Maintenance and Service Guide

HP Compaq nw8440 Notebook PC
HP Compaq nc8430 Notebook PC
HP Compaq nx8420 Notebook PC

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

MSG revision history

Revision	Publication date	Description
A	October 2010	The description for Top cover part number 418807-001 has been corrected to "For use with nw8440 models without fingerprint reader." The description for Top cover part number 416401-001 has been corrected to "For use with nw8440 models with fingerprint reader." The keyboard spare part numbers have been updated.

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1

Product Description

The HP Compaq nw8440 Notebook PC, HP Compaq nc8430 Notebook PC, and HP Compaq nx8420 Notebook PC offer advanced modularity, Intel® Core™ Duo processors, and extensive multimedia support.

HP Compaq nw8440 Notebook PC, HP Compaq nc8430 Notebook PC, and HP Compaq nx8420 Notebook PC

1.1 **Features**

■ The following processors, varying by computer model:

❏ Intel Core Duo T2600 (2.17-GHz)

❏ Intel Core Duo T2500 (2.00-GHz)

❏ Intel Core Duo T2400 (1.83-GHz)

❏ Intel Core Duo T2300 (1.66-GHz)

■ The following displays are available, varying by computer model:

❏ 15.4-inch, WUXGA, TFT (1920 × 1200) with over 16.8 million colors with AntiGlare

❏ 15.4-inch, WSXGA, TFT (1680 × 1050) with over 16.8 million colors with AntiGlare

❏ 15.4-inch, WXGA+, TFT (1440 × 900) with over 16.8 million colors with AntiGlare

■ 120-, 100-, 80-, and 60-GB high-capacity hard drive, varying by computer model

■ 256-MB DDR2 synchronous DRAM (SDRAM) at 533 MHz and 667 MHz, expandable to 4.0 GB

■ Microsoft® Windows® XP Professional

■ Full-size Windows keyboard with numeric keypad

■ TouchPad and pointing stick pointing devices, including a dedicated vertical scroll region (select models only)

■ Integrated 10 Base-T/100 Base-TX Ethernet local area network (LAN) network interface card (NIC) with RJ-45 jack

■ Integrated high-speed 56K modem with RJ-11 jack

- ■ Integrated wireless support for Mini Card IEEE 802.11a/b/g or 802.11b/g Wireless LAN (WLAN) device
- ■ Support for one Type I or Type II PC Card slot, with support for both 32-bit (CardBus) and 16-bit PC Cards, varying by computer model
- ■ External 90-watt AC adapter with 3-wire power cord
- ■ 8-cell Li-Ion battery
- ■ Stereo speakers
- ■ Volume up, volume mute, and volume down buttons
- ■ Support for the following optical drives:
  - ❏ DVD±RW and CD-RW Double-Layer Combo Drive
  - ❏ DVD/CD-RW Combo Drive
  - ❏ DVD-ROM drive
- ■ Connectors:
  - ❏ Accessory battery
  - ❏ Audio-in (microphone)
  - ❏ Audio-out (headphone)
  - ❏ Digital media slot
  - ❏ Docking connector
  - ❏ External monitor
  - ❏ IEEE 1394
  - ❏ RJ-11 (modem)
  - ❏ RJ-45 (network)
  - ❏ S-Video-out
  - ❏ Smart Adapter power
  - ❏ Three Universal Serial Bus (USB) v. 2.0

1.2 **Resetting the Computer**

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

✎ The following steps will not clear an unknown password if the stringent security option has been enabled in the BIOS. If stringent security is enabled, the system board must be replaced to reset an unknown password. Refer to Section 5.23, "Serial Connector Module," for more information on replacing the system board.

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

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

1. Prepare the computer for disassembly (refer to Section 5.3, "Preparing the Computer for Disassembly," for more information). Remove the real-time clock (RTC) battery (refer to Section 5.14, "RTC Battery," for more information on removing and replacing the RTC battery).

2. Wait approximately 5 minutes.

3. Replace the RTC battery and reassemble the computer.

4. Connect AC power to the computer. Do not reinsert any batteries at this time.

5. Turn on the computer.

All passwords and all CMOS settings have been cleared.

1.3 **Power Management**

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

■ Standby

■ Hibernation

■ Setting customization by the user

■ Hotkeys for setting the level of performance

■ Battery calibration

■ Lid switch standby/resume

■ Power button

■ Advanced Configuration and Power Management (ACPM) compliance

1.4 External Components

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

Front Components

Table 1-1

Front Components

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

Table 1-1

Front Components *(Continued)*

Item	Component	Function
3	Battery light	■ Amber: A battery is charging.
		■ Green: A battery is close to full charge capacity.
		■ Blinking amber: A battery that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light begins blinking more quickly.
		■ Off: If the computer is connected to an external power source, the light is turned off when all batteries in the computer are fully charged. If the computer is not connected to an external power source, the light is turned off until the battery reaches a low-battery condition.
4	Drive light	■ Blinking green: The hard drive or optical drive is being accessed.
		■ Amber: HP Mobile Data Protection has temporarily parked the hard drive.
5	Display release latch	Opens the computer.

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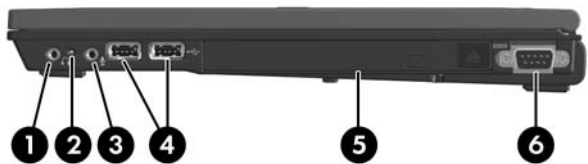
Right-Side Components

Table 1-2

Right-Side Components

Item	Component	Function
1	Audio-out (headphone) jack	Produces computer sound when connected to optional power stereo speakers, headphones, ear buds, a headset, or television audio.
2	Internal microphone	Records sound
3	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
4	USB ports (2)	Connect USB 1.1- and 2.0-compliant devices to the computer using a standard USB cable, or connect an optional External MultiBay II to the computer. The MultiBay II must also be connected to an external power source.
5	Optical drive	Supports an optical disc. The type of optical drive varies by model.
6	Serial port	Connects an optional serial device.

The external components on the rear panel of the computer are shown below and described in Table 1-3.
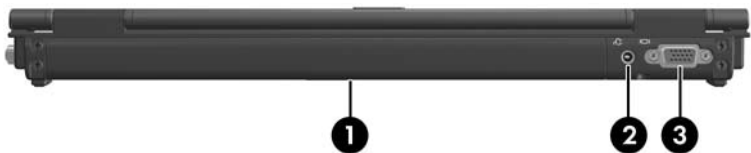
Rear Panel Components

Table 1-3

Rear Panel Components

Item	Component	Function
1	Battery bay	Holds a battery.
2	Smart adapter power connector	Connects an AC adapter or an optional power adapter.
3	External monitor port	Connects an optional VGA external monitor or projector.

The external components on the left side of the computer are shown below and described in Table 1-4.
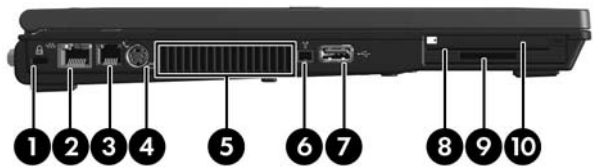
Left-Side Components

Table 1-4

Left-Side Components

Item	Component	Function
1	Security cable slot	Attaches an optional security cable to the computer.
		⚠ Security solutions are designed to act as deterrents. These deterrents may not prevent a product from being mishandled or stolen.
2	RJ-45 (network) jack	Connects an optional network cable.
3	RJ-11 (modem) jack	Connects the modem cable.
4	S-Video-out jack	Connects an optional S-Video device, such as a television, VCR, camcorder, projector, or video capture card.

Table 1-4

Left-Side Components *(Continued)*

Item	Component	Function
5	Exhaust vent	Provides airflow to cool internal components.
		⚠ To prevent overheating, do not obstruct vents. Use the computer only a hard, flat surface. Do not allow a hard surface, such as an adjoining printer, or a soft surface, such as pillows or thick rugs or clothing, to block airflow.
6	1394 port	Connects an optional 1394a device such as a scanner, digital camera, or digital camcorder.
7	USB port	Connects USB 1.1- and 2.0-compliant devices to the computer using a standard USB cable, or connects an optional External MultiBay II to the computer. The MultiBay II must also be connected to an external power source.
8	Smart card slot	Supports optional smart cards and Java™ Cards.
9	PC Card slot	Supports optional Type I or Type II 32-bit (CardBus) or 16-bit PC Cards.
10	Digital Media Slot	Supports Secure Digital (SD) Memory Cards and MultiMediaCards.

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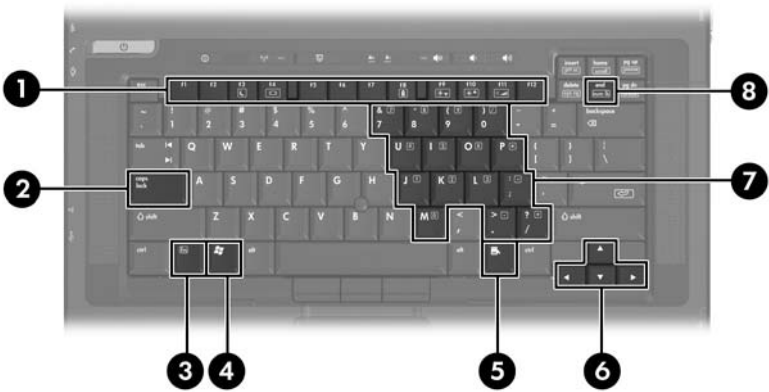
Standard Keyboard Components

Table 1-5

Standard Keyboard Components

Item	Component	Function
1	**f1** to **f12** keys (12)	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	Moves the cursor around the screen.
7	Keypad keys	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 computer top components are shown below and described in
Table 1-6.
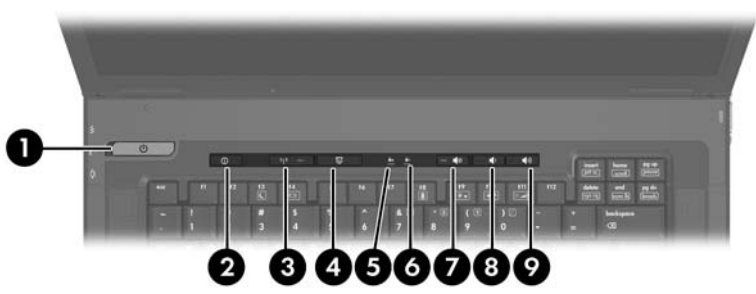
Top Components, Part 1

Table 1-6

Top Components

Item	Component	Function
1	Power button	When the computer is: ■ Off, press to turn on the computer. ■ On, briefly press to initiate hibernation. ■ In standby, briefly press to resume from standby. ■ In hibernation, briefly press to restore from hibernation. If the system has stopped responding and Windows shutdown procedures cannot be used, press and hold for 5 seconds to turn off the computer.
2	Info Center button	Launches Info Center, which enables you to open various software solutions.
3	Wireless button (with wireless light)	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.
4	Presentation button	Starts the presentation feature.
5	Caps lock light	On: **caps lock** is on.
6	Num lock light	On: **num lock** or the numeric keypad is on.
7	Volume mute button	Mutes or restores speaker volume.
8	Volume down button	decreases speaker volume.
9	Volume up button	Increases speaker volume.

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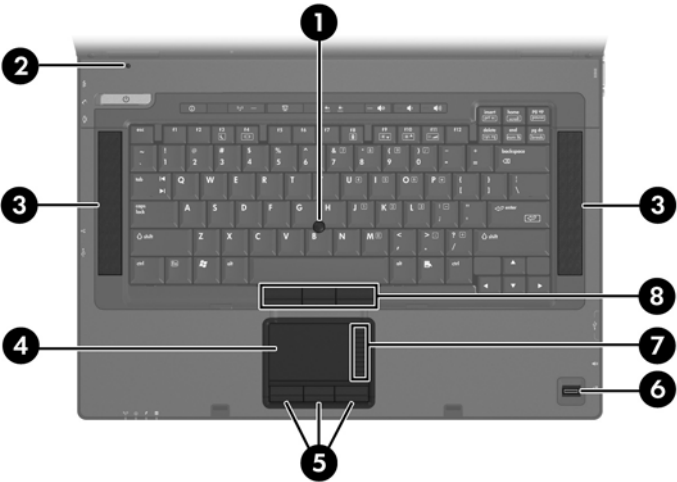
Top Components, Part 2

Table 1-7

Top Components

Item	Component	Function
1	Display lid switch	■ If the computer is closed while on, turns off the display. ■ If the computer is opened while in standby, turns on the computer (resumes from standby).
2	Pointing stick (select models only)	Moves the pointer and selects or activates items on the screen.
3	Stereo speakers (2)	Produce stereo sound.
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	TouchPad buttons	Function like the left, middle, and right buttons on an external mouse.
6	Fingerprint reader	Allows a fingerprint logon to Windows instead of using a password.
7	TouchPad scroll zone	Scrolls up or down.
8	Pointing stick buttons (select models only)	Function like the left, middle, and right buttons on an external mouse.

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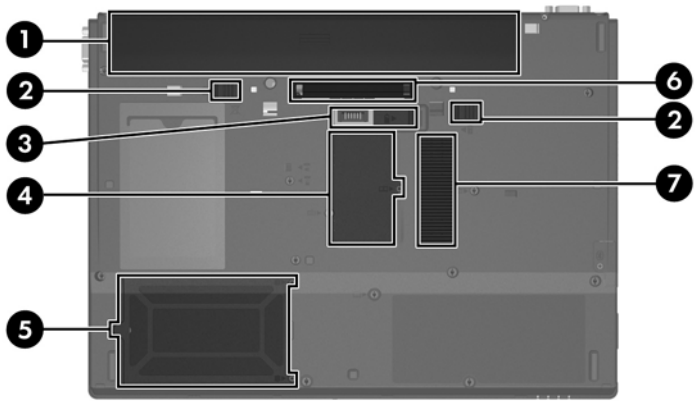
Bottom Components

Table 1-8

Bottom Components

Item	Component	Function
1	Battery bay	Holds the battery.
2	Battery release latches (2)	Secure the battery in the battery bay.
3	Accessory battery connector	Connects an optional HP Ultra-Capacity Battery or HP Extended Life Battery.
4	Memory module compartment	Contains one memory slot that supports replaceable memory modules.
5	Hard drive bay	Holds the primary hard drive.
6	Docking connector	Connects the computer to an optional docking device.
7	Exhaust vent	Provides airflow to cool internal components.
		△ To prevent overheating, do not obstruct vents. Use the computer only a hard, flat surface. Do not allow a hard surface, such as an adjoining printer, or a soft surface, such as pillows or thick rugs or clothing, to block airflow.

1.5 **Design Overview**

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

The system board provides the following device connections:

■ Audio

■ Digital Media Slot

■ Display

■ Hard drive

■ Intel Core Duo processors

■ Keyboard, pointing stick, and TouchPad

■ Memory modules

■ Mini Card module

■ Optical drive

■ PC Card

■ Smart Adapter AC adapter

■ Smart card

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

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

2

Troubleshooting

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

2.1 Computer Setup

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

Using Computer Setup

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

1. Turn on or restart the computer. Press **f10** while the F10 = ROM-Based Setup message is displayed in the lower-left corner of the screen.

   ❏ To change the language, use the cursor control keys to navigate to the **Advanced** menu.

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

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

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

3. To close Computer Setup and restart the computer:

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

   – or –

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

   – or –

   ❏ Select **Exit** > **Load Setup Defaults**, and then press **enter**.

4. When you are prompted to confirm your action, press **f10**.

Selecting from the File Menu

Table 2-1

File Menu

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

Selecting from the Security Menu

Table 2-2

Security Menu

Select	To Do This
Administrator Password	Enter, change, or delete an Administrator password.
Power-on Password	Enter, change, or delete a power-on password.
DriveLock Passwords	Enable/disable DriveLock; change a DriveLock user or master password.
	✎ DriveLock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Password Options (Password options can be selected only when a power-on password has been set.)	Enable/disable ■ QuickLock. ■ QuickLock on Standby. ■ QuickBlank.
	✎ To enable QuickLock on Standby or QuickBlank, you must first enable QuickLock.
Device Security	Enable/disable ■ Diskette drive startup.* ■ CD-ROM or diskette startup.
	✎ Settings for a DVD-ROM can be entered in the CD-ROM field.
*Not applicable to SuperDisk LS-120 drives.	

Selecting from the Advanced Menu

Table 2-3

Advanced Menu

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

Selecting from the Tools Menu

Table 2-4

Tools Menu

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

2.2 Troubleshooting Flowcharts

Table 2-5

Troubleshooting Flowcharts Overview

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

Table 2-5

Troubleshooting Flowcharts Overview *(Continued)*

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

Flowchart 2.1—Initial Troubleshooting

```
┌─────────────────┐
│ Begin           │
│ troubleshooting.│
└─────────────────┘
         │
         ▼         N
    ◇ Is there ───────────▶  ┌──────────────────┐
      power?                 │ Go to            │
         │                   │ "Flowchart       │
         │ Y                 │ 2.2—No Power,    │
         ▼                   │ Part 1."         │
                             └──────────────────┘

    ◇ Beeps,        N        ┌──────────────────┐
      LEDs, or error ──────▶ │ Check            │
      messages?              │ LED board,       │
         │                   │ speaker          │
         │ Y                 │ connections.     │
         ▼                   └──────────────────┘

    ◇ Is there video?  N     ┌──────────────────┐
      (no boot) ───────────▶ │ Go to            │
         │                   │ "Flowchart       │
         │ Y                 │ 2.6—No Video,    │
         ▼                   │ Part 1."         │
                             └──────────────────┘

    ◇ Is the OS      N       ┌──────────────────┐
      loading? ────────────▶ │ Go to            │
         │                   │ "Flowchart       │
         │ Y                 │ 2.9—No Operating │
         ▼                   │ System (OS)      │
                             │ Loading."        │
                             └──────────────────┘

    ◇ Is there       N       ┌──────────────────┐
      sound? ──────────────▶ │ Go to            │
         │                   │ "Flowchart       │
         │ Y                 │ 2.15—No Audio,   │
         │                   │ Part 1."         │
         │                   └──────────────────┘
```

```
    ◇ All drives      N      ┌──────────────────┐
      working? ────────────▶ │ Go to            │
         │                   │ "Flowchart       │
         │ Y                 │ 2.17—Nonfunc-    │
         ▼                   │ tioning Device." │
                             └──────────────────┘

    ◇ Keyboard/       N      ┌──────────────────┐
      pointing ──────────────▶│ Go to            │
      device             │ "Flowchart       │
      working?           │ 2.18—Nonfunc-    │
         │               │ tioning Keyboard"│
         │ Y             │ or "Flowchart    │
         ▼               │ 2.19—Nonfunc-    │
                         │ tioning Pointing │
                         │ Device."         │
                         └──────────────────┘

    ◇ Connecting      N      ┌──────────────────┐
      to network ──────────▶ │ Go to            │
      or modem?          │ "Flowchart       │
         │               │ 2.20—No          │
         │ Y             │ Network/Modem    │
         ▼               │ Connection."     │
                         └──────────────────┘
      ┌───────┐
      │  End  │
      └───────┘
```
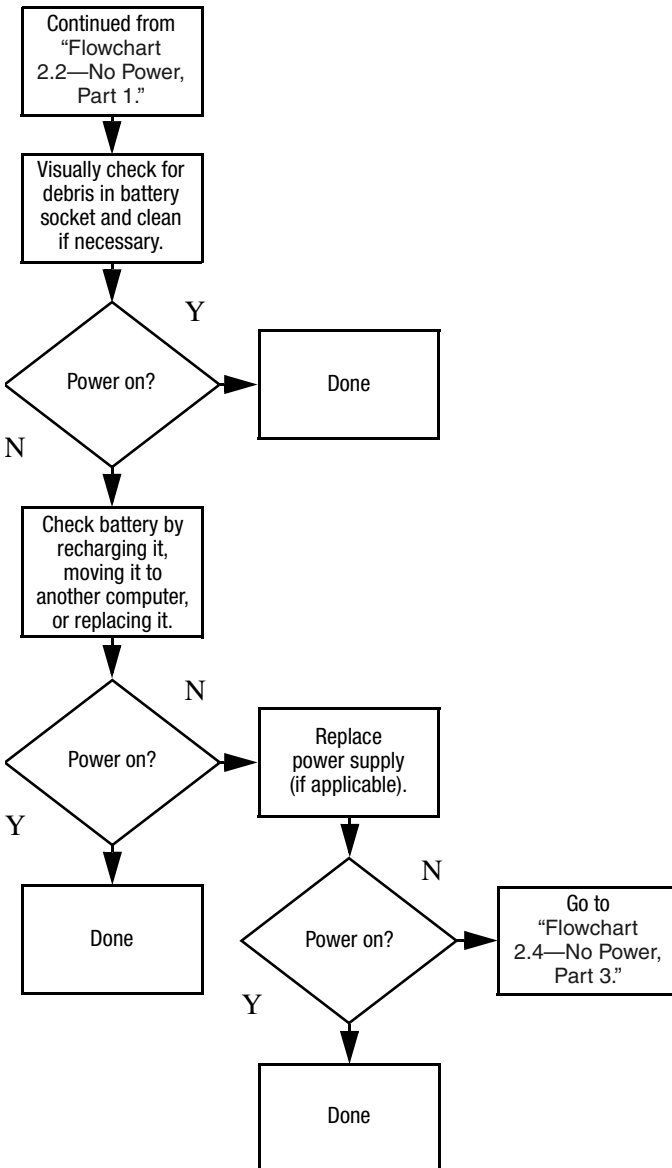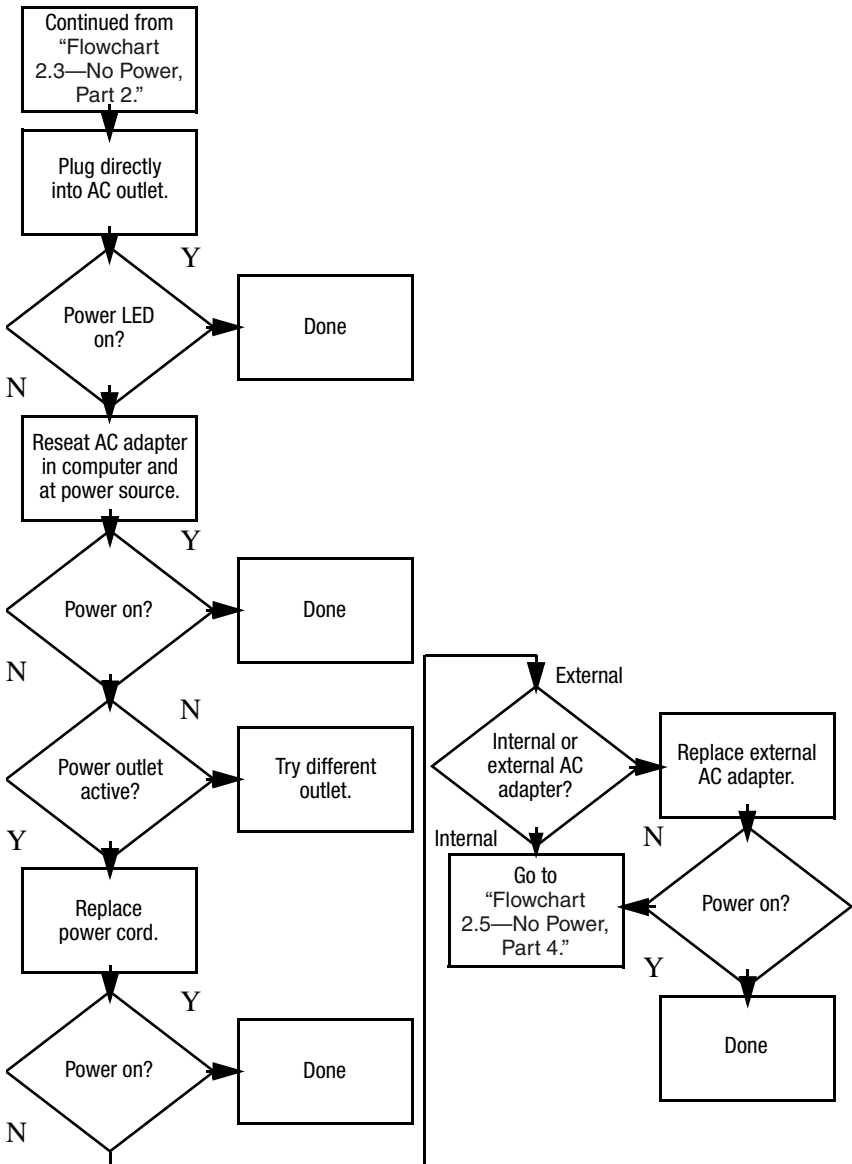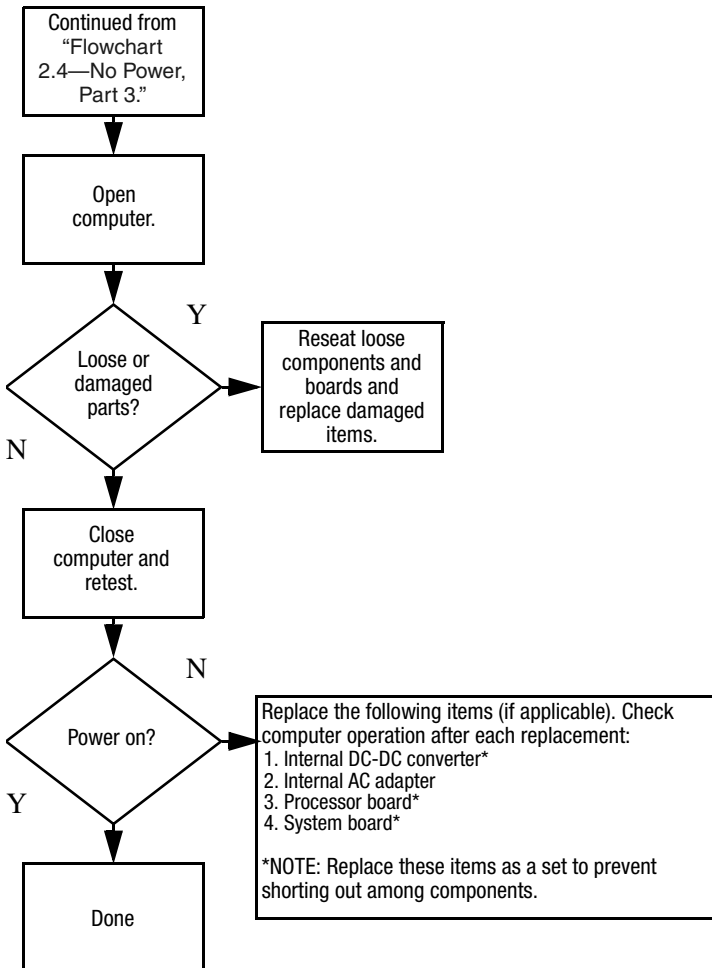
Flowchart 2.2—No Power, Part 1

No power (power LED is off).

↓

Remove from docking device (if applicable).

↓

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

Y ↓   Y ↓

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

Y ↓   Y ↓

Power up in docking device? —Y→ Done

N ↓

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

↓

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

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

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.    │
└────────┬────────┘
         │
         ▼          Y
     ╱ Power ╲──────────────►  ┌──────────┐
    ╲  on?  ╱                  │   Done   │
         │                     └──────────┘
       N │
         ▼
┌─────────────────┐
│ Check battery   │
│ by recharging   │
│ it, moving it   │
│ to another      │
│ computer, or    │
│ replacing it.   │
└────────┬────────┘
         │
         ▼          N          ┌──────────┐
     ╱ Power ╲──────────────►  │ Replace  │
    ╲  on?  ╱                  │ power    │
         │                     │ supply   │
       Y │                     │ (if      │
         ▼                     │ applicable)│
┌──────────┐                   └─────┬────┘
│   Done   │                         │
└──────────┘                         ▼        N
                                 ╱ Power ╲────────► Go to "Flowchart
                                ╲  on?  ╱           2.4—No Power, Part 3."
                                     │
                                   Y │
                                     ▼
                                ┌──────────┐
                                │   Done   │
                                └──────────┘
```

Flowchart 2.4—No Power, Part 3

```
┌─────────────────┐
│ Continued from  │
│  "Flowchart     │
│ 2.3—No Power,   │
│   Part 2."      │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ Plug directly   │
│ into AC outlet. │
└─────────────────┘
         │
         ▼
      Power LED        Y      ┌─────────┐
        on?        ────────►  │  Done   │
         │                    └─────────┘
         │ N
         ▼
┌─────────────────┐
│ Reseat AC adapter│
│ in computer and │
│ at power source.│
└─────────────────┘
         │
         ▼
      Power on?       Y      ┌─────────┐
         │        ────────►  │  Done   │
         │ N                 └─────────┘
         ▼
    Power outlet      N      ┌─────────────┐
      active?     ────────►  │ Try different│
         │                   │   outlet.   │
         │ Y                 └─────────────┘
         ▼
┌─────────────────┐
│    Replace      │
│  power cord.    │
└─────────────────┘
         │
         ▼
      Power on?       Y      ┌─────────┐
         │        ────────►  │  Done   │
         │ N                 └─────────┘
```

```
      External
   Internal or        ┌──────────────┐
   external AC    ───►│ Replace external│
    adapter?          │  AC adapter.  │
      │               └──────────────┘
      │ Internal            │
      ▼                     ▼
┌──────────────┐    N    Power on?
│   Go to      │◄──────     │
│ "Flowchart   │            │ Y
│ 2.5—No Power,│            ▼
│   Part 4."   │       ┌─────────┐
└──────────────┘       │  Done   │
                       └─────────┘
```

Flowchart 2.5—No Power, Part 4

```
Continued from
"Flowchart
2.4—No Power,
Part 3."
```

```
Open
computer.
```

```
Loose or
damaged
parts?
```
                    Y
```
Reseat loose
components and
boards and
replace damaged
items.
```
N

```
Close
computer and
retest.
```

                    N
```
Power on?
```
```
Replace the following items (if applicable). Check
computer operation after each replacement:
1. Internal DC-DC converter*
2. Internal AC adapter
3. Processor board*
4. System board*

*NOTE: Replace these items as a set to prevent
shorting out among components.
```
Y

```
Done
```

Flowchart 2.6—No Video, Part 1

No video.

Stand-alone or docking device?

Docking Device → Go to "Flowchart 2.7—No Video, Part 2."

*NOTE: To change from internal to external display, use the hotkey combination.

Stand-alone

Internal or external display*?

Internal → Adjust brightness. → Video OK?

Y → Done

N

A

External

Adjust brightness.

Video OK?

Y → Done

N

Check for bent pins on cable.

Press lid switch to ensure operation.

Video OK?

Y → Done

N

Replace the following one at a time. Test after each replacement.
1. Cable between computer and computer display (if applicable)
2. Display
3. System board

Video OK?

N → Try another display. → Internal and external video OK?

N → Replace system board.

Y

Done

Y

Done

Flowchart 2.7—No Video, Part 2

Continued from "Flowchart 2.6—No Video, Part 1."

Remove computer from docking device, if connected.

Adjust display brightness.

Video OK? — N → Go to "A" in "Flowchart 2.6—No Video, Part 1."

Y

Check that computer is properly seated in docking device, for bent pins on cable, and for monitor connection.

Video OK? — Y → Done

N

Adjust external monitor display.

Check brightness of external monitor.

Video OK? — Y → Done

N

Try another external monitor.

Internal and external video OK? — Y → Done

N

Go to "Flowchart 2.8—Nonfunctioning Docking Device (if applicable)."

Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

```
┌─────────────────┐
│ Nonfunctioning  │
│ docking device. │
└────────┬────────┘
         │
         ▼
┌─────────────────┐
│ Reset power cord in │
│ docking device and │
│ power outlet.   │
└────────┬────────┘
         │
         ▼
┌─────────────────┐
│ Check voltage   │
│ setting on docking │
│ device.         │
└────────┬────────┘
         │
         ▼
```

Nonfunctioning docking device.

Reset power cord in docking device and power outlet.

Check voltage setting on docking device.

Reset monitor cable connector at docking device.

Docking device operating? — Y → Done

N

Replace docking device.

Reinstall computer into docking device.

Docking device operating? — Y → Done

N

Test replacement docking device with new computer.

Flowchart 2.9—No Operating System (OS) Loading

No OS loading.*

↓

Reset 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 CD-ROM or DVD-ROM 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      ┌──────────────────┐
   ◇─────────◇───────────▶│ Go to            │
   ◇Nonsystem◇            │ "Flowchart       │
   ◇disk     ◇            │ 2.11—No OS       │
   ◇message? ◇            │ Loading,         │
   ◇─────────◇            │ Hard Drive,      │
       │                  │ Part 2."         │
       │ N                └──────────────────┘
       ▼
┌─────────────┐
│ Reseat      │
│ external    │
│ hard drive. │
└─────────────┘
       │
       ▼           Y      ┌──────────────────┐
   ◇─────────◇───────────▶│                  │
   ◇OS       ◇            │      Done        │
   ◇loading? ◇            │                  │
   ◇─────────◇            └──────────────────┘
       │ N
       │          N
       ▼
   ◇─────────◇───────────────────┐
   ◇Boot     ◇                   │
   ◇from     ◇                   │
   ◇CD?      ◇                   ▼           N      ┌──────────────────┐
   ◇─────────◇            ◇──────────◇──────────────▶│ Go to            │
       │ Y                ◇Boot      ◇               │ "Flowchart       │
       ▼                  ◇from      ◇               │ 2.13—No OS       │
┌─────────────────┐       ◇diskette? ◇               │ Loading,         │
│ Check the Setup │◀──────◇──────────◇               │ Diskette Drive." │
│ utility for     │           │ Y                   └──────────────────┘
│ correct         │           ▼
│ booting order.  │       ┌──────────────────┐
└─────────────────┘       │ Change boot      │
       │          N       │ priority through │
       ▼                  │ the Setup Utility│
   ◇─────────◇────────────│ and reboot.      │
   ◇Boot     ◇            └──────────────────┘
   ◇from     ◇                   │
   ◇hard     ◇                   ▼           N      ┌──────────────────┐
   ◇drive?   ◇            ◇──────────◇──────────────▶│ Go to            │
   ◇─────────◇            ◇Boot      ◇               │ "Flowchart       │
       │ Y                ◇from      ◇               │ 2.17—Nonfunction-│
       ▼                  ◇hard      ◇               │ ing Device."     │
┌─────────────┐◀──────────◇drive?    ◇               └──────────────────┘
│             │           ◇──────────◇
│    Done     │               │ Y
│             │
└─────────────┘
```

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

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

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

                    N
System                      →    Install OS
files on hard                    and reboot.
drive?

  Y                                  |
    ↓                                ↓
           Y                              Y
Virus          →    Clean virus.   →    OS          →    Done
on                                      loading from
hard drive?                             hard drive?

  N                                  N
    ↓                                ↓
                                         Y
Run SCANDISK and                    Diagnostics   →    Replace
check for                           on diskette?        hard drive.
bad sectors.

    ↓                                N
           N                             ↓
Can bad        →    Replace         Run diagnostics
sectors             hard drive.     and follow
be fixed?                           recommendations.

  Y
    ↓
                          N
Fix bad        →    Boot from   →    Replace
sectors.            hard drive?      hard drive.

           Y
             ↓
           Done
```

Flowchart 2.13—No OS Loading, Diskette Drive
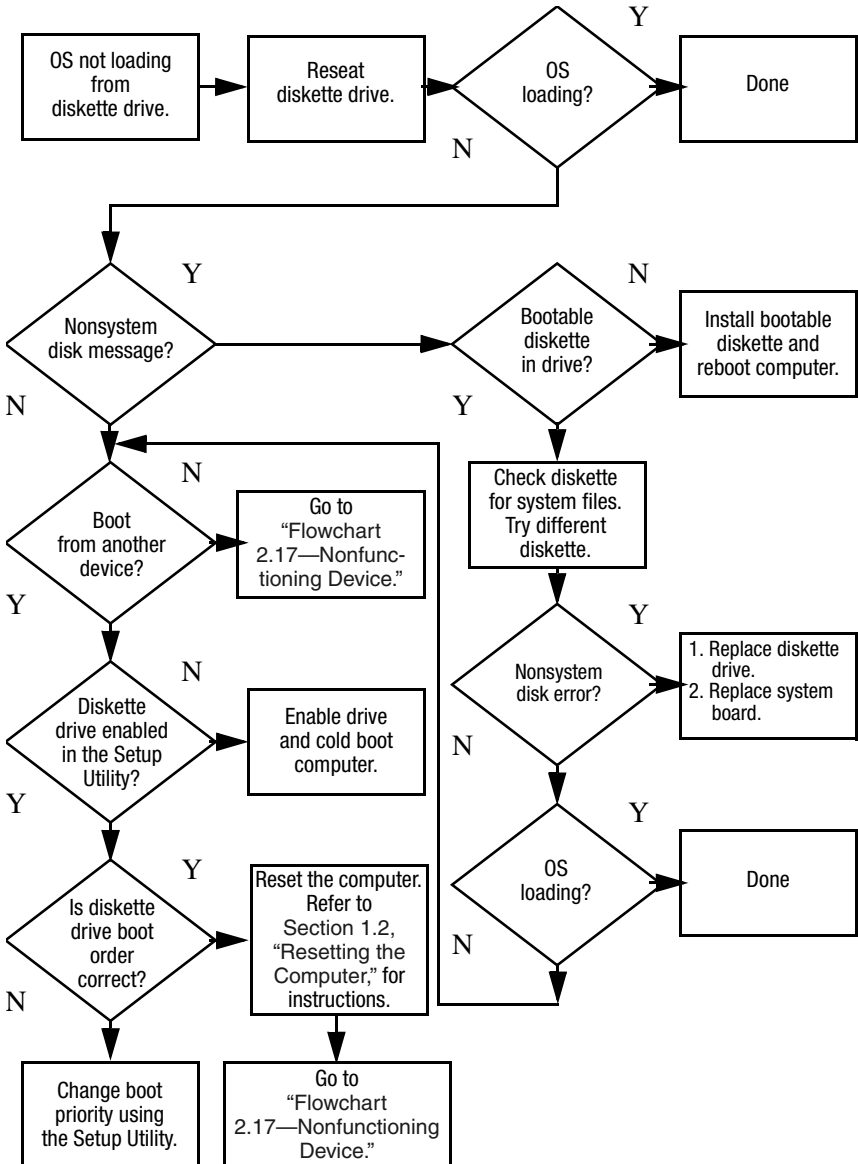
Flowchart 2.14—No OS Loading, Optical Drive
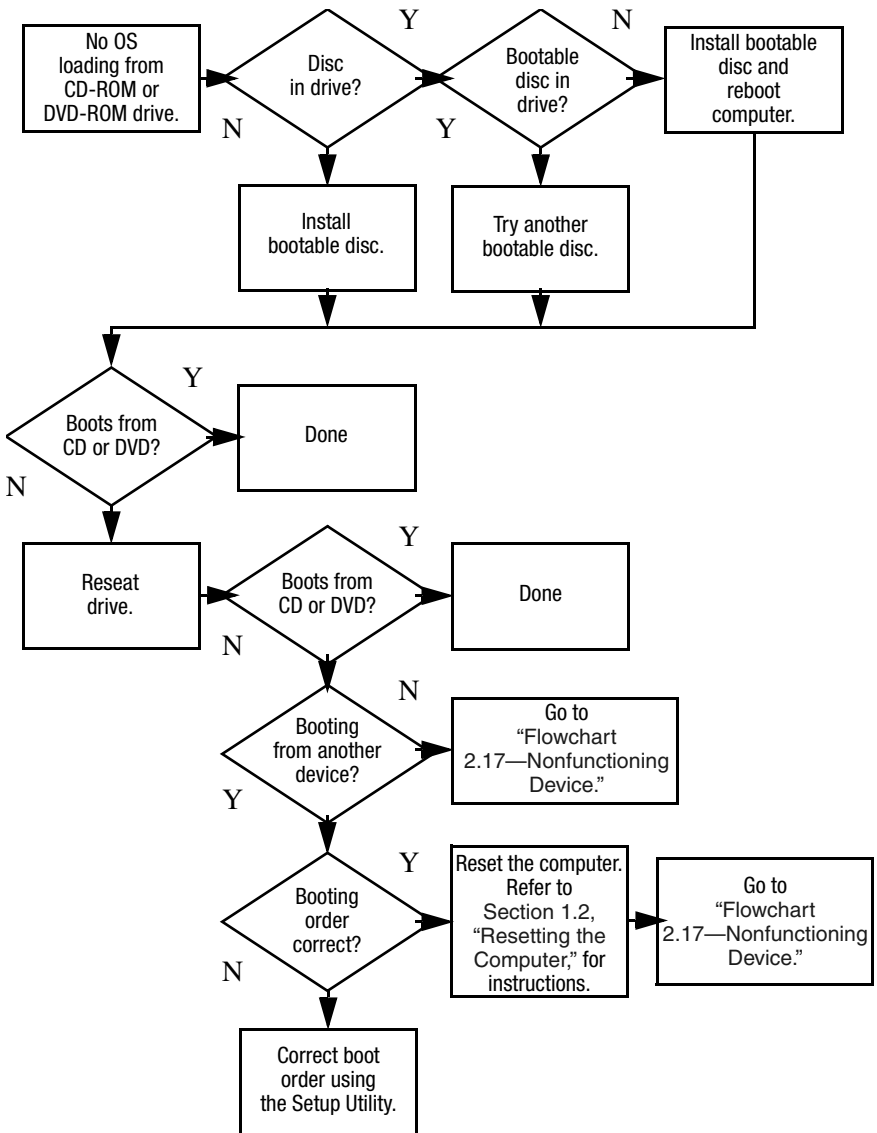
Flowchart 2.15—No Audio, Part 1

Flowchart 2.16—No Audio, Part 2

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

Audio driver in OS configured?

N → Reload audio drivers.

Y

Correct drivers for application?

N → Load drivers and set configuration in OS.

Y

Connect to external speaker.

Audio?

N → Replace audio board and speaker connections in computer (if applicable).

Audio?

Y → Done

N

Y

1. Replace internal speakers.
2. Replace audio board (if applicable).
3. Replace system board.

Flowchart 2.17—Nonfunctioning Device

```
                    ┌─────────────────┐
                    │  Nonfunctioning │
                    │     device.     │
                    └────────┬────────┘
                             │
                    ┌────────▼────────┐
                    │     Reseat      │
                    │     device.     │
                    └────────┬────────┘
                             │
   ┌─────────────────────────▼─────────────────────────┐
   │  Unplug the nonfunctioning device from the computer│
   │ and inspect cables and plugs for bent or broken pins or│
   │                  other damage.                     │
   └─────────────────────────┬─────────────────────────┘
```

Any physical device detected?

Y → Fix or replace broken item. → Go to "Flowchart 2.9—No Operating System (OS) Loading."

N → Clear CMOS. → Reattach device. Close computer, plug in power, and reboot. → Device boots properly?

N → Replace hard drive. / Replace NIC. If integrated NIC, replace system board. / Replace diskette drive. → Device boots properly?

Y → Done

N → Go to "Flowchart 2.9—No Operating System (OS) Loading."

Y → Done

Flowchart 2.18—Nonfunctioning Keyboard

Flowchart 2.19—Nonfunctioning Pointing Device

```
┌─────────────────┐
│ Pointing device │
│ not operating   │
│ properly.       │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ Connect computer│
│ to good external│
│ pointing device.│
└─────────────────┘
         │
         ▼
                    N
      ◇ External ─────────►  ┌──────────┐
        device              │ Replace  │
        works?              │ system   │
                            │ board.   │
    Y                       └──────────┘
         │
         ▼
┌─────────────────┐
│ Reseat internal │
│ pointing device │
│ connector       │
│ (if applicable).│
└─────────────────┘
         │
         ▼
              N
      ◇ OK? ──────────►  ┌──────────────────┐
                         │ Replace internal │
    Y                    │ pointing device  │
         │               │ or cable.        │
         ▼               └──────────────────┘
┌──────────┐                     │
│  Done    │                     ▼
└──────────┘                            Y
                           ◇ OK? ─────────►  ┌──────────┐
                                             │  Done    │
                       N                     └──────────┘
                           │
                           ▼
                    ┌──────────┐
                    │ Replace  │
                    │ system   │
                    │ board.   │
                    └──────────┘
```

Flowchart 2.20—No Network/Modem Connection

3

Illustrated Parts Catalog

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

3.1 Serial Number Location

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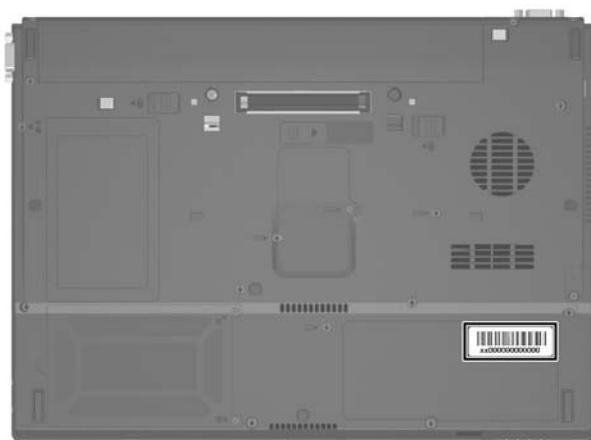
Serial Number Location

3.2 Computer Major Components
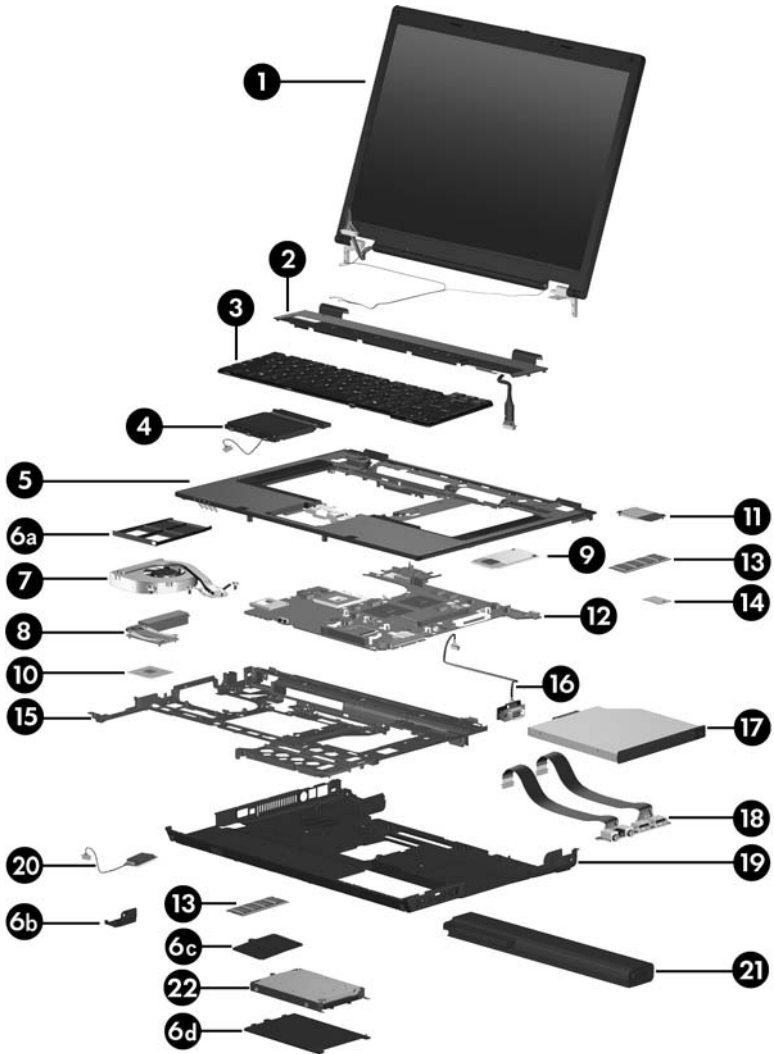
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components

Item	Description		Spare Part Number
1	**Display assemblies** (include wireless antenna transceivers and cables)		
	15.4-inch, WUXGA		416413-001
	15.4-inch, WSXGA		416412-001
	15.4-inch, WXGA+		416411-001
2	**Switch covers** (include LED board and LED board cable)		
	For use with nw8440 and nc8430 models		416405-001
	For use with nx8420 models		416406-001
3	**Keyboards**		
	Keyboard with pointing stick (includes keyboard and pointing stick cables) for use in:		

Belgium	416416-A41	Norway	416416-091
Brazil	416416-201	Portugal	416416-131
The Czech Republic	416416-221	Russia	416416-251
		Saudi Arabia	416416-171
Denmark	416416-081	Slovakia	416416-231
France	416416-051	Slovenia	416416-BA1
French Canada	416416-121	Spain	416416-071
Germany	416416-041	Sweden	416416-101
Greece	416416-151	Switzerland	416416-111
Hungary	416416-211	Taiwan	416416-AB1
Iceland	416416-DD1	Thailand	416416-281
Internationally	416416-B31	Turkey	416416-141
Israel	416416-BB1	The United Kingdom	416416-031
Italy	416416-061		
Japan	416416-291	The United States	416416-001
Korea	416416-AD1		
Latin America	416416-161		

Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description		Spare Part Number
3	**Keyboards *(Continued)***		
	Keyboard without pointing stick (includes keyboard cable) for use in:		
	Brazil	416417-201	Taiwan 416417-AB1
	Japan	416417-291	Thailand 416417-281
	Korea	416417-AD1	The United States 416417-001
	Latin America	416417-161	
4	**TouchPads**		
	With 3 TouchPad buttons		382675-001
	With 2 TouchPad buttons		382676-001
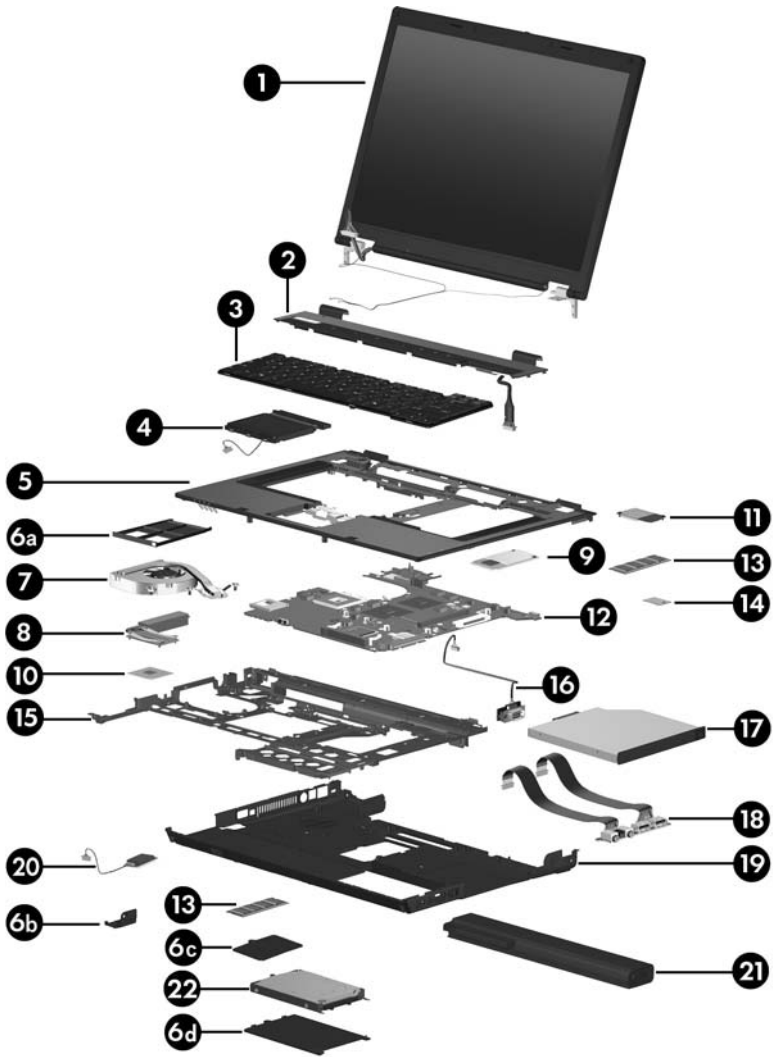
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description	Spare Part Number
5	**Top covers** (include speakers)	
	For use with nw8440 models without fingerprint reader	418807-001
	For use with nw8440 models with fingerprint reader	416401-001
	For use with nc8430 and nx820 models with fingerprint reader	416403-001
	For use with nc8430 and nx8420 models without fingerprint reader	416402-001
	Fingerprint reader board with cable (not illustrated)	416400-001
	Plastics Kit	416420-001
	Includes:	
6a	PC Card slot space saver	
6b	Bluetooth module cover	
6c	Memory module cover (includes 3 captive screws)	
6d	Hard drive cover (includes 2 captive screws)	
	Not illustrated: computer feet (7)	
7	**Fan assembly**	416409-001
8	**Heat sink** (includes thermal paste)	416408-001
9	**Thermal plate**	416410-001
10	**Processors** (include thermal paste)	
	Intel Core Duo T2600 (2.16-GHz) processor	413686-001
	Intel Core Duo T2500 (2.00-GHz) processor	413685-001
	Intel Core Duo T2400 (1.83-GHz) processor	413684-001
	Intel Core Duo T2300 (1.67-GHz) processor	413683-001
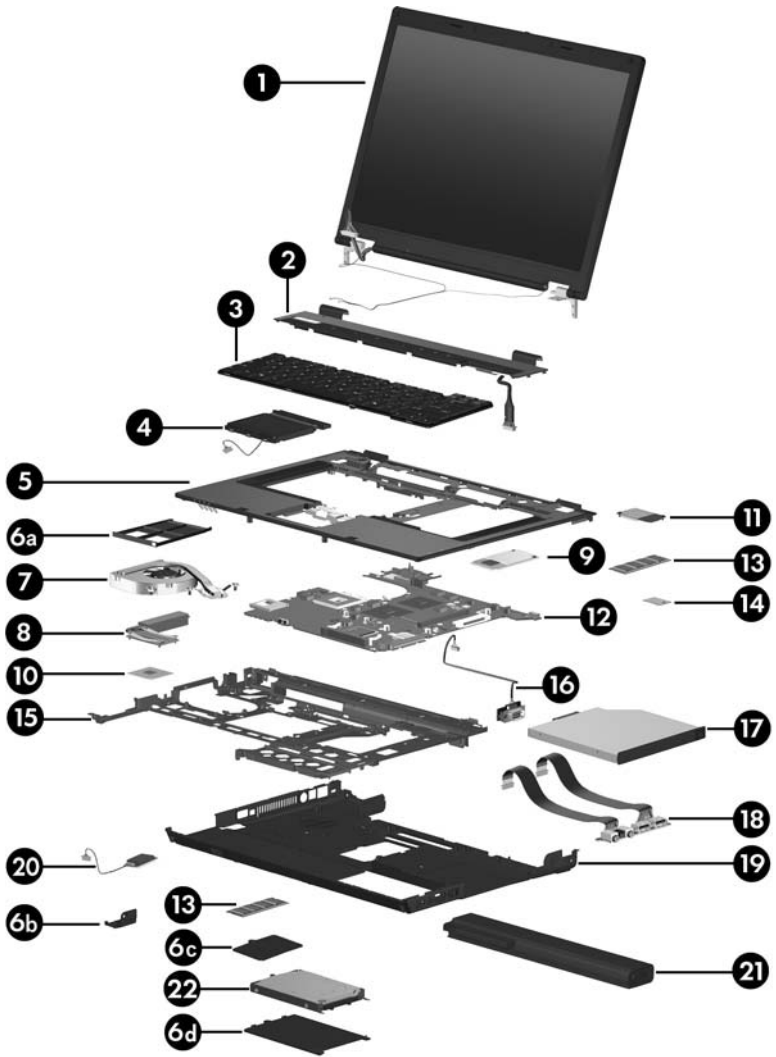
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
11	**Mini Card modules**			
	802.11b/g HS WLAN module for use in North America			407253-001
	802.11b/g HS WLAN module for use in the countries listed below. These countries are categorized as the rest of the world (ROW).			407253-002
	China Ecuador Haiti	Honduras Pakistan Peru	Qatar South Korea	Uruguay Venezuela
	802.11b/g HS WLAN module for use in Japan			407253-291
	802.11b/g LJ WLAN module for use in North America			407254-001
	802.11b/g LJ WLAN module for use in the ROW countries listed below.			407254-002
	China Ecuador Haiti	Honduras Pakistan Peru	Qatar South Korea	Uruguay Venezuela
	802.11b/g LJ WLAN module for use in Japan			407254-291
	802.11a/b/g GL WLAN module for use in the countries listed below. These countries are categorized as most of the world (MOW 1).			407575-001
	Antigua & Barbuda Argentina Australia Bahamas Barbados Brunei	Canada Chile Dominican Republic Guam Guatemala Hong Kong	Panama India Indonesia Malaysia Mexico New Zealand	Paraguay Saudi Arabia Taiwan The United States Vietnam

Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
11	**Mini Card modules** *(Continued)*			
	802.11a/b/g GL WLAN module for use in the countries listed below. These countries are categorized as most of the world (MOW 2).			407575-002
	Aruba Austria Azerbaijan Bahrain Belgium Bermuda Bulgaria Cayman Islands Columbia Croatia Cyprus Czech Republic Denmark Egypt	El Salvador Estonia Finland France Georgia Germany Greece Hungary Iceland Ireland Italy Latvia Lebanon The Philippines	Poland Portugal Romania Russia Serbia and Montenegro Singapore Slovakia Liechtenstein Lithuania Luxembourg Malta Monaco The Netherlands	Norway Oman Slovenia South Africa Spain Sri Lanka Sweden Switzerland Turkey The United Kingdom Uzbekistan
	802.11a/b/g GL WLAN module for use in the ROW countries listed below.			407575-003
	China Ecuador Haiti	Honduras Pakistan Peru	Qatar South Korea	Uruguay Venezuela
	802.11a/b/g GL WLAN module for use in Japan			407575-291

Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
12	**System board** (includes RTC battery and 256-MB of video memory)			416397-001
13	**Memory modules**, 1-DIMM			
	PC2-5300		PC2-4200	
	2048-MB	417506-001	2048-MB	417505-001
	1024-MB	414046-001	1024-MB	414042-001
	512-MB	414045-001	512-MB	414041-001
	256-MB	414044-001	256-MB	414040-001
14	**Modem module**			413691-001
15	**System board frame**			416407-001
16	**Serial connector module and cable**			416399-001
17	**Optical drives**			
	8X Max DVD±RW and CD-RW Double-Layer Combo Drive			413702-001
	4X Max DVD±RW and CD-RW Double-Layer Combo Drive			413700-001
	24X Max DVD/CD-RW Combo Drive			413701-001
	8X Max DVD-ROM drive			413699-001
18	**USB/audio board** (includes USB board cable and audio board cable)			416398-001
19	**Base enclosure**			416404-001
20	Bluetooth® module (includes Bluetooth module cable)			398393-001
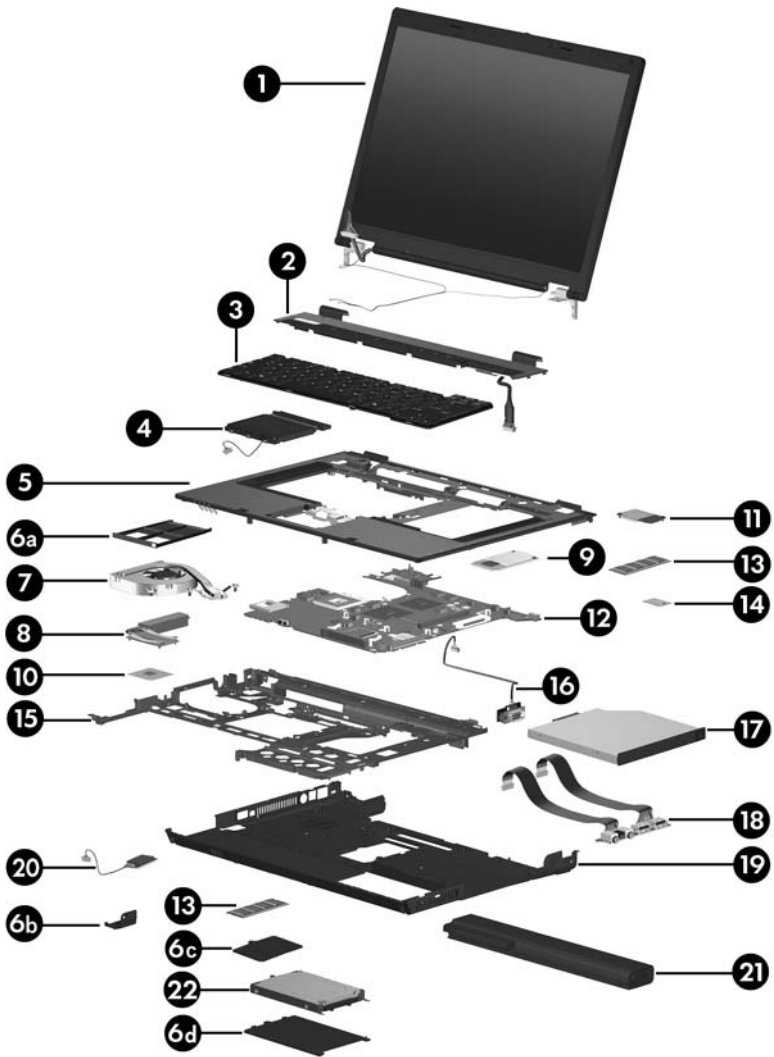
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
21	**8-cell, 4.8-AH battery pack**			372771-001
22	**Hard drives**			
	7200 rpm		5400 rpm	
	100-GB	416415-001	120-GB	416414-001
	80-GB	417507-001	100-GB	413853-001
			80-GB	413852-001
			60-GB	413851-001

3.3 Plastics Kit
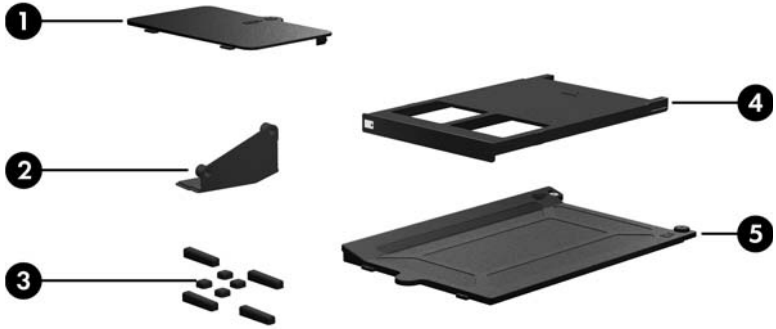
Table 3-2

Plastics Kit

Spare Part Number Information

Item	Description	Spare Part Number
	Plastics Kit Includes:	417527-001
1	Memory module compartment cover (includes 1 captive screw, captured by C clip)	
2	Bluetooth module cover (includes 1 captive screw, captured by C clip)	
3	Computer feet (8)	
4	PC Card slot bezel	
5	Hard drive cover (includes 2 captive screws, captured by C clips)	

3.4 Mass Storage Devices

Table 3-3

Mass Storage Devices

Spare Part Number Information

Item	Description			Spare Part Number
1	**Hard drives** (include frame and connector)			
	7200 rpm		5400 rpm	
	100-GB	416415-001	120-GB	416414-001
	80-GB	417507-001	100-GB	413853-001
			80-GB	413852-001
			60-GB	413851-001
2	**Optical drives** (include bezel)			
	8X Max DVD±RW and CD-RW Double-Layer Combo Drive			413702-001
	4X Max DVD±RW and CD-RW Double-Layer Combo Drive			413700-001
	24X Max DVD/CD-RW Combo Drive			413701-001
	8X Max DVD-ROM drive			413699-001

3.5 Miscellaneous (Not Illustrated)

Table 3-4

Miscellaneous (Not Illustrated)

Spare Part Information

Description	Spare Part Number
90-watt AC adapter	416421-021
External MultiBay II	366143-001
External MultiBay II power cable and stand	366144-001
HP Extended Life Battery	367456-001
HP Docking Station	413267-001
HP Docking Station Miscellaneous Plastics Kit	380089-001
Devices for use in External MultiBay II and HP Docking Station	
2X Max DVD±RW and CD-RW Double-Layer Combo Drive	375557-001
5400-rpm, 80-GB hard drive	375198-001
MultiBay 8X DVD-ROM Drive	373314-001
MultiBay 24X DVD/CD-RW Combo Drive	373315-001
USB diskette drive	359118-001
Nylon carrying case	325815-002

Table 3-4

Miscellaneous (Not Illustrated)

Spare Part Information *(Continued)*

Description	Spare Part Number
Power cords:	
For use in the United States	246959-001
For use in Australia	246959-011
For use in Europe, the Middle East, and Africa	246959-021
For use in the United Kingdom	246959-031
For use in Italy	246959-061
For use in Denmark	246959-081
For use in Brazil	246959-201
For use in Japan	246959-291
For use in Korea	246959-AD1
For use in Switzerland	246959-AG1
For use in Israel	246959-BB1
Screw Kit (includes the following screws; refer to Appendix A, "Screw Listing," for more information on specifications and usage)	416419-001

- Phillips PM3.0×3.0 screw
- Phillips PM2.5×13.0 spring-loaded screw
- Phillips PM2.5×7.0 screw
- Phillips PM2.5×5.0 screw
- Phillips PM2.5×4.0 screw
- Phillips PM2.5×3.0 screw
- Phillips PM2.0×8.0 screw
- Phillips PM2.0×5.0 screw
- Phillips PM2.0×4.0 screw
- Phillips PM2.0×3.0 screw
- Phillips PM2.0×2.0 screw
- Phillips PM1.5×3.0 screw
- Torx8 TM2.5×10.0 screw
- Torx8 T8M2.5×6.0 screw
- Torx8 T8M2.5×4.0 screw
- Hex HM5.0×12.0 screw lock
- Rubber screw covers

3.6 Sequential Part Number Listing

Table 3-5

Sequential Part Number Listing

Spare Part Number	Description
246959-001	Power cord for use in the United States
246959-011	Power cord for use in Australia
246959-021	Power cord for use in Europe, the Middle East, and Africa
246959-031	Power cord for use in the United Kingdom
246959-061	Power cord for use in Italy
246959-081	Power cord for use in Denmark
246959-201	Power cord for use in Brazil
246959-291	Power cord for use in Japan
246959-AD1	Power cord for use in Korea
246959-AG1	Power cord for use in Switzerland
246959-BB1	Power cord for use in Israel
325815-002	Nylon carrying case
359118-001	USB diskette drive
366143-001	External MultiBay II
366144-001	External MultiBay II power cable and stand
367456-001	HP Extended Life Battery
372771-001	8-cell, 4.8-AH battery pack
373314-001	MultiBay 8X DVD-ROM Drive for use in External MultiBay II and HP Docking Station
373315-001	MultiBay 24X DVD/CD-RW Combo Drive for use in External MultiBay II and HP Docking Station

Table 3-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
375198-001	5400-rpm, 80-GB hard drive for use in External MultiBay II and HP Docking Station
375557-001	2X Max DVD±RW and CD-RW Double-Layer Combo Drive for use in External MultiBay II and HP Docking Station
380089-001	HP Docking Station Miscellaneous Plastics Kit
382675-001	TouchPad with 3 TouchPad buttons
382676-001	TouchPad with 2 TouchPad buttons
398393-001	Bluetooth module (includes Bluetooth module cable)
407253-001	802.11b/g HS WLAN module for use in North America
407253-002	802.11b/g HS WLAN Mini Card module for use in the ROW countries listed below: China Honduras Qatar Uruguay Ecuador Pakistan South Korea Venezuela Haiti Peru
407253-291	802.11b/g HS WLAN module for use in Japan
407254-001	802.11b/g LJ WLAN module for use in North America
407254-002	802.11b/g LJ WLAN module for use in the ROW countries listed below: China Honduras Qatar Uruguay Ecuador Pakistan South Korea Venezuela Haiti Peru
407254-291	802.11b/g LJ WLAN module for use in Japan

Table 3-5

Sequential Part Number Listing *(Continued)*

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

Table 3-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
407575-003	802.11a/b/g GL WLAN module for use in the ROW countries listed below:
	China Honduras Qatar Uruguay Ecuador Pakistan South Korea Venezuela Haiti Peru
407575-291	802.11a/b/g GL WLAN module for use in Japan
413267-001	HP Docking Station
413683-001	Intel Core Duo T2300 (1.67-GHz) processor (includes thermal paste)
413684-001	Intel Core Duo T2400 (1.83-GHz) processor (includes thermal paste)
413685-001	Intel Core Duo T2500 (2.00-GHz) processor (includes thermal paste)
413686-001	Intel Core DuoT2600 (2.17-GHz) processor (includes thermal paste)
413691-001	Modem module
413699-001	8X Max DVD-ROM drive
413700-001	4X Max DVD±RW and CD-RW Double-Layer Combo Drive
413701-001	24X Max DVD/CD-RW Combo Drive
413702-001	8X Max DVD±RW and CD-RW Double-Layer Combo Drive
413851-001	5400-rpm, 60-GB hard drive
413852-001	5400-rpm, 80-GB hard drive
413853-001	5400-rpm, 100-GB hard drive
414040-001	1-DIMM, PC2-4200 256 MB memory module
414041-001	1-DIMM, PC2-4200, 512 MB memory module

Table 3-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
414042-001	1-DIMM, PC2-4200, 1024 MB memory module
414044-001	1-DIMM, PC2-5300, 256 MB memory module
414045-001	1-DIMM, PC2-5300, 512 MB memory module
414046-001	1-DIMM, PC2-5300, 1024 MB memory module
416397-001	System board (includes RTC battery and 256 MB of video memory)
416398-001	USB/audio board (includes USB board cable and audio board cable)
416399-001	Serial connector module and cable
416400-001	Fingerprint reader board and cable
416401-001	Top cover for use with nw8440 models with fingerprint reader (includes speakers)
416402-001	Top cover for use with nc8430 and nx8420 models without fingerprint reader (includes speakers)
416404-001	Base enclosure
416405-001	Switch cover for use with nw8440 and nc8430 models (includes LED board and LED board cable)
416406-001	Switch cover for use with nx8420 models (includes LED board and LED board cable)
416407-001	System board frame
416408-001	Heat sink (includes thermal paste)
416409-001	Fan assembly
416410-001	Thermal plate

Table 3-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
416411-001	15.4-inch, WXGA display assembly (includes wireless antenna transceivers and cables)
416412-001	15.4-inch, WSXGA+ display assembly (includes wireless antenna transceivers and cables)
416413-001	15.4-inch, WUXGA display assembly (includes wireless antenna transceivers and cables)
416414-001	5400-rpm, 120-GB hard drive
416415-001	7200-rpm, 100-GB hard drive
416416-001	Keyboard with pointing stick for use in the United States
416416-031	Keyboard with pointing stick for use in the United Kingdom
416416-041	Keyboard with pointing stick for use in Germany
416416-051	Keyboard with pointing stick for use in France
416416-061	Keyboard with pointing stick for use in Italy
416416-071	Keyboard with pointing stick for use in Spain
416416-081	Keyboard with pointing stick for use in Denmark
416416-091	Keyboard with pointing stick for use in Norway
416416-101	Keyboard with pointing stick for use in Sweden
416416-111	Keyboard with pointing stick for use in Switzerland
416416-121	Keyboard with pointing stick for use in French Canada
416416-131	Keyboard with pointing stick for use in Portugal
416416-141	Keyboard with pointing stick for use in Turkey
416416-151	Keyboard with pointing stick for use in Greece
416416-161	Keyboard with pointing stick for use in Latin America
416416-171	Keyboard with pointing stick for use in Saudi Arabia

Table 3-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
416416-201	Keyboard with pointing stick for use in Brazil
416416-211	Keyboard with pointing stick for use in Hungary
416416-221	Keyboard with pointing stick for use in the Czech Republic
416416-231	Keyboard with pointing stick for use in Slovakia
416416-251	Keyboard with pointing stick for use in Russia
416416-281	Keyboard with pointing stick for use in Thailand
416416-291	Keyboard with pointing stick for use in Japan
416416-AB1	Keyboard with pointing stick for use in Taiwan
416416-AD1	Keyboard with pointing stick for use in Korea
416416-B31	Keyboard with pointing stick for use internationally
416416-BA1	Keyboard with pointing stick for use in Slovenia
416416-BB1	Keyboard with pointing stick for use in Israel
416416-DD1	Keyboard with pointing stick for use in Iceland
416417-001	Keyboard without pointing stick for use in the United States
416417-161	Keyboard without pointing stick for use in Latin America
416417-201	Keyboard without pointing stick for use in Brazil
416417-281	Keyboard without pointing stick for use in Thailand
416417-291	Keyboard without pointing stick for use in Japan
416417-AB1	Keyboard without pointing stick for use in Taiwan
416417-AD1	Keyboard without pointing stick for use in Korea
416419-001	Screw Kit
416420-001	Plastics Kit

Table 3-5

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
416421-021	90-watt AC adapter
417505-001	1-DIMM, PC2-4200, 2048 MB memory module
417506-001	1-DIMM, PC2-5300, 2048 MB memory module
417507-001	7200-rpm, 80-GB hard drive
418807-001	Top cover for use with nw8440 models without fingerprint reader (includes speakers)

4

Removal and Replacement Preliminaries

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

4.1 Tools Required

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

- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers
- Torx8 screwdriver
- Flat-bladed screwdriver
- Hex 5.0-mm socket drive for system board screw locks

4.2 Service Considerations

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

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

Plastic Parts

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

Cables and Connectors

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

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

4.3 Preventing Damage to Removable Drives

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

■ Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in hibernation, turn the computer on, and then shut it down through the operating system.

■ Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

■ Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

■ Handle drives on surfaces covered with at least one inch of shock-proof foam.

■ Avoid dropping drives from any height onto any surface.

■ After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

■ Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.

■ Avoid exposing a drive to temperature extremes or liquids.

■ If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE: Handle With Care."

4.4 **Preventing Electrostatic Damage**

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

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

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

4.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

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

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

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

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

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

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

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

4.6 **Workstation Precautions**

Use the following grounding precautions at workstations:

■ Cover the workstation with approved static-shielding material (refer to Table 4-2, "Static-Shielding Materials").

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

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

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

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

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

■ Avoid contact with pins, leads, or circuitry.

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

4.7 Grounding Equipment and Methods

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

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

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

Other grounding equipment recommended for use in preventing electrostatic damage includes

■ Antistatic tape.

■ Antistatic smocks, aprons, and sleeve protectors.

■ Conductive bins and other assembly or soldering aids.

■ Nonconductive foam.

■ Conductive tabletop workstations with ground cords of one megohm resistance.

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

■ Field service kits.

■ Static awareness labels.

■ Material-handling packages.

■ Nonconductive plastic bags, tubes, or boxes.

■ Metal tote boxes.

■ Electrostatic voltage levels and protective materials.

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

Table 4-1

Typical Electrostatic Voltage Levels

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

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

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

Table 4-2

Static-Shielding Materials

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

5

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

There are as many as 72 screws and screw locks, in 14 different sizes and types, that may have to be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

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

5.1 **Serial Number**

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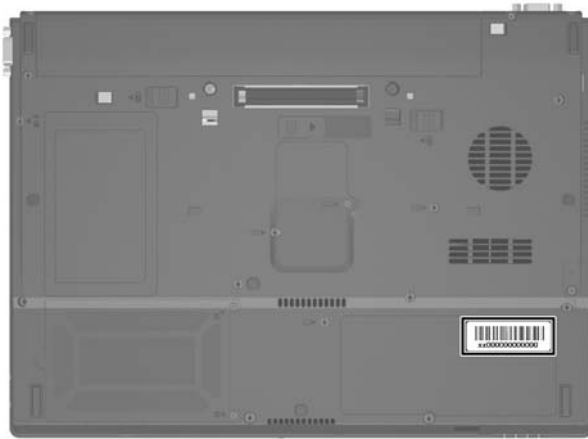
Serial Number Location

5.2 Disassembly Sequence Chart

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

Disassembly Sequence Chart

Section	Description	# of Screws Removed
5.3	Preparing the Computer for Disassembly	0
	Battery	0
5.4	Hard Drive	2 loosened to remove the hard drive cover 1 loosened to remove the hard drive 4 to disassemble hard drive
5.5	Computer Feet	0
5.6	Optical Drive	1 to remove the optical drive 2 to remove the optical drive bracket
5.7	External Memory Module	1 loosened to remove the memory module compartment cover
5.8	Bluetooth Module	1 loosened to remove the Bluetooth module cover 2 removed to remove Bluetooth module
5.9	Keyboard	2
5.10	Fan Assembly	4 loosened on fan assembly 4 removed on thermal plate
5.11	Heat Sink	4 loosened
5.12	Processor	1 loosened

Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
5.13	Internal Memory Module	0
5.14	RTC Battery	0
5.15	TouchPad	1
5.16	Mini Card Module	2
5.17	Switch Cover	3
5.18	Display Assembly	8
	⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini Card device authorized for use in your computer by the governmental agency that regulates wireless devices in your country. If you install a device and then receive a warning message, remove the device to restore computer functionality. Then contact Customer Care.	
5.19	Top Cover	16 screws
5.20	Modem Module	2
5.21	System Board	4 screws 2 screw locks
5.22	System Board Frame	2 screw locks 3 screws
5.23	Serial Connector Module	0
5.26	USB/Audio Board	2

5.3 Preparing the Computer for Disassembly

Before you begin any removal or installation procedures:

1. Shut down the computer. If you are unsure whether the computer is off or in hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power cord.

Battery Spare Part Number Information

8-cell, 4.8-AHr	372771-001

4. Remove the battery by following these steps:

   a. Turn the computer upside down with the rear panel toward you.

   b. Slide the battery release latch on the right ❶ and then the battery release latch on the left ❷ to release the battery.

   c. Slide the battery pack ❸ straight back and remove it.

Removing the Battery Pack

Reverse the above procedure to install the battery pack.

5.4 Hard Drive

Hard Drive Spare Part Number Information

7200 rpm		5400 rpm	
100 GB	416415-001	120 GB	416414-001
80 GB	417507-001	100 GB	413853-001
		80 GB	413852-001
		60 GB	413851-001

1. Prepare the computer for disassembly (Section 5.3).

2. Loosen the two Phillips PM2.0×5.0 screws ❶ that secure the hard drive cover to the computer.

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

4. Remove the hard drive cover.

✎ The hard drive cover is included in the Plastics Kit, spare part number 417527-001.
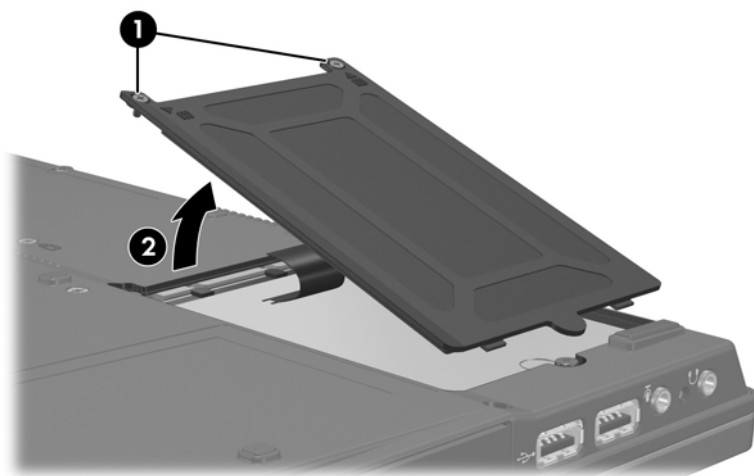
Removing the Hard Drive Cover

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

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

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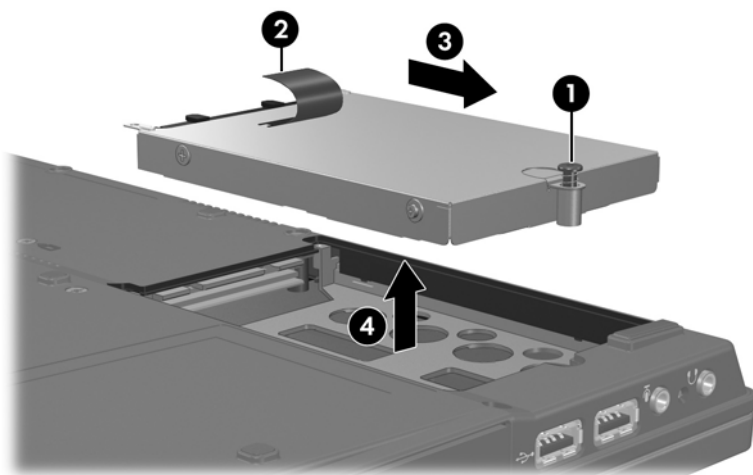
Removing the Hard Drive

8. Remove the four Phillips PM3.0×3.0 screws ❶ that secure the hard drive frame to the hard drive.

9. Lift the frame ❷ straight up to remove if from the hard drive.
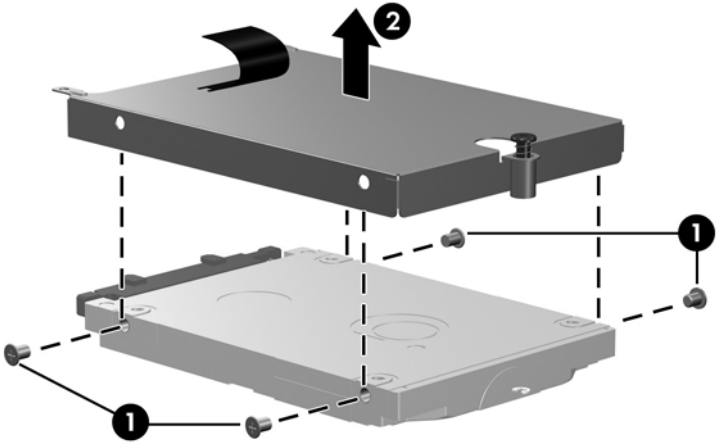
Removing the Hard Drive Frame

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

5.5 Computer Feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Plastics Kit, spare part number 417527-001.
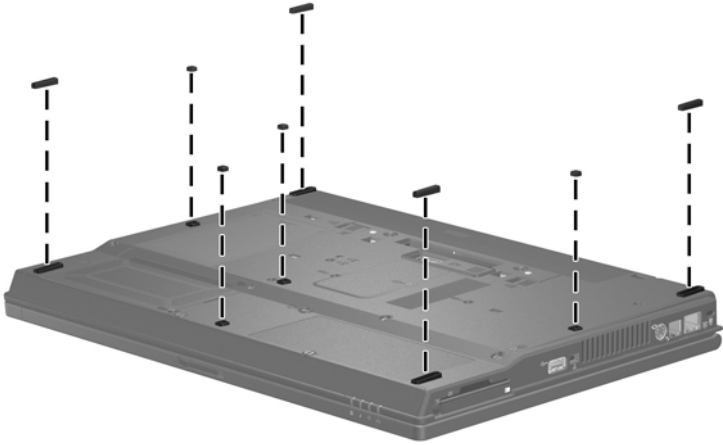
Replacing the Computer Feet

5.6 Optical Drive

Optical Drive Spare Part Number Information

8X Max DVD±RW and CD-RW Double-Layer Combo Drive	413702-001
4X Max DVD±RW and CD-RW Double-Layer Combo Drive	413700-001
24X Max DVD/CD-RW Combo Drive	413701-001
8X Max DVD-ROM drive	413699-001

1. Prepare the computer for disassembly (Section 5.3).
2. Position the computer with the left side toward you.
3. Remove the Torx8 T8M2.5×4.0 screw ❶ that secures the optical drive to the computer.
4. Insert a flat-bladed screwdriver into the slot ❷ on the bottom of the computer and push the tab.
5. Remove the optical drive ❸ from the computer.
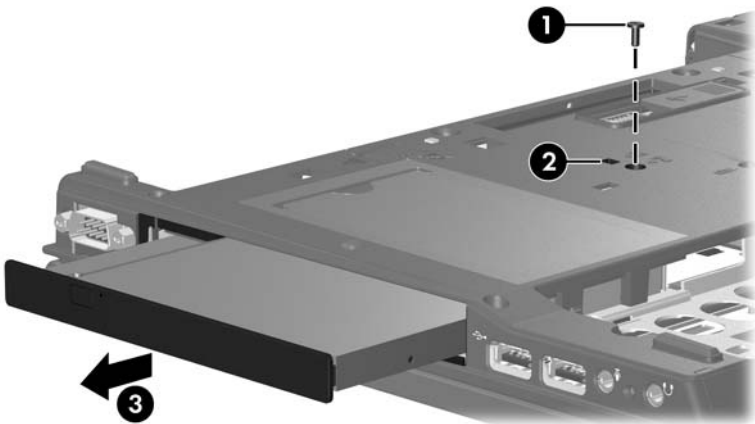
Removing the Optical Drive

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

7. Remove the optical drive bracket ❷.

Removing the Optical Drive Bracket

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

5.7 External Memory Module

Memory Module Spare Part Number Information

PC2-5300		PC2-4200	
2048 MB	417506-001	2048 MB	417505-001
1024 MB	414046-001	1024 MB	414042-001
512 MB	414045-001	512 MB	414041-001
256 MB	414044-001	256 MB	414040-001

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

3. Loosen the Phillips PM2.0×4.0 screw ❶ that secures the memory module compartment cover to the computer.

4. Lift the right side of the cover ❷ and swing it up and to the left.

5. Remove the memory module compartment cover.

✎ The memory module compartment cover is included in the Plastics Kit, spare part number 417527-001.
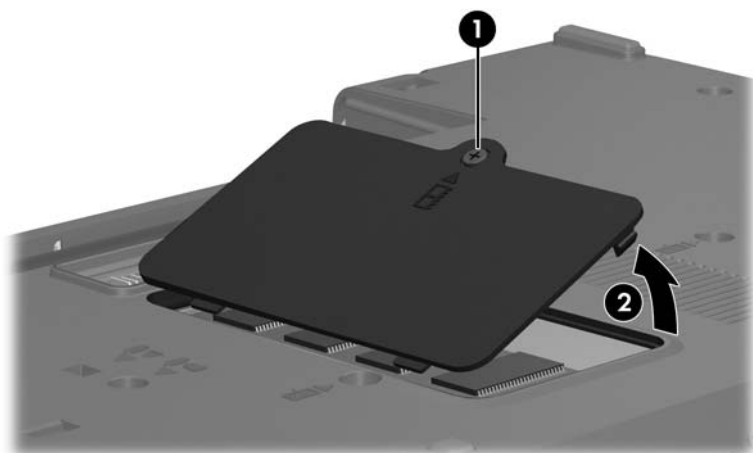
Removing the Memory Module Compartment Cover

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

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

8. Remove the memory module.

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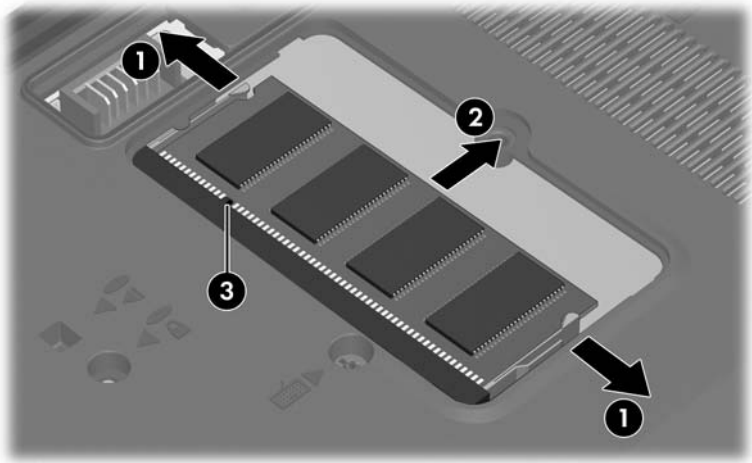
Removing the External Memory Module

Reverse the above procedure to install an external memory module.

5.8 **Bluetooth Module**

Bluetooth Module Spare Part Number Information

Bluetooth module (includes Bluetooth module cable)	398393-001

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

2. Position the computer with the right side toward you.

3. Loosen the Phillips PM1.5×3.0 screw ❶ that secures the Bluetooth module cover to the computer.

4. Remove the Bluetooth module cover ❷ from the computer.

✎ The Bluetooth module cover is included in the Plastics Kit, spare part number 417527-001.

5. Disconnect the Bluetooth module cable ❸ from the system board.
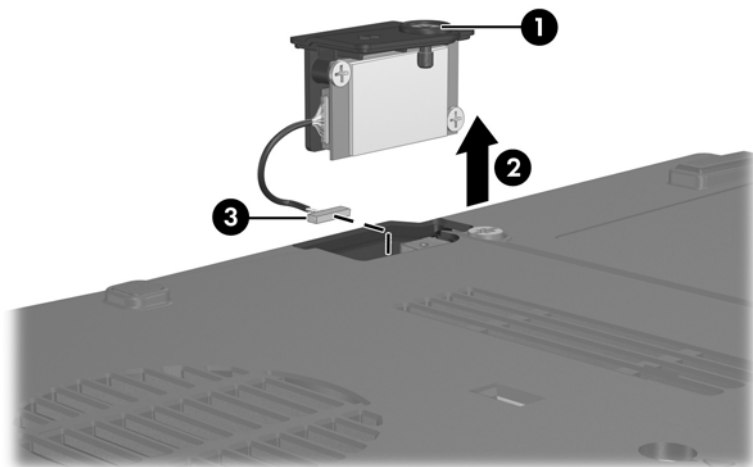
Removing the Bluetooth Module

6. Remove the two Phillips PM1.5×3.0 screws ❶ that secure the Bluetooth module to the Bluetooth module cover.

7. Remove the Bluetooth module ❷ from the cover.

8. Disconnect the Bluetooth module cable ❸ from the module.
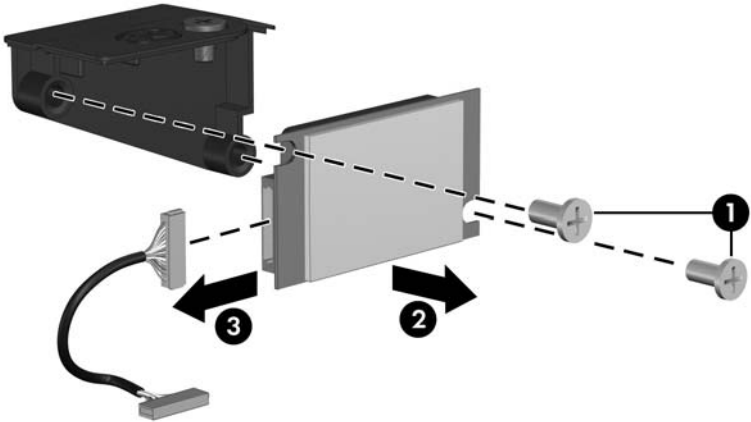
Removing the Bluetooth Module Cover

Reverse the above procedure to install a Bluetooth module.

5.9 Keyboard

Keyboard Spare Part Number Information

Keyboards with pointing stick for use in:

Belgium	416416-A41	Latin America	416416-161
Brazil	416416-201	Norway	416416-091
The Czech Republic	416416-221	Portugal	416416-131
Denmark	416416-081	Russia	416416-251
France	416416-051	Saudi Arabia	416416-171
French Canada	416416-121	Slovakia	416416-231
Germany	416416-041	Slovenia	416416-BA1
Greece	416416-151	Spain	416416-071
Hungary	416416-211	Sweden	416416-101
Iceland	416416-DD1	Switzerland	416416-111
Internationally	416416-B31	Taiwan	416416-AB1
Israel	416416-BB1	Thailand	416416-281
Italy	416416-061	Turkey	416416-141
Japan	416416-291	The United Kingdom	416416-031
Korea	416416-AD1	The United States	416416-001

Keyboard Spare Part Number Information *(Continued)*

Keyboards without pointing stick for use in:

Brazil	416417-201	Taiwan	416417-AB1
Japan	416417-291	Thailand	416417-281
Korea	416417-AD1	The United States	416417-001
Latin America	416417-161		

1. Prepare the computer for disassembly (Section 5.3).

2. Position the computer with the front toward you.

3. Remove the two Torx8 T8M2.5×10.0 screws that secure the keyboard to the computer.
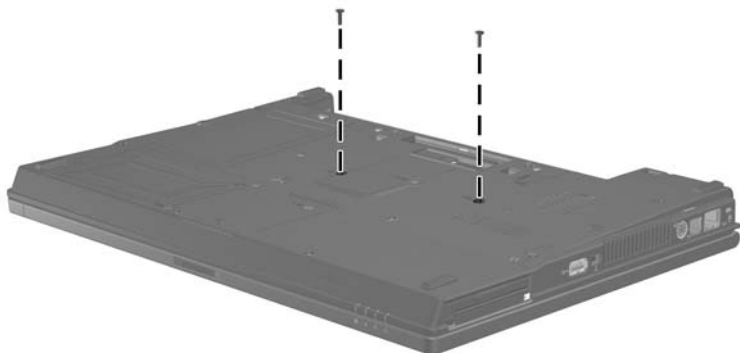
Removing the Keyboard Screws

4. Turn the computer display side up with the front toward you.

5. Open the computer as far as possible.

6. Slide the four keyboard retention tabs ❶ toward you. The tabs are located between the **esc** and **f1** keys, between the **f4** and **f5** keys, between the **f8** and **f9** keys, and between the **f12** and **delete** keys.

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

Releasing the Keyboard

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

✎ Step 9 applies to models with keyboards with pointing sticks.

9. Release the ZIF connector ❸ to which the pointing stick cable is connected and disconnect the pointing stick cable ❹ from the system board.
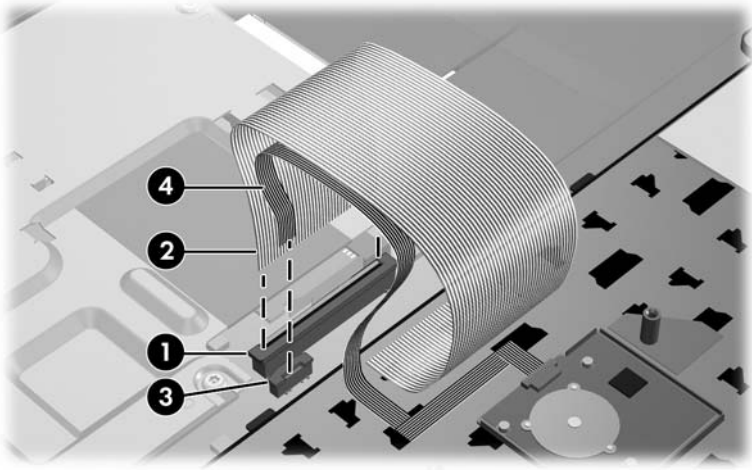
Disconnecting the Keyboard and Pointing Stick Cables

10. Remove the keyboard.

Reverse the above procedure to install the keyboard.

5.10 Fan Assembly

Fan Assembly

Spare Part Number Information

Fan assembly   416409-001

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

3. Disconnect the fan cable ❶ from the system board.

✎ The following screws should be removed, then installed, in the 1, 2, 3, 4 sequence stamped on the fan assembly.

4. Loosen the two Phillips PM2.0×3.0 screws ❷ and the two Phillips PM2.5×7.0 screws ❸ that secure the fan assembly to the computer.

5. Remove the fan assembly ❹.

✎ Due to the adhesive quality of the thermal paste located between the video heat sink and video board, it may be necessary to move the heat sink from side to side to detach the heat sink from the video board.
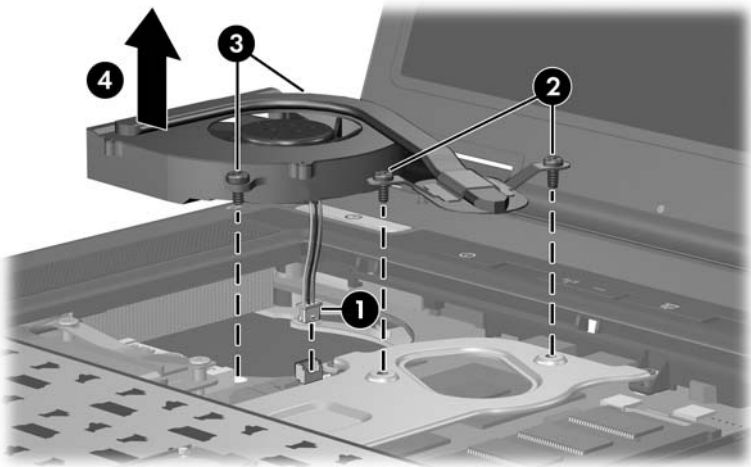
Removing the Fan Assembly

✎ The thermal paste should be thoroughly cleaned from the surfaces of the video board ❶ and video heat sink ❷ each time the fan assembly is removed. Thermal paste is included with all fan assembly and system board spare part kits.
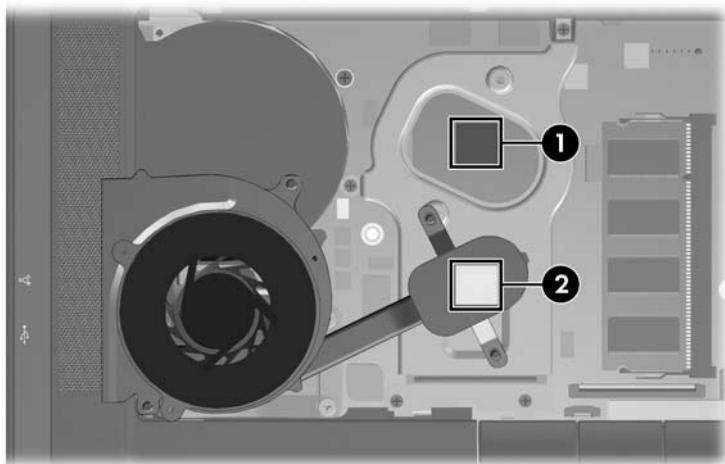
Replacing the Thermal Paste

✎ The following screws should be removed, then installed, in the 1, 2, 3, 4 sequence stamped on the thermal plate.

  6. Remove the four Torx8 T8M2.5×6.0 screws ❶ that secure the thermal plate to the computer.

  7. Remove the thermal plate ❷.

✎ Due to the adhesive quality of the thermal paste located between the thermal plate and video board, it may be necessary to move the thermal plate from side to side to detach the thermal plate from the video board.
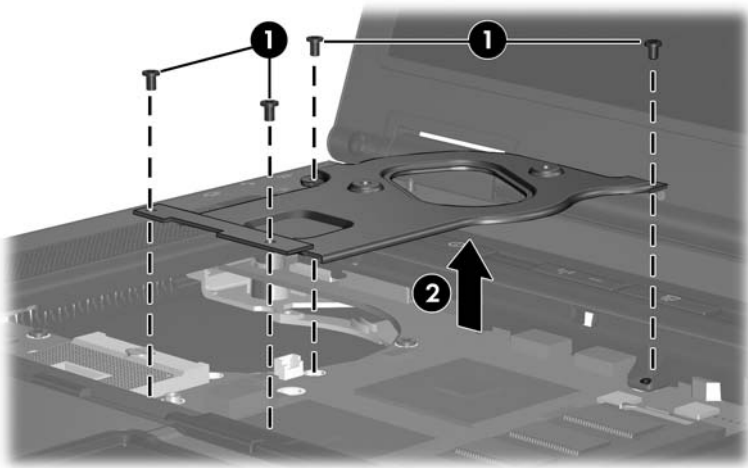
Removing the Thermal Plate

✎ The thermal paste should be thoroughly cleaned from the surfaces of the thermal plate ❶ and video board ❷ each time the thermal plate is removed.
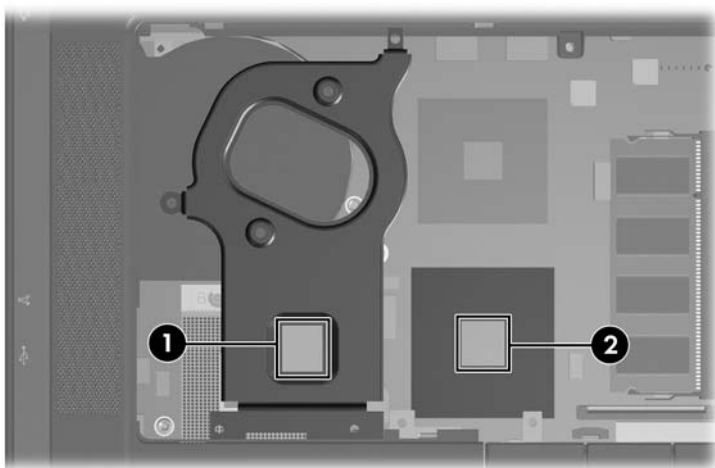
Replacing the Thermal Paste

Reverse the above procedure to install the fan assembly and thermal plate.

5.11   Heat Sink

Heat Sink Spare Part Number Information

Heat sink (includes thermal paste)	416408-001

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

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

4. Loosen the four Phillips PM2.5×8.0 shoulder screws ❶ that secure the heat sink to the computer.

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

5. Lift the right side of the heat sink ❷ until it disengages from the processor.

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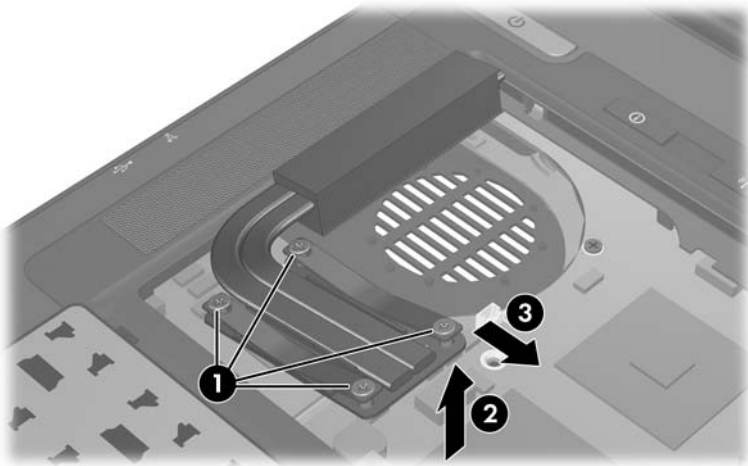
Removing the Heat Sink

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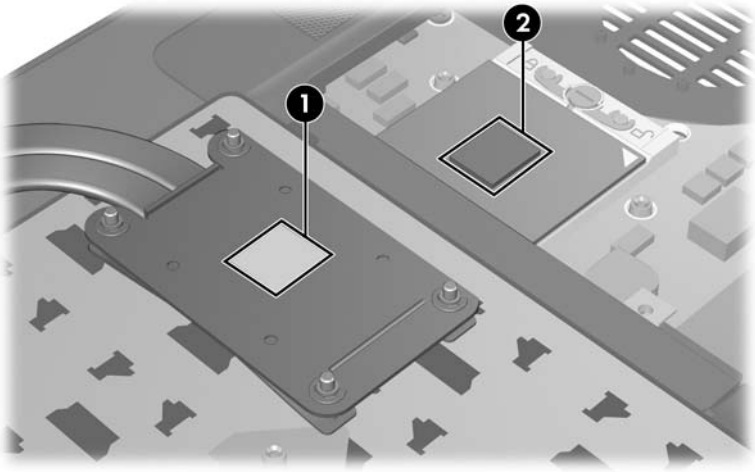
Replacing the Thermal Paste

Reverse the above procedure to install the heat sink.

5.12 Processor

Processor Spare Part Number Information

Intel Core Duo T2600 (2.16-GHz) processor	413686-001
Intel Core Duo T2500 (2.00-GHz) processor	413685-001
Intel Core Duo T2400 (1.83-GHz) processor	413684-001
Intel Core Duo T2300 (1.67-GHz) processor	413683-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

   a. Keyboard (Section 5.9)

   b. Fan assembly (Section 5.10)

   c. Heat sink (Section 5.11).

2. Use a flat-bladed screwdriver to turn the processor locking screw ❶ one-quarter turn counterclockwise until you hear a click.

3. Lift the processor ❷ straight up and remove it .

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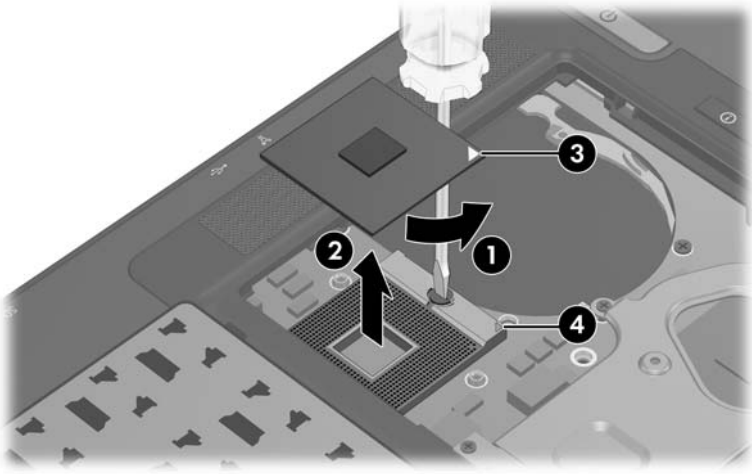
Removing the Processor

Reverse the above procedure to install the processor.

5.13   Internal Memory Module

Memory Module Spare Part Number Information

PC2-5300		PC2-4200	
2048 MB	417506-001	2048 MB	417505-001
1024 MB	414046-001	1024 MB	414042-001
512 MB	414045-001	512 MB	414041-001
256 MB	414044-001	256 MB	414040-001

1. Prepare the computer for disassembly (Section 5.3).

2. Release the keyboard (Section 5.9).

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

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

5. Remove the memory module.

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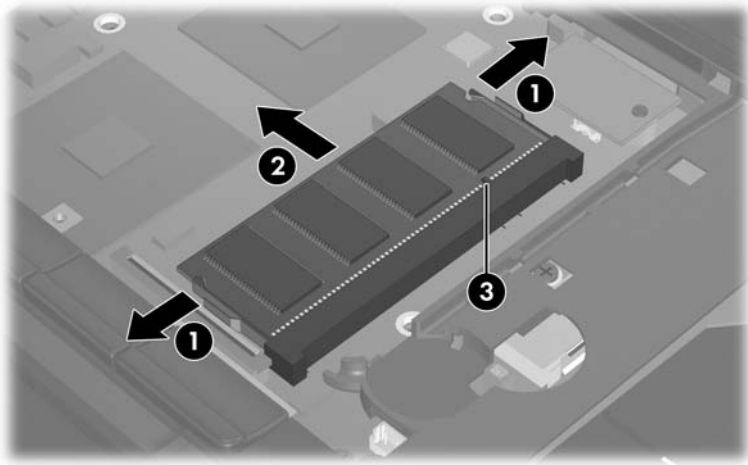
Removing the Internal Memory Module

Reverse the above procedure to install an internal memory module.

5.14 **RTC Battery**

✎ The RTC battery is included in the Plastics Kit, spare part number 417527-001.

1. Prepare the computer for disassembly (Section 5.3).

2. Release the keyboard (Section 5.9).

3. Remove the RTC battery from the clip in the top cover.
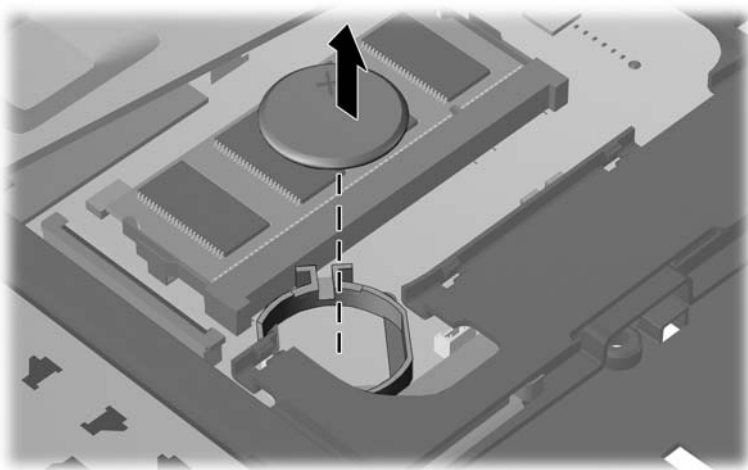
Removing the RTC Battery

Reverse the above procedure to install an RTC battery.

5.15 TouchPad

TouchPad Spare Part Number Information

TouchPad with 3 TouchPad buttons	382675-001
TouchPad with 2 TouchPad buttons	382676-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.9).
3. Turn the computer upside down with the front toward you.
4. Remove the Torx8 T8M2.5×10.0 screw that secures the TouchPad to the computer.
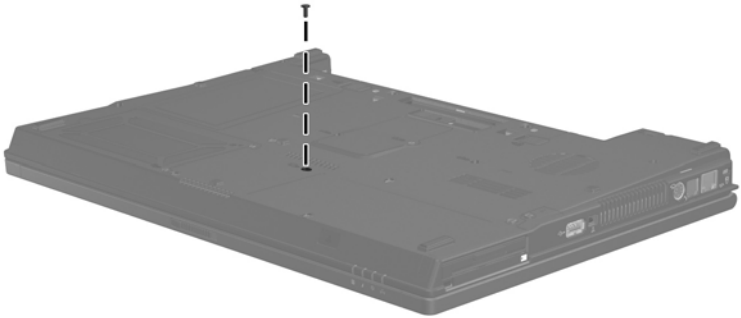
Removing the TouchPad Screw

5. Turn the computer display-side up with the front toward you.

6. Open the computer as far as possible.

7. Lift up on the rear edge of the TouchPad ❶ until it disengages from the computer.

8. Slide the TouchPad back ❷ until it rests on the computer.
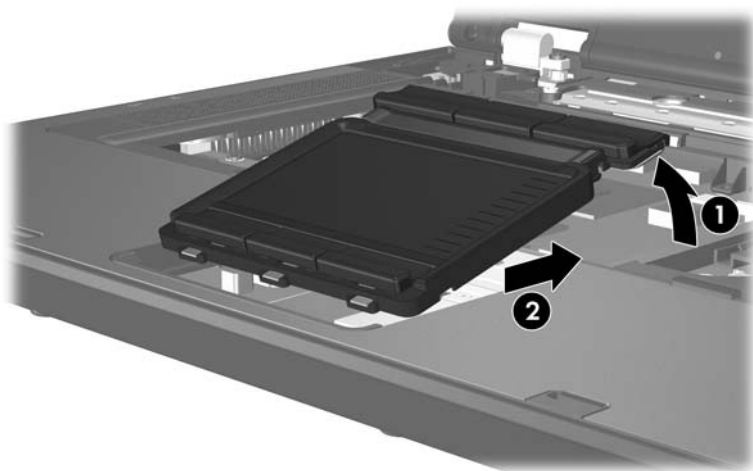
Releasing the TouchPad

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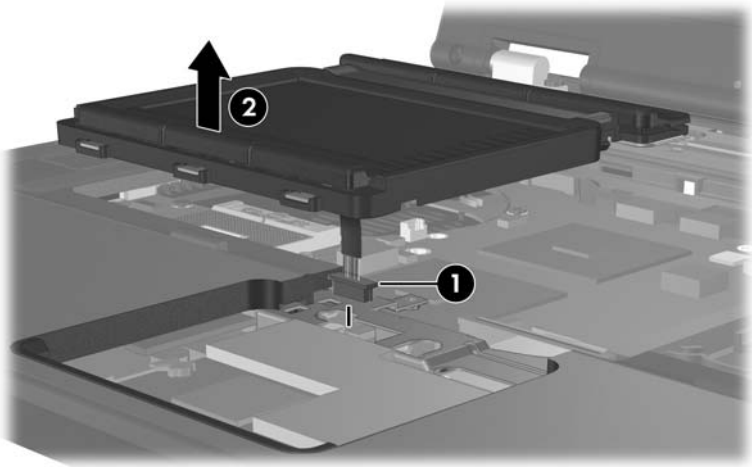
Removing the TouchPad

Reverse the above procedure to install the TouchPad.

5.16   Mini Card Module

Mini Card Module

Spare Part Number Information

802.11 b/g HS WLAN module for use in North America			407253-001
802.11 b/g HS WLAN module for use in the ROW countries listed below.			407253-002
China	Honduras	Qatar	Uruguay
Ecuador	Pakistan	South Korea	Venezuela
Haiti	Peru		
802.11 b/g HS WLAN module for use in Japan			407253-291
802.11 b/g LJ WLAN module for use in North America			407254-001
802.11 b/g LJ WLAN module for use in the ROW countries listed below.			407254-002
China	Honduras	Qatar	Uruguay
Ecuador	Pakistan	South Korea	Venezuela
Haiti	Peru		
802.11 b/g LJ WLAN module for use in Japan			407254-291
802.11a/b/g GL WLAN module for use in the MOW1 countries listed below.			407575-001
Antigua & Barbuda	Chile	Panama	Paraguay
Argentina	Dominican	India	Saudi Arabia
Australia	Republic	Indonesia	Taiwan
Bahamas	Guam	Malaysia	The United
Barbados	Guatemala	Mexico	States
Brunei	Hong Kong	New Zealand	Vietnam
Canada			

Mini Card Module

Spare Part Number Information *(Continued)*

802.11 a/b/g GL WLAN module for use in the MOW2 countries listed below:			407575-002
Aruba	Estonia	Poland	Norway
Austria	Finland	Portugal	Oman
Azerbaijan	France	Romania	Slovenia
Bahrain	Georgia	Russia	South Africa
Belgium	Germany	Serbia and Montenegro	Spain
Bermuda	Greece	Singapore	Sri Lanka
Bulgaria	Hungary	Slovakia	Sweden
Cayman Islands	Iceland	Liechtenstein	Switzerland
Columbia	Ireland	Lithuania	Turkey
Croatia	Italy	Luxembourg	The United
Cyprus	Latvia	Malta	Kingdom
Czech Republic	Lebanon	Monaco	Uzbekistan
Denmark	The	The Netherlands	
Egypt	Philippines		
El Salvador			
802.11 a/b/g GL WLAN module for use in the ROW countries listed below.			407575-003
China	Honduras	Qatar	Uruguay
Ecuador	Pakistan	South Korea	Venezuela
Haiti	Peru		
802.11 a/b/g GL WLAN module for use in Japan			407575-291

1. Prepare the computer for disassembly (Section 5.3).

2. Remove the keyboard (Section 5.9).

3. Remove the TouchPad (Section 5.15).

4. Make note of which antenna cable is attached to which antenna clip on the Mini Card module before disconnecting the cables, then disconnect the auxiliary and main antenna cables ❶ from the Mini Card module.

5. Remove the two Phillips PM2.0×4.0 screws ❷ that secure the Mini Card module to the computer. (The edge of the module opposite the socket rises away from the computer.)

6. Remove the Mini Card module by pulling the module ❸ away from the socket at an angle.

✎ Mini Card modules are designed with a notch ❹ to prevent incorrect installation.
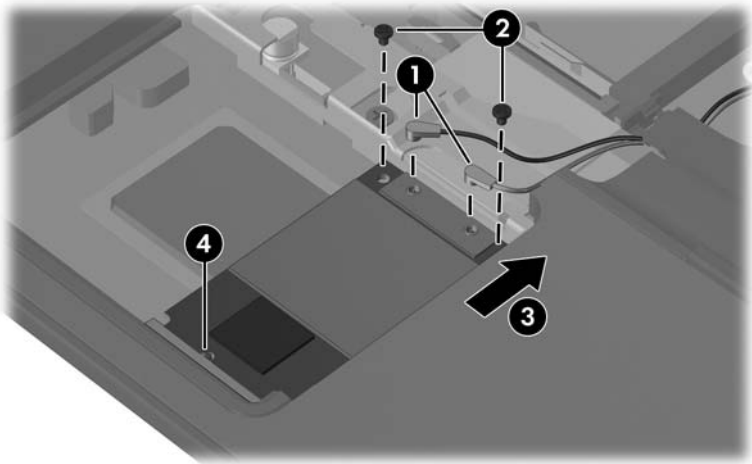
Removing a Mini Card Module

Reverse the above procedure to install a Mini Card module.

5.17   Switch Cover

Switch Cover Spare Part Number Information

For use with nw8440 and nc8430 models	416405-001
For use with nx8420 models	416406-001

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

1. Prepare the computer for disassembly (Section 5.3).

2. Remove the keyboard (Section 5.9).

3. Turn the computer upside down with the rear panel toward you.

4. Remove the 3 Phillips PM2.0×2.0 screws that secure the switch cover to the computer.
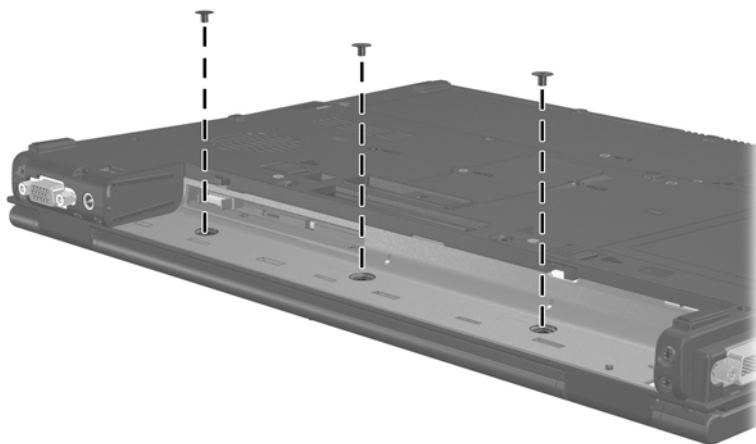
Removing the Switch Cover Screws

5. Turn the computer display-side up with the front toward you.

6. Open the computer as far as possible.

7. Use a flat-bladed screwdriver to lift up the left and right hinge cover sections of the switch cover ❶ to detach it from the computer.

8. Swing the rear edge of the switch cover ❷ up and toward you.
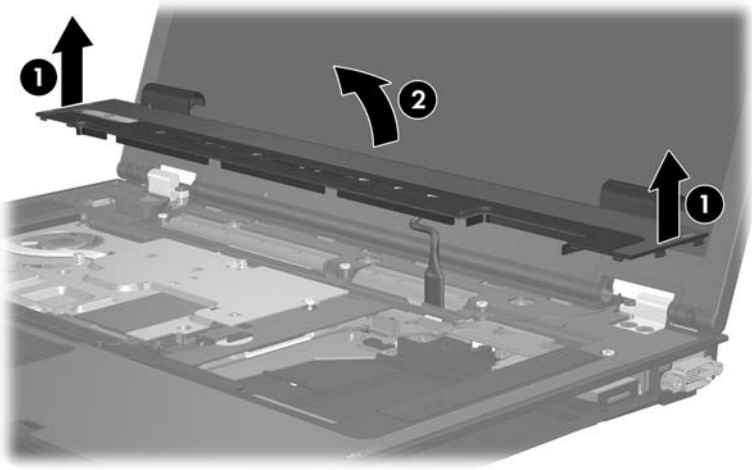
Releasing the Switch Cover

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

10. Remove the switch cover ❷.
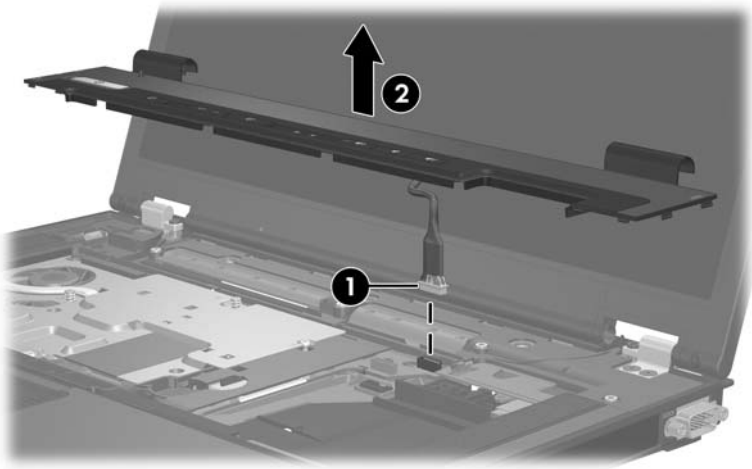
Removing the Switch Cover

Reverse the above procedure to install the switch cover.

5.18   Display Assembly

Display Assembly Spare Part Number Information

15.4-inch, WUXGA	416413-001
15.4-inch, WSXGA	416412-001
15.4-inch, WXGA+	416411-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

    a. Keyboard (Section 5.9)

    b. Switch cover (Section 5.17)

    c. TouchPad (Section 5.15)

2. Make note of which antenna cable is attached to which antenna clip on the Mini Card module before disconnecting the cables, then disconnect the wireless antenna cables ❶ from the Mini Card module.

3. Remove the wireless antenna cables from the top cover clips (❷ and ❸) through which they are routed.

4. Disconnect the display cable ❹ from the system board.
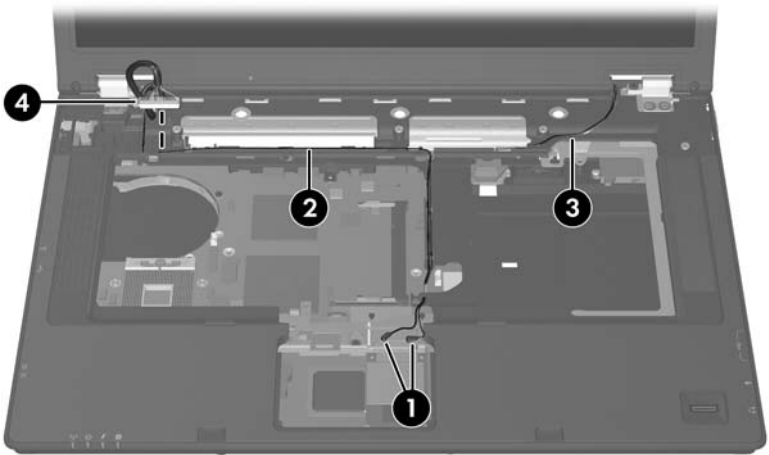
Disconnecting the Wireless Antenna and Display Cables

5. Remove the two Torx8 T8M2.5×10.0 screws ❶ and the two Phillips PM2.0×2.0 screws ❷ that secure the display assembly to the computer.
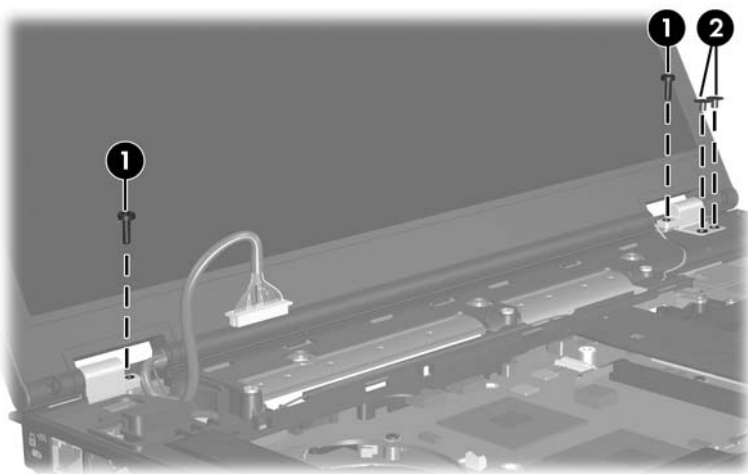
Removing the Display Assembly Screws

6. Position the computer with the rear panel toward you.

7. Remove the four Torx8 T8M2.5×10.0 screws ❶ that secure the display assembly to the computer.

8. Lift the display assembly ❷ straight up to remove it.
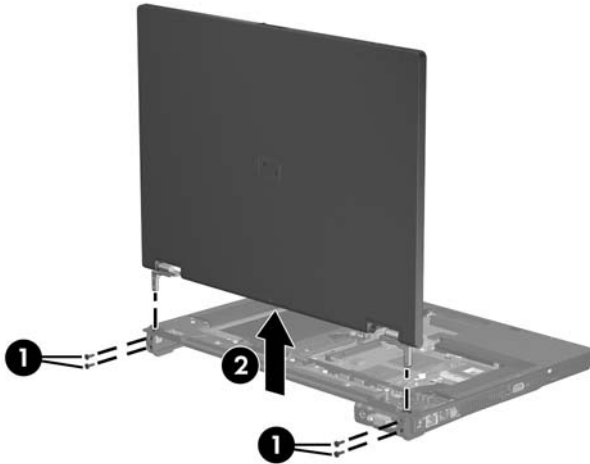
Removing the Display Assembly

Reverse the above procedure to install the display assembly.

5.19   Top Cover

Top Cover Spare Part Number Information

For use with nw8440 models without fingerprint reader	418807-001
For use with nw8440 models with fingerprint reader	416401-001
For use with nc8430 and nx8420 models with fingerprint reader	416403-001
For use with nc8430 and nx8420 models without fingerprint reader	416402-001
Fingerprint reader board with cable	416400-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

    a. Hard drive (Section 5.4)

    b. Optical drive (Section 5.6)

    c. Keyboard (Section 5.9)

    d. Fan assembly (Section 5.10)

    e. Switch cover (Section 5.17)

    f. TouchPad (Section 5.15)

    g. Display assembly (Section 5.18)

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

3. Remove the two rubber screw covers ❶ and the eleven Torx8 T8M2.5×10.0 screws ❷ that secure the top cover to the computer.

✎ The rubber screw covers are available in the Screw Kit, spare part number 416419-001.
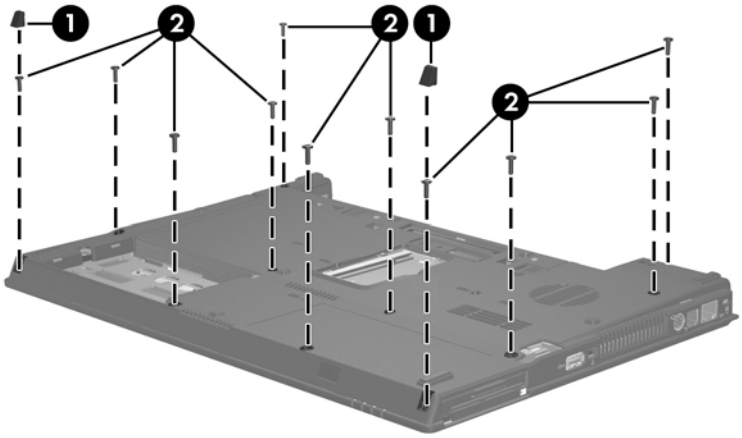
Removing the Top Cover Screws, Part 1

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

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

✎ Step 6 applies only to computer models with a fingerprint reader.

6. Disconnect the fingerprint reader cable ❷ from the system board.

7. Remove the four Torx8 T8M2.5×4.0 screws ❸ that secure the top cover to the computer.
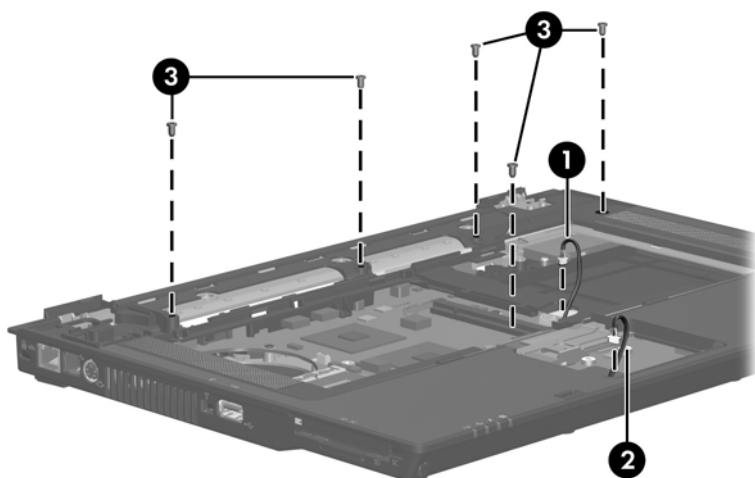
Removing the Top Cover Screws, Part 2

8. Lift the front edge of the top cover ❶ until it disengages from the base enclosure.

9. Lift the top cover ❷ straight up and remove it.
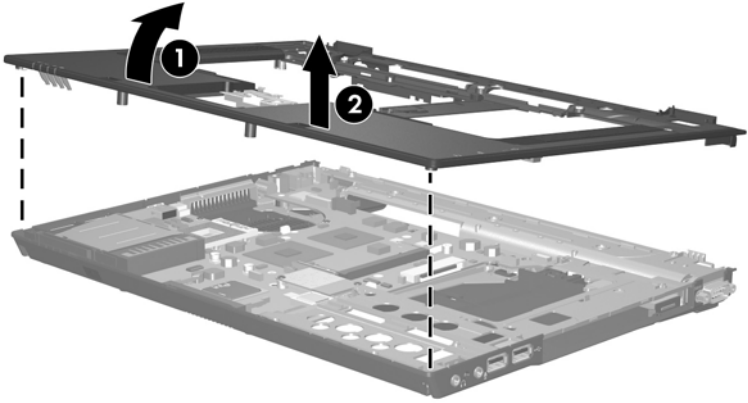
Removing the Top Cover

Reverse the above procedure to install the top cover.

5.20 Modem Module

Modem Module Spare Part Number Information

Modem module	413691-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

   a. Hard drive (Section 5.4)

   b. Optical drive (Section 5.6)

   c. Keyboard (Section 5.9)

   d. Switch cover (Section 5.17)

   e. TouchPad (Section 5.15)

   f. Display assembly (Section 5.18)

   g. Top cover (Section 5.19)

2. Remove the two Phillips PM2.5×4.0 screws ❶ that secure the modem board to the system board.
3. Lift the right side of the modem module ❷ to disconnect it from the system board.
4. Disconnect the modem cable ❸ from the modem module.
5. Remove the modem module.
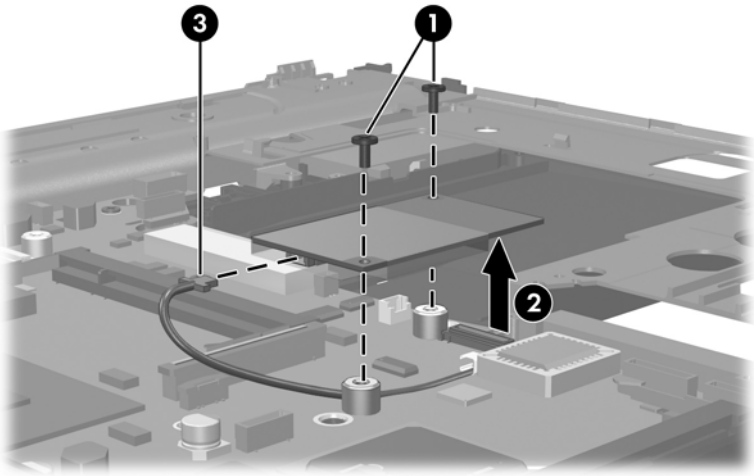
Removing the Modem Module

Reverse the above procedure to install the modem module.

5.21 System Board

System Board Spare Part Number Information

System board (includes RTC battery and 256-MB of video memory)	416397-001

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

- Memory modules (Section 5.7 and Section 5.13)
- Processor (Section 5.12)
- RTC battery (Section 5.14)
- Mini Card module (Section 5.16)
- Modem module (Section 5.20)

---

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

   a. Hard drive (Section 5.4)

   b. Optical drive (Section 5.6)

   c. Bluetooth module (Section 5.8)

   d. Keyboard (Section 5.9)

   e. Fan assembly (Section 5.10)

   f. Heat sink (Section 5.11)

   g. TouchPad (Section 5.15)

   h. Switch cover (Section 5.17)

   i. Display assembly (Section 5.18)

   j. Top cover (Section 5.19)

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

3. Disconnect the following cables from the system board:

   ❶ Serial connector module cable

   ❷ Modem cable

   ❸ USB board cable

   ❹ Audio board cable

   ❺ Modem cable
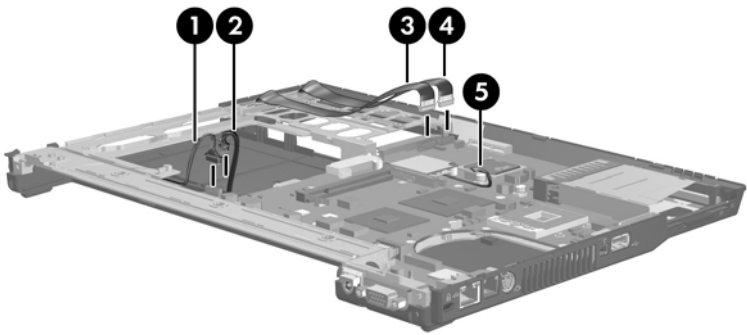
Disconnecting the System Board Cables

4. Remove the following:

   ❶ Two Torx T8M2.5×6.0 screws

   ❷ Two Torx T8M2.5×4.0 screws

   ❸ Two HM5.0×10.0 screw locks on each side of the external monitor connector
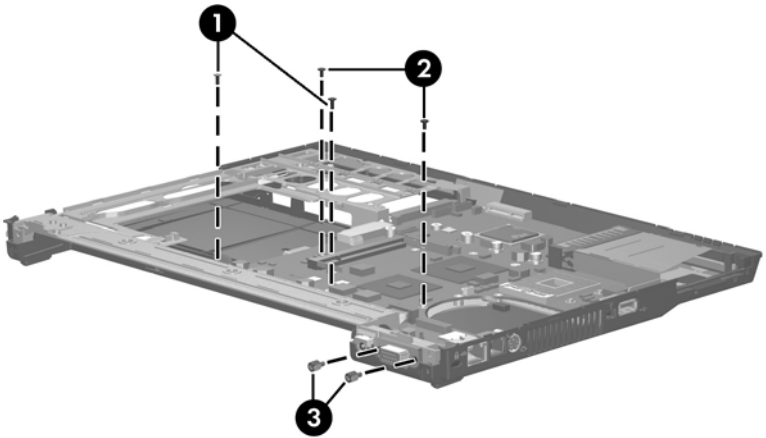
Removing the System Board Screws and Screw Locks

5. Remove the modem cable ❶ from the clip in the
   base enclosure.

6. Remove the modem cable ❷ from the clips in the
   system board.

7. Remove the modem connector ❸ from the clip in the
   base enclosure.
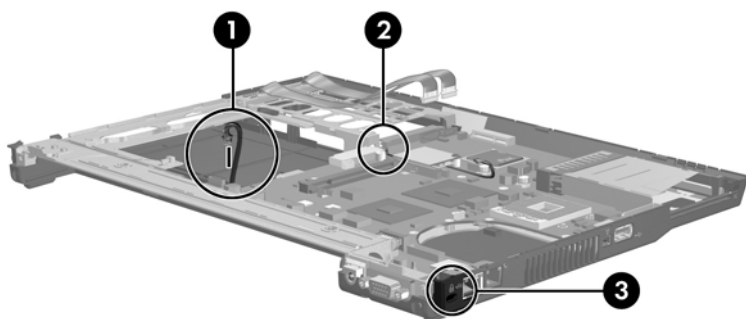
Releasing the System Board, Part 1

8. Flex the right side of the base enclosure ❶ until the USB ❷, 1394 ❸, and RJ-45 connectors ❹ are clear of the base enclosure.

9. Lift the left side of the system board ❺ until it rests at an angle.
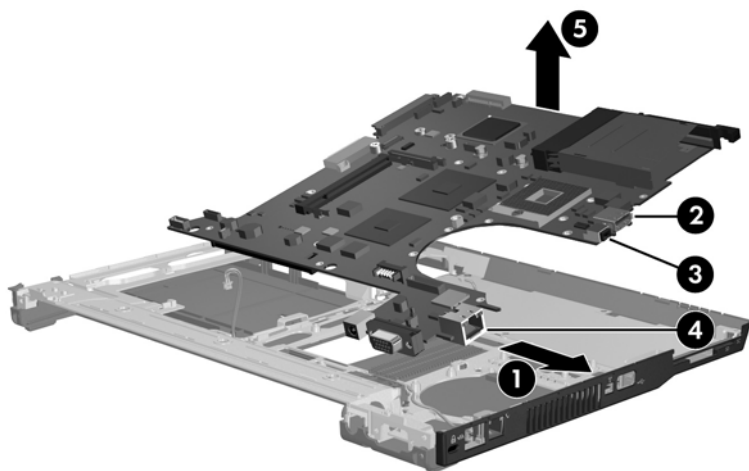
Releasing the System Board, Part 2

10. Lift the front edge of the system board ❶ until it rests at an angle.

11. Slide the system board ❷ forward until the rear-right section of the system board ❸ is clear of the screw boss ❹ on the system board frame.

12. Remove the system board ❺ from the base enclosure.
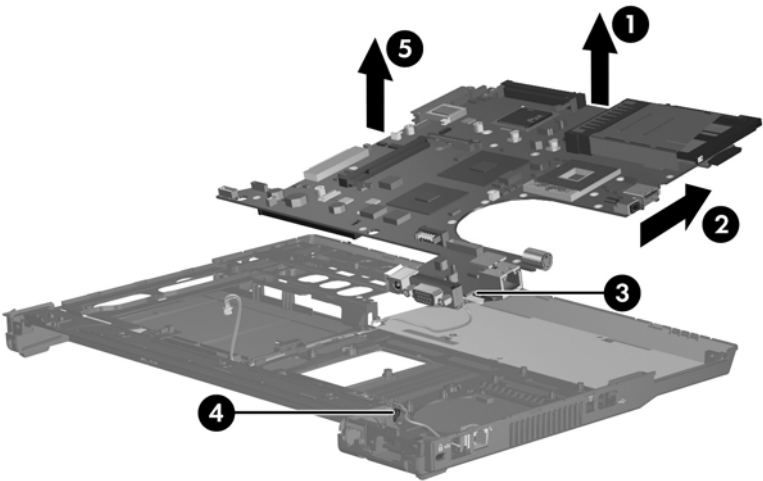
Removing the System Board

Reverse the above procedure to install the system board.

5.22 System Board Frame

System Board Frame Spare Part Number Information

System board frame (includes modem cable)	416407-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

   a. Hard drive (Section 5.4)

   b. Optical drive (Section 5.6)

   c. Bluetooth module (Section 5.8)

   d. Keyboard (Section 5.9)

   e. Fan assembly (Section 5.10)

   f. Heat sink (Section 5.11)

   g. TouchPad (Section 5.15)

   h. Switch cover (Section 5.17)

   i. Display assembly (Section 5.18)

   j. Top cover (Section 5.19)

   k. System board (Section 5.21)

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

3. Remove the two Hex HM5.0×12.0 screw locks ❶ on each side of the serial connector.

4. Remove the three Torx8 T8M2.5×6.0 screws ❷ that secure the system board frame to the base enclosure.

5. Remove the audio board and USB board cables ❸ from the base enclosure.

6. Lift the rear edge of the system board frame ❹ until it disengages from the base enclosure.

7. Remove the system board frame.
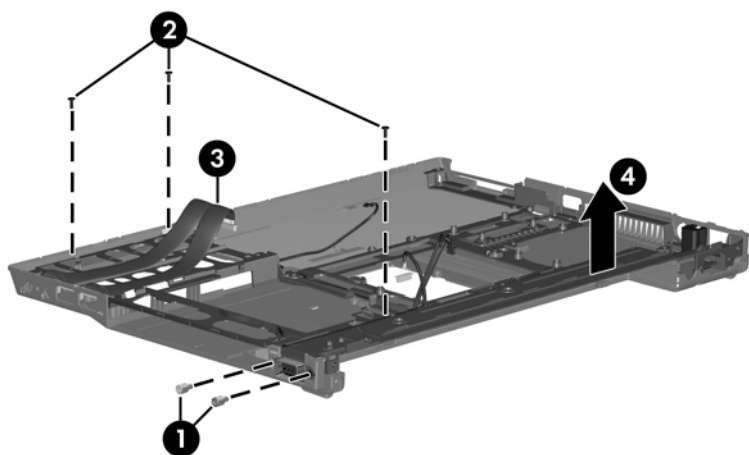
Remove the System Board Frame

8. If it is necessary to replace the modem cable, remove the modem connector and cable ❶ from the clips ❷ in the system board frame.
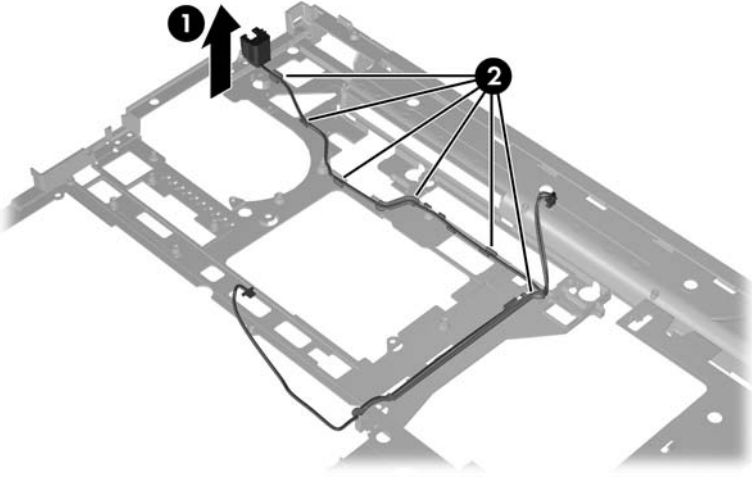
Removing the Modem Cable

Reverse the above procedures to install the system board frame.

5.23 Serial Connector Module

Serial Connector Module Spare Part Number Information	
Serial connector module and cable	416399-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

    a. Hard drive (Section 5.4)

    b. Optical drive (Section 5.6)

    c. Bluetooth module (Section 5.8)

    d. Keyboard (Section 5.9)

    e. Fan assembly (Section 5.10)

    f. Heat sink (Section 5.11)

    g. TouchPad (Section 5.15)

    h. Switch cover (Section 5.17)

    i. Display assembly (Section 5.18)

    j. Top cover (Section 5.19)

    k. System board (Section 5.21)

    l. System board frame (Section 5.22)

2. Position the system board frame with the rear panel toward you.

3. Remove the serial connector module cable ❶ from the clips in the system board frame.

4. Remove the serial connector module ❷ from the system board frame.
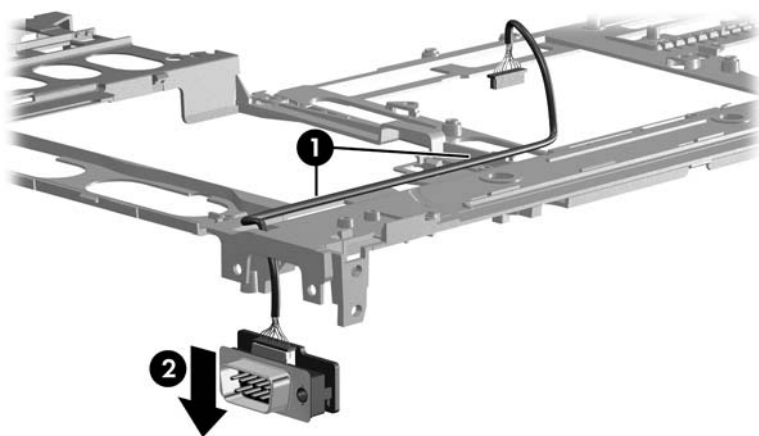
Removing the Serial Connector Module and Cable

Reverse the above procedure to install the serial connector module.

5.24 USB/Audio Board

USB/Audio Board Spare Part Number Information

USB/audio board (includes USB board cable and audio board cable)   416398-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:

   a. Hard drive (Section 5.4)

   b. Optical drive (Section 5.6)

   c. Bluetooth module (Section 5.8)

   d. Keyboard (Section 5.9)

   e. Fan assembly (Section 5.10)

   f. Heat sink (Section 5.11)

   g. TouchPad (Section 5.15)

   h. Switch cover (Section 5.17)

   i. Display assembly (Section 5.18)

   j. Top cover (Section 5.19)

   k. System board (Section 5.21)

   l. System board frame (Section 5.22)

2. Position the base enclosure with the front toward you.

3. Remove the two Torx8 T8M2.5×4.0 screws ❶ that secure the USB/audio board to the base enclosure.

4. Lift the left side of the USB/audio board ❷ to disengage it from the base enclosure.
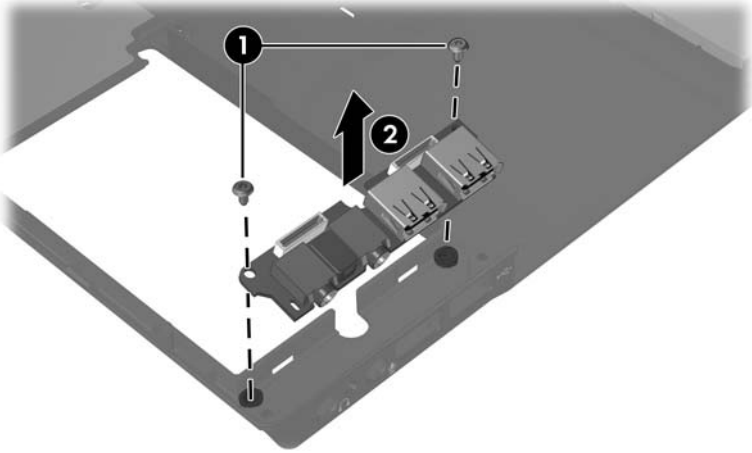
Removing the USB/Audio Board

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

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1

Computer

Dimensions	Metric	U.S.
Height (front to back)	2.8 to 3.3 cm	1.1 to 1.3 in
Width	35.8 cm	14.1 in
Depth	25.9 cm	10.2 in
Weight	2.81 kg	6.2 lbs
Input Power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W	
Operating current	4.74 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F

Table 6-1

Computer *(Continued)*

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

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

Table 6-2

15.4-inch, WUXGA+WVA

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.172 × 0.172 mm	
Format	1920 × 1200	
Configuration	RGB vertical stripe	
Backlight	CCFT	
Character display	80 × 25	
Total power consumption	6.0 W	
Viewing angle	+/-65° horizontal, +/-50° vertical typical	

Table 6-3

15.4-inch, WSXGA+WVA

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.197 × 0.197 mm	
Format	1680 × 1050	
Configuration	RGB vertical stripe	
Backlight	CCFT	
Character display	80 × 25	
Total power consumption	7.0 W	
Viewing angle	+/-60° horizontal, +40/-50° vertical typical	

Table 6-4

15.4-inch, WXGA+WVA

Dimensions		
Height	20.7 cm	8.1 in
Width	33.1 cm	13.0 in
Diagonal	39.1 cm	15.4 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1	
Brightness	180 nits typical	
Pixel resolution		
Pitch	0.259 × 0.259 mm	
Format	1440 × 900	
Configuration	RGB vertical stripe	
Backlight	CCFT	
Character display	80 × 25	
Total power consumption	6.5 W	
Viewing angle	+/-45° horizontal, +15/-35° vertical typical	

Table 6-5

Hard Drives

	120-GB*	100-GB*	80-GB*	60-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	SATA	SATA	SATA	SATA
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[†]	234,436,400	195,363,650	156,301,488	117,210,240
Disc rotational speed	5400 rpm	7200 and 5400 rpm	7200 and 5400 rpm	5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)			

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

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

Table 6-6

DVD±RW and CD-RW Double-Layer Combo Drive

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

Table 6-6

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

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

Table 6-7

DVD/CD-RW Combo Drive

DVD-ROM 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 6-7

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

Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	CD	DVD
Random	< 110 ms	< 130 ms
Full stroke	< 210 ms	< 225 ms
Audio output level	Audio-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
CD-R (24X)	3,600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1,500 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)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Table 6-8

DVD-ROM Drive

Applicable disc	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18)	
	CD-ROM (Mode 1 and 2)	
	CD Digital Audio	
	CD-XA ready (Mode 2, Form 1 and 2)	
	CD-I ready (Mode 2, Form 1 and 2)	
	CD-R	
	CD-RW	
	Photo CD (single and multisession)	
	CD-Bridge	
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	CD	DVD
Random	< 100 ms	< 125 ms
Full stroke	< 175 ms	< 225 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	512 MB	
Data transfer rate		
CD-R (24X)	3,600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1,500 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)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Table 6-9

System DMA

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

Table 6-10

System Interrupts

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

Table 6-10

System Interrupts *(Continued)*

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

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

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

Table 6-11

System I/O Addresses

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

Table 6-11

System I/O Addresses *(Continued)*

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

Table 6-11

System I/O Addresses *(Continued)*

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

Table 6-12

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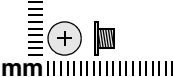
Size	Memory Address	System Function
640 KB	00000000-0009FFFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	01000000-047FFFFF	Super extended memory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

A

Screw Listing

This appendix provides specification and reference information for the screws used in the computer. All screws listed in this appendix are available in the Screw Kit, spare part number 416419-001.

Table A-1

Phillips PM3.0×3.0 Screw

	Color	Qty.	Length	Thread	Head Width
mm	Black	4	3.0 mm	3.0 mm	5.0 mm

Where used:

4 screws that secure the hard drive frame to the hard drive (documented in Section 5.4)
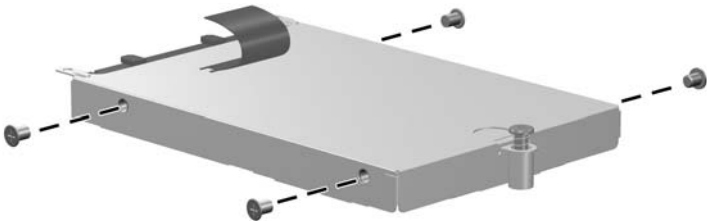
Phillips PM3.0×3.0 Screw Locations

Table A-2

Phillips PM2.0×5.0 Captive Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	4	5.0 mm	2.0 mm	5.0 mm
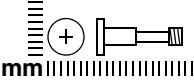
Where used:

❶ Two screws that secure the hard drive cover to the computer (screws are captured on the cover by C clips; documented in Section 5.4)

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

❸ One screw that secures the Bluetooth module cover to the computer (screw is captured on the cover by a C clip; documented in Section 5.8)
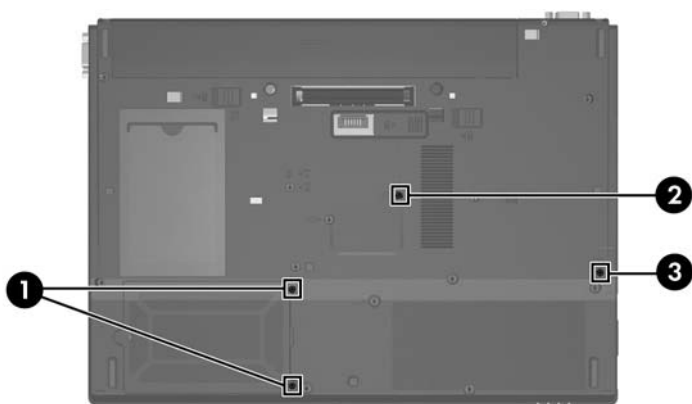
Phillips PM2.0×5.0 Captive Screw Locations

Table A-3

Phillips PM2.5×13.0 Captive Spring-Loaded Screw

	Color	Qty.	Length	Thread	Head Width
mm	Silver	1	13.0 mm	2.5 mm	6.0 mm

Where used:

One screw that secures the hard drive to the computer (screw is captured on the cover by a C clip; documented in Section 5.4)
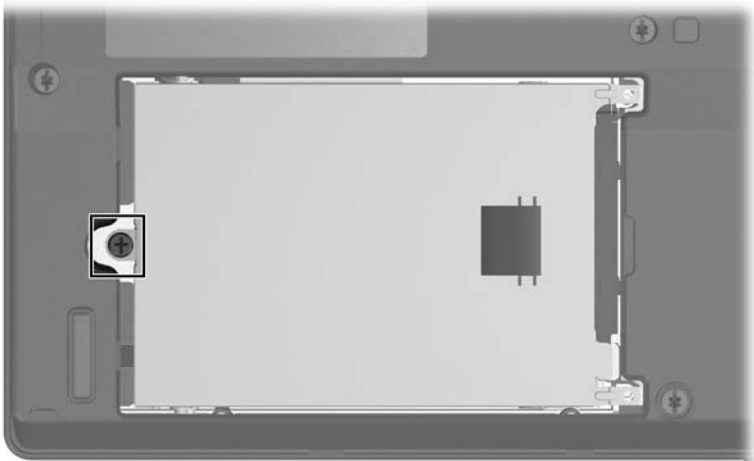
Phillips PM2.5×13.0 Captive Screw Location

Table A-4

Torx8 T8M2.5×4.0 Screw
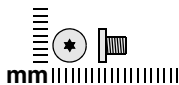
mm |||||||||||||||||||	Color	Qty.	Length	Thread	Head Width
	Black	13	4.0 mm	2.5 mm	5.0 mm

Where used:

One screw that secures the optical drive to the computer (documented in Section 5.6)

Torx8 T8M2.5×4.0 Screw Location

Table A-4

Torx8 T8M2.5×4.0 Screw *(Continued)*

mm‖‖‖‖‖‖‖‖‖‖‖‖	Color	Qty.	Length	Thread	Head Width
	Black	13	4.0 mm	2.5 mm	5.0 mm

Where used:

5 screws that secure the top cover to the computer (documented in Section 5.19)
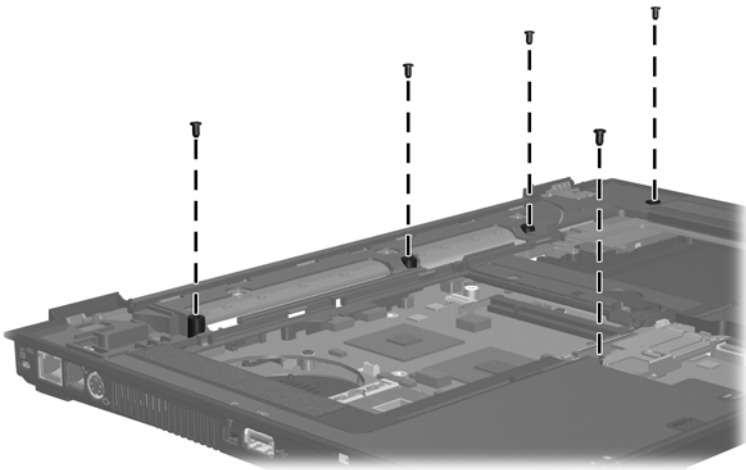
Torx8 T8M2.5×4.0 Screw Locations

Table A-4

Torx8 T8M2.5×4.0 Screw *(Continued)*

	Color	Qty.	Length	Thread	Head Width
mm	Black	13	4.0 mm	2.5 mm	5.0 mm

Where used:

❶ Two screws that secure the system board to the computer (documented in Section 5.21)

❷ Three screws that secure the system board frame to the computer (documented in Section 5.22)
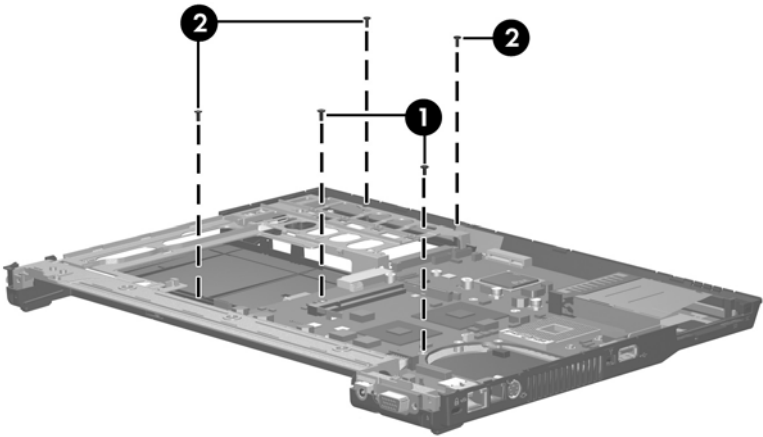
Torx8 T8M2.5×4.0 Screw Locations

Table A-4

Torx8 T8M2.5×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	13	4.0 mm	2.5 mm	5.0 mm
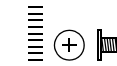
Where used:
2 screws that secure the USB/audio board to the computer (documented in Section 5.24)
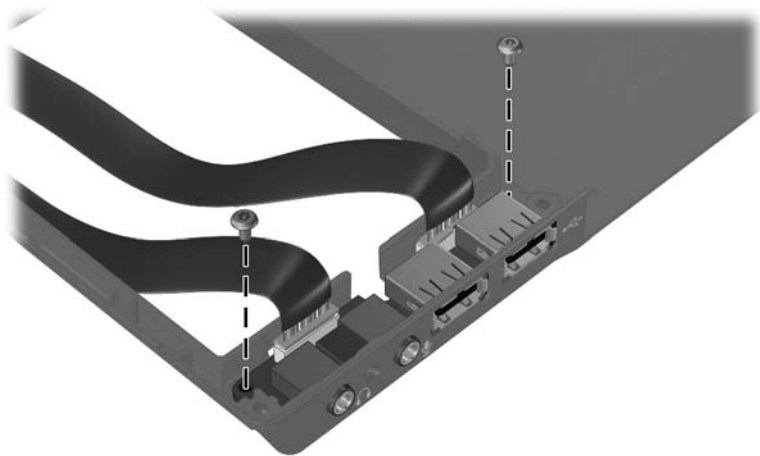
Torx8 T8M2.5×4.0 Screw Locations

Table A-5

Phillips PM2.0×3.0 Screw

	Color	Qty.	Length	Thread	Head Width
	Silver	4	3.0 mm	2.0 mm	5.0 mm

Where used:

2 screws that secure the optical drive bracket to the optical drive (documented in Section 5.6)

Phillips PM2.0×3.0 Screw Locations

Table A-5

Phillips PM2.0×3.0 Screw *(Continued)*
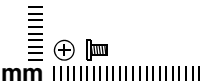
mm ▦ ⊕ ▦	Color	Qty.	Length	Thread	Head Width
	Silver	4	3.0 mm	2.0 mm	5.0 mm

Where used:

2 captive screws that secure the fan assembly to the computer (documented in Section 5.10)
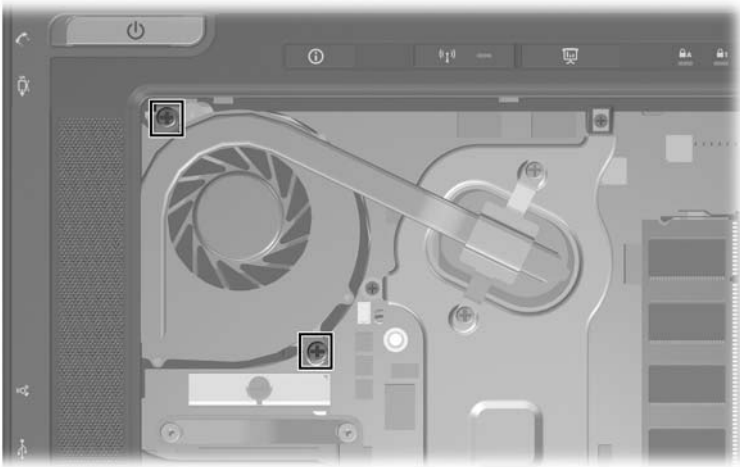
Phillips PM2.0×3.0 Captive Screw Locations

Table A-6

Phillips PM1.5×3.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	3.0 mm	1.5 mm	5.0 mm
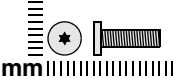
Where used:

2 screws that secure the Bluetooth module to the Bluetooth module cover (documented in Section 5.8)
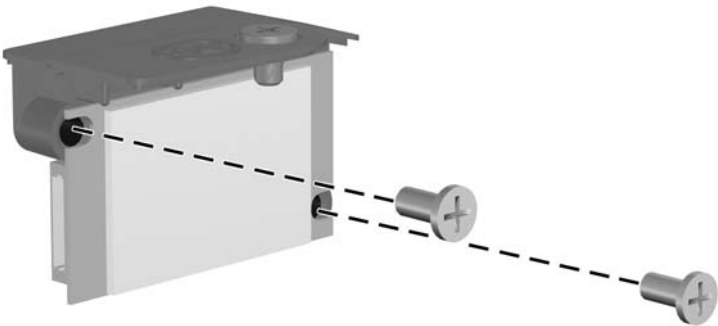
Phillips PM1.5×3.0 Screw Locations

Table A-7

Torx8 T8M2.5×10.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	20	10.0 mm	2.5 mm	5.0 mm
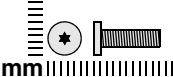
Where used:

❶ Two screws that secure the keyboard to the computer (documented in Section 5.9)

❷ One screw that secures the TouchPad to the computer (documented in Section 5.15)

❸ Four screws that secure the display assembly to the computer (documented in Section 5.18)

Torx8 T8M2.5×10.0 Screw Locations

Table A-7

Torx8 T8M2.5×10.0 Screw *(Continued)*

	Color	Qty.	Length	Thread	Head Width
mm	Black	20	10.0 mm	2.5 mm	5.0 mm
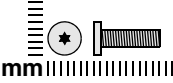
Where used:

2 screws that secure the display assembly to the computer (documented in Section 5.18)
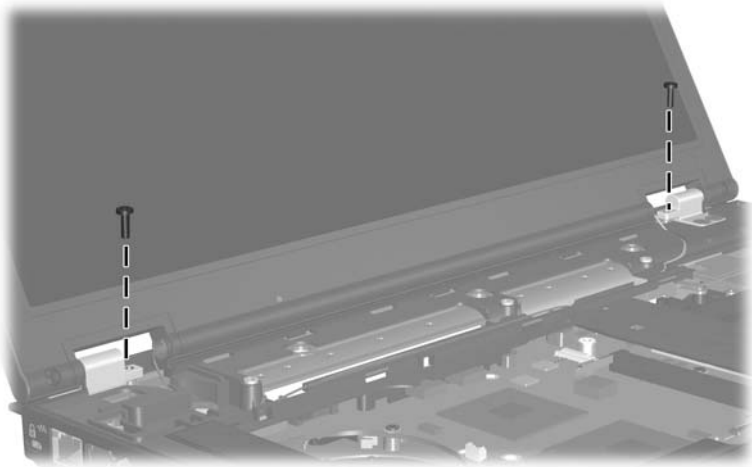
Torx8 T8M2.5×10.0 Screw Locations

Table A-7

Torx8 T8M2.5×10.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	20	10.0 mm	2.5 mm	5.0 mm
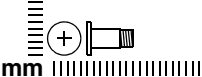
Where used:

11 screws that secure the top cover to the computer (documented in Section 5.19)
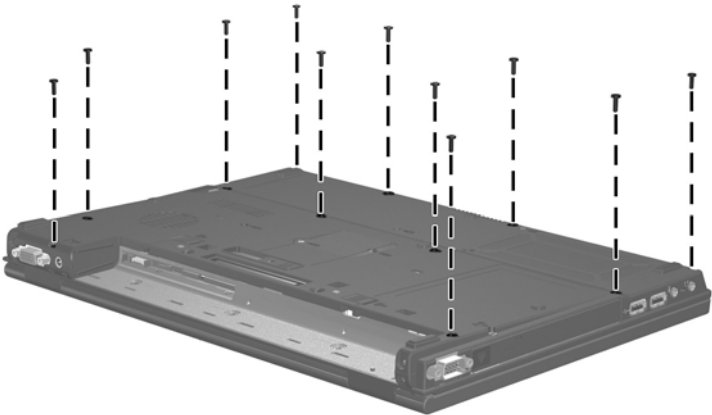
Torx8 T8M2.5×10.0 Screw Locations

Table A-8

Phillips PM2.5×7.0 Captive Screw
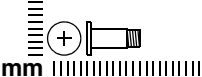
mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	7.0 mm	2.5 mm	5.0 mm

Where used:

2 captive screws that secure the fan assembly to the computer (documented in Section 5.10)
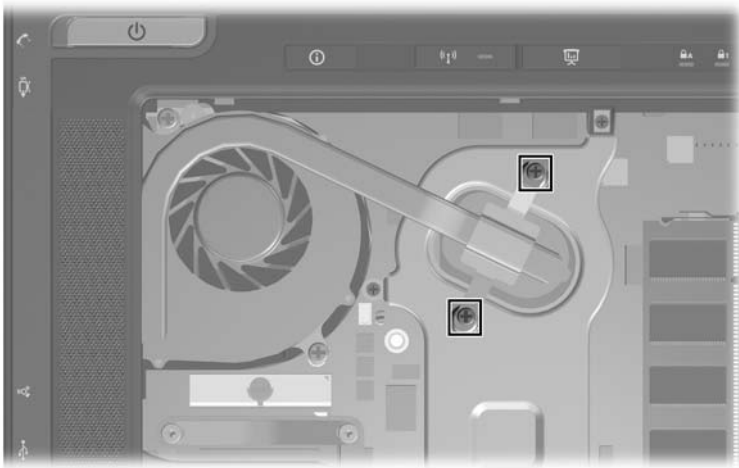
Phillips PM2.5×7.0 Captive Screw Locations

Table A-9

Phillips PM2.0×8.0 Captive Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	8.0 mm	2.0 mm	5.0 mm
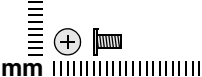
Where used:
4 captive screws that secure the heat sink to the computer (documented in Section 5.11)
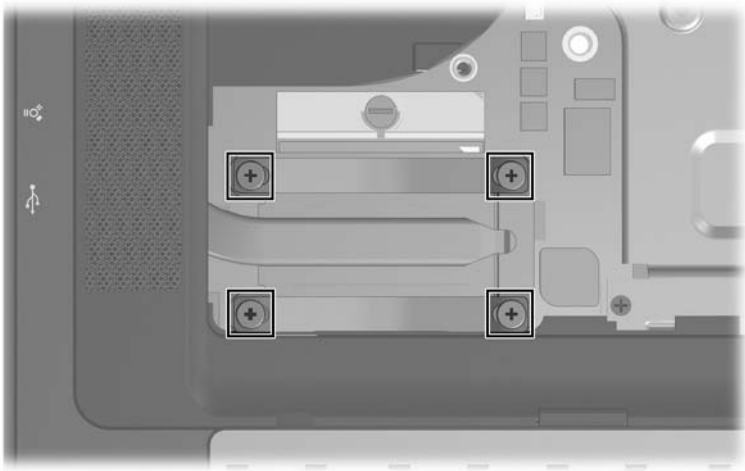
Phillips PM2.0×8.0 Captive Screw Locations

Table A-10

Phillips PM2.0×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	4.0 mm	2.0 mm	5.0 mm
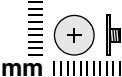
Where used:

2 screws that secure the Mini Card module to the computer (documented in Section 5.16)
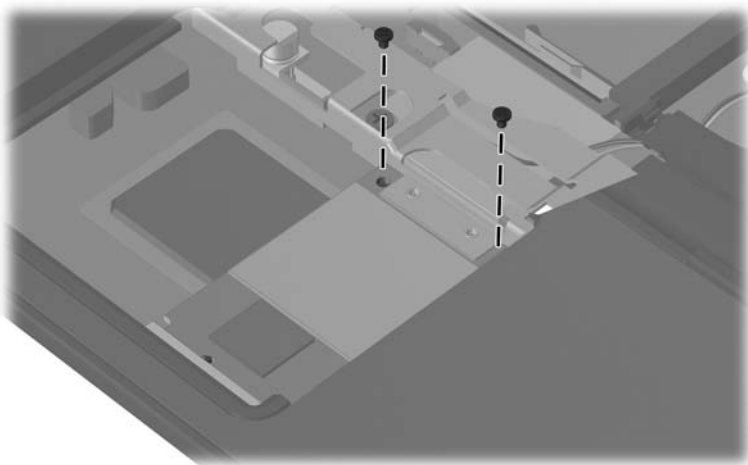
Phillips PM2.0×4.0 Screw Locations

Table A-11

Phillips PM2.0×2.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	5	2.0 mm	2.0 mm	5.0 mm
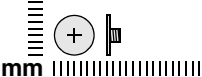
Where used:

3 screws that secure the switch cover to the computer (documented in Section 5.17)
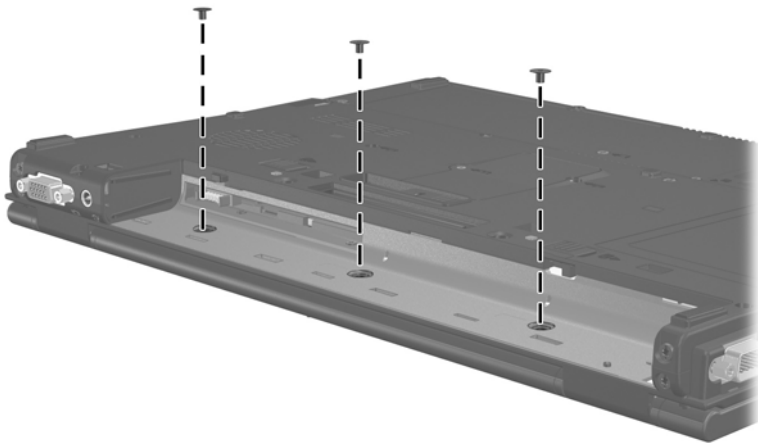
Phillips PM2.0×2.0 Screw Locations

Table A-11

Phillips PM2.0×2.0 Screw *(Continued)*

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

Where used:

2 screws that secure the display assembly to the computer (documented in Section 5.18)
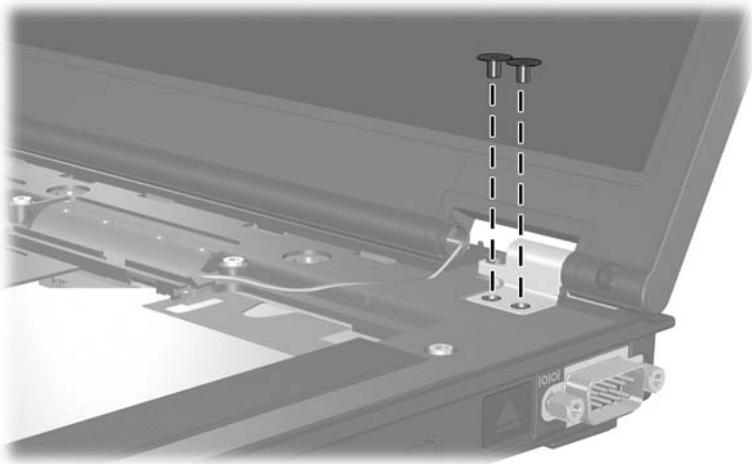
Phillips PM2.0×2.0 Screw Locations

Table A-12

Phillips PM2.5×4.0 Screw

mm	Color	Qty.	Length	Thread	Head Width
	Black	2	4.0 mm	2.5 mm	5.0 mm
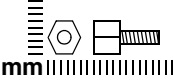
Where used:

2 screws that secure the modem module to the computer (documented in Section 5.20)
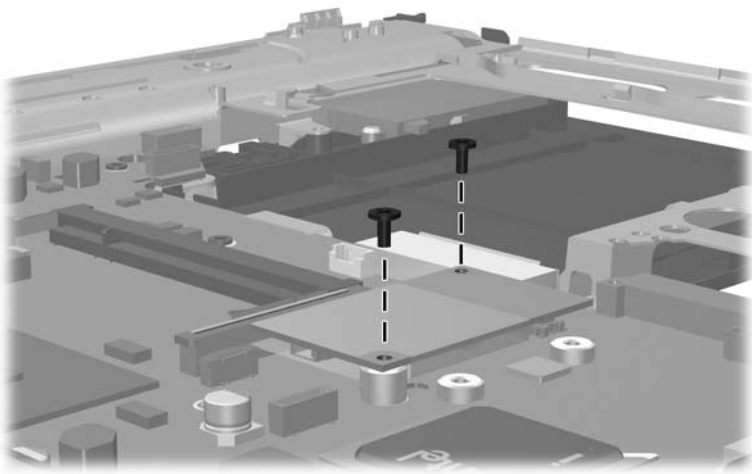
Phillips PM2.5×4.0 Screw Locations

Table A-13

Hex HM5.0×12.0 Screw Lock

mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	12.0 mm	5.0 mm	5.0 mm
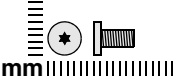
Where used:

❶ Two screw locks that secure the system board to the computer (documented in Section 5.21)

❷ Two screw locks that secure the system board frame to the computer (documented in Section 5.22)
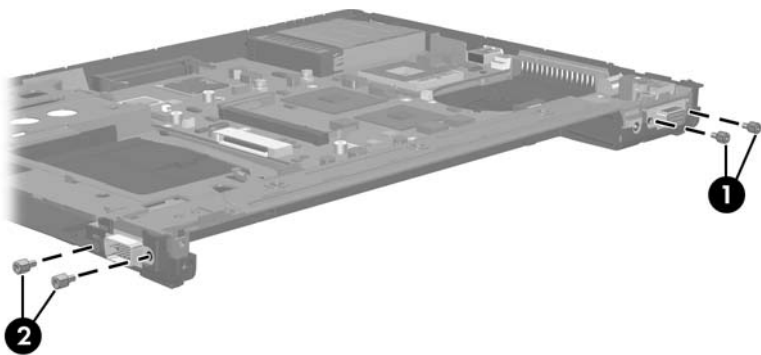
Hex HM5.0×12.0 Screw Lock Locations

Table A-14

Torx8 T8M2.5×6.0 Screw

	Color	Qty.	Length	Thread	Head Width
mm	Black	4	6.0 mm	2.5 mm	5.0 mm

Where used:

4 screws that secure the thermal plate to the computer (documented in Section 5.10)
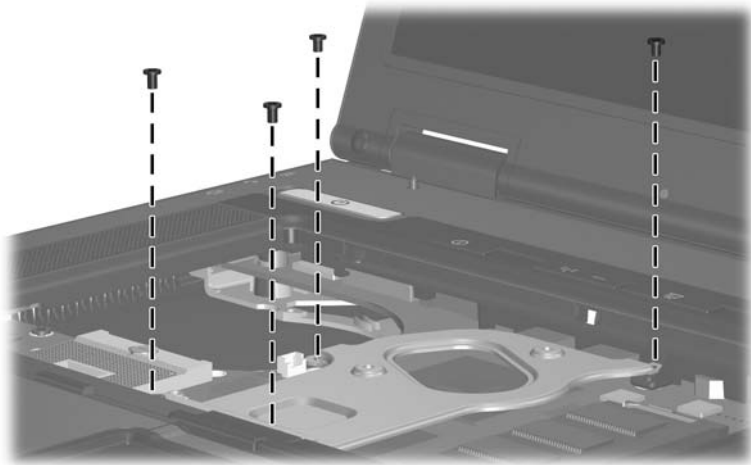
Torx8 T8M2.5×6.0 Screw Locations

B

Software Backup and Recovery

Backup

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

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

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

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

Safeguarding Your Data

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

Backing Up the System

Using HP Backup and Restore Manager, you can

■ Back up specific files and folders.

■ Back up the entire system.

■ Back up modifications since your last backup, using HP system restore points.

■ Schedule backups.

Backing Up Specific Files or Folders

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

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

To back up specific files or folders:

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

2. Click **Next**.

3. Click **Back up to protect system settings and important data files**, and then click **Next**.

4. Click **Back up individual files and folders**, and then click **Next**.

   The Backup Wizard opens.

5. Click **Next**.

6. Click **Backup selected files from most common locations (Recommended)**.

   – or –

   Click **Advanced Backup (Experienced users)** to access advanced filtering techniques.

7. Click **Next**.

8. Follow the on-screen instructions.

Backing Up the Entire Hard Drive

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

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

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

To back up your entire hard drive:

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

2. Click **Next**.

3. Click **Back up to protect system settings and important data files**, and then click **Next**.

4. Click **Back up entire hard drive**, and then click **Next**.

   The "Back up entire hard disk" page opens.

5. Click **Next**.

6. Select the location for the backup files, and then click **Next**.

7. Select the **Protect data access with password** check box, and type your password in the **Password and Confirm** boxes.

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

8. Click **Next**.

9. Follow the on-screen instructions.

Backing Up Modifications Made to the System

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

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

HP recommends that you create recovery points

■ Before you add or extensively modify software or hardware.

■ Periodically, whenever the system is performing optimally.

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

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

To create and schedule a system recovery point:

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

2. Click **Next**.

3. Click **Back up to protect system settings and important data files**, and then click **Next**.

4. Click **Create or manage Recovery Points**, and then click **Next**.

   The "Recovery Point Manager" page opens.

5. Follow the on-screen instructions.

Scheduling Backups

To schedule backups:

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

   The "Backup Scheduler" page opens.

2. Click **Next**.

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

   A summary of your system recovery point settings is displayed.

4. Follow the on-screen instructions.

Recovery

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

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

HP Backup and Recovery Manager allows you to

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

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

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

Creating Recovery Discs (Highly Recommended)

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

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

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

Before creating recovery discs:

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

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

■ Number each disc before inserting it into the optical drive of the computer.

■ If necessary, you can cancel Recovery Media Creator before you have finished creating the recovery discs. The next time you open Recovery Media Creator, you will be prompted to continue the disc creation process where you left off.

To create a set of recovery discs:

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

2. Click **Next**.

3. Click **Create factory software recovery CDs or DVDs to recover the system (Highly recommended)**, and then click **Next**.

   The "Recovery Media Creator" page opens.

4. Click **Next**.

5. Click **Write to CD/DVD**, and then click **Next**.

6. Follow the on-screen instructions.

Performing a Recovery

Performing a Recovery from the Recovery Discs

To perform a recovery from the recovery discs:

1. Back up all personal files.

2. Insert the first recovery disc into the optical drive and restart the computer.

3. Follow the on-screen instructions.

Performing a Recovery from the Hard Drive

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

■ From within Windows.

■ From the recovery partition.

Initiating a Recovery in Windows

To initiate a recovery in Windows:

1. Back up all personal files.

2. Select **Start > All Programs > HP Backup & Recovery > HP Backup and Recovery Manager**.

3. Click **Next**.

4. Click **Recover important files or the entire system**, and then click **Next**.

5. Click a recovery option, and then click **Next**.

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

6. Follow the on-screen instructions.

Initiating a Recovery from the Hard Drive Recovery Partition

To initiate a recovery from the hard drive recovery partition:

1. Back up all personal files.

2. Restart the computer, and then press **f11** before the Windows operating system loads.

3. Click a recovery option, and then click **Next**.

4. Follow the on-screen instructions.

C

Display Component Recycling

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

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

✎ **Materials Disposal**

This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life.

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

This appendix provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight ❶ and the liquid crystal display (LCD) panel ❷.
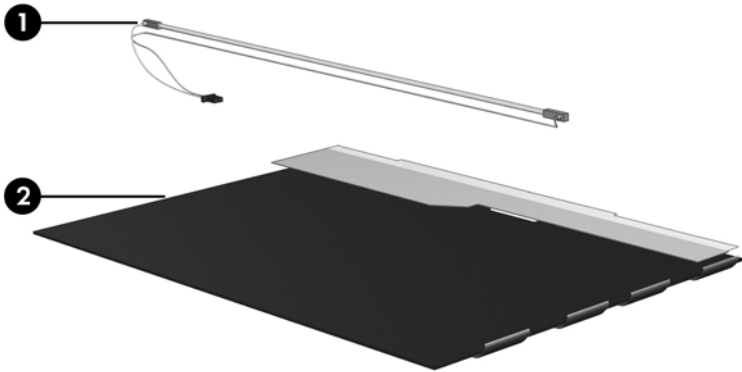
✎ Disassembly procedures differ from one display assembly to another. The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

1. Remove all screw covers ❶ and screws ❷ that secure the display bezel to the display assembly.
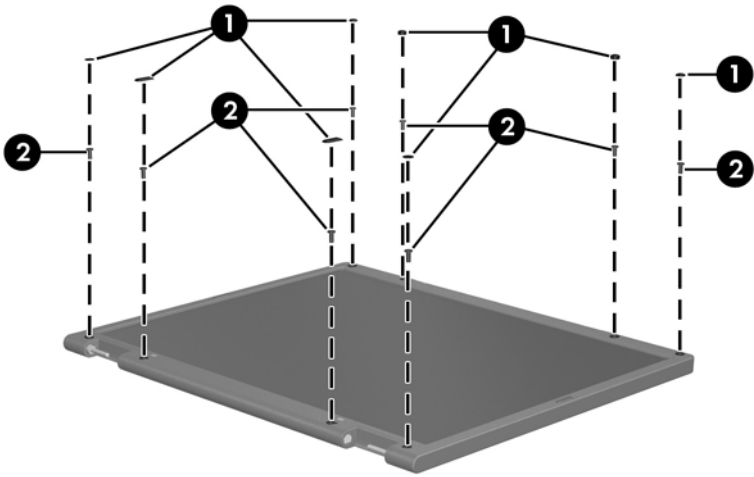
Removing the Display Bezel Screw Covers and Screws

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

3. Remove the display bezel ❸.
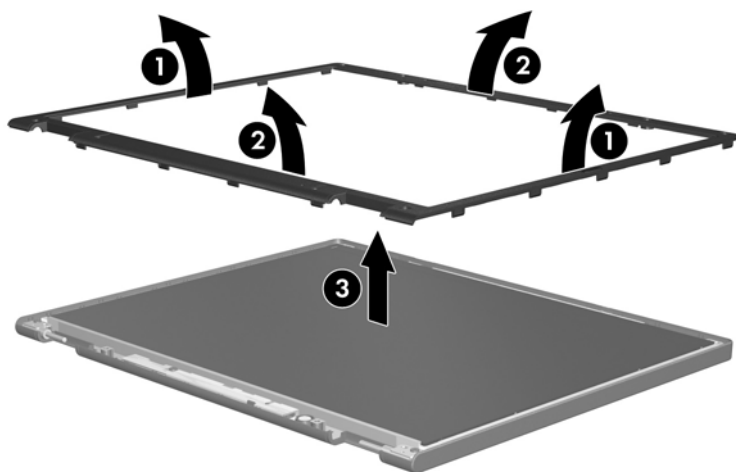
Removing the Display Bezel

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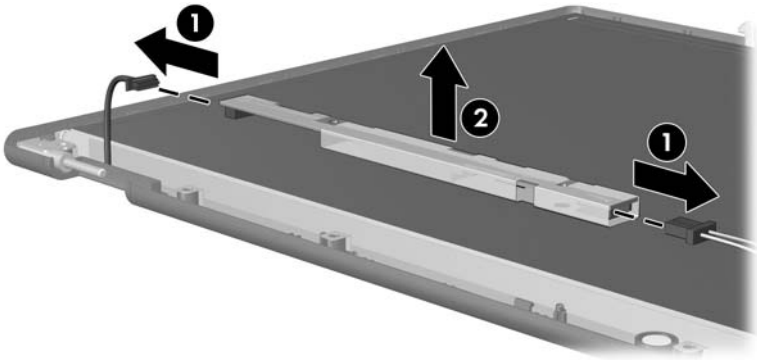
Removing the Display Inverter

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

6. Remove the display panel assembly ❷ from the display enclosure.
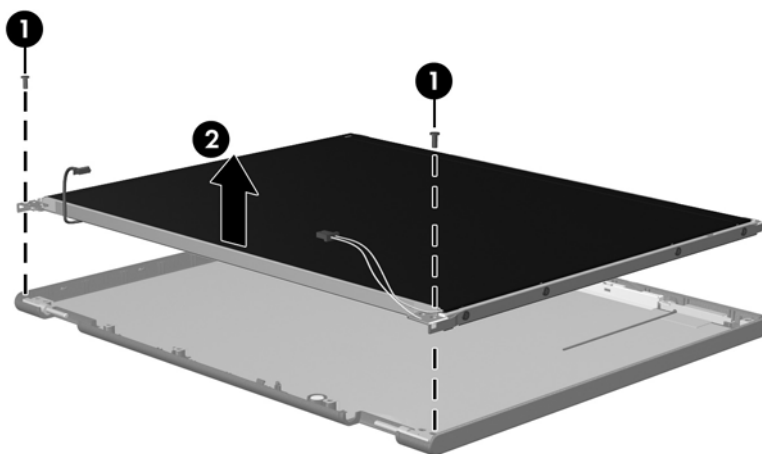
Removing the Display Panel Assembly

7. Turn the display panel assembly upside down.

8. Remove all screws that secure the display panel frame to the display panel.
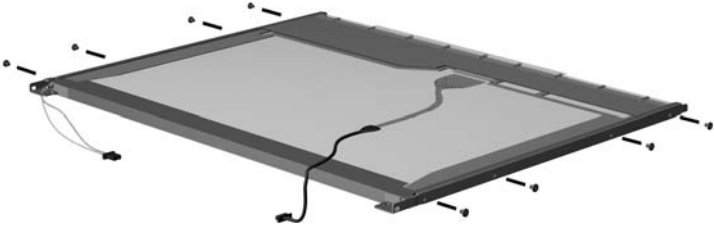
Removing the Display Panel Frame s

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

10. Remove the display panel frame ❷ from the display panel.
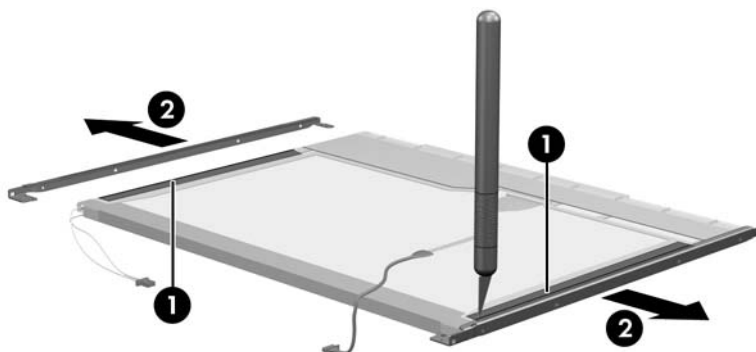
Removing the Display Frame

11. Remove the screws ❶ that secure the backlight cover to the
    display panel.

12. Lift the top edge of the backlight cover ❷ and swing it
    forward.

13. Remove the backlight cover.
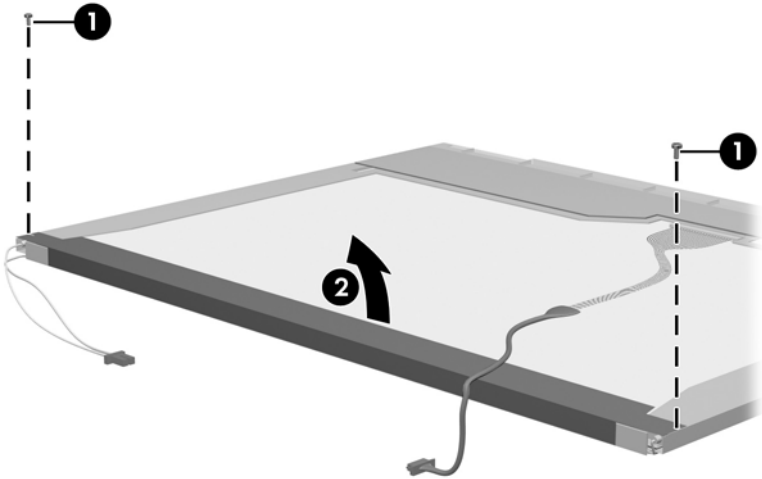
Removing the Backlight Cover

14. Turn the display panel right side up.

15. Remove the backlight cables ❶ from the clip ❷ in the display panel.
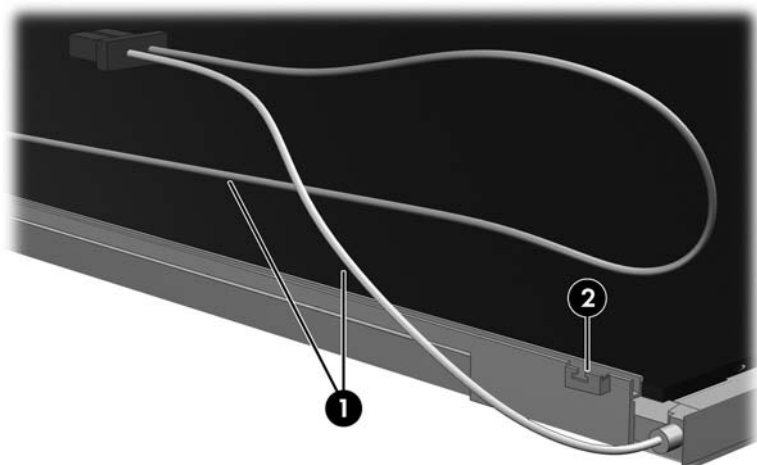
Releasing the Backlight Cables

16. Turn the display panel upside down.

17. Remove the backlight frame from the display panel.
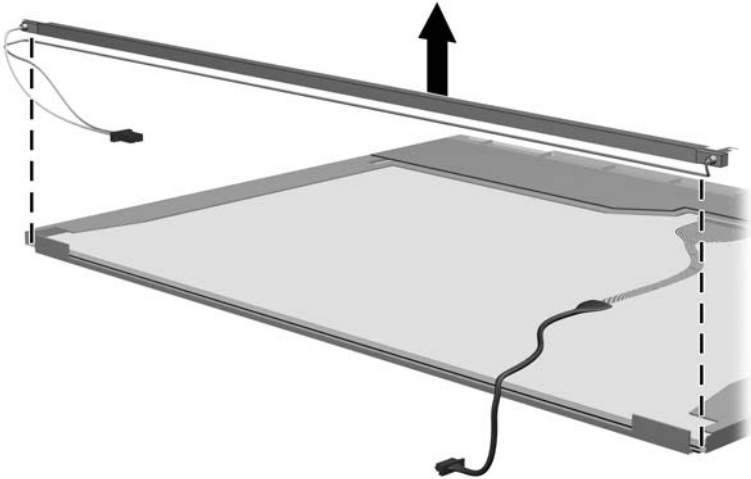
Removing the Backlight Frame

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

18. Slide the backlight out of the backlight frame.
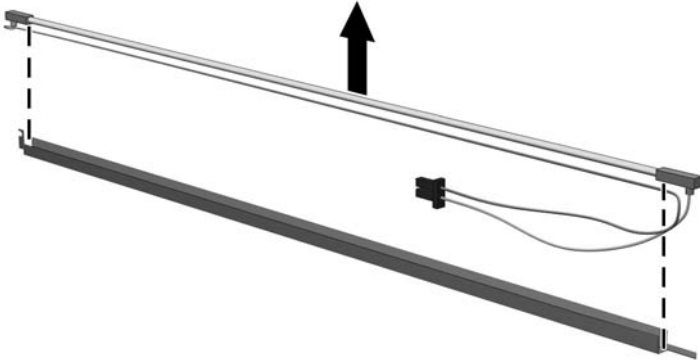
Removing the Backlight

19. Disconnect the display cable ❶ from the LCD panel.

20. Remove the screws ❷ that secure the LCD panel to the display rear panel.

21. Release the LCD panel ❸ from the display rear panel.

22. Release the tape ❹ that secures the LCD panel to the display rear panel.
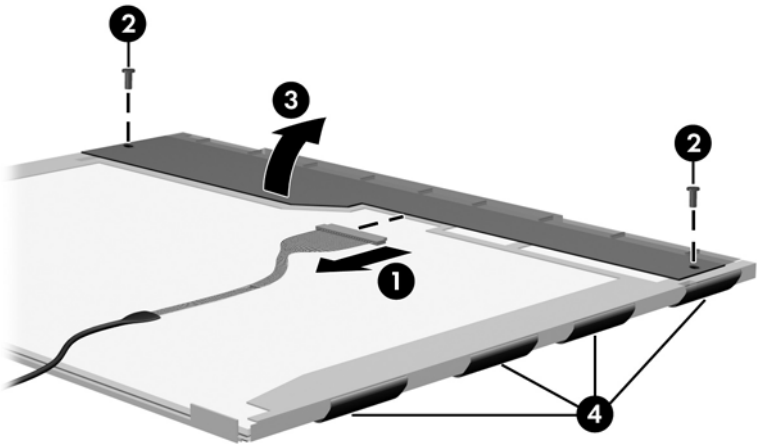
Releasing the LCD Panel

23. Remove the LCD panel.
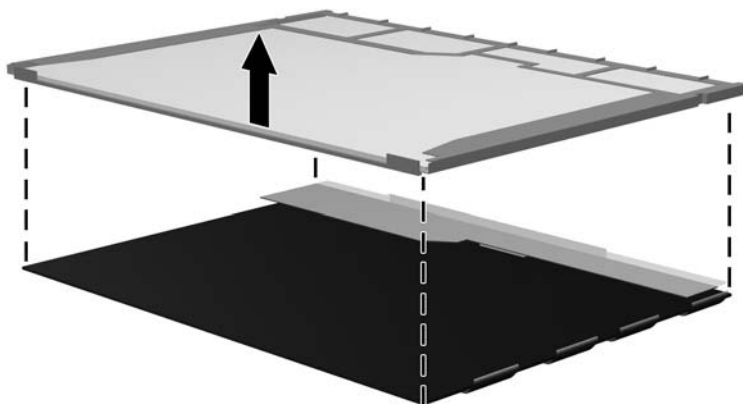
Removing the LCD Panel

24. Recycle the LCD panel and backlight.

D

Connector Pin Assignments

Table D-1

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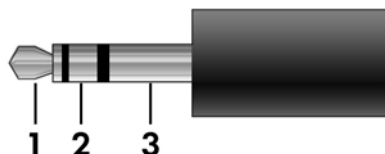
Pin	Signal	Pin	Signal
1	Audio out, left channel	3	Ground
2	Audio out, right channel		

Table D-2

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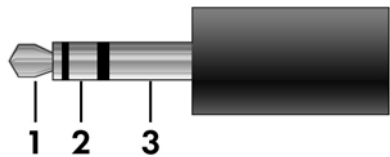
Pin	Signal	Pin	Signal
1	Audio signal in	3	Ground
2	Audio signal in		

Table D-3

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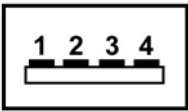
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data –	4	Ground

Table D-4

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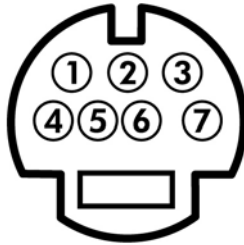
Pin	Signal	Pin	Signal
1	S-VHS color (C) signal	5	TV-CD
2	Composite video signal	6	S-VHS intensity ground
3	S-VHS intensity (Y) signal	7	Composite video ground
4	S-VHS color ground		

Table D-5

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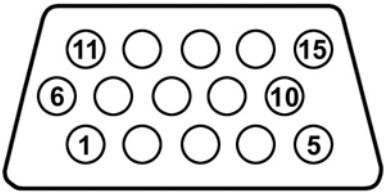
Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC 2B clock
8	Ground analog		

Table D-6

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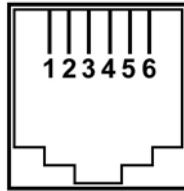
Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table D-7

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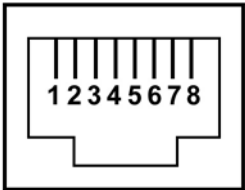
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit –	6	Receive –
3	Receive +	7	Unused
4	Unused	8	Unused

E

Power Cord Set Requirements

3-Conductor Power Cord Set

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

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

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

General Requirements

The requirements listed below are applicable to all countries.

■ The length of the power cord set must be at least 1.5 m (5.0 ft) and a maximum of 2.0 m (6.5 ft).

■ All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.

■ The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by each country's power system.

■ The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

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

✎ NOTES:

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

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

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

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

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

✐ NOTES:

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

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

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

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

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

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