HP Reactive Diagnostics Training for HP World – Offline Diagnostics (ODE)

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Agenda

1. Beginning Level
2. Intermediate Level
3. Advanced Level

Beginning Session

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Overview

Five Ws

1. What?
2. Why?
3. When?
4. Which?
5. Where?

What is ODE suite?

ODE

- ODE stands for Offline Diagnostics Environment
- Unlike the online exercisers, it is a point to point test.
- ODE does not depend on any Operating System (OS).
- Supported on any OS systems on the HP9000 and HP Integrity lines.
- It DOES depend on the CPU architecture:
  - PA (HP9000)
  - IPF (HP Integrity)

What is ODE suite?

Diagnostics

- The ODE Diagnostics Suite contains a set of diagnostics that test major components of a system and isolate the fault down to a failing Field Replaceable Unit(FRU).
- The following is a list of the major components in the ODE Diagnostics Suite:
  - Processor
  - Memory
  - Core Electronic chipset
  - Core IO
  - IO cards

What is ODE suite?

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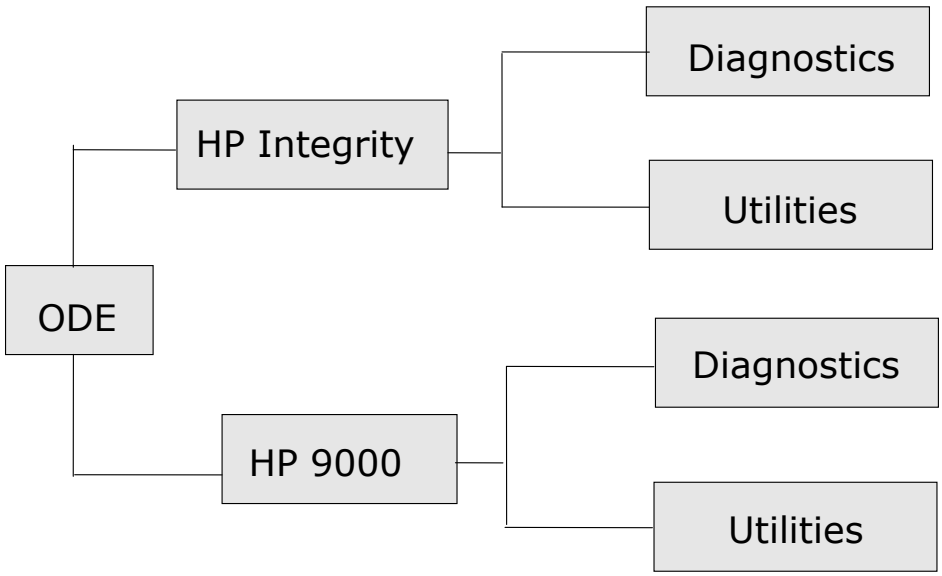
Utilities

- ODE Suite also contains a set of utilities that allows the user to view the system components and update firmware when system is offline.
- The major utilities consist of the following:
  - MAPPER: Display inventory/configuration of a system
  - DFDUTIL: updates SCSI disk drive firmware
  - COPYUTIL: offline backup/restore tool for boot devices; use image copy instead of file system copy.
  - FCFUPDATE: updates IO card firmware on supported cards

What is ODE suite?

Composition



Why use ODE suite?

Why

- ODE contains a comprehensive test coverage of the system.
- Every server and workstation shipped must pass the ODE tests.
- Speed.
- ODE is only choice when system is down.

When to use ODE suite?

When

- System crash
- OS is not bootable
- During reboot cycle

Which ODE tools to use?

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Which

- When you have more than 20 hrs, run the entire suite
- When time is limited, run the selected diagnostics tailored to the component suspected of failure
  - ex. If you notice that your LAN card is not working, run IOTEST to confirm that the card is indeed bad.

Where to get ODE suite?

Where

- It is included with the CD when the system is purchased
- The same diagnostics can be used from the smallest workstation to the biggest server.
- Getting update for offline tools
  - IPF: **http://www.hp.com/support/itaniumservers**
  - PA: **http://www.software.hp.com/ER_products_list.html**

How?

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How

- How much do ODE tools cost?
  - IPF – free
  - PA – part of support contract
- How to get it?
  - Included in a CD
- How to find support?
  - Local HP response center
- How to run it?
  - Stay tuned for the intermediate/advanced session

Intermediate Session

Interface

- Command line interface
  - User can select specific tests and/or utilities to execute on a specific hardware module
- Menu-driven interface
  - User can specify the hardware module to be tested
  - Exercise or diagnose hardware unit specified by user
  - Performs specific utility-type operations such as firmware download
- eDIAG
  - User can select from 2 levels of coverage and eDIAG will automatically launch the appropriate diagnostics.

Interface

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Table

	Command Line	Menu Interface
HP 9000 – 32bit	☑	☑
HP 9000 – 64bit	☑	
HP Integrity	☑	☑

Launch for HP 9000 Systems

Overview

- Support Plus Media
  - Boot the system from the Support Plus Media
- System disk
  - Boot ODE from the system disk
- Boot from LAN
  - Ability to designate on system as the boot server, and have all systems that desire to run diagnostics boot from the boot server.

Launch for HP Integrity Systems

Overview

- eDiag CD
  - Boot the system from the eDiag CD
- System disk
  - Boot ODE from the system disk
- Boot from LAN
  - Ability to designate on system as the boot server, and have all systems that desire to run diagnostics boot from the boot server.

eDiag Invention

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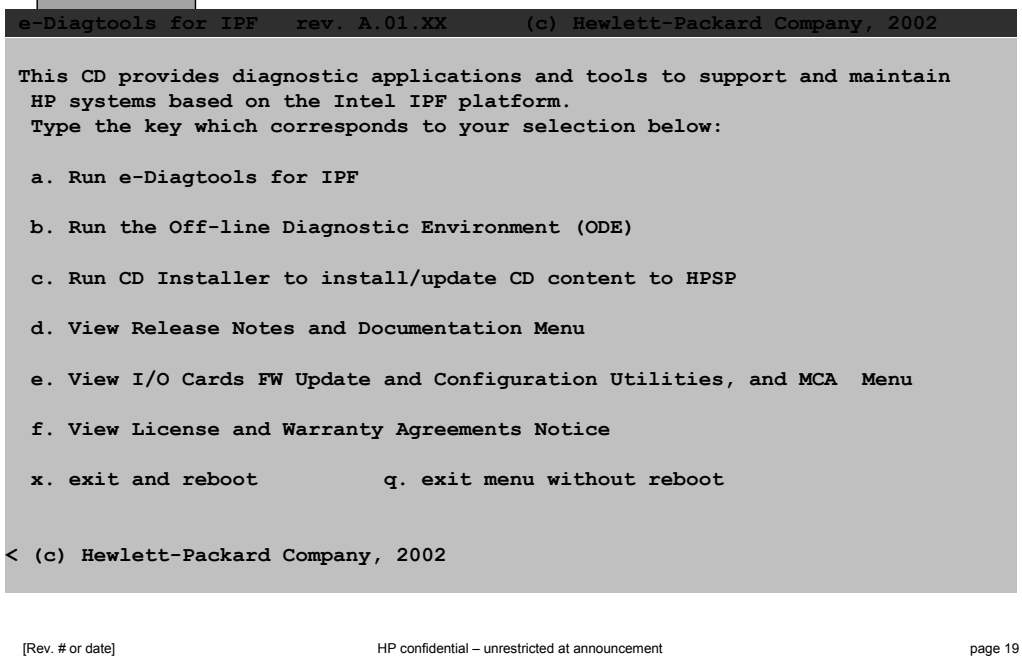
eDIAG

- ODE is traditionally used in HP manufacturing.
- Command line interface with script automation in manufacturing.
- eDIAG – Menu interface + ease of use allow end customers to be able to easily run ODE diagnostics in HP Integrity systems.
- Walk you through the eDIAG menu and show you what you can do with it.

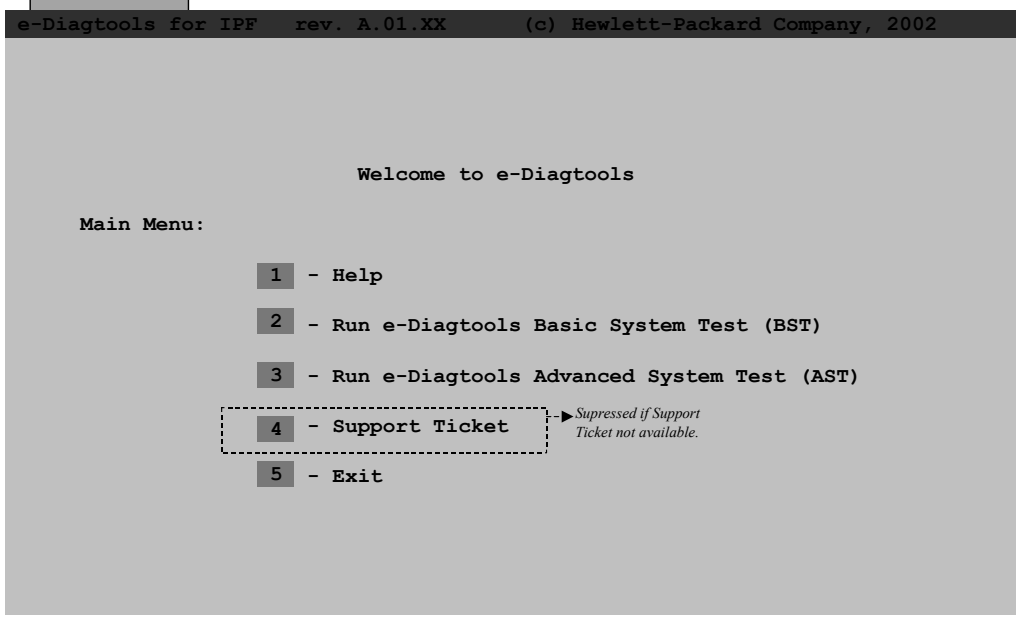
Set up

- Put the eDIAG CD in the CDROM.
- Bring the system offline to EFI shell menu.
- Select the option to boot from CD.

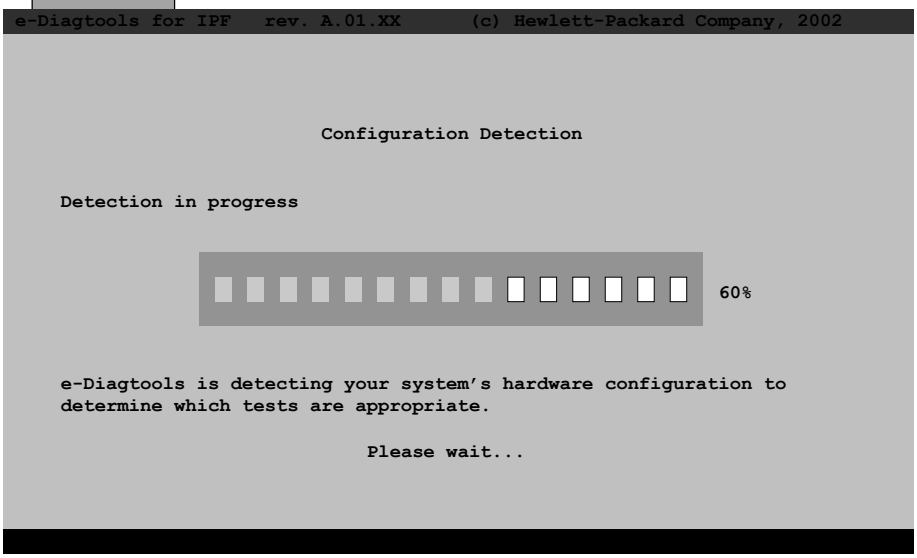
eDiag main menu



Menu for a) run eDiag tools



System detection

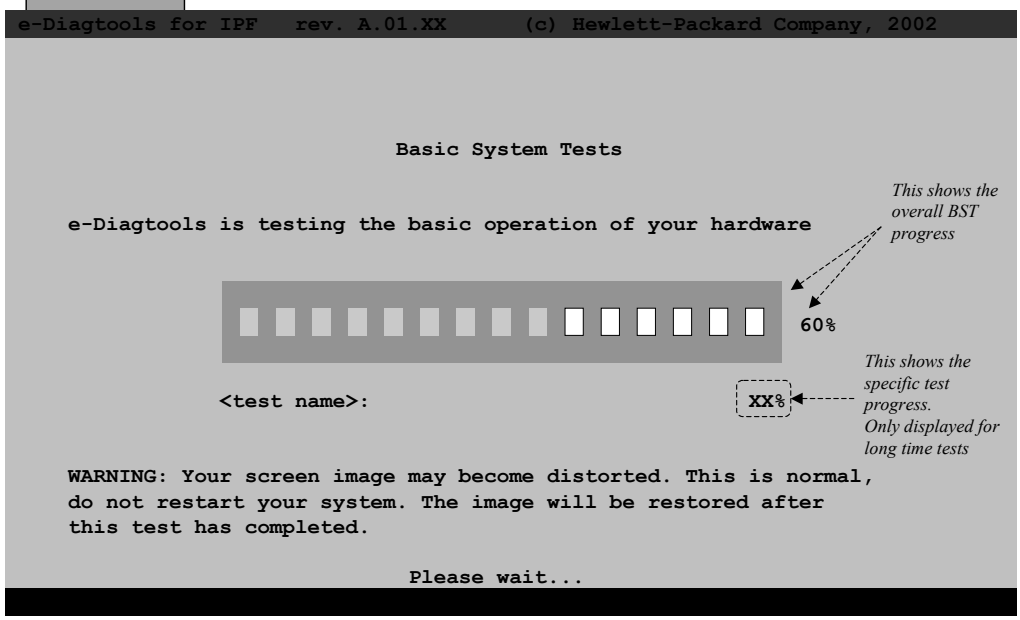


Found hardware components


```
e-Diagtools for IPF   rev. A.01.XX      (c) Hewlett-Packard Company, 2002

                        Configuration Description

System Identification: HP - XPeak

Hardware Components
-------------------

Processor
Cache Memory
Chipset
System Memory
NIC
IDE Controller
USB Controller
Serial Controller
SCSI_Controller
Storage Devices

  1              2              3              4
```

e-Diagtools has retrieved the system information and detected the key hardware components listed in this window. Now you can test your hardware, including these key components.

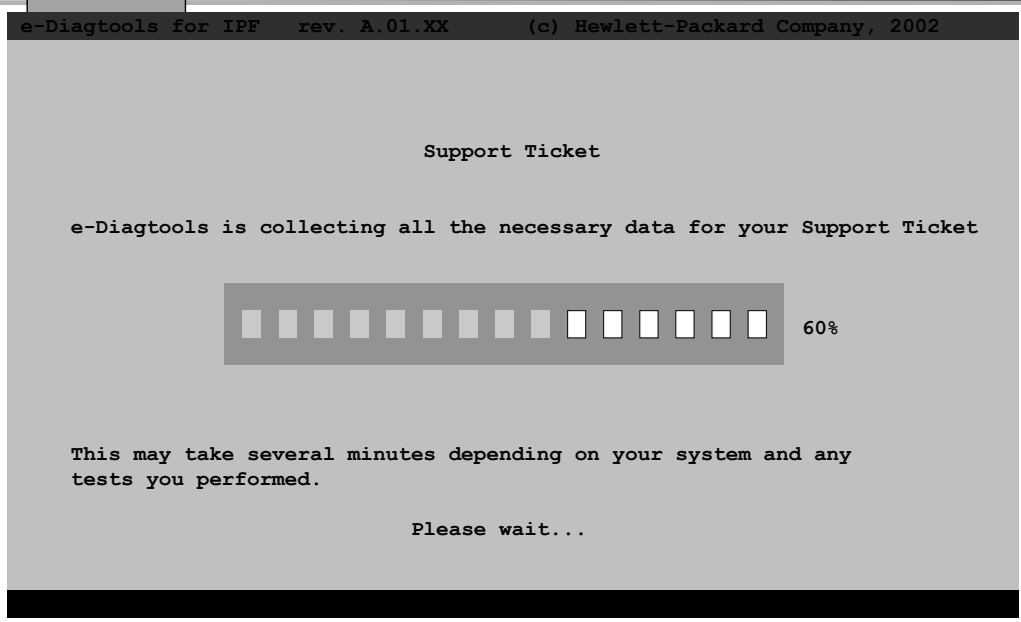
Test Progress Status



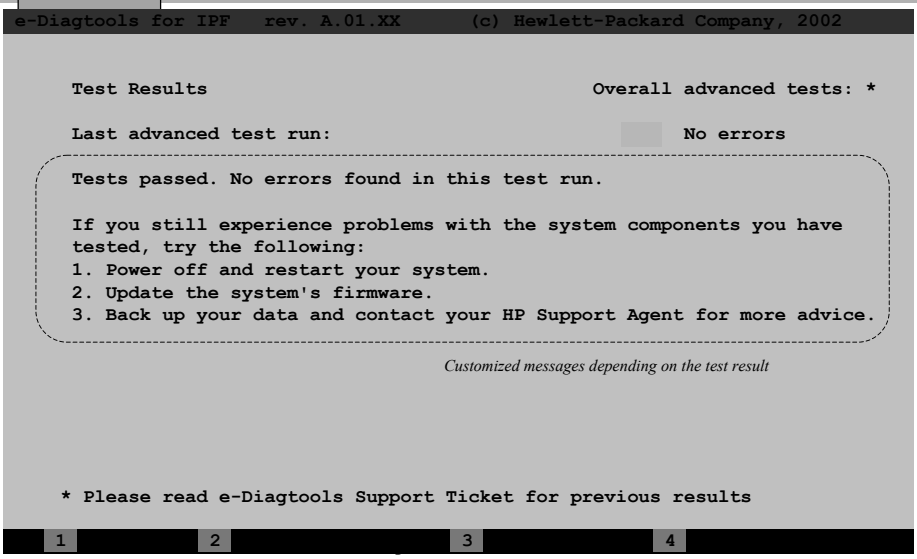
This shows the overall BST progress

This shows the specific test progress. Only displayed for long time tests

Support Ticket Generation

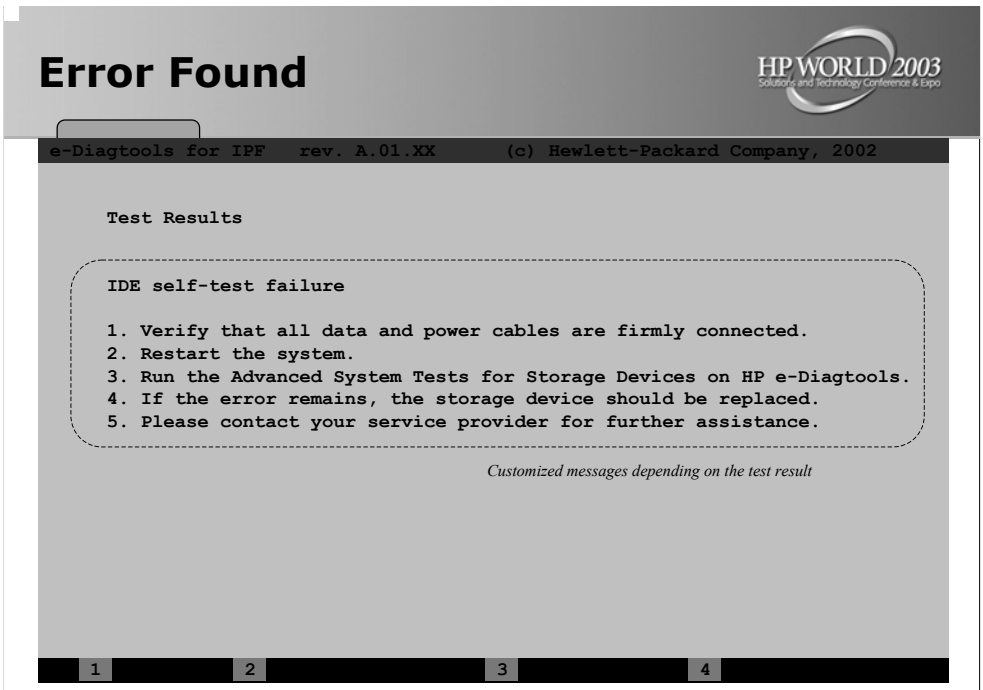


No Errors



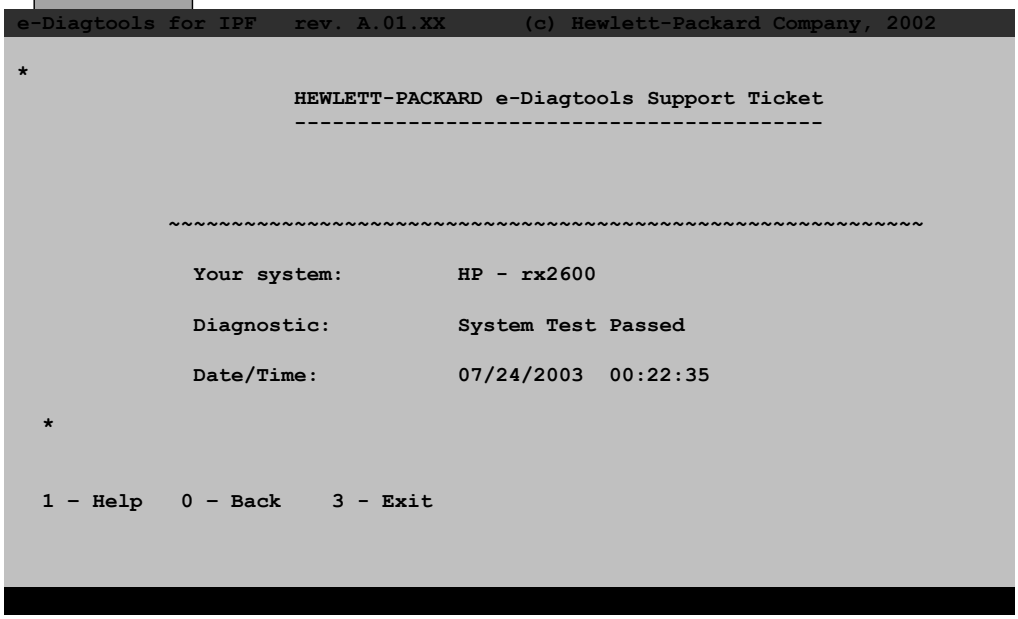
Customized messages depending on the test result

Error Found

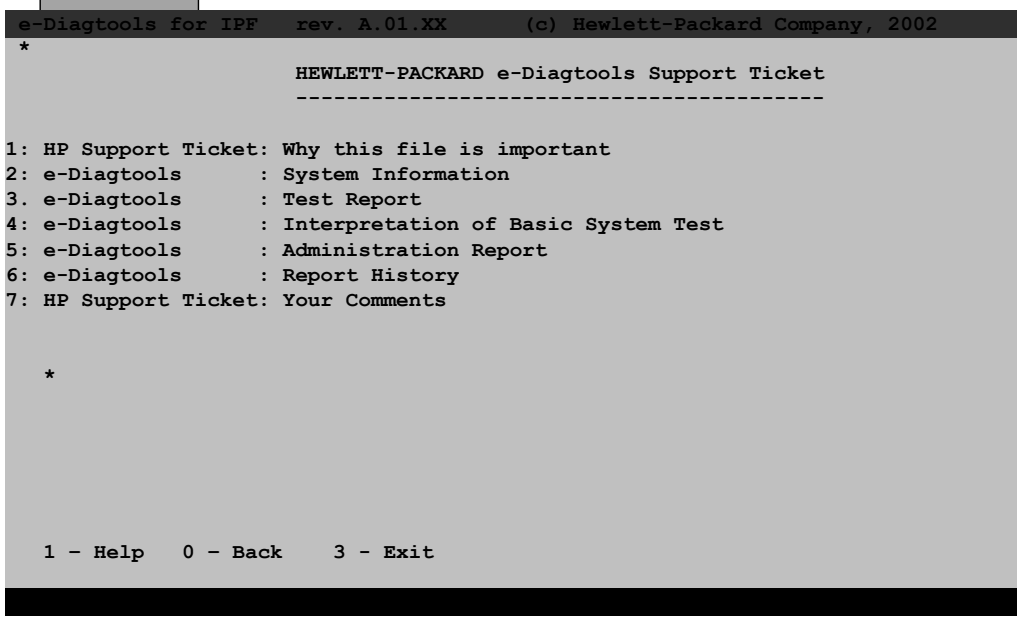


Customized messages depending on the test result

Support Ticket



Support Ticket (Cont.)



Support Ticket (Cont.)

Pass

```
e-Diagtools for IPF   rev. A.01.XX      (c) Hewlett-Packard Company, 2002
 *
                      HEWLETT-PACKARD e-Diagtools Support Ticket
                      ------------------------------------------

3. e-Diagtools      : Test Report


   [Processor]
   Processor  : OK
   TEST PASSED

   [Cache memory]
   Cache memory  : OK
   TEST PASSED

   [Chipset]                                                          *
   Chipset       : OK
   TEST PASSED

   *
   1 - Help   0 - Back    3 - Exit
```

Support Ticket (Cont.)

Fail

```
e-Diagtools for IPF   rev. A.01.XX      (c) Hewlett-Packard Company, 2002
                      HEWLETT-PACKARD e-Diagtools Support Ticket
                      ------------------------------------------
3. e-Diagtools      : Test Report

[Chipset]
Chipset       : Failed
ERROR 0505 IN SECTION 005 WHILE TESTING Mercury 0  for Ext Int# 16
Error Code: A104
ERROR 0505 IN SECTION 005 WHILE TESTING Mercury 1  for Ext Int# 16
Error Code: A104
ERROR 0505 IN SECTION 005 WHILE TESTING Mercury 2  for Ext Int# 16
Error Code: A104
ERROR 0505 IN SECTION 005 WHILE TESTING Mercury 3  for Ext Int# 16
Error Code: A104
TEST FAILED
-------------------------------------------------------
4: e-Diagtools      : Interpretation of Basic System Test
-------------------------------------------------------
[Defective Components]
PLUTO's External interrupt test failure
   *
   1 - Help   0 - Back    3 - Exit
```

Advanced Session

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Overview

- Command Line Interface for expert users
- Provides control and flexibility
- Allows users to run ODE utilities
- PA64 only supports Command Line Interface

eDiag Main Menu

ODE Command Line Interface


```
e-Diagtools for IPF   rev. A.01.XX      (c) Hewlett-Packard Company, 2002

*****************************************************************************
******                                                                 ******
******             Offline Diagnostic Environment                      ******
******                                                                 ******
******  (C) Copyright Hewlett-Packard Co 1993-2003                     ******
******                    All Rights Reserved                          ******
******                                                                 ******
******  HP shall not be liable for any damages resulting from the      ******
******  use of this program.                                           ******
******                                                                 ******
******                TC  Version B.00.11                              ******
******                SysLib Version B.00.06                           ******
******                Mapfile Version B.01.05                          ******
******                                                                 ******
*****************************************************************************

Type HELP for command information.
ODE>
```

MAPPER first

MAPPER

- It's a good practice to always run MAPPER before you run any diagnostics. Running MAPPER first identifies which components exist on the system.
- Check the MAPPER output to determine obvious inconsistencies.

Common ODE Commands

ODE

COMMAND	FUNCTION
CLEARLOG	Clears the contents of a message log
Control-Y/C	Abort a TC command or stop execution of a TM
DEBUG	Enable debug print off
DISPLOG	Display a message log
DUMP	Read and display memory locations
ERRNUM	Set/Display the state of the ERRNUM flag
ERRONLY	Enable printing of errors only
ERRPAUSE	Set/Display the state of the ERRPAUSE flag
ERRPRINT	Set/Display the state of the ERRPRINT flag

Common ODE Commands (Cont.)

ODE

EXIT	Return to higher level prompt
HELP	Display information on TC and TM commands
LOGSIZE	Set the size of a message log
LOOP	Set the loop counter
LS	List ODE modules and data files
RESET	Reinitialize a TM and reset ODE environment variables
RESUME	Continue execution of a TM that was paused
RUN	Start execution of a TM
SAVE	Save error log to a file. OUTPUT.TXT
UNLOAD	Remove a TM from memory

Available tools on ODE

Availability

```
ODE> ls

         Modules on this boot media are:

filename      type   size     created   description
-------------------------------------------------------------------------------
CIODIAG2.EFI  TM     643072   07/09/2003  Core IO diagnostic
CPUDIAG.EFI   TM     741376   07/09/2003  Processor diagnostic
IODIAG.EFI    TM     144384   07/09/2003  Runs selftests on I/O modules
MAPPER.EFI    TM     1654272  07/09/2003  System mapping utility
MEMDIAG.EFI   TM     263168   07/09/2003  Memory diagnostic
PERFVER.EFI   TM     817664   07/09/2003  Runs ROM-based selftests on
peripherals
PLUTODIAG.EFI TM     514560   07/09/2003  SBA/LBA diagnostic
COPYUTIL.EFI  TM     1041920  07/09/2003  Disk-to-tape copy utility
DFDUTIL.EFI   TM     850432   07/09/2003  Disk firmware download utility
FCFUPDATE.EFI TM     608256   07/09/2003  FW Update Utility for Fibre Channel

ODE> mapper
```

MAPPER Output

MAPPER

```
MAPPER> run
STARTING EXECUTION OF MAPPER
Date : 03/06/2002  Time : 15:25:44

System Identification:
OEMId        =HP
Mfr Model ID =  Everest
ACPI version =2

Processor Identification:
                                                Processor          L3
 Socket  Status      Vendor      Family         Type      Speed    cache
 ------  ------      ----------  ------------   -------   -----    -----
 cpu 0   Active      INTEL   Itanium Processor  Central   1.500GHz  6144KB
 cpu 1   Active      INTEL   Itanium Processor  Central   1.500GHz  6144KB
 cpu 2   Active      INTEL   Itanium Processor  Central   1.500GHz  6144KB
 cpu 3   Active      INTEL   Itanium Processor  Central   1.500GHz  6144KB

Memory Device Identification:
     Type      Location               Size(MByte)
     HP RAM    Ext 0-DIMM 0A           256
     HP RAM    Ext 0-DIMM 0B           256
     HP RAM    Ext 0-DIMM 1A           256
     HP RAM    Ext 0-DIMM 1B           256
Total Memory found: 1024 MB
```

MAPPER Output (Cont.)

MAPPER

```
Cache Identification:
Cache Level    Instruction(KBytes)   Data(KBytes)
  0               16                   16
  1               N/A                  256
  2               N/A                  6144

Configuring I/O...
Please wait.

Looking for SCSI devices via LSI SPT device driver.....
Looking for IDE devices via IDE device driver.....
Looking for USB devices via USB device drivers.....
```

MAPPER Output (Cont.)

MAPPER

```
 SubSys
                                                VENDOR DEVICE Vendor SUBSYS REV
PATH        COMPONENT NAME                      ID     ID     ID     ID     ID
----------- ----------------------------------- ------ ------ ------ ------ -----
0           System Bus Adapter                  103CH  1229H                 0022H
0/0         Local Bus Adapter                   103CH  122EH                 0032H
0/0/1/0
    USB Controller                              1033H  0035H  1033H  0035H  0041H
0/0/1/0.1.0             USB SILITEK USB Keyboard and Mouse (Keyboard)  01.20
0/0/1/0.1.1             USB SILITEK USB Keyboard and Mouse (Generic HID device)
01.20
0/0/1/1
    USB Controller                              1033H  0035H  1033H  0035H  0041H
0/0/1/1.1.0             USB Logitech N43 (Mouse)                      04.01
0/0/1/2
    USB Controller                              1033H  00e0H  1033H  00e0H  0002H
0/0/2/0
    IDE Controller                              1095H  0649H  1095H  0649H  0002H
0/0/2/0.0.0             IDE ATAPI CDROM DW-224E                       C.0B
0/0/3/0
    Ethernet Controller                         8086H  1229H  103cH  1274H  000DH
```

MAPPER Output (Cont.)

MAPPER

```
0/1        Local Bus Adapter                  103CH  122EH                0032H
0/1/1/0
    SCSI Bus Controller                       1000H  0030H  1000H  1000H  0007H
0/1/1/0.0.0              SCSI HP 36.4G ST336607LC                         HPC3
0/1/1/0.1.0              SCSI HP 36.4G ST336607LC                         HPC3
0/1/1/1
Ethernet Controller                      14e4H  1645H  103cH  12a4H  0015H
0/2        Local Bus Adapter                  103CH  122EH                0032H
0/6/1/0
    SCSI Bus Controller                       1000H  0021H  103cH  1330H  0001H
0/7        Local Bus Adapter                  103CH  122EH                0032H
0/7/1/0
    Communications Controller                 103cH  1290H  103cH  1291H  0001H
0/7/1/1
 Serial Controller                         103cH  1048H  103cH  1282H  0003H
0/7/2/0
    VGA or 8514 Controller                    1002H  5159H  103cH  12abH  0000H
IO map Done...

MAPPER execution complete
Date : 07/24/2003  Time : 01:13:20

Exiting...

RUN COMPLETED.
ODE>
```

Launching CPUDIAG

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CPUDIAG

```
ODE> cpudiag

********************************************************************************
******                                                                    ******
******                              CPUDIAG                               ******
******                                                                    ******
******          Copyright (C) 2002 by Hewlett-Packard Company             ******
******                        All Rights Reserved                         ******
******                                                                    ******
******   HP shall not be liable for any damages resulting from the        ******
******   use of this program.                                             ******
******                                                                    ******
******                           Version B.00.51                          ******
******                                                                    ******
********************************************************************************
Type HELP for command information.

Please wait, detecting if a MP system....
Initializing MP Protocol Interface....
Done
Number of Processors = 4
CPUDIAG>
```

Section/Loop Command

CPUDIAG

```
CPUDIAG> sec 1/2
CPUDIAG> loop 2
CPUDIAG> run
STARTING EXECUTION OF CPUDIAG

SECTION 001
general register Test Section

Started Date : 7/24/2003  Time : 16:31:24
Sent AP(3) Start Message
Sent AP(2) Start Message
Sent AP(1) Start Message
Finished Date : 7 /24/2003  Time : 16:31:24

SECTION 002
Bank register Test Section

Started Date : 7/24/2003  Time : 16:31:24
Sent AP(3) Start Message
Sent AP(2) Start Message
Sent AP(1) Start Message
Finished Date : 7 /24/2003  Time : 16:31:24
END OF LOOP 1
```

Section/Loop Command (Cont.)

CPUDIAG

```
STARTING EXECUTION OF CPUDIAG
SECTION 001
general register Test Section

Started Date : 7/24/2003  Time : 16:32:34
Sent AP(3) Start Message
Sent AP(2) Start Message
Sent AP(1) Start Message

Finished Date : 7 /24/2003  Time : 16:32:34

SECTION 002
Bank register Test Section

Started Date : 7/24/2003  Time : 16:32:34
Sent AP(3) Start Message
Sent AP(2) Start Message
Sent AP(1) Start Message

Finished Date : 7 /24/2003  Time : 16:32:34

END OF LOOP 2
RUN COMPLETED.
CPUDIAG>
```

Proc Command

CPUDIAG

```
CPUDIAG> proc 0/1
CPUDIAG> loop 1
CPUDIAG> run

STARTING EXECUTION OF CPUDIAG

SECTION 001
general register Test Section

Started Date : 7/24/2003  Time : 16:35:35
Sent AP(1) Start Message

Finished Date : 7 /24/2003  Time : 16:35:35
 SECTION 002
Bank register Test Section

Started Date : 7/24/2003  Time : 16:35:35
Sent AP(1) Start Message

Finished Date : 7 /24/2003  Time : 16:35:35

RUN COMPLETED.
CPUDIAG>
```

Master Command

CPUDIAG

```
CPUDIAG> master 1
CPU:ID 1 is now Master.
CPUDIAG> sec 20

CPUDIAG> run
STARTING EXECUTION OF CPUDIAG

SECTION 020
MP Purge Test Section

Started Date : 7/24/2003  Time : 17:48:20
Sent AP(1) Start Message

Master CPU: 1
Slave CPU: 0
Finished Date : 7 /24/2003  Time : 17:48:20

RUN COMPLETED.
CPUDIAG>
```

Error Messages

Error

```
CPUDIAG> proc 0/3
CPUDIAG> run
STARTING EXECUTION OF CPUDIAG

SECTION 001
general register Test Section

Started Date : 7/24/2003  Time : 18:4 :11

Sent AP(3) Start Message
Sent AP(2) Start Message
Sent AP(1) Start Message
2 0 0x000281 0x1880000000000340 Processor Bus Check
2 0 0x00028E 0x000000003FFFCDB0 Processor Mod Err Info Target ID

ERROR 1000 IN SECTION 001

CMC was detected!
CPUDIAG PAUSED>
```

DFDUTIL (thru system disk)

DFDUTIL

- Need to copy ODE suite to the HPSP
- Download the latest disk firmware from HP support
- Store the firmware in the HPSP directory
- Launch ODE from system disk by issuing ODE at the shell prompt.
  - Ex. fs0:\EFI\HP\DIAG\ODE>ode

DFDUTIL Banner

DFDUTIL

```
**************************************************************************
******                                                              ******
******             Offline Diagnostic Environment                   ******
******                                                              ******
******  (C) Copyright Hewlett-Packard Co 1993-2003                  ******
******                    All Rights Reserved                       ******
******                                                              ******
******  HP shall not be liable for any damages resulting from the   ******
******  use of this program.                                        ******
******                                                              ******
******                TC  Version B.00.11                           ******
******                SysLib Version B.00.06                        ******
******                Mapfile Version B.01.05                       ******
******                                                              ******
**************************************************************************

Type HELP for command information.
ODE> dfdutil
```

DFDUTIL Warning Message

DFDUTIL

```
*******************************************************************************
******                                                                   ******
******                            DFDUTIL                                ******
******                                                                   ******
******       Copyright (C) 2001-2003 by Hewlett-Packard Company          ******
******                        All Rights Reserved                        ******
******                                                                   ******
******   HP shall not be liable for any damages resulting from the       ******
******   use of this program.                                            ******
******                                                                   ******
******                          Version B.00.11                          ******
******                                                                   ******
*******************************************************************************

Type HELP for command information.
Entering DFD_entry()

*******************************************************************************
*                             WARNING!                                        *
*                            ---------                                        *
* DFDUTIL must have exclusive access to all the disks you wish to update.     *
* If you are in a multihost environment such as Switchover & ServiceGuard,    *
* make sure all other hosts are powered down before continuing.               *
*******************************************************************************
```

Detected Disks

DFDUTIL

```
Press <Return> to continue; Type h for help
Looking for SCSI devices via LSI SPT device driver.....

The Shared Library <SLMOD.EFI> is loaded.
... <23> modules found

Warning: CONFIGDATA is not loaded.
*************************************************************************
*                        HP Supported Disks Found                       *
*************************************************************************
Indx  Path              Product ID                        Bus    Size   Rev
--- ------------------- --------------------------------- ------ ------ ------
0   0/1/1/0.0.0
                        SCSI HP 18.2G ATLAS10K3_18_SCA    SCSI   18. GB   HP05
1   0/1/1/0.1.0
                        SCSI FUJITSU  MAJ3364MC           SCSI   36. GB   HP07
2   0/1/1/1.2.0
                        SCSI HP 18.2G ATLAS10K3_18_SCA    SCSI   18. GB   HP05
Legend:
Indx = Index number used for referencing the device
Rev  = Firmware Revision of the device

Note:  Due to different calculation methods used, the size
       of the device shown is only a rough approximation.
Create a firmware file list? (q for quit) [default for y]
```

Detected Firmware

DFDUTIL

```
Create a firmware file list? (q for quit) [default for y]

Please wait while I search for all the firmware files.
Note: This may take a while if you are booting from tape.
numFile = 4
..

*****************************************************************************
*                    Firmware Files Found (not disks)                       *
*****************************************************************************
File name         Intended Product ID                       Rev.    Size
---------------- ---------------------------------------- ------ --------
MAJ3364MC.HP08.frm rm                                        HP08   233472

Legend:
File name           = name of the firmware file
Intended Product ID = firmware file's intended product name
Rev.                = firmware Revision of the firmware file
Size                = exact byte size of the firmware image
eXiting DFD_entry()

DFDUTIL>
```

Update Firmware

DFDUTIL

```
DFDUTIL> download MAJ3364MC.HP08.frm 1
About to work on (1) range of disks w/MAJ3364MC.HP08.FRM firmware file.

*************************************************************
* Downloading firmware to a disk MAY destroy the data on the *
* disk.  Make sure you have made the necessary backups.      *
*************************************************************

*************************************************************
* About to download firmware MAJ3364MC.HP08.FRM onto disk(s): 1.
*************************************************************

Do you wish to continue with the download (y/[n]/q)? y

*************************************************************
*                          WARNING!                         *
* DO NOT INTERRUPT THIS PROCESS OR THE DISK MAY BE DAMAGED!  *
*************************************************************
```

Update Finished

DFDUTIL

```
************************************************************
* Please wait while disk 1 at 0/1/1/0.1.0             is updated
* from revision HP07 to HP08.
************************************************************
Please wait a few minutes for file verification of the downloaded firmware ....
Please wait while the disk ROMs are updating.

30 seconds left    ..........
20 seconds left    ..........
10 seconds left    ..........
Done!

************************************************************
*              Firmware downloaded SUCCESSFULLY!            *
*              --------------------------------             *
* Power off & on disk drive(s) to activate the new firmware. *
************************************************************

DFDUTIL>
```

Questions?

Interex, Encompass and HP bring you a powerful new HP World.