Maintenance and Service Guide

HP Compaq nc6220 and nc6230 Notebook PC

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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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1

Product Description

The HP Compaq nc6220 and nc6230 Notebook PCs offer advanced modularity, Intel® Pentium® M and Celeron® M processors, and extensive multimedia support.

HP Compaq nc6220 and nc6230 Notebook PCs

1.1 Features

- The following processors are available, varying by notebook model:
  - Intel Pentium M 770 (2.13-GHz)
  - Intel Pentium M 760 (2.00-GHz)
  - Intel Pentium M 750 (1.86-GHz)
  - Intel Pentium M 740 (1.73-GHz)
  - Intel Pentium M 730 (1.60-GHz)
  - Intel Celeron M 1.50-GHz)
- The following displays are available, varying by notebook model:
  - 14.1-inch, SXGA, TFT (1400 × 1050) with over 16.8 million colors
  - 14.1-inch, XGA, TFT (1280 × 800) with over 16.8 million colors
- The following high-capacity hard drives are available, varying by notebook model:
  - 60-GB (7200-rpm)
  - 80-GB, 60-GB, 40-GB (5400-rpm)
- 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 embedded numeric keypad
- TouchPad pointing device, including a dedicated vertical scroll region
- Integrated 10Base-T/100Base-TX Ethernet local area network (LAN) network interface card (NIC) with RJ-45 jack
- Integrated high-speed 56K modem with RJ-11 jack
- Integrated wireless support for Mini PCI IEEE 802.11a/b/g or 802.11b/g WLAN device

- Support for one Type I or Type II PC Card slot, with support for both 32-bit (CardBus) and 16-bit PC Cards, varying by notebook model
- External 65-watt AC adapter with 3-wire power cord, varying by notebook model
- 6-cell Li-Ion battery pack
- Stereo speakers
- Volume up, volume mute, and volume down buttons
- Support for the following optical drives:
  - DVD-ROM Drive
  - DVD+RW/R and CD-RW Combo Drive
  - DVD/CD-RW Combo Drive
- Connectors:
  - Audio-out (headphone)
  - Audio-in (microphone)
  - Universal Serial Bus (USB) v. 2.0 (3 ports)
  - Power
  - External monitor
  - RJ-11 (modem)
  - RJ-45 (network)
  - IEEE 1394
  - Travel battery
  - SD Card slot
  - Smart card reader
  - Infrared
  - Parallel port
  - S-Video-out
  - Docking connector

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 5.24, "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.

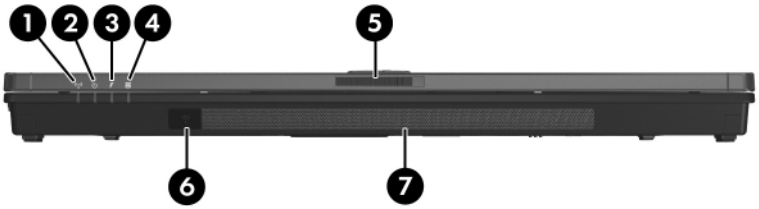
1.3 Power Management

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

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

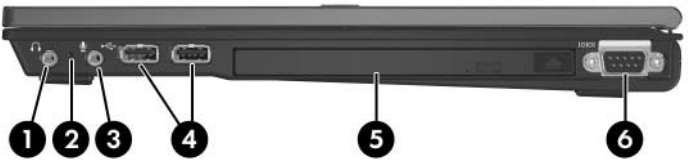
Item	Component	Function
1	Wireless light	On: an integrated wireless device has been turned on.
2	Power/standby light	■ On: Notebook is turned on. ■ Blinking: Notebook is in standby. ■ Off: Notebook is off.

Table 1-1

Front Components *(Continued)*

Item	Component	Function
3	Battery light	Amber: A battery pack is charging. Green: A battery pack is close to full charge capacity. Blinking amber: A battery pack that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light begins blinking more quickly. Off: If the notebook is connected to an external power source, the light is turned off when all batteries in the notebook are fully charged. If the notebook is not connected to an external power source, the light is turned off until the battery reaches a low-battery condition.
4	Integrated Drive Electronics (IDE) drive light	On: A drive in the hard drive bay or MultiBay II is being accessed.
5	Display release latch	Opens the notebook.
6	Infrared port	Provides wireless communication between the notebook and an optional IrDA-compliant device.
7	Speakers (2)	Produce stereo sound.

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



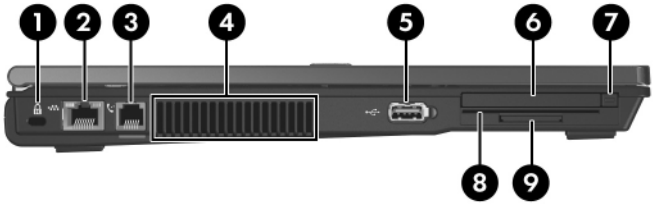
Right-Side Components

Table 1-2

Right-Side Components

Item	Component	Function
1	Audio-out (headphone) jack	Produces system sound when connected to optional powered stereo speakers, headphones, headset, or television audio.
2	Internal microphone	Records sound.
3	Audio-in (microphone) jack	Connects an optional microphone.
4	USB ports (2)	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable.
5	MultiBay II	Holds a MultiBay II device.
6	Serial port	Connects an optional serial device.

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	Security cable slot	Attaches an optional security cable to the notebook. △ The purpose of security solutions is to act as a deterrent. These solutions do not prevent the product from being mishandled or stolen.
2	RJ-45 (network) jack	Connects a network cable.
3	RJ-11 (modem) jack	Connects the modem cable.

Table 1-3

Left-Side Components *(Continued)*

Item	Component	Function
4	Vent	Enables airflow to cool internal components. ⚠ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing, may block airflow.
5	USB port	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable.
6	PC Card slot	Supports optional Type I or Type II PC Cards.
7	PC Card eject button	Ejects an optional PC Card from the PC Card slot.
8	Smart card reader	Accepts smart cards.
9	SD Card slot	Accepts Secure Digital (SD) Memory Cards.

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	External monitor port	Connects an optional external monitor or overhead projector.
2	Power connector	Connects an AC adapter or an optional automobile or aircraft adapter.
3	S-Video-out jack	Is a 7-pin, dual-purpose jack. It connects an optional S-Video device such as a television, VCR, camcorder, overhead projector, or video capture card by means of an optional, standard (4-pin) S-Video cable. The extra 3 pins also enable an optional S-Video-to-composite adapter to be used with the notebook.

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

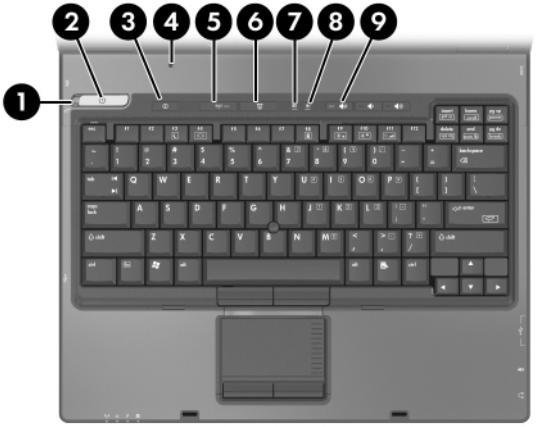
Standard Keyboard Components

Table 1-5

Standard Keyboard Components

Item	Component	Function
1	**f1** to **f12** keys (12)	Execute frequently used system functions when pressed in combination with the **fn** key.
2	**caps lock** key	Enables caps lock and turns on the caps lock light.
3	**fn** key	Executes frequently used system functions when pressed in combination with a function key or the **esc** key.
4	Windows logo key	Displays the Windows Start menu.
5	Windows applications key	Displays a shortcut menu for items beneath the pointer.
6	Arrow keys	Moves the cursor around the screen.
7	Embedded numeric keypad	Can be used like the keys on an external numeric keypad.
8	**num lock** key	Enables numeric lock, turns on the embedded numeric keypad, and turns on the num lock light.

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



Top Components, Part 1

Table 1-6

Top Components, Part 1

Item	Component	Function
1	Power/standby light	On: The notebook is on.
2	Power/standby button	When the notebook is: ■ Off, press and release to turn on the notebook. ■ In standby, press and release to exit standby. ■ In hibernation, press and release to restore from hibernation. If the system has stopped responding and Windows shutdown procedures cannot be used, press to the left and hold for 5 seconds to turn off the notebook.
3	Info Center button	Enables you to view a list of commonly used software solutions.
4	Display switch	Initiates standby if the display is closed while the notebook is turned on.
5	Wireless button	Enables/disables the WLAN and Bluetooth® devices.
	Wireless light	On: An integrated wireless device is hardware enabled.
6	Presentation mode button	Turns on Presentation mode.
7	Caps lock light	On: caps lock is on.
8	Num lock light	On: num lock is on or the embedded numeric keypad is enabled.
9	Volume mute button	Turns off the notebook sound.

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

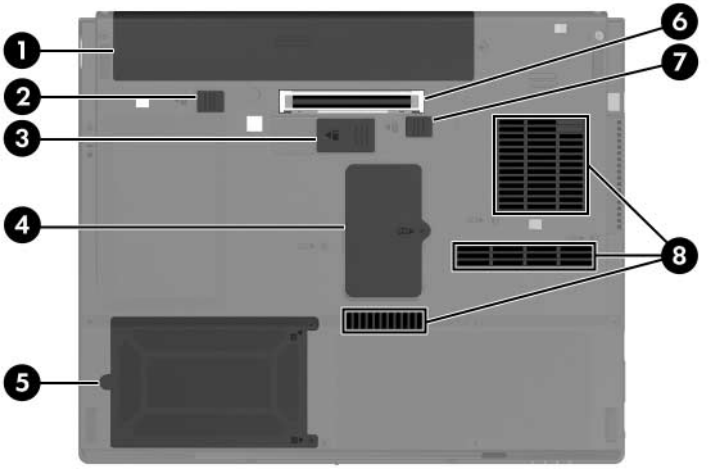
Top Components, Part 2

Table 1-7

Top Components, Part 2

Item	Component	Function
1	Volume down button	Decreases notebook sound.
2	Volume up button	Increases notebook sound.
3	Pointing stick	Moves the pointer and selects or activates items on the screen.
4	Left/right pointing stick buttons	Function like the left and right buttons on an external mouse.
5	TouchPad scroll zone	Scrolls up or down.
6	Left/right TouchPad buttons	Function like the left and right buttons on an external mouse.
7	TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling, selecting, and double-clicking.

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



Bottom Components

Table 1-8

Bottom Components

Item	Component	Function
1	Primary battery bay	Holds the primary battery pack.
2	Primary battery locking latch	Secures the primary battery pack into the battery bay.
3	Travel battery connector	Connects an optional travel battery.
4	Expansion memory module compartment	Accepts one optional memory module.
5	Hard drive bay	Holds the primary hard drive.
6	Docking connector	Connects the notebook to an optional docking device.
7	Primary battery release latch	Releases the primary battery pack from the battery bay.
8	Vents (3)	Enable airflow to cool internal components. △ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing, may block airflow.

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 M and Intel Celeron M 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.

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 the 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**.

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.

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.

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.

2.2 Troubleshooting Flowcharts

Table 2-5

Troubleshooting Flowcharts Overview

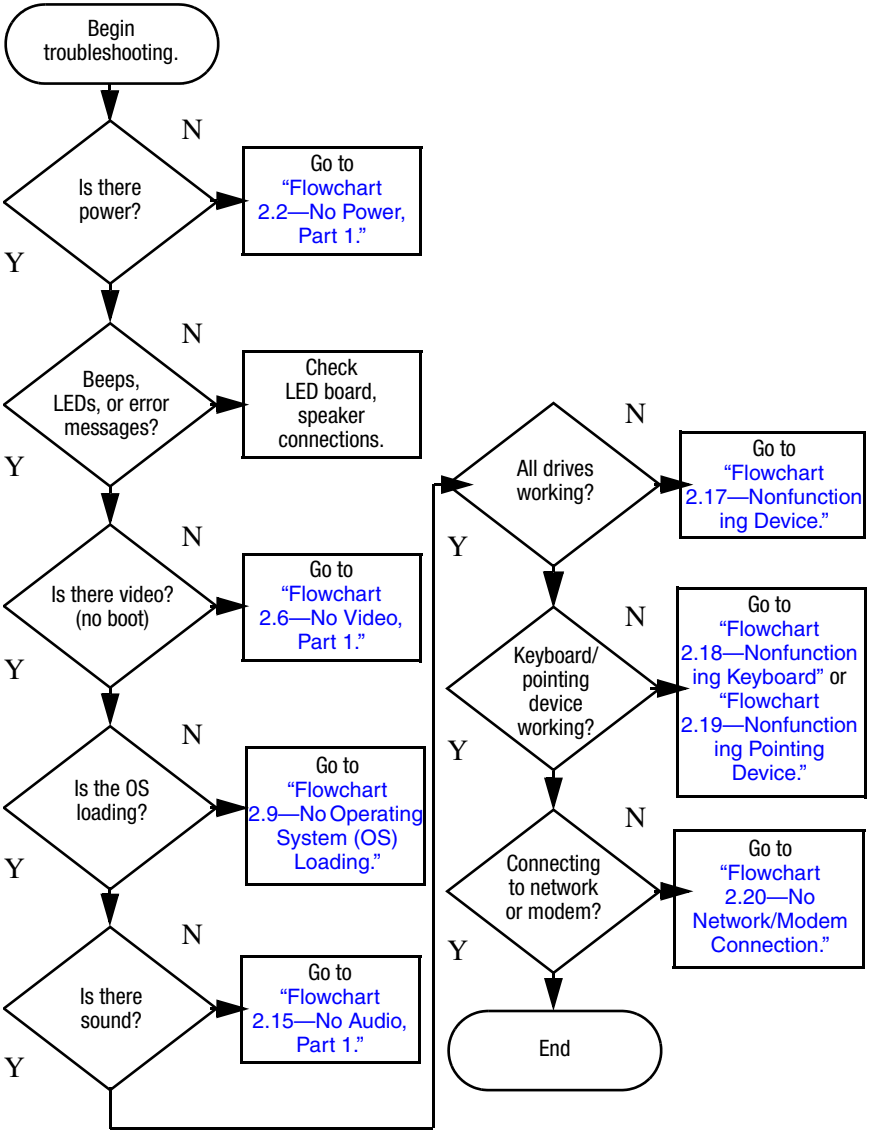
Flowchart	Description
2.1	“Flowchart 2.1—Initial Troubleshooting”
2.2	“Flowchart 2.2—No Power, Part 1”
2.3	“Flowchart 2.3—No Power, Part 2”
2.4	“Flowchart 2.4—No Power, Part 3”
2.5	“Flowchart 2.5—No Power, Part 4”
2.6	“Flowchart 2.6—No Video, Part 1”
2.7	“Flowchart 2.7—No Video, Part 2”
2.8	“Flowchart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

Table 2-5

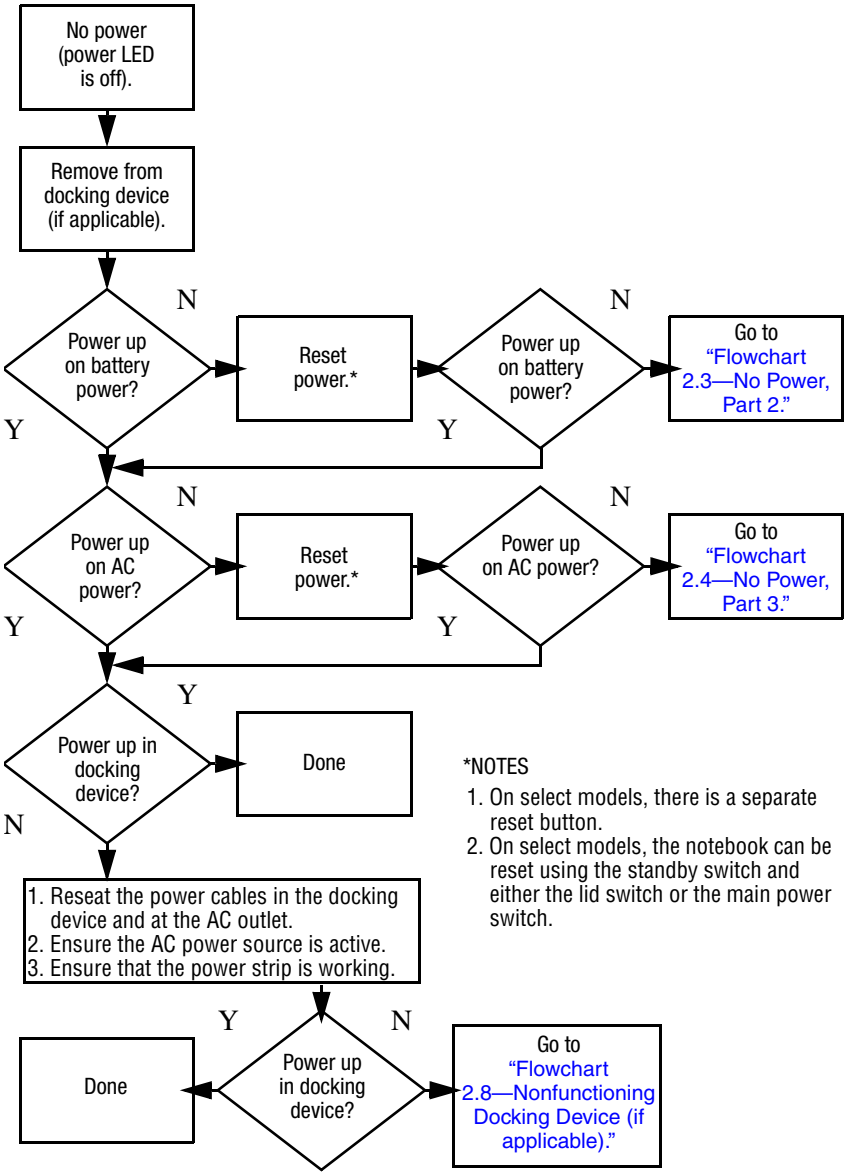
Troubleshooting Flowcharts Overview *(Continued)*

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

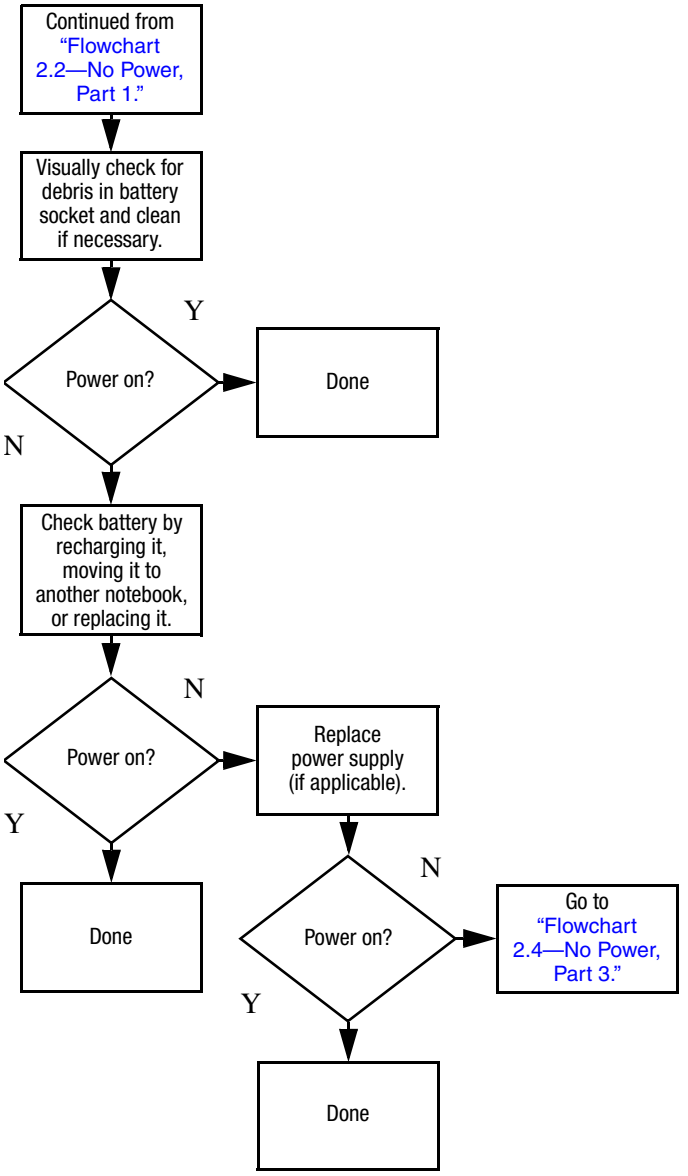
Flowchart 2.1—Initial Troubleshooting



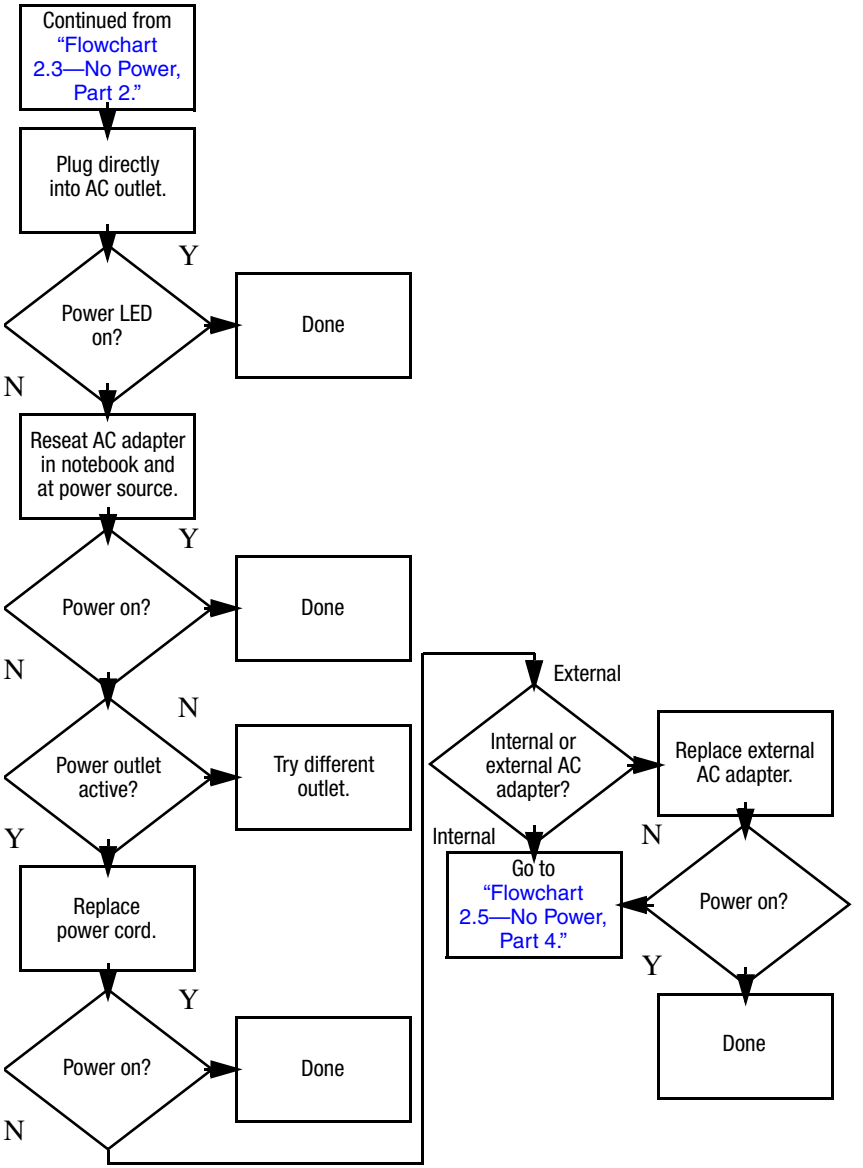
Flowchart 2.2—No Power, Part 1



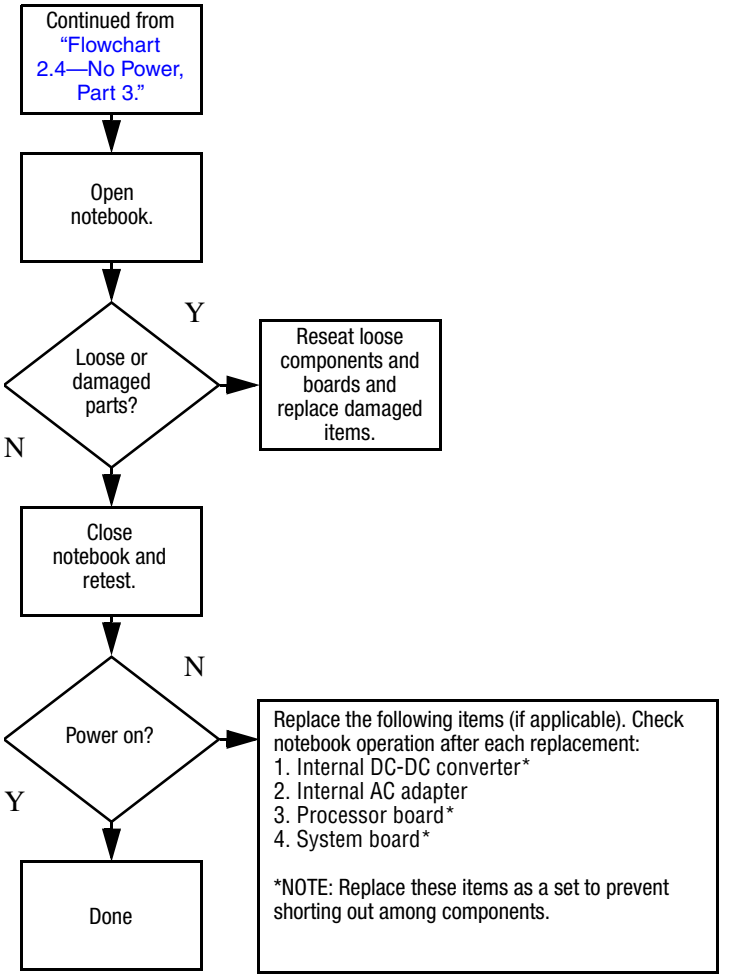
Flowchart 2.3—No Power, Part 2



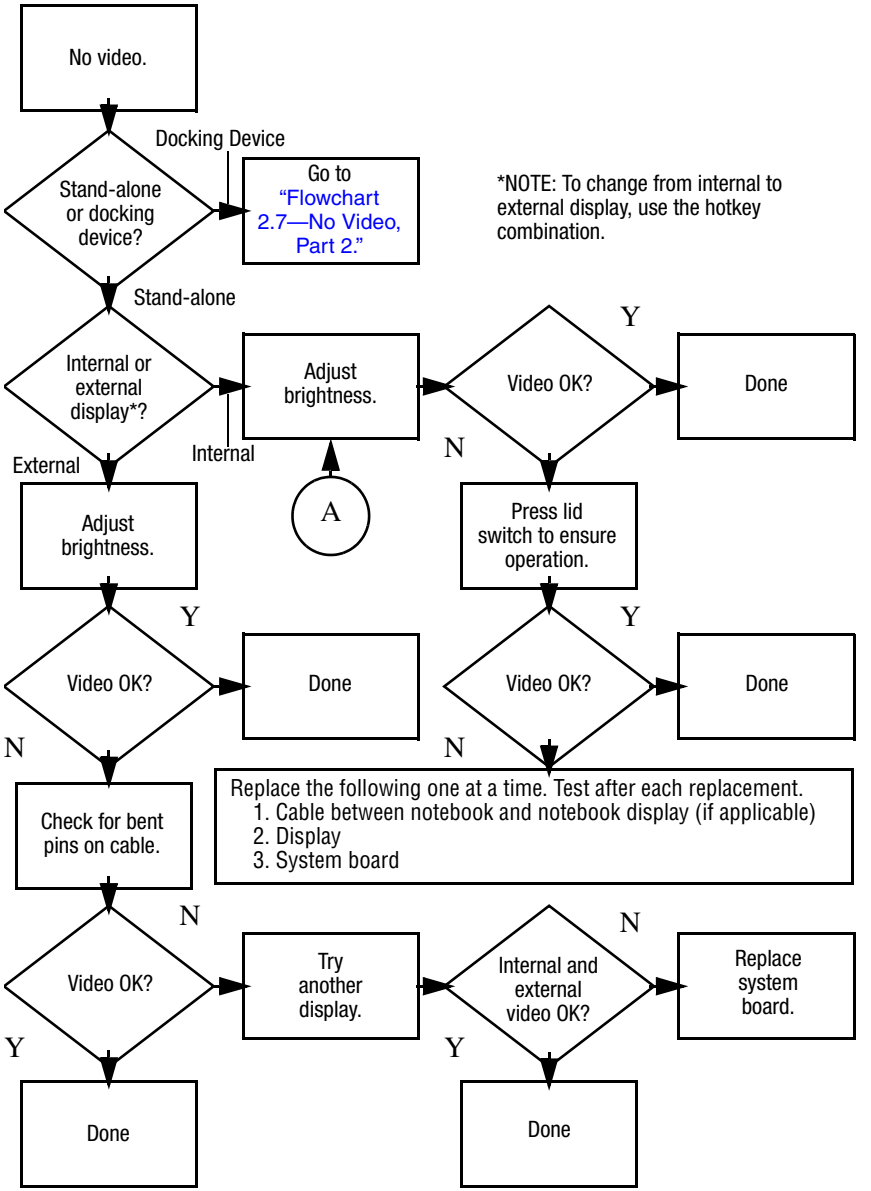
Flowchart 2.4—No Power, Part 3



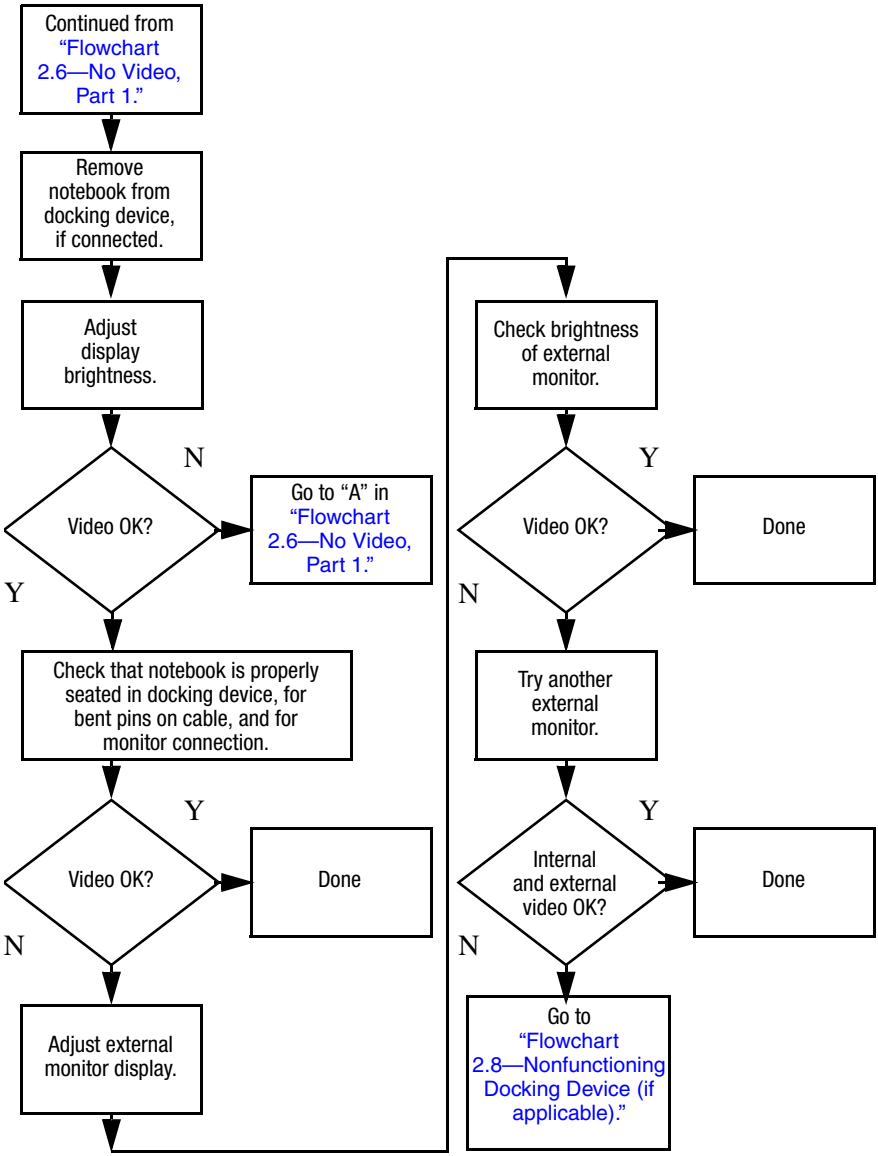
Flowchart 2.5—No Power, Part 4



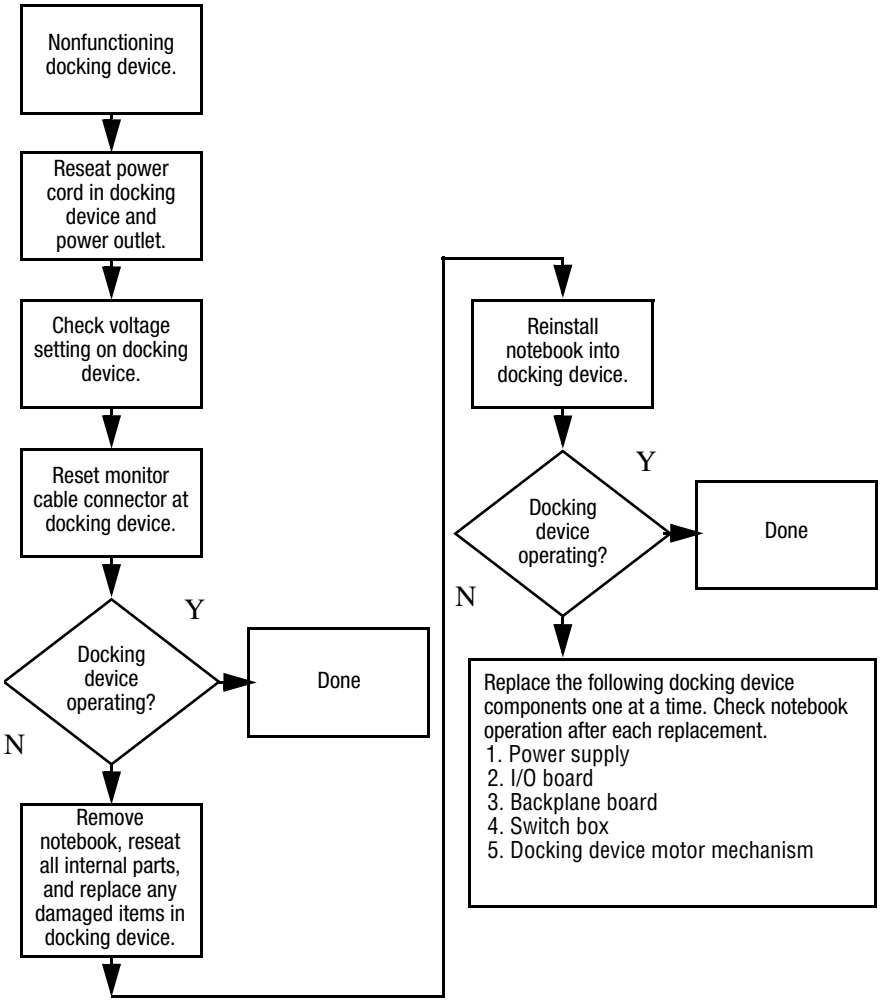
Flowchart 2.6—No Video, Part 1



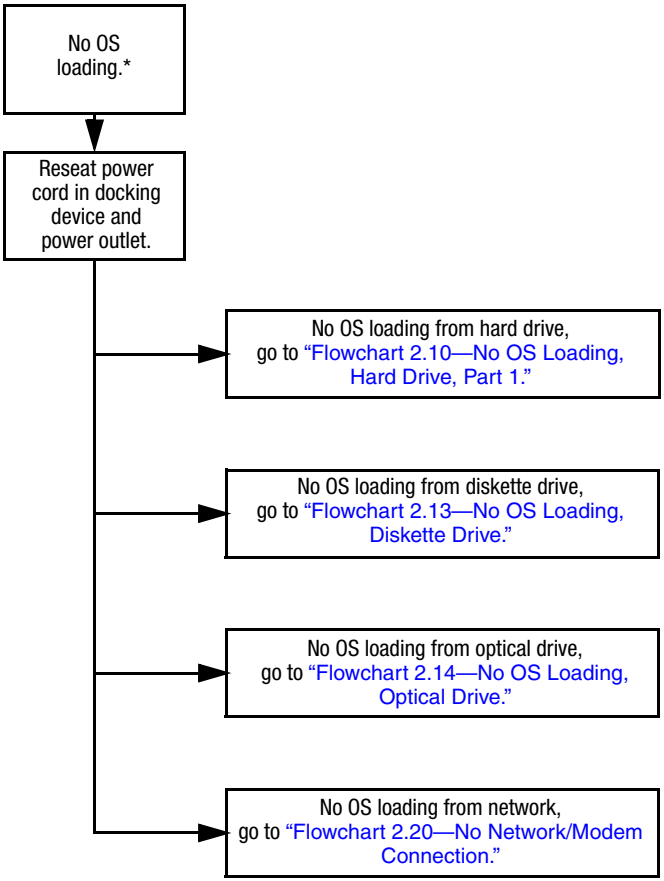
Flowchart 2.7—No Video, Part 2



Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

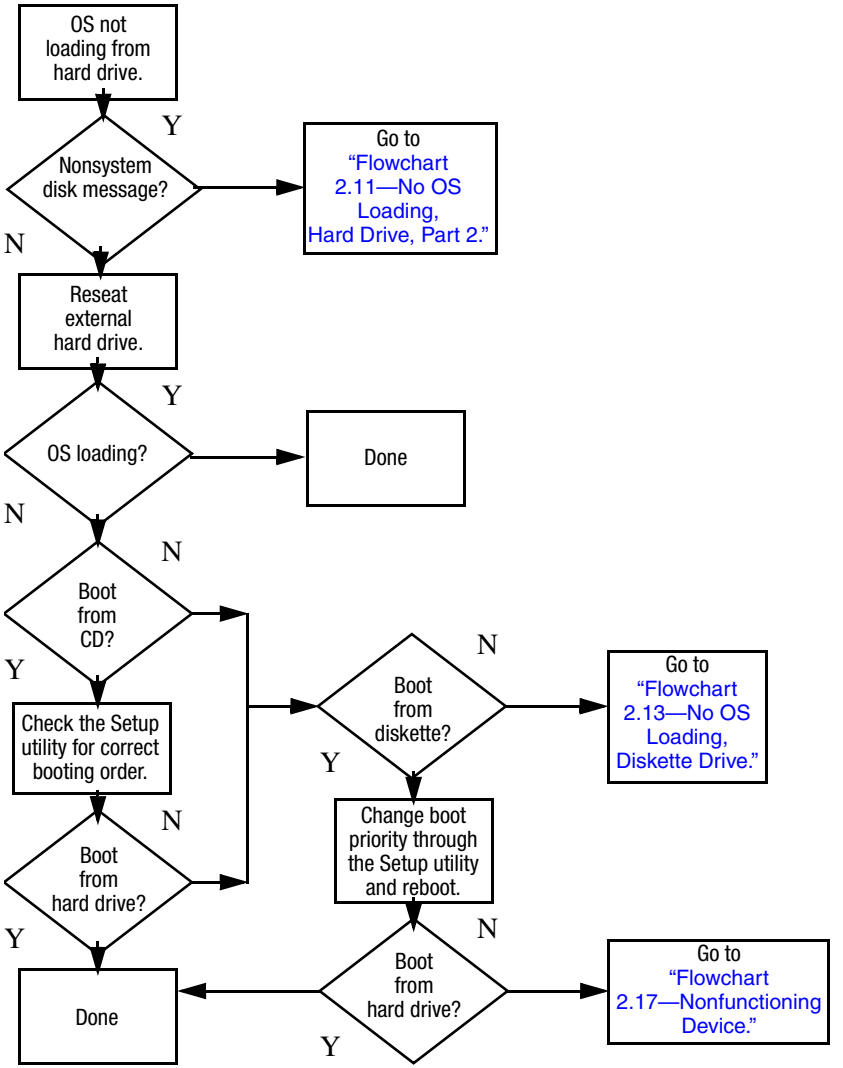


Flowchart 2.9—No Operating System (OS) Loading

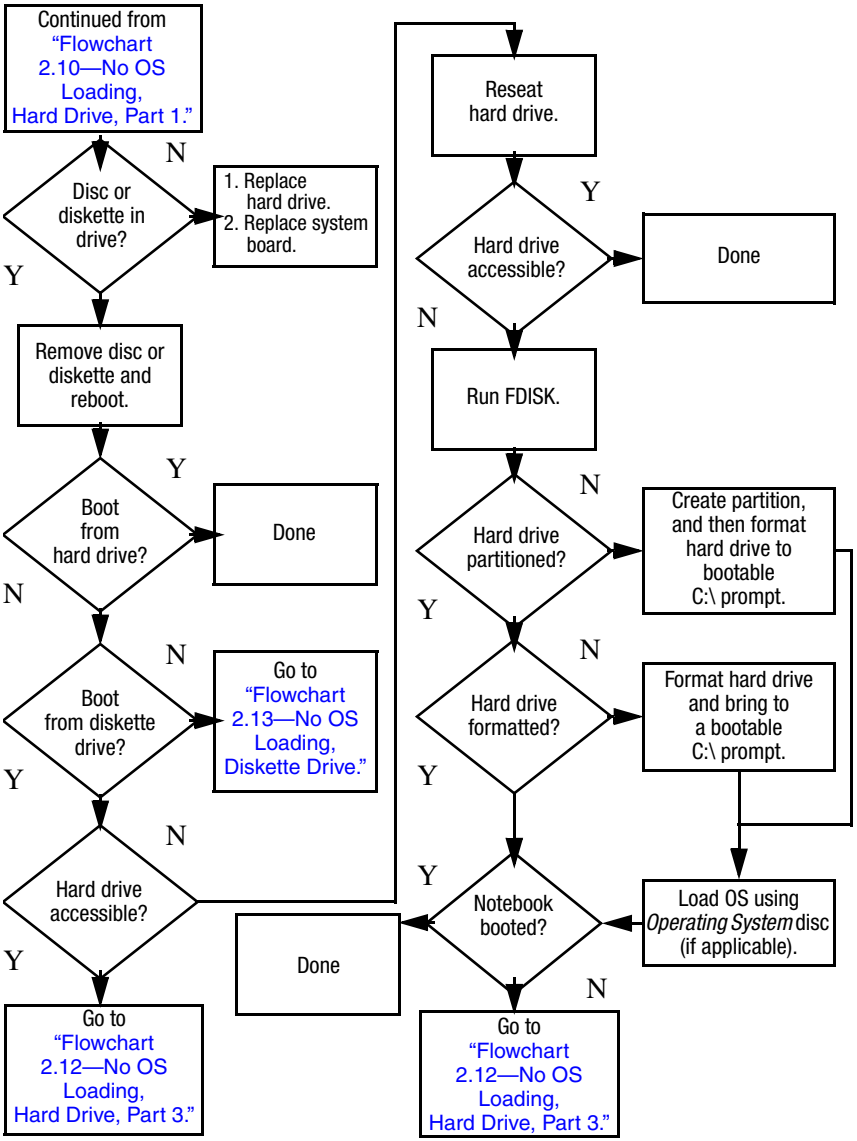


*NOTE: Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

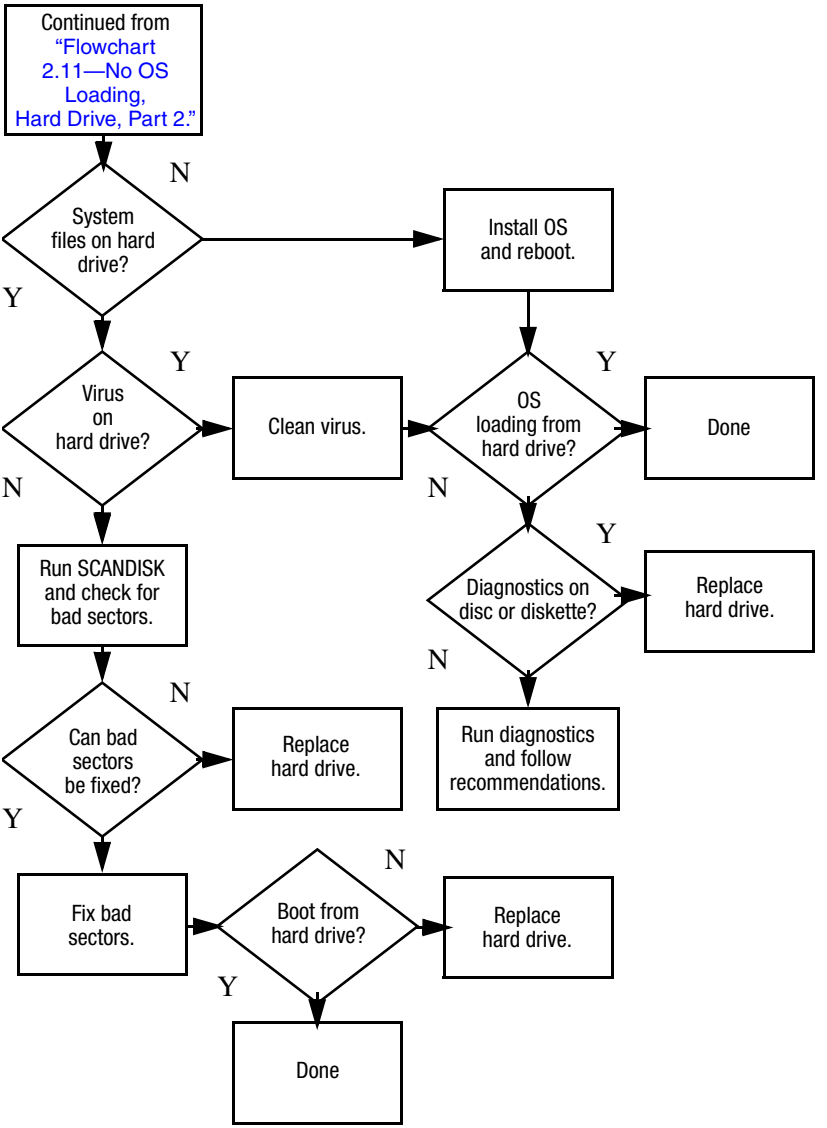
Flowchart 2.10—No OS Loading, Hard Drive, Part 1



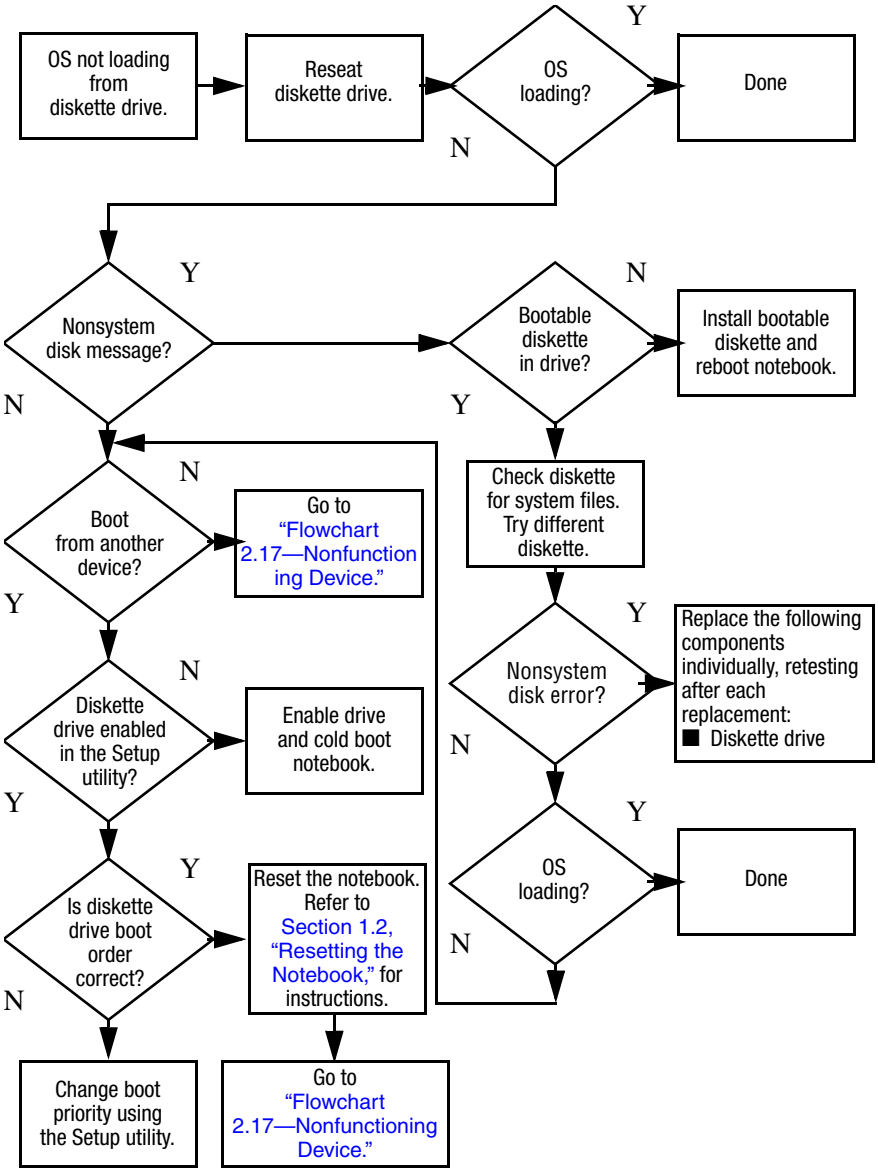
Flowchart 2.11—No OS Loading, Hard Drive, Part 2



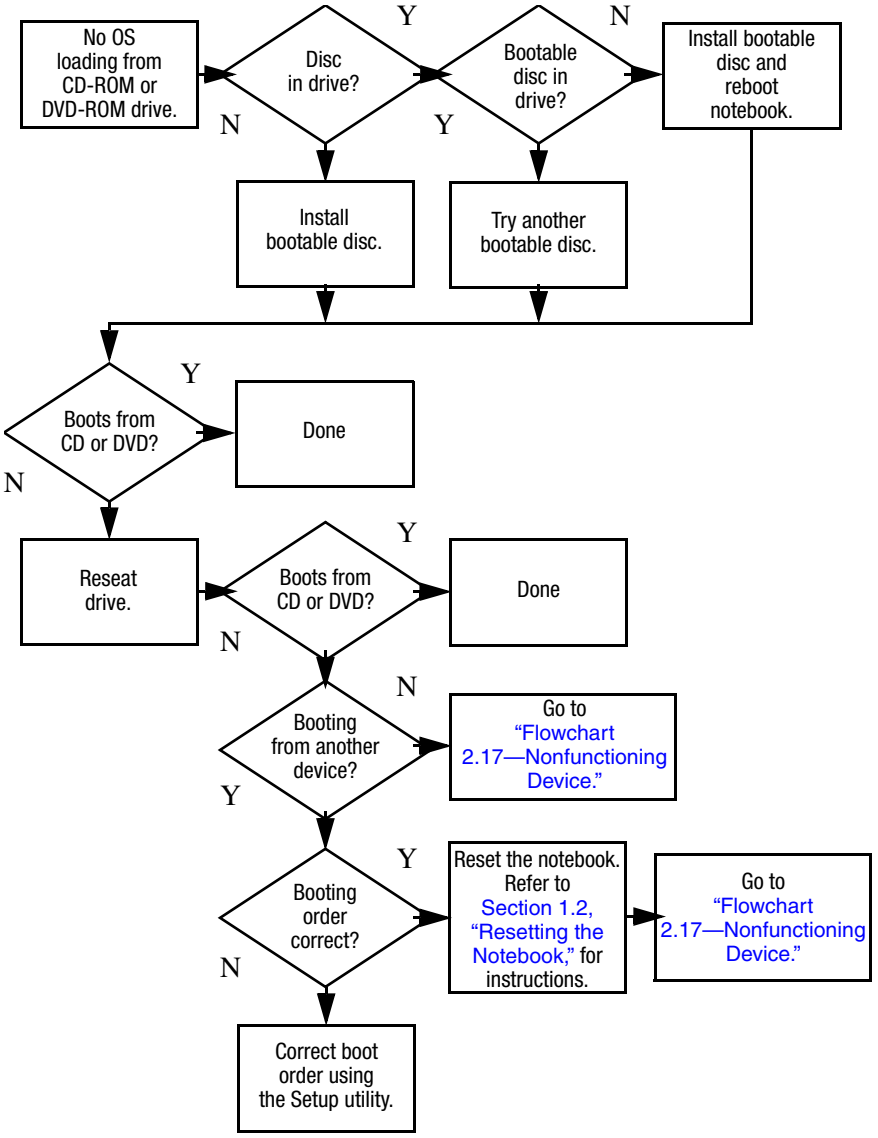
Flowchart 2.12—No OS Loading, Hard Drive, Part 3



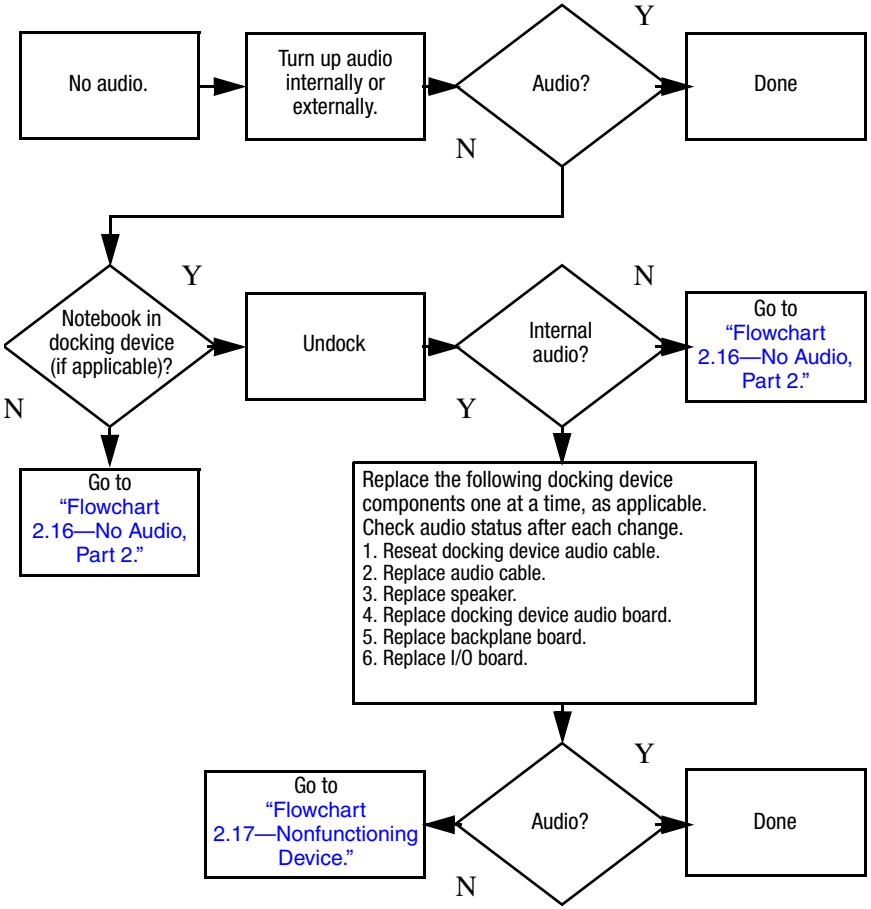
Flowchart 2.13—No OS Loading, Diskette Drive



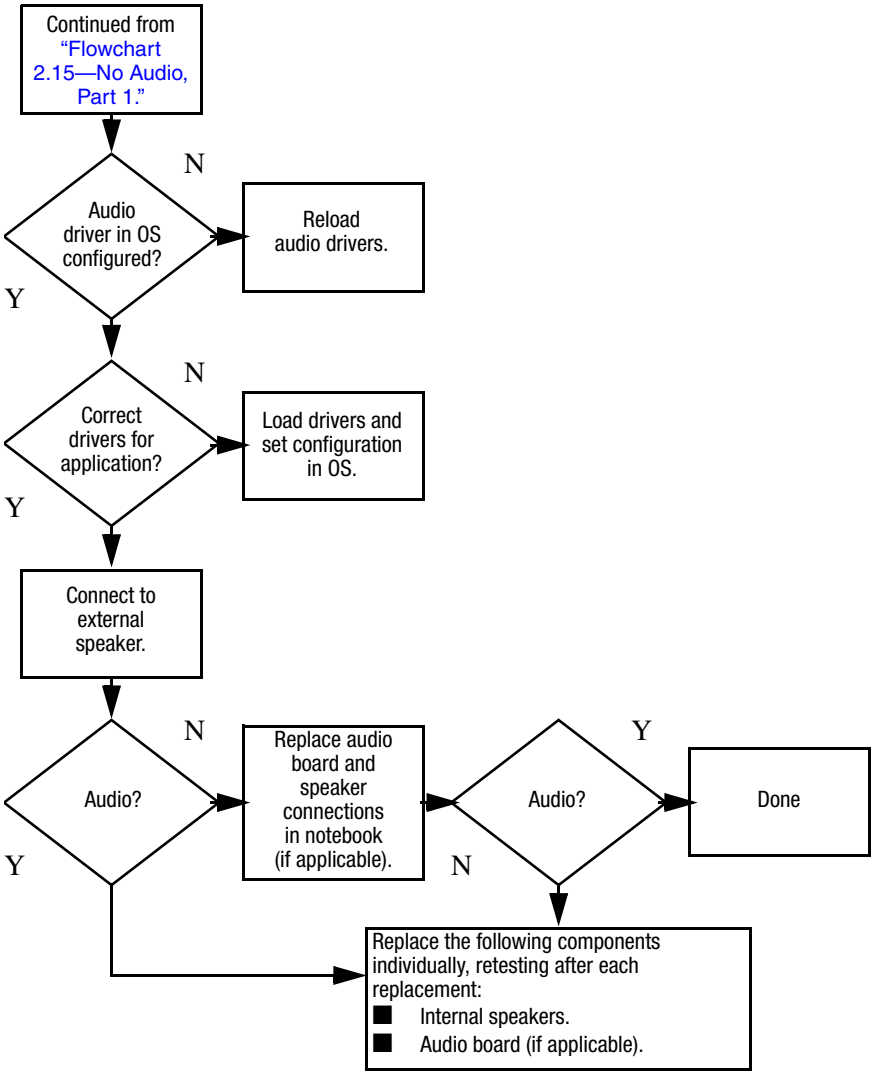
Flowchart 2.14—No OS Loading, Optical Drive



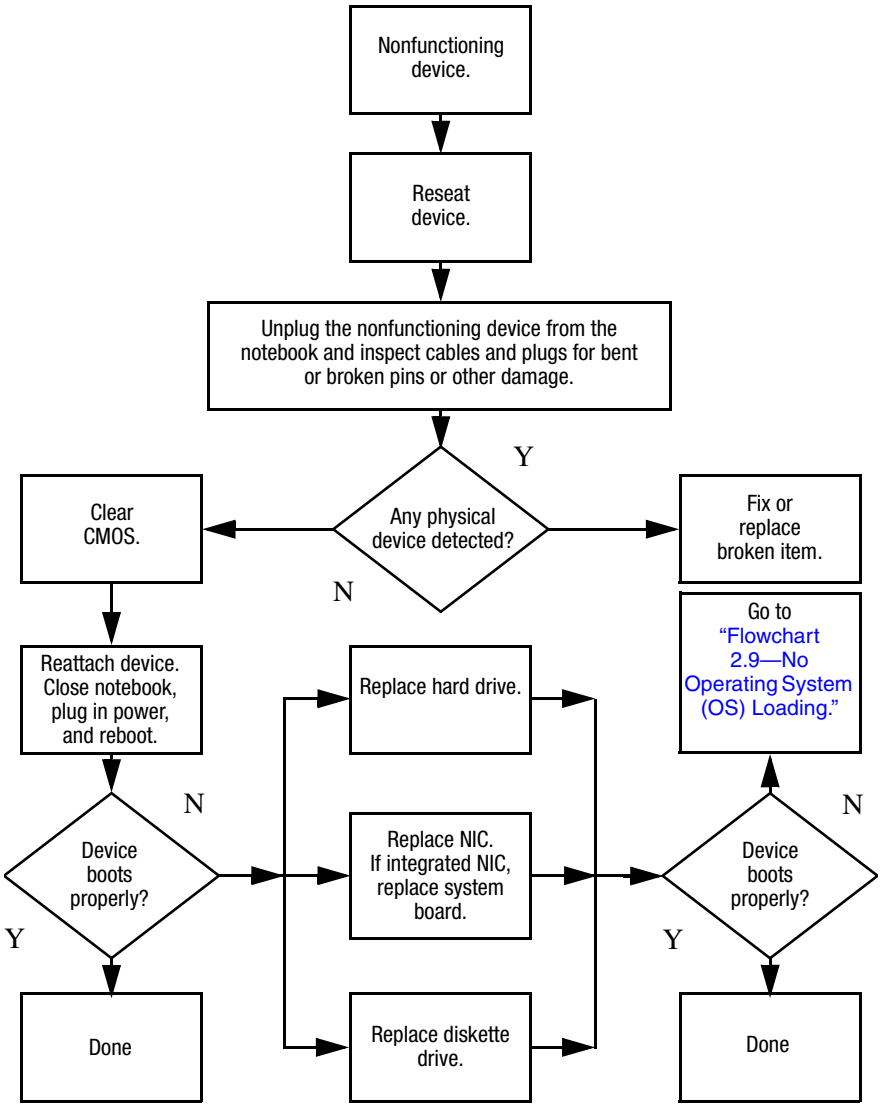
Flowchart 2.15—No Audio, Part 1



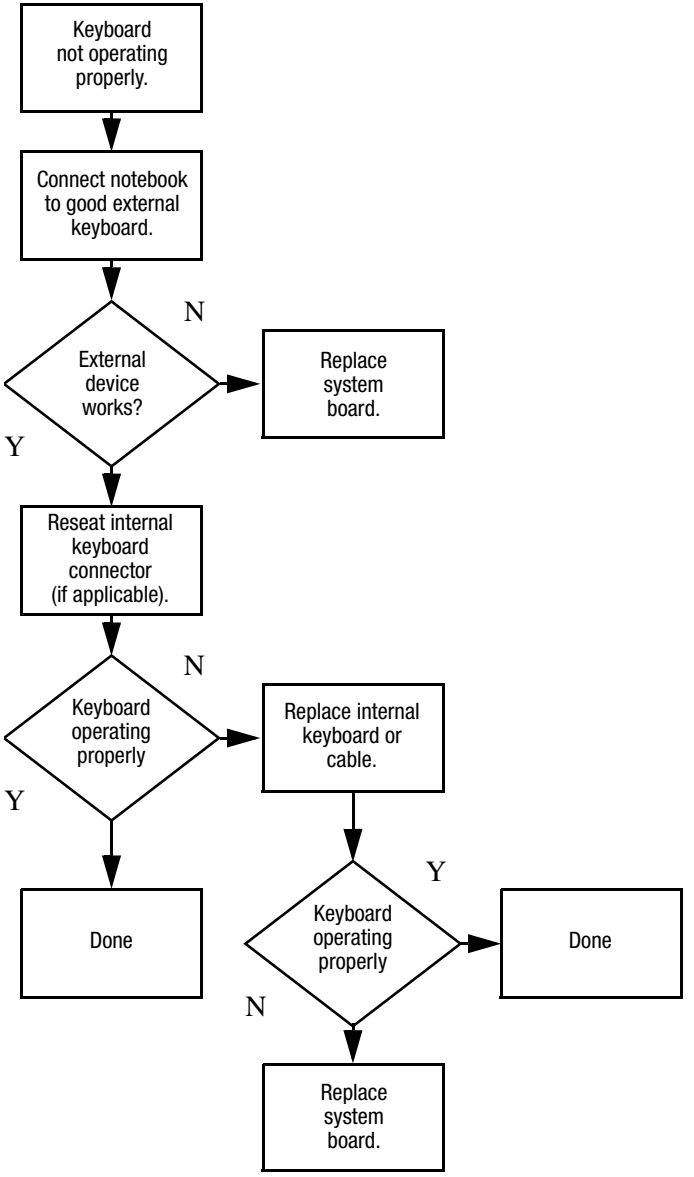
Flowchart 2.16—No Audio, Part 2



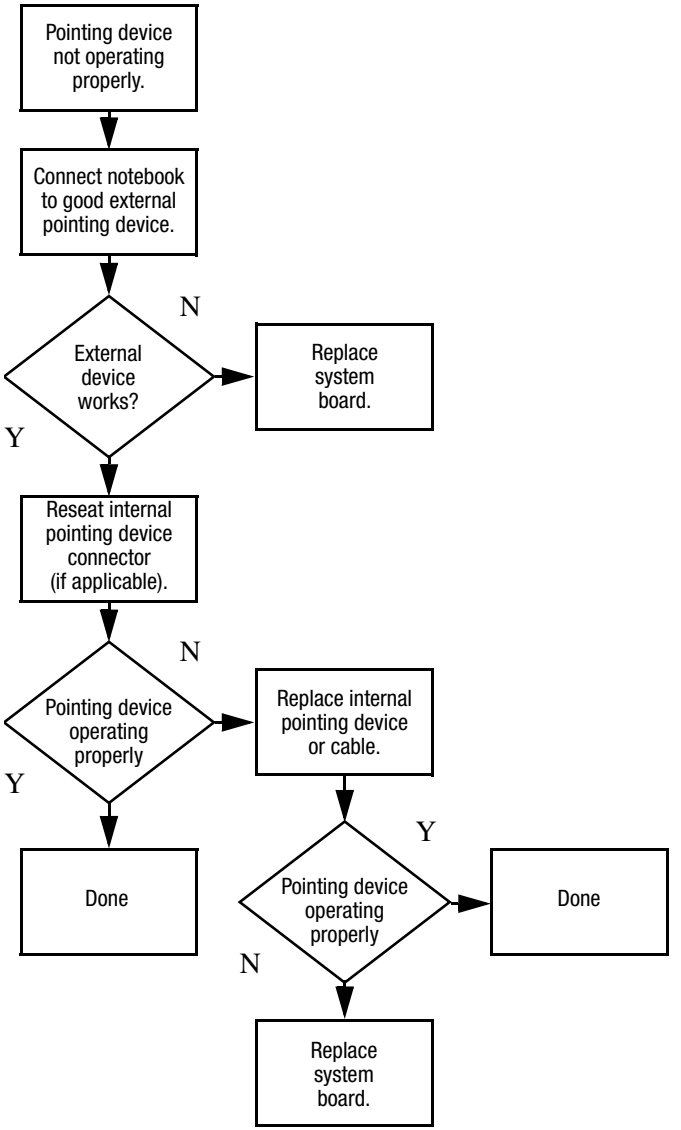
Flowchart 2.17—Nonfunctioning Device



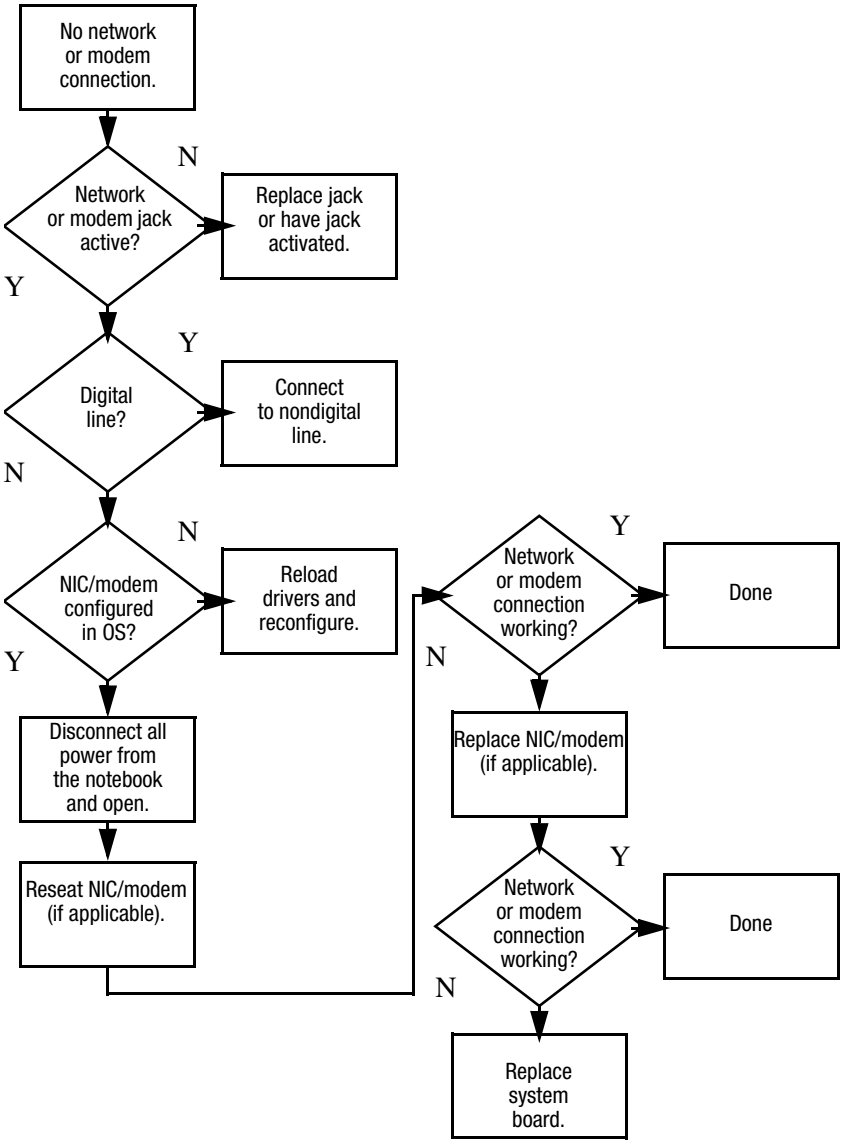
Flowchart 2.18—Nonfunctioning Keyboard



Flowchart 2.19—Nonfunctioning Pointing Device



Flowchart 2.20—No Network/Modem Connection



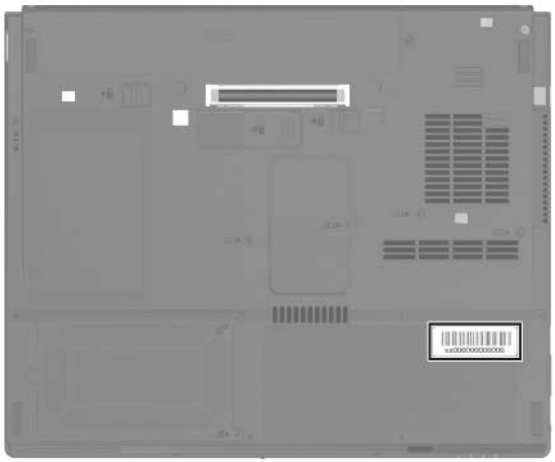
3

Illustrated Parts Catalog

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

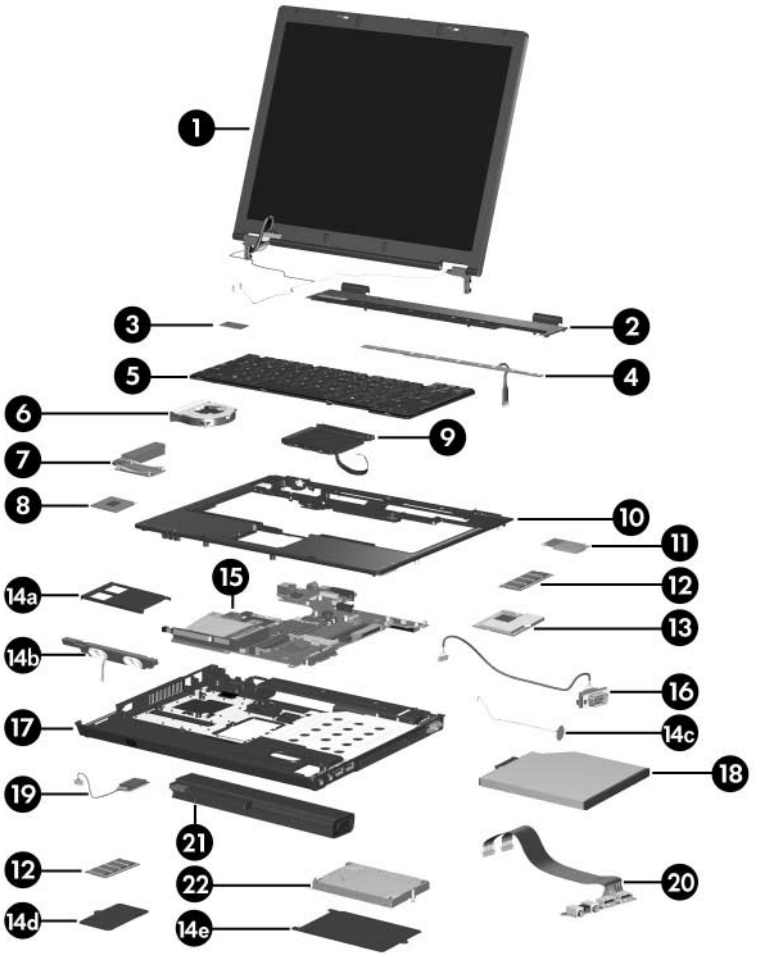
3.1 Serial Number Location

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



Serial Number Location

3.2 Notebook Major Components

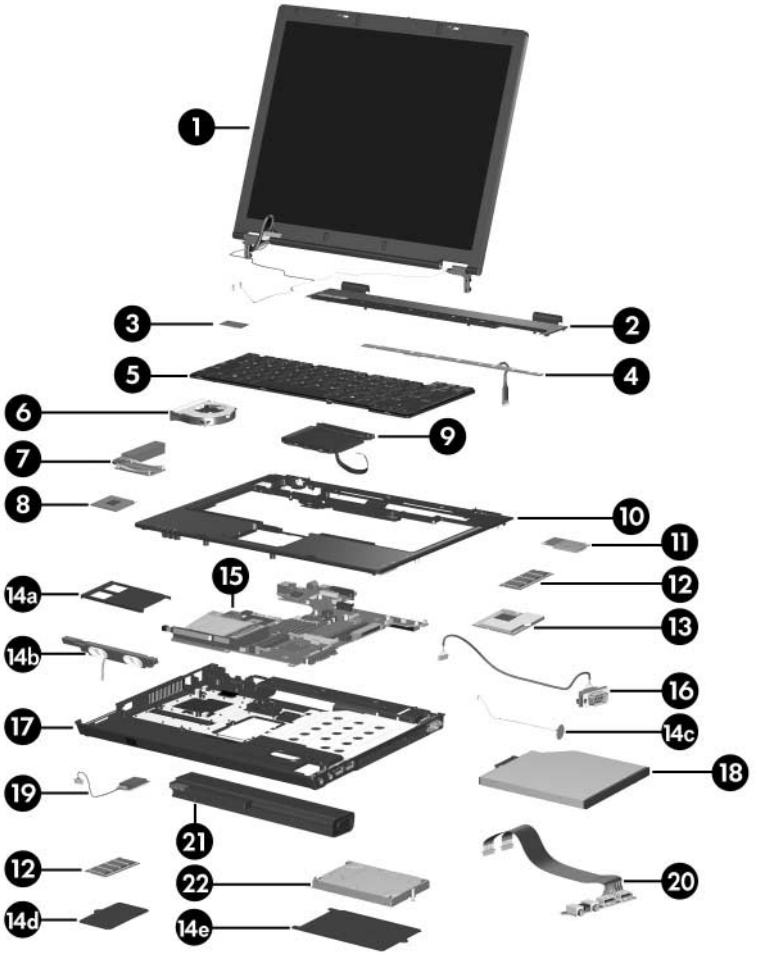


Notebook Major Components

Table 3-1

Spare Parts: Notebook Major Components

Item	Description			Spare Part Number
1	**Display assemblies** (include wireless antenna boards and cables)			
	14.1-inch, SXGA, TFT			379793-001
	14.1-inch, XGA, TFT			379792-001
2	**Switch cover**			379794-001
3	**TPM security card**			379807-001
4	**LED board** (includes LED board cable)			379795-001
5	**Keyboards**			
	Belgium	378188-A41	Latin America	378188-161
	Brazil	378188-201	Norway	378188-091
	Czech Republic	378188-221	Portugal	378188-131
	Denmark	378188-081	Russia	378188-251
	France	378188-051	Saudi Arabia	378188-171
	French Canada	378188-121	Slovakia	378188-231
	Germany	378188-041	Slovenia	378188-BA1
	Greece	378188-151	Spain	378188-071
	Hungary	378188-211	Sweden	378188-101
	Iceland	378188-DD1	Switzerland	378188-111
	International	378188-021	Taiwan	378188-AB1
	Israel	378188-BB1	Thailand	378188-281
	Italy	378188-061	Turkey	378188-141
	Japan	378188-291	United Kingdom	378188-031
	Korea	378188-AD1	United States	378188-001

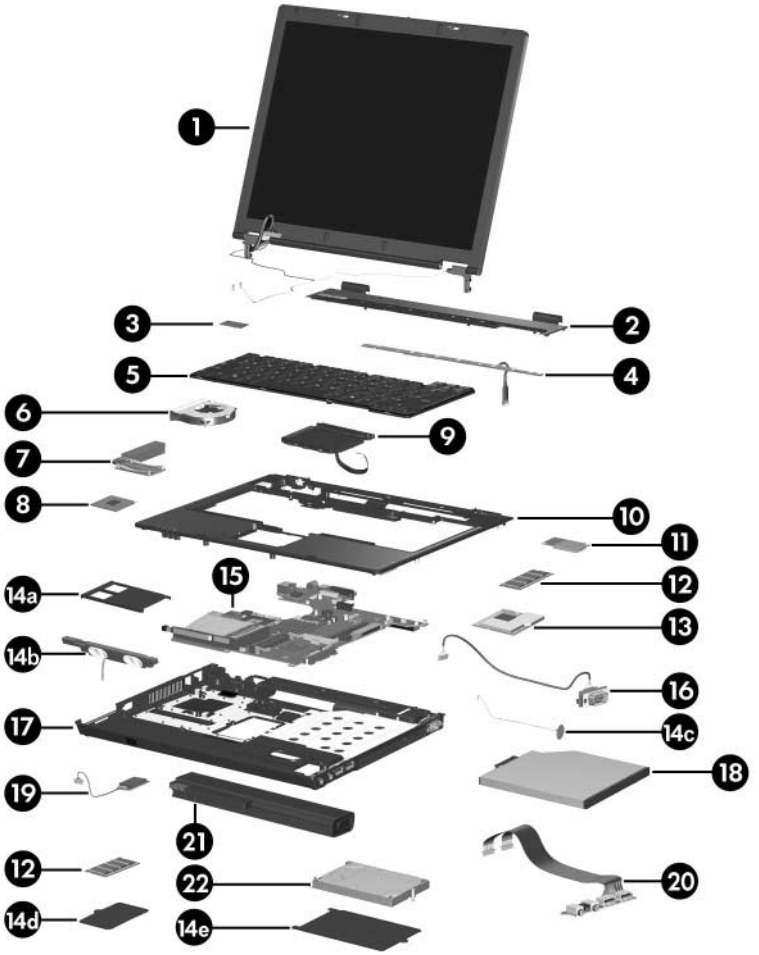


Notebook Major Components

Table 3-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
6	**Fan**	378233-001
7	**Heat sink** (includes thermal paste)	379799-001
8	**Processors** (include thermal paste)	
	Intel Pentium M 770 (2.13-GHz)	379806-001
	Intel Pentium M 760 (2.00-GHz)	379805-001
	Intel Pentium M 750 (1.86-GHz)	379804-001
	Intel Pentium M 740 (1.73-GHz)	379803-001
	Intel Pentium M 730 (1.60-GHz)	379802-001
	Intel Celeron M 730 (1.5-GHz)	379801-001
9	**TouchPad** (includes TouchPad cable)	379798-001
10	**Top cover**	379796-001
11	**Modem board**	380774-001
12	**Memory modules** (PC2-3200, CL3)	
	1024 MB	373121-001
	512 MB	373120-001
	256 MB	373119-001

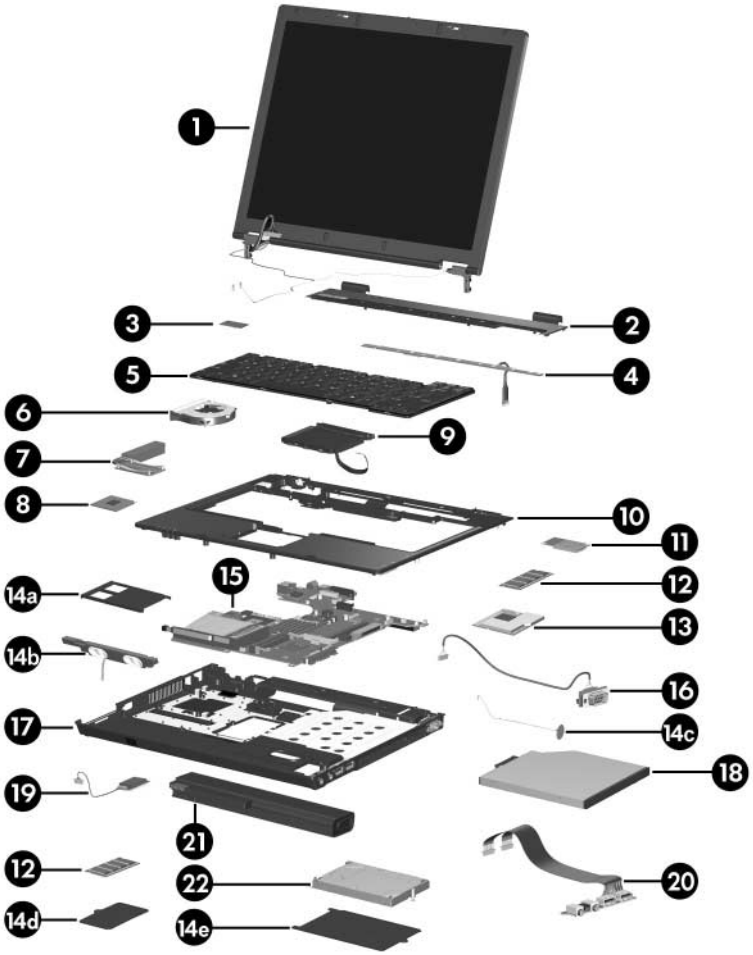


Notebook Major Components

Table 3-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
13	**Mini PCI communications cards**	
	802.11b/g combination WLAN card, for use internationally	373032-002
	802.11b/g combination WLAN card, for use Japan	373032-291
	802.11b/g combination WLAN card, for use in the United States	373032-001
	802.11a/b/g combination WLAN card, for use in Europe, Middle East, Africa	373900-021
	802.11a/b/g combination WLAN Mini PCI communications card for use Japan	373900-291
	802.11a/b/g combination WLAN card, for use internationally	373033-002
	802.11a/b/g combination WLAN card, for use Japan	373033-291
	802.11a/b/g combination WLAN card, for use in MOW	373900-001
	802.11a/b/g combination WLAN card, for use in the United States	373033-001
	802.11a/b/g High Band combination WLAN card	373901-001
	Miscellaneous Plastics Kit	379812-001
	Includes:	
14a	PC Card slot space saver	
14b	Speaker	
14c	RTC battery	
14d	Memory module compartment cover (includes 1 captive screw)	
14e	Hard drive cover (includes 2 captive screws)	
	Not illustrated:	
	Notebook feet	
	Base enclosure screw caps	
	Display bezel rubber caps	
	MultiBay II space saver	



Notebook Major Components

Table 3-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
15	**System boards** (include RJ-11 connector and cable)	
	Includes 64 MB of discrete video memory	382909-001
	Includes 32 MB of discrete video memory	379790-001
	Includes UMA video memory	379791-001
16	**Serial connector module** (includes serial connector module cable)	378227-001
17	**Base enclosure**	379797-001
18	**MultiBay II devices**	
	8X Max DVD-ROM drive	373314-001
	DVD+RW/R and CD-RW Combo Drive	375557-001
	DVD/CD-RW Combo Drive	373315-001
19	**Broadcomm Bluetooth wireless board** (includes Bluetooth board cable)	367871-001
20	**Audio boards** (include audio board cables)	
	For use with system boards with discrete video memory	385498-001
	For use with system boards with UMA video memory	379811-001
21	**Battery packs**	
	6-cell, 4.8-AHr	372772-001
	6-cell, 4.8-AHr	367457-001
	8-cell, travel battery	367456-001
22	**Hard drives** (include frame and connector)	
	7200-rpm	5400-rpm
	60-GB 380950-001	80-GB 379810-001
		60-GB 379809-001
		40-GB 379808-001

3.3 Miscellaneous Plastics Kit

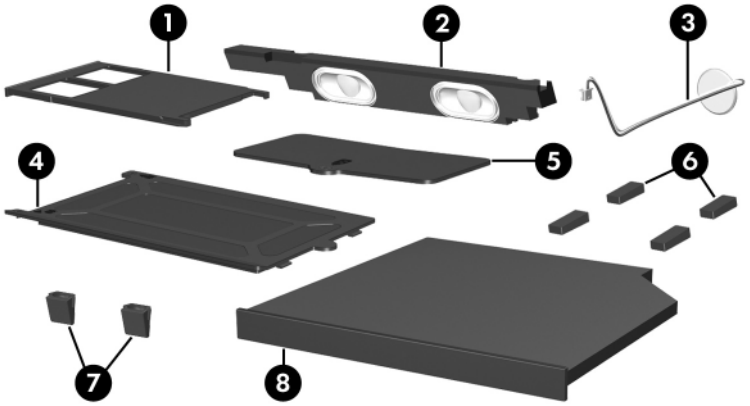


Table 3-2

Spare Part Number 379812-001

Item	Description
1	PC Card slot space saver
2	Speaker
3	RTC battery
4	Hard drive cover (includes 2 captive screws)
5	Memory module compartment cover (includes 1 captive screw)
6	Notebook feet (4)
7	Base enclosure rubber screw caps (2)
8	MultiBay II space saver
	Not illustrated: Display bezel rubber caps

3.4 Miscellaneous Cables Kit

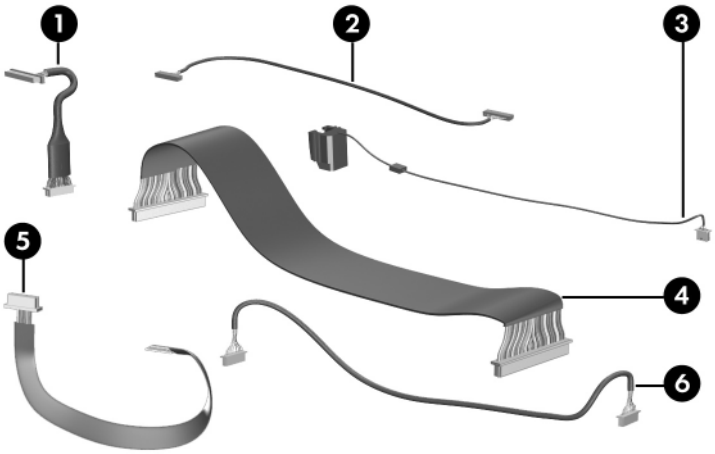


Table 3-3

Spare Part Number 389013-001

Item	Description
1	LED board cable
2	Bluetooth board cable
3	RJ-11 connector module with cable
4	Audio board cables (two, one for use on models with system boards with discrete video memory, one for use on models with system boards with UMA video memory)
5	TouchPad cable
6	Serial connector board cable
	Not illustrated: Speaker cable (for use on models with system boards with discrete video memory)

3.5 Mass Storage Devices

Table 3-4

Spare Part Number Information

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

3.6 Miscellaneous (Not Illustrated)

Table 3-5

Spare Part Information

Description	Spare Part Number
Adjustable notebook stand	372420-001
HP Advanced Docking Stand	374804-001
HP Docking Stand	374803-001
Docking Stand Miscellaneous Plastics Kit	380045-001
Carrying cases	
Nylon top load	325815-001 and 325815-002
Nylon entry level	325814-001
External MultiBay II	367621-001
External MultiBay II USB cable and stand	367622-001
External MultiBay II power cable	367870-001
USB 1.1 diskette drive	359118-001

Table 3-5

Spare Part Information *(Continued)*

Description	Spare Part Number
Power supplies	
65 watt AC adapter	239704-001
65 watt, slim profile AC adapter	381090-001
Power cords	
For use in:	
Australia and New Zealand	246959-011
Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden	246959-021
Brazil	246959-201
Canada, French Canada, Latin America, Taiwan, Thailand, and the United States	246959-001
Denmark	246959-081
Hong Kong and the United Kingdom	246959-031
Israel	246959-BB1
Italy	246959-061
Japan	246959-291
Korea	246959-AD1
Sweden	246959-AG1

Table 3-5

Spare Part Information *(Continued)*

Description	Spare Part Number
Screw Kit (includes the following screws; refer to Appendix C, "Screw Listing," for more information on specifications and usage ■ Hex socket HM5.0×11.0 screw lock ■ Phillips PM2.5×13.0 spring-loaded screw ■ Phillips PM2.5×4.0 screw ■ Phillips PM2.0x8.0 shoulder screw ■ Phillips PM2.0×8.0 screw ■ Phillips PM2.0×7.0 screw ■ Phillips PM2.0×4.0 screw ■ Phillips PM2.0x3.0 screw ■ Phillips PM1.5×8.0 screw ■ Phillips PM1.5×3.0 screw ■ Torx8 M2.0×8.0 screw	379813-001

3.7 Sequential Part Number Listing

Table 3-6

Sequential Part Number Listing

Spare Part Number	Description
239704-001	65-watt AC adapter
246959-001	Power cord for use in Canada, French Canada, Latin America, Taiwan, Thailand, and the United States
246959-011	Power cord for use in Australia and New Zealand
246959-021	Power cord for use in Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden
246959-031	Power cord for use in Hong Kong and the United Kingdom
246959-061	Power cord for use in Italy

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
246959-081	Power cord for use in Denmark
246959-201	Power cord for use in Brazil
246959-291	Power cord for use in Japan
246959-AD1	Power cord for use in Korea
246959-AG1	Power cord for use in Sweden
246959-BB1	Power cord for use in Israel
325814-001	Nylon, entry-level top load carrying case
325815-001	Nylon top load carrying case
325815-002	Nylon top load carrying case
359118-001	USB 1.1 diskette drive
367456-001	8-cell, travel battery pack
367457-001	6-cell, 4.8-AHr battery pack
367871-001	Broadcomm Bluetooth wireless board (includes Bluetooth board cable)
372420-001	Adjustable notebook stand
372772-001	6-cell, 4.8-AHr battery pack
373032-001	802.11b/g combination WLAN card, for use in the United States
373032-002	802.11b/g combination WLAN card, for use internationally
373032-291	802.11b/g combination WLAN card, for use Japan
373033-001	802.11a/b/g combination WLAN card, for use in the United States
373033-002	802.11a/b/g combination WLAN card, for use internationally
373033-291	802.11a/b/g combination WLAN card, for use Japan

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
373119-001	256-MB memory module (PC2-3200, CL3)
373120-001	512-MB memory module (PC2-3200, CL3)
373121-001	1024-MB memory module (PC2-3200, CL3)
373314-001	8X Max DVD-ROM drive MultiBay II device
373315-001	DVD/CD-RW Combo Drive MultiBay II device
373900-001	802.11a/b/g combination WLAN card, for use in MOW
373900-021	802.11a/b/g combination WLAN card, for use in Europe, Middle East, and Africa
373900-291	802.11a/b/g combination WLAN Mini PCI communications card for use Japan
373901-001	802.11a/b/g High Band combination WLAN card
374803-001	HP Docking Station
374804-001	HP Advanced Docking Station
375557-001	DVD+RW/R and CD-RW Combo Drive MultiBay II device
378188-001	Keyboard for use in the United States
378188-021	Keyboard for use internationally
378188-031	Keyboard for use in the United Kingdom
378188-041	Keyboard for use in Germany
378188-051	Keyboard for use in France
378188-061	Keyboard for use in Italy
378188-071	Keyboard for use in Spain
378188-081	Keyboard for use in Denmark
378188-091	Keyboard for use in Norway

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
378188-101	Keyboard for use in Sweden
378188-111	Keyboard for use in Switzerland
378188-121	Keyboard for use in French Canada
378188-131	Keyboard for use in Portugal
378188-141	Keyboard for use in Turkey
378188-151	Keyboard for use in Greece
378188-161	Keyboard for use in Latin America
378188-171	Keyboard for use in Saudi Arabia
378188-201	Keyboard for use in Brazil
378188-211	Keyboard for use in Hungary
378188-221	Keyboard for use in Czech Republic
378188-231	Keyboard for use in Slovakia
378188-251	Keyboard for use in Russia
378188-281	Keyboard for use in Thailand
378188-291	Keyboard for use in Japan
378188-A41	Keyboard for use in Belgium
378188-AB1	Keyboard for use in Taiwan
378188-AD1	Keyboard for use in Korea
378188-BA1	Keyboard for use in Slovenia
378188-BB1	Keyboard for use in Israel
378188-DD1	Keyboard for use in Iceland
378227-001	Serial connector module (includes cable)

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
378233-001	Fan
379790-001	System board (includes 32 MB of discrete video memory and RJ11 connector and cable)
379791-001	System board (includes UMA video memory and RJ11 connector and cable)
379792-001	14.1-inch, XGA, TFT display assembly (includes wireless antenna boards and cables)
379793-001	14.1-inch, SXGA, TFT display assembly (includes wireless antenna boards and cables)
379794-001	Switch cover
379795-001	LED board (includes LED board cable)
379796-001	Top cover
379797-001	Base enclosure
379798-001	TouchPad (includes TouchPad cable)
379799-001	Heat sink (includes thermal paste)
379801-001	Intel Celeron M 730 (1.5-GHz) processor (includes thermal paste)
379802-001	Intel Pentium M 730 (1.60-GHz) processor (includes thermal paste)
379803-001	Intel Pentium M 740 (1.73-GHz) processor (includes thermal paste)
379804-001	Intel Pentium M 750 (1.86-GHz) processor (includes thermal paste)
379805-001	Intel Pentium M 760 (2.00-GHz) processor (includes thermal paste)

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
379806-001	Intel Pentium M 770 (2.13-GHz) processor (includes thermal paste)
379807-001	TPM security card
379808-001	5400-rpm 40-GB hard drive (includes frame and connector)
379809-001	5400-rpm 60-GB hard drive (includes frame and connector)
379810-001	5400-rpm 80-GB hard drive (includes frame and connector)
379811-001	Audio for use with system boards with UMA video memory board (includes audio board cable)
379812-001	Miscellaneous Plastics Kit
379813-001	Screw Kit
380045-001	Docking Stand Miscellaneous Plastics Kit
380774-001	Modem board
380950-001	7200-rpm 60-GB hard drive (includes frame and connector)
381090-001	65 watt, slim profile AC adapter
382909-001	System board (includes 64 MB of discrete video memory and RJ11 connector and cable)
385498-001	Audio board for use with system boards with discrete video memory (includes audio board cable)
389013-001	Miscellaneous Cable Kit

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

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.

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.”

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

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.

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, drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

4.7 Grounding Equipment and Methods

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.

- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

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

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

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

Table 4-1

Typical Electrostatic Voltage Levels

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

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

Table 4-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 4-2

Static-Shielding Materials

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

5

Removal and Replacement Procedures

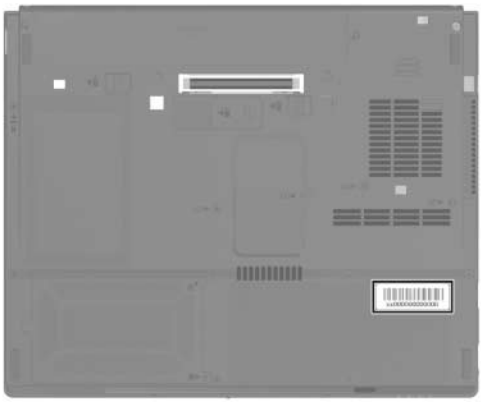
This chapter provides removal and replacement procedures.

There are 56 screws and screw locks, in 12 different sizes, that may need to be removed, replaced, or loosened when servicing the notebook. Make special note of each screw and screw lock size and location during removal and replacement.

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

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

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
5.4	Hard drive	2 loosened to remove the hard drive cover 1 loosened to remove the hard drive 6 to disassemble hard drive
5.5	Notebook feet	0
5.6	Bluetooth board	0
5.7	MultiBay II device	1
5.8	External memory module	1 loosened to remove the memory module compartment cover
5.9	Keyboard	3
5.10	Switch cover	3
5.11	LED board	5
5.12	TPM security card	1
5.13	Fan	2 loosened
5.14	Heat sink	4 loosened

Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
5.15	Processor	0
5.16	Modem board	2
5.17	Internal memory module	0
5.18	TouchPad	0
5.19	Mini PCI Communications Card ⚠ 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.	0
5.20	Display assembly	6
5.21	Top cover	11
5.22	Serial connector module	2 screw locks
5.23	Audio board	0
5.24	System board	2 screw locks 4 screws

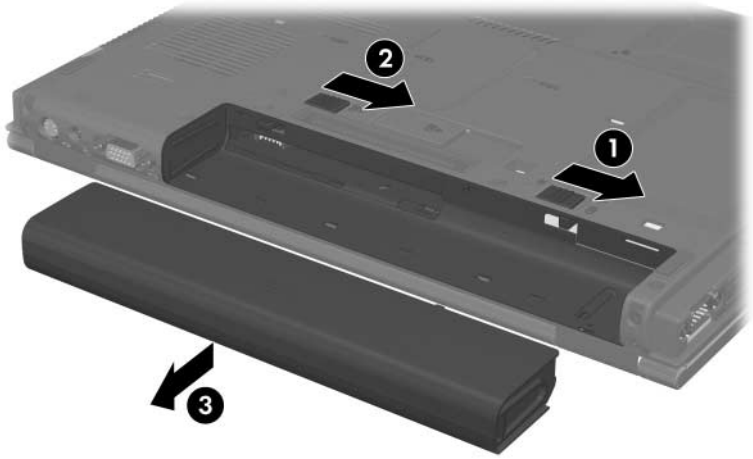
5.3 Preparing the Notebook for Disassembly

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	
6-cell, 4.4-AHr	372772-001
6-cell, 4.8-AHr	367457-001
8-cell, travel battery	367456-001

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



Removing the Battery Pack

Reverse the above procedure to install the battery pack.

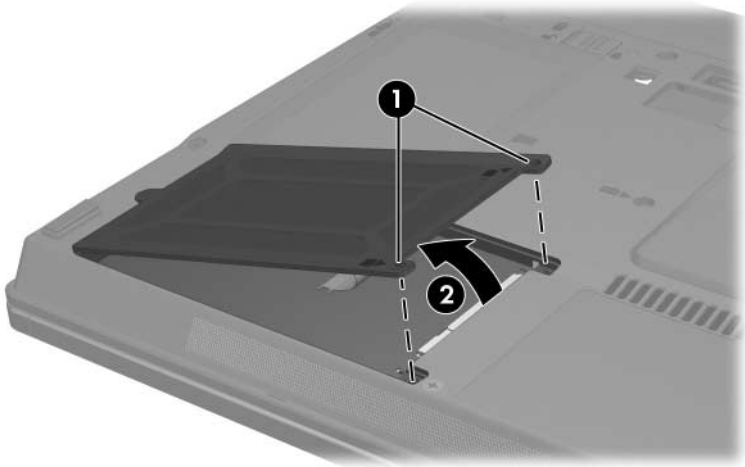
5.4 Hard Drive

Hard Drive Spare Part Number Information			
7200-rpm		5400-rpm	
60-GB	380950-001	80-GB	379810-001
		60-GB	379809-001
		40-GB	379808-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Position the notebook with the right side toward you.

3. Loosen the 2 PM1.5×4.0 screws ❶ that secure the hard drive cover to the notebook.
4. Lift the right side of the hard drive cover and swing it to the left ❷.
5. Remove the hard drive cover.

The hard drive cover is included in the Miscellaneous Plastics Kit, spare part number 379812-001.

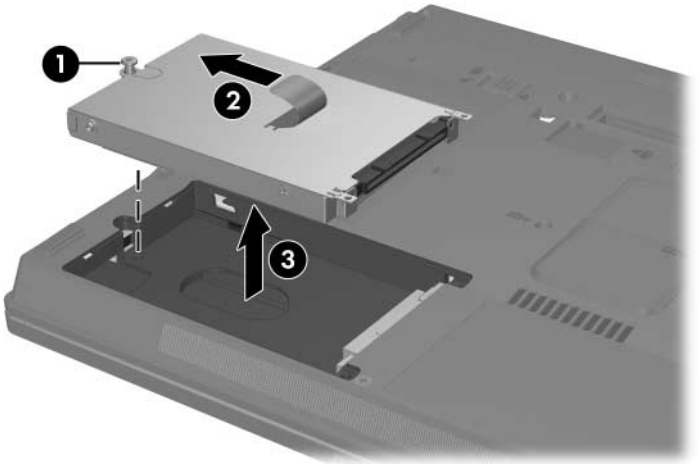


Removing the Hard Drive Cover

a. Loosen the PM2.5×13.0 spring-loaded hard drive retention screw ❶.

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

c. Remove the hard drive from the hard drive bay ❸.

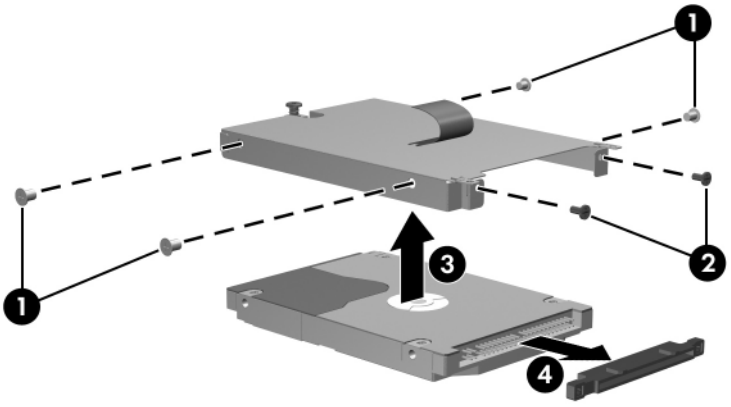


Removing the Hard Drive

d. Remove the 4 PM2.5×4.0 screws ❶ and the 2 PM1.5×4.0 screws ❷ that secure the hard drive frame to the hard drive.

e. Lift the frame straight up ❸ to remove if from the hard drive.

f. Remove the hard drive connector ❹ from the hard drive.

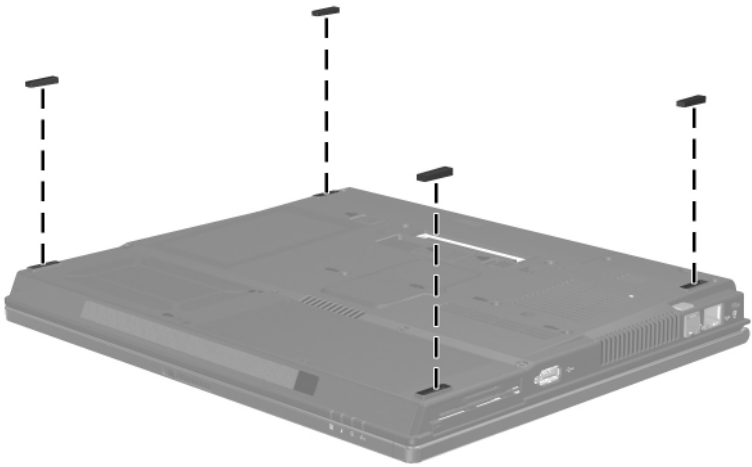


Removing the Hard Drive Frame and Connector

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

5.5 Notebook Feet

The notebook feet are adhesive-backed rubber pads. The feet are included in the Miscellaneous Plastics Kit, spare part number 379812-001.

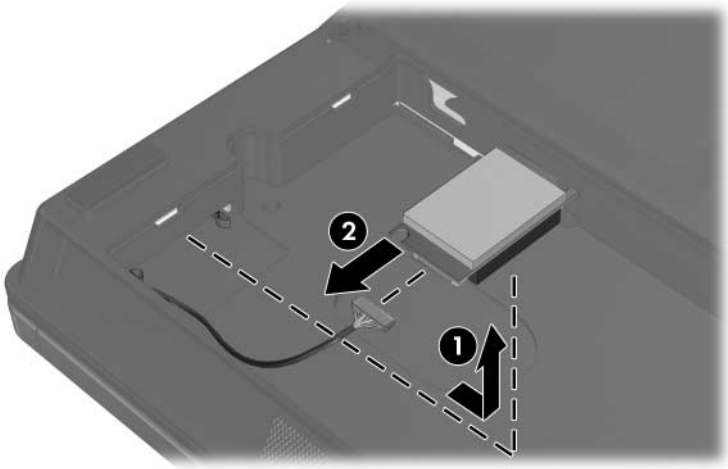


Replacing the Notebook Feet

5.6 Bluetooth Board

Bluetooth Board Spare Part Number Information	
Broadcomm Bluetooth wireless board (includes Bluetooth board cable)	367871-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Position the notebook with the front panel toward you.
3. Slide the Bluetooth board out of the clip ❶ in the hard drive compartment.
4. Disconnect the Bluetooth board cable ❷ from the board.



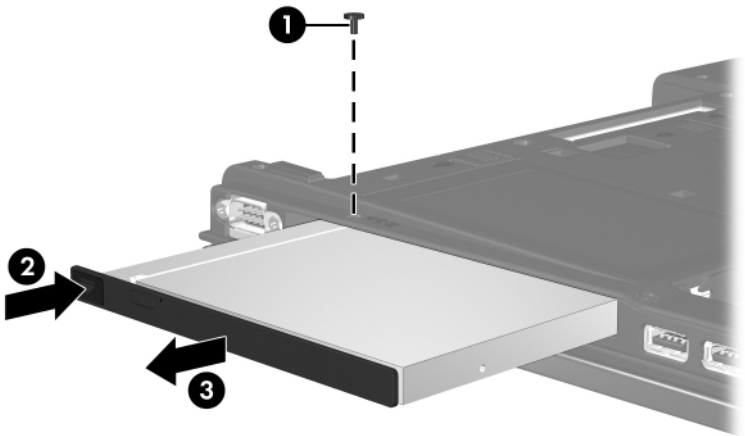
Removing the Bluetooth Board

Reverse the above procedure to install a Bluetooth board.

5.7 MultiBay II Device

MultiBay II Device Spare Part Number Information	
8X Max DVD-ROM drive	373314-001
DVD+RW/R and CD-RW Combo Drive	375557-001
DVD/CD-RW Combo Drive	373315-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Position the notebook with the right side toward you.
3. If it is installed, remove the PM2.0×5.0 security screw ❶ that secures the MultiBay II device to the notebook.
4. Gently press in on the left side of the device ❷ to unlock it.
5. Slide the device ❸ from the notebook.



Removing the MultiBay II Device

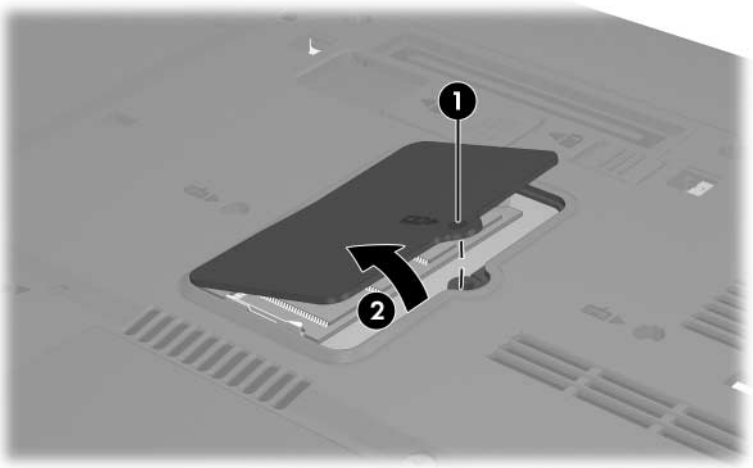
Reverse the above procedure to install a MultiBay II device.

5.8 External Memory Module

Memory Module Spare Part Number Information	
1024 MB	373121-001
512 MB	373120-001
256 MB	373119-001

1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Position the notebook with the front panel toward you.
3. Loosen the PM1.5×4.0 screw ❶ that secures the memory module compartment cover to the notebook.
4. Lift the right side of the cover up and swing it to the left ❷.
5. Remove the memory module compartment cover.

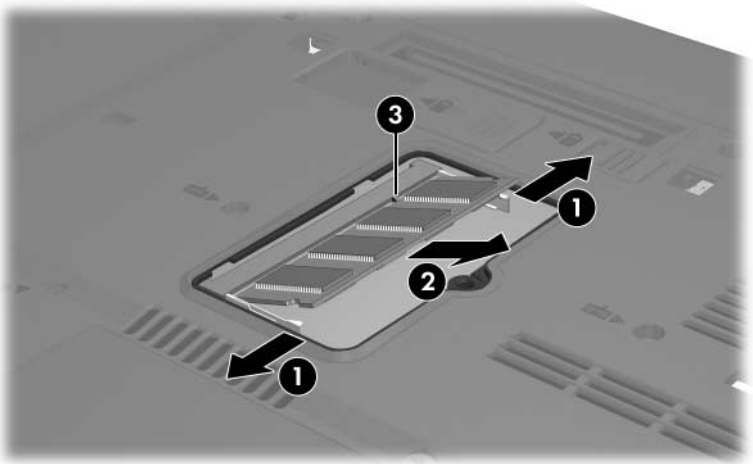
The memory module compartment cover is included in the Miscellaneous Plastics Kit, spare part number 379812-001.



Removing the Memory Module Compartment Cover

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

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



Removing the Memory Module

Reverse the above procedure to install a memory module.

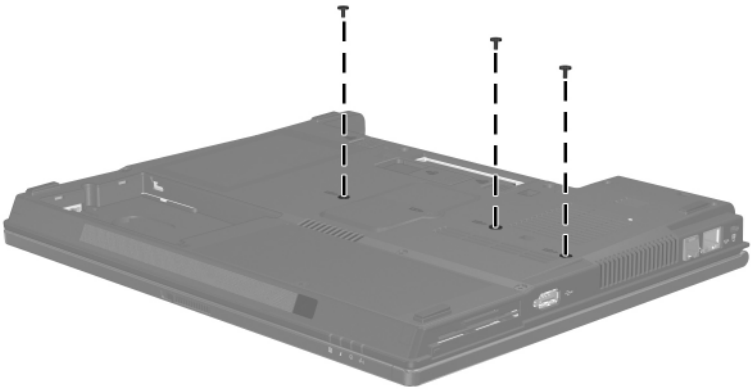
5.9 Keyboard

Keyboard Spare Part Number Information

Belgium	378188-A41	Latin America	378188-161
Brazil	378188-201	Norway	378188-091
Czech Republic	378188-221	Portugal	378188-131
Denmark	378188-081	Russia	378188-251
France	378188-051	Saudi Arabia	378188-171
French Canada	378188-121	Slovakia	378188-231
Germany	378188-041	Slovenia	378188-BA1
Greece	378188-151	Spain	378188-071
Hungary	378188-211	Sweden	378188-101
Iceland	378188-DD1	Switzerland	378188-111
International	378188-021	Taiwan	378188-AB1
Israel	378188-BB1	Thailand	378188-281
Italy	378188-061	Turkey	378188-141
Japan	378188-291	United Kingdom	378188-031
Korea	378188-AD1	United States	378188-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook upside down with the front panel toward you.

3. Remove the 3 T8M2.0×8.0 screws that secure the keyboard to the notebook.

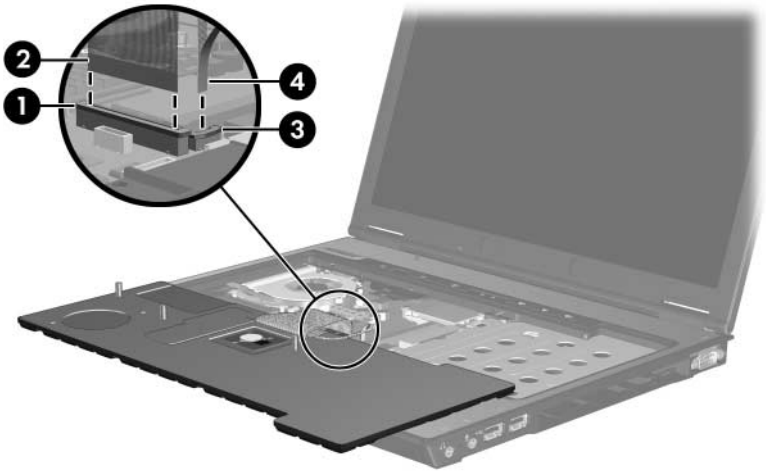


Removing the Keyboard Screws

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

Releasing the Keyboard

8. 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.
9. Release the ZIF connector ❸ to which the pointing stick cable is connected and disconnect the pointing stick cable ❹ from the system board.



Disconnecting the Keyboard and Pointing Stick Cables

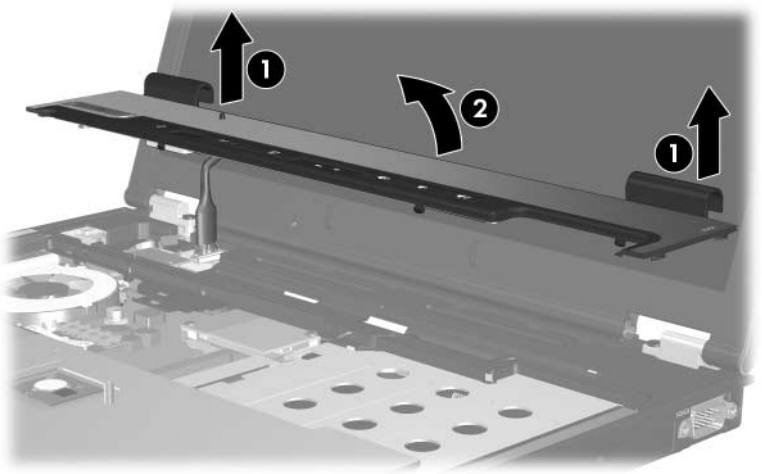
10. Remove the keyboard.

Reverse the above procedure to install the keyboard.

5.10 Switch Cover

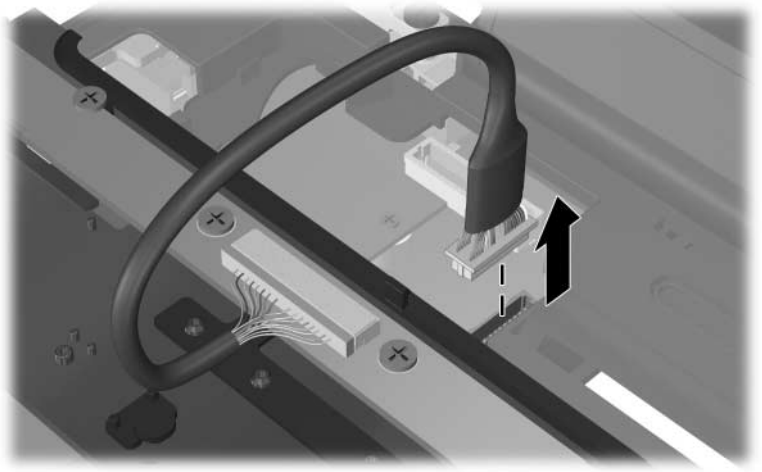
Switch Cover Spare Part Number Information	
Switch cover	379794-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Release the keyboard (Section 5.9).
3. Lift up the left and right hinge cover sections of the switch cover ❶ to detach the cover from the notebook.
4. Swing the rear edge of the hinge cover up and forward until the cover rests on the notebook ❷. (The LED board cable is now visible at the upper-left edge of the notebook.)



Removing the Switch Cover

5. Disconnect the LED board cable from the system board.



Disconnecting the LED Board Cable

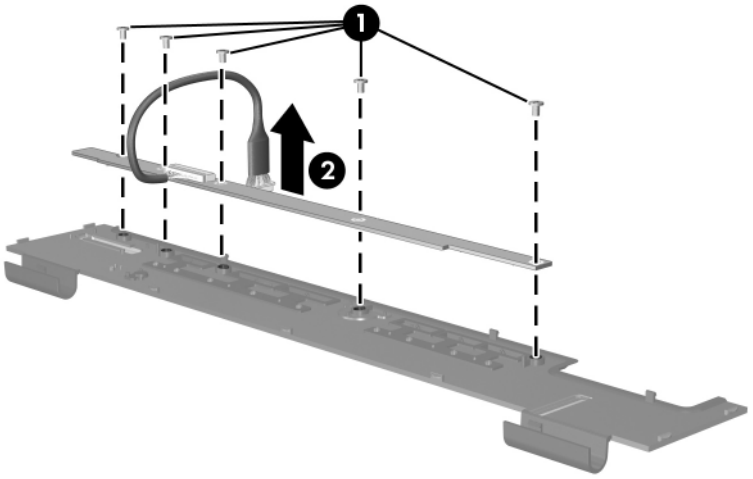
6. Remove the switch cover.

Reverse the above procedure to install the switch cover.

5.11 LED Board

LED Board Spare Part Number Information	
LED board (includes LED board cable)	379795-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.9).
3. Remove the switch cover (Section 5.10).
4. Turn the switch cover upside down.
5. Remove 5 PM2.0×3.0 screws ❶ that secure the LED board to the switch cover.
6. Remove the LED board ❷.



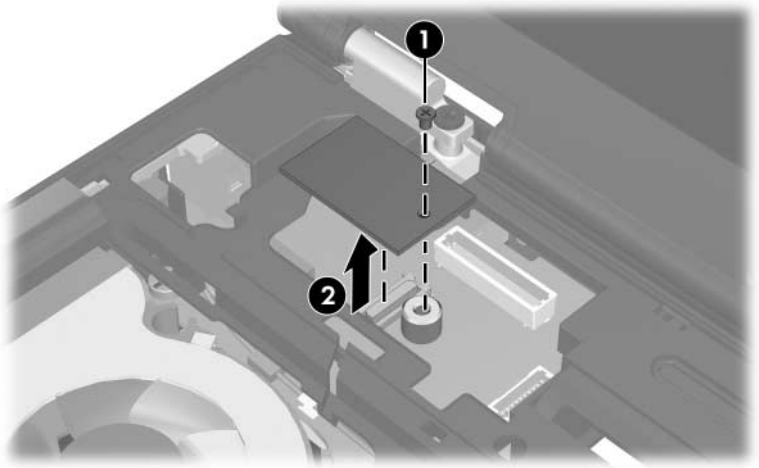
Removing the LED Board

Reverse the above procedure to install the LED board.

5.12 TPM Security Card

TPM Security Card Spare Part Number Information	
TPM security card	379807-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.9).
3. Remove the switch cover (Section 5.10).
4. Remove the PM1.5×3.0 screw ❶ that secures the TPM security card to the notebook.
5. Lift up on the right side of the card ❷ to disconnect it from the system board.



Removing the TPM Security Card

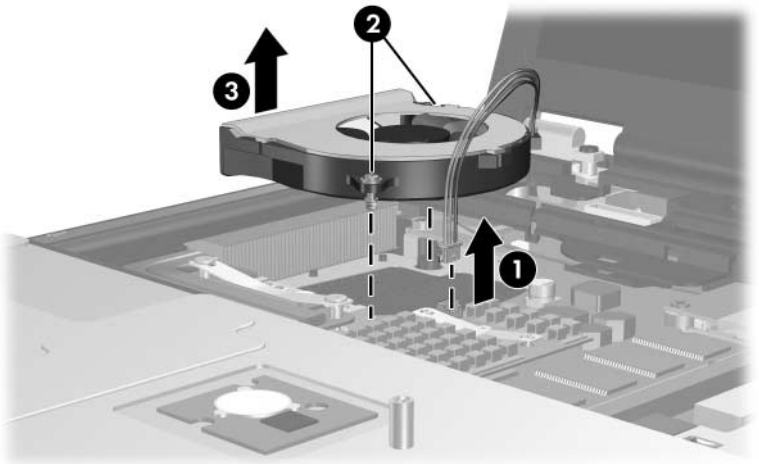
6. Remove the TPM security card.

Reverse the above procedure to install the TPM security card.

5.13 Fan

Fan Spare Part Number Information	
Fan	378233-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Release the keyboard (Section 5.9).
3. Disconnect the fan cable ❶ from the system board.
4. Loosen the 2 PM2.0×7.0 screws ❷ that secure the fan to the notebook.
5. Remove the fan ❸.



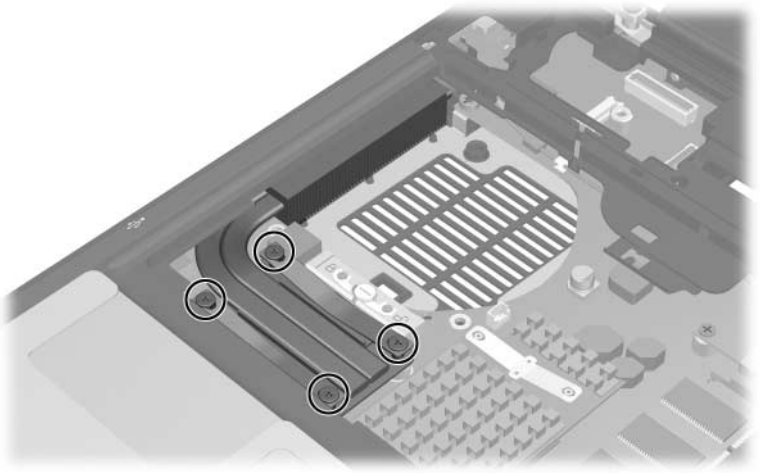
Removing the Fan

Reverse the above procedure to install the fan.

5.14 Heat Sink

Heat Sink Spare Part Number Information	
Heat sink (includes thermal paste)	379799-001

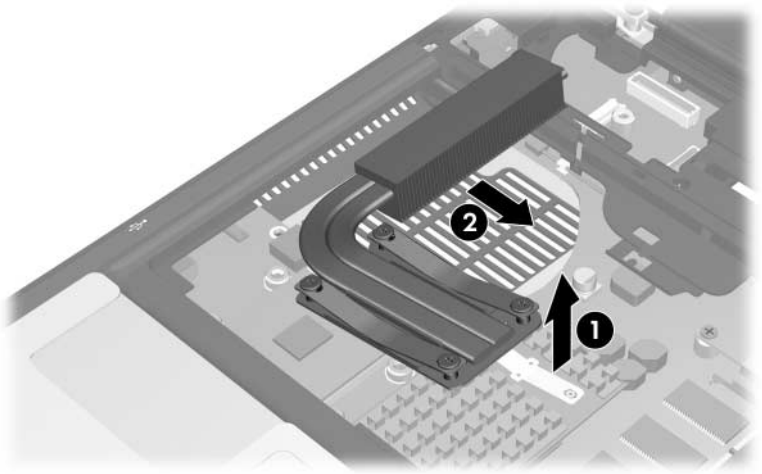
1. Prepare the notebook for disassembly (Section 5.3).
2. Release the keyboard (Section 5.9).
3. Remove the fan (Section 5.13).
4. Loosen the 4 PM2.0×8.0 shoulder screws that secure the heat sink to the notebook.



Loosening the Heat Sink Screws

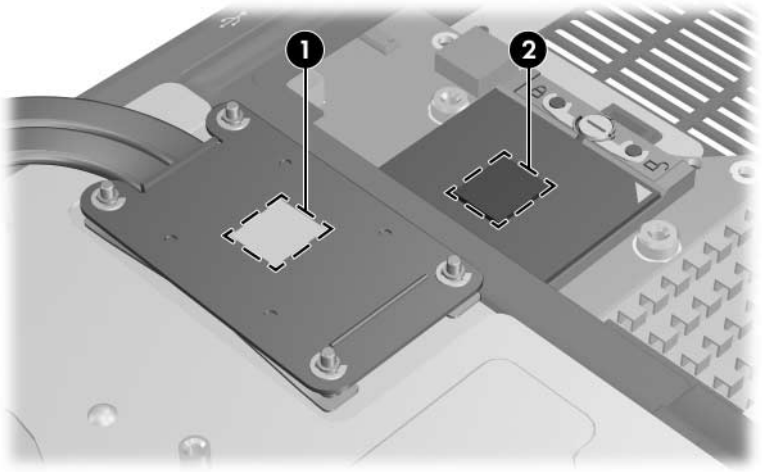
5. Lift the right side of the heat sink ❶ to disengage it from the processor.
6. Slide the heat sink up and to the right ❷ to remove it.

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



Removing the Heat Sink

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



Replacing the Thermal Paste

Reverse the above procedure to install the heat sink.

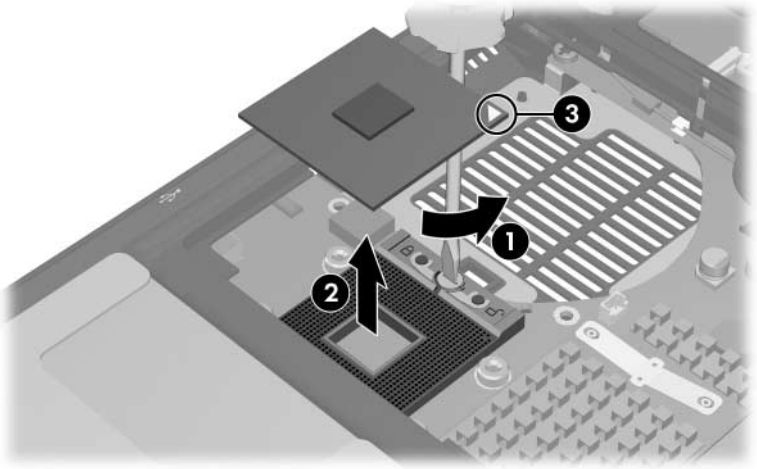
5.15 Processor

Processor Spare Part Number Information	
Processors (include thermal paste)	
Intel Pentium M 770 (2.13-GHz)	379806-001
Intel Pentium M 760 (2.00-GHz)	379805-001
Intel Pentium M 750 (1.86-GHz)	379804-001
Intel Pentium M 740 (1.73-GHz)	379803-001
Intel Pentium M 730 (1.60-GHz)	379802-001
Intel Celeron-M 730 (1.5-GHz)	379801-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Release the keyboard (Section 5.9).
3. Remove the fan (Section 5.13).
4. Remove the heat sink (Section 5.14).

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

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



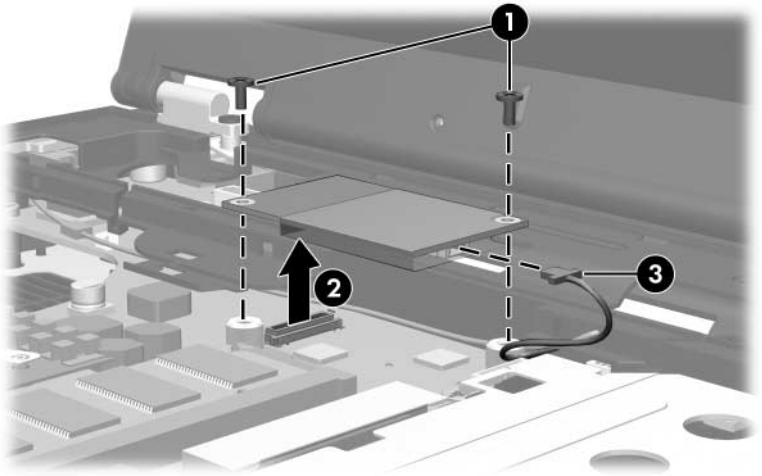
Removing the Processor

Reverse the above procedure to install the processor.

5.16 Modem Board

Modem Board Spare Part Number Information	
Modem board	380774-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Release the keyboard (Section 5.9).
3. Remove the 2 PM2.0×3.0 screws ❶ that secure the modem board to the notebook.
4. Lift the left side of the modem board ❷ to disconnect it from the system board.
5. Disconnect the modem cable ❸ from the modem board.
6. Remove the modem board.



Removing the Modem Board

Reverse the above procedure to install the modem board.

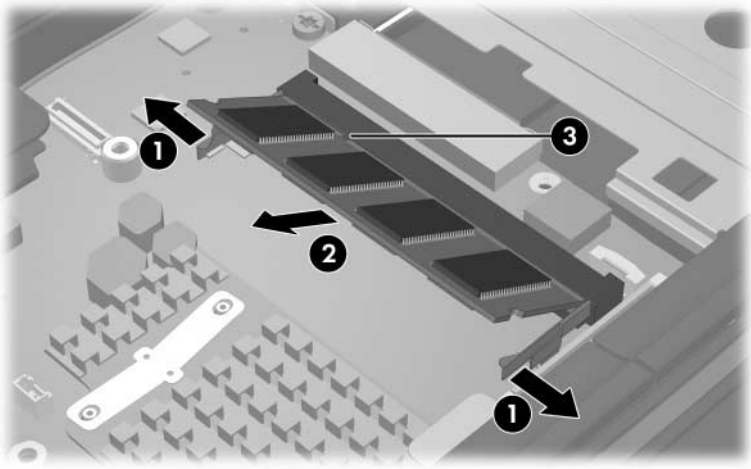
5.17 Internal Memory Module

Memory Module Spare Part Number Information	
1024 MB	373121-001
512 MB	373120-001
256 MB	373119-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Release the keyboard (Section 5.9).

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

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



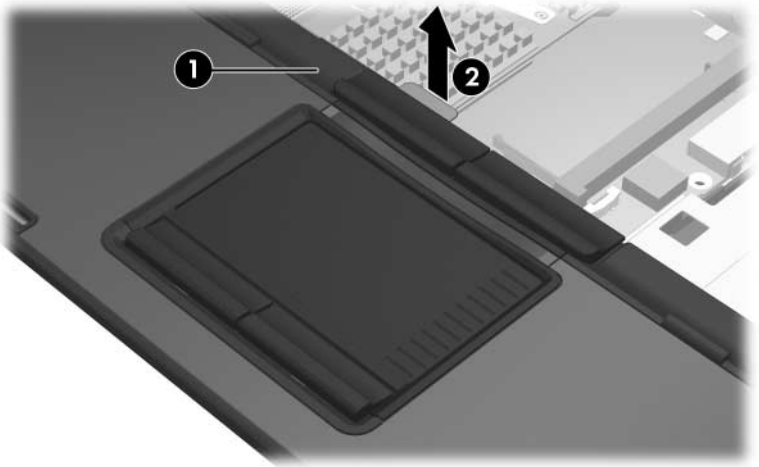
Removing the Internal Memory Module

Reverse the above procedure to install a memory module.

5.18 TouchPad

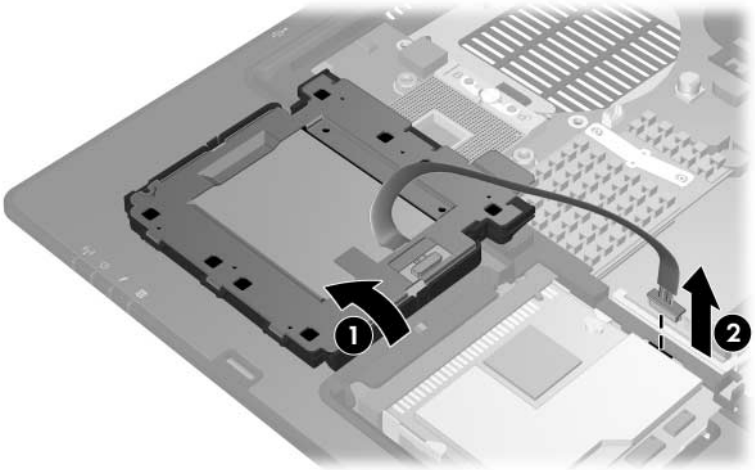
TouchPad Spare Part Number Information	
TouchPad (includes TouchPad cable)	379798-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.9).
3. Press down on the section of the top cover to the left of the metal tab next to the TouchPad ❶.
4. Lift up on the metal tab ❷ on the TouchPad until the TouchPad disengages from the top cover.



Releasing the TouchPad

5. Swing the TouchPad up and to the left ❶ until it rests on the palm rest.
6. Disconnect the TouchPad cable ❷ from the system board.



Removing the TouchPad

7. Remove the TouchPad.

Reverse the above procedure to install the TouchPad.

5.19 Mini PCI Communications Card

Mini PCI Communications Card Spare Part Number Information	
802.11b/g combination WLAN card, for use internationally	373032-002
802.11b/g combination WLAN card, for use Japan	373032-291
802.11b/g combination WLAN card, for use in the United States	373032-001
802.11a/b/g combination WLAN card, for use in Europe, Middle East, and Africa	373900-021
802.11a/b/g combination WLAN Mini PCI communications card for use Japan	373900-291
802.11a/b/g combination WLAN card, for use internationally	373033-002
802.11a/b/g combination WLAN card, for use Japan	373033-291
802.11a/b/g combination WLAN card, for use in MOW	373900-001
802.11a/b/g combination WLAN card, for use in the United States	373033-001
802.11a/b/g High Band combination WLAN card	373901-001

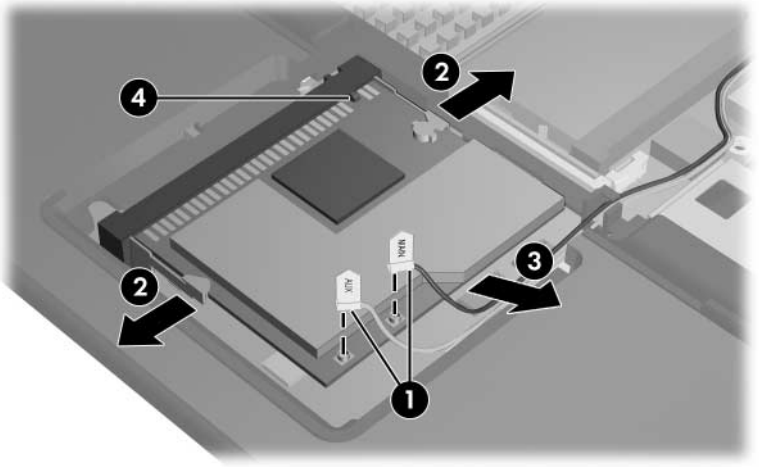
1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.9).
3. Remove the TouchPad (Section 5.18).

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

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

5. Spread the 2 retaining tabs ❷ on each side of the Mini PCI socket to release the Mini PCI communications card. (The side of the Mini PCI communications card opposite the socket rises away from the notebook.)
6. Remove the Mini PCI communications card by pulling the card 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

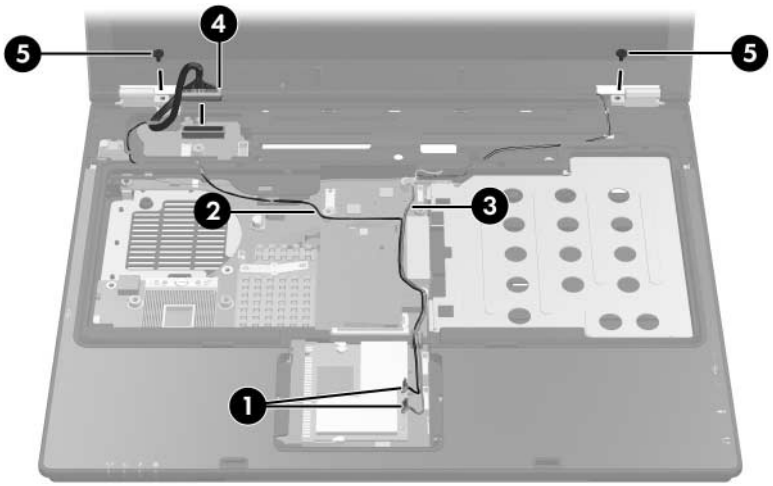
Reverse the above procedure to install a Mini PCI communications card.

5.20 Display Assembly

Display Assembly Spare Part Number Information	
14.1-inch, SXGA, TFT	379793-001
14.1-inch, XGA, TFT	379792-001

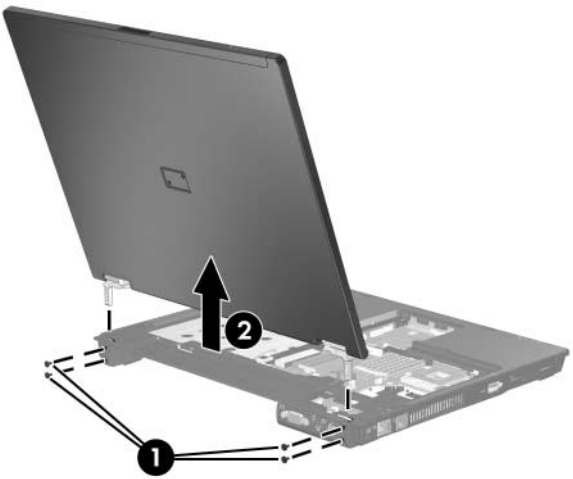
1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   a. Keyboard (Section 5.9)
   b. Switch cover (Section 5.10)
   c. TouchPad (Section 5.18)

2. Disconnect the wireless antenna cables ❶ from the Mini PCI communications card.
3. Remove the wireless antenna cables from the Mini PCI compartment and the top cover clips ❷ and ❸.
4. Disconnect the display cable ❹ from the system board.
5. Remove the 2 PM2.0×4.0 screws ❺ that secure the display assembly to the notebook.



Disconnecting the Display Cable and Removing the Display Screws

6. Position the notebook with the rear panel toward you.
7. Remove the 4 T8M2.0×8.0 screws ❶ that secure the display assembly to the notebook.
8. Lift the display assembly straight up and remove it ❷.



Removing the Display Assembly

Reverse the above procedure to install the display assembly.

5.21 Top Cover

Top Cover Spare Part Number Information	
Top cover	379796-001

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   a. Hard drive (Section 5.4)
   b. Keyboard (Section 5.9)
   c. Switch cover (Section 5.10)
   d. TouchPad (Section 5.18)
   e. Display assembly (Section 5.20)

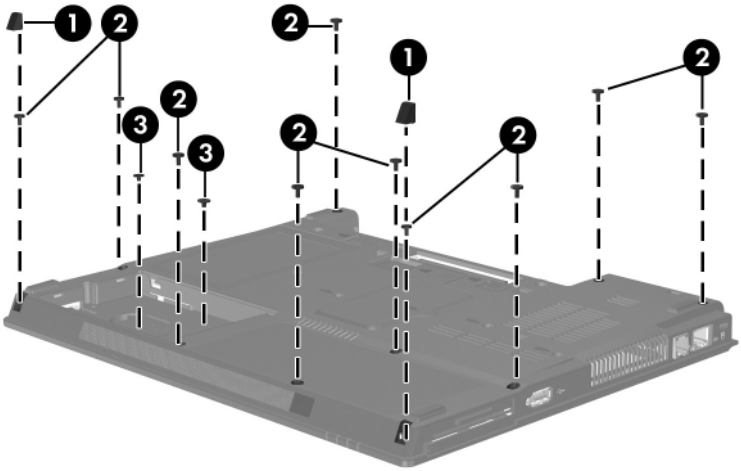
2. Turn the notebook upside down with the front panel toward you.
3. Remove the following:

   ❶ 2 rubber screw covers

The rubber screw covers are included in the Miscellaneous Plastics Kit, spare part number 379812-001.

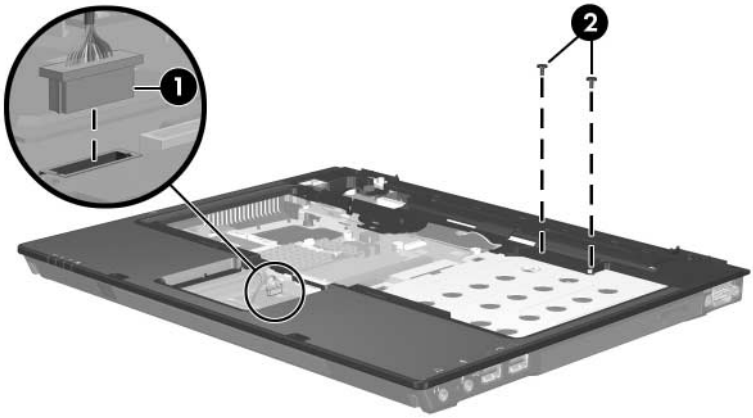
   ❷ 10 T8M2.0×8.0 screws

   ❸ 2 PM2.0×3.0 screws in the hard drive bay



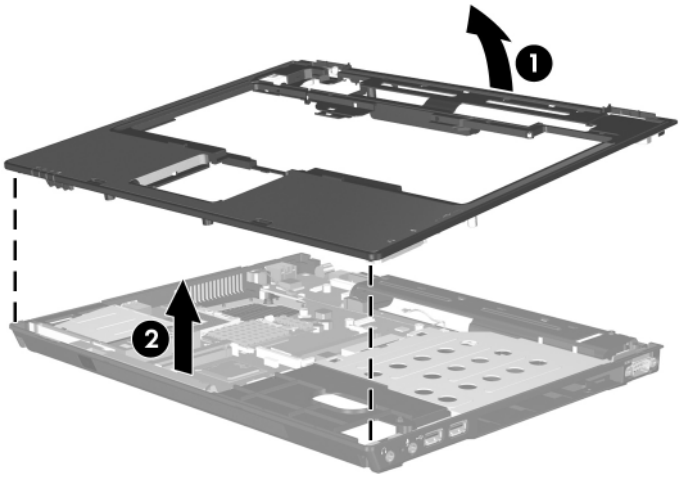
Removing the Top Cover Screws, Part 1

4. Turn the notebook right-side up with the front panel toward you.
5. Disconnect the Bluetooth board cable from the system board ❶.
6. Remove the 2 PM2.0×4.0 screws ❷ that secure the top cover to the notebook.



Removing the Top Cover Screws, Part 2

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



Releasing the Top Cover

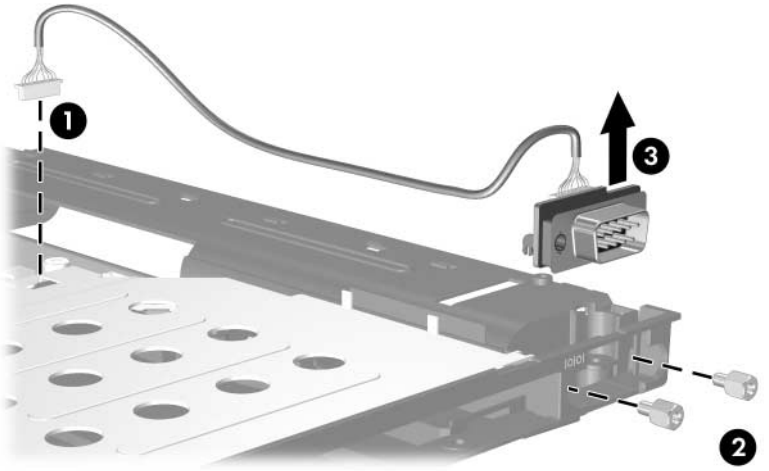
Reverse the above procedure to install the top cover.

5.22 Serial Connector Module

Serial Connector Module Spare Part Number Information	
Serial connector module (includes serial connector module cable)	378227-001

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   a. Hard drive (Section 5.4)
   b. Keyboard (Section 5.9)
   c. Switch cover (Section 5.10)
   d. TouchPad (Section 5.18)
   e. Display assembly (Section 5.20)
   f. Top cover (Section 5.21)

2. Position the notebook with the right side toward you.
3. Disconnect the serial connector module cable ❶ from the system board.
4. Remove the 2 HM5.0×11.0 screw locks ❷ that secure the serial connector module to the base enclosure.
5. Remove the serial connector module ❸ from the base enclosure.



Removing the Serial Connector Module and Cable

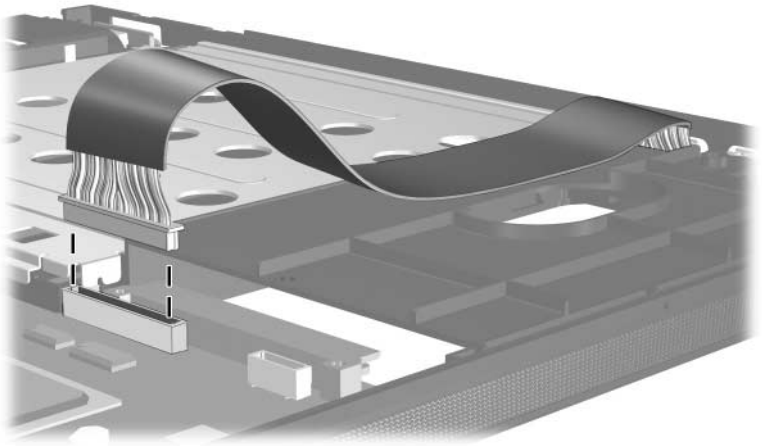
Reverse the above procedure to install the serial connector module.

5.23 Audio Board

Audio Board Spare Part Number Information	
For use with system boards with discrete video memory	385498-001
For use with system boards with UMA video memory	379811-001

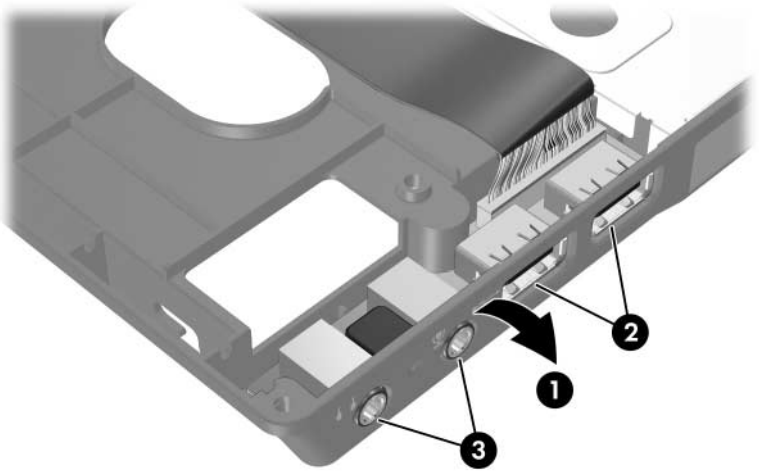
1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   a. Hard drive (Section 5.4)
   b. Keyboard (Section 5.9)
   c. Switch cover (Section 5.10)
   d. TouchPad (Section 5.18)
   e. Display assembly (Section 5.20)
   f. Top cover (Section 5.21)

2. Disconnect the audio board cables from the system board.



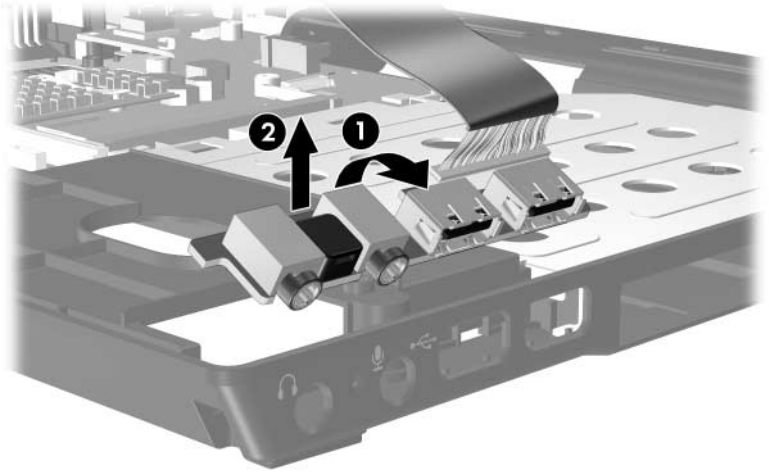
Disconnecting the Audio Board Cables

3. Flex the right side of the base enclosure outward ❶ until the USB connectors ❷ and audio connectors ❸ are clear of the openings in the base enclosure.



Releasing the Audio Board

4. Lift the right side of the audio board ❶, then lift the board out of the base enclosure ❷.



Removing the Audio Board

Reverse the above procedure to install the audio board.

5.24 System Board

System Board Spare Part Number Information	
Includes 64 MB of discrete video memory	382909-001
Includes 32 MB of discrete video memory	379790-001
Includes UMA video memory	379791-001

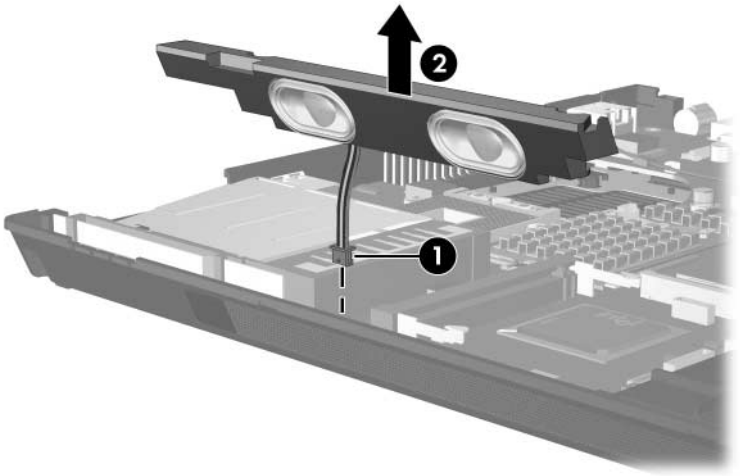
When replacing the system board, ensure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory modules (Section 5.8 and Section 5.17)
- TPM security card (Section 5.12)
- Processor (Section 5.15)
- Modem board (Section 5.16)
- Mini PCI communications card (Section 5.19)

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
   a. Hard drive (Section 5.4)
   b. Bluetooth board (Section 5.6)
   c. MultiBay II device (Section 5.7)
   d. Keyboard (Section 5.9)
   e. Switch cover (Section 5.10)
   f. Fan (Section 5.13)
   g. Heat sink (Section 5.14)
   h. TouchPad (Section 5.18)
   i. Display assembly (Section 5.20)
   j. Top cover (Section 5.21)

2. Disconnect the speaker cable from the system board ❶.
3. Remove the speaker ❷.

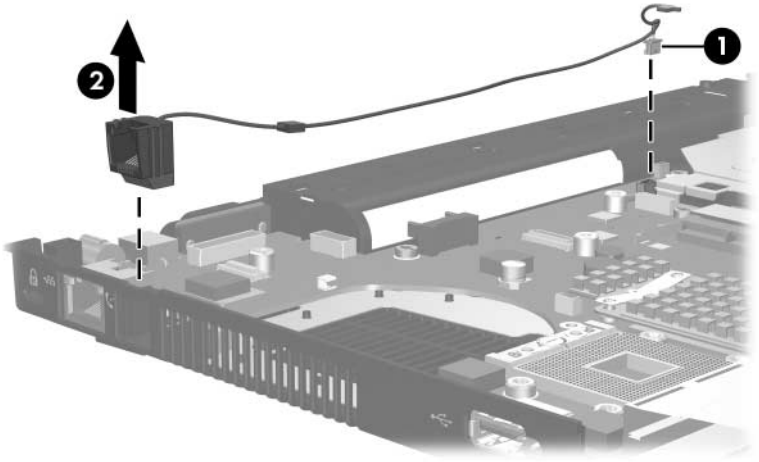
The speaker is included in the Miscellaneous Plastics Kit, spare part number 379812-001.



Removing the Speaker

4. Position the notebook with the left side toward you.
5. Disconnect the RJ-11 cable ❶ from the system board.
6. Remove the RJ-11 connector ❷ from the clip in the base enclosure.

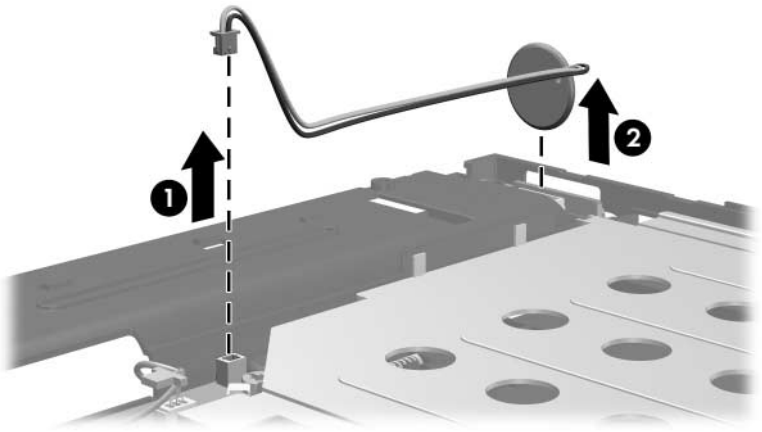
The RJ-11 connector and cable is included in the Miscellaneous Cables Kit, spare part number 389013-001.



Removing the RJ-11 Connector and Cable

7. Disconnect the RTC battery cable ❶ from the system board.
8. Remove the RTC battery ❷ from the clip in the top cover.

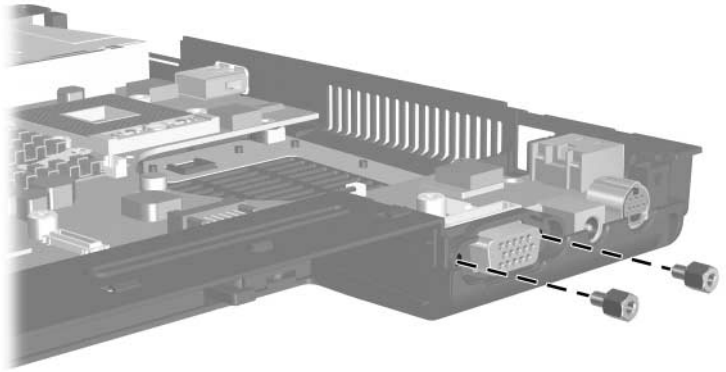
The RTC battery is included in the Miscellaneous Plastics Kit, spare part number 379812-001.



Removing the RTC Battery

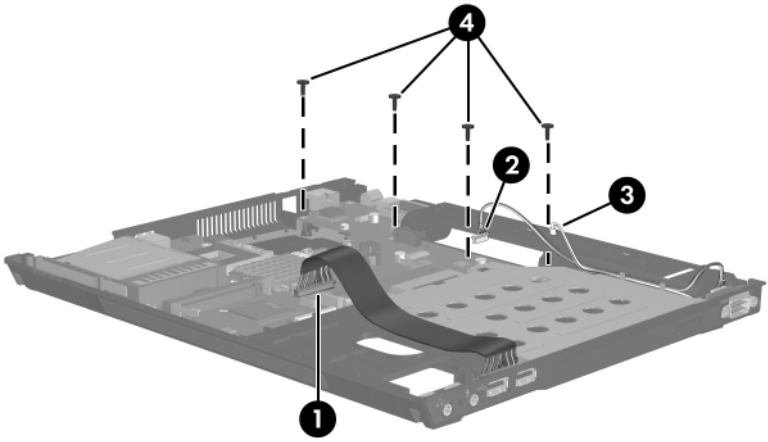
9. Position the notebook with the rear panel toward you.

10. Remove the 2 HM5.0×11.0 screw locks on each side of the external monitor connector.



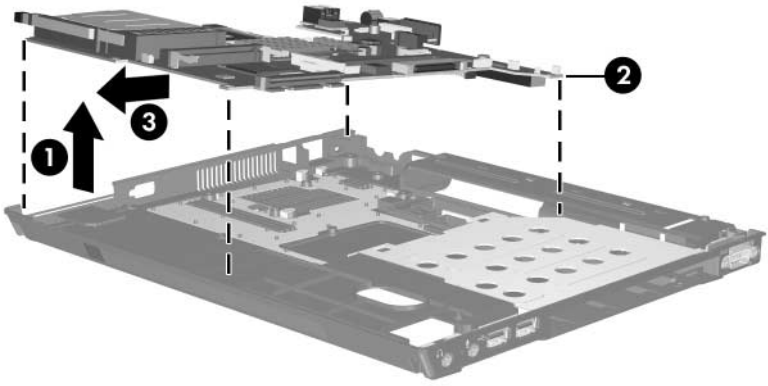
Removing the System Board Screw Locks

11. Position the notebook with the front toward you.
12. Disconnect the following cables from the system board:
    - ❶ Audio board cables
    - ❷ Serial connector cable
    - ❸ RTC battery cable
13. Remove the 4 T8M2.0×8.0 screws ❹ that secure the system board to the base enclosure.



Disconnecting the System Board Cables and Removing the System Board Screws

14. Lift the front edge of the system board ❶ until the right/rear corner is clear of the MultiBay II device shield ❷.
15. Slide the system board forward ❸ and remove it.



Removing the System Board Screws and Screw Locks

Reverse the above procedures to install the system board.

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1

Notebook

Dimensions	**Metric**	**U.S.**
Height (varies from front rear)	2.65 to 3.35 cm	1.04 to 1.32 in
Width	31.5 cm	12.40 in
Depth	25.7 cm	10.12 in
Weight		
Notebook with 14.1-inch display, MultiBay II device, and 6-cell battery pack	2.4 kg	5.29 lb
Input Power		
Operating voltage	18.5 V dc @ 3.5 A- 65 W	
Operating current	3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F

Table 6-1

Notebook *(Continued)*

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

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

Table 6-2

14.1-inch, SXGA, TFT Display

Dimensions		
Height	28.5 cm	11.2 in
Width	21.3 cm	8.4 in
Diagonal	35.8 cm	14.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical7	
Pixel resolution		
Pitch	0.197 × 0.197 mm	
Format	1680 × 1050	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	5.5 W	
Viewing angle	+/-35° horizontal, +15/-35° vertical typical	

Table 6-3

14.1-inch, XGA, TFT Display

Dimensions		
Height	28.5 cm	11.2 in
Width	21.3 cm	8.4 in
Diagonal	35.8 cm	14.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	+/-40° horizontal, +20/-40° vertical typical	

Table 6-4

Hard Drives

	80-GB*	60-GB*	60-GB*	40-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	99 g	99 g	99 g	102 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†	156,301,488	117,210,240	117,210,240	78,140,160
Disk rotational speed	5400 rpm	7200 rpm	5400 rpm	5400 rpm
Operating temperature		5°C to 55°C (41°F to 131°F)		

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

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

†Actual drive specifications may differ slightly.

Table 6-5

Primary 6-cell, Li-Ion Battery Pack

Dimensions		
Height	2.00 cm	0.79 in
Width	9.40 cm	3.70 in
Depth	13.40 cm	5.28 in
Weight	0.34 kg	0.75 lb
Energy		
Voltage	11.1 V	
Amp-hour capacity	4.4 Ah	
Watt-hour capacity	48 Wh	
Temperature		
Operating	5°C to 45°C	41°F to 113°F
Nonoperating	0°C to 60°C	32°F to 140°F

Table 6-6

8X DVD-ROM Drive

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

Table 6-7

DVD+RW/R and CD-RW Combo Drive

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

Table 6-7

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

Table 6-8

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)	

Table 6-8

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	

Table 6-9

System DMA

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

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

Table 6-10

System Interrupts

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

Table 6-10

System Interrupts *(Continued)*

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

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

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

Table 6-11

System I/O Addresses

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

Table 6-11

System I/O Addresses *(Continued)*

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

Table 6-11

System I/O Addresses *(Continued)*

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

Table 6-12

System Memory Map

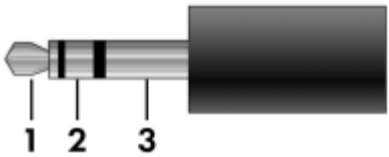
Size	Memory Address	System Function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	01000000-047FFFFF	Super extended memory
58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

A

Connector Pin Assignments

Table A-1

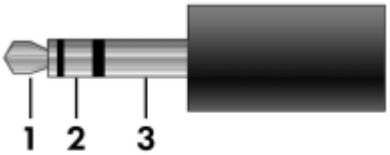
Audio-Out (Headphone)



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

Table A-2

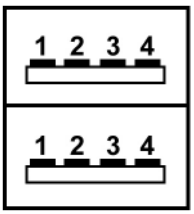
Audio-In (Microphone)



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

Table A-3

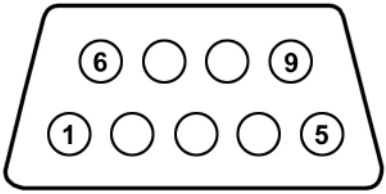
Universal Serial Bus



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

Table A-4

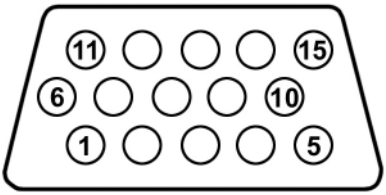
Serial



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

Table A-5

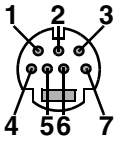
External Monitor



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

Table A-6

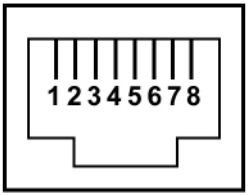
S-Video-Out



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

Table A-7

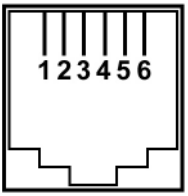
RJ-45 (Network)



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

Table A-8

RJ-11 (Modem)



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

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.

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.

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

NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

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

Country	Accredited Agency	Applicable Note Number
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1
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.

C

Screw Listing

This appendix provides specification and reference information for the screws and screw locks used in the notebook. All screws and screw locks listed in this appendix are available in the Screw Kit, spare part number 379813-001.

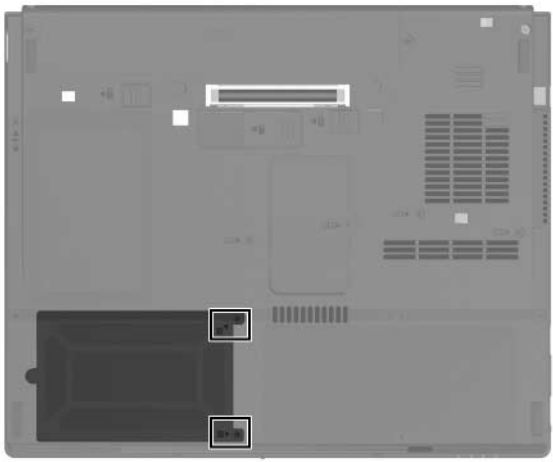
Table C-1

Phillips PM1.5×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	5	4.0 mm	1.5 mm	4.5 mm

Where used:

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



Phillips M1.5×4.0 Screw Locations

Table C-1

Phillips 1.5×4.0 Screw (Continued)

mm	Color	Qty.	Length	Thread	Head Width
	Black	5	4.0 mm	1.5 mm	4.5 mm

Where used:

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

Phillips M1.5×4.0 Screw Locations

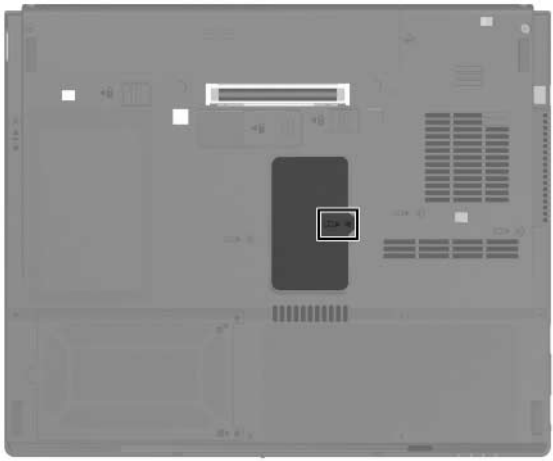
Table C-1

Phillips 1.5×4.0 Screw (Continued)

mm	Color	Qty.	Length	Thread	Head Width
	Black	5	4.0 mm	1.5 mm	4.5 mm

Where used:

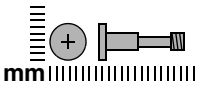
One screw that secures the memory module compartment cover to the notebook (screw is secured to the cover by a C clip; documented in Section 5.8)



Phillips PM1.5×4.0 Screw Location

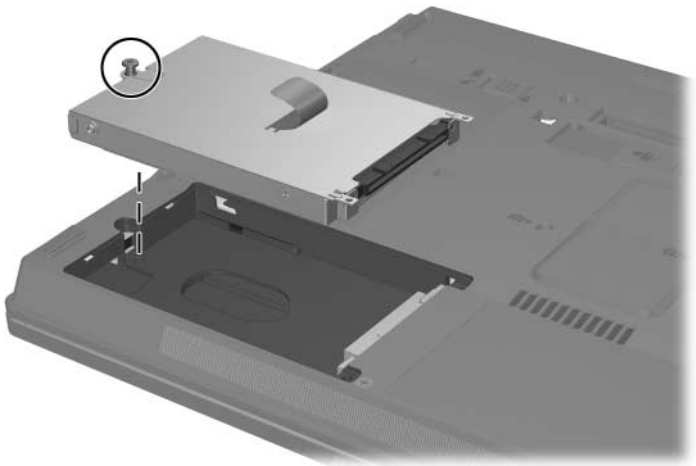
Table C-2

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

	Color	Qty.	Length	Thread	Head Width
	Black	1	13.0 mm	2.5 mm	5.5 mm

Where used:

One screw that secures the hard drive to the notebook (screw is captured on the hard drive frame by a C clip; documented in Section 5.3)



Phillips M2.5×13.0 Screw Location

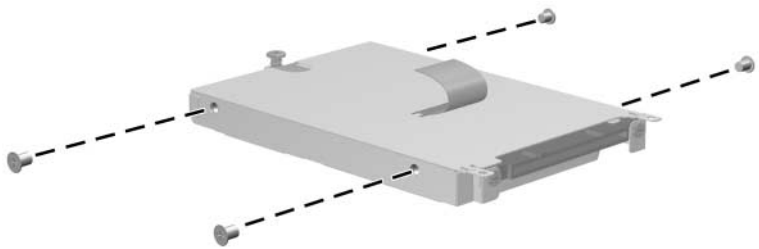
Table C-3

Phillips PM2.5×4.0 Shoulder Screw

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

Where used:

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



Phillips M2.5×4.0 Shoulder Screw Locations

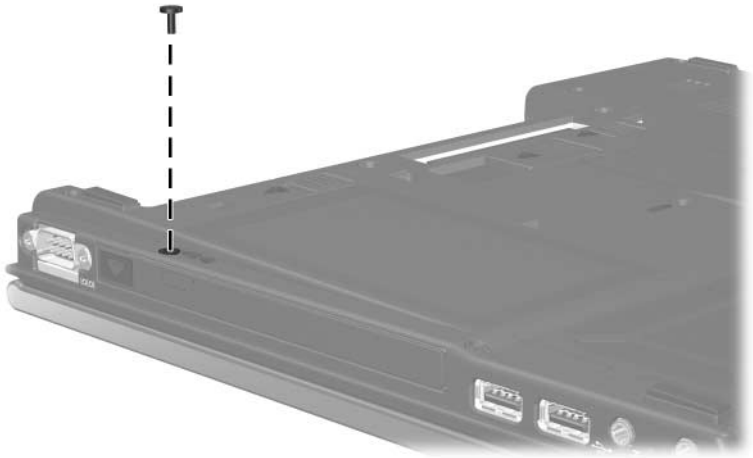
Table C-4

Phillips PM2.0×5.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	3	5.0 mm	2.0 mm	4.5 mm

Where used:

One screw that secures the MultiBay II device to the notebook (documented in Section 5.7)



Phillips PM2.0×5.0 Screw Location

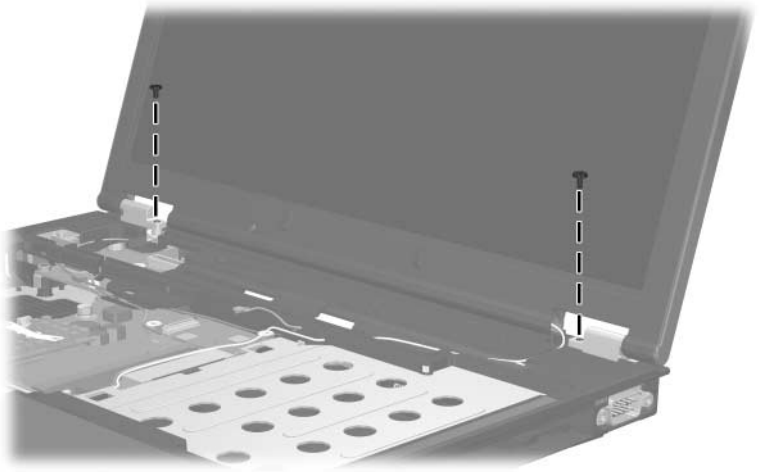
Table C-4

Phillips PM2.0×5.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	3	5.0 mm	2.0 mm	4.5 mm

Where used:

2 screws that secure the display assembly to the notebook (documented in Section 5.20)



Phillips PM2.0×5.0 Screw Location

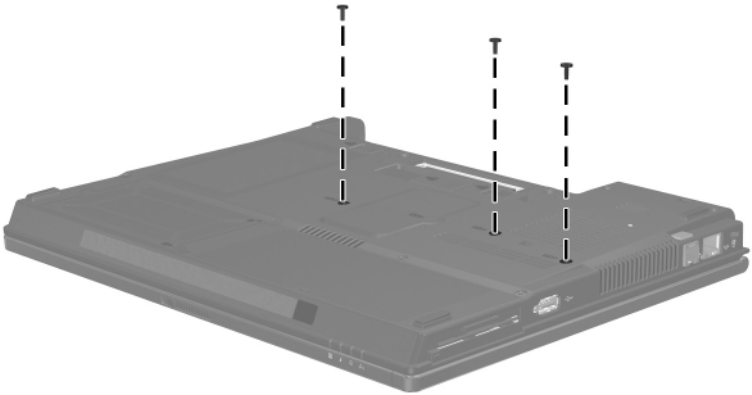
Table C-5

Torx8 M2.0×8.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	21	8.0 mm	2.0 mm	4.0 mm

Where used:

3 screws that secure the keyboard to the notebook (documented in Section 5.9)



Torx 8 M2.0×8.0 Screw Locations

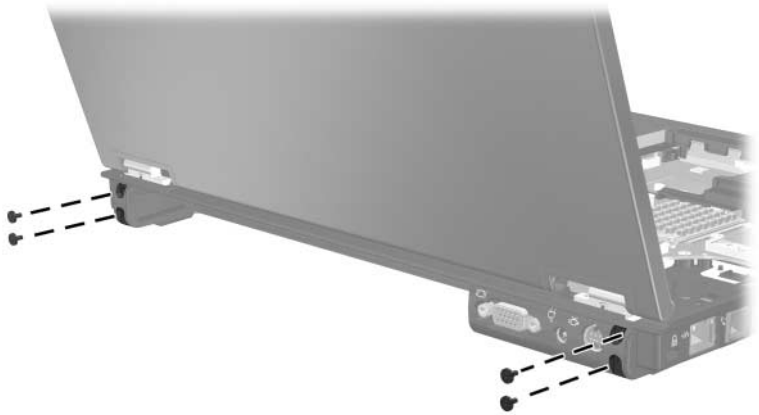
Table C-5

Torx8 M2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	21	8.0 mm	2.0 mm	4.0 mm

Where used:

4 screws that secure the display assembly to the notebook (documented in Section 5.20)



Torx 8 M2.0×8.0 Screw Locations

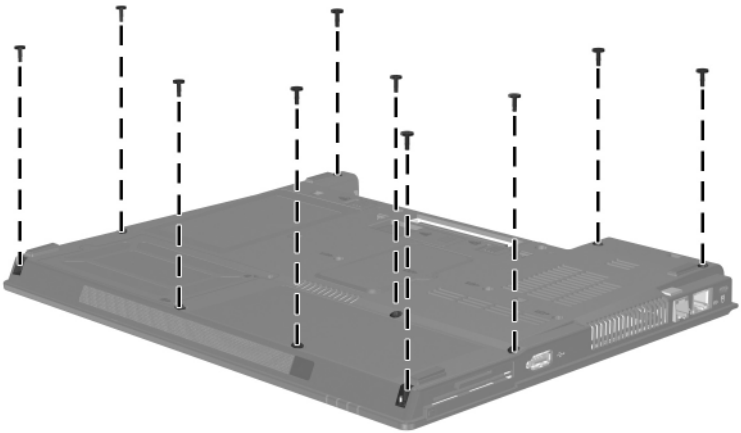
Table C-5

Torx8 M2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	21	8.0 mm	2.0 mm	4.0 mm

Where used:

10 screws that secure the top cover to the notebook (documented in Section 5.21)



Torx 8 M2.0×8.0 Screw Locations

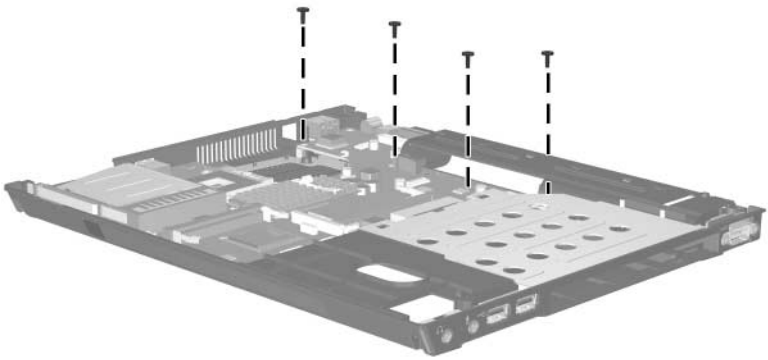
Table C-5

Torx8 M2.0×8.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	21	8.0 mm	2.0 mm	4.0 mm

Where used:

4 screws that secure the system board to the notebook (documented in Section 5.24)



Torx 8 M2.0×8.0 Screw Locations

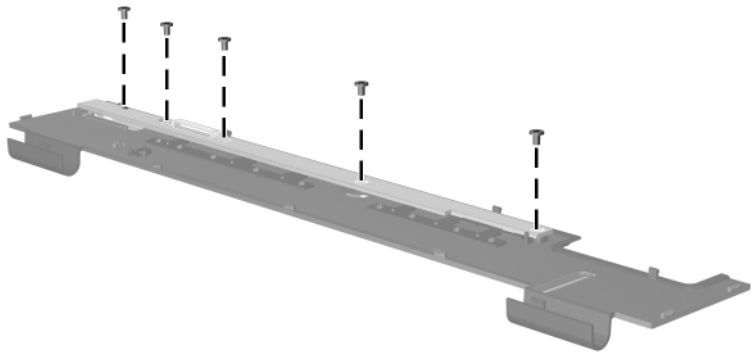
Table C-6

Phillips PM2.0×3.0 Screw

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

Where used:

5 screws that secure the LED board to the switch cover (documented in Section 5.11)



Phillips PM2.0×3.0 Screw Locations

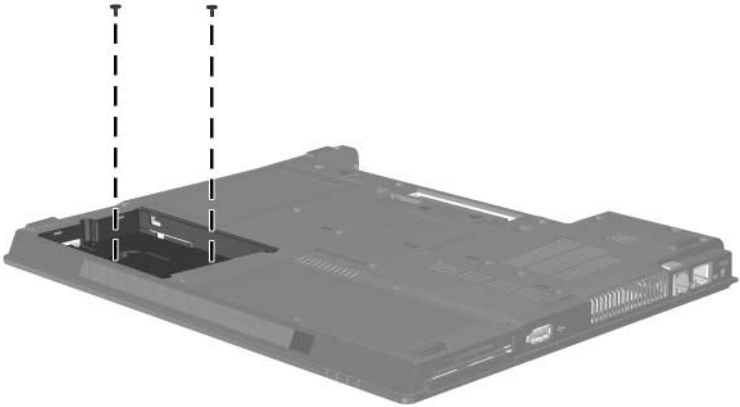
Table C-6

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

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

Where used:

2 screws that secure the top cover to the notebook in the hard drive bay (documented in Section 5.21)



Phillips PM2.0×3.0 Screw Locations

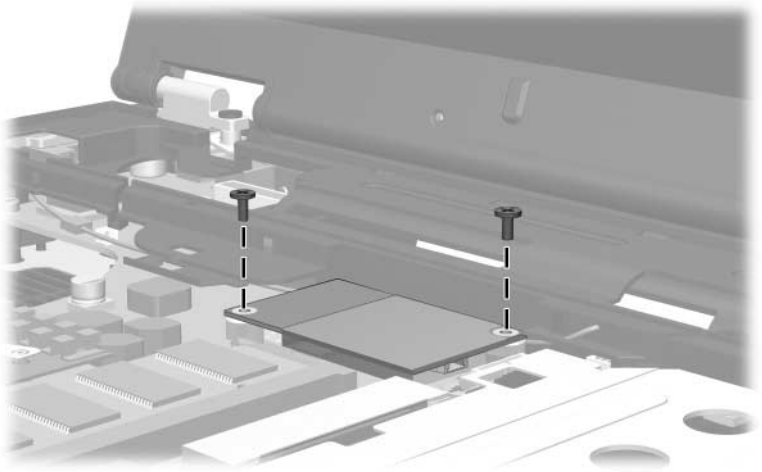
Table C-7

Phillips PM2.0×3.0 Screw

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

Where used:

2 screws that secure the modem board to the notebook (documented in Section 5.16)



Phillips M2.0×3.0 Screw Locations

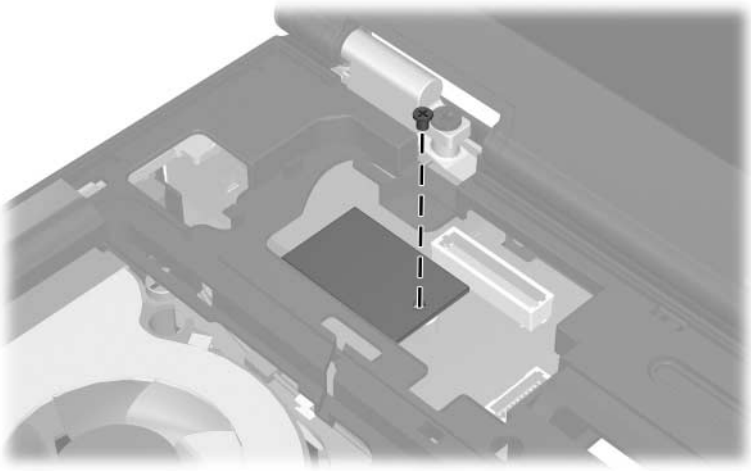
Table C-8

Phillips 1.5×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	1	3.0 mm	1.5 mm	2.25 mm

Where used:

One screw that secures the TPM security card to the notebook (documented in Section 5.12)



Phillips 1.5×3.0 Screw Locations

Table C-9

Phillips PM2.0×7.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	7.0 mm	2.0 mm	4.5 mm

Where used:

2 screws that secure the fan to the notebook (screws are captured on the fan assembly by an O clip; documented in Section 5.13)

Phillips PM2.0×7.0 Screw Locations

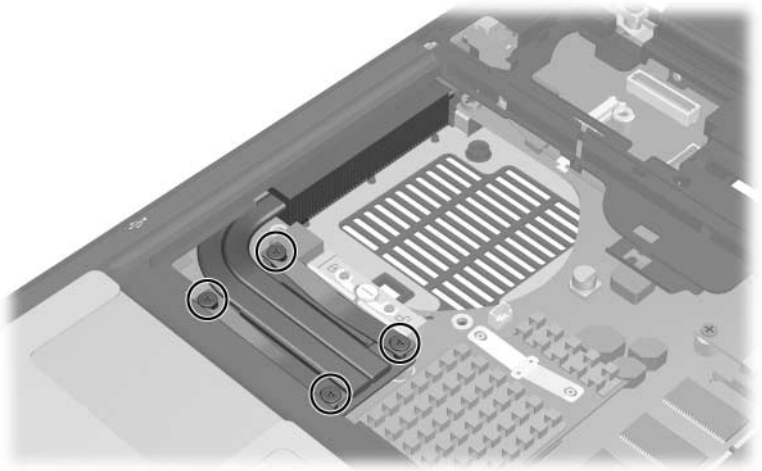
Table C-10

Phillips PM2.0x8.0 Shoulder Screw

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

Where used:

4 screws that secure the heat sink to the notebook
(screws are captured on the heat sink by C clips; documented in Section 5.14)



Phillips PM2.0x8.0 Shoulder Screw Locations

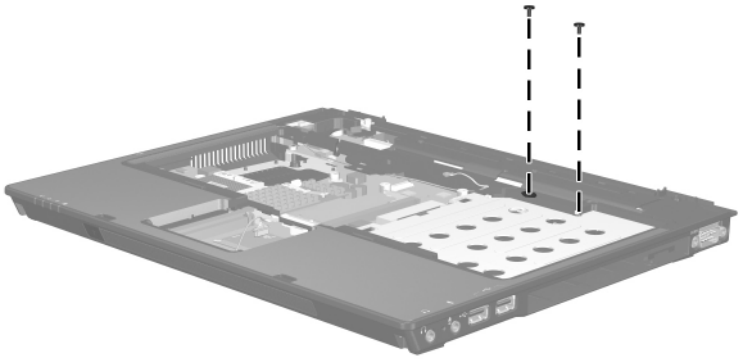
Table C-11

Phillips PM2.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	2	4.0 mm	2.0 mm	4.0 mm

Where used:

2 screws that secure the top cover to the notebook (documented in Section 5.21)



Phillips PM2.0×4.0 Screw Location

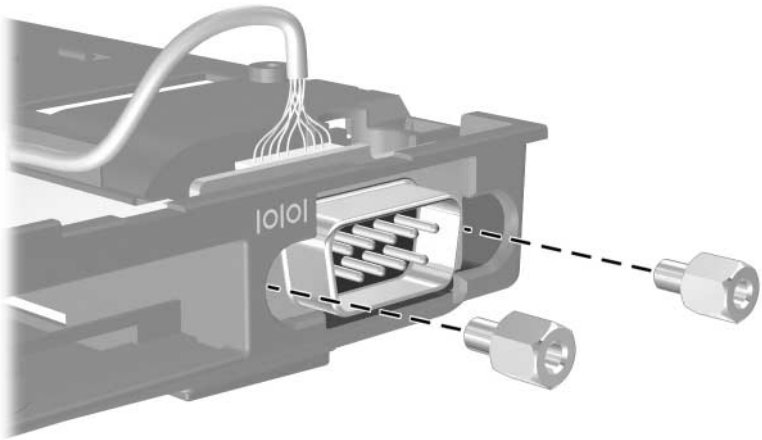
Table C-12

Hex Socket HM5.0×11.0 Screw Lock

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	11.0 mm	2.5 mm	5.0 mm

Where used:

2 screw locks that secure the serial connector module to the notebook (documented in Section 5.22)



Hex Socket HM5.0×11.0 Screw Lock Locations

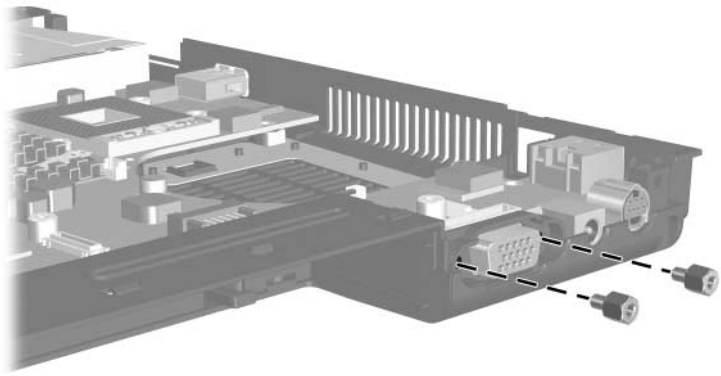
Table C-12

Hex Socket HM5.0×11.0 Screw Lock *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	11.0 mm	2.5 mm	5.0 mm

Where used:

2 screw locks that secure the system board to the notebook (documented in Section 5.24)



Hex Socket HM5.0×11.0 Screw Lock Locations

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