

IA64 Console Environment

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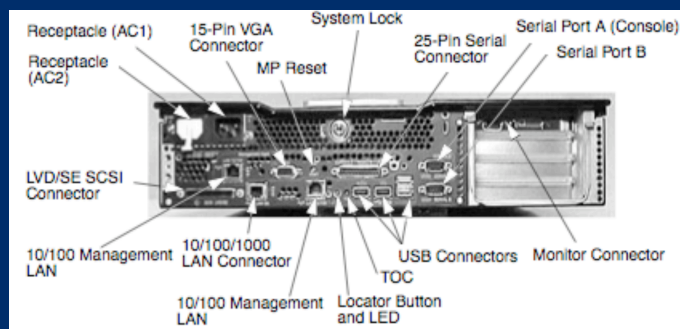


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Three console interfaces on the RX2600



- Extensible Firmware Interface (EFI)
- Remote Console interfaces
 - Baseboard Management Controller (BMC)
 - Management Processor (MP)



Extensible Firmware Interface (EFI) console



- EFI is the standard console for all IA64 systems, regardless of hardware vendor
- Each vendor can provide unique customizations
- Used to boot the system
- Interfaces with the operation system via PAL, SAL and EFI runtime services
- Provides both a menu and command line interface
- Code is stored in flash ROM and optional FAT partition
- EFI console is an open programming environment
 - Intel publishes the source code and tool kit
 - Intel transitioning EFI to SIG group, similar to PCI SIG
- EFI will eventually replace BIOS on IA32 systems

VMS_LOADER.EFI



- EFI application, built using MS Visual Studio with:
 - IA-64 cross compilers
 - EFI tool kit provided by Intel
 - MS linker produces P/COFF image format
- Runs in Physical Address mode as a console command
- Implements functionality of SRM BOOT command:
 - Initializes HWRPB structure
 - Creates bootstrap Virtual Address using translation registers
 - Loads IPB.EXE (ELF-format image)
 - Shuts down the EFI console with ExitBootServices()
 - Transfers to IPB in Virtual Address mode, via RFI instruction

Hybrid Disk Format



- **EFI requires GUID Partition Table (GPT) disk format**
- **EFI requires one FAT32 partition**
- **VMS requires ODS Files-11 disk format**
- **VMS does not support partition disks**
- **Both format co-exist, independent of each other**
- **EFI console view**
 - **GPT format with one 48Mb FAT32 partition**
 - **Remaining space unallocated**
- **VMS view**
 - **ODS Files-11 format disk**
 - **48Mb container file allocated for FAT32 partition**
- **CD-ROMs use ISO9660 format instead of GPT**

Selecting EFI console terminal



- **New systems are shipped with multiple devices selected as the console terminal**
- **VMS requires only one serial port for the console terminal**
- **Be sure USB keyboard is unplugged for now, support for USB keyboard and VGA console planned for the future**
- **Use the Boot Option Maintenance Menu to select only serial port and deselect other device**
- **Can select ANSI, VT100 and VT100+ terminal types, based on your terminal emulator**
- **Reset the system**

Booting VMS from the EFI Shell



- Select EFI Shell from the boot menu
- Set Boot flags environment variable, stored in NVRAM
 - IA64 flag values are generally the same as Alpha and VAX
 - Shell> set vms_flags "0,0"
- Select disk and directory
 - Shell> fs0:
 - fs0:> cd efi\vms
- Start the boot of VMS
 - fs0:> vms_loader
- Override environment variable
 - fs0:> vms_loader -flags 0,1

What's wrong with the Backspace key?



- EFI console requires ^H (ASCII 0x08) for backspace
- VMS traditionally uses DEL (ASCII 0x7F) for backspace
- Two methods for using the backspace key
 - Set terminal emulator to send DEL for backspace key
 - Use ^H in EFI Shell and Backspace key in VMS
 - Set terminal emulator to always send ^H for backspace key
 - Available in upcoming VMS for IA64 and Alpha
 - In LOGIN.COM:
 - \$ SET TERM/BACKSPACE=DELETE
 - Backspace key sends ^H and works for EFI Shell and VMS
 - Use ^V ^H ^H for beginning of line

Booting VMS from the EFI menu



- **Create new menu item**
 - Select Boot Option Maintenance Menu
 - Select Add Boot Option
 - Select volume
 - Select efi\vms\vms_loader
 - Add name, “HP OpenVMS Industry Standard 64”
 - No boot options are needed, since it uses VMS_FLAGS stored in NVRAM
 - Save settings to NVRAM

Boot Example



EFI version 1.10 [14.61]
EFI64 Running on Intel(R) Itanium Processor Family
EFI 1.10 IPF zx6000/rx2600/zx2000 1.22 [Wed Jul 23 16:43:12 2003] - HP

Copyright (c) 2000-2002 Broadcom Corporation
Broadcom NetXtreme Gigabit Ethernet EFI driver v3.0.7

Loading 'FPSWA'...
Loading 'Isi1030'...
Loading 'gigundi'...
2 0 0x00020B 0x0000000000000006 EFI Launching Boot Manager
Scsi(Pun0,Lun0) HP 18.2GST318406LC HP05 (40 MBytes/sec)
Scsi(Pun4,Lun0) HP 18.2GATLAS10K3_18_SCAHP05 (40 MBytes/sec)
Broadcom NetXtreme Gigabit Ethernet Adapter is detected (PCI)

EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.20 [4331]

Please select a boot option

Boot VMS on DKB0
EFI Shell [Built-in]
Boot Option Maintenance Menu
System Configuration Menu

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

Change EFI Boot Menu order



- Select Boot Option Maintenance Menu
- Select Change Boot Order
- Select new menu item
- Use the “u” key to move it to the top of the list
- Save Settings to NVRAM
- EFI shell command, bcfg, command can also be used to manage the EFI Boot menu
- Note that menu item imbeds disk GUID, so process must be repeated if you re-install VMS.
- In the future, VMS installation process will automate this task of adding EFI menu item

Set EFI Autoboot timeout



- Select Boot Option Maintenance Menu
- Select Set Auto Boot TimeOut
- Enter timeout value, usually 10 seconds
- Select Delete/Disable TimeOut to prevent autoboot

EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.21 [4334]

Please select a boot option

HP OpenVMS Industry Standard 64

EFI Shell [Built-in]

Boot Option Maintenance Menu

System Configuration Menu

Use _ and _ to change option(s). Use Enter to select an option

Default boot selection will be booted in 10 seconds

Other useful EFI shell commands



- Create VMS-like console commands
 - Shell> alias dir ls
- Display hardware and firmware revisions
 - Shell> info all
- Clear MP console logs files stored in NVRAM
 - Shell> clearlogs
- Map command display list of devices

Shell> map

Device mapping table

```
fs0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)/HD(Part1,Sig00000000)
fs1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,Sig832C30E1)
fs2 : Acpi(HWP0002,200)/Pci(1|0)/Scsi(Pun2,Lun0)/HD(Part1,SigDDA9F5F4)
blk0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
blk1 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)
blk2 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)/HD(Part1,Sig00000000)
blk3 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
blk4 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,Sig832C30E1)
blk5 : Acpi(HWP0002,200)/Pci(1|0)/Scsi(Pun2,Lun0)
blk6 : Acpi(HWP0002,200)/Pci(1|0)/Scsi(Pun2,Lun0)/HD(Part1,SigDDA9F5F4)
```

VMS_SHOW



- For the 8.2 release , VMS will distribute a utility to associate VMS device name with EFI pathnames

```
fs0:\efi\vms> vms_show devices
```

VMS: EIA0

EFI: Acpi(000222F0,0)/Pci(3|0)/Mac(00306E3829B5)

VMS: DKA0

EFI: fs0: Acpi(000222F0,100)/Pci(1|0)/Scsi(Pun0,Lun0)

VMS: EWA0

EFI: Acpi(000222F0,100)/Pci(2|0)/Mac(00306E38B938)

VMS: DKC200

EFI: fs1: Acpi(000222F0,200)/Pci(1|0)/Scsi(Pun2,Lun0)

- In the 8.2 release VMS_SET utility will allow selection of dump devices and HLL debugger port:

```
fs0:\efi\vms> vms_set dump_dev dka0,dkc200
```

VMS: DKA0

EFI: fs0: Acpi(000222F0,100)/Pci(1|0)/Scsi(Pun0,Lun0)

VMS: DKC200

EFI: fs1: Acpi(000222F0,200)/Pci(1|0)/Scsi(Pun2,Lun0)

```
fs0:\efi\vms> vms_show dump_dev
```

VMS: DKA0

EFI: fs0: Acpi(000222F0,100)/Pci(1|0)/Scsi(Pun0,Lun0)

VMS: DKC200

EFI: fs1: Acpi(000222F0,200)/Pci(1|0)/Scsi(Pun2,Lun0)

EFI commands

EFI Shell Command	Definition
help <command>	Display help for specified command or menu
reset	Reset the system
exit (at EFI shell)	Return to the main menu
EFI boot manager "change boot order"	Display or modify a path
befg	Search for boot devices
Many commands offer a [-b] parameter to cause 25 line breaks	Display or change scrolling capability
Configuration	Commands that deal with configuration items
autoboot	Display or set the auto start flag
info boot	Display or set processor boot identifier
EFI boot manager	Display boot-related information
autoboot	Seconds allowed for boot attempt
cpuconfig	Config/deconfig processor
boottest	Display or set boot tests execution
date	Read or set the date
time	Read or set the real time clock
Information	Commands that return system information
info all	Display all system information
info boot	Display boot-related information
info cpu	Display cache information
info chiprev	Display revision number of major VLSI
MP command <df>	Display FRU information
info fw	Display firmware version for PDC, ICM, and complex
info io	Display firmware version for PDC, ICM, and complex
LanAddress	Display core LAN station address
info mem	Display memory information
info cpu	Display processor information
Service	Service commands
errdump clear	Clear (zero) the contents of PIM
mm	Read memory locations scope of page deallocation
PDT	Display or clear the page deallocation table
errdump mca errdump emc errdump init	Display PIM information (processor internal memory)

Updating the EFI firmware



- Download firmware update program from HP website onto a local system.
- Minimum EFI firmware for VMS is 2.20
- Startup TCP/IP in the EFI console

```
Shell> load fs0:\efi\vms\tools\tcpipv4.efi
Shell> \efi\vms\tools\ifconfig lo0 inet 127.0.0.1 up
Shell> \efi\vms\tools\ifconfig sni0 inet 1.1.1.1 netmask 2.2.2.2 up
Shell> \efi\vms\tools\route add default 3.3.3.3
```
- Must be customized for your network environment
 - Replace 1.1.1.1 with IP address
 - Replace 2.2.2.2 with Netmask
 - Replace 3.3.3.3 with Gateway
- Hint: Use a script file to perform this task

Obtaining EFI firmware update



- Use FTP to copy over firmware update program

```
Shell> ftp 4.4.4.4
Connected to 4.4.4.4
220 foo.bar.com FTP Server (Version 5.3) Ready.
Name (4.4.4.4): HUBER
331 Username HUBER requires a Password
Password:
230 User logged in.
Remote system type is VMS.
ftp> bin
ftp> get fwupdate220.efi
ftp> bye
```

Installing the EFI firmware update



- **Execute the firmware update program**
 - Shell> fwupdate220
- **Warning: Do not power-off the system while flash ROM update is in progress**
- **Alternate update method**
 - Download ISO file, Burn CD-ROM and execute update program from CD-ROM

Remote Console Interface



- **Independent support system**
- **Available when the system is connected to a power source, even if the main power switch is set to “off”**
- **Vendor and system-specific functionality**
- **Two different remote consoles for the RX2600**
 - Baseboard Management Controller (BMC) with basic functionality
 - Management Process (MP) with more extensive features
 - Optional on RX2600, standard on larger system (RX4640)

Baseboard Management Controller (BMC)



- Available only on COM1 serial port of RX2600, ZX200, ZX6000
- Has it's own processor
- Password protected
- Entered by "ESC (" and exited by "ESC)" or "ESC Q"
- Power ON/OFF and system reset
- TOC command can be used to force a crash on hung system

cli>help

CLI Commands:

C [<passwordstring>]	- Change Password
CON	- Display Console selection
FPL	- Read Forward Progress Log
H	- Help (this text)
INFO	- Display BMC FW Revision
LOC [0,1]	- Locator LED Control
P [0,1]	- Power Control
Q	- Quit/Logout
RS [s]	- Reset System [and switch to sys console]
SE	- Read System Event Log
TOC [s]	- Send an INIT/TOC [and switch to sys console]

Management Processor (MP)



- Optional on RX2600, standard on RX4640 and up
- Minimum MP firmware for VMS is E2.22
- Uses it own processor with private ethernet adapter
- Username/Password protected
- Snoop EFI serial line and send out characters over serial line, TELNET or WWW (requires IP address)
- Supports multiple session, but only one controls input
- ^B used to enter remote console
- Can control power and reset system
- TC command can force a crash dump
- All console terminal I/O stored in NVRAM

MP Command Set



Command	Description		
BP	Reset BMC passwords	WHO	Display connected management processor users
CA	Configure asynch/serial ports	X	Exit management processor and disconnect
CG	Certificate generator	XD	Diagnostics and/or reset of management processor
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		
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		

```

MP MAIN MENU:

CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
    
```

Forcing a system crash



- History
 - On VAX and early Alpha system, ^P was detected by special hardware and handled by the console
 - Commodity serial ports pushed ^P detection in console firmware, if IPL < DEVICE_IPL
- EFI console ignores ^P, no way to return to EFI Shell
- IA64 VMS console terminal driver handles ^P
 - Calls XDELTA, if loaded
 - Prompts for forced crash, if IPL < DEVICE_IPL
- Remote console command generates Transfer of Control signal (BMC:TOC, MP:TC)
 - Handled by IA64 VMS as a non-maskable exception and results in a crash dump regardless of IPL

Future bootstrap options



- Fibre Channel
 - Similar to SCSI boot, but new vendor-specific setup program to replace the common SRM WIDMGR tool
- Network boot
 - Uses PXE (pixie) instead of MOP
 - LAD/LAST booting scheduled for 8.2
 - Cluster NISCS boot is post 8.2
- Partition system support for Superdome
 - VMS demo on Hard partition, Galaxy support in the future
- Memory disk boot under investigation
 - Use container file to eliminate boot drivers
 - Used by HP-UX and Linux and VAX/VMS to boot TK50

Links



- Handout: “Console Commands for the HP Integrity Server systems”–
CONSOLE_INTERFACE.DOC
- RX2600 Firmware updates:
 - http://h20000.www2.hp.com/bizsupport/TechSupport/DriverDownload.jsp?pnameOID=88839&locale=en_US&taskId=135&prodTypeId=15351&prodSeriesId=88837&submit.y=5&submit.x=8&cc=us&swEnvOID=54
- RX2600 support Manual
 - <http://h200001.www2.hp.com/bc/docs/support/SupportManual/lpn04096/lpn04096.pdf>



i n v e n t

Console Commands for the HP Integrity Server Systems



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Introduction

The HP Integrity Server system provides two console options: the Baseboard Management Console (BMC) and the Management Processor (MP) console. Both consoles can be used to power-cycle the systems and perform hardware-related operations. In addition to the low-level console functions, the Integrity Server system has a replacement for the SRM console in the Alpha processors, Extensible Firmware Interface (EFI). This document provides command summaries and examples of commonly used commands for both the BMC and the MP.

Ctrl/H and the Delete Key

Unlike OpenVMS, which uses the character **0X7F DEL/RUBOUT**, the BMC and the MP consoles and the EFI environment use **Ctrl/H**. If you press the Delete key on a VTxxx terminal or the key you have mapped to send **0X7F** in your terminal emulator, the character is not deleted.

This occurrence has triggered a new SYSGEN parameter, TTY_DEFCHAR3, and a new SET TERMINAL COMMAND to tell the terminal driver to re-map Ctrl/H to DEL. If you want the re-mapping to be system wide for all terminals, you need to OR 0x10 into the current value stored in TTY_DEFCHAR3. If you want to re-map a single terminal, issue the command:

```
$ set terminal/backspace=delete
```

Doing this allows you to change your terminal or terminal emulator to send **Ctrl/H** instead of **DEL**. When using command-line editing, you can still return to the start of the line by pressing the F12 key on a VTxxx terminal, or you can enter **Ctrl/V Ctrl/H Ctrl/H**.

If you set your terminal to re-map **Ctrl/H** to **DEL**, the driver does not perform the re-mapping operation if the terminal is in one of the following states:

- Terminal attribute is set to PASSALL
- Terminal attribute is set to PASTHRU
- IO\$_READALL
- IO\$_READPBLK
- Entering Ctrl/V tells the driver to pass the next character and skip the re-map check.

Console Input, Output, and Error

Currently, OpenVMS has two console restrictions for both the BMC and MP consoles:

1. The input, output, and error devices of these must point to a serial line console.
2. They must all be the same serial device.

If these conditions are not met you receive a warning out to the VMS_LOADER, and you may see other errors in later parts of the boot. Additionally, you may lose output that you would normally expect to see when booting.

Setting the Console Device

- Step 1 Power on the system. You should initially hook up to the console line on the management processor.

```
*****
Only default users are configured.
Use one of the following user/password pairs to login:

Admin/Admin
Oper/Oper
*****

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

Hewlett-Packard Management Processor

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MP Host Name: kthulu

Revision E.02.22

```
*****
MP ACCESS IS NOT SECURE
Default MP users are currently configured and remote access is enabled.
Modify default users passwords or delete default users (see UC command)
OR
Disable all types of remote access (see SA command)
*****
```

MP MAIN MENU:

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
MP> cm
```

(Use Ctrl-B to return to MP main menu.)

```
MP Host Name: kthulu
MP:CM> pc -on -nc
```

```
PC -on -nc
```

```
System will be powered on.
```

```
-> System is being powered on.
```

```
-> Command successful.
```

```
MP Host Name: kthulu
```

```
MP:CM> exit
```

```
MP MAIN MENU:
```

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
```

```
MP> co
```

You will now get lots of output from the system powering up. Eventually, you will get to this menu.

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.20 [4331]
```

```
Please select a boot option
```

```
EFI Shell [Built-in]
Boot Option Maintenance Menu
System Configuration Menu
```

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

Step 2 Select the "Boot Option Maintenance Menu" using either "v" "^" or ↑ ↓

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

```
Main Menu. Select an Operation
```

```
Boot from a File
Add a Boot Option
Delete Boot Option(s)
Change Boot Order

Manage BootNext setting
Set Auto Boot TimeOut

Select Active Console Output Devices
Select Active Console Input Devices
```

Select Active Standard Error Devices

Cold Reset
Exit

Timeout-->[10] sec SystemGuid-->[C198BA79-478A-11D7-9C22-6033AC66036B]
SerialNumber-->[US30464638]

- Step 3 Select each of the consoles and set the active console device. Use either "v" "^" or ↑ ↓. For this example, we will change only the console output device. When you select the output device, you receive a display something like the one below:

EFI Boot Maintenance Manager ver 1.10 [14.61]

Select the Console Output Device(s)

```
Acpi (PNP0501,0)/Uart (9600 N81)/VenMsg (PcAnsi)
Acpi (PNP0501,0)/Uart (9600 N81)/VenMsg (Vt100)
Acpi (PNP0501,0)/Uart (9600 N81)/VenMsg (Vt100+)
Acpi (PNP0501,0)/Uart (9600 N81)/VenMsg (VtUtf8)
Acpi (HWP0002,700)/Pci (1|1)/Uart (9600 N81)/VenMsg (PcAnsi)
* Acpi (HWP0002,700)/Pci (1|1)/Uart (9600 N81)/VenMsg (Vt100)
Acpi (HWP0002,700)/Pci (1|1)/Uart (9600 N81)/VenMsg (Vt100+)
Acpi (HWP0002,700)/Pci (1|1)/Uart (9600 N81)/VenMsg (VtUtf8)
Acpi (HWP0002,700)/Pci (2|0)
Save Settings to NVRAM
Exit
```

- Step 4 Using either the "v" "^" or ↑ ↓, move to the device you want to select or deselect. Pressing the Space bar changes the state, and the asterisk (*) indicates what is selected. In the above list, the Management Processor is selected and set to emulate a VT100. If you select **Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)**, the console is the BMC console labeled as console/serial A on the back of the system.
- Step 5 After making your changes, select the "Save Setting to NVRAM" and then exit.
- Step 6 Repeat Steps 4 and 5 for the output and error devices.
- Step 7 Finally, perform a cold reset of the system. If you changed the console from MP to the BMC or vice versa, you may need to move the serial cable to the appropriate connector on the system.

Console Comparison

The following lists provide the advantages and disadvantages of the BMC and MP consoles.

BMC Console

Advantages

- Simple to use.
- Small command set.
- Mode-less. You are either at its command prompt or you are not.

Disadvantages

- Single user.
- Limited features.
- Not available on many of the systems.

MP Console

Advantages

- Can be multi user. One user can issue commands to the EFI layer or the operating system, and multiple users can view it.
- Accessible by way of telnet or the web.
- Feature rich.
- Keeps log of last ~58 lines of display on the console. Now you can see what was really entered instead of getting it second hand.
- Can manipulate the server event logs.
- Supports dial-in access.
- Supports UPCs.

Disadvantages

- Not on all systems.
- More complex to perform simple operations like power cycling the system.
- Command menu and non-command menu commands, and you have to flip back and forth.

BMC System Console

On the RX2600, the Baseboard Management Console (BMC) is accessible through the serial port on the back of the system labeled Console/Serial A. This port is set to 9600 baud 8 bit no parity and one stop bit.

Entering Console Mode

To get the console processors attention and enter command mode, enter <ESC>(. You receive the cli> prompt, at which point you can enter commands.

Exiting Console Mode

To exit the console processor command mode, enter <ESC>Q. If OpenVMS is running, you are returned to the operating system prompt.

Command Summary

Command	Description
C [<passwordstring>]	Change Password
CON	Display console selection
FPL	Read forward progress log
H	Help
I <ipmi command data>	Send any IPMI message
	req fmt: rsSA netfnlun chk1 rqSWID rqSeq cmd [data] chk2
	resp fmt: rqSWID netfnlun chk3 rsSa rqSeqrsLun cmd ccode [data] chk4
INFO	Display BMC FW revision
IPMI <ipmi command data>	Send any IPMI message
	req fmt: netfnlun cmd [data]
	resp fmt: ccode [data]
LOC [0,1]	Locator LED control
P [0,1]	Power control
Q	Quit/Logout
RS [s]	Reset system [and switch to sys console]
SD	Read SDR repository
SE	Read System Event Log
TOC [s]	Send an INIT/TOC [and switch to sys console]

Powering System On/Off from the BMC

To power a system on, enter the following commands:

```
<ESC>(
cli>p 1
System Power set to ON
```

To power the system off, enter the following commands:

```
<ESC>(
cli>P 0
System Power set to OFF
```

Booting OpenVMS from the BMC

Step 1 Get the consoles attention by entering <ECS>(<

```
<ESC>(
cli>
```

Step 2 Power the system on.

```
cli>p 1
System Power set to ON
cli>
```

Step 3 Exit console mode <ESC>Q, and wait for the EFI command menu. (Note that some systems may have been set to time out after a small number of seconds.) You see the Shell> prompt.

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.20 [4331]
```

```
Please select a boot option
```

```
EFI Shell [Built-in]
Boot Option Maintenance Menu
System Configuration Menu
```

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

Step 4 Use "v", or "^", ↑ ↓ to select the "EFI Shell [Built-in]". You then get the Shell> prompt:

```
Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.61]
Device mapping table
fs0 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigC1CEDDA4)
blk0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
blk1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
blk2 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigC1CEDDA4)
Shell>
```

Step 5 Enter FS0: or the file structured device that OpenVMS installed on it:

```
Shell> fs0:  
fs0:\>
```

Step 6 Change the directory containing the OpenVMS initial boot loader by issuing **cd \efi\vms**

```
fs0:\> cd \efi\vms  
fs0:\efi\vms>
```

Step 7 Invoke the initial loader by entering **vms_loader -fl 0,2**. The -fl is one way to specify boot time flags just like on an Alpha system with the SRM console.

```
fs0:\efi\vms> vms_loader -fl 0,2
```

HP OpenVMS Industry Standard 64 Evaluation Release XA0K-J2S
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"Usual output suppressed"

```
%SET-I-INTSET, login interactive limit = 64, current interactive value = 0  
SYSTEM          job terminated at  3-NOV-2003 12:32:35.45
```

Accounting information:

Buffered I/O count:	2114	Peak working set size:	13424
Direct I/O count:	1601	Peak virtual size:	220384
Page faults:	2899	Mounted volumes:	0
Charged CPU time:	0 00:00:05.96	Elapsed time:	0 00:00:36.44

Forcing a Crash

To force a crash of OpenVMS, first try entering Ctrl/P. If the system is booted with XDelta, you can then enter the ;c command to force a crash. If the system is not booted with XDelta, you see the following:

```
Crash (y/n): y  
  
**** OpenVMS I64 Operating System XA0K-J2S - BUGCHECK ****  
  
** Bugcheck code = 00000965: DEBUGCRASH, Debugger forced system crash  
** Crash CPU: 00 Primary CPU: 00 Active CPUs: 00000003  
** Current Process = NULL  
** Current PSB ID = 00000001  
** Image Name =  
  
**** Starting compressed selective memory dump at 30-OCT-2003 17:34...
```

If the system does not respond to Ctrl/P then do the following:

```
<ESC>(
cli> TOC
Sending TOC/INIT.
<ESC>Q
```

Management Processor Console

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 the following:

- Power
- Reset
- Transfer of Control (TOC) capabilities
- Console access
- Display and recording of system events
- Display of 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 by way of 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
- 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:

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.

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 Login: Admin
MP password: ~

Hewlett-Packard Management Processor
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reserved
System Name: xxxxxxxx

MP MAIN MENU:
CO: Console
VFP: Virtual Front Panel
```

CM: Command Menu
 CL: Console Log
 SL: Show Event Logs
 CSP: Connect to Service Processor
 SE: Create OS Session
 HE: Main Menu Help
 X: Exit Connection MP>

Management Processor Commands

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
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 users use several different terminal types simultaneously, some users may see strange results.

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 console authority is Administrator and the new login is as an Operator, the command console is denied (remains in MP Main Menu mode). If a command is in progress, a message is 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 terminals, 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. Pressing the reset button on the back panel of your HP Server can reset forgotten passwords. After the MP reboots, the local console terminal displays a message for five seconds. Responding to this message in time allows 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 (hangs 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 are displayed. If executed in command mode, displays a list of command interface commands available to the user. 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. The 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. The default is 5 minutes. This timeout prevents a user from inadvertently keeping the MP locked in 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 it is 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-STST~4 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 non-mirrored 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 by using 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 operating system before issuing this command or use the commands graceful shutdown option.

This command allows you to switch the system power on or off. You 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.

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.

Display Logs

SL: Display the contents of the system status logs

This command displays the content of the event logs that have been stored in non-volatile 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
- The table below defines alert (or severity) levels.

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. Intelligent hardware modules, the OS, and system firmware produce events. Use VFP to view the live events. Use SL to view log events.

Navigate within the logs as follows:

- Plus sign (+) – View the next block (forward in time).
- Minus sign (-) – View the previous block (backward in time).
- Carriage-return – 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).
- Question mark (?) – Display help menu.
- Q – Quit

Alert Levels

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

When invoked, this command displays a current summary of system status, including the state of front panel LEDs.

There are two ways that the live display of events can be started:

1. Live Mode: Invoked from the VFP command at the MP prompt. To exit, type Q to quit the console.
2. Early Boot Mode: When the boot sequence for the system begins, the live VFP is invoked automatically. When boot finishes, you are automatically switched to console mode.

The LED state reflects the state of the front panel LEDs. When system power is off, the remote LED shows “off” even though remote access may be enabled with the EL or ER commands.

Who

WHO: Displays a list of MP connected users.

This command displays the login name and operating mode (Main Menu, command, etc.) 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 typed Ctrl/B, then the login name that the local operator 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 I²C connection (get BMC Device ID)
- LAN connectivity test using ping
- Modem self-tests

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

Avoiding Command Confirmation

Most of the commands will prompt you for confirmation before performing the command. You can bypass this confirmation by adding "-nc" to the command line.

Gaining Control of the Console

If you have multiple users sharing a console, you will see the following message if you try to enter commands to the console:

```
Shell>
- - - - - Live Console - - - - -

[Read only - use Ctrl-Ecf for console write access.]

To get control you need to enter <ESC>cf, not <CTRL-E>cf.
```

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:

```
MP> HE
```


MP Help: Main Menu
===== (Administrator) === Hardware
Revision al 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

Powering System On/Off from the MP Console

Step 1 To log into the MP console, you may need to press carriage-return a couple of times. You are then prompted to enter the user name and password. By default, they are set to "Admin". If you are not prompted to login, you have old firmware and need to see the section on updating the MP firmware.

```
*****
Only default users are configured.
Use one of the following user/password pairs to login:

Admin/Admin
Oper/Oper
*****

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

Hewlett-Packard Management Processor

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MP Host Name: kthulu

Revision E.02.22

MP ACCESS IS NOT SECURE
Default MP users are currently configured and remote access is enabled.
Modify default users passwords or delete default users (see UC command)
OR
Disable all types of remote access (see SA command)

MP MAIN MENU:

CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection

MP Host Name: kthulu
MP>

Step 2 Switch to the command menu by entering the CM command.

MP> cm

(Use Ctrl-B to return to MP main menu.)

MP Host Name: kthulu
MP:CM>

Step 3 Turn on the power by entering the command "**pc -on -nc**" and Ctrl/B to get out of command menu mode.

MP:CM> pc -on -nc

PC -on -nc

System will be powered on.

-> System is being powered on.

-> Command successful.

MP Host Name: kthulu
MP:CM> Ctrl/B

MP MAIN MENU:

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

```
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
MP>
```

To power off the system, return to the command menu and enter the command **"pc -off- nc"**:

```
MP> cm
```

(Use Ctrl/B to return to MP main menu.)

```
MP Host Name: kthulu
MP:CM> pc -off -nc
```

```
PC -off -nc
```

System will be powered off.

You must shut down the OS manually before this command is executed.
Failure to do this can cause problems when the OS is restarted.

-> System is being powered off.

-> Command successful.

```
MP Host Name: kthulu
MP:CM>
```

MP MAIN MENU:

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
MP>
```

Booting OpenVMS from the MP Console

- Step 1 To log into the MP console, you may need to press carriage-return a couple of times. You are then prompted to enter the user name and password. By default, they are set to "Admin". If you are not prompted to login, you have old firmware and need to see the section on updating the MP firmware.

```
*****
Only default users are configured.
Use one of the following user/password pairs to login:

Admin/Admin
Oper/Oper
*****

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

Hewlett-Packard Management Processor

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MP Host Name: kthulu

Revision E.02.22

```
*****
MP ACCESS IS NOT SECURE
Default MP users are currently configured and remote access is enabled.
Modify default users passwords or delete default users (see UC command)
OR
Disable all types of remote access (see SA command)
*****
```

MP MAIN MENU:

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

MP Host Name: kthulu
MP>

Step 2 Switch to the command menu by entering the CM command.

```
MP> cm
```

(Use Ctrl-B to return to MP main menu.)

```
MP Host Name: kthulu
MP:CM>
```

Step 3 Turn on the power by entering the command "**pc -on -nc**" and Ctrl/B to get out of command menu mode.

```
MP:CM> pc -on -nc
```

```
PC -on -nc
```

```
System will be powered on.
```

```
-> System is being powered on.
```

```
-> Command successful.
```

```
MP Host Name: kthulu
MP:CM> Ctrl/B
```

```
MP MAIN MENU:
```

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
MP>
```

Step 4 Exit MP console mode, **co**, and wait for the EFI command menu. (Note that some systems may have been set to time out after a small number of seconds.) You see the Shell> prompt.

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.20 [4331]
```

```
Please select a boot option
```

```
EFI Shell [Built-in]
Boot Option Maintenance Menu
System Configuration Menu
```

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

- Step 5 Use "v", or "^", ↑ ↓ to select the **"EFI Shell [Built-in]"**. You then receive the Shell> prompt:

```
Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.61]
Device mapping table
  fs0  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigC1CEDDA4)
  blk0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
  blk1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
  blk2 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigC1CEDDA4)
Shell>
```

- Step 6 Enter FS0: or the file structured device that Open VMS on it.

```
Shell> fs0:
```

```
fs0:\>
```

- Step 7 Now change the directory containing the OpenVMS initial boot loader by entering **cd \efi\vms**.

```
fs0:\> cd \efi\vms
```

```
fs0:\efi\vms>
```

- Step 8 Now invoke the initial loader by entering **vms_loader -fl 0,2**. The -fl is one way to specify boot time flags just like on the Alpha system with the SRM console.

```
fs0:\efi\vms> vms_loader -fl 0,2
```

```
HP OpenVMS Industry Standard 64 Evaluation Release XA0K-J2S
© Copyright 1976-2003 Hewlett-Packard Development Company, L.P.
```

"Usual output suppressed"

```
%SET-I-INTSET, login interactive limit = 64, current interactive value = 0
SYSTEM      job terminated at  3-NOV-2003 12:32:35.45
```

```
Accounting information:
Buffered I/O count:      2114      Peak working set size:      13424
Direct I/O count:       1601      Peak virtual size:      220384
Page faults:           2899      Mounted volumes:      0
Charged CPU time:      0 00:00:05.96  Elapsed time:      0 00:00:36.44
```

Forcing a Crash

To force a crash of OpenVMS, first try entering Ctrl/P. If the system is booted with XDelta, you can then enter the ";c" command to force a crash. If the system is not booted with XDelta, you see the following:

```
Crash (y/n): y

**** OpenVMS I64 Operating System XA0K-J2S - BUGCHECK ****

** Bugcheck code = 00000965: DEBUGCRASH, Debugger forced system crash
** Crash CPU: 00    Primary CPU: 00    Active CPUs: 00000003
** Current Process = NULL
** Current PSB ID = 00000001
** Image Name =

**** Starting compressed selective memory dump at 30-OCT-2003 17:34...
```

If the system does not respond to Ctrl/P, enter the following commands: **Ctrl/B**, **CM**, **TC -NC**, **Ctrl/B**, and **CO**. See the following example:

```
Ctrl/B
MP MAIN MENU:

    CO: Console
    VFP: Virtual Front Panel
    CM: Command Menu
    CL: Console Log
    SL: Show Event Logs
    CSP: Connect to Service Processor
    SE: Enter OS Session
    HE: Main Help Menu
    X: Exit Connection

MP Host Name: kthulu
MP> cm

    (Use Ctrl-B to return to MP main menu.)

MP Host Name: kthulu
MP:CM> tc -nc

TC -nc

Execution of this command irrecoverably halts all system processing and
I/O activity and restarts the computer system.
-> SPU hardware was successfully issued a TOC.

-> Command successful.

MP Host Name: kthulu
```

```
MP:CM><CTRL-B>
```

```
MP MAIN MENU:
```

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
```

```
MP> CO
```

Event Logs

The system event logs eventually fill-up. When this happens, a warning is output during power up, and the power up is delayed. To speed up the boot, you should clear the event logs by entering Ctrl/B to get to the MP consoles main display. Then enter the SL command. The following example shows output from an **SL** command.

```
MP MAIN MENU:
```

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
```

```
MP> sl
```

```
Event Log Viewer Menu:
```

Log Name	Entries	% Full	Latest Timestamped Entry
E - System Event	295	28 %	03 Nov 2003 14:42:16
F - Forward Progress	3210	80 %	
B - Current Boot	110	36 %	03 Nov 2003 14:42:16
P - Previous Boot	123	41 %	03 Nov 2003 14:38:11
C - Clear All Logs			
L - Live Events			

```
Enter menu item or [Ctrl-B] to Quit:
```

To clear the system event log, enter **c** at the "Enter menu item or [Ctrl-B] to Quit:" prompt. See the following example:

```
Enter menu item or [Ctrl-B] to Quit: c
Are you sure you want to clear all logs? (Y/[N]): y
```

```
-> Logs have been cleared.
```


MP MAIN MENU:

```
CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection
```

```
MP Host Name: kthulu
MP>
```

Updating the MP Firmware

The following example illustrates how to update the MP firmware. It was performed on a system with firmware that is older than what you are likely to find on recently purchased RX2600 systems.

You need the following items before you start updating the MP firmware:

- An IP address that can be loaned to the management port
- A serial cable to connect to the console port on the 3-port pigtail on the systems.
- A network cable to plug into the Management Processor's port. This is the left most of the 3 network connectors it is labeled LAN 10/100.
- Make sure users are not using the system. You are supposed to be able to do this while users are logged on, but I have never tried it.
- Make sure the system is NOT running TCP/IP with the same IP address you are going to loan to the console.

To perform the update, do the following steps.

1. Plug an Ethernet cable into the management port's connection.
2. Plug a serial cable into the console port on the MP port.
3. From a terminal or terminal emulator connected to the management port's console, hit Ctrl/B. This gets the management processor's attention. You will be prompted to log in. If your system has older MP firmware just enter <cr> for username and <cr> for password. If that does not work you likely have newer firmware and the username is Admin and the password is Admin.
(Note: if the system's Management Processor already has a valid IP address for our LAB, you can skip steps 4 and 5 and go to step 6.)
4. If you did not need a user name and password enter LC, which "Stands for lan configuration". Provide the IP address, name, and netmask, gateway, and so on. If you need a user name and password, enter CM at the prompt and then the LC command (a full console output example follows instructions, below).
5. You are prompted to use the "R" option of the XD command to reset the management processor for the lan configuration to take effect. (This command, as best we can tell, does not impact the operating system running on the server). So issue the XD command and select the R option. When the reset completes, re-enter Ctrl/B (that is, repeat step 3) to gain the attention of the management processor.
6. Now you need the following: IP address of the system with the firmware. If you did not need a user name and password previously for the management console, enter the command XU for a firmware update. If you needed the Admin user name and password, enter the command CM (command menu) and then the FW command for a firmware update.

In either case, you need to provide the follow data:

- An IP address from which to down load the firmware.
- The path to the firmware. For this update, the path is /dsa500/mp_fw/222.
- The username and password for system with the firmware.

You prompted to check the inputs to make sure it is what you want. If you say yes and made no mistakes, the firmware is updated. It takes 10 to 20 minutes depending upon how fast a connection you have and how busy the system you use is.

7. If you borrowed an IP address, repeat steps 4 and 5 to remove the name and address (that is, reset the management processor IP address and gateway back to the default value of 127.0.0.1).
8. I would unplug the system and plug it back in to force the Management Processor to reset itself. You can skip this step if the system already has valid IP data for our LAB. If you do this step, you need to repeat step 3.

Now return the network cable back to the 10/100 port used by the O.S. and EFI unplug the serial cable you are done.

SAMPLE UPGRADE: NODE NAK (*explanatory text added for clarification is in italics*)

```
AJAX>$ set host/lat  nak_con2      (Management processor serial console)
%LAT-S-CONNECTED, session to NAK_CON2 on node ZK034LHB007LAT7 established
%LAT-I-TODISCON, type ^\ to disconnect the session
```

(Ctrl/B typed to gain management processor attention.)

Leaving Console Mode - you may lose write access.

When Console Mode returns, type ^Ecf to get console write access.

```
Management Processor login:          (<cr>)
Management Processor password:      (<cr>)
```

Hewlett-Packard Management Processor

(c) Copyright Hewlett-Packard Development Company, L.P. 1999-2002. All Rights Reserved.

System Name: uninitialized

```
*****
MP ACCESS IS NOT SECURE
No MP users are currently configured and remote access is enabled.
Set up a user with a password (see SO command)
OR
Disable all types of remote access (see EL and ER commands)
*****
```

```
MP Host Name:  uninitialized
MP> lc
```

LC

This command allows you to modify the LAN configuration.

Current configuration:

```
MAC Address       : 0x00306e397dd2
IP Address        : 127.0.0.1
MP Host Name      : uninitialized
Subnet Mask       : 255.255.255.0
Gateway          :
Link State        : Auto Negotiate
Web Console Port Number: 2023
```

Do you want to modify the LAN configuration? (Y/[N]) y

Current IP Address: 127.0.0.1

Do you want to modify it? (Y/[N]) y

Enter new IP Address: XX.XX.xx.yyy *(Supply valid currently unused IP addr)*

New IP Address: XX.XX.xx.yyy

Confirm? (Y/[N]): y

-> IP Address will be updated.

Current MP Host Name: uninitialized

Do you want to modify it? (Y/[N]) n

Current Subnet Mask: 255.255.255.0

Do you want to modify it? (Y/[N]) n

Current Gateway:

Do you want to modify it? (Y/[N]) (Default will be IP Address) y

Enter new Gateway: XX.XX.xx.XXX

New Gateway: XX.XX.xx.100

Confirm? (Y/[N]): y

-> Gateway will be updated.

Current Link state: Auto Negotiate

Do you want to modify it? (Y/[N]) n

Current Web Console Port Number: 2023

Modifying Web Port number will cause all present Web connections to be dropped.

Do you want to modify it? (Y/[N]) n

-> Settings have been updated.

-> Reset the MP for LAN configuration to take effect.

-> Use the R option of the XD command to reset the MP.

MP Host Name: uninitialized

MP> XD

Non-destructive tests :

1. MP Parameters checksum
2. I2C connection (Get BMC Device ID)
3. LAN access (PING)
4. Modem selftests

Type R to reset the MP or [Q] to quit the diagnostic menu.

-> Choice: R

The MP is now being reset...

HP Management Processor

Firmware Revision E.02.10 Oct 1 2002,15:53:45

(c) Copyright Hewlett-Packard Development Company, L.P. 1999-2002. All Rights Reserved.

Type Ctrl-B to activate MP Command Interface.

(Ctrl/B typed to gain management processor attention.)

Leaving Console Mode - you may lose write access.

When Console Mode returns, type ^Ecf to get console write access.

Management Processor login: (<cr>)

Management Processor password: (<cr>)

Hewlett-Packard Management Processor

(c) Copyright Hewlett-Packard Development Company, L.P. 1999-2002. All Rights Reserved.

System Name: uninitialized

MP ACCESS IS NOT SECURE

No MP users are currently configured and remote access is enabled.

Set up a user with a password (see SO command)

OR

Disable all types of remote access (see EL and ER commands)

MP Host Name: uninitialized

MP> xu

XU

This command activates the upgrade mode. All connections will be closed, the session will be aborted, and the modem connection will be dropped immediately. Web and telnet connections will be dropped upon completion.

WARNING: Simultaneous upgrade of MP and System Firmware is not allowed and will result in SFW corruption.

Please, confirm your intention to activate the upgrade mode (Y/[N]) : y

Enter source system IP address (Q to quit): XX.XX.X.XX

Enter file path (Q to quit): /dsa500/mp_fw/222

Do you wish to use the default login: anonymous / MP@hp.com (Y/[N]/Q) : n

Enter login: firmwareupd (Supply valid user / password for FTP login)

Enter password:

MP Firmware Upgrade Parameters:

Source IP: XX.XX.X.XX (IP address of node for FTP login)

File Path: /dsa500/mp_fw/222

Login: firmwareupd

Confirm? (Y/[N]): y

-> MP firmware upgrade in progress....

Retrieving upgrade file using FTP.

Retrieved an upgrade file successfully.

Programming ROM. Percent Complete: 100.

Retrieving upgrade file using FTP.

Retrieved an upgrade file successfully.

Programming ROM. Percent Complete: 100.

Retrieving upgrade file using FTP.

Retrieved an upgrade file successfully.

Programming ROM. Percent Complete: 100.

(Why three file transfers/upgrades? Left as exercise for the reader.)

-> MP firmware upgrade complete - Web and telnet connections will be dropped. MP will now reset....

HP Management Processor

Firmware Revision E.02.22 Jun 13 2003,12:34:29

(Firmware Rev. Updated)

(c) Copyright Hewlett-Packard Development Company, L.P. 1999-2003. All Rights Reserved.

```

*****
Only default users are configured.
Use one of the following user/password pairs to login:

Admin/Admin
Oper/Oper
*****

MP login:          (<cr>)
MP password: (<cr>)

                                (After upgrade, need real user/password.)
                                (<cr> / <cr> no longer accepted)
MP login: Admin      (user: Admin / password: Admin)
MP password: ***** (Upper case is significant)

```

Hewlett-Packard Management Processor

(c) Copyright Hewlett-Packard Development Company, L.P. 1999-2003. All Rights Reserved.

MP Host Name: uninitialized

Revision E.02.22

```

*****
MP ACCESS IS NOT SECURE
Default MP users are currently configured and remote access is enabled.
Modify default users passwords or delete default users (see UC command)
OR
Disable all types of remote access (see SA command)
*****

```

MP MAIN MENU:

```

CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
CSP: Connect to Service Processor
SE: Enter OS Session
HE: Main Help Menu
X: Exit Connection

```

MP Host Name: uninitialized
MP> cm

(Use Ctrl-B to return to MP main menu.)

MP Host Name: uninitialized
MP:CM> lc

LC

At each prompt you may type DEFAULT to set default configuration or Q to Quit

Current LAN Configuration:

```
- - MAC Address           : 0x00306e397dd2
I - IP Address            : XX.XX.XX.XXX
H - MP Host Name          : uninitialized
S - Subnet Mask           : 255.255.255.0
G - Gateway Address       : XX.XX.XX.XXX
L - Link State            : Auto Negotiate
W - Web Console Port Number : 2023
```

Enter parameter(s) to change, A to modify All, or [Q] to Quit: i

For each parameter, enter:

```
New value, or
<CR> to retain the current value, or
DEFAULT to set the default value, or
Q to Quit
```

IP Address:

```
Current -> XX.XX.XX.XXX
          127.0.0.1 (default)
```

Modifying this parameter will cause all present LAN and Web connections to be dropped.

Enter new value, or Q to Quit: 127.0.0.1 *(specify 127.0.0.1 or say DEFAULT)*

-> IP Address will be updated

New LAN Configuration (* modified values):

```
- - MAC Address           : 0x00306e397dd2
+ I - IP Address          : 127.0.0.1
H - MP Host Name          : uninitialized
+ S - Subnet Mask         : 255.255.255.0
+ G - Gateway Address     : XX.XX.XX.XXX
L - Link State            : Auto Negotiate
W - Web Console Port Number : 2023
```

+ indicates inconsistent parameters

Enter parameter(s) to revise, or [Q] to Quit: G

For each parameter, enter:

```
New value, or
<CR> to retain the current value, or
DEFAULT to set the default value, or
Q to Quit
```

Gateway Address:

```
Current -> XX.XX.XX.XXX
          127.0.0.1 (default)
```

Enter new value, or Q to Quit: 127.0.0.1 *(specify 127.0.0.1 or say DEFAULT)*

-> Gateway Address will be updated

```
New LAN Configuration (* modified values):
- - MAC Address          : 0x00306e397dd2
* I - IP Address         : 127.0.0.1
  H - MP Host Name       : uninitialized
  S - Subnet Mask        : 255.255.255.0
* G - Gateway Address    : 127.0.0.1
  L - Link State         : Auto Negotiate
  W - Web Console Port Number : 2023
```

Enter Parameter(s) to revise, Y to confirm, or [Q] to Quit: Y

```
-> LAN Configuration has been updated.
-> Reset MP (XD command option 'R') for configuration to take effect.
```

```
MP Host Name: uninitialized
MP:CM> XD
```

XD

```
Diagnostics Menu:
Non-destructive tests:
  P - Parameter checksum
  I - I2C access (get BMC Device ID record)
  L - LAN access (PING)
  M - Modem selftests
Destructive tests:
  R - Restart MP
```

Enter menu item or [Q] to Quit: R

Confirm? (Y/[N]): Y

```
MP is now being reset...
HP Management Processor
Firmware Revision E.02.22 Jun 13 2003,12:34:29
(c) Copyright Hewlett-Packard Development Company, L.P. 1999-2003. All Rights Reserved.
```

```
*****
Only default users are configured.
Use one of the following user/password pairs to login:

Admin/Admin
Oper/Oper
*****
```

MP login:

```
.
.
.
MP Host Name: uninitialized
MP:CM> sysrev
```


SYSREV

Current firmware revisions

MP FW : E.02.22
BMC FW : 01.40
EFI FW : 01.22
System FW : 01.82

MP Host Name: uninitialized
MP:CM>

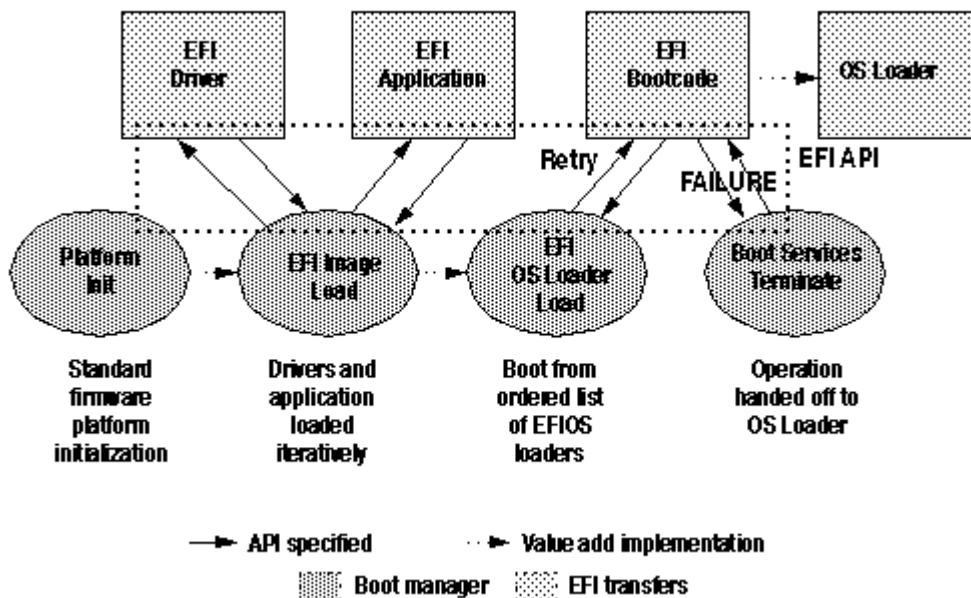
Extensible Firmware Interface (EFI) Boot Manager

EFI (Extensible Firmware Interface) is an operating system and platform-independent boot and pre-boot interface. EFI lies between the operating system and platform firmware, allowing the operating system to boot without having details about the underlying hardware and firmware. EFI supports boot devices, uses a flat memory model, and hides platform and firmware details from the operating system.

NOTE EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

EFI supports booting from media that contain an EFI OS loader or an EFI-defined System Partition. An EFI-defined System Partition is required by EFI to boot from a block device.

EFI Boot Sequence



Extensible Firmware Interface (EFI) Boot Manager

The EFI boot manager loads EFI applications (including OS first stage loader) and EFI drivers from an EFI-defined file system or image loading service. NVRAM variables point to the file to be loaded. These variables contain application specific data that are passed directly to the EFI application. EFI variables provide system firmware a boot menu that points to all the operating systems, even multiple versions of the same operating systems.

The EFI Boot Manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the Boot Manager presents you with different ways to bring up the system. For example, you can boot to the EFI Shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance menu.

- *Boot from a File*—Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the system searches for an EFI directory. If the EFI directory is found, then it looks in each of the subdirectories below EFI. In each of those subdirectories, it looks for the first file that is an executable EFI Application. Each of the EFI Applications that meet this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. You can also launch a specific application without adding it as a boot option. In this case the EFI Boot Manager searches the root directories and the \EFI\TOOLS directories of all of the EFI System Partitions present in the system for the specified EFI Application.
- *Add a Boot Option*—Adds a boot option to the EFI Boot Manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI Boot Manager searches for the executable file in the same directories as described in “Boot from a File” option. When the file is found, it is executed.
- *Delete Boot Options*—Deletes a specific boot option or all boot options
- *Change Boot Order*—Controls the relative order in which the EFI Boot Manager attempts boot options. For help on the control key sequences you need for this option, refer to the help menu.
- *Manage BootNext Setting*—Selects a boot option to use one time (the next boot operation)
- *Set Automatic Boot Timeout*—Defines the value in seconds that pass before the system automatically boots without user intervention. Setting this value to zero disables the timeout feature.
- *Exit*—Returns control to the EFI Boot Manager main menu. This displays the active boot devices, including a possible integrated shell (if the implementation is so constructed).

EFI Commands

The following table lists EFI commands:

EFI Commands

EFI Shell Command	Definition
help <command>	Display help for specified command or menu
reset	Reset the system
exit (at EFI shell)	Return to the main menu
EFI boot manager “change boot order”	Display or modify a path
bcfg	Search for boot devices
Many commands offer a [-b] parameter to cause 25 line breaks	Display or change scrolling capability
Configuration	Commands that deal with configuration items
autoboot	Display or set the auto start flag
info boot	Display or set processor boot identifier
EFI boot manager	Display boot-related information
autoboot	Seconds allowed for boot attempt
cpuconflg	Config/deconfig processor
boottest	Display or set boot tests execution
date	Read or set the date
time	Read or set the real time clock
Information	Commands that return system information
info all	Display all system information
info boot	Display boot-related information
info cpu	Display cache information
info chiprev	Display revision number of major VLSI
MP command <df>	Display FRU information
info fw	Display firmware version for PDC, ICM, and complex
info io	Display firmware version for PDC, ICM, and complex
LanAddress	Display core LAN station address
info mem	Display memory information
info cpu	Display processor information
Service	Service commands
errdump clear	Clear (zero) the contents of PIM
mm	Read memory locations scope of page deallocation
PDT	Display or clear the page deallocation table
errdump mca errdump cmc errdump init	Display PIM information (processor internal memory)

EFI/POSSE Commands

This section describes the EFI/POSSE commands developed for the server.

NOTE EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

help

Provides information on the EFI shell commands.

Syntax

```
help [-b] <category>
help [-b] <cxnd>
help [-b] bch <bchmenu> <bchcmd>
```

Parameters

-b	Enable page breaking
category	Category of commands to view help on commands cmd Shell command name on which to provide verbose information
bch	Display the list of SCM commands and their corresponding EFI bchmenu BCH menu name taken from the top level of the BCH menu bchcmd BCH command on which to display information

Operation

If help is invoked with no parameters, it displays a list of shell command categories. To list all of the commands within a category, the user should type “help <category>” (see examples). If invoked with the -b switch, any output longer than one page pauses after each page is displayed. If a shell command name is used as a parameter, verbose help is displayed for that command.

If help is invoked with the bch option, it displays a list of BCH commands and their corresponding EFI/POSSE commands. It instructs the user to repeat the command line followed by a menu name for more information on that menu. If help is invoked followed by bch and a menu name, it displays a list of commands that appear under that BCH menu. The user may then invoke help followed by bch, the menu name, and a BCH command name to display information on that command. This would point the user to the command that has taken the place of that BCH functionality, or will inform the user that the functionality no longer exists. As a shortcut, the user may enter help followed by BCH and a BCH command name to go straight to that command.

help command

```
Shell> help
List of classes of commands:

boot          -- Booting options and disk-related commands configuration --
Changing and retrieving system information
devices       -- Getting device, driver and handle information
memory        -- Memory related commands
shell         -- Basic shell navigation and customization scripts -- EFI
```

shell-script commands

Type "help" followed by a class name for a list of commands in that class
"help" followed by command name for full documentation

help configuration command

```
Shell> help configuration
Configuration commands:
cpuconfig-- Deconfigure or reconfigure Cpus
date      -- Display or set date
err       -- Display or set error level
esiproc   -- Make an ESI call
errdump   -- View/Clear logs
info      -- Display hardware information
monarch   -- View or set the monarch processor
paiproc   -- Make a PAL call
salproc   -- Make a SAL call
time      -- Display or set time
ver       -- Displays version info
```

Type "help" followed by command name for full documentation on that command.
Type "help -a" to display a list of all commands.

help cpuconfig command

```
Shell> help cpuconfig

CPUCONFIG [cpu] (onloff)
  cpu    Specifies which cpu to configure
  onloff Specifies to configure or deconfigure a cpu
```

Notes:

1. Cpu status will not change until next boot.

Examples:

* To deconfigure CPU 0 fs0:\> cpuconfig 0 off
CPU will be deconfigured on the next boot.

* To display configuration status of cpus fs0:\> cpuconfig
<CPU configuration data displayed>

help bch command

Configuration	help bch Co
INformation	help bch in
PAth	help bch pa
ScRool	help bch sr
SEArch	help bch sea
SERvice	help bch ser
BOot	help bch bo
HElp	help bch he
RESET	help bch reset
MAIn	help bch ma

For more help on one of the commands above, at the prompt type:

help bch COMMAND

baud

Sets the baud rate and communication settings for a UART.

Syntax

baud index baudrate

Parameters

index – 0 through the total number of UARTS minus one
baudrate – baud rate.

Operation

This command is used to change the speed for a UART in the system. This command works for all UARTs visible to EFIPOSSE. If the UART is part of PDH space and is initialized by the core firmware, this command communicates the settings to core firmware so the UART can be initialized with the new settings on the next boot. System default is 9600 baud.

Other Communication parameters are listed in the following table:

Communications Parameters

Parameter	Value
RECEIVE_FIFO_DEPTH	1
TIMEOUT	1000000
PARITY	No parity
DATA_BITS	8
STOP_BITS	1
CONTROL~MASK	0

boottest

Interacts with the speedy boot variable allowing it to be set appropriately.

Syntax

boottest	
boottest on	Displays status of all speedy boot bits
boottest off	Skips all tests (for a faster boot time)
boottest [test]	Displays status of a specific speedy boot bit
boottest [test] [off on]	-Set or clears a specific speedy boot bit

Parameters

[test] Each test can be set or cleared:

booting_valid	Enable/disable system firmware response to BOOTING bit. If OS Speedy Boot aware set to on.
early_cpu	Enable/disable early CPU self tests
late_cpu	Enable/disable late CPU self tests
platform	Enable/disable system board hardware tests.
chipset	Enable/Disable chipset tests

boottest command

```
Shell> boottest

BOOTTEST Settings Default Variable

OS is not speedy boot aware.

Selftest      Setting
-----
early_cpu     Skip this test
late_cpu      Skip this test
platform      Skip this test
chipset       Skip this test
io_hw         Skip this test
mem_init      Skip this test
mem_test      Skip this test
```

cpuconfig

Cpuconfig displays the CONFIG/DECONFIG state of processors in the systems and allows the user to configure or reconfigure processors.

cpuconfig command

```
Shell> cpuconfig

PROCESSOR MODULE INFORMATION
```

CPU Slot	# of Logical CPUs	Speed	L3 Cache Size	L4 Cache Size	Family/Model (hex.)	Rev	Processor State
0	1	900 MHz	1.5 MB	None	1F/00	B3	Active
1	1	900 MHz	1.5 MB	None	1F/00	B3	Active

default

Allows the user to restore NVM to default values and clear NVM storage values.

Syntax

```
default      [efilsal]
default      clear [bmclefilsal]
```

Parameters

clear clears NVM storage values

Operation

Default sets NVM and Stable Store values to predefined default values. To the normal user only a subset of values are available for default. Executing “default clear” resets the system.

errdump

Displays the contents of processor internal memory logged on the first MCA for all processors present in the system.

Syntax

```
errdump [mca 1 cpe 1 cmc 1 init 1 la 1 clear]
```

Parameters

mca	Dumps the Machine Check Abort error log
cpe	Dumps the Corrected Platform Error log
cmc	Dumps the Corrected Machine Check log
init	Dumps the Initialization log
la	Dumps the Logic Analyzer log
clear	Erases all of the logs

Operation

If a user enters no parameters, the usage is displayed. Otherwise, the specified error log is displayed. Adding -n to the clear parameter disables the confirmation prompt. (The errdump command can also be accessed via the System Configuration menu.)

info

Allows the user to display most system information.

Syntax

info (-b] (target]

Parameters

Target: valid targets are

all	display everything
cpu	display information on cpus
cache	display information on cache
mem	display information on memory
io	display information on io
boot	display boot-related information
chiprev	display information on chip revisions
fw	display firmware version information
sys	display system information
warning	warning display warning and stop boot information

info all command

```
Shell> info all
```

SYSTEM INFORMATION

```
Date/Time:  Oct 28, 2003  18:07:32  (20:03:10:28:18:07:32)
Manufacturer:  hp
Product Name:  server rx2600
Product Number:  A6870A
Serial Number:  US30464638
UUID:  C198BA79-478A-11D7-9C22-6033AC66036B
System Bus Frequency:  200 MHz
```

PROCESSOR MODULE INFORMATION

CPU Slot	# of Logical CPUs	Speed	L3 Cache Size	L4 Cache Size	Family/Model (hex.)	Rev	Processor State
0	1	900 MHz	1.5 MB	None	1F/00	B3	Active
1	1	900 MHz	1.5 MB	None	1F/00	B3	Active

MEMORY INFORMATION

	---- DIMM A ----		---- DIMM B ----	
	DIMM	Current	DIMM	Current
0	256MB	Active	256MB	Active
1	256MB	Active	256MB	Active
2	----		----	
3	----		----	
4	----		----	
5	----		----	

```
Active Memory      : 1024 MB
Installed Memory   : 1024 MB
```

I/O INFORMATION

BOOTABLE DEVICES

Order	Media Type	Path
1	HARDDRIVE	Acpi (HWP0002,100)/Pci (1 0)/Scsi (Pun0,Lun0)/HD (Part1,SigC1)

Seg #	Bus #	Dev #	Fnc #	Vendor ID	Device ID	Slot #	Path
00	00	01	00	0x1033	0x0035	XX	Acpi (HWP0002,0)/Pci (1 0)
00	00	01	01	0x1033	0x0035	XX	Acpi (HWP0002,0)/Pci (1 1)
00	00	01	02	0x1033	0x00E0	XX	Acpi (HWP0002,0)/Pci (1 2)
00	00	02	00	0x1095	0x0649	XX	Acpi (HWP0002,0)/Pci (2 0)
00	00	03	00	0x8086	0x1229	XX	Acpi (HWP0002,0)/Pci (3 0)
00	20	01	00	0x1000	0x0030	XX	Acpi (HWP0002,100)/Pci (1 0)
00	20	01	01	0x1000	0x0030	XX	Acpi (HWP0002,100)/Pci (1 1)
00	20	02	00	0x14E4	0x1645	XX	Acpi (HWP0002,100)/Pci (2 0)
00	40	01	00	0x1000	0x0021	03	Acpi (HWP0002,200)/Pci (1 0)
00	40	01	01	0x1000	0x0021	03	Acpi (HWP0002,200)/Pci (1 1)
00	E0	01	00	0x103C	0x1290	XX	Acpi (HWP0002,700)/Pci (1 0)
00	E0	01	01	0x103C	0x1048	XX	Acpi (HWP0002,700)/Pci (1 1)
00	E0	02	00	0x1002	0x5159	XX	Acpi (HWP0002,700)/Pci (2 0)

BOOT INFORMATION

Monarch CPU:

Current Monarch	Preferred Monarch	Possible Warnings
0	0	

AutoBoot: ON - Timeout is : 10 sec

Boottest:

BOOTTEST Settings Default Variable

OS is not speedy boot aware.

Selftest	Setting
early_cpu	Skip this test
late_cpu	Skip this test
platform	Skip this test
chipset	Skip this test
io_hw	Skip this test
mem_init	Skip this test
mem_test	Skip this test

LAN Address Information:

LAN Address	Path

```
Mac (00306E4A133D)  Acpi (HWP0002,0) /Pci (3|0) /Mac (00306E4A133D) )
*Mac (00306E4A121F)  Acpi (HWP0002,100) /Pci (2|0) /Mac (00306E4A121F) )
```

FIRMWARE INFORMATION

```
Firmware Revision: 2.20 [4331]

PAL_A Revision: 7.31/7.31
PAL_B Revision: 7.59

SAL Spec Revision: 3.01
SAL_A Revision: 2.00
SAL_B Revision: 2.20

EFI Spec Revision: 1.10
EFI Intel Drop Revision: 14.61
EFI Build Revision: 1.22

POSSE Revision: 0.10

ACPI Revision: 7.00

BMC Revision 1.50
IPMI Revision: 1.00
SMBIOS Revision: 2.3.2a
Management Processor Revision: E.02.22
```

WARNING AND STOP BOOT INFORMATION

CHIP REVISION INFORMATION

Chip Type	Logical ID	Device ID	Chip Revision
-----	-----	-----	-----
Memory Controller	0	122b	0023
Root Bridge	0	1229	0023
Host Bridge	0000	122e	0032
Host Bridge	0001	122e	0032
Host Bridge	0002	122e	0032
Host Bridge	0003	122e	0032
Host Bridge	0004	122e	0032
Host Bridge	0006	122e	0032
Host Bridge	0007	122e	0032
Other Bridge	0	0	0002
Other Bridge	0	0	0007
Baseboard MC	0	0	0150

lanaddress

Allows the user to display the core 10 MAC address.

Syntax:

```
lanaddress
```

Parameters

none

lanaddress command

```
Shell> lanaddress
```

LAN Address Information

LAN Address	Path
Mac (00306E4A133D)	Acpi (HWP0002,0) /Pci (3 0) /Mac (00306E4A133D)
*Mac (00306E4A121F)	Acpi (HWP0002,100) /Pci (2 0) /Mac (00306E4A121F)

monarch

Displays or modifies the ID of the bootstrap processor. The preferred monarch number is stored in NVM.

Syntax

monarch cpu

Parameters

cpu Specifies a cpu.

Operation

If specified with no parameters, monarch displays the Monarch processor for the system. Specifying a processor number alters the preferred Monarch processor. None of these changes takes affect until after a reboot.

monarch command

```
Shell> monarch
```

Current Monarch	Preferred Monarch	Possible Warnings
----- 0	----- 0	-----

pdt

Displays or clears the contents of the Page Deallocation Table.

Syntax

pdt (clear)

Parameters

clear Clears the pdt.

Operation

With no options specified, the command displays the PDT information for the system. The PDT is cleared and a reboot is required for memory reallocation and safe booting.

pdt command

```
Shell> pdt

PDT Information for PD

                Last Clear time for PD: PDT has not been cleared
Number of total entries in PD PDT:                100
Number of used entries in PD PDT:                   0
Number of free entries in PD PDT:                   100
Number of single-bit entries in PD PDT:              0
Number of multi-bit entries in PD PDT:               0
Address of first multi-bit error in PD: 0x0000000000000000
```

pdt clear command

```
Shell> pdt clear
Are you sure you want to clear the PDT for PD? [y/N] y

Shell> pdt

PDT Information for PD

                Last Clear time for PD: 10/29/03 05:32p
Number of total entries in PD PDT:                100
Number of used entries in PD PDT:                   0
Number of free entries in PD PDT:                   100
Number of single-bit entries in PD PDT:              0
Number of multi-bit entries in PD PDT:               0
Address of first multi-bit error in PD: 0x0000000000000000
```

sysmode

Display or modify the system mode.

Syntax

sysmode *normal* | *admin service*

Parameters

<i>normal</i>	Sets system mode to normal.
<i>admin</i>	Sets system mode to admin.
<i>service</i>	Sets system mode to service.

Operation

If specified alone, sysmode displays the system mode. If a mode is specified as a parameter, then the system mode is changed. This new mode takes effect immediately. The system mode is retained on successive boots. Interaction with sysmode in a variety of scenarios is outlined below.

sysmode command

```
Shell> sysmode
Current System Mode: ADMIN

Shell> sysmode admin
Current System Mode: ADMIN

You are now in ADMIN mode.

Shell> sysmode service
Current System Mode: ADMIN

You are now in SERVICE mode.

Shell> sysmode normal
Current System Mode: SERVICE

You are now in ADMIN mode.
```

Specifying SCSI Parameters

The following SCSI parameters may be configured for the SCSI board:

- SCSI ID (SCSI initiator ID)
- Maximum data transfer rate (SCSI rate)
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)

Using the SCSI Setup Utility

Step 1: At the EFI shell prompt, type this command to map the parameters for all PCI cards installed in the system:

```
info io
```

A list of all the devices that are installed in the hp rx2600 server and managed by EFI drivers is displayed. The output may look like this:

```
Shell> info io
```

```
I/O INFORMATION
```

```
BOOTABLE DEVICES
```

```
Order  Media Type  Path
-----
1      HARDDRIVE
Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part1,SigC1)
```

Seg #	Bus #	Dev #	Fnc #	Vendor ID	Device ID	Slot #	Path
00	00	01	00	0x1033	0x0035	XX	Acpi (HWP0002,0) /Pci (1 0)
00	00	01	01	0x1033	0x0035	XX	Acpi (HWP0002,0) /Pci (1 1)
00	00	01	02	0x1033	0x00E0	XX	Acpi (HWP0002,0) /Pci (1 2)
00	00	02	00	0x1095	0x0649	XX	Acpi (HWP0002,0) /Pci (2 0)
00	00	03	00	0x8086	0x1229	XX	Acpi (HWP0002,0) /Pci (3 0)
00	20	01	00	0x1000	0x0030	XX	Acpi (HWP0002,100) /Pci (1 0)
00	20	01	01	0x1000	0x0030	XX	Acpi (HWP0002,100) /Pci (1 1)
00	20	02	00	0x14E4	0x1645	XX	Acpi (HWP0002,100) /Pci (2 0)
00	40	01	00	0x1000	0x0021	03	Acpi (HWP0002,200) /Pci (1 0)
00	40	01	01	0x1000	0x0021	03	Acpi (HWP0002,200) /Pci (1 1)
00	E0	01	00	0x103C	0x1290	XX	Acpi (HWP0002,700) /Pci (1 0)
00	E0	01	01	0x103C	0x1048	XX	Acpi (HWP0002,700) /Pci (1 1)
00	E0	02	00	0x1002	0x5159	XX	Acpi (HWP0002,700) /Pci (2 0)

In the previous example, *two* SCSI boards are in the listing. The information for *both* channels of *both* SCSI boards is shown in bold, for highlighting purposes.

For each channel of the SCSI board, you need to note certain information. As an example, look at the information for the first SCSI board (the first two bold lines). For each channel of *this* SCSI board, note the following information:

Bus id	Identifies the bus the device is on; for the SCSI board, this is the same for both channels. In this example, the bus number is 40.
Dev #	The ID the device is assigned on the bus; for the SCSI board, this is the same for both channels. In this example, the SCSI board is device 01.
Fnc #	Identifies the channel of the device (00 for channel A, 01 for channel B, etc.). In this example, because the SCSI board has two channels, one channel is 00 and the other is 01.
Vendor ID	Shows the device's vendor ID; for the SCSI board, this is the same for both channels. For all SCSI board HBAs, the ID is 0x1000.
Device ID	Shows the device's device ID; for the SCSI board, this is the same for both channels. For all SCSI board HBAs, the ID is 0x0021.
Slot #	Identifies the physical card slot in the system where the HBA is installed; for the SCSI board, this is the same for both channels. In this example, the HBA is in slot 03.
Path	Identifies the device's path; for the SCSI board, this is the same for both channels. In this example, the HBA's path is Acpi (HWP0002, 200) /Pci (1 1 0) for channel A and Acpi (HWP0002, 200) /Pci (111) for channel B.

Using the SCSI board's information from the example above, the pieces of information that, combined, tell you this is a SCSI board are the following (shown in **bold**, for highlighting purposes):

```

00  40  01  00      0*1000 0*002103      Acpi(HWP0002,200)/Pci(110)
00  40  01  01      0*1000 0*002103      Acpi(HWP0002,200)/Pci(111)

```

Looking at all of the above information together, the Vendor (0x1000) and Device (**0x0021**) are the IDs for a SCSI board. Of the devices with those IDs, this device has two channels (Fnc * of 00 immediately followed by Fnc # of 01). Also, this SCSI board has a numeric (non-xx) Slot # (03, in this example).

Step 2. Still at the EFI shell prompt, type this command to obtain the controller's handle for the SCSI card:

```
devtree
```

A tree of all EFI-capable devices installed in the system is displayed. The output could look like the following:

```

Shell> devtree
Device Tree
Ctrl[04]
Ctrl[0A] Acpi (HWP0002,0)
Ctrl[15] Usb Open Host Controller
Ctrl[3D] Acpi (HWP0002,0) /Pci (1|0) /Usb (1, 0)
Ctrl[16] Usb Open Host Controller
Ctrl[17] Acpi (HWP0002,0) /Pci (1|2)
Ctrl[18] PCI IDE/ATAPI Controller
Ctrl[50] DV-28E-B
Ctrl[19] Acpi (HWP0002,0) /Pci (3|0)

```

```

Ctrl[51] Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4A133D)
Ctrl[0B] Acpi(HWP0002,100)
  Ctrl[1A] LSI Logic Ultra320 SCSI Controller
  Ctrl[1B] LSI Logic Ultra320 SCSI Controller
Ctrl[1C] Acpi(HWP0002,100)/Pci(2|0)
Ctrl[53] Broadcom NetXtreme Gigabit Ethernet Adapter
Ctrl[0C] Acpi(HWP0002,200)
  Ctrl[1D] LSI Logic Ultra160 SCSI Controller
  Ctrl[1E] LSI Logic Ultra160 SCSI Controller
Ctrl[0D] Acpi(HWP0002,300)
Ctrl[0E] Acpi(HWP0002,400)
Ctrl[0F] Acpi(HWP0002,600)
Ctrl[10] Acpi(HWP0002,700)
Ctrl[1F] Acpi(HWP0002,700)/Pci(1|0)
Ctrl[20] Acpi(HWP0002,700)/Pci(1|1)
Ctrl[3B] 16550 Serial UART Driver
Ctrl[3C] VT-100 Serial Console
Ctrl[36] Primary Console Input Device
Ctrl[37] Primary Console Output Device
Ctrl[35] Primary Standard Error Device
Ctrl[21] Acpi(HWP0002,700)/Pci(2|0)
Ctrl[12] VenHw(B19EEDB4-BCC0-11D4-8046-0010B5481A73)
Ctrl[38] Acpi(PNP0501,0)
Ctrl[39] 16550 Serial UART Driver
Ctrl[3A] VT-100 Serial Console
Ctrl[4B] VenHw(904EFCF0-F0A8-11D4-B4CA-303031303833)
Ctrl[4E] VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)

```

In the above example, *this* SCSI board's information is shown in bold, for highlighting purposes. You can tell the information is for this SCSI board because the path on the first line—Acpi(HWP0002, 200)—is the HBA's path from the information displayed by the info io command. The next two lines are for the SCSI board's two channels, one line for each channel (they contain the SCSI board's description [LSI Logic Ultra160 SCSI Controller]). Note the value shown for Ctrl—1D and 1E—at the beginning of each of those lines; this is the controller's handle for that channel. You need to know it for the next step.

NOTE	The controller's handle values will change on every boot.
------	---

Step 3. Still at the EFI shell prompt, type this command to obtain the EFI driver's handle for the SCSI card:

drvcfg

A list of all EFI-capable configurable components in the system is displayed. The output may look like this:

```

Shell> drvcfg
Configurable Components
  Drv[43] Ctrl[1D] Lang[eng]
  Drv[43] Ctrl[1E] Lang[eng]
  Drv[44] Ctrl[18] Lang[eng]
  Drv[46] Ctrl[1C] Lang[eng]
  Drv[4C] Ctrl[1A] Lang[eng]
  Drv[4C] Ctrl[1B] Lang[eng]

```

This listing shows which driver controls which device (controller). In the above example, *this* SCSI board's information is shown in bold, for highlighting purposes. You can tell the information is for this SCSI board because the values shown for Ctrl—1D and 1E—are the controller's handles for the SCSI board's two channels (from the information displayed by the devtree command).

NOTE The EFI driver's handle values will change on every boot.

TIP From this command (drvcfg), we recommend you record these two pieces of information for *each* channel of each SCSI board HBA you want to change the SCSI parameters for:

- Dry (the EFI driver's handle)
- Ctrl (the controller's handle)

Step 4. Using the information (the driver's handle [Dry] and the controller's handle [Ctrl]) from the d.rvcfg command, start the EFI SCSI Setup Utility for *one* channel of *this* SCSI board. Still at the EFI shell prompt, type this command:

```
drvcfg -s drv_handle ~trl_har.~le
```

where

- *drv_handle* is the handle of the driver that controls the channel whose SCSI ID you want to display or change
- *cntrl_handle* is the handle of the controller for the channel whose SCSI ID you want to display or change

So, continuing the example for *channel A* of *this* SCSI board, you would type:

```
drvcfg -s 43 1E
```

Step 5. The EFI SCSI Setup Utility starts, and its main menu is displayed, showing a list of all the EFI-capable HBAs in the system.

TIP To move the cursor in the EFI SCSI Setup Utility, you can use these keys:

- Arrow keys: ↑ ↓ ←→
- Alternate keys:
 - H = left
 - J = down
 - K = up
 - L = right
 - I = home
 - O = end

Move the cursor to highlight *this* channel of *this* SCSI board; press Enter. (To determine which channel of the HBA to highlight, match the PCI Bus, PCI Dev, and PCI Func values on this screen to the Bus #, Dev #, and Fnc # values from the info io command.)

CAUTION Do *not* select the <Global Properties> option on the main menu.

Step 6. The “Adapter Properties” screen for this channel of this SCSI board is displayed. If you like, you can make sure the utility is running for *this* channel of *this* SCSI board by comparing the values shown for PCI Bus, PCI Device, and PCI Function to the Bus #, Dev #, and Fnc * values from the info io command.

CAUTION Do *not* change the value for *any* of these fields on the “Adapter Properties” screen:

- Auto Termination
- SCSI Parity
- SCSI Bus Scan Order

- Spinup Delay (Secs)
- Changing any of these fields can cause unpredictable results.
-

CAUTION Do *not* change the value for *any* of these fields on the “Device Properties” screen:

- Scan Id
- Scan Ltns > 0
- Disconnect
- SCSI Timeout
- Queue Tags
- Format
- Verify

Changing any of these fields can cause unpredictable results.

Step 7 You may display (and optionally change) any SCSI parameters listed below for *this* channel of *this* SCSI board, or restore its SCSI parameters to their default values.

- SCSIID
- Maximum data transfer rate
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)
- Restore Defaults

Step 8 Use the arrow keys to navigate to the appropriate SCSI parameter.

Step 9 Use the plus (+) and minus (-) keys to scroll through the values until the value you want is displayed.

Step 10. Press Esc to exit the “Adapter Properties” screen. You are given these choices:

- Cancel the exit from the screen (to stay in the “Adapter Properties” screen for *this* channel of *this* SCSI board).
- Save the changes you made and then exit the screen.
- Discard the changes you made and then exit the screen.

Step 11. Move the cursor to the action (cancel, save, or discard) you want to take; press Enter.

If you selected cancel, you remain in the “Adapter Properties” screen for *this* channel of *this* SCSI board. You can still change *this* channel’s parameters listed above.

If you selected save or discard, you are placed in the EFI SCSI Setup Utility’s main menu.

CAUTION Do *not* select the <Global Properties> option on the main menu.

Step 12. Press Esc to exit the main menu and the EFI SCSI Setup Utility. Step 13. Select the option for exiting the utility.

Step 13. When you are prompted to, press Enter to stop *this* SCSI board; you are now back at the EFI shell prompt.

Step 14. At the EFI shell prompt, type this command:

reset

The system starts to reboot. This is required to cause the new SCSI setting.

Fibre Booting Overview

Introduction

With the release of OpenVMS for Industry Standard Servers or Intel Itanium based platforms, we need to provide OpenVMS booting and dumping capabilities for Fibre Channel devices.

For the HP Alpha based systems, we have the SRM console that provided a fibre controller console driver to boot and crash on Fibre devices. The console also provided the WWIDMGR utility that is mainly used to define alias names of fibre channel devices used for booting and dumping. The utility is also responsible for giving console device names that are associated to the worldwide identifiers (WWIDs) of a fibre channel device. With this utility, a user can specify associations between WWIDs and device names that are used for booting and dumping.

Itanium based platforms introduced a new interface between the operating system (OS) and the platform firmware called the Extensible Firmware Interface (EFI). The EFI is responsible for initializing the boot devices that are present in the system. This is done by either loading the bootable firmware from the host bus adapter, the systems' firmware, or manually loading it from the EFI shell. The EFI OS is also responsible on presenting all the bootable devices to the OS loader (VMS_LOADER) through the EFI device path.

When VMS_LOADER is executed, it loads the Itanium Primary Boot Block (IPB) where the appropriate boot device driver is selected and started. During the bootdriver selection, the WWID of the Target Port and the LUN of the Target device is saved and later used to select the runtime driver.

Supported Hardware

For the initial OpenVMS Industry Standard Release, we only intend to support the Emulex LP9802 with the firmware version 100X8 and EFI Boot firmware HE200a7. There are current future plans to support the QLogic 23XX SanBlade series.

Itanium Fibre Channel device booting only supports Point-to-Point Topology. There are no current plans to support FC Arbitrated Loop.

Fibre Channel storage devices that are currently supported are HSG, HSV and MSA1000.

Fibre booting will be supported on all OpenVMS supported Itanium systems.

Hardware Set-up

Emulex LP9802

Installing Bootable Firmware

The bootable firmware needs to be flashed to the Host Bus Adapters' (HBA) non-volatile memory (flash memory). Emulex provided an EFI utility EFIUTIL.EFI which provides access to the feature set of the Light Pulse family of host adapters such as viewing device characteristics, downloading firmware images, and manage other hardware components. Please refer to the *Light Pulse Common Utility for EFI User's Guide* Version 1.3 for details on downloading the bootable firmware.

As of V1.0 of this document, there is still a problem with the utility to download the bootable firmware to the LP9802. For those who want to update their firmware, they would need to do it on a Microsoft XP 64-bit using the LPUTILNT.EXE utility from the Emulex website.

Verifying the Bootable Firmware Installation

To verify the successful installation of the bootable firmware in the HBA, execute the EFI shell command “drivers” to show the list of drivers that follow the EFI model. Executing the shell command should display the Emulex SCSI Pass Thru Driver, Emulex Fibre HBA Driver, and the Emulex Fibre Disk Driver installed:

Example 1:

```
fs3:\efi\lms> drivers
      T D
D      Y C I
R      P F A
V VERSION E G G #D #C DRIVER NAME          IMAGE NAME
=====
11 00000010 B - - 7 13 PCI Bus Driver          PciBus
1E 00020007 D X X 1 - Emulex SCSI Pass Thru Driver EP
1F 00020007 B - - 1 2 Emulex Fibre HBA Driver    EH
20 00020007 D - - 2 - Emulex Fibre Disk Driver    ED
```

Configuring the Boot Devices from the Emulex Bios Utility

To configure a Fibre channel bootable devices that would be assigned a device and driver handle by EFI, you can either specify a boot device to the boot list or set the firmware to automatically scan a specific LUN on the fabric.

Emulex has provided a utility called BIOSUTIL.EFI, which is a menu-driven user interface that would allow a user to view and change the current EFI boot configuration data that is resident on each of the Emulex HBA’s non-volatile memory. This data is used during the EFI boot process to determine the EFI driver behavior.

To invoke the utility, the user needs to type “BIOSUTIL” at the EFI shell command line prompt and you will be on the top level menu which displays all of the Emulex Fibre Channel HBA cards that the utility found. The user selects one of the cards and all the subsequent lower level menus will apply only to the selected HBA.

Example 2:

```
fs0:\> biosutil

Retrieving Discovery and Flash data regarding Emulex HBA #0.

Please Wait...

      Emulex Light Pulse EFI BIOS Utility
      Copyright 02/07/2003, Ver 2.00a4, Emulex Corp.

Emulex Adapters in the System:

1. LP9802 PCI Bus#:80 Dev#:01 Func#:00

0. Exit Bios Utility.

Enter your selection (0 thru 1):
```

Once the user selects the desired HBA to be configured, the user is prompted with three bios utility functions to configure the boot device, configure the selected HBA's parameters, or to use the default parameters.

If you are setting up the device for the first time, select **Option 2** to configure the selected HBA's parameter. Otherwise, proceed to **Option 1** to configure the boot devices.

```
Example 3:

Adapter 1: S_ID:000000    PCI Bus#: 80 Dev#: 01 Func#: 00
LP9802:   I/O Base: 8000  Firmware Version: HS1.00X6
Port Name: 10000000 C931070A Node Name: 20000000 C931070A
Topology:  AUTO (start with FCAL). - default

1. Configure Boot Devices
2. Configure This Adapter's Parameters
3. Use Default Values for This Adapter

0. Return to previous menu

Enter your selection. Valid entries are 0 thru 3 : 2
```

If Option 2 is selected above, you see a list of EFI boot bios configuration that is current selected values in the flash memory. The user can select to view the current setting or to change the value of the setting. For OpenVMS, it is recommended that you set the following parameters.

```
Example 4:

Adapter 1: S_ID:000001    PCI Bus#: 80 Dev#: 01 Func#: 00
LP9802:   I/O Base: 8000  Firmware Version: HS1.00X6
Port Name: 10000000 C931070A Node Name: 20000000 C931070A
Topology:  AUTO (start with Point to Point).

1. Enable or Disable BIOS
2. Change Default ALPA of this adapter
3. Change Device Path Selection (FC or SCSI)
4. Change PLOGI Retry Timer (+Advanced Option+)
5. AutoScan Setting (+Advanced Option+)
6. Max LUNS Setting (+Advanced Option+)
7. Topology Selection (+Advanced Option+)

0. Return to Previous Menu
```

OpenVMS I64 Setting

ENABLED

1 - Default

FC - Default

2 - PLOGI retry 5msec

1 (Disable) - Default

256 - Default

3 (PTP only)

After setting the correct HBA settings, the user should go back to the Bios utility menu by choosing **Option 0**. By doing so, the settings are automatically saved on the HBA's option ROM. On the Bios Utility Menu, choose **Option 1** to configure the boot devices.

Now the user should see the Flash List Boot Devices, which is a list of selected boot device that a user may configure. The user can configure up to 8 boot devices to be presented to EFI. The boot devices are uniquely identified by their Device ID (DID) or World Wide ID (WWID) and their Logical Unit number (LUN).

Example 5:

Adapter 1: S_ID:021E00 PCI Bus#: 60 Dev#: 01 Func#: 00
LP9802: I/O Base: 6000 Firmware Version: HS1.00X6
Port Name: 10000000 C93106F4 Node Name: 20000000 C93106F4
Topology: AUTO (start with FCAL). - default

Flash List Boot Devices:

1. Unused DID:000000 WWPN:00000000 00000000
2. Unused DID:000000 WWPN:00000000 00000000
3. Unused DID:000000 WWPN:00000000 00000000
4. Unused DID:000000 WWPN:00000000 00000000
5. Unused DID:000000 WWPN:00000000 00000000
6. Unused DID:000000 WWPN:00000000 00000000
7. Unused DID:000000 WWPN:00000000 00000000
8. Unused DID:000000 WWPN:00000000 00000000

0. Return to previous menu

Select a Boot Entry for replacement. Valid entries are 0 thru 8: 1

Upon such selection, the user is presented with all of the Port Targets that are currently found during the fabric/loop discovery process. Select the Port Target where the target LUN is connected. The Port Target is usually the Device path of the device when you look at the device from SDA. If you are not sure, contact your system administrator and ask for the WWID of the Port Target and the SCSI LUN assigned to the device.

Example 6:

Adapter 1: S_ID:021E00 PCI Bus#: 60 Dev#: 01 Func#: 00
LP9802: I/O Base: 6000 Firmware Version: HS1.00X6
Port Name: 10000000 C93106F4 Node Name: 20000000 C93106F4
Topology: AUTO (start with FCAL). - default

Here are targets numbers 1 thru 4:

1. DID:011100 WWPN:50001FE1 0011B158
2. DID:050A00 WWPN:50001FE1 000704E3
3. DID:050B00 WWPN:50001FE1 000704E1
4. DID:060000 WWPN:500805F3 0001AF11

0. Return to boot list menu; No changes made.

Enter your selection. Valid entries are 0 thru 4: 1

Upon selection of one of Port Targets, the user is shown a list of all possible SCSI LUN's connected to the Port Target. Select one of the SCSI LUN's by inputting the LUN index number. After selecting the LUN, the user needs to select the boot method for the device (DID or WWID). Select WWID to complete the selection of the boot device. Repeat the process to add other bootable devices on the boot list.

Example 7:

Adapter 1: S_ID:021E00 PCI Bus#: 60 Dev#: 01 Func#: 00
LP9802: I/O Base: 6000 Firmware Version: HS1.00X6
Port Name: 10000000 C93106F4 Node Name: 20000000 C93106F4
Topology: AUTO (start with FCAL). - default

Here are lun numbers 1 thru 3:

Lun index number	Mode	Mode Lun#
1	peripheral dev	13
2	peripheral dev	14
3	peripheral dev	101

Enter Lun number from 1 to 3 to select LUN for booting.
Enter 0 to Return to boot list menu; No changes made.
Valid entries are zero, numbers 1 through 3.

1

Adapter 1: S_ID:021E00 PCI Bus#: 60 Dev#: 01 Func#: 00
LP9802: I/O Base: 6000 Firmware Version: HS1.00X6
Port Name: 10000000 C93106F4 Node Name: 20000000 C93106F4
Topology: AUTO (start with FCAL). - default

Selected Boot Device:

DID:011100 WWPN:50001FE1 0011B158 LUN: 13

1. Boot this device via WWPN.
2. Boot this device via DID.
0. Return to previous menu.

Enter your selection. Valid entries are 0 thru 2: 1
5. Unused DID:000000 WWPN:00000000 00000000

Exit the Boot Bios utility and refresh the Device mapping table by executing the EFI shell command “map”. You should see the created boot device option and proceed to boot OpenVMS for Industry Standard Servers.

Booting on MultiPath devices

MultiPath

Fibre channel devices that have multiple paths (MultiPath) will be done by configuring the EFI boot manager and setting the two unique fibre channel paths on the boot menu. If the first path fails, the EFI boot manager automatically uses the second path on the boot menu to boot the OpenVMS operating system.