters

To remove the converters, complete the following procedure:

1. Observe the necessary safety and ESD precautions.
2. Remove the Processor/Memory Complex.
3. Loosen the slide clamp screw that secures the converters but do not remove it. Loosening the upper screw allows you to remove the upper converters, while loosening the lower screw allows you to remove the lower converters.
4. With the converters to be removed located on the top of the unit, slide the clamp upward that secures that pair of converters.
5. Pull each converter straight out from its socket. Be sure that you keep the converter level as you remove it from its socket. Each converter has a keyed guide that is attached to the side of the Processor/Memory Complex.

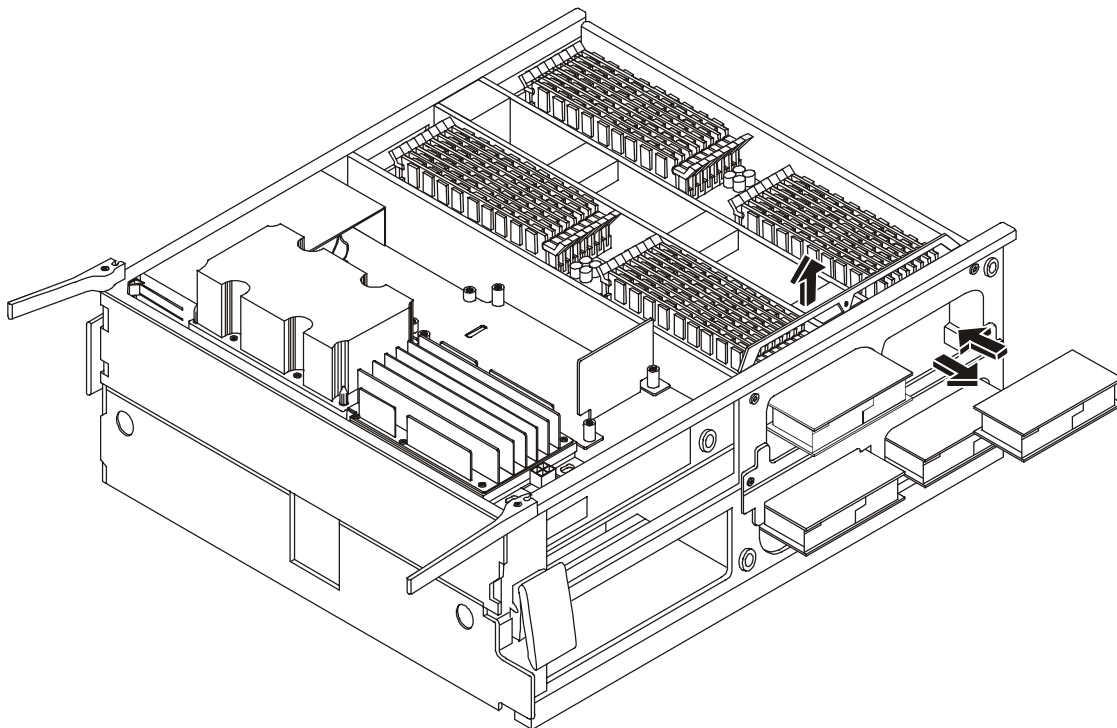


Figure 44. Memory Board DC-DC Converters

Installing the Memory Board DC-to-DC Converters

To install the converters, complete the following procedure:

1. Observe the necessary safety and ESD precautions.
2. Remove the Processor/Memory Complex.

3. Carefully align the Processor DC-to-DC converter's plug with the socket on the Processor/Memory Complex assembly and press it firmly into place. Be sure to keep the converter level such that the keyed guide accepts the edges of the bottom PCB on the converter.
4. Slip the slide clamp up over the converter to secure it in place. Do not tighten the screws until both pairs of converters have been installed.
5. Repeat steps three and four for each DC-to-DC converter you install. If you need to replace converters on the secondary memory board beneath the complex, turn the complex over and then replace the converters.
6. Reinstall the Processor/Memory Complex as described in "Installing the Processor/Memory Complex".

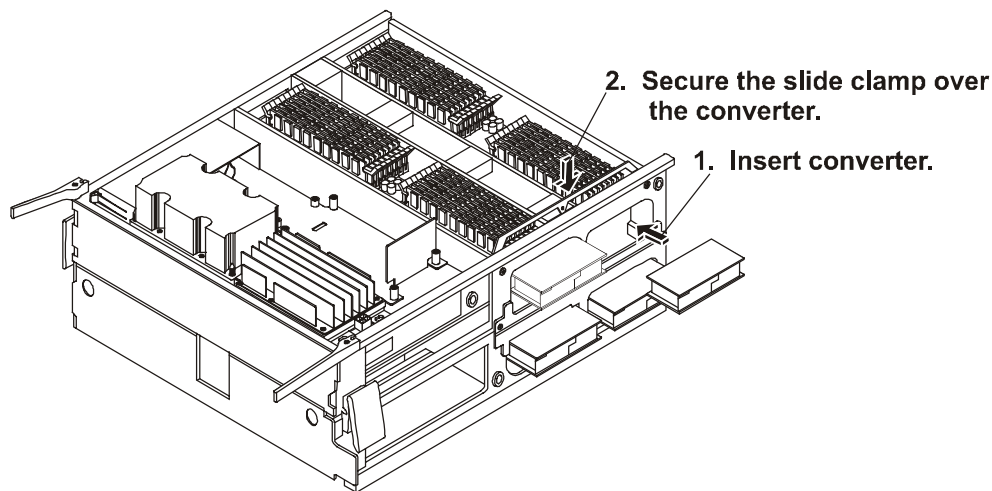


Figure 45. Memory Board DC-to-DC Converters

Installing the Processor Baseboard

The Processor Baseboard resides between the two halves of the Processor/Memory Complex. Removal of the Processor Baseboard involves disassembly of the entire Processor/Memory Complex.

The board can accommodate one to four processors and two memory boards. If your server does not have three or four processors, the underside of the Processor Baseboard will have CPU thermal dummies in place of the processors and power pods. These assemblies are easily removed when you lift the triple beam off the board.

Removing the Processor Baseboard

To remove the processor baseboard, complete the following procedure.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Processor/Memory Complex from the system.
3. Remove the topside memory board from the Processor/Memory Complex as described in “Removing and Installing Memory Boards.”

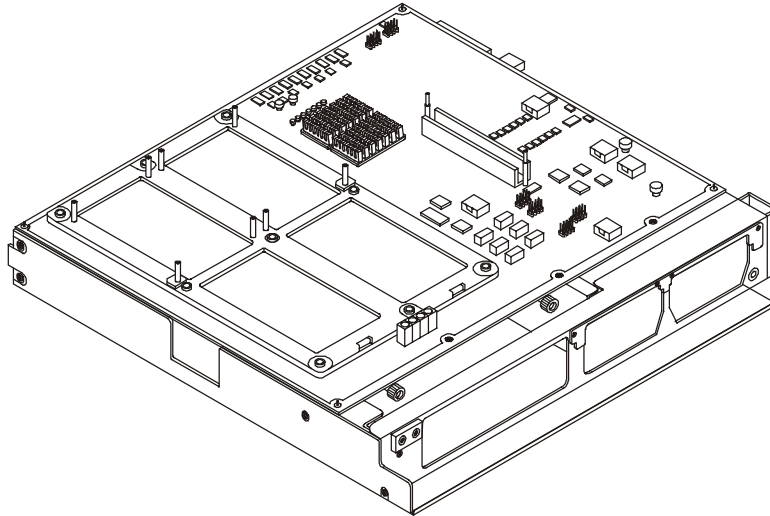


Figure 46. The Processor Baseboard

4. Remove the topside microprocessors as described in “Removing a Microprocessor.”
5. Carefully turn the Processor/Memory Complex over so that you can work on its underside.
6. Repeat steps three and four to remove components and hardware from this side of the Processor Baseboard.
7. With all components and hardware removed from both sides of the Processor/Memory Complex, carefully turn it over again so that it is oriented with its face up.
8. Loosen the two captive screws securing the Processor Baseboard between the two halves of the Processor/Memory Complex.
9. Open the four plastic latches that secure the two halves of the Processor/Memory Complex together. Gently lift the top half up and remove it.
10. Remove the Processor Baseboard from the Processor/Memory Complex.

NOTE	Remember the guide pin position in relation to the Processor Baseboard for re-installation. Use the location of the VHDM connector to identify the topside of the processor baseboard versus the bottom side of the processor baseboard.
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Installing the Board in a System with Three or Four Microprocessors

When installing a board that contains three or four microprocessors, complete the following procedure:

1. Place the bottom half of the Processor/Memory Complex on a clean ESD-protected work surface. The bottom half of the complex has wider rails as compared to the top half. Be sure that the rail side of the complex is in contact with the work surface.
2. Carefully place the Processor Baseboard topside up into position on the bottom half of the Processor/Memory Complex. Be sure that the guide pins align with the holes on the Processor Baseboard. If placed correctly, the Acacia Tree silkscreen will be visible.

NOTE The Processor Board must be squarely aligned in the Processor/Memory Complex.

3. Place the top half of the Processor/Memory Complex over the Processor Baseboard. Be sure that the guide pin relations are correct. The Processor Baseboard should be between the two Processor/Memory Complex halves.
4. Snap shut the four plastic latches that secure the two halves of the Processor/Memory Complex together.
5. Tighten the two captive screws that help secure the Processor Baseboard to the Processor/Memory Complex.
6. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
7. Locate and place the triple beam into position. (Do not install microprocessors or power pods).

NOTE Securing the triple beam into position without the microprocessors and power pods reduces the possibility of stress occurring on the Processor Baseboard when you install microprocessors and the memory board on the topside.

Secure the triple beam by tightening the four thumbscrews on the ends of the beam. Do not tighten the captive screws on the top of the triple beam at this time.

9. Carefully turn the Processor/Memory Complex over so that you can work on the topside.
10. Install the processors and power pods into the top half of the Processor/Memory Complex as described in "Installing an Additional Processor."
11. Install the triple beam.
12. Insert the sheet metal baffle located to the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To insert the baffle, press the flexible retaining tabs in as you slide the baffle into position.
13. Install the memory board into the top half of the Processor/Memory Complex as described in "Removing and Installing Memory Boards."
14. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
15. Remove the triple beam by first loosening the four thumbscrews found on the ends and then the captive screws found on the top of the triple beam. Lift the triple beam off the complex.

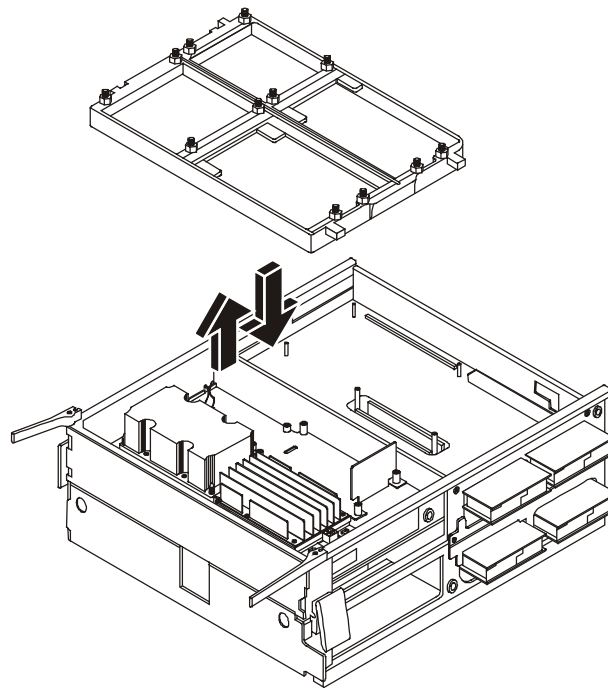


Figure 47. The Triple Beam

16. Install the processors and power pods into the bottom half of the Processor/Memory Complex as described in “Installing an Additional Processor.”
17. Install the triple beam and the metal baffle.
18. Install the memory board into the bottom half of the Processor/Memory Complex as described in “Removing and Installing Memory Boards.”
19. Install the Processor/Memory Complex into the server as described in “Installing the Processor/Memory Complex.”

Installing the Board in a System with Two Microprocessors

When installing a board with two microprocessors, complete the following procedure:

1. Place the bottom half of the Processor/Memory Complex on a clean ESD-protected work surface. The bottom half has wider rails as compared to the top half. Be sure that the rail side of the complex is in contact with the work surface.
2. Carefully place the Processor Baseboard topside up into position on the bottom half of the Processor/Memory Complex.
3. Place the top half of the Processor/Memory Complex over the Processor Baseboard. Be sure that the guide pin relations are correct. The Processor Baseboard should be between the two Processor/Memory Complex halves.
4. Snap shut the four plastic latches that secure the two halves of the Processor/Memory Complex together.
5. Tighten the two captive screws that help secure the Processor Baseboard to the Processor/Memory Complex.
6. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
7. Install the CPU thermal dummies into the bottom half of the Processor/Memory Complex as described in “Installing a CPU Thermal Dummy.”

8. Install the memory board into the bottom half of the Processor/Memory Complex as described in “Removing and Installing Memory Boards.”
9. Install the triple beam and metal baffle.
10. Carefully turn the Processor/Memory Complex over so that you can work on the topside.
11. Install the processors and power pods into the top half of the Processor/Memory Complex as described in “Installing an Additional Processor.”
12. Install the triple beam and metal baffle.
13. Install the memory board into the top half of the Processor/Memory Complex as described in “Removing and Installing Memory Boards.”
14. Install the Processor/Memory Complex into the server as described in “Installing the Processor/Memory Complex.”

Removing and Installing the SCSI Backplane

The SCSI Backplane resides on the back of the Hard Drive Bay. It is accessed by removing the Hard Disk Bay.

Removing the SCSI Backplane

To remove the SCSI Backplane, complete the following steps:

1. Remove the Hard Disk Bay as described in “Removing the Hard Disk Bay” earlier in this chapter.
2. Disconnect the LCD panel cable from the SCSI Backplane.
3. Remove the cap stabilizer retaining screw and the cap stabilizer. These two items will be used on the new board.
4. Remove the three screws that secure the SCSI Backplane to the Hard Disk Bay.
5. Carefully place the SCSI Backplane on a clean, anti-static work surface or in anti-static packaging.

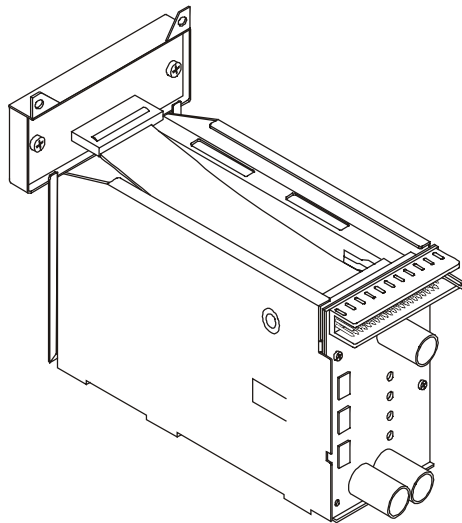


Figure 48. Removing the SCSI Backplane

Installing the SCSI Backplane Board

To install the SCSI Backplane Board, complete the following procedure:

1. Carefully align the SCSI Backplane in the slots to the rear of the Hard Disk Bay. Be sure that the four holes in the SCSI Backplane align with the holes and alignment pin in the bay.
2. Secure the SCSI Backplane to the bay by tightening the three screws.
3. Connect the Front Panel cable to the SCSI Backplane. Open the cable connector lock tabs to a 45° angle before inserting the cable.
4. Position the cap stabilizer and secure it with the cap stabilizer retaining screw.
5. Install the Hard Drive Bay as described in “Installing the Bay” earlier in this chapter.

I/O Baseboard

The I/O Baseboard resides in the upper rear of the chassis and plugs into the Sideplane. After removing all the PCI I/O boards, you can remove the I/O Baseboard.

Removing the I/O Baseboard

To remove the I/O baseboard, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.

WARNING The power supply will continue to provide standby current to the HP Server until the power cable is disconnected from the rear panel.

2. Power down the HP Server.
3. Disconnect the power cables.
4. Open the rear cover of the server and remove the non-hot plug PCI adapter board cover by loosening its screw and unhinging the cover.
5. Remove the top cover as described in “Removing the Top Cover.”
6. Remove the Legacy I/O board as described in “Removing the Legacy I/O Board.”
7. Disconnect the cable to the external SCSI port from the I/O Baseboard.

Disconnect the external SCSI cable from I/O Baseboard

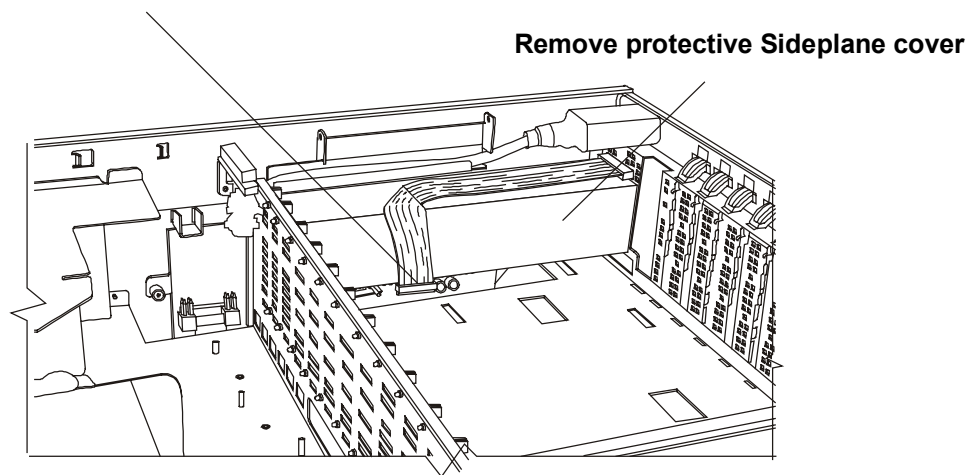


Figure 49. Removing the SCSI Cable from the I/O Baseboard

8. Loosen the captive screw to disconnect and remove the external SCSI port from the chassis I/O connector at the rear of chassis.
9. Remove all non-hot plug PCI and hot plug PCI I/O adapter boards as described in “Removing Accessory Boards.”
10. Remove all PCI slot plastic dividers.
11. Loosen the thumbscrew at the back of the chassis holding the protective cover over the DC-DC converters on the Sideplane, and remove the cover.
12. Remove all DC-DC converters from the Sideplane.

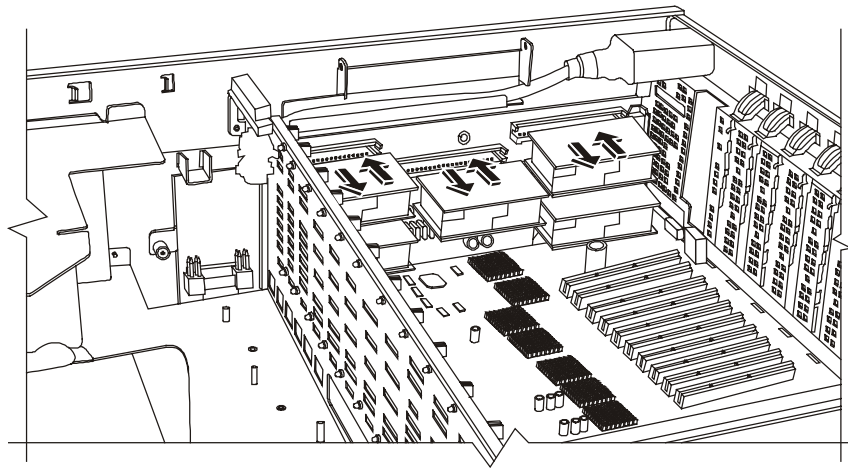


Figure 50. Removing the Sideplane DC-DC Converters

13. Loosen the two captive screws that hold the plastic shield over the I/O Baseboard. These screws also secure the baseboard tray to the server chassis.
14. Remove the PCI LED cable.
15. Remove the plastic shield.
16. Remove the Internal SCSI cable for the hard drives from the board.
17. Use the two extraction/installation levers on the sides of the I/O Baseboard to pull it clear of the connector on the Sideplane.
18. Once loose, slide the I/O Baseboard in the direction of the levers against the chassis frame.

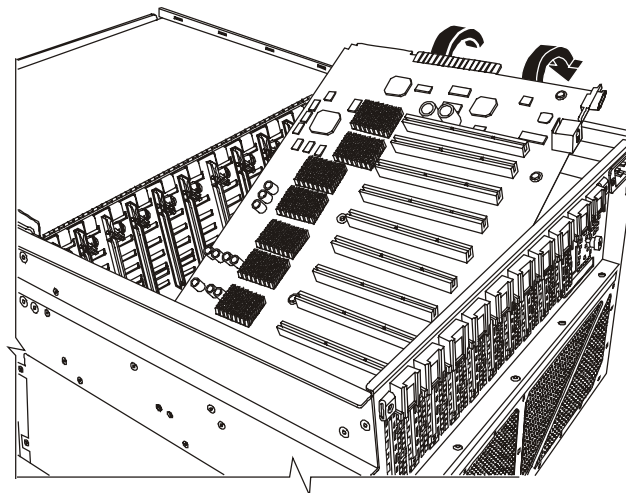


Figure 51. I/O Baseboard Removal

19. Lift the connector end out of the chassis first followed by the rest of the I/O Baseboard.
20. Place on a clean ESD-protected work surface.
21. Remove the nine screws and the two hex jackscrews that secure the video connector to the I/O Baseboard in order to separate it from the I/O Baseboard tray.

Installing the I/O Baseboard

To install the I/O Baseboard, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Install the I/O Baseboard into the I/O Baseboard tray.
3. Orient the I/O Baseboard and tray assembly such that the connector end faces the Sideplane.
4. Angle the I/O Baseboard such that the side with the two extraction/installation levers lowers into the chassis first.
5. Slide the lever end of the I/O Baseboard against chassis frame then lower the connector end into the chassis.
6. Slide the I/O Baseboard towards the Sideplane until lever aligns with the locking slots.
7. Rotate the levers downward to press the I/O Baseboard securely into the Sideplane.

Connect the Internal SCSI cable to the front of the I/O Baseboard.

9. Install the plastic shield over the I/O Baseboard and tighten the two thumbscrews that secure the shield and the I/O Baseboard in the chassis.
10. Connect the PCI LED cable.
11. Install the DC-DC converters on the Sideplane. The voltages are marked on the power supplies and near the sockets on the baseboard.
12. Install the protective cover over the DC-to-DC converters on the Sideplane, and secure the cover with the thumbscrew.
13. Connect the cable to the external SCSI port at both ends: one to the I/O Baseboard and the other secured to the rear of the chassis with the captive thumbscrew.
14. Install the Legacy I/O board and cables as described in “Installing the Legacy I/O Board”.
15. Install the non-hot plug PCI and hot plug PCI adapter boards as described in “Installing Accessory Boards.”
16. Install all PCI slot plastic dividers (I/O Card Dividers) as required.
17. Install the top cover
18. Attach the non-hot plug PCI adapter board cover and secure it with its screw.
19. Close the PCI I/O access door, and secure it with the two captive thumbscrews.
20. Reconnect the power cables.

Sideplane Board

The Sideplane is attached inside the left wall at the rear of the chassis. It receives the I/O Baseboard as well as the Power Distribution Board (T-Docking). To remove the Sideplane you must remove the Power Distribution Board (T-Docking), the I/O Baseboard, and the Processor/Memory Complex.

Removing the Sideplane Board

To remove the Sideplane board, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Remove the I/O Baseboard as described in “Removing the I/O Baseboard” in this chapter.
3. Remove the Power Distribution Board (T-Docking) as described in “Removing the Power Distribution Board (T-Docking)” in this chapter.
4. Remove the Processor/Memory Complex as described in “Removing the Processor/Memory Complex.”

NOTE Do not remove the screws that hold the Sideplane to the mounting plate.

5. Loosen the captive thumbscrews on the Sideplane that secure it and its mounting plate to the chassis.

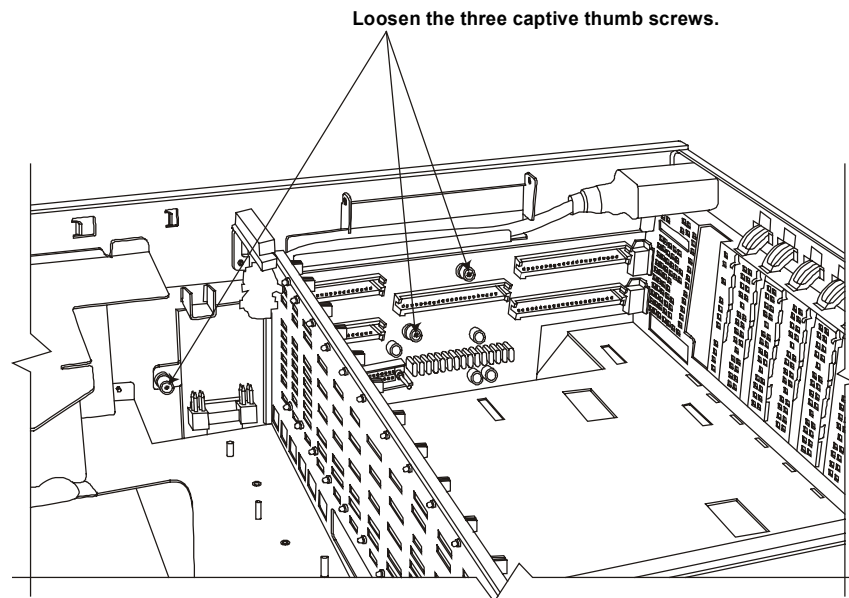


Figure 52. Removing the Screws from the Sideplane

6. Slide the Sideplane towards the front of the chassis. As you slide the board, keep the front bottom edge of the board in contact with the carrier tray as the board is rotated up and out of the chassis.
7. Tilt the Sideplane up and out of the chassis.
8. Remove the two retaining screws from the Sideplane to remove the mounting plate.

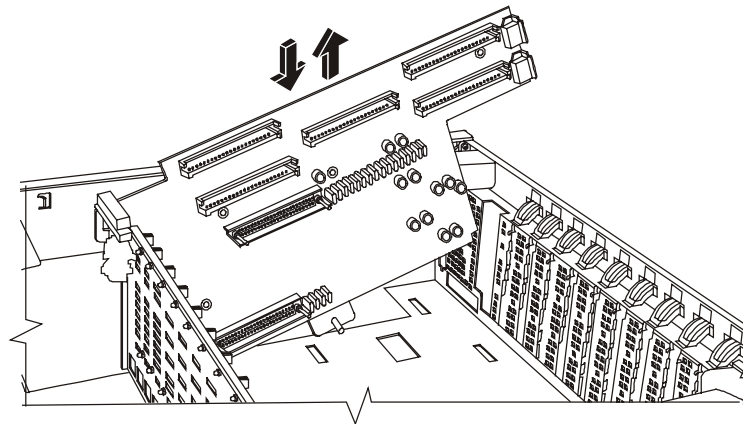


Figure 53. Remove the Sideplane

Installing the Sideplane Board

To install the Sideplane board, complete the following steps:

1. Observe all safety and ESD precautions for handling electronic components.
2. Install the Sideplane on to the mounting plate by tightening the two mounting plate screws.
3. Lower the board into the side of the chassis, and slide it toward the rear of the chassis back into position. The front lower corner of the board is the rotation point you should use when positioning the board into place.
4. Tighten the captive thumbscrews on Sideplane to secure it to the chassis.
5. Reinstall the Power Distribution Board (T-Docking) as described in “Installing the Power Distribution Board (T-Docking)”.
6. Reinstall the I/O Baseboard as described in “Installing the I/O Baseboard”.
7. Reinstall the Processor/Memory Complex.

PCI Hot Plug LED Board

The PCI Hot Plug LED Board resides just on the inside of the top rear of the chassis. This board enables PCI hot plug boards to be plugged into and out of the system without it being shut down.

Removing the PCI Hot Plug LED Board

To remove the PCI Hot Plug LED Board, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Removing the power cords ensures that the server is not under standby power.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Pull the chassis out of the rack as far as it will go.
5. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
6. Lift the rear cover to expose the non-hot plug PCI adapter board cover.

7. Loosen the screw that secures the non-hot plug PCI adapter board cover.
8. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover if you want by unseating the slot hinge. Access is now available to the PCI Hot Plug LED Board.
9. Disconnect the cable attached to the PCI Hot Plug LED Board.
10. Locate and remove the four small, black plastic retaining pins on the board. The pins are evenly spaced across the length of the board. To unlock the pin, grasp the head of the pin from the inside and pull it until it clicks.
11. Carefully pull the PCI Hot Plug LED Board away from the inside of the chassis and place it on an antistatic surface.

Installing the PCI Hot Plug LED Board

To install the PCI Hot Plug LED Board, complete the following steps:

1. Observe all safety and ESD precautions for handling electronic components.
2. Carefully place the PCI Hot Plug LED Board on the inside back of the server chassis in such a way as to line up the four, black pin receptacles with their respective holes.

NOTE

It is suggested that you place a piece of paper on the inside of the chassis just below the board as you insert the black retaining pins as a safeguard should they slip from your fingers.

3. Press the pins through the holes in the board and through their receptacles in the chassis.
4. Connect the cable to the PCI Hot-Plug LED Board.
5. Attach the non-hot plug PCI adapter board cover to the chassis and secure it with the screw.
6. Close the rear part of the top cover and secure it by tightening the two thumbscrews in the back.
7. Install the power cords.
8. Push the server back into the equipment rack.
9. Power-on the system.
10. Turn on all peripheral devices connected to the system that you shut down during this procedure.

Legacy I/O Board

The Legacy I/O Board is plugged into the I/O Baseboard in the rear of the chassis. It is accessible only when you remove or lift the non-hot plug PCI adapter board cover.

Removing the Legacy I/O Board

To remove the Legacy I/O Board, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Removing the power cords ensures that the server is not under standby power.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.
--

4. Pull the chassis out of the rack as far as it will go.
5. Label and disconnect all peripheral cables attached to the Legacy I/O board's back panel on the back of the system.
6. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
7. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
8. Loosen the screw that secures the non-hot plug PCI adapter board cover.
9. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover if you want by unseating the slotted hinge. Access is now available to the Legacy I/O board.
10. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
11. Loosen and remove the screw that secures the end of the board at the rear of the chassis.
12. Carefully grasp the board and gently slide it up so that you can access the cables described in the next two steps.
13. Remove the server management cable from the Legacy I/O board.

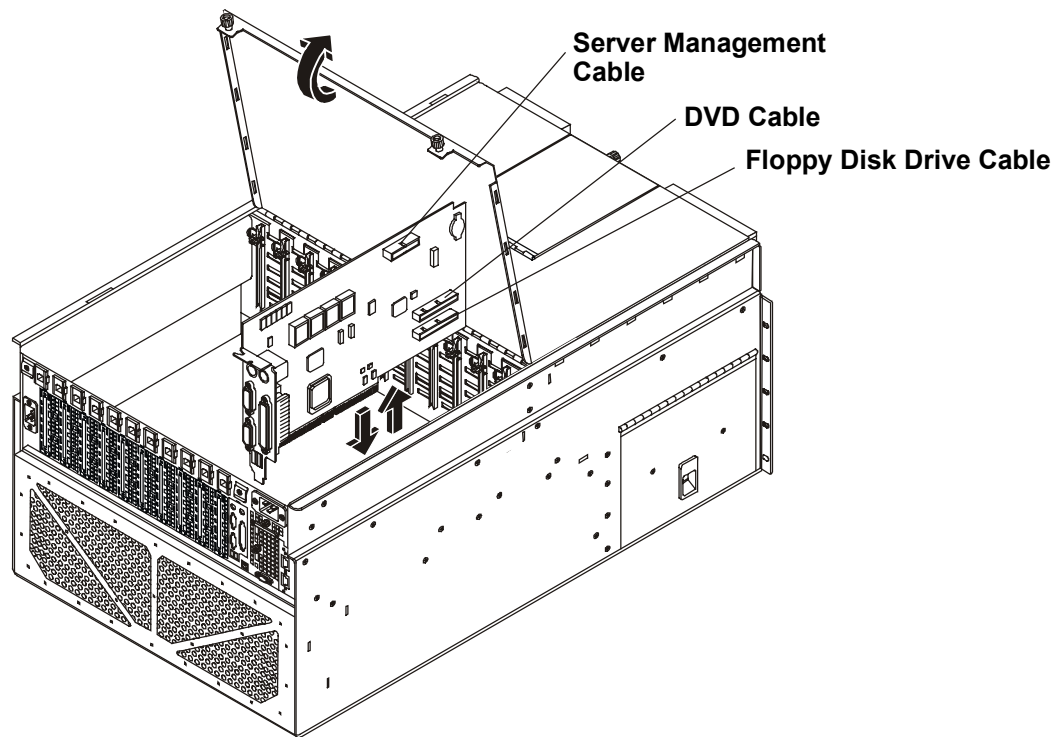


Figure 54. Removing Legacy I/O Board

14. Remove both IDE cables (DVD and Floppy Disk Drive) from the Legacy I/O board by grasping the ends of the cable connectors and rocking them out of their respective connectors.
15. Carefully lay the board component side up on an antistatic work surface or inside proper packaging.

Installing the Legacy I/O Board

To install the Legacy I/O Board, complete the following procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Be sure that the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis is open so that it will allow a board to be inserted.

NOTE

Being careful not to touch the components or gold edge connectors on the I/O Legacy board, remove it from its protective wrapper, and place it component-side up on a nonconductive, antistatic surface within reach of the primary and secondary IDE cables in the server.

3. Record the serial number of the board in your equipment log.
4. Connect the primary and secondary IDE cables to their respective connectors on the I/O Legacy board.
5. Connect the server management cable to the Legacy I/O board.
6. Press the board down firmly until it seats in its slot.
7. Attach the rear screw that secures the board to the chassis.
8. Close the plastic latching mechanism that secures the end of the board nearest the front of the chassis.

9. Install the non-hot plug PCI adapter board cover by aligning the slotted hinge into the chassis housing, closing the cover, and securing the cover screw.
10. Close the rear part of the top cover and secure it by tightening the two thumbscrews in the back.
11. Attach any peripherals to the rear panel of the Legacy I/O board.
12. Install the power cords to the system.
13. Push the system into the equipment rack.
14. Power-on the system.
15. Turn on all peripheral devices connected to the system that you shut down during this procedure.

Changing the Legacy I/O Board Battery

The lithium battery on the Legacy I/O board powers the real-time clock (RTC) for three to four years in the absence of power. When the battery weakens, it loses voltage and the system settings stored in CMOS RAM in the Real Time Clock (such as the date and time) can be wrong. Contact your customer service representative or dealer for a list of approved devices.

WARNING There is a danger of explosion if the battery is incorrectly replaced. Replace the battery only with the same or an equivalent type recommended by the equipment manufacturer.

Removing the Battery

To remove the battery, complete the following steps:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Legacy I/O board as described in “Removing and Installing the Legacy I/O Board.”
3. Insert the tip of a small flat-bladed screwdriver or equivalent under the plastic tab on the snap-on plastic retainer holding the battery on the Legacy I/O board.
4. Gently push down on the screwdriver to lift the battery.
5. Remove the battery from its socket.
6. Dispose of the battery according to local ordinance.

Installing the Battery

To install a new battery, complete the following steps:

1. Remove the new lithium battery from its package and, being careful to observe the correct polarity, insert it in the battery socket.
2. Close the plastic tab over the battery.
3. Install the Legacy I/O board as described in “Removing and Installing the Legacy I/O Board” in this chapter.
4. Close the rear portion of the top chassis cover.

Power Distribution Board (T-Docking)

The Power Distribution Board (T-Docking) resides in the upper front half of the chassis above the 172 mm fans. You can access it by removing the top cover of the chassis and removing the Hard Drive Bay.

Removing the Power Distribution Board (T-Docking)

1. Observe all safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Removing the power cords ensures that the server is not under standby power.

WARNING Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Remove the top cover as described in “Removing the Top Cover.”
5. Remove all power supplies as described in “Hot Swapping Power Supplies.”
6. Disconnect the data and power cables from the DVD and the diskette drive. Place the cables in the I/O bay area.
7. Disconnect the Server Management cable from the Power Distribution Board (T-Docking).
8. Disconnect the Internal SCSI cable from the I/O Baseboard.
9. Loosen the captive screw on top of the Power Distribution Board (T-Docking) bracket and remove the bracket.

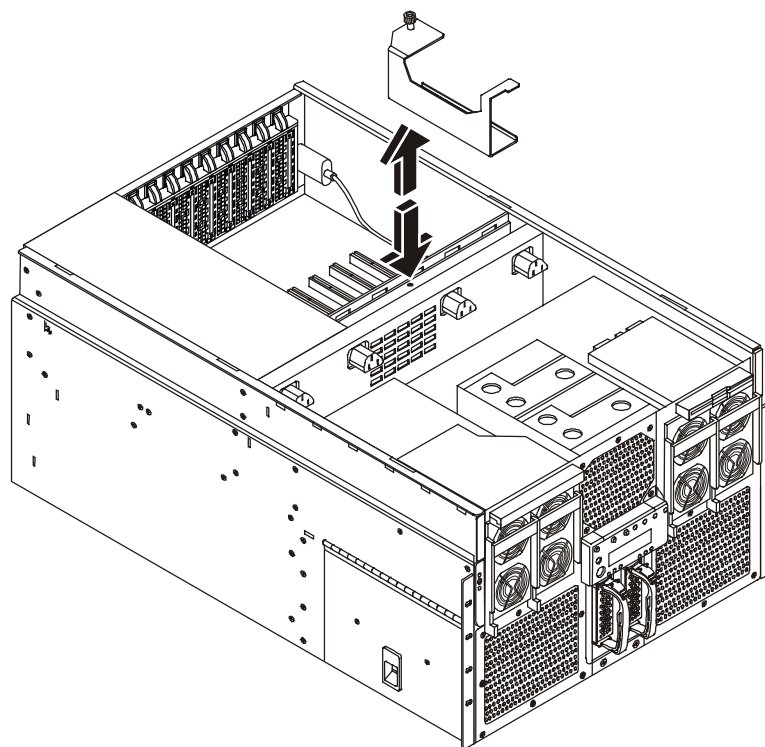


Figure 55. Removing the Power Distribution Board (T-Docking)'s Top Bracket

10. Remove the 12 V DC-DC converter from the top of the Power Distribution Board (T-Docking).
11. Remove the fan, DVD, and floppy drive cable power connector from the Power Distribution Board by squeezing the lock tab and carefully pulling the connector upwards.

Loosen the two top captive screws from the AC Power Distribution Bracket. Lift the AC distribution bracket out of the way and disconnect the AC input cables from both connectors.

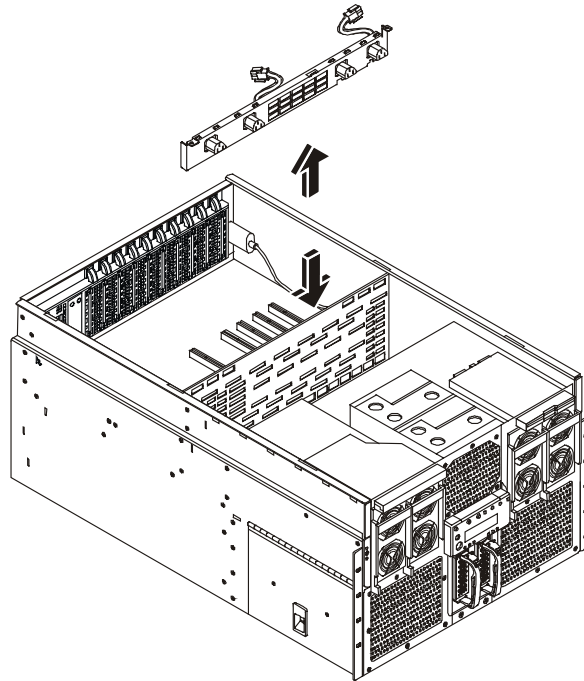


Figure 56. Removing the AC Distribution Bracket

13. Loosen the six captive thumbscrews securing the Power Distribution Board plastic overlay. Remove the overlay.
14. Remove the two hot swap drives from the Hard Drive Bay.
15. Remove the four screws securing the Hard Drive Bay and pull the bay completely out of the chassis.

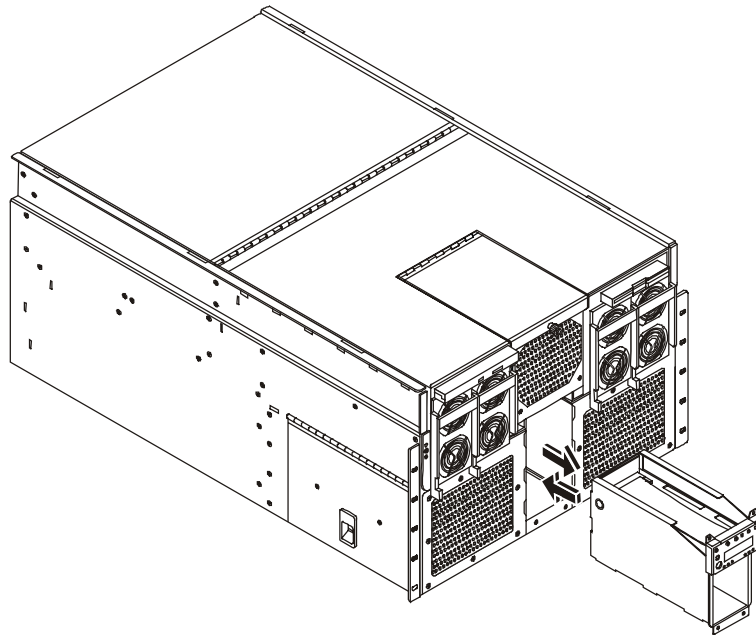


Figure 57. Removing the Hard Drive Bay from the Chassis

16. Disconnect the two 172 mm fan cables from the bottom side of the Power Distribution Board (T-Docking). You can access these cables from the emptied Hard Drive Bay.
17. Lift the small handle mounted to the top of the Power Distribution Board (T-Docking) near the Sideplane to disengage the Power Distribution Board (T-Docking) from the Sideplane.
18. Grasp the Power Distribution Board (T-Docking) by the right-rear edge and lift up to remove it from the chassis.

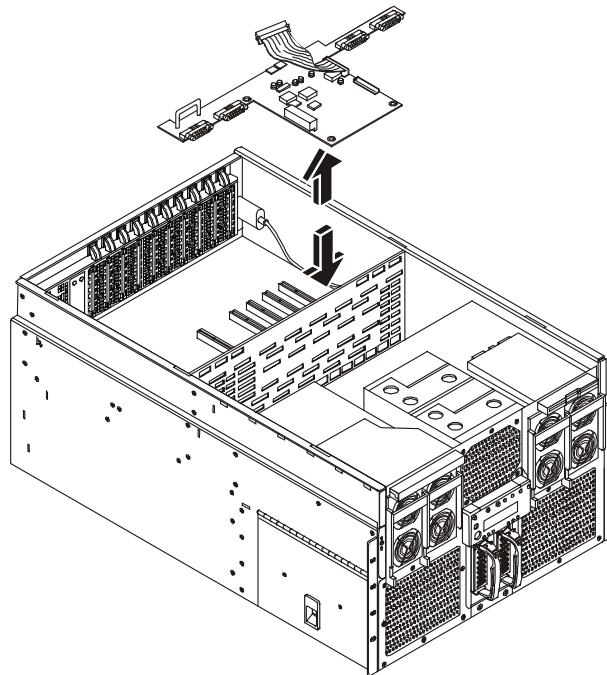


Figure 58. Removing the Power Distribution Board (T-Docking)

Installing the Power Distribution Board (T-Docking)

To install the Power Distribution Board (T-Docking), complete the following procedure:

1. Remove the U-shaped handle on the original Power Distribution Board (T-Docking) and attach it to the replacement board.
2. Place the Power Distribution Board (T-Docking) into position, taking care to locate the board over the indexing stake in the middle and not over the SCSI cable.
3. Engage the connector on the side of the Power Distribution Board (T-Docking) to the Sideplane. Be sure that the connector on the Power Distribution Board (T-Docking) is aligned correctly with the Sideplane before pressing the board down.
4. Connect the 172 mm fan cables to the underside of the Power Distribution Board (T-Docking). You can make the connection through the emptied Hard Drive Bay.
5. Reinsert the Hard Drive Bay and secure the four front screws.
6. Reinsert the two hot swap drives into the Hard Drive Bay.
7. Connect the Internal SCSI cable to the I/O Baseboard.
8. Install the 120 mm fan cable into the top of the Power Distribution Board (T-Docking).
9. Connect the DC-DC converter to the top of the Power Distribution Board (T-Docking).
10. Connect AC input cables to both connectors on the AC Power Distribution bracket.
11. Align the AC input bracket and install the two screws to secure it.
12. Install the bracket between the 120 mm fan housing and the AC input bracket. Make sure that the fan cable can reach the connector on the Power Distribution Board (T-Docking).
13. Install the Server Management cable.
14. Connect the power and data cables to the DVD and diskette drives.
15. Install the power supplies.

Install the top cover.

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