Offline Diagnostics Environment Administrator's and User's Guide

HP Part Number: 5992-6605
Published: April 2009
Edition: 2

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About This Document

The Offline Diagnostics Environment (ODE) provides a support tools platform that enables you to troubleshoot a system that is running without an operating system. With the ODE you can test systems that cannot be tested using the online tools.

Intended Audience

This document is intended for HP service and support personnel and system administrators who manage the following systems:

- HP Integrity servers and workstations based on the Itanium® processor
- HP 9000 servers and workstations

Administrators are expected to have knowledge of operating system concepts, commands, and configuration.

This document is not a tutorial.

New and Changed Information in This Edition

This is a new manual. Some of the information it contains came from the following documents and supersedes those documents:

- *ODE: Overview*
- *Overview Guide: Itanium Processor Family (IPF) Offline Diagnostics and Utilities CD*
- *Overview Guide: PA-RISC HP 9000 Offline Diagnostics Environment CD*
- *ODE: Frequently Asked Questions*

Document Organization

This document is organized as follows:

Chapter 1 “ODE Overview”	Provides an overview of the offline diagnostics environment.
Chapter 2 “Using ODE on Integrity Servers and Itanium Workstations”	Describes the ODE tools for the Integrity Systems and Itanium workstations and tells you how to obtain and install them.
Chapter 3 “Using ODE on HP 9000 Systems”	Describes the ODE tools for HP 9000 systems and tells you how to obtain and install them.
Chapter 4 “Performing Common ODE Tasks”	Provides examples of using ODE tools to perform common tasks and how ODE reacts when it detects a problem.

Typographic Conventions

This document uses the following typographical conventions:

`Command`	A command name or qualified command phrase.
`Variable`	The name of a placeholder in a command or other syntax display that you replace with an actual value.
`Filename`	The name of a file or directory.
`User input`	Commands and other text that you enter.
NOTE	A note contains additional information to emphasize or supplement important points of the main text.

Related Information

The following Web sites can provide you with additional information about the ODE and system diagnostics in general:

- For more information about diagnostic tools and concepts:
  www.hp.com/go/hpux-diagnostics-docs
- To read about changes in the latest CD release:
  www.hp.com/go/hpux-diagnostics-offline-docs
- To order the latest version of the ODE CD or to download an image from which you can create your own CD:
  www.software.hp.com
- For a suumary of how to use the ODE tools, a *Quick Reference Guide* is available in PDF format at the following Web site:
  www.hp.com/go/hpux-diagnostics-offline-docs

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1 ODE Overview

This chapter provides information on the following topics:

- The purpose of ODE and when to use it.
- ODE limitations.

Offline Diagnostics Environment

The Offline Diagnostics Environment (ODE) provides a support tools platform that enables you to troubleshoot a system that is running without an operating system.

With the ODE you can test systems that cannot be tested using online tools. The offline environment is also useful for certain types of testing, such as when booting the system first is undesirable, as is often the case with manufacturing applications.

ODE tools are available for troubleshooting problems on the Itanium processor family and on HP 9000 systems (also referred to as PA-RISC systems). The way you use these tools is similar on both types of platforms. The syntax and operation is the same; the primary differences are the names of the tools and the way that ODE is launched. It does not depend on any operating system.

The ODE provides two user interfaces:

- The command-line interface lets you select specific tests and utilities to execute on specific hardware modules.

  Use the command-line interface option if you are an advanced user and familiar with the ODE. The command line interface allows you more control over the tests that you want to conduct.

- The menu-driven interface, which is only available on 32-bit systems, lets you specify the hardware module for the tests you want to run. ODE selects the appropriate tests to execute on the specified module.

  Use the menu-driven interface if you are unfamiliar with the command-line interface or with ODE. When you select a module to test, the menu-driven interface is designed to choose and then execute the appropriate tests for that module.

ODE has a distributed architecture that consists of several modules. Each module has a specific function and uses well defined protocols to communicate with other modules. ODE includes the following modules:

- Test Controller

  Acts as a user interface and launches the execution of the Test Modules.

- Test Modules

  Diagnostic or utility programs that execute within ODE.

  These modules exercise or diagnose the user-specified hardware component or perform operations such as downloading firmware. The test modules are provided for the following components:

  — Processor
  — Memory
  — Core electronic chipset
  — Core I/O
  — I/O cards
  — Peripheral devices

- System Library (SysLib)

  A set of common routines used by both the Test Controller and Test Modules.

These routines perform functions such as I/O, string parsing, and system control.

The ODE tools are provided on CDs for Itanium systems (See "Obtaining the Latest Version of ODE" (page 9)) and HP 9000 systems (See "Obtaining the Latest Version of ODE for HP 9000 Systems" (page 14)). You can order the CDs free or you can download the CD image and burn your own CD.

ODE Limitations

The Offline Diagnostics Environment cannot be used on all systems and the way it is distributed has recently changed for HP 9000 systems. The following sections describe these limitations.

V-Class Systems

Offline diagnostics on V-Class systems are different from offline diagnostics on all other HP systems.

The offline diagnostics tools for V-Class systems are not supplied on the *Offline Diagnostics and Utilities* CD. Instead, they are run from the V-Class Test Station. For procedures and details, see the V-Class hardware documentation.

RX4610 and RX9610 systems

The Offline diagnostics tools for RX4610 and RX9610 systems systems are different from the ODE diagnostics provided for other HP Integrity servers and Itanium-based workstations. For more information, go to the following Web site:
www.hp.com/go/hpux-diagnostics-offline-docs

Support Plus Media for HP 9000 systems

ODE for HP 9000 systems was distributed on the Support Plus Media until the June 2005 release (PA0506). Since the September 2005 release (PA0509), ODE is distributed only on the *HP 9000 Offline Diagnostics Environment* CD-ROM.

2 Using ODE on Integrity Servers and Itanium Workstations

ODE tools for HP Integrity servers and HP workstations based on the Itanium processor are distributed on the *HP Integrity Servers and Itanium Workstations Offline Diagnostics and Utilities CD-ROM*. In addition to the ODE tools, the CD provides other utilities that are helpful in identifying problems with your Integrity server or Itanium workstation.

This chapter describes the ODE tools for Integrity Systems and Itanium worksations and tells you how to obtain and install them. See "Non-ODE Tools on the CD" for information about non-ODE tools included on the CD. The following topics are discussed:

- An overview of the ODE tools for Integrity systems and Itanium workstations.
- How to obtain a CD containing the ODE or to create your own CD using an image downloaded from the Web.
- How to run the ODE either from CD or from the HP Service Partition (HPSP).

ODE Tools Overview

The ODE tools are located in the `\EFI\HP\DIAG\ODE` directory on the CD. The following is a partial list of the diagnostics and utilities provided under ODE. The complete list is documented in the `\EFI\HP\DIAG\DOCUMENTATION\Prod_Desc_All` file on the CD.

`CIODIAG2`	Core I/O diagnostic tool
`CPUDIAG`	CPU diagnostic tool
`DFDUTIL`	Firmware update utilities for SCSI disks
`FCFUPDATE`	Fibre Channel firmware update tool.
`IODIAG`	Diagnostic tool for HP Tachyon Fibre Channel board
`MAPPER`	Utility for mapping the physical layout of the SPU and its peripherals
`MEMDIAG`	Memory diagnostic tool
`PCIUTIL`	PCI HBA firmware update utility
`PERFVER`	Utility to run supported SCSI/IDE self-tests on devices
`PLUTODIAG`	Diagnostic tool for Pluto and Mercury Core Electronics Complex (CEC)

Obtaining the Latest Version of ODE

The *HP Integrity Servers and Itanium Workstations Offline Diagnostics and Utilities CD-ROM* is shipped with all Integrity systems and Itanium workstations. This CD is updated quarterly, at which time new functions and features may be added, new hardware diagnostics may be incorporated, and performance may be enhanced.

You can order a CD for free from the HP Software Depot Web page or you can download an image of the CD to create your own CD. The following sections describe these alternatives.

To read about changes in the latest CD release, go to the following Web site:

www.hp.com/go/hpux-diagnostics-offline-docs

Ordering a CD

To order a CD free of charge from HP Software Depot, follow these steps:

1. Open a browser and navigate to the HP Software Depot Web main page:

   http://www.software.hp.com
2. In the Search field, type `ipf offline` and click the search button (>>). The page displays current and previous versions of the CD.
3. Select the appropriate version.

4. Click **Receive for Free** and follow the instructions to complete your order.

Downloading an Image to Create a CD

You can download a master `.iso` image file to create your own CD using your CD burner and software.

The following steps describe how to download a Zip file that contains the image.

1. Open a browser and navigate to the HP Support and Drivers Web site:

   http://welcome.hp.com/country/us/en/support.html
2. Under the section **Select a product category**, click **Servers**.
3. Select **Integrity Servers and Integrity Blade Servers**.
4. Select the desired server series.
5. Select the desired server product.
6. On the left pane of the screen, under the heading **Tasks for my selected product**, select **Download drivers and software**.
7. Under **Select operating system**, select **Cross operating system (BIOS, Firmware, Diagnostics, etc.).**
8. On the **Download drivers and software** page, go the **Diagnostic** section and select **IPF Offline Diagnostics and Utilities** for the version you want to download.
9. Select the Release Notes tab. Read the Release Notes before downloading the CD image. The Release Notes contain important instructions on downloading and producing an image of the CD and other useful information such as platform information and revision history.
10. Select **Obtain software**. You will have to accept the license agreement to download the Zip file.
11. Follow the instructions found in the Release Notes to create the CD.

Running ODE

You can run the ODE either from the CD or from the HP Service Partition (HPSP), a special disk partition that is available when the operating system is not running. Determine which action is best for you:

- Running ODE from the HPSP is considerably faster than running it from CD. On systems that have an HPSP, you can copy the files to the partition from the CD by using a command on the Launch menu (see "Running ODE from the HPSP").

  If your system does not have an HPSP, refer to your operating system user guide for instructions on creating one.
- Run ODE from the CD if any of the following conditions exist:
  - The hard disk is not functioning or is unavailable.
  - The system does not support an HPSP.
  - The HPSP does not have the latest version of the tools installed.

Running ODE from the HPSP

The following steps describe the procedure for running ODE from an HPSP.

1. Reset system power. The computer should come up to the Boot Manager menu.
2. See whether the HPSP is listed as one of the boot devices on the Boot Manager menu:
   - If the HPSP appears as a boot device, move the cursor to the line that contains that option and press **Enter**. The computer will boot to the Launch menu.
   - If the HPSP does not appear as a boot device, verify that an HPSP exists on the system. If the HPSP does not exist, you may have to create one. Refer to your operating system

user guide for instructions on verifying and creating of the HPSP. When the partition is created, copy the files from the CD. Follow these steps:

1. Boot from the CD to the Launch menu.
2. At the Launch menu, select the option for copying the contents of the CD to the HPSP (**Run CD Installer to install/update CD content to HPSP**).
3. When you return to the Boot Manager menu, an entry for the HPSP as a boot device displays.

3. Start ODE by choosing the selection for ODE at the Launch menu.

   Alternately, you can start ODE from the EFI prompt. To do this, change directories to `\EFI\HP\DIAG\ODE` and enter the ODE command. For example:

```
fs2:>  cd \EFI\HP\DIAG\ODE
fs2:\EFI\HP\DIAG\ODE> ODE
```

Running ODE from the CD

The following steps describe the procedure for running the *HP Integrity Servers and Itanium Workstations Offline Diagnostics and Utilities CD-ROM*

1. Insert the CD into the CD drive and reboot. The system boots to the Boot Manager menu.
2. See whether the CD drive is listed as one of the boot devices on the Boot Manager menu:
   - If the CD drive appears as a boot device, move the cursor to the line that contains it and press the **Enter** key. The CD will boot to the Launch menu.
   - If the CD drive does not appear as one of the boot devices, select the item on the Boot Manager menu to add a boot device. Although this process can vary, the following steps reflect a typical procedure:
     1. Confirm that the CD is in the CD-ROM drive.
     2. Select **Boot Option Maintenance**.
     3. Select **Add a Boot Option**.
     4. Select **Removable Media Boot**.
     5. Answer the prompts.

     NOTE: You can give any response to the **Boot Option Data Type** prompt.

     6. Exit the menu, then exit the Boot Option maintenance menu. You return to the Boot Manager menu.
     7. Select CD drive as the boot device to boot from the CD to the Launch menu. After configuring the CD drive as a boot device, you will not have to add it again on subsequent boots.

3. Start ODE by choosing ODE on the Launch menu.

   Alternately, you can start ODE from the EFI (Extensible Firmware Interface) prompt. To do this, change directories to `\EFI\HP\DIAG\ODE` and enter the `ode` command. For example:

```
fs2:>  cd \EFI\HP\DIAG\ODE
fs2:\EFI\HP\DIAG\ODE> ode
```

Non-ODE Tools on the CD

The *HP Integrity Servers and Itanium Workstations Offline Diagnostics and Utilities CD-ROM* also provides a collection of non-ODE based diagnostic utilities. The following list describes several of those utilities:

Launchmenu — An application that allows the selection and execution of a set of other applications available in a specific environment. It is available in the `\EFI\HP\TOOLS\LaunchMenu` directory.

CD_Installer	An application to update/install the diagnostics CD image to the HP Service Partition (HPSP) of the disk running under EFI. It is available in the `\EFI\HP\TOOLS\CD_Installer` directory.
MCA utilities	A Machine Check Analyzer (MCA) Binary Logs gathering tool. It is available in the `\EFI\HP\TOOLS\MCA_Utilities` directory.

Network utilities	Utilities to diagnose network latency, communication, or configuration issues. The following tools are available in the `\EFI\HP\TOOLS\Network` directory:
	`ftp.efi`
	`ifconfig.efi`
	`inet.nsh`
	`ping.efi`
	`route.efi`
	`tcpipv4.efi`

I/O card utilities	Diagnostics and firmware update utilities for various I/O cards. Each supported card has its own utility and instruction set. A complete list of the I/O cards diagnostics and utilities is available in the `\EFI\HP\DIAG\DOCUMENTATION\Prod_Desc_All` directory.

3 Using ODE on HP 9000 Systems

The *HP 9000 Offline Diagnostics Environment CD* provides a comprehensive offline diagnostic solution. The CD includes a suite of diagnostic tools that enable you to troubleshoot a system troubleshoot a system on which HP-UX cannot be booted.

The ODE is also useful for some types of testing when it is not desirable to boot to the operating system first, as is often the case in manufacturing environment.

This chapter describes the ODE tools for HP 9000 systems and tells you how to obtain and install them. This chapter addresses the following topics:

- An overview of the ODE tools on HP 9000 systems.
- How to obtain a CD containing the ODE or to create your own CD using an image downloaded from the Web.
- How to run the ODE either from CD or from the system disk using the Boot Logical Interchange Format (LIF).

ODE Tools Overview

The following list provides an overview of ODE diagnostics and utilities that are available for HP 9000 systems:

`ASTRODIAG2*`	The Core Electronic Complex (CEC) diagnostic tool for ASTRO chip
`CIODIAG*`	The core I/O diagnostics tool for SD64A, SD32A, SD16A, rp7410, rp7420, rp8410, and rp8420 systems
`COPYUTIL2`	Utilities for creating copies and backups
`DFDUTIL2`	Utilities for updating disk firmware
`DISKEXPT2*`	A utility for performing nondestructive tests on supported disks
`DISKUTIL2`	Utilities for updating disk firmware
`ESCDIAG*`	A CEC diagnostics tool for the sx2000
`IOTEST2`	A diagnostics tool for I/O cards
`IKEDIAG2`	A CEC diagnostics tool for the IKE chip
`MAKODIAG*`	A CPU diagnostics tool for PA800 and PA8900 processors
`MAPPER2`	A mapping utility for identifying and displaying system components, including hardware modules and peripheral devices
`MEM2*`	A diagnostics utility for memory
`MOABDIAG*`	A crossbar diagnostics tool for the sx2000
`PACIODIAG*`	The core I/O diagnostics tool for rp3410, rp3440, rp4410, rp4440, and c8000 systems
`PCIUTIL`	Utility available only on 64–bit systems used for updating firmware, reading Vital Product Data (VPD) and World Wide Number (WWN) of supported I/O cards.
`PERFVER2`	A utility for running self tests on supported devices
`PLUTODIAG*`	The Core Electronic Complex (CEC) diagnostics tool for the Zx1 chipset
`REODIAG*`	A CEC diagnostics tool for the sx1000
`TOGODIAG*`	A crossbar diagnostics tool for the sx1000
`WDIAG*`	A CPU diagnostics tool for PCX-W processors

An asterisk (*) indicates ODE tools that require a license. See the *HP 9000 CD Overview Guide* for information on tools that require a license on 64-bit systems.

NOTE: HP provides different versions of the tools for 32–bit systems and 64-bit systems, such as the N-Class systems. The 64-bit versions are indicated by having a "2" appended to the program name. For example, the 64-bit version of `MAPPER` is `MAPPER2`.

Obtaining the Latest Version of ODE for HP 9000 Systems

The *HP 9000 Offline Diagnostics Environment CD* is shipped with all HP-UX systems. This CD is updated as needed. New functions and features are added; new hardware diagnostics is incorporated; and performance is enhanced periodically.

You can order a CD for free from the HP Software Depot Web page or you can download an image of the CD to create your own CD.

The following steps list the procedure for ordering a free CD from HP Software Depot :

1. Open a browser and navigate to the HP Software Depot site main page:

   http://www.software.hp.com

2. In the Search bar type `pa offline` and click the search button (>>). The page displays the current and prior versions of the CD along with the Release Notes.
3. Review the list and select the appropriate version.

   Read the Release Notes completely before downloading the CD image. The Release Notes contain useful information such as platform information and revision history.

4. Click the **Receive for Free** button and follow the instructions to complete your order.

You can also download a master `*.cdimage` image file and create your own CD using your CD burner and software.

NOTE: The `*.cdimage` is a large single file that must be renamed to `*.iso` before copying it onto a CD-ROM. The `*.cdimage` is neither a collection of data files (compressed or decompressed) nor an executable file (binary). In effect, you will download the CD image from the Web site, rename the CD image and copy it onto a CD.

To read about changes offered in the latest CD release, go to the following Web site:

www.hp.com/go/hpux-diagnostics-offline-docs

Running ODE

You can run ODE in one of the following ways:

- Using the *HP 9000 Offline Diagnostics Environment* CD
- Using the Boot Logical Interchange Format (LIF) volume from the system disk

HP recommends that you run the offline diagnostics tools using the HP 9000 Offline ODE CD for the following reasons:

- You can access the complete set of offline diagnostics tools.
- You can run ODE from the CD when the system is not booted to the operating system.
- You do not need a system disk to run ODE.
- You can run ODE on both HP 3000 (MPE/iX) systems and HP 9000 System (HP-UX).
- You can use the command-line interface or the menu-driven interface to run the tools on 32-bit systems.

If you do not have the *HP 9000 Offline Diagnostics Environment* CD, you can run the offline diagnostics tools from the system disk. Before doing so, consider the following:

- The system disk contains only a subset of the most commonly used offline diagnostics tools:
  - For 32-bit systems:

    `MAPPER`

```
IOTEST
PERFVER
```

— For 64-bit systems:

```
MAPPER2
IOTEST2
PERFVER2
```

- You cannot use the menu-driven interface.

Running ODE from the CD

To run ODE, the system must be at the Boot Console Handler (BCH). When the system is configured to boot to the operating system automatically, it waits 10 seconds for user intervention. You can press any key to stop the autoboot process and go to the main menu prompt.

The following steps describe how to run ODE from the CD:

1. Insert the *HP 9000 Offline Diagnostics Environment CD* in the CD drive.
2. Restart the computer to boot to the PDC (Processor Dependent Code) prompt.

NOTE: The appearance of PDC prompts may differ from one computer to another.

3. At the PDC prompt, enter the `search` command for a list of bootable devices. For example:

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

IODC
Path#  Device Path (dec)  Device Path (mnem)  Device Type        Rev
-----  -----------------  ------------------  -----------        ----
P0      0/0/1/1.2          intscsib.2        Random access media   1
P1      0/0/2/0.2          intscsia.2        Random access media   1
```

4. Select the CD-ROM device and boot from that device:

```
Main Menu: < Enter command or menu > boot P1
```

5. When prompted, answer **y** (yes) to interact with the Initial Program Loader (IPL):

```
Interact with IPL (Y, N, or Cancel)? y
```

This will return the ISL> prompt.

6. At the ISL prompt, enter the `ode` command to run the ODE program:

```
ISL> ode
```

This will return the ODE> prompt.

7. At the ODE prompt, enter the `ls` command to obtain a list of the offline diagnostics tools:

```
ODE> ls
Modules on this boot media are:

filename    type    size     created   description
-------------------------------------------------------------------------------
MAPPER2     TM      146      05/07/12  64 bit version of the system mapping
IOTEST2     TM      882      05/07/12  64 bit version that runs ROM-based self
PERFVER2    TM      126      05/07/12  64 bit version that runs ROM-based self
```

8. To select and run the ODE tools, enter the `run` command and the name of the module you want to run. For example:

```
ODE> run mapper2
```

IMPORTANT: You must restart the system after running any ODE module before booting to the operating system or running any non-ODE utility.

Running from the System Disk

To run the offline diagnostics tools from the system disk, you must install the LIF-LOAD to the boot area of the system disk from the *HP 9000 Offline Diagnostics Environment CD*.

LIF is a subset of the offline diagnostics tools for HP 9000 systems. After LIF is installed, you can boot the system disk to the ISL prompt, run the ODE program, and then launch the offline diagnostics tools from the ODE prompt.

The following sections tell you how to determine whether LIF-LOAD is installed on the system disk, how to install LIF-LOAD on a HP 9000 system, and how to boot from the LIF volume.

NOTE: Prior to September 2005 the LIF volume was a part of the Support Plus Media. Since then, it is available only on the *HP 9000 Offline Diagnostics Environment CD*.

Determining Whether LIF-LOAD Is Installed

Complete the following procedure to check if LIF-LOAD is installed on the system disk:

1. Restart the computer to boot to the PDC prompt.

   NOTE: PDC prompts may differ from one system to another.

2. At the PDC prompt, boot from the primary boot path:

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

3. When prompted, answer yes to interact with the IPL:

   ```
   Interact with IPL (Y, N, or Cancel)? y
   ```

   This will return the ISL> prompt.

4. Enter the `ls` command at the ISL prompt:

   ```
   ISL> ls
   ```

If `ls` returns ODE in its display list, LIF-LOAD is installed on the system. If it is not installed, see "Installing LIF-LOAD."

Installing LIF-LOAD

Complete the following procedure for installing the LIF-LOAD product to the boot area of the system disk:

1. Boot the system to HP-UX.
2. Log in as root.
3. Load the *HP 9000 Offline Diagnostics Environment CD* to the CD drive.
4. Make a directory from root (/) as a mount point. For example:

   ```
   # mkdir /Offline_CD
   ```

5. Enter the `ioscan -fnCdisk` command to find the block special device file for the CD drive. In the following example the block special device file for the CD is `/dev/dsk/c0t0d0`:

   ```
   # ioscan -fnCdisk

   Class     I  H/W Path       Driver S/W State   H/W Type     Description

   disk      0  10/0/14/0.0.0  sdisk CLAIMED     DEVICE       TEAC    CD-532E-B
                               /dev/dsk/c0t0d0   /dev/rdsk/c0t0d0
   disk      1  10/0/15/1.4.0  sdisk CLAIMED     DEVICE       SEAGATE ST39204LC
                               /dev/dsk/c3t4d0   /dev/rdsk/c3t4d0
   ```

6. Mount the CD using the CD block special device file and the directory you created in step 4. For example:

   ```
   # mount /dev/dsk/c0t0d0 /Offline_CD
   ```

7. Run the following script from the CD mount directory:

   ```
   # /Offline_CD/DOCS/install_lifload.ksh
   ```

Running the ODE Tools

The following steps describe the procedure to run ODE from the system disk:

1. Boot the system from the PDC prompt.
2. Enter the following command:

   ```
   >> boot primary
   ```

3. When prompted, answer **y** (yes) to interact with the IPL:

   ```
   Interact with IPL (Y, N, or Cancel)? y
   ```

4. At the ISL prompt, enter the `ode` command to run the ODE program:

   ```
   ISL> ode
   ```

5. Enter the `ls` command at the ODE prompt to obtain a list of the offline diagnostics tools:

   ```
   ODE> ls
   ```

   The screen displays a list of the tools.

6. To select and run the tools, enter the `run` command and the name of the module you want to run. For example:

   ```
   ODE> run mapper2
   ```

4 Performing Common ODE Tasks

This chapter shows how to use ODE tools to perform common tasks and lets you see how ODE reacts when detecting a problem.

The offline diagnostics tools that run on Integrity Systems and Itanium worksations and on HP 9000 systems are similar in syntax and functions; the primary differences are in the names of the tools and the way they are launched. Keep this in mind as you review the examples in the following sections. The output in either section will be similar to what you will see, regardless of which system you are diagnosing.

Running ODE Tools on Integrity Systems and Itanium Worksations

This section shows the output of tools run on Integrity Systems and Itanium worksations systems. The complementary tools for HP 9000 systems will produce similar results. The following examples are provided:

- Loading and running a test module.
- Using the two test modules together.
- Viewing an error detected by a test module.
- Obtaining a list of the tools supported by your platform.
- Examples that show the ODE output for various invalid commands.

Loading ODE and Running a Test Module

The example in this section shows the following information:

- The ODE startup banner
- Running the test module `cpudiag` for the first time.
- Running `cpudiag` for a second time (the banner information is not displayed).
- Running the `cpudiag help` command
- Setting and using environmental variables.
- Exiting `cpudiag` and ODE

Example 4-1 Loading ODE and Running a Test Module

```
fs0:\EFI\HP\DIAG\ODE>ode

**********************************************************************
******                                                          ******
******           OFFLINE DIAGNOSTIC ENVIRONMENT                 ******
******                                                          ******
******        (C) Copyright Hewlett-Packard Co 2006             ******
******            All Rights Reserved                           ******
******                                                          ******
******                                                          ******
******               TC Version XX.XX.XX                        ******
******               SysLib Version XX.XX.XX                    ******
******                                                          ******
******                                                          ******
**********************************************************************

Type HELP for command information.
ODE> run cpudiag

**********************************************************************
******                                                          ******
******                            CPUDIAG                       ******
******                                                          ******
******             (C) Copyright Hewlett-Packard Co 2006        ******
******                      All Rights Reserved                 ******
******                                                          ******
****** This program may only be used by HP support personnel and ******
****** those customers with the appropriate Class license or     ******
****** Node license for systems specified by the license.  HP    ******
****** shall not be liable for any damages resulting from misuse ******
******   or unauthorized use of this program.  This program     ******
******   remains the property of HP.                            ******
******                                                          ******
******                        Version XX.XX.XX                  ******
******                                                          ******
**********************************************************************

Type HELP for command information.

STARTING EXECUTION OF CPUDIAG
SECTION 001
SECTION 002
SECTION 003

END OF LOOP 1.

RUN COMPLETED.
ODE> cpudiag

CPUDIAG> help
CPUDIAG Help
Commands
--------
DIAGINFO  -- Display information about LDIAG
SECTION   -- Sets/Displays current test sections to execute
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
```

```
CREG      -- Displays selected control and application registers

ODE Commands Available from CPUDIAG

Basic Commands
--------------
HELP -- Prints detailed information to the screen, when
  "help command" or "help var" is typed
LS   -- List modules available on boot medium
Module_Name -- Load and initialize a module by typing its name
                 (For more help, type "help module_name")
RUN -- Run a module (after setting desired environment variables)
Control-Y|Control-C -- Abort an ODE command; pause a module run
RESUME -- Restart a paused module
DISPLOG -- After running a module, display contents of a log
EXIT -- Return to next higher level prompt

Environmental Variables
-----------------------
SHOWSTATE -- Display the value of the following environment variables:
LOOP -- Run a test this many times
ERRPRINT [ON|OFF] -- Print low-level error messages to console
                           (primarily for manufacturing use)
ERRNUM [ON|OFF] -- Print one-line, numbered errors to the console
ERRPAUSE [ON|OFF] -- Pause module upon error detection
ERRONLY [ON|OFF] -- Print ONLY error messages; disable non-error
                          and isolation message printing
INFOPRINT [ON|OFF] -- Print informational messages to the console
ISOPRINT [ON|OFF] -- Print fault isolation messages to the
   console
ISOPAUSE [ON|OFF] -- Pause module when isolation message is
         generated
LOGSIZE -- Set the size of a message log
DEFAULT -- Reset environment variables to default state

CPUDIAG> help section cr

SECTION {integer: 0..3 | integer integer | integer/integer |
[integer] [integer/integer] }.  This command sets a 4 bit logical
integer bit mask.  Each bit corresponds to a test section in the
diagnostic.  For each bit that is set a test section is executed.
Examples: SECTION 3 sets bit three and clears all other bits. SECTION
1 3 sets bits one and three and clears all other bits. SECTION 1/3 is
equivalent to SECTION 1 2 3.

CPUDIAG> section 2
CPUDIAG> loop 2
CPUDIAG> run cr

STARTING EXECUTION OF CPUDIAG
SECTION 002

END OF LOOP 1.

STARTING EXECUTION OF CPUDIAG
SECTION 002

END OF LOOP 2.

RUN COMPLETED.
CPUDIAG> exit
ODE> exit
fs0:\efi\diag>
```

Running Multiple Test Modules

The example in this section shows two test modules, `cpudiag` and `memdiag` , being run.

Example 4-2 Running Multiple Test Modules

```
ODE> loop 2;run cpudiag memdiag

**************************************************************************
******                                                              ******
******                            CPUDIAG                           ******
******                                                              ******
******             (C) Copyright Hewlett-Packard Co 2006            ******
******                      All Rights Reserved                     ******
******                                                              *****
****** This program may only be used by HP support personnel and ******
****** those customers with the appropriate Class license or     ******
****** Node license for systems specified by the license.  HP    ******
****** shall not be liable for any damages resulting from misuse ******
****** or unauthorized use of this program.  This program        ******
****** remains the property of HP.                               ******
******                                                              ******
******                        Version XX.XX.XX                      ******
******                                                              ******
**************************************************************************

Type HELP for command information.

STARTING EXECUTION OF CPUDIAG
SECTION 001
SECTION 002
SECTION 003

**************************************************************************
******                                                              ******
******                            MEMDIAG                           ******
******                                                              ******
******             (C) Copyright Hewlett-Packard Co 2006            ******
******                      All Rights Reserved                     ******
******                                                              ******
****** This program may only be used by HP support personnel and ******
****** those customers with the appropriate Class license or     ******
****** Node license for systems specified by the license.  HP    ******
****** shall not be liable for any damages resulting from misuse ******
****** or unauthorized use of this program.  This program        ******
****** remains the property of HP.                               ******
******                                                              ******
******                        Version XX.XX.XX                      ******
******                                                              ******
**************************************************************************

Type HELP for command information.

STARTING EXECUTION OF MEMDIAG
SECTION 001
SECTION 002
SECTION 003

END OF LOOP 1.

STARTING EXECUTION OF CPUDIAG
SECTION 001
SECTION 002
SECTION 003
STARTING EXECUTION OF MEMDIAG
SECTION 001
SECTION 002
SECTION 003
```

```
END OF LOOP 2.

RUN COMPLETED.
ODE> exit
fs0:\efi\diag>
```

Error Detection

The following example shows an error detected by the test module `cpudiag`. In the example, ERRPRINT is on, ERRPAUSE is on, and `cpudiag` implements a command that dumps the state of the general registers (REGISTER). This example begins with only ODE loaded. Notice the changes in the command prompt:

Example 4-3 Error Detection

```
ODE> run cpudiag

************************************************************************
******                                                          ******
******                            CPUDIAG                       ******
******                                                          ******
******             (C) Copyright Hewlett-Packard Co 2006        ******
******                      All Rights Reserved                 ******
******                                                          ******
****** This program may only be used by HP support personnel and ******
****** those customers with the appropriate Class license or    ******
****** Node license for systems specified by the license.  HP   ******
****** shall not be liable for any damages resulting from misuse ******
****** or unauthorized use of this program.  This program       ******
****** remains the property of HP.                              ******
******                                                          ******
******                       Version XX.XX.XX                   ******
******                                                          ******
************************************************************************
Type HELP for command information.

STARTING EXECUTION OF CPUDIAG
SECTION 001

ERROR 002 DETECTED IN SECTION 001 WHILE TESTING THE CPU
General register 8 was 0x555555a5 should be 0x55555555.

CPUDIAG PAUSED> proc

CPUDIAG PAUSED> resume
SECTION 002
SECTION 003
CPUDIAG DETECTED 1 HARDWARE ERROR

END OF LOOP 1.

RUN COMPLETED
ODE>
```

Determining the Tools Supported by the Platform

Some ODE tools cannot be used on all platforms. Attempting to use an unsupported tool will generate an error message. For example:

Example 4-4 Using an Unsupported Tool

```
ODE> WDIAG

The Hversion = 88c0. The Sversion = 491. UUT_MODEL = 88c
------------------------------------------------------------------------
WARNING: THIS PROCESSOR MODEL 88c IS INCOMPATIBLE WITH THIS DIAGNOSTIC.
------------------------------------------------------------------------

FATAL SOFTWARE ERROR !!
EXECUTION OF WDIAG MAY PRODUCE UNDEFINED RESULTS
ERROR: Initialization of WDIAG failed
```

If you are uncertain about which tools you can use on your system, specify the `ls` command at the ODE prompt to obtain information about the tools your system supports. For example:

Example 4-5 Determining the System-Supported Tools

```
ODE> ls

          Modules on this boot media are:

filename    type    size     created   description
-------------------------------------------------------------------------
README2     TM      345      06/03/14  64 bit version that displays README file
MAPPER2     TM      800      06/03/14  64 bit version of the system mapping utility
MEM2        TM      1604     06/03/14  64 bit Memory diagnostic
MAKODIAG    TM      9601     06/03/14  CPU diagnostic for PA8800 processors
PCIUTIL     TM      942      06/03/14  PCI HBA Firmware Update Utility
```

Entering Invalid Commands

Common errors such as specifying an unknown command, a misspelled command, or an inaccurate parameter will cause ODE to generate error messages. Example 4-6 shows three such errors.

Example 4-6 Entering Invalid Commands

```
ODE> loadd
INVALID COMMAND: COMMAND = LOADD

ODE> load
MISSING PARAMETER: COMMAND = LOAD

ODE> load !4
INVALID PARAMETER: COMMAND = LOAD !4
```

Running ODE Tools on HP 9000 Systems

This section shows the output of tools run on HP 9000 systems. The complementary tools for Integrity Systems and Itanium worksations will produce similar results. The following examples are provided:

- Examining the tools suite
- Examining a tool's functions and running the tool
- Using the `makodiag` command
- Using the `diskexpt2` command

Examining the Tools Suite

The following example shows the initiation of an ODE session and using the `ls` command to display the installed tools on a 64-bit system:

Example 4-7 Examining the Tools Suite

```
ISL> ode

Loading....

*************************************************************************
******                                                             ******
******             Offline Diagnostic Environment                  ******
******                                                             ******
******  (C) Copyright Hewlett-Packard Co 1993-2006                 ******
******                     All Rights Reserved                     ******
******                                                             ******
******  HP shall not be liable for any damages resulting from the  ******
******  use of this program.                                       ******
******                                                             ******
******                TC  Version A.02.27                          ******
******                SysLib Version A.00.78                       ******
******                Loader Version A.00.62                       ******
******                Mapfile Version A.01.67                      ******
******                                                             ******
*************************************************************************

Type HELP for command information.
ODE> ls

          Modules on this boot media are:

filename    type    size     created   description
-------------------------------------------------------------------------------
README2     TM      345      06/03/14  64 bit version that displays README fil
MAPPER2     TM      800      06/03/14  64 bit version of the system mapping ut
MEM2        TM      1604     06/03/14  64 bit Memory diagnostic
AR60DIAG2   TM      3117     06/03/14  Fibre Channel 60 disk array utility (64
ARDIAG2     TM      3731     06/03/14  64 bit version of the ICE & ICICLE disk
COPYUTIL2   TM      2131     06/03/14  64 bit version of the Disk-to-tape copy
DFDUTIL2    TM      1729     06/03/14  64 bit version of the Disk firmware dow
DISKEXPT2   TM      1655     06/03/14  64 bit version of the expert disk utili
DISKUTIL2   TM      1553     06/03/14  64 bit version of the nondestructive di
MAKODIAG    TM      9601     06/03/14  CPU diagnostic for PA8800 processors
NIKEARRY2   TM      1843     06/03/14  Nike disk array utility
PACIODIAG   TM      3895     06/03/14  Core IO diagnostic
PCIUTIL     TM      942      06/03/14  PCI HBA Firmware Update Utility
PLUTODIAG   TM      3878     06/03/14  PLUTO IO Controller diagnostic
VADIAG2     TM      4787     06/03/14  hp StorageWorks Virtual Array Utility
IOTEST2     TM      4675     06/03/14  64 bit version that runs ROM-based self
PERFVER2    TM      2343     06/03/14  64 bit version that runs ROM-based self
```

Examining a Tool's Functions and Running the Tool

The following example examines the functions of a tool using the `help` command and then running the command.

Example 4-8 Examining a Tool's Functions and Running the Tool

```
ODE> mapper2

**************************************************************************
******                                                              ******
******                            MAPPER2                           ******
******                                                              ******
******       Copyright (C) 2003-2006 by Hewlett-Packard Company     ******
******                       All Rights Reserved                    ******
******                                                              ******
******   HP shall not be liable for any damages resulting from the  ******
******   use of this program.                                       ******
******                                                              ******
******                         Version B.01.02                      ******
******                                                              ******
**************************************************************************

Type HELP for command information.

MAPPER2 Help

     Commands
     --------
     UTILINFO -- Display information about MAPPER

Continue ([y]/n)? y

ODE Commands Available from MAPPER2

    Basic Commands
    --------------
    HELP -- Prints detailed information to the screen, when "help" <command>
            or "help" <var> is typed
    LS -- List modules available on boot medium
    RUN -- Run a module (after setting desired environment variables)
    Control-Y|Control-C -- Abort an ODE command; pause a module run
    RESUME -- Restart a paused module
    DISPLOG -- After running a module, display contents of a log
    EXIT -- Return to next higher level prompt

    Environmental Variables
    -----------------------
    SHOWSTATE -- Display the value of the following environment variables:
        LOOP -- Run a test this many times
        ERRPRINT [ON|OFF] -- Print low-level error messages to console
                             (primarily for manufacturing use)
        ERRNUM [ON|OFF] -- Print one-line, numbered errors to the console

Continue ([y]/n)? y

        ERRPAUSE [ON|OFF] -- Pause module upon error detection
        ERRONLY [ON|OFF] -- Print ONLY error messages; disable non-error
                            and isolation message printing
        INFOPRINT [ON|OFF] -- Print informational messages to the console
        ISOPRINT [ON|OFF] -- Print fault isolation messages to the console
        ISOPAUSE [ON|OFF] -- Pause module when isolation message is generated
    LOGSIZE -- Set the size of a message log
    DEFAULT -- Reset environment variables to default state

MAPPER2> help utilinfo

     UTILINFO

     Use this command to display information about the MAPPER utility.

MAPPER2> utilinfo

MAPPER is an ODE-based utility program.  It is intended to display the con-
figuration of an HPPA system.   This includes the path, identification, and
revision information of HPPA modules and peripheral devices.   HPPA modules
include Processors,  Memory Controllers,  and I/O Modules (such as bus con-
```

verters, channel adapters, device adapters, and interface cards). Processor Hardware Model, Hardware ID, Processor Board Component revisions, Cache and TLB sizes, and Co-processor information are displayed as well. HPPA system Software Model, Software ID, Software Capabilities, and Model Strings are also shown.

```
MAPPER2> run

STARTING EXECUTION OF MAPPER2

Processor Identification:
    Hardware Model:  884H, Revision: 0
    Software Model:    4H, Revision: 0
    Hardware ID:  0, Software ID:  2842435972 (unsigned decimal)
    HP-UX Model String: 9000/800/rp4440
    Processor Board Revisions:
        CPU - CPU Chip:                    257
        PDC - Processor Dependent Code:    45.11
    Cache and TLB Sizes:
        Instruction Cache:  3276 K bytes, Instruction TLB:     240 entries
        Data Cache:         3276 K bytes, Data TLB:            240 entries
    Co-processors:
        Floating Point Co-processor(s) installed

Configuring the System...

I/O Configuration:
                                                Type  HW    SW    Revisions
Path       Component Name                       ID    Model Model Hdwr  Firm
---------- ------------------------------------ ----- ----- ----- ----- -----
0          Pluto I/O BC McKinley Port           CH    880H  CH    0     0
0/0        Mercury PCI Bridge                   DH    783H  AH    0     0
0/0/1/0    Communications Controller            103CH 1290H 103CH 1291H 01H
0/0/1/1    Serial Controller                    103CH 1048H 103CH 1282H 03H
0/0/2/0    USB Controller                       1033H 0035H 1033H 0035H 41H
0/0/2/1    USB Controller                       1033H 0035H 1033H 0035H 41H
0/0/3/0    IDE Controller                       1095H 0649H 1095H 0649H 02H
0/0/3/0.0.0.0
             DV-28E-B                           -     -     -     -
0/1        Mercury PCI Bridge                   DH    783H  AH    0     0
0/1/1/0    Symbios SCSI Ultra160 LVD HBA        1000H 0021H 103CH 1340H 01H
0/1/1/0.1.0
             HP 36.4G ST336753LC                -     -     -     -     HPC3
0/1/1/0.4.0
             HP SAFTE                           -     -     -     -     1
0/1/1/1    Symbios SCSI Ultra160 LVD HBA        1000H 0021H 103CH 1340H 01H
0/1/1/1.0.0
             HP 36.4G ST336753LC                -     -     -     -     HPC3
0/1/1/1.4.0
             HP SAFTE                           -     -     -     -     1
0/1/2/0    Ethernet Controller                  14E4H 1645H 103CH 128AH 15H
0/2        Mercury PCI Bridge                   DH    783H  AH    0     0
0/2/1/0    HP A7143A 4 Port Ultra160 RAID HBA   0E11H B060H 0E11H 4070H 02H
0/4        Mercury PCI Bridge                   DH    783H  AH    0     0
0/4/1/0    PCI->PCI Bridge                      1014H 01A7H 0000H 0000H 03H
0/4/1/0/4/0
           HP A9784A 2Gb FC/GigE Combo Adapter  1077H 2312H 103CH 12C7H 03H
0/4/1/0/6/0
           HP A9784A 1000Base-T FC/GigE Combo   14E4H 16C7H 103CH 12CAH 10H
0/4/2/0    HP A7011A 1000Base-SX Dual Port HBA  8086H 107AH 103CH 12A8H 03H
0/4/2/1    HP A7011A 1000Base-SX Dual Port HBA  8086H 107AH 103CH 12A8H 03H
0/5        Mercury PCI Bridge                   DH    783H  AH    0     0
0/5/2/0    Fibre Channel Controller             10DFH F980H 10DFH F980H 01H
0/6        Mercury PCI Bridge                   DH    783H  AH    0     0
0/6/1/0    PCI->PCI Bridge                      8086H B154H 0000H 0000H 00H
0/6/1/0/4/0
           Ethernet Controller                  1011H 0019H 103CH 125AH 41H
0/6/1/0/5/0
           Ethernet Controller                  1011H 0019H 103CH 125AH 41H
0/6/1/0/6/0
           Ethernet Controller                  1011H 0019H 103CH 125AH 41H
0/6/1/0/7/0
```

```
           Ethernet Controller                1011H 0019H 103CH 125AH 41H
8          Memory Controller (4 Gbytes)       1H    AFH   9H    0     0
           Slot  0/0a   256MB
           Slot  0/0b   256MB
           Slot  0/0c   256MB
           Slot  0/0d   256MB
           Slot  0/1a   256MB
           Slot  0/1b   256MB
           Slot  0/1c   256MB
           Slot  0/1d   256MB
           Slot  0/2a    --
           Slot  0/2b    --
           Slot  0/2c    --
           Slot  0/2d    --
           Slot  0/3a   512MB
           Slot  0/3b   512MB
           Slot  0/3c   512MB
           Slot  0/3d   512MB
16         Management Controller              FH    4H    C0H   0     0
128        Processor                          0H    884H  4H    0     0
129        Processor                          0H    884H  4H    0     0

RUN COMPLETED.
MAPPER2>  ex

    Resetting the Boot Device...
    Done.

Exiting...
```

Using the makodiag Command

The following example output from the `makodiag` command. The vertical ellipses represent output that was removed from this example to make it shorter.

Example 4-9 Using the makodiag Command

```
ODE> makodiag; run; ex

The Hversion = 8840. The Sversion = 491. UUT_MODEL = 884

********************************************************************************
******                                                                    ******
******                              MAKODIAG                              ******
******                                                                    ******
******          Copyright (C) 2006 by Hewlett-Packard Company             ******
******                        All Rights Reserved                         ******
******                                                                    ******
******   This program may only be used by HP support personnel and        ******
******   those customers with the appropriate Class license or            ******
******   Node license for systems specified by the license.  HP           ******
******   shall not be liable for any damages resulting from misuse        ******
******   or unauthorized use of this program.  This program               ******
******   remains the property of HP.                                      ******
******                                                                    ******
******                            Version B.00.33                         ******
******                                                                    ******
********************************************************************************

Type DIAGINFO for test information.

Enter password or a <cr> to exit:

Type HELP for command information.

Found 2 processors

STARTING EXECUTION OF MAKODIAG

SECTION 00
.
.
.
SECTION 006

STARTING BUS INTERFACE DATA PATH TESTS - SECTIONS 7/10

SECTION 007

SECTION 008

SECTION 009

SECTION 010

STARTING CACHE DATA PATH TESTS - SECTIONS 11/25

SECTION 011

SECTION 012

SECTION 013
.............................
SECTION 14
<Test Skipped>

SECTION 16
.
.
.
```

```
STARTING CPU INSTRUCTION TESTS - SECTIONS 35/86

SECTION 035
.
.
.
SECTION 086

STARTING CPU EXTENDED TESTS - SECTIONS 87/100

SECTION 087
.
.
.
SECTION 100

STARTING FLOATING POINT TESTS - SECTIONS  102/134

SECTION 102
.
.
.
SECTION 134

<<<MASTER = 1  SLAVE = 0>>>

STARTING MULTIPLE PROCESSOR TESTS - SECTIONS  140/149

SECTION 140
Set up for LDW/STW (line test) test

Testing the LDW/STW instructions (line test) - syncronously

Checking ownership of blocks, and LDW/STW times

Set up for LDW/STW (word test) test

Testing the LDW/STW instructions (word test) -- syncronously

Checking ownership of blocks, and LDW/STW times

SECTION 141

Functional test of PDTLB instruction

SECTION 142

Functional test of PITLB instruction

SECTION 143

PDTLB head on interface test

SECTION 144

PITLB head on interface test

SECTION 145

LOAD/STORE instructions test (virtual mode)
Set up for virtual mode LDW/STW test
Testing the LDW/STW instructions
Testing the LDWM/STWM instructions
Testing the LDWX/STW instructions
Testing the LDH/STH instructions
```

```
Testing the LDB/STB instructions
Testing the STW/LDCWS instructions
Testing the STD/LDD instructions

SECTION 146

Functional test of FIC instruction

<<<MASTER = 1  SLAVE = 0>>>

STARTING MULTIPLE PROCESSOR TESTS - SECTIONS  140/149

SECTION 140
Set up for LDW/STW (line test) test

Testing the LDW/STW instructions (line test) - syncronously

Checking ownership of blocks, and LDW/STW times

Set up for LDW/STW (word test) test

Testing the LDW/STW instructions (word test) -- syncronously

Checking ownership of blocks, and LDW/STW times

SECTION 141

Functional test of PDTLB instruction

SECTION 142

Functional test of PITLB instruction

SECTION 143

PDTLB head on interface test

SECTION 144

PITLB head on interface test

SECTION 145

LOAD/STORE instructions test (virtual mode)
Set up for virtual mode LDW/STW test
Testing the LDW/STW instructions
Testing the LDWM/STWM instructions
Testing the LDWX/STW instructions
Testing the LDH/STH instructions
Testing the LDB/STB instructions
Testing the STW/LDCWS instructions
Testing the STD/LDD instructions

SECTION 146

Functional test of FIC instruction

RUN COMPLETED.
Wait 7 seconds for processors to return to ready state.
```

Using the diskexpt2 Command

The following example shows the output from the `diskexpt2` command. Note the restrictions on using this command and the required use of a password.

Example 4-10 Using the diskexpt2 Command

```
ODE> diskexpt2

Type HELP for command information.

**************************************************************************
******                                                              ******
******                          DISKEXPT2                           ******
******                                                              ******
******        Copyright (C) Hewlett-Packard Co. 1998 thru 2006      ******
******                      All Rights Reserved                     ******
******                                                              ******
******   This program may only be used by HP support personnel and  ******
******   those customers with the appropriate Class license or      ******
******   Node license for systems specified by the license.  HP     ******
******   shall not be liable for any damages resulting from misuse  ******
******   or unauthorized use of this program.  This program         ******
******   remains the property of HP.                                ******
******                                                              ******
******                         Version B.00.27                      ******
******                                                              ******
**************************************************************************

Enter password or a <cr> to exit:

The bus is being scanned for devices. Please wait.
More than 3 Modules/Busses were found on this system.
Since mapping all the Busses will take time, you can
choose a range of busses to map or press <return> to
map all the busses.  For example, to map bus 2, 4, 5,
and 6, type the range 2,4/6
Indx Path               Module     Bus    HPA      SPA
---- ---------------    ---------- ------ -------- --------
0    0/1/1/0            PCI SCSI   SCSI   200800   0
1    0/1/1/1            PCI SCSI   SCSI   200900   0
2    0/2/1/0            PCI RAID160 SCSI   400800   0
3    0/4/1/0/4/0        PCI FCQL   Fibre  812000   0

Enter a range (? for help, q for quit)<default is map all>:

The bus is being scanned for devices. Please wait.
Sel/
Indx Path                    Product String                      Rev    Bus    Size
---- --------------------    ---------------------------------- ------ ------ ------
 0   0/1/1/0.1.0        HP 36.4G ST336753LC               HPC3   SCSI   36.4 GB
 1   0/1/1/1.0.0        HP 36.4G ST336753LC               HPC3   SCSI   36.4 GB

Legend:
Sel/Indx - Indx of the disk listed. This is flagged with a '*'
           if it is marked for testing.
NOTE:
  The size of disk may not match the Information Specified by
  the vendor due to difference in calculation methods.

DISKEXPT2> help

DISKEXPT2 Help

------------------------------------------------------------------------------
Quick Start on Utility.
---------------------
UTILINFO  A brief procedure on how to use the utility.

Environment variables:
---------------------
SHOWENV   Displays the current settings for TESTDISK, BLOCK and RANGE.
BLOCK     Selects the block to be tested.
RANGE     Selects range of blocks to be tested by the ROMT and WRTMT commands.
TESTDISK  Selects the disk to be tested.

Read & Writing Disk Blocks:
--------------------------
SHOWBUF   Displays the internal buffer contents after the last read command.
READBLK   Reads the given block from the given SCSI disk.
READFULL  Reads the given block with the header from the given SCSI disk.
WRITEBLK  Writes the given block on to the given disk.
WRITEFULL Writes the given block with the header on to the given disk.

Media Tests:
-----------
ROMT      Performs a read media test on the selected range of blocks.
WRTMT     Performs a write/read/verify test on the selected range of blocks.

Continue ([y]/n)? y

------------------------------------------------------------------------------
Disk Log Access:
---------------
ACCESSLOG Displays the disk logs in a consise format.
READLOG   Reads the log data from the disk.
CLRLOG    Clears the log data from the disk.
```

```
Reassigning Block:
-----------------
SPARE     Reassigns the given block on the disk.

Gathering Disk Information:
--------------------------
DISPMAP   Displays a list of all the disks found with their present settings.
DISKINFO  Displays the contents of SCSI Inquiry Command for SCSI and Describe
          Command for FLEX and CS80 devices.
INQUIRY   Use DISKINFO command.
DESCRIBE  Use DISKINFO command.
MODESENSE Get mode sense information from SCSI devices only.

Add a Disk Manually:
-------------------
ADDDISK   Allows the user to add non-responding disks to the mapped list of
          disks.
------------------------------------------------------------------------------

Continue ([y]/n)? y

ODE Commands Available from DISKEXPT2

    Basic Commands
    --------------
    HELP -- Prints detailed information to the screen, when "help <command>" or "help <var>" is typed
    LS -- List modules available on boot medium
    RUN -- Run a module (after setting desired environment variables)
    Control-Y|Control-C -- Abort an ODE command; pause a module run
    RESUME -- Restart a paused module
    DISPLOG -- After running a module, display contents of a log
    EXIT -- Return to next higher level prompt

    Environmental Variables
    -----------------------
    SHOWSTATE -- Display the value of the following environment variables:
        LOOP -- Run a test this many times
        ERRPRINT [ON|OFF] -- Print low-level error messages to console
                             (primarily for manufacturing use)
        ERRNUM [ON|OFF] -- Print one-line, numbered errors to the console

Continue ([y]/n)? n

DISKEXPT2> diskinfo
Test Disk (0 - 1 ) ? 0
Peripheral Qualifier: Requested LUN is supported
Peripheral Device Type: Direct-access device
Medium is NOT removable
Device-type Modifier = 0(0x0)
ISO Version = 0  |  ECMA Version = 0 |  ANSI Version = 3
Reserved
Device does NOT support the TERMINATE I/O PROCESS message
INQUIRY data format is as specified in SCSI-2
Other supported features:
16-bit wide data transfer, Synchronous data transfer, Linked commands, Tagged Command Queuing
This device responds to a RESET condition with a SOFT RESET alternative
Vendor Identification: HP 36.4G
Product Identification: ST336753LC
Product Revision Level: HPC3
Vendor Specific Information:
     Addr     |              Hexadecimal                |   ASCII
------------------------------------------------------------------------
 36   (0x24  ) | 0x33 0x48 0x58 0x30 0x4b 0x38 0x52 0x57 | 3HX0K8RW
 44   (0x2c  ) | 0x20 0x20 0x20 0x20 0x53 0x45 0x41 0x47 |     SEAG
 52   (0x34  ) | 0x41 0x54 0x45 0x20                     | ATE
Any additional information from the vendor:
     Addr     |              Hexadecimal                |   ASCII
------------------------------------------------------------------------
 96   (0x60  ) | 0x00 0x43 0x6f 0x70 0x79 0x72 0x69 0x67 | .Copyrig
 104  (0x68  ) | 0x68 0x74 0x20 0x28 0x63 0x29 0x20 0x32 | ht (c) 2
 112  (0x70  ) | 0x30 0x30 0x32 0x20 0x53 0x65 0x61 0x67 | 002 Seag
 120  (0x78  ) | 0x61 0x74 0x65 0x20 0x41 0x6c 0x6c 0x20 | ate All
 128  (0x80  ) | 0x72 0x69 0x67 0x68 0x74 0x73 0x20 0x72 | rights r
 136  (0x88  ) | 0x65 0x73 0x65 0x72 0x76 0x65 0x64 0x20 | eserved

DISKEXPT2> modesense
Test Disk (0 - 1 ) ? 1
---------------------------------------------
             POSSIBLE PAGE CODES
---------------------------------------------
     0x01 - Read-write error recovery page
     0x02 - Disconnect-reconnect page
     0x03 - Format device page
     0x04 - Rigid disk geometry page
     0x05 - Flexible disk page
     0x07 - Verify error recovery page
     0x08 - Caching Page
     0x09 - Peripheral device page
     0x0A - Control mode page
     0x0B - Medium types supported page
     0x0C - Notch and partition page
     0x3F - Return all pages
```

```
-------------------------------------------
Page Code<Return to quit>? 0x09
     Addr     |              Hexadecimal                |   ASCII
-------------------------------------------------------------------------
 0    (0x0   ) | 0x00 0x1e 0x00 0x10 0x00 0x00 0x00 0x08 | ........
 8    (0x8   ) | 0x00 0x00 0x00 0x00 0x00 0x00 0x02 0x00 | ........
 16   (0x10  ) | 0x89 0x0e 0x00 0x00 0x00 0x00 0x00 0x00 | ........
 24   (0x18  ) | 0x00 0x00 0x00 0x00 0x00 0x00 0x04 0x00 | ........

DISKEXPT2> help modesense

-------------------------------------------------------------------------
                            MODESENSE  COMMAND
-------------------------------------------------------------------------
This command reads the mode sense page from SCSI device and displays the
contents in HEX and ASCII.
This command takes two optional parameters; disk index and page code. When
no parameters are given as part of the command, and the environment variable
TESTDISK is not set, it prompts the user to supply the disk index and the
page code. A list of possible page codes are given to the user.

SYNTAX: MODESENSE [<disk index> <page code> ]

EXAMPLE:

DISKEXPT > MODESENSE 1 0x3f

NOTES:
  1.All parameters can be in decimal or hex(0x/0Xnnn or nnnH/h formats).
    Default is decimal.
  2.There are no standard set of supported page codes across all devices.
    The device responds with proper error messages if non-supported page
    codes are choosen.
-------------------------------------------------------------------------

DISKEXPT2> ex
```

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