

Service Reference Guide

HP Compaq dx2250 Business PC



© Copyright 2006 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice.

Microsoft and Windows are trademarks of Microsoft Corporation in the U.S. and other countries.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

This document contains proprietary information that is protected by copyright. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company.

Service Reference Guide

Business PCs

First Edition (November 2006)

Document Part Number: 440319–001

About This Book



WARNING! Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.



NOTE: Text set off in this manner provides important supplemental information.

Table of contents

Index 153

1 Install the Operating System



CAUTION: Do not add optional hardware or third-party devices to your computer until the operating system is successfully installed. Doing so may cause errors and may prevent the operating system from installing properly. Once the automatic installation has begun, **DO NOT TURN OFF THE COMPUTER UNTIL THE PROCESS IS COMPLETE**. Turning off the computer during the installation process might damage the software that runs the computer or prevent its proper installation.



NOTE: Be sure there is a 10.2-cm (4-inch) clearance at the back of the unit and above the monitor to permit the required airflow.

The first time the computer is turned on, the operating system is automatically installed. This takes approximately 10 minutes, depending on the operating system being installed. Carefully read and follow the instructions that appear on the screen to complete the installation.



NOTE: If the computer shipped with more than one operating system language on the hard drive, the installation process could take up to 60 minutes.

If the computer was not shipped with a Microsoft operating system, some portions of this documentation do not apply. For complete operating system installation and configuring instructions, refer to the operating system documentation. Additional information is available in online help.

Microsoft security updates are available on the Microsoft Web site.

Installing or Upgrading Device Drivers

When installing optional hardware devices after the operating system installation is complete, you must also install the drivers for each of the devices.

If prompted for the i386 directory, replace the path specification with **C:\i386**, or use the **Browse** button in the dialog box to locate the i386 folder. This action points the operating system to the appropriate drivers.

Obtain the latest support software, including support software for the operating system from <http://www.hp.com/support>. Select your country and language, select **Download drivers and software**, enter the model number of the computer, and press **Enter**.

Transferring Files and Settings

Use the Microsoft Windows XP Professional/Home Files and Settings Transfer Wizard to move files and settings from the old computer to the new one. Click **Start > All Programs > Accessories > System**

Tools > Files and Settings Transfer Wizard. Follow the wizard's instructions to transfer files and settings to the new computer.

HP Backup and Recovery Manager

The HP Backup and Recovery Manager is an easy-to-use, versatile application that is pre-loaded on each system and allows you to:

- create Recovery Points to back up the entire system incrementally
- back up the entire system in a single hard archive
- back up individual files

Backups can be scheduled to occur automatically at designated intervals, or they can be initiated manually. Recovery can be performed from the Recovery Partition on the hard drive or the Recovery Disc Set. The Recovery Disc Set includes the *Restore Plus!* CD, the Microsoft Operating System, and any Supplemental Software CDs.



NOTE: HP highly recommends that you create a Recovery Disc Set immediately before using the computer and schedule regular automatic Recovery Point backups.

To create the Recovery Disc Set:

1. Click **Start > HP Backup and Recovery > HP Backup and Recovery Manager** to open the Backup and Recovery Wizard, then click **Next**.
2. Select **Create factory software recovery CDs or DVDs to recover the system**.
3. Follow the instructions in the wizard.

The HP Backup and Recovery Manager provides two basic recovery methods. The first, recovery of files and folders, operates in Windows. The second, PC Recovery, requires a reboot to the Recovery Partition or from the Recovery Disc Set. To reboot to the Recovery Partition, press F11 at startup when you see the message "Press F11 for Emergency Recovery."



NOTE: For more information on using HP Backup and Recovery Manager, refer to the *HP Backup and Recovery Manager User Guide* by selecting **Start > HP Backup and Recovery > HP Backup and Recovery Manager Manual**.

You can order a Recovery Disc Set from HP by calling the HP support center. Go to the following Web site, select your region, and click the **Technical support after you buy** link under the **Call HP** heading to obtain the support center telephone number for your region.

http://welcome.hp.com/country/us/en/wwcontact_us.html

2 Computer Setup (F10) Utility

Computer Setup (F10) Utilities

Use Computer Setup (F10) Utility to do the following:

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Modify the boot order of bootable devices such as hard drives, diskette drives, optical drives, or USB flash media devices.
- Restrict a device from booting the unit.
- Run hard drive self-tests.
- View CPU and system temperatures.
- Enter the Asset Tag or property identification number assigned by the company to this computer.
- Establish a supervisor password that controls access to Computer Setup (F10) Utility and the settings described in this section.
- Secure integrated I/O functionality, including the serial, USB, or parallel ports, audio, or embedded NIC, so that they cannot be used until they are unsecured.
- Enable or disable removable media boot ability.
- Enable or disable legacy diskette write ability (when supported by hardware).

Using Computer Setup (F10) Utilities

Computer Setup can be accessed only by turning the computer on or restarting the system. To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer. If you are in Microsoft Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. The Computer Setup Utility screen is divided into menu headings and actions.

Eight menu headings appear on the Computer Setup Utility screen:

- System Information
- Standard CMOS Features
- Advanced BIOS Features
- Advanced Chipset Features
- Integrated Peripherals
- Power Management Setup
- PC Health Status

Five action choices are listed on the Computer Setup Utility screen:

- Load Optimized Defaults
- Set Supervisor Password
- Set User Password
- Save & Exit Setup
- Exit Without Saving

Use the arrow keys to select the appropriate heading, then press **Enter**. Use the arrow (up and down) keys to select the option you want, then press **Enter**. To return to the previous screen, press **Esc**.

4. To apply and save changes, press **F10** or select **Save & Exit Setup** on the Computer Setup Utility screen and press **Enter**.

If you have made changes that you do not want applied, select **Exit Without Saving** and press **Enter**.



CAUTION: Do NOT turn the computer power OFF while the BIOS is saving the Computer Setup (F10) changes because the CMOS could become corrupted. It is safe to turn off the computer only after exiting the F10 Setup screen.

Table 2-1 Computer Setup (F10) Utility Main Menu

| Heading | Table |
|---------------------------|--|
| System Information | Table 2-2 Computer Setup—System Information on page 5 |
| Standard CMOS Features | Table 2-3 Computer Setup—Standard CMOS Features on page 6 |
| Advanced BIOS Features | Table 2-4 Computer Setup—Advanced BIOS Features on page 8 |
| Advanced Chipset Features | Table 2-5 Computer Setup—Advanced Chipset Features on page 9 |
| Integrated Peripherals | Table 2-6 Computer Setup—Integrated Peripherals on page 10 |

Table 2-1 Computer Setup (F10) Utility Main Menu (continued)

| | |
|-------------------------------|--|
| Power Management Setup | Table 2-7 Computer Setup—Power Management Setup on page 11 |
| PC Health Status | Table 2-8 Computer Setup—PC Health Status on page 12 |
| (Action Choices) | Table 2-9 Computer Setup—(Action Choices) on page 12 |

Computer Setup—System Information



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-2 Computer Setup—System Information

| Option | Description |
|------------------------------|---|
| Product Name | (view only) |
| SKU Number | (view only) |
| Processor Type | (view only) |
| Processor Speed | (view only) |
| Cache Size | (view only) |
| Memory Size | (view only) |
| System ROM | (view only) |
| Integrated MAC | (view only) |
| UUID | (view only) |
| System Serial # | (view only) |
| Asset Tracking Number | (view only) |
| Enter Asset Tag No. | Enter asset tag number assigned by the company (maximum 18 characters). |

Computer Setup—Standard CMOS Features



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-3 Computer Setup—Standard CMOS Features

| Option | Description |
|------------------------------|--|
| Date (mm:dd:yy) | Allows you to set system date. |
| Time (hh:mm:ss) | Allows you to set system time. |
| PATA Controller | Disables/enables PATA Controller. |
| PATA Channel 0 Master | For each, if PATA HDD is used, allows you to: |
| PATA Channel 0 Slave | <ul style="list-style-type: none">• run HDD self-test for selected channel:<ul style="list-style-type: none">• SMART Status Check• HDD Short Self-Test• HDD Extended Self-Test• set PATA Ch 0 Master/Slave device details on selected channel to:<ul style="list-style-type: none">• Auto• Manual• set access mode on selected channel to:<ul style="list-style-type: none">• CHS (Cylinder-Head-Sector)• LBA (Logical Block Addressing)• Large• Auto• view:<ul style="list-style-type: none">• Firmware Version• Capacity• Cylinder• Head• Precomp• Landing Zone• Sector |
| SATA Controller | Disables/enables onboard SATA controller. |
| SATA Mode | Allows you to set the onboard SATA mode to: <ul style="list-style-type: none">• Native IDE• Legacy IDE |

Table 2-3 Computer Setup—Standard CMOS Features (continued)

| | |
|------------------------------|---|
| SATA Channel 1 Master | For each, allows you to: |
| SATA Channel 2 Master | <ul style="list-style-type: none">• run HDD self-test for selected channel:<ul style="list-style-type: none">• SMART Status Check• HDD Short Self-Test• HDD Extended Self-Test• set extended IDE drive on selected channel to:<ul style="list-style-type: none">• None• Auto• set access mode on selected channel to:<ul style="list-style-type: none">• Large• Auto• view:<ul style="list-style-type: none">• Firmware Version• Capacity• Cylinder• Head• Precomp• Landing Zone• Sector |
| Floppy Controller | Disables/enables the floppy disk controller. |
| Drive A | Allows you to set Drive A to: <ul style="list-style-type: none">• None• 1.44M, 3.5 in. |
| Halt On | Allows you to set POST error behavior to: <ul style="list-style-type: none">• All Errors• No Errors• All but Keyboard• All but Diskette• All but Diskette/Keyboard |
| POST Delay | Allows you to set a POST delay to: <ul style="list-style-type: none">• 0 seconds• 5 seconds• 10 seconds |

- 15 seconds
- 30 seconds

Computer Setup—Advanced BIOS Features



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-4 Computer Setup—Advanced BIOS Features

| | |
|-----------------------------------|--|
| Device Boot Disabling | Allows you to restrict a device from booting the unit. You can disable as a bootable device: <ul style="list-style-type: none"> • None • USB • Internal ODD • Internal FDD • USB + ODD + FDD |
| F9 Boot Menu | Disables/enables F9 Boot Menu. |
| Removable Device Boot Seq. | Allows you to specify the order of attached removable devices (such as Floppy Discs or USB FDD). The first drive in the order has priority in the boot sequence and is recognized as drive A. |
| Hard Disk Boot Seq. | Allows you to specify the order of attached hard drive devices (such as USB HDD storage, USB2 Drive Key, or USB flash media). The first drive in the order has priority in the boot sequence and is recognized as drive C (if any devices are attached). |
| Optical Drive Boot Seq. | Allows you to specify the order in which attached optical drives (including USB ODD) are checked for a bootable operating system image. |
| Network Boot Seq. | Allows you to specify the order in which network devices (including UP NIC cards) are checked for a bootable operating system image. |
| First Boot Device | Allows you to specify which devices will boot first, second, third, and fourth or to disable any of the four: <ul style="list-style-type: none"> • Removable • Hard Disk • CDROM • Network • Disabled |
| Second Boot Device | |
| Third Boot Device | |
| Fourth Boot Device | |
| | <p>NOTE: MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started.</p> |
| Boot Up NumLock Status | Allows you to set the default NumLock status to off or on. |
| Security Option | Allows you to set the security option to Setup or System so that the password is required every time the system boots or only when entering Computer Setup. |
| BIOS Write Protect | Disables/enables BIOS write Protect function. |
| AMD NX Function | Disables/enables AMD NX Function. |

Computer Setup—Advanced Chipset Features



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-5 Computer Setup—Advanced Chipset Features

| Option | Description |
|---|---|
| UMA Frame Buffer | Select the UMA (Unified Memory Architecture) frame buffer size: <ul style="list-style-type: none">• 32MB• 64MB• 128MB• Recommended (system allocates memory automatically) |
| Init Display First (VGA Setting) | Allows you to select the primary display device: <ul style="list-style-type: none">• PCI Slot• OnChipVGA• PCIEx |
| SURROUNDVIEW (VGA Setting) | Disables/enables SURROUNDVIEW (available when an ATI PCIEx video card is installed). |
| Auto Detect PCI Clk (VGA Setting) | Disables/enables PCI clock auto-detection. |
| Spread Spectrum (VGA Setting) | Disables/enables Spread Spectrum. |

Computer Setup—Integrated Peripherals



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-6 Computer Setup—Integrated Peripherals

| Option | Heading |
|------------------------------|--|
| Onboard HD Audio | Disables/enables onboard HD audio. |
| OnChip USB Controller | Disables/enables USB controller. |
| USB Legacy Support | Disables/enables USB legacy support function (USB keyboard, USB mouse, and USB flash media). |
| Onboard LAN | Disables/enables onboard LAN controller. |
| Onboard LAN Boot ROM | Disables/enables the boot ROM of the onboard LAN chip. |
| Onboard Serial Port | Allows you to select a setting for the onboard serial port: <ul style="list-style-type: none">• Disabled• 3F8/IRQ4• 2F8/IRQ3• 3E8/IRQ4• 2E8/IRQ3 |
| Onboard Parallel Port | Allows you to select a setting for the onboard parallel port: <ul style="list-style-type: none">• Disabled• 378/IRQ7• 278/IRQ5• 3BC/IRQ7 |
| Parallel Port Mode | Allows you to select parallel port mode: <ul style="list-style-type: none">• SPP• EPP• ECP• ECP+EPP• Normal |

Computer Setup—Power Management Setup



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-7 Computer Setup—Power Management Setup

| Option | Heading |
|-----------------------------------|--|
| After AC Power Loss | Allows you to select system power loss behavior: <ul style="list-style-type: none">• On• Off• Last State |
| External Modem S5 Wake-Up | Disables/enables wake-up modem from S5. |
| Wake on PCI Device from S5 | Disables/enables PCI S5 on power on. |
| AMD Cool'n'Quiet | Disables/enables the AMD Cool'n'Quiet feature. |
| RTC Alarm Resume | Disables/enables RTC (real-time clock) alarm. |
| Date (of Month) | If RTC Alarm Resume is enabled, allows you to select the day of the month for resumption of RTC alarm. (Set to 0 for every day.) |
| Resume Time (hh:mm:ss) | If RTC Alarm Resume is enabled, allows you to select what time the RTC alarm will resume. |

Computer Setup—PC Health Status



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-8 Computer Setup—PC Health Status

| Option | Description |
|-----------------------------------|--|
| System Fan Fail Check | Disables/enables system fan detection during POST. |
| Smart Fan Function | Disables/enables smart fan functionality. |
| Current CPU Temperature | (view only) |
| Current System Temperature | (view only) |
| Current CPU Fan Speed | (view only) |
| Current System Fan Speed | (view only) |
| Vcore | (view only) |
| +12V | (view only) |
| VCC5 | (view only) |
| +3.3V | (view only) |
| VBAT (V) | (view only) |
| 3VSB (V) | (view only) |

Computer Setup—(Action Choices)



NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 2-9 Computer Setup—(Action Choices)

| Option | Description |
|--------------------------------|---|
| Load Optimized Defaults | Allows you to reset Computer Setup to factory defaults. |
| Set Supervisor Password | Allows you to establish a password to control access to Computer Setup. |
| Set User Password | Allows you to establish a password to control access to the computer. (Supervisor password must be set before you can set a User password.) |
| Save & Exit Setup | Allows you to save current settings and exit Computer Setup. |
| Exit Without Saving | Allows you to exit Computer Setup without saving changes. |

Recovering the Configuration Settings

Recovering the configuration settings established in the Computer Setup (F10) Utility requires that you first back up the settings before a recovery is needed.

The CMOS Save/Load utility can be found at <http://www.hp.com> under the Software & Driver Downloads for your specific model. Download the firmware files into a folder on a removable storage device. It is recommended that you save any modified computer configuration settings to a diskette, a USB flash media device, or a diskette-like device (a storage device set to emulate a diskette drive) and save the diskette or device for possible future use.

Backing Up the CMOS

1. Make sure the computer to be backed up is turned on. Connect the removable storage to the computer.
2. Boot to DOS.
3. Type `N:\folder\BIOS.exe SAVE:ABC001.DAT` (where N is the drive letter of the removable storage) to save the CMOS setting to the removable storage device.

Restoring the CMOS

1. Make sure the target computer is turned on. Connect the removable storage to the target computer.
2. Boot to DOS.
3. Type `N:\folder\BIOS.exe LOAD:ABC001.DAT` (where N is the drive letter of the removable storage) to load the custom CMOS setting onto the target system.

3 HP Insight Diagnostics

HP Insight Diagnostics



NOTE: HP Insight Diagnostics is included on CD with some computer models only.

The HP Insight Diagnostics utility allows you to view information about the hardware configuration of the computer and perform hardware diagnostic tests on the subsystems of the computer. The utility simplifies the process of effectively identifying, diagnosing, and isolating hardware issues.

The Survey tab is displayed when you invoke HP Insight Diagnostics. This tab shows the current configuration of the computer. From the Survey tab, there is access to several categories of information about the computer. Other tabs provide additional information, including diagnostic test options and test results. The information in each screen of the utility can be saved as an html file and stored on a diskette or USB HP Drive Key.

Use HP Insight Diagnostics to determine if all the devices installed on the computer are recognized by the system and functioning properly. Running tests is optional but recommended after installing or connecting a new device.

You should run tests, save the test results, and print them so that you have printed reports available before placing a call to the Customer Support Center.



NOTE: Third party devices may not be detected by HP Insight Diagnostics.

Accessing HP Insight Diagnostics

You must boot to the *Documentation and Diagnostics CD*, as described in the steps below, to access HP Insight Diagnostics.

1. While the computer is on, insert the *Documentation and Diagnostics CD* into an optical drive on the computer.
2. Shut down the operating system and turn off the computer.
3. Turn on the computer. The system will boot to the CD.



NOTE: If the system does not boot to the CD in the optical drive, you may need to change the boot order in the Computer Setup (F10) utility so that the system attempts to boot to the optical drive before booting to the hard drive. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for more information.

4. Select the appropriate language and click **Continue**.



NOTE: It is recommended that you accept the assigned default keyboard for your language unless you want to test your specific keyboard.

5. In the End User License Agreement page, click **Agree** if you agree with the terms. The HP Insight Diagnostics utility launches with the Survey tab displayed.

Survey Tab

The **Survey** tab displays important system configuration information.

In the **View level** field, you can select the **Summary** view to see limited configuration data or select the **Advanced** view to see all the data in the selected category.

In the **Category** field, you can select the following categories of information to display:

All—Gives a listing of all categories of information about the computer.

Overview—Gives you a listing of general information about the computer.

Architecture—Provides system BIOS and PCI device information.

Asset Control—Shows product name, asset tag, system serial number, and processor information.

Communication—Shows information about the computer parallel (LPT) and serial (COM) port settings, plus USB and network controller information.

Graphics—Shows information about the graphics controller of the computer.

Input Devices—Shows information about the keyboard, mouse, and other input devices connected to the computer.

Memory—Shows information about all memory in the computer. This includes memory slots on the system board and any memory modules installed.

Miscellaneous—Shows HP Insight Diagnostics version information, computer configuration memory (CMOS) information, system board data, and system management BIOS data.

Storage—Shows information about storage media connected to the computer. This list includes all fixed disks, diskette drives, and optical drives.

System—Shows information about the computer model, processor, chassis, and BIOS, plus internal speaker and PCI bus information.

Test Tab

The Test tab allows you to choose various parts of the system to test. You can also choose the type of test and testing mode.

There are three types of tests to choose from:

- **Quick Test**—Provides a predetermined script where a sample of each hardware component is exercised and requires no user intervention in either Unattended or Interactive mode.
- **Complete Test**—Provides a predetermined script where each hardware component is fully tested. There are more tests available in the Interactive mode, but these require user intervention.
- **Custom Test**—Provides the most flexibility in controlling the testing of a system. The Custom Test mode allows you to specifically select which devices, tests, and test parameters are run.

For each test type, there are two test modes to choose from:

- **Interactive Mode**—Provides maximum control over the testing process. The diagnostic software will prompt you for input during tests that require your interaction. You may also determine whether the test passed or failed.
- **Unattended Mode**—Does not display prompts and requires no interaction. If errors are found, they are displayed when testing is complete.

To begin testing:

1. Select the Test tab.
2. Select the tab for the type of test you want to run: **Quick**, **Complete**, or **Custom**.
3. Select the **Test Mode: Interactive** or **Unattended**.
4. Choose how you want the test to be executed, either **Number of Loops** or **Total Test Time**. When choosing to run the test over a specified number of loops, enter the number of loops to perform. If you desire to have the diagnostic test for a specified time period, enter the amount of time in minutes.
5. If performing a Quick Test or Complete Test, select the device to be tested from the drop-down list. If performing a Custom Test, Click the **Expand** button and select the devices to be tested or click the **Check All** button to select all devices.
6. Click the **Begin Testing** button at the bottom right corner of the screen to start the test. The Status tab, which allows you to monitor the progress of the test, is automatically displayed during the testing process. When the test is complete, the Status tab shows whether the device passed or failed.
7. If errors are found, go to the Log tab and click the **Error Log** to display more detailed information and recommended actions.

Status Tab

The Status tab displays the status of the selected tests. The type of test executed (**Quick**, **Complete**, or **Custom**) is also displayed. The main progress bar displays the percent complete of the current set of tests. While testing is in progress, a **Cancel Testing** button is displayed for use if you want to cancel the test.

After testing has completed, the **Cancel Testing** button is replaced with a **Retest** button. The **Retest** button will retest the last set of tests executed. This enables you to re-run the set of tests without having to re-enter the data in the Test tab.

The Status tab also shows:

- The devices being tested
- The test status (running, passed, or failed) of each device being tested
- The overall test progress of all devices being tested
- The test progress for each device being tested
- The elapsed test times for each device being tested

Log Tab

The Log tab contains a **Test Log** tab and an **Error Log** tab.

The **Test Log** displays all tests that have been executed, the number of times of execution, the number of times failed, and the time it took to complete each test. The **Clear Test Log** button will clear the contents of the **Test Log**.

The **Error Log** displays the tests for devices that have failed during the diagnostic testing and includes the following columns of information.

- The **Device** section displays the device tested.
- The **Test** section displays the type of test run.
- The **Description** section describes the error that the diagnostic test found.
- The **Recommended Repair** will give a recommended action that should be performed to resolve the failed hardware.
- The **Failed Count** is the number of times the device has failed a test.
- The **Error Code** provides a numerical code for the failure. The error codes are defined in the Help tab.

The **Clear Error Log** button will clear the contents of the Error Log.

Help Tab

On the Help tab contains an **HP Insight Diagnostics** tab, an **Error Codes** tab, and a **Test Components** tab.

The **HP Insight Diagnostics** tab contains help topics and includes search and index features.

The **Error Codes** tab provides a description of each numerical error code that may appear in the **Error Log** tab located on the **Log** tab. Each code has a corresponding error **Message** and a **Recommended Repair** action that should help solve the problem. To find an error code description quickly, enter the code in the box at the top of the tab and click the **Find Error Codes** button.

The **Test Components** tab displays low-level information on tests that are run.

Saving and Printing Information in HP Insight Diagnostics

You can save the information displayed in the HP Insight Diagnostics **Survey** and **Log** tabs to a diskette or a USB 2.0 HP Drive Key (64MB or higher). You can not save to the hard drive. The system will automatically create an html file that has the same appearance as the information displayed on the screen.

1. Insert a diskette or USB 2.0 HP Drive Key (capacity must be 64MB or higher). USB 1.0 Drive Keys are not supported.
2. Click **Save** in the bottom right corner of the screen.
3. Select **Save to the floppy** or **Save to USB key**.
4. Enter a file name in the **File Name** box and click the **Save** button. An html file will be saved to the inserted diskette or USB HP Drive Key.



NOTE: Do not remove the diskette or USB key until you see a message indicating that the html file has been written to the media.

5. Print the information from the storage device used to save it.



NOTE: To exit HP Insight Diagnostics, click Exit Diagnostics button in the bottom left corner of the screen then remove the *Documentation and Diagnostics CD* from the optical drive.

Downloading the Latest Version of HP Insight Diagnostics

1. Go to <http://www.hp.com>.
2. Click the **Software & Driver Downloads** link.
3. Enter your product number (for example, dc7700) in the text box and press the **Enter** key.
4. Select your specific computer model.
5. Select your OS.
6. Click the **Diagnostic** link.
7. Click **HP Insight Diagnostics Offline Edition**.
8. Select a language and click **Download**.



NOTE: The download includes instructions on how to create the bootable CD.

Protecting the Software

To protect software from loss or damage, you should keep a backup copy of all system software, applications, and related files stored on the hard drive. See the operating system or backup utility documentation for instructions on making backup copies of data files.

Restoring the Software

The HP Backup and Recovery Manager is an easy-to-use, versatile application that is pre-loaded on each system and allows you to:

- create Recovery Points to back up the entire system incrementally
- back up the entire hard drive in a single archive
- back up individual files

Backups can be scheduled to occur automatically at designated intervals, or they can be initiated manually. Recovery can be performed from the Recovery Partition on the hard drive or the Recovery Disc Set . The Recovery Disc Set includes the *Restore Plus!* CD, the Microsoft Operating System, and any Supplemental Software CDs.



NOTE: HP highly recommends that you create a Recovery Disc Set immediately before using the computer and schedule regular automatic Recovery Point backups.

The HP Backup and Recovery Manager provides two basic recovery methods. The first, recovery of files and folders, operates in Windows. The second, PC Recovery, requires a reboot to the Recovery Partition or from the Recovery Disc Set. To reboot to the Recovery Partition, press F11 at startup when you see the message "Press F11 for Emergency Recovery."



NOTE: For more information on using HP Backup and Recovery Manager, refer to the *HP Backup and Recovery Manager User Guide* by selecting **Start > HP Backup and Recovery > HP Backup and Recovery Manager Manual**.

4 Desktop Management

HP Client Management Solutions provides standards-based solutions for managing and controlling desktops, workstations, and notebook PCs in a networked environment. HP pioneered desktop manageability in 1995 with the introduction of the industry's first fully manageable desktop personal computers. HP is a patent holder of manageability technology. Since then, HP has led an industry-wide effort to develop the standards and infrastructure required to effectively deploy, configure, and manage desktops, workstations, and notebook PCs. HP develops its own management software and works closely with leading management software solution providers in the industry to ensure compatibility between HP Client Management Solutions and these products. HP Client Management Solutions are an important aspect of our broad commitment to providing you with solutions that assist you in lowering the total cost of owning and maintaining the PCs throughout their lifecycle.

The key capabilities and features of desktop management are:

- Initial configuration and deployment
- Remote system installation
- Software updating and management
- ROM flash
- Asset tracking and security
- Fault notification and recovery



NOTE: Support for specific features described in this guide may vary by model or software version.

Initial Configuration and Deployment

The computer comes with a preinstalled system software image. After a brief software “unbundling” process, the computer is ready to use.

You may prefer to replace the preinstalled software image with a customized set of system and application software. There are several methods for deploying a customized software image. They include:

- Installing additional software applications after unbundling the preinstalled software image.
- Using software deployment tools, such as HP OpenView Client Configuration Manager, HP OpenView Configuration Management Solutions Radia OS Manager, or Altiris Deployment Solution, to replace the preinstalled software with a customized software image.
- Using a disk cloning process to copy the contents from one hard drive to another.

The best deployment method depends on your information technology environment and processes. The PC Deployment section of the HP Lifecycle Service Web site (<http://h20219.www2.hp.com/services/cache/80906-0-0-225-121.html>) provides information to help you select the best deployment method.

The *Restore Plus!* CD, ROM-based setup, and ACPI hardware provide further assistance with recovery of system software, configuration management and troubleshooting, and power management.



NOTE: See [HP Backup and Recovery Manager on page 23](#) for information on creating the *Restore Plus!* CD.

HP OpenView Agent

The Radia Management Agent (RMA) used by both HP OpenView Client Configuration Manager and HP OpenView PC Configuration Management Solutions (Radia) is pre-loaded on the computer. When installed, it enables communication with the HP OpenView management console.

To install the Radia Management Agent:

1. Click **Start**.
2. Click **All Programs**.
3. Click **HP Manageability**.
4. Click **Radia Management Agent Readme**.
5. Review and follow the instructions contained in the Readme file to install the Radia Management Agent.

Altiris Deployment Solution Agent

This program is pre-loaded on the computer. When installed, it enables communication with the administrator Altiris Deployment Solution console.

To install Altiris Deployment Solution Agent:

1. Click **Start**.
2. Click **All Programs**.
3. Click **Software Setup**.
4. Click **Next**.
5. Scroll down and click on the link to install Altiris AClient.

The Altiris Deployment Solution Agent is a key infrastructure component for enabling the HP Client Foundation Suite and the Client Premium Suite. To learn about the other infrastructure components necessary for implementing the HP Client Foundation Suite and Client Premium Suite, please visit www.hp.com/go/easydeploy.

HP Backup and Recovery Manager



CAUTION: HP no longer ships the *Restore Plus!* CD set with PCs. Instead, HP Backup and Recovery Manager is pre-loaded on each system. HP recommends that you create a recovery CD set as soon as you have set up the new computer. Creating the *Restore Plus!* CD set is important in the event that you ever need to restore the system hard drive to its factory installed state.

HP Backup and Recovery Manager can create the *Restore Plus!* CD set. This set includes the *Restore Plus!* CD, the Operating System CD, and any Supplemental Software CDs.



CAUTION: The *Restore Plus!* CD set will not include any system settings or user data created after the initial system setup.

To create the *Restore Plus!* CD set:

1. Click **Start > HP Backup and Recovery > HP Backup and Recovery Manager** to open the Backup and Recovery Wizard, then click **Next**.
2. Select **Create factory software recovery CDs or DVDs to recover the system**.
3. Follow the instructions in the wizard.

In addition to allowing you to create the *Restore Plus!* CD set, HP Backup and Recovery Manager can be used to back up data and system files to the hard drive, to network drives, or to removable media, such as CDs, DVDs, or flash media. If data or system files are lost, deleted, or corrupted, Backup and Recovery Manager allows you to retrieve data or restore the last good system image.



CAUTION: HP recommends that a backup schedule be created immediately to ensure continued system and data protection. Automatic backups can be scheduled using the HP Backup and Recovery Manager Wizard. Recovery Points, Entire Drive Backups, and File Backups can be automatically backed up without user intervention. HP recommends scheduling Recovery Point Backups to provide the most comprehensive coverage.



NOTE: If HP Backup and Recovery Manager is preinstalled, the *Restore Plus!* CD set and the initial recovery point may be saved to disc as often as necessary, but only a single copy of the Microsoft Windows CD can be created, due to licensing constraints.

You can access a user manual at **Start > HP Backup and Recovery > HP Backup and Recovery Manager Manual**. We suggest that you print this document for easy reference in case of future emergency.

If **Create factory software recovery CDs or DVDs to recover the system** is unavailable on your system, the HP *Restore Plus!* CD set can be obtained through product support on http://welcome.hp.com/country/us/en/contact_us.html.

Remote System Installation

Remote System Installation allows you to start and set up the system using the software and configuration information located on a network server by initiating the Preboot Execution Environment (PXE). The Remote System Installation feature is usually used as a system setup and configuration tool, and can be used for the following tasks:

- Formatting a hard drive
- Deploying a software image on one or more new PCs
- Remotely updating the system BIOS in flash ROM ([Remote ROM Flash on page 29](#))
- Configuring the system BIOS settings

To initiate Remote System Installation, press **F12** when the **F12 = Network Service Boot** message appears in the lower-right corner of the HP logo screen when the computer is booting up. Follow the instructions on the screen to continue the process. The default boot order is a BIOS configuration setting that can be changed to always attempt to PXE boot.

Software Updating and Management

HP provides several tools for managing and updating software on desktops, workstations, and notebooks:

- HP Client Manager
- HP System Software Manager
- HP ProtectTools Security Manager
- HP Client Management Premium Suite
- HP Client Foundation Suite
- HP OpenView Client Configuration Manager
- HP OpenView Management Suite for Desktops using Radia
- HP Proactive Change Notification
- HP Subscriber's Choice

HP Client Management Interface

Regardless of the system management tools your IT department uses, managing both your hardware and software assets is important to keeping your IT costs low and your business agile.

With the HP Client Management Interface (HP CMI), new HP business computers seamlessly integrate into your managed IT environment. HP CMI provides an interface that simplifies the integration of HP business computers with popular industry system management tools (including Microsoft Systems Management Server, IBM Tivoli Software, and HP OpenView Operations) and custom inhouse developed management applications. Using HP CMI, systems management tools and applications can request in-depth client inventory, receive health status information, and manage system BIOS settings by communicating directly with the client computer, reducing the need for agent or connector software to achieve integration.



NOTE: The system management tools mentioned above do not automatically connect into HP CMI. Some script development is typically required to interface with HP CMI.

HP Client Management Interface is based on industry standards that include Microsoft Windows Management Interface (MS WMI), Web-Based Enterprise Management (WBEM), System Management BIOS (SMBIOS), and Advanced Configuration and Power Interface (ACPI). HP CMI is a foundation technology utilized in HP Client Management Solutions. With HP CMI, HP gives you flexibility in choosing how you manage your HP client computers.

HP Client Management Interface used in conjunction with system management software can:

- Request in-depth client inventory information—Capture detailed information about the processors, hard drives, memory, BIOS, drivers, including sensor information (such as fan speed, voltage, and temperature)
- Receive health status information—Subscribe for a wide range of client hardware alerts (such as over-temperature, fan stall, and hardware configuration changes) to be sent to the system management console, application, or to the local client computer. Alerts are sent real-time when triggered by hardware events.
- Manage system BIOS settings—Perform F10 functions including setting and changing the BIOS passwords and computer boot order remotely from your system management console on any or all of your client systems without having to visit each machine.

HP System Software Manager

HP System Software Manager (SSM) is a free utility that automates remote deployment of device drivers and BIOS updates for your networked HP business PCs. When SSM runs, it silently (without user interaction) determines the revision levels of drivers and BIOS installed on each networked client system and compares this inventory against system software SoftPaqs that have been tested and stored in a central file store. SSM then automatically updates any down-revision system software on the networked PCs to the later levels available in the file store. Since SSM only allows distribution of SoftPaq updates to the correct client system models, administrators can confidently and efficiently use SSM to keep system software updated.

System Software Manager integrates with enterprise software distribution tools such as HP OpenView Management Suite using Radia and Microsoft Systems Management Server (SMS). Using SSM, you can distribute customer-created or third-party updates that have been packaged in the SSM-format.

SSM may be downloaded at no charge by visiting www.hp.com/go/ssm.

HP Client Manager

HP Client Manager, developed with Altiris, is available free for all supported HP business desktop, notebook, and workstation models. SSM is integrated into HP Client Manager, and enables central tracking, monitoring, and management of the hardware aspects of HP client systems.

Use HP Client Manager to:

- Get valuable hardware information such as CPU, memory, video, and security settings
- Monitor system health to fix problems before they occur
- Automatically acquire and install drivers and BIOS updates without visiting each PC

- Remotely configure BIOS and security settings
- Automate processes to quickly resolve hardware problems

Tight integration with HP Instant Support tools reduces hardware troubleshooting time.

- Diagnostics—remotely run & view reports on HP desktop, notebook, and workstation models
- System Health Scan—check for known hardware issues in your installed base of HP client systems
- Active Chat—connect to HP customer support to resolve issues
- HP Knowledgebase—link to expert information
- Automated SoftPaq collection and delivery process for fast resolution of hardware problems
- Identify, inventory, and initialize systems with HP ProtectTools embedded security chip
- Option for health alerts to display locally on the client system
- Report basic inventory information for non-HP clients

For more information on HP Client Manager, visit www.hp.com/go/clientmanager.

HP ProtectTools Security Manager

ProtectTools Security Manager software provides security features that help protect against unauthorized access to the computer, networks, and critical data. Enhanced security functionality is provided by the following modules:

- Smart Card Security for ProtectTools
- Embedded Security for ProtectTools
- BIOS Configuration for ProtectTools
- Credential Manager for ProtectTools

The modules available for your computer may vary depending on your model. For example, Embedded Security for ProtectTools requires that the Trusted Platform Module (TPM) embedded security chip (some models only) be installed on your computer, and Smart Card Security for ProtectTools requires an optional smart card and reader.

ProtectTools modules may be preinstalled, preloaded, or available for purchase from the HP Web site. Visit <http://www.hp.com/products/security> for more information.

HP Client Management Premium Suite

HP Client Premium Suite (HP CPS) is designed for organizations wanting full client hardware and software lifecycle management from a single, Web-based management console. It combines:

- HP Client Manager
- HP Systems Insight Manager Connector
- HP OpenView Connector
- Altiris Client Manager Suite - Level 1
- Altiris Connector Solution

- Altiris Local Recovery Pro
- Altiris AuditExpress

For more information on HP Client Management Premium Suite, visit www.hp.com/go/easydeploy.

HP Client Foundation Suite

The HP Client Foundation Suite (HP CFS) is designed for organizations wanting essential client management functionality. It combines:

- HP Client Manager
- HP Systems Insight Manager Connector
- Altiris Migration Suite
- Altiris Local Recovery Pro

For more information about the HP Client Foundation Suite, visit <http://www.hp.com/go/easydeploy>.

HP OpenView Client Configuration Manager

HP OpenView Client Configuration Manager is a simplified, out-of-the-box, and easy-to-use solution that solves immediate PC software configuration management needs.

- Integrated software management
 - Inventory collection
 - Operating system deployment and settings migration
 - Patch management
 - Software distribution
 - Software usage metering
- Integrated hardware management
 - Remote control
 - HP alert monitoring
 - HP hardware driver and BIOS updates
 - Integration with HP ProtectTools
 - Free add-on support for Intel Active Management Technology (AMT)
 - Free version for basic hardware management of HP desktops and notebooks, and software and hardware management for HP Thin Clients.

For more information about the HP OpenView Client Configuration Manager, visit <http://www.managementsoftware.hp.com/products/ccm/index.html>.

HP OpenView PC Configuration Management Solutions

HP OpenView Configuration Management solutions automate the management of software such as operating systems, applications, patches, content, and configuration settings to ensure that each computing device is maintained in the right configuration.

Proven across enterprises of every size and complexity, HP's adaptive, policy-based model for software Configuration Management, automates the entire software lifecycle management process - from discovery, deployment, and ongoing management through to migration and retirement.

By substituting automation for manual intervention, HP helps its customers lower costs, significantly reduce software related problems, and ensure the software supporting their business operations is reliable and secure.

For more information on HP OpenView PC Configuration Management Solution, visit <http://h20229.www2.hp.com/solutions/ascm/index.html>.

Proactive Change Notification

The Proactive Change Notification program uses the Subscriber's Choice Web site in order to proactively and automatically:

- Send you Proactive Change Notification (PCN) e-mail informing you of hardware and software changes to most commercial computers and servers, up to 60 days in advance
- Send you e-mail containing Customer Bulletins, Customer Advisories, Customer Notes, Security Bulletins, and Driver alerts for most commercial computers and servers

You create your own profile to ensure that you only receive the information relevant to a specific IT environment. To learn more about the Proactive Change Notification program and create a custom profile, visit <http://h30046.www3.hp.com/subhub.php>

Subscriber's Choice

Subscriber's Choice is a client-based service from HP.

Based on your profile, HP will supply you with personalized product tips, feature articles, and/or driver and support alerts/notifications.

Subscriber's Choice Driver and Support Alerts/Notifications will deliver e-mails notifying you that the information you subscribed to in your profile is available for review and retrieval. To learn more about Subscriber's Choice and create a custom profile, visit <http://h30046.www3.hp.com/subhub.php>.

Retired Solutions

Two software packages, Altiris Local Recovery, and Dantz Retrospect, will no longer be shipping on HP business desktops, notebooks, or workstations. Starting with new business desktops, notebooks, and workstations released in 2006, all will ship with HP Backup and Recovery Manager.

ROM Flash

The computer's BIOS is stored in a programmable flash ROM (read only memory). By establishing a setup password in the Computer Setup (F10) Utility, you can protect the ROM from being unintentionally updated or overwritten. This is important to ensure the operating integrity of the computer. Should you need or want to upgrade the BIOS, you may download the latest BIOS images from the HP driver and support page, <http://www.hp.com/support/files>.



CAUTION: For maximum ROM protection, be sure to establish a setup password. The setup password prevents unauthorized ROM upgrades. System Software Manager allows the system administrator to set the setup password on one or more PCs simultaneously. For more information, visit <http://www.hp.com/go/ssm>.

Remote ROM Flash

Remote ROM Flash allows the system administrator to safely upgrade the BIOS on remote HP computers directly from the centralized network management console. Enabling the system administrator to perform this task remotely on multiple computers results in a consistent deployment of, and greater control over, HP PC BIOS images over the network. It also results in greater productivity and lower total cost of ownership.



NOTE: The computer must be powered on, or turned on through Remote Wakeup, to take advantage of Remote ROM Flash.

For more information on Remote ROM Flash, refer to the HP Client Manager Software or System Software Manager at <http://h18000.www1.hp.com/im/prodinfo.html>.

HPQFlash

The HPQFlash utility is used to locally update or restore the system BIOS of individual PCs from a Windows operating system.

For more information on HPQFlash, visit <http://www.hp.com/support/files> and enter the model number of the computer when prompted.

Boot Block Emergency Recovery Mode

Boot Block Emergency Recovery Mode permits system recovery in the unlikely event of a ROM flash failure. For example, if a power failure were to occur during a BIOS upgrade, the ROM flash would be incomplete. This would render the system BIOS unusable. The Boot Block is a flash-protected section of the ROM that contains code that checks for a valid system BIOS image when the system is turned on.

- If the system BIOS image is valid, the system starts normally.
- If the system BIOS image is not valid, a failsafe Boot Block BIOS provides enough support to
 - search removable media for BIOS image files. If an appropriate BIOS image file is found, it is automatically flashed into the ROM.
 - start the system from bootable removable media that automatically invokes system BIOS upgrade utilities.

When an invalid system BIOS image is detected, the system power LED will blink red 8 times, one blink every second. Simultaneously, the speaker will beep 8 times. If the portion of the system ROM containing the video option ROM image is not corrupt, **Boot Block Emergency Recovery Mode** will be displayed on the screen.

To recover the system after it enters Boot Block Emergency Recovery Mode, complete the following steps:

1. Turn off the power.
2. Insert a diskette, CD, or USB flash device containing the desired BIOS image file in the root directory.



NOTE: The media must be formatted using the FAT12, FAT16, or FAT32 file system.

3. Turn on the computer.

If no appropriate BIOS image file is found, the failsafe Boot Block BIOS will attempt to start the system from a bootable device. If no bootable device is found, you will be prompted to insert media containing a BIOS image file or BIOS upgrade utility.

If the system successfully reprograms the ROM, the system will automatically power off.

4. Remove the removable media used to upgrade the BIOS.
5. Turn the power on to restart the computer.

Replicating the Setup

The following procedures give an administrator the ability to easily copy one setup configuration to other computers of the same model. This allows for faster, more consistent configuration of multiple computers.



NOTE: Both procedures require a diskette drive or a supported USB flash media device, such as an HP Drive Key.

Copying to Single Computer



CAUTION: A setup configuration is model-specific. File system corruption may result if source and target computers are not the same model. For example, do not copy the setup configuration from a dc7xxx PC to a dx7xxx PC.

1. Select a setup configuration to copy. Turn off the computer. If you are in Windows, click **Start > Shut Down > Shut Down**.
2. If you are using a USB flash media device, insert it now.
3. Turn on the computer.
4. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

5. If you are using a diskette, insert it now.
6. Click **File > Replicated Setup > Save to Removable Media**. Follow the instructions on the screen to create the configuration diskette or USB flash media device.

7. Turn off the computer to be configured and insert the configuration diskette or USB flash media device.
8. Turn on the computer to be configured.
9. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.
10. Click **File > Replicated Setup > Restore from Removable Media**, and follow the instructions on the screen.
11. Restart the computer when the configuration is complete.

Copying to Multiple Computers



CAUTION: A setup configuration is model-specific. File system corruption may result if source and target computers are not the same model. For example, do not copy the setup configuration from a dc7xxx PC to a dx7xxx PC.

This method takes a little longer to prepare the configuration diskette or USB flash media device, but copying the configuration to target computers is significantly faster.



NOTE: A bootable diskette is required for this procedure or to create a bootable USB flash media device. If Windows XP is not available to use to create a bootable diskette, use the method for copying to a single computer instead (see [Copying to Single Computer on page 30](#)).

1. Create a bootable diskette or USB flash media device. See [Supported USB Flash Media Device on page 32](#) or [Unsupported USB Flash Media Device on page 33](#).



CAUTION: Not all computers can be booted from a USB flash media device. If the default boot order in the Computer Setup (F10) Utility lists the USB device before the hard drive, the computer can be booted from a USB flash media device. Otherwise, a bootable diskette must be used.

2. Select a setup configuration to copy. Turn off the computer. If you are in Windows, click **Start > Shut Down > Shut Down**.
3. If you are using a USB flash media device, insert it now.
4. Turn on the computer.
5. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

6. If you are using a diskette, insert it now.
7. Click **File > Replicated Setup > Save to Removable Media**. Follow the instructions on the screen to create the configuration diskette or USB flash media device.
8. Download a BIOS utility for replicating setup (repset.exe) and copy it onto the configuration diskette or USB flash media device. To obtain this utility, go to tap/welcome.hp.com/support/files and enter the model number of the computer.

9. On the configuration diskette or USB flash media device, create an `autoexec.bat` file containing the following command:

```
reset.exe
```

10. Turn off the computer to be configured. Insert the configuration diskette or USB flash media device and turn the computer on. The configuration utility will run automatically.
11. Restart the computer when the configuration is complete.

Creating a Bootable Device

Supported USB Flash Media Device

Supported devices have a preinstalled image to simplify the process of making them bootable. All HP or Compaq and most other USB flash media devices have this preinstalled image. If the USB flash media device being used does not have this image, use the procedure later in this section (see [Unsupported USB Flash Media Device on page 33](#)).

To create a bootable USB flash media device, you must have:

- a supported USB flash media device
- a bootable DOS diskette with the `FDISK` and `SYS` programs (If `SYS` is not available, `FORMAT` may be used, but all existing files on the USB flash media device will be lost.)
- a PC that is bootable from a USB flash media device



CAUTION: Some older PCs may not be bootable from a USB flash media device. If the default boot order in the Computer Setup (F10) Utility lists the USB device before the hard drive, the computer can be booted from a USB flash media device. Otherwise, a bootable diskette must be used.

1. Turn off the computer.
2. Insert the USB flash media device into one of the computer's USB ports and remove all other USB storage devices except USB diskette drives.
3. Insert a bootable DOS diskette with `FDISK.COM` and either `SYS.COM` or `FORMAT.COM` into a diskette drive and turn on the computer to boot to the DOS diskette.
4. Run `FDISK` from the `A:\` prompt by typing `FDISK` and pressing Enter. If prompted, click **Yes (Y)** to enable large disk support.
5. Enter Choice [5] to display the drives in the system. The USB flash media device will be the drive that closely matches the size of one of the drives listed. It will usually be the last drive in the list. Note the letter of the drive.

USB flash media device drive: _____



CAUTION: If a drive does not match the USB flash media device, do not proceed. Data loss can occur. Check all USB ports for additional storage devices. If any are found, remove them, reboot the computer, and proceed from step 4. If none are found, either the system does not support the USB flash media device or the USB flash media device is defective. DO NOT proceed in attempting to make the USB flash media device bootable.

6. Exit `FDISK` by pressing the `Esc` key to return to the `A:\` prompt.

7. If your bootable DOS diskette contains SYS.COM, go to step 8. Otherwise, go to step 9.
8. At the **A:** prompt, enter `SYS x:` where x represents the drive letter noted above.



CAUTION: Be sure that you have entered the correct drive letter for the USB flash media device.

After the system files have been transferred, SYS will return to the **A:** prompt. Go to step 13.

9. Copy any files you want to keep from your USB flash media device to a temporary directory on another drive (for example, the system's internal hard drive).
10. At the **A:** prompt, enter `FORMAT /S X:` where X represents the drive letter noted before.



CAUTION: Be sure that you have entered the correct drive letter for the USB flash media device.

FORMAT will display one or more warnings and ask you each time whether you want to proceed. Enter `Y` each time. FORMAT will format the USB flash media device, add the system files, and ask for a Volume Label.

11. Press `Enter` for no label or enter one if desired.
12. Copy any files you saved in step 9 back to your USB flash media device.
13. Remove the diskette and reboot the computer. The computer will boot to the USB flash media device as drive C.



NOTE: The default boot order varies from computer to computer, and it can be changed in the Computer Setup (F10) Utility.

If you have used a DOS version from Windows 9x, you may see a brief Windows logo screen. If you do not want this screen, add a zero-length file named LOGO.SYS to the root directory of the USB flash media device.

Return to [Copying to Multiple Computers on page 31](#).

Unsupported USB Flash Media Device

To create a bootable USB flash media device, you must have:

- a USB flash media device
- a bootable DOS diskette with the FDISK and SYS programs (If SYS is not available, FORMAT may be used, but all existing files on the USB flash media device will be lost.)
- a PC that is bootable from a USB flash media device



CAUTION: Some older PCs may not be bootable from a USB flash media device. If the default boot order in the Computer Setup (F10) Utility lists the USB device before the hard drive, the computer can be booted from a USB flash media device. Otherwise, a bootable diskette must be used.

1. If there are any PCI cards in the system that have SCSI, ATA RAID or SATA drives attached, turn off the computer and unplug the power cord.



CAUTION: The power cord MUST be unplugged.

2. Open the computer and remove the PCI cards.
3. Insert the USB flash media device into one of the computer's USB ports and remove all other USB storage devices except USB diskette drives. Close the computer cover.
4. Plug in the power cord and turn on the computer.
5. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

6. Go to **Advanced > PCI Devices** to disable both the PATA and SATA controllers. When disabling the SATA controller, note the IRQ to which the controller is assigned. You will need to reassign the IRQ later. Exit setup, confirming the changes.

SATA IRQ: _____

7. Insert a bootable DOS diskette with `FDISK.COM` and either `SYS.COM` or `FORMAT.COM` into a diskette drive and turn on the computer to boot to the DOS diskette.
8. Run `FDISK` and delete any existing partitions on the USB flash media device. Create a new partition and mark it active. Exit `FDISK` by pressing the **Esc** key.
9. If the system did not automatically restart when exiting `FDISK`, press **Ctrl+Alt+Del** to reboot to the DOS diskette.
10. At the **A:** prompt, type `FORMAT C: /S` and press **Enter**. Format will format the USB flash media device, add the system files, and ask for a Volume Label.
11. Press **Enter** for no label or enter one if desired.
12. Turn off the computer and unplug the power cord. Open the computer and re-install any PCI cards that were previously removed. Close the computer cover.
13. Plug in the power cord, remove the diskette, and turn on the computer.
14. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.
15. Go to **Advanced > PCI Devices** and re-enable the PATA and SATA controllers that were disabled in step 6. Put the SATA controller on its original IRQ.
16. Save the changes and exit. The computer will boot to the USB flash media device as drive C.



NOTE: The default boot order varies from computer to computer, and it can be changed in the Computer Setup (F10) Utility. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for instructions.

If you have used a DOS version from Windows 9x, you may see a brief Windows logo screen. If you do not want this screen, add a zero-length file named LOGO.SYS to the root directory of the USB flash media device.

Return to [Copying to Multiple Computers on page 31](#).

Dual-State Power Button

With Advanced Configuration and Power Interface (ACPI) enabled, the power button can function either as an on/off switch or as a standby button. The standby feature does not completely turn off power, but instead causes the computer to enter a low-power standby state. This allows you to power down quickly without closing applications and to return quickly to the same operational state without any data loss.

To change the power button's configuration, complete the following steps:

1. Left click on the **Start Button**, then select **Control Panel > Power Options**.
2. In the **Power Options Properties**, select the **Advanced** tab.
3. In the **Power Button** section, select **Stand by**.

After configuring the power button to function as a standby button, press the power button to put the system in a very low power state (standby). Press the button again to quickly bring the system out of standby to full power status. To completely turn off all power to the system, press and hold the power button for four seconds.



CAUTION: Do not use the power button to turn off the computer unless the system is not responding; turning off the power without operating system interaction could cause damage to or loss of data on the hard drive.

HP Web Site Support

HP engineers rigorously test and debug software developed by HP and third-party suppliers, and develop operating system specific support software, to ensure performance, compatibility, and reliability for HP computers.

When making the transition to new or revised operating systems, it is important to implement the support software designed for that operating system. If you plan to run a version of Microsoft Windows that is different from the version included with the computer, you must install corresponding device drivers and utilities to ensure that all features are supported and functioning properly.

HP has made the task of locating, accessing, evaluating, and installing the latest support software easier. You can download the software from <http://www.hp.com/support>.

The Web site contains the latest device drivers, utilities, and flashable ROM images needed to run the latest Microsoft Windows operating system on the HP computer.

Industry Standards

HP management solutions integrate with other systems management applications, and are based on industry standards, such as:

- Web-Based Enterprise Management (WBEM)
- Windows Management Interface (WMI)
- Wake on LAN Technology
- ACPI
- SMBIOS
- Pre-boot Execution (PXE) support

Asset Tracking and Security

Asset tracking features incorporated into the computer provide key asset tracking data that can be managed using HP Systems Insight Manager, HP Client Manager, HP OpenView Configuration Management and Asset Management solutions, or other system management applications. Seamless, automatic integration between asset tracking features and these products enables you to choose the management tool that is best suited to the environment and to leverage the investment in existing tools.

HP also offers several solutions for controlling access to valuable components and information. HP Embedded Security for ProtectTools, if installed, prevents unauthorized access to data and checks system integrity and authenticates third-party users attempting system access. (For more information, refer to the *HP ProtectTools Security Manager Guide* at www.hp.com.) Security features such as HP Embedded Security for ProtectTools, the Smart Cover Sensor and the Smart Cover Lock, available on some models, help to prevent unauthorized access to the internal components of the personal computer. By disabling parallel, serial, or USB ports, or by disabling removable media boot capability, you can protect valuable data assets. Memory Change and Smart Cover Sensor alerts can be automatically forwarded to system management applications to deliver proactive notification of tampering with a computer's internal components.



NOTE: HP Embedded Security for ProtectTools, the Smart Cover Sensor, and the Smart Cover Lock are available as options on some systems.

Use the following utilities to manage security settings on the HP computer:

- Locally, using the Computer Setup Utilities. See the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* included with the computer for additional information and instructions on using the Computer Setup Utilities. Some computers also have HP BIOS Configuration for ProtectTools, which is a Windows-based component of ProtectTools that allows administrators to configure BIOS security settings from within the running OS.
- Remotely, using HP Client Manager Software or System Software Manager. This software enables the secure, consistent deployment and control of security settings from a simple command-line utility.

The following table and sections refer to managing security features of the computer locally through the Computer Setup (F10) Utilities.

Table 4-1 Security Features Overview




| Option | Description |
|--|---|
| Setup Password | <p>Allows you to set and enable setup (administrator) password.</p> <p> NOTE: If the setup password is set, it is required to change Computer Setup options, flash the ROM, and make changes to certain plug and play settings under Windows.</p> <p>See the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information.</p> |
| Power-On Password | <p>Allows you to set and enable power-on password.</p> <p>See the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information.</p> |
| Password Options (This selection will appear only if a power-on password is set.) | <p>Allows you to specify whether the password is required for warm boot (Ctrl +Alt+Del).</p> <p>See the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information.</p> |
| Pre-Boot Authorization | <p>Allows you to enable/disable the Smart Card to be used in place of the Power-On Password.</p> |
| Smart Cover | <p>Allows you to:</p> <ul style="list-style-type: none">• Enable/disable the Cover Lock.• Enable/disable the Cover Removal Sensor. <p> NOTE: <i>Notify User</i> alerts the user that the sensor has detected that the cover has been removed. <i>Setup Password</i> requires that the setup password be entered to boot the computer if the sensor detects that the cover has been removed.</p> <p>This feature is supported on some models only. See the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information.</p> |
| Embedded Security | <p>Allows you to:</p> <ul style="list-style-type: none">• Enable/disable the Embedded Security device.• Reset the device to Factory Settings. <p>This feature is supported on some models only. See the <i>HP ProtectTools Security Manager Guide</i> at www.hp.com</p> |
| Device Security | <p>Enables/disables serial ports, parallel port, front USB ports, system audio, network controllers (some models), and SCSI controllers (some models).</p> |
| Network Service Boot | <p>Enables/disables the computer's ability to boot from an operating system installed on a network server. (Feature available on NIC models only; the network controller must reside on the PCI bus or be embedded on the system board.)</p> |

Table 4-1 Security Features Overview (continued)

| Option | Description |
|---|--|
| System IDs | <p>Allows you to set:</p> <ul style="list-style-type: none">• Asset tag (18-byte identifier) and ownership Tag (80-byte identifier displayed during POST). See the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information.• Chassis serial number or Universal Unique Identifier (UUID) number. The UUID can only be updated if the current chassis serial number is invalid. (These ID numbers are normally set in the factory and are used to uniquely identify the system.) <p>Keyboard locale setting (for example, English or German) for System ID entry.</p> |
| DriveLock (some models) | <p>Allows you to assign or modify a master or user password for ATA hard drives. When this feature is enabled, the user is prompted to provide one of the DriveLock passwords during POST. If neither is successfully entered, the hard drive will remain inaccessible until one of the passwords is successfully provided during a subsequent cold-boot sequence.</p> <p> NOTE: This selection will only appear when at least one ATA drive that supports the ATA Security command set is attached to the system.</p> <p>See the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information.</p> |
| <p>For more information about Computer Setup, see the <i>Computer Setup (F10) Utility Guide</i> on the <i>Documentation and Diagnostics CD</i>.</p> <p>Support for security features may vary depending on the specific computer configuration.</p> | |

Password Security

The power-on password prevents unauthorized use of the computer by requiring entry of a password to access applications or data each time the computer is turned on or restarted. The setup password specifically prevents unauthorized access to Computer Setup, and can also be used as an override to the power-on password. That is, when prompted for the power-on password, entering the setup password instead will allow access to the computer.

A network-wide setup password can be established to enable the system administrator to log in to all network systems to perform maintenance without having to know the power-on password, even if one has been established.

Establishing a Setup Password Using Computer Setup

If the system is equipped with an embedded security device, refer to the *HP ProtectTools Security Manager Guide* at www.hp.com. Establishing a setup password through Computer Setup prevents reconsideration of the computer (use of the Computer Setup (F10) utility) until the password is entered.

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. Select **Security**, then select **Setup Password** and follow the instructions on the screen.
4. Before exiting, click **File > Save Changes and Exit**.

Establishing a Power-On Password Using Computer Setup

Establishing a power-on password through Computer Setup prevents access to the computer when power is turned on, unless the password is entered. When a power-on password is set, Computer Setup presents **Password Options** under the **Security** menu. Password options include **Password Prompt on Warm Boot**. When **Password Prompt on Warm Boot** is enabled, the password must also be entered each time the computer is rebooted.

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. Select **Security**, then **Power-On Password** and follow the instructions on the screen.
4. Before exiting, click **File > Save Changes and Exit**.

Entering a Power-On Password

To enter a power-on password, complete the following steps:

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart the Computer**.
2. When the key icon appears on the monitor, type the current password, then press **Enter**.



NOTE: Type carefully; for security reasons, the characters you type do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must turn off the computer, then turn it on again before you can continue.

Entering a Setup Password

If the system is equipped with an embedded security device, refer to the *HP ProtectTools Security Manager Guide* at www.hp.com.

If a setup password has been established on the computer, you will be prompted to enter it each time you run Computer Setup.

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. When the key icon appears on the monitor, type the setup password, then press **Enter**.



NOTE: Type carefully; for security reasons, the characters you type do not appear on the screen.

If you enter the password incorrectly, a broken key icon appears. Try again. After three unsuccessful tries, you must turn off the computer, then turn it on again before you can continue.

Changing a Power-On or Setup Password

If the system is equipped with an embedded security device, refer to the *HP ProtectTools Security Manager Guide* at www.hp.com.

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart the Computer**.
2. To change the Power-On password, go to step 3.

To change the Setup password, as soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. When the key icon appears, type the current password, a slash (/) or alternate delimiter character, the new password, another slash (/) or alternate delimiter character, and the new password again as shown: `current password/new password/new password`



NOTE: Type carefully; for security reasons, the characters you type do not appear on the screen.

4. Press **Enter**.

The new password takes effect the next time you turn on the computer.



NOTE: Refer to the [National Keyboard Delimiter Characters on page 41](#) for information about the alternate delimiter characters. The power-on password and setup password may also be changed using the Security options in Computer Setup.

Deleting a Power-On or Setup Password

If the system is equipped with an embedded security device, refer to the *HP ProtectTools Security Manager Guide* at www.hp.com.

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart the Computer**.
2. To delete the Power-On password, go to step 3.

To delete the Setup password, as soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. When the key icon appears, type the current password followed by a slash (/) or alternate delimiter character as shown: `current password/`
4. Press **Enter**.



NOTE: Refer to [National Keyboard Delimiter Characters on page 41](#) for information about the alternate delimiter characters. The power-on password and setup password may also be changed using the Security options in Computer Setup.

National Keyboard Delimiter Characters

Each keyboard is designed to meet country-specific requirements. The syntax and keys that you use to change or delete the password depend on the keyboard that came with the computer.

| National Keyboard Delimiter Characters | | | | | |
|--|---|----------------|---|-----------------|---|
| Arabic | / | Greek | - | Russian | / |
| Belgian | = | Hebrew | . | Slovakian | - |
| BHCSY* | - | Hungarian | - | Spanish | - |
| Brazilian | / | Italian | - | Swedish/Finnish | / |
| Chinese | / | Japanese | / | Swiss | - |
| Czech | - | Korean | / | Taiwanese | / |
| Danish | - | Latin American | - | Thai | / |
| French | ! | Norwegian | - | Turkish | . |
| French Canadian | é | Polish | - | U.S. English | / |
| German | - | Portuguese | - | | |

* For Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia

Clearing Passwords

If you forget the password, you cannot access the computer. Refer to the *Troubleshooting Guide* on the *Documentation and Diagnostics CD* for instructions on clearing passwords.

If the system is equipped with an embedded security device, refer to the *HP ProtectTools Security Manager Guide* at www.hp.com.

DriveLock

DriveLock is an industry-standard security feature that prevents unauthorized access to the data on ATA hard. DriveLock has been implemented as an extension to Computer Setup. It is only available when hard drives that support the ATA Security command set are detected. DriveLock is intended for HP customers for whom data security is the paramount concern. For such customers, the cost of the hard drive and the loss of the data stored on it is inconsequential when compared with the damage that could result from unauthorized access to its contents. In order to balance this level of security with the practical need to accommodate a forgotten password, the HP implementation of DriveLock employs a two-password security scheme. One password is intended to be set and used by a system administrator while the other is typically set and used by the end-user. There is no "back-door" that can be used to unlock the drive if both passwords are lost. Therefore, DriveLock is most safely used when the data

contained on the hard drive is replicated on a corporate information system or is regularly backed up. In the event that both DriveLock passwords are lost, the hard drive is rendered unusable. For users who do not fit the previously defined customer profile, this may be an unacceptable risk. For users who do fit the customer profile, it may be a tolerable risk given the nature of the data stored on the hard drive.

Using DriveLock

When one or more hard drives that support the ATA Security command set are detected, the DriveLock option appears under the Security menu in Computer Setup. The user is presented with options to set the master password or to enable DriveLock. A user password must be provided in order to enable DriveLock. Since the initial configuration of DriveLock is typically performed by a system administrator, a master password should be set first. HP encourages system administrators to set a master password whether they plan to enable DriveLock or keep it disabled. This will give the administrator the ability to modify DriveLock settings if the drive is locked in the future. Once the master password is set, the system administrator may enable DriveLock or choose to keep it disabled.

If a locked hard drive is present, POST will require a password to unlock the device. If a power-on password is set and it matches the device's user password, POST will not prompt the user to re-enter the password. Otherwise, the user will be prompted to enter a DriveLock password. On a cold boot, either the master or the user password may be used. On a warm boot, enter the same password used to unlock the drive during the preceding cold-boot. Users will have two attempts to enter a correct password. On a cold boot, if neither attempt succeeds, POST will continue but the drive will remain inaccessible. On a warm boot or restart from Windows, if neither attempt succeeds, POST will halt and the user will be instructed to cycle power.

DriveLock Applications

The most practical use of the DriveLock security feature is in a corporate environment. The system administrator would be responsible for configuring the hard drive which would involve, among other things, setting the DriveLock master password and a temporary user password. In the event that the user forgets the user password or the equipment is passed on to another employee, the master password can always be used to reset the user password and regain access to the hard drive.

HP recommends that corporate system administrators who choose to enable DriveLock also establish a corporate policy for setting and maintaining master passwords. This should be done to prevent a situation where an employee intentionally or unintentionally sets both DriveLock passwords before leaving the company. In such a scenario, the hard drive would be rendered unusable and require replacement. Likewise, by not setting a master password, system administrators may find themselves locked out of a hard drive and unable to perform routine checks for unauthorized software, other asset control functions, and support.

For users with less stringent security requirements, HP does not recommend enabling DriveLock. Users in this category include personal users or users who do not maintain sensitive data on their hard drives as a common practice. For these users, the potential loss of a hard drive resulting from forgetting both passwords is much greater than the value of the data DriveLock has been designed to protect. Access to Computer Setup and DriveLock can be restricted through the Setup password. By specifying a Setup password and not giving it to end users, system administrators are able to restrict users from enabling DriveLock.

Smart Cover Sensor

CoverRemoval Sensor, available on some models, is a combination of hardware and software technology that can alert you when the computer cover or side panel has been removed. There are three levels of protection, as described in the following table.

Table 4-2 Smart Cover Sensor Protection Levels

| Level | Setting | Description |
|---------|----------------|---|
| Level 0 | Disabled | Smart Cover Sensor is disabled (default). |
| Level 1 | Notify User | When the computer is restarted, the screen displays a message indicating that the computer cover or side panel has been removed. |
| Level 2 | Setup Password | When the computer is restarted, the screen displays a message indicating that the computer cover or side panel has been removed. You must enter the setup password to continue. |



NOTE: These settings can be changed using Computer Setup. For more information about Computer Setup, see the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD*.

Setting the Smart Cover Sensor Protection Level

To set the Smart Cover Sensor protection level, complete the following steps:

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. Select **Security > Smart Cover > Cover Removal Sensor**, and select the desired security level.
4. Before exiting, click **File > Save Changes and Exit**.

Smart Cover Lock

The Smart Cover Lock is a software-controllable cover lock featured on some HP computers. This lock prevents unauthorized access to the internal components. Computers ship with the Smart Cover Lock in the unlocked position.



CAUTION: For maximum cover lock security, be sure to establish a setup password. The setup password prevents unauthorized access to the Computer Setup utility.



NOTE: The Smart Cover Lock is available as an option on some systems.

Locking the Smart Cover Lock

To activate and lock the Smart Cover Lock, complete the following steps:

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. Select **Security > Smart Cover > Cover Lock > Lock option**.
4. Before exiting, click **File > Save Changes and Exit**.

Unlocking the Smart Cover Lock

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart**.
2. As soon as the computer is turned on, press **F10** when the monitor light turns green to enter Computer Setup. Press **Enter** to bypass the title screen, if necessary.



NOTE: If you do not press **F10** at the appropriate time, you must restart the computer and again press **F10** when the monitor light turns green to access the utility.

3. Select **Security > Smart Cover > Cover Lock > Unlock**.
4. Before exiting, click **File > Save Changes and Exit**.

Using the Smart Cover FailSafe Key

If you enable the Smart Cover Lock and cannot enter the password to disable the lock, you will need a Smart Cover FailSafe Key to open the computer cover. You will need the key in any of the following circumstances:

- Power outage
- Startup failure
- PC component failure (such as processor or power supply)
- Forgotten password



CAUTION: The Smart Cover FailSafe Key is a specialized tool available from HP. Be prepared; order this key before you need one at an authorized reseller.

To obtain the FailSafe Key, call the appropriate number listed in the warranty.

For more information about using the Smart Cover FailSafe Key, consult the *Hardware Reference Guide* on the *Documentation and Diagnostics CD*.

Cable Lock Provision

The rear panel of the computer accommodates a cable lock so that the computer can be physically secured to a work area.

For illustrated instructions, please see the *Hardware Reference Guide* on the *Documentation and Diagnostics CD*.

Fingerprint Identification Technology

Eliminating the need to enter user passwords, HP Fingerprint Identification Technology tightens network security, simplifies the login process, and reduces the costs associated with managing corporate networks. Affordably priced, it is not just for high-tech, high-security organizations anymore.



NOTE: Support for Fingerprint Identification Technology varies by model.

For more information, visit:

<http://h18004.www1.hp.com/products/security/>.

Fault Notification and Recovery

Fault Notification and Recovery features combine innovative hardware and software technology to prevent the loss of critical data and minimize unplanned downtime.

If the computer is connected to a network managed by HP Client Manager, the computer sends a fault notice to the network management application. With HP Client Manager Software, you can also remotely schedule diagnostics to automatically run on all managed PCs and create a summary report of failed tests.

Drive Protection System

The Drive Protection System (DPS) is a diagnostic tool built into the hard drives installed in some HP computers. DPS is designed to help diagnose problems that might result in unwarranted hard drive replacement.

When HP computers are built, each installed hard drive is tested using DPS, and a permanent record of key information is written onto the drive. Each time DPS is run, test results are written to the hard drive. You can use this information to help diagnose conditions that caused you to run the DPS software. Refer to the *Troubleshooting Guide* on the *Documentation and Diagnostics CD* for instructions on using DPS.

Surge-Tolerant Power Supply

An integrated surge-tolerant power supply provides greater reliability when the computer is hit with an unpredictable power surge. This power supply is rated to withstand a power surge of up to 2000 volts without incurring any system downtime or data loss.

Thermal Sensor

The thermal sensor is a hardware and software feature that tracks the internal temperature of the computer. This feature displays a warning message when the normal range is exceeded, which gives you time to take action before internal components are damaged or data is lost.

5 Serial and Parallel ATA Drive Guidelines and Features



NOTE: Serial ATA = SATA

Parallel ATA = PATA

HP only supports the use of SATA hard drives on these models of computer. No PATA drives are supported.

SATA Hard Drives

| Serial ATA Hard Drive Characteristics | |
|---|-------------------|
| Number of pins/conductors in data cable | 7/7 |
| Number of pins in power cable | 15 |
| Maximum data cable length | 39.37 in (100 cm) |
| Data interface voltage differential | 400-700 mV |
| Drive voltages | 3.3 V, 5 V, 12 V |
| Jumpers for configuring drive | N/A |
| Data transfer rate | 3.0 Gb/s |

SATA Hard Drive Cables

SATA Data Cable

Always use an HP approved SATA 3.0 Gb/s cable as it is fully backwards compatible with the SATA 1.5 Gb/s drives.

Current HP desktop products ship with SATA 3.0 Gb/s hard drives.

SATA data cables are susceptible to damage if overflexed. Never crease a SATA data cable and never bend it tighter than a 30 mm (1.18 in) radius.

The SATA data cable is a thin, 7-pin cable designed to transmit data for only a single drive. As shown in the table, each cable has 3 grounds, and 4 transmit/receive pins.

| Pin Number | Usage | Device Plug | Host Plug |
|------------|--------|---------------|---------------|
| P1 | Ground | Ground | Ground |
| P2* | A+ | Transmit data | Receive data |
| P3* | A- | Transmit data | Receive data |
| P4 | Ground | Ground | Ground |
| P5** | B- | Receive data | Transmit data |
| P6** | B+ | Receive data | Transmit data |
| P7 | Ground | Ground | Ground |

*P2 and P3 differential signal pair

**P5 and P6 differential signal pair

SATA Power Cable

| Pin | Usage | Notes | Pin | Usage | Notes |
|-----|--------|-------------|-----|--------|------------|
| P1 | V3.3 | 3.3 V power | P9 | V5 | 5 V power |
| P2 | V3.3 | 3.3 V power | P10 | Ground | |
| P3 | V3.3 | 3.3 V power | P11 | Ground | |
| P4 | Ground | | P12 | Ground | |
| P5 | Ground | | P13 | V12 | 12 V power |
| P6 | Ground | | P14 | V12 | 12 V power |
| P7 | V5 | 5 V power | P15 | V12 | 12 V power |
| P8 | V5 | 5 V power | | | |

PATA Device Information

This model supports PATA drives.

ATA SMART Drives

The Self Monitoring Analysis and Recording Technology (SMART) ATA drives for the HP Personal Computers have built-in drive failure prediction that warns the user or network administrator of an impending failure or crash of the hard drive. The SMART drive tracks fault prediction and failure indication parameters such as reallocated sector count, spin retry count, and calibration retry count. If the drive determines that a failure is imminent, it generates a fault alert.

Hard Drive Capacities

The combination of the file system and the operating system used in the computer determines the maximum usable size of a drive partition. A drive partition is the largest segment of a drive that may be properly accessed by the operating system. A single hard drive may therefore be subdivided into a number of unique drive partitions in order to make use of all of its space.

Because of the differences in the way that drive sizes are calculated, the size reported by the operating system may differ from that marked on the hard drive or listed in the computer specification. Drive size calculations by drive manufacturers are bytes to the base 10 while calculations by Microsoft are bytes to the base 2.

| Drive/Partition Capacity Limits | | | | |
|---------------------------------|-----------------|--------------------|--------------|-------|
| File System | Controller Type | Operating System | Maximum Size | |
| | | | Partition | Drive |
| FAT 32 | ATA | Windows 2000/ XP | 32 GB | 2 TB |
| NTFS | ATA | Windows NT/2000/XP | 2 TB | 2 TB |

6 Identifying the Chassis, Routine Care, and Disassembly Preparation

This chapter provides general service information for the computer. Adherence to the procedures and precautions described in this chapter is essential for proper service.



CAUTION: When the computer is plugged into an AC power source, voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

Chassis Designations

The following subsection illustrates the dx2250 chassis design.

Microtower (MT)



Electrostatic Discharge Information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

Generating Static

The following table shows that:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

| Event | Relative Humidity | | |
|----------------------------------|-------------------|----------|----------|
| | 55% | 40% | 10% |
| Walking across carpet | 7,500 V | 15,000 V | 35,000 V |
| Walking across vinyl floor | 3,000 V | 5,000 V | 12,000 V |
| Motions of bench worker | 400 V | 800 V | 6,000 V |
| Removing DIPs* from plastic tube | 400 V | 700 V | 2,000 V |
| Removing DIPs* from vinyl tray | 2,000 V | 4,000 V | 11,500 V |
| Removing DIPs* from Styrofoam | 3,500 V | 5,000 V | 14,500 V |
| Removing bubble pack from PCB | 7,000 V | 20,000 V | 26,500 V |
| Packing PCBs in foam-lined box | 5,000 V | 11,000 V | 21,000 V |

*These are then multi-packaged inside plastic tubes, trays, or Styrofoam.



NOTE: 700 volts can degrade a product.

Preventing Electrostatic Damage to Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent damage to electric components and accessories.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.

- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

Personal Grounding Methods and Equipment

Use the following equipment to prevent static electricity damage to equipment:

- **Wrist straps** are flexible straps with a maximum of one-megohm \pm 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of one-megohm \pm 10% resistance between the operator and ground.

| Static Shielding Protection Levels | |
|------------------------------------|---------|
| Method | Voltage |
| Antistatic plastic | 1,500 |
| Carbon-loaded plastic | 7,500 |
| Metallized laminate | 15,000 |

Grounding the Work Area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended Materials and Equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids

- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm +/- 10% resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm +/- 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Operating Guidelines

To prevent overheating and to help prolong the life of the computer:

- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold.
- Operate the computer on a sturdy, level surface. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow.
- Never restrict the airflow into the computer by blocking any vents or air intakes. Do not place the keyboard, with the keyboard feet down, directly against the front of the desktop unit as this also restricts airflow.
- Occasionally clean the air vents on all vented sides of the computer. Lint, dust, and other foreign matter can block the vents and limit the airflow. Be sure to unplug the computer before cleaning the air vents.
- Never operate the computer with the cover or side panel removed.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.
- Install or enable power management functions of the operating system or other software, including sleep states.

Routine Care

General Cleaning Safety Precautions

1. Never use solvents or flammable solutions to clean the computer.
2. Never immerse any parts in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
3. Always unplug the computer when cleaning with liquids or damp cloths.
4. Always unplug the computer before cleaning the keyboard, mouse, or air vents.
5. Disconnect the keyboard before cleaning it.
6. Wear safety glasses equipped with side shields when cleaning the keyboard.

Cleaning the Computer Case

Follow all safety precautions in [General Cleaning Safety Precautions on page 55](#) before cleaning the computer.

To clean the computer case, follow the procedures described below:

- To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.
- For stronger stains, use a mild dishwashing liquid diluted with water. Rinse well by wiping it with a cloth or swab dampened with clear water.
- For stubborn stains, use isopropyl (rubbing) alcohol. No rinsing is needed as the alcohol will evaporate quickly and not leave a residue.
- After cleaning, always wipe the unit with a clean, lint-free cloth.
- Occasionally clean the air vents on the computer. Lint and other foreign matter can block the vents and limit the airflow.

Cleaning the Keyboard

Follow all safety precautions in [General Cleaning Safety Precautions on page 55](#) before cleaning the keyboard.

To clean the tops of the keys or the keyboard body, follow the procedures described in [Cleaning the Computer Case on page 55](#).

When cleaning debris from under the keys, review all rules in [General Cleaning Safety Precautions on page 55](#) before following these procedures:



CAUTION: Use safety glasses equipped with side shields before attempting to clean debris from under the keys.

- Visible debris underneath or between the keys may be removed by vacuuming or shaking.
- Canned, pressurized air may be used to clean debris from under the keys. Caution should be used as too much air pressure can dislodge lubricants applied under the wide keys.
- If you remove a key, use a specially designed key puller to prevent damage to the keys. This tool is available through many electronic supply outlets.



CAUTION: Never remove a wide leveled key (like the space bar) from the keyboard. If these keys are improperly removed or installed, the keyboard may not function properly.

- Cleaning under a key may be done with a swab moistened with isopropyl alcohol and squeezed out. Be careful not to wipe away lubricants necessary for proper key functions. Use tweezers to remove any fibers or dirt in confined areas. Allow the parts to air dry before reassembly.

Cleaning the Monitor

- Wipe the monitor screen with a clean cloth moistened with water or with a towelette designed for cleaning monitors. Do not use sprays or aerosols directly on the screen; the liquid may seep into the housing and damage a component. Never use solvents or flammable liquids on the monitor.
- To clean the monitor body follow the procedures in [Cleaning the Computer Case on page 55](#).

Cleaning the Mouse

Before cleaning the mouse, ensure that the power to the computer is turned off.

- Clean the mouse ball by first removing the retaining plate and the ball from the housing. Pull out any debris from the ball socket and wipe the ball with a clean, dry cloth before reassembly.
- To clean the mouse body, follow the procedures in [Cleaning the Computer Case on page 55](#).

Service Considerations

Listed below are some of the considerations that you should keep in mind during the disassembly and assembly of the computer.

Power Supply Fan

The power supply fan is a variable-speed fan based on the temperature in the power supply.



CAUTION: The cooling fan is always on when the computer is in the “On” mode. The cooling fan is off when the computer is in “Standby,” “Suspend,” or “Off” modes.

You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

Tools and Software Requirements

To service the computer, you need the following:

- Torx T-15 screwdriver (HP screwdriver with bits, PN 161946-001)
- Torx T-15 screwdriver with small diameter shank (for certain front bezel removal)
- Flat-bladed screwdriver (may sometimes be used in place of the Torx screwdriver)
- Phillips #2 screwdriver
- Diagnostics software
- HP tamper-resistant T-15 wrench (Smart Cover FailSafe Key, PN 166527-001) or HP tamper-resistant bits (Smart Cover FailSafe Key, PN 166527-002)

Screws

The screws used in the computer are not interchangeable. They may have standard or metric threads and may be of different lengths. If an incorrect screw is used during the reassembly process, it can damage the unit. HP strongly recommends that all screws removed during disassembly be kept with the part that was removed, then returned to their proper locations.



CAUTION: Metric screws have a black finish. U.S. screws have a silver finish and are used on hard drives only.

CAUTION: As each subassembly is removed from the computer, it should be placed away from the work area to prevent damage.

Cables and Connectors

Most cables used throughout the unit are flat, flexible cables. These cables must be handled with care to avoid damage. Apply only the tension required to seat or unseat the cables during insertion or removal from the connector. Handle cables by the connector whenever possible. In all cases, avoid bending or twisting the cables, and ensure that the cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced.



CAUTION: When servicing this computer, ensure that cables are placed in their proper location during the reassembly process. Improper cable placement can damage the computer.

Hard Drives

Handle hard drives as delicate, precision components, avoiding all physical shock and vibration. This applies to failed drives as well as replacement spares.

- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package “Fragile: Handle With Care.”
- Do not remove hard drives from the shipping package for storage. Keep hard drives in their protective packaging until they are actually mounted in the CPU.
- Avoid dropping drives from any height onto any surface.
- If you are inserting or removing a hard drive, turn off the computer. Do not remove a hard drive while the computer is on or in standby mode.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to [Electrostatic Discharge Information on page 52](#)
- Do not use excessive force when inserting a drive.
- Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

Lithium Coin Cell Battery

The battery that comes with the computer provides power to the real-time clock and has a minimum lifetime of about three years.

See the appropriate removal and replacement chapter for the chassis you are working on in this guide for instructions on the replacement procedures.



WARNING! This computer contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140°F (60°C). Do not attempt to recharge the battery.



NOTE: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, their authorized partners, or their agents.

7 Removal and Replacement Procedures — Microtower (MT) Chassis

Adherence to the procedures and precautions described in this chapter is essential for proper service. After completing all necessary removal and replacement procedures, run the Diagnostics utility to verify that all components operate properly.



NOTE: Not all features listed in this guide are available on all computers.

Preparation for Disassembly

1. Close any open software applications.
2. Exit the operating system.
3. Remove any diskette or compact disc from the computer.
4. Turn off the computer and any peripheral devices that are connected to it.



CAUTION: Turn off the computer before disconnecting any cables.

CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. In some systems the cooling fan is on even when the computer is in the “Standby,” or “Suspend” modes. The power cord should always be disconnected before servicing a unit.

5. Disconnect the power cord from the electrical outlet and then from the computer.
6. Disconnect all peripheral device cables from the computer.




NOTE: During disassembly, label each cable as you remove it, noting its position and routing. Keep all screws with the units removed.



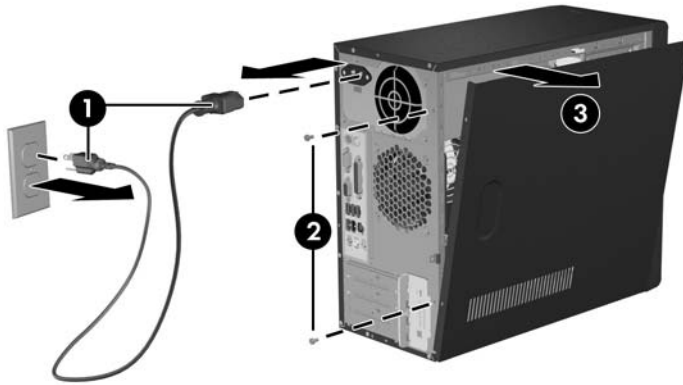
CAUTION: The screws used in the computer are of different thread sizes and lengths; using the wrong screw in an application may damage the unit.

Access Panel

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#)).

 **CAUTION:** Before removing the computer access panel, ensure that the computer is turned off and that the power cord is disconnected from the electrical outlet.

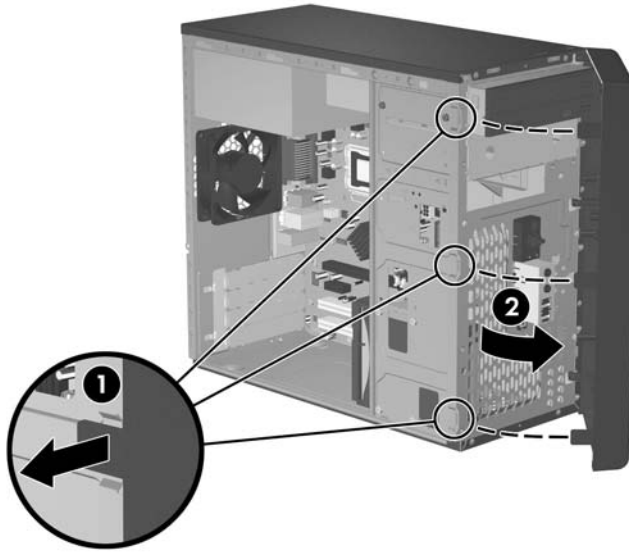
2. Disconnect the power cord from the computer and from the power source (1).
3. Remove the two screws that secure the access panel to the computer chassis (2).
4. Slide the access panel back about 6 mm (1/4 inch), then rotate the top of the panel away from the chassis (pivot on the bottom) and lift it off the unit (3).



To replace the access panel, reverse the removal steps.

Front Bezel

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Press down on all three tabs (1) on the left side of the bezel then, rotate the bezel off the chassis (2), beginning with the left side and then the right side.



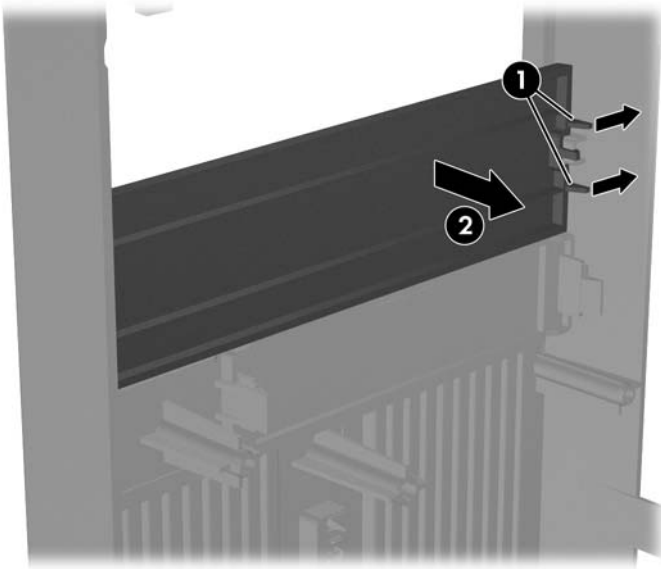
To reinstall the front bezel, reverse the removal procedure.

Front Drive Bezels

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Remove the front bezel ([Front Bezel on page 61](#))

5.25" Drive Bezel Blank

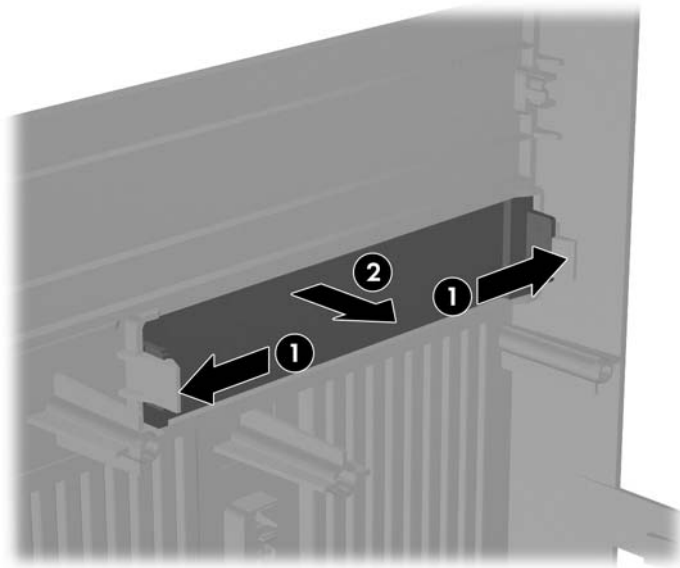
While facing the inside of the front bezel, press the two retaining tabs on the right towards the outer edge of the bezel (1) and pull the bezel blank inwards (2) to remove it.



To install a bezel blank, reverse the removal procedure.

Removing a 3.5" Drive Bezel Blank

While facing the inside of the front bezel, press outward on the retaining tabs on each side of the bezel blank (1) and pull the bezel blank inwards to remove it.



NOTE: To install a 3.5" bezel blank, press the blank inward from the inside of the front bezel so that it snaps into place.

Memory

The computer comes with double data rate 2 synchronous dynamic random access memory (DDR2-SDRAM) dual inline memory modules (DIMMs).



CAUTION: DDR and DDR2 memory modules are not interchangeable.

DDR2-SDRAM DIMMs

The memory sockets on the system board can be populated with up to two industry-standard DIMMs. These memory sockets are populated with at least one preinstalled DIMM. To achieve the maximum memory support, you can populate the system board with up to 2 GB of memory configured in a high-performing dual channel mode.

For proper system operation, the DDR2-SDRAM DIMMs must be:

- industry-standard 240-pin
- unbuffered PC2-5300 667 MHz-compliant
- 1.8 volt DDR2-SDRAM DIMMs

The DDR2-SDRAM DIMMs must also:

- support CAS latency 4 and 5 for DDR2/667 MHz
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

- 256Mbit, 512Mbit, and 1Gbit non-ECC memory technologies
- single-sided and double-sided DIMMs
- DIMMs constructed with x8 and x16 DDR devices; DIMMs constructed with x4 SDRAM are not supported



NOTE: The system will not start if you install unsupported DIMMs.

Installing Memory Modules



CAUTION: The memory module sockets have gold metal contacts. When upgrading the memory, it is important to use memory modules with gold metal contacts to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

CAUTION: Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

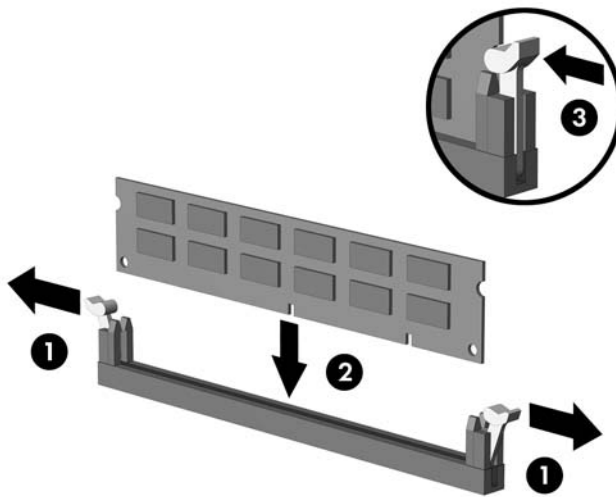
CAUTION: When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#)).
2. Remove the access panel and lay the computer down on its side to make it easier to work on. ([Access Panel on page 60](#))



WARNING! To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

3. Open both latches of the memory module socket (1), and insert the memory module into the socket (2). Begin by installing a module into the socket nearest the pre-installed module, and install the modules following the numerical order of the sockets.



NOTE: A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

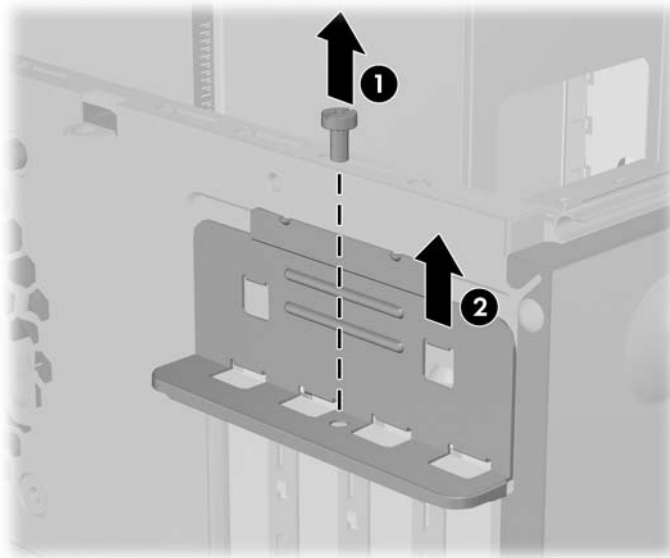
4. Push the module down into the socket, ensuring that the module is fully inserted and properly seated. Make sure the latches are in the closed position (3).
5. Repeat steps 4 and 5 for any additional modules that you want to install.

To reassemble the computer, reverse the removal procedure.

Expansion Cards

Expansion Slot Cover Lock

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Lay the computer down on its side to make it easier to work on.
4. On the rear of the computer, remove the screw that secures the slot cover lock in place (1) then, slide the slot cover lock up and away from the slots to remove it from the computer (2).



To reinstall the slot cover lock, reverse the removal procedure.

PCI/PCIe Expansion Card

To remove an expansion card continue with step 1.

To install an expansion card in an existing empty slot go to step 9.

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Lay the computer down on its side to make it easier to work on.
4. Remove the slot cover lock ([Expansion Slot Cover Lock on page 66](#))

If you are installing an expansion card for the first time go to step 9.

If you are replacing an existing expansion card go to step 5.

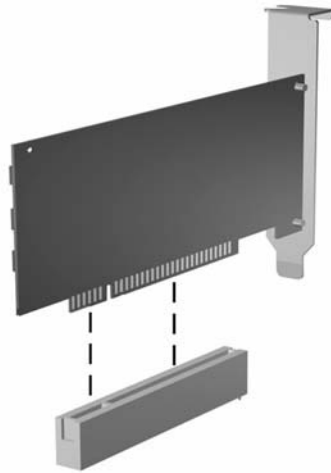
5. Disconnect any cables attached to the expansion card.
6. Hold the card at each end and carefully rock it back and forth until the connectors pull free from the socket. Be sure not to scrape the card against other components.
7. Store the card in anti-static packaging.
8. Install a new expansion card or an expansion slot cover to close the open slot.

To install a replacement expansion card go to step 10.

9. If you are installing an expansion card for the first time you must first remove the expansion slot cover. Use a flat blade screwdriver to pry out the metal shield on the rear panel that covers the expansion slot. Be sure you remove the appropriate shield for the expansion card you are installing.

| Removable Shield | Expansion Card Type |
|------------------|---------------------|
| Top shield | PCI Express x16 |
| Second shield | PCI Express x1 |
| Third shield | PCI |
| Bottom shield | PCI |

10. With the card aligned so the mounting bracket will fit firmly against the computer backwall, slide the expansion card into the expansion socket and press it firmly into place.



NOTE: When you install an expansion card, make sure you press firmly on the card so that the entire connector seats properly in the expansion card socket.

11. Reinstall the slot cover lock and its retaining screw.
12. Replace the access panel.
13. Connect external cables to the installed card, if needed.

Reconfigure the computer, if necessary.

Cable Management

Always follow good cable management practices when working inside the computer.

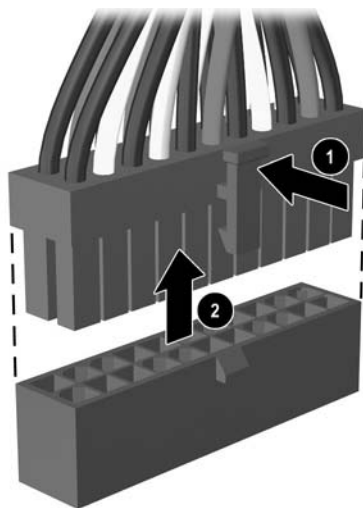
- Keep cables away from major heat sources like the heatsink.
- Do not jam cables on top of expansion cards or memory modules. Printed circuit cards like these are not designed to take excessive pressure on them.
- When folding a flat ribbon cable, never fold to a sharp crease. Sharp creases may damage the wires.
- Some flat ribbon cables come prefolded. Never change the folds on these cables.
- Do not bend any cable sharply. A sharp bend can break the internal wires.
- Never bend a SATA data cable tighter than a 30 mm (1.18 in) radius.
- Never crease a SATA data cable.
- Do not rely on components like the drive cage, power supply, or computer cover to push cables down into the chassis. Always position the cables to lay properly by themselves.

When removing the power supply power cable from the P1 connector on the system board, always follow these steps:

1. Squeeze on the top of the retaining latch attached to the cable end of the connector 1.
2. Grasp the cable end of the connector and pull it straight up 2.



CAUTION: Always pull the connector - NEVER pull on the cable. Pulling on the cable could damage the cable and result in a failed power supply.



Cable Connections

| Cable | To | Cable Designator |
|--------------|----------------------|------------------|
| Power Supply | 1st SATA Hard drive | P6 |
| Power Supply | System board, 24-pin | P1 |
| Power Supply | CPU power, 4-pin | P2 |
| Power Supply | 1st Optical drive | P3 |
| Power Supply | 2nd Optical drive | P4 |
| Power Supply | 2nd SATA Hard drive | P5 |
| Power Supply | Diskette drive | P7 |

| Cable | To | PCA Designator |
|-----------------------|--------------|-------------------|
| Diskette drive | System board | FDD1 (Black) |
| 1st SATA Hard drive | System board | SATA 0 (Orange) |
| 2nd SATA Hard drive | System board | SATA 1 (Orange) |
| ODD Data | System board | IDE1 (Blue) |
| ODD Audio | System board | JCD1 (Black) |
| Heatsink fan | System board | CPU FAN 2 (Brown) |
| Secondary system fan | System board | SYSFAN1 (White) |
| Front power on button | System board | JFP1 (Black) |
| Front I/O USB | System board | JUSB1 (Black) |
| Speaker | System board | SPKR (White) |
| Front audio | System board | AUD1 (Green) |

Drives

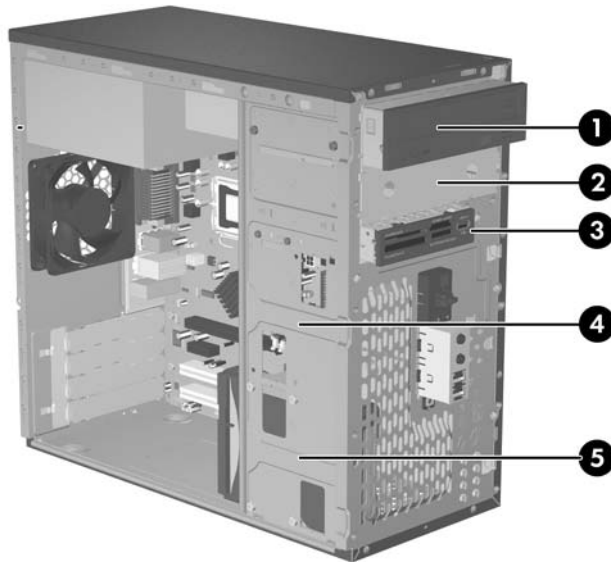
The computer supports up to five drives that may be installed in various configurations.

This Section describes the procedure for replacing or upgrading the storage drives. A Torx T-15 screwdriver is needed to remove and install the guide screws on a drive.



CAUTION: Make sure personal files on the hard drive are backed up to an external storage device before removing the hard drive. Failure to do so will result in data loss. After replacing the primary hard drive, you will need to run the Restore Plus! CD to load the Compaq factory-installed files.

Drive Positions



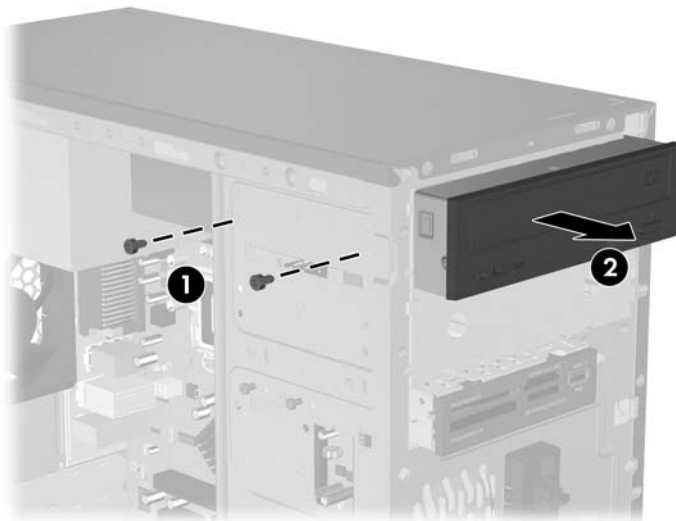
| Drive Positions | | | |
|-----------------|----------------------|------|---------------------------------|
| Item | Description | Item | Description |
| (1) | Optical drive* | (4) | Internal hard drive (secondary) |
| (2) | Optical drive* | (5) | Internal hard drive (primary) |
| (3) | External# 3.5" drive | | |

*An optical drive is a CD-ROM, CD-R/RW, DVD-ROM, DVD-R/RW, or CD-RW/DVD Combo drive.

#Optical media card reader illustrated.

5.25" Drive

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Remove the front bezel ([Front Bezel on page 61](#))
4. Disconnect the power, data, and audio cables, as necessary, from the back of the drive.
5. Remove the two screws that secure the drive in the drive cage (1).
6. Slide the drive out of the drive cage, as shown in the illustration below (2).



7. After the drive has been removed from the chassis, remove the two guide screws from the left side of the drive. These screws should be transferred to the new drive.

To install a drive, reverse the removal procedure.



NOTE: If you are installing a 5.25" drive for the first time into bay 2 you must first remove the metal shield that covers the bay by pressing in on the silver-colored tab on the left side of the chassis then pulling the shield out from the front of the chassis. It is not necessary to remove the drive from bay 1 when performing this operation.

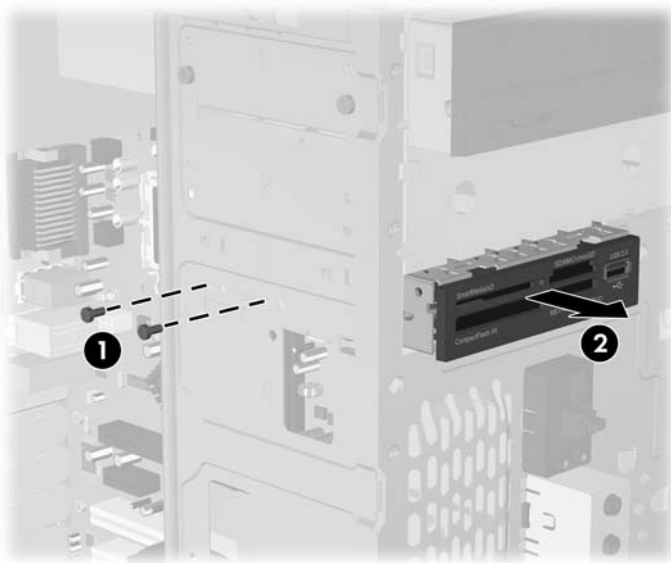
NOTE: There are a total of eight extra guide/retainer screws on the front of the chassis behind the bezel. Four have Unified Standard (US) #6–32 standard threads and four have M3 metric threads. US screws are used for hard drives and have a silver finish. Metric screws are used for all other drives and have a black finish. Be sure to install the appropriate guide screws into the drive.

3.5" Drive

If you are installing a device for the first time in the external 3.5" drive bay you will need to use a flat blade screwdriver to break out the metal shield.

The 3.5" external drive bay may be populated with a diskette drive or a media card reader. The removal procedure is the same for both devices.

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Remove the front bezel ([Front Bezel on page 61](#))
4. If the device is a media card reader, disconnect the internal USB cable from the system board. If the device is a diskette drive, disconnect the power, and data cables from the back of the drive.
5. Remove the retainer screws that secure the drive in the bay (1) then slide the drive forward and out of the bay (2).



To install a drive, reverse the removal procedure. Be sure to install a guide screw on the front right side of a new drive. The guide screw helps secure the drive in place.

Refer to the table below for proper retainer and guide screw locations.

| Device | Retainer Screws | Guide Screws |
|-------------------|------------------------------|------------------------------|
| Diskette Drive | 2 (labeled "FDD" on chassis) | 1 (front left side of drive) |
| Media Card Reader | 2 (labeled "CR" on chassis) | none |

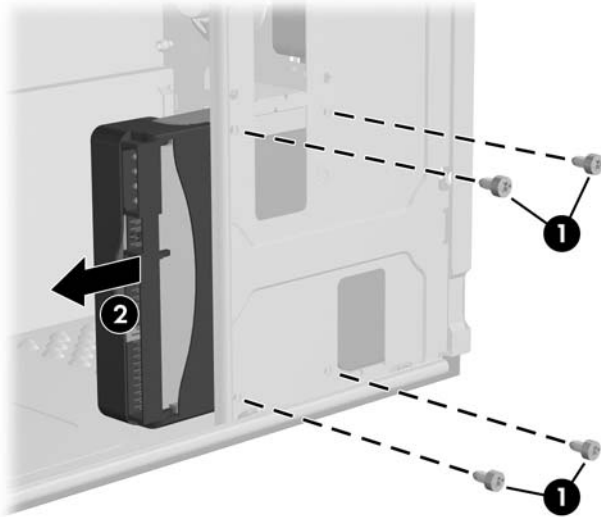


NOTE: If you are installing a drive in the external 3.5" drive bay for the first time, use a flat blade screwdriver to pry out the metal shield covering the bay.

NOTE: There are a total of eight extra guide/retainer screws on the front of the chassis behind the bezel. Four have Unified Standard (US) #6–32 standard threads and four have M3 metric threads. US screws are used for hard drives and have a silver finish. Metric screws are used for all other drives and have a black finish. Be sure to install the appropriate guide screws into the drive.

Removing a 3.5" Hard Drive

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Remove the front bezel ([Front Bezel on page 61](#))
4. Disconnect the power, and data cables from the back the drive.
5. Remove the four retaining screws that secure the drive in the drive cage (1).
6. Slide the drive out of the rear of the drive bay (2).



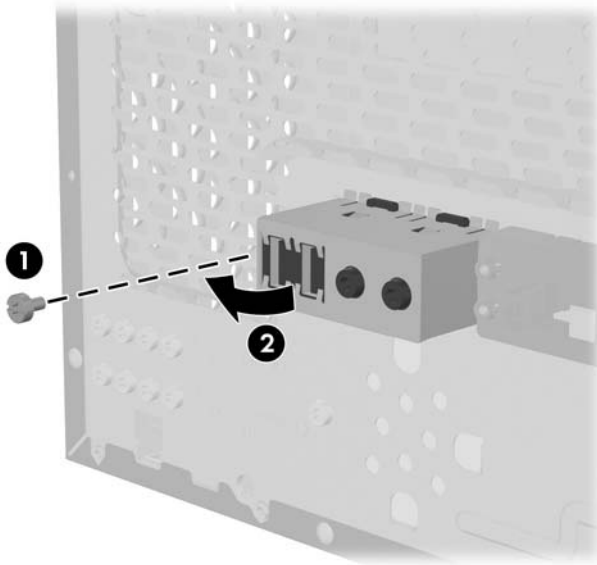
To replace the hard drive cage, reverse the removal procedure. No guide screws are required for drives installed in the hard drive bays (bays 4 and 5).



NOTE: If you replaced the primary hard drive, the *Restore Plus!*CD may be used to restore the operating system, software drivers, and/or any software applications that were preinstalled on the computer. Follow the instructions in the guide included with the CD. When the restore process has been completed, reinstall any personal files that were backed up before replacing the hard drive.

Front I/O Panel Housing Assembly

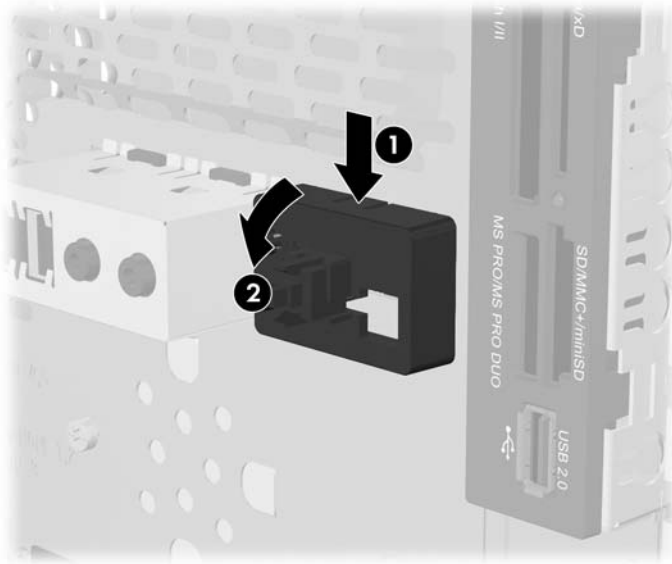
1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel and rotate the computer so the system board is parallel to the table to make it easier to work on ([Access Panel on page 60](#))
3. Remove the front bezel ([Front Bezel on page 61](#))
4. Free the two cables from the cable tie that is attached to the chassis.
5. Remove the screw (1) that secures the housing to the chassis and then rotate the housing away from the chassis and pull the assembly out of the chassis.



To install the housing assembly, reverse the removal procedures.

Power Switch Assembly

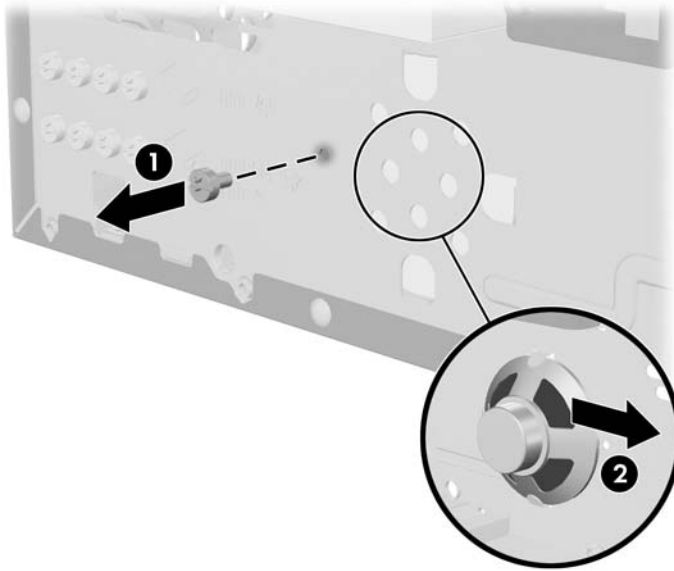
1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#)).
2. Remove the access panel and rotate the computer so the system board is parallel to the table to make it easier to work on ([Access Panel on page 60](#)).
3. Disconnect the braided cables from the system board.
4. Free the braided cables from the cable tie that is attached to the chassis.
5. Squeeze the top of the switch holder (1), rotate the switch, and remove it from the chassis.



To install the power switch assembly, reverse the removal procedures.

Speaker

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Remove the front bezel ([Front Bezel on page 61](#))
4. Disconnect the speaker cable from the system board.
5. Free the cable from the cable tie that is attached to the chassis.
6. Remove the screw that secures the speaker to the inside of the chassis (1) then, remove the speaker (2) by sliding it out of the retaining clips..

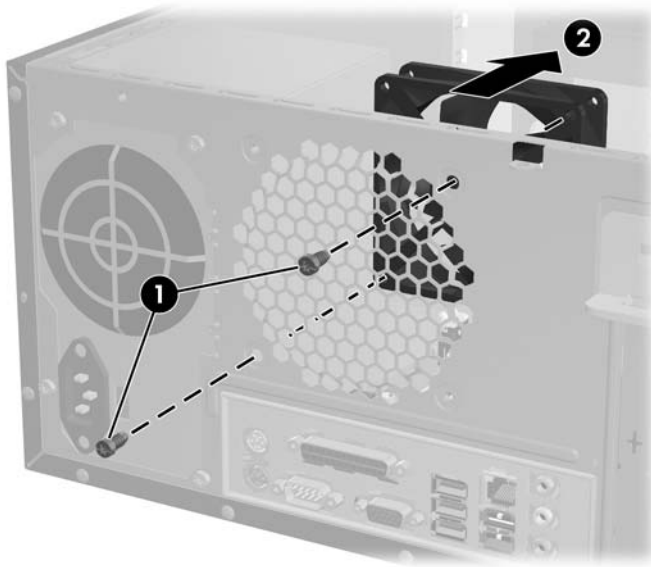


To install the speaker, reverse the removal procedure.

When installing the speaker, make sure the speaker wires point towards the speaker retaining screw.

System Fan

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#))
3. Disconnect the cable that connects the system fan to the system board.
4. Remove the screws that secure the fan to the chassis and remove the fan.



To install the fan, reverse the removal procedures.



NOTE: When installing the fan, make sure the wires leading from the fan are located near the P2 4-pin power connector on the system board.

Heatsink

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel and lay the computer down on its side to make it easier to work on. ([Access Panel on page 60](#))
3. Disconnect the heatsink control cable from the system board.
4. Loosen the four captive screws that secure the heatsink to the system board.
5. Lift the heatsink from atop the processor and set it on its side to keep from contaminating the work area with thermal grease.



When reinstalling an existing heatsink, make sure that its bottom has been cleaned with an alcohol wipe and fresh thermal grease has been applied to the top of the processor. New heatsinks come from the factory with fresh thermal grease already applied.

Position the heatsink so that fan wiring is closest to the power supply. Check to ensure that the heatsink mounting lugs do not rest on any electrical components before tightening the retaining screws.



CAUTION: Heatsink retaining screws should be tightened in diagonally opposite pairs (as in an X) to evenly seat the heatsink to the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

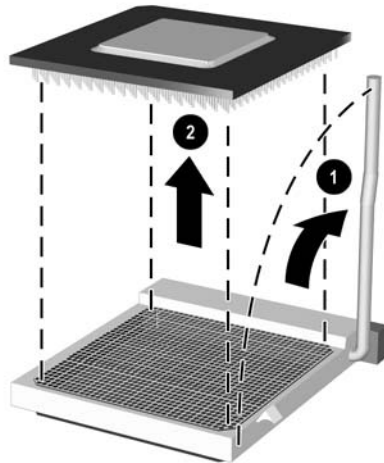
Processor

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#)).
2. Remove the access panel and lay the computer down on its side to make it easier to work on. ([Access Panel on page 60](#)).
3. Disconnect the heatsink control cable from the system board and remove the heatsink. [Heatsink on page 80](#)
4. Rotate the processor locking lever to its full open position (1).
5. Raise and rotate the microprocessor retainer to its full open position (2).
6. Carefully lift the processor from the socket (3).



CAUTION: Do NOT handle the pins in the processor socket. These pins are very fragile and handling them could cause irreparable damage. Once pins are damaged it may be necessary to replace the system board.

CAUTION: The heatsink must be installed within 24 hours of installing the processor to prevent damage to the processor's solder connections.



To install a new processor:

1. Place the processor in its socket and close the retainer.
2. Secure the locking lever.

If reusing the existing heatsink, go to step 3.

If using a new heatsink, go to step 6.

3. If reusing the existing heatsink, clean the bottom of the heatsink with the alcohol pad provided in the spares kit.
4. Apply the thermal grease provided in the spares kit to the top of the processor and install the heatsink atop the processor.

5. Go to step 7.
6. If using a new heatsink, remove the protective covering from the bottom of the heatsink and place it in position atop the processor.
7. Secure the heatsink to the system board and system board tray with the 4 captive screws and attach the heatsink control cable to the system board.



CAUTION: Heatsink retaining screws should be tightened in diagonally opposite pairs (as in an X) to evenly seat the heatsink on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.



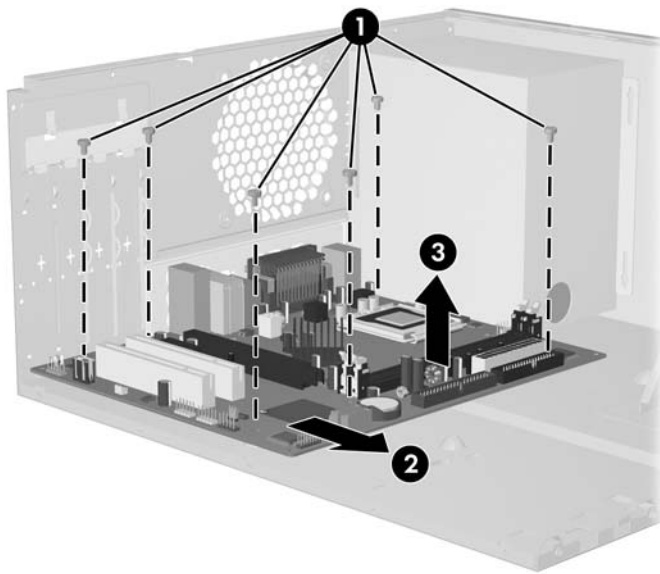
NOTE: After installing a new processor onto the system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system ROM BIOS can be found on the Web at: <http://h18000.www1.hp.com/support/files>.

System Board

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel. ([Access Panel on page 60](#))
3. Remove the front bezel and lay the computer down on its side to make it easier to work on. ([Front Bezel on page 61](#)).
4. Disconnect the power, and data cables from the back of all installed drives.
5. Disconnect all cables from the system board.
6. Remove the heatsink from the system board ([Heatsink on page 80](#))
7. Remove the 6 screws that secure the system board to the chassis (1).
8. Slide the system board towards the front of the chassis (2) then, angle the back of the board up to remove it (3).



NOTE: The system board in the computer may look slightly different from the one shown here.



To install the system board, reverse the removal procedure.



NOTE: After installing a new system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system ROM BIOS can be found on the Web at: <http://h18000.www1.hp.com/support/files>.

Battery

The battery that comes with your computer provides power to the real-time clock and has a lifetime of about three years. When replacing the battery, use a battery equivalent to the battery originally installed on the computer. The computer comes with a 3-volt lithium coin cell battery.



NOTE: The lifetime of the lithium battery can be extended by plugging the computer into a live AC wall socket. The lithium battery is only used when the computer is NOT connected to AC power.



WARNING! This computer contains an internal lithium manganese dioxide battery. There is a risk of fire and burns if the battery is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60°C (140°F)
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace the battery only with the HP/Compaq spare designated for this product.



CAUTION: Before replacing the battery, it is important to back up the computer CMOS settings. When the battery is removed or replaced, the CMOS settings will be cleared. Refer to the *Troubleshooting Guide* for information on backing up the CMOS settings.



NOTE: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP/Compaq, their authorized partners, or their agents.



CAUTION: Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#)).

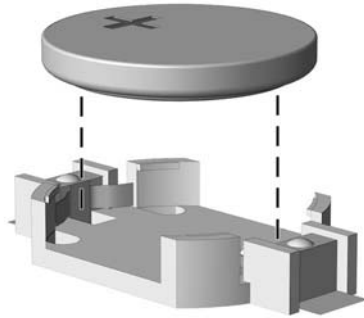


NOTE: It may be necessary to remove an expansion card to gain access to the battery.

3. Locate the battery and battery holder on the system board.

Type 1 Battery Holder

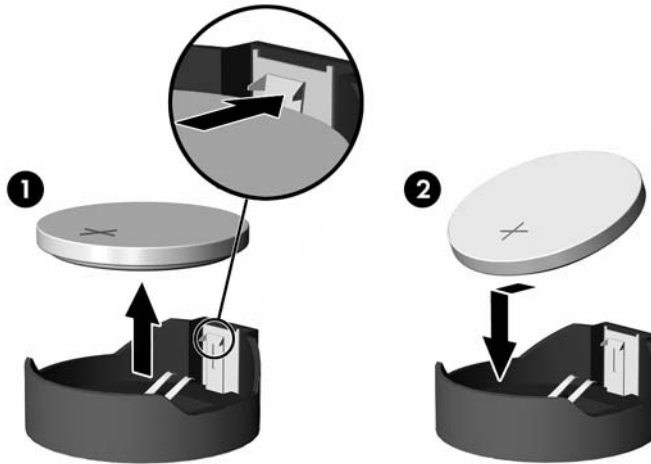
1. Lift the battery out of its holder.



2. Slide the replacement battery into position, positive side up.
3. The battery holder automatically secures the battery in the proper position.
4. Replace the computer access panel.
5. Plug in the computer and turn on power to the computer.
6. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide*.

Type 2 Battery Holder

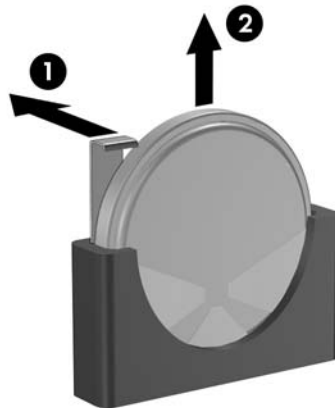
1. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out (1).
2. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up (2). Push the other edge down until the clamp snaps over the other edge of the battery.



3. Replace the computer access panel.
4. Plug in the computer and turn on power to the computer.
5. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide*.

Type 3 Battery Holder

1. Pull back on the clip (1) that holds the battery in place, then remove the battery (2).
2. Insert the new battery and position the clip back in place.



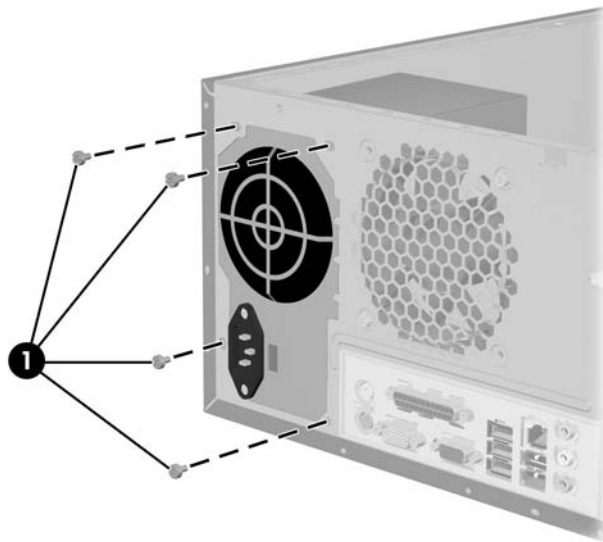
3. Replace the computer access panel.
4. Plug in the computer and turn on power to the computer.
5. Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide*.

Power Supply



WARNING! Voltage is always present on the system board when the computer is plugged into an active AC outlet. To avoid possible personal injury and damage to the equipment the power cord should be disconnected from the computer and/or the AC outlet before opening the computer.

1. Prepare the computer for disassembly ([Preparation for Disassembly on page 59](#))
2. Remove the access panel ([Access Panel on page 60](#)).
3. Disconnect all power cables from the mass storage devices and from the system board.
4. Remove the 4 screws that secure the power supply to the chassis.
5. Slide the power supply toward the front of the computer, then lift it out of the computer.




To install the power supply, reverse the removal procedure.


A Connector Pin Assignments

This appendix contains the pin assignments for many computer and workstation connectors. Some of these connectors may not be used on the product being serviced.


Keyboard

| Connector and Icon | Pin | Signal |
|---|-----|--------|
|  | 1 | Data |
| | 2 | Unused |
| | 3 | Ground |
| | 4 | +5 VDC |
| | 5 | Clock |
| | 6 | Unused |


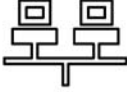
Mouse

| Connector and Icon | Pin | Signal |
|---|-----|--------|
|  | 1 | Data |
| | 2 | Unused |
| | 3 | Ground |
| | 4 | +5 VDC |
| | 5 | Clock |
| | 6 | Unused |

Ethernet BNC

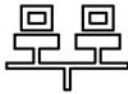
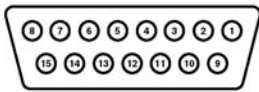
| Connector and Icon | Pin | Signal |
|---|-----|--------|
|  | 1 | Data |
| | 2 | Ground |

Ethernet RJ-45

| Connector and Icon | | Pin | Signal |
|---|--|-----|-------------------|
|   | | 1 | (+) Transmit Data |
| | | 2 | (-) Transmit Data |
| | | 3 | (+) Receive Data |
| | | 4 | Unused |
| | | 5 | Unused |
| | | 6 | (-) Receive Data |
| | | 7 | Unused |
| | | 8 | Unused |


Ethernet AUI

Connector and Icon

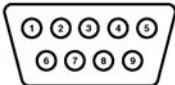



| Pin | Signal | Pin | Signal |
|-----|-------------------------------------|-----|-----------------------------------|
| 1 | Ground | 9 | Positive AUI Differential Receive |
| 2 | Negative AUI Differential Collision | 10 | +12V |
| 3 | Positive AUI Differential Collision | 11 | Ground |
| 4 | Negative AUI Differential Transmit | 12 | Ground |
| 5 | Positive AUI Differential Transmit | 13 | Unused |
| 6 | Ground | 14 | Unused |
| 7 | Ground | 15 | Unused |
| 8 | Negative AUI Differential Receive | 16 | Unused |

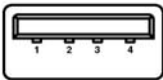

Parallel Interface

| Connector and Icon | | | |
|---|------------|-------|--------------------|
|  | | | |
| Pin | Signal | Pin | Signal |
| 1 | Strobe | 10 | Acknowledge |
| 2 | Data Bit 0 | 11 | Busy |
| 3 | Data Bit 1 | 12 | Paper End |
| 4 | Data Bit 2 | 13 | Select |
| 5 | Data Bit 3 | 14 | Auto Linefeed |
| 6 | Data Bit 4 | 15 | Error |
| 7 | Data Bit 5 | 16 | Initialize Printer |
| 8 | Data Bit 6 | 17 | Select IN |
| 9 | Data Bit 7 | 18–25 | Signal Ground |

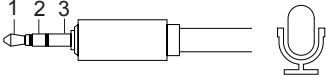
Serial Interface, Powered and Non-Powered

| Connector and Icon | Pin | Signal |
|---|-----|---------------------------------|
|   | 1 | Carrier Detect (12V if powered) |
| | 2 | Receive Data |
| | 3 | Transmit Data |
| | 4 | Data Terminal Ready |
| | 5 | Signal Ground |
| | 6 | Data Set Ready |
| | 7 | Request to Send |
| | 8 | Clear to Send |
| | 9 | Ring Indicator (5V if powered) |

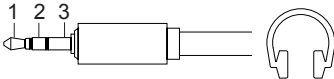
USB

| Connector and Icon | Pin | Signal |
|---|-----|--------|
|   | 1 | +5 VDC |
| | 2 | - Data |
| | 3 | + Data |
| | 4 | Ground |

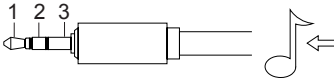
Microphone

| Connector and Icon (1/8" miniphone) | Pin | Signal |
|---|------------|-------------|
|  | 1 (Tip) | Audio_left |
| | 2 (Ring) | Audio_Right |
| | 3 (Shield) | Ground |

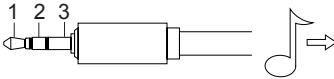
Headphone

| Connector and Icon (1/8" miniphone) | Pin | Signal |
|---|------------|-------------|
|  | 1 (Tip) | Audio_left |
| | 2 (Ring) | Power_Right |
| | 3 (Shield) | Ground |

Line-in Audio

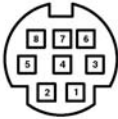

| Connector and Icon (1/8" miniphone) | Pin | Signal |
|---|------------|----------------|
|  | 1 (Tip) | Audio_In_Left |
| | 2 (Ring) | Audio_In_Right |
| | 3 (Shield) | Ground |

Line-out Audio

| Connector and Icon (1/8" miniphone) | Pin | Signal |
|---|------------|-----------------|
|  | 1 (Tip) | Audio_Out_Left |
| | 2 (Ring) | Audio_Out_Right |
| | 3 (Shield) | Ground |

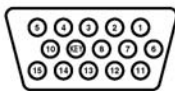
External Infrared Transceiver

| Connector and Icon | Pin | Signal |
|--------------------|-----|--------|
|--------------------|-----|--------|

| | | |
|---|---|----------|
|   | 1 | Transmit |
| | 2 | Receive |
| | 3 | Ground |
| | 4 | 5V |
| | 5 | Mode |
| | 6 | Not Used |
| | 7 | Not Used |
| | 8 | Not Used |

Monitor

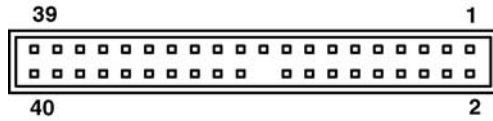
Connector and Icon



| Pin | Signal | Pin | Signal |
|-----|--------------|-----|------------------|
| 1 | Red Analog | 9 | +5V (fused) |
| 2 | Green Analog | 10 | Ground |
| 3 | Blue Analog | 11 | Not used |
| 4 | Not used | 12 | DDC Serial Data |
| 5 | Ground | 13 | Horizontal Sync |
| 6 | Ground | 14 | Vertical Sync |
| 7 | Ground | 15 | DDC Serial Clock |
| 8 | Ground | | |

ATA/ATAPI (IDE) Standard Drive Cable

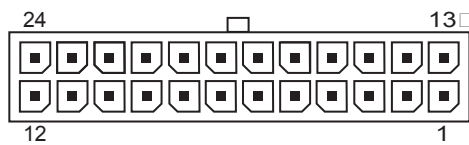
Connector



| Pin | Signal | Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|-----|----------------------|
| 1 | Reset | 15 | DD1 | 29 | DMAK |
| 2 | Ground | 16 | DD14 | 30 | Ground |
| 3 | DD7 | 17 | DD0 | 31 | INTRQ |
| 4 | DD8 | 18 | DD15 | 32 | IOCS16 |
| 5 | DD6 | 19 | Ground | 33 | DA1 |
| 6 | DD9 | 20 | (Key) | 34 | PDIAG (cable detect) |
| 7 | DD5 | 21 | DMARQ | 35 | DA0 |
| 8 | DD10 | 22 | Ground | 36 | DA2 |
| 9 | DD4 | 23 | DIOW | 37 | CS1FX |
| 10 | DD11 | 24 | Ground | 38 | CS3FX |
| 11 | DD3 | 25 | DIOR | 39 | DASP |
| 12 | DD12 | 26 | Ground | 40 | Ground |
| 13 | DD2 | 27 | IORDY | | |
| 14 | DD13 | 28 | CSEL | | |

24-Pin Power

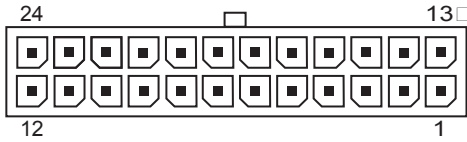
Connector



| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|-----|--------|-----|---------|-----|--------|-----|--------|
| 1 | +3.3V | 7 | GND | 13 | +3.3V | 19 | GND |
| 2 | +3.3V | 8 | POK | 14 | -12V | 20 | open |
| 3 | GND | 9 | +5 Vaux | 15 | GND | 21 | +5V |
| 4 | +5V | 10 | +12V | 16 | PSON | 22 | +5V |
| 5 | GND | 11 | +12V | 17 | GND | 23 | +5V |
| 6 | +5V | 12 | +3.3V | 18 | GND | 24 | GND |

24-Pin MicroFit Power

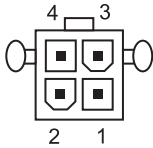
Connector



| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|-----|---------|-----|---------|-----|-----------|-----|--------|
| 1 | +5 Vaux | 7 | PWRGD | 13 | +12V | 19 | GND |
| 2 | GND | 8 | +3.3V | 14 | +5V Sense | 20 | +3.3V |
| 3 | +5V | 9 | +3.3V | 15 | GND | 21 | Sense |
| 4 | +5V | 10 | Tach | 16 | +5V | 22 | +3.3V |
| 5 | PS_ON | 11 | GND | 17 | +5V | 23 | +3.3V |
| 6 | GND | 12 | Fan-CMD | 18 | +3.3V | 24 | GND |
| | | | | | | | -12V |

4-Pin Power (for CPU)

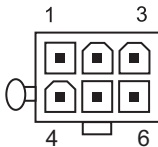
Connector and Icon



| Pin | Signal |
|-----|----------|
| 1 | GND |
| 2 | GND |
| 3 | +12V CPU |
| 4 | -12V CPU |

6-Pin Power (for CPU)

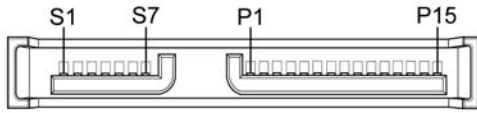
Connector and Icon



| Pin | Signal |
|-----|---------|
| 1 | GND |
| 2 | GND |
| 3 | GND |
| 4 | 12V CPU |
| 5 | 12V CPU |
| 6 | +12V |

SATA Data and Power

Drive Connector



| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|-----|----------|-----|--------|
| S1 | Ground | S2 | A+ | S3 | A- | S4 | Ground |
| S5 | B- | S6 | B+ | S7 | Ground | | |
| P1 | Ground | P2 | V 3.3 | P3 | V 3.3 | P4 | Ground |
| P5 | B- | P6 | Ground | P7 | V 5 | P8 | V 5 |
| P9 | V 5 | P10 | Ground | P11 | Reserved | P12 | Ground |
| P13 | V 12 | P14 | V12 | P15 | V 12 | | |

*S = Data, P = Power

PCI Express

x1, x4, x8, and x16 PCI Express Connector



Pin A

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|-----|---------|-----|--------|-----|---------|-----|--------|-----|--------|
| 1 | PRSENT1 | 6 | JTAG3 | 11 | PERST# | 16 | PERp0 | 21 | PERp1 |
| 2 | +12V | 7 | JTAG4 | 12 | GND | 17 | PERn0 | 22 | PERn1 |
| 3 | +12V | 8 | JTAG5 | 13 | REFCLK+ | 18 | GND | 23 | GND |
| 4 | GND | 9 | +3.3V | 14 | REFCLK- | 19 | RSVD | 24 | GND |
| 5 | JTAG2 | 10 | +3.3V | 15 | GND | 20 | GND | 25 | PERp2 |
| 26 | PERn(2) | 31 | GND | 36 | PERn4 | 41 | GND | 46 | GND |
| 27 | GND | 32 | RSVD | 37 | GND | 42 | GND | 47 | PERp7 |
| 28 | GND | 33 | RSVD | 38 | GND | 43 | PERp6 | 48 | PERn7 |
| 29 | PERp3 | 34 | GND | 39 | PERp5 | 44 | PERn6 | 49 | GND |
| 30 | PERn3 | 35 | PERp4 | 40 | PERn5 | 45 | GND | 50 | RSVD |
| 51 | GND | 56 | PERp9 | 61 | PERn10 | 66 | GND | 71 | GND |

| | | | | | | | | | |
|----|--------|----|--------|----|--------|----|--------|----|--------|
| 52 | PERp8 | 57 | PERn9 | 62 | GND | 67 | GND | 72 | PERp13 |
| 53 | PERn8 | 58 | GND | 63 | GND | 68 | PERp12 | 73 | PERn13 |
| 54 | GND | 59 | GND | 64 | PERp11 | 69 | PERn12 | 74 | GND |
| 55 | GND | 60 | PERp10 | 65 | PERn11 | 70 | GND | 75 | GND |
| 76 | PERp14 | 81 | PERn15 | | | | | | |
| 77 | PERn14 | 82 | GND | | | | | | |
| 78 | GND | | | | | | | | |
| 79 | GND | | | | | | | | |
| 80 | PERp15 | | | | | | | | |

Pin B information is on the next page



NOTE: x1 PCI Express uses pins 1-18

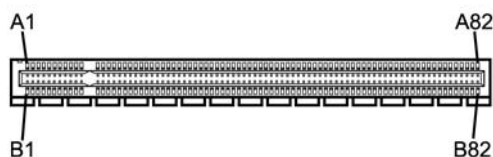
x4 PCI Express uses pins 1-32

x8 PCI Express uses pins 1-49

x16 PCI Express uses pins 1-8

PCI Express

x1, x4, x8, and x16 PCI Express Connector



Pin B

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|-----|--------|-----|---------|-----|--------|-----|--------|-----|---------|
| 1 | +12V | 6 | SMDAT | 11 | WAKE# | 16 | GND | 21 | GND |
| 2 | +12V | 7 | GND | 12 | RSVD | 17 | GND | 22 | GND |
| 3 | RSVD | 8 | +3.3 V | 13 | GND | 18 | PETp1 | 23 | PETp2 |
| 4 | GND | 9 | JTAG1 | 14 | PETp0 | 19 | PETn1 | 24 | PETn2 |
| 5 | SMCLK | 10 | 3.3vAux | 15 | PETn0 | 20 | | 25 | GND |
| 26 | GND | 31 | PRSNT2# | 36 | GND | 41 | PETp6 | 46 | PETn7 |
| 27 | PETp3 | 32 | GND | 37 | PETp5 | 42 | PRTn6 | 47 | GND |
| 28 | PETn3 | 33 | PETp4 | 38 | PETn5 | 43 | GND | 48 | PRSNT2# |
| 29 | GND | 34 | PETn4 | 39 | GND | 44 | GND | 49 | GND |
| 30 | RSVD | 35 | GND | 40 | GND | 45 | PETp7 | 50 | PETp8 |

| | | | | | | | | | |
|----|--------|----|---------|----|--------|----|--------|----|--------|
| 51 | PETn8 | 56 | GND | 61 | GND | 66 | PETp12 | 71 | PETn13 |
| 52 | GND | 57 | GND | 62 | PETp11 | 67 | PETn12 | 72 | GND |
| 53 | GND | 58 | PETp10 | 63 | PETn11 | 68 | GND | 73 | GND |
| 54 | PETp9 | 59 | PETn10 | 64 | GND | 69 | GND | 74 | PETp14 |
| 55 | PETn9 | 60 | GND | 65 | GND | 70 | PETp13 | 75 | PETn14 |
| 76 | GND | 81 | PRSNT2# | | | | | | |
| 77 | GND | 82 | RSVD | | | | | | |
| 78 | PETp15 | | | | | | | | |
| 79 | PETn15 | | | | | | | | |
| 80 | GND | | | | | | | | |

Pin B information is on the next page



NOTE: x1 PCI Express uses pins 1-18

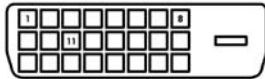
x4 PCI Express uses pins 1-32

x8 PCI Express uses pins 1-49

x16 PCI Express uses pins 1-8

DVI Connector

Connector and Icon



| Pin | Signal | Pin | Signal |
|-----|-------------------------|-----|-------------------------|
| 1 | T.M.D.S. Data2- | 13 | T.M.D.S. Data3+ |
| 2 | T.M.D.S. Data2+ | 14 | +5V Power |
| 3 | T.M.D.S. Data2/4 Shield | 15 | Ground (for +5V) |
| 4 | T.M.D.S. Data4- | 16 | Hot Pug Detect |
| 5 | T.M.D.S. Data4+ | 17 | T.M.D.S. Data0- |
| 6 | DDC Clock | 18 | T.M.D.S. Data0+ |
| 7 | DDC Data | 19 | T.M.D.S. Data0/5 Shield |
| 8 | No Connect | 20 | T.M.D.S. Data5- |
| 9 | T.M.D.S. Data1- | 21 | T.M.D.S. Data5+ |
| 10 | T.M.D.S. Data1+ | 22 | T.M.D.S. Data Shield |
| 11 | T.M.D.S. Data1/3 Shield | 23 | T.M.D.S. Clock+ |

B Power Cord Set Requirements

The power supplies on some computers have external power switches. The voltage select switch feature on the computer permits it to operate from any line voltage between 100-120 or 220-240 volts AC. Power supplies on those computers that do not have external power switches are equipped with internal switches that sense the incoming voltage and automatically switch to the proper voltage.

The power cord set received with the computer meets the requirements for use in the country where you purchased the equipment.

Power cord sets for use in other countries must meet the requirements of the country where you use the computer.

General Requirements

The requirements listed below are applicable to all countries:

1. The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
2. The power cord set must have a minimum current capacity of 10A (7A Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
3. The diameter of the wire must be a minimum of 0.75 mm² or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet).

The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.



WARNING! Do not operate this product with a damaged power cord set. If the power cord set is damaged in any manner, replace it immediately.

Japanese Power Cord Requirements

For use in Japan, use only the power cord received with this product.



CAUTION: Do not use the power cord received with this product on any other products.

Country-Specific Requirements

Additional requirements specific to a country are shown in parentheses and explained below.

| Country | Accrediting Agency | Country | Accrediting Agency |
|---------------|--------------------|--------------------|--------------------|
| Australia (1) | EANSW | Italy (1) | IMQ |
| Austria (1) | OVE | Japan (3) | METI |
| Belgium (1) | CEBC | Norway (1) | NEMKO |
| Canada (2) | CSA | Sweden (1) | SEMKO |
| Denmark (1) | DEMKO | Switzerland (1) | SEV |
| Finland (1) | SETI | United Kingdom (1) | BSI |
| France (1) | UTE | United States (2) | UL |
| Germany (1) | VDE | | |

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75mm₂ conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SVT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 0.75 mm₂ conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

C POST Error Messages

This appendix lists the error codes, error messages, and the various indicator light and audible sequences that you may encounter during Power-On Self-Test (POST) or computer restart, the probable source of the problem, and steps you can take to resolve the error condition.

POST Message Disabled suppresses most system messages during POST, such as memory count and non-error text messages. If a POST error occurs, the screen will display the error message. To manually switch to the POST Messages Enabled mode during POST, press any key (except **F10** or **F12**). The default mode is POST Message Disabled.

The speed at which the computer loads the operating system and the extent to which it is tested are determined by the POST mode selection.

Quick Boot is a fast startup process that does not run all of the system level tests, such as the memory test. Full Boot runs all of the ROM-based system tests and takes longer to complete.

Full Boot may also be enabled to run every 1 to 30 days on a regularly scheduled basis. To establish the schedule, reconfigure the computer to the Full Boot Every x Days mode, using Computer Setup.



NOTE: For more information on Computer Setup, see the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD*.

Power-On Self-Test (POST)

POST is a series of diagnostic tests that runs automatically when the system is turned on. POST checks the following items to ensure that the computer system is functioning properly:

- Keyboard
- Memory modules
- All mass storage devices
- Processors
- Controllers



NOTE: If the Power-On Password is set, a key icon appears on the screen while POST is running. You will need to enter the password before continuing.

If POST finds an error in the system, an audible and/or visual message occurs.

POST Numeric Codes and Text Messages

This section covers those POST errors that have numeric codes associated with them. The section also includes some text messages that may be encountered during POST.



NOTE: The computer will beep once after a POST text message is displayed on the screen.

Table C-1 Numeric Codes and Text Messages

| Control panel message | Description | Recommended action |
|---|---|---|
| 101-Option ROM Checksum Error | System ROM or expansion board option ROM checksum. | <ol style="list-style-type: none"> 1. Verify the correct ROM. 2. Flash the ROM if needed. 3. If an expansion board was recently added, remove it to see if the problem remains. 4. Clear CMOS. 5. If the message disappears, there may be a problem with the expansion card. 6. Replace the system board. |
| 103-System Board Failure | DMA or timers. | <ol style="list-style-type: none"> 1. Clear CMOS. 2. Remove expansion boards. 3. Replace the system board. |
| 110-Out of Memory Space for Option ROMs | Recently added PCI expansion card contains an option ROM too large to download during POST. | <ol style="list-style-type: none"> 1. If a PCI expansion card was recently added, remove it to see if the problem remains. 2. In Computer Setup, set Advanced > Device Options > NIC PXE Option ROM Download to DISABLE to prevent PXE option ROM for the internal NIC from being downloaded during POST to free more memory for an expansion card's option ROM. Internal PXE option ROM is used for booting from the NIC to a PXE server. 3. Ensure the ACPI/USB Buffers @ Top of Memory setting in Computer Setup is enabled. |
| 162-System Options Not Set | <p>Configuration incorrect.</p> <p>RTC (real-time clock) battery may need to be replaced.</p> | <p>Run Computer Setup and check the configuration in Advanced > Onboard Devices.</p> <p>Reset the date and time under Control Panel. If the problem persists, replace the RTC battery. See the <i>Hardware Reference Guide</i> on the <i>Documentation and Diagnostics CD</i> for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement.</p> |
| 163-Time & Date Not Set | Invalid time or date in configuration memory. | Reset the date and time under Control Panel (Computer Setup can also be used). If |

Table C-1 Numeric Codes and Text Messages (continued)

| Control panel message | Description | Recommended action |
|---|--|---|
| | RTC (real-time clock) battery may need to be replaced. | the problem persists, replace the RTC battery. See the <i>Hardware Reference Guide</i> on the <i>Documentation and Diagnostics CD</i> for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement. |
| 163-Time & Date Not Set | CMOS jumper may not be properly installed. | Check for proper placement of the CMOS jumper if applicable. |
| 164-MemorySize Error | Memory amount has changed since the last boot (memory added or removed). | Press the F1 key to save the memory changes. |
| 164-MemorySize Error | Memory configuration incorrect. | <ol style="list-style-type: none">1. Run Computer Setup or Windows utilities.2. Make sure the memory module(s) are installed properly.3. If third-party memory has been added, test using HP-only memory.4. Verify proper memory module type. |
| 201-Memory Error | RAM failure. | <ol style="list-style-type: none">1. Run Computer Setup or Windows utilities.2. Ensure memory modules are correctly installed.3. Verify proper memory module type.4. Remove and replace the identified faulty memory module(s).5. If the error persists after replacing memory modules, replace the system board. |
| 213-Incompatible Memory Module in Memory Socket(s) X, X, ... | A memory module in memory socket identified in the error message is missing critical SPD information, or is incompatible with the chipset. | <ol style="list-style-type: none">1. Verify proper memory module type.2. Try another memory socket.3. Replace DIMM with a module conforming to the SPD standard. |
| 214-DIMM Configuration Warning | Populated DIMM Configuration is not optimized. | Rearrange the DIMMs so that each channel has the same amount of memory. |
| 219-ECC Memory Module Detected ECC Modules not supported on this Platform | Recently added memory module(s) support ECC memory error correction. | <ol style="list-style-type: none">1. If additional memory was recently added, remove it to see if the problem remains.2. Check product documentation for memory support information. |
| 301-Keyboard Error | Keyboard failure. | <ol style="list-style-type: none">1. Reconnect keyboard with computer turned off.2. Check connector for bent or missing pins. |

Table C-1 Numeric Codes and Text Messages (continued)

| Control panel message | Description | Recommended action |
|--|---|---|
| | | <ol style="list-style-type: none"> 3. Ensure that none of the keys are depressed. 4. Replace keyboard. |
| 303-Keyboard Controller Error | I/O board keyboard controller. | <ol style="list-style-type: none"> 1. Reconnect keyboard with computer turned off. 2. Replace the system board. |
| 304-Keyboard or System Unit Error | Keyboard failure. | <ol style="list-style-type: none"> 1. Reconnect the keyboard with computer turned off. 2. Ensure that none of the keys are depressed. 3. Replace the keyboard. 4. Replace the system board. |
| 404-Parallel Port Address Conflict Detected | Both external and internal ports are assigned to parallel port X. | <ol style="list-style-type: none"> 1. Remove any parallel port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup. |
| 410-Audio Interrupt Conflict | IRQ address conflicts with another device. | Enter Computer Setup and reset the IRQ in Advanced > Onboard Devices . |
| 411-Network Interface Card Interrupt Conflict | IRQ address conflicts with another device. | Enter Computer Setup and reset the IRQ in Advanced > Onboard Devices . |
| 501-Display Adapter Failure | Graphics display controller. | <ol style="list-style-type: none"> 1. Reseat the graphics card (if applicable). 2. Clear CMOS. 3. Verify monitor is attached and turned on. 4. Replace the graphics card (if possible). |
| 510-Flash Screen Image Corrupted | Flash Screen image has errors. | Reflash the system ROM with the latest BIOS image. |
| 511-CPU, CPUA, or CPUB Fan not Detected | CPU fan is not connected or may have malfunctioned. | <ol style="list-style-type: none"> 1. Reseat CPU fan. 2. Reseat fan cable. 3. Replace CPU fan. |
| 512-Chassis, Rear Chassis, or Front Chassis Fan not Detected | Chassis, rear chassis, or front chassis fan is not connected or may have malfunctioned. | <ol style="list-style-type: none"> 1. Reseat chassis, rear chassis, or front chassis fan. 2. Reseat fan cable. 3. Replace chassis, rear chassis, or front chassis fan. |
| 514-CPU or Chassis Fan not Detected | CPU or chassis fan is not connected or may have malfunctioned. | <ol style="list-style-type: none"> 1. Reseat CPU or chassis fan. 2. Reseat fan cable. 3. Replace CPU or chassis fan. |

Table C-1 Numeric Codes and Text Messages (continued)

| Control panel message | Description | Recommended action |
|---|--|---|
| 601-Diskette Controller Error | Diskette controller circuitry or floppy drive circuitry incorrect. | <ol style="list-style-type: none"> 1. Run Computer Setup. 2. Check and/or replace cables. 3. Clear CMOS. 4. Replace diskette drive. 5. Replace the system board. |
| 605-Diskette Drive Type Error | Mismatch in drive type. | <ol style="list-style-type: none"> 1. Run Computer Setup. 2. Disconnect any other diskette controller devices (tape drives). 3. Clear CMOS. |
| 610-External Storage Device Failure | External tape drive not connected. | Reinstall tape drive or press F1 and allow system to reconfigure without the drive. |
| 611-Primary Floppy Port Address Assignment Conflict | Configuration error. | Run Computer Setup and check the configuration in Advanced > Onboard Devices . |
| 660-Display cache is detected unreliable | Integrated graphics controller display cache is not working properly and will be disabled. | Replace system board if minimal graphics degrading is an issue. |
| 912-Computer Cover Has Been Removed Since Last System Startup | Computer cover was removed since last system startup. | No action required. |
| 917-Front Audio Not Connected | Front audio harness has been detached or unseated from motherboard. | Reconnect or replace front audio harness. |
| 918-Front USB Not Connected | Front USB harness has been detached or unseated from motherboard. | Reconnect or replace front USB harness. |
| 921-Device in PCI Express slot failed to initialize | There is an incompatibility/problem with this device and the system or PCI Express Link could not be retrained to an x1. | Try rebooting the system. If the error reoccurs, the device may not work with this system |
| 1151-Serial Port A Address Conflict Detected | Both external and internal serial ports are assigned to COM1. | <ol style="list-style-type: none"> 1. Remove any serial port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup or Windows utilities. |
| 1152-Serial Port B Address Conflict Detected | Both external and internal serial ports are assigned to COM2. | <ol style="list-style-type: none"> 1. Remove any serial port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup or Windows utilities. |
| 1155-Serial Port Address Conflict Detected | Both external and internal serial ports are assigned to same IRQ. | <ol style="list-style-type: none"> 1. Remove any serial port expansion cards. 2. Clear CMOS. 3. Reconfigure card resources and/or run Computer Setup or Windows utilities. |
| 1201-System Audio Address Conflict Detected | Device IRQ address conflicts with another device. | Enter Computer Setup and reset the IRQ in Advanced > Onboard Devices . |

Table C-1 Numeric Codes and Text Messages (continued)

| Control panel message | Description | Recommended action |
|--|--|---|
| 1202-MIDI Port Address Conflict Detected | Device IRQ address conflicts with another device. | Enter Computer Setup and reset the IRQ in Advanced > Onboard Devices . |
| 1203-Game Port Address Conflict Detected | Device IRQ address conflicts with another device. | Enter Computer Setup and reset the IRQ in Advanced > Onboard Devices . |
| 1720-SMART Hard Drive Detects Imminent Failure | Hard drive is about to fail. (Some hard drives have a hard drive firmware patch that will fix an erroneous error message.) | <ol style="list-style-type: none"> 1. Determine if hard drive is giving correct error message. Enter Computer Setup and run the Drive Protection System test under Storage > DPS Self-test. 2. Apply hard drive firmware patch if applicable. (Available at http://www.hp.com/support.) 3. Back up contents and replace hard drive. |
| 1796-SATA Cabling Error | One or more SATA devices are improperly attached. For optimal performance, the SATA 0 and SATA 1 connectors must be used before SATA 2 and SATA 3. | Ensure SATA connectors are used in ascending order. For one device, use SATA 0. For two devices, use SATA 0 and SATA 1. For three devices, use SATA 0, SATA1, and SATA 2. |
| 1797-SATA Drivelock is not supported in RAID mode. | Drivelock is enabled on one or more SATA hard drives, and they cannot be accessed while the system is configured for RAID mode. | Either remove the Drivelocked SATA device or disable the Drivelock feature. To disable the Drivelock feature, enter Computer Setup, change Storage > Storage Options > SATA Emulation to IDE , and select File > Save Changes and Exit . Reenter Computer Setup and select Security > Drivelock . For each listed Drivelock-capable SATA device, ensure Drivelock is Disabled . Lastly, change Storage > Storage Options > SATA Emulation back to RAID and select File > Save Changes and Exit . |
| 1801-Microcode Patch Error | Processor is not supported by ROM BIOS. | <ol style="list-style-type: none"> 1. Upgrade BIOS to proper version. 2. Change the processor. |
| 2200-PMM Allocation Error during MEBx Download | Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM | <ol style="list-style-type: none"> 1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the computer, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board. |
| 2201-MEBx Module did not checksum correctly | Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM | <ol style="list-style-type: none"> 1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the power |

Table C-1 Numeric Codes and Text Messages (continued)

| Control panel message | Description | Recommended action |
|---|---|---|
| | | cord, restore the original memory configuration, and reboot the computer. |
| | | 4. If the error persists, replace the system board. |
| 2202-PMM Deallocation Error during MEBx cleanup | Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM | <ol style="list-style-type: none"> 1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the power cord, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board. |
| 2203-Setup error during MEBx execution | MEBx selection or exit resulted in a setup failure. | <ol style="list-style-type: none"> 1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the power cord, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board. |
| 2204-Inventory error during MEBx execution | BIOS information passed to the MEBx resulted in a failure. | <ol style="list-style-type: none"> 1. Reboot the computer. 2. If the error persists, update to the latest BIOS version. 3. If the error still persists, replace the system board. |
| 2205-Interface error during MEBx execution | MEBx operation experienced a hardware error during communication with ME. | <ol style="list-style-type: none"> 1. Reboot the computer. 2. If the error persists, update to the latest BIOS version. 3. If the error still persists, replace the system board. |
| Invalid Electronic Serial Number | Electronic serial number has become corrupted. | <ol style="list-style-type: none"> 1. Run Computer Setup. If Setup already has data in the field or will not allow the serial number to be entered, download from http://www.hp.com and run SP5572.EXE (SNZERO.EXE). 2. Run Computer Setup and try to enter serial number under Security, System ID, then save changes. |
| Network Server Mode Active and No Keyboard Attached | Keyboard failure while Network Server Mode enabled. | <ol style="list-style-type: none"> 1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. |

Table C-1 Numeric Codes and Text Messages (continued)

| Control panel message | Description | Recommended action |
|----------------------------------|--|---|
| | | <ol style="list-style-type: none">3. Ensure that none of the keys are depressed.4. Replace keyboard. |
| Parity Check 2 | Parity RAM failure. | Run Computer Setup and Diagnostic utilities. |
| System will not boot without fan | CPU fan not installed or disconnected in VSFF chassis. | <ol style="list-style-type: none">1. Remove the computer cover, press the power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header. Ensure the heatsink is properly seated and installed.2. If the fan is plugged in and the heatsink is properly seated but the fan does not spin, then replace the heatsink-fan assembly. |

Interpreting POST Diagnostic Front Panel LEDs



This section covers the front panel LED codes that may occur before or during POST that do not necessarily have an error code or text message associated with them.



NOTE: If you see flashing LEDs on a PS/2 keyboard, look for flashing LEDs on the front panel of the computer and refer to the following table to determine the front panel LED codes.

Recommended actions in the following table are listed in the order in which they should be performed.

Replace the system board or power supply only as the last resort.

| Activity | Possible Cause | Recommended Action |
|--|---|--|
| Green Power LED On. | Computer on. | None |
| Green Power LED flashes every one second. | Processor thermal protection activated: A fan may be blocked or not turning. OR The heatsink/fan assembly is not properly attached to the processor. | <ol style="list-style-type: none"> 1. Ensure that the computer air vents are not blocked and the processor cooling fan is running. 2. Open hood, press power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header. Ensure the fan is fully/ properly seated or installed. <p> WARNING! Rotating fan blades can cause serious bodily harm. Be sure to keep your hands away from the rotating blades.</p> <ol style="list-style-type: none"> 3. If fan is plugged in and seated properly, but is not spinning, then replace processor fan. 4. Reseat processor heatsink and verify that the fan assembly is properly attached. 5. Contact an authorized reseller or service provider. |
| Green Power LED flashes every two seconds. | Computer in Suspend to RAM mode (some models only) or normal Suspend mode. | Press any key or move the mouse to wake the computer. |
| Green Power LED flashes five times, once every second, followed by a two second pause. | Pre-video memory error. | <p> CAUTION: To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module.</p> <ol style="list-style-type: none"> 1. Reseat DIMMs. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the system board. |

| Activity | Possible Cause | Recommended Action |
|---|------------------------------------|---|
| Green Power LED flashes six times, once every second, followed by a two second pause. | Pre-video graphics error. | <p>For systems with a graphics card:</p> <ol style="list-style-type: none"> 1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board. <p>For systems with integrated graphics, replace the system board.</p> |
| Green Power LED flashes eight times, once every second, followed by a two second pause. | Invalid ROM based on bad checksum. | <ol style="list-style-type: none"> 1. Reflash the system ROM with the latest BIOS image. 2. Replace the system board. |
| System does not power on and LEDs are not flashing. | System unable to power on. | <p>Press and hold the power button for less than 4 seconds. If the hard drive LED turns green, the power button is working correctly. Try the following:</p> <ol style="list-style-type: none"> 1. Check that the voltage selector (some models), located on the rear of the power supply, is set to the appropriate voltage. Proper voltage setting depends on your region. 2. Replace the system board. <p>OR</p> <p>Press and hold the power button for less than 4 seconds. If the hard drive LED does not turn on green then:</p> <ol style="list-style-type: none"> 1. Check that the unit is plugged into a working AC outlet. 2. Open hood and check that the power button harness is properly connected to the system board. 3. Check that both power supply cables are properly connected to the system board. 4. Check to see if the 5V_aux light on the system board is turned on. If it is turned on, then replace the power button harness. If the problem persists, replace the system board. 5. If the 5V_aux light on the system board is not turned on, remove the expansion cards one at a time until the 5V_aux light on the system board turns on. If the problem persists, replace the power supply. |

D Troubleshooting Without Diagnostics

This chapter provides information on how to identify and correct minor problems, such as diskette drive, hard drive, optical drive, graphics, audio, memory, and software problems. If you encounter problems with the computer, refer to the tables in this chapter for probable causes and recommended solutions.



NOTE: For information on specific error messages that may appear on the screen during Power-On Self-Test (POST) at startup, refer to Appendix A, [POST Error Messages on page 103](#).

Safety and Comfort



WARNING! Misuse of the computer or failure to establish a safe and comfortable work environment may result in discomfort or serious injury. Refer to the *Safety & Comfort Guide* on the *Documentation and Diagnostics CD* and available on the Web site at <http://www.hp.com/ergo> for more information on choosing a workspace and creating a safe and comfortable work environment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. For more information, refer to *Safety & Regulatory Information* on the *Documentation and Diagnostics CD*.

Before You Call for Technical Support

If you are having problems with the computer, try the appropriate solutions below to try to isolate the exact problem before calling for technical support.

- Run the diagnostics utility. Refer to Chapter 1, [HP Insight Diagnostics on page 15](#) for more information.
- Run the Drive Protection System (DPS) Self-Test in Computer Setup. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for more information.
- Check the Power LED on the front of the computer to see if it is flashing red. The flashing lights are error codes that will help you diagnose the problem. Refer to Appendix A, [POST Error Messages on page 103](#) for more information.
- If the screen is blank, plug the monitor into a different video port on the computer if one is available. Or, change out the monitor with a monitor that you know is functioning properly.
- If you are working on a network, plug another computer with a different cable into the network connection. There may be a problem with the network plug or cable.
- If you recently added new hardware, remove the hardware and see if the computer functions properly.

- If you recently installed new software, uninstall the software and see if the computer functions properly.
- Boot the computer to the Safe Mode to see if it will boot without all of the drivers loaded. When booting the operating system, use “Last Known Configuration.”
- Refer to the comprehensive online technical support at <http://www.hp.com/support>.
- Refer to the following [Helpful Hints on page 114](#) section in this guide.

To assist you in resolving problems online, HP Instant Support Professional Edition provides you with self-solve diagnostics. If you need to contact HP support, use HP Instant Support Professional Edition's online chat feature. Access HP Instant Support Professional Edition at: <http://www.hp.com/go/ispe>.

Access the Business Support Center (BSC) at <http://www.hp.com/go/bizsupport> for the latest online support information, software and drivers, proactive notification, and worldwide community of peers and HP experts.

If it becomes necessary to call for technical assistance, be prepared to do the following to ensure that your service call is handled properly:

- Be in front of your computer when you call.
- Write down the computer serial number and product ID number, and the monitor serial number before calling.
- Spend time troubleshooting the problem with the service technician.
- Remove any hardware that was recently added to your system.
- Remove any software that was recently installed.
- Restore the system to a Recovery Point created in HP Backup and Recovery Manager or run the *Restore Plus!* CD. For more information on using HP Backup and Recovery Manager, refer to the *HP Backup and Recovery Manager User Guide* by selecting **Start > HP Backup and Recovery > HP Backup and Recovery Manager Manual**.



CAUTION: Running the *Restore Plus!* CD will erase all data on the hard drive.

Helpful Hints

If you encounter problems with the computer, monitor, or software, see the following list of general suggestions before taking further action:

- Check that the computer and monitor are plugged into a working electrical outlet.
- Check to see that the voltage select switch (some models) is set to the appropriate voltage for your region (115V or 230V).
- Check to see that the computer is turned on and the green power light is on.
- Check to see that the monitor is turned on and the green monitor light is on.
- Check the Power LED on the front of the computer to see if it is flashing red. The flashing lights are error codes that will help you diagnose the problem. Refer to Appendix A, [POST Error Messages on page 103](#) for more information.
- Turn up the brightness and contrast controls of the monitor if the monitor is dim.

- Press and hold any key. If the system beeps, then the keyboard should be operating correctly.
- Check all cable connections for loose connections or incorrect connections.
- Wake the computer by pressing any key on the keyboard or pressing the power button. If the system remains in suspend mode, shut down the computer by pressing and holding the power button for at least four seconds then press the power button again to restart the computer. If the system will not shut down, unplug the power cord, wait a few seconds, then plug it in again. The computer will restart if automatic start on power loss is set in Computer Setup. If it does not restart, press the power button to start the computer.
- Reconfigure the computer after installing a non–plug and play expansion board or other option. See [Solving Hardware Installation Problems on page 137](#) for instructions.
- Be sure that all the needed device drivers have been installed. For example, if you are using a printer, you need a driver for that model printer.
- Remove all bootable media (diskette, CD, or USB device) from the system before turning it on.
- If you have installed an operating system other than the factory-installed operating system, check to be sure that it is supported on the system.
- If the system has multiple video sources (embedded, PCI, or PCI-Express adapters) installed (embedded video on some models only) and a single monitor, the monitor must be plugged into the monitor connector on the source selected as the primary VGA adapter. During boot, the other monitor connectors are disabled and if the monitor is connected into these ports, the monitor will not function. You can select which source will be the default VGA source in Computer Setup.



CAUTION: When the computer is plugged into an AC power source, there is always voltage applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

Solving General Problems

You may be able to easily resolve the general problems described in this section. If a problem persists and you are unable to resolve it yourself or if you feel uncomfortable about performing the operation, contact an authorized dealer or reseller.



WARNING! When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.


Look for the LED on the system board. If the LED is illuminated, the system still has power. Power off the computer and remove the power cord before proceeding.

Table D-1 Solving General Problems

Computer appears locked up and will not turn off when the power button is pressed.

| Cause | Solution |
|---|---|
| Software control of the power switch is not functional. | <ol style="list-style-type: none">1. Press and hold the power button for at least four seconds until the computer turns off.2. Disconnect the power cord from the electrical outlet. |

Computer will not respond to USB keyboard or mouse.

| Cause | Solution |
|-------------------------------------|---|
| Computer is in standby mode. | To resume from standby mode, press the power button.  CAUTION: When attempting to resume from standby mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data. |
| System has locked up. | Restart computer. |

Computer date and time display is incorrect.

| Cause | Solution |
|--|--|
| RTC (real-time clock) battery may need to be replaced. | First, reset the date and time under Control Panel (Computer Setup can also be used to update the RTC date and time). If the problem persists, replace the RTC battery. See the <i>Hardware Reference Guide</i> on the <i>Documentation and Diagnostics CD</i> for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement. |


 **NOTE:** Connecting the computer to a live AC outlet prolongs the life of the RTC battery.

Table D-1 Solving General Problems (continued)

Cursor will not move using the arrow keys on the keypad.

| Cause | Solution |
|------------------------------------|--|
| The Num Lock key may be on. | Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys. The Num Lock key can be disabled (or enabled) in Computer Setup. |

There is no sound or sound volume is too low.


| Cause | Solution |
|--|---|
| System volume may be set low or muted. | <ol style="list-style-type: none">1. Check the F10 BIOS settings to make sure the internal system speaker is not muted (this setting does not affect the external speakers).2. Make sure the external speakers are properly connected and powered on and that the speakers' volume control is set correctly.3. Use the system volume control available in the operating system to make sure the speakers are not muted or to increase the volume. |
| The audio device may be connected to the wrong jack on the rear of the computer or the jack has been retasked to perform a different function. | Ensure that the device is connected to the correct jack on the rear of the computer. If the correct jack is being used and the problem persists, the jack may have been retasked to perform a function that is different from the default function. Open the Realtek control panel by clicking the Realtek HD Audio Manager icon in the task tray or the Realtek entry in the operating system's Control Panel and set the jack to the desired function. |

Poor performance is experienced.

| Cause | Solution |
|---|---|
| Processor is hot. | <ol style="list-style-type: none">1. Make sure airflow to the computer is not blocked. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow.2. Make sure fans are connected and working properly (some fans only operate when needed).3. Make sure the processor heatsink is installed properly. |
| Hard drive is full. | Transfer data from the hard drive to create more space on the hard drive. |
| Low on memory. | Add more memory. |
| Hard drive fragmented. | Defragment hard drive. |
| Program previously accessed did not release reserved memory back to the system. | Restart the computer. |
| Virus resident on the hard drive. | Run virus protection program. |

Table D-1 Solving General Problems (continued)

Poor performance is experienced.

| Cause | Solution |
|---|--|
| Too many applications running. | <ol style="list-style-type: none"> 1. Close unnecessary applications to free up memory. Some applications run in the background and can be closed by right-clicking on their corresponding icons in the task tray. To prevent these applications from launching at startup, go to Start > Run and type <code>msconfig</code>. On the Startup tab of the System Configuration Utility, uncheck applications that you do not want to launch automatically. <p> CAUTION: Do not prevent applications from launching at startup that are required for proper system operation.</p> <ol style="list-style-type: none"> 2. Add more memory. |
| Some software applications, especially games, are stressful on the graphics subsystem | <ol style="list-style-type: none"> 1. Lower the display resolution for the current application or consult the documentation that came with the application for suggestions on how to improve performance by adjusting parameters in the application. 2. Add more memory. 3. Upgrade the graphics solution. |
| Cause unknown. | Restart the computer. |

Computer powered off automatically and the Power LED flashes Red two times, once every second, followed by a two second pause, and the computer beeps two times. (Beeps stop after fifth iteration but LEDs continue flashing).

| Cause | Solution |
|--|--|
| Processor thermal protection activated: A fan may be blocked or not turning. OR The heatsink is not properly attached to the processor. | <ol style="list-style-type: none"> 1. Ensure that the computer air vents are not blocked and the processor cooling fan is running. 2. Open hood, press power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header. 3. If fan is plugged in, but is not spinning, then replace the heatsink/fan assembly. |

System does not power on and the LEDs on the front of the computer are not flashing.

| Cause | Solution |
|----------------------------|--|
| System unable to power on. | <p>Press and hold the power button for less than 4 seconds. If the hard drive LED turns green, then:</p> <ol style="list-style-type: none"> 1. Check that the voltage selector, located on the rear of the power supply on some models, is set to the appropriate voltage. Proper voltage setting depends on your region. 2. Remove the expansion cards one at a time until the 5V_aux light on the system board turns on. 3. Replace the system board. |

Table D-1 Solving General Problems (continued)

System does not power on and the LEDs on the front of the computer are not flashing.

| Cause | Solution |
|-------|---|
| | <p>OR</p> <p>Press and hold the power button for less than 4 seconds. If the hard drive LED does not turn on green then:</p> <ol style="list-style-type: none">1. Check that the unit is plugged into a working AC outlet.2. Open hood and check that the power button harness is properly connected to the system board.3. Check that both power supply cables are properly connected to the system board.4. Check to see if the 5V_aux light on the system board is turned on. If it is turned on, then replace the power button harness.5. If the 5V_aux light on the system board is off, then replace the power supply.6. Replace the system board. |

Solving Power Problems

Common causes and solutions for power problems are listed in the following table.

Table D-2 Solving Power Problems

Power supply shuts down intermittently.

| Cause | Solution |
|--|---|
| Voltage selector switch on rear of computer chassis (some models) not switched to correct line voltage (115V or 230V). | Select the proper AC voltage using the selector switch. |
| Power supply will not turn on because of internal power supply fault. | Replace the power supply. |

Computer powered off automatically and the Power LED flashes Red two times, once every second, followed by a two second pause, and the computer beeps two times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|--|--|
| Processor thermal protection activated: A fan may be blocked or not turning. OR The heatsink is not properly attached to the processor. | <ol style="list-style-type: none">1. Ensure that the computer air vents are not blocked and the processor cooling fan is running.2. Open hood, press power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header.3. If fan is plugged in, but is not spinning, then replace the heatsink/fan assembly. |

Power LED flashes Red four times, once every second, followed by a two second pause, and the computer beeps four times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|---|---|
| Power failure (power supply is overloaded). | <ol style="list-style-type: none">1. Check that the voltage selector, located on the rear of the power supply (some models), is set to the appropriate voltage. Proper voltage setting depends on your region.2. Open the hood and ensure the 4- or 6-wire power supply cable is seated into the connector on the system board.3. Check if a device is causing the problem by removing ALL attached devices (such as hard, diskette, or optical drives, and expansion cards). Power on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly.4. Replace the power supply.5. Replace the system board. |

Solving Diskette Problems

Common causes and solutions for diskette problems are listed in the following table.



NOTE: You may need to reconfigure the computer when you add or remove hardware, such as an additional diskette drive. See [Solving Hardware Installation Problems on page 137](#) for instructions.

Table D-3 Solving Diskette Problems

Diskette drive light stays on.

| Cause | Solution |
|--|---|
| Diskette is damaged. | In Microsoft Windows XP, right-click Start , click Explore , and select a drive. Select File > Properties > Tools . Under Error-checking click Check Now . |
| Diskette is incorrectly inserted. | Remove diskette and reinsert. |
| Drive cable is not properly connected. | Reconnect drive cable. Ensure that all four pins on the diskette power cable are connected to the drive. |

Drive not found.

| Cause | Solution |
|---|--|
| Cable is loose. | Reseat diskette drive data and power cables. |
| Removable drive is not seated properly. | Reseat the drive. |

Diskette drive cannot write to a diskette.

| Cause | Solution |
|--|---|
| Diskette is not formatted. | Format the diskette. <ol style="list-style-type: none">1. From Windows Explorer select the disk (A) drive.2. Right-click the drive letter and select Format.3. Select the desired options, and click Start to begin formatting the diskette. |
| Diskette is write-protected. | Use another diskette or remove the write protection. |
| Writing to the wrong drive. | Check the drive letter in the path statement. |
| Not enough space is left on the diskette. | <ol style="list-style-type: none">1. Use another diskette.2. Delete unneeded files from diskette. |
| Legacy diskette writes are disabled in Computer Setup. | Enter Computer Setup and enable Legacy Diskette Write in Storage > Storage Options . |
| Diskette is damaged. | Replace the damaged disk. |

Table D-3 Solving Diskette Problems (continued)

Cannot format diskette.

| Cause | Solution |
|--|---|
| Invalid media reported. | When formatting a disk in MS-DOS, you may need to specify diskette capacity. For example, to format a 1.44-MB diskette, type the following command at the MS-DOS prompt: FORMAT A: /F:1440 |
| Disk may be write-protected. | Open the locking device on the diskette. |
| Legacy diskette writes are disabled in Computer Setup. | Enter Computer Setup and enable Legacy Diskette Write in Storage > Storage Options . |

A problem has occurred with a disk transaction.

| Cause | Solution |
|--|---|
| The directory structure is bad, or there is a problem with a file. | In Windows XP, right-click Start , click Explore , and select a drive. Select File > Properties > Tools . Under Error-checking , click Check Now . |

Diskette drive cannot read a diskette.

| Cause | Solution |
|---|---|
| You are using the wrong diskette type for the drive type. | Check the type of drive that you are using and use the correct diskette type. |
| You are reading the wrong drive. | Check the drive letter in the path statement. |
| Diskette is damaged. | Replace the diskette with a new one. |

“Invalid system disk” message is displayed.


| Cause | Solution |
|--|--|
| A diskette that does not contain the system files needed to start the computer has been inserted in the drive. | When drive activity stops, remove the diskette and press the Spacebar . The computer should start up. |
| Diskette error has occurred. | Restart the computer by pressing the power button. |

Cannot Boot to Diskette.

| Cause | Solution |
|--|--|
| Diskette is not bootable. | Replace with a bootable diskette. |
| Diskette boot has been disabled in Computer Setup. | <ol style="list-style-type: none">1. Run Computer Setup and enable diskette boot in Storage > Boot Order.2. Run Computer Setup and enable diskette boot in Storage > Storage Options > Removable Media Boot. |

Table D-3 Solving Diskette Problems (continued)

Cannot Boot to Diskette.

| Cause | Solution |
|---|--|
| Network server mode is enabled in Computer Setup. |  NOTE: Both steps should be used as the Removable Media Boot function in Computer Setup overrides the Boot Order enable command. Run Computer Setup and disable Network Server Mode in Security > Password Options . |

Solving Hard Drive Problems

Table D-4 Solving Hard Drive Problems

Hard drive error occurs.

| Cause | Solution |
|--|--|
| Hard disk has bad sectors or has failed. | <ol style="list-style-type: none">1. In Windows XP, right-click Start, click Explore, and select a drive. Select File > Properties > Tools. Under Error-checking, click Check Now.2. Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk. |

Disk transaction problem.

| Cause | Solution |
|--|---|
| Either the directory structure is bad or there is a problem with a file. | In Windows XP, right-click Start , click Explore , and select a drive. Select File > Properties > Tools . Under Error-checking , click Check Now . |

Drive not found (identified).

| Cause | Solution |
|---|--|
| Cable could be loose. | Check cable connections. |
| The system may not have automatically recognized a newly installed device. | See reconfiguration directions in the Solving Hardware Installation Problems on page 137 section. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem. If this is a newly installed drive, run the Computer Setup utility and try adding a POST delay under Advanced > Power-On Options . |
| The device is attached to a SATA port that has been disabled in Computer Setup. | Run the Computer Setup utility and ensure the device's SATA port is enabled in Storage > Storage Options . |
| Drive responds slowly immediately after power-up. | Run Computer Setup and increase the POST Delay in Advanced > Power-On Options . |

Nonsystem disk/NTLDR missing message.

| Cause | Solution |
|---|---|
| The system is trying to start from a diskette that is not bootable. | Remove the diskette from the diskette drive. |
| The system is trying to start from the hard drive but the hard drive may have been damaged. | <ol style="list-style-type: none">1. Insert a bootable diskette into the diskette drive and restart the computer.2. Check the hard drive format using fdisk: If NTFS formatting, use a third party reader to evaluate the drive. If FAT32 formatting, the hard drive cannot be accessed. |

Table D-4 Solving Hard Drive Problems (continued)

Nonsystem disk/NTLDR missing message.

| Cause | Solution |
|---|--|
| System files missing or not properly installed. | <ol style="list-style-type: none">1. Insert a bootable diskette into the diskette drive and restart the computer.2. Check the hard drive format using Fdisk: If NTFS formatting, use a third party reader to evaluate the drive. If FAT32 formatting, the hard drive cannot be accessed.3. Install system files for the appropriate operating system.4. Restore the system to a recovery point in HP Backup and Recovery Manager. Refer to the <i>HP Backup and Recovery Manager User Guide</i> in the Windows Start menu for more information. |
| Hard drive boot has been disabled in Computer Setup. | Run the Computer Setup utility and enable the hard drive entry in the Storage > Boot Order list. |
| Bootable hard drive is not attached as first in a multi-hard drive configuration. | If attempting to boot from a hard drive, ensure it is attached to the system board connector labeled P60 SATA 0. |
| Bootable hard drive's controller is not listed first in the Boot Order. | Run the Computer Setup utility and select Storage > Boot Order and ensure the bootable hard drive's controller is listed immediately under the Hard Drive entry. |

Computer will not boot from hard drive.

| Cause | Solution |
|---|--|
| The device is attached to a SATA port that has been disabled in Computer Setup. | Run the Computer Setup utility and ensure the device's SATA port is enabled in Storage > Storage Options . |
| Boot order is not correct. | Run the Computer Setup utility and change boot sequence in Storage > Boot Order . |
| Hard Drive's "Emulation Type" is set to "None." | Run the Computer Setup utility and change the "Emulation Type" to "Hard Disk" in the device's details under Storage > Device Configuration . |
| The device is attached to a SATA port that has been disabled in Computer Setup. | Run the Computer Setup utility and ensure the device's SATA port is enabled in Storage > Storage Options . |
| Hard drive is damaged. | Observe if the front panel Power LED is blinking RED and if any beeps are heard. See Appendix A, POST Error Messages on page 103 to determine possible causes for the blinking red and beep codes. See the Worldwide Limited Warranty for terms and conditions. |

Computer seems to be locked up.

| Cause | Solution |
|--|--|
| Program in use has stopped responding to commands. | Attempt the normal Windows "Shut Down" procedure. If this fails, press the power button for four or more seconds to turn off the power. To restart the computer, press the power button again. |

Solving Media Card Reader Problems

Table D-5 Solving Media Card Reader Problems

Media card will not work in a digital camera after formatting it in Microsoft Windows XP.

| Cause | Solution |
|---|--|
| By default, Windows XP will format any media card with a capacity greater than 32MB with the FAT32 format. Most digital cameras use the FAT (FAT16 & FAT12) format and can not operate with a FAT32 formatted card. | Either format the media card in the digital camera or select FAT file system to format the media card in a computer with Windows XP. |

A write-protected or locked error occurs when attempting to write to the media card.

| Cause | Solution |
|--|---|
| Media card is locked. Locking the media card is a safety feature that prevents writing to and deleting from an SD/Memory Stick/PRO card. | If using an SD card, make sure that the lock tab located on the right of the SD card is not in the locked position. If using a Memory Stick/PRO card, make sure that the lock tab located on the bottom of the Memory Stick/PRO card is not in the locked position. |

Can not write to the media card.

| Cause | Solution |
|--|--|
| The media card is a read-only memory (ROM) card. | Check the manufacturer's documentation included with your card to see if it is writable. |

Unable to access data on the media card after inserting it into a slot.

| Cause | Solution |
|--|---|
| The media card is not inserted properly, is inserted in the wrong slot, or is not supported. | Ensure that the card is inserted properly with the gold contact on the correct side. The green LED will light if inserted properly. |

Do not know how to remove a media card correctly.

| Cause | Solution |
|---|--|
| The computer's software is used to safely eject the card. | Open My Computer , right-click on the corresponding drive icon, and select Eject . Then pull the card out of the slot. |


 **NOTE:** Never remove the card when the green LED is flashing.

Table D-5 Solving Media Card Reader Problems (continued)

After installing the media card reader and booting to Windows, the reader and the inserted cards are not recognized by the computer.

| Cause | Solution |
|--|--|
| The operating system needs time to recognize the device if the reader was just installed into the computer and you are turning the PC on for the first time. | Wait a few seconds so that the operating system can recognize the reader and the available ports, and then recognize whatever media is inserted in the reader. |

After inserting a media card in the reader, the computer attempts to boot from the media card.

| Cause | Solution |
|--|---|
| The inserted media card has boot capability. | If you do not want to boot from the media card, remove it during boot or do not select the option to boot from the inserted media card during the boot process. |

Computer will not boot from a USB removable drive or media that is inserted in the USB port on the media card reader.

| Cause | Solution |
|---|---|
| The media card reader is connected to the computer via the PCI card, which is not supported on the HP Desktop BIOS. | The bootable USB device will have boot support if you connect the media card reader to an available USB connector on the computer's system board. If no connector is available, plug the bootable device into a different USB port on the computer. |

After installing the media card reader, the front USB ports on the computer do not work.


| Cause | Solution |
|---|--|
| The USB cable for the front USB ports was disconnected so that the system board connector could be used for the reader. | Reconnect the cable for the front USB ports. Install the PCI card and connect the media reader to the USB connector on the PCI card. |

Solving Display Problems

If you encounter display problems, see the documentation that came with the monitor and to the common causes and solutions listed in the following table.

Table D-6 Solving Display Problems

Blank screen (no video).

| Cause | Solution |
|--|--|
| Monitor is not turned on and the monitor light is not on. | Turn on the monitor and check that the monitor light is on. |
| Bad monitor. | Try a different monitor. |
| The cable connections are not correct. | Check the cable connection from the monitor to the computer and to the electrical outlet. |
| You may have a screen blanking utility installed or energy saver features are enabled. | Press any key or click the mouse button and, if set, type your password. |
| System ROM is corrupted; system is running in Boot Block Emergency Recovery Mode (indicated by eight beeps). | Reflash the system ROM with the latest BIOS image. See the "Boot Block Emergency Recovery Mode" section of the <i>Desktop Management Guide</i> on the <i>Documentation and Diagnostics CD</i> for more information. |
| You are using a fixed-sync monitor and it will not sync at the resolution chosen. | Be sure that the monitor can accept the same horizontal scan rate as the resolution chosen. |
| Computer is in standby mode. | Press the power button to resume from standby mode. |
| |  CAUTION: When attempting to resume from standby mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data. |
| Monitor cable is plugged into the wrong connector. | Ensure that the monitor is plugged into an active connector on the rear of the computer. If another connector is available, connect the monitor to that connector and reboot the system. |
| Monitor settings in the computer are not compatible with the monitor. | <ol style="list-style-type: none"> 1. Restart the computer and press F8 during startup when you see "Press F8" in the bottom right corner of the screen. 2. Using the keyboard arrow keys, select Enable VGA Mode and press Enter. 3. In Windows Control Panel, double-click the Display icon and select the Settings tab. 4. Use the sliding control to reset the resolution. |

Cannot enable integrated graphics after installing a PCI Express graphics card.

| Cause | Solution |
|--|---|
| On systems with ATI integrated graphics, the integrated graphics can be enabled in Computer Setup only if an ATI PCI Express graphics card is installed. | On systems with ATI integrated graphics, install an ATI PCI Express graphics card and enable the integrated graphics in Computer Setup. |

Table D-6 Solving Display Problems (continued)

Blank screen and the power LED flashes Red five times, once every second, followed by a two second pause, and the computer beeps five times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|-------------------------|---|
| Pre-video memory error. | <ol style="list-style-type: none">1. Reseat DIMMs. Power on the system.2. Replace DIMMs one at a time to isolate the faulty module.3. Replace third-party memory with HP memory.4. Replace the system board. |

Blank screen and the power LED flashes Red six times, once every second, followed by a two second pause, and the computer beeps six times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|---------------------------|--|
| Pre-video graphics error. | <p>For systems with a graphics card:</p> <ol style="list-style-type: none">1. Reseat the graphics card. Power on the system.2. Replace the graphics card.3. Replace the system board. <p>For systems with integrated graphics, replace the system board.</p> |

Blank screen and the power LED flashes Red seven times, once every second, followed by a two second pause, and the computer beeps seven times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|---|---------------------------|
| System board failure (ROM detected failure prior to video). | Replace the system board. |

Monitor does not function properly when used with energy saver features.

| Cause | Solution |
|---|---------------------------------------|
| Monitor without energy saver capabilities is being used with energy saver features enabled. | Disable monitor energy saver feature. |

Dim characters.

| Cause | Solution |
|--|---|
| The brightness and contrast controls are not set properly. | Adjust the monitor brightness and contrast controls. |
| Cables are not properly connected. | Check that the graphics cable is securely connected to the graphics card and the monitor. |

Table D-6 Solving Display Problems (continued)

Blurry video or requested resolution cannot be set.

| Cause | Solution |
|--|--|
| If the graphics controller was upgraded, the correct graphics drivers may not be loaded. | Install the video drivers included in the upgrade kit. |
| Monitor is not capable of displaying requested resolution. | Change requested resolution. |
| Graphics card is bad. | Replace the graphics card. |


The picture is broken up, rolls, jitters, or flashes.

| Cause | Solution |
|---|---|
| The monitor connections may be incomplete or the monitor may be incorrectly adjusted. | <ol style="list-style-type: none">1. Be sure the monitor cable is securely connected to the computer.2. In a two-monitor system or if another monitor is in close proximity, be sure the monitors are not interfering with each other's electromagnetic field by moving them apart.3. Fluorescent lights or fans may be too close to the monitor. |
| Monitor needs to be degaussed. | Degauss the monitor. Refer to the documentation that came with the monitor for instructions. |

Image is not centered.

| Cause | Solution |
|-------------------------------|---|
| Position may need adjustment. | Press the Menu button to access the OSD menu. Select ImageControl/ Horizontal Position or Vertical Position to adjust the horizontal or vertical position of the image. |

"No Connection, Check Signal Cable" displays on screen.

| Cause | Solution |
|--------------------------------------|--|
| Monitor video cable is disconnected. | Connect the video cable between the monitor and computer.  CAUTION: Ensure that the computer power is off while connecting the video cable. |

"Out of Range" displays on screen.

| Cause | Solution |
|--|--|
| Video resolution and refresh rate are set higher than what the monitor supports. | Restart the computer and enter Safe Mode. Change the settings to a supported setting then restart the computer so that the new settings take effect. |

Table D-6 Solving Display Problems (continued)

Vibrating or rattling noise coming from inside a CRT monitor when powered on.

| Cause | Solution |
|---|--|
| Monitor degaussing coil has been activated. | None. It is normal for the degaussing coil to be activated when the monitor is powered on. |

Clicking noise coming from inside a CRT monitor.

| Cause | Solution |
|---|---|
| Electronic relays have been activated inside the monitor. | None. It is normal for some monitors to make a clicking noise when turned on and off, when going in and out of standby mode, and when changing resolutions. |

High pitched noise coming from inside a flat panel monitor.

| Cause | Solution |
|---|--|
| Brightness and/or contrast settings are too high. | Lower brightness and/or contrast settings. |

Fuzzy focus; streaking, ghosting, or shadowing effects; horizontal scrolling lines; faint vertical bars; or unable to center the picture on the screen (flat panel monitors using an analog VGA input connection only).

| Cause | Solution |
|---|---|
| Flat panel monitor's internal digital conversion circuits may be unable to correctly interpret the output synchronization of the graphics card. | <ol style="list-style-type: none">1. Select the monitor's Auto-Adjustment option in the monitor's on-screen display menu.2. Manually synchronize the Clock and Clock Phase on-screen display functions. To download a SoftPaq that will assist you with the synchronization, go to the following Web site, select the appropriate monitor, and download either SP32347 or SP32202: http://www.hp.com/support |
| Graphics card is not seated properly or is bad. | <ol style="list-style-type: none">1. Reseat the graphics card.2. Replace the graphics card. |

Certain typed symbols do not appear correct.

| Cause | Solution |
|---|---|
| The font you are using does not support that particular symbol. | Use the Character Map to locate and select the appropriate symbol. Click Start > All Programs > Accessories > System Tools > Character Map . You can copy the symbol from the Character Map into a document. |

Solving Audio Problems

If the computer has audio features and you encounter audio problems, see the common causes and solutions listed in the following table.

Table D-7 Solving Audio Problems

Sound cuts in and out.


| Cause | Solution |
|---|--|
| Processor resources are being used by other open applications. | Shut down all open processor-intensive applications. |
| Direct sound latency, common in many media player applications. | In Windows XP: <ol style="list-style-type: none">1. From the Control Panel, select Sounds and Audio Devices.2. On the Audio tab, select a device from the Sound Playback list.3. Click the Advanced button and select the Performance tab.4. Set the Hardware acceleration slider to None and the Sample rate conversion quality slider to Good and retest the audio.5. Set the Hardware acceleration slider to Full and the Sample rate conversion quality slider to Best and retest the audio. |

Sound does not come out of the speaker or headphones.

| Cause | Solution |
|--|--|
| Software volume control is turned down. | Double-click the Speaker icon on the taskbar, then make sure that Mute is not selected and use the volume slider to adjust the volume. |
| Audio is hidden in Computer Setup. | Enable the audio in Computer Setup: Security > Device Security > Audio . |
| The external speakers are not turned on. | Turn on the external speakers. |
| The audio device may be connected to the wrong jack on the rear of the computer or the jack has been retasked to perform a different function. | Ensure that the device is connected to the correct jack on the rear of the computer. If the correct jack is being used and the problem persists, the jack may have been retasked to perform a function that is different from the default function. Open the Realtek control panel by clicking the Realtek HD Audio Manager icon in the task tray or the Realtek entry in the operating system's Control Panel and set the jack to the desired function. |
| External speakers plugged into the wrong audio jack on a recently installed sound card. | See the sound card documentation for proper speaker connection. |
| Digital CD audio is not enabled. | Enable digital CD audio: <ol style="list-style-type: none">1. From the Control Panel, select System.2. On the Hardware tab, click the Device Manager button. |

Table D-7 Solving Audio Problems (continued)

Sound does not come out of the speaker or headphones.

| Cause | Solution |
|--|--|
| | <ol style="list-style-type: none">Right-click on the CD/DVD device and select Properties.On the Properties tab, make sure Enable digital CD audio for this CD-ROM device is checked. |
| Headphones or devices connected to the line-out connector mute the internal speaker. | Turn on and use headphones or external speakers, if connected, or disconnect headphones or external speakers. |
| Volume is muted. | <ol style="list-style-type: none">From the Control Panel program, click Sound, Speech and Audio Devices, then click Sounds and Audio Devices.Click the Mute check box to remove the check mark from the box. |
| Computer is in standby mode. | Press the power button to resume from standby mode.  CAUTION: When attempting to resume from standby mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data. |

Sound from headphones is not clear or muffled.

| Cause | Solution |
|--|--|
| Headphones are plugged into the rear audio output connector. The rear audio output connector is for powered audio devices and is not designed for headphone use. | Plug the headphones into the headphone connector on the front of the computer. |

Computer appears to be locked up while recording audio.

| Cause | Solution |
|----------------------------|--|
| The hard disk may be full. | Before recording, make sure there is enough free space on the hard disk. You can also try recording the audio file in a compressed format. |

Line-in, Line-out, headphone, or microphone jacks are not functioning properly.

| Cause | Solution |
|---|--|
| Jacks have been reconfigured in the audio driver or application software. | In the audio driver or application software, reconfigure the jacks or set the jacks to their default values. |

Solving Printer Problems

If you encounter printer problems, see the documentation that came with the printer and to the common causes and solutions listed in the following table.

Table D-8 Solving Printer Problems

Printer will not print.

| Cause | Solution |
|---|---|
| Printer is not turned on and online. | Turn the printer on and make sure it is online. |
| The correct printer drivers for the application are not installed. | <ol style="list-style-type: none">1. Install the correct printer driver for the application.2. Try printing using the MS-DOS command: <pre>DIR C:\ > LPT1</pre>If the printer works, reload the printer driver. |
| If you are on a network, you may not have made the connection to the printer. | Make the proper network connections to the printer. |
| Printer may have failed. | Run printer self-test. |

Printer will not turn on.

| Cause | Solution |
|---|--|
| The cables may not be connected properly. | Reconnect all cables and check the power cord and electrical outlet. |

Printer prints garbled information.

| Cause | Solution |
|--|---|
| The correct printer driver for the application is not installed. | Install the correct printer driver for the application. |
| The cables may not be connected properly. | Reconnect all cables. |
| Printer memory may be overloaded. | Reset the printer by turning it off for one minute, then turn it back on. |

Printer is offline.


| Cause | Solution |
|----------------------------------|---|
| The printer may be out of paper. | Check the paper tray and refill it if it is empty. Select online. |

Solving Keyboard and Mouse Problems

If you encounter keyboard or mouse problems, see the documentation that came with the equipment and to the common causes and solutions listed in the following table.

Table D-9 Solving Keyboard Problems

Keyboard commands and typing are not recognized by the computer.

| Cause | Solution |
|--|--|
| Keyboard connector is not properly connected. | <ol style="list-style-type: none">1. On the Windows Desktop, click Start.2. Click Shut Down. The Shut Down Windows dialog box is displayed.3. Select Shut down.4. After the shutdown is complete, reconnect the keyboard to the back of the computer and restart the computer. |
| Program in use has stopped responding to commands. | Shut down your computer using the mouse and then restart the computer. |
| Keyboard needs repairs. | See the Worldwide Limited Warranty for terms and conditions. |
| Wireless device error. | <ol style="list-style-type: none">1. Check the software, if available, for device status.2. Check/replace device batteries.3. Reset receiver and keyboard. |
| Computer is in standby mode. | Press the power button to resume from standby mode.  CAUTION: When attempting to resume from standby mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data. |

Cursor will not move using the arrow keys on the keypad.

| Cause | Solution |
|------------------------------------|--|
| The Num Lock key may be on. | Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys. The Num Lock key can be disabled (or enabled) in Computer Setup. |


Table D-10 Solving Mouse Problems

Mouse does not respond to movement or is too slow.

| Cause | Solution |
|--|--|
| Mouse connector is not properly plugged into the back of the computer. | Shut down the computer using the keyboard. <ol style="list-style-type: none">1. Press the Ctrl and Esc keys at the same time (or press the Windows logo key) to display the Start menu.2. Use the up or down arrow key to select Shut Down and then press the Enter key. |

Table D-10 Solving Mouse Problems (continued)

Mouse does not respond to movement or is too slow.

| Cause | Solution |
|--|--|
| | <ol style="list-style-type: none">Use the up or down arrow key to select the Shut Down option and then press the Enter key.After the shutdown is complete, plug the mouse connector into the back of the computer (or the keyboard) and restart. |
| Program in use has stopped responding to commands. | Shut down the computer using the keyboard then restart the computer. |
| Mouse may need cleaning. | Remove the roller ball cover on the mouse and clean the internal components. |
| Mouse may need repair. | See the Worldwide Limited Warranty for terms and conditions. |
| Wireless device error. | <ol style="list-style-type: none">Check the software, if available, for device status.Check/replace device batteries.Reset receiver and mouse. |
| Computer is in standby mode. | Press the power button to resume from standby mode.  CAUTION: When attempting to resume from standby mode, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data. |

Mouse will only move vertically, horizontally, or movement is jerky.

| Cause | Solution |
|---|--|
| Mouse roller ball or the rotating encoder shafts that make contact with the ball are dirty. | Remove roller ball cover from the bottom of the mouse and clean the internal components with a mouse cleaning kit available from most computer stores. |

Solving Hardware Installation Problems

You may need to reconfigure the computer when you add or remove hardware, such as an additional drive or expansion card. If you install a plug and play device, Windows XP automatically recognizes the device and configures the computer. If you install a non–plug and play device, you must reconfigure the computer after completing installation of the new hardware. In Windows XP, use the **Add Hardware Wizard** and follow the instructions that appear on the screen.



WARNING! When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

Look for the LED on the system board. If the LED is illuminated, the system still has power. Power off the computer and remove the power cord before proceeding.

Table D-11 Solving Hardware Installation Problems

A new device is not recognized as part of the system.


| Cause | Solution |
|---|--|
| Device is not seated or connected properly. | Ensure that the device is properly and securely connected and that pins in the connector are not bent down. |
| Cable(s) of new external device are loose or power cables are unplugged. | Ensure that all cables are properly and securely connected and that pins in the cable or connector are not bent down. |
| Power switch of new external device is not turned on. | Turn off the computer, turn on the external device, then turn on the computer to integrate the device with the computer system. |
| When the system advised you of changes to the configuration, you did not accept them. | Reboot the computer and follow the instructions for accepting the changes. |
| A plug and play board may not automatically configure when added if the default configuration conflicts with other devices. | Use Windows XP Device Manager to deselect the automatic settings for the board and choose a basic configuration that does not cause a resource conflict. You can also use Computer Setup to reconfigure or disable devices to resolve the resource conflict. |
| USB ports on the computer are disabled in Computer Setup. | Enter Computer Setup (F10) and enable the USB ports. |

Computer will not start.

| Cause | Solution |
|---|--|
| Wrong memory modules were used in the upgrade or memory modules were installed in the wrong location. | <ol style="list-style-type: none">1. Review the documentation that came with the system to determine if you are using the correct memory modules and to verify the proper installation.2. Observe the beeps and LED lights on the front of the computer. Beeps and flashing LEDs are codes for specific problems.3. If you still cannot resolve the issue, contact Customer Support. |

Table D-11 Solving Hardware Installation Problems (continued)

Power LED flashes Red five times, once every second, followed by a two second pause, and the computer beeps five times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|--|---|
| Memory is installed incorrectly or is bad. |  CAUTION: To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module. <ol style="list-style-type: none">1. Reseat DIMMs. Power on the system.2. Replace DIMMs one at a time to isolate the faulty module.3. Replace third-party memory with HP memory.4. Replace the system board. |

Power LED flashes Red six times, once every second, followed by a two second pause, and the computer beeps six times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|---|---|
| Graphics card is not seated properly or is bad, or system board is bad. | For systems with a graphics card: <ol style="list-style-type: none">1. Reseat the graphics card. Power on the system.2. Replace the graphics card.3. Replace the system board. For systems with integrated graphics, replace the system board. |

Power LED flashes Red ten times, once every second, followed by a two second pause, and the computer beeps ten times. (Beeps stop after fifth iteration but LEDs continue flashing.)


| Cause | Solution |
|------------------|---|
| Bad option card. | <ol style="list-style-type: none">1. Check each option card by removing the cards one at time (if multiple cards), then power on the system to see if fault goes away.2. Once bad card is identified, remove and replace bad option card.3. Replace the system board. |

Solving Network Problems

Some common causes and solutions for network problems are listed in the following table. These guidelines do not discuss the process of debugging the network cabling.

Table D-12 Solving Network Problems

Wake-on-LAN feature is not functioning.

| Cause | Solution |
|---|--|
| Wake-on-LAN is not enabled. | Enable Wake-on-LAN. |
|  <p>NOTE: Some NICs come with their own configuration applets that allow for more detailed control and configuration of wake features. Refer to the documentation included with the NIC for more information.</p> | <ol style="list-style-type: none"> 1. Select Start > Control Panel. 2. Double-click Network Connections. 3. Double-click Local Area Connection. 4. Click Properties. 5. Click Configure. 6. Click the Power Management tab, then select the check box to Allow this device to bring the computer out of standby. |

Network driver does not detect network controller.

| Cause | Solution |
|---------------------------------|--|
| Network controller is disabled. | <ol style="list-style-type: none"> 1. Run Computer Setup and enable network controller. 2. Enable the network controller in the operating system via Device Manager. |
| Incorrect network driver. | Check the network controller documentation for the correct driver or obtain the latest driver from the manufacturer's Web site. |

Network status link light never flashes.

 **NOTE:** The network status light is supposed to flash when there is network activity.

| Cause | Solution |
|--|--|
| No active network is detected. | Check cabling and network equipment for proper connection. |
| Network controller is not set up properly. | Check for the device status within Windows, such as Device Manager for driver load and the Network Connections applet within Windows for link status. |
| Network controller is disabled. | <ol style="list-style-type: none"> 1. Run Computer Setup and enable network controller. 2. Enable the network controller in the operating system via Device Manager. |

Table D-12 Solving Network Problems (continued)

Network status link light never flashes.



NOTE: The network status light is supposed to flash when there is network activity.

| Cause | Solution |
|--|---|
| Network driver is not properly loaded. | Reinstall network drivers. See the <i>Network & Internet Communications Guide</i> on the <i>Documentation and Diagnostics CD</i> . |
| System cannot autosense the network. | Disable auto-sensing capabilities and force the system into the correct operating mode. See the <i>Network & Internet Communications Guide</i> on the <i>Documentation and Diagnostics CD</i> . |

Diagnostics reports a failure.

| Cause | Solution |
|--|---|
| The cable is not securely connected. | Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device. |
| The cable is attached to the incorrect connector. | Ensure that the cable is attached to the correct connector. |
| There is a problem with the cable or a device at the other end of the cable. | Ensure that the cable and device at the other end are operating correctly. |
| Network controller interrupt is shared with an expansion board. | Under the Computer Setup Advanced menu, change the resource settings for the board. |
| The network controller is defective. | Replace the network controller. |

Diagnostics passes, but the computer does not communicate with the network.

| Cause | Solution |
|--|---|
| Network drivers are not loaded, or driver parameters do not match current configuration. | Make sure the network drivers are loaded and that the driver parameters match the configuration of the network controller. Make sure the correct network client and protocol is installed. |
| The network controller is not configured for this computer. | Select the Network icon in the Control Panel and configure the network controller. |

Network controller stopped working when an expansion board was added to the computer.

| Cause | Solution |
|--|--|
| Network controller interrupt is shared with an expansion board. | Under the Computer Setup Advanced menu, change the resource settings for the board. |
| The network controller requires drivers. | Verify that the drivers were not accidentally deleted when the drivers for a new expansion board were installed. |
| The expansion board installed is a network card (NIC) and conflicts with the embedded NIC. | Under the Computer Setup Advanced menu, change the resource settings for the board. |

Table D-12 Solving Network Problems (continued)

Network controller stops working without apparent cause.

| Cause | Solution |
|---|---|
| The files containing the network drivers are corrupted. | Download the network drivers from http://www.hp.com and reinstall them. |
| The cable is not securely connected. | Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device. |
| The network controller is defective. | Replace the network controller. |

New network card will not boot.

| Cause | Solution |
|---|--|
| New network card may be defective or may not meet industry-standard specifications. | Install a working, industry-standard NIC, or change the boot sequence to boot from another source. |

Cannot connect to network server when attempting Remote System Installation.

| Cause | Solution |
|--|---|
| The network controller is not configured properly. | Verify Network Connectivity, that a DHCP Server is present, and that the Remote System Installation Server contains the NIC drivers for your NIC. |

System setup utility reports unprogrammed EEPROM.

| Cause | Solution |
|----------------------|-----------------|
| Unprogrammed EEPROM. | Contact HP. |

Solving Memory Problems

If you encounter memory problems, some common causes and solutions are listed in the following table.



CAUTION: Power may still be supplied to the DIMMs when the computer is turned off. To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module.

For those systems that support ECC memory, HP does not support mixing ECC and non-ECC memory. Otherwise, the computer will not boot the operating system.

Table D-13 Solving Memory Problems

System will not boot or does not function properly after installing additional memory modules.

| Cause | Solution |
|--|--|
| Memory module is not the correct type or speed grade for the system or the new memory module is not seated properly. | Replace module with the correct industry-standard device for the computer. On some models, ECC and non-ECC memory modules cannot be mixed. |

Out of memory error.

| Cause | Solution |
|--|---|
| Memory configuration may not be set up correctly. | Use the Device Manager to check memory configuration. |
| You have run out of memory to run the application. | Check the application documentation to determine the memory requirements. |

Memory count during POST is wrong.

| Cause | Solution |
|--|---|
| The memory modules may not be installed correctly. | Check that the memory modules have been installed correctly and that proper modules are used. |
| Integrated graphics may use system memory. | No action required. |

Insufficient memory error during operation.

| Cause | Solution |
|---|---|
| Too many Terminate and Stay Resident programs (TSRs) are installed. | Delete any TSRs that you do not need. |
| You have run out of memory for the application. | Check the memory requirements for the application or add more memory to the computer. |

Table D-13 Solving Memory Problems (continued)

Power LED flashes Red five times, once every second, followed by a two second pause, and the computer beeps five times. (Beeps stop after fifth iteration but LEDs continue flashing.)

| Cause | Solution |
|--|---|
| Memory is installed incorrectly or is bad. | <ol style="list-style-type: none">1. Reseat DIMMs. Power on the system.2. Replace DIMMs one at a time to isolate the faulty module.3. Replace third-party memory with HP memory.4. Replace the system board. |

Solving Processor Problems

If you encounter processor problems, common causes and solutions are listed in the following table.

Table D-14 Solving Processor Problems

Poor performance is experienced.

| Cause | Solution |
|-------------------|--|
| Processor is hot. | <ol style="list-style-type: none">1. Make sure the airflow to the computer is not blocked.2. Make sure the fans are connected and working properly (some fans only operate when needed).3. Make sure the processor heatsink is installed properly. |

Power LED flashes Red three times, once every second, followed by a two second pause.

| Cause | Solution |
|--|---|
| Processor is not seated properly or not installed. | <ol style="list-style-type: none">1. Check to see that the processor is present.2. Reseat the processor. |

Solving CD-ROM and DVD Problems

If you encounter CD-ROM or DVD problems, see the common causes and solutions listed in the following table or to the documentation that came with the optional device.

Table D-15 Solving CD-ROM and DVD Problems

System will not boot from CD-ROM or DVD drive.

| Cause | Solution |
|---|--|
| The device is attached to a SATA port that has been disabled in the Computer Setup utility. | Run the Computer Setup utility and ensure the device's SATA port is enabled in Storage > Storage Options . |
| Removable Media Boot is disabled in the Computer Setup utility. | Run the Computer Setup utility and enable booting to removable media in Storage > Storage Options . Ensure CD-ROM is enabled in Storage > Boot Order . |
| Network Server Mode is enabled in Computer Setup. | Run the Computer Setup utility and disable Network Server Mode in Security > Password Options . |
| Non-bootable CD in drive. | Try a bootable CD in the drive. |
| Boot order not correct. | Run the Computer Setup utility and change boot sequence in Storage > Boot Order . |

Drive not found (identified).

| Cause | Solution |
|---|--|
| Cable could be loose. | Check cable connections. |
| The system may not have automatically recognized a newly installed device. | See reconfiguration directions in the Solving Hardware Installation Problems on page 137 section. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem. If this is a newly installed drive, run the Computer Setup utility and try adding a POST delay under Advanced > Power-On Options . |
| The device is attached to a SATA port that has been disabled in Computer Setup. | Run the Computer Setup utility and ensure the device's SATA port is enabled in Storage > Storage Options . |
| Drive responds slowly immediately after power-up. | Run Computer Setup and increase the POST Delay in Advanced > Power-On Options . |

CD-ROM or DVD devices are not detected or driver is not loaded.

| Cause | Solution |
|---|---|
| Drive is not connected properly or not properly configured. | See the documentation that came with the optional device. |

Table D-15 Solving CD-ROM and DVD Problems (continued)

Movie will not play in the DVD drive.

| Cause | Solution |
|--|---|
| Movie may be regionalized for a different country. | See the documentation that came with the DVD drive. |
| Decoder software is not installed. | Install decoder software. |
| Damaged media. | Replace media. |
| Movie rating locked out by parental lock. | Use DVD software to remove parental lock. |
| Media installed upside down. | Reinstall media. |

Cannot eject compact disc (tray-load unit).

| Cause | Solution |
|--|--|
| Disc not properly seated in the drive. | Turn off the computer and insert a thin metal rod into the emergency eject hole and push firmly. Slowly pull the tray out from the drive until the tray is fully extended, then remove the disc. |

CD-ROM, CD-RW, DVD-ROM, or DVD-R/RW drive cannot read a disc or takes too long to start.

| Cause | Solution |
|---|---|
| Media has been inserted upside down. | Re-insert the Media with the label facing up. |
| The DVD-ROM drive takes longer to start because it has to determine the type of media played, such as audio or video. | Wait at least 30 seconds to let the DVD-ROM drive determine the type of media being played. If the disc still does not start, read the other solutions listed for this topic. |
| CD or DVD disc is dirty. | Clean CD or DVD with a CD cleaning kit, available from most computer stores. |
| Windows does not detect the CD-ROM or DVD-ROM drive. | <ol style="list-style-type: none">1. Use Device Manager to remove or uninstall the device.2. Restart the computer and let Windows detect the CD or DVD driver. |

Recording or copying CDs is difficult or impossible.

| Cause | Solution |
|-----------------------------------|---|
| Wrong or poor quality media type. | <ol style="list-style-type: none">1. Try using a slower speed when recording.2. Verify that you are using the correct media for the drive.3. Try a different brand of media. Quality varies widely between manufacturers. |

USDT computer boots too slow after removing a CD-ROM or DVD drive.

Cause

Solution

The system is searching for the drive during boot because the drive cable is still attached to the system board.

Disconnect the drive cable from the system board.

Solving Drive Key Problems

If you encounter Drive Key problems, common causes and solutions are listed in the following table.

Table D-16 Solving Drive Key Problems

USB Drive Key is not seen as a drive letter in Windows XP.

| Cause | Solution |
|--|--|
| The drive letter after the last physical drive is not available. | Change the default drive letter for the Drive Key in Windows XP. |

USB Drive Key not found (identified).

| Cause | Solution |
|--|--|
| The device is attached to a USB port that has been hidden in Computer Setup. | Run the Computer Setup utility and ensure that "Device available" is selected for "All USB Ports" and "Front USB Ports" under Security > Device Security . |
| The device was not properly seated before power-up. | Ensure the device is fully inserted into the USB port before applying power to the system. |

System will not boot from USB Drive Key.

| Cause | Solution |
|---|---|
| Boot order is not correct. | Run the Computer Setup utility and change boot sequence in Storage > Boot Order . |
| Removable Media Boot is disabled in the Computer Setup utility. | Run the Computer Setup utility and enable booting to removable media in Storage > Storage Options . Ensure USB is enabled in Storage > Boot Order . |
| The image on the device is not bootable. | Follow the procedures described in the "ROM Flash: Replicating the Setup: Creating a Bootable Device: Supported USB Flash Media Device" section of the <i>Service Reference Guide</i> . |

The computer boots to DOS after making a bootable Drive Key.

| Cause | Solution |
|------------------------|--|
| Drive Key is bootable. | Install the Drive Key only after the operating system boots. |

Solving Front Panel Component Problems

If you encounter problems with devices connected to the front panel, refer to the common causes and solutions listed in the following table.

Table D-17 Solving Front Panel Component Problems

A USB device, headphone, or microphone is not recognized by the computer.

| Cause | Solution |
|---|--|
| Device is not properly connected. | <ol style="list-style-type: none">1. Turn off the computer.2. Reconnect the device to the front of the computer and restart the computer. |
| The device does not have power. | If the USB device requires AC power, be sure one end is connected to the device and one end is connected to a live outlet. |
| The correct device driver is not installed. | <ol style="list-style-type: none">1. Install the correct driver for the device.2. You might need to reboot the computer. |
| The cable from the device to the computer does not work. | <ol style="list-style-type: none">1. If possible, replace the cable.2. Restart the computer. |
| The device is not working. | <ol style="list-style-type: none">1. Replace the device.2. Restart the computer. |
| USB ports on the computer are disabled in Computer Setup. | Enter Computer Setup (F10) and enable the USB ports. |

Solving Internet Access Problems

If you encounter Internet access problems, consult your Internet Service Provider (ISP) or refer to the common causes and solutions listed in the following table.

Table D-18 Solving Internet Access Problems

Unable to connect to the Internet.

| Cause | Solution |
|--|---|
| Internet Service Provider (ISP) account is not set up properly. | Verify Internet settings or contact your ISP for assistance. |
| Modem is not set up properly. | Reconnect the modem. Verify the connections are correct using the quick setup documentation. |
| Web browser is not set up properly. | Verify that the Web browser is installed and set up to work with your ISP. |
| Cable/DSL modem is not plugged in. | Plug in cable/DSL modem. You should see a "power" LED light on the front of the cable/DSL modem. |
| Cable/DSL service is not available or has been interrupted due to bad weather. | Try connecting to the Internet at a later time or contact your ISP. (If the cable/DSL service is connected, the "cable" LED light on the front of the cable/DSL modem will be on.) |
| The CAT5 UTP cable is disconnected. | Connect the CAT5 UTP cable between the cable modem and the computers's RJ-45 connector. (If the connection is good, the "PC" LED light on the front of the cable/DSL modem will be on.) |
| IP address is not configured properly. | Contact your ISP for the correct IP address. |
| Cookies are corrupted. (A "cookie" is a small piece of information that a Web server can store temporarily with the Web browser. This is useful for having the browser remember some specific information that the Web server can later retrieve.) | Windows XP <ol style="list-style-type: none">1. Select Start > Control Panel.2. Double-click Internet Options.3. On the General tab, click the Delete Cookies button. Windows 2000 <ol style="list-style-type: none">1. Select Start > Settings > Control Panel.2. Double-click Internet Options.3. On the General tab, click the Delete Cookies button. |

Cannot automatically launch Internet programs.

| Cause | Solution |
|--|--|
| You must log on to your ISP before some programs will start. | Log on to your ISP and launch the desired program. |

Internet takes too long to download Web sites.

| Cause | Solution |
|-------------------------------|--|
| Modem is not set up properly. | Verify that the correct modem speed and COM port are selected. |

Table D-18 Solving Internet Access Problems (continued)

Internet takes too long to download Web sites.

| Cause | Solution |
|-------|--|
| | <p data-bbox="874 260 1469 296">Windows XP</p> <ol data-bbox="874 296 1469 863" style="list-style-type: none"><li data-bbox="874 296 1469 352">1. Select Start > Control Panel.<li data-bbox="874 352 1469 409">2. Double-click System.<li data-bbox="874 409 1469 466">3. Click the Hardware tab.<li data-bbox="874 466 1469 543">4. In the Device Manager area, click the Device Manager button.<li data-bbox="874 543 1469 600">5. Double-click Ports (COM & LPT).<li data-bbox="874 600 1469 678">6. Right-click the COM port the modem uses, then click Properties.<li data-bbox="874 678 1469 756">7. Under Device status, verify that the modem is working properly.<li data-bbox="874 756 1469 812">8. Under Device usage, verify the modem is enabled.<li data-bbox="874 812 1469 863">9. If there are further problems, click the Troubleshoot button and follow the on-screen instructions. <p data-bbox="874 863 1469 898">Windows 2000</p> <ol data-bbox="874 898 1469 1465" style="list-style-type: none"><li data-bbox="874 898 1469 955">1. Select Start > Settings > Control Panel.<li data-bbox="874 955 1469 1012">2. Double-click System.<li data-bbox="874 1012 1469 1068">3. Click the Hardware tab.<li data-bbox="874 1068 1469 1146">4. In the Device Manager area, click the Device Manager button.<li data-bbox="874 1146 1469 1203">5. Double-click Ports (COM & LPT).<li data-bbox="874 1203 1469 1281">6. Right-click the COM port the modem uses, then click Properties.<li data-bbox="874 1281 1469 1358">7. Under Device status, verify that the modem is working properly.<li data-bbox="874 1358 1469 1415">8. Under Device usage, verify the modem is enabled.<li data-bbox="874 1415 1469 1465">9. If there are further problems, click the Troubleshoot button and follow the on-screen instructions. |

Solving Software Problems

Most software problems occur as a result of the following:

- The application was not installed or configured correctly.
- There is insufficient memory available to run the application.
- There is a conflict between applications.
- Be sure that all the needed device drivers have been installed.
- If you have installed an operating system other than the factory-installed operating system, check to be sure it is supported on the system.



NOTE: HP Backup and Recovery Manager can be used to restore the software to a recovery point or to restore the system to its factory configuration. Refer to [HP Backup and Recovery Manager on page 2](#) for more information.

If you encounter software problems, see the applicable solutions listed in the following table.

Table D-19 Solving Software Problems

Computer will not continue and no HP logo screen has appeared.

| Cause | Solution |
|--------------------------|---|
| POST error has occurred. | Observe the beeps and LED lights on the front of the computer. See Appendix A, POST Error Messages on page 103 to determine possible causes. See the Restore Kit or the Worldwide Limited Warranty for terms and conditions. |

Computer will not continue after HP logo screen has appeared.

| Cause | Solution |
|------------------------------|--|
| System files may be damaged. | Restore the files from the Recovery Disc Set or backups you created in HP Backup and Recovery Manager. |

“Illegal Operation has Occurred” error message is displayed.

| Cause | Solution |
|---|--|
| Software being used is not Microsoft-certified for your version of Windows. | Verify that the software is certified by Microsoft for your version of Windows (see program packaging for this information). |
| Configuration files are corrupt. | If possible, save all data, close all programs, and restart the computer. |

Index

Symbols/Numerics

- 24-pin MicroFit power pin assignments 95
- 24-pin power pin assignments 94
- 4-pin power pin assignments 95
- 5.25
 - drive bezel blank 62
- 6-pin power pin assignments 95

A

- access panel, removal and replacement 60
- access to computer, controlling 36
- adding devices 1
- Altiris
 - AClient 22
 - Deployment Solution Agent 22
- asset tracking 36
- ATA/ATAPI (IDE) drive cable pin assignments 94
- audible codes 111
- audio problems 132

B

- Backup and Recovery Manager 2, 19, 23
- battery
 - disposal 58
 - removal and replacement 84
- beep codes 111
- bezel blank, 5.25" drive 62
- BIOS
 - Boot Block Emergency Recovery Mode 29
 - HPQFlash 29
 - Remote ROM Flash 29

- Boot Block Emergency Recovery Mode 29
- boot problems 147
- bootable device
 - creating 32
 - DiskOnKey 32, 33
 - HP Drive Key 32, 33
 - USB flash media device 32
- booting options
 - Full Boot 103
 - Quick Boot 103

C

- cable connections 70
- cable lock provision 44
- cable management 69
- cable pinouts
 - SATA data 47
 - SATA power 48
- cautions
 - AC power 51
 - adding devices 1
 - cables 58
 - cooling fan 57
 - cover lock security 43
 - electrostatic discharge 52
 - FailSafe Key 44
 - keyboard cleaning 56
 - keyboard keys 56
 - operating system
 - installation 1
 - protecting ROM 28
- CD-ROM or DVD problems 145
- change notification 28
- changing operating systems, important information 35
- changing password 40
- chassis types, illustrated 51
- chassis
 - MT illustrated 51

- cleaning
 - computer 55
 - mouse 57
 - safety precautions 55
- clearing password 41
- Client Foundation Suite 27
- Client Management Interface 24
- Client Management Premium Suite 26
- Client Manager 25
- cloning tools, software 21
- computer cleaning 55
- Computer Setup Utilities 30
- configuring power button 35
- connector pin assignments 89
- controlling access to
 - computer 36
- country power cord set requirements 101
- cover lock 43
- cover lock security, caution 43
- Customer Support 113
- customizing software 21

D

- deleting password 40
- delimiter characters, table 41
- deployment tools, software 21
- device drivers, installing 1
- diagnostic tool for hard drives 45
- diagnostics utility 15
- disassembly preparation 59
- disk, cloning 21
- diskette problems 121
- DiskOnKey
 - bootable 32, 33
 - HP Drive Key 32

- drive
 - 5.25" removal and replacement 72
 - hard drive removal and replacement 73
- Drive Key problems 148
- drive positions 71
- drive, protecting 45
- DriveLock
 - applications 42
 - using 42
- dual-state power button 35
- DVI pin assignments 98
- E**
- electrostatic discharge (ESD)
 - preventing damage 52
- Emergency Recovery Mode, Boot Block 29
- entering
 - power-on password 39
 - setup password 39
- error
 - codes 103, 111
 - messages 104
- ethernet
 - AUI pin assignments 90
 - BNC pin assignments 89
 - RJ-45 pin assignments 90
- expansion card removal and replacement 67
- expansion slot cover lock removal and replacement 66
- F**
- FailSafe Key
 - caution 44
 - ordering 44
- fan, power supply 57
- Fault Notification and Recovery
 - HP Client Manager 45
- fingerprint identification technology 45
- flashing LEDs 111
- front bezel removal and replacement 61
- front drive bezel 62
- front I/O panel removal and replacement 76
- front panel problems 149
- G**
- general problems 116
- grounding methods 53
- H**
- hard drive
 - proper handling 58
 - removal and replacement 73, 75
 - SATA characteristics 47
- hard drive problems 124
- hard drives, diagnostic tool 45
- hardware installation
 - problems 137
- headphone pin assignments 92
- heatsink removal and replacement 80
- helpful hints 114
- HP
 - Backup and Recovery Manager 23
 - Client Foundation Suite 27
 - Client Management Interface 24
 - Client Management Premium Suite 26
 - Client Manager 25
 - ProtectTools Security Manager 26
 - System Software Manager 25
- HP Backup and Recovery Manager 2
- HP Drive Key
 - bootable 32, 33
 - DiskOnKey 32
- HP Insight Diagnostics 15
- HP Lifecycle solutions 21
- HP OpenView Agent 22
- HP OpenView Client Configuration Manager 27
- HP OpenView PC Management Solution 28
- HPQFlash 29
- I**
- industry standards 36
- infrared (IR) transceiver, external,
 - pin assignments 92
- initial configuration 21
- Insight Diagnostics 15
- internal temperature of
 - computer 45
- Internet access problems 150
- Internet addresses. See Web sites
- K**
- keyboard
 - cleaning 56
 - pin assignments 89
- keyboard delimiter characters, national 41
- keyboard problems 135
- L**
- line—in audio pin assignments 92
- line—out audio pin assignments 92
- locking Smart Cover Lock 44
- M**
- Media Card Reader
 - problems 126
- memory
 - specifications 64
- memory problems 142
- memory, removal and replacement 64
- microphone pin assignments 92
- monitor
 - pin assignments 93
- monitor problems 128
- mouse
 - pin assignments 89
- mouse cleaning 57
- mouse problems 135
- MT
 - chassis, illustrated 51
- N**
- national keyboard delimiter characters 41
- network problems 139
- notification of changes 28
- numeric error codes 104
- O**
- operating guidelines 55
- operating systems, important information about 35
- optical drive problems 145

ordering FailSafe Key 44
overheating, prevention 55

P

parallel interface pin
 assignments 91
password
 changing 40
 clearing 41
 deleting 40
 power-on 39
 security 38
 setup 38, 39
PC deployment 21
PCI Express pin assignments 96
PCN (Proactive Change Notification) 28
POST error messages 103
power button
 configuring 35
 dual-state 35
power cord set requirements
 country specific 101
power problems 120
power supply
 fan 57
 removal and replacement 88
power supply, surge-tolerant 45
power switch assembly, removal and replacement 77
power-on password
 changing 40
 deleting 40
 entering 39
 setting 39
Preboot Execution Environment (PXE) 24
preinstalled software image 21
preparation for disassembly 59
printer problems 134
Proactive Change Notification (PCN) 28
problems
 audio 132
 CD-ROM or DVD 145
 diskette 121
 Drive Key 148
 front panel 149
 general 116
 hard drive 124

hardware installation 137
Internet access 150
keyboard 135
Media Card Reader 126
memory 142
monitor 128
mouse 135
network 139
power 120
printer 134
processor 144
 software 152
processor problems 144
processor removal and replacement 81
protecting hard drive 45
protecting ROM, caution 28
ProtectTools Security Manager 26
PXE (Preboot Execution Environment) 24

R

Radia Management Agent 22
recovery
 creating disc recovery set 2
Recovery Disc Set 19
Recovery Mode, Boot Block Emergency 29
recovery, software 21
Remote ROM Flash 29
remote setup 24
Remote System Installation 24
removal and replacement
 5.25" drive 72
 access pannel 60
 battery 84
 expansion card 67
 expansion slot cover lock 66
 front bezel 61
 front I/O panel 76
 hard drive 73, 75
 heatsink 80
 memory 64
 power switch assembly 77
 processor 81
 speaker 78
 system board 83
 system fan 79
Restore Plus! CD 2

retired solutions 28
ROM
 flash 28
 Remote Flash 29

S

safety and comfort 113
safety precautions
 cleaning 55
SATA
 connectors on system board 47
 data cable pinouts 47
 hard drive characteristics 47
 pin assignments 96
 power cable pinouts 48
screws, correct size 57
SDRAM (synchronous dynamic random access memory) 64
security
 cable lock 44
 DriveLock 41
 features, table 37
 fingerprint identification technology 45
 password 38
 ProtectTools Security Manager 26
 settings 36
 Smart Cover Lock 43
 Smart Cover Sensor 43
serial interface pin
 assignments 91
service considerations 57
setup
 copying to multiple computers 31
 copying to single computer 30
 initial 21
 replicating 30
setup password
 changing 40
 deleting 40
 entering 39
 setting 38
Smart Cover FailSafe Key, ordering 44
Smart Cover Lock
 FailSafe Key 44

- locking 44
- unlocking 44
- Smart Cover Sensor
 - protection levels 43
 - setting 43
- software
 - Altiris AClient 22
 - Altiris Deployment Solution Agent 22
 - asset tracking 36
 - backing up 19
 - Drive Protection System 45
 - HP Backup and Recovery Manager 2, 23
 - HP Client Foundation Suite 27
 - HP Client Management Interface 24
 - HP Client Management Premium Suite 26
 - HP Client Manager 25
 - HP Insight Diagnostics 15
 - HP OpenView Client Configuration Manager 27
 - HP OpenView PC Management Solution 28
 - HP ProtectTools Security Manager 26
 - HP System Software Manager 25
 - integration 21
 - problems 152
 - recovery 21
 - Remote System Installation 24
 - Restore Plus! 23
 - Restore Plus! CD 2
 - restoring 19
 - servicing computer 57
 - updating and management tools 24
- spare part number
 - tamper-resistant wrench 57
 - Torx T-15 screwdriver 57
- speaker, removal and replacement 78
- specifications
 - memory 64
- static electricity 52
- Subscriber's Choice 28

- surge-tolerant power supply 45
- system board
 - SATA connectors 47
- system board removal and replacement 83
- system fan, removal and replacement 79
- System Software Manager 25

T

- tamper-proof screws
 - tool 57
- temperature control 55
- temperature, internal computer 45
- thermal sensor 45
- tools, servicing 57
- Torx T15 screwdriver 57

U

- unlocking Smart Cover Lock 44
- URLs (Web sites). *See* Web sites
- USB flash media device, bootable 32, 33
- USB pin assignments 91

V

- ventilation, proper 55

W

- Wake-on-LAN feature 139
- Web sites
 - BIOS download 28
 - Fingerprint Identification Technology 45
 - HP Client Foundation Suite 27
 - HP Client Foundation Suite and Client Premium Suite 22
 - HP Client Management Premium Suite 27
 - HP Client Manager 26
 - HP OpenView Client Configuration Manager 27
 - HP OpenView Management Suite 28
 - HP ProtectTools Security Manager 26
 - HPQFlash 29
 - PC deployment 22

- Proactive Change Notification 28
- Remote ROM Flash 29
- replicating setup 31
- Restore Plus! 23
- ROM Flash 29
- software support 35
- Subscriber's Choice 28
- Subscriber's Choice 28
- System Software Manager download 25