hp 9000 rp3410 and rp3440
Operations Guide

Regulatory Model Number: FCLSA-0201

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1 About This Document

This document describes how to operate your hp 9000 rp3410 and rp3440 Servers, Regulatory Model Number: FCLSA-0201.

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

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What's in This Document

The *hp 9000 rp3410 and rp3440 Operations Guide* contains these chapters:

- **Chapter 2, "Controls, Ports and Indicators."** Use this chapter to learn about the front panel controls, rear panel ports and connectors, and all system LED locations and functions
- **Chapter 3, "External Connectors."** Use this chapter to learn about all external connectors, plugs, and their pinouts
- **Chapter 4, "Utilities."** Use this chapter to learn how to navigate in the EFI and management processor environments
- **Chapter 5, "Troubleshooting."** Use this chapter to learn how to perform minimal troubleshooting of your system
- **Chapter 6, "Specifications."** Use this chapter to learn the basic mechanical specifications of your HP Server

Typographical Conventions

This document uses the following conventions.

Title	The title of a document or a CD.
KeyCap	The name of a keyboard key. Note that **Return** and **Enter** both refer to the same key.
Emphasis	Text that is emphasized.
Bold	Text that is strongly emphasized, such as the summary text in bulleted paragraphs.
`ComputerOut`	Text displayed by the computer.
`UserInput`	Commands and other text that you type.
`Command`	A command name or qualified command phrase.

Related Documents

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Information to Collect Before You Contact Support

Before you contact HP support, you should:

Step 1. Check information on troubleshooting and attempt to solve the problem. Refer to the *Chapter 5, "Troubleshooting."*

- Note failure symptoms and error indications (LEDs and messages) by checking the SEL and FPL logs

- Try to determine precisely what did or did not happen

Step 2. Collect the following information:

- The model number of your server (for example, rp3410)

- The product number of your server. This can be found on the identification label, which is found at the front of the unit (typically A6961)

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

Step 3. Become familiar with your system configuration:

- Are you using the LAN, RS232, or web interface to monitor the server?

- How many processors, DIMMs, and PCI cards have been installed?

- What versions of processor, memory, and PCI cards are used and where are they installed?

- What accessories are installed?

Step 4. Determine the following:

- Which firmware versions are in use?

- When did the problem start?

- Have recent changes been made to the system?

- Which operating system and version is in use?

2 Controls, Ports and Indicators

This chapter describes the controls, ports, and indicators found on the front panel and rear panel locations of the hp 9000 rp3410 or rp3440 Server. The hp 9000 rp3410 and rp3440 Servers are designed to be rack mounted.

Control Panel

The control panel of the hp 9000 rp3410 and rp3440 Servers provide the controls and indicators commonly used for operation.

Figure 2-1   **Front View**
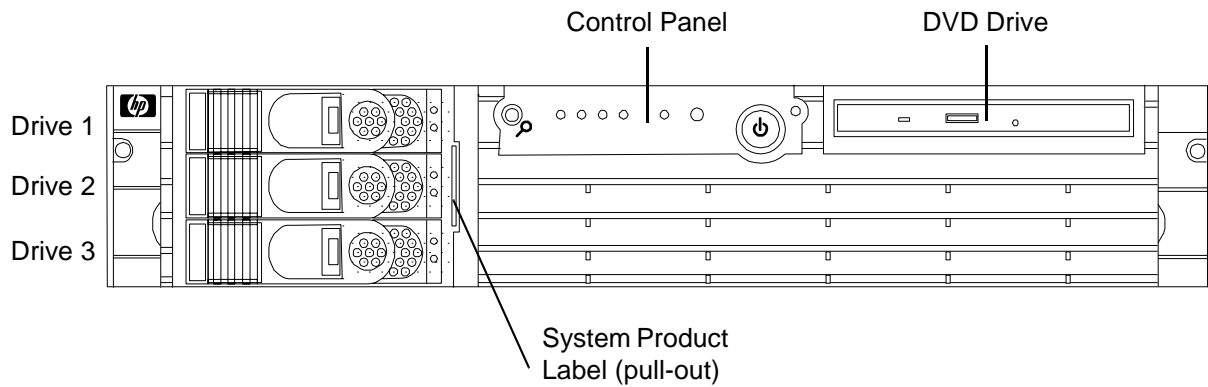
Figure 2-2   **Control Panel**
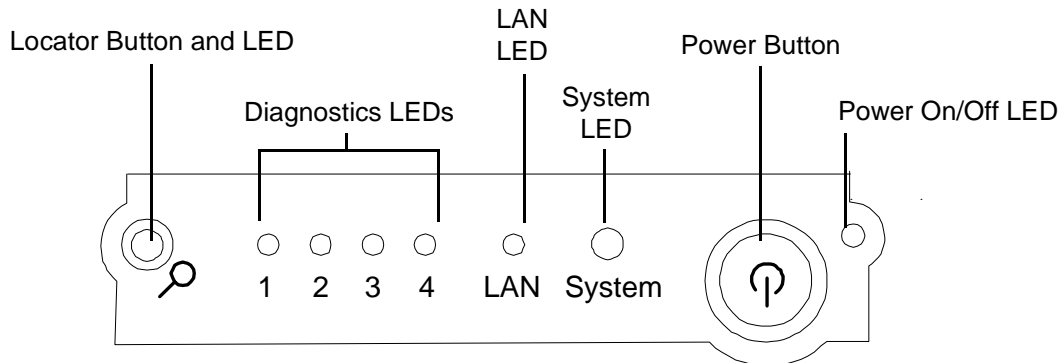
Table 2-1   Control Panel LEDs and Switches

Name	Function
Power On/Off LED	The green on/off LED is illuminated when the power is on

Power Button	Controls the power supply (turns system power on/off) if power is available to the power supply. (Controls both power supplies if two are installed.)
	
	If power is off but power is available to the power supplies, pressing the Power button:
	
	    Momentarily (less than 1 second) turns on the power supplies and applies power to server circuits
	
	    For more than 1 second and then released, has no effect.
	
	If power is on and the system is at ISL, pressing the Power button:
	
	    Momentarily (less than 1 second) has no effect
	
	    For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	
	    For more than 5 seconds (and then released) causes an immediate/hard power down.
	
	If power is on and the system is at BCH, pressing the Power button:
	
	    Momentarily (less than 1 second) causes a immediate/hard power down
	
	    For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	
	    For more than 5 seconds (and then released) causes an immediate/hard power down.
	
	If power is on but the OS has been shut down, pressing the Power button:
	
	    Momentarily (less than 1 second) has no effect
	
	    For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	
	    For more than 5 seconds (and then released) causes an immediate/hard power down.
	
	If the OS is running, pressing the Power button:
	
	    Momentarily (less than 1 second) has no effect
	
	    For more than 1 second, but less than 5 seconds—do not use. This selection initiates e-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	
	    For more than 5 seconds (and then released) causes an immediate/hard power down.

System LED	The System LED provides information about the system status. When operation is normal, the LED is green. When there is a system warning, the LED is flashing yellow. When there is a system fault, the LED is flashing red[a]
LAN LED	The LAN LED provides status information about the LAN interface. When the LAN LED is flashing, there is activity on the LAN

Table 2-1   **Control Panel LEDs and Switches (Continued)**

Name	Function
Diagnostic LED 1	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system[a]
Diagnostic LED 2	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system[a]
Diagnostic LED 3	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system[a]
Diagnostic LED 4	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system[a]
Locator Button and LED	The locator button and LED are used to help locate this server within a rack of servers. When the button is engaged, the blue LED illuminates and an additional blue LED on the rear panel of the server illuminates. This function may be remotely activated

a. Refer to Chapter 5, "Troubleshooting," for information provided by the System and diagnostic LEDs.

Additional Controls and Indicators

The hp9000 rp3410 and rp3440 Servers can have up to three low-voltage differential (LVD), 3.5 inch form factor hot-pluggable disk drives installed. These disk drives have LEDs that provide status and activity information.

Hot-Plug Disk Drive Indicators

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

• Status LED—The Drive Status LED is tri-color and may display green, yellow, or red at any given time. These colors indicate a normal, warning, or failure condition

• Activity LED—The Drive Activity LED is green and indicates disk drive activity. This LED is directly controlled by the disk drive and turns on when a drive is accessed

Figure 2-3   Hot-Plug Disk Drive LED Indicators
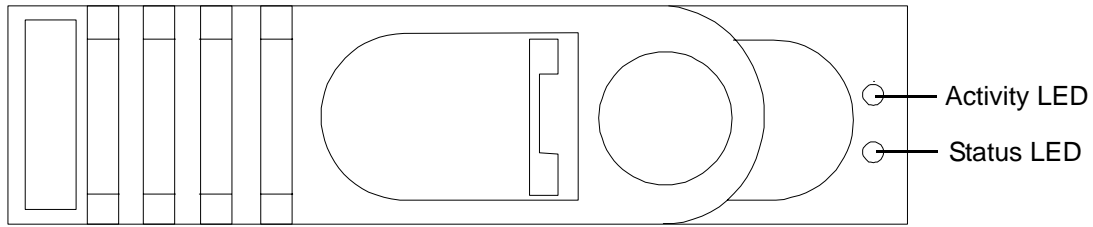
Table 2-2   Hot-Plug Disk Drive LED Definitions

LED	State	Description
Activity LED	Flashing green	Drive access under hard drive control
Status LED	Solid red	Drive fault
	Slow flashing yellow	Drive predictive fault
	Green	Drive/slot normal (drive present)
	Blank	Pass through mode

Optional Removable Media Drive

The hp 9000 rp3410 and rp3440 Servers are delivered without a removable media drive. Either a DVD-ROM or CD-RW/DVD-ROM drive may be added. Each of these optional devices has one activity LED.

Figure 2-4   DVD–ROM
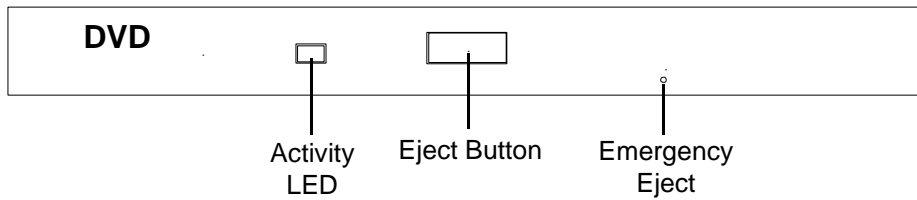
Table 2-3   DVD Drive LED Definitions

LED	State	Description
Activity LED	Flashing green	Drive activity

Rear Panel

The hp 9000 rp3410 and rp3440 Server rear panels include communication ports, I/O ports, AC power connector, and the locator LED/button. Additional LEDs located on the rear panel of the hp 9000 rp3410 and rp3440 Servers signal the operational status of:

• Management Processor Card LAN

Figure 2-5   Rear View
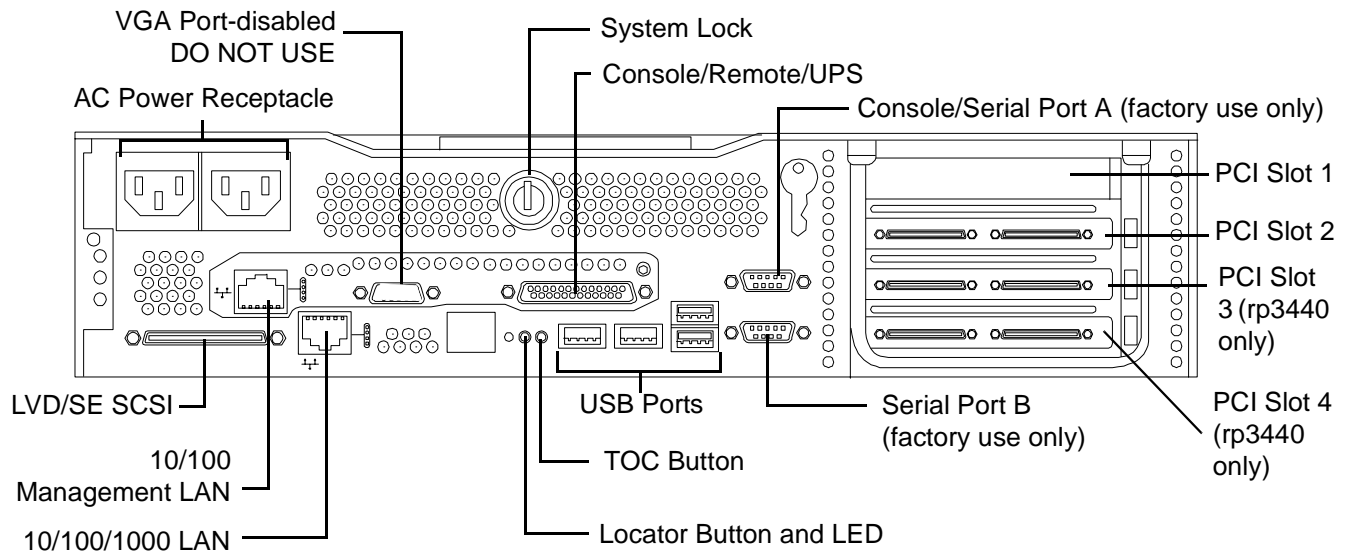
Table 2-4   Rear Panel Connectors and Switches

Connector/Switch	Function
AC Power	Primary power connection for the server
LVD/SE SCSI	68-pin, low-voltage differential, single-ended U160 SCSI. This connector provides external SCSI connection on SCSI Channel B
(1 Gb) 10/100/1000 LAN	10/100/1000 base-T ethernet LAN connector
Serial A (console) and Serial B	9-pin male serial connectors—factory use only
USB	Four universal serial bus (USB 2.0) connectors
TOC	Transfer of control button. Halts all system processing and I/O activity and restarts the computer system
Locator Button and LED	The locator button and LED are used to help locate a server within a rack of servers. When the button is engaged, the blue LED illuminates and an additional blue LED on the front panel of the server illuminates. This function may be remotely activated

Table 2-4   Rear Panel Connectors and Switches (Continued)

Connector/Switch	Function
Video (not used)	15-pin female video connector. DISABLED-DO NOT USE. To enable video capability you must obtain the supported A6150 video PCI card. See enclosed ReadMe, A6150-90001
Console/Remote/UPS	25-pin female serial data bus connector for the management processor card
10/100 MP LAN	10 Mb/100 Mb LAN connector for the management processor card

10/100/1000 base-T ethernet LAN Connector

The rear panel 10/100/1000 base-T ethernet LAN connector has the following status and activity LEDs.

Figure 2-6   10/100/1000 base-T ethernet LAN Connector LEDs

Table 2-5   10/100/1000 base-T ethernet LAN Connector LEDs

LED	Description
1000BT	Blinking green—the 1000 MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
100BT	Blinking green—the 100 MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
10BT	Blinking green—the 10 MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
Activity	Blinking green—LAN activity

Management Processor Card LAN LEDs

The management processor LAN uses an RJ-45 type connector. This connector has four LEDs that signal status and activity.

Figure 2-7   Management Processor Card LAN LEDs
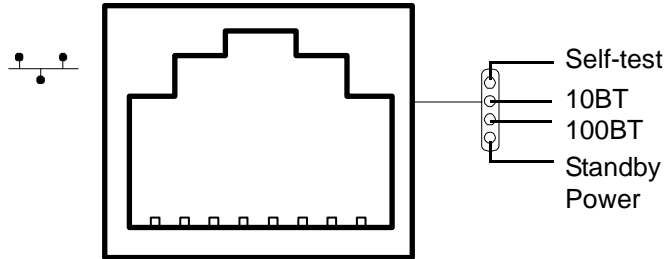
Table 2-6   Management Processor Card LAN LEDs

LED	Description
Self-test	Yellow—MP is running self-test or error detected
10BT	Green—10BT link established, blinking green—10BT link activity, off—no link
100BT	Green—100BT link established, blinking green—100BT link activity, off—no link
Standby Power	Green—Standby power on, off—standby power off

3   External Connectors

This chapter describes the external connectors provided on the hp 9000 rp3410 and rp3440 Servers.

Connector Pinouts

The following ports and connectors are found on the rear panel of the hp 9000 rp3410 and rp3440 Servers.

- Dual USB 2.0
- Serial A (console) and Serial B (factory use only)
- 68-pin LVD, SE U160 SCSI
- 10/100 Management LAN
- 10/100/1000 LAN

Figure 3-1   Rear View of Server
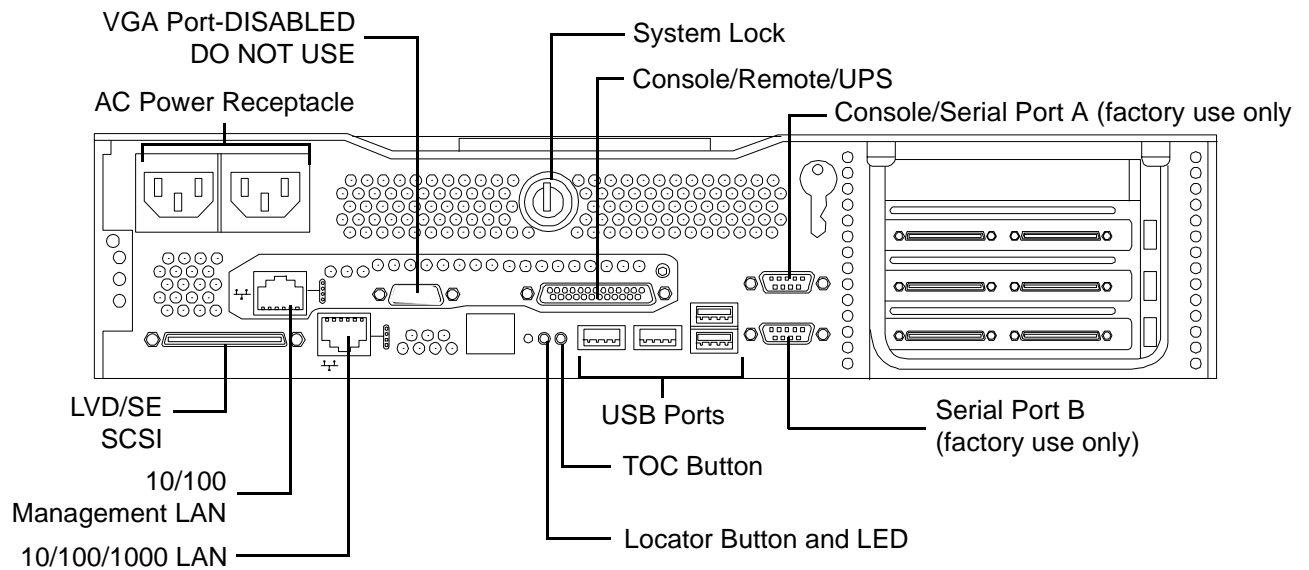
Universal Serial Bus (USB 2.0) Ports

Figure 3-2   Dual USB Port Connector
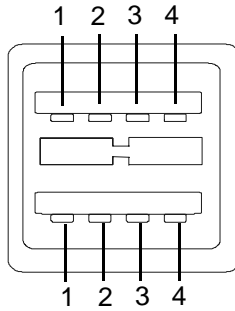
Figure 3-3   Single USB Port
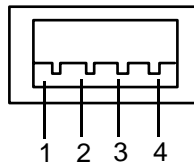
Table 3-1   USB Pinouts

Pin Number	Signal Description
1	+5 VDC
2	MR
3	PR
4	Ground

SCSI Port, Ultra 3, 68-Pin

A single, Ultra 3, 68 pin SCSI connector is located at the rear panel of the server. The external connector supports SCSI channel "B."

Figure 3-4   SCSI Port, Ultra 3, 68-Pin
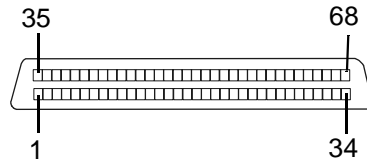
Table 3-2   SCSI Port Pinouts

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

Table 3-2   SCSI Port Pinouts (Continued)

Pin Number	Signal Description	Pin Number	Signal Description
20	S20	54	S54
21	S21 (+ATN)	55	S55 (–ATN)
22	S22	56	S56
23	S23 (+BSY)	57	S57 (–BSY)
24	S24 (+ACK)	58	S58 (–ACK)
25	S25 (+RST)	59	S59 (–RST)
26	S26 (+MSG)	60	S60 (–MSG)
27	S27 (+SEL)	61	S61 (–SEL)
28	S28 (+C/D)	62	S62 (–C/D)
29	S29 (+REQ)	63	S63 (–REQ)
30	S30 (+I/O)	64	S64 (–I/O)
31	S31 (+DB 8)	65	S65 (–DB 8)
32	S32 (+DB 9)	66	S66 (–DB 9)
33	S33 (DB 10)	67	S67 (–DB 10)
34	S34 (DB 11)	68	S68 (–DB 11)

10/100/1000 LAN Connector

Figure 3-5   **10/100/1000 LAN Connector**
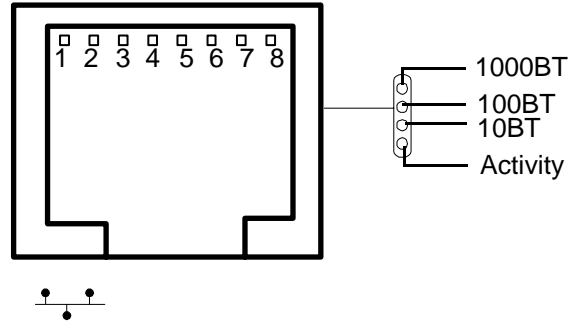
Table 3-3   **10/100/1000 LAN Connector Pinouts**

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

4 Utilities

Boot Console Handler (BCH)

The boot console handler (BCH) is separate code in processor dependent code (PDC). It has two purposes:

- It lets the bootstrap code know which path to boot from

- It allows you to interact with PDC to view and/or modify a set of specific system parameters

Booting is accomplished in the standard PA RISC manner but may be transparent [depending on the state of the autoflags (boot, search, and start)]. If the autoflags are clear and you override autobooting, a boot sequence will end up in the interactive portion of BCH where modification and/or viewing of some system parameters is possible.

NOTE   When the `autostart` flag is off, autoboots will be interrupted if a configuration change occurs which causes reduced performance; thus requiring you to intervene prior to booting to the internal system loader (ISL).

The auto boot will halt at the BCH prompt and you may continue booting by entering `boot`.

BCH Commands

In the interactive portion of BCH there is a Main Menu and five submenus.

Table 4-1   **BCH Commands**

Submenu	Description
BOot [PRI|ALT|<path>]	Boot from a specified path
DIsplay	Redisplay the current menu
HElp [<menu>|<command.>]	Display help for specified command or menu
RESET	Restart the system
MAin	Return to the Main Menu

Main Menu

The following commands are available in the main menu:

```
---- Main Menu -------------------------------------------------------------


    Command                        Description

    -------                        -----------

    BOot [PRI|ALT|<path>]          Boot from specified path

 ** PAth [PRI|ALT|CON|KEY] [<path>]  Display or modify a path

    SEArch [DIsplay|IPL] [<path>]  Search for boot devices
```

```
        COnfiguration menu              Displays or sets boot values

        INformation menu                Displays hardware information

        SERvice menu                    Displays service commands

    *   DeBug menu                      Displays debug commands




        DIsplay                         Redisplay the current menu

        HElp [<menu>|<command>]         Display help for menu or command

        RESET                           Restart the system

----

Main Menu: Enter command or menu >
```

* Not accessible to user.

** You cannot modify the keyboard path.

Configuration Menu

The following commands are available in the configuration menu:

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


---- Configuration Menu -------------------------------------------------



    Command                       Description

    -------                       -----------

    AUto [BOot|SEArch|STart] [ON|OFF] Display or set specified flag

    BootID [<proc>] [<bootid>]    Display or set Boot Identifier

    BootINfo                      Display boot-related information

    BootTimer [0 - 200]           Seconds allowed for boot attempt

    CPUconfig [<proc>] [ON|OFF]   Config/Deconfig processor

    DEfault                       Set the system to predefined values

    FAn [HI|NORmal]               Display or change fan speed

    FastBoot [ON|OFF]             Display or set boot tests execution

    PAth [PRI|ALT] [<path>]       Display or modify a path
```

```
    SEArch [DIsplay|IPL] [<path>]     Search for boot devices

    TIme [c:y:m:d:h:m:[s]]            Read or set the real time clock in GMT


    BOot [PRI|ALT|<path>]             Boot from specified path

    DIsplay                          Redisplay the current menu

    HElp [<command>]                 Display help for specified command

    RESET                            Restart the system

    MAin                             Return to Main Menu

----

Configuration Menu: Enter command >
```

The configuration default command sets the following values:

```
 Primary boot path:     0/0/1/0.0

   Alternate boot path:  0/0/2/0

   Console path:         0/0/1/0.0

   Keyboard path:        0/0/4/0.0

   Autoboot:             ON

   Autosearch:           ON

   Autostart:            OFF

   BootTimer             0
```

Information Menu

The following commands are available from the information menu:

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


---- Information Menu -------------------------------------------------------


    Command                     Description

    -------                     -----------

    ALL                         Display all system information

    BootINfo                    Display boot-related information

    CAche                       Display cache information

    ChipRevisions               Display revisions of major VLSI

    COprocessor                 Display coprocessor information
```

```
    FRU                           Display FRU information

    FwrVersion                    Display firmware version

  * IO                            Display I/O interface information

    LanAddress                    Display Core LAN station address

    MEmory                        Display memory information

 ** PRocessor                     Display processor information

*** WArnings                      Display selftest warning messages



    BOot [PRI|ALT|<path>]         Boot from specified path

    DIsplay                       Redisplay the current menu

    HElp [<command>]              Display help for specified command

    RESET                         Restart the system

    MAin                          Return to Main Menu

----

Information Menu: Enter command >
```

* The PCI device information displayed here will include description, path, vendorID, deviceID, slot#, and bus#.

** Processor command displays system model string

***Warnings displayed are:

- System serial number not set

- Support bus controller initialization failure

- WARNING: Card in unsupported PCI slot for ____system

- WARNING: Too many cpus for a ____ system. System will not boot

- WARNING: Too much memory for a ____system

- WARNING: A fatal error has occurred—system cannot boot. Review warning messages in the information menu

Info PR Example This command displays processor information on the console.

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

Model: hp server . (model string 9000/800/rp3410)

PROCESSOR INFORMATION

HVERSION SVERSION Processor

Processor Speed Model Model/Op CVERSION State

--------- -------- -------- -------- -------- -------------
```

0 900 MHz 0x0886 0x0491 3.0 Active

1 900 MHz 0x0886 0x0491 0.0 Unknown

Central Bus Speed (in MHz) : 200

Software ID (dec) : 4468297807722676169

Software ID (hex) : 0x3e02952e9bf77fc9

Software Capability : 0x01f0

Service Menu

The following commands are available from the service menu:

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


---- Service Menu -------------------------------------------------------


    Command                       Description

    -------                       -----------

    CLEARPIM                      Clear (zero) the contents of PIM

    SCSI [option] [<path>] [<val>]  Display or set SCSI controller values

    MemRead <address> [<len>]     Read memory and I/O locations

    PDT [CLEAR]                   Display or clear the PDT

    PIM [<proc>] [HPMC|LPMC|TOC]  Display PIM information

    ProductNum <O|C> [<number>]   Display or set Product Number

    ScRoll [ON|OFF]               Display or change scrolling ability

    SELftests [ON|OFF]            Enable/disable self test execution


    BOot [PRI|ALT|<path>]         Boot from specified path

    DIsplay                       Redisplay the current menu

    HElp [<command>]              Display help for specified command

    RESET                         Restart the system

    MAin                          Return to Main Menu

----

Service Menu: Enter command > e
```

The `ProductNum` command is for setting up the original and/or current product number. The Software Identification (SWID) doesn't get updated automatically on change of the original product number but it can be generated by executing the default command from the Configuration SubMenu.

The `SCSI` command is for displaying/setting the SCSI controller parameters like initiator ID and speed. These parameters are used by the OS device drivers to program the controller(s).

Management Processor

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

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

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

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

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

Accessing the Management Processor

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

- The **local RS-232C port** using a local terminal

- The **remote RS-232C port** using external modem (dial-up) access, if remote modem access is configured

- The **management processor LAN port** using Web Console or telnet if login access through the management processor LAN is enabled

Interacting with the Management Processor

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

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

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

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

Management Processor Command Interface

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

MP Welcome Screen

MP welcome screen commands:

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


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

MP commands are described in the following paragraphs.

Management Processor Commands

Table 4-2   Management Processor Commands and Descriptions

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

Table 4-2   Management Processor Commands and Descriptions (Continued)

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

Reset BMC Passwords

BP: Reset BMC passwords

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

Configure Serial Port Parameters

CA: Configure local and remote serial port parameters

Set up the local serial port parameters as follows:

- TERMINAL TYPE: VT100 vs HPterm

- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec

- FLOW CONTROL: Hardware uses RTS/CTS; software uses Xon/Xoff

- TRANSMIT CONFIGURATION STRINGS: Disable this setting whenever the modem being used is not compatible with the supported modem (MT5634ZBA)

IMPORTANT   Do not mix HP and VT100 terminal types at the same time.

Set up the remote serial port parameters as follows:

- MODEM PROTOCOL: Bell or CCITT (CCITT is a European standard; RTS/CTS signaling is used, as well as the ring signal. Bell is a U.S. or simple mode)

- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec

- FLOW CONTROL: Hardware uses RTS/CTS; software uses Xon/Xoff

- TRANSMIT CONFIGURATION STRINGS: Disable this setting whenever the modem being used is not compatible with the supported modem (MT5634ZBA)

- MODEM PRESENCE: When the modem may not always be connected, set this parameter to "not always connected"

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

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

Example 4-1   HP-UX

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

1. The application takes the terminal information from the OS. This value is set in the CA command and takes effect for all MP ports.

2. The $TERM shell environment variable.

3. The application directly queries the terminal (in this case, the write enabled terminal establishes the terminal type).

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

Certificate Generate

CG: Generate RSA key pair or self signed certificate

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

Console Log

CL: Console log—view the history of the console output

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

Command Mode

CM: Command mode—enter command mode

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

Console

CO: COnsole—leave command mode and enter console mode

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

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

Connect to Service Processor

CSP: Connect to remote management processor over the LAN

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

Date

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

Default Configuration

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

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

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

There are three ways to reset passwords in the MP:

1. In the SO command, change individual users.

2. In the DC command choose Reset Security Configuration.

3. Forgotten passwords can be reset by pressing the MP reset button on the back panel of your HP Server. After the MP reboots, the local console terminal displays a message for five seconds. Responding to this message in time will allow a local user to reset the passwords.

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

Display FRUID

DF: Display FRUID information

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

Disconnect Remote or LAN Console

DI: DIsconnect remote/modem or LAN/WEB console

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

Front Panel Process

`FP`: Turn off front panel fault or attention LEDs

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

MP Firmware Update

`FW`: Activates MP firmware upgrade mode

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

Help

`HE`: Display help for menu or command

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

Display System ID

`ID`: Display/modify system information

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

- SNMP contact information
- SNMP server information
- SPU hostname

Inactivity Timeout

`IT`: Inactivity timeout settings

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

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

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

Configure LAN Console

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

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

- MP IP address

- MP host name

- Subnet mask

- Gateway address

- Web console port number

- Link state

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

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

LAN Status

`LS`: LAN status

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

Return to Main Menu

`MA`: Return to MP Main Menu

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

Modem Reset

`MR`: Modem reset

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

Modem Status

`MS`: Modem status—Display modem status

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

Power Control

`PC`: Power control—turn system power on and off

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

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

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

Configure Paging

PG: Paging parameter setup—configures pagers

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

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

Power Status

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

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

Reset BMC

RB: Reset BMC

This command resets the BMC by toggling a GPIO pin.

Reset System

RS: Reset system through RST signal

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

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

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

Set Access

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

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

Create Local Session

SE: Log into the system on local or remote port

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

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

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

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

Display Logs

`SL`: Display contents of the system status logs

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

- System Event Log (SEL)—High attention events and errors
- Forward progress—All events
- Current boot log—All events between `start of boot` and `boot complete`
- Previous boot log—The events from the previous boot

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

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

Navigate within the logs as follows:

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

Table 4-3 defines alert (or severity) levels.

Table 4-3   Alert Levels

Severity	Definition
0	Minor forward progress
1	Major forward progress
2	Informational
3	Warning

Table 4-3   Alert Levels (Continued)

Severity	Definition
5	Critical
7	Fatal

Security Options

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

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

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

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

A disabled user's login is not accepted.

Firmware Revision Status

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

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

System Status

SS: Displays the status of the system processors

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

Transfer of Control

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

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

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

Tell

TE: TEll—sends a message to other terminals

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

User Configuration

UC: User configuration—controls user access

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

Virtual Front Panel

VFP: Display virtual front panel

The VFP command presents a summary of the system by using direct console addressing. If the terminal is not recognized by the MP, VFP mode will be rejected. Each individual user will get this summary in order to avoid issues related to terminal type and screen display mode.

This command is executed from the Main Menu. When accessed, VFP displays the current state of the system including current LED status. The display refreshes at one second intervals.

Who

WHO: Displays a list of MP connected users

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

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

Exit from MP

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

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

Diagnostics

XD: Diagnostics and/or reset of MP

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

- MP parameter checksum
- Verify I^{2}C connection (get BMC device ID)
- LAN connectivity test using ping
- Modem self-tests

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

Management Processor Help System

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

```
HE

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

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

                    MP Help System
```

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

Enter a command at the help prompt:

        OVerview   : Launch the help overview

        LIst       : Show the list of MP commands

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

        TOPics     : Show all MP Help topics and commands

        HElp       : Display this screen

        Q          : Quit help
```

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

Accessing the Baseboard Management Controller (BMC)

To log in to the BMC command line interface, use a serial connection and terminal emulation software:

NOTE	The default terminal emulation type is VT100+. Terminal emulation for the BMC cannot be changed. The default baud rate is 9600. This setting can be changed from the EFI Boot Options Maintenance Menu.

1. With the system turned off, connect a null-modem cable to Serial Port 1 on the rear panel of the system, and to your remote device.

2. Configure the terminal emulation software with these settings:

   - Baud rate: 9600

   - Bits: 8

   - Parity: None

   - Stop bits: 1 (one)

   - Flow control: XON/XOFF

3. Using the terminal emulation, connect to the system with a direct connection.

4. Turn on the system. The EFI menu displays in the terminal window.

5. To access the BMC command line interface, press: **Esc (**.

   For example, on a U.S. QWERTY keyboard, press **Esc**, then press **Shift** and **9** at the same time.

NOTE	If AC power is connected to the system, this command activates the BMC command line interface even if the system power is off.

6. If prompted, enter the user or admin password at the login prompt:

   ```
   login>
   ```

   You are not prompted for a password if none has been defined.

7. The BMC prompt displays. If you entered the admin password, you have full access. If you entered the user password, you have restricted access.

   ```
   Admin Session Initiated

    cli>
   ```

   or

   ```
   User Session Initiated

   cli>
   ```

Using the BMC Command Line Interface (CLI)

The baseboard management controller (BMC) supports the industry-standard Intelligent Platform Management Interface specification (IPMI 1.0 with Extensions). This specification describes the management features that have been built into the system board. These features include:

- Diagnostics (local and remote)

- Console support

- Configuration management

- Hardware management

- Troubleshooting

There are two categories of BMC commands:

- Simple commands

- Intelligent Platform Management Interface (IPMI) commands

This section provides a brief overview of the available commands. For detailed information, go to the Intel® web site: http://www.intel.com/design/servers/ipmi.

Executing BMC Commands

To execute BMC commands at the command prompt:

1. Type the command and any required parameters after the `cli>` prompt.

   Use the **Backspace** key to correct mistakes.

2. Press **Enter** to execute the command.

Logging Out of the BMC Command Line Interface

When you are finished using the BMC CLI:

1. If you have a system password set, to log out of the BMC without returning to the system console, execute:

   Q

   The BMC login prompt displays:

   ```
   login>
   ```

2. To log out of the BMC and return to the system console, press **Esc Q** (press **Esc**, then press **Shift** and **Q** at the same time).

Simple Commands

Simple IPMI commands allow you to control the BMC interface, view logs, get help, and change your password.

To execute simple BMC commands:

1. Type the command, followed by any required options. For example, to execute the change password command, type **C**.

2. Press **Enter**.

3. If prompted, enter the additional information, such as a new password, and press **Enter.** For example:

   ```
   cli> c

   Type the new password> ****

   Retype the new password> ****
   ```

```
New password confirmed.

cli>
```

Table 4-4   BMC Commands

Command Syntax	Options	Mode	Description
C	Prompts user for new password	User	Allows user to change the password
FPL	N/A	User	Reads the forward progress log. This log is encoded and can be used by HP support representatives
H	N/A	User	Displays list of BMC commands
INFO	N/A	User	Displays the BMC firmware revision
LOC [0, 1]	0 = off 1 = on	User	Turns the system locator LED on or off
P [0, 1]	0 = off 1 = on	User	Forces system power on or off; does not shut down using OS procedures. If you do not enter a parameter, displays the current power state
Q	N/A	User	Logs out user; does not close BMC session
RS	N/A	User	Resets the system
SD	N/A	User	Displays the SDR repository. This data is encoded according to the IPMI spec and can be used by HP support representatives
SE	N/A	User	Displays system event log (SEL). This log is encoded and can be used by HP support representatives

IPMI Commands

IPMI commands allow you to communicate with and configure various components of the system. IPMI commands are available only to users with admin level access.

CAUTION   Do not run BMC IPMI commands unless you are experienced with the IPMI specification. If you make mistakes running these commands, you can accidentally delete or modify data and cause your system to operate unpredictably or fail to operate.

All IPMI commands require a sequence of hex codes used as parameters. Each command may include some or all of the following parameters:

- Network Function and Lun (NetFnLun). The NetFn parameter identifies the message category. The LUN value is always 0

- *Command.* The messages specified in this document contain a one-byte command field. Commands within each category are unique. Command values can range from 00h through FDh. FEh is reserved for future extension of the specification, and FFh is reserved for message interface level error reporting on potential future interfaces

- *Data.* The Data field carries the additional parameters for a request or a response, if any

  The IPMI commands can be entered in long or short forms. The associated response from the BMC matches the form of the command

For example:

- Short format, or `ipmi`, command:

  — Syntax:

  ```
  ipmi NetFnLun Cmd Data1 Data2 ... DataN
  ```

  — Sample command and system response

  ```
  cli> ipmi 18 04

  00 55 00

  cli>
  ```

- Long format, or `i`, command

  — Syntax:

  ```
  i 0 NetFnLun 0 0 0 Cmd Data1 Data2 ... DataN 0
  ```

  — Sample command and system response:

  ```
  cli> i 20 18 C8 f0 04 04 08

  F0 1C F4 20 04 04 00 55 00 83

  cli>
  ```

Long format IPMI commands ("I") use an ASCII transcription of the IPMI data format. The following examples illustrate how IPMI commands and responses are structured.

NOTE   All noncommand bytes can be replaced with 0.

Table 4-5   **Long Format IPMI Command Data Structure Example**

	Bits		Byte
7-2		**1-0**	
	rsSa = 0x20		0x20
NetFn = 0x07		rsLUN = 0x00	0x18
	Checksum = 0xC8		0xC8
	rqSWID = 0xF0		0xF0
rqSeq = 0x01		rqLUN = 0x00	0x04
	Cmd = 0x04		0x04
	Checksum = 0x08		0x08

Table 4-6   Long Format IPMI Response Data Structure Example

	Bits		Byte
7-2		1-0	
	rqSWID = 0xF0		0xF0
NetFn = 0x07		rsLUN = 0x00	0x1C
	Checksum = 0xF4		0xF4
	rsSA = 0x20	0x20	
rqSeq = 0x01		rsLUN = 0x00	0x04
	Cmd = 0x04		0x04
	Data byte 1 = 0x00 (completion code)		0x00
	Data byte 2 = 0x55 (result = no error)		0x55
	Data byte 3 = 0x00 (details)		0x00
	Checksum = 0x83		0x83

The BMC supports the version 1.0 IPMI categories and commands listed in the following tables. For detailed information on the IPMI specification and commands, go to the Intel web site: http://www.intel.com/design/servers/ipmi.

Table 4-7   Command Categories

NetFn	NetFN<<2	Description
00, 01	00, 04	Chassis
04, 05	10, 14	Sensor/event (S/E)
06, 07	18, 1C	Application
0A, 0B	28, 2C	Storage
32, 33	C8, CC	HP custom (proprietary)

Table 4-8   Chassis Commands

Command	Description
01h	Get chassis status
02h	Chassis control
0Fh	Get power-on hours (POH) counter
06h	Set power restore policy

Table 4-9 **Sensor/Event Commands**

Command	Description
01h	Get event receiver
02h	Platform event (a.k.a. "Event Message")
28h	Set sensor event enable
29h	Get sensor event enable
2Ah	Re-arm sensor events
2Dh	Get sensor reading

Table 4-10 **Application Commands**

Command	Description
IPM device "global" commands	
01h	Get device ID
02h	Cold reset
03h	Warm reset
04h	Get self test results
Broadcast commands	
01h	Broadcast 'get device ID'
System interface commands	
2Eh	Set BMC global enables
2Fh	Get BMC global enables
30h	Clear message flags
31h	Get message flags
32h	Enable message channel receive
33h	Get message
34h	Send message
35h	Read event message buffer
36h	Get BT interface capabilities

Table 4-10   Application Commands (Continued)

Command	Description
BMC watchdog timer commands	
22h	Reset watchdog timer
24h	Set watchdog timer
25h	Get watchdog timer

Table 4-11   Storage Commands

Command	Description
SEL Commands	
40h	Get SEL info
41h	Get SEL allocation info
42h	Reserve SEL
43h	Get SEL entry
44h	Add SEL entry
47h	Clear SEL
48h	Get SEL time
49h	Set SEL time
SDR repository commands	
20h	Get SDR repository info
21h	Get SDR repository allocation info
22h	Reserve SDR repository
23h	Get SDR
28h	Get SDR repository time
29h	Set SDR repository time
FRU inventory device commands	
10h	Get FRU inventory area info
11h	Read FRU inventory data
12h	Write FRU inventory data

5 Troubleshooting

This chapter provides troubleshooting instructions for maintaining your hp 9000 rp3410 or hp 9000 rp3440 Server.

Troubleshooting Methodology

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

CAUTION	Do not operate the HP Server for more than 5 minutes with any cover (including disk drives) removed. Damage to system components may result due to improper cooling airflow.

To troubleshoot your system you must be familiar with the HP-UX operating system and be able to start and stop testing processes. You should also be familiar with Support Tools Manager (STM), which runs in HP-UX, and the Offline Diagnostics Environment (ODE).

Online troubleshooting programs are available on your HP-UX operating system. Offline troubleshooting programs are available on the resource CD that is shipped with your HP Server. Descriptions and user information about offline troubleshooting tools are available at http://docs.hp.com. The offline tools are available for downloading at http://software.hp.com.

Using the Front Panel Power Button

The server power button on the front panel operates differently, depending on how long the button is held in and on what the system is doing when the button is pressed. You must be aware of its uses to properly troubleshoot the system. Power button functions are described in the following table.

Table 5-1   Power Button Functions

System State	Switch Pressed Time	Result
Power connected to power supplies—system power off	1 second or less	System power on
	More than 1 second	No effect
System at ISL	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown

Table 5-1   Power Button Functions (Continued)

System State	Switch Pressed Time	Result
System at BCH	Less than 1 second	Hard shutdown
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown
Power on—OS shut down	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown
OS running	Less than 1 second	No effect
	More than 1 second but less than 5 seconds	Not used. This selection initiates E-buzzer functions that are not supported in the hp 9000 rp3410 and hp 9000 rp3440 servers
	More than 5 seconds	Hard shutdown

Operating System Will Boot

If your operating system is running and you are experiencing problems, use the following online tools to help solve your problem:

- Support Tools Manager (STM)

- Event Monitoring Service (EMS)

- Management Processor (MP)

Support Tools Manager

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

- Graphical interface for X-based terminals (XSTM)

- Menu interface for ASCII terminals (MSTM)

- Command line interface for all ASCII terminals (CSTM)

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

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

For complete documentation on how to access and use STM go to http://docs.hp.com. Under Topics menu go to Diagnostics and look for Support Tools Manager.

Event Monitoring Service

Event Monitoring Service (EMS) is the framework for monitoring hardware and reporting events. You can use EMS to eliminate most undetected hardware failures that cause data loss or interruptions of system operation. You can monitor a hardware device (such as a disk) for the occurrence of any unusual activity (called an event). When an event occurs, it is reported by a variety of notification methods such as e-mail. Event detections are handled automatically with minimal involvement on your part.

The following monitors are available:

- CMC monitor

- UPS monitor

- FC hub monitor

- FC switch monitor

- Peripheral status monitor

- Memory monitor

EMS comes with your HP-UX operating system. To bring up the event monitoring main menu, execute the following command at the shell prompt:

```
/etc/opt/resmon/lbin/monconfig
```

From the list of main menu selections, choose:

```
(E) Enable Monitoring
```

Management Processor

The management processor (MP) interface provides access to the baseboard management controller system information and provides some configuration capabilities. By viewing the system logs by way of the MP you can view information that can assist in solving problems affecting your computer. To access your MP interface and system logs, perform the following steps:

NOTE	The MP interface must be accessed from a terminal console that is attached to the MP via the MP LAN or MP remote serial connector. The MP is always available for troubleshooting, regardless of the state of your system, as long as there is AC power applied to your computer.

NOTE	At publication, the current version of the Management Processor Revision is E.02.25.
	Check the HP website for the latest revision.

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

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

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

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

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

Step 5. For a complete explanation of the management processor and all commands, refer to Chapter 4, "Utilities."

System Event Logs (SEL)

Step 1. Access the management processor command prompt.

Step 2. Run the sl command. The Event Log Viewer menu will display:

```
SL

Event Log Viewer:


Log Name          Entries     % Full       Latest Entry

----------------------------------------------------------------

E - System Event        9          1 %      29 Oct 2002 19:15:05

F - Forward Progress  129          3 %
```

```
B - Current Boot           82

P - Previous Boot           0

L - Live Events

C - Clear All Logs



Enter your choice or [Q] to Quit:
```

Step 3. Select e to review the events. The Event Log Navigation menu will display:

```
Set up alert filter options on this buffer? (Y/[N])

(N)

        Log Name            Entries    % Full       Latest Entry

-------------------------------------------------------------------

E - System Event          410        47 %       18 Feb 2003 09:38:10



Event Log Navigation Help:



    +        View next block     (forward in time,  e.g. from 3 to 4)

    -        View previous block (backward in time, e.g. from 3 to 2)

    <CR>   Continue to the next or previous block

    D        Dump the entire log for capture and analysis

    F        First entry

    L        Last entry

    J        Jump to entry number

    V        View mode configuration (text, keyword, hex)

    ?        Display this Help menu

    Ctrl-B  Quit and return to the Main Menu
```

Step 4. Select v, then t to change the display to text mode:

```
Display Mode Configuration:

            H - Hex mode

  Current -> K - Keyword mode

            T - Text mode

Enter new value, or [Q] to Quit:

T
```

Step 5. To decode the blinking state of System LED, review the entire SEL and look at events with alert level 3 and above.

For example:

```
Log Entry 24: 14 Feb 2003 15:27:02

Alert Level 3: Warning

Keyword: Type-02 1b0800 1771520

Hot Swap Cage: SCSI cable removed

Logged by: BMC;  Sensor: Cable / Interconnect - SCSI ChExt Cable

Data1: Device Removed/Device Absent

0x203E4D0AC6020220 FFFF0008F61B0300


Log Entry 73: 00:00:12

Alert Level 3: Warning

Keyword: Type-02 050301 328449

The server's built-in sensors have detected an open chassis door.

Logged by: BMC;  Sensor: Physical Security - Chassis Open

Data1: State Asserted

0x200000000C020570 FFFF010302050300
```

Operating System Will Not Boot

If your operating system will not boot, but you are able to reach the BCH (from either the main disk partition or CD), then use the following offline tools to help solve your problem:

• Offline Diagnostic Environment (ODE)

Offline Diagnostic Environment (ODE)

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

Step 1. Power on your HP Server and insert the *Support Plus CD*.

Step 2. Boot the system to the PDC (BOOTADMIN, BCH, etc.) prompt. PDC prompts may differ on some computer models.

    Main Menu: Enter command or menu>

Step 3. List the bootable devices by entering search: `search`.

Step 4. Select the CD device that contains the *Support Plus CD*, for example:

    p3

Step 5. Boot from that device by entering boot p3: `boot p3`.

Step 6. You are asked to interact with the Initial System Loader (ISL) prompt. Enter yes: `y`.

Step 7. From the ISL prompt, start the Offline Diagnostics Environment by entering ODE: `ODE`.

The following commands are available at the ODE prompt:

Table 5-2   ODE Commands

Command	Description
`help`	To display a list and description of the available commands
`help` *<command>*	To display the additional information
`help` *<var>*	To display the additional information
`ls`	To list the ODE modules that will run on your computer
<module_name>	To run an ODE module interactively
`run` *<module_name>*	To run an ODE module non-interactively

Disk and I/O Path Logging

Some failures result in I/O path logging. These paths help to indicate the source of the error and may be included in the error message or logged into console or event logs. The following table describes the disk drive and PCI slot paths for your HP Server.

Table 5-3   **Internal Disk and DVD Paths**

Slot	Path
Slot 2 (top)	0/1/1/1.2
Slot 1 (middle)	0/1/1/0.1
Slot 0 (bottom)	0/1/1/0.0
DVD	0/0/2/0.0

Table 5-4   **Extended Core I/O Paths**

Function	Path
Console Port	0/7/1/1.0
Remote Port	0/7/1/1.2
UPS Port	0/7/1/0.0
VGA Port	0/7/2/0 (disabled)

Table 5-5   **PCI I/O Paths**

I/O Slot	Path
Slot 1	0/4
Slot 2	0/3
Slot 3	0/2 (Active for rp3440 only)
Slot 4	0/6 (Active for rp3440 only)

Identifying and Diagnosing Hardware Problems

Should a hardware failure occur, the system LED, diagnostic LEDs and the System Event Log (SEL) will help you identify the problem:

- LEDs. The lights on the front bezel of the server change color and blink in different patterns to help identify specific hardware problems. LEDs on the rear panel of the server display LAN status

- The System Event Log (SEL) provides detailed information about the errors identified by the LEDs

Troubleshooting Using LEDs

Four diagnostic LEDs, one power LED, and one system LED are located on the control panel of the system. The following sections describe their functions. Additional diagnostic LEDs are provided on the system board. (Refer to "System Board Diagnostic LEDs" on page 71.)

If the system has no management processor (MP) card installed, the four diagnostic LEDs on the front panel warn of impending failures and allow you to take preventive action. For example, you may want to back up your data or replace a component before it fails.

- If no management processor card is installed, the boot progress is monitored by diagnostic LEDs 1 through 4. During the boot-up the LEDs will turn on in sequence until the BCH prompt is reached

- If a management processor card is installed, the boot process will be monitored by the management processor card. The LEDs will be off

Figure 5-1   **Control Panel LEDs**
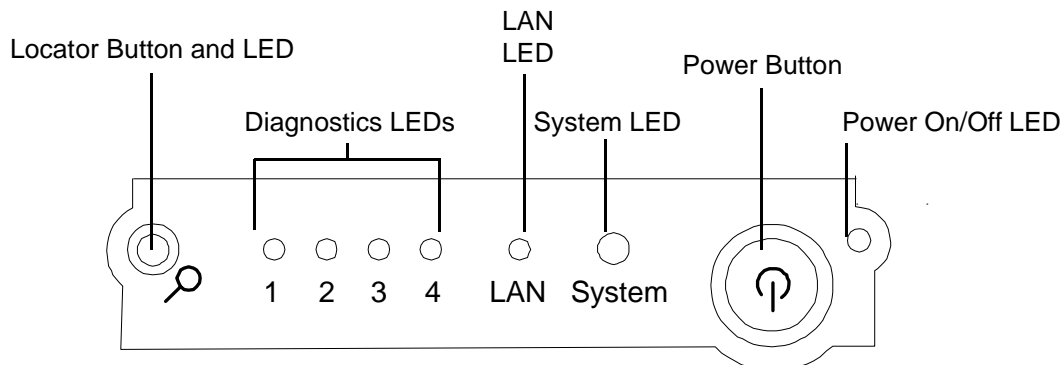
Power and System LEDs

The Power and System LED indicate the state of the system. When the system LED is blinking yellow or red, a problem exists.

Table 5-6   **System LED States**

System LED	State
Off	AC power off if power LED is off
Solid green	Running OS
Blinking green	Booting or running EFI

Table 5-6 **System LED States (Continued)**

System LED	State
Blinking yellow (1/sec.)	Attention: Alerts of levels 3-5 detected in the management processor logs The LED will turn off once the event log has been read
Blinking red (2/sec.)	Fault: System Alert 7 Detected, LED will blink until the problem is resolved and the system boots successfully or until it is manually turned off with the management processor `dc` command Fatal hardware error detected by BMC, LED will blink until problem is corrected

For system alerts of levels 3-5, the attention condition on the LED can be cleared by accessing the logs using the `sl` command available in the management processor command mode.

The fault condition for system alerts of level 7 can only be cleared with the `dc` command unless hardware replacement is necessary. Refer to the SL error logs for additional error information.

NOTE   Always check the management processor status logs in the case of a blinking yellow or red system LED before replacing any hardware.

Diagnostic LEDs The four diagnostic LEDs on the front bezel of the system are used for diagnosing the health of the system. Refer to the SEL and FPL logs for specific information about the warning or failure indicated by the diagnostics LEDs.

These LEDs warn of impending hardware failures and allow you to take preventive action, such as making a system backup or replacing a component before it fails. These diagnostic LEDs are labeled 1, 2, 3 and 4.

The location of red LEDs can be used to identify the category of the fault or warning. For example, if LED 1 is red, there is a problem with memory. However, if LEDs 1 and 2 are both red, there is a problem with the system processor.

If the diagnostic LEDs indicate an error, check the SEL for a more detailed explanations of the failure.

- The System LED indicates the severity of the error. Check this LED before proceeding to analyze the sequence of diagnostic LEDs:
  - Blinking yellow indicates a WARNING
  - Blinking red indicates a FAULT
- The Diagnostic LEDs provide details about the specific error:
  - Solid red indicates the failing part or subsystem
  - Off or solid green diagnostic LEDs provide additional details about the failure

The faults and warnings fall into several general categories.

Table 5-7 **Diagnostic LEDs Fault and Warning Categories**

LED 1	LED 2	LED 3	LED 4	Category
Red	Any[a]	Any[a]	Any[a]	Memory
Any[a]	Red	Any[a]	Any[a]	Firmware
Any[a]	Any[a]	Red	Any[a]	System board
Any[a]	Any[a]	Any[a]	Red	Fan
Red	Red	Any[a]	Any[a]	Processor
Red	Any[a]	Red	Any[a]	BMC
Red	Any[a]	Any[a]	Red	Temperature
Any[a]	Red	Any[a]	Red	Power supply
Red	Red	Red	Red	Unknown

a. This LED can display any color other than red (for example,
   green or off).

Warnings

The following tables provide additional information about each specific warning associated with the various possible LED lighting sequences when **the system LED is yellow**.

Table 5-8 **Unknown Warning**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Red	Red	Red	Unknown warning	View the SEL for additional information. For further assistance, contact your HP Support Engineer

Table 5-9 **Memory Warnings**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Green	Off	Off	Mismatched memory pairs	Review the information on installing memory in the *hp 9000 rp3410 and hp 9000 rp3440 Installation Guide*
Flashing Yellow	Red	Off	Green	Green	Memory thermal load order	Review the information on installing memory in the *hp 9000 rp3410 and hp 9000 rp3440 Installation Guide*

Table 5-9   Memory Warnings (Continued)

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Green	Green	Green	Bad SPD information (can't detect type)	View the SEL for additional information. For further assistance, contact your HP Support Engineer

Table 5-10   System Board Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Green	Green	Red	Off	Battery voltage low	Replace the system board battery

Table 5-11   Fan Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Green	Off	Off	Red	Fan 1A is not functioning properly	Replace the fan that is not functioning
Flashing Yellow	Off	Green	Off	Red	Fan 1B is not functioning properly	Replace the fan that is not functioning
Flashing Yellow	Off	Off	Green	Red	CPU fan 0 is not functioning properly	Replace the fan that is not functioning.
Flashing Yellow	Green	Green	Off	Red	CPU fan 1 is not functioning properly	Replace the fan that is not functioning. If a processor fan has failed, you must replace the CPU
Flashing Yellow	Off	Green	Green	Red	Fan module 2 (memory) is not functioning properly	Replace the fan that is not functioning. If a processor fan has failed, you must replace the CPU
Flashing Yellow	Green	Green	Green	Red	Fan module 3 (memory) is not functioning properly	Replace the fan that is not functioning

Table 5-12   **Processor Warnings**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Red	Green	Off	Processor 0 temperature exceeds limit	View the SEL for additional information. Make sure nothing is blocking the processor's airflow
Flashing Yellow	Red	Red	Off	Green	Processor 1 temperature exceeds limit	View the SEL for additional information. Make sure nothing is blocking the processor's airflow

Table 5-13   **Temperature Warnings**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Red	Green	Green	Red	External air temperature too high	Make sure nothing is blocking the system's airflow and place your system in an air-conditioned room

Table 5-14   **Video Warnings**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Off	Red	Red	Off	No video adapter present	Install a video adapter. Refer to the installation instructions shipped with the video adapter

Table 5-15   **Power Supply Warnings**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Yellow	Green	Red	Off	Red	Power supply 1 fault	Replace the power supply
Flashing Yellow	Off	Red	Green	Red	Power supply 2 fault	Replace the power supply

Faults The following tables provide additional information about each specific fault associated with the various possible LED lighting sequences **when the system LED is red**.

Table 5-16   Unknown Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Red	Red	Red	Unknown fault	View the SEL for additional information. For further assistance, contact your HP Support Engineer

Table 5-17   Memory Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Green	Off	Off	Mismatched memory pairs	Review the information on installing memory in the *hp 9000 rp3410 and hp 9000 rp3440 Installation Guide*
Flashing Red	Red	Off	Off	Green	Uncorrectable memory error	Replace memory
Flashing Red	Red	Green	Green	Off	No memory installed	Install memory
Flashing Red	Red	Green	Green	Green	Bad Memory. One or more DIMMs are bad or not seated properly	Reseat the DIMMs. If the error persists, replace them

Table 5-18   Firmware Errors

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Off	Red	Off	Off	System firmware hang or system fault	View the SEL for additional information. For further assistance, contact your HP Support Engineer

Table 5-19   **System Board Faults**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Off	Green	Red	Off	VRM overvoltage	View the SEL for additional information. For further assistance, contact your HP Support Engineer
Flashing Red	Green	Off	Red	Off	VRM undervoltage	View the SEL for additional information. For further assistance, contact your HP Support Engineer

Table 5-20   **Fan Faults**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Green	Off	Off	Red	Cooling unit 1 fault (power)	Replace the fan that is not functioning
Flashing Red	Off	Green	Off	Red	Cooling unit 2 fault (memory)	Replace the fan that is not functioning
Flashing Red	Off	Off	Green	Red	Cooling unit 3 fault (Disks/PCI)	Replace the fan that is not functioning

Table 5-21   **Processor Faults**

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Red	Off	Green	Processor 0 temperature exceeds limit	If a processor fan has failed, you must replace the CPU
Flashing Red	Red	Red	Off	Off	Processor 1 temperature exceeds limit	If a processor fan has failed, you must replace the CPU
Flashing Red	Red	Red	Green	Green	No processor detected	Install processor

Table 5-22   BMC Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Green	Red	Off	BMC firmware is damaged	Turn off and unplug the system. Wait 20 seconds, then plug in and restart the system. If the error repeats, replace the system board
Flashing Red	Red	Green	Red	Green	System board FRU inventory device inaccessible	Replace the system board

Table 5-23   Temperature Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Red	Green	Green	Red	External air temperature too high	Make sure nothing is blocking the system's airflow and place your system in an air-conditioned room

Table 5-24   Power Supply Errors

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	Off	Red	Off	Red	VRM or power pod fault	View the SEL for additional information
Flashing Red	Green	Red	Off	Red	Power supply fault	View the SEL for additional information. Replace the power supply if necessary
Flashing Red	Green	Red	Green	Red	12V out of range (power supply interface fault)	View the SEL for additional information. If the power supply interface has failed it is necessary to replace the base unit

LAN LEDs

The front panel LAN LED indicates the system is communicating over the Gigabit or system management LAN:

- Blinking green, the system is communicating over the LAN

- Solid green, LAN link is established, no current LAN activity

- Not green, no LAN cable attached, LAN network dead or the system is off

10/100/1000 LAN LEDs are on the rear panel:

Table 5-25   10/100/1000 base-T Ethernet LAN Connector LEDs

LED	Description
1000BT	Blinking green—the 1000 MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
100BT	Blinking green—the 100 MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
10BT	Blinking green—the 10 MHz with ethernet protocol and twisted-pair wiring is enabled, off—no link
Activity	Blinking green—LAN activity

One System Management 10/100 LAN port on the rear panel provides the following LEDs:

Table 5-26   System Management 10/100 LAN LEDs

LAN LED	Location	Color	State
Speed	Top	On	Port linked at 100 Mb/s
		Off	Port linked at 10 Mb/s
Activity	Bottom	On	Port linked
		Off	No link established

Four management processor LAN LEDs are also on the rear panel if the system has a management processor card installed:

Table 5-27   Management Processor Card LAN LEDs

LAN LED	Location	Color	State
Self-test	Top	Yellow	Management processor running selftest or error
		Off	Management processor has booted

Table 5-27   Management Processor Card LAN LEDs (Continued)

LAN LED	Location	Color	State
10BT	2nd from top	Green	10BT link established
		Blinking green	10BT activity
		Off	No link or 100BT link
100BT	2nd from bottom	Green	100BT link established
		Blinking green	100BT activity
		Off	No link or 10BT link
Standby Power	Bottom	Green	Standby power on
		Off	Standby power off

System Board Diagnostic LEDs

There are three additional LEDs that can help when troubleshooting the system. These LEDs are located on the system board close to the back of the system and can be viewed through the small cooling holes in the system case.

Figure 5-2   **Location of the STBY, F/W and BMC LEDs**

F/W LED

BMC LED

STBY LED

The STBY LED may be viewed here through the cooling vents

The BMC and F/W LEDs may be viewed here through the cooling vents
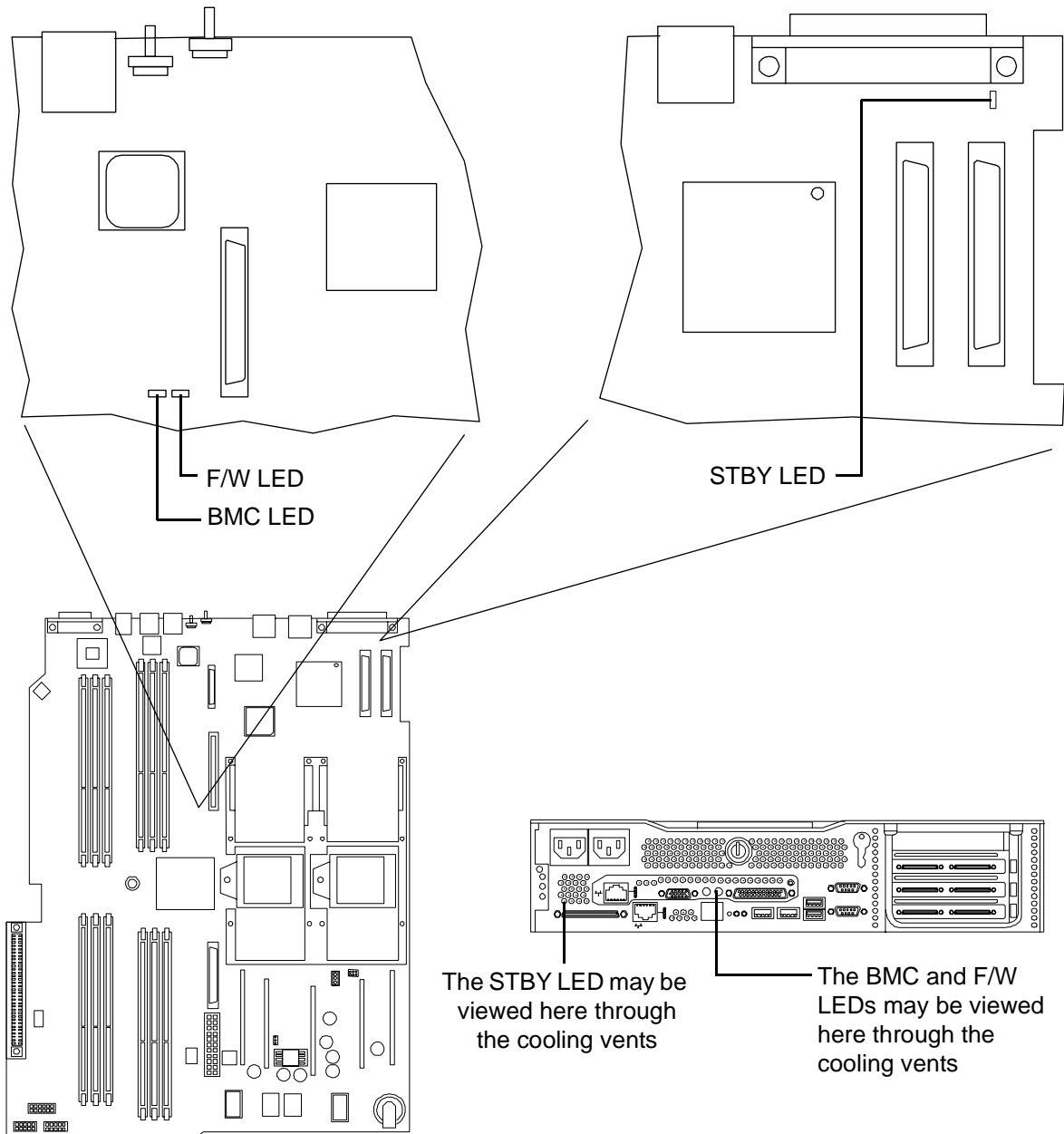
Table 5-28   System Board LEDs

LED	Cleaning Procedure
STBY	This standby LED comes on as soon as the system's power cord is plugged in. If this light is off when you plug it in, reseat the power supply, and if this does not work, replace the power supply
BMC	A few seconds after the system is plugged in this LED starts blinking, which means that the Baseboard Management Controller is alive
F/W	A few seconds after the system button is pressed in, the system firmware code fetch LED comes on, indicating that the firmware has started the boot process

Cleaning Procedures

Refer to the following table for cleaning procedures for this hp 9000 rp3410 or hp 9000 rp3440 Server. Be sure to turn off power to the server when cleaning it.

Table 5-29   Cleaning

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

CAUTION   DO NOT use petroleum-based cleaners (such as lighter fluid) or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone. These chemicals could damage all plastic and painted surfaces.

Where to Get Help

HP customer care will help you solve server problems and, if necessary, initiate appropriate service procedures.

Support is available on the web and by phone.

For information on contacting the HP IT Resource Center (ITRC) near you, go to http://www.itrc.hp.com.

Information to Collect Before you Contact Support

Before you contact HP support, you should:

Step 1. Check the previous sections of this chapter and attempt to solve the problem.

- Note failure symptoms and error indications (LEDs and messages) by checking the SEL and FPL logs

- Try to determine precisely what did or did not happen

Step 2. Collect the following information:

- The model number of your server (for example, rp3410)

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

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

Step 3. Be familiar with your system configuration.

- Are you using the LAN, RS232, or web interface to monitor the server?

- How many processors, DIMMs, and PCI cards have been installed?

- What versions of processor, memory, and PCI cards are used and where are they installed?

- What accessories are installed?

Step 4. Determine the following:

- Which firmware versions are in use?

- When did the problem start?

- Have recent changes been made to the system?

- Which operating system and version is in use?

Online Support

To contact HP Customer Support online, refer to the *Worldwide Limited Warranty and Technical Support Guide* or visit us at http://www.hp.com/go/bizsupport. On our web page, enter the server model number (rp3410) and search the field.

The following information is available on this web site:

- Software and firmware updates

- The latest drivers and utilities

- Additional documentation

Phone Support

To contact HP customer support by phone, go to the HP IT Resource Center (ITRC) near you, at http://www.itrc.hp.com. Local phone numbers are listed in your native language for help.

6 Specifications

Introduction

This chapter provides the hardware specifications of the hp 9000 rp3410 and rp 3440 Server. The following tables provide the specifications required for normal operation of the hp 9000 rp3410 or hp 9000 rp3440 Server.

Hardware Specifications

Table 6-1   Hardware Specifications

Component	rp3410	rp3440
Micro-processors	1 or 2 PA RISC 800 MHz/1.5 MB cache	2 or 4 PA RISC 800 MHz/3 MB cache 1 GHz/3 MB cache
Memory	Supports up to 12 double data rate (DDR) registered ECC memory, in PC2100 DIMMs. Supported DDR DIMM sizes: 256 MB and 512 MB	Supports up to 12 double data rate (DDR) registered ECC Memory, in PC2100 DIMMs. Supported DDR DIMM sizes: 256 MB, 512 MB, 1 GB, and 2 GB
Disk drives	3-36 GB, 15K RPM Ultra320 SCSI HotPlug disk or 3- 73 GB, 15K RPM Ultra320 SCSI HotPlug disk or 3-146 GB, 10K RPM Ultra320 SCSI HotPlug disk	3-36 GB, 15K RPM Ultra320 SCSI HotPlug disk or 3-73 GB, 15K RPM Ultra320 SCSI HotPlug disk or 3-146 GB, 10K RPM Ultra320 SCSI HotPlug disk
Video	A6150 PCI card (optional)	A6150 PCI card (optional)
SCSI	Integrated Ultra-3 SCSI dual channel controller; 80 MB/s transfer rate with one internal 68-pin connector and one external 68-pin connector	Integrated Ultra-3 SCSI dual channel controller; 80 MB/s transfer rate with one internal 68-pin connector and one external 68-pin connector
LAN	PCI Gigabyte, fast ethernet controller	PCI Gigabyte, fast ethernet controller
PCI slots	Two 64-bit PCI-X slots, 133 MHz, 3.3V slots	Four 64-bit PCI-X slots, 133 MHz, 3.3V slots
Core I/O	One serial port, 4 USB 2.0 ports, integrated RJ-45 LAN on management processor card	One serial ports, 4 USB 2.0 ports, integrated RJ-45 LAN on management processor card
DVD-ROM	None	IDE interface; 48x speed

Table 6-1   Hardware Specifications (Continued)

Component	rp3410	rp3440
External storage	Optional	Optional
Power supply	1-650W power supply	2-650W power supplies

Server Dimensions and Weights

This section provides dimensions and weights of hp 9000 rp3410 and rp3440 Server components.

Component Dimensions

Table 6-2   Server Component Dimensions

Dimension	Value
Rack Dimensions (Depth x Width x Height)	67.9 cm (26.8 in.) maximum x 48.3 cm (19.0 in.) x 8.6 cm (3.4 in.)
Tower Dimensions (Depth x Width x Height)	67.5 cm (26.6 in.) x 29.5 cm (11.6 in.) x 49.4 cm (19.5 in.)
Rack Weight	Min: 17.5 kg (38.6 lb.) Max: 22.2 kg (49.0 lb.)
Tower weight	Min: 22.4 kg (49.4 lb.) Max: 25.5 kg (56.3 lb.
Tower Footprint	0.2 m2 (2.1 sq. ft.)
Rack Units	2U

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