Maintenance and Service Guide

HP Pavilion zd8000 Notebook PC

Document Part Number: 372712-002

February 2008

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

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Maintenance and Service Guide
HP Pavilion zd8000 Notebook PC
Second Edition: February 2008
First Edition: January 2005
Document Part Number: 372712-002

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1

Product Description

The HP Pavilion zd8000 Notebook PC offers advanced modularity, Intel® Mobile Pentium® 4 processors, and extensive multimedia support.

HP Pavilion zd8000 Notebook PC

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1.1 Features

- The following processors are available, varying by notebook model:
  - Intel Pentium 4 560 (3.6-GHz) with 800-MHz front side bus (FSB) with HT Technology
  - Intel Pentium 4 550 (3.4-GHz) with 800-MHz FSB with HT Technology
  - Intel Pentium 4 540 (3.2-GHz) with 800-MHz FSB with HT Technology
  - Intel Pentium 4 530 (3.0-GHz) with 800-MHz FSB with HT Technology
  - Intel Pentium 4 520 (2.8-GHz) with 800-MHz FSB with HT Technology
- The following displays are available, varying by notebook model:
  - 17.0-inch WSXGA+WVA (1680 × 1050) with Brightview TFT display with over 16.7 million colors
  - 17.0-inch WXGA+WVA (1440 × 900) with Brightview TFT display with over 16.7 million colors
  - 17.0-inch WXGA+WVA (1440 × 900) TFT display with over 16.7 million colors
- 100-, 80-, 60-, or 40-GB high-capacity hard drive, varying by notebook model
- 256-MB DDR2 synchronous DRAM (SDRAM) at 400 and 533 MHz, expandable to 2.0 GB
- Microsoft® Windows® XP Home Edition or Windows XP Professional, varying by notebook model
- Full-size Windows keyboard with full-size numeric keypad
- TouchPad pointing device, including a dedicated vertical scroll region and a button that enables/disables TouchPad operation.
- Integrated 10 Base-T/100 Base-TX Ethernet local area network (LAN) network interface card (NIC) with RJ-45 jack

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- Integrated high-speed 56K modem with RJ-11 jack
- Integrated wireless support for Mini PCI IEEE 802.11b and 802.11b/g WLAN device
- Support for one Type II PC Card slot, with support for both 32-bit (CardBus) and 16-bit PC Cards
- External 180- and 135-watt AC adapter with 3-wire power cord, varying by notebook model
- 12-cell Li-Ion battery pack
- Stereo speakers with volume up, volume mute, and volume down buttons
- Support for the following optical drives:
  - 8X Max DVD±RW/R and CD-RW Combo Drive
  - 24X Max DVD/CD-RW Combo Drive
- Connectors:
  - External monitor
  - Universal Serial Bus (USB) v. 2.0 (four ports)
  - RJ-11 (modem)
  - RJ-45 (network)
  - Audio-out (headphone)
  - Audio-in (microphone)
  - Power
  - IEEE 1394 (select models only)
  - S-Video-out (select models only)
  - Infrared
  - Expansion port 2
  - Digital Media Slot
  - Digital drive bay
  - ExpressCard

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1.2 Resetting the Notebook

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

1. Prepare the notebook for disassembly (refer to Section 5.3, "Preparing the Notebook for Disassembly," for more information).
2. Remove the real time clock (RTC) battery (refer to Section 5.16, "System Board," for more information on removing and replacing the RTC battery).
3. Wait approximately 5 minutes.
4. Replace the RTC battery and reassemble the notebook.
5. Connect AC power to the notebook. Do not reinsert any battery packs at this time.
6. Turn on the notebook.

All passwords and all CMOS settings have been cleared.

1.3 Power Management

The notebook comes with power management features that extend battery operating time and conserve power. The notebook 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/standby button
- Advanced Configuration and Power Management (ACPM) compliance

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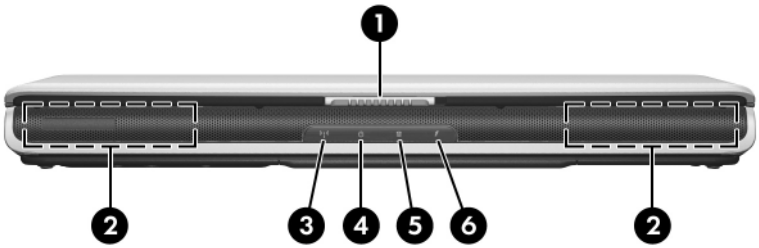
1.4 External Components

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



Front Components

Table 1-1

Front Components

Item	Component	Function
1	Display release latch	Opens the notebook.
2	Stereo speakers (2)	Produce stereo sound.
3	Power/standby light	■ On: Notebook is turned on. ■ Blinking: Notebook is in standby. ■ Off: Notebook is off.
4	Battery light	■ On: Battery pack is charging. ■ Blinking: Battery pack has reached a low-battery condition.
5	AC power light	On: Notebook is receiving AC power.
6	Hard drive activity light	On: A notebook drive is being accessed.

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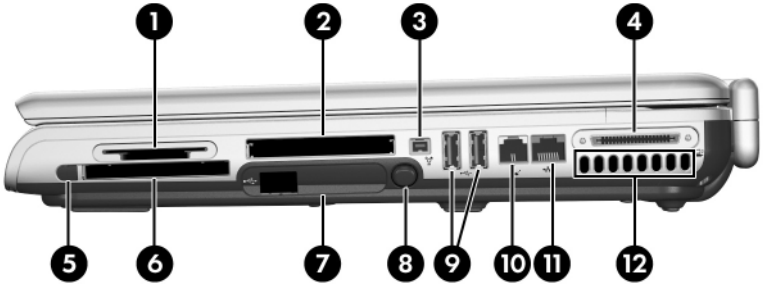
The external components on the right side of the notebook are shown below and described in Table 1-2.



Right-Side Components

Table 1-2

Right-Side Components

Item	Component	Function
1	Digital Media Slot	Supports the following optional digital media: Secure Digital (SD) Memory Card, Secure Digital Input/Output (SD I/O), Memory Stick, Memory Stick Pro, MultiMediaCard, xD-Picture Card, and SmartMedia card.
2	ExpressCard slot	Supports an optional ExpressCard.
3	1394 port	Connects an optional 1394a device such as a scanner, digital camera, or digital camcorder.

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Table 1-2

Right-Side Components *(Continued)*

Item	Component	Function
4	Expansion port 2	Connects to an optional notebook expansion product.
5	PC Card eject button	Ejects an optional PC Card from the PC Card slot.
6	PC Card slot	Supports an optional Type I or Type II 32-bit (CardBus) or 16-bit PC Card. Also serves as a storage location for the optional mobile remote control.
7	Digital drive bay	Supports an optional USB digital drive.
8	Digital drive eject button	Ejects an optional USB digital drive from the digital drive bay.
9	USB ports (2)	Connect an optional 1.1- or 2.0-compliant USB device.
10	RJ-11 (modem) jack	Connects the modem cable.
11	RJ-45 (network) jack	Connects an optional network cable.
12	Exhaust vent	Provides airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs or clothing, to block airflow.

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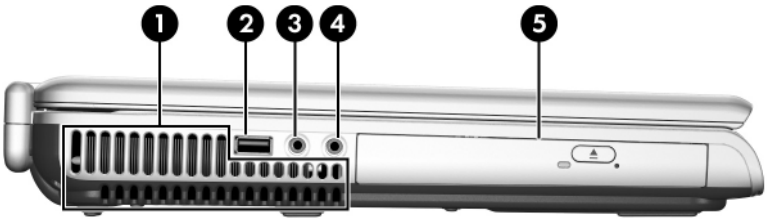
The external components on the left side of the notebook are shown below and described in Table 1-3.



Left-Side Components

Table 1-3

Left-Side Components

Item	Component	Function
1	Exhaust vent	Provides airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs or clothing, to block airflow.
2	USB port	Connects an optional 1.1- or 2.0-compliant USB device.
3	Audio-in (microphone) jack	Connects an optional monaural microphone.
4	Audio-out (headphone) jack (2)	Connect optional headphones or powered stereo speakers. Also connects the audio function of an audio/video device such as a television or VCR.
5	Optical drive	Supports an optical disc. The type of optical drive, such as a combination CD-ROM/DVD-ROM, varies by model.

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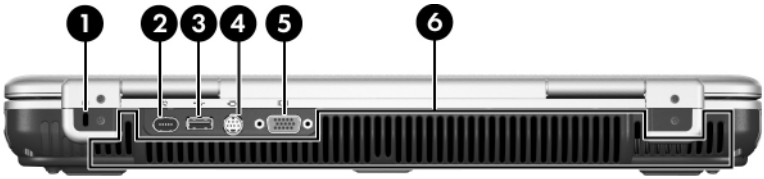
The external components on the rear panel of the notebook are shown below and described in Table 1-4.



Rear Panel Components

Table 1-4

Rear Panel Components

Item	Component	Function
1	Security cable slot	Attaches an optional security cable to the notebook.
2	Power connector	Connects an AC adapter.
3	USB port	Connects an optional 1.1- or 2.0-compliant USB device.
4	S-Video-out jack	Connects an optional S-Video device, such as a television, VCR, camcorder, projector, or video capture card.
5	External monitor port	Connects an optional VGA external monitor or projector.
6	Exhaust vent	Provides airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs or clothing, to block airflow.

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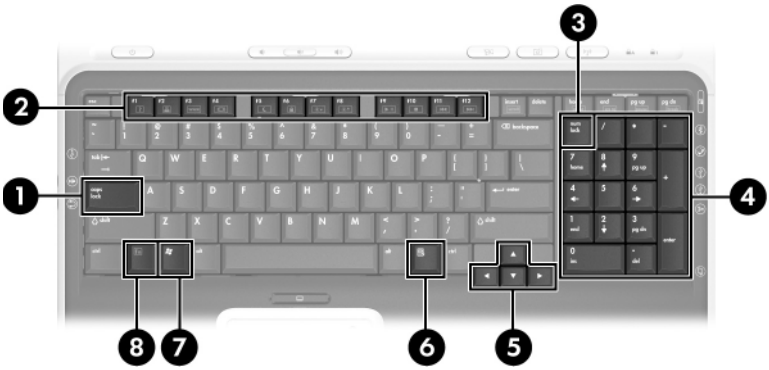
The standard keyboard components of the notebook are shown below and described in Table 1-5.



Standard Keyboard Components

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Table 1-5

Standard Keyboard Components

Item	Component	Function
1	**caps lock** key	Enables caps lock and turns on the caps lock light.
2	**f1** to **f12** keys (12)	Perform system and application tasks. When combined with the **fn** key, several keys and buttons perform additional tasks as hotkeys.
3	**num lock** key	Enables numeric lock, turns on the embedded numeric keypad, and turns on the num lock light.
4	Keypad keys (15)	In Windows, can be used like the keys on an external numeric keypad.
5	Arrow keys	Moves the cursor around the screen.
6	Windows applications key	In Windows, displays a shortcut menu for items beneath the pointer.
7	Windows logo key	In Windows, displays the Windows Start menu.
8	**fn** key	Combines with other keys to perform system tasks. For example, pressing **fn+f7** decreases screen brightness.

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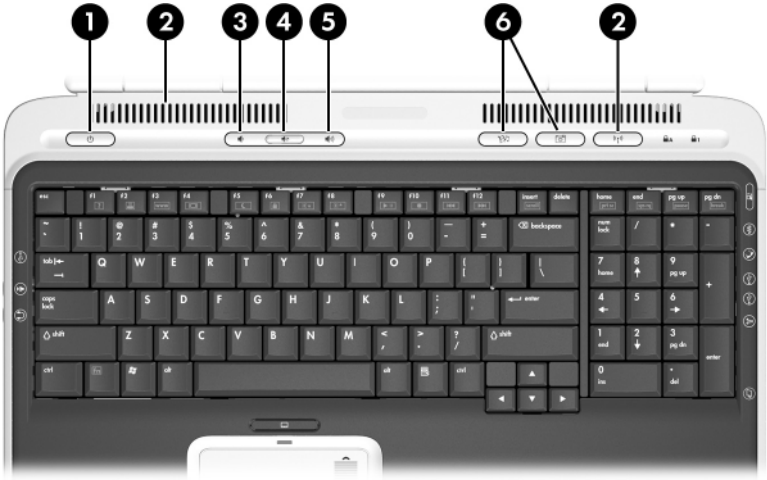
The upper components of the keyboard are shown below and on the following page and described in Tables 1-6 and 1-7.



Upper Keyboard Components

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Table 1-6

Upper Keyboard Components

Item	Component	Function
1	Power/standby button	When the notebook is: ■ Off, press to turn on the notebook. ■ On, briefly press to initiate standby. ■ In standby, briefly press to resume from standby. ■ In hibernation, briefly press to restore from hibernation. ✎ If the system has stopped responding and Microsoft Windows shutdown procedures cannot be used, press and hold the power/standby button for at least 4 seconds to turn off the notebook.
2	Exhaust vents	Provide airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs or clothing, to block airflow.
3	Volume down button	Decreases system volume.
4	Volume mute button	Mutes or restores system volume.
5	Volume up button	Increases system volume.
6	Quick Launch buttons (2)	Launch default multimedia, digital imaging, or music applications (varies by model). To reassign another application to a Quick Launch button, refer to “Using Custom Assignments and Schemes” in Chapter 2 of the *Hardware and Software Guide* included with the notebook.

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The top components of the notebook are shown below and described in Table 1-7.

Notebook Top Components

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Table 1-7

Notebook Top Components

Item	Component	Function
1	TouchPad	Moves the pointer and selects or activates items on the screen.
2	TouchPad light	On: TouchPad is enabled.
3	TouchPad button	Enables/disables the TouchPad.
4	Wireless button	Turns the wireless network device on and off (select models only).
	Wireless light	On: An integrated wireless device has been enabled.
5	Caps lock light	On: **caps lock** is on.
6	Num lock light	On: **num lock** or the numeric keypad is on.
7	TouchPad scroll zone	Scrolls up or down.
8	Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

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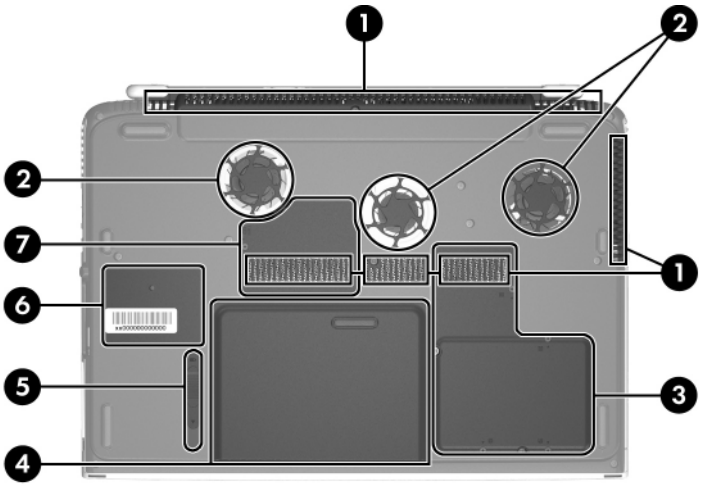
The external components on the bottom of the notebook are shown below and described in Table 1-8.



Bottom Components

Table 1-8

Bottom Components

Item	Component	Function
1	Exhaust vents (4)	Provide airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs or clothing, to block airflow.

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Table 1-8

Bottom Components *(Continued)*

Item	Component	Function
2	Fans (2)	Provide airflow to cool internal components. △ To prevent overheating, do not obstruct fans. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs or clothing, to block airflow.
3	Hard drive bay	Holds the internal hard drive.
	Mini PCI compartment	Holds an optional wireless LAN device. △ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your notebook 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 notebook functionality. Then contact Customer Care.
4	Battery bay	Holds a battery pack.
5	Battery pack release latch	Releases a battery pack from the battery bay.
6	Label areas (2)	Contains the notebook serial number and other applicable regulatory labels.
7	Memory module compartment	Contains two memory slots that support replaceable memory modules. The number of preinstalled memory modules varies by notebook model.

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1.5 Design Overview

This section presents a design overview of key parts and features of the notebook. 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:

- Memory module
- Mini PCI communications devices
- Hard drive
- Display
- Keyboard and TouchPad
- Audio
- Intel Pentium 4 processors
- PC Card

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

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

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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 system information and customization utility that can be used even when your operating system is not working or will not load. This utility includes settings that are not available in Windows.

Using Computer Setup

Information and settings in Computer Setup are accessed from the Main, Security, Advanced, or Tools menus:

1. Turn on or restart the notebook. Press **f10** while the F10 = ROM-Based Setup message is displayed in the lower-left corner of the screen.
   - ❏ To change the language, use the cursor control keys to navigate to the **Advanced** menu**.**
   - ❏ To view navigation information, press **f1.**
   - ❏ To return to the Computer Setup menu, press **esc.**

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2. Select the **Main, Security, Advanced,** or **Tools** menu.
3. To close Computer Setup and restart the notebook:
   - ❏ Select **Exit > Exit Saving Changes,** and then press **enter.**

   – or –

   - ❏ Select **Exit > Exit Discarding Changes,** and then press **enter.**

   – or –

   - ❏ Select **Exit > Load Setup Defaults,** and then press **enter.**
4. When you are prompted to confirm your action, press **f10.**

Selecting from the Main Menu

Table 2-1

Main Menu

Select	To Do This
System Information	■ Change the system time and system date. ■ View identification information about the notebook. ■ View specification information about the processor, memory and cache size, and system ROM.

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Selecting from the Security Menu

Table 2-2

Security Menu

Select	To Do This
Administrator Password	Enter, change, or delete an Administrator password.
Power-on Password	Enter, change, or delete a power-on password.
DriveLock Passwords	Enable/disable DriveLock; change a DriveLock user or master password. ✎ DriveLock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the notebook.
Password Options (Password options can be selected only when a power-on password has been set.)	Enable/disable: ■ QuickLock ■ QuickLock on standby ■ QuickBlank ✎ To enable QuickLock on standby or QuickBlank, you must first enable QuickLock.
Device Security	Enable/disable: ■ Diskette drive startup* ■ CD-ROM or diskette startup ✎ Settings for a DVD-ROM can be entered in the CD-ROM field.

*Not applicable to SuperDisk LS-120 drives.

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Selecting from the Advanced Menu

Table 2-3

Advanced Menu

Select	To Do This
Language	Change the Computer Setup language.
Boot Order	Enable/disable MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system.
Accessibility Options	Allows electronic and information technology to be accessible to people with varying ranges of abilities.
Video Memory	Displays the amount of video memory available on the notebook.

Selecting from the Tools Menu

Table 2-4

Tools Menu

Select	To Do This
Hard Drive Self Test	Run a quick comprehensive self test on hard drives in the system that support the test features.

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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 Expansion Base (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”

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Table 2-5

Troubleshooting Flowcharts Overview *(Continued)*

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

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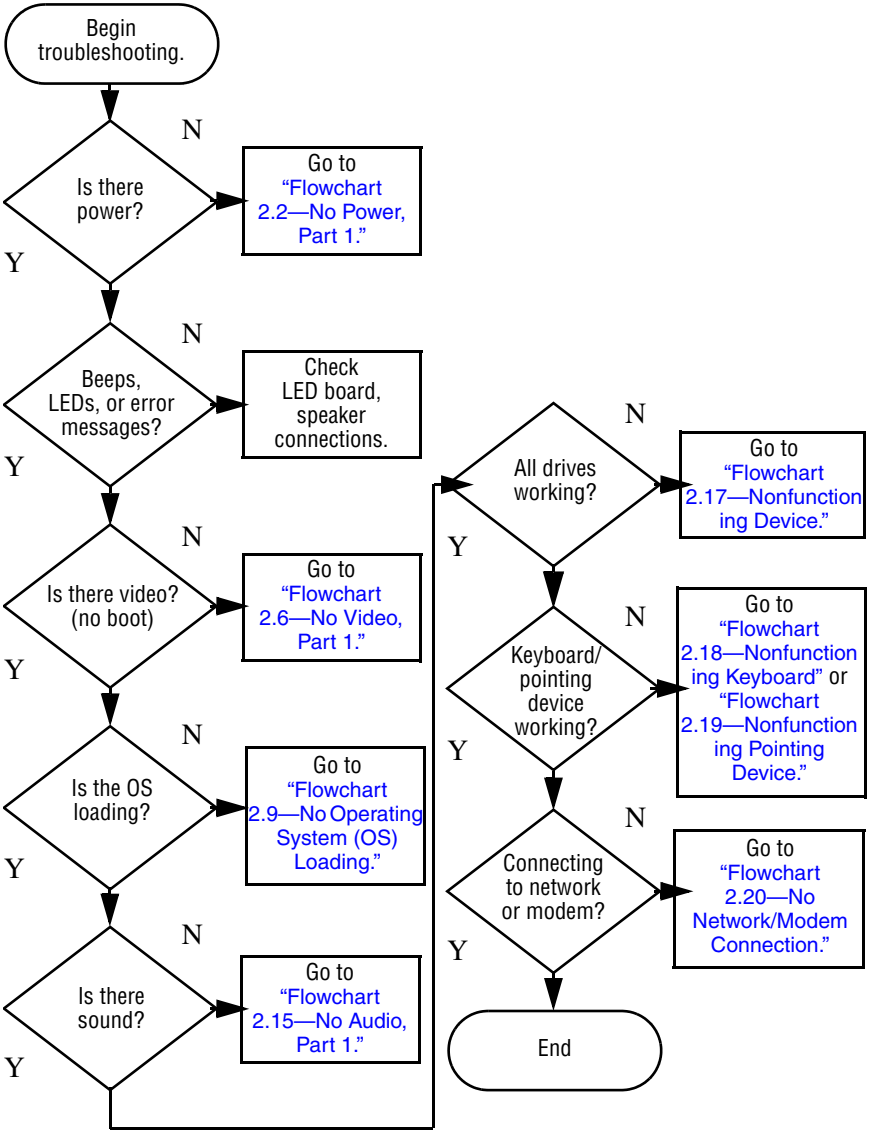
Flowchart 2.1—Initial Troubleshooting



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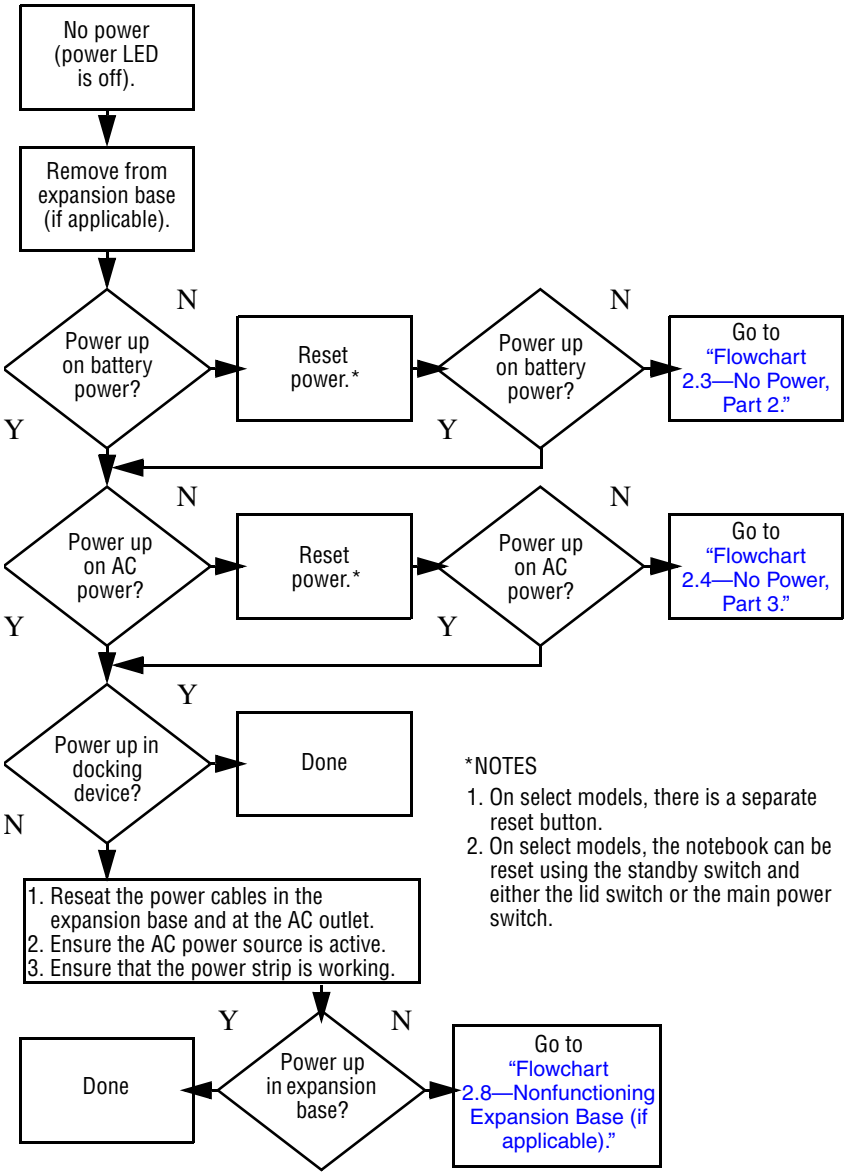
Flowchart 2.2—No Power, Part 1



*NOTES

1. On select models, there is a separate reset button.
2. On select models, the notebook can be reset using the standby switch and either the lid switch or the main power switch.

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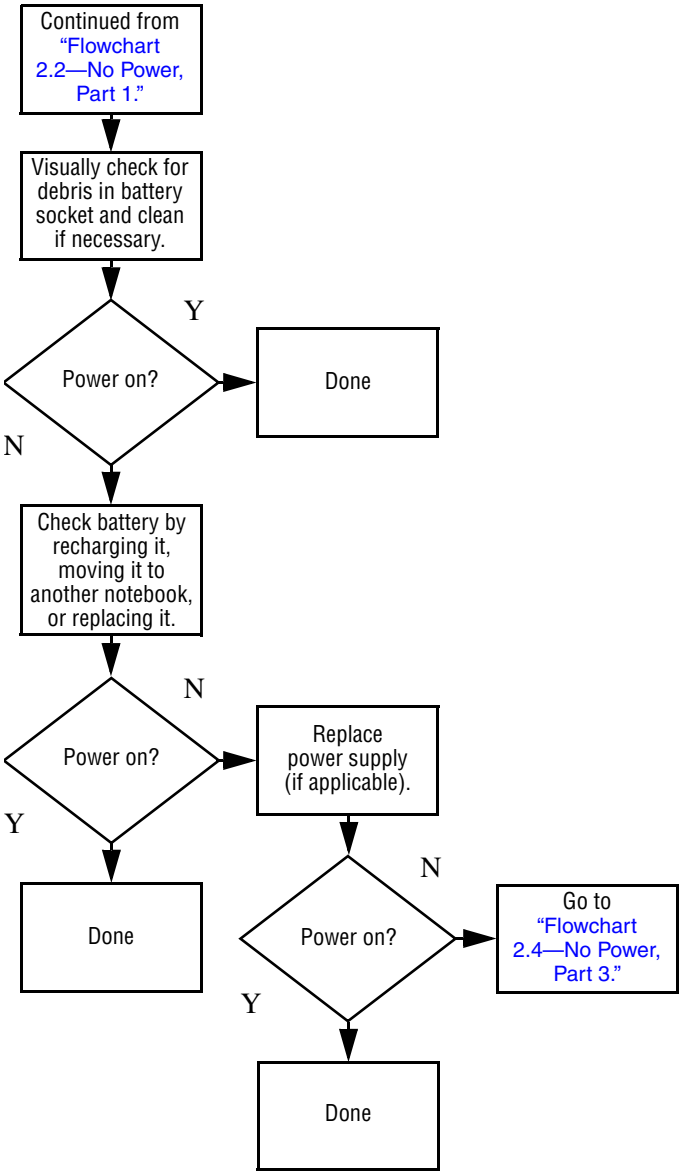
Flowchart 2.3—No Power, Part 2



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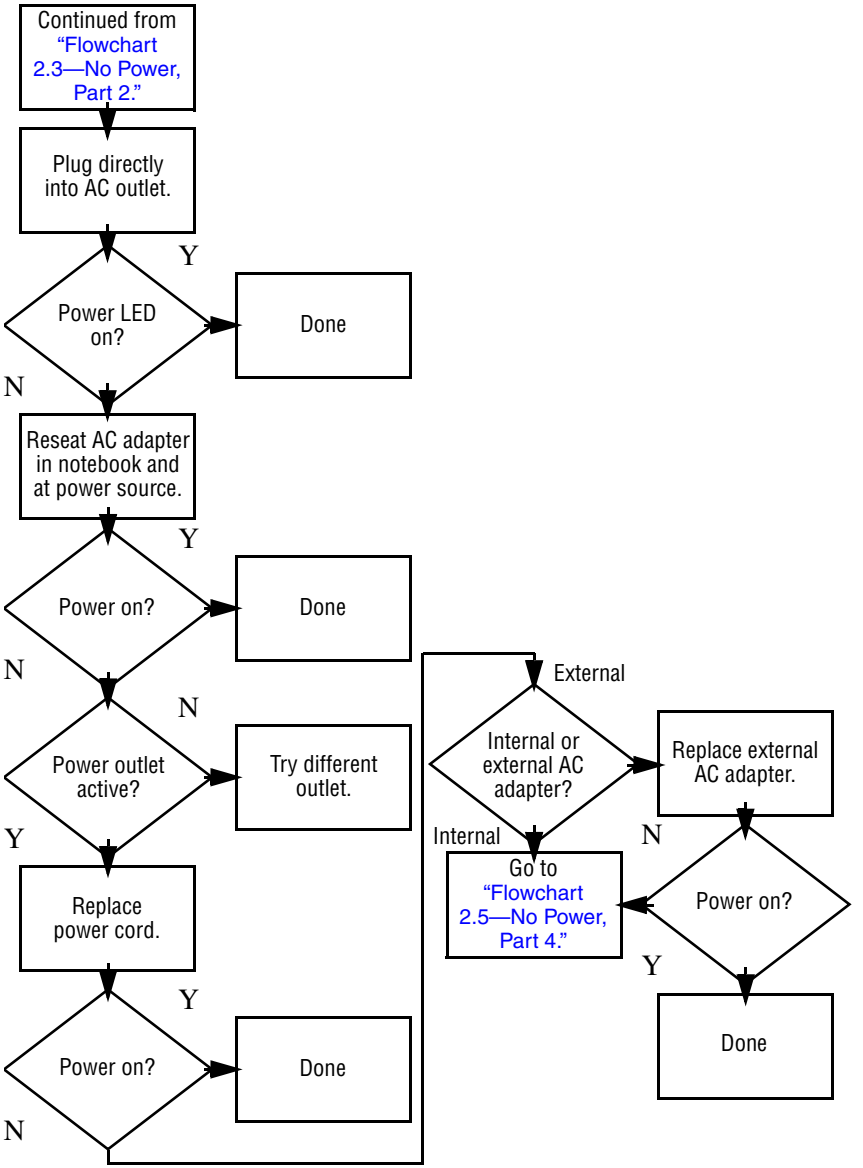
Flowchart 2.4—No Power, Part 3



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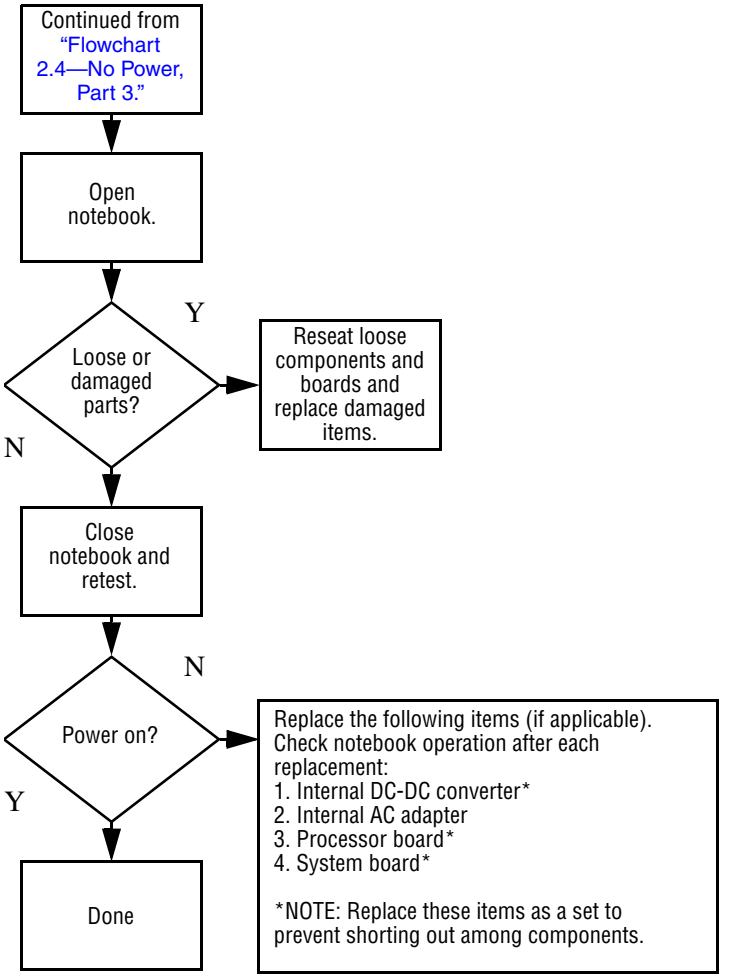
Flowchart 2.5—No Power, Part 4



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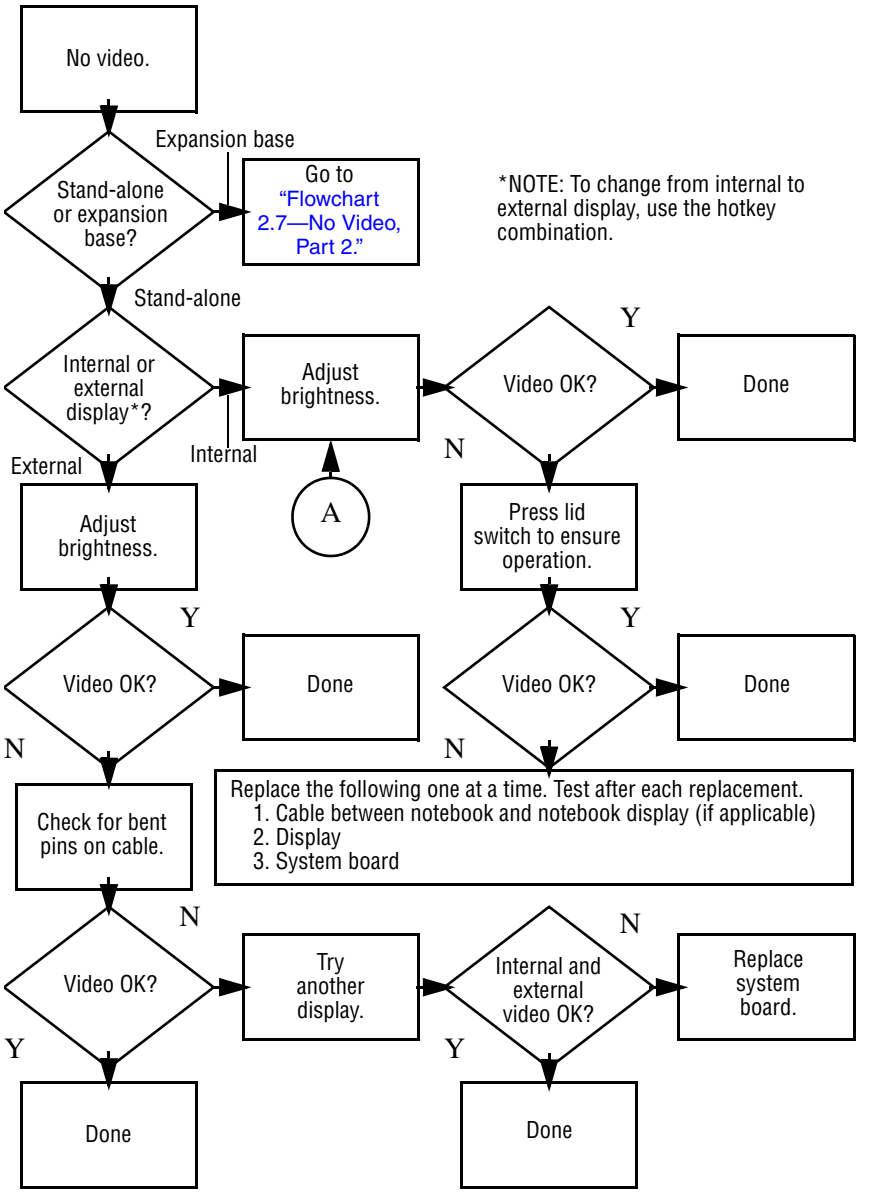
Flowchart 2.6—No Video, Part 1



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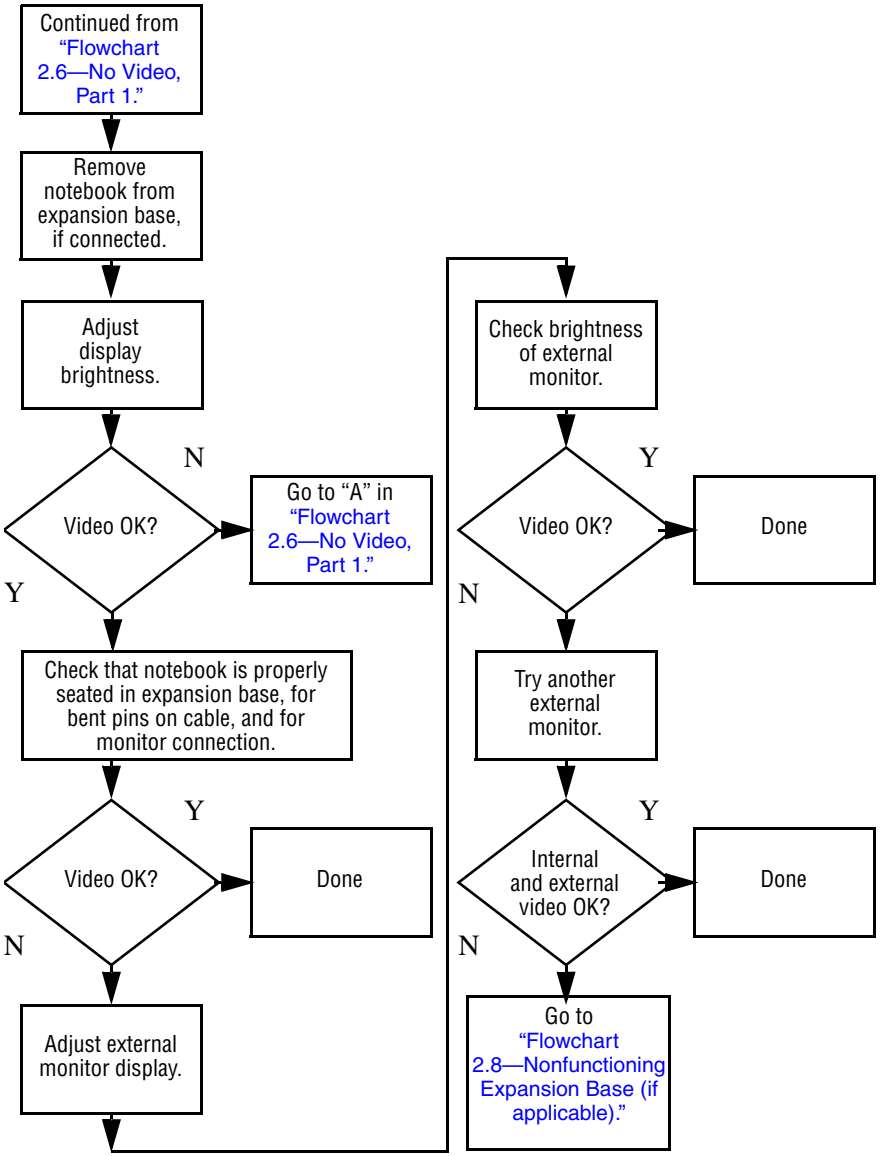
Flowchart 2.7—No Video, Part 2



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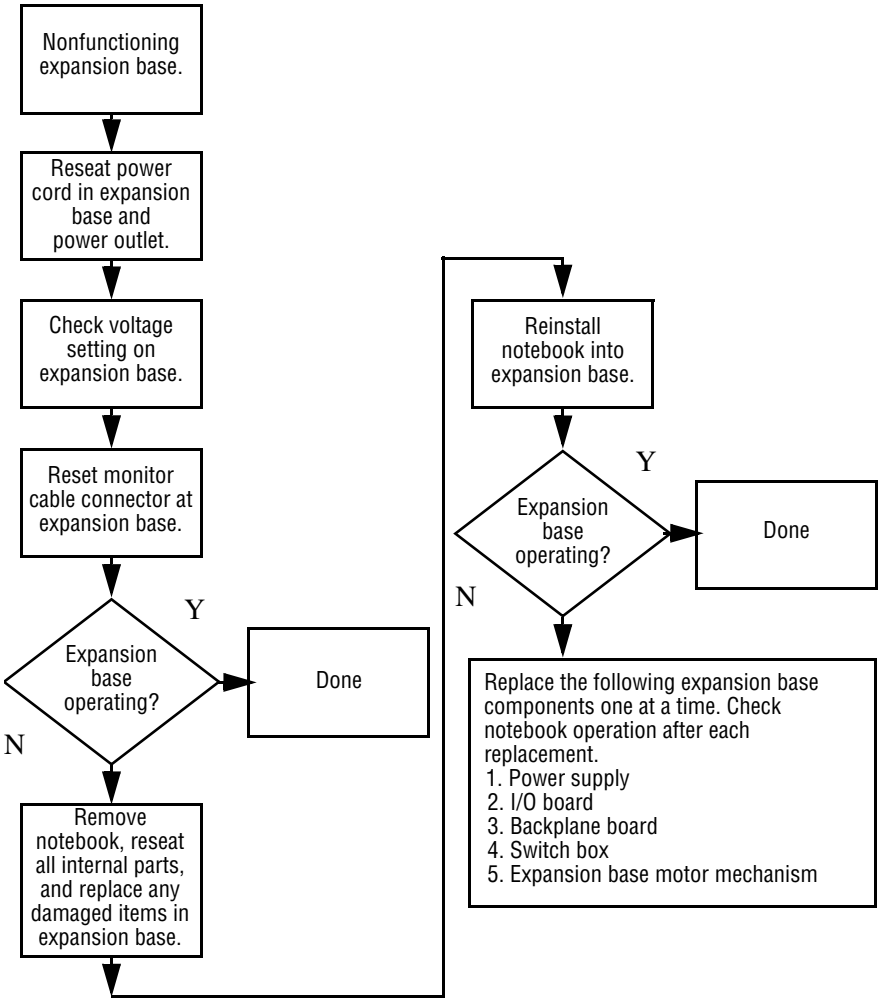
Flowchart 2.8—Nonfunctioning Expansion Base (if applicable)



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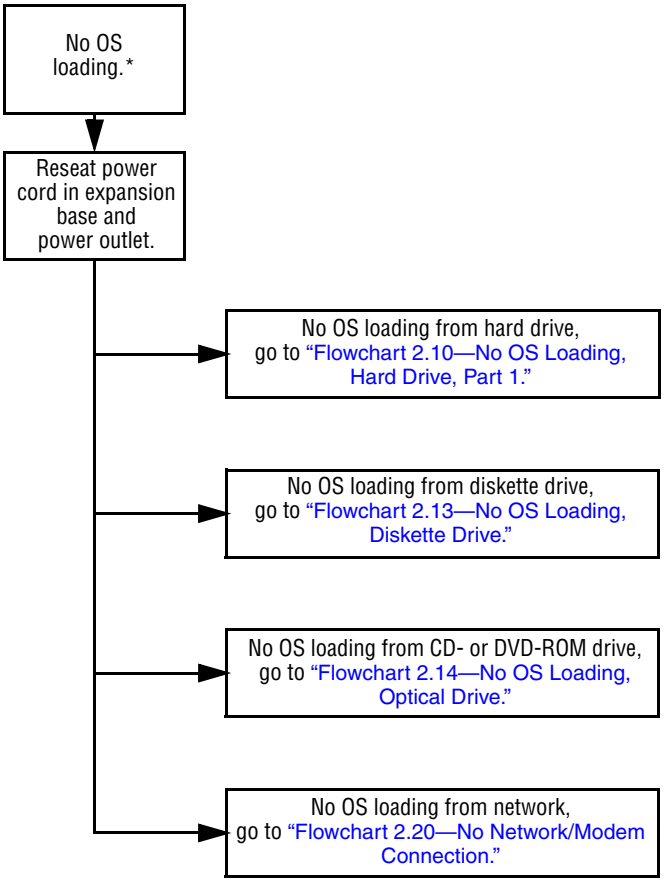
Flowchart 2.9—No Operating System (OS) Loading



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

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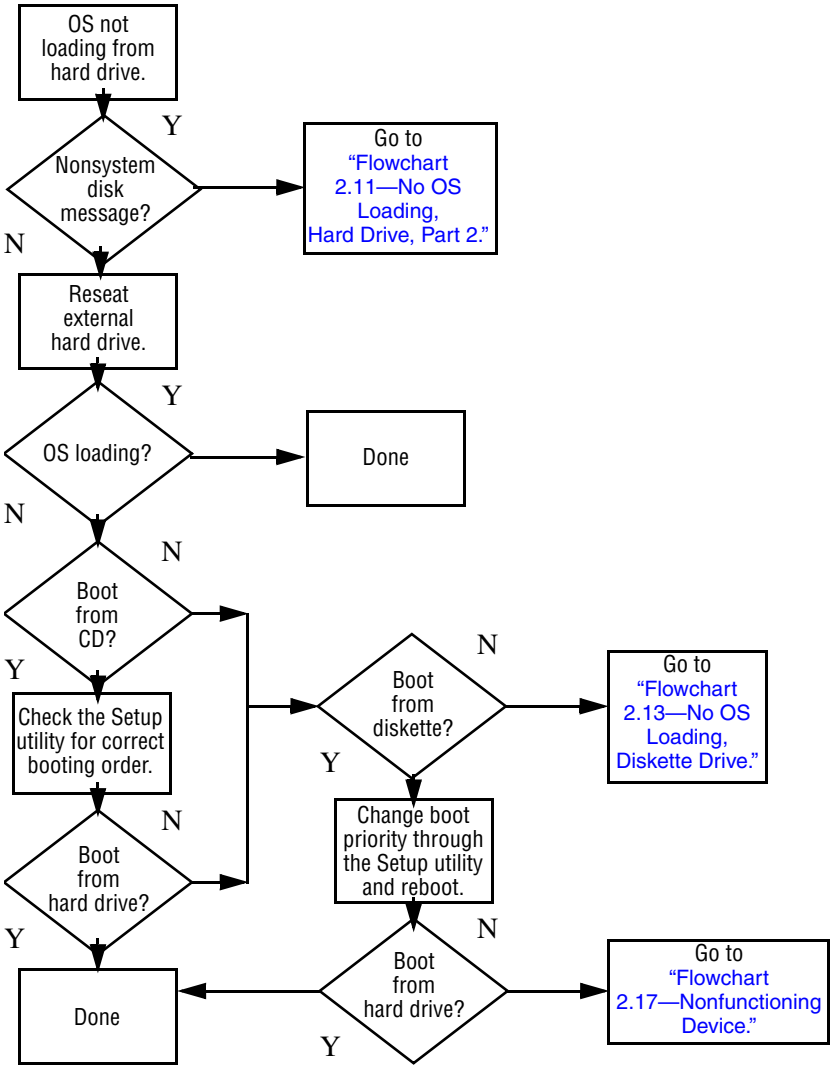
Flowchart 2.10—No OS Loading, Hard Drive, Part 1



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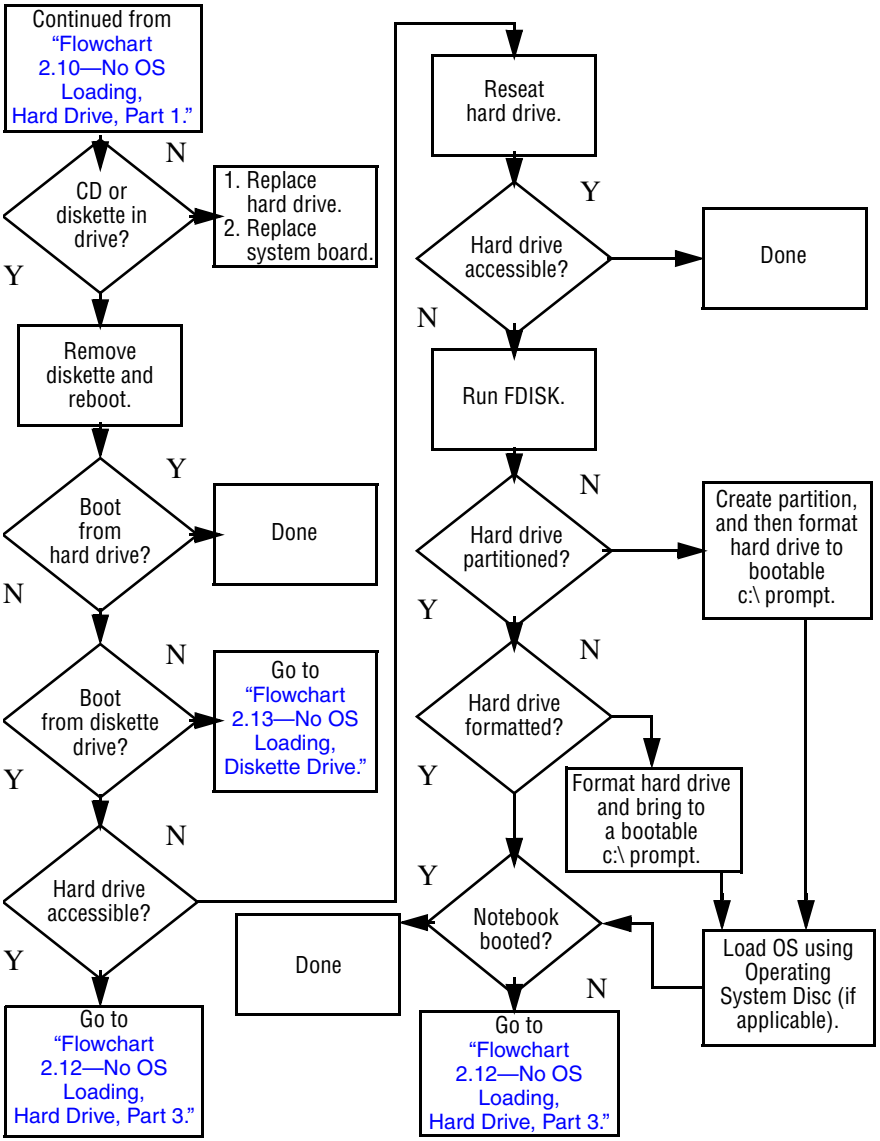
Flowchart 2.11—No OS Loading, Hard Drive, Part 2



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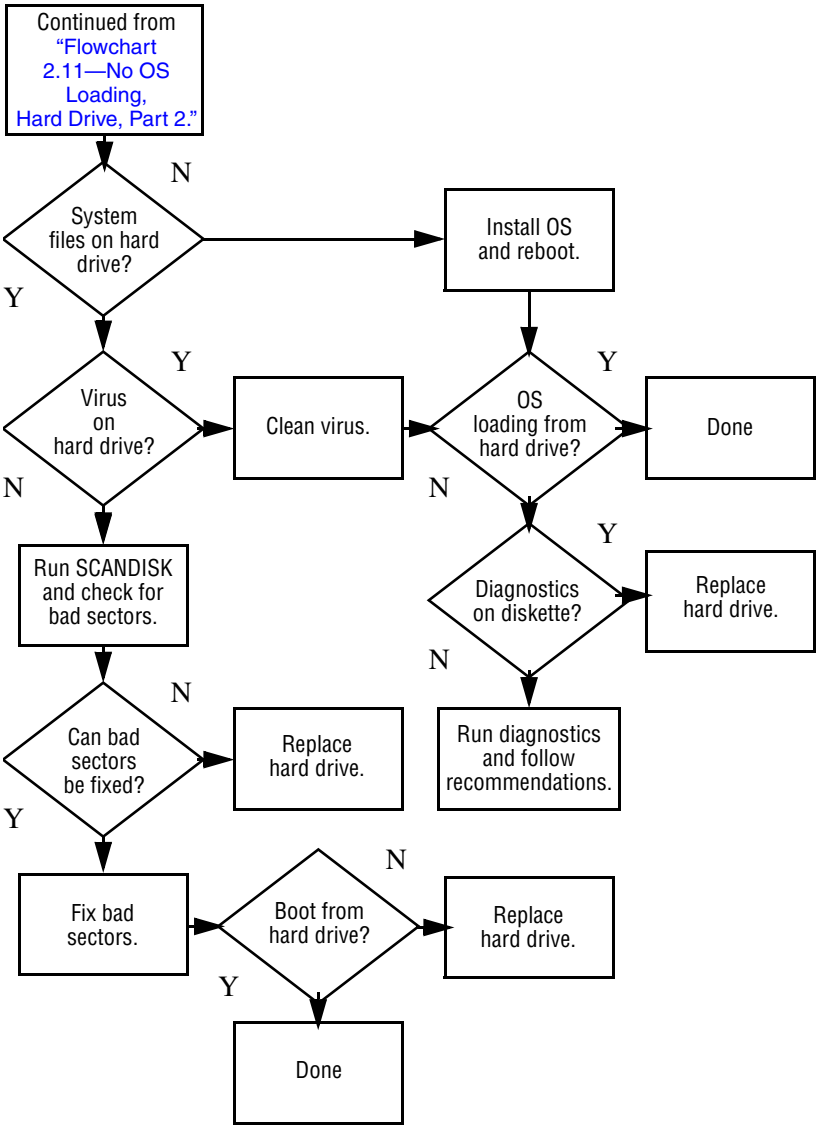
Flowchart 2.12—No OS Loading, Hard Drive, Part 3



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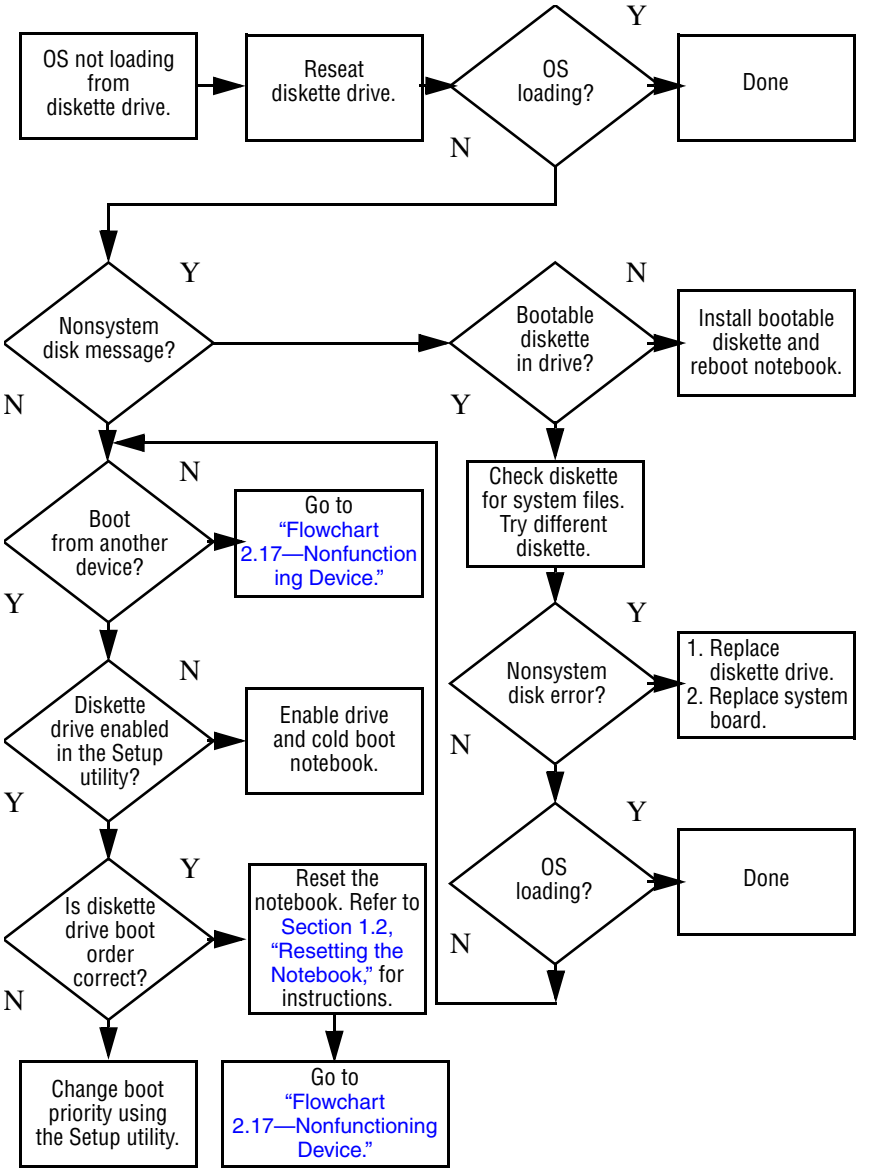
Flowchart 2.13—No OS Loading, Diskette Drive



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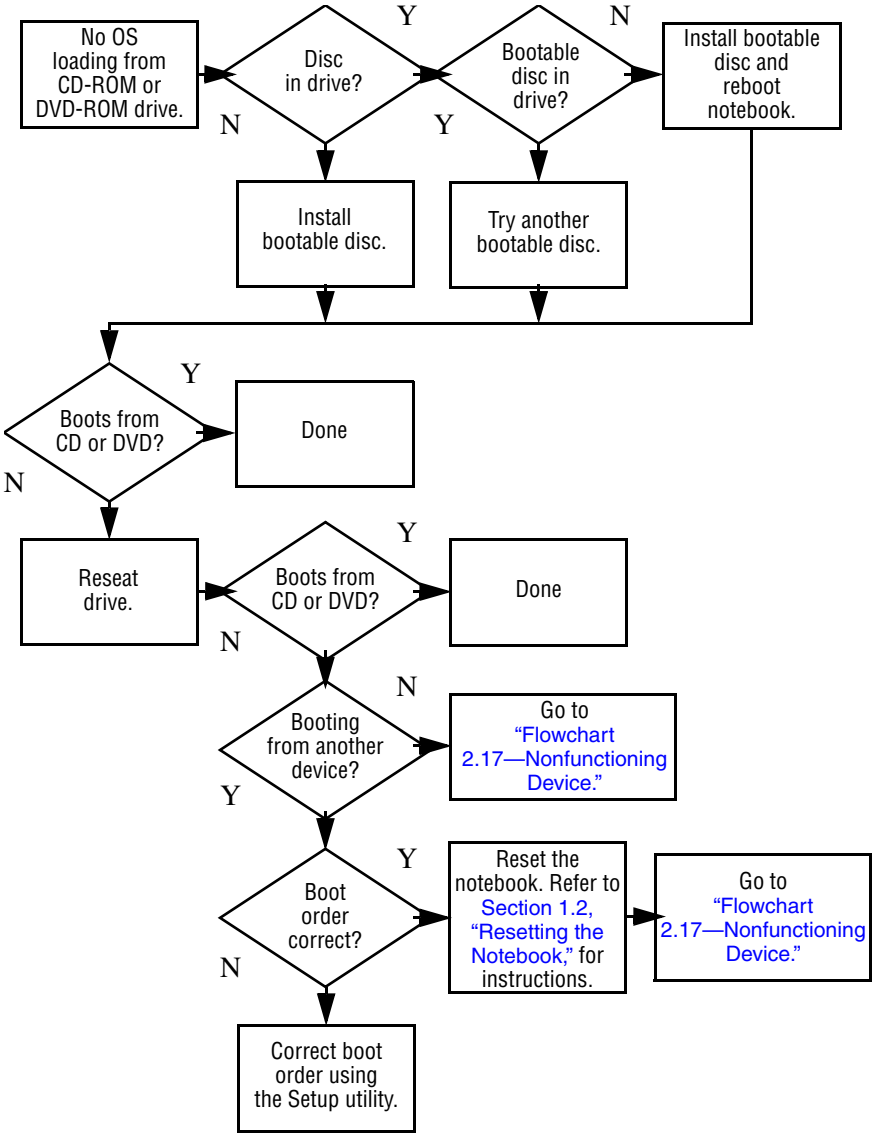
Flowchart 2.14—No OS Loading, Optical Drive



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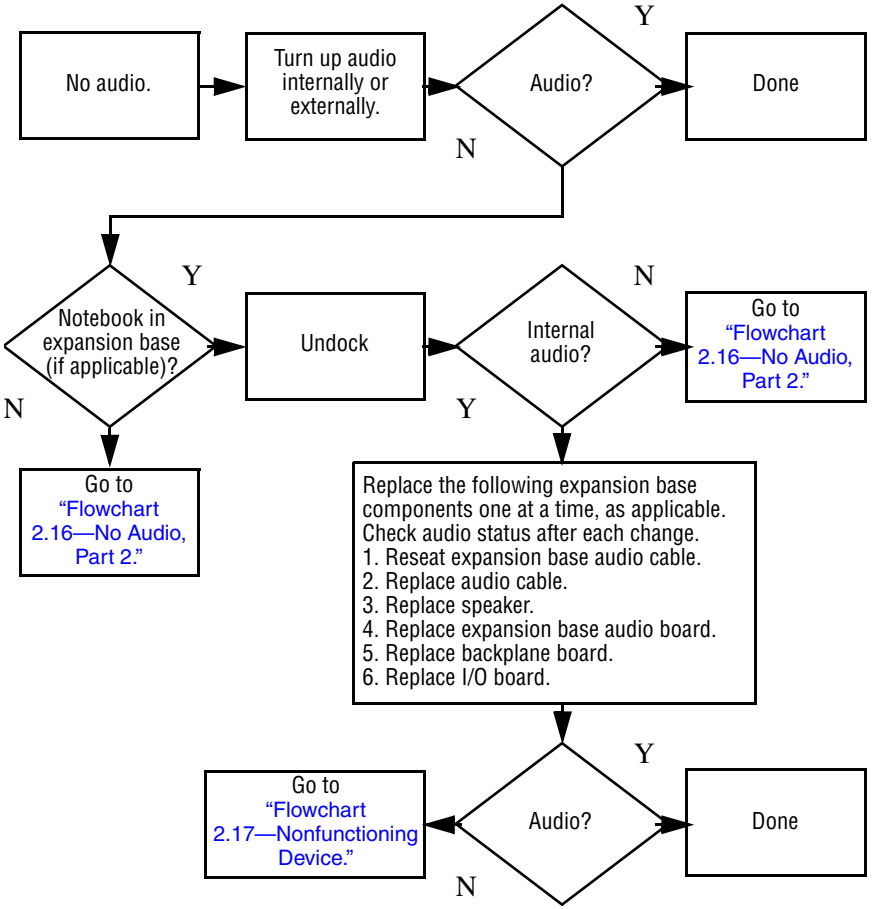
Flowchart 2.15—No Audio, Part 1



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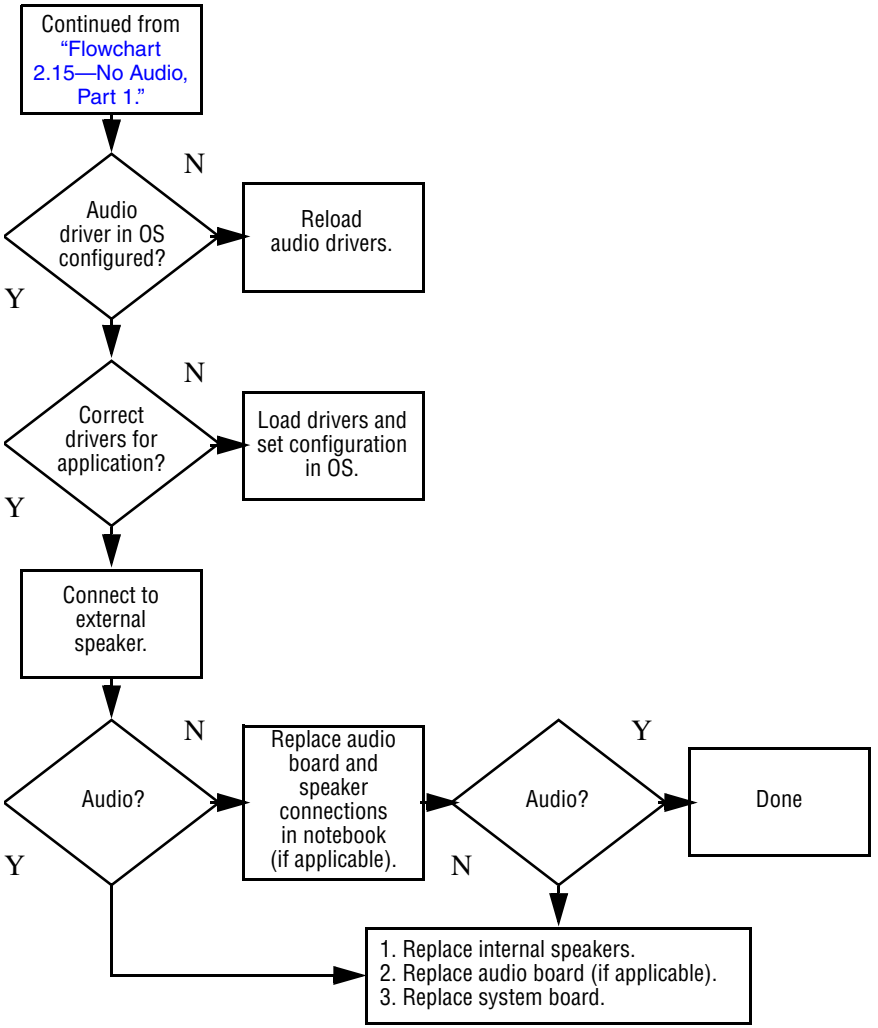
Flowchart 2.16—No Audio, Part 2



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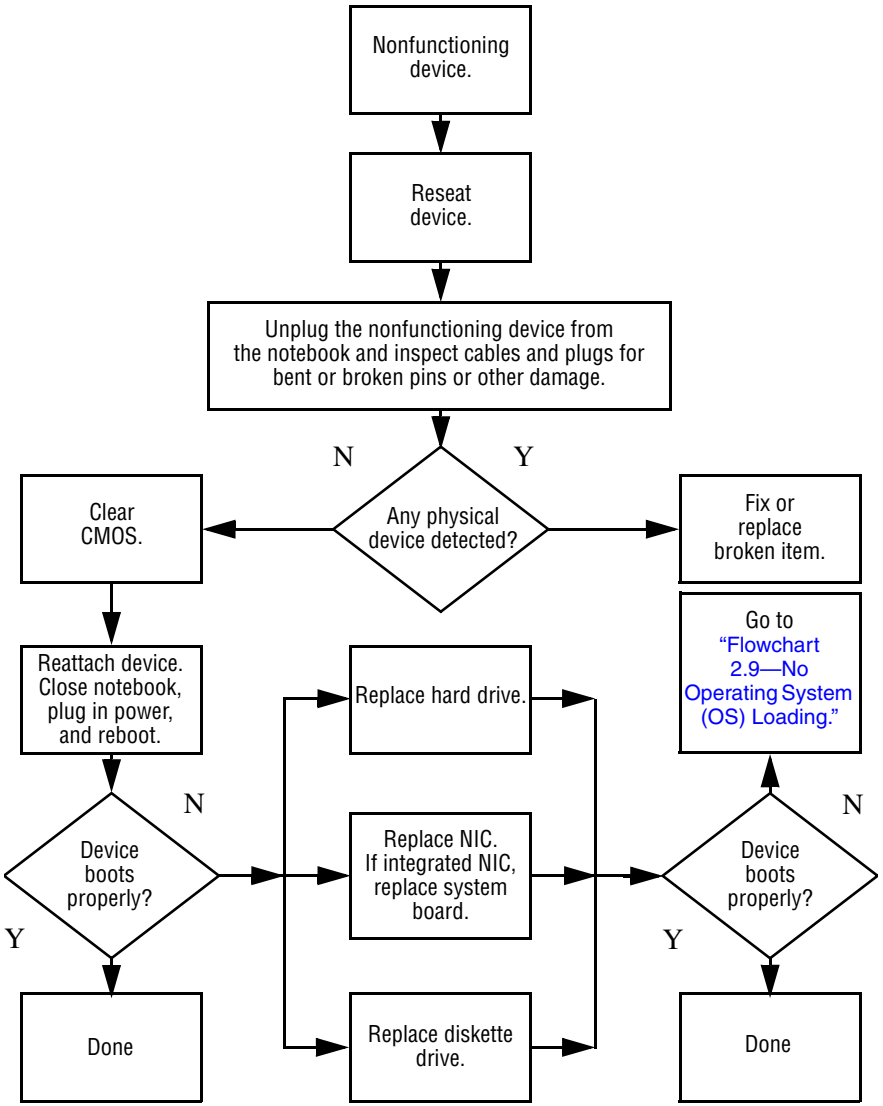
Flowchart 2.17—Nonfunctioning Device



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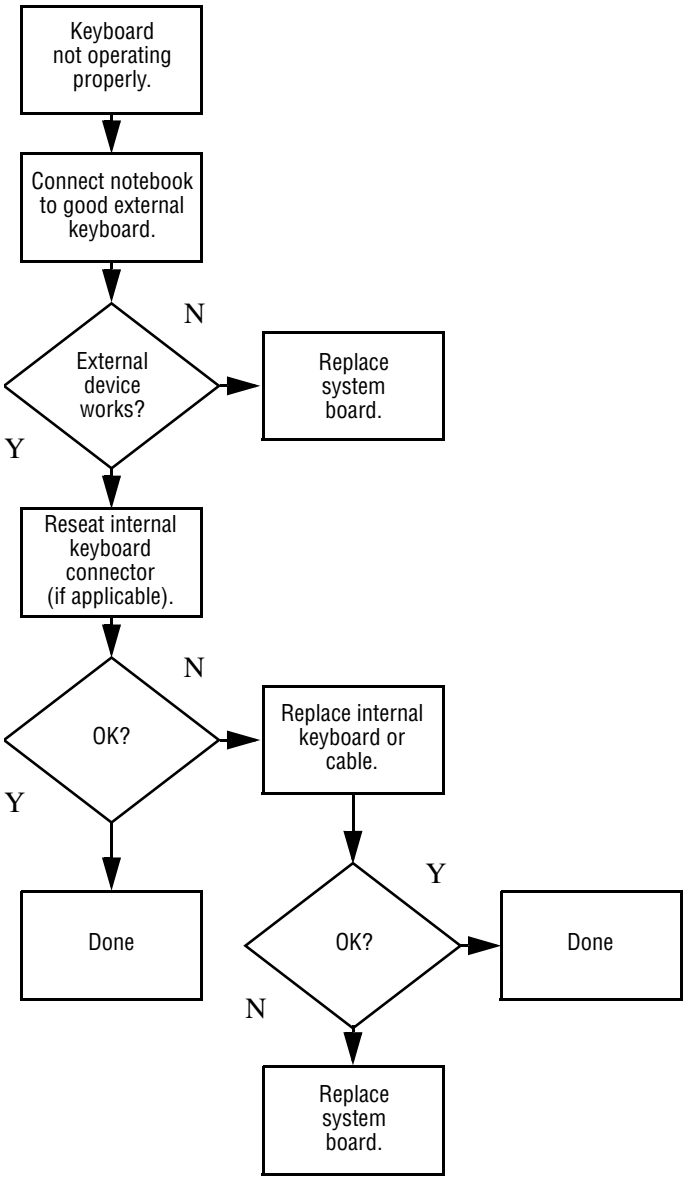
Flowchart 2.18—Nonfunctioning Keyboard



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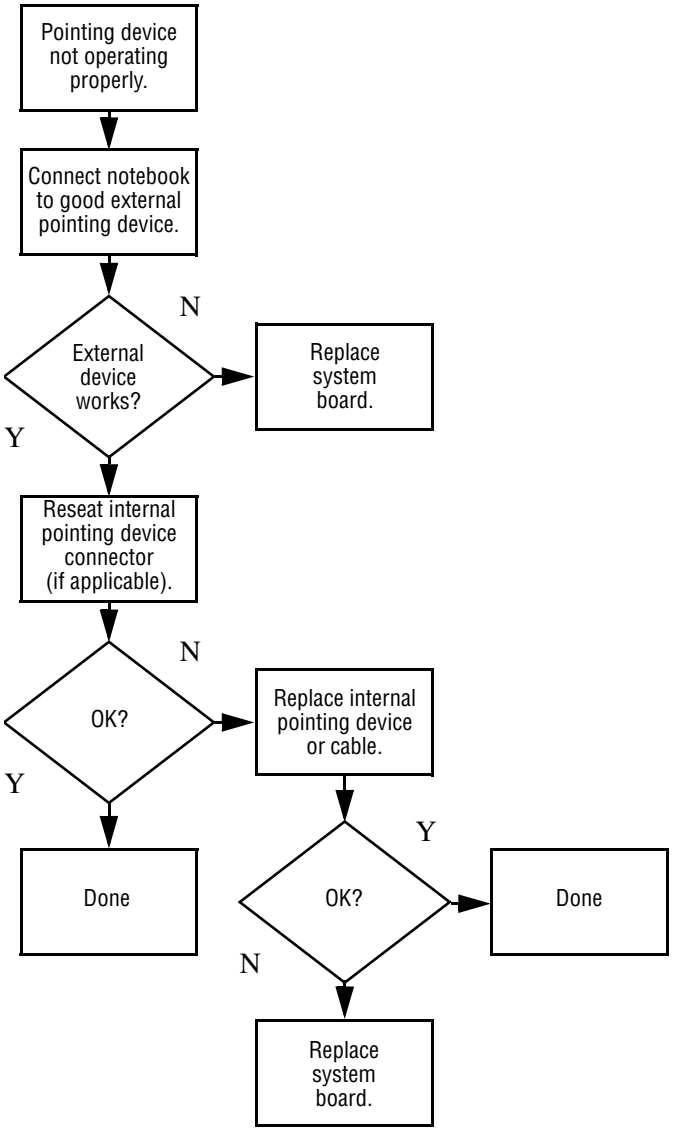
Flowchart 2.19—Nonfunctioning Pointing Device



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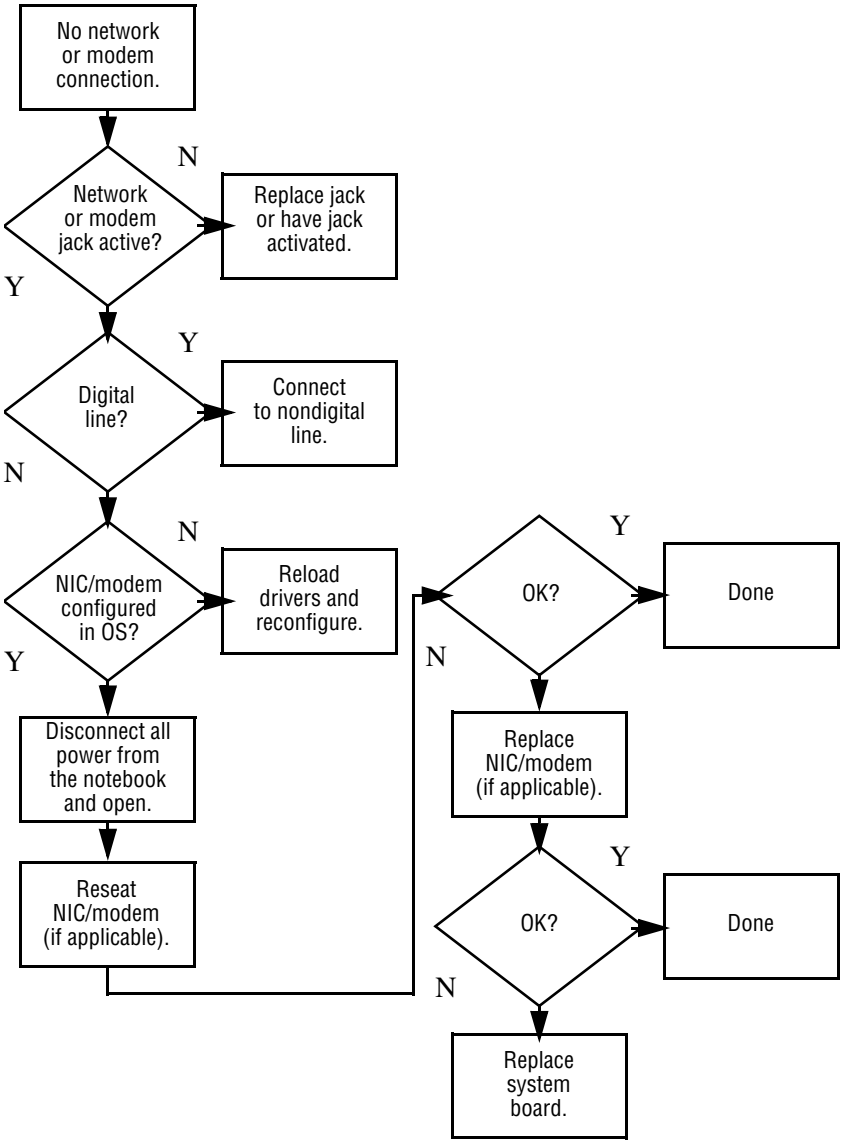
Flowchart 2.20—No Network/Modem Connection



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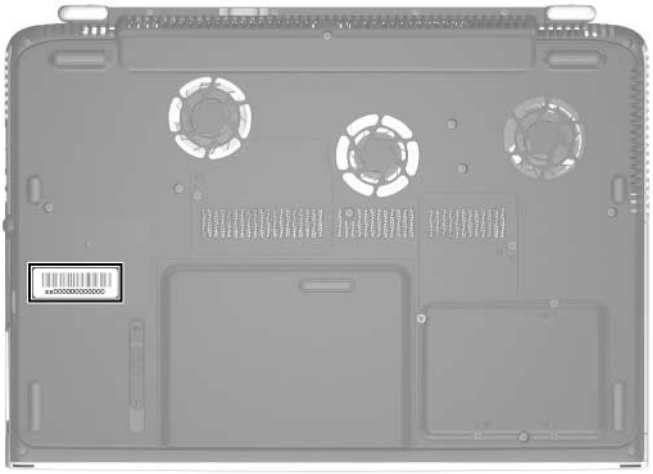
3

Illustrated Parts Catalog

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

3.1 Serial Number Location

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



Serial Number Location

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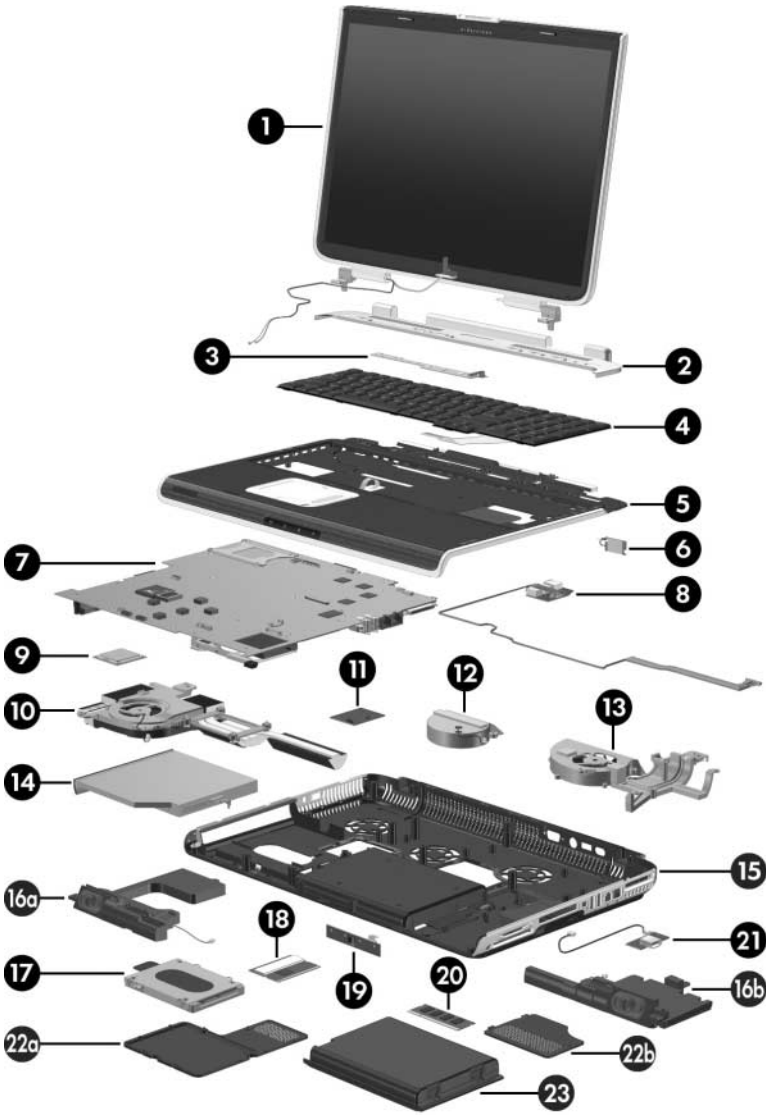
3.2 Notebook Major Components



Notebook Major Components

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Table 3-1

Spare Parts: Notebook Major Components

Item	Description			Spare Part Number
1	**Display assemblies** (include wireless antenna boards and cables)			
	17.0-inch, WSXGA+WVA with Brightview			374723-001
	17.0-inch, WXGA+WVA with Brightview			374722-001
	17.0-inch, WXGA+WVA			374721-001
2	**Switch cover**			
	For use on notebook models with wireless			374754-001
	For use on notebook models without wireless			380444-001
3	**LED Board** (includes cable)			378771-001
4	**Keyboards**			
	Belgium	374741-181	Spain	374741-071
	Brazil	374741-201	Sweden/Finland	374741-101
	Denmark	374741-081	Switzerland	374741-111
	France	374741-051	United Kingdom	374741-031
	French Canada	374741-121	Asia Pacific, Australia, Canada, Hong Kong, People's Republic of China, and the United States	374741-001
	Germany	374741-041		
	Greece	374741-151		
	International	374741-B31		
	Italy	374741-061		
	Latin America	374741-161		
	Norway	374741-091		
	Portugal	374741-131		
	Saudi Arabia	374741-171		
5	**Top cover** (includes TouchPad)			374750-001
6	**Broadcomm Bluetooth® wireless board**			376651-001

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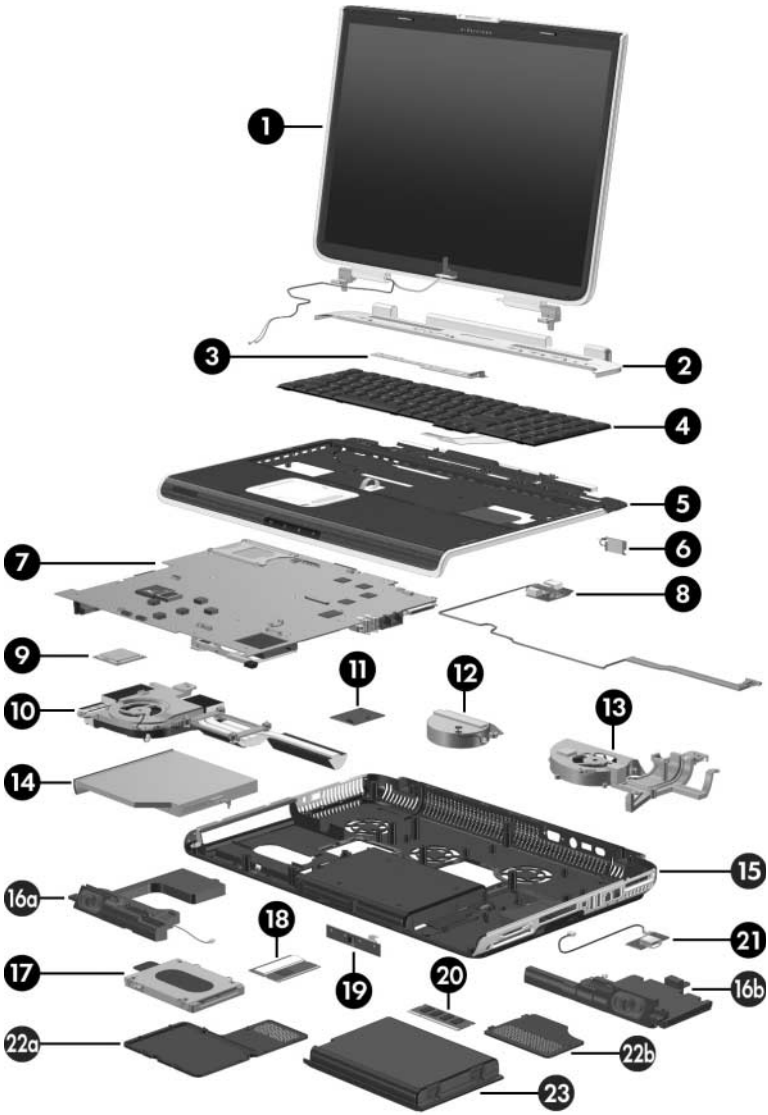

Notebook Major Components

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Table 3-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
7	**System boards** (include disk cell RTC battery)	
	M24P with 256 MB RAM	374711-001
	M24P with 128 MB RAM	374709-001
	M22P with 64 MB RAM	374707-001
8	**Audio/USB board** (includes cable)	374761-001
9	**Processors** (include thermal pad)	
	Intel Pentium 4 560 (3.6-GHz)	377213-001
	Intel Pentium 4 550 (3.4-GHz)	374718-001
	Intel Pentium 4 540 (3.2-GHz)	374717-001
	Intel Pentium 4 530 (3.0-GHz)	374716-001
	Intel Pentium 4 520 (2.8-GHz)	374715-001
10	**Heat sink module** (includes left fan and thermal paste)	380030-001
11	**Modem board**	374758-001
12	**Base enclosure middle fan**	380029-001
13	**Base enclosure right fan**	380027-001
14	**Optical drives** (include bezel)	
	Dual Format, Double Layer	382079-001
	8X Dual Format, Light Scribe	383608-001
	8X DVD±RW/R and CD-RW Combo Drive	374737-001
	24X DVD/CD-RW Combo Drive	374735-001
15	**Base enclosure**	374752-001
	Speakers	378521-001
16a	Left	
16b	Right	

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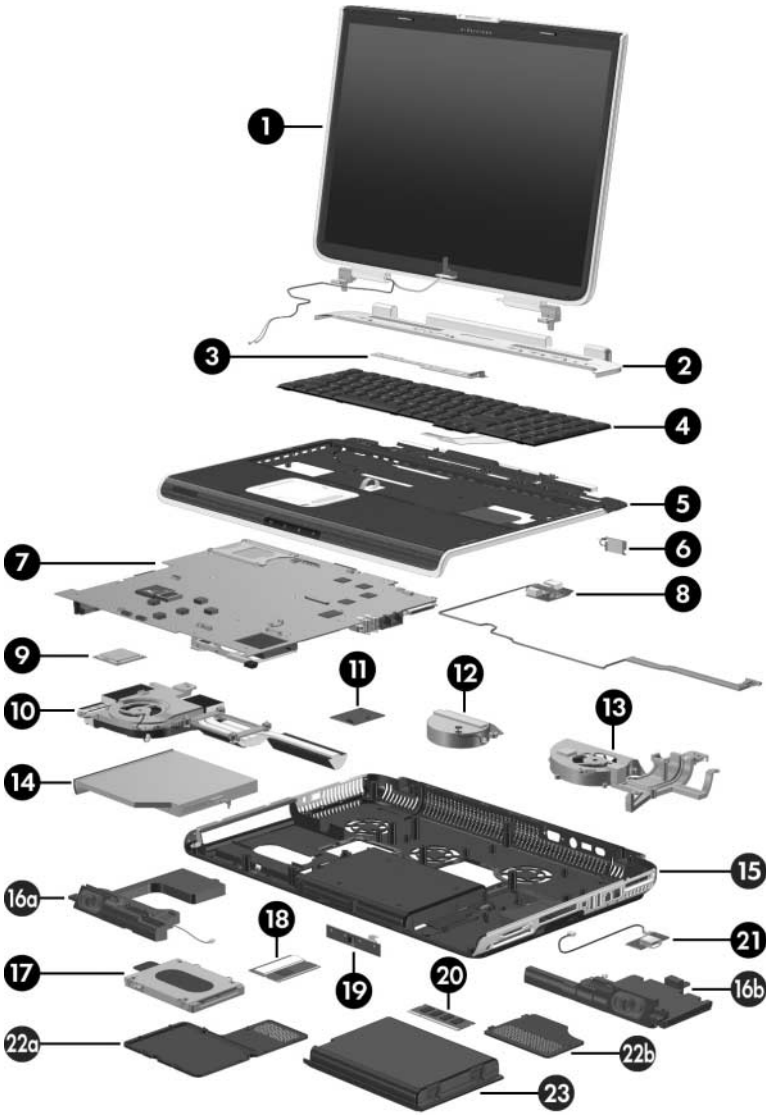

Notebook Major Components

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Table 3-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description			Spare Part Number
17	**Hard drives** (include frame)			
	7200-rpm		4200-rpm	
	60-GB	374732-001	100-GB	374730-001
	5400-rpm		80-GB	374729-001
	100-GB	380258-001	60-GB	374728-001
	80-GB	374731-001	40-GB	378767-001
18	**Mini PCI communications cards**			
	802.11b/g, for use in most of the world (MOW)			373047-001
	802.11b/g, for use in the rest of the world (ROW)			373048-001
	802.11a/b/g combination card, for use in the United States			376650-001
19	**Infrared board** (includes cable)			374760-001
20	**Memory modules** (400-MHz DDR2)			
	1024 MB			374726-001
	512 MB			374725-001
	256 MB			374724-001
21	**USB digital drive board**			374759-001
	Miscellaneous Plastics Kit			374746-001
	Includes:			
22a	Hard drive cover (includes 4 captive screws)			
22b	Memory module compartment cover (includes 2 captive screws)			
	Not illustrated: Notebook feet SD Card slot space saver PC Card slot space saver			
23	**Battery pack, 12-cell, 2.2-AHr**			374762-001

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3.3 Miscellaneous Plastics Kit

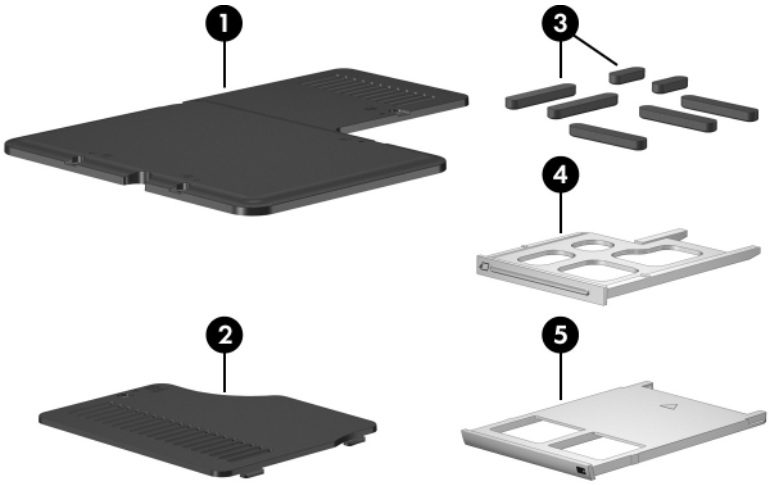

Table 3-2

Spare Part Number 374746-001

Item	Description	Spare Part Number
1	Hard drive cover (includes 4 captive screws)	
2	Memory module compartment cover (includes 2 captive screws)	
3	Notebook feet (7)	
4	SD Card slot space saver	
5	PC Card slot space saver	

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3.4 Mass Storage Devices

Table 3-3

Spare Part Number Information

Item	Description			Spare Part Number
1	**Optical drives**			
	Dual Format, Double Layer			382079-001
	8X Dual Format, Light Scribe			383608-001
	8X DVD±RW/R and CD-RW Combo Drive			374737-001
	24X DVD/CD-RW Combo Drive			374735-001
2	**Hard drives** (include frame)			
	7200-rpm		4200-rpm	
	60-GB	374732-001	100-GB	374730-001
	5400-rpm		80-GB	374729-001
	100-GB	380258-001	60-GB	374728-001
	80-GB	374731-001	40-GB	378767-001

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3.5 Media Center Edition Accessories

Table 3-4

Spare Part Number Information

Item	Description	Spare Part Number
1	**Dual TV Tuner/Digital Video Recorder**	377553-001
2	**TV tuner stand**	377559-001
3	**TV tuner AC adapter**	377555-001
4	**Media Center mini remote control**	375705-001
	Not illustrated:	
	Audio/Video Cable Kit	377557-001
	Coaxial Cable Kit	377556-001
	Entertainment Y-cable	375759-001
	Miscellaneous Cable Kit	377558-001

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3.6 Miscellaneous (Not Illustrated)

Table 3-5

Spare Part Information

Description	Spare Part Number
AC adapters	
180 watt, 3-wire plug—for use on all notebook models	374743-001
135 watt, 3-wire plug—for use only on notebook models with Intel Pentium 4 530 (3.0-GHz) and Intel Pentium 4 520 (2.8-GHz) processors	378768-001
HP remote control	371694-001
Logo Kit	374748-001
Wired headset with volume control	371693-001
USB 1.1 digital drive	364727-001
USB 1.1 diskette drive	344897-001
USB travel mouse	309674-001
Screw Kit (includes the following screws; refer to Appendix C, "Screw Listing," for more information on screw specifications and usage) ■ Phillips PM2.5×4.0 screw ■ Phillips PM2.0×7.0 round head screw ■ Phillips PM2.0×7.0 screw ■ Phillips PM2.0×5.0 screw ■ Phillips PM2.0×4.0 screw ■ Phillips PM2.0×3.0 screw ■ Phillips PM1.5×2.0 screw	374744-001

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Table 3-5

Spare Part Information *(Continued)*

Description	Spare Part Number
Power cords (3-wire plug, for use with 135-watt AC adapters)	
For use in:	
Australia and New Zealand	373979-011
Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden	373979-021
Canada, French Canada, Latin America, Taiwan, Thailand, and the United States	373979-001
Denmark	373979-081
Hong Kong and the United Kingdom	373979-031
Italy	373979-061
People's Republic of China	373979-AA1
Switzerland	373979-111

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Table 3-5

Spare Part Information *(Continued)*

Description	Spare Part Number
Power cords (3-wire plug, for use with 180-watt AC adapters)	
For use in:	
Australia and New Zealand	345252-011
Brazil	345252-201
Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden	345252-021
Canada, French Canada, Latin America, Taiwan, Thailand, and the United States	345252-001
Denmark	345252-081
Hong Kong and the United Kingdom	345252-031
Italy	345252-061
People's Republic of China	345252-AA1
Switzerland	345252-111

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3.7 Sequential Part Number Listing

Table 3-6

Sequential Part Number Listing

Spare Part Number	Description
309674-001	USB travel mouse
344897-001	USB 1.1 diskette drive
345252-001	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Canada, French Canada, Latin America, Taiwan, Thailand, and the United States
345252-011	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Australia and New Zealand
345252-021	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden
345252-031	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Hong Kong and the United Kingdom
345252-061	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Italy
345252-081	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Denmark
345252-111	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Switzerland
345252-201	Power cord, with 3-wire plug, for use with 180-watt AC adapters in Brazil

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Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
345252-AA1	Power cord, with 3-wire plug, for use with 180-watt AC adapters in the People's Republic of China
364727-001	USB digital drive
371693-001	Wired headset with volume control
371694-001	HP remote control
373047-001	802.11b/g Mini PCI communications card, for use in most of the world (MOW)
373048-001	802.11b/g Mini PCI communications card, for use in the rest of the world (ROW)
373979-001	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Canada, French Canada, Latin America, Taiwan, Thailand, and the United States
373979-011	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Australia and New Zealand
373979-021	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden
373979-031	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Hong Kong and the United Kingdom
373979-061	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Italy

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Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
373979-081	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Denmark
373979-111	Power cord, with 3-wire plug, for use with 135-watt AC adapters in Switzerland
373979-AA1	Power cord, with 3-wire plug, for use with 135-watt AC adapters in the People's Republic of China
374707-001	System board M22P with 64 MB RAM (includes disk cell RTC battery)
374709-001	System board M24P with 128 MB RAM (includes disk cell RTC battery)
374711-001	System board M24P with 256 MB RAM (includes disk cell RTC battery)
374715-001	Intel Pentium 4 520 (2.8-GHz) processor, includes thermal pad
374716-001	Intel Pentium 4 530 (3.0-GHz) processor, includes thermal pad
374717-001	Intel Pentium 4 540 (3.2-GHz) processor, includes thermal pad
374718-001	Intel Pentium 4 550 (3.4-GHz) processor, includes thermal pad
374721-001	Display assembly, 17.0-inch, WXGA+WVA, includes wireless antenna boards and cables

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Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
374722-001	Display assembly, 17.0-inch, WXGA+WVA with Brightview, includes wireless antenna boards and cables
374723-001	Display assembly, 17.0-inch, WSXGA+WVA with Brightview, includes wireless antenna boards and cables
374724-001	256-MB memory module, 400 MHz DDR2
374725-001	512-MB memory module, 400 MHz DDR2
374726-001	1024-MB memory module, 400 MHz DDR2
374728-001	4200-rpm, 60-GB hard drive, includes frame and connector
374729-001	4200-rpm, 80-GB hard drive, includes frame and connector
374730-001	4200-rpm, 100-GB hard drive, includes frame and connector
374731-001	5400-rpm, 80-GB hard drive, includes frame and connector
374732-001	7200-rpm, 60-GB hard drive, includes frame and connector
374735-001	24X DVD/CD-RW Combo Drive
374737-001	8X DVD±RW/R and CD-RW Combo Drive
374741-001	Keyboard for use in Asia Pacific, Australia, Canada, Hong Kong, People's Republic of China, and the United States
374741-002	Keyboard for use in International
374741-031	Keyboard for use in United Kingdom
374741-041	Keyboard for use in Germany

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Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
374741-051	Keyboard for use in France
374741-061	Keyboard for use in Italy
374741-071	Keyboard for use in Spain
374741-081	Keyboard for use in Denmark
374741-091	Keyboard for use in Norway
374741-101	Keyboard for use in Sweden/Finland
374741-111	Keyboard for use in Switzerland
374741-121	Keyboard for use in French Canada
374741-131	Keyboard for use in Portugal
374741-151	Keyboard for use in Greece
374741-161	Keyboard for use in Latin America
374741-171	Keyboard for use in Saudi Arabia
374741-181	Keyboard for use in Belgium
374743-001	AC adapter, 180 watt, 3-wire plug—for use on all notebook models
374744-001	Miscellaneous Screw Kit
374746-001	Miscellaneous Plastics Kit
374748-001	Logo Kit
374750-001	Top cover (includes TouchPad)

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Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
374752-001	Base enclosure
374754-001	Switch cover for use with notebook models with wireless
380030-001	Heat sink module (includes left fan and thermal paste)
374758-001	Modem board
374759-001	USB digital drive board
374760-001	Infrared board with cable
374761-001	Audio/USB board
374762-001	Battery pack, 12-cell, 2.2-AHr
374774-001	Screw Kit
377553-001	HP Dual TV Tuner/Digital Video Recorder
376650-001	802.11a/b/g combination card, for use in the United States
376651-001	Broadcomm Bluetooth wireless card
377213-001	Intel Pentium 4 560 (3.6-GHz) processor, includes thermal pad
375705-001	HP Media Center mini remote control
377555-001	Dual Tuner AC adapter
377556-001	Dual Tuner Coaxial Cable Kit

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Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
377557-001	Dual Tuner Cable Kit
377558-001	Dual Tuner Miscellaneous Cable Kit
377559-001	Dual Tuner Plastic Stand
378521-001	Speakers, left and right
378767-001	4200-rpm, 40-GB hard drive, includes frame and connector
378768-001	AC adapters, 135 watt, 2-wire plug—for use only on notebook models with Intel Pentium 4 530 (3.0-GHz) and Intel Pentium 4 520 (2.8-GHz) processors
378771-001	LED board
380258-001	5400-rpm, 100-GB hard drive, includes frame and connector
380444-001	Switch cover for use with notebook models without wireless
380027-001	Base enclosure right fan
380029-001	Base enclosure middle fan
382079-001	Dual Format, Double Layer
383608-001	8X Dual Format, Light Scribe

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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
- 5.0-mm socket for system board screwlocks
- Flat-bladed screwdriver
- Tool kit—includes connector removal tool, loopback plugs, and case utility tool

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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 notebook, 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 notebook, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the notebook.

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

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4.3 Preventing Damage to Removable Drives

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

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

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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.

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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. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

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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.

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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

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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

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5

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

There are 69 screws and screw locks, in 9 different sizes, that must be removed, replaced, or loosened when servicing the notebook. Make special note of each screw size and location during removal and replacement.

Refer to Appendix C, "Screw Listing." for detailed information on screw sizes, locations, and usage.

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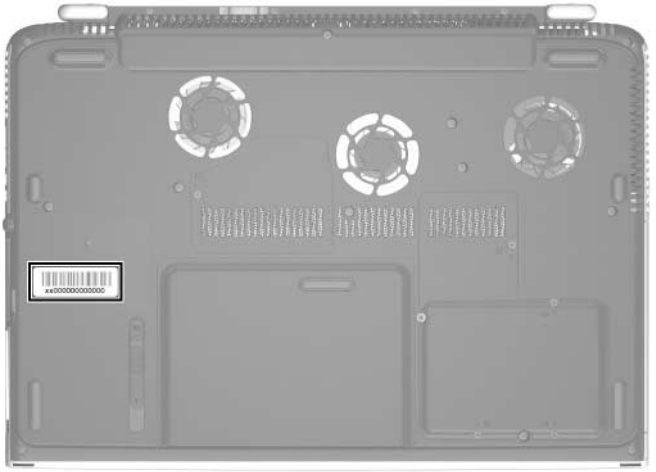
5.1 Serial Number

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



Serial Number Location

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5.2 Disassembly Sequence Chart

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

Disassembly Sequence Chart

Section	Description	# of Screws Removed
5.3	Preparing the notebook for disassembly	
	Battery pack	0
	Hard drive	4 to remove hard drive cover 0 to remove hard drive 4 to disassemble hard drive
5.4	Notebook feet	0
5.5	Optical drive	1
5.6	Memory module	1 loosened
5.7	Mini PCI communications card	4 to remove hard drive cover
	⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your notebook 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 notebook functionality. Then contact Customer Care.	
5.8	Switch cover	5

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Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
5.9	LED board	1
5.10	Keyboard	2
5.11	Display assembly	4
5.12	Top cover	20
5.13	Infrared board	1
5.14	Audio/USB board	1
5.15	Bluetooth board	0
5.16	System board	2 screw locks 7 screws
5.17	Speakers	2 on left speaker 1 on right speaker
5.18	Digital drive board	2
5.19	Base enclosure fans	2 on left fan 4 on right fan
5.20	Modem board	1
5.21	Heat sink module	4
5.22	Processor	0

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5.3 Preparing the Notebook for Disassembly

Before you begin any removal or installation procedures:

1. Shut down the notebook. If you are unsure whether the notebook 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 notebook.
3. Disconnect the power cord.

Battery Pack Spare Part Number Information	
Battery pack, 12-cell, 2.2-AHr	374762-001

4. Remove the battery pack by following these steps:
   a. Turn the notebook upside down with the front panel toward you.

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b. Slide and hold the battery release latch ❶ toward the front of the notebook. (The left edge of the battery pack disengages from the notebook.)

c. Lift the right edge of the battery pack up and swing it to the left ❷.

d. Remove the battery pack.

Removing the Battery Pack

Reverse the above procedure to install the battery pack.

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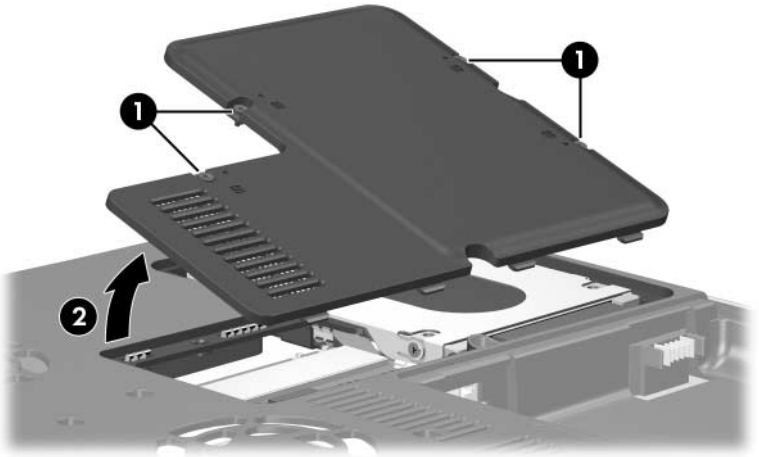
5. Remove the hard drive by following these steps:
   a. Loosen the four PM2.0×5.0 screws ❶ that secure the hard drive cover to the notebook.
   b. Remove the hard drive cover ❷.

The hard drive cover is included in the Miscellaneous Plastics Kit, spare part number 374746-001.



Removing the Hard Drive Cover

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Hard Drive Spare Part Number Information	
7200-rpm	
60-GB	374732-001
5400-rpm	
100-GB	380258-001
80-GB	374731-001
4200-rpm	
100-GB	374730-001
80-GB	374729-001
60-GB	374728-001
40-GB	378767-001

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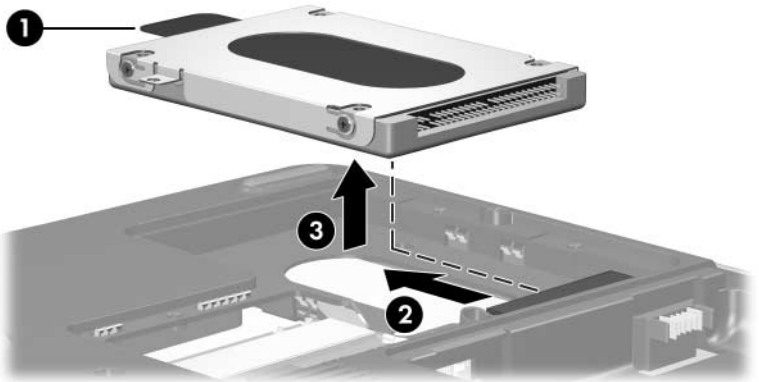
c. Grasp the mylar tab ❶ on the left side of the hard drive and slide the hard drive to the left ❷ to disconnect it from the system board.

d. Remove the hard drive ❸.



Removing the Hard Drive

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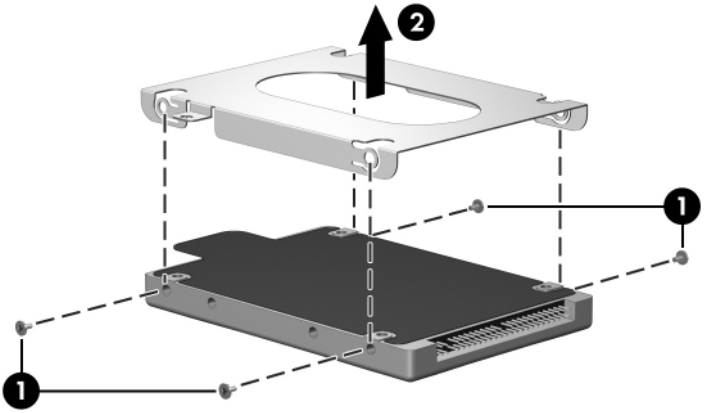
e. Remove the four PM2.5×4.0 screws ❶ that secure the hard drive frame to the hard drive.

f. Lift the frame straight up ❷ to remove if from the hard drive.



Removing the Hard Drive Frame and Connector

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

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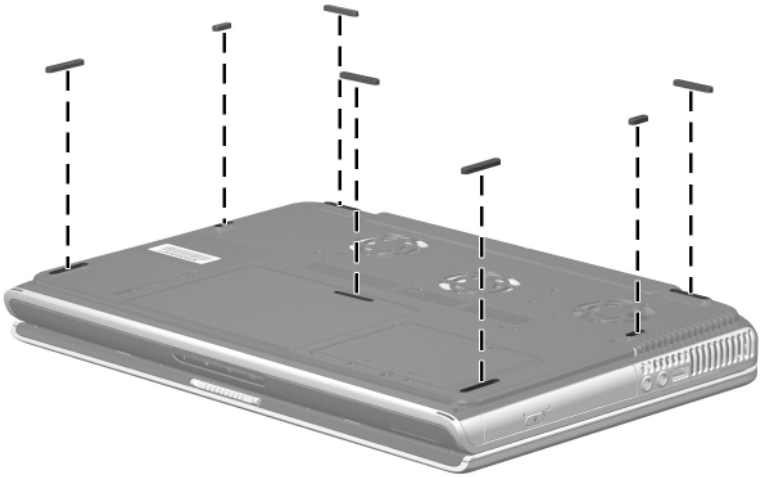
5.4 Notebook Feet

The notebook feet are adhesive-backed rubber pads. The feet are included in the Miscellaneous Plastics Kit, spare part number 374746-001.



Replacing the Notebook Feet

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5.5 Optical Drive

Spare Part Number Information	
Dual Format, Double Layer	382079-001
8X Dual Format, Light Scribe	383608-001
8X DVD±RW/R and CD-RW Combo Drive	374737-001
24X DVD/CD-RW Combo Drive	374735-001

1. Prepare the notebook for disassembly (refer to Section 5.3).

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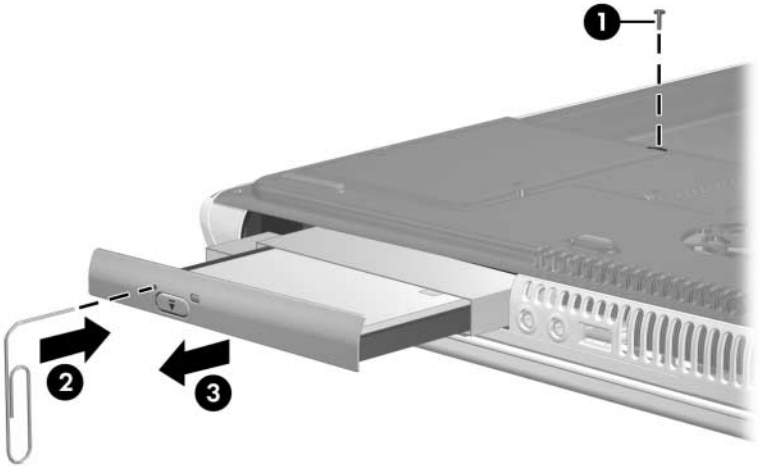
2. Remove the PM2.0×8.0 screw ❶ that secures the optical drive to the notebook.
3. Insert a thin tool, such as a paper clip, into the media tray release hole ❷. (The optical drive media tray releases from the optical drive.)
4. Use the media tray frame to slide the optical drive outward ❸.
5. Remove the optical drive.



Removing the Optical Drive

Reverse the above procedure to install an optical drive.

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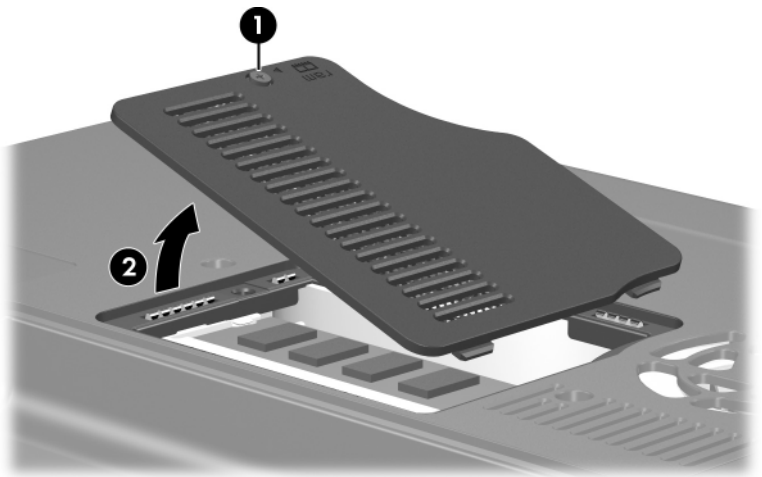
5.6 Memory Module

Spare Part Number Information	
1024-MB, 400 MHz DDR2	374726-001
512-MB, 400 MHz DDR2	374725-001
256-MB, 400 MHz DDR2	374724-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Loosen the PM2.0×5.0 screw ❶ that secures the memory module compartment cover to the notebook.
3. Lift the left edge of the cover up and swing it to the right ❷.
4. Remove the memory module compartment cover.

The memory module compartment cover is included in the Miscellaneous Plastics Kit, spare part number 374746-001.



Removing the Memory Module Compartment Cover

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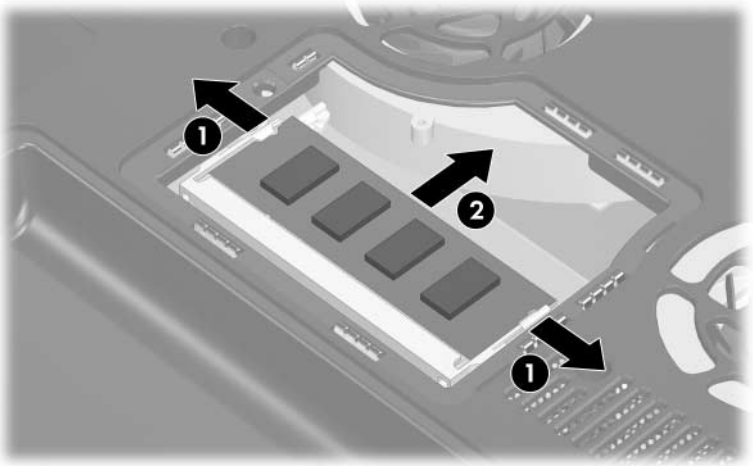
5. Spread the retaining tabs ❶ on each side of the memory module socket to release the memory module board. (The back edge side of the board rises away from the notebook.)
6. Slide the module away from the socket at an angle ❷.
7. Remove the memory module board.

Note that memory modules are slotted to prevent incorrect installation into the memory module socket.



Removing the Memory Module

Reverse the above procedure to install a memory module.

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5.7 Mini PCI Communications Card

Spare Part Number Information	
802.11b/g, for use in most of the world (MOW)	373047-001
802.11b/g, for use in the rest of the world (ROW)	373048-001
802.11a/b/g combination card, for use in the United States	376650-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Remove the hard drive cover (refer to Section 5.3).

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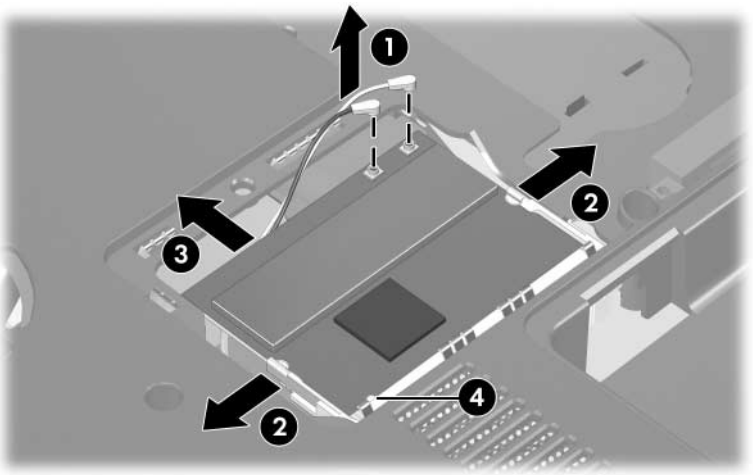
3. Disconnect the auxiliary and main ❶ antenna cables from the Mini PCI communications card.

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

4. Spread the two retaining tabs ❷ on each side of the Mini PCI socket to release the Mini PCI card. (The right edge of the card rises away from the notebook.)
5. Remove the wireless communications card by pulling the board away from the socket at a 45-degree angle ❸.

Note that the Mini PCI communications card is slotted ❹ to prevent incorrect installation.



Removing a Mini PCI Communications Card

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

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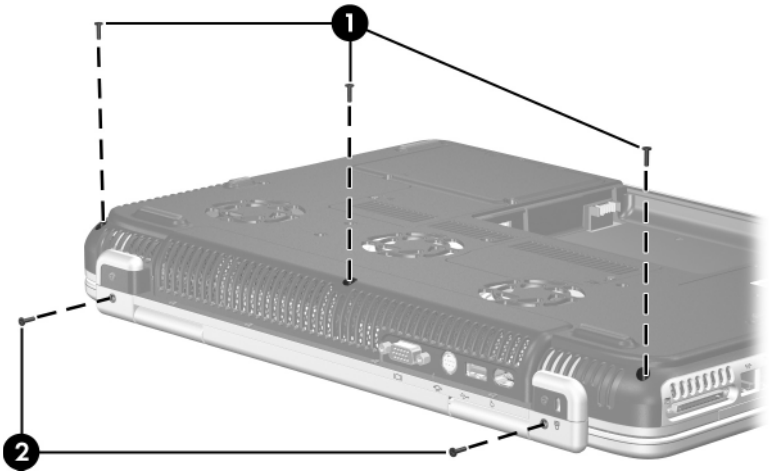
5.8 Switch Cover

Spare Part Number Information	
For use on notebook models with wireless	374754-001
For use on notebook models without wireless	380444-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Position the notebook with the rear panel toward you.
3. Remove the three PM2.0×8.0 screws ❶ from the bottom of the notebook that secure the switch cover to the notebook.
4. Remove the two PM2.0×8.0 screws ❷ from the notebook rear panel that secure the switch cover to the notebook.



Removing the Switch Cover Screws

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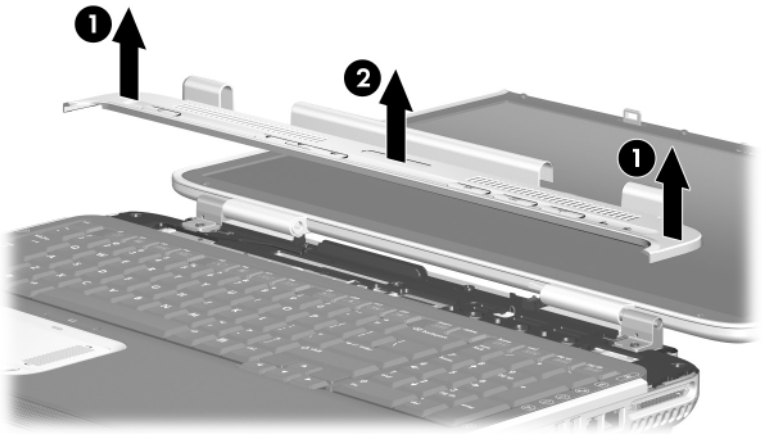
5. Turn the notebook display-side up with the front panel toward you.
6. Open the notebook as far as possible.
7. Lift up the left and right sides of the switch cover ❶ to detach it from the notebook.
8. Remove the switch cover ❷.



Removing the Switch Cover

Reverse the above procedure to install the switch cover.

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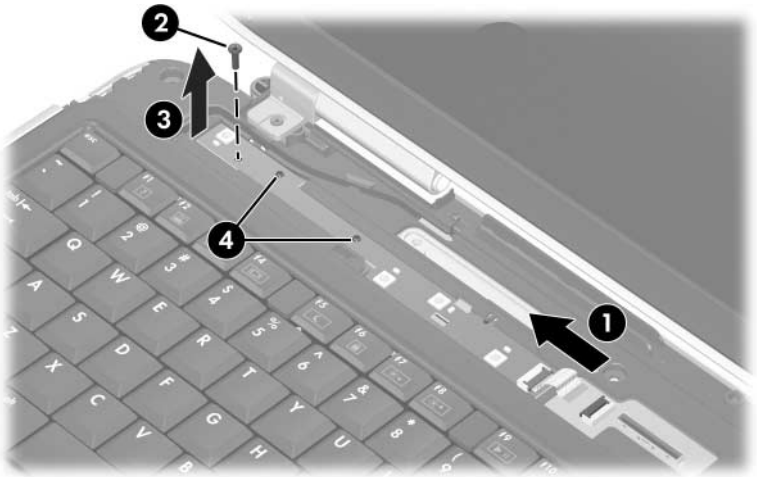
5.9 LED Board

Spare Part Number Information	
LED board (includes cable)	378771-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Remove the switch cover (refer to Section 5.8).
3. Release the zero insertion force (ZIF) connector ❶ to which the LED board cable is connected and disconnect the cable.
4. Remove the PM2.0×4.0 screw ❷ that secures the LED board to the top cover.
5. Lift the left side of the LED board ❸ until the board disengages from the alignment pins ❹ on the top cover.



Releasing the LED Board

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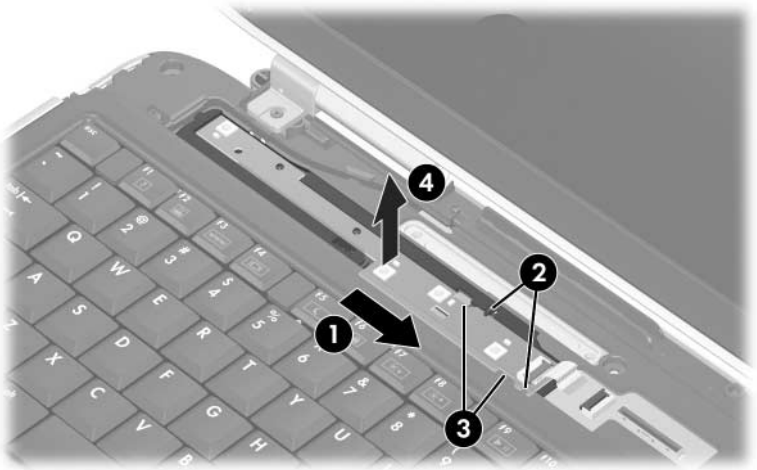
6. Slide the LED board to the right ❶ until the tabs ❷ on the top cover are aligned with the notches ❸ on the LED board.
7. Remove the LED board ❹.



Removing the LED Board

Reverse the above procedure to install the LED board.

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5.10 Keyboard

Spare Part Number Information			
Belgium	374741-181	Portugal	374741-131
Denmark	374741-081	Saudi Arabia	374741-171
France	374741-051	Spain	374741-071
French Canada	374741-121	Sweden/Finland	374741-101
Germany	374741-041	Switzerland	374741-111
Greece	374741-151	United Kingdom	374741-031
International	374741-B31	Asia Pacific, Australia, Canada, Hong Kong, People's Republic of China, and the United States	374741-001
Italy	374741-061		
Latin America	374741-161		
Norway	374741-091		

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Remove the switch cover (refer to Section 5.8).
3. Turn the notebook upside down with the front panel toward you.

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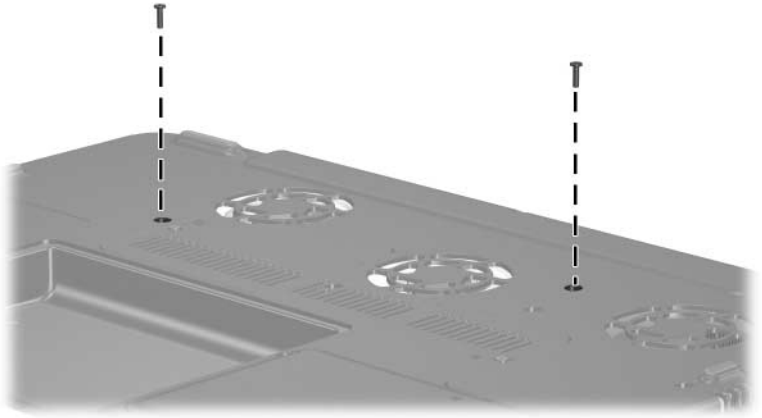
4. Remove the two PM2.0×8.0 screws that secure the keyboard to the notebook.



Removing the Keyboard Screws

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5. Turn the notebook display-side up with the front panel toward you.
6. Open the notebook as far as possible.
7. Use a flat-bladed tool to push back the four keyboard retention tabs. The tabs are located above the **f1** and **f2** keys, above the **f6** and **f7** keys, above the **f11** and **f12** keys, and above the **end** and **pg up** keys.

Releasing the Keyboard

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

Removing the Keyboard

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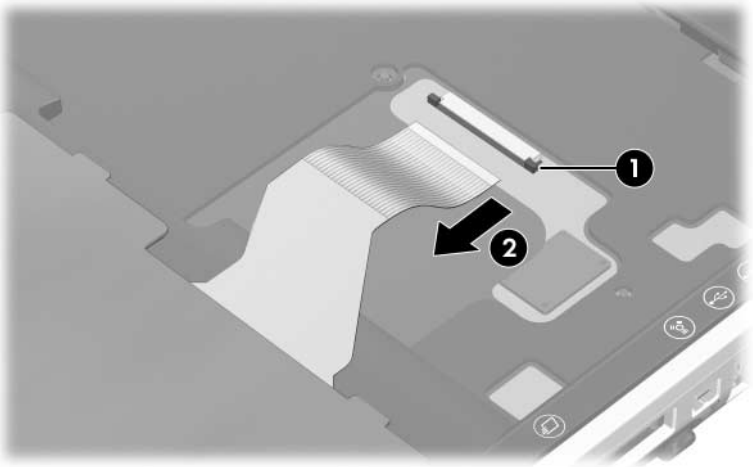
9. Release the zero insertion force (ZIF) connector ❶ to which the keyboard cable is connected and disconnect the keyboard cable ❷ from the system board.
10. Remove the keyboard.



Removing the Keyboard

Reverse the above procedure to install the keyboard.

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5.11 Display Assembly

Spare Part Number Information	
17.0-inch, WSXGA+WVA with Brightview	374723-001
17.0-inch, WXGA+WVA with Brightview	374722-001
17.0-inch, WXGA+WVA	374721-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)

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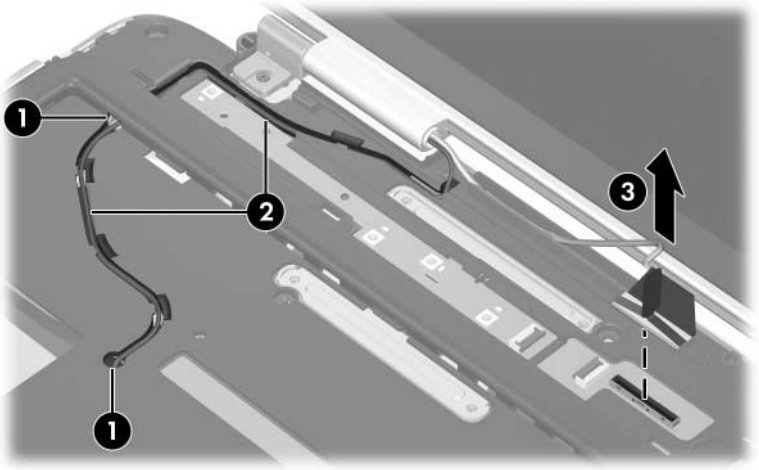
2. Remove the wireless antenna cables from the top cover holes ❶ and from the routing channels ❷ through which the cables are routed.
3. Disconnect the display cable ❸ from the system board.



Disconnecting the Display Cables

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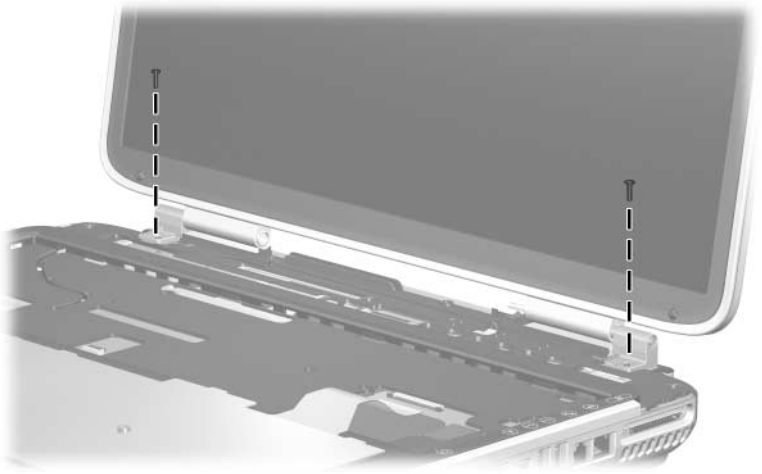
4. Remove the two PM2.0×8.0 screws that secure the display assembly to the notebook.



Removing the Display Screws

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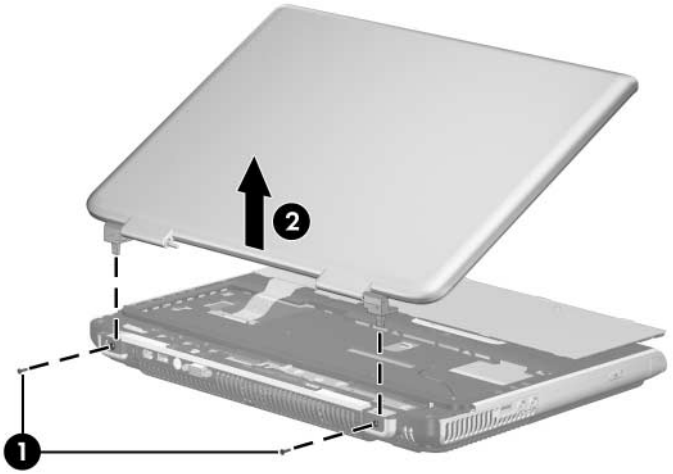
5. Position the notebook with the rear panel toward you.

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 notebook components.

6. Remove the two PM2.0×8.0 screws ❶ that secure the display assembly to the notebook.
7. Lift the display assembly straight up to remove it ❷.



Removing the Display Assembly

Reverse the above procedure to install the display assembly.

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5.12 Top Cover

Spare Part Number Information	
Top cover (includes TouchPad)	374750-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
2. Turn the notebook upside down with the rear panel toward you.

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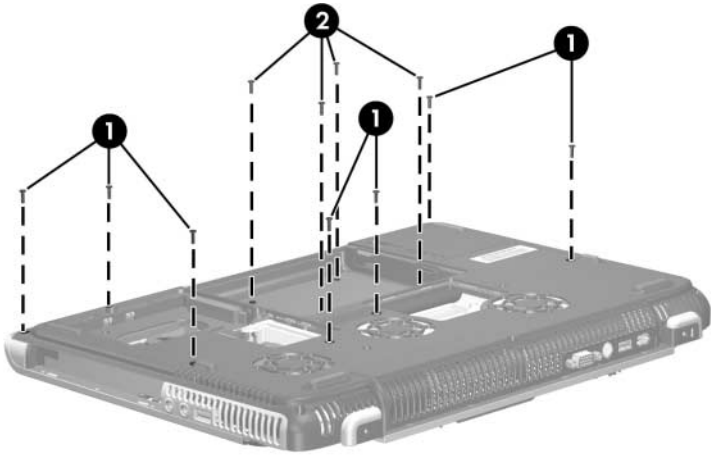
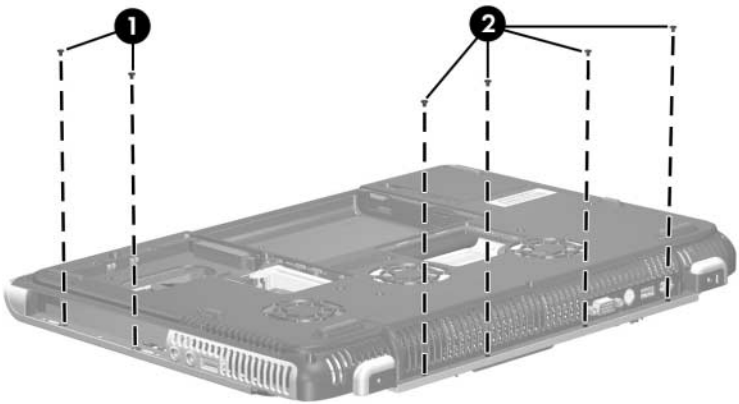
3. Remove the seven PM2.0×8.0 screws ❶ on the surface of the base enclosure and the four PM2.0×8.0 screws ❷ in the battery bay.



Removing the Top Cover Screws, Part 1

4. Remove the two PM2.0×3.0 screws ❶ in the optical drive bay and the four PM2.0×3.0 screws ❷ on the rear edge of the base enclosure.



Removing the Top Cover Screws, Part 2

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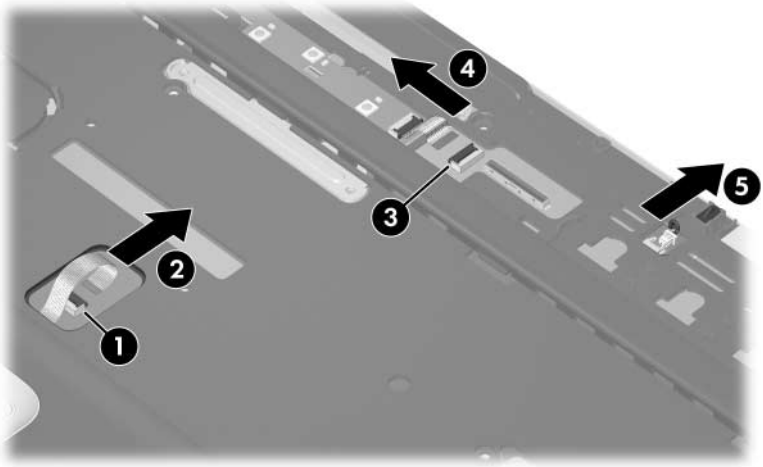
5. Turn the notebook top-side up with the front panel toward you.
6. Release the ZIF connector ❶ to which the TouchPad cable is connected and disconnect the TouchPad cable ❷ from the system board.
7. Release the ZIF connector ❸ to which the LED/button board cable is connected and disconnect the LED/button board cable ❹ from the system board.
8. Disconnect the display switch module cable ❺ from the system board.



Disconnecting the TouchPad and LED Board Cables

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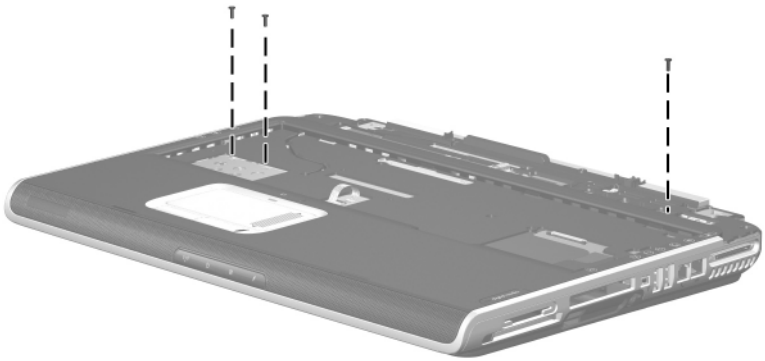
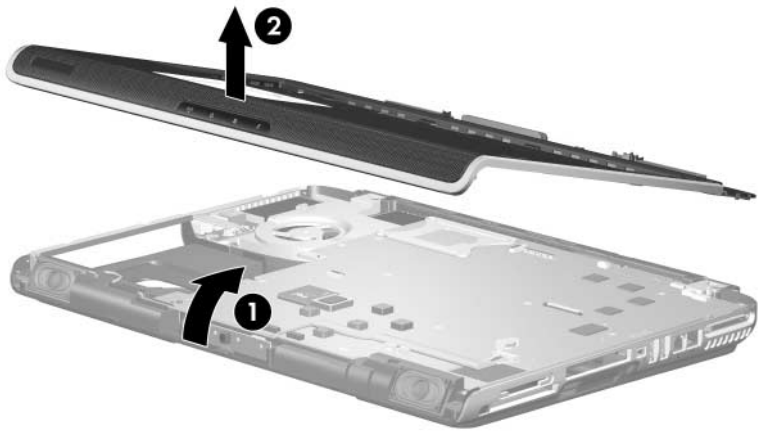
9. Remove the three PM2.0×8.0 screws that secure the base enclosure to the notebook.



Removing the Top Cover Screws

10. Swing the front edge of the top cover up and back ❶ until it detaches from the notebook.
11. Lift the top cover straight up ❷ to remove it.



Removing the Top Cover

Reverse the above procedure to install the top cover.

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5.13 Infrared Board

Spare Part Number Information	
Infrared board with cable	374760-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)

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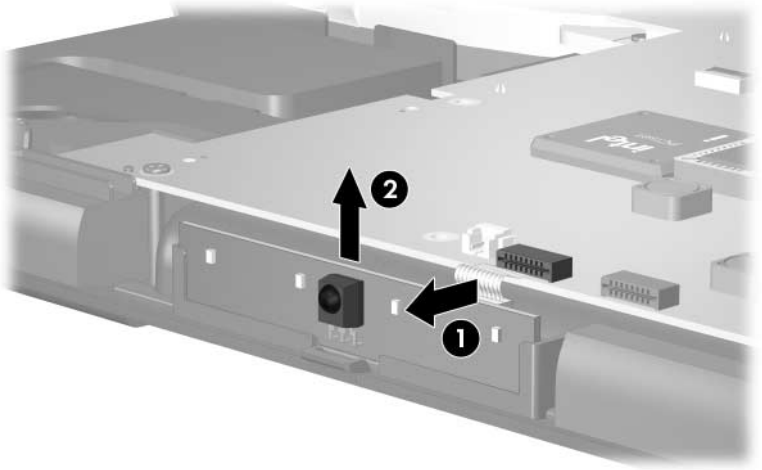
2. Disconnect the infrared board cable ❶ from the low insertion force (LIF) connector on the system board.
3. Remove the infrared board ❷ from the clip in the base enclosure.



Removing the Infrared Board

Reverse the above procedure to install the infrared board.

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5.14 Audio/USB Board

Spare Part Number Information	
Audio/USB board (includes cable)	374761-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. Infrared board (refer to Section 5.13)

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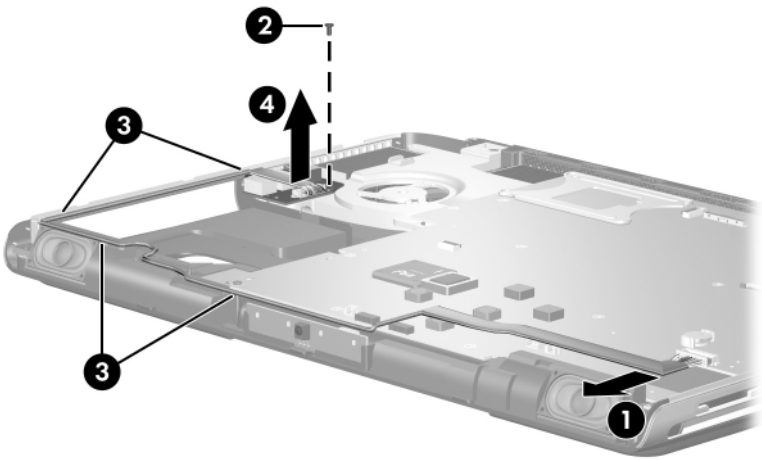
2. Disconnect the audio/USB board cable ❶ from the system board.
3. Remove the PM2.0×6.0 screw ❷ that secures the audio/USB board to the base enclosure.
4. Remove the audio/USB board cable from the base enclosure clips ❸ through which it is routed.
5. Remove the audio/USB board ❹.



Removing the Audio/USB Board

Reverse the above procedure to install the audio/USB board.

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5.15 Bluetooth Board

Spare Part Number Information	
Broadcomm Bluetooth wireless card	376651-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)

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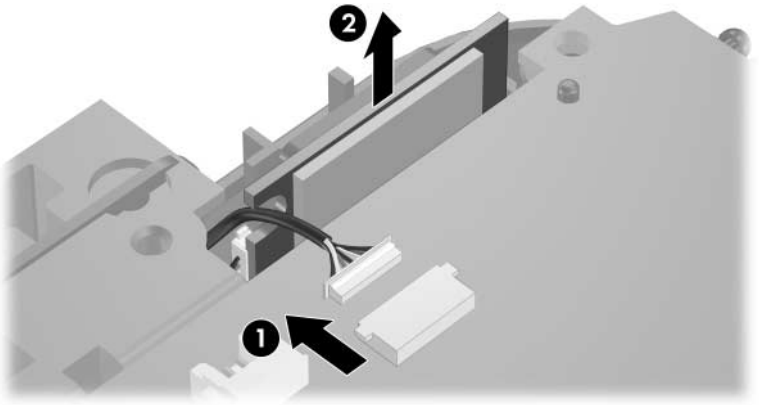
2. Disconnect the Bluetooth board cable ❶ from the system board.
3. Remove the Bluetooth board ❷ from the clip in the base enclosure.



Removing the Bluetooth Board

Reverse the above procedure to install the Bluetooth board.

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5.16 System Board

Spare Part Number Information	
M24P with 256 MB RAM (includes RTC battery)	374711-001
M24P with 128 MB RAM (includes RTC battery)	374709-001
M22P with 64 MB RAM (includes RTC battery)	374707-001

All system board spares kits include a disk cell RTC battery.

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

- Memory modules (refer to Section 5.6)
- Mini PCI communications card (refer to Section 5.7)
- Modem board (refer to Section 5.20)
- Heat sink module (refer to Section 5.21)
- Processor (refer to Section 5.22)

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Switch cover (refer to Section 5.8)
   c. Keyboard (refer to Section 5.10)
   d. Display assembly (refer to Section 5.11)
   e. Top cover (refer to Section 5.12)
2. Turn the notebook upside down with the front toward you.

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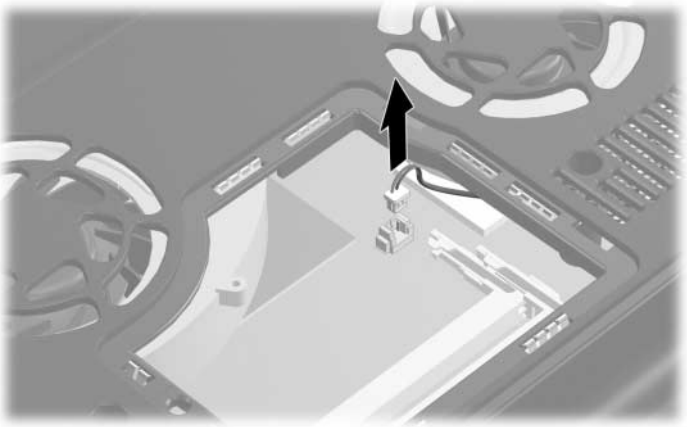
3. Disconnect the fan cable from the system board through the memory module compartment.



Disconnecting the Fan Cables

4. Turn the notebook top-side up with the front panel toward you.

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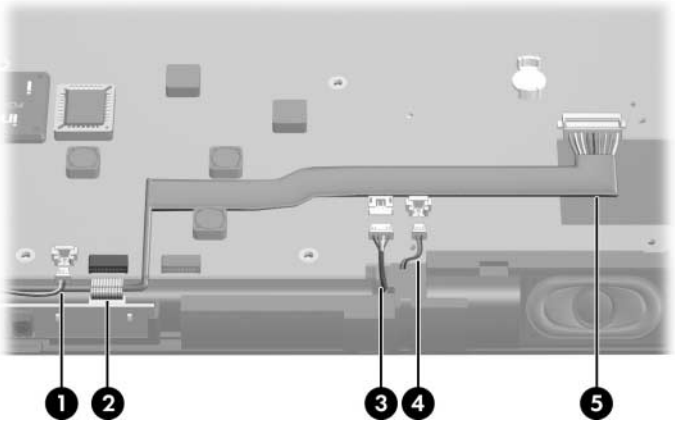
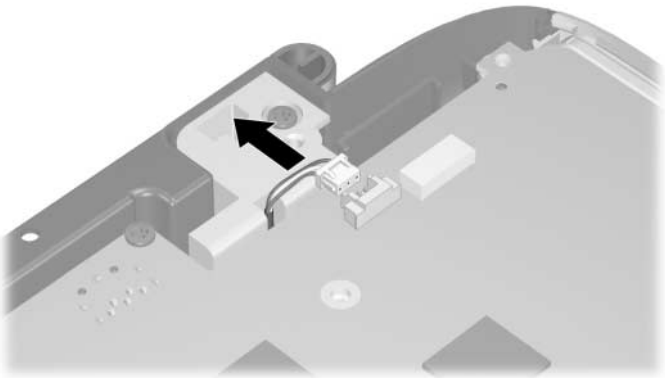
5. Disconnect the following cables from the system board:
   - ❶ Left speaker cable
   - ❷ Front panel LED board cable
   - ❸ Digital drive board cable
   - ❹ Right speaker cable
   - ❺ Audio/USB board cable



Disconnecting the System Board Cables, Part 1

6. Disconnect the fan cable from the system board.



Disconnecting the System Board Cables, Part 2

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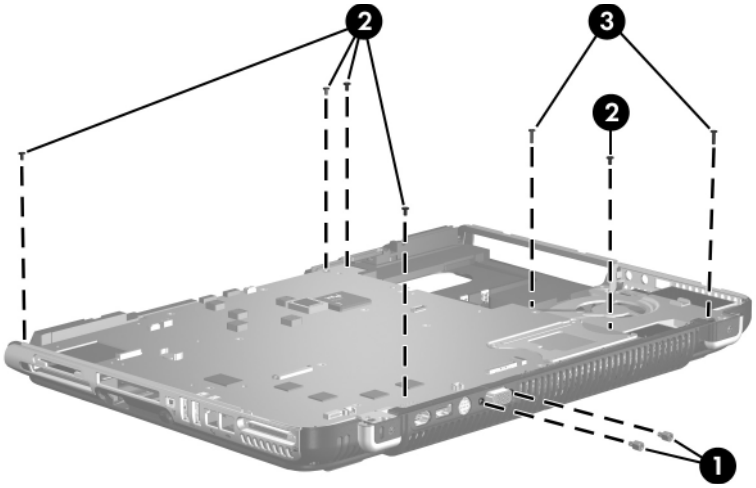
7. Position the notebook with the rear panel toward you.
8. Remove the following:
   - ❶ Two HM5.0×9.0 screw locks on each side of the external monitor connector
   - ❷ Five PM2.0×4.0 screws that secure the system board to the base enclosure
   - ❸ Two PM2.0×8.0 screws that secure the heat sink module to the base enclosure



Removing the System Board Screws and Screw Locks

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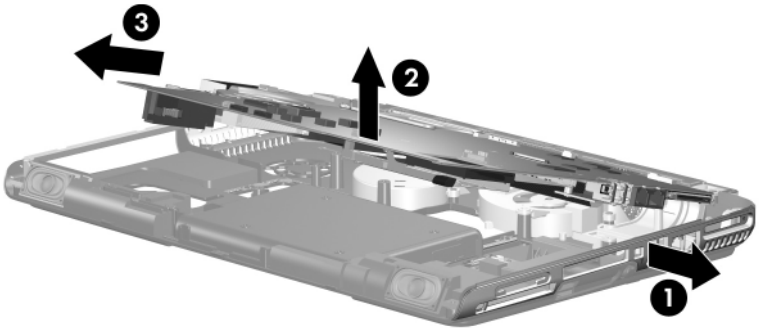
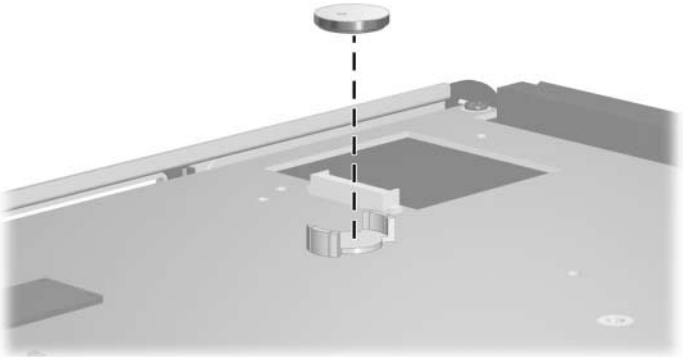
9. Position the notebook with the front panel toward you.
10. Flex the right rear edge of the base enclosure outward until the expansion port 2 is clear of the base enclosure ❶.
11. Lift the front edge of the system board until it clears the base enclosure ❷.
12. Slide the system board forward at an angle and remove it ❸.



Removing the System Board

13. If necessary, remove the RTC battery from the socket on the system board.



Removing the RTC Battery

Reverse the above procedures to install the system board and the RTC battery.

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5.17 Speakers

Spare Part Number Information	
Left and right speakers	378521-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment cover (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. System board (refer to Section 5.16)
2. Position the notebook with the rear panel toward you.

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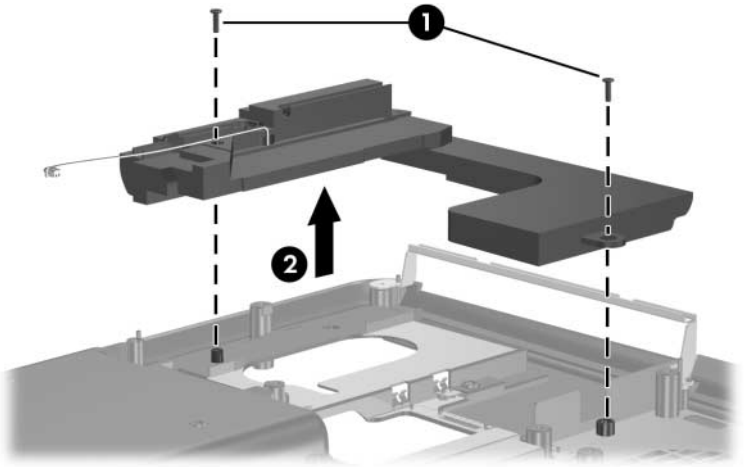
3. Remove the two PM2.0×4.0 ❶ screws that secure the left speaker to the base enclosure.
4. Remove the left speaker ❷.



Removing the Left Speaker

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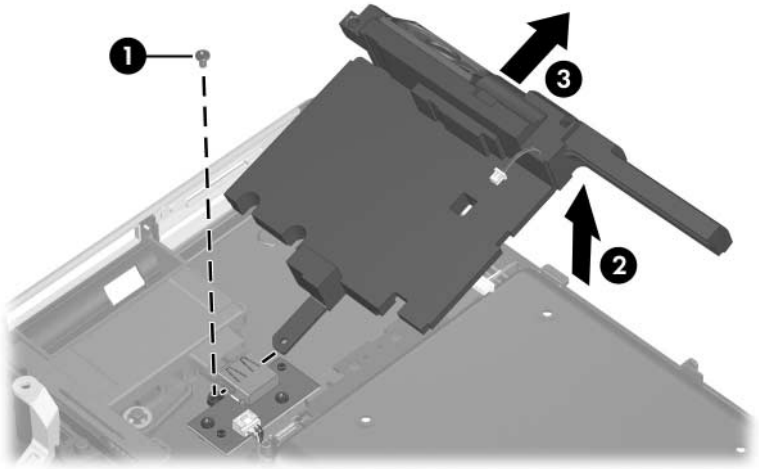
5. Remove the PM1.5×3.5 screw ❶ that secures the right speaker to the base enclosure.
6. Lift the right side of the right speaker ❷, then slide the speaker to the right to remove it ❸.



Removing the Right Speaker

Reverse the above procedure to install the speakers.

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5.18 USB Digital Drive Board

Spare Part Number Information	
USB digital drive board	374759-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment cover (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. System board (refer to Section 5.16)

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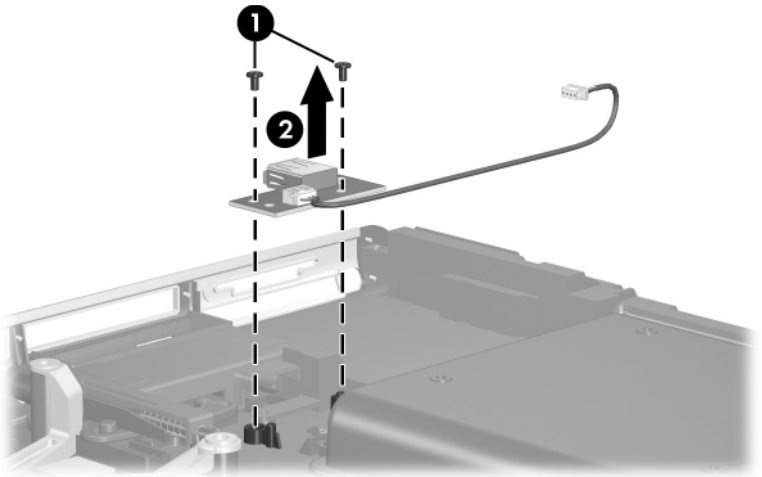
2. Remove the two PM2.0×4.0 screws ❶ that secure the digital drive board to the base enclosure.
3. Remove the digital drive board ❷.



Removing the Digital Drive Board

Reverse the above procedure to install the digital drive board.

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5.19 Base Enclosure Fans

Spare Part Number Information	
Base enclosure middle fan	380029-001
Base enclosure right fan	380027-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment cover (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. System board (refer to Section 5.16)

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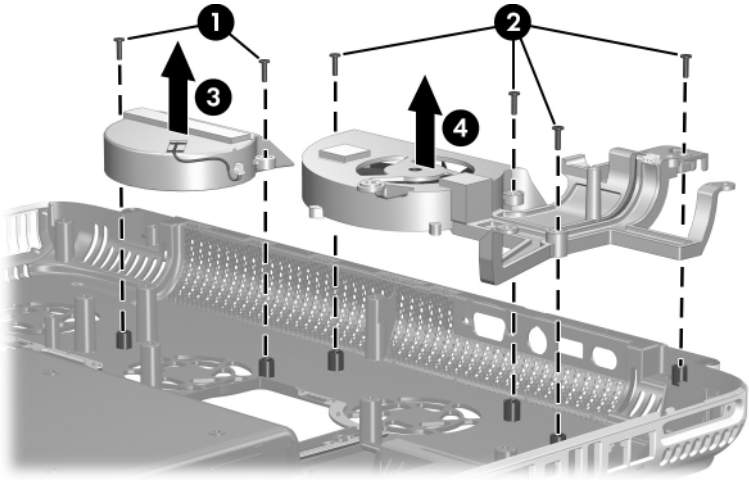
2. Remove the two PM2.0×8.0 screws ❶ that secure the middle fan to the base enclosure.
3. Remove the four PM2.0×8.0 screws ❷ that secure the right fan to the base enclosure.
4. Remove the base enclosure middle ❸ and right fans ❹.



Removing the Base Enclosure Fans

Reverse the above procedure to install the base enclosure fans.

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5.20 Modem Board

Spare Part Number Information	
Modem board	374758-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment cover (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. System board (refer to Section 5.16)
2. Turn the system board upside down with the external monitor connector toward you.

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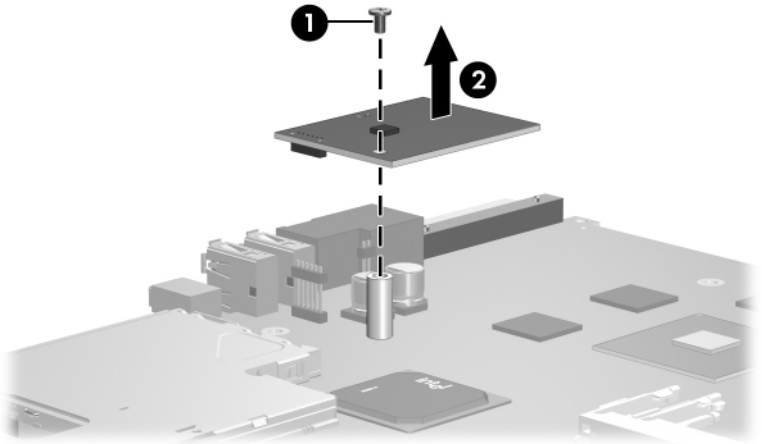
3. Remove the PM2.0×3.0 screw ❶ that secures the modem board to the system board.
4. Remove the modem board ❷.



Removing the Modem Board

Reverse the above procedure to install the modem board.

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5.21 Heat Sink Module

Spare Part Number Information	
Heat sink module (includes left fan and thermal paste)	380030-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment cover (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. System board (refer to Section 5.16)

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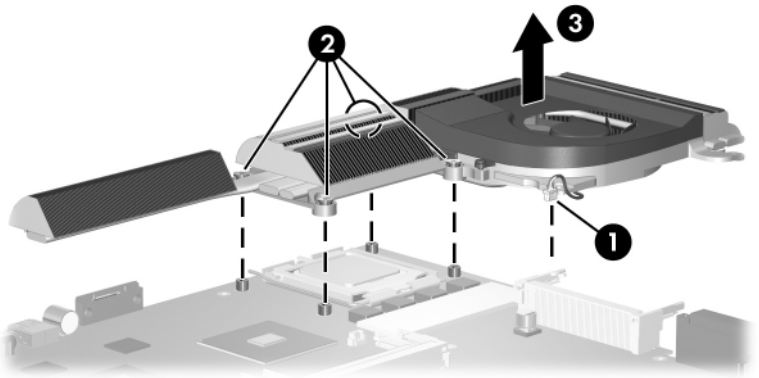
2. Disconnect the fan cable from the system board ❶.
3. According to the 1, 2, 3, 4 sequence stamped into the heat sink module, loosen the four PM2.0×12.0 spring-loaded shoulder screws ❷ that secure the heat sink module to the system board.
4. Lift the heat sink module and remove it ❸.

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



Removing the Heat Sink Module

Reverse the above procedure to install the heat sink module.

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5.22 Processor

Spare Part Number Information	
Intel Pentium 4 560 (3.6-GHz)	377213-001
Intel Pentium 4 550 (3.4-GHz)	374718-001
Intel Pentium 4 540 (3.2-GHz)	374717-001
Intel Pentium 4 530 (3.0-GHz)	374716-001
Intel Pentium 4 520 (2.8-GHz)	374715-001

1. Prepare the notebook for disassembly (refer to Section 5.3) and remove the following components:
   a. Optical drive (refer to Section 5.5)
   b. Memory module compartment cover (refer to Section 5.6)
   c. Mini PCI compartment cover (refer to Section 5.7)
   d. Switch cover (refer to Section 5.8)
   e. Keyboard (refer to Section 5.10)
   f. Display assembly (refer to Section 5.11)
   g. Top cover (refer to Section 5.12)
   h. System board (refer to Section 5.16)
   i. Heat sink module (refer to Section 5.21)

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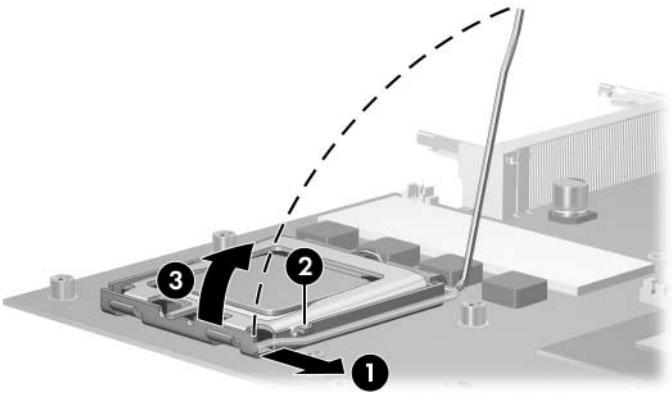
CAUTION: The processor release arm is under spring tension. Do not let go of the arm when removing or installing the processor. Failure to follow this caution can result in damage to the processor and system board.

2. Slide the tip of the processor release arm to the right ❶ until it clears the stop on the socket ❷.
3. Manually swing the arm up and back as far as it will freely go ❸.



Disengaging the Processor Release Arm

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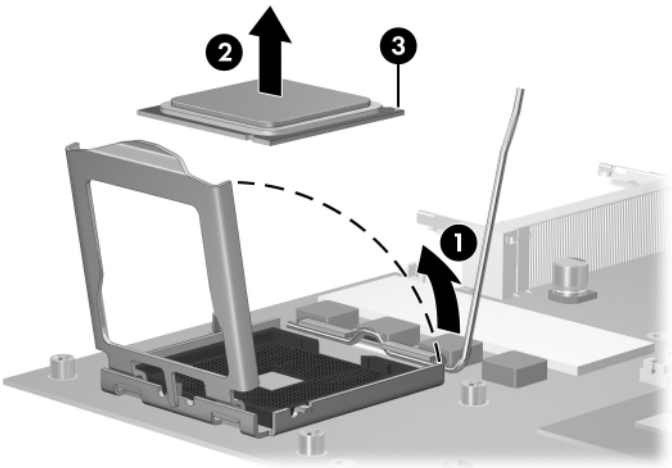
4. Swing the processor socket cover up and forward ❶.
5. Lift the processor straight up to remove it ❷.

The gold triangle ❸ on the processor should be aligned in the front right corner when you install the processor.



Removing the Processor

Reverse the above procedure to install the processor.

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6

Specifications

This chapter provides physical and performance specifications.

Table 6-1

Notebook

Dimensions		
Height		
Front	4.51 cm	1.78 in
Rear	4.97 cm	1.96 in
Width	39.79 cm	15.70 in
Depth	28.81 cm	11.34 in
Weight	4.22 kg	9.3 lb
Stand-alone power requirements		
Operating voltage	19.0 V dc @ 7.1 A/9.5 A – 135 W/180 W	
Operating current	7.1 A/9.5 A	
Temperature		
Operating	10°C to 35°C	5°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%

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Table 6-1

Notebook *(Continued)*

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 notebook operates well within this range of temperatures.

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Table 6-2

17.0-inch, WSXGA+WVA Brightview Display

Dimensions		
Height	23.00 cm	9.06 in
Width	36.80 cm	14.49 in
Diagonal	43.40 cm	17.09 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.197 × 0.197 mm	
Format	1680 × 1050	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4 W	
Viewing angle	+/-65° horizontal, +/-50° vertical typical	

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Table 6-3

17.0-inch, WXGA+WVA Brightview Display

Dimensions		
Height	23.00 cm	9.06 in
Width	36.80 cm	14.49 in
Diagonal	43.40 cm	17.09 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.259 × 0.259 mm	
Format	1280 × 800	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4 W	
Viewing angle	+/-40° horizontal, +20/-40° vertical typical	

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Table 6-4

Hard Drives, Part 1

	100-GB*	100-GB*	80-GB*	80-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	99 g	102 g	99 g	99 g
Interface type	ATA-5	ATA-5	ATA-5	ATA-5
Transfer rate				
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)				
Single track	3 ms	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms	24 ms
Logical blocks†	195,364,233	195,364,233	156,301,488	156,301,488
Disk rotational speed	5400 rpm	4200 rpm	5400 rpm	4200 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.

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Table 6-5

Hard Drives, Part 2

	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	102 g	99 g	99 g
Interface type	ATA-5	ATA-5	ATA-5
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	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms
Logical blocks†	117,210,240	117,210,240	78,140,160
Disk rotational speed	7200 rpm	4200 rpm	4200 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.

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Table 6-6

Primary 12-cell, Li-Ion Battery Pack

Dimensions		
Height	2.00 cm	0.79 in
Width	15.80 cm	6.22 in
Depth	11.90 cm	4.69 in
Weight	0.34 kg	0.75 lb
Energy		
Voltage	148. V	
Amp-hour capacity	6.6 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

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Table 6-7

24X DVD/CD-RW Combo Drive

Applicable disk	**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)	
Disk diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	

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Table 6-7

24X DVD/CD-RW Combo Drive *(Continued)*

Disk 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	

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Table 6-8

8X DVD±RW/R and CD-RW Combo Drive

Applicable disk	**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)	
Disk diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	

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Table 6-8

8X DVD±RW/R and CD-RW Combo Drive *(Continued)*

Disk 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	

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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.

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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

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

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Table 6-10

System Interrupts *(Continued)*

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

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.

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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

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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

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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)

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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

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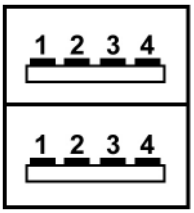
A

Connector Pin Assignments

Table A-1

Universal Serial Bus



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

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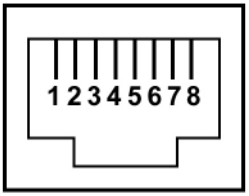
Table A-2

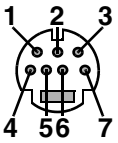
RJ-45 (Network)



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

Table A-3

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		

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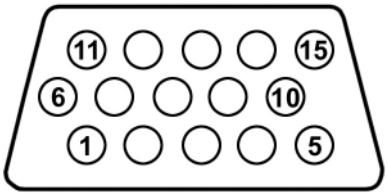
Table A-4

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		

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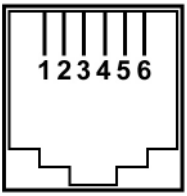
Table A-5

RJ-11 (Modem)



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

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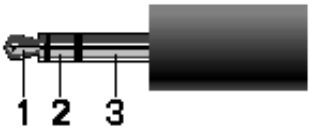
Table A-6

Audio-In (Microphone)



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

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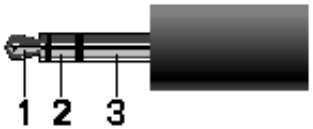
Table A-7

Audio-Out (Headphone)



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

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B

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the notebook 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 notebook 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 notebook is used.

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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 notebook.

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Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country	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
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1

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

Country	Accredited Agency	Applicable Note Number
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.

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C

Screw Listing

This appendix provides specification and reference information for the screws used in the notebook. All screws listed in this appendix are available in the Miscellaneous Screw Kit, spare part number 374744-001.

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Table C-1

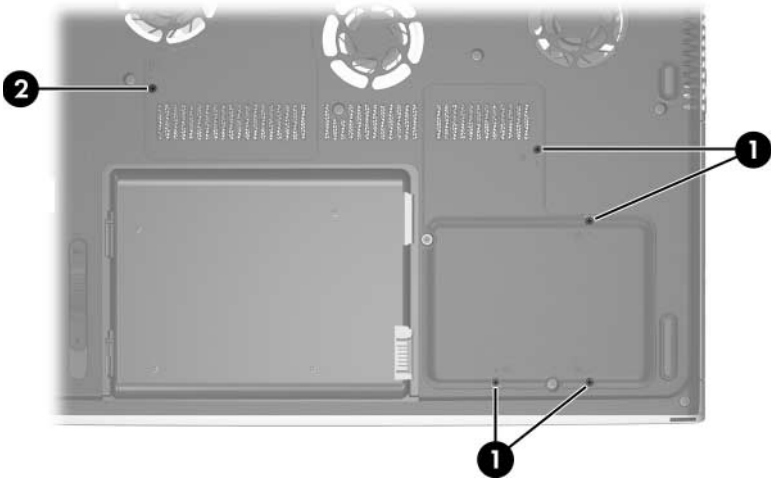
Phillips PM2.0×5.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	5	5.0 mm	2.0 mm	4.0 mm

Where used:

❶ Four screws that secure the hard drive cover to the notebook (screws are captured on the cover by C clips; documented in Section 5.3)

❷ One screw that secures the memory module compartment cover to the notebook (screw is captured on the cover by a C clip; documented in Section 5.6)



Phillips M2.0×5.0 Screw Locations

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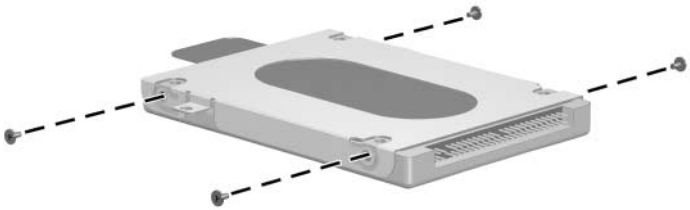
Table C-2

Phillips PM2.5×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	4.0 mm	2.5 mm	4.0 mm

Where used:

Four screws that secure the hard drive frame to the hard drive (documented in Section 5.3)



Phillips M2.5×4.0 Screw Locations

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Table C-3

Phillips PM2.0×8.0 Screw

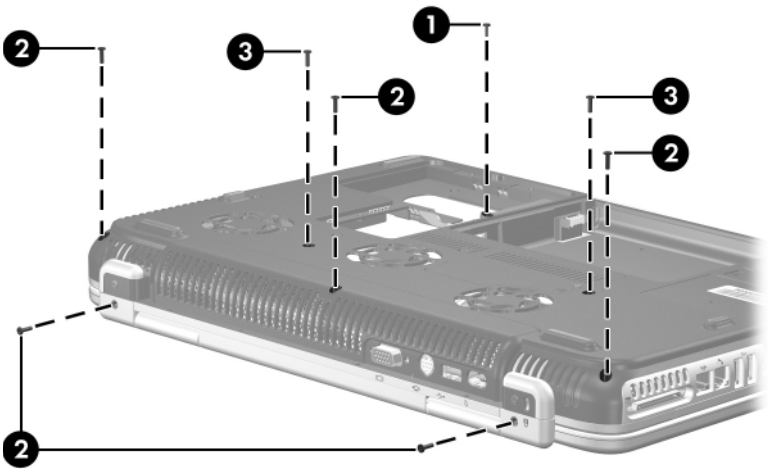
mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

❶ One screw that secures the optical drive to the notebook (documented in Section 5.5)

❷ Five screws that secure the switch cover to the notebook (documented in Section 5.8)

❸ Two screws that secure the keyboard to the notebook (documented in Section 5.10)



Phillips M2.0×8.0 Screw Location

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Table C-3

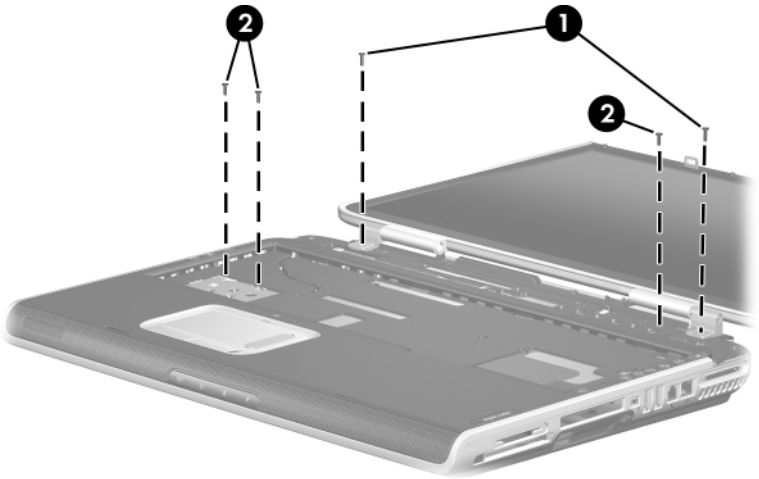
Phillips PM2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

❶ Two screws that secure the display assembly to the notebook (documented in Section 5.11)

❷ Three screws that secure the top cover to the notebook (documented in Section 5.12)



Phillips M2.0×8.0 Screw Locations

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Table C-3

Phillips PM2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

Two screws that secure the display assembly to the notebook (documented in Section 5.11)

Phillips M2.0×8.0 Screw Locations

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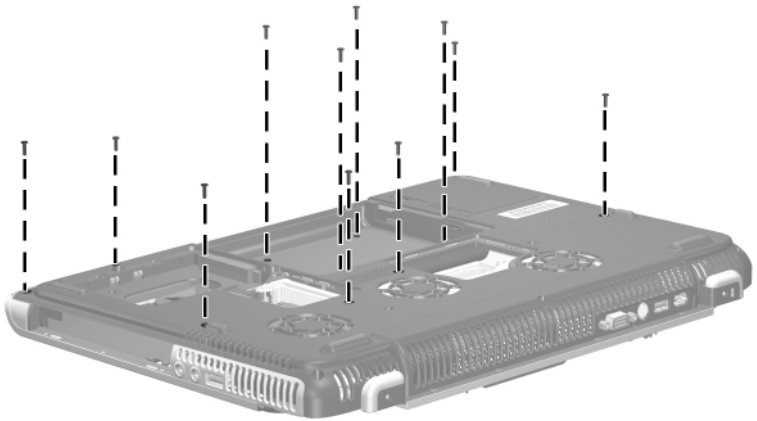
Table C-3

Phillips PM2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

Eleven screws that secure the top cover to the notebook (documented in Section 5.12)



Phillips M2.0×8.0 Screw Locations

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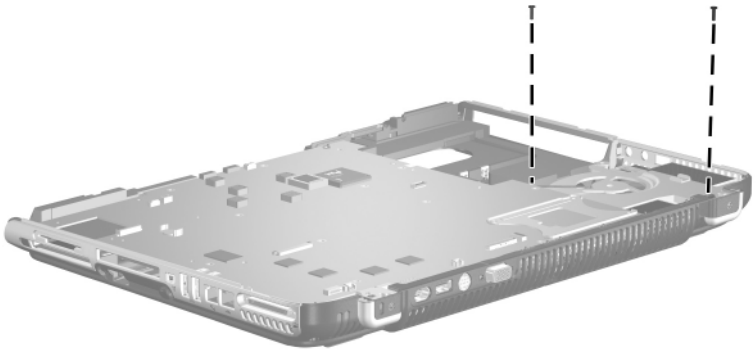
Table C-3

Phillips PM2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

Two screws that secure the heat sink module to the notebook (documented in Section 5.21)



Phillips M2.0×8.0 Screw Locations

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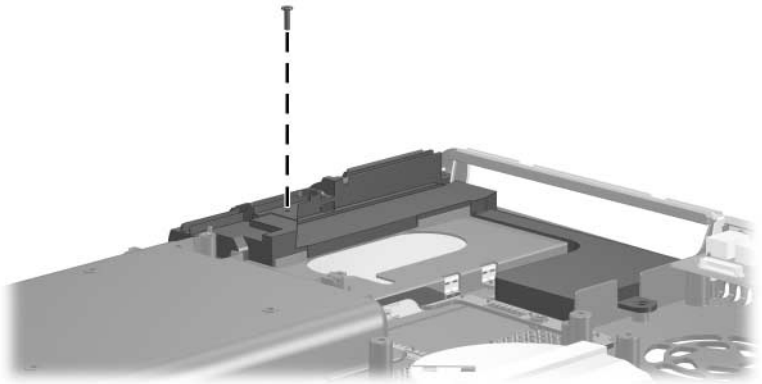
Table C-3

Phillips PM2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the left speaker to the notebook (documented in Section 5.17)



Phillips M2.0×8.0 Screw Location

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Table C-3

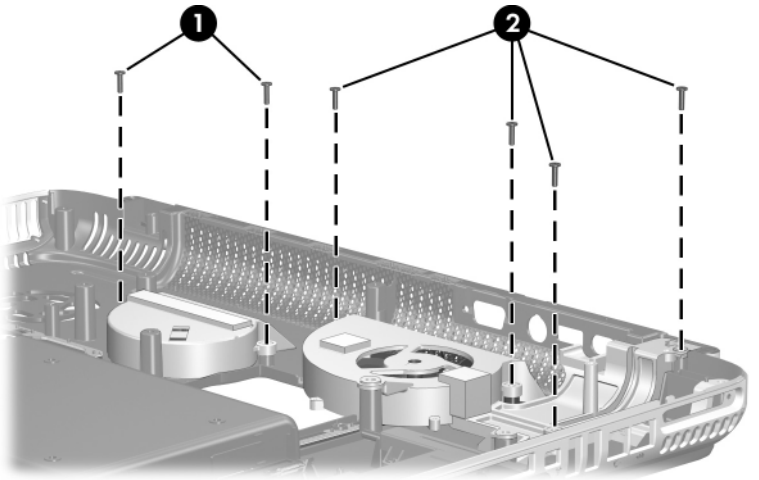
Phillips PM2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	35	8.0 mm	2.0 mm	4.0 mm

Where used:

❶ Two screws that secure the base enclosure left fan to the notebook (documented in Section 5.19)

❷ Four screws that secure the base enclosure right fan to the notebook (documented in Section 5.19)



Phillips M2.0×8.0 Screw Locations

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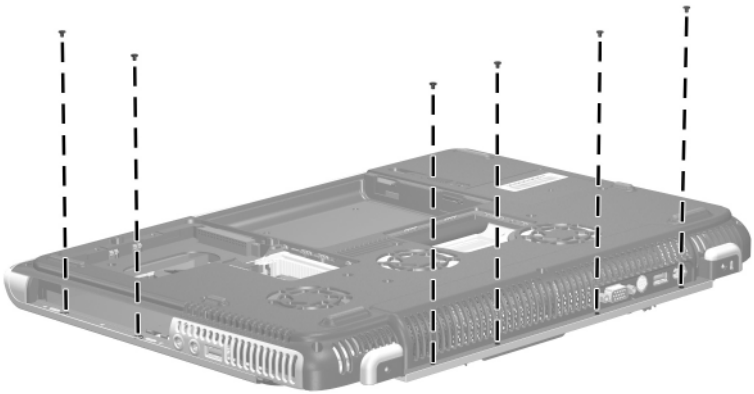
Table C-4

Phillips PM2.0×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	7	3.0 mm	2.0 mm	4.0 mm

Where used:

Six screws that secure the top cover to the notebook (documented in Section 5.12)



Phillips M2.0×3.0 Screw Locations

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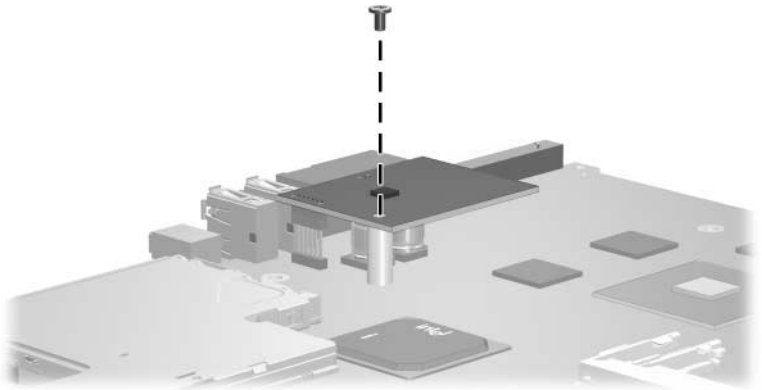
Table C-4

Phillips PM2.0×3.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	7	3.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the modem board to the notebook (documented in Section 5.20)



Phillips M2.0×3.0 Screw Location

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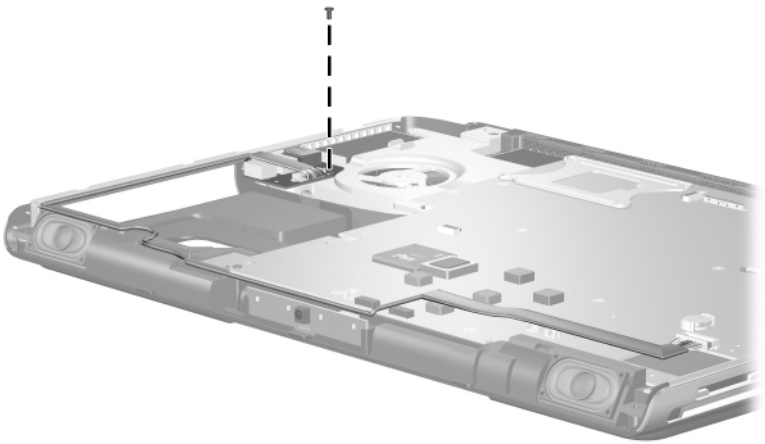
Table C-5

Phillips PM2.0×6.0 Screw

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

Where used:

One screw that secures the audio/USB board to the notebook (documented in Section 5.14)



Phillips M2.0×6.0 Screw Location

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Table C-6

Hex Socket HM5.0×9.0 Screw Lock

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	9.0 mm	2.5 mm	5.0 mm

Where used:

Two screw locks that secure the system board to the notebook (documented in Section 5.16)

Hex Socket HM5.0×9.0 Screw Lock Locations

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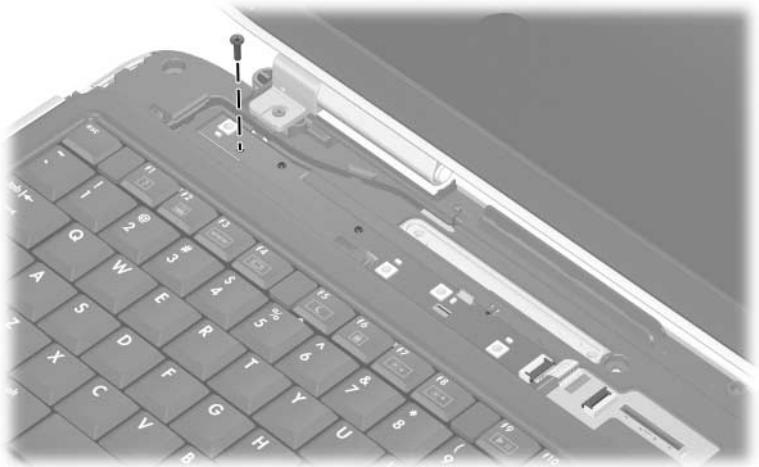
Table C-7

Phillips PM2.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	4.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the LED board to the notebook (documented in Section 5.9)



Phillips M2.0×4.0 Screw Locations

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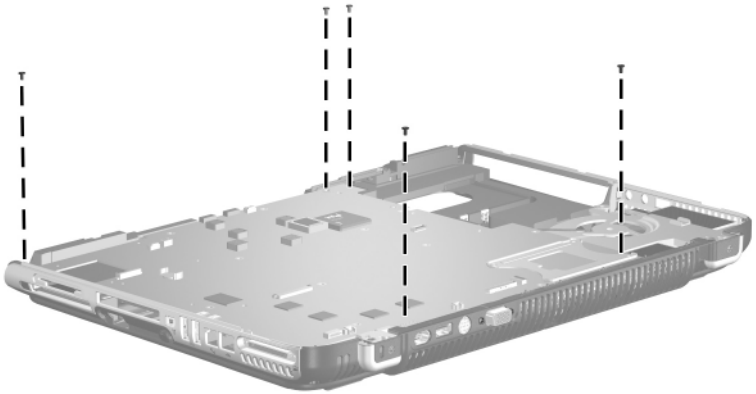
Table C-7

Phillips PM2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	4.0 mm	2.0 mm	4.0 mm

Where used:

Five screws that secure the system board to the notebook (documented in Section 5.16)



Phillips M2.0×4.0 Screw Locations

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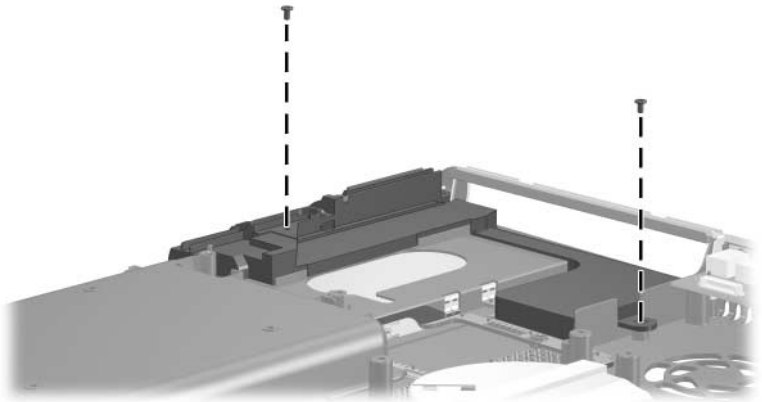
Table C-7

Phillips PM2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	4.0 mm	2.0 mm	4.0 mm

Where used:

Two screws that secure the left speaker to the notebook (documented in Section 5.17)



Phillips M2.0×3.0 Screw Location

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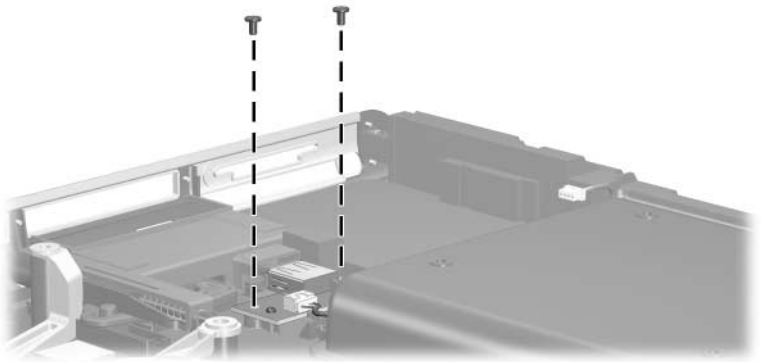
Table C-7

Phillips PM2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	10	4.0 mm	2.0 mm	4.0 mm

Where used:

Two screws that secure the digital drive board to the notebook (documented in Section 5.18)



Phillips M2.0×4.0 Screw Locations

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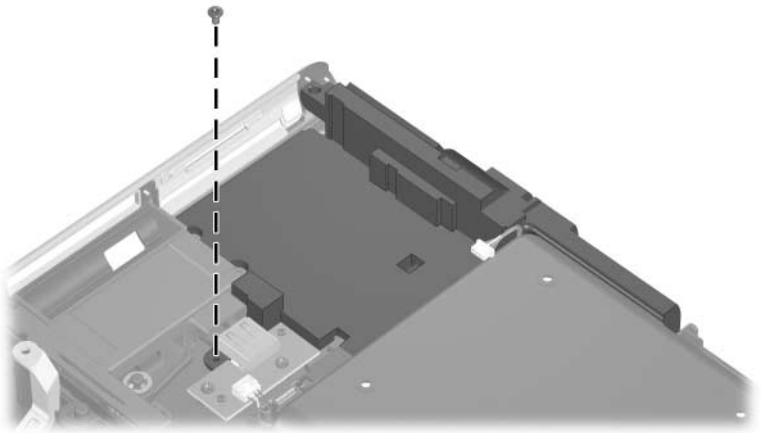
Table C-8

Phillips PM1.5×3.5 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	1	3.5 mm	1.5 mm	3.5 mm

Where used:

One screw that secures the right speaker to the notebook (documented in Section 5.17)



Phillips M1.5×3.5 Screw Location

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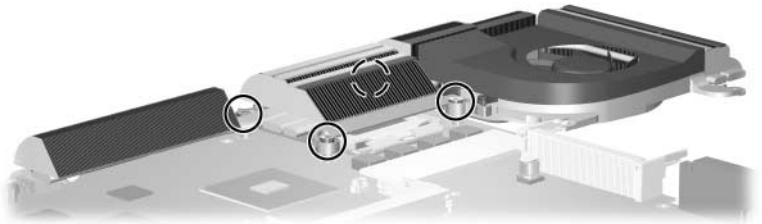
Table C-9

Phillips PM2.0×12.0 Spring-Loaded Shoulder Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	12.0 mm	2.0 mm	6.0 mm

Where used:

Four screws that secure the heat sink module to the notebook (documented in Section 5.21)



Phillips M2.0×12.0 Spring-Loaded Shoulder Screw Locations

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