User Service Guide

HP 9000 rp7420

Third Edition

Manufacturing Part Number : A7025-96018
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Revision History

First Edition	Initial release. December, 2003. P/N was A7025-96003.
Second Edition	Added Disk LED information in Chapter 2. Minor edits. June 2004.
Third Edition	Minor edits. September 2006.
Fourth Edition	Added updated system power requirements information in Appendix B. October 2006.

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1 Introduction

The HP 9000 rp7420 Server is a member of the HP business-critical computing platform family: a mid-range, mid-volume server, positioned as an upgrade to the HP 9000 rp7410 product in the PL-1X product line. The HP 9000 rp7420 Server shares the same hardware as the HP 9000 rp7410 with changes to the cell board, CPU modules, core I/O, and the PCI-X backplane. The HP 9000 rp7420 Server provides increased performance over its predecessor.

Overview

The HP 9000 rp7420 Server is a 10U, 8-socket Symmetric Multi-Processing, rack-mount server that accommodates up to 64 GB of memory; PCI-X I/O, and internal peripherals, including disks and DVD/tape. Its high availability features include N+1 hot-pluggable fans and power, redundant power cords, and hot-pluggable PCI-X cards and internal disks. It currently uses dual core, PA-RISC processors.

Figure 1-1 HP 9000 rp7420 Server (front view)

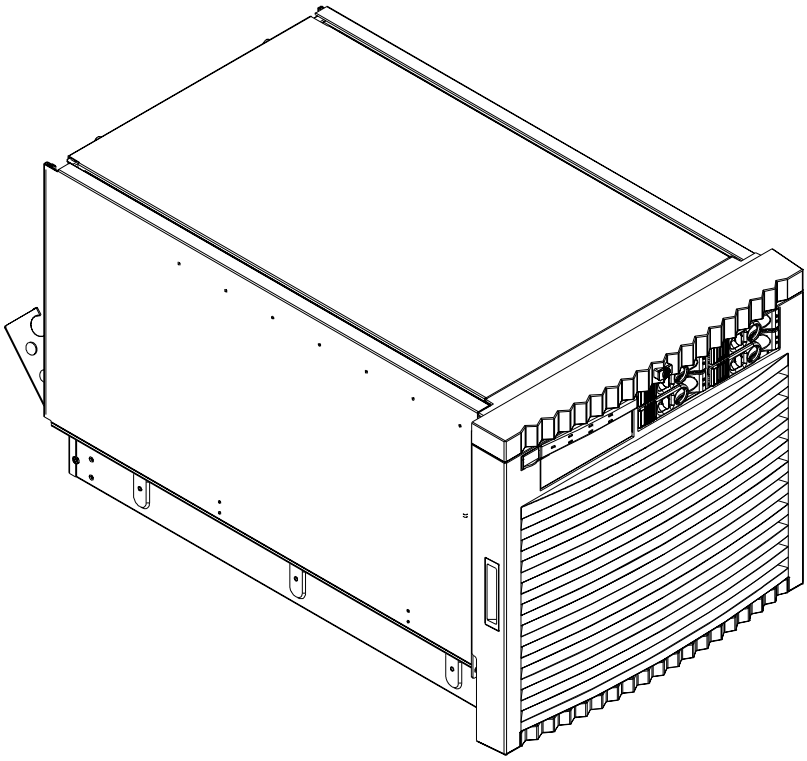
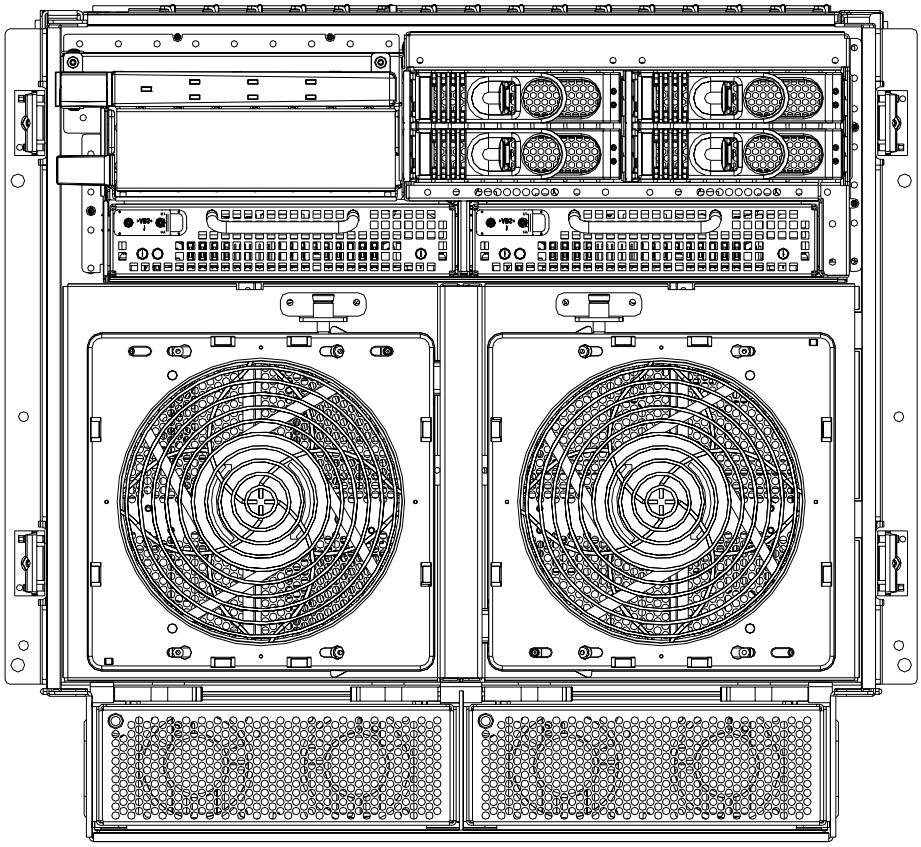


Figure 1-2 HP 9000 rp7420 Server (without front bezel)

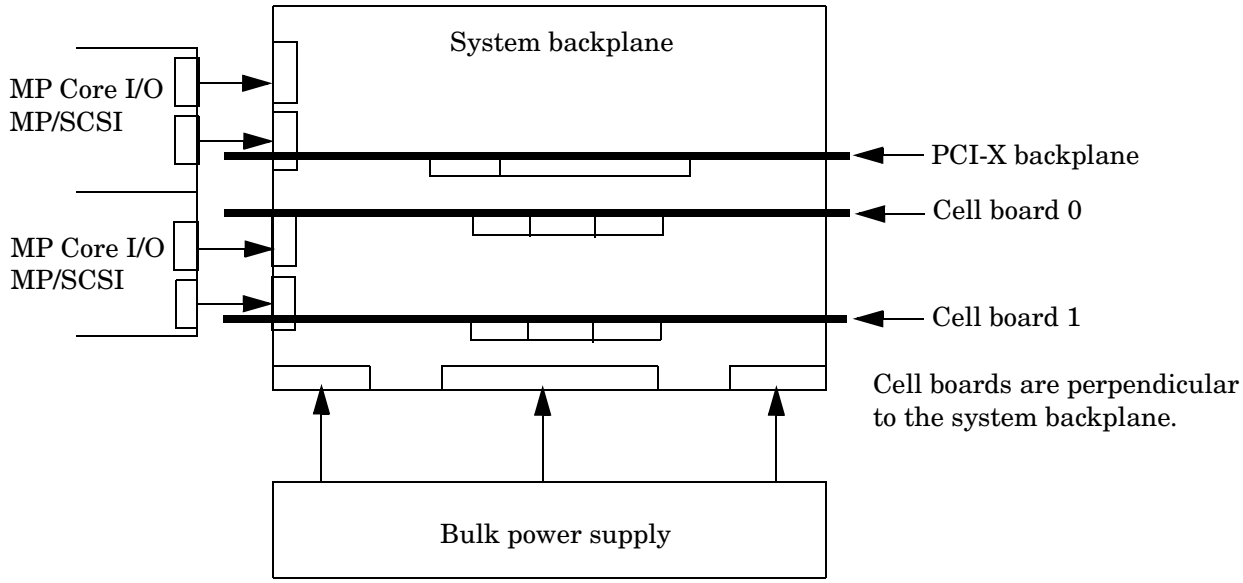


System Backplane

The system backplane is comprisee of the system clock generation logic, the system reset generation logic, DC-to-DC converters, power monitor logic, and two Local Bus Adapter (LBA) link-to-PCI converter ASICs. It also includes connectors for attaching the cell boards, the PCI-X backplane, Management Processor (MP) Core I/O MP/SCSI boards, SCSI cables, bulk power, chassis fans, the front panel display, intrusion switches, and the system scan card. Unlike Superdome or the rp8400, there are no Crossbar Chips (XBC) on the system backplane. The “crossbar-less” back-to-back Cell Controller (CC) connection increases performance and reduces costs.

Only half of the MP 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.

Figure 1-3 System Backplane Block Diagram



System Bacplane to PCI-X Backplane Connectivity

The PCI-X backplane uses two connectors for the System Bus Adapter (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 CC 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

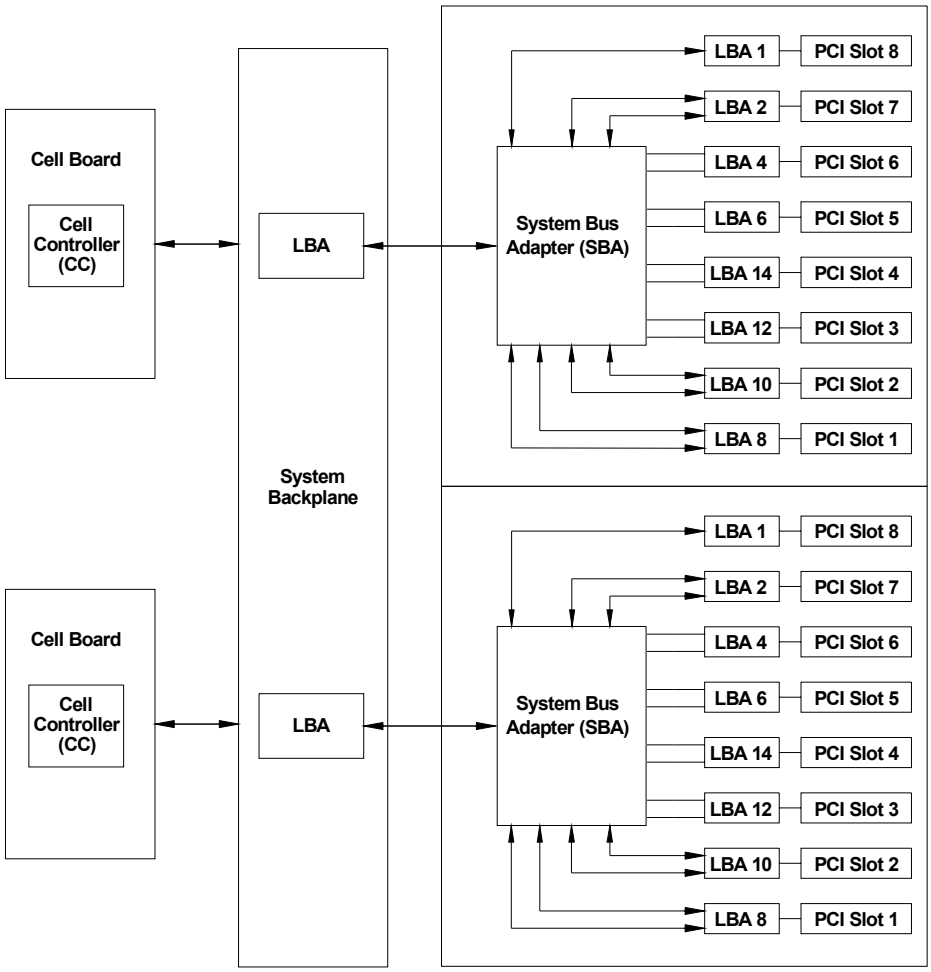
The system backplane contains reset and clock circuitry that propagates through the whole system. The central clocks drive all major chip set clocks. Therefore, these circuits represent a system wide single point of failure.

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 seen in Figure 1-4. The CC on cell board 0 and cell board 1 each communicate with individual SBAs over the SBA link. The SBA link consists of both an inbound and an outbound link with an effective bandwidth of approximately 1 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 4 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.

Figure 1-4 PCI-X Board to Cell Board Block Diagram



NOTE PCI-X slots 1 through 7 are dual rope slots, while slot 8 is a single rope slot.

The PCI-X backplane is the primary I/O interface for HP 9000 rp7420 Server systems. It provides sixteen 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. All sixteen PCI slots are keyed for 3.3-volt connectors (accepting both Universal and 3.3-V cards). The PCI-X backplane does not provide any 5-volt slots for the I/O cards. See Table 1-1 for more details.

The PCI-X backplane is physically one board but behaves like two independent partitions. SBA 0 and its associated LBAs and eight PCI-X slots form one I/0 partition. SBA 1 and its associated LBAs and eight PCI-X slots form the other I/0 partition. One I/O partition can be powered down separate from the other I/O partition.

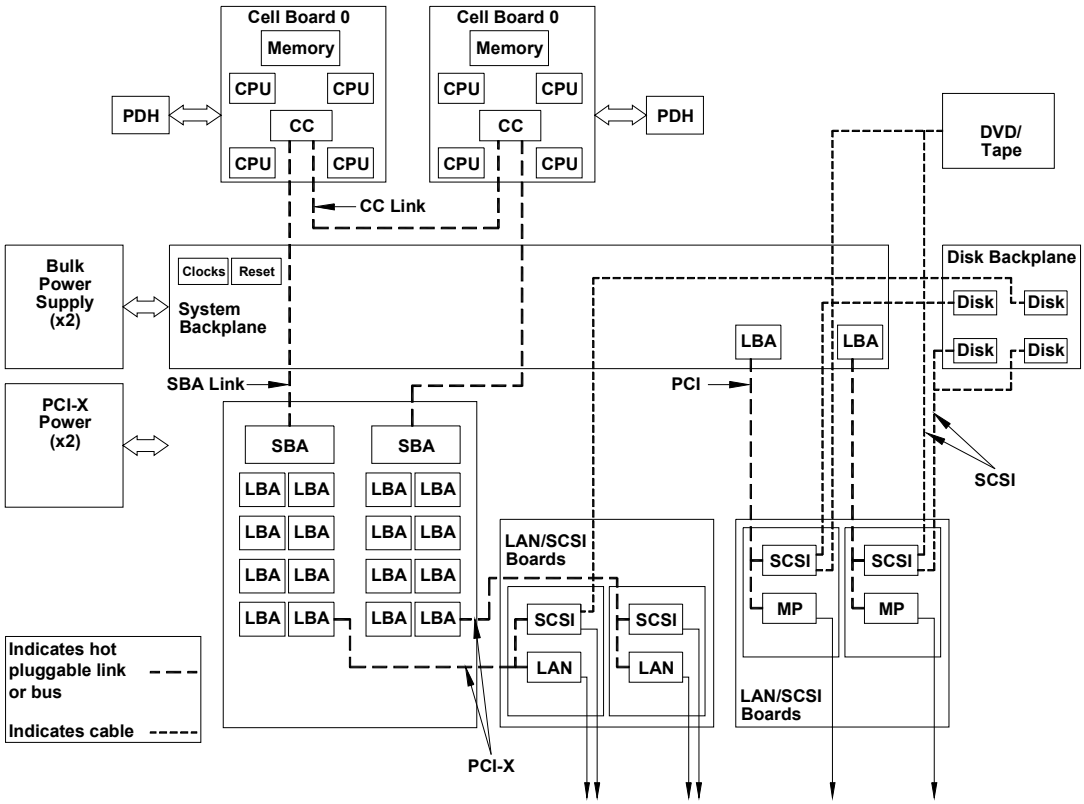
Table 1-1 PCI-X Slot Types

I/O Partition	Slot	Device[a]
0	8	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	7	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	6	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	5	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	4	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	3	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	2	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
0	1	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	8	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	7	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	6	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	5	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	4	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	3	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	2	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot
1	1	PCI (33 or 66 MHz) / PCI-X (66 or 133 MHz) 64-bit, 3.3V connector, Hot Plug Slot

a. If the slot is used as a PCI slot then either the 33 MHz or 66 MHz PCI frequency is supported. If the slot is used as a PCI-X slot then either the 66 MHz or 133 MHz PCI-X frequency is supported.

Detailed HP 9000 rp7420 Server Description

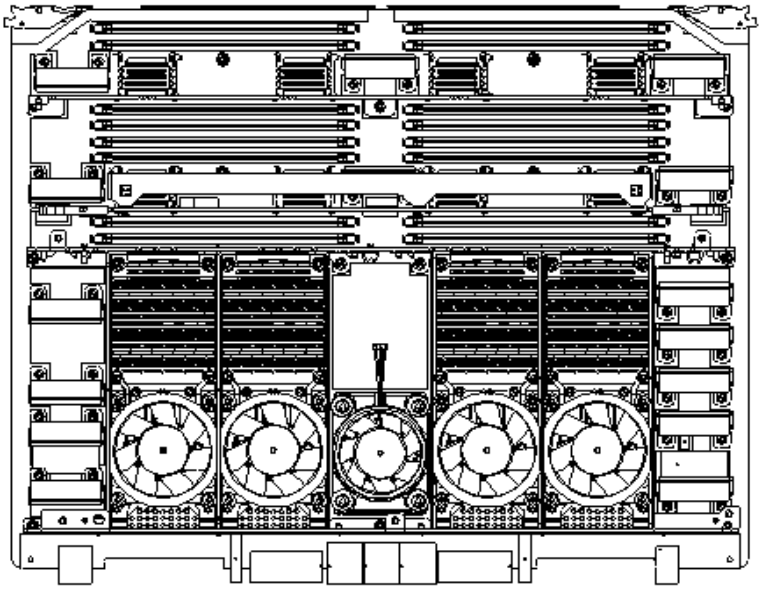
Figure 1-5 HP 9000 rp7420 Server 8-Socket Block Diagram



Cell Board

The cell board contains several hardware blocks connected by several data buses. The major hardware blocks are the Central Processor Units (CPUs), the Cell Controller, the Memory Controllers, and the Memory. Minor hardware blocks include Clock Distribution, Power Distribution, Reset Circuit, and Platform Dependent Hardware (PDH) Riser Board Interface. The buses include two Front Side Buses (FBS0 and FBS1), a Memory (MID) bus, a Crossbar (XB) bus, and an I/O bus. All these blocks come together at the CC chip.

Figure 1-6 Cell Board

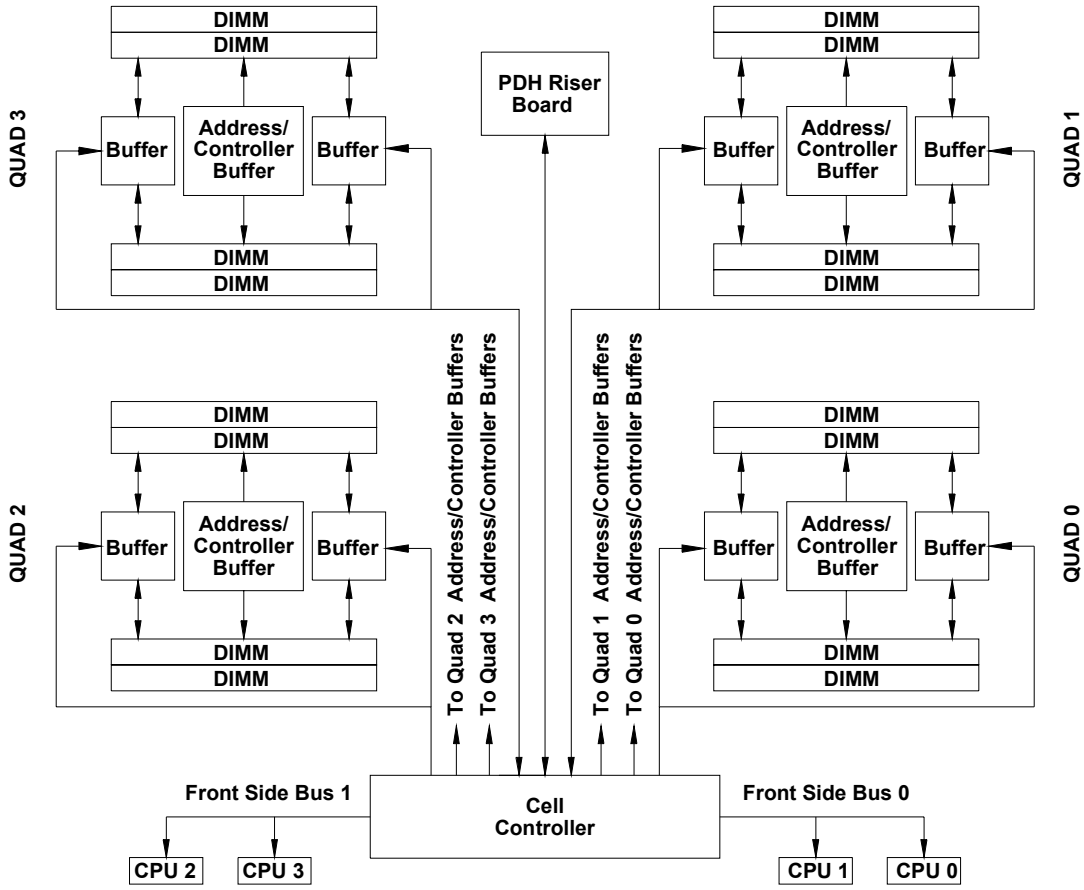


The HP 9000 rp7420 Server has a 48-V distributed power system and receives the 48-V power from the system backplane board. The cell board contains DC-to-DC converters to generate the required voltage rails. The DC-to-DC converters on the cell board do not provide N+1 redundancy.

Because of space limitations on the cell board, the PDH/PDHC 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.

Figure 1-7 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. In practice, the CC runs the two paths 180 degrees out of phase with respect to each other to facilitate pipelining in the CC. Address and control signals are fanned out through register ports to the synchronous dynamic random access memory (SDRAM) on the DIMMs.

Figure 1-7 Memory Subsystem



PDH Riser Board

The Platform Dependant Hardware Riser board is a daughter card for the cell board. It contains a micro-processor memory interface microcircuit, processor-dependent hardware including the processor-dependent code (PDC), flash memory, and a manageability microcontroller, called the Platform Dependant Hardware Controller (PDHC) with associated circuitry. The PDH obtains cell board configuration information from cell board signals and from the LPM on the cell.

The PDH riser board contains circuitry that the Cell board requires to function and, therefore, each cell board must have a PDH Riser installed before it is added to a server.

Central Processor Units

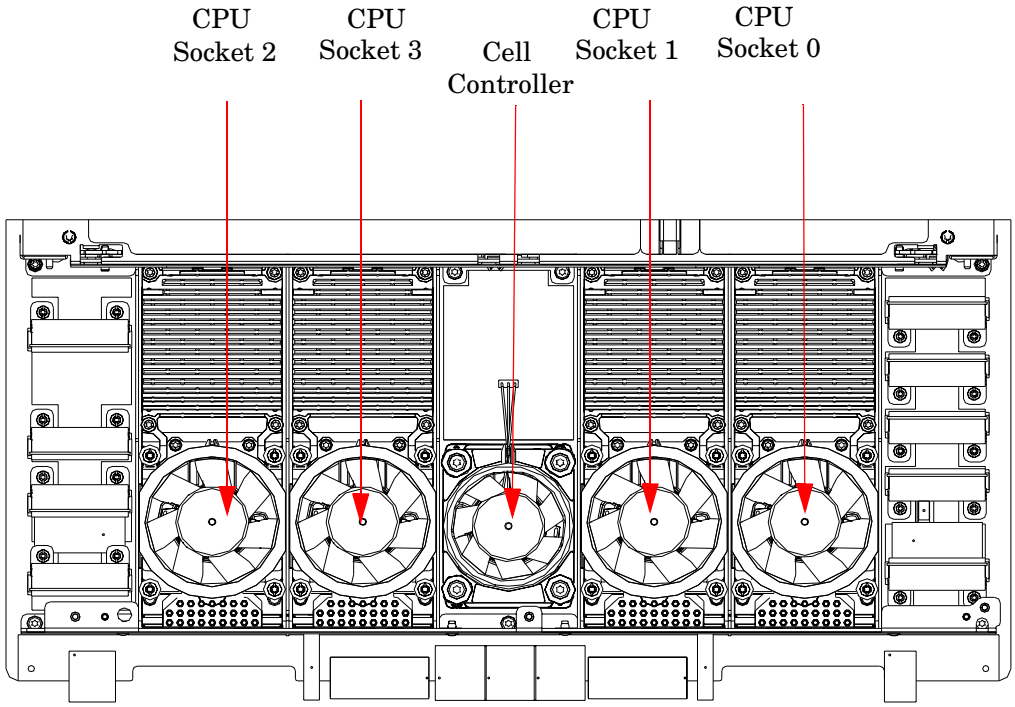
The cell board can hold up to eight (four dual-core) CPUs and can be populated with CPUs in increments of two CPUs. On a cell board, the processors must be the same type and speed. Two CPUs is the minimum configuration allowed on the HP 9000 rp7420 Server. There are two Frontside Buses (FBS), one for sockets 0 and 1, and one for sockets 2 and 3. Each FBS must have either a CPU or a terminator at the end of the bus or

the board will not operate properly. There cannot be a terminator board in socket 1 or socket 3 locations. See Table 1-2 for the CPU load order that must be maintained when adding CPUs to the cell board. See Figure 1-8 for the locations on the cell board for installing CPUs.

Table 1-2 Cell Board CPU Load Order

Number of CPUs Installed	Socket 0 Location	Socket 1 Location	Socket 2 Location	Socket 3 Location
Two	CPU installed	Empty slot	Terminator	Empty
Four	CPU installed	Empty slot	CPU installed	Empty
Six	CPU installed	CPU or Empty	CPU installed	Empty or CPU
Eight	CPU installed	CPU installed	CPU installed	CPU installed

Figure 1-8 CPU Locations on Cell Board



DIMMs

Custom designed by HP, each DIMM contains 36 x 4 SDRAM memory components similar to PC-133 memory, but qualified to run at 125 MHz. They have a low-voltage TTL interface. The CEC does *not* support traditional DRAMs.

The HP 9000 rp7420 Server supports DIMMs with 256 MB, 512 MB 1 GB, and 2 GB capacity. Table 1-3 shows each DIMM supported with its associated capacity, the resulting total system capacity, and the memory component density.

DIMMs must be loaded in sets of two at specific locations. For best performance, HP recommends loading sets of eight DIMMs.

Table 1-3 HP 9000 rp7420 Server DIMMs

DIMM Capacity	Total Capacity	Memory Component Density
256 MB	8 GB	32 Mb
512 MB	16 GB	64 Mb
1 GB	32 GB	128 Mb
2 GB	64 GB	256 Mb
4 GB	128 GB	512 Mb

Main Memory Performance

Latency to main memory is an important parameter in determining overall system performance. With memory buses running at 125 MHz, the latency for a page hit is 8.5 cycles (68 ns), the latency for a page closed is 11.5 cycles (92 ns), and the latency for a page miss is 14.5 cycles (116 ns).

Valid Memory Configurations

The HP 9000 rp7420 Server is capable of supporting as little as 0.5 GB of main memory using two 256 MB DIMMs installed on a single cell board and as much as 128 GB by filling all 16 DIMM slots on both cell boards with 4 GB DIMMs.

DIMMs must be loaded in sets of two at specified locations on the cell board. Two DIMMs are called a rank, so two ranks would be equivalent to four DIMMs, three ranks would be six DIMMs, and so on. The DIMMs must be the same size in a rank. The DIMMs across all cells in a partition should have identical memory loaded. Figure 1-9 shows the DIMM slot layout on the cell board. See Table 1-4 for DIMM load order.

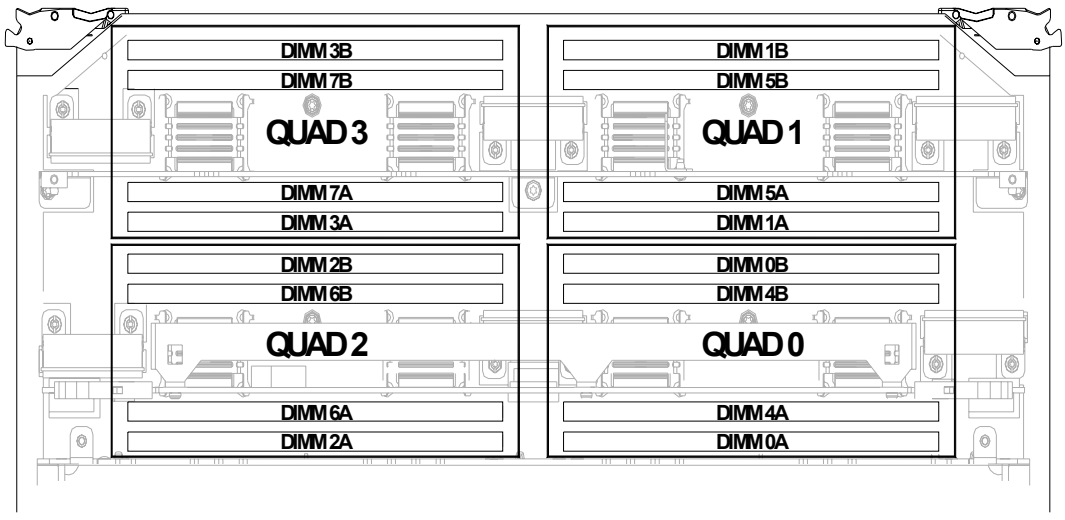
A quad seen in Figure 1-9 is a grouping of four DIMMs. Configurations with 8 or 16 DIMM slots loaded are recommended. The DIMM sizes in a quad can be different but the DIMMs in a rank must be the same size.

Table 1-4 DIMM Load Order

Number of DIMMs Installed	Action Taken	DIMM Location on Cell Board	Quad Location
2 DIMMs = 1 Rank	Install First	0A and 0B	Quad 0
4 DIMMs = 2 Ranks	Add Second	1A and 1B	Quad 1
6 DIMMs = 3 Ranks	Add Third	2A and 2B	Quad 2
8 DIMMs = 4 Ranks	Add Fourth	3A and 3B	Quad 3
10 DIMMs = 5 Ranks	Add Fifth	4A and 4B	Quad 0
12 DIMMs = 6 Ranks	Add Sixth	5A and 5B	Quad 1
14 DIMMs = 7 Ranks	Add Seventh	6A and 6B	Quad 2
16 DIMMs = 8 Ranks	Add Last	7A and 7B	Quad 3

Figure 1-9 DIMM Slot Layout

Front Edge of Cell Board



Rear Edge of Cell Board
(Plugs into the System Backplane)

Cells and nPartitions

A cell board that has an I/O link to a bootable device and a console (usually supplied by an MP Core I/O card) is a potential boot cell. The cell that contains the boot console I/O path is the called the root cell. Both cells are potential root cells. The primary or default root cell in a single nPartition system is the bottom cell (cell 1).

An nPartition (also called a Protection Domain) is a cell or cells running the same operating system and sharing processes and memory space among the components. Each nPartition must have one root cell and can contain both cells. The HP 9000 rp7420 Server has only two possible nPartition configurations: single or dual. The additional cell that can be part of the nPartition does not require I/O links or MP Core I/O cards.

In the single nPartition case, if two cells are present, either cell can be the root cell, assuming both cells have MP Core I/O functionality present. If only one cell is present, that cell is the root cell (and should be cell 1).

In the dual nPartition case (two cells required), each nPartition consists of one cell, and each cell must be a root cell. The ability to interconnect two cells in one nPartition or isolate the cells in a dual nPartition system provides system configuration flexibility. System partitioning is configured by the system management processor.

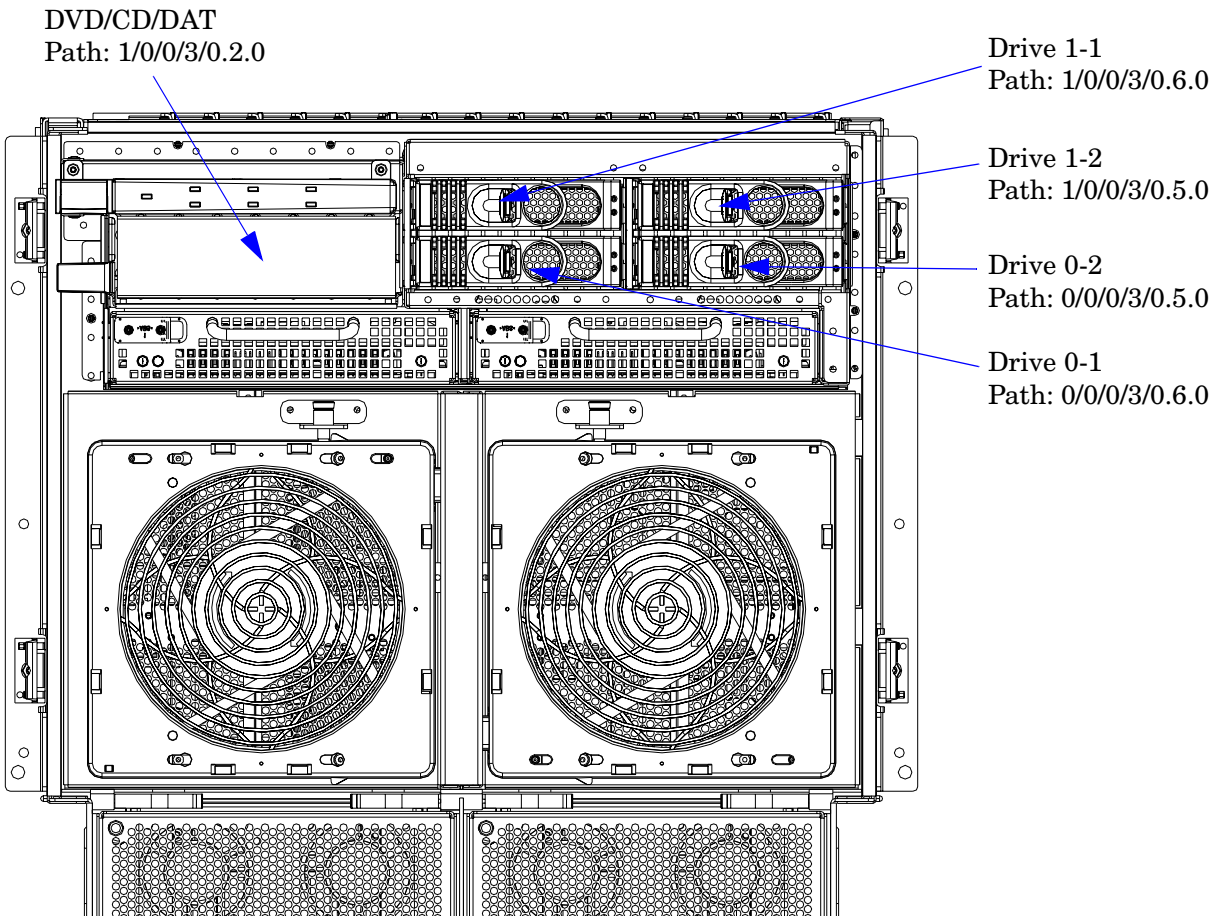
NOTE Partition configuration information is available at http://docs.hp.com. Refer to *HP Systems Partition Guide: Administration for nPartitions* for more detail.

Internal Disk Devices for the HP 9000 rp7420 Server

In an HP 9000 rp7420 Server, 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 CD/DVD/DAT drive connects to cell 1 through the core I/O card for cell 1.

Figure 1-10 Internal Disks



MP/SCSI MP Core I/O Board

The HP 9000 rp7420 Server accommodates two sets of MP Core I/O functionality. Each MP/SCSI core I/O board set consists of a MP/SCSI board and a Procurium LAN/SCSI board. At least one MP/SCSI board is required (independent of partitions). An additional MP/SCSI board can be added as well (and 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 Ultra160 SCSI controller.

Procurium LAN/SCSI Board

At least one Procurium LAN/SCSI board is required for the minimum system configuration; two are required in a dual partition system. The Procurium 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 Procurium board and another that can accommodate either a Procurium board or any other supported add-in PCI-X card. The Procurium board is hot-pluggable.

Mass Storage (Disk) Backplane

Internal mass storage connections (to disks) are routed on the mass storage backplane, having connectors and termination circuitry. All disks are hot-pluggable. The HP 9000 rp7420 Server accommodates one internal, removable media device. Therefore, only one power connector for a removable media device is required on the mass storage backplane. The mass storage backplane incorporates a circuit that allows power to the internal removable media device to be programmatically cycled.

Server Description

Dimensions

The dimensions of the HP 9000 rp7420 Server are as follows:

- Width: 44.45 cm (17.5 inches), constrained by EIA standard 19 inch racks
- Depth: Defined by cable management constraints to fit into standard 36-inch deep racks (Rittal/Compaq, Rosebowl I):

  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
- 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.

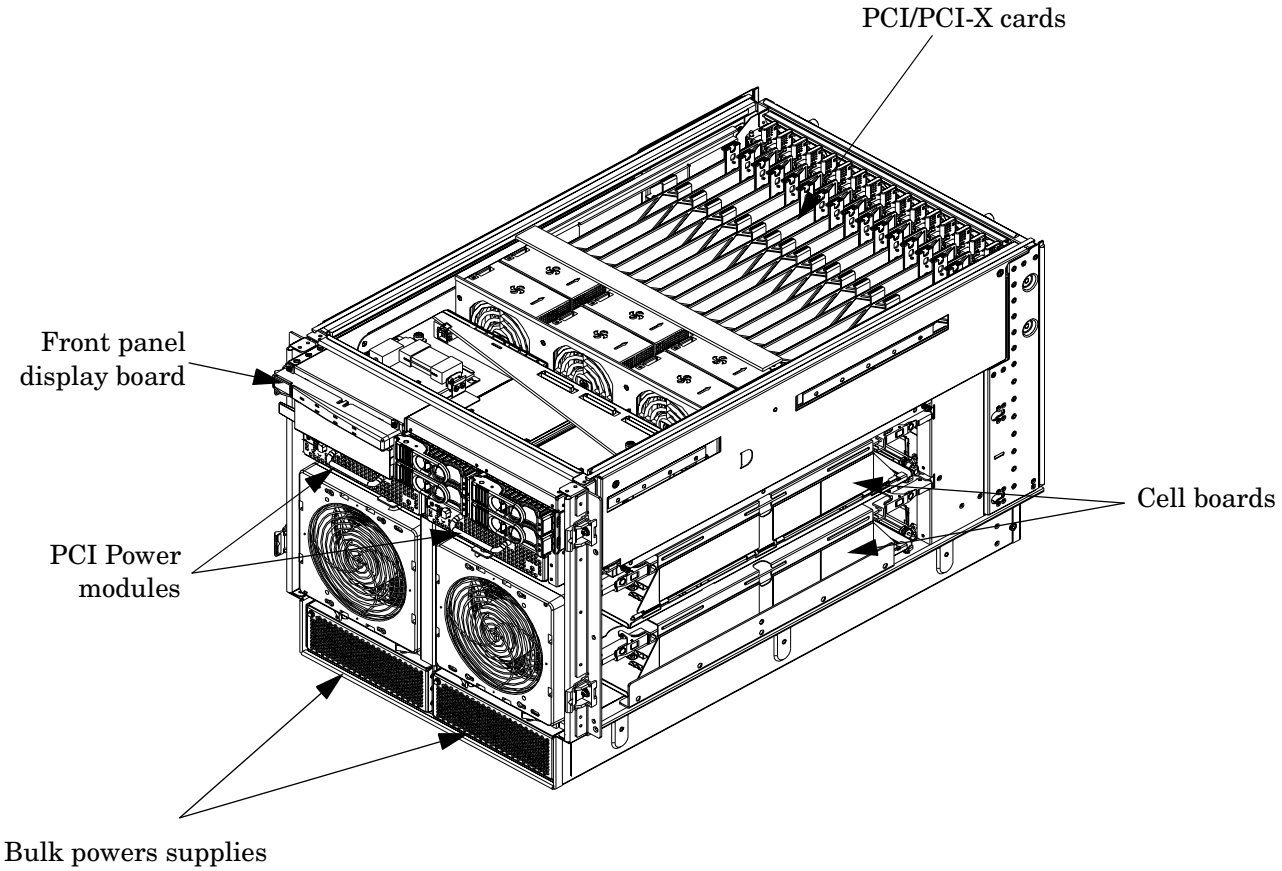
System Chassis

The mass storage section located in the front allows access to removable mass storage devices without removal of the bezel (not shown). This is especially helpful when the system is mounted in the lowest position in a rack. The mass storage bay accommodates one 5.25-inch removable media device and up to four 3.5-inch hard drives. 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 a removable bezel are two PCI DC-to-DC power converters.

The BPS section is partitioned by a sealed metallic enclosure located in the bottom of the package. This enclosure houses the N+1 fully redundant BPS.

Figure 1-11 Right-Front View of HP 9000 rp7420 Server



The PCI-X card section, located toward the rear, is accessed by removing the top cover.

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.

The MP/SCSI MP Core I/O boards are positioned vertically at the rear of the chassis.

The PCI-X card bulkhead connectors are located in the top rear portion of the chassis.

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

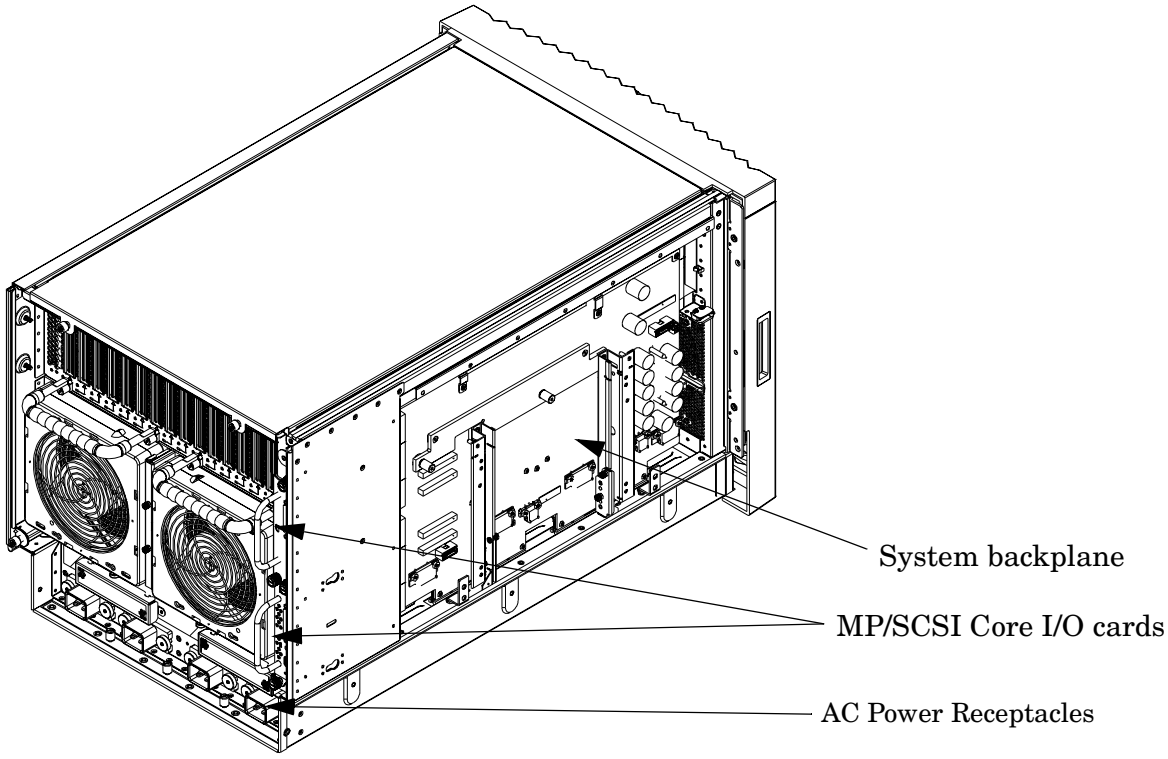
A cable harness that connects from the rear of the BPSs to the system backplane provides DC power distribution.

Access the system backplane is accomplished by removing the left side cover. The system backplane inserts by a guide/insertion mechanism using a single large jack screw assembly.

SCSI ribbon-cable assemblies route from the mass storage area to the backside of the system backplane and to the Procurium PCI MP Core I/O card.

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

Figure 1-12 Left-Rear View of HP 9000 rp7420 Server



2 Unpacking the Server

HP shipping containers are designed to protect their contents under normal shipping conditions. After the equipment arrives, carefully inspect each carton for signs of shipping damage. A tilt indicator is installed on each carton shipped. The beads in the indicator will roll to the upper position if the container has been tilted to an angle that could cause equipment damage. The tilt indicator itself has two windows, and each window,

under normal conditions, shows four beads present. If a carton has been mishandled or accidentally dropped, the tilt indicator indicates missing beads. If damage is found, document the damage with photographs and contact the transport carrier immediately.

Examine the server cabinet for visible shipping damage. After unpacking the cabinet, check for damage that might have been obscured by the shipping container. If damage is found after visual inspection, document the damage with photographs and contact the transport carrier immediately.

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

NOTE The server might come already racked or ready for rack installation.

Unpacking a Racked Server

This section contains information about unpacking the 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.**

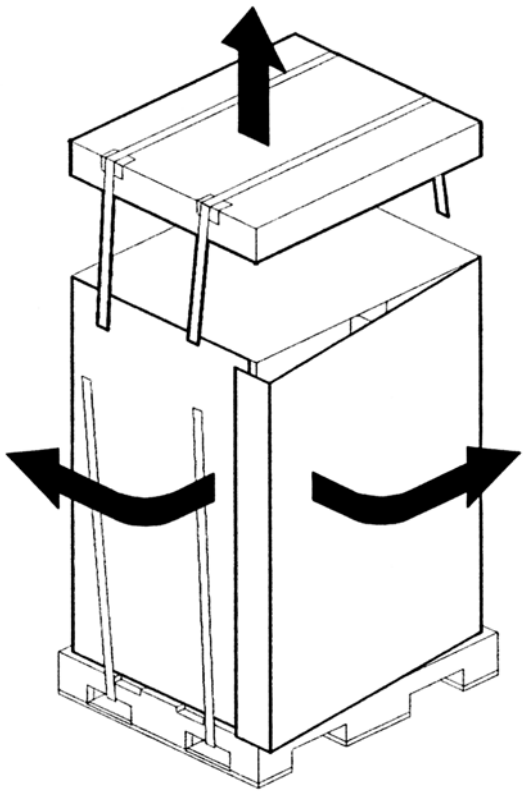
NOTE Position the pallet to allow for enough space to roll the cabinet off the pallet before unpacking.

Remove the cabinet using the following procedure:

1. Cut the polystrap bands around the shipping container.
2. Lift the cardboard top cap from the shipping box. See Figure 2-1.
3. Remove the corrugated wrap from the pallet.
4. Remove the packing materials.

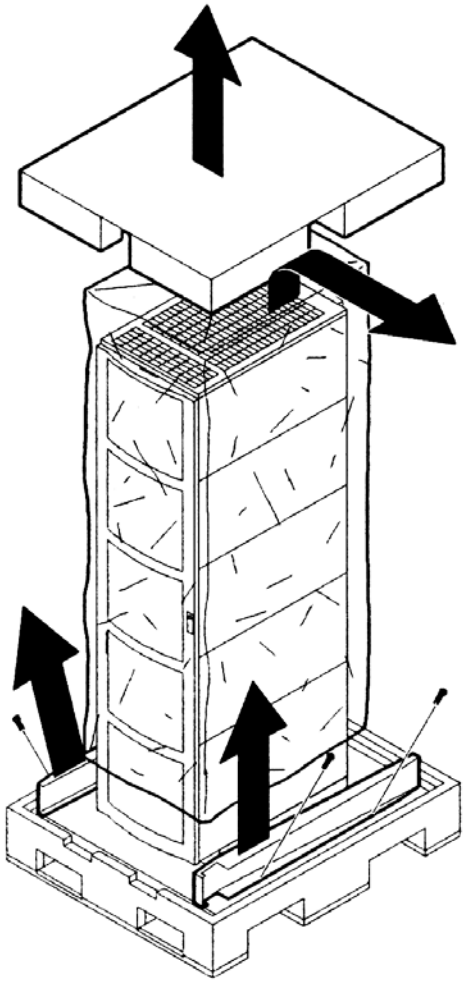
CAUTION The plastic wrapping material should be cut off rather than pulled off. Pulling the plastic covering off represents an electrostatic discharge (ESD) hazard.

Figure 2-1 Removing the Polystraps and Cardboard



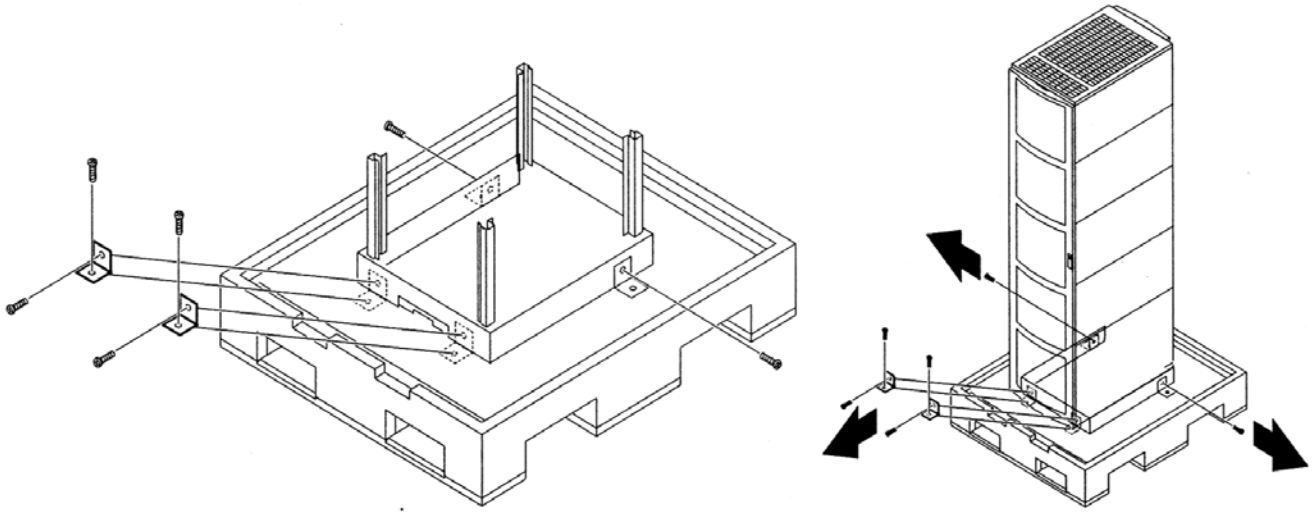
5. Remove the four bolts that hold the ramps to the pallet, and remove the ramps. See Figure 2-2.

Figure 2-2 Removing the Shipping Bolts and Plastic Cover



6. Remove the six bolts from the base that attaches the rack to the pallet. See Figure 2-3.

Figure 2-3 Preparing to Roll Off the Pallet

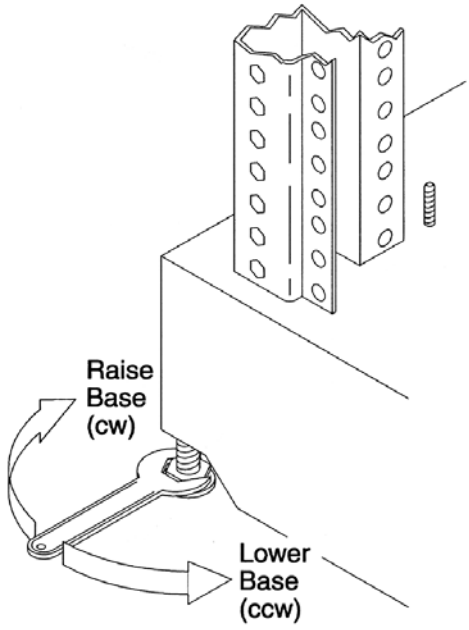


WARNING **Be sure that the leveling feet on the rack are raised before you roll the rack down the ramp and any time you roll the rack on the casters. Use caution when rolling the cabinet off the ramp. A single server in the cabinet weighs approximately 665 pounds. HP strongly recommends that two people roll the cabinet off the pallet.**

Securing the Cabinet

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

Figure 2-4 Securing the Cabinet



Unpacking a Non-Racked Server

NOTE If this server was delivered with a wheel kit, proceed to the chapter titled “Installing Additional Components”.

NOTE HP recommends the use of a lifter, such as a RONI Company model 17000 SP 400 lifting device, when moving a non-racked system, shown in Figure 2-5. If no lifter is available, install the lift handle panels provided with the system.

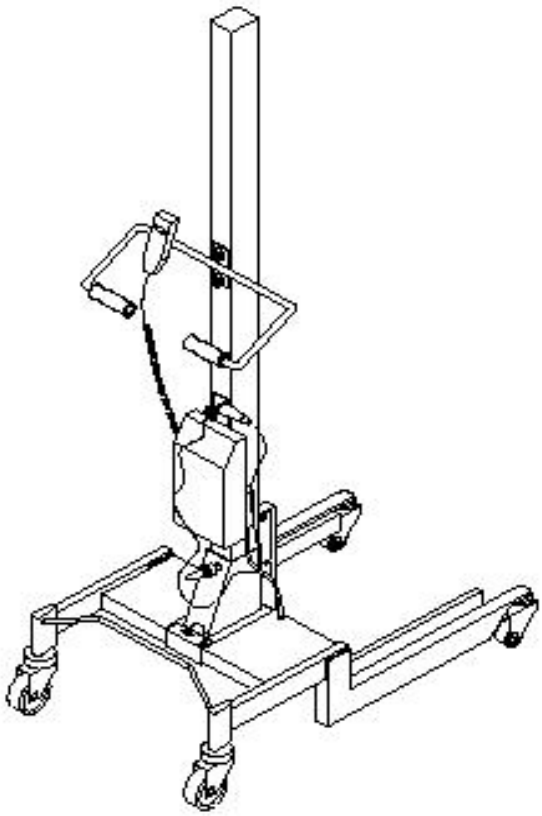
Unloading with a Lifter

Use the following procedure to unload the server from the pallet using a lifter.

WARNING **Use caution when using a lifter. Because of the weight of the server, it must be centered on the lifter forks before raising it off the pallet to avoid injury.**

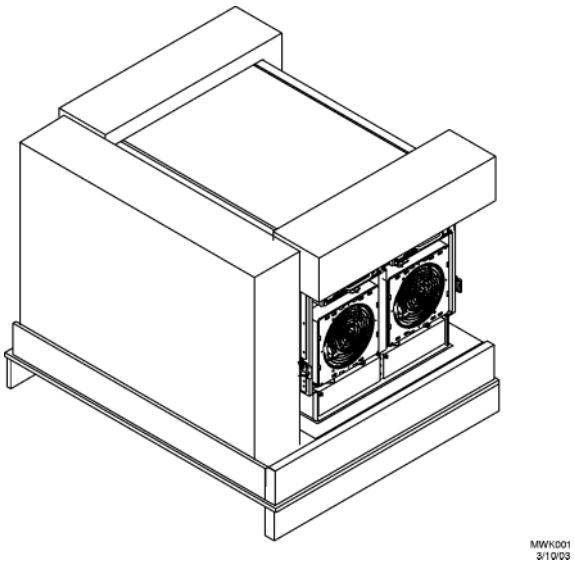
Never extend more than one server from the same cabinet while installing or servicing another server product. Failure to follow these instructions could result in the cabinet tipping over.

Figure 2-5 RONI Lifter



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

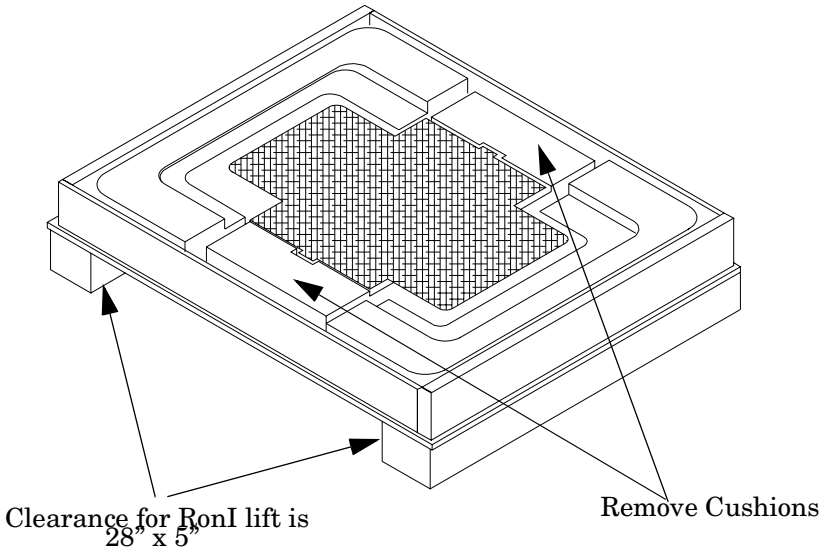
Figure 2-6 Server with Shipping Box Removed



2. Remove all cartons from the pallet, leaving only the server.

3. Remove the two foam cushions for lift access as shown in Figure 2-7.

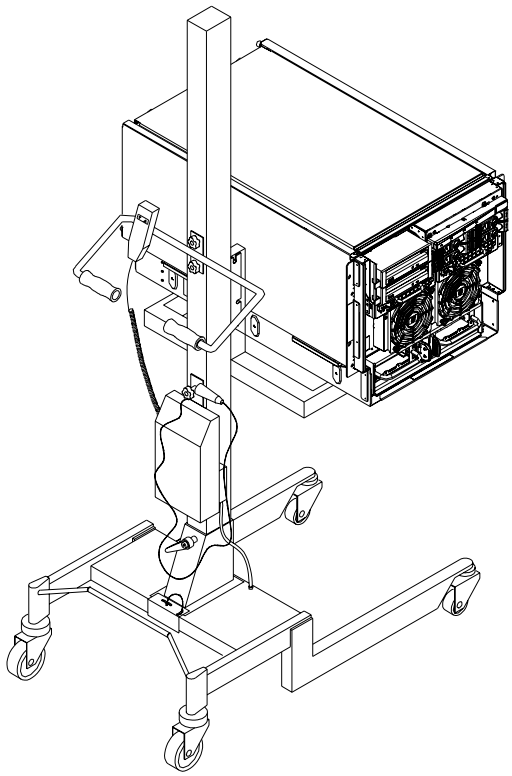
Figure 2-7 Remove Cushions for Lift Access



4. Insert the lifter forks under the server.
5. Carefully roll the lift forward until it is fully positioned against the side of the server.

6. Slowly raise the server off the pallet until it clears the pallet cushions.

Figure 2-8 Raising a Server Off the Pallet



7. 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.

NOTE When installing the system in a rack, refer to the HP *J1530B Rack Integration Kit Installation Guide*.

Unloading with Lift Handle Panels

WARNING **Use this procedure only if an HP approved lift is not available. This procedure should only be attempted by two authorized HP service technicians.**

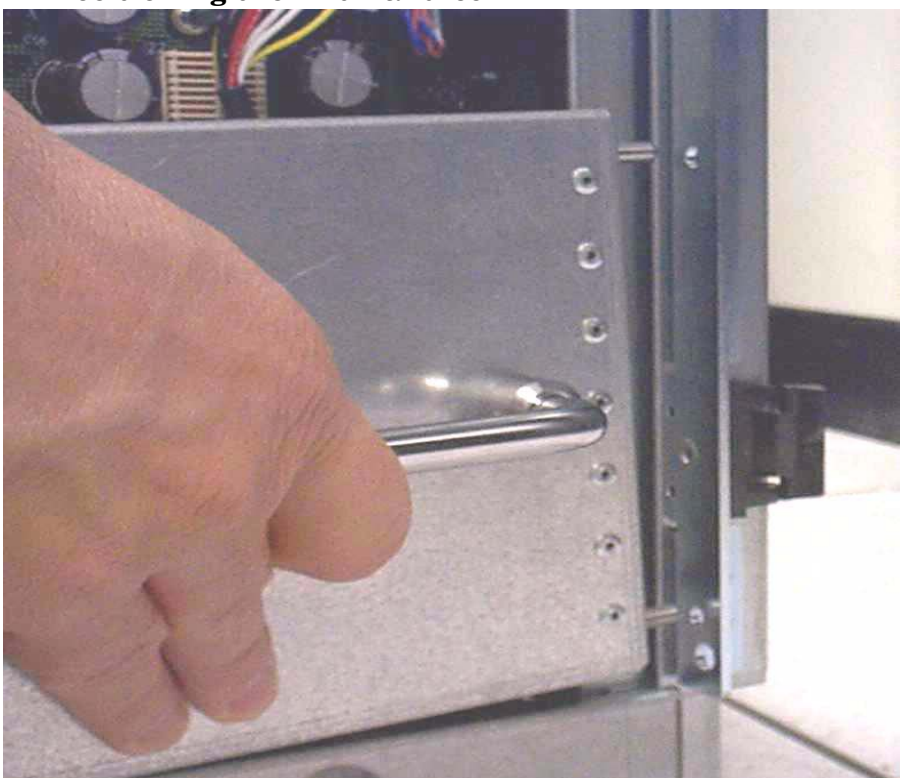
Before attempting this procedure, HP recommends that all cell boards and AC power supplies be removed. Instructions for removing these components can be found in the Removal and Replacement chapter of the service manual. Review local safety regulations before attempting to move the system, using the lift handle panels.

Failure to observe these precautions can cause serious injury to personnel or damage to equipment.

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

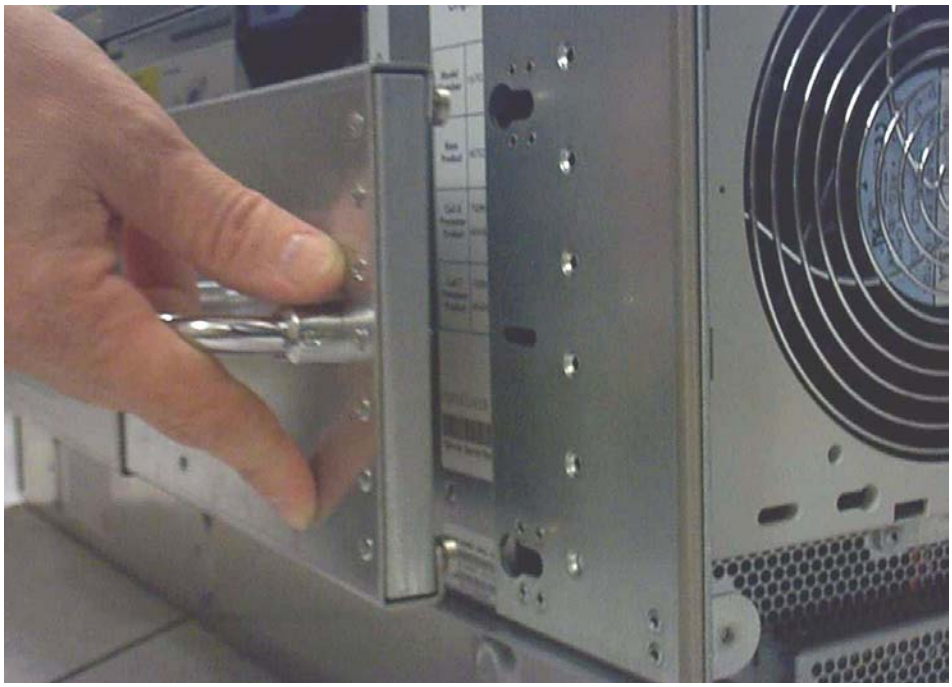
1. Remove both side covers. If present, remove the front panel.
2. Locate lift handles and remove from storage plate.
3. Orient lift handle panels such that when installed, the handles hang down at 90 degrees and lock in a horizontal position during lifting.

Figure 2-9 Positioning the Lift Handles



4. With one handle in each hand, install the pin end of the panel into the back side of the front rack mount ears on the chassis.

Figure 2-10 Inserting the Pins Into the Rack



5. Pull the string plunger out, move the handles apart, and install the shoulder washer end of the panel into the keyway feature.

Figure 2-11 Lift Handles Mounted

6. Continue to pull the handles apart until the spring plunger snaps into final position. The spring plunger will drop down into the recess position.
7. Ensure that the handles are secure by pressing the handles together and moving back and forth.
8. Repeat steps 3 through 7 for the other handle.
9. To lift the server, rotate the handles 90 degrees to horizontal position.

NOTE If installing the system in a rack, refer to the *installation guide, HP J1530B rack installation kit*.

---

10. After moving the server, remove the lift handle panels from the chassis and reinstall the server covers and front bezel. Refer to the *installation guide*, *HP J1530B rack installation kit*.

Installing Server Into the Rack

Any server that is to be installed into a rack is shipped with equipment slides. With every set of slides comes an installation guide: *installation guide, hp J1530B rack installation kit*.

3 Installing Accessories

This chapter describes the installation of those components not installed at time of delivery.

Wheel Kit Installation

Compare the packing list with the contents of the wheel kit before beginning the installation.

Table 3-1 Wheel Kit Packing List

Part Number	Description	Quantity
A6753-04013	Wheel Kit consisting of the following components:	1
A6753-04002	Right side caster cover	1
A6753-04003	Left side caster 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 nnloading ramp	1
Not Applicable	Phillips head wood screw (used to attach the ramp to the pallet)	2

Tools Required for Installation

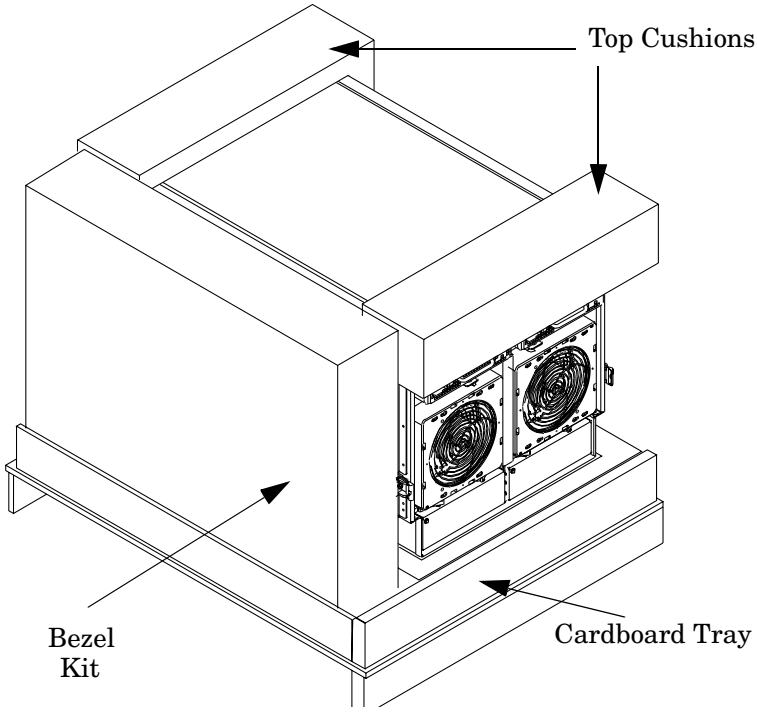
The following list provides the installer with the recommended tools to perform the wheel kit installation.

- 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.**

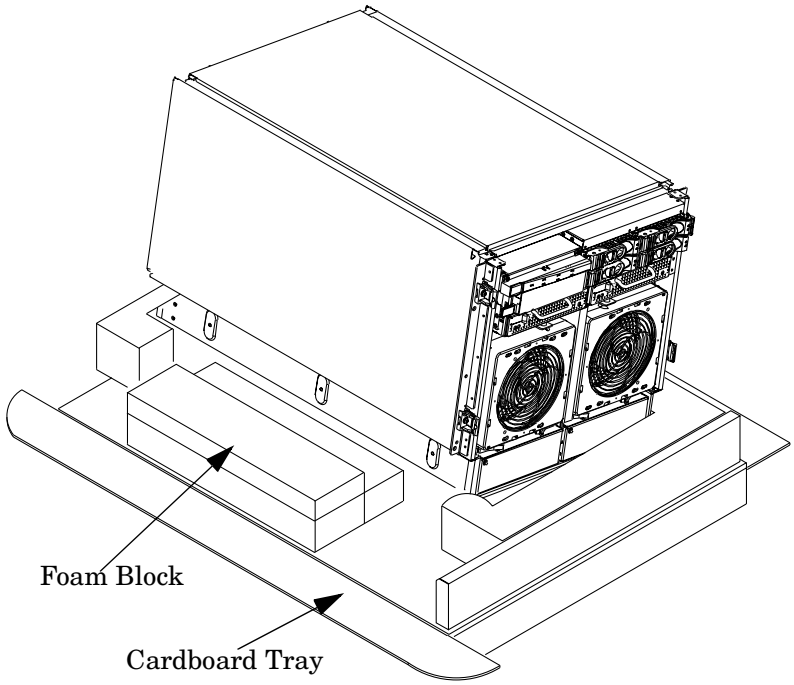
1. Cut and remove the polystrap bands securing the HP server to the pallet.
2. Lift the carton top from the cardboard tray resting on the pallet.
3. Remove the bezel kit carton and the top cushions from the pallet.

Figure 3-1 Component Locations



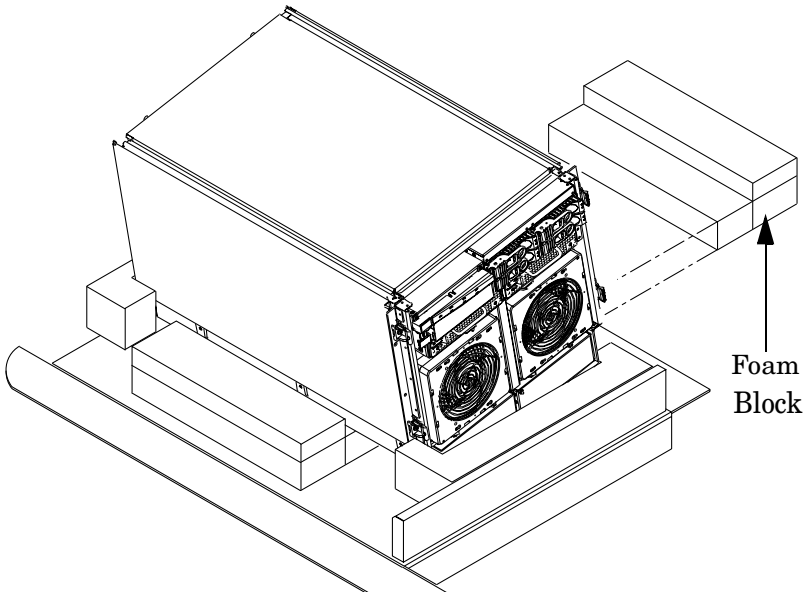
4. Unfold bottom cardboard tray.
5. Carefully tilt the server and place one of the foam blocks (A6093-44002) under the left side of the server. Do not remove any other cushions until instructed to do so.

Figure 3-2 Left Foam Block Position



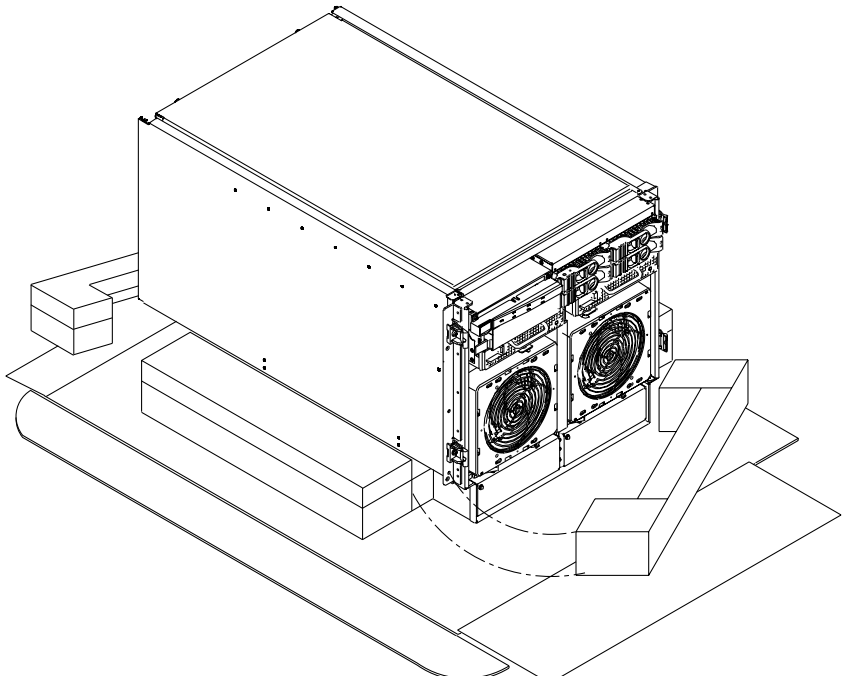
6. Carefully tilt the server and place the other foam block provided in the kit under the right side of the server.

Figure 3-3 Right Foam Block Position



7. Remove the cushions from the lower front and rear of the server. Do not disturb the side cushions.

Figure 3-4 Foam Block Removal



8. Locate and identify the caster assemblies. Use the following table to identify the casters.

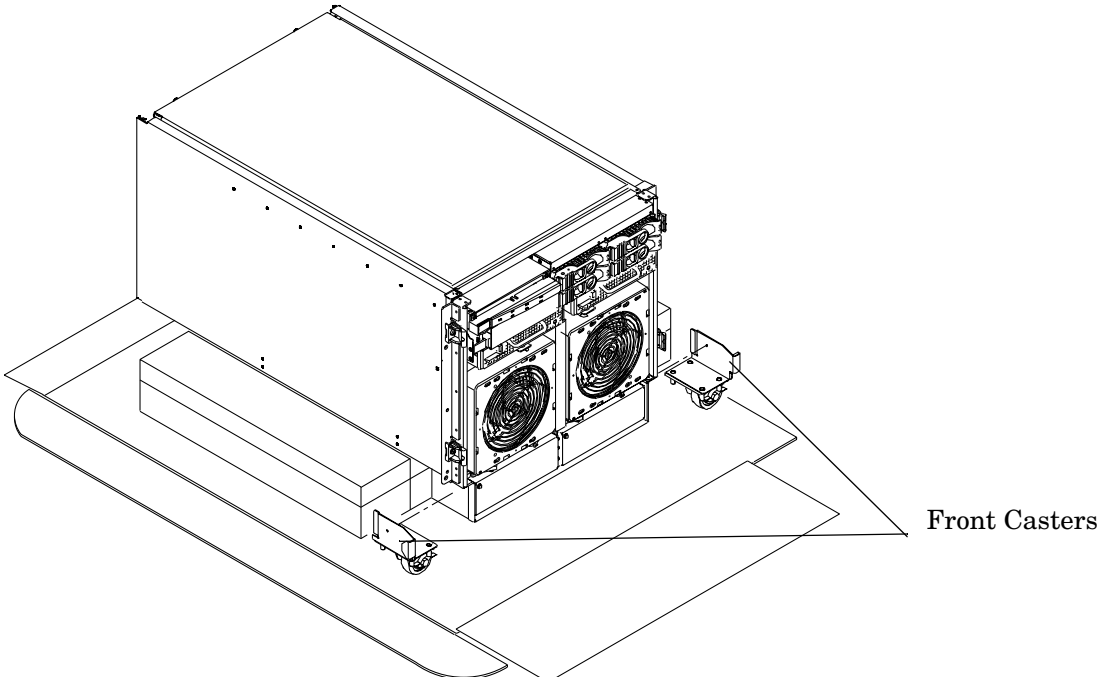
NOTE The caster part number is stamped on the caster mounting plate.

Table 3-2 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 3-5 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.

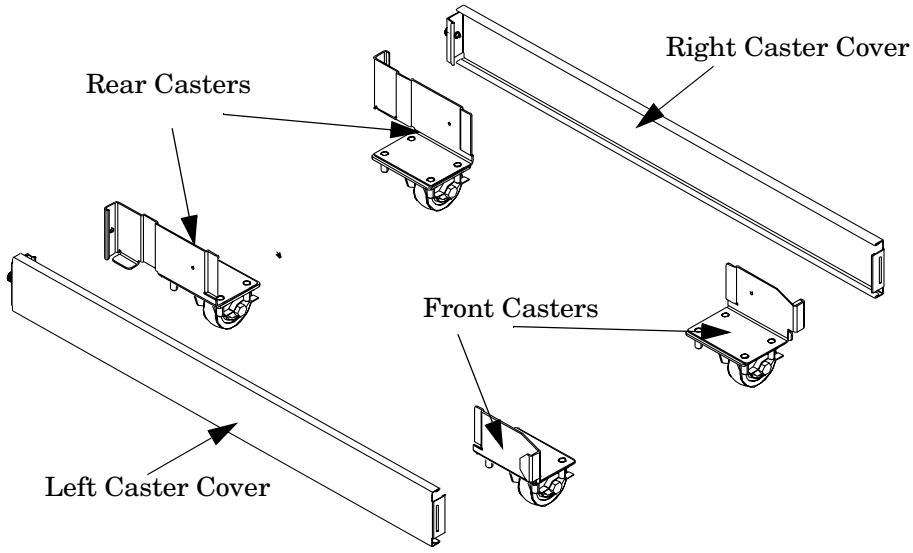
NOTE There are two pre-drilled holes in the ramp. Use the two screws taped to the ramp to attach the ramp to the pallet.

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.

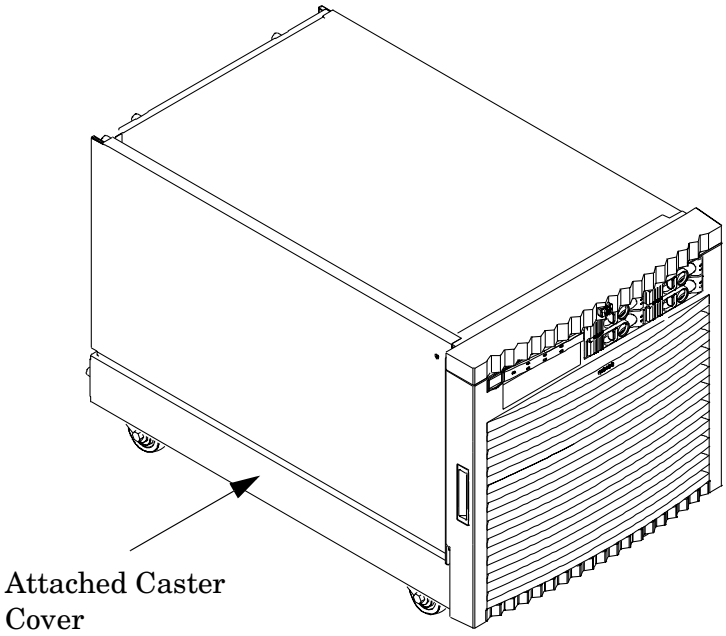
16. Insert the slot on the caster cover into the front caster. Secure the cover to the server by tightening the captive screw on the cover at the rear of the server.

Figure 3-6 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 3-7 Completed Server



PCI-X Card Cage Assembly I/O Cards

A number of PCI and PCI-X I/O cards are supported in the HP 9000 rp7420 Server. Known cards supported at the release of this manual are shown in Table 3-3.

Table 3-3 HP 9000 rp7420 Server I/O Cards

Part Number	Card Description	Number of Cards Supported (B - Bootable)
A3739B	FDDI Dual Attach	15
A6847A	Next Generation 1000B-SX	15
A6825A	Next Generation 1000B-T	15
A5149A	Ultra2 SCSI	15B
A5150A	2-port Ultra2 SCSI	15B
A5159B	2-port FWD SCSI	15B
A5230A	10/100B-TX (RJ45)	15
A5483A	ATM 622 (MMF connector)	15
A5506B	4-port 10/100B-TX	15
A5513A	ATM 155 (MMF connector)	15
A5515A	ATM 155 (UTP5 connector)	15
A5783A	Token Ring (4/16/100 Mb/s)	15
A5838A	2-port Ultra2-SCSI + 2-port 100T	15B
A5856A	RAID 4Si	12B
A6386A	Hyperfabric II	8
A6748A	8-port Terminal MUX	15
A6749A	64-port Terminal MUX	15
A6794AX	Procurium GigE LAN/SCSI combo card	2B
A6795A	2G FC Tachlite	15B
A6826A	2-port 2 Gb FC	15B
A6828A	1-port U160 SCSI	15B
A6829A	2-port U160 SCSI	15B
A7011A	1000BaseSX Dual Port	15
A7012A	1000 BaseT Dual Port	15
A7143A	U160 RAID - SmartArray 5304	12B

Table 3-3 HP 9000 rp7420 Server I/O Cards (Continued)

Part Number	Card Description	Number of Cards Supported (B - Bootable)
A7173A	2 port U320 SCSI	15B
J3525A	2-port serial (X25/FR/SDLC)	15
J3526A	4-port serial (X25/FR)	15
Z7340A	8-port ACC	16
A4800A	FWD SCSI	15B
A4926A	Gigabit Ethernet (1000B-SX)	15
A4929A	Gigabit Ethernet (1000B-T)	15
A5158A	Fibre Channel PCI Adapter	15B
A6092A	Hyperfabric (PCI 4X)	4
A9782A	PCI-X 1000Base-T GigE/2Gb Combo	15B
A9784A	PCI-X 1000Base-T GigE/2G FC Combo	15B
A9890A	SmartArray 6402 2-channel RAID	12B
A9891A	SmartArray 6404 4-channel RAID	12B
AB286A	PCI-X 2-Port 4X InfiniBand HCA (HPC)	1
AB287A	10G Ethernet	2
AB290A	U320 SCSI/GigE Combo Card	15B
AB378A	1-port 4Gb FC card PCI-X	15B
AB379A	2-port 4Gb FC card PCI-X	15B
AB465A	PCI-X 2-port 1000B-T/2-port 2Gb FC Combo	15B
AB545A	4-port 1000B-T Ethernet	15
AD278A	8-port Terminal MUX	15
AD279A	64-port Terminal MUX	15

PCI I/O Card Installation

HP 9000 rp7420 Servers implement 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 PCI I/O card installation procedures should be downloaded from the http://docs.hp.com Web site. Background information and procedures for adding a new PCI I/O card using online addition are found in the *Interface Card OL* Support Guide*.

Prerequisites for Adding a PCI I/O Card Using the Attention Button

The prerequisites for this procedure are:

- Drivers for the card have already been installed.
- There are no drivers 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 is steady **OFF** or is blinking if a user has requested the slot location.
- Refer to 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.

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

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

Step 1. Remove the top cover.

Step 2. Remove the PCI bulkhead filler panel.

Step 3. Flip the PCI MRL for the card slot to the open position. See Figure 3-8.

Step 4. Install the new PCI card in the slot.

NOTE A slow, firm pressure is needed to properly seat the card into the backplane.

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

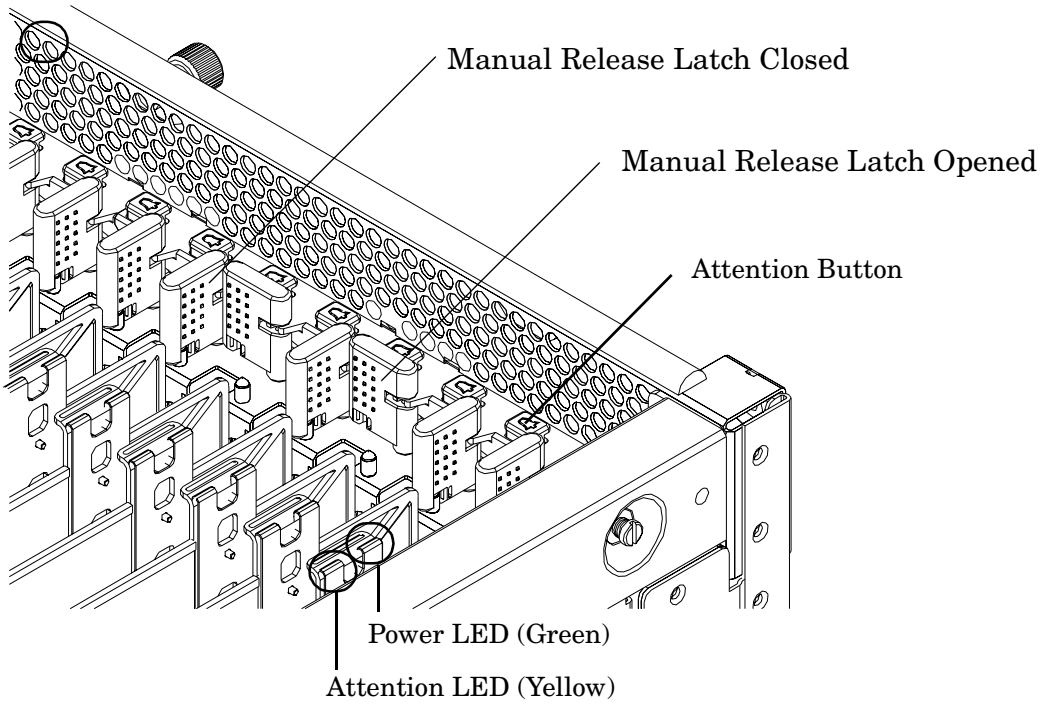
CAUTION Working out of sequence or not completing the actions within each step could cause the system to crash.

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

Step 6. Press the attention button.

The green power LED will start to blink.

Figure 3-8 PCI I/O Slot Details



Step 7. Wait for the green power LED to stop blinking and remain solid green.

Step 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. Refer to the *Interface Card OL* Support Guide* located on the Web at http://docs.hp.com for details.

Step 9. Replace the top cover.

Step 10. Connect all cables to the installed PCI card.

4 Cabling and Power Up

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

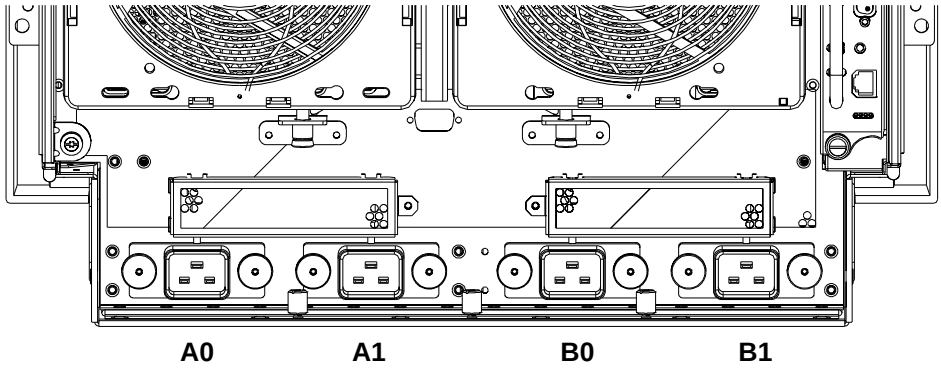
AC Input Power

The server has five line cord configurations:

- All four line cords (preferred configuration)
- Cords A0 and A1 only
- Cords B0 and B1 only
- Cords A0 and B0 only
- Cords A1 and B1 only

A single-line-cord configuration is not allowed.

Figure 4-1 Power Cord Configuration

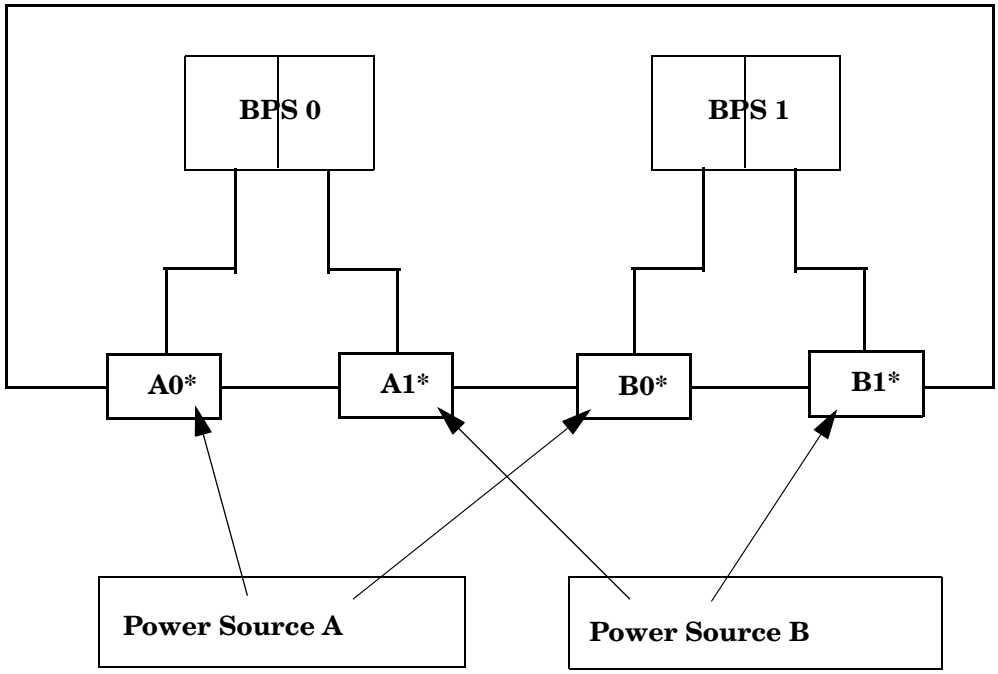


The power cord configuration is passed to the operating system using the `pwrgrd` (Power Grid) command. Each of the five selections in the `pwrgrd` command matches one of the configurations. The appropriate option should be selected for the actual line cord configuration. With the correct configuration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

```
prompt> pwrgrd
Power grid configuration preference.
1. Grid A only (Cords A0,B0 required)
2. Grid B only (Cords A1,B1 required)
3. Grids A & B (Cords A0,A1,B0,B1 required)
4. Cords A0 & B0 only
5. Cords A1 & B1 only
Select Option:
```

If two separate power sources are available, the two power supplies can be plugged into the separate power sources, increasing system reliability should one power source fail.

Figure 4-2 Power Source versus. Power Distribution



***180-269 VAC**

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.**

NOTE System firmware prevents boot when a single power cord configuration is detected.

Voltage Check

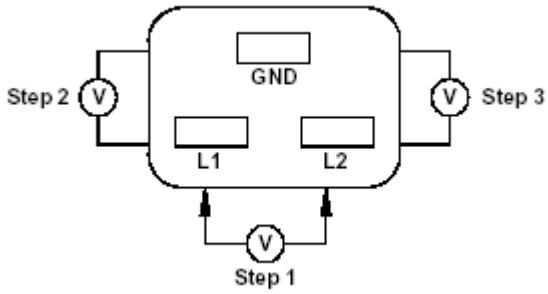
This section provides voltage check information for use on the customer site. The emphasis focuses on measuring the voltages at the power cord plug end specified as an IEC 320 C19 type plug. This end plugs directly into the back of the HP 9000 rp7420 Server chassis.

NOTE These procedures must be performed for each power cord that will be plugged directly into the back of the HP 9000 rp7420 Server. If the expected results from this procedure are not observed during the voltage check, see the next section titled “Voltage Check (Additional Procedure).”

Voltage Range Verification of Receptacle

This measures the voltage between L1 and L2, L1 to ground, and L2 to ground. Three separate measurements are performed during this procedure. See Figure 4-3 for voltage reference points when performing the following measurements.

Figure 4-3 Voltage Reference Points for IEC 320 C19 Plug



IMPORTANT These measurements must be performed for every power cord that plugs into the HP 9000 rp7420 Server.

Step 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 measured should be between 200–240 V AC regardless of the geographic region.

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

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

Table 4-1 provides single phase voltage measurement examples dependent on the geographic region where these measurements are taken.

Table 4-1 Single Phase Voltage Examples

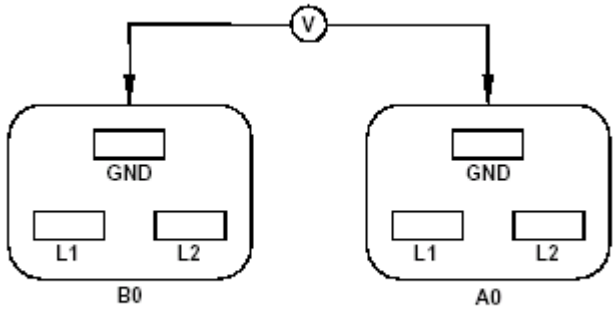
	Japan	North America	Europe[a]
L1-L2	210 V	208 V or 240 V	230 V
L1-GND	105 V	120 V	230 V
L2-GND	105 V	120 V	0 V

a. In some European countries there might not be a polarization.

Safety Ground Verification

This measures the voltage level between B0 and A0. The measurement is taken between ground pins of the two power cords. See Figure 4-4 for ground reference points when performing this measurement.

Figure 4-4 Safety Ground Reference Check



Step 1. Measure the voltage between B0 and A0. Take the AC voltage down to the lowest scale on the volt meter.

Step 2. Insert one probe into the ground pin for B0.

Step 3. Insert the other probe into the ground pin for A0.

Step 4. 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 cords into the HP 9000 rp7420 Server.

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.

This procedure must be performed if the previous voltage check procedure did not yield the expected results as previously outlined.

NOTE If a UPS is used, refer to applicable UPS documentation for information to connect the server and to check the UPS output voltage. UPS User Manual documentation is shipped with the UPS. Documentation can also be found at http://www.hp.com/racksolutions.

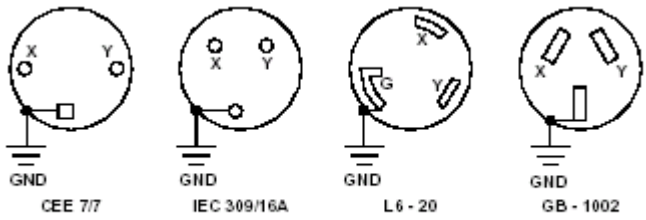
Step 1. Verify that site power is **OFF**.

Step 2. Open the site circuit breakers.

Step 3. Verify that the receptacle ground connector is connected to ground. See Figure 4-5 for connector details.

Step 4. Set the site power circuit breaker to **ON**.

Figure 4-5 Wall Receptacle Pinouts



WARNING **There is a risk of shock hazard while testing primary power. Use properly insulated probes.**

Step 5. Verify that the voltage between receptacle pins x and y is between 200 and 240 V AC.

Step 6. Set the site power circuit breaker to **OFF**.

Step 7. Ensure that power is removed from the server.

Step 8. Route and connect the server power connector to the site power receptacle.

- For locking type receptacles, line up the key on the plug with the groove in the receptacle.
- 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 might result in injury to personnel or damage to equipment when AC power is applied to the cabinet.**

Step 9. Set the site power circuit breaker to **ON**.

Step 10. Set the server power to **ON**.

Step 11. Check that the indicator light on each power supply is lit.

MP Core I/O Connections

Each HP 9000 rp7420 Server can have up to two MP Core I/O board sets installed. Which allows two partitions to operate, or MP Core I/O redundancy in a single partition configuration. Each MP 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/PCI-X expansion card bay. Only the primary MP 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 board, only two internal disks can be accessed.

MP/SCSI Connections

The MP/SCSI board is required to update firmware, access the console, turn partition power on/off, access all but two of the internal peripherals, and use other features of the system.

Connections to the MP/SCSI board include the following:

- DB25 Connector, by way of the M cable

  This RS232 connector provides connections for a local console, external modem, and a UPS. The server end of the M cable terminates in a DB25 connector. The opposite side of the cable terminates in three DB9 connectors labeled CONSOLE, UPS, and REMOTE.
- 10/100 Base-T LAN RJ45 connector (for LAN and Web Console access).

  This LAN uses standby power and is still active if the front panel power switch is off and AC is present.
- Internal LVD Ultra 160 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
- Internal LVD Ultra 160 SCSI channel for connections to internal mass storage
- External LVD Ultra 160 SCSI channel connected to a 68-pin VHDCI connector
- 10/100/1000 Base-T LAN RJ45 connector

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

Management Processor Access

NOTE To access the Management Processor for the initial installation, the M cable must first be connected to the DB25 connector located on the primary MP/SCSI board. The primary MP/SCSI board is located in the lower MP/SCSI board slot.

Setting Up the Customer Engineer Tool (PC)

The Customer Engineer (CE) Tool is usually a laptop. It allows communication with the MP in the HP 9000 rp7420 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 LAN IP addresses
- Shutting down cell board power

Communication with the MP is established 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/none (parity)
- 9600 baud
- na (Receive)
- na (Transmit)

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

1. From the Reflection 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 terminal type VT100.
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 allows direct communications with the MP. **Only one window can be created** on 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 M cable connector labeled CONSOLE.
2. Connect the other end of the RS-232 cable to the CE Tool.

Standby Power and Logging in to the MP

After connecting the serial device, it is possible to log in to the Management Processor (MP). Housekeeping power (also known as standby power) is generated as soon as AC power is applied to the server. Because the MP uses standby 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 +48 V DC.

Before powering up the HP 9000 rp7420 Server 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.

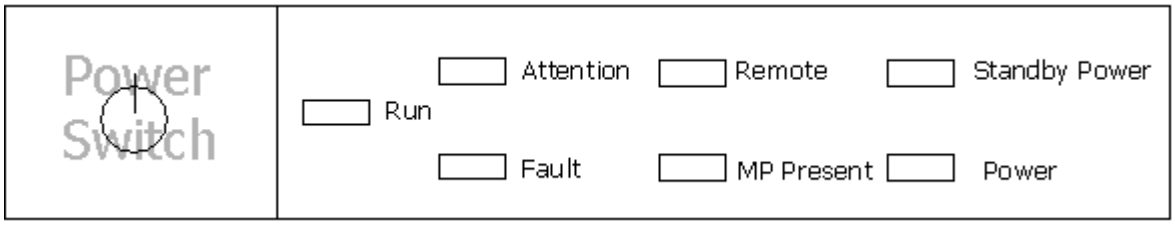
   The preferred tool is the CE Tool running Reflection.

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

1. Connect the server to AC power.

On the front of the HP 9000 rp7420 Server, a solid green **Standby Power** LED, a solid green **MP Present** LED, and a flashing amber **Attention** LED will illuminate after about 30 seconds.

Figure 4-6 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 flash amber.
   - After 30 seconds has elapsed. The flashing amber BPS LED for each BPS becomes a flashing green LED.

   Refer to 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, be sure 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 4-7 MP Main Menu

```
                        Welcome to the

                   rp7420 Management Processor

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                        Version A.0.017


    MP MAIN MENU:

         CO: Consoles
        VFP: Virtual Front Panel (partition status)
         CM: Command Menu
         CL: Console Logs
         SL: Show Event Logs
         HE: Help
          X: Exit Connection

MP> _
```

Configuring LAN Information for the MP

To set the MP LAN IP address:

1. At the MP Main Menu prompt (MP>), enter **cm**. From the MP Command Menu prompt (MP:CM>), enter **lc** (for LAN configuration).

   The default values are displayed, and a prompt, asking if default values are to be modified, is displayed. It is a good idea to write down the information, because it might be required for future troubleshooting.

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

Enter **lc** and press the **Return** key. The following screen is displayed:

Figure 4-8 The lc Command Screen

```
MP:CM> LC

This command modifies the LAN parameters.

Current configuration of MP LAN interface
  MAC address  : 00:30:6e:05:09:24
  IP address   : 15.99.83.215   (0x0f6353d7)
  Hostname     : quartz-s
  Subnet mask  : 255.255.255.0          (0xffffff00)
  Gateway      : 15.99.83.254   (0x0f6353fe)
  Status       : UP and RUNNING
  AutoNegotiate : Enabled
  Data Rate    : 100 Mb/s
  Duplex       : Half
  Error Count  : 0
  Last Error   : none


    Do you want to modify the configuration for the customer LAN? (Y/[N]) q
MP:CM>
```

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

2. At the prompt, *Do you want to modify the configuration for the customer LAN?*, enter **y**.

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

3. Enter **y**.
4. Enter the new IP address.

   The customer must provide this address for network interface 0.

5. Confirm the new address.
6. Enter the MP Network name.

   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.

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

   This information must come from the customer.

8. The system indicates the parameters have been updated and returns to the MP Command Menu prompt (MP:CM>).
9. Enter the **ls** command at the MP Command Menu prompt (MP:CM>) to check the LAN parameters and status.

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

Figure 4-9 The ls Command Screen

```
MP:CM> LS

Current configuration of MP LAN interface
  MAC address  : 00:30:6e:05:09:24
  IP address   : 15.99.83.215   (0x0f6353d7)
  Hostname     : quartz-s
  Subnet mask  : 255.255.255.0          (0xffffff00)
  Gateway      : 15.99.83.254   (0x0f6353fe)
  Status       : UP and RUNNING
  AutoNegotiate : Enabled
  Data Rate    : 100 Mb/s
  Duplex       : Half
  Error Count  : 0
  Last Error   : none

MP:CM>
```

To return to the MP Main Menu, enter **ma**.

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. The Web browser allows access to the server through the LAN port on the core I/O card. MP configuration must be done from an ASCII console.

NOTE The MP 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:

Step 1. Connect to the MP using a serial connection.

Step 2. Configure the MP LAN. Refer to “Configuring LAN Information for the MP”.

Step 3. Type **CM** to enter the Command Menu.

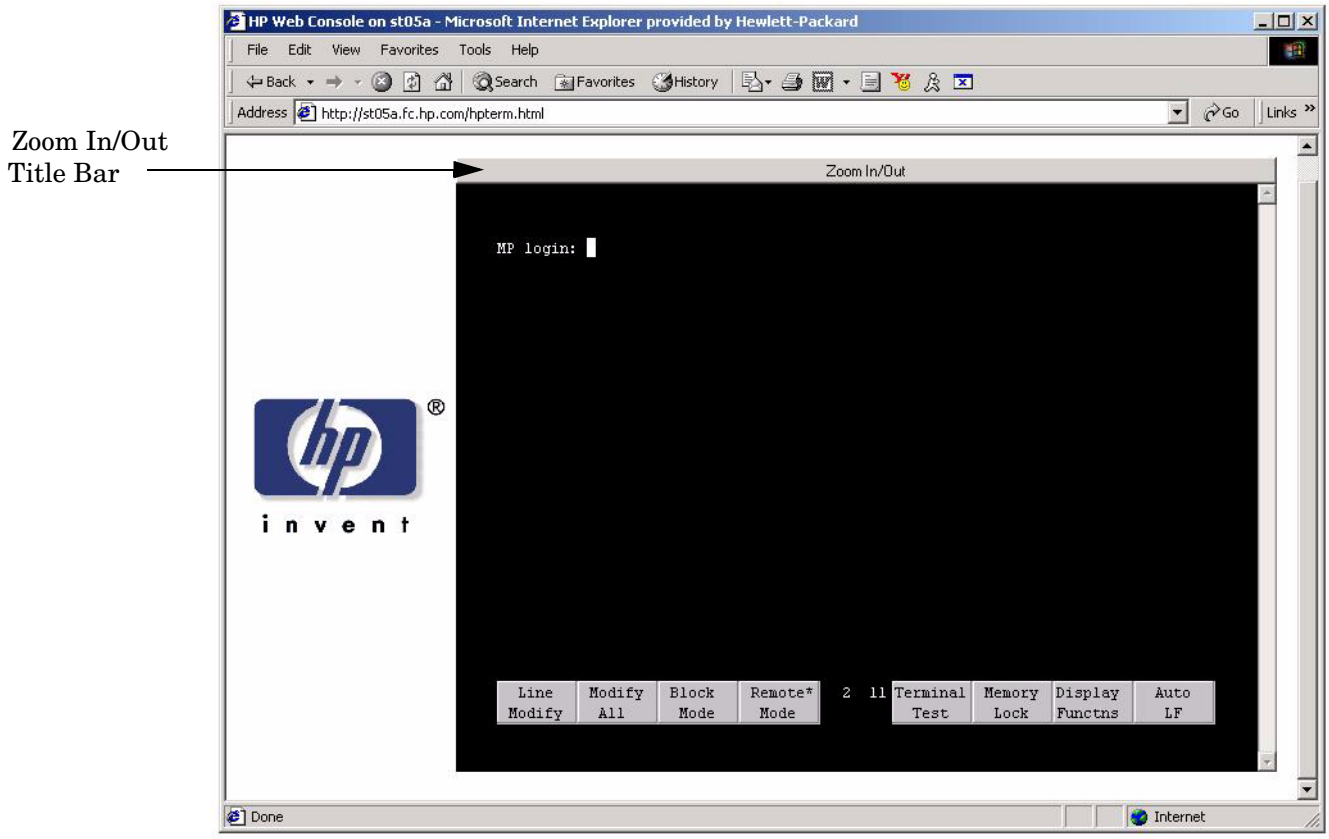
Step 4. Type **sa** at the MP:CM> prompt to display and set MP remote access.

Figure 4-10 Example sa Command

```
MP:CM> sa

This command displays and allows modification of access parameters.

    T - Telnet access           : Enabled.
    M - Modem access            : Enabled.
    W - Web Console             : Enabled (SSL NOT active).
    N - Network Diagnostics     : Disabled.
    I - IPMI Lan access         : Disabled.

    Select access mode to change : w

    The following options are available for Web access:
          1 - Web access disabled
          2 - Web access enabled
          3 - Secure web access enabled
    Select option:
```

Step 5. Launch a Web browser on the same subnet using the IP address for the MP LAN port.

Figure 4-11 Browser Window



Step 6. Click anywhere on the Zoom In/Out title bar to generate a full screen MP window.

Step 7. Select the emulation type you want to use.

Step 8. Login to the MP when the login window appears.

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

Verifying 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.

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. A screen similar to the following is displayed:

Figure 4-12 The du Command Screen

```
MP:CM> DU

The following MP bus devices were found:
+---+----+-----+-------+------+-----------+
|   |    |     |       |      |           |
|   |    | Sys |       | PCI  |    BPS    |
|Cab|  MP |Bkpln| Cells |Domain|           |
| # |    |     |  0 1  | 0  1 |    0 1    |
+---+----+-----+-------+------+-----------|
| 0 | *  |  *  |  * *  | *  * |    * *    |
+---+----+-----+-------+------+-----------+

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 4-12 shows that cells are installed in slots 0 and 1. In the cabinet, cells should be physically located in slots 0 and 1.

Booting the HP 9000 rp7420 Server

After powering on the MP, +3.3 V Housekeeping power, and verifying that the MP detects the presence of the cell boards, power up the server.

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

- A window showing all activity in the complex. Following the installation procedure in this manual 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.
- A window showing activity for a single partition.

  To display activity for each partition as it powers up:

  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 More than one window cannot be opened using a serial display device.

To power on the server:

1. Switch the power switch at the front of the server to **On**. The following events occur:
   - Power is applied to the server.
   - PDC starts to run on each cell.
   - The cell self test executes.
   - Hardware initializes for the server.
   - Console communication is established.
2. When activity on the Reflection screen stops, return to the MP Main Menu by entering **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 Management Processor

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 Command Menu
5. Go to the Console Menu by entering **co** at the MP Main Menu.

Exiting the MP should automatically return to the Boot Console Handler main menu.

Verifying the System Configuration using Boot Console Handler

From the BCH main menu, enter **in** to go the Information Menu. Use the corresponding command from the menu to verify the type and quantity of processors, memory, and I/O cards:

- pr (Processors)
- me (Memory)
- io (Check the PCI device information to determine if the values match the devices installed in the server)

Once the parameters have been verified, use the ma command to return to the BCH Main Menu.

Booting HP-UX using Boot Console Handler

If 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, use the pa (path) command (from the Configuration Menu) to set boot path.

1. Main Menu: Enter command or Menu> **co**
2. Configuration Menu> **pa pri xx/xx/xx**
3. Configuration Menu> **ma**

Once the Primary Path has been set, use the bo (boot) command (from the Main Menu) to boot HP-UX.

1. Main Menu: Enter command or Menu> **bo pri**
2. The following prompt is displayed:

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

   Enter **n**.

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 On Demand

The Instant Capacity On Demand (iCOD) 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.

Internally, iCOD systems physically have more CPUs, called iCOD CPUs, than the number of CPUs actually purchased. These iCOD CPUs reside in the purchased system, but they belong to HP and therefore are HP assets. A nominal “Right-To-Access Fee” is paid to HP for each iCOD processor in the system. At any time, any number of iCOD CPUs can be “activated.” Activating an iCOD CPU automatically and instantaneously transforms the iCOD CPU into an instantly ordered and fulfilled CPU upgrade that requires payment. After the iCOD CPU is activated and paid for, it is no longer an iCOD CPU, but is now an ordered and delivered CPU upgrade for the system.

The most current information on installing, configuring, and troubleshooting iCOD can be found at http://docs.hp.com

NOTE Ensure that the customer is aware of the iCOD email requirements. Refer to http://docs.hp.com for further details.

Using the Checklist

The following checklist is an installation aid and should be used only after you have installed several systems using the detailed procedures described in the body of this manual. 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 4-2 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				
	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)					

Table 4-2 Factory-Integrated Installation Checklist (Continued) (Continued)

PROCEDURE		IN-PROCESS		COMPLETED	
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					
Configure remote login (if required). See Appendix B.					
Verify remote link (if required)					
Install non-factory, integrated I/O cards (if required)					

Table 4-2 Factory-Integrated Installation Checklist (Continued) (Continued)

PROCEDURE		IN-PROCESS		COMPLETED	
	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)					

5 Troubleshooting

This chapter contains information about the various status LEDs on the HP 9000 rp7420 Server and other troubleshooting information.

Common Installation Problems

The following sections contain general procedures to help you locate installation problems.

CAUTION Replace the top cover before operating the server, even for a short time. Otherwise, overheating can damage chips, boards, and mass storage devices. However, you can safely remove the PCI access panel while the server is running to remove and replace PCI hot-plug cards. For any other service activity requiring access to the processor baseboard or I/O backplane, power down the server and observe all safety precautions.

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:

1. Check all cable and power connections, including those in the rack, and so on.
2. 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.
3. Verify all cables and boards are securely plugged in to the appropriate connectors or slots.
4. Remove all extra options, such as disk drives, one at a time, checking the affect of each on the server.
5. Unplug the power cords, wait 20 seconds, plug-in the power cords and restart the server.
6. If a hardware error is suspected, follow these steps:
   a. Log users off the LAN and power down the server.
   b. Extend the server out of the rack and remove the top cover.
   c. Simplify the server to the minimum configuration.

      The minimum configuration consists of the following:

      - One cell
      - Two processors
      - One quad of memory DIMMS (size 256 MB or larger)
      - One MP/SCSI card
      - One LAN/SCSI card
      - System backplane
      - PCI-X backplane
      - One BPS
      - Two PCI power modules
      - Two power cords
7. Remove all third-party options and reinstall each one, one at a time, checking the server after each installation.
8. Replace the top cover and reconnect cables. Boot the server. If it does not function properly, refer to the procedures in the following section.

The Server Does Not Power On

Use these steps to check for power related problems:

1. Check each BPS LED.

   The LED is located in the lower left hand corner of the power supply face. Table 5-3 shows the states of the LEDs.

   A yellow LED indicates that the line cord connections are not consistent with the `pwrgrd` settings.

2. Verify that the power supply and both power cords are plugged in to the chassis.

The Server Powers On Then Shuts Down with a Fault Light

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

1. Ensure that a conductive item has not been dropped or left inside the server chassis.
2. Check the connections on all boards.
3. Check the system backplane for bent pins.

Use the ps command at the Command Menu to display detailed power and hardware status for selected system hardware.

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 in order for the MP to recognize that the cell board is powered up and functioning 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 the cell board is extracted, then reinserted and 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 5-1 for a sample of the output. If the state is “**RDY**” (all caps), it means that the “ready bit” is true. If the state is “**rdy**” (lower case) it means that the “ready bit” is false. The meaning of each of these states is listed below.

Figure 5-1 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 CCO cci I2C PWR)
Attention Led is off

Power Status : 0x7c (12VSTBY 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

Table 5-1 Ready Bit States

Ready Bit State	MP:>CM DE command status	Meaning
True	“RDY” (upper case)	All cell VRMs installed, and both cell latches are locked.
False	“rdy” (lower case)	One or more VRMs not installed or failed, and/or one or more cell latches not locked.

HP 9000 rp7420 Server LED Indicators

The server has LEDs that indicate the health of the server. This section defines those LEDs.

Front Panel LEDs

There are seven LEDs located on the front panel.

Figure 5-2 Front Panel with LED Indicators

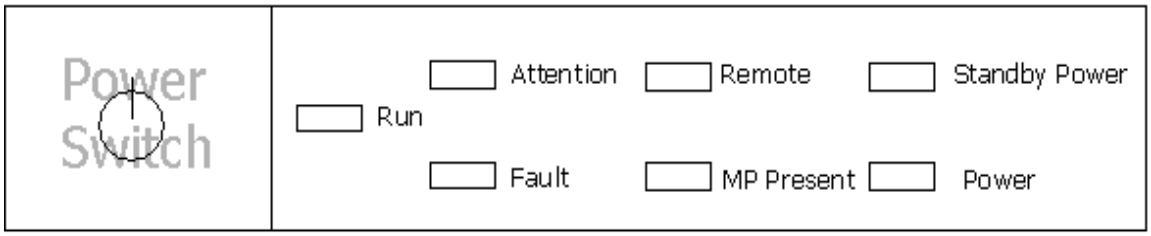


Table 5-2 Front Panel LEDs

LED	Driven By	State	Description
Power	GPM[a]	On Green	48V Good (LED works even if MP is not installed, or installed and not active)
		Off	48V Off
Standby Power	GPM	On Green	3.3V standby good (LED works even if MP is not installed, or installed and is not active)
		Off	3.3V standby Off
MP Present	GPM	On Green	At least one MP is installed and active
		Off	No MPs are installed or at least one is installed but not active
Remote	MP through GPM	On Green	Dial-in (remote) console enabled
		Off	Dial-in (remote) console is disabled, or MP is not installed, or MP is installed and not active
Attention	MP through GPM	Flash Yellow	Chassis log alert unread
		Off	No alert, or MP is not installed, or MP installed and is not active
Run	PDC/MP through GPM	On Green	One or more partitions running
		Off	No partition running, or MP is not installed, or MP is installed and not active

Table 5-2 Front Panel LEDs (Continued)

LED	Driven By	State	Description
Fault	PDC/MP via GPM	Flash Red	One or more partitions have reported a fault
		Off	No partitions running, or MP not installed, or MP installed and not active

a. GPM stands for global power monitor

Bulk Power Supply LEDs

There is a single three-color LED on each BPS.

Figure 5-3 BPS LED Locations

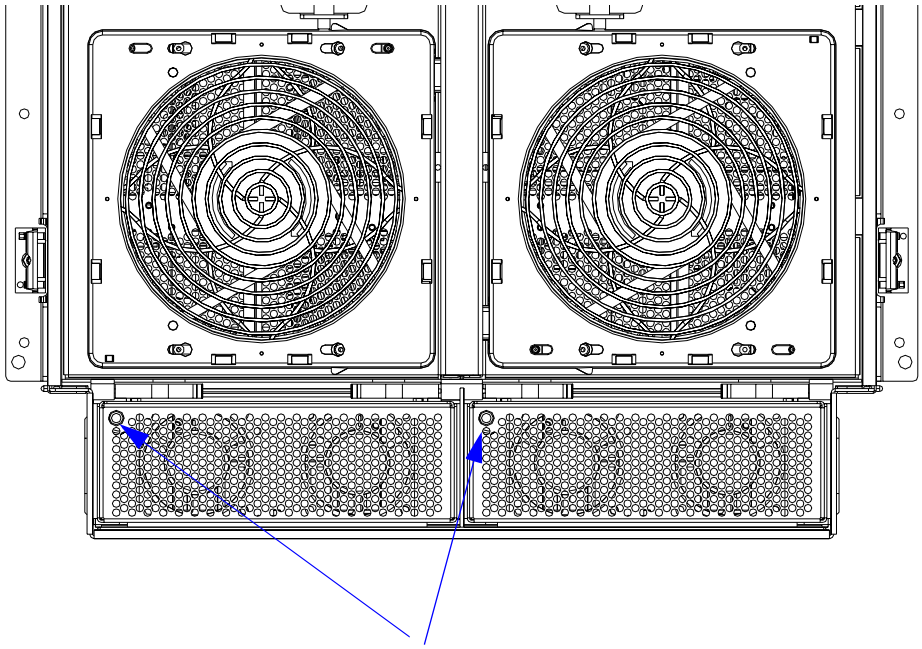


Table 5-3 BPS LEDs

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

Table 5-3 BPS LEDs (Continued)

LED Indication	Description
Yellow	BPS is in standby state with recoverable fault(s) present but no non-recoverable faults
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 Power Supply LEDs

There are three LEDs on the PCI power supply. Green and yellow LEDs follow OL* operation. A multi-color LED reports warnings and faults.

Figure 5-4 PCI Power Supply LED Locations

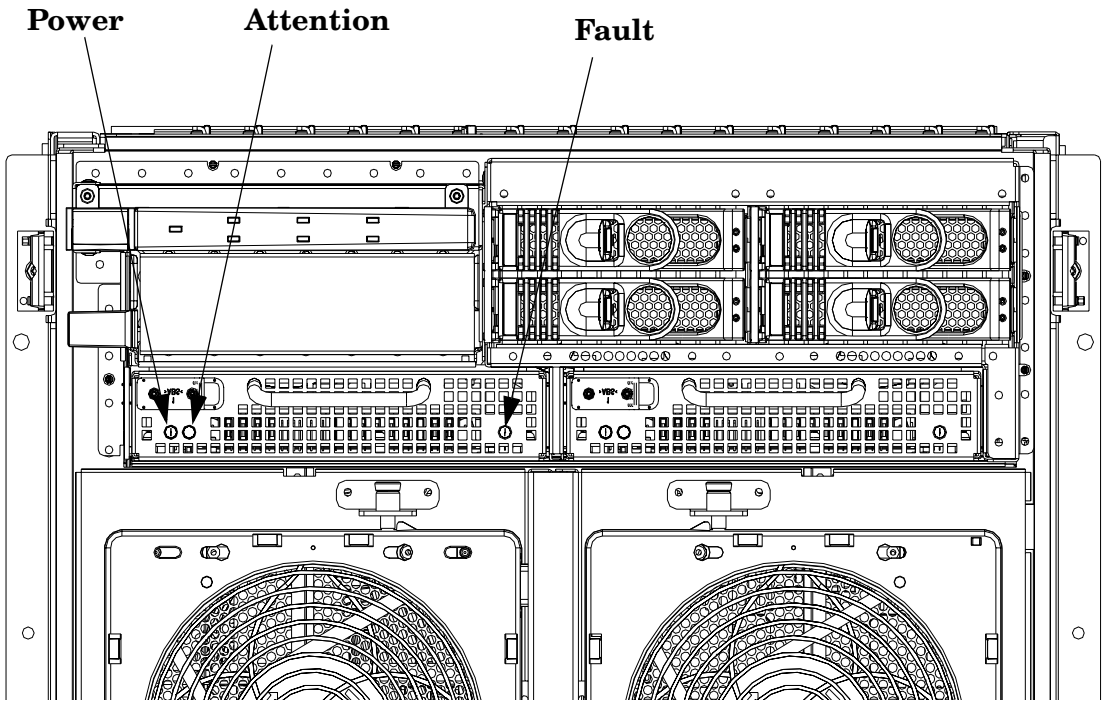


Table 5-4 PCI Power Supply LEDs

LED	Driven By	State	Description
Power	Each supply	On Green	All output voltages generated by the power supply are within limits.
		Off	Power to the I/O chassis or the entire system has been removed.
Attention	MP through PCI LPM[a]	Yellow	See Table 5-9 for LED status in combination with the green power LED for PCI-X slot status.
Fault	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.

a. LPM stands for local power monitor.

System and PCI I/O Fan LEDs

There is a single three-color LED on each system and PCI I/O fan.

Figure 5-5 Front, Rear and PCI I/O Fan LEDs

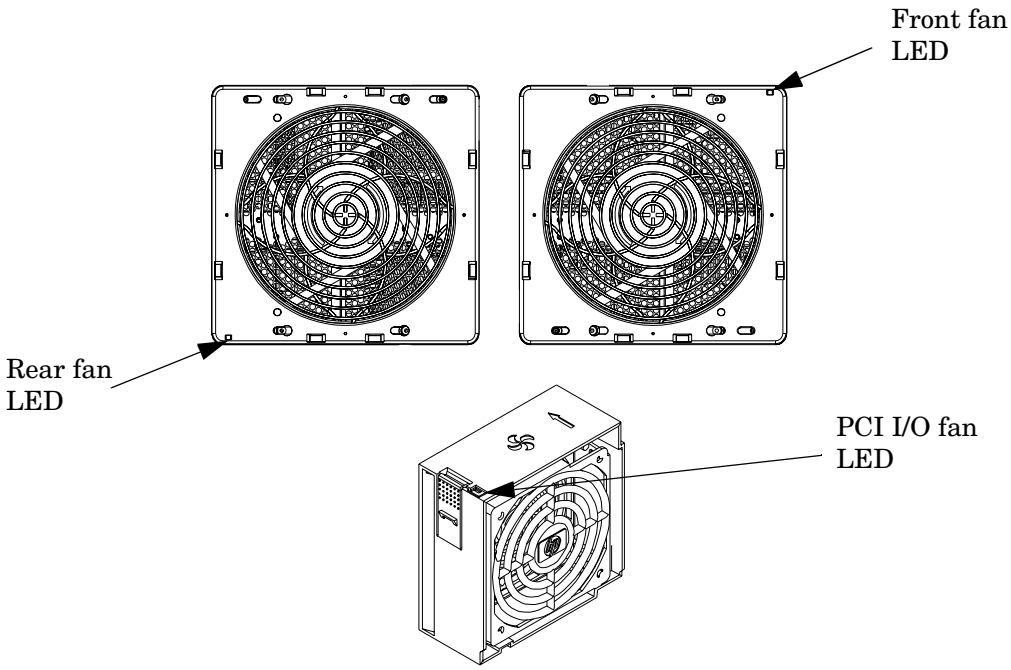


Table 5-5 System and PCI I/O Fan LEDs

LED	Driven By	State	Description
Fan Status	Fan	On Green	Normal
		Flashing Yellow	Predictive failure
		Flashing 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 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 5-6 Cell Board LED Locations

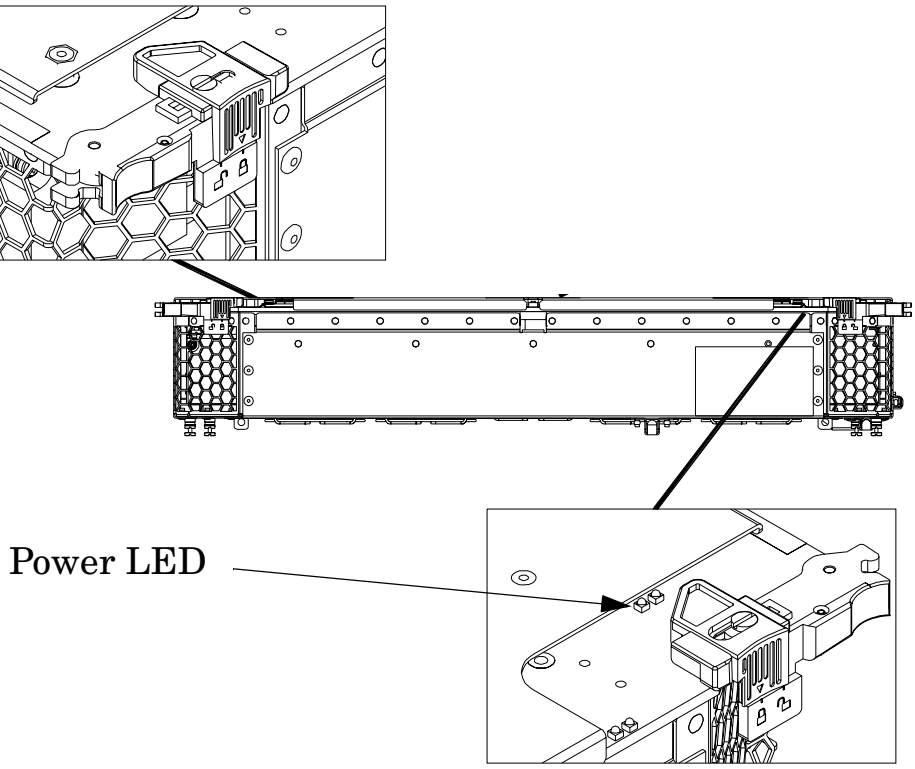


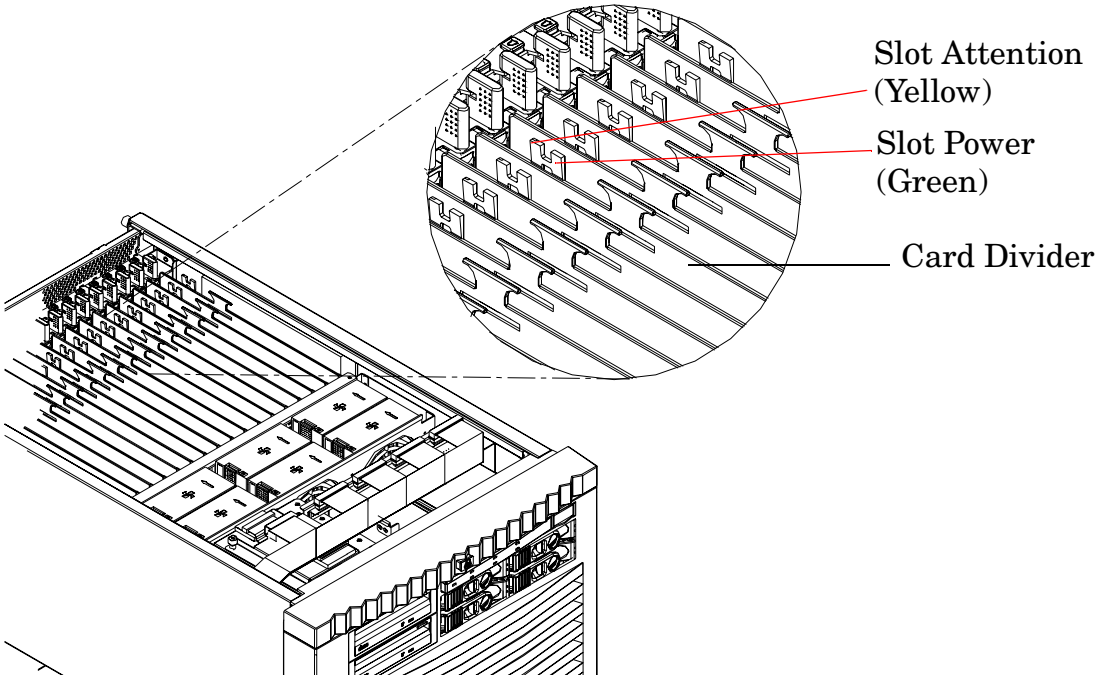
Table 5-6 Cell Board OL* LED Indicators

Location	LED	Driven by	State	Description
On cell board (located in the server cabinet)	Power	Cell LPM	On Green	3.3V Standby and Cell_Pwr_Good
			Off	3.3V Standby off, or 3.3V Standby on and no Cell_Pwr_Good
	Attention	MP through GPM	Flash Yellow	Safe to remove the cell board from the system

PCI OL* Card Divider LEDs

The PCI OL* card LEDs are located on each of the 16 PCI-X slot dividers in the PCI-X chassis area. The green power LED indicates whether power is supplied to the card slot. The yellow attention LED states are defined in Table 5-9.

Figure 5-7 PCI OL* LED Locations



Core I/O LEDs

The core I/O LEDs in Table 5-7 on page 83 are located on the bulkhead of the installed core I/O PCA.

Figure 5-8 Core I/O Card Bulkhead LEDs

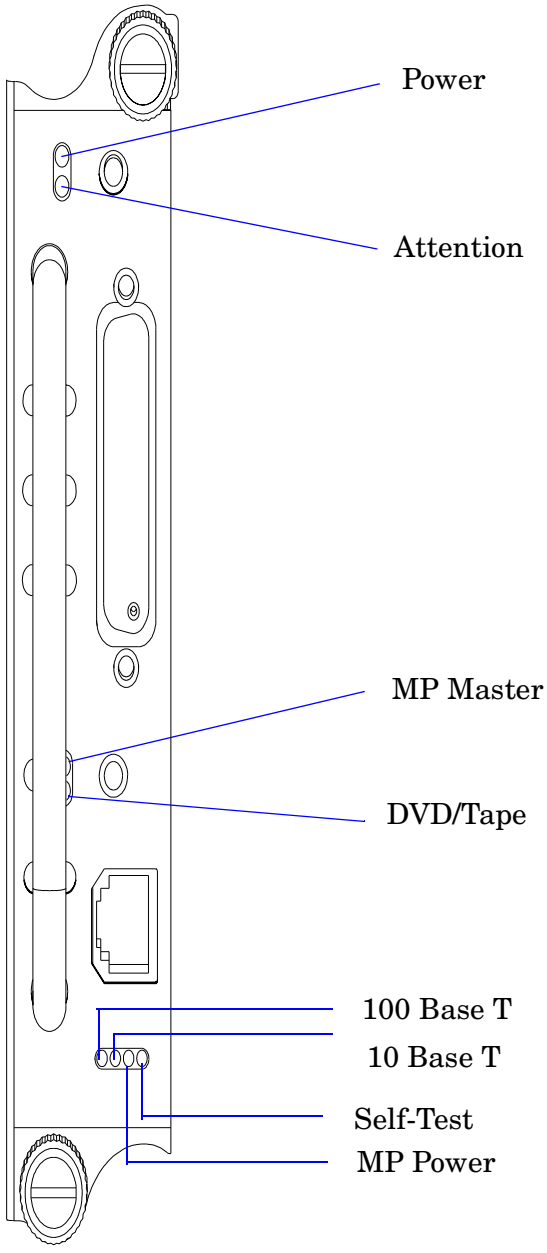


Table 5-7 Core I/O LEDs

LED (as silk-screened on the bulkhead)	State	Description
Power	On Green	I/O power on
Attention	On Yellow	PCI attention
MP Master	On Green	Core I/O is managing the system
DVD/Tape	On Green	Core I/O is managing the DVD/Tape
Self-Test	On Yellow	Failure during POST
MP LAN Act	On Green	MP LAN activity
MP LAN 10 BT	On Green	MP LAN in 10 BT mode
MP LAN 100 BT	On Green	MP LAN in 100 BT mode

Core I/O Buttons

There are two recessed buttons on the back of the core I/O card, as explained in Table 5-8.

Figure 5-9 Core I/O Button Locations

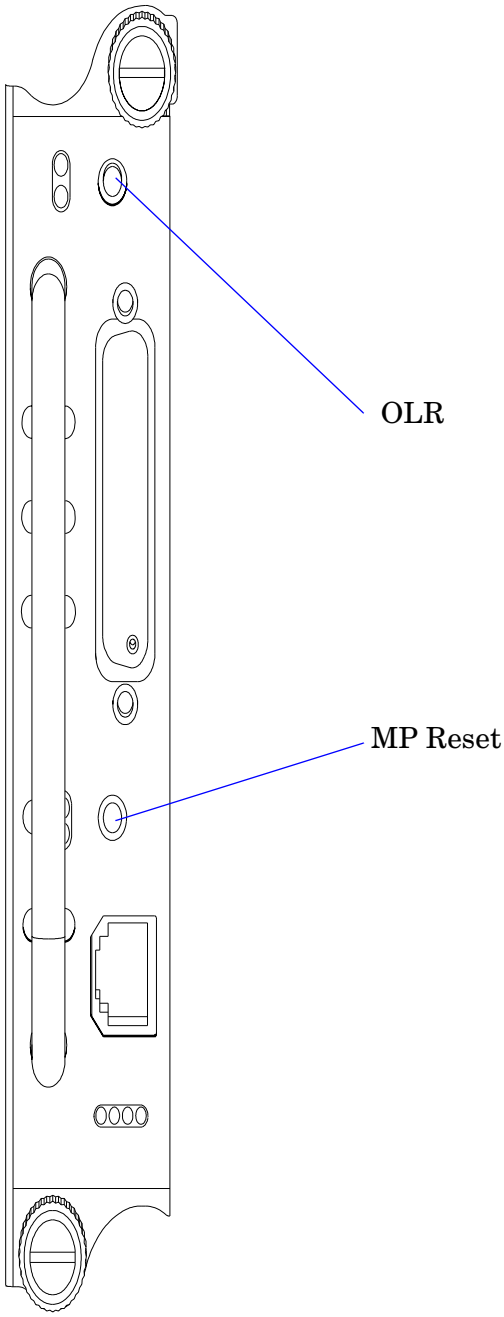


Table 5-8 Core I/O Buttons

Button Identification (as silk-screened on the bulkhead)	Location	Function
MP RESET	Center of the core I/O card	Resets the MP **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 **Remote/Modem Port Parameters** • Disabled
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 5-9 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 5-10 Disk Drive LED Location

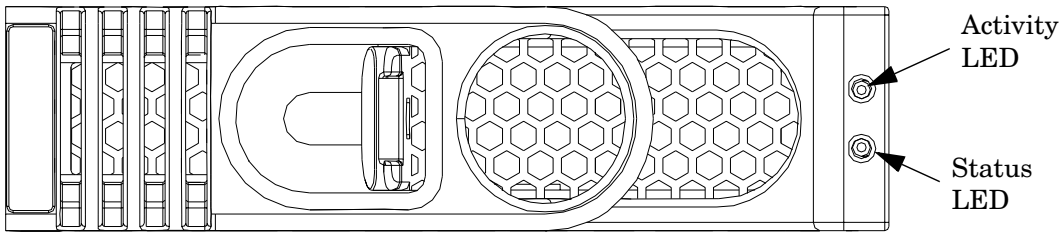


Table 5-10 Disk Drive LEDs

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

Table 5-10 Disk Drive LEDs (Continued)

Activity LED	Status LED	Flash Rate	Description
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

Server Management Subsystem Hardware Overview

Server management for the HP 9000 rp7420 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. It also communicates with the operating console and session gettys by universal asynchronous receiver-transmitters (UARTs) on the core I/O PCI bus.

Connection to the management processor is by way of two 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 0, since the master MP is always the MP on the core I/O board in slot 0.

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 0 is the master MP and provides all of the server management functions. The MP on the core I/O board in slot 1 is a slave MP and redirects the operating system gettys to the master MP over an internal MP-to-MP link. All external connections to the MP must be to the master MP in slot 0. The slave MP ports will be disabled.

For high availability (HA), the server powers up and powers down without an MP. Booting HP-UX without an MP depends on the ability of the operating system to boot without a console getty. Thus, in a two-partition system, the partition with a failed MP might not boot, since the MP provides the console getty.

The server configuration cannot be changed without the 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

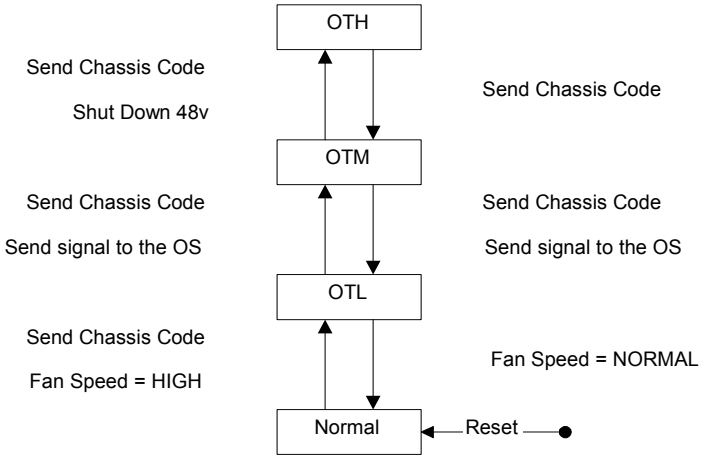
Server Management Behavior

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. To this end, the ambient temperature of the server is broken into four ranges: normal, overtemp low (OTL), overtemp medium (OTM), and overtemp high (OTH). Figure 5-11 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 5-11 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 5-11, 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 PCI-X 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 nine front fans, twelve 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.

Server Management Commands

Table 5-11 lists the server management commands.

Table 5-11 Management Commands

Command	Description
BO	Boot a partition
DF	Display FRU Information of an Entity
MA	Return to Main Menu
MR	Modem reset
PE	Power entities on or off
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 5-12 lists the server status commands

Table 5-12 Status Commands

Command	Description
CP	Display partition cell assignments
HE	Display the list of available commands
LS	Display LAN connected console status
MS	Display modem status
PS	Display detailed power and hardware configuration status

Table 5-13 lists the server system and access configuration commands

Table 5-13 System and Access Configuration Commands

Command	Description
CA	Configure Asynchronous and Modem parameters
CC	Initiate a Complex Configuration

Table 5-13 System and Access Configuration Commands (Continued)

CG	Generate ssl key pair and self signed certificate
CP	Display partition cell assignments
DATE	Set the time and date
DC	Reset parameters to default configuration
DE	Display entity status
DI	Disconnect Remote or LAN console
DFW	Duplicate firmware
DU	Display devices on bus
FW	Firmware update utility
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
PWRGRD	Allows user to configure the power grid
RL	Re-key complex profile lock
RU	Reset MP bus device
SA	Display and Set MP Remote Access
SO	Configure security options and access control
XD	MP Diagnostic and reboot

Firmware Updating

The server MP pulls a firmware update from an FTP server over the management LAN.

Instructions

- The user logs in to the server console through the LAN, local serial, or remote serial locations.
- The user types 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.

DFW—Duplicate Firmware

- Access Level: Administrator
- Scope: Complex
- Description: This command allows field support personnel to copy firmware already installed on the system to an equivalent entity in the same complex.

Figure 5-12 illustrates the output and questions requiring responses. After 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 before 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 5-12 should not be used as an upgrade procedure and is provided only as an example.

Figure 5-12 Firmware Update Command Example

Firmware Upgrade and Downgrade Procedures

Use these instructions to upgrade or downgrade system firmware.

CAUTION If updating any firmware, be sure to update the core I/O field programmable gate array (FPGA) first and then AC power cycle before updating any firmware.

IMPORTANT Read these instructions in their entirety before performing any firmware update.

Step 1. Ensure the operating system(s) is shut down.

Step 2. Install the MP core I/O FPGA, ensure you get a successful load message then AC power cycle.

Step 3. Install the cell PDHC firmware, ensure a successful load message is received then AC power cycle.

Possible Error Messages

- Could not ping host
- Could not validate cyclic redundancy check (CRC) of packet
- Could not find firmware update
- Invalid password

6 Removing and Replacing Components

This chapter describes how to shut down nPartitions, power off the server and remove and replace hardware components in the server.

HP 9000 rp7420 Server Customer Replaceable Units

These procedures are intended for use by trained and experienced service personnel only.

Hot-plug CRUs

A Customer Replaceable Unit is defined as hot-plug if it can be removed from the chassis while the system remains operational but requires software intervention before removing the CRU.

The following hardware components are hot-pluggable CRUs:

- Disk Drive
- Core I/O Board
- 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 removing the CRU.

The following list identifies the hot-swap CRUs in the HP 9000 rp7420 Server.

- Front Smart Fan Assembly
- Rear Smart Fan Assembly
- PCI-X Fan Assembly
- BPS

Other CRUs

To remove and replace the CRUs that are neither hot-plug, nor hot-swap, HP-UX must be shut down in the nPartition where the CRU resides, and power to the CRU must be turned off before removing it. See “Powering down Hardware Components and Powering on the Server” on page 101 for complete instructions.

These CRUs include:

- CD/DVD/DAT Drive
- PCI Power Module

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 ESD. Carefully observe the precautions and recommended procedures in this manual to prevent component damage from static electricity.

CAUTION Connect to ground with a wrist strap. Connection can be made to any grounded metal assembly in the cabinet. Both you and the electronic devices must be grounded to avoid static discharges that can cause damage.

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, Part number A3024-80004.
- 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 they are ready to be installed.
- Avoid working in carpeted areas, and keep body movement to a minimum while installing accessories.

Powering down Hardware Components and Powering on the Server

When you remove and replace hardware, you may need to power off hardware components as part of the remove and replace procedure.

This section gives details on how to power off and on hardware components.

Powering Off Hardware Components

To power off individual components or the entire cabinet:

Step 1. Log in to the management processor (MP) of the server.

Step 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.

HP-UX on the nPartition must be shut down before you power off any of the hardware assigned to the nPartition.

When you are certain the nPartition is not running HP-UX, you can power off components that belong to the nPartition.

Step 3. Access the MP Command menu.

From the MP Main menu, enter **CM** to access the Command menu.

Step 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.

Step 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.

Step 6. If you need to disable *all power* in the entire cabinet, you also must disconnect all power cords to disable all housekeeping power.

IMPORTANT Because of power redundancy capabilities, it is important that each power cord plug into its proper receptacle. Label all power cords to indicate into which receptacle each cord plugs. Ensure that the cabinet power has been turned off before disconnecting any power cords.

Step 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:

Step 1. If needed, reconnect all power cords to the appropriate receptacles and power on the system.

Step 2. Use the MP Command menu PE command to power on the hardware component that was powered off and replaced.

Step 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.

Step 4. Reboot each nPartition.

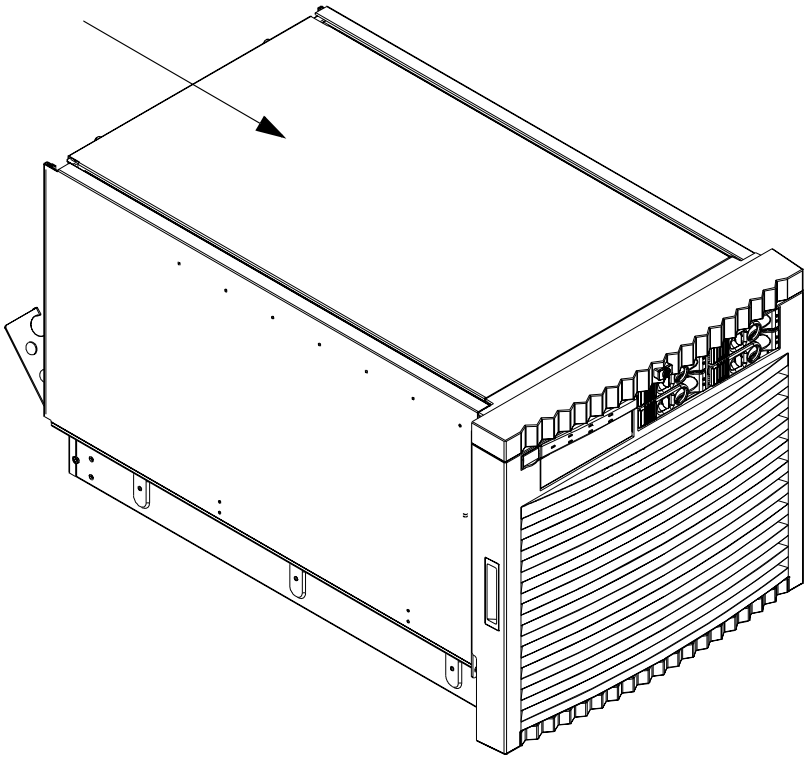
Step 5. Verify system functionality by using the On-line Diagnostic Support Tools Manager (STM) exerciser.

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.

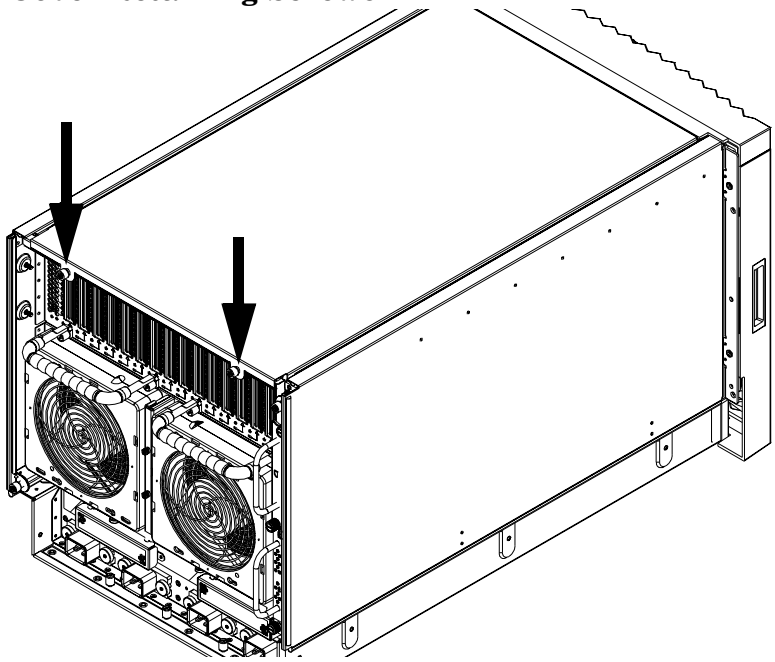
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Figure 6-1 Top Cover



Removing the Top Cover

Figure 6-2 Top Cover Retaining Screws



Step 1. Loosen the retaining screws securing the cover to the rear of the chassis.

Step 2. Slide the cover toward the rear of the chassis.

Step 3. Lift the cover up and away from the chassis.

Replacing the Top Cover

Step 1. Slide the cover into position. It should easily slide into position. Use a slow, firm pressure to properly seat the cover.

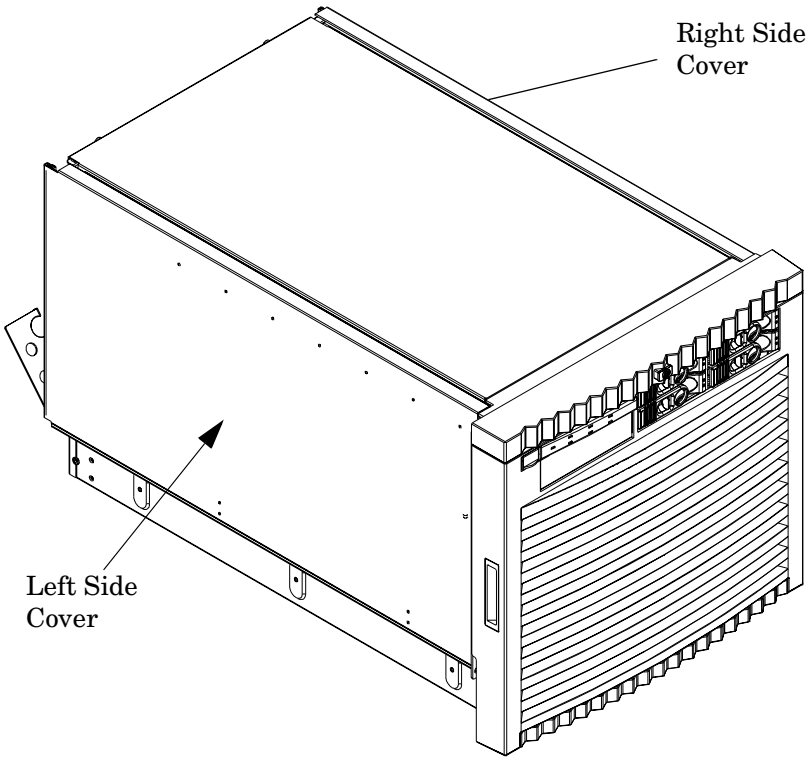
Step 2. Tighten the retaining screws to secure the cover to the chassis.

Removing and Replacing a Side Cover

It is necessary to remove and replace one or more of the covers to access the components within the server chassis.

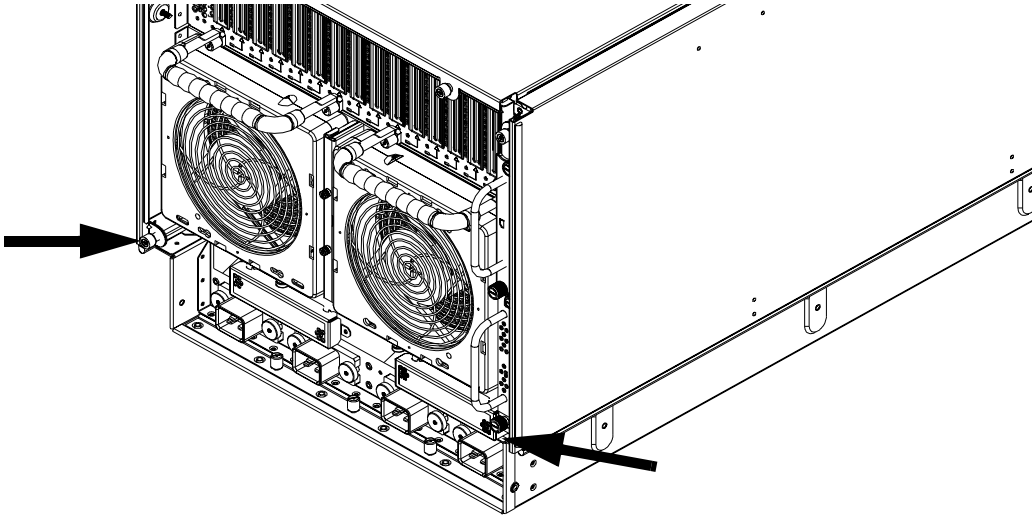
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Figure 6-3 Side Cover Locations



Removing a Side Cover

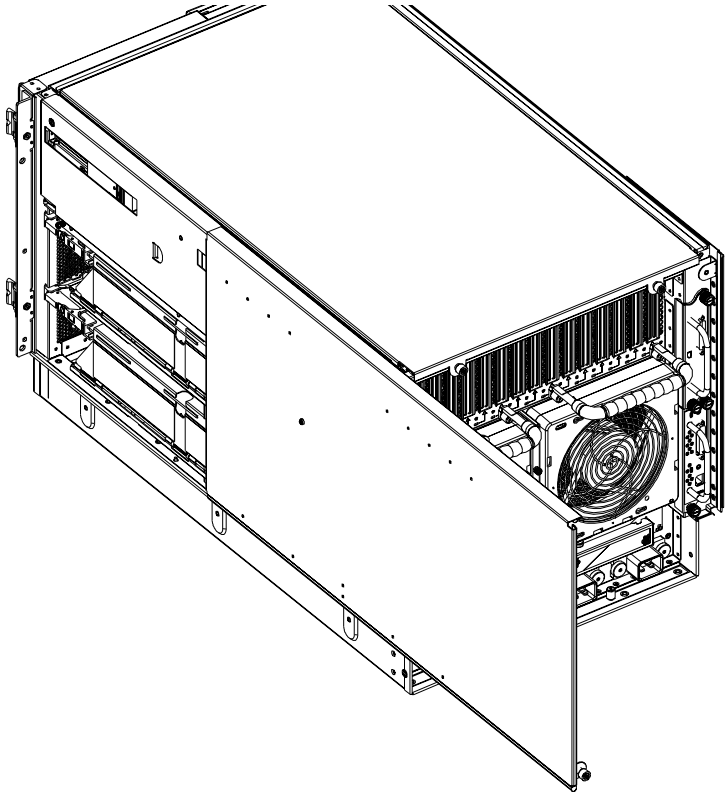
Figure 6-4 Side Cover Retaining Screw



Step 1. Loosen the retaining screw securing the cover to the chassis.

Step 2. Slide the cover from the chassis.

Figure 6-5 Side Cover Removal Detail



Replacing a Side Cover

Step 1. Slide the cover in position.

Step 2. The cover easily slides into position. Use a slow, firm pressure to properly seat the cover.

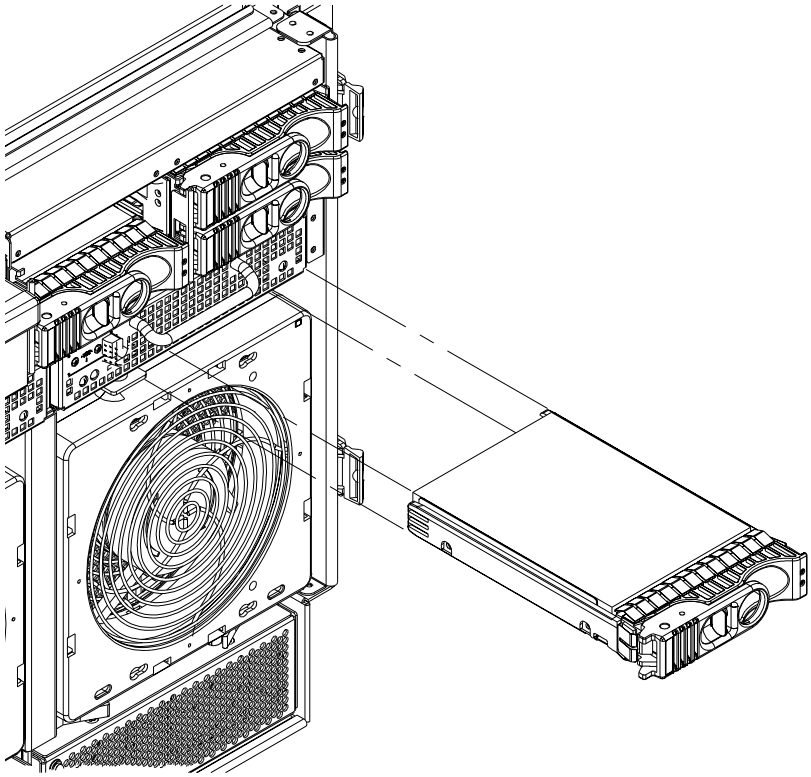
Step 3. Tighten the retaining screw to secure the cover to the chassis.

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 down Hardware Components and Powering on the Server” on page 101 for more information. The remainder of the internal disk drives are hot-pluggable.

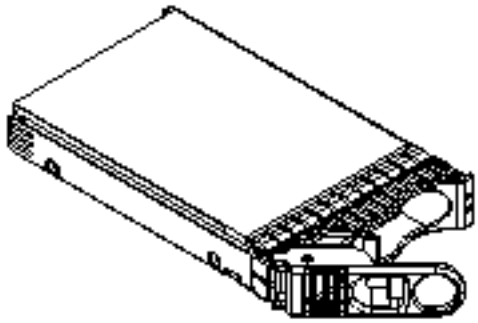
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Figure 6-6 Disk Drive Location



Removing a Disk Drive

Figure 6-7 Disk Drive Detail



Step 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.

Step 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.

Step 1. Before installing the disk drive, enter the following command:

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

Step 2. Enter the following command:

```
#ioscan -f
```

The response message after running this command is:

```
NO_HW
```

Step 3. Be sure the front locking latch is open, then position the disk drive in the chassis.

Step 4. Slide the disk drive into the chassis. Use a slow, firm pressure to properly seat the connection.

Step 5. Depress the front locking latch to secure the disk drive in the chassis.

Step 6. Spin up the disk by entering one of the following commands:

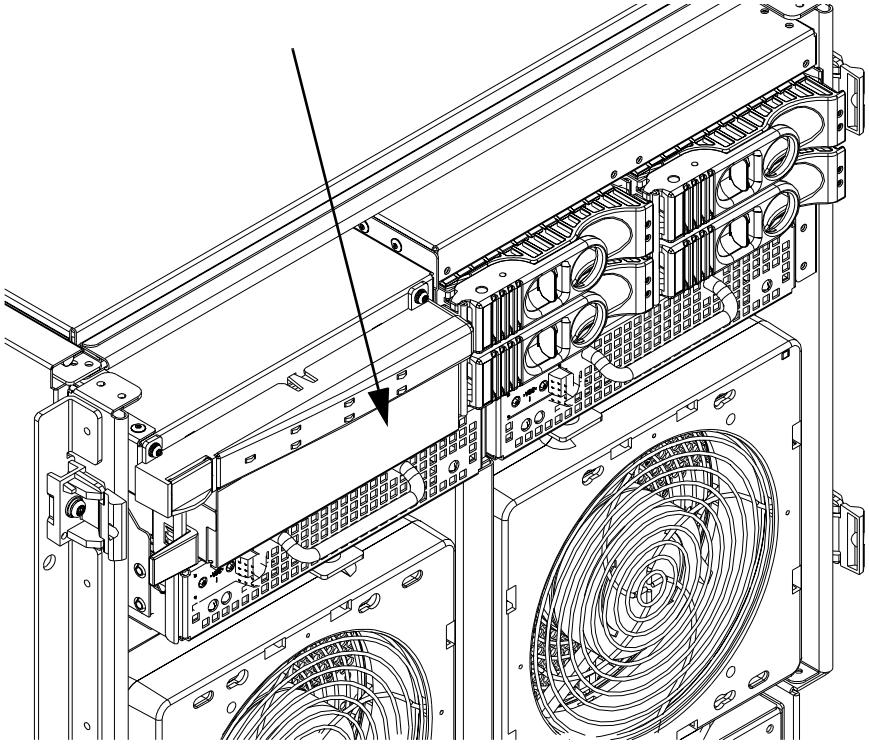
```
#diskinfo -v /dev/rdsk/cxtxdx
#ioscan -f
#pvcreate
#vgcfgrestore
```

Removing and Replacing a CD/DVD/DAT Drive

The CD/DVD/DAT 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 down Hardware Components and Powering on the Server” on page 101 for more information.

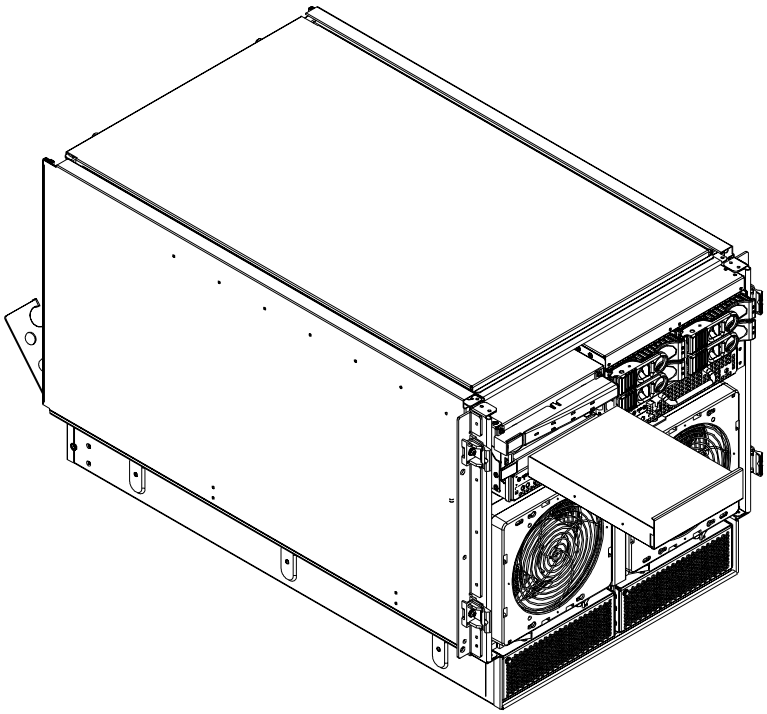
CAUTION Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Figure 6-8 CD/DVD/DAT Location



Removing a CD/DVD/DAT Drive

Figure 6-9 CD/DVD/DAT Detail



Step 1. To remove the CD/DVD/DAT, depress the front locking latch to release the drive from the chassis.

Step 2. Slide the drive far enough from the chassis to disconnect the cables from the rear of the CD/DVD/DAT.

Step 3. Slide the drive completely out of the chassis.

Step 4. Remove the rails and clips from the drive.

Replacing a CD/DVD/DAT Drive

CAUTION Before attempting to install the drive into the chassis, position the data cable over the top of the drive to avoid pinching the cable during installation.

Step 1. Attach the rails and clips to the drive.

Step 2. Partially slide the drive into the chassis and connect the cables to the rear of the CD/DVD/DAT.

Step 3. Fully slide the drive into the chassis.

Step 4. The drive easily slides into the chassis. Use a slow, firm pressure to properly seat the drive and the release latch goes into the locked position.

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 6-10 Front Smart Fan Assembly Locations

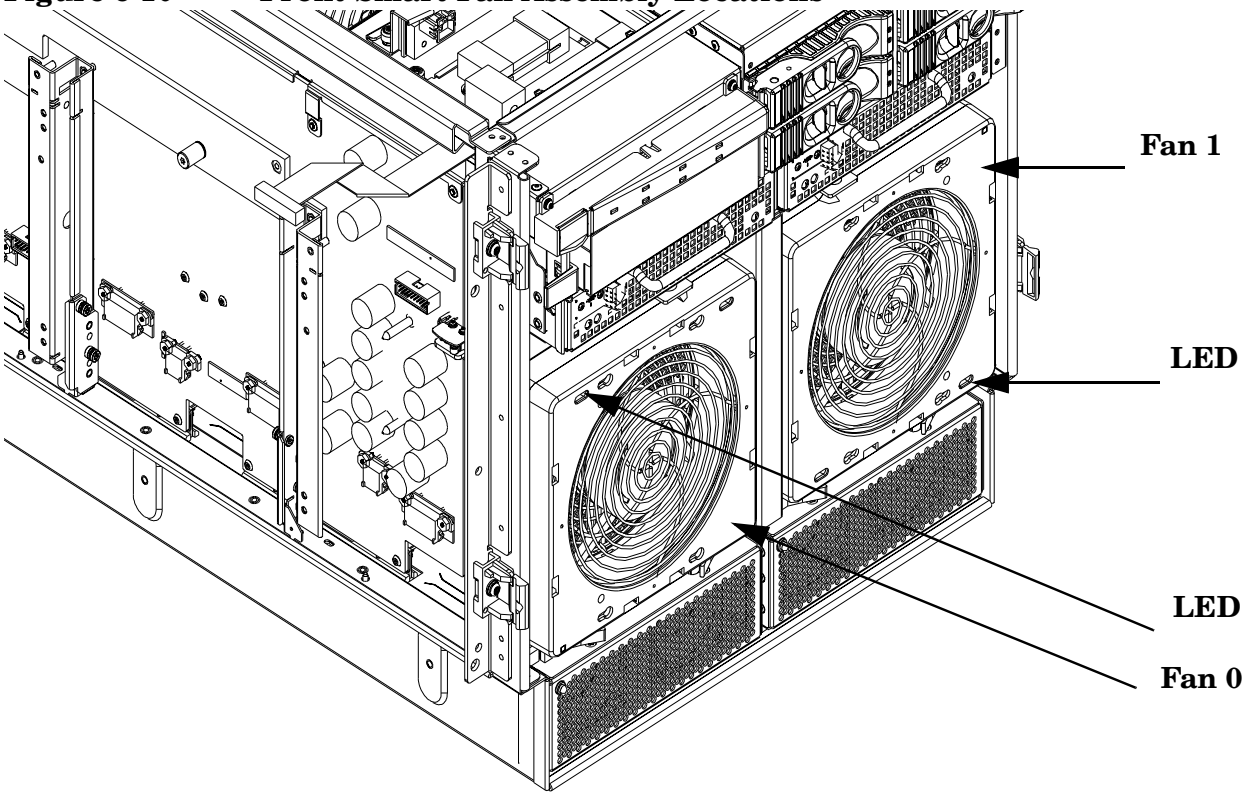


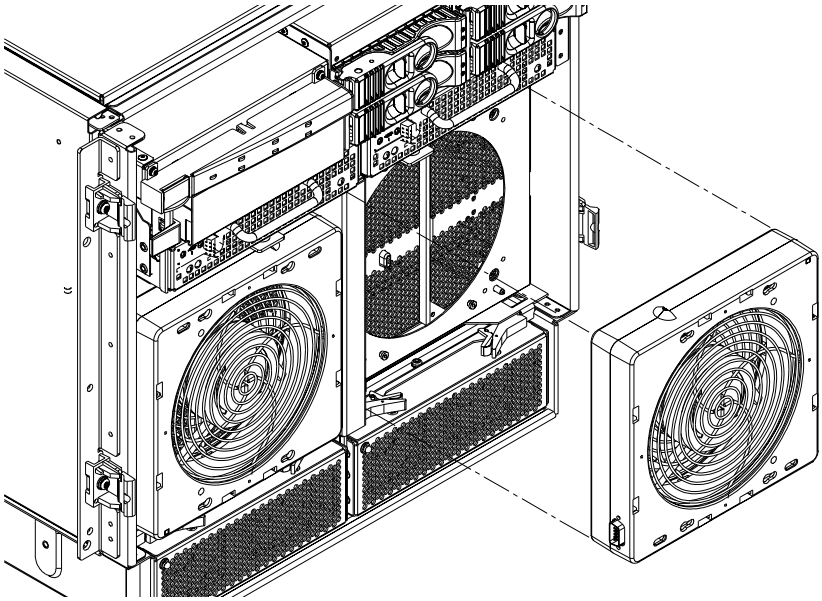
Table 6-1 Front Smart Fan Assembly LED Indications

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

Table 6-1 Front Smart Fan Assembly LED Indications (Continued)

LED State	Meaning
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



Step 1. Remove the front bezel.

Step 2. Push the fan release pin away from the fan.

Step 3. Slide the fan away from the connector.

Step 4. Pull the fan away from the chassis.

Replacing a Front Smart Fan Assembly

Step 1. Position the fan assembly on the chassis fan guide pins.

Step 2. Slide the fan into the connector.

Step 3. Verify that the fan release pin is in the locked position.

Step 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 6-12 Rear Smart Fan Assembly Locations

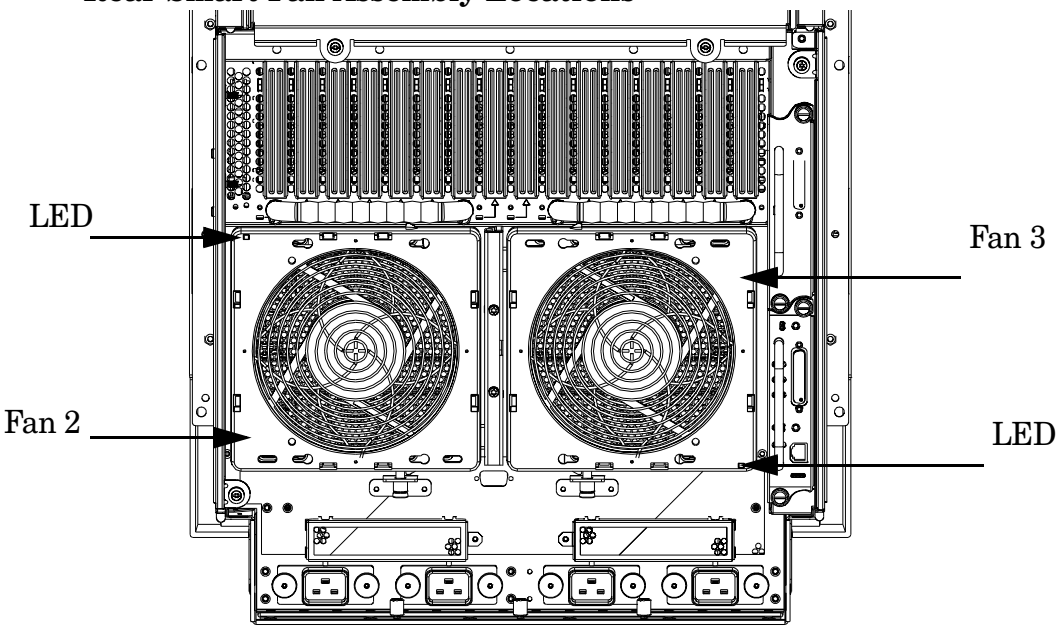
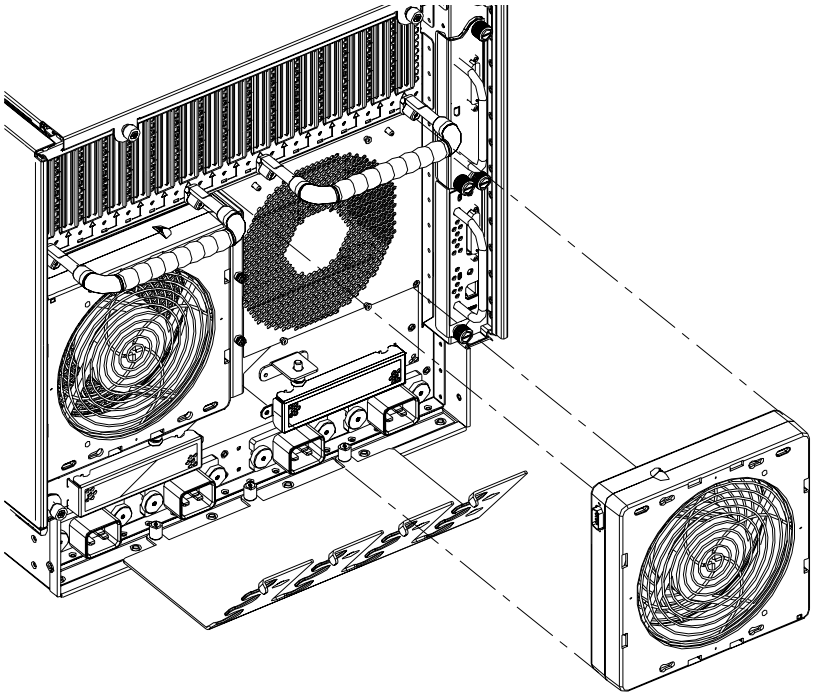


Table 6-2 Rear Smart Fan Assembly LED Indications

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 6-13 Rear Fan Detail



Step 1. Push the fan release pin away from the fan.

Step 2. Slide the fan away from the connector.

Step 3. Pull the fan away from the chassis.

Replacing a Rear Smart Fan Assembly

Step 1. Carefully position the fan assembly on the chassis fan guide pins.

Step 2. Slide the fan into the connector.

Step 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 PCI-X Smart Fan Assembly

The PCI-X 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 6-14 PCI-X Smart Fan Assembly Location

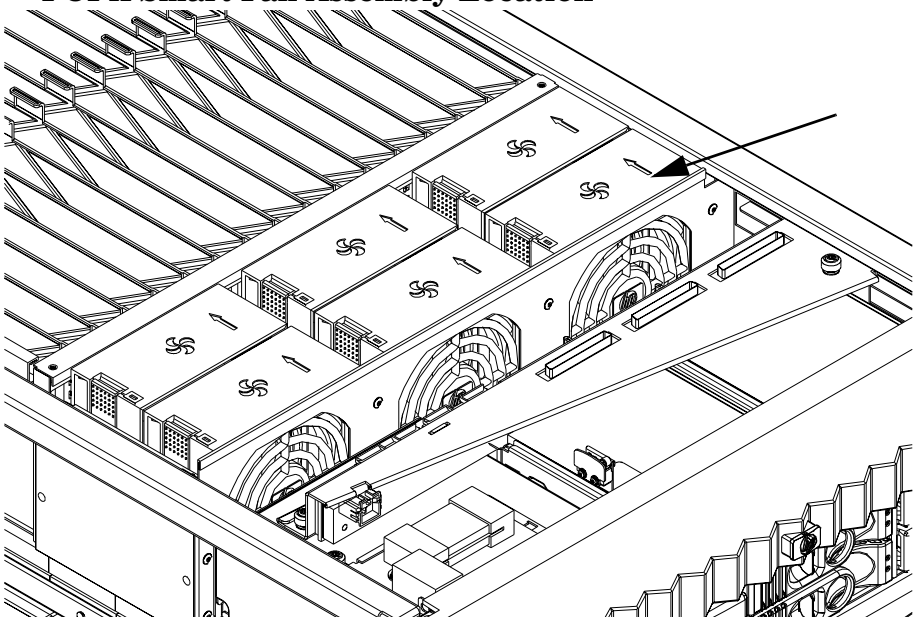
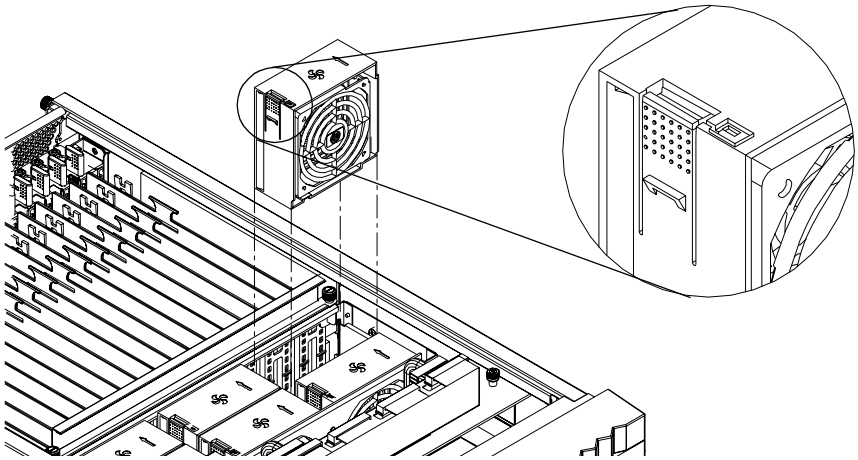


Table 6-3 Smart Fan Assembly LED Indications

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-X Smart Fan Assembly

Figure 6-15 PCI-X Smart Fan Assembly Detail



Step 1. Remove the top cover.

Step 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.

Step 3. Slide the fan upward from the chassis.

Replacing a PCI-X Smart Fan Assembly

Step 1. Carefully position the fan assembly in the chassis.

Step 2. The fan easily slides into the chassis. Use a slow, firm pressure to properly seat the connection.

Step 3. Replace the top cover.

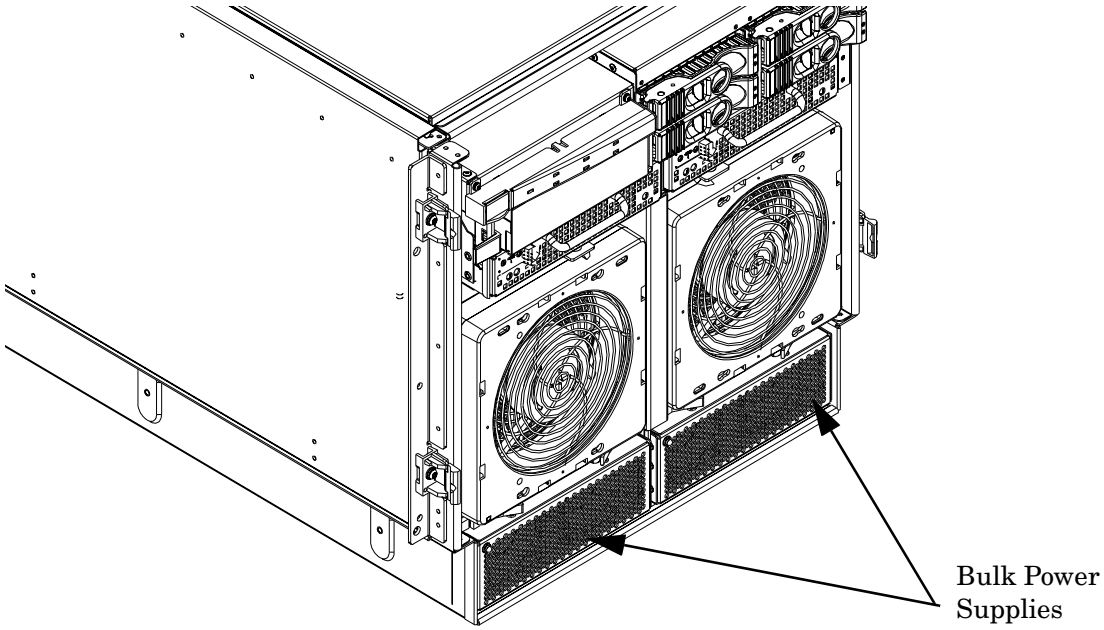
NOTE A green fan LED indicates the fan is operational.

Removing and Replacing a BPS

The BPS 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.

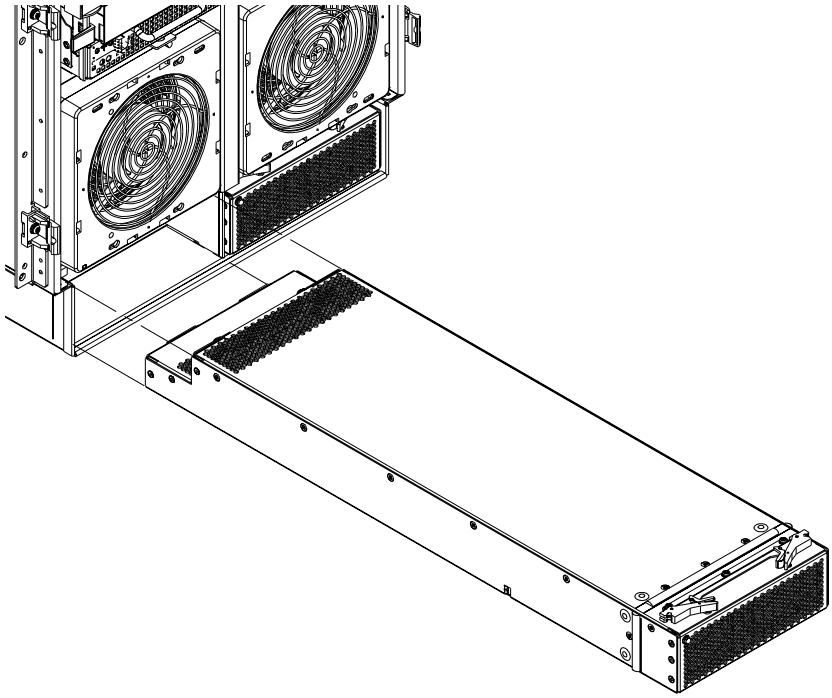
Figure 6-16 BPS Location



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

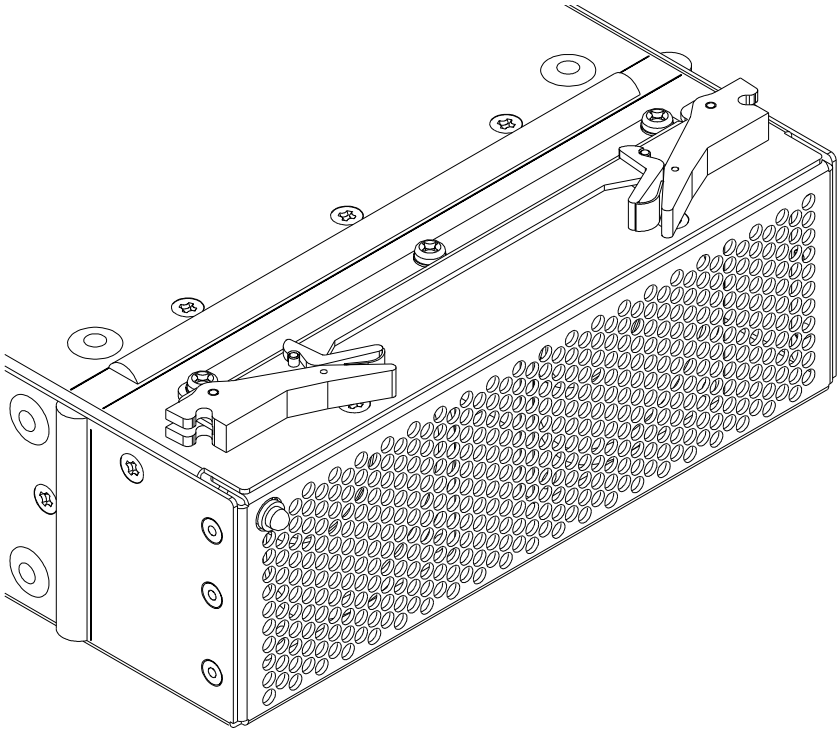
Figure 6-17 BPS Detail



Step 1. Remove the front bezel.

Step 2. Pull the extraction levers located on the upper front outer portion of the BPS.

Figure 6-18 Extraction Levers



Step 3. Slide the BPS forward using the extractions levers to remove it from the chassis.

CAUTION Use caution when handling the BPS. A BPS weighs 18 lb.

Replacing a BPS

Step 1. Verify that the extraction levers are in the open position, then insert the BPS into the empty slot.

Step 2. The BPS easily slides into the chassis. Use a slow, firm pressure to properly seat the connection.

Step 3. Ensure the BPS has seated by closing the extraction levers.

Step 4. Replace the front bezel.

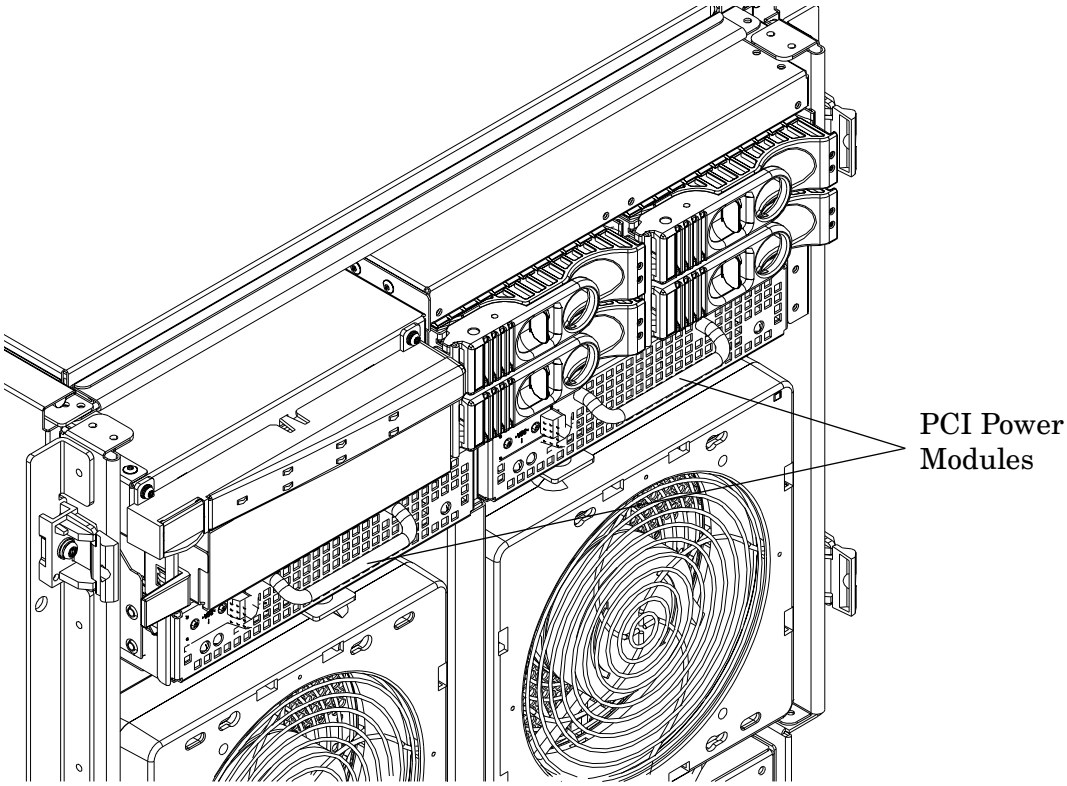
NOTE The BPS LED should show BPS operational and no fault. The BPS LED should be GREEN.

Removing and Replacing a PCI Power Module

The PCI power module is located in the front of the chassis. The system power must be turned off to replace this CRU. See “Powering down Hardware Components and Powering on the Server” on page 101.

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

Figure 6-19 PCI Power Module Location



Preliminary Procedures

Step 1. Identify the failed power supply. Table 6-4 identifies the meaning of the PCI Power Supply LED state.

Step 2. Connect to ground with a wrist strap.

Step 3. Visually inspect the replacement part for proper number and revision.

Step 4. Shut down the partition and power off the PCI domain.

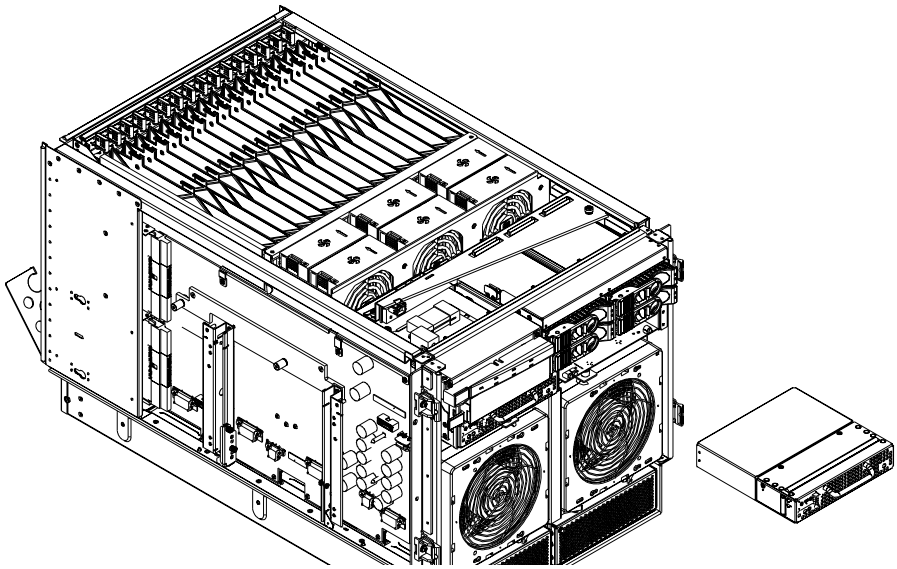
Step 5. Remove the front bezel.

Table 6-4 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.
Attention	MP through PCI LPM	Yellow	See Table 5-8 for LED status in combination with the green power LED for PCI-X slot status.
Fault	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.

Removing a PCI Power Module

Figure 6-20 PCI Power Module Detail



Step 1. Grasp the handle on the front of the power module.

Step 2. Slide and hold the locking tab to the right and pull the PCI module from the chassis.

Replacing a PCI Power Module

Step 1. Slide the PCI power module into the chassis until the locking tab clicks and locks.

Step 2. Power on the system. Use PE and PS commands to confirm success.

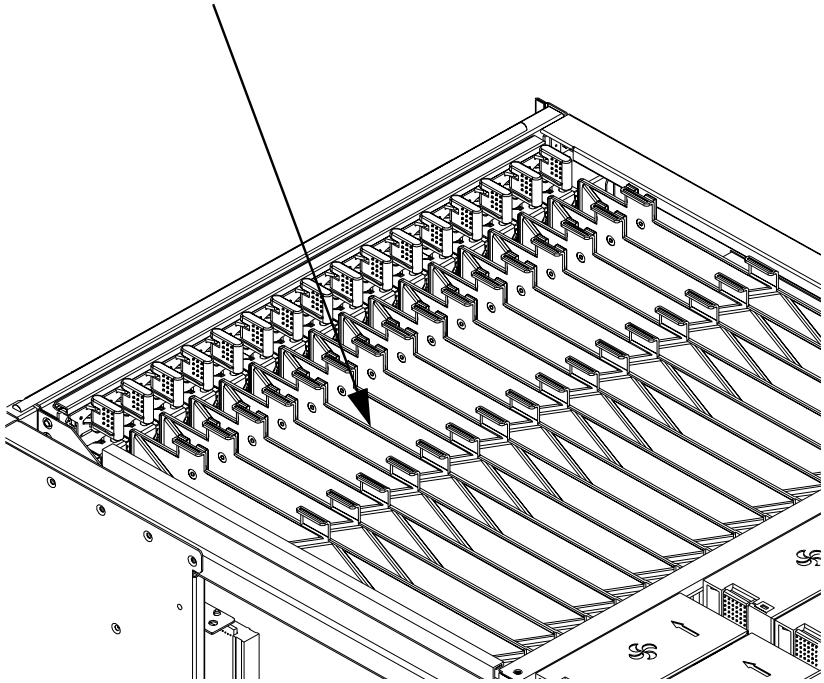
Step 3. Note the status of Power Supply LEDs. The Green LED should be on, and the fault LED should be off.

Removing and Replacing a PCI Card

The PCI cards are located in the rear of the chassis in the PCI card cage. PCI cards are hot-plug components. See “Hot-plug CRUs” on page 98 for a list and description of hot-plug CRUs.

IMPORTANT Complete information regarding OL* for I/O cards is on the Web at http://docs.hp.com. Refer to the Interface Card OL* Support Guide for details. It is strongly recommended that you obtain a copy of this guide and refer to it before beginning the removal and replacement of PCI cards.

Figure 6-21 PCI Card Location



Removing the PCI Card

This procedure describes how to perform an *online replacement* 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.

NOTE HP 9000 rp7420 Servers implement manual retention 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.

Prerequisites for this procedure:

- The card to be replaced uses the same drivers and is of the same type as the card being replaced.
- The green power LED is steady **ON**.
- The yellow attention LED if steady **OFF** or is blinking if a user has requested the slot location.
- Run the `olrad -q` command to determine the status of all the PCI I/O slots.

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

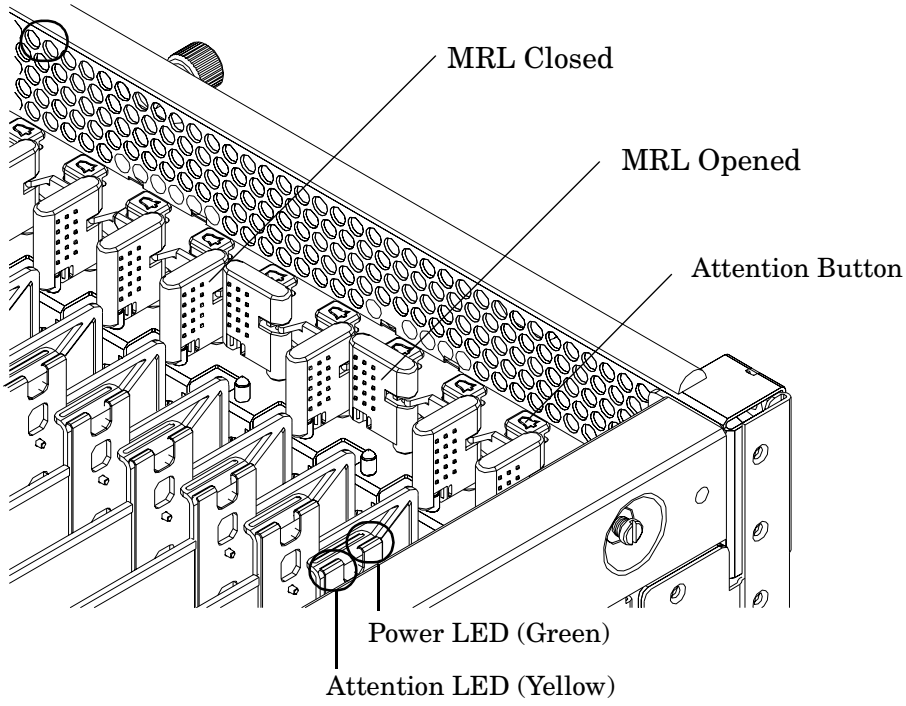
Step 1. Remove the top cover. See “Removing the Top Cover” on page 104 for the procedure.

Step 2. Press the attention button. Refer to Figure 6-1.

The green power LED will start to blink and then turn steady **OFF**. If the green power LED does not go **OFF**, then check the hotplugd daemon log file (default: /var/adm/hotplugd.log) for errors and do not proceed further.

NOTE If the attention button is pressed a second time during the first five seconds while the green LED is blinking, the operation is cancelled and the power to the slot will remain on.

Figure 6-22 PCI I/O Slot Details



Step 3. Label and remove the cables connected to the PCI card to be removed.

Step 4. Flip the PCI MRL for the card slot to the open position.

Step 5. Firmly pull up on the tabs on the PCI card separator.

Step 6. Remove the card from the PCI slot.

Replacing the PCI Card

Step 1. Install the new replacement PCI card in the slot.

NOTE Online addition using the attention button does not perform the pre-add sequence of olrad which uses the `olrad -a` command.

Step 2. Flip the PCI MRL for the card slot to the closed position.

Step 3. Press the attention button.

The green power LED will start to blink.

Step 4. Wait for the green power LED to stop blinking and turn solid green.

Step 5. Check for errors in the hotplugd daemon log file (default: /var/adm/hotplugd.log).

Step 6. Connect all cables to the replacement PCI card.

Step 7. Replace the top cover. See “Replacing the Top Cover” on page 104.

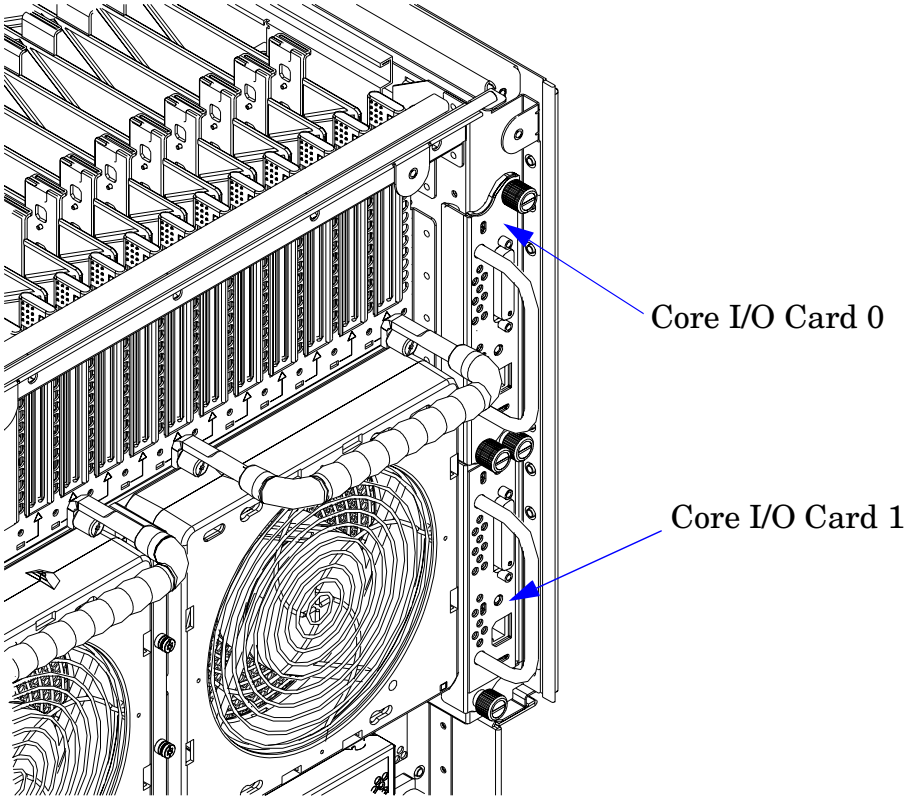
The critical resource analysis (CRA) performed while doing an attention button initiated replace action is very restrictive and the action will not complete—it will fail—to protect critical resources from being impacted. For finer control over CRA actions use `pdweb` or the `olrad` command. Refer to the Interface Card OL* Support Guide located on the Web at http://docs.hp.com for details.

Removing and Replacing a Core I/O Board

The MP/SCSI core I/O board is located in the rear of the chassis. The core I/O board is a hot-plug component. However, the operating system on the nPartition must be shut down to replace this CRU. Do not power off any part of the system or nPartition.

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

Figure 6-23 Core I/O Location



Removing a Core I/O board

Step 1. Save all MP networking details, including: the IP address, hostname, subnet mask, gateway, and other information. From the MP Command menu, enter the **LS** command to display the current MP customer LAN interface status.

Step 2. Use the MP:CM> PS, or the MP:CM> DE commands with option G, to determine core I/O board status. Refer to Figure 6-24 and Figure 6-25.

Figure 6-24 PS Command

```
MP:CM> ps

Display detailed status of the selected MP bus device.


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 |*  *|*  *|  *  | * * | *   * | * * |
+---+----+----+-----+-----+-------+-----+

You may display detailed power and hardware status for the following items:

    T - Cabinet
    S - System Backplane
    G - MP (Core I/O)
    P - IO Chassis
    C - Cell
        Select Device: g

HW status for MP : No Fault Detected

Complex model string: 9000/800/rp7420

MP is not failed over

Attention LED is ON
Remote LED is on

Battery state is good

Last MP software reset occurred FRI MAY 28 12:59:35 2004

MP firmware rev 5.022, built on May 20 2004 15:41:37

MP:CM>
```

Figure 6-25 DE Command

```
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: g

Cabinet 0 MP status
FW revision     :   5.022 built on May 20 2004 at 15:41:37
MP failed over : false
Battery state  : good
Attention LED  : on
Remote LED     : on
Cabinet type   : rp7420

MP Reset Registry
Timestamp      :  FRI MAY 28 12:59:35 2004
Task name      :  tTtyContlr
Function name  :  subReset
Line number    :  202
Module errno   :  0
VxWorks errno  :  0x3d0002
Error level    :  Crash
Parameter1     :  0xffffffff
Parameter2     :  0xffffffff

MP:CM> _
```

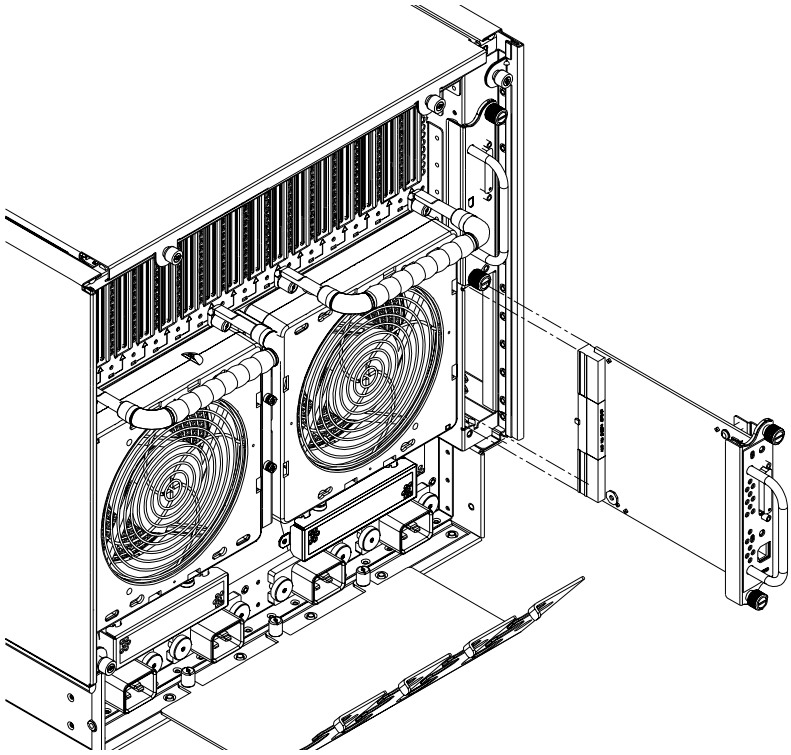
Step 3. Label and remove all cables connected to the core I/O board.

Step 4. Loosen the two retaining screws securing the board to the chassis.

Step 5. Securely grasp the handle on the board.

Step 6. Slide the board from the chassis.

Figure 6-26Core I/O Detail



Replacing a Core I/O board

Step 1. Position the core I/O board in the chassis.

Step 2. The board slides easily into the chassis. Use a slow, firm pressure to properly seat the connection.

Step 3. Tighten the two retaining screws, securing the board to the chassis.

Step 4. Connect the cables that were labeled and detached during removal of the core I/O.

Step 5. Reset the nPartition with the MP **RR** command. This command will stop the boot process at BIB and allow you to check the firmware revision of the new MP. Update or backdate as needed. Configure the network settings as outlined in the following section.

A Parts and Accessories

This appendix contains the HP 9000 rp7420 Server CRU list.

Table A-1 HP 9000 rp7420 Server CRU List

CRU Description	Replace Part Number	Exchange Part Number
CABLES		
Pwr Crd C19/unterminated interntl-Europe	8120-6895	N/A
Pwr Crd C19/IEC-309 L6-20 BLACK CA ASSY	8120-6897	N/A
Pwr Crd C19/GB 1002 4.5m BLACK CA ASSY	8120-0070	N/A
Pwr Crd C19/L6-20 4.5m BLACK CA ASSY	8120-6903	N/A
C19/C20, BLK, 4.5m - Jumper	8121-0806	N/A
C19/C20, BLK, 2.5m - Jumper	8121-0802	N/A
DISKs and REMOVABLE MEDIA		
Removable DVD Drive	A9879-67001	N/A
36GB 15K RPM SCSI Disk (A9880A)	A9896-64001	A9896-69001
72GB 15K RPM SCSI Disk (A9881A)	A9897-64001	A9897-69001
146GB 10K RPM Disk (A9882A)	A9898-64001	A9898-69001
Removable DAT 40i (DDS4) Tape Drive	C5686-67204	C5686-69204
FANS		
Assy, Smart Fan (Front/Rear) qty 4	A6752-67029	N/A
KITS		
Removable Media Rail Kit	A6752-67011	N/A
Side/Top Covers Kit (Graphite)	A7027-67001	N/A
MISCELLANEOUS		
Nameplate, rp7420 (Graphite)	A7025-40003	N/A
PCI Filler Plate	5001-6892	N/A
TOOLS		
24" x 36" Static Mat (with ground strap)	A5201-68004	N/A

B System Specifications

This appendix 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 B-1 HP 9000 rp7420 Server Server Dimensions and Weights

	Stand-alone	Packaged
Height	17.3 in / 43.9 cm	35.75 in / 90.8 cm
Width	17.5 in / 44.4 cm	28.0 in / 71.1 cm
Depth	30.0 in / 76.2 cm	28.38 in / 72.0 cm
Weight - Pounds (kilograms)	220 lb / 100 kg	N/A

The shipping box, pallet, ramp, and container adds approximately 50 lb to the total system weight. The size and number of miscellaneous pallets will be determined by the equipment ordered.

Table B-2 HP 9000 rp7420 Server Component Weights

Quantity	Description	Weight (lb/kg)
1 or 2	Cell board	27.80 lb /12.61 kg
1	System backplane	12 lb (estimate) / 5.44 kg (estimate)
1	PCI backplane	20.4 lb / 9.25 kg
2	Bulk power supply	18 lb / 8.2 kg
1	Mass storage backplane	1 lb / 0.45 kg
2	PCI DC-to-DC converters	5 lb / 2.27 kg

Electrical Specifications

This section provides electrical specifications for HP 9000 rp7420 Server.

Grounding

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

Install a protective earthing 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 HP 9000 rp7420 Server is 12 amps. 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 HP 9000 rp7420 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 HP 9000 rp7420 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 HP 9000 rp7420 Server can receive AC input from two different AC power sources.

System AC Power Specifications

Power Cords

Table B-3 lists the various power cables available for use with a HP 9000 rp7420 Server system. Each power cord is 15 feet (4.5 meters) in length with a IEC 60320-1 C19 female connector attached to one end.

Table B-3 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 B-4 lists the AC power requirements for an HP 9000 rp7420 Server. This table provides information to help determine the amount of AC power needed for your computer room.

Table B-4 AC Power Specifications

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

Power Required (50 - 60 Hz)	Watts	VA	Comments
Maximum Theoretical Power	3000	3060	See #1 below
Marked Electrical Power	---	2640	12A @ 220 VAC, see note #2
Typical Maximum Power	1975	2015	See note #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. “Typical maximum power” is the input power measured at the AC input expressed in Watts and Volt-Amps, and the measured maximum 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.

Environmental Specifications

This section provides the environmental, power dissipation, noise emission, and airflow specifications for the HP 9000 rp7420 Server.

Temperature and Humidity

The cabinet is actively cooled using forced convection in a Class C1-modified environment. The recommended humidity for a Class C1 server is 40-55%.

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 1000 feet of elevation above 5000 feet above sea level up to 30° C at 10,000 feet. For optimum reliability and performance, the recommended operating range is 20° to 25° C

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 under non-operating conditions.

Cooling

Cell Section 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; and two 150 mm fans housed in cosmetic plastic fan carriers and mounted externally to the rear chassis wall, pull air through the cell section.

Each cell area fan cooling 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.

BPS Cooling

Cooling for the 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 and to help reduce the localized airflow dead spots that typically occur at the faceplate tail of each PCI card.

Standby Cooling

Several components within the chassis consume significant amounts of power while the system is in standby mode. The system fans run at 1541 rpm, or 38% 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 B-5 Typical HP 9000 rp7420 Server Configurations

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	16	16	1	4	2	2	2015	6879.21
2	8	8	0	2	2	2	1648	5626.27
2	4	8	0	2	2	2	1590	5482.26
1	4	8	0	1	1	2	995	3396.93

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. Refer to the applicable documentation for such devices to determine the power and air-conditioning that is required to support these devices.

Acoustic Noise Specification

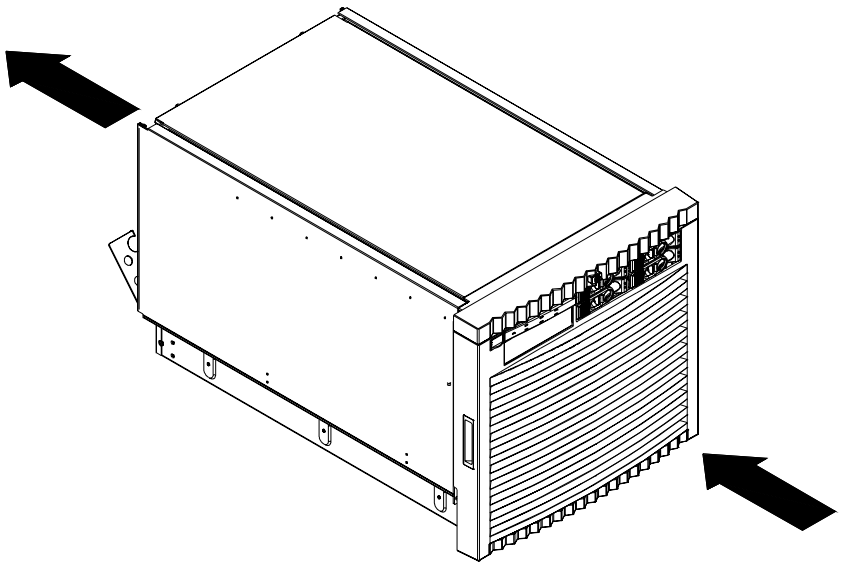
The acoustic noise specification for the HP 9000 rp7420 Server is 57.3 db (sound pressure level at bystander position). It is appropriate for dedicated computer room environments but not office environments. The LwA is 7.5 Bels. Be sure to understand the acoustic noise specifications relative to operator positions within the computer room or when adding servers to computer rooms with existing noise sources.

Airflow

The HP 9000 rp7420 Server requires that the cabinet air intake temperature be between 68° and 77° F (20° and 25° C) at 332 CFM.

Figure B-1 illustrates the location of the inlet and outlet airducts on a single cabinet.

Figure B-1 Airflow Diagram



System Requirements Summary

This section summarizes the requirements that must be considered in preparing the site for the HP 9000 rp7420 Server.

Power Consumption and Air Conditioning

To determine the power consumed and the air conditioning required, follow the guidelines in Table B-5.

NOTE When determining power requirements, consider any peripheral equipment that will be installed during initial installation or as a later update. Refer to 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.

Weight

To determine overall weight, follow the examples in Table B-6, then complete the entries in Table B-7.

Table B-6 Example Weight Summary

Component	Quantity	Multiply By	Weight
Cell Boards	2	27.80 lb / 12.61 kg	55.60 lb / 25.22 kg
PCI Card (varies – used A3739B here)	4	0.34 lb / 0.153 kg	1.36 lb / 0.61 kg
Power Supply (BPS)	2	18.0 lb / 8.2 kg	36 lb / 16.40 kg
DVD	1	2.2 lb / 1.0 kg	2.2 lb / 1.0 kg
Disk Drive	4	1.6 lb / 0.73 kg	6.40 lb / 2.90 kg
Chassis with skins and front bezel cover	1	131 lb / 59.42 kg	131 lb / 59.42 kg
		Total weight	232.56 lb / 105.55kg

Table B-7 Weight Summary

Component	Quantity	Multiply By	Weight (kg)
Cell Boards		27.80 lb / 12.61 kg	
PCI Card		weight varies	
Power Supply (BPS)		18 lb / 8.2 kg	
DVD		2.2 lb / 1.0 kg	

Table B-7 Weight Summary (Continued)

Component	Quantity	Multiply By	Weight (kg)
Disk Drive		1.6 lb / 0.73 kg	
Chassis with skins and front bezel cover		131 lb / 59.42 kg	
		Total weight	

C MP Commands

This appendix contains a list of the Server Management Commands.

Server Management Commands

Table C-1 lists the server management commands.

Table C-1 Service Commands

Command	Description
BO	Boot a partition
DATE	Set the time and date
DF	Display FRU Information of an entity
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
LOC	Display and Set Locator LED status

Table C-2 lists the server status commands

Table C-2 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 C-3 lists the server system and access config commands

Table C-3 System and Access Config Commands

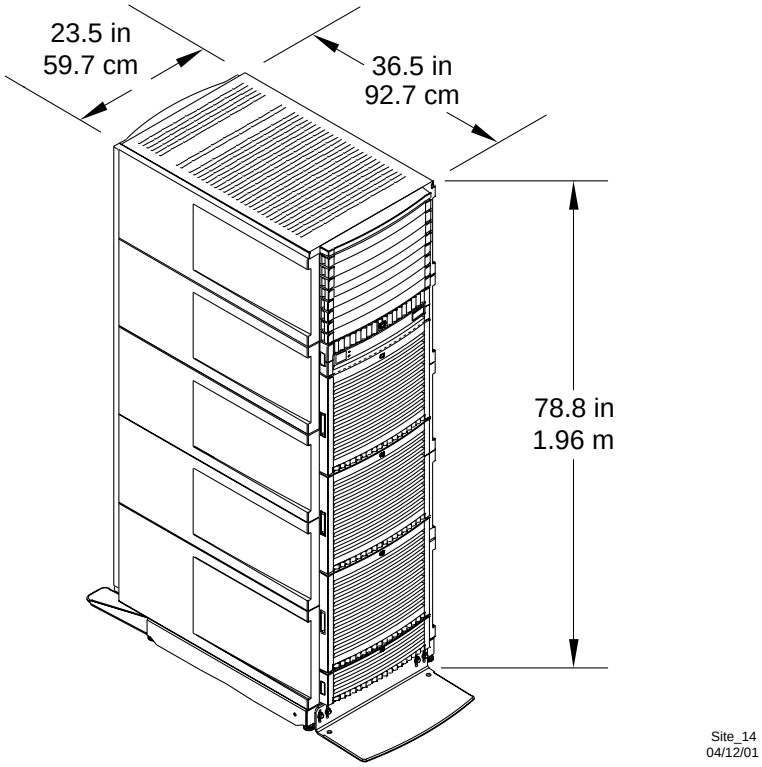
Command	Description
CA	Only displays local rs232 parameters
CC	Initiate a Complex Configuration
UPS	Set parameters for ups monitoring via SNMP
SNMP	Set SNMP daemon parameters
CP	Display partition cell assignments
DC	Reset parameters to default configuration
DI	Disconnect Remote or LAN console
ID	Change 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
SO	Configure security options and access control
XD	MP Diagnostic and reboot

D 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 D-1 illustrates the overall dimensions required for an HP Integrity rx8620 Server.

Figure D-1 HP Integrity rx8620 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:

Step 1. Remove several copies of the floor plan grid.

Step 2. Cut and join them together (as necessary) to create a scale model floor plan of your computer room.

Step 3. Remove a copy of each applicable equipment footprint template.

Step 4. Cut out each template selected in step 3; then place it on the floor plan grid created in step 2.

Step 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 D-2 HP Integrity rx8620 Server Cabinet Template

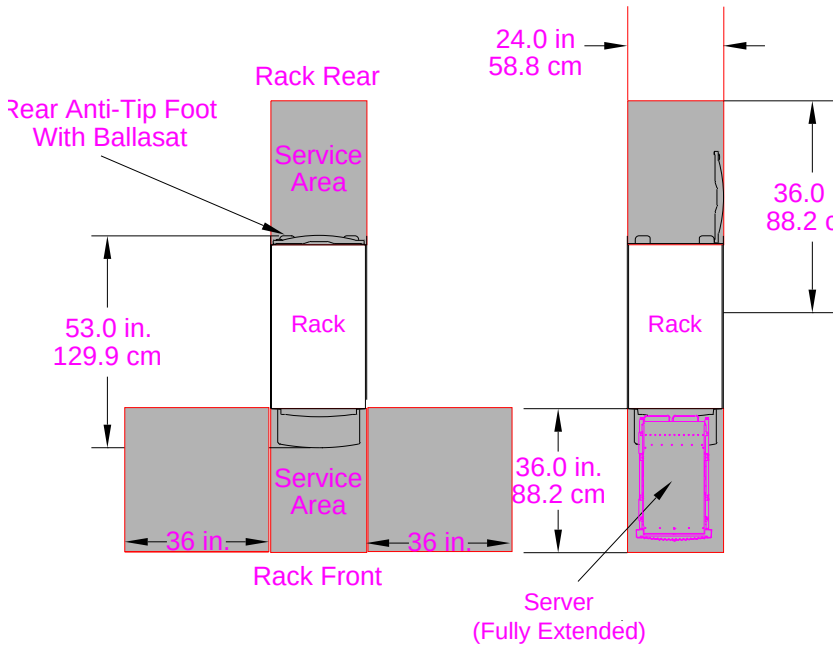


Figure D-3 Planning Grid

Scale: 1/4 inch = 1 foot

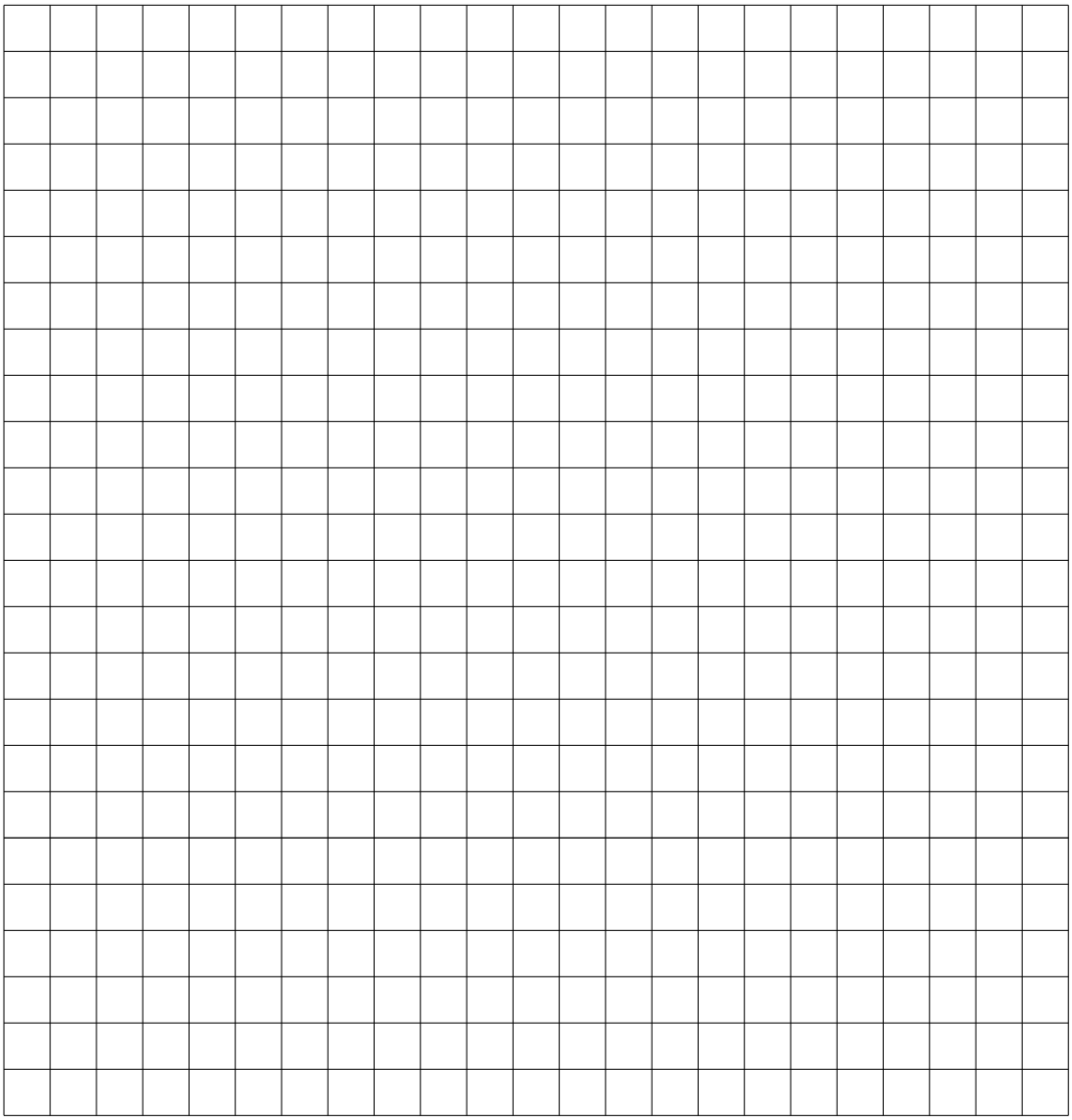


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Figure D-4 Planning Grid

Scale: 1/4 inch = 1 foot

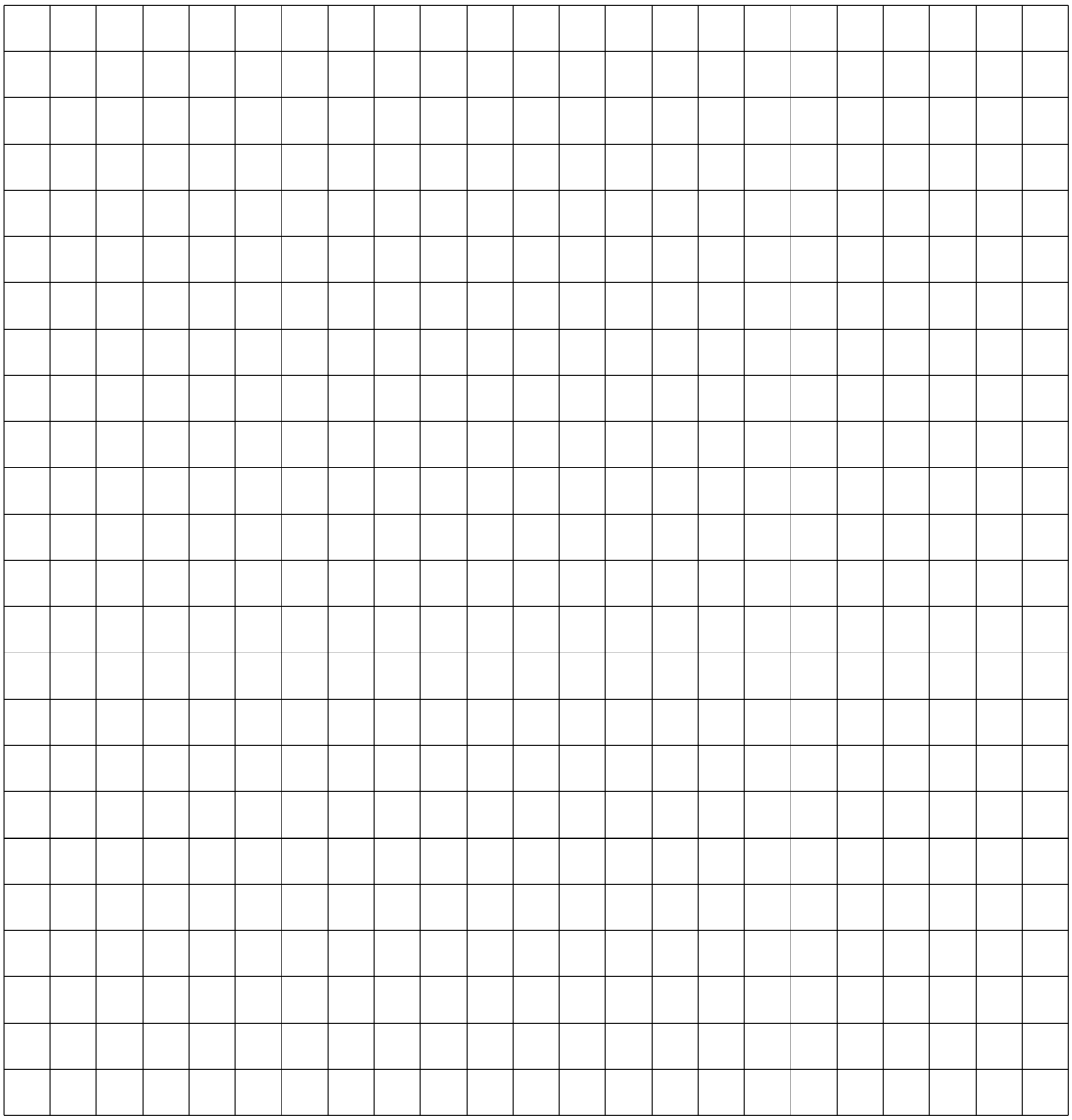

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Figure D-5 Planning Grid

Scale: 1/4 inch = 1 foot

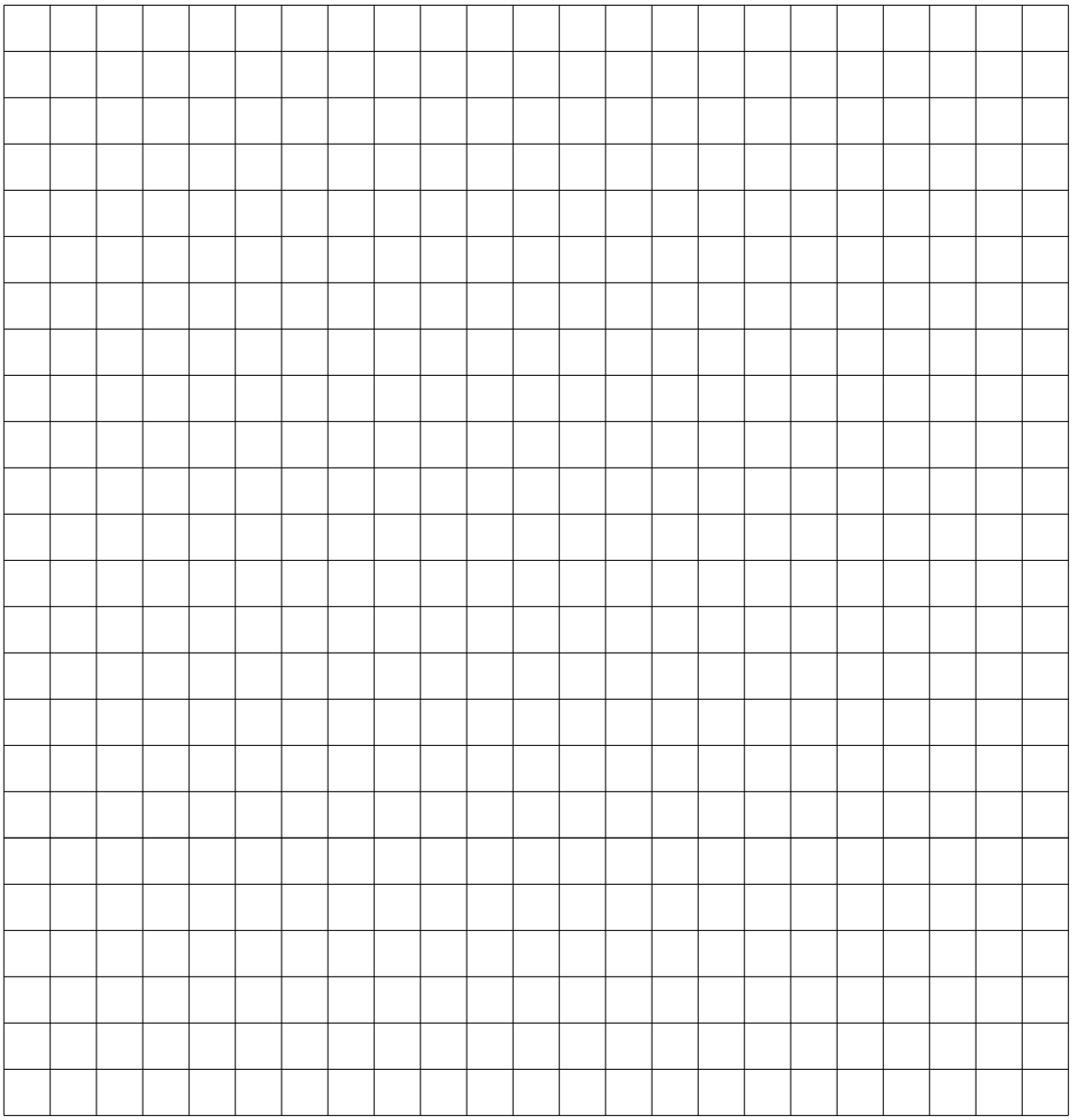

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Figure D-6 Planning Grid

Scale: 1/4 inch = 1 foot

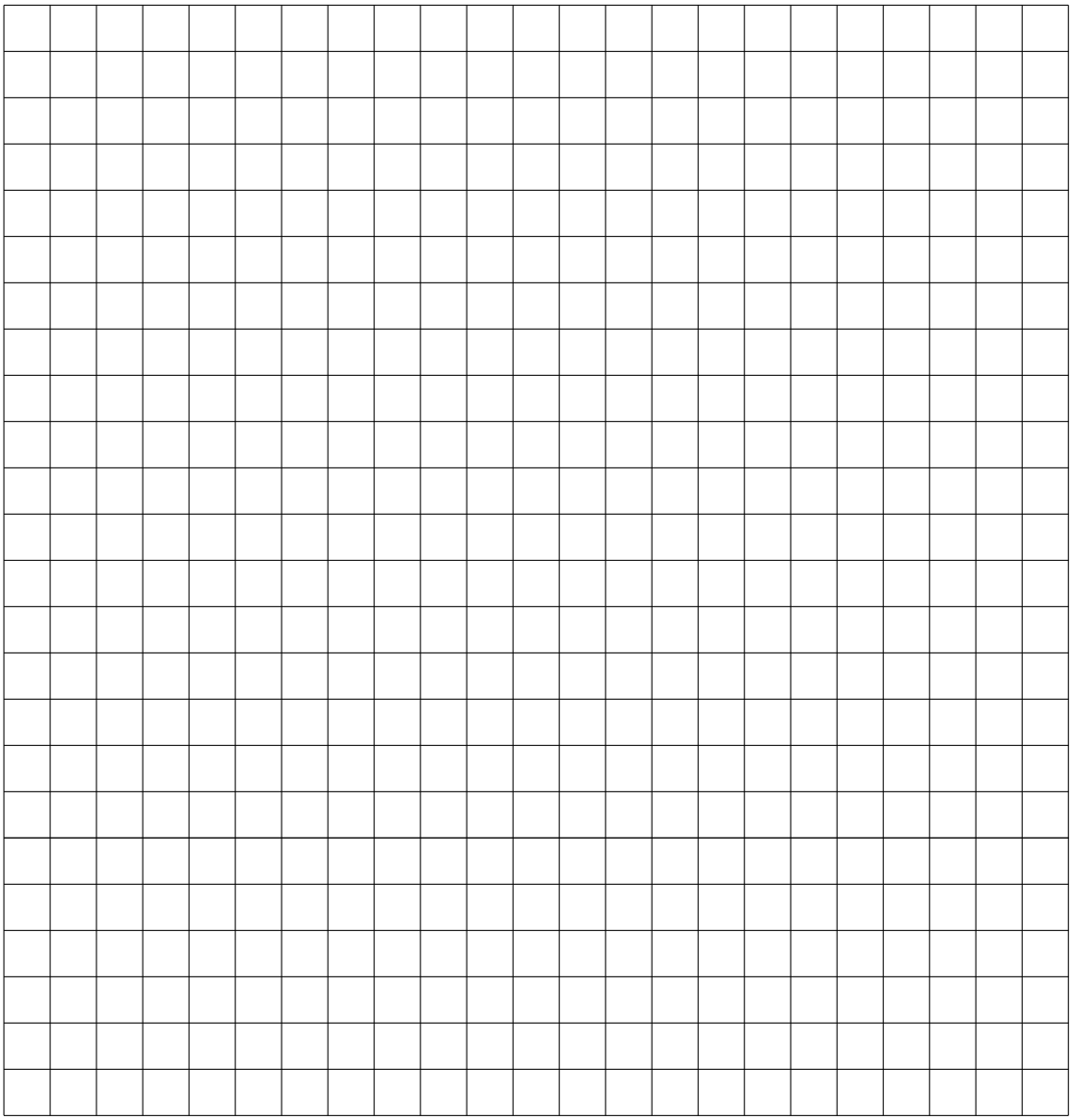

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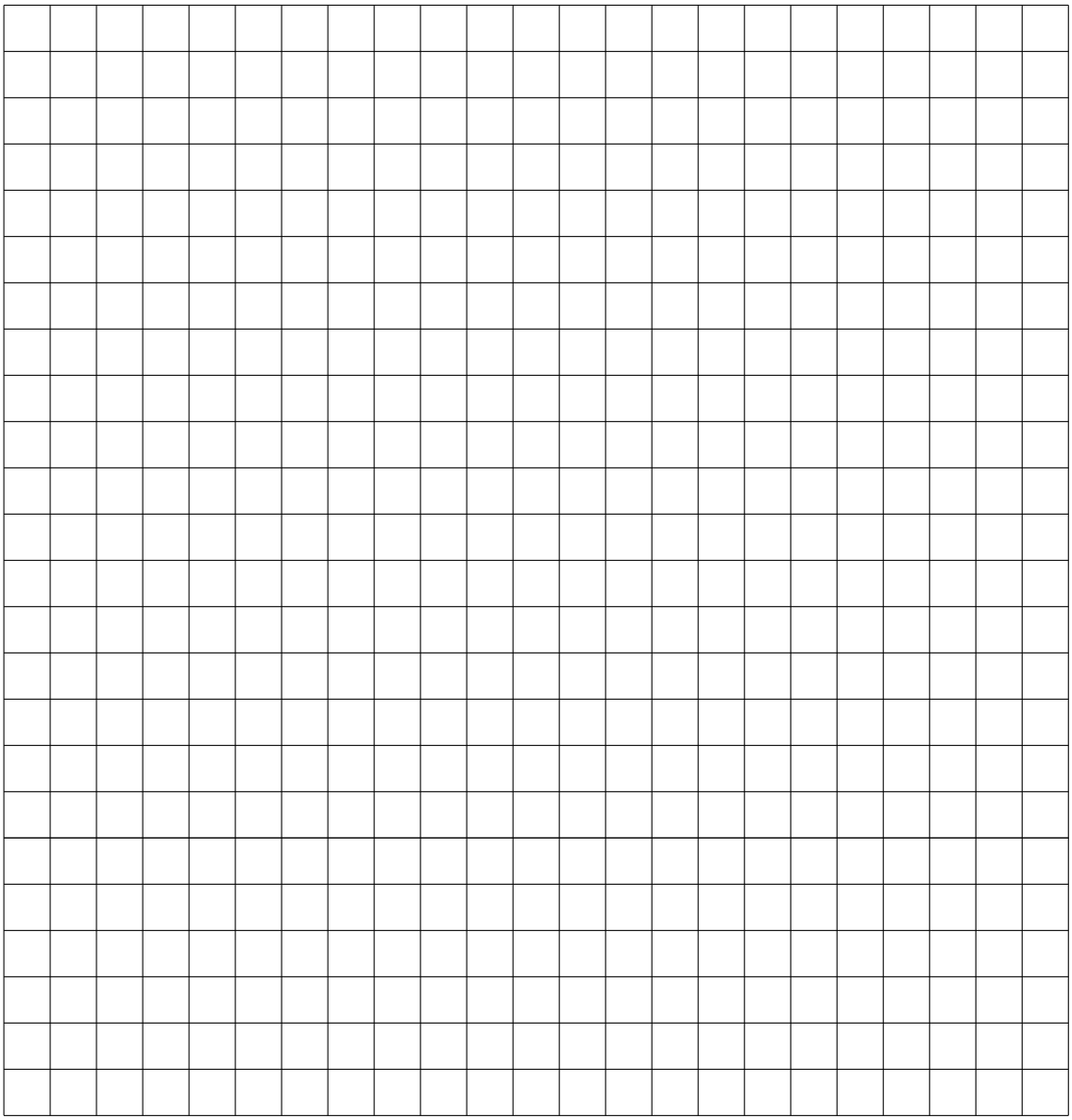
Figure D-7 Planning Grid

Scale: 1/4 inch = 1 foot



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