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Maintenance and Service Guide

HP Compaq nx6130 Notebook PC

June 2005

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 nx6130 Notebook PC offers advanced modularity, Intel® Pentium® M and Celeron® M processors, and extensive multimedia support.

HP Compaq nx6130 Notebook PC

1.1 **Features**

- The following processors are available, varying by notebook model:

  ❏ Intel Pentium M 2.13-, 2.00-, 1.86-, 1.73-, 1.60-, or 1.30-GHz processor,

  ❏ Intel Celeron M 1.5- or 1.4-GHz

- The following displays are available, varying by notebook model:

  ❏ 15.0-inch, SXGA+WVA, TFT (1400 × 1050) with over 16.8 million colors

  ❏ 15.0-inch, XGA, TFT (1024 × 768) with over 16.8 million colors

  ❏ 14.1-inch, XGA, TFT (1024 × 768) with over 16.8 million colors

- 80-, 60-, or 40-GB high-capacity hard drive, varying by notebook model

- 256-MB DDR2 synchronous DRAM (SDRAM) at 533 MHz, expandable to 2.0 GB

- Microsoft® Windows® XP Home Edition SP2, Windows XP Professional SP2, or FreeDOS, varying by notebook model

- Full-size Windows keyboard with embedded numeric keypad

- TouchPad pointing device, including a dedicated vertical scroll region

- Integrated 10/100/1000 PCI-based 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 802.11b/g or 802.11a/b/g WLAN device
- Support for one or two Type II PC Card slots, 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
- Support for the following optical drives:
  - DVD±RW and CD-RW Dual Layer Combo Drive, LightScribe
  - DVD±RW and CD-RW Combo Drive
  - DVD/CD-RW Combo Drive
  - DVD-ROM drive
- Universal Serial Bus ports (4)
- PC Card slots (2)
- Volume up, volume mute, and volume down buttons
- Info Center button
- Infrared port
- 6-in-1 Digital Media Slot
- Serial port
- Parallel port
- S-Video-out jack
- Docking connector

■ Connectors:
- ❏ Audio-out (headphone)
- ❏ Audio-in (microphone)
- ❏ Universal Serial Bus (USB) v. 2.0 (4 ports)
- ❏ Power
- ❏ External monitor
- ❏ RJ-11 (modem)
- ❏ RJ-45 (network)
- ❏ IEEE 1394
- ❏ Travel battery
- ❏ Infrared
- ❏ Digital Media Slot
- ❏ Parallel port
- ❏ S-Video-out
- ❏ Docking connector
- ❏ Serial port

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 6.3, "Preparing the Notebook for Disassembly," for more information).

2. Remove the real-time clock (RTC) battery (refer to Section 6.17, "RTC Battery," for more information on removing and replacing the RTC battery).

3. Wait approximately 5 minutes.

4. Replace the RTC battery and reassemble the 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.
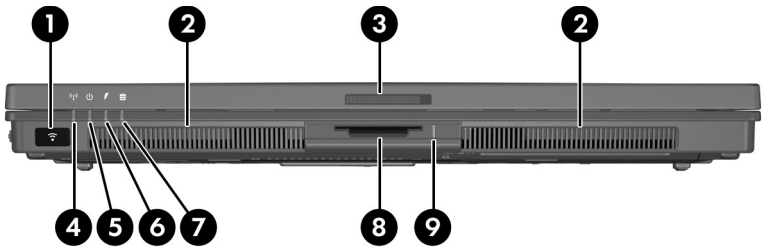
Front Components

Table 1-1

Front Components

Item	Component	Function
1	Infrared port	Provides wireless communication between the notebook and an optional IrDA-compliant device.
2	Stereo speakers (2)	Produce stereo sound.
3	Display release latch	Opens the notebook.
4	Wireless light	On: an integrated wireless device has been enabled.
5	Power/standby light	■ Green: The notebook is on. ■ Blinking green: The notebook is in standby mode. ■ Off: The notebook is off or in hibernation.

Table 1-1

Front Components *(Continued)*

Item	Component	Function
6	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.
7	Integrated Drive Electronics (IDE) drive light	Blinking: The hard drive or optical drive is being accessed.
8	6-in-1 Digital Media Slot	Supports 6 optional digital memory card formats: SD (Secure Digital) Memory Card, MultiMediaCard, Memory Stick, Memory Stick Pro, SmartMedia, and xD-Picture Card.
9	6-in-1 Digital Media Slot light	On: A digital memory card is being accessed.

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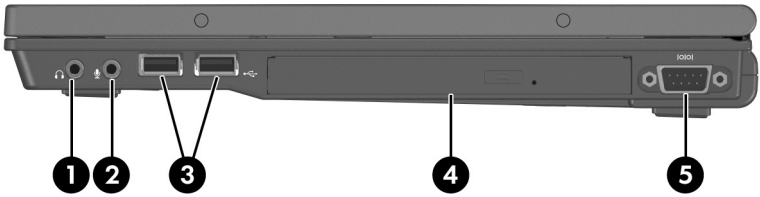
Right-Side Components

Table 1-2

Right-Side Components

Item	Component	Function
1	Audio-out (headphone) jack	Connects optional headphones or powered stereo speakers. Also connects the audio function of an audio/video device such as a television or VCR.
2	Audio-in (microphone) jack	Connects an optional monaural microphone.
3	USB ports (2)	Connect USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable, or connect an optional External MultiBay II to the notebook. The MultiBay II must also be connected to an external power source.
4	Optical drive	Supports an optical disc. The type of optical drive varies by model.
5	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.
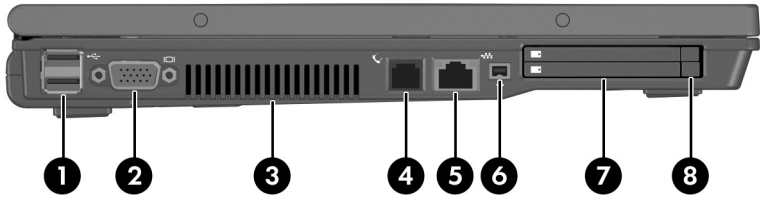
Left-Side Components

Table 1-3

Left-Side Components

Item	Component	Function
1	USB ports (2)	Connect USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable, or connect an optional External MultiBay II to the notebook. The MultiBay II must also be connected to an external power source.
2	External monitor port	Connects an optional VGA external monitor or projector.

Table 1-3

Left-Side Components *(Continued)*

Item	Component	Function
3	Exhaust vent	Provides airflow to cool internal components. ⚠ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs, or clothing, to block airflow.
4	RJ-11 (modem) jack	Connects the modem cable.
5	RJ-45 (network) jack	Connects an optional network cable.
6	1394 port	Connects an optional 1394a device such as a scanner, digital camera, or digital camcorder.
7	PC Card slots (2)	Support an optional Type I, Type II, or Type III 32-bit (CardBus) or 16-bit PC Card.
8	PC Card eject buttons (2)	Eject an optional PC Card from the PC Card slot.

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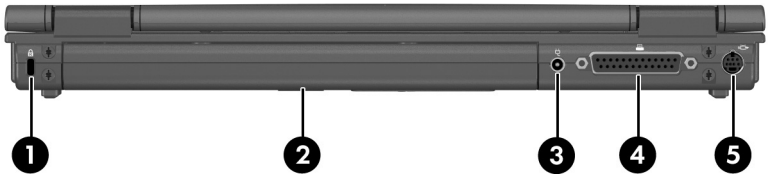
Rear Panel Components

Table 1-4

Rear Panel Components

Item	Component	Function
1	Security cable slot	Attaches an optional security cable to the notebook. ⚠ Security solutions are designed to act as deterrents. These deterrents may not prevent a product from being mishandled or stolen.
2	Battery bay	Holds a battery pack.
3	Power connector	Connects an AC adapter or an optional automobile or aircraft adapter.
4	Parallel port	Connects an optional parallel device, such as an external diskette drive or a printer.
5	S-Video-out jack	Connects an optional S-Video device, such as a television, VCR, camcorder, projector, or video capture card.

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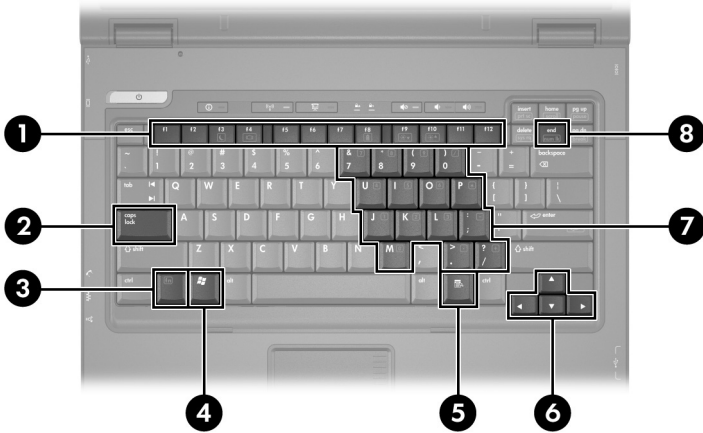
Standard Keyboard Components

Table 1-5

Standard Keyboard Components

Item	Component	Function
1	**f1** to **f12** keys (12)	Perform system and application tasks. When combined with the **fn** key, several keys and buttons perform additional tasks as hotkeys.
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	In Windows, displays the Windows Start menu.
5	Windows applications key	In Windows, displays a shortcut menu for items beneath the pointer.
6	Arrow keys	Move the cursor around the screen.
7	Keypad keys (15)	In Windows, 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.
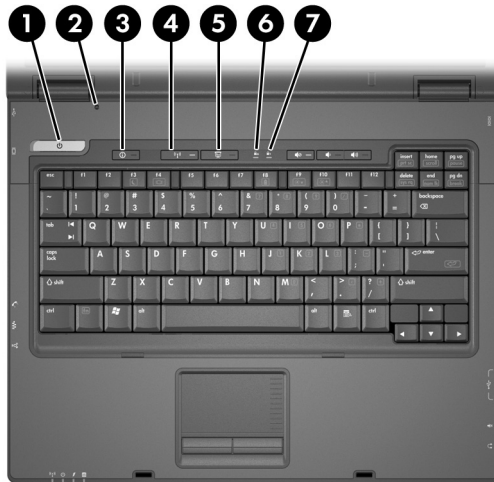
Top Components, Part 1

Table 1-6

Top Components, Part 1

Item	Component	Function
1	Power/standby button	When the notebook is:
		■ Off, press to turn on the notebook.
		■ On, briefly press to initiate hibernation.
		■ In standby, briefly press to resume from standby.
		■ In hibernation, briefly press to restore from hibernation.
		If the system has stopped responding and Windows shutdown procedures cannot be used, press and hold for 5 seconds to turn off the notebook.

Table 1-6

Top Components, Part 1 *(Continued)*

Item	Component	Function
2	Display lid switch	■ If the notebook is closed while on, turns off the display.
		■ If the notebook is opened while in standby, turns on the notebook (resumes from standby).
3	Info Center button	Launches Info Center.
4	Wireless button	Turns the wireless functionality on or off, but does not create a wireless connection.
		✎ To establish a wireless connection, a wireless network must already be set up.
5	Presentation mode button	Turns on Presentation mode.
6	Caps lock light	On: caps lock is on.
7	Num lock light	On: num lock or the numeric keypad is on.

The notebook top components are continued below and described in Table 1-7.
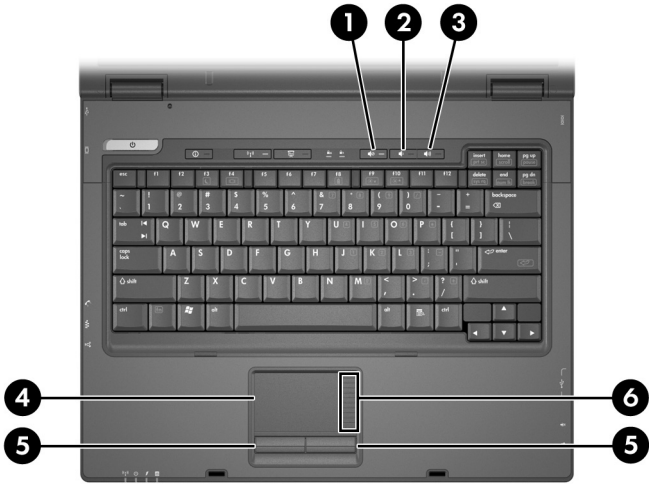
Top Components, Part 2

Table 1-7

Top Components, Part 2

Item	Component	Function
1	Volume mute button	Mutes or restores system volume.
2	Volume down button	Decreases system volume.
3	Volume up button	Increases system volume.
4	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.
5	Left/right TouchPad buttons	Function like the left and right buttons on an external mouse.
6	TouchPad scroll zone	Scrolls up or down.

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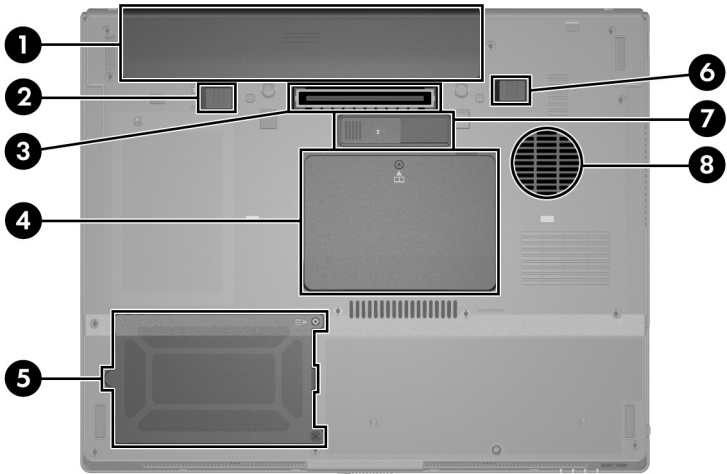
Bottom Components

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	Docking connector	Connects the notebook to an optional docking device.

Table 1-8

Bottom Components *(Continued)*

Item	Component	Function
4	Memory module compartment	Contains 1 memory slot that supports a replaceable memory module.
	Mini PCI compartment	Holds an optional wireless LAN device.
		△ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your notebook by the governmental agency that regulates wireless devices in your country. If you install a device and then receive a warning message, remove the device to restore notebook functionality. Then contact Customer Care.
5	Hard drive bay	Holds the primary hard drive.
6	Primary battery release latch	Releases the primary battery pack from the battery bay.
7	Travel battery connector	Connects an optional travel battery.
8	Fan	Provides airflow to cool internal components.
		△ To prevent overheating, do not obstruct fans. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs, or clothing, to block airflow.

1.5 **Design Overview**

This section presents a design overview of key parts and features of the notebook. Refer to Chapter 4, "Illustrated Parts Catalog," to identify replacement parts, and Chapter 6, "Removal and Replacement Procedures," for disassembly steps.

The system board provides the following device connections:

■ Audio

■ Display

■ Hard drive

■ Intel Pentium M and Celeron M processors

■ Keyboard and TouchPad

■ Memory module

■ Mini PCI communications devices

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

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

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

Accessing Computer Setup

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

1. Open Computer Setup by turning on or restarting the notebook. Press **f10** while the F10 = Based Setup message is displayed in the lower-left corner of the screen.

   ❏ To change the language, press **f2**.

   ❏ To view navigation information, press **f1**.

   ❏ To return to the Computer Setup menu, press **esc**.

2. Select the **File**, **Security**, **Tools**, or **Advanced** menu.

3. To exit Computer Setup, choose one of the following:

   ❏ To exit without saving any changes, use the arrow keys to select **File > Ignore changes and exit**, and then follow the instructions on the screen.

   ❏ To exit and save all the settings you have entered, use the arrow keys to select **File > Save changes and exit**, and then follow the instructions on the screen.

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

Computer Setup Defaults

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

1. Open Computer Setup by turning on or restarting the notebook. Press **f10** while the F10 = Based Setup message is displayed in the lower-left corner of the screen.

   ❏ To change the language, press **f2**.

   ❏ To view navigation information, press **f1**.

2. Use the arrow keys to select **File > Restore defaults**.

3. Select the **Restore Defaults** check box.

4. To confirm the restoration, press **f10**.

5. Select **File > Save changes and exit**, and then follow the instructions on the screen.

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

Selecting from the File Menu

Table 2-1

File Menu

Select	To Do This
System Information	■ View identification information about the notebook and any battery packs in the system. ■ View specification information about the processor, memory and cache size, video revision, keyboard controller version, and system ROM.
Save to floppy	Save system configuration settings to a diskette.
Restore from floppy	Restore system configuration settings from a diskette.
Restore defaults	Replace configuration settings in Computer Setup with factory default settings. (Identification information is retained.)
Ignore changes and exit	Cancel changes entered during the current session. Then exit and restart the notebook.
Save changes and exit	Save changes entered during the current session. Then exit and restart the notebook. The changes you save are in effect when the notebook restarts.

Selecting from the Security Menu

Table 2-2

Security Menu

Select	To Do This
Administrator password	Enter, change, or delete an HP Administrator password.
Power-on password	Enter, change, or delete a power-on password.
Password options	■ Enable/Disable stringent security. ■ Enable/Disable required password on restart.
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.
Smart Card Security	Enable/disable power-on support for smart cards. ✎ This feature is supported by select smart card readers only.
Device security	■ Enable/Disable devices in the system. ■ Enable NIC for inclusion in MultiBoot.
System IDs	Enter user-defined identification values.

Selecting from the Tools Menu

Table 2-3

Tools Menu

Select	To Do This
HDD Self Test options	Run a quick or comprehensive self-test on any hard drive in the system.
Battery Information	View information about any battery packs in the notebook.
Memory Check	■ Run a self-test on memory modules in the notebook. ■ View information about memory modules installed in the notebook.

Selecting from the Advanced Menu

Table 2-4

Advanced Menu

Select	To Do This
Language (or press **f2**)	Change the Computer Setup language.
Boot options	■ Enable/Disable MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system. ■ Set the boot order.
Device options	■ Swap the functions of the **fn** key and left **ctrl** key. ■ Enable/Disable multiple pointing devices at startup. (To set the notebook to support only a single, usually nonstandard, pointing device at startup, select **Disable**.) ■ Enable/Disable USB legacy support for a USB keyboard, mouse, and hub. When USB legacy support is enabled ❒ A USB keyboard, mouse, and hub work even when a Windows operating system is not loaded. ❒ The notebook starts from a bootable hard drive, diskette drive diskette, or CD, CD-RW, or DVD inserted into a drive connected by a USB connector to the notebook or to an optional docking device. ■ Select a parallel port mode: EPP (Enhanced Parallel Port), standard, bidirectional, or ECP (Enhanced Capabilities Port). ■ Enable/Disable all settings in the **SpeedStep** window. (When Disable is selected, the notebook runs in Battery Optimized mode.)

2.2 Troubleshooting Flowcharts

Table 2-5

Troubleshooting Flowcharts Overview

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

Table 2-5

Troubleshooting Flowcharts Overview *(Continued)*

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

Flowchart 2.1—Initial Troubleshooting

Flowchart 2.2—No Power, Part 1

No power
(power LED
is off).

↓

Remove from
docking device
(if applicable).

↓

N

Power up
on battery
power? → Reset
power.* → Power up
on battery
power? **N** → Go to
"Flowchart 2.3—No
Power, Part 2."

Y ← **Y**

N

Power up
on AC
power? → Reset
power.* → Power up
on AC power? **N** → Go to
"Flowchart 2.4—No
Power, Part 3."

Y ← **Y**

Y

Power up in
docking
device? → Done

N

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

↓

1. Reseat the power cables in the docking device and at the AC outlet.
2. Ensure the AC power source is active.
3. Ensure that the power strip is working.

↓

Done ← **Y** Power up
in docking
device? **N** → Go to
"Flowchart 2.8—Non-
functioning Docking
Device (if applicable)."

Flowchart 2.3—No Power, Part 2

```
┌─────────────────────┐
│  Continued from     │
│  "Flowchart 2.2—No  │
│  Power, Part 1."    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Visually check for │
│  debris in battery  │
│  socket and clean   │
│  if necessary.      │
└─────────────────────┘
          │
          ▼
       ◇ Power on? ◇ ──Y──▶ ┌──────────┐
          │                  │   Done   │
          N                  └──────────┘
          │
          ▼
┌─────────────────────┐
│  Check battery by   │
│  recharging it,     │
│  moving it to       │
│  another notebook,  │
│  or replacing it.   │
└─────────────────────┘
          │
          ▼
       ◇ Power on? ◇ ──N──▶ ┌─────────────┐
          │                  │  Replace    │
          Y                  │  power supply│
          │                  │  (if applicable).│
          ▼                  └─────────────┘
    ┌──────────┐                   │
    │   Done   │                   ▼
    └──────────┘            ◇ Power on? ◇ ──N──▶ ┌─────────────┐
                                  │               │  Go to      │
                                  Y               │  "Flowchart 2.4—No│
                                  │               │  Power, Part 3."│
                                  ▼               └─────────────┘
                           ┌──────────┐
                           │   Done   │
                           └──────────┘
```

Flowchart 2.4—No Power, Part 3

Continued from "Flowchart 2.3—No Power, Part 2."

Plug directly into AC outlet.

Power LED on? — Y → Done

N

Reseat AC adapter in notebook and at power source.

Power on? — Y → Done

N

Power outlet active? — N → Try different outlet.

Y

Replace power cord.

Power on? — Y → Done

N

Internal or external AC adapter? — External → Replace external AC adapter.

Internal

Go to "Flowchart 2.5—No Power, Part 4."

Power on? — N → Go to "Flowchart 2.5—No Power, Part 4."

Y → Done

Flowchart 2.5—No Power, Part 4

```
┌─────────────────────┐
│  Continued from     │
│  "Flowchart 2.4—No  │
│   Power, Part 3."   │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│       Open          │
│     notebook.       │
└─────────────────────┘
          │
          ▼
                         Y      ┌─────────────────────┐
        ◇ Loose or  ◇──────────▶│   Reseat loose      │
        ◇ damaged   ◇           │  components and     │
        ◇ parts?    ◇           │     boards and      │
                                │  replace damaged    │
          │ N                   │       items.        │
          ▼                     └─────────────────────┘
┌─────────────────────┐
│       Close         │
│  notebook and       │
│     retest.         │
└─────────────────────┘
          │
          ▼
                         N      ┌──────────────────────────────────────────────┐
        ◇ Power on? ◇──────────▶│ Replace the following items (if applicable).   │
                                │    notebook operation after each replacement:  │
          │ Y                   │ 1. Internal DC-DC converter*                   │
          ▼                     │ 2. Internal AC adapter                         │
┌─────────────────────┐         │ 3. Processor board*                            │
│                     │         │ 4. System board*                               │
│       Done          │         │                                                │
│                     │         │  *NOTE: Replace these items as a set to prevent│
└─────────────────────┘         │       shorting out among components.           │
                                └──────────────────────────────────────────────┘
```

Flowchart 2.6—No Video, Part 1

```
┌─────────────────┐
│   No video.     │
└────────┬────────┘
         │
         ▼
    ◇ Stand-alone ◇ ──Docking Device──► ┌──────────────────────┐
    ◇ or docking  ◇                      │      Go to            │     *NOTE: To change from internal to
    ◇ device?     ◇                      │ "Flowchart 2.7—No    │     external display, use the hotkey combi-
         │                               │  Video, Part 2."      │     nation.
    Stand-alone                          └──────────────────────┘
         │
         ▼
    ◇ Internal or ◇        ┌─────────────┐        ◇ Video OK? ◇ ──Y──► ┌──────────┐
    ◇ external    ◇───────►│   Adjust    │───────►◇           ◇        │  Done    │
    ◇ display*?   ◇Internal│ brightness. │        ◇           ◇        └──────────┘
         │                 └─────────────┘              │
    External                      ▲                     N
         │                       (A)                     │
         ▼                                                ▼
    ┌──────────┐                                   ┌──────────────┐
    │  Adjust  │                                   │  Press lid   │
    │brightness│                                   │ switch to    │
    └────┬─────┘                                   │  ensure      │
         │        Y                                │ operation.   │
         ▼                                         └──────┬───────┘
    ◇ Video OK? ◇──Y──► ┌──────┐                          │        Y
    ◇           ◇       │ Done │                     ◇ Video OK? ◇──Y──► ┌──────┐
         │              └──────┘                     ◇           ◇       │ Done │
         N                                                │              └──────┘
         │                                                N
         ▼                                                ▼
    ┌──────────────┐    ┌──────────────────────────────────────────────────────────┐
    │ Check for    │    │ Replace the following one at a time. Test after each        │
    │ bent pins on │    │ replacement.                                                │
    │ cable.       │    │  1. Cable between notebook and notebook display (if          │
    └──────┬───────┘    │     applicable)                                             │
           │  N         │  2. Display                                                 │
           ▼            │  3. System board                                            │
    ◇ Video OK? ◇       └──────────────────────────────────────────────────────────┘
    ◇           ◇──N──► ┌──────────┐   N    ◇ Internal and ◇──N──► ┌──────────┐
         │              │  Try     │        ◇ external     ◇       │ Replace  │
         Y              │ another  │───────►◇ video OK?    ◇       │ system   │
         │              │ display. │        ◇              ◇       │ board.   │
         ▼              └──────────┘              │                └──────────┘
    ┌──────────┐                                  Y
    │   Done   │                                  │
    └──────────┘                                  ▼
                                            ┌──────────┐
                                            │   Done   │
                                            └──────────┘
```

Flowchart 2.7—No Video, Part 2

```
┌─────────────────────┐
│  Continued from     │
│ "Flowchart 2.6—No   │
│   Video, Part 1."   │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│     Remove          │
│ notebook from dock- │
│    ing device,      │
│   if connected.     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐                          ┌─────────────────────┐
│      Adjust         │                          │  Check brightness   │
│      display        │                          │  of external        │
│    brightness.      │                          │    monitor.         │
└─────────────────────┘                          └─────────────────────┘
          │                                                │
          │         N                                      │          Y
          ▼                   ┌──────────────────┐         ▼                  ┌──────────────┐
      ◇─────────◇             │  Go to "A" in    │     ◇─────────◇            │              │
     ◇ Video OK? ◇───────────▶│ "Flowchart 2.6—No│    ◇ Video OK? ◇──────────▶│    Done      │
      ◇─────────◇             │  Video, Part 1." │     ◇─────────◇            │              │
          │                   └──────────────────┘         │                  └──────────────┘
          │ Y                                               │ N
          ▼                                                 ▼
┌─────────────────────────────┐                   ┌─────────────────────┐
│ Check that notebook is      │                   │   Try another       │
│ properly seated in docking  │                   │   external          │
│ device, for bent pins on    │                   │   monitor.          │
│ cable, and for monitor      │                   └─────────────────────┘
│ connection.                 │                             │
└─────────────────────────────┘                             │
          │                                                 ▼
          │         Y          ┌──────────────┐         ◇─────────◇          ┌──────────────┐
      ◇─────────◇              │              │        ◇ Internal  ◇   Y      │              │
     ◇ Video OK? ◇────────────▶│    Done      │       ◇ and external◇────────▶│    Done      │
      ◇─────────◇              │              │        ◇ video OK?  ◇         │              │
          │                    └──────────────┘         ◇─────────◇          └──────────────┘
          │ N                                               │ N
          ▼                                                 ▼
┌─────────────────────┐                            ┌─────────────────────┐
│  Adjust external    │                            │      Go to          │
│  monitor display.   │                            │ "Flowchart 2.8—Non- │
└─────────────────────┘                            │ functioning Docking │
          │                                         │ Device (if          │
          │                                         │  applicable)."      │
          └──────────────────────────────────┐     └─────────────────────┘
```

Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

```
┌─────────────────┐
│ Nonfunctioning  │
│ docking device. │
└─────────────────┘
        │
        ▼
┌─────────────────┐
│ Reseat power    │
│ cord in docking │
│ device and      │
│ power outlet.   │
└─────────────────┘
        │
        ▼
┌─────────────────┐                              ┌─────────────────┐
│ Check voltage   │                              │ Reinstall       │
│ setting on      │                              │ notebook into   │
│ docking device. │                              │ docking device. │
└─────────────────┘                              └─────────────────┘
        │                                                │
        ▼                                                ▼
┌─────────────────┐                                   ◇ Docking ◇      Y
│ Reset monitor   │                                   ◇ device   ◇ ──────→ ┌────────┐
│ cable connector │                                   ◇ operating?◇         │  Done  │
│ at docking      │                                    ◇        ◇           └────────┘
│ device.         │                                   N │
└─────────────────┘                                     ▼
        │                                        ┌─────────────────┐
        ▼            Y                           │ Test replacement│
   ◇ Docking ◇  ──────→ ┌────────┐              │ docking device  │
   ◇ device   ◇         │  Done  │              │ with new        │
   ◇ operating?◇        └────────┘              │ notebook.       │
    ◇        ◇                                   └─────────────────┘
   N │
     ▼
┌─────────────────┐
│ Remove notebook,│
│ replace docking │
│ device.         │
└─────────────────┘
```

Flowchart 2.9—No Operating System (OS) Loading

| No OS loading.* |

↓

| Reseat power cord in docking device and power outlet. |

| No OS loading from hard drive, go to "Flowchart 2.10—No OS Loading, Hard Drive, Part 1." |

| No OS loading from diskette drive, go to "Flowchart 2.13—No OS Loading, Diskette Drive." |

| No OS loading from optical drive, go to "Flowchart 2.14—No OS Loading, Optical Drive." |

| No OS loading from network, go to "Flowchart 2.20—No Network/Modem Connection." |

*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

```
        ┌──────────────┐
        │   OS not     │
        │ loading from │
        │ hard drive.  │
        └──────┬───────┘
               │
               ▼
            ╱─────╲          Y    ┌────────────────────┐
          ╱ Nonsystem╲───────────▶│       Go to        │
         ╱ disk message?╲          │"Flowchart 2.11—No  │
          ╲           ╱            │    OS Loading,     │
            ╲───────╱             │Hard Drive, Part 2."│
               │                   └────────────────────┘
               │ N
               ▼
        ┌──────────────┐
        │    Reseat    │
        │   external   │
        │  hard drive. │
        └──────┬───────┘
               │
               ▼
            ╱─────╲          Y    ┌────────────┐
          ╱   OS    ╲─────────────▶│    Done    │
         ╱ loading?   ╲             └────────────┘
          ╲           ╱
            ╲───────╱
               │ N
               ▼
            ╱─────╲    N
          ╱  Boot   ╲──────────────┐
         ╱   from     ╲            │
          ╲   CD?     ╱            ▼
            ╲───────╱         ╱─────╲     N    ┌────────────┐
               │ Y         ╱  Boot   ╲─────────▶│   Go to    │
               ▼          ╱   from     ╲        │"Flowchart  │
      ┌────────────────┐  ╲ diskette?  ╱        │2.13—No OS  │
      │ Check the Setup│    ╲───────╱           │Loading,    │
      │utility for correct│      │ Y            │Diskette    │
      │ booting order. │        ▼               │  Drive."   │
      └───────┬────────┘  ┌──────────────┐      └────────────┘
              │           │ Change boot  │
              ▼           │priority through│
           ╱─────╲   N    │the Setup utility│
         ╱  Boot   ╲──────│  and reboot. │
        ╱   from     ╲    └──────┬───────┘
         ╲ hard drive?╱          │
           ╲───────╱             ▼
              │ Y            ╱─────╲     N    ┌────────────────────┐
              ▼           ╱  Boot   ╲─────────▶│       Go to        │
      ┌────────────┐    ╱   from     ╲        │"Flowchart 2.17—Non-│
      │    Done    │◀───╲ hard drive?╱         │ functioning Device."│
      └────────────┘      ╲───────╱            └────────────────────┘
                             │ Y
```

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

```
Continued from
"Flowchart 2.10—No
OS Loading,
Hard Drive, Part 1."

              N
Disc or
diskette in          1. Replace
drive?                  hard drive.
                     2. Replace system
   Y                    board.

Remove disc or
diskette and
reboot.

              Y
Boot
from               Done
hard drive?

   N

              N
Boot               Go to
from diskette      "Flowchart
drive?             2.13—No OS
                   Loading, Diskette
   Y               Drive."

              N
Hard drive
accessible?

   Y

Go to
"Flowchart 2.12—No
OS Loading,
Hard Drive, Part 3."
```

```
Reseat
hard drive.

              Y
Hard drive
accessible?          Done

   N

Run FDISK.

              N
Hard drive         Create partition,
partitioned?       and then format
                   hard drive to boot-
   Y               able
                   C:\ prompt.

              N
Hard drive         Format hard drive
formatted?         and bring to
                   a bootable
   Y               C:\ prompt.

   Y
Notebook           Load OS using Oper-
booted?            ating System disc (if
                   applicable).
       Done
              N
Go to
"Flowchart 2.12—No
OS Loading,
Hard Drive, Part 3."
```

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

Continued from "Flowchart 2.11—No OS Loading, Hard Drive, Part 2."

System files on hard drive?

N → Install OS and reboot.

Y ↓

Virus on hard drive?

Y → Clean virus.

OS loading from hard drive?

Y → Done

N ↓

Diagnostics on disc or diskette?

Y → Replace hard drive.

N ↓

Run diagnostics and follow recommendations.

N ↓

Run SCANDISK and check for bad sectors.

Can bad sectors be fixed?

N → Replace hard drive.

Y ↓

Fix bad sectors.

Boot from hard drive?

N → Replace hard drive.

Y ↓

Done

Flowchart 2.13—No OS Loading, Diskette Drive

OS not loading from diskette drive. → Reseat diskette drive. → OS loading? — **Y** → Done

— **N**

Nonsystem disk message? — **Y** → Bootable diskette in drive? — **N** → Install bootable diskette and reboot notebook.

N (Nonsystem disk message?)

Bootable diskette in drive? — **Y** → Check diskette for system files. Try different diskette.

Boot from another device? — **N** → Go to "Flowchart 2.17—Nonfunctioning Device."

Y (Boot from another device?)

Diskette drive enabled in the Setup utility? — **N** → Enable drive and cold boot notebook.

Y (Diskette drive enabled in the Setup utility?)

Check diskette for system files. Try different diskette. → Nonsystem disk error? — **Y** → Replace the following components individually, retesting after each replacement:
■ Diskette drive

N (Nonsystem disk error?)

Is diskette drive boot order correct? — **Y** → Reset the notebook. Refer to Section 1.2, "Resetting the Notebook," for instructions.

N (Is diskette drive boot order correct?)

Nonsystem disk error? — **N** → OS loading? — **Y** → Done

N (OS loading?)

Change boot priority using the Setup utility.

Go to "Flowchart 2.17—Nonfunctioning Device."

Flowchart 2.14—No OS Loading, Optical Drive

```
┌──────────────┐                                                    ┌──────────────┐
│ No OS        │         Y              N                           │ Install bootable │
│ loading from │      ╱ Disc ╲      ╱ Bootable ╲                     │ disc and     │
│ CD-ROM or    │ ───▶ ╲ in drive? ╲ ─▶ ╲ disc in  ╲ ───────────────▶ │ reboot       │
│ DVD-ROM drive.│      ╲        ╱      ╲ drive?  ╱                   │ notebook.    │
└──────────────┘         N              Y                           └──────────────┘
                         │              │                                  │
                         ▼              ▼                                  │
                  ┌──────────┐   ┌──────────────┐                          │
                  │ Install  │   │ Try another  │                          │
                  │ bootable disc. │ bootable disc. │                      │
                  └──────────┘   └──────────────┘                          │
                         │              │                                  │
```

Boots from CD or DVD? —Y—▶ Done

N

Reseat drive. —▶ Boots from CD or DVD? —Y—▶ Done

N

Booting from another device? —N—▶ Go to "Flowchart 2.17—Non-functioning Device."

Y

Booting order correct? —Y—▶ Reset the notebook. Refer to Section 1.2, "Resetting the Notebook," for instructions. —▶ Go to "Flowchart 2.17—Non-functioning Device."

N

Correct boot order using the Setup utility.

Flowchart 2.15—No Audio, Part 1

```
No audio. → Turn up audio internally or externally. → Audio?
                                                        Y → Done
                                                        N ↓
```

```
Notebook in docking device (if applicable)?
  Y → Undock → Internal audio?
                 N → Go to "Flowchart 2.16—No Audio, Part 2."
                 Y ↓
  N ↓
Go to "Flowchart 2.16—No Audio, Part 2."

Test audio with a replacement docking device and a new notebook.
  ↓
Audio?
  Y → Done
  N → Go to "Flowchart 2.17—Non-functioning Device."
```

Flowchart 2.16—No Audio, Part 2

Continued from "Flowchart 2.15—No Audio, Part 1."

N → Audio driver in OS configured? → Reload audio drivers.

Y

N → Correct drivers for application? → Load drivers and set configuration in OS.

Y

Connect to external speaker.

N → Audio? → Replace audio board and speaker connections in notebook (if applicable). → **Y** → Audio? → **Y** → Done

Y

N

Replace the following components individually, retesting after each replacement:

■ Internal speakers.
■ Audio board (if applicable).

Flowchart 2.17—Nonfunctioning Device

```
                        ┌─────────────────┐
                        │  Nonfunctioning │
                        │     device.     │
                        └─────────────────┘
                                 │
                                 ▼
                        ┌─────────────────┐
                        │     Reseat      │
                        │     device.     │
                        └─────────────────┘
                                 │
                                 ▼
        ┌─────────────────────────────────────────────────┐
        │ Unplug the nonfunctioning device from the notebook│
        │ and inspect cables and plugs for bent or broken pins│
        │                or other damage.                  │
        └─────────────────────────────────────────────────┘
                                 │
                                 ▼
  ┌──────────┐         ◇─────────────────◇        ┌──────────────┐
  │  Clear   │◄────────│  Any physical   │──Y────►│   Fix or     │
  │  CMOS.   │         │ device detected?│        │   replace    │
  └──────────┘    N    ◇─────────────────◇        │ broken item. │
       │                                          └──────────────┘
       ▼                                          ┌──────────────┐
  ┌──────────┐                                    │   Go to      │
  │ Reattach │                                    │"Flowchart 2.9│
  │ device.  │       ┌──────────────────┐         │—No Operating │
  │  Close   │   ┌──►│Replace hard drive.├──┐      │System (OS)   │
  │notebook, │   │   └──────────────────┘  │      │Loading."     │
  │plug in   │   │                         │      └──────────────┘
  │power, and│   │                         │            ▲
  │ reboot.  │   │                         │            │
  └──────────┘   │   ┌──────────────────┐  │    ◇──────────────◇
       │    N    │   │  Replace NIC.    │  │    │    Device    │──N──►
       ▼         │   │If integrated NIC,│  │    │    boots     │
  ◇──────────◇   │   │ replace system   ├──┼───►│   properly?  │
  │  Device  ├───┤   │     board.       │  │    ◇──────────────◇
  │  boots   │   │   └──────────────────┘  │       │    Y
  │ properly?│   │                         │       ▼
  ◇──────────◇   │   ┌──────────────────┐  │   ┌──────────┐
     │  Y       └──►│ Replace diskette  ├──┘   │   Done   │
     ▼              │     drive.       │       └──────────┘
  ┌──────────┐      └──────────────────┘
  │   Done   │
  └──────────┘
```

Flowchart 2.18—Nonfunctioning Keyboard

Flowchart 2.19—Nonfunctioning Pointing Device

Flowchart 2.20—No Network/Modem Connection

```
┌──────────────┐
│ No network   │
│ or modem     │
│ connec-tion. │
└──────┬───────┘
       │
       ▼           N
   ╱Network╲   ──────►  ┌──────────────┐
  ╱ or modem ╲          │ Replace jack │
  ╲ jack     ╱          │ or have jack │
   ╲ active?╱           │ acti-vated.  │
     │ Y                └──────────────┘
     ▼           Y
   ╱Digital╲    ──────►  ┌──────────────┐
   ╲ line? ╱             │ Connect      │
     │ N                 │ to nondigital│
     ▼                   │ line.        │
   ╱NIC/modem╲    N      └──────────────┘
  ╱configured ╲──────►  ┌──────────────┐
  ╲ in OS?    ╱         │ Reload       │
     │ Y                │ drivers and  │
     ▼                  │ recon-figure.│
┌──────────────┐        └──────────────┘
│ Disconnect   │
│ all power    │
│ from the     │
│ notebook     │
│ and open.    │
└──────┬───────┘
       ▼
┌──────────────┐
│ Reseat       │
│ NIC/modem    │
│ (if          │
│ applicable). │
└──────────────┘
```

Network or modem connection working? Y → Done, N →

Replace NIC/modem (if applicable).

Network or modem connection working? Y → Done, N →

Replace system board.

3

Software Update and Recovery

Software Updates

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

To update HP software:

1. Identify your computer model, product category, and series or family. Prepare for a system BIOS update by identifying the BIOS version currently installed on the computer.

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

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

2. Access the HP Web site at http://www.hp.com to obtain the updates or purchase the *Support Software* disc.

3. Install the updates.

Accessing Computer Information

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

■ The product *category* is Notebook.

■ The product *family* name and *series* number are printed on the display bezel.

■ *Model* information is provided on the serial number label on the bottom of the computer.

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

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

To use Computer Setup for displaying BIOS information:

1. Open Computer Setup by turning on or restarting the computer, and then pressing **f10** while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.

2. Use the arrow keys to select **File > System Information**, and then press **enter**.

   BIOS date information is displayed.

3. To exit Computer Setup, use the arrow keys to select **File > Ignore changes and exit**. Then follow the instructions on the screen.

Obtaining the Support Software Disc

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

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

Software Updates and the HP Web Site

Most software on the HP Web site is packaged in compressed files called *SoftPaq*s. Some BIOS updates may be packaged in compressed files called *ROMPaq*s.

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

Downloading a BIOS Update

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

■ Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

■ Do not shut down the computer or initiate standby or hibernation.

■ Do not insert, remove, connect, or disconnect any device, cable, or cord.

To download a BIOS update:

1. Access the page on the HP Web site that provides software for your computer:

   ❏ Select **Start > Help and Support**, and then click a software update link.

   – or –

   ❏ Visit the HP Web site at http://www.hp.com/support.

2. Follow the instructions on the screen to identify your computer and access the BIOS update you want to download.

3. At the download area:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the instructions on the screen to download your selection to the hard drive.

✎ Make a note of the path to the location on your hard drive where the BIOS update will be downloaded. You will need to access this path when you are ready to install the update.

Installing a BIOS Update

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

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

1. Open Windows Explorer by clicking **Start > All Programs > Accessories > Windows Explorer**.

2. In the left pane of the Windows Explorer window:

   a. Click **My Computer** and then your hard drive designation.

✎ The hard drive designation is typically Local Disk (C:).

   b. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

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

   The BIOS installation begins.

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

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

Recovering the BIOS

✎ The BIOS recovery procedure requires a USB diskette drive and a formatted diskette.

The BIOS can be recovered if the flash memory is corrupted. Flash memory corruption can occur if the notebook powers down while the BIOS is being updated.

When the notebook is turned on, the boot block portion of the flash memory performs an integrity check on the rest of the BIOS image and enters recovery mode if the image is corrupt.

BIOS recovery can be forced on a non-functioning notebook by turning on the notebook while pressing and holding the Windows logo key + **B** on the nonfunctioning notebook keyboard until the caps lock light blinks.

To recover the BIOS:

1. If the nonfunctioning notebook is docked in an optional docking device, undock the notebook.

2. Attach the USB diskette drive directly to a USB port on the nonfunctioning notebook. (USB hubs are not supported for BIOS recovery).

3. Insert the correct ROMPaq diskette for the product being updated. The BIOS image file must to be located in the root directory of the diskette and must be in contiguous sectors. The easiest way to ensure this is to visit http://www.hp.com, download the Softpaq, and let the Softpaq create the ROMPaq diskette.

4. Press and hold the Windows logo key + **B** on the notebook keyboard (do not use an external keyboard) and turn on the notebook and wait for the caps lock light to start blinking.

5. Release the Windows logo key + **B**.

   The BIOS recovery procedure takes approximately one minute to read the image from the diskette, and then an additional 15 seconds to program the image into flash memory. The notebook restarts when the BIOS recovery procedure is complete. Do not attempt to turn off the notebook after starting a recovery.

   If the BIOS recovery procedure stalls, the caps lock light will begin blinking. This situation can arise if the diskette is corrupt or the incorrect ROMPaq is used. If the notebook does not restart after approximately 3 minutes, press and hold the power button, or slide and hold the power switch, for at least 5 seconds to force the notebook to turn itself off. Then repeat the BIOS recovery procedure.

4

Illustrated Parts Catalog

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

4.1 Serial Number Location

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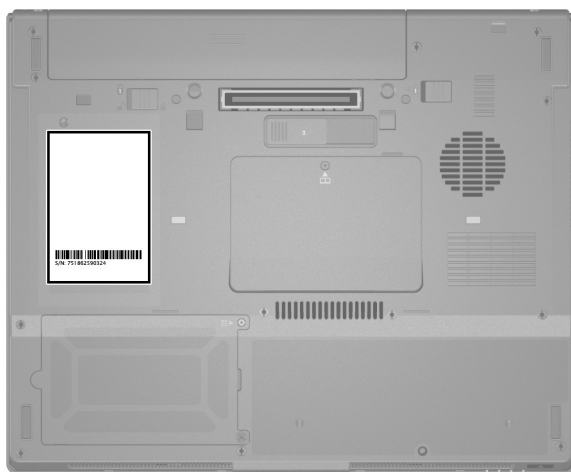
Serial Number Location

4.2 Notebook Major Components
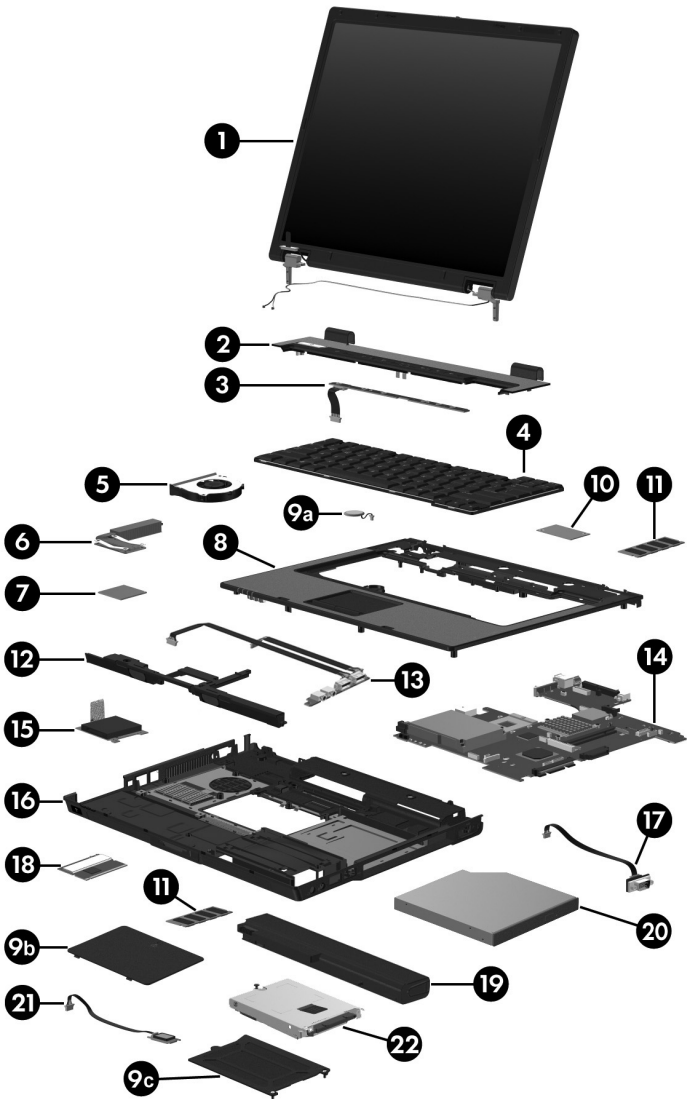
Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components

Item	Description			Spare Part Number
1	**Display assemblies** (include wireless antenna boards and cables)			
	15.0-inch, SXGA+WVA, TFT			395459-001
	15.0-inch, XGA, TFT			395458-001
	14.1-inch, XGA, TFT			395457-001
2	**Switch cover**			378232-001
3	**LED board**			378228-001
4	**Keyboards**			
	Korea	397243-AD1	Thailand	397243-281
	Taiwan	397243-AB1	United States	397243-001
5	**Fan**			378233-001
6	**Heat sink** (includes thermal paste)			379799-001
7	**Processors** (include thermal paste)			
	Intel Pentium M 2.13-GHz			378224-001
	Intel Pentium M 2.00-GHz			378223-001
	Intel Pentium M 1.86-GHz			378222-001
	Intel Pentium M 1.73-GHz			378221-001
	Intel Pentium M 1.60-GHz			378220-001
	Intel Pentium M 1.30-GHz			378219-001
	Intel Celeron M 1.5-GHz			378218-001
	Intel Celeron M 1.4-GHz			378217-001
8	**Top cover** (includes TouchPad)			395463-001
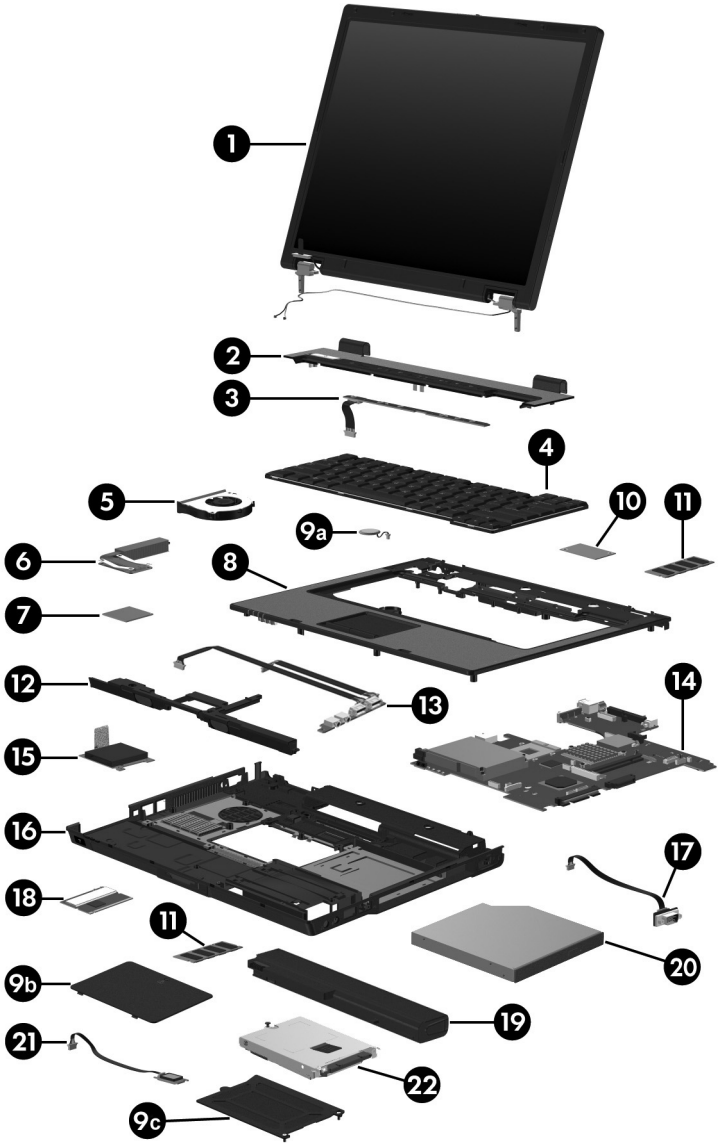
Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description	Spare Part Number
	Miscellaneous Plastics Kit	378236-001
	Includes:	
9a	RTC battery	
9b	Memory module/Mini PCI compartment cover (includes 1 captive screw)	
9c	Hard drive cover (includes 2 captive screws)	
	Not illustrated: Notebook feet PC Card slot space savers (2)	
10	**Modem board**	325521-001
11	**Memory modules** (533-MHz DDR2)	
	1024 MB	373121-001
	512 MB	373120-001
	256 MB	373119-001
12	**Speaker**	378237-001
13	**USB/audio board**	378226-001
14	**System boards**	
	With 64 MB of video RAM	395461-001
	With 32 MB of video RAM	395460-001
15	**Digital media board**	395462-001
16	**Base enclosure**	395464-001
17	**Serial connector module**	378227-001
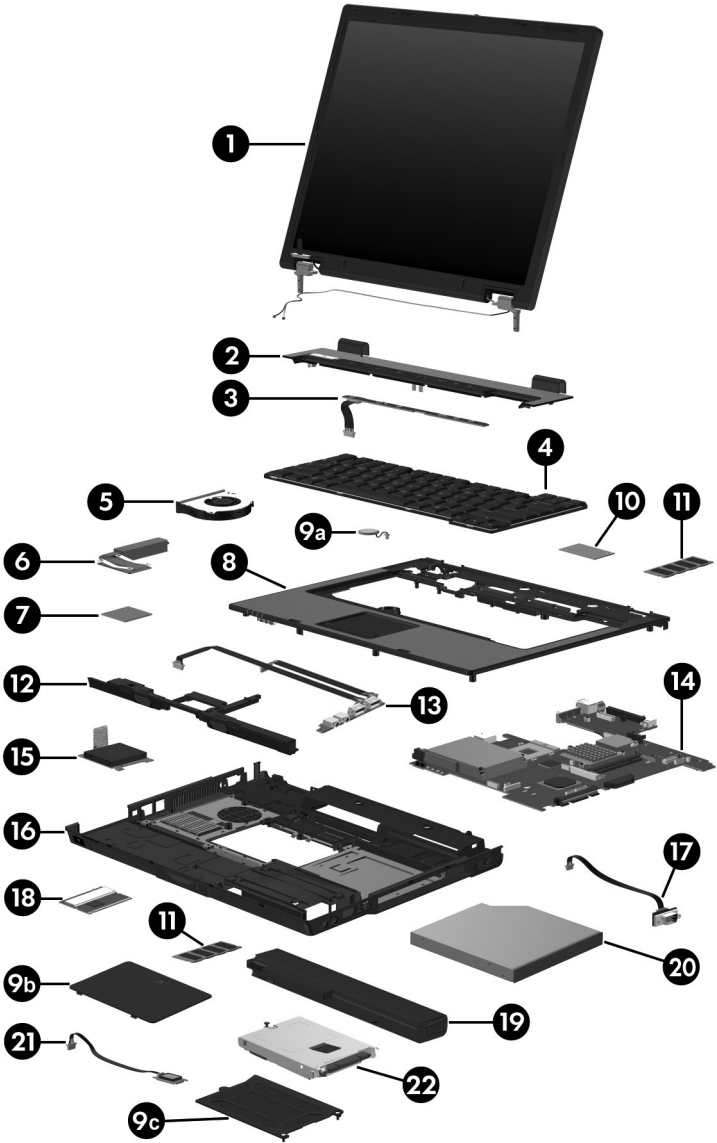
Notebook Major Components

Table 4-1

Spare Parts: Notebook Major Components *(Continued)*

Item	Description		Spare Part Number
18	**Mini PCI communications cards**		
	802.11b/g WLAN card, for use in most of the world		381582-001
	802.11b/g WLAN card, for use in the rest of the world		381583-001
	802.11a/b/g combination WLAN card, for use in the Asia Pacific region		373900-021
	802.11a/b/g combination WLAN card, for use in the rest of the world		373901-002
19	**Battery packs**		
	6-cell, 4.8-AHr		372772-001
	6-cell, 4.8-AHr		367457-001
	8-cell, travel battery pack		367456-001
20	**Optical drives** (include bezel)		
	8X Max DVD-ROM drive		380770-001
	DVD/CD-RW Combo Drive		380772-001
	8X Max DVD±RW and CD-RW Combo Drive		380773-001
	8X Max DVD±RW and CD-RW Dual Layer Combo Drive, LightScribe		397247-001
21	**Broadcomm Bluetooth® wireless board** (includes Bluetooth board cable)		367871-001
22	**Hard drives** (include frame and connector)		
	5400-rpm	4200-rpm, 60-GB	378213-001
	80-GB	380108-001	
	60-GB	378215-001	
	40-GB	380107-001	

4.3 Miscellaneous Plastics Kit
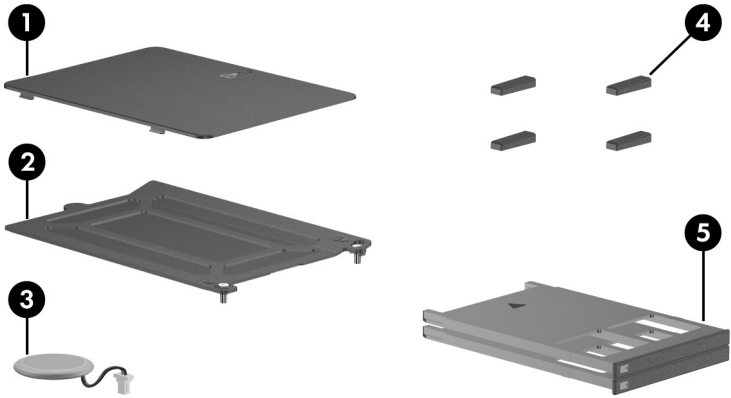
Table 4-2

Miscellaneous Plastics Kit

Spare Part Number 378236-001

Item	Description
1	Memory module/Mini PCI compartment cover (includes 1 captive screw)
2	Hard drive cover (includes 2 captive screws)
3	RTC battery (includes cable)
4	Notebook feet (4)
5	PC Card slot space savers (2)

4.4 Miscellaneous Cable Kit
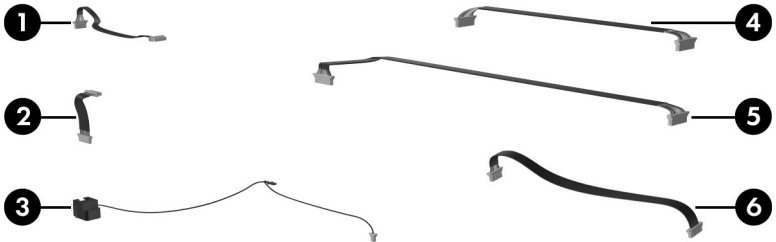
Table 4-3

Miscellaneous Cable Kit

Spare Part Number 395465-001

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

4.5 Mass Storage Devices

Table 4-4

Mass Storage Devices

Spare Part Number Information

Item	Description		Spare Part Number
1	**Hard drives** (include frame and connector)		
	5400-rpm	4200-rpm	
	80-GB 380108-001	60-GB	378213-001
	60-GB 378215-001		
	40-GB 380107-001		
2	**Optical drives** (include bezel)		
	8X Max DVD-ROM drive		380770-001
	DVD/CD-RW Combo Drive		380772-001
	8X Max DVD±RW and CD-RW Combo Drive		380773-001
	8X Max DVD±RW and CD-RW Dual Layer Combo Drive, LightScribe		397247-001

4.6 Miscellaneous (Not Illustrated)

Table 4-5

Miscellaneous (Not Illustrated)

Spare Part Information

Description	Spare Part Number
65 watt AC adapter	239704-001
HP Advanced Docking Station	374804-001
HP Docking Station	374803-001
Docking Station Miscellaneous Plastics Kit	380089-001
Carrying cases	
Nylon top-load	325815-001 and 325815-002
Nylon entry-level	325814-001
External MultiBay II	366143-001
External MultiBay II power cable and stand	366144-001
8-cell travel battery	367456-001
USB 1.1 diskette drive	359118-001
Power cords	
For use in:	
Canada, French Canada, Latin America, Taiwan, Thailand, and the United States	246959-001
Hong Kong and the United Kingdom	246959-031
Korea	246959-AD1
People's Republic of China	246959-AA1

Table 4-5

Miscellaneous (Not Illustrated)

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	378235-001

- Hex socket HM5.0×9.0 screw lock
- Phillips PM2.5×13.0 spring-loaded screw
- Phillips PM2.5×4.0 shoulder screw
- Phillips PM2.5×4.0 screw
- Phillips PM2.0×8.0 shoulder screw
- Phillips PM2.0×7.0 screw
- Phillips PM2.0×4.0 screw
- Phillips PM2.0×3.0 screw
- Phillips PM1.5×4.0 screw
- Phillips PM1.5×3.5 screw
- Torx T8M2.0×9.0 screw
- Torx T8M2.0×4.0 screw
- Torx T8M2.0×2.0 screw

4.7 Sequential Part Number Listing

Table 4-6

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
246959-031	Power cord for use in Hong Kong and the United Kingdom
246959-AA1	Power cord for use in People's Republic of China
246959-AD1	Power cord for use in Korea
325521-001	Modem board
325814-001	Nylon entry-level carrying case
325815-001	Nylon top-load carrying case
325815-002	Nylon top-load carrying case
359118-001	USB 1.1 diskette drive
366143-001	External MultiBay II
366144-001	External MultiBay II power cable and stand
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)
372772-001	6-cell, 4.8-AHr battery pack
373119-001	256-MB memory module (533-MHz DDR2)
373120-001	512-MB memory module (533-MHz DDR2)
373121-001	1024-MB memory module (533-MHz DDR2)

Table 4-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
373900-021	802.11a/b/g combination WLAN Mini PCI communications card, for use in the Asia Pacific region
373901-002	802.11a/b/g combination WLAN card, for use in the rest of the world
374803-001	HP Docking Station
374804-001	HP Advanced Docking Station
378213-001	4200-rpm, 60-GB hard drive (includes frame and connector)
378215-001	5400-rpm, 60-GB hard drive (includes frame and connector)
378217-001	Intel Celeron M 1.4-GHz processor (includes thermal paste)
378218-001	Intel Celeron M 1.5-GHz processor (includes thermal paste)
378219-001	Intel Pentium M 1.30-GHz processor (includes thermal paste)
378220-001	Intel Pentium M 1.60-GHz processor (includes thermal paste)
378221-001	Intel Pentium M 1.73-GHz processor (includes thermal paste)
378222-001	Intel Pentium M 1.86-GHz processor (includes thermal paste)
378223-001	Intel Pentium M 2.00-GHz processor (includes thermal paste)
378224-001	Intel Pentium M 2.13-GHz processor (includes thermal paste)
378226-001	USB/audio board
378227-001	Serial connector module
378228-001	LED board
378232-001	Switch cover
378233-001	Fan
378235-001	Screw Kit
378236-001	Miscellaneous Plastics Kit

Table 4-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
378237-001	Speaker
379799-001	Heat sink (includes thermal paste)
380089-001	Docking Station Miscellaneous Plastics Kit
380107-001	5400-rpm, 40-GB hard drive (includes frame and connector)
380108-001	5400-rpm, 80-GB hard drive (includes frame and connector)
380770-001	8X Max DVD-ROM drive (includes bezel)
380772-001	DVD/CD-RW Combo Drive (includes bezel)
380773-001	8X Max DVD±RW and CD-RW Combo Drive (includes bezel)
381582-001	802.11b/g WLAN Mini PCI communications card, for use in most of the world
381583-001	802.11b/g WLAN Mini PCI communications card, for use in the rest of the world
395457-001	14.1-inch, XGA, TFT display assembly (includes wireless antenna boards and cables)
395458-001	15.0-inch, XGA, TFT display assembly (includes wireless antenna boards and cables)
395459-001	15.0-inch, SXGA+WVA, TFT display assembly (includes wireless antenna boards and cables)
395460-001	System board with 32 MB of video RAM
395461-001	System board with 64 MB of video RAM
395462-001	Digital media board
395463-001	Top cover (include TouchPad)
395464-001	Base enclosure
395465-001	Miscellaneous Cable Kit

Table 4-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
397243-001	Keyboard for use in the United States
397243-281	Keyboard for use in Thailand
397243-AB1	Keyboard for use in Taiwan
397243-AD1	Keyboard for use in Korea
397247-001	8X Max DVD±RW and CD-RW Dual Layer Combo Drive, LightScribe (includes bezel)

5

Removal and Replacement Preliminaries

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

5.1 Tools Required

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

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

5.2 Service Considerations

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

✎ As you remove each subassembly from the 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.

5.3 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."

5.4 **Preventing Electrostatic Damage**

Many electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs.

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

5.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

■ To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.

■ Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.

■ Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.

■ Place items on a grounded surface before removing items from their containers.

■ Always be properly grounded when touching a sensitive component or assembly.

■ Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.

■ Use transporters and conveyors made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

5.6 **Workstation Precautions**

Use the following grounding precautions at workstations:

■ Cover the workstation with approved static-shielding material (refer to Table 5-2, "Static-Shielding Materials").

■ Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

■ Use conductive field service tools, such as cutters, screwdrivers, and vacuums.

■ When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.

■ Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.

■ Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.

■ Avoid contact with pins, leads, or circuitry.

■ Turn off power and input signals before inserting or removing connectors or test equipment.

5.7 **Grounding Equipment and Methods**

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

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

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

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

■ Antistatic tape

■ Antistatic smocks, aprons, and sleeve protectors

■ Conductive bins and other assembly or soldering aids

■ Nonconductive foam

■ Conductive tabletop workstations with ground cords of one megohm resistance

■ Static-dissipative tables or floor mats with hard ties to the ground

■ Field service kits

■ Static awareness labels

■ Material-handling packages

■ Nonconductive plastic bags, tubes, or boxes

■ Metal tote boxes

■ Electrostatic voltage levels and protective materials

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

Table 5-1

Typical Electrostatic Voltage Levels

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

Table 5-2

Static-Shielding Materials

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

6

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

There are 64 screws and screw locks, in 11 different sizes, that must 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.

6.1 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.
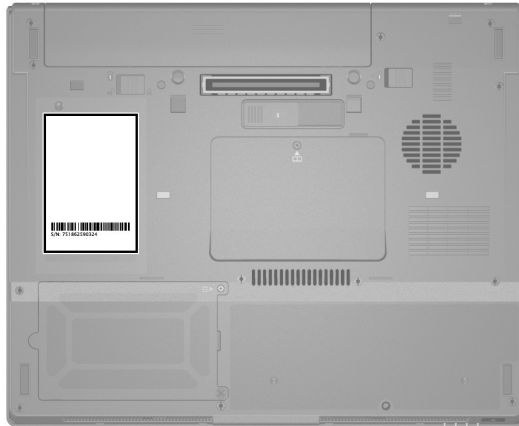
Serial Number Location

6.2 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
6.3	Preparing the notebook for disassembly	
	Battery pack	0

Disassembly Sequence Chart *(Continued)*

6.4	Hard drive	2 loosened to remove the hard drive cover 1 loosened to remove the hard drive 6 to disassemble the hard drive
6.5	Notebook feet	0
6.6	Bluetooth board	0
6.7	External memory module	1 loosened to remove the memory module/Mini PCI compartment cover
6.8	Mini PCI Communications Card	1 loosened to remove the memory module/Mini PCI compartment cover

⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your notebook by the governmental agency that regulates wireless devices in your country. If you install a device and then receive a warning message, remove the device to restore notebook functionality. Then contact Customer Care.

6.9	Optical drive	1
6.10	Keyboard	2
6.11	Switch cover	2
6.12	LED board	4
6.13	Fan	2 loosened
6.14	Heat sink	4 loosened
6.15	Processor	1 loosened
6.16	Internal memory module	0
6.17	RTC battery	0
6.18	Display assembly	6

Disassembly Sequence Chart *(Continued)*

6.19	Top cover	15
6.20	Speaker	6
6.21	Modem board	2
6.22	Digital media board	0
6.23	USB/audio board	1
6.24	System board	1 screw 4 screw locks
6.25	Serial connector module	2 screw locks

6.3 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, 4.8-AHr	372772-001
6-cell, 4.8-AHr	367457-001
8-cell, travel battery pack	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.
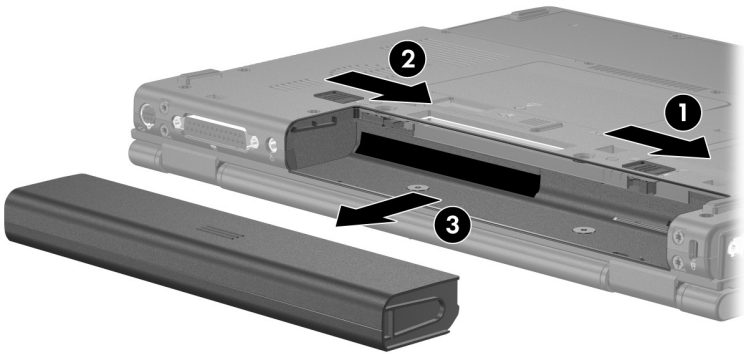
Removing the Battery Pack

Reverse the above procedure to install the battery pack.

6.4 Hard Drive

Hard Drive Spare Part Number Information

5400-rpm		4200-rpm	
80-GB	380108-001	60-GB	378213-001
60-GB	378215-001		
40-GB	380107-001		

1. Prepare the notebook for disassembly (refer to Section 6.3).

2. Loosen the two PM2.0×4.0 screws ❶ that secure the hard drive cover to the notebook.

3. Lift the left side of the hard drive cover and swing it to the right ❷.

4. Remove the hard drive cover.

✎ The hard drive cover is included in the Miscellaneous Plastics Kit, spare part number 378236-001.
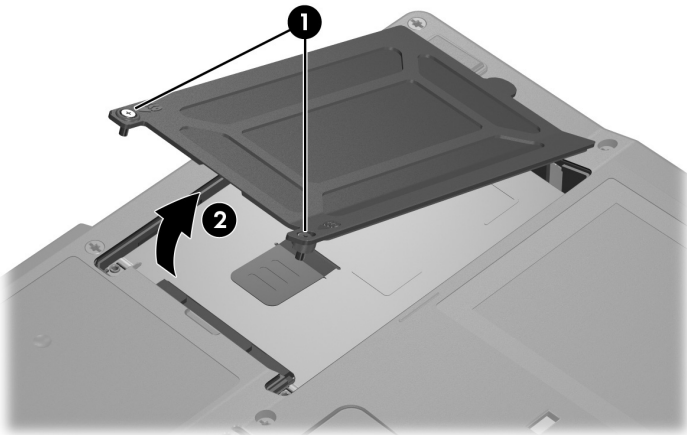
Removing the Hard Drive Cover

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

6. Grasp the mylar tab ❷ on the hard drive and slide the hard drive to the right ❸ to disconnect it from the system board.

7. Remove the hard drive from the hard drive bay ❹.
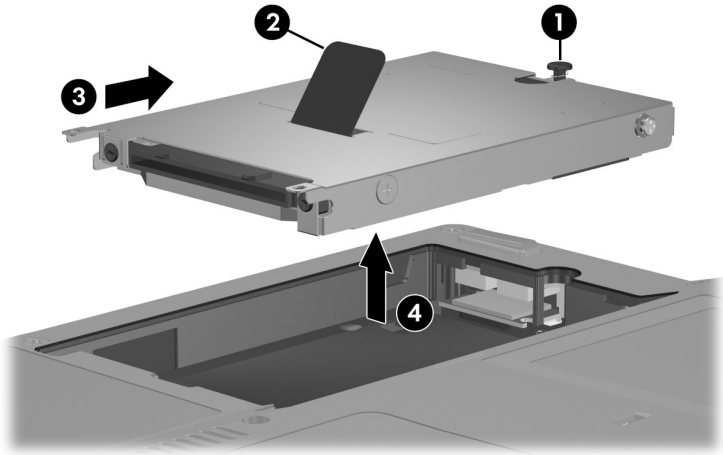
Removing the Hard Drive

8. Remove the two PM2.5×4.0 hard drive frame shoulder screws ❶ from each side of the hard drive.

9. Remove the two PM2.5×4.0 hard drive frame screws ❷ from each side of the hard drive.

10. Remove the two PM1.5×3.5 hard drive frame screws ❸ from the front of the hard drive.

11. Lift the frame straight up ❹ to remove if from the hard drive.

12. Remove the hard drive connector ❺ from the hard drive.
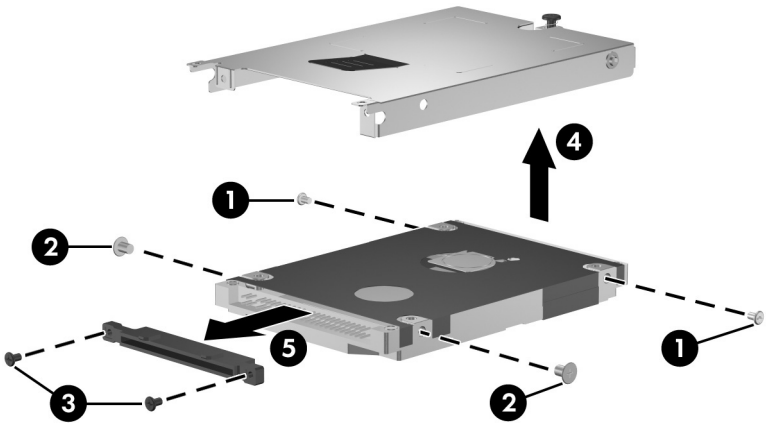
Removing the Hard Drive Frame and Connector

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

6.5 **Notebook Feet**

The notebook feet are adhesive-backed rubber pads. The feet are included in the Miscellaneous Plastics Kit, spare part number 378236-001.

Replacing the Notebook Feet

6.6 **Bluetooth Board**

Bluetooth Board Spare Part Number Information

Broadcomm Bluetooth wireless board (includes Bluetooth   367871-001
board cable)

---

1. Prepare the notebook for disassembly (refer to Section 6.3).

2. Remove the hard drive (Section 6.4).

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.
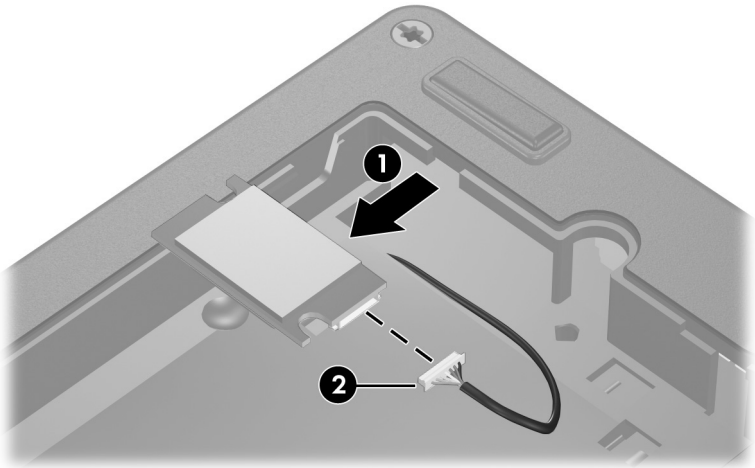
Removing the Bluetooth Board

Reverse the above procedure to install a Bluetooth board.

6.7 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 6.3).

2. Position the notebook with the front toward you.

3. Loosen the PM2.0×4.0 screw ❶ that secures the memory module/Mini PCI compartment cover to the notebook.

4. Lift the rear edge of the cover up and swing it toward you ❷.

5. Remove the memory module/Mini PCI compartment cover.

✎ The memory module/Mini PCI compartment cover is included in the Miscellaneous Plastics Kit, spare part number 378236-001.
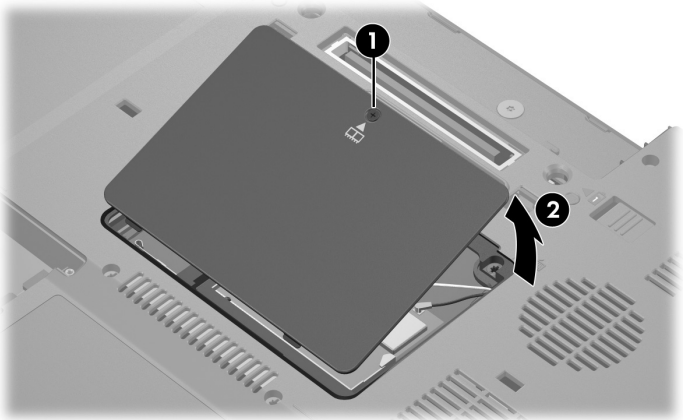
Removing the Memory Module/Mini PCI Compartment Cover

6. Spread the retaining tabs ❶ on each side of the memory module socket to release the memory module board. (The edge of the module opposite the socket rises away from the notebook.)

7. Slide the module away from the socket at an angle ❷.

8. Remove the memory module board.

✎ Memory modules are slotted ❸ to prevent incorrect installation into the memory module socket.
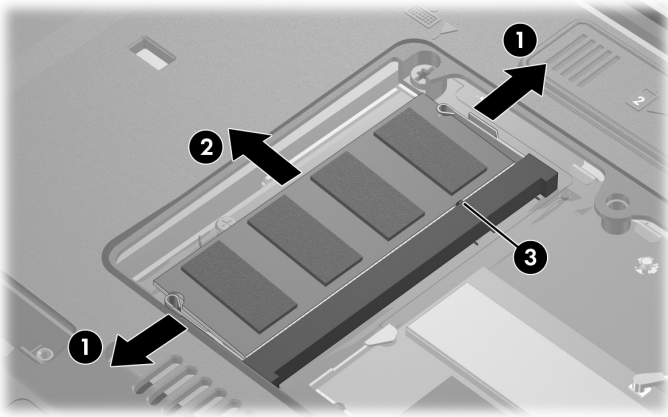
Removing the Memory Module

Reverse the above procedure to install a memory module.

6.8 Mini PCI Communications Card

Mini PCI Communications Card	
Spare Part Number Information	
802.11b/g WLAN card, for use in most of the world	381582-001
802.11b/g WLAN card, for use in the rest of the world	381583-001
802.11a/b/g combination WLAN card, for use in the Asia Pacific region	373900-021
802.11a/b/g combination WLAN card, for use in the rest of the world	373901-002

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the memory module/Mini PCI compartment cover (Section 6.7).

3. Position the notebook with the front toward you.

4. Disconnect the auxiliary and main antenna cables ❶ 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 edge of the 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.

✎ The Mini PCI communications card is slotted ❹ to prevent incorrect installation.
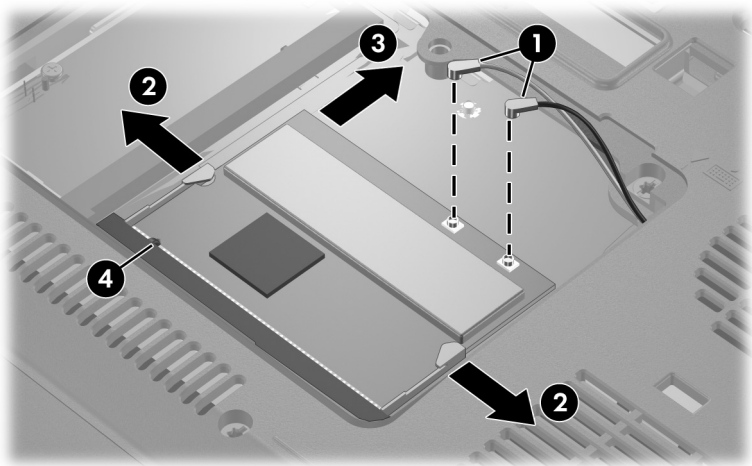
Removing a Mini PCI Communications Card

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

6.9 Optical Drive

Optical Drive Spare Part Number Information

8X Max DVD-ROM drive	380770-001
DVD/CD-RW Combo Drive	380772-001
8X Max DVD±RW and CD-RW Combo Drive	380773-001
8X Max DVD±RW and CD-RW Dual Layer Combo Drive, LightScribe	397247-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the memory module/Mini PCI compartment cover (Section 6.7).

3. Position the notebook with the left side toward you.

4. Remove the T8M2.0×9.0 screw ❶ that secures the optical drive to the notebook.

5. Insert a thin tool, such as an unbent paper clip ❷, into the media tray release hole and release the media tray.

6. Use the media tray to slide the optical drive to the left and out of the notebook ❸.

7. Remove the optical drive.
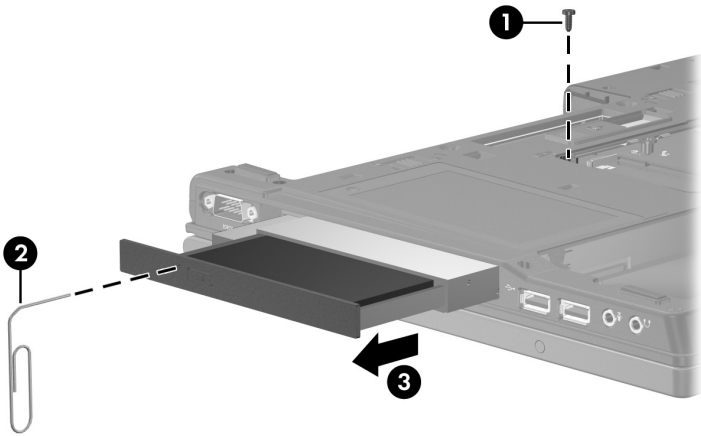
Removing the Optical Drive

Reverse the above procedure to install an optical drive.

6.10 Keyboard

Keyboard Spare Part Number Information

For use in Korea	397243-AD1	For use in Thailand	397243-281
For use in Taiwan	397243-AB1	For use in the United States	397243-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the memory module/Mini PCI compartment cover (Section 6.7).

3. Remove the two T8M2.0×9.0 screws that secure the keyboard to the notebook.

✎ The left keyboard retention screw is also used to secure the optical drive.
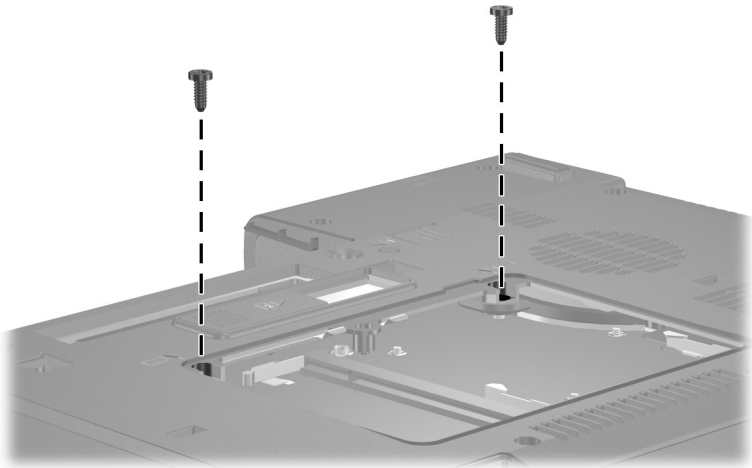
Removing the Keyboard Screws

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

5. Open the notebook as far as possible.

6. Slide the 4 keyboard retaining latches toward you.
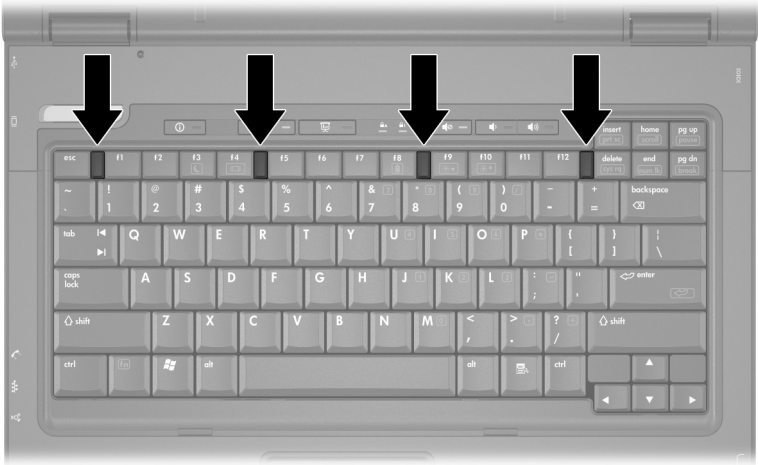
Releasing the Keyboard Latches

7. Lift the rear edge of the keyboard up and swing it toward you until it rests on the palm rest.

Releasing the Keyboard

8. Release the zero insertion force (ZIF) connector ❶ to which the keyboard cable is attached and disconnect the keyboard cable ❷.
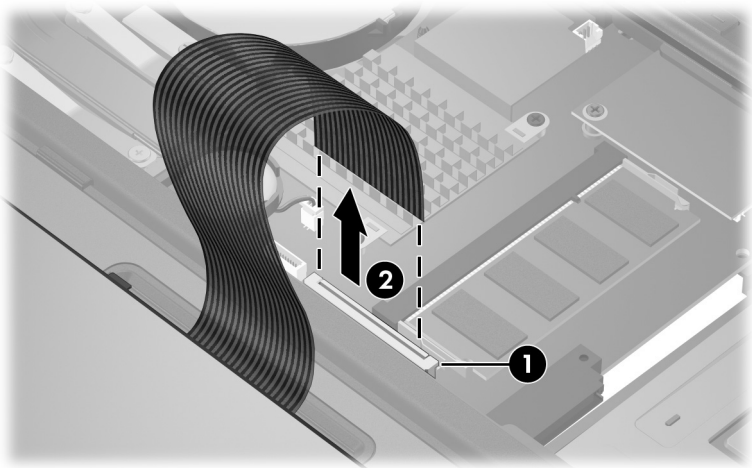
Disconnecting the Keyboard Cable

9. Remove the keyboard.

Reverse the above procedure to install the keyboard.

6.11 Switch Cover

Switch Cover Spare Part Number Information	
Switch cover	378232-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard (Section 6.10).

3. Close the notebook.

4. Turn the notebook upside down with the rear panel toward you.

5. Remove the two T8M2.0×2.0 screws that secure the switch cover to the notebook.
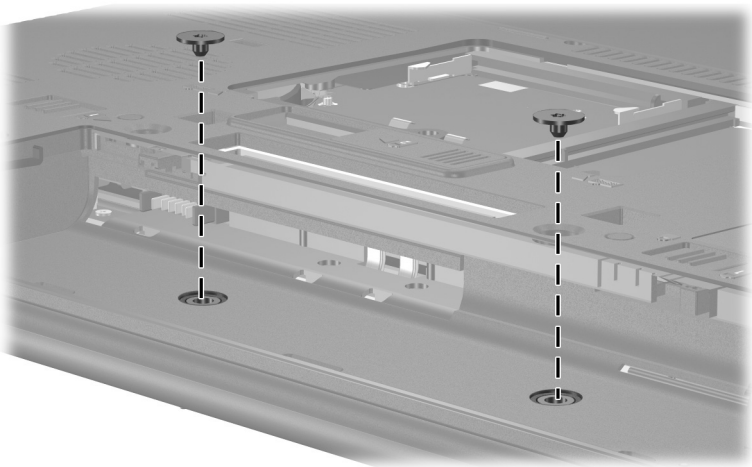
Removing the Switch Cover Screws

6. Turn the notebook display-side up with front toward you.

7. Open the notebook as far as possible.

8. Disconnect the LED board cable ❶ from the system board.

9. Insert a flat-bladed screwdriver into the four notches ❷ on the front edge of the switch cover and lift up ❸ until the cover disengages from the notebook.

10. Remove the switch cover.
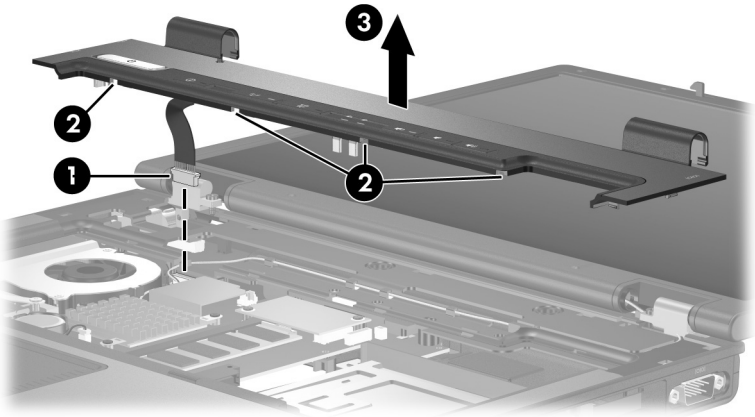
Removing the Switch Cover

Reverse the above procedure to install the switch cover.

6.12 **LED Board**

LED Board Spare Part Number Information

LED board (includes LED board cable)   378228-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard (Section 6.10).

3. Remove the switch cover (Section 6.11).

4. Turn the notebook upside down with the rear panel toward you.

5. Turn the switch cover upside down.

6. Remove the four PM1.5×4.0 screws ❶ that secure the LED board to the switch cover.

7. Remove the LED board ❷.
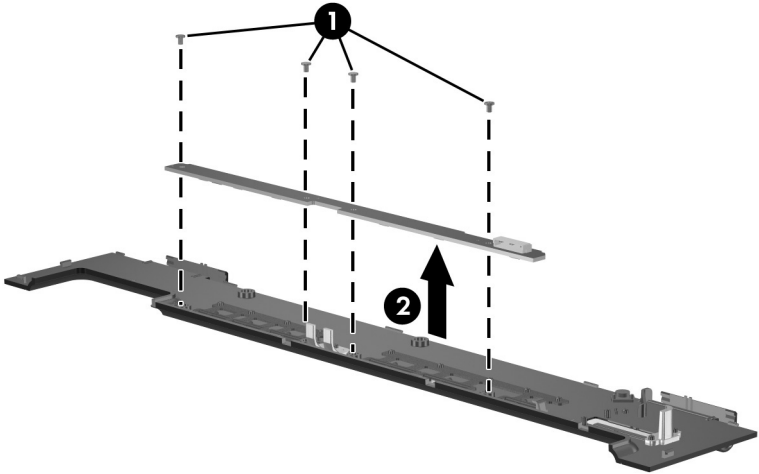
Removing the LED Board

Reverse the above procedure to install the LED board.

6.13 Fan

Fan Spare Part Number Information	
Fan	378233-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard (Section 6.10).

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.
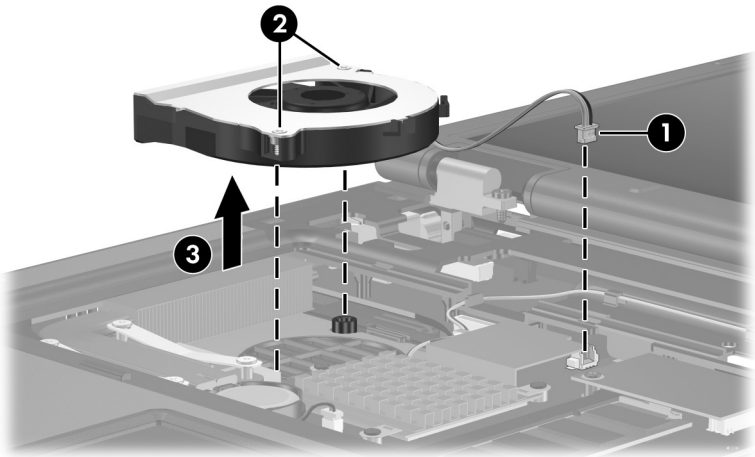
Removing the Fan

Reverse the above procedure to install the fan.

6.14   Heat Sink

Heat Sink Spare Part Number Information

Heat sink (includes thermal paste)	379799-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard (Section 6.10).

3. Remove the fan (Section 6.13).

4. Loosen the four PM2.0×8.0 shoulder screws ❶ that secure the heat sink to the notebook.

5. Lift the right side of the heat sink ❷ to disengage it from the processor.

6. Slide the heat sink up and to the right ❸ 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.
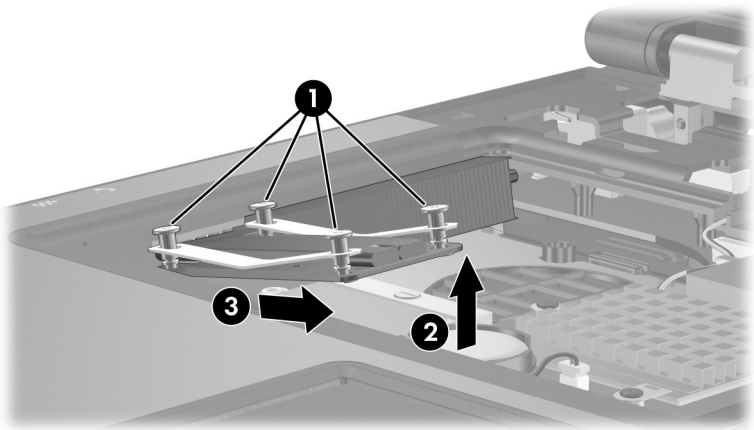
Removing the Heat Sink

✎ 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 should be reapplied to both surfaces before the heat sink is reinstalled. Thermal paste is included with all heat sink and processor spare part kits.
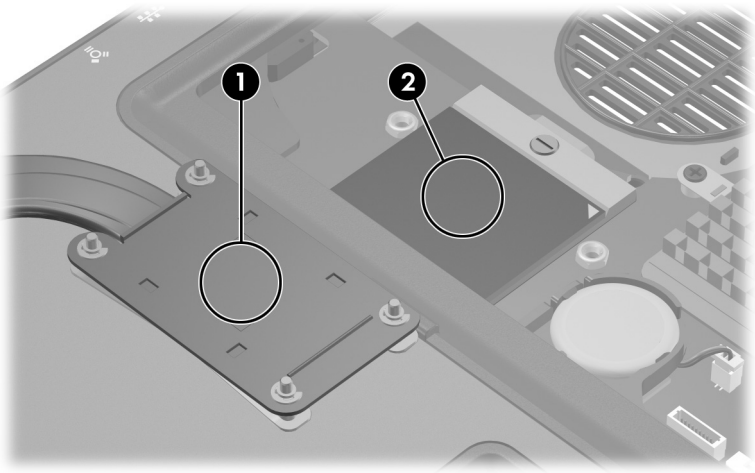
Replacing the Thermal Paste

Reverse the above procedure to install the heat sink.

6.15 Processor

Processor Spare Part Number Information

Intel Pentium M 2.13-GHz	378224-001
Intel Pentium M 2.00-GHz	378223-001
Intel Pentium M 1.86-GHz	378222-001
Intel Pentium M 1.73-GHz	378221-001
Intel Pentium M 1.60-GHz	378220-001
Intel Pentium M 1.30-GHz	378219-001
Intel Celeron M 1.5-GHz	378218-001
Intel Celeron M 1.4-GHz	378217-001

1. Prepare the notebook for disassembly (Section 6.3).

2. Remove the keyboard (Section 6.10).

3. Remove the fan (Section 6.13).

4. Remove the heat sink (Section 6.14).

5. Use a flat-bladed 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 front-right corner when you install the processor.
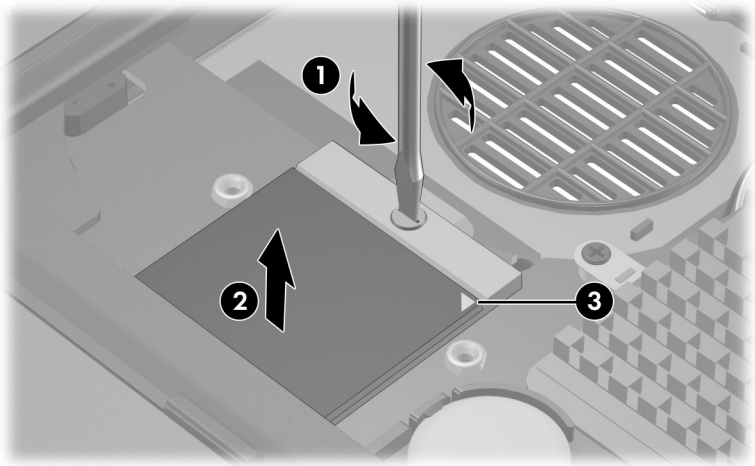
Removing the Processor

Reverse the above procedure to install the processor.

6.16 Internal Memory Module

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

1. Prepare the notebook for disassembly (Section 6.3).
2. Remove the keyboard (Section 6.10).

3. Spread the retaining tabs ❶ on each side of the memory module socket to release the memory module board. (The edge of the module opposite the socket rises away from the notebook.)

4. Slide the module away from the socket at an angle ❷.

5. Remove the memory module board.

✎ Memory modules are slotted ❸ to prevent incorrect installation into the memory module socket.
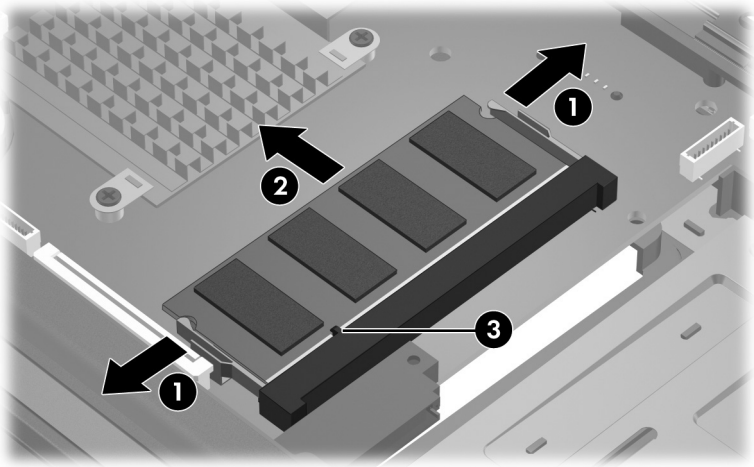
Removing the Memory Module

Reverse the above procedure to install a memory module.

6.17 **RTC Battery**

✎ The RTC battery is included in the Miscellaneous Plastics Kit, spare part number 378236-001.

1. Prepare the notebook for disassembly (Section 6.3).
2. Remove the keyboard (Section 6.10).
3. Disconnect the RTC battery cable ❶ from the system board.
4. Remove the RTC battery ❷ from the clip in the top cover.
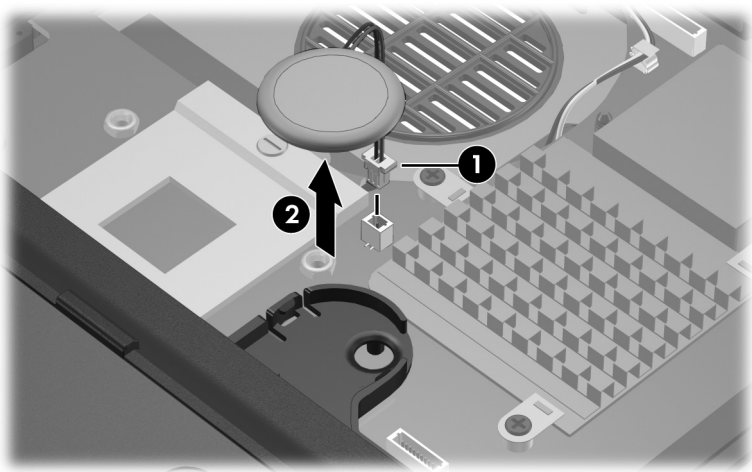
Removing the RTC Battery

Reverse the above procedure to install an RTC battery.

6.18 Display Assembly

Display Assembly Spare Part Number Information

15.0-inch, SXGA+WVA, TFT	395459-001
15.0-inch, XGA, TFT	395458-001
14.1-inch, XGA, TFT	395457-001

1. Prepare the notebook for disassembly (Section 6.3), and then remove the following components:

    a. Memory module/Mini PCI compartment cover (Section 6.7)

    b. Optical drive (Section 6.9)

    c. Keyboard (Section 6.10)

    d. Switch cover (Section 6.11)

2. Disconnect the wireless antenna cables from the Mini PCI communications board (Section 6.8).

3. Turn the notebook display-side up with the front toward you.

4. Open the notebook as far as possible.

5. Disconnect the display cable ❶ from the system board.

6. Remove the wireless antenna cables from the Mini PCI compartment and the top cover clips ❷.

7. Remove the two T8M2.0×9.0 screws ❸ that secure the display assembly to the notebook.
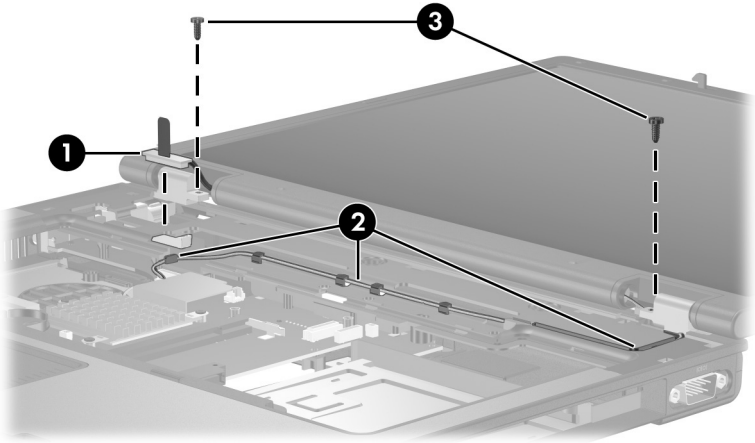
Disconnecting the Display Cable and Removing the Display Screws

8. Swing the display assembly into a partially closed position.

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

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

10. Remove the four T8M2.0×9.0 screws ❶ that secure the display assembly to the notebook.

11. Lift the display assembly straight up and remove it ❷.
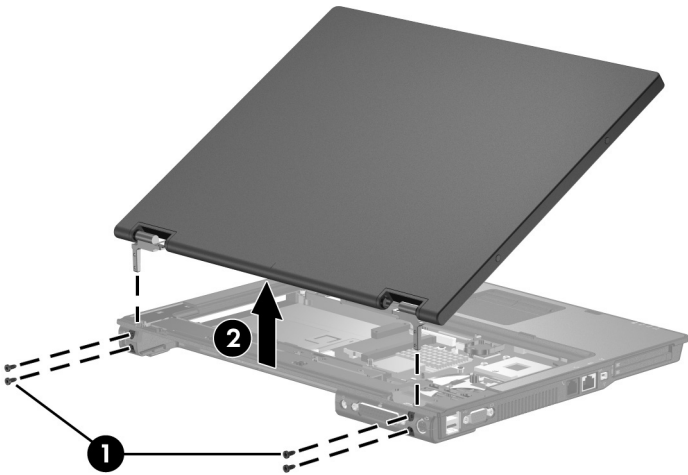
Removing the Display Assembly

Reverse the above procedure to install the display assembly.

6.19 Top Cover

Top Cover Spare Part Number Information

Top cover (includes TouchPad)	395463-001

1. Prepare the notebook for disassembly (Section 6.3), and then remove the following components:

   a. Memory module/Mini PCI compartment cover (Section 6.7)

   b. Optical drive (Section 6.9)

   c. Keyboard (Section 6.10)

   d. Switch cover (Section 6.11)

   e. RTC battery (Section 6.17)

   f. Display assembly (Section 6.18)

2. Turn the notebook upside down with the front toward you.

3. Remove the thirteen T8M2.0×9.0 screws that secure the top cover to the notebook.
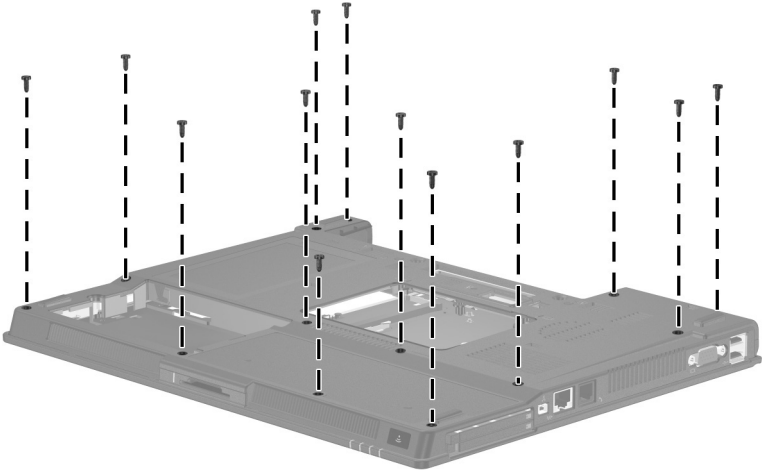
Removing the Top Cover Screws, Part 1

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

5. Remove the two T8M2.0×9.0 screws ❶ that secure the top cover to the notebook.

6. Disconnect the TouchPad cable ❷ from the system board.
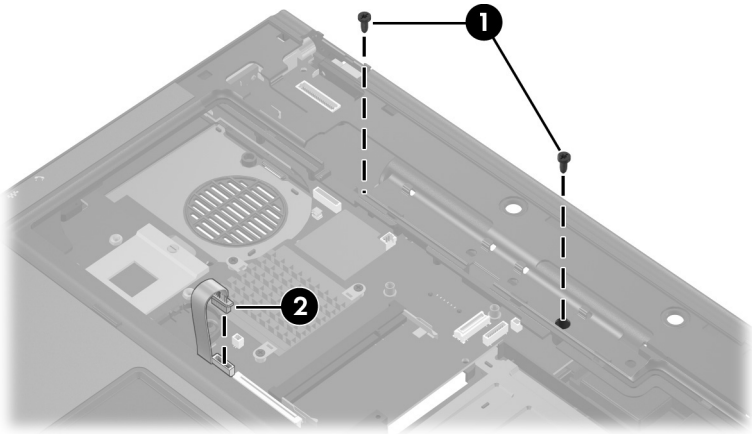
Removing the Top Cover Screws, Part 2

7. Lift up the rear edge of the top cover ❶ until it disengages from the base enclosure.

8. Swing the top cover toward you ❷ until the left and right sides of the top cover disengage from the base enclosure.

9. Lift up on the left ❸ and right sides ❹ of the top cover until the top cover disengages from the base enclosure.
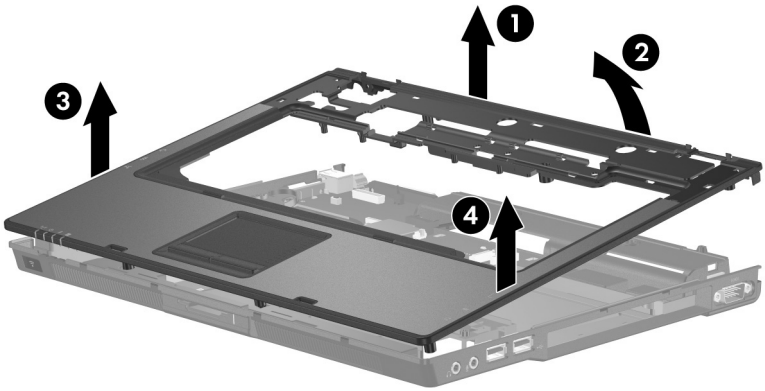
Releasing the Top Cover

10. Lift the top cover straight up until the front edge of the top cover disengages from the base enclosure and remove the top cover.

Reverse the above procedure to install the top cover.

6.20 **Speaker**

Speaker Spare Part Number Information

Speaker   378237-001

1. Prepare the notebook for disassembly (Section 6.3), and then remove the following components:

   a. Memory module/Mini PCI compartment cover (Section 6.7)

   b. Optical drive (Section 6.9)

   c. Keyboard (Section 6.10)

   d. Switch cover (Section 6.11)

   e. Display assembly (Section 6.18)

   f. Top cover (Section 6.19)

2. Disconnect the speaker cable from the system board.
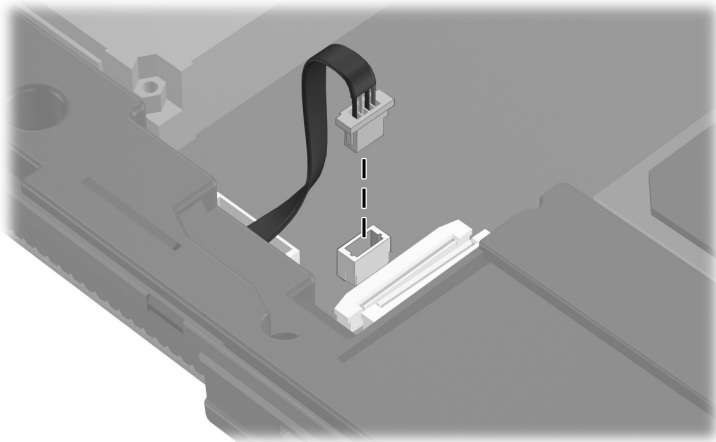
Disconnecting the Speaker Cable

3. Remove the six T8M2.0×4.0 screws ❶ that secure the speaker to the notebook.

4. Lift the speaker up ❷ until it clears the system board.

5. Slide the speaker toward you ❸ and remove it.
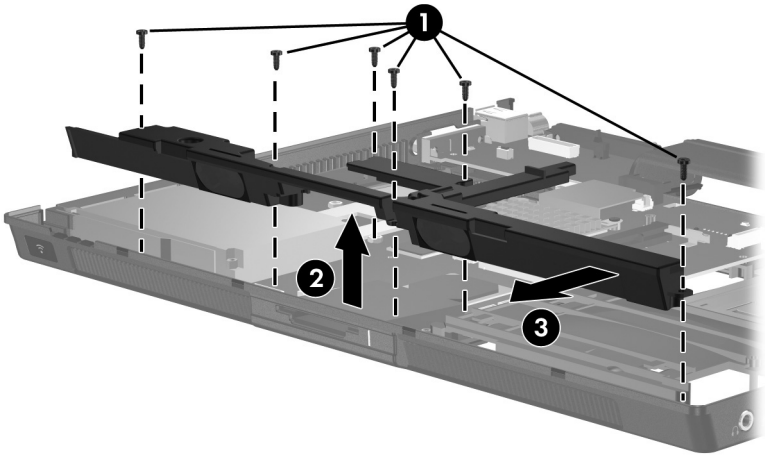
Removing the Speaker

Reverse the above procedure to install the speaker.

6.21 Modem Board

Modem Board Spare Part Number Information	
Modem board	325521-001

1. Prepare the notebook for disassembly (Section 6.3), and then remove the following components:

   a. Memory module/Mini PCI compartment cover (Section 6.7)

   b. Optical drive (Section 6.9)

   c. Keyboard (Section 6.10)

   d. Switch cover (Section 6.11)

   e. Display assembly (Section 6.18)

   f. Top cover (Section 6.19)

   g. Speaker (Section 6.20)

2. Remove the two PM2.0×3.0 screws ❶ that secure the modem board to the notebook.

3. Lift the front edge of the modem board ❷ to disconnect it from the system board.

4. Disconnect the modem cable ❸ from the modem board.

5. Remove the modem board.
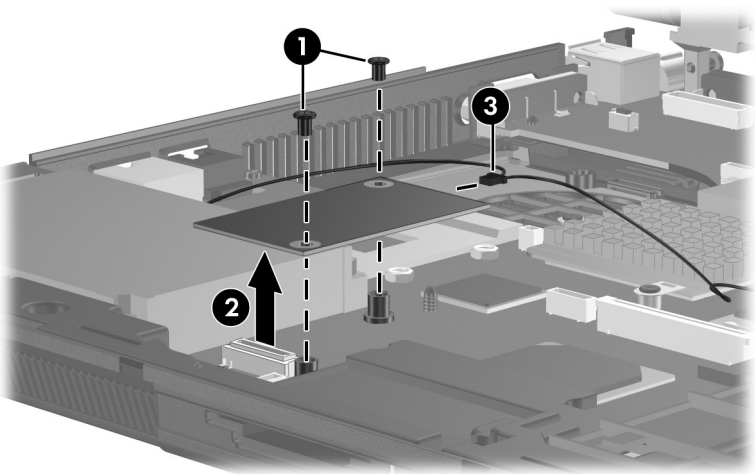
Removing the Modem Board

Reverse the above procedure to install the modem board.

6.22 Digital Media Board

Digital Media Board Spare Part Number Information	
Digital media board (includes digital media board cable)	395462-001

1. Prepare the notebook for disassembly (Section 6.3), and then remove the following components:

    a. Memory module/Mini PCI compartment cover (Section 6.7)

    b. Optical drive (Section 6.9)

    c. Keyboard (Section 6.10)

    d. Switch cover (Section 6.11)

    e. Display assembly (Section 6.18)

    f. Top cover (Section 6.19)

    g. Speaker (Section 6.20)

2. Release the ZIF connector to which the digital media board cable is attached and disconnect the digital media board cable ❶ from the system board.

3. Remove the digital media board ❷.
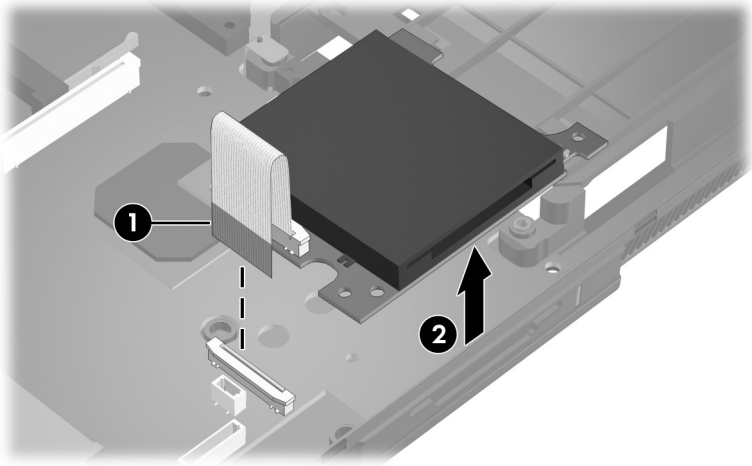
Removing the Digital Media Board

Reverse the above procedure to install the digital media board.

6.23 USB/Audio Board

USB/Audio Board Spare Part Number Information	
USB/audio board	378226-001

1. Prepare the notebook for disassembly (Section 6.3), and then remove the following components:

    a. Memory module/Mini PCI compartment cover (Section 6.7)

    b. Optical drive (Section 6.9)

    c. Keyboard (Section 6.10)

    d. Switch cover (Section 6.11)

    e. Display assembly (Section 6.18)

    f. Top cover (Section 6.19)

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

3. Disconnect the USB cable ❶ and audio cable ❷ from the system board.

4. Remove the PM1.5×3.0 screw ❸ that secures the USB/audio board and shield to the base enclosure.

5. Remove the cables from the clips ❹ in the base enclosure.

6. Remove the USB/audio board ❺.
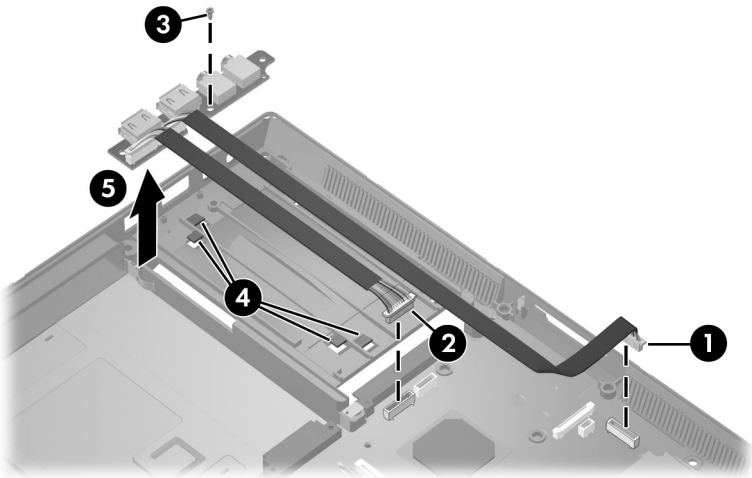
Removing the USB/Audio Board

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

6.24 System Board

System Board Spare Part Number Information

With 64 MB of video RAM	395461-001
With 32 MB of video RAM	395460-001

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

■ Memory modules (Section 6.7 and Section 6.16)

■ Mini PCI communications card (Section 6.8)

■ Processor (Section 6.15)

■ Modem board (Section 6.21)

1. Prepare the notebook for disassembly (Section 6.3),
   and then remove the following components:

   a. Hard drive (Section 6.4)

   b. Bluetooth board (Section 6.6)

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Fan (Section 6.13)

   g. Heat sink (Section 6.14)

   h. RTC battery (Section 6.17)

   i. Display assembly (Section 6.18)

   j. Top cover (Section 6.19)

   k. Speaker (Section 6.20)

   l. Digital media board (Section 6.22)

   m. USB/audio board (Section 6.23)

2. Turn the notebook upside down with the rear panel
   toward you.

3. Disconnect the serial connector cable ❶ and the Bluetooth cable ❷ from the system board.

4. Remove the T8M2.0×4.0 screw ❸ that secures the system board to the base enclosure next to the RJ-11 connector.

5. Remove the two HM5.0×9.0 screw locks ❹ on each side of the parallel connector.

6. Remove the two HM5.0×9.0 screw locks ❺ on each side of the external monitor connectors.
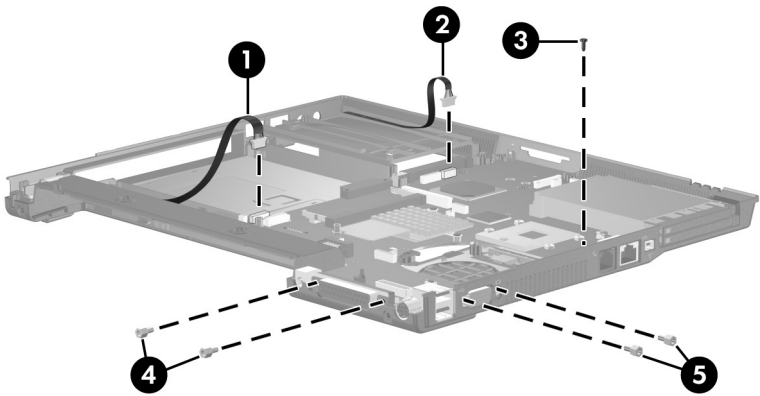
Removing the System Board Screws and Screw Locks

7. Use the optical drive connector to lift the system board up ❶ until the power connector ❷ is clear of the base enclosure.

8. Slide the system board to the left ❸ at an angle and remove it.
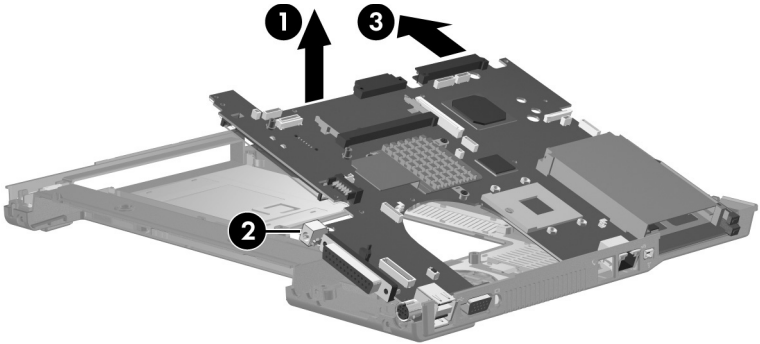
Removing the System Board

9. If necessary, disconnect the RJ-11 connector module cable from the system board and remove the RJ-11 connector module and cable.
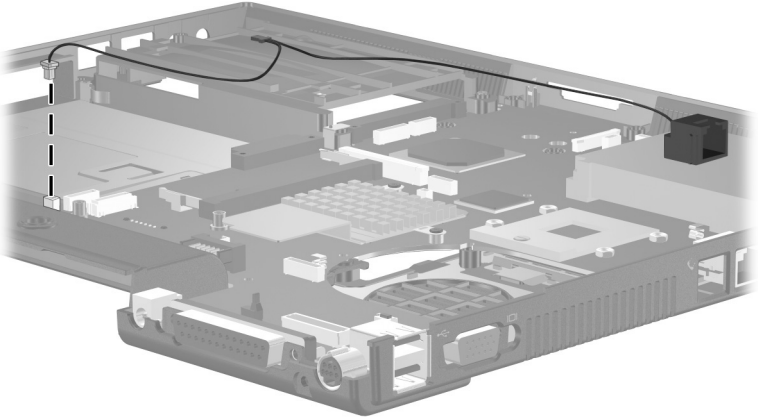
Removing the RJ-11 Connector Module and Cable

Reverse the above procedures to install the system board.

6.25 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 6.3), and then remove the following components:

   a. Hard drive (Section 6.4)

   b. Bluetooth board (Section 6.6)

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Fan (Section 6.13)

   g. Heat sink (Section 6.14)

   h. Modem board (Section 6.21)

   i. Display assembly (Section 6.18)

   j. Top cover (Section 6.19)

   k. Speaker (Section 6.20)

   l. Digital media board (Section 6.22)

   m. USB/audio board (Section 6.23)

   n. System board (Section 6.24)

2. Turn the base enclosure upside down with the rear panel toward you.

3. Remove the two HM5.0×9.0 screw locks ❶ on each side of the serial connector.

4. Lift the serial connector module and cable out of the base enclosure ❷.

5. Disconnect the serial connector module cable from the system board ❸.
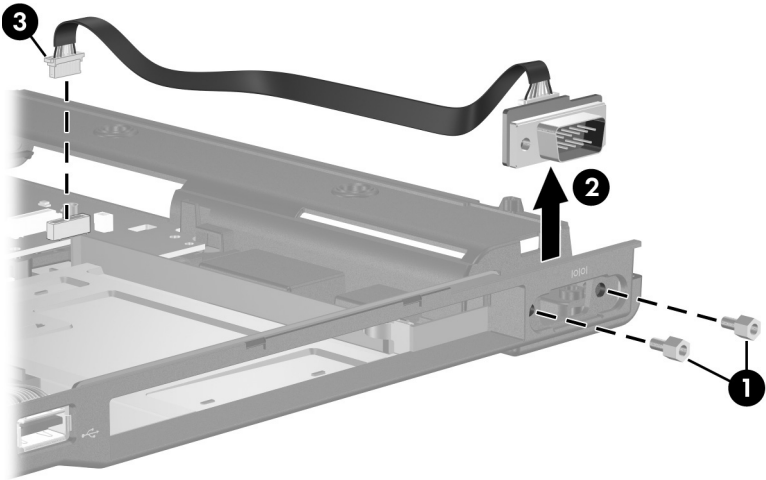
Removing the Serial Connector Module

Reverse the above procedures to install the serial connector module.

7

Specifications

This chapter provides physical and performance specifications.

Table 7-1

Notebook

Dimensions	Metric	U.S.
Height	32.8 cm	12.91
Width	26.7 cm	10.51
Depth	3.1 cm	1.22
Weight	2.66 kg	5.86 lbs
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
Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%

Table 7-1

Notebook *(Continued)*

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

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

Table 7-2

15.0-inch, SXGA+WVA, TFT Display

Dimensions		
Height	30.0 cm	11.8 in
Width	22.9 cm	9.0 in
Diagonal	38.1 cm	15.0 in
Number of colors	Up to 16.8 million	
Contrast ratio	300:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.264 × 0.264 mm	
Format	1400 × 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 7-3

15.0-inch, XGA, TFT Display

Dimensions		
Height	30.0 cm	11.8 in
Width	22.9 cm	9.0 in
Diagonal	38.1 cm	15.0 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1	
Brightness	150 nits typical	
Pixel resolution		
Pitch	0.264 × 0.264 mm	
Format	1024 × 768	
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 7-4

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	150 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 7-5

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	99 g
Interface type	ATA-6	ATA-6	ATA-6	ATA-6
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	76,140,160
Disc rotational speed	5400 rpm	5400 rpm	4200 rpm	5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)			

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

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.
[†]Actual drive specifications may differ slightly.

Table 7-6

Primary 6-cell, Li-Ion Battery Pack

Dimensions		
Height	2.00 cm	0.79 in
Width	5.30 cm	2.10 in
Depth	20.30 cm	8.00 in
Weight	0.34 kg	0.74 lb
Energy		
Voltage	10.8 V	
Amp-hour capacity	4.8 Ah	
Watt-hour capacity	51 Wh	
Temperature		
Operating	0°C to 45°C	32°F to 113°F
Nonoperating	-20°C to 60°C	-4°F to 140°F

Table 7-7

DVD-ROM Drive

Applicable disc	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18)	
	CD-ROM (Mode 1 and 2)	
	CD Digital Audio	
	CD-XA ready (Mode 2, Form 1 and 2)	
	CD-I ready (Mode 2, Form 1 and 2)	
	CD-R	
	CD-RW	
	Photo CD (single and multisession)	
	CD-Bridge	
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 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 7-8

DVD/CD-RW Combo Drive

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

Table 7-8

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

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

Table 7-9

DVD±RW and CD-RW Combo Drive

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

Table 7-9

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

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

Table 7-10

System DMA

Hardware DMA	System Function
DMA0	Not applicable
DMA1*	Not applicable
DMA2*	Not applicable
DMA3	SMC IrCC - Fast Infrared Port
DMA4	Direct memory access controller
DMA5*	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned
*PC Card controller can use DMA 1, 2, or 5.	

Table 7-11

System Interrupts

IRQ	System Function
IRQ0	System timer
IRQ1	Standard 101-/102-Key or Microsoft Natural Keyboard
IRQ2	Cascaded
IRQ3	SMC IrCC - Fast Infrared Port
IRQ4	COM1
IRQ5*	Not assigned
IRQ6	Diskette drive
IRQ7*	Parallel port
IRQ8	System CMOS/real-time clock
IRQ9*	Microsoft ACPI-compliant system
IRQ10*	Mobile Intel 915GM/PM Express PCI Express Root Port - 2591
	Intel 82801FB/FBM USB Universal Host Controller - 2658
	Intel 82801FB/FBM USB Universal Host Controller - 265B
	Intel 82801FB/FBM USB2 Enhanced Host Controller - 265C
	Intel 82801FB/FBM PCI Express Root Port - 2660
	ATI MOBILILITY RADEON X300
	SDA Standard Compliant Secure Digital Host Controller
	TI OHCI Compliant IEEE 1394 Host Controller
	TI PCI GemCore based SmartCard Controller
	TI PCIxx21 Integrated FlashMedia Controller
	TI PCIxx21/x515 Cardbus controller
	Agere System AC '97 Modem

Table 7-11

System Interrupts *(Continued)*

IRQ11*	Intel 82801FB/FBM USB Universal Host Controller - 2659
	Intel 82801FB/FBM USB Universal Host Controller - 265A
	Broadcom NetXtreme Gigabit Ethernet #2
	SoundMAX Integrated Digital Audio
IRQ12	Synaptics PS/2 TouchPad
IRQ13	Numeric data processor
IRQ14	Primary IDE channel
IRQ15*	Not assigned

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

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

Table 7-12

System I/O Addresses

I/O Address (hex)	System Function (shipping configuration)
000 - 00F	DMA controller no.1
010 - 01F	System board resources
020 - 021	Interrupt controller no.1
022 - 023	Unused
024 - 03F	System board resources
040 - 043	System timer
044 - 04D	Unused
04E - 04F	System board resources
050 - 053	System board resources

Table 7-12

System I/O Addresses *(Continued)*

I/O Address (hex)	System Function (shipping configuration)
054 - 059	Unused
060	Keyboard controller
061	System speaker
062	MS ACPI-Compliant embedded controller
063	System board resources
064	Keyboard controller
065	System board resources
066	MS ACPI-Compliant embedded controller
067	System board resources
068	Unused
070 - 071	RTC/CMOS
072 - 073	RTC/CMOS
074 - 077	Motherboard resources
078 - 079	Unused
080 - 08F	DMA page registers
090 - 09F	System board resources
0A0 - 0A1	Interrupt controller no.2
0A2 - 0A3	Unused
0A4 - 0BD	System board resources
0BE - 0BF	Unused
0C0 - 0DF	DMA controller 2
0E0 - 0EF	Unused
0F0 - 0FF	Numeric data processor

Table 7-12

System I/O Addresses *(Continued)*

I/O Address (hex)	System Function (shipping configuration)
100 - 10F	SMC IrCC - Fast Infrared Port
110 - 1EF	Unused
1F0 - 1F7	Primary IDE channel
1F8 - 377	Unused
378 - 37F	Parallel port (LPT1/default)
380 - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Unused
3C0 - 3DF	VGA
3E0 - 3E7	Unused
3E8 - 3EF	SMC IrCC - Fast infrared port
3F0 - 3F5	Unused
3F6	Primary IDE channel
3F7	Unused
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register
CFC - CFF	PCI configuration data register

Table 7-13

System Memory Map

Size	Memory Address	System Function
640 KB	00000000 - 0009FFFF	Base memory
128 KB	000A0000 - 000BFFFF	Video memory
128 KB	000C0000 - 000DFFFF	Video BIOS and other Optional ROM
128 KB	000E0000 - 000FFFFF	System BIOS
2047 MB	00010000 - 7FFFFFFF	Extended memory
1 GB	80000000 - BFFFFFFF	PCI Bus
32 MB	C0000000 - C1FFFFFF	Video memory (direct access)
991 MB	C2000000 - FFF00000	PCI Bus
1 MB	FFF00000 - FFFFFFFF	System BIOS

A

Connector Pin Assignments

Table A-1

Audio-Out (Headphone)
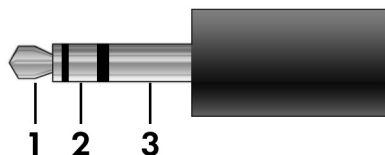
Pin	Signal	Pin	Signal
1	Audio out, left channel	3	Ground
2	Audio out, right channel		

Table A-2

Audio-In (Microphone)
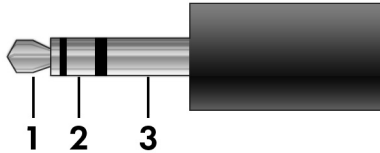
Pin	Signal	Pin	Signal
1	Audio signal in	3	Ground
2	Audio signal in		

Table A-3

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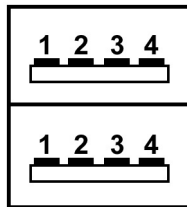
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data –	4	Ground

Table A-4

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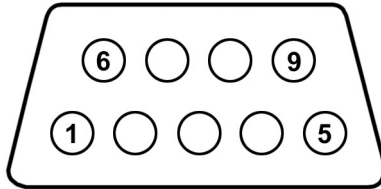
Pin	Signal	Pin	Signal
1	Carrier detect	6	Data set ready
2	Receive data	7	Ready to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Ground		

Table A-5

Parallel Port
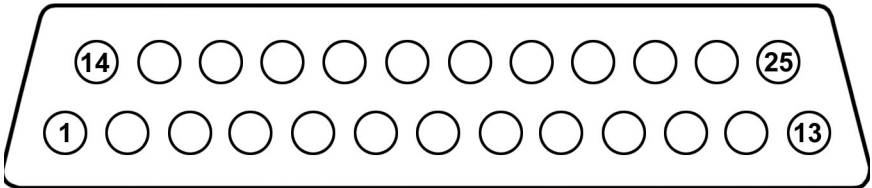
Pin	Signal	Pin	Signal
1	Strobe	14	Auto linefeed
2	Data bit 0	15	Error
3	Data bit 1	16	Initialize printer
4	Data bit 2	17	Select in
5	Data bit 3	18	Ground
6	Data bit 4	19	Ground
7	Data bit 5	20	Ground
8	Data bit 6	21	Ground
9	Data bit 7	22	Ground
10	Acknowledge	23	Ground
11	Busy	24	Ground
12	Paper end	25	Ground
13	Select		Ground

Table A-6

7-Pin S-Video-Out
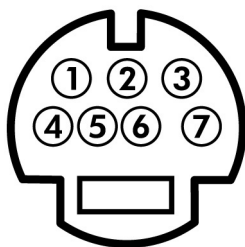
Pin	Signal	Pin	Signal
1	C (chrominance)	5	Composite video
2	Ground	6	Unused
3	Y (luminance)	7	Ground
4	Ground		

Table A-7

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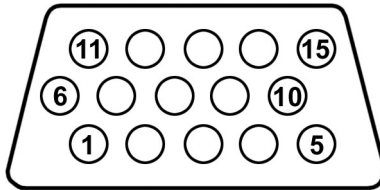
Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC 2B clock
8	Ground analog		

Table A-8

RJ-11 (Modem)
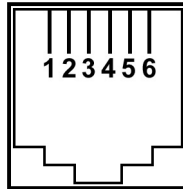
Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-9

RJ-45 (Network)
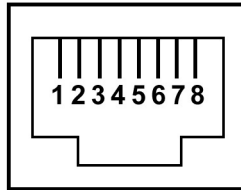
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit –	6	Receive –
3	Receive +	7	Unused
4	Unused	8	Unused

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

✎ NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

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

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

✎ NOTES:

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

4. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

5. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

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 378235-001.

Table C-1

Phillips PM2.0×4.0 Screw

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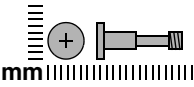
Where used:

❶ One screw that secures the memory module/Mini PCI compartment cover to the notebook (screw is captured on the cover by a C clip; documented in Section 6.7)

❷ Two screws that secure the hard drive cover to the notebook (screws are captured on the cover by C clips; documented in Section 6.4)
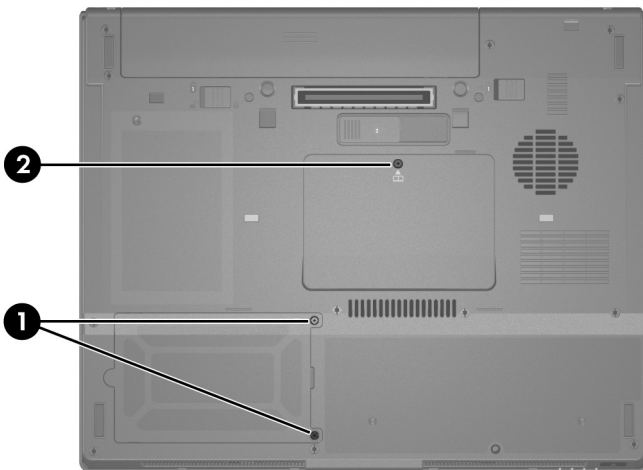
Phillips PM2.0×4.0 Screw Locations

Table C-2

Phillips PM2.5×13.0 Spring-Loaded

Hard Drive Retention Screw

	Color	Qty.	Length	Thread	Head Width
mm	Silver	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 6.4)
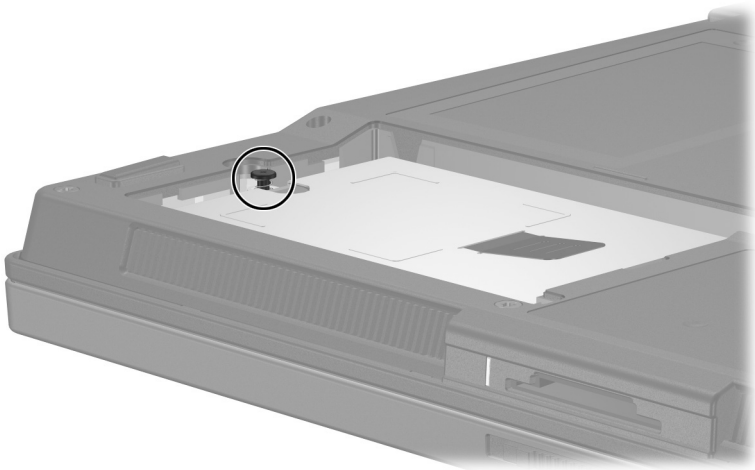
Phillips PM2.5×13.0 Screw Location

Table C-3

Phillips PM2.5×4.0 Shoulder Screw, Phillips PM2.5×4.0 Screw,

and Phillips PM1.5×3.5 Screw

⬛mm⬛	Color	Qty.	Length	Thread	Head Width
	Silver	2	4.0 mm	2.5 mm	4.0 mm
⬛mm⬛	Color	Qty.	Length	Thread	Head Width
	Silver	2	4.0 mm	2.5 mm	4.5 mm
⬛mm⬛	Color	Qty.	Length	Thread	Head Width
	Black	2	3.5 mm	1.5 mm	4.5 mm

Where used:
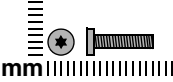
❶ Two shoulder screws that secure the hard drive frame to the hard drive (documented in Section 6.4)

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

❸ Two screws that secure the hard drive frame to the hard drive (documented in Section 6.4)
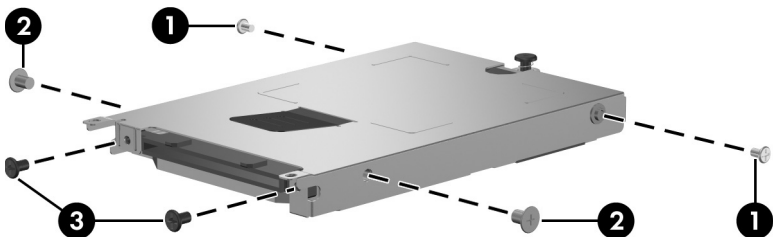
Phillips PM2.5×4.0 Shoulder Screw, Phillips PM2.5×4.0 Screw, and Phillips PM1.5×3.5 Screw Locations

Table C-4

Torx T8M2.0×9.0 Screw

	Color	Qty.	Length	Thread	Head Width
mm	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the optical drive to the notebook (documented in Section 6.9)
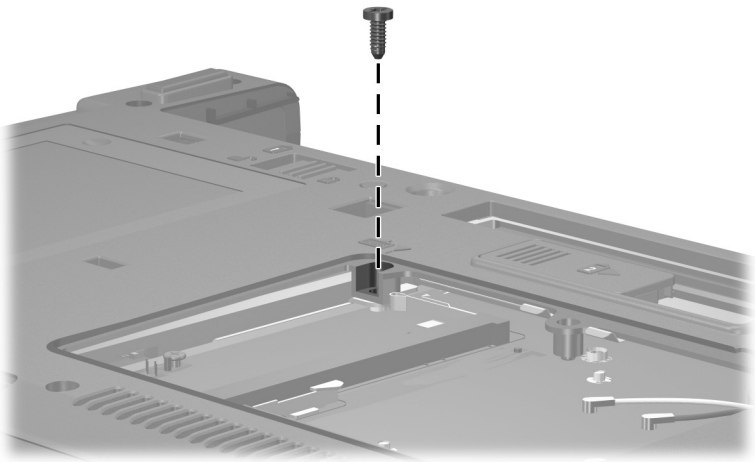
Torx T8M2.0×9.0 Screw Location

Table C-4

Torx T8M2.0×9.0 Screw *(Continued)*
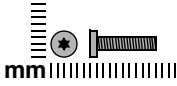
mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm
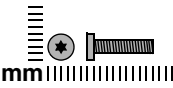
Where used:

2 screws that secure the keyboard to the notebook (documented in Section 6.10)

Torx T8M2.0×9.0 Screw Locations

Table C-4

Torx T8M2.0×9.0 Screw *(Continued)*

	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

2 screws that secure the display assembly to the notebook (documented in Section 6.18)

Torx T8M2.0×9.0 Screw Locations

Table C-4

Torx T8M2.0×9.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm
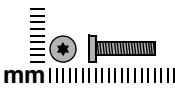
Where used:

4 screws that secure the display assembly to the notebook (documented in Section 6.18)

Torx T8M2.0×9.0 Screw Locations

Table C-4

Torx T8M2.0×9.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

13 screws that secure the top cover to the notebook (documented in Section 6.19)
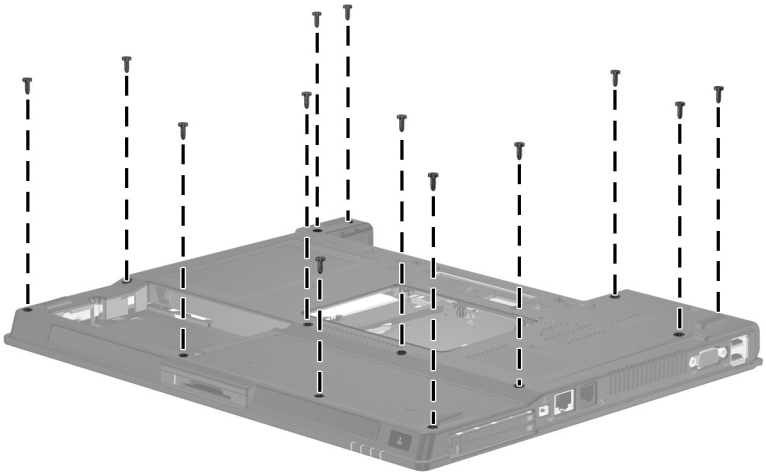
Torx T8M2.0×9.0 Screw Locations

Table C-4

Torx T8M2.0×9.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

2 screws that secure the top cover to the notebook (documented in Section 6.19)
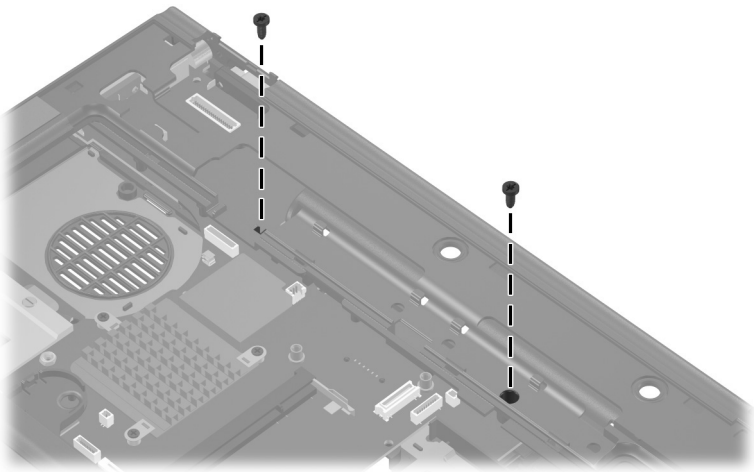
Torx T8M2.0×9.0 Screw Locations

Table C-5

Torx T8M2.0×2.0 Screw
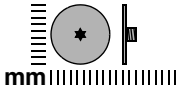
mm	Color	Qty.	Length	Thread	Head Width
	Black	2	2.0 mm	2.0 mm	6.0 mm
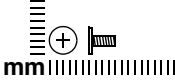
Where used:

2 screws that secure the switch cover to the notebook (documented in Section 6.11)
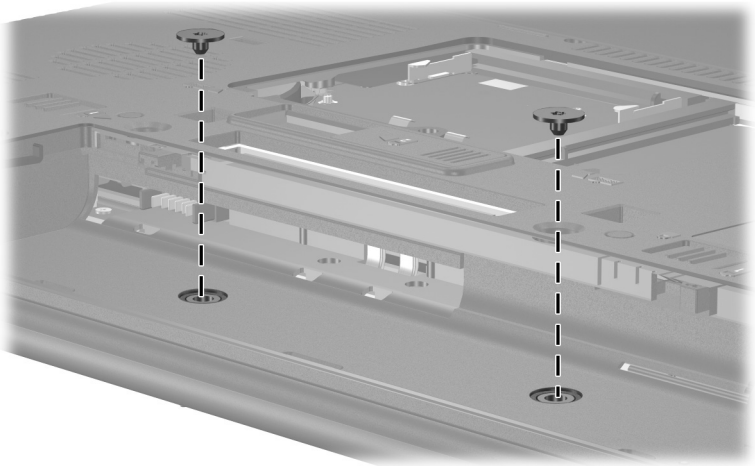
Torx T8M2.0×2.0 Screw Locations

Table C-6

Phillips PM1.5×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	4.0 mm	1.5 mm	4.0 mm

Where used:
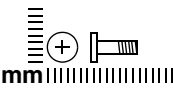
4 screws that secure the LED board to the switch cover (documented in Section 6.12)
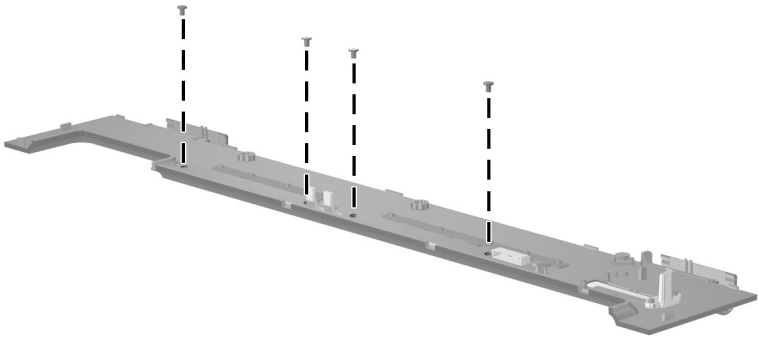
Phillips PM1.5×4.0 Screw Locations

Table C-7

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 6.13)
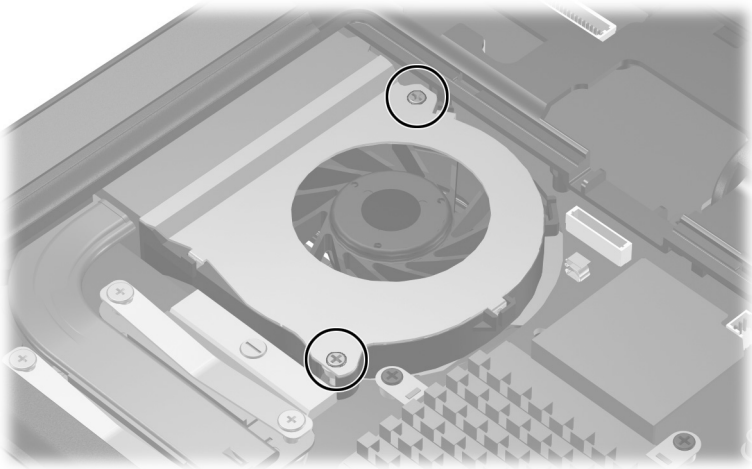
Phillips PM2.0×7.0 Screw Locations

Table C-8

Phillips PM2.0×8.0 Shoulder Screw
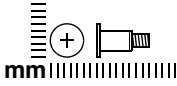
	Color	Qty.	Length	Thread	Head Width
	Silver	4	8.0 mm	2.0 mm	5.0 mm
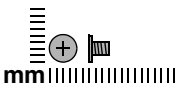
Where used:

4 screws that secure the heat sink to the notebook (screws are captured on the heat sink by C clips; documented in Section 6.14)
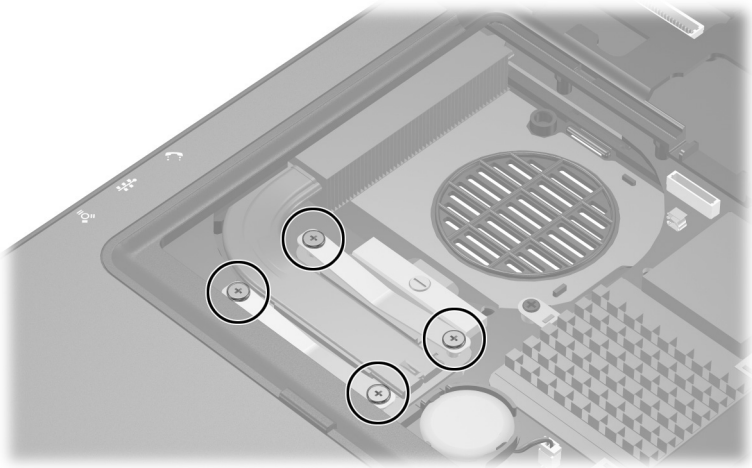
Phillips PM2.0×8.0 Shoulder Screw Locations

Table C-9

Phillips PM2.0×3.0 Screw

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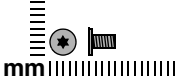
Where used:

2 screws that secure the modem board to the notebook (documented in Section 6.21)
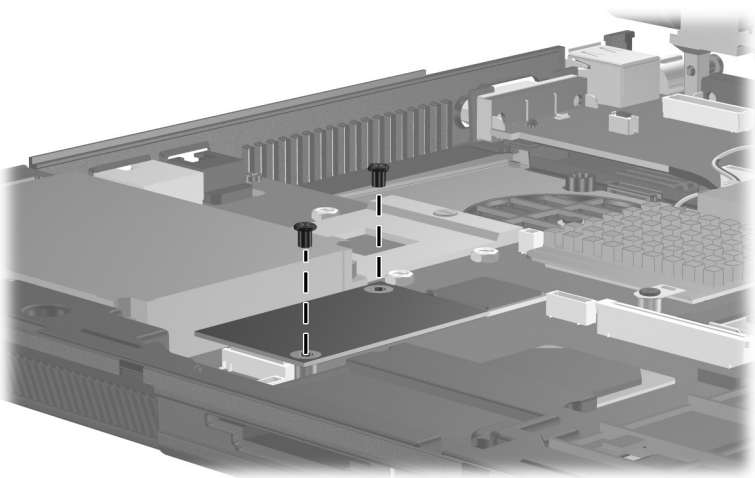
Phillips PM2.0×3.0 Screw Locations

Table C-10

Torx T8M2.0×4.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Black	8	4.0 mm	2.0 mm	4.0 mm
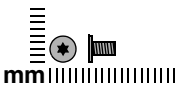
Where used:

6 screws that secure the speaker to the notebook (documented in Section 6.20)
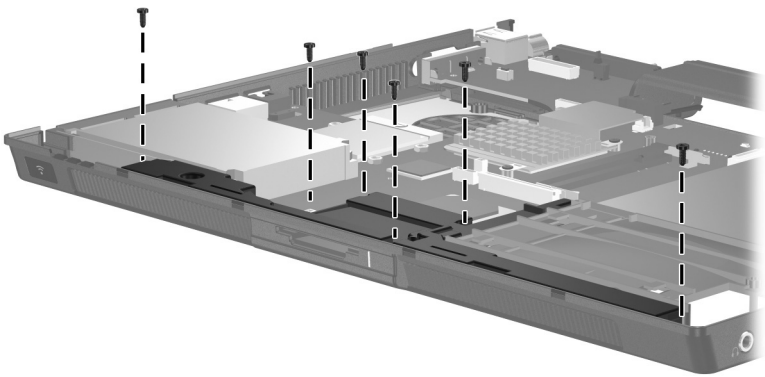
Torx T8M2.0×4.0 Screw Locations

Table C-10

Torx T8M2.0×4.0 Screw *(Continued)*

	Color	Qty.	Length	Thread	Head Width
mm	Black	8	4.0 mm	2.0 mm	4.0 mm
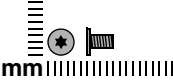
Where used:

One screw that secures the USB/audio board the notebook (documented in Section 6.23)
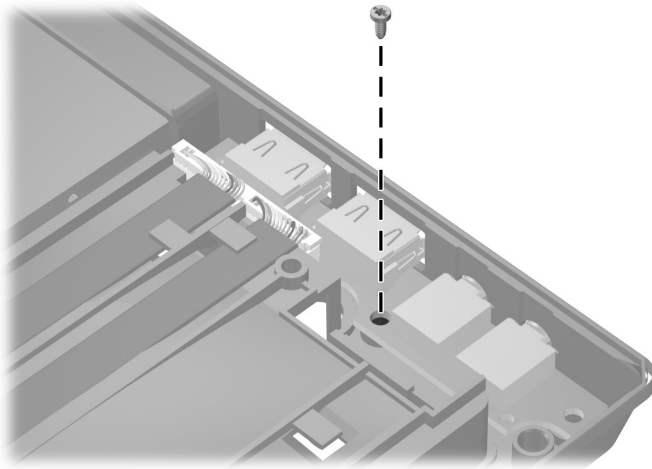
Torx T8M2.0×4.0 Screw Location

Table C-10

Torx T8M2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	8	4.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the system board the notebook (documented in Section 6.24)
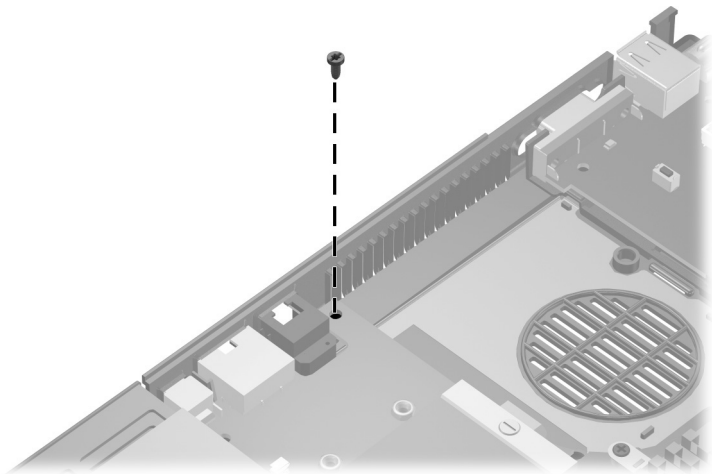
Torx T8M2.0×4.0 Screw Location

Table C-11

Hex Socket HM5.0×9.0 Screw Lock

	Color	Qty.	Length	Thread	Head Width
mm	Silver	6	9.0 mm	2.5 mm	5.0 mm

Where used:

❶ Two screw locks that secure the system board to the notebook (documented in Section 6.24)

❷ Two screw locks that secure the system board to the notebook (documented in Section 6.24)
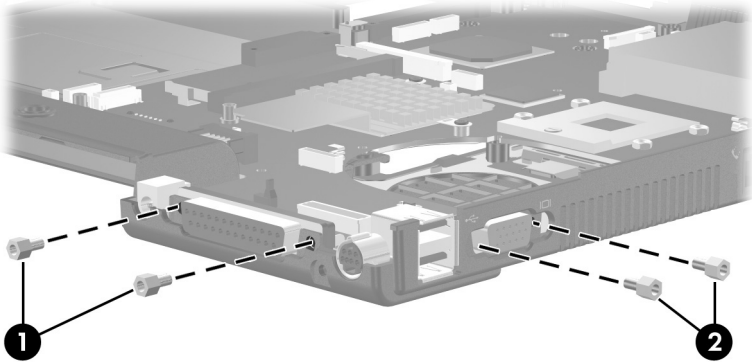
Hex Socket HM5.0×9.0 Screw Lock Locations

Table C-11

Hex Socket HM5.0×9.0 Screw Lock *(Continued)*
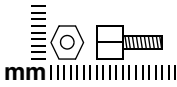
	Color	Qty.	Length	Thread	Head Width
	Silver	6	9.0 mm	2.5 mm	5.0 mm

Where used:

2 screw locks that secure the serial connector board to the system board (documented in Section 6.25)

Hex Socket HM5.0×9.0 Screw Lock Locations

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