

Understanding and maintaining the Integrity Console

Presented by

Jim Mehlhop

www.parsec.com | 888-4-PARSEC

To E-mail Jim

mehlhop@parsec.com

To Download

http://www.parsec.com/public/Integrity_console.pdf



- Introduction
- Console overview
- EFI
- BMC
- MP
- iLo
- Booting
- Updating Firmware
- Backing up the system board configuration

- The RX2600 will serve as our example
 - One of many I64 Integrity servers supported by OpenVMS version 8.3
- The Integrity console consists of three components
 - Extensible Firmware Interface (EFI)
 - Maintenance Processor (MP)
 - Baseboard Management Controller (BMC)

Note: The MP is optional and does not exist on every system



Management Processor Card
MP Card 10/100 connection
1000Mb connection
LAN 10/100
Management Card
VGA
MP
RESET
CONSOLE / REMOTE / UPS
LAN 10
TDC
USB
CONSOLE
SERIAL A
SERIAL B
Serial Console connection
Three Headed Cable Connection

- There are two ways to communicate with the various components of the Integrity console:
 - Connecting to Console/Remote/UPS connector, which you will have to have the associated three headed cable (called a dongle) shown in the next slide.
 - Via a network cable plugged into the LAN 10/100 Management Card Ethernet connection.



Three Headed Cable (dongle)



- Console
- Remote
- UPS



USB to serial

Null Modem cable

- The I64 console is quite different from the Alpha console. There are a number of additional components that you have to understand before you can understand the console. The following components are part of the I64 console:
 - Extensible Firmware Interface (EFI), a standard Integrity interface
 - Baseboard Management Controller (BMC), an HP value added interface.
 - Management Processor (MP) (optional on some I64 models), an HP value added interface.

Feature/Function	Extensible Firmware Interface	Maintenance Processor	Baseboard Management Card
Configuration Functions	Boot environment System date/time Security passwords Processors Devices and drivers SCSI parameters Memory	Power restore policy Default configuration Diagnostics Upgrade firmware Security options Inactivity timeout User configuration Serial, LAN, and remote/modem access	Power restore policy Security options BMC password
Remote Capabilities	Yes, depending on MP or BMC connectivity	Yes	Yes, through modem or remote serial connection
Access type	Depends on MP or BMC connectivity (EFI behavior is independent of the connection type)	Local EIA-232 serial with terminal emulation software, remote (modem) EIA-232 serial, LAN/Telnet (also allows access through web browser)	Local EIA-232 serial only, with terminal emulation software

- The Extensible Firmware Interface (EFI) is an interface that allows you to configure the I64 firmware. Compared to Alpha, this is the closest thing to a console device. The EFI is basically a mini-OS that supports a FAT file system and it's own executables and command procedures. The EFI menu includes the following options:
 - The **EFI Shell** is a command line interface that allows you to operate the EFI commands or create and run automated scripts. The EFI shell can be used to set boot flags, show devices and other console related functions.
 - **Boot Option Maintenance Menu** allows you to select the order of the devices from which you want the firmware to attempt to boot the OS. You can also configure the system to boot from a configuration file.
 - The **System Configuration Menu** lets you view the system configuration and change or delete administrator and user passwords.

- The EFI Shell is equivalent to DCI
 - Executables for the Shell have a file type of .efi
 - Command procedures have a file type of .nsh

- The Baseboard Management Controller (BMC) supports the industry-standard Intelligent Platform Management Interface (IPMI) specification. This specification describes the management features that have been built into the system board. These features include:
 - Local and remote diagnostics
 - Console support
 - Configuration management
 - Hardware management
 - Troubleshooting

- The BMC has a command line interface with commands that will allow you to do low level system operations such as power on and off the system. **To use BMC you must be connected to “SERIAL A” on the rear panel of the system.**
 - You will be prompted for a password if it has been set up.
 - To enter the BMC from the EFI, type <esc>(ul> - The BMC prompt is: cli>
- To exit the BMC, type <esc>)
- The following are some of the more commonly used BMC CLI commands:

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	- Crash the system

- Standard on rx2600-2, rx4640-8, rx7620-16, rx86-32, and Superdome
- Optional on rx1600-2, rx1620-2, and rx2620-2
 - Can be ordered – part number is A9803A
- Username and password protected
- Always on
- Can connect via
 - The serial line through a dongle cable
 - TCP/IP: telnet, web server, and ssh
- Both interfaces lead to the Extensible Firmware Interface (EFI). The EFI allows you to boot.
- Supports multiple simultaneous user access (multiple viewers but one user with control)

- Once connected to the MP, a username and password must be entered
- To reenter the MP (from the EFI for instance) enter ctrl/b
- To erase characters, enter ctrl/h. Some terminal emulators will allow you to assign the delete key to a ctrl/h
- Exit the MP with an “x”
- The MP prompt is MP>
- **Important!** Set your terminal emulator to be 24*80 for your viewing pleasure!!

MP login: **Admin**

MP password: *********

Hewlett-Packard Integrated Lights-Out HP Integrity and HP 9000

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MP Host Name: ia64
Revision E.03.30

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
HE: Main Help Menu
X: Exit Connection

[ia64] MP>

```
[ia64] MP> vfp
```

```
.  
Welcome to the Virtual Front Panel (VFP).  
Use Ctrl-B to exit.
```

System state	Activity	# of logs since boot
-----	-----	-----
Boot complete		137

E indicates error since last boot

LEDs	LOCATOR	SYSTEM	POWER
	OFF	ON GREEN	ON GREEN

Status | System running normally.

```
[ia64] MP:VFP(Use '?' to display VFP terminal info or Ctrl-B to Quit)> <^B>
```

MP MAIN MENU:

- CO: Console
- VFP: Virtual Front Panel
- CM: Command Menu
- CL: Console Log
- SL: Show Event Logs
- HE: Main Help Menu
- X: Exit Connection

[ia64] MP> cm

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

[ia64] MP:CM>

```
[ia64] MP:CM> help
```

```
HE
```

```
==== MP Help: Main Menu =====
```

```
Hardware Revision a5  Firmware Revision E.03.30 Oct 27 2006,13:43:15
```

```
Integrated Lights-Out for HP Integrity and HP 9000 - Management Processor (MP)
```

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 Command Menu 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
```

```
====
```

```
MP:HE>
```

```
MP:HE> li
```

```
li
```

```
==== MP Help: Command Menu List =====
```

```
BP  : Reset BMC Passwords           MS  : Modem Status
CA  : Configure asynch/serial ports PC  : Remote Power Control
DATE: Display Date                  PG  : PaGing parameters setup
DC  : Default Configuration         PR  : Power Restore Policy Config.
DF  : Display FRU Information       PS  : Power management module Status
DI  : DIscconnect users            RB  : Reset BMC
DNS : Configure DHCP and DNS       RS  : Reset System through RST signal
FW  : Upgrade MP firmware          SA  : Set MP Access
HE  : Display Help                 SNMP: Configure SNMP parameters
ID  : System Information           SO  : Security Options
IT  : Modify MP inactivity timeouts SS  : System processors Status
LC  : Configure LAN, SSH and Web ports SYSREV: Display System firmware Revs.
LDAP: Configure Directory parameters TC  : Reset system via INIT
LM  : License Management           TE  : TELL- send a msg. to other users
LOC : Locator LED display         UC  : User Configuration
LS  : LAN Status                  WHO : Display connected MP users
MR  : Modem Reset                 XD  : Diagnostics and reset of MP
```

```
====
```

```
(HE for main help, enter command name, or Q to quit)
```

```
MP:HE>
```

```
MP:HE> lc
```

```
lc
```

```
==== MP Help: Port Configuration =====
```

```
LC : LAN Configuration usage (IP address, etc.)
```

```
Command access level: MP Configuration access.
```

This command modifies the LAN Configuration. Configurable parameters: DHCP enable/disable, MP IP Address, MP host name, subnet mask, gateway, web access port number, SSH access port number, LAN speed, and autonegotiation.

If DHCP is enabled, the IP address, subnet mask and gateway address for the system are obtained from the DHCP server. A user cannot set the IP Address, Subnet Mask and Gateway Address if DHCP is enabled. In order to configure these parameters, disable DHCP and set appropriate values.

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: "MPNAME-on-SYSTEM" as the MP Host name, so both names show up in the prompt (limit 19 chars, no spaces allowed.)

```
MORE Help (Q to go back to main, enter command name, or <CR> for more):
```

```
==== MP Help: Port Configuration =====
```

```
LC : LAN Configuration usage (Continued)
```

```
Command line usage:
```

```
LC [ -ip <ipaddr> ] [ -subnet <subnet> ] [ -gateway <ipaddr> ]  
  [ -host <text> ] [ -web <n> ] [ -link <auto|T(10baseT)> ]  
  [ -ssh <n> ] [ -dhcp <e|d> ] [ -nc ]
```

```
SEE ALSO:  DNS, LS, SA  (DNS Configuration, LAN Status, Set Access)
```

```
====  
(HE for main help, enter command name, or Q to quit)  
MP:HE>
```

At the help prompt (MP:HE>) either a Q or a <cr> will get you back to the MP

- To remotely access the MP, you must configure the MP LAN port. To configure the MP LAN port, the following steps must be taken:
 1. Log in to the MP via the serial console line
 2. Select the command menu (cm)
 3. Select the LAN configuration option (lc)
 4. Specify the appropriate network parameters
 - IP address
 - Network mask
 - Gateway address
 5. Connect a network cable to the MP LAN port
 6. Hide the Dongle somewhere (you may never use it again)


```
[sys6console] MP:CM> lc
```

```
LC
```

```
Current LAN Configuration:
```

```
- - MAC Address           : 0x00306e397db2
D - DHCP Status          : Disabled
I - IP Address           : 192.168.0.216
M - MP Host Name         : sys6console
S - Subnet Mask          : 255.255.255.0
G - Gateway Address      : 192.168.0.1
L - Link State           : Auto Negotiate
W - Remote Serial Console Port : 2023
H - SSH Access Port      : 2123
- - IPMI / LAN Port      : 623
```

```
Enter parameter(s) to change, A to modify All, or [Q] to Quit: A <CR>
```

```
A
```

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 -> 192.168.0.216

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: <CR>

-> Current IP Address has been retained

Host Name:

Current -> sys6console
mp00306e397db2 (default)

Enter new value, or Q to Quit: **sys226console**
sys226console

-> Host Name will be updated

Subnet Mask:

Current -> 255.255.255.0 (default)

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

Enter new value, or Q to Quit: **<CR>**

-> Current Subnet Mask has been retained

Gateway Address:

Current -> 192.168.0.1
127.0.0.1 (default)

Enter new value, or Q to Quit: **<CR>**

-> Current Gateway Address has been retained

Remote Serial Console Port:

Current -> 2023 (default)
Options: 2000 to 2400

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

Enter new value, or Q to Quit: **<CR>**

-> Current Remote Serial Console Port has been retained

SSH Console Port Number:

Current -> 2123

22 (default)

Options: 22, 2000 to 2400

Enter new value, or Q to Quit: **22**

22

-> SSH Console Port Number will be updated

DHCP Status:

Current -> D - Disabled

E - Enabled (default)

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

Enter new value, or Q to Quit: **D**

D

-> Current DHCP Status has been retained

Link State:

Current -> A - Auto Negotiate (default)

T - 10BaseT

Modifying this parameter will cause all present LAN and
Web

connections to be dropped.

Enter new value, or Q to Quit:

-> Current Link State has been retained

New LAN Configuration (* modified values):

```
- - MAC Address           : 0x00306e397db2
D - DHCP Status          : Disabled
I - IP Address           : 192.168.0.216
* M - MP Host Name       : sys226console
S - Subnet Mask          : 255.255.255.0
G - Gateway Address      : 192.168.0.1
L - Link State           : Auto Negotiate
W - Remote Serial Console Port : 2023
* H - SSH Access Port    : 22
- - IPMI / LAN Port      : 623
```

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

-> LAN Configuration has been updated.

-> Reset MP (XD command option 'R') for configuration to take effect.

[sys226console] MP:CM>

```
[sys226console] 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**

R

**** Invalid entry specified! ****

<CR> to continue...

- Sometimes it is case sensitive and not even with the case shown!

<CR> to continue...

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**

r

Confirm? (Y/[N]): y

y

MP is now being reset...

- At this point lost connectivity


HP iLO Login - Mozilla Firefox

File Edit View History Bookmarks Tools Help

192.168.0.216 https://192.168.0.216/

Norton Norton Safe Search Search Cards & Log-ins


HP iLO Login



invent

Integrated Lights-Out *Advanced*

HP Integrity and HP 9000



User name:

Password:

This is a private system. Do not attempt to login unless you are an authorized user. Any authorized or unauthorized access and use may be monitored and can result in criminal or civil prosecution under applicable law.

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- There are multiple ways to execute most functions. First we will look at powering the system on/off.
- This can be done via telnet from here forward, simply referred to as the MP, and via the Web interface referred to as iLo (iLo2/iLo3 based on system). First via the MP:

```
ia64] MP> cm
```

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

```
[sys226console] MP:CM> pc
```

```
PC
```

```
Current System Power State: On
```

```
Power Control Menu:
```

```
C   - Power Cycle  
ON  - Power On  
OFF - Power Off  
G   - Graceful Shutdown
```

```
Enter menu item or [Q] to Quit: off  
off
```

```
System will be powered off.y  
y
```

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

```
[sys226console] MP:CM>
```

The screenshot displays the HP Integrated Lights-Out Advanced web interface in a Mozilla Firefox browser. The browser's address bar shows the URL `https://192.168.0.216/home.html`. The interface includes a navigation menu with tabs for System Status, Remote Console, Virtual Devices, Administration, and Help. The "Power & Reset" section is active, showing the following settings:

- Power**
 - System Power: On
 - System Power Control:
 - Power Cycle
 - Power On
 - Power Off
 - Graceful Shutdown
 - System Power Restore Settings:
 - Restore Previous Power State
 - Automatically Power On
 - Remain Powered Off
- Reset**
 - System Reset:
 - Reset through RST signal
 - Reset through INIT or TOC signal
- BMC:**
 - Reset BMC Passwords
 - Reset BMC
- iLO:**
 - Reset iLO to Default Configuration
 - Reset iLO

Each section has a "Submit" button. A modal dialog box is overlaid on the interface, displaying the message: "The page at https://192.168.0.216 says: You must shut down the OS manually before this command is executed. Failure to do this can cause problems when the OS is restarted. Do you wish to continue?" with "OK" and "Cancel" buttons.

In the bottom right corner, a PuTTY terminal window titled "192.168.0.216 - PuTTY" shows the following output:

```
Logfile was closed by operator _SYS226$OPA0:
Logfile was SYS226::SYS$SYSROOT:[SYSMGR]OPERATOR.LOG;162

***** OPCOM  8-SEP-2010 16:19:58.95 *****
Operator _SYS226$OPA0: has been disabled, username SYSTEM

Quorum: 4 (of 7 votes); this node contributes 6 votes
Cluster has no voting quorum disk.

Setting this node's VOTES to zero & adjusting quorum.
%CNXMAN, Proposing modification of quorum or quorum disk membership
%CNXMAN, Completing VMScluster state transition

Quorum: 1 (of 1 vote); this node contributes 0 votes
Cluster has no voting quorum disk.

SYSTEM SHUTDOWN COMPLETE

**** Primary HALTED with code HWRPB_HALT$K_REMAIN_HALTED

**** Hit any key to cold reboot ****
P00>>>
```

HP Integrated Lights-Out - Mozilla Firefox

File Edit View History Bookmarks Tools Help

192.168.0.216 https://192.168.0.216/home.html

Norton Norton Safe Search Search Cards & Log-ins

HP Integrated Lights-Out

hp Integrated Lights-Out Advanced
HP Integrity and HP 9000

Current User : Admin
iLO Hostname: sys226console
[Sign Out](#)

System Status Remote Console Virtual Devices Administration Help

Power & Reset

Power

System Power: Off

System Power Control:

- Power Cycle
- Power On
- Power Off
- Graceful Shutdown

Submit

System Power Restore Settings

- Restore Previous Power State
- Automatically Power On
- Remain Powered Off

Submit

Reset

System Reset:

- Reset through RST signal
- Reset through INIT or TOC signal

Submit

BMC:

- Reset BMC Passwords
- Reset BMC

iLO:

- Reset iLO to Default Configuration
- Reset iLO

Submit

The page at https://192.168.0.216 says:

Do you wish to continue?

OK Cancel

- On the iLo2 systems there is a separate tab for Power Management (force crash, etc) and the Virtual Media tab is for exactly that. The Blades have yet another tab (BL c-Class)

The screenshot shows a Citrix Presentation Server Client window displaying the HP Integrated Lights-Out 2 Advanced web interface. The browser address bar shows `https://10.10.37.103/home.html`. The page header includes the HP logo, the text "Integrated Lights-Out 2 Advanced" and "HP Integrity", a user profile for "Mehlhop" with hostname "b86u923con", and a "Sign Out" link. A navigation menu contains tabs for "System Status", "Remote Console", "Virtual Media", "Power Management", "Administration", "BL c-Class", and "Help". The "Virtual Media" tab is active, showing a "Virtual Media" sidebar and a main content area. The main content area has a "Launch" button and a "Floppy and USB Key" checkbox. Below this is a section titled "CD-ROM, Floppy, and USB Key Support" with the following text: "Connect the CD-ROM, floppy diskette, or USB key physical devices or images on your client system to the remote server so they appear local to the server during system boot or while the operating system is available." This is followed by three sub-sections: "Virtual Media OS Support" (advising to check OS support), "Advanced License" (stating that an Advanced Pack license is needed), and "Virtual Media Right" (explaining that the Virtual Media right must be enabled in User Administration). The final section is "Status Message Update", which states that the status message will update every 10 seconds.

HP Integrated Lights-Out 3 - Windows Internet Explorer
https://10.73.202.1/home.html

Norton Norton Safe Search Search Cards & Log-ins

Hector Rocha's Home HP Integrated Lights-O...

HP Integrated Lights-Out 3 Advanced
HP Integrity rx2800 i2

iLO Hostname: rx2800mp
Current User : Administrator
[Home](#) | [Sign Out](#)

Virtual Front Panel

LEDs: Locator System System
UID Health Power

State: Power Off

Navigation Menu

- System Status
 - Status Summary
 - System Health
 - System Event Log
 - Forward Progress Log
 - System Inventory
 - iLO Health
 - iLO Event Log
- Remote Console
 - Remote Serial Console
 - Integrated Remote Console
 - Virtual Media
- Power Management
 - Power & Reset**
 - Power Meter Readings
 - Power Regulator
- Administration
 - Firmware Upgrade
 - Licensing
- User Administration
 - Local Accounts
 - Group Accounts
- Settings
 - Access Settings
 - Directory Settings
 - Network Settings

Help

Power & Reset

System Power: Off

Power On: **Momentary Press**

System Power Restore Settings:

- Restore Previous Power State
- Automatically Power On
- Remain Powered Off

Submit

Power On Delay: none (minimum)

Submit

Wake-On-LAN:

- Enable
- Disable

Submit

Integrity rx2800 i2

Done

Internet | Protected Mode: On 100%

```
[sys226console] MP:CM> pc
```

PC

Current System Power State: Off

Power Control Menu:

- C - Power Cycle
- ON - Power On
- OFF - Power Off
- G - Graceful Shutdown

Enter menu item or [Q] to Quit: **on**
on

System will be powered on.

Confirm? (Y/[N]): **y**

y

-> System is being powered on.

```
[sys226console] MP:CM>
```



```
[sys226console] MP:CM> <^B>
```

```
MP MAIN MENU:
```

```
CO: Console  
VFP: Virtual Front Panel  
CM: Command Menu  
CL: Console Log  
SL: Show Event Logs  
HE: Main Help Menu  
X: Exit Connection
```

```
[sys226console] MP> co
```

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

```
- - - - - Prior Console Output - - - - -  
Quorum: 1 (of 1 vote); this node contributes 0 votes  
Cluster has no voting quorum disk.
```

```
SYSTEM SHUTDOWN COMPLETE
```

```
**** Primary HALTED with code HWRPB_HALT$K_REMAIN_HALTED
```

```
**** Hit any key to cold reboot ****
```

```
P00>>>
```

```
- - - - - Live Console - - - - -
```

```
*****
```

```
.  
. .  
.
```

- The console interface for the Integrity Servers is provided by the EFI
 - EFI is a new interface provided by Intel to replace the BIOS
 - The EFI user interface is called the “shell”
 - EFI provides an interface to the hardware
 - EFI runs applications from an EFI partition
 - EFI partitions contain FAT file systems
 - Seeing “*fsn*” devices in the device mapping table indicated that that device has an EFI partition
 - If the device does not have an EFI partition, it will show up as “*blk n* ” device
 - OpenVMS bootable devices will normally have a mixture of FAT partitions and Block partitions (*blk#*’s from the EFI viewpoint)

MP MAIN MENU:

V8.3 conversational PKA0.0

- - OpenVMS - DKA100:

Conversational boot from dka100 PKA0.1

DVD

EFI Shell [Built-in]

test

HE: Main Help Menu

X: Exit Connection

Loading.: EFI Shell [Built-in]

EFI Shell version 1.10 [14.61]

Device mapping table to return to MP main menu.)

fs0 : Acpi(HWP0002,100)/Pci(1|0)/**Scsi (Pun0, Lun0)** /HD(Part1, SigEC04A681-C93F-11

fs1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1, Lun0) /HD(Part1, Sig2044175C)

blk0 : Acpi(HWP0002,100)/Pci(1|0)/**Scsi (Pun0, Lun0)** - - - - -

blk1 : Acpi(HWP0002,100)/Pci(1|0)/**Scsi (Pun0, Lun0)** /HD(Part1, SigEC04A681-C93F-11

blk2 : Acpi(HWP0002,100)/Pci(1|0)/**Scsi (Pun0, Lun0)** /HD(Part2, SigEC04A680-C93F-11

blk3 : Acpi(HWP0002,100)/Pci(1|0)/**Scsi (Pun0, Lun0)** /HD(Part3, SigEC04A680-C93F-11

blk4 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1, Lun0)

blk5 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1, Lun0) /HD(Part1, Sig2044175C)

Shell>

- The EFI is made up of the following major components:
 - EFI Firmware core
 - EFI system partition (ESP)
 - Created by the operating system
 - Operating system loader
 - Contains value added software utilities and tools
 - EFI Boot manager
 - Supports the operating system boot loader menu

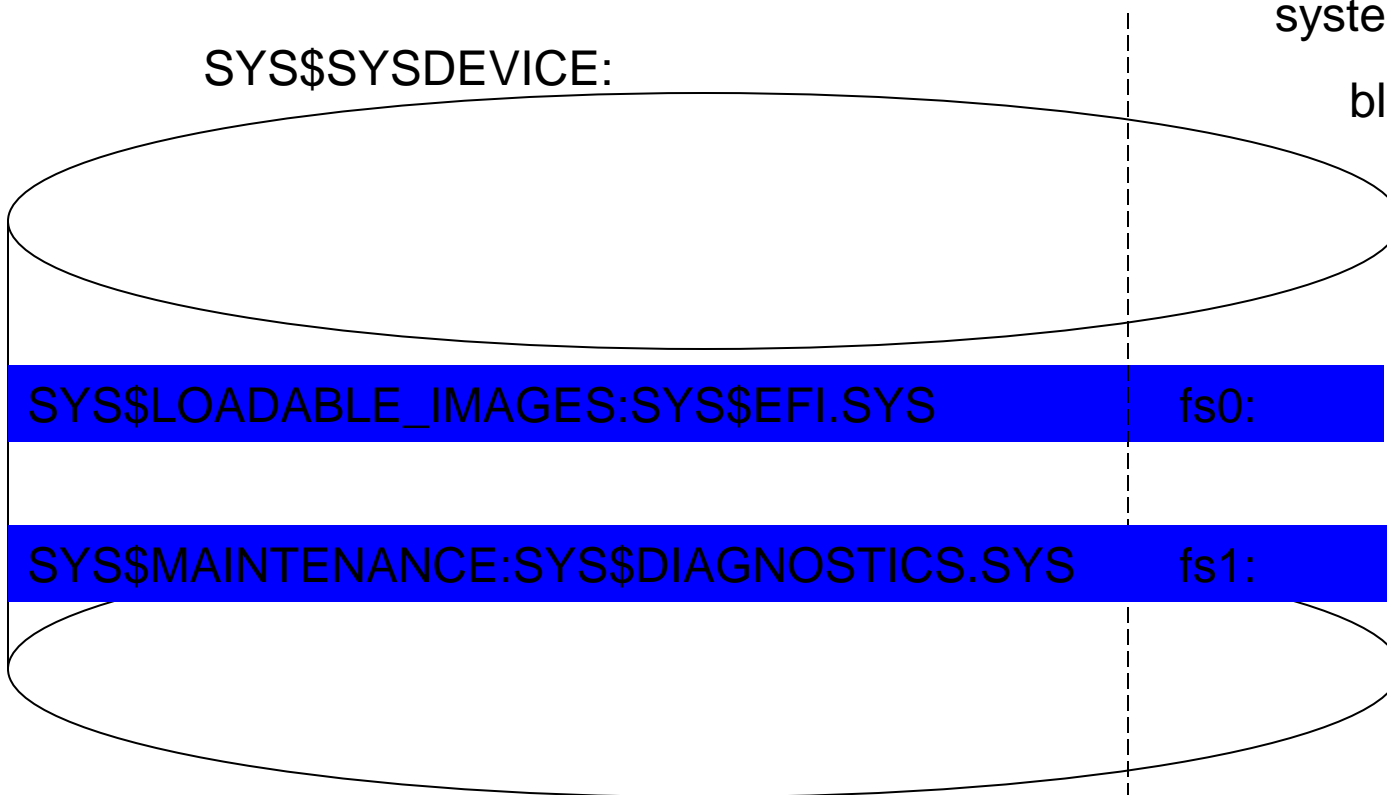
- EFI requires a GUID (Global Unique Identifier) Partition Table (GPT) disk format with at least one FAT32 partition
 - The FAT32 partition contains the EFI support files
 - OpenVMS supports ODS2/ODS5, but doesn't support FAT32
 - To make this work, both formats exist independently on the same disk
 - VMS sees the GPT as `gpt.sys` in the MFD
 - GUID gets updated with VMS update, thus boot options must be fixed/validated
 - The GPT is in the boot block(s) and points to any FAT partitions contained on that device

OpenVMS View of the system
disk

SYS\$SYSDEVICE:

EFI View of the
system disk

blk0:



Files-11 ODS2/5 volume with container files.

GPT format with
one or more
partitions.

```
$ dump/header/block=count:0 sys$sysdevice:[000000]gpt.sys
```

```
Dump of file SYS$SYSDEVICE:[000000]GPT.SYS;1 on 16-MAY-2008 12:59:04.77  
File ID (11,11,0) End of file block 80 / Allocated 80
```

File Header

Header area

Identification area offset: 40

...

File identification: (11,11,0)

Extension file identification: (0,0,0)

...

Identification area

File name: GPT.SYS;1

...

Map area

Retrieval pointers

Count: 40 LBN: 0

Count: 40 LBN: 71132920

Checksum: 16326

\$

```
$ dump/header/block=count:0 sys$common:[sys$lldr]sys$efi.sys
```

```
Dump of file SYS$COMMON:[SYS$LDR]SYS$EFI.SYS;1 on 16-MAY-2008 13:02:24.86
```

```
File ID (439,4,0) End of file block 256000 / Allocated 256000
```

File Header

Header area

...

File identification: *(439,4,0)*

Extension file identification: (0,0,0)

VAX-11 RMS attributes

File name length: 13

File name: SYS\$EFI.SYS;1

...

Map area

Retrieval pointers

Count:	256000	LBN:	425072
--------	--------	------	--------

Checksum: 8829

\$

Please select a boot option

```
OpenVMS V8.3 PKA0.0
V8.3 conversational PKA0.0
OpenVMS - DKA100:
Conversational boot from dka100 PKA0.1
DVD
EFI Shell[Built-in]
DVD new
Boot Option Maintenance Menu
System Configuration Menu
```

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

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,SigEC04A681-C93F-11
D8-B246-414243202020)
```

```
fs1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig2044175C)
```

```
blk0 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
```

```
blk1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,SigEC04A681-C93F-11
```

Shell>

```
Shell> fs0: <CR>
fs0:\> dir <CR>
Directory of: fs0:\

 04/03/06  02:16p <DIR>           2,048  EFI
          0 File(s)              0 bytes
          1 Dir(s)
```

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

```
fs0:\EFI> dir
Directory of: fs0:\EFI

 04/03/06  02:16p <DIR>           2,048  .
 04/03/06  02:16p <DIR>             0  ..
 04/03/06  02:16p <DIR>           2,048  VMS
          0 File(s)              0 bytes
          3 Dir(s)
```

```
fs0:\EFI>
```

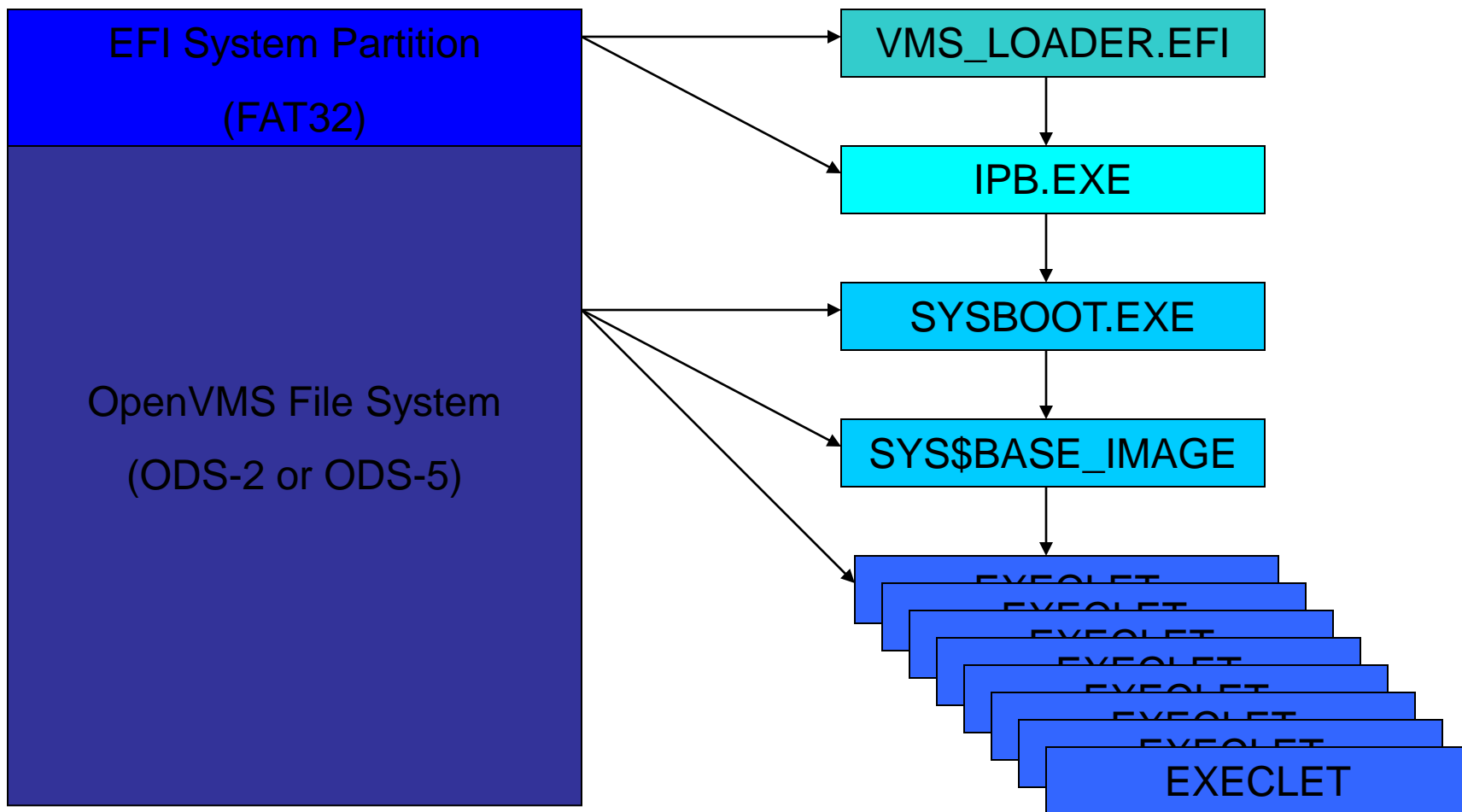
```
fs0:\EFI> cd vms
```

```
fs0:\EFI\VMS> ls
```

```
Directory of: fs0:\EFI\VMS
```

04/03/06	02:16p	<DIR>	2,048	.
04/03/06	02:16p	<DIR>	2,048	..
04/03/06	02:16p	<DIR>	2,048	UPDATE
04/03/06	02:16p	<DIR>	2,048	TOOLS
03/28/08	03:38p		3,948,544	IPB.EXE
04/30/07	02:18p		1,173,504	VMS_LOADER.EFI
03/28/08	03:39p		329,216	VMS_BCFG.EFI
04/30/07	02:18p		887,296	VMS_SPCFG.EFI
03/28/08	03:38p		300,032	VMS_SHOW.EFI
03/28/08	03:39p		302,592	VMS_SET.EFI
6 File(s)		6,941,184 bytes		
4 Dir(s)				

```
fs0:\EFI\VMS>
```



- There are a number of ways to boot OpenVMS once it has been installed:
 - Set up a boot option using the “Boot Option Maintenance Menu” option in the EFI menu, using the `vms_bcfg` or `bcfg` utility, or the `BOOT_OPTIONS.COM` command procedure. Once created, you can select it and make it the default.
 - Navigate the FAT32 directory structure to find the `VMS_LOADER.EFI` file and invoke it.
 - Create an alias to point to the `VMS_LOADER` and invoke that. This option is the closest thing to the SRM that you are probably familiar with. However the addition or removal of a bootable device can change the `fs#`.
 - Execute the `SYS$MANAGER:BOOT_OPTIONS` command procedure from DVD or OpenVMS.
- Note: When booting from the DVD, you may need to execute the following command and the EFI shell prompt:

```
shell> map -r
```

EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4411]

Please select a boot option

DVD

EFI Shell[Built-in]

Boot Option Maintenance Menu

System Configuration Menu

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

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-->[20] sec SystemGuid-->[62F272DE-E457-11D8-A9CA-B753D35CBA26]

SerialNumber-->[US42779094]

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

```
Add a Boot Option.  Select a Volume
```

```
F8_3 [Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0) /HD (Part1,SigEC0  
V8_3 [Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun1,Lun0) /HD (Part1,Sig204  
Load File [EFI Shell [Built-in]]  
Load File [Acpi (HWP0002,0) /Pci (3|0) /Mac (00306EF3AB09) ]  
Load File [Acpi (HWP0002,100) /Pci (2|0) /Mac (00306EF30B4F) ]  
Exit
```

Note: The first line correspondes to FS0 (SCSI(Pun0,Lun0) Partition 1


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

```
Select file or change to new directory:
```

```
07/14/06 02:00p <DIR>          1,024 EFI
```

```
[Treat like Removable Media Boot]
```

```
Exit
```

<Next Screen>

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

```
Select file or change to new directory:
```

```
07/14/06 02:00p <DIR>          1,024 .
```

```
07/14/06 02:00p <DIR>           0 ..
```

```
07/14/06 02:00p <DIR>          1,024 VMS
```

```
Exit
```

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

```
Select file or change to new directory:
```

```
04/03/06 02:16p <DIR>          2,048 .  
04/03/06 02:16p <DIR>          2,048 ..  
04/03/06 02:16p <DIR>          2,048 UPDATE  
04/03/06 02:16p <DIR>          2,048 TOOLS  
04/30/07 02:18p          1,173,504 VMS_LOADER.EFI  
03/28/08 03:39p          329,216 VMS_BCFG.EFI  
04/30/07 02:18p          887,296 VMS_SPCFG.EFI  
03/28/08 03:38p          300,032 VMS_SHOW.EFI  
03/28/08 03:39p          302,592 VMS_SET.EFI
```

```
Exit
```

Filename: \EFI\VMS\VMS_LOADER.EFI

DevicePath:

[Acpi (HWP0002,100)/Pci (1|0)/Scsi (Pun0,Lun0)/HD (Part1,SigEC04A681-C
93F-11D8-B246-414243202020)/\EFI\VMS\VMS_LOADER.EFI]

IA-64 EFI Application 04/30/07 02:18p 1,173,504 bytes

Enter New Description: ***OpenVMS Primary Boot Option***

Enter BootOption Data Type [A-Ascii U-Unicode N-No BootOption] :
Unicode

Enter BootOption Data [Data will be stored as Unicode string]:

Save changes to NVRAM [Y-Yes N-No]: **Y**

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 2.31 [4411]
```

```
Please select a boot option
```

```
DVD
```

```
EFI Shell[Built-in]
```

```
OpenVMS Primary Boot Option
```

```
Boot Option Maintenance Menu
```

```
System Configuration Menu
```

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

- Now that the option exists, we need to make it the first one on the list because when the system is powered up, or rebooted, the first entry on the list is what is selected by default

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-->[20] sec SystemGuid-->[62F272DE-E457-11D8-A9CA-B753D35CBA26]
SerialNumber-->[US42779094]

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

```
Change boot order.  Select an Operation
```

OpenVMS Primary Boot Option

DVD

EFI Shell[Built-in]

Save Settings to NVRAM

Help

Exit

```
NVRAM Not updated.  Save NVRAM? [Y to save, N to ignore] Y
```

- Use the up and down arrows to select the option you want to move
- To move it up on the list type the “u” key for up. To move the selected operation down on the list, type “d” for down
- Our newly created option is now first on the list
- Select exit to save the changes

EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4411]

Please select a boot option

OpenVMS Primary Boot Option

DVD

EFI Shell[Built-in]

OpenVMS xyz

Boot Option Maintenance Menu

System Configuration Menu

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

Loading.: OpenVMS Primary Boot Option

Starting: OpenVMS Primary Boot Option

HP OpenVMS Industry Standard 64 Operating System, Version V8.3

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%PKA0, Copyright (c) 2001 LSI Logic, PKM V1.1.01

...

```
Shell> bcfg boot add 1 fs0:\efi\vms\vms_loader.efi "hp OpenVMS"
```

```
Target = 8
```

```
bcfg: Add boot option as 1
```

```
Shell>exit
```

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4411]
```

```
Please select a boot option
```

```
hp OpenVMS
```

```
OpenVMS Primary Boot Option
```

```
DVD
```

```
EFI Shell[Built-in]
```

```
Boot Option Maintenance Menu
```

```
System Configuration Menu
```

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

```
Loading.: hp OpenVMS
```

```
Starting: hp OpenVMS
```

```
HP OpenVMS Industry Standard 64 Operating System, Version V8.3
```

```
© Copyright 1976-2007 Hewlett-Packard Development Company, L.P.
```

```
...
```


- Instead of messing with all of the above, if you have OpenVMS V8.3 or later you can use a command procedure to manage your boot options. This did not work on the i2 machines and the initial release of 8.4. For example:

```
$ @sys$manager:boot_options
```

```
OpenVMS I64 Boot Manager Boot Options List Management Utility
```

- (1) ADD an entry to the Boot Options list
 - (2) *DISPLAY the Boot Options list*
 - (3) REMOVE an entry from the Boot Options list
 - (4) MOVE the position of an entry in the Boot Options list
 - (5) VALIDATE boot options and fix them as necessary
 - (6) Modify Boot Options TIMEOUT setting
-
- (B) Set to operate on the Boot Device Options list
 - (D) Set to operate on the Dump Device Options list
 - (G) Set to operate on the Debug Device Options list
-
- (E) EXIT from Boot Manager utility

You can also enter Ctrl-Y at any time to abort this utility.

```
Enter your choice: 2
```

To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices):

EFI Boot Options list: Timeout = 7 secs.

Entry	Description	Options
1	\$32\$dka0: PKA0.0 \$32\$DKA0 PCI(0 20 1 0) Scsi(Pun0,Lun0)	-f1 0,0
2	dka0 conversational PKA0.0 PKA0.0 \$32\$DKA0 PCI(0 20 1 0) Scsi(Pun0,Lun0)	-f1 0,1
3	OpenVMS on DKA100: PKA0.1 \$32\$DKA100 PCI(0 20 1 0) Scsi(Pun1,Lun0)	
4	dka100 conversational PKA0.1 \$32\$DKA100 PCI(0 20 1 0) Scsi(Pun1,Lun0)	-f1 0,1
5	Boot DVD \$32\$DQA0 PCI(0 0 2 0) ATA(Primary,Master)	
6	EFI Shell [Built-in] VenHw(d65a6b8c-71e5-4df0-d2f009a9)	

6 entries found.

Enter your choice:

Enter your choice: **1**

Enter the device name (Enter "?" for a list of devices): ?

Device Name	Device Status	Error Count	Volume Label	Free Blocks	Trans Count	Mnt Cnt
\$27\$DKA0:	(CLASS8) Online	0				
\$32\$DKA0:	(CLASS8) Mounted	0	I64SYS	17405496	655	2
\$32\$DKA100:	(CLASS8) Mounted alloc	0	IVMS83	49404112	1	1
\$32\$DQA0:	(CLASS8) Online	0				

...
 EFI Built-in EFI Shell

Enter the device name (Enter "?" for a list of devices): **\$32\$dka100:**

Enter the desired position number (1,2,3,,) of the entry.
 To display the Boot Options list, enter "?" and press Return.

Position [1]: **3**

Enter the value for VMS_FLAGS in the form n,n.

VMS_FLAGS [NONE]: **0,1**

Enter a short description (do not include quotation marks).

Description ["\$32\$DKA100:"]: **v8.3 conversational**

efi\$bcfg: \$32\$dka100: (Boot0004) Option successfully added

Enter your choice: 2

To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices):

EFI Boot Options list: Timeout = 7 secs.

Entry	Description	Options
1	\$32\$dka0: PKA0.0 \$32\$DKA0 PCI(0 20 1 0) Scsi(Pun0,Lun0)	-fl 0,0
2	dka0 conversational PKA0.0 PKA0.0 \$32\$DKA0 PCI(0 20 1 0) Scsi(Pun0,Lun0)	-fl 0,1
3	v8.3 conversational PKA0.1 \$32\$DKA100 PCI(0 20 1 0) Scsi(Pun1,Lun0)	-fl 0,1
4	OpenVMS on DKA100: PKA0.1 \$32\$DKA100 PCI(0 20 1 0) Scsi(Pun1,Lun0)	
5	dka100 conversational PKA0.1 \$32\$DKA100 PCI(0 20 1 0) Scsi(Pun1,Lun0)	-fl 0,1
6	Boot DVD \$32\$DQA0 PCI(0 0 2 0) ATA(Primary,Master)	
7	EFI Shell [Built-in] VenHw(d65a6b8c-71e5-4df0-d2f009a9)	

7 entries found.

Enter your choice:

Enter your choice:

OpenVMS I64 Boot Manager Boot Options List Management Utility

- (1) ADD an entry to the Boot Options list
- (2) DISPLAY the Boot Options list
- (3) REMOVE an entry from the Boot Options list
- (4) MOVE the position of an entry in the Boot Options list
- (5) VALIDATE boot options and fix them as necessary
- (6) Modify Boot Options TIMEOUT setting

...

(E) EXIT from Boot Manager utility

You can also enter Ctrl-Y at any time to abort this utility.

Enter your choice: **6**

efi\$bcfg: Boot Timeout period is 20 secs

Would you like to modify the Timeout value? (Yes/No) [NO] **y**

Please enter the Timeout value in seconds: **15**

efi\$bcfg: Boot Timeout period is 15 secs

Enter your choice:

- On an Alpha, boot flags is an SRM variable. On the Integrity server, boot flags is an EFI variable.
 - Alpha
 - P00> set boot_osflags 0,1
 - Integrity
 - Shell> set vms_flags 0,1
- The boot command or menu entry overrides the default.
- The following example shows how to set and show boot flags:

```
fs0:\EFI\VMS> set vms_flags 0,1
```

```
fs0:\EFI\VMS> set
vms_flag      : 0,0
bcfg          : 0,0
path         :
.;fs0:\efi\tools;fs0:\efi\boot;fs0:\;fs1:\efi\tools;fs1:\efi\boot;fs1:\
vms_flags : 0,1
```

```
fs0:\EFI\VMS>
```

- You can create EFI Alias commands, similar to DCL command synonyms with the EFI Alias command. Be CAREFUL as inserting the installation DVD may change the FS# designation. To view an Alias, perform the following:

```
fs0:\EFI\VMS> alias
  setv : fs1:\efi\vms\vms_set
  sdev  : fs0:\efi\vms\vms_show device
  show  : fs0:\efi\vms\vms_show.efi
  myse  : fs0:\efi\vms\vms_set.efi
  dir   : ls
  md    : mkdir
  rd    : rm
  del   : rm
  copy  : cp
  find  : ls -r
  ll    : ls
  cat   : type
fs0:\EFI\VMS>
```

- To create and alias:

```
fs0:\EFI\VMS> alias b fs0:\efi\vms\vms_loader  
fs0:\EFI\VMS> alias sysboot "fs0:\efi\vms\vms_loader.efi -fl 0,1"  
fs0:\EFI\VMS> b  
fs0:\EFI\VMS> b -fl 0,1
```

HP OpenVMS Industry Standard 64 Operating System, Version V8.3
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...

- There are a few utilities that were designed for OpenVMS:
 - vms_show
 - vms_set
 - vms_bcfg

- Translated between EFI and OpenVMS device names
- Display (selected) device mapping
 - `vms_show device [device-name]`
- Display (selected) dump device
 - `vms_show dump_dev [device-name]`
- Display (selected) debug device
 - `vms_show debug_dev [device-name]`

```
fs0:\EFI\VMS> alias show
```

```
show : fs0:\efi\vms\vms_show.efi
```

```
fs0:\EFI\VMS> show device
```

```
VMS: EIA0 00-30-6E-F3-AB-09
```

```
EFI: Acpi (HWP0002,0) /Pci (3|0) /Mac (00306EF3AB09)
```

```
VMS: DKA100 HP 36.4GMAS3367NC HPC3 V8_3
```

```
EFI: fs1: Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun1,Lun0)
```

```
VMS: DKA0 HP 36.4GMAS3367NC HPC3 F8_3
```

```
EFI: fs0: Acpi (HWP0002,100) /Pci (1|0) /Scsi (Pun0,Lun0)
```

```
VMS: EWA0 00-30-6E-F3-0B-4F
```

```
EFI: Acpi (HWP0002,100) /Pci (2|0) /Mac (00306EF30B4F)
```

- Set dump device only accepts OpenVMS style names

– vms_set dump_dev dev [,dev...]

```
fs0:\EFI\VMS> vms_show dump_dev
```

```
fs0:\EFI\VMS> vms_set dump_dev dka100
```

```
VMS: DKA100                HP 36.4GMAS3367NC          HPC3      V8_3
EFI: fs1: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
```

```
fs0:\EFI\VMS> vms_show dump_dev
```


```
VMS: DKA100                HP 36.4GMAS3367NC          HPC3      V8_3
EFI: fs1: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
```

```
fs0:\EFI\VMS>
```


HP iLO Login - Windows Internet Explorer

https://10.100.0.15/ Certificate Error Google

PARSEC Group - Sales Summ... HP iLO Login



Integrated Lights-Out

HP Integrity and HP 9000

User name:

Password:

[Sign In](#) [Clear](#)

This is a private system. Do not attempt to login unless you are an authorized user. Any authorized or unauthorized access and use may be monitored and can result in criminal or civil prosecution under applicable law.

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Done Internet 100%

HP Integrated Lights-Out - Windows Internet Explorer

https://10.100.0.15/home.html Certificate Error Google

PARSEC Group - Sales Summ... HP Integrated Lights-Out

hp Integrated Lights-Out
HP Integrity and HP 9000

Current User : Admin
iLO Hostname: ia64
[Sign Out](#)

System Status Remote Console Virtual Devices Administration Help

Status Summary
Server Status
System Event Log

Status Summary

General Active Users

System Power: ● On

Latest System Event Log Entry: OS Boot Complete
16 May 2008 15:07:09

Firmware Revisions:

iLO MP:	E.03.30
BMC:	01.53
EFI:	01.22
System Firmware:	02.31

iLO IP Address: 10.100.0.15

Date & Time: 05/16/2008 15:33:10

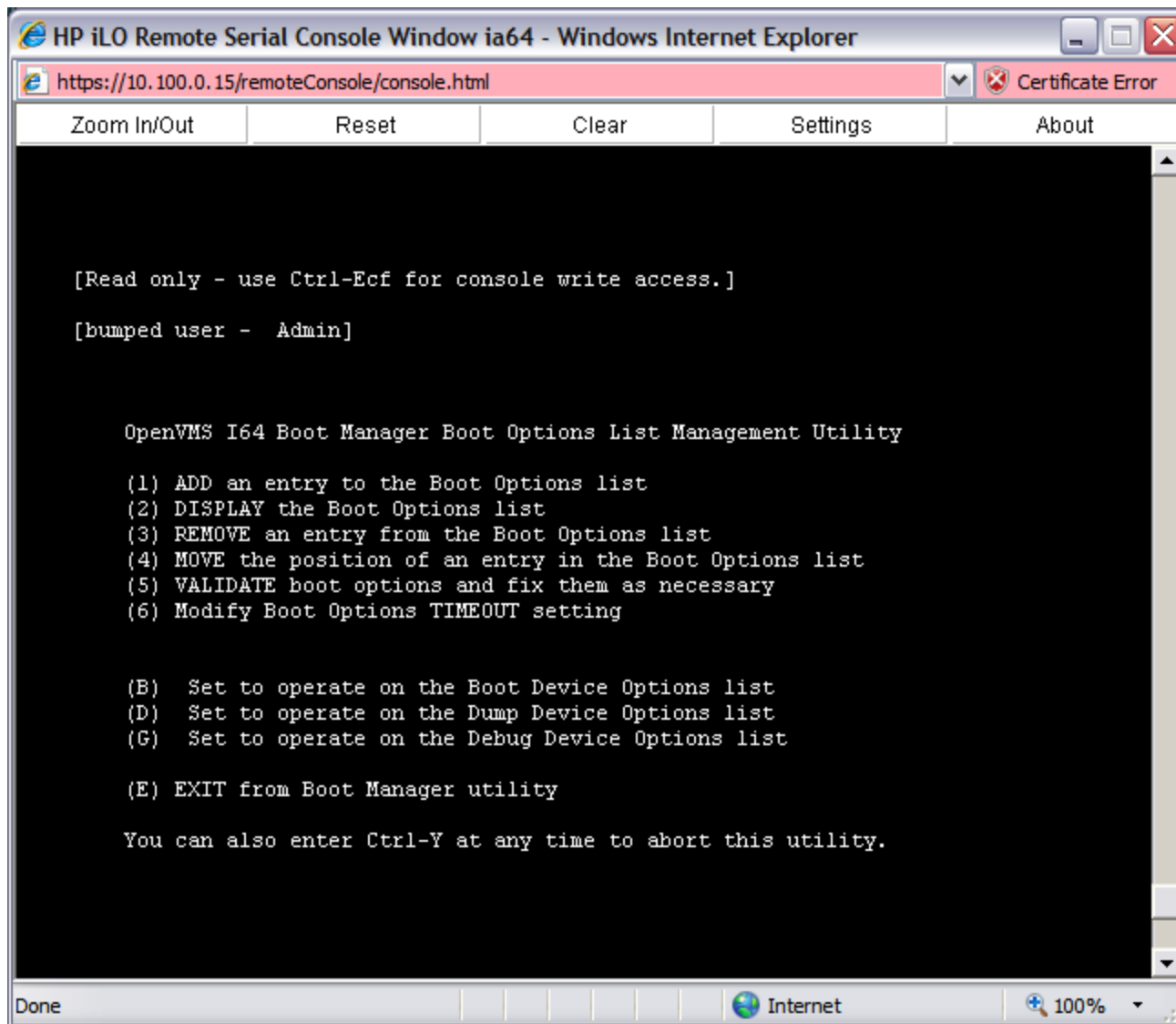
Locator LED: ● [Turn LED On](#)

Done Internet 100%

The screenshot shows a Windows Internet Explorer browser window displaying the HP Integrated Lights-Out (iLO) management interface. The browser's address bar shows the URL `https://10.100.0.15/home.html` and a "Certificate Error" warning. The page title is "HP Integrated Lights-Out - Windows Internet Explorer".

The iLO interface header includes the HP logo, the text "Integrated Lights-Out HP Integrity and HP 9000", and a navigation menu with tabs for "System Status", "Remote Console", "Virtual Devices", "Administration", and "Help". The "Remote Console" tab is selected. On the right side of the header, it displays "Current User : Admin", "iLO Hostname: ia64", and a "Sign Out" link.

The main content area is titled "Remote Serial Console" and contains the message: "The Remote Serial Console has been opened in a new browser window." Below this message is a "View Console" button. The browser's status bar at the bottom shows "Done" and "Internet" connectivity.



HP Integrated Lights-Out - Windows Internet Explorer

https://10.100.0.15/home.html Certificate Error Google

PARSEC Group - Sales Summ... HP Integrated Lights-Out x Welcome to Tabbed Browsing

hp Integrated Lights-Out
HP Integrity and HP 9000

Current User : Admin
iLO Hostname: ia64
[Sign Out](#)

System Status Remote Console Virtual Devices Administration Help

User Administration
Access Settings
Network Settings
Firmware Upgrade
Licensing
Directory Settings
SNMP Settings

Network Settings

Standard Domain Name Server

MAC Address: 0x00306e3af6f5

DHCP Status: Enable Disable

iLO Host Name:

IP Address:

Subnet Mask:

Gateway Address:

Link State: Auto Negotiate 10BaseT

Done Internet 100%

- There are a number of ways to force a crash on an Integrity:
 - MP:CO ^P/^P/Yes
 - MP:CM> TC
 - iLo Virtual Devices/Power & Reset/System Reset/Reset System through INIT or TOC Signal
 - Availability Manager
- The console ^P mechanism is the most common (similar to an alpha) but not as reliable as the others.

```
*****  
This is a private system.  
Do not attempt to login unless you are an authorized user.  
Any authorized or unauthorized access or use may be monitored and can  
result in criminal or civil prosecution under applicable law.  
*****
```

```
MP login: Admin  
MP password: *****  
<^P>  
Interrupt Priority C
```

```
Commands:  
C device    Cancel Mount Verification  
Q           Adjust Quorum  
CTRL-P     Prompt for Crash  
CTRL-Z     Exit IPC
```

```
IPC> ^P  
  
Crash (y/n): y  
Starting Crash...
```

```
**** OpenVMS I64 Operating System V8.3-1H1 - BUGCHECK ****  
  
** Bugcheck code = 0000064C: OPERCRASH, Operator forced system crash  
** Crash CPU: 00000000      Primary CPU: 00000000      Node Name: SYS226  
** Highest CPU number:      00000001
```

MP MAIN MENU:

- CO: Console
- VFP: Virtual Front Panel
- CM: Command Menu
- CL: Console Log
- SL: Show Event Logs
- HE: Main Help Menu
- X: Exit Connection

```
[sys226console] MP> cm
```

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

```
[sys226console] MP:CM> tc
```

TC

Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system.

Type Y to confirm your intention to restart the system: (Y/[N]) y

Y

-> SPU hardware was successfully issued a TOC.

```
[sys226console] MP:CM>
```

```
[sys226console] MP:CM> <^B>
```

MP MAIN MENU:

- CO: Console
- VFP: Virtual Front Panel
- CM: Command Menu
- CL: Console Log
- SL: Show Event Logs
- HE: Main Help Menu
- X: Exit Connection

```
[sys226console] MP> co
```

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

```
- - - - - Prior Console Output - - - - -  
Data (read only)      FFFFFFFF.88901600 FFFFFFFF.8890181F 77712A00  
Code                  FFFFFFFF.815E6B00 FFFFFFFF.815FB99F 7EA31500  
Data (read only)     FFFFFFFF.88901A00 FFFFFFFF.88906397 7772E600  
Data (read/write)    FFFFFFFF.88906400 FFFFFFFF.889069EF 77731C00  
Short data (read/write) FFFFFFFF.88906A00 FFFFFFFF.8890706F 7773D600  
Linked 5-FEB-2009 19:09
```

The screenshot shows the HP Integrated Lights-Out Advanced web interface in a Mozilla Firefox browser. The browser's address bar shows the URL `https://192.168.0.216/home.html`. The interface includes a navigation menu with tabs for System Status, Remote Console, Virtual Devices, Administration, and Help. The 'Power & Reset' section is active, displaying options for System Power, System Power Restore Settings, Reset, BMC, and iLO. A modal dialog box is overlaid on the page, titled 'The page at https://192.168.0.216 says:', containing a warning icon and the text: 'Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system. Do you wish to continue?'. The dialog has 'OK' and 'Cancel' buttons.

HP Integrated Lights-Out Advanced
HP Integrity and HP 9000

Current User : Admin
iLO Hostname: sys226console
[Sign Out](#)

System Status Remote Console Virtual Devices Administration Help

Power & Reset

Power

The page at `https://192.168.0.216` says:

Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system. Do you wish to continue?

OK Cancel

System Power:

System Power Control:

System Power Restore Settings

- Restore Previous Power State
- Automatically Power On
- Remain Powered Off

Submit

Reset

System Reset:

- Reset through RST signal
- Reset through INIT or TOC signal

Submit

BMC:

- Reset BMC Passwords
- Reset BMC

iLO:

- Reset iLO to Default Configuration
- Reset iLO

Submit

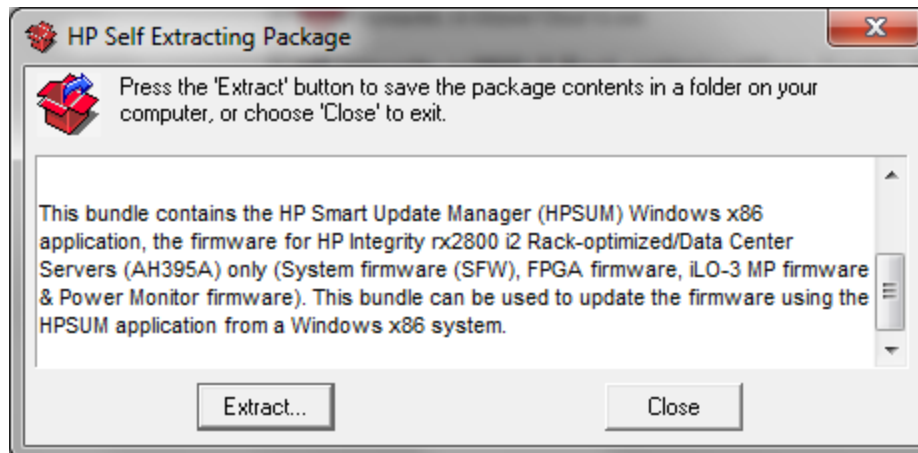
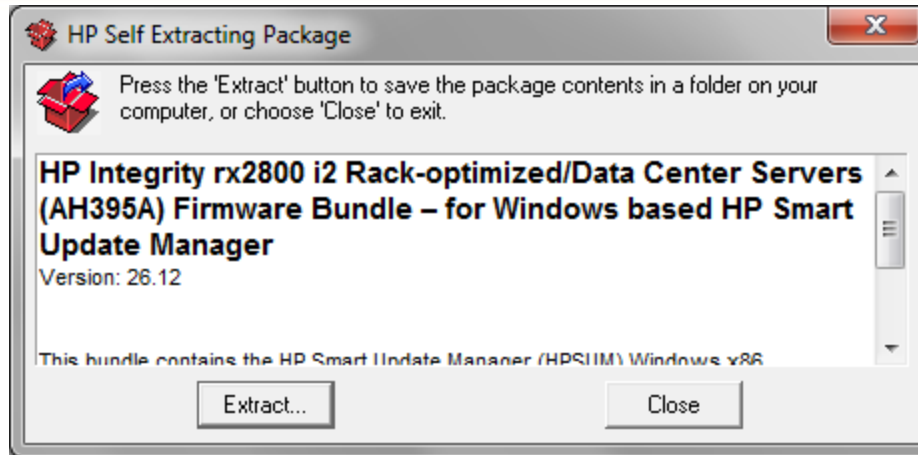
On the console terminal

```
**** OpenVMS I64 Operating System V8.3-1H1 - BUGCHECK ****

** Bugcheck code = 00000AFC: CPUINT_INIT, Hardware INIT interrupt received
** Crash CPU: 00000000      Primary CPU: 00000000      Node Name: SYS226
** Highest CPU number:      00000001
** Active CPUs:             00000000.00000003
** Available CPUs:          00000000.00000003
** Current Process:         NULL
** Current PSB ID:          00000001
** Register Dump:
TRAP_TYPE      =          00000066
IIP             = FFFFFFFF.8058FA40
RSC             = 00000000.00000000
BSP             = FFFFF802.8D932450
BSPSTORE       = FFFFF802.8D932300
RNAT            = 00000000.00000000
BSPBASE        = 00000040.FFF6A000
PFS            = 00000000.000010A9
AST_F12        = 00000000.00000000.00000000.00000000
AST_F13        = 00000000.00000000.00000000.00000000
AST_F14        = 00000000.00000000.00000000.00000000
AST_F15        = 00000000.00000000.00000000.00000000
PREDS          = 00000000.00056AE3
IPSR           = 00001010.08426030
```

- Updating the Integrity firmware steps:
 1. Go to the following Web site
 2. <http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?lang=en&cc=us&taskId=135&prodTypeId=15351&prodCatId=321933>
 3. Find your server type on the list provided and following the links.
 4. Click on the “Cross operating system (BIOS, Firmware, Diagnostics, etc)” link
 5. Locate the appropriate ISO-image firmware file, and download the ISO-image firmware (zip-compressed) file to your system.
 6. Unzip the firmware file, it will have an .ISO extension
 7. Run a windows CD write program like Roxio
 8. Record the data on the CD, specifying the .ISO file as the source for the CD.
 9. Boot the CD on your Integrity
 10. If i2 machine there is no ISO file. Only Tarballs and a Windows installation package for HPSUM (Smart Update Manager)

Update firmware



Loading.: DVD

HPOFM located on removable media device at 'fs0:\EFI\BOOT\'

```
/-----\  
| (i) INFORMATION: The option "Internal Bootable DVD" has been |  
| added to the EFI Boot Manager. It is required for HPOFM, but |  
| could allow any user to bypass the EFI Shell password and gain |  
| system access. The option can be removed by using the Boot |  
| Option Maintenance Menu. |  
| |  
| OK |  
| |  
\-----/
```

HPOFM located on removable media device at 'fs0:\EFI\BOOT\'

HP Offline Firmware Manager Version v2.6.53

Copyright (c) 2003 Hewlett-Packard Development Company, L.P.

Portions Copyright (c) 2000-2003 LSI Logic Corporation. All rights reserved.

HPOFM will start in 4 second(s)...<cr>

HP Offline Firmware Manager v2.6.53 hp integrity server rx2600

```
/-----\  
| Welcome to the HP Offline Firmware Manager (HPOFM)! HPOFM reduces the |  
| complexity of managing your computer's firmware. More information about |  
| firmware updates is available in installation manuals, and online at |  
| http://www.hp.com/go/support |  
| |  
| Thank you for choosing Hewlett-Packard! |  
| |  
| OK |  
\-----/
```

HP Offline Firmware Manager v2.6.53 hp integrity server rx2600

Welcome to HPOFM

```
/----- Main Menu -----\  
| Welcome |  
| Manage Firmware |  
| Help |  
| Exit |  
\-----/
```

arrows move | ENTER selects | F1, ? for Help
ENTER selects

HP Offline Firmware Manager v2.6.53 hp integrity server rx2600

Manage Firmware

Devices with updateable firmware appear in the list below, if included in the package and detected in the system. Devices of identical types, and any indented devices shown below, are all updated together. Devices prefixed by '---' cannot be updated from HPOFM, but help is shown upon selection.

Press SPACE to display the firmware update release notes for the highlighted device.

Select all : everything will be updated

Deselect all : clear all selections

Device	Local Version	Version on Disk	Date on Disk
[X] Management Processor	E.02.29	E.03.15	05/11/2005

Back

Begin update

arrows move | TAB changes section | ENTER selects | F1, ? for Help

```
/-----\  
| (i) INFORMATION: After updating, the MP will reset, and the MP |  
| console will be disconnected. You will need to reconnect to the MP |  
| manually. |  
| |  
| OK |  
\-----/
```

```
/-----\  
| (?) QUESTION: This update process may require a reboot and the |  
| DVD must be kept in the drive until this program returns. |  
| |  
| Do you want to continue? |  
| |  
| Cancel Continue |  
\-----/
```

Executing: "Management Processor"

- Updating the Integrity Controller firmware steps:
 1. Go to the following Web site
 2. <http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?lang=en&cc=us&taskId=135&prodTypeId=15351&prodCatId=321933>
 3. Find your server type on the list provided and following the links.
 4. Click on the “Cross operating system (BIOS, Firmware, Diagnostics, etc)” link
 5. Select and download the **IPF Offline Diagnostics and Utilities** ISO-image firmware (zip-compressed) file to your system.
 6. Unzip the firmware file, it will have an .ISO extension
 7. Run a windows CD write program like Roxio
 8. Record the data on the CD, specifying the .ISO file as the source for the CD.
 9. Boot the CD on your Integrity
 10. If i2 machine there is no ISO file. Only Tarballs and a Windows installation package for HPSUM (Smart Update Manager)

This CD provides diagnostic applications and tools to support and maintain HP systems based on the Intel IPF platform.

Type the key which corresponds to your selection below:

- a. View CD Overview
- b. Run the Off-line Diagnostic Environment (ODE)
- c. Run CD Installer to install/update CD content to HPSP
- d. View Release Notes and Documentation Menu
- e. View I/O Cards FW Update and Configuration Utilities, MCA, and ICM Menu
- f. View License and Warranty Agreements Notice

- x. exit and reboot
- q. exit menu without reboot

Time Remaining = 0

ATTENTION NOTICE

ATTENTION: USE OF THE SOFTWARE IS SUBJECT TO THE HP SOFTWARE LICENSE TERMS CONTAINED IN THE "LICENSES.TXT" FILE AND THE "IPF OFFLINE DIAGNOSTICS AND UTILITIES AS-IS WARRANTY STATEMENT" CONTAINED IN THE "WARRANTY.TXT" FILE INCLUDED IN THE "\EFI\HP\DIAG\DOCUMENTATION\" DIRECTORY OF THE PHYSICAL MEDIA ON WHICH THE SOFTWARE HAS BEEN PROVIDED. USING THE SOFTWARE INDICATES YOUR ACCEPTANCE OF THESE LICENSE TERMS. IF YOU DO NOT ACCEPT THESE LICENSE TERMS, YOU MAY RETURN THE SOFTWARE FOR A FULL REFUND.

<End of file> press any key to quit:

HP Itanium Processor Family Diagnostics and Utilities CD

Version A.01.23

This CD provides diagnostic applications and tools to support and maintain HP systems based on the Intel IPF platform.

Type the key which corresponds to your selection below:

- a. View CD Overview
- b. Run the Off-line Diagnostic Environment (ODE)
- c. Run CD Installer to install/update CD content to HPSP
- d. View Release Notes and Documentation Menu
- e. View I/O Cards FW Update and Configuration Utilities, MCA, and ICM Menu
- f. View License and Warranty Agreements Notice

- x. exit and reboot
- q. exit menu without reboot ****

< (c) Hewlett-Packard Company, 2003-2009

```
*****
*****
*****          Offline Diagnostic Environment          *****
*****
***** (C) Copyright Hewlett-Packard Co 1993-2008 *****
*****          All Rights Reserved                    *****
*****
***** HP shall not be liable for any damages resulting from the *****
***** use of this program.                            *****
*****
*****          TC Version B.00.24                      *****
*****          SysLib Version B.00.11                  *****
*****          Mapfile Version B.01.37                 *****
*****
*****
```

Type HELP for command information.
ODE>

```
ODE> ls
```

```
Modules on this boot media are:
```

```
filename      type  size   created  description
-----
CIODIAG2.EFI  TM    798720 11/13/2009 Core IO diagnostic
COPYUTIL.EFI  TM    1126400 11/13/2009 Disk-to-tape copy utility
CPUDIAG.EFI   TM    1454080 11/13/2009 Processor diagnostic
DFDUTIL.EFI   TM    942592 11/13/2009 Disk firmware download utility
FCFUPDATE.EFI TM    418816 11/13/2009 FW Update Utility for Fibre Channel
IODIAG.EFI    TM    262656 11/13/2009 Runs selftests on I/O modules
MAPPER.EFI    TM    1113600 11/13/2009 System mapping utility
MEMDIAG.EFI   TM    328192 11/13/2009 Memory diagnostic
PERFVER.EFI   TM    939520 11/13/2009 Runs ROM-based selftests on peripherals
PLUTODIAG.EFI TM    610816 11/13/2009 SBA/LBA diagnostic
```

```
ODE>
```

```
ODE> fcfupdate
```

```
*****  
*****  
*****          FCFUPDATE          *****  
*****  
*****          Copyright (C) 2009 by Hewlett-Packard Company          *****  
*****          All Rights Reserved          *****  
*****  
*****  HP shall not be liable for any damages resulting from the  *****  
*****  use of this program.  *****  
*****  
*****          Version B.00.44          *****  
*****  
*****
```

```
Scanning the system for supported cards ... No FC Cards found  
Done
```

```
Searching for F/W files... Done  
Update Protocol not found.  Aborting.
```

```
Type HELP for command information.  
No supported IO Cards Found in the system
```

```
*****  
*                               List of Firmware Files found                               *  
*****
```

File Name	Version	Size	Vend ID & Dev ID	Supported
fc_1_37.frm	137	89088	0x103C	0x1029
a9782a_bc.frm	230	11288	0x14e4	0x16c7
brcm_efi.frm	7000b	79360	0x14e4	0x16c7
i_03004800_193.frm	3004800	108032	0x8086	0x1026
i_03004800_194.frm	3004800	108032	0x8086	0x1079
i_03004800_331.frm	3004800	108032	0x8086	0x1026
i_03004800_332.frm	3004800	108032	0x8086	0x1027
i_03004800_7011.frm	3004800	108032	0x8086	0x107a
i_03004800_7012.frm	3004800	108032	0x8086	0x1079
i_3003_290.frm	3000030	123392	0x8086	0x1079
i_3003_545.frm	3000030	123392	0x8086	0x1079
c_03081400_221.frm	3081400	173056	0x8086	0x10a7
c_03081400_222.frm	3081400	173056	0x8086	0x10a7
c_03081400_339.frm	3081400	173056	0x8086	0x10bc
c_03081400_360m.frm	3081400	183808	0x8086	0x10d9
c_03081400_364m.frm	3081400	183808	0x8086	0x10da
c_03081400_393.frm	3081400	173056	0x8086	0x10a9

Continue ([y]/n)? n

FCFUPDATE> exit

ODE> cpudiag

```
*****
*****
*****          CPUDIAG          *****
*****
*****      Copyright (C) 2008 by Hewlett-Packard Company      *****
*****          All Rights Reserved          *****
*****
*****  HP shall not be liable for any damages resulting from the  *****
*****  use of this program.  *****
*****
*****          Version B.00.71          *****
*****
*****
```

CPUDIAG:ImageStart 0x00000040fdb68000 Size 0x000000000118e000

Type HELP for command information.

```
Please wait, detecting if a MP system....  
MP.EFI loaded at 0x40ffcc0000 size 0xaa000  
Initializing MP Protocol Interface....  
Done  
Number of Processors = 2
```

```
Sent AP(1) Start Message
```

```
CPUDIAG> help
```

```
CPUDIAG Help
```

```
Commands
```

```
-----
```

```
SECTION -- Displays/Sets current test sections to execute  
DIAGINFO -- Displays the test sections covered by cpudiag  
UP -- Test only one processor (the BSP)  
MP -- Test all processors in the system  
SEED -- Sets the default seed value to be used  
PROC -- Selects which processors to test  
PSTAT -- Displays information on processors to test  
BREAK -- Sets breakpoints in diagnostic  
MASTER -- Selects which cpu will play the master role in the Multi-processor tests  
GREG -- Displays the static general registers  
CREG -- Displays selected control and application registers  
FREG -- Displays the static floating point registers registers  
CPUFREQ -- Displays selected processor's actual frequency  
THREADS -- Displays all the processors and their sibling threads
```

```
Continue ([y]/n)? y
```



```
CPUDIAG> mp
```

```
2 processors are used in testing
```

```
CPUDIAG> run
```

```
STARTING EXECUTION OF CPUDIAG
```

```
SECTION 001
```

```
General register Test Section
```

```
Started Date : 9/11/2010 Time : 10:38:32
```

```
Sent AP(1) Start Message
```

```
Finished Date : 09/11/2010 Time : 10:38:32
```

```
SECTION 002
```

```
Bank register Test Section
```

```
.  
. .  
. .
```

```
Skipping Multi-Threaded Section:25.
```

```
RUN COMPLETED.
```

```
CPUDIAG>
```

- You can use the EFI SHELL to manually find the command procedures to accomplish tasks as well:
 - **Set your default to the correct location**
 - **Execute the command procedure (.nsh file)**

```
EFI Shell version 1.10 [14.61]
```

```
Device mapping table
```

```
fs0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)
```

```
fs1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,SigAFC31241-054A-11DF-9C6E-AA000400FEFF)
```

```
blk0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
```

```
blk1 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)
```

```
blk2 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
```

```
blk3 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,SigAFC31241-054A-11DF-9C6E-AA000400FEFF)
```

```
blk4 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part3,SigEDA77411-0D76-11DE-8901-00306E3947DE)
```

```
Shell> fs0:
```

```
fs0:\> dir
```

```
Directory of: fs0:\
```

```
11/13/09 02:24p <DIR>          1,024  EFI
          0 File(s)          0 bytes
          1 Dir(s)
```

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

```
fs0:\EFI>
```

```
fs0:\EFI> cd hp
```

```
fs0:\EFI\HP> dir
```

```
Directory of: fs0:\EFI\HP
```

```
11/13/09 02:24p <DIR>          1,024 .
11/13/09 02:24p <DIR>          1,024 ..
11/13/09 02:24p <DIR>          1,024 DIAG
11/13/09 02:27p <DIR>          1,024 TOOLS
      0 File(s)                0 bytes
      4 Dir(s)
```

```
fs0:\EFI\HP> cd tools
```

```
fs0:\EFI\HP\TOOLS> dir
```

```
Directory of: fs0:\EFI\HP\TOOLS
```

```
11/13/09 02:27p <DIR>          1,024 .
11/13/09 02:27p <DIR>          1,024 ..
11/13/09 02:27p <DIR>          1,024 MCA_Utilities
11/13/09 02:27p <DIR>          1,024 ilosetup
11/13/09 02:27p <DIR>          1,024 icm_UTILITY
11/13/09 02:27p <DIR>          1,024 IO_CARDS
11/13/09 02:29p <DIR>          1,024 NetWork
11/13/09 02:29p <DIR>          2,048 CD_Installer
11/13/09 02:30p <DIR>          1,024 LaunchMenu
      0 File(s)                0 bytes
      9 Dir(s)
```

```
fs0:\EFI\HP\TOOLS>
```

```
fs0:\EFI\HP\TOOLS> cd io_cards
```

```
fs0:\EFI\HP\TOOLS\IO_CARDS> dir  
Directory of: fs0:\EFI\HP\TOOLS\IO_CARDS
```

```
11/13/09 02:27p <DIR>          1,024 .  
11/13/09 02:27p <DIR>          1,024 ..  
11/13/09 02:27p <DIR>          1,024 Gigabit_PCIe  
11/13/09 02:27p <DIR>          1,024 SmartArray  
11/13/09 02:27p <DIR>          2,048 SAS  
11/13/09 02:28p <DIR>          1,024 U320_Scsi  
11/13/09 02:28p <DIR>          1,024 U160_Scsi  
11/13/09 02:28p <DIR>          1,024 ixgbe  
11/13/09 02:28p <DIR>          1,024 iexgbe  
11/13/09 02:28p <DIR>          1,024 icxgbe  
11/13/09 02:28p <DIR>          1,024 Ibutil64  
11/13/09 02:28p <DIR>          2,048 Gigabit  
11/13/09 02:29p <DIR>          1,024 FC4  
11/13/09 02:29p <DIR>          1,024 FC2  
11/13/09 02:29p <DIR>          1,024 FC  
      0 File(s)          0 bytes  
     15 Dir(s)
```

```
fs0:\EFI\HP\TOOLS\IO_CARDS> > cd fc2
```

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2>
```

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2> dir
```

```
Directory of: fs0:\EFI\HP\TOOLS\IO_CARDS\FC2
```

```
11/13/09  02:29p <DIR>          1,024  .
11/13/09  02:29p <DIR>          1,024  ..
03/29/07  06:45p                236,291 EfiUtil.pdf
10/14/05  01:46p                 655  fcd_update2.nsh
10/14/05  09:32p                 669  fcd_vpd.nsh
03/30/07  02:39p                50,176  ql2312ef.bin
03/30/07  02:39p                75,264  ql2312fw.bin
06/26/07  05:31p                 2,142  Readme.txt
06/26/07  05:42p                26,401  ReleaseNotes.txt
03/30/07  02:31p                122,368  efiiaux.drv
03/29/07  06:45p                304,068  EfiCfg.pdf
03/28/07  06:07p                 r      386,048  efiutil.efi
      10 File(s)      1,204,082 bytes
       2 Dir(s)
```

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2>
```

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2> fcd_update2.nsh  
fcd_update2.nsh> echo -off  
Update the EFI driver and RISC firmware on all the fibre  
channel adapters based on QLogic ISP23xx
```

Wait...

```
Fibre Channel Card Efi Utility  2.30  (3/28/2007)  
No adapters found.  
No adapters connected to driver, exiting...  
Exit status code: Not Found
```

If the screen does not indicate that every fibre channel adapters is updated, you may need to execute search all command from EFI shell, then repeat the procedure. Note that search all command may take a long time. On some systems, this command may fail because it is implemented only on some HP Integrity servers.

When the operation is complete, enter EFI shell command RESET.

```
fs0:\EFI\HP\TOOLS\IO_CARDS\FC2> exit
```

- The **NVRAMBKP Utility** allows you to backup all of your site customizations.
- Fills a common gap in backup strategies where the system console settings are not recorded.
- The alternative is documenting the console settings on paper and typing them in again when needed.
- There are two packages available:
 - nvrambkp_010301.zip Bootable CD-ROM ISO Image
 - nvrambkp_010301EFI.tar EFI package

- These packages can be downloaded through http and the World Wide Web using the following method:
 1. Connect to the Hewlett-Packard Support & Drivers home pages at: <http://www.hp.com/go/bizsupport>
 2. Select Download drivers and software.
 3. Enter the server model number (for example, BL870c) and then click >> to begin the search
 4. Select the appropriate product from the Product search result
 5. Select the Cross operating system (BIOS, Firmware, Diagnostics, etc.) section
 6. Select Utility
 7. Locate the appropriate utility package and click Download. (example [IPF Offline Diagnostics and Utilities](#)). These come out quarterly.

- The packages include instructions how to use the utility. These steps are (assuming you download the ISO image).
 1. Burn the ISO image to CD using a pc CD burning application
 2. Insert the CD into the Integrity DVD drive.
 3. Boot the Integrity into the EFI
 4. Copy the utility to an EFI partition on one or more of the VMS disks
 5. Run the application off of one of the read/write FS#'s to save the configuration.
- To recover the configuration you simply run the application from the EFI partition and use the restore qualifier..

- **Example Utility CD is mounted and therefore shows up as FS0:**

```
Shell>  
Map to the cd:
```

```
Shell> fs0:
```

```
fs0:\>
```

```
fs0:\> ls
```

```
Directory of: fs0:\
```

```
10/10/08 12:20p <DIR>          512  EFI  
          0 File(s)             0 bytes  
          1 Dir(s)
```

```
fs0:\> cd EFI
```

```
fs0:\EFI> ls
```

```
Directory of: fs0:\EFI
```

```
10/10/08 12:20p <DIR>          512  .  
10/10/08 12:20p <DIR>           0  ..  
10/10/08 12:20p <DIR>          512  HP  
          0 File(s)             0 bytes  
          3 Dir(s)
```

```
fs0:\EFI>
```

```
fs0:\EFI> cd HP
```

```
fs0:\EFI\HP> ls
```

```
Directory of: fs0:\EFI\HP
```

```
10/10/08  12:20p <DIR>          512  .
10/10/08  12:20p <DIR>          512  ..
10/10/08  12:20p <DIR>          512  FIRMWARE
          0 File(s)              0 bytes
          3 Dir(s)
```

```
fs0:\EFI\HP> cd FIRMWARE
```

```
fs0:\EFI\HP\FIRMWARE> LS
```

```
Directory of: fs0:\EFI\HP\FIRMWARE
```

```
10/10/08  12:20p <DIR>          512  .
10/10/08  12:20p <DIR>          512  ..
10/03/08  03:55p                1,609  notice.txt
10/03/08  12:12p             386,560  nvrambkp.efi
10/03/08  12:35p             6,938  nvrambkp_readme.txt
10/06/06  01:21a             590,336  TextViewer.efi
          4 File(s)          985,443 bytes
          2 Dir(s)
```

- Copy the Utility to File System 1 (system disk EFI partition)

```
fs0:\EFI\HP\FIRMWARE> cp nvrmbkp.efi fs1:
```

```
copying fs0:\EFI\HP\FIRMWARE\nvrmbkp.efi -> fs1:\nvrmbkp.efi
```

```
- [ok]
```

```
fs0:\EFI\HP\FIRMWARE> fs1:
```

```
fs1:\>
```

```
fs1:\> ls
```

```
Directory of: fs1:\
```

04/03/06	02:16p	<DIR>	2,048	EFI
10/03/08	12:12p		386,560	nvrmbkp.efi
		1 File(s)	386,560 bytes	
		1 Dir(s)		

```
fs1:\>
```

- Run utility `-a` (archive all) Archive name `-l` (log) Logfile name

```
fs1:\> nvrmbkp.efi -a testconfig -l test.log
```

```
Hewlett-Packard (R) IPF Non-Volatile Configuration Back-up Utility  
Version 01.03.01
```

```
Copyright (C) Hewlett-Packard. All rights reserved.
```

```
Operation: Archive to testconfig  
Archive Operation: Initiated
```

```
Time-Stamp (local): Tue Dec 16 05:01:12 2008
```

```
Please provide creator's name [upto 24 char]:
```

```
> Jim Mehlhop
```

```
Is [Jim Mehlhop] ok? [y/n] > y
```

```
Add Comments? [y/n] > n
```

```
Archive: System Information
```

```
Archive: System ID Information
```

```
Archive: EFI NVRAM Information
```

```
Archive: ROM NVRAM Information
```

```
Operation: Archive to testconfig Completed
```

```
fs1:\> dir
```

```
Directory of: fs1:\
```

04/03/06	02:16p	<DIR>	2,048	EFI
10/03/08	12:12p		386,560	nvrambkp.efi
12/16/08	12:01p		6,044	test.log
12/16/08	12:01p		2,489	testconfig

```
6 File(s)      406,664 bytes
```

```
1 Dir(s)
```

```
fs1:\>
```

- Run utility to restore setting `-r` (restore) Archive file name `-l` (log) Log file name

```
fs1:\> nvrmbkp.efi -r testconfig -l testrestore.log
```

```
Hewlett-Packard (R) IPF Non-Volatile Configuration Back-up Utility  
Version 01.03.01
```

```
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```

```
Operation: Restore from testconfig
```

```
Restore Operation: Initiated
```

```
Restore: ROM NVRAM Information
```

```
Restore: System ID Information
```

```
Restore: EFI NVRAM Information
```

```
Operation: Restore from testconfig Completed
```

```
System Reset: Issued!
```


MP MAIN MENU:

CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
HE: Main Help Menu
X: Exit Connection

[ia64] MP> **co**

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

- - - - - Prior Console Output - - - - -
Copyright (C) Hewlett-Packard. All rights reserved.

.
. .
System Reset: Issued!

- - - - - Live Console - - - - -

* ROM Version : 02.31

Question & Answer

*Presented by
Jim Mehlhop*

www.parsec.com

mehlhop@parsec.com

888-4-PARSEC

