Maintenance and Service Guide

HP Compaq nx6330 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 nx6330 Notebook PC offers advanced modularity, Intel® Core™ Duo processors, and extensive multimedia support.

HP Compaq nx6330 Notebook PC

1.1 Features

- The following processors are available, varying by computer model:
- Intel Core Duo T2700 (2.33-GHz)
- Intel Core Duo T2600 (2.16-GHz)
- Intel Core Duo T2500 (2.00-GHz)
- Intel Core Duo T2400 (1.83-GHz)
- Intel Core Duo T1400 (1.83-GHz)
- Intel Core Duo T2300E (1.66-GHz)
- Intel Core Duo T2300 (1.66-GHz)
- Intel Core Duo T1300 (1.66-GHz)
- 14.1-inch, WXGA+, TFT and 14.1-inch, WXGA, TFT(1400 × 1050) with over 16.8 million colors, varying by computer model
- 100-, 80-, 60-, and 40-GB high-capacity hard drive, varying by computer model
- 256-MB DDR2 synchronous DRAM (SDRAM) at 667 or 533 MHz, expandable to 4.0 GB
- The following operating systems are available, varying by computer model:
  - ❏ Microsoft® Windows® XP Professional
  - ❏ Microsoft Windows XP Home
  - ❏ FreeDOS
  - ❏ Red Flag Linux
- Full-size Windows keyboard with embedded numeric keypad
- TouchPad pointing device
- Integrated 10 Base-T/100 Base-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/g or 802.11b/g Wireless LAN (WLAN) device
- Support for one optional Type I, Type II, or Type III 32-bit (CardBus) or 16-bit PC Card, varying by computer model
- External 90-watt AC adapter with 3-wire power cord
- 6-cell Li-Ion battery
- Stereo speakers
- Volume up, volume mute, and volume down buttons
- Support for the following optical drives:
  - DVD±RW and CD-RW Combo Drive
  - DVD/CD-RW Combo Drive
  - DVD-ROM drive
- Connectors:
  - Accessory battery
  - Audio-out (headphone)
  - Audio-in (microphone)
  - Digital Media Slot
  - Docking connector
  - External monitor
  - IEEE 1394
  - Power
  - RJ-11 (modem)
  - RJ-45 (network)
  - S-Video-out
  - Universal Serial Bus (USB) v. 2.0 (two or three, varying by computer model)

1.2 Resetting the Computer

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

The following steps will not clear an unknown password if the stringent security option has been enabled in the BIOS. If stringent security is enabled, the system board must be replaced to reset an unknown password. Refer to Section 5.22, "RTC Battery," for more information on replacing the system board.

Before replacing the system board, perform the steps below to make sure stringent security has been properly enabled.

Enabling stringent security provides enhanced protection for the power-on password and administrator password and other forms of power-on authorization. Stringent security is enabled/disabled by accessing the Password Options menu in the Computer Setup utility. Refer to Section 2.1, "Computer Setup," for more information.

1. Prepare the computer for disassembly (refer to Section 5.3, "Preparing the Computer for Disassembly," for more information). Remove the real-time clock (RTC) battery (refer to Section 5.22, "RTC Battery," for more information on removing and replacing the RTC battery).
2. Wait approximately 5 minutes.
3. Replace the RTC battery and reassemble the computer.
4. Connect AC power to the computer. Do not reinsert any batteries at this time.
5. Turn on the computer.

All passwords and all CMOS settings have been cleared.

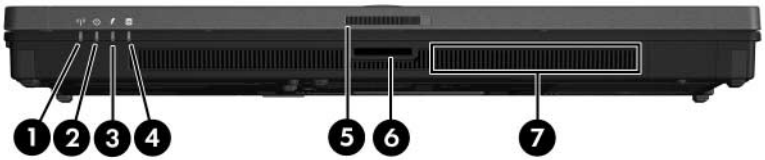
1.3 Power Management

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

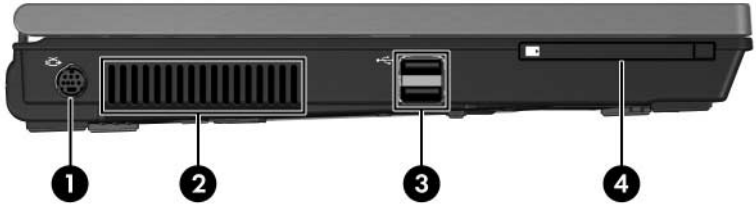
Item	Component	Function
1	Wireless light	On: An integrated wireless device, such as a wireless local area network (LAN) device and/or a Bluetooth® device, is turned on.
2	Power light	■ On: The computer is on. ■ Blinking: The computer is in standby. ■ Blinking rapidly: An AC adapter with a higher power rating should be connected. ■ Off: The computer is off or in hibernation.

Table 1-1

Front Components *(Continued)*

Item	Component	Function
3	Battery light	■ Amber: A battery is charging. ■ Green: A battery is close to full charge capacity. ■ Blinking amber: A battery 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 begins blinking rapidly. ■ Off: If the computer is plugged into an external power source, the light is turned off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low-battery condition.
4	Drive light	■ Blinking: The hard drive or optical drive is being accessed. ■ Amber: HP Mobile Data Protection has temporarily parked the internal hard drive.
5	Display release latch	Opens the computer.
6	Digital Media Slot	Supports Secure Digital (SD) Memory Cards.
7	Stereo speakers (2)	Produce computer sound.

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	S-Video-out jack	Connects an optional S-Video device such as a television, VCR, camcorder, overhead projector, or video capture card.
2	Exhaust vent	Enables airflow to cool internal components. ⚠ To prevent overheating, do not obstruct vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or thick rugs or clothing, to block airflow. ✎ The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
3	USB ports (2)	Connect an optional USB device.
4	PC Card slot	Supports optional Type I, Type II, or Type III 32-bit (CardBus) or 16-bit PC Cards.

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

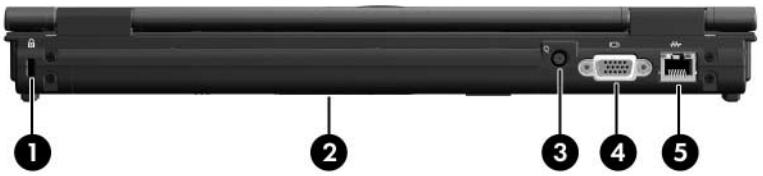
Right-Side Components

Table 1-3

Right-Side Components

Item	Component	Function
1	USB port	Connects an optional USB device.
2	Optical drive	Reads an optical disc.
4	Internal microphone	Records sound.
5	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
6	Audio-out (headphone) jack	Produces computer sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.
6	RJ-11 (modem) jack	Connects a modem cable.

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



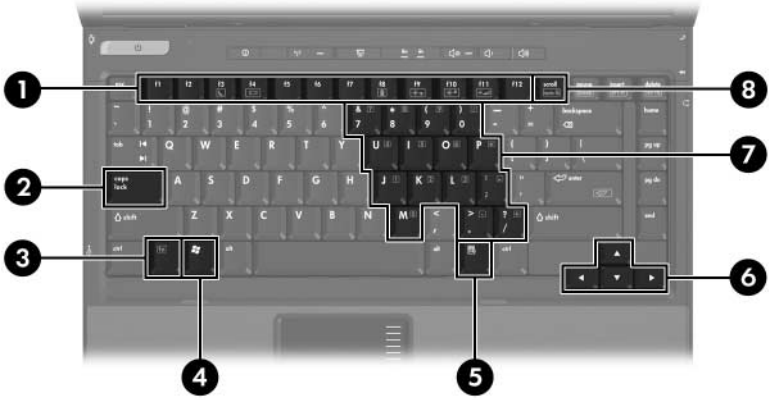
Rear Panel Components

Table 1-4

Rear Panel Components

Item	Component	Function
1	Security cable slot	Attaches an optional security cable to the computer. △ The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
2	Battery bay	Holds the battery.
3	Smart adapter power connector	Connects an AC adapter.
4	External monitor port	Connects an optional VGA monitor or projector.
5	RJ-45 (network) jack	Connects a network cable.

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	**f1** to **f12** keys (12)	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 Microsoft Windows Start menu.
5	Windows applications key	Displays a shortcut menu for items beneath the pointer.
6	Arrow keys	Move the cursor around the screen.
7	Embedded numeric 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

Table 1-6

Top Components

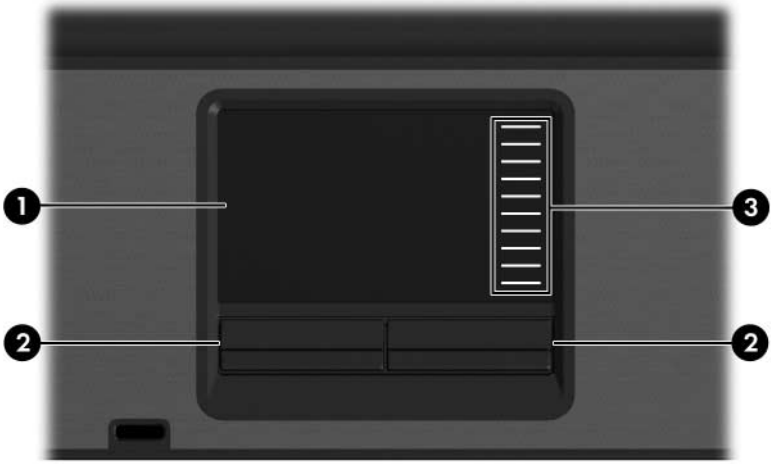
Item	Component	Function
1	Power button	When the computer is: ■ Off, press to turn on the computer. ■ On, press to enter hibernation. ■ In standby, briefly press to exit standby. ■ In hibernation, briefly press to exit hibernation. If the system has stopped responding and Microsoft Windows shutdown procedures cannot be used, press and hold the power button for 5 seconds to turn off the computer.

Table 1-6

Top Components *(Continued)*

Item	Component	Function
2	Display lid switch	■ If the computer is closed while on, turns off the display. ■ If the computer is opened while in standby, turns on the computer (exits from standby).
3	Info Center button	Launches Info Center, which enables you to open various software solutions.
4	Wireless button	Turns the wireless feature on or off, but does not create a wireless connection. ✎ To establish a wireless connection, a wireless network must already be set up.
5	Presentation button	Starts the presentation feature.
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	Mutes or restores computer sound.
9	Volume down button	Decreases speaker volume.
10	Volume up button	Increases speaker volume.

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



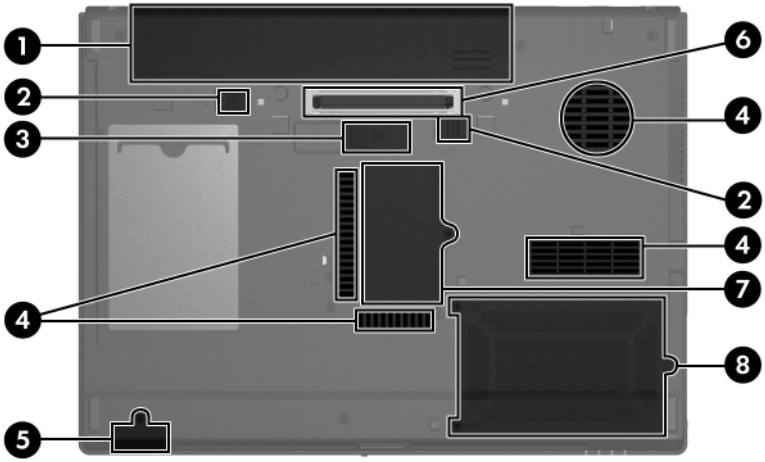
TouchPad Components

Table 1-7

TouchPad Components

Item	Component	Function
1	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.
2	Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.
3	TouchPad scroll zone	Scrolls up or down.

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	Battery bay	Holds the battery.
2	Battery release latches (2)	Release the battery from the battery bay.
3	Accessory battery connector	Connects an optional accessory battery.

Table 1-8

Bottom Components *(Continued)*

Item	Component	Function
4	Exhaust vents	Enable airflow to cool internal components. ⚠ To prevent overheating, do not obstruct vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or thick rugs or clothing, to block airflow. ✎ The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
5	Bluetooth compartment	Contains a Bluetooth device (select models only).
6	Docking connector	Connects an optional docking device. ✎ This platform does not support DVI output provided by optional docking.
7	Memory module compartment	Contains the memory module slot.
8	Hard drive bay	Holds the hard drive.

1.5 Design Overview

This section presents a design overview of key parts and features of the computer. Refer to Chapter 3, "Illustrated Parts Catalog," to identify replacement parts, and Chapter 5, "Removal and Replacement Procedures," for disassembly steps.

The system board provides the following device connections:

- Intel Core Duo processors
- Audio
- Display
- Hard drive
- Keyboard and TouchPad
- Memory module
- Mini Card module
- PC Card

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 turn 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. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

2
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.

Some of the Computer Setup menu items listed in this guide may not be supported by your computer.

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

An external keyboard connected by USB can be used with Computer Setup only if USB legacy support is enabled.

The information and settings in Computer Setup are accessed from the File, Security, Diagnostics, and System Configuration menus.

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.

   In Computer Setup, the following shortcuts are available:

   - ❏ To change the language, press **f2**.
   - ❏ To view navigation information, press **f1**.
   - ❏ To close open dialog boxes and return to the main Computer Setup screen **esc**.

2. Select the **Files**, **Security**, **Diagnostics**, or **System Configuration** menu.
3. To exit Computer Setup, choose one of the following methods:

   - ❏ To exit Computer Setup without saving your preferences, use the arrow keys to select **File > Ignore Changes and Exit**. Then follow the instructions on the screen.
   - ❏ To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save Changes and Exit**. Then follow the instructions on the screen.

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, and then pressing **f10** while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.

   In Computer Setup, the following shortcuts are available:

   - ❏ To change the language, press **f2**.
   - ❏ To view navigation information, press **f1**.
   - ❏ To close open dialog boxes and return to the main Computer Setup screen **esc**.

2. Use the arrow keys to select **File > Restore defaults**, and then press **enter**.
3. When the confirmation dialog box opens, press **f10**.
4. Select the Restore defaults check box, and then press **enter**.
5. To confirm the restoration, press **f10**.
6. To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save Changes and Exit**. Then follow the instructions on the screen.

   Your preferences go into effect when the computer restarts.

Your password and security settings are not changed when you restore the factory default settings.

Computer Setup Menus

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

Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.

Table 2-1

File Menu

Select	To Do This
System Information	■ View identification information for the computer and the battery packs in the system. ■ View specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.
Restore defaults	Replace the configuration settings in Computer Setup with factory default settings. (Password and security settings are not changed when you restore the factory default settings.)
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. Your changes go into effect when the computer restarts.

Table 2-2

Security Menu

Select	To Do This
Setup password	Enter, change, or delete a setup password.
Power-on password	Enter, change, or delete a power-on password.
Password options	■ Enable/disable stringent security. ■ Enable/disable password requirement on computer restart.
DriveLock passwords	■ Enable/disable DriveLock on any computer hard drive and optional MultiBay hard drives. ■ Change a DriveLock user or master password. ✎ DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Smart card security	Enable/disable support for smart card and Java™ Card power-on authentication. ✎ Power-on authentication for smart cards is supported only on computers with optional smart card readers.
TPM Embedded Security	Enable/disable support for TPM (Trusted Platform Module) Embedded Security, which protects the computer from unauthorized access to owner functions in Embedded Security for ProtectTools. For more information, refer to the ProtectTools Security Manager Reference Guide located in the Help and Support Center, or refer to Credential Manager for ProtectTools online Help.

Table 2-2

Security Menu *(Continued)*

Select	To Do This
System IDs	Enter user-defined computer asset and ownership tag.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive. The following options are available: ✎ Fast: Runs the Disk Sanitizer erase cycle once. ✎ Optimum: Runs the Disk Sanitizer erase cycle 3 times. ✎ Custom: Allows you to select the desired number of Disk Sanitizer erase cycles from a list. △ If you run Disk Sanitizer, the data on the primary hard drive is destroyed permanently.

Table 2-3

Diagnostics Menu

Select	To Do This
Memory Check	Run a comprehensive check on system memory.
Hard Drive Self-Test options	Run a comprehensive self-test on any hard drive in the system or on any optional MultiBay hard drive.

Table 2-4

System Configuration Menu

Select	To Do This
Language (or press **f2**).	Change the Computer Setup language.
Boot options	■ Set **f9**, **f10**, and **f12** delay when starting up. ■ Enable/disable CD-ROM boot. ■ Enable/disable Floppy boot. ■ Enable/disable internal network adapter boot and set the boot mode (PXE or RPL). ■ Enable/disable MultiBoot, which sets a boot order that can include most boot devices in the system. ■ Set the boot order.

Table 2-4

System Configuration Menu *(Continued)*

Select	To Do This
Device configurations	■ Swap the functions of the **fn** key and left **ctrl** key. ■ Enable/disable USB legacy support. When enabled, USB legacy support allows a USB keyboard, mouse, and hub to work in Computer Setup even when a Microsoft Windows operating system is not loaded. ■ The computer to start from bootable USB devices, including a hard drive, diskette drive diskette, or optical drive connected by a USB port to the computer or to an optional docking device (select models only). ■ Automatic/disable Intel SpeedStep Technology. ■ Select a parallel port mode: EPP (Enhanced Parallel Port), standard, bidirectional, or ECP (Enhanced Capabilities Port). ■ Enable/disable BIOS DMA data transfers (select models only). ■ Enable/disable the system fan when connected to an AC outlet. ■ Enable/disable Intel or AMD PSAE Execution Disable. When enabled, the processor can disable some virus code execution, which helps to improve computer security.

Table 2-4

System Configuration Menu *(Continued)*

Select	To Do This
Device configurations *(Continued)*	■ Enable/disable SATA Native Support. ■ Enable/disable Dual Core CPU. ■ Enable/disable Secondary Battery Fast Charge.
Built-In Device Options	■ Enable/disable embedded WLAN Device Radio. ■ Enable/disable embedded Bluetooth® Device ■ Radio. ■ Enable/disable LAN/WLAN Switching. When enabled, switches to a WLAN when a LAN is either unavailable or disconnected. ■ Enable/disable Wake on LAN from Off.
Port Options	■ Enable/disable the serial port. ■ Enable/disable the parallel port. ■ Enable/disable the flash media reader. ■ Enable/disable the USB port. △ Disabling the USB port also disables MultiBay devices and ExpressCard devices on the advanced port replicator. ■ Enable/disable the 1394 port. ■ Enable/disable the cardbus slot. ■ Enable/disable the ExpressCard slot. ■ Enable/disable the infrared port.

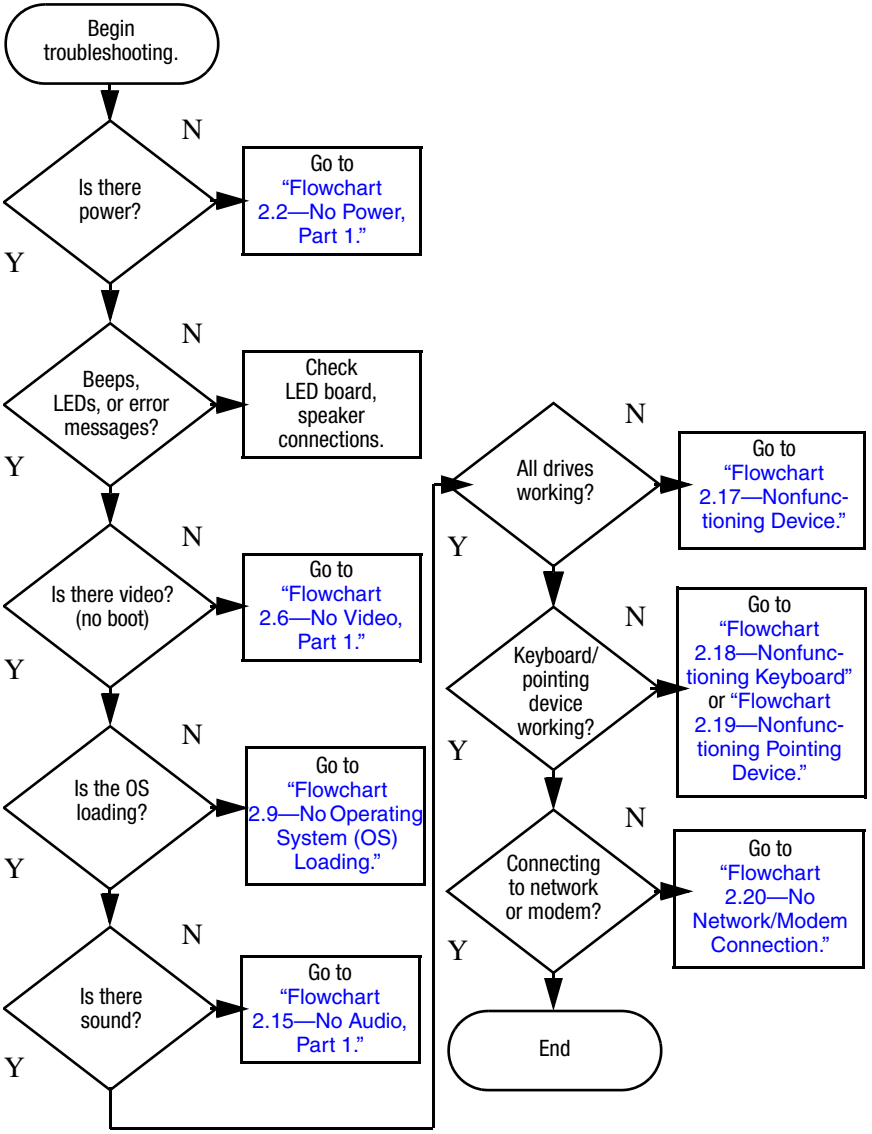
2.2 Troubleshooting Flowcharts

Table 2-5

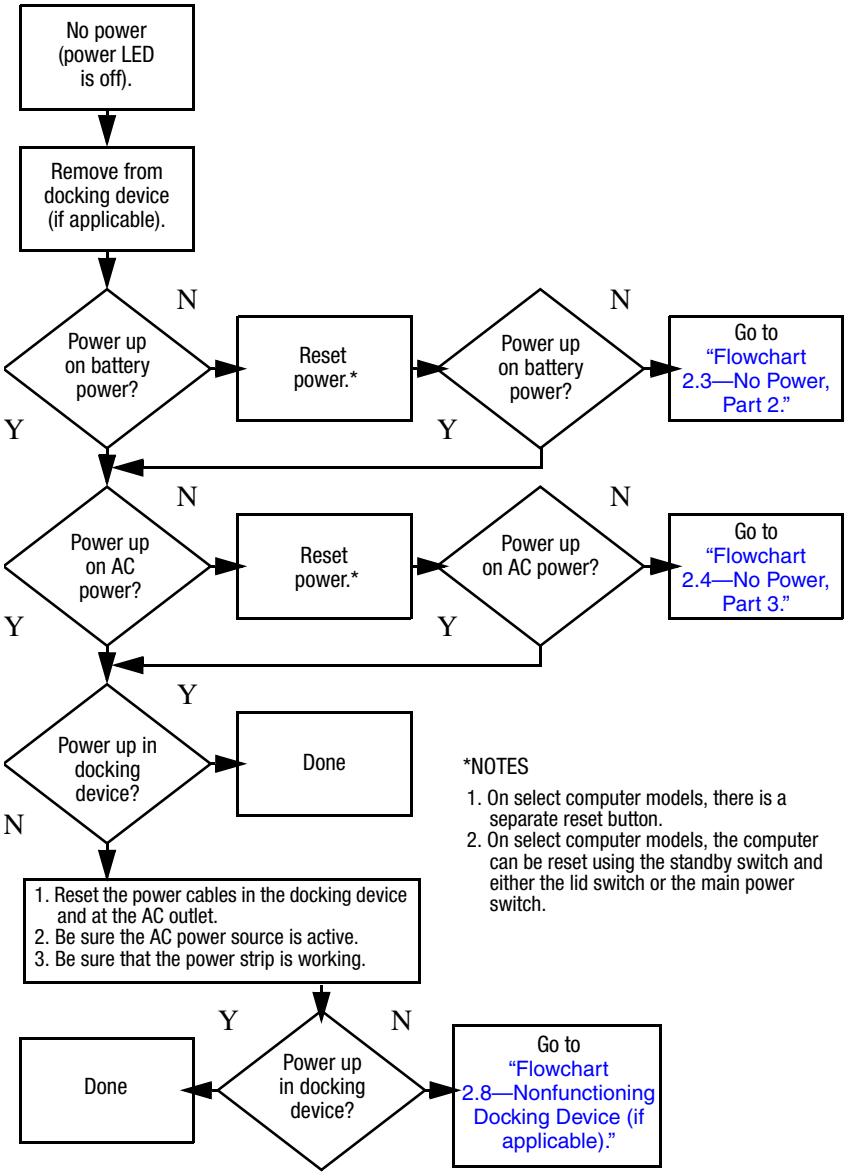
Troubleshooting Flowcharts Overview

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”
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”

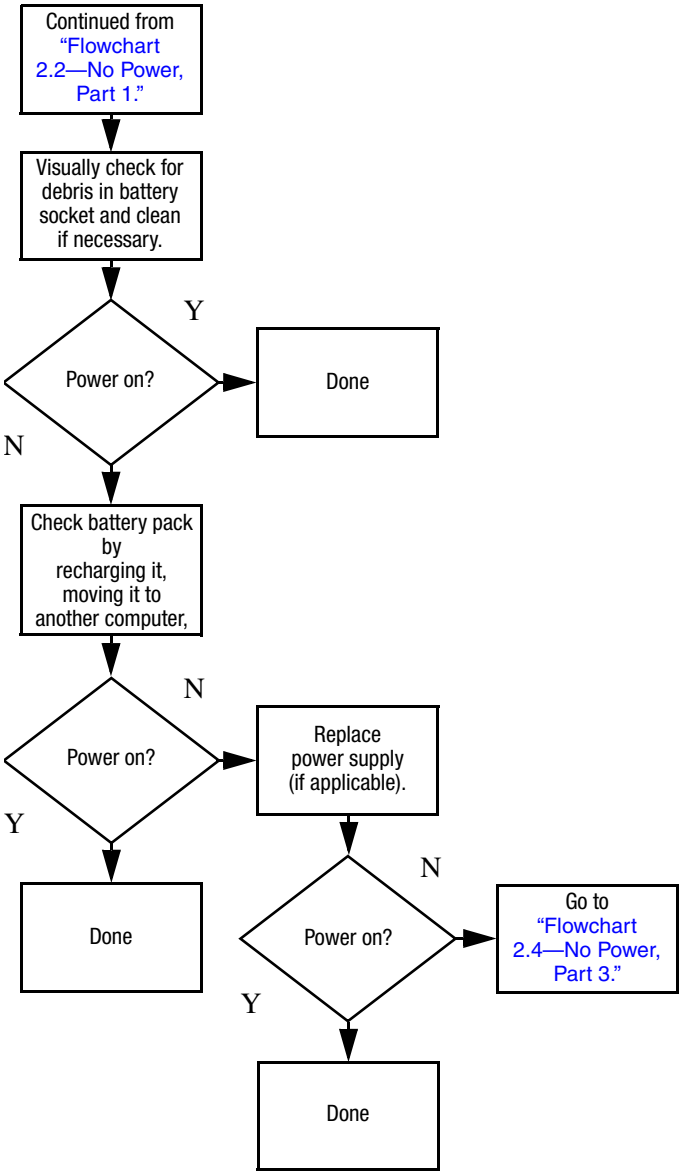
Flowchart 2.1—Initial Troubleshooting



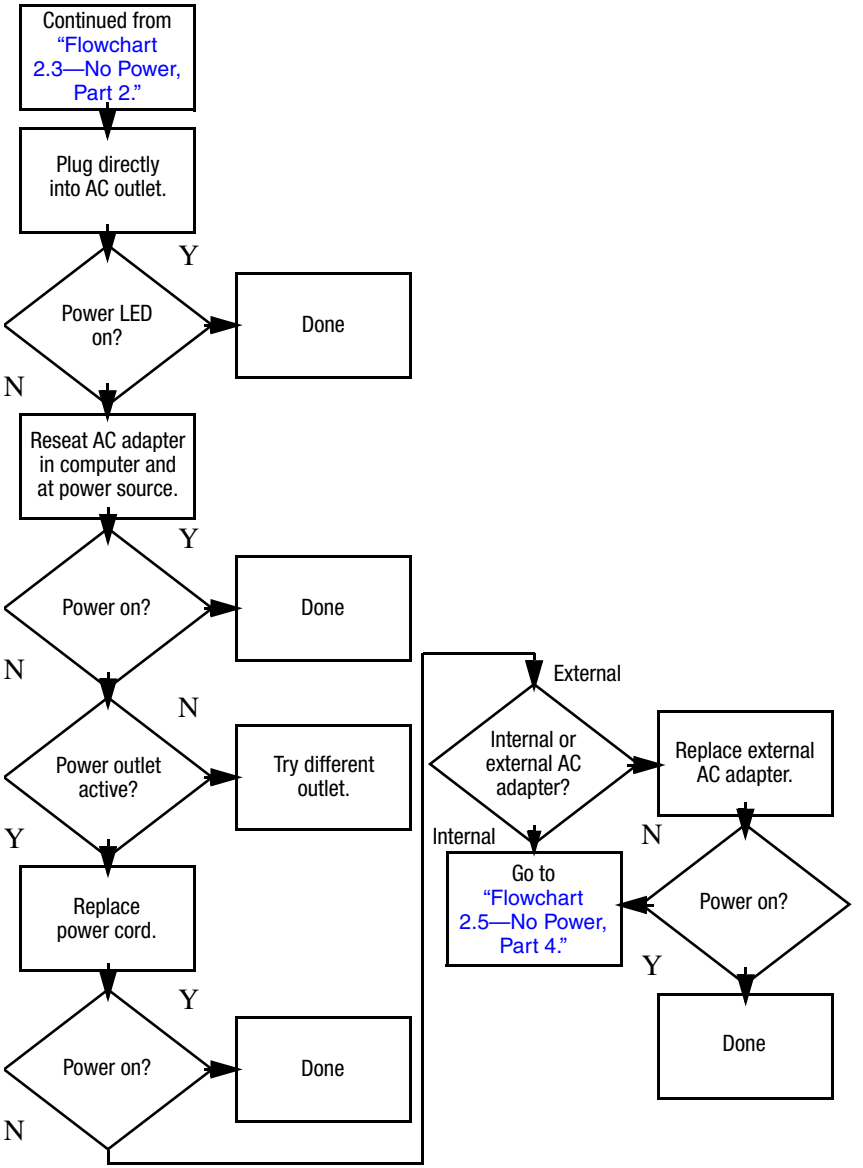
Flowchart 2.2—No Power, Part 1



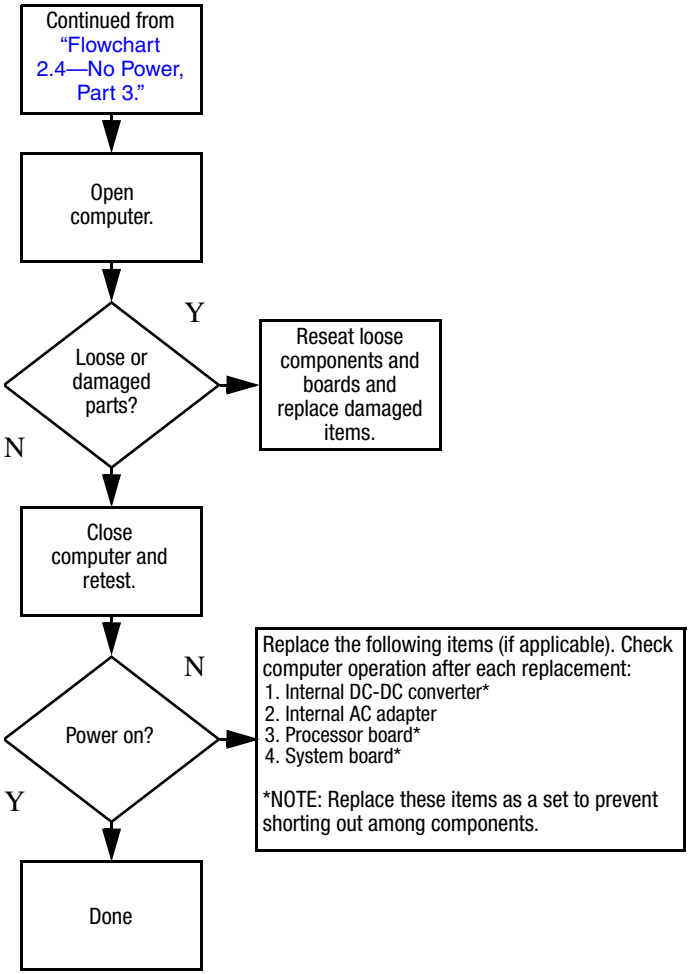
Flowchart 2.3—No Power, Part 2



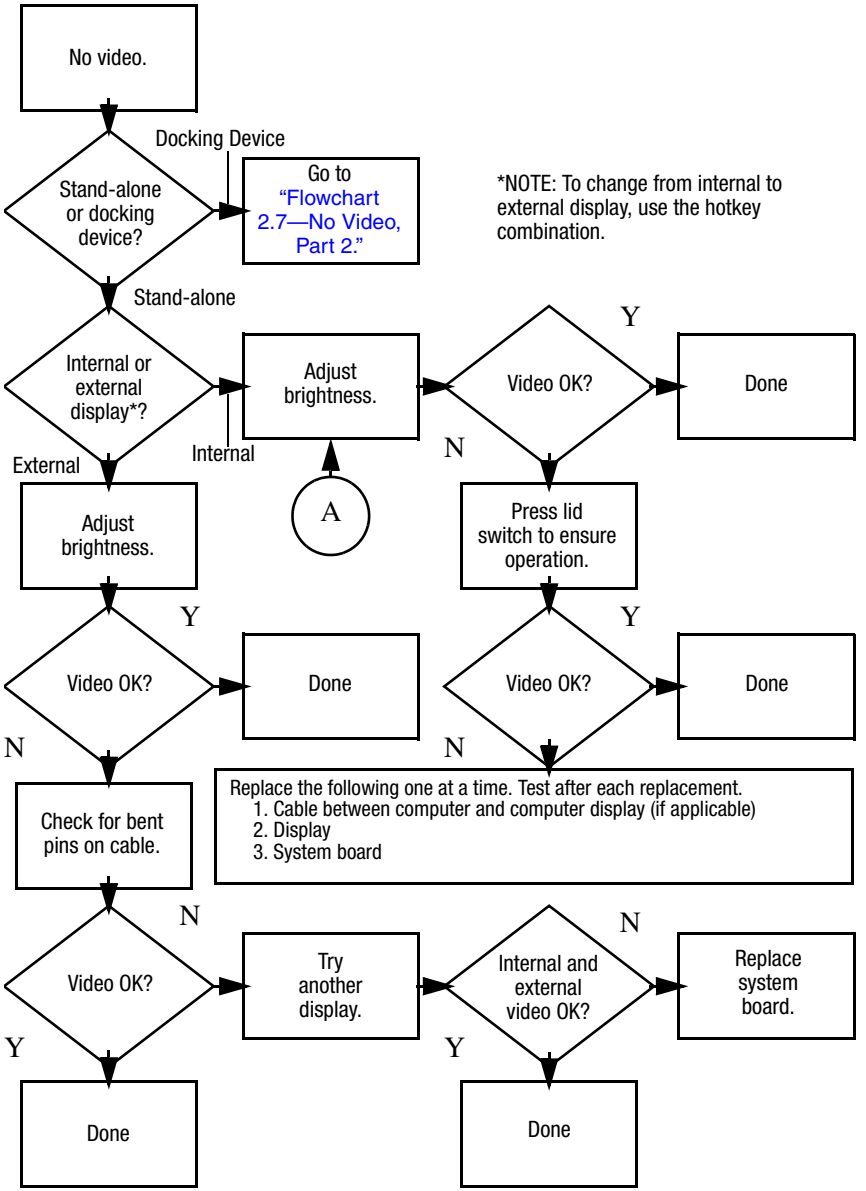
Flowchart 2.4—No Power, Part 3



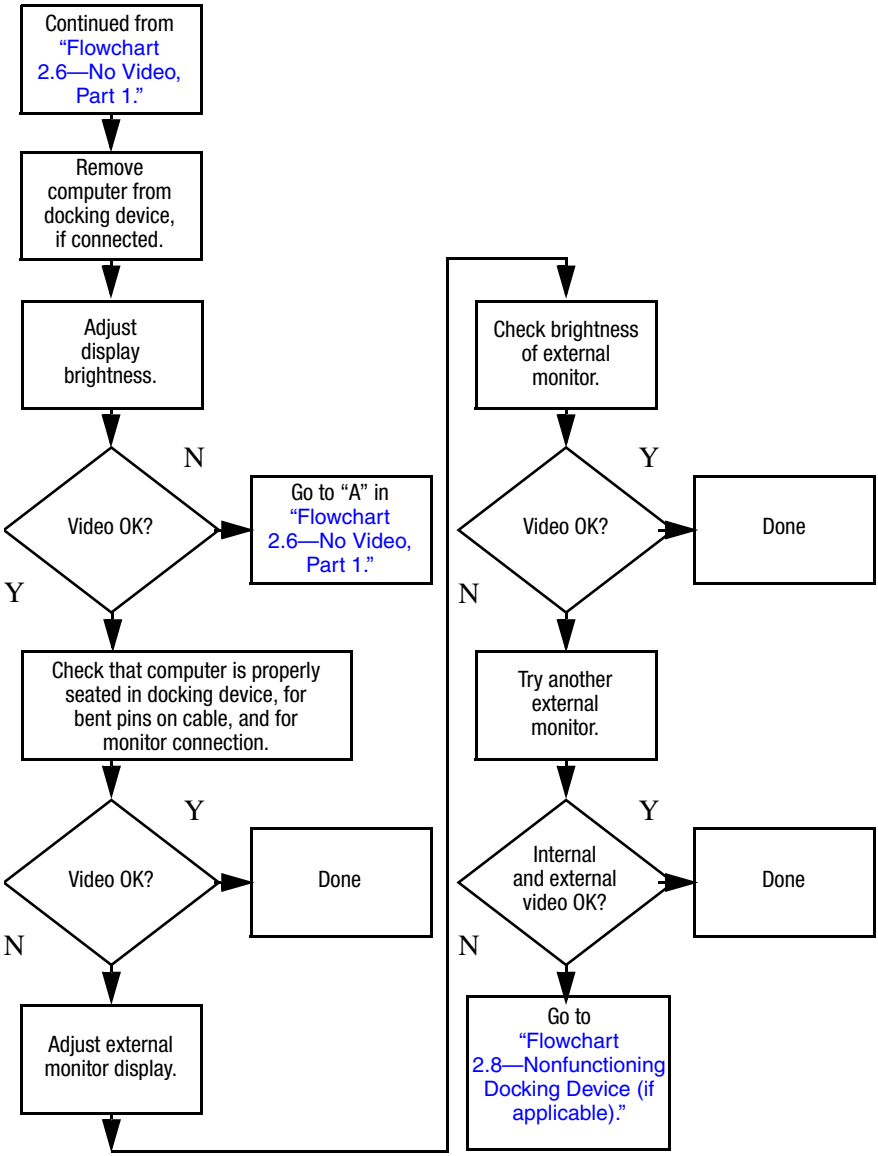
Flowchart 2.5—No Power, Part 4



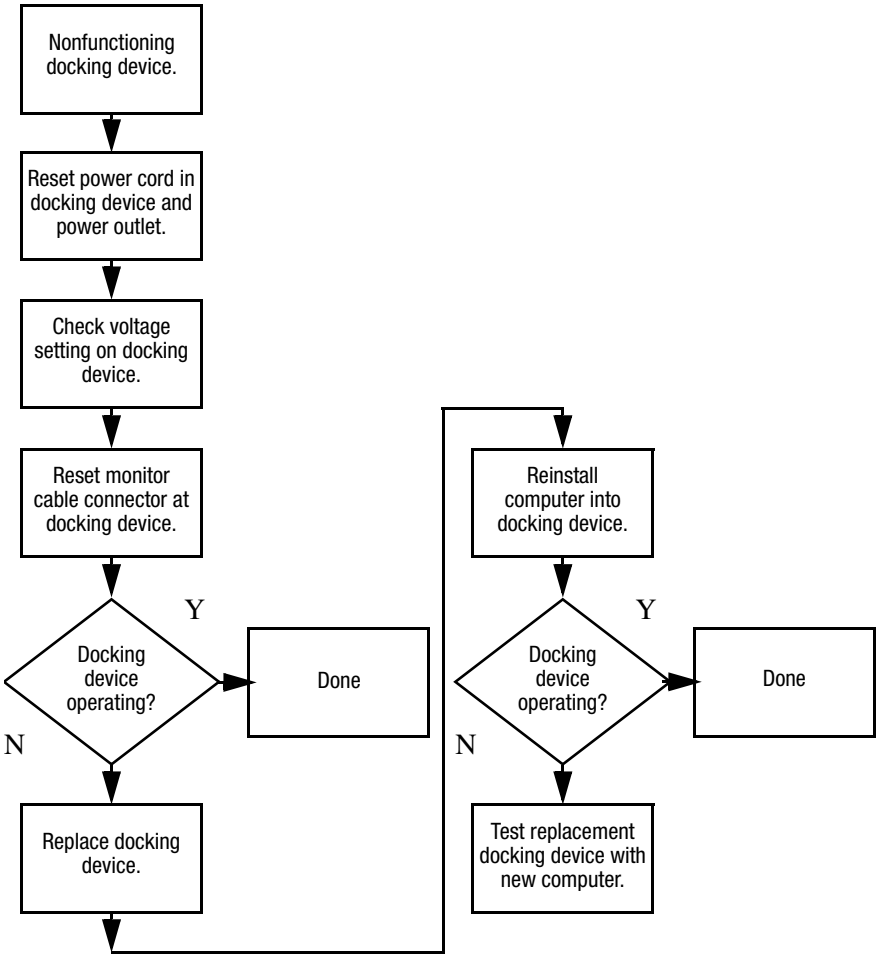
Flowchart 2.6—No Video, Part 1



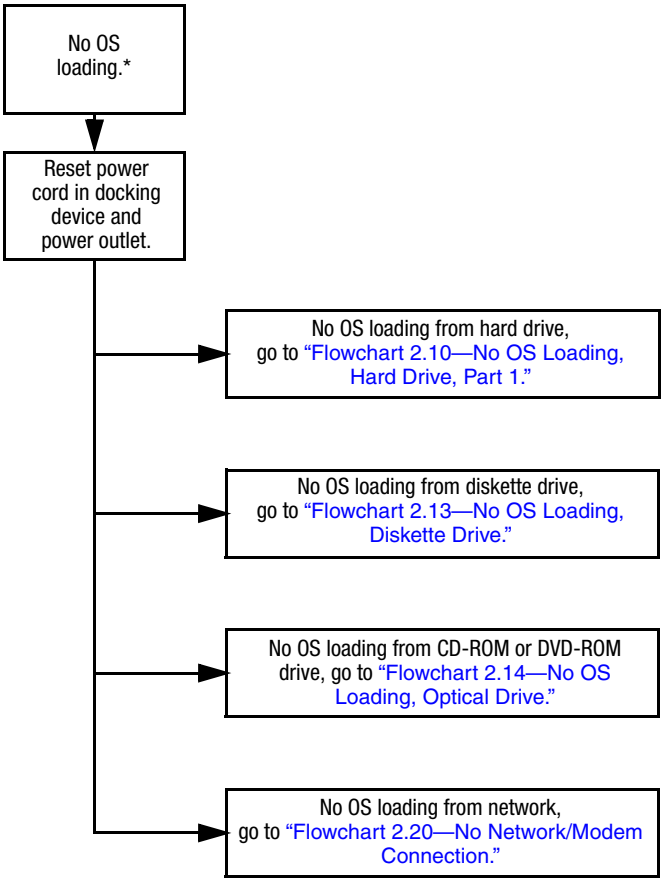
Flowchart 2.7—No Video, Part 2



Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

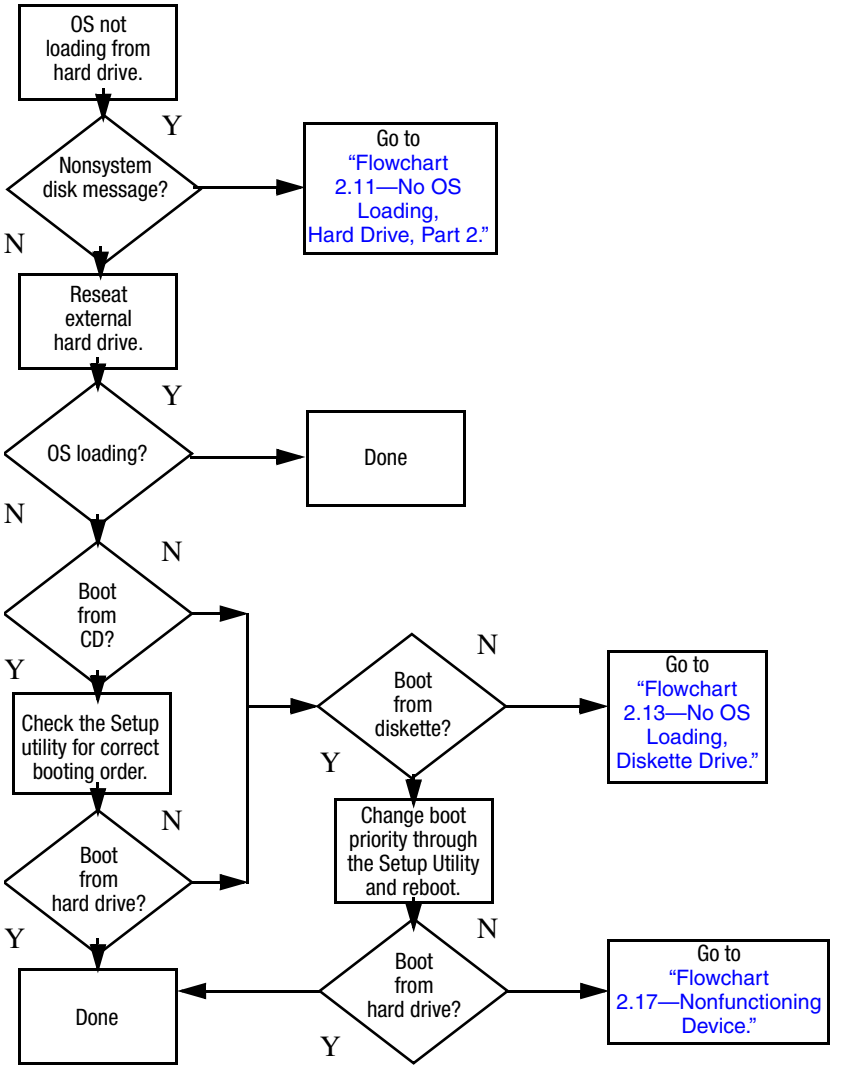


Flowchart 2.9—No Operating System (OS) Loading

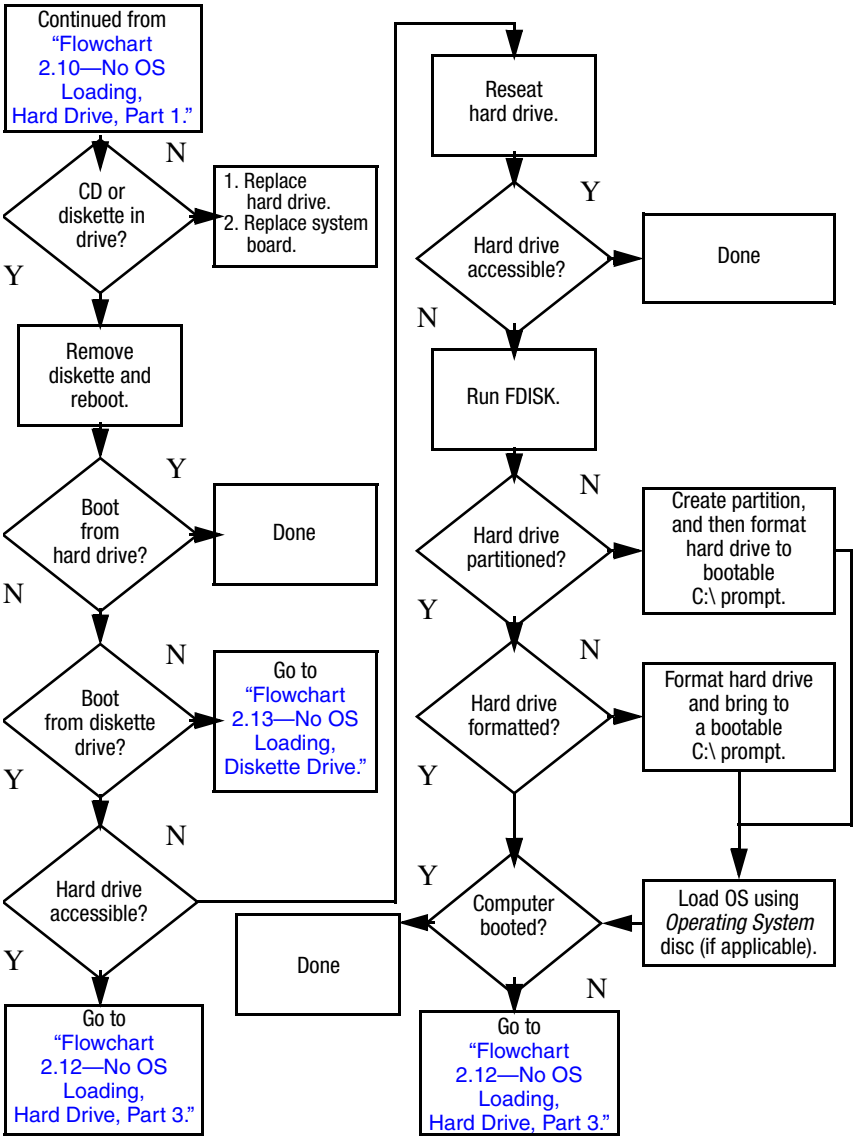


*NOTE: Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

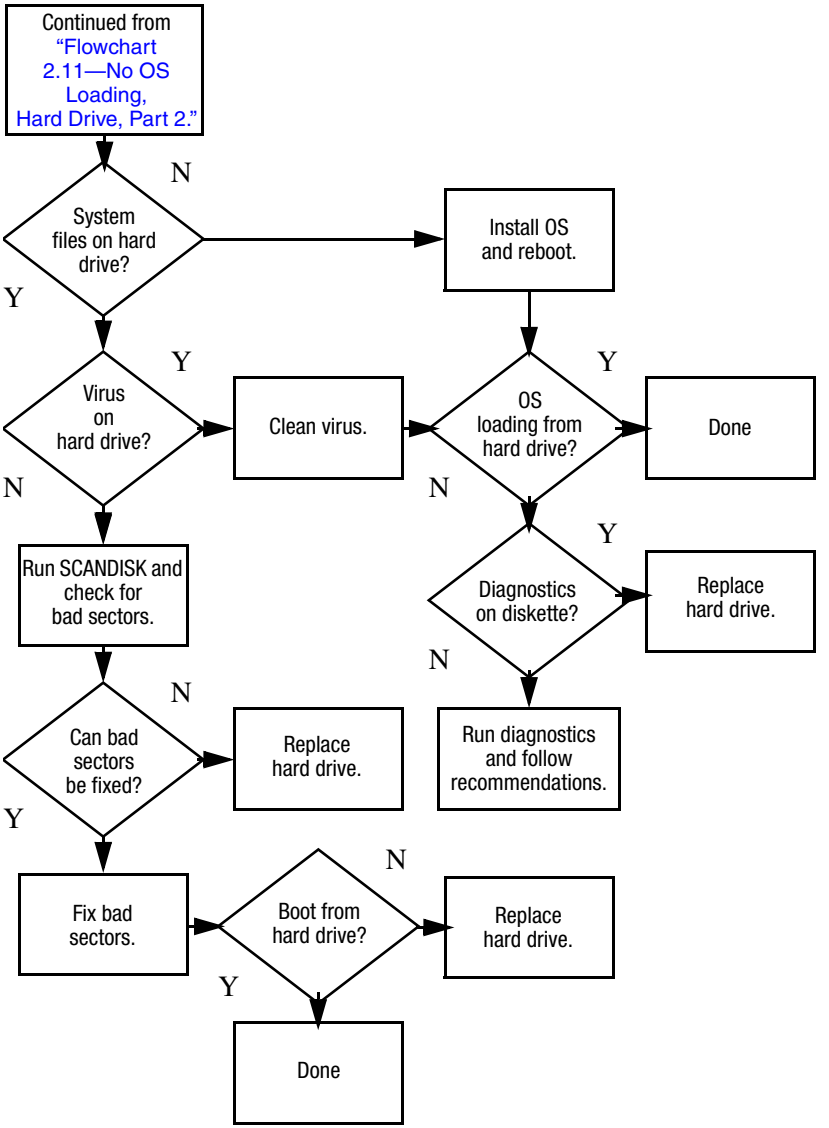
Flowchart 2.10—No OS Loading, Hard Drive, Part 1



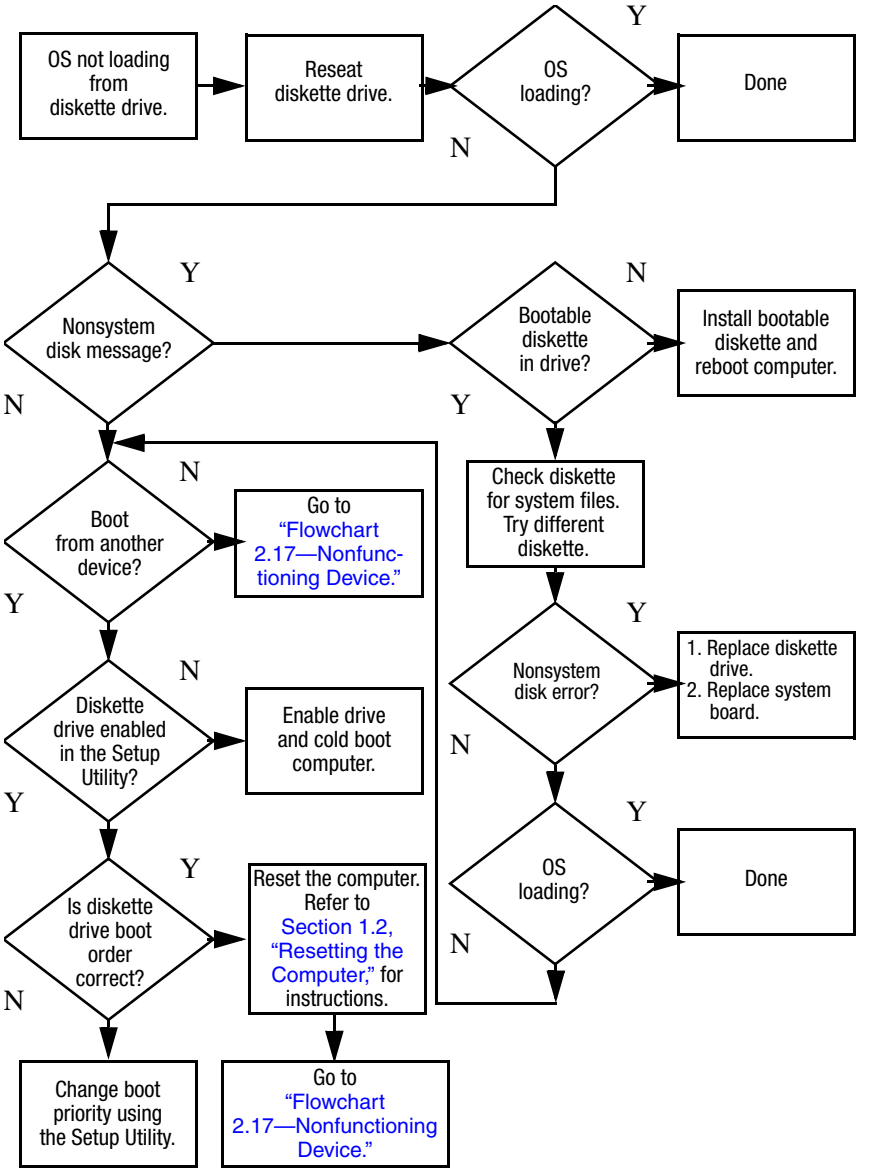
Flowchart 2.11—No OS Loading, Hard Drive, Part 2



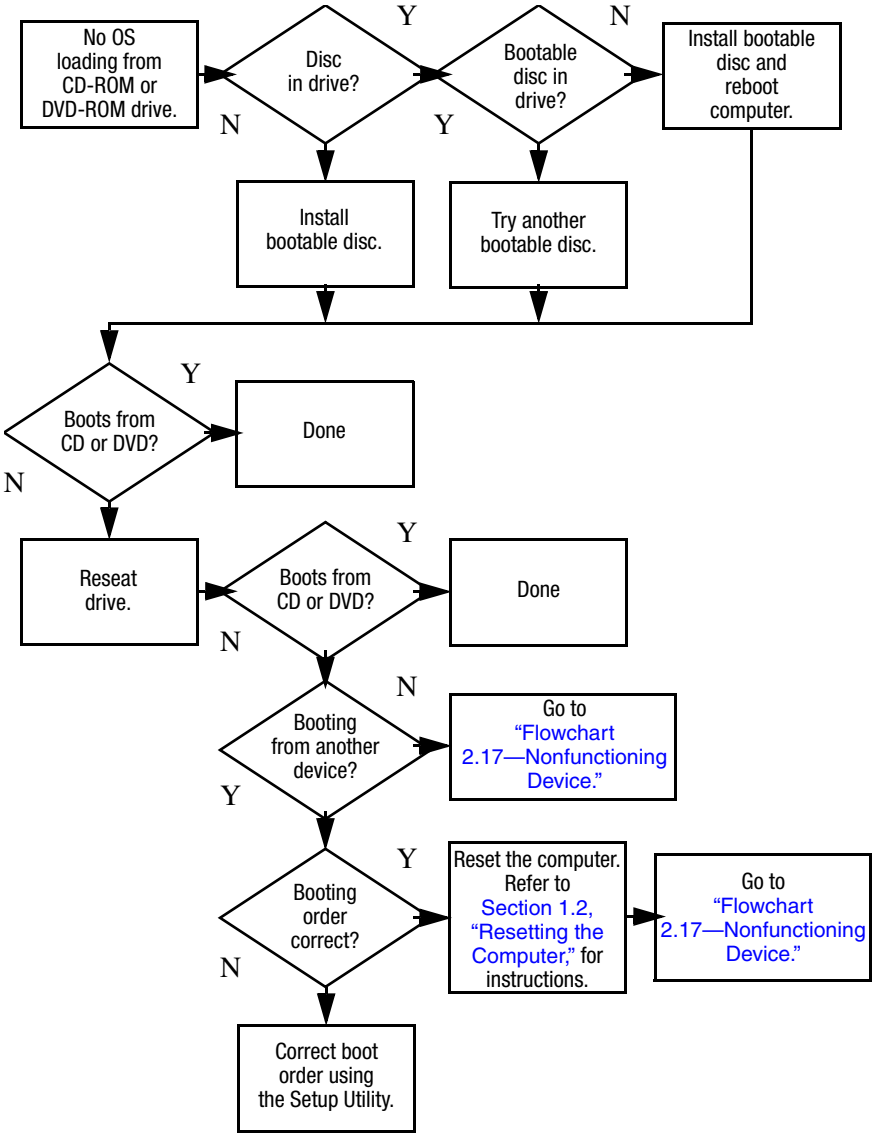
Flowchart 2.12—No OS Loading, Hard Drive, Part 3



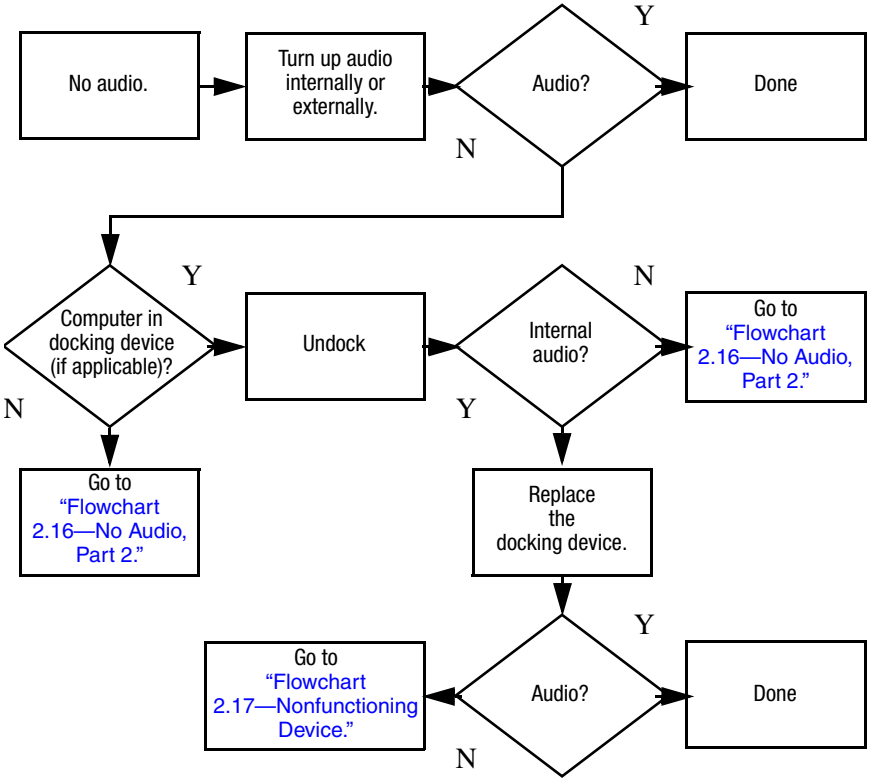
Flowchart 2.13—No OS Loading, Diskette Drive



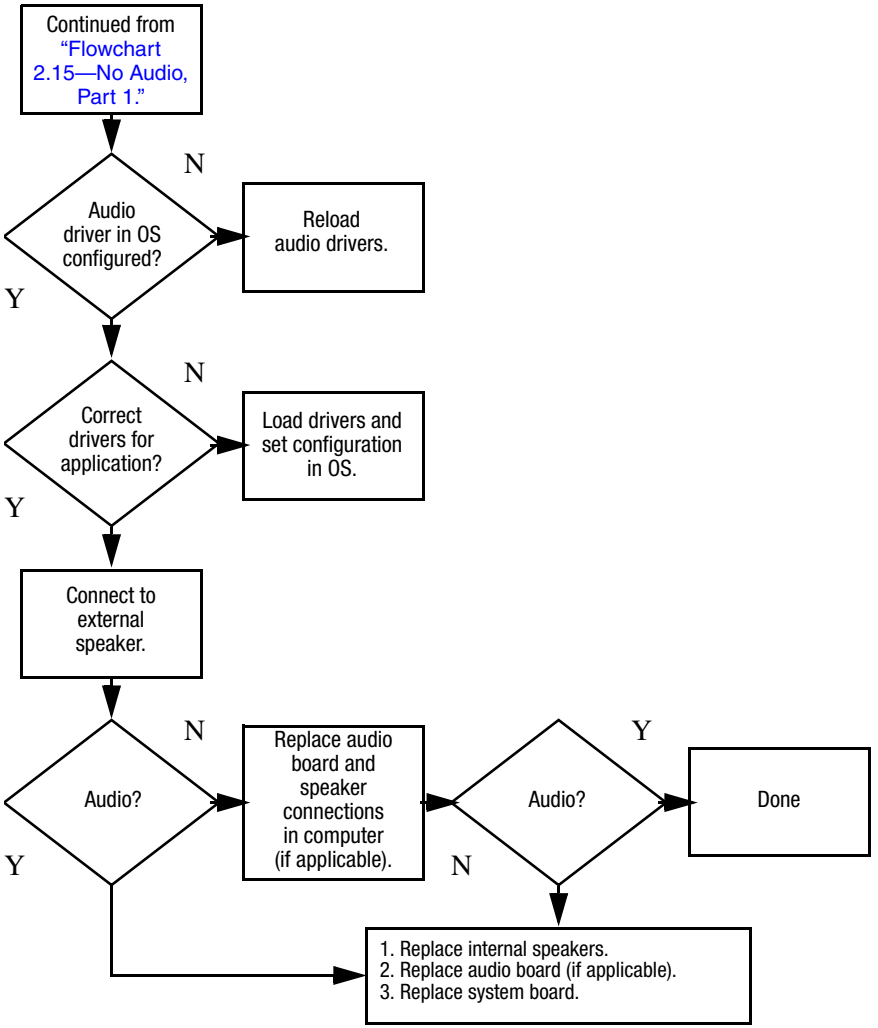
Flowchart 2.14—No OS Loading, Optical Drive



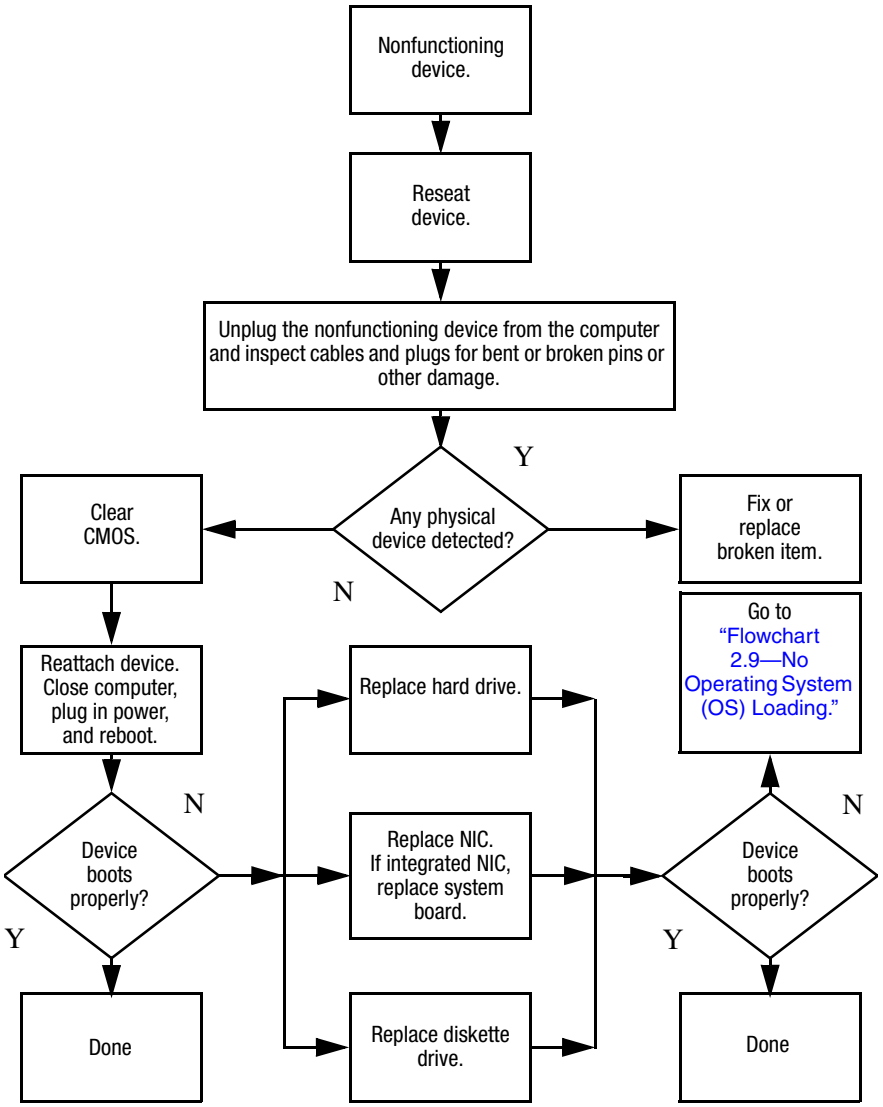
Flowchart 2.15—No Audio, Part 1



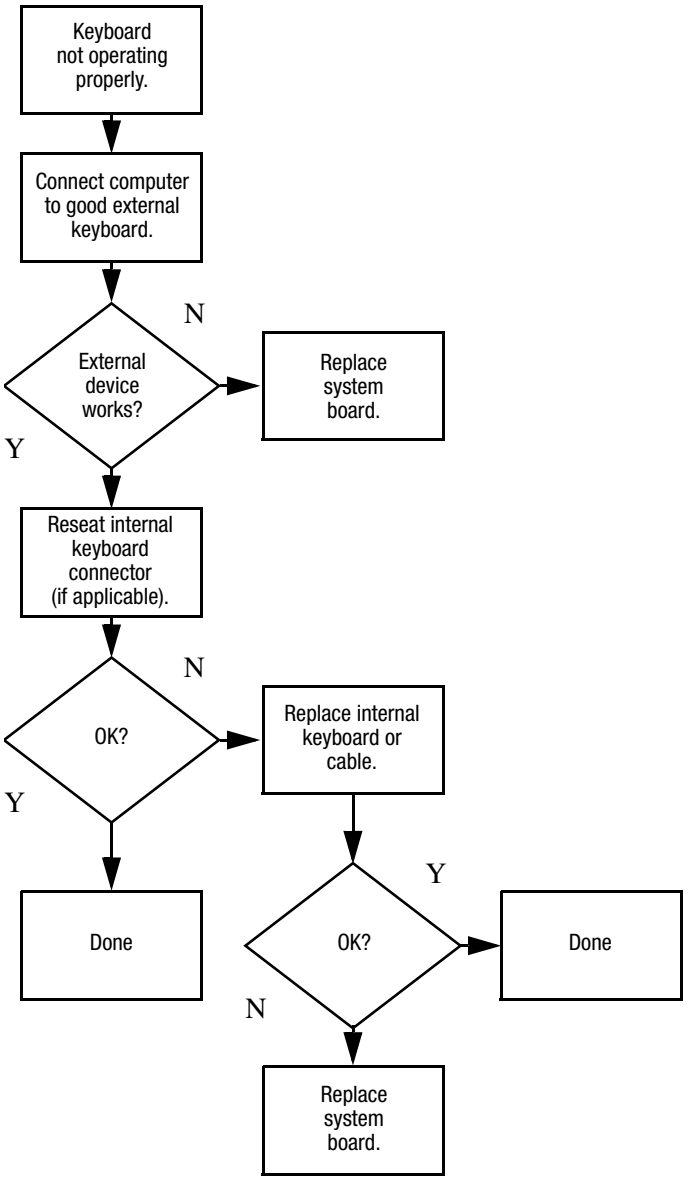
Flowchart 2.16—No Audio, Part 2



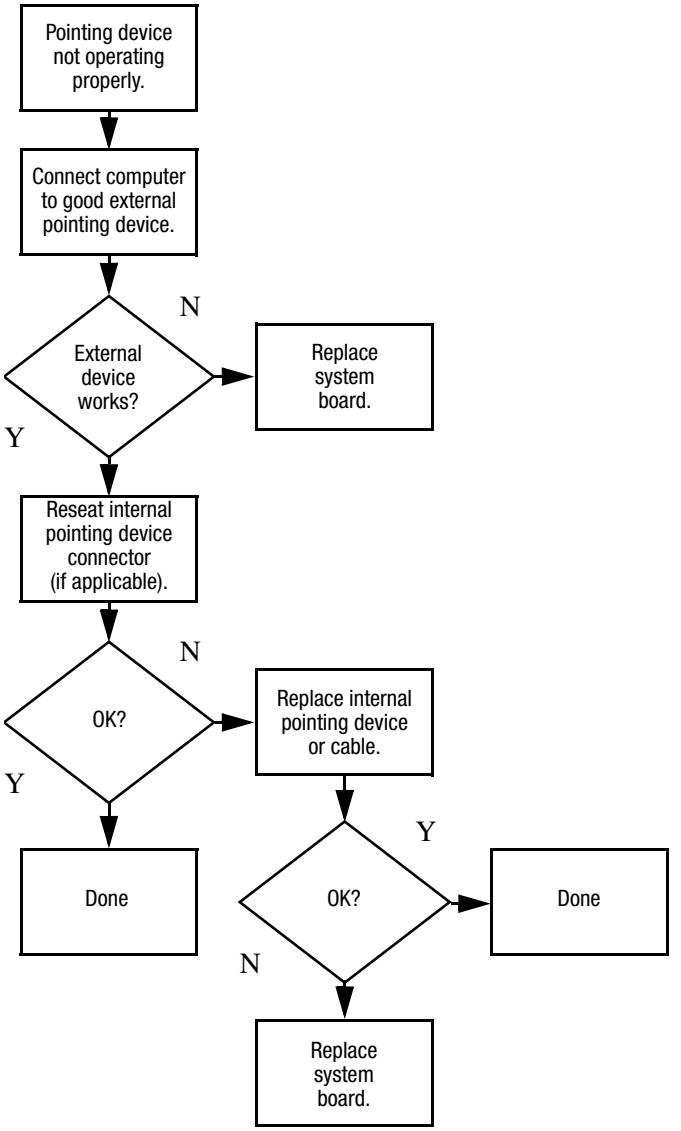
Flowchart 2.17—Nonfunctioning Device



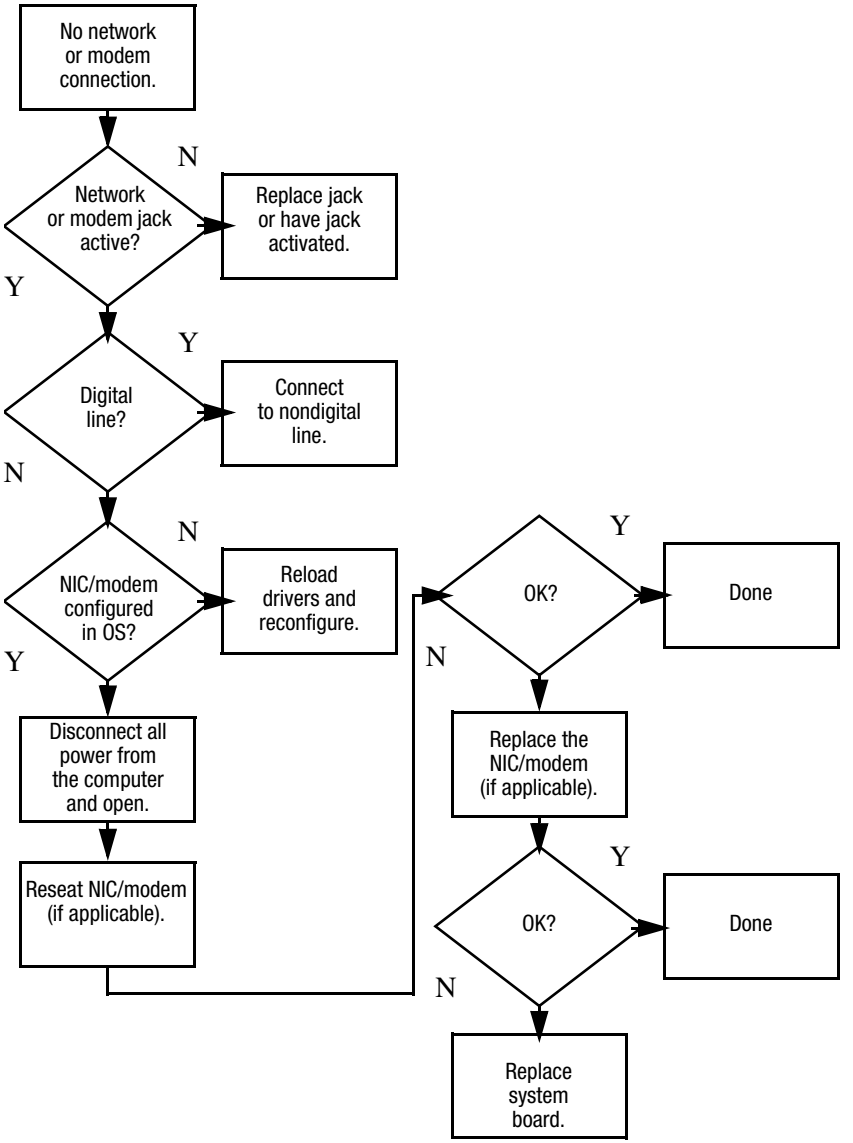
Flowchart 2.18—Nonfunctioning Keyboard



Flowchart 2.19—Nonfunctioning Pointing Device



Flowchart 2.20—No Network/Modem Connection



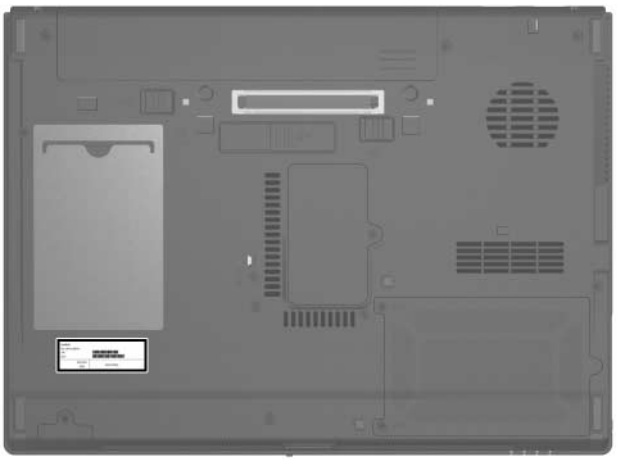
3

Illustrated Parts Catalog

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

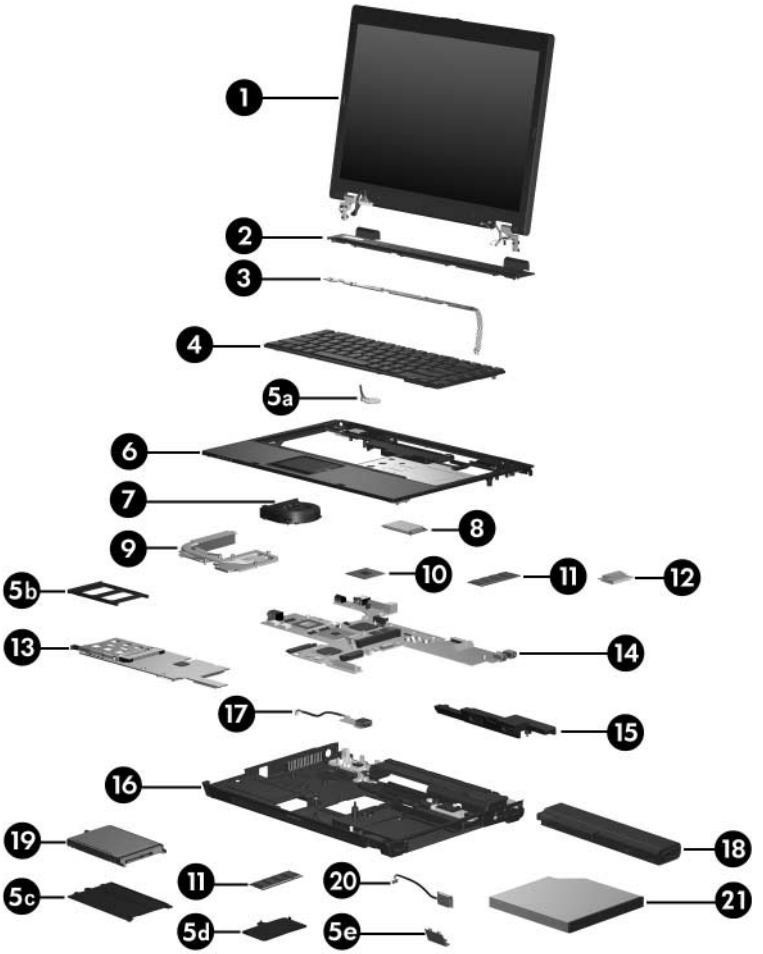
3.1 Serial Number Location

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



Serial Number Location

3.2 Computer Major Components

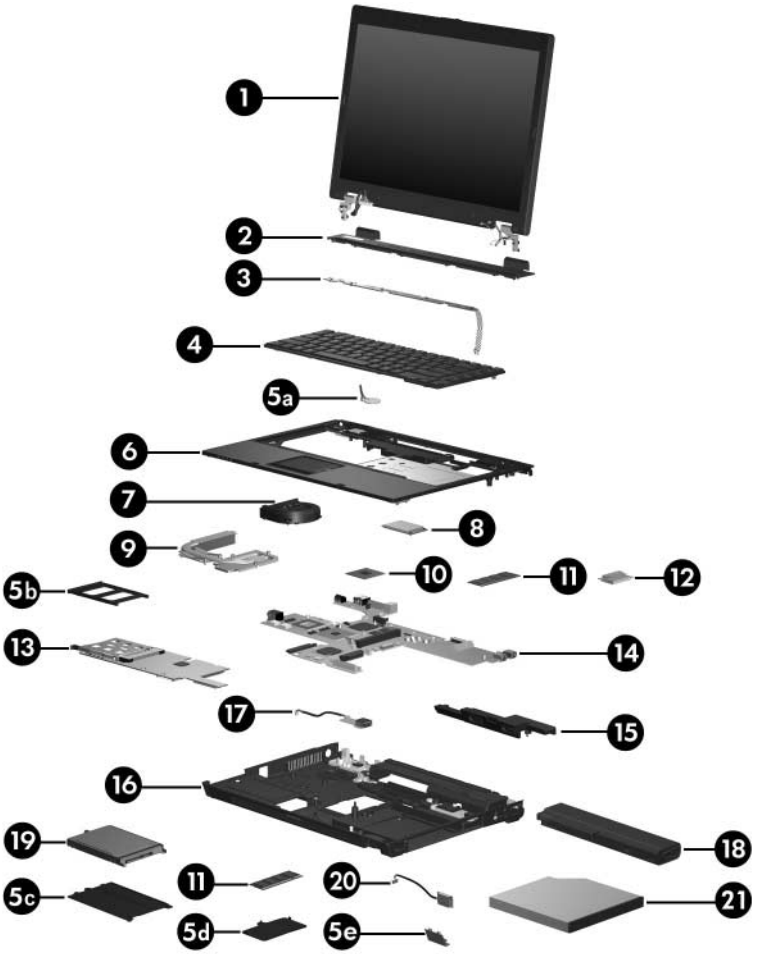


Computer Major Components

Table 3-1

Spare Parts: Computer Major Components

Item	Description			Spare Part Number
1	**Display assemblies** (include wireless antenna transceivers and cables)			
	14.1-inch, WXGA+, TFT			431307-001
	14.1-inch, WXGA, TFT			431306-001
2	**Switch cover**			431308-001
3	**LED board** (includes LED board cable)			431305-001
4	**Keyboards**			
	Korea	431322-AD1	Thailand	431322-281
	Taiwan	431322-AB1	The United States	431322-001
	Plastics Kit			431319-001
	Includes:			
5a	RTC battery			
5b	PC Card bezel			
5c	Hard drive cover (includes 2 captive screws, secured by C-clips)			
5d	Memory module compartment cover (includes 1 captive screw, secured by a C-clip)			
5e	Bluetooth module cover (includes 1 captive screw, secured by a C-clip)			
	Not illustrated:			
	Computer feet			
	Base enclosure rubber screw covers			
	Display bezel rubber screw covers			
6	**Top cover** (includes TouchPad, bracket, and cable)			431309-001
7	**Fan**			431312-001

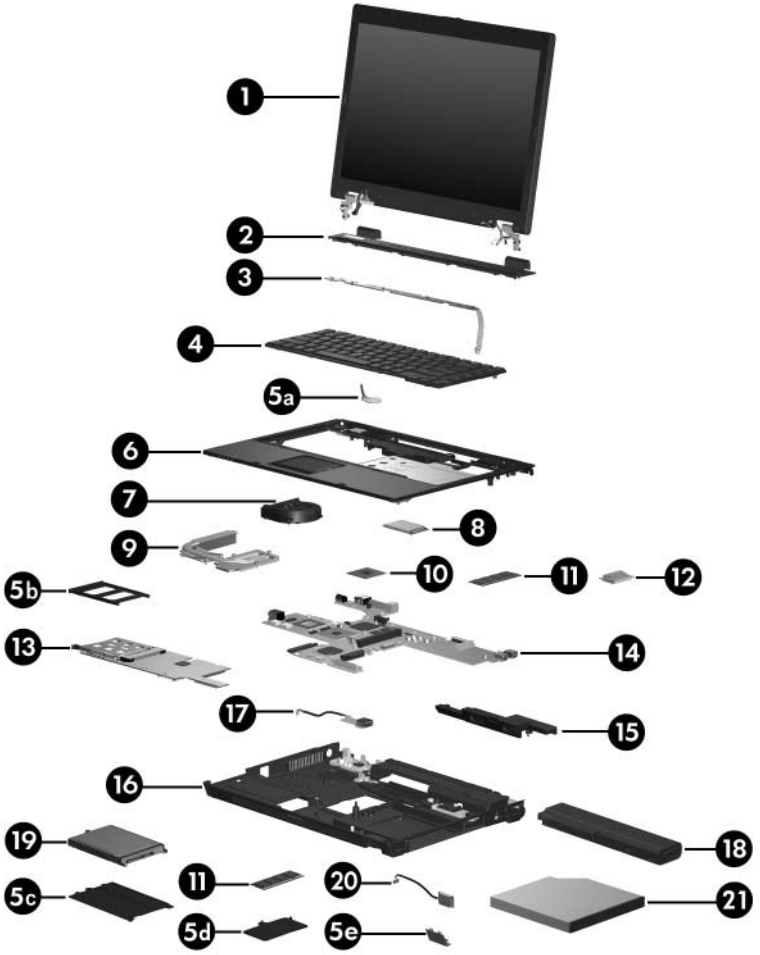


Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
8	**Mini Card module**			
	802.11a/b/g Intel Mini Card WLAN module for use in the countries listed below. These countries are categorized as most of the world 1 (MOW 1).			407575-001
	Antigua & Barbuda Argentina Australia Bahamas Barbados Brunei	Canada Chile Dominican Republic Guam Guatemala Hong Kong	Panama India Indonesia Malaysia Mexico New Zealand	Paraguay Saudi Arabia Taiwan The United States Vietnam
	802.11a/b/g Intel Mini Card WLAN module for use in the countries listed below. These countries are categorized as most of the world 2 (MOW 2).			407575-002
	Aruba Austria Azerbaijan Bahrain Belgium Bermuda Bulgaria Cayman Islands Columbia Croatia Cyprus The Czech Republic Denmark	Egypt El Salvador Estonia Finland France Georgia Germany Greece Hungary Iceland Ireland Italy Latvia Lebanon	The Philippines Poland Portugal Romania Russia Serbia and Montenegro Singapore Slovakia Liechtenstein Lithuania Luxembourg Malta Monaco	The Netherlands Norway Oman Slovenia South Africa Spain Sri Lanka Sweden Switzerland Turkey The United Kingdom Uzbekistan

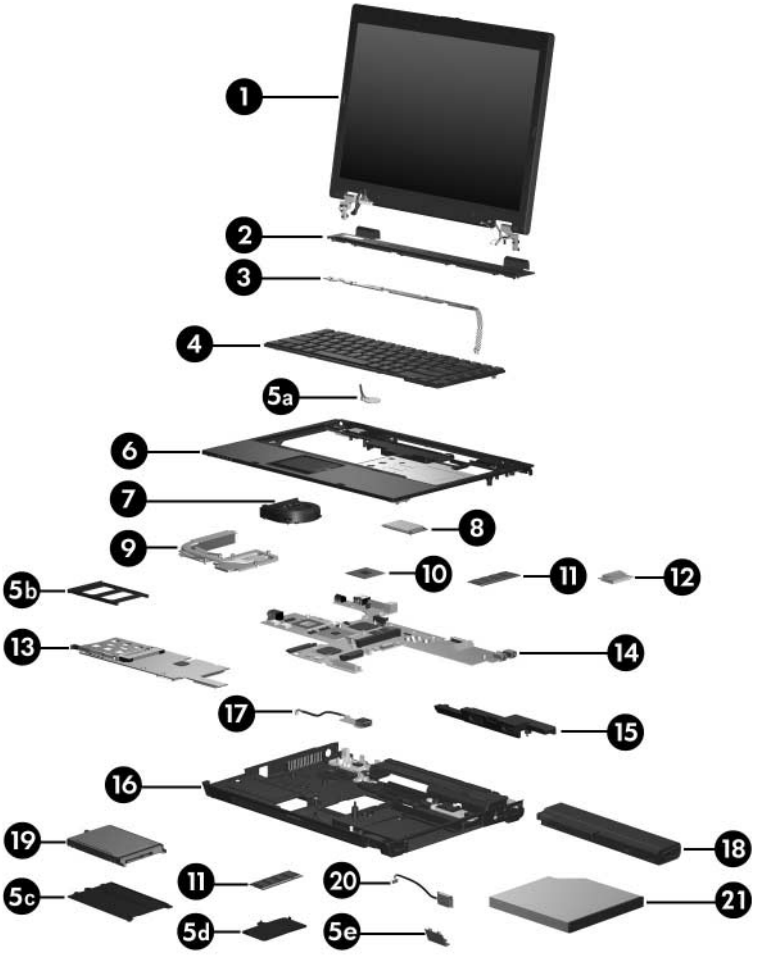


Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
8	**Mini Card module** *(Continued)*			
	802.11a/b/g Intel Mini Card WLAN module for use in the countries listed below. These countries are categorized as the rest of the world ROW.			407575-003
	China Ecuador Haiti	Honduras Pakistan Peru	Qatar South Korea	Uruguay Venezuela
	802.11b/g Mini Card WLAN module for use in the following countries:			409250-004
	Israel Jordan	Kuwait Thailand	United Arab Emirates	Ukraine
9	**Heat sink** (includes thermal paste)			431311-001
	Thermal Grease Kit (not illustrated)			413706-001
10	**Processors** (include thermal paste)			
	Intel Core Duo T2700 (2.33-GHz)			431315-001
	Intel Core Duo T2600 (2.16-GHz)			413686-001
	Intel Core Duo T2500 (2.00-GHz)			413685-001
	Intel Core Duo T2400 (1.83-GHz)			413684-001
	Intel Core Duo T1400 (1.83-GHz)			431314-001
	Intel Core Duo T2300E (1.66-GHz)			430687-001
	Intel Core Duo T2300 (1.66-GHz)			413683-001
	Intel Core Duo T1300 (1.66-GHz)			413682-001
	Thermal Grease Kit (not illustrated)			413706-001

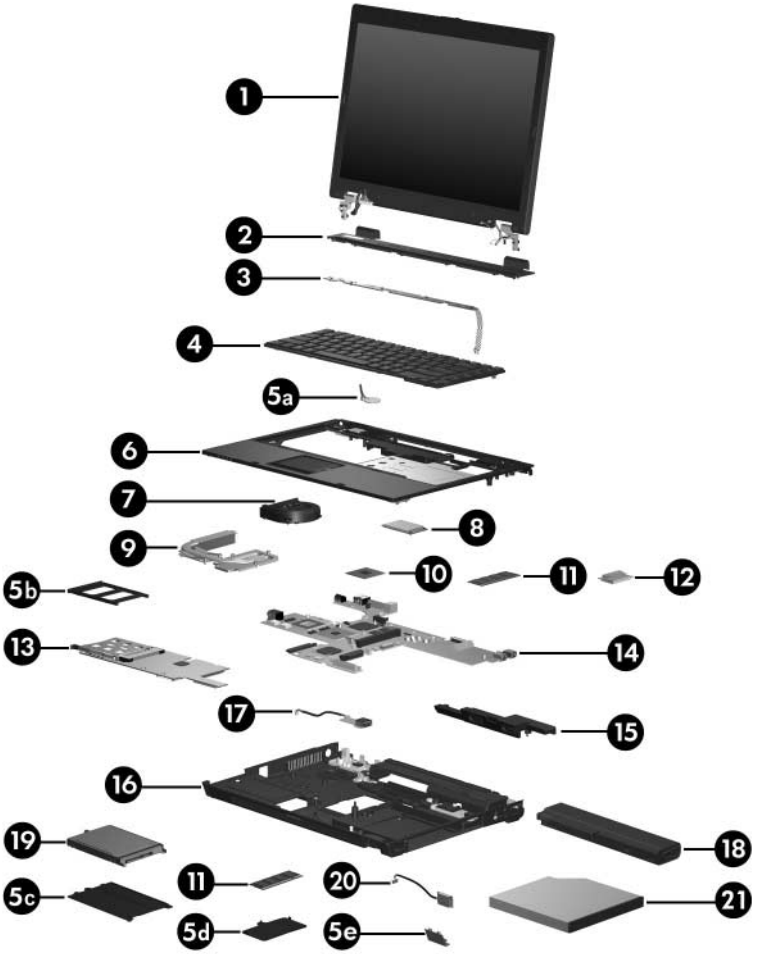


Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
11	**Memory modules**			
	PC2-5300		PC2-4200	
	2048-MB	417506-001	2048-MB	417505-001
	1024-MB	414046-001	1024-MB	414042-001
	512-MB	414045-001	512-MB	414041-001
	256-MB	414044-001	256-MB	414040-001
12	**Modem module** (includes modem module cable)			399441-001
13	**PC Card assembly**			431303-001
14	**System boards** (include PC Card/ExpressCard assembly)			
	With 128-MB of video memory			431302-001
	With 64-MB of video memory			431301-001
15	**Speaker**			431321-001
16	**Base enclosure**			431310-001
17	**USB board** (includes USB board cable)			431304-001
18	**Batteries**			
	6-cell, 4.8-Ah			372772-001
	6-cell, 4.0-Ah			393652-001



Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
19	**Hard drives** (include frame)			
	7200-rpm		5400-rpm	
	60-GB	413854-001	100-GB	413853-001
			80-GB	413852-001
			60-GB	413851-001
			40-GB	413850-001
20	**Bluetooth® module** (includes Bluetooth module cable)			398393-001
21	**Optical drives** (include bezel and optical drive bracket)			
	DVD±RW and CD-RW double-layer Combo Drive with LightScribe			431317-001
	DVD±RW and CD-RW double-layer Combo Drive			431316-001
	DVD/CD-RW Combo Drive			431323-001
	DVD-ROM drive			373314-001

3.3 Plastics Kit

Table 3-2

Plastics Kit

Spare Part Number Information

Item	Description	Spare Part Number
	Plastics Kit Includes:	431319-001
1	PC Card bezel	
2	Hard drive cover (includes 2 captive screws, secured by C-clips)	
3	Memory module compartment cover (includes 1 captive screw, secured by a C-clip)	
4	Bluetooth module cover (includes 1 captive screw, secured by a C-clip)	
5	RTC battery	
6	Computer feet (6)	
7	Base enclosure rubber screw covers (2)	

3.4 Cable Kit

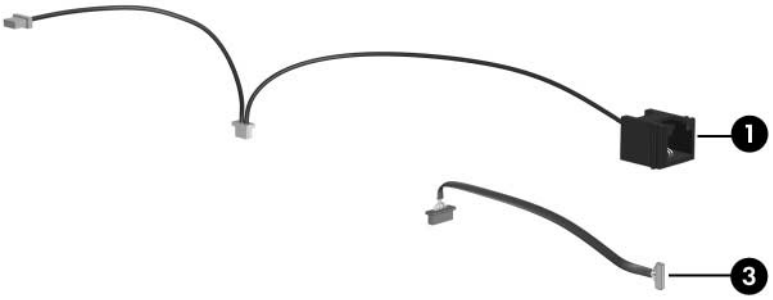


Table 3-3

Cable Kit

Spare Part Number Information

Item	Description	Spare Part Number
	Cable Kit Includes:	431318-001
1	Modem module cable	
2	Bluetooth module cable	

3.5 Mass Storage Devices

Table 3-4
Mass Storage Devices
Spare Part Number Information

Item	Description			Spare Part Number
1	**Hard drives** (include frame)			
	7200-rpm		5400-rpm	
	60-GB	413854-001	100-GB	413853-001
			80-GB	413852-001
			60-GB	413851-001
			40-GB	413850-001
2	**Optical drives** (include bezel)			
	DVD±RW and CD-RW double-layer Combo Drive with LightScribe			431317-001
	DVD±RW and CD-RW double-layer Combo Drive			431316-001
	DVD/CD-RW Combo Drive			431323-001
	DVD-ROM drive			373314-001

3.6 Miscellaneous (Not Illustrated)

Table 3-5

Miscellaneous (Not Illustrated)

Spare Part Information

Description	Spare Part Number
8-cell travel battery	367456-001
90-watt AC adapter	416421-001
External MultiBay II	366143-001
External MultiBay II power cable and stand	366144-001
HP Docking Station	413267-001
HP Docking Station 120 W AC adapter	391174-001
HP Docking Station Miscellaneous Plastics Kit	380089-001
MultiBay 24X DVD/CD-RW Combo Drive (for use in External MultiBay II and HP Docking Station)	373315-001
DVD±RW and CD-RW Double-Layer Combo Drive (for use in External MultiBay II and HP Docking Station)	375557-001
Nylon carrying case	325815-002

Table 3-5

Miscellaneous (Not Illustrated)

Spare Part Information *(Continued)*

Description	Spare Part Number
Power cords	
For use in:	
Australia	246959-011
Canada, French Canada, Latin America, Taiwan, and the United States	246959-001
Japan	246959-291
Korea	246959-AD1
Screw Kit (includes the following screws; refer to Appendix A, "Screw Listing," for more information on specifications and usage) ■ Hex socket HM5.0×9.0 screw lock ■ Phillips PM3.0×4.0 screw ■ Phillips PM2.5×13.0 spring-loaded screw ■ Phillips PM2.5×4.0 screw ■ Phillips PM2.0×8.0 screw ■ Phillips PM2.0×5.0 screw ■ Phillips PM2.0×3.0 screw ■ Torx8 T8M2.0×9.0 screw ■ Torx8 T8M2.0×8.0 screw ■ Torx8 T8M2.5×6.0 screw ■ Torx8 T8M2.0×11.0 screw	431320-001

3.7 Sequential Part Number Listing

Table 3-6

Sequential Part Number Listing

Spare Part Number	Description
246959-001	Power cord for use in Canada, French Canada, Latin America, Taiwan, and the United States
246959-011	Power cord for use in Australia
246959-291	Power cord for use in Japan
246959-AD1	Power cord for use in Korea
325815-002	Nylon carrying case
366143-001	External MultiBay II
366144-001	External MultiBay II power cable and stand
367456-001	8-cell travel battery
372772-001	6-cell, 4.8-Ah battery
373314-001	DVD-ROM drive
373315-001	MultiBay 24X DVD/CD-RW Combo Drive (for use in External MultiBay II and HP Docking Station)
375557-001	DVD±RW and CD-RW double-layer Combo Drive (for use in External MultiBay II and HP Docking Station)
380089-001	HP Docking Station Miscellaneous Plastics Kit
391174-001	HP Docking Station 120 W AC adapter
393652-001	6-cell, 4.0-Ah battery
398393-001	Bluetooth module (includes Bluetooth module cable)
399441-001	Modem module (includes modem module cable)

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description			
407575-001	802.11a/b/g Intel Mini Card WLAN module for use in the MOW1 countries listed below:			
	Antigua & Barbuda	Canada	Panama	Paraguay
	Argentina	Chile	India	Saudi Arabia
	Australia	Dominican Republic	Indonesia	Taiwan
	Bahamas	Guam	Malaysia	The United States
	Barbados	Guatemala	Mexico	Vietnam
	Brunei	Hong Kong	New Zealand	
407575-002	802.11a/b/g Intel Mini Card WLAN module for use in the MOW2 countries listed below:			
	Aruba	Egypt	The Philippines	The Netherlands
	Austria	El Salvador	Poland	Norway
	Azerbaijan	Estonia	Portugal	Oman
	Bahrain	Finland	Romania	Slovenia
	Belgium	France	Russia	South Africa
	Bermuda	Georgia	Serbia and Montenegro	Spain
	Bulgaria	Germany	Singapore	Sri Lanka
	Cayman Islands	Greece	Slovakia	Sweden
	Columbia	Hungary	Liechtenstein	Switzerland
	Croatia	Iceland	Lithuania	Turkey
	Cyprus	Ireland	Luxembourg	The United Kingdom
	The Czech Republic	Italy	Malta	Uzbekistan
	Denmark	Latvia	Monaco	
		Lebanon		

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description			
407575-003	802.11a/b/g Intel Mini Card WLAN module for use in the ROW countries listed below:			
	China	Honduras	Qatar	Uruguay
	Ecuador	Pakistan	South Korea	Venezuela
	Haiti	Peru		
409280-004	802.11b/g Mini Card WLAN module for use in the following countries:			
	Israel	Kuwait	United Arab Emirates	Ukraine
	Jordan	Thailand		
413682-001	Intel Core Duo T1300 (1.66-GHz) processor			
413683-001	Intel Core Duo T2300 (1.66-GHz) processor			
413684-001	Intel Core Duo T2400 (1.83-GHz) processor			
413685-001	Intel Core Duo T2500 (2.00-GHz) processor			
413686-001	Intel Core Duo T2600 (2.16-GHz) processor			
413694-001	Serial port module (includes serial port module cable)			
413706-001	Thermal Grease Kit			
413850-001	5400-rpm, 40-GB hard drive (includes frame)			
413851-001	5400-rpm, 60-GB hard drive (includes frame)			
413852-001	5400-rpm, 80-GB hard drive (includes frame)			
413853-001	5400-rpm, 100-GB hard drive (includes frame)			
413854-001	7200-rpm, 60-GB hard drive (includes frame)			
414040-001	PC2-4200, 256-MB memory module			
414041-001	PC2-4200, 512-MB memory module			

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
414042-001	PC2-4200, 1024-MB memory module
414044-001	PC2-5300, 256-MB memory module
414045-001	PC2-5300, 512-MB memory module
414046-001	PC2-5300, 1024-MB memory module
416421-001	90-watt AC adapter
417505-001	PC2-4200, 2048-MB memory module
417506-001	PC2-5300, 2048-MB memory module
430687-001	Intel Core Duo T2300E (1.66-GHz) processor
431301-001	System board with 64-MB video memory
431302-001	System board with 128-MB video memory
431303-001	PC Card assembly
431304-001	USB board (includes USB board cable)
431305-001	LED board (includes LED board cable)
431306-001	14.1-inch XGA, TFT display assembly (includes wireless antenna transceivers and cables)
431307-001	14.1-inch XGA+, TFT display assembly (includes wireless antenna transceivers and cables)
431308-001	Switch cover
431309-001	Top cover
431310-001	Base enclosure
431311-001	Heat sink (includes thermal paste)
431312-001	Fan
431314-001	Intel Core Duo T1400 (1.83-GHz) processor

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
431315-001	Intel Core Duo T2700 (2.33-GHz) processor
431316-001	DVD±RW and CD-RW double-layer Combo Drive
431317-001	DVD±RW and CD-RW double-layer Combo Drive with LightScribe
431318-001	Cable Kit
431319-001	Plastics Kit
431320-001	Screw Kit
431321-001	Speaker
431322-001	Keyboard for use in the United States
431322-281	Keyboard for use in Thailand
431322-AB1	Keyboard for use in Taiwan
431322-AD1	Keyboard for use in Korea
431323-001	DVD/CD-RW Combo Drive

4

Removal and Replacement Preliminaries

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

4.1 Tools Required

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

- Magnetic screwdriver
- Phillips P0 screwdriver
- Torx8 screwdriver
- 5.0-mm socket for system board screw locks
- Flat-bladed screwdriver

4.2 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, be sure 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. Be sure 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.

4.3 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, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.
- Before handling a drive, be sure 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.”

4.4 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 might not be affected at all and can work perfectly throughout a normal cycle. Or the device might function normally for a while, then degrade in the internal layers, reducing its life expectancy.

4.5 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. Be sure 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.

4.6 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.

4.7 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 ±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 4-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 4-1

Typical Electrostatic Voltage Levels

	Relative Humidity		
Event	**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 4-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 4-2

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

5

Removal and Replacement Procedures

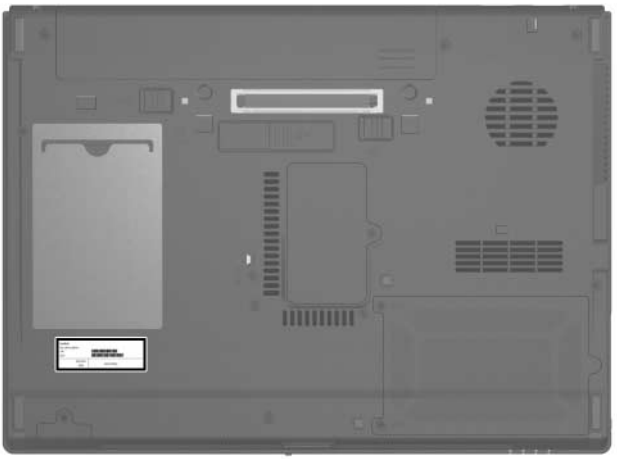
This chapter provides removal and replacement procedures.

There are as many as 64 screws and screw locks, in 11 different sizes, that must 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 A, "Screw Listing" for detailed information on screw and screw lock sizes, locations, and usage.

5.1 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

5.2 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
5.3	Preparing the Computer for Disassembly	
	Battery	0
5.4	Hard Drive	2 loosened to remove the hard drive cover 1 loosened to remove the hard drive 4 to remove the hard drive frame
5.5	Computer Feet	0
5.6	Bluetooth Module	1 loosened to remove the Bluetooth module cover
5.7	External Memory Module	1 loosened to remove the memory module compartment cover
5.8	Optical Drive	1 to remove the optical drive 2 to remove the optical drive bracket
5.9	Switch Cover LED board	2 5
5.10	Keyboard	4
5.11	Fan	2
5.12	Heat Sink	7 loosened
5.13	Processor	1 loosened

Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
5.14	Internal Memory Module	0
5.15	Mini Card WLAN Module	2
	⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini Card 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.	
5.16	Display Assembly	6
5.17	Top Cover	11
5.18	PC Card Assembly	3
5.19	Modem Module	2
5.20	Speaker	2
5.21	USB Board	1
5.22	RTC Battery	0
5.23	System Board	2 screws 2 screw locks

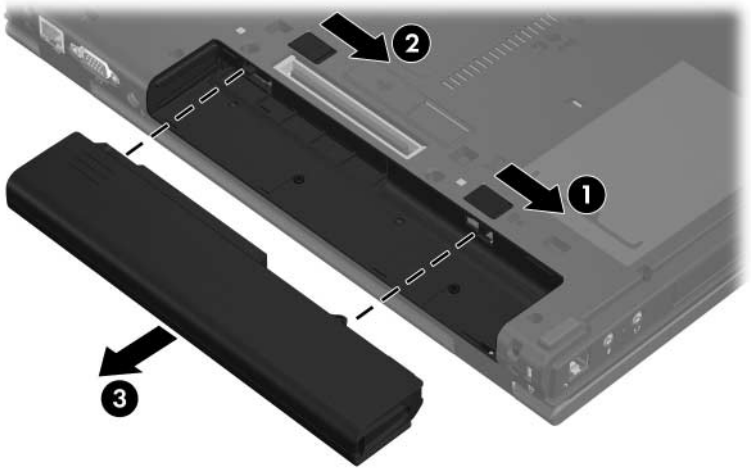
5.3 Preparing the Computer for Disassembly

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 Spare Part Number Information	
6-cell, 4.8-Ah	372772-001
6-cell, 4.0-Ah	393652-001

4. Remove the battery by following these steps:
   a. Turn the computer upside down with the rear panel toward you.
   b. Slide the battery release latch on the right ❶ and then the battery release latch on the left ❷ to release the battery.
   c. Slide the battery ❸ straight back and remove it.



Removing the Battery

Reverse the above procedure to install the battery.

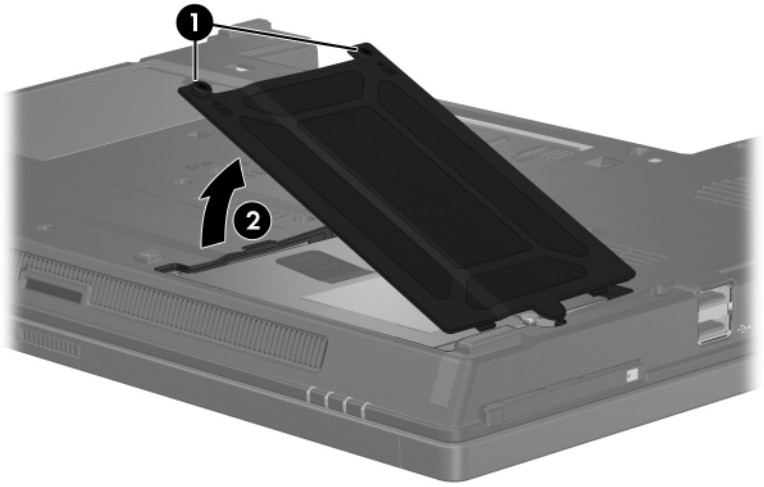
5.4 Hard Drive

Hard Drive Spare Part Number Information			
Hard drives (include frame)			
7200-rpm		5400-rpm	
60-GB	413854-001	100-GB	413853-001
		80-GB	413852-001
		60-GB	413851-001
		40-GB	413850-001

1. Prepare the computer for disassembly (refer to Section 5.3).
2. Position the computer with the front toward you.

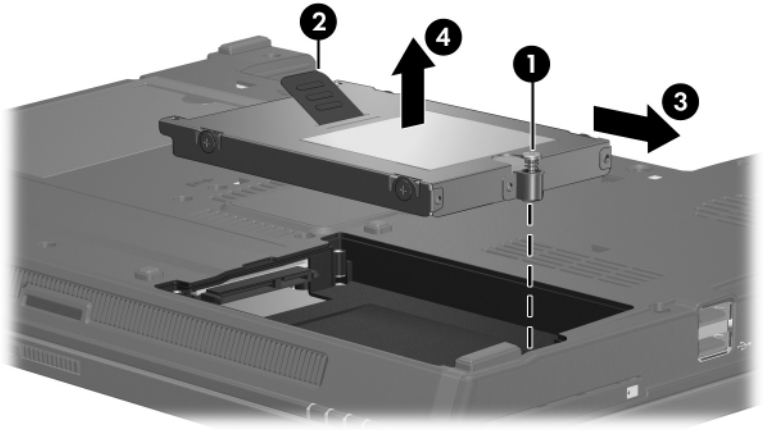
3. Loosen the two Phillips PM2.0×5.0 screws ❶ that secure the hard drive cover to the computer.
4. Lift the left side of the hard drive cover ❷ and swing it to the right.
5. Remove the hard drive cover.

The hard drive cover is included in the Plastics Kit, spare part number 431319-001.



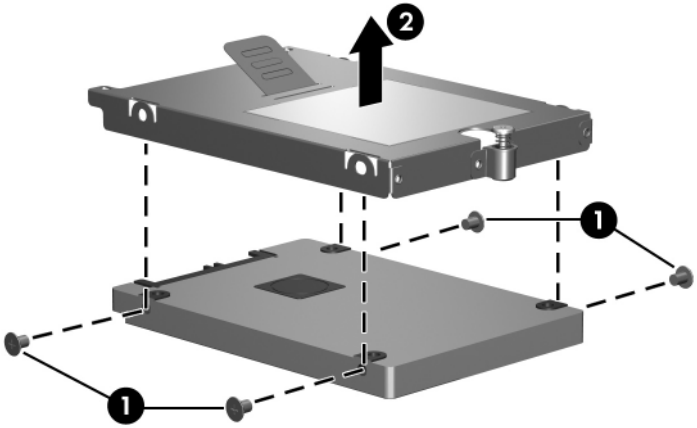
Removing the Hard Drive Cover

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



Removing the Hard Drive

9. Remove the four Phillips PM3.0×3.0 hard drive frame screws ❶ from each side of the hard drive.
10. Lift the frame ❷ straight up to remove it from the hard drive.

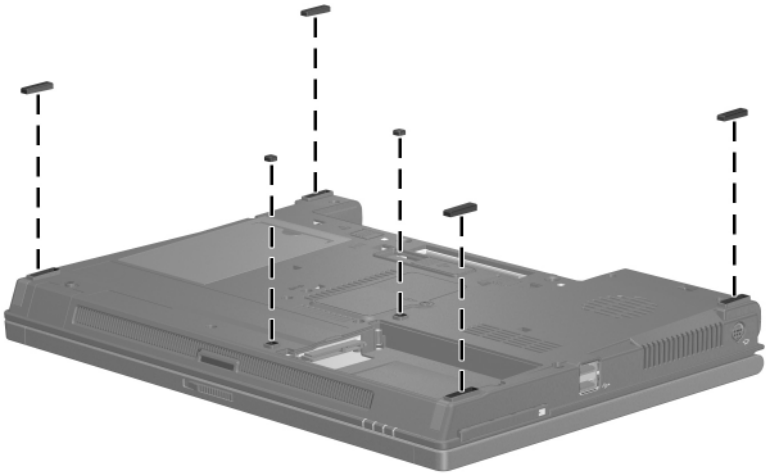


Removing the Hard Drive Frame

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

5.5 Computer Feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Plastics Kit, spare part number 431319-001.



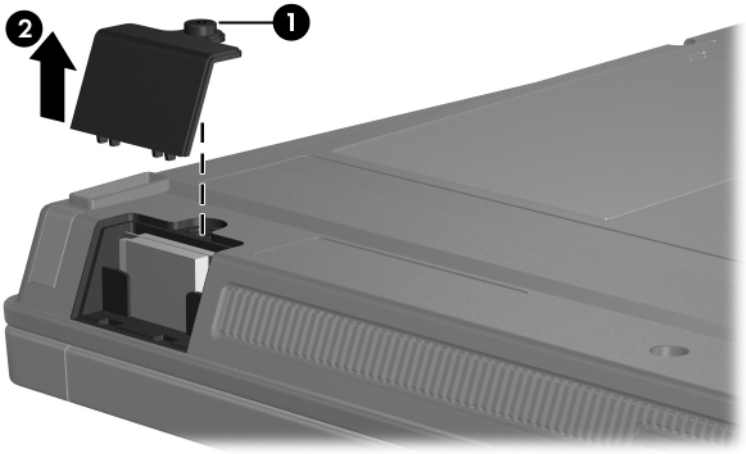
Replacing the Computer Feet

5.6 Bluetooth Module

Bluetooth Module Spare Part Number Information	
Bluetooth module (includes Bluetooth module cable)	398393-001

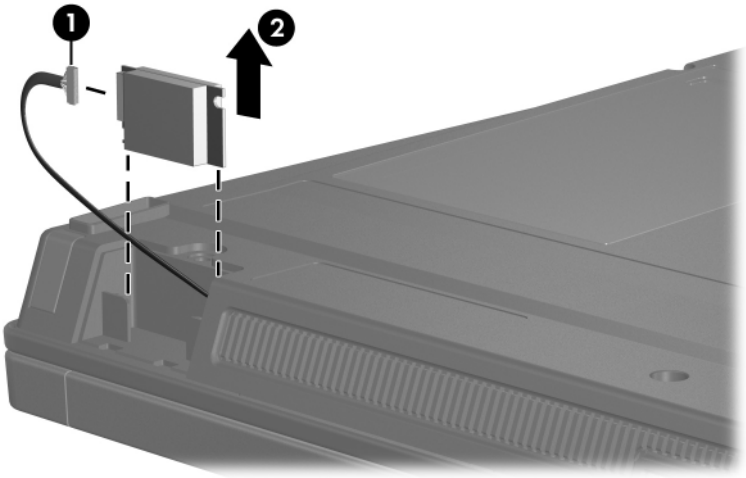
1. Prepare the computer for disassembly (refer to Section 5.3).
2. Loosen the Phillips PM2.0×5.0 screw ❶ that secures the Bluetooth module cover to the computer.
3. Remove the Bluetooth module cover ❷.

The Bluetooth module cover is included in the Plastics Kit, spare part number 431319-001.



Removing the Bluetooth Module Cover

4. Disconnect the Bluetooth module cable ❶ from the Bluetooth module.
5. Remove the Bluetooth module ❷ from the computer.



Removing the Bluetooth Module

Reverse the above procedure to install the Bluetooth module.

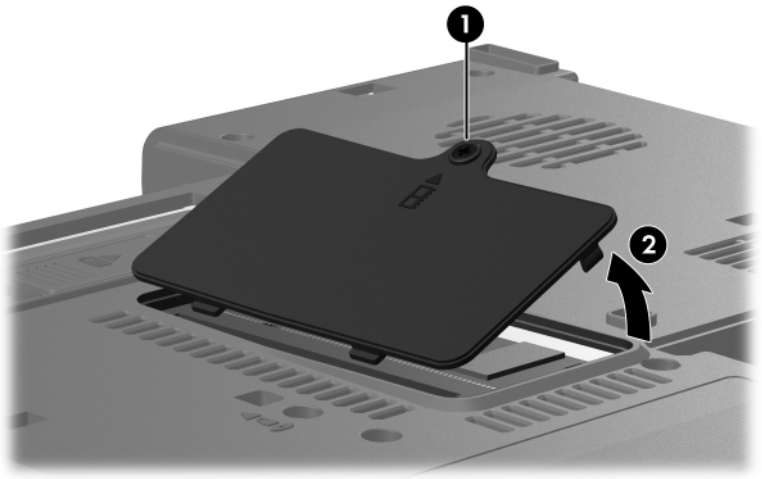
5.7 External Memory Module

Memory Module Spare Part Number Information			
PC2-5300		PC2-4200	
2048-MB	417506-001	2048-MB	417505-001
1024-MB	414046-001	1024-MB	414042-001
512-MB	414045-001	512-MB	414041-001
256-MB	414044-001	256-MB	414040-001

1. Prepare the computer for disassembly (refer to Section 5.3).
2. Position the computer with the front toward you.

3. Loosen the Phillips PM2.0×5.0 screw ❶ that secures the memory module compartment cover to the computer.
4. Lift the right side of the cover ❷ and swing it to the left.
5. Remove the memory module compartment cover.

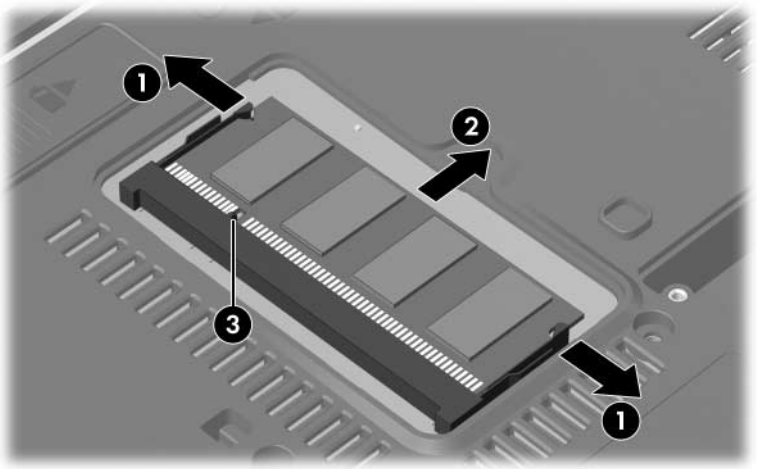
The memory module compartment cover is included in the Plastics Kit, spare part number 431319-001.



Removing the Memory Module Compartment Cover

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

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



Removing the Memory Module

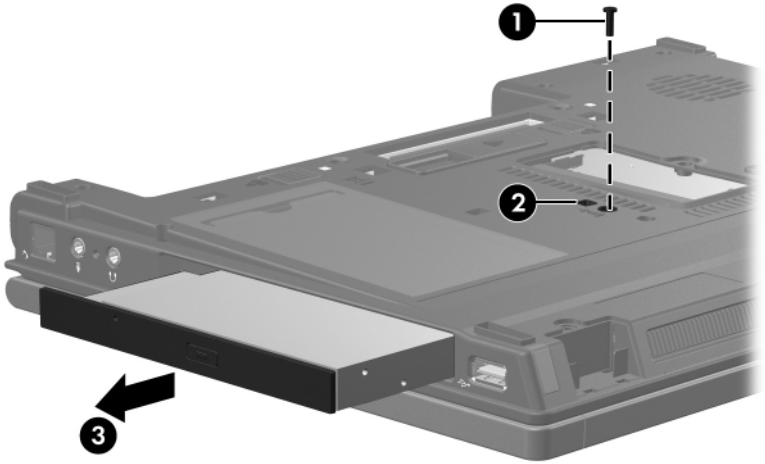
Reverse the above procedure to install a memory module.

5.8 Optical Drive

Optical Drive Spare Part Number Information	
DVD±RW and CD-RW double-layer Combo Drive with LightScribe	431317-001
DVD±RW and CD-RW double-layer Combo Drive	431316-001
DVD/CD-RW Combo Drive	431323-001
DVD-ROM drive	373314-001

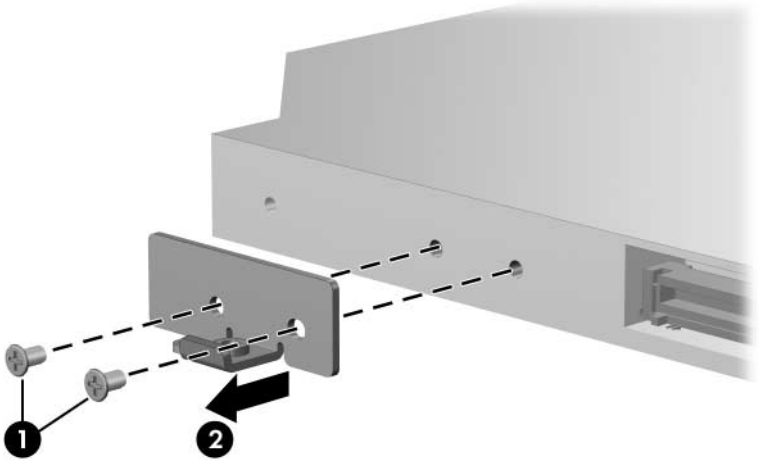
1. Prepare the computer for disassembly (Section 5.3).
2. Position the computer with the left side toward you.

3. Remove the Torx8 T8M2.5×8.0 screw ❶ that secures the optical drive to the computer.
4. Insert a flat-bladed driver into the slot ❷ on the bottom of the computer and push the tab.
5. Remove the optical drive ❸ from the computer.



Removing the Optical Drive

6. If it is necessary to replace the optical drive bracket, remove the two Phillips PM2.0×3.0 screws ❶ that secure the bracket to the optical drive.
7. Remove the optical drive bracket ❷.



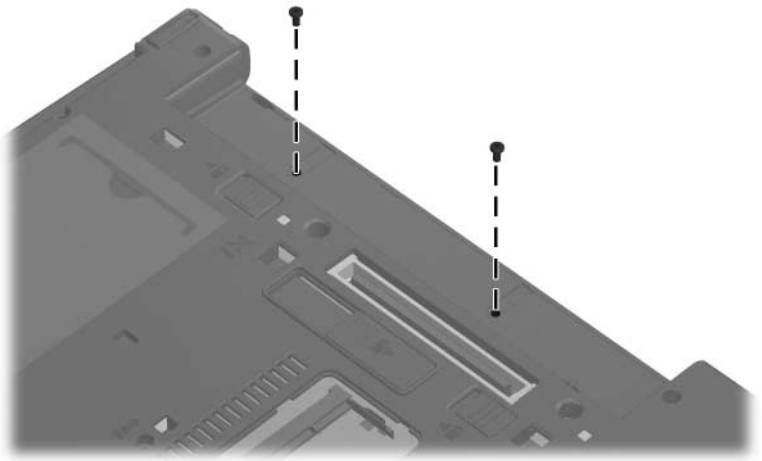
Removing the Optical Drive

Reverse the above procedure to reassemble and install an optical drive.

5.9 Switch Cover

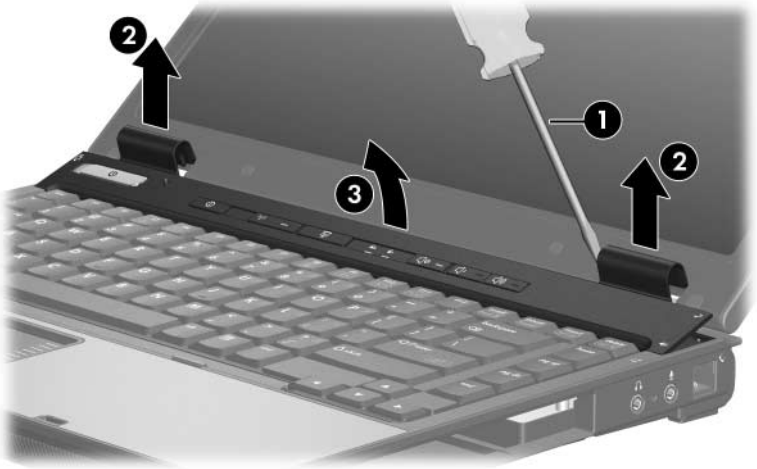
Switch Cover Spare Part Number Information	
Switch Cover	431308-001

1. Prepare the computer for disassembly (Section 5.3).
2. Position the computer with the front toward you.
3. Remove the two Phillips PM2.5×4.0 screws that secure the switch cover to the computer.



Removing the Switch Cover Screws

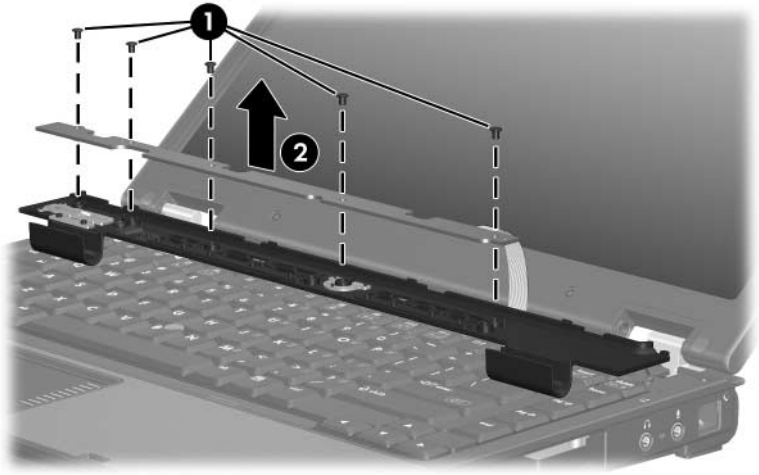
4. Turn the computer display-side up with the front toward you.
5. Open the computer as far as possible.
6. Insert a flat-bladed screwdriver ❶ under the inside edges of the hinge cover sections ❷ of the switch cover and gently pry up until the switch cover disengages from the computer.
7. Lift the rear edge of the switch cover ❸ and swing it forward until it rests on the keyboard.



Releasing the Switch Cover

8. Remove the five Phillips PM2.5×4.0 screws ❶ that secure the LED board to the switch cover.
9. Remove the LED board ❷.

The LED board is available using spare part number 431305-001.



Removing the LED Board

10. Remove the switch cover.

Reverse the above procedure to install the switch cover.

5.10 Keyboard

Keyboard Spare Part Number Information			
For use in:			
Korea	431322-AD1	Thailand	431322-281
Taiwan	431322-AB1	The United States	431322-001

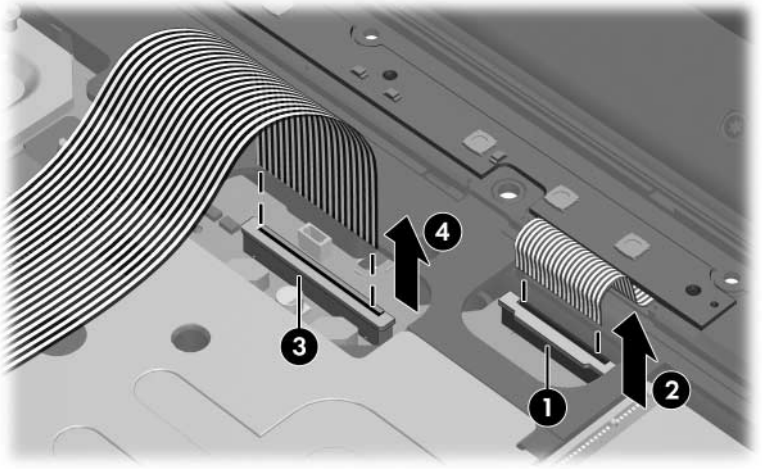
1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.7).
3. Remove the four Phillips PM2.5×4.0 screws that secure the keyboard to the computer.

Removing the Keyboard Screws

4. Lift the rear edge of the keyboard and swing it forward until it rests on the palm rest.

Releasing the Keyboard

5. Release the zero insertion force (ZIF) connector ❶ to which the LED board cable is attached and disconnect the LED board cable ❷.
6. Release the ZIF connector ❸ to which the keyboard cable is attached and disconnect the pointing keyboard cable ❹.



Disconnecting the Keyboard Cable

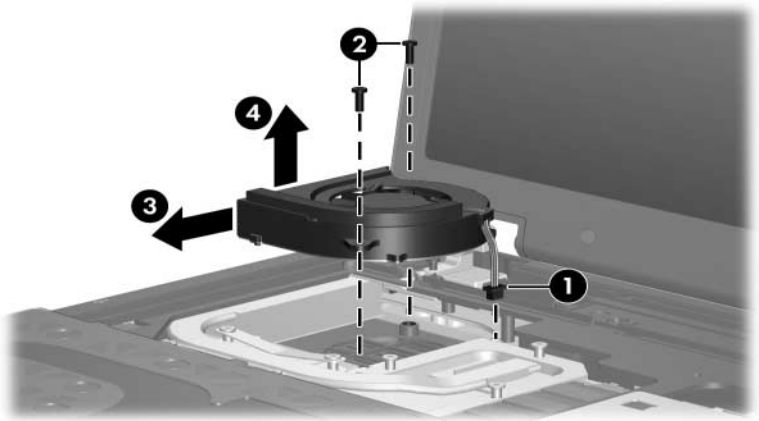
7. Remove the keyboard and LED board.

Reverse the above procedure to install the keyboard.

5.11 Fan

Fan Spare Part Number Information	
Fan	431312-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.9).
3. Release the keyboard (Section 5.10).
4. Disconnect the fan cable ❶ from the system board.
5. Remove the two Torx8 T8M2.5×6.0 screws ❷ that secure the fan to the computer.
6. Slide the fan ❸ toward the front of the computer to disengage it from the base enclosure.
7. Remove the fan ❹.



Removing the Fan

Reverse the above procedure to install the fan.

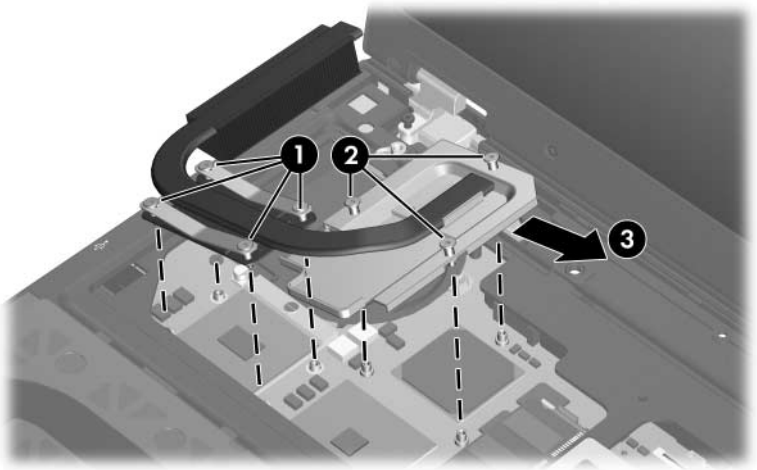
5.12 Heat Sink

Heat Sink Spare Part Number Information	
Heat sink (includes thermal paste)	431311-001
Thermal Grease Kit (not illustrated)	413706-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.9).
3. Release the keyboard (Section 5.10).
4. Remove the fan (Section 5.11).

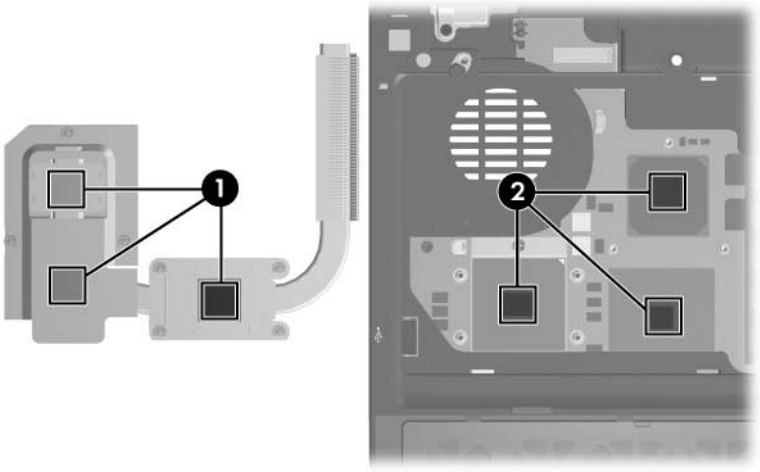
5. Loosen the four Torx8 T8M2.0×11.0 screws ❶ and the three Phillips PM2.0×8.0 screws ❷ that secure the heat sink to the computer.
6. Lift the right side of the heat sink to disengage it from the processor and slide the heat sink ❸ to the right to remove it.

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.



Removing the Heat Sink

The thermal paste and thermal pads should be thoroughly cleaned from the surfaces of the heat sink ❶ and system board components ❷ each time the heat sink is removed. Thermal paste and pads are included with the heat sink and all processor spare part kits and are also available using spare part number 413706-001.



Thermal Paste and Pad Locations

Reverse the above procedure to install the heat sink.

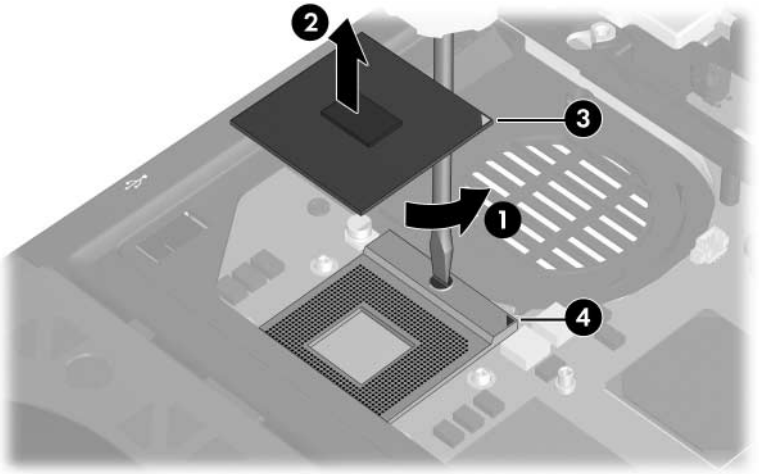
5.13 Processor

Processor Spare Part Number Information	
Intel Core Duo T2700 (2.33-GHz)	431315-001
Intel Core Duo T2600 (2.16-GHz)	413686-001
Intel Core Duo T2500 (2.00-GHz)	413685-001
Intel Core Duo T2400 (1.83-GHz)	413684-001
Intel Core Duo T1400 (1.83-GHz)	431314-001
Intel Core Duo T2300E (1.66-GHz)	430687-001
Intel Core Duo T2300 (1.66-GHz)	413683-001
Intel Core Duo T1300 (1.66-GHz)	413682-001
Thermal Grease Kit	413706-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.9).
3. Release the keyboard (Section 5.10).
4. Remove the fan (Section 5.11).
5. Remove the heat sink (Section 5.12).

6. Use a flat-bladed screwdriver to turn the processor locking screw ❶ one-half turn counterclockwise until you hear a click.
7. Lift the processor ❷ straight up and remove it.

The gold triangle ❸ on the processor should be aligned with the triangle icon ❹ embossed on the processor socket when you install the processor.



Removing the Processor

Reverse the above procedure to install the processor.

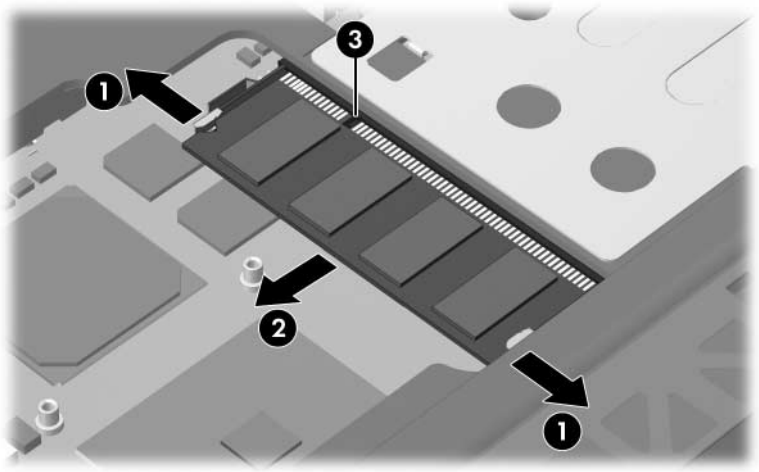
5.14 Internal Memory Module

Memory Module Spare Part Number Information			
PC2-5300		PC2-4200	
2048-MB	417506-001	2048-MB	417505-001
1024-MB	414046-001	1024-MB	414042-001
512-MB	414045-001	512-MB	414041-001
256-MB	414044-001	256-MB	414040-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.9).
3. Release the keyboard (Section 5.10).

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

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



Removing the Memory Module

Reverse the above procedure to install a memory module.

5.15 Mini Card WLAN Module

Mini Card WLAN Module

Spare Part Number Information

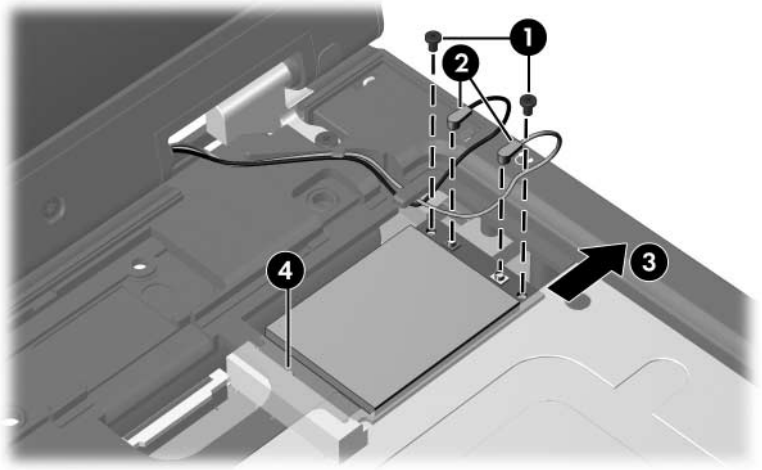
802.11a/b/g Intel Mini Card WLAN module for use in the MOW 1 countries listed below:				407575-001
Antigua & Barbuda	Canada	Panama	Paraguay	
Argentina	Chile	India	Saudi Arabia	
Australia	Dominican Republic	Indonesia	Taiwan	
Bahamas	Guam	Malaysia	The United States	
Barbados	Guatemala	Mexico	Vietnam	
Brunei	Hong Kong	New Zealand		
802.11a/b/g Intel Mini Card WLAN module for use in the MOW 2 the countries listed below:				407575-002
Aruba	Egypt	The Phillippines	The Netherlands	
Austria	El Salvador	Poland	Norway	
Azerbaijan	Estonia	Portugal	Oman	
Bahrain	Finand	Romania	Slovenia	
Belgium	France	Russia	South Africa	
Bermuda	Georgia	Serbia and Montenegro	Spain	
Bulgaria	Germany	Singapore	Sri Lanka	
Cayman Islands	Greece	Slovakia	Sweden	
Columbia	Hungary	Liechtenstein	Switzerland	
Croatia	Iceland	Lithuania	Turkey	
Cyprus	Ireland	Luxembourg	The United Kingdom	
The Czech Republic	Italy	Malta	Uzbekistan	
Denmark	Latvia	Monaco		
	Lebanon			

Mini Card WLAN Module Spare Part Number Information *(Continued)*			
802.11a/b/g Intel Mini Card WLAN module for use in the ROW countries listed below:			407575-003
China	Honduras	Qatar	Uruguay
Ecuador	Pakistan	South Korea	Venezuela
Haiti	Peru		
802.11b/g Mini Card WLAN module for use in the following countries:			409250-004
Israel	Kuwait	United Arab Emirates	Ukraine
Jordan	Thailand		

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.9).
3. Release the keyboard (Section 5.10).

4. Make note of which antenna cable is attached to which antenna clip on the Mini Card WLAN module before disconnecting the cables, then disconnect the auxiliary and main antenna cables ❶ from the module.
5. Remove the two Phillips PM2.5×4.0 screws ❷ that secure the Mini Card WLAN module to the computer.
6. Remove the Mini Card WLAN module ❸ by pulling the module from the socket at an angle.

Mini Card WLAN modules are designed with a notch ❹ to prevent incorrect installation.



Removing a Mini Card WLAN Module

Reverse the above procedure to install a Mini Card WLAN module.

5.16 Display Assembly

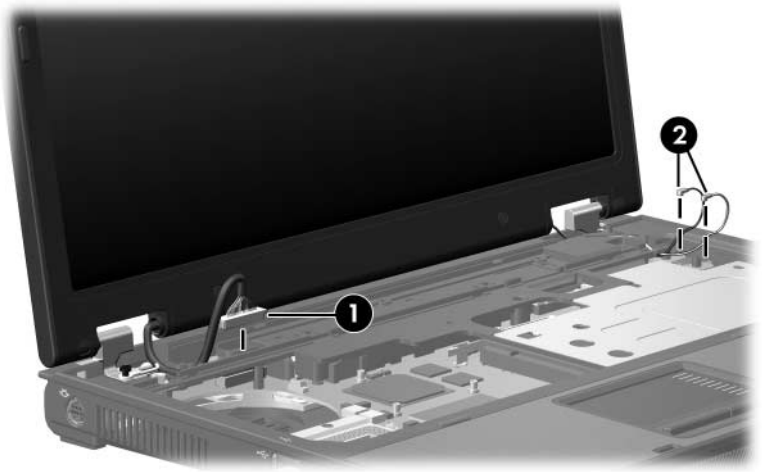
Display Assembly Spare Part Number Information	
14.1-inch, WXGA+, TFT	431307-001
14.1-inch, WXGA, TFT	431306-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.9).
3. Remove the keyboard (Section 5.10).
4. Disconnect the wireless antenna cables from the Mini Card WLAN module (Section 5.15).

5. Position the computer with the rear panel toward you.
6. Remove the four Torx8 T8M2.5×8.0 screws that secure the display assembly to the computer.

Removing the Display Assembly Screws

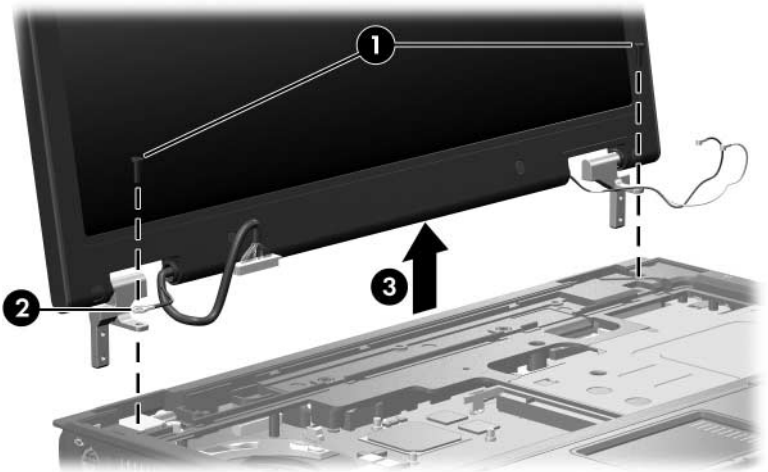
7. Position the computer with the front toward you.
8. Open the computer as far as possible.
9. Disconnect the display cable ❶ from the system board.
10. Remove the wireless antenna cables ❷ from the clips in the top cover.



Disconnecting the Display Cables

CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

11. Remove the two Torx8 T8M2.5×8.0 screws ❶ that secure the display assembly to the computer.
12. Release the display cable ground loop ❷ from the left display hinge.
13. Lift the display assembly ❸ straight up and remove it.



Removing the Display Assembly

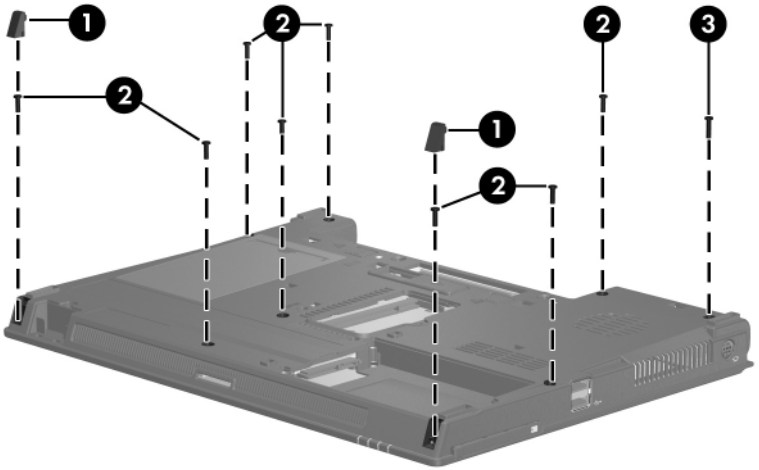
Reverse the above procedure to reassemble and install the display assembly.

5.17 Top Cover

Top Cover Spare Part Number Information	
Top cover (includes TouchPad, bracket, and cable)	431309-001

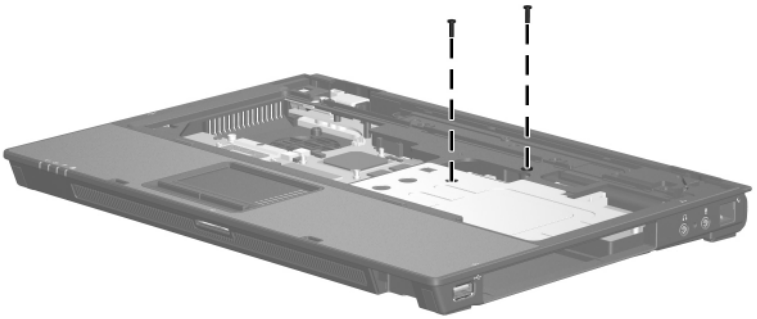
1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Display assembly (Section 5.16)
2. Turn the computer upside down with the front toward you.

3. Remove the following:
   - ❶ Two rubber screw covers
   - ❷ Eight Torx8 T8M2.5×8.0 screws
   - ❸ One Torx8 TM82.5×9.0 screw



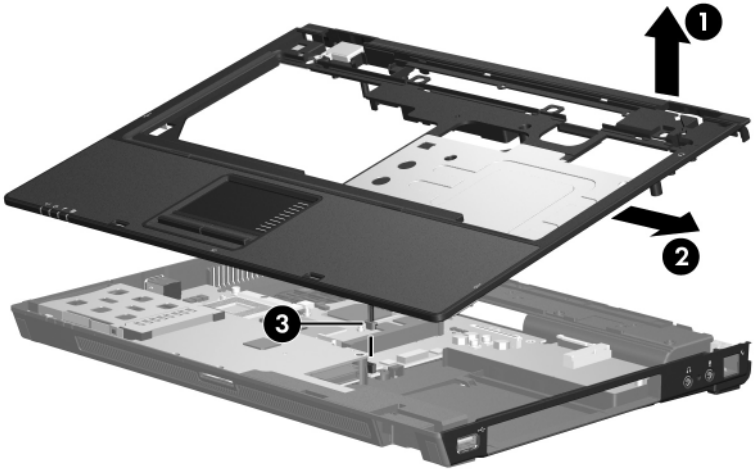
Removing the Top Cover Screws, Part 1

4. Turn the computer right-side up with the front toward you.
5. Remove the two Torx8 T8M2.5×8.0 screws that secure the top cover to the computer.



Removing the Top Cover Screws, Part 2

6. Lift up the rear edge of the top cover ❶ until it disengages from the base enclosure.
7. Slide the top cover ❷ to the right until the TouchPad cable is accessible.
8. Disconnect the TouchPad cable ❸ from the system board.



Removing the Top Cover

9. Remove the top cover.

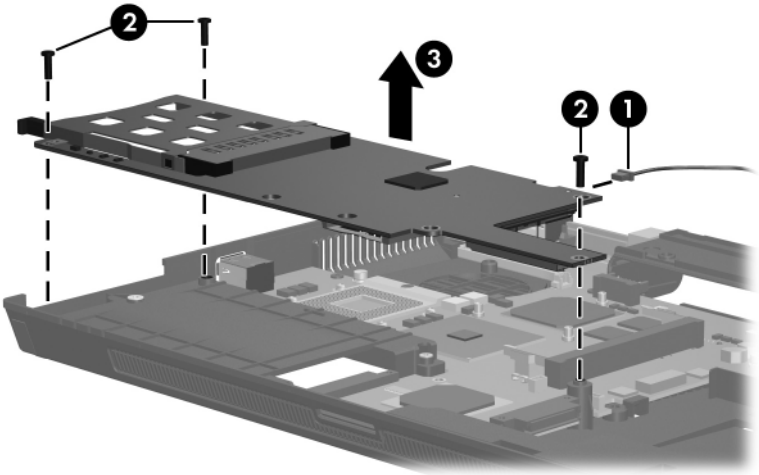
Reverse the above procedure to install the top cover.

5.18 PC Card Assembly

PC Card Assembly Spare Part Number Information	
PC Card assembly	431303-001

1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Display assembly (Section 5.16)
   f. Top cover (Section 5.17)

2. Disconnect the modem module cable ❶ from the modem module.
3. Remove the three Phillips PM2.5×4.0 screws ❷ that secure the PC Card assembly to the computer.
4. Remove the PC Card assembly ❸.



Removing the PC Card Assembly

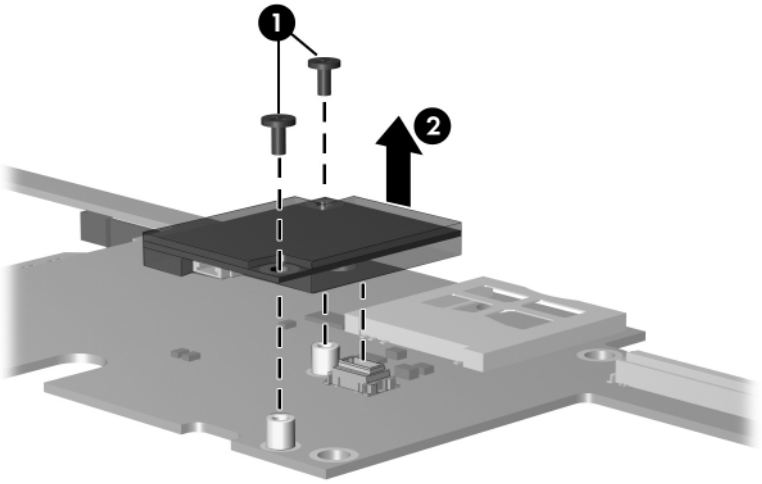
Reverse the above procedure to install the PC Card assembly.

5.19 Modem Module

Modem Module Spare Part Number Information	
Modem module	399441-001

1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Display assembly (Section 5.16)
   f. Top cover (Section 5.17)
   g. PC Card assembly (Section 5.18)

2. Turn the PC Card assembly upside down.
3. Remove the two Phillips PM2.5×4.0 screws ❶ that secure the modem module to the PC Card assembly.
4. Remove the modem module ❷.



Removing the Modem Module

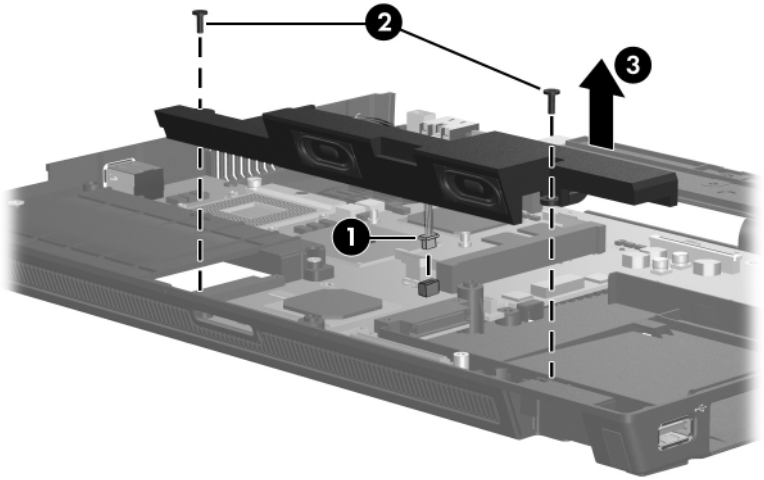
Reverse the above procedure to install the modem module.

5.20 Speaker

Speaker Module Spare Part Number Information	
Speaker	431321-001

1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Display assembly (Section 5.16)
   f. Top cover (Section 5.17)
   g. PC Card assembly (Section 5.18)

2. Disconnect the speaker cable ❶ from the system board.
3. Remove the two Torx8 T8M2.5×6.0 screws ❷ that secure the speaker to the computer.
4. Remove the speaker ❸.



Removing the Speaker

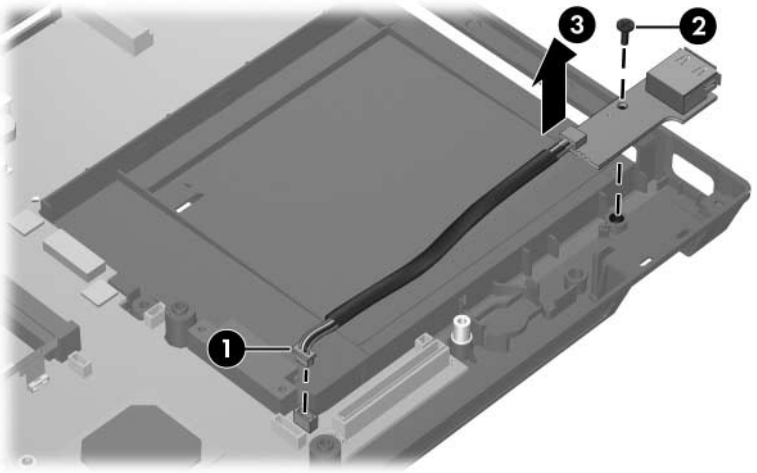
Reverse the above procedure to install the speaker.

5.21 USB Board

USB Board Spare Part Number Information	
USB board	431304-001

1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Display assembly (Section 5.16)
   f. Top cover (Section 5.17)
   g. PC Card assembly (Section 5.18)
   h. Speaker (Section 5.20)

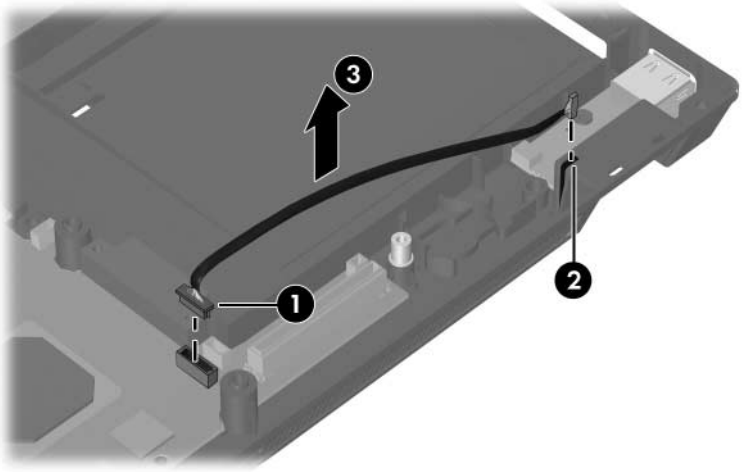
2. Disconnect the USB board cable ❶ from the system board.
3. Remove the Torx8 T8M2.5×4.0 screw ❷ that secures the USB board to the computer.
4. Remove the USB board ❸.



Removing the USB Board

5. If it is necessary to replace the Bluetooth module cable, disconnect the cable ❶ from the system board.
6. Remove the cable from the slot ❷ in the base enclosure.
7. Remove the Bluetooth module cable ❸.

The Bluetooth module cable is included in the Bluetooth Module spare part kit, spare part number 398393-001, and is also available in the Cable Kit, spare part number 431318-001.



Removing the Bluetooth Module Cable

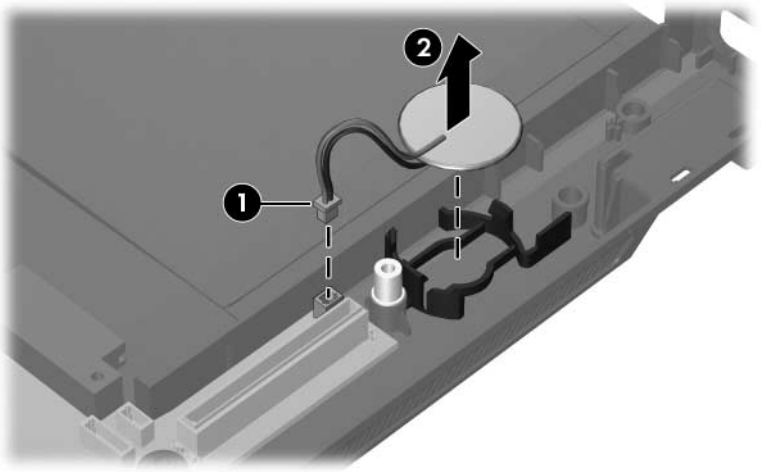
Reverse the above procedure to install the USB board.

5.22 RTC Battery

The RTC battery is included in the Plastics Kit, spare part number 431319-001.

1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Display assembly (Section 5.16)
   f. Top cover (Section 5.17)
   g. PC Card assembly (Section 5.18)
   h. Speaker (Section 5.20)

2. Disconnect the RTC battery cable ❶ from the system board.
3. Remove the RTC battery ❷ from the clip on the base enclosure.



Removing the RTC Battery

Reverse the above procedure to install the RTC battery.

5.23 System Board

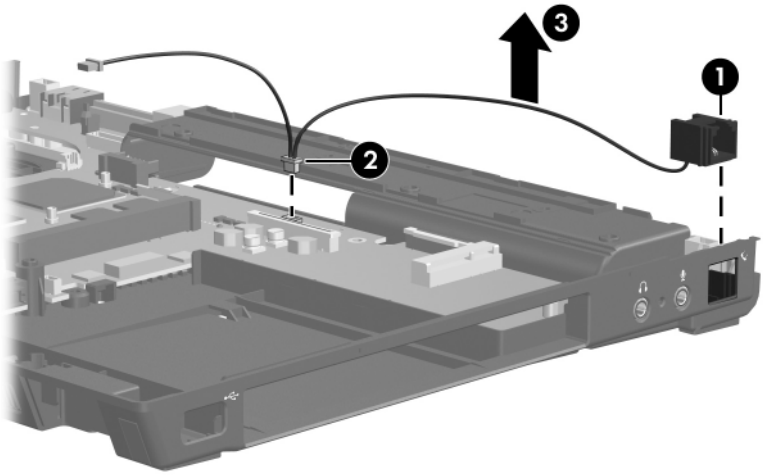
System Board Spare Part Number Information	
With 128-MB of video memory	431302-001
With 64-MB of video memory	431301-001

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

- Memory modules (Section 5.7 and Section 5.14)
- Processor (Section 5.13)
- Mini Card WLAN module (Section 5.15)

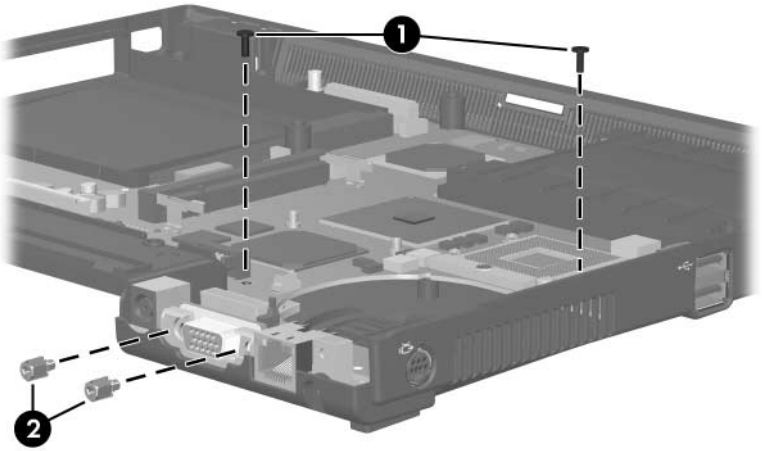
1. Prepare the computer for disassembly (Section 5.3), and then remove the following components:
   a. Hard drive (Section 5.4)
   b. Optical drive (Section 5.8)
   c. Switch cover (Section 5.9)
   d. Keyboard (Section 5.10)
   e. Fan (Section 5.11)
   f. Heat sink (Section 5.12)
   g. Display assembly (Section 5.16)
   h. Top cover (Section 5.17)
   i. PC Card assembly (Section 5.18)
   j. Speaker (Section 5.20)

2. Remove the modem connector ❶ from the clip on the base enclosure.
3. Disconnect the modem module cable ❷ from the system board.
4. Remove the modem module cable ❷.



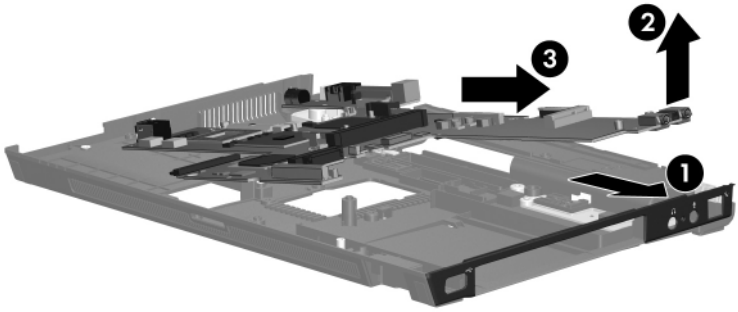
Removing the Modem Module Cable

5. Position the base enclosure with the rear panel toward you.
6. Remove the two Torx8 T8M2.5×6.0 screws ❶ that secure the system board to the base enclosure.
7. Remove the two HM5.0×9.0 screw locks ❷ on each side of the external monitor port.



Removing the System Board Screws and Screw Locks

8. Position the base enclosure with the front toward you.
9. Flex the right-rear section of the base enclosure ❶ until the audio connectors disengage from the openings in the base enclosure.
10. Lift the right side of the system board ❷ until the board rests at an angle.
11. Slide the system board ❸ to the right and remove it from the base enclsoure.



Removing the System Board

Reverse the above procedures to install the system board.

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1

Computer

Dimensions	**Metric**	**U.S.**
Height	24.5 mm	9.65 in
Width	33.8 mm	13.31 in
Depth (varies from front to back)	3.1 to 3.7 mm	1.22 to 1.46 in
Weight		
With 15.0-inch display, optical drive, and 6-cell battery pack	< 2.22 kg	< 5.0 lbs
Input Power		
Operating voltage	19.0 V dc @ 4.74 A – 90W	
Operating current	4.74 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 6-1

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 6-2

14.1-inch, WXGA+, TFT Display

Dimensions		
Height	21.3 cm	8.4 in
Width	28.5 cm	11.2 in
Diagonal	35.8 cm	14.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	300:1	
Brightness	200 nits typical	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1440×900	
Configuration	vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	+/-40° horizontal, +/-25° vertical typical	

Table 6-3

14.1-inch, WXGA, TFT Display

Dimensions		
Height	21.3 cm	8.4 in
Width	28.5 cm	11.2 in
Diagonal	35.8 cm	14.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	300:1	
Brightness	200 nits typical	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1280 × 800	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	+/-40° horizontal, +/-25° vertical typical	

Table 6-4

Hard Drives

	100-GB*	80-GB*
Dimensions		
Height	9.5 mm	9.5 mm
Width	70 mm	70 mm
Weight	99 g	99 g
Interface type	SATA	SATA
Transfer rate		
Synchronous (maximum)	100 MB/sec	100 MB/sec
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	3 ms	3 ms
Average	13 ms	13 ms
Maximum	24 ms	24 ms
Logical blocks†	195,363,650	156,301,488
Disc rotational speed	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 6-4

Hard Drives *(Continued)*

	60-GB*	60-GB*	40-GB*
Dimensions			
Height	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm
Weight	99 g	99 g	102 g
Interface type	SATA	SATA	SATA
Transfer rate			
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	1 ms	3 ms	3 ms
Average	10 ms	13 ms	13 ms
Maximum	18 ms	24 ms	24 ms
Logical blocks†	117,210,240	117,210,240	78,140,160
Disc rotational speed	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 6-5

Primary 6-cell, Li-Ion Battery

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 6-6

DVD/CD-RW Combo Drive

Applicable disc	**Read:** 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	**Write:** 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 6-6

DVD/CD-RW Combo Drive *(Continued)*

Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
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 6-7

DVD±RW and CD-RW Combo Drive

Applicable disc	**Read:** 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	**Write:** 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 6-7

DVD±RW and CD-RW Combo Drive *(Continued)*

Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
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 6-8

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 µm	
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 6-9

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 6-10

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 6-10

System Interrupts *(Continued)*

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 6-11

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 6-11

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 6-11

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 6-12

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

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 431320-001.

Table A-1

Phillips PM2.0×5.0 Screw

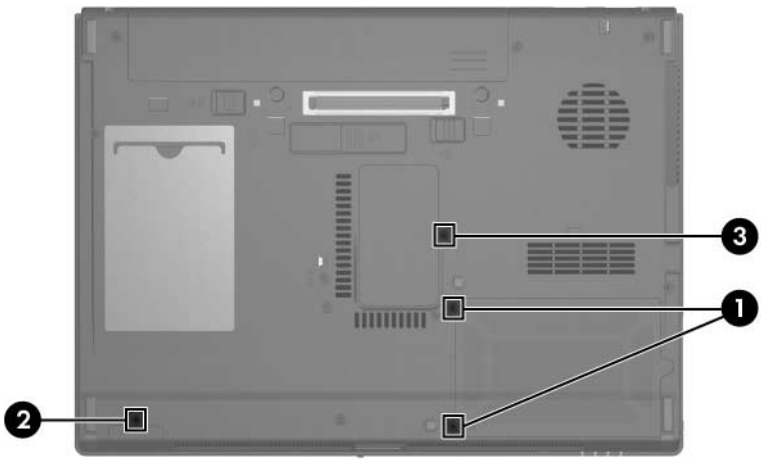
mm	Color	Qty.	Length	Thread	Head Width
	Black	4	5.0 mm	2.0 mm	4.0 mm

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 5.4)

❷ One screw that secures the Bluetooth module cover to the computer (screw is captured on the cover by a C-clip; documented in Section 5.6)

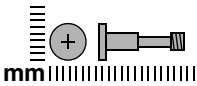
❸ One screw that secures the memory module compartment cover to the computer (screw is captured on the cover by a C-clip; documented in Section 5.7)



Phillips PM2.0×5.0 Screw Locations

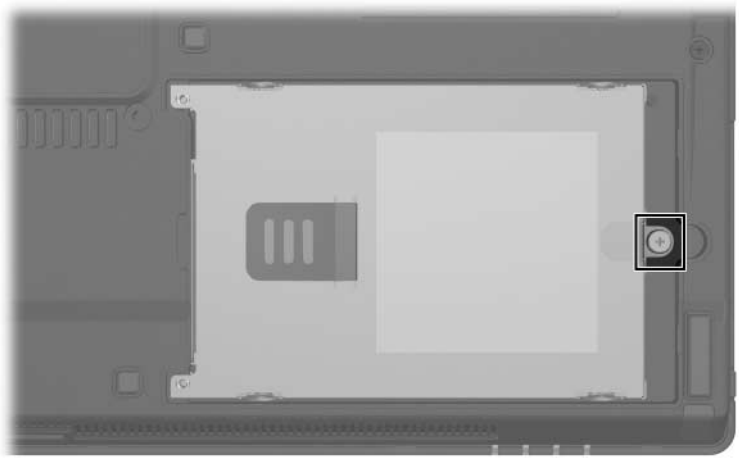
Table A-2

Phillips PM2.5×13.0 Spring-loaded Hard Drive Retention Screw

	Color	Qty.	Length	Thread	Head Width
	Silver	1	13.0 mm	2.5 mm	5.5 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 5.4)



Phillips PM2.5×13.0 Spring-loaded Hard Drive Retention Screw Screw Location

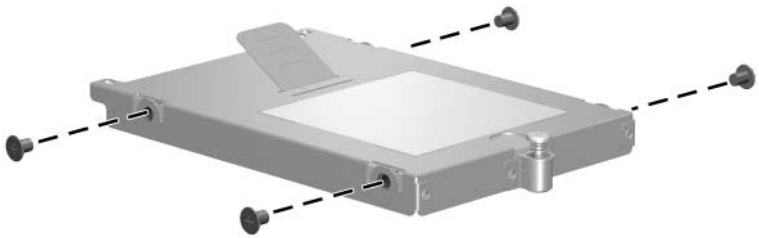
Table A-3

Phillips PM3.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	4.0 mm	3.0 mm	4.5 mm

Where used:

4 screws that secure the hard drive frame to the hard drive (documented in Section 5.4)



Phillips PM3.0×4.0 Screw Locations

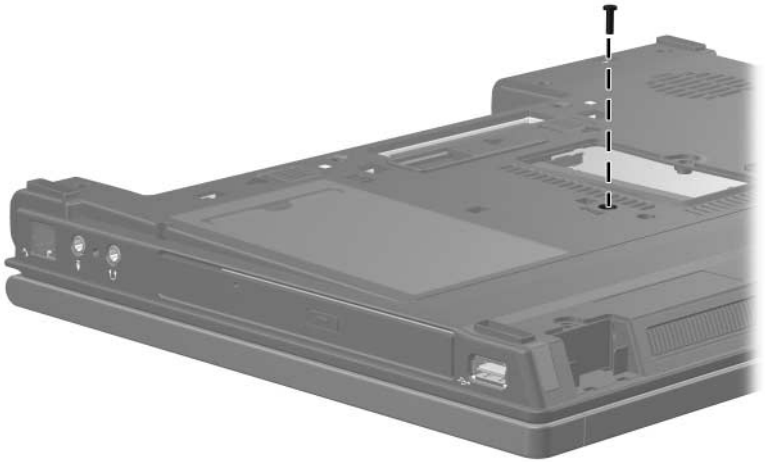
Table A-4

Torx8 T8M2.5×8.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	17	8.0 mm	2.5 mm	5.0 mm

Where used:

One screw that secures the optical drive to the computer (documented in Section 5.8)



Torx8 T8M2.5×8.0 Screw Location

Table A-4

Torx8 T8M2.5×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	17	8.0 mm	2.5 mm	5.0 mm

Where used:

4 screws that secure the display assembly to the computer (documented in Section 5.16)

Torx8 T8M2.5×8.0 Screw Locations

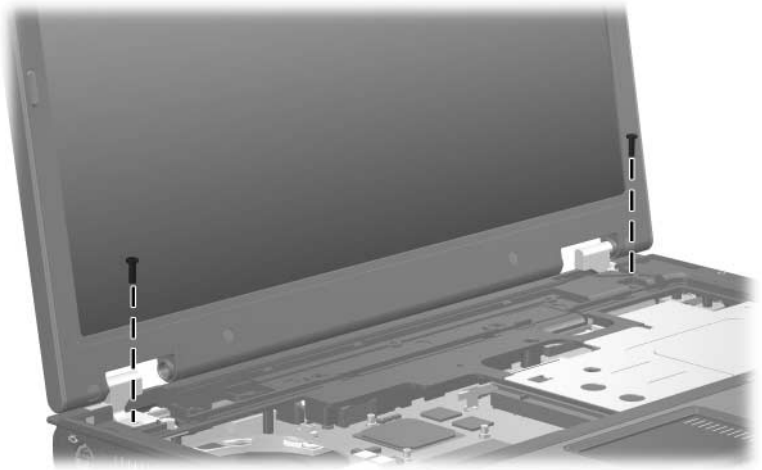
Table A-4

Torx8 T8M2.5×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	17	8.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the display assembly to the computer (documented in Section 5.16)



Torx8 T8M2.5×8.0 Screw Locations

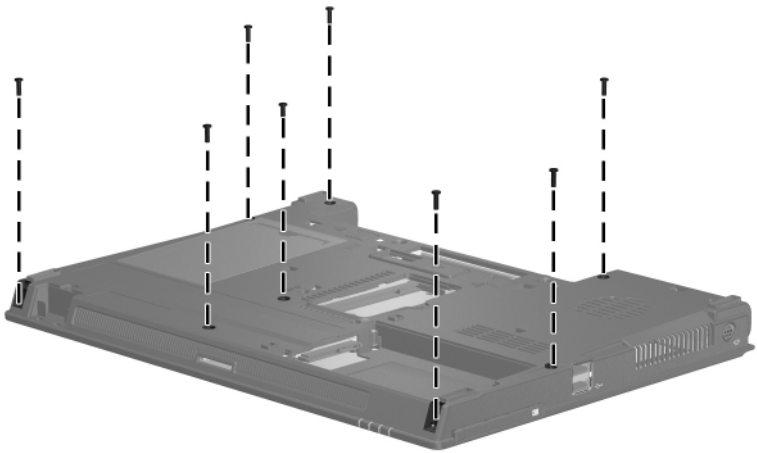
Table A-4

Torx8 T8M2.5×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	17	8.0 mm	2.5 mm	5.0 mm

Where used:

8 screws that secure the top cover to the computer (documented in Section 5.17)



Torx8 T8M2.5×8.0 Screw Locations

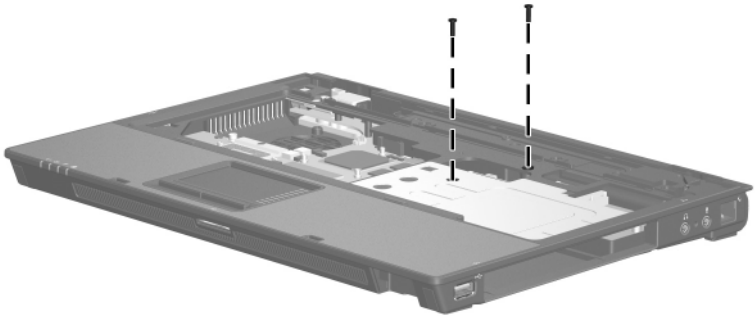
Table A-4

Torx8 T8M2.5×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	17	8.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the top cover to the computer (documented in Section 5.17)



Torx8 T8M2.5×8.0 Screw Locations

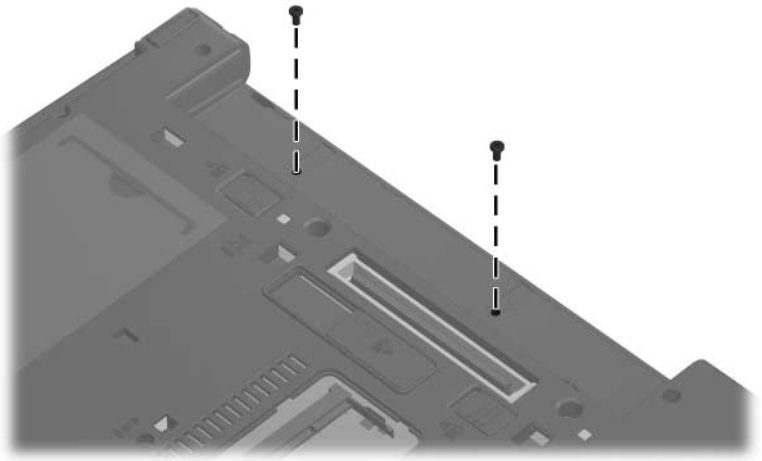
Table A-5

Phillips PM2.5×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the switch cover to the computer to the computer (documented in Section 5.9)



Phillips PM2.5×4.0 Screw Locations

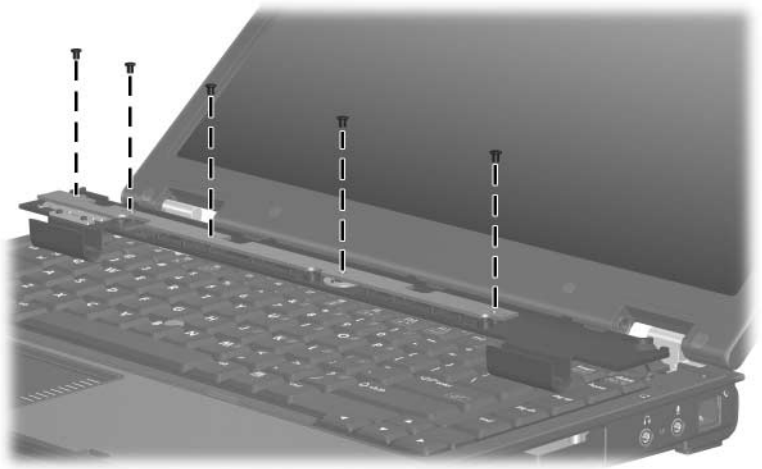
Table A-5

Phillips PM2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

5 screws that secure the LED board to the switch cover (documented in Section 5.9)



Phillips PM2.5×4.0 Screw Locations

Table A-5

Phillips PM2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

4 screws that secure the keyboard to the computer (documented in Section 5.10)

Phillips PM2.5×4.0 Screw Locations

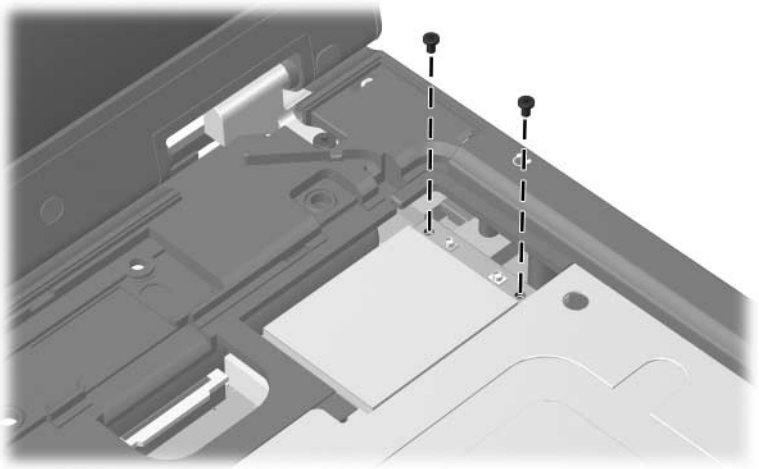
Table A-5

Phillips PM2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the Mini Card WLAN to the computer (documented in Section 5.10)



Phillips PM2.5×4.0 Screw Locations

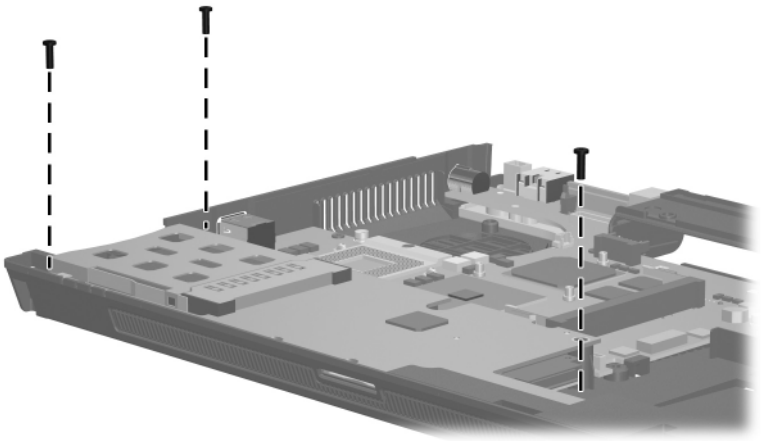
Table A-5

Phillips PM2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

3 screws that secure the PC Card assembly to the computer (documented in Section 5.18)



Phillips PM2.5×4.0 Screw Locations

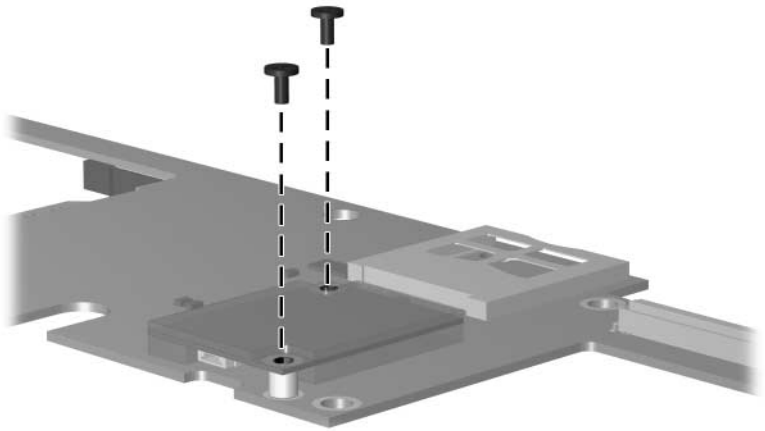
Table A-5

Phillips PM2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the modem module to the PC Card assembly (documented in Section 5.19)



Phillips PM2.5×4.0 Screw Locations

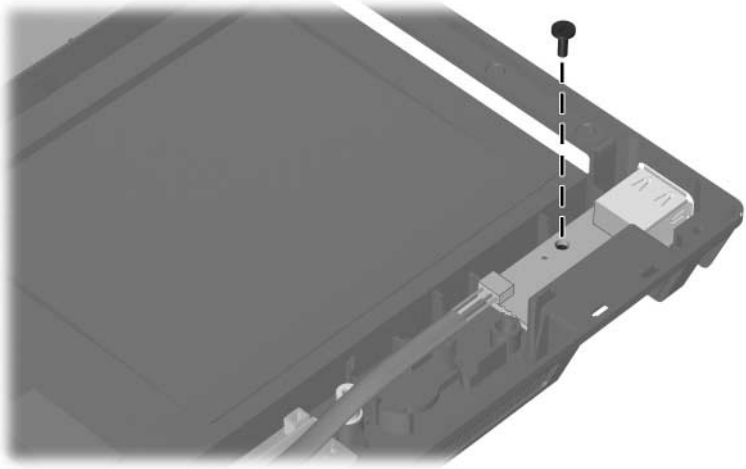
Table A-5

Phillips PM2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	19	4.0 mm	2.5 mm	5.0 mm

Where used:

One screw that secures the USB board to the computer (documented in Section 5.21)



Phillips PM2.5×4.0 Screw Location

Table A-6

Torx8 T8M2.5×6.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	6.0 mm	2.5 mm	5.0 mm

Where used:
2 screws that secure the fan to the computer (documented in Section 5.11)

Torx8 T8M2.5×6.0 Screw Locations

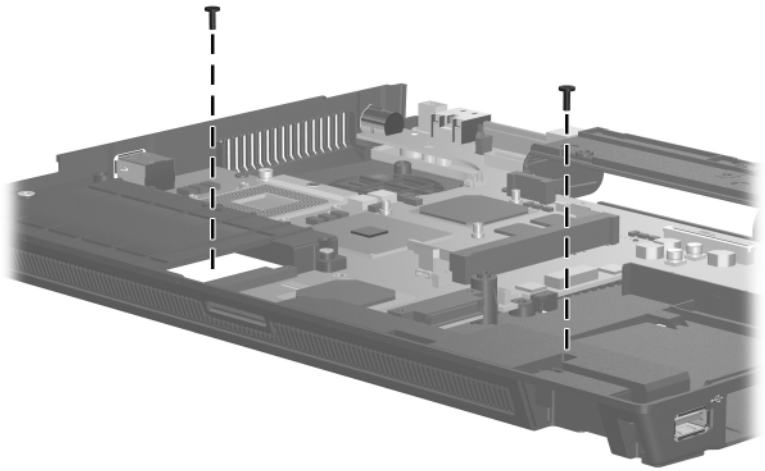
Table A-6

Torx8 T8M2.5×6.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	6.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the speaker to the computer (documented in Section 5.20)



Torx8 T8M2.5×6.0 Screw Locations

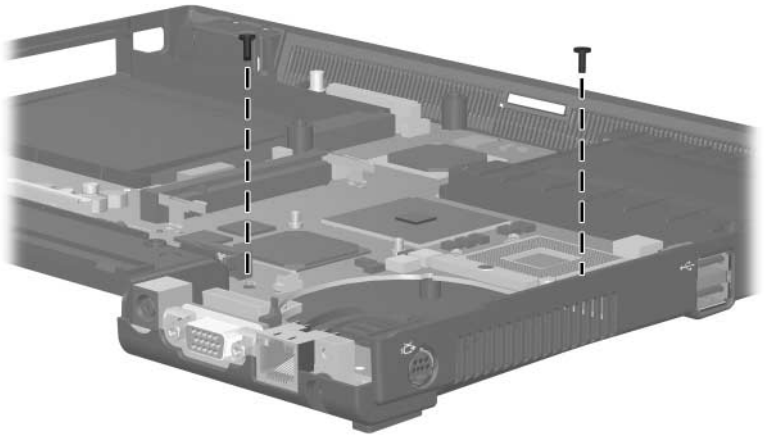
Table A-6

Torx8 T8M2.5×6.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	6.0 mm	2.5 mm	5.0 mm

Where used:

2 screws that secure the system board to the computer (documented in Section 5.23)



Torx8 T8M2.5×6.0 Screw Locations

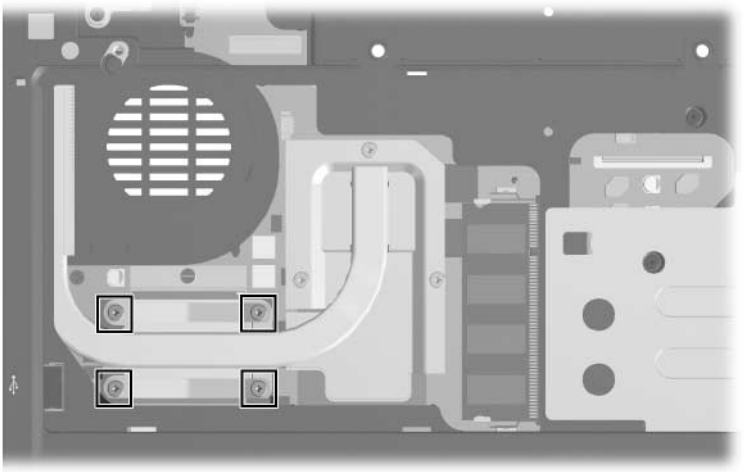
Table A-7

Torx8 T8M2.0×11.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	4	11.0 mm	2.0 mm	5.0 mm

Where used:

4 screws that secure the heat sink to the computer (documented in Section 5.12)



Torx8 T8M2.0×11.0 Screw Locations

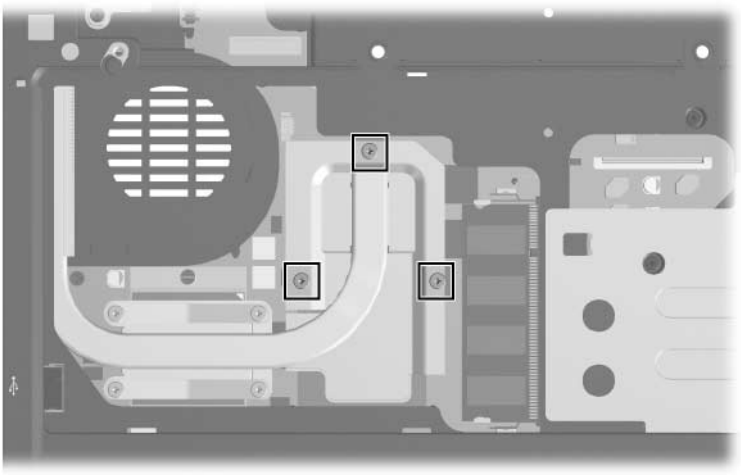
Table A-8

Phillips PM2.0×8.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	3	8.0 mm	2.0 mm	5.0 mm

Where used:

3 screws that secure the heat sink to the computer (documented in Section 5.12)



Phillips PM2.0×8.0 Screw Locations

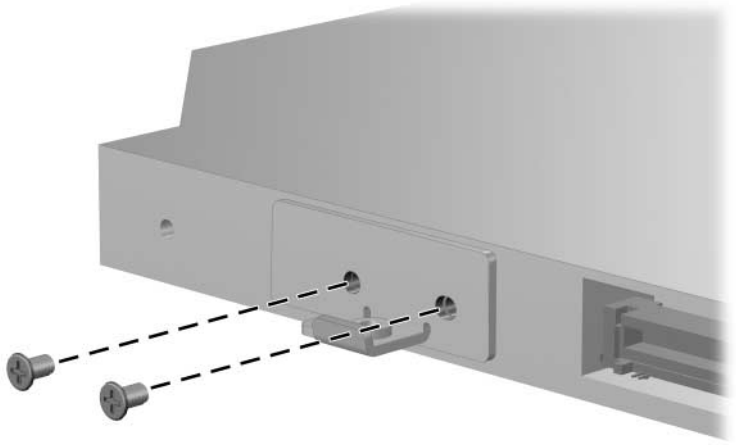
Table A-9

Phillips PM2.0×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	3.0 mm	2.0 mm	4.0 mm

Where used:

2 screws that secure the optical drive bracket to the to the optical drive bracket (documented in Section 5.8)



Phillips PM2.0×3.0 Screw Locations

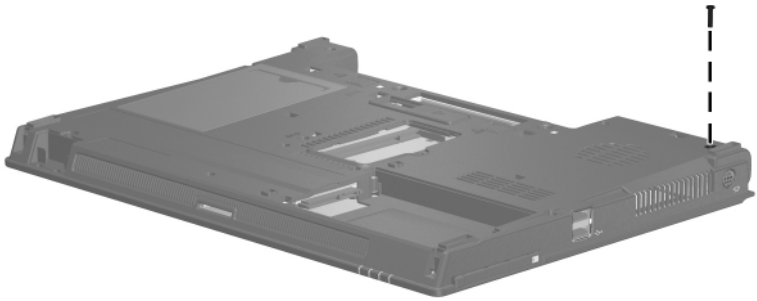
Table A-10

Torx8 T8M2.5×9.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	1	9.0 mm	2.5 mm	5.0 mm

Where used:

One screw that secures the top cover to the computer (documented in Section 5.17)



Torx8 T8M2.5×9.0 Screw Location

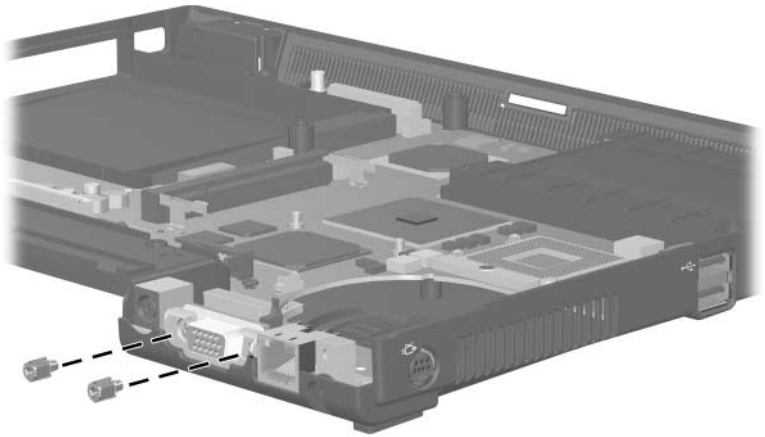
Table A-11

Hex Socket HM5.0×9.0 Screw Lock

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	9.0 mm	5.0 mm	5.0 mm

Where used:

2 screw locks that secure the system board to the computer (documented in Section 5.23)



Hex Socket HM5.0×9.0 Screw Lock Locations

B

Backup and Recovery

Backup

HP Backup and Recovery Manager provides several ways to back up the system and to recover optimal system functionality.

HP installed drivers, utilities, and applications can be copied to a CD or to a DVD using HP Backup and Recovery Manager.

Formatted DVD±RW discs and DVD±RW double-layer discs are not compatible with HP Backup and Recovery Manager.

The computer must be connected to external power before you perform backup and recovery procedures.

Safeguarding Your Data

To safeguard your documents, store personal files in the My Documents folder and periodically create a backup copy of the folder.

Backing Up the System

Using HP Backup and Restore Manager, you can

- Back up specific files and folders.
- Back up the entire system.
- Back up modifications since your last backup, using HP system restore points.
- Schedule backups.

Backing Up Specific Files or Folders

You can back up specific files or folders to the hard drive, to an optional external hard drive, or to discs.

This process will take several minutes, depending on the file size and the speed of the computer.

To back up specific files or folders:

1. Select **Start > All Programs > HP Backup & Recovery > HP Backup and Recovery Manager**.
2. Click **Next**.
3. Click **Back up to protect system settings and important data files**, and then click **Next**.
4. Click **Back up individual files and folders**, and then click **Next**.

   The Backup Wizard opens.
5. Click **Next**.
6. Click **Backup selected files from most common locations (Recommended)**.

   – or –

   Click **Advanced Backup (Experienced users)** to access advanced filtering techniques.
7. Click **Next**.
8. Follow the on-screen instructions.

Backing Up the Entire Hard Drive

When you perform a complete backup of the hard drive, you are saving the full factory image, including the Windows operating system, software applications, and all personal files and folders.

A copy of the entire hard drive image can be stored on another hard drive, on a network drive, or on recovery discs that you create.

This process may take over an hour, depending on your computer speed and the amount of data being stored.

To back up your entire hard drive:

1. Select **Start > All Programs > HP Backup & Recovery > HP Backup and Recovery Manager**.
2. Click **Next**.
3. Click **Back up to protect system settings and important data files**, and then click **Next**.
4. Click **Back up entire hard drive**, and then click **Next**.

   The "Back up entire hard disk" page opens.
5. Click **Next**.
6. Select the location for the backup files, and then click **Next**.
7. Select the **Protect data access with password** check box, and type your password in the **Password and Confirm** boxes.

This step is optional. If you do not want to password-protect your data access, clear the **Protect data access with password** check box.

8. Click **Next**.
9. Follow the on-screen instructions.

Backing Up Modifications Made to the System

When you back up modifications since your last backup, you are creating system recovery points. This allows you to save a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes made to your system.

The first system recovery point, a snapshot of the entire image, is automatically created the first time you perform a backup. Subsequent recovery points make a copy of changes made after that time.

HP recommends that you create recovery points

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

Recovering to an earlier recovery point does not affect data files or e-mails created since that recovery point.

After you create a recovery point, you are prompted to schedule subsequent recovery points. You can schedule recovery points for a specific time or event in your system.

To create and schedule a system recovery point:

1. Select **Start > All Programs > HP Backup & Recovery > HP Backup and Recovery Manager**.
2. Click **Next**.
3. Click **Back up to protect system settings and important data files**, and then click **Next**.
4. Click **Create or manage Recovery Points**, and then click **Next**.

   The “Recovery Point Manager” page opens.
5. Follow the on-screen instructions.

Scheduling Backups

To schedule backups:

1. Select **Start > All Programs > HP Backup & Recovery > HP Backup Scheduler**.

   The "Backup Scheduler" page opens.

2. Click **Next**.

3. Schedule system recovery points at specific intervals (now, daily, weekly, or monthly) or at specific events, such as at system start or when you dock to an optional docking station (select computer models only), by clicking one of the available options. Click **Next** to further define the settings.

   A summary of your system recovery point settings is displayed.

4. Follow the on-screen instructions.

Recovery

HP Backup and Recovery Manager analyzes the hard drive and creates a dedicated hard drive recovery partition on the hard drive large enough to store a copy of the full factory image. You can choose whether you want to store that copy on the recovery partition, on another drive, or on external recovery discs.

Before using HP Backup and Recovery Manager, try repairing the system by running Microsoft Windows System Restore. For more information, select **Start > Help and Support**, and then search for "System Restore."

HP Backup and Recovery Manager allows you to

- **Create recovery discs (highly recommended).** The recovery discs are used to start up your computer and to recover the full factory image (operating system and software) in case of system failure or instability.

If you do not have a CD or DVD burner, a copy of the entire hard drive image can be stored on another hard drive or on a network drive.

- **Perform a recovery.** You can perform a full system recovery or recover important files from the recovery partition on the hard drive, from another drive, or from recovery discs that you create.

Creating Recovery Discs (Highly Recommended)

After setting up the computer for the first time, you can create a set of recovery discs of the full factory image, using Recovery Media Creator in the HP Backup and Recovery Manager. The recovery discs are used to start up (boot) the computer and recover the operating system and software to factory settings in case of system failure or instability.

CAUTION: After you create the recovery discs, you can increase the amount of available space on the hard drive by deleting the recovery partition. However, doing this is not recommended. If you delete this partition, you will lose any information that is on the partition.

Only one set of recovery discs can be created for this computer.

Before creating recovery discs:

- Obtain high-quality CD-R, DVD-R, or DVD+R media, purchased separately.

Formatted DVD±RW discs and DVD±RW double-layer discs are not compatible with HP Backup and Recovery Manager.

- Number each disc before inserting it into the optical drive of the computer.
- If necessary, you can cancel Recovery Media Creator before you have finished creating the recovery discs. The next time you open Recovery Media Creator, you will be prompted to continue the disc creation process where you left off.

To create a set of recovery discs:

1. Select **Start > All Programs > HP Backup & Recovery > HP Backup and Recovery Manager**.
2. Click **Next**.
3. Click **Create factory software recovery CDs or DVDs to recover the system (Highly recommended)**, and then click **Next**.

   The "Recovery Media Creator" page opens.
4. Click **Next**.
5. Click **Write to CD/DVD**, and then click **Next**.
6. Follow the on-screen instructions.

Performing a Recovery

Performing a Recovery from the Recovery Discs

To perform a recovery from the recovery discs:

1. Back up all personal files.
2. Insert the first recovery disc into the optical drive and restart the computer.
3. Follow the on-screen instructions.

Performing a Recovery from the Hard Drive

There are 2 ways to initiate a recovery from the hard drive:

- From within Windows.
- From the recovery partition.

Initiating a Recovery in Windows

To initiate a recovery in Windows:

1. Back up all personal files.
2. Select **Start > All Programs > HP Backup & Recovery > HP Backup and Recovery Manager**.
3. Click **Next**.
4. Click **Recover important files or the entire system**, and then click **Next**.
5. Click a recovery option, and then click **Next**.

If you choose to recover the system, the computer restarts and recovery begins.

6. Follow the on-screen instructions.

Initiating a Recovery from the Hard Drive Recovery Partition

To initiate a recovery from the hard drive recovery partition:

1. Back up all personal files.
2. Restart the computer, and then press **f11** before the Windows operating system loads.
3. Click a recovery option, and then click **Next**.
4. Follow the on-screen instructions.

C

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 in the display assembly that might require special handling at end-of-life.

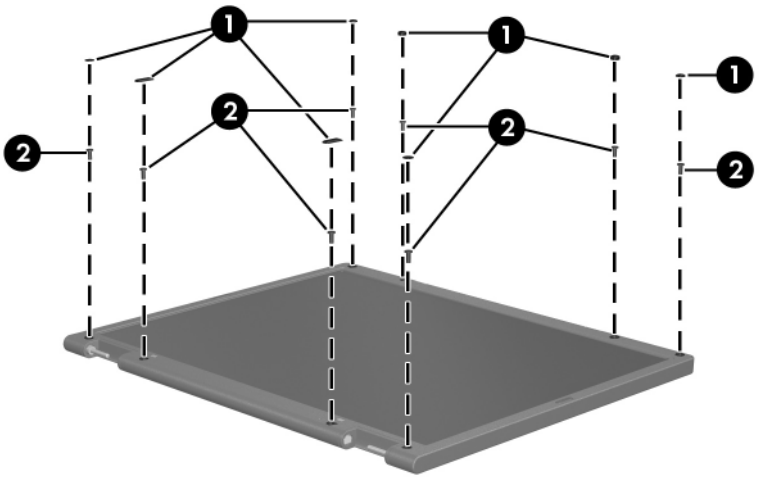
Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities or the Electronic Industries Alliance (EIA) at http://www.eiae.org.

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

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.

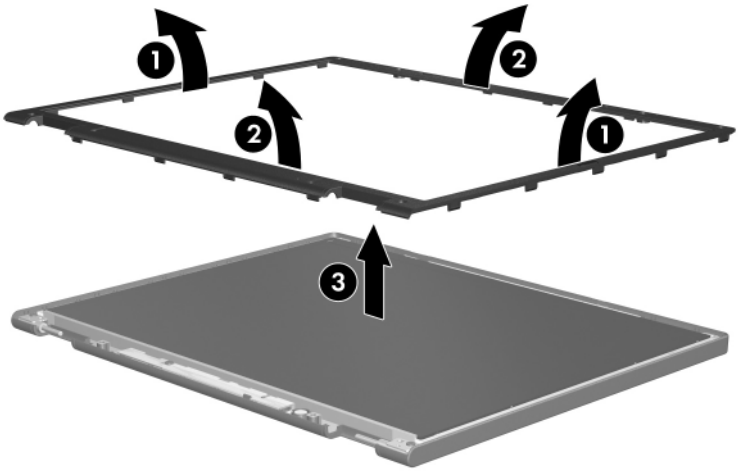
Perform the following steps to disassemble the display assembly:

1. Remove all screw covers ❶ and screws ❷ that secure the display bezel to the display assembly.



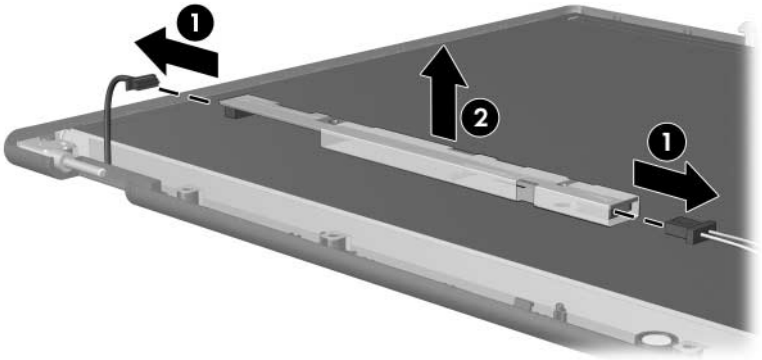
Removing the Display Bezel Screw Covers and Screws

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



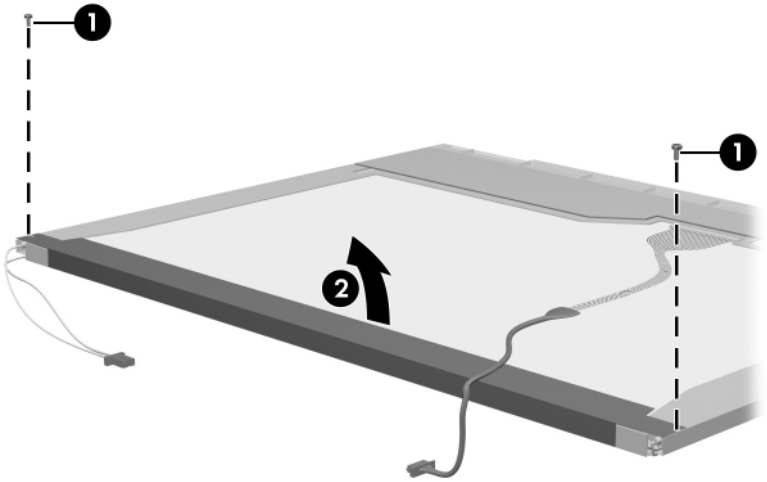
Removing the Display Bezel

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



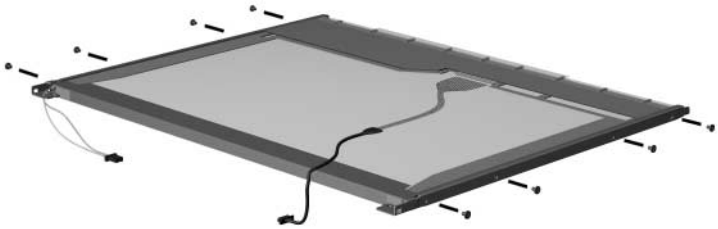
Removing the Display Inverter

5. Remove all screws ❶ that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly ❷ from the display enclosure.



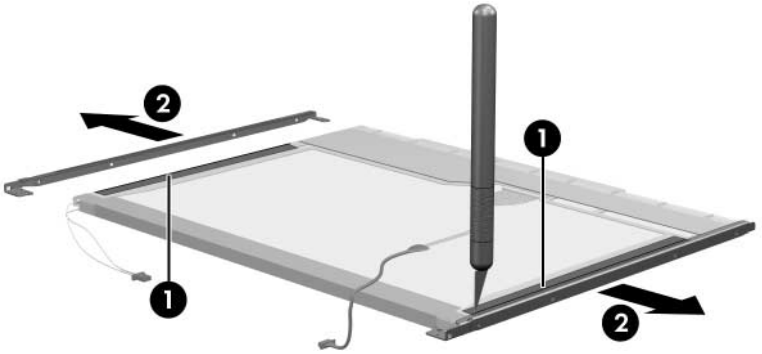
Removing the Display Panel Assembly

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



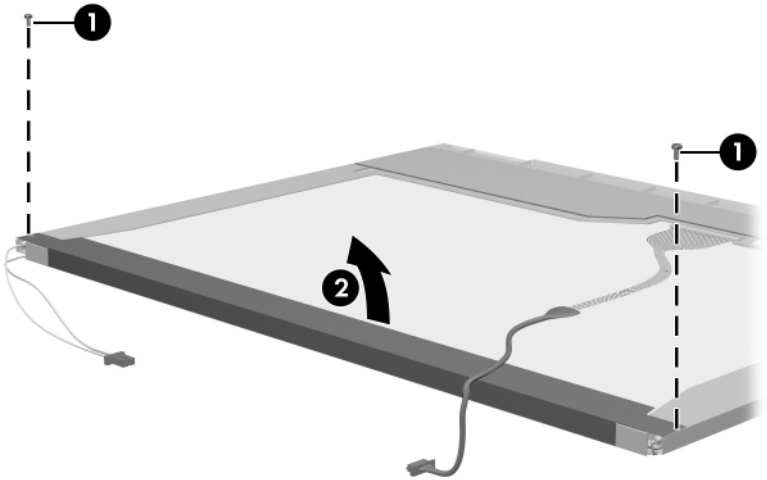
Removing the Display Panel Frame Screws

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



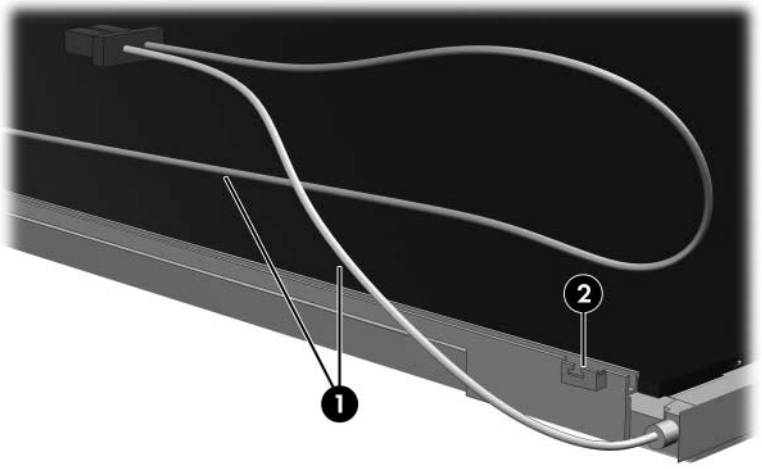
Removing the Display Frame

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.



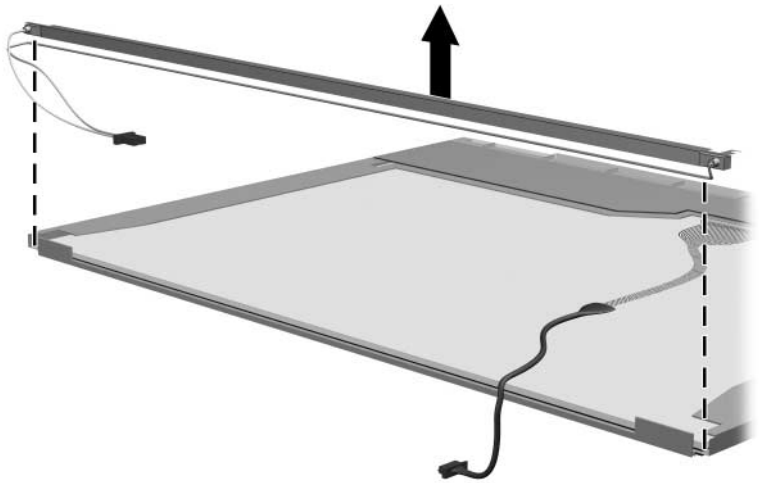
Removing the Backlight Cover

14. Turn the display panel right-side up.
15. Remove the backlight cables ❶ from the clip ❷ in the display panel.



Releasing the Backlight Cables

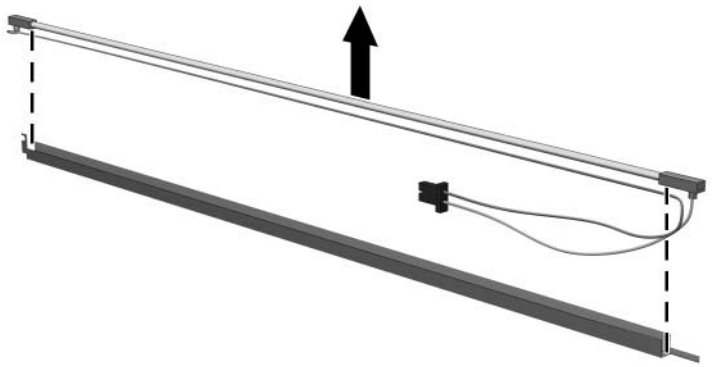
16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.



Removing the Backlight Frame

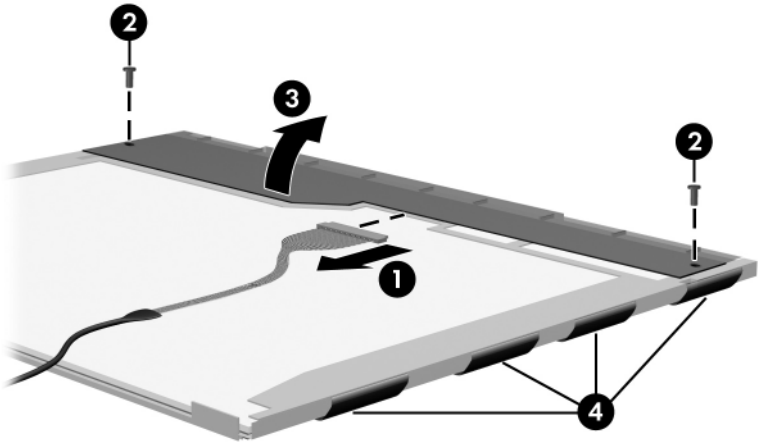
WARNING: The backlight contains mercury. Caution should be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

18. Slide the backlight out of the backlight frame.



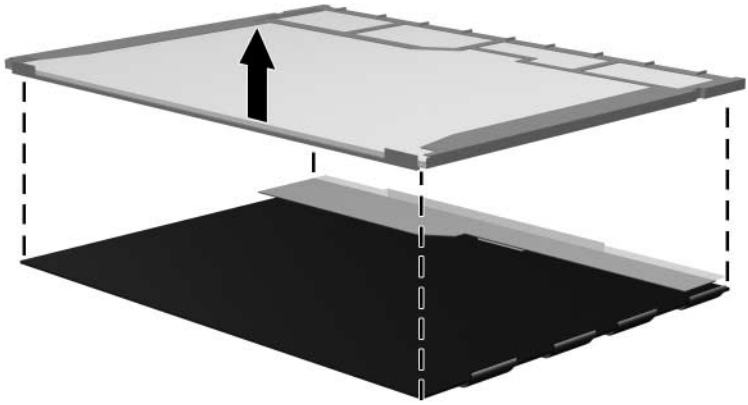
Removing the Backlight

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. Release 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

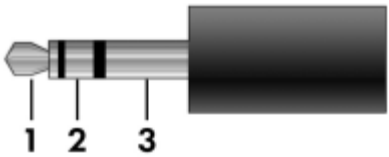
24. Recycle the LCD panel and backlight.

D

Connector Pin Assignments

Table D-1

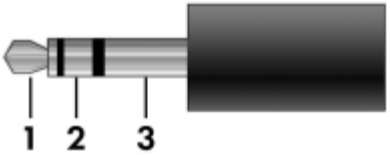
Audio-Out (Headphone)



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

Table D-2

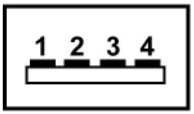
Audio-In (Microphone)



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

Table D-3

Universal Serial Bus



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

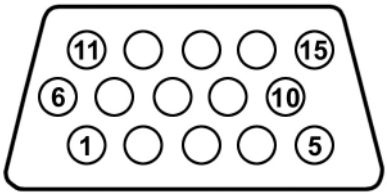
Table D-4

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		

Table D-5

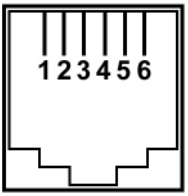
External Monitor



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 D-6

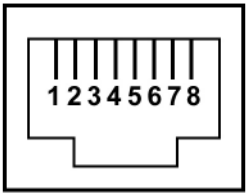
RJ-11 (Modem)



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

Table D-7

RJ-45 (Network)



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

E

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	KEMA	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.

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