HP Integrity rx7640 and HP 9000 rp7440 Servers User Service Guide

Contents

About this Document

This document covers the HP Integrity rx7640 and HP 9000 rp7440 Servers.

This document does not describe system software or partition configuration in any detail. For detailed information concerning those topics, See the HP *nPartition Administrator's Guide*.

Book Layout

This document contains the following chapters and appendices:

- Chapter 1 - Overview
- Chapter 2 - Site Preparation
- Chapter 3 - Installing the Server
- Chapter 4 - Operating System Boot and Shutdown
- Chapter 5 - Server Troubleshooting
- Chapter 6 - Removal and Replacement
- Chapter 7 - HP 9000 rp7440 Server
- Appendix A - Replaceable Parts
- Appendix B - MP Commands
- Appendix C - Templates
- Index

Intended Audience

This document is intended to be used by customer engineers assigned to support the HP Integrity rx7640 and HP 9000 rp7440 Servers.

Publishing History

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

First Edition	. . . .	March 2006
Second Edition	. . . .	September 2006
Third Edition	Minor edits throughout. Added Chapter 7 for PA release.	January 2007
Fourth Edition	Minor edits.	November 2007
Fifth Edition	Updated Ronl lift information.	November 2011

Related Information

You can access other information on HP server hardware management, Microsoft® Windows® administration, and diagnostic support tools at the following Web sites:

Documentation:

The main Web site for HP technical documentation is http://www.hp.com/go/bizsupport.

Server Hardware Information:

The following website offers more system information: http://www.hp.com/go/integrity_servers-docs. It provides HP nPartition server hardware management information, including site preparation, installation, and more.

Windows Operating System Information:

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

* http://www.hp.com/go/windows-on-integrity-docs

* http://www.microsoft.com/technet/

Diagnostics and Event Monitoring: Hardware Support Tools:

Complete information about HP hardware support tools, including online and offline diagnostics and event monitoring tools, is at the www.hp.com/go/bizsupport Web site. This site has manuals, tutorials, FAQs, and other reference material.

Web Site for HP Technical Support:

HP Support Center is located at the following website:

http://www.hp.com/go/hpsc/

It provides comprehensive support information for IT professionals on a wide variety of topics, including software, hardware, and networking.

Typographic Conventions

The following notational conventions are used in this publication.

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

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

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

* `Commands and options` are represented using `this font`.

* **`Text that you type exactly as shown`** is represented using **`this font`**.

* *`Text to be replaced with text that you supply`* is represented using *`this font`*.

  Example: "Enter the `ls -l` *`filename`* command" means you must replace *`filename`* with your own text.

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

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

* **Menu —> Submenu** represents a menu selection you can perform.

  Example: "Select the **Partition —> Create Partition** action" means you must select the **Create Partition** menu item from the **Partition** menu.

* `Example screen output` is represented using `this font`.

HP contact information

For the name of the nearest HP authorized reseller:

* In the United States, see the HP US service locator webpage (http://welcome.hp.com/country/us/en/wwcontact.html.)

* In other locations, see the Contact HP worldwide (in English) webpage:

  http://welcome.hp.com/country/us/en/wwcontact.html.

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- In the United States, for contact options see the Contact HP United States webpage: (http://welcome.hp.com/country/us/en/contact_us.html)

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    - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
    - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, see the HP website: (http://www.hp.com/go/carepack).

- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html)

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Include the document title and manufacturing part number. All submissions become the property of HP

1 HP Integrity rx7640 Server and HP 9000 rp7440 Server Overview

The HP Integrity rx7640 and HP 9000 rp7440 Servers are members of HP's business-critical computing platform family in the mid-range product line.

The information in chapters one through six of this guide applies to the HP Integrity rx7640 and HP 9000 rp7440 Servers, except for a few items specifically denoted as applying only to the HP Integrity rx7640 Server. Chapter seven covers any information specific to the HP 9000 rp7440 Server only.

> **IMPORTANT:** Ensure a valid UUID is either in place or available prior to maintenance of these servers. This step is vital when performing upgrades and is recommended for existing hardware service restoration. Specific information for upgrades is found in the *Upgrade Guide, Mid-Range Two-Cell HP Servers to HP Integrity rx7640 Server*.

The server is a 10U[1] high, 8-socket symmetric multiprocessor (SMP) rack-mount or standalone server. Features of the server include:

- Up to 256 GB of physical memory provided by dual inline memory modules (DIMMs).
- Dual-core processors.
- Up to 16 processors with a maximum of 4 processor modules per cell board and a maximum of 2 cell boards.
- One cell controller (CC) per cell board.
- Turbo fans to cool CPUs and CCs on the cell boards.
- Up to four embedded hard disk drives.
- One half-height DVD drive, two slimline DVDs or one DAT drive.
- Two front chassis mounted N+1 fans.
- Two rear chassis mounted N+1 fans.
- Six N+1 PCI-X card cage fans.
- Two N+1 bulk power supplies.
- N+1 hot-swappable system oscillators.
- Sixteen PCI slots divided into two IO Chassis each. Each IO Chassis accommodates eight slots supporting PCI/PCI-X/PCI-X 2.0 device adapters or four PCI/PCI-X/PCI-X 2.0 and four PCIe device adapters.
- Up to two core I/O card sets.
- One manageability processor per core I/O card with failover capability when two or more core I/O cards are installed and properly configured.
- Four 220 V AC power plugs. Two are required and the other two provide power source redundancy.

Detailed Server Description

The following section provides detailed information about the server components.

Dimensions and Components

The following section describes server dimensions and components.

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1. The U is a unit of measurement specifying product height. One U is equal to 1.75 inches.

Figure 1 Server (Front View With Bezel)
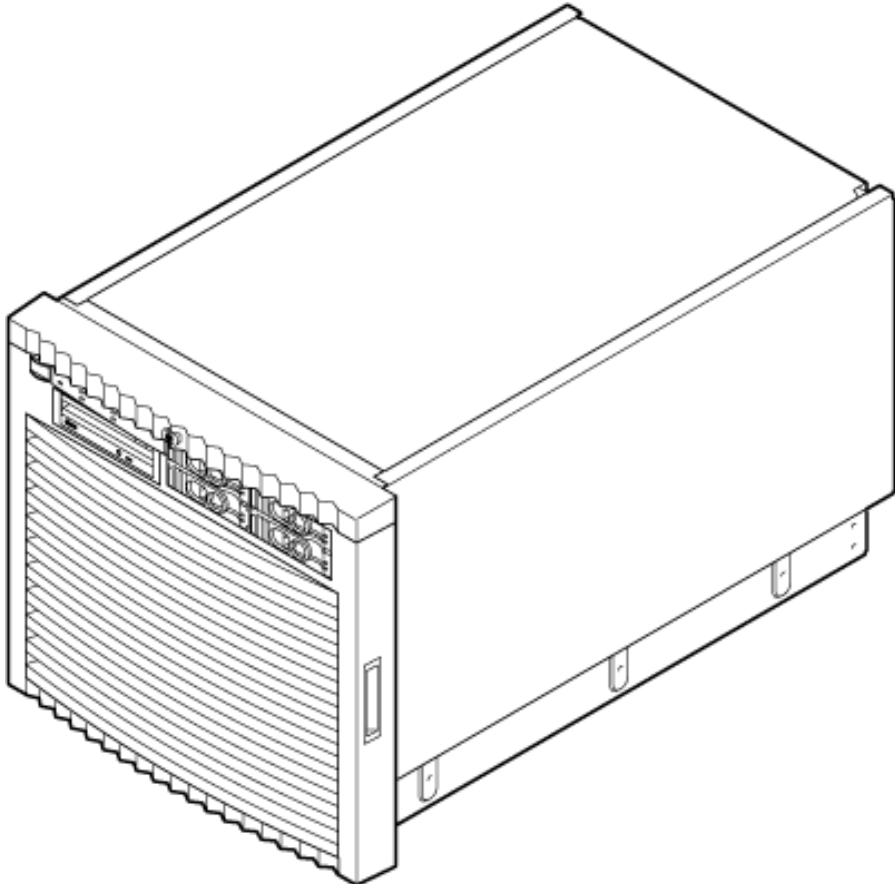
Figure 2 Server (Front View Without Bezel)

Power Switch

Removable Media Drive

PCI Power Supplies

Front OLR Fans

Bulk Power Supplies

Hard Disk Drives
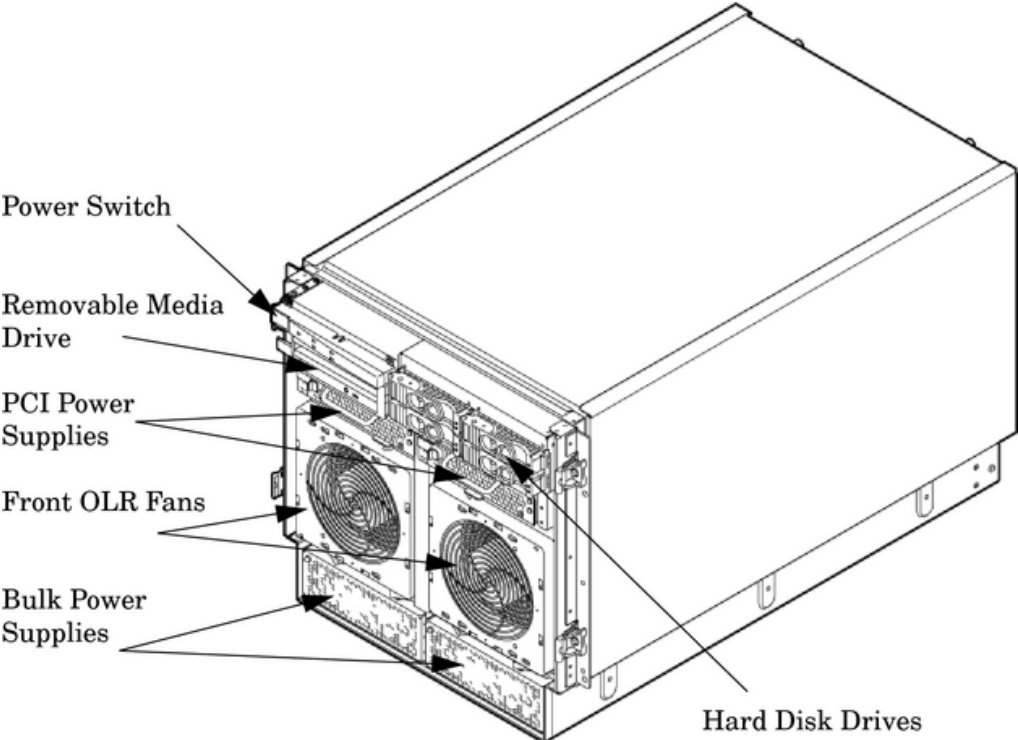
The server has the following dimensions:

- Depth: Defined by cable management constraints to fit into standard 36-inch deep rack:

    25.5 inches from front rack column to PCI connector surface

    26.7 inches from front rack column to MP Core I/O connector surface

    30 inches overall package dimension, including 2.7 inches protruding in front of the front rack columns.

- Width: 44.45 cm (17.5 inches), constrained by EIA standard 19 inch racks.

- Height: 10U – 0.54 cm = 43.91 cm (17.287 inches). This is the appropriate height for a product that consumes 10U of rack height while allowing adequate clearance between products directly above and below this product. Fitting four server units per 2 m rack and upgrade of current 10U height products in the future are the main height constraints.

The mass storage section located in the front enables access to the 3.5-inch hard drives without removal of the bezel. This is especially helpful when the system is mounted in the lowest position in a rack. The mass storage bay also accommodates one 5.25-inch removable media device. The front panel display board, containing LEDs and the system power switch, is located directly above the 5.25-inch removable media bay.

Below the mass storage section and behind the removable front bezel are two, N+1 PCI-X power supplies.

The bulk power supply section is partitioned by a sealed metallic enclosure located in the bottom of the package. This enclosure houses the N+1 fully redundant BPSs. Install these power supplies from the front of the server after removing the front bezel.

Figure 3 Right-Front View
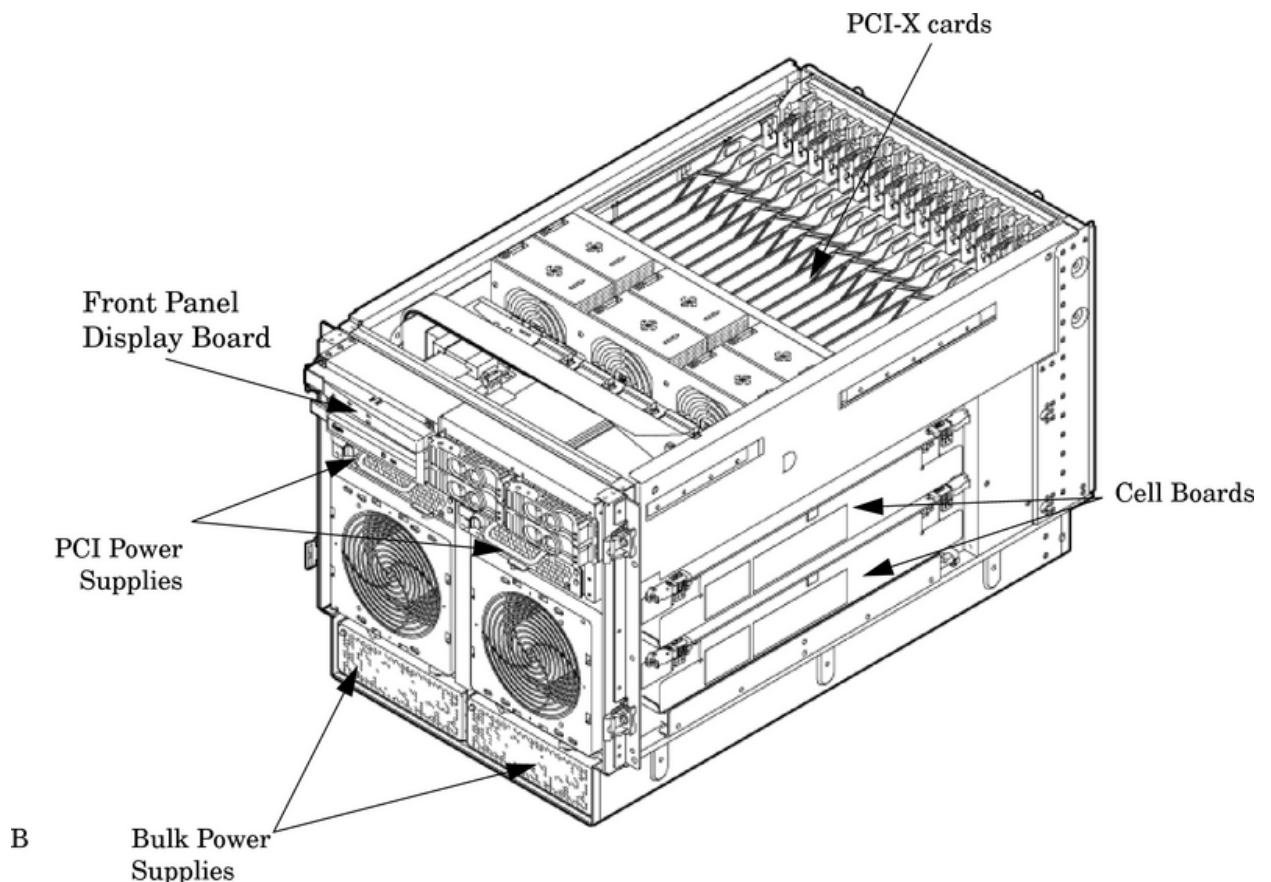
Access the PCI-X card section, located toward the rear, by removing the top cover.

The PCI card bulkhead connectors are located at the rear top.

The PCI OLR fan modules are located in front of the PCI-X cards. These six 9.2-cm fans are housed in plastic carriers. They are configured in two rows of three fans.

Four OLR system fan modules, externally attached to the chassis, are 15-cm (6.5-inch) fans. Two fans are mounted on the front surface of the chassis and two are mounted on the rear surface.

The cell boards are accessed from the right side of the chassis behind a removable side cover.

The two MP/SCSI boards are positioned vertically at the rear of the chassis.

The two hot-pluggable N+1 redundant bulk power supplies provide a wide input voltage range. They are installed in the front of the chassis, directly under the front fans.

A cable harness that connects from the rear of the BPSs to the system backplane provides DC power distribution.

Access the system backplane by removing the left side cover. The system backplane hinges from the lower edge and is anchored at the top with two jack screws.

The SCSI ribbon-cable assembly routes from the mass storage area to the backside of the system backplane for connection to the MP/SCSI card, and to the AB290A LAN/SCSI PCI-X cards.

Figure 4 Left-Rear View
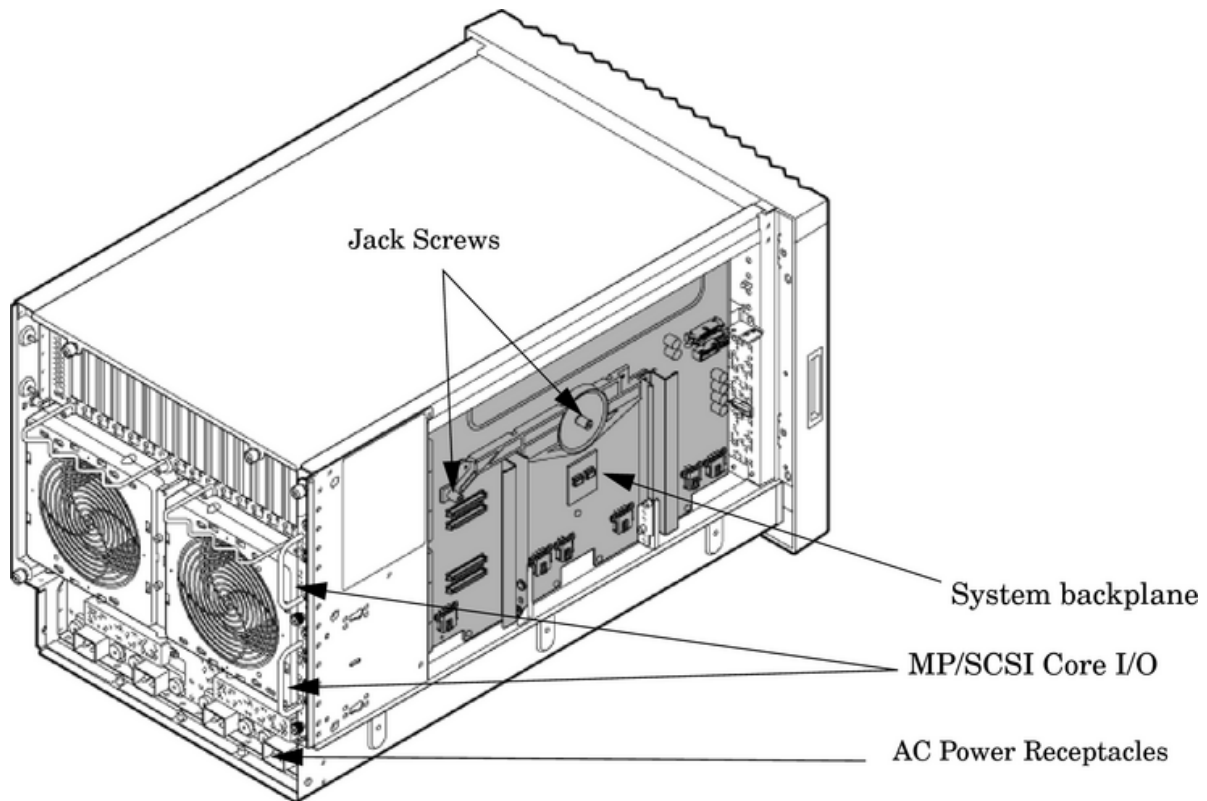
Front Panel

Front Panel Indicators and Controls

The front panel, located on the front of the server, includes the power switch. See Figure 5

Enclosure Status LEDs

The following status LEDs are on the front panel:

- Locate LED (blue)
- Power LED (tri-color)

- Management processor (MP) status LED (tri-color)
- Cell 0, 1 status (tri-color) LEDs

Figure 5 Front Panel LEDs and Power Switch
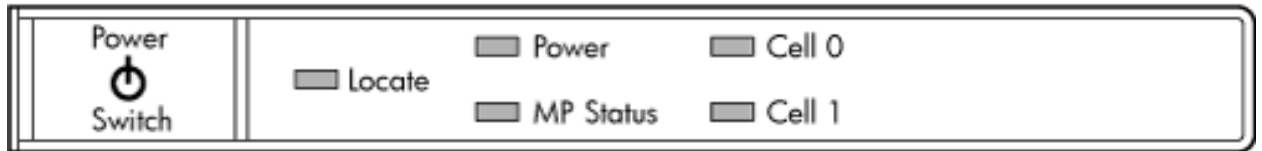
Cell Board

The cell board, illustrated in Figure 6, contains the processors, main memory, and the CC application specific integrated circuit (ASIC) which interfaces the processors and memory with the I/O, and to the other cell board in the server. The CC is the heart of the cell board, enabling communication with the other cell board in the system. It connects to the processor dependent hardware (PDH) and micro controller hardware. Each cell board holds up to two processor modules and 16 memory DIMMs. One or two cell boards can be installed in the server. A cell board can be selectively powered off for adding processors, memory, or for maintenance of the cell board, without affecting the other cell board in a configured partition.

Figure 6 Cell Board
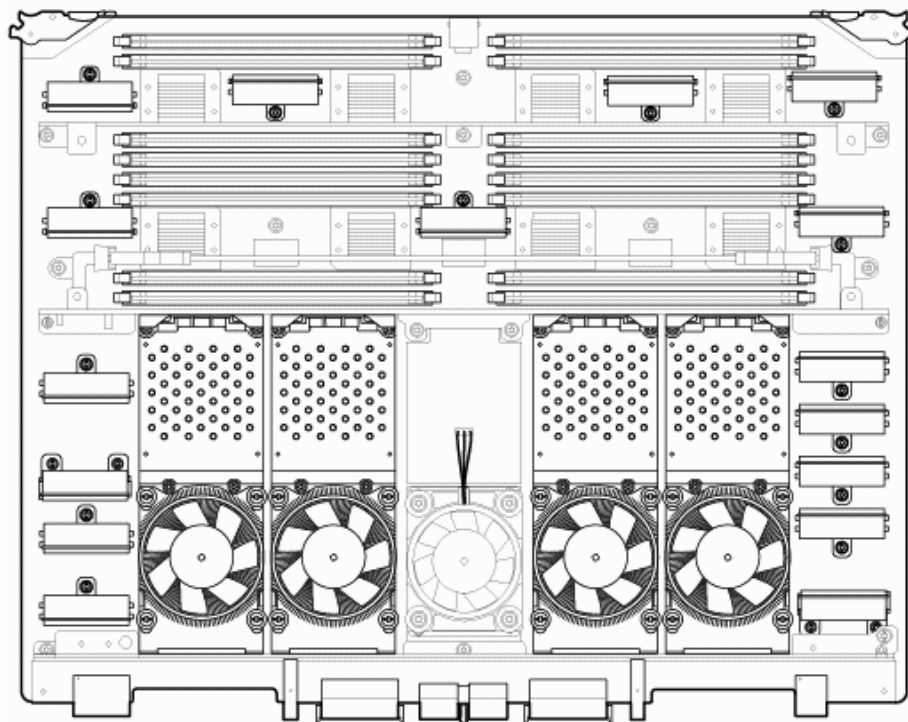
The server has a 48 V distributed power system and receives the 48 V power from the system backplane board. The cell board contains DC-to-DC converters to generate the required voltage rails. The DC-to-DC converters on the cell board do not provide N+1 redundancy.

The cell board contains the following major buses:

- Two front side buses (FSB), each with up to two processors
- Four memory buses (one going to each memory quad)
- Incoming and outgoing I/O bus that goes off board to an SBA chip

- Incoming and outgoing crossbar bus that goes off board to the other cell board
- PDH bus that goes to the PDH and microcontroller circuitry

All of these buses come together at the CC chip.

Because of space limitations on the cell board, the PDH and microcontroller circuitry resides on a riser board that plugs into the cell board at a right angle. The cell board also includes clock circuits, test circuits, and de-coupling capacitors.

PDH Riser Board

The PDH riser board is a small card that plugs into the cell board at a right angle. The PDH riser interface contains the following components:

- Microprocessor memory interface microcircuit
- Hardware including the processor dependant code (PDH) flash memory
- Manageability microcontroller with associated circuitry

The PDH obtains cell board configuration information from cell board signals and from the cell board local power module (LPM).

Central Processor Units

The cell board can hold up to four CPU modules. Each CPU module can contain up to two CPU cores on a single socket. Modules are populated in increments of one. On a cell board, the processor modules must be the same family, type, and clock frequencies. Mixing of different processors on a cell board or partition is not supported. See Table 1 for the load order that must be maintained when adding processor modules to the cell board. See Figure 7 for the locations on the cell board for installing processor modules.

NOTE: Unlike previous HP cell based systems, the HP Integrity rx7640 server cell board does not require that a termination module be installed at the end of an unused FSB. System firmware is allowed to disable an unused FSB in the CC. This enables both sockets of the unused bus to remain unpopulated.

Table 1 Cell Board CPU Module Load Order

Number of CPU Modules Installed	Socket 2	Socket 3	Socket 1	Socket 0
1	Empty slot	Empty slot	Empty slot	CPU installed
2	CPU installed	Empty slot	Empty slot	CPU installed
3	CPU installed	Empty slot	CPU installed	CPU installed
4	CPU installed	CPU installed	CPU installed	CPU installed

Figure 7 CPU Locations on Cell Board

Socket 2   Socket 3   Cell Controller   Socket 1   Socket 0
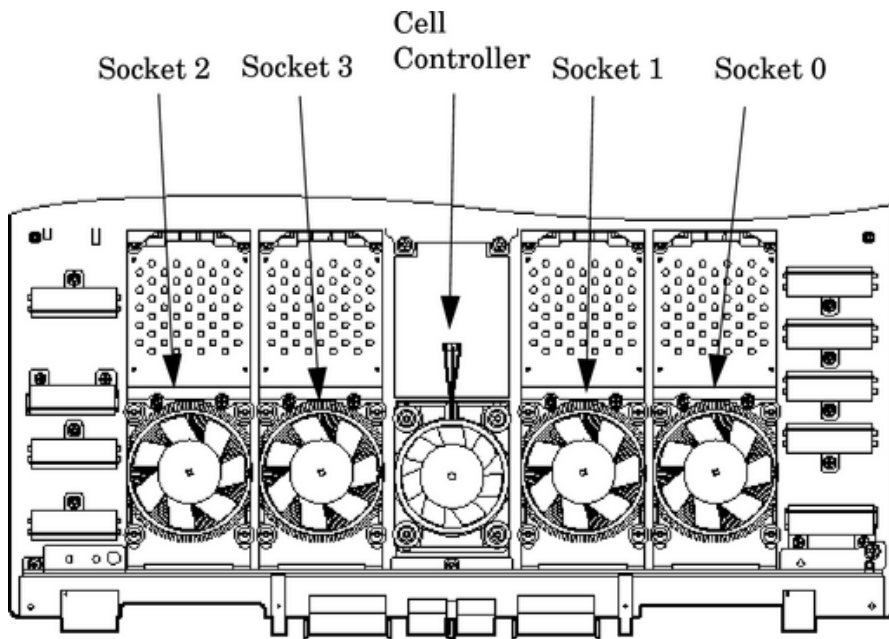
Memory Subsystem

Figure 8 shows a simplified view of the memory subsystem. It consists of two independent access paths, each path having its own address bus, control bus, data bus, and DIMMs . Address and control signals are fanned out through register ports to the synchronous dynamic random access memory (SDRAM) on the DIMMs.

The memory subsystem comprises four independent quadrants. Each quadrant has its own memory data bus connected from the cell controller to the two buffers for the memory quadrant. Each quadrant also has two memory control buses; one for each buffer.

Figure 8 Memory Subsystem
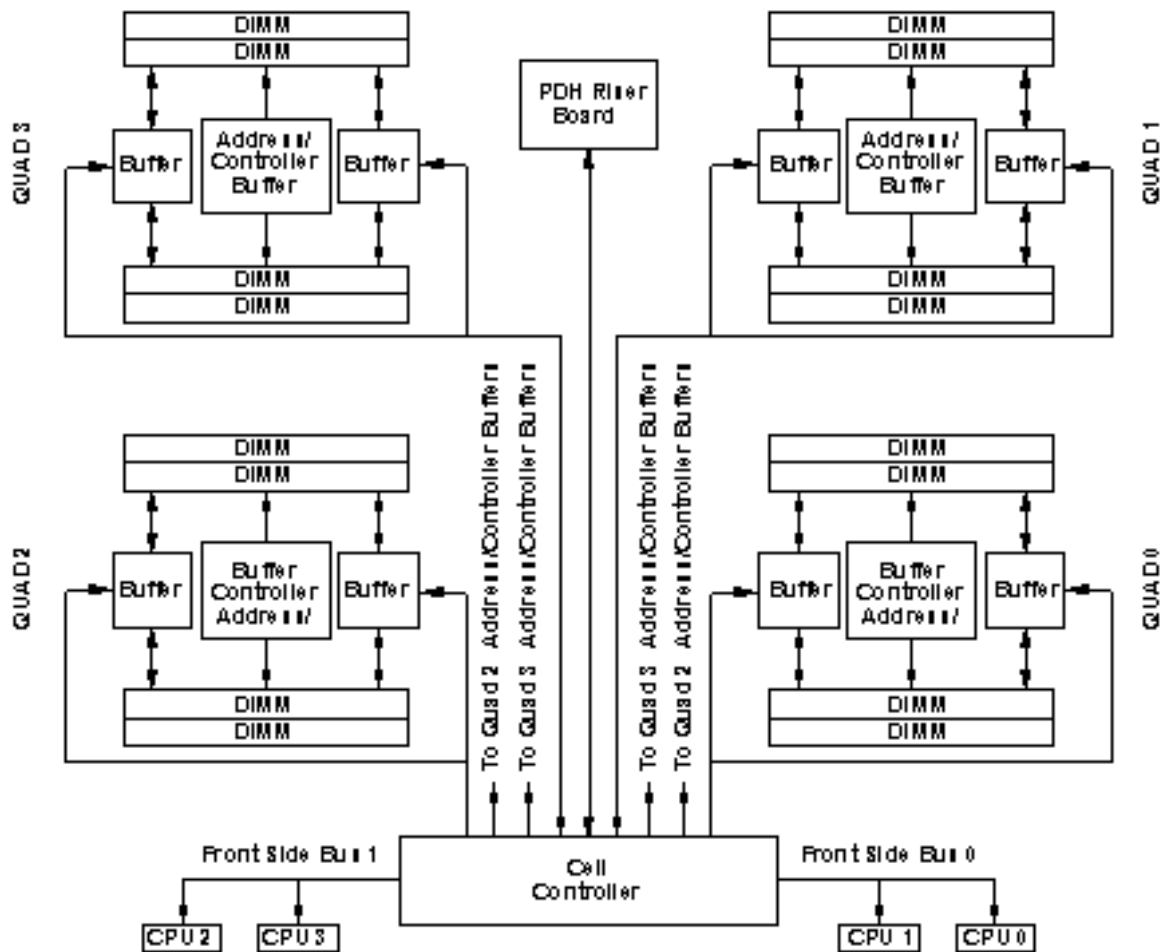
DIMMs

The memory DIMMs used by the server are custom designed by HP. Each DIMM contains DDR-II SDRAM memory that operates at 533 MT/s. Industry standard DIMM modules do not support the high availability and shared memory features of the server. Therefore, industry standard DIMM modules are not supported.

The server supports DIMMs with densities of 1, 2, 4, and 8 GB. Table 2 (page 18) lists each supported DIMM size, the resulting total system capacity, and the memory component density. Each DIMM is connected to two buffer chips on the cell board.

Table 2 Server DIMMs

DIMM Size	Total Capacity	Memory Component Density
1 GB	32 GB	128 MB
2 GB	64 GB	256 MB
4 GB	128 GB	512 MB
8 GB	256 GB	1024 MB

Cells and nPartitions

An nPartition comprises one or more cells working as a single system. Any I/O chassis that is attached to a cell belonging to an nPartition is also assigned to the nPartition. Each I/O chassis has PCI card slots, I/O cards, attached devices, and a core I/O card assigned to the I/O chassis.

On the server, each nPartition has its own dedicated portion of the server hardware which can run a single instance of the operating system. Each nPartition can boot, reboot, and operate independently of any other nPartitions and hardware within the same server complex.

The server complex includes all hardware within an nPartition server: all cabinets, cells, I/O chassis, I/O devices and racks, management and interconnecting hardware, power supplies, and fans.

A server complex can contain one or two nPartitions, enabling the hardware to function as a single system or as multiple systems.

NOTE: Partition configuration information is available at the following website:

www.hp.com/go/bizsupport

For details, see the *nPartition Administrator's Guide*.

Internal Disk Devices for the Server

As Figure 9 (page 19) shows, in a server cabinet, the top internal disk drives connect to cell 1 through the core I/O for cell 1. Both of the bottom disk drives connect to cell 0 through the core I/O for cell 0.

The DVD/DAT drive connects to cell 1 through the core I/O card for cell 1.

Figure 9 Disk Drive and DVD Drive Location
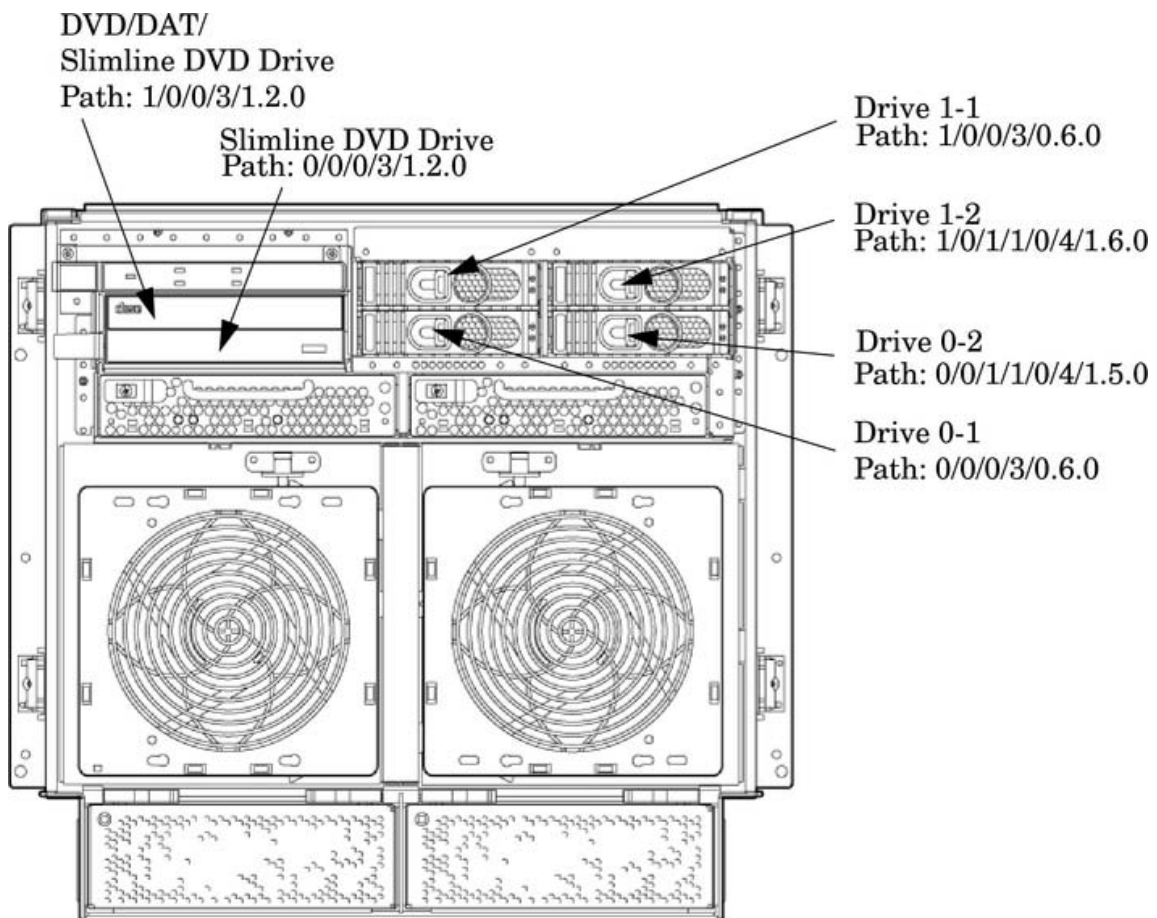
System Backplane

The system backplane contains the following components:

*   The system clock generation logic
*   The system reset generation logic

- DC-to-DC converters

- Power monitor logic

- Two local bus adapter (LBA) chips that create internal PCI buses for communicating with the core I/O card

The backplane also contains connectors for attaching the cell boards, the PCI-X backplane, the core I/O board set, SCSI cables, bulk power, chassis fans, the front panel display, intrusion switches, and the system scan card. Unlike Superdome or the HP Integrity rx8640, there are no Crossbar Chips (XBC) on the system backplane. The "crossbar-less" back-to-back CC connection increases performance.

Only half of the core I/O board set connects to the system backplane. The MP/SCSI boards plug into the backplane, while the LAN/SCSI boards plug into the PCI-X backplane.

System Bacplane to PCI-X Backplane Connectivity

The PCI-X backplane uses two connectors for the SBA link bus and two connectors for the high speed data signals and the manageability signals.

SBA link bus signals are routed through the system backplane to the cell controller on each corresponding cell board.

The high speed data signals are routed from the SBA chips on the PCI-X backplane to the two LBA PCI bus controllers on the system backplane.

Clocks and Reset

The system backplane contains reset and clock circuitry that propagates through the whole system. The system backplane central clocks drive all major chip set clocks. The system central clock circuitry features redundant, hot-swappable oscillators.

I/O Subsystem

The cell board to the PCI-X board path runs from the CC to the SBA, from the SBA to the ropes, from the ropes to the LBA, and from the LBA to the PCI slots. The CC on cell board 0 and cell board 1 communicates through an SBA over the SBA link. The SBA link consists of both an inbound and an outbound link with an effective bandwidth of approximately 11.5 GB/sec. The SBA converts the SBA link protocol into "ropes." A rope is defined as a high-speed, point-to-point data bus. The SBA can support up to 16 of these high-speed bi-directional rope links for a total aggregate bandwidth of approximately 11.5 GB/sec. Each LBA acts as a bus bridge, supporting either one or two ropes and capable of driving 33 MHz or 66 MHz for PCI cards. The LBAs can also drive at 66 MHz or 133 MHz for PCI-X cards, and at 266 MHz for PCI-X mode 2 cards installed in mode 2 capable slots.

Table 3 and Table 4 list the mapping of PCI-X slots to boot paths. The cell column refers to the cell board installed in the server in cell slot 0 and in cell slot 1.

Table 3 PCI-X paths for Cell 0

Cell	PCI-X Slot	IO Chassis	Path
0	1	0	0/0/8/1
0	2	0	0/0/10/1
0	3	0	0/0/12/1
0	4	0	0/0/14/1
0	5	0	0/0/6/1
0	6	0	0/0/4/1

Table 3 PCI-X paths for Cell 0 *(continued)*

Cell	PCI-X Slot	IO Chassis	Path
0	7	0	0/0/2/1
0	8	0	0/0/1/1

Table 4 PCI-X Paths Cell 1

Cell	PCI-X Slot	I/O Chassis	Path
1	1	1	1/0/8/1
1	2	1	1/0/10/1
1	3	1	1/0/12/1
1	4	1	1/0/14/1
1	5	1	1/0/6/1
1	6	1	1/0/4/1
1	7	1	1/0/2/1
1	8	1	1/0/1/1

The server supports two internal SBAs. Each SBA provides the control and interfaces for eight PCI-X slots. The interface is through the rope bus (16 ropes per SBA). For each SBA, the ropes are divided in the following manner:

- A single rope is routed to support the core I/O boards through LBAs located on the system backplane.
- A single rope is routed to an LBA on the PCI backplane to support a slot for PCI and PCI-X cards (slot 8).
- Six ropes are bundled into double ropes to three LBAs. They support slots 1, 2, and 7 for PCI and PCI-X mode 1 cards.
- Eight fat ropes are bundled into quad ropes to four LBAs. They support slots 3, 4, 5, and 6 for PCI and PCI-X mode 2 cards.

NOTE: PCI-X slots 1-7 are dual rope slots while slot 8 is a single rope slot. A rope is defined as a high speed point to point data bus.

The PCI-X backplane is the primary I/O interface for the server. It provides 16, 64-bit, hot-plug PCI/PCI-X slots. Fourteen of the slots have dual ropes connected to the LBA chips. The remaining two slots have a single rope connected to each LBA chip. Each of the sixteen slots are capable of 66 MHz/33 MHz PCI or 133 MHz/66 MHz PCI-X. Four slots in PCI-X support 266 MHz. All sixteen PCI slots are keyed for 3.3 volt connectors (accepting both Universal and 3.3 V cards). See Table 5 for more details.

The PCI-X backplane is physically one board, but it behaves like two independent partitions. SBA 0, its associated LBAs, and eight PCI-X slots form one I/O partition. SBA 1, its associated LBAs, and eight PCI-X slots form the other I/O partition. One I/O partition can be reset separately from the other I/O partition, but cannot be powered down independently.

IMPORTANT: Always see the PCI card's manufacturer for the specific PCI card performance specifications. PCI, PCI-X mode 1, and PCI-X mode 2 cards are supported at different clock speeds. Select the appropriate PCI-X I/O slot for best performance.

Table 5 (page 22) lists the PCI-X slot types supported on the server.

Table 5 PCI-X Slot Types

I/O Partition	Slot[1]	Maximum MHz	Maximum Peak Bandwidth	Ropes	Supported Cards	PCI Mode Supported
0	8	133	533 MB/s	001	3.3 V	PCI or PCI-X Mode 1
	7	133	1.06 GB/s	002/003	3.3 V	PCI or PCI-X Mode 1
	6	266	2.13 GB/s	004/005	3.3 V or 1.5 V	PCI-X Mode 2
	5	266	2.13 GB/s	006/007	3.3 V or 1.5 V	PCI-X Mode 2
	4	266	2.13 GB/s	014/015	3.3 V or 1.5 V	PCI-X Mode 2
	3	266	2.13 GB/s	012/013	3.3 V or 1.5 V	PCI-X Mode 2
	2	133	1.06 GB/s	010/011	3.3 V	PCI or PCI-X Mode 1
	1	133	1.06 GB/s	008/009	3.3 V	PCI or PCI-X Mode 1
1	8	133	533 MB/s	001	3.3 V	PCI or PCI-X Mode 1
	7	133	1.06 GB/s	002/003	3.3 V	PCI or PCI-X Mode 1
	6	266	2.13 GB/s	004/005	3.3 V or 1.5 V	PCI-X Mode 2
	5	266	2.13 GB/s	006/007	3.3 V or 1.5 V	PCI-X Mode 2
	4	266	2.13 GB/s	014/015	3.3 V or 1.5 V	PCI-X Mode 2
	3	266	2.13 GB/s	012/015	3.3 V or 1.5 V	PCI-X Mode 2
	2	133	1.06 GB/s	010/011	3.3 V	PCI or PCI-X Mode 1
	1	133	1.06 GB/s	008/009	3.3 V	PCI or PCI-X Mode 1

[1] Each slot will auto select the proper speed for the card installed up to the maximum speed for the slot. Placing high speed cards into slow speed slots will cause the card to be driven at the slow speed.

PCI-X/PCIe Backplane

The 16–slot (8 PCI and PCI-X; 8 PCI-Express) mixed PCI-X/PCI-Express ("PCI-X/PCIe") I/O backplane was introduced for the Dual-Core Intel® Itanium® processor 9100 Series release and is heavily leveraged from the PCI-X backplane design. Only the differences will be described here. See "I/O Subsystem" (page 20) for common content between the two boards.

The PCI-Express I/O backplane comprises two logically independent I/O circuits (partitions) on one physical board.

- The I/O chip in cell location zero (0) and its associated four PCI-X ASICs, four PCIe ASICs, and their respective PCI/PCI-X/PCIe slots form PCI-Express I/O partition 0 plus core I/O.

- The I/O chip in cell location one (1) and its associated four PCI-X ASICs, four PCIe ASICs, and their respective PCI/PCI-X/PCIe slots form PCI-Express I/O partition 1 plus core I/O.

Each PCI/PCI-X slot has a host-to-PCI bridge associated with it, and each PCIe slot has a host-to-PCIe bridge associated with it. A dual slot hot swap controller chip and related logic is also associated with each pair of PCI or PCIe slots. The I/O chip on either cell location 0 or 1 is a primary I/O system interface. Upstream, the I/O chips communicate directly with the cell controller ASIC on the host cell board via a high bandwidth logical connection known as the HSS link. When installed in the SEU chassis within a fully configured system, the ASIC on cell location 0 connects to the cell

controller chip on cell board 2, and the ASIC on cell location 1 connects to the cell controller chip on cell board 3 through external link cables.

Downstream, the ASIC spawns 16 logical 'ropes' that communicate with the core I/O bridge on the system backplane, PCI interface chips, and PCIe interface chips. Each PCI chip produces a single 64–bit PCI-X bus supporting a single PCI or PCI-X add-in card. Each PCIe chip produces a single x8 PCI-Express bus supporting a single PCIe add-in card.

The ropes in each I/O partition are distributed as follows:

- One PCI-X ASIC is connected to each I/O chip with a single rope capable of peak data rates of 533Mb/s (PCIX-66).

- Three PCI-X ASICs are connected to each I/O chip with dual ropes capable of peak data rates of 1.06Gb/s (PCIX-133).

- Four PCIe ASICs are connected to each I/O chip with dual fat ropes capable of peak data rates of 2.12Gb/s (PCIe x8).

In addition, each I/O chip provides an external single rope connection for the core I/O.

Each PCI-Express slot on the PCI-X/PCIe I/O board is controlled by its own ASIC and is also independently supported by its own half of the dual hot swap controller. All PCIe slots are designed to be compliant with PCIe Rev.1.0. The PCI-Express I/O backplane will provide slot support for VAUX3.3, SMB*, and JTAG.

PCI-X/PCIe Slot Boot Paths

PCI-X/PCIe slot boot paths are directly leveraged from the PCI-X backplane. See Table 3 (page 20) and Table 4 (page 21) for more details.

NOTE: The differences between the PCI X backplane and the PCI-X/PCIe backplane are as follows:

- Twelve ropes are bundled in two rope pairs to 6 LBAs to support 6 slots for PCI and PCI-X cards instead of 14. These ropes are capable of 133MHz.

- Sixteen ropes are bundled into dual fat ropes to 8 LBAs to support 8 additional slots for PCIe cards. These ropes are capable of 266MHz.

Table 6 PCI-X/PCIe Slot Types

I/O Partition	Slot[1]	Maximum MHz	Maximum Peak Bandwidth	Ropes	Supported Cards	PCI Mode Supported
0	8[2]	66	533 MB/s	001	3.3 V	PCI or PCI-X Mode 1
	7	133	1.06 GB/s	002/003	3.3 V	PCI or PCI-X Mode 1
	6	266	2.13 GB/s	004/005	3.3 V	PCIe
	5	266	2.13 GB/s	006/007	3.3 V	PCIe
	4	266	2.13 GB/s	014/015	3.3 V	PCIe
	3	266	2.13 GB/s	012/013	3.3 V	PCIe
	2	133	1.06 GB/s	010/011	3.3 V	PCI or PCI-X Mode 1
	1	133	1.06 GB/s	008/009	3.3 V	PCI or PCI-X Mode 1
1	8	66	533 MB/s	001	3.3 V	PCI or PCI-X Mode 1

Table 6 PCI-X/PCIe Slot Types *(continued)*

I/O Partition	Slot[1]	Maximum MHz	Maximum Peak Bandwidth	Ropes	Supported Cards	PCI Mode Supported
	7	133	1.06 GB/s	002/003	3.3 V	PCI or PCI-X Mode 1
	6	266	2.13 GB/s	004/005	3.3 V	PCIe
	5	266	2.13 GB/s	006/007	3.3 V	PCIe
	4	266	2.13 GB/s	014/015	3.3 V	PCIe
	3	266	2.13 GB/s	012/013	3.3 V	PCIe
	2	133	1.06 GB/s	010/011	3.3 V	PCI or PCI-X Mode 1
	1	133	1.06 GB/s	008/009	3.3 V	PCI or PCI-X Mode 1

1. Each slot will auto select the proper speed for the card installed up to the maximum speed for the slot. Placing high speed cards into slow speed slots will cause the card to be driven at the slow speed.

2. Slot is driven by a single rope and has a maximum speed of 66 MHz.

MP/SCSI Board

Up to two MP/SCSI cards can be plugged into the server. At least one MP/SCSI board is required (independent of partitions). An additional MP/SCSI board is required in a dual partition system. Both MP/SCSI boards are oriented vertically and plug into the system backplane. The MP/SCSI board incorporates a dual channel Ultra320 SCSI controller and is hot-pluggable.

LAN/SCSI Board

At least one LAN/SCSI board is required for the minimum system configuration. Two are required in a dual partition system. The LAN/SCSI board is a standard PCI form factor card with PCI card edge connectors. The PCI-X backplane has one slot location reserved for the required board and another that can accommodate either a second LAN/SCSI board or any other supported add-in PCI-X card. The LAN/SCSI board is hot-pluggable.

Mass Storage (Disk) Backplane

Internal mass storage connections to disks are routed on the mass storage backplane, which has connectors and termination logic. All hard disks are hot-plug, but removable media disks are not. The servers accommodate one internal, half-height, removable media device, or two internal, slim line DVD+RW removable media devices.. The mass storage backplane incorporates a circuit that enables power to the internal removable media device to be programmatically cycled.

2 Server Site Preparation

This chapter describes the basic server configuration and its physical specifications and requirements.

Dimensions and Weights

This section provides dimensions and weights of the system components. Table 7 gives the dimensions and weights for a fully configured server.

Table 7 Server Dimensions and Weights

	Standalone	Packaged
Height- Inches (centimeters)	17.3 (43.9)	35.75 (90.8)
Width- Inches (centimeters)	17.5 (44.4)	28.0 (71.1)
Depth- Inches (centimeters)	30.0 (76.2)	28.38 (72.0)
Weight - Pounds (kilograms)	220.0[1] (100.0)	665.0[2] (302.0)

[1] This weight represents a fully configured server before it is installed in a rack.

[2] The packaged weight represents a server installed in a 2-m rack. The packaged weight includes a fully configured server in a 2-m rack with a rear door, rail slide kit, line cord anchor kit, interlock assembly, cable management arm, 120-lb ballast kit, and a 60-A PDU. The shipping box, pallet, and container, not included in the packaged weight in Table 7, adds approximately 150.0-lb to the total system weight when shipped. The size and number of miscellaneous pallets will be determined by the equipment ordered by the customer.

Table 8 provides component weights for calculating the weight of a server not fully configured. Table 9 provides an example of how to calculate the weight. Table 10 is a blank worksheet for calculating the weight of the server. To determine the overall weight, follow the example in Table 9, and complete the worksheet in Table 10 for your system.

Table 8 Server Component Weights

Quantity	Description	Weight lb (kg)
1	Chassis	90.0 (41.0)
1 - 2	Cell board	27.80 (12.61) each
1	System backplane	[estimate] 12 (5.44)
1	PCI-X card cage assembly	20.4 (9.25)
2	Bulk power supply	18.0 (8.2) each
1	Mass storage backplane	1.0 (0.45)
2	PCI-X power supplies	5.0 (2.27) each
1 - 4	Hard disk drive	1.60 (0.73) each
1	Removable media disk drive	2.20 (1.00) each

Table 9 Example Weight Summary

Component	Quantity	Multiply By	Weight (kg)
Cell board	2	27.8 (12.16)	55.6 (25.22)
PCI card (varies - used sample value)	4	0.34 (0.153)	1.36 (0.61)
Power supply (BPS)	2	18 (8.2)	36.0 (16.4)
DVD drive	1	2.2 (1.0)	2.2 (1.0)

Table 9 Example Weight Summary *(continued)*

Component	Quantity	Multiply By	Weight (kg)
Hard disk drive	4	1.6 (0.73)	6.40 (2.90)
Chassis with skins and front bezel cover	1	90.0 (41.0)	90.0 (41.0)
		Total weight	191.56 (87.0)

Table 10 Weight Summary

Component	Quantity	Multiply By	Weight (kg)
Cell Board		27.8 (12.16)	
PCI Card		0.34 (0.153)	
Power Supply (BPS)		18 (8.2)	
DVD Drive		2.2 (1.0)	
Hard Disk Drive		1.6 (0.73)	
Chassis with skins and front bezel cover		90.0 (41.0)	
		Total weight	

Electrical Specifications

This section provides electrical specifications for the server.

Grounding

The site building shall provide a safety ground and protective earth for each AC service entrance to all cabinets.

Install a protective earthing (PE) conductor that is identical in size, insulation material, and thickness to the branch-circuit supply conductors. The PE conductor must be green with yellow stripes. The earthing conductor must be connected from the unit to the building installation earth or if supplied by a separately derived system, at the supply transformer or motor-generator set grounding point.

Circuit Breaker

The Marked Electrical for the server is 15 amps per line cord. The recommended circuit breaker size is 20 amps for North America. For countries outside North America, consult your local electrical authority having jurisdiction for the recommended circuit breaker size.

The server contains four C20 power receptacles located at the bottom rear bulkhead. A minimum of two power cords must be used to maintain normal operation of the server. A second set of two cords can be added to improve system availability by protecting, for example, against power source failures or accidentally tripped circuit breakers. The server can receive AC input from two different AC power sources.

System AC Power Specifications

Power Cords

Table 11 lists the various power cables available for use with the server. Each power cord is 15 feet (4.5 meters) in length with a IEC 60320-1 C19 female connector attached to one end.

Table 11 Power Cords

Part Number	Description	Where Used
8120-6895	Stripped end, 240 volt	International - Other
8120-6897	Male IEC309, 240 volt	International - Europe
8121-0070	Male GB-1002, 240 volts	China
8120-6903	Male NEMA L6-20, 240 volt	North America/Japan

System Power Specifications

Table 12 and Table 13 list the AC power requirements for the servers. These tables provide information to help determine the amount of AC power needed for your computer room.

Table 12 AC Power Requirements

Requirements	Value	Comments
Nominal input voltage	200/208/220/230/240 (VAC rms)	
Frequency range (minimum - maximum)	50 - 60 (Hz)	
Number of phases	1	
Maximum input current	12 amps	Per line cord
Maximum inrush current	30 A peak for 15 ms	Per line cord
Power factor correction	>0.98 >0.95	At all loads of 50% - 100% of supply rating At all loads 0f 25% - 50% of supply rating
Ground leakage current (mA)	<3.0 (ma)	Per line cord

Table 13 System Power Requirements

Power Required (50–60 Hz)	Watts	VA	Comments
Maximum Theoretical Power	3166	3231	See Note 1
Marked Electrical Power	– – –	2640	12A @ 220 VAC, See Note 2
User-Expected Maximum Power	2128	2171	See Note 3

Note 1: Maximum Theoretical Power: or "Maximum Configuration" (Input power at the ac input expressed in Watts and Volt-Amps to take into account Power factor correction.)The calculated sum of the maximum worst case power consumption for every subsystem in the server. This number will never be exceeded by a functioning server for any combination of hardware and software under any conditions.

Note 2: Marked Electrical Power: (Input power at the ac input expressed in Volt-Amps.)The Marked Electrical Power is the rating given on the chassis label and represents the input power required for facility ac power planning and wiring requirements. This number represents the expected maximum power consumption for the server based on the power rating of the bulk power supplies. This number can safely be used to size ac circuits and breakers for the system under all conditions.

Note 3: User-Expected Maximum Power: or User Expected Maximum Power, (Input power at the ac input expressed in Watts and Volt-Amps.)The measured maximum worst case power consumption. This number represents the larges power consumption that HP engineers were able to produce for the server with any combination of hardware under laboratory conditions using aggressive software applications designed specifically to work the system at maximum load. This number can safely be used to compute thermal loads and power consumption for the system under all conditions.

Environmental Specifications

This section provides the environmental, power dissipation, noise emission, and airflow specifications for the server.

Temperature and Humidity

The cabinet is actively cooled using forced convection in a Class C1-modified environment. The recommended humidity level for Class C1 is 40 to 55% relative humidity (RH).

Operating Environment

The system is designed to run continuously and meet reliability goals in an ambient temperature of 5° to 35° C at sea level. The maximum allowable temperature is derated 1° C per 1,000 feet of elevation above 3,000 feet above sea level up to 25° C at 10,000 feet. For optimum reliability and performance, the recommended operating range is 20° to 25° C. This meets or exceeds the requirements for Class 2 in the corporate and ASHRAE standard. See Table 14 (page 28) for an example of the ASHRAE thermal report.

Table 14 Example ASHRAE Thermal Report

	Condition						
	Voltage 208 Volts						
	Typical Heat Release	Airflow, nominal	Airflow, maximum at 35° C	Weight		Over System Dimensions (W x D x H)	
Description	Watts	cfm	(m3/hr)	lb	kg	Inches	mm
Minimum configuration	670	960	1631	192.2	87.4	h=17.29 w=17.50 d=30.00	439.17 444.50 762.00
Full configuration	2128	960	1631	220	100	h=17.29 w=17.50 d=30.00	439.17 444.50 762.00
Typical configuration	1090	960	1637	N/A	N/A	h=17.29 w=17.50 d=30.00	439.17 444.50 762.00
ASHRAE class			Minimum configuration	1 cell board, 2 CPUs, 2 GB, 1 core I/O card			
			Full configuration	2 cell boards, 8 CPUs, 64 GB, 2 core I/O cards			
			Typical configuration	1 cell board, 4 CPUs, 32 GB, 1 core I/O card, 8 I/O cards, 2 hard drives			

Environmental Temperature Sensor

To ensure that the system is operating within the published limits, the ambient operating temperature is measured using a sensor placed near the chassis inlet, between the cell boards. Data from the sensor is used to control the fan speed and to initiate system overtemp shutdown.

Non-Operating Environment

The system is designed to withstand ambient temperatures between -40° to 70° C (-40° to 158°) under non-operating conditions.

Cooling

Internal Chassis Cooling

The cabinet incorporates front-to-back airflow across the cell boards and system backplane. Two 150 mm fans, mounted externally on the front chassis wall behind the cosmetic front bezel, push air into the cell section. Two 150 mm fans housed in cosmetic plastic fan carriers, mounted externally to the rear chassis wall, pull air through the cell section.

Each fan is controlled by a smart fan control board, embedded in the fan module plastic housing. The smart fan control board receives fan control input from the system fan controller on the system backplane and returns fan status information to the system fan controller. The smart fan control board also controls the power and the pulse width modulated control signal to the fan and monitors the speed indicator back from the fan. The fan status LED is driven by the smart fan control board.

Bulk Power Supply Cooling

Cooling for the bulk power supplies (BPS) is provided by two 60 mm fans contained within each BPS. Air flows into the front of the BPS and is exhausted out of the top of the power supply through upward facing vents near the rear of the supply. The air is then ducted out of the rear of the chassis with minimal leakage into the cell airflow plenum.

PCI/Mass Storage Section Cooling

Six 92 mm fans located between the mass storage devices and the PCI card cage provide airflow through these devices. The PCI fans are powered with housekeeping power and run at full speed at all times. The air is pulled through the mass storage devices and pushed through the PCI Card Cage. Perforation is provided between the PCI bulkheads to allow adequate exhaust ventilation.

Standby Cooling

Several components within the chassis consume significant amounts of power while the system is in standby mode. The system fans run at a portion of full speed during standby to remove the resulting heat from the cabinet. The fans within the power supply will operate at full speed during standby.

Typical Power Dissipation and Cooling

Table 15 (page 29) provides calculations for configurations for the HP Integrity rx7640. For calculations for the HP 9000 rp7440 server, see Chapter 7 (page 159).

Table 15 Typical Server Configurations for the HP Integrity rx7640 Server

Cell Boards	Memory Per Cell Board	PCI Cards (assumes 10 watts each)	DVDs	Hard Disk Drives	Core I/O	Bulk Power Supplies	Typical Power	Typical Cooling
Qty	GBytes	Qty	Qty	Qty	Qty	Qty	Watts	BTU/hr
2	32	16	2	4	2	2	2128	7265
2	16	8	0	2	2	2	1958	6685
2	8	8	0	2	2	2	1921	6558
1	8	8	0	1	1	2	1262	4308

The air conditioning data is derived using the following equations.

- Watts x (0.860) = kcal/hour
- Watts x (3.414) = Btu/hour
- Btu/hour divided by 12,000 = tons of refrigeration required

NOTE: When determining power requirements you must consider any peripheral equipment that will be installed during initial installation or as a later update. See the applicable documentation for such devices to determine the power and air-conditioning that is required to support these devices.

Acoustic Noise Specification

The acoustic noise specification for the server is 57.3 db (sound pressure level at bystander position) It is appropriate for dedicated computer room environments but not office environments. The LwA is 7.5 Bels. Care should be taken to understand the acoustic noise specifications relative to operator positions within the computer room or when adding servers to computer rooms with existing noise sources.

Airflow

The recommended server cabinet air intake temperature is between 20° and 25° C (68° and 77° F) at 960 CFM.

Figure 10 (page 30) illustrates the location of the inlet and outlet airducts on a single cabinet. Air is drawn into the front of the server and forced out the rear.

Figure 10 Airflow Diagram
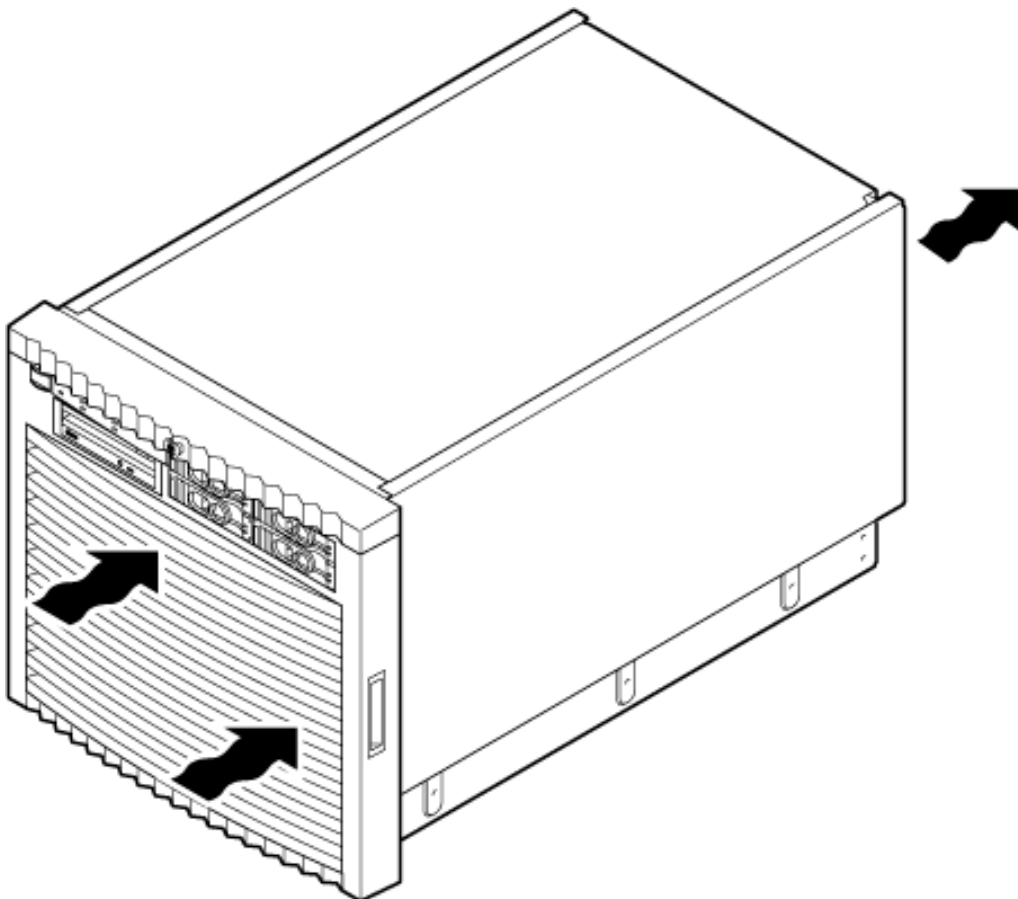
System Requirements Summary

This section summarizes the requirements that must be considered in preparing the site for the server.

Power Consumption and Air Conditioning

To determine the power consumed and the air conditioning required, follow the guidelines in .

NOTE: When determining power requirements, consider any peripheral equipment that will be installed during initial installation or as a later update. See the applicable documentation for such devices to determine the power and airconditioning that is required to support these devices.

Maximum power is the sum of the worst case power consumption of every subsystem in the box and should be used to size worst case power consumption. Typical power consumption numbers are what HP engineers have measured when running power-intensive applications. These are generally lower than maximum power numbers because all of the subsystems in the box to simultaneously drawing maximum power for long durations is uncommon.

3 Installing the Server

Inspect shipping containers when the equipment arrives at the site. Check equipment after the packing has been removed. This chapter discusses how to inspect and install the server.

Receiving and Inspecting the Server Cabinet

This section contains information about receiving, unpacking and inspecting the server cabinet.

NOTE: The server will ship in one of three different configurations. The configurations are:

- On a pallet installed in a server cabinet
- On a pallet for rack mount into an existing cabinet on the customer site
- On a pallet with a wheel kit for installation as a standalone server

HP shipping containers are designed to protect their contents under normal shipping conditions. A tilt indicator is installed on each carton shipped. The tilt indicator has two windows, and each window under normal conditions will show four beads present. If a carton has been mishandled, accidentally dropped, or knocked against something, the tilt indicator will indicate missing beads. If the container has been tilted to an angle that could cause equipment damage, the beads in the indicator will roll to the upper position.

After the equipment arrives at the customer site, carefully inspect each carton for signs of shipping damage. If the container is damaged, document the damage with photographs and contact the transport carrier immediately.

NOTE: The factory provides an installation warranty that is effective from the time the customer receives the shipment until Field Services turns the system over to the customer.

Upon inspection of a received system and during installation of the system, if any parts or accessories are missing or defective, they will be replaced directly from the factory by a priority process. To request replacement parts, the HP Installation Specialist must contact the local Order Fulfillment group which will coordinate the replacement with the factory.

Unpacking the Server Cabinet

This section contains information about unpacking the server cabinet.

⚠ **WARNING!** Wear protective glasses while cutting the plastic bands around the shipping container. These bands are under tension. When cut, they can spring back and cause serious eye injury.

NOTE: Position the pallet to allow enough space to roll the cabinet off the pallet before starting.

Remove the server cabinet using the following steps:

1. Cut the polystrap bands around the shipping container.
2. Lift the cardboard top cap from the shipping box. See Figure 11 (page 33).

Figure 11 Removing the Polystraps and Cardboard
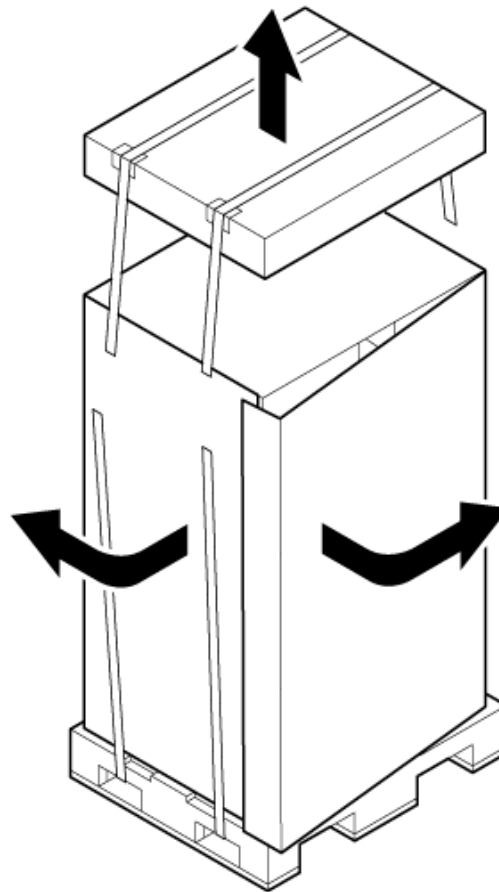
3. Remove the corrugated wrap from the pallet.
4. Remove the packing materials.

△ **CAUTION:** Cut the plastic wrapping material off rather than pull it off. Pulling the plastic covering off represents an electrostatic discharge (ESD) hazard to the hardware.

5. Remove the four bolts holding down the ramps, and remove the ramps.

NOTE: Figure 12 shows one ramp attached to the pallet on either side of the cabinet with each ramp secured to the pallet using two bolts. In an alternate configuration, the ramps are secured together on one side of the cabinet with one bolt.

Figure 12 Removing the Shipping Bolts and Plastic Cover
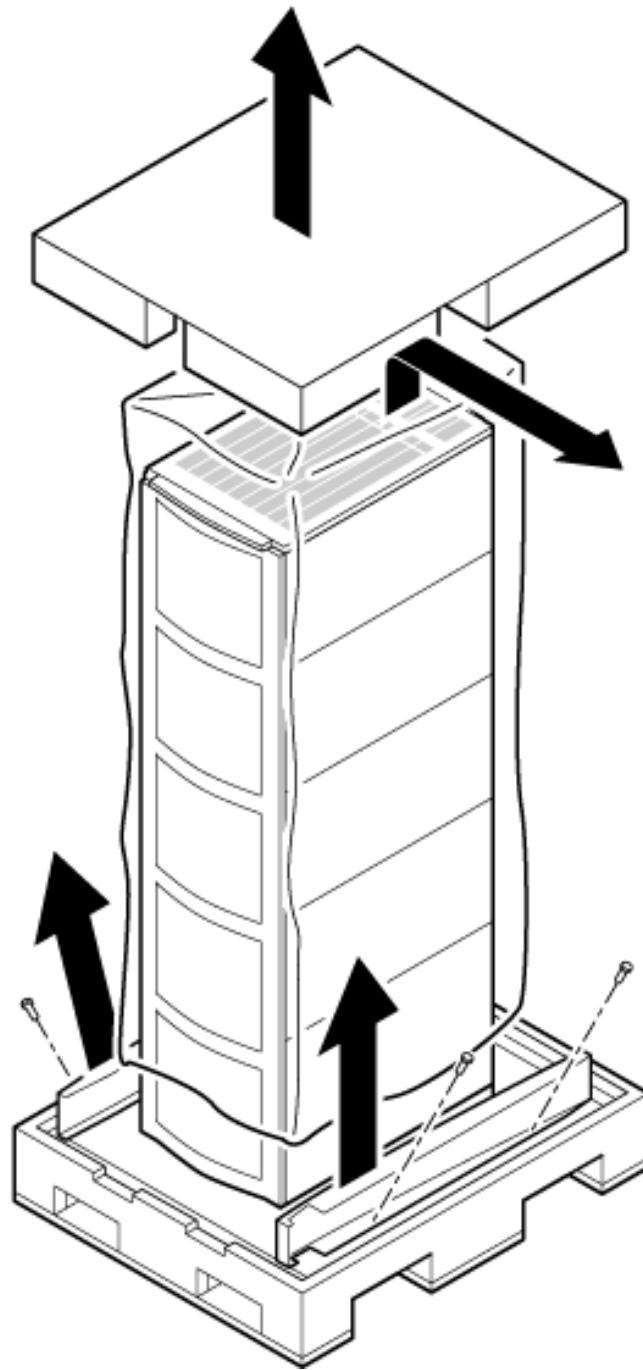
6. Remove the six bolts from the base that attaches the rack to the pallet.

Figure 13 Preparing to Roll Off the Pallet
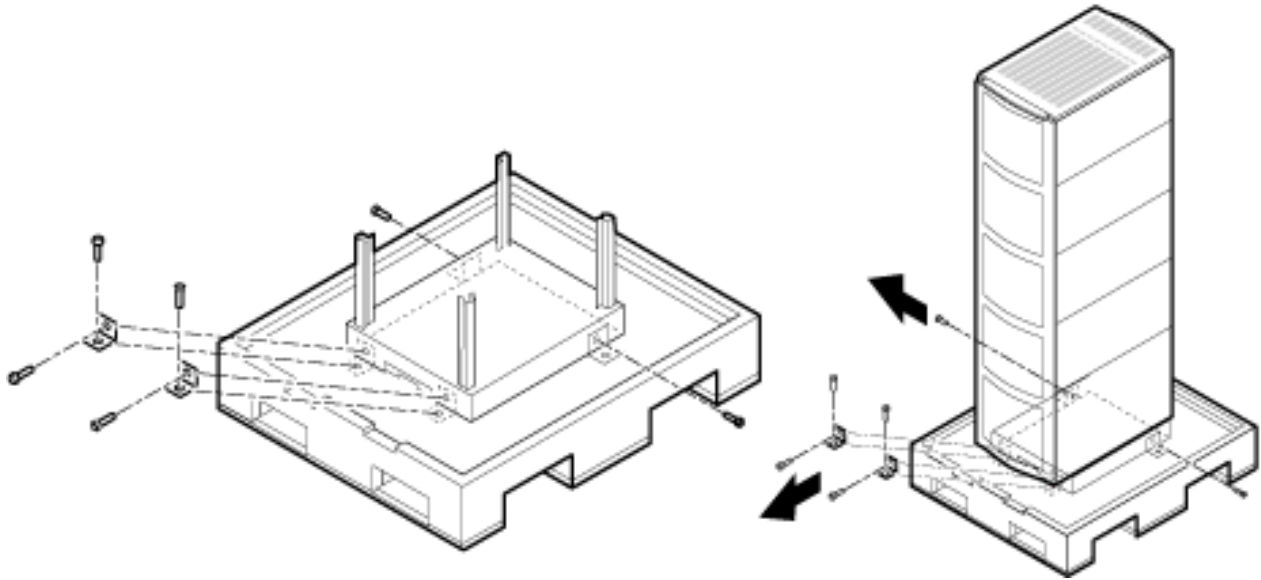
⚠ **WARNING!**   Be sure that the leveling feet on the rack are raised before you roll the rack down the ramp, and any time you roll the rack on the casters. Use caution when rolling the cabinet off the ramp. A single server in the cabinet may weigh in excess of 280 lbs. It is strongly recommended that two people roll the cabinet off the pallet.

After unpacking the cabinet, examine it for damage that might have been obscured by the shipping container. If you discover damage, document the damage with photographs and contact the transport carrier immediately.

If the equipment has any damage, the customer must obtain a damage claim form from the shipping representative. The customer must complete the form and return it to the shipping representative.

Securing the Cabinet

When in position, secure and stabilize the cabinet using the leveling feet at the corners of the base (Figure 14 (page 36)). Install the anti-tip mechanisms on the bottom front and rear of the rack.

Figure 14 Securing the Cabinet
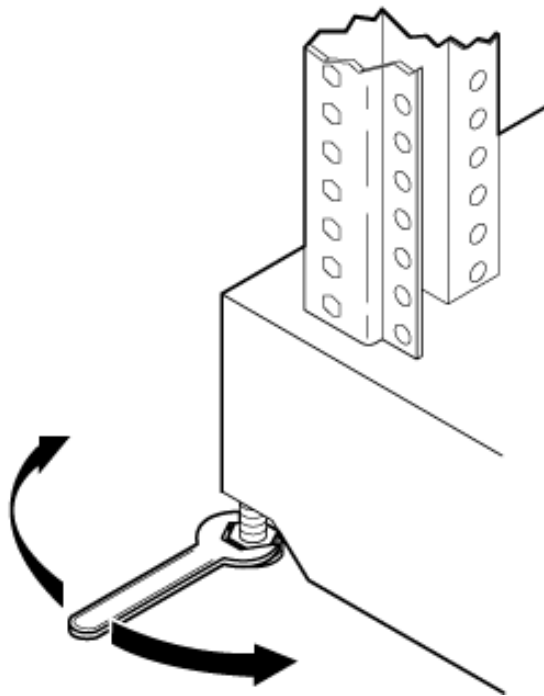
Standalone and To-Be-Racked Systems

Servers shipped in a *stand-alone* or *to-be-racked* configuration must have the core I/O *handles* and the PCI *towel bars* attached at system installation. Obtain and install the core I/O handles and PCI towel bars from the accessory kit A6093-04046. The towel bars and handles are the same part. See the following service note *A6093A-11*.

Rack-Mount System Installation

Information is available to help with rack-mounting the server. This list is intended to guide the HP Installation Specialist to the documentation that has been written by the Rack and Power team. The server can be installed in both the 10000 Series Rack and the Rack System/E.

The external Web site is:

http://h18004.www1.hp.com/products/servers/platforms/rackandpower.html

Lifting the Server Cabinet Manually

Use this procedure only if no HP approved lift is available.

> △ **CAUTION:** This procedure must only be performed by four qualified HP Service Personnel utilizing proper lifting techniques and procedures.
>
> **CAUTION:** Observe all electrostatic discharge (ESD) safety precautions before attempting this procedure. Failure to follow ESD safety precautions can result in damage to the server.

1. Follow the instructions on the outside of the service packaging to remove the banding and cardboard top from the server pallet.
2. Reduce the weight by removing the bulk power supplies and cell boards. Place each on an ESD approved surface.

> △ **CAUTION:** System damage can occur through improper removal and reinstallation of bulk power supplies and cell boards. See Chapter 6: Removing and Replacing Components, for the correct procedures to remove and reinstall these components.

3. Remove the systems left and right side covers.

    NOTE: The latest lift handles available for the 2-cell servers are symmetrical and can be installed on either side of the server.

4. Locate one handle and ensure the two thumbscrews are removed from its front flange.
5. Insert the 2 protruding tabs on rear flange of handle into the slotted keyways in the server's chassis. See Figure 15.

Figure 15 Inserting Rear Handle Tabs into Chassis

6. Align the screw holes in the handle's front flange with the rack mounting holes in the server's rack mount flange. Secure with the two thumbscrews. See Figure 16 (page 38).

Figure 16 Attaching the Front of Handle to Chassis
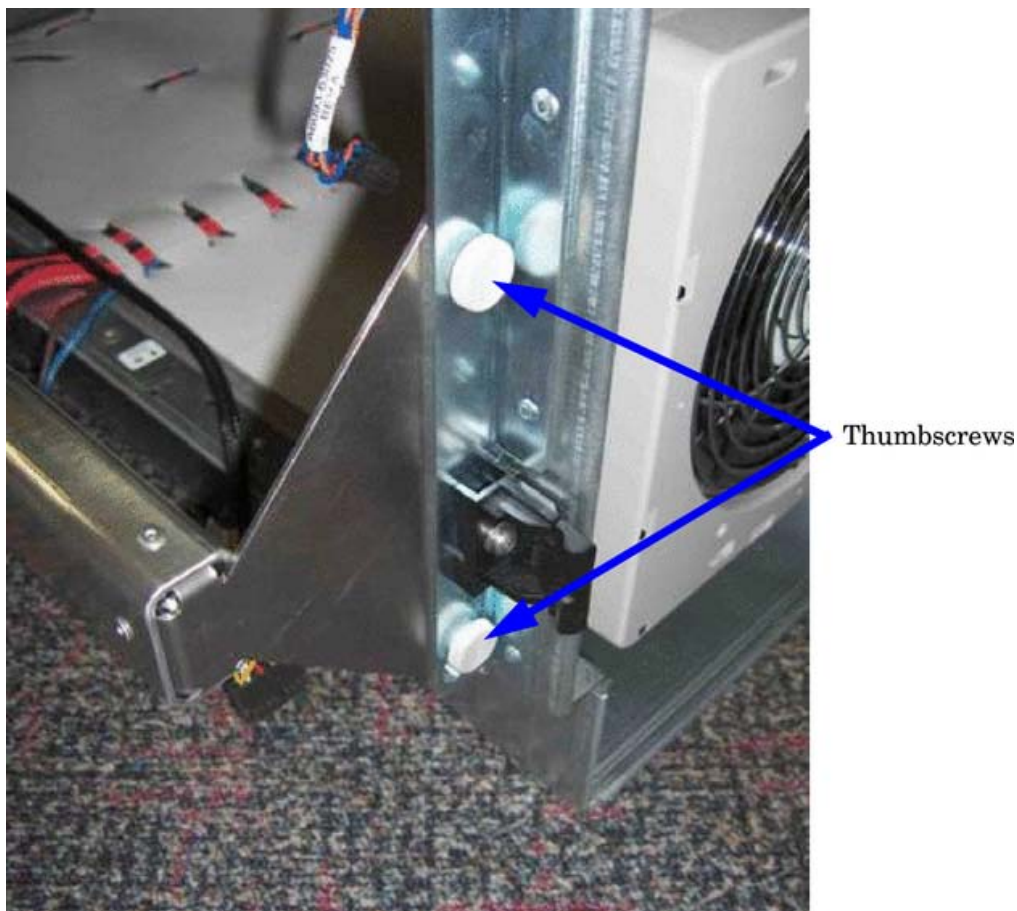
7. Repeat steps 2—4 to install the other handle on the other side of the server.
8. After handles are secured, server is ready to lift.
9. Handles are removed in reverse order of steps 2—4.
10. After moving the server, remove the lift handles from the chassis.
11. After the server is secured, replace the previously removed cell boards and bulk power supplies.
12. Reinstall the side covers and front bezel.

Using the RonI Model 17000 SP 400 Lifting Device

Use the lifter designed by the RonI company to rack-mount the server. The lifter can raise 400 lb/182 kg to a height of 5 feet. The lifter can be broken down into several components. When completely broken down, no single component weighs more than 25 lb/12 kg. The ability to break the lifter down makes it easy to transport from the office to the car and then to the customer site.

For more information about the RonI lifter, such as assembling, troubleshooting, and maintaining the lifter, see the *LIFT-O-FLEX® 17000 SP 400 Manual*.

http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c03036431/c03036431.pdf

Use the following procedure to unload the server from the pallet after the lifter is assembled.

⚠ **WARNING!** Use caution when using the lifter. To avoid injury, because of the weight of the server, center the server on the lifter forks before raising it off the pallet.

Always rack the server in the bottom of a cabinet for safety reasons. Never extend more than one server from the same cabinet while installing or servicing another server product. Failure to follow these instructions could result in the cabinet tipping over.

Figure 17 RonI Lifter
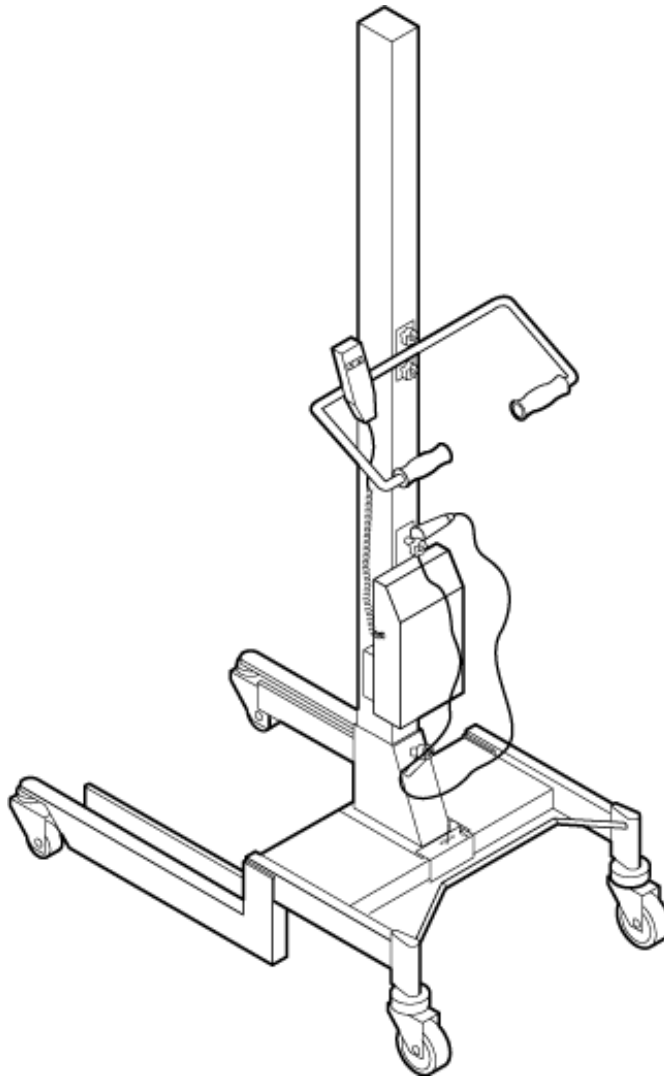
1. Obtain the *HP J1530C Rack Integration Kit Installation Guide* before proceeding with the rack mount procedure. This guide covers these important steps:

    •   Installing the anti-tip stabilizer kit (A5540A)

    •   Installing the ballast kit (J1479A)

    •   Installing the barrel nuts on the front and rear columns

    •   Installing the slides

2. Follow the instructions on the outside of the server packaging to remove the banding and carton top from the server pallet.

3. Carefully roll the lift forward until it is fully positioned against the side of the pallet.

Figure 18 Positioning the Lifter to the Pallet
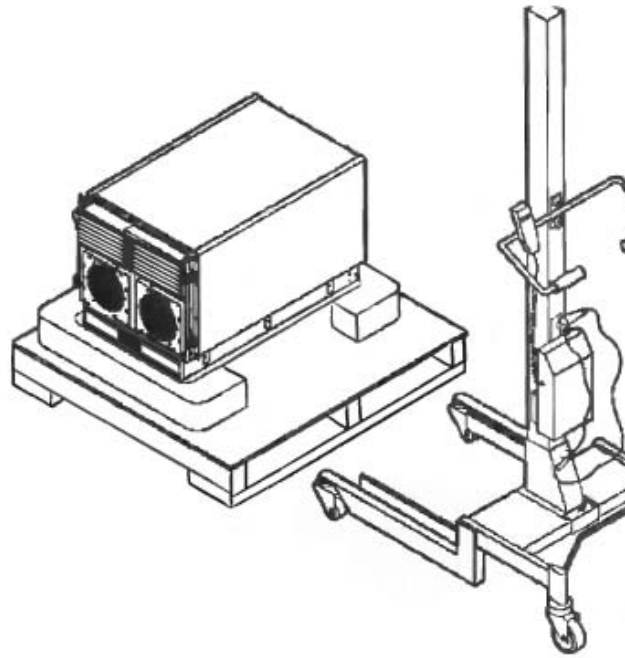
4. Carefully slide server onto lifter forks.
5. Slowly raise the server off the pallet until it clears the pallet cushions.

Figure 19 Raising the Server Off the Pallet Cushions
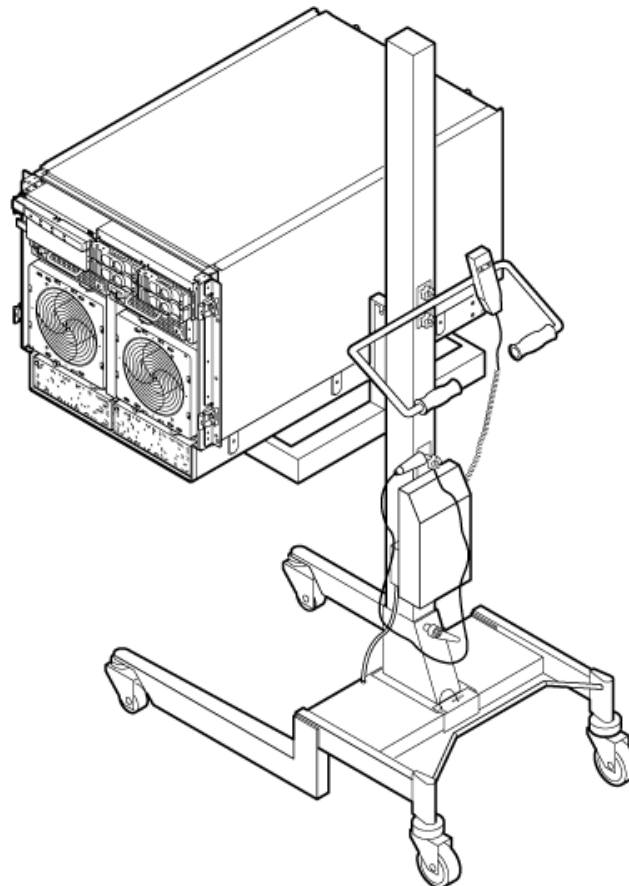
6. Carefully roll the lifter and server away from the pallet. Do not raise the server any higher than necessary when moving it over to the rack.

7. Follow the *HP J1530C Rack Integration Kit Installation Guide* to complete these steps:
   - Mounting the server to the slides
   - Installing the cable management arm (CMA)
   - Installing the interlock device assembly (if two servers are in the same cabinet)

Wheel Kit Installation

Compare the packing list (Table 16) with the contents of the wheel kit before beginning the installation. For a more updated list of part numbers, go to the HP Part Surfer web site at the following website:

http://www.partsurfer.hp.com

Table 16 Wheel Kit Packing List

Part Number	Description	Quantity
A6753-04013	Wheel Kit consisting of the following components:	1
A6753-04002	Side cover	1
A6753-04003	Side cover	1
A6753-04004	Top cover	1
A6753-00007	Caster cover	2
A6753-04001	Right front caster assembly	1
A6753-04005	Right rear caster assembly	1
A6753-04006	Left front caster assembly	1
A6753-04007	Left rear caster assembly	1
0515-2478	M4 x 0.7 8mm T15 steel zinc machine screw (Used to attach each caster to the chassis)	4
A6093-44013	Plywood unloading ramp	1
Not Applicable	Phillips head wood screw (Used to attach the ramp to the pallet)	2

Tools Required for Installation

The following list provides the installer with the recommended tools to perform the wheel kit installation.

- Diagonal side cutters
- Safety glasses
- Torx screwdriver with T-15 bit
- Phillips head screwdriver

⚠ **WARNING!** Wear protective glasses while cutting the plastic bands around the shipping container. These bands are under tension. When cut, they can spring back and cause serious eye injury.

Use the following procedure to install the wheel kit.
1. Cut and remove the polystrap bands securing the HP server to the pallet.
2. Lift the carton top from the cardboard tray resting on the pallet.
3. Remove the bezel kit carton and the top cushions from the pallet.

Figure 20 Component Locations
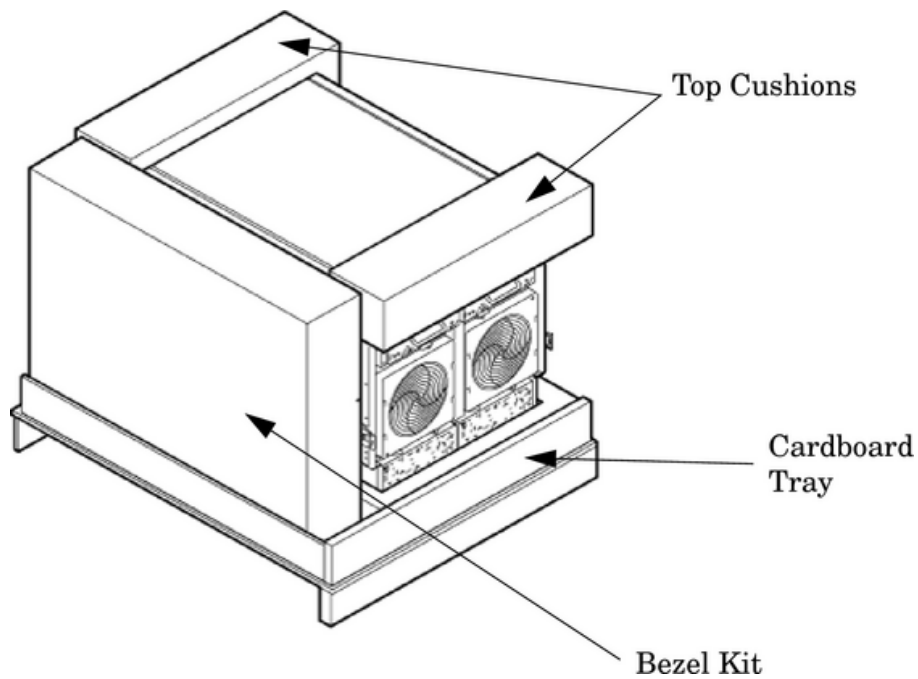
4. Unfold bottom cardboard tray.
5. Carefully tilt the server and place one of the foam blocks (A6093-44002) under the left side of the server. Do not remove any other cushions until instructed to do so.

Figure 21 Left Foam Block Position
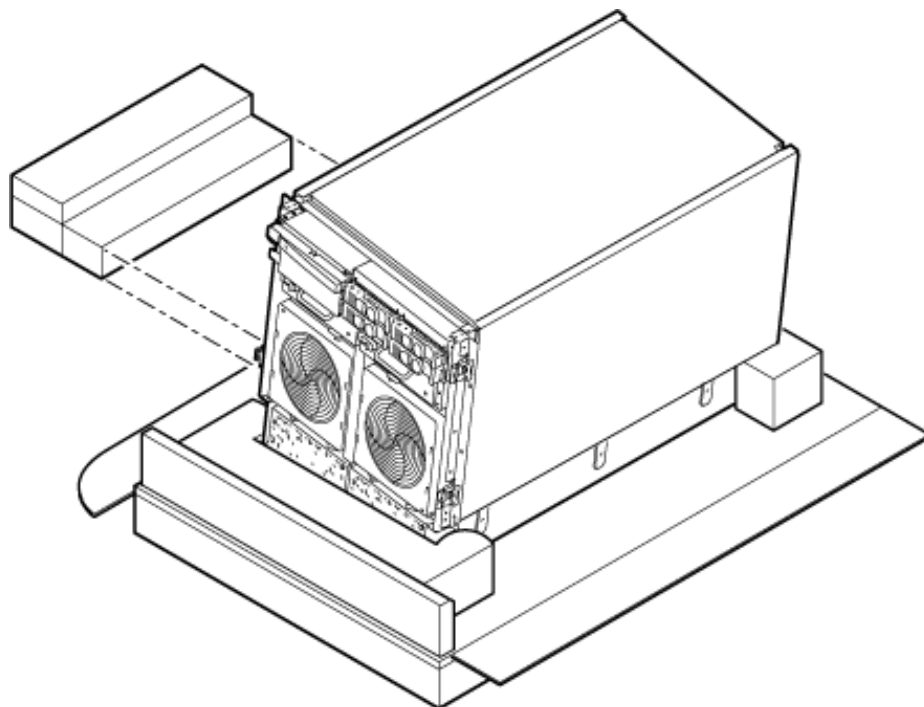
6. Carefully tilt the server and place the other foam block provided in the kit under the right side of the server.

Figure 22 Right Foam Block Position
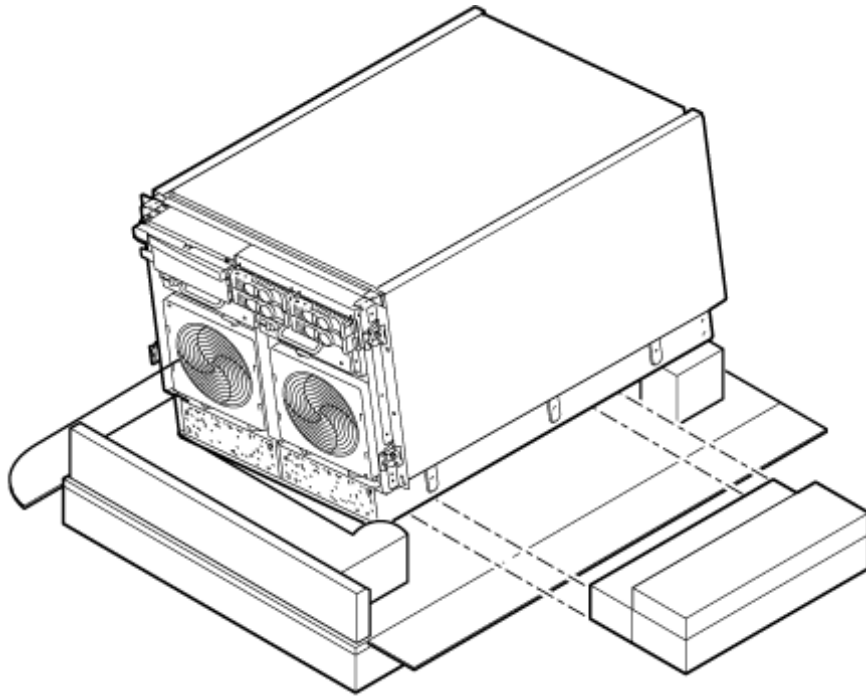
7. Remove the cushions from the lower front and rear of the server. Do not disturb the side cushions.

Figure 23 Foam Block Removal
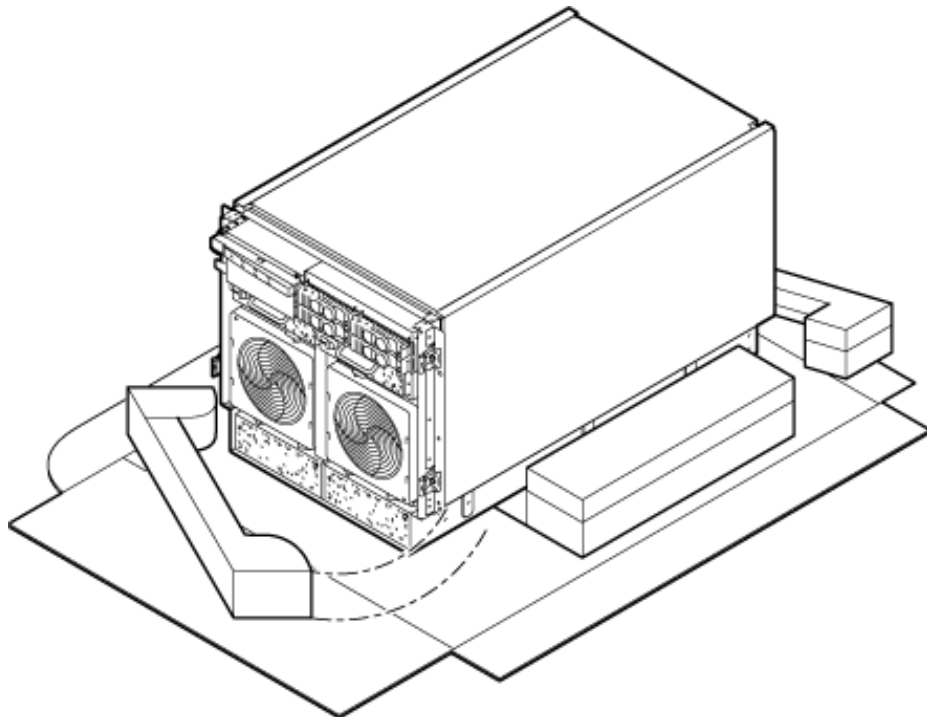
8. Locate and identify the caster assemblies. Use the following table to identify the casters.

   NOTE: The caster part number is stamped on the caster mounting plate.

Table 17 Caster Part Numbers

Caster	Part Number
Right front	A6753-04001
Right rear	A6753-04005
Left front	A6753-04006
Left rear	A6753-04007

9. Locate and remove one of the four screws from the plastic pouch. Attach the a caster to the server.

Figure 24 Attaching a Caster to the Server
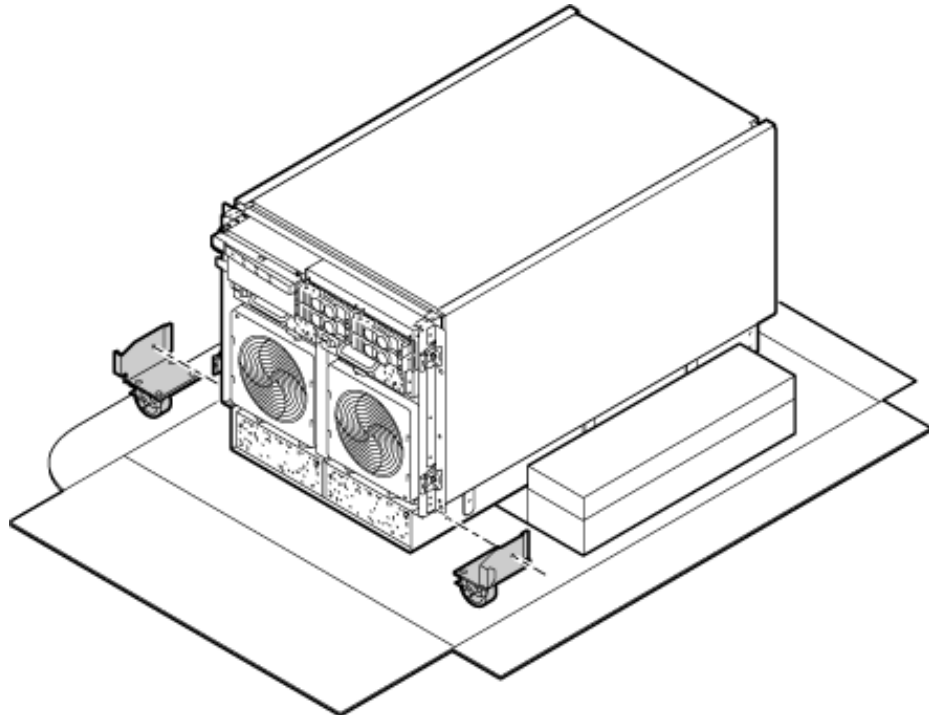
10. Attach the remaining casters to the server using the screws supplied in the plastic pouch.
11. Remove the foam blocks from the left and right side of the server.
12. Locate the plywood ramp.
13. Attach the ramp to the edge of the pallet.

> **NOTE:** There are two pre-drilled holes in the ramp. Use the two screws taped to the ramp to attach the ramp to the pallet.

14. Carefully roll the server off the pallet and down the ramp.
15. Locate the caster covers.

> **NOTE:** The caster covers are designed to fit on either side of the server.

16. Insert the slot on the caster cover into the front caster. Secure the cover to the server by tightening the captive screw on the cover at the rear of the server.

Figure 25 Securing Each Caster Cover to the Server
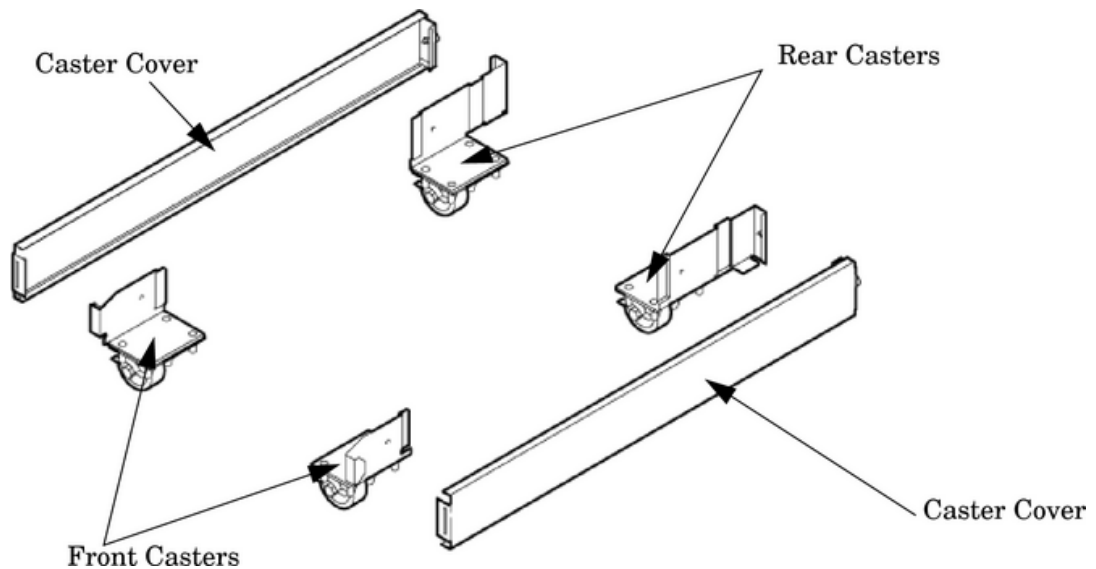
17. Wheel kit installation is complete when both caster covers are attached to the server, and the front bezel and all covers are installed.

Figure 26 Completed Server
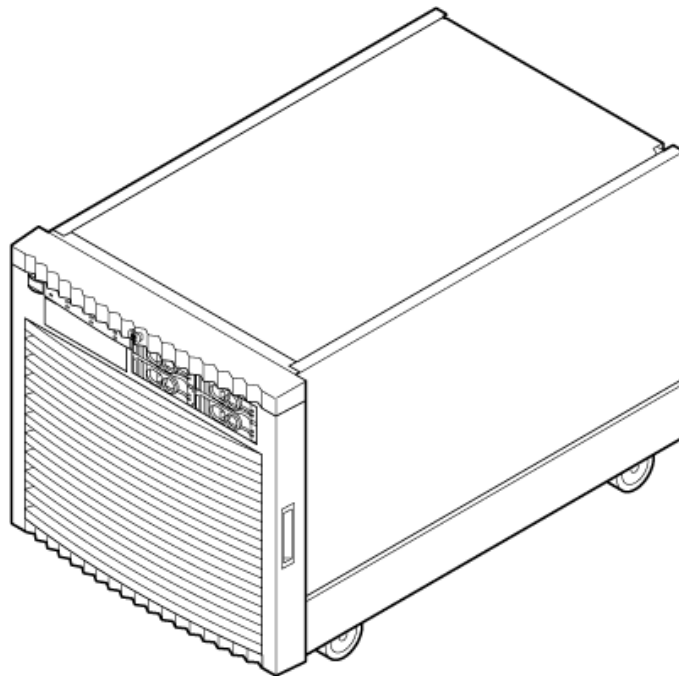
Installing the Power Distribution Unit

The server may ship with a power distribution unit (PDU). Two 60 A PDUs available for the server. Each PDU 3 U high and is mounted horizontally between the rear columns of the server cabinet. The 60 A PDUs are delivered with an IEC-309 60 A plug.

The 60 A NEMA[2] PDU has four 20 A circuit breakers and is constructed for North American use. Each of the four circuit breakers has two IEC[3]-320 C19 outlets providing a total of eight IEC-320 C19 outlets.

___

2. The acronym NEMA stands for National Electrical Manufacturers Association.
3. The acronym IEC stands for International Electrotechnical Commission.

The 60A IEC PDU has four 16A circuit breakers and is constructed for International use. Each of the four circuit breakers has two IEC-320 C19 outlets providing a total of eight IEC-320 C19 outlets.

Each PDU is 3U high and is rack-mounted in the server cabinet.

Documentation for installation will accompany the PDU. The documentation can also be found at the external Rack Solutions Web site at:

http://www.hp.com/go/rackandpower

This PDU might be referred to as a Relocatable Power Tap outside HP.

The PDU installation kit contains the following:

- PDU with cord and plug
- Mounting hardware
- Installation instructions

Installing Additional Cards and Storage

This section provides information on additional products ordered after installation and any dependencies for these add-on products.

The following options may be installed in the server.

- Additional hard disk drive storage
- Removable media device storage
- PCI and PCI-X I/O cards

Installing Additional Hard Disk Drives

The disk drives are located in the front of the chassis (Figure 27 (page 47)). The hard disk drives are hot-plug drives.

A list of replacement disk drives for the server is in Appendix A (page 167). The list contains both removable media disk drives and hard disk drives.

Figure 27 Disk Drive and DVD Drive Location

DVD/DAT/
Slimline DVD Drive
Path: 1/0/0/3/1.2.0

Slimline DVD Drive
Path: 0/0/0/3/1.2.0

Drive 1-1
Path: 1/0/0/3/0.6.0

Drive 1-2
Path: 1/0/1/1/0/4/1.6.0

Drive 0-2
Path: 0/0/1/1/0/4/1.5.0

Drive 0-1
Path: 0/0/0/3/0.6.0
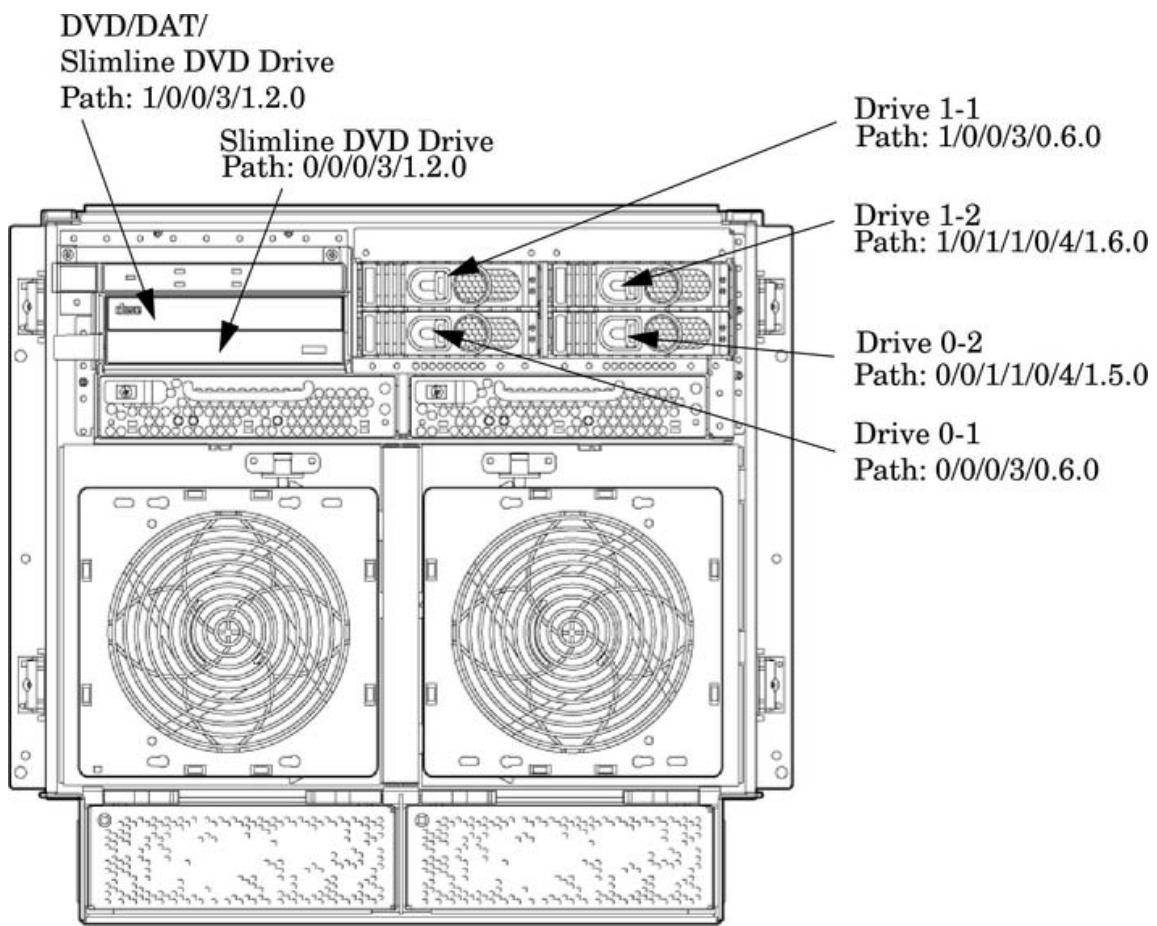
Use the following procedure to install the disk drives:

1. Be sure the front locking latch is open, then position the disk drive in the chassis.
2. Slide the disk drive into the chassis, a slow firm pressure is needed to properly seat the connector.
3. Press the front locking latch to secure the disk drive in the chassis.
4. If the server OS is running, spin up the disk by entering one of the following commands:

```
#diskinfo -v /dev/rdsk/cxtxdx
#ioscan -f
```

Removable Media Drive Installation

The DVD drive, or DAT tape drive is located in the left front of the chassis. The server power must be turned off before installation. See the following for more information: Chapter 4: Booting and Shutting Down the Operating System, "Powering Off Hardware Components and Powering On the Server" (page 126), and "Removing and Replacing a Half-Height DVD/DAT Drive" (page 140).

Figure 28 Removable Media Location
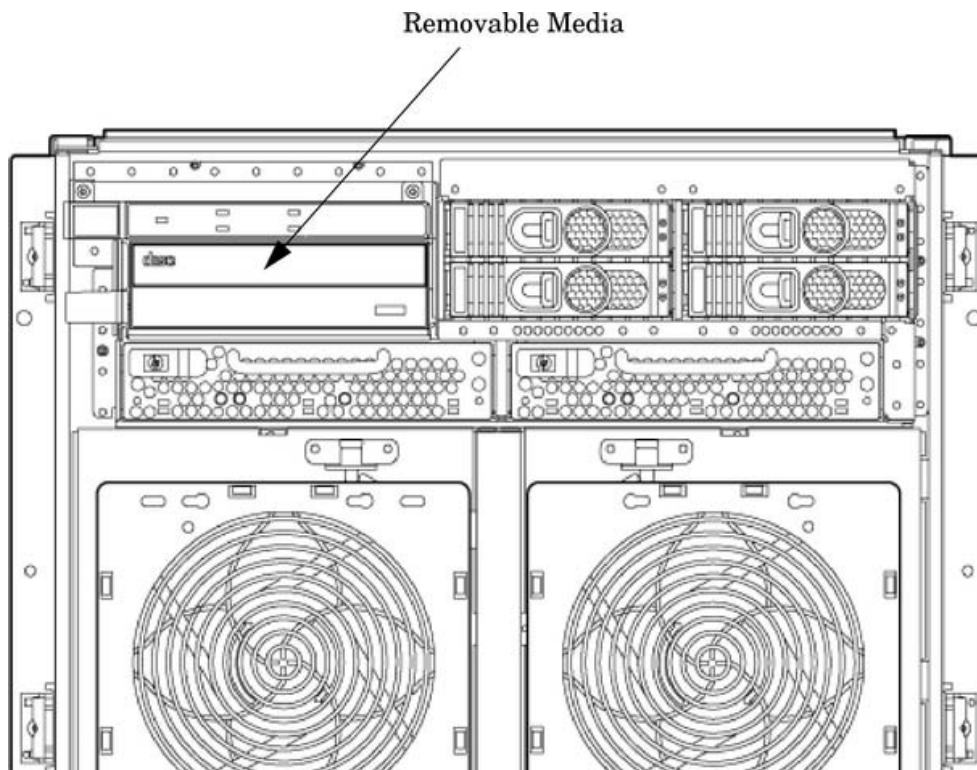
1. Remove the front bezel.
2. Remove the filler panel from the server.
3. Install the left and right media rails and clips to the drive.
4. Connect the cables to the rear of the drive
5. Fold the cables out of the way and slide the drive into the chassis.

   The drive easily slides into the chassis; however, a slow firm pressure is needed for proper seating.

   The front locking tab will latch to secure the drive in the chassis.

6. Replace the front bezel.
7. Power on the server, and power up nPartitions.
8. Verify operation of the drive.

PCI-X Card Cage Assembly I/O Cards

The server supports a number of PCI and PCI-X I/O cards. Table 18 lists the cards currently supported on the server.

Several cards can lose boot functionality in the HP Integrity rx7640 server. The customer must use another I/O card to retain boot functionality if the customer's card is not supported in the rx7640 server.

Table 18 HP Integrity rx7640 PCI-X and PCIe I/O Cards

Part Number	Card Description	HP-UX	Windows®	Linux®	VMS
A4926A	Gigabit Ethernet (1000b-SX)				
A4929A	Gigabit Ethernet (1000b-T)				
A5158A	FCMS - Tachlite				
A5230A	10/100b-TX (RJ45)				

Table 18 HP Integrity rx7640 PCI-X and PCIe I/O Cards *(continued)*

Part Number	Card Description	HP-UX	Windows®	Linux®	VMS
A5506B	4-port 10/100b-TX				
A5838A	2-port Ultra2 SCSI/2-Port 100b-T Combo				
A6386A	Hyperfabric II				
A6749A	64-port Terminal MUX				
A6795A	2G FC Tachlite	B			
A6825A	Next Gen 1000b-T	b	b		
A6826A[1]	2-port 2Gb FC	B			B
A6828A	1-port U160 SCSI	B	B		
A6829A	2-port U160 SCSI	B	B		
A6847A	Next Gen 1000b-SX	b	b		
A6869B[2]	Obsidian 2 VGA/USB	B			B
A7011A	1000b-SX Dual Port	b	b	b	
A7012A	1000b-T Dual Port	b	b	b	
A7173A	2-port U320 SCSI	B	B	B	B
A9782A[1]	1000b-T GigE/2G FC Combo	Bb			B
A9784A[1]	PCI-X 1000b-T GigE/2G FC Combo	Bb			B
A9890A	2-port Smart Array 6402 (U320)	B	B	B	B
A9891A	4-port Smart Array 6402 (U320)	B	B	B	B
AB232A[1]	Emulex 9802 Fibre Channel		B		
AB286A	PCI-X 2-port 4X InfiniBand HCA (HPC)				
AB286C	PCI-X 2-Port 4X InfiniBand HCA (HPC)-RoHS				
AB287A	10 GbE - Fiber (PCI-X 133)	b	b	b	
AB290A	U320 SCSI/GigE Combo Card	Bb	Bb	Bb	B
AB345A	PCI-X 2-port 4X InfiniBand HCA				
AB345C	PCI-X 2-Port 4X InfiniBand HCA - RoHS				
AB378A[1]	QLogic 1-port 4Gb FC (PCI-X 266)	B			B
AB378B[1]	QLogic 1-port 4Gb FC card (PCI-X 266)	B			B
AB379A[1]	QLogic 2-port 4Gb FC (PCI-X 266)	B	B	B	B
AB379B[1]	QLogic 2-port 4Gb FC card (PCI-X 266)	B	B	B	B
AB429A[1]	1-Port 4Gb FC QLogic – AB378A equivalent		B	B	
AB465A[1]	2-port 1000b-T 2Gb FC Combo	Bb			B
AB466A[1]	Emulex 1050DC Fibre Channel		B		
AB467A[1]	Emulex 1050D Fibre Channel		B		
AB545A	4-Port 1000b-T Ethernet	b			
AD167A[1]	Emulex 4Gb/s		B	B	

Table 18 HP Integrity rx7640 PCI-X and PCIe I/O Cards *(continued)*

Part Number	Card Description	HP-UX	Windows®	Linux®	VMS
AD168A[1]	Emulex 4Gb/s DC		B	B	
AD193A	1 port 4Gb FC & 1 port GbE HBA PCI-X	Bb			B
AD194A	2 port 4Gb FC & 2 port GbE HBA PCI-X	Bb			B
AD278A	8-Port Terminal MUX				
AD279A	64-Port Terminal MUX				
AD307A	LOA (USB/VGA/RMP)	B			B
J3525A	2-port Serial				
337972-B21	SA P600 (Redstone)		B	B	
PCIe Cards					
A8002A	Emulex 1–port 4Gb FC PCIe		B	B	
A8003A	Emulex 2–port 4Gb FC PCIe		B	B	
AD299A	1 port 4Gb FC HBA PCIe (Emulex)	B			B
AD300A	2 Port 4Gb FC HBA PCIe (QLogic)	B	B	B	B
AD313A	2 Ch 4X Infiniband HCA PCIe				
AD337A	2 Port 1000bT NIC PCIe	b	b	b	
AD338A	2 Port 1000bT-SX NIC PCIe	b	b	b	
AE311A	1 Port 4Gb FC HBA PCIe (QLogic)		B	B	
AH226A	E500 SAS HBA (Bumper)		B	B	
AD355A	2 port 4Gb FC HBA PCIe (Emulex)		B	B	

- B- Supports Mass Storage Boot
- b- Supports LAN Boot
- Bb- Supports Mass Storage and LAN Boot
1. Factory integration (software load) of the OpenVMS, Windows, and Linux operating systems via Fibre Channel is NOT supported.
2. Boot support is limited to OS installation, updating, and repairing media.

Ⓘ **IMPORTANT:** The above list of part numbers is current and correct as of September 2009. Part numbers change often. Check the following website to ensure you have the latest part numbers associated with this server:

http://www.partsurfer.hp.com

Installing an Additional PCI-X Card

Ⓘ **IMPORTANT:** While the installation process for PCI/PCI-X cards and PCIe cards is the same, PCIe cards are physically smaller than PCI-X cards and are not interchangeable.

NOTE: The PCI I/O card installation process varies depending on what version of the HP-UX operating system you are running on your system. PCI I/O card installation procedures should be downloaded from the following website: www.hp.com/go/bizsupport. Select a following guide and enter the title in the *search* field for background information and procedures to add a new PCI I/O card using online addition:

- *nPartition Administrator's Guide*
- *Interface Card OL* Support Guide for HP-UX 11.23*

NOTE: The Lights Out Advanced/KVM Card (LOA) is a PCI-X accessory card that can be installed into any sx2000–based Integrity server to enable the advanced virtual graphical console (vKVM) and virtual CD/DVD/ISO file (vMedia) features of the Integrity Lights Out Management Processor (iLO/MP). The LOA card is also a graphics/USB card that offers physical video functionality for servers running Windows, and USB functionality for servers running HP-UX, Windows and OpenVMS. All Lights Out Advanced features are fully enabled on the LOA card – there is no additional "advanced pack" license to purchase. At present, vKVM is only available for servers running Windows and vMedia is available for servers running HP-UX, Windows and OpenVMS. There are no current plans to support the LOA card under Linux.

The LOA card has specific slotting requirements that must be followed for full functionality. They are as follows:

- Must be placed in a mode 1 PCI/PCI-X slot
- Must be placed in an I/O chassis with a core I/O card
- Must be only one LOA card on each partition

HP recommends that you place the LOA card in the lowest numbered slot possible.

The server implements manual release latch (MRL) hardware for use in online add or replacement (OLAR) operations. If an MRL is left open while the server is booting, HP-UX can incorrectly cache PCI slot power status causing OLAR operations to fail. To prevent this situation, ensure all the MRLs are closed before booting the server.

If OLAR reports that a slot is present and powered off, but no OLAR operations to turn power on to that slot have succeeded even after the MRL is closed, the MRL may have been left open during boot. To clear this condition, close the MRL for the PCI slot then power off the PCI slot using the `rad -o` command. This will allow future OLAR operations to succeed on this PCI slot.

IMPORTANT: The installation process varies depending on what method for installing the PCI card is selected. PCI I/O card installation procedures should be downloaded from the following website: www.hp.com/go/bizsupport. Background information and procedures for adding a new PCI I/O card using online addition are found in the *Interface Card OL* Support Guide*. Enter the title of the guide into the *search* field to locate.

PCI I/O OL* Card Methods

There are three methods for performing OL* operations on PCI I/O cards.

`pdweb`	The Peripheral Device Tool (pdweb) Web-based method of performing OL*.
`olrad`	The command line method of performing OL*.
Attention Button	The hardware system slot based method of performing OL*.

Adding a PCI I/O Card Using the Attention Button

The following prerequisites for this procedure:

- Drivers for the card have already been installed.
- No drivers are associated with the slot.
- The green power LED is steady **OFF**. Should the empty slot be in the **ON** state use the olrad command or the pdweb tool to power the slot **OFF**.
- The yellow attention LED if steady **OFF** or is blinking if a user has requested the slot location.
- See the host bus adapter (HBA) documentation for details on card installation.
- Run the `olrad -q` command to determine the status of all the PCI I/O slots.
- Obtain a copy of the interface card guide for instructions on preparing the operating system for the online addition of the PCI I/O card before attempting to insert a PCI I/O card into the PCI-X card cage assembly backplane slot.

This procedure describes how to perform an *online addition* of a PCI card using the attention button for cards whose drivers support online add or replacement (OLAR). The attention button is also referred to as the *doorbell*.

1. Remove the top cover.
2. Remove the PCI bulkhead filler panel.
3. Flip the PCI manual retention latch (MRL) for the card slot to the open position. See Figure 29 (page 53).
4. Install the new PCI card in the slot.

   NOTE: Apply a slow, firm pressure to properly seat the card into the backplane.

5. Flip the PCI MRL for the card slot to the closed position.

△ **CAUTION:** Working out of sequence or not completing the actions within each step could cause the system to crash.

Do not press the attention button until the latch is locked.

6. Press the attention button.

   The green power LED will start to blink.

Figure 29 PCI I/O Slot Details

Manual Release Latch Closed

Manual Release Latch Open

OL* Attention Button

Power LED (Green)

Attention LED (Yellow)
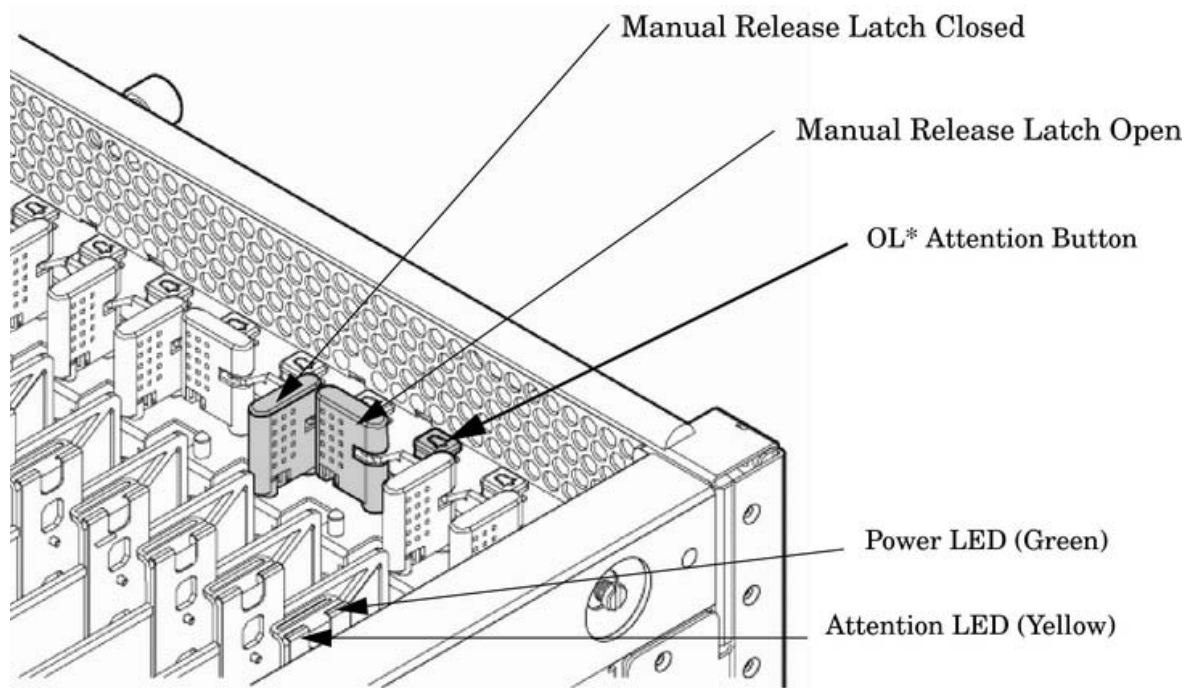
7. Wait for the green power LED to stop blinking.

8. Check for errors in the `hotplugd` daemon log file (default: `/var/adm/hotplugd.log`).

   The critical resource analysis (CRA) performed while doing an attention button initiated add action is very restrictive and the action will not complete–it will fail–to protect critical resources from being impacted.

   For finer control over CRA actions use `pdweb` or the `olrad` command. See the *Interface Card OL* Support Guide* located at the following website: www.hp.com/go/bizsupport. Enter the title of the guide into the *search* field to locate.

9. Replace the top cover.

10. Connect all cables to the installed PCI card.

Installing an A6869B VGA/USB PCI Card in a Server

The A6869B VGA/USB PCI card is a dual function combo card, hosting VGA and universal serial bus (USB) controllers. Both of these devices sit behind a PCI-PCI bridge. The A6869B VGA/USB PCI card operates at the conventional 66MHz/64 bit PCI rate and is universally keyed. All signalling and form factors conform to the *PCI Local Bus Specification 2.3*. The VGA controller has 128Mbits of DDR-1 RAM for use as a frame buffer.

The A6869B VGA/USB PCI card can be installed into any slot in a PCI/PCI-X backplane.

ⓘ **IMPORTANT:** If you are installing the A6869B in HP servers based on the sx1000 chipset, such as HP Superdome, rx7620 or rx8620, the system firmware must be updated to a minimum revision of 3.88.

IMPORTANT: Search for available PCI slots that support the conventional clock speed to conserve availability of higher speed PCI-X card slots to PCI-X cards that use the higher bandwidth. This applies to mid-range as well as high-end HP server I/O PCI-X backplanes.

Figure 30 PCI/PCI-X Card Location

PCI/PCI-X Cards
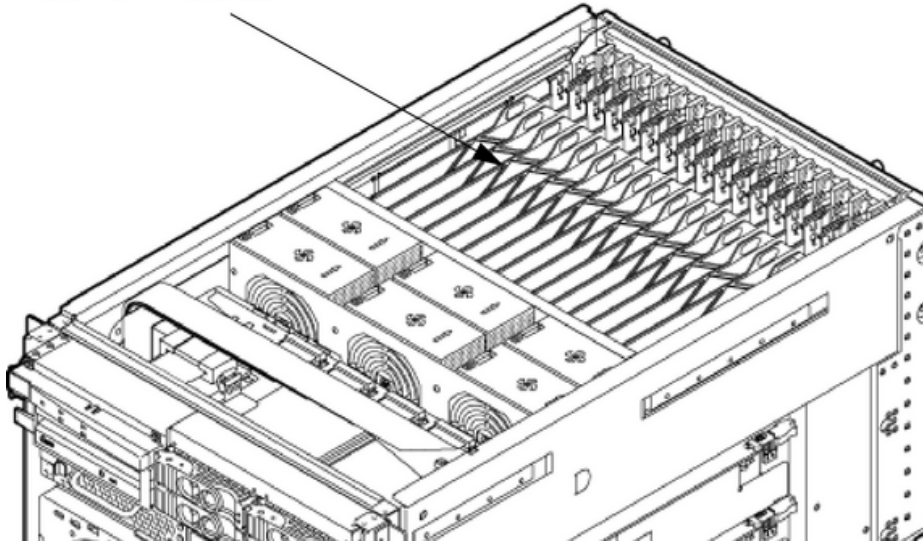
> ⓘ **IMPORTANT:** Some PCI I/O cards, such as the A6869B VGA/USB PCI card, cannot be added or replaced online (while Windows® remains running). For these cards, you must shut down Windows on the nPartition before performing the card replacement or addition. See the section on Shutting Down nPartitions and Powering off Hardware Components in the appropriate service guide.

1. If the A6869B VGA/USB PCI card is currently not installed, follow proper procedures to shut down the nPartition and power-off the appropriate PCI power domain.
2. Locate a vacant conventional clock speed PCI slot where the A6869B VGA/USB PCI card will reside.
3. Position the PCI card over the empty slot, observing that edge connector keyways match on the PCI backplane connector.
4. Using a slow firm pressure, seat the card down into the slot.
5. Connect the monitor, mouse, and keyboard cables to the card.
6. Connect power, and turn on the monitor.
7. Follow proper procedures to power-on the PCI power domain and boot the Windows nPartition.

Once Windows has completely booted, the video, keyboard and mouse are ready for use.

Troubleshooting the A6869B VGA/USB PCI Card

The following provides some troubleshooting solutions and a URL to a useful reference site.

No Console Display

Black Screen. No text displayed.	Hardware problem.
	* Must have supported power enabled.
	* Must have a functional VGA/USB PCI card.
	* Must have a functional PCI slot. Select another slot on same partition/backplane.
	* Must have the VGA/USB PCI card firmly seated in PCI backplane slot.
	* Must have a supported monitor.
	* Must have verified cable connections to VGA/USB PCI card.
Display unreadable.	* Ensure system FW supports the VGA/USB PCI card.
	* Ensure graphics resolution is compatible and set correctly.

Reference URL

There are many features available for HP Servers at this website including links to download Windows Drivers.

HP Servers Technical Support

http://www.hp.com/support/itaniumservers

Cabling and Power Up

After the system has been unpacked and moved into position, it must be connected to a source of AC power. The AC power must be checked for the proper voltage before the system is powered up. This chapter describes these activities.

Checking the Voltage

This section provides voltage check information for use on the customer site. The empahsis focuses on measuring the voltages at the power cord plug and specified as an IEC 320 C19 type plug. This end plugs directly into the back of the server chassis.

NOTE: Perform these procedures for each power cord that will be plugged directly into the back of the server. If you do not obtain the expected results from this procedure during the voltage check, see the section titled "Voltage Check (Additional Procedure)" (page 59)."

Preface

The server requires a minimum of 2 power cords. To enable full power redundancy, 4 power cords may be used. When using 4 power cords, dual power sources may be used to provide additional power source protection.

Power cords are designated and labeled A0, A1, B0 and B1. Cords A0 and B0 should be energized from the same power source and cords A1 and B1 should be energized from a second, independently qualified power surce. The cord labeling corresponds to the labeling at the servers power receptacles.

Voltage Range Verification of Receptacle

Use this procedure to measure the voltage between L1 and L2, L1 to ground, and L2 to ground. See Figure 31 (page 55) for voltage reference points when performing the following measurements.

Figure 31 Voltage Reference Points for IEC 320 C19 Plug
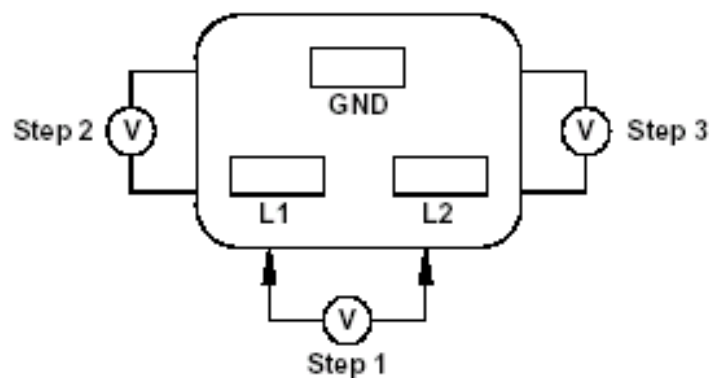
① IMPORTANT: Perform these measurements for every power cord that plugs into the server.

1. Measure the voltage between L1 and L2. This is considered to be a phase-to-phase measurement in North America. In Europe and certain parts of Asia-Pacific, this measurement is referred to as a phase-to-neutral measurement. The expected voltage should be between 200–240 V AC regardless of the geographic region.

2. Measure the voltage between L1 and ground. In North America, verify that this voltage is between 100–120 V AC. In Europe and certain parts of Asia-Pacific, verify that this voltage is between 200–240 V AC.

3. Measure the voltage between L2 and ground. In North America, verify that this voltage is between 100–120 VAC. In Europe and certain parts of Asia-Pacific, verify that this voltage is 0 (zero) V AC.

Table 19 provides single phase voltage measurement examples dependent on the geographic region where these measurements are taken.

Table 19 Single Phase Voltage Examples

	Japan	North America	Europe[1]
L1-L2	210V	208V or 240V	230V
L1-GND	105V	120V	230V
L2-GND	105V	120V	0V

[1] In some European countries there may not be a polarization.

Verifying the Safety Ground (Single Power Source)

Use this procedure to measure the voltage level between A0 and A1. It also verifies the voltage level between B0 and B1. Take measurements between ground pins. See Figure 32 (page 57) for ground reference points when performing these measurements.

Figure 32 Safety Ground Reference Check

⚠ **WARNING!**   SHOCK HAZARD

Risk of shock hazard while testing primary power.

Use properly insulated probes.

Be sure to replace access cover when finished testing primary power.

1. Measure the voltage between A0 and A1 as follows:
   a. Take the AC voltage down to the lowest scale on the volt meter.
   b. Insert the probe into the ground pin for A0.
   c. Insert the other probe into the ground pin for A1.
   d. Verify that the measurement is between 0-5 V AC.

   If the measurement is 5 V or greater, escalate the situation. Do not attempt to plug the power cord into the server cabinet.

2. Measure the voltage between B0 and B1 as follows:
   a. Take the AC voltage down to the lowest scale on the volt meter.
   b. Insert the probe into the ground pin for B0.
   c. Insert the other probe into the ground pin for B1.
   d. Verify that the measurement is between 0-5 V AC.

   If the measurement is 5 V or greater, escalate the situation. Do not attempt to plug the power cord into the server cabinet.

Verifying the Safety Ground (Dual Power Source)

Use this procedure to measure the voltage level between A0 and A1, between B0 and B1, between A0 and B0, and between A1 and B1. Take all measurements between ground pins. See Figure 33 (page 58) for ground reference points when performing these measurements.

Figure 33 Safety Ground Reference Check

> ⚠ **WARNING!**   SHOCK HAZARD
>
> Risk of shock hazard while testing primary power.
>
> Use properly insulated probes.
>
> Be sure to replace access cover when finished testing primary power.

1. Measure the voltage between A0 and A1 as follows:
   a. Take the AC voltage down to the lowest scale on the volt meter.
   b. Insert the probe into the ground pin for A0.
   c. Insert the other probe into the ground pin for A1.
   d. Verify that the measurement is between 0-5 V AC.

   If the measurement is 5 V or greater, escalate the situation. Do not attempt to plug the power cord into the server cabinet.

2. Measure the voltage between B0 and B1 as follows:
   a. Take the AC voltage down to the lowest scale on the volt meter.
   b. Insert the probe into the ground pin for B0.
   c. Insert the other probe into the ground pin for B1.
   d. Verify that the measurement is between 0-5 V AC.

   If the measurement is 5 V or greater, escalate the situation. Do not attempt to plug the power cord into the server cabinet.

3. Measure the voltage between A0 and B0 as follows:
   a. Take the AC voltage down to the lowest scale on the volt meter.
   b. Insert the probe into the ground pin for A0.
   c. Insert the other probe into the ground pin for B0.
   d. Verify that the measurement is between 0-5 V AC.

   If the measurement is 5 V or greater, escalate the situation. Do not attempt to plug the power cord into the server cabinet.

4. Measure the voltage between A1 and B1 as follows:
   a. Take the AC voltage down to the lowest scale on the volt meter.
   b. Insert the probe into the ground pin for A1.
   c. Insert the other probe into the ground pin for B1.
   d. Verify that the measurement is between 0-5 V AC.

   If the measurement is 5 V or greater, escalate the situation. Do not attempt to plug the power cord into the server cabinet.

Voltage Check (Additional Procedure)

The voltage check ensures that all phases (and neutral, for international systems) are connected correctly to the cabinet and that the AC input voltage is within limits.

Perform this procedure if the previous voltage check procedure did not yield the expected results.

NOTE: If you use an uninterrupted power supply (UPS), see the applicable UPS documentation for information on connecting the server and checking the UPS output voltage. UPS user documentation is shipped with the UPS. Documentation is also available at:

http://www.hp.com/go/rackandpower

1. Verify that site power is **OFF**.
2. Open the site circuit breakers.
3. Verify that the receptacle ground connector is connected to ground. See Figure 34 for connector details.
4. Set the site power circuit breaker to **ON**.

Figure 34 Wall Receptacle Pinouts
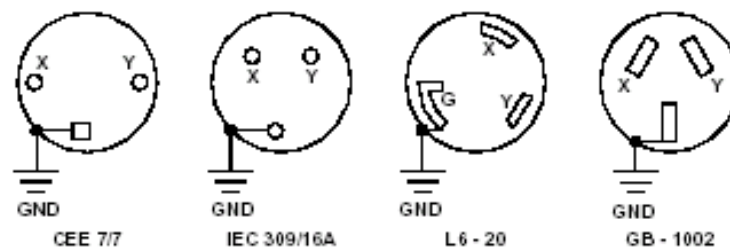
⚠ **WARNING!**   SHOCK HAZARD

Risk of shock hazard while testing primary power.

Use properly insulated probes.

Be sure to replace access cover when finished testing primary power.

5. Verify that the voltage between receptacle pins X and Y is between 200 and 240V AC.
6. Set the site power circuit breaker to **OFF**.
7. Route and connect the server power connector to the site power receptacle.
   a. For locking type receptacles, line up the key on the plug with the groove in the receptacle.
   b. Push the plug into the receptacle and rotate to lock the connector in place.

⚠ **WARNING!**   Do not set site AC circuit breakers serving the processor cabinets to **ON** before verifying that the cabinet has been wired into the site AC power supply correctly. Failure to do so may result in injury to personnel or damage to equipment when AC power is applied to the cabinet.

8. Set the site power circuit breaker to **ON**.
9. Set the server power to **ON**.
10. Check that the indicator light on each power supply is lit.

Connecting AC Input Power

The server can receive AC input power from two different AC power sources. If two separate power sources are available, the server can be plugged into the separate power sources, increasing system realibility if one power source fails. The main power source is defined to be A0 and B0. The redundant power source is defined to be A1 and B1. See Figure 35 for the AC power input label scheme.

NOTE: When running the server with a single power source, either A0 and B0 or A1 and B1 should be used. All other combinations are not supported. Either combination requires two power cords.

Figure 35 AC Power Input Labeling
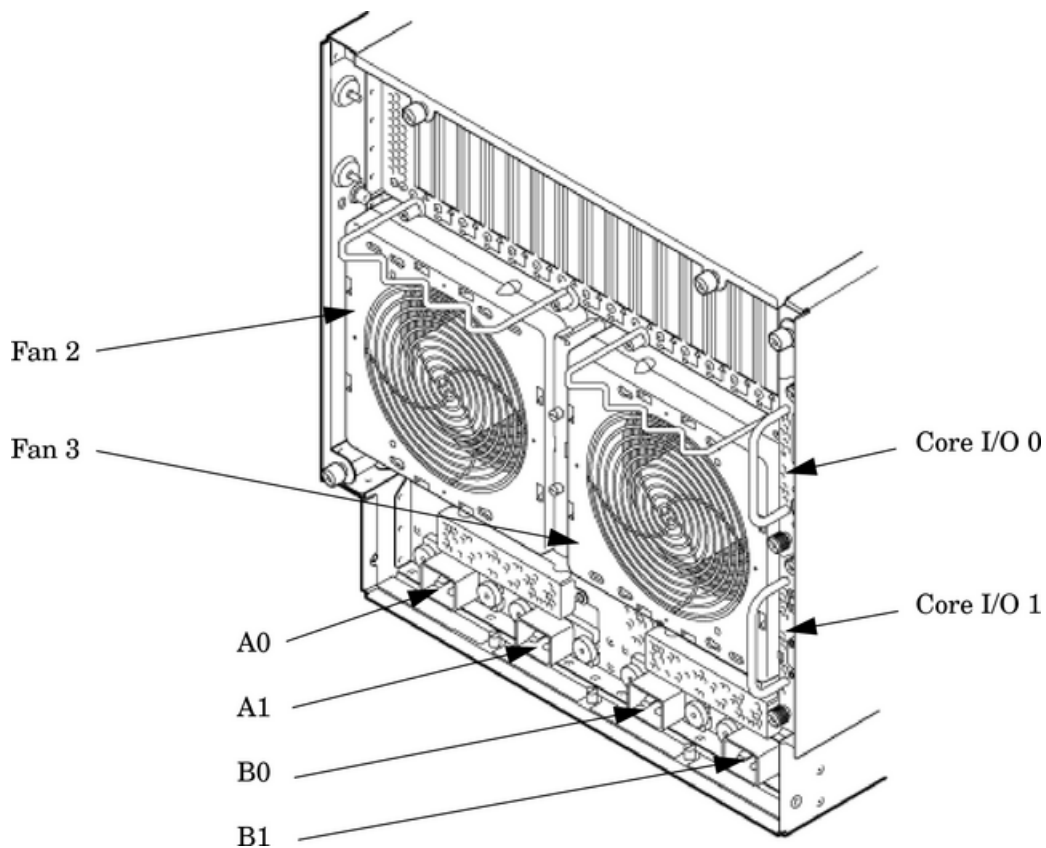
The server has two power cord configurations:

- All four line cords (preferred configuration)
- Cords A0 and B0 only

A single-line-cord configuration is not allowed.

The power cord configuration is passed to the operating system using the `pwrgrd` (Power Grid) command. Each of the five selections in the `pwrgrd` command matches one of the configurations. The appropriate option should be selected for the actual line cord configuration. With the correct configuration selected, the LEDs should be green. when the pwrgrd command is invoked, the following menu is displayed.

```
MP:CM> pwrgrd
```

```
The current power grid configuration is: Single grid

Power grid configuration preference.
1. Single grid
2. Dual grid

Select Option:
```

Figure 36 Distribution of Input Power for Each Bulk Power Supply
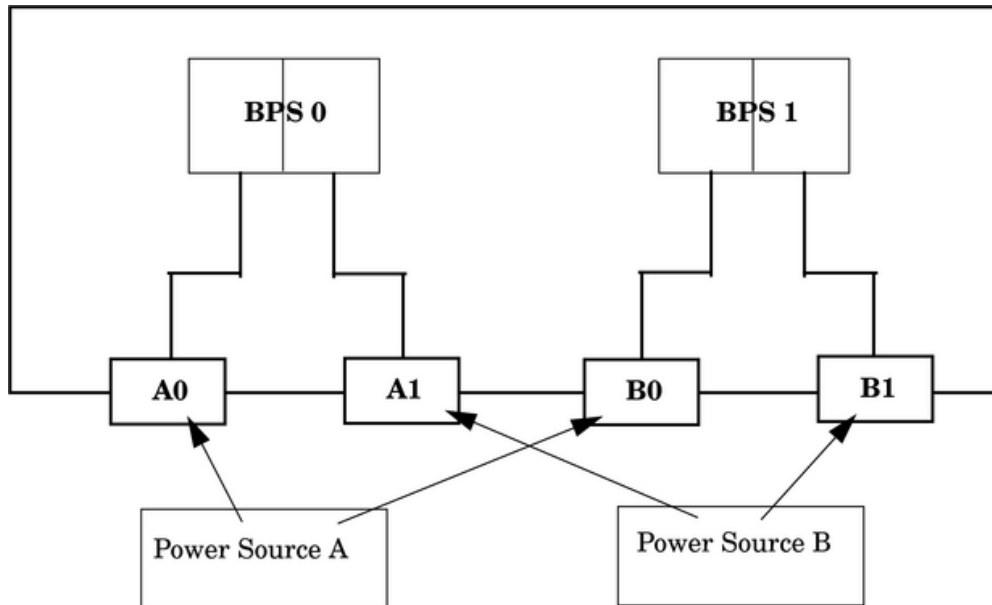
⚠ **WARNING!**   Voltage is present at various locations within the server whenever a power source is connected. This voltage is present even when the main power switch is in the off position. To completely remove power, all power cords must be removed from the server. Failure to observe this warning could result in personal injury or damage to equipment.

△ **CAUTION:**   Do not route data and power cables together in the same cable management arm.

Do not route data and power cables in parallel paths in close proximity to each other. The suggested minimum distance between the data and power cables is 3 inches (7.62 cm).

The power cord has current flowing through it, which creates a magnetic field. The potential to induce electromagnetic interference in the data cables exists, which can cause data corruption.

NOTE: Label the AC power cords during the installation. One suggestion is to use tie wraps that have the flag molded into the tie wrap. The flag can be labeled using the appropriate two characters to represent the particular AC power input (for example, A0). Another suggestion would be to use color coded plastic bands. Use one color to represent the first pair A0/A1 and another color to represent the second pair B0/B1 (provided a second power source is available at the customer site).

NOTE: System firmware will prevent boot when a single power cord configuration is detected.

Installing The Line Cord Anchor (for rack mounted servers)

The line cord anchor is attached to the rear of the server when rack mounted. It provides a method to secure the line cords to the server preventing accidental removal of the cords from the server.

Two Cell Server Installation (rp7410, rp7420, rp7440, rx7620, rx7640)

There are 3 studs with thumb nuts located at the rear of the server chassis. The line cord anchor installs on these studs.

To install the line cord anchor:

1. Remove and retain the thumb nuts from the studs.
2. Install the line cord anchor over the studs. See Figure 37: "Two Cell Line Cord Anchor (rp7410, rp7420, rp7440, rx7620, rx7640)".
3. Tighten the thumb nuts onto the studs.
4. Weave the power cables through the line cord anchor. Leave enough slack to allow the plugs to be disconnected from the receptacles without removing the cords from the line cord anchor.
5. Use the supplied straps to attach the cords to the anchor. See Figure 38: "Line Cord Anchor Attach Straps".

Figure 37 Two Cell Line Cord Anchor (rp7410, rp7420, rp7440, rx7620, rx7640)
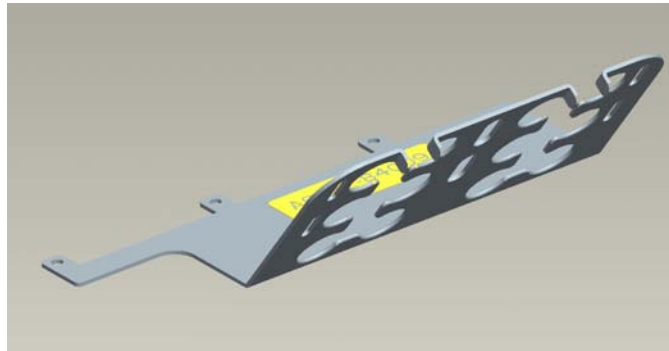
Figure 38 Line Cord Anchor Attach Straps
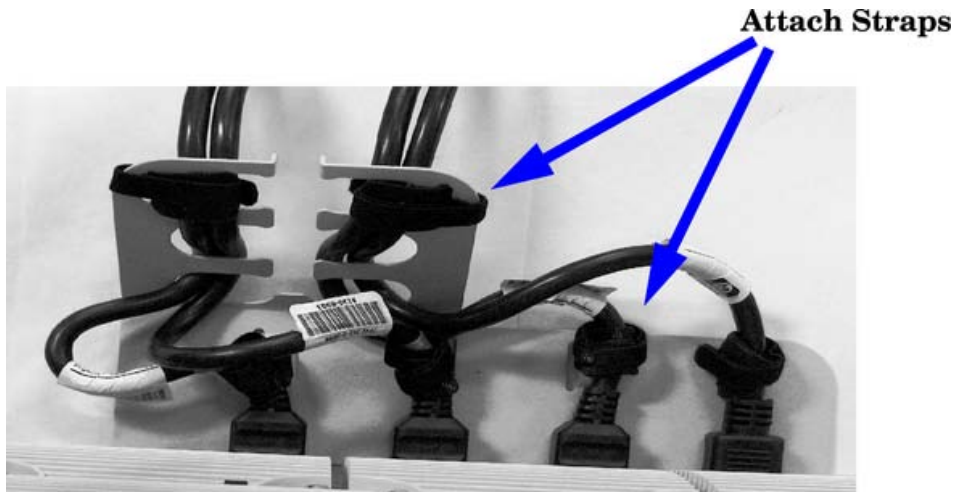
Core I/O Connections

Each server can have up to two core I/O board sets installed which allows for two partitions to operate, or MP core I/O redundancy in a single or dual partition configuration. Each core I/O board set consists of two boards: the MP/SCSI board and the LAN/SCSI board. The MP/SCSI board is oriented vertically and accessed from the back of the server. The LAN/SCSI is accessed from the PCI expansion card bay. Only the primary core I/O board set (MP/SCSI slot 1 and LAN/SCSI slot 8, chassis 1) is required for a single partition implementation. The secondary MP/SCSI board is not necessary for full operation; however, without the secondary MP/SCSI and LAN/SCSI boards, only the top two internal disks can be accessed.

MP/SCSI I/O Connections

The MP/SCSI board is required to update firmware, access the console, turn partition power on or off, access one of the HDDs and one of the removable media devices, and utilize other features of the system. For systems running a single partition, one MP/SCSI board is required. A second MP/SCSI board is required for a dual-partition configuration, or if you want to enable primary or secondary MP failover for the server.

Connections to the MP/SCSI board include the following:

- DB9 connector for Local Console
- 10/100 Base-T LAN RJ45 connector (for LAN and Web Console access)

  This LAN uses standby power and is active when AC is present and the front panel power switch is off.

- Internal LVD Ultra 320 SCSI channel for connections to internal mass storage
- Internal SE Ultra SCSI channel for connection to an internal removable media device.

LAN/SCSI Connections

The LAN/SCSI board is a PCI form factor card that provides the basic external I/O connectivity for the system.

Connections to the LAN/SCSI board include the following:

- PCI-X to PCI-X bridge for multi-device compatibility
- Two LVD Ultra 320 SCSI channel controllers: one for internal connection to one of the HDD devices, and the other is available for connection to an external device
- Two 10/100/1000 Base-T LAN RJ45 connectors

The primary LAN interface is located on the LAN/SCSI board installed in the right-most slot when viewing the system from the back.

Management Processor Access

NOTE: The primary MP/SCSI board is located in the lower MP/SCSI board slot.

Setting Up the Customer Engineer Tool (PC)

The CE Tool is usually a laptop. It allows communication with the Management Processor (MP) in the server. The MP monitors the activity of either a one-partition or a multiple-partition configuration.

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

- Verifying that the components are present and installed correctly
- Setting the MP LAN configurations
- Shutting down cell board power

Establish communication with the MP by connecting the CE Tool to the local RS-232 port on the MP core I/O card.

Setting CE Tool Parameters

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

- 8 data bits/ no parity
- 9600 baud
- na (Receive)
- na (Transmit)

If the CE Tool is a laptop using **Reflection 1**, ensure communications settings are in place, using the following procedure:

1. From the **Reflection 1** Main screen, pull down the **Connection** menu and select **Connection Setup**.
2. Select **Serial Port**.
3. Select **Com1**.
4. Check the settings and change, if required.

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

5. Click **OK** to close the Connection Setup window.
6. Pull down the **Setup** menu and select **Terminal** (under the **Emulation** tab).
7. Select the **VT100** HP terminal type.
8. Click **Apply**.

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

9. Click **OK**.

Connecting the CE Tool to the Local RS232 Port on the MP

This connection enables direct communications with the MP. Only *one* window can be created n the CE Tool to monitor the MP. When enabled, it provides direct access to the MP and any partition.

Use the following procedure to connect the CE Tool to the Local RS-232 Port on the MP:

1. Connect one end of a null modem cable (9-pin to 9-pin) (Part Number 5182-4794) to the cable connector labeled **CONSOLE**.
2. Connect the other end of the RS-232 cable to the CE Tool.

Turning on Housekeeping Power and Logging in to the MP

After connecting the serial device, it is possible to log in to the Management Processor (MP). +3.3V DC Housekeeping power (HKP) (also known as standby power) is active as soon as AC power is applied to the server. As the MP uses housekeeping power, it is possible to log in to the MP even when the power switch is in the OFF position. The power switch is a DC power switch that controls +48V DC.

Before powering up the server for the first time:

1. Verify that the AC voltage at the input source is within specifications for each server being installed.
2. If not already done so, power on the serial display device.

    The preferred tool is the CE tool running **Reflection 1**.

To set up a communications link and log in to the MP:

1. Apply power to the server cabinet.

    On the front of the server, a solid green **Power** LED and a solid green **MP Status** LED will illuminate after about 30 seconds. See Figure 39.

Figure 39 Front Panel Display
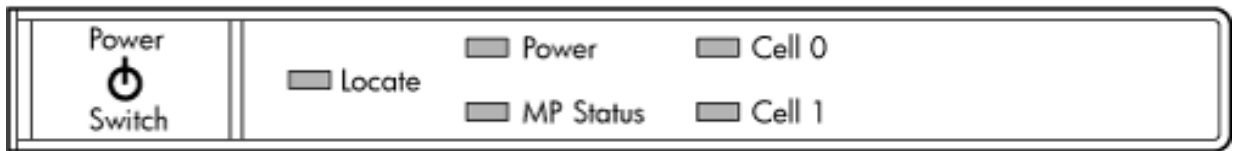
2. Check the bulk power supply LED for each BPS.

   When on, the breakers distribute power to the BPSs. AC power is present at the BPSs:

   - When power is first applied. The BPS LEDs will be flashing amber.

   - After 30 seconds has elapsed. The flashing amber BPS LED for each BPS becomes a flashing green LED.

   See power cord policies to interpret LED indicators.

3. Log in to the MP:

   a. Enter **Admin** at the login prompt. The login is case sensitive.

      It takes a few moments for the MP prompt to display. If it does not, ensure the laptop serial device settings are correct: 8 bits, no parity, 9600 baud, and na for both Receive and Transmit. Then, try again.

   b. Enter **Admin** at the password prompt. The password is case sensitive.

      The MP Main Menu is displayed:

Figure 40 MP Main Menu

```
                        Welcome to
                rx7640's Management Processor


        MP MAIN MENU:

             CO: Consoles
            VFP: Virtual Front Panel
             CM: Command Menu
             CL: Console Logs
             SL: Show Event Logs
             FW: Firmware Update
             HE: Help
              X: Exit Connection


    [metro-s] MP>
```

Configuring LAN Information for the MP

This section describes how to set and verify the server management processor (MP) LAN port information. LAN information includes the MP network name, the MP IP address, the subnet mask, and the gatway address. This information is provided by the customer.

To set the MP LAN IP address:

1. At the MP Main Menu prompt (MP>) enter cm to enter the MP Command.

   NOTE: If the Command Menu is not shown, enter **q** to return to the MP Main Menu, then enter **cm.**.

2. From the MP Command Menu prompt (MP:CM>) enter lc (for LAN configuration).

   The screen displays the default values and asks if you want to modify them. Write down the information or log it in a file, as it may be required for future troubleshooting. See Figure 41 (page 66).

   Figure 41 The lc Command Screen

   ```
   MP:CM>  lc

   This command modifies the LAN parameters.

   Current configuration of MP customer LAN interface
     MAC address    : 00:12:79:b4:03:1c
     IP address     : 15.11.134.222    0x0f0b86de
     Hostname       : metro-s
     Subnet mask    : 255.255.248.0    0xfffff800
     Gateway        : 15.11.128.1      0x0f0b8001
     Status         : UP and RUNNING
     Link    : Connected 100Mb Half Duplex

   Do you want to modify the configuration for the MP LAN (Y/[N]) q
   ```

   NOTE: The value in the IP address field has been set at the factory. Obtain the LAN IP address from the customer.

3. At the prompt, *Do you want to modify the configuration for the MP LAN?,* enter Y.

   The current IP address is shown; and the following prompt displays: *Do you want to modify it? (Y/[N])*

4. Enter Y.
5. Enter the new IP address.

   The customer must provide this address for network interface 0.

6. Confirm the new address.
7. Enter the MP Hostname.

   This is the host name for the customer LAN. The name can be as many as 64 characters in length, and include alphanumeric characters, - (dash), _ (under bar),. (period), or a space. HP recommends that the name be a derivative of the complex name. For example, Acme.com_MP.

8. Enter the LAN parameters for the *Subnet mask* and *Gateway address* fields.

   This information must come from the customer.

   When this step is completed, the system will indicate that the parameters have been updated and return to the MP Command Menu prompt (MP:CM>)

9. To check the LAN parameters and status, enter the ls command at the MP Command Menu prompt (MP:CM>).

10. A screen similar to the following is displayed, allowing verification of the settings:

Figure 42 The ls Command Screen

```
[metro-s] MP:CM> ls

Current configuration of MP customer LAN interface
    MAC address    : 00:12:79:b4:03:02
    IP address     : 15.99.49.26      0x0f63311a
    Hostname       : metro-s
    Subnet mask    : 255.255.248.0    0xfffff800
    Gateway        : 15.99.49.254     0x0f6331fe
    Status         : UP and RUNNING
```

11. To return to the MP main menu, enter **ma**.
12. To exit the MP, enter **x** at the MP main menu.

Accessing the Management Processor via a Web Browser

Web browser access is an embedded feature of the MP/SCSI card. The Web browser enables access to the server through the LAN port on the core I/O card. MP configuration must be done from an ASCII console connected to the Local RS232 port..

NOTE: The MP/SCSI card has a separate LAN port from the system LAN port. It requires a separate LAN drop, IP address, and networking information from that of the port used by HP-UX.

Before starting this procedure, the following information is required:

- IP address for the MP LAN
- Subnet mask
- Gateway address
- Host name (this is used when messages are logged or printed)

To configure the LAN port for a Web browser, perform the following steps:

1. Connect to the MP using a serial connection.
2. Configure the MP LAN. See "Configuring LAN Information for the MP".
3. Type cm to enter the Command Menu.
4. Type sa at the MP:CM> prompt to display and set MP remote access.

Figure 43 Example sa Command

```
[metro-s] MP:CM> sa

This command displays and allows modification of access parameters.

    T - Telnet access          : Enabled.
    H - SSH access             : Enabled.
    W - Web Console            : Enabled (SSL NOT active).
    N - Network Diagnostics    : Disabled.
    I - IPMI Lan access        : Disabled.
    S - SNMP                   : Enabled.

    Select access mode to change (q to quit) : q
```

5. Enter `W` to modify web access mode.
6. Enter option `2` to enable web access.
7. Launch a Web browser on the same subnet using the IP address for the MP LAN port.

Figure 44 Browser Window
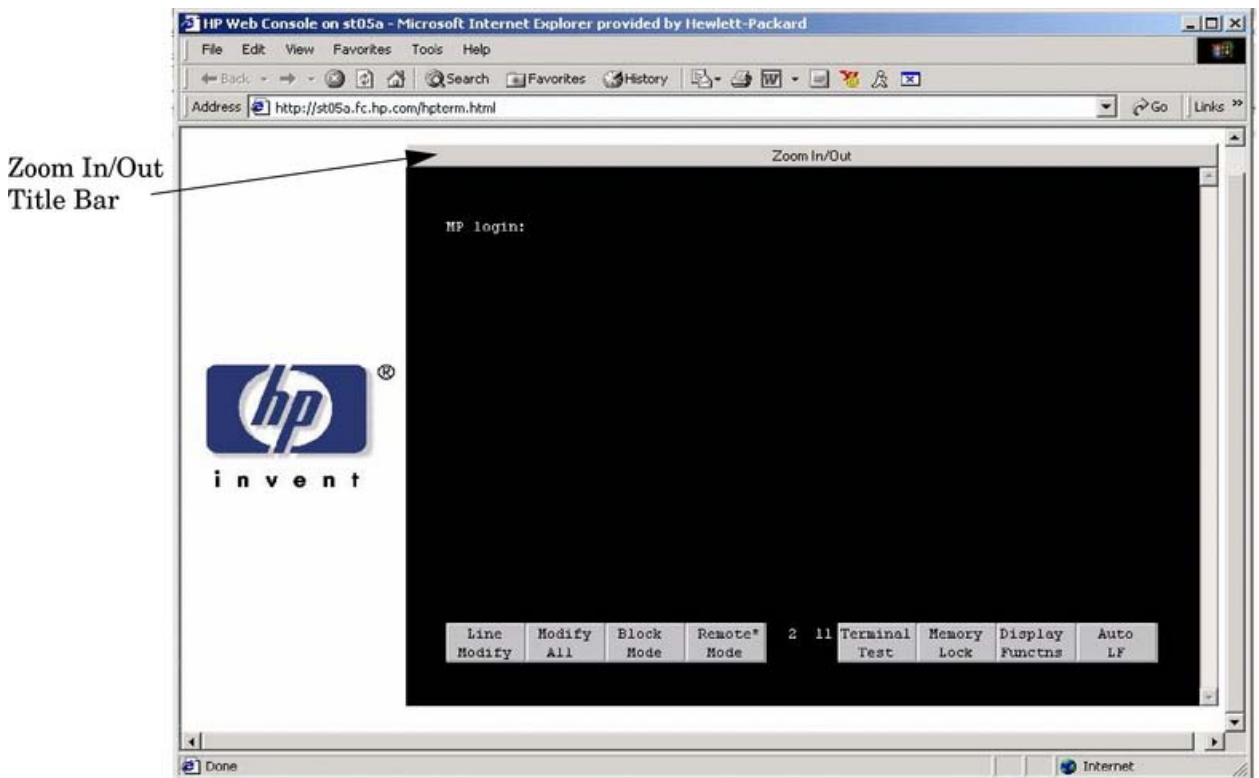
8. Select the emulation type you want to use.
9. Click anywhere on the Zoom In/Out title bar to generate a full screen MP window.
10. Login to the MP when the login window appears.

Access to the MP via a Web browser is now possible.

Verifying the Presence of the Cell Boards

To perform this activity, either connect to the MP using a console, or connect the CE Tool (laptop) to the RS-232 Local port on the MP/SCSI card.

After logging in to the MP, verify that the MP detects the presence of all the cells installed in the cabinet. It is important for the MP to detect the cell boards. If it does not, the partitions will not boot.

To determine if the MP detects the cell boards:

1. At the MP prompt, enter **cm**.

    This displays the Command Menu. The Command Menu enables viewing or modifying the configuration and viewing the utilities controlled by the MP.

    To view a list of the commands available, enter **he**. Press **Enter** to see more than one screen of commands. Use the **Page Up** and **Page Down** keys to view the previous or next screen of commands. To exit the Help Menu, enter **q**.

2. From the command prompt (MP:CM>), enter **du**.

    The du command displays the MP bus topology. See Figure 45:

    Figure 45 The du Command Screen

    ```
    [mp]  MP:CM> du

    The following MP bus devices were found:
    +---+----+----+-----+-----+-------+-----+
    |   |    |    |     |     |       |     |
    |   |    |LAN\| Sys |     | IO    |     |
    |Cab| MP |SCSI|Bkpln|Cells|Chassis| BPS |
    | # |M  S|0  1|     | 0 1 | 0   1 | 0 1 |
    +---+----+----+-----+-----+-------+-----+
    | 0 |*  *|*  *|  *  | * * | *   * | * * |
    +---+----+----+-----+-----+-------+-----+

    [mp]  MP:CM>
    ```

    There will be an asterisk (*) in the column marked MP.

3. Verify that there is an asterisk (*) for each of the cells installed in the cabinet, by comparing what is in the *Cells* column with the cells physically located inside the cabinet.

    Figure 45 shows that cells are installed in slots 0 and 1. In the cabinet, cells should be physically located in slots 0 and 1.

System Console Selection

Each operating system requires that the correct console type be selected from the firmware selection menu. The following section describes how to determine the correct console device.

If an operating system is being installed or the system configuration is being changed the system console setting must be checked to ensure it matches the hardware and OS. Not checking the console selection can result in the system using an unexpected device as a console, which can appear as a system hang when booting.

1. Determine the console you want to use.

    Depending on your operating system and your hardware you can select one of two possible devices as your system console. The possibilities are:

    *   Management Processor (MP) Serial Port
    *   VGA device

2. Select the appropriate console device (deselect unused devices):
   a. Choose the **Boot option maintenance menu** choice from the main **Boot Manager Menu**.
   b. Select the **Console Output, Input or Error devices** menu item for the device type you are modifying:
      - Select **Active Console Output Devices**
      - Select **Active Console Input Devices**
      - Select **Active Console Error Devices**
   c. Available devices will be displayed for each menu selection. Figure 46 shows a typical output of selecting the Console Output Devices menu.

Figure 46 Console Output Device menu

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

Select the Console Output Device(s)


        Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
        Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
        Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
        Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
        Acpi(HWP0002,700)/Pci(0|1)/Uart(9600 N81)/VenMsg(PcAnsi)
        Acpi(HWP0002,700)/Pci(0|1)/Uart(9600 N81)/VenMsg(Vt100)
        Acpi(HWP0002,700)/Pci(0|1)/Uart(9600 N81)/VenMsg(Vt100+)
        Acpi(HWP0002,700)/Pci(0|1)/Uart(9600 N81)/VenMsg(VtUtf8)
      * Acpi(HWP0003,400)/Pci(0|0)
        Save Settings to NVRAM
        Exit
```

   d. Choose the correct device for your system and deselect others. See the section below titled "Interface Differences Between Itanium-based Systems" for details about choosing the appropriate device.
   e. Select **Save Settings to NVRAM** and then `Exit` to complete the change.
   f. A system reset is required for the changes to take effect.

VGA Consoles

Any device that has a PCI section in its path and does not have a UART section will be a VGA device. If you require a VGA console, choose the device and unmark all others. Figure 46 shows that a VGA device is selected as the console.

Interface Differences Between Itanium-based Systems

Each Itanium-based system has a similar interface with minor differences. Some devices may not be available on all systems depending on system design or installed options.

Other Console Types

Any device that has a UART section but no PCI section is a system serial port. To use the system serial port (if available) as your console device, select the system serial device entry that matches your console type (PcAnsi, Vt100, Vt100+, VtUtf8) and deselect everything else.

If you choose either a system or MP serial port HP recommends that you use a vt100+ capable terminal device.

Additional Notes on Console Selection

Each Operating System makes decisions based on the EFI Boot Maintenance Manager menu's Select Active Console selections to determine where to send its output. If incorrect console devices are chosen the OS may fail to boot or will boot with output directed to the wrong location. Therefore, any time new potential console devices are added to the system or anytime NVRAM on the system is cleared console selections should be reviewed to ensure that they are correct.

Configuring the Server for HP-UX Installation

Installation of the HP-UX operating system requires the server hardware to have a specific configuration. If the server's rootcell value is incorrectly set, an install of HP-UX will fail.

To verify and set the proper rootcell value:

1. At the EFI Shell interface prompt enter the rootcell command with no arguments. The current value for rootcell will be displayed. If the value is '1' continue with installing HP-UX.
2. To set the rootcell value to '1', at the EFI Shell interface prompt, enter 'rootcell 1'.
3. At the EFI Shell interface prompt, enter reset to save the new rootcell value.
4. Continue with installation of HP-UX.

Booting the Server

Power on the server either by pressing the power switch on the front panel or by using the `PE` command to power on the cabinet or complex at the management processor Command Menu.

If you are using a LAN crossover cable with the laptop, review server activity for each partition configured while the server powers on and boots. You can open Windows for the complex and for each partition. HP recommends that at least two windows be opened:

1. A window showing all activity in the complex. Following the installation procedure in this document causes a window to be open at startup.

    To display activity for the complex:
    1. Open a separate Reflection window and connect to the MP.
    2. From the MP Main Menu, select the `vfp` command with the `s` option.

2. A window showing activity for a single partition.

To display activity for each partition as it powers on:

1. Open a separate Reflection window and connect to the MP.
2. Select the `vfp` command and select the desired partition to view.

    There should be no activity on the screen at this point in the installation process.

NOTE: You cannot open more than one window using a serial display device.

To power on the server:

1. At the `MP:CM>` prompt, use the `PE> x` command to power on the complex, or the `PE> t` command for each cabinet. The following events occur:

    - Power is applied to the server.

    - Processor-dependent code (PDC) starts to run on each cell.

    - The cell self-test executes.

    - Hardware initializes for the server.

    - Console communication is established.

2. After the cell has joined the partition or after boot is blocked (`BIB`) is displayed at the Virtual Front Panel (`VFP`), return to the MP Main Menu by pressing **Ctrl+B**.
3. Enter `co` to enter console mode.

4. Enter the partition number of the partition to boot.

5. Press **Enter**.

Selecting a Boot Partition Using the MP

At this point in the installation process, the hardware is set up, the MP is connected to the LAN, the AC and DC power have been turned on, and the self-test is completed. Now the configuration can be verified.

After the DC power on and the self-test is complete, use the MP to select a boot partition.

1. From the MP Main Menu, enter `cm`.

2. From the MP Command Menu, enter `bo`.

3. Select the partition to boot. Partitions can be booted in any order.

4. Return to the MP Main Menu by entering `ma` from the MP Command Menu.

5. Enter the console by typing `co` at the MP Main Menu.

Exit the MP to return automatically to the Extensible Firmware Interface (`EFI`) Shell menu.

Verifying the System Configuration Using the EFI Shell

From the EFI main menu, enter the POSSE shell by entering `co`. Typing help will list all the command categories available in the shell:

- configuration -- goes to the configuration menu, where system configuration can be reset, configured or viewed.

- memory -- memory related commands.

Once the parameters have been verified, enter `x` to return to the `EFI Main Menu`.

Booting HP-UX Using the EFI Shell

If the Instant Ignition was ordered, HP-UX will have been installed in the factory at the Primary Path address. If HP-UX is at a path other than the Primary Path, do the following:

1. Type **cm** to enter the Command Menu from the Main Menu.

2. MP:CM> **bo** This command boots the selected partition.

    Select a partition to boot:

3. Return to the Main Menu: `MP:CM>` **ma**

4. From the Main Menu, go to the Consoles Menu: `MP>` **co**

    Select a partition number.

5. Return to the Main Menu by pressing **Ctrl+B**.

6. At the EFI Shell prompt, select the file system to boot. Generally this is fs0.

    Shell> **fs0:**

7. At the fs0 prompt, type HPUX to boot the HP-UX operating system:

    fso:\> **hpux**

NOTE: If the partition fails to boot or if the server was shipped without *Instant Ignition*, booting from a DVD that contains the operating system and other necessary software might be required.

Adding Processors with Instant Capacity

The Instant Capacity program provides access to additional CPU resources beyond the amount that was purchased for the server. This provides the ability to activate additional CPU power for unexpected growth and unexpected spikes in workloads.

Instant Capacity systems physically have more CPUs contained internally. They are called Instant Capacity CPUs and are more than the number of CPUs actually purchased. These Instant Capacity

CPUs reside in the purchased system and are tracked as HP-owned assets. A nominal "Right-To-Access Fee" is paid to HP for each Instant Capacity CPU in the system. Any number of Instant Capacity CPUs can be activated at any time. Activating an Instant Capacity CPU automatically and promptly transforms the Instant Capacity CPU into an instantly ordered and fulfilled CPU upgrade that requires payment. After the Instant Capacity CPU is activated and paid for, it is now an ordered and delivered CPU upgrade for the system rather than an Instant Capacity CPU.

The following list offers information needed to update to iCAP version 8.x:

- HP-UX HWEnable 11i - Hardware Enablement Patches for HP-UX11i v2, June 2006

- B9073BA - B.11.23.08.00.00.95 - HP-UX iCOD Instant Capacity (iCAP)

- Kernel entry - `diag2` - module diag2 best [413F2ED6]

- B8465BA - A.02.00.04 - HP WBEM Services for HP-UX

- NPar Provider - B.11.23.01.03.00.06 - nPartition Provider

Current information on installing, configuring, and troubleshooting iCAP version 8.x is available by entering the document part number, *B9073-90192* into the *search* field of the following website: www.hp.com/go/bizsupport

Information on the latest release notes for iCAP version 8.x can be found in the same document.

NOTE: Ensure that the customer is aware of the Instant Capacity email requirements. See www.hp.com/go/bizsupport for further details.

Installation Checklist

The checklist in Table 20 is an installation aid. Use it only after you have installed several systems by following the detailed procedures described in the body of this document. This checklist is a compilation of the tasks described in this manual, and is organized as follows:

Procedures   The procedures outlined in this document in order

In-process   The portion of the checklist that allows you to comment on the current status of a procedure

Completed   The final check to ensure that a step has been completed and comments

Major tasks are in **bold type**, sub tasks are indented.

Table 20 Factory-Integrated Installation Checklist

Procedure	In-process		Completed	
	Initials	Comments	Initials	Comments
Obtain LAN information				
Verify site preparation				
Site grounding verified				
Power requirements verified				
Check inventory				
Inspect shipping containers for damage				
Unpack SPU cabinet				
Allow proper clearance				
Cut polystrap bands				
Remove cardboard top cap				

Table 20 Factory-Integrated Installation Checklist *(continued)*

Procedure	In-process		Completed	
Remove corrugated wrap from the pallet				
Remove four bolts holding down the ramps and remove the ramps				
Remove antistatic bag				
Check for damage (exterior and interior)				
Position ramps				
Roll cabinet off ramp				
Unpack the peripheral cabinet (if ordered)				
Unpack other equipment				
Remove and dispose of packaging material				
Move cabinet(s) and equipment to computer room				
Move cabinets into final position				
Position cabinets next to each other (approximately 1/2 inch)				
Adjust leveling feet				
Install anti-tip plates				
Inspect cables for proper installation				
Set up CE tool and connect to Remote RS-232 port on MP				
Apply power to cabinet (Housekeeping)				
Check power to BPSs				
Log in to MP				
Set LAN IP address on MP				
Connect customer console				
Set up network on customer console				
Verify LAN connection				
Verify presence of cells				
Power on cabinet (48 V)				
Verify system configuration and set boot parameters				
Set automatic system restart				
Boot partitions				

Table 20 Factory-Integrated Installation Checklist *(continued)*

Procedure	In-process		Completed	
Configure remote login (if required). See Appendix B.				
Verify remote link (if required)				
Install non-factory, integrated I/O cards (if required)				
Select PCI card slot				
Install PCI card				
Verify installation				
Route cables using the cable management arm				
Install other peripherals (if required)				
Perform visual inspection and complete installation				
Set up network services (if required)				
Enable iCOD (if available)				
Final inspection of circuit boards				
Final inspection of cabling				
Area cleaned and debris and packing materials disposed of				
Account for tools				
Dispose of parts and other items				
Make entry in Gold Book (recommended)				
Customer acceptance and signoff (if required)				

4 Booting and Shutting Down the Operating System

This chapter presents procedures for booting an operating system (OS) on an nPartition (hardware partition) and procedures for shutting down the OS.

Operating Systems Supported on Cell-based HP Servers

HP supports nPartitions on cell-based HP 9000 servers and cell-based HP Integrity servers. The following list describes the OSes supported on cell-based servers based on the HP sx2000 chipset.

- HP 9000 servers have PA-RISC processors and include the following cell-based models based on based on the HP sx2000 chipset:

  ◦ HP 9000 Superdome (SD16B, SD32B, and SD64B models)

  ◦ HP rp8440

  ◦ HP rp7440

  These HP 9000 servers run HP-UX 11i Version 1 (B.11.11). See "Booting and Shutting Down HP-UX" (page 81) for details on booting an OS on these servers.

- HP Integrity servers have Intel® Itanium® processors and include the following cell-based models based on the HP sx2000 chipset:

  ◦ HP Integrity Superdome (SD16B, SD32B, and SD64B models)

  ◦ HP rx8640

  ◦ HP rx7640

  All HP Integrity servers based on the HP sx2000 chipset run the following OSes:

  ◦ HP-UX 11i Version 2 (B.11.23) — See "Booting and Shutting Down HP-UX" (page 81) for details.

  ◦ Microsoft® Windows® Server 2003 — See "Booting and Shutting Down Microsoft Windows" (page 96) for details.

  HP Integrity servers based on the HP sx2000 chipset run the following OSes *only in nPartitions that have dual-core Intel® Itanium® processors*:

  ◦ HP OpenVMS I64 8.3 — Supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of OpenVMS I64 are not supported on servers based on the HP sx2000 chipset.

    See "Booting and Shutting Down HP OpenVMS I64" (page 91) for details.

  ◦ Red Hat Enterprise Linux 4 Update 4— On servers based on the HP sx2000 chipset, is supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of Red Hat Enterprise Linux are not supported on servers based on the HP sx2000 chipset.

    NOTE: Red Hat Enterprise Linux 4 will be supported soon after the release of cell-based HP Integrity servers with the Intel® Itanium® dual-core processor. It is not supported on these servers when they first release.

    See "Booting and Shutting Down Linux" (page 100) for details.

  ◦ SuSE Linux Enterprise Server 10 — On servers based on the HP sx2000 chipset, is supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of SuSE Linux Enterprise Server are not supported on servers based on the HP sx2000 chipset.

NOTE: SuSE Linux Enterprise Server 10 is supported on HP rx8640 servers, and will be supported on other cell-based HP Integrity servers with the Intel® Itanium® dual-core processor (rx7640 and Superdome) soon after the release of those servers.

See for details.

NOTE: On servers based on the HP sx2000 chipset, each cell has a cell local memory (CLM) parameter, which determines how firmware may interleave memory residing on the cell. The supported and recommended CLM setting for the cells in an nPartition depends on the OS running in the nPartition. Some OSes support using CLM, and some do not. For details on CLM support for the OS you will boot in an nPartition, see the booting section for that OS.

System Boot Configuration Options

This section briefly discusses the system boot options you can configure on cell-based servers. You can configure boot options that are specific to each nPartition in the server complex.

HP 9000 Boot Configuration Options

On cell-based HP 9000 servers the configurable system boot options include boot device paths (`PRI`, `HAA`, and `ALT`) and the autoboot setting for the nPartition. To set these options from HP-UX, use the `setboot` command. From the BCH system boot environment, use the `PATH` command at the BCH Main Menu to set boot device paths, and use the `PATHFLAGS` command at the BCH Configuration menu to set autoboot options. For details, issue `HELP command` at the appropriate BCH menu, where `command` is the command for which you want help.

HP Integrity Boot Configuration Options

On cell-based HP Integrity servers, you must properly specify the ACPI configuration value, which affects the OS startup process and on some servers can affect the shutdown behavior. You also can configure boot device paths and the autoboot setting for the nPartition. The following list describes each configuration option:

- **Boot Options List**

  The boot options list is a list of loadable items available for you to select from the EFI Boot Manager menu. Ordinarily, the boot options list includes the EFI Shell and one or more OS loaders.

  The following example includes boot options for HP OpenVMS, Microsoft Windows, HP-UX, and the EFI Shell. The final item in the EFI Boot Manager menu, the Boot Configuration menu, is not a boot option. The Boot Configuration menu enables system configuration through a maintenance menu.

  ```
  EFI Boot Manager ver 1.10 [14.61]  Please select a boot option
      HP OpenVMS 8.3
      EFI Shell [Built-in]
      Windows Server 2003, Enterprise
      HP-UX Primary Boot: 4/0/1/1/0.2.0
      Boot Option Maintenance Menu


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

  NOTE: In some versions of EFI, the Boot Configuration menu is listed as the Boot Option Maintenance Menu.

  To manage the boot options list for each system use the EFI Shell, the EFI Boot Configuration menu, or OS utilities.

At the EFI Shell, the `bcfg` command supports listing and managing the boot options list for all OSs except Microsoft Windows. On HP Integrity systems with Windows installed the `\MSUtil\nvrboot.efi` utility is provided for managing Windows boot options from the EFI Shell. On HP Integrity systems with OpenVMS installed, the `\efi\vms\vms_bcfg.efi` and `\efi\vms\vms_show` utilities are provided for managing OpenVMS boot options.

The EFI Boot Configuration menu provides the Add a Boot Option, Delete Boot Option(s), and Change Boot Order menu items. (If you must add an EFI Shell entry to the boot options list, use this method.)

To save and restore boot options, use the EFI Shell `variable` command. The `variable -save file` command saves the contents of the boot options list to the specified `file` on an EFI disk partition. The `variable -restore file` command restores the boot options list from the specified `file` that was previously saved. Details also are available by entering `help variable` at the EFI Shell.

OS utilities for managing the boot options list include the HP-UX `setboot` command and the HP OpenVMS `@SYS$MANAGER:BOOT_OPTIONS.COM` command.

The OpenVMS I64 installation and upgrade procedures assist you in setting up and validating a boot option for your system disk. HP recommends that you allow the procedure to do this. Alternatively, you can use the `@SYS$MANAGER:BOOT_OPTIONS.COM` command (also referred to as the OpenVMS I64 Boot Manager utility) to manage boot options for your system disk. The OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility is a menu-based utility and is easier to use than EFI. To configure OpenVMS I64 booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility (`BOOT_OPTIONS.COM`). For more information on this utility and other restrictions, see the *HP OpenVMS for Integrity Servers Upgrade and Installation Manual*.

For details, see the following sections.

- To set HP-UX boot options, see "Adding HP-UX to the Boot Options List" (page 82).

- To set OpenVMS boot options, see "Adding HP OpenVMS to the Boot Options List" (page 92).

- To set Windows boot options, see "Adding Microsoft Windows to the Boot Options List" (page 96).

- To set Linux boot options, see "Adding Linux to the Boot Options List" (page 101).

- **Hyper-Threading**

  nPartitions that have dual-core Intel® Itanium® processors can support Hyper-Threading. Hyper-Threading provides the ability for processors to create a second virtual core that allows additional efficiencies of processing. For example, a dual-core processor with Hyper-Threading active can simultaneously run four threads.

  The EFI Shell `cpuconfig` command can enable and disable Hyper-Threading for an nPartition whose processors support it. Recent releases of the nPartition Commands and Partition Manager also support Hyper-Threading.

  Details of the `cpuconfig` command are given below and are available by entering `help cpuconfig` at the EFI Shell.

  - `cpuconfig threads` — Reports Hyper-Threading status for the nPartition

  - `cpuconfig threads on` — Enables Hyper-Threading for the nPartition. After enabling Hyper-Threading the nPartition must be reset for Hyper-Threading to be active.

  - `cpuconfig threads off` — Disables Hyper-Threading for the nPartition. After disabling Hyper-Threading the nPartition must be reset for Hyper-Threading to be inactive

  After enabling or disabling Hyper-Threading, the nPartition must be reset for the Hyper-Threading change to take effect. Use the EFI Shell `reset` command.

Enabled means that Hyper-Threading will be active on the next reboot of the nPartition. *Active* means that each processor core in the nPartition has a second virtual core that enables simultaneously running multiple threads.

- **Autoboot Setting**

  You can configure the autoboot setting for each nPartition either by using the `autoboot` command at the EFI Shell, or by using the Set Auto Boot TimeOut menu item at the EFI Boot Option Maintenance menu.

  To set autoboot from HP-UX, use the `setboot` command.

- **ACPI Configuration Value—HP Integrity Server OS Boot**

  On cell-based HP Integrity servers you must set the proper ACPI configuration for the OS that will be booted on the nPartition.

  To check the ACPI configuration value, issue the `acpiconfig` command with no arguments at the EFI Shell.

  To set the ACPI configuration value, issue the `acpiconfig` *value* command at the EFI Shell, where *value* is either `default` or `windows`. Then reset the nPartition by issuing the `reset` EFI Shell command for the setting to take effect.

  The ACPI configuration settings for the supported OSes are in the following list.

  ◦ **HP-UX ACPI Configuration: default**

    On cell-based HP Integrity servers, to boot or install the HP-UX OS, you must set the ACPI configuration value for the nPartition to `default`.

    For details, see "ACPI Configuration for HP-UX Must Be default" (page 83).

  ◦ **HP OpenVMS I64 ACPI Configuration: default**

    On cell-based HP Integrity servers, to boot or install the HP OpenVMS I64 OS, you must set the ACPI configuration value for the nPartition to `default`.

    For details, see "ACPI Configuration for HP OpenVMS I64 Must Be default" (page 93).

  ◦ **Windows ACPI Configuration: windows**

    On cell-based HP Integrity servers, to boot or install the Windows OS, you must set the ACPI configuration value for the nPartition to `windows`.

    For details, see "ACPI Configuration for Windows Must Be windows" (page 98).

  ◦ **Red Hat Enterprise Linux ACPI Configuration: default**

    On cell-based HP Integrity servers, to boot or install the Red Hat Enterprise Linux OS, you must set the ACPI configuration value for the nPartition to `default`.

    For details, see "ACPI Configuration for Red Hat Enterprise Linux Must Be default" (page 102).

  ◦ **SuSE Linux Enterprise Server ACPI Configuration: default**

    On cell-based HP Integrity servers, to boot or install the SuSE Linux Enterprise Server OS, you must set the ACPI configuration value for the nPartition to `default`.

    For details, see "ACPI Configuration for SuSE Linux Enterprise Server Must Be default" (page 103).

- **ACPI Softpowerdown Configuration—OS Shutdown Behavior**

  On HP rx7620, rx7640, rx8620, and rx8640 servers, you can configure the nPartition behavior when an OS is shut down and halted. The two options are to have hardware power off when the OS is halted, or to have the nPartition be made inactive (all cells are in a

boot-is-blocked state). The normal OS shutdown behavior on these servers depends on the ACPI configuration for the nPartition.

You can run the `acpiconfig` command with no arguments to check the current ACPI configuration setting; however, softpowerdown information is displayed only when different from normal behavior.

To change the nPartition behavior when an OS is shut down and halted, use either the `acpiconfig enable softpowerdown` EFI Shell command or the `acpiconfig disable softpowerdown` command, and then reset the nPartition to make the ACPI configuration change take effect.

- ○ **acpiconfig enable softpowerdown**

    When set on HP rx7620, rx7640, rx8620, and rx8640 servers, `acpiconfig enable softpowerdown` causes nPartition hardware to be powered off when the OS issues a shutdown for reconfiguration command (for example, `shutdown -h` or `shutdown /s`).

    This is the normal behavior on HP rx7620, rx7640, rx8620, and rx8640 servers with a `windows` ACPI configuration setting.

    When softpowerdown is enabled on HP rx7620, rx7640, rx8620, and rx8640 servers, if one nPartition is defined in the server, then halting the OS powers off the server cabinet, including all cells and I/O chassis. On HP rx7620, rx7640, rx8620, and rx8640 servers with multiple nPartitions, halting the OS from an nPartition with softpowerdown enabled causes only the resources on the local nPartition to be powered off.

    To power on hardware that has been powered off, use the `PE` command at the management processor Command Menu.

- ○ **acpiconfig disable softpowerdown**

    When set on HP rx7620, rx7640, rx8620, and rx8640 servers, `acpiconfig disable softpowerdown` causes nPartition cells to remain at a boot-is-blocked state when the OS issues a shutdown for reconfiguration command (for example, `shutdown -h` or `shutdown /s`). In this case, an OS shutdown for reconfiguration makes the nPartition inactive.

    This is the normal behavior on HP rx7620, rx7640, rx8620, and rx8640 servers with an ACPI configuration setting of `default`.

    To make an inactive nPartition active, use the management processor `BO` command to boot the nPartition past the boot-is-blocked state.

- • **Boot Modes on HP Integrity nPartitions: nPars and vPars Modes**

    On cell-based HP Integrity servers, each nPartition can be configured in either of two boot modes:

    - ○ `nPars` Boot Mode

        In `nPars` boot mode, an nPartition is configured to boot any single operating system in the standard environment. When an nPartition is in `nPars` boot mode, it cannot boot the vPars monitor and therefore does not support HP-UX virtual partitions.

    - ○ `vPars` Boot Mode

        In `vPars` boot mode, an nPartition is configured to boot into the vPars environment. When an nPartition is in `vPars` boot mode, it can only boot the vPars monitor and therefore it only supports HP-UX virtual partitions and it does not support booting HP OpenVMS I64, Microsoft Windows, or other operating systems. On an nPartition in `vPars` boot mode, HP-UX can boot only within a virtual partition (from the vPars monitor) and cannot boot as a standalone, single operating system in the nPartition.

△ **CAUTION:** An nPartition on an HP Integrity server cannot boot HP-UX virtual partitions when in `nPars` boot mode. Likewise, an nPartition on an HP Integrity server cannot boot an operating system outside of a virtual partition when in `vPars` boot mode.

To display or set the boot mode for an nPartition on a cell-based HP Integrity server, use any of the following tools as appropriate. See *Installing and Managing HP-UX Virtual Partitions (vPars)*, Sixth Edition, for details, examples, and restrictions.

○ `parconfig` EFI shell command

The `parconfig` command is a built-in EFI shell command. See the `help parconfig` command for details.

○ `\EFI\HPUX\vparconfig` EFI shell command

The `vparconfig` command is delivered in the `\EFI\HPUX` directory on the EFI system partition of the disk where HP-UX virtual partitions has been installed on a cell-based HP Integrity server. For usage details, enter the `vparconfig` command with no options.

○ `vparenv` HP-UX command

On cell-based HP Integrity servers only, the `vparenv` HP-UX command is installed on HP-UX 11iv2 (B.11.23) systems that have the HP-UX virtual partitions software. See *vparenv*(1m) for details.

NOTE: On HP Integrity servers, nPartitions that do not have the `parconfig` EFI shell command do not support virtual partitions and are effectively in nPars boot mode.

HP recommends that you do not use the `parconfig` EFI shell command and instead use the `\EFI\HPUX\vparconfig` EFI shell command to manage the boot mode for nPartitions on cell-based HP Integrity servers.

See *Installing and Managing HP-UX Virtual Partitions (vPars)*, Sixth Edition, for details.

Booting and Shutting Down HP-UX

This section presents procedures for booting and shutting down HP-UX on cell-based HP servers and a procedure for adding HP-UX to the boot options list on HP Integrity servers.

- To determine whether the cell local memory (CLM) configuration is appropriate for HP-UX, see "HP-UX Support for Cell Local Memory" (page 81).
- To add an HP-UX entry to the nPartition boot options list on an HP Integrity server, see "Adding HP-UX to the Boot Options List" (page 82).
- To boot HP-UX, see "Booting HP-UX" (page 83).
- To shut down HP-UX, see "Shutting Down HP-UX" (page 90).

HP-UX Support for Cell Local Memory

On servers based on the HP sx2000 chipset, each cell has a cell local memory (CLM) parameter, which determines how firmware interleaves memory residing on the cell.

ⓘ **IMPORTANT:** HP-UX 11i Version 2 (B.11.23) supports using CLM. The optimal CLM settings for HP-UX B.11.23 depend on the applications and workload the OS is running.

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -V -c#` command and `parstatus -V -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where # is the cell number) or the specified nPartition (`-p#`, where # is the nPartition number). For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

To display CLM configuration details from the EFI Shell on a cell-based HP Integrity server, use the `info mem` command. If the amount of noninterleaved memory reported is less than 512 MB, then no CLM is configured for any cells in the nPartition (and the indicated amount of noninterleaved memory is used by system firmware). If the `info mem` command reports more than 512 MB of noninterleaved memory, then use Partition Manager or the `parstatus` command to confirm the CLM configuration details.

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

Adding HP-UX to the Boot Options List

This section describes how to add an HP-UX entry to the system boot options list.

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu).

See "Boot Options List" (page 77) for additional information about saving, restoring, and creating boot options.

NOTE: On HP Integrity servers, the OS installer automatically adds an entry to the boot options list.

Procedure 1 Adding an HP-UX Boot Option

This procedure adds an HP-UX item to the boot options list from the EFI Shell.

To add an HP-UX boot option when logged in to HP-UX, use the `setboot` command. For details, see the *setboot*(1M) manpage.

1. Access the EFI Shell environment.

   Log in to the management processor, and enter `CO` to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. Access the EFI System Partition for the device from which you want to boot HP-UX (`fsX:` where *X* is the file system number) .

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the HP-UX loader is `\EFI\HPUX\HPUX.EFI`, and it should be on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Display all items in the boot options list for the system.

   - `bcfg boot rm #` — Remove the item number specified by *#* from the boot options list.

   - `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.

   - `bcfg boot add # file.efi "Description"` — Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

     For example, `bcfg boot add 1 \EFI\HPUX\HPUX.EFI "HP-UX 11i"` adds an HP-UX 11i item as the first entry in the boot options list.

   See the `help bcfg` command for details.

4. Exit the console and management processor interfaces if you are finished using them.

To exit the EFI environment press **^B** (**Control+B**); this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Booting HP-UX

This section describes the following methods of booting HP-UX:

△ **CAUTION:**

ACPI Configuration for HP-UX Must Be default

On cell-based HP Integrity servers, to boot the HP-UX OS, an nPartition ACPI configuration value must be set to default.

At the EFI Shell interface, enter the acpiconfig command with no arguments to list the current ACPI configuration. If the acpiconfig value is not set to default, then HP-UX cannot boot. In this situation you must reconfigure acpiconfig; otherwise, booting will be interrupted with a panic when the HP-UX kernel is launched.

To set the ACPI configuration for HP-UX:

1. At the EFI Shell interface, enter the acpiconfig default command.
2. Enter the reset command for the nPartition to reboot with the proper (default) configuration for HP-UX.

Standard HP-UX Booting

This section describes how to boot HP-UX on cell-based HP 9000 servers and cell-based HP Integrity servers.

Procedure 2 HP-UX Booting (BCH Menu)

From the BCH Menu, use the BOOT command to boot the HP-UX OS. The BCH Menu is available only on HP 9000 servers.

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX.

   Log in to the management processor, and enter CO to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the Main Menu: Enter command or menu> prompt). If you are at a BCH menu other than the Main Menu, then enter MA to return to the BCH Main Menu.

2. Choose which device to boot.

   From the BCH Main Menu, use the path command to list any boot path variable settings. The primary (PRI) boot path normally is set to the main boot device for the nPartition. You also can use the SEARCH command to find and list potentially bootable devices for the nPartition.

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

        Primary Boot Path:   0/0/2/0/0.13
                             0/0/2/0/0.d     (hex)
   HA Alternate Boot Path:   0/0/2/0/0.14
                             0/0/2/0/0.e     (hex)
      Alternate Boot Path:   0/0/2/0/0.0
                             0/0/2/0/0.0     (hex)


  Main Menu: Enter command or menu >
```

3. Boot the device by using the `BOOT` command from the BCH interface.

    You can issue the `BOOT` command in any of the following ways:

    - **BOOT**

      Issuing the `BOOT` command with no arguments boots the device at the primary (PRI) boot path.

    - **BOOT *bootvariable***

      This command boots the device indicated by the specified boot path, where *bootvariable* is the PRI, HAA, or ALT boot path.

      For example, `BOOT PRI` boots the primary boot path.

    - **BOOT LAN INSTALL** or **BOOT LAN.*ip-address* INSTALL**

      The `BOOT... INSTALL` commands boot HP-UX from the default HP-UX install server or from the server specified by *ip-address*.

    - **BOOT *path***

      This command boots the device at the specified *path*. You can specify the *path* in HP-UX hardware path notation (for example, 0/0/2/0/0.13) or in path label format (for example, P0 or P1) .

      If you specify the *path* in path label format, then *path* refers to a device path reported by the last `SEARCH` command.

    After you issue the `BOOT` command, the BCH interface prompts you to specify whether you want to stop at the ISL prompt.

    To boot the `/stand/vmunix` HP-UX kernel from the device without stopping at the ISL prompt, enter n to automatically proceed past ISL and execute the contents of the `AUTO` file on the chosen device. (By default the `AUTO` file is configured to load `/stand/vmunix`.)

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

        Primary Boot Path:   0/0/1/0/0.15

      Do you wish to stop at the ISL prompt prior to booting? (y/n) >> n

    ISL booting  hpux

    Boot
    : disk(0/0/1/0/0.15.0.0.0.0.0;0)/stand/vmunix
    ```

    To boot an HP-UX kernel other than `/stand/vmunix`, or to boot HP-UX in single-user or LVM-maintenance mode, stop at the ISL prompt and specify the appropriate arguments to the `hpux` loader.

4. Exit the console and management processor interfaces if you are finished using them.

    To exit the BCH environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Procedure 3 HP-UX Booting (EFI Boot Manager)

From the EFI Boot Manager menu, select an item from the boot options list to boot HP-UX using that boot option. The EFI Boot Manager is available only on HP Integrity servers.

See "ACPI Configuration for HP-UX Must Be default" (page 83) for required configuration details.

1. Access the EFI Boot Manager menu for the nPartition on which you want to boot HP-UX.

    Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.

    When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

2. At the EFI Boot Manager menu, select an item from the boot options list.

    Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.

3. Press **Enter** to initiate booting using the chosen boot option.

4. Exit the console and management processor interfaces if you are finished using them.

    To exit the EFI environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Procedure 4 HP-UX Booting (EFI Shell)

From the EFI Shell environment, to boot HP-UX on a device first access the EFI System Partition for the root device (for example `fs0:`) and then enter `HPUX` to initiate the loader. The EFI Shell is available only on HP Integrity servers.

See "ACPI Configuration for HP-UX Must Be default" (page 83) for required configuration details.

1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX.

    Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.

    When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

    From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. At the EFI Shell environment, issue the `acpiconfig` command to list the current ACPI configuration for the local nPartition.

    On cell-based HP Integrity servers, to boot the HP-UX OS, an nPartition ACPI configuration value must be set to `default`. If the `acpiconfig` value is not set to `default`, then HP-UX cannot boot; in this situation you must reconfigure `acpiconfig` or booting will be interrupted with a panic when launching the HP-UX kernel.

    To set the ACPI configuration for HP-UX:

    a. At the EFI Shell interface enter the `acpiconfig default` command.

    b. Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for HP-UX.

3. At the EFI Shell environment, issue the `map` command to list all currently mapped bootable devices.

    The bootable file systems of interest typically are listed as `fs0:`, `fs1:`, and so on.

4. Access the EFI System Partition for the device from which you want to boot HP-UX (`fsX:` where `X` is the file system number).

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

   The file system number can change each time it is mapped (for example, when the nPartition boots, or when the `map -r` command is issued).

5. When accessing the EFI System Partition for the desired boot device, issue the `HPUX` command to initiate the `HPUX.EFI` loader on the device you are accessing.

   The full path for the loader is `\EFI\HPUX\HPUX.EFI`. When initiated, `HPUX.EFI` references the `\EFI\HPUX\AUTO` file and boots HP-UX using the default boot behavior specified in the `AUTO` file.

   You are given 10 seconds to interrupt the automatic booting of the default boot behavior. Pressing any key during this 10-second period stops the HP-UX boot process and enables you to interact with the `HPUX.EFI` loader. To exit the loader (the `HPUX>` prompt), enter `exit` (this returns you to the EFI Shell).

   To boot the HP-UX OS, do not type anything during the 10-second period given for stopping at the `HPUX.EFI` loader.

```
Shell>  map
Device mapping table
  fs0  : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk0 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk1 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk2 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part2,Sig72550000)
  blk3 : Acpi(000222F0,2A8)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk4 : Acpi(000222F0,2A8)/Pci(0|1)/Scsi(Pun2,Lun0)

Shell>  fs0:

fs0:\>  hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

6. Exit the console and management processor interfaces if you are finished using them.

   To exit the EFI environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Single-User Mode HP-UX Booting

This section describes how to boot HP-UX in single-user mode on cell-based HP 9000 servers and cell-based HP Integrity servers.

- On HP 9000 servers, to boot HP-UX in single-user mode, see "Single-User Mode HP-UX Booting (BCH Menu)" (page 86).

- On HP Integrity servers, to boot HP-UX in single-user mode, see "Single-User Mode HP-UX Booting (EFI Shell)" (page 88).

Procedure 5 Single-User Mode HP-UX Booting (BCH Menu)

From the BCH Menu, you can boot HP-UX in single-user mode by issuing the `BOOT` command, stopping at the ISL interface, and issuing `hpux` loader options. The BCH Menu is available only on HP 9000 servers.

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in single-user mode.

   Log in to the management processor, and enter CO to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the Main Menu: Enter command or menu> prompt). If you are at a BCH menu other than the Main Menu, then enter MA to return to the BCH Main Menu.

2. Boot the desired device by using the BOOT command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply y to the "stop at the ISL prompt" question).

   ```
   Main Menu: Enter command or menu >  BOOT 0/0/2/0/0.13

    BCH Directed Boot Path: 0/0/2/0/0.13

    Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y

   Initializing boot Device.

   ....

   ISL Revision A.00.42  JUN 19, 1999

   ISL>
   ```

3. From the ISL prompt, issue the appropriate Secondary System Loader (hpux) command to boot the HP-UX kernel in the desired mode.

   Use the hpux loader to specify the boot mode options and to specify which kernel to boot on the nPartition (for example, /stand/vmunix).

   - To boot HP-UX in single-user mode:

     ISL> **hpux -is boot /stand/vmunix**

     Example 1 (page 87) shows output from this command.

   - To boot HP-UX at the default run level:

     ISL> **hpux boot /stand/vmunix**

   To exit the ISL prompt and return to the BCH interface, issue the EXIT command instead of specifying one of the hpux loader commands.

   See the *hpux*(1M) manpage for a detailed list of hpux loader options.

Example 1 Single-User HP-UX Boot

```
ISL Revision A.00.42  JUN 19, 1999

ISL>  hpux -is /stand/vmunix

Boot
: disk(0/0/2/0/0.13.0.0.0.0.0;0)/stand/vmunix
8241152 + 1736704 + 1402336 start 0x21a0e8

....

INIT: Overriding default level with level 's'

INIT: SINGLE USER MODE

INIT: Running /sbin/sh

#
```

4. Exit the console and management processor interfaces if you are finished using them.

To exit the BCH environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Procedure 6 Single-User Mode HP-UX Booting (EFI Shell)

From the EFI Shell environment, boot in single-user mode by stopping the boot process at the HPUX.EFI interface (the HP-UX Boot Loader prompt, HPUX>) by entering the boot -is vmunix command. The EFI Shell is available only on HP Integrity servers.

See "ACPI Configuration for HP-UX Must Be default" (page 83) for required configuration details.

1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX in single-user mode.

   Log in to the management processor, and enter CO to access the Console list. Select the nPartition console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. Access the EFI System Partition for the device from which you want to boot HP-UX (fsX: where X is the file system number).

3. When accessing the EFI System Partition for the desired boot device, issue the HPUX command to initiate the \EFI\HPUX\HPUX.EFI loader on the device you are accessing.

4. Boot to the HP-UX Boot Loader prompt (HPUX>) by pressing any key within the 10 seconds given for interrupting the HP-UX boot process. You will use the HPUX.EFI loader to boot HP-UX in single-user mode in the next step.

   After you press any key, the HPUX.EFI interface (the HP-UX Boot Loader prompt, HPUX>) is provided. For help using the HPUX.EFI loader, enter the help command. To return to the EFI Shell, enter exit.

   ```
   fs0:\> hpux

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   All rights reserved

   HP-UX Boot Loader for IA64  Revision 1.723

   Press Any Key to interrupt Autoboot
   \efi\hpux\AUTO ==> boot vmunix
   Seconds left till autoboot -   9

   [User Types a Key to Stop the HP-UX Boot Process and Access the HPUX.EFI Loader ]
        Type 'help' for help

   HPUX>
   ```

5. At the HPUX.EFI interface (the HP-UX Boot Loader prompt, HPUX>), enter the boot -is vmunix command to boot HP-UX (the /stand/vmunix kernel) in single-user (-is) mode.

   ```
   HPUX>  boot -is vmunix

   > System Memory = 4063 MB
   loading section 0 ............................................... (complete)
   loading section 1
   ........ (complete)
   loading symbol table
   loading System Directory(boot.sys) to MFS
   ....
   loading MFSFILES Directory(bootfs) to MFS
   ......
   Launching /stand/vmunix SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

   Console is on a Serial Device
   ```

```
Booting kernel...
```

6. Exit the console and management processor interfaces if you are finished using them.

   To exit the EFI environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

LVM-Maintenance Mode HP-UX Booting

This section describes how to boot HP-UX in LVM-maintenance mode on cell-based HP 9000 servers and cell-based HP Integrity servers.

- On HP 9000 servers, to boot HP-UX in LVM-maintenance mode, see "LVM-Maintenance Mode HP-UX Booting (BCH Menu)" (page 89).

- On HP Integrity servers, to boot HP-UX in LVM-maintenance mode, see "LVM-Maintenance Mode HP-UX Booting (EFI Shell)" (page 89).

Procedure 7 LVM-Maintenance Mode HP-UX Booting (BCH Menu)

From the BCH Menu, you can boot HP-UX in LVM-maintenance mode by issuing the BOOT command, stopping at the ISL interface, and issuing hpux loader options. The BCH Menu is available only on HP 9000 servers.

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.

   Log in to the management processor, and enter CO to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the Main Menu: Enter command or menu> prompt). If you are at a BCH menu other than the Main Menu, then enter MA to return to the BCH Main Menu.

2. Boot the desired device by using the BOOT command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply y to the "stop at the ISL prompt" question).

3. From the ISL prompt, issue the appropriate Secondary System Loader (hpux) command to boot the HP-UX kernel in the desired mode.

   To boot HP-UX in LVM-maintenance mode:

   ```
   ISL> hpux -lm boot /stand/vmunix
   ```

4. Exit the console and management processor interfaces if you are finished using them.

   To exit the BCH environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Procedure 8 LVM-Maintenance Mode HP-UX Booting (EFI Shell)

From the EFI Shell environment, boot in LVM-maintenance mode by stopping the boot process at the HPUX.EFI interface (the HP-UX Boot Loader prompt, HPUX>) by entering the boot -lm vmunix command. The EFI Shell is available only on HP Integrity servers.

See "ACPI Configuration for HP-UX Must Be default" (page 83) for required configuration details.

1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.

    Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.

    When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

    From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. Access the EFI System Partition for the device from which you want to boot HP-UX (`fsX:` where `X` is the file system number).

3. When accessing the EFI System Partition for the desired boot device, issue the `HPUX` command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the device you are accessing.

4. Type any key within the 10 seconds given for interrupting the HP-UX boot process. This stops the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`).

5. At the `HPUX.EFI` interface, enter the `boot -lm vmunix` command to boot HP-UX (the `/stand/vmunix` kernel) in LVM-maintenance (`-lm`) mode.

6. Exit the console and management processor interfaces if you are finished using them.

    To exit the EFI environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Shutting Down HP-UX

When HP-UX is running on an nPartition, you can shut down HP-UX using the `shutdown` command.

On nPartitions you have the following options when shutting down HP-UX:

*   To shut down HP-UX and reboot an nPartition: `shutdown -r`

    On cell-based HP Integrity servers, the `shutdown -r` command is equivalent to the `shutdown -R` command.

*   To shut down HP-UX and halt an nPartition: `shutdown -h`

    On cell-based HP Integrity servers, the `shutdown -h` command is equivalent to the `shutdown -R -H` command.

*   To perform a reboot for reconfiguration of an nPartition: `shutdown -R`

*   To hold an nPartition at a shutdown for reconfiguration state: `shutdown -R -H`

For details, see the *shutdown*(1M) manpage.

NOTE: On HP rx7620, rx7640, rx8620, and rx8640 servers, you can configure the nPartition behavior when an OS is shut down and halted (`shutdown -h` or `shutdown -R -H`). The two options are to have hardware power off when the OS is halted, or to have the nPartition be made inactive (all cells are in a boot-is-blocked state).

The normal behavior for HP-UX shut down and halt is for the nPartition to be made inactive.

For details, see "ACPI Softpowerdown Configuration—OS Shutdown Behavior" (page 79).

Procedure 9 Shutting Down HP-UX

From the HP-UX command line, issue the `shutdown` command to shut down the HP-UX OS.

1. Log in to HP-UX running on the nPartition that you want to shut down.

   Log in to the management processor for the server and use the Console menu to access the system console. Accessing the console through the MP enables you to maintain console access to the system after HP-UX has shut down.

2. Issue the `shutdown` command with the appropriate command-line options.

   The command-line options you specify dictate the way in which HP-UX is shut down, whether the nPartition is rebooted, and whether any nPartition configuration changes take place (for example, adding or removing cells).

   Use the following list to choose an HP-UX shutdown option for your nPartition:

   - Shut down HP-UX and halt the nPartition.

     On cell-based HP Integrity servers, the `shutdown -h` command puts an nPartition into the shutdown for reconfiguration state; for details, see the discussion of `shutdown -R -H` in this list.

   - Shut down HP-UX and reboot the nPartition.

     Issue the `shutdown -r` command to shut down and reboot the nPartition.

     On cell-based HP Integrity servers, the `shutdown -r` command is equivalent to the `shutdown -R` command.

   - Perform a reboot for reconfiguration of the nPartition.

     Issue the HP-UX `shutdown -R` command to perform a reboot for reconfiguration.

     This shuts down HP-UX, reconfigures the nPartition if needed, and reboots the nPartition.

   - Reboot the nPartition and put it into the shutdown for reconfiguration state.

     Use the HP-UX `shutdown -R -H` command to hold the nPartition in the shutdown for reconfiguration state.

     This leaves the nPartition and all its cells in an inactive state (the nPartition can be reconfigured remotely), unless the normal behavior has been modified. For details, see "ACPI Softpowerdown Configuration—OS Shutdown Behavior" (page 79).

     To reboot the nPartition, you must do so manually by using the `BO` command at the management processor Command Menu.

   If HP-UX is halted on the nPartition, thus not allowing you to use the `shutdown` command, you can reboot or reset the nPartition by issuing commands from the management processor Command Menu.

Booting and Shutting Down HP OpenVMS I64

This section presents procedures for booting and shutting down HP OpenVMS I64 on cell-based HP Integrity servers and procedures for adding HP OpenVMS to the boot options list.

- To determine whether the cell local memory (CLM) configuration is appropriate for HP OpenVMS, see "HP OpenVMS I64 Support for Cell Local Memory" (page 92).

- To add an HP OpenVMS entry to the boot options list, see "Adding HP OpenVMS to the Boot Options List" (page 92).

- To boot HP OpenVMS on a cell-based HP Integrity server, see "Booting HP OpenVMS" (page 93).

- To shut down HP OpenVMS, see "Shutting Down HP OpenVMS" (page 95).

HP OpenVMS I64 Support for Cell Local Memory

On servers based on the HP sx2000 chipset, each cell has a cell local memory (CLM) parameter, which determines how firmware interleaves memory residing on the cell.

> ⓘ **IMPORTANT:** HP OpenVMS I64 does not support using CLM. Before booting OpenVMS on an nPartition, you must ensure that the CLM parameter for each cell in the nPartition is set to zero (0). Although you might be able to boot OpenVMS on an nPartition with CLM configured, any memory configured as cell local is unusable, and such a configuration is untested and unsupported.

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -V -c#` command and `parstatus -V -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where # is the cell number) or the specified nPartition (`-p#`, where # is the nPartition number). For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

To display CLM configuration details from the EFI Shell on a cell-based HP Integrity server, use the `info mem` command. If the amount of noninterleaved memory reported is less than 512 MB, then no CLM is configured for any cells in the nPartition (and the indicated amount of noninterleaved memory is used by system firmware). If the `info mem` command reports more than 512 MB of noninterleaved memory, then use Partition Manager or the `parstatus` command to confirm the CLM configuration details.

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

Adding HP OpenVMS to the Boot Options List

On HP Integrity servers, you can use the following procedures to manage boot options list entries for HP OpenVMS.

You can add the `\efi\vms\vms_loader.efi` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu).

See "Boot Options List" (page 77) for additional information about saving, restoring, and creating boot options.

> **NOTE:** OpenVMS I64 installation and upgrade procedures assist you in setting up and validating a boot option for your system disk. HP recommends that you allow the procedure to do this.

To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility (`BOOT_OPTIONS.COM`). For more information on this utility and other restrictions, see the *HP OpenVMS for Integrity Servers Upgrade and Installation Manual*.

Procedure 10 Adding an HP OpenVMS Boot Option

This procedure adds an HP OpenVMS item to the boot options list from the EFI Shell.

To add an HP OpenVMS boot option when logged in to OpenVMS, use the `@SYS$MANAGER:BOOT_OPTIONS.COM` command.

1. Access the EFI Shell environment.

    Log in to the management processor, and enter `CO` to access the system console.

    When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

    From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. Access the EFI System Partition for the device from which you want to boot HP OpenVMS (`fsX:`, where `X` is the file system number).

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the HP OpenVMS loader is `\efi\vms\vms_loader.efi`, and it should be on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   You can also accomplish this step by using the `\efi\vms\vms_bcfg.efi` and `\efi\vms\vms_show.efi` utilities, which are available on the EFI System Partition for HP OpenVMS. Both `vms_bcfg` and `vms_show` are unique utilities for OpenVMS I64. The `vms_bcfg` utility differs from the `bcfg` EFI command in that `vms_bcfg` enables you to specify boot devices using device names consistent with OpenVMS naming conventions.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Display all items in the boot options list for the system.

   - `bcfg boot rm #` — Remove the item number specified by # from the boot options list.

   - `bcfg boot mv #a #b` — Move the item number specified by #a to the position specified by #b in the boot options list.

   - `bcfg boot add # file.efi "Description"` — Add a new boot option to the position in the boot options list specified by #. The new boot option references `file.efi` and is listed with the title specified by `Description`.

     For example, `bcfg boot add 1 \efi\vms\vms_loader.efi "HP OpenVMS"` adds an HP OpenVMS item as the first entry in the boot options list.

   See the `help bcfg` command for details.

4. Exit the console and management processor interfaces if you are finished using them.

   To exit the EFI environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Booting HP OpenVMS

To boot HP OpenVMS I64 on a cell-based HP Integrity server use either of the following procedures.

- "Booting HP OpenVMS (EFI Boot Manager)" (page 94)
- "Booting HP OpenVMS (EFI Shell)" (page 94)

△ **CAUTION:**

ACPI Configuration for HP OpenVMS I64 Must Be default

On cell-based HP Integrity servers, to boot the HP OpenVMS OS, an nPartition ACPI configuration value must be set to `default`.

At the EFI Shell interface, enter the `acpiconfig` command with no arguments to list the current ACPI configuration. If the `acpiconfig` value is not set to `default`, then OpenVMS cannot boot. In this situation, you must reconfigure `acpiconfig`; otherwise, booting will fail and report the `INCONSTATE` code when OpenVMS is launched.

To set the ACPI configuration for HP OpenVMS I64:

1. At the EFI Shell interface enter the `acpiconfig default` command.

2. Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for OpenVMS.

Procedure 11 Booting HP OpenVMS (EFI Boot Manager)

From the EFI Boot Manager menu, select an item from the boot options list to boot HP OpenVMS using the selected boot option.

1. Access the EFI Boot Manager menu for the system on which you want to boot HP OpenVMS.

   Log in to the management processor, and enter `CO` to select the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

2. At the EFI Boot Manager menu, select an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to use when booting the device.

3. Press **Enter** to initiate booting using the selected boot option.

4. Exit the console and management processor interfaces when you have finished using them.

   To exit the EFI environment press **^B** (**Control+B**); this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Procedure 12 Booting HP OpenVMS (EFI Shell)

From the EFI Shell environment, to boot HP OpenVMS on a device first access the EFI System Partition for the root device (for example `fs0:`), and enter `\efi\vms\vms_loader` to initiate the OpenVMS loader.

1. Access the EFI Shell environment for the system on which you want to boot HP OpenVMS.

   Log in to the management processor, and enter `CO` to select the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. At the EFI Shell environment, issue the `map` command to list all currently mapped bootable devices.

   The bootable file systems of interest typically are listed as `fs0:`, `fs1:`, and so on.

3. Access the EFI System Partition for the device from which you want to boot HP OpenVMS (`fsX:`, where *X* is the file system number).

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

   Also, the file system number might change each time it is mapped (for example, when the system boots, or when the `map -r` command is issued).

4. When accessing the EFI System Partition for the desired boot device, issue the `\efi\vms\vms_loader` command to initiate the `vms_loader.efi` loader on the device you are accessing.

   ```
   fs5:>  \efi\vms\vms_loader.efi


       HP OpenVMS Industry Standard 64 Operating System, Version V8.2-1
          Copyright 1976-2005 Hewlett-Packard Development Company, L.P.

   %PKA0, Copyright (c) 1998 LSI Logic PKW V3.2.20 ROM 4.19
   %PKA0, SCSI Chip is SYM53C1010/66, Operating mode is LVD Ultra3 SCSI
   %SMP-I-CPUTRN, CPU #01 has joined the active set.
   ```

```
%SMP-I-CPUTRN, CPU #02 has joined the active set.
...
```

5. Exit the console and management processor interfaces when you have finished using them.

    To exit the EFI environment press **^B** (**Control+B**); this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Shutting Down HP OpenVMS

This section describes how to shut down the HP OpenVMS OS on cell-based HP Integrity servers.

Procedure 13 Shutting Down HP OpenVMS

From the HP OpenVMS command line, issue the **@SYS$SYSTEM:SHUTDOWN** command to shut down the OpenVMS OS.

1. Log in to HP OpenVMS running on the system that you want to shut down.

    Log in to the management processor (MP) for the server and use the Console menu to access the system console. Accessing the console through the MP enables you to maintain console access to the system after HP OpenVMS has shut down.

2. At the OpenVMS command line (DCL) issue the @SYS$SYSTEM:SHUTDOWN command and specify the shutdown options in response to the prompts given.

    >**@SYS$SYSTEM:SHUTDOWN**

```
            SHUTDOWN -- Perform an Orderly System Shutdown
                        on node RSNVMS

How many minutes until final shutdown [0]:
Reason for shutdown [Standalone]:
Do you want to spin down the disk volumes [NO]?
Do you want to invoke the site-specific shutdown procedure [YES]?
Should an automatic system reboot be performed [NO]? yes
When will the system be rebooted [shortly via automatic reboot]:
Shutdown options (enter as a comma-separated list):
 REBOOT_CHECK        Check existence of basic system files
 SAVE_FEEDBACK       Save AUTOGEN feedback information from this boot
 DISABLE_AUTOSTART   Disable autostart queues
 POWER_OFF           Request console to power-off the system

Shutdown options [NONE]:

%SHUTDOWN-I-OPERATOR, this terminal is now an operator's console
...
```

> **NOTE:** HP OpenVMS I64 currently does not support the POWER_OFF shutdown option.

The SYS$SYSTEM:SHUTDOWN.COM command prompts establish the shutdown behavior, including the shutdown time and whether the system is rebooted after it is shut down.

- To perform a reboot for reconfig from OpenVMS I64 running on an nPartition, issue @SYS$SYSTEM:SHUTDOWN.COM from OpenVMS, and then enter Yes at the "Should an automatic system reboot be performed" prompt.

- To perform a shutdown for reconfig of an nPartition running OpenVMS I64:
    1. Issue @SYS$SYSTEM:SHUTDOWN.COM from OpenVMS and enter No at the "Should an automatic system reboot be performed" prompt.
    2. Access the management processor and, from the management processor Command Menu, issue the RR command and specify the nPartition. The nPartition you specify will be put in the shutdown for reconfig state.

Booting and Shutting Down Microsoft Windows

This section presents procedures for booting and shutting down the Microsoft Windows OS on cell-based HP Integrity servers and a procedure for adding Windows to the boot options list.

- To determine whether the cell local memory (CLM) configuration is appropriate for Windows, see "Microsoft Windows Support for Cell Local Memory" (page 96).
- To add a Windows entry to the boot options list, see "Adding Microsoft Windows to the Boot Options List" (page 96).
- To boot Windows, see "Booting Microsoft Windows" (page 98).
- To shut down Windows, see "Shutting Down Microsoft Windows" (page 99).

Microsoft Windows Support for Cell Local Memory

On servers based on the HP sx2000 chipset, each cell has a cell local memory (CLM) parameter, which determines how firmware interleaves memory residing on the cell.

ⓘ **IMPORTANT:** Microsoft Windows supports using CLM on cell-based HP Integrity servers. For best performance in an nPartition running Windows, HP recommends that you configure the CLM parameter to 100 percent for each cell in the nPartition.

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -V -c#` command and `parstatus -V -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where # is the cell number) or the specified nPartition (`-p#`, where # is the nPartition number). For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

To display CLM configuration details from the EFI Shell on a cell-based HP Integrity server, use the `info mem` command. If the amount of noninterleaved memory reported is less than 512 MB, then no CLM is configured for any cells in the nPartition (and the indicated amount of noninterleaved memory is used by system firmware). If the `info mem` command reports more than 512 MB of noninterleaved memory, then use Partition Manager or the `parstatus` command to confirm the CLM configuration details.

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

Adding Microsoft Windows to the Boot Options List

To add a Microsoft Windows entry to the system boot options list, you must do so from EFI. Use the `\MSUtil\nvrboot.efi` utility to import boot options from the `EFI\Microsoft\WINNT50\Boot00...` file on the device from which Windows is loaded.

See "Boot Options List" (page 77) for additional information about saving, restoring, and creating boot options.

NOTE: On HP Integrity servers, the OS installer automatically adds an entry to the boot options list.

Procedure 14 Adding a Microsoft Windows Boot Option

This procedure adds the Microsoft Windows item to the boot options list.

1. Access the EFI Shell environment.

   Log in to the management processor, and enter CO to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. Access the EFI System Partition for the device from which you want to boot Microsoft Windows (fsX: where X is the file system number).

   For example, enter fs2: to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Microsoft Windows loader is \efi\microsoft\winnt50\ ia64ldr.efi, and it should be on the device you are accessing. (However, you must initiate this loader only from the EFI Boot Menu and not from the EFI Shell.)

3. List the contents of the \EFI\Microsoft\WINNT50 directory to identify the name of the Windows boot option file (Boot00nn) that you want to import into the system boot options list.

   ```
   fs0:\> ls EFI\Microsoft\WINNT50
   Directory of: fs0:\EFI\Microsoft\WINNT50

     09/18/03  11:58a <DIR>          1,024  .
     09/18/03  11:58a <DIR>          1,024  ..
     12/18/03  08:16a                  354  Boot0001
            1 File(s)        354 bytes
            2 Dir(s)
   fs0:\>
   ```

4. At the EFI Shell environment, issue the \MSUtil\nvrboot.efi command to launch the Microsoft Windows boot options utility.

   ```
   fs0:\> msutil\nvrboot

   NVRBOOT: OS Boot Options Maintenance Tool [Version 5.2.3683]

     1. SUSE SLES 9
     2. HP-UX Primary Boot: 0/0/1/0/0.2.0
   * 3. Windows Server 2003, Datacenter
     4. EFI Shell [Built-in]

    * = Windows OS boot option

    (D)isplay (M)odify (C)opy E(x)port (I)mport (E)rase (P)ush (H)elp (Q)uit

   Select>
   ```

5. Use the Import command to import the Windows boot options file.

   ```
   Select> i
   Enter IMPORT file path: \EFI\Microsoft\WINNT50\Boot0001
   Imported Boot Options from file: \EFI\Microsoft\WINNT50\Boot0001

   Press enter to continue
   ```

6. Press **Q** to quit the NVRBOOT utility, and exit the console and management processor interfaces if you are finished using them.

   To exit the EFI environment press **^B** (**Control+B**); this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Booting Microsoft Windows

You can boot the Windows Server 2003 OS on an HP Integrity server by using the EFI Boot Manager to choose the appropriate Windows item from the boot options list.

See "Shutting Down Microsoft Windows" (page 99) for details on shutting down the Windows OS.

△ **CAUTION:**

ACPI Configuration for Windows Must Be windows

On cell-based HP Integrity servers, to boot the Windows OS, an nPartition ACPI configuration value must be set to `windows`.

At the EFI Shell, enter the `acpiconfig` command with no arguments to list the current ACPI configuration. If the `acpiconfig` value is not set to `windows`, then Windows cannot boot. In this situation, you must reconfigure `acpiconfig`; otherwise, booting will be interrupted with a panic when Windows is launched.

To set the ACPI configuration for Windows: At the EFI Shell enter the `acpiconfig windows` command, and then enter the `reset` command for the nPartition to reboot with the proper (`windows`) configuration for Windows.

NOTE:

Microsoft Windows Booting on HP Integrity Servers

The recommended method for booting Windows is to use the EFI Boot Manager menu to choose a Windows entry from the boot options list. Using the `ia64ldr.efi` Windows loader from the EFI Shell is not recommended.

Procedure 15 Windows Booting

From the EFI Boot Manager menu, select an item from the boot options list to boot Windows using that boot option. The EFI Boot Manager is available only on HP Integrity servers.

See "ACPI Configuration for Windows Must Be windows" (page 98) for required configuration details.

1. Access the EFI Boot Manager menu for the system on which you want to boot Windows.

   Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

2. At the EFI Boot Manager menu, select an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.

3. Press **Enter** to initiate booting using the chosen boot option.

4. When Windows begins loading, wait for the Special Administration Console (SAC) to become available.

   The SAC interface provides a text-based administration tool that is available from the nPartition console. For details, see the SAC online help (type **?** at the `SAC>` prompt).

   ```
   Loading.: Windows Server 2003, Datacenter
   Starting: Windows Server 2003, Datacenter

                         Starting Windows...
   *****************************************************************************

   Computer is booting, SAC started and initialized.
   ```

```
Use the "ch -?" command for information about using channels.
Use the "?" command for general help.

SAC>
```

5. Exit the console and management processor interfaces if you are finished using them.

To exit the console environment, press **^B** (**Control+B**); this exits the console and returns to the management processor Main menu. To exit the management processor, enter X at the Main menu.

Shutting Down Microsoft Windows

You can shut down the Windows OS on HP Integrity servers using the **Start** menu or the `shutdown` command.

△ **CAUTION:**   Do not shut down Windows using Special Administration Console (SAC) `restart` or `shutdown` commands under normal circumstances.

Issuing `restart` or `shutdown` at the SAC> prompt causes the system to restart or shut down immediately and can result in the loss of data.

Instead, use the Windows **Start** menu or the `shutdown` command to shut down without loss of data.

To shut down Windows use either of the following methods.

- Select **Shut Down** from the **Start** menu, and select either **Restart** or **Shut down** from the drop-down menu.

  Selecting the **Restart** menu item shuts down and restarts the system. Selecting the **Shut down** menu item shuts down the system.

  You can use this method when using the Windows graphical interface.

- Issue the `shutdown` command from the Windows command line.

  See the procedure "Windows Shutdown from the Command Line" (page 99) for details.

  You can issue this command from a command prompt through the Special Administration Console (SAC) or from any other command line.

  The Windows `shutdown` command includes the following options:

`/s`	Shut down the system. This is the equivalent of **Start—>Shut Down, Shut down**.
`/r`	Shut down and restart the system. This is the equivalent of **Start—>Shut Down, Restart**.
`/a`	Abort a system shutdown.
`/t xxx`	Set the timeout period before shutdown to *xxx* seconds. The timeout period can range from 0–600, with a default of 30.

  See the `help shutdown` Windows command for details.

NOTE: On HP rx7620, rx7640, rx8620, and rx8640 servers, performing a shutdown using `shutdown /s` (or the equivalent **Start—>Shut Down, Shut down**) powers off the server cabinet or powers off the cells and I/O chassis assigned to the nPartition. You can customize this behavior. For details, see "ACPI Softpowerdown Configuration—OS Shutdown Behavior" (page 79).

On HP Integrity Superdome servers, the Windows `shutdown /s` command shuts down the system and keeps all cells at the boot-is-blocked (BIB) inactive state.

Procedure 16 Windows Shutdown from the Command Line

From the Windows command line, issue the `shutdown` command to shut down the OS.

1. Log in to Windows running on the system that you want to shut down.

    For example, access the system console and use the Windows SAC interface to start a command prompt, from which you can issue Windows commands to shut down the the system.

2. Check whether any users are logged in.

    Use the `query user` or `query session` command.

3. Issue the `shutdown` command and the appropriate options to shut down the Windows Server 2003 on the system.

    You have the following options when shutting down Windows:

    - To shut down Windows and reboot: **`shutdown /r`**

        Alternatively, you can select the **Start —> Shut Down** action and select **Restart** from the drop-down menu.

    - To shut down Windows and not reboot (either power down server hardware or put an nPartition into a shutdown for reconfiguration state): **`shutdown /s`**

        Alternatively, you can select the **Start —> Shut Down** action and select **Shut down** from the drop-down menu.

    - To abort a shutdown (stop a shutdown that has been initiated): **`shutdown /a`**

    For example:

    ```
    shutdown /r /t 60 /c "Shut down in one minute."
    ```

    This command initiates a Windows system shutdown-and-reboot after a timeout period of 60 seconds. The `/c` option specifies a message that is broadcast to any other users of the system.

Booting and Shutting Down Linux

This section presents procedures for booting and shutting down the Linux OS on cell-based HP Integrity servers and a procedure for adding Linux to the boot options list.

- To determine whether the cell local memory (CLM) configuration is appropriate for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, see "Linux Support for Cell Local Memory" (page 100).

- To add a Linux entry to the nPartition boot options list, see "Adding Linux to the Boot Options List" (page 101).

- To boot Red Hat Enterprise Linux, see "Booting Red Hat Enterprise Linux" (page 102).

- To boot SuSE Linux Enterprise Server, see "Booting SuSE Linux Enterprise Server " (page 103).

- To shut down Linux, see "Shutting Down Linux" (page 104).

Linux Support for Cell Local Memory

On servers based on the HP sx2000 chipset, each cell has a cell local memory (CLM) parameter, which determines how firmware interleaves memory residing on the cell.

⊙ **IMPORTANT:**   Red Hat Enterprise Linux does not support using CLM. Before booting Red Hat Enterprise Linux on an nPartition, you must ensure that the CLM parameter for each cell in the nPartition is set to zero (0). Although you might be able to boot Red Hat Enterprise Linux on an nPartition with CLM configured, any memory configured as cell local is unusable, and such a configuration is untested and unsupported.

SuSE Linux Enterprise Server supports using CLM. The optimal CLM settings for SuSE Linux Enterprise Server depend on the applications and workload the OS is running.

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -V -c#` command and `parstatus -V -p#` command

report the CLM amount requested and CLM amount allocated for the specified cell (-c#, where # is the cell number) or the specified nPartition (-p#, where # is the nPartition number). For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

To display CLM configuration details from the EFI Shell on a cell-based HP Integrity server, use the info mem command. If the amount of noninterleaved memory reported is less than 512 MB, then no CLM is configured for any cells in the nPartition (and the indicated amount of noninterleaved memory is used by system firmware). If the info mem command reports more than 512 MB of noninterleaved memory, then use Partition Manager or the parstatus command to confirm the CLM configuration details.

To set the CLM configuration, use Partition Manager or the parmodify command. For details, see the *nPartition Administrator's Guide* (http://www.hp.com/go/virtualization-manuals).

Adding Linux to the Boot Options List

This section describes how to add a Linux entry to the system boot options list. The processes for adding both Red Hat Enterprise Linux and SuSE Linux Enterprise Servers are given here.

You can add the \EFI\redhat\elilo.efi loader or the \efi\SuSE\elilo.efi loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu).

See "Boot Options List" (page 77) for additional information about saving, restoring, and creating boot options.

NOTE: On HP Integrity servers, the OS installer automatically adds an entry to the boot options list.

Procedure 17 Adding a Linux Boot Option

This procedure adds a Linux item to the boot options list.

1. Access the EFI Shell environment.

   Log in to the management processor, and enter CO to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

2. Access the EFI System Partition for the device from which you want to boot Linux (fs*X*:, where *X* is the file system number).

   For example, enter fs2: to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Red Hat Enterprise Linux loader is \EFI\redhat\elilo.efi, and it should be on the device you are accessing.

   The full path for the SuSE Linux Enterprise Server loader is \efi\SuSE\elilo.efi, and it should be on the device you are accessing.

3. At the EFI Shell environment, use the bcfg command to manage the boot options list.

   The bcfg command includes the following options for managing the boot options list:

   - bcfg boot dump — Display all items in the boot options list for the system.
   - bcfg boot rm # — Remove the item number specified by # from the boot options list.

- `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.

- `bcfg boot add # file.efi "Description"` — Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

  For example, `bcfg boot add 1 \EFI\redhat\elilo.efi "Red Hat Enterprise Linux"`adds a Red Hat Enterprise Linux item as the first entry in the boot options list.

  Likewise, `bcfg boot add 1 \efi\SuSE\elilo.efi "SLES 9"`adds a SuSE Linux item as the first entry in the boot options list.

  See the `help bcfg` command for details.

4. Exit the console and management processor interfaces if you are finished using them.

   To exit the EFI environment press **^B** (**Control+B**); this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Booting Red Hat Enterprise Linux

You can boot the Red Hat Enterprise Linux OS on HP Integrity servers using either of the methods described in this section.

See for details on shutting down the Red Hat Enterprise Linux OS.

△ **CAUTION:**

ACPI Configuration for Red Hat Enterprise Linux Must Be default

On cell-based HP Integrity servers, to boot the Red Hat Enterprise Linux OS, an nPartition ACPI configuration must be value set to `default`.

At the EFI Shell, enter the `acpiconfig` command with no arguments to list the current ACPI configuration. If the `acpiconfig` value is not set to `default`, then Red Hat Enterprise Linux could panic. In this situation, you must reconfigure `acpiconfig` to eliminate any bus address conflicts and ensure all I/O slots have unique addresses.

To set the ACPI configuration for Red Hat Enterprise Linux:

- At the EFI Shell enter the `acpiconfig default` command.

- Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for Red Hat Enterprise Linux.

Use either of the following methods to boot Red Hat Enterprise Linux:

- Choose a Red Hat Enterprise Linux entry from the EFI Boot Manager menu.

  To load the Red Hat Enterprise Linux OS at the EFI Boot Manager menu, choose its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the OS using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

  See the procedure for details.

  After choosing the file system for the boot device (for example, `fs0:`), you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

  On a Red Hat Enterprise Linux boot device EFI System Partition, the full paths to the loader and configuration files are:

```
\EFI\redhat\elilo.efi
\EFI\redhat\elilo.conf
```

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Procedure 18 Booting Red Hat Enterprise Linux (EFI Shell)

Use this procedure to boot Red Hat Enterprise Linux from the EFI Shell.

See for required configuration details.

1. Access the EFI Shell.

   From the system console, select the EFI Shell entry from the EFI Boot Manager menu to access the shell.

2. Access the EFI System Partition for the Red Hat Enterprise Linux boot device.

   Use the `map` EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.

   To select a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter `fs3:` at the EFI Shell prompt.

3. Enter `ELILO` at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader's full path by entering `\EFI\redhat\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the Red Hat Enterprise Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Booting SuSE Linux Enterprise Server

You can boot the SuSE Linux Enterprise Server 9 OS on HP Integrity servers using either of the methods described in this section.

See for details on shutting down the SuSE Linux Enterprise Server OS.

△ **CAUTION:**

ACPI Configuration for SuSE Linux Enterprise Server Must Be default

On cell-based HP Integrity servers, to boot the SuSE Linux Enterprise Server OS, an nPartition ACPI configuration value must be set to `default`.

At the EFI Shell, enter the `acpiconfig` command with no arguments to list the current ACPI configuration. If the `acpiconfig` value is not set to `default`, then SuSE Linux Enterprise Server could panic.

To set the ACPI configuration for SuSE Linux Enterprise Server:

- At the EFI Shell enter the `acpiconfig default` command.

- Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for SuSE Linux Enterprise Server.

Use either of the following methods to boot SuSE Linux Enterprise Server:

- Choose a SuSE Linux Enterprise Server entry from the EFI Boot Manager menu.

  To load the SuSE Linux Enterprise Server OS at the EFI Boot Manager menu, choose its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the OS using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

  See the procedure "Booting SuSE Linux Enterprise Server (EFI Shell)" (page 104) for details.

  After choosing the file system for the boot device (for example, `fs0:`), you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

  On a SuSE Linux Enterprise Server boot device EFI System Partition, the full paths to the loader and configuration files are:

  `\efi\SuSE\elilo.efi`

  `\efi\SuSE\elilo.conf`

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Procedure 19 Booting SuSE Linux Enterprise Server (EFI Shell)

Use this procedure to boot SuSE Linux Enterprise Server 9 from the EFI Shell.

See "ACPI Configuration for SuSE Linux Enterprise Server Must Be default" (page 103) for required configuration details.

1. Access the EFI Shell.

   From the system console, select the EFI Shell entry from the EFI Boot Manager menu to access the shell.

2. Access the EFI System Partition for the SuSE Linux Enterprise Server boot device.

   Use the `map` EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.

   To select a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter **fs3:** at the EFI Shell prompt.

3. Enter **ELILO** at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader's full path by entering `\efi\SuSE\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the SuSE Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Shutting Down Linux

Use the `shutdown` command to shut down Red Hat Enterprise Linux or SuSE Linux Enterprise Server.

The Red Hat Enterprise Linux and SuSE Linux Enterprise Server `shutdown` command includes the following options:

-h   Halt after shutdown.

On cell-based HP Integrity servers, this either powers down server hardware or puts the nPartition into a shutdown for reconfiguration state.

Use the `PE` command at the management processor Command Menu to manually power on or power off server hardware, as needed.

-r   Reboot after shutdown.

-c   Cancel an already running shutdown.

time   When to shut down (required). You can specify the *time* option in any of the following ways:

- Absolute time in the format *hh:mm*, in which *hh* is the hour (one or two digits) and *mm* is the minute of the hour (two digits).

- Number of minutes to wait in the format *+m*, in which *m* is the number of minutes.

- `now` to immediately shut down; this is equivalent to using `+0` to wait zero minutes.

See the *shutdown*(8) Linux manpage for details. Also see the Linux manpage for the `poweroff` command.

NOTE: On HP rx7620, rx7640, rx8620, and rx8640 servers, you can configure the nPartition behavior when an OS is shut down and halted (`shutdown -h` or `poweroff`). The two options are to have hardware power off when the OS is halted or to have the nPartition be made inactive (all cells are in a boot-is-blocked state).

The normal behavior for Red Hat Enterprise Linux or SuSE Linux Enterprise Server shut down and halt is for the nPartition to be made inactive.

For details, see "ACPI Softpowerdown Configuration—OS Shutdown Behavior" (page 79).

Procedure 20 Shutting Down Linux

From the command line for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, issue the `shutdown` command to shut down the OS.

1. Log in to Linux running on the system you want to shut down.

   Log in to the management processor (MP) for the server and use the Console menu to access the system console. Accessing the console through the MP enables you to maintain console access to the system after Linux has shut down.

2. Issue the `shutdown` command with the desired command-line options, and include the required *time* argument to specify when the operating shutdown is to occur.

   For example, `shutdown -r +20` will shut down and reboot the system starting in 20 minutes.

5 Server Troubleshooting

This chapter contains tips and procedures for diagnosing and correcting problems with the server and its field replaceable units (CRUs). Information about the various status LEDs on the server is also included.

Common Installation Problems

The following sections contain general procedures to help you locate installation problems.

> ⚠ **CAUTION:** Do not operate the server with the top cover removed for an extended period of time. Overheating can damage chips, boards, and mass storage devices. However, you can safely remove the top cover while the server is running to remove and replace PCI hot-plug cards.

Most problems are the result of incorrect system and SCSI subsystem configurations.

To troubleshoot an installation problem, perform the following checks in the order given:

a. Check all cable and power connections, including those in the rack, and so on.

b. Ensure the server is configured properly.

Check the Setup Utility. If the error is a network-related problem, determine if the server has enough memory and hard disk drive capacity.

c. Verify all cables and boards are securely plugged in to the appropriate connectors or slots.

d. Remove all extra options, such as disk drives, one at a time, checking the affect of each on the server.

e. Unplug the power cord, wait 20 seconds, plug-in the power cord and restart the server.

f. If you suspect a hardware error:

1. Log users off the LAN and power down the server.
2. Simplify the server to the minimum configuration.

The minimum configuration consists of the following:

- One cell board
- One processor
- One pair of memory DIMMs
- One MP/SCSI card
- One LAN/SCSI card
- System backplane
- PCI-X backplane
- One BPS
- One PCI power module
- One power cord

g. Remove all third-party options and reinstall each one, one at a time, checking the server after each installation.

h. Replace the top cover and reconnect the power cord and other cables. Boot the server. If it does not function properly, see the procedures in the following section.

The Server Does Not Power On

To check for power related problems, use the checklist below:

a. Check the LED for each bulk power supply (BPS).

The LED is located in the lower left hand corner of the power supply face. Table 22 shows the states of the LEDs.

b. Verify that the power supply and a minimum of two power cords are plugged in to the chassis.

A yellow LED indicates that the line cord connections are not consistent with the `pwrgrd` settings.

> **NOTE:** A minimum of two power cords must be connected to A0 and B0 or A1 and B1. If the front panel yellow power LED continues to flash with two power cords connected then the server may not be in an N+1 configuration. Four power cords will be required.

c. Remove and replace any suspect BPS.

The Server Powers On But Fails Power-On Self Test

Use this checklist when the server fails power on self test (POST):

a. Check for error messages on the system console.
b. Check for fault LEDs.
c. Check for error messages in the MP logs.

Server LED Indicators

The server has LEDs that indicate the health of the server. This section defines those LEDs.

Front Panel LEDs

There are five LEDs located on the front panel.

Figure 47 Front Panel with LED Indicators
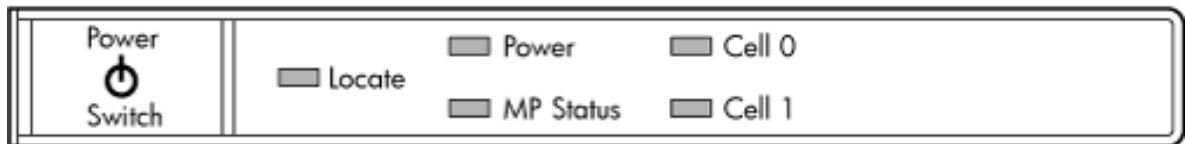
Table 21 Front Panel LEDs

LED	Status	Description
Power	Off	48 V Off
	Red	BPS or PCI power module absent.
	Yellow	Non-redundant power condition exists
	Flash Green	Server cabinet is powering off. OS shutdown is in progress.
	On Green	48 V Good.
MP Status	Green (solid)	At least one MP is installed and active
	Off	No MPs are installed or at least one is installed but not active
	Red (flashing)	Cabinet overtemp condition exists
	Red (solid)	Cabinet shutdown for thermal reasons
	Yellow (flashing)	Cabinet fan slow or failed, master slave failover.

Table 21 Front Panel LEDs *(continued)*

LED	Status	Description
	Yellow (solid)	FPGA detects no MPs present or functioning
Cell 0 and Cell 1	Green (solid)	Cell power on
	Off	Cell power off
	Red (solid)	Cell fault. Cell powered off due to power problem or HPMC/MC event from cell
	Yellow (flashing)	Cell fault warning Latches not latched, LPM not ready, VRMs reporting not good or OT Cell fan slow/failed
	Yellow (Solid)	Cell not present
Locate	Blue (flashing)	User requests locator ON and specifies (1 - 72) hour off timeout. Default timeout is 24 hours.
	Off	Timeout. Or user requests locator off.

Bulk Power Supply LEDs

There is a single three-color LED on each bulk power supply.

Figure 48 BPS LED Locations
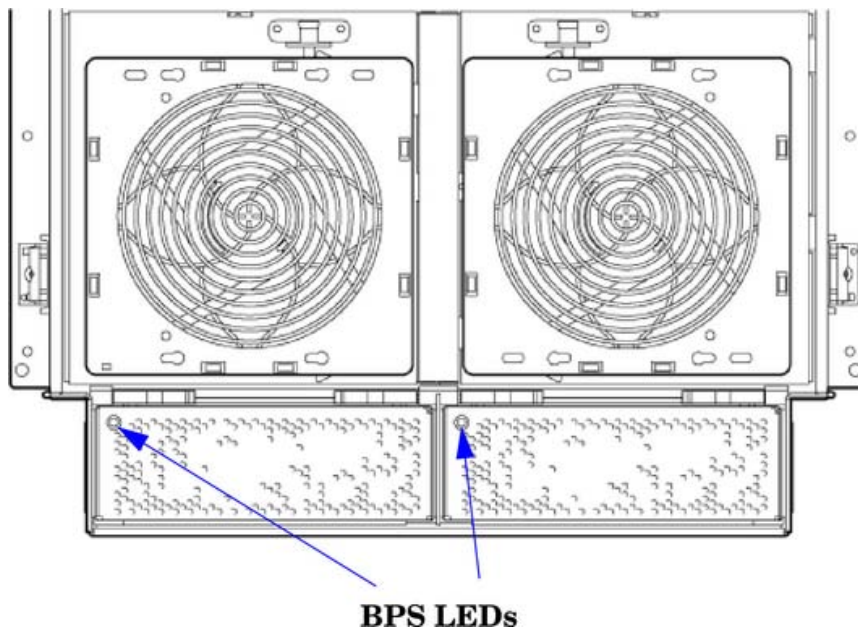
BPS LEDs

Table 22 BPS LEDs

LED Indication	Description
Blinking Green	BPS is in standby state with no faults or warnings
Green	BPS is in run state (48 volt output enabled) with no faults or warnings
Blinking Yellow	BPS is in standby or run state with warning(s) present but no faults
Yellow	BPS is in standby state with recoverable fault(s) present but no non-recoverable faults

Table 22 BPS LEDs *(continued)*

LED Indication	Description
Blinking RED	BPS state might be unknown, non-recoverable fault(s) present
Red	Not Used
Off	BPS fault or failure, no power cords installed or no power to the chassis

PCI-X Power Supply LEDs

There are two active LEDs on the PCI-X power supply. A green power LED and a multi-color LED reports warnings and faults.
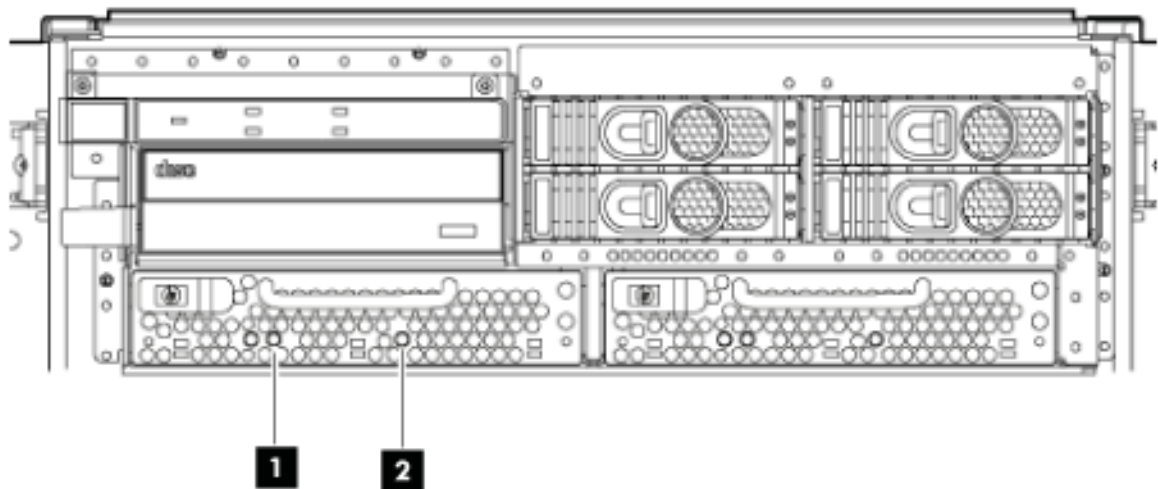
Figure 49 PCI-X Power Supply LED Locations

Table 23 PCI-X Power Supply LEDs

LED	Driven By	State	Description
Power[1]	Each supply	On Green	All output voltages generated by the power supply are within limits.
		Off	Power to entire system has been removed.
Fault[2]	Each supply	Flash Yellow	The temperature within the power supply is above the lower threshold.
		On Yellow	The temperature of the power supply is approaching the thermal limit.
		Flash Red	Power supply has shut down due to an over temperature condition, a failure to regulate the power within expected limits, or a current-limit condition.
		Off	Normal operation.

System and PCI I/O Fan LEDs

There is a single three-color LED on each system and PCI I/O fan.

Figure 50 Front, Rear and PCI I/O Fan LEDs
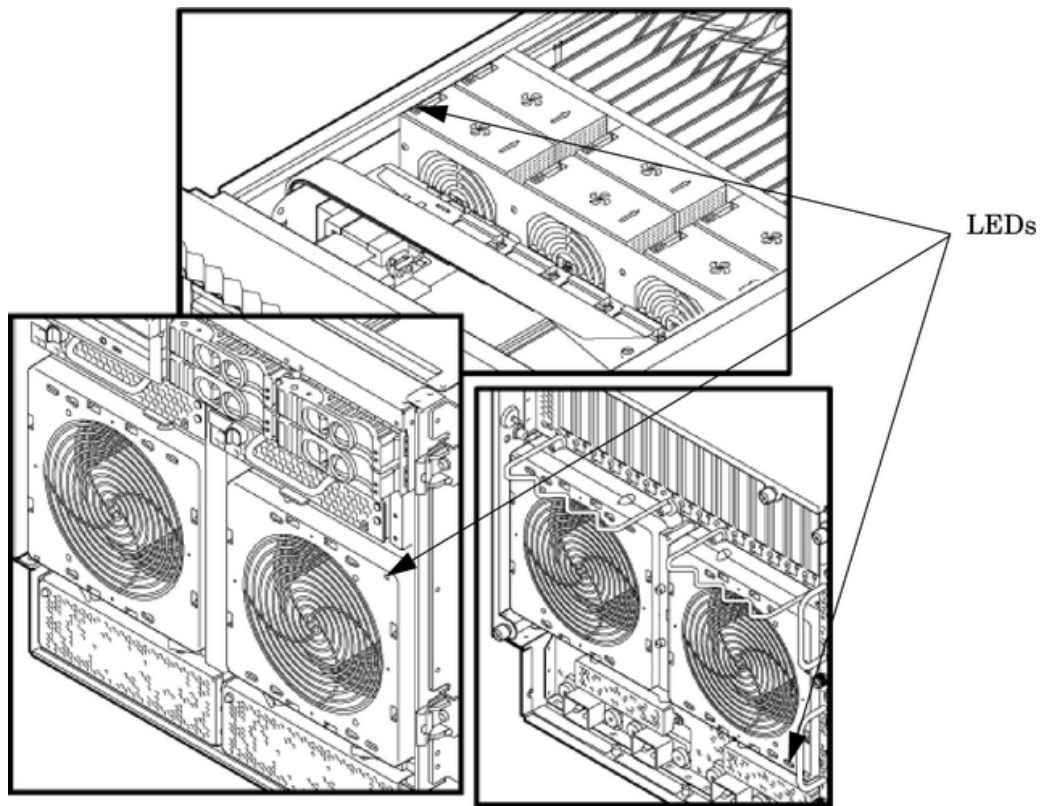
Table 24 System and PCI I/O Fan LEDs

LED	Driven By	State	Description
Fan Status	Fan	On Green	Normal
		Flash Yellow	Predictive failure
		Flash Red	Failed
		Off	No power

OL* LEDs

Cell Board LEDs

There is one green power LED located next to each ejector on the cell board in the server that indicates the power is good. When the LED is illuminated green, power is being supplied to the cell board and it is unsafe to remove the cell board from the server.

There is one yellow attention LED located next to each ejector lever on the cell board in the server. When the LED is flashing yellow, it is safe to remove the cell board from the server.

Figure 51 Cell Board LED Locations

Voltage Margin Active (Red)
Standby (Green)

PDHC Heartbeat (Green)
Manageability Fab (Green)
SM (Green)
BIB (Green)

Cell Power (Green)
Attention (Yellow)

Cell Power (Green)
Attention (Yellow)
V3P3 Standby (Green)
V12 Standby (Green)
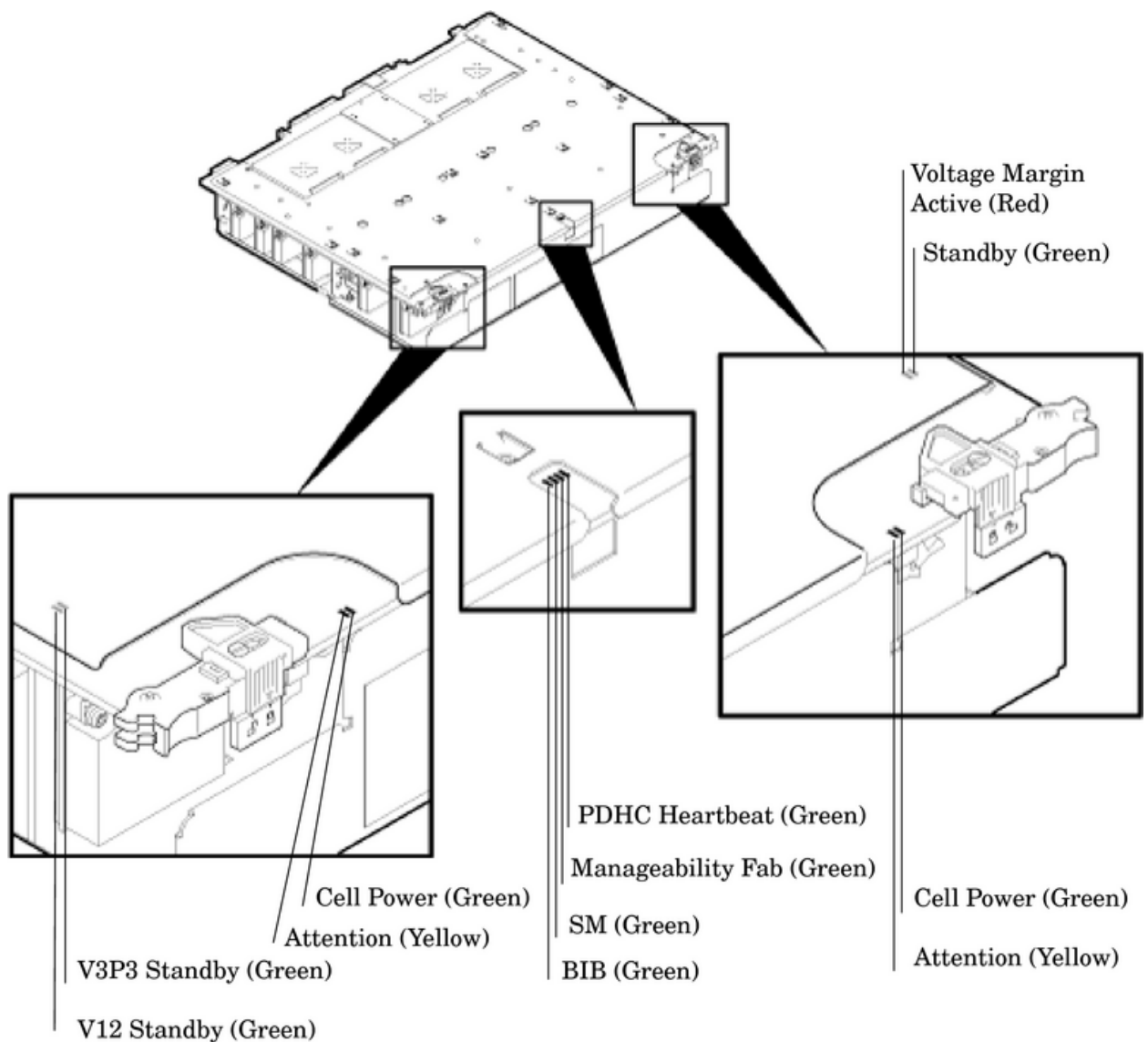
Table 25 Cell Board OL* LED Indicators

Location	LED	Driven by	State	Description
On cell board (located in the server cabinet)	Power	Cell LPM	On Green	3.3 V Standby and Cell_Pwr_Good
			Off	3.3 V Standby off, or 3.3 V Standby on and no Cell_Pwr_Good
	Attention	MP via GPM	Flash Yellow	Safe to remove the cell board from the system

PCI-X OL* Card Divider LEDs

The PCI-X OL* card LEDs are located on each of the 16 PCI-X slot dividers in the PCI-X card cage assembly area. The green power LED indicates whether power is supplied to the card slot. The yellow attention LED states are defined in Table 28 (page 115).

Figure 52 PCI-X OL* LED Locations

Slot Attention (Yellow)

Slot Power (Green)

Card Divider
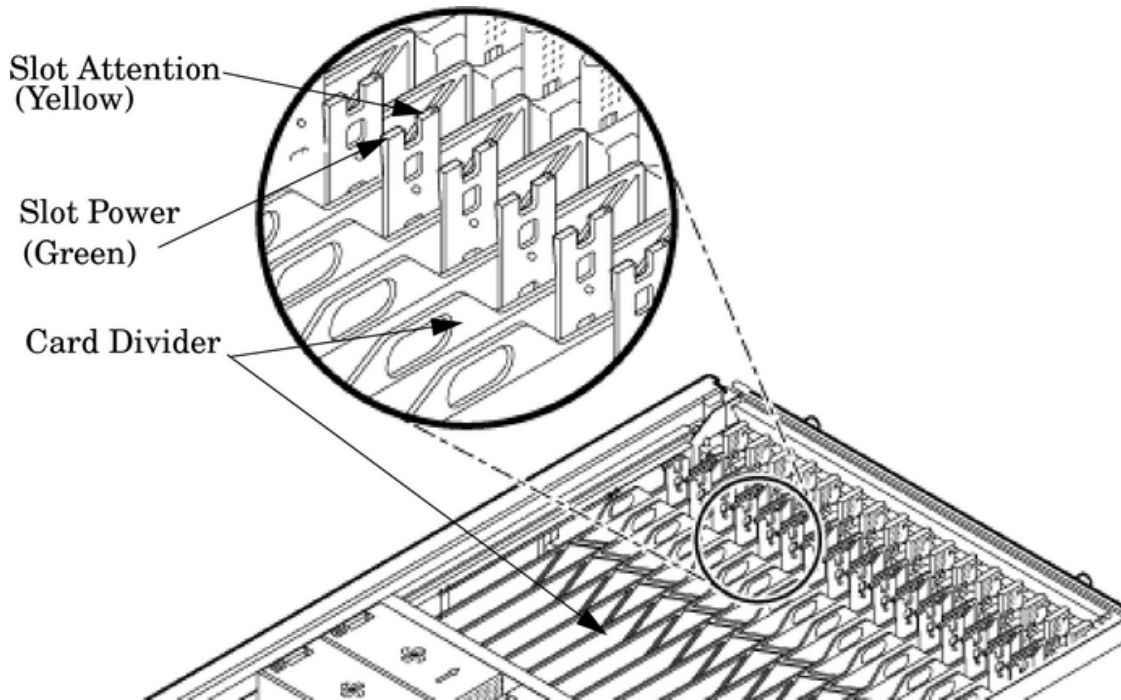
Core I/O LEDs

The core I/O LEDs are located on the bulkhead of the installed core I/O PCA. See Table 26 (page 113) to determine status and description. .

Figure 53 Core I/O Card Bulkhead LEDs
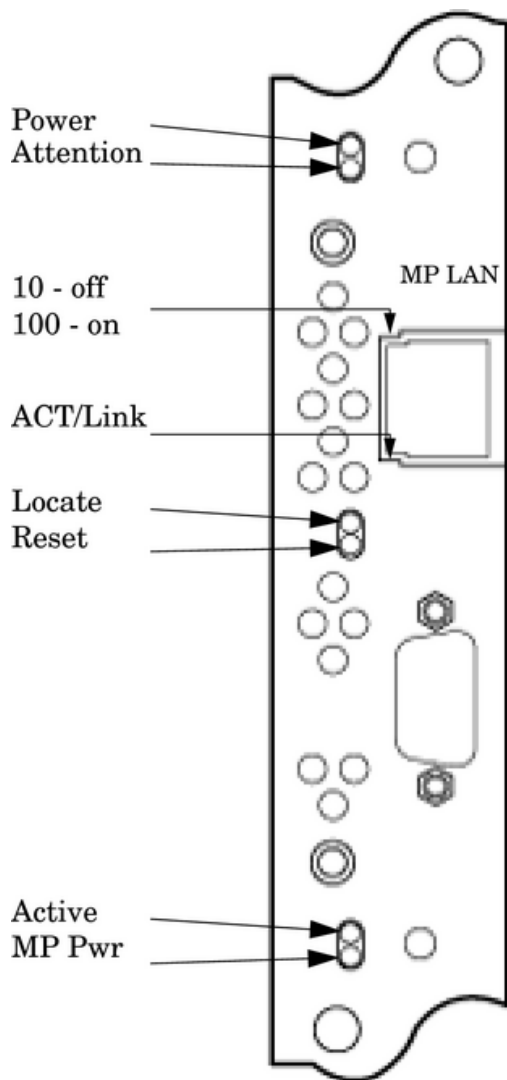
Table 26 Core I/O LEDs

LED (as silk-screened on the bulkhead)	State	Description
Power	On Green	I/O power on
Attention	On Yellow	PCI attention
MP LAN 10 BT	On Green	MP LAN in 10 BT mode
MP LAN 100 BT	On Green	MP LAN in 100 BT mode
ACT/Link	On Green	MP LAN activity
Locate	On Blue	Locater LED
Reset	On Amber	Indicates that the MP is being reset
Active	On Green	This core I/O is managing the system
MP Power	On Green	Indicates standby power is on

Core I/O Buttons

There are two recessed buttons on the back of the core I/O card, as explained in Table 27.

Figure 54 Core I/O Button Locations
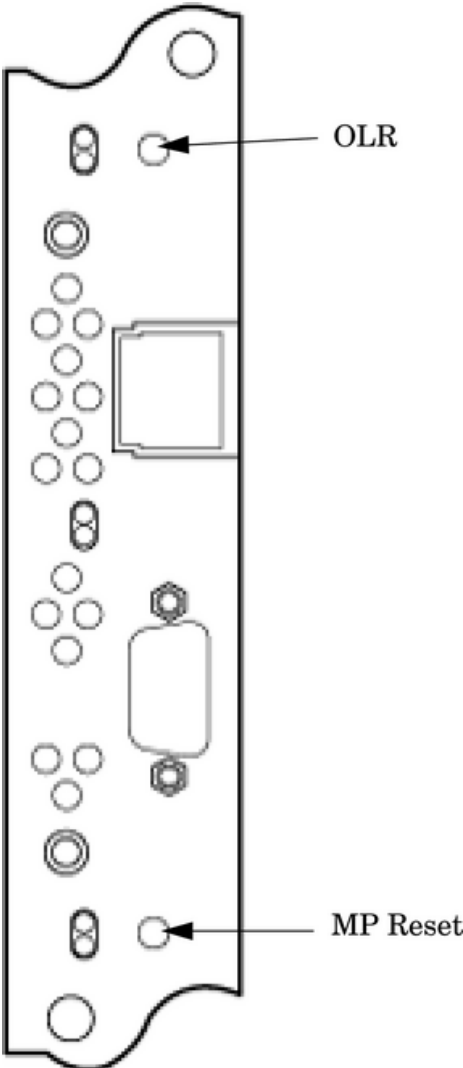
Table 27 Core I/O Buttons

Button Identification (as silk-screened on the bulkhead)	Location	Function
MP RESET	Center of the core I/O card	Resets the MP

Table 27 Core I/O Buttons *(continued)*

Button Identification (as silk-screened on the bulkhead)	Location	Function
		NOTE: If the MP RESET button is held for longer than five seconds, it will clear the MP password and reset the LAN, RS-232 (serial port), and modem port parameters to their default values. ## LAN Default Parameters • IP Address—192.168.1.1 • Subnet mask—255.255.255.0 • Default gateway—192.168.1.1 • Hostname—gsp0 ## RS-232 (Serial Port) Default Parameters • 9600 baud • 8 bits • No parity
OLR (Symbol next to button is shown below)	Top end of the core I/O card	Request OL* for this core I/O slot **NOTE:** The OLR function is not enabled for the core I/O card.

PCI-X Hot-Plug LED OL* LEDs

Table 28 OL* LED States

State	Power (Green)	Attention (Yellow)
Normal operation, slot power on	On	Off
Slot selected, slot power on	On	Flashing
Slot needs attention, slot power on	On	On
Slot available, slot power off	Off	Off
Ready for OL*, slot power off	Off	Flashing
Fault detected, slot power off	Off	On
Slot powering down or up	Flashing	Off

Disk Drive LEDs

There are two tri-color LED on each disk drive.

Figure 55 Disk Drive LED Location
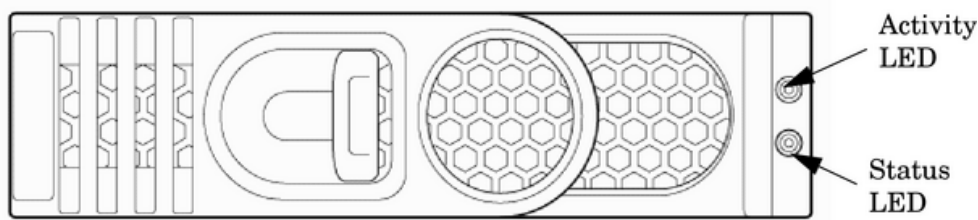
Table 29 Disk Drive LEDs

Activity LED	Status LED	Flash Rate	Description
Off	Green	Steady	Normal operation, power applied
Green	Off	Steady	Green stays on during foreground drive self-test
Green	Off	Flutter at rate of activity	I/O Disk activity
Off	Yellow	Flashing at 1Hz or 2 Hz	Predictive failure, needs immediate investigation
Off	Yellow	Flashing at 0.5Hz or 1Hz	Operator inducing manually
Off	Yellow	Steady	Module fault, critical
Off	Off	LEDs off	Unit not powered or installed

Interlock Switches

There are three interlock switches located in the server. Both side covers and the top cover have an interlock switch located underneath each cover.

- Side Covers—If either side cover is removed while the system is powered on, the system fans on the front and rear increase in speed to ensure adequate cooling. An event code is generated to indicate a side cover was removed.

- Top Cover—If the top cover is removed while the system power is on, the PCI-X card cage assembly I/O fan speed will not change. An event code is generated to indicate the top cover was removed.

Server Management Subsystem Hardware Overview

Server management for the server is provided by an MP on the core I/O board. The server management hardware is powered by standby power that is available whenever the server is plugged into primary AC power. This allows service access even if the DC power to the server is switched off.

The MP communicates with the server subsystems, sensors, and PDC by internal buses.

Connection to the management processor is by way of three I/O paths:

- An RS-232 port for a local terminal
- A 10/100/1000 baseT LAN port (Web console)

When the server is configured with one core I/O board, that board must be in slot 1, since the primary MP is always on the core I/O board in slot 1.

When the server is configured for two partitions, it must contain two core I/O boards, one for each partition. It will also contain two MPs. In this case, the MP in slot 1 is the primary MP and provides all of the server management functions. The MP on the core I/O board in slot 0 is a

secondary MP and redirects the operating system gettys to the primary MP over an internal MP-to-MP link. All external connections to the MP must be to the primart MP in slot 1. The secondary MP ports will be disabled.

The server configuration cannot be changed without the MP.

In the event of a primary MP failure, the secondary MP automatically becomes the primary MP.

Server Management Overview

Server management consists of four basic functional groups:

- Chassis management
- Chassis logging
- Console and session redirection
- Service access

Chassis Management

Chassis management consists of control and sensing the state of the server subsystems:

- Control and sensing of bulk power
- Control and sensing of DC-to-DC converters
- Control and sensing of fans
- Control of the front panel LEDs
- Sensing temperature
- Sensing of the power switch
- Sensing chassis intrusion
- Reading CRU PROMS

Chassis Logging

Chassis logging consists of maintaining logs of chassis codes:

- Boot codes
- Activity codes
- Error codes

Console and Session Redirection

Console and session redirection allows the console and session terminals to be connected over RS-232, a modem, or a LAN connection (Web console).

Service Access

Service access allows access to and control of server state. Service access is secured by a password. Service access functions include:

- Access to chassis logs
- Configuration of partitions
- Control for online addition and replacement
- Access to the virtual front panel
- Transfer of control and reset

Server Management Behavior

This section describes how the system responds to over-temperature situations, how the firmware controls and monitors fans, and how it controls power to the server.

Thermal Monitoring

The manageability firmware is responsible for monitoring the ambient temperature in the server and taking appropriate action if this temperature becomes too high. The ambient temperature of the server is broken into four ranges: normal, overtemp low (OTL), overtemp medium (OTM), and overtemp high (OTH). Figure 56 shows the actions taken at each range transition. Actions for increasing temperatures are shown on the left; actions for decreasing temps are shown on the right.

Figure 56 Temperature States
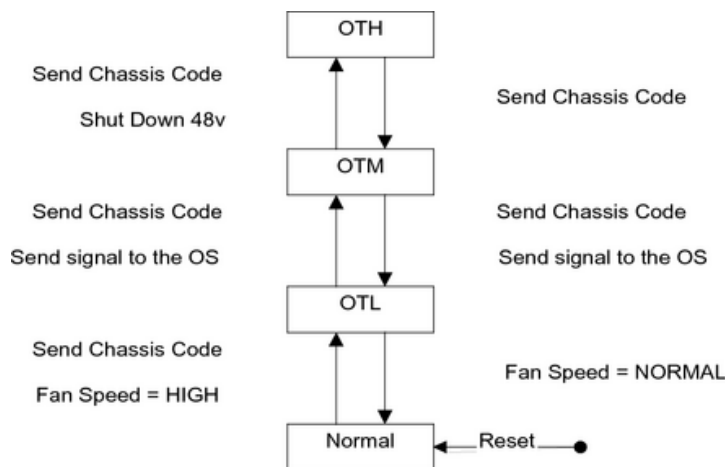
On large temperature swings, the server will transition through all states in order. It might go to the following state immediately, but each of the preceding actions will occur. If the temperature reaches the highest range, the server will be shut down immediately by the manageability firmware.

Fan Control

There are three sets of fans in the system: those on the I/O bay, the front and rear fans that are connected to the main backplane, and those on the cell boards. The front fans are run off of standby power, and will be running any time AC input power is supplied to the server. All of the fans turn on when 48 V power is supplied to the system.

As shown Figure 56, the fan behavior is related to the temperature state. The fans will be set to high speed when the ambient temperature is anywhere above the normal operating range. The front and rear fans will be set to high speed any time a chassis intrusion switch is triggered when removing a side cover.

Altimeter Circuit

The system backplane contains an altimeter circuit. This circuit is used to adjust the chassis fan speeds for the operating altitude at power on and during MP initialization. The chassis fans consist of the two front fans, two rear fans, and the six PCI-X I/O assembly fans. If an altimeter failure is detected, the information is logged as an Event ID then propagated to the OS level to be picked up by monitoring diagnostics.

The altimeter circuit is checked at power on by the MP. If an expected value is returned from the altimeter circuit, the altimeter is determined good. The altimeter reading is then set in non-volatile random access memory (NVRAM) on board the core I/O card. If the value is ever lost like for a core I/O replacement, the NVRAM will be updated at next boot provided the altimeter is functioning

normally. If the altimeter has failed, and the stable storage value has been lost because of a core I/O failure or replacement, the MP will adjust the fan speeds for sea-level operation.

NOTE: Fans driven to a high RPM in dense air cannot maintain expected RPM and will be considered bad by the MP leading to a "False Fan Failure" condition.

Power Control

If active, the manageability firmware is responsible for monitoring the power switch on the front panel. Setting this switch to the ON position is a signal to the MP to turn on 48 V DC power to the server. The PE command can also be used to send this signal. This signal does not always generate a transition to the powered state. The following conditions prevent the manageability firmware from applying 48 V DC power to the server:

- Insufficient number of active bulk power supplies
- Insufficient number of I/O fans
- Insufficient number of main fans
- Ambient temperature is in an OVERTEMP HIGH condition

Unless one of the following conditions occurs, 48 V DC power to the server is maintained:

- A main fan failure causes there to be an insufficient number of main fans.
- A I/O fan failure causes there to be an insufficient number of I/O fans.
- Ambient temperature reaches an OVERTEMP HIGH condition.
- The front panel power switch is turned OFF.
- The PE command is issued to the manageability firmware to turn off power to the server cabinet.

Updating Firmware

The following sections describe how to update firmware using either Firmware Manager (FM) or FTP.

Firmware Manager

You can update firmware by using the HP Firmware Manager (HP FM). HP FM is a set of tools for updating firmware on an Integrity or PA-RISC system. HP FM is packaged with firmware and distributed through the web.

HP FM provides two methods of updating firmware. The method to use depends on whether or not the operating system is running on the system:

- HP OS-Initiated Firmware Manager (HP OSIFM) – Use HP OSIFM if the HP-UX, Linux, or Windows operating system is running on the system. HP OSIFM provides a firmware package in a patch or product file for HP-UX and a Smart Component for Windows and Linux. You download the patch, product, or Smart Component to a system, and then use the operating system to update the firmware.
- HP Offline Firmware Manager (HP OFM) – Use HP OFM if the operating system is not running on the system, or to update the firmware for a device in the boot path. HP OFM provides a firmware package as an .ISO image that you download to a system to create a CD. You then use the CD to boot the system and update the firmware. HP OFM is available only for Integrity systems.

Using FTP to Update Firmware

The following section contains instructions for using FTP to update firmware.

- The user logs into the server console through the LAN, local serial, or remote serial locations.

- The user gives the FW command to start the firmware update.

  NOTE: The LAN configuration for the server must be set for the FTP connection to function correctly regardless of whether the console LAN, local serial, or other connection is used to issue the FW command.

FW – Firmware Update

- Access Level: Administrator

- Scope: Complex

- Description: This command prompts the user for the location of the firmware software and the FLASH handle (from a list) which represents all upgradeable entities.

Figure 57 illustrates the output and questions requiring responses. Once the user replies **Y** to the confirmation request, the firmware update makes the connection to the FTP server at the IP address given using the user and password details supplied. The appropriate files will be downloaded and burned into the selected Flash memories. Note that the firmware update validates the image to determine that the image name supplied is that of a valid image type prior to burning the image into the Flash memory.

△ **CAUTION:**   Instructions for updating the firmware are contained in the firmware release notes for each version of firmware. The procedure should be followed exactly for each firmware update otherwise the system could be left in an unbootable state. Figure 57 should not be used as an upgrade procedure and is provided only as an example.

Figure 57 Firmware Update Command Sample

```
[metro-s] MP> fw


              Welcome to the Firmware Update Utility

              (Use <Ctrl-b> to return to main menu.)



Current Server Settings:
   Server               : 15.11.130.234
   FW Source Directory : kmix_pa_2.1D
   User Name            : fwupdate

Update firmware from this source? ([Y]/N) y

Enter password:    ERROR: Cannot connect to server!

Current Server Settings:
   Server               : 15.11.130.234
   FW Source Directory : kmix_pa_2.1D
   User Name            : fwupdate

Update firmware from this source? ([Y]/N)

Enter password:    ERROR: Cannot connect to server!

Current Server Settings:
   Server               : 15.11.130.234
   FW Source Directory : kmix_pa_2.1D
   User Name            : fwupdate

Update firmware from this source? ([Y]/N) q
```

Possible Error Messages

- Could not ping host
- Could not validate CRC of packet
- Could not find firmware update
- Invalid password

PDC Code CRU Reporting

The processor dependent code (PDC) interface defines the locations for the CRUs. These locations are denoted in the following figures to aid in physically locating the CRU when the diagnostics point to a specific CRU that has failed or may be failing in the near future.

Figure 58 Server Cabinet CRUs (Front View)
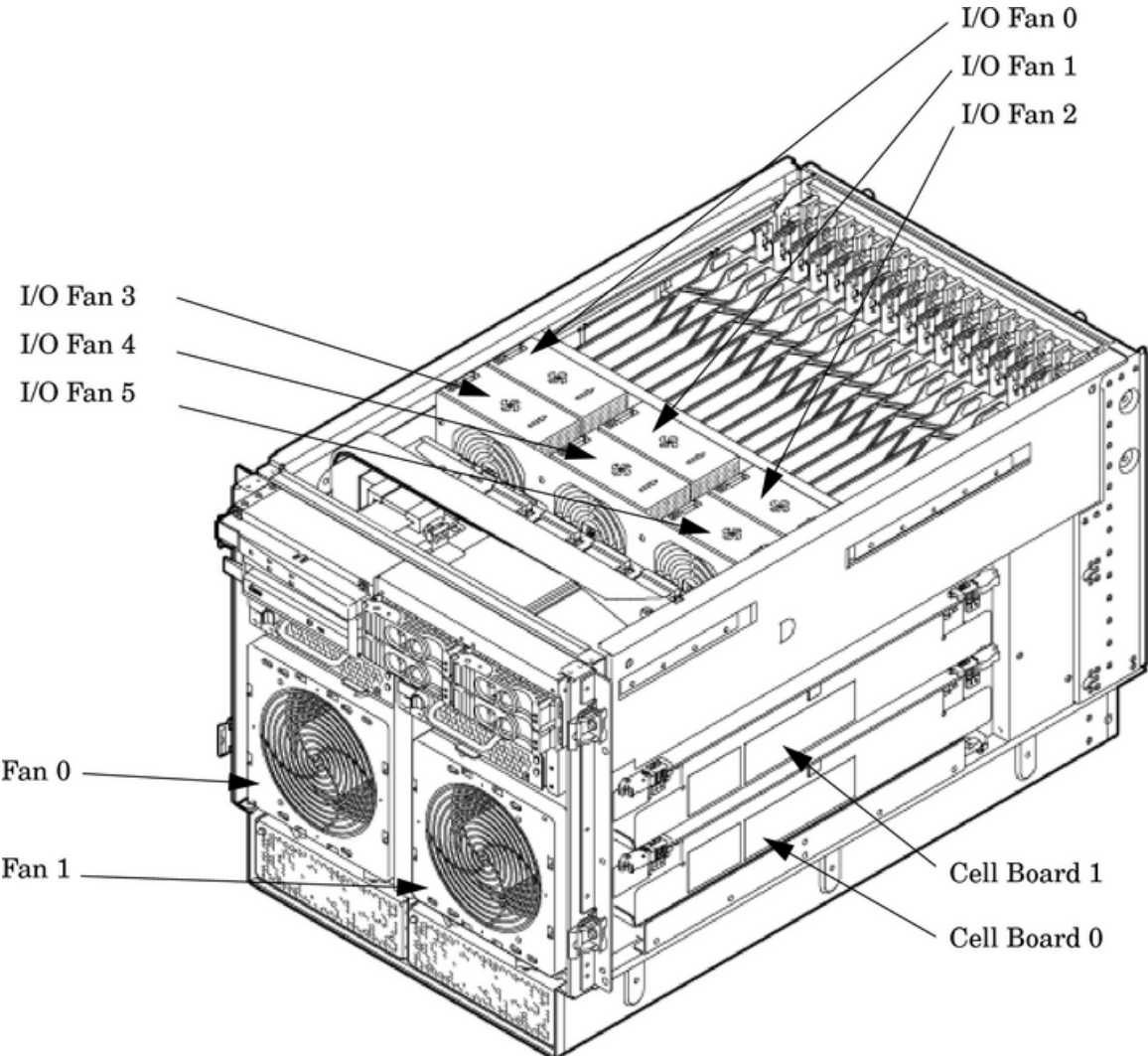
Figure 59 Server Cabinet CRUs (Rear View)
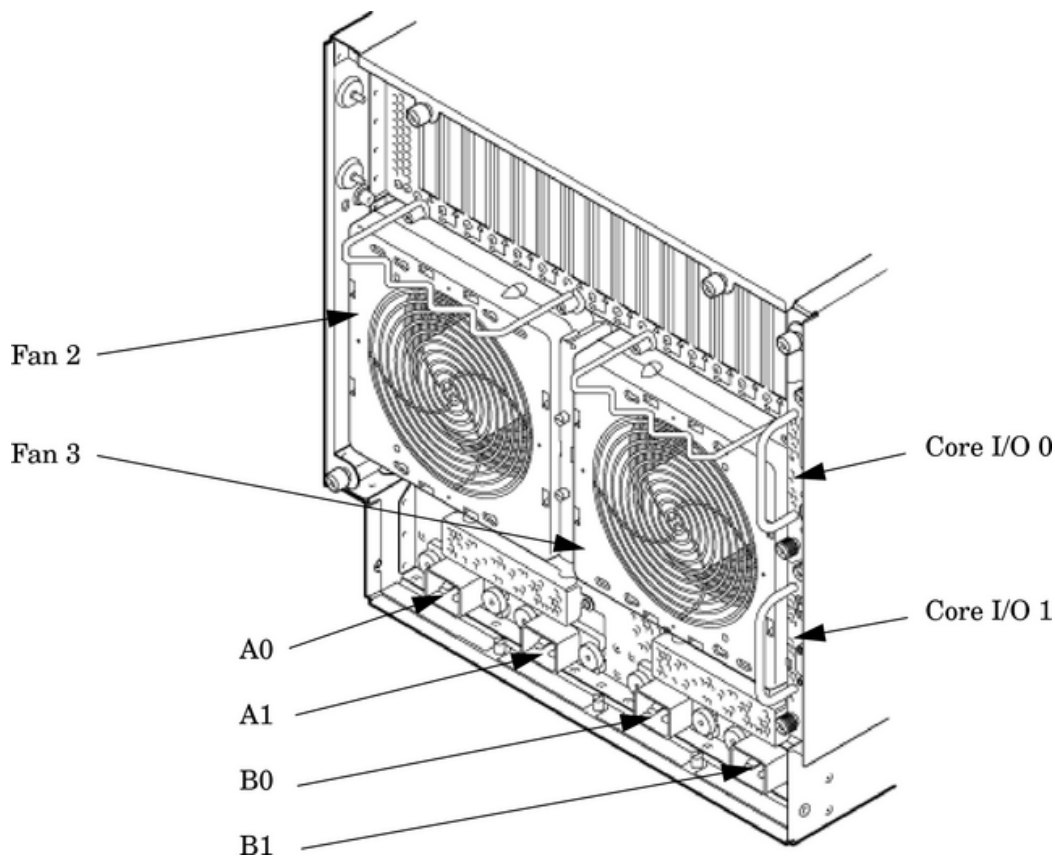
Verifying Cell Board Insertion

Cell Board Extraction Levers

It is important that both extraction levers on the cell board be in the locked position. Both levers must be locked for the cell board to power up and function properly.

Power to the cell board should only be removed using the MP:CM>**PE** command or by shutting down the partition or server. Therefore, if the levers become unlocked, the partition will not have a chance to logically shut down, and damage could occur to the operating system.

If the cell board is powered on and one lever becomes unlocked, the cell board will stay powered on. However, if the cell board is powered off, it will not power on again until both levers are in the locked position.

The lever status can be determined by issuing the MP:CM>**DE** command and viewing the power status of the cell board controller (PDHC). The "ready" bit will only be true when both levers are locked and all VRMs are installed. This status can be used to determine if both levers are locked and the cell board is properly installed in the chassis. See Figure 60 (page 124) for a sample of the output.

If the state is "RDY" denoted by capital letters in the computer output then the "ready bit" is true. If the state is "rdy" as denoted by lower case letters in the computer output then the "ready bit" is false. See Table 30 for details.

Table 30 Ready Bit States

Ready Bit State	MP:CM> DE Command Power Status	Meaning
True	"RDY" (denoted by upper case letters)	All cell VRMs are installed and both cell latches are locked.
False	"rdy" (denoted by lower case letters)	One or more VRMs are not installed or failed and/or one or more cell latches are not locked.

Figure 60 de Command Output

```
MP:CM> de

Display summary status of the selected MP device.

      B - BPS   (Bulk Power Supplies)
      U - CLU   (Cabinet Utilities: Fans, Intrusion, Clock's etc.)
      A - PACI  (Partition Console Interface)
      G - MP    (Management Processor)
      P - PM    (Power Management)
      H - Cell Board Controller (PDHC)
          Select device: h
      Enter cell number: 1

Cell Controller (PDHC) status. Cell 1
FW Revision  : 3.006 built FRI AUG 15 12:01:54 2003
MICE Revision : 1.0

PDHC state      : 0x3b (err bib SMG CGO cci I2C PWR)
Attention Led is off

Power Status : 0x7c (12USTBY (RDY) EN PWR vflt tflt fanflt)

LED State    : 0x0e (BIB SMG I2C heartbeat)

IO Connection Status     : 0x01 (Connection OK)
IO Chassis Phys Location : 0x01 (cabinet=0, PCI Backplane=0, PCI Domain=1)
Core Cell Number         : 0x81 (cabinet=0, cell=1, Valid)

Temp Fault Status : 0x00 (cpu0 cpu1 cpu2 cpu3 mmu cell)
CPU 0 Temp                : 47   deg C
CPU 1 Temp                : 0    deg C
CPU 2 Temp                : 59   deg C
CPU 3 Temp                : 0    deg C
MMU Temp                  : 30   deg C
Cell Board Temp           : 28   deg C

Fan Status                : 0x00cc (See PS command for detail)
Local I2C Bus Status      : 0x00 (OK)

MP:CM>
```

Ready Bit (RDY) is set to true

6 Removing and Replacing Components

This chapter provides a detailed description of the server field replaceable unit (CRU) removal and replacement procedures. The sections contained in this chapter are:

Customer Replaceable Units (CRUs)

The following section lists the different types of CRUs the server supports.

Hot-plug CRUs

A CRU is defined as hot-plug if it can be removed from the chassis while the system remains operational, but requires software intervention prior to removing the CRU.

The following are remove and replace procedures for hot-plug CRUs:

- Removing and Replacing a Disk Drive
- Removing and Replacing a Slimline DVD Drive
- Removing and Replacing a Dual Slimline DVD Carrier
- Removing and Replacing a PCI/PCI-X Card

Hot-Swap CRUs

A CRU is hot-swap if it can be removed from the chassis while the server remains operational and requires no software intervention before it is removed.

The following list identifies procedures for removing and replacing the hot-swap CRUs in the aerver:

- Removing and Replacing a Front Smart Fan Assembly
- Removing and Replacing a Rear Smart Fan Assembly
- Removing and Replacing a PCI Smart Fan Assembly
- Removing and Replacing a Bulk Power Supply
- Removing and Replacing the PCI Power Supply
- Removing and Replacing the System Clock

Other CRUs

To remove and replace the CRUs that are neither hot-plug nor hot-swap, you must shut down HP-UX in the nPartition where the CRU resides and turn off power to the CRU before removing it. See "Powering Off Hardware Components and Powering On the Server" (page 126) and Chapter 4 "Operating System Boot and Shutdown" for complete instructions.

Procedures for these CRUs include:

- Removing and Replacing a Half-Height DVD/DAT Drive
- Removing and Replacing PCA Front Panel Board
- Removing and Replacing a PCI-X Power Supply

Safety and Environmental Considerations

⚠ **WARNING!**   Before proceeding with any installation, maintenance, or service on a system that requires physical contact with electrical or electronic components, be sure that either power is removed or safety precautions are followed to protect against electric shock and equipment damage. Observe all WARNING and CAUTION labels on equipment. All installation and service work must be done by qualified personnel.

Communications Interference

HP system compliance tests are conducted with HP supported peripheral devices and shielded cables, such as those received with the system. The system meets interference requirements of all countries in which it is sold. These requirements provide reasonable protection against interference with radio and television communications.

Installing and using the system in strict accordance with HP's instructions minimizes the chances that the system will cause radio or television interference. However, HP does not guarantee that the system will not interfere with radio and television reception.

Take these precautions:

- Use only shielded cables.

- Install and route the cables according to the instructions provided.

- Ensure that all cable connector screws are firmly tightened.

- Use only HP supported peripheral devices.

- Ensure that all panels and cover plates are in place and secure before system operation.

Electrostatic Discharge

HP systems and peripherals contain assemblies and components that are sensitive to electrostatic discharge (ESD). Carefully observe the precautions and recommended procedures in this document to prevent component damage from static electricity.

Take these precautions:

- Prepare an ESD safe work surface large enough to accommodate the various assemblies handled during the upgrade. Use a grounding mat and an anti-static wrist strap, such as those included in the ESD Field Service Kit (9300-1609).

- The anti-static bag can not function as a static dissipating mat. Do not use the anti-static bag for any other purpose than to enclose a product.

- Treat all assemblies, components, and interface connections as static-sensitive.

- When unpacking cards, interfaces, and other accessories that are packaged separately from the system, keep the accessories in the conductive plastic bags until you are ready to install them.

- Avoid working in carpeted areas, and keep body movement to a minimum while installing accessories.

Powering Off Hardware Components and Powering On the Server

When you remove and replace hardware, you might need to power off hardware components as part of the remove and replace procedure.

This section gives details on how to power the hardware components off and on.

Powering Off Hardware Components

To power off individual components or the entire cabinet:

1. Log in to the management processor (MP) of the server.
2. If the component you will power off is assigned to an nPartition, then use the Virtual Front Panel (VFP) to view the current boot state of the nPartition.

   Shut down HP-UX on the nPartition before you power off any of the hardware assigned to the nPartition. See Chapter 4 "Operating System Boot and Shutdown."

   When you are certain the nPartition is not running HP-UX, you can power off components that belong to the nPartition.

See Chapter 4 "Operating System Boot and Shutdown" for details on determining the nPartition boot state and shutting down HP-UX.

3. Access the MP Command menu.

   From the MP Main menu, enter CM to access the Command Menu.

4. Use the MP Command Menu `PS` command to check details about the hardware component you plan to power off.

   The `PS` command enables you to check the status of the cabinet, system backplane, MP core I/O, PCI power domains—or bricks—in the I/O card cage and cells.

5. Use the MP Command Menu `PE` command to power off the hardware component.

   Using the `PE` command, you can power on or off the cabinet (including all cells and I/O in the cabinet), individual cells along with their associated I/O domain, or PCI power domains (bricks).

   Using the Command menu `PE` command to manage cabinet power is equivalent to using the front panel power switch.

6. To disable *all power* in the entire cabinet, disconnect all power cords to disable all housekeeping power.

   ⓘ **IMPORTANT:** Because of power redundancy capabilities, it is important to plug each power cord into its proper receptacle. Label each power cord to indicate its correct receptacle.

   ⚠ **WARNING!** Ensure that the cabinet power has been turned off before disconnecting any power cords.

7. Perform the hardware removal and replacement procedure for the powered off component.

Powering On the System

To power on the system after a repair:

1. If needed, reconnect all power cords to the appropriate receptacles and power on the system.
2. Use the MP Command Menu `PE` command to power on the hardware component that was powered off and replaced.
3. Use the `PS` command to verify that power is enabled to the newly replaced part. For example: Enter **C** from within the `PS` command to select cell.

   If power is absent from the part, enter the `PE` command and select **T** to power on the entire cabinet.

   NOTE: You may need to allow time for some components to complete power on self test (POST) before a complete status is available.

4. Reboot each nPartition. See Chapter 4 "Operating System Boot and Shutdown."
5. Verify system functionality by using the Online Diagnostic Support Tools Manager (STM) exerciser.

Removing and Replacing the Top Cover

It is necessary to remove and replace one or more of the covers to access the components within the server chassis.

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

Figure 61 Top Cover
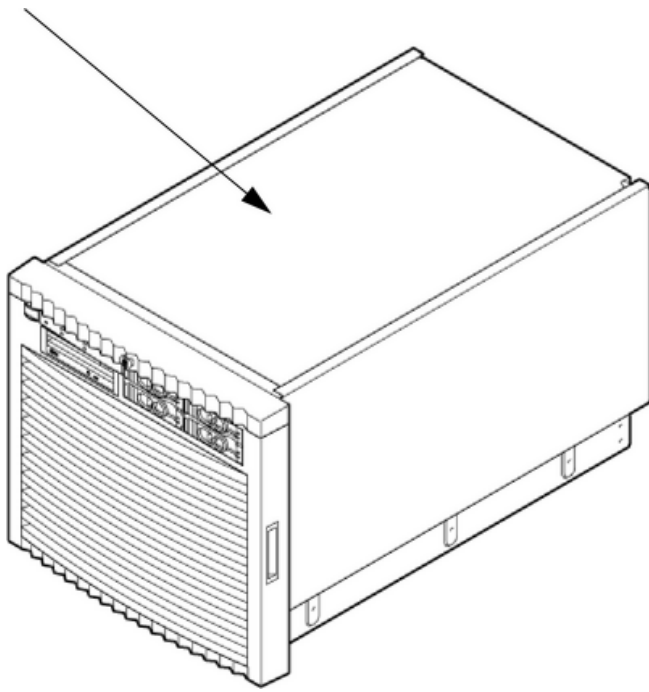
Removing the Top Cover

Figure 62 Top Cover Retaining Screws
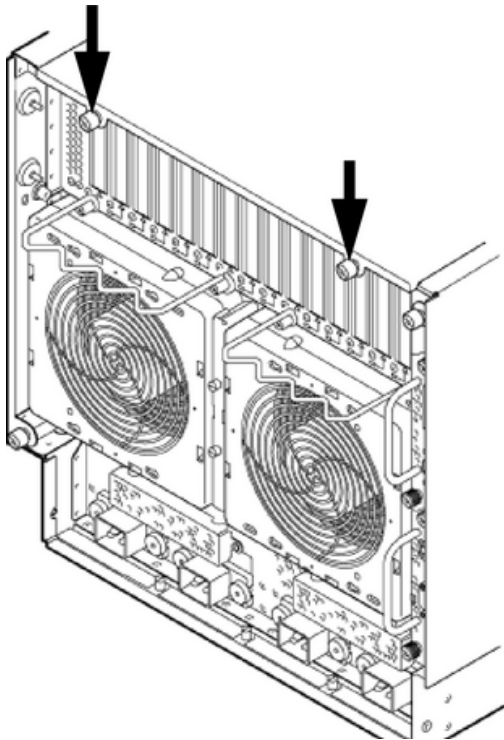
1. Connect to ground with a wrist strap and grounding mat. See "Electrostatic Discharge " (page 126) for more information.
2. Loosen the retaining screws securing the cover to the rear of the chassis.
3. Slide the cover toward the rear of the chassis.
4. Lift the cover up and away from the chassis.

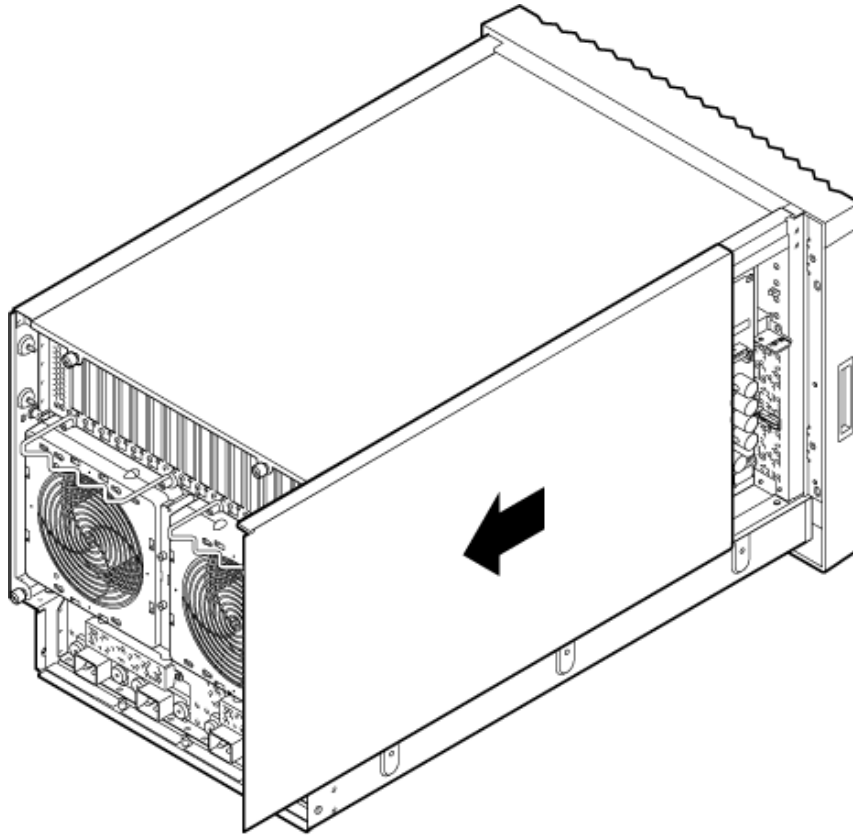## Replacing the Top Cover

1. Orient the cover on the top of the chassis.

   NOTE: Carefully seat the cover to avoid damage to the intrusion switch.
   ---

2. Slide the cover into position using a slow firm pressure to properly seat the cover.
3. Tighten the retaining screws to secure the cover to the chassis.

Removing and Replacing a Side Cover

It is necessary to remove and replace one or both of the side covers to access the components within the server chassis.

Figure 63 Side Cover Locations
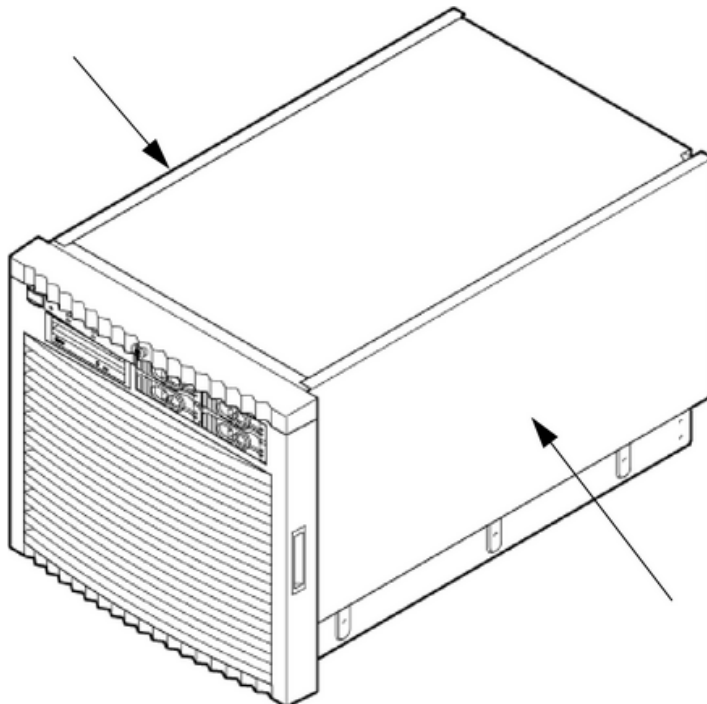
Removing a Side Cover

Figure 64 Side Cover Retaining Screws
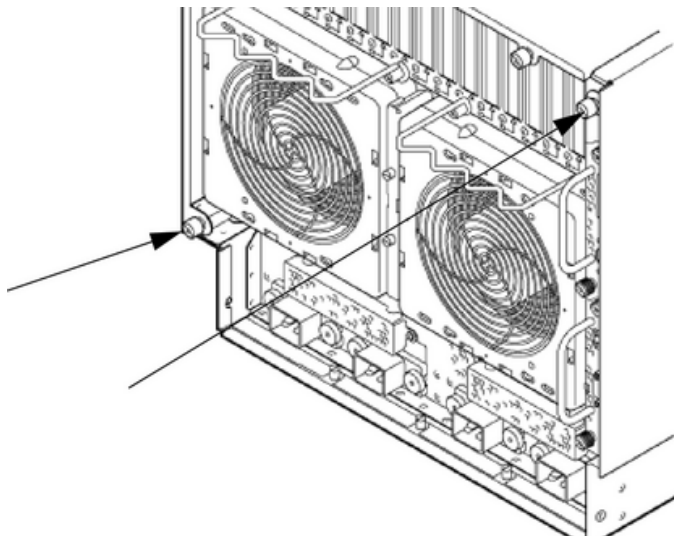
1. Connect to ground with a wrist strap and grounding mat. See "Electrostatic Discharge " (page 126) for more information.
2. Loosen the retaining screw securing the cover to the rear of the chassis.
3. Slide the cover toward the rear of the chassis; then rotate outward and remove from chassis.

Figure 65 Side Cover Removal Detail

Replacing a Side Cover

1. Slide the cover in position.
2. The cover easily slides into position. Use a slow firm pressure to properly seat the cover.
3. Tighten the retaining screw to secure the cover to the chassis.

Removing and Replacing the Front Bezel

Figure 66 Bezel hand slots

Grasp here
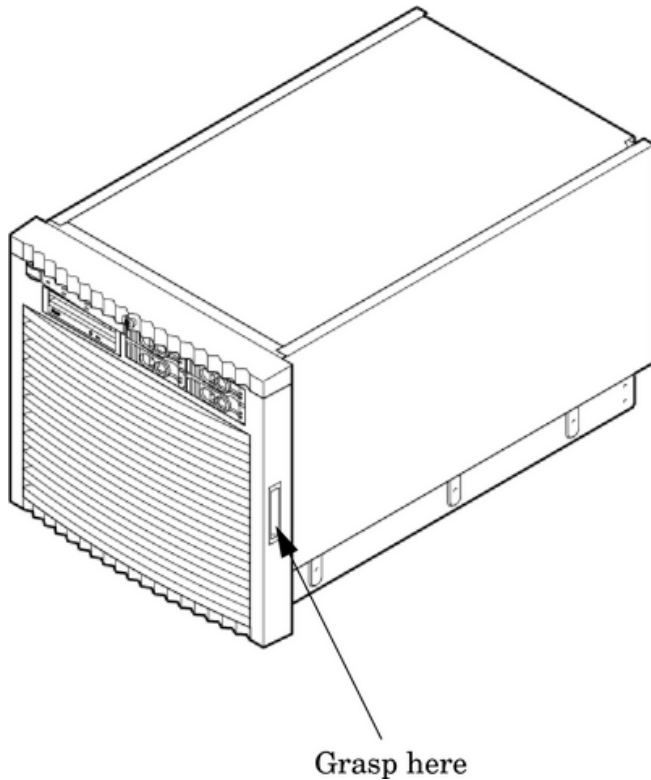
Removing the Front Bezel

- From the front of the server, grasp both sides of the bezel and pull firmly toward you. The catches will release and the bezel will pull free.

Replacing the Front Bezel

- From the front of the server, grasp both sides of the bezel and push toward the server. The catches will secure the bezel to the chassis.

Removing and Replacing PCA Front Panel Board

The front panel board is located in the front of the chassis. All system power must be removed before attempting to remove or replace this component.

Figure 67 Front Panel Assembly Location

Front Panel Board
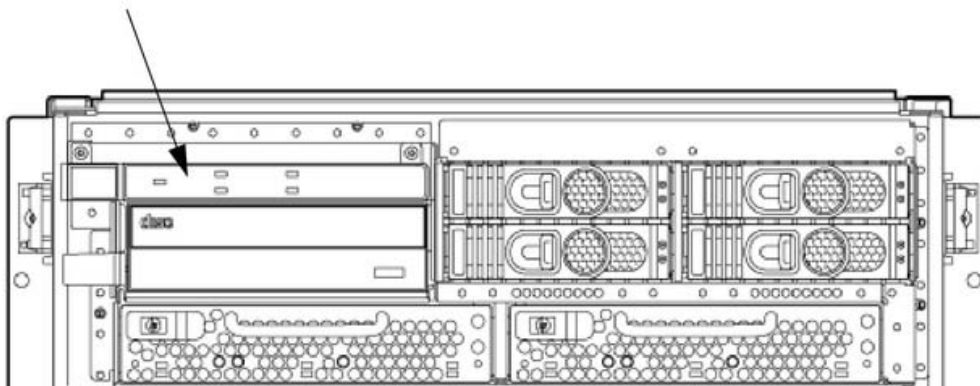
Removing the PCA Front Panel Board

1. Remove the front bezel and the top and left side covers.
2. Follow proper procedures to power off the server.
3. Disconnect the SCSI cables from MSBP and move them out of the way.

    This helps provide access to the common tray cage cover.
4. Disconnect the DVD power cable from the mass storage backplane. (
5. Disconnect the front panel cable from the system backplane. (Figure 68).
6. Unscrew the captive fastener on the common tray cage cover.
7. Apply firm pressure to slide the common tray cage cover to the rear, then lift. Place the cable as far back as possible to gain clear access to the front panel.
8. Remove the front panel bezel by removing the two screws. After the screws are removed, press the tab in the center of the bezel to release the bezel.
9. Remove the two screws revealed upon removing the bezel.
10. Place your left hand under the sheet metal wall that acts as a handle, and simultaneously, gently lift the handle upward and pull on the cable. This action disengages the tabs on the PCA front panel from the slots on the common tray cage
11. Gently pull the cable and handle toward the rear of the chassis until the steel power button that was initially protruding though the chassis clears the hole.
12. Rotate the top edge of the board toward you about 30 degrees by lifting on the handle with your left hand.
13. Angle the board such that the right side with the cable moves away from you and the opposite side with the power connector moves towards you.

    Ensure that the power switch does not get stuck in one of the many holes in the front of the chassis. This rotation is best accomplished by gently pulling the cable with your right hand toward the rear of the cabinet.
14. Remove the cable end of the board first by gently pulling the cable with your right hand and adjusting the angle of the board with your left hand.

    After the first tab on the board is outside the cavity, removal should proceed easily.

Figure 68 Front Panel Board Detail
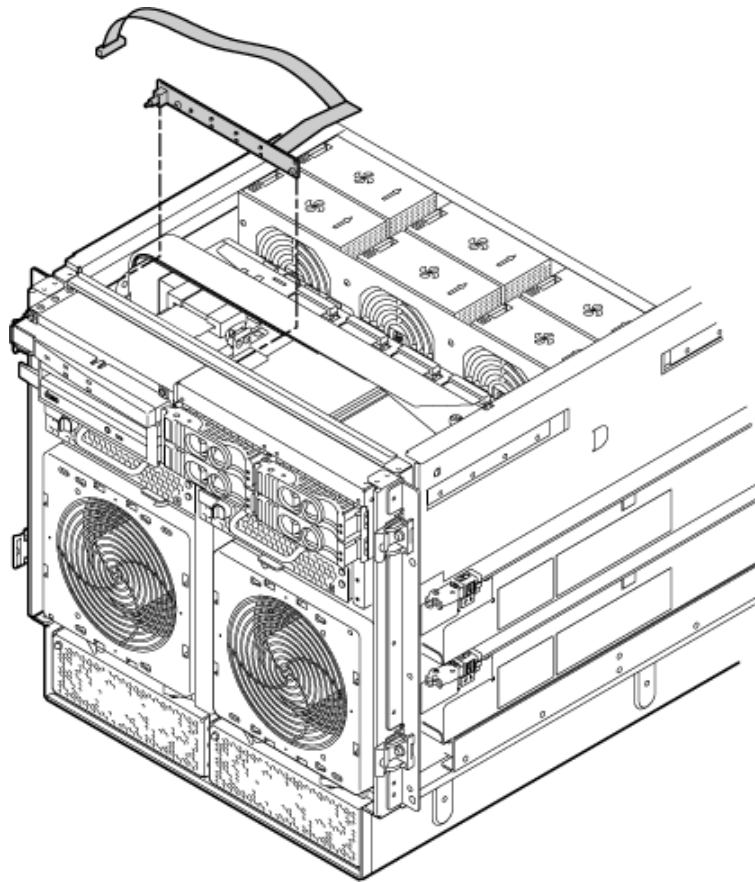
Replacing the Front Panel Board

1. Slide the front panel into its slot from inside the server.
2. Insert the left side of the board into the slot first; the right side of the board is angled toward the rear of the chassis. Insert the right side of the board.

   Ensure that the power switch does not get caught in one of the many holes in the front of the chassis. Push the panel forward until the lock tabs click.
3. Attach the front panel bezel. Align the light pipes with the slots in the chassis and push toward the rear of the chassis, then press the tab in the center of the bezel to snap it into place.
4. Tighten the two screws to secure the fron panel bezel to the chassis.
5. Replace the common tray cage cover.
6. Tighten the captive fastener on the common tray cage cover.
7. Attach the front panel cable to the system backplane.
8. Attach the DVD power cable.
9. Attach the SCSI cables to the MSBP.
10. Replace the front bezel and the top and left side covers.
11. Follow proper procedures to power on the server.

Figure 69 Front Panel Board Cable Location on Backplane

Front Panel Board
Connector

System Backplane
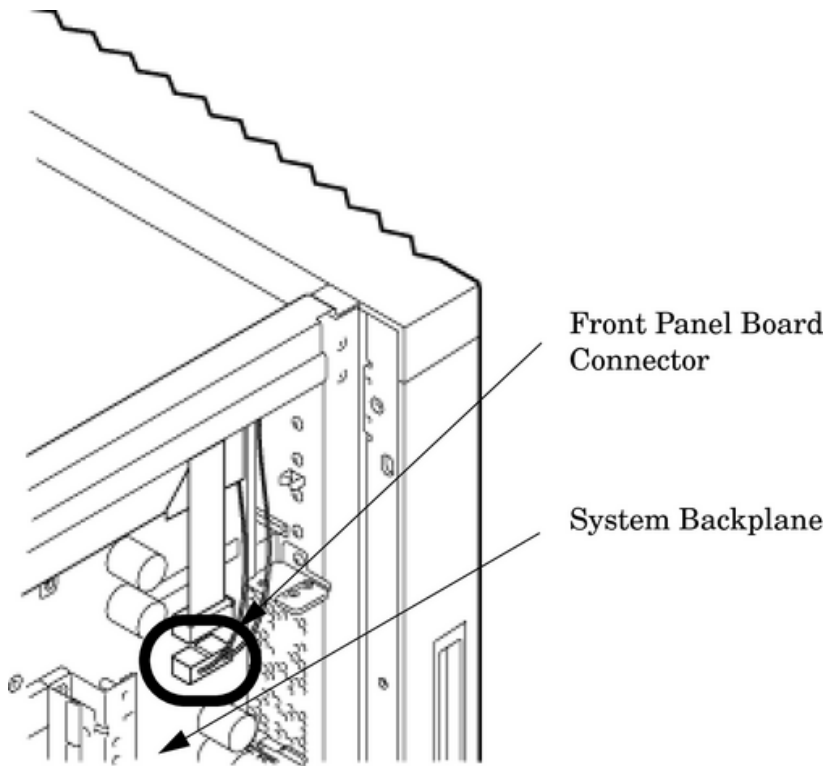
Removing and Replacing a Front Smart Fan Assembly

The Front Smart Fan Assembly is located in the front of the chassis. The fan assembly is a hot swappable component.

△ **CAUTION:** Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.
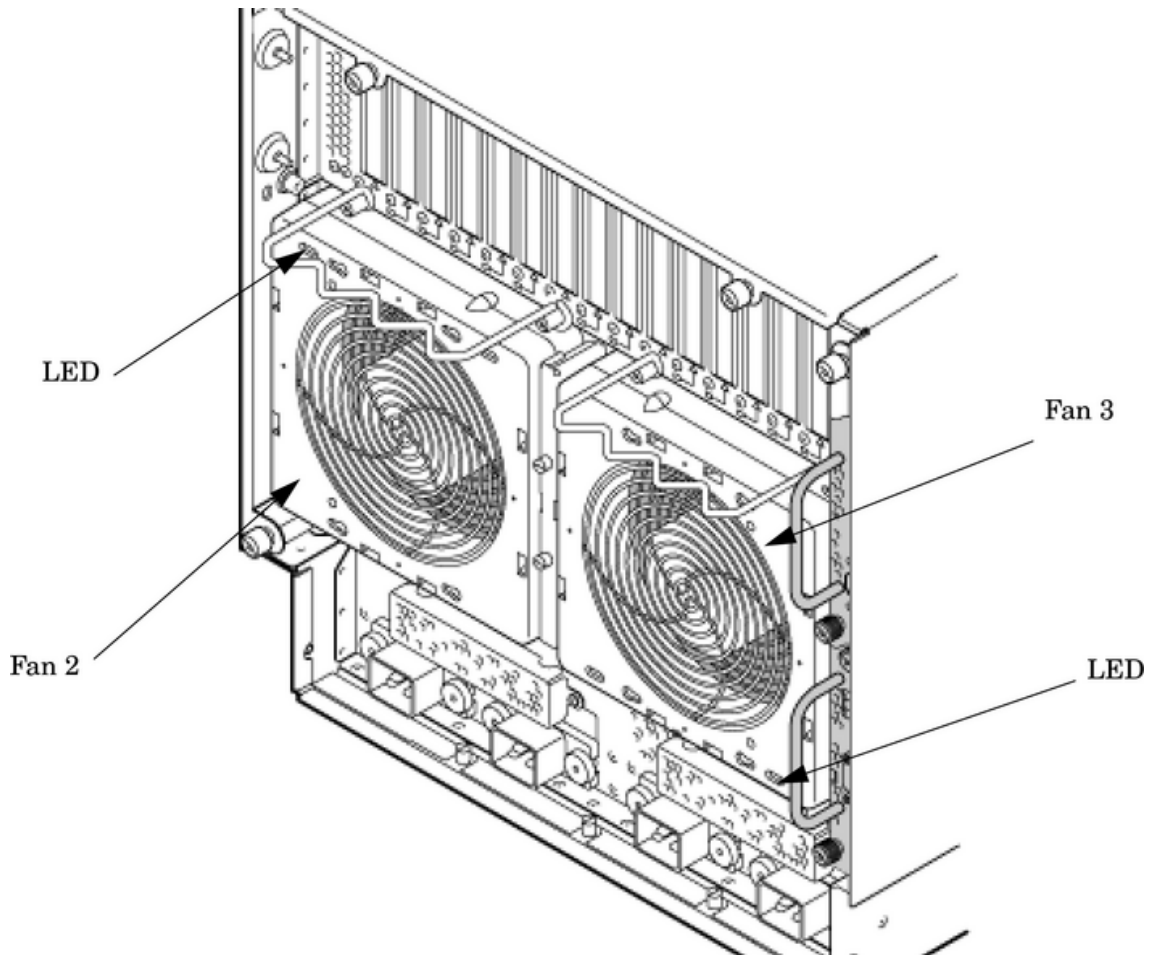
Figure 70 Front Smart Fan Assembly Locations
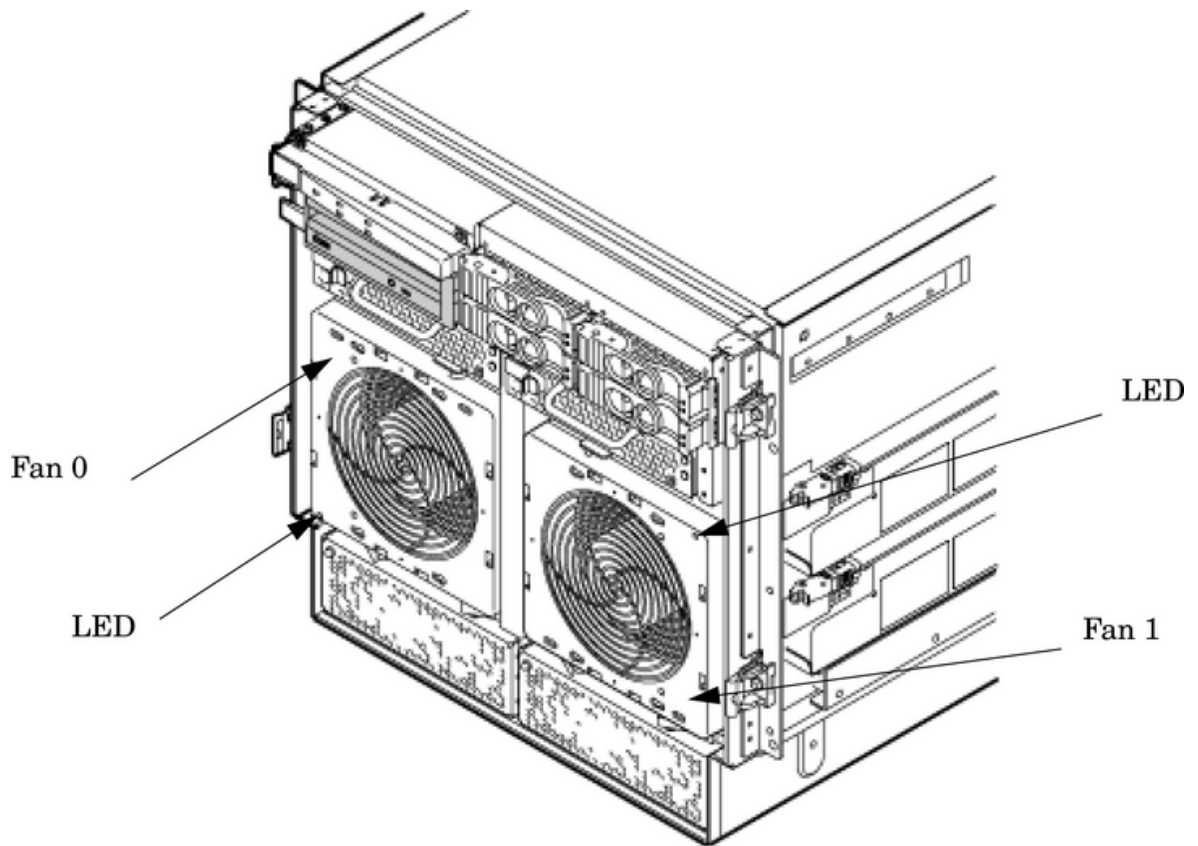
Table 31 Front Smart Fan Assembly LED Indications

LED State	Meaning
On Green	Fan is at speed and in sync or not at speed less than six seconds
Flashing Yellow	Fan is not keeping up with speed/sync pulse for greater than six seconds
Flashing Red	Fan failed/stalled or has run slow or fast for greater than six seconds
Off	Fan is not installed or no power is applied to fan

Removing a Front Smart Fan Assembly

Figure 71 Front Fan Detail
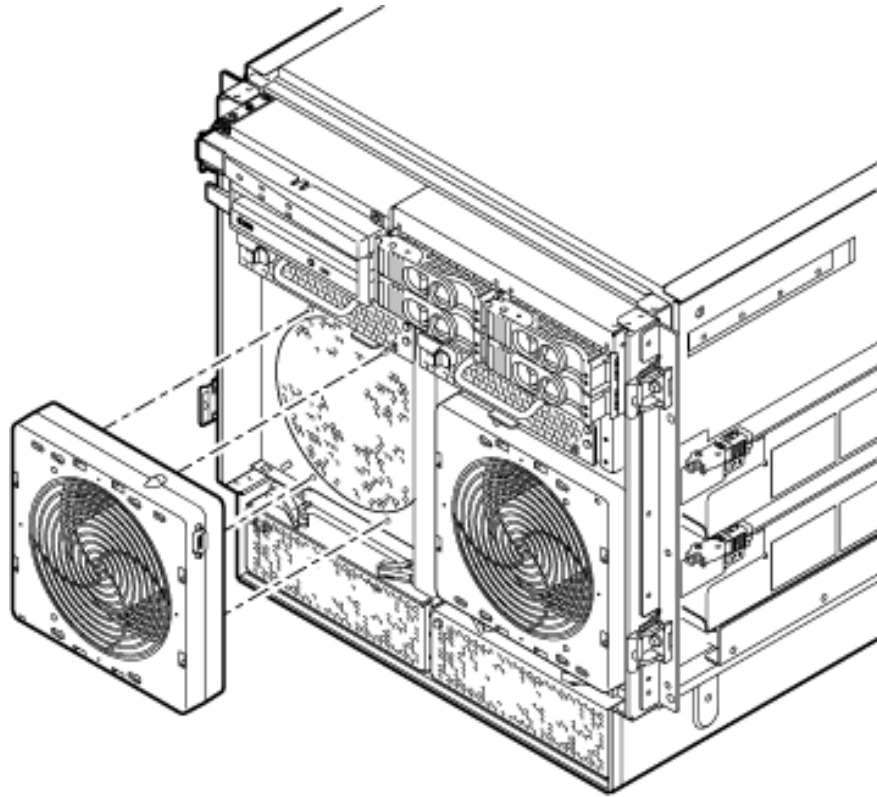
1. Remove the front bezel.
2. Pull the fan release pin upward away from the fan.
3. Slide the fan away from the connector.
4. Pull the fan away from the chassis.

Replacing a Front Smart Fan Assembly

1. Position the fan assembly on the chassis fan guide pins.
2. Slide the fan into the connector.
3. Verify that the fan release pin is in the locked position.
4. Replace the front bezel.

NOTE: The fan LED should show fan is operational (green).

Removing and Replacing a Rear Smart Fan Assembly

The Rear Smart Fan Assembly is located in the rear of the chassis. The fan assembly is a hot swappable component.

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

Figure 72 Rear Smart Fan Assembly Locations

Table 32 Rear Smart Fan Assembly LED Indications

LED State	Meaning
On Green	Fan is at speed and in sync or not at speed less than six seconds
Flashing Yellow	Fan is not keeping up with speed/sync pulse for greater than six seconds
Flashing Red	Fan failed/stalled or has run slow or fast for greater than six seconds
Off	Fan is not installed or no power is applied to fan

Removing a Rear Smart Fan Assembly

Figure 73 Rear Fan Detail
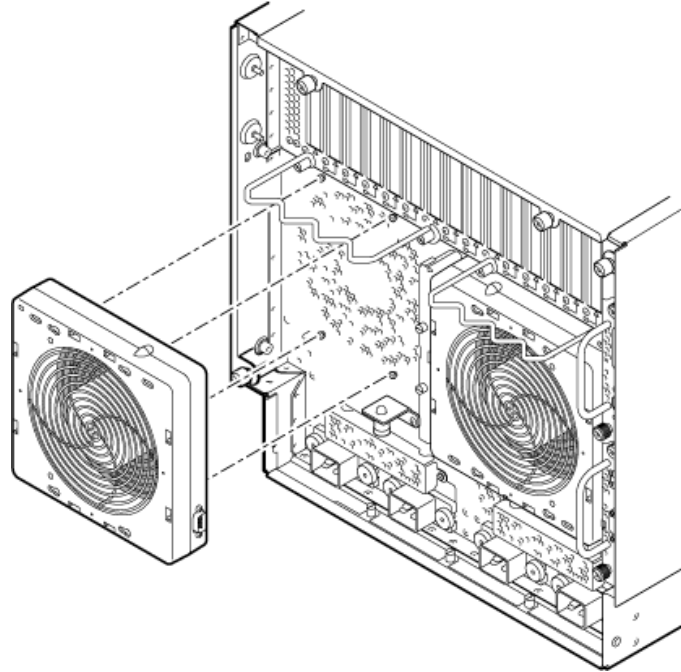
1. Pull the fan release pin upward away from the fan.
2. Slide the fan away from the connector.
3. Pull the fan away from the chassis.

Replacing a Rear Smart Fan Assembly

1. Carefully position the fan assembly on the chassis fan guide pins.
2. Slide the fan into the connector.
3. Verify that the fan release pin is in the locked position.

> **NOTE:** A green fan LED indicates the fan is operational.

Removing and Replacing a Disk Drive

The disk drives are located in the front of the chassis. The nPartition must be shut down to remove or replace the drive that serves as the boot disk, if the boot disk is not mirrored. See "Powering Off Hardware Components and Powering On the Server" (page 126) for more information. The remainder of the internal disk drives are hot-pluggable.

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

Figure 74 Disk Drive Location
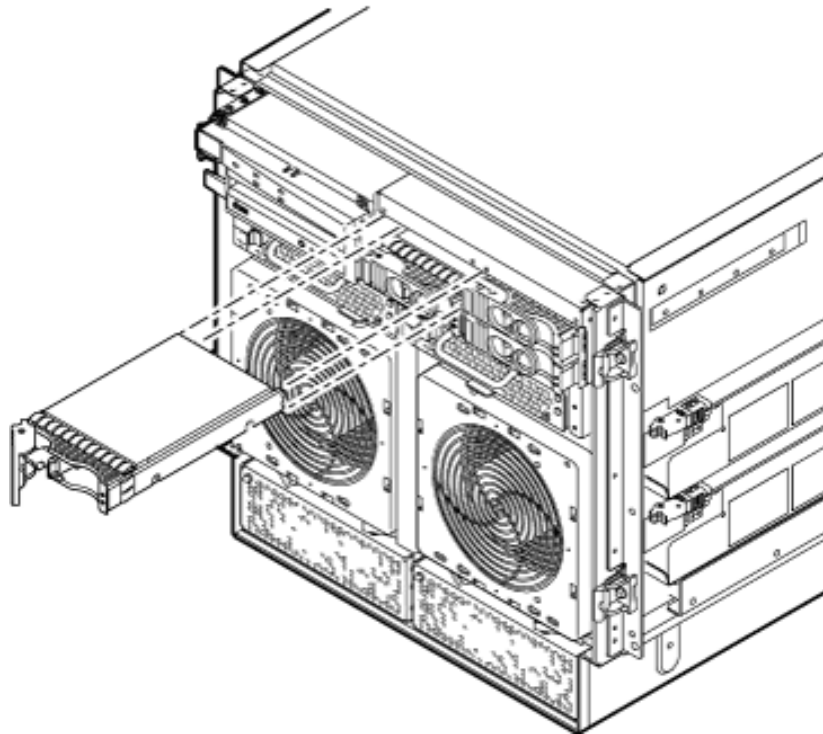
Removing a Disk Drive

Figure 75 Disk Drive Detail
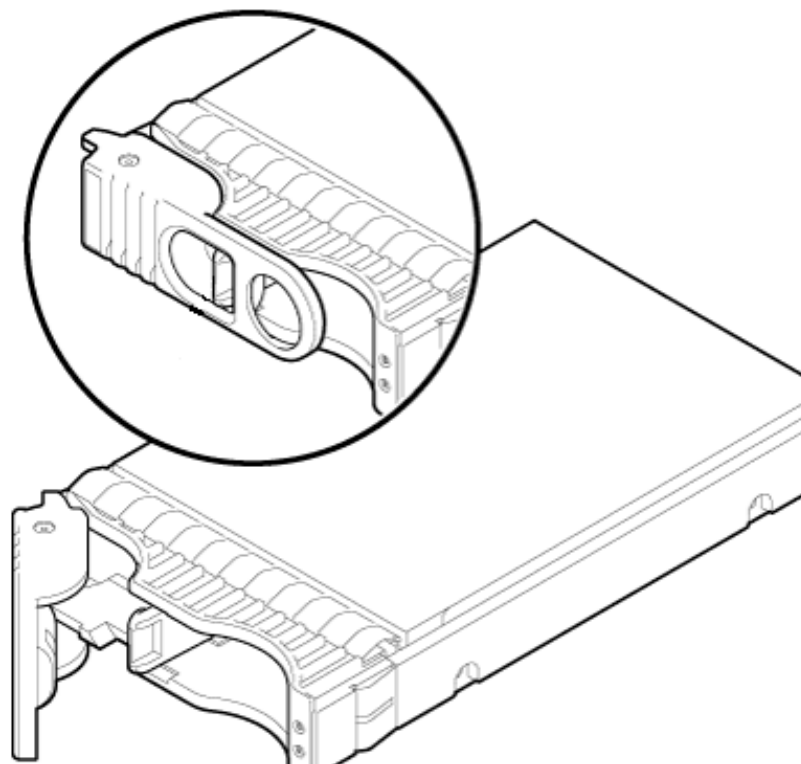
1. Disengage the front locking latch on the disk drive by pushing the release tab to the right and the latch lever to the left.
2. Pull forward on the front locking latch and carefully slide the disk drive from the chassis.

Replacing a Disk Drive

> **NOTE:** Sometimes using the `diskinfo` and `ioscan` commands will produce cached data. To resolve this, these commands should be run when the disk drive is removed.

1. Before installing the disk drive, enter the following command:

   `#diskinfo -v /dev/rdsk/cxtxdx`

2. Enter the following command:

   `#ioscan -f`

   The response message after running this command is:

   `NO_HW`

3. Be sure the front locking latch is open, then position the disk drive in the chassis.
4. Slide the disk drive into the chassis. Use a slow firm pressure to properly seat the connection.
5. Depress the front locking latch to secure the disk drive in the chassis.
6. Spin up the disk by entering one of the following commands:

   `#diskinfo -v /dev/rdsk/cxtxdx`

   `#ioscan -f`

   `#pvcreate`

   `#vgcfgrestore`

Removing and Replacing a Half-Height DVD/DAT Drive

TheDVD/DATdrive is located in the front of the chassis (Figure 76). The system power to this component must be removed before attempting to remove or replace it. See "Powering Off Hardware Components and Powering On the Server" (page 126) for more information.

△ **CAUTION:** Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.
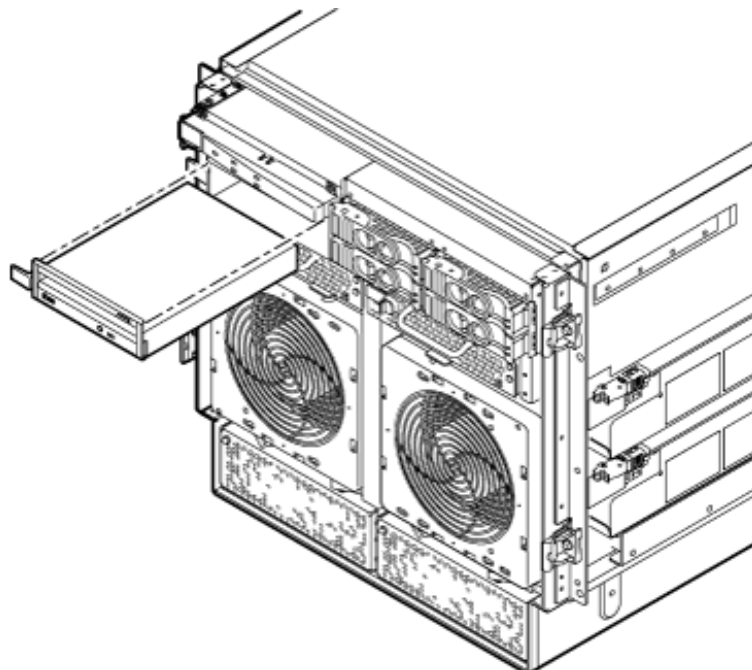
Figure 76 DVD/DAT Location
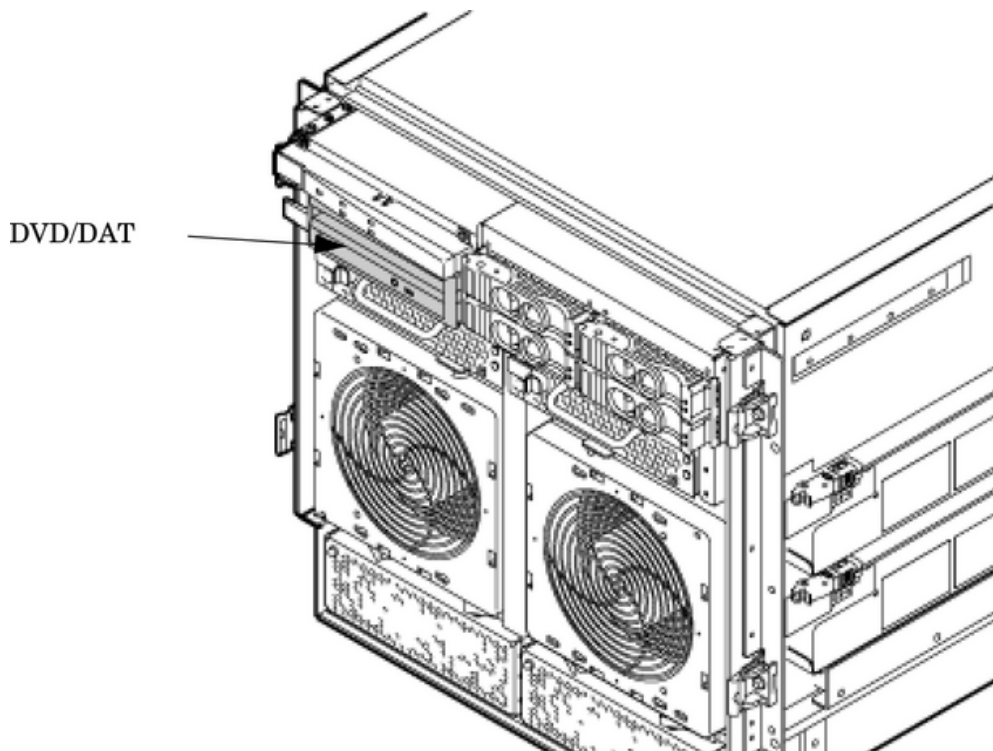
DVD/DAT

Removing a DVD/DAT Drive

1. To remove the DVD/DAT, depress the front locking latch to loosen the drive from the chassis.
2. Partially slide the drive out.
3. Disengage the cables from the rear of the DVD/DAT.
4. Remove the rails and clips from the drive.
5. Completely slide the drive from the chassis. (Figure 77).

Figure 77 DVD/DAT Detail

Installing a Half-Height DVD or DAT Drive.

> △ **CAUTION:** The following section describes precise instructions for removable media cable measurement and orientation. Failure to comply will damage drive(s), data, and power cables.

Use this section to configure and install a half-height DVD or DAT drive.

Internal DVD and DAT Devices That Are Not Supported In HP Integrity rx7640

Table 33 refers to DVD or DAT drives that are not supported in the HP Integrity rx7640 server.

Table 33 Unsupported Removable Media Devices

System	DVD Product #	DAT Product #
rp7410	A6180A—DVD Drive	A6182A—DAT40 DDS4 half-height
rp7420	AB351A—DVD+RW half-height[1]	A9878A—DAT 40GB half-height
rx7620	AB351A—DVD+RW half-height[1]	A9878A—DAT 40GB half-height

1. Product number **AB351B** is supported and supersedes the obsolete AB351A.

Removable Media Cable Configuration for a Half-height DVD or DAT Drive

Installation of the half-height DVD or DAT drive requires that only the *Top DVD/DAT* SCSI data cable and one power cable is configured into the removable media drive bay. For proper installation the power cable must run to the right of the data cable. See Figure 78.

Figure 78 Single SCSI and Power Cable in Drive Bay


The following procedure provides information on configuring the removable media drive bay cables for use with the half-height DVD or DAT drive.

1. Turn off power and remove the top cover.
2. If the cable configuration appears as shown in Figure 78 with one power cable and the *Top DVD/DAT* data cable, proceed with the installation of the drive as described in "Installing the Half-Height DVD or DAT drive" (page 144).
3. Move the SCSI cables that connect to the mass storage backplane out of the way.
4. Move the removable media data cables out of the way.
5. Remove the metal removable media bay cover.
6. Carefully unfold the *Bottom DVD* data cable at the bends marked with green and unnest from the *Top DVD/DAT* cable.
7. Locate the data cable labeled *Top DVD/DAT*. This cable must be used for a DVD or DAT drive.

8. Carefully fold the *Top DVD/DAT* data cable and insert it into the media bay. The cable must extend out of the drive bay so the black line aligns with the front of the chassis. The cable terminator remains outside of the drive bay in the top of the chassis.

9. Insert one power cable into the drive bay to the right of the data cable as shown in Figure 79. The power cable must extend out of the drive bay so the red flag on the red wire aligns with the front of the chassis. See Figure 79.

Figure 79 SCSI and Power Cable Lengths

Black Line on SCSI Data Cable

Red Cable Length Flag
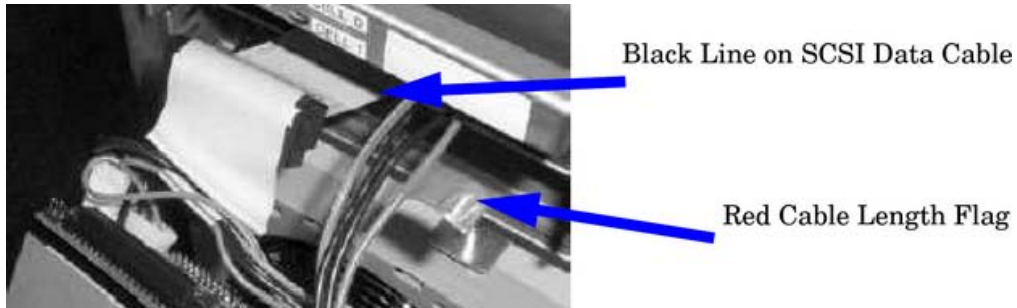
10. Carefully position the metal removable media cover over the SCSI data and power cable and fasten into place.

△ **CAUTION:** Ensure the service length of the cables remains fixed as described in steps 7 and 8 when securing the removable media cover. Failure to comply will damage the removable media drive, data, and power cables.

NOTE: The SCSI data cable end folds over the metal cover.

11. Carefully fold the *Bottom DVD* data cable at the orange lines and lay it in the server chassis. See Figure 80.

**Figure 80 SCSI and Power Cable Lengths**

Folded Bottom DVD Cable
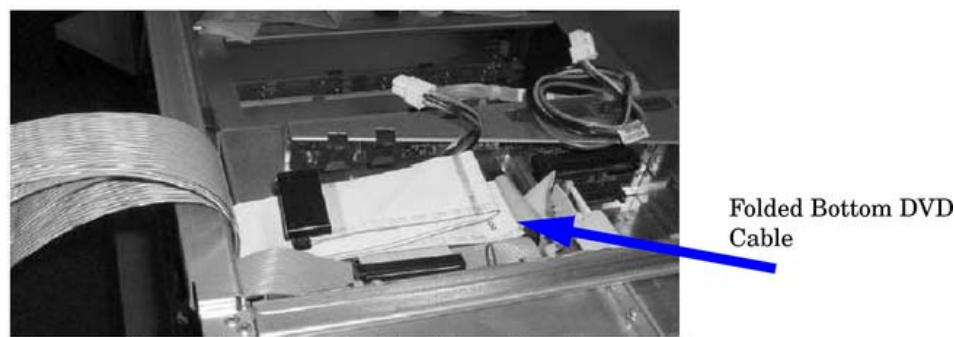
12. Connect both removable media power cables to the mass storage backplane and secure the unused power cable by coiling it.
13. Replace the top cover.
14. Connect the SCSI cables to the mass storage backplane.
15. Proceed to "Installing the Half-Height DVD or DAT drive" (page 144) for installation of the drive.

Installing the Half-Height DVD or DAT drive

1. Ensure the cables are the correct length. The black line on the SCSI cable and the red flag on the red power cable must align with the front of the front bezel. See Figure 81 .

Figure 81 SCSI and Power Cable Lengths

Black Line on SCSI Data Cable

Red Cable Length Flag
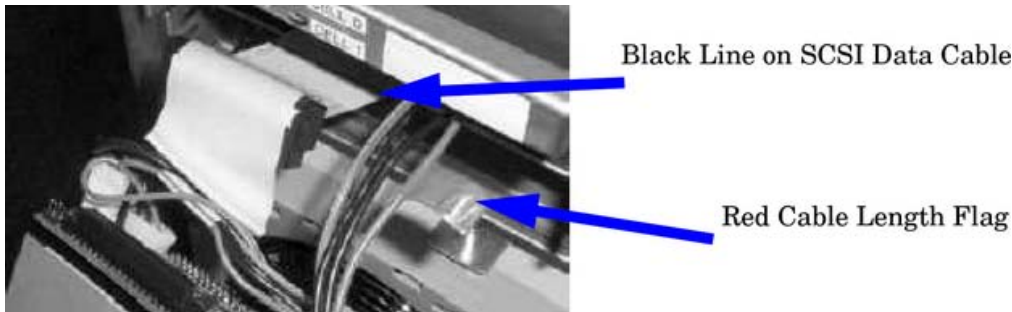
2. On the rear of the DVD drive, insert the removable media power cable through the keyed rectangular opening. See Figure 82.
3. Plug the DVD drive power cable into the removable media power cable.
4. Tightly route the yellow, two black and one red wire through the cable clip as shown in Figure 82.

Figure 82 Power Cable Connection and Routing

Removable Media Power Cable Routed Through the Cable Clip on the Back of the DVD Drive.
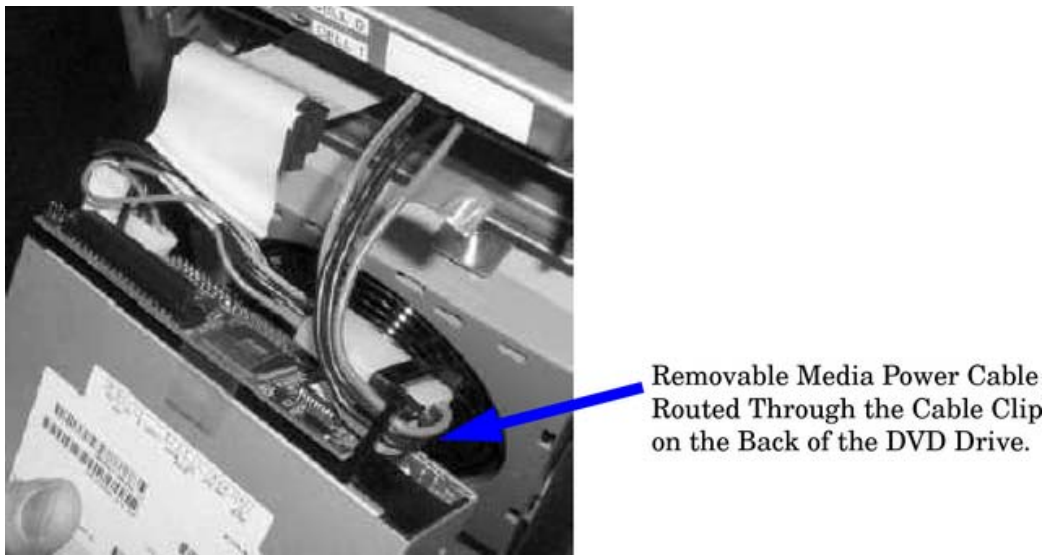
5. Connect the SCSI cable to the rear of the drive.
6. Install the left and right media rails and clips to the drive.
7. Fold the cables out of the way and slide the drive into the chassis. The drive easily slides into the chassis; however, a slow firm pressure is needed for proper seating. The front locking tab will latch to secure the drive in the chassis.

Removing and Replacing a Slimline DVD Drive

The Slimline DVD drive is located in the front of the chassis. This CRU is hot-pluggable.

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

Figure 83 DVD Drive Location
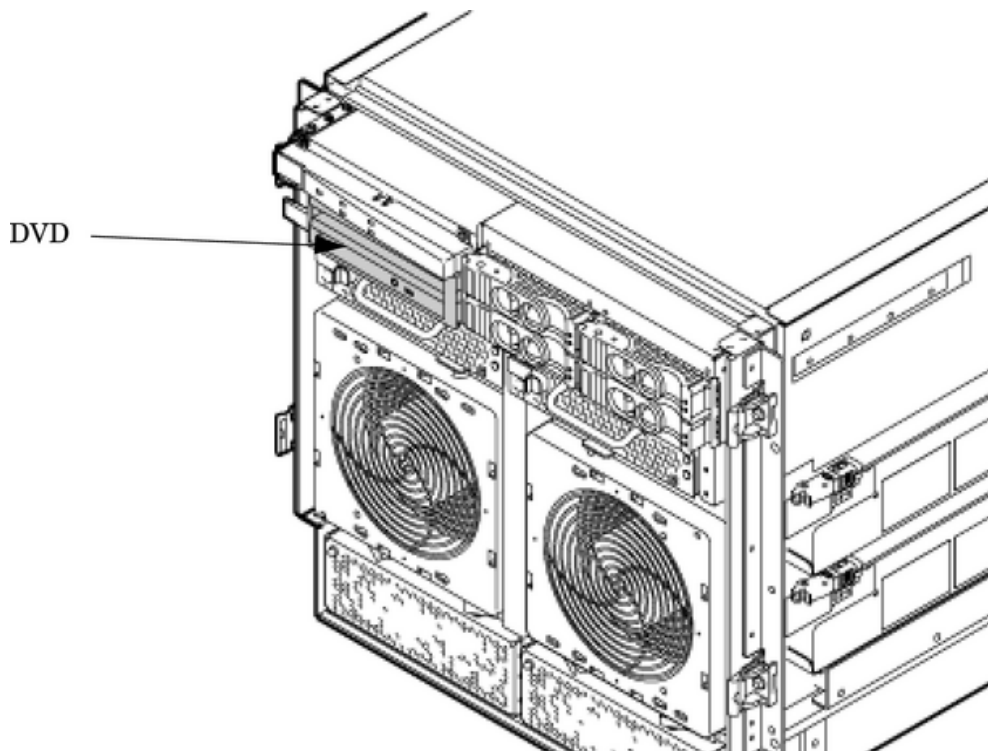
Removing a Slimline DVD Drive

1. To remove the DVD drive, press the drive release mechanism to release the drive from the drive bay.
2. Slide the drive out of the DVD carrier.

Replacing a Slimline DVD Drive

• Slide the drive into the DVD carrier until it clicks into place.

Removing and Replacing a Dual Slimline DVD Carrier

The Slimline DVD carrier is located in the front of the chassis. The system power to this component must be removed before attempting to remove or replace it. See "Powering Off Hardware Components and Powering On the Server" (page 126) for more information.

The carrier holds two Slimline DVDs. The carrier has 2 SCSI-to-IDE converter PCAs that enable the Slimline DVDs to be hot-pluggable CRUs.

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

Figure 84 Slimline DVD Carrier Location
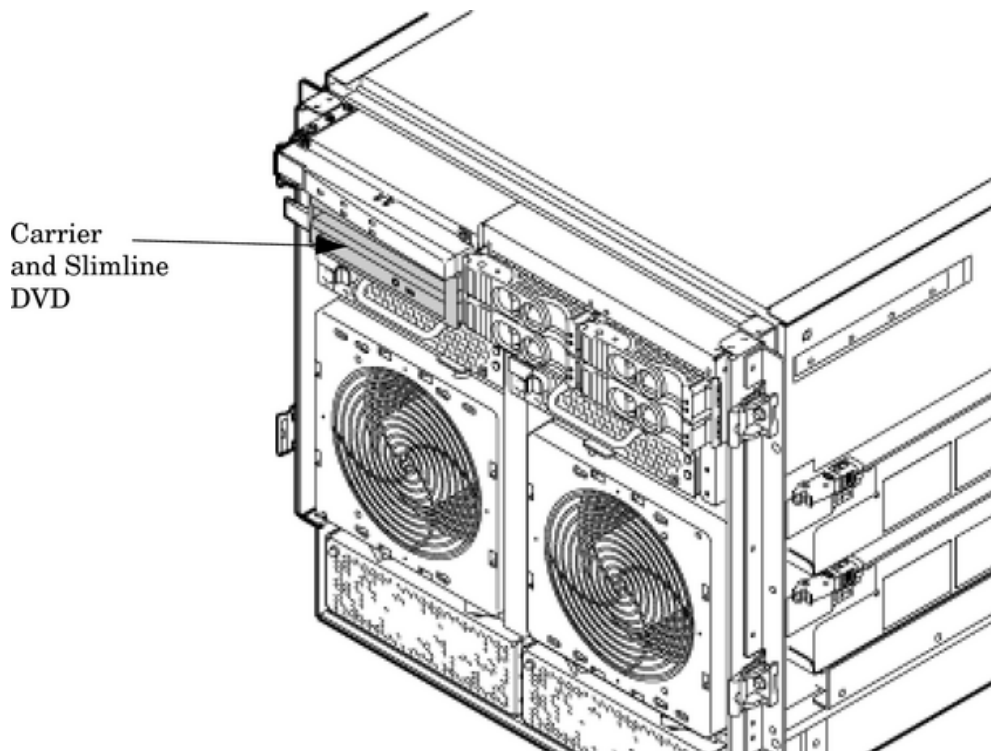
Removing a Slimline DVD Carrier

To remove the carrier, use the following procedure:
1. Depress the front locking latch to loosen the carrier from the chassis.
2. Partially slide the carrier out.
3. Disengage the cables from the rear of the carrier.
4. Completely slide the carrier from the chassis.

Installation of Two Slimline DVD+RW Drives.

The HP Integrity rx7640 server can be configured with two slimline DVD+RW drives. Installation of the slimline DVD+RW drives requires that two core IO card sets are installed in the server. When the slimline DVD+RW drives are installed, the top drive is associated with cell 1 and the bottom drive is associated with cell 0.

Installation of the slimline DVD+RW drives requires the following configuration of the data and power cables in the removable media drive bay.

Removable Media Cable Configuration for the Slimline DVD+RW Drives

Installation of the slimline DVD+RW drives requires that both SCSI data cables (*Top DVD/DAT* and *Bottom DVD*) and both power cables are installed into the removable media drive bay. For proper installation the power cables must be routed to the left of the data cables as shown in Figure 85.

Figure 85 Data and Power Cable Configuration for Slimline DVD Installation
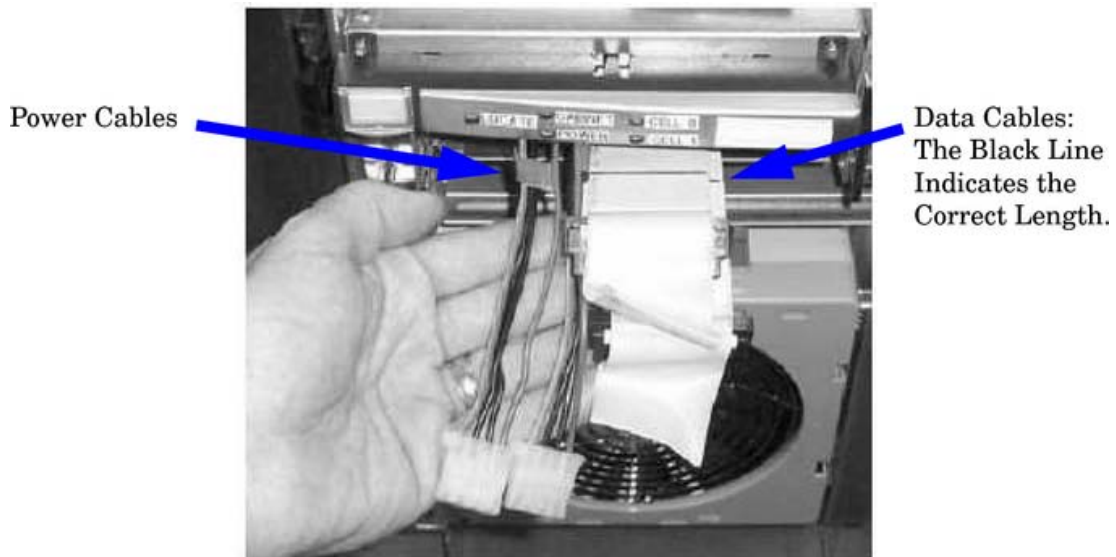
The following procedure provides information on configuring the removable media drive bay cables for use with the slimline DVD+RW drives.

1. If the cable configuration appears as shown in figure Figure 85 with two power cables and both the *Top DVD/DAT* and *Bottom DVD* data cables, proceed with the installation of the drives as described in "Installing the Slimline DVD+RW Drives" (page 149).
2. Turn off power and remove the top cover.
3. Move the SCSI cables on top of the mass storage backplane out of the way.
4. Move the removable media data cables out of the way.
5. Remove the metal removable media bay cover.
6. Unfold bends marked in orange and flatten the cable marked *Bottom DVD*.
7. Fold the *Bottom DVD* cable at green stripe then nest the *Top DVD/DAT* and *Bottom DVD* cables together and fold as shown in Figure 86.

Figure 86 Top DVD/DAT and Bottom DVD Cables Nested Together
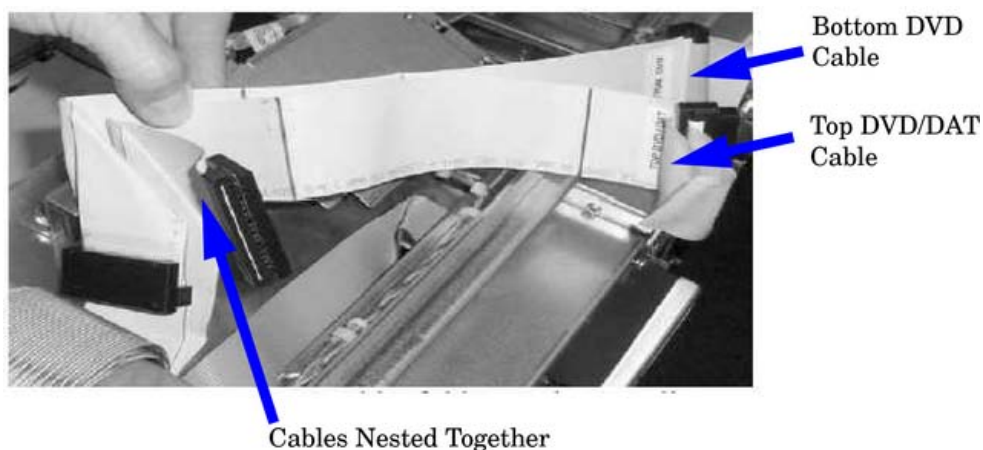
8. Insert the two power cables into the media bay so they are on the left side of the drive bay when viewed from the front of the system.
9. Carefully insert the SCSI cables into the media bay. The SCSI cables lay on top of the power cables previously inserted into the media bay. The SCSI cables must extend out of the drive bay so the black line on each cable aligns with the front of the chassis. The SCSI cables extend from the drive bay at different lengths. The cable terminators remain ouside of the drive bay

in the top of the chassis. When correctly installed, the cables must be configured as shown in Figure 87.

Figure 87 SCSI and Power Cables for Slimline DVD+RW Installation

Power Cable Flag Indicator

SCSI Cable Length Indicator
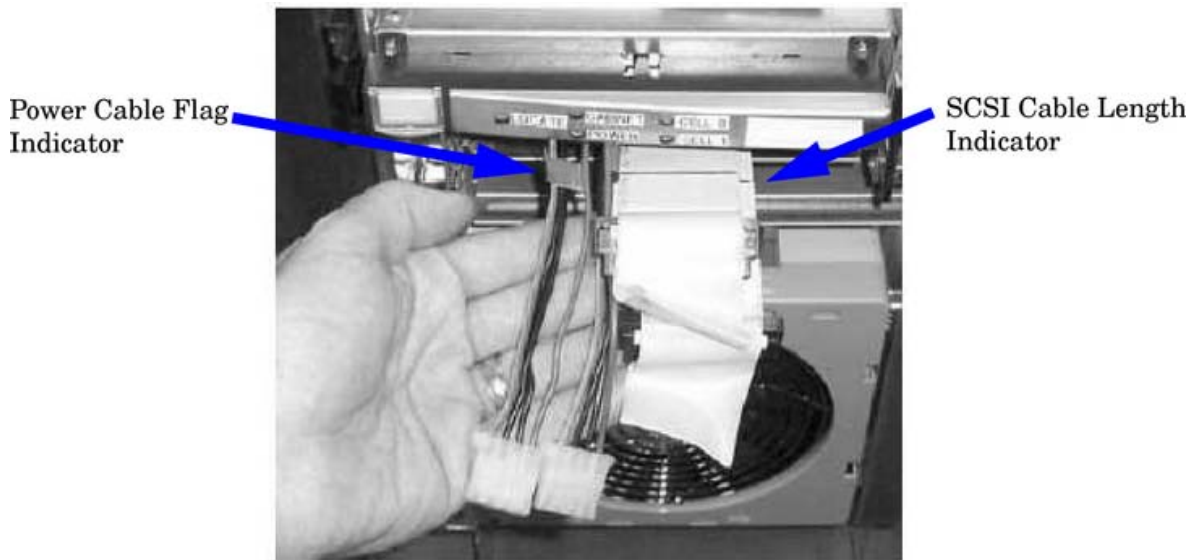
10. Carefully position the metal removable media cover over the SCSI data and power cables and fasten into place.

△ **CAUTION:** Ensure the service length of the cables remains fixed as described in steps 7 and 8 when securing the removable media cover. Failure to comply will damage the removable media drives, data, and power cables.

NOTE: The SCSI data cable end folds over the metal cover. The terminators sit on top of the metal removable media cover.

11. Connect the removable media power cables into the mass storage backplane connectors.
12. Replace the top cover.
13. Connect the SCSI cables to the mass storage backplane.
14. Proceed with Installing the Slimline DVD+RW Drives.

Installing the Slimline DVD+RW Drives

1. Ensure the cables are the correct length. The black line on the SCSI cables and the red flags on the red power cables must align with the front of the front bezel. See Figure 88.

ⓘ **IMPORTANT:** The SCSI connectors must be on the right and the power cables must be on the left when viewed from the front of the server for proper installation. See Figure 88. Cross the power cables under the SCSI cables in the top of the server before the cables are inserted into the drive bay

Figure 88 SCSI and Power Cables for Slimline DVD Installation

Power Cable Flag Indicator

SCSI Cable Length Indicator
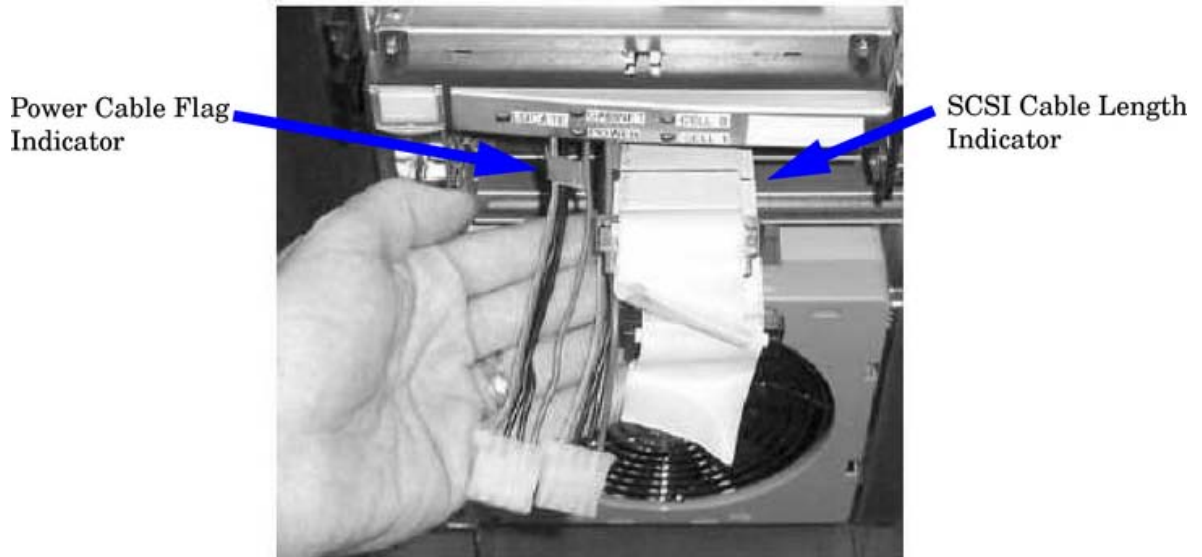
2. Connect the SCSI cables to the rear of the drive carrier. The SCSI cables are labeled to indicate the top and bottom drives.
3. Connect the power cables to the rear of the drive carrier.
4. Install the left and right media rails and clips to the drive carrier.
5. Fold the cables out of the way and slide the drive carrier into the chassis.
   a. The carrier easily slides into the chassis; however, a slow firm pressure is needed for proper seating.
   b. The front locking tab will latch to secure the carrier in the chassis.
6. Install the slimline drives into the carrier.

Removing and Replacing a PCI/PCI-X Card

The PCI/PCI-X cards are located in the rear of the chassis in the PCI-X card cage. PCI/PCI-X cards are hot pluggable components.

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

Figure 89 PCI/PCI-X Card Location
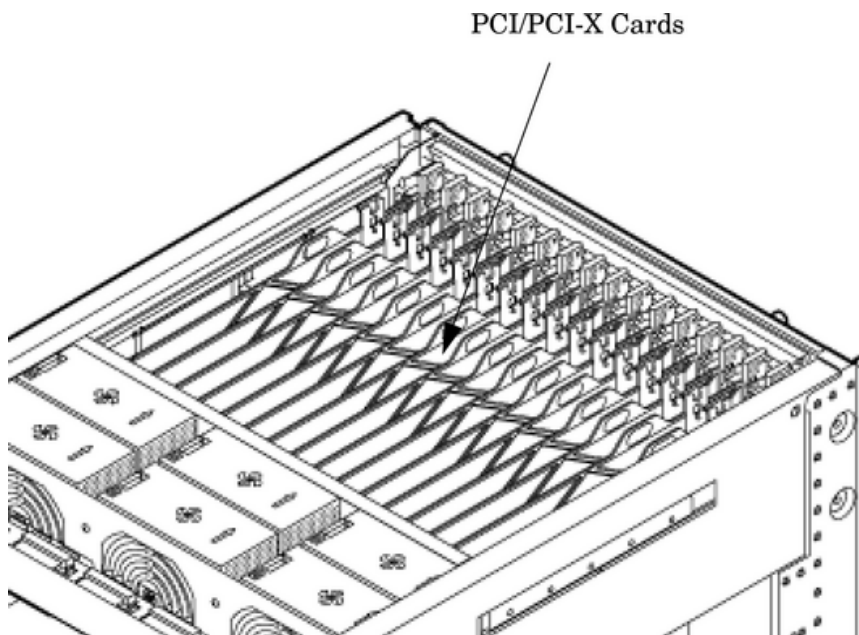
PCI/PCI-X I/O cards can be removed and replaced by using the SAM (`/usr/sbin/sam`) application or by using Partition Manager (`/opt/parmgr/bin/parmgr`).

This procedure describes how to perform an *online replacement* of a PCI/PCI-X card using SAM, for cards whose drivers support online add or replacement (OLAR).

(!) **IMPORTANT:** Some PCI/PCI-X I/O cards cannot be added or replaced online (while HP-UX remains running). For these cards, you must shut down HP-UX on the nPartition before performing the card replacement or addition. See "Powering Off Hardware Components and Powering On the Server" (page 126).

Installing the New LAN/SCSI Core I/O PCI-X Card(s)

(!) **IMPORTANT:** The new LAN/SCSI Core I/O PCI-X cards must be installed in slot 8 in both IO Chassis 1 and 0 of the PCI-X backplane. When a SCSI RAID PCI-X card is installed, you must follow the RAID card manufacturer's instructions for supported backplane slot locations.

Previous versions of the 2-cell server LAN/SCSI Core I/O cards (rx7620/rp7420) were installed in the PCI backplane in IO Chassis 0, slot 1 and IO Chassis 1, slot 8.

The rx7620/rp7420 configuration is not supported in the rx7640/rp7440 servers.

The new LAN/SCSI Core I/O PCI-X card(s) must be installed in the following order:
1. If the system will be configured with one Core I/O card set, the LAN/SCSI card must be installed in PCI-X IO Chassis 1, slot number 8. This slot is reserved for the primary Core I/O LAN/SCSI card.
2. If a second Core I/O card set is installed, it must be installed in PCI-X IO Chassis 0, slot number 8. This slot is reserved for the second Core I/O LAN/SCSI card.

△ **CAUTION:** When a LAN/SCSI PCI card is added to an HP Integrity rx7640 server as part of a core I/O set, it must not have an external SCSI device connected to *port B* of the LAN/SCSI PCI card. Data corruption will result to each of the connected SCSI devices.

If a LAN/SCSI PCI card is installed individually (non-core I/O set), additional SCSI devices can be connected to the external bulkhead *ports A and B*.

The LAN/SCSI PCI card is supported as an add-on (non-core I/O set) PCI card for HP Integrity rx7640 server.

PCI/PCI-X Card Replacement Preliminary Procedures

1. Run SAM (`/usr/sbin/sam`) and from the main SAM Areas screen select the **Peripheral Devices** area, then select the **Cards** area.
2. From the I/O Cards screen, select the card you will replace and then select the **Actions—>Replace** menu item.
3. Wait for SAM to complete its critical resource analysis for the selected card and then review the analysis results.

   If no critical resources will be disabled by taking the selected card offline, click the **OK** button to suspend the card's driver and power off the card's PCI-X slot. Proceed with the next step.

   If SAM detected that the selected PCI/PCI-X card cannot be taken offline, you will not be able to click the **OK** button and cannot replace the card while HP-UX remains running. In this case, you must shut down HP-UX on the nPartition before replacing the defective card.
4. Locate the PCI-X slot where the selected card resides.

   On the server, you can view the PCI-X slots and slot LEDs from the rear of the cabinet.

   The selected slot will be powered off (its green power LED will be off), and the slot's amber attention indicator (a dark orange yellow LED) will be blinking.

Removing a PCI/PCI-X Card

1. Label and remove the cable(s) connected to the PCI/PCI-X card to be removed.
2. Remove the top cover.
3. Flip the card slot's PCI MRL to the open position.
4. Firmly pull up on the tabs on the card separator.
5. Remove the card from the PCI slot.

Replacing the PCI/PCI-X Card

1. Position the replacement PCI/PCI-X card in the slot.

   NOTE: Use a slow firm pressure to properly set the card into its connection. PCI/PCI-X cards tend to be difficult to install.

2. Flip the card slot's PCI MRL to the closed position.
3. Replace the top cover.
4. Connect all cables to the replacement PCI/PCI-X card.
5. In SAM's Replace Card window, click the **OK** button.

   SAM powers the PCI slot back on and turns off the slot's attention indicator. SAM also resumes the card's driver operations.
6. Confirm that the replacement card is online and powered on, using SAM's I/O Cards screen.
7. Exit SAM

Option ROM

To allow faster booting, system firmware does not auto-scan PCI devices with an Option ROM. In order to boot from a PCI connected device with an Option ROM, it must be added to the table of boot devices as follows:

1. Install the I/O card into the chassis.
2. Boot the server to the EFI shell.
3. Execute the EFI search command.

   To add a single card:

   search <cell> <pci_slot #>

To add all cards:

search all

4. Execute the following EFI command:

map -r

5. Enter the Boot Manager by executing the following command:

exit

6. From the EFI Boot Manager Menu, select "Boot Option Maintenance Menu" and then from the Main Menu, select "Add a Boot Option". Now add the device as a new boot device.

Updating Option ROMs

The Option ROM on a PCI I/O card can be "flashed" or updated. The procedure to flash an I/O card follows.

1. Install the I/O card into the chassis.
2. Boot the server to the EFI shell.
3. Execute the EFI search command.

   To add a single card:

   search <cell> <pci_slot #>

   To add all cards:

   search all

4. Execute the following EFI command:

   map -r

   NOTE: Each I/O card type and firmware image update may require a different flash utility and procedure. Follow the instructions in the .txt file included with the latest HP IPF Offline Diagnostic & Utilities CDROM.

   ---

5. Load the HP IPF Offline Diagnostic & Utilities CDROM.

   The CDROM will contain the flash utility for IO each card type, firmware images, and a .txt file that will include instructions and information about updating the firmware images.

Removing and Replacing a PCI Smart Fan Assembly

The PCI Smart Fan Assembly is located at the front of the PCI cardcage, toward the middle top portion of the server. The fan assembly is a hot swappable component.

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

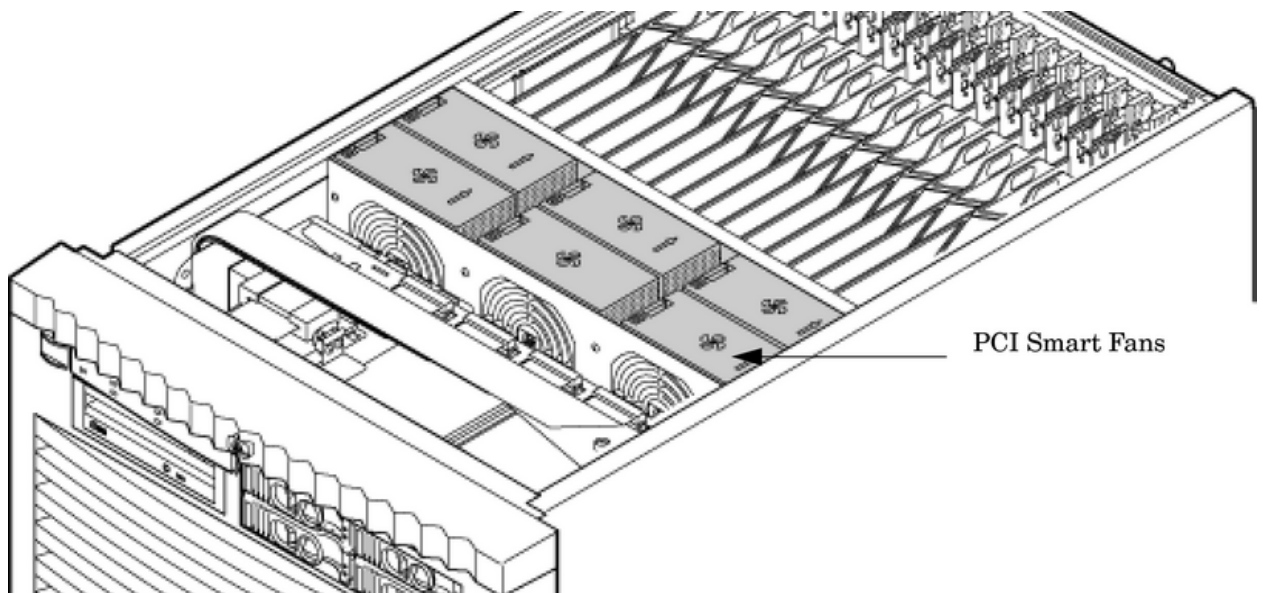**Figure 90 PCI Smart Fan Assembly Location**

PCI Smart Fans

Table 34 Smart Fan Assembly LED Indications

LED State	Meaning
On Green	Fan is at speed and in sync or not at speed less than six seconds
Flashing Yellow	Fan is not keeping up with speed/sync pulse for greater than six seconds
Flashing Red	Fan failed/stalled or has run slow or fast for greater than six seconds
Off	Fan is not installed or no power is applied to fan

Removing a PCI Smart Fan Assembly

Figure 91 PCI Smart Fan Assembly Detail
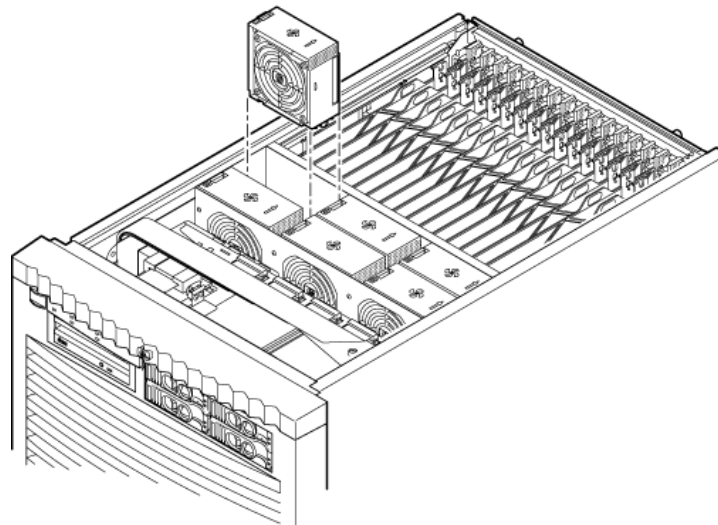
1. Remove the top cover.
2. Grasp the fan with thumb and forefinger while depressing the locking tab.

   NOTE: The two right side fans, as viewed from the front, are located very close to the chassis. It might be necessary to use a tool, such as a flatblade screwdriver, to assist in removing them.

3. Slide the fan upward from the chassis.

Replacing a PCI Smart Fan Assembly

1. Carefully position the fan assembly in the chassis.
2. The fan easily slides into the chassis. Use a slow firm pressure to properly seat the connection.
3. Replace the top cover.

NOTE: A green fan LED indicates the fan is operational.

Removing and Replacing a PCI-X Power Supply

The PCI-X power supply is located in the front of the chassis. The PCI-X power supply is N+1 and a hot-swap unit.

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

Figure 92 PCI-X Power Supply Location
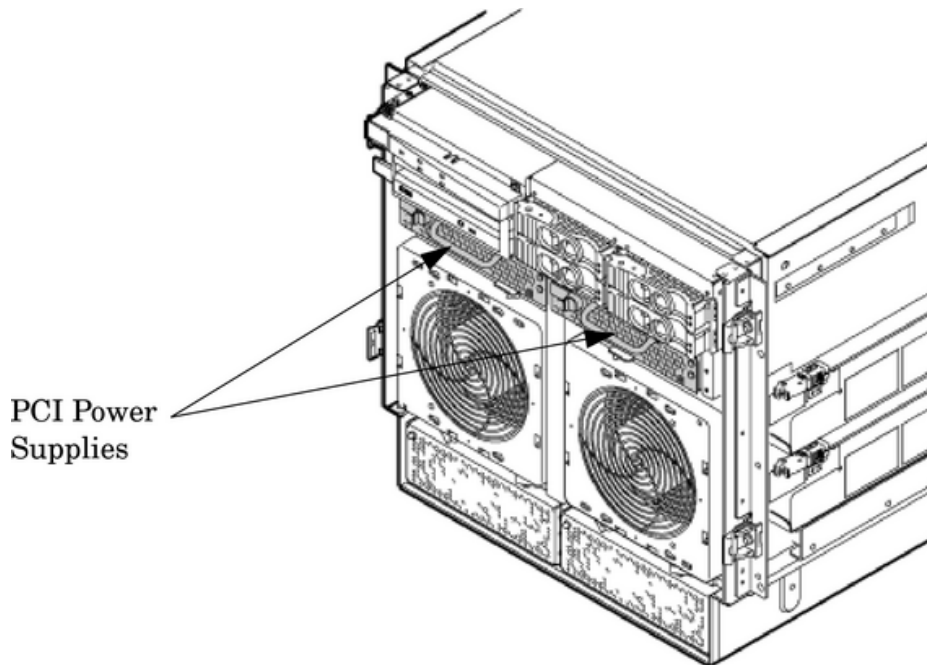
Preliminary Procedures

1. Remove the front bezel.
2. Identify the failed power supply. Table 35 identifies the meaning of the PCI-X Power Supply LED state.
3. Connect to ground with a wrist strap and grounded mat.
4. Visually inspect the replacement part for proper number and revision.

Table 35 PCI-X Power Supply LEDs

LED	Driven By	State	Description
Power	Each supply	On Green	All output voltages generated by the power supply are within limits.
		Off	Power to entire system has been removed.

Table 35 PCI-X Power Supply LEDs *(continued)*

LED	Driven By	State	Description
Fault	Each supply	Flash Red	Power supply has shut down due to an over temperature condition, a failure to regulate the power within expected limits, or a current-limit condition.
		Off	Normal operation.

Removing a PCI-X Power Supply

Figure 93 PCI Power Supply Detail
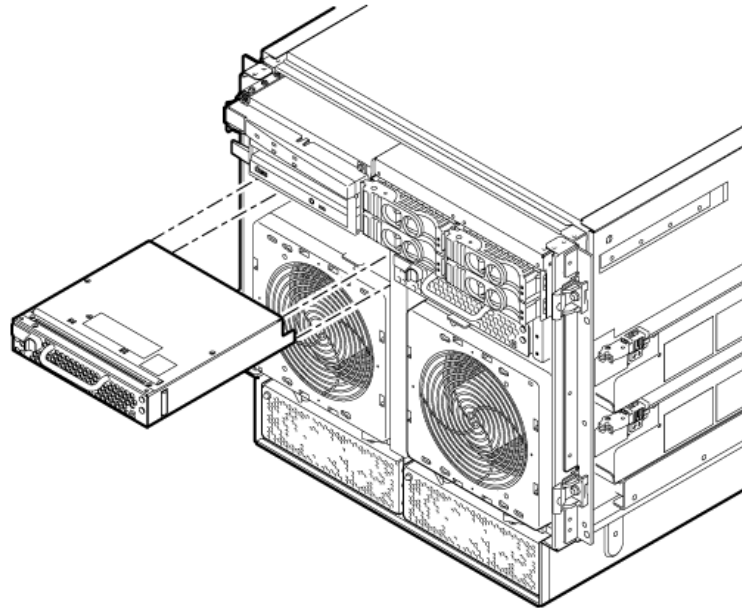
1. Securely grasp the handle on the front of the power supply.
2. Slide and hold the locking tab to the right and pull the PCI-X supply from the chassis.

## Replacing the PCI Power Supply

1. Slide the power supply in the chassis until the thumb latch clicks into the locked position.
2. The module easily slides into the chassis; apply a slow, firm pressure to properly seat the connection.
3. Verify the status of the power supply LEDs. Green LED should be ON and the fault LED should be OFF.

Removing and Replacing a Bulk Power Supply

The bulk power supply is located in the front of the chassis. The BPS is a hot swappable component.

△ **CAUTION:** Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.
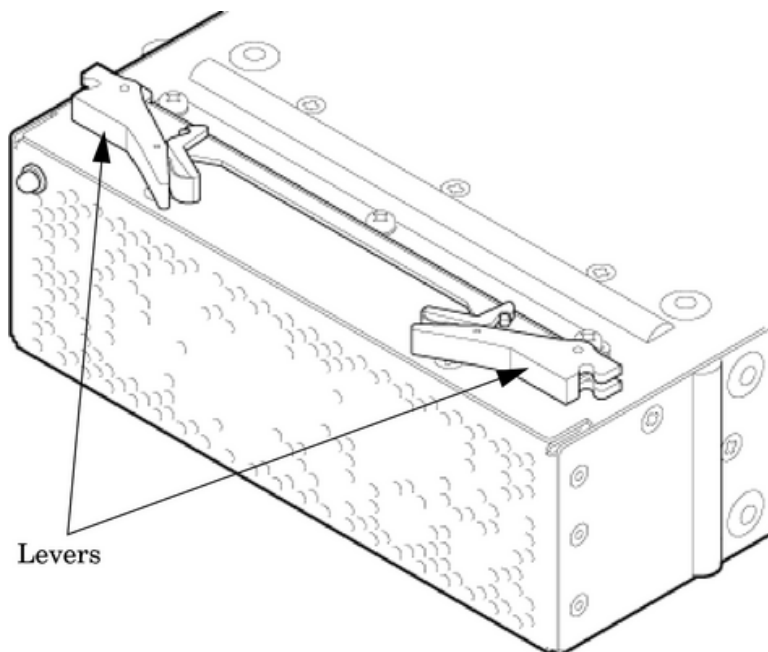
Figure 94 BPS Location

Bulk Power
Supplies
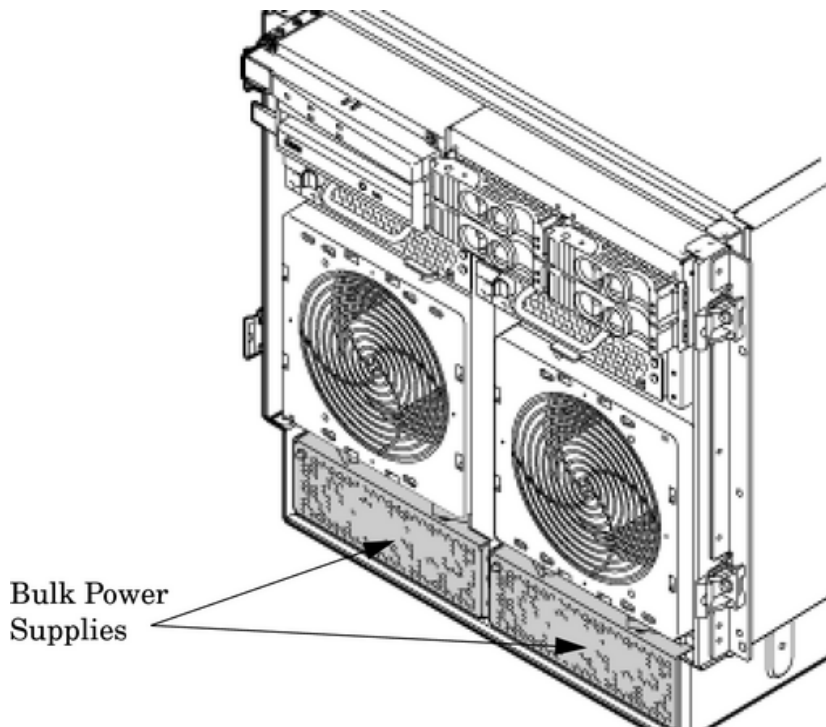
⊙ **IMPORTANT:** When a BPS is pulled from the server and then immediately re-inserted, the server might report an overcurrent condition and shut down.
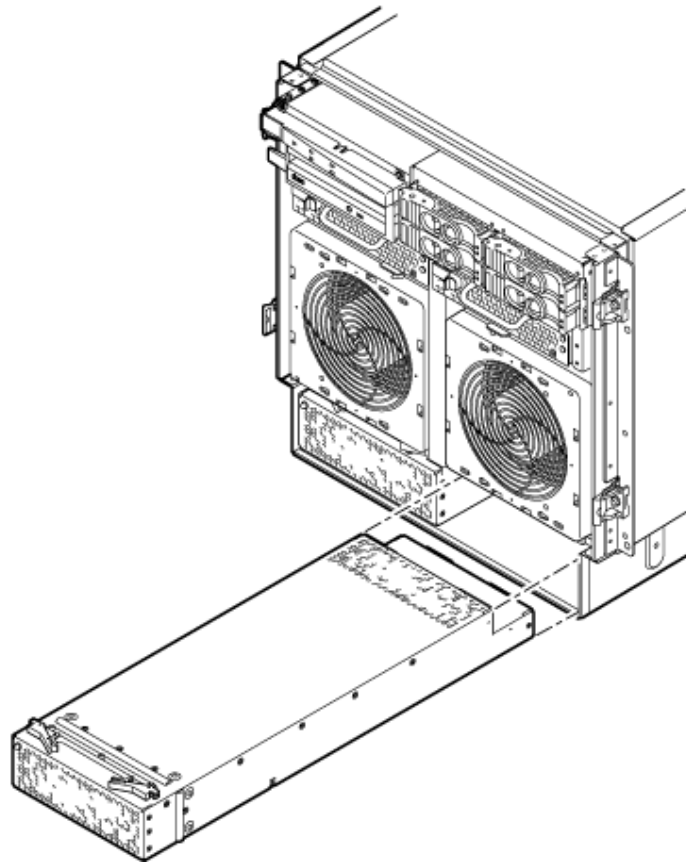
Removing a BPS

1. Remove the front bezel.
2. Press in on the extraction lever release mechanism and pull outward.

Figure 95 Extraction Levers

Levers

3. Slide the BPS forward using the extractions levers to remove it from the chassis.

Figure 96 BPS Detail

⚠ **CAUTION:** Use caution when handling the BPS. A BPS weighs 18 lbs.

Replacing a BPS

1. Verify that the extraction levers are in the open position, then insert the BPS into the empty slot.
2. The BPS easily slides into the chassis. Use a slow firm pressure to properly seat the connection.
3. Ensure the BPS has seated by closing the extraction levers.
4. Replace the front bezel.

   NOTE: The BPS LED should show BPS operational and no fault. The BPS LED should be GREEN.

Configuring Management Processor (MP) Network Settings

After removing and replacing the core I/O in the server, verify the MP LAN network settings, using the settings from the original (replaced) core I/O.

To *configure* management processor network settings, use the MP Command menu's `LC` command. To *list* the current management processor (MP) network configuration, use the `LS` command.

Default Management Processor Network Settings

Table 36 lists an example of the default MP LAN network settings for the server.

Table 36 Default Configuration for Management Processor LAN

MP LAN IP Address	192.168.1.1
MP LAN Host Name	gsp0

Table 36 Default Configuration for Management Processor LAN *(continued)*

MP LAN Subnet Mask	255.255.255.0
MP LAN Gateway	192.168.1.1

This procedure (Command menu, `LC` command) configures the management processor's MP LAN network settings from the management processor Command menu.

1. Connect to the server complex management processor and enter `CM` to access the Command menu.

    Use `telnet` to connect to the management processor, if possible.

    If a management processor is at its default configuration (including default network settings), connect to it using either of these methods:

    - Establish a direct serial cable connection through the management processor local RS-232 port.

    - Access a PC or workstation on the same subnet as the management processor, modify its network routing tables to include the default MP LAN IP address, then `telnet` to the management processor. The procedure to modify networking and connect is:

        1. Access a PC or workstation on the management processor subnet.

        2. Modify the network routing tables for the PC or workstation by using the

            `route add 192.168.1.1`*`ClientName`*

            command, where

            `ClientName`   Is the network name of the PC or workstation.

            From a PC command prompt:

            `route add 192.168.1.1`*`ClientName`*

            On an HP-UX workstation log in as `root` and use this command:

            `/usr/sbin/route add 192.168.1.1 `*`ClientName`*

            After reconfiguring the management processor networking, remove these network routing table changes with the `route delete` command.

        3. Enter this command to confirm the new network connection to the management processor:

            `ping 198.168.1.1 -n 2`

        4. Use the

            `telnet 192.168.1.1`

            command from the PC or workstation to connect to the management processor.

2. From the management processor Command menu, enter `LS` to *list* the current network settings, and, if needed, use the `LC` command to *reconfigure* the network settings for the management processor.

    The `LC` command enables modifications to the MP LAN and/or the private LAN configuration.

    Cancel all changes to the management Processor LAN configuration at any time by replying `Q` to any of the `LC` command prompts.

3. Ensure that the MP networking configuration is correct.

7 HP Integrity rp7440 Server

The following information describes material specific to the HP Integrity rx7640 and HP 9000 rp7440 Servers and the PA-8900 processor.

The following is covered in this chapter:

- System Power Requirements for the rp7440 Server
- Boot Console Handler (BCH) for the HP Integrity rx7640 and HP 9000 rp7440 Servers
- HP-UX for the HP Integrity rx7640 and HP 9000 rp7440 Servers
- PA-8900 Processor Module
- System Verification

Electrical and Cooling Specifications

This section describes the electrical and power dissipation specifications for the HP Integrity rx7640 and HP 9000 rp7440 Servers.

Tables 7-1 and 7-2 list the system power, power dissipation, and cooling requirements for the server. For more information on system power specifications, see Chapter 2.

Table 37 System Power Requirements for the HP Integrity rx7640 and HP 9000 rp7440 Servers

Power Required(50-60 Hz)	Watts	VA	Comments
Maximum Theoretical Power	3092	3130	See # 1
Marked Electrical Power		2640	12A@ 220 VAC, see # 2
User-Expected Maximum Power	2078	2120	See # 3

1. "Maximum theoretical power" is used to describe input power at the AC input. It is expressed in Watts and Volt-Amps to take into account power factor correction. The calculated sum is the maximum worst-case power consumption for every subsystem in the server. This number will not be exceeded by a properly functioning server for any combination of hardware and software.
2. "Marked electrical power" is the input power measured at the AC input expressed in Volt-Amps. The marked electrical power is the rating given on the chassis label and represents the input power required for facility AC power planning and wiring requirements. This number represents the expected maximum power consumption for the server based on the power rating of the bulk power supplies. This number can safely be used to size AC circuits and breakers for the system.
3. "User-Expected Maximum Power" is the input power measured at the AC input expressed in Watts and Volt-Amps, and the measured worst-case power consumption. This number represents the largest power consumption for the server under laboratory conditions, using aggressive software applications designed specifically to work the system at maximum loads and power consumption.

Table 7-2 provides calculations for the configurations shown in the table.

Table 38 Typical Server Configurations for the HP 9000 rp7440 Server

Cell Boards	Memory Per Cell Board	PCI Cards (assumes 10 watts each)	DVDs	Hard Disk Drives	Core I/O	Bulk Power Supplies	Typical Power	Typical Cooling
Qty	GBytes	Qty	Qty	Qty	Qty	Qty	Watts	BTU/hr
2	32	16	3	2	2	2	2078	7096
2	16	8	2	2	2	2	1908	6515
2	8	8	2	2	2	2	1871	6389
1	8	8	1	1	1	2	1237	4224

The air conditioning data is derived using the following equations.

- Watts x (0.860) = kcal/hour
- Watts x (3.414) = Btu/hour
- Btu/hour divided by 12,000 = tons of refrigeration required

NOTE: When determining power requirements you must consider any peripheral equipment that will be installed during initial installation or as a later update. See the applicable documentation for such devices to determine the power and air-conditioning that is required to support these devices.

Boot Console Handler (BCH) for the HP Integrity rx7640 and HP 9000 rp7440 Servers

Booting an HP 9000 sx2000 Server to BCH

After you power on the server or use the management processor (MP) `BO` command to boot an nPartition past boot-is-blocked (BIB), the nPartition console will show activity while the firmware is initialized and will stop at the BCH Main Menu (the `Main Menu: Enter command or menu>` prompt).

Use the BCH `DI` command to redisplay the current menu and its available commands.

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

---- Main Menu -------------------------------------------------------

    Command                           Description
    -------                           -----------
    BOot [PRI|HAA|ALT|<path>]         Boot from specified path
    PAth [PRI|HAA|ALT] [<path>]       Display or modify a path
    SEArch [ALL|<cell>|<path>]        Search for boot devices
    ScRoll [ON|OFF]                   Display or change scrolling capability
    COnfiguration menu                Displays or sets boot values
    INformation menu                  Displays hardware information
    SERvice menu                      Displays service commands
    DIsplay                           Redisplay the current menu
    HElp [<menu>|<command>]           Display help for menu or command
    REBOOT                            Restart Partition
    RECONFIGRESET                     Reset to allow Reconfig Complex Profile

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

For information about any of the available BCH commands, use the `HE` command.

HP-UX for the HP Integrity rx7640 and HP 9000 rp7440 Servers

HP supports nPartitions on cell-based HP 9000 servers. The HP 9000 rp7440 Server runs HP-UX 11i Version 1 (B.11.11).

HP 9000 Boot Configuration Options

On cell-based HP 9000 servers the configurable system boot options include boot device paths (`PRI`, `HAA`, and `ALT`) and the autoboot setting for the nPartition. To set these options from HP-UX, use the `setboot` command. From the BCH system boot environment, use the `PATH` command at the BCH Main Menu to set boot device paths, and use the `PATHFLAGS` command at the BCH Configuration menu to set autoboot options. For details, issue `HELP command` at the appropriate BCH menu, where `command` is the command for which you want help.

Booting and Shutting Down HP-UX

This section presents procedures for booting and shutting down HP-UX on cell-based HP 9000 servers.

Standard HP-UX Booting

Procedure 21 HP-UX Booting (BCH Menu)

From the BCH Menu, use the `BOOT` command to boot the HP-UX OS. The BCH Menu is available only on HP 9000 servers.

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX.

    Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the `Main Menu: Enter command or menu>` prompt). If you are at a BCH menu other than the Main Menu, then enter `MA` to return to the BCH Main Menu.

2. Choose which device to boot.

    From the BCH Main Menu, use the `PATH` command to list any boot path variable settings. The primary (PRI) boot path normally is set to the main boot device for the nPartition. You also can use the `SEARCH` command to find and list potentially bootable devices for the nPartition.

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

         Primary Boot Path:   0/0/2/0/0.13
                              0/0/2/0/0.d     (hex)

      HA Alternate Boot Path: 0/0/2/0/0.14
                              0/0/2/0/0.e     (hex)

        Alternate Boot Path:  0/0/2/0/0.0
                              0/0/2/0/0.0     (hex)

    Main Menu: Enter command or menu >
    ```

3. Boot the device by using the `BOOT` command from the BCH interface.

    You can issue the `BOOT` command in any of the following ways:

    *   **BOOT**

        Issuing the `BOOT` command with no arguments boots the device at the primary (PRI) boot path.

    *   **BOOT *bootvariable***

        This command boots the device indicated by the specified boot path, where *bootvariable* is the PRI, HAA, or ALT boot path.

        For example, `BOOT PRI` boots the primary boot path.

- **BOOT LAN INSTALL** or **BOOT LAN.*ip-address* INSTALL**

  The `BOOT... INSTALL` commands boot HP-UX from the default HP-UX install server or from the server specified by *ip-address*.

- **BOOT *path***

  This command boots the device at the specified *path*. You can specify the *path* in HP-UX hardware path notation (for example, 0/0/2/0/0.13) or in path label format (for example, P0 or P1) .

  If you specify the *path* in path label format, then *path* refers to a device path reported by the last `SEARCH` command.

After you issue the `BOOT` command, the BCH interface prompts you to specify whether you want to stop at the ISL prompt.

To boot the `/stand/vmunix` HP-UX kernel from the device without stopping at the ISL prompt, enter n to automatically proceed past ISL and execute the contents of the `AUTO` file on the chosen device. (By default the `AUTO` file is configured to load `/stand/vmunix`.)

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

     Primary Boot Path:  0/0/1/0/0.15

  Do you wish to stop at the ISL prompt prior to booting? (y/n) >> n

ISL booting   hpux

Boot
: disk(0/0/1/0/0.15.0.0.0.0.0;0)/stand/vmunix
```

To boot an HP-UX kernel other than `/stand/vmunix`, or to boot HP-UX in single-user or LVM-maintenance mode, stop at the ISL prompt and specify the appropriate arguments to the `hpux` loader.

4. Exit the console and management processor interfaces if you are finished using them.

   To exit the BCH environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Single-User Mode HP-UX Booting

This section describes how to boot HP-UX in single-user mode on cell-based HP 9000 servers.

Procedure 22 Single-User Mode HP-UX Booting (BCH Menu)

From the BCH Menu, you can boot HP-UX in single-user mode by issuing the `BOOT` command, stopping at the ISL interface, and issuing `hpux` loader options. The BCH Menu is available only on HP 9000 servers.

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in single-user mode.

   Log in to the management processor, and enter CO to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the `Main Menu: Enter command or menu>` prompt). If you are at a BCH menu other than the Main Menu, then enter MA to return to the BCH Main Menu.

2. Boot the desired device by using the `BOOT` command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply y to the "stop at the ISL prompt" question).

```
Main Menu: Enter command or menu > BOOT 0/0/2/0/0.13

 BCH Directed Boot Path: 0/0/2/0/0.13
```

```
 Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y
Initializing boot Device.

....

ISL Revision A.00.42  JUN 19, 1999

ISL>
```

3. From the ISL prompt, issue the appropriate Secondary System Loader (`hpux`) command to boot the HP-UX kernel in the desired mode.

   Use the `hpux` loader to specify the boot mode options and to specify which kernel to boot on the nPartition (for example, `/stand/vmunix`).

   - To boot HP-UX in single-user mode:

     ISL> **hpux -is boot /stand/vmunix**

     Example 2 (page 163) shows output from this command.

   - To boot HP-UX at the default run level:

     ISL> **hpux boot /stand/vmunix**

   To exit the ISL prompt and return to the BCH interface, issue the EXIT command instead of specifying one of the `hpux` loader commands.

   See the *hpux*(1M) manpage for a detailed list of `hpux` loader options.

Example 2 Single-User HP-UX Boot

```
ISL Revision A.00.42  JUN 19, 1999

ISL> hpux -is /stand/vmunix

Boot
: disk(0/0/2/0/0.13.0.0.0.0.0;0)/stand/vmunix
8241152 + 1736704 + 1402336 start 0x21a0e8

....

INIT: Overriding default level with level 's'

INIT: SINGLE USER MODE

INIT: Running /sbin/sh
#
```

---

4. Exit the console and management processor interfaces if you are finished using them.

   To exit the BCH environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

LVM-Maintenance Mode HP-UX Booting

This section describes how to boot HP-UX in LVM-maintenance mode on cell-based HP 9000 servers.

Procedure 23 LVM-Maintenance Mode HP-UX Booting (BCH Menu)

From the BCH Menu, you can boot HP-UX in LVM-maintenance mode by issuing the BOOT command, stopping at the ISL interface, and issuing `hpux` loader options. The BCH Menu is available only on HP 9000 servers.

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.

   Log in to the management processor, and enter CO to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the `Main Menu: Enter command or menu>` prompt). If you are at a BCH menu other than the Main Menu, then enter MA to return to the BCH Main Menu.

2. Boot the desired device by using the BOOT command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply y to the "stop at the ISL prompt" question).

3. From the ISL prompt, issue the appropriate Secondary System Loader (hpux) command to boot the HP-UX kernel in the desired mode.

   To boot HP-UX in LVM-maintenance mode:

   ```
   ISL> hpux -lm boot /stand/vmunix
   ```

4. Exit the console and management processor interfaces if you are finished using them.

   To exit the BCH environment, press **^B** (**Control+B**); this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Shutting Down HP-UX

When HP-UX is running on an nPartition, you can shut down HP-UX using the `shutdown` command.

On nPartitions you have the following options when shutting down HP-UX:

- To shut down HP-UX and reboot an nPartition: `shutdown -r`

- To shut down HP-UX and halt an nPartition: `shutdown -h`

- To perform a reboot for reconfiguration of an nPartition: `shutdown -R`

- To hold an nPartition at a shutdown for reconfiguration state: `shutdown -R -H`

Procedure 24 Shutting Down HP-UX

From the HP-UX command line, issue the `shutdown` command to shut down the HP-UX OS.

1. Log in to HP-UX running on the nPartition that you want to shut down.

   Log in to the management processor for the server and use the Console menu to access the system console. Accessing the console through the MP enables you to maintain console access to the system after HP-UX has shut down.

2. Issue the `shutdown` command with the appropriate command-line options.

    The command-line options you specify dictate the way in which HP-UX is shut down, whether the nPartition is rebooted, and whether any nPartition configuration changes take place (for example, adding or removing cells).

    Use the following list to choose an HP-UX shutdown option for your nPartition:

    *   Shut down HP-UX and halt the nPartition.

    *   Shut down HP-UX and reboot the nPartition.

        Issue the `shutdown -r` command to shut down and reboot the nPartition.

    *   Perform a reboot for reconfiguration of the nPartition.

        Issue the HP-UX `shutdown -R` command to perform a reboot for reconfiguration.

        This shuts down HP-UX, reconfigures the nPartition if needed, and reboots the nPartition.

    *   Reboot the nPartition and put it into the shutdown for reconfiguration state.

        Use the HP-UX `shutdown -R -H` command to hold the nPartition in the shutdown for reconfiguration state.

        This leaves the nPartition and all its cells in an inactive state (the nPartition can be reconfigured remotely), unless the normal behavior has been modified.

        To reboot the nPartition, you must do so manually by using the `BO` command at the management processor Command Menu.

    If HP-UX is halted on the nPartition, thus not allowing you to use the `shutdown` command, you can reboot or reset the nPartition by issuing commands from the management processor Command Menu.

System Verification

The minimum firmware version supported at release of the HP 9000 rp7440 Server is *rp8440 and rp7440 Firmware Version 1.0.*

After the system firmware is updated, use the management processor (MP) `cm` menu to verify status using the `sysrev`command.

```
[Mit_pa-mp] MP:CM> sysrev
    Cabinet firmware revision report
PROGRAMMABLE HARDWARE :
System Backplane :     GPM          EMMUX

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

                   001.001.000  001.000.000
IO Backplane       :  IO_LPM-0      IO_LPM-1

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

                   001.001.001  001.001.001
Core IO            :   CIO-0         CIO-1

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

                   001.002.000  001.002.000
                     CELL_LPM    CELL_JTAG     CELL_PDH

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

Cell 0 :           001.002.000  001.002.000  001.004.000

Cell 1 :           001.002.000  001.002.000  001.004.000
```

```
FIRMWARE:
Core IO

  MP-0           :   B.002.005.010

  ED-0           :     002.007.000

  MP-1           :   B.002.005.010

  ED-1           :     002.007.000
Cell 0

  PDHC           :   B.023.003.033 - Active

  PDHC           :   B.023.003.030

  PDC_FW         :     042.009.000 - Active

  PDC_FW         :     042.009.000

Cell 1

  PDHC           :   B.023.003.033 - Active

  PDHC           :   B.023.003.030

  PDC_FW         :     042.009.000 - Active

  PDC_FW         :     042.009.000




[Mit_pa-mp] MP:CM>
```

Verify that the processors are reporting by using the management processor (MP) Main Menu and using the `in pr` command to display their status:

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

PROCESSOR INFORMATION
       Cab/                                               Processor
 Cell  Slot   CPU   Speed    HVERSION  SVERSION  CVERSION  State
 ----  ----   ---   -------- --------  --------  --------  --------------
   0   0/0    0A    1068 MHz 0x8900    0x0491    0x0401    Active
              0B    1068 MHz 0x8900    0x0491    0x0401    Idle
              1A    1068 MHz 0x8900    0x0491    0x0401    Idle
              1B    1068 MHz 0x8900    0x0491    0x0401    Idle
              2A    1068 MHz 0x8900    0x0491    0x0401    Idle
              2B    1068 MHz 0x8900    0x0491    0x0401    Idle
              3A    1068 MHz 0x8900    0x0491    0x0401    Idle
              3B    1068 MHz 0x8900    0x0491    0x0401    Idle

            Partition Total Cells: 1
      Partition Total Processors: 8
     Partition Active Processors: 8
  ition Deconfigured Processors: 0
```

A Replaceable Parts

Replaceable Parts

This appendix contains the server CRU list. For a more updated list of part numbers, go to the HP Part Surfer web site at: the following website:

http://www.partsurfer.hp.com

Table 39 Server CRU Descriptions and Part Numbers

CRU DESCRIPTION	Replacement P/N	Exchange P/N
POWER CORDS AND CABLES		
Pwr Crd C19/unterminated interntl-Europe	8120-6895	None
Pwr Crd C19/IEC-309 L6-20 4.5m BLACK CA ASSY	8120-6897	None
Pwr Crd C19/L6-20 4.5m BLACK C	8120-6903	None
240V N.AMERICAN UPS 4.5M C19/L	8120-8494	None
Pwr Crd C19/GB 1002 4.5m BLACK CA ASSY	8121-0070	None
C19/C20, BLK, 2.5m - Jumper	8121-0802	None
C19/C20, BLK, 4.5m - Jumper	8121-0806	None
BOARDS		
LO vKVM, vMedia, USB	AD307–67001	None
MASS STORAGE DEVICES		
DVD + RW Drive	AB351-67002	None
DVD+RW Slimline Drive	AD143-2100A	None
DVD+RW Slimline Carrier + 2 A-cards	AD013-2101A	None
Removable DAT 40i (DDS4)	DW009-67201	DW009-69201
36 GB Ultra 320 15K RPM SCSI Disk	AB420-2101A	AB420-69001
73 GB Ultra 320 15K RPM SCSI Disk	AB421-2101A	AB421-69001
146 GB Ultra 320 10K RPM SCSI Disk	AB422-2101A	AB422-69001
300 GB Ultra 320 10K RPM SCSI Disk	AB423-2101A	AB423-69001
FANS		
Assy, Smart Fan FT and RR	A6752-67129	None
Assy, Smart Fan PCI C/C	A6752-67030	None
Fan, CPU	AB388-00005	None
Fan, Cell Controller	A6093-00276	None
KITS		
PCI OLR Kit	A6093-67114	None
Clock Oscillator Kit	AB297-63002	None
Cell Board Air Baffle Kit	A6913-67005	None
Side/Top Covers Kit (Graphite)	AB312-67002	None
Removeable Media Kit	A6752-67011	None

Table 39 Server CRU Descriptions and Part Numbers *(continued)*

CRU DESCRIPTION	Replacement P/N	Exchange P/N
POWER		
AC Power Supply	0957-2183	None
PCI-X N+1 Power Module	0950-4637	None
OTHER COMPONENTS		
Nameplate, rp7440	A9959-3401A	None
Nameplate, rx7640	AB312-2108A	None
Box, DVD Filler (Carbon)	A6912-00014	None
Intrusion Switch	5040-6317	None
Assy, Bezel, No NamePlate (Graphite)	A7025-04001	None
Assy, Front Panel Display Bezel	AB312-2102A	None
Snap, Bezel Attach	C2786-40002	None

B MP Commands

This appendix contains a list of the Server Management Commands.

Server Management Commands

Table 40 lists the server management commands.

Table 40 Service Commands

Command	Description
BO	Boot a partition
DATE	Set the time and date
DF	Display CRU Information of an Entity
LOC	Display and Set Locator LED status
MA	Return to Main Menu
PE	Power entities on or off
PWRGRD	Allows user to configure the power grid
RE	Reset entity
RR	Reset partition for reconfiguration
RS	Reset a partition
SYSREV	Returns all System Revisions
TC	Send a TOC signal to a partition
TE	Broadcast a message to all users of the MP command handler
WHO	Display list of MP connected users

Table 41 lists the server status commands

Table 41 Status Commands

Command	Description
CP	Display partition cell assignments
DE	Display entity status
DU	Display devices on bus
HE	Display the list of available commands
LS	Display LAN connected console status
PS	Display detailed power and hardware configuration status

Table 42 lists the server system and access config commands

Table 42 System and Access Config Commands

Command	Description
CA	Configure Asynchronous and Modem parameters
CC	Initiate a Complex Configuration
CG	Generate ssl key pair and self signed certificate

Table 42 System and Access Config Commands *(continued)*

CP	Display partition cell assignments
DC	Reset parameters to default configuration
DI	Disconnect Remote or LAN console
ID	Change certain stable complex configuration profile fields
IF	Display network interface information
IT	Modify command interface inactivity time-out
LC	Configure LAN connections
LS	Display LAN connected console status
PARPERM	Enable/Disable interpartition security
PD	Modify default Partition for this login session
RL	Re-key complex profile lock
RU	Reset MP bus device
SA	Display and set MP remote access
SNMP	Set SNMP daemon parameters
SO	Configure security options and access control
UPS	Set parameters for ups monitoring via snmp
XD	MP Diagnostic and reboot

C Templates

This appendix contains blank floor plan grids and equipment templates. Combine the necessary number of floor plan grid sheets to create a scaled version of the computer room floor plan.

Figure 97 illustrates the overall dimensions required for the server.

Figure 97 Server Space Requirements
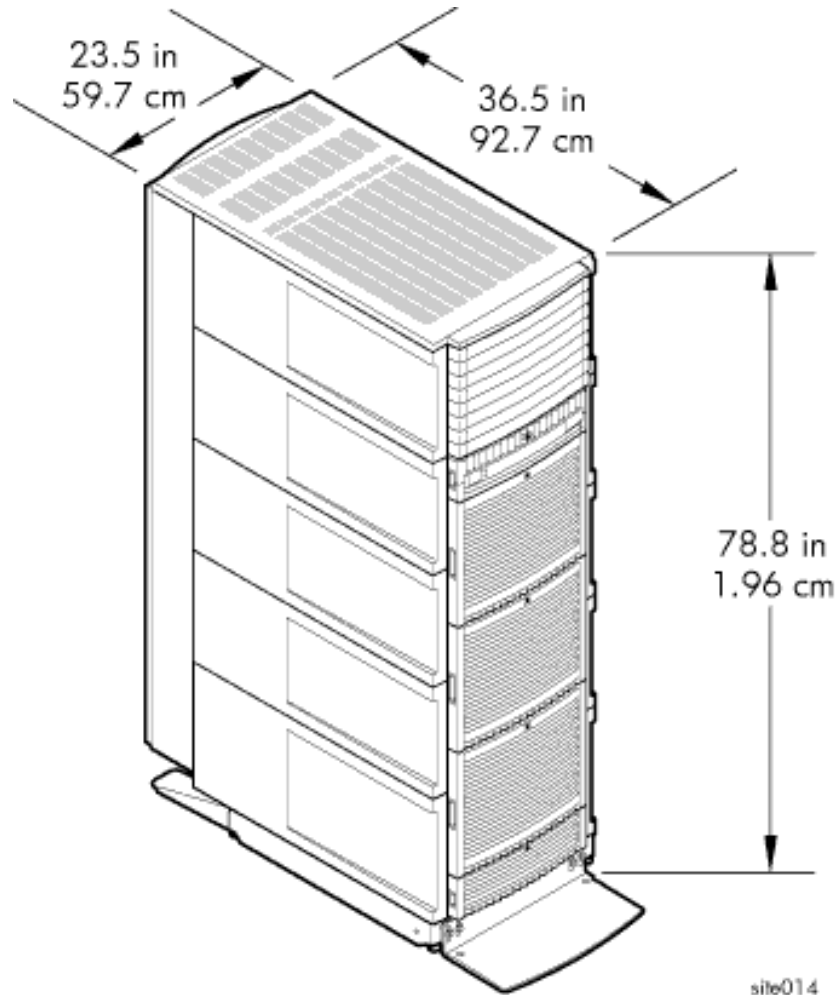
Equipment Footprint Templates

Equipment footprint templates are drawn to the same scale as the floor plan grid (1/4 inch = 1 foot). These templates show basic equipment dimensions and space requirements for servicing.

The service areas shown on the template drawings are lightly shaded.

The equipment templates should be used with the floor plan grid to define the location of the equipment that will be installed in your computer room.

NOTE: Photocopying typically changes the scale of drawings copied. If any templates are copied, then all templates and floor plan grids must also be copied.

Computer Room Layout Plan

Use the following procedure to create a computer room layout plan:

1. Remove several copies of the floor plan grid.
2. Cut and join them together (as necessary) to create a scale model floor plan of your computer room.

3. Remove a copy of each applicable equipment footprint template.
4. Cut out each template selected in step 3; then place it on the floor plan grid created in step 2.
5. Position pieces until the desired layout is obtained; then fasten the pieces to the grid. Mark locations of computer room doors, air-conditioning floor vents, utility outlets, and so on.

NOTE: Attach a reduced copy of the completed floor plan to the site survey. HP installation specialists use this floor plan during equipment installation.

Figure 98 Server Cabinet Template

Scale: 1/4 inch = 1 foot
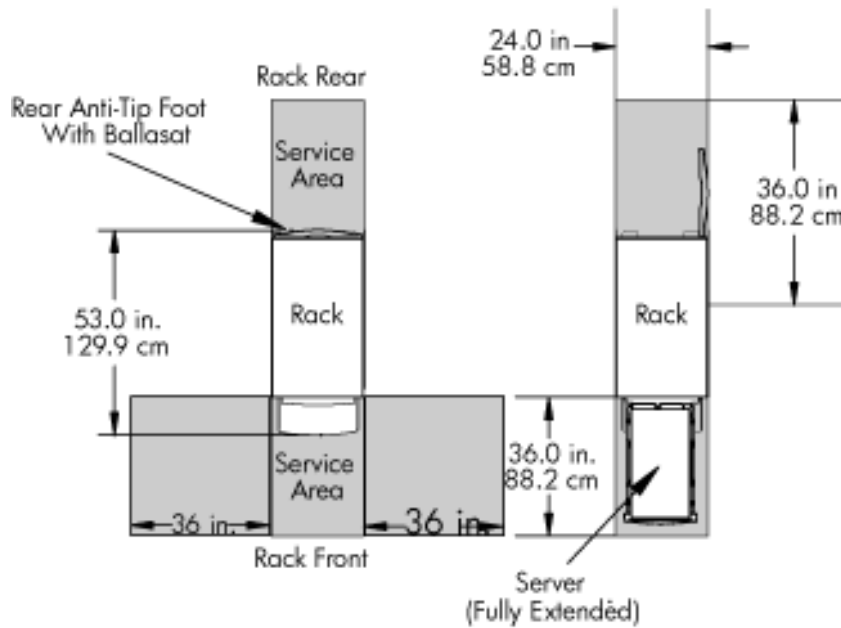
Figure 99 Planning Grid

Scale: 1/4 inch = 1 foot
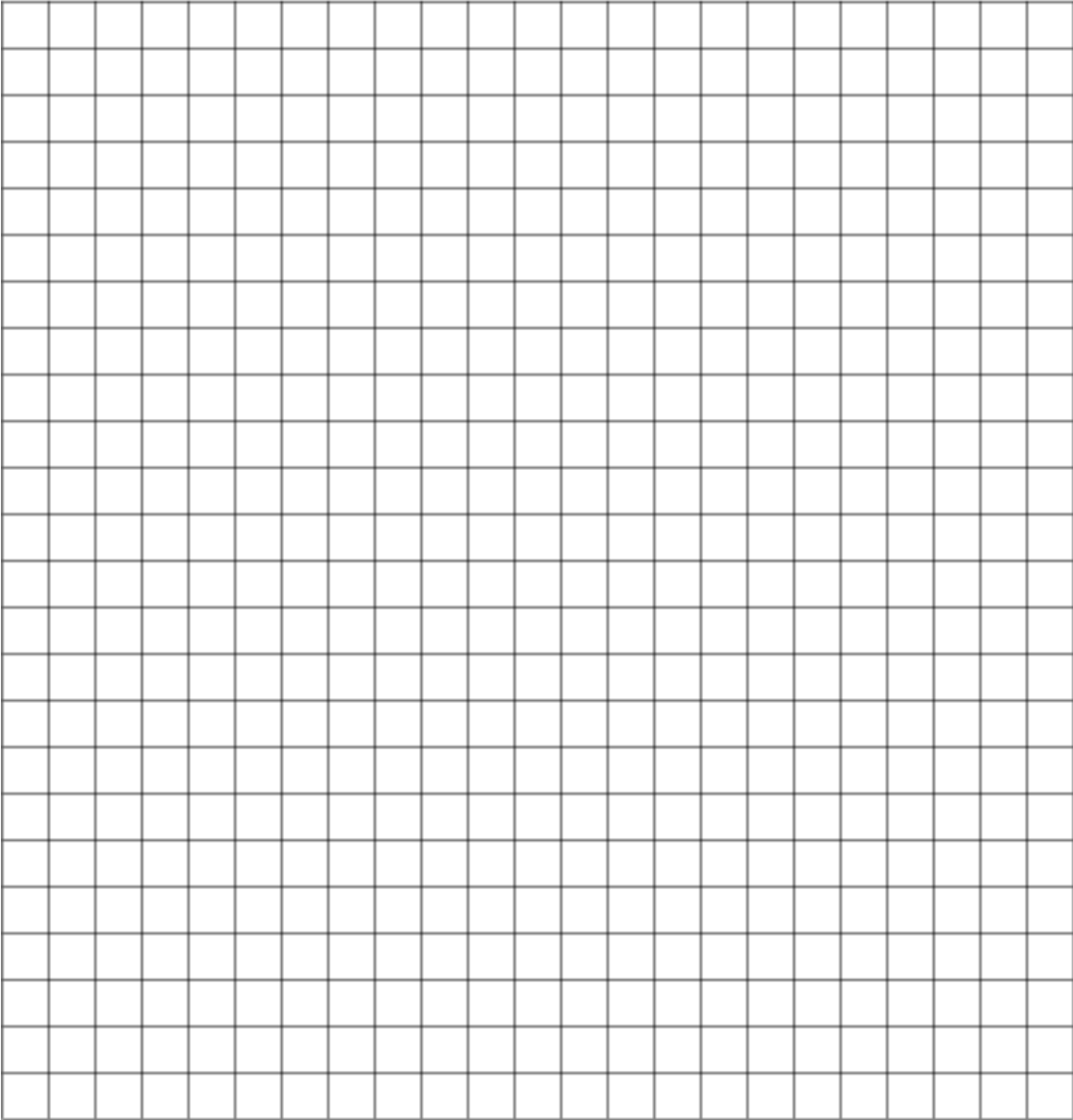
Figure 100 Planning Grid

Scale: 1/4 inch = 1 foot

Index