



Maintenance and Service Guide

HP Compaq nx8220 Notebook PC
HP Compaq nw8240 Notebook PC
HP Compaq nc8230 Notebook PC

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This guide is a troubleshooting reference used for maintaining and servicing the computer. It provides comprehensive information on identifying computer features, components, and spare parts; troubleshooting computer problems; and performing computer disassembly procedures.

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1

Product Description

The HP Compaq nx8220, nw8240, and nc8230 Notebook PCs offer advanced modularity, Intel® Pentium® M processors, and extensive multimedia support.



HP Compaq nx8220, nw8240, and nc8230 Notebook PCs

1.1 Features

- Intel Pentium M 2.13-, 2.00-, 1.86-, 1.73-, or 1.60-GHz processors, varying by computer model
- The following displays are available, varying by computer model:
 - 15.4-inch, UXGA, TFT (1600 × 1200) with over 16.8 million colors
 - 15.4-inch, WSXGA, TFT (1680 × 1050) with over 16.8 million colors
 - 15.4-inch, WXGA, TFT (1366 × 768) with over 16.8 million colors
- 80-, 60-, or 40-GB high-capacity hard drive, varying by computer model
- 256-MB DDR2 synchronous DRAM (SDRAM) at 400 and 533 MHz, expandable to 2.0 GB
- Microsoft® Windows® XP Home Edition or Windows XP Professional, varying by computer model
- Full-size Windows keyboard with embedded numeric keypad
- TouchPad and pointing stick pointing devices, including a dedicated vertical scroll region.
- Integrated 10Base-T/100Base-TX Ethernet local area network (LAN) network interface card (NIC) with RJ-45 jack
- Integrated high-speed 56K modem with RJ-11 jack
- Integrated wireless support for Mini PCI IEEE 802.11a/b and 802.11a/b/g WLAN device
- Support for one Type I or Type II PC Card slot, with support for both 32-bit (CardBus) and 16-bit PC Cards

- External 90-watt AC adapter with 3-wire power cord
 - 8-cell Li-Ion battery pack
 - Stereo speakers
 - Volume up, volume mute, and volume down buttons (full-featured models only)
-



Numerous references are made throughout this *Maintenance and Service Guide* to “full-featured” and “defeatured” units. A computer model is considered to be full-featured if it has 3 Universal Serial Bus ports and the following components:

- Volume control buttons
- Quick Launch buttons
- Infrared port
- SD Memory Card slot
- Serial port
- S-Video-out port
- Docking connector

A computer model is considered to be defeatured if it has only 2 Universal Serial Bus ports and none of the components listed above.

- Support for the following optical drives:
 - ❑ DVD-ROM drive
 - ❑ DVD+RW/R and CD-RW Combo Drive
 - ❑ DVD/CD-RW Combo Drive
- Connectors:
 - ❑ Infrared (full-featured models only)
 - ❑ Audio-out (headphone)
 - ❑ Audio-in (microphone)
 - ❑ Universal Serial Bus (USB) v. 2.0 (3 ports on full-featured computer models, 2 ports on defeatured computer models)
 - ❑ Serial port (full-featured models only)
 - ❑ Power
 - ❑ External monitor
 - ❑ RJ-45 (network)
 - ❑ RJ-11 (modem)
 - ❑ S-Video-out (full-featured models only)
 - ❑ IEEE 1394
 - ❑ PC Card
 - ❑ Smart card
 - ❑ SD Memory Card (full-featured models only)
 - ❑ Parallel port (full-featured models only)
 - ❑ Primary battery
 - ❑ Travel battery
 - ❑ Docking connector (full-featured models only)

1.2 Resetting the Computer

If the computer you are servicing has an unknown password, follow these steps to clear the password. These steps also clear CMOS:

1. Prepare the computer for disassembly (refer to [Section 6.3, “Preparing the Computer for Disassembly,”](#) for more information).
2. Remove the real-time clock (RTC) battery (refer to [Section 6.11, “RTC Battery,”](#) for more information on removing and replacing the RTC battery).
3. Wait approximately 5 minutes.
4. Replace the RTC battery and reassemble the computer.
5. Connect AC power to the computer. Do not reinsert any battery packs at this time.
6. Turn on the computer.

All passwords and all CMOS settings have been cleared.

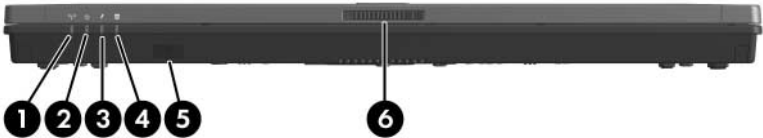
1.3 Power Management

The computer comes with power management features that extend battery operating time and conserve power. The computer supports the following power management features:

- Standby
- Hibernation
- Setting customization by the user
- Hotkeys for setting the level of performance
- Battery calibration
- Lid switch standby/resume
- Power button
- Advanced Configuration and Power Management (ACPM) compliance

1.4 External Components

The external components on the front of the computer are shown below and described in Table 1-1.



Front Components

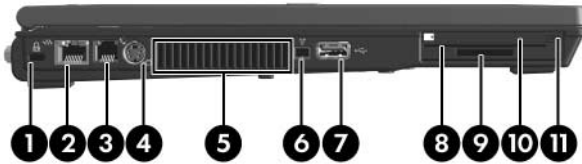
Table 1-1
Front Components

Item	Component	Function
1	Wireless light	On: an integrated wireless device (selected models only) has been turned on.
2	Power light	■ On: The computer is on. ■ Blinking: The computer is in standby mode.

Table 1-1
Front Components (Continued)

Item	Component	Function
3	Battery light	<ul style="list-style-type: none"> ■ Amber: A battery pack is charging. ■ Green: A battery pack is close to full charge capacity. ■ Blinking amber: A battery pack that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light blinks more quickly. ■ Off: If the computer is connected to external power, the light is turned off when all batteries in the computer are fully charged. If the computer is not connected to external power, the light is turned off until the battery reaches a low-battery condition.
4	Integrated Drive Electronics (IDE) drive light	On: A drive in the hard drive bay or MultiBay II is being accessed.
5	Infrared port (full-featured models only)	Provides wireless communication between the computer and an optional IrDA-compliant device.
6	Display release latch	Opens the computer.

The external components on the left side of the computer are shown below and described in Table 1-2.




Left-Side Components

Table 1-2

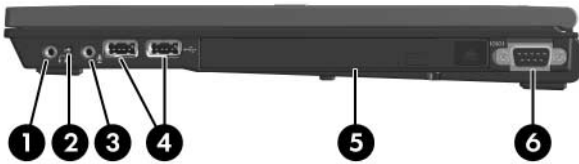
Left-Side Components

Item	Component	Function
1	Security cable slot	Attaches an optional security cable to the computer. △ Security solutions are designed to act as deterrents. These deterrents may not prevent a product from being mishandled or stolen.
2	RJ-45 (network) jack	Connects a network cable.
3	RJ-11 (modem) jack	Connects the modem cable.
4	S-Video-out jack (full-featured models only)	Is a 7-pin, dual-purpose jack. It connects an optional S-Video device, such as a television, VCR, camcorder, overhead projector, or video capture card with an optional, standard (4-pin) S-Video cable. The extra 3 pins also enable an optional S-Video-to-composite adapter to be used with the computer.

Table 1-2
Left-Side Components (Continued)

Item	Component	Function
5	Vent	<p>Enables airflow to cool internal components.</p> <p> To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows or thick rugs or clothing, to block airflow.</p>
6	1394 port (4 pin)	Connects an optional 4-pin 1394 device, such as a camcorder.
7	USB port	Connects USB 1.1- and 2.0-compliant devices to the computer using a standard USB cable, or connects an optional External MultiBay or External MultiBay II to the computer. The External MultiBay must be connected to an external power source.
8	Smart card reader	Accepts smart cards.
9	SD Memory Card slot	Accepts Secure Digital (SD) Memory Cards.
10	PC Card slot	Supports optional Type I or Type II PC Card.
11	PC Card eject button	Ejects PC Cards from the PC Card slot.

The external components on the right side of the computer are shown below and described in Table 1-3.



Right-Side Components

Table 1-3

Right-Side Components

Item	Component	Function
1	Audio-out (headphone) jack	Produces system sound when connected to optional powered stereo speakers, headphones, headset, or television audio.
2	Internal microphone	Records sound.
3	Audio-in (microphone) jack	Connects an optional monaural microphone.
4	USB ports (2) (full-featured models only)	Connect USB 1.1- and 2.0-compliant devices to the computer using a standard USB cable, or connects an optional External MultiBay or External MultiBay II to the computer. The External MultiBay must also be connected to an external power source.
5	MultiBay II	Holds an optional MultiBay II device.
6	Serial port (full-featured models only)	Connects an optional serial device.

The external components on the rear panel of the computer are shown below and described in Table 1-4.

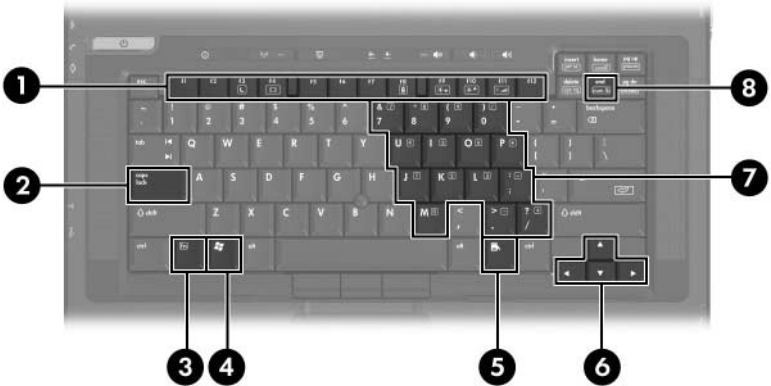


Rear Panel Components

Table 1-4
Rear Panel Components

Item	Component	Function
1	Primary battery bay	Holds the primary battery pack.
2	Power connector	Connects an AC adapter or an optional automobile or aircraft adapter.
3	External monitor port	Connects an optional external VGA monitor or projector.

The standard keyboard components of the computer are shown below and described in Table 1-5.



Standard Keyboard Components

Table 1-5
Standard Keyboard Components

Item	Component	Function
1	Function keys (f3 , f4 , f8–f11)	Execute frequently used system functions when pressed in combination with the fn key.
2	caps lock key	Enables caps lock and turns on the caps lock light.
3	fn key	Executes frequently used system functions when pressed in combination with a function key or the esc key.
4	Windows logo key	Displays the Windows Start menu.
5	Windows applications key	Displays a shortcut menu for items beneath the pointer.
6	Arrow keys	Moves the cursor around the screen.
7	Keypad keys (15)	Can be used like the keys on an external numeric keypad.
8	num lock key	Enables numeric lock, turns on the embedded numeric keypad, and turns on the num lock light.

The computer top components are shown below and described in Table 1-6.



Top Components, Part 1

Table 1-6
Top Components, Part 1


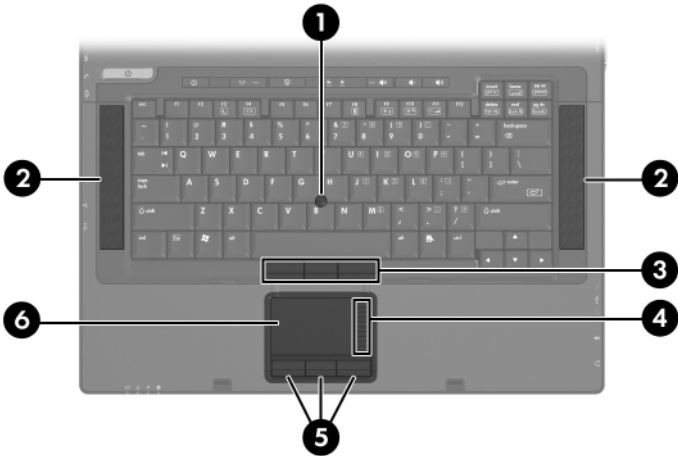
Item	Component	Function
1	Display lid switch	Initiates standby if the display is closed while the computer is turned on.
2	Power button	When the computer is: <ul style="list-style-type: none">■ Off, press to turn on the computer.■ On, briefly press to initiate hibernation.■ In standby, briefly press to resume from standby.■ In hibernation, briefly press to restore from hibernation. <p> If the system has stopped responding and Microsoft Windows shutdown procedures cannot be used, press and hold the power button for at least 4 seconds to turn off the computer.</p>

Table 1-6
Top Components, Part 1 (Continued)

Item	Component	Function
3	Info Center button	Enables you to view a list of commonly used software solutions.
4	Wireless button Wireless light	Enables and disables wireless LAN or Bluetooth® devices (select models only). On: A wireless LAN or Bluetooth device is hardware enabled.
5	Presentation mode button	Turns on Presentation mode.
6	Caps lock light	On: caps lock is on.
7	Num lock light	On: num lock or the numeric keypad is on.
8	Volume mute button (full-featured models only)	Turns off computer sound.
9	Volume down button (full-featured models only)	Decreases system sound.
10	Volume up button (full-featured models only)	Increases system sound.

The computer top components are continued below and described in Table 1-7.

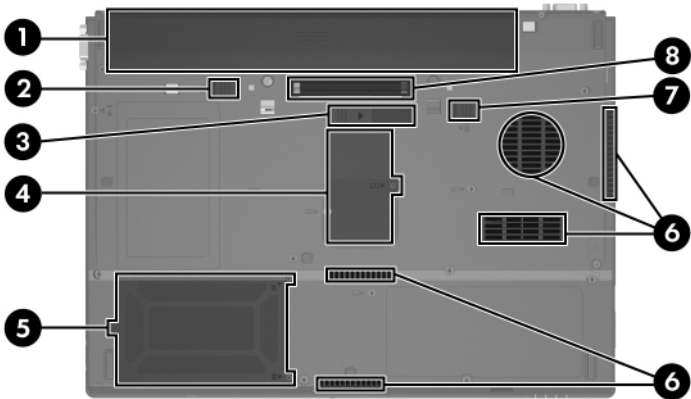


Top Components, Part 2

Table 1-7
Top Components, Part 2

Item	Component	Function
1	Pointing stick (select models only)	Moves the pointer and selects or activates items on the screen.
2	Speakers	Produce stereo sound.
3	Pointing stick buttons (select models only)	Function like the buttons on an external mouse.
4	TouchPad scroll zone	Scrolls up or down.
5	TouchPad buttons	Function like the buttons on an external mouse.
6	TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling, selecting, and double-clicking.

The external components on the bottom of the computer are shown below and described in Table 1-8.




Bottom Components

Table 1-8
Bottom Components

Item	Component	Function
1	Primary battery bay	Holds the primary battery pack.
2	Primary battery locking latch	Secures the primary battery pack into the battery bay. This latch must be set to unlock to release the battery.

Table 1-8
Bottom Components (Continued)

Item	Component	Function
3	Travel battery connector	Connects an optional travel battery.
4	Memory module compartment	Contains one memory module slot.
5	Hard drive bay	Holds the primary hard drive.
6	Vents (5)	Enable airflow to cool internal components.
		 To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows or thick rugs or clothing, to block airflow.
7	Primary battery release latch	Releases the primary battery pack from the battery bay. The primary battery locking latch must be in the unlocked position.
8	Docking connector (full-featured models only)	Connects the computer to an optional docking device.

1.5 Design Overview

This section presents a design overview of key parts and features of the computer. Refer to [Chapter 4, “Illustrated Parts Catalog,”](#) to identify replacement parts, and [Chapter 6, “Removal and Replacement Procedures,”](#) for disassembly steps.

The system board provides the following device connections:

- Audio
- Display
- Hard drive
- Intel Pentium M processors
- Keyboard
- Memory module
- Mini PCI communications devices
- PC Card
- Pointing stick
- TouchPad
- Trusted platform module (TPM) security module



CAUTION: To properly ventilate the computer, allow at least a 7.6-cm (3-inch) clearance on the left and right sides of the computer.

The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to be turned on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

Troubleshooting



WARNING: Only authorized technicians trained by HP should repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly-/module-level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indication of component replacement or printed wiring board modification may void any warranty or exchange allowances.

2.1 Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load. If the operating system is working, the computer restarts the operating system after you exit Computer Setup.



Pointing devices are not supported in Computer Setup; you must use the keyboard to navigate and make selections.

The menu tables later in this chapter provide an overview of Computer Setup options.

Accessing Computer Setup

The information and settings in Computer Setup are accessed from the **File**, **Security**, **Tools**, and **Advanced** menus.

1. Open Computer Setup by turning on or restarting the computer. Press **f10** while the F10 = Based Setup message is displayed in the lower-left corner of the screen.
 - To change the language, press **f2**.
 - To view navigation information, press **f1**.
 - To return to the Computer Setup menu, press **esc**.
2. Select the **File**, **Security**, **Tools**, or **Advanced** menu.
3. To exit Computer Setup, choose one of the following:
 - To exit without saving any changes, use the arrow keys to select **File > Ignore changes and exit**, and then follow the instructions on the screen.
 - To exit and save all the settings you have entered, use the arrow keys to select **File > Save changes and exit**, and then follow the instructions on the screen.

Your preferences are set when you exit Computer Setup and take effect when the computer restarts.

Computer Setup Defaults

To return all settings in Computer Setup to the values that were set at the factory:

1. Open Computer Setup by turning on or restarting the computer. Press **f10** while the F10 = Based Setup message is displayed in the lower-left corner of the screen.
 - To change the language, press **f2**.
 - To view navigation information, press **f1**.
2. Use the arrow keys to select **File > Restore defaults**.
3. Select the **Restore Defaults** check box.

4. To confirm the restoration, press **f10**.
5. Select **File > Save changes and exit**, and then follow the instructions on the screen.

When the computer restarts, the factory settings are restored, and any identification information you have entered is saved.




Selecting from the File Menu

Table 2-1
File Menu

Select	To Do This
System Information	<ul style="list-style-type: none"> ■ View identification information about the computer and any battery packs in the system. ■ View specification information about the processor, memory and cache size, video revision, keyboard controller version, and system ROM.
Save to floppy	Save system configuration settings to a diskette.
Restore from floppy	Restore system configuration settings from a diskette.
Restore defaults	Replace configuration settings in Computer Setup with factory default settings. (Identification information is retained.)
Ignore changes and exit	Cancel changes entered during the current session. Then exit and restart the computer.
Save changes and exit	Save changes entered during the current session. Then exit and restart the computer. The changes you save are in effect when the computer restarts.

Selecting from the Security Menu

Table 2-2
Security Menu

Select	To Do This
Administrator password	Enter, change, or delete an HP Administrator password.
Power-on password	Enter, change, or delete a power-on password.
Password options	<ul style="list-style-type: none"> ■ Enable/Disable stringent security. ■ Enable/Disable required password on restart.
DriveLock passwords	<p>Enable/disable DriveLock; change a DriveLock user or master password.</p> <p> DriveLock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.</p>
Smart Card security	<p>Enable/disable power-on support for smart cards.</p> <p> This feature is supported by select Smart Card readers only.</p>
Embedded security	<ul style="list-style-type: none"> ■ Enable/Disable the embedded security chip. ■ Restore embedded security chip to factory settings. ■ Enable/Disable power-on authentication support. ■ Enable/Disable automatic DriveLock. ■ Reset power-on authentication credential <p> Embedded Security settings are accessible only if the computer is equipped with an embedded security chip.</p>
Device security	<ul style="list-style-type: none"> ■ Enable/Disable devices in the system. ■ Enable NIC for inclusion in MultiBoot.
System IDs	Enter user-defined identification values.

Selecting from the Tools Menu

Table 2-3
Tools Menu

Select	To Do This
HDD Self Test options	Run a quick or comprehensive self-test on any hard drive in the system.
Battery Information	View information about any battery packs in the computer.
Memory Check	<ul style="list-style-type: none"> <li data-bbox="426 594 900 646">■ Run a self-test on memory modules in the computer. <li data-bbox="426 659 900 711">■ View information about memory modules installed in the computer.

Selecting from the Advanced Menu

Table 2-4
Advanced Menu

Select	To Do This
Language (ore press f2)	Change the Computer Setup language.
Boot options	<ul style="list-style-type: none"> ■ Enable/Disable MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system. ■ Set the boot order.
Device options	<ul style="list-style-type: none"> ■ Swap the functions of the fn key and left ctrl key. ■ Enable/Disable multiple pointing devices at startup. (To set the computer to support only a single, usually nonstandard, pointing device at startup, select Disable.) ■ Enable/Disable USB legacy support for a USB keyboard, mouse, and hub. When USB legacy support is enabled <ul style="list-style-type: none"> <input type="checkbox"/> A USB keyboard, mouse, and hub work even when a Windows operating system is not loaded. <input type="checkbox"/> The computer starts from a bootable hard drive, diskette drive diskette, or CD, CD-RW, or DVD inserted into a drive connected by a USB connector to the computer or to an optional docking device. ■ Select a parallel port mode: EPP (Enhanced Parallel Port), standard, bidirectional, or ECP (Enhanced Capabilities Port). ■ Enable/Disable all settings in the SpeedStep window. (When Disable is selected, the computer runs in Battery Optimized mode.)

2.2 Troubleshooting Flowcharts

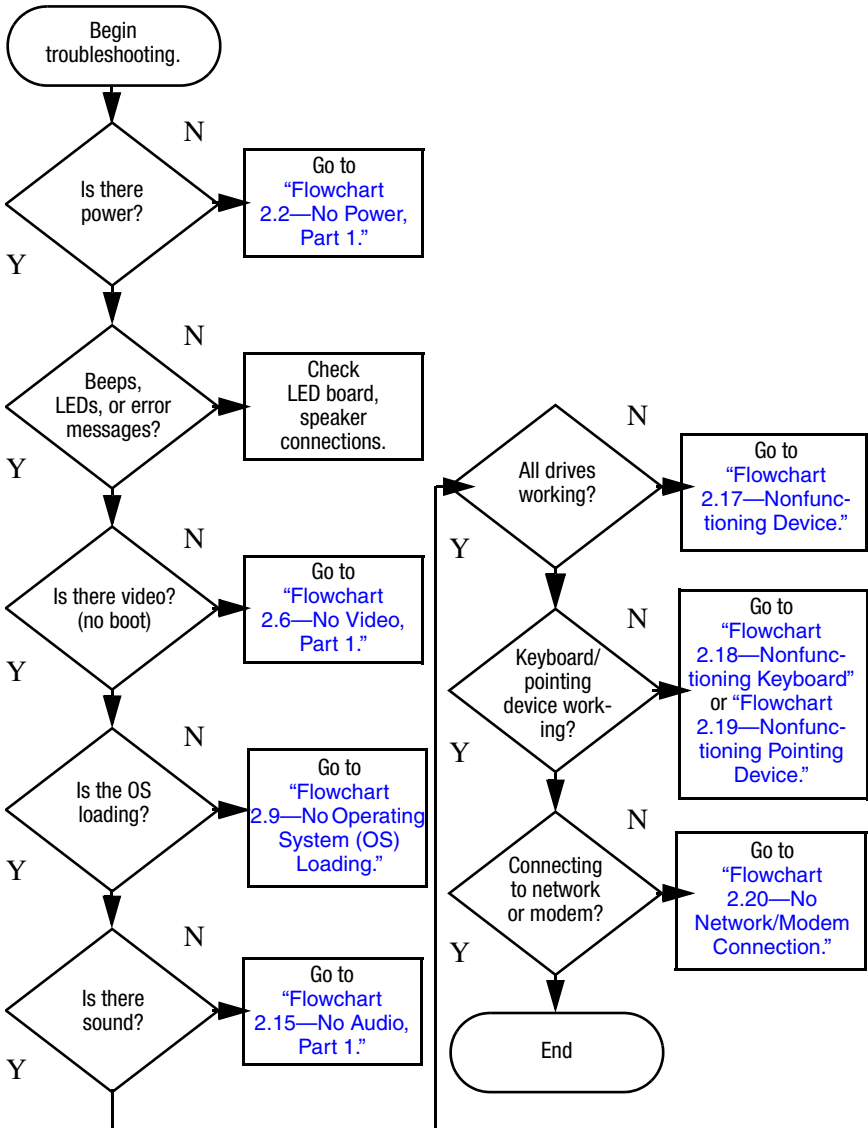
Table 2-5
Troubleshooting Flowcharts Overview

Flowchart	Description
2.1	"Flowchart 2.1—Initial Troubleshooting"
2.2	"Flowchart 2.2—No Power, Part 1"
2.3	"Flowchart 2.3—No Power, Part 2"
2.4	"Flowchart 2.4—No Power, Part 3"
2.5	"Flowchart 2.5—No Power, Part 4"
2.6	"Flowchart 2.6—No Video, Part 1"
2.7	"Flowchart 2.7—No Video, Part 2"
2.8	"Flowchart 2.8—Nonfunctioning Docking Device (if applicable)"
2.9	"Flowchart 2.9—No Operating System (OS) Loading"
2.10	"Flowchart 2.10—No OS Loading, Hard Drive, Part 1"
2.11	"Flowchart 2.11—No OS Loading, Hard Drive, Part 2"
2.12	"Flowchart 2.12—No OS Loading, Hard Drive, Part 3"
2.13	"Flowchart 2.13—No OS Loading, Diskette Drive"

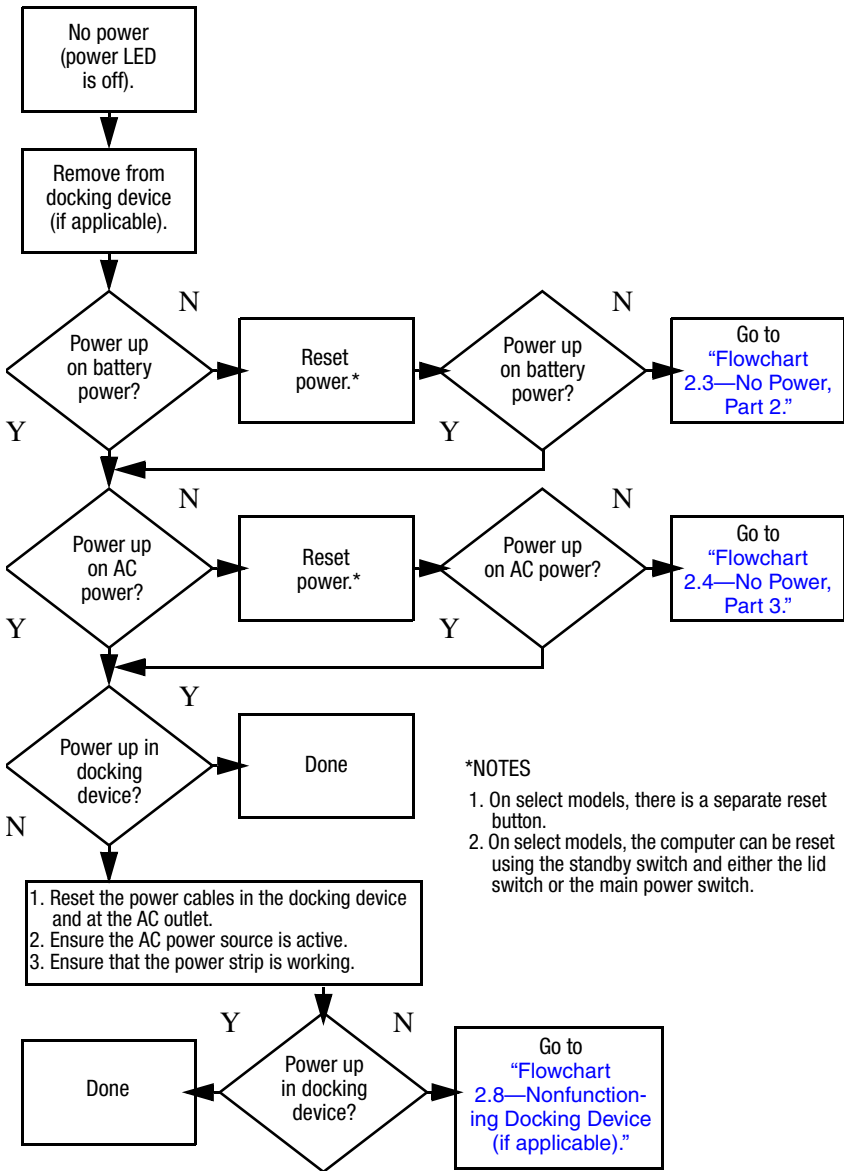
Table 2-5
Troubleshooting Flowcharts Overview (*Continued*)

Flowchart	Description
2.14	"Flowchart 2.14—No OS Loading, Optical Drive"
2.15	"Flowchart 2.15—No Audio, Part 1"
2.16	"Flowchart 2.16—No Audio, Part 2"
2.17	"Flowchart 2.17—Nonfunctioning Device"
2.18	"Flowchart 2.18—Nonfunctioning Keyboard"
2.19	"Flowchart 2.19—Nonfunctioning Pointing Device"
2.20	"Flowchart 2.20—No Network/Modem Connection"

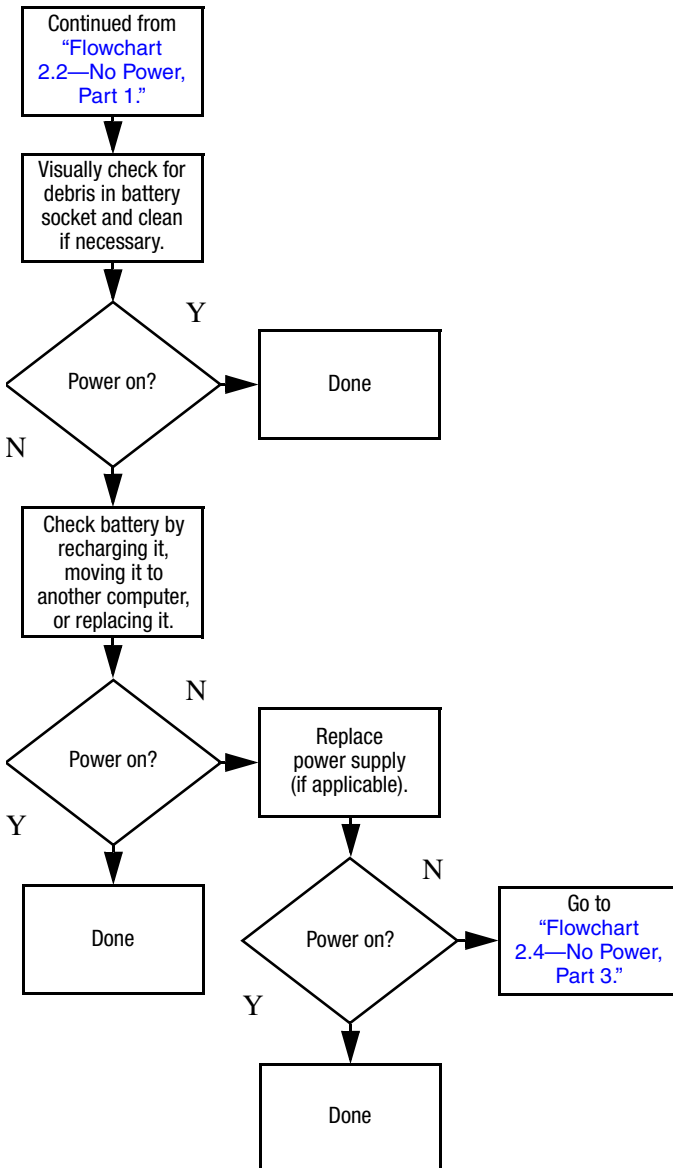
Flowchart 2.1 – Initial Troubleshooting



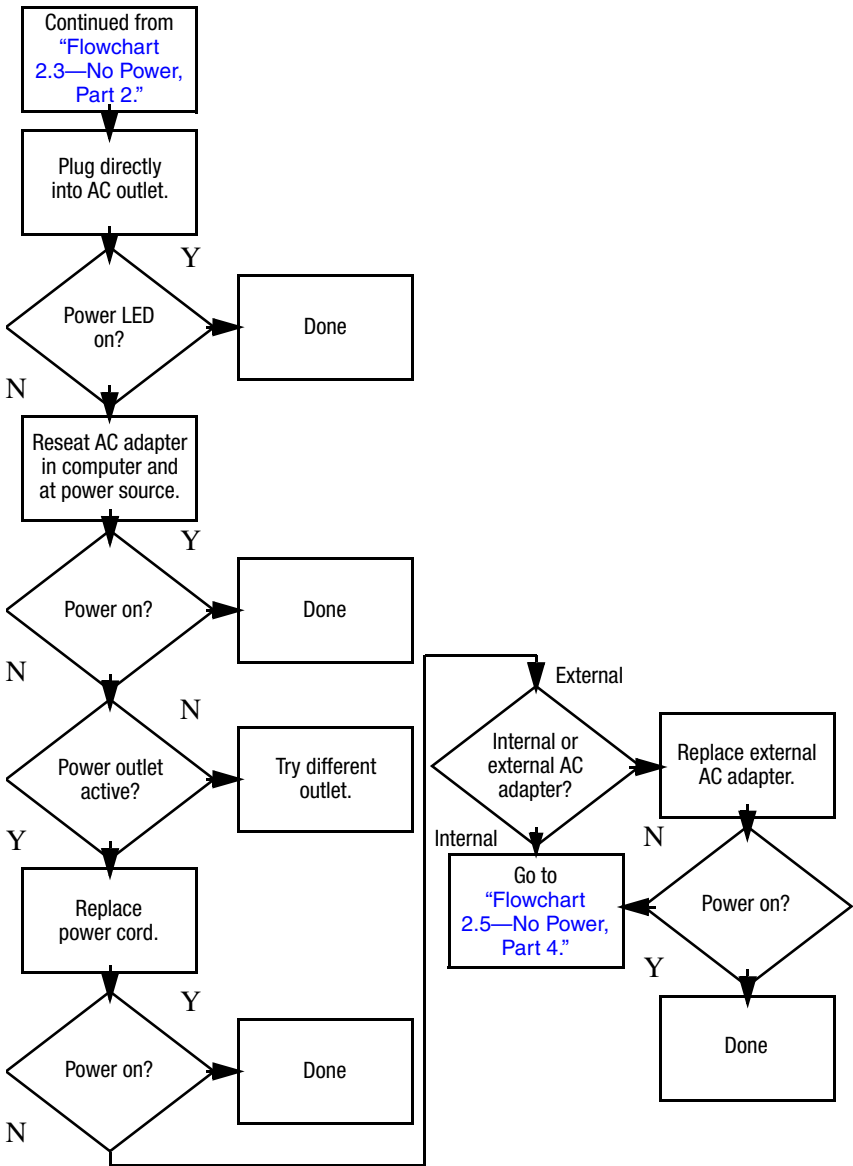
Flowchart 2.2—No Power, Part 1



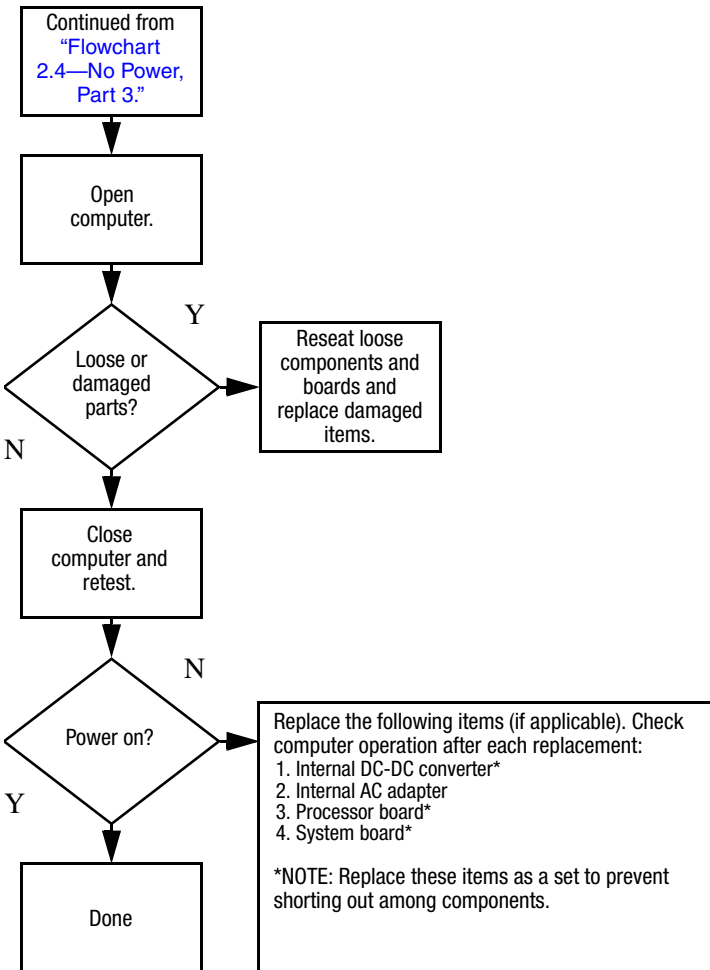
Flowchart 2.3—No Power, Part 2



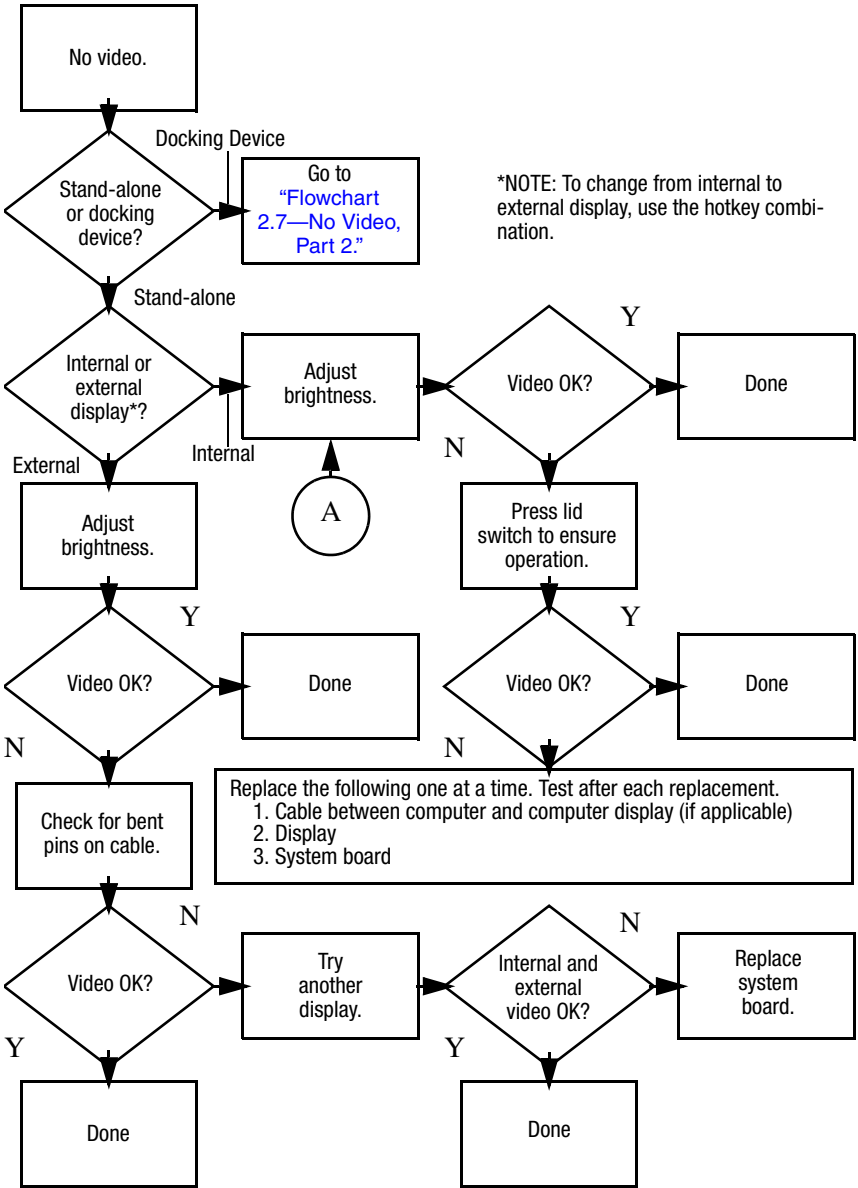
Flowchart 2.4—No Power, Part 3



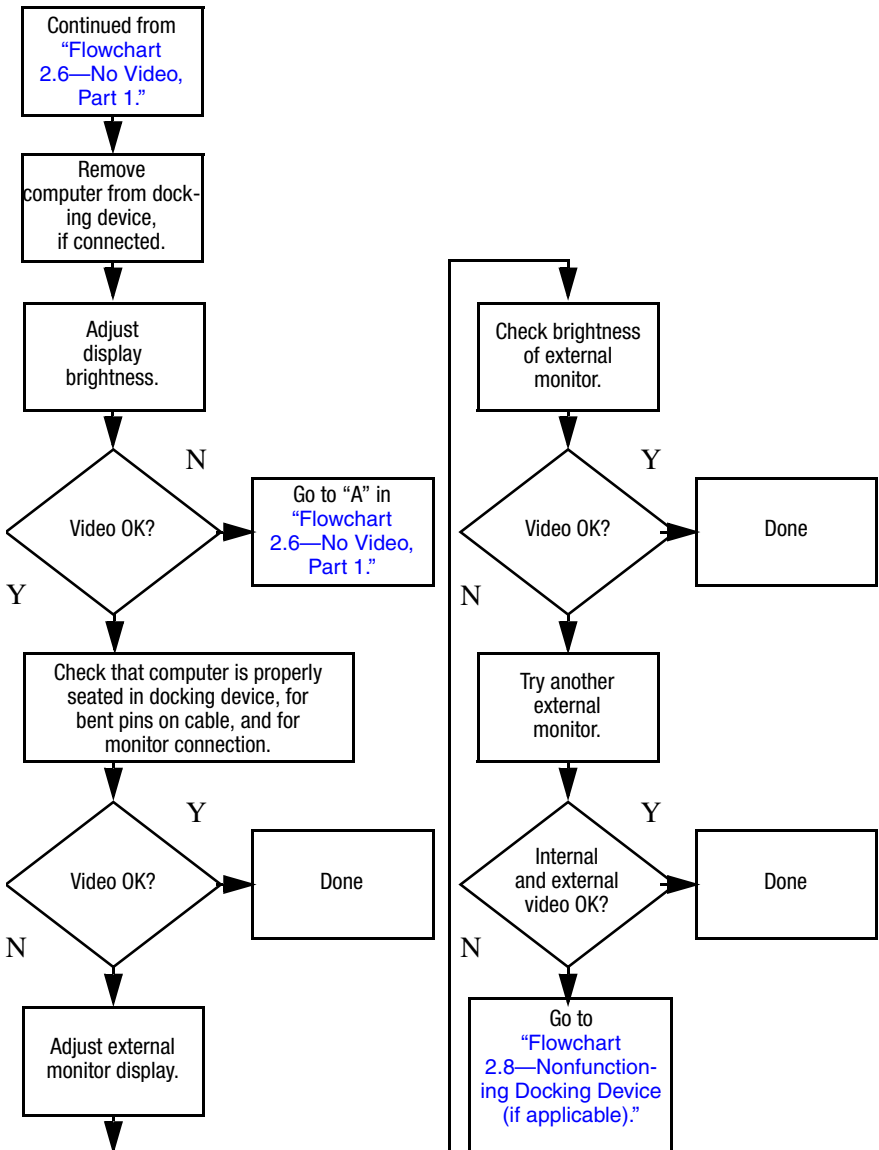
Flowchart 2.5—No Power, Part 4



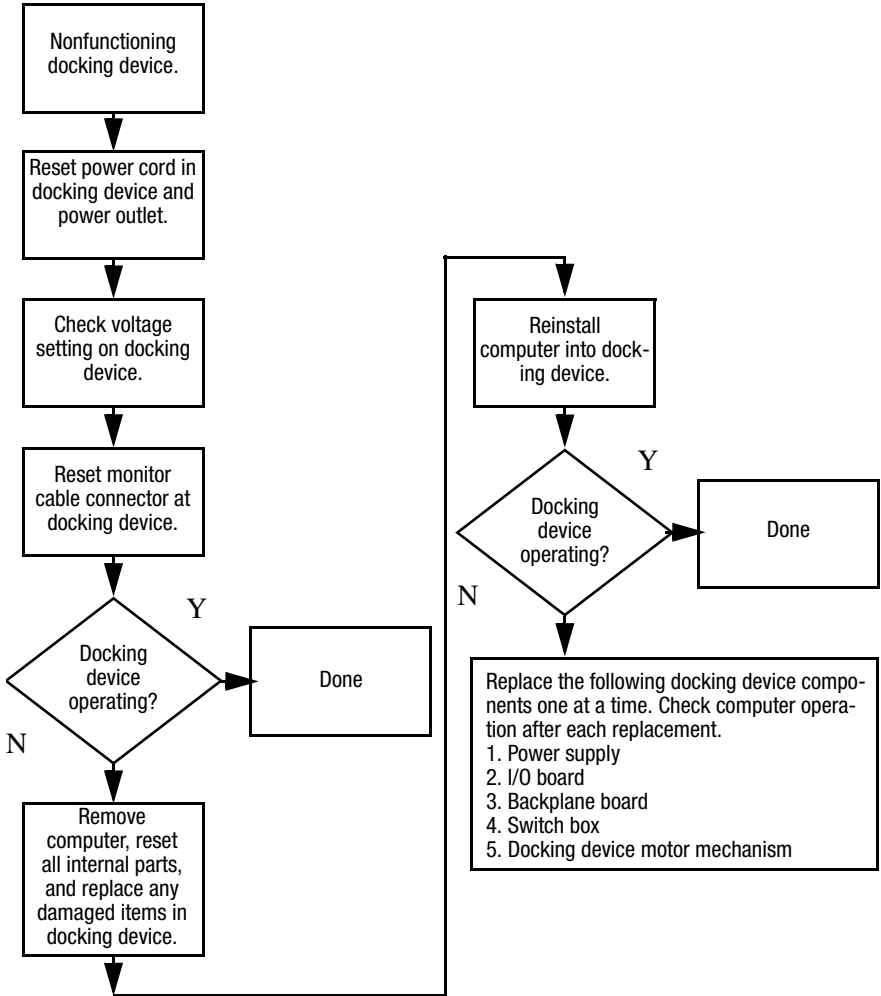
Flowchart 2.6—No Video, Part 1



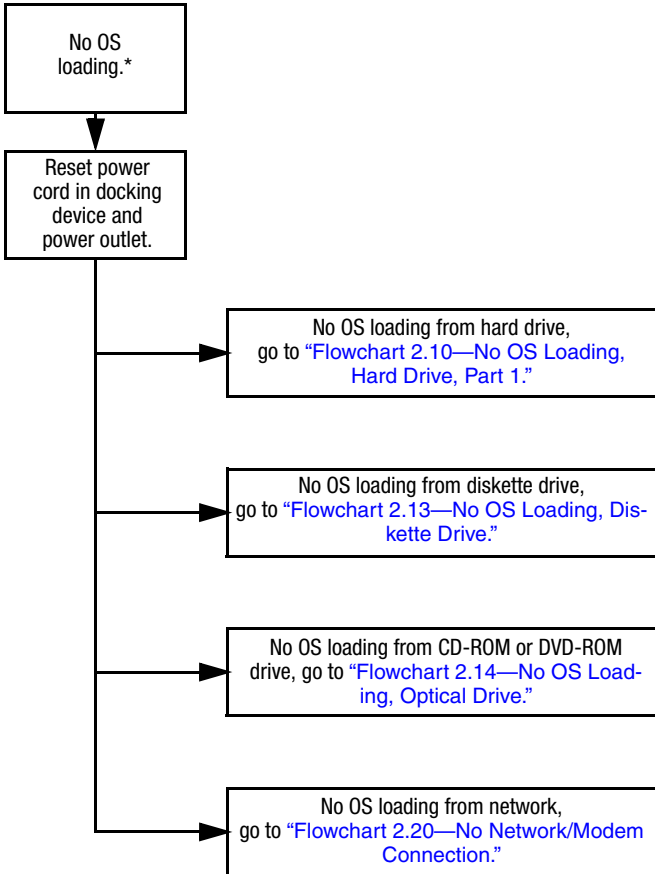
Flowchart 2.7—No Video, Part 2



Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

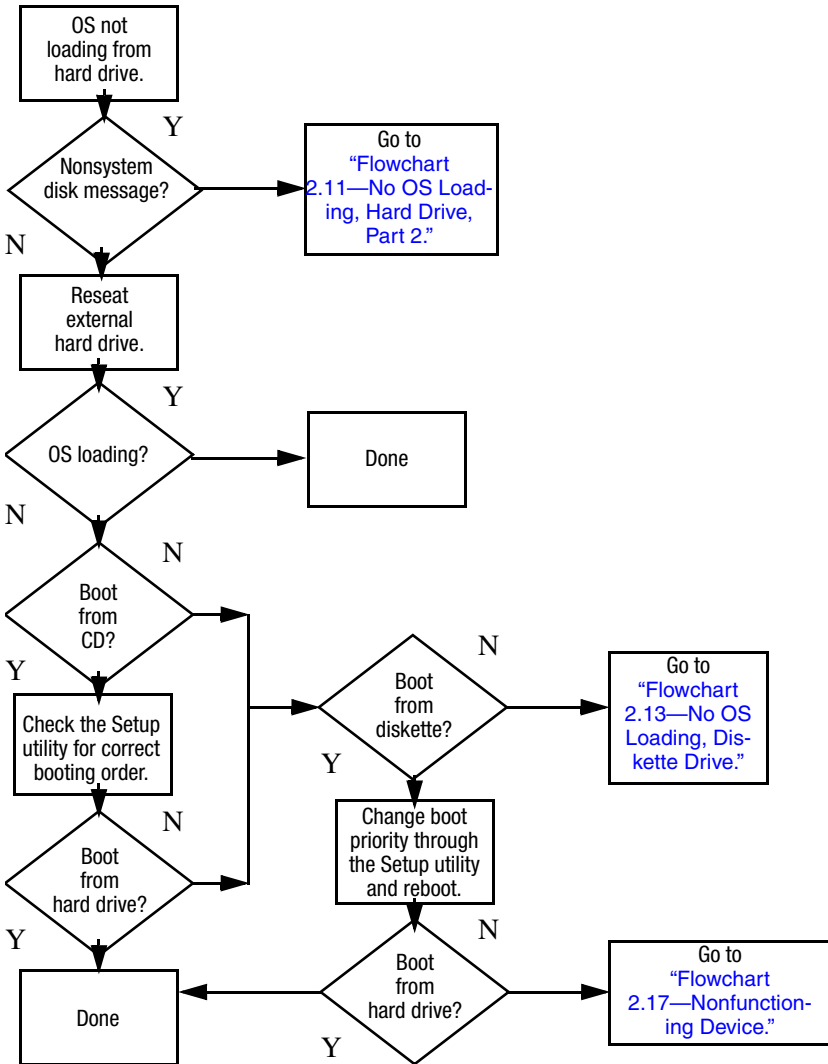


Flowchart 2.9—No Operating System (OS) Loading

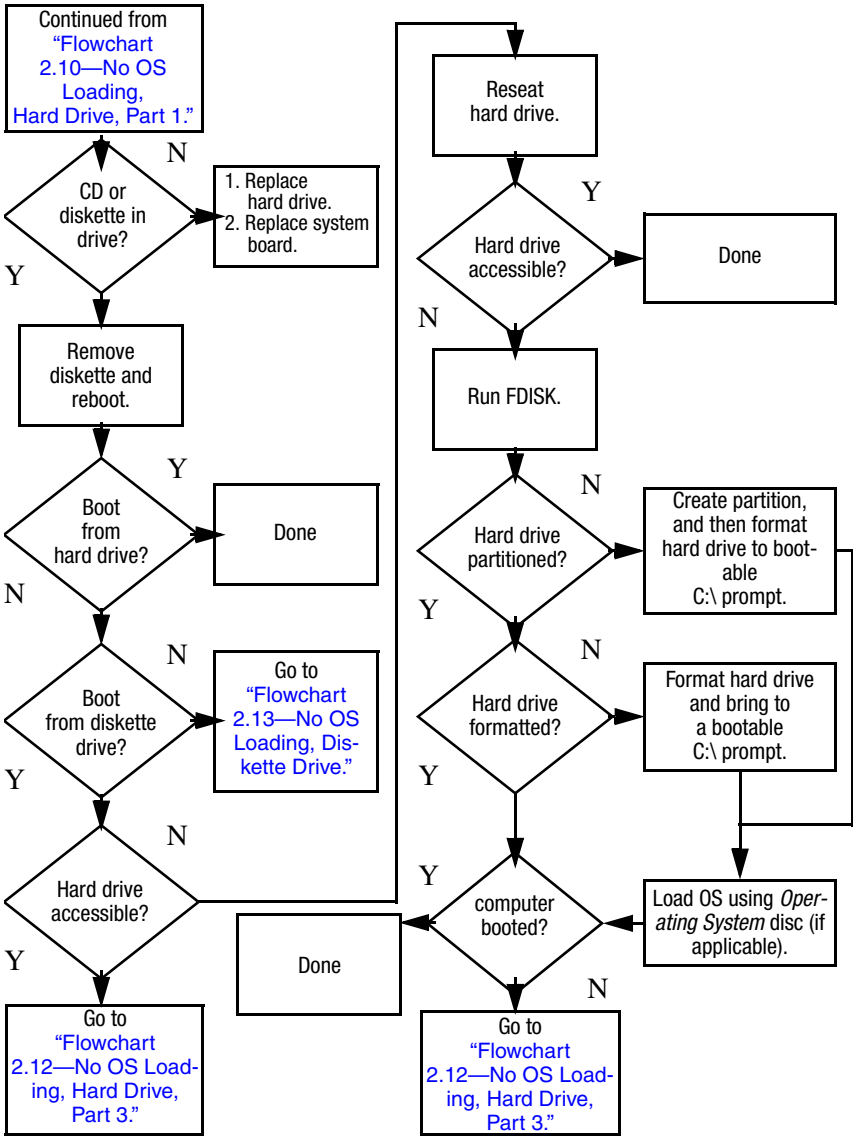


*NOTE: Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

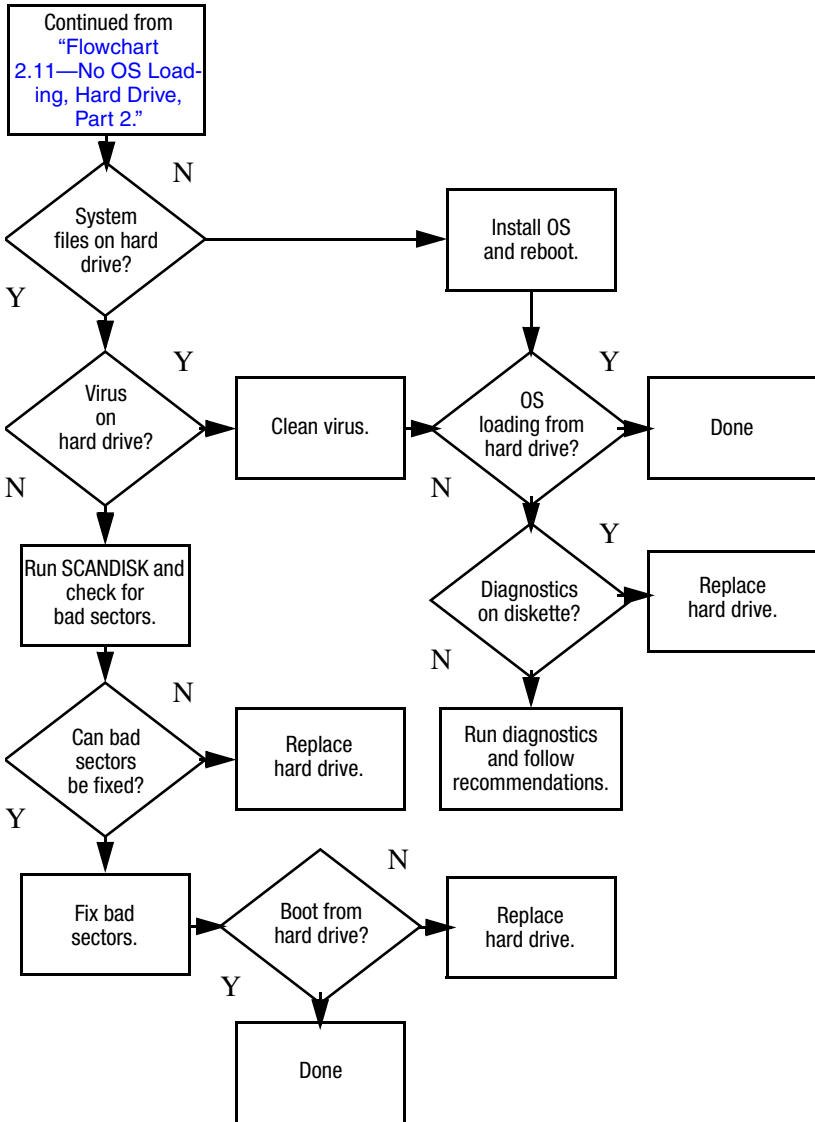
Flowchart 2.10—No OS Loading, Hard Drive, Part 1



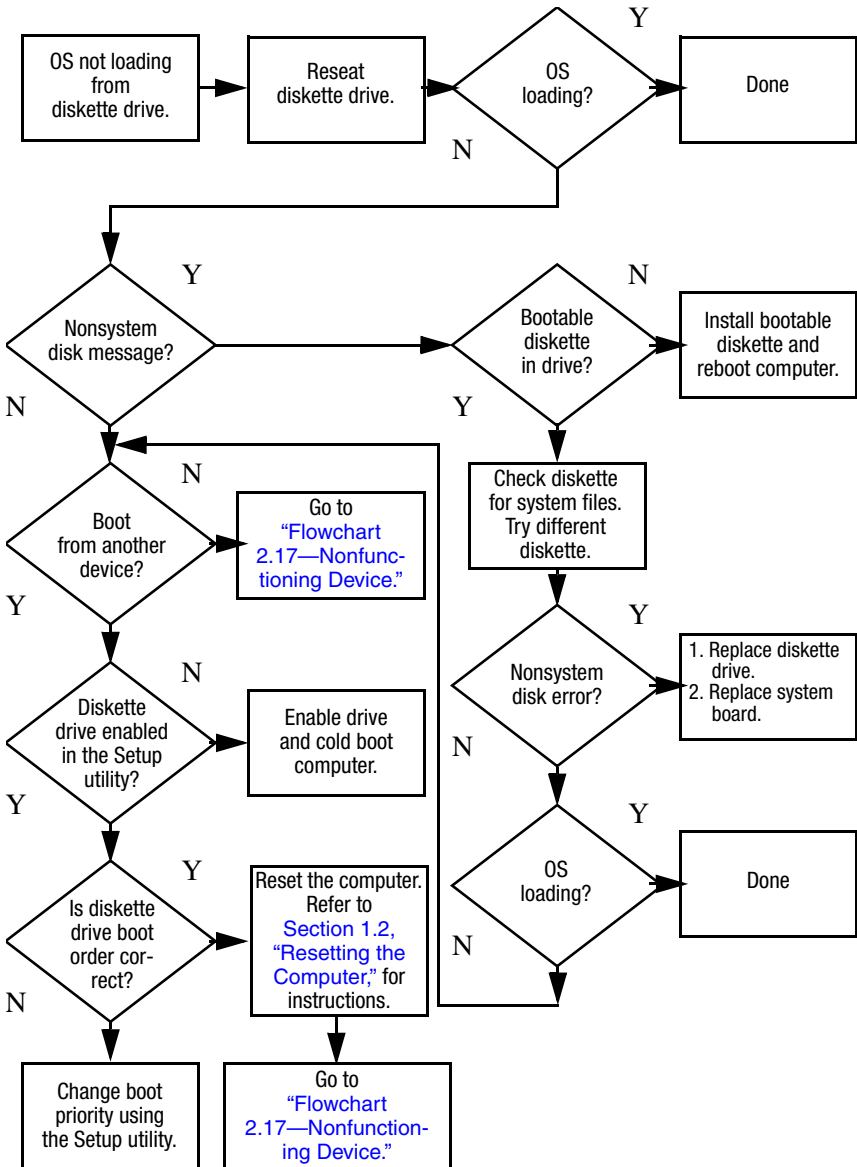
Flowchart 2.11 – No OS Loading, Hard Drive, Part 2



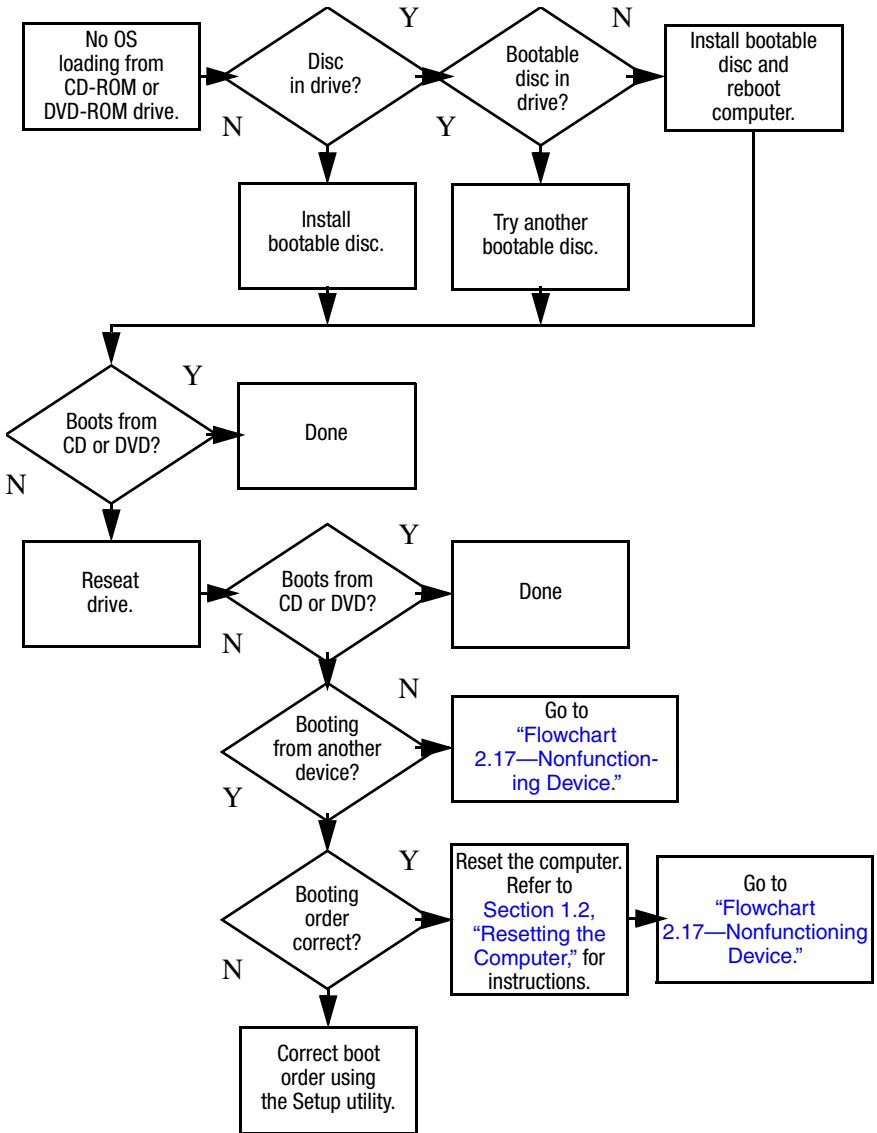
Flowchart 2.12—No OS Loading, Hard Drive, Part 3



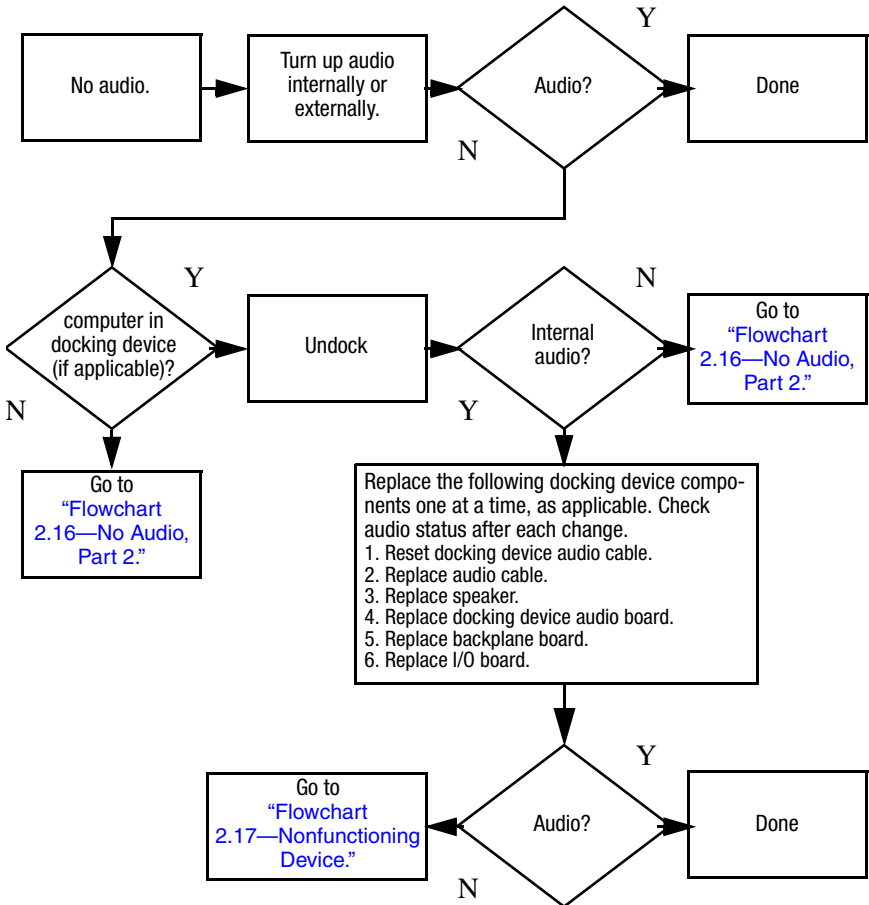
Flowchart 2.13—No OS Loading, Diskette Drive



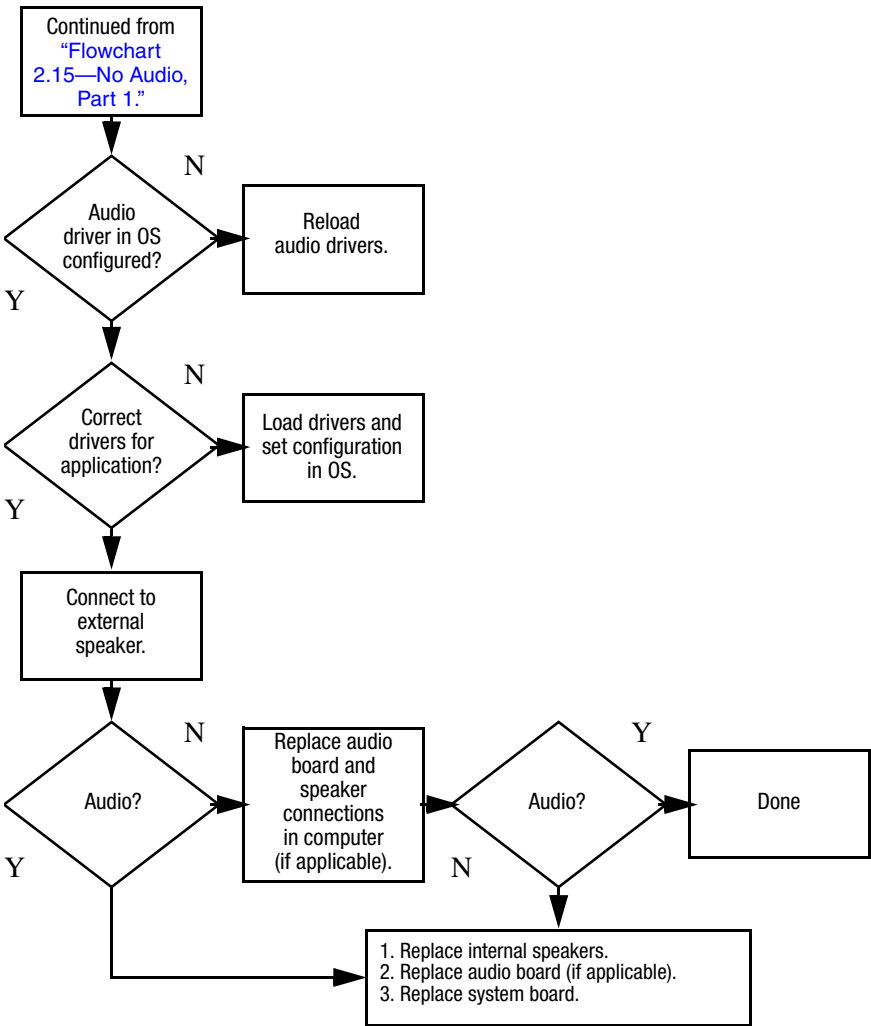
Flowchart 2.14—No OS Loading, Optical Drive



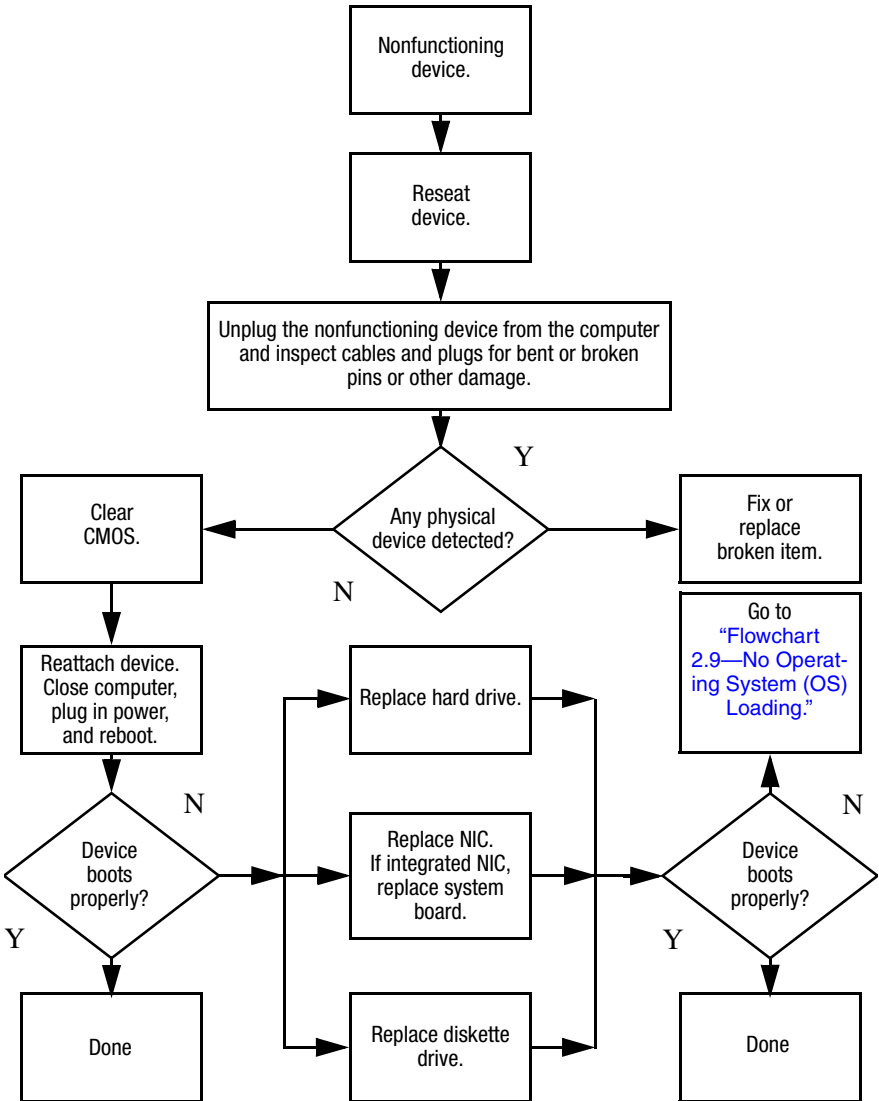
Flowchart 2.15—No Audio, Part 1



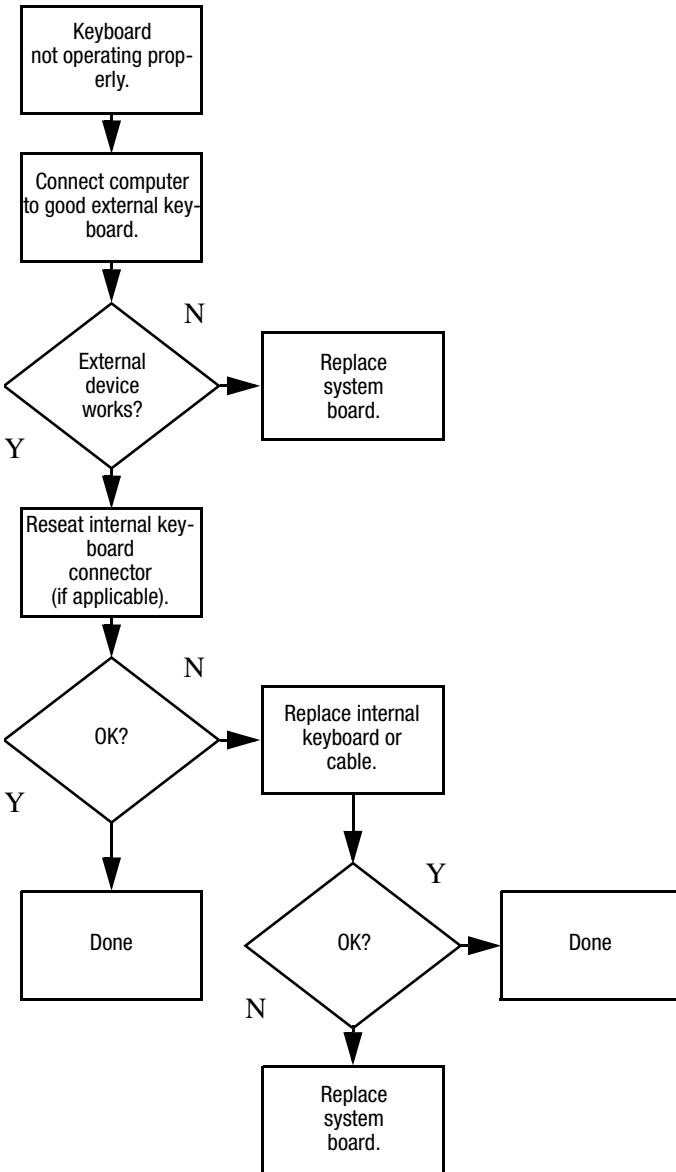
Flowchart 2.16—No Audio, Part 2



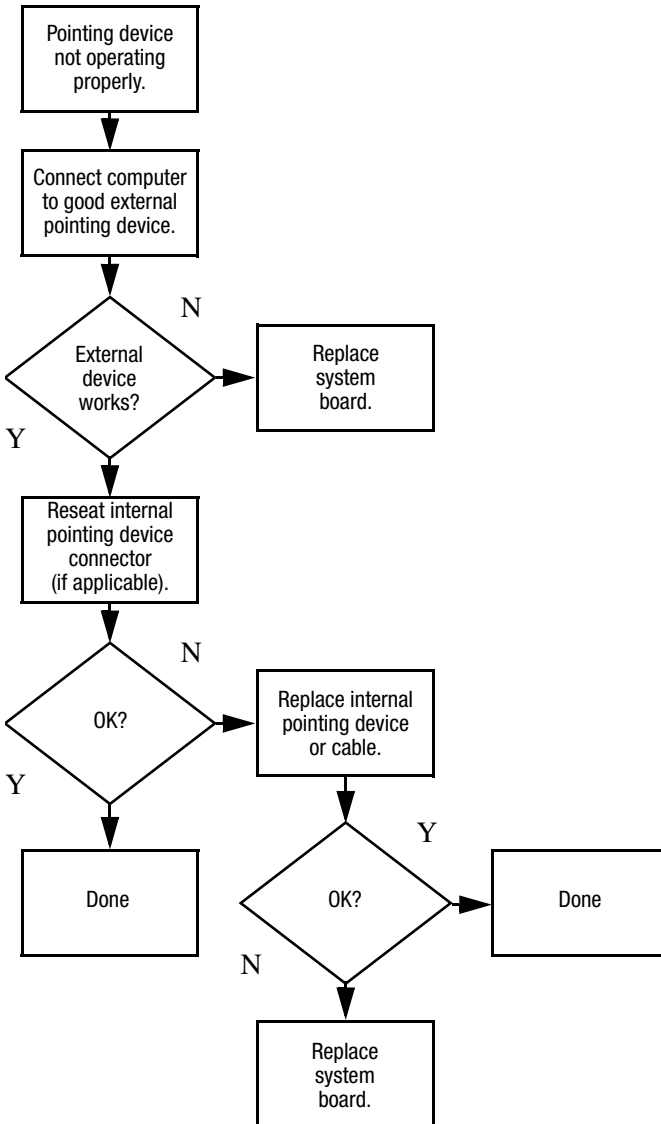
Flowchart 2.17—Nonfunctioning Device



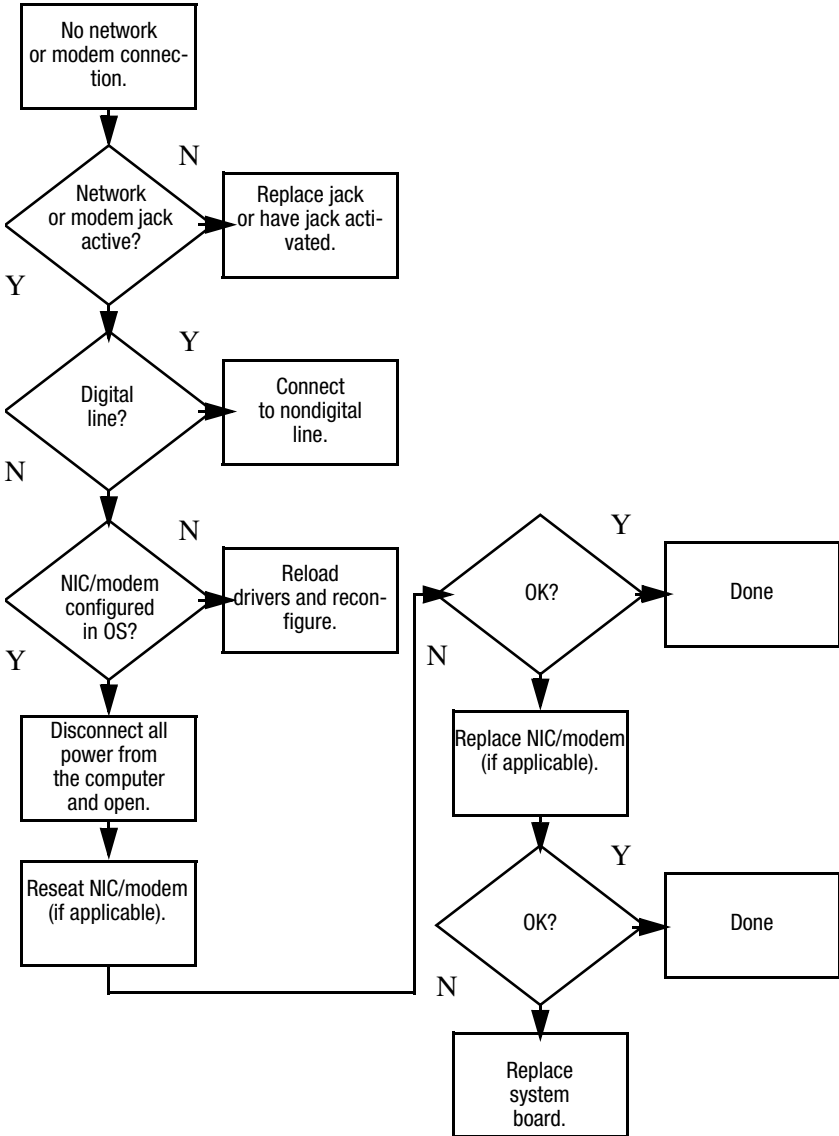
Flowchart 2.18—Nonfunctioning Keyboard



Flowchart 2.19—Nonfunctioning Pointing Device



Flowchart 2.20—No Network/Modem Connection



Software Update and Recovery

3.1 Software Updates

To stay current with the newest technology and maintain optimal performance, install the latest versions of HP software on your computer as they become available.

To update HP software:

1. Identify your computer model, product category, and series or family. Prepare for a system ROM update by identifying the ROM version currently installed on the computer. For more information, refer to “[Accessing Computer Information](#).”



CAUTION: If your computer is connected to a network, it is recommended that you consult with your network administrator before installing any software updates, especially system ROM updates.



The computer system ROM stores the BIOS software. The BIOS initializes the operating system, determines how the computer will interact with the hardware devices, and provides for data transfer among hardware devices, including the time and date.

2. Access the updates through the HP Web site by visiting <http://www.hp.com> or by obtaining the *Support Software CD* (purchased separately). For information about obtaining the *Support Software CD*, refer to “[Obtaining the Support Software CD](#).”
3. Install the updates.

Accessing Computer Information

Before you access the updates for your computer, collect the following information:

- The product *category* is Notebook.
- The product *family* name and *series* number are printed on the display bezel.
- *Model* information is provided on the serial number label on the bottom of the computer.

To determine whether available ROM updates contain later ROM versions than those currently installed on the computer, you need to know the version of the system ROM currently installed.

ROM version information (also known as ROM date and System BIOS) can be displayed by pressing **fn+esc** (if you are already in Microsoft Windows) or by opening Computer Setup.

To use Computer Setup for displaying ROM information:

1. Open Computer Setup by turning on or restarting the computer, and then pressing **f10** while the “F10 = ROM Based Setup” message is displayed in the lower-left corner of the screen.
2. Use the arrow keys to select **File > System Information**, and then press **enter**.
ROM date information is displayed.
3. To exit Computer Setup, use the arrow keys to select **File > Ignore changes and exit**. Then follow the instructions on the screen.

Obtaining the Support Software CD

The *Support Software* CD provides HP software updates and installation instructions. The CD includes device drivers, ROM updates, and utilities.

To purchase the current *Support Software* CD or a subscription that provides both the current version and future versions of the CD, visit the HP Web site at <http://www.hp.com>.

Software Updates and the HP Web Site

Most software on the HP Web site is packaged in compressed files called *SoftPaqs*. Some ROM updates may be packaged in compressed files called *ROMPaqs*.

Most download packages contain a file named *Readme.txt*. A *Readme.txt* file contains information regarding installing and troubleshooting the file. The *Readme.txt* files included with *ROMPaqs* are provided in English only.


Downloading a ROM Update



CAUTION: To prevent damage to the computer or an unsuccessful installation, download and install a ROM update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a ROM update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation:

- Do not disconnect power from the computer by unplugging the power cord from the AC outlet.
 - Do not shut down the computer or initiate standby or hibernation.
 - Do not insert, remove, connect, or disconnect any device, cable, or cord.
-

To download a ROM update:

1. Access the page on the HP Web site that provides software for your computer:
 - ❑ Select **Start > Help and Support**, and then click a software update link.
 - or –
 - ❑ Visit the HP Web site at <http://www.hp.com/support>.
2. Follow the instructions on the screen to identify your computer and access the ROM update you want to download.
3. At the download area:
 - a. Identify the ROM update that is later than the ROM version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the instructions on the screen to download your selection to the hard drive.
 -  Make a note of the path to the location on your hard drive to which the ROM package will be downloaded. You may need to access the ROM package after it has been downloaded.

Installing a ROM Update



If your computer is connected to a network, it is recommended that you consult with your network administrator before installing any software updates, especially system ROM updates.

ROM installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed:

1. Open Windows Explorer by selecting **Start > All Programs > Accessories > Windows Explorer**.
2. In the left pane of the Windows Explorer window:
 - a. Click **My Computer** and then your hard drive designation. (The hard drive designation is typically Local Disk C.)
 - b. Open the folder on your hard drive that contains the update.



Follow the path you made a note of before you downloaded the update.

3. Double-click the file with an .exe extension (for example, filename.exe).

The ROM installation begins.

4. Complete the installation by following the instructions on the screen.




After a message on the screen reports a successful installation, you may delete the downloaded file from your hard drive.

Downloading Other Software


To download and install software other than a ROM update:

1. Access the page on the HP Web site that provides software for your computer:
 - ❑ Select **Start > Help and Support**, and then click a software update link.
- or –
- ❑ Visit the HP Web site at <http://www.hp.com/support> and click **Download drivers and software** to download the software for your computer model.

2. Follow the instructions on the screen to find the software you want to update.
3. At the download area, select the software you want and follow the download instructions on the Web page.

 Make a note of the path to the location on your hard drive to which the ROM package will be downloaded. You may need to access the ROM package after it has been downloaded.

4. When the download is complete, open Windows Explorer by selecting **Start > All Programs > Accessories > Windows Explorer**.
5. In the left pane of the **Windows Explorer** window, click **My Computer** and then your hard drive designation. (The hard drive designation is typically Local Disk C.)

 Follow the path you made a note of earlier to the folder on your hard drive that contains the update.

6. Open the folder and double-click the file with an .exe extension (for example, filename.exe).
The installation begins.
7. Complete the installation by following the instructions on the screen.



After a message on the screen reports a successful installation, you may delete the download package from your hard drive.

3.2 System Recovery

The computer system recovery process provides several ways to recover optimal system functionality. For best results, attempt to recover optimal computer functionality by using the following procedures *in the order described here*.

Safeguarding Your Data

Software or devices added to the computer can cause your system to become unstable. To safeguard your documents, store personal files in the My Documents folder and periodically create a backup copy of the My Documents folder.

Using Altiris Local Recovery

Altiris Local Recovery is a preloaded application that protects the files on your computer by storing copies of files, called *snapshots*. If files on your computer are accidentally deleted or corrupted, you can easily restore the files yourself. You can also restore your complete file system to a previous state.

Altiris Local Recovery provides protection of files by backing up files to a hidden Altiris recovery partition. When you install the software, the Recovery Agent Partition Wizard guides you through the process of creating the recovery partition. After the partition is created, the computer restarts and creates the first snapshot. After the snapshot is created, the computer restarts, making the snapshot available for recovery through Windows.

By default, Local Recovery automatically takes snapshots of your files on a regular basis. You can change the snapshot schedule. For more information, refer to the Altiris Local Recovery Help.

To access your snapshots in the Altiris Recovery Agent folder:

1. Right-click the Altiris Recovery Agent icon on your desktop.
2. Click **Open**.

To restore one of the listed snapshots, drag the snapshot file to the appropriate location on your hard drive.

For more information on configuring and using Altiris Local Recovery, visit the HP Web site at <http://www.hp.com/go/easydeploy>, or open the software and click **Help** on the menu bar.

Using System Restore Points

System Restore is a Windows operating system feature that allows you to reverse undesirable changes to your computer by restoring the computer to an earlier state, called a *restore point*. A restore point is a “snapshot” of your software, drivers, and operating system files at a particular time. The computer automatically creates restore points at regular intervals and may create additional restore points when you change your personal settings or add software or hardware.

You can manually create additional restore points to provide increased protection for your system files and settings. It is recommended that you manually create restore points

- Before you add or extensively modify software or hardware.
- Periodically, whenever the system is performing optimally.

Restoring to any restore point does not affect your data files. For example, restoring your system software to an earlier state will not affect documents or e-mails that you saved after that time.



If you do not like the results of your restoration, you can reverse the restoration.

Creating a System Restore Point

To create a system restore point:

1. Select **Start > Help and Support**.
2. Click **System Restore**.

The System Restore window opens.

3. Click **Create a restore point**, and then click **Next**.
4. Follow the on-screen instructions.

Restoring to a Restore Point

To restore the computer to a previous date and time when it was functioning optimally:

1. Select **Start > Help and Support**.
2. Click **System Restore**.
The System Restore window opens.
3. Click **Restore my computer to an earlier time**, and then click **Next**.
4. Follow the on-screen instructions.

Reinstalling Applications

Applications preinstalled or preloaded on your computer can be reinstalled by using the *Recovery* disc or a third-party software disc.



In most cases, the applications preloaded on your computer, such as those available in the Software Setup utility, can be reinstalled from your hard drive. To access the Software Setup utility, select **Start > All Programs > Software Setup**.

The application reinstallation process replaces corrupted system files within the application and reinstalls deleted system files within the application.

- In most cases: If the application you are reinstalling is still installed on your computer, the reinstallation process does not affect your settings within the application.
- In all cases: If an application has been deleted from your computer, the reinstallation process reinstalls the application or utility to the factory image but cannot restore your personal settings.

Reinstalling Applications from the Hard Drive

To reinstall a preloaded application or utility from your hard drive:

1. Select **Start > All Programs > Software Setup**, and then follow the instructions on the screen.
2. When you are prompted to select the software you want to reinstall, select or clear the appropriate check boxes.

Reinstalling Applications from Discs

To reinstall applications from discs:

1. Insert the disc into the optical drive.
 - If autorun is enabled, an installation wizard opens.
 - If autorun is disabled, select **Start > Run**. Enter
`x:\setup.exe`
where *x* is your optical drive designation
and then select **OK**.
2. When the installation wizard opens, follow the installation instructions on the screen.
3. Restart the computer if prompted.

Repairing the Operating System

To attempt an operating system repair without deleting your personal data, use the *Operating System* disc that was shipped with the computer:



If your computer does not have an internal optical drive, connect an optional external optical drive.

1. Connect the computer to external power through the AC adapter and turn on the computer.
2. Immediately insert the *Operating System* disc into the computer.
3. Press and hold the power button for at least 5 seconds to turn off the computer.
4. Press the power button again to turn on the computer.
5. When prompted, press any key to start from the disc.

After a few minutes, you may need to select your language, and then the Setup Wizard opens.



On the “Welcome to Setup” page, do not press **R** (step 8 in this procedure) until you have completed steps 6 and 7.

6. Press **enter** to continue.

A licensing agreement page is displayed.

7. Press **f8** to accept the agreement and continue.

The “Setup” page is displayed.

8. Press **R** to repair the selected Windows installation.

The repair process begins. This process takes 1 to 2 hours to complete.

The computer restarts in Windows after the process is complete.

Reinstalling the Operating System



CAUTION: To protect your personal data and the software installed on the computer, back up your data before reinstalling the operating system. See the Windows online Help utility to learn more about backing up your files. Select **Start > Help and Support**. Then type "backup" in the Search box.

If other recovery efforts do not successfully repair the operating system, you can reinstall it.

To reinstall the operating system:




During the reinstallation, you may be prompted for your Product Key. Your Product Key is provided on the Microsoft Certificate of Authenticity label on the bottom of the computer.



If your computer does not have an internal optical drive, connect an optional external optical drive.

1. Connect the computer to external power through the AC adapter and turn on the computer.
2. Immediately insert the *Operating System* disc into the computer.
3. Press and hold the power button for at least 5 seconds to turn off the computer.

4. Press the power button again to turn on the computer.
5. When prompted, press any key to start from the disc.
After a few minutes, you may need to select your language, and then the Setup Wizard opens.
6. Press **enter** to continue.
A licensing agreement page is displayed.
7. Press **f8** to accept the agreement and continue.
The “Setup” page is displayed.
8. Press **esc** to continue installing a new copy of the operating system instead of repairing it.
9. Press **enter** to set up the operating system.
10. Press **C** to continue setup using this partition.
11. Select **Format the partition using the NTFS file system (Quick)**, and then press **enter**.

 Formatting this drive deletes all current files.


12. Press **F** to format the drive.
The reinstallation process begins. This process takes 1 to 2 hours to complete.
The computer restarts in Windows when the process is complete.

Reinstalling Device Drivers and Other Software

After the operating system installation process is complete, you must reinstall drivers.

To reinstall drivers, use the *Recovery* disc included with the computer:

1. While running Windows, insert the *Recovery* disc into the optical drive.

 If your computer does not have an internal optical drive, connect an optional external optical drive.

2. If you do not have autorun enabled:

- a. Select **Start > Run**.

- b. Then type `D:\SWSETUP\APPINSTL\SETUP.EXE`

where *D* indicates the optical drive.

3. Follow the on-screen instructions for installing the drivers.

After the drivers are reinstalled, you must reinstall any software you added to the computer. Follow the installation instructions provided with the software.

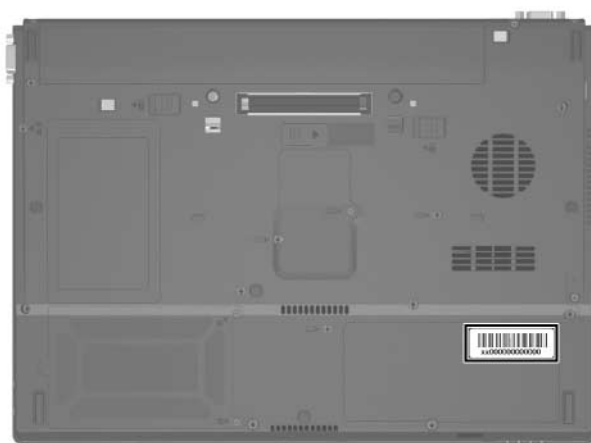
4

Illustrated Parts Catalog

This chapter provides an illustrated parts breakdown and a reference for spare part numbers.

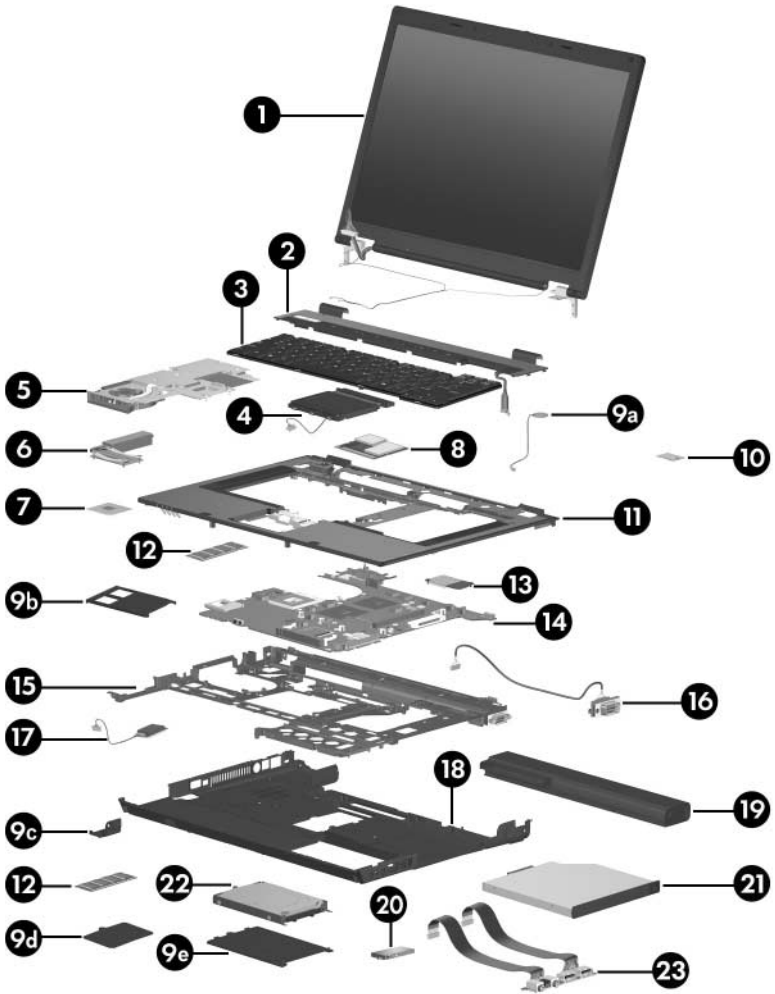
4.1 Serial Number Location

When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of the computer.



Serial Number Location

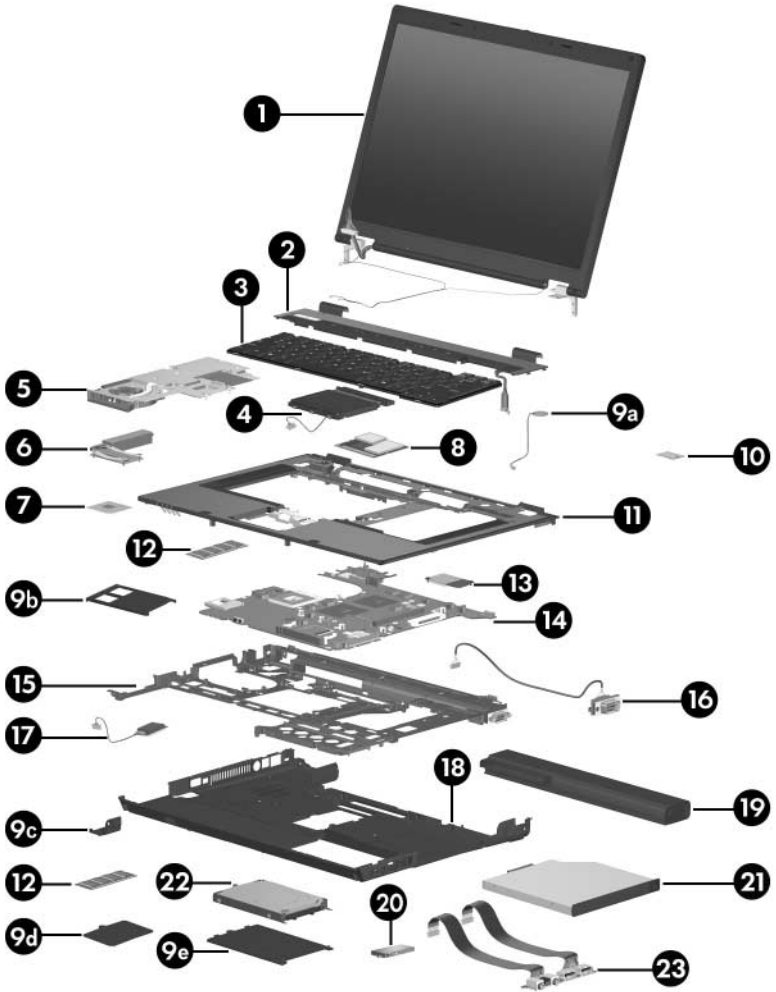
4.2 Computer Major Components



Computer Major Components

Table 4-1
Spare Parts: Computer Major Components

Item	Description	Spare Part Number		
1	Display assemblies (include wireless antenna boards and cables)			
	15.4-inch, WSXGA, TFT	382684-001		
	15.4-inch, WXGA, TFT	382682-001		
	15.4-inch, UXGA, TFT	382683-001		
2	Switch covers (include LED board and LED board cable)			
	For use only with HP Compaq nw8240 and nc8230 models	382680-001		
	For use only with HP Compaq nx8220 models	384133-001		
3	Keyboards, with pointing stick			
	Belgium	378203-181	Latin America	378203-161
	Brazil	378203-201	Norway	378203-091
	Czech Republic	378203-221	Portugal	378203-131
	Denmark	378203-081	Russia	378203-251
	France	378203-051	Saudi Arabia	378203-171
	French Canada	378203-121	Slovakia	378203-231
	Germany	378203-041	Slovenia	378203-BA1
	Greece	378203-151	Spain	378203-071
	Hungary	378203-211	Sweden	378203-101
	Iceland	378203-DD1	Switzerland	378203-111
	International	378203-002	Taiwan	378203-AB1
	Israel	378203-BB1	Thailand	378203-281
	Italy	378203-061	Turkey	378203-141
	Japan	378203-291	United Kingdom	378203-031
	Korea	378203-AD1	United States	378203-001

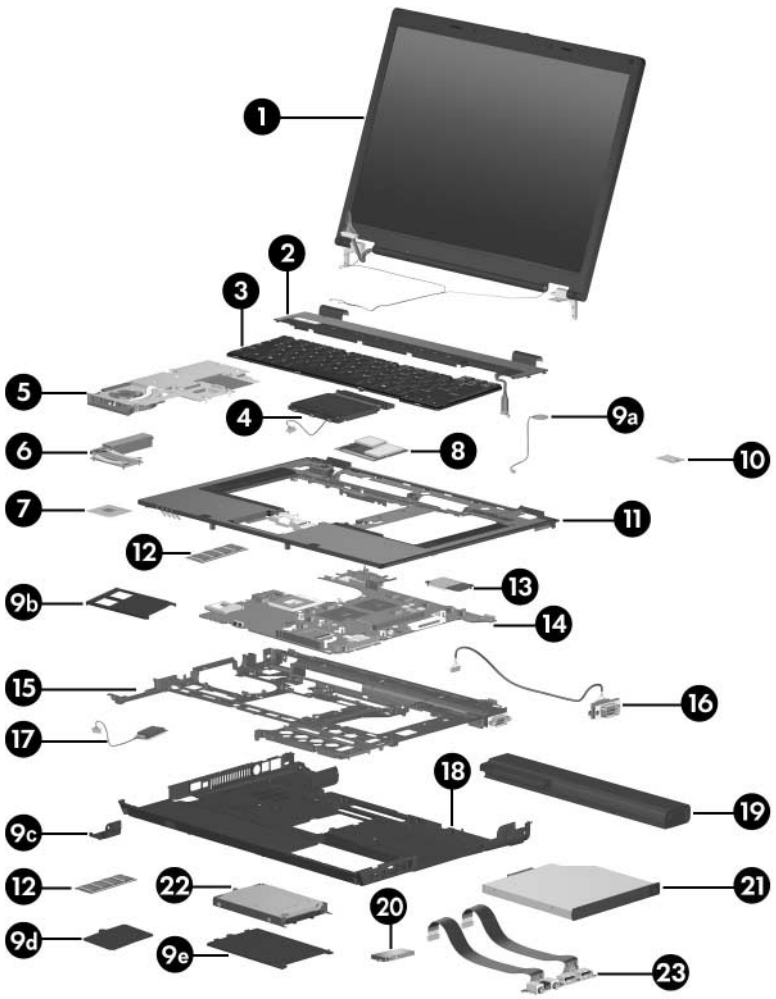


Computer Major Components

Table 4-1

Spare Parts: Computer Major Components (*Continued*)

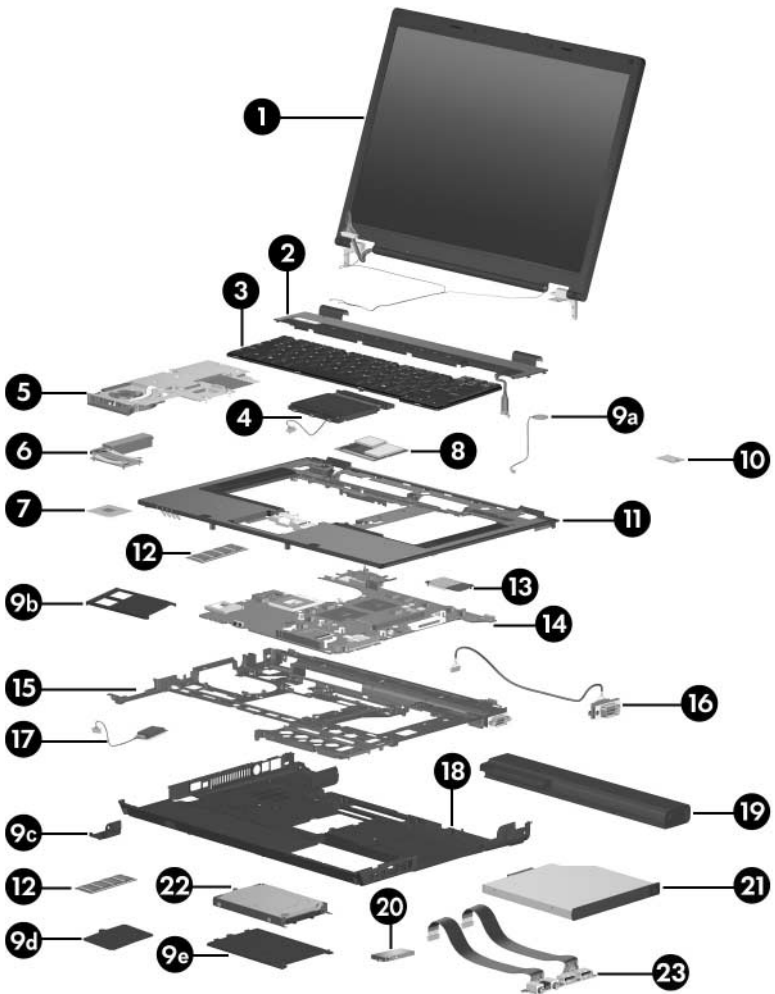
Item	Description	Spare Part Number		
3	Keyboards, without pointing stick			
	Belgium	385548-181	Latin America	385548-161
	Brazil	385548-201	Norway	385548-091
	Czech Republic	385548-221	Portugal	385548-131
	Denmark	385548-081	Russia	385548-251
	France	385548-051	Saudi Arabia	385548-171
	French Canada	385548-121	Slovakia	385548-231
	Germany	385548-041	Slovenia	385548-BA1
	Greece	385548-151	Spain	385548-071
	Hungary	385548-211	Sweden	385548-101
	Iceland	385548-DD1	Switzerland	385548-111
	International	385548-002	Taiwan	385548-AB1
	Israel	385548-BB1	Thailand	385548-281
	Italy	385548-061	Turkey	385548-141
	Japan	385548-291	United Kingdom	385548-031
	Korea	385548-AD1	United States	385548-001
4	TouchPads (include TouchPad cable)			
	With TouchPad buttons and pointing stick buttons			382675-001
	With TouchPad buttons			382676-001
5	Thermal plate (includes fan and thermal paste)			382674-001
6	Heat sink (includes thermal paste)			379799-001
7	Processors (include thermal paste)			
	Intel Pentium M 770 (2.13-GHz)			378224-001
	Intel Pentium M 760 (2.00-GHz)			378223-001
	Intel Pentium M 750 (1.86-GHz)			378222-001
	Intel Pentium M 740 (1.73-GHz)			378221-001
	Intel Pentium M 730 (1.60-GHz)			378220-001



Computer Major Components

Table 4-1**Spare Parts: Computer Major Components (Continued)**

Item	Description	Spare Part Number
8	Mini PCI communications modules	
	802.11b/g Mini PCI modem, for use in most of the world	381582-001
	802.11b/g Mini PCI modem, for use in the rest of the world	381583-001
	802.11b/g combination wireless local access network (WLAN) module, for use internationally	373032-002
	802.11b/g combination WLAN module, for use in Japan	373032-291
	802.11b/g combination WLAN module, for use in the United States	373032-001
	802.11a/b/g combination WLAN communications module, for use internationally	373033-002
	802.11a/b/g combination WLAN communications module, for use in Japan	373033-291
	802.11a/b/g combination WLAN communications module, for use in the United States	373033-001
	802.11a/b/g Mini PCI WLAN communications module, for use in Europe, the Middle East, and Africa	373900-021
	802.11a/b/g Mini PCI WLAN communications module, for use in Japan	373900-291
	802.11a/b/g Mini PCI WLAN communications module, for use in most of the world	373900-001
	802.11a/b/g Mini PCI WLAN communications module, for use in the rest of the world	373901-001

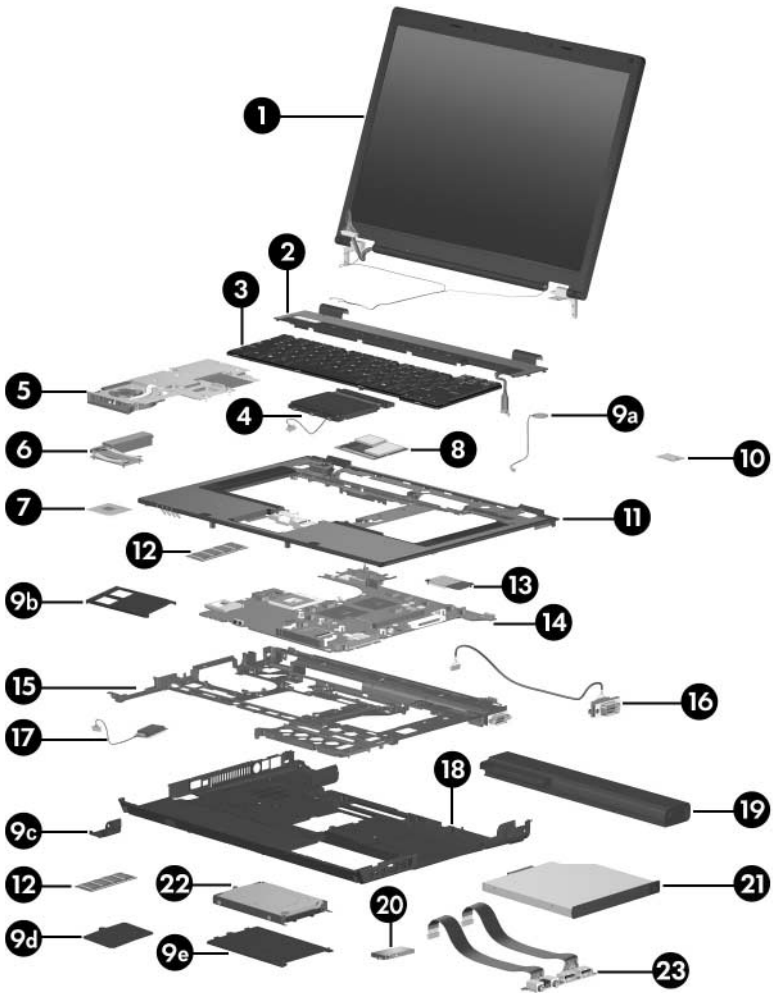


Computer Major Components

Table 4-1

Spare Parts: Computer Major Components (*Continued*)

Item	Description	Spare Part Number
	Miscellaneous Plastics Kit	382691-001
	Includes:	
9a	RTC battery	
9b	PC Card slot space savers (2)	
9c	Bluetooth cover (includes 1 captive screw)	
9d	Memory module compartment cover (includes 1 captive screw)	
9e	Hard drive cover (includes 2 captive screws)	
	Not illustrated:	
	Computer feet	
10	TPM security module	379807-001
11	Top covers (include speakers)	
	For use only with HP Compaq nw8240 models	382679-001
	For use only with HP Compaq nc8230 and nx8220 models	382678-001
12	Memory modules	
	DDR2, PC2-4200, CL3, 533 MHz	
	1024 MB	373121-001
	512 MB	373120-001
	256 MB	373119-001
	DDR2, PC2-3200, CL3, 400 MHz	
	1024 MB	391021-001
	512 MB	391020-001
	256 MB	391019-001
13	Modem board (high-speed 56K)	325521-001

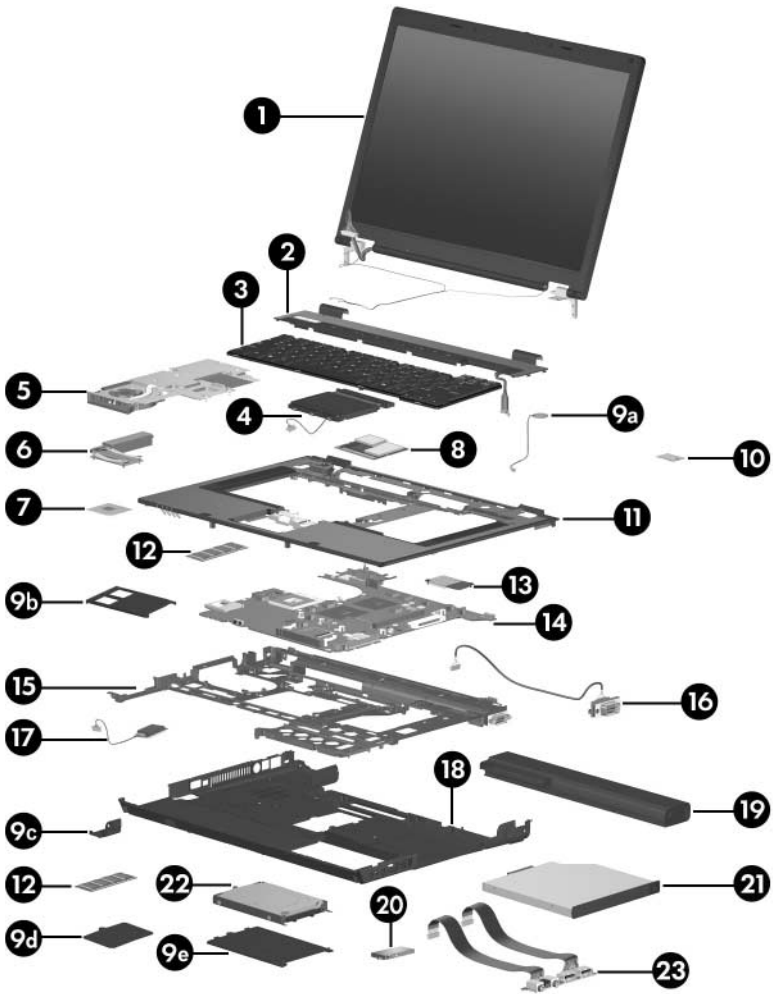


Computer Major Components

Table 4-1

Spare Parts: Computer Major Components (*Continued*)

Item	Description	Spare Part Number
14	System boards	
	With 128-MB video memory, for use only with HP Compaq nw8240 models	382686-001
	With 128-MB video memory, for use only with HP Compaq nc8320 and nx8220 models	382687-001
	With 64-MB video memory, for use only with HP Compaq nc8230 and nx8220 models	382688-001
15	System board frame (includes RJ-11 connector module and cable)	382689-001
16	Serial connector module (includes serial connector module cable)	382690-001
17	Broadcomm Bluetooth wireless board (includes Bluetooth board cable)	367871-001
18	Base enclosures	
	For use only with HP Compaq nw8240 models	384132-001
	For use only with HP Compaq and nc8230 and nx8220 models	382681-001



Computer Major Components

Table 4-1

Spare Parts: Computer Major Components (Continued)

Item	Description	Spare Part Number
19	Battery packs	
	8-cell, 4.8-AHr	372771-001
	8-cell, travel battery	367456-001
20	Push button module	382693-001
21	MultiBay II devices	
	8X Max DVD-ROM drive	373314-001
	DVD+RW/R and CD-RW Combo Drive	375557-001
	DVD/CD-RW Combo Drive	373315-001
22	Hard drives (include frame and connector)	
	7200-rpm	5400-rpm
	60-GB	380950-001
		80-GB
		60-GB
		40-GB
23	Audio board (includes audio board cable and USB board cable)	382677-001

4.3 Miscellaneous Plastics Kit

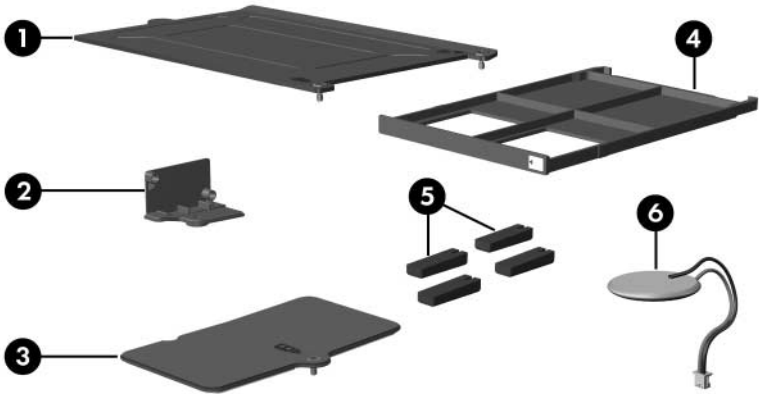


Table 4-2
Spare Part Number 382691-001

Item	Description
1	Hard drive cover (includes 2 captive screws)
2	Bluetooth cover (includes 1 captive screw)
3	Memory module compartment cover (includes 1 captive screw)
4	PC Card slot space saver
5	Computer feet (4)
6	RTC battery

4.4 Miscellaneous Cable Kit

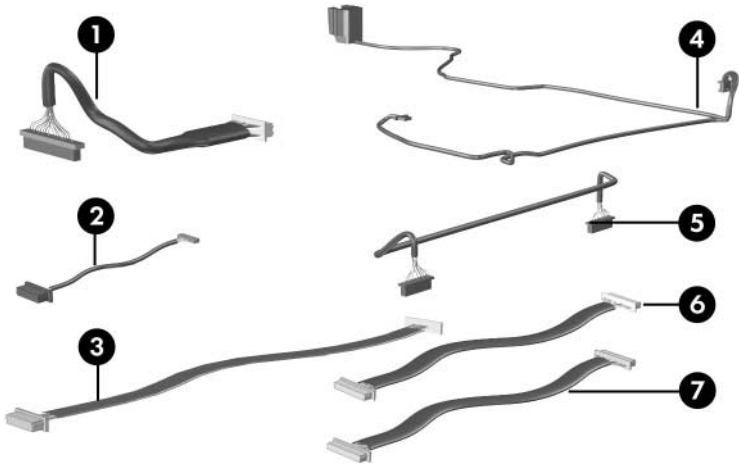


Table 4-3

Spare Part Number 389014-001

Item	Description
1	LED board cable
2	Bluetooth cable
3	TouchPad cable
4	RJ-11 connector module and cable
5	Serial connector board cable
6	Audio board cable
7	USB board cable

4.5 Mass Storage Devices



Table 4-4
Spare Part Number Information

Item	Description	Spare Part Number
1	Hard drives (include frame and connector)	
	7200-rpm	5400-rpm
	60-GB	80-GB
	380950-001	60-GB
		40-GB
		379810-001
		379809-001
		379808-001
2	Optical drives (include bezel)	
	8X Max DVD-ROM drive	373314-001
	DVD+RW/R and CD-RW Combo Drive	375557-001
	DVD/CD-RW Combo Drive	373315-001

4.6 Miscellaneous (Not Illustrated)

Table 4-5
Spare Part Information

Description	Spare Part Number
Adjustable Notebook Stand	372420-001
Advanced Docking Station	374804-001
Docking Station	374803-001
Docking Station Miscellaneous Plastics Kit	380045-001
Carrying cases	
Nylon top load	325815-001 and 325815-002
Nylon entry level	325814-001
USB 1.1 diskette drive	359118-001

Table 4-5
Spare Part Information (Continued)

Description	Spare Part Number
Power supply , 90 watt, slim line profile	374791-001
Power cords	
For use in:	
Australia and New Zealand	246959-011
Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden	246959-021
Brazil	246959-201
Canada, French Canada, Latin America, Taiwan, Thailand, and the United States	246959-001
Denmark	246959-081
Hong Kong and the United Kingdom	246959-031
Israel	246959-BB1
Italy	246959-061
Japan	246959-291
Korea	246959-AD1
Sweden	246959-AG1

Table 4-5
Spare Part Information (Continued)

Description	Spare Part Number
Screw Kit (includes the following screws; refer to Appendix C, "Screw Listing," for more information on specifications and usage)	382692-001
■ Hex socket HM5.0×12.0 screw lock	■ Phillips PM2.0×5.0 screw
■ Phillips PM3.0×5.0 screw	■ Phillips PM2.0×4.0 screw
■ Phillips PM3.0×4.0 screw	■ Phillips PM2.0×2.0 screw
■ Phillips PM2.5×13.0 spring-loaded screw	■ Phillips PM1.5×4.0 screw
■ Phillips PM2.0×10.0 spring-loaded screw	■ Phillips PM1.5×3.0 screw
■ Phillips PM2.0×8.0 shoulder screw	■ Torx 8 M2.0×9.5 screw
■ Phillips PM2.0×6.0 screw	■ Torx 8 M2.0×6.0 screw
	■ Torx 8 M2.0×4.0 screw

4.7 Sequential Part Number Listing

Table 4-6
Sequential Part Number Listing

Spare Part Number	Description
246959-001	Power cord for use in Canada, French Canada, Latin America, Taiwan, Thailand, and the United States
246959-011	Power cord for use in Australia and New Zealand
246959-021	Power cord for use in Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden
246959-031	Power cord for use in Hong Kong and the United Kingdom

Table 4-6
Sequential Part Number Listing (Continued)

Spare Part Number	Description
246959-061	Power cord for use in Italy
246959-081	Power cord for use in Denmark
246959-201	Power cord for use in Brazil
246959-291	Power cord for use in Japan
246959-AD1	Power cord for use in Korea
246959-AG1	Power cord for use in Sweden
246959-BB1	Power cord for use in Israel
325521-001	Modem board (high-speed 56K)
325814-001	Nylon entry level carrying case
325815-001	Nylon top load carrying case
325815-002	Nylon top load carrying case
359118-001	USB 1.1 diskette drive
367456-001	8-cell travel battery pack
367871-001	Broadcomm Bluetooth wireless board, includes cable
372420-001	Adjustable Notebook Stand
372771-001	8-cell, 4.8-AHr battery pack
373032-001	802.11b/g combination WLAN Mini PCI communications module for use in the United States
373032-002	802.11b/g combination WLAN Mini PCI communications module for use internationally
373032-291	802.11b/g combination WLAN Mini PCI communications module for use in Japan
373033-001	802.11a/b/g combination WLAN module Mini PCI communications module for use in the United States

Table 4-6
Sequential Part Number Listing (*Continued*)

Spare Part Number	Description
373033-002	802.11a/b/g combination WLAN Mini PCI communications module for use internationally
373033-291	802.11a/b/g combination WLAN Mini PCI communications module for use in Japan
373119-001	256-MB memory module (DDR2, PC2-4200, CL3, 533 MHz)
373120-001	512-MB memory module (DDR2, PC2-4200, CL3, 533 MHz)
373121-001	1024-MB memory module (DDR2, PC2-4200, CL3, 533 MHz)
373314-001	8X DVD-ROM drive
373315-001	24X DVD/CD-RW Combo Drive
373900-001	802.11a/b/g combination WLAN module Mini PCI communications module for use in most of the world
373900-021	802.11a/b/g combination WLAN Mini PCI communications module for use in Europe, Middle East, and Africa
373900-291	802.11a/b/g combination WLAN Mini PCI communications module for use in Japan
373901-001	802.11a/b/g High Band combination WLAN Mini PCI communications module
374791-001	90 watt, slim line profile power supply
374803-001	Docking Station
374804-001	Advanced Docking Station
375557-001	DVD+RW/R and CD-RW Combo Drive
378203-001	Keyboard, with pointing stick for use in the United States
378203-002	Keyboard, with pointing stick for use internationally
378203-031	Keyboard, with pointing stick for use in the United Kingdom
378203-041	Keyboard, with pointing stick for use in Germany

Table 4-6
Sequential Part Number Listing (*Continued*)

Spare Part Number	Description
378203-051	Keyboard, with pointing stick for use in France
378203-061	Keyboard, with pointing stick for use in Italy
378203-071	Keyboard, with pointing stick for use in Spain
378203-081	Keyboard, with pointing stick for use in Denmark
378203-091	Keyboard, with pointing stick for use in Norway
378203-101	Keyboard, with pointing stick for use in Sweden
378203-111	Keyboard, with pointing stick for use in Switzerland
378203-121	Keyboard, with pointing stick for use in French Canada
378203-131	Keyboard, with pointing stick for use in Portugal
378203-141	Keyboard, with pointing stick for use in Turkey
378203-151	Keyboard, with pointing stick for use in Greece
378203-161	Keyboard, with pointing stick for use in Latin America
378203-171	Keyboard, with pointing stick for use in Saudi Arabia
378203-181	Keyboard, with pointing stick for use in Belgium
378203-201	Keyboard, with pointing stick for use in Brazil
378203-211	Keyboard, with pointing stick for use in Hungary
378203-221	Keyboard, with pointing stick for use in Czech Republic
378203-231	Keyboard, with pointing stick for use in Slovakia
378203-251	Keyboard, with pointing stick for use in Russia
378203-281	Keyboard, with pointing stick for use in Thailand
378203-291	Keyboard, with pointing stick for use in Japan
378203-AB1	Keyboard, with pointing stick for use in Taiwan

Table 4-6
Sequential Part Number Listing (*Continued*)

Spare Part Number	Description
378203-AD1	Keyboard, with pointing stick for use in Korea
378203-BA1	Keyboard, with pointing stick for use in Slovenia
378203-BB1	Keyboard, with pointing stick for use in Israel
378203-DD1	Keyboard, with pointing stick for use in Iceland
378220-001	Intel Pentium M 1.60-GHz processor, includes thermal paste
378221-001	Intel Pentium M 1.73-GHz processor, includes thermal paste
378222-001	Intel Pentium M 1.86-GHz processor, includes thermal paste
378223-001	Intel Pentium M 2.00-GHz processor, includes thermal paste
378224-001	Intel Pentium M 2.13-GHz processor, includes thermal paste
379799-001	Heat sink (includes thermal paste)
379807-001	Trusted Platform Module (TPM) security module
379808-001	5400-rpm, 40-GB hard drive (includes frame and connector)
379809-001	5400-rpm, 60-GB hard drive (includes frame and connector)
379810-001	5400-rpm, 80-GB hard drive (includes frame and connector)
380045-001	Docking Station Miscellaneous Plastics Kit
380950-001	7200-rpm, 60-GB hard drive (includes frame and connector)
381582-001	802.11b/g WLAN Mini PCI communications module for use in most of the world
381583-001	802.11b/g WLAN Mini PCI communications module for use in the rest of the world
382674-001	Thermal plate (includes fan and thermal paste)
382675-001	TouchPad with TouchPad buttons and pointing stick buttons (includes TouchPad cable)
382676-001	TouchPad with TouchPad buttons (includes TouchPad cable)

Table 4-6
Sequential Part Number Listing (*Continued*)

Spare Part Number	Description
382677-001	Audio board (includes audio board cable and USB board cable)
382678-001	Top cover for use only with HP Compaq nc8230 and nc8220 models (includes speakers)
382679-001	Top cover for use only with HP Compaq nw8240 models (includes speakers)
382680-001	Switch cover for use only with HP Compaq nw8240 and nc8230 models (include LED board and LED board cable)
382681-001	Base enclosure for use only with HP Compaq and nc8230 and nc8220 models
382682-001	Display assembly, 15.4-inch, WXGA, TFT (includes wireless antenna boards and cables)
382683-001	Display assembly, 15.4-inch, UXGA, TFT (includes wireless antenna boards and cables)
382684-001	Display assembly, 15.4-inch, WSXGA, TFT (includes wireless antenna boards and cables)
382686-001	System board with 128-MB video memory, for use only with HP Compaq nw8240 models
382687-001	System board with 128-MB video memory, for use only with HP Compaq nc8230 and nc8220 models
382688-001	System board with 64-MB video memory, for use only with HP Compaq nc8230 and nc8220 models
382689-001	System board frame (includes RJ-11 connector module and cable)
382690-001	Serial connector module (includes serial connector module cable)
382691-001	Miscellaneous Plastics Kit

Table 4-6
Sequential Part Number Listing (*Continued*)

Spare Part Number	Description
382692-001	Miscellaneous Screw Kit
382693-001	Push button module
384132-001	Base enclosure for use only with HP Compaq nw8240 models
384133-001	Switch cover for use only with HP Compaq nc8220 models (include LED board and LED board cable)
385548-001	Keyboard, without pointing stick for use in the United States
385548-002	Keyboard, without pointing stick for use internationally
385548-031	Keyboard, without pointing stick for use in the United Kingdom
385548-041	Keyboard, without pointing stick for use in Germany
385548-051	Keyboard, without pointing stick for use in France
385548-061	Keyboard, without pointing stick for use in Italy
385548-071	Keyboard, without pointing stick for use in Spain
385548-081	Keyboard, without pointing stick for use in Denmark
385548-091	Keyboard, without pointing stick for use in Norway
385548-101	Keyboard, without pointing stick for use in Sweden
385548-111	Keyboard, without pointing stick for use in Switzerland
385548-121	Keyboard, without pointing stick for use in French Canada
385548-131	Keyboard, without pointing stick for use in Portugal
385548-141	Keyboard, without pointing stick for use in Turkey
385548-151	Keyboard, without pointing stick for use in Greece
385548-161	Keyboard, without pointing stick for use in Latin America
385548-171	Keyboard, without pointing stick for use in Saudi Arabia
385548-181	Keyboard, without pointing stick for use in Belgium

Table 4-6
Sequential Part Number Listing (*Continued*)

Spare Part Number	Description
385548-201	Keyboard, without pointing stick for use in Brazil
385548-211	Keyboard, without pointing stick for use in Hungary
385548-221	Keyboard, without pointing stick for use in Czech Republic
385548-231	Keyboard, without pointing stick for use in Slovakia
385548-251	Keyboard, without pointing stick for use in Russia
385548-281	Keyboard, without pointing stick for use in Thailand
385548-291	Keyboard, without pointing stick for use in Japan
385548-AB1	Keyboard, without pointing stick for use in Taiwan
385548-AD1	Keyboard, without pointing stick for use in Korea
385548-BA1	Keyboard, without pointing stick for use in Slovenia
385548-BB1	Keyboard, without pointing stick for use in Israel
385548-DD1	Keyboard, without pointing stick for use in Iceland
389014-001	Miscellaneous Cable Kit
390119-001	256-MB memory module (DDR2, PC2-3200, CL3, 400 MHz)
390120-001	512-MB memory module (DDR2, PC2-3200, CL3, 400 MHz)
390121-001	1024-MB memory module (DDR2, PC2-3200, CL3, 400 MHz)

Removal and Replacement Preliminaries

This chapter provides essential information for proper and safe removal and replacement service.

5.1 Tools Required

You will need the following tools to complete the removal and replacement procedures:

- Magnetic screwdriver
- Phillips P0 screwdriver
- Torx T8 screwdriver
- 5.0-mm socket for system board locks
- Flat-bladed screwdriver
- Tool kit—includes connector removal tool, loopback plugs, and case utility tool

5.2 Service Considerations

The following sections include some of the considerations that you should keep in mind during disassembly and assembly procedures.



As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic Parts

Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and Connectors



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

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Ensure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

5.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a removable drive, or loss of information, observe the following precautions:

- Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in hibernation, turn the computer on, and then shut it down through the operating system.
- Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive and ensure that the optical drive tray is closed.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Handle drives on surfaces covered with at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or liquids.
- If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE: Handle With Care.”

5.4 Preventing Electrostatic Damage

Many electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. 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.

A sudden discharge of static electricity from a 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 may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

5.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.
- Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a sensitive component or assembly.
- Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

5.6 Workstation Precautions

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-shielding material (refer to [Table 4-2, “Static-Shielding Materials”](#)).
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

5.7 Grounding Equipment and Methods

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm $\pm 10\%$ resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or 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 foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Other grounding equipment recommended for use in preventing electrostatic damage includes:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

Table 5-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 5-1
Typical Electrostatic Voltage Levels

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



A product can be degraded by as little as 700 V.

Table 5-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 5-2
Static-Shielding Materials

Material	Use	Voltage Protection Level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

6

Removal and Replacement Procedures

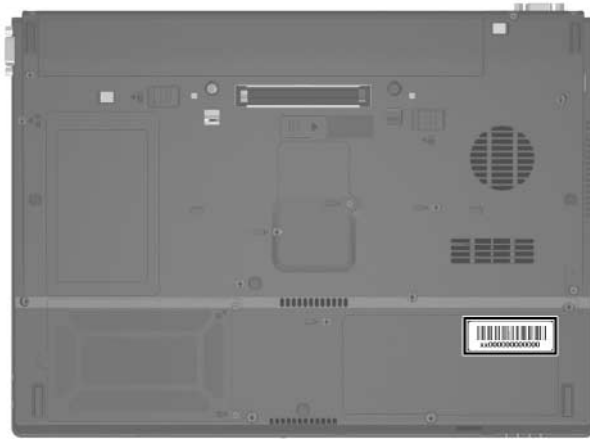
This chapter provides removal and replacement procedures.

There are as many as 78 screws and screw locks, in 15 different sizes and types, that may have to be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

Refer to [Appendix C, “Screw Listing,”](#) for detailed information on screw and screw lock sizes, locations, and usage.

6.1 Serial Number

Report the computer serial number to HP when requesting information or ordering spare parts. The serial number is located on the bottom of the computer.




Serial Number Location

6.2 Disassembly Sequence Chart

Use the chart below to determine the section number to be referenced when removing computer components.

Disassembly Sequence Chart		
Section	Description	# of Screws Removed
6.3	Preparing the Computer for Disassembly Battery pack	0
6.4	Hard Drive	2 loosened to remove the hard drive cover 1 loosened to remove the hard drive 6 to disassemble hard drive
6.5	Computer Feet	0
6.6	MultiBay II Device	1
6.7	External Memory Module	1 loosened to remove the memory module compartment cover
6.8	Bluetooth Board	1 loosened to remove the Bluetooth board cover 2 removed to remove Bluetooth board
6.9	Keyboard	2
6.10	Switch Cover	3 to remove the switch cover 6 to remove the LED board
6.11	RTC Battery	0
6.12	Thermal Plate	4 loosened 4 removed

Disassembly Sequence Chart (*Continued*)

Section	Description	# of Screws Removed
6.13	Heat Sink	4 loosened
6.14	Processor	1 loosened
6.15	TPM Security Module	1
6.16	Internal Memory Module	0
6.17	TouchPad	1
6.18	Mini PCI Communications Module	0
	 To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your computer by the governmental agency that regulates wireless devices in your country. If you install a device and then receive a warning message, remove the device to restore computer functionality. Then contact Customer Care.	
6.19	Display Assembly	8
6.20	Top Cover	2 rubber screw covers 16 screws
6.21	Modem Board	2
6.22	System Board	7 screws 2 screw locks
6.23	System Board Frame	2
6.24	Push Button Module	1
6.25	Serial Connector Module	2 screw locks
6.26	Audio Board	2

6.3 Preparing the Computer for Disassembly

Before you begin any removal or installation procedures:

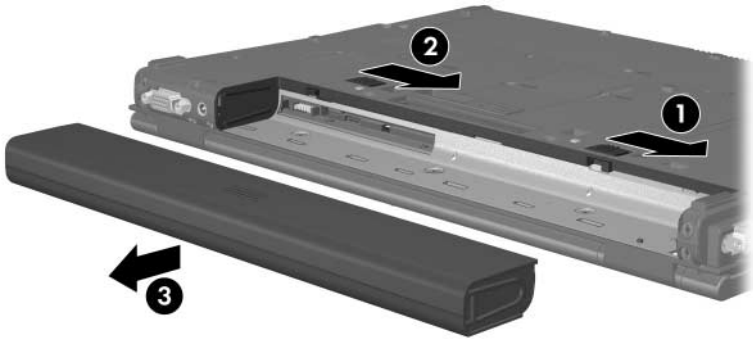
1. Shut down the computer. If you are unsure whether the computer is off or in hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power cord.

Battery Pack Spare Part Number Information

8-cell, 4.8-AHr

372771-001

4. Remove the battery pack by following these steps:
 - a. Turn the computer upside down with the rear panel toward you.
 - b. Slide and release the battery pack lock latch ❶ to the right. (The battery pack partially disengages from the computer.)
 - c. Slide and hold the battery pack release latch ❷ to the right.
 - d. Slide the battery pack ❸ straight back and remove it.



Removing the Battery Pack

Reverse the above procedure to install the battery pack.

6.4 Hard Drive

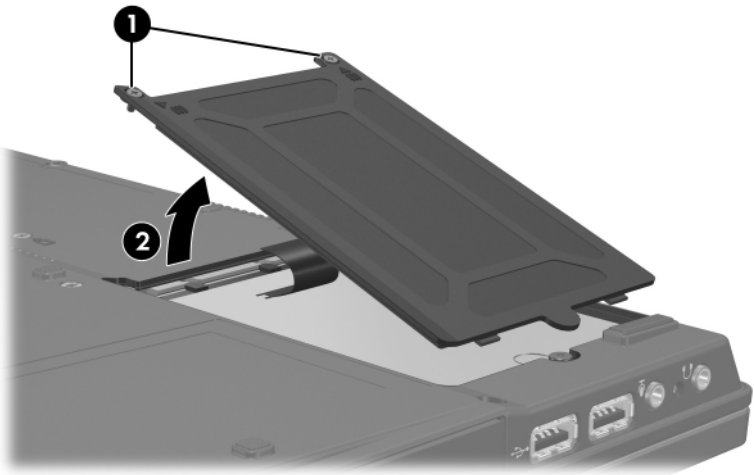
Hard Drive Spare Part Number Information

7200-rpm		5400-rpm	
60-GB	380950-001	80-GB	379810-001
		60-GB	379809-001
		40-GB	379808-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Loosen the two PM2.0×4.0 screws **1** that secure the hard drive cover to the computer.
3. Lift the left side of the hard drive cover **2** and swing it to the right.
4. Remove the hard drive cover.

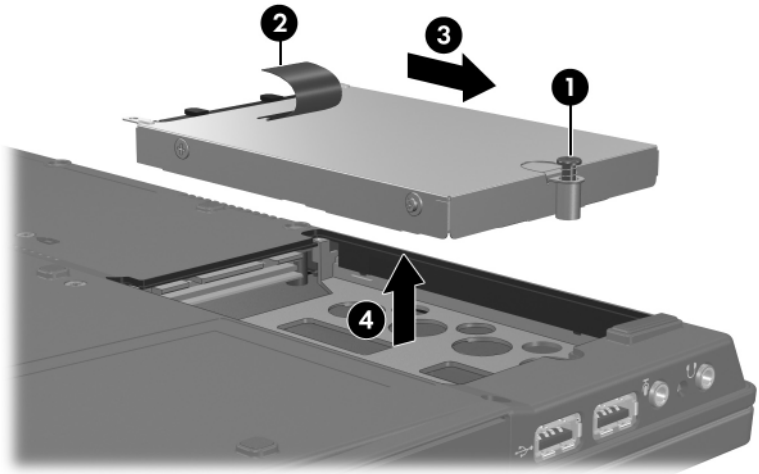


The hard drive cover is included in the Miscellaneous Plastics Kit, spare part number 382691-001.



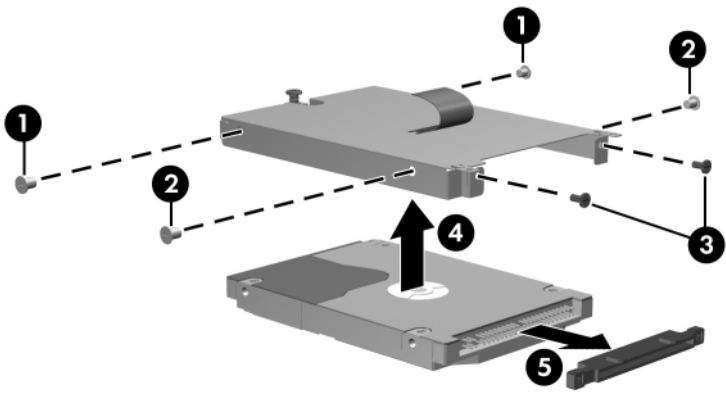
Removing the Hard Drive Cover

5. Loosen the PM2.5×13.0 spring-loaded hard drive retention screw ❶.
6. Grasp the mylar tab ❷ on the left side of the hard drive and slide the hard drive to the right ❸ to disconnect it from the system board.
7. Remove the hard drive ❹ from the hard drive bay.



Removing the Hard Drive

8. Remove the following:
 - ❶ Two PM3.0×5.0 screws
 - ❷ Two PM3.0×4.0 screws
 - ❸ Two PM1.5×4.0 screws
9. Lift the frame ❹ straight up to remove it from the hard drive.
10. Remove the hard drive connector ❺ from the hard drive.

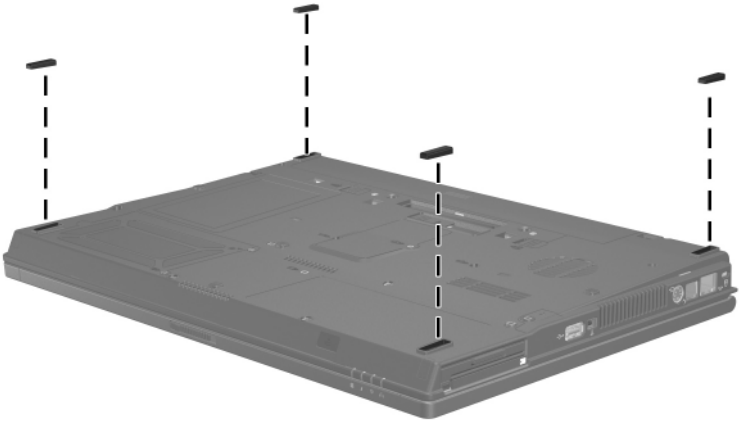


Removing the Hard Drive Frame and Connector

Reverse the above procedure to reassemble and install the hard drive.

6.5 Computer Feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Miscellaneous Plastics Kit, spare part number 382691-001.



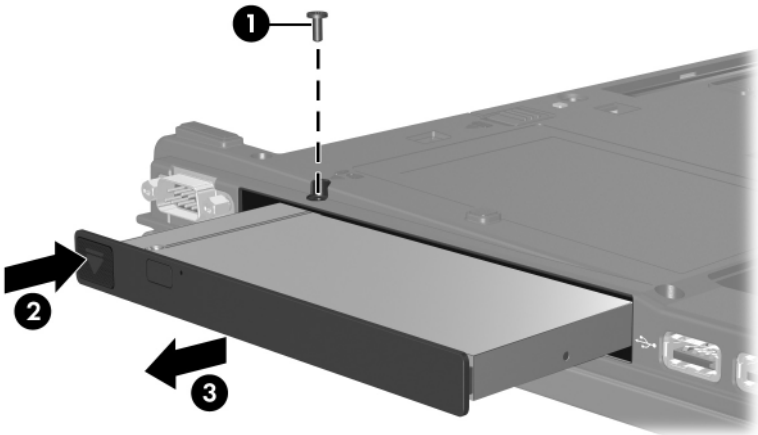
Replacing the Computer Feet

6.6 MultiBay II Device

MultiBay II Device Spare Part Number Information

DVD-ROM drive	373314-001
DVD+RW/R and CD-RW Combo Drive	375557-001
DVD/CD-RW Combo Drive	373315-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Position the computer with the left side toward you.
3. If it is installed, remove the T8M2.0x4.0 screw **1** that secures the MultiBay II device to the computer.
4. Gently press in on the left side of the device **2** to unlock it.
5. Slide the device **3** from the computer.



Removing the MultiBay II Device

Reverse the above procedure to install a MultiBay II device.

6.7 External Memory Module

Memory Module Spare Part Number Information

DDR2, PC2-4200, CL3, 533 MHz

1024 MB	373121-001
512 MB	373120-001
256 MB	373119-001

DDR2, PC2-3200, CL3, 400 MHz

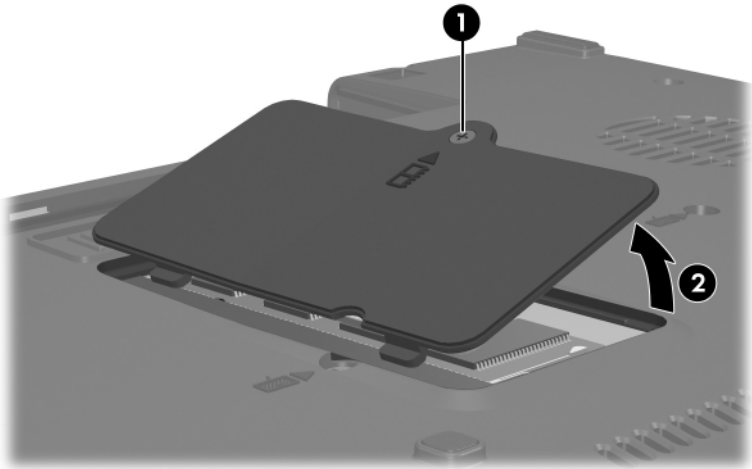
1024 MB	391021-001
512 MB	391020-001
256 MB	391019-001

1. Prepare the computer for disassembly (refer to [Section 6.3](#)).
2. Position the computer with the front toward you.

3. Loosen the PM2.0×4.0 screw **1** that secures the memory module compartment cover to the computer.
4. Lift the right side of the cover **2** up and swing it to the left.
5. Remove the memory module compartment cover.



The memory module compartment cover is included in the Miscellaneous Plastics Kit, spare part number 382691-001.

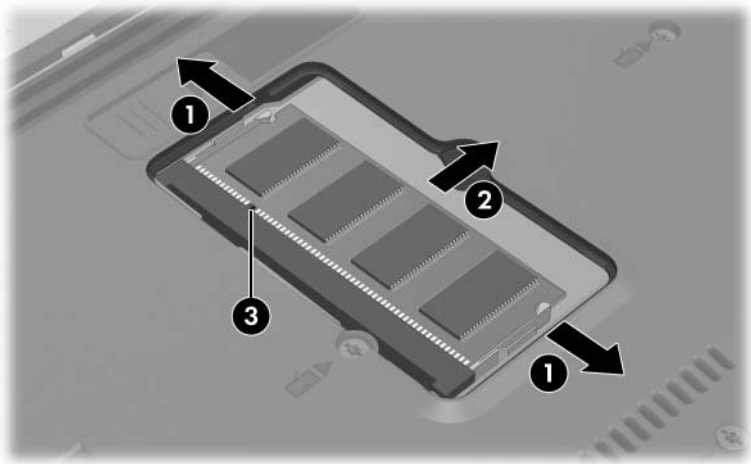


Removing the Memory Module Compartment Cover

6. Spread the retaining tabs **1** on each side of the memory module socket to release the memory module. (The side of the module opposite the socket rises away from the computer.)
7. Slide the module **2** away from the socket at an angle.
8. Remove the memory module board.



Memory modules are designed with a notch **3** to prevent incorrect installation into the memory module socket.



Removing the External Memory Module

Reverse the above procedure to install an external memory module.

6.8 Bluetooth Board

Bluetooth Board Spare Part Number Information

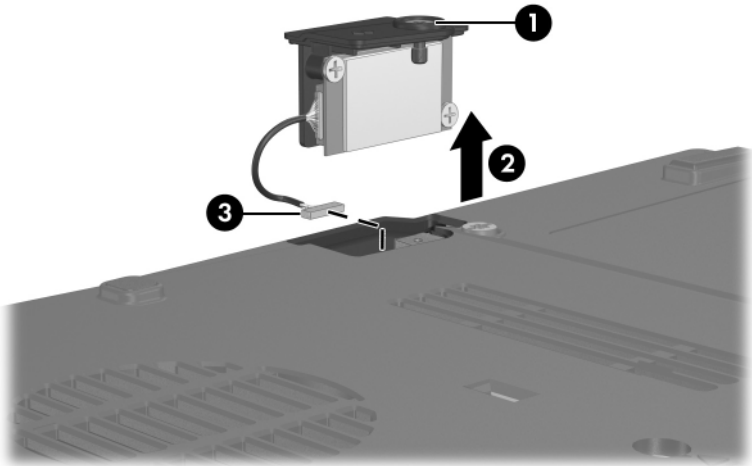
Broadcomm Bluetooth wireless board (includes Bluetooth board cable)	367871-001
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1. Prepare the computer for disassembly (refer to [Section 6.3](#)).
2. Position the computer with the right side toward you.
3. Loosen the PM1.5×3.0 screw **1** that secures the Bluetooth cover to the computer.
4. Remove the Bluetooth cover **2** from the computer.



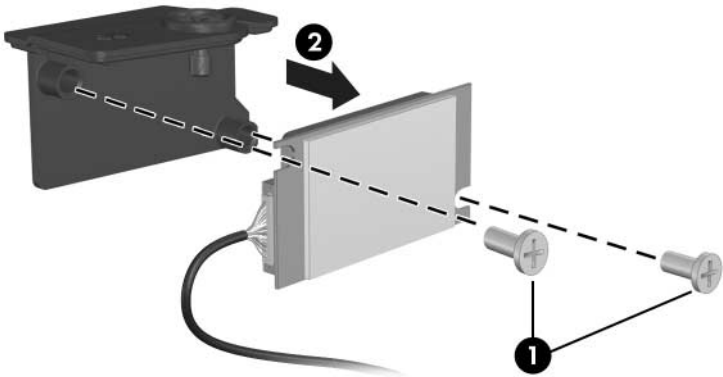
The Bluetooth cover is included in the Miscellaneous Plastics Kit, spare part number 382691-001.

5. Disconnect the Bluetooth cable **3** from the system board.



Removing the Bluetooth Board

6. Remove the two PM1.5×3.0 screws ❶ that secure the Bluetooth board to the Bluetooth cover.
7. Remove the Bluetooth board ❷ from the cover.



Removing the Bluetooth Board Cover

Reverse the above procedure to install a Bluetooth board.

6.9 Keyboard

Keyboard Spare Part Number Information

With pointing stick

Belgium	378203-181	Latin America	378203-161
Brazil	378203-201	Norway	378203-091
Czech Republic	378203-221	Portugal	378203-131
Denmark	378203-081	Russia	378203-251
France	378203-051	Saudi Arabia	378203-171
French Canada	378203-121	Slovakia	378203-231
Germany	378203-041	Slovenia	378203-BA1
Greece	378203-151	Spain	378203-071
Hungary	378203-211	Sweden	378203-101
Iceland	378203-DD1	Switzerland	378203-111
International	378203-002	Taiwan	378203-AB1
Israel	378203-BB1	Thailand	378203-281
Italy	378203-061	Turkey	378203-141
Japan	378203-291	United Kingdom	378203-031
Korea	378203-AD1	United States	378203-001

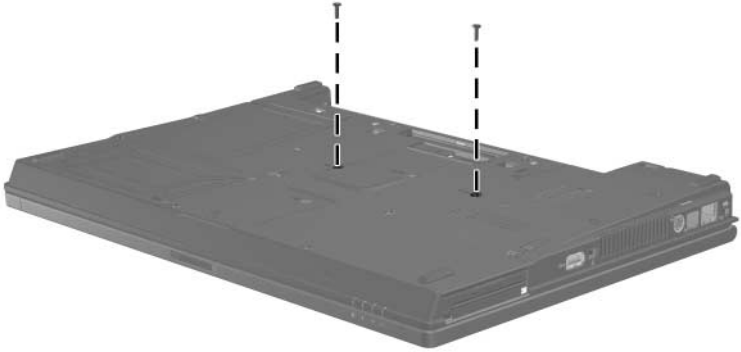
Keyboard Spare Part Number Information (Continued)

Without pointing stick

Belgium	385548-181	Latin America	385548-161
Brazil	385548-201	Norway	385548-091
Czech Republic	385548-221	Portugal	385548-131
Denmark	385548-081	Russia	385548-251
France	385548-051	Saudi Arabia	385548-171
French Canada	385548-121	Slovakia	385548-231
Germany	385548-041	Slovenia	385548-BA1
Greece	385548-151	Spain	385548-071
Hungary	385548-211	Sweden	385548-101
Iceland	385548-DD1	Switzerland	385548-111
International	385548-002	Taiwan	385548-AB1
Israel	385548-BB1	Thailand	385548-281
Italy	385548-061	Turkey	385548-141
Japan	385548-291	United Kingdom	385548-031
Korea	385548-AD1	United States	385548-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Position the computer with the front panel toward you.

3. Remove the two T8M2.0×9.5 screws that secure the keyboard to the computer.



Removing the Keyboard Screws

4. Turn the computer display-side up with the front panel toward you.
5. Open the computer as far as possible.
6. Slide the four keyboard retention tabs ❶ toward you. The tabs are located between the **esc** and **f1** keys, between the **f4** and **f5** keys, between the **f8** and **f9** keys, and between the **f12** and **delete** keys.
7. Lift the rear edge of the keyboard ❷ and swing it toward you until it rests on the palm rest.



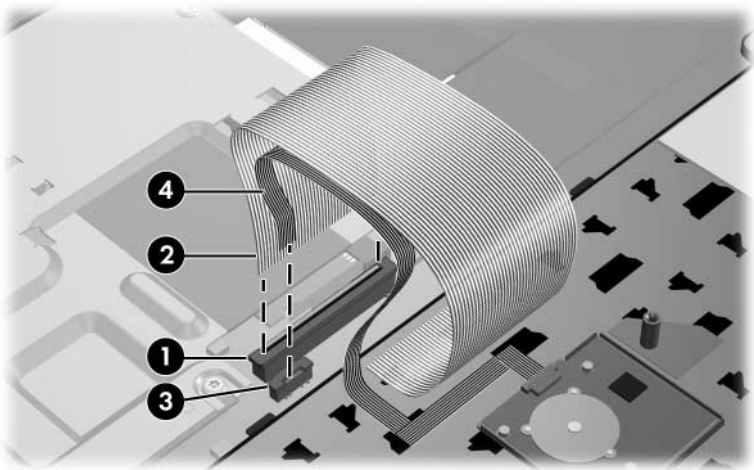
Releasing the Keyboard

8. Release the zero insertion force (ZIF) connector **1** to which the keyboard cable is connected and disconnect the keyboard cable **2** from the system board.



Step 9 applies to models with keyboards with pointing sticks.

9. Release the ZIF connector **3** to which the pointing stick cable is connected and disconnect the pointing stick cable **4** from the system board.



Disconnecting the Keyboard and Pointing Stick Cables

10. Remove the keyboard.

Reverse the above procedure to install the keyboard.

6.10 Switch Cover

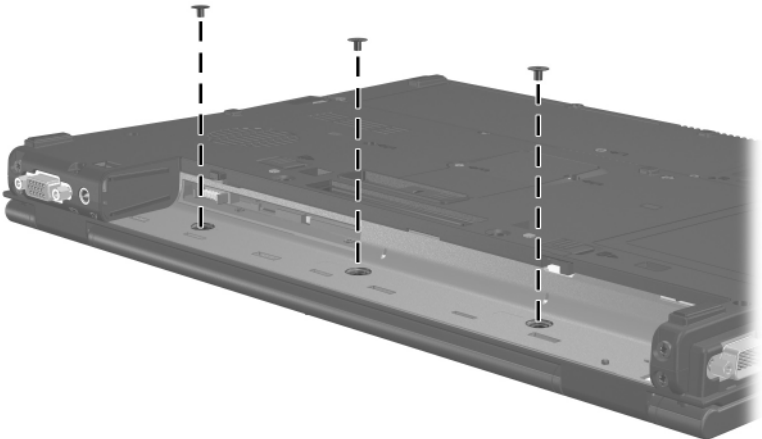
Switch Cover Spare Part Number Information

For use only with HP Compaq nw8240 and nc8230 models	382680-001
For use only with HP Compaq nc8220 models	384133-001



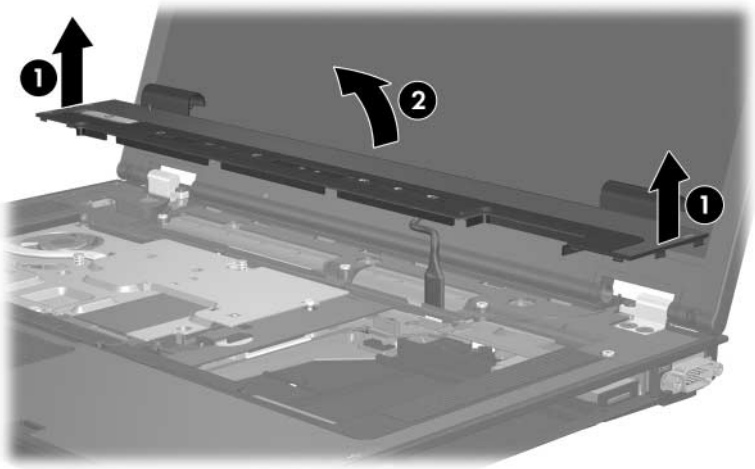
Both switch cover spare part kits include the LED board and LED board cable.

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Remove the keyboard ([Section 6.9](#)).
3. Turn the computer upside down with the rear panel toward you.
4. Remove the three PM2.0×2.0 screws that secure the switch cover to the computer.



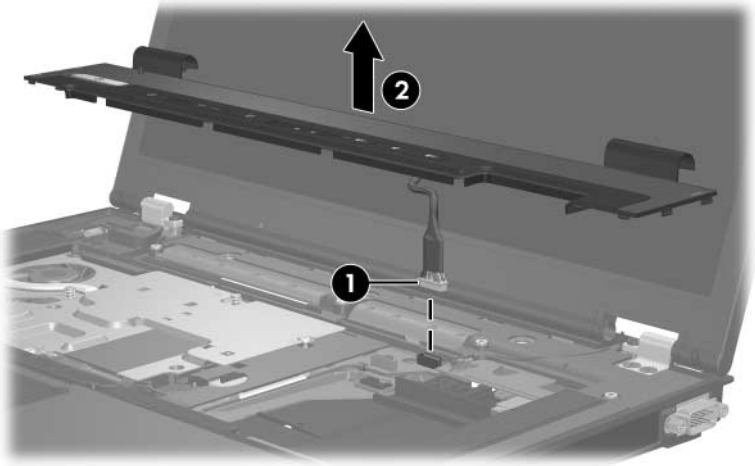
Removing the Switch Cover Screws

5. Turn the computer display-side up with the front panel toward you.
6. Open the computer as far as possible.
7. Use a flat-blade screwdriver to lift up the left and right hinge cover sections of the switch cover ❶ to detach it from the computer.
8. Swing the rear edge of the switch cover ❷ up and toward you.



Releasing the Switch Cover

9. Disconnect the LED board cable ❶ from the system board.
10. Remove the switch cover ❷.

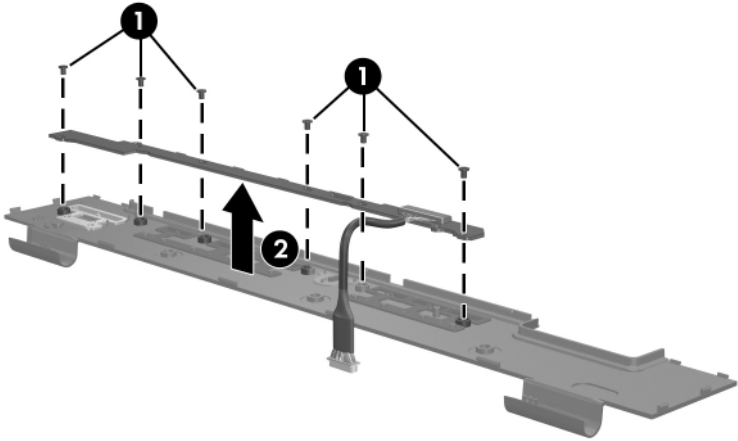


Removing the Switch Cover



If necessary, perform the following steps to remove the LED board from the switch cover.

11. Turn the switch cover upside down.
12. Remove the six PM1.5×3.0 screws **1** that secure the LED board to the switch cover.
13. Remove the LED board **2**.



Removing the LED Board

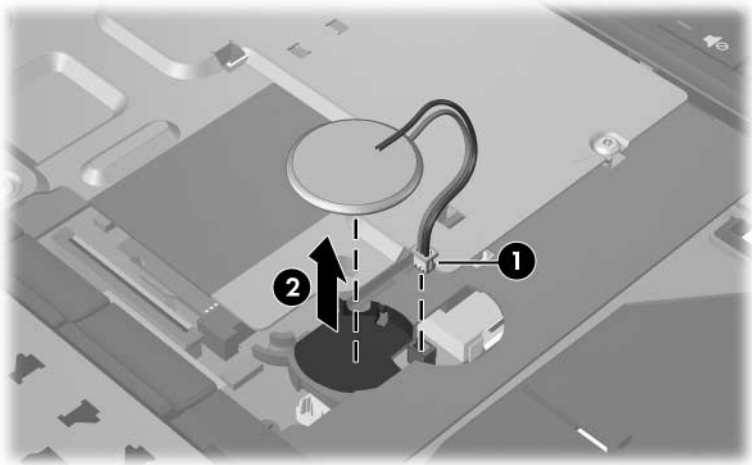
Reverse the above procedure to install the switch cover and LED board.

6.11 RTC Battery



The RTC battery is included in the Miscellaneous Plastics Kit, spare part number 382691-001.

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Release the keyboard ([Section 6.9](#)).
3. Disconnect the RTC battery cable ❶ from the system board.
4. Remove the RTC battery ❷ from the clip in the top cover.



Removing the RTC Battery

Reverse the above procedure to install an RTC battery.

6.12 Thermal Plate

Thermal Plate Spare Part Number Information

Thermal plate (includes fan and thermal paste)	382674-001
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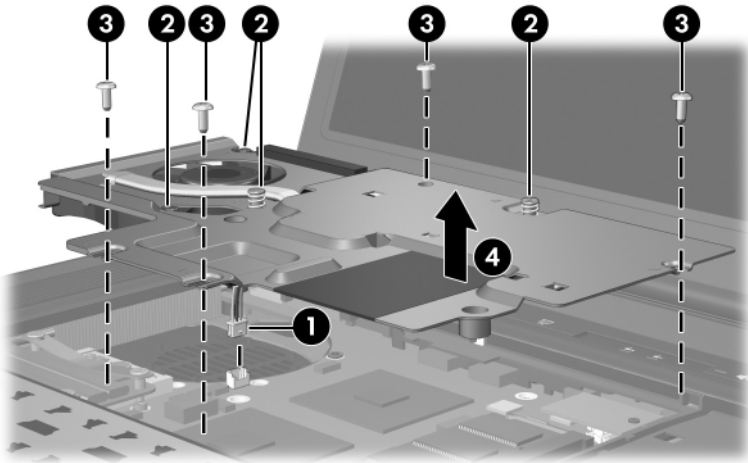
1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Release the keyboard ([Section 6.9](#)).

3. Disconnect the fan cable **1** from the system board.



The following screws should be loosened and removed, then installed, in the 1, 2, 3, 4, 5, 6, 7, 8 sequence stamped on the thermal plate.

4. Loosen the four PM2.0×10.0 spring-loaded screws **2** that secure the thermal plate to the computer.
5. Remove the four T8M2.0×4.0 screws **3** that secure the thermal plate to the computer.
6. Remove the thermal plate **4**.



Removing the Thermal Plate

Reverse the above procedure to install the thermal plate.

6.13 Heat Sink

Heat Sink Spare Part Number Information

Heat sink (includes thermal paste)

379799-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Release the keyboard ([Section 6.9](#)).
3. Remove the thermal plate ([Section 6.12](#)).



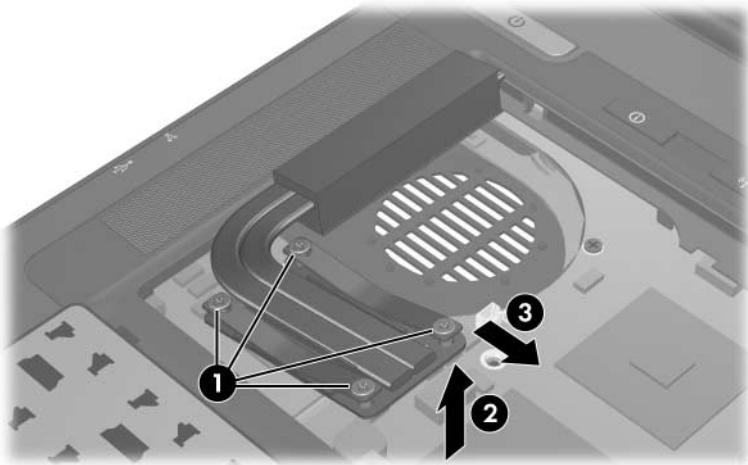
The following screws should be loosened and installed in the 1, 2, 3, 4 sequence stamped on the heat sink.

4. Loosen the four PM2.0x8.0 shoulder screws **1** that secure the heat sink to the computer.
-



Due to the adhesive quality of the thermal paste located between the heat sink and processor, it may be necessary to move the heat sink from side to side to detach the heat sink from the processor.

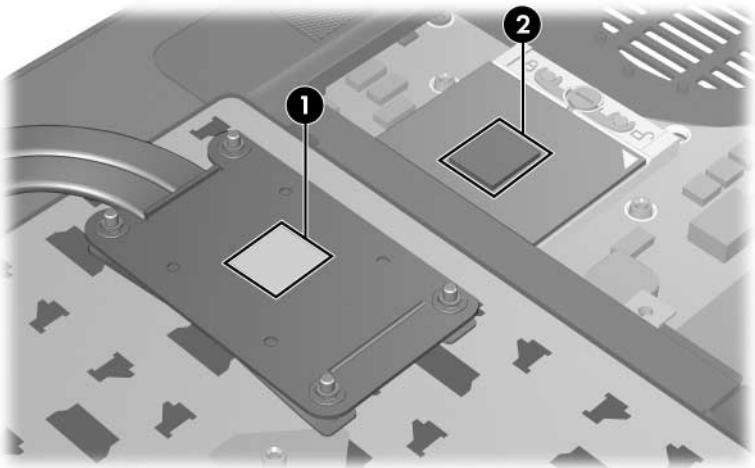
5. Lift the right side of the heat sink **2** until it disengages from the processor.
6. Slide the heat sink **3** to the right and remove it.



Removing the Heat Sink



The thermal paste should be thoroughly cleaned from the surfaces of the heat sink **1** and processor **2** each time the heat sink is removed. Thermal paste is included with all heat sink and processor spare part kits.



Replacing the Thermal Paste

Reverse the above procedure to install the heat sink.

6.14 Processor

Processor Spare Part Number Information

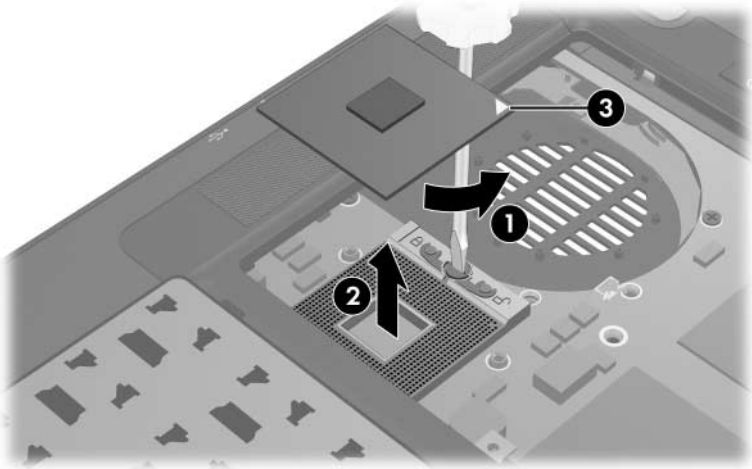
Intel Pentium M 770 (2.13-GHz)	378224-001
Intel Pentium M 760 (2.00-GHz)	378223-001
Intel Pentium M 750 (1.86-GHz)	378222-001
Intel Pentium M 740 (1.73-GHz)	378221-001
Intel Pentium M 730 (1.60-GHz)	378220-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Release the keyboard ([Section 6.9](#)).
3. Remove the thermal plate ([Section 6.12](#)).
4. Remove the heat sink ([Section 6.13](#)).

5. Use a flat-blade screwdriver to turn the processor locking screw **1** one-quarter turn counterclockwise until you hear a click.
6. Lift the processor **2** straight up and remove it .



The gold triangle **3** on the processor should be aligned in the rear right corner when you install the processor.



Removing the Processor

Reverse the above procedure to install the processor.

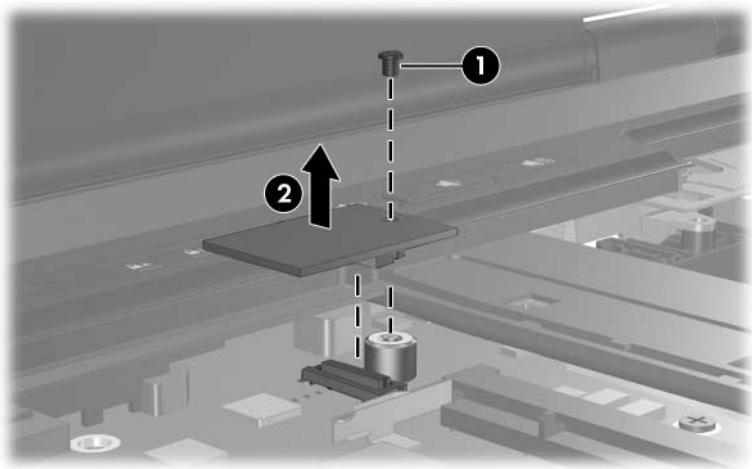
6.15 TPM Security Module

TPM Security Module Spare Part Number Information

TPM security module

379807-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Release the keyboard ([Section 6.9](#)).
3. Remove the PM1.5×3.0 screw **1** that secures the TPM security module to the computer.
4. Lift up on the right side of the module to disconnect it from the system board and remove the module **2**.



Removing the TPM Security Module

Reverse the above procedure to install the TPM security module.

6.16 Internal Memory Module

Memory Module Spare Part Number Information

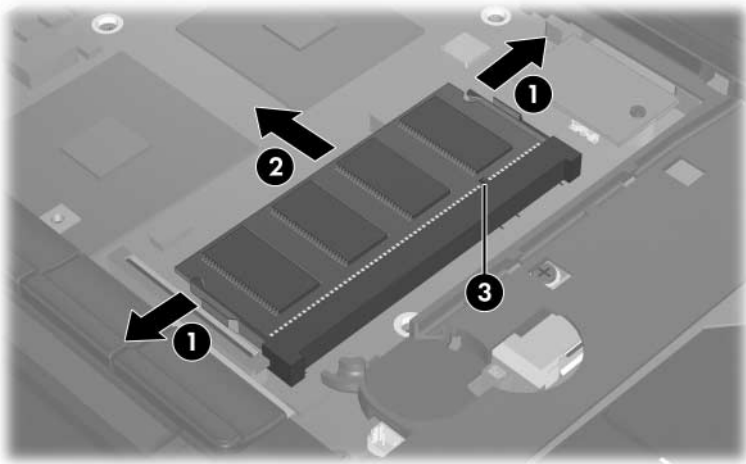
1024 MB	373121-001
512 MB	373120-001
256 MB	373119-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Release the keyboard ([Section 6.9](#)).
3. Remove the thermal plate ([Section 6.12](#)).

4. Spread the retaining tabs **1** on each side of the memory module socket to release the memory module board. (The side of the module opposite the socket rises away from the computer.)
5. Slide the module away from the socket at an angle **2**.
6. Remove the memory module board.



Memory modules are designed with a notch **3** to prevent incorrect installation into the memory module socket.



Removing the Internal Memory Module

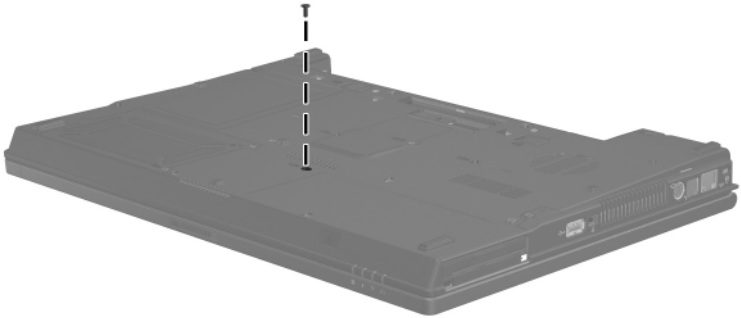
Reverse the above procedure to install an internal memory module.

6.17 TouchPad

TouchPad Spare Part Number Information

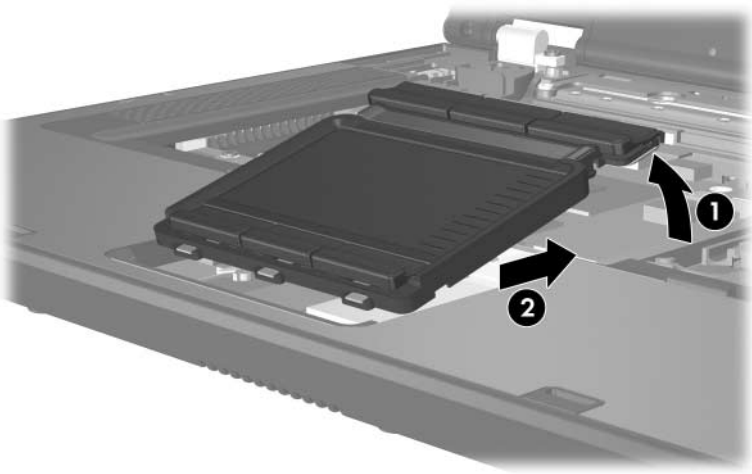
For use only with HP Compaq nw8240 models	382679-001
For use only with HP Compaq nc8230 and nc8220 models	382678-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Remove the keyboard ([Section 6.9](#)).
3. Turn the computer upside down with the front toward you.
4. Remove the T8M2.0×9.5 screw that secures the TouchPad to the computer.



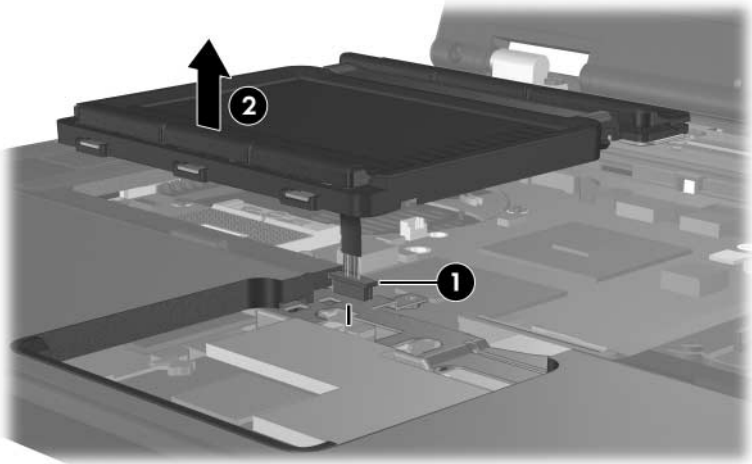
Removing the TouchPad Screw

5. Turn the computer display-side up with the front toward you.
6. Open the computer as far as possible.
7. Lift up on the front edge of the TouchPad **1** until it disengages from the computer.
8. Slide the TouchPad back **2** until it rests on the computer.



Releasing the TouchPad

9. Disconnect the TouchPad cable ❶ from the system board.
10. Remove the TouchPad ❷.



Removing the TouchPad

Reverse the above procedure to install the TouchPad.

6.18 Mini PCI Communications Module

Mini PCI Communications Module Spare Part Number Information

802.11b/g Mini PCI modem, for use in most of the world	381582-001
802.11b/g Mini PCI modem, for use in the rest of the world	381583-001
802.11b/g combination wireless local access network (WLAN) module, for use internationally	373032-002
802.11b/g combination WLAN module, for use in Japan	373032-291
802.11b/g combination WLAN module, for use in the United States	373032-001
802.11a/b/g combination WLAN communications module, for use internationally	373033-002
802.11a/b/g combination WLAN communications module, for use in Japan	373033-291
802.11a/b/g combination WLAN communications module, for use in the United States	373033-001
802.11a/b/g Mini PCI WLAN communications module, for use in Europe, the Middle East, and Africa	373900-021
802.11a/b/g Mini PCI WLAN communications module, for use in Japan	373900-291
802.11a/b/g Mini PCI WLAN communications module, for use in most of the world	373900-001
802.11a/b/g Mini PCI WLAN communications module, for use in the rest of the world	373901-001

1. Prepare the computer for disassembly ([Section 6.3](#)).
2. Remove the keyboard ([Section 6.9](#)).
3. Remove the TouchPad ([Section 6.17](#)).

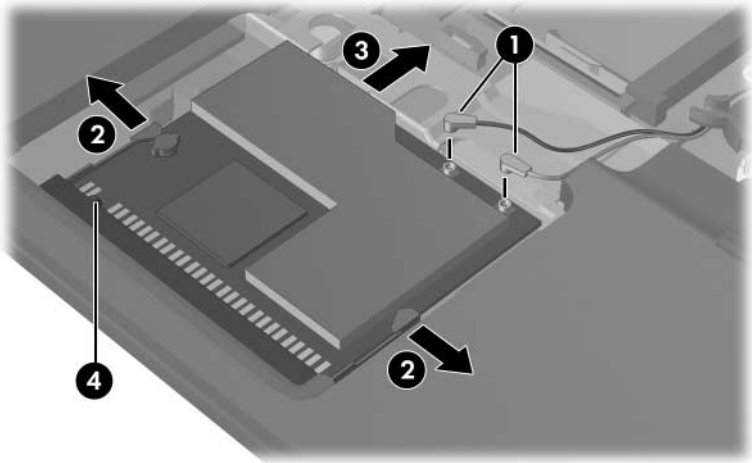


Make note of which antenna cable is attached to which antenna clip on the Mini PCI communications module before disconnecting the cables.

4. Disconnect the auxiliary and main antenna cables **1** from the Mini PCI communications module.
 5. Spread the two retaining tabs **2** on each side of the Mini PCI socket to release the Mini PCI communications module. (The edge of the module opposite the socket rises away from the computer.)
 6. Remove the Mini PCI communications module by pulling the module **3** away from the socket at a 45-degree angle.
-



Mini PCI communications modules are designed with a notch **4** to prevent incorrect installation.



Removing a Mini PCI Communications Module

Reverse the above procedure to install a Mini PCI communications module.

6.19 Display Assembly

Display Assembly Spare Part Number Information

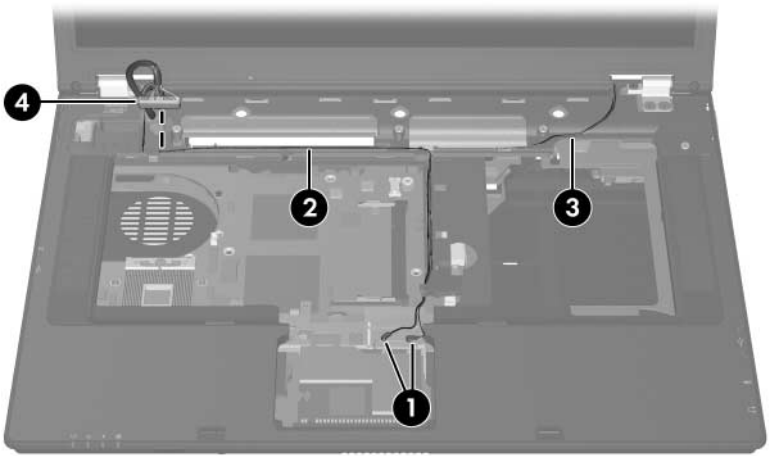
15.4-inch, SWXGA, TFT	382684-001
15.4-inch, WXGA, TFT	382682-001
15.4-inch, UXGA, TFT	382683-001

1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Keyboard ([Section 6.9](#))
 - b. Switch cover ([Section 6.10](#))
 - c. TouchPad ([Section 6.17](#))



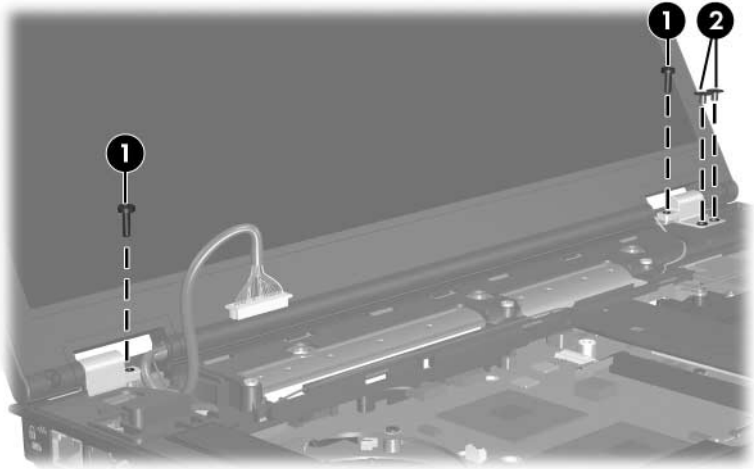
Make note of which antenna cable is attached to which antenna clip on the Mini PCI communications module before disconnecting the cables.

2. Disconnect the wireless antenna cables **1** from the Mini PCI communications module.
3. Remove the wireless antenna cables from the top cover clips **2** and **3** through which they are routed.
4. Disconnect the display cable **4** from the system board.



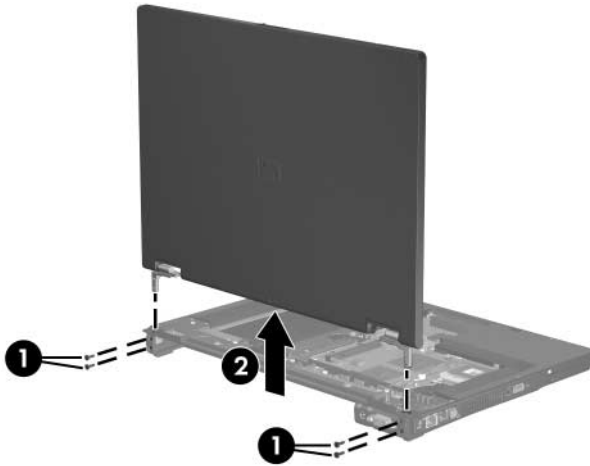
Disconnecting the Wireless Antenna and Display Cables

5. Remove the two T8M2.0×9.5 screws ❶ and the two PM2.0×2.0 screws ❷ that secure the display assembly to the computer.



Removing the Display Screws

6. Position the computer with the rear panel toward you.
7. Remove the four T8M2.0×9.5 screws **1** that secure the display assembly to the computer.
8. Lift the display assembly **2** straight up to remove it.



Removing the Display

Reverse the above procedure to install the display assembly.

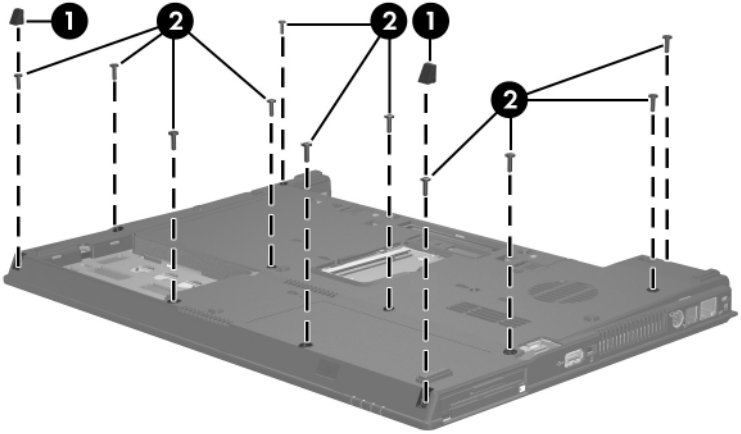
6.20 Top Cover

Top Cover Spare Part Number Information

For use only with HP Compaq nw8240 models	382679-001
For use only with HP Compaq nc8230 and nc8220 models	382678-001

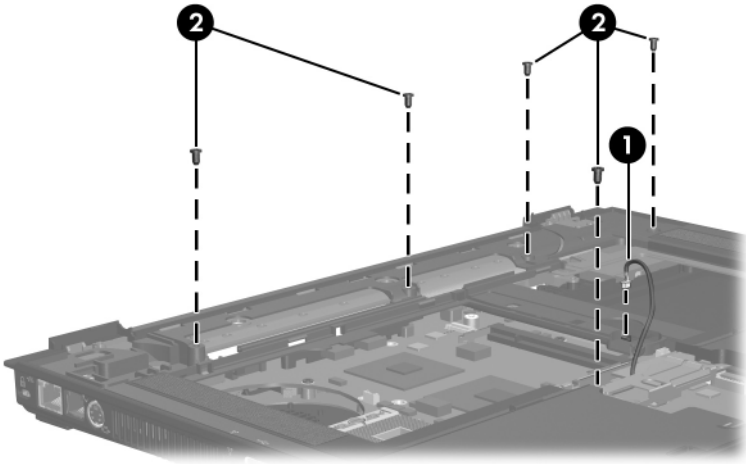
1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. Keyboard ([Section 6.9](#))
 - c. Switch cover ([Section 6.10](#))
 - d. TouchPad ([Section 6.17](#))
 - e. Display assembly ([Section 6.19](#))
2. Turn the computer upside down with the front panel toward you.

3. Remove the two rubber screw covers ❶ and the eleven T8M2.0×9.5 screws ❷ that secure the top cover to the computer.



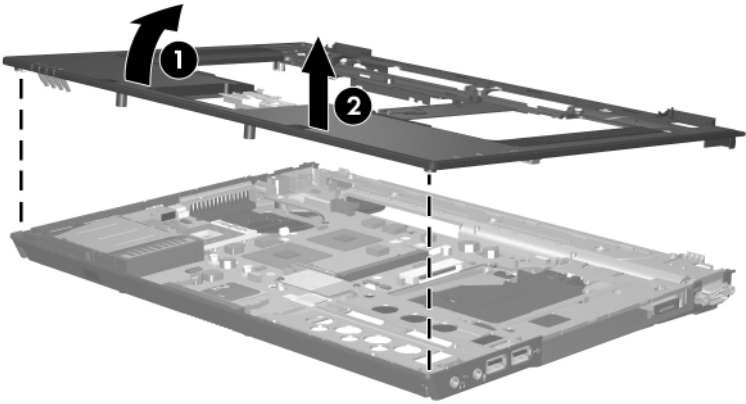
Removing the Top Cover Screws, Part 1

4. Turn the computer right-side up with the front panel toward you.
5. Disconnect the speaker cable **1** from the system board.
6. Remove the five T8M2.0×4.0 screws **2** that secure the top cover to the computer.



Removing the Top Cover Screws, Part 2

7. Lift the front edge of the top cover ❶ until it disengages from the base enclosure.
8. Lift the top cover ❷ straight up and remove it.



Removing the Top Cover

Reverse the above procedure to install the top cover.

6.21 Modem Board

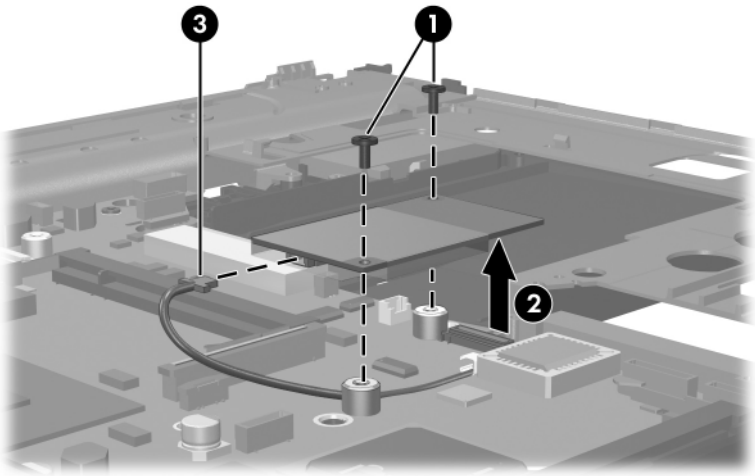
Modem Board Spare Part Number Information

Modem board (high-speed 56K)

325521-001

1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. Keyboard ([Section 6.9](#))
 - c. Switch cover ([Section 6.10](#))
 - d. TouchPad ([Section 6.17](#))
 - e. Display assembly ([Section 6.19](#))
 - f. Top cover ([Section 6.20](#))

2. Remove the two T8M2.0×4.0 screws **1** that secure the modem board to the system board.
3. Lift the right side of the modem board **2** to disconnect it from the system board.
4. Disconnect the modem cable **3** from the modem board.
5. Remove the modem board.



Removing the Modem Board

Reverse the above procedure to install the modem board.

6.22 System Board

System Board Spare Part Number Information

With 128-MB video memory, for use only with HP Compaq nw8240 models	382686-001
With 128-MB video memory, for use only with HP Compaq nc8230 and nc8220 models	382687-001
With 64-MB video memory, for use only with HP Compaq nc8230 and nc8220 models	382688-001

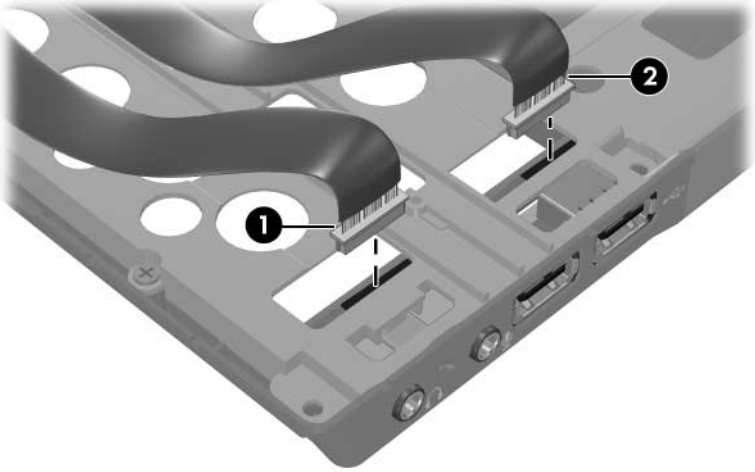


When replacing the system board, ensure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory modules ([Section 6.7](#) and [Section 6.16](#))
 - Processor ([Section 6.14](#))
 - TPM security module ([Section 6.15](#))
 - Mini PCI communications module ([Section 6.18](#))
 - Modem board ([Section 6.21](#))
-

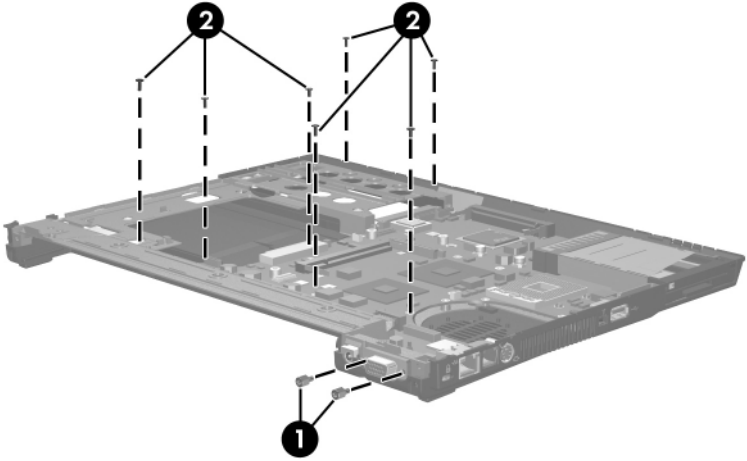
1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. MultiBay II device ([Section 6.6](#))
 - c. Bluetooth board ([Section 6.8](#))
 - d. Keyboard ([Section 6.9](#))
 - e. Switch cover ([Section 6.10](#))
 - f. Thermal plate ([Section 6.12](#))
 - g. Heat sink ([Section 6.13](#))
 - h. TouchPad ([Section 6.17](#))
 - i. Display assembly ([Section 6.19](#))
 - j. Top cover ([Section 6.20](#))

2. Disconnect the RTC battery cable from the system board ([Section 6.11](#)).
3. Position the computer with the front panel toward you.
4. Disconnect the audio board cables **1** and **2** from the audio board.



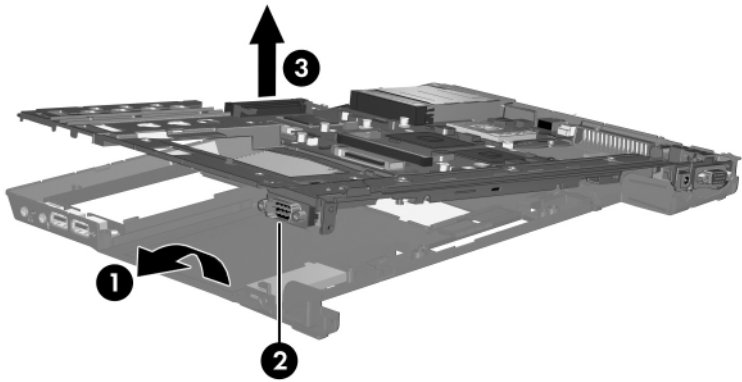
Disconnecting the Audio Board Cables

5. Position the computer with the rear panel toward you.
6. Remove the following:
 - ❶ Two HM5.0×10.0 screw locks on each side of the external monitor connector
 - ❷ Seven T8M2.0×6.0 screws



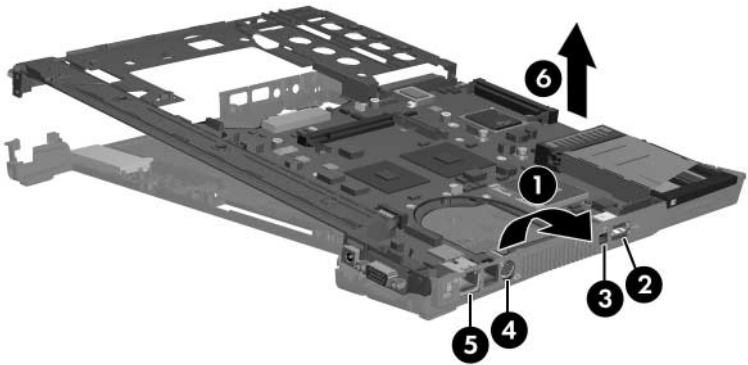
Removing the System Board Screws and Screw Locks

7. Flex the left side of the base enclosure **1** until the serial connector **2** is clear of the base enclosure.
8. Lift the left side of the system board **3** until it rests at an angle.



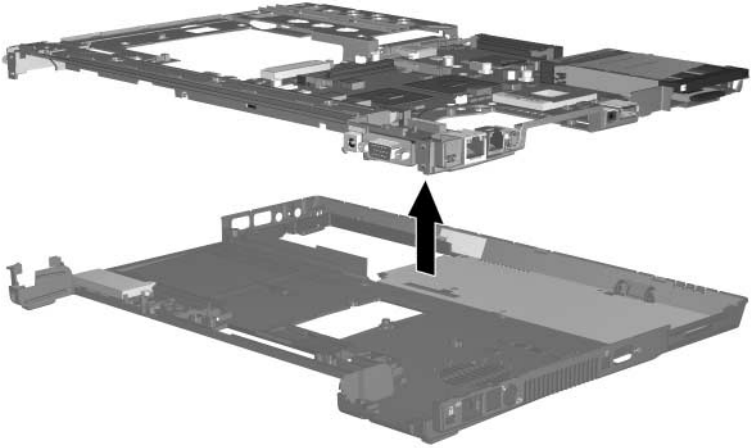
Releasing the System Board, Part 1

9. Flex the right side of the base enclosure **1** until the USB **2**, 1394 **3**, S-Video **4**, and RJ-45 connectors **5** are clear of the base enclosure.
10. Lift the right side of the system board **6** until it rests at an angle.



Releasing the System Board, Part 2

11. Lift the system board straight up and remove it.



Removing the System Board

Reverse the above procedure to install the system board.

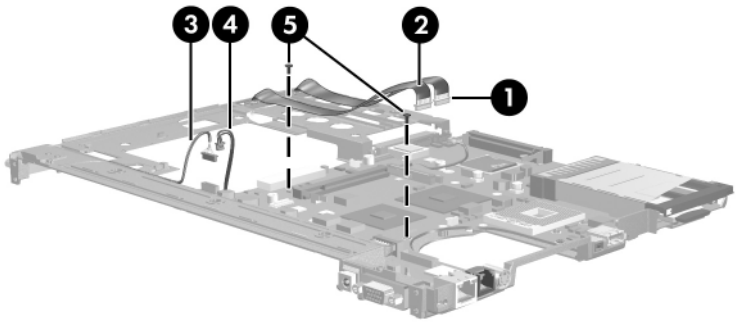
6.23 System Board Frame

System Board Frame Spare Part Number Information

System board frame (includes RJ-11 modem cable)	382689-001
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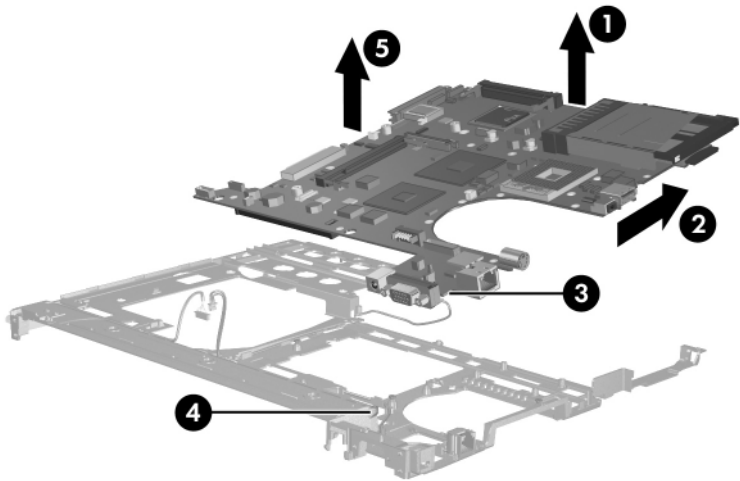
1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. MultiBay II device ([Section 6.6](#))
 - c. Bluetooth board ([Section 6.8](#))
 - d. Switch cover ([Section 6.10](#))
 - e. Keyboard ([Section 6.9](#))
 - f. Thermal plate ([Section 6.12](#))
 - g. Heat sink ([Section 6.13](#))
 - h. TouchPad ([Section 6.17](#))
 - i. Display assembly ([Section 6.19](#))
 - j. Top cover ([Section 6.20](#))
 - k. System board ([Section 6.22](#))

2. Disconnect the following cables from the system board:
 - ❶ Audio connector board cable
 - ❷ USB connector board cable
 - ❸ Serial connector board cable
 - ❹ Modem cable
3. Remove the two T8M2.0×4.0 screws ❺ that secure the system board to the system board frame.



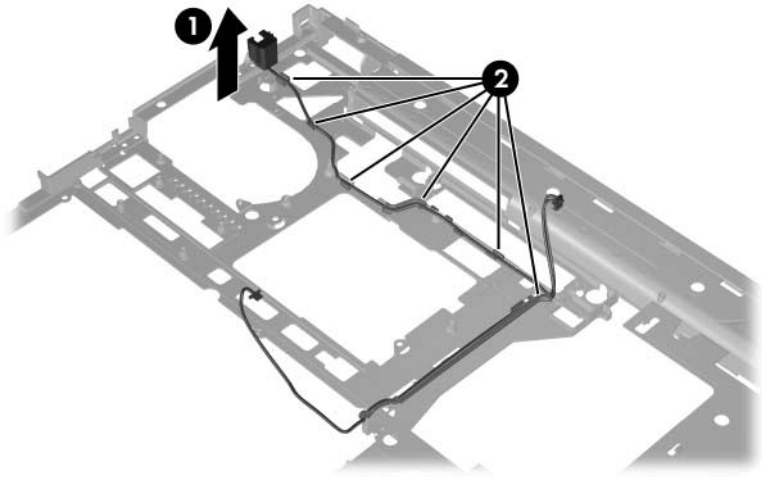
Disconnecting the System Board Cables

4. Lift the rear edge of the system board **1** until it rests at an angle.
5. Slide the system board **2** back until the front-right section of the system board **3** is clear of the screw boss **4** on the system board frame.
6. Remove the system board **5** from the system board frame.



Removing the System Board from the System Board Frame

7. If necessary, remove the RJ-11 connector module and cable ❶ from the clips ❷ in the system board frame.



Removing the RJ-11 Connector Module and Cable

Reverse the above procedures to install the system board frame.

6.24 Push Button Module

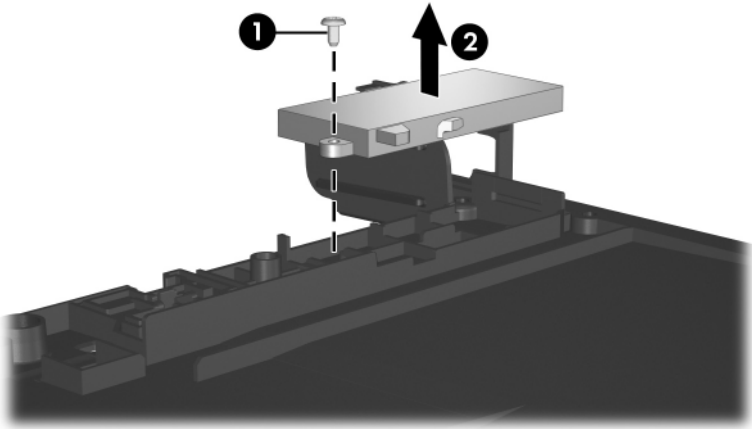
Push Button Module Spare Part Number Information

Push button module

382693-001

1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. MultiBay II device ([Section 6.6](#))
 - c. Bluetooth board ([Section 6.8](#))
 - d. Switch cover ([Section 6.10](#))
 - e. Keyboard ([Section 6.9](#))
 - f. Thermal plate ([Section 6.12](#))
 - g. Heat sink ([Section 6.13](#))
 - h. TouchPad ([Section 6.17](#))
 - i. Display assembly ([Section 6.19](#))
 - j. Top cover ([Section 6.20](#))
 - k. System board ([Section 6.22](#))

2. Remove the PM2.0×6.0 screw ❶ that secures the push button module to the base enclosure.
3. Remove the push button module ❷.



Removing the Push Button Module

Reverse the above procedures to install the push button module.

6.25 Serial Connector Module

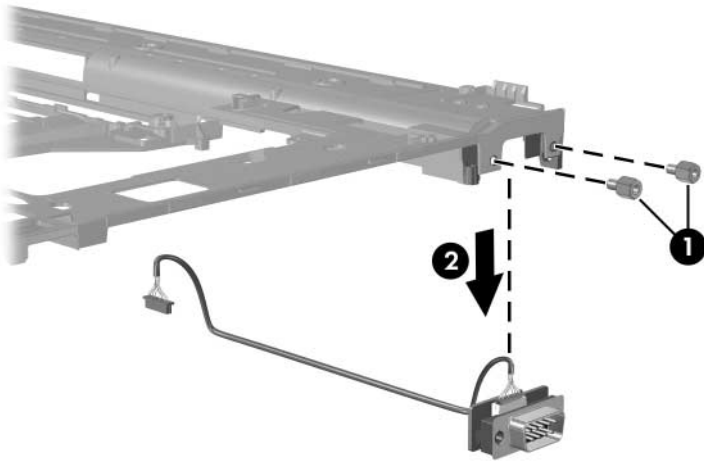
Serial Connector Module Spare Part Number Information

Serial connector module

382690-001

1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. MultiBay II device ([Section 6.6](#))
 - c. Bluetooth board ([Section 6.8](#))
 - d. Switch cover ([Section 6.10](#))
 - e. Keyboard ([Section 6.9](#))
 - f. Thermal plate ([Section 6.12](#))
 - g. Heat sink ([Section 6.13](#))
 - h. TouchPad ([Section 6.17](#))
 - i. Display assembly ([Section 6.19](#))
 - j. Top cover ([Section 6.20](#))
 - k. System board ([Section 6.22](#))

2. Remove the two HM5.0×10.0 screw locks ❶ that secure the serial connector module to the system board frame.
3. Remove the serial connector module ❷ from the system board frame.



Removing the Serial Connector Module and Cable

Reverse the above procedure to install the serial connector module.

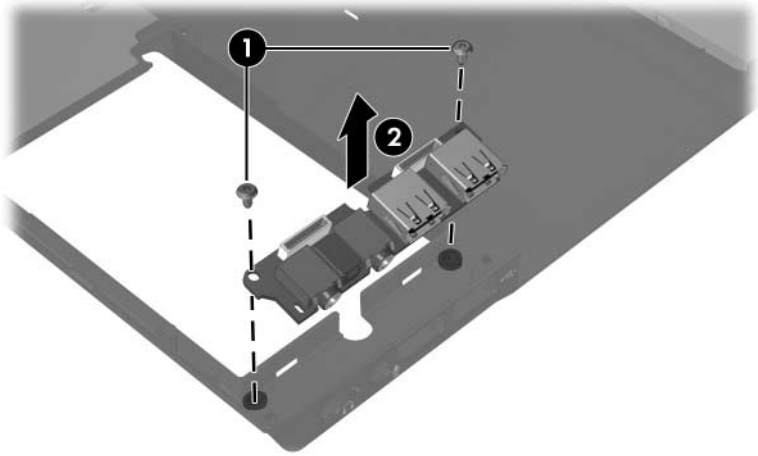
6.26 Audio Board

Audio Board Spare Part Number Information

Audio board (includes audio board cable)	382677-001
--	------------

1. Prepare the computer for disassembly ([Section 6.3](#)) and remove the following components:
 - a. Hard drive ([Section 6.4](#))
 - b. MultiBay II device ([Section 6.6](#))
 - c. Bluetooth board ([Section 6.8](#))
 - d. Switch cover ([Section 6.10](#))
 - e. Keyboard ([Section 6.9](#))
 - f. Thermal plate ([Section 6.12](#))
 - g. Heat sink ([Section 6.13](#))
 - h. TouchPad ([Section 6.17](#))
 - i. Display assembly ([Section 6.19](#))
 - j. Top cover ([Section 6.20](#))
 - k. System board ([Section 6.22](#))

2. Remove the two T8M2.0×4.0 screws ❶ that secure the audio board to the base enclosure.
3. Lift the left side of the audio board ❷ to disengage it from the base enclosure.



Removing the Audio Board

Reverse the above procedure to install the audio board.

Specifications

This chapter provides physical and performance specifications.

Table 7-1
Computer

Dimensions	Metric	U.S.
Height	35.6 cm	14.02 in
Width	26.0 cm	10.24 in
Depth (front to back)	2.8 to 3.4 cm	1.1 to 1.34 in
Weight		
Full-featured model with optical drive and 8-cell battery pack	2.85 kg	6.25 lbs
Defeatured model with 8-cell battery pack	2.60 kg	5.73 lbs
Input Power		
Operating voltage	18.5 V dc @ 3.5 A - 90 W	
Operating current	3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F

Table 7-1
Computer (Continued)

Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random Vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	



Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.

Table 7-2
15.4-inch, WSXGA, TFT Display

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors		Up to 16.8 million
Contrast ratio		200:1
Brightness		180 nits typical
Pixel resolution		
Pitch	0.197 × 0.197 mm	
Format	1680 × 1050	
Configuration	RGB vertical stripe	
Backlight		Edge lit
Character display		80 × 25
Total power consumption		5.5 W
Viewing angle		+/-65° horizontal, +/-50° vertical typical

Table 7-3
15.4-inch, WXGA, TFT Display

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.259 × 0.259 mm	
Format	1280 × 800	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	5.5 W	
Viewing angle	+/-65° horizontal, +50° vertical typical	

Table 7-4
15.4-inch, UXGA, TFT Display

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1600 × 1200	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	5.5 W	
Viewing angle	+/-65° horizontal, +50° vertical typical	

Table 7-5
Hard Drives

	60-GB*	80-GB*	60-GB*	40-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	102 g	99 g	102 g	99 g
Interface type				
	ATA-5	ATA-5	ATA-5	ATA-5
Transfer rate				
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security



Certain restrictions and exclusions apply. Consult Customer Care for details.

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.

†Actual drive specifications may differ slightly.

Table 7-5
Hard Drives (*Continued*)

	60-GB*	80-GB*	60-GB*	40-GB*
Seek times (typical read, including setting)				
Single track	3 ms	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms	24 ms
Logical blocks [†]	117,210,240	156,301,488	117,210,240	78,140,160
Disk rotational speed	5400 rpm	7200 rpm	5400 rpm	5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)			



Certain restrictions and exclusions apply. Consult Customer Care for details.

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.

[†]Actual drive specifications may differ slightly.

Table 7-6
Primary 8-cell, Li-Ion Battery Pack

Dimensions

Height	2.00 cm	0.79 in
Width	9.40 cm	3.70 in
Depth	13.40 cm	5.28 in
Weight	0.34 kg	0.75 lb

Energy

Voltage	11.1 V
Amp-hour capacity	4.4 Ah
Watt-hour capacity	48 Wh

Temperature

Operating	5°C to 45°C	41°F to 113°F
Nonoperating	0°C to 60°C	32°F to 140°F

Table 7-7
DVD-ROM Drive

Applicable disc	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18) CD-ROM (Mode 1 and 2) CD Digital Audio CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R CD-RW Photo CD (single and multisession) CD-Bridge	
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 μ m	
Access time	CD	DVD
Random	< 100 ms	< 125 ms
Full stroke	< 175 ms	< 225 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	512 KB	
Data transfer rate		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD rate)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 10 seconds	
Stop time	< 3 seconds	

Table 7-8
DVD/CD-RW Combo Drive

Applicable disc	Read:	Write:
	DVD-R, DVD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), CD-ROM (Mode 1 and 2) CD Digital Audio CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R, CD-RW Photo CD (single and multisession) CD-Bridge	CD-R and CD-RW
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	

Table 7-8
DVD/CD-RW Combo Drive (Continued)

Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 μ m	
Access time	CD media	DVD media
Random	< 110 ms	< 130 ms
Full stroke	< 210 ms	< 225 ms
Audio output level	Line-out, 0.7 V rms	
Cache buffer	2 MB	
Data transfer rate		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1352 KB/s at 1X DVD rate)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Table 7-9
DVD+RW/R and CD-RW Combo Drive

Applicable disc	Read:	Write:
	DVD-R, DVD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), CD-ROM (Mode 1 and 2) CD Digital Audio CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R, CD-RW Photo CD (single and multisession) CD-Bridge	CD-R and CD-RW DVD-R and DVD-RW
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	

Table 7-9
DVD+RW/R and CD-RW Combo Drive (Continued)

Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 μ m	
Access time	CD	DVD
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
Audio output level	Audio-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
CD-R (16X)	2,400 KB/s (150 KB/s at 1X CD rate)	
CD-RW (8X)	1,200 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3,600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD rate)	
DVD-R (4X)	5,400 KB/s (1,352 KB/s at 1X DVD rate)	
DVD-RW (2X)	2,700 KB/s (1,352 KB/s at 1X DVD rate)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Table 7-10
System DMA

Hardware DMA	System Function
DMA0	Not applicable
DMA1*	Not applicable
DMA2*	Not applicable
DMA3	Not applicable
DMA4	Direct memory access controller
DMA5*	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned

*PC Card controller can use DMA 1, 2, or 5.

Table 7-11
System Interrupts

Hardware IRQ	System Function
IRQ0	System timer
IRQ1	Standard 101-/102-Key or Microsoft Natural Keyboard
IRQ2	Cascaded
IRQ3	Intel 82801DB/DBM USB2 Enhanced Host Controller—24CD
IRQ4	COM1
IRQ5*	Conexant AC—Link Audio Intel 82801DB/DBM SMBus Controller—24C3 Data Fax Modem with SmartCP
IRQ6	Diskette drive
IRQ7*	Parallel port
IRQ8	System CMOS/real-time clock
IRQ9*	Microsoft ACPI-compliant system
IRQ10*	Intel USB UHCI controller—24C2 Intel 82852/82855 GM/GME Graphic Controller Realtek RTL8139 Family PCI fast Ethernet Controller

Table 7-11
System Interrupts (Continued)

Hardware IRQ	System Function
IRQ11	Intel USB EHCI controller—24CD Intel USB UHCI controller—24C4 Intel USB UHCI controller—24C7 Intel Pro/Wireless 2200BG TI OHCI 1394 host controller TI PCI1410 CardBus controller
IRQ12	Synaptics PS/2 TouchPad
IRQ13	Numeric data processor
IRQ14	Primary IDE channel
IRQ15	Secondary IDE channel

*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.



PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.

Table 7-12
System I/O Addresses

I/O Address (hex)	System Function (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 "Super I/O" configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/RTC
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2

Table 7-12
System I/O Addresses (Continued)

I/O Address (hex)	System Function (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
201	Joystick (decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port

Table 7-12
System I/O Addresses (Continued)

I/O Address (hex)	System Function (shipping configuration)
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer—OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	PC Card controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	“A” diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

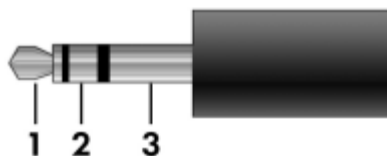
Table 7-13
System Memory Map

Size	Memory Address	System Function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	01000000-047FFFFF	Super extended memory
58 MB	04800000-07FFFFFF	Unused
2 MB	08000000-080FFFFF	Video memory (direct access)
4 GB	08200000-FFFEFFFF	Unused
64 KB	FFFF0000-FFFFFFFF	System BIOS

A

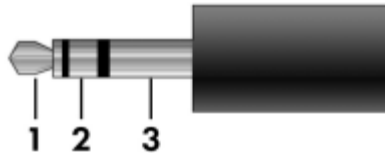
Connector Pin Assignments

Table A-1
Audio-Out (Headphone)



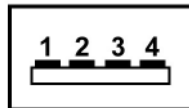
Pin	Signal	Pin	Signal
1	Audio out, left channel	3	Ground
2	Audio out, right channel		

Table A-2
Audio-In (Microphone)



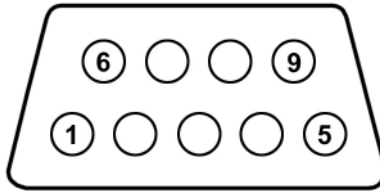
Pin	Signal	Pin	Signal
1	Audio signal in	3	Ground
2	Audio signal in		

Table A-3
Universal Serial Bus



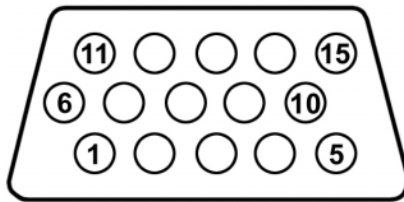
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data -	4	Ground

Table A-4
Serial



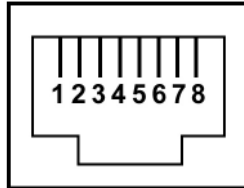
Pin	Signal	Pin	Signal
1	Carrier detect	6	Data set ready
2	Receive data	7	Ready to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Ground		

Table A-5
External Monitor



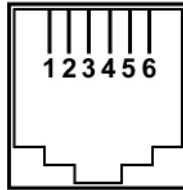
Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC 2B clock
8	Ground analog		

Table A-6
RJ-45 (Network)



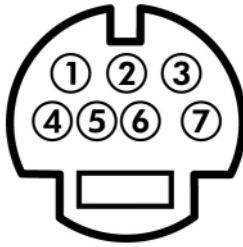
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit -	6	Receive -
3	Receive +	7	Unused
4	Unused	8	Unused

Table A-7
RJ-11 (Modem)



Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-8
S-Video-Out



Pin	Signal	Pin	Signal
1	S-VHS color (C) signal	5	TV-CD
2	Composite video signal	6	S-VHS intensity ground
3	S-VHS intensity (Y) signal	7	Composite video ground
4	S-VHS color ground		

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the computer permits it to operate from any line voltage from 100 to 120 or 220 to 240 volts AC.

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

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

General Requirements

The requirements listed below are applicable to all countries.

- The length of the power cord set must be at least 1.5 m (5.0 ft) and a maximum of 2.0 m (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country/Region	Accredited Agency	Applicable Note Number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3



NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² 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 SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

3-Conductor Power Cord Set Requirements (*Continued*)

Country/Region	Accredited Agency	Applicable Note Number
Korea	EK	4
The Netherlands	KE A	1
Norway	NEMKO	1
People's Republic of China	CCC	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
United Kingdom	BSI	1
United States	UL	2



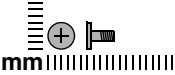
NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² 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 SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
 3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
 4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² 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.
 5. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² 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.
-

Screw Listing

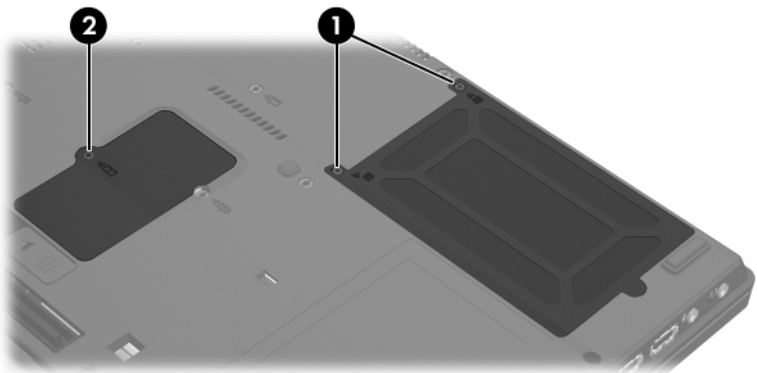
This appendix provides specification and reference information for the screws and screw locks used in the computer. All screws and screw locks listed in this appendix are available in the Screw Kit, spare part number 382692-001.

Table C-1
Phillips PM2.0×4.0 Screw

 mm	Color	Qty.	Length	Thread	Head Width
	Black	3	4.0 mm	2.0 mm	4.0 mm

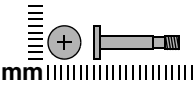
Where used:

- ❶ Two screws that secure the hard drive cover to the computer (screws are captured on the cover by C clips; documented in [Section 6.4](#))
- ❷ One screw that secures the memory module compartment cover to the computer (screw is captured on the cover by C clips; documented in [Section 6.7](#))



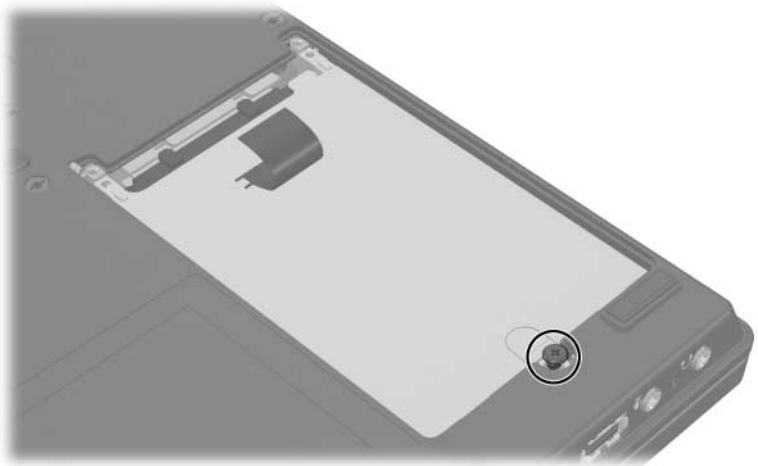
Phillips PM2.0×4.0 Screw Locations

Table C-2
Phillips PM2.5×13.0 Spring-Loaded Hard Drive
Retention Screw

	Color	Qty.	Length	Thread	Head Width
	Black	1	13.0 mm	2.5 mm	5.0 mm

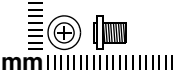
Where used:

One screw that secures the hard drive to the computer (screw is captured on the hard drive frame by a C clip; documented in [Section 6.4](#))



Phillips PM2.5×13.0 Screw Location

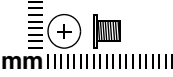
Table C-3
Phillips PM3.0x5.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Silver	2	5.0 mm	3.0 mm	5.0 mm

Where used:

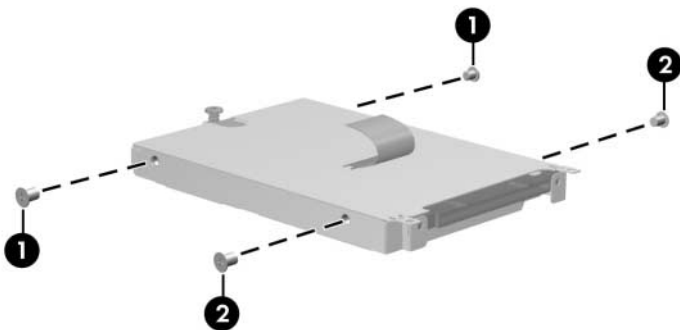
- ❶ Two screws that secure the hard drive frame to the hard drive (documented in [Section 6.4](#))

Table C-4
Phillips PM3.0x4.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Silver	2	4.0	3.0 mm	5.0 mm

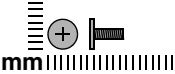
Where used:

- ❷ Two screws that secure the hard drive frame to the hard drive (documented in [Section 6.4](#))



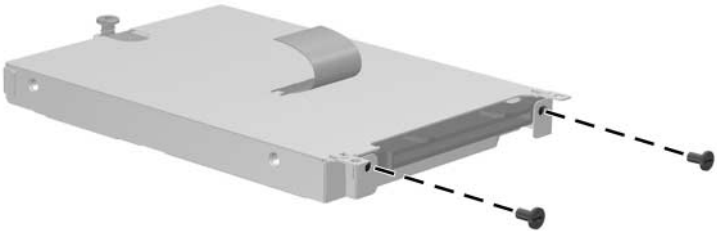
Phillips PM3.0x5.0 and PM3.0x4.0 Screw Locations

Table C-5
Phillips PM1.5×4.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Black	2	4.0 mm	1.5 mm	4.5 mm

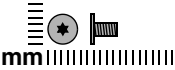
Where used:

2 screws that secure the hard drive frame to the hard drive (documented in [Section 6.4](#))



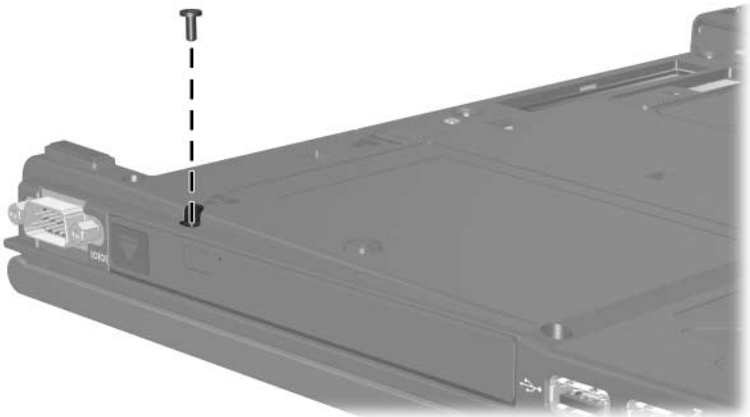
Phillips PM1.5×4.0 Screw Locations

Table C-6
Torx T8M2.0x4.0 Screw

 mm	Color	Qty.	Length	Thread	Head Width
	Black	16	4.0 mm	2.0 mm	4.5 mm

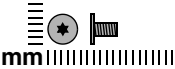
Where used:

One screw that secures the MultiBay II device to the computer (documented in [Section 6.6](#))



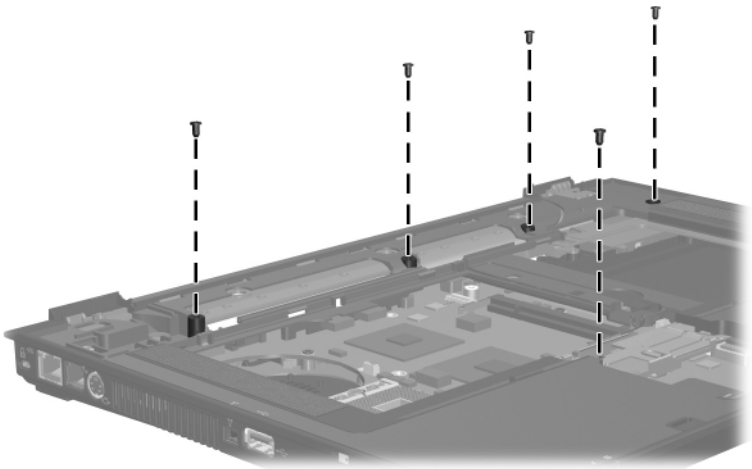
Torx T8M2.0x4.0 Screw Location

Table C-6
Torx T8M2.0×4.0 Screw (Continued)

 mm	Color	Qty.	Length	Thread	Head Width
	Black	16	4.0 mm	2.0 mm	4.5 mm

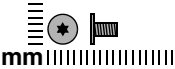
Where used:

5 screws that secure the top cover to the computer (documented in [Section 6.20](#))



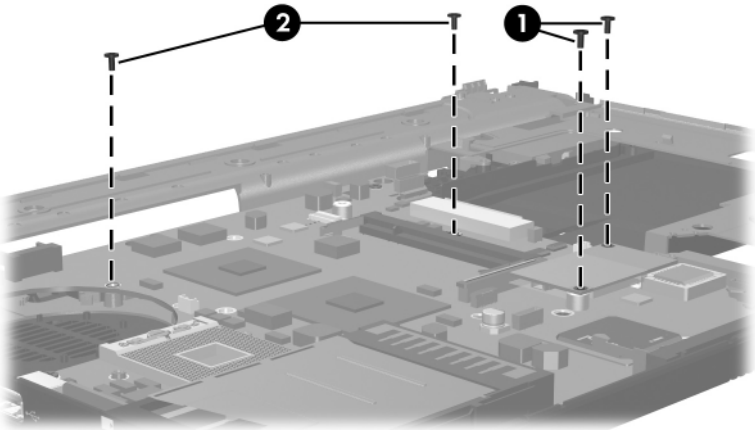
Torx T8M2.0×4.0 Screw Locations

Table C-6
Torx T8M2.0×4.0 Screw (Continued)

 mm	Color	Qty.	Length	Thread	Head Width
	Black	16	4.0 mm	2.0 mm	4.5 mm

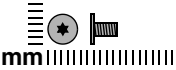
Where used:

- ❶ Two screws that secure the modem board to the computer (documented in [Section 6.21](#))
- ❷ Two screws that secure the system board to the computer (documented in [Section 6.22](#))



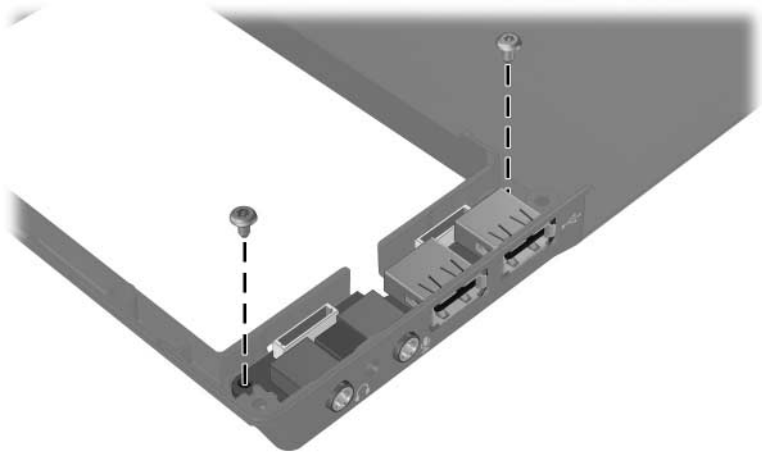
Torx T8M2.0×4.0 Screw Locations

Table C-6
Torx T8M2.0×4.0 Screw (Continued)

	Color	Qty.	Length	Thread	Head Width
mm	Black	16	4.0 mm	2.0 mm	4.5 mm

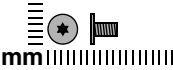
Where used:

2 screws that secure the audio board to the computer (documented in [Section 6.26](#))



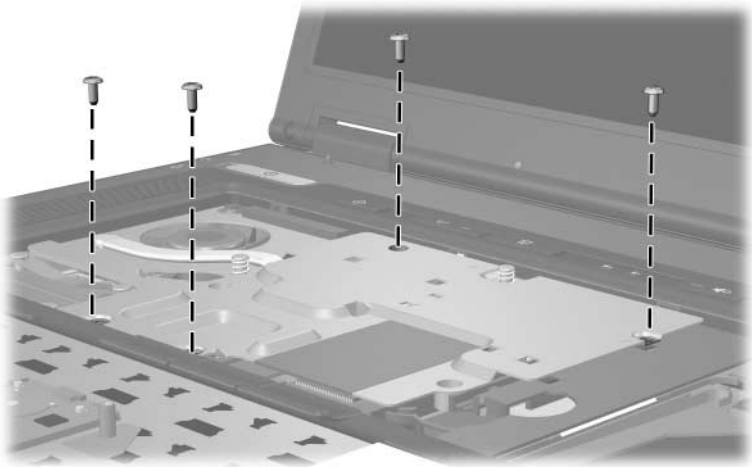
Torx T8M2.0×4.0 Screw Locations

Table C-6
Torx T8M2.0×4.0 Screw (Continued)

	Color	Qty.	Length	Thread	Head Width
mm	Black	16	4.0 mm	2.0 mm	4.5 mm

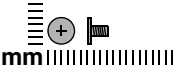
Where used:

4 screws that secure the thermal plate to the computer (documented in [Section 6.12](#))




Torx T8M2.0×4.0 Screw Locations

Table C-7
Phillips PM1.5x3.0 Screw

 mm	Color	Qty.	Length	Thread	Head Width
	Black	10	3.0 mm	1.5 mm	4.0 mm

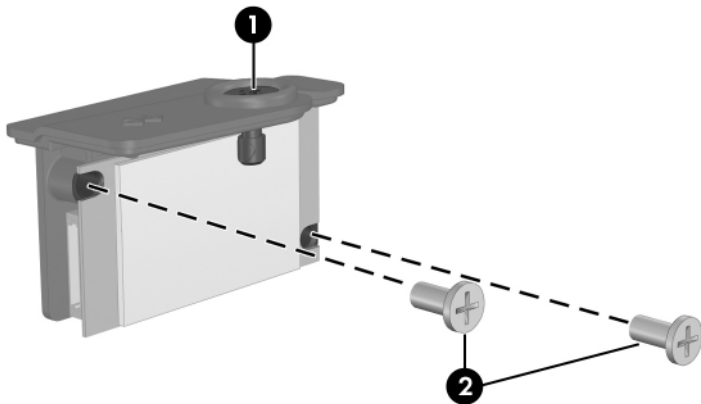
Where used:

- ❶ One black screw that secures the Bluetooth cover to the computer (screw is captured on the cover by a C clip; documented in [Section 6.8](#))

 mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	3.0 mm	1.5 mm	3.0 mm

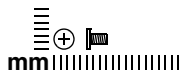
Where used:

- ❷ Two silver screws that secure the Bluetooth board to the Bluetooth cover (documented in [Section 6.8](#))



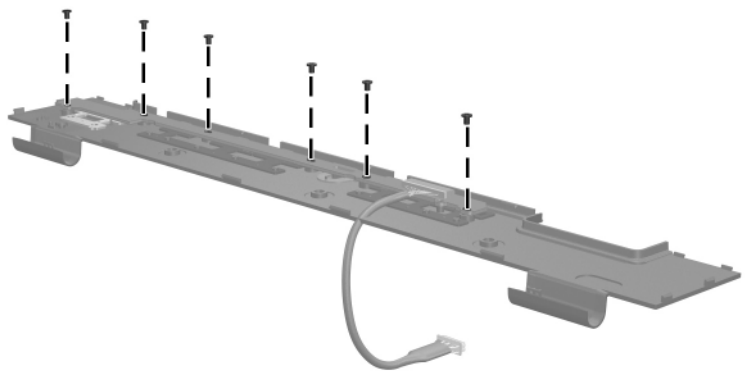
Phillips PM1.5x3.0 Screw Locations

Table C-7
Phillips PM1.5x3.0 Screw (Continued)

 mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	3.0 mm	1.5 mm	3.0 mm

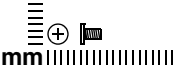
Where used:

6 screws that secure the LED board to the switch cover (documented in [Section 6.10](#))



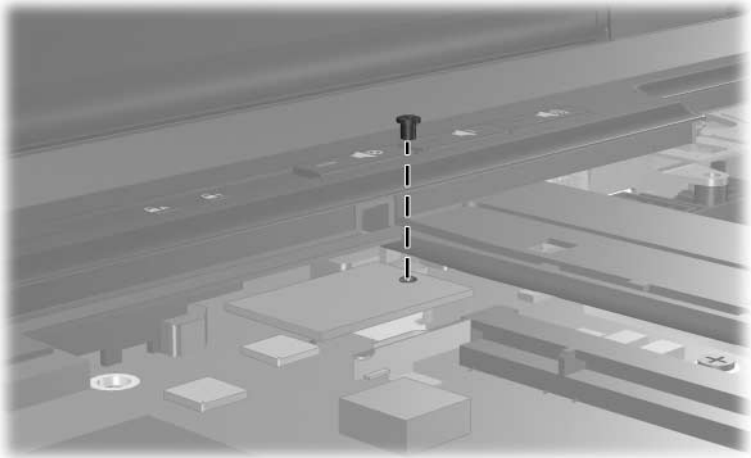
Phillips PM1.5x3.0 Screw Locations

Table C-7
Phillips PM1.5x3.0 Screw (Continued)

 mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	3.0 mm	1.5 mm	4.0 mm

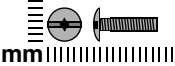
Where used:

One screw that secures the TPM security module to the computer (documented in [Section 6.15](#))



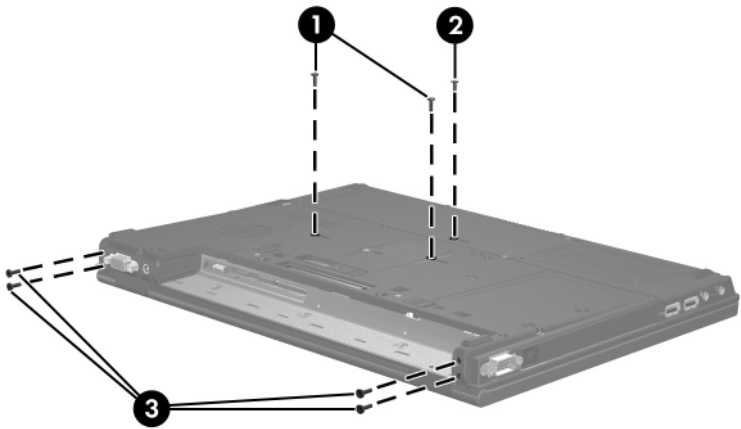
Phillips PM1.5x3.0 Screw Location

Table C-8
Torx T8M2.0×9.5 Screw

 mm	Color	Qty.	Length	Thread	Head Width
	Black	20	9.5 mm	2.0 mm	5.0 mm

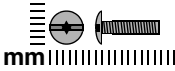
Where used:

- 1 Two screws that secure the keyboard to the computer (documented in [Section 6.9](#))
- 2 One screw that secures the TouchPad to the computer (documented in [Section 6.17](#))
- 3 Four screws that secure the display assembly to the computer (documented in [Section 6.19](#))



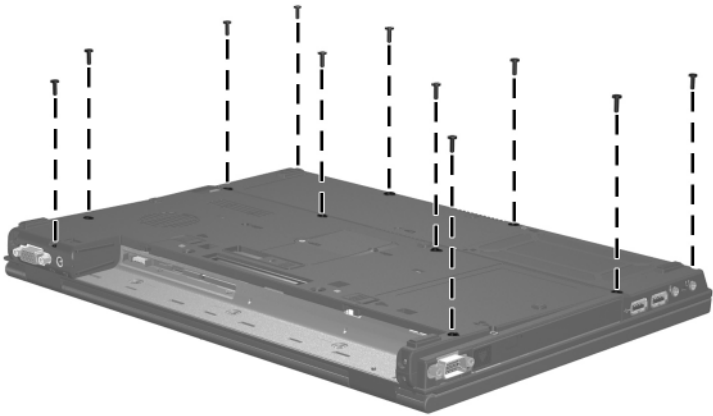
Torx T8M2.0×9.5 Screw Locations

Table C-8
Torx T8M2.0×9.5 Screw (Continued)

	Color	Qty.	Length	Thread	Head Width
	Black	20	9.5 mm	2.0 mm	5.0 mm

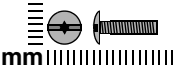
Where used:

11 screws that secure the top cover to the computer (documented in [Section 6.20](#))



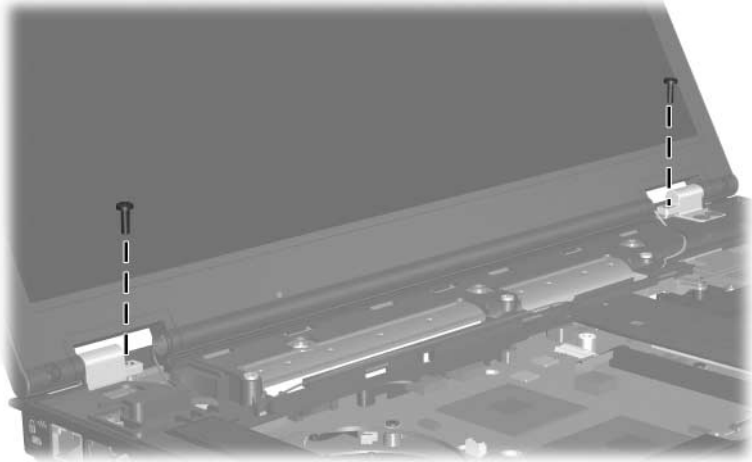
Torx T8M2.0×9.5 Screw Locations

Table C-8
Torx T8M2.0×9.5 Screw (Continued)

 mm	Color	Qty.	Length	Thread	Head Width
	Black	20	9.5 mm	2.0 mm	5.0 mm

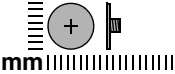
Where used:

2 screws that secure the display assembly to the computer (documented in [Section 6.19](#))



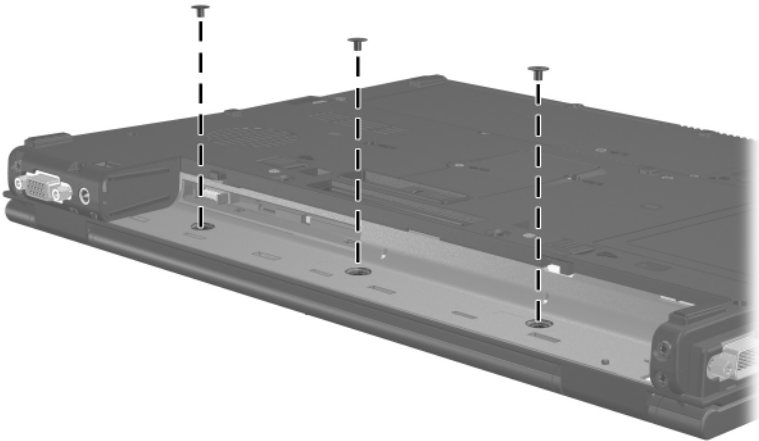
Torx T8M2.0×9.5 Screw Locations

Table C-9
Phillips PM2.0×2.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Black	5	2.0 mm	2.0 mm	7.0 mm

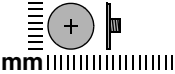
Where used:

3 screws that secure the switch cover to the computer (documented in [Section 6.10](#))



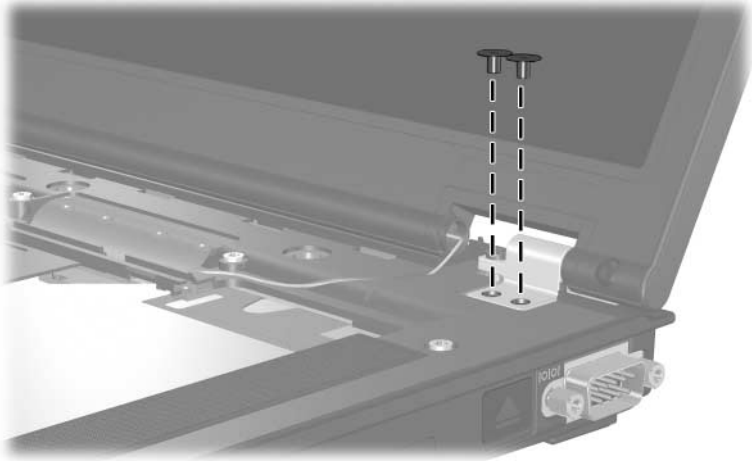
Phillips PM2.0×2.0 Screw Locations

Table C-9
Phillips PM2.0x2.0 Screw (Continued)

	Color	Qty.	Length	Thread	Head Width
	Black	5	2.0 mm	2.0 mm	7.0 mm

Where used:

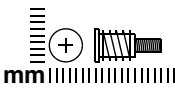
2 screws that secure the display assembly to the computer (documented in [Section 6.19](#))



Phillips PM2.0x2.0 Screw Locations

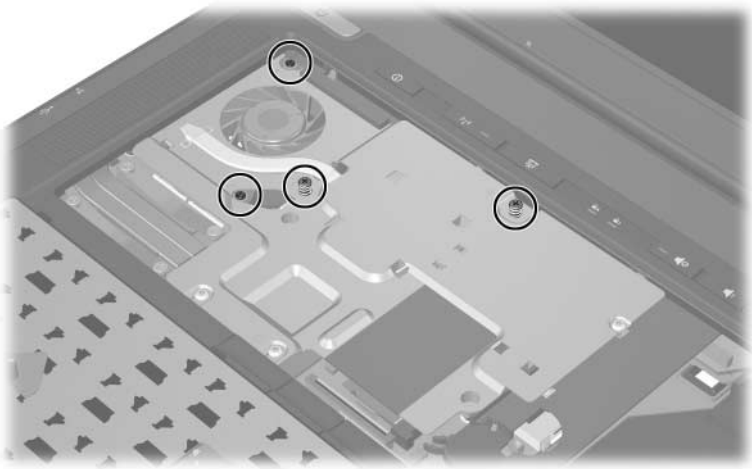
Table C-10

Phillips PM2.0×10.0 Spring-Loaded Screw

	Color	Qty.	Length	Thread	Head Width
	Silver	4	10.0 mm	2.0 mm	5.0 mm

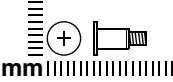
Where used:

4 screws that secure the thermal plate to the computer (documented in [Section 6.12](#))



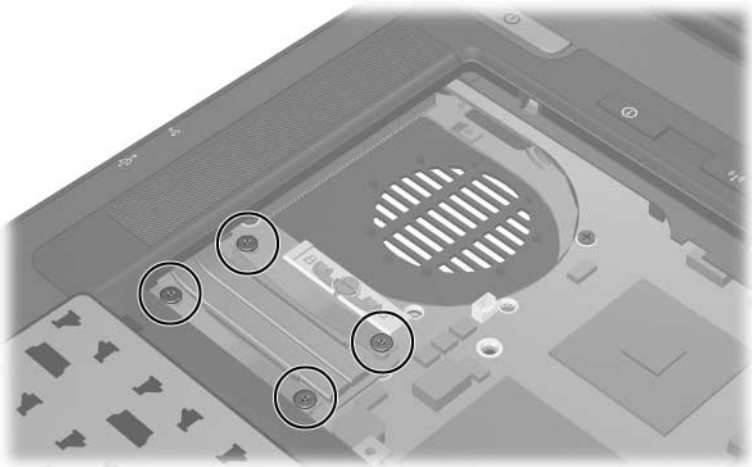
Phillips PM2.0×10.0 Spring-Loaded Screw Locations

Table C-11
Phillips PM2.0x8.0 Shoulder Screw

	Color	Qty.	Length	Thread	Head Width
	Silver	4	8.0 mm	2.0 mm	5.0 mm

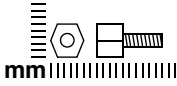
Where used:

4 screws that secure the heat sink to the computer (screws are captured on the heat sink by C clips; documented in [Section 6.13](#))



Phillips PM2.0x8.0 Shoulder Screw Locations

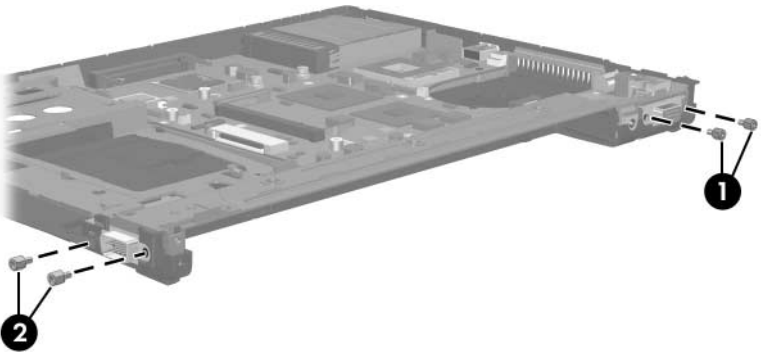
Table C-12
Hex Socket HM2.5×10.0 Screw Lock



Color	Qty.	Length	Thread	Head Width
Silver	4	10.0 mm	2.5 mm	5.0 mm

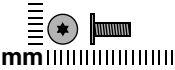
Where used:

- ❶ Two screw locks that secure the system board to the computer (documented in [Section 6.22](#))
- ❷ Two screw locks that secure the serial connector module to the computer (documented in [Section 6.25](#))



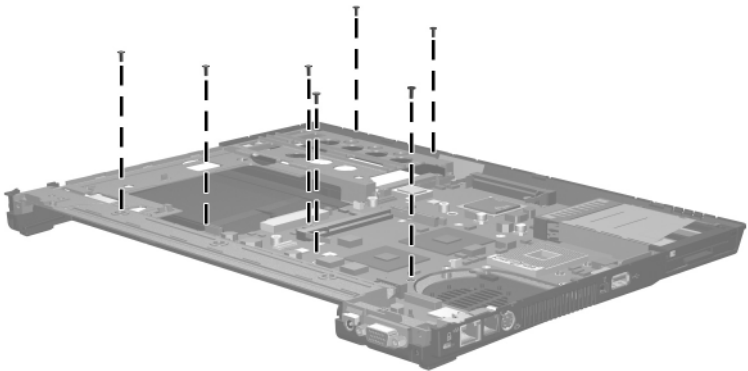
Hex Socket HM2.5×10.0 Screw Lock Locations

Table C-13
Torx T8M2.0x6.0 Screw

 mm	Color	Qty.	Length	Thread	Head Width
	Black	7	6.0 mm	2.0 mm	4.5 mm

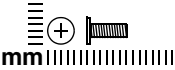
Where used:

7 screws that secure the system board to the computer (documented in [Section 6.22](#))



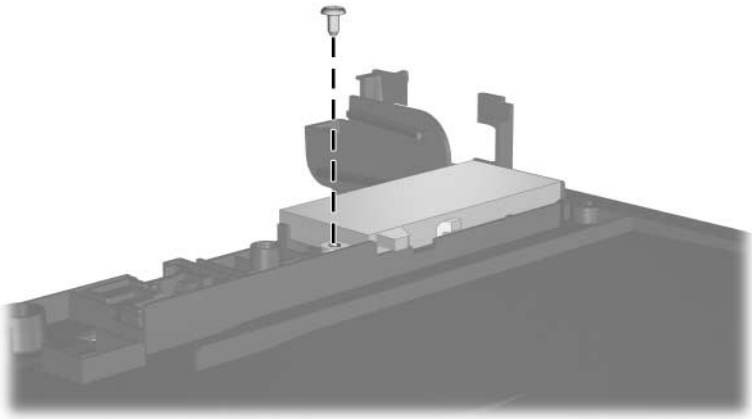
Torx T8M2.0x6.0 Screw Locations

Table C-14
Phillips PM2.0×6.0 Screw

 mm	Color	Qty.	Length	Thread	Head Width
	Silver	1	6.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the push button module to the base enclosure (documented in [Section 6.24](#))



Phillips PM2.0×6.0 Screw Location

Display Component Recycling



WARNING: The backlight contains mercury. Caution should be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.



CAUTION: The procedures in this appendix can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. Careful handling should be exercised when removing these components.

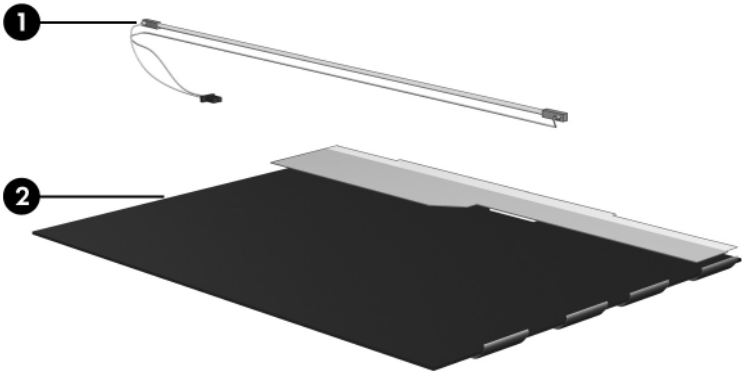


Materials Disposal

This HP product contains mercury in the backlight of the display assembly and may require special handling at end of life.

Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities or visit the Electronic Industries Alliance (EIA) at <http://www.eiae.org>.

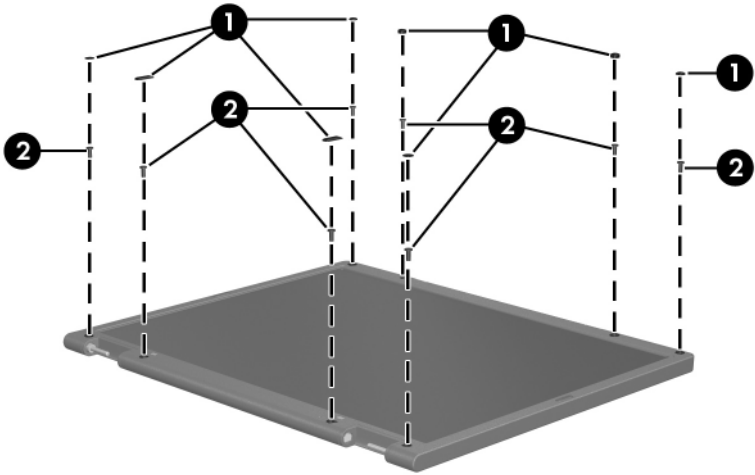
This appendix provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **1** and the liquid crystal display (LCD) panel **2**.



Disassembly procedures differ from one display assembly to another. The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

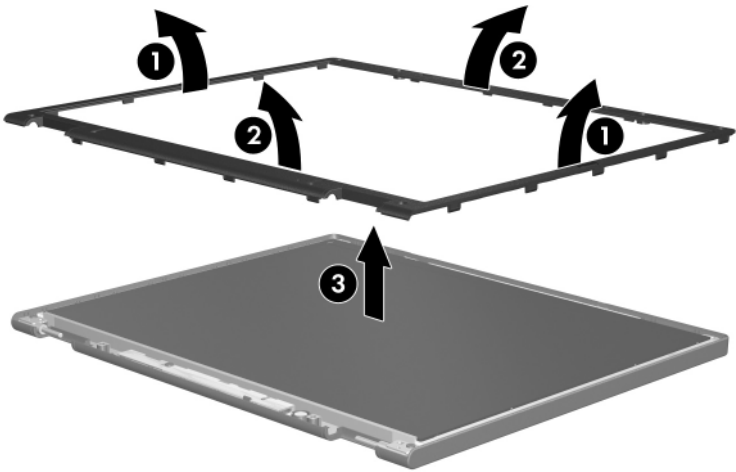
Perform the following steps to disassemble the display assembly:

1. Remove all screw covers **1** and screws **2** that secure the display bezel to the display assembly.



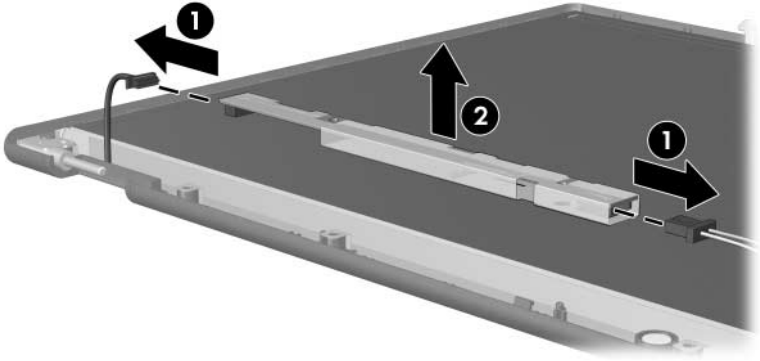
Removing the Display Bezel Screw Covers and Screws

-
2. Lift up and out on the left and right inside edges ① and the top and bottom inside edges ② of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel ③.



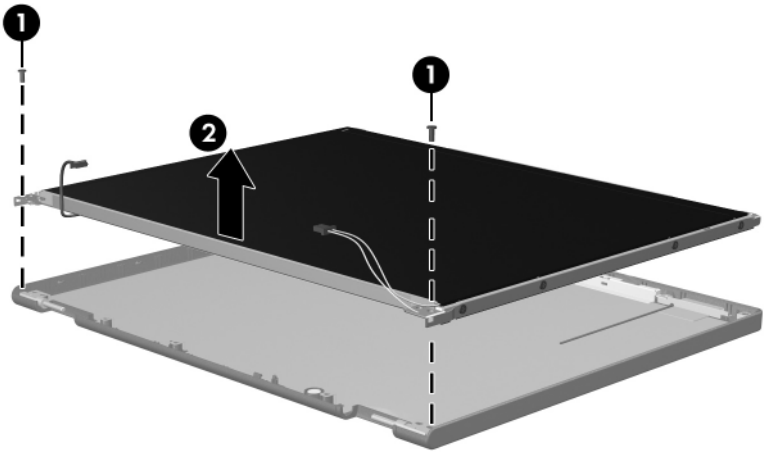
Removing the Display Bezel

4. Disconnect all display panel cables ❶ from the display inverter and remove the inverter ❷.



Removing the Display Inverter

5. Remove all screws **1** that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly **2** from the display enclosure.



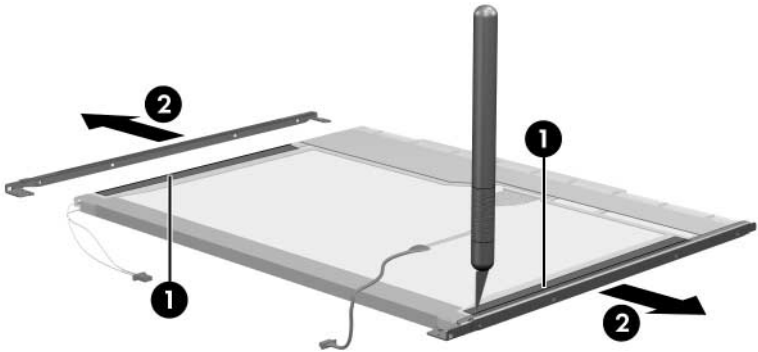
Removing the Display Panel Assembly

7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.



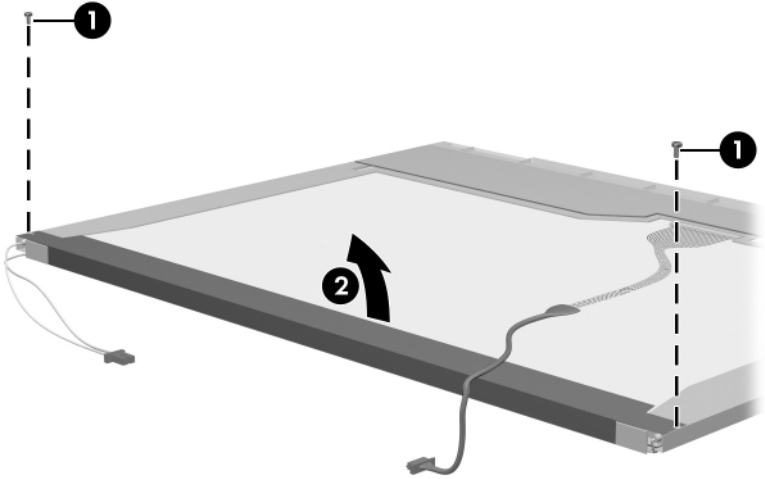
Removing the Display Panel Frame Screws

9. Use a sharp-edged tool to cut the tape ❶ that secures the side of the display panel to the display panel frame.
10. Remove the display panel frame ❷ from the display panel.



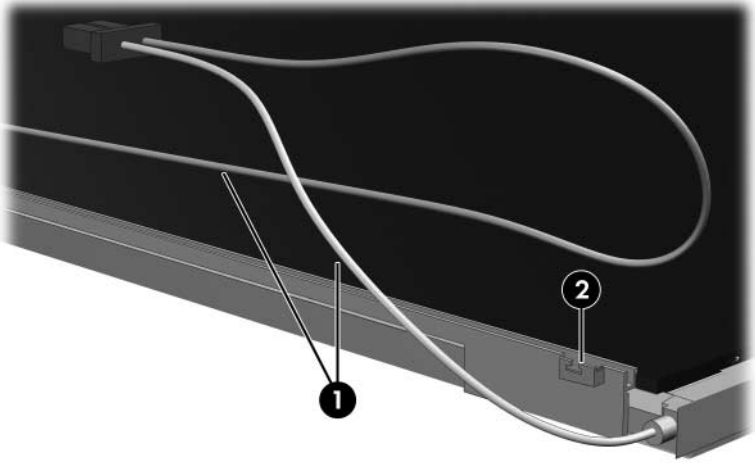
Removing the Display Frame

11. Remove the screws ❶ that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover ❷ and swing it forward.
13. Remove the backlight cover.



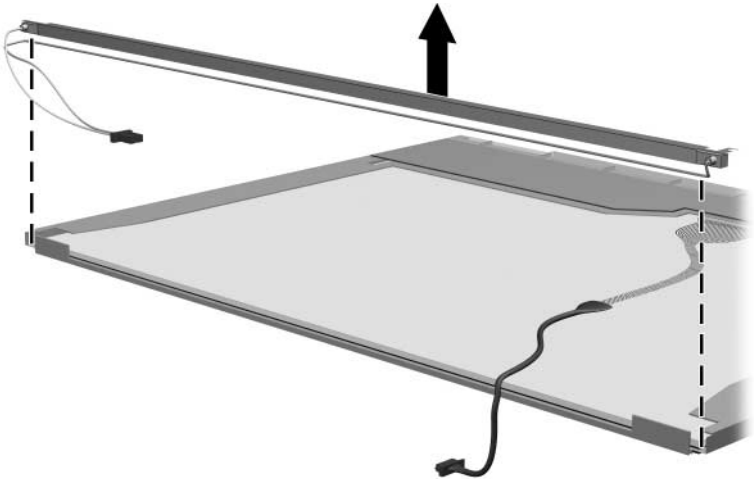
Removing the Backlight Cover

14. Turn the display panel right-side up.
15. Remove the backlight cables **1** from the clip **2** in the display panel.



Releasing the Backlight Cables

16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.

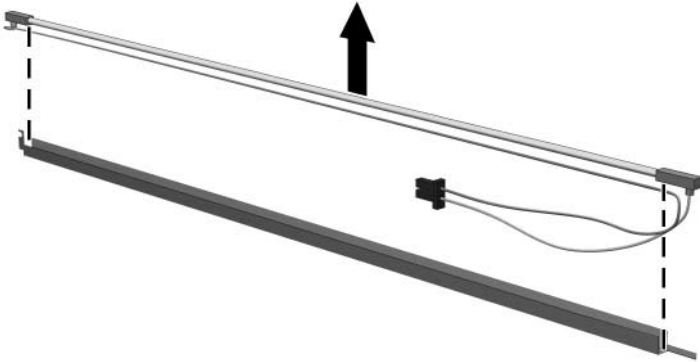


Removing the Backlight Frame



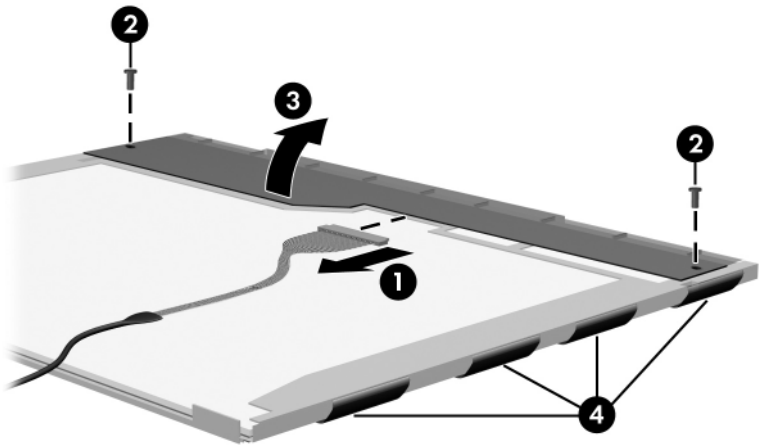
WARNING: The backlight contains mercury. Caution should be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

18. Slide the backlight out of the backlight frame.



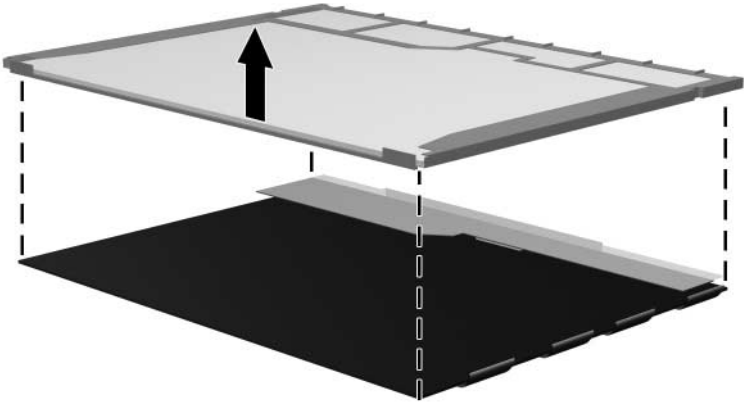
Removing the Backlight

19. Disconnect the display cable ❶ from the LCD panel.
20. Remove the screws ❷ that secure the LCD panel to the display rear panel.
21. Release the LCD panel ❸ from the display rear panel.
22. Remove the tape ❹ that secures the LCD panel to the display rear panel.



Releasing the LCD Panel

23. Remove the LCD panel.



Removing the LCD Panel

24. Recycle the display backlight and LCD panel.

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