Maintenance & Service Guide

HP 100B All-in-One PC

Maintenance & Service Guide

HP Compaq 100B All-in-One PC

Second Edition (June 2012)

First Edition (January 2011)

Document Part Number: 640045-002

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

1 Installing and Customizing the Software

If your computer was not shipped with a Microsoft operating system, some portions of this documentation do not apply. Additional information is available in online help after you install the operating system.

NOTE: If the computer was shipped with Windows Vista or Windows 7 loaded, you will be prompted to register the computer with HP Total Care before installing the operating system. You will see a brief movie followed by an online registration form. Fill out the form, click the **Begin** button, and follow the instructions on the screen.

CAUTION: Do not add optional hardware or third-party devices to the computer until the operating system is successfully installed. Doing so may cause errors and prevent the operating system from installing properly.

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.

Installing the Operating System

The first time you turn on the computer, the operating system is installed automatically. This process takes about 5 to 10 minutes, depending on which operating system is being installed. Carefully read and follow the instructions on the screen to complete the installation.

CAUTION: 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 may damage the software that runs the computer or prevent its proper 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 your computer was not shipped with a Microsoft operating system, some portions of this documentation do not apply. Additional information is available in online help after you install the operating system.

Downloading Microsoft Windows Updates

1. To set up your Internet connection, click **Start** > **Internet Explorer** and follow the instructions on the screen.
2. Once an Internet connection has been established, click the **Start** button.

3. Select the **All Programs** menu.
4. Click on the **Windows Update** link.

   In Windows Vista and Windows 7, the **Windows Update** screen appears. Click **view available updates** and make sure all critical updates are selected. Click the **Install** button and follow the instructions on the screen.

   In Windows XP, you will be directed to the **Microsoft Windows Update Web site**. If you see one or more pop-up windows that ask you to install a program from http://www.microsoft.com, click **Yes** to install the program. Follow the instructions on the Microsoft Web site to scan for updates and install critical updates and service packs.

   It is recommended that you install all of the critical updates and service packs.
5. After the updates have been installed, Windows will prompt you to reboot the machine. Be sure to save any files or documents that you may have open before rebooting. Then select **Yes** to reboot the machine.

Installing or Upgrading Device Drivers (Windows systems)

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 (and firmware)**, enter the model number of the computer, and press Enter.

Accessing Disk Image (ISO) Files

There are disk image files (ISO files) included on your PC that contain the installation software for additional software. These CD image files are located in the folder C:\SWSetup\ISOs. Each .iso file can be burned to CD media to create an installation CD. It is recommended that these disks be created and the software installed in order to get the most from your PC. The software and image file names are:

- Corel WinDVD SD and BD – installation software for WinDVD – used to play DVD movies
- HP Insight Diagnostics OR Vision Diagnostics – software to perform diagnostic activities on your PC

Protecting the Software

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

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, optical drives, or USB flash media devices.
- Select Post Messages Enabled or Disabled to change the display status of Power-On Self-Test (POST) messages. Post Messages Disabled suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. To manually switch to Post Messages Enabled during POST, press any key (except F1 through F12).
- Enable the power-on password prompt during system restarts (warm boots) as well as during power-on.
- Establish a setup password that controls access to the Computer Setup (F10) Utility and the settings described in this section.
- Secure integrated I/O functionality, including USB, audio, or embedded NIC, so that they cannot be used until they are unsecured.
- Enable or disable removable media boot ability.
- Solve system configuration errors detected but not automatically fixed during the Power-On Self-Test (POST).
- Execute self-tests on a specified ATA hard drive (when supported by drive).

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 before the computer boots to the operating system 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 before the computer boots to the operating system to access the utility.

3. Select your language from the list and press Enter.
4. A choice of five headings appears in the Computer Setup Utilities menu: File, Storage, Security, Power, and Advanced.
5. Use the arrow (left and right) keys to select the appropriate heading. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the Computer Setup Utilities menu, press Esc.
6. To apply and save changes, select **File** > **Save Changes and Exit**.
   - If you have made changes that you do not want applied, select **Ignore Changes and Exit**.
   - To reset to factory settings or previously saved default settings (some models), select **Apply Defaults and Exit**. This option will restore the original factory system defaults.

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

Heading	Table
File	Table 2-2 Computer Setup—File on page 5
Storage	Table 2-3 Computer Setup—Storage on page 6
Security	Table 2-4 Computer Setup—Security on page 7
Power	Table 2-5 Computer Setup—Power on page 10
Advanced	Table 2-6 Computer Setup—Advanced on page 10

Computer Setup—File

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

Table 2-2 Computer Setup—File

Option	Description
System Information	Lists: • Product name • SKU number (some models) • Processor type/speed/stepping/cache size • Installed memory size/speed, number of channels (single or dual) (if applicable) • Integrated MAC address for embedded, enabled NIC (if applicable) • System BIOS (includes family name and version) • Chassis serial number
About	Displays copyright notice.
Set Time and Date	Allows you to set system time and date.
Apply Defaults and Exit	Applies the currently selected default settings and clears any established passwords.
Ignore Changes and Exit	Exits Computer Setup without applying or saving any changes.
Save Changes and Exit	Saves changes to system configuration or default settings and exits Computer Setup.

Computer Setup—Storage

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

Table 2-3 Computer Setup—Storage

Option	Description
Device Configuration	Lists all installed BIOS-controlled storage devices. When a device is selected, detailed information and options are displayed. The following options may be presented: **Hard Disk**: Size, model, firmware, serial number, connector color, SMART, emulation type. Emulation type has the following choices: • None (prevents BIOS data accesses and disables it as a boot device) • Hard Disk (treated as a hard disk) **CD-ROM**: Model, firmware, serial number. No emulation options available.
Storage Options	**SATA Emulation** Allows you to choose how the SATA controller and devices are accessed by the operating system. There are two supported options: AHCI and IDE. AHCI (default option) - Allows operating systems with AHCI device drivers loaded to take advantage of more advanced features of the SATA controller. IDE - This is the most backwards-compatible setting of the two options. Operating systems usually do not require additional driver support in IDE mode. **NOTE:** The AHCI device driver must be installed prior to attempting to boot from an AHCI volume. If you attempt to boot from an AHCI volume without the required device driver installed, the system will crash (blue screen).
DPS Self-Test	Allows you to execute self-tests on ATA hard drives capable of performing the Drive Protection System (DPS) self-tests. **NOTE:** This selection will only appear when at least one drive capable of performing the DPS self-tests is attached to the system.
Boot Order	Allows you to: • Specify the order in which attached devices (such as a USB flash media device, hard drive, optical drive, or network interface card) are checked for a bootable operating system image. Each device on the list may be individually excluded from or included for consideration as a bootable operating system source. • Specify the order of attached hard drives. The first hard drive in the order will have priority in the boot sequence and will be recognized as drive C (if any devices are attached). **NOTE:** MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started. **Shortcut to Temporarily Override Boot Order** To boot **one time** from a device other than the default device specified in Boot Order, restart the computer and press F9 before the computer boots to the operating system. After POST is completed, a list of bootable devices is displayed. Use the arrow keys to select the preferred bootable device and press Enter. The computer then boots from the selected non-default device for this one time.

Computer Setup—Security

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

Table 2-4 Computer Setup—Security

Option	Description
Setup Password	Allows you to set and enable a setup (administrator) password. **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. See the *Desktop Management Guide* for more information.
Power-On Password	Allows you to set and enable a power-on password. The power-on password prompt appears after a power cycle. If the user does not enter the correct power-on password, the unit will not boot. **NOTE:** This password does not appear on warm boots , such as Ctrl+Alt+Delete or **Restart from Windows**, unless enabled in **Password Options** (see below). See the *Desktop Management Guide* for more information.
Device Security	Allows you to set Device Available/Device Hidden for: • System audio • Network controllers (some models) • SATA0 • SATA1

USB Security	Allows you to enable or disable groups of USB ports or individual USB ports:
	
	• Front USB Ports
	  ◦ USB Port 11
	  ◦ USB Port 13
	• Rear USB Ports
	  ◦ USB Port 0
	  ◦ USB Port 1
	  ◦ USB Port 4
	  ◦ USB Port 9
	• Accessory USB Ports
	  ◦ USB Port 3
	  ◦ USB Port 12

Slot Security	Allows you to disable or enable the mini card slot
Network Service Boot	Enables/disables the computer's ability to boot from an operating system installed on a network server.

Table 2-4 Computer Setup—Security (continued)

System IDs	Shows: • Product name • 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.) • SKU number • Family name • Feature Allows you to set: • Keyboard locale setting (for example, English or German) for System ID entry.

Table 2-4 Computer Setup—Security (continued)

System Security (some models: these options are hardware dependent)	Data Execution Prevention (some models) (enable/disable) - Helps prevent operating system security breaches. PAVP (Models with Blu-ray drives) (disabled/min/max) - PAVP enables the Protected Audio Video Path in the Chipset. This may allow viewing of some protected high definition content that would otherwise be prohibited from playback. Selecting Max will assign 96 Megabytes of system memory exclusively to PAVP. Virtualization Technology (some models) (enable/disable) - Controls the virtualization features of the processor. Changing this setting requires turning the computer off and then back on. Virtualization Technology Directed I/O (some models) (enable/disable) - Controls virtualization DMA remapping features of the chipset. Changing this setting requires turning the computer off and then back on. Trusted Execution Technology (some models) (enable/disable) - Controls the underlying processor and chipset features needed to support a virtual appliance. Changing this setting requires turning the computer off and then back on. To enable this feature you must enable the following features: • Embedded Security Device Support • Virtualization Technology • Virtualization Technology Directed I/O Embedded Security Device Support (some models) (enable/disable) - Permits activation and deactivation of the Embedded Security Device. Changing this setting requires turning the computer off and then back on. **NOTE:** To configure the Embedded Security Device, a Setup password must be set. • Reset to Factory Settings (some models) (Do not reset/Reset) - Resetting to factory defaults will erase all security keys. Changing this setting requires turning the computer off and then back on. **CAUTION:** The embedded security device is a critical component of many security schemes. Erasing the security keys will prevent access to data protected by the Embedded Security Device. Choosing Reset to Factory Settings may result in significant data loss.
System Security (*continued*)	OS management of Embedded Security Device (some models) (enable/disable) - This option allows the user to limit operating system control of the Embedded Security Device. Changing this setting requires turning the computer off and then back on. This option allows the user to limit OS control of the Embedded Security Device. • Reset of Embedded Security Device through OS (some models) (enable/disable) - This option allows the user to limit the operating system ability to request a Reset to Factory Settings of the Embedded Security Device. Changing this setting requires turning the computer off and then back on. **NOTE:** To enable this option, a Setup password must be set. Button Retask Password Protection (disable/enable) - Controls whether or not the Setup password must be provided to WMI methods used to re-task the function of the side panel buttons. Power Button (enable/disable) - Allows you to disable or enable the power button. Consumer IR Power Button (enable/disable) - Controls whether or not the BIOS will respond to Remote Control power button presses. This does not affect the Remote Control power button operation in Windows. Optical Drive Eject Button (enable/disable) - Allows you to disable or enable the optical drive eject button. Disabling the eject button does not disable software control of the eject function inside Windows.

Computer Setup—Power

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

Table 2-5 Computer Setup—Power

Option	Description
Hardware Power Management	SATA Power Management—Enables or disables the SATA bus and/or device power management. S5 Maximum Power Savings—Turns off power to all nonessential hardware when system is off to meet EUP Lot 6 requirement of less than 1 Watt power usage. Enabling this feature will disable any wake events and management devices while in S5.
Thermal	Fan idle mode—Displays CPU fan speed.

Computer Setup—Advanced

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

Table 2-6 Computer Setup—Advanced

Option	Heading
Power-On Options	Allows you to set: • POST messages (enable/disable). Suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. • After Power Loss (off/on/previous state): Setting this option to: ◦ Off—causes the computer to remain powered off when power is restored. ◦ On—causes the computer to power on automatically as soon as power is restored. ◦ Previous state—causes the computer to power on automatically as soon as power is restored, if it was on when power was lost. **NOTE:** If you turn off power to the computer using the switch on a power strip, you will not be able to use the suspend/sleep feature or the Remote Management features. • POST Delay (None, 5, 10 15, or 20 seconds). Enabling this feature will add a user-specified delay to the POST process. This delay is sometimes needed for hard disks on some PCI cards that spin up very slowly, so slowly that they are not ready to boot by the time POST is finished. The POST delay also gives you more time to select F10 to enter Computer (F10) Setup.
BIOS Power-On	Allows you to set the computer to turn on automatically at a time you specify.
Bus Options	On some models, allows you to enable or disable: • PCI SERR# Generation. • PCI VGA Palette Snooping, which sets the VGA palette snooping bit in PCI configuration space; only needed when more than one graphics controller is installed.

Table 2-6 Computer Setup—Advanced (continued)

Device Options	Allows you to set: • Num Lock State at Power-On (off/on). • Internal Speaker (some models) (does not affect external speakers). • NIC Option ROM Download (PXE, Disable, iSCSI). The BIOS contains an embedded NIC option ROM to allow the unit to boot through the network to a PXE server. This is typically used to download a corporate image to a hard drive. The NIC option ROM takes up memory space below 1MB commonly referred to as DOS Compatibility Hole (DCH) space. This space is limited. This F10 option will allow users to disable the downloading of this embedded NIC option ROM thus giving more DCH space for additional PCI cards which may need option ROM space. The default will be to have the NIC PXE option-ROM-enabled.
Management Devices	Only displayed in the Advanced Menu when the BIOS detects multiple management options. This option is for installed NIC cards that support ASF or DASH. Use the Management Devices menu to select if the BIOS management operations will be through the embedded solution or one of the installed NIC cards.
Management Operations	Allows you to set: • MEBx Setup Prompt (enable/disable) • Unprovision AMT on next boot • SOL Terminal Emulation Mode • SOL Local Keyboard (enable/disable)

3 Serial ATA (SATA) Drive Guidelines and Features

NOTE: HP only supports the use of SATA hard drives on these models of computer. No Parallel ATA (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.

SMART ATA 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

			Maximum Size	
File System	**Controller Type**	**Operating System**	**Partition**	**Drive**
FAT 32	ATA	Windows 7	32 GB	2 TB
NTFS	ATA	Windows 7	2 TB	2 TB

4 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 Designation

An all-in one form factor is available.

All-in One

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.

	Relative Humidity		
Event	**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 ± 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 ± 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 removed.
- Do not place computers so near each other that they are subject to each other’s re-circulated or preheated air.
- 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 18 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 18 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 18.

When cleaning debris from under the keys, review all rules in General Cleaning Safety Precautions on page 18 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 18.

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 18.

Service Considerations

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

Tools and Software Requirements

To service the computer, you need the following:

- Torx T-15 screwdriver (HP screwdriver with bits, PN 161946-001)
- 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:** 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 15
- 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 140ºF (60ºC). 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.

5 Illustrated parts catalog

Computer major components

Item	Description	Spare part number
(1)	**System board** (includes dual-core AMD processor)	644692-001
(2)	**Inverter board**	

Item	Description	Spare part number
	For use with LG displays	646797-001
	For use with Samsung/CMI displays	646796-001
	Inverter board cable	646788-001
(3)	**Power switch board assembly**	649230-001
(4)	**WLAN module (802.11a/b/g/n)**	634906-001
(5)	**Feet**	
	Right foot	646784-001
	Left foot	646785-001
(6)	**Optical drive bracket**	646805-001
(7)	**Fan**	646798-001
(8)	**Front bezel**	646780-001
(9)	**Hard drive cable**	646789-001
(10)	**Optical drive cable**	646790-001
(11)	**Heat sink assembly (thermal module)** (includes replacement thermal material)	646799-001
(12)	**Power button board cable**	646782-001
(13)	**WLAN module antenna cable**	646806-001
	Webcam cable assembly (not illustrated)	646786-001
(14)	**Stand**	646783-001
(15)	**Rear cover**	646781-001
(16)	**Speakers**	
	Right speaker	646792-001
	Left speaker	646793-001
	Display panel, 20-inch (not illustrated)	
	LG	646795-001
	Samsung/CMI	646796-001
	8X DVD±RW SuperMulti DL Drive with LightScribe without bezel (not illustrated)	619238-001
	Optical drive bezel (not illustrated)	646804-001
	Hard drive (not illustrated)	
	750-GB	632938-001
	500-GB	621421-001
	250-GB	621419-001
	Hard drive grommets (rubber)	646791-001
	Memory modules (PC3-10600, 1333-MHz; not illustrated)	
	4-GB	646801-001

Item	Description	Spare part number
	2-GB	646800-001
	1-GB	647448-001
	AC adapter 90W (external; not illustrated)	646779-001
	Keyboard, USB (not illustrated)	
	Brazil	537924-201
	Latin America	537924-161
	United States	537924-001
	Mouse, USB, optical. Portia (not illustrated)	596410-001
	Screw Kit (not illustrated)	647523-001
	Power cords (not illustrated)	
	For use in Argentina	403811-201
	For use in Brazil	490371-202
	For use in Italy	246959-061
	For use in the United States	246959-001

Mass storage devices

Description	Spare part number
8X DVD±RW SuperMulti DL Drive with LightScribe without bezel	619238-001
Hard drive	
750-GB	632938-001
500-GB	621421-001
250-GB	621419-001
Hard drive grommets (rubber)	646791-001

Sequential part number listing

Spare part number	Description
246959-001	Power cord for use in the United States
246959-061	Power cord for use in Italy
403811-201	Power cord for use in Argentina
490371-202	Power cord for use in Brazil
537924-001	USB keyboard for use in the United States
537924-161	USB keyboard for use in Latin America

Spare part number	Description
537924-201	USB keyboard for use in Brazil
596410-001	Mouse, USB, Portia
619238-001	8X DVD±RW SuperMulti DL Drive with LightScribe without bezel
621419-001	Hard drive, 250 GB
621421-001	Hard drive, 500 GB
632938-001	Hard drive, 750 GB
634906-001	WLAN module (802.11a/b/g/n)
644692-001	System board with AMD dual core processor
646779-001	AC adapter, 90 W, for use in India (external)
646780-001	Front bezel
646781-001	Rear cover
646782-001	Power button board cable
646783-001	Stand
646784-001	Foot, right
646785-001	Foot, left
646786-001	Webcam module cable
646787-001	LVDS cable
646788-001	Inverter board cable
646789-001	Hard drive cable
646790-001	Optical drive cable
646791-001	Hard drive grommets (rubber)
646792-001	Speaker, right
646793-001	Speaker, left
646794-001	Display, 20-inch, Samsung/CMI
646795-001	Display, 20-inch, LG
646796-001	Inverter for use with Samsung/CMI displays
646797-001	Inverter for use with LG displays
646798-001	Fan
646799-001	Heat sink assembly (thermal module) (includes replacement thermal material)
646800-001	2-GB memory module (PC3-10600, 1333-MHz)
646801-001	4-GB memory module (PC3-10600, 1333-MHz)
646804-001	Optical drive bezel
646805-001	Optical drive bracket
646806-001	WLAN module antenna cable

Spare part number	Description
647448-001	1-GB memory module
647523-001	Screw Kit
649230-001	Power switch board assembly

6 Removal and Replacement Procedures All-in One (AIO) Chassis

The following sections provide information about disassembling various components of the HP Pro All-in-One.

Preparing to Disassemble the Computer

To avoid injury and equipment damage, always complete the following steps in order, when opening the HP Pro All-in-One.

1. Remove all media (CD, DVD, etc.) from the computer.
2. Shut down the computer.
3. After the system has completely shut down, disconnect the power adapter from the back of the computer.
4. Disconnect all other attached cables from the back of the computer.
5. Place the computer face down on a soft flat surface. HP recommends that you set down a blanket, towel, or other soft cloth to protect the touch screen surface from scratches or other damage.

⚠ **WARNING!** Beware of sharp edges inside the chassis.

Rear Cover

Description	Spare part number
Rear cover	646781-001

The computer has one main cover on the back. Remove it to gain access to internal components.

To remove the rear cover:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Lift the stand.

Figure 6-1 Lifting the stand

3. Remove the five Torx T15M3.0x8.0 screws that secure the rear cover to the computer.

Figure 6-2 Removing the rear cover screws

4. Use a flat tool to pry open the slots on the bottom of the computer.

Figure 6-3 Prying the rear cover loose

5. Lift the rear cover off the computer.

Figure 6-4 Removing the rear cover

To replace the rear cover, reverse the removal procedures.

Feet

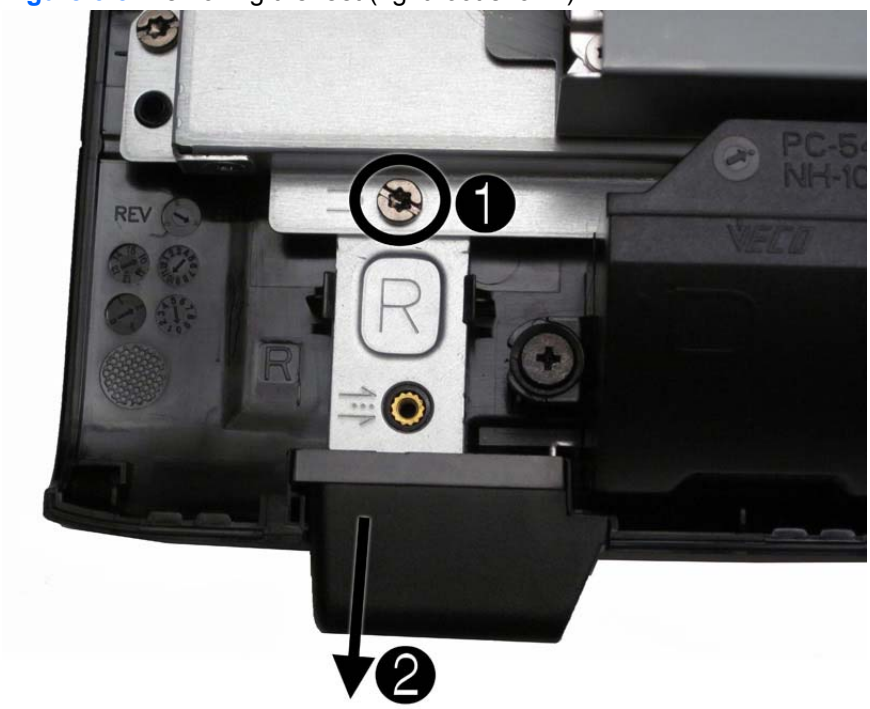
Description	Spare part number
Foot, right	646784-001
Foot, left	646785-001

Each foot is connected to the computer with one screw. The top of the foot is positioned under the display panel bracket. You must slide the foot out from under the bracket to remove it, and place it back under the bracket to install it.

To remove the feet:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. For each foot, remove the Torx T15 3.0x6.0 screw **(1)** that secures the foot to the computer.
4. Slide the foot away out from under the display panel bracket and away from the computer **(2)**.

Figure 6-5 Removing the feet (right foot shown)



To replace the feet, reverse the removal procedures.

When reinstalling a foot, make sure you slide the top of the foot under the display panel bracket before securing the screw.

Stand

Description	Spare part number
Stand	646783-001

The stand is secured with four screws.

To remove the stand:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the four Torx T15M4.0x8.0 screws that secure the stand to the rear cover.

Figure 6-6 Removing the stand screws

4. Lift the stand off the cover.

Figure 6-7 Removing the stand

To replace the stand, reverse the removal procedures.

Optical Drive

Description	Spare part number
8X DVD±RW SuperMulti DL Drive with LightScribe without bezel	619238-001
Optical drive bezel	646804-001

The optical drive is located under the rear cover on the left side of the computer (when viewed from behind). It is secured with one screw.

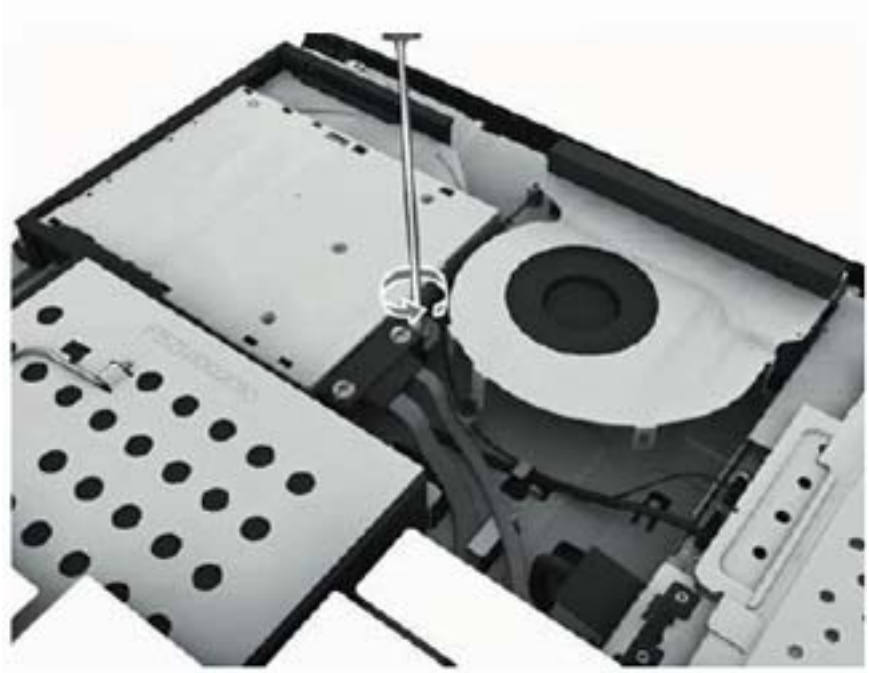
Figure 6-8 Optical drive location

To remove the optical drive:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).

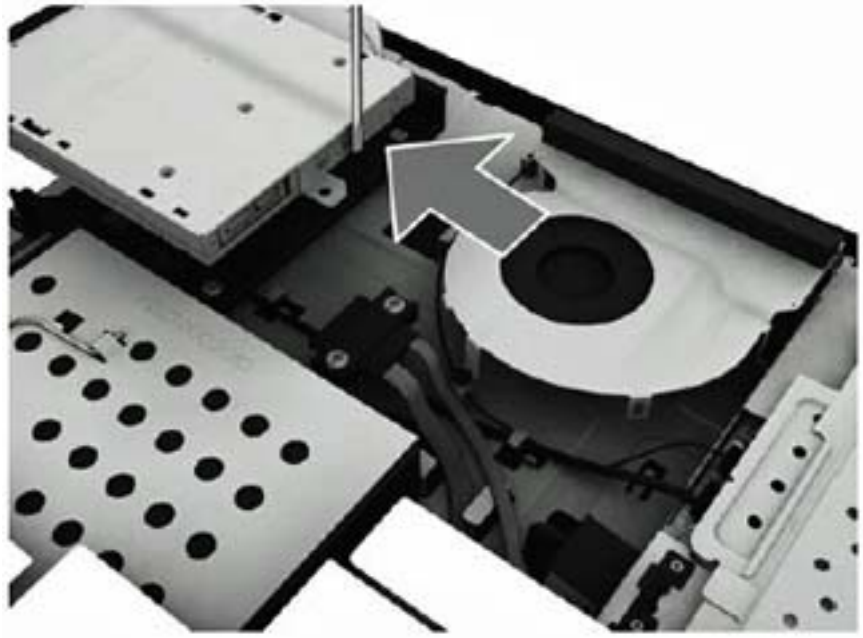
3. Loosen the captive screw that secures the optical drive to the computer.

Figure 6-9 Loosening the drive screw



4. Insert a tool into the slot to push the drive out of the bay, and then slide the drive out of the computer.

Figure 6-10 Removing the optical drive



To install an optical drive, reverse the removal procedures.

Hard Drive

Description	Spare part number
750-GB	632938-001
500-GB	621421-001
250-GB	621419-001
Hard drive grommets (rubber)	646791-001

The hard drive is located under the rear cover on the left side of the computer (when viewed from behind). The drive is secured with one captive screw and is housed in a removable cage.

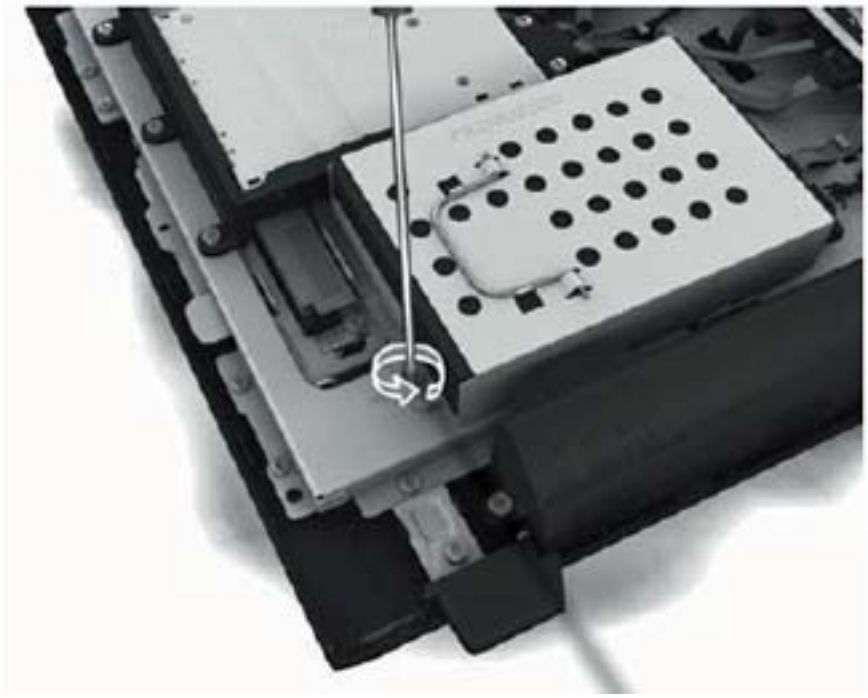
Figure 6-11 Hard drive location

To remove the hard drive:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).

3. Loosen the captive screw that secures the drive to the computer.

Figure 6-12 Loosening the hard drive screw

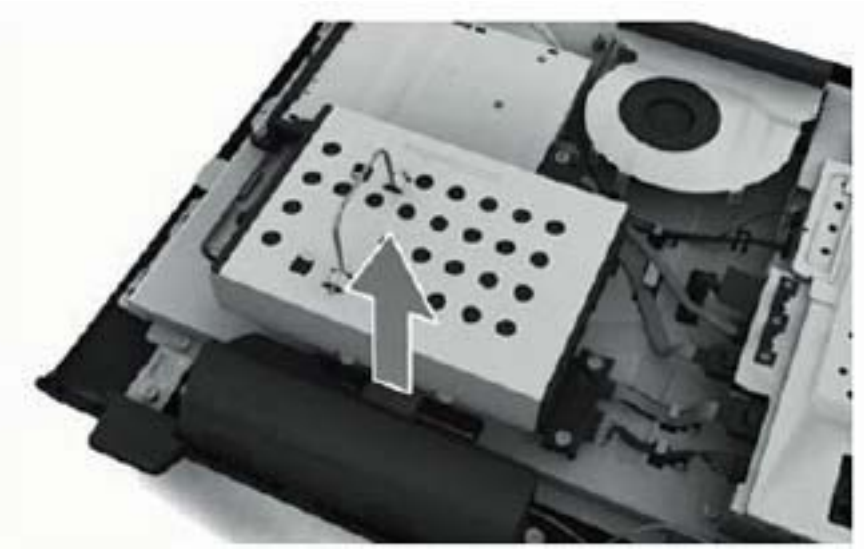


4. Slide the drive to the left to disconnect the cables.

Figure 6-13 Sliding the hard drive to disconnect the cables

5. Using the drive cage handle, lift the drive out of the computer.

Figure 6-14 Removing the hard drive from the computer



6. To remove the hard drive from the hard drive cage, remove the four Phillips screws that secure the drive to the cage, and then slide the drive out of the cage.

Figure 6-15 Removing the hard drive cage screws

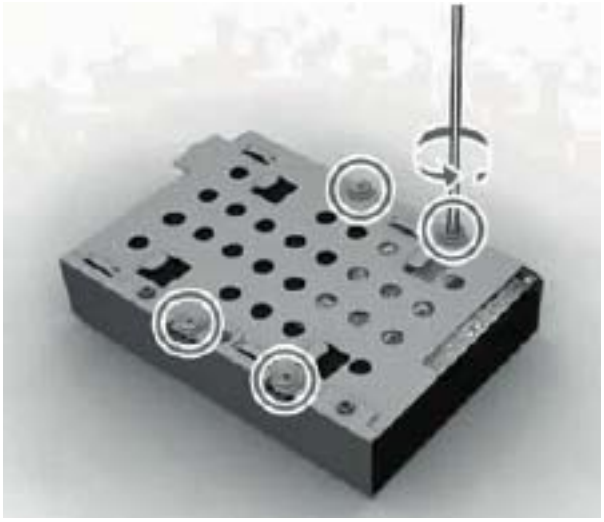
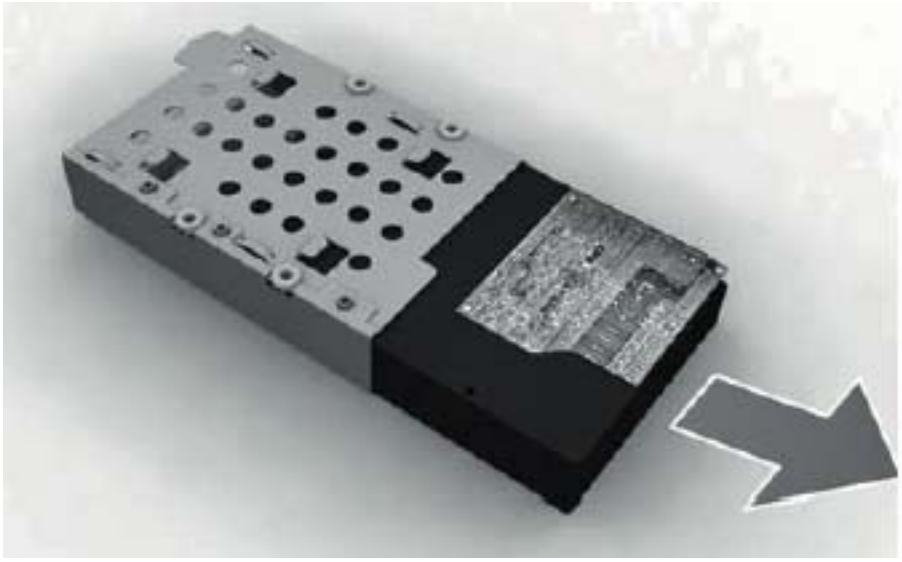


Figure 6-16 Removing the hard drive from the hard drive cage



To replace the hard drive, reverse the removal procedures.

Memory

Description	Spare part number
4-GB	646801-001
2-GB	646800-001
1-GB	647448-001

Memory modules are located on the right side of the computer (when viewed from behind) under the memory cover. The computer has two memory slots.

Figure 6-17 Memory location

To remove a memory module:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).

3. Loosen the memory cover screw.

Figure 6-18 Removing the memory cover screw

4. Lift the memory cover off the computer.

Figure 6-19 Removing the memory cover

5. Open both latches of the memory module socket, and then remove the memory module from the socket.

Figure 6-20 Removing the memory module

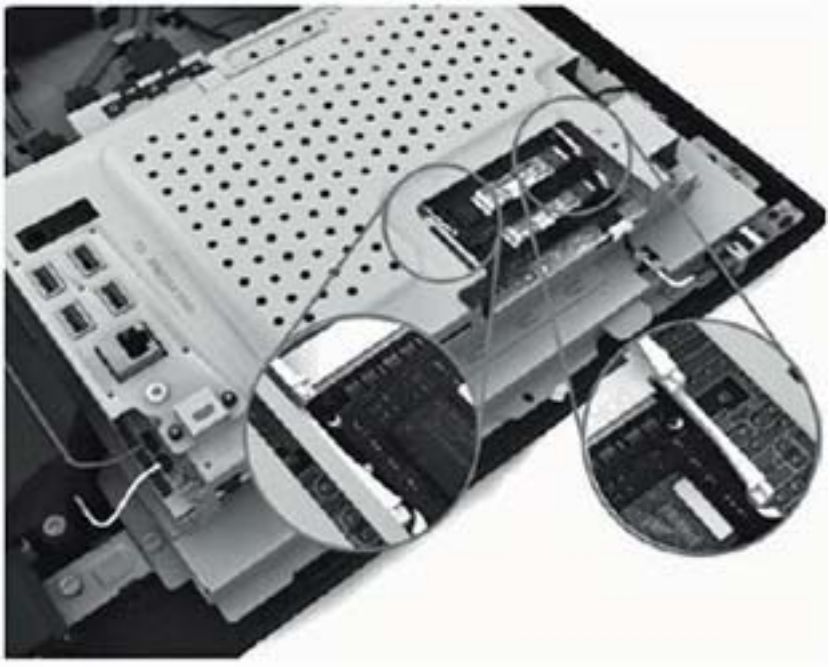


Figure 6-21 Removing the memory module

NOTE: If you are removing both cards, you must remove the upper one before removing the lower one.

To install a memory module, reverse the removal procedures.

Fan

Description	Spare part number
Fan	646798-001

The fan is located at the top of the computer.

Figure 6-22 Fan location

To remove the fan:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).

3. Disconnect the fan cable from the system board connector.

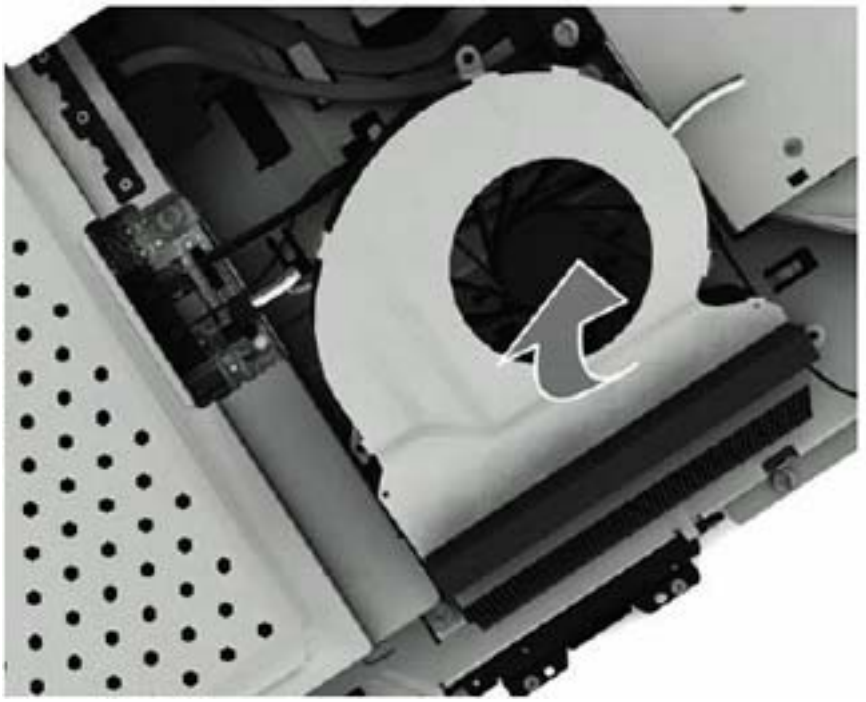
Figure 6-23 Disconnecting the fan cable

4. Remove the four Phillips PM25x60 screws that secure the fan to the computer.

Figure 6-24 Removing the fan screws

5. Lift the fan out of the computer.

Figure 6-25 Removing the fan



To install the fan, reverse the removal procedures.

Speakers

Description	Spare part number
Speaker, right	646792-001
Speaker, left	646793-001

The speakers are located at the bottom of the computer. Two screws secure each speaker. Each speaker connects to the system board..

Figure 6-26 Speaker location

To remove the speakers:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).

3. Remove two Phillips PM30x100 screws that secure each speaker to the computer.

Figure 6-27 Removing the left speaker screws

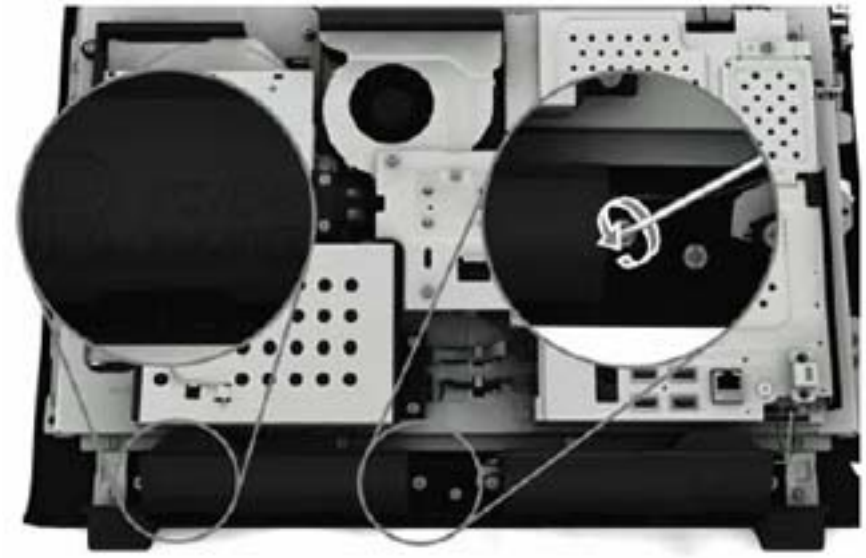
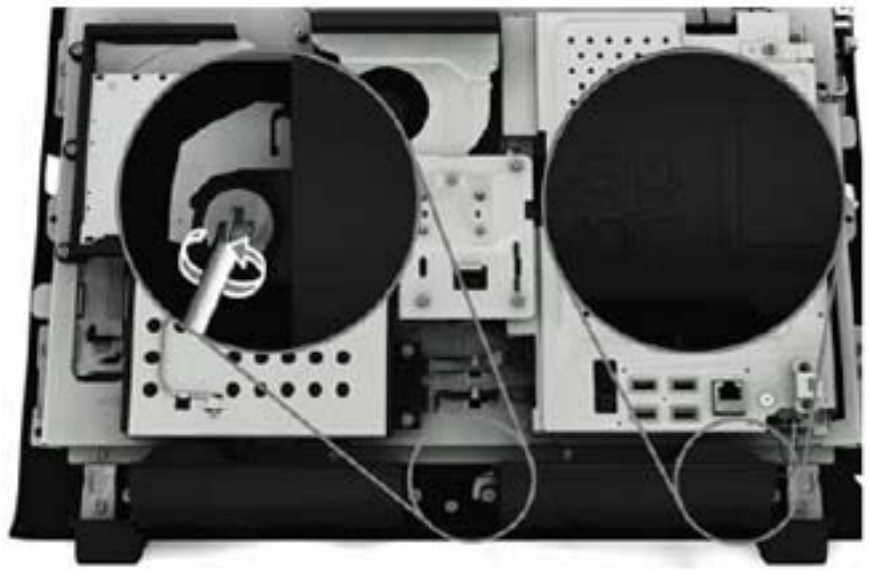
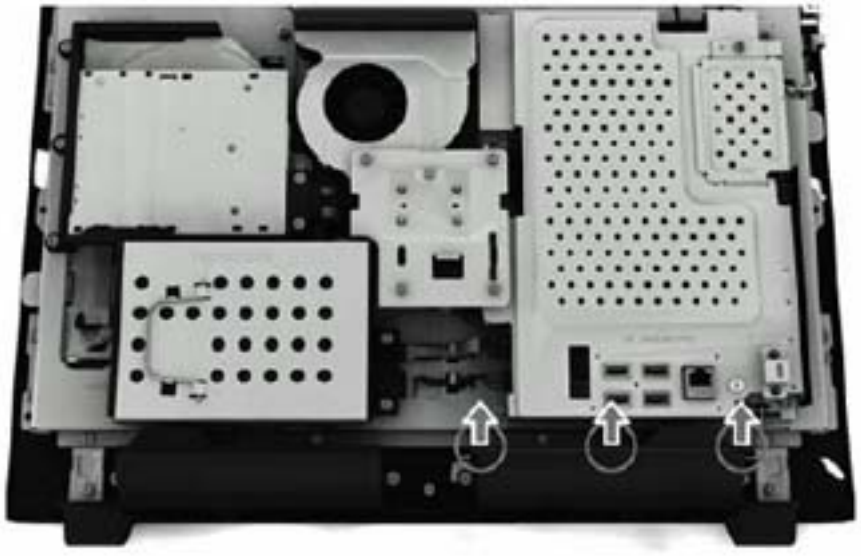


Figure 6-28 Removing the right speaker screws



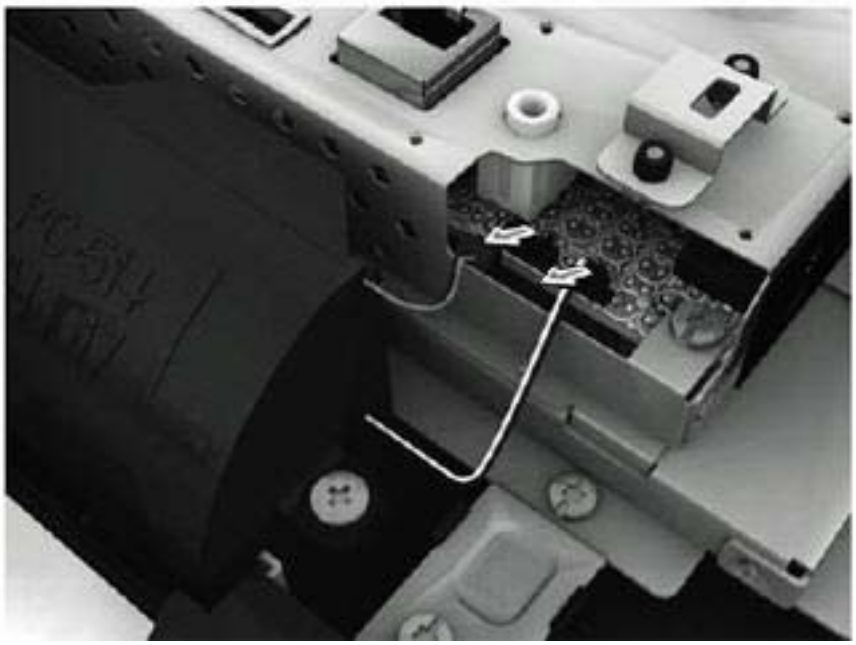
4. Remove the left speaker wire from the routing path.

Figure 6-29 Removing the left speaker wire



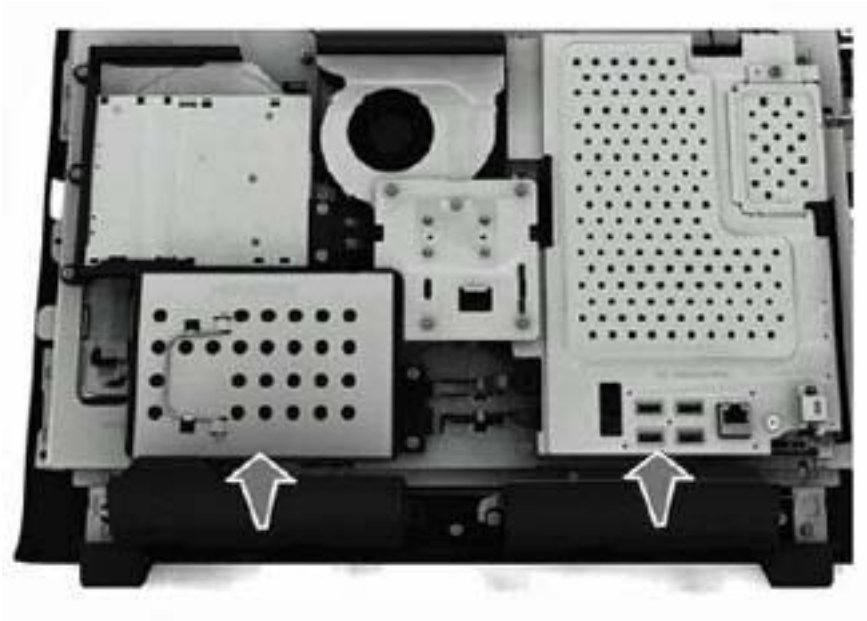
5. Disconnect the speaker cables from the system board connectors.

Figure 6-30 Disconnecting the speaker cables from the system board



6. Lift the speakers from the computer.

Figure 6-31 Removing the speakers



To install the speakers, reverse the removal procedures.

Webcam Module and Cable

Description	Spare part number
Webcam module cable	646786-001

The webcam module assembly is located at the top of the computer. It is secured with three screws and has one connector. A removable bracket houses the module. The webcam cable routes along the top of the computer from the left side of the module to the system board. Tape secures the cable to the computer.

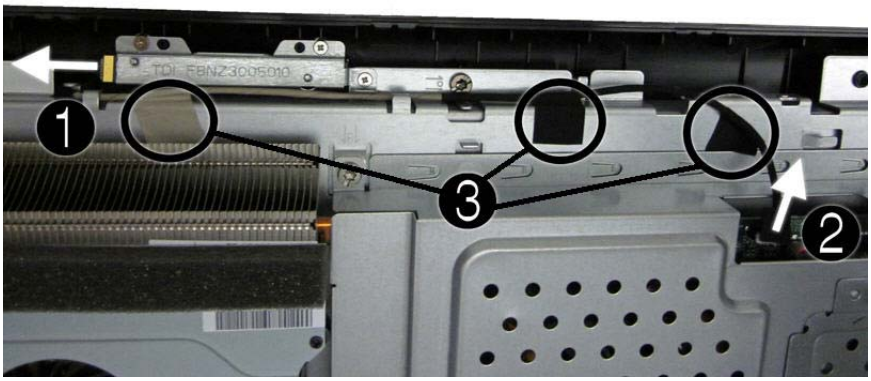
Figure 6-32 Webcam module location

To remove the webcam module cable:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Disconnect the cable from the webcam module **(1)** and from the system board **(2)**.

4. Remove the tape **(3)** that secures the cable to the computer, and then lift the cable from the computer.

Figure 6-33 Removing the webcam module cable

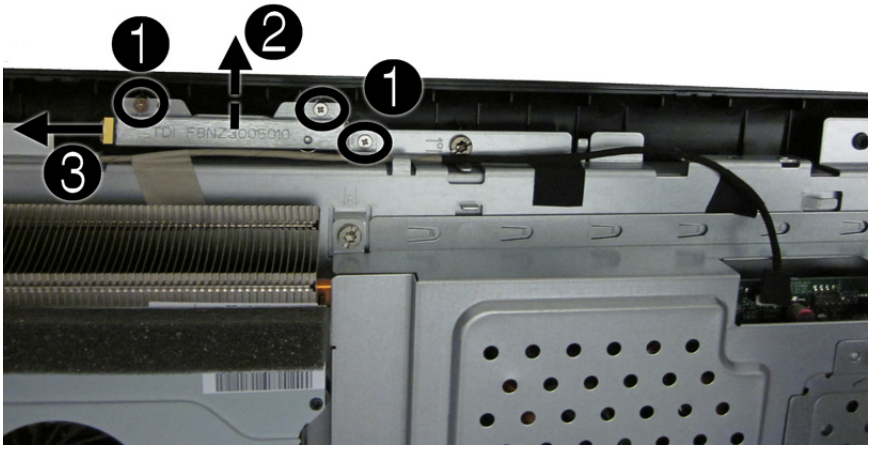


5. Remove the webcam module cable from the computer.

To remove the webcam module:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the three Phillips PM20x30 screws **(1)** that secure the webcam module assembly to the computer.
4. Lift the webcam assembly up as much as the cable allows **(2)**, and then disconnect the cable from the module **(3)**.

Figure 6-34 Removing the webcam module



5. Remove the webcam module assembly from the computer.

6. To remove the webcam module from the bracket, remove the two Phillips PM20x30 screws that secure the module to the bracket, and then remove the module from the bracket.

Figure 6-35 Removing the webcam module from the bracket

To install a webcam module, reverse the removal procedures.

Hard Drive Cable

Description	Spare part number
Hard drive cable	646789-001

The hard drive cable is secured to the computer with two screws and connects the hard drive to the system board.

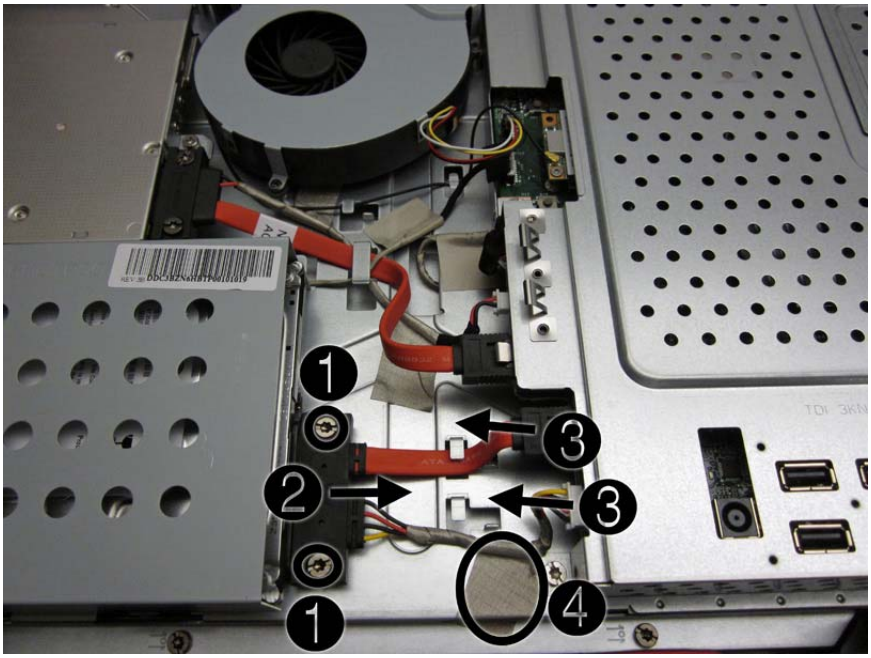
Figure 6-36 Hard drive cable location

To remove the hard drive cable:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the two Torx T15M3.0x6.0 screws **(1)** that secure the connector to the computer.
4. Disconnect the connector from the hard drive **(2)** and from the system board **(3)**.

5. Remove the tape securing the cable to the computer **(4)**, and then lift the connector from the computer.

Figure 6-37 Removing the hard drive cable



To install the hard drive cable, reverse the removal procedures.

Optical Drive Cable

Description	Spare part number
Optical drive cable	646790-001

The optical drive cable is secured to the computer with two screws and connects the optical drive to the system board.

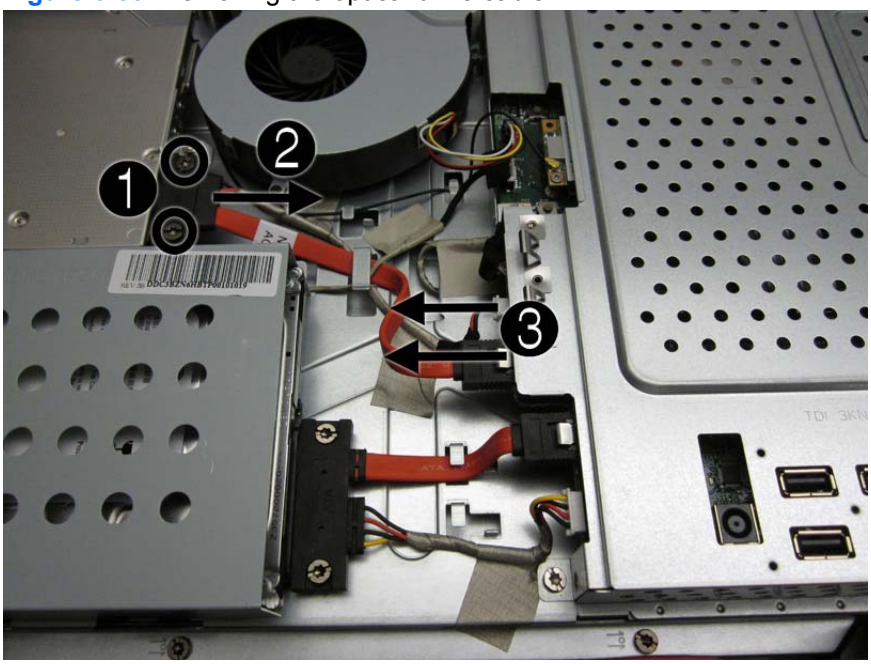
Figure 6-38 Optical drive cable location

To remove the optical drive cable:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the two Torx T15M3.0x6.0 screws **(1)** that secure the connector to the computer.
4. Disconnect the connector from the optical drive **(2)** and from the system board **(3)**.

5. Remove the tape securing the cable to the computer, and then lift the connector from the computer.

Figure 6-39 Removing the optical drive cable



To install the optical drive cable, reverse the removal procedures.

Optical Drive Bracket

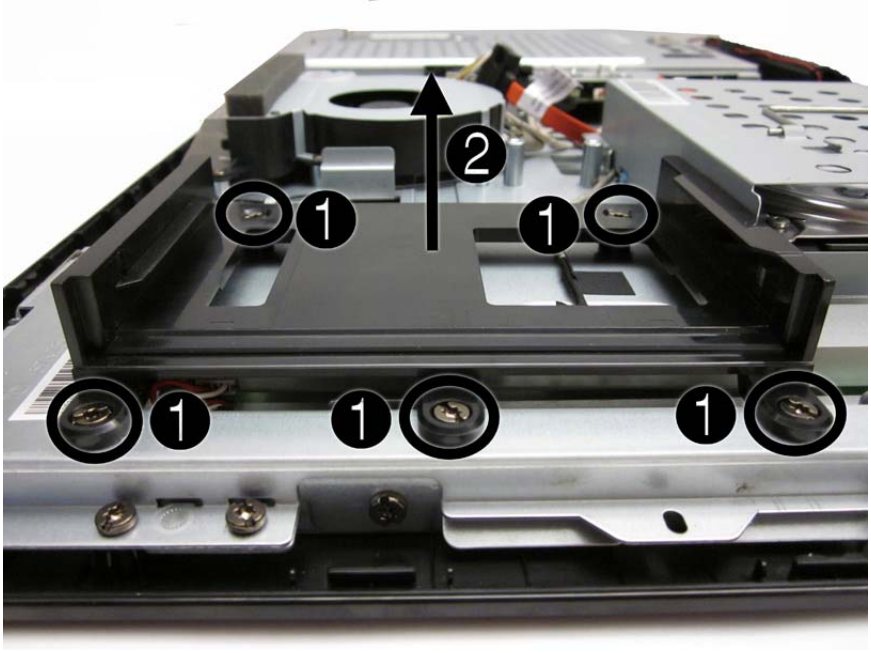
Description	Spare part number
Optical drive bracket	646805-001

The optical drive bracket is located under the optical drive. You must remove the optical drive to access the bracket, which is secured by five screws.

To remove the optical drive bracket:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the optical drive (see Optical Drive on page 33).
4. Remove the five Torx T15M3.0x6.0 screws **(1)** that secure the optical drive bracket to the computer.
5. Lift the bracket from the computer **(2)**.

Figure 6-40 Removing the optical drive bracket



To install the optical drive bracket, reverse the removal procedures.

Inverter Board

Description	Spare part number
Inverter for use with Samsung/CMI display panels	646796-001
Inverter for use with LG display panels	646797-001
Inverter board cable	646788-001

The inverter board is located on the left side of the computer under the optical drive. You must remove the optical drive and the optical drive bracket to gain access to the inverter board. The inverter board is secured with two screws and has three connectors.

Figure 6-41 Inverter board location

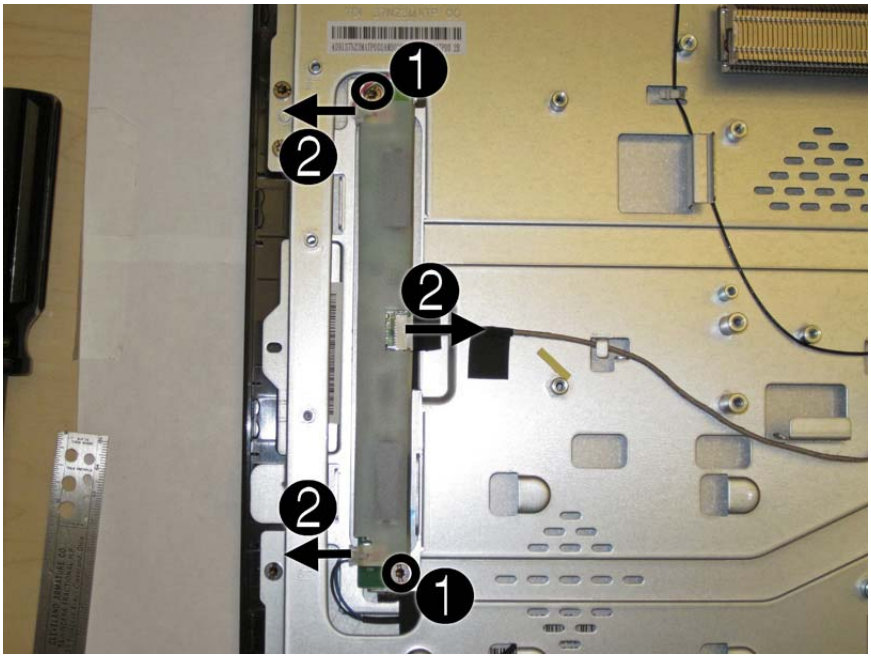
To remove the inverter board:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the optical drive (see Optical Drive on page 33).
4. Remove the optical drive bracket (see Optical Drive Bracket on page 56).
5. Remove the two Torx T15M3.0x6.0 screws **(1)** that secure the board to the computer.

6. Disconnect the three cables from the board **(2)**.

NOTE: Be careful not to damage the cables when disconnecting them from the board. Do not pull on the wires.

Figure 6-42 Removing the inverter board



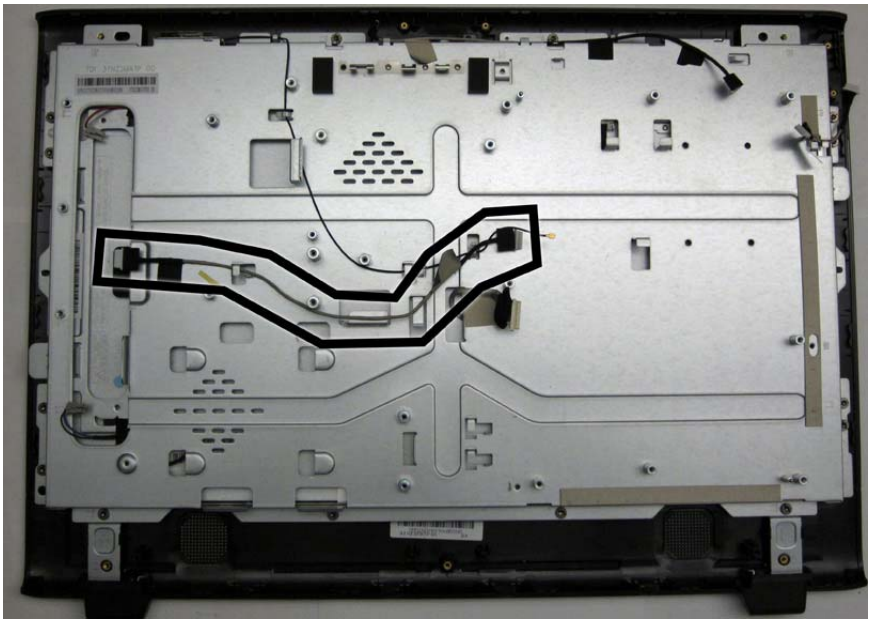
7. Remove the inverter board from the computer.

To remove the inverter board:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the optical drive (see Optical Drive on page 33).
4. Remove the optical drive bracket (see Optical Drive Bracket on page 56).
5. Remove the tape that secures the cable to the computer.

6. Lift the cable from the computer.

Figure 6-43 Removing the inverter board cable



To install the inverter board cable, reverse the removal procedures.

Power Button Board and Cable

Description	Spare part number
Power switch board assembly	649230-001
Power button board cable	646782-001

The power button board is located on the top right side of the computer (when viewed from the back). It is secured with two screws and has one connector.

The power button board cable connects to the bottom of the board and to the system board.

Figure 6-44 Power button board location

To remove the power button board:

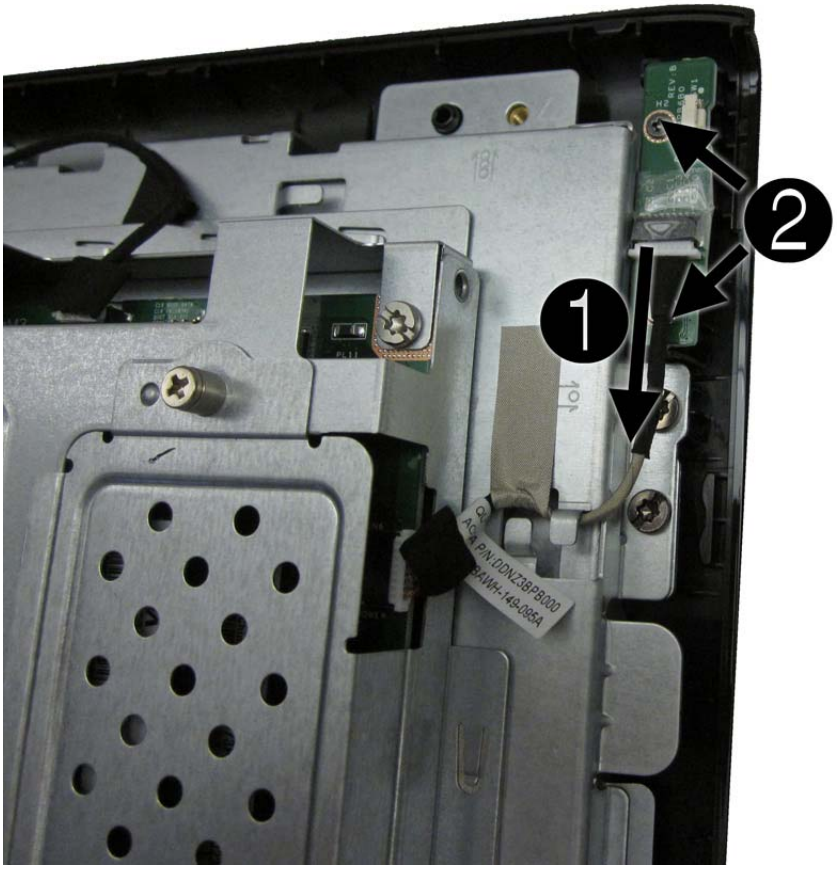
1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the tape **(1)** and two screws **(2)** that secure the board to the computer.

NOTE: Note the location of the grounding cables for proper replacement.

4. Lift the board as far as the cables allow, and then disconnect the two cables from the board **(3)**.

NOTE: Be careful not to damage the cables when disconnecting them from the board. Do not pull on the wires.

Figure 6-45 Removing the power button board



5. Remove the board from the computer.

To remove the power button board cable:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Disconnect the cable from the power button board **(1)** and the system board **(2)**.

4. Remove the tape **(3)** that secures the cable to the computer, and then remove the cable from the clip built into the computer **(4)**.

Figure 6-46 Removing the power button board cable

5. Remove the cable from the computer.

To install the power button board cable, reverse the removal procedures.

System Board Shield

The system board shield sits above the system board. It is secured with five screws. You must disconnect several cables that route to the system board to remove the shield.

Figure 6-47 System board location

To remove the system board shield:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Disconnect the following cables from the system board:
   - WLAN cable
   - Inverter cable
   - Power button board cable
   - Webcam cable
   - Fan cable
   - Speaker cables

4. Remove the five Torx T15M3.0x6.0 screws that secure the shield to the computer.

Figure 6-48 Removing the system board shield

5. Lift the shield from the computer.

To install the system board shield, reverse the removal procedures.

Heat Sink (Thermal Module)

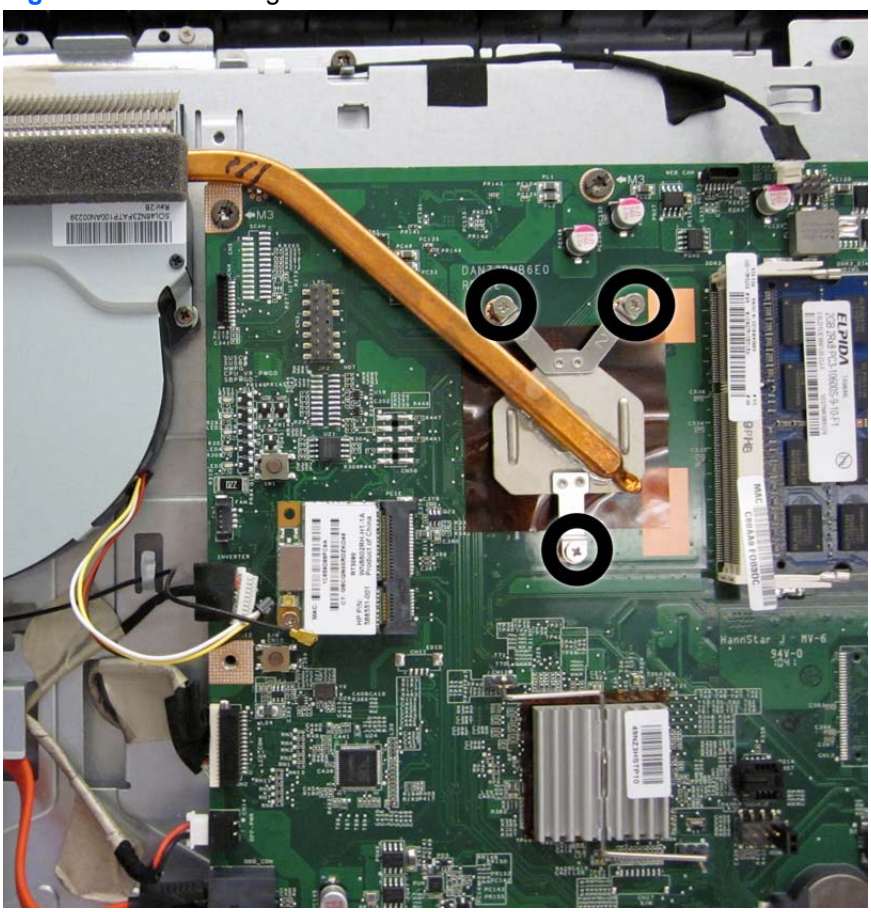
Description	Spare part number
Heat sink (thermal module)	646799-001

The heat sink is secured with three captive screws.

To remove the heat sink:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the system board shield (see System Board Shield on page 63).
3. In the order indicated by the numbers stamped into the heat sink, remove the three Phillips screws that secure the heat sink to the system board.

Figure 6-49 Removing the heat sink



4. Lift the heat sink off the system board.

To replace the heat sink, reverse the removal procedures.

WLAN Module

Description	Spare part number
WLAN module (802.11a/b/g/n)	634906-001
WLAN cable and antenna	646806-001

The WLAN module is located on the left side of the system board. You must remove the system board shield to gain access to the module. One screw and one antenna connect to the module. The antenna cable routes from the module to the antenna at the top of the computer.

Figure 6-50 WLAN module location

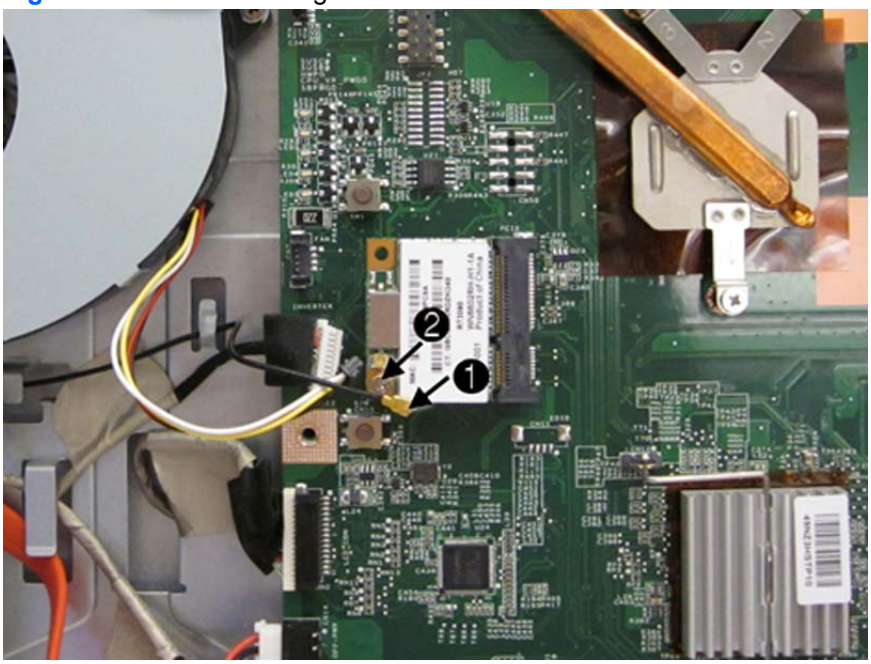
To remove the WLAN module:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).

3. Remove the system board shield (see System Board Shield on page 63).

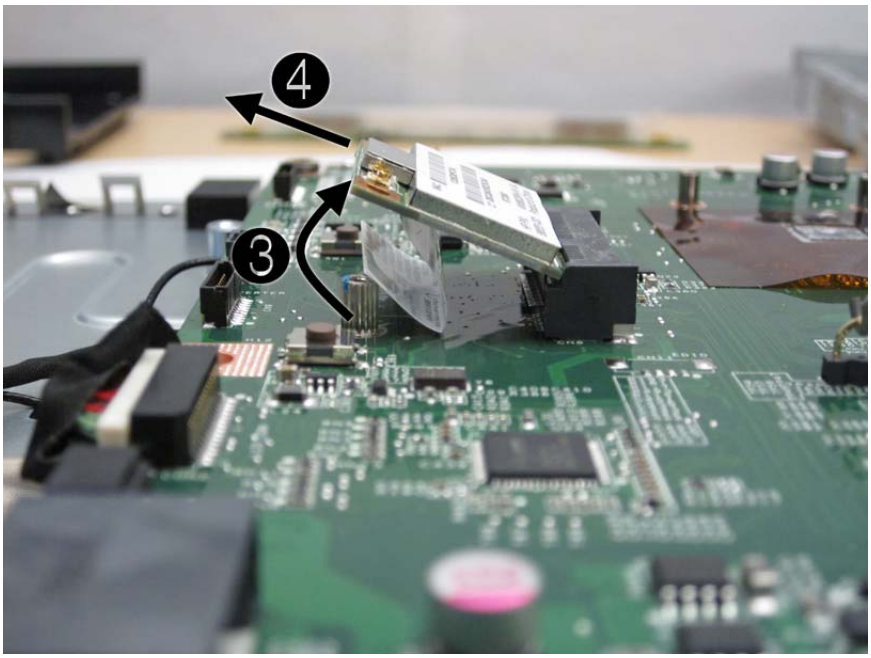
4. Disconnect the antenna cable from the module **(1)**, and then remove the Phillips screw **(2)** that secures the module to the computer.

Figure 6-51 Disconnecting the WLAN module



5. Lift the module to a 45-degree angle **(3)**, and then remove it from the system board **(4)**.

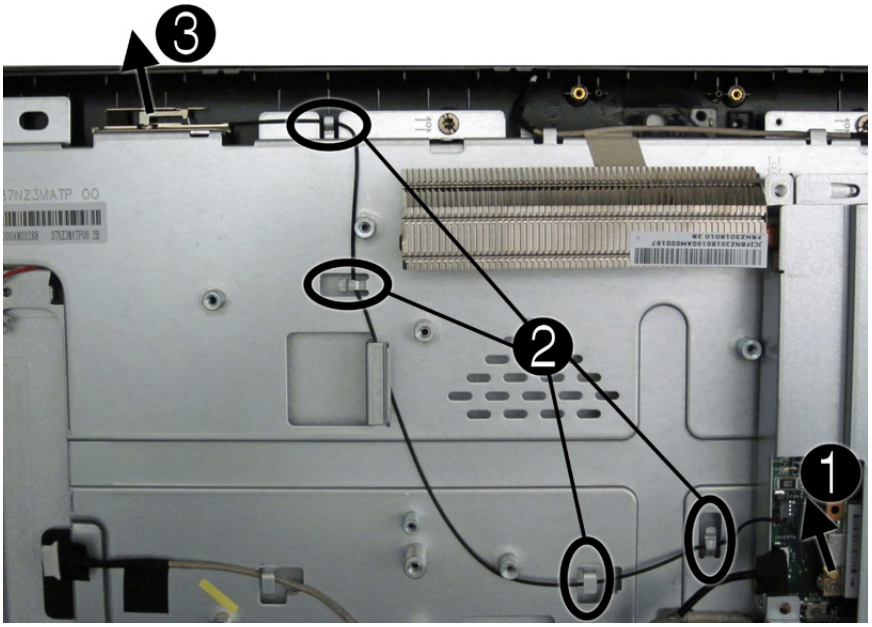
Figure 6-52 Removing the WLAN module



To remove the WLAN module antenna and cable:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the system board shield (see System Board Shield on page 63).
4. Disconnect the antenna cable from the module **(1)**, remove the cable from the clips built into the computer **(2)**, and then lift the antenna from the top of the computer **(3)**.

Figure 6-53 Disconnecting the WLAN module



To install the WLAN module cable and antenna, reverse the removal procedures.

NOTE: WLAN modules are designed with a notch to prevent incorrect insertion.

System Board

Description	Spare part number
System board with AMD dual core processor (includes thermal material)	644692-001

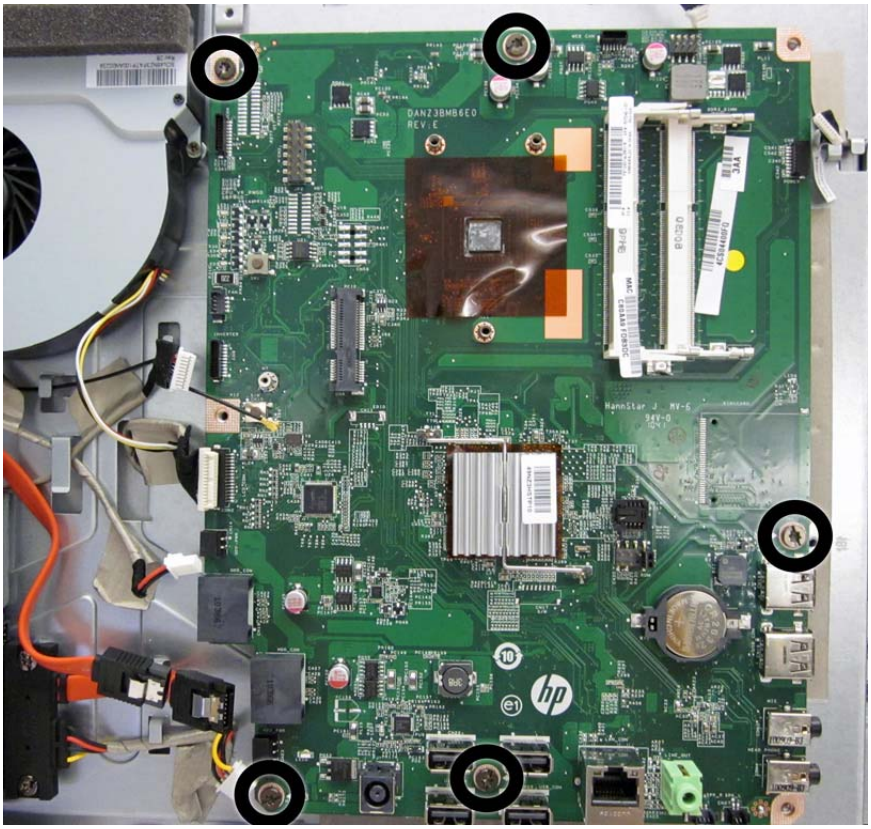
The system board is located on the upper right side of the computer (when viewed from the rear), under the system board shield. It is secured with five screws.

To remove the system board:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the memory modules (see Memory on page 39).
4. Remove the system board shield (see System Board Shield on page 63).
5. Remove the WLAN module (see WLAN Module on page 66).
6. Disconnect all cables from the system board, noting their location for reinstallation.

7. Remove the five Torx T15M3.0x6.0 screws that secure the system board to the computer.

Figure 6-54 Removing the system board



NOTE: For installation, the system board screw holes are labeled M3.

8. Lift the system board up and out of the computer.

To install the system board, reverse the removal procedures.

Front Bezel

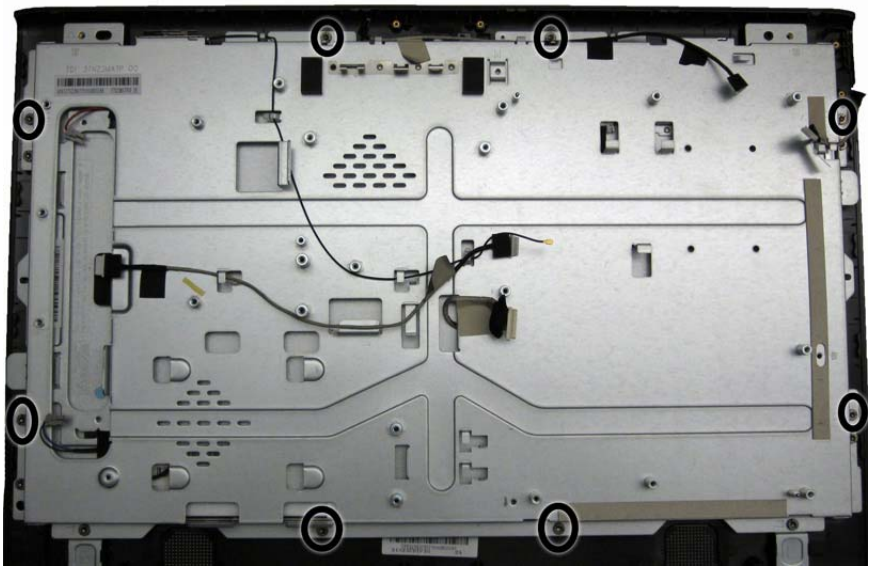
Description	Spare part number
Front bezel	646780-001

The front bezel is secured to the display panel bracket with eight screws.

To remove the front bezel:

1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the speakers (see Speakers on page 45).
4. Remove the power button board (see Power Button Board and Cable on page 60).
5. Remove the webcam (see Webcam Module and Cable on page 49).
6. Push the display cable through the hole in the cover.
7. Move aside any remaining cables that impede removal of the cover.
8. Remove the eight screws that secure the bezel to the display bracket.

Figure 6-55 Removing the front bezel



9. Separate the bezel from the display panel bracket.

To replace the front bezel, reverse the removal procedures.

Display Panel

Description	Spare part number
Display, 20-inch, LG	646795-001
Display, 20-inch, Samsung/CMI	646794-001

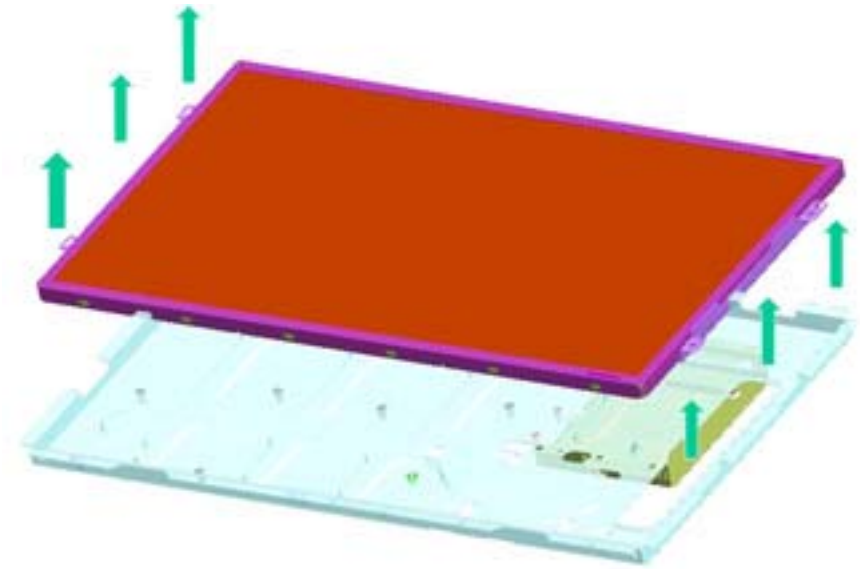
After you remove the front bezel and feet, the display bracket is secured with four remaining screws.

A metal bracket houses the display panel. You must remove the display panel from the bracket to replace the raw panel.

To remove the display panel:

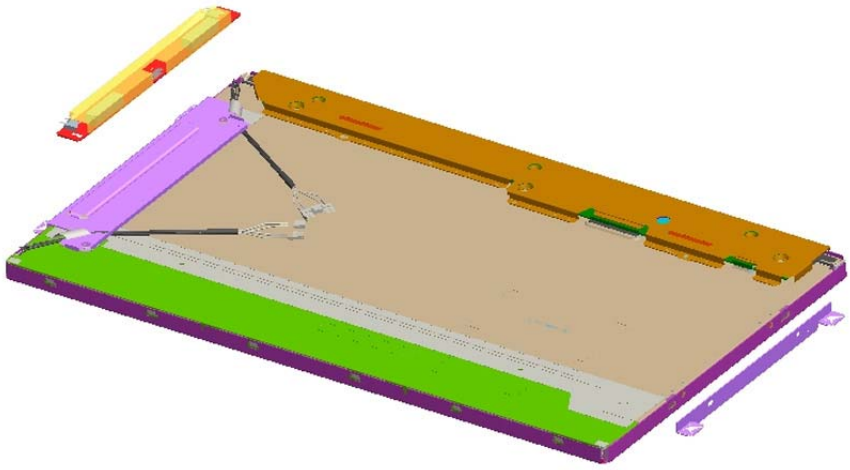
1. Prepare the computer for disassembly (see Preparing to Disassemble the Computer on page 26).
2. Remove the rear cover (see Rear Cover on page 27).
3. Remove the inverter board (see Inverter Board on page 57).
4. Push the display cable through the hole in the cover.
5. Remove the six screws from the right and left sides of the bracket and remove it from the frame.

Figure 6-56 Removing the display panel



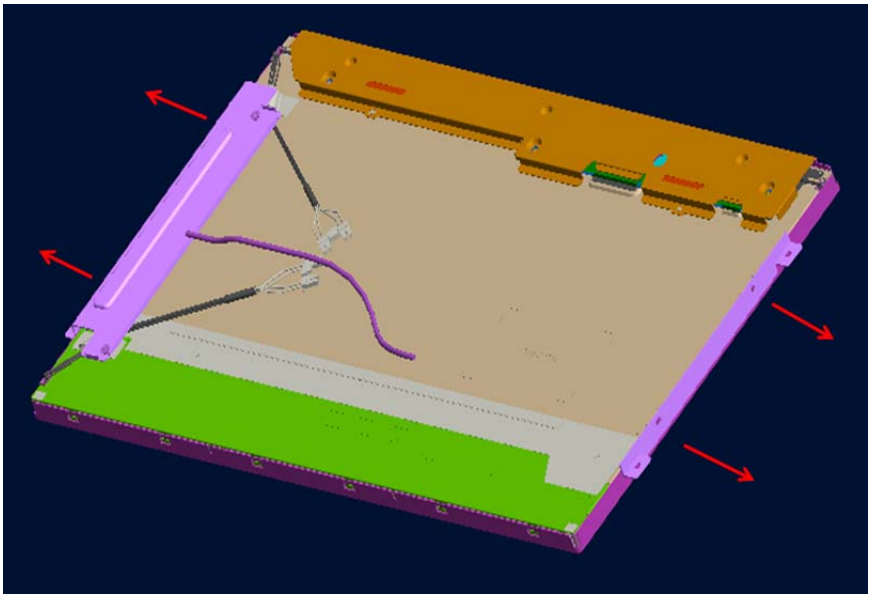
6. Remove the two screws that secure the LCD inverter, and then remove it from LCD bracket.

Figure 6-57 Removing the inverter



7. Remove the four screws from the LCD brackets, and then remove them from the LCD module.

Figure 6-58 Removing the brackets



To replace the display panel, reverse the removal procedures.

A 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, F11, 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.

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 A-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.	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.	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.	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.
162-System Options Not Set	Configuration incorrect. RTC (real-time clock) battery may need to be replaced.	Run Computer Setup and check the configuration in **Advanced** > **Device Options**. Reset the date and time under **Control Panel**. If the problem persists, replace the RTC battery. See the *Hardware Reference Guide* for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement.
163-Time & Date Not Set	Invalid time or date in configuration memory. RTC (real-time clock) battery may need to be replaced.	Reset the date and time under **Control Panel** (Computer Setup can also be used). If the problem persists, replace the RTC battery. See the *Hardware Reference Guide* for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement.

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

Control panel message	Description	Recommended action
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.	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.	1. Ensure memory modules are correctly installed. 2. Verify proper memory module type. 3. Remove and replace the identified faulty memory module(s). 4. 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.	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.	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.	1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. 3. Ensure that none of the keys are depressed. 4. Replace keyboard.
303-Keyboard Controller Error	I/O board keyboard controller.	1. Reconnect keyboard with computer turned off. 2. Replace the system board.

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

Control panel message	Description	Recommended action
304-Keyboard or System Unit Error	Keyboard failure.	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.
510-Flash Screen Image Corrupted	Flash Screen image has errors.	Reflash the system ROM with the latest BIOS image.
511-CPU Fan not Detected	CPU fan is not connected or may have malfunctioned.	1. Reseat CPU fan. 2. Reseat fan cable. 3. Replace CPU fan.
512-Rear Chassis Fan not Detected	Rear chassis fan is not connected or may have malfunctioned.	1. Reseat rear chassis fan. 2. Reseat fan cable. 3. Replace rear chassis fan.
513-Front Chassis fan not detected	Front chassis fan is not connected or may have malfunctioned.	1. Reseat front chassis fan. 2. Reseat fan cable. 3. Replace front chassis fan.
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.
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
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.)	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.
1801-Microcode Patch Error	Processor is not supported by ROM BIOS.	1. Upgrade BIOS to proper version. 2. Change the processor.
1802-Processor Not Supported	Recently installed processor is not supported by the system.	Install a processor supported by your system.

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

Control panel message	Description	Recommended action
1805-Ambient Temperature Previously Over Limit	This system was placed in a low power state to prevent damage due to excessive environmental temperature.	Make sure the system meets the HP enclosure guidelines as listed in the QuickSpecs, including the following: 1. Clean the air vents on the front, back, or any other vented side of the computer. 2. Ensure that there is a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. 3. Ensure that computers are not so near each other that they are subject to each other's re-circulated or preheated air. 4. If the computer is within an enclosure, ensure that there is proper intake and exhaust ventilation for the enclosure.
2200-PMM Allocation Error during MEBx Download	Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM.	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.	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.

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

Control panel message	Description	Recommended action
2202-PMM Deallocation Error during MEBx cleanup	Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM.	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.
2211-Memory not configured correctly for proper MEBx execution	SODIMM1 is not installed.	Make sure there is a memory module in the SODIMM1 socket and that it is properly seated.
2212-USB Key Provisioning failure writing to device	USB device used for USB key provisioning will not allow BIOS to update provision file properly.	1. Try a different USB key device for provisioning. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2217-ME Firmware Version request failure	ME firmware is not properly responding to BIOS query for version information.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2218-ME Firmware Version should be updated	ME firmware must be updated to match current functionality contained in the system BIOS.	1. Update to the latest ME firmware version. 2. If the error persists and system BIOS has been recently updated, restore previous system BIOS version. 3. If the error still persists, replace the system board.
2219-USB Key Provisioning file has invalid header identifier	Provisioning file contained on the USB key has been corrupted or is not a valid version for the current ME firmware.	1. Recreate the provisioning file using third party management console software. 2. If the error persists and system BIOS has been recently updated, restore previous system BIOS version. Otherwise, update the ME firmware version. 3. If the error still persists, replace the system board.

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

Control panel message	Description	Recommended action
2220-USB Key Provisioning file has mismatch version	Provisioning file contained on the USB key is not a valid version for the current ME firmware.	1. Reboot the computer. 2. If the error persists and system BIOS has been recently updated, restore previous system BIOS version. Otherwise, update the ME firmware version. 3. If the error still persists, replace the system board.
2230-General error during MEBx execution	Error occurred during MEBx execution which fails into the “General” grouping. Status information displayed along with the error provides further clarity into the failure. MEBx handles transference of information between the system BIOS and ME firmware.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2231-ME error during MEBx execution	Error occurred during MEBx execution which fails into “ME” grouping.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2232-AMT error during MEBx execution	Error occurred during MEBx execution which fails into “AMT” grouping.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2233-HECI error during MEBx execution	Error occurred during MEBx execution which fails into “MEI or HECI” grouping.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
Invalid Electronic Serial Number	Electronic serial number is missing.	Enter the correct serial number in Computer Setup.

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

Control panel message	Description	Recommended action
Network Server Mode Active and No Keyboard Attached	Keyboard failure while Network Server Mode enabled.	1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. 3. Ensure that none of the keys are depressed. 4. Replace keyboard.
Parity Check 2	Parity RAM failure or a PCI/PCIe device is asserting a SERR#.	Run Computer Setup and Diagnostic utilities. To disable a PCI/PCIe device from asserting a SERR#, run the Computer Setup utility and select **Advanced** > **Bus Options** > **SERR# Generation** > **Disable**.

Interpreting POST Diagnostic Front Panel LEDs and Audible Codes

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

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.

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.

Not all diagnostic lights and audible codes are available on all models.

Table A-2 Diagnostic Front Panel LEDs and Audible Codes

Activity	Beeps	Possible Cause	Recommended Action
Green Power LED On.	None	Computer on.	None
Green Power LED flashes every two seconds.	None	Computer in Suspend to RAM mode (some models only) or normal Suspend mode.	None required. Press any key or move the mouse to wake the computer.
Red Power LED flashes two times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	2	Thermal protection activated: Air flow is restricted, a fan may not be functioning, or the heatsink is not properly attached.	1. Clean the air vents on the front, back, or any other vented side of the computer. 2. Ensure that there is a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. 3. Ensure that computers are not so near each other that they are subject to each other's re-circulated or preheated air. 4. If the computer is within an enclosure, ensure that there is proper intake and exhaust ventilation for the enclosure. 5. If a message appears on the screen indicating that a fan is not working, replace the fan. 6. Ensure that the heat sink is properly attached.
Red Power LED flashes three times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	3	Processor not installed (not an indicator of bad processor).	1. Check to see that the processor is present. 2. Reseat the processor.

Table A-2 Diagnostic Front Panel LEDs and Audible Codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes four times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	4	Power failure (power supply is overloaded).	1. Open the hood and ensure the 4 or 6-wire power supply cable is seated into the connector on the system board. 2. 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. 3. Replace the power supply. 4. Replace the system board.
Red Power LED flashes five times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	5	Pre-video memory error.	**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. 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.
Red Power LED flashes six times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	6	Pre-video graphics error.	For systems with a graphics card: 1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board. For systems with integrated graphics, replace the system board.
Red Power LED flashes seven times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	7	System board failure (ROM detected failure prior to video).	Replace the system board.
Red Power LED flashes eight times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	8	Invalid ROM based on bad checksum.	1. Reflash the system ROM with the latest BIOS image. 2. Replace the system board.

Table A-2 Diagnostic Front Panel LEDs and Audible Codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes nine times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	9	System powers on but is unable to boot.	1. Unplug the AC power cord from the computer, wait 30 seconds, then plug the power cord back in to the computer. 2. Replace the system board. 3. Replace the processor.
Red Power LED flashes ten times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	10	Bad option card.	1. Check each option card by removing the card (one at a time if multiple cards), then power on the system to see if fault goes away. 2. Once a bad card is identified, remove and replace the bad option card. 3. Replace the system board.
Red Power LED flashes eleven times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	11	The current processor does not support a feature previously enabled on this system.	1. Install a TXT capable processor. 2. Disable TXT in the Computer Setup (F10) utility. 3. Reinstall the original processor.
System does not power on and LEDs are not flashing.	None	System unable to power on.	Press and hold the power button for less than 4 seconds. If the hard drive LED turns green, the power button is working correctly and the system board needs to be replaced. OR Press and hold the power button for less than 4 seconds. If the hard drive LED does not turn on green then: 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. It the problem persists, replace the power supply.

B 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.

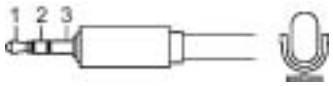
Ethernet BNC

Connector and Icon	Pin	Signal
	1	Data
	2	Ground

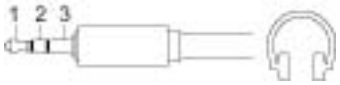
USB

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

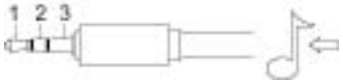
Microphone

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

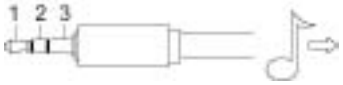
Headphone

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

C 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 mm_2 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, 0.75mm_2 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 mm_2 conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

Index