

User Service Guide

HP Integrity Superdome/sx2000 and HP 9000 Superdome/sx2000 Servers

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About This Document

This document contains the system overview, system-specific parameters, installation procedures of the system, operating system specifics, and procedures for components in the system.

Intended Audience

This document is intended for HP trained Customer Support Consultants.

Document Organization

This document is organized as follows:

Chapter 1	This chapter presents an historical view of the Superdome server family, describes the various server components, and describes how the server components function together.
Chapter 2	This chapter contains the dimensions and weights for the server and various components. Electrical specifications, environmental requirements, and templates are also included.
Chapter 3	This chapter describes how to unpack and inspect the system, set up the system, connect the MP to the customer LAN, and how to complete the installation.
Chapter 4	This chapter describes how to boot and shut down the server operating system (OS) for each OS supported.
Appendix A	This appendix contains tables that describe the various LED states for the front panel, power and OL* states, and OL* states for I/O chassis cards.
Appendix B	This appendix provides a summary for each management processor (MP) command. Screen output is provided for each command so you can see the results of the command.
Appendix C	This appendix provides procedures to power off and power on the system when the removal and replacement of a component requires it.
Appendix D	This appendix contains templates for cable cutouts and caster locations; SD16, SD32, SD64, and I/O expansion cabinets; and the computer room floor.

Typographic Conventions

The following typographic conventions are used in this document.



WARNING! Lists requirements that you must meet to avoid personal injury.



CAUTION: Provides information required to avoid losing data or to avoid losing system functionality.



IMPORTANT: Provides essential information to explain a concept or to complete a task.



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

- Commands and options are represented using this font.
- **Text that you type exactly as shown** is represented using **this font**.

- *Text to be replaced with text that you supply* is represented using *this font*.
Example: “Enter the `ls -l filename` command” means you must replace *filename* with your own text.
- **Keyboard keys and graphical interface items (such as buttons, tabs, and menu items)** are represented using **this font**.
Examples: The **Control** key, the **OK** button, the **General** tab, the **Options** menu.
- **Menu → Submenu** represents a menu selection you can perform.
Example: “Select the **Partition → Create Partition** action” means you must select the **Create Partition** menu item from the **Partition** menu.
- Example screen output is represented using *this font*.

Related Information

Further information on HP server hardware management, Microsoft® Windows®, and diagnostic support tools are available through the following website links.

Website for HP Technical Documentation The following link is the main website for HP technical documentation. This site offers comprehensive information about HP products available for free. See <http://docs.hp.com>.

Server Hardware Information The following link is the systems hardware section of the docs.hp.com website. It provides HP nPartition server hardware management information, including information on site preparation, installation, and so on. See <http://docs.hp.com/hpux/hw/>.

Diagnostics and Event Monitoring: Hardware Support Tools The following link contains comprehensive information about HP hardware support tools, including online and offline diagnostics and event monitoring tools. This website has manuals, tutorials, FAQs, and other reference material. See <http://docs.hp.com/hpux/diag>.

Website for HP Technical Support The following link is the HP IT resource center website and provides comprehensive support information for IT professionals on a wide variety of topics, including software, hardware, and networking. See <http://us-support2.external.hp.com>.

Publishing History

The document printing date and edition number indicate the document’s current edition and are included in the following table. The printing date will change when a new edition is produced. Document updates may be issued between editions to correct errors or document product changes. The latest version of this document is available on line at:

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First Edition	March 2006
Second Edition	September 2006
Third Edition	February 2007
Fourth Edition	November 2007
Fifth Edition	March 2009
Sixth Edition	September 2009



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- Support can be obtained from US & Canada at: **1-800-593-6631**
- For Worldwide locations, visit:

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

You will be asked to provide the product number & serial number and may be required to provide dated proof of purchase.

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To obtain technical installation and support information pertaining to this product, refer to the following web site:

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1 Overview

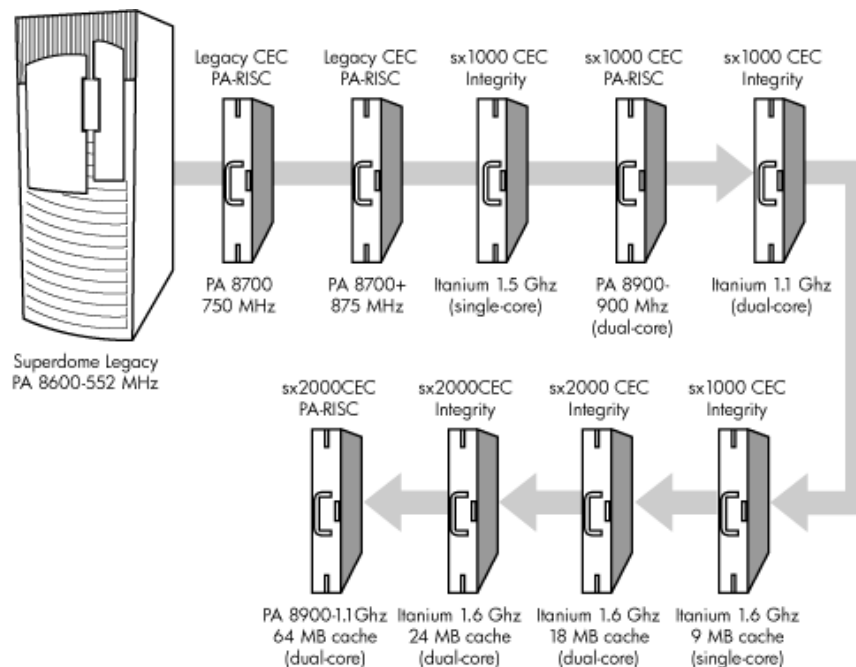
Server History and Specifications

Superdome was introduced as the new platform architecture for high-end HP servers between the years 2000 and 2004. Superdome represented the first collaborative hardware design effort between traditional HP and Convex technologies. Superdome was designed to replace T- and V-Class servers and to prepare for the transition from PA-RISC to Intel® Itanium® processors. The new design enabled the ability of running different operating systems on the same server. The design also included several new, high-availability features. Initially, Superdome was released with the legacy core electronics complex (CEC) and a 552 MHz PA-8600 processor. The Legacy CEC supported two additional speeds; a 750 MHz PA-8700 followed by an 875 MHz PA-8700 processor.

The HP Integrity server project consisted of four projects based on the sx1000 CEC chipset and the Integrity cell boards. The first release was the sx1000 chipset, Integrity cell boards, Itanium firmware and a 1.2 MHz Intel® processor. This release included PCI-X and PCI I/O mixes. The Integrity systems were compatible with the legacy Superdome IOX.

The second release, based on the sx1000 CEC, included Integrity cell boards, but used PA-RISC firmware, and a dual-core PA-RISC processor. The release also included a 2 GB DIMM and a new HP-UX version. Components such as processors, processor power pods, memory, firmware, and operating system all changed for this release.

Figure 1-1 Superdome History



The third release, also based on the sx1000 chipset, included the Integrity cell boards, Itanium firmware, and a 1.5 MHz Itanium CPU. The CPU module consisted of a dual-core processor with a new cache controller. The firmware allowed for mixed cells within a system. All three DIMM sizes were supported. Firmware and operating system changes were minor compared to their earlier versions.

The fourth and final release is the HP super scalable sx2000 processor chipset. It is also based on the new CEC that supports up to 128 PA-RISC or Itanium processors. It is the last generation of Superdome servers to support the PA-RISC family of processors. Modifications to the server components include:

- the new CEC chipset
- board changes including cell board
- system backplane
- I/O backplane
- associated power boards
- interconnect
- a redundant, hot-swappable clock source

Server Components

A Superdome system consists of the following types of cabinet assemblies:

- Minimum of one Superdome left-side cabinet. The Superdome cabinet contains the processors, the memory, and the core devices of the system. They also house the system's PCI cards. Systems can include both left and right cabinet assemblies containing a left or right backplane (SD64) respectively.
- One or more HP Rack System/E cabinets. These rack cabinets are used to hold the system peripheral devices such as disk drives.
- Optionally, one or more I/O expansion cabinets (Rack System/E). An I/O expansion cabinet is required when a customer requires more PCI cards than can be accommodated in the Superdome cabinets.

The width of the cabinet assemblies accommodates moving them through standard-sized doorways. The intake air to the main (cell) card cage is filtered. This air filter is removable for cleaning and replacement while the system is fully operational.

A status display is located on the outside of the front and rear doors of each cabinet. This feature enables you to determine the basic status of each cabinet without opening any cabinet doors.

The Superdome is a cell-based system. Cells communicate with others utilizing the crossbar on the backplane. Every cell has its own I/O interface, which can be connected to one 12-slot I/O card cage using two System Bus Adapter (SBA) link cables. Not all SBA links are connected by default, due to a physical limitation of four I/O card cages per cabinet or node. In addition to these components, each system consists of a power subsystem and a utility subsystem. Three types of Superdome are available:

- SD16
- SD32
- SD64, a two-cabinet system with single-CPU cell board sockets

The SD## represents the maximum number of available CPU sockets.

An SD16 contains the following components:

- Up to four cell boards
- Four I/O card cages
- Five I/O fans
- Four system cooling fans
- Four bulk power supplies (BPS)
- Two power distribution control assemblies (PDCA)

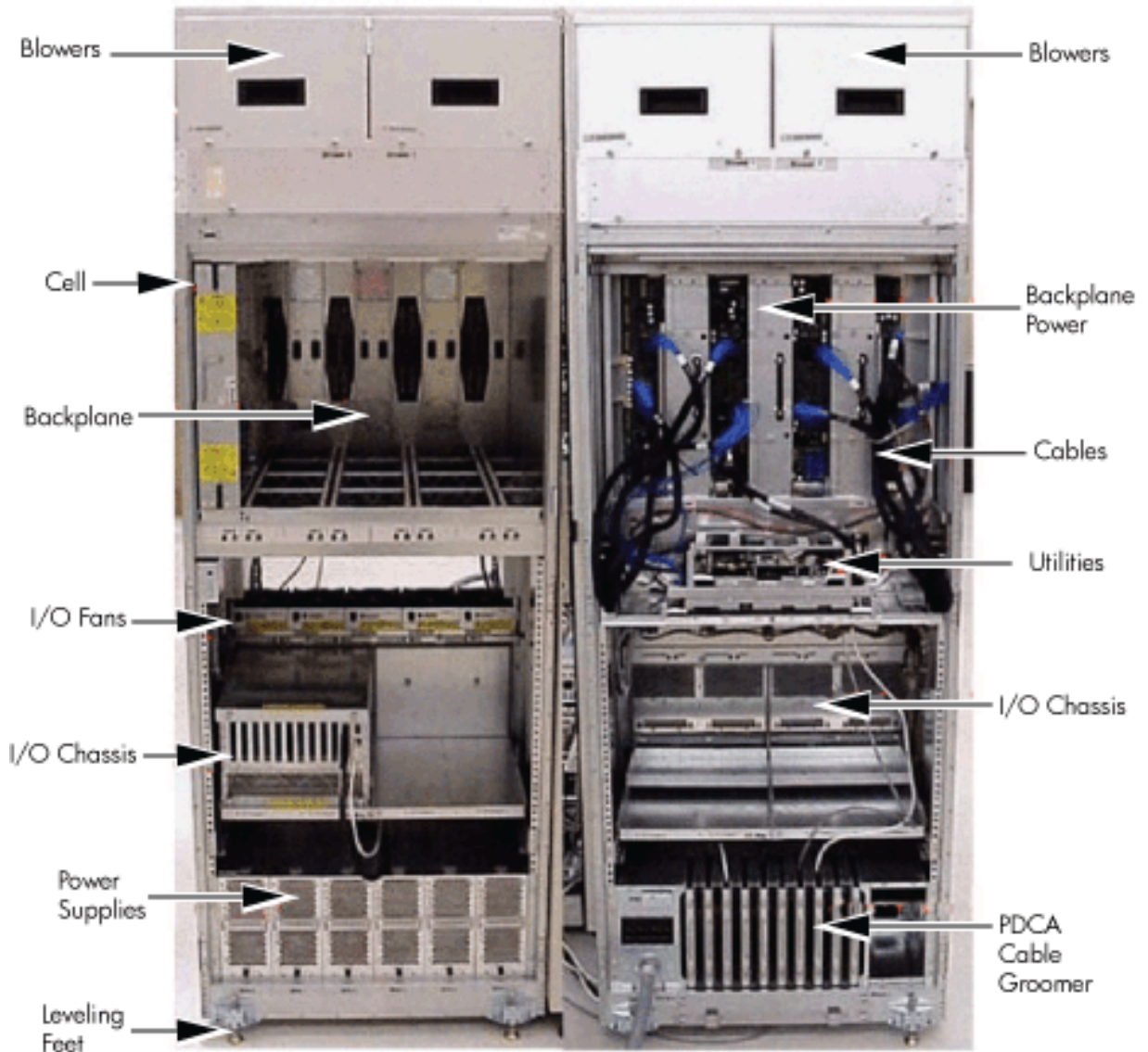
Two backplane N+1 power supplies provide power to the SD16. The four cell boards are connected to one pair of crossbar chips (XBC). The backplane of an SD16 is the same as a backplane of an SD32. On the HUCB utility PCB is a switch set to *TYPE= 1*.

An SD32 has up to eight cell boards. All eight cell boards are connected to two pairs of XBCs. The SD32 backplane is designed for a system upgrade to an SD64. On an SD32, four of the eight connectors use U-Turn cables. The U-Turn cables double the number of links and the bandwidth between the XBCs and are recommended to achieve best performance. An SD64 has up to 16 cell boards and requires two cabinets. All 16 cell boards are connected to four pairs of XBCs. The

SD64 consists of left backplane and right backplane cabinets, which are connected using 12 m-Link cables.

When the PA-RISC dual-core or the Itanium dual-core processors are used, the CPU counts are doubled by the use of the dual-die processors, as supported on the Intel® Itanium® cell boards. Up to 128 processors can be supported.

Figure 1-2 Superdome Cabinet Components



Power Subsystem

The power subsystem consists of the following components:

- One or two PDCA's
- One Front End Power Supply (FEPS)
- Up to six BPS
- One power board per cell
- An HIOB power system
- Backplane power bricks
- Power monitor (PM) on the Universal Glob of Utilities (UGUY)
- Local power monitors (LPM) on the cell, the HIOB, and the backplanes

AC Power

The ac power system includes the PDCA, one FEPS, and up to six BPS.

The FEPS is a modular, 2n+2 shelf assembly power system that can consume up to 17 KVA of power from ac sources. The purpose of the FEPS chassis is to provide interconnect, signal and voltage busing between the PDCAs and BPSs, between the BPSs and utility subsystem, and between the BPS and the system power architecture. The FEPS subsystem comprises three distinct modular assemblies: six BPS, two PDCAs, and one FEPS chassis.

At least one 3-phase PDCA per Superdome cabinet is required. For redundancy, you can use a second PDCA. The purpose of the PDCA is to receive a single 3-phase input and output three 1-phase outputs with a voltage range of 200 to 240 volts regardless of the ac source type. The PDCA also provides a convenience disconnect switch/circuit breaker for service, test points, and voltage present LED indicators. The PDCA is offered as a 4-wire or a 5-wire PDCA device. Separate PDCAs (PDCA-0 and PDCA-1) can be connected to 4-wire and 5-wire input source simultaneously as long as the PDCA internal wiring matches the wiring configuration of the ac source.

The 4-wire PDCA is used in a phase to phase voltage range of 200 to 240 volts at 50/60 Hz. This PDCA is rated for a maximum input current of 44 Amps per phase. The ac input power line to the PDCA is connected with power plugs or is hardwired. When using power plugs, use a power cord [OLFLEX 190 (PN 6008044) four conductor 6-AWG (16 mm), 600 V, 60 Amp, 90°C, UL and CSA approved, conforms to CE directives GN/YW ground wire].

When installing cables in locations that have been designated as "air handling spaces" (under raised flooring or overhead space used for air supply and air return), advise the customer to specify the use of data cables that contain a plenum rating. Data cables with this rating have been certified for FLAMESPREAD and TOXICITY (low smoke emissions). Power cables do not carry a plenum rating, they carry a data processing (DP) rating. Power cables installed in air handling spaces should be specified with a DP rating. Details on the various levels of the DP rating system are found in the National Electric Code (NEC) under Article 645.

The following recommend plugs for the 4-wire PDCA:

- In-line connector: Mennekes ME 460C9, 3-phase, 4-wire, 60 Amp, 250 V, UL approved, color blue, IEC309-1 grounded at 9:00 o'clock.
- Panel-mount receptacle: Mennekes ME 460R9, 3-phase, 4-wire, 60 Amp, 250 V, UL approved, color blue, IEC309-1 grounded at 9:00 o'clock.

The 5 wire PDCA is used in a phase-to-neutral voltage range of 200 to 240 V ac 50/60Hz. This PDCA is rated for a maximum input current of 24 Amps per phase. The ac input power line to the PDCA is connected with power plugs or is hardwired. When using power plugs, a power cord [five conductors, 10-AWG (6 mm), 450/475 V, 32 Amps, <HAR< European wire cordage, GN/YW ground wire]. Alternatively the customer can provide the power plug including the power cord and the receptacle. Recommended plugs are as follows:

- Inline connector: Mennekes ME532C6-16, 3-phase, 5-wire, 32 Amps, 450/475 V, VDE certified, color red, IEC309-1, IEC309-2, grounded at 6:00 o'clock.
- Panel-mount receptacle: Mennekes ME532R6-1276, 3-phase, 5-wire, 32 Amp, 450/475 V, VDE certified, color red, IEC309-1, IEC309-2, grounded at 6:00 o'clock.
- FUSE per phase: 25 Amp (valid for Germany).

DC Power

Each power supply output provides 48 V dc up to 60 A (2.88 kVA) and 5.3 V dc housekeeping. Normally an SD32 Superdome cabinet contains six BPS independent from the installed number of cells and I/O. An SD16 normally has four BPS installed.

Power Sequencing

The power on sequence is as follows:

1. When the main power circuit breaker is turned on, the housekeeping (HKP) voltage turns on first and provides 5.3 V dc to the UGUY, Management Processor (MP), system backplane, cells, and all HIOB. Each BPS provides 5.3 V.
2. When HKP voltage is on the MP performs the following steps:
 - a. De-asserts the Reset and begins to boot SBC.
 - b. Loads VxWorks from flash (can be viewed from the local port).
 - c. Completes the SBC, single board computer hub (SBCH) power-on self-test (POST) begins, and LED start activity appears.
 - d. Loads firmware from Compact Flash to RAM.
 - e. SBCH POST completes. The heartbeat light blinks. USB LEDs turn on later.
 - f. CLU POST and PM POST immediately after power on.
3. After MP POST completes, the MP configures the system.
4. The CLU POST completes.
5. When PM POST completes, the system takes several steps.
6. When the MP finishes the system configuration, it becomes operational and completes several tasks.
7. When the PDHC POST completes, it becomes operational and completes its tasks.
When the MP, CLU, and PM PDHC POST completes, utilities entities run their main loops.

Enabling 48 Volts

The PM must enable +48 V first , but it must obtain permission from the MP. To enable 48 V, the transition cabinet power switch must be moved from OFF to ON. Alternatively you can use the MP Command `pe` if the power switch is already ON. If the switch is ON, the cabinet wakes up from Power on Reset).

If the PM has permission, it sends a `PS_CTL_L` signal to the FEPS. Then the BPS enables +48 V converters, which send +48 V to the backplane, I/O chassis, HUCB, cells, fans, and blowers. Once the +48 V is enabled, it is cabled to the backplane, cells, and I/O chassis.

Cooling System

The Superdome has four blowers and five I/O fans per cabinet. These components are all hot-swappable. All have LEDs indicating their current status. Temperature monitoring occurs for the following:

- Inlet air for temperature increases above normal
- BPS for temperature increases above normal
- The I/O power board over temperature signal is monitored

The inlet air sensor is on the main cabinet, located near the bottom of cell 1 front. The inlet air sensor and the BPS sensors are monitored by the power monitor 3 (PM3) on the UGUY, and the I/O power board sensors are monitored by the CLU on the UGUY.

The PM controls and monitors the speed of groups of N+1 redundant fans. In a CPU cabinet, fan group 0 consists of the four main blowers and fan group 1 consists of the five I/O fans. In an I/O Expansion (IOX) cabinet, fan groups 0–3 consist of four I/O fans and fan group 4 consists of two management subsystem fans. All fans are expected to be populated at all times with the exception of the OLR of a failed fan.

The main blowers feature a variable speed control. The blowers operate at full speed; available circuitry can reduce the normal operating speed. All of the I/O fans and managed fans run at one speed.

One minute after setting the main blower fan Reference to the desired speed or powering on the cabinet, the PM uses the tach select register to cycle through each fan and measure its speed. When a fan is selected, Timer 1 is used in counter mode to count the pulses on port T1 over a period of one second. If the frequency does not equal the expected frequency plus some margin of error, the fan is considered to have failed and is subtracted from the working fan count.

If the failure causes a transition to N- I/O or main fans in a CPU cabinet, the cabinet is immediately powered off. If the failure causes a transition to N- I/O fans in an IOX cabinet, the I/O backplanes contained in the I/O Chassis Enclosure (ICE) containing that fan group are immediately powered off.

Only inlet temperature increases are monitored by HP-UX; all other high temperature increase chassis codes do not activate the `envd` daemon to act as configured in the `/etc/envd.conf` file. The PM monitors ambient inlet temperature. The PM polls an analog-to-digital converter to read the current ambient temperature. The temperature falls into one of four ranges: Normal, OverTempLow, OverTempMid, or OverTempHigh. The following state codes describe the actions taken based on the various temperature state transitions:

OTL_THRESHOLD = 32C ----> Send error code PDC_IPR_OLT

OTM_THRESHOLD = 38C ----> Send error code PDC_INT_OTM

OTH_THRESHOLD = 40C ----> Shut down 48 V



NOTE: In an IOX cabinet, the thresholds are set two degrees higher to compensate for the fact that the cabinet sensor is mounted in a hot spot.

Utilities Subsystem

The Superdome utilities subsystem is comprised of a number of hardware and firmware components located throughout the Superdome system.

Platform Management

The sx2000 platform management subsystem consists of a number of hardware and firmware components located throughout the sx2000 system. The sx2000 uses the sx1000 platform management components, with firmware changes to support new functionality.

The following list describes the major hardware components of the platform management subsystem and the changes required for the sx2000:

The PDH microcontroller is located on each cell PDH daughtercard assembly. It provides communication between the management firmware, the PDH space, and the USB bus. The microcontroller represents a change from the prior implementation, Intel® 80C251 processes, to a more powerful 16-bit microcontroller. This microcontroller change enables the PDH daughtercard design to be compatible across all three new CEC platforms. It also enables the extra processing power to be used to move the console UARTs into PDH memory space located on the cell, eliminating the sx1000 core I/O (CIO) card.

The UGUY on Superdome contains the PM, the CLU, and the system clock source circuitry.

The CLU circuitry on the UGUY assembly provides cabinet-level cable interconnect for backplane, I/O card cage utility signal communication, and scan support.

The PM circuitry on the UGUY assembly monitors and controls the 48 V dc, the cabinet environment (ambient temperature and fans), and controls power to the entities (cells and I/O bays).

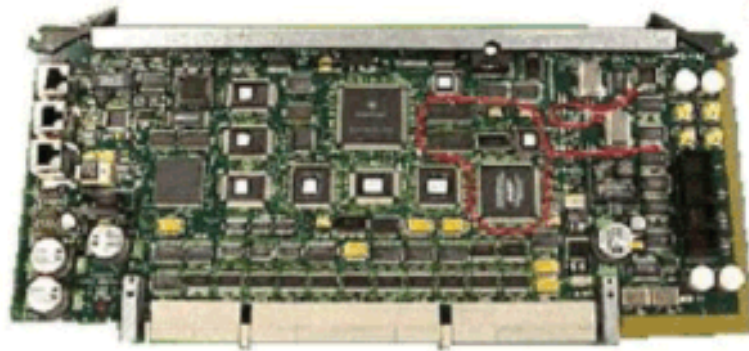
The MP is a single board computer (SBC) that controls the console (local and remote), the front panel display and its redirection on the console, maintains logs for the event IDs, coordinates messages between devices, and performs other service processor functions.

The SBCH board provides USB hubs into the cabinet from an upstream hub or the MP.

UGUY

Every cabinet contains one UGUY. See (Figure 1-3). The UGUY plugs into the HUCB. It is not hot-swappable. Its MP microprocessor controls power monitor functions, executing the Power Monitor 3 (PM3) firmware and the CLU firmware.

Figure 1-3 UGUY



CLU Functionality

The CLU collects and reports the configuration information for itself, the main backplane, I/O backplanes, and the SUB/HUB. Each of these boards has a configuration EEPROM containing FRU IDs, revision information, and for the main backplane and I/O backplanes, maximum power requirements in the fully configured, fully loaded states. These EEPROMs are powered by housekeeping power (HKP) and are accessible to SARG from an I2C bus. The power requirement information is sent to the PM3 automatically when HKP is applied or when a new entity is plugged in. The configuration information is sent to the SUB in response to a `get_config` command.

The CLU gathers the following information over its five I2C buses:

- Board revision information is contained in the board's configuration EEPROM for the UGUY board, the SBCH board, the main backplane, the main backplane power boards (HBPB), the I/O backplane (HIOB), and the I/O backplane power boards (IOPB).
- Power requirements from the configuration EEPROM for the main backplane (HLSB or HRSB) and the I/O backplanes. This information is sent to the PM3 processor so it can calculate cabinet power requirements.
- Power control and status interface. Another function of the UGUY is to use the `power_good` signals to drive the power on sequence.
- Reset control which includes a reset for each I/O backplane, a main backplane cabinet reset, TRST - JTAG reset for all JTAG scan chains in the entire cabinet, a system clock control margin control, nominal or high margin and a clock source selection and internal or external OL* LED control.
- Status LEDs for the SBA cable OL*, the cell OL*, the I/O backplane OL*, the JTAG scan control, the three scan chains per cell, the three scan chains per I/O backplane, and the three scan chains on the main backplane.

PM3 Functionality

The PM3 performs the following functions:

1. FEPS control and monitoring.
Superdome has six BPS and the UGUY sends 5V to the BPS for use by the fault collection circuitry.
2. Fan control and monitoring.
In addition to the blowers, there are five I/O system fans above and between the I/O bays. These fans run at full speed all the time. There is no fan speed signal.
3. Cabinet mode and cabinet number fan out.
The surface mount dip switch on the HUCB (UGUY backplane) is used to configure a Superdome cabinet for normal use or as an SD16 cabinet. Use the 16-position thumb switch on the UGUY to set the cabinet number. Numbers 0-7 are for CPU-oriented cabinets and numbers 8-15 are for I/O-only cabinets.
4. Local Power Monitor (LPM) interfaces. Each big board (cell board, I/O backplane, and main backplane) contains logic that controls conversion of 48 V to lower voltages. The PM3 interfaces to the LPM with the board-present input signal to the PM3 and the power-enable output signal from the PM3.
5. Front and rear panel board control.

System Clocks

The sx2000 system clock differs from the sx1000 system clock in that the system clocks are only supplied from the backplane and to the backplane crossbar ASICs and the cell boards. There is no distribution of the system clocks to the I/O backplanes. Instead, independent local clock distribution is provided on the I/O backplane. The system clocks are not provided by the PM3 on sx2000 servers. The sx2000 system clock source resides on the system backplane.

Management Processor

The MP is comprised of two PCBs, the SBC and the SBCH. The MP is a hot-swappable unit powered by +5 V HKP that holds the MP configuration parameters in compact flash and the error and activity logs and the complex identification information or complex profile in battery backed NVRAM. It also provides the USB network controller (MP bus). Each complex has one MP per complex. It cannot be set up for redundancy. However, it is not a single point of failure for the complex because it can be hot-swapped. If the MP fails, the complex can still boot and function. However, the following utility functions are lost until the MP can be replaced:

- Processing and storing log entries (chassis codes)
- Console functions to every partition
- OL* functions
- VFP and system alert notification
- Connection to the MP for maintenance, either locally or remotely
- Diagnostics (ODE and scan)

Figure 1-4 Management Processor



The SBCH provides the physical and electrical interface to the SBC, the fanning out of the USB to internal and external subsystems, and a LAN 10/100BT ethernet connection. It plugs into the HUCB and is hot-swappable. Every CPU cabinet contains one SBCH board, but only one SBCH contains an SBC board used as the MP for the complex. The remaining SBCH boards act as USB hubs.

The SBC board is an embedded computer running system utility board (SUB) firmware. It is the core of the MP. It plugs into the SBCH board through a PC104 interface. The SBC provides the following external interfaces to the utility subsystem:

- LAN (10/100BT ethernet) for customer console access
- RS232 port for local console access for manufacturing and field support personnel

The modem function is not included on the SBC and must be external to the cabinet.

Compact Flash

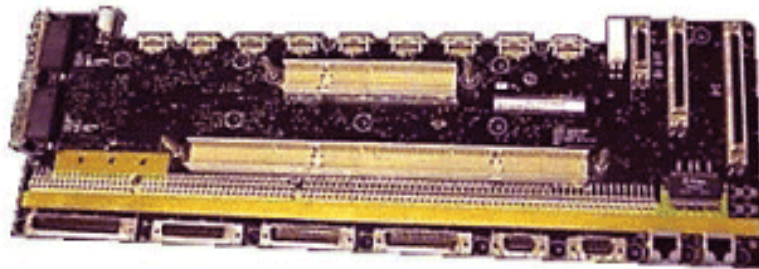
The Compact Flash is a PCMCIA-style memory card that plugs into the SBC board. It stores the MP firmware and the customer's MP configuration parameters. The parameters stored in the compact flash are as follows:

- Network configurations for both the public and private LANs
- User name and password combinations for logging in to the MP
- Baud rates for the serial ports
- Paging parameters for a specified alert level
- Configurable system alert parameters

HUCB

The HUCB, shown in Figure 1-5, is the backplane of the utility subsystem. It provides cable distribution for all the utility signals except the clocks. It also provides the customer LAN interface and serial ports. The support management station (SMS) connects to the HUCB. The system type switch is located on the HUCB. This board has no active circuits. It is not hot-swappable.

Figure 1-5 HUCB



Backplane

The system backplane assembly fabric provides the following functionality in an sx2000 system:

- Interfaces the CLU subsystem to the system backplane and cell modules
- Houses the system crossbar switch fabrics and cell modules
- Provides switch fabric interconnect between multiple cabinets
- Generates system clock sources
- Performs redundant system clock source switching
- Distributes the system clock to crossbar chips and cell modules
- Distributes HKP to cell modules
- Terminates I/O cables to cell modules

The backplane supports up to eight cells, interconnected by the crossbar links. A sustained total bandwidth of 25.5 GB is provided to each cell. Each cell connects to three individual XBC ASICs. This connection enables a single chip crossing when a cell communicates with another cell in its four-cell group. When transferring data between cells in different groups, two crossbar links compensate for the resultant multiple chip crossings. This topology also provides for switch fabric redundancy

Dual rack/backplane systems contain two identical backplanes. These backplanes use 12 high-speed interface cables as interconnects instead of the flex cable interface previously employed for the legacy Superdome crossbar. The sustainable bisection bandwidth between cabinets is 72 GB/s at a link speed of 2.1 GT/s.

Crossbar Chip

The crossbar fabrics in the sx2000 are implemented using the XBC crossbar chip. Each XBC is a non-bit-sliced, eight-port non-blocking crossbar that can communicate with the CC or XBC ASICs. Each of the eight ports is full duplex, capable of transmitting and receiving independent packets simultaneously. Each port consists of 20 channels of IBM's HSS technology. Eighteen channels are used for packet data. One channel is used for horizontal link parity, and one channel is a spare. The HSS channels can run from 2.0- 3.2 GT/s. At 3.0 GT/s, each port provides 8.5 GB/s of sustainable bidirectional data bandwidth.

Like the CC and the SBA, XBC implements link-level retry to recover from intermittent link errors. XBC can also replace a hard-failed channel with the spare channel during the retry process, which guarantees continued reliable operation in the event of a broken channel, or single or multibit intermittent errors.

XBC supports enhanced security between hard partitions by providing write protection on key CSRs. Without protection, CSRs such as the routing tables can be modified by a rogue OS, causing other hard partitions in the system to crash. To prevent this, key CSRs in XBC can only be modified by packets with the Secure bit set. This bit is set by the CC, based on a register that is set only by

a hard cell reset, which causes secure firmware to be entered. This bit is cleared by secure firmware before passing control to an OS.

Switch Fabrics

The system backplane houses the switch fabric that connects to each of the cell modules. The crossbar switch is implemented by a three-link-per-cell topology: three independent switch fabrics connected in parallel. This topology provides switch fabric redundancy in the crossbar switch. The backplane crossbar can be extended to an additional crossbar in a second backplane for a dual backplane configuration. It connects through a high-speed cable interface to the second backplane. This 12-cable high-speed interface replaces the flex cable interface previously used on the Superdome system.

Backplane Monitor and Control

The backplane implements the following monitor and control functions:

- Backplane detect and enable functions to and from the CLU
- Backplane LED controls from the CLU
- Backplane JTAG distribution and chains
- Cabinet ID from the CLU
- Reset and power manager FPGA (RPM) and JTAG interface and header for external programming
- XBC reset, configuration and control
- IIC bus distribution to and from the CLU
- Clock subsystem monitor and control
- Power supply monitor and control
- Cell detect, power monitor, reset and enable to and from the CLU
- JTAG and USB data distribution to and from each cell module
- Cell ID to each cell module
- OSP FPGA functionality

I2C Bus Distribution

The sx2000 system I2C bus extends to the Superdome backplane (SDBP) assembly through a cable connected from the CLU subsystem. This cable connects from J17 on the CLU to J64 on the SDBP. The clock and data signals on this cable are buffered through I2C bus extenders on the CLU and on the backplane.

The I2C bus is routed to an I2C multiplexer on the backplane where the bus is isolated into four bus segments. Three bus segments are dedicated to connections to the three RPMs. The remaining segment is used to daisy-chain the remaining addressable devices on the bus. Each bus segment is addressed through a port on the I2C multiplexer.

Clock Subsystem

The backplane houses two hot-swap oscillator (HSO) modules. Each HSO board generates a system clock that feeds into the backplane. Each HSO output is routed to the redundant clock source (RCS) module. The RCS module accepts input from the two HSO modules and produces a single system clock, which is distributed on the backplane to all cell modules and XBC ASICs.

System Clock Distribution

The system components that receive the system clock are the eight cell boards that plug into to the backplane and the six XBC on the system backplane. Two backplane clock power detectors (one for each 8-way sine clock power splitter) are on the RCS. The backplane power detector sits at the end of the clock tree and measures the amplitude of the clock from the RCS to determine

if it is providing a signal of the correct amplitude to the cell boards and XBCs. Its output is also an alarm signal to the RPM FPGA.

System clocks can originate from these input sources:

- the single-ended external clock input MCX connector
- the 280 MHz margin oscillator on the redundant clock source (RCS) board
- one of the 266.667 MHz oscillators on one of the HSO modules

The source selection is determined either by firmware or by logic in the RCS.

The clock source has alarm signals to indicate the following health status conditions to the cabinet management subsystem:

- Loss of power and loss of clock for each of the clock oscillator boards
- Loss of clock output to the backplanes

The sx2000 clock system differs from the sx1000 clock system in that the system clocks are only supplied to the backplane crossbar ASICs and the cell boards. System clocks are not distributed to the I/O backplanes. Instead, independent local clock distribution is provided on the I/O backplane.

Hot-Swap Oscillator

Two hot-swappable clock oscillators combine the outputs of both oscillators to form an N+1 redundant fault tolerant clock source. The resultant clock source drives clocks over connector and cable interfaces to the system backplanes.

The HSO board contains a 266.667 MHz PECL oscillator. The output from this oscillator drives a 266.667 MHz band-pass SAW filter that drives a monolithic IC power amplifier. The output of the power amplifier is a 266.667 sine wave clock that goes to the RCS. The module also has two LEDs, one green and one yellow, that are visible through the module handle. Table 1-1 describes the HSO LEDs. The electrical signal that controls the LEDs is driven by the RCS.

Table 1-1 HSO LED Status Indicator Meaning

Green LED	Yellow LED	Meaning
On	Off	Module OK. HSO is producing a clock of the correct amplitude and frequency and is plugged into its connector.
Off	On	Module needs attention. HSO is not producing a clock of the correct amplitude or frequency, but it is plugged into its connector.
Off	Off	Module power is off.

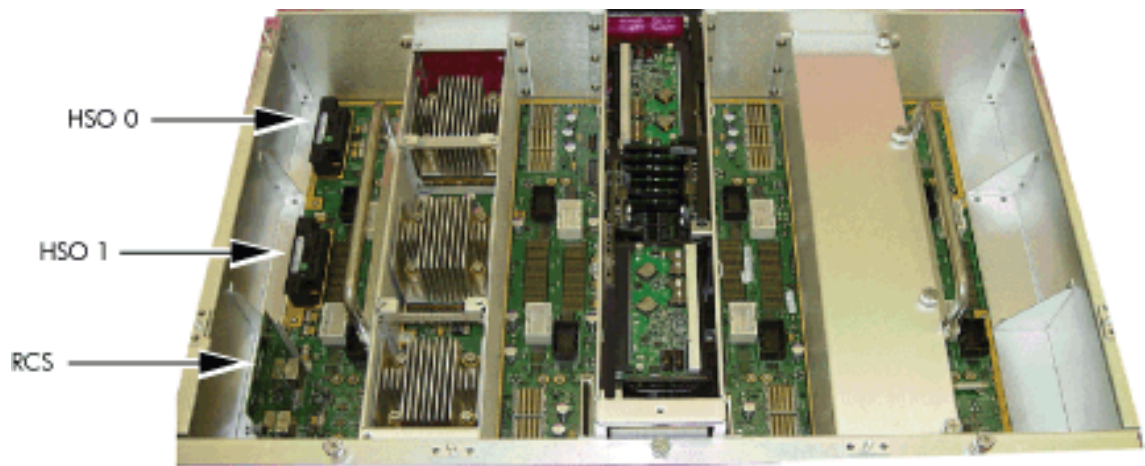
sx2000 RCS Module

The sx2000 RCS module supplies clocks to the Superdome sx2000 backplane, communicates clock alarms to the RPM, and accepts control input from the RPM. It has an I2C EEPROM on the module so that the firmware can inventory the module on system power on.

The RCS supplies 16 copies of the sine wave system clock to the sx2000 system backplane. Eight copies go to the eight cell boards, six copies go to the six XBCs on the system backplane, and two copies to the backplane clock power detector.

In normal operation, the RCS selects one of the two HSOs as the source of clocks for the platform. The HSO selected depends on whether the HSO is plugged into the backplane and on whether it has a valid output level. This selection is overridden if there is a connection from the clock input MCX connector on the master backplane. Figure 1-6 shows the locations of the HSOs and RCS on the backplane.

Figure 1-6 HSO and RCS Locations



If only one HSO is plugged in and its output is of valid amplitude, then it is selected. If its output is valid, then a green LED on the HSO is lit. If its output is not valid, then a yellow LED on the HSO lights and an alarm signal goes from the RCS to the RPM. The RCS provides a clock that is approximately 100 KHz less than the correct frequency, even if the output of the HSOs are not of valid amplitude or no HSOs are plugged in.

If both HSOs are plugged in and their output amplitudes are valid, then one of the two is selected as the clock source by logic on the RCS. The green LEDs on both HSOs light.

If one of the HSOs outputs does not have the correct amplitude then the RCS uses the other one as the source of clocks and sends an alarm signal to the RPM indicating which oscillator failed. The green LED lights on the good HSO and the yellow LED lights on the failed HSO.

If an external clock cable is connected from the master backplane clock output MCX connector to the slave backplane clock input MCX connector, then this overrides any firmware clock selections. The clock source from the slave backplane becomes the master backplane.

If firmware selects the margin oscillator as the source of clocks, then it is the source of clocks as long as there is no connection to the clock input MCX connector from the master backplane.

If the firmware selects the external margin clock SMB connectors as the source of clocks, then it is the source of clocks as long as no connection exists to the clock input MCX connector from the master backplane.

Cabinet ID

The backplane receives a 6-bit cabinet ID from the CLU interface J64 connector. The cabinet ID is buffered and routed to each RPM and to each cell module slot. The RPM decodes the cabinet number from the cabinet ID and uses this bit to alter the cabinet number bit in the ALBID byte sent to each XBC through the serial bit stream.

Cell ID

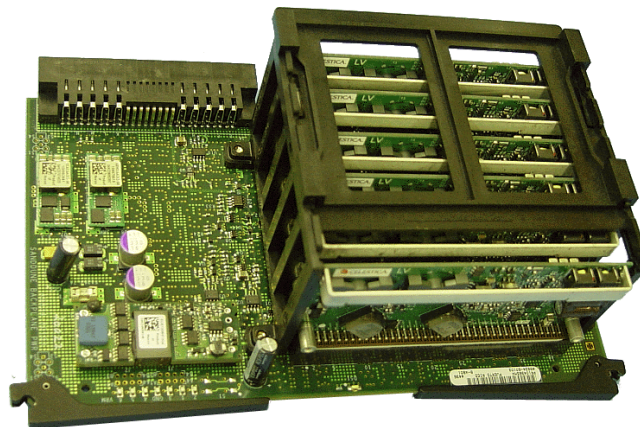
The backplane generates a 3-bit slot ID for each cell slot in the backplane. The slot ID and five bits from the cabinet ID are passed to each cell module as the cell ID.

Backplane Power Requirements and Power Distribution

The dc power supply for the backplane assembly runs from the cabinet power supply subsystem through two power cables attached to the backplane. Connectors for the dc supply input have the same reference designators and are physically located in the same position as on the Superdome system backplane. The power cables are reused cable assemblies from the Superdome system and the supply connection is not redundant. One cable is used for housekeeping supply input. A second cable is used for 48 V supply input.

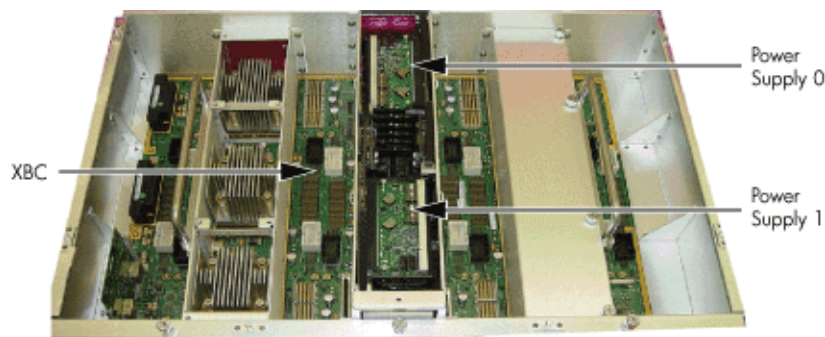
The backplane has two slots for power supply modules. The power supply connector for each slot has a 1-bit slot address to identify the slot. The address bit for power supply slot 0 is grounded. The address bit for slot 1 floats on the backplane. The power supply module provides a pull-up resistor on the address line on slot 1. The power supply module uses the slot address bit as bit A0 for generating a unique I2C address for the FRU ID prom. Figures 1-7 and 1-8 identify and show the location of the backplane power supply modules.

Figure 1-7 Backplane Power Supply Module



Each power supply slot has a power supply detect bit that determines if the power supply module is inserted into the backplane slot. This bit is routed to an input on the RPMs. The RPM provides a pull-up resistor for logic 1 when the power supply module is missing. When the power supply module is inserted into the slot, the bit is grounded by the power supply and logic 0 is detected by the RPM, indicating that the power supply module is present in the backplane slot.

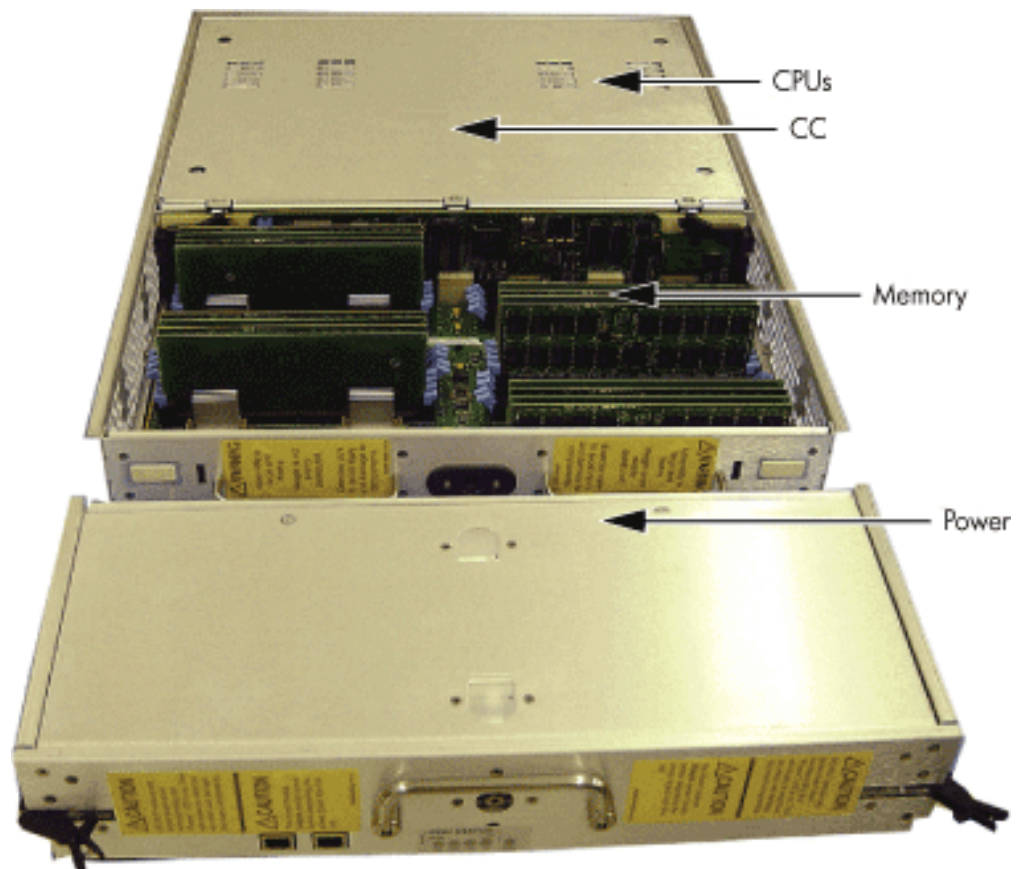
Figure 1-8 Backplane (Rear View)



CPU and Memories

The cell provides the processing and memory resources required by each sx2000 system configuration. Each cell includes the following components: four processor module sockets, a single cell (or coherency) controller ASIC, a high-speed crossbar interface, a high-speed I/O interface, eight memory controller ASICs, capacity for up to 32 double-data rate (DDR) DIMMs, high-speed clock distribution circuitry, a management subsystem interface, scan (JTAG) circuitry for manufacturing test, and a low-voltage DC power interface. Figure 1-9 shows the locations of the major components.

Figure 1-9 Cell Board



Cell Controller

The heart of the cell design is the cell controller. The cell controller provides two front side bus (FSB) interfaces, with each FSB connected to two processor modules. The communication bandwidth is 6.8 GB/s sustained at 266.67 MHz on each FSB. This bandwidth is shared by the two processor modules on the FSB. Interfaces external to the cell provided by the cell controller consist of three crossbar links, called the fabric interface, and a remote I/O subsystem link. The fabric interface enables multiple cells to communicate with each other across a self-correcting, high-speed communication pathway. Sustained crossbar bandwidth is 8.5 GB/s per link at 3.0 GT/s, or 25.5 GB/s across the three links.

The remote I/O link provides a self-correcting, high-speed communication pathway between the cell and the I/O subsystem through a pair of cables. Sustained I/O bandwidth is 5.5 GB/s for a 50% inbound and outbound mix, and approximately 4.2 GB/s for a range of mixes. The cell controller interfaces to the cell's memory system. The memory interface is capable of providing a sustained bandwidth of 14 to 16 GB/s at 266.67 MHz to the cell controller.

Processor Interface

The cell controller has two separate FSB interfaces. Each of those FSBs is connected to two processor sockets in a standard three-drop FSB configuration. The cell controller FSB interface is pinned out exactly like that of its predecessor cell controller to preserve past cell routing. The cell controller pinout minimizes total routing delay without sacrificing timing skew between the FSB address and data and control signals. Such tight routing controls enable the FSB to achieve a frequency of 266.67 MHz, and the data to be transmitted on both edges of the interface clock. The 128-bit FSB can achieve 533.33 MT/s, thus 8.5 GB/s burst data transfer rate is possible.

Processors

There are several Itanium and PA-RISC processor families supported by the processors are already installed on the cell board. All processors require that a minimum firmware version be installed. For the processors supported, see Table 1-2.

Table 1-2 Supported Processors and Minimum Firmware Versions

Processor Family	Minimum Firmware Version	Core Frequency
Intel ® Itanium® single-core processors with 9 MB cache	4.3e (IPF SFW 004.080.000)	1.6 GHz
Intel ® Itanium® dual-core processors with 18 MB cache	5.5d (IPF SFW 005.024.000)	1.6 GHz
Intel ® Itanium® dual-core processors with 24 MB cache	5.5d (IPF SFW 005.024.000)	1.6 GHz
PA-8900 dual-core processor with 64 MB cache	PDC_FW 042.009.000	1.1 GHz
Intel ® Itanium ® dual-core 9100 series processors with 18 MB cache	8.6d (IPF SFW 009.022.000)	1.6 GHz
Intel ® Itanium ® dual-core 9100 series processors with 24 MB cache	8.6d (IPF SFW 009.022.000)	1.6 GHz

Rules for Processor Mixing

- Processor families cannot be mixed on a cell board or within a partition
- Processor frequencies cannot be mixed on a cell board or within a partition
- Cache sizes cannot be mixed on a cell board or within a partition
- Major processor steppings cannot be mixed on a cell board or within a partition
- Full support for Itanium and PA-RISC processors within the same complex but in different partitions

Cell Memory System

Each cell in the sx2000 system has its own independent memory subsystem. This memory subsystem consists of four logical memory subsystems that achieve a combined bandwidth of 17 GB/s peak, 14-16 GB/s sustained. This cell is the first of the Superdome designs to support the use of DDR I/O DRAM. These DIMMs are to be based on the DDR-II protocol, and the cell design supports DIMM capacities of 1, 2, or 4 GB using monolithic DRAMs. Nonmonolithic, (stacked) DRAMS are not supported on the sx2000. The additional capacitive load and requirement for additional chip selects is not accommodated by the new chipset. All DIMMs used in the sx2000 are compatible with those used in other new CEC platforms. However other platforms can support DIMMs based on nonmonolithic DRAMs that are incompatible with the sx2000. Cell memory is illustrated in Figure 1-10.

Figure 1-10 Cell Memory



DIMMs are named according to both physical location and loading order. The physical location is used for connectivity on the board and is the same for all quads. Physical location is a letter (A or B) followed by a number (0, 1, 2, or 3). The letter indicates which side of the quad the DIMM is on. A is the left side, or the side nearest CC. The DIMMs are then numbered 0 through 3, starting at the outer DIMM and moving inwards the memory controllers.

Memory Controller

The memory controller CEC's primary function is to source address and control signals and multiplex and demultiplex data between the CC and the devices on the DDR DIMMs. Four independent memory blocks, consisting of two memory controllers and eight DIMMs, are supported by interface buses running between the CC and the memory controller. The memory controller converts these link streams to the correct signaling voltage levels (1.8 V) and timing for DDR2 protocol.

Bandwidth is limited by the memory interface buses that transfer data between the CC and the memory controller. The memory controller also performs the write (tag update) portion of a read-modify-write (RMW) access. The memory controller is bit sliced, and two controllers are required to form one 72-bit CC memory interface data (MID) bus. The CC MID buses are bidirectional, source synchronous, and run at 533.33 MT/s. The memory side of a pair of memory controller ASICs consists of two 144-bit bidirectional DDR2 SDRAM data buses operating at 533.33 MT/s. Each bus supports up to four echelons of DRAMs.

DIMM Architecture

The fundamental building block of the DIMM is a DDR2 DRAM with a 4-bit data width. Each DIMM transfers 72 bits of data on a read/write, and the data is double-clocked at a clock frequency of 266.67 MHz for an effective peak transfer rate of 533.33 MT/s. Each DIMM includes 36 DRAM devices for data storage and two identical custom address buffers. These buffers fan out and check the parity of address and control signals received from the memory controller. The DIMM densities for the sx2000 are 1 GB (256 Gb DRAMs), 2 GB (512 Gb DRAMs), and 4 GB (1 Gb DRAMs). The new sx2000 chipset DIMMs have the same mechanical form factor as the DIMMs used in Integrity systems, but the DIMM and the connector, are keyed differently from previous DIMM designs to prevent improper installation. The DIMM is roughly twice the height of an industry-standard DIMM. This height increase enables the DIMM to accommodate twice as many DRAMs as an industry-standard DIMM and provides redundant address and control signal contacts not available on industry-standard DDR2 DIMMs.

Memory Interconnect

MID bus data is transmitted through the four 72-bit, ECC-protected MID buses, each with a clock frequency equal to the CC core frequency. The data is transmitted on both edges of the clock, so the data transfer rate (533 MT/s) of each MID is twice the MID clock frequency (267 MHz). A

configuration of at least eight DIMMs (two in each quadrant) activates all four MID buses. The theoretical bandwidth of the memory subsystem can be calculated as follows: $(533 \text{ MT/s} * 8 \text{ Bytes/T} * 4) = 17 \text{ GB/s}$ The MID buses are bit-sliced across two memory controllers with 36-bits of data going to each memory controller. In turn, each memory controller takes that high-speed data (533 MT/s) from the MID, and combines four consecutive MID transfers to form one 144-bit DRAM bus. This DRAM bus is routed out in two 72-bit buses to two DIMM sets, which include four DIMMs each. The DDR DRAM bus runs at 267 MT/s and data is clocked on both edges of the clock.

The DDR DRAM address and control (MIA) signals for each quadrant originate at the CC and are routed to the DIMMs through the memory controller. On previous systems, these signals did not touch the memory chips; they were routed to the DIMMs through fan out buffers. The DRAM address and control signals are protected by parity so that signaling errors are detected and do not cause silent data corruption. The MIA bus, comprised of the SDRAM address and control signals, is checked for parity by the memory controller. Each of the 32 DIMMs can generate a unique parity error signal that is routed to one of four parity error inputs per memory controller. Each memory controller then logically gates the DIMM parity error signals it receives with its own internal parity checks for the MIC and MIT buses. This logical gating results in a single parity error output that is driven to the CC and latched as an event in an internal memory-mapped register.

Eight unique buses for command and control signals are transmitted from the CC to each memory controller simultaneously with the appropriate MID bus interconnect. Each MIC bus includes four signals running at 533 MT/s. Each command on the MIC bus takes four cycles to transmit and is protected by parity so that signaling errors are detected and do not cause silent data corruption.

Four MIT buses are routed between the CC and the designated tag memory controllers. MIT buses run at 533 MT/s and use the same link type as the MID buses. Each MIT bus includes six signals and a differential strobe pair for deskewing. As with the MIA and MIC buses, the MIT is protected by parity so that signaling errors are detected and do not cause silent data corruption.

Mixing Different Sized DIMMs

Mixing different sized DIMMs is allowed, provided you follow these rules:

- An echelon of DIMMs consists of two DIMMs of the same type.
- All supported DIMM sizes can be present on a single cell board at the same time, provided previous rule is satisfied.
- Memory must be added in one echelon increments.
- The amount of memory contained in an interleaved group must be 2^n bytes.

Memory Interleaving

Memory is interleaved in the following ways on sx2000 systems:

- MBAT (across DIMMs)
- Cell map (across cells)
- Link (across fabrics)

Memory Bank Attribute Table

The memory bank attribute table (MBAT) interleaving is done on a per-cell basis before the partition is rendezvoused. The cell map and fabric interleaving are done after the partition has rendezvoused. SDRAM on the cell board is installed in physical units (echelons). The sx2000 has 16 independent echelons. Each echelon consists of two DDR DIMMs. Each rank can have multiple internal logical units called banks, and each bank contains multiple rows and columns of memory. An interleaving algorithm determines how a rank, bank, row, or column address is formed for a particular physical address.

The 16 echelons in the memory subsystem can be subdivided into four independent memory quadrants accessed by four independent MID buses. Each quadrant contains two independent SDRAM buses. Four echelons can be installed on each SDRAM bus. The CC contains four MBATs, one for each memory quadrant. Each MBAT contains eight sets of routing CSRs (one per rank). Each routing CSR specifies the bits of the address that are masked or compared to select the corresponding rank, referred to as interleave bits. The routing CSR also specifies how the remaining address bits are routed to bank, row, and column address bits.

To optimize bandwidth, consecutive memory accesses target echelons that are as far from each other as possible. For this reason, the interleaving algorithm programs the MBATs so that consecutive addresses target echelons in an order that skips first across quadrants, then across SDRAM buses, then across echelons per SDRAM bus, then across banks per rank.

Cell Map

Cell mapping creates a scheme that is easy to implement in hardware. It enables easy calculation of the interleaving parameters for software. In order to do this part of the physical address to perform a lookup into a table, it gives the actual physical cell and ways of interleaving into memory at this address. Be aware of the following:

- A portion of memory that is being interleaved across must start at an offset that is a multiple of the memory chunk for that entry. For example, to interleave across 16 GB of memory with one entry, the starting address for this chunk must be 0 GB, 16 GB, 32 GB, 48 GB, or 64 GB. If using three 2 GB entries to interleave across three cells, then the multiple must be 2 GB, not 6 GB.
- Interleaving is performed across the actual cells within the system. Interleaving can be done across a minimum of 0.5 GB on a cell, and a maximum interleave across 256 GB per cell.
- Each cell in an interleave group must have the same amount of memory interleaved. That is, you cannot interleave 2 GB in one cell and 4 GB in another cell.

The cell map remains the same size as in previous HP Integrity CECs.

Link Interleaving

The link interleaving functionality did not exist in sx1000. This logic is new for the sx2000 CC. The sx2000 enables cells to be connected through multiple paths. In particular, each CC chip has three crossbar links. When one CC sends a packet to another CC, it must specify which link to use.

The CC is the sx2000 chipset cell controller. It interfaces to processors, main memory, the crossbar fabric, an I/O subsystem, and processor-dependent hardware (PDH). Two data path CPU bus interfaces are implemented, with support for up to four processors on each bus. The CC supports bus speeds of 200 MHz and 267 MHz. The 128-bit data bus is source synchronous, and data can be transferred at twice the bus frequency: 400 MT/s or 533 MT/s. The address bus is 50 bits wide, but only 44 bits are used by the CC. Error correction is provided on the data bus and parity protection is provided on the address bus.

Memory Error Protection

All of the CC cache lines are protected in memory by an error correction code (ECC). The sx2000 memory ECC scheme is significantly different from the sx1000 memory ECC scheme. An ECC code word is 288 bits long: 264 bits of payload (data and tag) and 24 bits of redundancy. An ECC code word is contained in each pair of 144-bit chunks. The first chunk in the pair (for example chunk 0 in the 0,1 pair) contains all the even nibbles of the payload and redundancy, and the second chunk contains all the odd nibbles. The memory data path (MDP) block checks for, and if necessary, corrects any correctable errors.

DRAM Erasure

A common cause of a correctable memory error is a DRAM failure; the ability to correct this type of memory failure in hardware is called chip kill. Address or control bit failure is a common cause. Chip kill ECC schemes have added hardware logic that enables them to detect and correct more than a single-bit error when the hardware is programmed to do so. A common implementation of traditional chip kill is to scatter data bits from each DRAM component across multiple ECC code words, so that only one bit from each DRAM is used per ECC code word.

Double chip kill is an extension to memory chip kill that enables the system to correct multiple ECC errors in an ECC code word. Double chip kill is also known as DRAM erasure.

DRAM erasure is invoked when the number of correctable memory errors exceeds a threshold. It can be invoked on a memory subsystem, bus, rank or bank. PDC tracks the errors on the memory subsystem, bus, rank and bank in addition to the error information it tracks in the PDT.

PDC Functional Changes

There are three primary threads of control in the processor dependent code (PDC): the bootstrap, the errors code, and the PDC procedures. The bootstrap is the primary thread of control until the OS is launched. The boot console handler (BCH) acts as a user interface for the bootstrap, but can also be used to diagnose problems with the system. The BCH can call the PDC procedures but this explicit capability is only available in MFG mode through the Debug menu.

The PDC procedures are the primary thread of control once the OS launches. Once the OS launches, the PDC code is only active when the OS calls a PDC procedure or there is an error that calls the error code. Normally, the error thread of control returns control back to the OS through OS_HPMC, OS_TOC or RFI (LPMC or CMCI). In some cases, the HPMC or MCA handler halts the cell or partition.

If a correctable memory error occurs during run time, the new chipset logs the error and corrects it in memory (reactive scrubbing). Diagnostics periodically call PDC_PAT_MEM (Read Memory Module State Info) to read the errors logs. When this PDC call is made, system firmware updates the PDT, and deletes entries older than 24 hours in the structure that counts how many errors have occurred for each memory subsystem, bus, rank or bank. When the counts exceed the thresholds, PDC invokes DRAM erasure on the appropriate memory subsystem, bus, rank or bank. Invoking DRAM erasure does not interrupt the operation of the OS.

When PDC invokes DRAM erasure, the information returned by PDC_PAT_MEM (Read Memory Module State Info) indicates the scope of the invocation and provides information to enable diagnostics to determine why it was invoked. PDC also sends IPMI events indicating that DRAM erasure is in use. When PDC invokes DRAM erasure, the correctable errors that caused DRAM erasure are removed from the PDT. Because invoking DRAM erasure increases the latency of memory accesses and reduces the ability of ECC to detect multibit errors, you must notify the customer that the memory subsystem must be serviced. HP recommends that the memory subsystem be serviced within a month of invoking DRAM erasure on a customer machine.

The thresholds for invoking DRAM erasure are incremental, so that PDC invokes DRAM erasure on the smallest part of memory subsystem necessary to protect the system against another bit error.

Platform Dependent Hardware

The platform dependent hardware (PDH) includes functionality that is required by both system and management firmware. The PDH provides the following features:

- An interface that passes multiple forms of information between system firmware and the MP on the SBC by the platform dependent hardware controller (PDHC, on the PDH daughter card).
- Flash EPROM for PDHC boot code storage.
- PDHC SRAM for operational instruction and data storage.

- Memory mapped control and status registers (CSRs) control the cell for management needs.
- System management bus (SMBus) reads the processor module information EEPROM, scratch EEPROM, and thermal sensing device.
- I2C bus reads PDH, cell, and cell power board FRU ID information.
- Serial presence detect (SPD) bus detects and investigates loaded DIMMs.
- Timing control of cell reset signals.
- Logic analyzer ports for access to important PDH signals.
- PDH resources accessible by the processors (system firmware) and the management subsystem.
- Flash EPROM for system firmware bootstrap code storage and update capability.
- System firmware scratch pad SRAM for operation instruction and data storage.
- Battery backed NVRAM and real time clock (RTC) chip to provide wall clock time.
- Memory-mapped registers for configuration related information
- Console UARTs (moved from I/O space).
- Low level debug and general purpose debug ports (UART).
- Trusted platform monitor (TPM).

Reset

The sequencing and timing of reset signals is controlled by the LPM, a field-programmable gate array (FPGA) that resides on the cell. The LPM is powered by the housekeeping rail and has a clock input from the PDH daughter card that runs continuously at 8 MHz. This enables the LPM and the rest of the utility subsystem interface to operate regardless of the power state of the cell.

Cell reset can be initiated from the following sources:

- Power enable of the cell (initial power-on)
- Backplane reset causes installed cells to reset, or cell reset initiated from PDHC in direct response to an MP command or during a system firmware update
- System firmware-controlled soft reset initiated by writing into the PDH interface chip test and reset register

The LPM contains a large timer that gates all the reset signals and ensures the proper signaling sequence regardless of the source of that reset event. The most obvious reset sequencing event is the enabling of power to the cell, but the sequencing of the reset signals is consistent even if the source of that reset is an MP command reset for the main backplane, a partition, or the cell itself.

Cell OL*

For online add (OLA) of a cell, the CC goes through the normal power on reset sequence. For online delete (OLD) of a cell, software cleans up to the I/O (SBA) interface to put it in reset mode and hold it there. When the I/O (SBA) link is held in reset, the cell is ready; power can be turned off and the cell can be removed.

I/O Subsystem

The SIOBP is an update of the GXIOB, with a new set of chips that increase the board's internal bandwidth and support the newer PCI-X 2.0 protocol. The SIOBP uses most of the same mechanical parts as the GXIOB. The connections between the I/O chassis and the rest of the system have changed. The cell board to I/O backplane links are now multichannel, high-speed serial (HSS) based rather than a parallel interface. Because of this, the SIOBP can only be paired with the sx2000 cell board and is not backward compatible with earlier Superdome cell boards. The term PCI-X I/O chassis refers to the assembly containing an SIOBP. All slots are capable of supporting both PCI and PCI-X cards.

A new concept for the sx2000 is a fat rope. A fat rope is logically one rope that has 32 wires. It consists of two single ropes but has the four command wires in the second single rope removed. The concept of a single rope remains unchanged. It has 18 signals, of which 10 are bidirectional, single-ended address and data bits. Two pairs of unidirectional, single-ended lines carry commands in each direction and a differential strobe pair for each direction. These are all enhanced ropes, which support double the bandwidth of plain ropes and additional protocol behavior. Ropes transfer source-synchronous data on both edges of the clock and can run at either of two speeds.

The major components in the I/O chassis are the system bus adapter (SBA) ASIC and 12 logical bus adapter (LBA) ASICs. The high speed serial (HSS) links (one inbound and one outbound) are a group of 20 high-speed serial differential connections using a cable that enables the I/O chassis to be located as much as 14 feet away from the cell board. This enables the use of an I/O expansion cabinet to provide more I/O slots than fit in the main system cabinet.

Enhanced ropes are fast, narrow links that connect singly or in pairs between the SBA and four specific LBAs. Fat ropes are enhanced dual-width ropes that are treated logically as a single rope. A fat rope can connect to an LBA. Dual fat ropes can connect to an LBA.

A PCI-X I/O chassis consist of four printed circuit assemblies (the PCI-X I/O backplane, the PCI-X I/O power board, the PCI-X I/O power transfer board, and the doorbell board) plus the necessary mechanical components required to support 12 PCI card slots.

The master I/O backplane (HMIOB) provides easy connectivity for the I/O chassis. The HSS link and utilities signals come through the master I/O backplane. Most of the utilities signals travel between the UGUY and the I/O backplane, with a few passing through to the I/O power board. The I/O power board contains all the power converters that produce the various voltages needed on the I/O backplane. Both the I/O backplane and the I/O power board have FRU EEPROMs. An I/O power transfer board provides the electrical connections for power and utility signals between the I/O backplane and I/O power board.

PCI-X Backplane Functionality

The majority of the functionality of a PCI-X I/O backplane is provided by a single SBA ASIC and twelve LBA ASICs (one per PCI slot). A dual-slot hot-plug controller chip plus related logic is also associated with each pair of PCI slots. The SBA is the primary I/O component. Upstream, the SBA communicates directly with the cell controller CC ASIC of the host cell board through a high-bandwidth logical connection (HSS link). Downstream, the SBA spawns 16 logical ropes that communicate with the LBA PCI interface chips. Each PCI chip produces a single 64-bit PCI-X bus supporting a single PCI or PCI-X add-in card. The SBA and the CC are components of the sx2000 and are not compatible with the legacy or Integrity CECs.

The newer design for the LBA PCI chip replaces the previous design for LBA chip providing PCI-X 2.0 features. Link signals are routed directly from one of the system connector groups to the SBA. The 16 ropes generated by the SBA are routed to the LBA chips as follows:

- The four LBAs are tied to the SBA by single-rope connections and are capable of peak data rates of 533 MB/s (equivalent to the peak bandwidth of PCI 4x or PCIX-66).
- LBAs are tied to the SBA by either a single fat or dual-rope connections and are capable of peak data rates of 1.06 GB/s (equivalent to the peak bandwidth of PCIX-133). Two LBAs use dual-fat rope connections and are capable of peak data rates of 2.12 GB/s (equivalent to the peak bandwidth of PCIX-266).

Internally, the SBA is divided into two halves, each supporting four single ropes and four fat ropes. The I/O backplane routing interconnects the ASICs in order to balance the I/O load on each half of the SBA.

SBA Chip CC-to-Ropes

The SBA chip communicates with the CC on the cell board through a pair of high-speed serial unidirectional links (HSS or e-Links). Each unidirectional e-Link consists of 20 serial 8b/10b

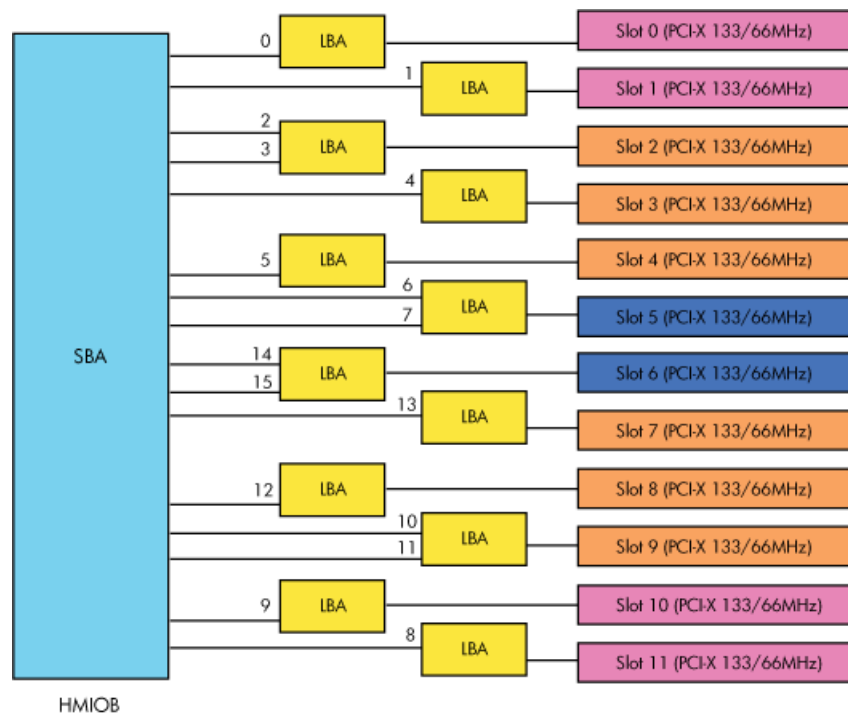
encoded differential data bits operating at 2.36 GT/s. This yields a peak total bidirectional HSS link bandwidth of 8.5 GB/s. Internally, SBA routes this high-speed data to and from one of two rope units. Each rope unit spawns four single ropes and four fat ropes. A maximum of two like ropes can connect to an LBA. This means that the SBA to LBA rope configurations can be single, dual, or fat ropes and the SBA-to-LBA rope configurations can be single, dual, fat or dual fat ropes.

In a default configuration, ropes operate with a 133 MHz clock and so have 266 MT/s for a peak bandwidth (266 MB/s per single rope). In the enhanced configuration, ropes operate with a 266 MHz clock and so have 533 MT/s for a peak bandwidth 533 MB/s per single rope. On the SIOBP, firmware is expected to always configure the 266 MHz enhanced ropes.

Ropes can be connected to an LBA either individually or in pairs. A single rope can sustain up to PCI 4x data rates (full bandwidth support for a 64-bit PCI card at 33 or 66 MHz or for a 64-bit PCI-X card at 66 MHz for a 32-bit PCI-X card at 133 MHz). A dual rope or fat rope can sustain PCI 8x data rates (64-bit PCI-X card at 133 MHz). A dual fat rope can sustain PCI 16x data rates (64-bit PCI-X card at 266 MHz). Because of the internal architecture of the SBA, when two ropes are combined, they must be adjacent even/odd pairs. Ropes 0 and 1 can be combined, but not 1 and 2. The two paired ropes must also be of the same type, either single or fat.

The location of the ropes on the SBA chip determines the rope mapping to PCI slots on the I/O backplane (Figure 1-11 "PCI-X I/O Rope Mapping").

Figure 1-11 PCI-X I/O Rope Mapping



Ropes-to-PCI LBA Chip

The LBA ASIC interfaces between the ropes and the PCI bus. The primary enhancement to the LBA ASIC is support of PCI-X 2.0 266 MHz bus operation. The extra bandwidth requirements of the higher speed PCI-X bus are met by widening the ropes interface to accept single, dual, fat, or dual fat ropes. Another LBA enhancement is selectable ECC protection on the data bus.

The SIOBP board has six LBAs configured with either dual ropes or a fat rope. This provides enough bandwidth for PCI-X 133 MHz 64-bit or less operation. Two LBA chips are configured with dual fat ropes (slots 5 and 6) that provide enough bandwidth to support PCI-X 2.0 running at 266 MHz 64-bit or less. Each LBA is capable of only 3.3 V or 1.5 V signaling on the PCI bus.

Cards that allow only 5 V signaling are not supported; PCI connector keying prevents insertion of such cards.

Each LBA has control and monitor signals for use with a PCI hot-swap chip. It also converts PCI interrupts into interrupt transactions which are fed back to the CPUs.

PCI Slots

For maximum performance and availability, each PCI slot is sourced by its own LBA chip and is supported by its own portion of a hot-plug controller. All slots are designed to Revision 2.2 of the PCI specification and Revision 2.0a of the PCI-X specification and can support full size 64-bit cards with the exceptions noted below. Shorter or smaller cards are also supported, as are 32-bit cards. Slot 0 support for the core I/O card is removed on the SIOBP.

SIOBP PCI slot support of VAUX3.3 and PME is not supported. SMBus is supported in hardware through two I2C Muxes. Firmware can configure the muxes to enable communication to any of the 12 PCI slots. JTAG is not supported for PCI slots.

Each device on a PCI bus is assigned a physical device number. On the past HIOB, the slot was configured as device 0. However, the PCI-X specification requires that the host bridge to be device 0. So for SIOBP the slot is configured as device 1.

The SIOBP's ten outermost slots support only 3.3 V signaling (PCI or PCI-X Mode 1). The two innermost slots support either 3.3 V or 1.5 V (PCI-X Mode 2) signaling. All SIOBP PCI connectors physically prevent 5 V signaling cards from being installed.

Mixed PCI-X and PCI Express I/O Chassis

The 12-slot mixed PCI-X/PCI Express (PCIe) I/O chassis was introduced for the sx2000 Superdome with the two new dual-core Intel® Itanium® processors and is heavily leveraged from the 12-slot PCI-X I/O chassis. The primary change replaces six of the LBAs with a new LBA ASIC to provide six PCI Express 1.1 compliant slots. The PCI-X/PCIe I/O chassis is only supported for Intel® Itanium® dual-core processors.

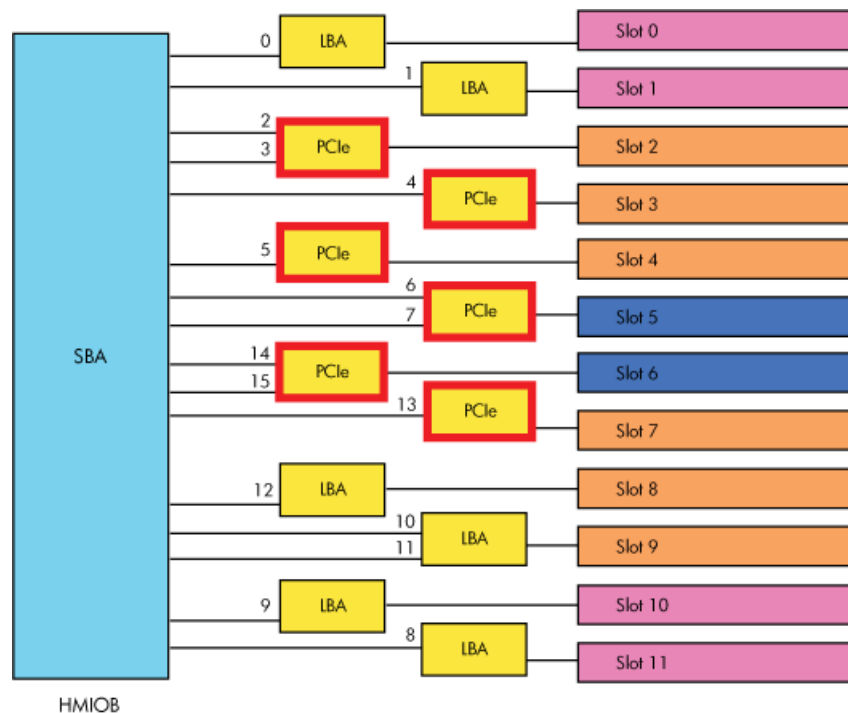
The new LBA provides an 8-lane (x8) Root Port compliant with the PCIe 1.1 specification. The six corresponding slots are compatible with PCIe cards with x8 or smaller edge connectors. PCIe slots are not compatible with PCI or PCI-X cards. Physical keying prevents installation of PCI or PCI-X cards into PCIe slots, or PCIe cards into PCI-X slots.

The new PCIe I/O backplane board is a respin of the SIOBP3, with six of the LBA ASICs replaced with new PCIe LBA ASICs. These new LBA ASICs populate slots 2, 3, 4, 5, 6, and 7. All other slots contain PCI LBA ASICs. Slot 2 is a dual-thin rope; slots 3, 4, and 7 are fat-ropes and slots 5 and 6 are dual-fat ropes. All slots are hot-pluggable (Figure 1-12 "PCIe I/O Rope Mapping").

The new AIOBP I/O backplane uses most of the same mechanical components as the SIOBP. The differences are the PCIe connector, and the card extractor hardware.

A PCI-X I/O chassis consists of four printed circuit assemblies; the PCI-X I/O backplane, the PCI-X I/O power board, the PCI-X I/O power transfer board, and the doorbell board plus the necessary mechanical components required to support 12 PCI card slots.

Figure 1-12 PCIe I/O Rope Mapping



PCI Hot-Swap Support

All 12 slots support PCI hot-plug permitting OLA and OLD of individual I/O cards without impacting the operation of other cards or requiring system downtime. Card slots are physically isolated from each other by nonconductive card separators that also serve as card ejectors to aid in I/O card removal. A pair of light pipes attached to each separator conveys the status of the slot power (green) and attention (yellow/amber) LEDs, clearly associating the indicators with appropriate slots. An attention button (doorbell) and a manual retention latch (MRL) is associated with each slot to support the initiation of hot-plug operations from the I/O chassis.

The core I/O provided a base set of I/O functions required by Superdome protection domains. In past Superdomes, PCI slot 0 of the I/O backplane provided a secondary edge connector to support a core I/O card. In the sx2000 chipset, the core I/O function is moved onto the PDH card, and the extra core I/O sideband connector is removed from the SIOBP board.

System Management Station

The Support Management Station (SMS) provides support, management and diagnostic tools for field support. This station combines software applications from several organizations within HP onto a single platform with the intent of helping field support reduce MTTR. Applications running on the SMS include tools to collect and analyze system log information, analyze and decode crash dump data, perform scan diagnostics, and provide configuration rules and recommendations for the CE's. The SMS also acts as an FTP server for the PDC, Itanium, and manageability firmware files needed to perform firmware updates on the systems. The SMS is also host to the Partition Manager Command-Line Interface tool used for partitioning the sx1000 and sx2000 platforms. The SMS software runs on both a Windows-based PC and an HP-UX workstation (Table 1-3 "SMS Lifecycles"). The SMS supports both HP Superdome Integrity and PA-RISC systems. By default, customer orders specify the PC SMS for new systems. Support for sx1000 and sx2000 systems is provided for the HP-UX workstations currently in the field. New customers will purchase a Windows-based HP Series rp5700 PC. The support provided on the prior generation of SMS is equivalent to that available for Superdome but does not include new capabilities developed for the Windows environment. Each customer site containing a Superdome system must have at least one SMS . The SMSs must have an Ethernet connection to the

management LAN of each system MP on which it is used. If possible, locate the SMS close to the system being tested so field support has convenient access to both machines.

Table 1-3 SMS Lifecycles

Superdome	SMS	Console
Legacy prior to April 2004	rp2470	Supported PC/workstation (e.g. B2600)
Legacy after April 2004	UNIX SMS: rx2600 <i>HP-UX 11i v2 ONLY</i>	TFT5600
Legacy upgraded to sx1000 and sx2000	Windows SMS: ProLiant ML350 G4P, TFT5600 & Ethernet switch <i>Windows 2000 Server SP4</i>	
	Any HP-UX 11.0 or later SMS with software upgrade	Existing console device
New sx1000 and sx2000	Windows SMS: ProLiant ML350 G5, TFT7600 & Ethernet switch <i>Windows Server 2000</i>	
	UNIX SMS: rx2620 <i>HP-UX 11i v2 ONLY</i>	TFT7600
sx1000 and sx2000 beginning September 2009	Windows HP PC SMS	TFT7600

User Accounts

Two standard user accounts are created on the SMS. The first account user name is root and it uses the standard root password for Superdome SMS stations. This account has administrative access. The second account user name is hduser and it uses the standard hduser password for the Superdome SMS stations. This account has general user permissions.

New Server Cabling

Three new Superdome cables designed for the sx2000 improve data rate and electrical performance:

- an m-Link cable
- two types (lengths) of e-Link cable
- a clock cable

m-Link Cable

The m-Link cable (A9834-2002A) is the primary backplane to second cabinet backplane high speed interconnect. The m-Link cable connects XBCs between system and I/O backplanes. The cable uses 4x10 HMZD connectors with Amphenol Spectra-Strip 26AWG twin-ax cable material. The m-Link cable is designed with one length but it is used in several connecting points. Thus, you must manage excessive cable length carefully. The ideal routing keeps m-Link cables from blocking access of power and XBC modules. Twelve high-speed cables must be routed around the backplane frame with the support of mechanical retentions. The m-Link cable is designed with a more robust dielectric material than the legacy REO cable and can withstand a tighter bend radius. However, HP recommends keeping the minimum bend radius at 2 inches.

e-Link Cable

The e-Link cables (A9834-2000B) are seven feet long cables and the external e-Link cable (A9834-2001A) is 14 feet long. Both use 2-mm HM connectors with Gore 26AWG PTFE twin-ax cable material. The e-Link cable connects the cell to the local I/O chassis, and the external e-Link

cable connects the cells to a remote PCI-X chassis. Because both the e-Link and the external e-Link use the same cable material as the legacy REO cable, cable routing and management of these cables in sx2000 system remain unchanged relative to Superdome. The external e-Link cable requires a bend radius no smaller than two inches. The e-Link cable requires a bend radius no smaller than four inches. Figure 1-13 illustrates an e-Link cable.

Figure 1-13 e-Link Cable



During system installation, two internal e-Link or two external e-Link cables are needed for each cell board and I/O backplane. Twelve m-Link cables are needed for each dual-cabinet configuration.

Figure 1-14 Backplane Cables



Clock Cable

The clock distribution to a second cabinet for the sx2000 requires a new cable (A9834-2003A).

Firmware

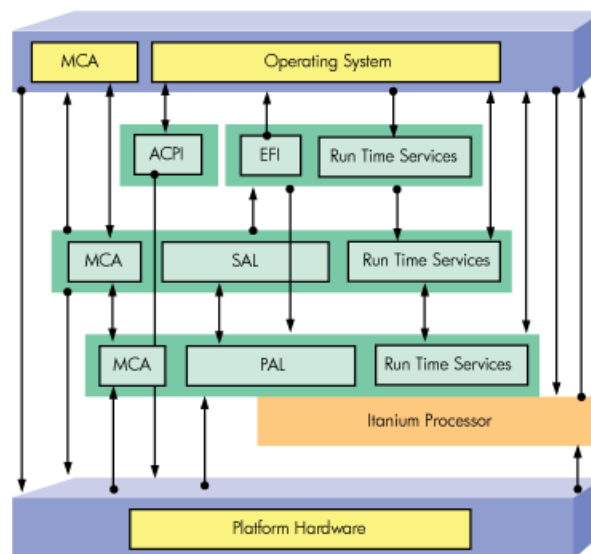
The newer Intel® Itanium® Processor firmware consists of many components loosely coupled by a single framework. These components are individually linked binary images that are bound together at run time. Internally, the firmware employs a software database called a device tree to represent the structure of the hardware platform and to provide a means of associating software elements with hardware functionality.

Itanium or PA-RISC firmware releases for HP Integrity Superdome/sx2000 or HP 9000/sx2000 are available.

Itanium Firmware for HP Integrity Superdome/sx2000

The Itanium firmware incorporates the following firmware interfaces:

Figure 1-15 Itanium Firmware Interfaces



- Processor Abstraction Layer (PAL) provides a seamless firmware abstraction between the processor, the system software, and the platform firmware.
- System Abstraction Layer (SAL) provides a uniform firmware interface and initializes and configures the platform.
- Extensible Firmware Interface (EFI) provides an interface between the OS and the platform firmware.
- Advanced Configuration and Power Interface (ACPI) provides a new standard environment for configuring and managing server systems. It moves system configuration and management from the BIOS to the operating system and abstracts the interface between the platform hardware and the OS software, thereby enabling each to evolve independently of the other.

The firmware supports HP-UX 11i version 2, Linux, Windows, and OpenVMS through the Itanium® processor family standards and extensions. It includes no operating system-specific functionality. Every OS is presented the same interface to system firmware, and all features are available to each OS.



NOTE: Windows Server 2003 Datacenter does not support the latest ACPI specification (2.0). The firmware must provide legacy (1.0b) ACPI tables.

Using the `acpicfg` command, the ACPI tables presented to the OS are different. The firmware implements the standard Intel® Itanium® Processor family interfaces with some implementation-specific enhancements that the OS can use but is not required to use, such as page deallocation table reporting, through enhanced `SAL_GET_STATE_INFO` behavior.

User Interface

The Intel® Itanium® processor family firmware employs a user interface called the Pre-OS system startup environment (POSSE). The POSSE shell is based on the EFI shell. Several commands were added to the EFI shell to support HP value-added functionality. The new commands encompass functionality similar to BCH commands on PA-RISC systems. However, the POSSE shell is not designed to encompass all BCH functionality. They are separate interfaces.

Error and Event IDs

The new system firmware generates event IDs, similar to chassis codes, for errors, events, and forward progress to the MP through common shared memory. The MP interprets, stores, and reflects these event IDs back to running partitions. This helps in the troubleshooting process.

The following seven firmware packages installed in the sx2000 to support the IPMI manageability environment:

- Management Processor (h_mp.xxx.xxx.xxx.frm)
- Power Monitor (h_pm.xxx.xxx.xxx.frm)
- Cabinet-Level Utilities (h_clu.xxx.xxx.xxx.frm)
- Cell (h_cell_pdh.xxx.xxx.xxx.frm)
- Processor-Dependent Hardware Code (h_pdhc.xxx.xxx.xxx.frm)
- Event Dictionary (h_ed.xxx.xxx.xxx.frm)
- Intel® Itanium® Processor Family Firmware (ipf.x.xx.frm)

For the latest Superdome sx2000 firmware levels, check your Engineering Advisories.

To update firmware on the Superdome sx2000, use the fw command from the MP Main Menu.

MP MAIN MENU:

CO: Consoles

VFP: Virtual Front Panel

CM: Command Menu

CL: Console Logs

SL: Show Event Logs

FW: Firmware Update

HE: Help

X: Exit Connection

Itanium System Firmware Functions

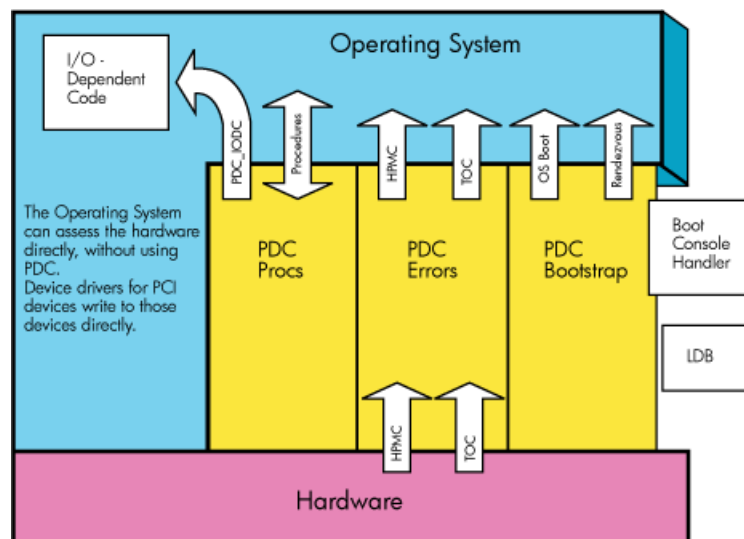
Support for HP-UX, Windows (Enterprise Server and Data Center), Linux, and OpenVMS

- Support for EFI 1.10.14.61 and EFI 1.1 I/O drivers
- Support for ACPI 1.0b up through 2.0c (OS-dependent)
- Parallel main memory initialization. Support for double chip-spare in memory ECC code
- OLAD of new cells with noninterleaved memory, OLAD I/O cards
- Support for link level retry with self-healing for crossbar and I/O links
- Support for both native and EBC EFI I/O card drivers
- Maximum 128 CPU cores per partition (8 CPU cores per cell)
- Supports mixing Itanium cells of different frequencies or major steps (generations) in separate partitions within a complex
- Supports mixing of Itanium and PA-RISC processors in the same complex but in different partitions.
- Support for 1, 2, and 4 GB DDR-II DIMMs
- Support for mixed DIMMs on a cell
- Support for common DIMMs across sx2000 platforms
- Supports nonuniform memory configurations within a partition
- Address parity checking on DIMMs (no address ECC)
- Support for cell local memory
- Support for adding DIMMs in increments of eight
- Support for new LBA and PCI-X 2.0 (266 MHz) (PCI compatible)
- Support for all PCI-X and PCI cards supported by respective sx1000 systems
- Elimination of Superdome core I/O card for Superdome/sx2000 console
- Infiniband supported using PCI-X cards only
- Support for shadowed system firmware flash

PA-RISC Firmware for HP 9000/sx2000 Servers

The PA-RISC firmware incorporates firmware interfaces shown in Figure 1–18.

Figure 1-16 PA-RISC Firmware Interfaces



PA-RISC System Firmware Functions

- Supports only HP-UX
- Supports mixing of PA-RISC and Itanium cell boards in the same complex but in different partitions
- Detects and rejects Itanium cell boards mixing in a partition with PA-RISC cell boards
- Support all system management tools available with sx1000 systems
- FRU isolation and event ID reporting as enabled by the hardware and manageability firmware
- Cell OLAD (COLAD) of cells with noninterleaved memory. PA-RISC I/O card OLAD support requirements and design are the same as on sx1000 systems.
- Support for link level retry with self-healing for crossbar and I/O links
- Maximum of eight processor cores per cell board, based on NVM part size of 12 MB
- Supports two processors per CPU module
- Supports mixing of specific processor versions after they are identified as being compatible by the program
- Dual-core configuration, deconfiguration. Support for 1, 2, and 4 GB DDR-II DIMMs
- Support for mixed DIMMs on a cell
- Support for nonuniform memory configurations within a partition and address parity checking on DIMMs (no address ECC)
- Support for configuring and deconfiguring DIMMs in increments of two
- Enforcement of DIMM loading order
- PCI-X 2.0 (266 MHz) based I/O attach (PCI compatible)
- Support for all PCI-X and PCI cards supported by respective sx1000 systems
- Support for I/O slot doorbells and latches
- Elimination of Superdome core I/O card for Superdome/sx2000 console

Server Configurations

See the *HP System Partitions Guide* for information about proper configurations.

Basic Configuration Rules

Single-Cabinet System:

- Two to 32 CPUs per complex with single-core processors
- Four to 64 CPU cores per complex with dual-core processors

- Minimum of one cell
- Maximum of eight cells

Dual-Cabinet System:

- Six to 64 CPU cores per complex with single-core processors
- Twelve to 128 CPU cores per complex with dual-core processors
- Minimum of three cells
- Maximum of 16 cells
- No master/checker support for dual-core processors

The rules for mixing processors are as follows:

- No mixing of frequencies on a cell or within a partition
- No mixing of cache sizes on a cell or within a partition
- No mixing of major steppings on a cell or within a partition
- Support for Itanium and PA-RISC processors within the same complex, but not in the same partition
- Maximum of 32 DIMMs per cell
- 32 GB memory per cell with 256 MB SDRAMs (1 GB DIMMs)
- 64 GB memory per cell with 512 MB SDRAMs (2 GB DIMMs)
- DIMM mixing is allowed

Server Errors

To support high availability (HA), the new chipset includes functionality for error correction, detection and recovery. Errors in the new chipset are divided into the following categories:

- nPartition access
- Hardware correctable
- Global shared memory
- Hardware uncorrectable
- Fatal blocking time-out
- Deadlock recovery errors

These categories are listed in increasing severity, ranging from hardware partition access errors, which are caused by software or hardware running in another partition, to deadlock recovery errors, which indicate a serious hardware failure that requires a reset of the cell to recover. The term software refers to privileged code, such as PDC or the OS, but not to user code. The sx2000 chipset supports the nPartition concept, where user and software errors in one nPartition cannot affect another nPartition.

2 System Specifications

The following specifications are based on ASHRAE Class 1. Class 1 is a controlled computer room environment, in which products are subject to controlled temperature and humidity extremes. Throughout this chapter each specification is defined as thoroughly as possible to ensure that all data is considered, to ensure a successful site preparation and system installation. For more information, see *Generalized Site Preparation Guide*, Second Edition, part number 5991-5990, at the <http://docs.hp.com> website.

Dimensions and Weights

This section contains server component dimensions and weights for the system.

Component Dimensions

Table 2-1 lists the dimensions for the cabinet and components. Table 2-2 list the dimensions for optional I/O expansion (IOX) cabinets.

Table 2-1 Server Component Dimensions

Component	Width (in/cm)	Depth (in/cm)	Height (in/cm)	Maximum Quantity per Cabinet
Cabinet	30/76.2	48/121.9	77.2/195.6	1
Cell board	16.5/41.9	20.0/50.2	3.0/7.6	8 ¹
Cell power board (CPB)	16.5/41.9	10.125/25.7	3.0/7.6	8 ¹
I/O backplane	11.0/27.9	17.6/44.7		1
Master I/O backplane	3.25/8.3	23.75/60.3	1.5/3.8	1
I/O card cage	12.0/30.5	17.5/44.4	8.38/21.3	4
PDCA	7.5/19.0	11.0/27.9	9.75/24.3	2

¹ SD16 is limited to a maximum of 4.

Table 2-2 I/O Expansion Cabinet Component Dimensions

Cabinet Type	Height (in/cm)	Width (in/cm)	Depth (in/cm)
E33	63.5/161	23.5/59.7	77.3/196.0
E41	77.5/197	23.5/59.7	36.5/92.7

Component Weights

Table 2-3 lists the server and component weights. Table 2-4 lists the weights for optional IOX cabinets.



NOTE: To determine the weight of the Support Management Station (SMS) and any console used with this server, see the related documents.

Table 2-3 System Component Weights

Component	Weight Per Unit (lb/kg)	Quantity	Weight (lb/kg)
Chassis ¹	745.17/338.1	1	745.17/338.10
Cell board without power board and DIMMs	30.96/14.04	8	247.68/112.32

Table 2-3 System Component Weights (continued)

Component	Weight Per Unit (lb/kg)	Quantity	Weight (lb/kg)
Cell power board	8.50/3.86	8	68.00/30.88
DIMMs	0.20/0.09	256	51.20/23.04
Bulk power supply	3.83/1.74	6	23.00/10.44
PDCA	26.00/11.80	2	52.00/23.59
I/O card cage	36.50/16.56	4	146.00/66.24
I/O cards	0.45/0.20	48	21.60/9.80
Fully configured server (SD32 cabinet)		1	1354.65/614.41 ²

1 The listed weight for a chassis includes the weight of all components not listed in Table 2-3.

2 The listed weight for a fully configured cabinet includes all components and quantities listed in Table 2-3.

Table 2-4 IOX Cabinet Weights

Component	Weight ¹ (lb/kg)
Fully configured cabinet	1104.9/502.2
I/O card cage	36.50/16.56
Chassis	264/120

1 The listed weight for a fully configured cabinet includes all items installed in a 1.6 meter cabinet. Add approximately 11 pounds when using a 1.9 meter cabinet.

Shipping Dimensions and Weights

Table 2-5 lists the dimensions and weights of the SMS and a single cabinet with shipping pallet.

Table 2-5 Miscellaneous Dimensions and Weights

Equipment	Width (in/cm)	Depth/Length (in/cm)	Height (in/cm)	Weight (lb/kg)
System on shipping pallet ¹²³	39.00/99.06	48.63/123.5	73.25/186.7	1424.66/648.67
Blowers and frame on shipping pallet	40.00/101.6	48.00/121.9	62.00/157.5	99.2/45.01
IOX cabinet on shipping pallet ⁴	38.00/96.52	48.00/121.9	88.25/224.1	1115/505.8

1 Shipping box, pallet, ramp, and container add approximately 116 pounds (52.62 kg) to the total system weight.

2 Blowers and frame are shipped on a separate pallet.

3 Size and number of miscellaneous pallets are determined by the equipment ordered by the customer.

4 Assumes no I/O cards or cables installed. The shipping kit and pallet and all I/O cards add approximately 209 pounds (94.80 kg) to the total weight.

Electrical Specifications

The following specifications are based on ASHRAE Class 1. Class 1 is a controlled computer room environment, in which products are subject to controlled temperature and humidity extremes. Throughout this chapter each specification is defined as thoroughly as possible to ensure that all data is considered to ensure a successful site preparation and system installation.

Grounding

The site building must provide a safety ground or protective earth for each ac service entrance to all cabinets.



WARNING! This equipment is Class 1 and requires full implementation of the grounding scheme to all equipment connections. Failure to attach to protective earth results in loss of regulatory compliance and creates a possible safety hazard.

Circuit Breaker

Each cabinet using a 3-phase, 4-wire input requires a dedicated circuit breaker to support the Marked Electrical current of 44 A per phase. The facility electrician and local service codes determine proper circuit breaker selection.

Each cabinet using a 3-phase, 5-wire input requires a dedicated circuit breaker to support the Marked Electrical current of 24 A per phase. The facility electrician and local service codes determine proper circuit breaker selection.



NOTE: When using the minimum-size breaker, always choose circuit breakers with the maximum allowed trip delay to avoid nuisance tripping.

Power Options

Table 2-6 describes the available power options. Table 2-7 provides details about the available options. The options listed are consistent with options for earlier Superdome systems.

Table 2-6 Available Power Options

Option	Source Type	Source Voltage (Nominal)	PDCA Required	Input Current Per Phase 200 to 240 V ac	Power Receptacle Required
6	3-phase	Voltage range 200 to 240 V ac, phase-to-phase, 50 Hz/60 Hz	4-wire	44 A maximum per phase	Connector and plug provided with a 2.5 meter (8.2 feet) power cable. Electrician must hardwire the receptacle to 60 A site power.
7	3-phase	Voltage range 200 to 240 V ac, phase-to-neutral, 50 Hz/60 Hz	5-wire	24 A maximum per phase	Connector and plug provided with a 2.5 meter (8.2 feet) power cable. Electrician must hardwire the receptacle to 32 A site power.

1 A dedicated branch circuit is required for each PDCA installed.

Table 2-7 Option 6 and 7 Specifics

PDCA Part Number	Attached Power Cord	Attached Plug	Receptacle Required
A5201-69023 (Option 6)	OLFLEX 190 (PN 600804) is a 2.5 meter (8.2 feet) multiconductor, 600 V, 90° C, UL and CSA approved, oil resistant flexible cable (8 AWG 60 A capacity).	Mennekes ME 460P9 (60 A capacity)	Mennekes ME 460R9 (60 A capacity)
A5201-69024 (Option 7)	H07RN-F (OLFLEX PN 1600130) is a 2.5 meter (8.2 feet) heavy-duty neoprene-jacketed harmonized European flexible cable (4 mm ² 32 A capacity).	Mennekes ME 532P6-14 (32 A capacity)	Mennekes ME 532R6-1500 (32 A capacity)



NOTE: A qualified electrician must wire the PDCA receptacle to site power using copper wire and in compliance with all local codes.

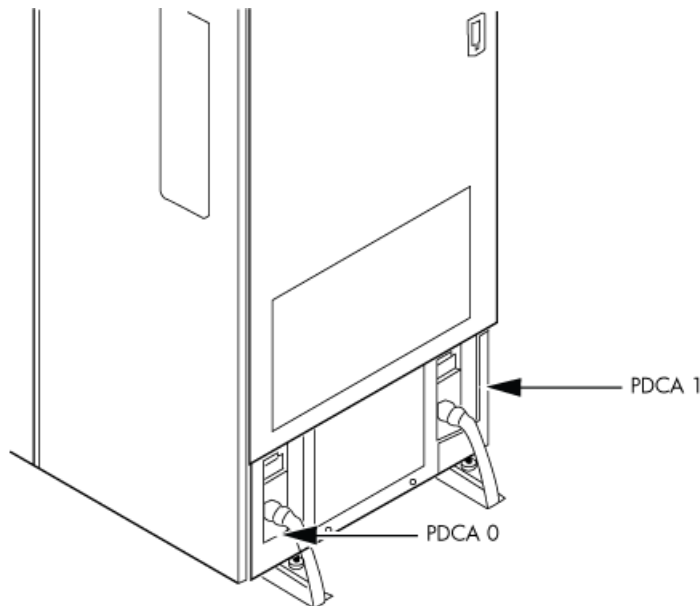
All branch circuits used within a complex must be connected together to form a common ground. All power sources such as transformers, UPSs, and other sources, must be connected together to form a common ground.

When only one PDCA is installed in a system cabinet, it must be installed as PDCA 0. For the location of PDCA 0, see Figure 2-1.



NOTE: When wiring a PDCA, phase rotation is unimportant. When using two PDCA's, however, the rotation must be consistent for both.

Figure 2-1 PDCA Locations



System Power Requirements

Table 2-8 and Table 2-9 list the ac power requirements for an HP Integrity Superdome/sx2000 system. These tables provide information to help determine the amount of ac power needed for your computer room.

Table 2-8 Power Requirements (Without SMS)

Requirement	Value	Comments
Nominal input voltage	200/208/220/230/240 V ac rms	
Input voltage range (minimum to maximum)	200 to 240 V ac rms	Autoselecting (measured at input terminals)
Frequency range (minimum to maximum)	50/60 Hz	
Number of phases	3	
Maximum inrush current	90 A (peak)	
Product label maximum current, 3-phase, 4-wire	44 A rms	Per-phase at 200 to 240 V ac
Product label maximum current, 3-phase, 5-wire	24 A rms	Per-phase at 200 to 240 V ac

Table 2-8 Power Requirements (Without SMS) (continued)

Requirement	Value	Comments
Power factor correction	0.95 minimum	
Ground leakage current (mA)	> 3.5 mA	See the following WARNING.



WARNING! Beware of shock hazard. When connecting or removing input power wiring, always connect the ground wire first and disconnect it last.

Component Power Requirements

Table 2-9 Component Power Requirements (Without SMS)

Component	Component Power Required 50 Hz to 60 Hz ¹
Maximum configuration for SD16	8,200 VA
Maximum configuration for SD32	12,196 VA
Cell board	900 VA
I/O card cage	500 VA

¹ A number to use for planning, to allow for enough power to upgrade through the life of the system.

IOX Cabinet Power Requirements

The IOX requires a single-phase 200-240 V ac input. Table 2-10 lists the ac power requirements for the IOX cabinet.



NOTE: The IOX accommodates two ac inputs for redundancy.

Table 2-10 I/O Expansion Cabinet Power Requirements (Without SMS)

Requirement	Value
Nominal input voltage	200/208/220/230/240 V ac rms
Input voltage range (minimum to maximum)	170-264 V ac rms
Frequency range (minimum to maximum)	50/60 Hz
Number of phases	1
Marked electrical input current	16 A
Maximum inrush current	60 A (peak)
Power factor correction	0.95 minimum

Table 2-11 I/O Expansion Cabinet Component Power Requirements

Component	Component Power Required 50 Hz to 60 Hz
Fully configured cabinet	3200 VA
I/O card cage	500 VA
ICE	600 VA

IOX Cabinet Power Cords

Table 2-12 lists the power cords for the IOX cabinet.

Table 2-12 I/O Expansion Cabinet ac Power Cords

Part Number A5499AZ	Where Used	Connector Type
-001	North America	L6-20
-002	International	IEC 309

Environmental Requirements

This section provides the environmental, power dissipation, noise emission, and air flow specifications.

Temperature and Humidity Specifications

Table 2-13 Operational Physical Environment Requirements¹

Temperature (Dry Bulb °C) ²		Relative Humidity % Noncondensing		Dew Point ³	Rate of Change (°C/hr, max)
Allowable ^{4,5}	Recommended ⁶	Allowable ⁵	Recommended ⁶		
15 to 32 (59° to 90°F)	20 to 25 (68° to 77°F)	20 to 80	40 to 55	17	5

- 1 The maximum elevation for the operating environment is 3050 meters.
- 2 Dry bulb temperature is the regular ambient temperature. Derate maximum dry bulb temperature 1°C/300 m above 900 m.
- 3 Must be a noncondensing environment.
- 4 With installed media, the minimum temperature is 10°C and maximum relative humidity is limited to 80%. Specific media requirements can vary.
- 5 Allowable equipment design extremes as measured at the equipment inlet.
- 6 Recommended target facility design and operational range.

Table 2-14 Nonoperational Physical Environment Requirements

Storage			Powered Off (Installed)		
Temp (°C, dry bulb - regular ambient temperature)	Rel Hum %; Noncondensing	Dew point (max)	Temp (°C, dry bulb - regular ambient temperature)	Rel Hum % Noncondensing	Dew point (max)
-40 to 60	8 to 90	32	5 to 45	8 to 90	29



NOTE: The values in Table 2-14 meet or exceed all ASHRAE specifications.

Power Dissipation

Table 2-15 lists the power requirements by configuration (number of cell boards, amount of memory per cell, and number of I/O chassis) for the HP Integrity Superdome/sx2000.

The table contains two columns of power numbers expressed in watts. The Breaker Power column lists the power used to size the wall breaker at the installation site. The Typical Power column lists typical power. Typical power numbers can be used to assess the average utility cost of

cooling and electrical power. Table 2-15 also lists the recommended breaker sizes for 4-wire and 5-wire sources.



WARNING! Do not connect a 380 to 415 V ac supply to a 4-wire PDCA. This is a safety hazard and results in damage to the product. Line-to-line or phase-to-phase voltage measured at 380 to 415 V ac must always be connected using a 5-wire PDCA.

Table 2-15 HP Integrity Superdome/sx2000 Dual-Core CPU Configurations¹

Cells (in cabinet)	Memory (DIMMs per cell)	I/O (fully populated)	Typical Power (Watts)	Cooling (BTU/Hr)	Breaker Power (Watts) ²
8	32	4	9490	32382	11957
8	16	2	7620	26001	9601
8	8	4	8140	27776	10256
8	8	2	7180	24500	9047
8	4	4	7620	26001	9601
8	4	2	6660	22726	8391
6	16	4	7320	24978	9223
6	16	2	6360	21702	8013
6	8	4	7000	23886	8820
6	8	2	6040	20610	7610
6	4	4	6680	22794	8417
6	4	2	5720	19518	7207
4	16	4	6170	21054	7774
4	16	2	5210	17778	6564
4	8	4	5960	20337	7509
4	8	2	5000	17061	6300
4	4	4	5760	19655	7257
4	4	2	4800	16379	6048
2	16	2	4010	13683	5052
2	8	2	3890	13274	4901
2	4	2	3780	12898	4763

¹ Values in Table 2-15 are based on 25 W load I/O cards, 1 GB DIMMs and four Intel® Itanium® dual-core processors with 18 MB or 24 MB cache per cell board or four PA-RISC processors with 64 MB.

² These numbers are valid only for the specific configurations shown. Any upgrades can require a change to the breaker size. A 5-wire source uses a 4-pole breaker, and a 4-wire source uses a 3-pole breaker. *The protective earth (PE) ground wire is not switched.*

Table 2-16 HP Integrity Superdome/sx2000 Single-Core CPU Configurations¹

Cell (in cabinet)	Memory (DIMMs per Cell)	I/O (fully populated)	Typical Power (Watts)	Cooling (BTU/Hr)	Breaker Power (Watts) ²
8	32	4	9130	31181	11503
8	16	2	7260	24794	9147
8	8	4	7783	26580	9806

Table 2-16 HP Integrity Superdome/sx2000 Single-Core CPU Configurations (continued)

Cell (in cabinet)	Memory (DIMMs per Cell)	I/O (fully populated)	Typical Power (Watts)	Cooling (BTU/Hr)	Breaker Power (Watts) ²
8	8	2	6823	23302	8596
8	4	4	7260	24794	9147
8	4	2	6300	21516	7938
6	16	4	6968	23797	8779
6	16	2	6008	20518	7570
6	8	4	6640	22677	8366
6	8	2	5680	19398	7156
6	4	4	6325	21601	7969
6	4	2	5365	18322	6759
4	16	4	5813	19852	7324
4	16	2	4853	16574	6114
4	8	4	4647	15870	5855
4	8	2	3687	12592	4645
4	4	4	5382	18380	6781
4	4	2	4422	15102	5571
2	16	2	3656	12486	4606
2	8	2	3534	12069	4453
2	4	2	3423	11690	4313

¹ Values in Table 2-15 are based on 25 W load I/O cards, 1 GB DIMMs and four Intel® Itanium® single-core processors with 9 MB cache per cell board.

² These numbers are valid only for the specific configurations shown. Any upgrades can require a change to the breaker size. A 5-wire source uses a 4-pole breaker, and a 4-wire source uses a 3-pole breaker. *The protective earth (PE) ground wire is not switched.*

Acoustic Noise Specification

The acoustic noise specifications are as follows:

- 8.2 bel (sound power level)
- 65.1 dBA (sound pressure level at operator position)

These levels are appropriate for dedicated computer room environments, not office environments.

You must understand the acoustic noise specifications relative to operator positions within the computer room when adding HP Integrity Superdome/sx2000 systems to computer rooms with existing noise sources.

Airflow

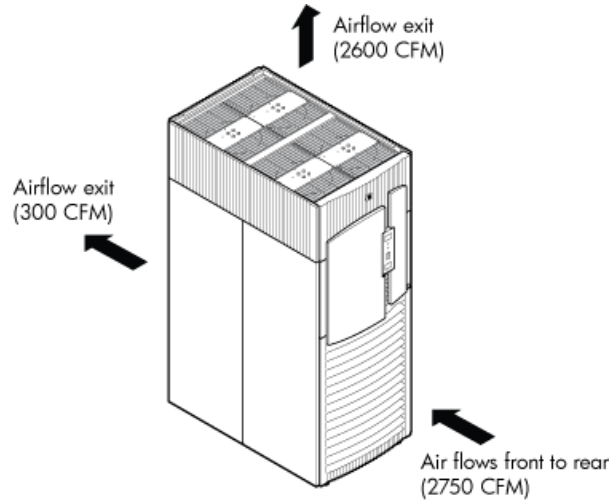
HP Integrity Superdome/sx2000 systems require the cabinet air intake temperature to be between 15°C and 32°C (59°F and 89.6°F) at 2900 CFM.

Figure 2-2 illustrates the location of the inlet and outlet air ducts on a single cabinet.



NOTE: Approximately 5% of the system airflow draws from the rear of the system and exits the top of the system.

Figure 2-2 Airflow Diagram



A thermal report for the HP Integrity Superdome/sx2000 server is provided in Table 2-17 (page 57).

Table 2-17 Physical Environmental Specifications

	Condition					Weight				Overall System Dimensions (W X D X H)	
	Voltage 200–240 V ac	Nominal Airflow ²		Maximum Airflow at 32°C ^{1,2}							
	Typical Heat Release	CFM	m ³ /hr	CFM	m ³ /hr	pounds	kg	in	mm		
Description	Watts	CFM	m ³ /hr	CFM	m ³ /hr	pounds	kg	in	mm		
Minimum Configuration	3423	2900	5.0	2900	5.0	926.3	420.3	30x48x72	762x1219x1956		
Maximum Configuration	9130	2900	5.0	2900	5.0	1241.2	563.2	30x48x72	762x1219x1956		
Typical Configuration	6968	2900	5.0	2900	5.0	1135.2	515.1	30x48x72	762x1219x1956		
ASHRAE Class 1						Minimum Configuration ³		2 Cell, 4 DIMM, 2 I/O			
						Maximum Configuration ³		8 Cell, 32 DIMM, 4 I/O			
						Typical Configuration ³		6 Cell, 16 DIMM, 4 I/O			

- 1 Derate maximum dry bulb temperature 1°C/300 m above 900 m.
- 2 The system deviates slightly from front to top and rear airflow protocol. Approximately 5 percent of the system airflow is drawn in from the rear of the system. See Figure 2-2 (page 57) for more details.
- 3 See Table 2-15 (page 55) and Table 2-16 (page 55) for additional details regarding minimum, maximum, and typical configurations.

3 Installing the System

This chapter describes installation of HP Integrity Superdome/sx2000 and HP 9000/sx2000 systems. Installers must have received adequate training, be knowledgeable about the product, and have a good overall background in electronics and customer hardware installation.

Introduction

The instructions in this chapter are written for Customer Support Consultants (CSC) who are experienced at installing complex systems. This chapter provides details about each step in the sx2000 installation process. Some steps must be performed before others can be completed successfully. To avoid undoing and redoing an installation step, follow the installation sequences outlined in this chapter.

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 instructions provided by HP 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 the following 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 turning on the system.

Electrostatic Discharge

HP systems and peripherals contain assemblies and components that are sensitive to electrostatic discharge (ESD).



CAUTION: Carefully observe the precautions and recommended procedures in this document to prevent component damage from static electricity.

Take the following precautions:

- Always wear a grounded wrist strap when working on or around system components.
- 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 their non-conductive plastic bags until you are ready to install them.
- Before removing or replacing any components or installing any accessories in the system, select a work area in which potential static sources are minimized, preferably an antistatic work station.
- Avoid working in carpeted areas and keep body movement to a minimum while installing accessories.

Public Telecommunications Network Connection

Instructions are issued to the installation site that modems cannot be connected to public telecommunications networks until full datacomm licenses are received for the country of installation. Some countries do not require datacomm licenses. The product regulations engineer must review beta site locations, and if datacomm licenses are not complete, ensure that the installation site is notified officially and in writing that the product cannot be connected to public telecommunications networks until the license is received.

Unpacking and Inspecting the System

This section describes what to do before unpacking the server and how to unpack the system itself.



WARNING! Do not attempt to move the cabinet, packed or unpacked, up or down an incline of more than 15 degrees.

Verifying Site Preparation

Verifying site preparation includes gathering LAN information and verifying electrical requirements.

Gathering LAN Information

The Support Management Station (SMS) connects to the customer's LAN. Determine the appropriate IP address.

Verifying Electrical Requirements

The site must be verified for proper grounding and electrical requirements prior to the system being shipped to the customer as part of the site preparation. Before unpacking and installing the system, verify with the customer that grounding specifications and power requirements are met.

Checking the Inventory

The sales order packing slip lists all equipment shipped from HP. Use this packing slip to verify that all equipment has arrived at the customer site.



NOTE: To identify each item by part number, see the sales order packing slip.

One of the large overpack containers is labeled "Open Me First." This box contains the *Solution Information Manual* and DDCAs. The unpacking instructions are in the plastic bag taped to the cabinet.

The following items are in other containers. Check them against the packing list:

- Power distribution control assembly (PDCA) and power cord
- Two blower housings per cabinet
- Four blowers per cabinet
- Four side skins with related attachment hardware
- Cabinet blower bezels and front door assemblies
- Support Management Station
- Cables
- Optional equipment
- Boot device with the operating system installed

Inspecting the Shipping Containers for Damage

HP shipping containers are designed to protect their contents under normal shipping conditions. After the equipment arrives at the customer site, carefully inspect each carton for signs of shipping damage.



WARNING! Do not attempt to move the cabinet, packed or unpacked, up or down an incline of more than 15 degrees.

A tilt indicator is installed on the back and side of the cabinet shipping container (Figure 3-1 (page 61)). If the container is tilted to an angle that can cause equipment damage, the beads in the indicator shift positions (Figure 3-2 (page 62)). If a carton has received a physical shock and the tilt indicator is in an abnormal condition, visually inspect the unit for any signs of damage. If damage is found, document the damage with photographs and contact the transport carrier immediately.

Figure 3-1 Normal Tilt Indicator

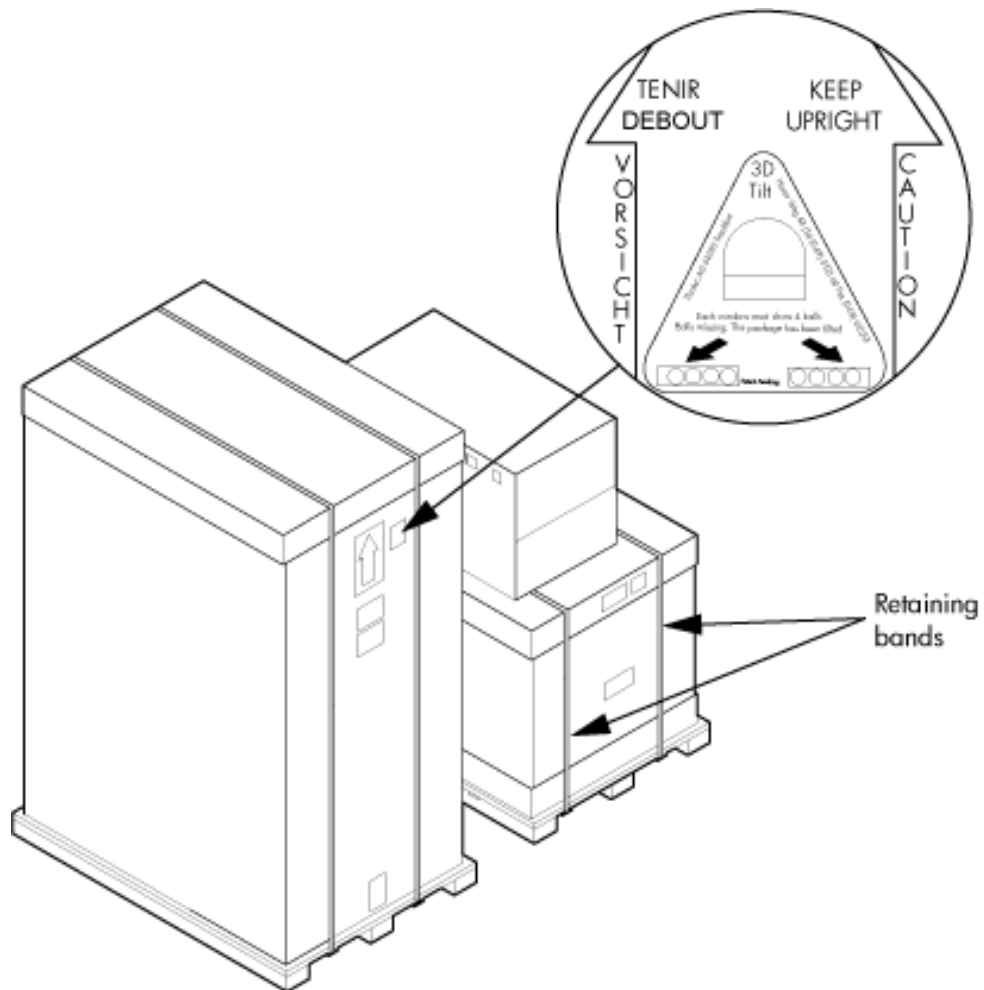
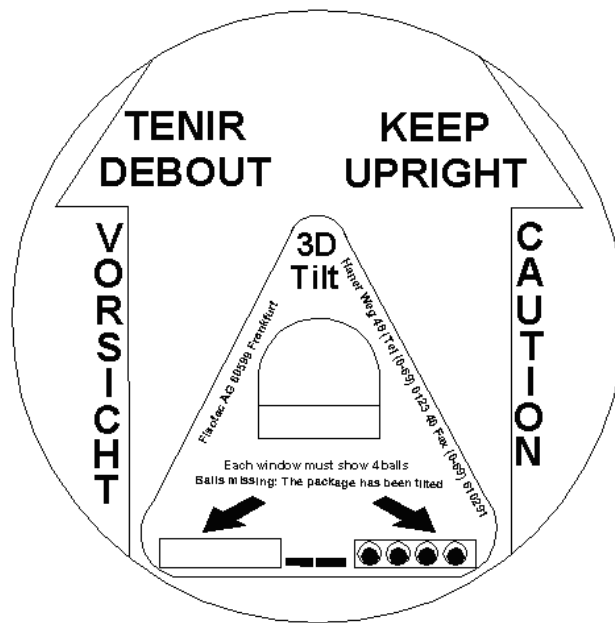


Figure 3-2 Abnormal Tilt Indicator



NOTE: If the tilt indicator shows that an abnormal shipping condition has occurred, write “possible hidden damage” on the bill of lading and keep the packaging.

Inspection Precautions

- When the shipment arrives, check each container against the carrier's bill of lading. Inspect the exterior of each container immediately for mishandling or damage during transit. If any of the containers are damaged, request the carrier's agent be present when the container is opened.
- When unpacking the containers, inspect each item for external damage. Look for broken controls and connectors, dented corners, scratches, bent panels, and loose components.



NOTE: HP recommends keeping the shipping container and the packaging material. If it becomes necessary to repackage the cabinet, the original packing material is necessary.

If discarding the shipping container or packaging material, dispose of them in an environmentally responsible manner (recycle, if possible).

Claims Procedures

If the shipment is incomplete, if the equipment is damaged, or it fails to meet specifications, notify the nearest HP Sales and Service Office. If damage occurred in transit, notify the carrier as well.

HP will arrange for replacement or repair without waiting for settlement of claims against the carrier. In the event of damage in transit, retain the packing container and packaging materials for inspection.

Unpacking and Inspecting Hardware Components

This section describes the procedures for opening the shipping container and unpacking and inspecting the cabinet.

Tools Required

The following tools are required to unpack and install the system:

- Standard hand tools, such as a adjustable-end wrench
- ESD grounding strap
- Digital voltmeter capable of reading ac and dc voltages
- 1/2-inch socket wrench
- 9/16-inch wrench
- #2 Phillips screwdriver
- Flathead screwdriver
- Wire cutters or utility knife
- Safety goggles or glasses
- T-10, T-15, T-20, T-25, and T-30 Torx drivers
- 9-pin to 25-pin serial cable (HP part number 24542G)
- 9-pin to 9-pin null modem cable

Unpacking the Cabinet



WARNING! Use three people to unpack the cabinet safely.

HP recommends removing the cardboard shipping container before moving the cabinet into the computer room.

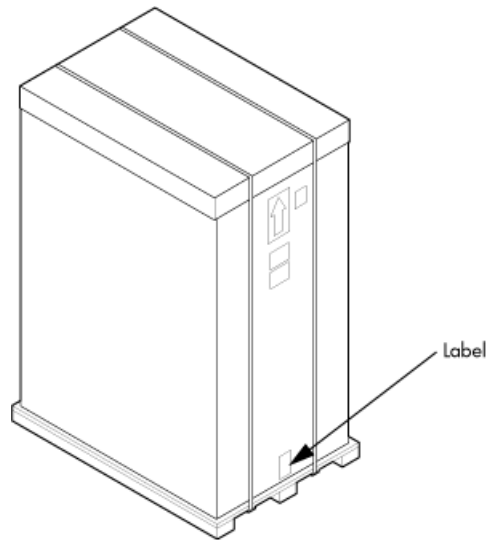


NOTE: If unpacking the cabinet in the computer room, be sure to position it so that it can be moved into its final position easily. Notice that the front of the cabinet (Figure 3-3) is the side with the label showing how to align the ramps.

To unpack the cabinet, follow these steps:

1. Position the packaged cabinet so that a clear area about three times the length of the package (**about 12 feet** or 3.66 m) is available in front of the unit, and at least 2 feet (0.61 m) are available on the sides.

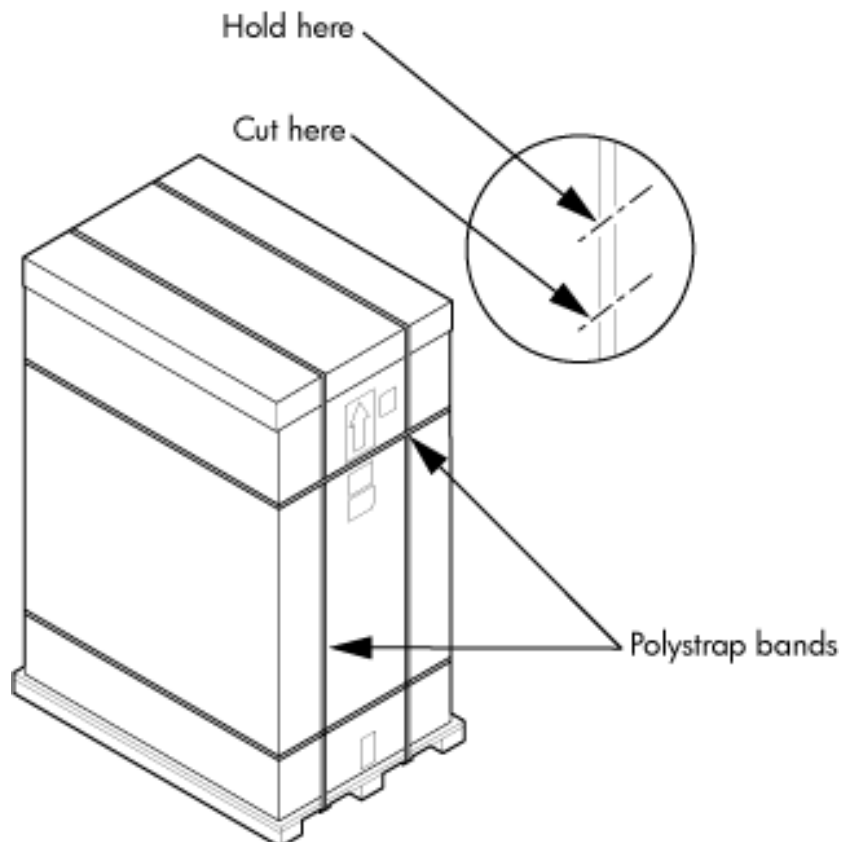
Figure 3-3 Front of Cabinet Container



WARNING! Do not stand directly in front of the strapping while cutting it. Hold the band above the intended cut and wear protective glasses. These bands are under tension. When cut, they spring back and can cause serious eye injury.

2. Cut the plastic polystrap bands around the shipping container (Figure 3-4 (page 64)).

Figure 3-4 Cutting the Polystrap Bands



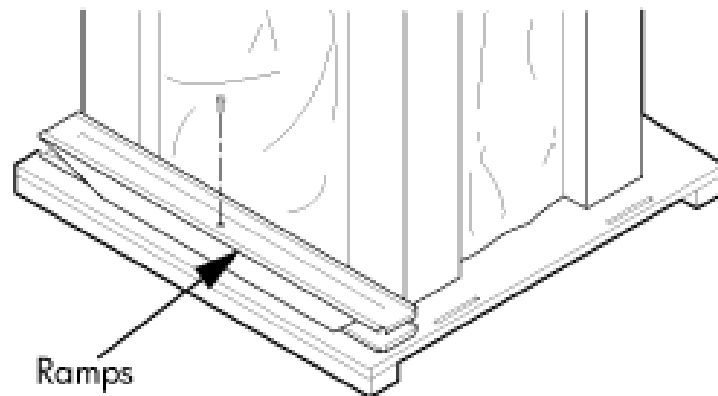
3. Lift the cardboard corrugated top cap off the shipping box.
4. Remove the corrugated sleeves surrounding the cabinet.



CAUTION: Cut the plastic wrapping material off rather than pulling it off. Pulling the plastic covering off creates an ESD hazard to the hardware.

5. Remove the stretch wrap, the front and rear top foam inserts, and the four corner inserts from the cabinet.
6. Remove the ramps from the pallet and set them aside (Figure 3-5 (page 65)).

Figure 3-5 Removing the Ramps from the Pallet



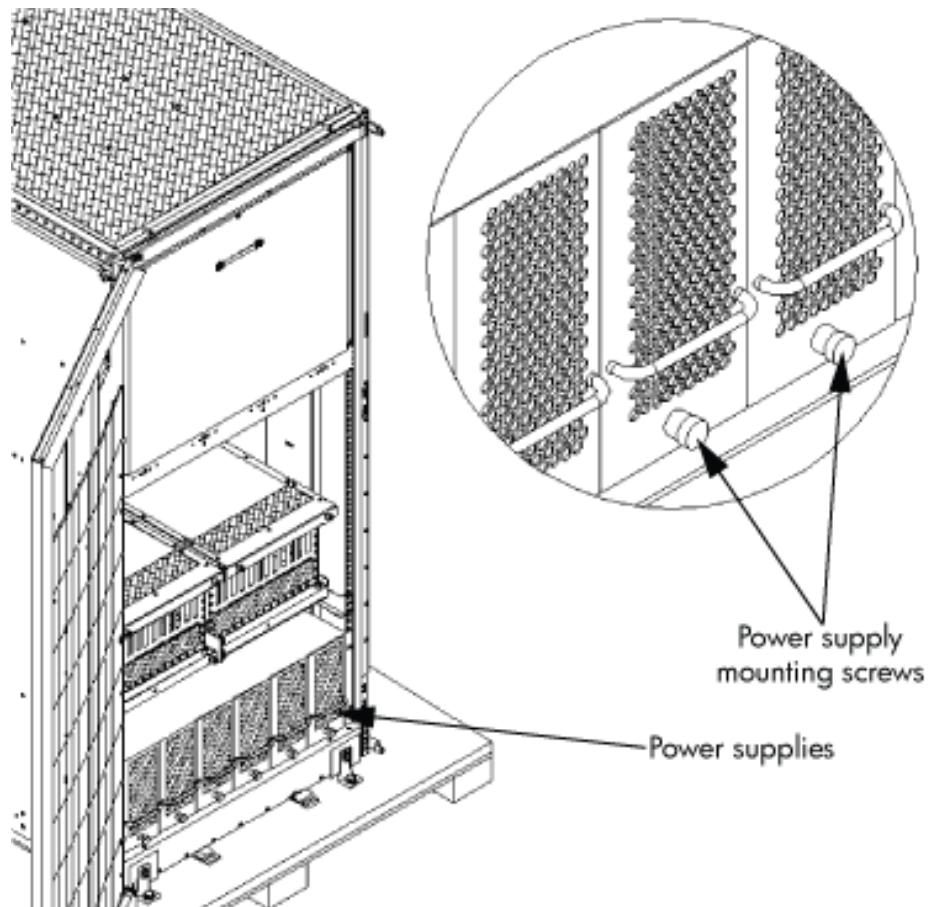
7. Remove the plastic antistatic bag by lifting it straight up off the cabinet. If the cabinet or any components are damaged, follow the claims procedure. Some damage can be repaired by replacing the damaged part. If you find extensive damage, you might need to repack and return the entire cabinet to HP.

Inspecting the Cabinet

To inspect the cabinet exterior for signs of shipping damage, follow these steps:

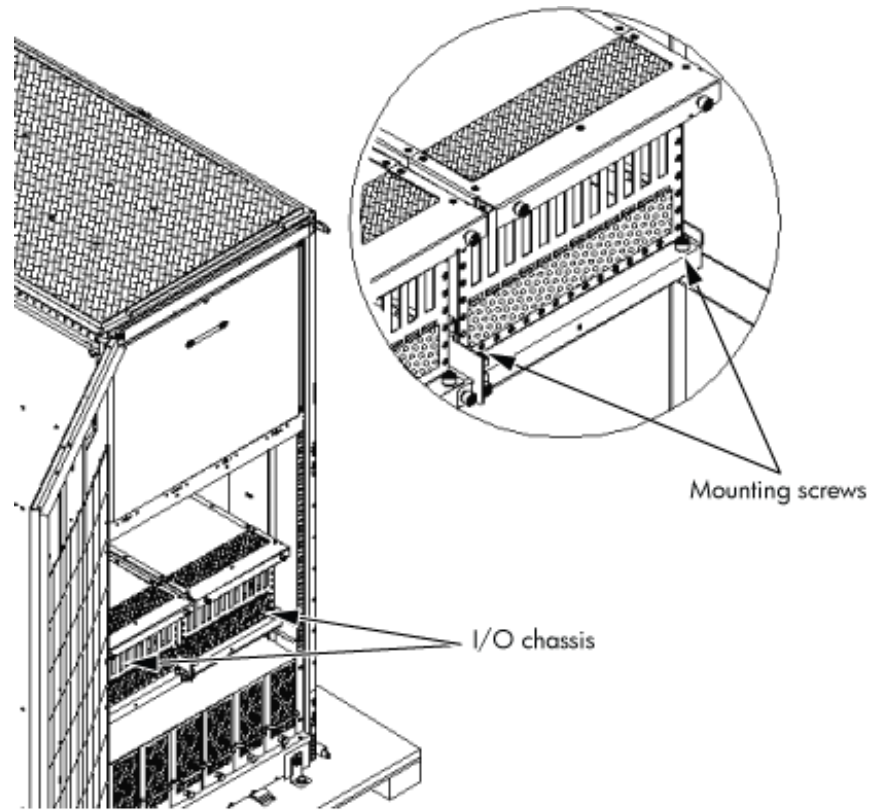
1. Look at the top and sides for dents, warping, or scratches.
2. Verify that the power supply mounting screws are in place and **locked** (Figure 3-6).

Figure 3-6 Power Supply Mounting Screws Location



3. Verify that the I/O chassis mounting screws are in place and secure (Figure 3-7).
Inspect all components for signs of shifting during shipment or any signs of damage.

Figure 3-7 I/O Chassis Mounting Screws

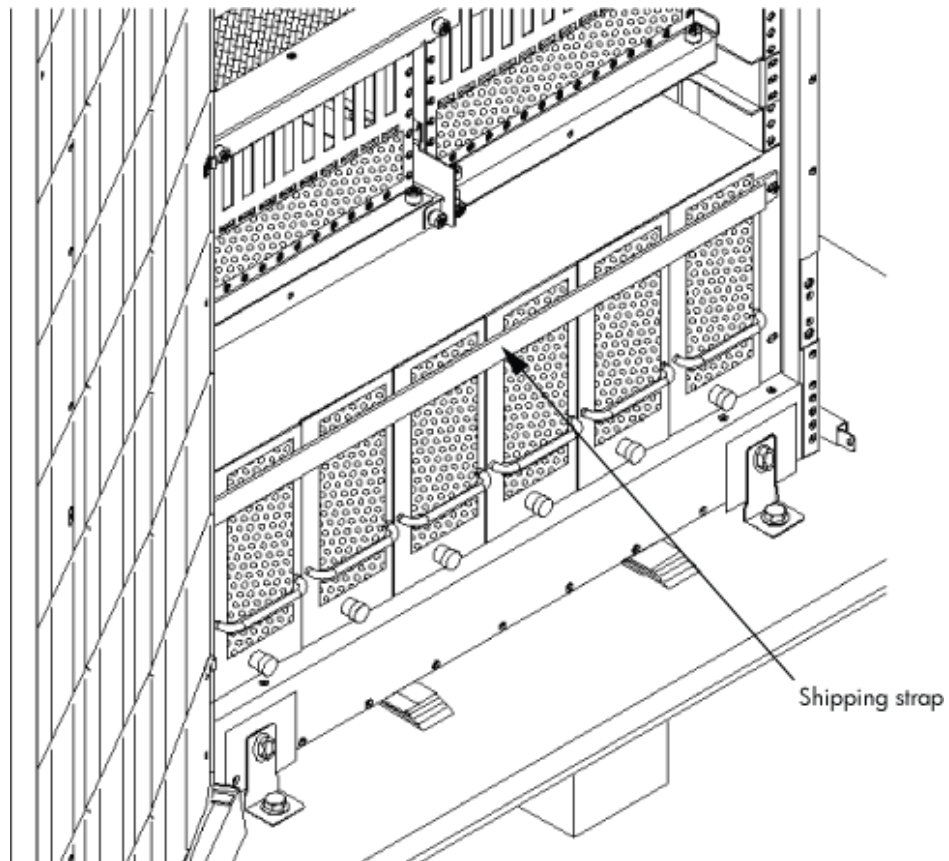


Moving the Cabinet Off the Pallet

1. Remove the shipping strap that holds the BPSs in place during shipping (Figure 3-8 (page 68)).

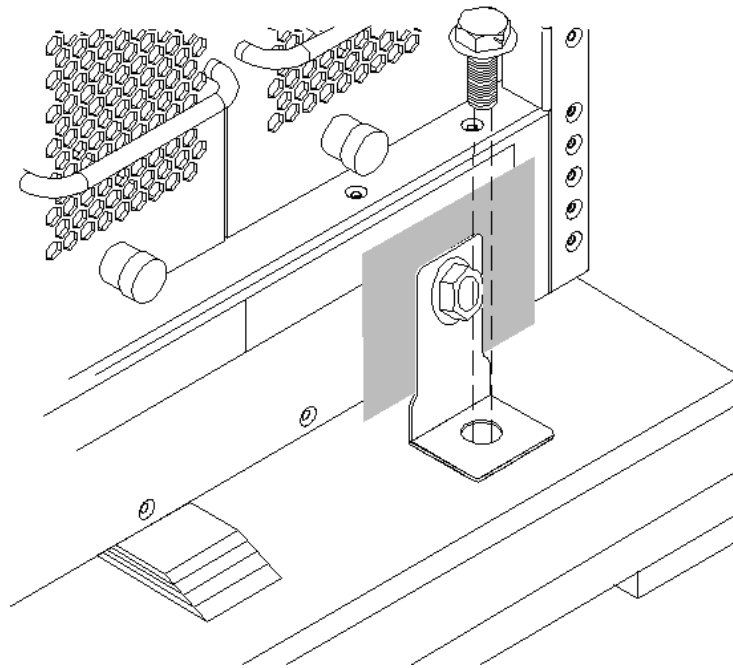
Failure to remove the shipping strap will obstruct air flow into the BPS and FEPS.

Figure 3-8 Shipping Strap Location



2. Remove the pallet mounting brackets and pads on the side of the pallet where the ramp slots are located (Figure 3-9).

Figure 3-9 Removing the Mounting Brackets



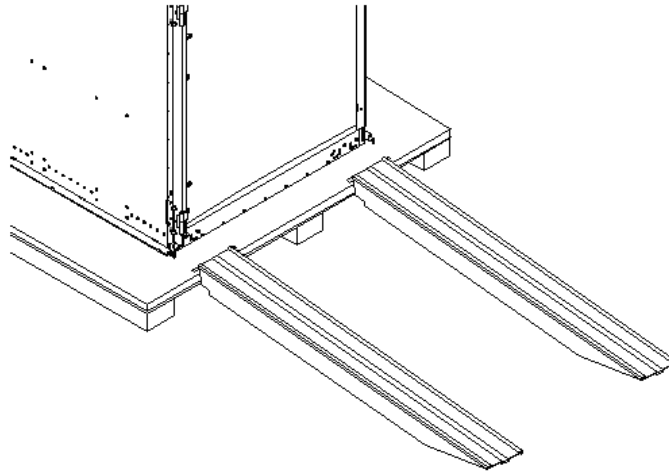
⚠ WARNING! Do not remove the bolts on the mounting brackets that attach to the pallet. These bolts prevent the cabinet from rolling off the back of the pallet.

3. On the other side of the pallet, remove only the bolt on each mounting bracket that is attached to the cabinet.
4. Insert the ramps into the slots on the pallet.

⚠ CAUTION: Make sure the ramps are **parallel and aligned** (Figure 3-10).

The casters on the cabinet must roll unobstructed onto the ramp.

Figure 3-10 Positioning the Ramps

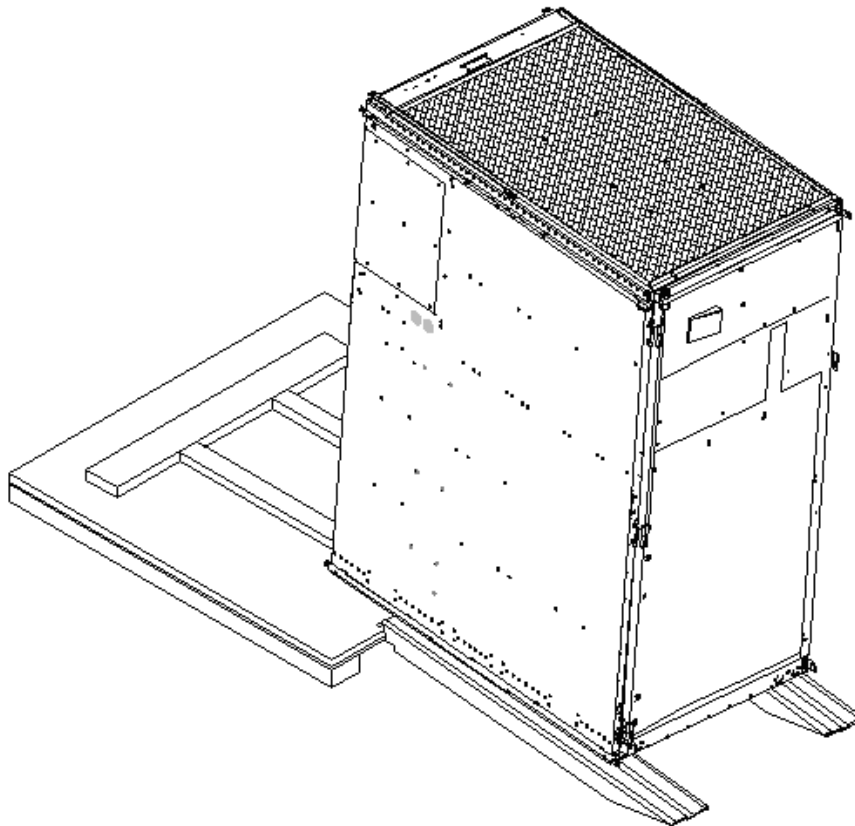


WARNING! Do not attempt to roll a cabinet without help. The cabinet can weigh as much as 1400 pounds (635 kg). Three people are required to roll the cabinet off the pallet. Position one person at the rear of the cabinet and one person on each side.

WARNING! Do not attempt to move the cabinet, either packed or unpacked, up or down an incline of more than 15 degrees.

5. Carefully roll the cabinet down the ramp (Figure 3-11).

Figure 3-11 Rolling the Cabinet Down the Ramp



6. Unpack any other cabinets that were shipped.

Unpacking the PDCA

At least one PDCA ships with the system. In some cases, the customer might order two PDCA's, the second to be used as a backup power source. Unpack the PDCA and ensure it has the power cord option for installation.

Several power cord options are available for the PDCA's. Only options 6 and 7 are currently available in new system configurations (Table 3-1 (page 71)). Table 3-2 (page 71) details options 6 and 7.

Table 3-1 Available Power Options

Option	Source Type	Source Voltage (Nominal)	PDCA Required	Input Current Per Phase 200 to 240 V ac	Power Receptacle Required
6	3-phase	Voltage range 200 to 240 V ac, phase-to-phase, 50 Hz / 60 Hz	4-wire	44 A maximum per phase	Connector and plug provided with a 2.5 m (8.2 feet) power cable. An electrician must hardwire receptacle to 60 A site power.
7	3-phase	Voltage range 200 to 240 V ac, phase-to-neutral, 50 Hz / 60 Hz	5-wire	24 A maximum per phase	Connector and plug provided with a 2.5 m (8.2 feet) power cable. An electrician must hardwire receptacle to 32 A site power.

¹ A dedicated branch circuit is required for each PDCA installed.

Table 3-2 Power Cord Option 6 and 7 Details

PDCA Part Number	Attached Power Cord	Attached Plug	Receptacle Required
A5201-69023 (Option 6)	OLFLEX 190 (PN 600804) is a 2.5 meter multiconductor, 600 V, 90°C, UL and CSA approved, oil resistant flexible cable. (8 AWG 60 A capacity)	Mennekes ME 460P9 (60 A capacity)	Mennekes ME 460R9 (60 A capacity)
A5201-69024 (Option 7)	H07RN-F (OLFLEX PN 1600130) is a 2.5 meter heavy-duty neoprene jacketed harmonized European flexible cable. (4 mm ² 32 A capacity)	Mennekes ME 532P6-14 (32 A capacity)	Mennekes ME 532R6-1500 (32 A capacity)

Returning Equipment

If the equipment is damaged, use the original packing material to repackage the cabinet for shipment. If the packing material is not available, contact the local HP Sales and Support Office regarding shipment.

Before shipping, place a tag on the container or equipment to identify the owner and the service to be performed. Include the equipment model number and the full serial number, if applicable. The model number and the full serial number are printed on the system information labels located at the bottom front of the cabinet.



WARNING! Do not attempt to push the loaded cabinet up the ramp onto the pallet. Three people are required to push the cabinet up the ramp and position it on the pallet. Inspect the condition of the loading and unloading ramp before use.

Repackaging

To repackage the cabinet, follow these steps:

1. Assemble the HP packing materials that came with the cabinet.
2. Carefully roll the cabinet up the ramp.
3. Attach the pallet mounting brackets to the pallet and the cabinet.

4. Reattach the ramps to the pallet.
5. Replace the plastic antistatic bag and foam inserts.
6. Replace the cardboard surrounding the cabinet.
7. Replace the cardboard caps.
8. Secure the assembly to the pallet with straps.

The cabinet is now ready for shipment.

Setting Up the System

After a site is prepared, the system is unpacked, and all components are inspected, the system can be prepared for booting.

Moving the System and Related Equipment to the Installation Site

Carefully move the cabinets and related equipment to the installation site but not into the final location. If the system is to be placed at the end of a row, you must add side bezels before positioning the cabinet in its final location. Check the path from where the system was unpacked to its final destination to make sure the way is clear and free of obstructions.



WARNING! If the cabinet must be moved up ramps, be sure to maneuver it using three people.

Unpacking and Installing the Blower Housings and Blowers

Each cabinet contains two blower housings and four blowers. Although similar in size, the blower housings for each cabinet are not the same; one has a connector to which the other attaches. To unpack and install the housings and blowers, follow these steps:

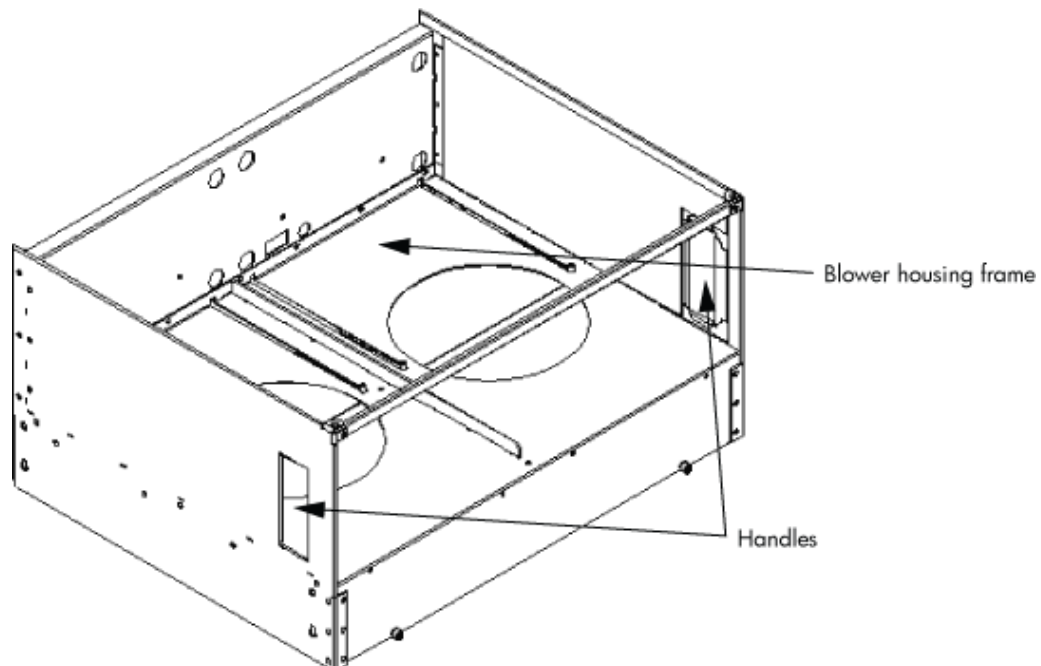
1. Unpack the housings from the cardboard box and set them aside.

The rear housing is labeled **Blower 3 Blower 2**. The front housing is labeled **Blower 0 Blower 1**.



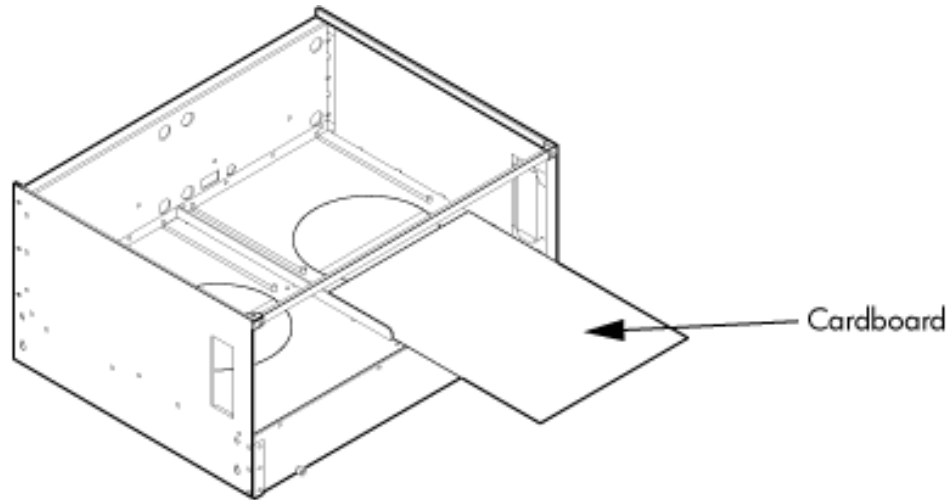
CAUTION: Do not lift the housing by the frame (Figure 3-12).

Figure 3-12 Blower Housing Frame



2. Remove the cardboard from the blower housing (Figure 3-13).
This cardboard protects the housing baffle during shipping. If it is not removed, the fans can not work properly.

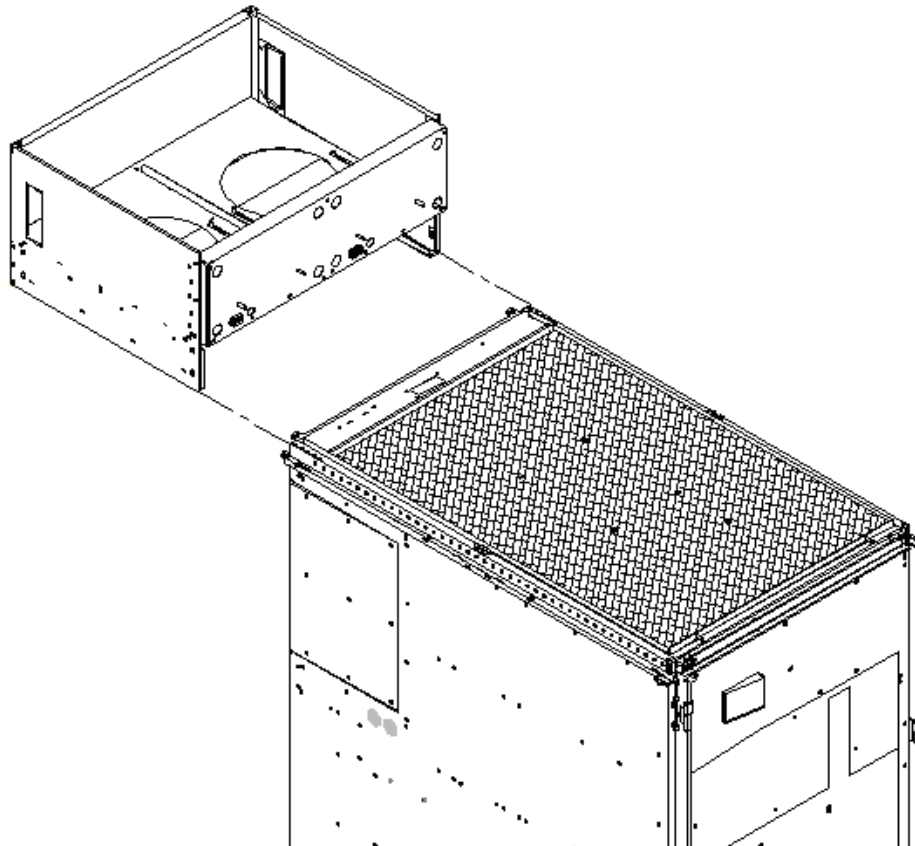
Figure 3-13 Removing Protective Cardboard from the Housing



NOTE: Double-check that the protective cardboard has been removed.

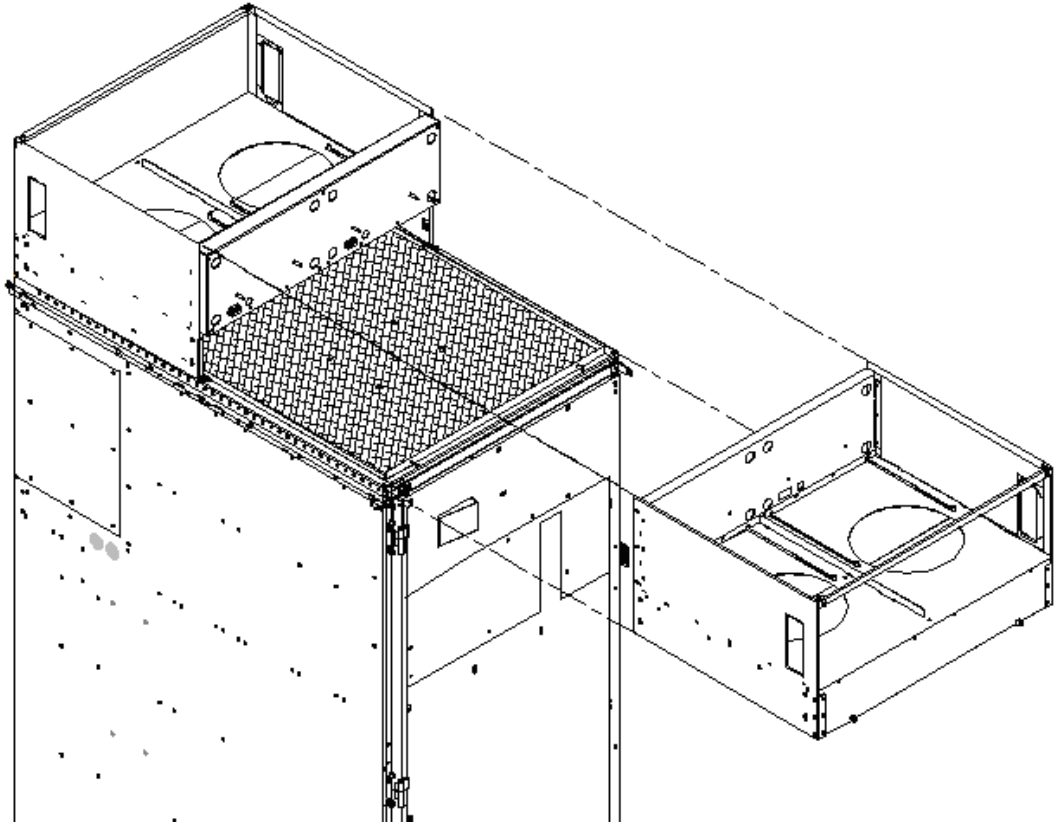
3. Using the handles on the housing labeled **Blower 3 Blower 2**, align the edge of the housing over the edge at the top rear of the cabinet, and slide it into place until the connectors at the back of each housing are fully mated (Figure 3-14). Then tighten the thumbscrews at the front of the housing.

Figure 3-14 Installing the Rear Blower Housing



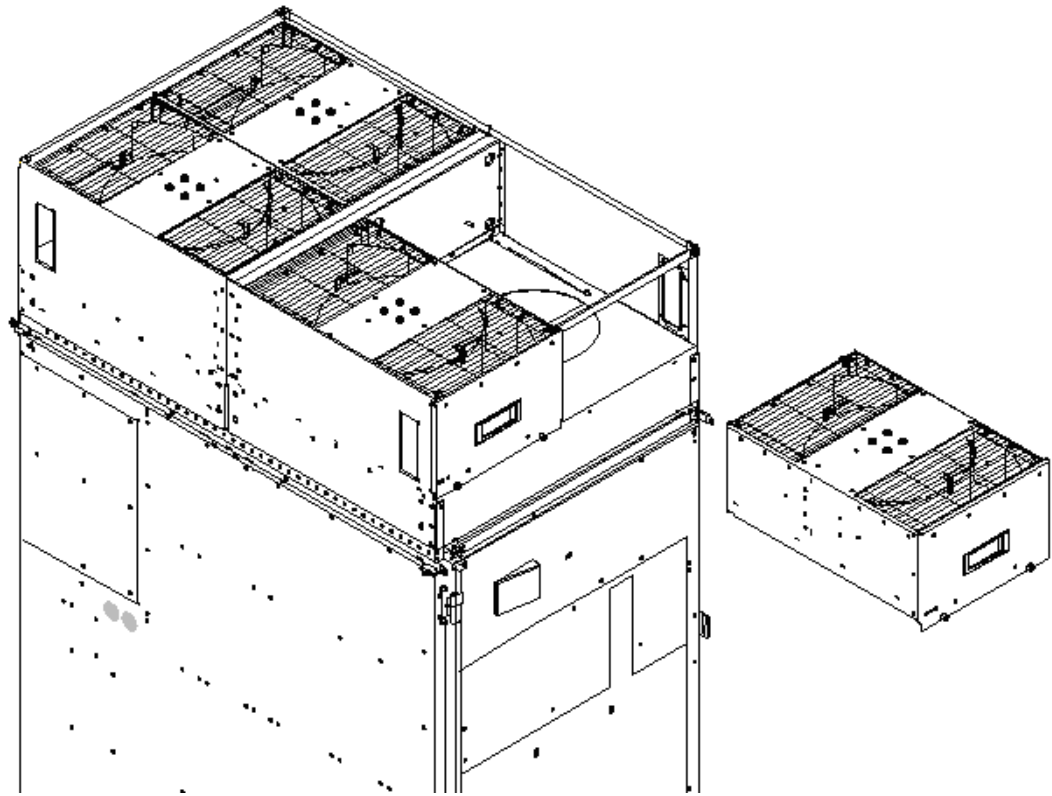
- Using the handles on the housing labeled **Blower 0 Blower 1**, align the edge of the housing over the edge at the top front of the cabinet, and slide it into place until the connectors at the back of each housing are fully mated (Figure 3-15). Then tighten the thumbscrews at the front of the housing.

Figure 3-15 Installing the Front Blower Housing



- Unpack each of the four blowers.
- Insert each of the four blowers into place in the blower housings with the thumbscrews at the bottom (Figure 3-16).

Figure 3-16 Installing the Blowers



7. Tighten the thumbscrews at the front of each blower.
8. If required, install housings on any other cabinets that were shipped with the system.

Attaching the Side Skins and Blower Side Bezels

Two cosmetic side panels affix to the left and right sides of the system. In addition, each system has bezels that cover the sides of the blowers.



IMPORTANT: Be sure to attach the side skins at this point in the installation sequence, especially if the cabinet is to be positioned at the end of a row of cabinets or between cabinets.

Attaching the Side Skins

Each system has four side skins: two front-side skins and two rear-side skins.



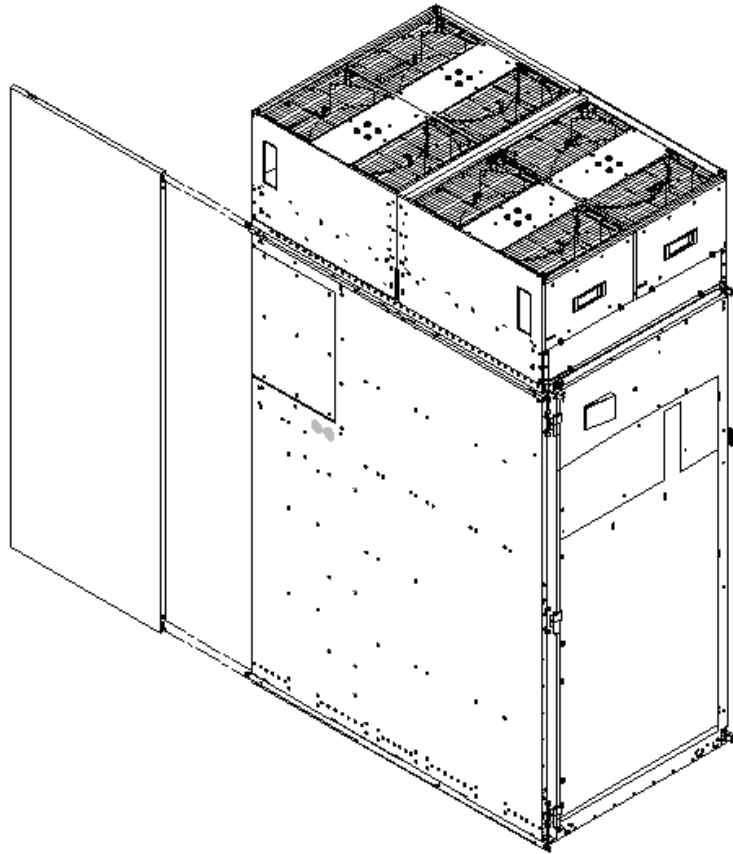
NOTE: Attach side skins to the left side of cabinet 0 and the right side of cabinet 1 (if applicable).

To attach the side skins, follow these steps:

1. If not already done, remove the side skins from their boxes and protective coverings.
2. From the end of the brackets at the back of the cabinet, position the side skin *with the lap joint* (Rear) over the top bracket and under the bottom bracket, and gently slide it into position (Figure 3-17).

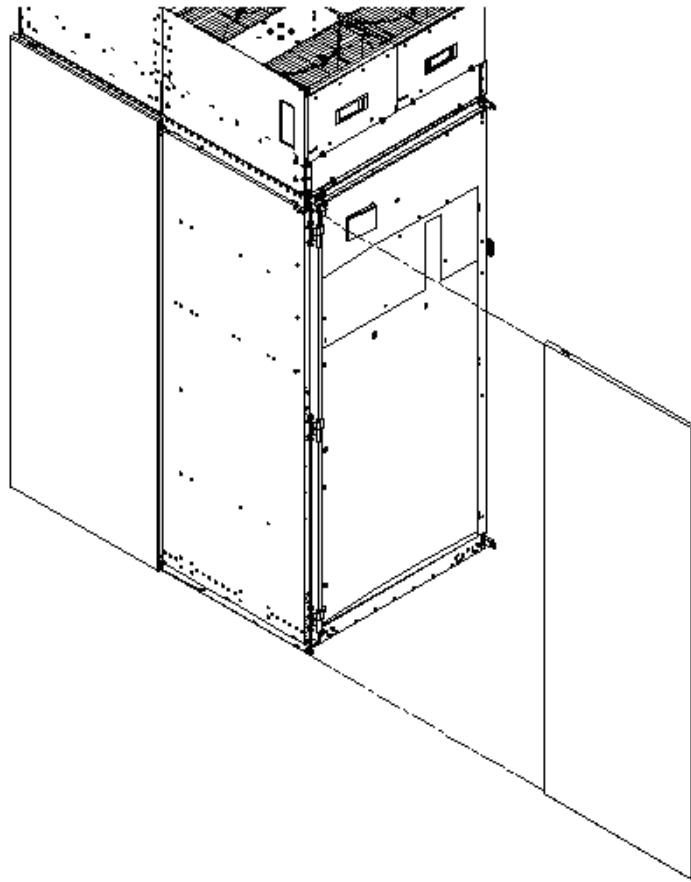
Two skins are installed on each side of the cabinet: one has a lap joint (Rear) and one does not (Front). The side skins with the lap joint are marked *Rear* and the side skins without the lap joint are marked *Front*.

Figure 3-17 Attaching the Rear Side Skin



3. Attach the skin *without the lap joint* (Front) over the top bracket and under the bottom bracket and gently slide the skin into position.

Figure 3-18 Attaching the Front Side Skins



4. Push the side skins together, making sure the skins overlap at the lap joint.

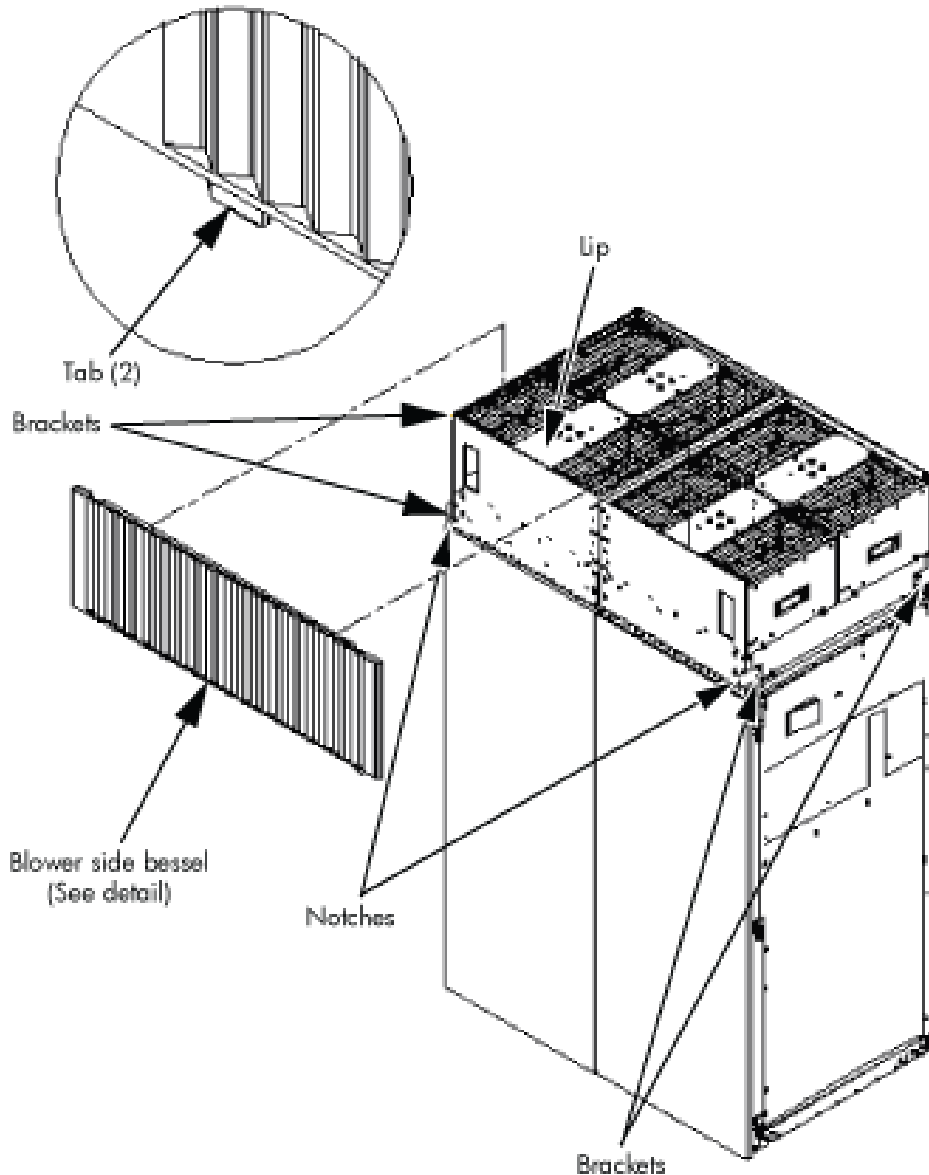
Attaching the Blower Side Bezels

The bezels are held on at the top by the bezel lip, which fits over the top of the blower housing frame, and are secured at the bottom by tabs that fit into slots on the cabinet side panels (Figure 3-19).

Use the same procedure to attach the right and left blower side bezels.

1. Place the side bezel slightly above the blower housing frame.

Figure 3-19 Attaching the Side Bezels



2. Align the lower bezel tabs to the slots in the side panels.
3. Lower the bezel so the bezel top lip fits securely on the blower housing frame and the two lower tabs are fully inserted into the side panel slots.



IMPORTANT: Use four screws to attach the side skins to the top and bottom brackets, except for the top bracket on the right side (facing the front of the cabinet). Do not attach the rear screw on that bracket. Insert all screws but do not tighten until all side skins are aligned.

4. Using a T-10 driver, attach the screws to secure the side skins to the brackets.
5. Repeat step 1 through step 4 for the skins on the other side of the cabinet.
6. To secure the side bezels to the side skins, attach the blower bracket locks (HP part number A5201-00268) to the front and back blowers using a T-20 driver.

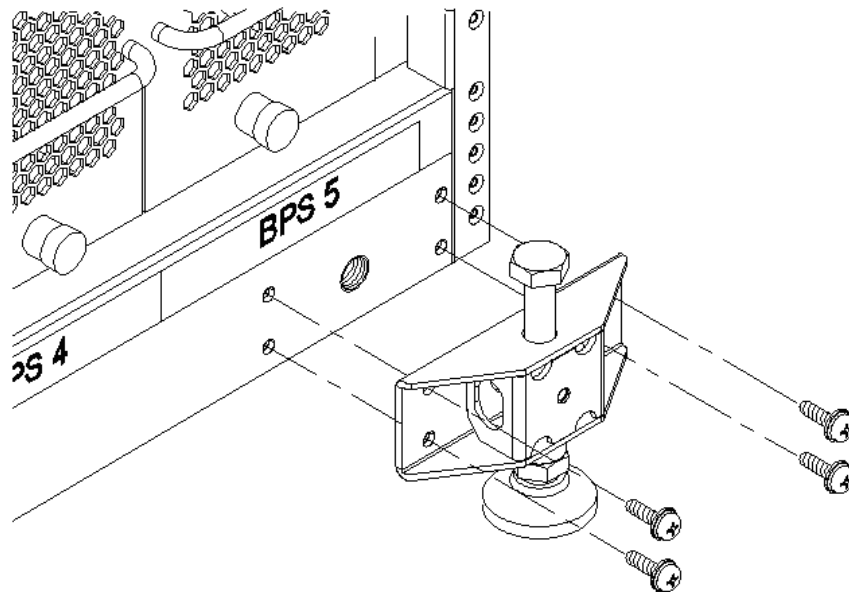
There are two blower bracket locks on the front blowers and two on the rear.

Attaching the Leveling Feet and Leveling the Cabinet

After positioning the cabinet in its final location, to attach and adjust the leveling feet, follow these steps:

1. Remove the leveling feet from their packages.
2. Attach the leveling feet to the cabinet using four T-25 screws.

Figure 3-20 Attaching the Leveling Feet



3. Screw down each leveling foot clockwise until it is in firm contact with the floor. Adjust each foot until the cabinet is level.

Installing the Front Door Bezels and the Front and Rear Blower Bezels

Each cabinet has two doors, one at the front and one at the back. The back door is shipped on the chassis and requires no assembly. The front door, which is also shipped on the chassis, requires the assembly of two plastic bezels to its front surface and a cable from the door to the upper front bezel. In addition, you must install bezels that fit over the blowers at the front and back of the cabinet.

Installing the Front Door Bezels

The front door assembly includes two cosmetic covers, a control panel, and a key lock. To install the front door, you must connect the control panel ribbon cable from the chassis to the control panel and mount the two plastic bezels onto the metal chassis door.

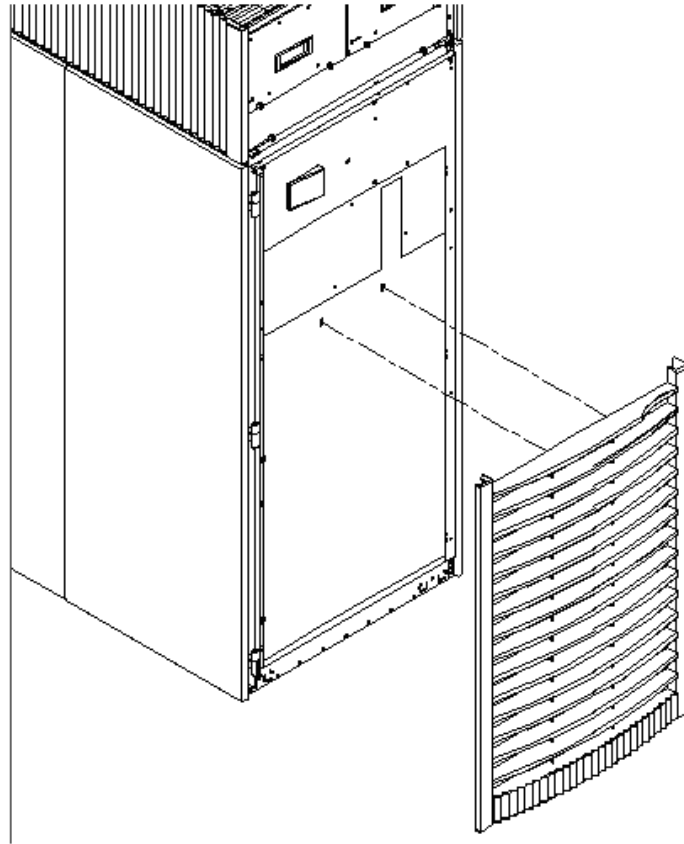


IMPORTANT: The procedure in this section requires two people and must be performed with the front metal chassis door open.

To install the front door assembly, follow these steps:

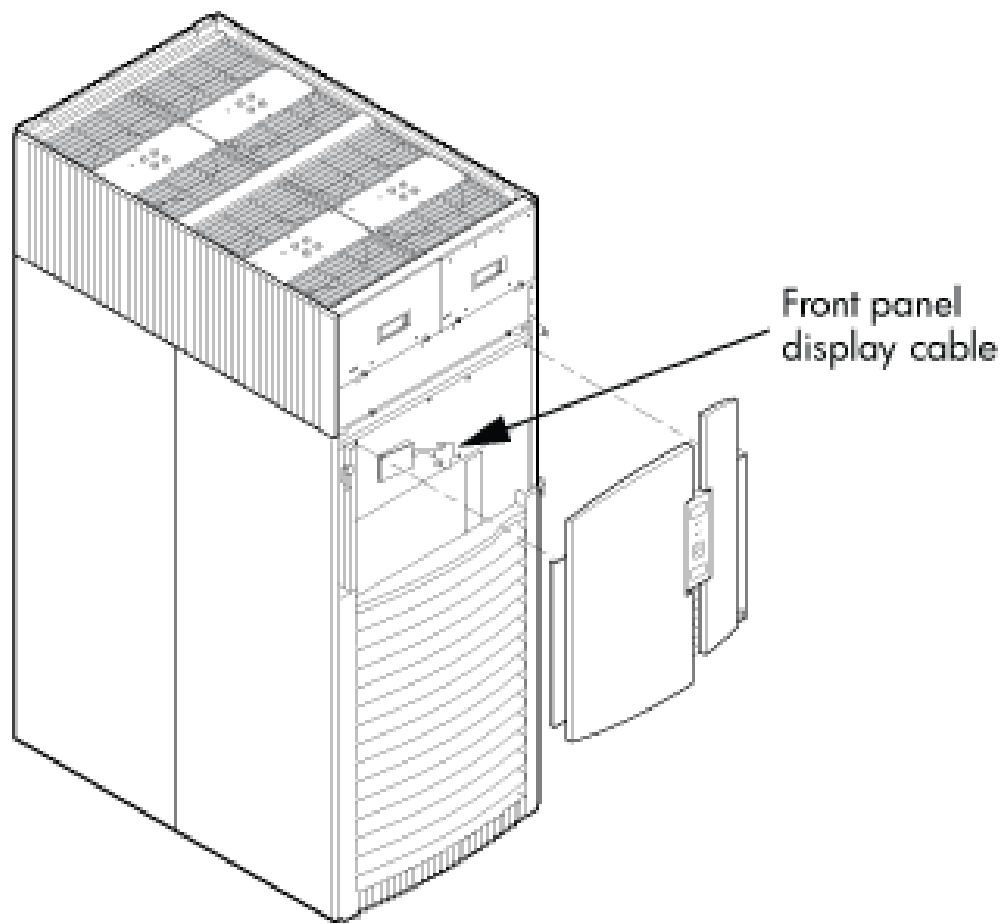
1. Open the front door, unsnap the screen, and remove all the filters held in place with Velcro.
2. Remove the cabinet keys that are taped inside the top front door bezel.
3. Insert the shoulder studs on the lower door bezel into the holes on the front door metal chassis (Figure 3-21).

Figure 3-21 Installing the Lower Front Door Assembly



4. Using a T-10 driver, secure the lower door bezel to the front door chassis with 10 of the screws provided. Insert all screws loosely, then tighten them after the bezel is aligned.
5. While another person holds the upper door bezel near the door chassis, attach the ribbon cable to the back of the control panel on the bezel and tighten the two flathead screws (Figure 3-22).

Figure 3-22 Installing the Upper Front Door Assembly



6. Feed the grounding strap through the door and attach it to the cabinet.
7. Insert the shoulder studs on the upper door bezel into the holes on the front door metal chassis.
8. Using a T-10 driver, secure the upper door bezel to the metal door with eight of the screws provided. Be sure to press down on the hinge side of the bezel while tightening the screws to prevent misalignment of the bezel.
9. Reattach all filters removed in step 1.

Installing the Rear Blower Bezel

The rear blower bezel is a cosmetic cover for the blowers and is located above the rear door.

To install the rear blower bezel, follow these steps:

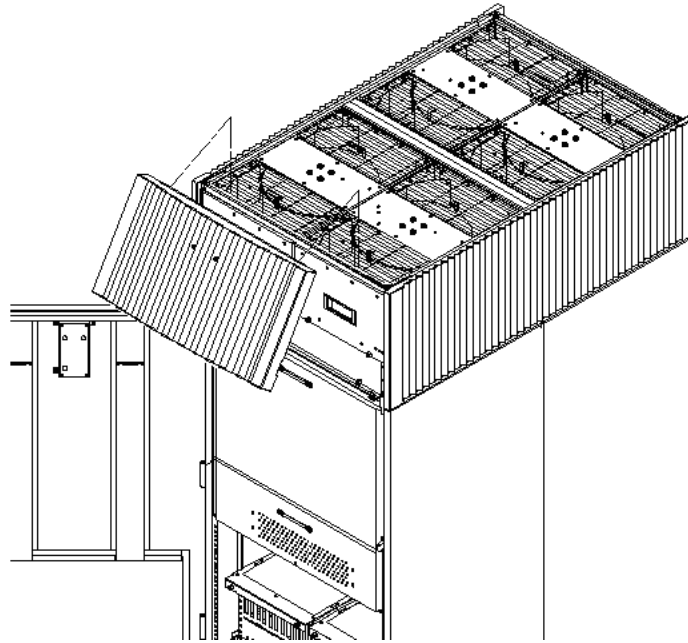
1. Open the rear cabinet door.



NOTE: The latch is located on the right side of the door.

2. Slide the bezel over the blower housing frame, hooking the lip of the bezel onto the cross support of the blower housing while holding the bottom of the bezel. Rotate the bezel downward from the top until the bottom snaps in place (Figure 3-23 (page 82)).

Figure 3-23 Installing the Rear Blower Bezel



3. Align the bezel over the nuts that are attached to the bracket at the rear of the cabinet.
4. Using a T-20 driver, tighten the two captive screws on the lower flange of the bezel.



NOTE: Tighten the screws securely to prevent them from interfering with the door.

5. Close the cabinet rear door.

Installing the Front Blower Bezel

The front blower bezel is a cosmetic cover for the blowers and is located above the front door. To install the front blower bezel, follow these steps:

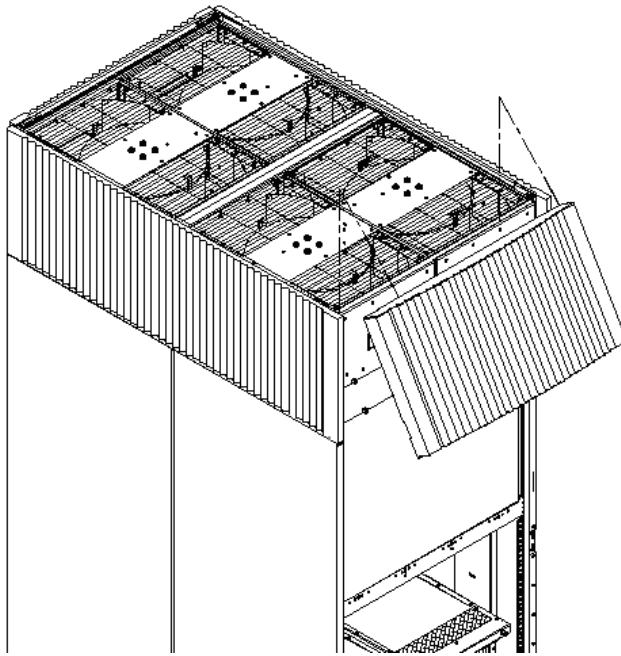
1. Open the front door.



NOTE: The latch is located on the right side of the front door.

2. Position the bezel over the blower housing frame, hooking the lip of the bezel onto the cross support of the blower housing (Figure 3-24 (page 83)).

Figure 3-24 Installing the Front Blower Bezel



3. Align the bezel over the nuts that are attached to the bracket at the front of the cabinet.
4. Using a T-20 driver, tighten the two captive screws on the lower flange of the bezel.



NOTE: Tighten the screws securely to prevent them from interfering with the door.

5. Close the front door.

Wiring Check



WARNING! LETHAL VOLTAGE HAZARD—Hazardous voltages can be present in the cabinet if incorrectly wired into the site AC power supply. Always verify correct wiring and product grounding before applying AC power to the cabinet. Failure to do so can result in injury to personnel and damage to equipment.

Verify the following items before applying AC power to the cabinet:

- Cabinet safety ground connects to the site electrical system ground and is not left floating or connected to a phase.
- The minimum required method of grounding is to connect the green power cord safety ground to the site ground point through the power cord receptacle wiring. HP does not recommend cabinet grounding. Treat cabinet grounding as auxiliary or additional grounding over and above the ground wire included within the supplied power cord.

If the product ground is left floating, anyone coming into contact with the cabinet can receive a lethal shock if a component fails and causes leakage or direct connection of phase energy to the cabinet.

If the product ground connects to a phase, the server is over 200 volts above ground, presenting a lethal shock hazard to anyone coming into contact with the product when site AC power is applied to the product.

Verify the connection of the product ground to site AC power ground through a continuity check between the cabinet and site AC power supply ground. Perform the continuity check while the site AC power supply circuit breakers serving the cabinet and the cabinet circuit breaker are all set to **OFF**.

To verify that the product ground connects to the site AC power supply ground, follow these steps:

1. Ensure that the site AC power supply circuit breakers serving the cabinet are set to **OFF**.
2. Ensure that the cabinet main circuit breaker is set to **OFF**.
3. Touch one test probe to the site AC power supply ground source.
4. Touch the other test probe to an unpainted metal surface of the cabinet.



NOTE: If the digital multimeter (DMM) leads can not reach from the junction box to the cabinet, use a piece of wire connected to the ground terminal of the junction box.

5. Check for continuity indication of less than 0.1 ohm.
 - If continuity is *not* found, check to ensure that the DMM test leads are making good contact to unpainted metal and try again.
 - If continuity is *still* not found, disconnect the cabinet site AC power immediately and notify the customer of the probability of incorrectly wired AC power to the cabinet.
 - If continuity is good, and connection of the cabinet to site AC power supply ground (and not floating or connected to a phase) is verified, then check the voltage.



NOTE: For dual power sources, proceed to “Checking Voltage” (page 88) with special attention to PDCA 0 ground pin to PDCA 1 ground pin voltage. Anything greater than 3 V is cause for further investigation.

Installing and Verifying the PDCA

All systems are delivered with the appropriate cable plug for options 6 and 7 (Figure 3-25 (page 85)).

Check the voltages at the receptacle prior to plugging in the PDCA plug.

- To verify the proper wiring for a 4-wire PDCA, use a digital voltmeter (DVM) to measure the voltage at the receptacle. Voltage must read 200–240 V ac phase-to-phase as measured between the receptacle pins as follows: L1 to L2, L2 to L3, L1 to L3 (Figure 3-26 (page 85)).
- To verify the proper wiring for a 5-wire PDCA, use a DVM to measure the voltage at the receptacle. Voltage must read 200–240 V ac phase-to-neutral as measured between the receptacle pins as follows: L1 to N, L2 to N, L3 to N (Figure 3-27 (page 86)).

Figure 3-25 PDCA Assembly for Options 6 and 7

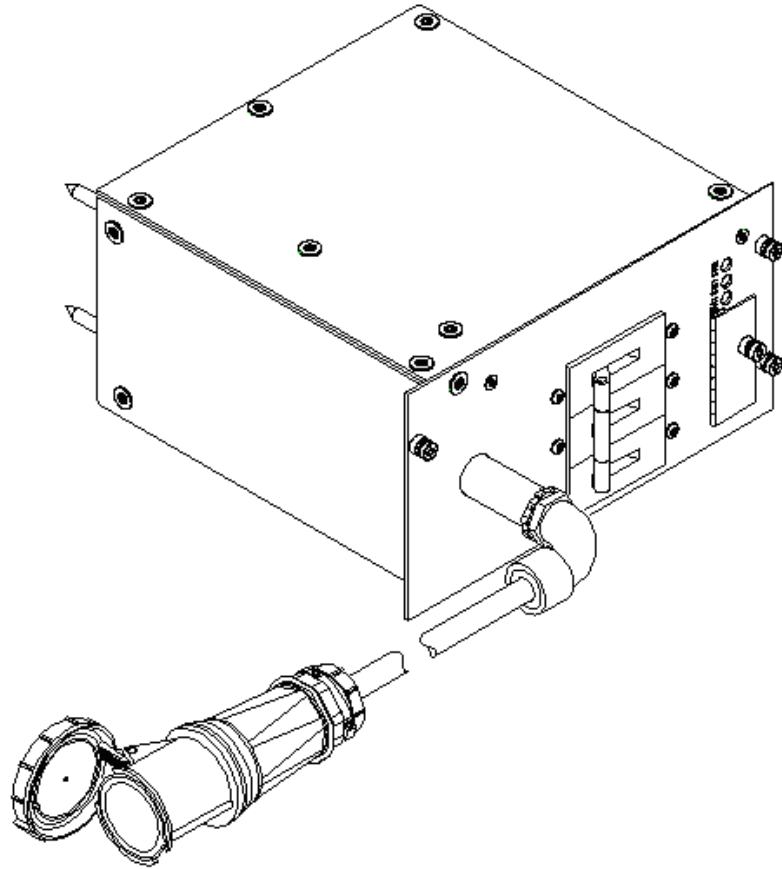


Figure 3-26 A 4-Wire Connector

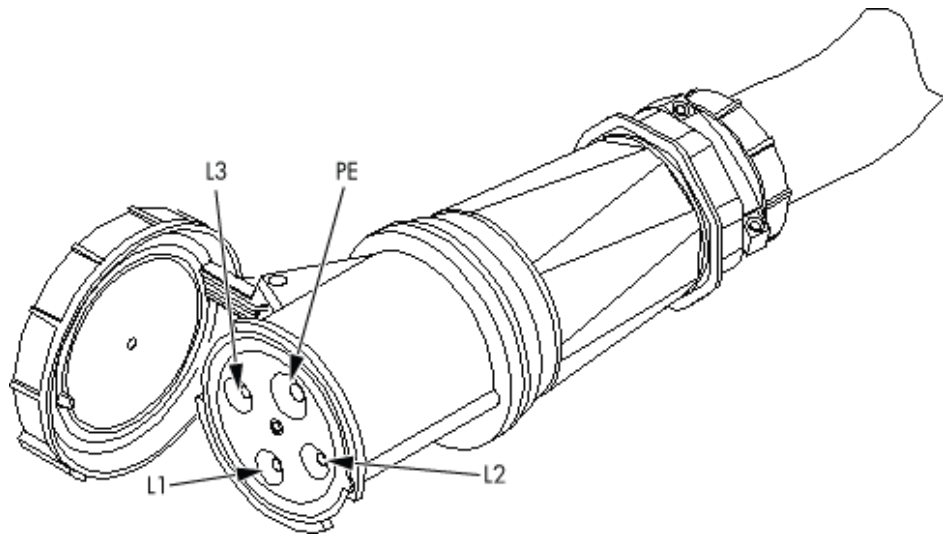
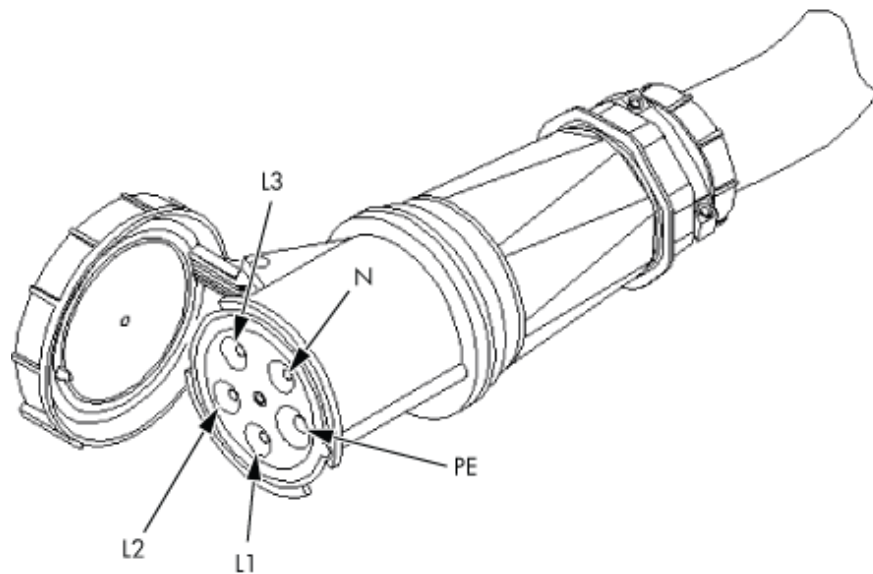


Figure 3-27 A 5-Wire Connector



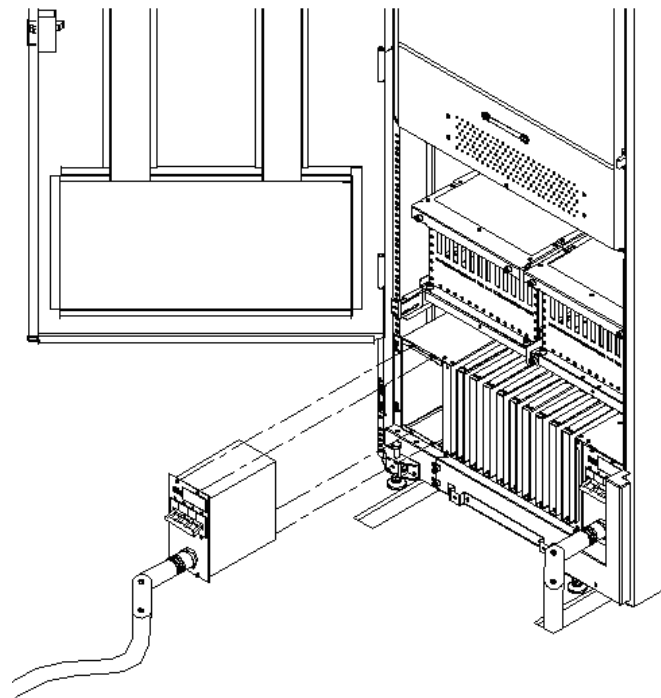
To install the PDCA, follow these steps:



WARNING! Make sure the circuit breaker on the PDCA is **OFF**.

1. Remove the rear PDCA bezel by removing the four retaining screws.
2. Run the power cord down through the appropriate opening in the floor tile.
3. Insert the PDCA into its slot (Figure 3-28 (page 86)).

Figure 3-28 Installing the PDCA



4. Using a T-20 driver, attach the four screws that hold the PDCA in place.
5. If required, repeat step 2 through step 4 for the second PDCA.

6. Reinstall the rear PDCA bezel.

CAUTION: Do not measure voltages with the PDCA breaker set to **ON**. Make sure the electrical panel breaker is **ON** and the PDCA breaker is **OFF**.

7. Plug in the PDCA connector.
8. Check the voltage at the PDCA:
 - a. Using a T-20 driver, remove the screw on the hinged panel at the top of the PDCA. (Figure 3-29).
 - b. Using a voltmeter, measure the test points and compare the values to the ranges given in Table 3-3 (page 87) to make sure the voltages conform to the specifications for the PDCA and local electrical specifications.

If the voltage values do not match the specifications, have the customer contact an electrician to troubleshoot the problem.

Figure 3-29 Checking PDCA Test Points (5-Wire)

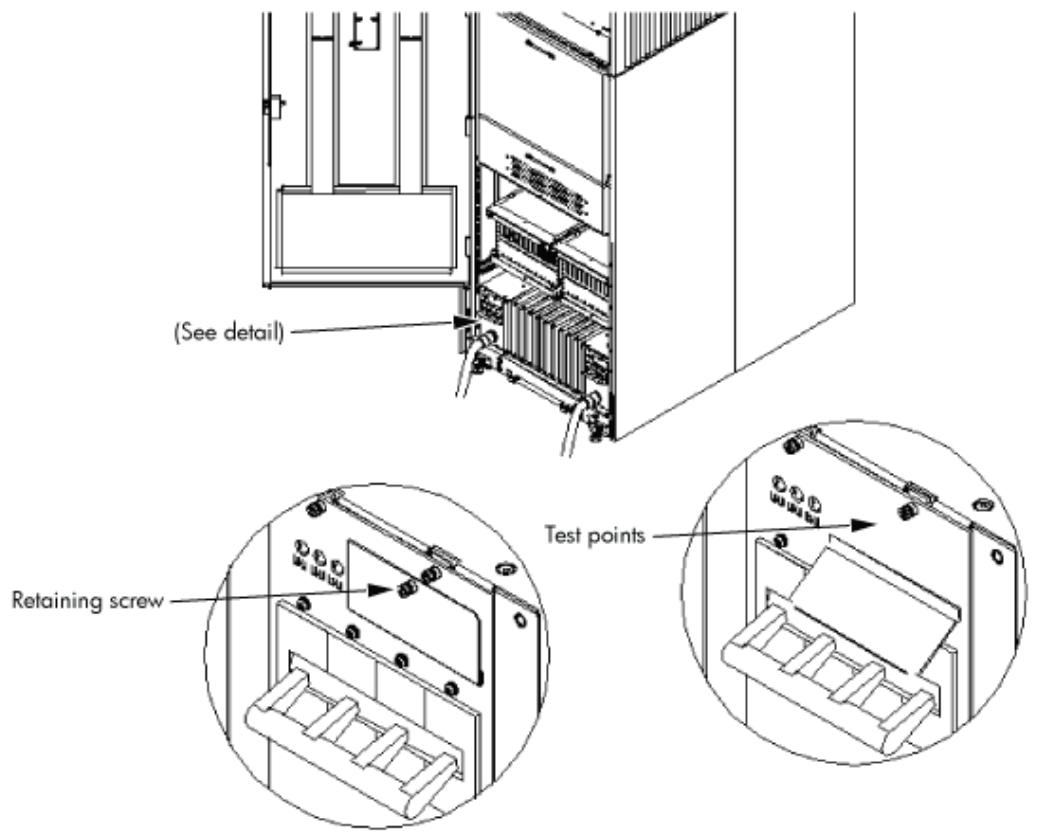


Table 3-3 4- and 5-Wire Voltage Ranges

4-Wire	5-Wire
L2 to L3: 200-240 V	L1 to N: 200-240 V
L2 to L1: 200-240 V	L2 to N: 200-240 V
L1 to L3: 200-240 V	L3 to N: 200-240 V
	N to Ground: ¹

¹ Neutral to ground voltage can vary from millivolts to several volts depending on the distance to the ground/neutral bond at the transformer. Any voltage over 3 V must be investigated by a site preparation or power specialist.

Checking Voltage

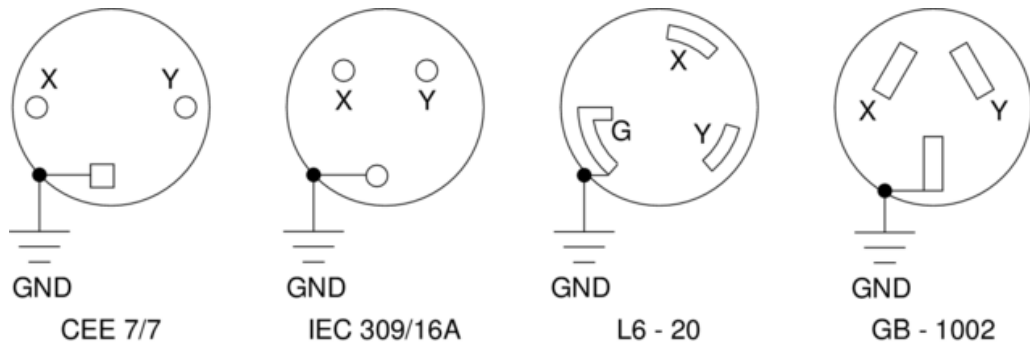
The voltage check ensures that all phases (and neutral, for international systems) are wired correctly for the cabinet and that the AC input voltage is within specified limits.



NOTE: If you use a UPS, see 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 and is available at <http://docs.hp.com>.

1. Verify that site power is **OFF**.
2. Open the site circuit breakers.
3. Verify that the receptacle ground connector is connected to ground. See Figure 3-30 for connector details.
4. Set the site power circuit breaker to **ON**.

Figure 3-30 Wall Receptacle Pinouts



KIN006
7/11/01

5. Verify that the voltage between receptacle pins x and y is 200–240 volts ac.
6. Set the site power circuit breaker to **OFF**.
7. Ensure that power is removed from the server.
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 can result in injury to personnel or damage to equipment when ac power is applied to the cabinet.

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

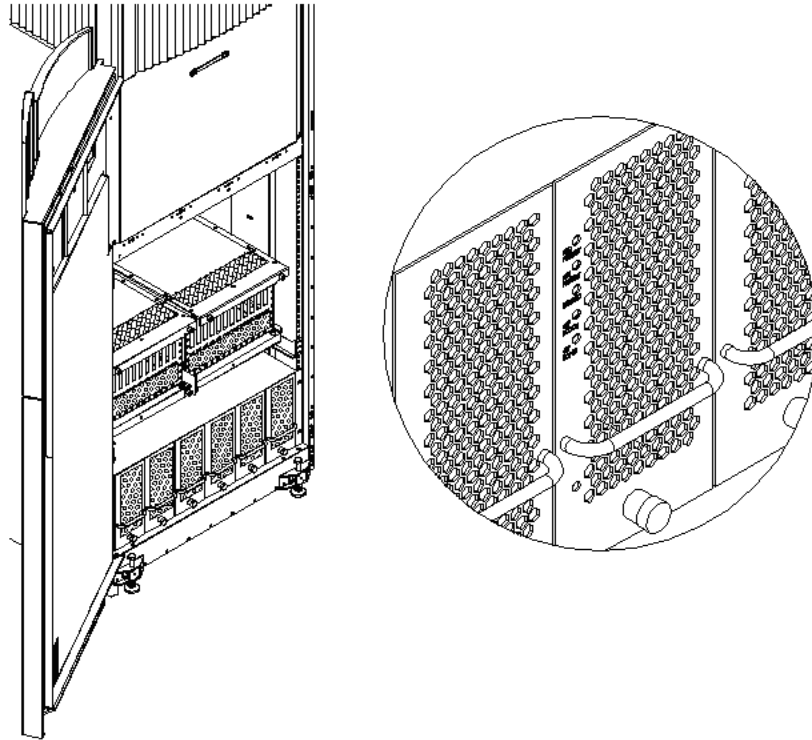


WARNING! There is a risk of shock hazard while testing primary power. Use properly insulated probes. Be sure to replace the access cover when you finish testing primary power.

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

11. Check that the indicator LED on each power supply is lit. See Figure 3-31.

Figure 3-31 Power Supply Indicator LED



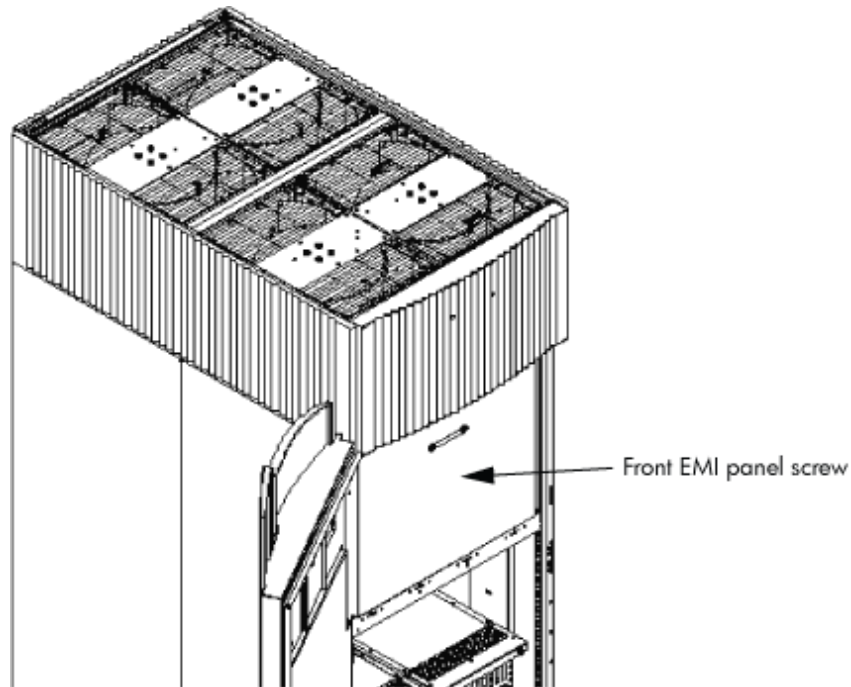
Removing the EMI Panels

Remove the front and back electromagnetic interference (EMI) panels to access ports and to visually check whether components are in place and the LEDs are properly illuminated when power is applied to the system.

To remove the front and back EMI panels, follow these steps:

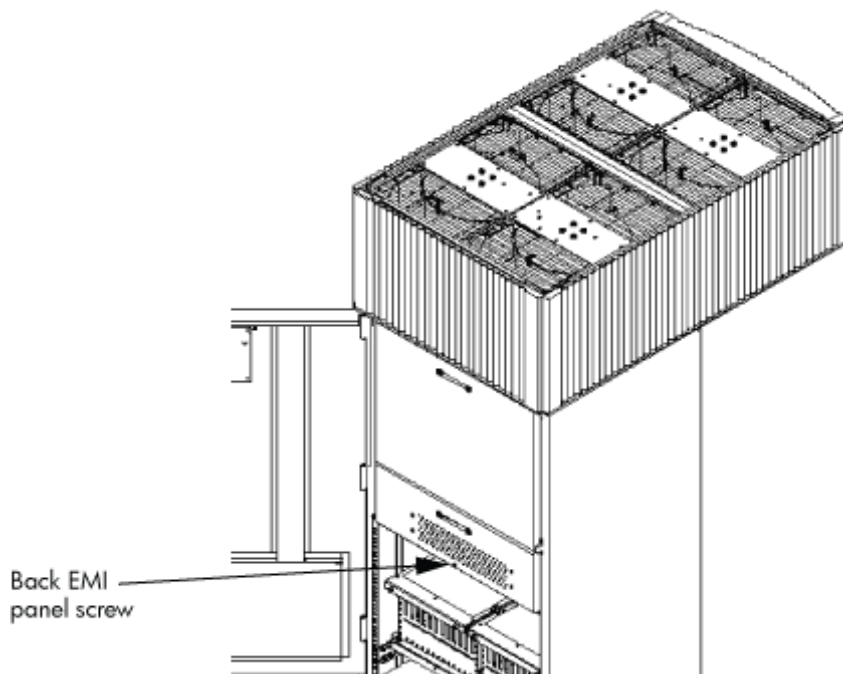
1. Using a T-20 driver, loosen the captive screw at the top center of the front EMI panel (Figure 3-32).

Figure 3-32 Removing Front EMI Panel Screw



2. Use the handle provided to remove the EMI panel and set it aside.
When in position, the EMI panels (front and back) are tightly in place. Removing them takes controlled but firm exertion.
3. Loosen the captive screw at the lower center of the back EMI panel (Figure 3-33 (page 90)).

Figure 3-33 Removing the Back EMI Panel



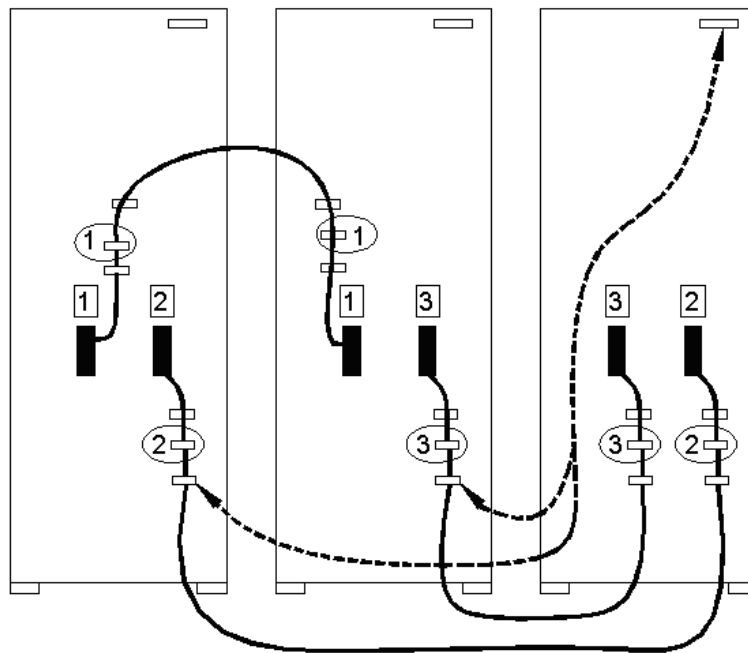
4. Use the handle provided to gently remove the EMI panel and set it aside.

Connecting the Cables

The I/O cables are attached and tied inside the cabinet. When the system is installed, these cables must be untied, routed, and connected to the cabinets where the other end of the cables terminate. Use the following guidelines and Figure 3-34 to route and connect cables. For more information on cable routing, see “Routing the I/O Cables” (page 91).

- Each cabinet is identified with a unique color. The cabinet color label is located at the top of the cabinet.
- The colored label *closest to the cable connector* corresponds to the color of the cabinet to which it is attached.
- The colored label farther away from the cable connector corresponds to the color of the cabinet where the other end of the cable is attached. In Figure 3-34, the dotted lines show where the label is located and where the cable terminates.
- Each cable is also labeled with a unique number. This number label is applied on both ends of the cable and near the port where the cable is to be connected. In Figure 3-34, the cable number labels are indicated by circled numbers, and the cabinet port numbers are indicated with boxed numbers.

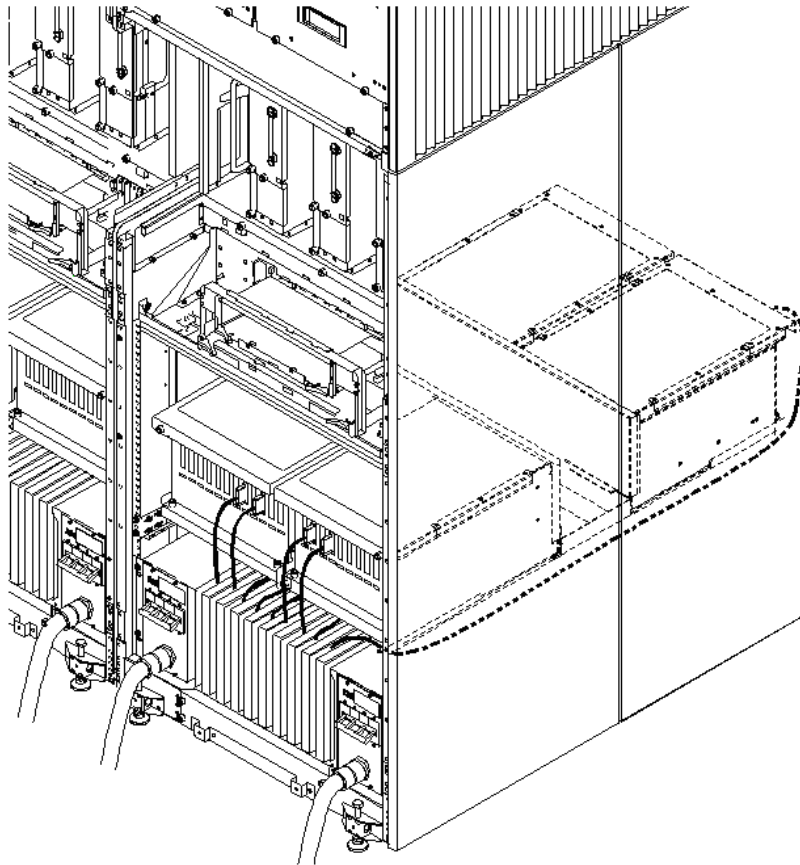
Figure 3-34 Cable Labeling



Routing the I/O Cables

Routing the cables is a significant task in the installation process. Efficient cable routing is important not only for the initial installation, but also to aid in future service calls. The most efficient use of space is to route cables so that they are not crossed or tangled. Figure 3-35 (page 92) illustrates efficient I/O cable routing.

Figure 3-35 Routing I/O Cables



To route cables through the cable groomer at the bottom rear of the cabinet, follow these steps:

1. Remove the cable access plate at the bottom of the groomer.
2. Beginning at the front of the cabinet, route the cables using the following pattern:
 - a. Route the first cable on the left side of the leftmost card cage first. Route it under the PCI-X card cage toward the back of the cabinet and down through the first slot at the right of the cable groomer.
 - b. Route the second cable on the left side of the leftmost card cage to the right of the first cable, and so on, until routing all of the cables in the card cage is complete.

The number and width of cables varies from system to system. Use judgment and the customer's present and estimated future needs to determine how many cables to route through each cable groomer slot.

- c. After routing the leftmost card cage at the front of the cabinet, route the cables in the rightmost card cage at the back of the cabinet. Begin with the right cable in the card cage and work toward the left.
 - d. After routing the cables in the rightmost card cage at the rear of the cabinet, return to the front of the system and route the cables in the next card cage to the right.
 - e. Repeat steps a through d until all the cables are routed.
3. Connect the management processor cables last.
4. Reattach the cable access plate at the bottom of the cable groomer.
5. Reattach the cable groomer kick plate at the back of the cabinet.
6. Slip the L bracket under the power cord on the rear of the PDCA.
7. While holding the L bracket in place, insert the PDCA completely into the cabinet and secure the L bracket with one screw.

Installing the Support Management Station

The Support Management Station (SMS) ships separately in boxes. The SMS software and 3 Revisions of Superdome Firmware history are preloaded at the factory.

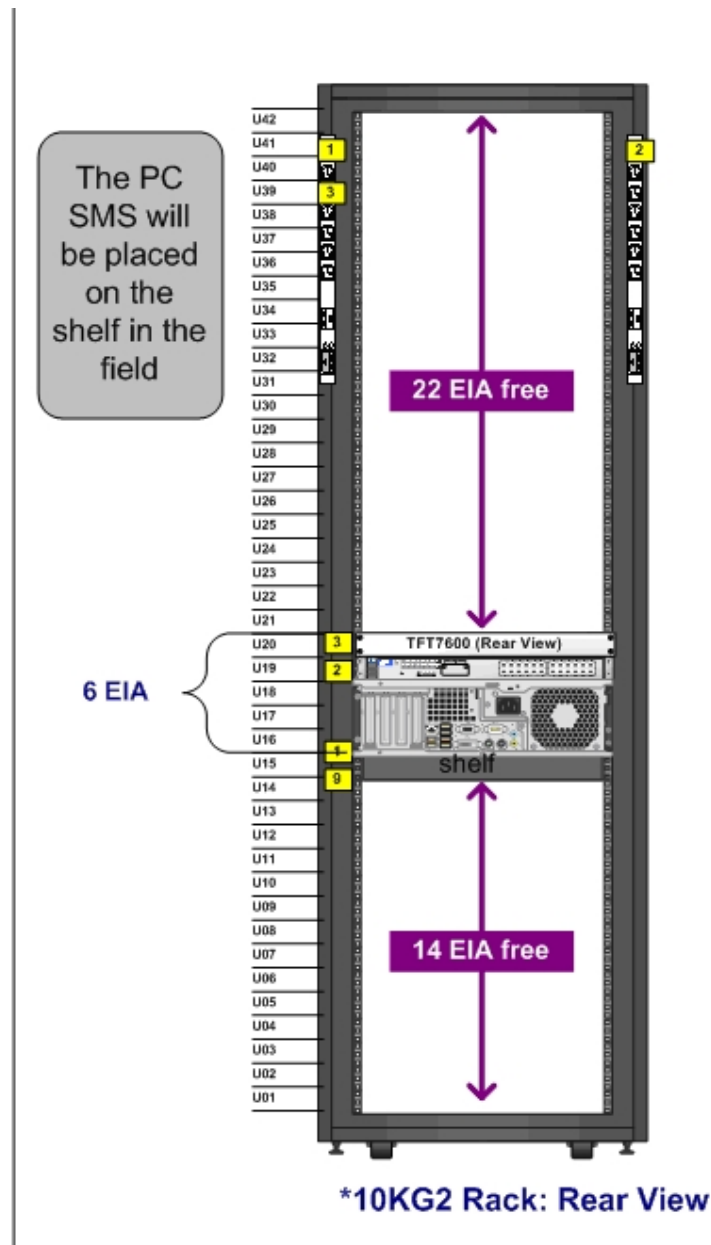


NOTE: The SMS Shelf may or may not be installed in the factory prior to shipping.

Installing the SMS Support Shelf

1. Unpack the SMS rp5700 PC and Support Shelf from their respective shipping containers.
2. Install the Support Shelf Rack at the U15 position in the 10KG2 Rack and place the SMS PC onto the shelf.

See the following:



Connecting the SMS to the Superdome

The Superdome *Cookbook* document is found through the following website (requires authentication):

<http://athp.hp.com/portal/site/sig/menuitem.260d6c199fc475a058b9d8a989806e01/>

In the *Search the Sales Library:* field, enter the keywords: *SMS Cookbook*. A second window is displayed with the file information. Select *Worldwide, English (US)* to download.



NOTE: The *SMS Cookbook* file is presented as a Windows Visio file.

The SMS software and 3 revisions of Superdome firmware histories are preloaded onto the SMS at the factory. If needed, see the following section for the procedures to capture the SMS SW and Superdome firmware files.

SMS Software and Superdome Firmware Downloading Procedure

Go to the following URL (requires authentication):

<http://intranet.hp.com/tsg/WW2/CESL/Pages/SMS-SW-FW.aspx>

Select the *STSD SMS & FW Files* link at approximately mid page.

The *Superdome_Binaries.exe* file is a self-extracting archive containing the following Firmware binaries and SMS Software Utilities for Superdome Servers:

1. SX1000 – Last three revisions of PA and IA Firmware
2. SX2000 – Last three revisions of PA and IA Firmware
3. Legacy – Last three revisions of PA Firmware
4. SMS Software Utilities:
 - CYGWIN
 - EIT
 - PARCLI
 - SCAN

Either copy the *Superdome_Binaries.exe* file to the desktop, or save it to a CD.

Open the *Superdome_Binaries.exe* file.



NOTE: The */opt* directory will be created as the default location.

SMS Software Utilities

Move the Software Utilities onto the SMS as indicated:

- SCAN – `c:\opt\scansw`
- CYGWIN – `c:\CYGWIN`
- PARCLI – `c:\Program Files\Hewlett-Packard\nParCommands`
- EIT Tools – `c:\Program Files\Hewlett-Packard\EIT`

Superdome Firmware Instructions



NOTE: Reference to pa or ia denotes two firmware types: one for *PARISC* Processors (pa) and one for *Itanium* Processors (ia). This is applicable for the sx1000, the sx2000, and the Legacy Servers. The Legacy Servers will only have the *PARISC* Processors (pa) installed.

PC SMS

1. Create a `c:\opt\firmware\sxX000\X.Xx` directory.

Example 3-1 Directory Example

```
sx2000\8.7f
```

2. Copy the `h_ipf_(pa or ia)_sxX000_X.Xx.tar.gz` file to the `c:\opt\firmware\sxX000\X.Xx` directory.
3. Open a Cygwin window.
4. Enter the following command to move that bundle into the targeted directory:

```
cd c:\opt\firmware\sxX000\X.Xx
```
5. Enter the following command to un-compress the gzip file:

```
gunzip h_ipf_(pa or ia)_sxX000_X.Xx.tar.gz
```
6. Enter the following command to un-tar the tar files:

```
tar -xvf h_ipf_(pa or ia)_sxX000_X.Xx.tar
```

HP-UX SMS

1. Create a `/opt/firmware/sxX000/X.Xx` directory.

Example 3-2 Directory Example

```
sx2000/8.7f
```

2. Copy the `h_ipf_(pa or ia)_sxX000_X.Xx.tar.gz` file to the `/opt/firmware/sxX000/X.Xx` directory.
3. Change the directory to:

```
/opt/firmware/sxX000/X.Xx
```
4. Enter the following command to un-compress the gzip file:

```
gunzip h_ipf_(pa or ia)_sxX000_X.Xx.tar.gz
```
5. Enter the following command to un-tar the tar file:

```
tar -xvf h_ipf_(pa or ia)_sxX000_X.Xx.tar
```

Configuring the Event Information Tools

There are three tools included in the Event Information Tools (EIT) bundle for the SMS. They are the Console Logger, the IPMI Log Acquirer and the IPMI Event Viewer. These tools work together to collect, interpret, and display system event messages on the SMS.

EIT Tools Functionality

The Console Logger captures the commands typed at the console, the response displayed, and alert messages generated by the system. It stores them on the SMS disk drive in a continuous log format.

The IPMI Log Acquirer acquires FPL and FRUID logs from the remote system and stores them on the SMS disk drive.

The IPMI Event Viewer analyzes the FPL logs captured by the IPMI Log Acquirer and displays the system event information through either a command-line or Web-based interface.

Where to Find the EIT Documentation

The latest documentation for setting up and configuring these tools is available at:

<http://docs.hp.com/en/diag.html>

Once you are at the website, select “Event Information Tools (EIT) - formerly SMS”. You will find documentation for each of the following subjects:

- Console Logger
- IPMI Event Viewer
- IPMI Log Acquirer
- Release Notes

Turning On Housekeeping Power

To turn on housekeeping power to the system, follow these steps:

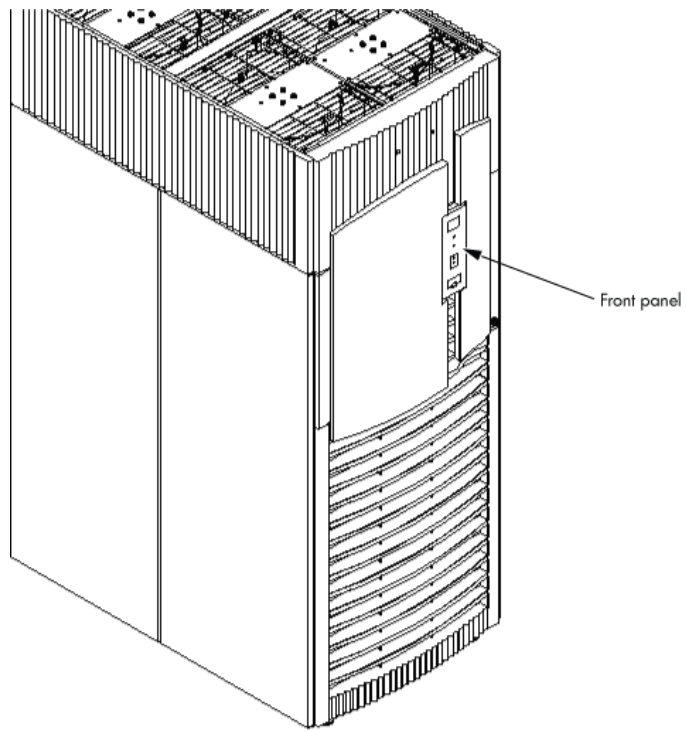
1. Verify that the ac voltage at the input source is within specifications for each cabinet being installed.
2. Ensure the following:
 - The ac breakers are in the **OFF** position.
 - The cabinet power switch at the front of the cabinet is in the **OFF** position.
 - The ac breakers and cabinet switches on the I/O expansion cabinet (if present) are in the **OFF** position.
3. If the complex has an IOX cabinet, power on this cabinet first.



IMPORTANT: The 48 V switch on the front panel must be **OFF**.

4. Turn on the ac breakers on the PDCAs at the back of the each cabinet.
 - In a large complex, power on the cabinets in one of the two following orders:
 - 9, 8, 1, 0
 - 8, 9, 0, 1
 - On the front and back panels, the HKP and the Present LEDs illuminate (Figure 3-36).
 - On cabinet 0, the HKP and the Present LEDs illuminate, but only the HKP LED illuminates on cabinet 1 (the right cabinet).

Figure 3-36 Front Panel with HKP and Present LEDs

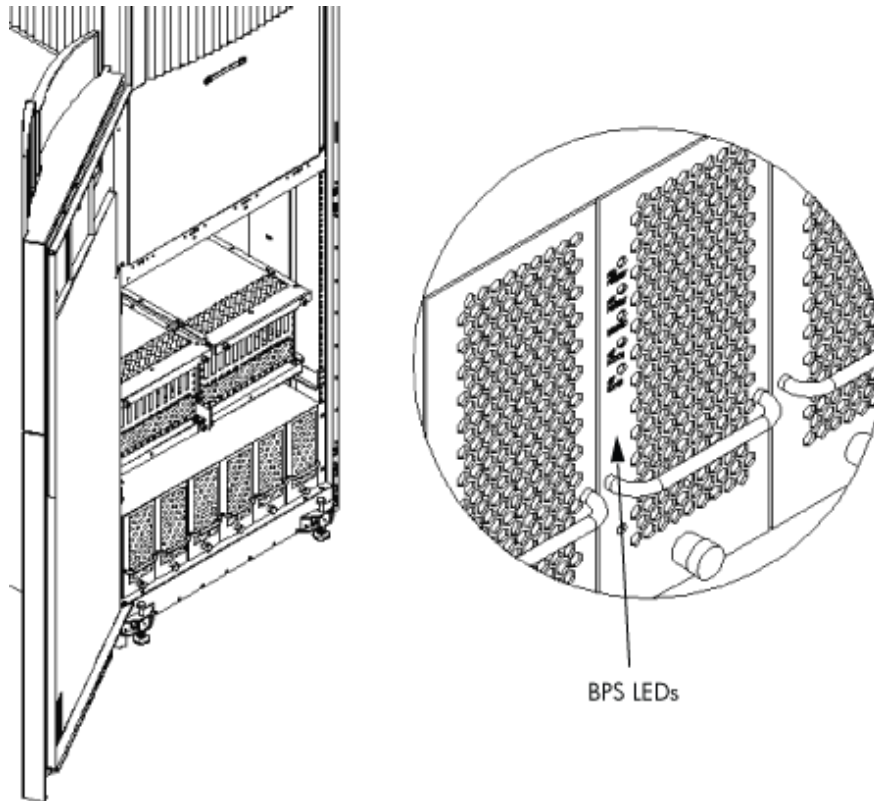


5. Examine the BPS LEDs (Figure 3-37).

When on, the breakers on the PDCA distribute ac power to the BPSs. Power is present at the BPSs when:

- The amber LED next to the AC0 Present label is on (if the breakers on the PDCA are on the left side at the back of the cabinet).
- The amber LED next to the AC1 Present label is on (if the breakers on the PDCA are on the right side at the back of the cabinet).

Figure 3-37 BPS LEDs



Connecting the MP to the Customer LAN

This section describes how to connect, set up, and verify the management processor (MP) to the customer LAN. LAN information includes the MP network name (host name), the MP IP address, the subnet mask, and the gateway address. The customer provides this information.

Connecting the MP to the Network



NOTE: Based on the customer's existing SMS configuration, make the appropriate modifications to add in the Superdome/sx2000 SMS LAN configuration.

Unlike earlier systems, which required the MP to be connected to the private LAN, the sx2000 system MP now connects to the customer's LAN through the appropriate hub, switch, router, or other customer-provided LAN device.

In some cases, the customer can connect the SMS to the MP on the private management LAN. In this case, inform the customer that administrators will not be able to access the SMS remotely and will have to use the SMS as a "local" device.

Connect the MP to the customer's LAN:

1. Connect one end of the RJ-45 LAN cable to the LAN port on the MP (Figure 3-38).

Figure 3-38 MP LAN Connection Location



2. Connect the other end of the LAN cable to the customer-designated LAN port. Obtain the IP address for the MP from the customer.
Connect the dial-up modem cable between the MP modem and the customers phone line connection.

Setting the Customer IP Address



NOTE: The default IP address for the customer LAN port on the MP is **192.168.1.1**.

To set the customer LAN IP address, follow these steps:

1. From the MP Command Menu prompt *MP:CM>*, enter **1c** (LAN configuration). The screen displays the default values and asks if you want to modify them.



TIP: Write down the information, as it may be required for future troubleshooting.

If you are not already in the Command Menu, enter **ma** to return to the Main Menu, then enter **cm**.

The LAN configuration screen appears (Figure 3-39).

Figure 3-39 LAN Configuration Screen

```

c:\ Telnet feshd1-u.rsn.hp.com
[feshd1-u] MP> cm

Enter HE to get a list of available commands
(Use ^B to return to main menu.)

[feshd1-u] MP:CM> 1c

This command modifies the LAN parameters.

Current configuration of MP customer LAN interface
MAC address : 00:10:83:fd:07:54
IP address  : 10.99.49.138    0x0f63318a
Name        : feshd1-u
Subnet mask : 255.255.248.0  0xffff8000
Gateway     : 10.99.49.254   0x0f6331fe
Status      : UP and RUNNING

Do you want to modify the configuration for the customer LAN? <Y/[N]> _

```

2. If the LAN software on the MP is working properly, the message LAN status: UP and RUNNING appears. The value in the IP address field has been set at the factory.



NOTE: The customer LAN IP address is designated LAN port 0.

3. The prompt asks if you want to modify LAN port 0. Enter **Y**. The current customer IP address appears; then the *Do you want to modify it? (Y/[N])* prompt appears.
4. Enter **Y**.
5. Enter the new IP address.
6. Confirm the new address.
7. Enter the MP network name. This is the host name for the customer LAN. You can use any name up to 64 characters long. It can include alphanumeric, dash (-), under score (_), period (.), or the space character. HP recommends that the name be a derivative of the complex name. For example, Maggie.com_MP.
8. Enter the LAN parameters for *Subnet mask* and *Gateway address*. Obtain this information from the customer.
9. To display the LAN parameters and status, enter the **1s** command at the MP Command Menu prompt (*MP:CM>*). The **1s** command screen appears (Figure 3-40).

Figure 3-40 The ls Command Screen

```
Telnet feshd1-u.rsn.hp.com
[feshd1-u] MP:CM> ls

Current configuration of MP customer LAN interface
MAC address : 00:10:83:fd:07:54
IP address  : 10.99.49.138    0x0f63318a
Name        : feshd1-u
Subnet mask : 255.255.248.0  0xfffff800
Gateway     : 10.99.49.254   0x0f6331fe
Status      : UP and RUNNING

Current configuration of MP private LAN interface
MAC address : 00:a0:f0:00:83:36
IP address  : 192.168.2.12   0xc0a8020c
Name        : priv-02
Subnet mask : 255.255.255.0  0xffffffff00
Gateway     : 192.168.2.12   0xc0a8020c
Status      : UP and RUNNING

[feshd1-u] MP:CM>
```

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

To exit the MP, enter **x** at the MP Main Menu.

10. Check the settings for the model string, UUID, and Creator Product Name using the **ID** command. For example:

MP modifiable stable complex configuration data fields.

```
Model String           : 9000/800/SD32B
Complex System Name    : maggie
Original Product Number: A5201A
Current Product Number : A9834A
UUID                   : ffffffff-ffff-ffff-ffff-ffffffffffffff
Creator Manufacturer    : hp
Creator Product Name   : superdome server SD32B
Creator Serial Number  : USRxxxxxxxx
OEM Manufacturer       :
OEM Product Name       :
OEM Serial Number     : USRxxxxxxxx
```

11. Set the date and time using the MP command.

Booting and Verifying the System

After installing the system, verify that the proper hardware is installed and booted.

This section describes how to power on the cabinet and boot and test each partition. You must open a console window for each partition. You must also open two additional windows, one window for initiating reset on partitions and the other for monitoring system partition status. Initiate the MP in each window.



NOTE: The HKP must be **ON** and the 48 V switch on the front panel must be **OFF** . To turn on the HKP, see “Turning On Housekeeping Power” .

Connecting to the MP

Before powering on the cabinet, you need to open several windows connected to the MP. Then switch the 48 V on and boot each partition to the EFI prompt, (the BCH prompt in the case of an HP 9000/sx2000 server). To connect to the MP, follow these steps:

1. On the SMS, open the following command prompt windows:
 - One console window for each partition (MP CO option)
 - One for initializing the RS command from the MP
 - One for monitoring partition status (MP VFP option)

In each window, connect to the MP by entering the following:

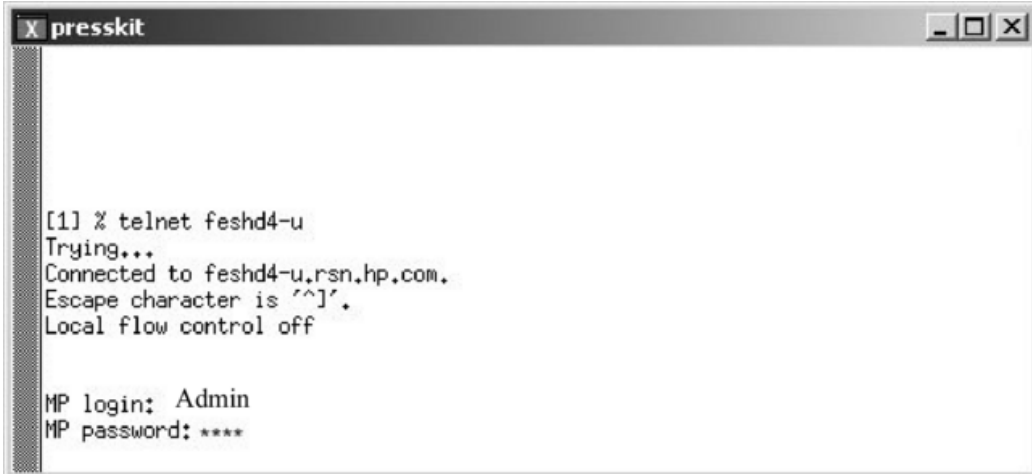
```
telnet <MP hostname>
```

Or

```
telnet <IP address>
```

2. Enter the appropriate login and password at the MP prompts (Figure 3-41).

Figure 3-41 Logging In



```
presskit

[1] % telnet feshd4-u
Trying...
Connected to feshd4-u.rsn.hp.com.
Escape character is '^]'.
Local flow control off

MP login: Admin
MP password: ****
```

The MP Main Menu appears (Figure 3-42).

Figure 3-42 Main MP Menu



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

(c)Copyright 2000 Hewlett-Packard Co., All Rights Reserved.

                Welcome to
                Superdome's Management Processor

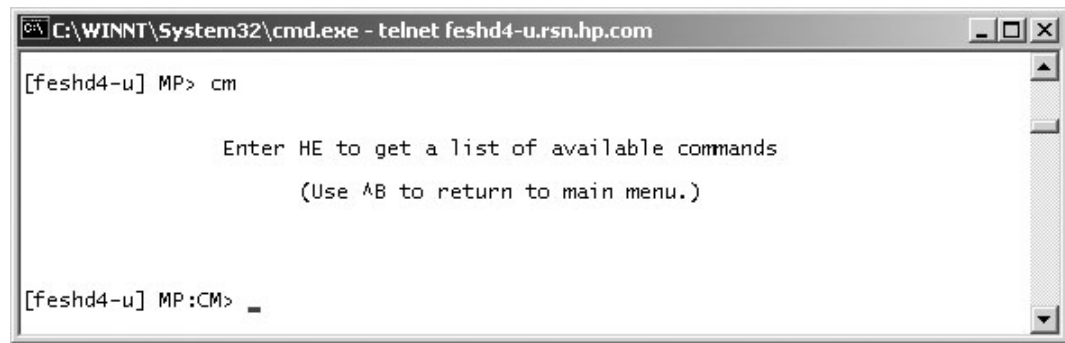
Utility Subsystem FW Revision Level: 14.6

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

[feshd4-u] MP>
```

3. Repeat steps 1 and 2 for each partition.
4. In one window bring up the command prompt by entering **cm** at the MP> prompt (Figure 3-43).

Figure 3-43 MP Command Option



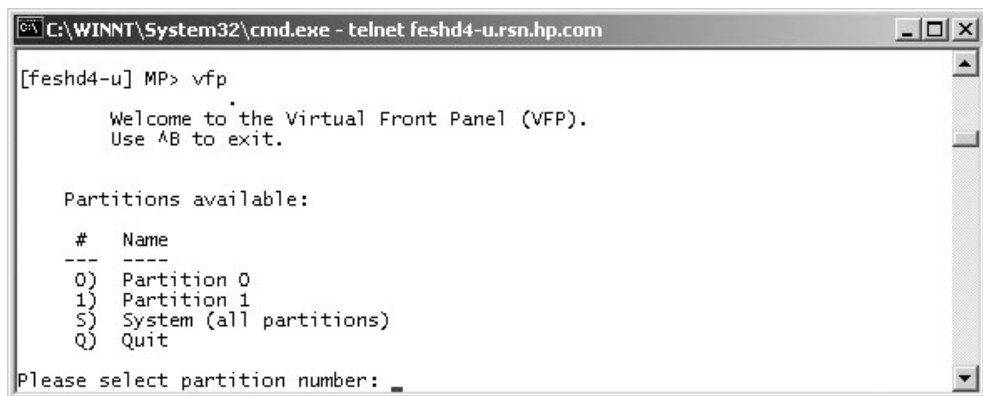
```
C:\WINNT\System32\cmd.exe - telnet feshd4-ursn.hp.com
[feshd4-u] MP> cm

Enter HE to get a list of available commands
(Use ^B to return to main menu.)

[feshd4-u] MP:CM> _
```

5. In the another window, open the Virtual Front Panel (VFP) by entering **vfp** at the MP prompt (Figure 3-44). Use this window to observe partition status.

Figure 3-44 MP Virtual Front Panel



```
C:\WINNT\System32\cmd.exe - telnet feshd4-ursn.hp.com
[feshd4-u] MP> vfp

Welcome to the Virtual Front Panel (VFP).
Use ^B to exit.


Partitions available:

#  Name
---  ---
0)  Partition 0
1)  Partition 1
S)  System (all partitions)
Q)  Quit

Please select partition number: _
```

6. From the VFP menu, enter **s** to select the whole system, or enter the partition number to select a particular partition. An output similar to Figure 3-45 appears. In this example, no status is listed because the system 48 V has not been switched on.

Figure 3-45 Example of Partition State—Cabinet Not Powered Up



```
C:\WINNT\System32\cmd.exe - telnet feshd4-ursn.hp.com
#  Partition state      Activity
-  -
0
1

0 Logs
0 Logs

E indicates error since last boot
MP:VFP (Use '?' to display help or ^B to Quit) > _
```


7. For each of the remaining windows, open the partition console for each partition by enter `co` at the `MP>` prompt (Figure 3-46). These windows open blank.



NOTE: If information appears in the windows, it means nothing because the cabinet is powered off.

Figure 3-46 MP Console Option

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP> co
Partitions available:
# Name
--- ---
0) Partition 0
1) Partition 1
Q) Quit
Please select partition number: _
```

Powering On the System 48 V Power Supply

To power on the system 48 V power supply, follow these steps:

1. Switch on the 48 V supply from each cabinet front panel.



IMPORTANT: If the complex has an IOX cabinet, power on this cabinet first.

In a large complex, power on cabinets in one of the two following orders: 9, 8, 1, 0 or 8, 9, 0, 1.



IMPORTANT: The MP must be running in each window.

As the cabinet boots, observe the partition activity in the window displaying the VFP.

2. For HP Integrity Superdome/sx2000 systems, follow the procedure in “Booting the HP Integrity Superdome/sx2000 to an EFI Shell”.
3. For HP 9000/sx2000 systems, follow the procedure in “Booting an HP 9000 sx2000 Server to BCH”.

Booting the HP Integrity Superdome/sx2000 to an EFI Shell

After powering on or using the `CM bo` command, all partition console windows show activity while the firmware initializes and stops momentarily at an EFI Boot Manager menu (Figure 3-47).

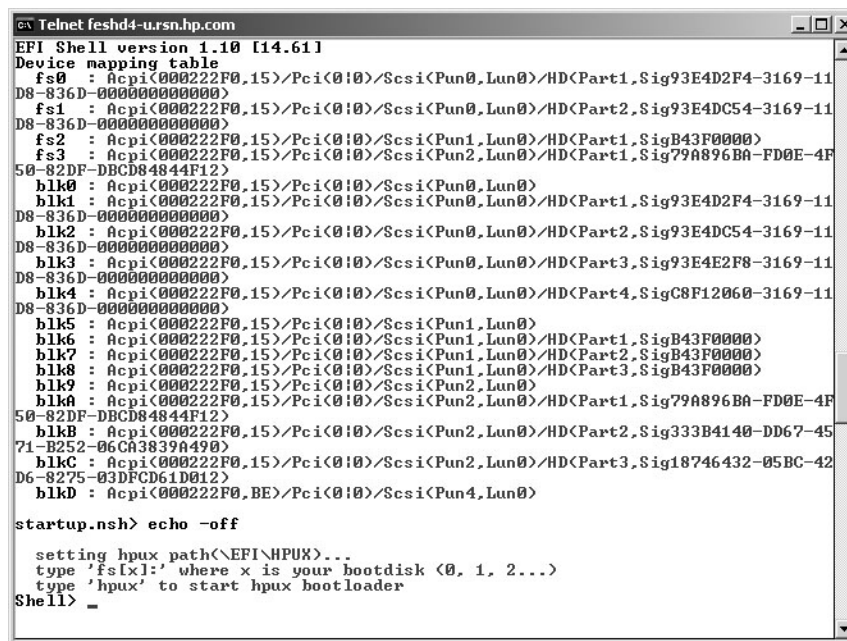
Figure 3-47 HP Integrity Superdome/sx2000 EFI Boot Manager



Use the up and down arrow keys on the keyboard to highlight `EFI Shell (Built-in)` and press **Enter**. Do this for all partitions.

After you start the EFI Shell, the console window displays the EFI shell prompt (Figure 3-48).

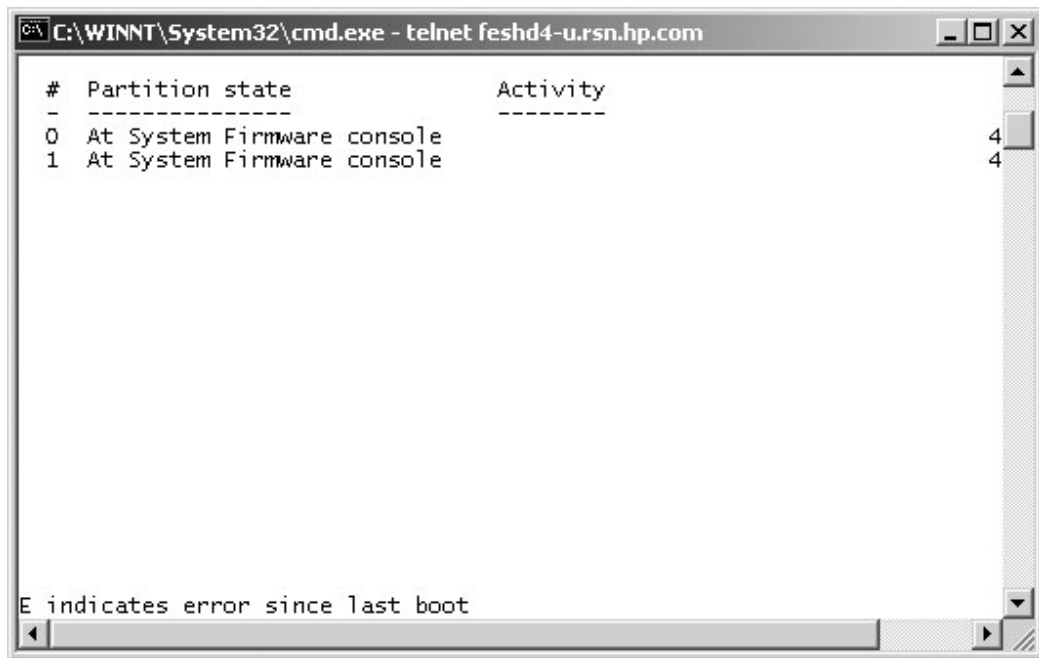
Figure 3-48 EFI Shell Prompt



NOTE: If autoboot is enabled for an nPartition, you must interrupt it to stop the boot process at the EFI firmware console.

The VFP indicates that each partition is at system firmware console (Figure 3-49).

Figure 3-49 HP Integrity Superdome/sx2000 Partitions at System Firmware Console



Booting an HP 9000 sx2000 Server to BCH

After you power on the server or use the MP BO command to boot an nPartition past boot-is-blocked (BIB), the nPartition console shows activity while the firmware initializes and stops at the BCH Main Menu (the Main Menu: Enter command or menu> prompt).

To redisplay the current menu and its available commands, enter the BCH DI command.

Main Menu: Enter command or menu > **di**

```

---- Main Menu -----
Command      Description
-----
BBoot [PRI|HAA|ALT|<path>]      Boot from specified path
Path [PRI|HAA|ALT] [<path>]      Display or modify a path
SEArch [ALL|<cell>|<path>]      Search for boot devices
ScRoll [ON|OFF]                Display or change scrolling capability

Configuration menu              Displays or sets boot values
INformation menu                Displays hardware information
SErvice menu                    Displays service commands

DIsplay                        Redisplay the current menu
HElp [<menu>|<command>]        Display help for menu or command
REBOOT                          Restart Partition
RECONFIGRESET                   Reset to allow Reconfig Complex Profile
----
Main Menu: Enter command or menu >
  
```

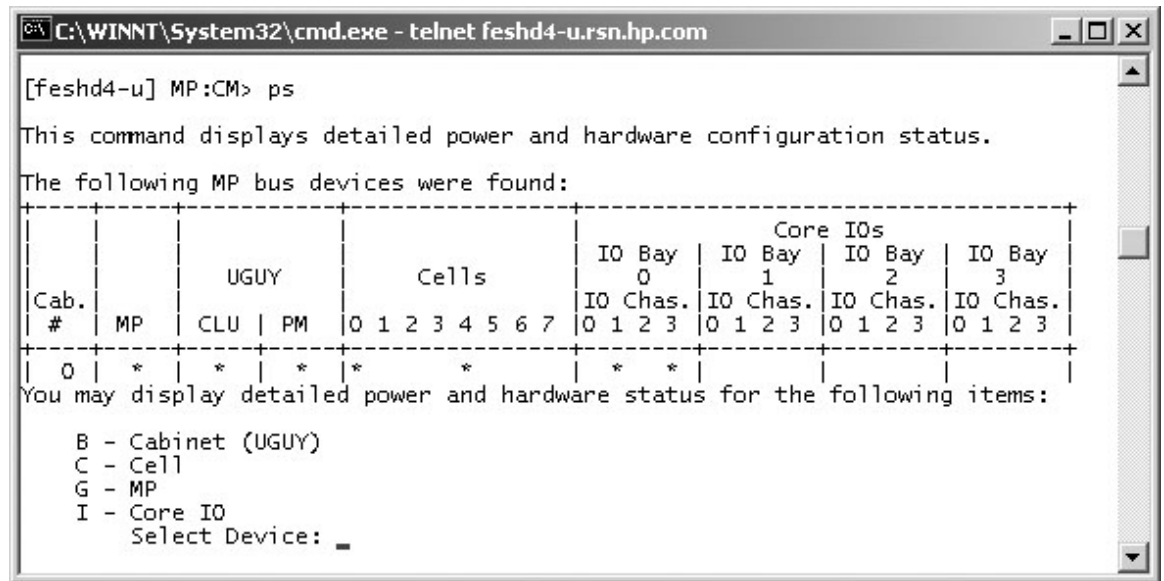
For information about any of the available BCH commands, enter the HE command.

Verifying the System

To verify the system, follow these steps:

1. To observe the power status, enter **ps** at the **CM>** prompt. A status screen similar to the one in Figure 3-50 appears.

Figure 3-50 Power Status First Window



2. At the **Select Device:** prompt, enter **b** then the cabinet number to check the power status of the cabinet. Observe **Power Switch:** on and **Power:** enabled (Figure 3-51).

Figure 3-51 Power Status Window

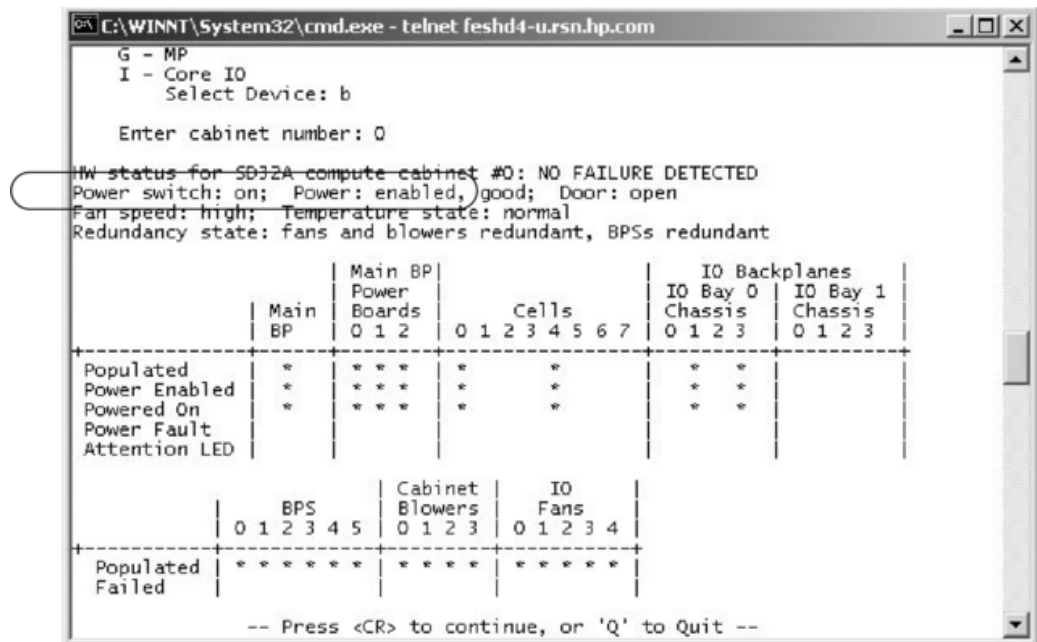


Figure 3-51 shows that cells are installed in slots 0 and 4. In the cabinet, verify that cells are physically located in slots 0 and 4.

3. Press **<CR>** one more time to observe the power status (Figure 3-52).

Figure 3-52 Power Status Showing State of UGUY LEDs

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
Populated      *      * * * *      *      *      * * *
Power Enabled  *      * * * *      *      *      * * *
Powered On     *      * * * *      *      *      * * *
Power Fault
Attention LED

          BPS      Cabinet      IO
          0 1 2 3 4 5      Blowers      Fans
          0 1 2 3      0 1 2 3      0 1 2 3 4
-----
Populated      * * * * * * * * * * * * * * * * * *
Failed

-- Press <CR> to continue, or 'Q' to Quit --

Voltage margin: nominal; Clock margin: nominal

UGUY LEDs:      CLU Status      PM Status      CLU POST
                *** _ _ _ _      *** _ _ _ _

Flex connections | Connected | Parity | Connected | Location
                  | error     | to cabinet | (Upper/Lower)
-----
XBC [7-0]       | NYNYNYNY | NNNNNNNN | 00000000 | N/A
RC [7-0]        | NNNNNNNN | NNNNNNNN | 00000000 | LLLLLLLL

PM firmware rev 14.4, time stamp: FRI APR 25 14:33:38 2003
CLU firmware rev 14.2, time stamp: WED APR 16 16:36:42 2003

[feshd4-u] MP:CM> _

```

4. Verify that there is an asterisk (*) in the columns marked MP, CLU, and PM.



IMPORTANT: An asterisk (*) appears in the MP column only for cabinet 0; that is, the cabinet containing the MP.

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 located inside the cabinet.

Running JET Software

To ensure that the network diagnostic is enabled at the MP prompt, enter the `nd` command; `MP:CM>nd`. You must run `nd` to run scan and to do firmware updates to the system.

The JTAG Utility for Scan Tests (JUST) Exploration Tool (JET) collects system information for each system on a network and places it in files for use by other scan tools. JET gathers configuration data by executing a series of queries targeted at the MP and the CLU portion of the UGUY board.



IMPORTANT: You must resolve any problems you find as a result of running JET before booting the operating system.

Running JUST

To run JUST to ensure that the hardware is working properly, follow these steps:

1. Enter `jet_setup` at the Windows® SMS command window or enter `scan_setup` at the HP-UX SMS command window.
2. Enter the `complex_name`, IP address, and system type.
3. Enter `jet -s <complex_name>`.
4. Enter `just -s <complex_name>`.

See the JET User Guide, JUST Users Guide, and other related documentation for testing located in:

- `\opt\scansw\docs\stt` directory on the Windows® Support Management Station
- `/opt/scansw/docs/stt` directory on the HP-UX Support Management Station



IMPORTANT: After scan testing successfully completes, reset the complex by cycling the AC power.

Power Cycling After Using JET

After using JET, you must recycle the system power because the offline diagnostic can deallocate the CPUs.

To remove the 48 V power, run the `MP pe` command. Then cycle the ac breakers on the rear of the cabinets. For details on power cycling the system, see [Appendix C \(page 173\)](#). Leave power off for about 30 seconds to allow the backplane CSRs to reset.



IMPORTANT: If the complex has any IOX cabinets with IDs 8 or 9, you must power cycle these cabinets in the proper sequence.

Offline Diagnostic Environment

Now that scan has been run, you can run all the appropriate diagnostics for this system. See the offline diagnostic environment (ODE) documentation for instructions.

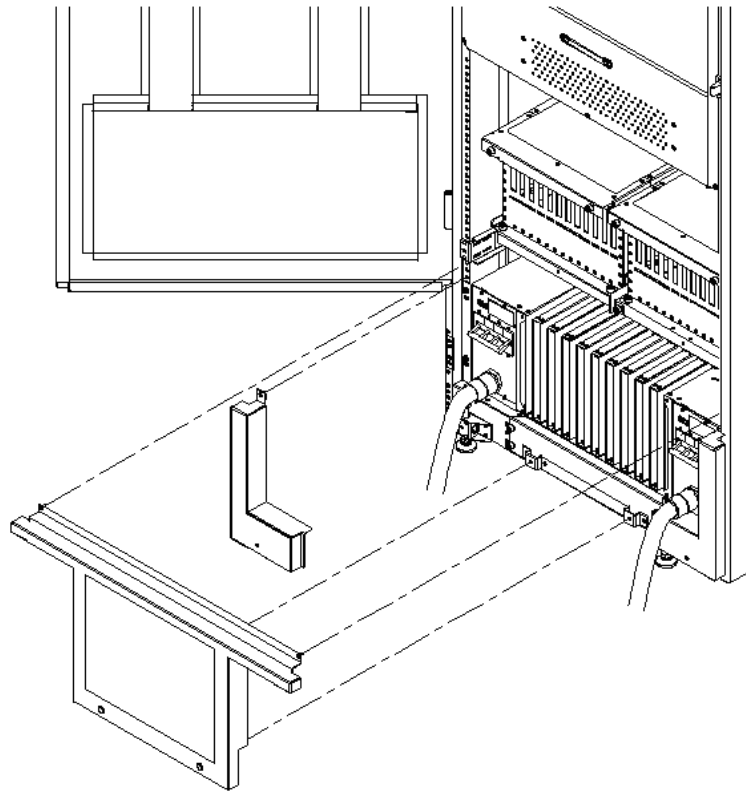
Attaching the Rear Kick Plates

Kick plates protect cables from accidentally being disconnected or damaged and add an attractive cosmetic touch to the cabinet. You must attach three metal kick plates to the bottom rear of the cabinet.

To install the kick plates, follow these steps:

1. Hold the left kick plate in position and attach a clip nut (0590-2318) on the cabinet column next to the hole in the flange at the top of the kick plate ([Figure 3-53](#)).
2. Using a screw (0515-0671) and a T-25 driver, attach the flange on the kick plate to the nut clip.
3. Using a T-10 driver and a screw, attach the bottom of the kick plate to the center hole in the leveling foot.

Figure 3-53 Attaching Rear Kick Plates



4. Perform steps 1–3 on the right kick plate.
5. Position the upper flange of the center kick plate under the I/O trays complementary mounting bracket, to retain the center kick plate top flanges. No top screws are needed on the center kick plate. Orient this asymmetrical bracket with the hole located nearest the edge in the up position.
6. Using a T-20 driver, tighten the thumbscrews at the bottom of the center kick plate.

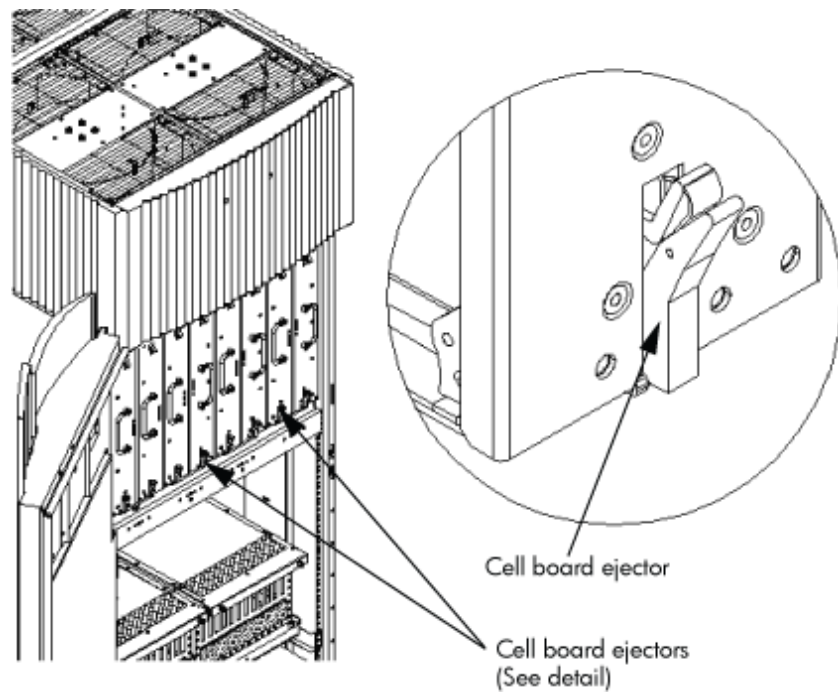
Performing a Visual Inspection and Completing the Installation

After booting the system, carefully inspect it and reinstall the EMI panels. To perform a final inspection and complete the installation, follow these steps:

1. Visually inspect the system to verify that all components are in place and secure.
2. Check that the cables are secured and routed properly.
3. Check that the cell board ejectors are secure (Figure 3-54).

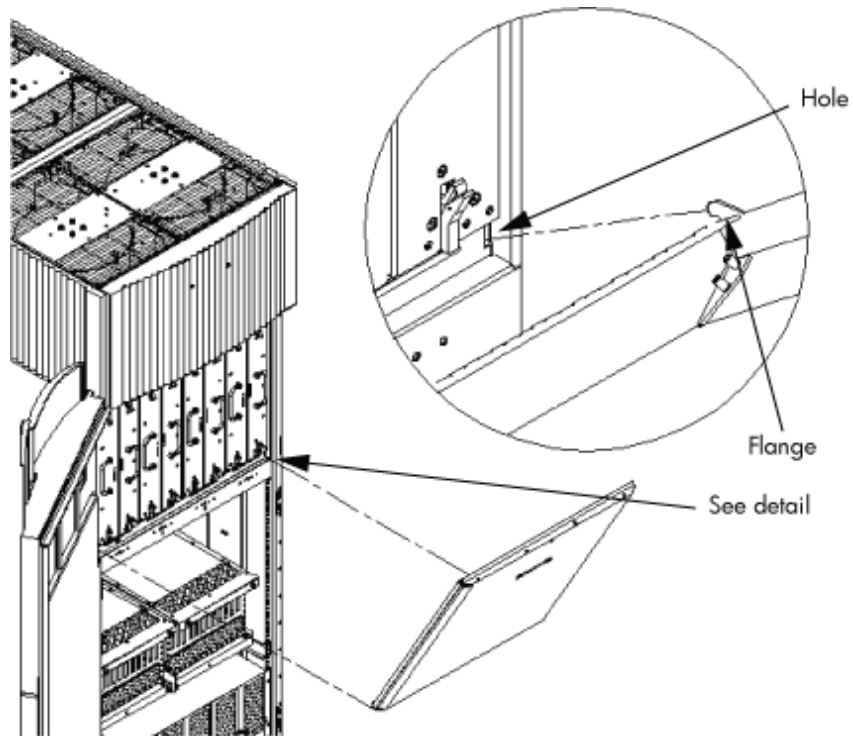
If the ejectors are broken or open, the cell board is disconnected.

Figure 3-54 Cell Board Ejectors



4. Reinstall the front EMI panel (Figure 3-55).

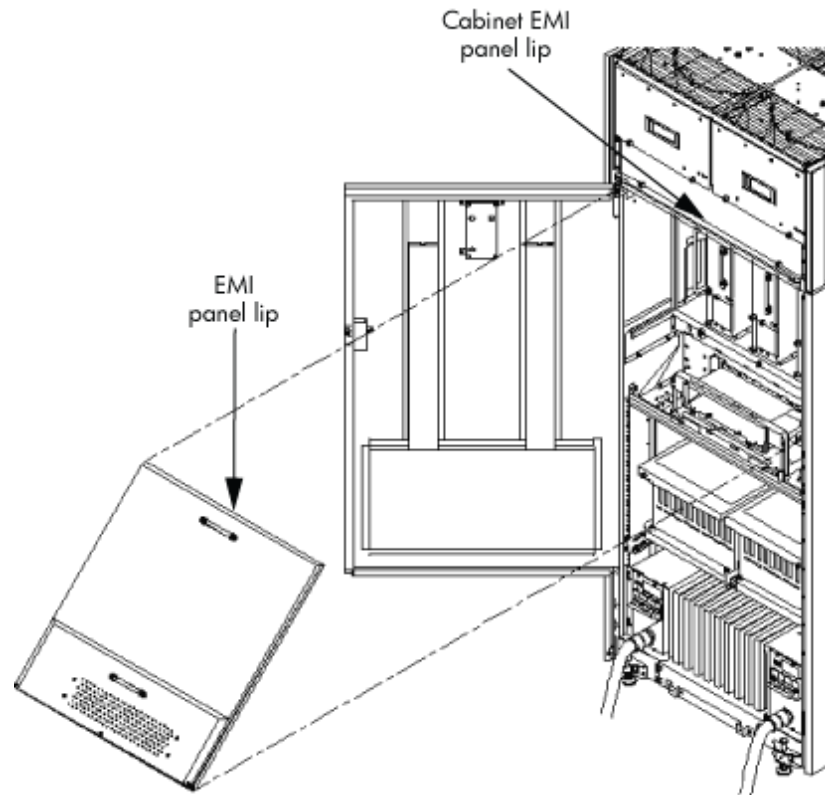
Figure 3-55 Front EMI Panel Flange and Cabinet Holes



- a. Hook the flange at the lower corners of the EMI panel into the holes on the cabinet.
 - b. Position the panel at the top lip, and lift the panel up while pushing the bottom into position.
If needed, compress the EMI gasket to seat the panel properly.
 - c. Reattach the screw at the top of the EMI panel.
5. Check that the cables inside the rear enclosure are secure.

6. Reinstall the back EMI panel (Figure 3-56 (page 112)).
 - a. Align the lip inside the cabinet with the lip on the EMI panel.

Figure 3-56 Reinstalling the Back EMI Panel



- b. Push the EMI panel up and in. If needed, compress the EMI gasket at the top of the enclosure to get the panel to seat properly.
 - c. Reattach the screw at the bottom of the EMI panel.

Conducting a Post-Installation Check

After the system is installed in a computer room and verified, conduct the post-installation check. Before turning the system over to the customer, inspect the system visually and clean up the installation area. Perform the following:

- **Inspect circuit boards.** Verify that all circuit boards are installed and properly seated and that the circuit board retainers are reinstalled.
- **Inspect cabling.** Ensure that all cables are installed, secured, and properly routed.
- **Inspect test points.** Verify that test leads are removed from the test points and that the test points are properly covered.
- **Clean up and dispose of debris.** Remove all debris from the area and dispose of it properly.
- **Perform final check.** Inspect the area to ensure that all parts, tools, and other items used to install the system are disposed of properly. Then close and lock the doors.
- **Enter information in the Gold Book.** When the installation and cleanup are complete, make the appropriate notations in the Gold Book shipped with the system.
- **Obtain customer acceptance (if required).** Be sure to thank the customer for choosing HP.

4 Booting and Shutting Down the Operating System

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

Operating Systems Supported on Cell-based HP Servers

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

- HP 9000 servers have PA-RISC processors and include the following cell-based models based on the HP sx2000 chipset:
 - HP 9000 Superdome (SD16B, SD32B, and SD64B models)
 - HP rp8440
 - HP rp7440

These HP 9000 servers run HP-UX 11i Version 1 (B.11.11). Refer to “Booting and Shutting Down HP-UX” (page 118) for details on booting an OS on these servers.

- HP Integrity servers have Intel® Itanium® processors and include the following cell-based models based on the HP sx2000 chipset:
 - HP Integrity Superdome (SD16B, SD32B, and SD64B models)
 - HP rx8640
 - HP rx7640

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

- HP-UX 11i Version 2 (B.11.23) — Refer to “Booting and Shutting Down HP-UX” (page 118) for details.
- Microsoft® Windows® Server 2003 — Refer to “Booting and Shutting Down Microsoft Windows” (page 133) for details.

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

- HP OpenVMS I64 8.3 or later — Supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of OpenVMS I64 are not supported on servers based on the HP sx2000 chipset.
Refer to “Booting and Shutting Down HP OpenVMS I64” (page 128) for details.
- Red Hat Enterprise Linux 4 Update 4— On servers based on the HP sx2000 chipset, is supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of Red Hat Enterprise Linux are not supported on servers based on the HP sx2000 chipset.
Refer to “Booting and Shutting Down Linux” (page 138) for details.
- Red Hat Enterprise Linux 5— On servers based on the HP sx2000 chipset, is supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of Red Hat Enterprise Linux are not supported on servers based on the HP sx2000 chipset.
Refer to “Booting and Shutting Down Linux” (page 138) for details.
- SuSE Linux Enterprise Server 10 — On servers based on the HP sx2000 chipset, is supported only in nPartitions that have dual-core Intel® Itanium® processors. Prior releases of SuSE Linux Enterprise Server are not supported on servers based on the HP sx2000 chipset.



NOTE: SuSE Linux Enterprise Server 10 is supported on HP rx7640 and rx8640 servers, and will be supported on other cell-based HP Integrity servers with the Intel® Itanium® dual-core processor (Superdome) with SuSE Linux Enterprise Server 10 Service Pack 1.

Refer to “Booting and Shutting Down Linux” (page 138) for details.



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

System Boot Configuration Options

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

HP 9000 Boot Configuration Options

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

HP Integrity Boot Configuration Options

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

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

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

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

```
HP OpenVMS 8.3
EFI Shell [Built-in]
Windows Server 2003, Enterprise
HP-UX Primary Boot: 4/0/1/1/0.2.0
Boot Option Maintenance Menu
```

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



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

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

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

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

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

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

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

For details, refer to the following sections.

- To set HP-UX boot options refer to “Adding HP-UX to the Boot Options List” (page 118).
 - To set OpenVMS boot options refer to “Adding HP OpenVMS to the Boot Options List” (page 129).
 - To set Windows boot options refer to “Adding Microsoft Windows to the Boot Options List” (page 134).
 - To set Linux boot options refer to “Adding Linux to the Boot Options List” (page 139).
- **Hyper-Threading** nPartitions that have dual-core Intel® Itanium® processors can support Hyper-Threading. Hyper-Threading provides the ability for processors to create a second virtual core that allows additional efficiencies of processing. For example, a dual-core processor with Hyper-Threading active can simultaneously run four threads.

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

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

- `cpuconfig threads` – Reports Hyper-Threading status for the nPartition
- `cpuconfig threads on` – Enables Hyper-Threading for the nPartition. After enabling Hyper-Threading the nPartition must be reset for Hyper-Threading to be active.
- `cpuconfig threads off` – Disables Hyper-Threading for the nPartition. After disabling Hyper-Threading the nPartition must be reset for Hyper-Threading to be inactive

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

Enabled means that Hyper-Threading will be active on the next reboot of the nPartition.

Active means that each processor core in the nPartition has a second virtual core that enables simultaneously running multiple threads.

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

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

- **ACPI Configuration Value—HP Integrity Server OS Boot** On cell-based HP Integrity servers you must set the proper ACPI configuration for the OS that will be booted on the nPartition. To check the ACPI configuration value, issue the `acpicfg` command with no arguments at the EFI Shell.

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

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

- **HP-UX ACPI Configuration: default** On cell-based HP Integrity servers, to boot or install the HP-UX OS, you must set the ACPI configuration value for the nPartition to `default`. For details, refer to “ACPI Configuration for HP-UX Must Be default” (page 120).
- **HP OpenVMS I64 ACPI Configuration: default** On cell-based HP Integrity servers, to boot or install the HP OpenVMS I64 OS, you must set the ACPI configuration value for the nPartition to `default`. For details, refer to “ACPI Configuration for HP OpenVMS I64 Must Be default” (page 131).
- **Windows ACPI Configuration: windows** On cell-based HP Integrity servers, to boot or install the Windows OS, you must set the ACPI configuration value for the nPartition to `windows`. For details, refer to “ACPI Configuration for Windows Must Be windows” (page 136).

- **Red Hat Enterprise Linux ACPI Configuration: default** On cell-based HP Integrity servers, to boot or install the Red Hat Enterprise Linux OS, you must set the ACPI configuration value for the nPartition to `default`.
For details, refer to “ACPI Configuration for Red Hat Enterprise Linux Must Be default” (page 140).
- **SuSE Linux Enterprise Server ACPI Configuration: default** On cell-based HP Integrity servers, to boot or install the SuSE Linux Enterprise Server OS, you must set the ACPI configuration value for the nPartition to `default`.
For details, refer to “ACPI Configuration for SuSE Linux Enterprise Server Must Be default” (page 141).
- **Boot Modes on HP Integrity nPartitions: nPars and vPars Modes** On cell-based HP Integrity servers, each nPartition can be configured in either of two boot modes:
 - **nPars Boot Mode**
In nPars boot mode, an nPartition is configured to boot any single operating system in the standard environment. When an nPartition is in nPars boot mode, it cannot boot the vPars monitor and therefore does not support HP-UX virtual partitions.
 - **vPars Boot Mode**
In vPars boot mode, an nPartition is configured to boot into the vPars environment. When an nPartition is in vPars boot mode, it can only boot the vPars monitor and therefore it only supports HP-UX virtual partitions and it does not support booting HP OpenVMS I64, Microsoft Windows, or other operating systems. On an nPartition in vPars boot mode, HP-UX can boot only within a virtual partition (from the vPars monitor) and cannot boot as a standalone, single operating system in the nPartition.



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

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

- `parconfig` EFI shell command
The `parconfig` command is a built-in EFI shell command. Refer to the `help parconfig` command for details.
- `\EFI\HPUX\vparconfig` EFI shell command
The `vparconfig` command is delivered in the `\EFI\HPUX` directory on the EFI system partition of the disk where HP-UX virtual partitions has been installed on a cell-based HP Integrity server. For usage details, enter the `vparconfig` command with no options.
- `vparsenv` HP-UX command
On cell-based HP Integrity servers only, the `vparsenv` HP-UX command is installed on HP-UX 11iv2 (B.11.23) systems that have the HP-UX virtual partitions software. Refer to `vparsenv(1m)` for details.



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

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

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

Booting and Shutting Down HP-UX

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

- To determine whether the cell local memory (CLM) configuration is appropriate for HP-UX, refer to “HP-UX Support for Cell Local Memory” (page 118).
- To add an HP-UX entry to the nPartition boot options list on an HP Integrity server, refer to “Adding HP-UX to the Boot Options List” (page 118).
- To boot HP-UX, refer to “Booting HP-UX” (page 119).
- To shut down HP-UX, refer to “Shutting Down HP-UX” (page 127).

HP-UX Support for Cell Local Memory

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



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

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -v -c#` command and `parstatus -v -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where `#` is the cell number) or the specified nPartition (`-p#`, where `#` is the nPartition number). For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

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

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

Adding HP-UX to the Boot Options List

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

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

See “Boot Options List” (page 114) for additional information about saving, restoring, and creating boot options.



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

Procedure 4-1 Adding an HP-UX Boot Option

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

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

1. Access the EFI Shell environment.

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

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

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

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

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

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

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

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

- `bcfg boot dump` — Display all items in the boot options list for the system.
- `bcfg boot rm #` — Remove the item number specified by *#* from the boot options list.
- `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add # file.efi "Description"` — Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

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

Refer to the `help bcfg` command for details.

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

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

Booting HP-UX

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

- “Standard HP-UX Booting” (page 120) — The standard ways to boot HP-UX. Typically, this results in booting HP-UX in multiuser mode.
- “Single-User Mode HP-UX Booting” (page 123) — How to boot HP-UX in single-user mode.
- “LVM-Maintenance Mode HP-UX Booting” (page 126) — How to boot HP-UX in LVM-maintenance mode.

Refer to “Shutting Down HP-UX” (page 127) for details on shutting down the HP-UX OS.



CAUTION:

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

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

To set the ACPI configuration for HP-UX:

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

Standard HP-UX Booting

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

- On HP 9000 servers, to boot HP-UX refer to “HP-UX Booting (BCH Menu)” (page 120).
- On HP Integrity servers, to boot HP-UX use either of the following procedures:
 - “HP-UX Booting (EFI Boot Manager)” (page 121)
 - “HP-UX Booting (EFI Shell)” (page 122)

Procedure 4-2 HP-UX Booting (BCH Menu)

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

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

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

2. Choose which device to boot.

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

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

```
Primary Boot Path:  0/0/2/0/0.13  
                   0/0/2/0/0.d      (hex)
```

```
HA Alternate Boot Path: 0/0/2/0/0.14  
                       0/0/2/0/0.e  (hex)
```

```
Alternate Boot Path:  0/0/2/0/0.0  
                    0/0/2/0/0.0    (hex)
```

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

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

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

- **BOOT**
Issuing the `BOOT` command with no arguments boots the device at the primary (PRI) boot path.
- **BOOT *bootvariable***
This command boots the device indicated by the specified boot path, where *bootvariable* is the PRI, HAA, or ALT boot path.
For example, `BOOT PRI` boots the primary boot path.
- **BOOT LAN INSTALL** or **BOOT LAN.*ip-address* INSTALL**
The `BOOT . . . INSTALL` commands boot HP-UX from the default HP-UX install server or from the server specified by *ip-address*.
- **BOOT *path***
This command boots the device at the specified *path*. You can specify the *path* in HP-UX hardware path notation (for example, `0/0/2/0/0.13`) or in path label format (for example, `P0` or `P1`).
If you specify the *path* in path label format, then *path* refers to a device path reported by the last `SEARCH` command.

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

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

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

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

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

```
ISL booting hpx
```

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

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

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

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

Procedure 4-3 HP-UX Booting (EFI Boot Manager)

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

Refer to “ACPI Configuration for HP-UX Must Be default” (page 120) for required configuration details.

1. Access the EFI Boot Manager menu for the nPartition on which you want to boot HP-UX. Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.
When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.
2. At the EFI Boot Manager menu, select an item from the boot options list.
Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.
3. Press **Enter** to initiate booting using the chosen boot option.
4. Exit the console and management processor interfaces if you are finished using them.
To exit the EFI environment, press **^B (Control+B)**; this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Procedure 4-4 HP-UX Booting (EFI Shell)

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

Refer to “ACPI Configuration for HP-UX Must Be default” (page 120) for required configuration details.

1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX. Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.
When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.
From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.
2. At the EFI Shell environment, issue the `acpicfg` command to list the current ACPI configuration for the local nPartition.
On cell-based HP Integrity servers, to boot the HP-UX OS, an nPartition ACPI configuration value must be set to `default`. If the `acpicfg` value is not set to `default`, then HP-UX cannot boot; in this situation you must reconfigure `acpicfg` or booting will be interrupted with a panic when launching the HP-UX kernel.
To set the ACPI configuration for HP-UX:
 - a. At the EFI Shell interface enter the `acpicfg default` command.
 - b. Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for HP-UX.
3. At the EFI Shell environment, issue the `map` command to list all currently mapped bootable devices.
The bootable file systems of interest typically are listed as `fs0:`, `fs1:`, and so on.
4. Access the EFI System Partition for the device from which you want to boot HP-UX (`fsX:` where `X` is the file system number).
For example, enter `fs2:` to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

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

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

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

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

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

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

```
Shell> fs0:
```

```
fs0:\> hpux
```

```
(c) Copyright 1990-2002, Hewlett Packard Company.
All rights reserved
```

```
HP-UX Boot Loader for IA64 Revision 1.723
```

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

6. Exit the console and management processor interfaces if you are finished using them. To exit the EFI environment, press **^B (Control+B)**; this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter X at the Main Menu.

Single-User Mode HP-UX Booting

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

- On HP 9000 servers, to boot HP-UX in single-user mode, refer to “Single-User Mode HP-UX Booting (BCH Menu)” (page 123).
- On HP Integrity servers, to boot HP-UX in single-user mode, refer to “Single-User Mode HP-UX Booting (EFI Shell)” (page 125).

Procedure 4-5 Single-User Mode HP-UX Booting (BCH Menu)

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

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

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

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

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

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

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

```
Initializing boot Device.
```

```
....
```

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

```
ISL>
```

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

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

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

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

Example 4-1 (page 124) shows output from this command.

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

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

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

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

Example 4-1 Single-User HP-UX Boot

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

```
ISL> hpux -is /stand/vmunix
```

```
Boot
```

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

```
....
```

```
INIT: Overriding default level with level 's'
```

```
INIT: SINGLE USER MODE
```

```
INIT: Running /sbin/sh
```

```
#
```

- Exit the console and management processor interfaces if you are finished using them.
To exit the BCH environment, press **^B (Control+B)**; this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter **x** at the Main Menu.

Procedure 4-6 Single-User Mode HP-UX Booting (EFI Shell)

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

Refer to "ACPI Configuration for HP-UX Must Be default" (page 120) for required configuration details.

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

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

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

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

- Access the EFI System Partition for the device from which you want to boot HP-UX (`fsX:` where *X* is the file system number).
- When accessing the EFI System Partition for the desired boot device, issue the `HP-UX` command to initiate the `\EFI\HP-UX\HP-UX .EFI` loader on the device you are accessing.
- Boot to the HP-UX Boot Loader prompt (`HP-UX>`) by pressing any key within the 10 seconds given for interrupting the HP-UX boot process. You will use the `HP-UX .EFI` loader to boot HP-UX in single-user mode in the next step.

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

```
fs0:\> hpx
```

```
(c) Copyright 1990-2002, Hewlett Packard Company.
All rights reserved
```

```
HP-UX Boot Loader for IA64 Revision 1.723
```

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

[User Types a Key to Stop the HP-UX Boot Process and Access the HP-UX.EFI Loader]

```
Type 'help' for help
```

```
HP-UX>
```

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

```
HP-UX> boot -is vmunix
> System Memory = 4063 MB
loading section 0
..... (complete)
loading section 1
..... (complete)
loading symbol table
loading System Directory(boot.sys) to MFS
....
```

```

loading MFSFILES Directory(bootfs) to MFS
.....
Launching /stand/vmunix
SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

Console is on a Serial Device
Booting kernel...

```

6. Exit the console and management processor interfaces if you are finished using them. To exit the EFI environment, press **^B (Control+B)**; this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter **x** at the Main Menu.

LVM-Maintenance Mode HP-UX Booting

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

- On HP 9000 servers, to boot HP-UX in LVM-maintenance mode, refer to “LVM-Maintenance Mode HP-UX Booting (BCH Menu)” (page 126).
- On HP Integrity servers, to boot HP-UX in LVM-maintenance mode, refer to “LVM-Maintenance Mode HP-UX Booting (EFI Shell)” (page 126).

Procedure 4-7 LVM-Maintenance Mode HP-UX Booting (BCH Menu)

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

1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.
Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the `Main Menu: Enter command or menu>` prompt). If you are at a BCH menu other than the Main Menu, then enter `MA` to return to the BCH Main Menu.
2. Boot the desired device by using the `BOOT` command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply `y` to the “stop at the ISL prompt” question).
3. From the ISL prompt, issue the appropriate Secondary System Loader (`hpux`) command to boot the HP-UX kernel in the desired mode.
To boot HP-UX in LVM-maintenance mode:

```
ISL> hpux -lm boot /stand/vmunix
```
4. Exit the console and management processor interfaces if you are finished using them.
To exit the BCH environment, press **^B (Control+B)**; this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter **x** at the Main Menu.

Procedure 4-8 LVM-Maintenance Mode HP-UX Booting (EFI Shell)

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

Refer to “ACPI Configuration for HP-UX Must Be default” (page 120) for required configuration details.

1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.
 Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.
 When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.
 From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.
2. Access the EFI System Partition for the device from which you want to boot HP-UX (`fsX:` where `X` is the file system number).
3. When accessing the EFI System Partition for the desired boot device, issue the `HPUX` command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the device you are accessing.
4. Type any key within the 10 seconds given for interrupting the HP-UX boot process. This stops the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`).
5. At the `HPUX.EFI` interface, enter the `boot -lm vmunix` command to boot HP-UX (the `/stand/vmunix` kernel) in LVM-maintenance (`-lm`) mode.
6. Exit the console and management processor interfaces if you are finished using them.
 To exit the EFI environment, press **^B (Control+B)**; this exits the nPartition console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Shutting Down HP-UX

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

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

- To shut down HP-UX and reboot an nPartition: `shutdown -r`
 On cell-based HP Integrity servers, the `shutdown -r` command is equivalent to the `shutdown -R` command.
- To shut down HP-UX and halt an nPartition: `shutdown -h`
 On cell-based HP Integrity servers, the `shutdown -h` command is equivalent to the `shutdown -R -H` command.
- To perform a reboot for reconfiguration of an nPartition: `shutdown -R`
- To hold an nPartition at a shutdown for reconfiguration state: `shutdown -R -H`

For details, refer to the `shutdown(1M)` manpage.

Procedure 4-9 Shutting Down HP-UX

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

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

2. Issue the `shut down` command with the appropriate command-line options.

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

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

- Shut down HP-UX and halt the nPartition.
On cell-based HP Integrity servers, the `shut down -h` command puts an nPartition into the shutdown for reconfiguration state; for details, refer to the discussion of `shut down -R -H` in this list.
- Shut down HP-UX and reboot the nPartition.
Issue the `shut down -r` command to shut down and reboot the nPartition.
On cell-based HP Integrity servers, the `shut down -r` command is equivalent to the `shut down -R` command.
- Perform a reboot for reconfiguration of the nPartition.
Issue the HP-UX `shut down -R` command to perform a reboot for reconfiguration. This shuts down HP-UX, reconfigures the nPartition if needed, and reboots the nPartition.
- Reboot the nPartition and put it into the shutdown for reconfiguration state.
Use the HP-UX `shut down -R -H` command to hold the nPartition in the shutdown for reconfiguration state.



NOTE: On Superdome SX2000 PA, `shut down -R -H` does not stop at BIB if the MP has been hot swapped since the last reboot.

NOTE: On HP Integrity servers you should reset an nPartition only after all self tests and partition rendezvous have completed. For example, when the nPartition is inactive (all cells are at BIB) or is at EFT.

This leaves the nPartition and all its cells in an inactive state (the nPartition can be reconfigured remotely).

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

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

Booting and Shutting Down HP OpenVMS I64

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

- To determine whether the cell local memory (CLM) configuration is appropriate for HP OpenVMS, refer to “HP OpenVMS I64 Support for Cell Local Memory” (page 129).
- To add an HP OpenVMS entry to the boot options list, refer to “Adding HP OpenVMS to the Boot Options List” (page 129).
- To boot HP OpenVMS on a cell-based HP Integrity server, refer to “Booting HP OpenVMS” (page 131).
- To shut down HP OpenVMS, refer to “Shutting Down HP OpenVMS” (page 132).

HP OpenVMS I64 Support for Cell Local Memory

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



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

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -v -c#` command and `parstatus -v -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where `#` is the cell number) or the specified nPartition (`-p#`, where `#` is the nPartition number). For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

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

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

Adding HP OpenVMS to the Boot Options List

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

You can add the `\efi\vms\vms_loader.efi` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu). See “Boot Options List” (page 114) for additional information about saving, restoring, and creating boot options.



NOTE: OpenVMS I64 installation and upgrade procedures assist you in setting up and validating a boot option for your system disk. HP recommends that you allow the procedure to do this.

To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility (`BOOT_OPTIONS.COM`). For more information on this utility and other restrictions, refer to the *HP OpenVMS for Integrity Servers Upgrade and Installation Manual*.

Procedure 4-10 Adding an HP OpenVMS Boot Option

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

To add an HP OpenVMS boot option when logged in to OpenVMS, use the `@SYS$MANAGER:BOOT_OPTIONS.COM` command.

1. Access the EFI Shell environment.

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

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

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

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

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

The full path for the HP OpenVMS loader is `\efi\vms\vms_loader.efi`, and it should be on the device you are accessing.

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

You can also accomplish this step by using the `\efi\vms\vms_bcfg.efi` and `\efi\vms\vms_show.efi` utilities, which are available on the EFI System Partition for HP OpenVMS. Both `vms_bcfg` and `vms_show` are unique utilities for OpenVMS I64. The `vms_bcfg` utility differs from the `bcfg` EFI command in that `vms_bcfg` enables you to specify boot devices using device names consistent with OpenVMS naming conventions.

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

- `bcfg boot dump` — Display all items in the boot options list for the system.
- `bcfg boot rm #` — Remove the item number specified by *#* from the boot options list.
- `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add # file.efi "Description"` — Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

For example, `bcfg boot add 1 \efi\vms\vms_loader.efi "HP OpenVMS"` adds an HP OpenVMS item as the first entry in the boot options list.

Refer to the `help bcfg` command for details.

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

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

Booting HP OpenVMS

To boot HP OpenVMS I64 on a cell-based HP Integrity server use either of the following procedures.

- “Booting HP OpenVMS (EFI Boot Manager)” (page 131)
- “Booting HP OpenVMS (EFI Shell)” (page 131)



CAUTION:

ACPI Configuration for HP OpenVMS I64 Must Be default On cell-based HP Integrity servers, to boot the HP OpenVMS OS, an nPartition ACPI configuration value must be set to default.

At the EFI Shell interface, enter the `acpiconfig` command with no arguments to list the current ACPI configuration. If the `acpiconfig` value is not set to default, then OpenVMS cannot boot. In this situation, you must reconfigure `acpiconfig`; otherwise, booting will fail and report the `INCONSTATE` code when OpenVMS is launched.

To set the ACPI configuration for HP OpenVMS I64:

1. At the EFI Shell interface enter the `acpiconfig default` command.
2. Enter the `reset` command for the nPartition to reboot with the proper (default) configuration for OpenVMS.

Procedure 4-11 Booting HP OpenVMS (EFI Boot Manager)

From the EFI Boot Manager menu, select an item from the boot options list to boot HP OpenVMS using the selected boot option.

1. Access the EFI Boot Manager menu for the system on which you want to boot HP OpenVMS. Log in to the management processor, and enter `CO` to select the system console. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading.
2. At the EFI Boot Manager menu, select an item from the boot options list. Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to use when booting the device.
3. Press **Enter** to initiate booting using the selected boot option.
4. Exit the console and management processor interfaces when you have finished using them. To exit the EFI environment press **^B (Control+B)**; this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Procedure 4-12 Booting HP OpenVMS (EFI Shell)

From the EFI Shell environment, to boot HP OpenVMS on a device first access the EFI System Partition for the root device (for example `fs0:`), and enter `\efi\vms\vms_loader` to initiate the OpenVMS loader.

1. Access the EFI Shell environment for the system on which you want to boot HP OpenVMS. Log in to the management processor, and enter `CO` to select the system console. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the `EFI Boot Manager` heading. From the EFI Boot Manager menu, select the EFI Shell menu option to access the EFI Shell environment.

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

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

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

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

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

4. When accessing the EFI System Partition for the desired boot device, issue the `\efi\vms\vms_loader` command to initiate the `vms_loader.efi` loader on the device you are accessing.

```
fs5:> \efi\vms\vms_loader.efi
```

```
HP OpenVMS Industry Standard 64 Operating System, Version V8.3
Copyright 1976-2005 Hewlett-Packard Development Company, L.P.
```

```
%PKA0, Copyright (c) 1998 LSI Logic PKW V3.2.20 ROM 4.19
%PKA0, SCSI Chip is SYM53C1010/66, Operating mode is LVD Ultra3 SCSI
%SMP-I-CPUTRN, CPU #01 has joined the active set.
%SMP-I-CPUTRN, CPU #02 has joined the active set.
...
```

5. Exit the console and management processor interfaces when you have finished using them. To exit the EFI environment press **^B (Control+B)**; this exits the system console and returns to the management processor Main Menu. To exit the management processor, enter `X` at the Main Menu.

Shutting Down HP OpenVMS

This section describes how to shut down the HP OpenVMS OS on cell-based HP Integrity servers.

Procedure 4-13 Shutting Down HP OpenVMS

From the HP OpenVMS command line, issue the `@SYS$SYSTEM:SHUTDOWN` command to shut down the OpenVMS OS.

1. Log in to HP OpenVMS running on the system that you want to shut down. Log in to the management processor (MP) for the server and use the Console menu to access the system console. Accessing the console through the MP enables you to maintain console access to the system after HP OpenVMS has shut down.

2. At the OpenVMS command line (DCL) issue the @SYS\$SYSTEM: SHUTDOWN command and specify the shutdown options in response to the prompts given.

```
>@SYS$SYSTEM: SHUTDOWN
```

```
SHUTDOWN -- Perform an Orderly System Shutdown
           on node RSNVMS
```

```
How many minutes until final shutdown [0]:
Reason for shutdown [Standalone]:
Do you want to spin down the disk volumes [NO]?
Do you want to invoke the site-specific shutdown procedure [YES]?
Should an automatic system reboot be performed [NO]? yes
When will the system be rebooted [shortly via automatic reboot]:
Shutdown options (enter as a comma-separated list):
  REBOOT_CHECK           Check existence of basic system files
  SAVE_FEEDBACK         Save AUTOGEN feedback information from this boot
  DISABLE_AUTOSTART     Disable autostart queues
  POWER_OFF             Request console to power-off the system

Shutdown options [NONE]:

%SHUTDOWN-I-OPERATOR, this terminal is now an operator's console
...
```



NOTE: HP OpenVMS I64 currently does not support the POWER_OFF shutdown option.

The SYS\$SYSTEM: SHUTDOWN.COM command prompts establish the shutdown behavior, including the shutdown time and whether the system is rebooted after it is shut down.

- To perform a reboot for reconfig from OpenVMS I64 running on an nPartition, issue @SYS\$SYSTEM: SHUTDOWN.COM from OpenVMS, and then enter Yes at the “Should an automatic system reboot be performed” prompt.
- To perform a shutdown for reconfig of an nPartition running OpenVMS I64:
 1. Issue @SYS\$SYSTEM: SHUTDOWN.COM from OpenVMS and enter No at the “Should an automatic system reboot be performed” prompt.
 2. Access the management processor and, from the management processor Command Menu, issue the RR command and specify the nPartition. The nPartition you specify will be put in the shutdown for reconfig state.

Booting and Shutting Down Microsoft Windows

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

- To determine whether the cell local memory (CLM) configuration is appropriate for Windows, refer to “Microsoft Windows Support for Cell Local Memory” (page 133).
- To add a Windows entry to the boot options list, refer to “Adding Microsoft Windows to the Boot Options List” (page 134).
- To boot Windows, refer to “Booting Microsoft Windows” (page 135).
- To shut down Windows, refer to “Shutting Down Microsoft Windows” (page 137).

Microsoft Windows Support for Cell Local Memory

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



IMPORTANT: Microsoft Windows supports using CLM on cell-based HP Integrity servers. For best performance in an nPartition running Windows, HP recommends that you configure the CLM parameter to 100 percent for each cell in the nPartition.

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -V -c#` command and `parstatus -V -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where `#` is the cell number) or the specified nPartition (`-p#`, where `#` is the nPartition number). For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

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

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

Adding Microsoft Windows to the Boot Options List

To add a Microsoft Windows entry to the system boot options list, you must do so from EFI. Use the `\MSUtil\nvrboot.efi` utility to import boot options from the `EFI\Microsoft\WINNT50\Boot00...` file on the device from which Windows is loaded.

See “Boot Options List” (page 114) for additional information about saving, restoring, and creating boot options.



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

Procedure 4-14 Adding a Microsoft Windows Boot Option

This procedure adds the Microsoft Windows item to the boot options list.

1. Access the EFI Shell environment.

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

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

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

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

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

The full path for the Microsoft Windows loader is `\efi\microsoft\winnt50\ia64ldr.efi`, and it should be on the device you are accessing. (However, you must initiate this loader only from the EFI Boot Menu and not from the EFI Shell.)

3. List the contents of the `\EFI\Microsoft\WINNT50` directory to identify the name of the Windows boot option file (`Boot00nn`) that you want to import into the system boot options list.

```

fs0:\> ls EFI\Microsoft\WINNT50
Directory of: fs0:\EFI\Microsoft\WINNT50

    09/18/03  11:58a <DIR>          1,024  .
    09/18/03  11:58a <DIR>          1,024  ..
    12/18/03  08:16a                354   Boot0001
           1 File(s)              354 bytes
           2 Dir(s)

```

```
fs0:\>
```

4. At the EFI Shell environment, issue the `\MSUtil\nvrboot.efi` command to launch the Microsoft Windows boot options utility.

```
fs0:\> msutil\nvrboot
```

```
NVRBOOT: OS Boot Options Maintenance Tool [Version 5.2.3683]
```

- ```

1. SUSE SLES 9
2. HP-UX Primary Boot: 0/0/1/0/0.2.0
* 3. Windows Server 2003, Datacenter
4. EFI Shell [Built-in]

```

```
* = Windows OS boot option
```

```
(D)isplay (M)odify (C)opy E(x)port (I)mport (E)rase (P)ush (H)elp (Q)uit
```

```
Select>
```

5. Use the `Import` command to import the Windows boot options file.

```
Select> i
```

```
Enter IMPORT file path: \EFI\Microsoft\WINNT50\Boot0001
```

```
Imported Boot Options from file: \EFI\Microsoft\WINNT50\Boot0001
```

```
Press enter to continue
```

6. Press **Q** to quit the NVRBOOT utility, and exit the console and management processor interfaces if you are finished using them.

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

## Booting Microsoft Windows

You can boot the Windows Server 2003 OS on an HP Integrity server by using the EFI Boot Manager to choose the appropriate Windows item from the boot options list.

Refer to “Shutting Down Microsoft Windows” (page 137) for details on shutting down the Windows OS.



**CAUTION:**

**ACPI Configuration for Windows Must Be windows** On cell-based HP Integrity servers, to boot the Windows OS, an nPartition ACPI configuration value must be set to windows.

At the EFI Shell, enter the `acpicfg` command with no arguments to list the current ACPI configuration. If the `acpicfg` value is not set to windows, then Windows cannot boot. In this situation, you must reconfigure `acpicfg`; otherwise, booting will be interrupted with a panic when Windows is launched.

To set the ACPI configuration for Windows: At the EFI Shell enter the `acpicfg windows` command, and then enter the `reset` command for the nPartition to reboot with the proper (windows) configuration for Windows.



**NOTE:**

**Microsoft Windows Booting on HP Integrity Servers** The recommended method for booting Windows is to use the EFI Boot Manager menu to choose a Windows entry from the boot options list. Using the `ia64ldr.efi` Windows loader from the EFI Shell is not recommended.

**Procedure 4-15 Windows Booting**

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

Refer to “ACPI Configuration for Windows Must Be windows” (page 136) for required configuration details.

1. Access the EFI Boot Manager menu for the system on which you want to boot Windows.  
Log in to the management processor, and enter `CO` to access the Console list. Select the nPartition console.  
When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, select the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.
2. At the EFI Boot Manager menu, select an item from the boot options list.  
Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.
3. Press **Enter** to initiate booting using the chosen boot option.
4. When Windows begins loading, wait for the Special Administration Console (SAC) to become available.

The SAC interface provides a text-based administration tool that is available from the nPartition console. For details, refer to the SAC online help (type `?` at the `SAC>` prompt).

```
Loading.: Windows Server 2003, Datacenter
Starting: Windows Server 2003, Datacenter
```

```
Starting Windows...

Computer is booting, SAC started and initialized.

Use the "ch -?" command for information about using channels.
Use the "?" command for general help.

SAC>
```



5. Exit the console and management processor interfaces if you are finished using them.  
To exit the console environment, press **^B (Control+B)**; this exits the console and returns to the management processor Main menu. To exit the management processor, enter X at the Main menu.

## Shutting Down Microsoft Windows

You can shut down the Windows OS on HP Integrity servers using the **Start** menu or the `shutdown` command.

 **CAUTION:** Do not shut down Windows using Special Administration Console (SAC) `restart` or `shutdown` commands under normal circumstances.

Issuing `restart` or `shutdown` at the `SAC>` prompt causes the system to restart or shut down immediately and can result in the loss of data.

Instead, use the Windows **Start** menu or the `shutdown` command to shut down without loss of data.

To shut down Windows use either of the following methods.

- Select **Shut Down** from the **Start** menu, and select either **Restart** or **Shut down** from the drop-down menu.

Selecting the **Restart** menu item shuts down and restarts the system. Selecting the **Shut down** menu item shuts down the system.

You can use this method when using the Windows graphical interface.

- Issue the `shutdown` command from the Windows command line.

Refer to the procedure “Windows Shutdown from the Command Line” (page 137) for details.

You can issue this command from a command prompt through the Special Administration Console (SAC) or from any other command line.

The Windows `shutdown` command includes the following options:

- `/s` Shut down the system. This is the equivalent of **Start—>Shut Down, Shut down.**
- `/r` Shut down and restart the system. This is the equivalent of **Start—>Shut Down, Restart.**
- `/a` Abort a system shutdown.
- `/t xxx` Set the timeout period before shutdown to `xxx` seconds. The timeout period can range from 0–600, with a default of 30.

Refer to the `help shutdown` Windows command for details.

### Procedure 4-16 Windows Shutdown from the Command Line

From the Windows command line, issue the `shutdown` command to shut down the OS.

1. Log in to Windows running on the system that you want to shut down.

For example, access the system console and use the Windows SAC interface to start a command prompt, from which you can issue Windows commands to shut down the system.

2. Check whether any users are logged in.

Use the `query user` or `query session` command.

3. Issue the `shutdown` command and the appropriate options to shut down the Windows Server 2003 on the system.

You have the following options when shutting down Windows:

- To shut down Windows and reboot: `shutdown /r`  
Alternatively, you can select the **Start** → **Shut Down** action and select **Restart** from the drop-down menu.
- To shut down Windows and not reboot (either power down server hardware or put an nPartition into a shutdown for reconfiguration state): `shutdown /s`  
Alternatively, you can select the **Start** → **Shut Down** action and select **Shut down** from the drop-down menu.
- To abort a shutdown (stop a shutdown that has been initiated): `shutdown /a`

For example:

```
shutdown /r /t 60 /c "Shut down in one minute."
```

This command initiates a Windows system shutdown-and-reboot after a timeout period of 60 seconds. The `/c` option specifies a message that is broadcast to any other users of the system.

## Booting and Shutting Down Linux

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

- To determine whether the cell local memory (CLM) configuration is appropriate for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, refer to “Linux Support for Cell Local Memory” (page 138).
- To add a Linux entry to the nPartition boot options list, refer to “Adding Linux to the Boot Options List” (page 139).
- To boot Red Hat Enterprise Linux, refer to “Booting Red Hat Enterprise Linux” (page 140).
- To boot SuSE Linux Enterprise Server, refer to “Booting SuSE Linux Enterprise Server” (page 141).
- To shut down Linux, refer to “Shutting Down Linux” (page 142).

## Linux Support for Cell Local Memory

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



---

**IMPORTANT:** Red Hat Enterprise Linux 4 Update 4 and later, Red Hat Enterprise Linux 5 and later, and SUSE Enterprise Linux 10 and later, supports using CLM.

---

To check CLM configuration details from an OS, use Partition Manager or the `parstatus` command. For example, the `parstatus -v -c#` command and `parstatus -v -p#` command report the CLM amount requested and CLM amount allocated for the specified cell (`-c#`, where `#` is the cell number) or the specified nPartition (`-p#`, where `#` is the nPartition number). For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

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

than 512 MB of noninterleaved memory, then use Partition Manager or the `parstatus` command to confirm the CLM configuration details.

To set the CLM configuration, use Partition Manager or the `parmodify` command. For details, refer to the *HP System Partitions Guide* or the Partition Manager Web site (<http://docs.hp.com/en/PARMGR2/>).

## Adding Linux to the Boot Options List

This section describes how to add a Linux entry to the system boot options list. The processes for adding both Red Hat Enterprise Linux and SuSE Linux Enterprise Servers are given here.

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

See “Boot Options List” (page 114) for additional information about saving, restoring, and creating boot options.



---

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

---

### Procedure 4-17 Adding a Linux Boot Option

This procedure adds a Linux item to the boot options list.

1. Access the EFI Shell environment.

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

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

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

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

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

The full path for the Red Hat Enterprise Linux loader is `\EFI\redhat\elilo.efi`, and it should be on the device you are accessing.

The full path for the SuSE Linux Enterprise Server loader is `\efi\SuSE\elilo.efi`, and it should be on the device you are accessing.

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

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

- `bcfg boot dump` — Display all items in the boot options list for the system.
- `bcfg boot rm #` — Remove the item number specified by *#* from the boot options list.
- `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add # file.efi "Description"` — Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

For example, `bcfg boot add 1 \EFI\redhat\elilo.efi "Red Hat Enterprise Linux"` adds a Red Hat Enterprise Linux item as the first entry in the boot options list.

Likewise, `bcfg boot add 1 \efi\SuSE\elilo.efi "SLES 9"` adds a SuSE Linux item as the first entry in the boot options list.

Refer to the `help bcfg` command for details.

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

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

## Booting Red Hat Enterprise Linux

You can boot the Red Hat Enterprise Linux OS on HP Integrity servers using either of the methods described in this section.

Refer to “Shutting Down Linux” (page 142) for details on shutting down the Red Hat Enterprise Linux OS.



### CAUTION:

**ACPI Configuration for Red Hat Enterprise Linux Must Be default** On cell-based HP Integrity servers, to boot the Red Hat Enterprise Linux OS, an nPartition ACPI configuration must be value set to `default`.

At the EFI Shell, enter the `acpicfg` command with no arguments to list the current ACPI configuration. If the `acpicfg` value is not set to `default`, then Red Hat Enterprise Linux could panic. In this situation, you must reconfigure `acpicfg` to eliminate any bus address conflicts and ensure all I/O slots have unique addresses.

To set the ACPI configuration for Red Hat Enterprise Linux:

- At the EFI Shell enter the `acpicfg default` command.
- Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for Red Hat Enterprise Linux.

Use either of the following methods to boot Red Hat Enterprise Linux:

- Choose a Red Hat Enterprise Linux entry from the EFI Boot Manager menu.

To load the Red Hat Enterprise Linux OS at the EFI Boot Manager menu, choose its entry from the list of boot options.

Choosing a Linux entry from the boot options list boots the OS using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

Refer to the procedure “Booting Red Hat Enterprise Linux (EFI Shell)” (page 140) for details.

After choosing the file system for the boot device (for example, `fs0:`), you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

On a Red Hat Enterprise Linux boot device EFI System Partition, the full paths to the loader and configuration files are: `\EFI\redhat\elilo.efi`

`\EFI\redhat\elilo.conf`

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

### Procedure 4-18 Booting Red Hat Enterprise Linux (EFI Shell)

Use this procedure to boot Red Hat Enterprise Linux from the EFI Shell.

Refer to “ACPI Configuration for Red Hat Enterprise Linux Must Be default” (page 140) for required configuration details.

1. Access the EFI Shell.  
From the system console, select the EFI Shell entry from the EFI Boot Manager menu to access the shell.
2. Access the EFI System Partition for the Red Hat Enterprise Linux boot device.  
Use the map EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.  
To select a file system to use, enter its mapped name followed by a colon (:). For example, to operate with the boot device that is mapped as `fs3`, enter `fs3:` at the EFI Shell prompt.
3. Enter `ELILO` at the EFI Shell command prompt to launch the `ELILO.EFI` loader.  
If needed, you can specify the loader’s full path by entering `\EFI\redhat\elilo` at the EFI Shell command prompt.
4. Allow the `ELILO.EFI` loader to proceed with booting the Red Hat Enterprise Linux kernel.  
By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.  
To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO` boot prompt. To exit the loader, use the `exit` command.

## Booting SuSE Linux Enterprise Server

You can boot the SuSE Linux Enterprise Server 9 OS on HP Integrity servers using either of the methods described in this section.

Refer to “Shutting Down Linux” (page 142) for details on shutting down the SuSE Linux Enterprise Server OS.



### CAUTION:

**ACPI Configuration for SuSE Linux Enterprise Server Must Be default** On cell-based HP Integrity servers, to boot the SuSE Linux Enterprise Server OS, an nPartition ACPI configuration value must be set to `default`.

At the EFI Shell, enter the `acpiconfig` command with no arguments to list the current ACPI configuration. If the `acpiconfig` value is not set to `default`, then SuSE Linux Enterprise Server could panic.

To set the ACPI configuration for SuSE Linux Enterprise Server:

- At the EFI Shell enter the `acpiconfig default` command.
- Enter the `reset` command for the nPartition to reboot with the proper (`default`) configuration for SuSE Linux Enterprise Server.

Use either of the following methods to boot SuSE Linux Enterprise Server:

- Choose a SuSE Linux Enterprise Server entry from the EFI Boot Manager menu.  
To load the SuSE Linux Enterprise Server OS at the EFI Boot Manager menu, choose its entry from the list of boot options.  
Choosing a Linux entry from the boot options list boots the OS using `ELILO.EFI` loader and the `elilo.conf` file.
- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.  
Refer to the procedure “Booting SuSE Linux Enterprise Server (EFI Shell)” (page 142) for details.

After choosing the file system for the boot device (for example, `fs0:`), you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

On a SuSE Linux Enterprise Server boot device EFI System Partition, the full paths to the loader and configuration files are:

```
\efi\SuSE\elilo.efi
\efi\SuSE\elilo.conf
```

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

#### **Procedure 4-19 Booting SuSE Linux Enterprise Server (EFI Shell)**

Use this procedure to boot SuSE Linux Enterprise Server 9 from the EFI Shell.

Refer to “ACPI Configuration for SuSE Linux Enterprise Server Must Be default” (page 141) for required configuration details.

1. Access the EFI Shell.

From the system console, select the EFI Shell entry from the EFI Boot Manager menu to access the shell.

2. Access the EFI System Partition for the SuSE Linux Enterprise Server boot device.

Use the `map EFI Shell` command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.

To select a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter `fs3:` at the EFI Shell prompt.

3. Enter `ELILO` at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

If needed, you can specify the loader’s full path by entering `\efi\SuSE\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the SuSE Linux kernel.

By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

## Shutting Down Linux

Use the `shutdown` command to shut down Red Hat Enterprise Linux or SuSE Linux Enterprise Server.

The Red Hat Enterprise Linux and SuSE Linux Enterprise Server `shutdown` command includes the following options:

- h Halt after shutdown.

On cell-based HP Integrity servers, this either powers down server hardware or puts the nPartition into a shutdown for reconfiguration state.

Use the `PE` command at the management processor Command Menu to manually power on or power off server hardware, as needed.

- r Reboot after shutdown.

- c Cancel an already running shutdown.

- time* When to shut down (required). You can specify the *time* option in any of the following ways:
- Absolute time in the format *hh:mm*, in which *hh* is the hour (one or two digits) and *mm* is the minute of the hour (two digits).
  - Number of minutes to wait in the format *+m*, in which *m* is the number of minutes.
  - *now* to immediately shut down; this is equivalent to using *+0* to wait zero minutes.

Refer to the *shutdown(8)* Linux manpage for details. Also refer to the Linux manpage for the *poweroff* command.

#### **Procedure 4-20 Shutting Down Linux**

From the command line for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, issue the *shutdown* command to shut down the OS.

1. Log in to Linux running on the system you want to shut down.  
Log in to the management processor (MP) for the server and use the Console menu to access the system console. Accessing the console through the MP enables you to maintain console access to the system after Linux has shut down.
2. Issue the *shutdown* command with the desired command-line options, and include the required *time* argument to specify when the operating shutdown is to occur.  
For example, `shutdown -r +20` will shut down and reboot the system starting in 20 minutes.

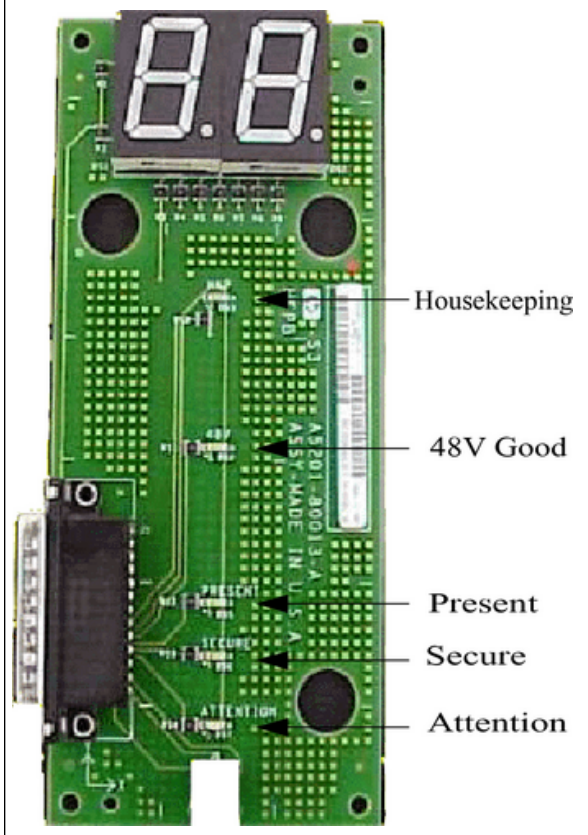





# A sx2000 LEDs

**Table A-1 Front Panel LEDs**

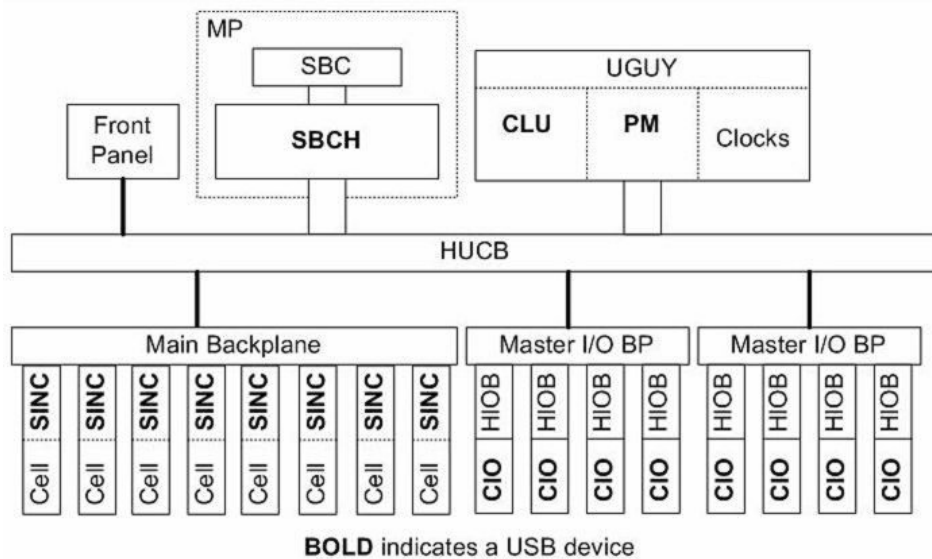
| LED        | Driven By | State                       | Meaning                                                          |
|------------|-----------|-----------------------------|------------------------------------------------------------------|
| 48V Good   | PM        | On (green)                  | 48V is good                                                      |
| HKP Good   | PM        | On (green)                  | Housekeeping is good.                                            |
| MP Present | PM        | On (green)                  | MP is installed in this cabinet.                                 |
| Cabinet#   | PM        | Numeric<br>Dash<br>Flashing | Cabinet number<br>Invalid cabinet ID<br>Locate feature activated |
| Attention  | MP        | Flashing Red                | Chassis log alert                                                |



**Table A-2 Power and OL\* LEDs**

| LED                        | Location                             | Driven By | State                             | Meaning                                                                                        |
|----------------------------|--------------------------------------|-----------|-----------------------------------|------------------------------------------------------------------------------------------------|
| Cell Power                 | Chassis beside cell and on cell      | Cell LPM  | Solid Green                       | HKP, PWR_GOOD                                                                                  |
| Cell Attention             | Chassis beside cell                  | CLU       | Solid Yellow                      | Cell OL*<br> |
| PDHC Post                  | Cell                                 | PDHC      | 0x0<br>0xf<br>0xe->0x1            | PDHC Post or run state                                                                         |
| PM Post                    | On the UGUY board, driven by the PM  | MOP       | 0x0<br>0xf<br>0xe->0x1            | No HKP<br>MOP is reset or dead<br>PM Post or run state                                         |
| CLU Post                   | On the UGUY board, driven by the CLU | SARG      | 0x0<br>0xf<br>0xe->0x1            | No HKP<br>CLU is reset or dead<br>CLU Post or run state                                        |
| PCI Card cage Attention    | Chassis behind PCI card cage         | CLU       | Solid Yellow                      | PCI card cage OL* LED,                                                                         |
| Link Cable OL*             | Main Backplane                       | CLU       | Solid Yellow                      | Link cable OL*                                                                                 |
| MP Post                    | SBCH                                 | SBCH      | 0x0<br>0xf<br>0xe->0x1            | No HKP<br>MP is reset or dead<br>MP Post or run state                                          |
| Cabinet and IO Bay Fans    | Each fan                             | PM        | Solid Green                       | Fan is running and no fault                                                                    |
| Backplane Power Boards     | System Backplane                     | RPM       | Solid Green<br>Yellow<br>Blinking | Power supply is running<br>Power fault                                                         |
| Hot swap oscillators (HSO) | System Backplane                     | RPM       | Solid Green<br>Solid Yellow       | HSO Supply running<br>HSO clock fault                                                          |

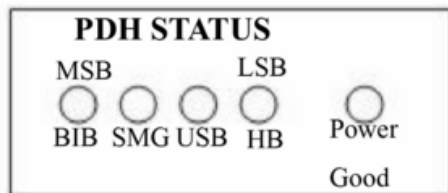
**Figure A-1 Utilities**



**Table A-3 OL\* LED States**

| Description                                  | Power (Green) | OL* (Yellow) |
|----------------------------------------------|---------------|--------------|
| Normal operation (powered)                   | On            | Off          |
| Fault detected, power on                     | On            | Flashing     |
| Slot selected, power on, not ready for OLA/D | On            | On           |
| Power off or slot available                  | Off           | Off          |
| Fault detected, power off                    | Off           | Flashing     |
| Ready for OL*                                | Off           | On           |

**Figure A-2 PDH Status**



A label on the outside of the SDCPB Frame indicates PDH Status, dc/dc converter faults that shutdown the sx2000 cell, and loss of dc/dc converter redundancy. Figure A-2 illustrates the label and Table A-4 describes each LED.



**NOTE:** The Power Good LED is a bicolor LED (green and yellow).

**Table A-4 PDH Status and Power Good LED States**

| LED        | Description          | Definition                                                                                                                                                                                                                                                                                       |
|------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BIB        | Boot Is Blocked      | When illuminated, it tells the end user that the system is ready to boot.                                                                                                                                                                                                                        |
| SMG        | Shared Memory Good   | This references non-volatile memory that manageability and system firmware share. When illuminated, the system is ready to begin fetching code.                                                                                                                                                  |
| USB        | Universal Serial Bus | When illuminated, PDHC is communicating with the MP.                                                                                                                                                                                                                                             |
| HB         | Heart Beat           | When blinking, the PDHC processor is running and the cell board can be powered on.                                                                                                                                                                                                               |
| Power Good | Power Good           | Solid green - All power is operating within specifications.<br>Blinking yellow - Voltage rail(s) have been lost and the cell board has shutdown.<br>Solid green but blinking yellow - Cell board is still operating, but one of the redundant converters has failed on one of the voltage rails. |

---

# B Management Processor Commands

This appendix summarizes the management processor (MP) commands. In the examples, MP is used as the command prompt.



**NOTE:** The term Guardian Service Processor has been changed to Management Processor, but some code already written uses the old term.

---

## BO Command

### BO - Boot partition

- Access level—Single PD user
- Scope—partition

This command boots the specified partition. It ensures that all the cells assigned to the target partition have valid complex profiles and then releases Boot-Is-Blocked (BIB).

### Example B-1 BO command

---

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> bo
This command boots the selected partition.

Name
--- ---
0) Partition 0
1) Partition 1

Select a partition number: 0

Do you want to boot partition number 0? (Y/[N]) y
-> The selected partition will be booted.
[feshd4-u] MP:CM>
```

---

## CA Command

### CA - Configure Asynchronous & Modem Parameters

- Access level—Operator
- Scope—Complex

There is one active RS232 port connection to the service processor's textual user interface. This RS232 connection is called the local RS232 port. The local RS232 port connects to a local terminal or to the CE laptop.

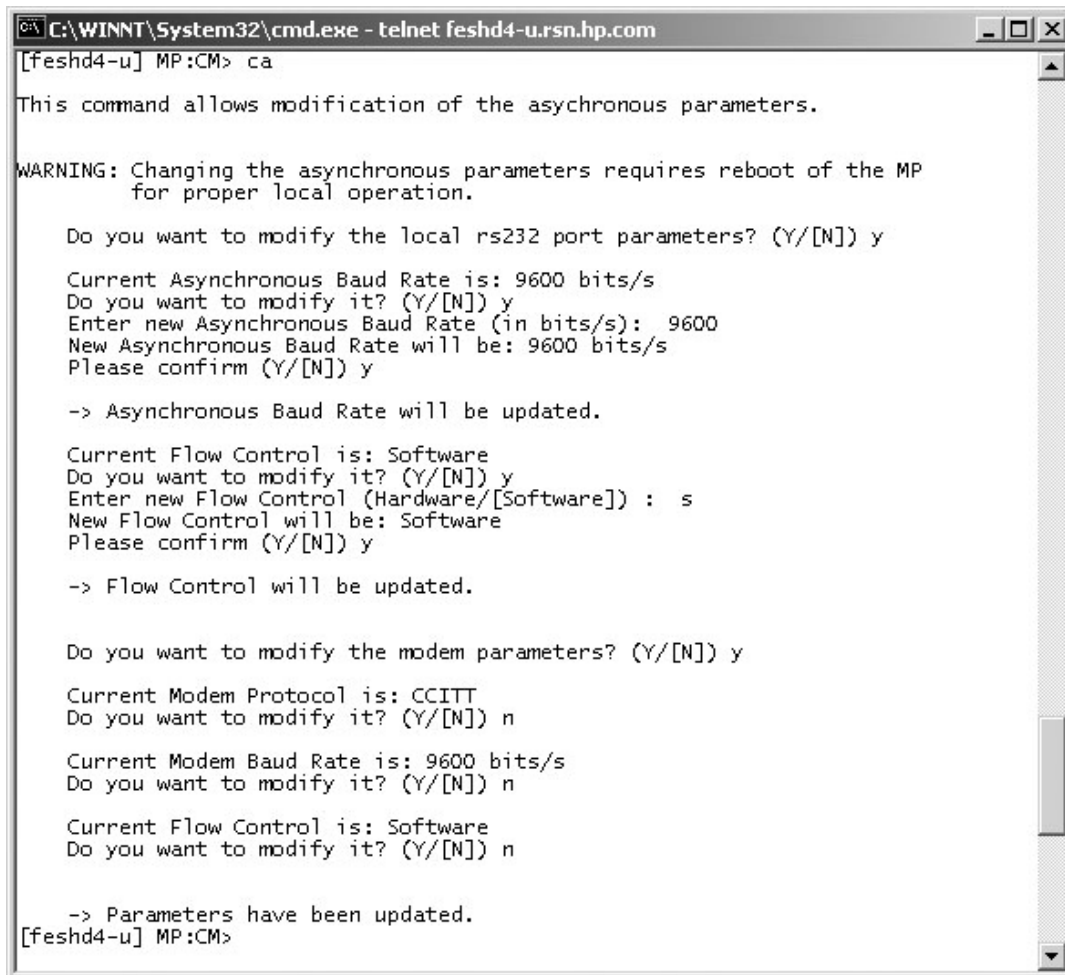


**NOTE:** On the HUCB board, there is a remote RS232 connector. The remote RS232 system was used to connect to a modem on legacy systems. Modem support is removed, so connections to the remote RS232 connector are ignored.

---

This command enables you to configure the local and remote console ports. The parameters you can configure are the baud rate, flow control, and modem type.

## Example B-2 CA Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> ca

This command allows modification of the asynchronous parameters.

WARNING: Changing the asynchronous parameters requires reboot of the MP
 for proper local operation.

Do you want to modify the local rs232 port parameters? (Y/[N]) y

Current Asynchronous Baud Rate is: 9600 bits/s
Do you want to modify it? (Y/[N]) y
Enter new Asynchronous Baud Rate (in bits/s): 9600
New Asynchronous Baud Rate will be: 9600 bits/s
Please confirm (Y/[N]) y

-> Asynchronous Baud Rate will be updated.

Current Flow Control is: Software
Do you want to modify it? (Y/[N]) y
Enter new Flow Control (Hardware/[Software]) : s
New Flow Control will be: Software
Please confirm (Y/[N]) y

-> Flow Control will be updated.

Do you want to modify the modem parameters? (Y/[N]) y

Current Modem Protocol is: CCITT
Do you want to modify it? (Y/[N]) n

Current Modem Baud Rate is: 9600 bits/s
Do you want to modify it? (Y/[N]) n

Current Flow Control is: Software
Do you want to modify it? (Y/[N]) n

-> Parameters have been updated.
[feshd4-u] MP:CM>
```

## CC Command

### CC - Complex Configuration

- Access level—Administrator
- Scope—Complex

This command performs an initial out-of-the-box complex configuration. The system can be configured as either a single (user specified) cell in partition 0 (the genesis complex profile) or the last profile can be restored. The state of the complex prior to command execution has no bearing on the changes to the configuration. You must ensure that all other partitions are shut down before using this command. You might need to run the ID command after you create a genesis complex profile. If the genesis profile is selected, then all remaining cells are assigned to the free cell list.



**NOTE:** This command does not boot any partitions. Use the BO command to boot needed partitions.

**NOTE:** If possible, use a cell in the genesis complex profile that has a bootable device attached.

### Example B-3 CC Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> cc

This command allows you to change the complex profile.

WARNING: You must either shut down the OSs for reconfiguration or
execute the RR (reset for reconfiguration) command for all
partitions before executing this command.

 G - Build genesis complex profile
 L - Restore last complex profile
 Select profile to build or restore: g

The genesis complex profile creates one single cell partition.

WARNING: The genesis complex profile automatically UNRESTRICTS
nPartition Configuration Privilege. This allows partitions
to issue configuration commands that can affect other
partitions.

 Use the PARPERM command to restrict nPartition Configuration
 Privilege.

Choose the cell to use.

 Enter cabinet number: 0
 Enter slot number: 4

Do you want to modify the complex profile? (Y/[N]) y
-> The complex profile will be modified.

[feshd4-u] MP:CM> m
```

## CP Command

### CP - Cells Assigned by Partition

- Access Level - Single Partition User
- Scope - Complex

The cp command displays a table of cells assigned to partitions and arranged by cabinets.



**NOTE:** This is for display only, no configuration is possible with this command.

### Example B-4 CP Command

```

C:\ Telnet feshd5-u.rsn.hp.com
GSP:CM> cp

Cabinet | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7
Slot | 01234567|01234567|01234567|01234567|01234567|01234567|01234567|01234567
Part 0 |XXXXXXXX|XXXXXXXX|.....|X.....|.....|.....|.....|.....
GSP:CM> _

```

## DATE Command

### DATE Command - Set Date and Time.

- Access level— Administrator
- Scope— Complex

This command changes the value of the real time clock chip on the MP.

### Example B-5 DATE Command

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> date

This command sets the date and time on the MP.

Current date is: 07/07/03
Do you want to modify it? (Y/[N]) y
Enter new date (mm/dd/yy): 07/07/03
New date will be: 07/07/03
Please confirm (Y/[N]) y

Current time is: 14:45:05
Do you want to modify it? (Y/[N]) y
Enter new time (hh:mm:ss): 15:49:45
New time will be: 15:49:45
Please confirm (Y/[N]) y
[feshd4-u] MP:CM>

```

## DC Command

### DC - Default Configuration

- Access level— Administratrix
- Scope— Complex

This command resets some or all of the configuration parameters to their default values.



**NOTE:** The clock setting is not effected by the DC command.

The following example shows the various parameters and their defaults.



## Example B-6 DC Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> dc

This command allows you to reset parameters to their default settings.

Parameter Current Configuration Default Configuration

MANAGEMENT PROCESSOR:
 Command Timeout 3 3

ASYNCHRONOUS:
 Baud Rate 9600 9600
 Flow Control Software(xon/xoff) Software(xon/xoff)

MP SECURITY:
 Login TimeOut 1 1
 Login Retries 3 3
 Flow Control Timeout 5 5

LAN:
 Customer LAN IP Address 15.99.49.133 192.168.1.1
 Customer LAN Host Name feshd4-u gsp0
 Customer LAN Subnet Mask 255.255.255.0 255.255.255.0
 Customer LAN Gateway 15.99.49.254 192.168.1.1

 Private LAN IP Address 192.168.2.14 192.168.2.10
 Private LAN Host Name priv-04 priv-00
 Private LAN Subnet Mask 255.255.255.0 255.255.255.0
 Private LAN Gateway 192.168.2.10 192.168.2.10

MANUFACTURING:
 Manufacturing Mode DISABLED DISABLED

MODEM:
 Modem Enable ENABLED ENABLED
 Modem Protocol CCITT CCITT
 Modem Baud Rate 9600 9600
 Flow Control Software(xon/xoff) Software(xon/xoff)

ASR (Automatic System Restart):
 ASR Enabled/Disabled Partitions Default is
 1 1 all partitions
 0....5....0....5 disabled
 DDDDDDDDDDDDDDDDD

Do you wish to reset ALL parameters to their defaults? (Y/[N]) n
```

## DF Command

### DF - Display FRUID

- Access level—Single Partition User
- Scope—Complex

This command displays the FRUID data of the specified FRU. FRU information for the SBC, BPS, and processors are constructed because they do not have a FRU ID EEPROM. This makes the list of FRUs different than the list presented in the WF command.

## Example B-7 DF Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> df
This command displays the FRU ID information for the selected FRU.

Do you want a specific FRU or a dump? ([S]/D) d

A - ALL - All FRU devices in a cabinet.
B - CPB - Cell power board.
C - CIO - Core IO (contains PACI).
D - DIMM
G - UGUY
H - SBCH
I - IOB
M - PRM - Processor module.
O - IOPB - IO back plane power board.
P - BPB - Main back plane power board.
R - LSB/RSB
S - SBC
T - PDH - PDH daughtercard.
W - CB - Cell board.
X - BPS
Select FRU : g

Enter cabinet number: 0

The Entity you have selected is UGUY, in Cabinet 0
Retrieving information for 1 FRU(s)
1 of 1 FRU IDs were retrieved and valid

Fru Name Part Name Loc Serial Num Art Eng Scan R Fru Spec.
Manf Test Hist. 0 Manf Test Hist. 1 Manf Test Hist. 2 CC V FR
Manf Test Hist. 3 Manf Test Hist. 4 Manf Test Hist. 5 Spare

UGUY3 A5201-60204 SC40130200 B XF01 0x1 BB500120
b00100050840000000 b00100051180000000 000000000000000000 72 Y A
c0a100052220000000 000000000000000000 000000000000000000 0000

[feshd4-u] MP:CM>
```

## DI Command

### DI - Disconnect Remote or LAN Console

- Access level—Operator
- Scope—Complex

This command initiates separate remote console or LAN console disconnect sequences. For the remote console, the modem control lines are deasserted, forcing the modem to hang up the telephone line. For the LAN console, the telnet connection is closed.

If the console being disconnected has an access mode of single connection (see ER command), then it is disabled, otherwise it remains enabled after the connection is dropped.

The number after the LAN console status is the number of LAN connections.

There is one active RS232 port connection to the service processor's textual user interface. This RS232 connection is called the local RS232 port. The local RS232 port connects to a local terminal or to the CE laptop.



**NOTE:** On the HUCB board, there is a remote RS232 connector. The remote RS232 system was used to connect to a modem on legacy systems. For sx2000 servers, modem support is removed, so connections to the remote RS232 connector are ignored.

### Example B-8 DI Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> di
This command disconnects console connections.

Remote console: DISCONNECTED
LAN console: CONNECTED (1)

Disconnect Remote console? (Y/[N]) n
Disconnect LAN console? (Y/[N]) n

Remote console: DISCONNECTED
LAN console: CONNECTED (1)

[feshd4-u] MP:CM>
```

## DL Command

### DL - Disable LAN Access

- Access level—Administrator
- Scope—Complex

This command disables telnet LAN access. Disabling telnet access kills all of the current telnet connections and causes future telnet connection requests to be sent a connection refused message.

### Example B-9 DL Command

Example:

In the following example, the administrator is connected by telnet to the MP. When DL runs, the telnet connection to the MP is closed.

```
MP:CM> dl
Disable telnet access and close open telnet connections? (Y/[N]) y
WARNING: Answering yes will close this connection.
Are you sure? (Y/[N]) y
-> Telnet access disabled. All non-diagnostic connections closed.
Connection closed by foreign host..
```



**NOTE:** The DL command is deprecated and does not appear in the help menu. Use the SA and DI commands to control both telnet and SSH connections.

## EL Command

### EL - Enable LAN Access

- Access level—Administrator
- Scope—Complex

This command enables telnet LAN access.

## Example B-10 EL Command

---

```
MP:CM> e1
Enable telnet access? (Y/[N]) y
-> Telnet access enabled.
MP:CM>
```

See also: DI, DL. Note that this command is deprecated and does not support SSH. Use the SA command instead.

---

## HE Command

### HE - Help Menu

- Scope—N/A
- Access level—Single PD user

This command displays a list of all MP commands available to the level of the MP access (administrator, operator, or single PD user). The commands that are available in manufacturing mode are displayed if the MP is in manufacturing mode.

In the following example, the MP is in manufacturing mode, so the manufacturing commands are shown in the last screen. This example is from a prerelease version of MP firmware.

## Example B-11 HE Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-ursn.hp.com
[feshd4-u] MP:CM> he

Management Processor (MP) - FW Revision 14.6, May 6 2003 at 18:29:42
Utility Subsystem FW Revision Level: 14.6

The following are the service commands that are available

BO : Boot a partition.
DF : Display FRU information of an Entity.
MA : Return to the Main menu.
MR : Modem Reset
PCIOLAD: Activate/Deactivate a PCI card.
PE : Power entities on or off.
RE : Reset entity.
RR : Reset a partition for reconfiguration.
RS : Reset a partition.
TC : Send a TOC signal to a partition.
TE : Broadcast a message to all users of the MP Command Handler.
VM : Margin the voltage in a cabinet
WHO : Display a list of MP connected users

Press q to quit or <CR> to continue...

Management Processor (MP) - FW Revision 14.6, May 6 2003 at 18:29:42
Utility Subsystem FW Revision Level: 14.6

The following are the status commands that are available

CP : Display partition cell assignments
HE : Display the list of available commands
IO : Display IO chassis/cell connectivity
LS : Display LAN connected console status
MS : Display the status of the Modem
PS : Display detailed power and hardware configuration status.
SYSREV : Display revisions of all firmware entities in the complex.

Press q to quit or <CR> to continue...

Management Processor (MP) - FW Revision 14.6, May 6 2003 at 18:29:42
Utility Subsystem FW Revision Level: 14.6

The following are the system and access config commands that are available

AR : Configure the Automatic System Restart
CA : Configure Asynchronous and Modem parameters
CC : Initiate a Complex Configuration
CP : Display partition cell assignments
DATE : Set the time and date
DC : Reset parameters to default configuration
DI : Disconnect Remote or LAN Console
ID : Change certain stable complex configuration profile fields
IO : Display IO chassis/cell connectivity
IT : Modify command interface inactivity timeout
LC : Configure LAN connections
LS : Display LAN connected console status

Press q to quit or <CR> to continue...

Management Processor (MP) - FW Revision 14.6, May 6 2003 at 18:29:42
Utility Subsystem FW Revision Level: 14.6

The following are the system and access config commands that are available

PARPERM : Enable/Disable Partition Reconfiguration
PD : Modify default Partition for this login session.
RL : Rekey Complex Profile Lock
SA : Display and Set MP Remote Access
SQ : Configure Security Options and Access Control
XD : MP Diagnostics and Reset

[feshd4-u] MP:CM>
```

## ID Command

### ID - Configure Complex Identification

- Access level—Operator
- Scope—Complex

This command configures the complex identification information. The complex identification information includes the following:

- Model number
- Model string
- Complex serial number
- Complex system name
- Original product number
- Current product number
- Enterprise ID and diagnostic license

This command is similar to the `SSCONFIG` command in ODE.

The command is protected by an authentication mechanism. The MP generates a lock word, and you must supply an authentication key that is dependent on the lock word. A one minute fixed timeout protects against this command being entered inadvertently. This command has no effect if the timeout pops or the wrong authentication key is entered.

This command is inoperable until the MP has determined the golden complex profile.



**NOTE:** When the system powers on for the first time, you must run the `CC` command before you can run the `ID` command.

### Example B-12 ID Command

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> id

This command allows you to change certain fields in the Stable complex
configuration portion of the complex profile.

Retrieving the stable complex configuration portion of the complex profile.

MP modifiable stable complex configuration data fields.
Model String : 9000/800/SD32A
Complex System Name : FeshD4
Original Product Number : A5201A
Current Product Number : A5201A
UUID : ffffffff-ffff-ffff-ffff-fffffffffffffff
Creator Manufacturer : HP
Creator Product Name : superdome server SD32A
Creator Serial Number : USR2025FP2
OEM Manufacturer :
OEM Product Name :
OEM Serial Number :

Do you want to modify any of this information? (Y/[N]) _

```

## IO Command

### IO - Display Connectivity Between Cells and I/O

- Access level—Single Partition User
- Scope—Complex

This command displays a mapping of the connectivity between cells and I/O.

## Example B-13 Example:

```
• MP:CM> io-----+Cabinet | 0 | 1 |-----+-----+-----+Slot
|01234567|01234567|-----+-----+-----+Cell |XXXX....|.....|IO Cab |0000....|.....|IO Bay
|0101....|.....|IO Chas |1133....|.....|MP:CM>• See also: PS
```

## IT Command

### IT - View / Configure Inactivity Timeout Parameters

- Access level—Operator
- Scope—Complex

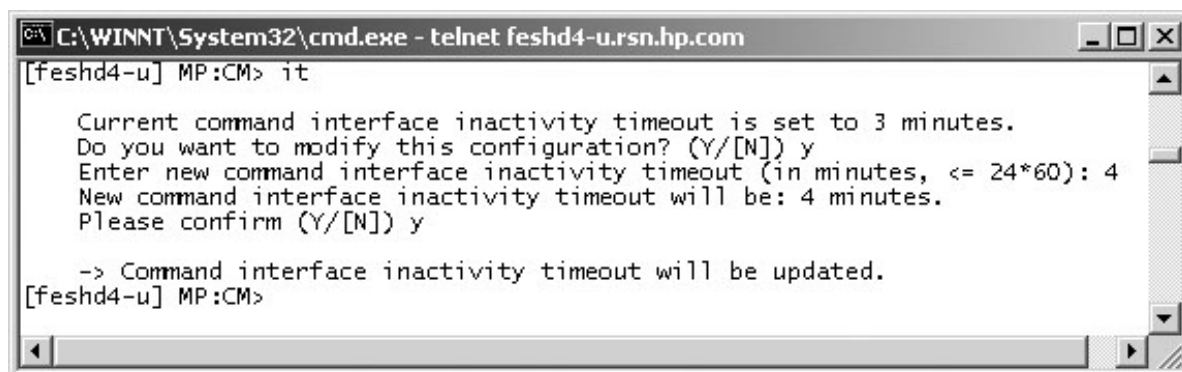
This command sets the two inactivity timeouts.

The session inactivity timeout prevents a session to a partition from being inadvertently left open, preventing other users from logging onto a partition using the same path. If the system session is hung or if the partition OS is hung, the IT command also prevents a session from being locked indefinitely.

The second timeout is an MP-Handler command timeout. This stops a user from not completing a command and preventing other users from using the MP-Handler.

Neither timeout can be deactivated.

### Example B-14 IT Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> it

Current command interface inactivity timeout is set to 3 minutes.
Do you want to modify this configuration? (Y/[N]) y
Enter new command interface inactivity timeout (in minutes, <= 24*60): 4
New command interface inactivity timeout will be: 4 minutes.
Please confirm (Y/[N]) y

-> Command interface inactivity timeout will be updated.
[feshd4-u] MP:CM>
```

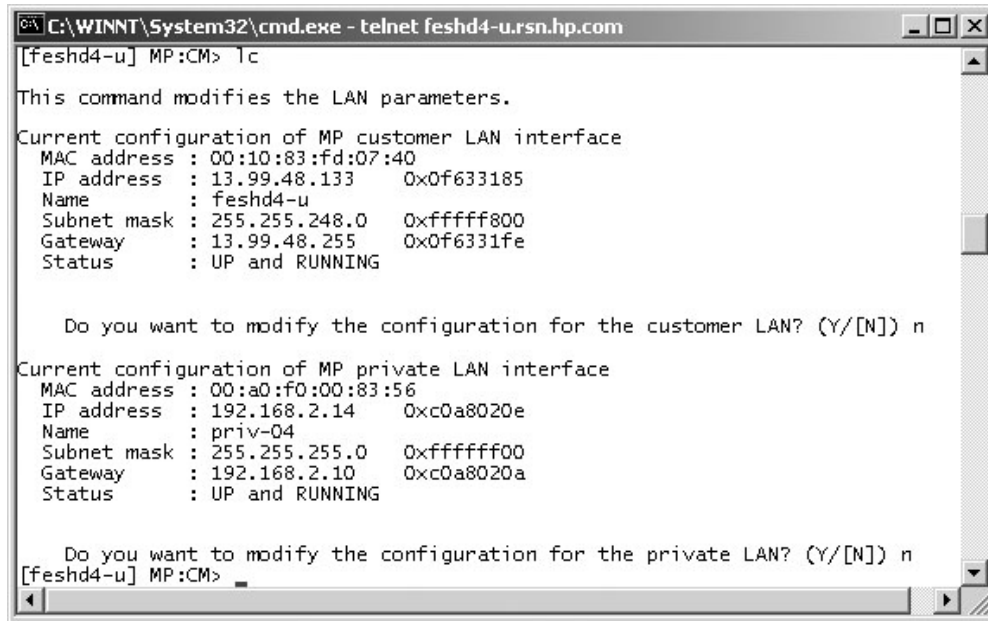
## LC Command

### LC - LAN Configuration

- Access level—Administrator
- Scope—Complex

This command displays and modifies the LAN configurations. The IP address, hostname, subnet mask, and gateway address can be modified with this command.

## Example B-15 LC Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> lc

This command modifies the LAN parameters.

Current configuration of MP customer LAN interface
MAC address : 00:10:83:fd:07:40
IP address : 13.99.48.133 0x0f633185
Name : feshd4-u
Subnet mask : 255.255.248.0 0xfffff800
Gateway : 13.99.48.255 0x0f6331fe
Status : UP and RUNNING

Do you want to modify the configuration for the customer LAN? (Y/[N]) n

Current configuration of MP private LAN interface
MAC address : 00:a0:f0:00:83:56
IP address : 192.168.2.14 0xc0a8020e
Name : priv-04
Subnet mask : 255.255.255.0 0xfffff000
Gateway : 192.168.2.10 0xc0a8020a
Status : UP and RUNNING

Do you want to modify the configuration for the private LAN? (Y/[N]) n
[feshd4-u] MP:CM> _
```

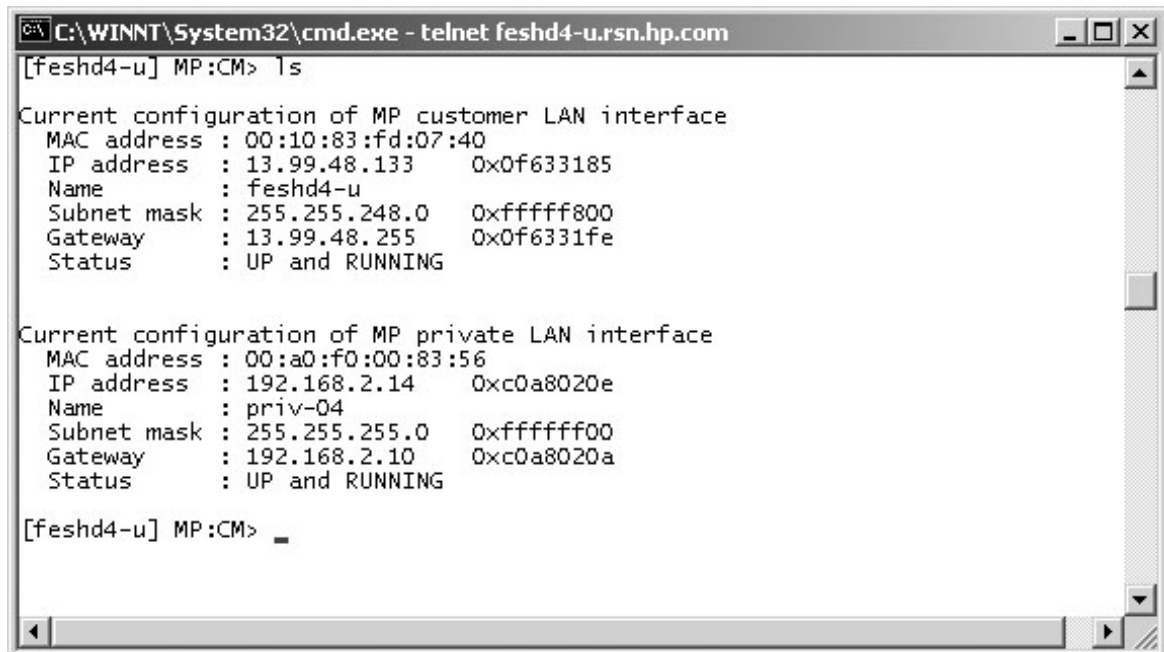
## LS Command

### LS - LAN Status

- Access level—Single Partition User
- Scope—Complex

This command displays all parameters and current connection status of the LAN interface.

## Example B-16 LS Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> ls

Current configuration of MP customer LAN interface
MAC address : 00:10:83:fd:07:40
IP address : 13.99.48.133 0x0f633185
Name : feshd4-u
Subnet mask : 255.255.248.0 0xfffff800
Gateway : 13.99.48.255 0x0f6331fe
Status : UP and RUNNING

Current configuration of MP private LAN interface
MAC address : 00:a0:f0:00:83:56
IP address : 192.168.2.14 0xc0a8020e
Name : priv-04
Subnet mask : 255.255.255.0 0xfffff000
Gateway : 192.168.2.10 0xc0a8020a
Status : UP and RUNNING

[feshd4-u] MP:CM> _
```

## MA Command

### MA - Main Menu



- Access level—Single Partition User
- Scope—N/A

The command returns you from the command menu to the main menu. Only the user that enters the command is returned to the private main menu.

### Example B-17 MP Main Menu

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> ma

MP MAIN MENU:

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

[feshd4-u] MP>

```

## ND Command

### ND - Network Diagnostics

- Access level—Administrator
- Scope—Complex

This command enables or disables network diagnostics. This enables or disables the Ethernet access to MP Ethernet ports other than the main telnet port (TCP port 23). Disabling the network diagnostic port prevents the user from accessing the system with diagnostic tools such as JUST, GDB, LDB and firmware update (FWUU).

### Example B-18 ND Command

```

MP:CM> nd
Network diagnostics are currently enabled.
Do you want to disable network diagnostics? (Y/[N]) y
-> Network diagnostics are disabled.
MP:CM>

MP:CM> nd
Network diagnostics are currently disabled.
Do you want to enable network diagnostics? (Y/[N]) y
-> Network diagnostics are enabled.
MP:CM>

```

See also: DC Command

## PD Command

### PD - Set Default Partition

- Access level—Operator
- Scope—Complex

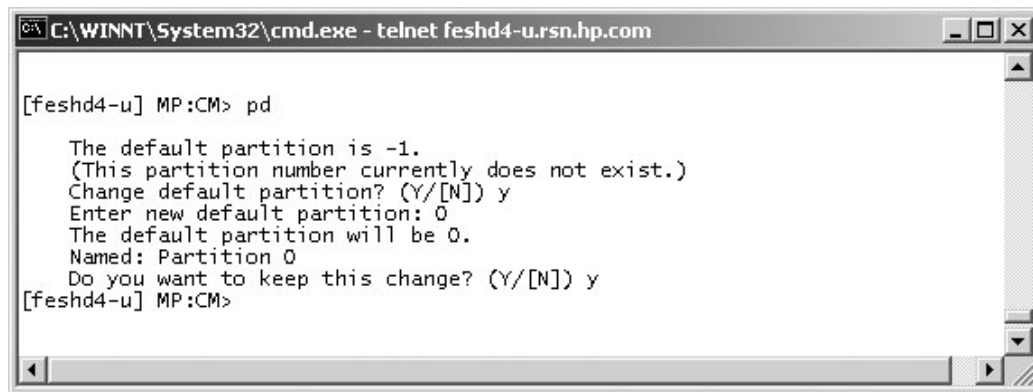
This command sets the default partition. If a default partition already exists, then this command overrides the previously defined partition. Setting the default partition prevents the user from

being forced to enter a partition in commands that require a partition for their operation. For example, this prevents a user from accidentally TOCing the wrong partition.

A default partition is automatically set for users who are assigned the Single Partition User access level when they log in into the MP handler. A user assigned the Single Partition User access level can not change the default partition.

When Administrator- or Operator-level users log in, their default partition is set to an invalid partition. The default partition for users of these access levels is maintained independently for each connection. When the user logs out of the MP handler, the default partition setting is not stored in nonvolatile storage.

### Example B-19 PD Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-ursn.hp.com

[feshd4-u] MP:CM> pd

The default partition is -1.
(This partition number currently does not exist.)
Change default partition? (Y/[N]) y
Enter new default partition: 0
The default partition will be 0.
Named: Partition 0
Do you want to keep this change? (Y/[N]) y
[feshd4-u] MP:CM>
```

See also: RE and SO commands

## PE Command

### PE - Power Entity

- Access level—Operator
- Scope—Complex

This command turns power on or off to the specified entity. If a default partition is defined, then the targeted entity must be a member of that partition. If the entity being powered on is an entire cabinet, this command interacts with the physical cabinet power switch. If the cabinet power switch is in the off position then this command does not turn cabinet power on. If this command is used to power off a cabinet, then the power switch is turned from on to off to on, the cabinet powers on. Powering on or off a cell also powers on or off any attached I/O backplane. Also powering on a cell powers on the I/O backplane attached to that cell first. The system backplane (HLSB) cannot be selected as an entity, and can only be controlled by the cabinet entity.

Powering off a partition that is released from BIB can result in extraneous error events being stored in the event logs.

## Example B-20 PE Command for a Compute Cabinet

---

```
[spudome] MP:CM> pe
This command controls power enable to a hardware device.
B - Cabinet
C - Cell
I - IO Chassis
P - Partition
Select Device: b
Enter cabinet number: 0
WARNING: Cabinet 0 is connected to cabinet 1. Cabinets 0 and 1 must be powered off and on such that both
cabinets are off for an overlapping interval.
If one cabinet is powered off then on while the other cabinet remains on, communications between the two
cabinets will be lost.
The power state is ON for cabinet 0.
In what state do you want the power? (ON/OFF) off
[spudome] MP:CM>

[spudome] MP:CM> pe
This command controls power enable to a hardware device.
B - Cabinet
C - Cell
I - IO Chassis
P - Partition
Select Device: p
Name

0) Partition 0
1) Partition 1
2) Partition 2
3) Partition 3
Select a partition number: 0
The power state is OFF for partition 0.
In what state do you want the power? (ON/OFF) on
[spudome] MP:CM>
```

---

See also: PS command

## PS Command

### PS - Power and Configuration Status

- Access level—Single Partition User
- Scope—Cabinet

This command displays the status of the specified hardware.

You can retrieve a summary or more detailed information on one of the following: a cabinet, a cell, a core IO, and the MP.



- Access level—Operator
- Scope—Complex

This command resets the specified entity. Be careful when resetting entities because of the side effects. Resetting an entity has the following side effects:

- The CLU sends the backplane\_reset signal on the main backplane, which results in the following being reset:
- All XBCs, RCs, cells plugged into backplane, PDH interface chips, CCs, all CPUs except PDHC, any attached RIOs, all I/O adapters installed in the I/O backplanes associated with the above RIOs.
- The SINC sends the mpon signal to the PDH interface chip, which results in the following being reset:
- The PDH interface chip, CC, all CPUs except SINC, any attached RIO, all I/O adapters installed in the I/O backplane associated with the above RIO
- The CLU sends the iobackplane\_reset signal to the appropriate I/O backplane, which results in the following being reset:
- RIO and all I/O adapters installed in the I/O backplane

```
MP:CM> re
This command resets a hardware device.
C - Cell
I - IO Chassis
M - Main Backplane
Select device: m
Enter cabinet number: 0
Do you want to reset the Main Backplane in Cabinet 0? (Y/[N]) y
-> The selected device(s) will be reset.
MP:CM>
```

See also: PE command

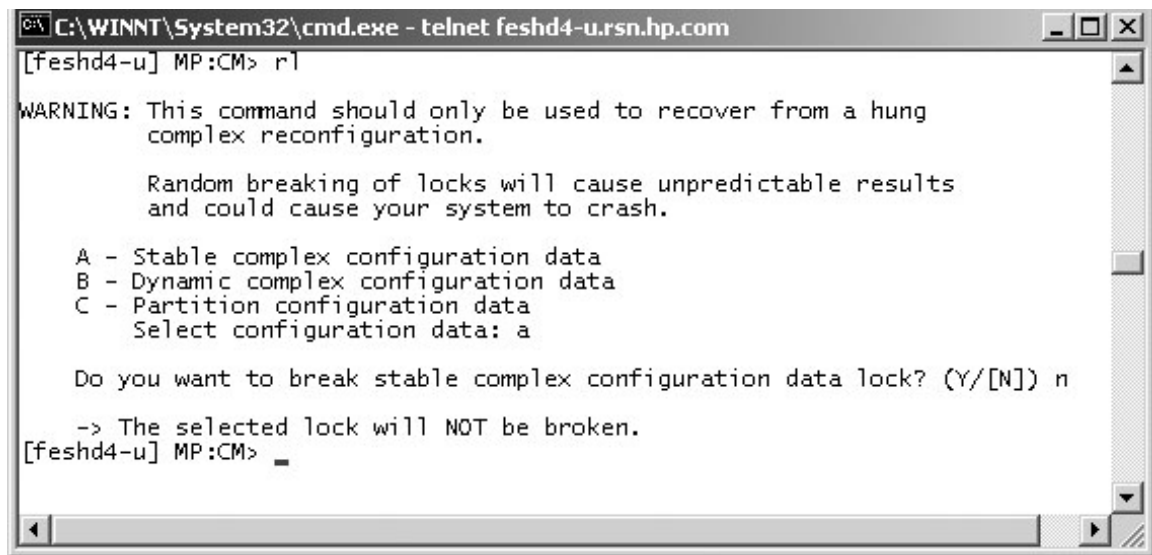
## RL Command

### **RL - Re-key Complex Profile Lock**

- Access level—Operator
- Scope—Complex

This command rekeys the complex profile lock. Use the RL command to recover from the error caused by the holder of the lock terminating before releasing the complex profile lock. It invalidates any outstanding key to the complex profile lock. There are up to 66 complex profile locks, one for each partition in section C and one key each for the A and B sections of the complex profile. The default partition is the default when prompting the user for which lock to rekey.

## Example B-22 Re-key lock for partition 3



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> r
WARNING: This command should only be used to recover from a hung
 complex reconfiguration.

 Random breaking of locks will cause unpredictable results
 and could cause your system to crash.

 A - Stable complex configuration data
 B - Dynamic complex configuration data
 C - Partition configuration data
 Select configuration data: a

 Do you want to break stable complex configuration data lock? (Y/[N]) n
 -> The selected lock will NOT be broken.
[feshd4-u] MP:CM> _
```

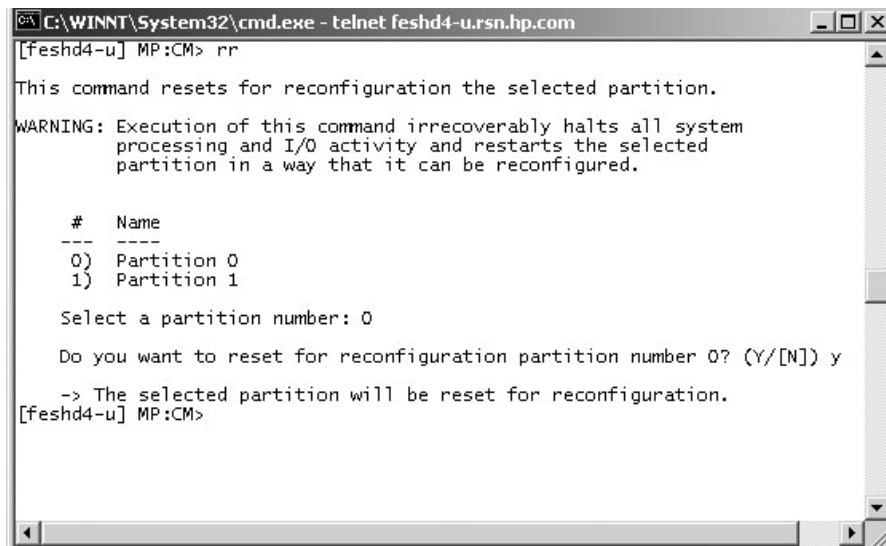
## RR Command

### RR - Reset Partition for Re-configuration

- Access level—Single Partition User
- Scope—Partition

This command resets the specified partition, but does not automatically boot it. The utility system resets each cell that is a member of the specified partition. If the user is either Administrator or Operator, you can choose a partition.

## Example B-23 RR Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> rr
This command resets for reconfiguration the selected partition.
WARNING: Execution of this command irrecoverably halts all system
 processing and I/O activity and restarts the selected
 partition in a way that it can be reconfigured.

 # Name
 --- ----
 0) Partition 0
 1) Partition 1

 Select a partition number: 0

 Do you want to reset for reconfiguration partition number 0? (Y/[N]) y
 -> The selected partition will be reset for reconfiguration.
[feshd4-u] MP:CM>
```

## RS Command

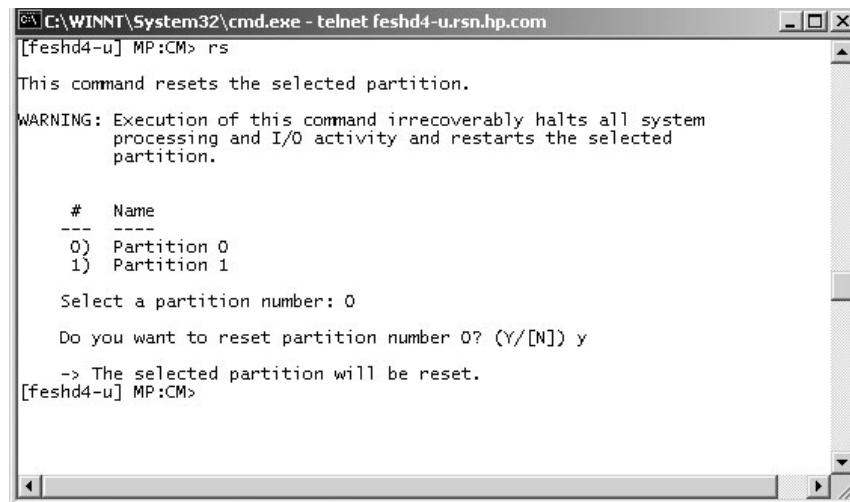
### RS - Reset Partition

- Access level—Single PD user
- Scope—Partition

This command resets and boots the specified partition. The utility system resets each cell that is a member of the specified partition. Once all cells have reset, the partition boots. If you are either Administrator or Operator, you can choose a partition.

### Example B-24 RS Command

---



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> rs
This command resets the selected partition.
WARNING: Execution of this command irrecoverably halts all system
 processing and I/O activity and restarts the selected
 partition.

Name
--- ----
0) Partition 0
1) Partition 1

Select a partition number: 0

Do you want to reset partition number 0? (Y/[N]) y
-> The selected partition will be reset.
[feshd4-u] MP:CM>
```

## SA Command

### SA - Set Access Parameters

- Access level—Administrator
- Scope—Complex

This command modifies the enablement of interfaces including telnet, SSH, modem, network diagnostics, IPMI LAN, Web console, and so on.

### Example B-25 SA Command

---

```
[spudome] MP:CM> sa
This command displays and allows modification of access parameters.
T - Telnet access : Enabled
H - Secure Shell access : Enabled
N - Network Diagnostics : Enabled
D - DIAG Menu : Enabled
I - IPMI Lan access : Enabled
Select access mode to change :
```

See also: EL, DL, DI, ND, PARPERM

## SO Command

### SO - Security Options and Access Control Configuration

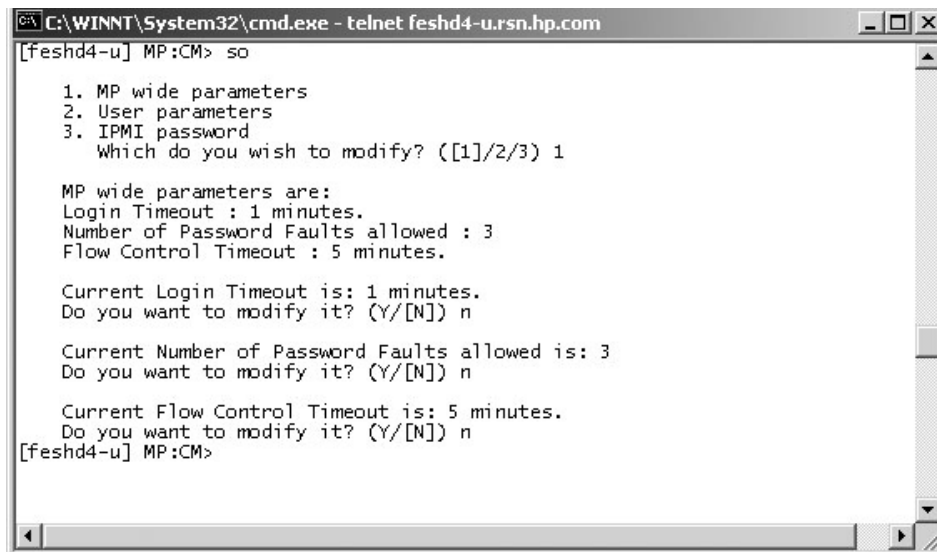
- Access level—Administrator
- Scope—Complex

This command modifies the security options and access control to the MP handler. The following parameters can be modified:

- Login timeout
- Number of password faults allowed

- Flow control timeouts
- User parameters:
  - User name
  - Organization name
  - Access level
  - Mode
  - User state

### Example B-26 SO Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> so
 1. MP wide parameters
 2. User parameters
 3. IPMI password
 Which do you wish to modify? ([1]/2/3) 1

MP wide parameters are:
Login Timeout : 1 minutes.
Number of Password Faults allowed : 3
Flow Control Timeout : 5 minutes.

Current Login Timeout is: 1 minutes.
Do you want to modify it? (Y/[N]) n

Current Number of Password Faults allowed is: 3
Do you want to modify it? (Y/[N]) n

Current Flow Control Timeout is: 5 minutes.
Do you want to modify it? (Y/[N]) n
[feshd4-u] MP:CM>
```

## SYSREV Command

### **SYSREV - Display System and Manageability Firmware Revisions**

- Access level—Single Partition User
- Scope—Complex

This command will display the firmware revisions of all of the entities in the complex.



## Example B-27 SYSREV Command

```
MP:CM> sysrev
Manageability Subsystem FW Revision Level: 7.14
| Cabinet #0 |
-----+-----
| SYS FW | PDHC |
Cell (slot 0) | 32.2 | 7.6 |
Cell (slot 1) | 32.2 | 7.6 |
Cell (slot 2) | 32.2 | 7.6 |
Cell (slot 3) | 32.2 | 7.6 |
Cell (slot 4) | | |
Cell (slot 5) | | |
Cell (slot 6) | | |
Cell (slot 7) | | |
| |
MP | 7.14 |
CLU | 7.6 |
PM | 7.12 |
CIO (bay 0, chassis 1) | 7.4 |
CIO (bay 0, chassis 3) | 7.4 |
CIO (bay 1, chassis 1) | 7.4 |
CIO (bay 1, chassis 3) | 7.4 |
MP:CM>
```

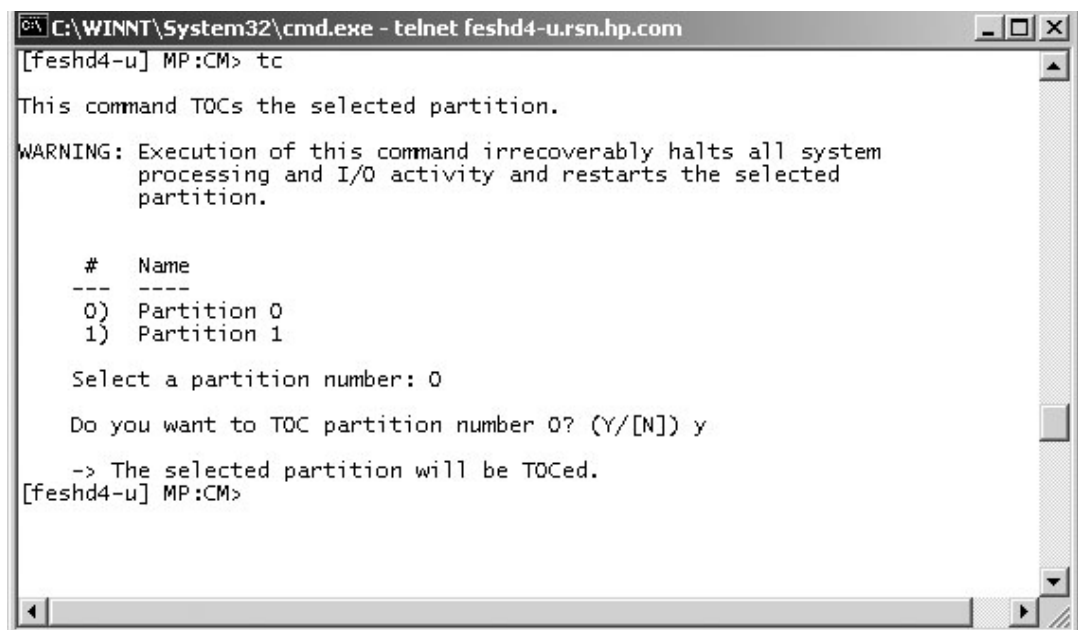
## TC Command

### TC - TOC Partition

- Access level—Single Partition User
- Scope—Partition

This command transfers the control (TOC) of the specified partition. The SINC on each cell in the specified partition sends the sys\_init signal to the PDH interface chip.

### Example B-28 TC Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> tc
This command TOCs the selected partition.
WARNING: Execution of this command irrecoverably halts all system
 processing and I/O activity and restarts the selected
 partition.

Name
--- ----
0) Partition 0
1) Partition 1

Select a partition number: 0

Do you want to TOC partition number 0? (Y/[N]) y
-> The selected partition will be TOCed.
[feshd4-u] MP:CM>
```

## TE Command

### TE - Tell

- Access level—Single Partition User
- Scope—Complex

This command treats all characters following the TE as a message that is broadcast when <CR> is pressed. The message size is limited to 80 characters. Any extra characters are not broadcast. Also, any message that is written is not entered into the console log.



**NOTE:** All users connected to the MP handler receive the message, irrespective of what partition the user sending the message has access to.

### Example B-29 TE Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> te
 Enter message to broadcast (must be less than 80 characters).
is anyone out there
[feshd4-u] MP:CM> _
```

## VM Command

### VM - Voltage Margin

- Access level—Single Partition User
- Scope—Cabinet

This command adjusts the voltage of all marginable supplies within a range of +/- 5%. No reset is required for this command to become effective.

### Example B-30 VM Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> vm
This command allows margining of a cabinet's voltage.
Cabinet 0's voltage margin is Nominal
 Enter cabinet number: 0
 N - Nominal
 H - High
 L - Low
 Select Margin Level: n
 Do you want to margin the voltage in cabinet 0? (Y/[N]) y
 -> The cabinet voltage will be margined.
[feshd4-u] MP:CM> _
```

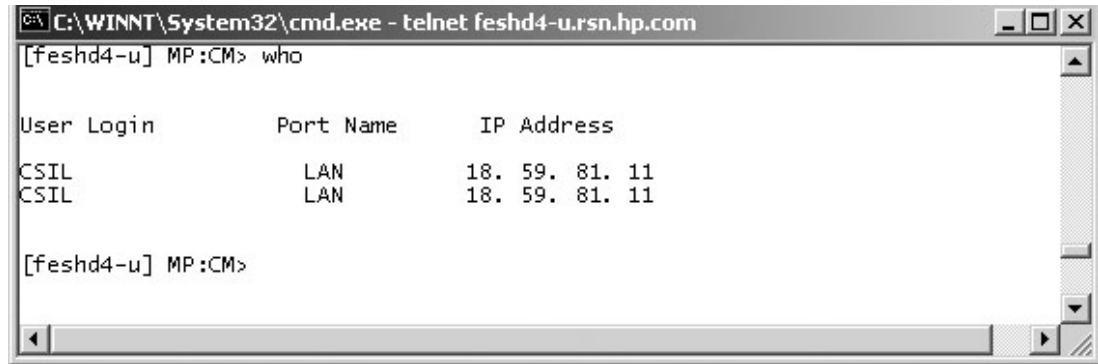
## WHO Command

### WHO - Display List of Connected Users

- Access level—Single Partition User
- Scope—Complex

This command displays the login name of the connected console client user and the port on which they are connected. For LAN console clients, the remote IP address is displayed.

### Example B-31 WHO Command



The screenshot shows a Windows command prompt window titled "C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com". The prompt is "[feshd4-u] MP:CM>". The user has entered the command "who". The output is a table with three columns: "User Login", "Port Name", and "IP Address". There are two rows of data, both for "CSIL" users connected via "LAN" at IP address "18. 59. 81. 11".

```
[feshd4-u] MP:CM> who

User Login Port Name IP Address
CSIL LAN 18. 59. 81. 11
CSIL LAN 18. 59. 81. 11

[feshd4-u] MP:CM>
```

## XD Command

### **XD - Diagnostic and Reset of MP**

- Access level—Operator
- Scope—Complex

This command tests certain functions of the SBC and SBCH boards.



---

**IMPORTANT:** Some of the tests are destructive. Do not run this command on a system running the operating system.

---

### Example B-32 XD Command

---

```
C:\WINNT\System32\cmd.exe
[feshd4-u] MP:CM> xd

Non destructive tests:
 1. Parameters checksum
 2. Ping
 Type R to reset the MP or Q to quit the diagnostic menu.

Enter your choice: 1
Test result is: PASS

Non destructive tests:
 1. Parameters checksum
 2. Ping
 Type R to reset the MP or Q to quit the diagnostic menu.

Enter your choice: 2
Enter IP address: 192.168.2.14
Test result is: FAIL

Non destructive tests:
 1. Parameters checksum
 2. Ping
 Type R to reset the MP or Q to quit the diagnostic menu.

Enter your choice: r
Connection to host lost.
C:\>
```

# C Powering the System On and Off

This appendix provides procedures to power a system on and off.

## Shutting Down the System

Use this procedure to shut down the system.

## Checking System Configuration

To check the current system configuration in preparation for shutdown, follow these steps:

1. Open a command prompt window and connect to the MP (Figure C-1):  
`telnet <hostname>`

**Figure C-1 Connecting to the Host**



```
[1] % telnet feshd4-u
Trying...
Connected to feshd4-u.rsn.hp.com.
Escape character is '^]'.
Local flow control off

MP login: CSIL
MP password: ****
```

2. Enter the login and password at the MP prompt. The Main Menu appears (Figure C-2).

**Figure C-2 Main MP Menu**



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

(c)Copyright 2000 Hewlett-Packard Co., All Rights Reserved.

 Welcome to
 Superdome's Management Processor

Utility Subsystem FW Revision Level: 14.6

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

[feshd4-u] MP>
```

3. Open the Command Menu by entering **cm** at the MP prompt.
4. Make sure that no one else is using the system by entering **who** at the CM prompt. Only one user should be seen, as indicated in Figure C-3.

**Figure C-3 Checking for Other Users**

```

c:\ Telnet feshd5-u.rsn.hp.com

GSP> cm

 Enter HE to get a list of available commands

GSP:CM> who

User Login Port Name IP Address

Admin LAN 15.236.162.174
GSP:CM> _

```

5. Read and save the current system configuration by entering **cp** and the CM prompt. Cabinet and partition information appear (Figure C-4).

**Figure C-4 Checking Current System Configuration**

```

c:\ Telnet feshd5-u.rsn.hp.com

GSP:CM> cp

Cabinet | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7

Slot | 01234567|01234567|01234567|01234567|01234567|01234567|01234567

Part | 0 |XXXXXXXX|XXXXXXXX|.....|X.....|.....|.....|.....

GSP:CM> _

```

6. Go back to the Main Menu by entering **ma** at the CM prompt.
7. From the Main Menu, enter **vfp** to open the Virtual Front Panel (Figure C-5).

**Figure C-5 MP Virtual Front Panel**

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP> vfp

Welcome to the Virtual Front Panel (VFP).
Use ^B to exit.

Partitions available:

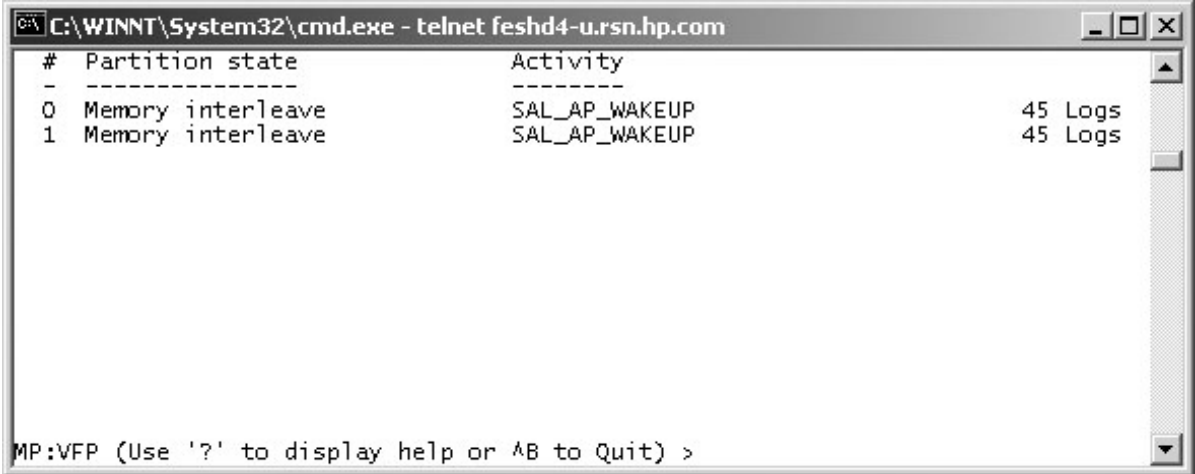
Name
--- ---
0) Partition 0
1) Partition 1
5) System (all partitions)
Q) Quit

Please select partition number: _

```

- From the VFP, enter **s** to select the whole system or enter the partition number to select a particular partition. You should see an output similar to that shown in Figure C-6.

**Figure C-6 Example of Partition State**



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
Partition state Activity

0 Memory interleave SAL_AP_WAKEUP 45 Logs
1 Memory interleave SAL_AP_WAKEUP 45 Logs

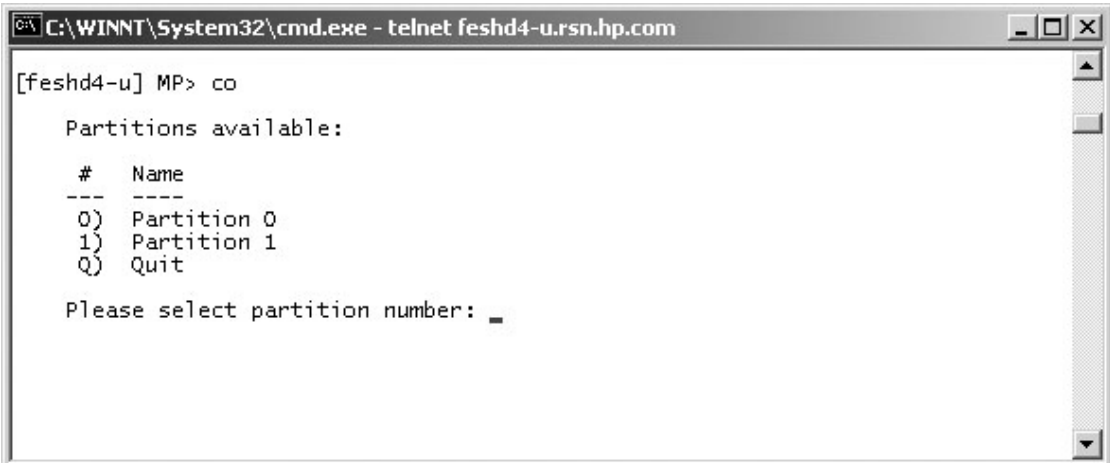
MP:VFP (Use '?' to display help or ^B to Quit) >
```

- Press **ctrl+B** to exit the Virtual Front Panel and return to the Main Menu.

## Shutting Down the Operating System

You must shut down the operating system on each partition. From the Main Menu prompt, enter **co** to bring up the Partition Consoles Menu (Figure C-7).

**Figure C-7 Partition Consoles Menu**



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP> co

Partitions available:

Name
--- ---
0) Partition 0
1) Partition 1
Q) Quit

Please select partition number: _
```

For each partition, to shut down the OS, follow these steps:

- Enter the partition number at the prompt.
- Log in to the console:
  - HP-UX: Log in as root
  - Linux: Log in as root
  - Windows: Log in as Administrator. From the Special Administration Console (SAC> prompt) enter **cmd** to start a new command prompt. Press **Esc+Tab** to switch to the channel for the command prompt and log in.

3. At the console prompt, shut down and halt the operating system by entering the shutdown command.
  - HP-UX: Enter the **shutdown -h** command
  - Linux: Enter the **shutdown -h <time>** command, where <time> is the number of minutes until system shutdown
  - Windows: Enter the **shutdown /s** command
4. Exit the partition console by entering **ctrl+B** after shutting down the system.
5. Repeat step 1 through step 4 for each partition.

## Preparing the Partitions for Shutdown



**IMPORTANT:** Before powering off the cabinets, HP recommends first that all partitions be brought to the boot-is-blocked (BIB) state. If any of the partitions do not stop at BIB, then wait for them to reach EFI or BCH and execute the RR command.

To ensure that all partitions are ready to be shut down, follow these steps:

1. From the CM> prompt, issue an rr command (Figure C-8).
2. Enter the partition number, and when prompted for reset of the partition number, enter **Y**.

**Figure C-8 Entering the rr Command**

```

C:\ Telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> rr

This command resets for reconfiguration the selected partition.

WARNING: Execution of this command irrecoverably halts all system
 processing and I/O activity and restarts the selected
 partition in a way that it can be reconfigured.

 # Name
 --- ---
 0> feshd4a
 1> feshd4b

Select a partition number: 0

Do you want to reset for reconfiguration partition number 0? <Y/[N]> y

-> The selected partition will be reset for reconfiguration.
[feshd4-u] MP:CM>

```

3. At the CM> prompt, enter **de -s** (Figure C-9).
4. From the de menu prompt, enter **s** to display the Cell PDH Controller.
5. When prompted, enter the cabinet and cell board number on which the partition resides.
6. Read the Cell PDH Controller status to determine if the partition is at BIB.



Figure C-9 Using the `de -s` Command

```
Telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> de -s

This command displays status of the selected MP bus device.

C - CLU <located on the UGUY board>
D - PACI <located on the CIO board>
M - MP <located across SBC and SBCH boards>
P - PM <located on the UGUY board>
S - Cell PDH Controller <located on the Cell board>
 Select device: s

Enter cabinet number: 0
Enter slot number: 0

Cell PDH Controller(0, 0) Status
PDHC FW Revision : 14.10, SUN AUG 17 10:56:24 2003
Cell Type : IA, comp:complex=B/0x42,part-cell=C/0x43 cpu=Z/0x5a
Cell Frequencies : FSB = 200.0 MHz (0x03), CPU core = 1200.0 MHz (0x93)
)
System FW Revision : 1.12
Cell Hardware Revisions : Cell=0x07, PDH Daughtercard=0x00
Programming Model : PDHC=0x00, PDH=0x03
CPLD Revisions : PDHC CPLD=0x10, PDH CPLD=1.0, LPM=0x11
State : 0x1a (BIB SMG CCO USB dbg), PDH accessible
Reset State : 0x0000
Power State : good, no fault voltage margin=nominal
 Power Board Brick Faults : 0x00 (<)
 Cell Board Brick Faults : 0x00 (<)
 CPU Module Brick Faults : 0x00 (<)
LED State : 0x06 (_ * * _)
IO Chassis Cable Status : 0x01 (Connection OK)
IO Chassis Phys Location : 0x01 (cabinet=0, IO bay=0, IO chassis=1)
Core Cell Number : 0x00 (Invalid, cabinet=0, slot=0)
CPU Module Presence : 0 1 2 3 <FRU Pres Mask=7a f7 08 7b 55 55 55 55>
 : * * * *
DIMM Presence : Quad: | 0 | 1 | 2 | 3 |
 : Side: | A | B | A | B | A | B | A | B |
 : Rank: |0123|0123|0123|0123|0123|0123|0123|0123|
 : |*_*|*_*|*_*|*_*|*_*|*_*|*_*|*_*|

[feshd4-u] MP:CM>
```

7. Repeat step 1 through step 6 for each partition.

## Powering Off the System

To power off the system, follow these steps:

1. From the Command Menu, enter `pe` (Figure C-10).

Figure C-10 Power Entity Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> pe

This command controls power enable to a hardware device.

B - Cabinet
C - Cell
I - IO Chassis
 Select Device: b

Enter cabinet number: 0

The power state is OFF for Cabinet 0.
In what state do you want the power? (ON/OFF) _
```

2. Enter the number of the cabinet to power off. In Figure C-10, the number is 0.
3. When prompted for the state of the cabinet power, enter `off`.
4. Enter `ps` at the `CM>` prompt to view the power status (Figure C-11).

**Figure C-11 Power Status First Window**

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> ps
This command displays detailed power and hardware configuration status.
The following MP bus devices were found:

| Cab. | UGUY | Cells | Core IOs |
| # | MP | CLU | PM | 0 1 2 3 4 5 6 7 | IO Bay 0 | IO Bay 1 | IO Bay 2 | IO Bay 3 |
					IO Chas.	IO Chas.	IO Chas.	IO Chas.			
0	*	*	*	*	*	*	*	*	*	*	*

You may display detailed power and hardware status for the following items:
 B - Cabinet (UGUY)
 C - Cell
 G - MP
 I - Core IO
 Select Device: _

```

5. Enter **b** at the select device prompt to ensure that the cabinet power is off. The output should be similar to that in Figure C-12. The power switch is on, but the power is not enabled.

**Figure C-12 Power Status Second Window**

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u
G - MP
I - Core IO
 Select Device: b

Enter cabinet number: 0

HW status for SD32A compute cabinet #0: NO FAILURE DETECTED
Power switch: on; Power: not enabled, not present; Door: open
Fan speed: normal; Temperature state: normal
Redundancy state: fans and blowers redundant, BPSs redundant

Main BP	Main BP	Cells	IO Backplanes	
	Power		IO Bay 0	IO Bay 1
	Boards	0 1 2 3 4 5 6 7	Chassis	Chassis
	0 1 2		0 1 2 3	0 1 2 3						
Populated	*	* * * * *	* * * * *	* * * * *						
Power Enabled										
Powered On										
Power Fault										
Attention LED										
-----	-----	-----	-----	-----						
	BPS	Cabinet	IO							
	0 1 2 3 4 5	Blowers	Fans							
	0 1 2 3	0 1 2 3	0 1 2 3 4							
---	---	---	---	---	---	---	---	---		
Populated	* * * * *	* * * * *	* * * * *							
Failed										
-----|-----|-----|-----|
-- Press <CR> to continue, or 'Q' to Quit --

```

The cabinet is now powered off.

## Turning On Housekeeping Power

To turn on housekeeping power to the system, follow these steps:

1. Verify that the ac voltage at the input source is within specifications for each cabinet being powered on.

2. Ensure the following:
  - The ac breakers are in the OFF position.
  - The cabinet power switch at the front of the cabinet is in the OFF position.
  - The ac breakers and cabinet switches on the I/O expansion (IOX) cabinet (if one is present) are in the OFF position.
3. If the complex has an IOX cabinet, power on this cabinet first.



---

**IMPORTANT:** The 48 V switch on the front panel must be OFF at this time.

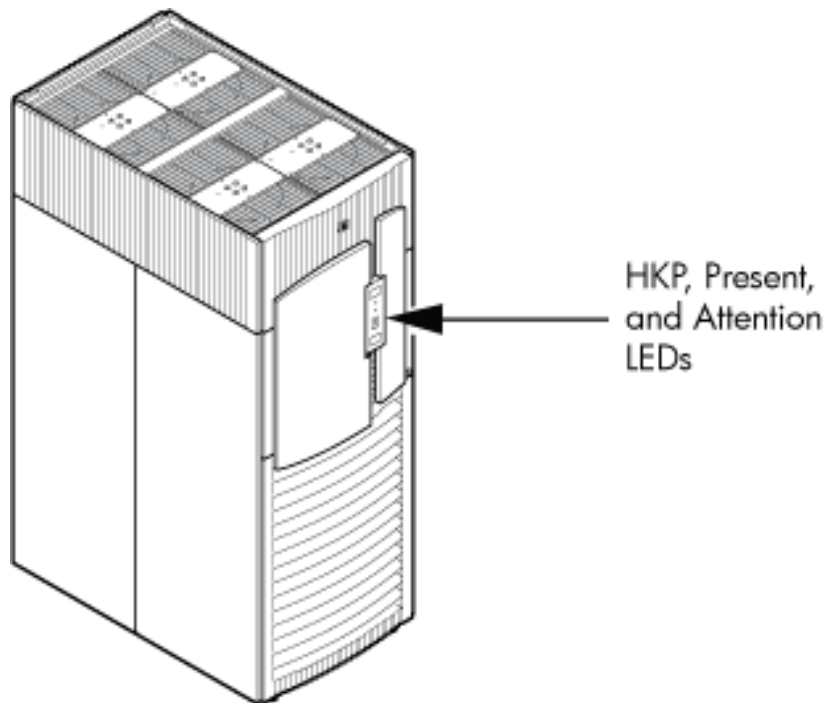
---

4. Turn on the ac breakers on the PDCAs at the back of the each cabinet.  
In a large complex, power on cabinets in one of the two following orders:
  - 9, 8, 1, 0
  - 8, 9, 0, 1

On the front and back panels, the HKP and Present LEDs illuminate (Figure C-13).

On cabinet 0, the HKP and the Present LEDs illuminate, but only the HKP LED illuminates on cabinet 1 (the right cabinet).

**Figure C-13 Front Panel Display with Housekeeping (HKP) Power and Present LEDs On**

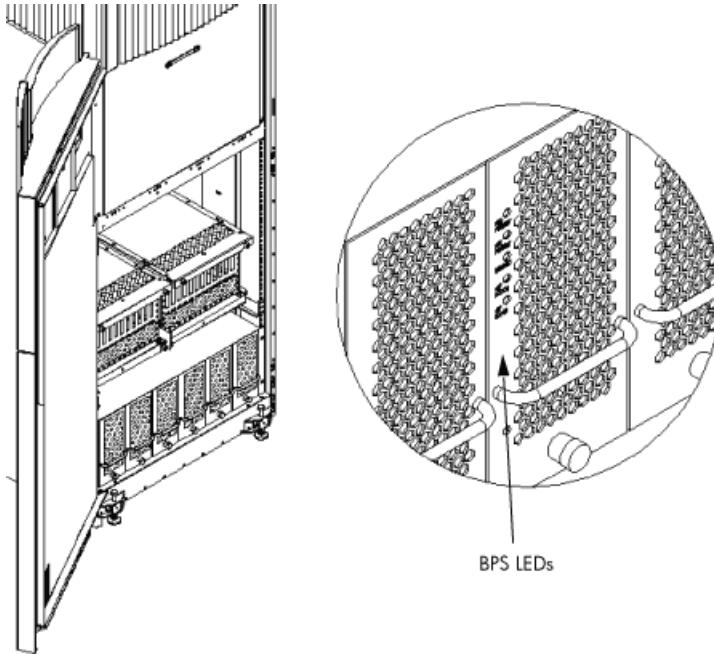


5. Examine the bulk power supply (BPS) LEDs (Figure C-14).

When on, the breakers on the PDCA distribute power to the BPSs. Power is present at the BPSs when:

- The amber LED labeled AC0 Present is on (if the breakers are on the PDCA on the left side at the back of the cabinet).
- The amber LED labeled AC1 Present is on (if the breakers are on the PDCA on the right side at the back of the cabinet).

**Figure C-14 BPS LEDs**



## Powering On the System Using the PE Command

To power on the system, follow these steps:

1. From the Command Menu, enter the **pe** command.



**IMPORTANT:** If the complex has an IOX cabinet, power on this cabinet first.

In a large complex, power on the cabinets in one of the two following orders:

- 9, 8, 1, 0
- 8, 9, 0, 1

2. Enter **B** and then the cabinet number (Figure C-15).

**Figure C-15 Power Entity Command**

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> pe
This command controls power enable to a hardware device.
 B - Cabinet
 C - Cell
 I - IO Chassis
 Select Device: b
Enter cabinet number: 0
The power state is OFF for Cabinet 0.
In what state do you want the power? (ON/OFF) _
```

3. Enter **on** to power on the cabinet.
4. From the **CM>** prompt, enter **ps** to observe the power status. The status screen shown in Figure C-16 appears.

**Figure C-16 Power Status First Window**

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> ps
This command displays detailed power and hardware configuration status.
The following MP bus devices were found:

| Cab. | UGUY | Cells | Core IOs |
#	MP	CLU	PM	0 1 2 3 4 5 6 7	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3						
0	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-----	-----	-----	-----	-----	-----	-----	-----	-----						
You may display detailed power and hardware status for the following items:
 B - Cabinet (UGUY)
 C - Cell
 G - MP
 I - Core IO
 Select Device: _
```

- At the Select Device prompt, enter **B** then the cabinet number to check the power status of the cabinet. Observe that the power switch is on and power is enabled as shown in Figure C-17.

**Figure C-17 Power Status Window**

```

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
G - MP
I - Core IO
 Select Device: b

Enter cabinet number: 0

HW status for SD32A compute cabinet #0: NO FAILURE DETECTED
Power switch: on; Power: enabled, good; Door: open
Fan speed: high; Temperature state: normal
Redundancy state: fans and blowers redundant, BPSs redundant

 Main BP | Main BP | IO Backplanes
 Power | | IO Bay 0 | IO Bay 1
 Boards | Cells | Chassis | Chassis
 0 1 2 | 0 1 2 3 4 5 6 7 | 0 1 2 3 | 0 1 2 3
-----+-----+-----+-----+
Populated | * * * | * * * * * | * *
Power Enabled | * * * | * * * * * | * *
Powered On | * * * | * * * * * | * *
Power Fault | | |
Attention LED | | |

 BPS | Cabinet | IO
 0 1 2 3 4 5 | Blowers | Fans
 0 1 2 3 | 0 1 2 3 | 0 1 2 3 4
-----+-----+-----+
Populated | * * * * * | * * * * * | * * * * *
Failed | | |

-- Press <CR> to continue, or 'Q' to Quit --

```

# 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 your computer room floor plan.

## Templates

Figure D-1 illustrates the locations required for the cable cutouts.

Figure D-2 "SD16 and SD32 Space Requirements" illustrates the overall dimensions required for SD16 and SD32 systems.

Figure D-3 "SD64 Space Requirements" illustrates the overall dimensions required for an SD64 complex.

**Figure D-1 Cable Cutouts and Caster Locations**

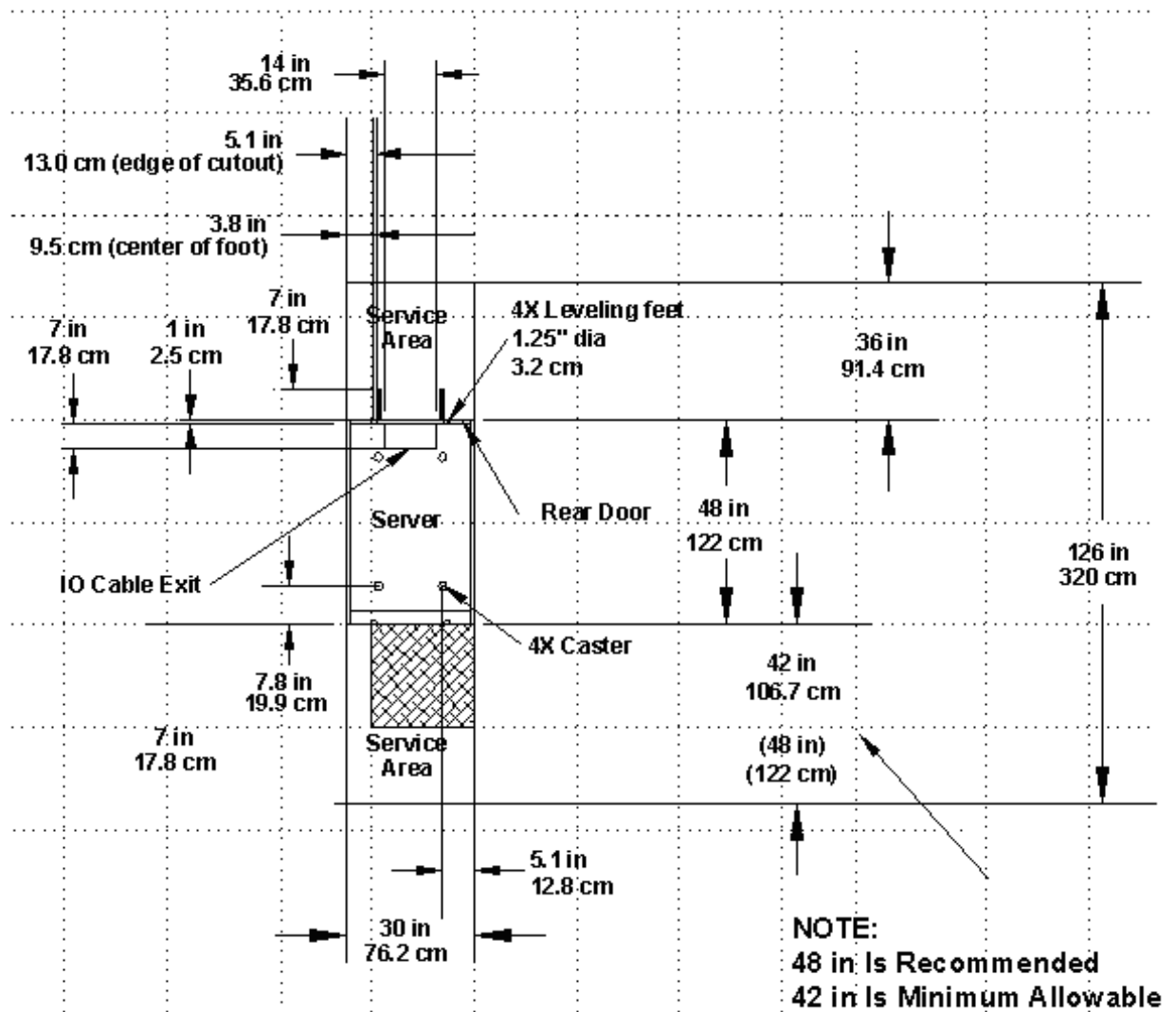
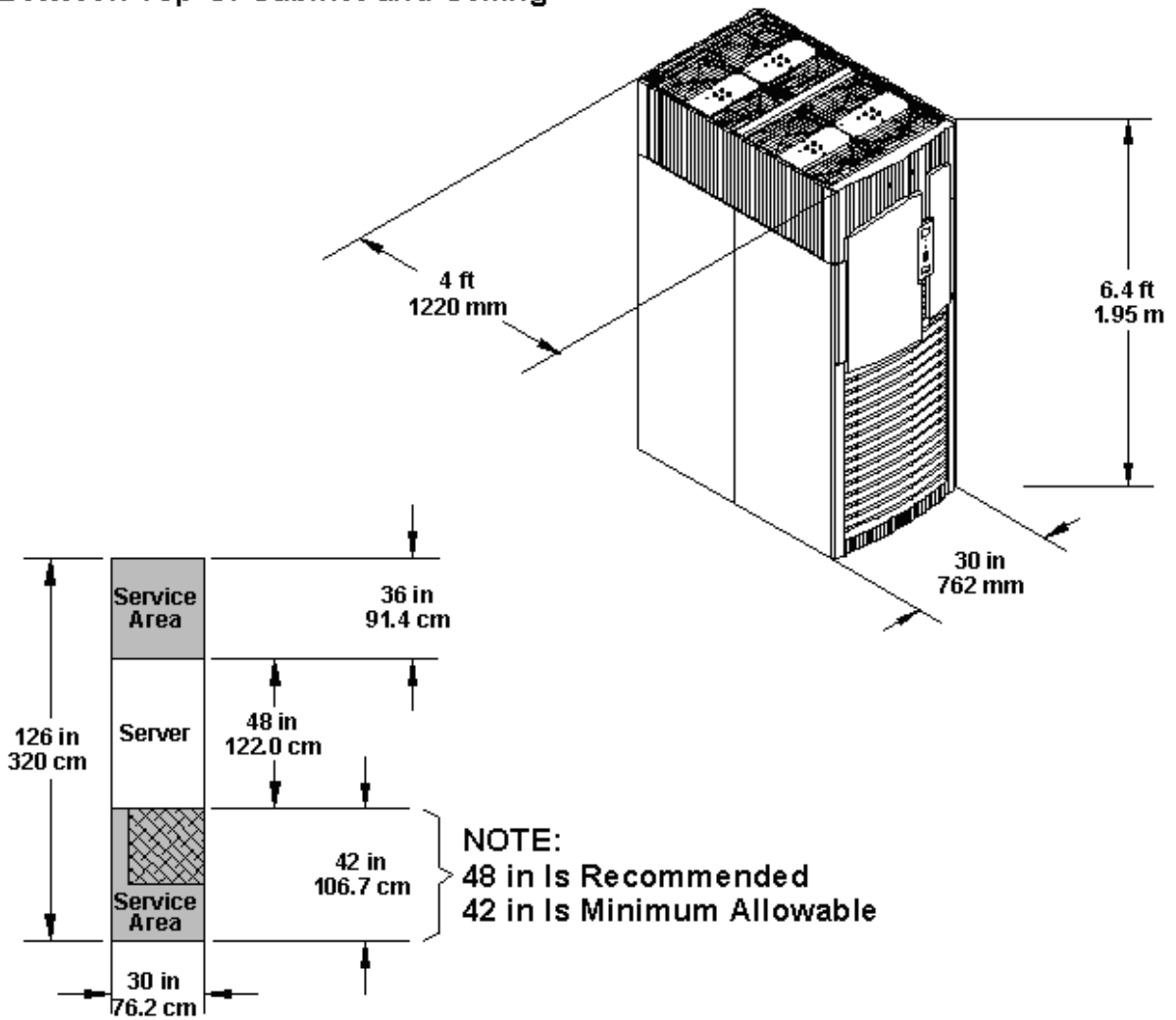


Figure D-2 SD16 and SD32 Space Requirements

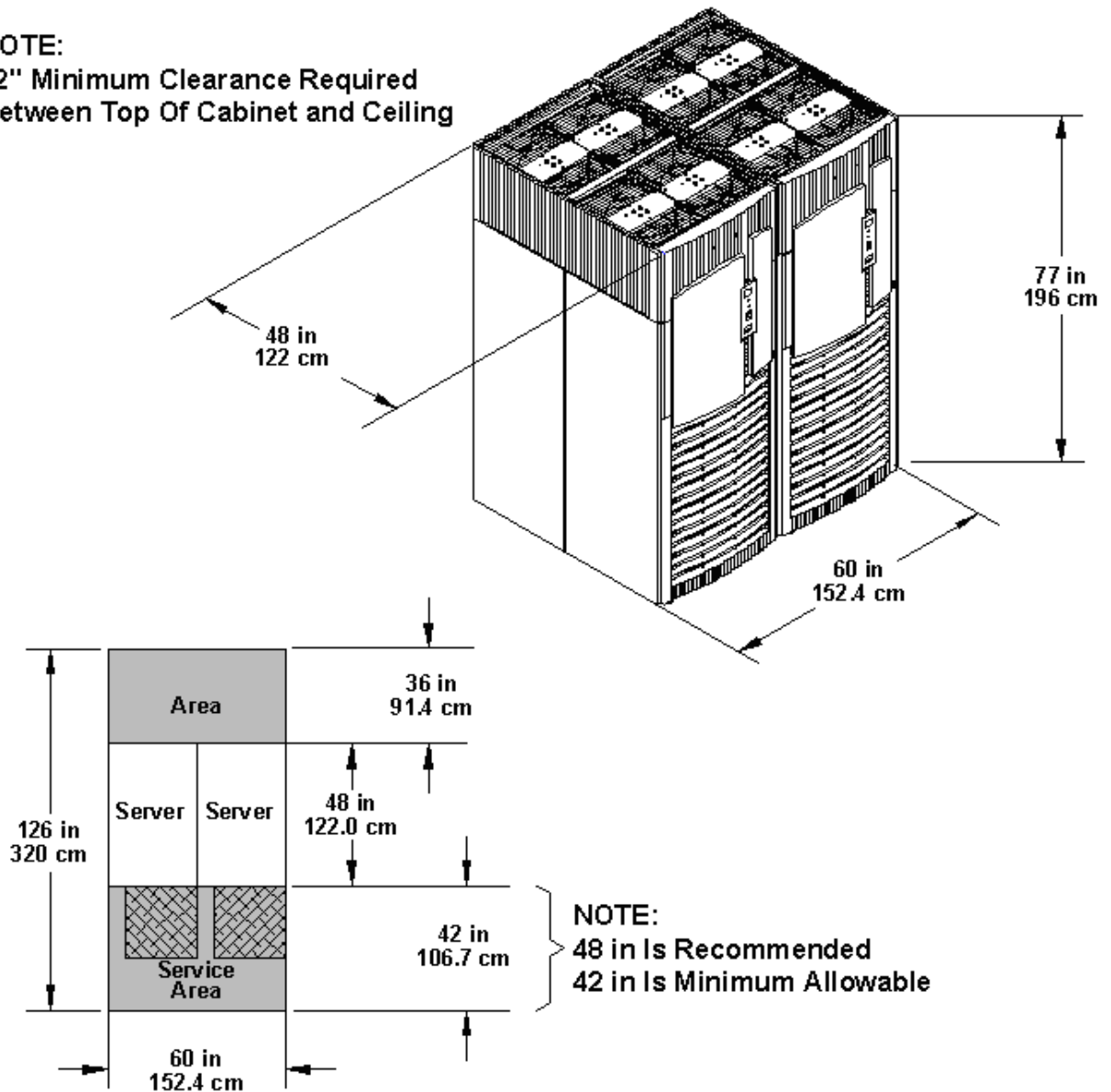
NOTE:  
12" Minimum Clearance Required  
Between Top Of Cabinet and Ceiling





**Figure D-3 SD64 Space Requirements**

**NOTE:**  
**12" Minimum Clearance Required**  
**Between Top Of Cabinet and Ceiling**



## 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.

Use equipment templates with the floor plan grid to define the location of the equipment to be installed in the computer room.



**NOTE:** Photocopying typically changes the scale of copied drawings. If any templates are copied, then all templates and floor plan grids must also be copied.

## Computer Room Layout Plan

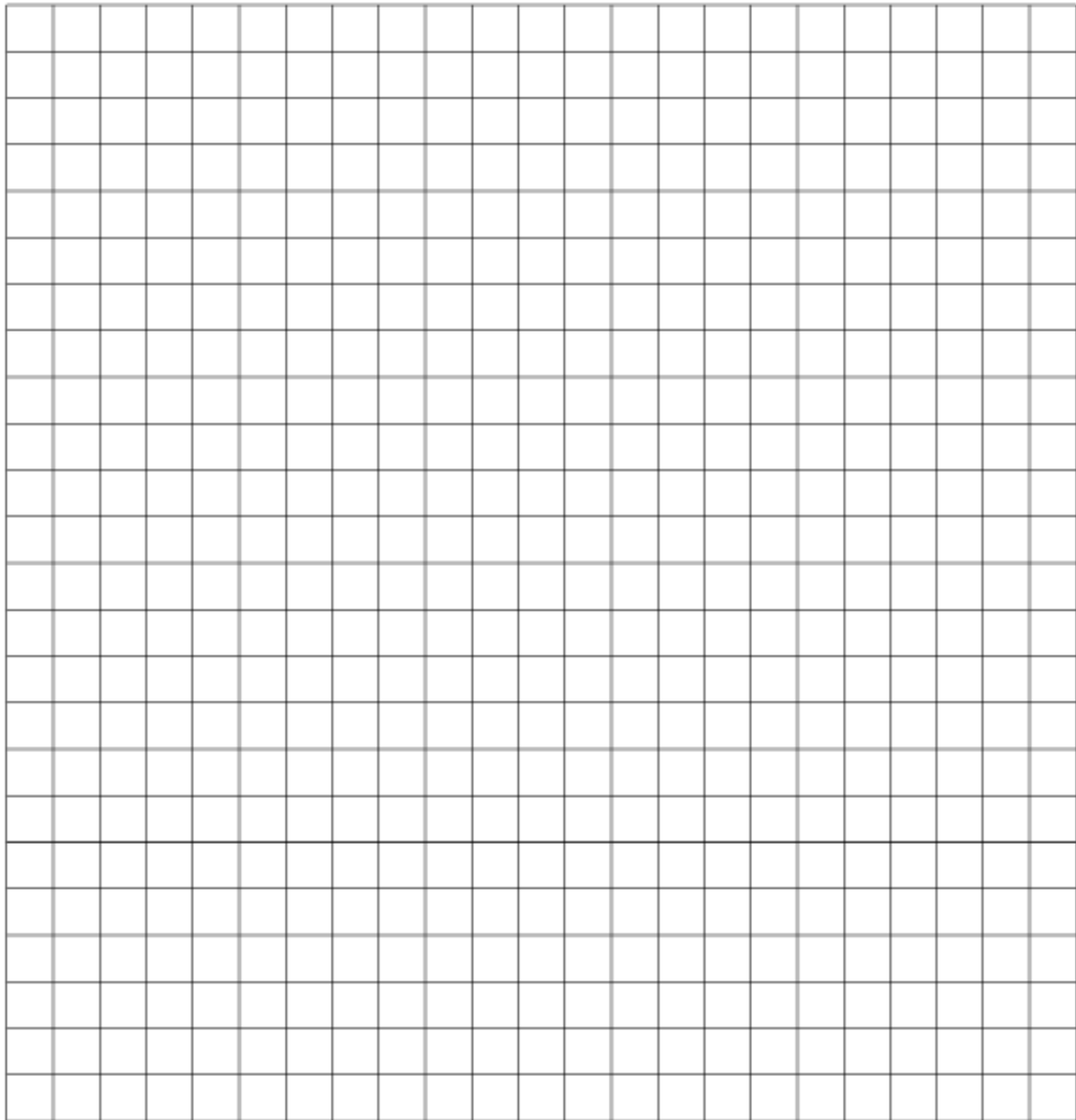
To create a computer room layout, follow these steps:

1. Remove several copies of the floor plan grid from this appendix.
2. Cut and join them together (as necessary) to create a scale model floor plan of the computer room.
3. Remove a copy of each applicable equipment footprint template.

4. Cut out each template selected in step 3, then place it on the floor plan grid created in step 2.
5. Position pieces until the desired layout is obtained then fasten the pieces to the grid. Mark the locations of the computer room doors, air conditioning floor vents, utility outlets, and so on.

**Figure D-4 Computer Floor Template**

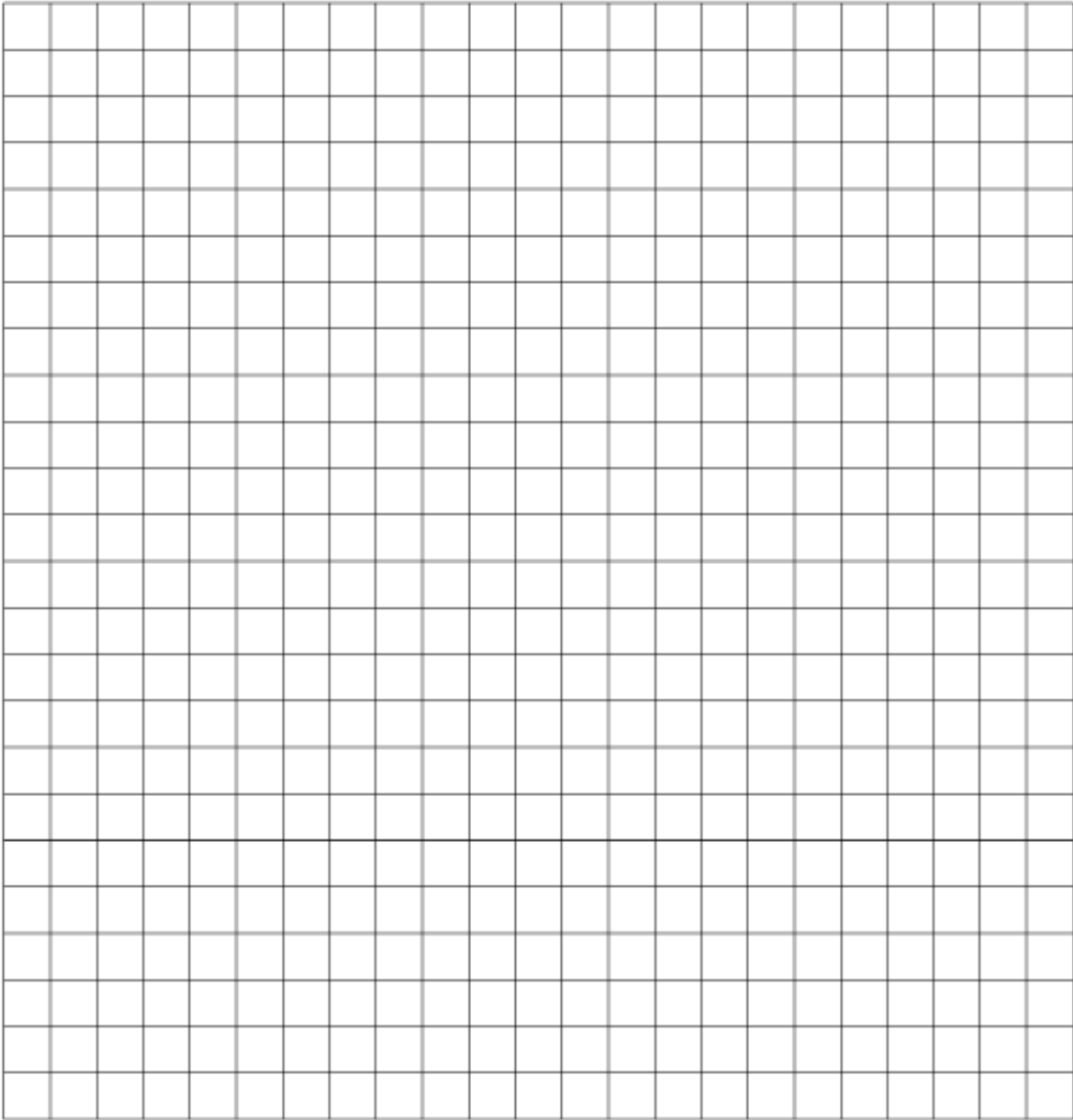
Scale: 1/4 inch = 1 foot



605P016A  
12/20/99

**Figure D-5 Computer Floor Template**

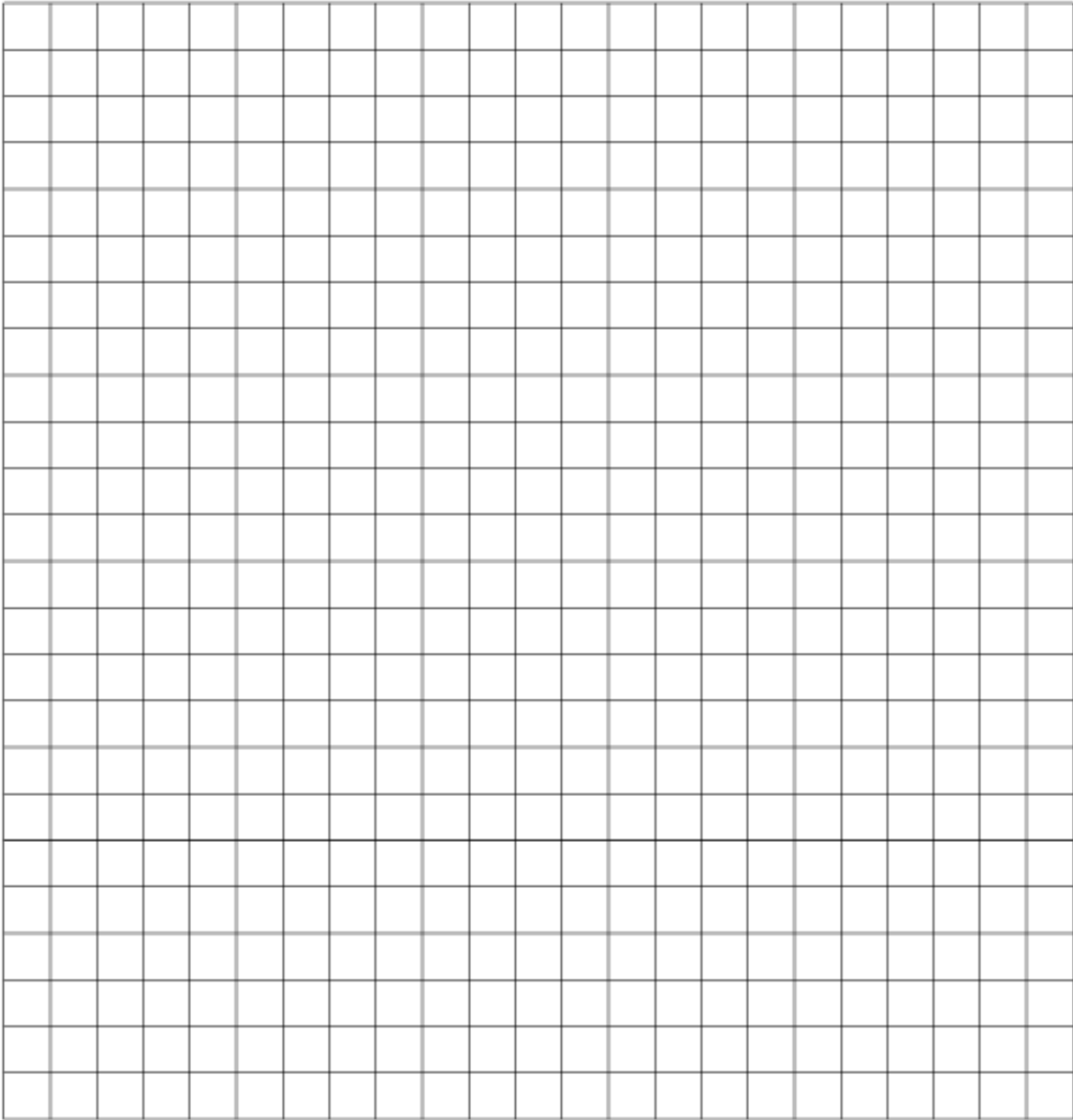
Scale: 1/4 inch = 1 foot



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12/20/99

**Figure D-6 Computer Floor Template**

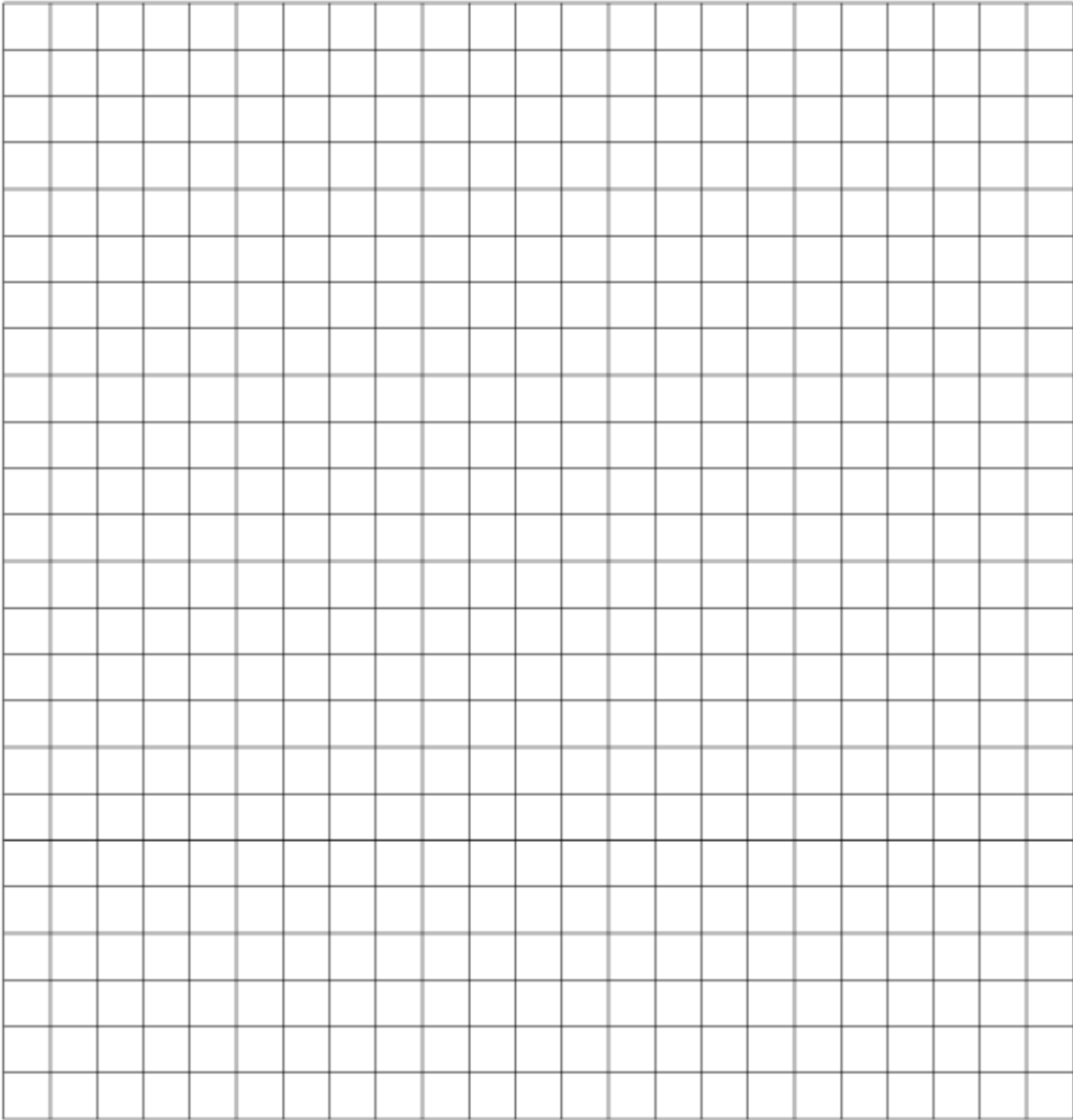
Scale: 1/4 inch = 1 foot



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**Figure D-7 Computer Floor Template**

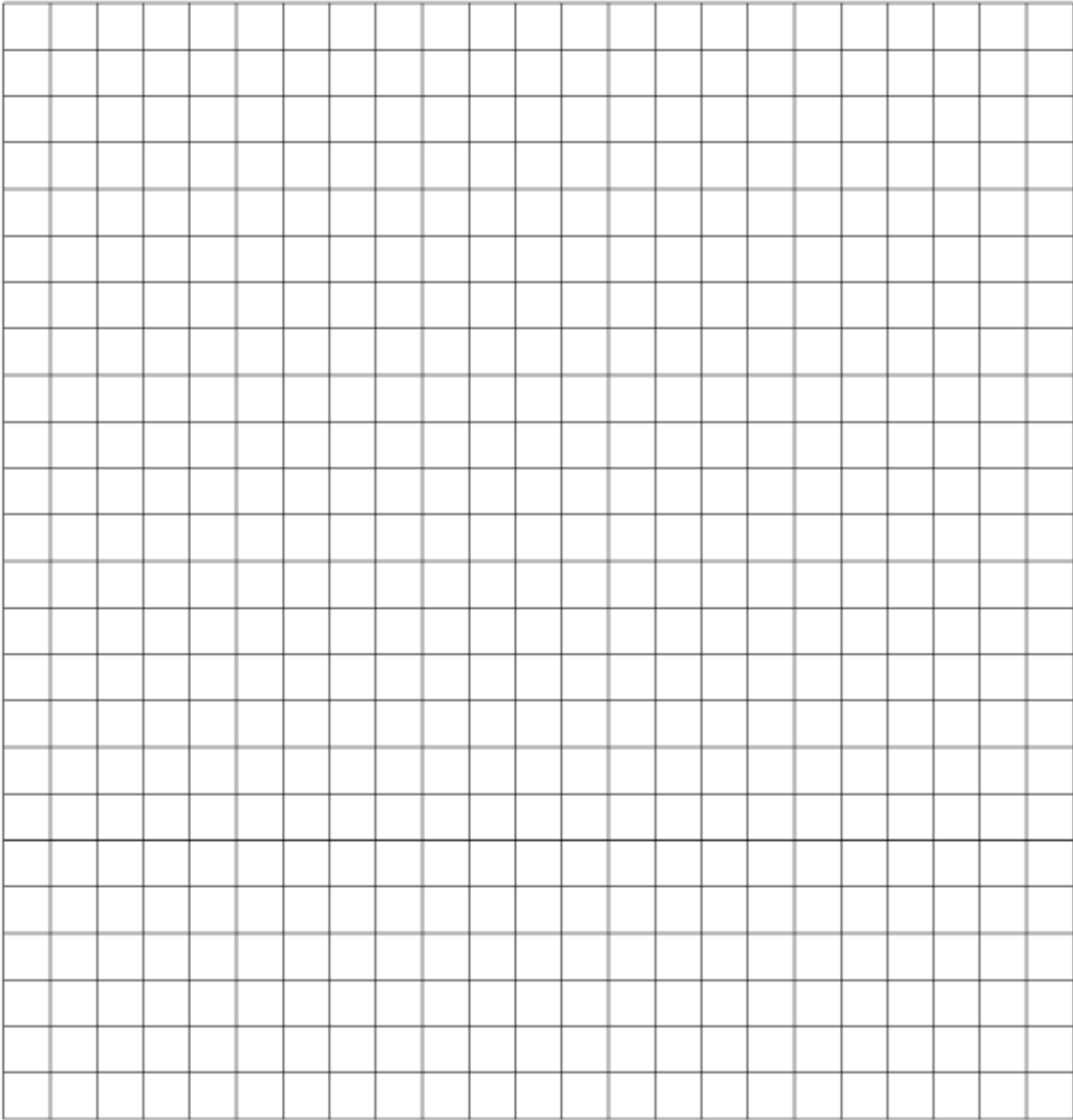
Scale: 1/4 inch = 1 foot



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**Figure D-8 Computer Floor Template**

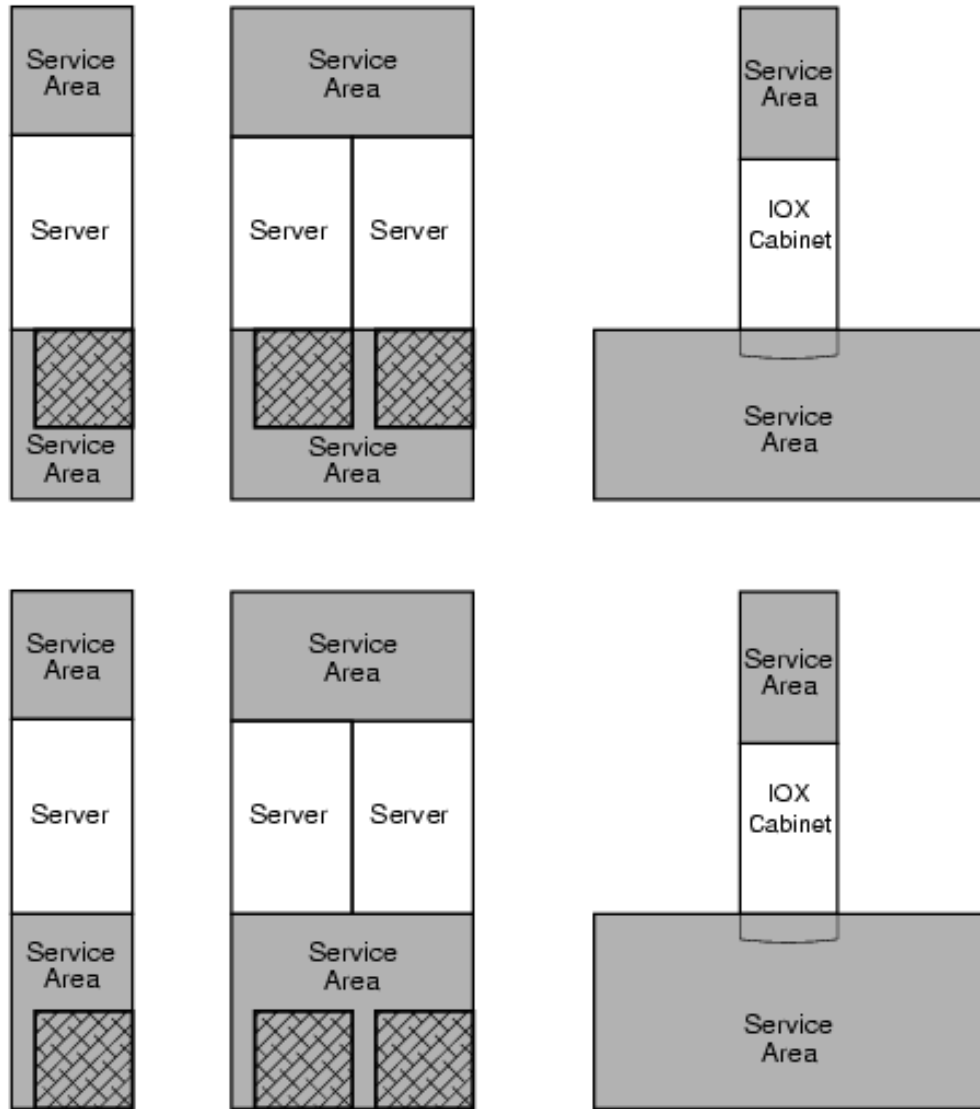
Scale: 1/4 inch = 1 foot



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Figure D-9 SD32, SD64, and IOX Cabinet Templates

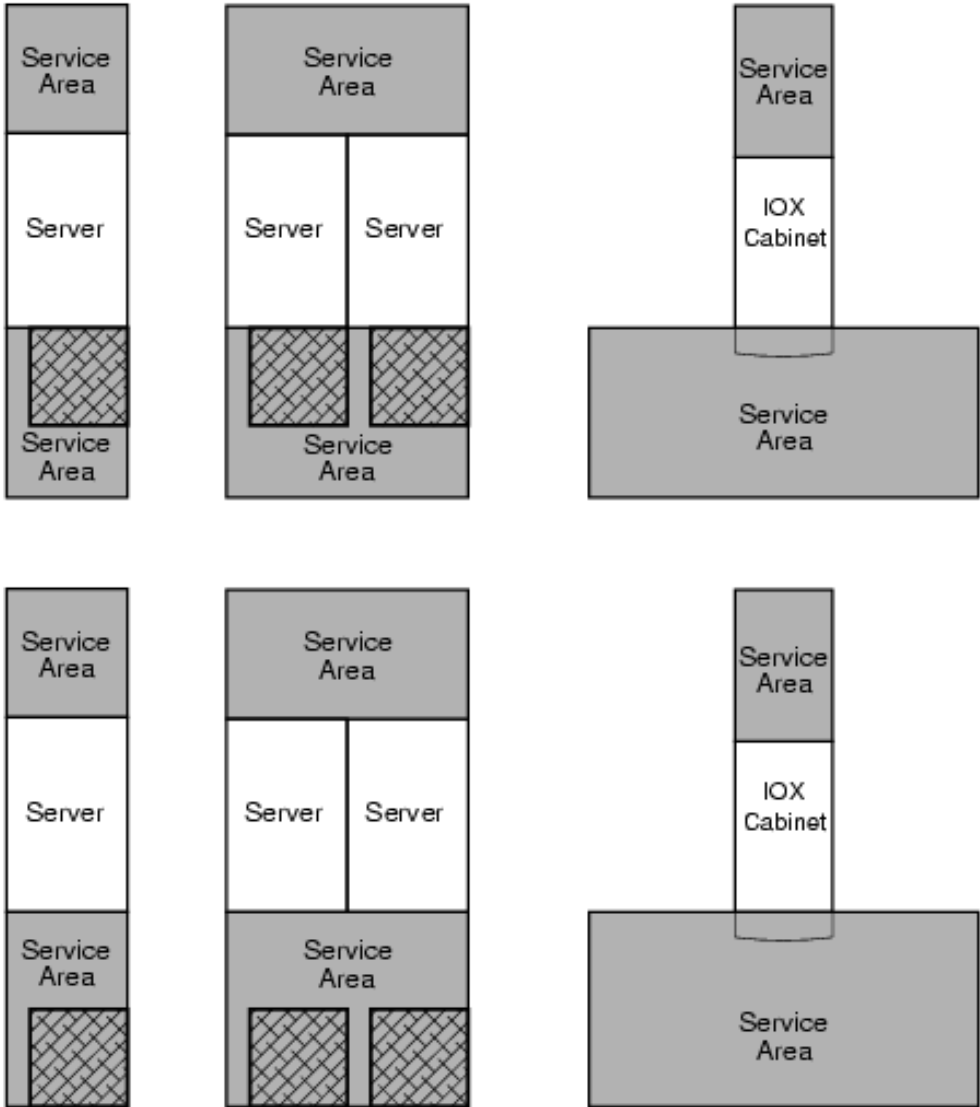
Scale: 1/4 inch = 1 foot



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7/16/00

Figure D-10 SD32, SD64, and IOX Cabinet Templates

Scale: 1/4 inch = 1 foot

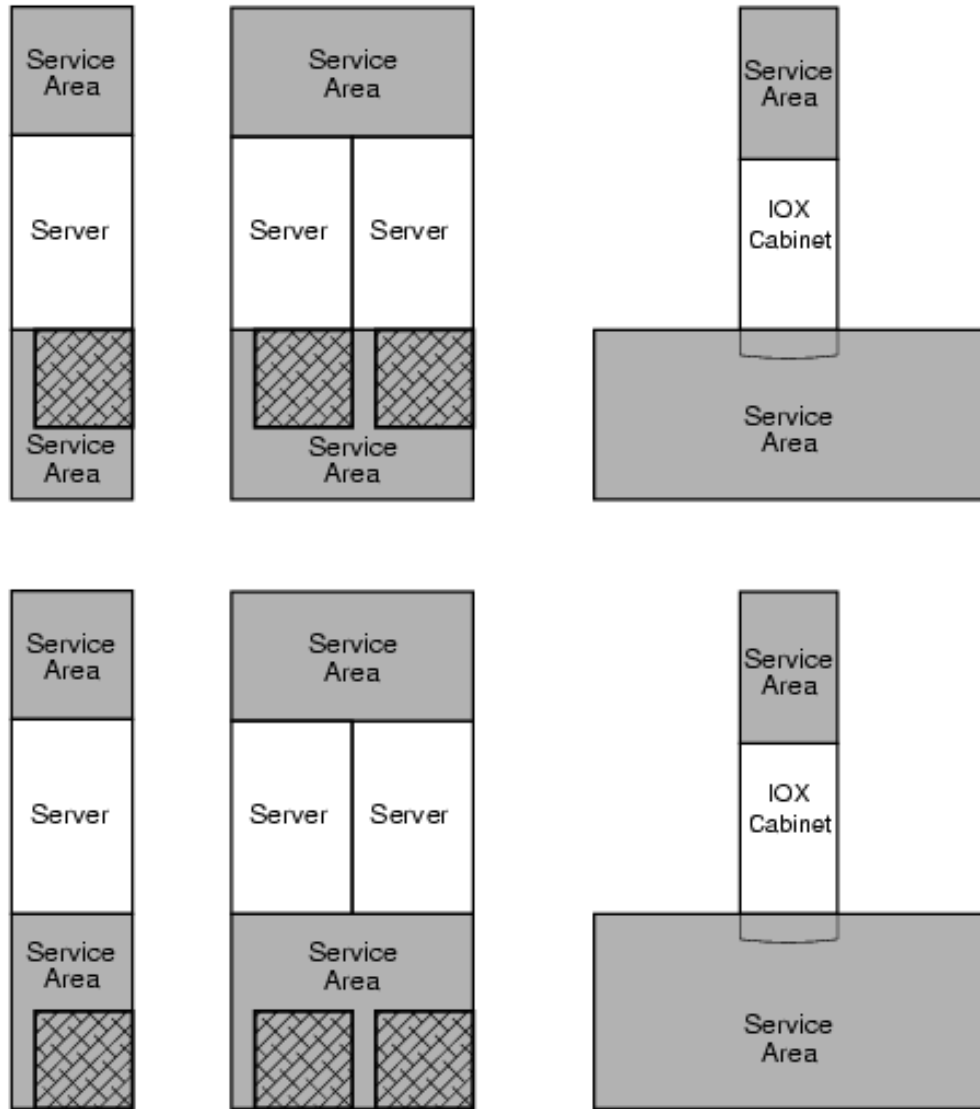


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7/16/00



Figure D-11 SD32, SD64, and IOX Cabinet Templates

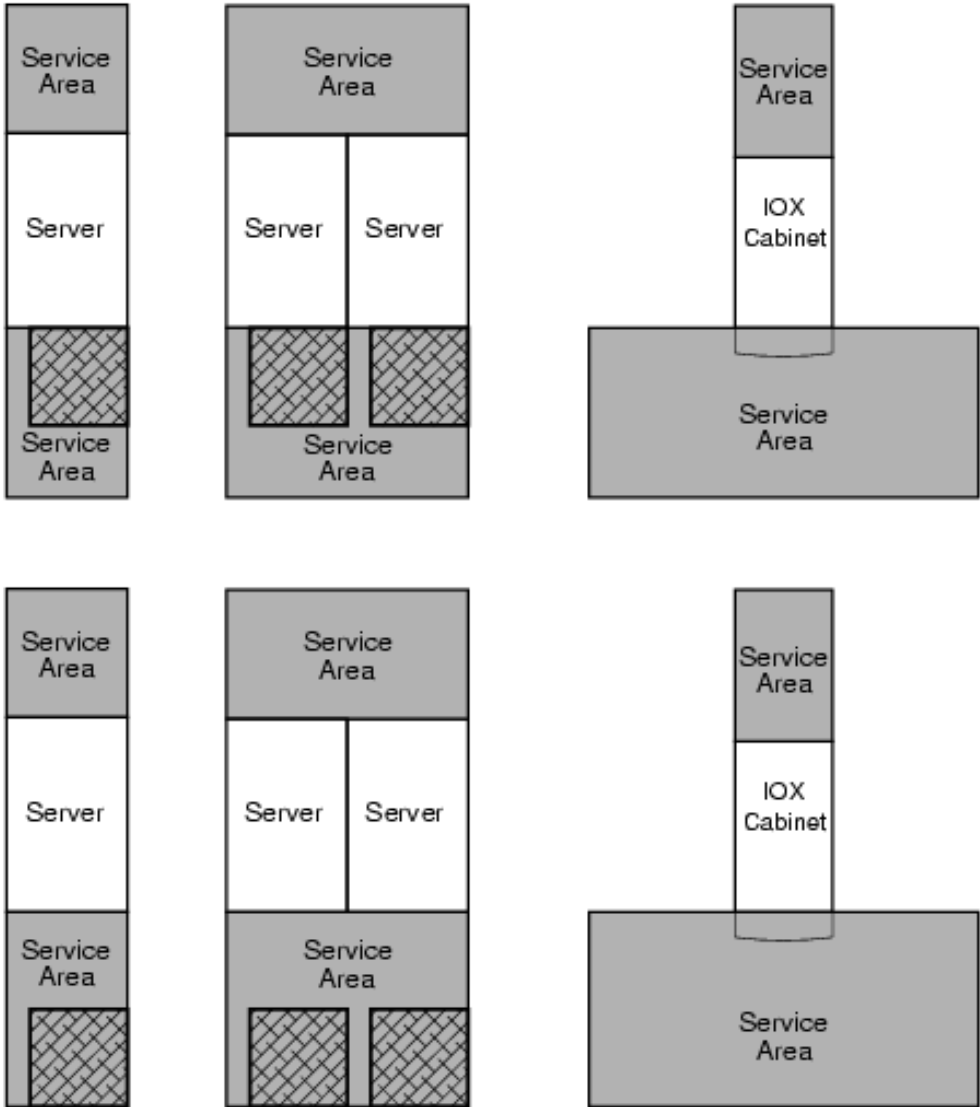
Scale: 1/4 inch = 1 foot



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7/16/00

Figure D-12 SD32, SD64, and IOX Cabinet Templates

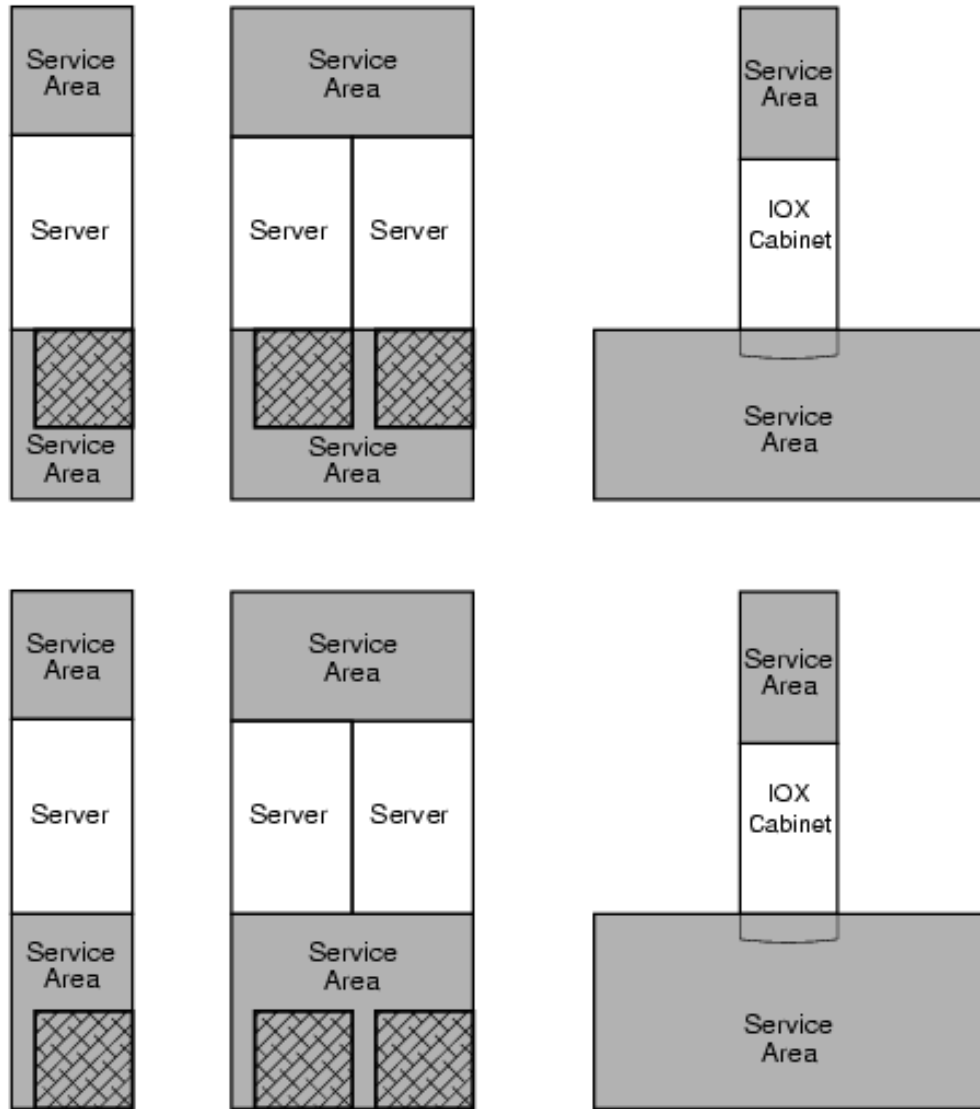
Scale: 1/4 inch = 1 foot



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7/16/00

Figure D-13 SD32, SD64, and IOX Cabinet Templates

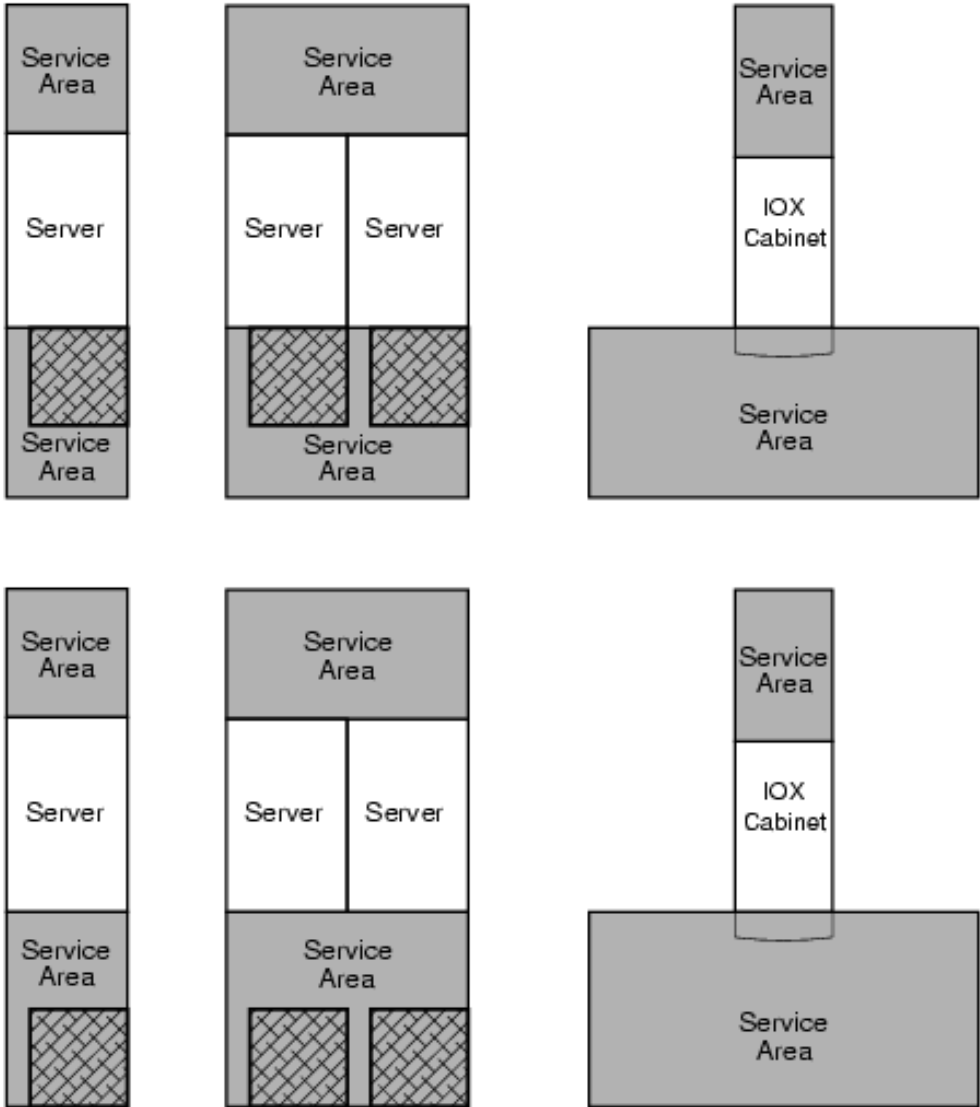
Scale: 1/4 inch = 1 foot



605P017A  
7/16/00

Figure D-14 SD32, SD64, and IOX Cabinet Templates

Scale: 1/4 inch = 1 foot



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7/16/00

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