Maintenance and Service Guide

HP Compaq nx6110/nc6110 and nx6120/nc6120 Notebook PCs

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

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1

Product Description

The HP Compaq nx6110/nc6110 and nx6120/nc6120 Notebook PCs offer advanced modularity, Intel® Pentium® M and Celeron® M processors, and extensive multimedia support.

HP Compaq nx6110/nc6110 and nx6120/nc6120 Notebook PCs

1.1 **Features**

- The following processors are available, varying by computer model:
    - ❏ Intel Pentium M 2.13-, 2.00-, 1.86-, 1.73-, 1.60-, or 1.30-GHz processor,
    - ❏ Intel Celeron M 1.5- or 1.4-GHz
- The following displays are available, varying by computer model:
    - ❏ 15.0-inch, SXGA+WVA, TFT (1400 × 1050) with over 16.8 million colors
    - ❏ 15.0-inch, XGA, TFT (1280 × 800) with over 16.8 million colors
    - ❏ 14.1-inch, XGA, TFT (1280 × 800) with over 16.8 million colors
- 80-, 60-, 40-, or 30-GB high-capacity hard drive, varying by computer model
- 256-MB DDR2 synchronous DRAM (SDRAM) at 400 and 533 MHz, expandable to 2.0 GB
- Microsoft® Windows® XP Home Edition or Windows XP Professional, varying by computer model
- Full-size Windows keyboard with embedded numeric keypad
- TouchPad pointing device, including a dedicated vertical scroll region and a button that enables/disables TouchPad operation.
- TouchPad and pointing stick pointing devices (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 PCI IEEE 802.11b or 802.11b/g WLAN device

■ Support for 1 or 2 Type II PC Card slots, with support for both 32-bit (CardBus) and 16-bit PC Cards, varying by computer model

■ External 65-watt AC adapter with 3-wire power cord, varying by computer model

■ 6-cell Li-Ion battery pack

■ Stereo speakers

■ Volume up, volume mute, and volume down buttons (full-featured models only)

✎ Numerous references are made throughout this *Maintenance and Service Guide* to "full-featured" and "defeatured" units. A computer model is considered to be full-featured if it has 4 Universal Serial Bus ports, 2 PC Card slots, and the following components:

■ Volume control buttons

■ Info Center button

■ Infrared port

■ 6-in-1 Digital Media Slot

■ Serial port

■ Parallel port

■ S-Video-out jack

■ Docking connector

A computer model is considered to be defeatured if it has only 2 Universal Serial Bus ports, 1 PC Card slot, and none of the components in the preceding list.

- ■ Support for the following optical drives:
  - ❏ DVD±RW and CD-RW Combo Drive
  - ❏ DVD/CD-RW Combo Drive
  - ❏ DVD-ROM drive
  - ❏ CD-ROM drive
- ■ Connectors:
  - ❏ Audio-out (headphone)
  - ❏ Audio-in (microphone)
  - ❏ Universal Serial Bus (USB) v. 2.0 (4 ports on full-featured computer models, 2 ports on defeatured computer models)
  - ❏ Power
  - ❏ External monitor
  - ❏ RJ-11 (modem)
  - ❏ RJ-45 (network)
  - ❏ IEEE 1394
  - ❏ Travel battery
  - ❏ Infrared (full-featured models only)
  - ❏ Digital Media Slot (full-featured models only)
  - ❏ Parallel port (full-featured models only)
  - ❏ S-Video-out (full-featured models only)
  - ❏ Docking connector (full-featured models only)

1.2 **Resetting the Computer**

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

1. Prepare the computer for disassembly (refer to Section 6.3, "Preparing the Computer for Disassembly," for more information).

2. Remove the real-time clock (RTC) battery (refer to Section 6.18, "RTC Battery," for more information on removing and replacing the RTC battery).

3. Wait approximately 5 minutes.

4. Replace the RTC battery and reassemble the computer.

5. Connect AC power to the computer. Do not reinsert any battery packs at this time.

6. 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.
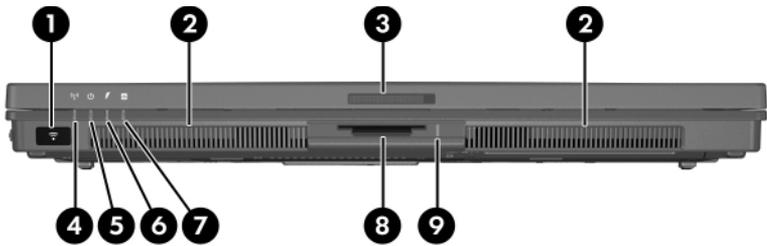
Front Components

Table 1-1

Front Components

Item	Component	Function
1	Infrared port (full-featured models only)	Provides wireless communication between the computer and an optional IrDA-compliant device.
2	Stereo speakers (2)	Produce stereo sound.
3	Display release latch	Opens the computer.
4	Wireless light	On: an integrated wireless device has been enabled.

Table 1-1

Front Components *(Continued)*

Item	Component	Function
5	Power light	■ Green: The computer is on. ■ Blinking green: The computer is in standby. ■ Off: The computer is off or in hibernation.
6	Battery light	■ Amber: A battery pack is charging. ■ Green: A battery pack is close to full charge capacity. ■ Blinking amber: A battery pack that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light begins blinking more quickly. ■ Off: If the 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.
7	Integrated Drive Electronics (IDE) drive light	Blinking: The hard drive or optical drive is being accessed.
8	6-in-1 Digital Media Slot (full-featured models only)	Supports 6 optional digital memory card formats: SD (Secure Digital) Memory Card, MultiMediaCard, Memory Stick, Memory Stick Pro, SmartMedia, and xD-Picture Card.
9	6-in-1 Digital Media Slot light (full-featured models only)	On: A digital memory card is being accessed.

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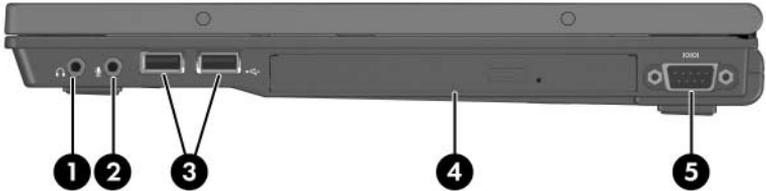
Right-Side Components

Table 1-2

Right-Side Components

Item	Component	Function
1	Audio-out (headphone) jack	Connect optional headphones or powered stereo speakers. Also connects the audio function of an audio/video device such as a television or VCR.
2	Audio-in (microphone) jack	Connects an optional monaural microphone.
3	USB ports (2) (full-featured models only)	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.
4	Optical drive	Supports an optical disc. The type of optical drive varies by model.
5	Serial port (full-featured models only)	Connects an optional serial device.

The external components on the left side of the computer are shown below and described in Table 1-3.
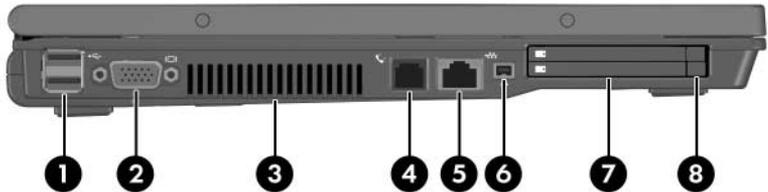
Left-Side Components

Table 1-3

Left-Side Components

Item	Component	Function
1	USB ports (2)	Connect USB 1.1- and 2.0-compliant devices to the 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.
2	External monitor port	Connects an optional VGA external monitor or projector.

Table 1-3

Left-Side Components *(Continued)*

Item	Component	Function
3	Exhaust vent	Provides airflow to cool internal components.
	⚠ To prevent overheating, do not obstruct vents. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs, or clothing, to block airflow.	
4	RJ-11 (modem) jack	Connects the modem cable.
5	RJ-45 (network) jack	Connects an optional network cable.
6	1394 port	Connects an optional 1394a device such as a scanner, digital camera, or digital camcorder.
7	PC Card slots (2 slots on full-featured models, 1 slot on defeatured models)	Support an optional Type I, Type II, or Type III 32-bit (CardBus) or 16-bit PC Card.
8	PC Card eject buttons (2 buttons on full-featured models, 1 button on defeatured models)	Eject an optional PC Card from the PC Card slot.

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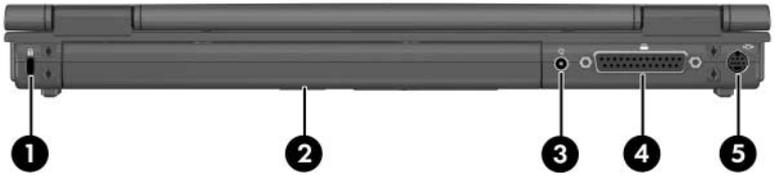
Rear Panel Components

Table 1-4

Rear Panel Components

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

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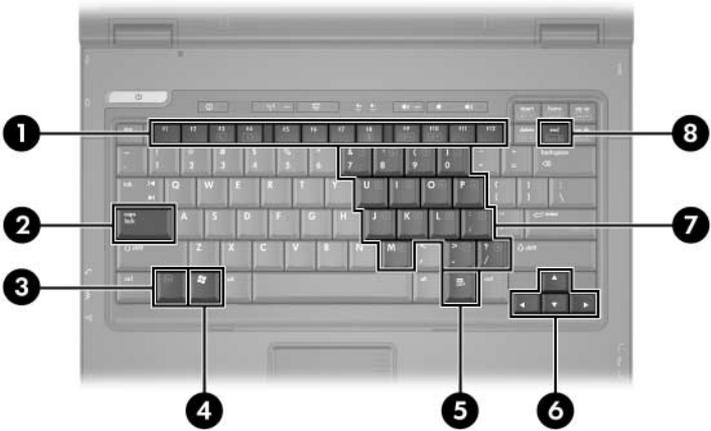
Standard Keyboard Components

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 (15)	In Windows, can be used like the keys on an external numeric keypad.
8	**num lock** key	Enables numeric lock, turns on the embedded numeric keypad, and turns on the num lock light.

The computer top components are shown below and described in Table 1-6.
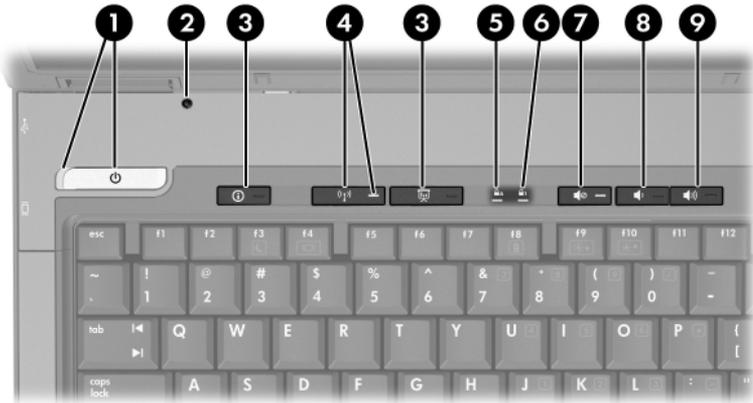
Top Components, Part 1

Table 1-6

Top Components, Part 1

Item	Component	Function
1	Power light	■ On: The computer is turned on.
		■ Blinking: The computer is in standby,
		■ Off: The computer is off.
	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.

Table 1-6

Top Components, Part 1 *(Continued)*

Item	Component	Function
2	Display lid switch	■ If the computer is closed while on, turns off the display.
		■ If the computer is opened while in standby, turns on the computer (resumes from standby).
3	Info Center button	Enables you to view a list of commonly used software solutions.
	Presentation mode button	Turns on Presentation mode.
4	Wireless button	Turns the wireless functionality on or off, but does not create a wireless connection.
	✎ To establish a wireless connection, a wireless network must already be set up.	
	Wireless light	On: An integrated woreless device has bee turned on.
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 (full-featured models only)	Mutes or restores system volume.
8	Volume down button (full-featured models only)	Decreases system volume.
9	Volume up button (full-featured models only)	Increases system volume.

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

Top Components, Part 2

Table 1-7

Top Components, Part 2

Item	Component	Function
1	Pointing stick	Moves the pointer and selects or activates items on the screen.
2	Left/right pointing stick buttons	Function like the left and right buttons on an external mouse.
3	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.
4	Left/right TouchPad buttons	Function like the left and right buttons on an external mouse.
5	TouchPad scroll zone	Scrolls up or down.

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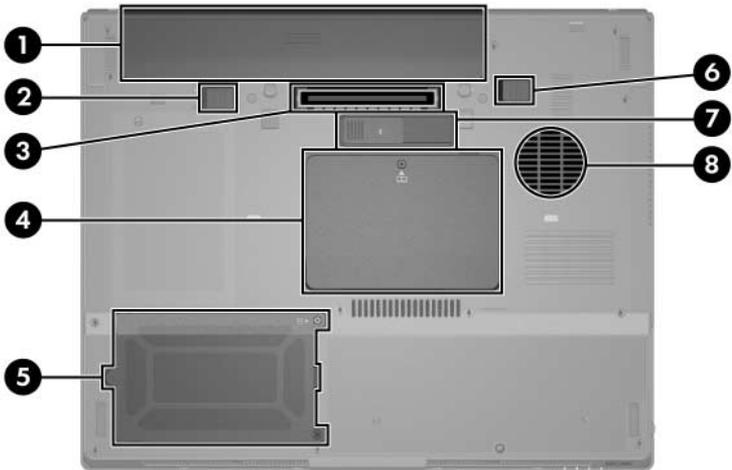
Bottom Components

<div align="center">

Table 1-8

Bottom Components

</div>

Item	Component	Function
1	Primary battery bay	Holds the primary battery pack.
2	Primary battery locking latch	Secures the primary battery pack into the battery bay.
3	Docking connector (full-featured models only)	Connects the computer to an optional docking device.

Table 1-8

Bottom Components *(Continued)*

Item	Component	Function
4	Memory module compartment	Contains 2 memory slots that support replaceable memory modules. The number of preinstalled memory modules varies by computer model.
	Mini PCI compartment	Holds an optional wireless LAN device.
	⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI device authorized for use in your 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	Hard drive bay	Holds the primary hard drive.
6	Primary battery release latch	Releases the primary battery pack from the battery bay.
7	Travel battery connector	Connects an optional travel battery.
8	Fan	Provides airflow to cool internal components.
	⚠ To prevent overheating, do not obstruct fans. Do not allow a hard surface, such as a printer, or a soft surface, such as pillows, thick rugs, or clothing, to block airflow.	

1.5 **Design Overview**

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

The system board provides the following device connections:

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

$\triangle$ **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 be turned on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the 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 Main Menu

Table 2-1

Main Menu

Select	To Do This
System Information	■ Change the system time and system date.
	■ View identification information about the 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.

Is there power? — N → Go to "Flowchart 2.2—No Power, Part 1."

Y

Beeps, LEDs, or error messages? — N → Check LED board, speaker connections.

Y

Is there video? (no boot) — N → Go to "Flowchart 2.6—No Video, Part 1."

Y

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

Y

Is there sound? — N → Go to "Flowchart 2.15—No Audio, Part 1."

Y

All drives working? — N → Go to "Flowchart 2.17—Nonfunctioning Device."

Y

Keyboard/ pointing device working? — N → Go to "Flowchart 2.18—Nonfunctioning Keyboard" or "Flowchart 2.19—Nonfunctioning Pointing Device."

Y

Connecting to network or modem? — N → Go to "Flowchart 2.20—No Network/Modem Connection."

Y

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 (down), **Y** (down)

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

Y (down), **Y** (down)

Power up in docking device? — **Y** → Done

N (down)

*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.

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

↓

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

Flowchart 2.3—No Power, Part 2

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

Flowchart 2.4—No Power, Part 3

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

Plug directly into AC outlet.

Power LED on?

Y → Done

N

Reseat AC adapter in computer and at power source.

Power on?

Y → Done

N

Power outlet active?

N → Try different outlet.

Y

Replace power cord.

Power on?

Y → Done

N

Internal or external AC adapter?

External → Replace external AC adapter.

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

Power on?

N

Y → Done

Flowchart 2.5—No Power, Part 4

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

Flowchart 2.6—No Video, Part 1

```
No video.
```

```
Stand-alone
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 ↓
```
Press lid
switch to ensure
operation.
```

External ↓
```
Adjust
brightness.
```

A

```
Video OK?
```
Y →
```
Done
```

Y →
```
Video OK?
```
→
```
Done
```

N ↓
```
Check for bent
pins on cable.
```

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
```

N →
```
Video OK?
```
→
```
Try
another
display.
```
→
```
Internal and
external
video OK?
```
N →
```
Replace
system
board.
```

Y ↓
```
Done
```

Y ↓
```
Done
```

Flowchart 2.7—No Video, Part 2

Flowchart 2.8—Nonfunctioning Docking Device (if applicable)

```
┌─────────────────┐
│  Nonfunctioning │
│  docking device.│
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ Reset power cord in │
│ docking device and  │
│   power outlet.     │
└─────────────────┘
         │
         ▼
┌─────────────────┐                              ┌─────────────────┐
│  Check voltage  │                              │    Reinstall    │
│ setting on docking │                           │ computer into   │
│     device.     │                              │ docking device. │
└─────────────────┘                              └─────────────────┘
         │                                                │
         ▼                                                ▼
┌─────────────────┐                                     ╱╲
│  Reset monitor  │                            Y      ╱    ╲
│ cable connector at │                              ╱ Docking ╲      ┌─────────┐
│ docking device. │                               ╱  device   ╲────▶│  Done   │
└─────────────────┘                               ╲ operating? ╱     └─────────┘
         │                                         ╲        ╱
         ▼                                      N    ╲    ╱
       ╱╲                                              ╲╱
     ╱    ╲      Y                                      │
   ╱ Docking ╲        ┌─────────┐                       ▼
  ╱  device   ╲──────▶│  Done   │          ┌──────────────────────────────────┐
  ╲ operating? ╱       └─────────┘          │ Replace the following docking device │
   ╲        ╱                               │ components one at a time. Check computer │
 N   ╲    ╱                                 │ operation after each replacement.    │
       ╲╱                                   │ 1. Power supply                      │
        │                                   │ 2. I/O board                         │
        ▼                                   │ 3. Backplane board                   │
┌─────────────────┐                         │ 4. Switch box                        │
│    Remove       │                         │ 5. Docking device motor mechanism    │
│ computer, reset │                         └──────────────────────────────────┘
│ all internal parts, │
│ and replace any │
│ damaged items in │
│ docking device. │
└─────────────────┘
        │
        └──────────────────────────────────┘
```

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.
```

```
Nonsystem
disk message?
```
Y →
```
Go to
"Flowchart
2.11—No OS
Loading,
Hard Drive, Part 2."
```

N ↓

```
Reseat
external
hard drive.
```

```
OS loading?
```
Y →
```
Done
```

N ↓

```
Boot
from
CD?
```
N →

Y ↓

```
Check the Setup
utility for correct
booting order.
```

```
Boot
from
hard drive?
```
N →

Y ↓

```
Done
```

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

Y ↓

```
Change boot
priority through
the Setup Utility
and reboot.
```

```
Boot
from
hard drive?
```
N →
```
Go to
"Flowchart
2.17—Nonfunctioning
Device."
```

Y ←

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

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

CD or diskette in drive?

N → 1. Replace hard drive. 2. Replace system board.

Y ↓

Remove diskette and reboot.

Boot from hard drive?

Y → Done

N ↓

Boot from diskette drive?

N → Go to "Flowchart 2.13—No OS Loading, Diskette Drive."

Y ↓

Hard drive accessible?

Y ↓

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

N →

Reseat hard drive.

Hard drive accessible?

Y → Done

N ↓

Run FDISK.

Hard drive partitioned?

N → Create partition, and then format hard drive to bootable C:\ prompt.

Y ↓

Hard drive formatted?

N → Format hard drive and bring to a bootable C:\ prompt.

Y ↓

Computer booted?

Y → Done

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

Load OS using *Operating System* disc (if applicable).

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

Flowchart 2.13—No OS Loading, Diskette Drive

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

OS loading? — **N**

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

Nonsystem disk message? — **N**

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

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

Boot from another device? — **Y**

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

Diskette drive enabled in the Setup utility? — **Y**

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

Is diskette drive boot order correct? — **N** → Change boot priority using the Setup Utility.

Reset the computer → Go to "Flowchart 2.17—Nonfunctioning Device."

Check diskette for system files. Try different diskette. → Nonsystem disk error? — **Y** → 1. Replace diskette drive. 2. Replace system board.

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

OS loading? — **N**

Flowchart 2.14—No OS Loading, Optical Drive

```
No OS                    Y              N        Install bootable
loading from       Disc          Bootable         disc and
CD-ROM or          in drive?     disc in          reboot
DVD-ROM drive.                   drive?           computer.

            N                     Y


              Install          Try another
              bootable disc.   bootable disc.


         Y
Boots from        Done
CD or DVD?

  N


Reseat       Boots from    Y    Done
drive.       CD or DVD?

              N
                       N
             Booting         Go to
             from another    "Flowchart
             device?         2.17—Nonfunctioning
                             Device."
              Y

                       Y
             Booting         Reset the computer.   Go to
             order           Refer to              "Flowchart
             correct?        Section 1.2,          2.17—Nonfunctioning
                             "Resetting the        Device."
              N              Computer," for
                             instructions.

             Correct boot
             order using
             the Setup Utility.
```

Flowchart 2.15—No Audio, Part 1

```
┌──────────────┐     ┌──────────────┐          ╱Y╲
│  No audio.   │────▶│ Turn up audio│────▶   ╱Audio?╲────▶ ┌──────────┐
└──────────────┘     │ internally or│         ╲      ╱      │   Done   │
                     │  externally. │          ╲    ╱       └──────────┘
                     └──────────────┘            N
```

```
        Y                                    N
    ╱Computer in╲                        ╱Internal╲         ┌──────────────┐
   ╱  docking    ╲──▶┌────────┐──▶      ╱  audio?  ╲───▶     │    Go to     │
   ╲  device      ╱  │ Undock │         ╲          ╱         │ "Flowchart   │
    ╲(if applicable)?╱ └────────┘         ╲        ╱          │ 2.16—No Audio,│
        N                                    Y              │   Part 2."   │
        │                                    │              └──────────────┘
        ▼                                    ▼
┌──────────────┐                     ┌──────────────┐
│    Go to     │                     │  Replace     │
│ "Flowchart   │                     │   the        │
│ 2.16—No Audio,│                    │ docking device.│
│   Part 2."   │                     └──────────────┘
└──────────────┘                            │
                                            ▼
                                          ╱Y╲
┌──────────────┐                       ╱Audio?╲────▶ ┌──────────┐
│    Go to     │◀────                  ╲      ╱      │   Done   │
│ "Flowchart   │                        ╲    ╱       └──────────┘
│ 2.17—Nonfunctioning│                    N
│   Device."   │
└──────────────┘
```

Flowchart 2.16—No Audio, Part 2

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.

N — Clear CMOS.

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

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

Device boots properly? Y → Done

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

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

Device boots properly? Y → Done

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

Flowchart 2.18—Nonfunctioning Keyboard

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

Flowchart 2.19—Nonfunctioning Pointing Device

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

Flowchart 2.20—No Network/Modem Connection

3

Software Updates and Recovery

3.1 Software Updates

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

To update HP software:

1. Identify your computer model, product category, and series or family. Prepare for a system ROM update by identifying the ROM version currently installed on the computer. For more information, refer to "Accessing Computer Information."

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

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

2. Access the updates through the HP Web site (http://www.hp.com) or the *Support Software* CD (purchased separately). For information about obtaining the *Support Software* CD, refer to "Obtaining the Support Software CD."

3. Install the updates.

Accessing Computer Information

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

■ The product *category* is Notebook.

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

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

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

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

To use Computer Setup for displaying ROM information:

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

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

   ROM date information is displayed.

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

Obtaining the Support Software CD

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

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

Software Updates and the HP Web Site

Most software on the HP Web site is packaged in compressed files called *SoftPaqs*. Some ROM updates may be packaged in compressed files called *ROMPaqs*.

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

Downloading a ROM Update

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

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

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

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

To download a ROM update:

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

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

   – or –

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

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

3. At the download area:

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

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

      ✎ Make a note of the path to the location on your hard drive where the ROM package will be downloaded. You may need to access the ROM package after it has been downloaded.

Installing a ROM Update

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

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

To install a ROM update:

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

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

   a. Click **My Computer** and then your hard drive designation. (The hard drive designation is typically Local Disk C.)

   b. Open the folder on your hard drive that contains the update.

      ✎ Follow the path you made a note of before you downloaded the update.

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

   The ROM installation begins.

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

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

Downloading Other Software

To download and install software other than a ROM update:

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

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

   – or –

   ❏ Visit the HP Web site at http://www.hp.com/support and click **Download drivers and software** to download the software for your computer model.

2. Follow the instructions on the screen to find the software you want to update.

3. At the download area, select the software you want and follow the download instructions on the Web page.

   ✎ Make a note of the path to the location on your hard drive where the ROM package will be downloaded. You may need to access the ROM package after it has been downloaded.

4. When the download is complete, open Windows Explorer by selecting **Start > All Programs > Accessories > Windows Explorer**.

5. In the left pane of the **Windows Explorer** window, click **My Computer** and then your hard drive designation. (The hard drive designation is typically Local Disk C.)

   ✎ Follow the path you made a note of earlier to the folder on your hard drive that contains the update.

6. Open the folder and double-click the file with an .exe extension (for example, filename.exe).

   The installation begins.

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

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

3.2 System Recovery

The computer system recovery process provides several ways to recover optimal system functionality. For best results, attempt to recover optimal computer functionality by using the following procedures *in the order described here.*

Safeguarding Your Data

Software or devices added to the computer can cause your system to become unstable. To safeguard your documents, store personal files in the My Documents folder and periodically create a backup copy of the My Documents folder.

Altiris Local Recovery

Altiris Local Recovery is a preloaded application that protects the files on your computer by storing copies of files, called *snapshots*. If files on your computer are accidentally deleted or corrupted, you can easily restore the files yourself. You can also restore your complete file system to a previous state.

Altiris Local Recovery provides protection of files by backing up files to a hidden Altiris recovery partition. When you install the software, the Recovery Agent Partition Wizard guides you through the process of creating the recovery partition. After the partition is created, the computer restarts and creates the first snapshot. After the snapshot is created, the computer restarts, making the snapshot available for recovery through Windows.

By default, Local Recovery automatically takes snapshots of your files on a regular basis. You can change the snapshot schedule. For more information, refer to the Altiris Local Recovery Help.

To access your snapshots in the Altiris Recovery Agent folder:

1. Right-click the Altiris Recovery Agent icon on your desktop.

2. Click **Open**.

To restore one of the listed snapshots, drag the snapshot file to the appropriate location on your hard drive.

For more information on configuring and using Altiris Local Recovery, visit the HP Web site at http://www.hp.com/go/easydeploy, or open the software and click **Help** on the menu bar.

Using System Restore Points

System Restore is an operating system feature that allows you to reverse undesirable changes to your computer by restoring the computer to an earlier state, called a *restore point*. A restore point is a "snapshot" of your software, drivers, and operating system files at a particular time. The computer automatically creates restore points at regular intervals and may create additional restore points when you change your personal settings or add software or hardware.

You can manually create additional restore points to provide increased protection for your system files and settings. It is recommended that you manually create restore points

■ Before you add or extensively modify software or hardware.

■ Periodically, whenever the system is performing optimally.

Restoring to any restore point does not affect your data files. For example, restoring your system software to an earlier state will not affect documents or e-mails that you saved after that time.

✎ If you do not like the results of your restoration, you can reverse the restoration.

Creating a System Restore Point

To create a system restore point:

1. Select **Start > Help and Support**.
2. Click **System Restore**.

   The System Restore window opens.

3. Click **Create a restore point**, and then click **Next**.
4. Follow the on-screen instructions.

Restoring to a Restore Point

To restore the computer to a previous date and time when it was functioning optimally:

1. Select **Start > Help and Support**.
2. Click **System Restore**.

   The System Restore window opens.

3. Click **Restore my computer to an earlier time**, and then click **Next**.
4. Follow the on-screen instructions.

Reinstalling Applications

Applications preinstalled or preloaded on your computer can be reinstalled by using the *Recovery* disc or a third-party software disc.

✎ In most cases, the applications preloaded on your computer, such as those available in the Software Setup Utility, can be reinstalled from your hard drive. To access the Software Setup Utility, select **Start > All Programs > Software Setup**.

The application reinstallation process replaces corrupted system files within the application and reinstalls deleted system files within the application.

■ In most cases: If the application you are reinstalling is still installed on your computer, the reinstallation process does not affect your settings within the application.

■ In all cases: If an application has been deleted from your computer, the reinstallation process reinstalls the application or utility to the factory image but cannot restore your personal settings.

Reinstalling Applications from the Hard Drive

To reinstall a preloaded application or utility from your hard drive:

1. Select **Start > All Programs > Software Setup**, and then follow the instructions on the screen.

2. When you are prompted to select the software you want to reinstall, select or clear the appropriate check boxes.

Reinstalling Applications from Discs

To reinstall applications from discs:

1. Insert the disc into the optical drive.

   ❏ If autorun is enabled, an installation wizard opens.

   ❏ If autorun is disabled, select **Start > Run**. Enter

     x:\setup.exe

     where *x* is your optical drive designation

     and then select **OK**.

2. When the installation wizard opens, follow the installation instructions on the screen.

3. Restart the computer if prompted.

Repairing the Operating System

To attempt an operating system repair without deleting your personal data, use the *Operating System* disc that was shipped with the computer:

✎ If your computer does not have an optical drive, you may need to connect to an optional external MultiBay.

1. Connect the computer to external power through the AC adapter and turn on the computer.

2. Immediately insert the *Operating System* disc into the computer.

3. Press and hold the power button for at least 5 seconds to turn off the computer.

4. Press the power button again to turn on the computer.

5. When prompted, press any key to start from the disc.

After a few minutes, you may need to select your language, and then the Setup Wizard opens.

✎ On the "Welcome to Setup" page, do not press **R** (step 8 in this procedure) until you have completed steps 6 and 7.

6. Press **enter** to continue.

   A licensing agreement page is displayed.

7. Press **f8** to accept the agreement and continue.

   The "Setup" page is displayed.

8. Press **R** to repair the selected Windows installation.

   The repair process begins. This process takes 1 to 2 hours to complete.

The computer restarts in Windows after the process is complete.

Reinstalling the Operating System

△ **CAUTION:** To protect your personal data and the software installed on the computer, back up your data before reinstalling the operating system. See the Windows online Help utility to learn more about backing up your files. Select **Start > Help and Support**. Then type "backup" in the Search box.

✎ During the reinstallation, you may be prompted for your Product Key. Your Product Key is provided on the Microsoft Certificate of Authenticity label on the bottom of the computer.

If other recovery efforts do not successfully repair the operating system, you can reinstall it.

To reinstall the operating system:

✎ If your computer does not have an optical drive, you may need to connect to an optional external MultiBay.

1. Connect the computer to external power through the AC adapter and turn on the computer.

2. Immediately insert the *Operating System* disc into the computer.

3. Press and hold the power button for at least 5 seconds to turn off the computer.

4. Press the power button again to turn on the computer.

5. When prompted, press any key to start from the disc.

   After a few minutes, you may need to select your language, and then the Setup Wizard opens.

6. Press **enter** to continue.

   A licensing agreement page is displayed.

7. Press **f8** to accept the agreement and continue.

   The "Setup" page is displayed.

8. Press **esc** to continue installing a new copy of the operating system instead of repairing it.

9. Press **enter** to set up the operating system.

10. Press **C** to continue setup using this partition.

11. Select **Format the partition using the NTFS file system (Quick)**, and then press **enter**.

    △ Formatting this drive deletes all current files.

12. Press **F** to format the drive.

    The reinstallation process begins. This process takes 1 to 2 hours to complete.

The computer restarts in Windows when the process is complete.

Reinstalling Device Drivers and Other Software

After the operating system installation process is complete, you must reinstall drivers.

To reinstall drivers, use the *Recovery* disc included with the computer:

1. While running Windows, insert the *Recovery* disc into the optical drive.

2. If you do not have autorun enabled:

   a. Select **Start > Run**.

   b. Then type D:\SWSETUP\APPINSTL\SETUP.EXE

      where *D* indicates the optical drive.

3. Follow the on-screen instructions for installing the drivers.

After the drivers are reinstalled, you must reinstall any software you added to the computer. Follow the installation instructions provided with the software.

4

Illustrated Parts Catalog

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

4.1 Serial Number Location

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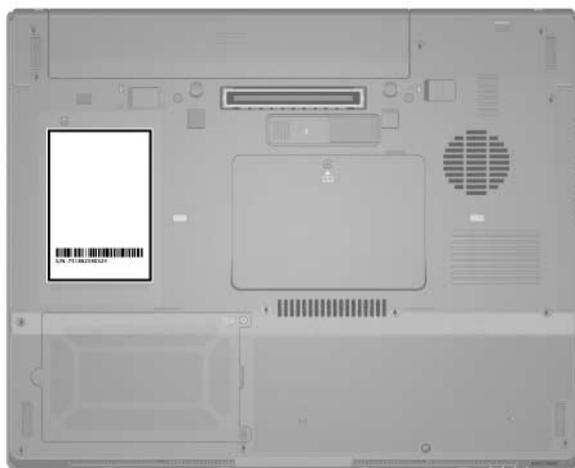
Serial Number Location

4.2 Computer Major Components
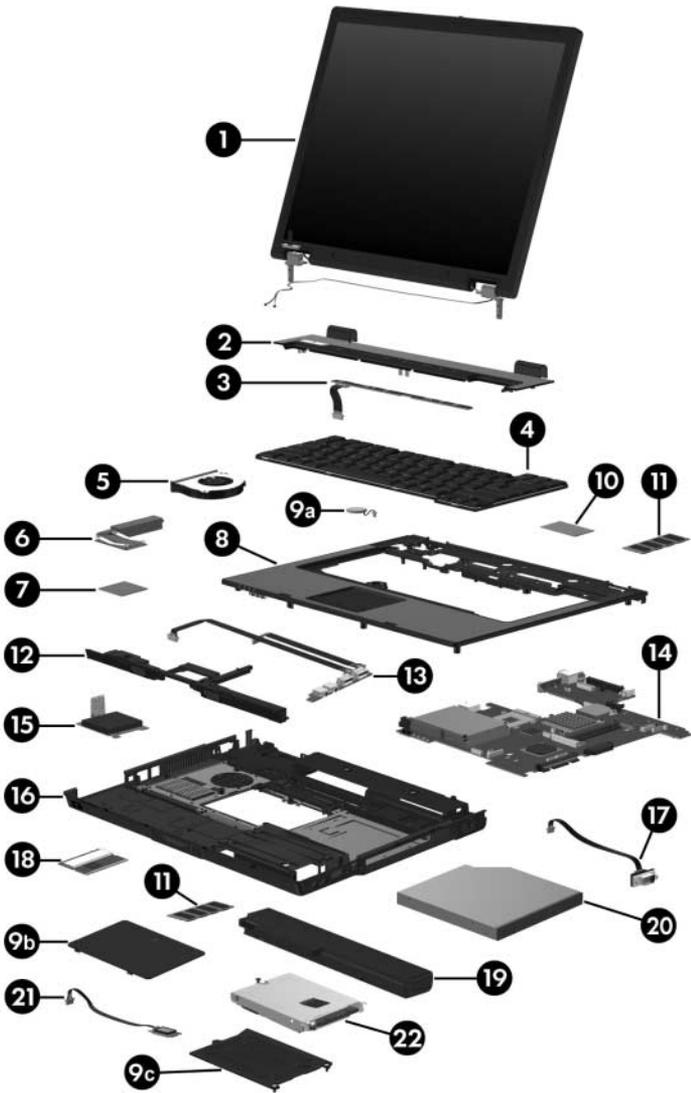
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components

Item	Description	Spare Part Number
1	**Display assemblies** (include wireless antenna boards and cables)	
	15.0-inch, SXGA+WVA, TFT	378210-001
	15.0-inch, XGA, TFT	378209-001
	14.1-inch, XGA, TFT	378208-001
2	**Switch covers**	
	For use with full-featured models	378232-001
	For use with defeatured models	378242-001
3	**LED board** (for use only with full-featured models; includes LED board cable)	378228-001
4	**Keyboards**	

For use with computer models with Dual Stick (Pointing Stick and TouchPad) pointing devices:

Brazil	398609-201	Norway	398609-091
Czech Republic	398609-221	Portugal	398609-131
Denmark	398609-081	Russia	398609-251
France	398609-051	Saudi Arabia	398609-171
French Canada	398609-121	Slovakia	398609-231
Germany	398609-041	Slovenia	398609-BA1
Greece	398609-151	Spain	398609-071
Hungary	398609-211	Sweden	398609-101
Iceland	398609-DD1	Switzerland	398609-111
International	398609-002	Taiwan	398609-AB1
Israel	398609-BB1	Thailand	398609-281
Italy	398609-061	Turkey	398609-141
Japan	398609-291	United Kingdom	398609-031
Korea	398609-AD1	United States	398609-001
Latin America	398609-161		

Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description		Spare Part Number
4	**Keyboards** *(Continued)*		
	For use with computer models with TouchPad only pointing devices:		
	Belgium	378248-181	Latin America 378248-161
	Brazil	378248-201	Norway 378248-091
	Czech Republic	378248-221	Portugal 378248-131
	Denmark	378248-081	Russia 378248-251
	France	378248-051	Saudi Arabia 378248-171
	French Canada	378248-121	Slovakia 378248-231
	Germany	378248-041	Slovenia 378248-BA1
	Greece	378248-151	Spain 378248-071
	Hungary	378248-211	Sweden 378248-101
	Iceland	378248-DD1	Switzerland 378248-111
	International	378248-002	Taiwan 378248-AB1
	Israel	378248-BB1	Thailand 378248-281
	Italy	378248-061	Turkey 378248-141
	Japan	378248-291	United Kingdom 378248-031
	Korea	378248-AD1	United States 378248-001
5	**Fan**		378233-001
6	**Heat sink** (includes thermal paste)		379799-001
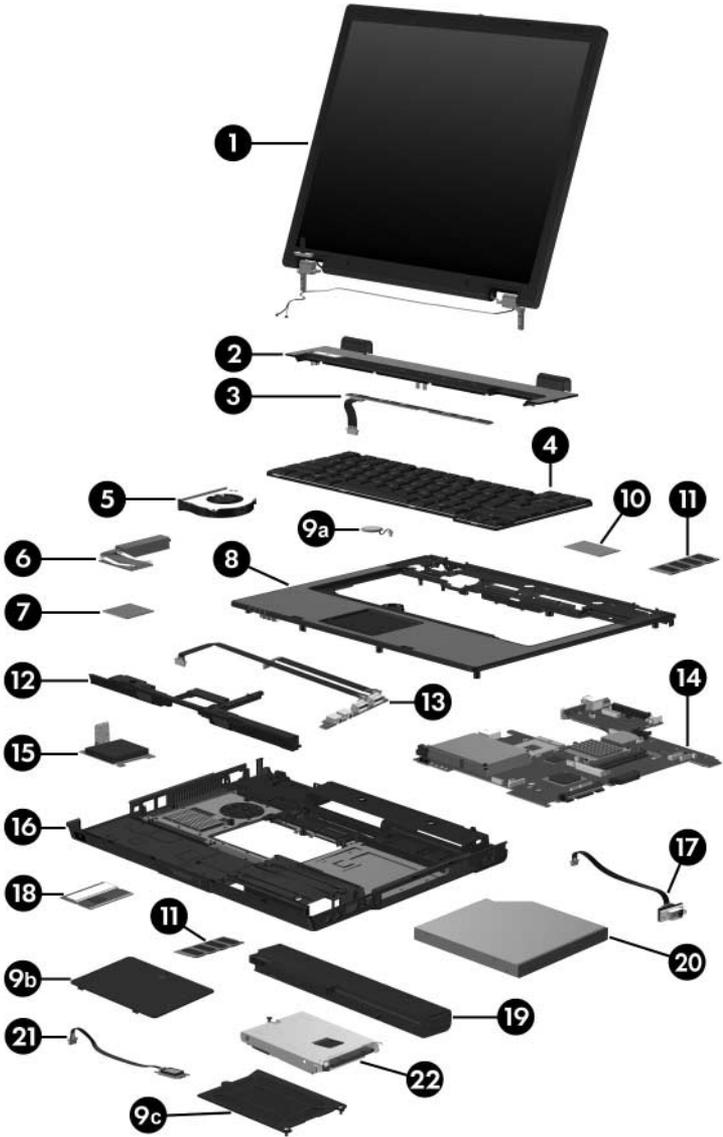
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description	Spare Part Number
7	**Processors** (include thermal paste)	
	Intel Pentium M 2.13-GHz	378224-001
	Intel Pentium M 2.00-GHz	378223-001
	Intel Pentium M 1.86-GHz	378222-001
	Intel Pentium M 1.73-GHz	378221-001
	Intel Pentium M 1.60-GHz	378220-001
	Intel Pentium M 1.30-GHz	378219-001
	Intel Celeron M 1.5-GHz	378218-001
	Intel Celeron M 1.4-GHz	378217-001
	Intel Celeron M 1.3-GHz	378216-001
8	**Top covers** (include TouchPad)	
	For use with computer models with Dual Stick (Pointing Stick and TouchPad) pointing devices:	399109-001
	For use with full-featured models	378230-001
	For use with defeatured models	378239-001
	Pointing stick board (not illustrated; for use only with computer models with Dual Stick pointing devices)	399110-001
	Miscellaneous Plastics Kit	378236-001
	Includes:	
9a	RTC battery	
9b	Memory module/Mini PCI compartment cover (includes 1 captive screw)	
9c	Hard drive cover (includes 2 captive screws)	
	Not illustrated: Computer feet PC Card slot space savers (2)	
10	**Modem board**	325521-001
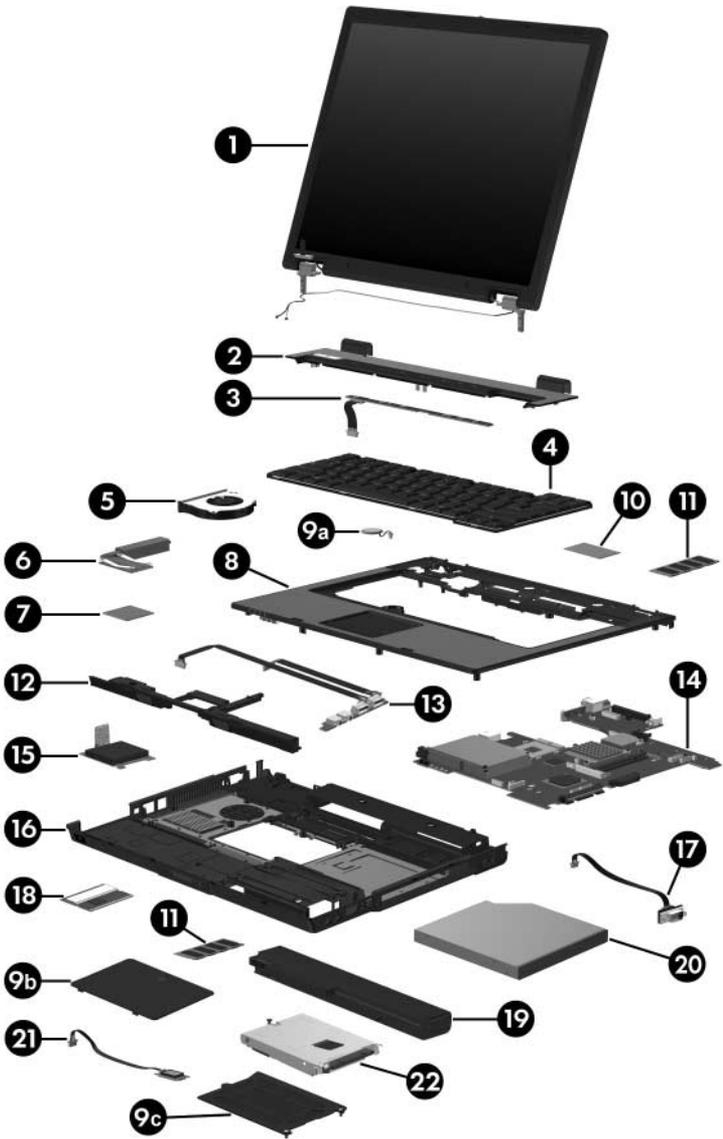
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description	Spare Part Number
11	**Memory modules** (400-MHz DDR2)	
	1024 MB	336579-001
	512 MB	336578-001
	256 MB	336577-001
	128 MB	336576-001
12	**Speaker**	378237-001
13	**USB/audio board** (for use only with full-featured models; includes audio board cable, and USB board cable)	378226-001
	Audio board (for use only with defeatured models; includes audio board cable)	378241-001
14	**System boards**	
	For use with full-featured models	378225-001
	For use with defeatured models-GML	378238-001
	For use with defeatured models-GM	383219-001
15	**Digital media board** (for use only with full-featured models; includes digital media board cable)	378229-001
16	**Base enclosure**	
	For use with full-featured models	378231-001
	For use with defeatured models	378240-001
17	**Serial connector module** (for use only with full-featured models; includes serial connector board cable)	378227-001
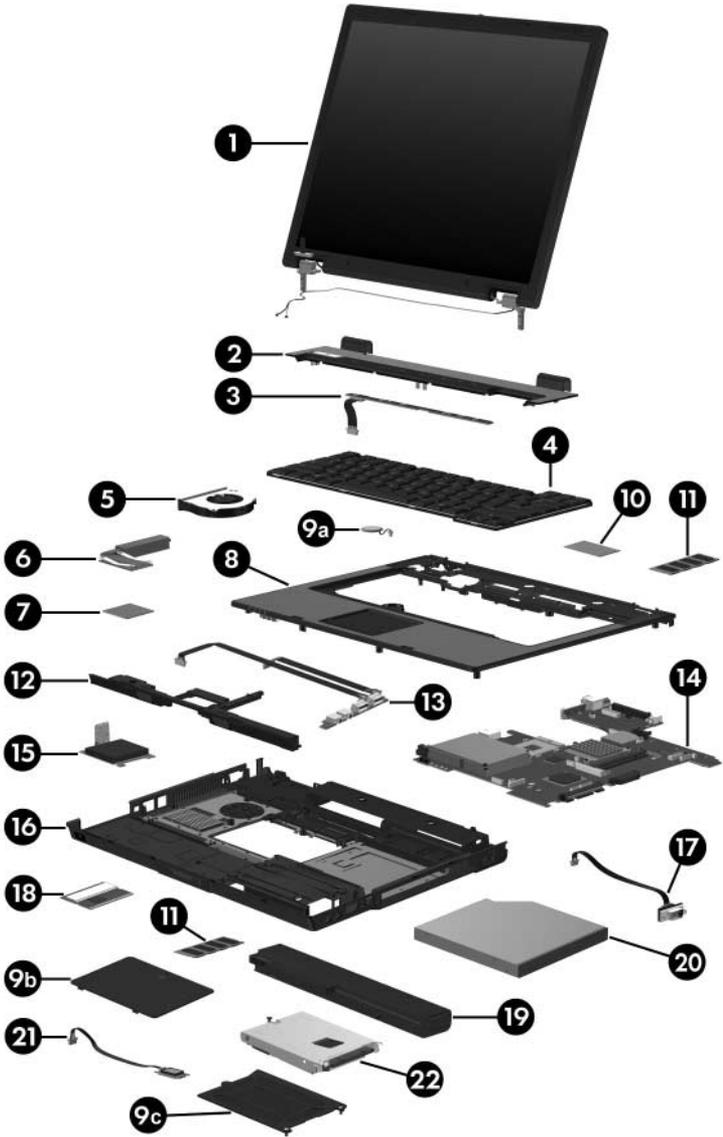
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description	Spare Part Number
18	**Mini PCI communications modules**	
	802.11b WLAN card, for use in most of the world	381580-001
	802.11b WLAN card, for use in the rest of the world	381581-001
	802.11b/g WLAN card, for use in most of the world	381582-001
	802.11b/g WLAN card, for use in the the rest of the world	381583-001
	802.11b/g combination WLAN card, for use internationally	373032-002
	802.11b/g combination WLAN card, for use Japan	373032-291
	802.11b/g combination WLAN card, for use in the United States	373032-001
	802.11a/b/g combination WLAN card, for use in Europe, Middle East, Africa	373900-021
	802.11a/b/g combination WLAN Mini PCI communications card for use Japan	373900-291
	802.11a/b/g combination WLAN card, for use internationally	373033-002
	802.11a/b/g combination WLAN card, for use Japan	373033-291
	802.11a/b/g combination WLAN card, for use in most of the world	373900-001
	802.11a/b/g combination WLAN card, for use in the United States	373033-001
	802.11a/b/g High Band combination WLAN card	373901-001
19	**Battery packs**	
	6-cell, 4.8-AHr	367457-001
	6-cell, 4.4-AHr	372772-001
	6-cell, 4.4-AHr	383220-001
	6-cell, 2.2-AHr	364602-001
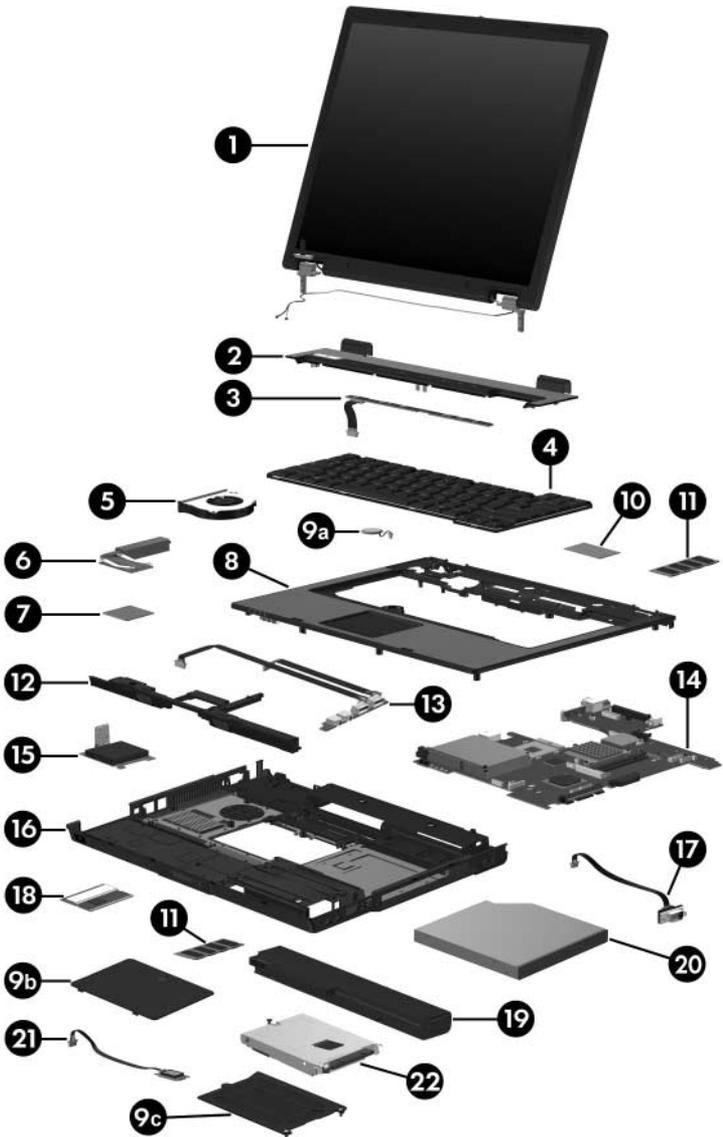
Computer Major Components

Table 3-1

Spare Parts: Computer Major Components *(Continued)*

Item	Description			Spare Part Number
20	**Optical drives** (include bezel)			
	24X Max CD-ROM drive			380768-001
	8X Max DVD-ROM drive			380770-001
	8X Max DVD±RW and CD-RW Combo Drive			380773-001
	4X Max DVD±RW and CD-RW Combo Drive			380771-001
	2X Max DVD±RW and CD-RW Combo Drive			375557-001
	DVD/CD-RW Combo Drive			380772-001
	DVD±RW and CD-RW Double Layer Combo Drive			398608-001
	DVD±RW and CD-RW Combo Drive			403093-001
21	**Broadcomm Bluetooth® wireless board** (includes Bluetooth board cable)			367871-001
22	**Hard drives** (include frame and connector)			
	5400-rpm		4200-rpm	
	80-GB	380108-001	80-GB	378214-001
	60-GB	378215-001	60-GB	378213-001
	40-GB	380107-001	40-GB	378212-001
			30-GB	378211-001

4.3 Miscellaneous Plastics Kit
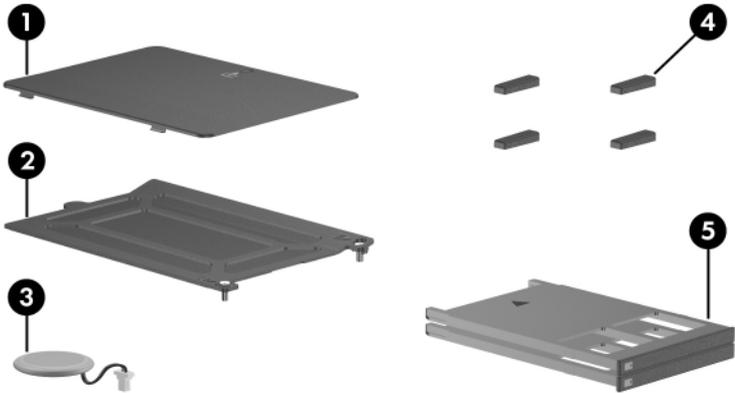
Table 3-2

Miscellaneous Plastics Kit

Spare Part Number Information

Item	Description	Spare Part Number
	Miscellaneous Plastics Kit Includes:	378236-001
1	Memory module/Mini PCI compartment cover (includes 1 captive screw)	
2	Hard drive cover (includes 2 captive screws)	
3	RTC battery	
4	Computer feet (4)	
5	PC Card slot space savers (2)	

4.4 Miscellaneous Cable Kit

Table 3-3

Miscellaneous Cable Kit

Spare Part Number Information

Item	Description	
	Miscellaneous Cable Kit	381709-001
	Includes:	
1	Bluetooth board cable	
2	LED board cable	
3	RJ-11 connector module and cable	
4	Audio board cable	
5	USB board cable	
6	Serial connector module cable	

4.5 Mass Storage Devices

Table 3-4

Mass Storage Devices

Spare Part Number Information

Item	Description			Spare Part Number
1	**Hard drives** (include frame and connector)			
	5400-rpm		4200-rpm	
	80-GB	380108-001	80-GB	378214-001
	60-GB	378215-001	60-GB	378213-001
	40-GB	380107-001	40-GB	378212-001
			30-GB	378211-001
2	**Optical drives** (include bezel)			
	24X Max CD-ROM drive			380768-001
	8X Max DVD-ROM drive			380770-001
	8X Max DVD±RW and CD-RW Combo Drive			380773-001
	4X Max DVD±RW and CD-RW Combo Drive			380771-001
	2X Max DVD±RW and CD-RW Combo Drive			375557-001
	DVD/CD-RW Combo Drive			380772-001
	DVD±RW and CD-RW Double Layer Combo Drive			398608-001
	DVD±RW and CD-RW Combo Drive			403093-001

4.6 Miscellaneous (Not Illustrated)

Table 3-5

Miscellaneous (Not Illustrated)

Spare Part Information

Description	Spare Part Number
65 watt AC adapter	239704-001
HP Advanced Docking Station	374804-001
HP Docking Station	374803-001
Docking Device Miscellaneous Plastics Kit	380089-001
Carrying cases	
Nylon top load	325815-001 and 325815-002
Nylon entry-level	325814-001
External MultiBay cradle	366143-001
External MultiBay cradle power cable and stand	366144-001
MultiBay 24X DVD/CD-RW Combo Drive	373315-001
MultiBay 8X DVD-ROM Drive	373314-001
MultiBay hard drive, 80-GB, 5400-rpm	375198-001
8-cell travel battery	367456-001
USB 1.1 diskette drive	359118-001

Table 3-5

Miscellaneous (Not Illustrated)

Spare Part Information *(Continued)*

Description	Spare Part Number
Screw Kit (includes the following screws; refer to Appendix C, "Screw Listing," for more information on specifications and usage	378235-001

- Hex socket HM5.0×9.0 screw lock
- Phillips PM2.5×13.0 spring-loaded screw
- Phillips PM2.5×4.0 shoulder screw
- Phillips PM2.5×4.0 screw
- Phillips PM2.0×8.0 shoulder screw
- Phillips PM2.0×7.0 screw

- Phillips PM2.0×4.0 screw
- Phillips PM2.0×3.0 screw
- Phillips PM1.5×4.0 screw
- Phillips PM1.5×3.5 screw
- Torx8 T8M2.0×9.0 screw
- Torx8 T8M2.0×4.0 screw
- Torx8 T8M2.0×2.0 screw

Table 3-5

Miscellaneous (Not Illustrated)

Spare Part Information *(Continued)*

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

4.7 Sequential Part Number Listing

Table 3-6

Sequential Part Number Listing

Spare Part Number	Description
239704-001	65-watt AC adapter
246959-001	Power cord for use in Canada, French Canada, Latin America, Taiwan, Thailand, and the United States
246959-011	Power cord for use in Australia and New Zealand
246959-021	Power cord for use in Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden
246959-031	Power cord for use in Hong Kong and the United Kingdom
246959-061	Power cord for use in Italy
246959-081	Power cord for use in Denmark
246959-201	Power cord for use in Brazil
246959-291	Power cord for use in Japan
246959-AD1	Power cord for use in Korea
246959-AG1	Power cord for use in Sweden
246959-BB1	Power cord for use in Israel
325521-001	Modem board
325814-001	Nylon entry-level carrying case
325815-001	Nylon top load carrying case
325815-002	Nylon top load carrying case
336576-001	128-MB memory module, 400-MHz DDR2
336577-001	256-MB memory module, 400-MHz DDR2
336578-001	512-MB memory module, 400-MHz DDR2

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
336579-001	1024-MB memory module, 400-MHz DDR2
359118-001	USB 1.1 diskette drive
364602-001	6-cell, 2.2-AHr battery pack
366143-001	External MultiBay cradle
366144-001	External MultiBay cradle power cable and stand
367456-001	8-cell travel battery
367457-001	6-cell, 4.8-AHr battery pack
367871-001	Broadcomm Bluetooth wireless board, includes cable
372772-001	6-cell, 4.4-AHr battery pack
373032-001	802.11b/g combination WLAN Mini PCI communications card for use in the United States
373032-002	802.11b/g combination WLAN Mini PCI communications card for use internationally
373032-291	802.11b/g combination WLAN Mini PCI communications card for use Japan
373033-001	802.11a/b/g combination WLAN card Mini PCI communications card for use in the United States
373033-002	802.11a/b/g combination WLAN Mini PCI communications card for use internationally
373033-291	802.11a/b/g combination WLAN Mini PCI communications card for use in Japan
373314-001	MultiBay 8X DVD-ROM Drive
373315-001	MultiBay 24X DVD/CD-RW Combo Drive
373900-001	802.11a/b/g combination WLAN card Mini PCI communications card for use in most of the world

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
373900-021	802.11a/b/g combination WLAN Mini PCI communications card for use Europe, Middle East, and Africa
373900-291	802.11a/b/g combination WLAN Mini PCI communications card for use Japan
373901-001	802.11a/b/g High Band combination WLAN Mini PCI communications card
374803-001	HP Docking Station
374804-001	HP Advanced Docking Station
375198-001	MultiBay hard drive, 80-GB, 5400-rpm
375557-001	2X Max DVD±RW and CD-RW Combo Drive, includes bezel
378208-001	14.1-inch, XGA, TFT, display assembly, includes wireless antenna boards and cables
378209-001	15.0-inch, XGA, TFT, display assembly, includes wireless antenna boards and cables
378210-001	15.0-inch, SXGA+WVA, TFT display assembly, includes wireless antenna boards and cables
378211-001	30-GB hard drive, 4200-rpm, includes frame and connector
378212-001	40-GB hard drive, 4200-rpm, includes frame and connector
378213-001	60-GB hard drive, 4200-rpm, includes frame and connector
378214-001	80-GB hard drive, 4200-rpm, includes frame and connector
378215-001	60-GB hard drive, 5400-rpm, includes frame and connector
378216-001	Intel Celeron M 1.3-GHz processor, includes thermal paste
378217-001	Intel Celeron M 1.4-GHz processor, includes thermal paste
378218-001	Intel Celeron M 1.5-GHz processor, includes thermal paste
378219-001	Intel Pentium M 1.30-GHz processor, includes thermal paste

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
378220-001	Intel Pentium M 1.60-GHz processor, includes thermal paste
378221-001	Intel Pentium M 1.73-GHz processor, includes thermal paste
378222-001	Intel Pentium M 1.86-GHz processor, includes thermal paste
378223-001	Intel Pentium M 2.00-GHz processor, includes thermal paste
378224-001	Intel Pentium M 2.13-GHz processor, includes thermal paste
378225-001	System board, for use only with full-featured models
378226-001	USB/audio board, includes audio board cable and USB board cable, for use only with full-featured models
378227-001	Serial connector board, includes serial connector board cable
378228-001	LED board, includes LED board cable
378229-001	Digital media board, includes digital media board cable
378230-001	Top cover, includes TouchPad, for use only with full-featured models
378231-001	Base enclosure, for use only with full-featured models
378232-001	Switch cover, for use only with full-featured models
378233-001	Fan
378235-001	Miscellaneous Screw Kit
378236-001	Miscellaneous Plastics Kit
378237-001	Speaker
378238-001	System board, for use only with defeatured models (GML)
378239-001	Top cover, includes TouchPad, for use only with defeatured models
378240-001	Base enclosure, for use only with defeatured models

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
378241-001	Audio board, includes audio cable, for use only with defeatured models
378242-001	Switch cover, for use only with defeatured models
378248-001	Keyboard for use in United States
378248-002	Keyboard for use internationally
378248-031	Keyboard for use in United Kingdom
378248-041	Keyboard for use in Germany
378248-051	Keyboard for use in France
378248-061	Keyboard for use in Italy
378248-071	Keyboard for use in Spain
378248-081	Keyboard for use in Denmark
378248-091	Keyboard for use in Norway
378248-101	Keyboard for use in Sweden
378248-111	Keyboard for use in Switzerland
378248-121	Keyboard for use in French Canada
378248-131	Keyboard for use in Portugal
378248-141	Keyboard for use in Turkey
378248-151	Keyboard for use in Greece
378248-161	Keyboard for use in Latin America
378248-171	Keyboard for use in Saudi Arabia
378248-181	Keyboard for use in Belgium
378248-201	Keyboard for use in Brazil
378248-211	Keyboard for use in Hungary

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
378248-221	Keyboard for use in the Czech Republic
378248-231	Keyboard for use in Slovakia
378248-251	Keyboard for use in Russia
378248-281	Keyboard for use in Thailand
378248-291	Keyboard for use in Japan
378248-AB1	Keyboard for use in Taiwan
378248-AD1	Keyboard for use in Korea
378248-BA1	Keyboard for use in Slovenia
378248-BB1	Keyboard for use in Israel
378248-DD1	Keyboard for use in Iceland
379799-001	Heat sink, includes thermal paste
380089-001	Docking Station Miscellaneous Plastics Kit
380108-001	80-GB hard drive, 5400-rpm, includes frame and connector
380768-001	24X Max CD-ROM drive, includes bezel
380770-001	8X Max DVD-ROM drive, includes bezel
380771-001	4X Max DVD±RW and CD-RW Combo Drive, includes bezel
380772-001	DVD/CD-RW Combo Drive, includes bezel
380773-001	8X Max DVD±RW and CD-RW Combo Drive, includes bezel
381580-001	802.11b/g WLAN Mini PCI communications card for use in most of the world
381581-001	802.11b/g WLAN Mini PCI communications card for use in the rest of the world
381582-001	802.11b/g WLAN Mini PCI communications card for use in most of the world

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
381583-001	802.11b/g WLAN Mini PCI communications card for use in the rest of the world
381709-001	Miscellaneous Cable Kit
383219-001	System board, for use only with defeatured models (GM)
383220-001	6-cell, 4.0-AHr battery pack
378242-001	Switch cover, for use only with defeatured models
398608-001	DVD±RW and CD-RW Double Layer Combo Drive
398609-001	Keyboard for use in United States
398609-002	Keyboard for use internationally
398609-031	Keyboard for use in United Kingdom
398609-041	Keyboard for use in Germany
398609-051	Keyboard for use in France
398609-061	Keyboard for use in Italy
398609-071	Keyboard for use in Spain
398609-081	Keyboard for use in Denmark
398609-091	Keyboard for use in Norway
398609-101	Keyboard for use in Sweden
398609-111	Keyboard for use in Switzerland
398609-121	Keyboard for use in French Canada
398609-131	Keyboard for use in Portugal
398609-141	Keyboard for use in Turkey
398609-151	Keyboard for use in Greece
398609-161	Keyboard for use in Latin America

Table 3-6

Sequential Part Number Listing *(Continued)*

Spare Part Number	Description
398609-171	Keyboard for use in Saudi Arabia
398609-201	Keyboard for use in Brazil
398609-211	Keyboard for use in Hungary
398609-221	Keyboard for use in the Czech Republic
398609-231	Keyboard for use in Slovakia
398609-251	Keyboard for use in Russia
398609-281	Keyboard for use in Thailand
398609-291	Keyboard for use in Japan.
398609-AB1	Keyboard for use in Taiwan
398609-AD1	Keyboard for use in Korea
398609-BA1	Keyboard for use in Slovenia
398609-BB1	Keyboard for use in Israel
398609-DD1	Keyboard for use in Iceland
399109-001	Top cover, includes TouchPad, for use only with computer models with Dual Stick (Pointing Stick and TouchPad) pointing devices
399110-001	Pointing stick board (for use only with computer models with Dual Stick pointing devices)
403093-001	DVD±RW and CD-RW Combo Drive

5

Removal and Replacement Preliminaries

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

5.1 Tools Required

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

■ Magnetic screwdriver
■ Phillips P0 screwdriver
■ Torx8 screwdriver
■ 5.0-mm socket for system board locks
■ Flat-bladed screwdriver
■ Tool kit—includes connector removal tool, loopback plugs, and case utility tool

5.2 Service Considerations

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

✎ As you remove each subassembly from the 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, ensure 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. Ensure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

5.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the 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, ensure that a diskette or disc is not in the drive and ensure that the optical drive tray is closed.

- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

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

- Avoid dropping drives from any height onto any surface.

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

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

- Avoid exposing a drive to temperature extremes or liquids.

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

5.4 **Preventing Electrostatic Damage**

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

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

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

5.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

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

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

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

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

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

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

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

5.6 Workstation Precautions

Use the following grounding precautions at workstations:

■ Cover the workstation with approved static-shielding material (refer to Table 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.

5.7 Grounding Equipment and Methods

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

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

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

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

■ Antistatic tape

■ Antistatic smocks, aprons, and sleeve protectors

■ Conductive bins and other assembly or soldering aids

■ Nonconductive foam

■ Conductive tabletop workstations with ground cords of one megohm resistance

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

■ Field service kits

■ Static awareness labels

■ Material-handling packages

■ Nonconductive plastic bags, tubes, or boxes

■ Metal tote boxes

■ Electrostatic voltage levels and protective materials

Table 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

6

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

There are 62 screws and screw locks, in 11 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

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

6.1 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.
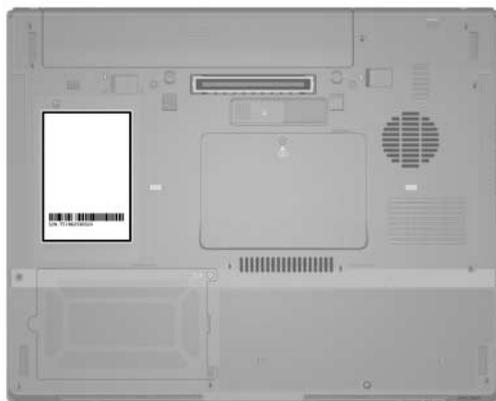
Serial Number Location

6.2 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
6.3	Preparing the Computer for Disassembly	
	Battery pack	0
6.4	Hard Drive	2 loosened to remove the hard drive cover 1 loosened to remove the hard drive 6 to disassemble hard drive
6.5	Computer Feet	0
6.6	Bluetooth Board	0
6.7	External Memory Module	1 loosened to remove the memory module/Mini PCI compartment cover
6.8	Mini PCI Communications Module	0
	⚠ To prevent an unresponsive system and the display of a warning message, install only a Mini PCI 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.	
6.9	Optical Drive	1

Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
6.10	Keyboard	2
6.11	Switch Cover	2
6.12	LED Board	4
6.13	Fan	2 loosened
6.14	Heat Sink	4 loosened
6.15	Processor	1 loosened
6.16	Modem Board	2
6.17	Internal Memory Module	0
6.18	RTC Battery	0
6.19	Display Assembly	6
6.20	Top Cover	15
6.21	Speaker	4
6.22	Digital Media Board	0
6.23	USB/Audio Board	1
6.24	System Board	1 screw 4 screw locks on HP Compaq nc6110 and nc6120 models 2 screw locks on HP Compaq nx6110 and nx6120 models
6.25	Serial Connector Module	2 screw locks

6.3 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 Pack Spare Part Number Information	
6-cell, 4.8-AHr	367457-001
6-cell, 4.4-AHr	372772-001
6-cell, 4.4-AHr	383220-001
6-cell, 2.2-AHr	364602-001

4. Remove the battery pack by following these steps:

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

    b. Slide and hold the battery pack lock latch ❶ to the right.

    c. Slide the battery pack release latch ❷ to the right. (The battery pack disengages from the computer.)

    d. Slide the battery pack ❸ straight back and remove it.
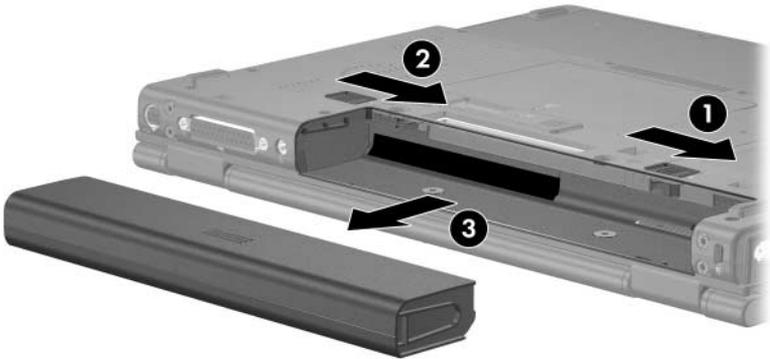
Removing the Battery Pack

Reverse the above procedure to install the battery pack.

6.4 **Hard Drive**

Hard Drive Spare Part Number Information

5400-rpm		4200-rpm	
80-GB	380108-001	80-GB	378214-001
60-GB	378215-001	60-GB	378213-001
40-GB	380107-001	40-GB	378212-001
		30-GB	378211-001

1. Prepare the computer for disassembly (refer to).
2. Loosen the 2 Phillips PM2.0×4.0 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 Miscellaneous Plastics Kit, spare part number 378236-001.
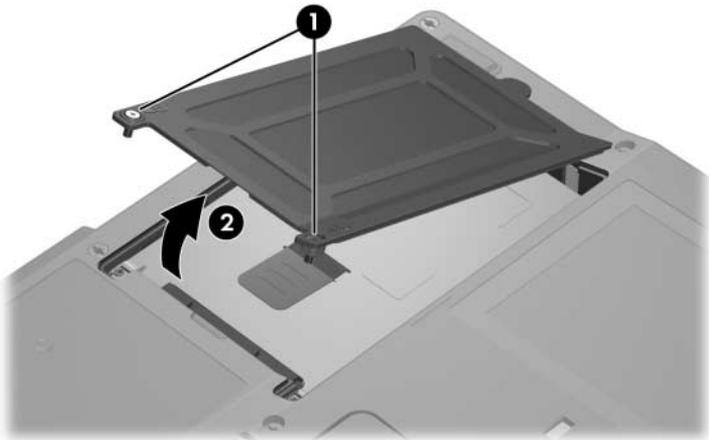
Removing the Hard Drive Cover

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.
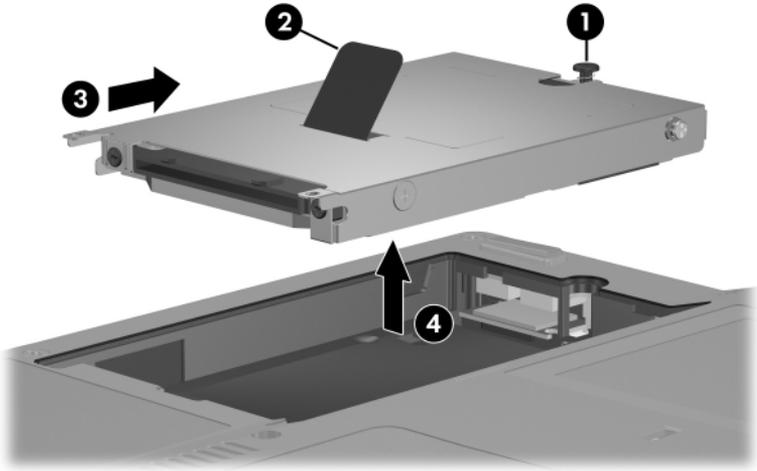
Removing the Hard Drive

8. Remove the 2 Phillips PM2.5×4.0 hard drive frame shoulder screws ❶ from each side of the hard drive.

9. Remove the 2 Phillips PM2.5×4.0 hard drive frame screws ❷ from each side of the hard drive.

10. Remove the 2 Phillips PM1.5×3.5 hard drive frame screws ❸ from the front of the hard drive.

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

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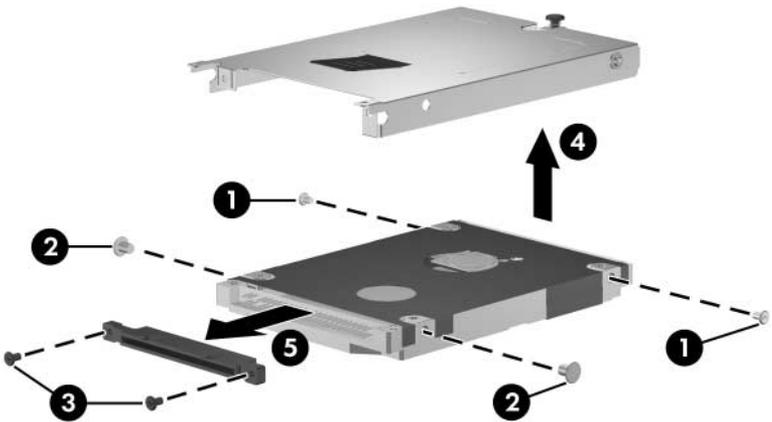
Removing the Hard Drive Frame and Connector

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

6.5 **Computer Feet**

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

Replacing the Computer Feet

6.6 **Bluetooth Board**

Bluetooth Board Spare Part Number Information

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

1. Prepare the computer for disassembly (refer to Section 6.3).
2. Remove the hard drive (Section 6.4).

3. Slide the Bluetooth board ❶ out of the clip in the hard drive compartment.

4. Disconnect the Bluetooth board cable ❷ from the board.
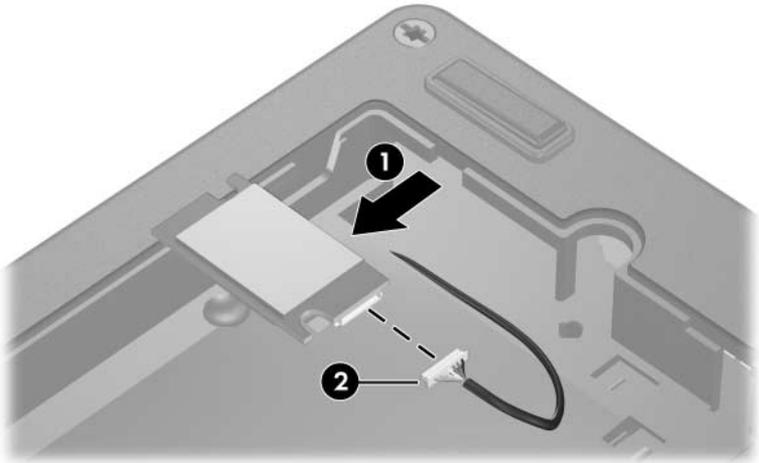
Removing the Bluetooth Board

Reverse the above procedure to install a Bluetooth board.

6.7 External Memory Module

Memory Module Spare Part Number Information

1024 MB	336579-001
512 MB	336578-001
256 MB	336577-001
128 MB	336576-001

1. Prepare the computer for disassembly (refer to Section 6.3).
2. Position the computer with the front toward you.
3. Loosen the Phillips PM2.0×4.0 screw ❶ that secures the memory module/Mini PCI compartment cover to the computer.
4. Lift the rear edge of the cover ❷ up and swing it toward you.
5. Remove the memory module/Mini PCI compartment cover.

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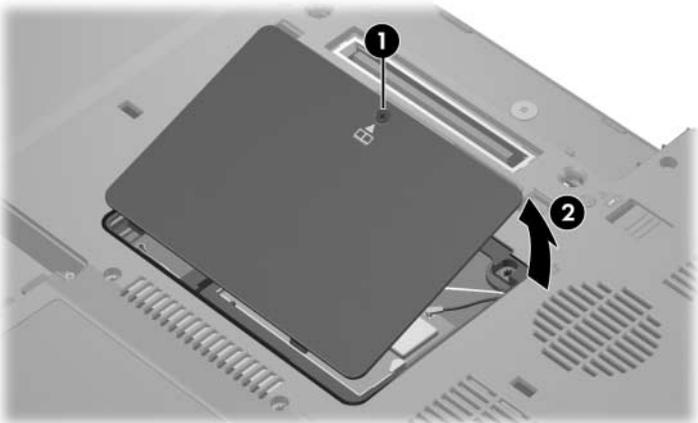
Removing the Memory Module/Mini PCI Compartment Cover

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

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

8. Remove the memory module.

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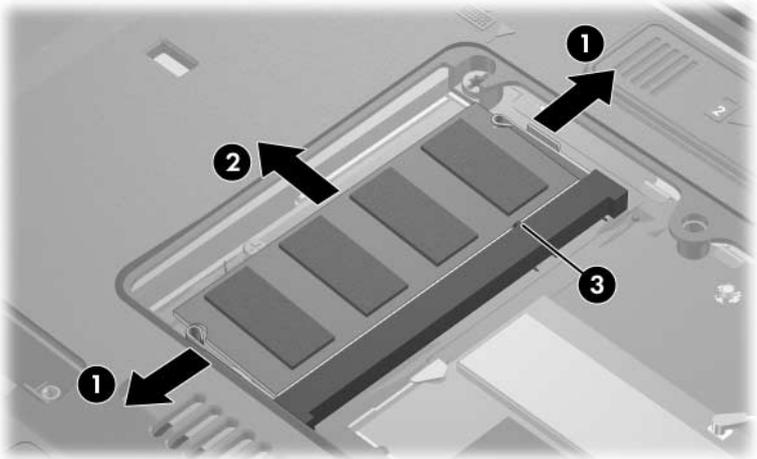
Removing the Memory Module

Reverse the above procedure to install a memory module.

6.8 Mini PCI Communications Module

Mini PCI Communications Module Spare Part Number Information	
802.11b/g WLAN module, for use in most of the world	381582-001
802.11b/g WLAN module, for use in the rest of the world	381583-001
802.11b/g combination WLAN module, for use internationally	373032-002
802.11b/g combination WLAN module, for use Japan	373032-291
802.11b/g combination WLAN module, for use in the United States	373032-001
802.11a/b/g combination WLAN module, for use in Europe, Middle East, and Africa	373900-021
802.11a/b/g combination WLAN Mini PCI communications module for use Japan	373900-291
802.11a/b/g combination WLAN module, for use internationally	373033-002
802.11a/b/g combination WLAN module, for use Japan	373033-291
802.11a/b/g combination WLAN module, for use in most of the world	373900-001 373033-001
802.11a/b/g combination WLAN module, for use in the United States	
802.11a/b/g High Band combination WLAN module	373901-001

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

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

3. Position the computer with the front toward you.

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

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

5. Spread the two retaining tabs ❷ on each side of the Mini PCI socket to release the Mini PCI communications module. (The edge of the module opposite the socket rises away from the computer.)

6. Remove the Mini PCI communications module ❸ by pulling the card away from the socket at a 45-degree angle.

✎ Mini PCI communications modules are designed with notches ❹ to prevent incorrect installation.
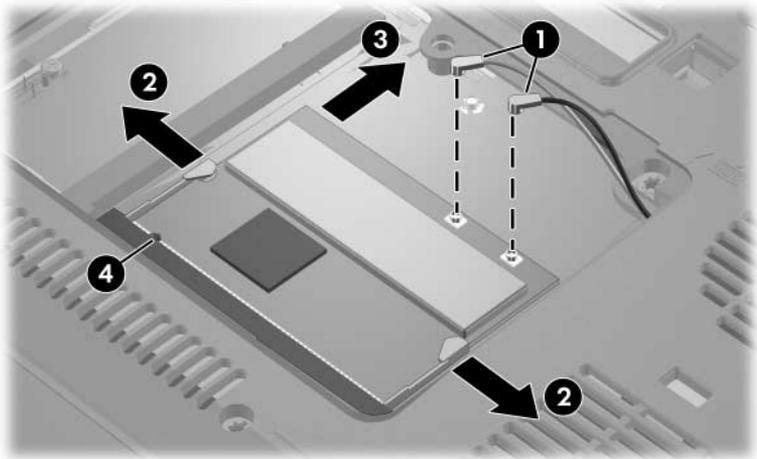
Removing a Mini PCI Communications Module

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

6.9 Optical Drive

Optical Drive Spare Part Number Information

24X Max CD-ROM drive	380768-001
8X Max DVD-ROM drive	380770-001
8X Max DVD±RW and CD-RW Combo Drive	380773-001
4X Max DVD±RW and CD-RW Combo Drive	380771-001
2X Max DVD±RW and CD-RW Combo Drive	375557-001
DVD/CD-RW Combo Drive	380772-001
DVD±RW and CD-RW Double Layer Combo Drive	398608-001
DVD±RW and CD-RW Combo Drive	403093-001

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

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

3. Position the computer with right side toward you.

4. Remove the Torx8 T8M2.0×9.0 screw ❶ that secures the optical drive to the computer.

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

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

7. Remove the optical drive.
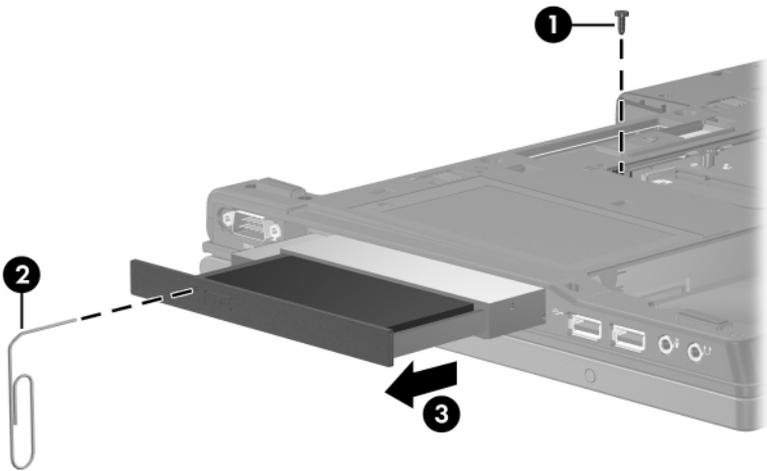
Removing the Optical Drive

Reverse the above procedure to install an optical drive.

6.10 Keyboard

Keyboard Spare Part Number Information

For use with computer models with Dual Stick (Pointing Stick and TouchPad) pointing devices:

Brazil	398609-201	Norway	398609-091
Czech Republic	398609-221	Portugal	398609-131
Denmark	398609-081	Russia	398609-251
France	398609-051	Saudi Arabia	398609-171
French Canada	398609-121	Slovakia	398609-231
Germany	398609-041	Slovenia	398609-BA1
Greece	398609-151	Spain	398609-071
Hungary	398609-211	Sweden	398609-101
Iceland	398609-DD1	Switzerland	398609-111
International	398609-002	Taiwan	398609-AB1
Israel	398609-BB1	Thailand	398609-281
Italy	398609-061	Turkey	398609-141
Japan	398609-291	United Kingdom	398609-031
Korea	398609-AD1	United States	398609-001
Latin America	398609-161		

Keyboard Spare Part Number Information *(Continued)*

For use with computer models with TouchPad only pointing devices:

Belgium	378248-181	Latin America	378248-161
Brazil	378248-201	Norway	378248-091
Czech Republic	378248-221	Portugal	378248-131
Denmark	378248-081	Russia	378248-251
France	378248-051	Saudi Arabia	378248-171
French Canada	378248-121	Slovakia	378248-231
Germany	378248-041	Slovenia	378248-BA1
Greece	378248-151	Spain	378248-071
Hungary	378248-211	Sweden	378248-101
Iceland	378248-DD1	Switzerland	378248-111
International	378248-002	Taiwan	378248-AB1
Israel	378248-BB1	Thailand	378248-281
Italy	378248-061	Turkey	378248-141
Japan	378248-291	United Kingdom	378248-031
Korea	378248-AD1	United States	378248-001

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

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

3. Remove the 2 Torx8 T8M2.0×9.0 screws that secure the keyboard to the computer.
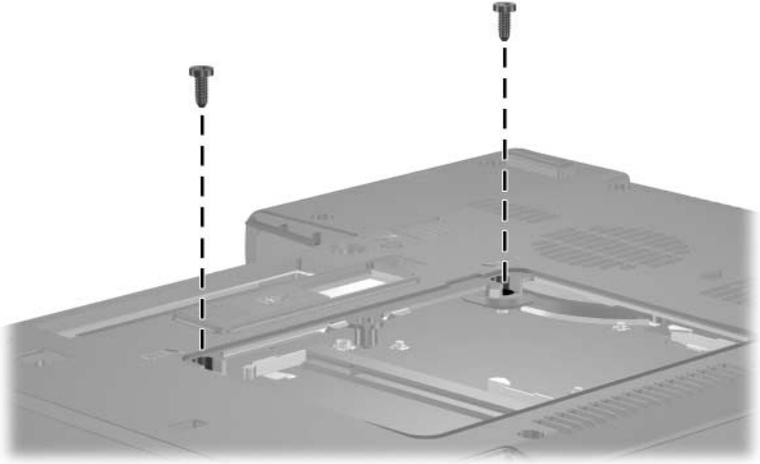
Removing the Keyboard Screws

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

5. Open the computer as far as possible.

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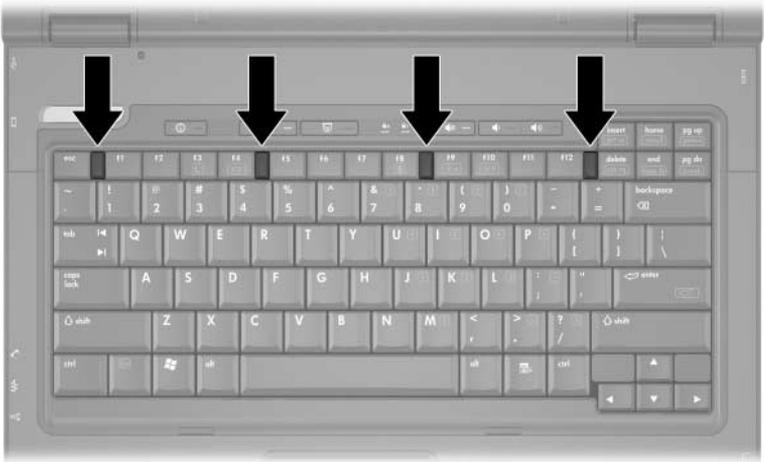
Releasing the Keyboard Latches

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

Releasing the Keyboard

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

✎ Step 9 applies only to computer models equipped with a pointing stick.

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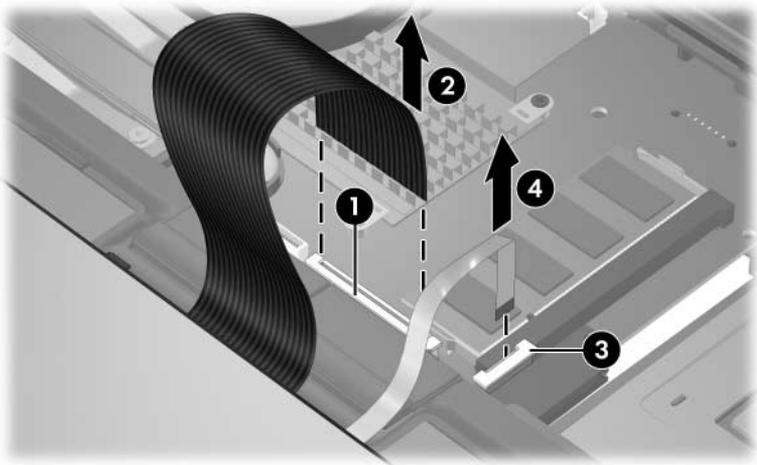
Disconnecting the Keyboard and Pointing Stick Cables

10. Remove the keyboard.

Reverse the above procedure to install the keyboard.

6.11 Switch Cover

Switch Cover Spare Part Number Information

Switch covers

For use with full-featured models	378232-001
For use with defeatured models	378242-001

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

2. Remove the keyboard (Section 6.10).

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

4. Remove the 2 Torx8 T8M2.0×2.0 screws that secure the switch cover to the computer.
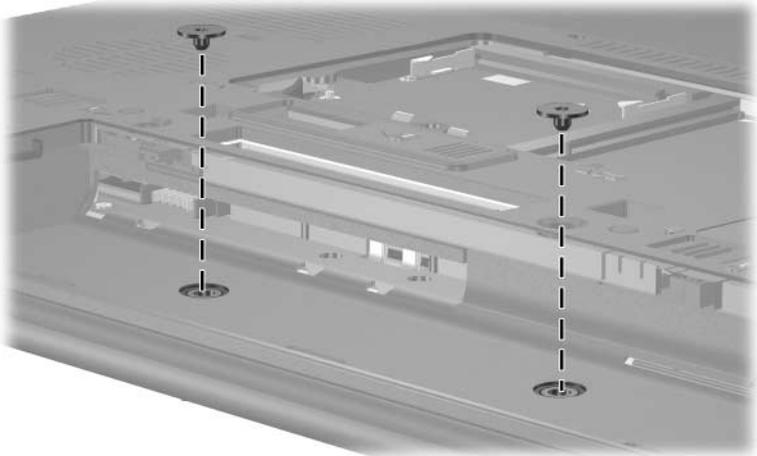
Removing the Switch Cover Screws

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

6. Open the computer as far as possible.

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

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

9. Remove the switch cover.
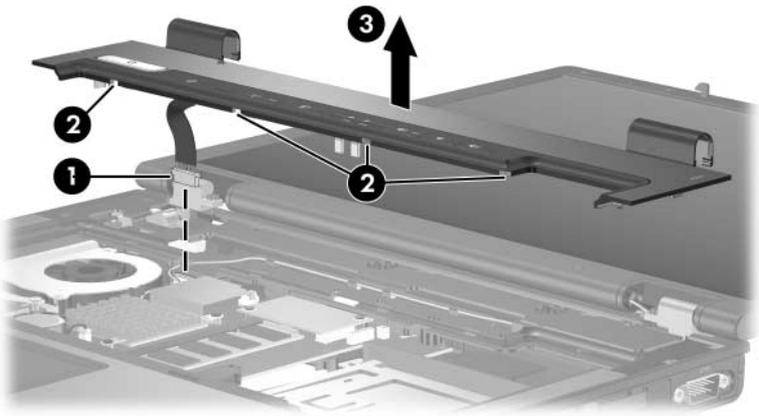
Removing the Switch Cover

Reverse the above procedure to install the switch cover.

6.12   **LED Board**

✎ This section applies only to full-featured models.

LED Board Spare Part Number Information

LED board (includes LED board cable)   378228-001

---

1. Prepare the computer for disassembly (Section 6.3).
2. Remove the keyboard (Section 6.10).
3. Remove the switch cover (Section 6.11).
4. Turn the computer upside down with the rear panel toward you.
5. Turn the switch cover upside down.

6. Remove the 4 Phillips PM1.5×4.0 screws ❶ that secure the LED board to the switch cover.

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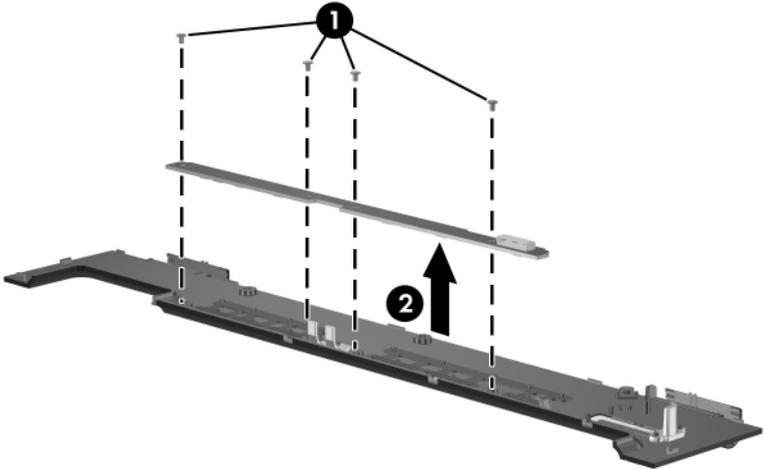
Removing the LED Board

Reverse the above procedure to install the LED board.

6.13 Fan

Fan Spare Part Number Information

Fan	378233-001

1. Prepare the computer for disassembly (Section 6.3).
2. Release the keyboard (Section 6.10).
3. Disconnect the fan cable ❶ from the system board.
4. Loosen the 2 Phillips PM2.0×7.0 screws ❷ that secure the fan to the computer.
5. Remove the fan ❸.
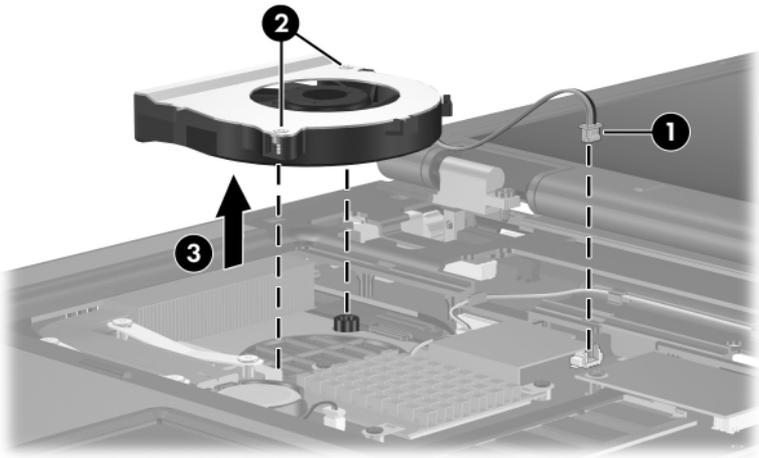
Removing the Fan

Reverse the above procedure to install the fan.

6.14 Heat Sink

Heat Sink Spare Part Number Information

Heat sink (includes thermal paste)   379799-001

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

2. Release the keyboard (Section 6.10).

3. Remove the fan (Section 6.13).

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

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

6. Slide the heat sink ❸ up and to the right to remove it.

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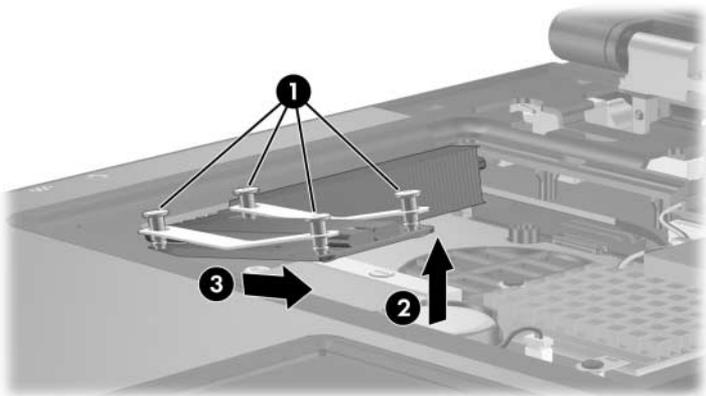
Removing the Heat Sink

Reverse the above procedure to install the heat sink.

6.15 Processor

Processor Spare Part Number Information

Intel Pentium M 2.13-GHz	378224-001
Intel Pentium M 2.00-GHz	378223-001
Intel Pentium M 1.86-GHz	378222-001
Intel Pentium M 1.73-GHz	378221-001
Intel Pentium M 1.60-GHz	378220-001
Intel Pentium M 1.30-GHz	378219-001
Intel Celeron M 1.5-GHz	378218-001
Intel Celeron M 1.4-GHz	378217-001
Intel Celeron M 1.3-GHz	378216-001

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

2. Release the keyboard (Section 6.10).

3. Remove the fan (Section 6.13).

4. Remove the heat sink (Section 6.14).

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

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

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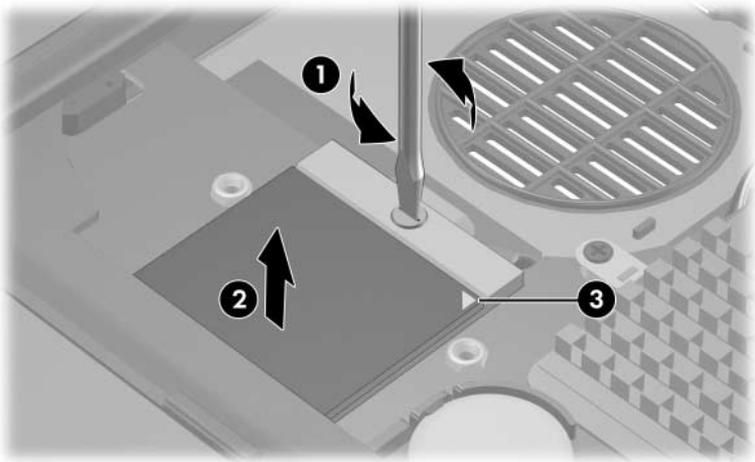
Removing the Processor

Reverse the above procedure to install the processor.

6.16 Modem Board

Modem Board Spare Part Number Information

Modem board	325521-001

1. Prepare the computer for disassembly (Section 6.3).
2. Release the keyboard (Section 6.10).

3. Remove the 2 Phillips PM2.0×3.0 screws ❶ that secure the modem board to the computer.
4. Lift the right side of the modem board ❷ to disconnect it from the system board.
5. Disconnect the modem cable ❸ from the modem board.
6. Remove the modem board.
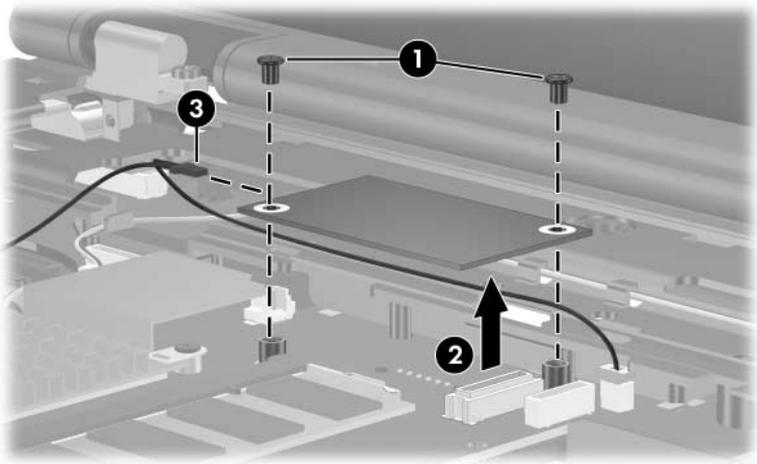
Removing the Modem Board

Reverse the above procedure to install the modem board.

6.17   Internal Memory Module

Memory Module Spare Part Number Information	
1024 MB	336579-001
512 MB	336578-001
256 MB	366577-001

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

2. Release the keyboard (Section 6.10).

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

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

5. Remove the memory module.

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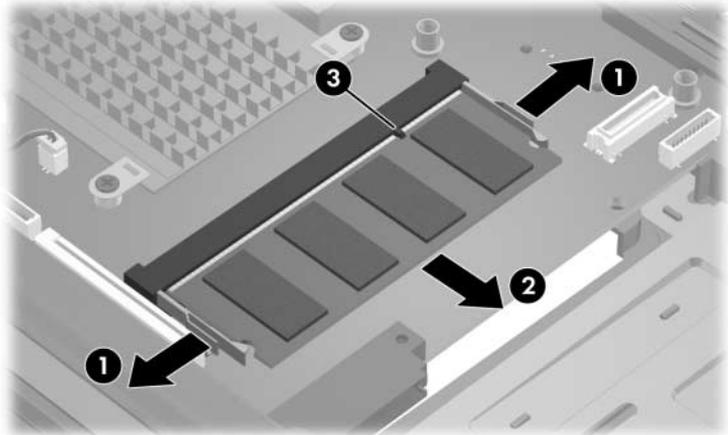
Removing the Memory Module

Reverse the above procedure to install a memory module.

6.18 RTC Battery

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

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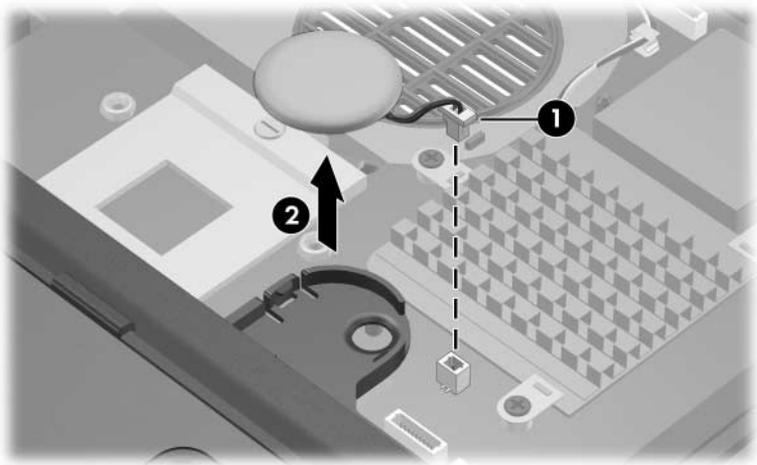
Removing the RTC Battery

Reverse the above procedure to install an RTC battery.

6.19 Display Assembly

Display Assembly Spare Part Number Information

15.0-inch, SXGA+WVA, TFT	378210-001
15.0-inch, XGA, TFT	378209-001
14.1-inch, XGA, TFT	378208-001

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

2. Remove the Memory module/Mini PCI compartment cover (Section 6.7) and disconnect the wireless antenna cables from the Mini PCI communications module (Section 6.8).

3. Remove the keyboard (Section 6.10).

4. Remove the switch cover (Section 6.11)

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

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

7. Remove the 2 Torx8 T8M2.0×9.0 screws ❸ that secure the display assembly to the computer.
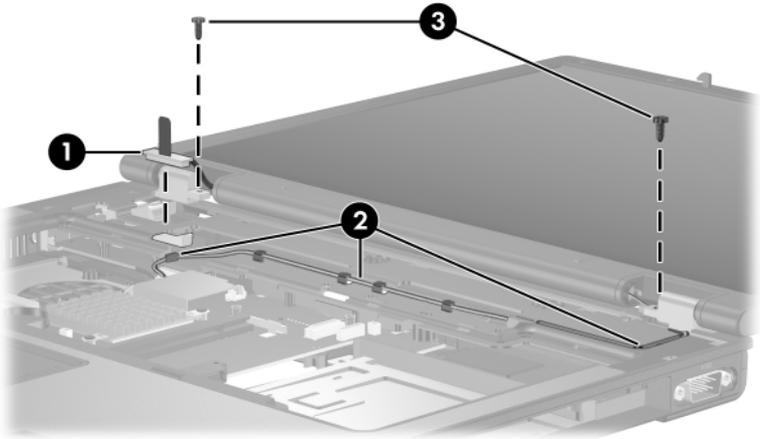
Disconnecting the Display Cable and Removing the Display Screws

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

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

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

10. Remove the 4 Torx8 T8M2.0×9.0 screws ❶ that secure the display assembly to the computer.

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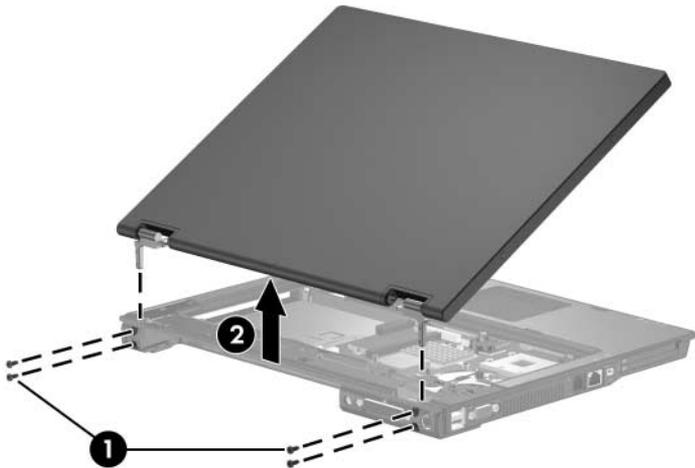
Removing the Display Assembly

Reverse the above procedure to install the display assembly.

6.20 Top Cover

Top Cover Spare Part Number Information

Top cover (include TouchPad)	
For use with computer models with Dual Stick (Pointing Stick and TouchPad) pointing devices:	399109-001
For use with full-featured models	378230-001
For use with defeatured models	378239-001
Pointing stick board (for use only with computer models with Dual Stick pointing devices)	399110-001

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

   a. Hard drive (Section 6.4)

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

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Display assembly (Section 6.19)

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

3. Remove the 13 Torx8 T8M2.0×9.0 screws that secure the top cover to the computer.
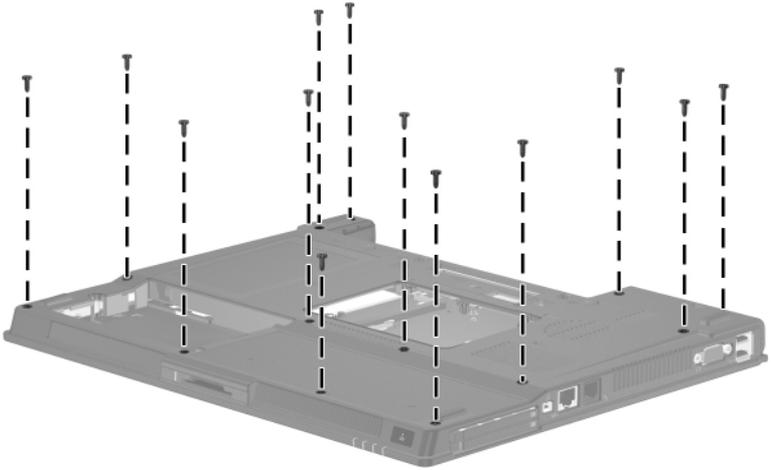
Removing the Top Cover Screws, Part 1

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

5. Disconnect the RTC battery cable from the system board.
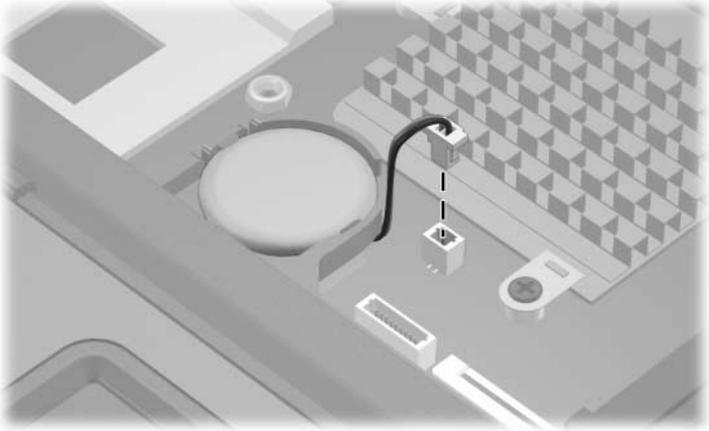
Disconnecting the RTC Battery Cable

6. Remove the 2 Torx8 T8M2.0×9.0 screws ❶ that secure the top cover to the computer.

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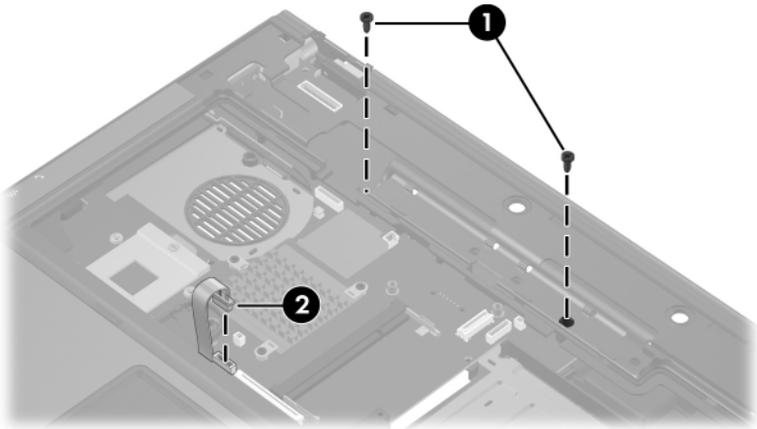
Removing the Top Cover Screws, Part 2

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

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

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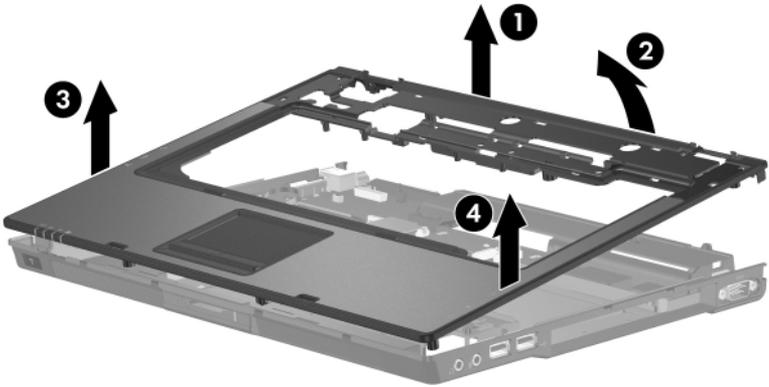
Releasing the Top Cover

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

Reverse the above procedure to install the top cover.

6.21 Speaker

Speaker Spare Part Number Information

Speaker	378237-001

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

   a. Hard drive (Section 6.4)

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

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Display assembly (Section 6.19)

   g. Top cover (Section 6.20)

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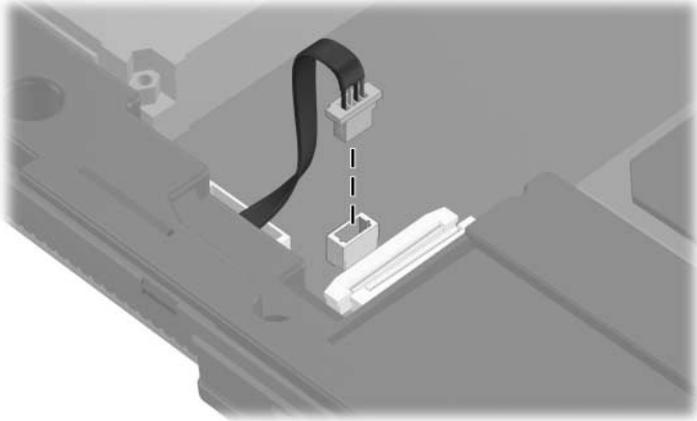
Disconnecting the Speaker Cable

3. Remove the 4 Torx8 T8M2.0×4.0 screws ❶ that secure the speaker to the computer.

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

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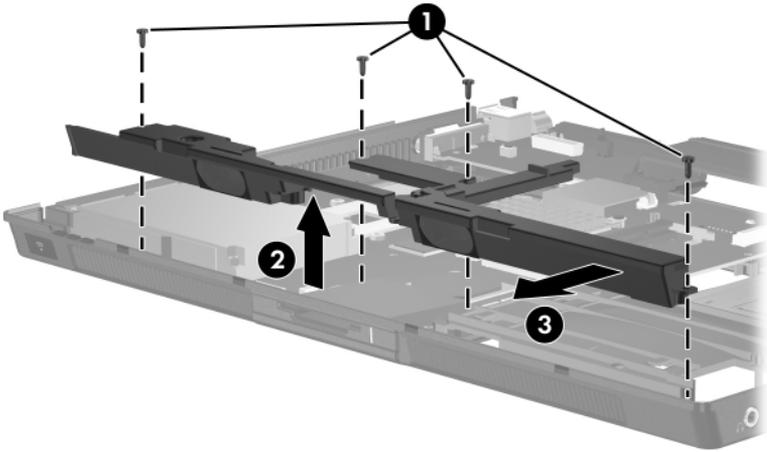
Removing the Speaker

Reverse the above procedure to install the speaker.

6.22 Digital Media Board

✎ This section applies only to full-featured models.

Digital Media Board Spare Part Number Information

Digital media board (includes digital media board cable)　　378229-001

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

   a. Hard drive (Section 6.4)

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

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Display assembly (Section 6.19)

   g. Top cover (Section 6.20)

   h. Speaker (Section 6.21)

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

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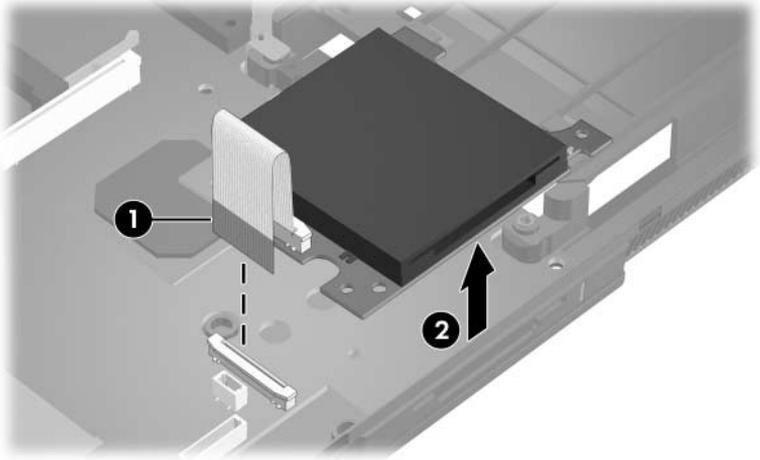
Removing the Digital Media Board

Reverse the above procedure to install the digital media board.

6.23 USB/Audio Board

✎ Full-featured models are equipped with a USB/audio board.
Defeatured models are equipped with an audio board. The
removal procedures are identical for both boards.

USB/Audio Board Spare Part Number Information

USB/audio board (for use only with full-featured models; includes audio board cable and USB board cable)	378226-001
Audio board (for use only with defeatured models; includes audio board cable)	378241-001

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

   a. Hard drive (Section 6.4)

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

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Display assembly (Section 6.19)

   g. Top cover (Section 6.20)

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

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

✎ The USB cable is present only on full-featured models.

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

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

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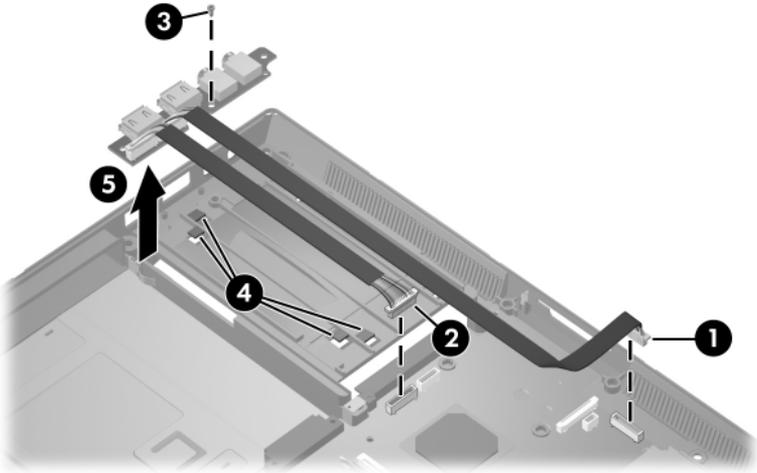
Removing the USB/Audio Board

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

6.24 System Board

System Board Spare Part Number Information

For use with full-featured models	378225-001
For use with defeatured models-GML	378238-001
For use with defeatured models-GML	383219-001

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

- Memory modules (Section 6.7 and Section 6.17)
- Mini PCI communications card (Section 6.8)
- Processor (Section 6.15)
- Modem board (Section 6.16)

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

   a. Hard drive (Section 6.4)

   b. Bluetooth board (Section 6.6)

   c. Optical drive (Section 6.9)

   d. Keyboard (Section 6.10)

   e. Switch cover (Section 6.11)

   f. Fan (Section 6.13)

   g. Heat sink (Section 6.14)

   h. RTC battery (Section 6.18)

   i. Display assembly (Section 6.19)

   j. Top cover (Section 6.20)

   k. Speaker (Section 6.21)

   l. Digital media board (Section 6.22)

   m. USB/audio board (Section 6.23)

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

3. Remove the Torx8 T8M2.0×4.0 screw ❸ that secures the system board to the base enclosure next to the RJ-11 connector.

✎ Step 4 applies only to full-featured models.

4. Remove the 2 HM5.0×9.0 screw locks ❹ on each side of the parallel connector.

5. Remove the 2 HM5.0×9.0 screw locks ❺ on each side of the external monitor connectors.
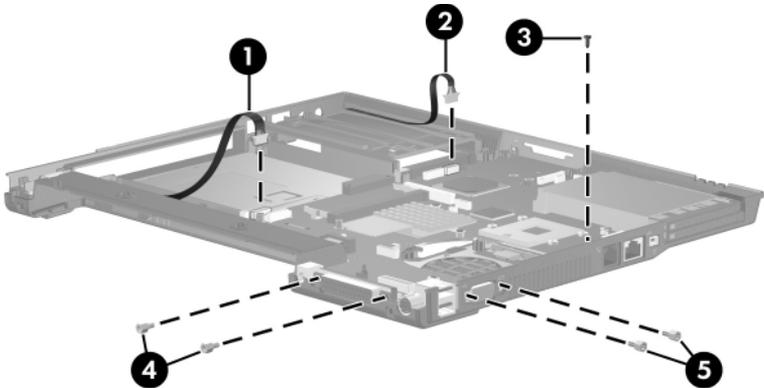
Removing the System Board Screws and Screw Locks

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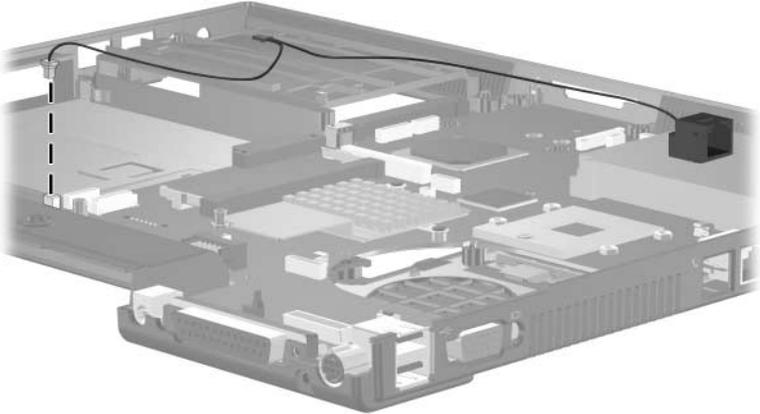
Removing the RJ-11 Connector Module and Cable

7. Use the optical drive connector to lift the system board ❶ until the power connector ❷ is clear of the base enclosure.
8. Slide the system board ❸ to the left at an angle and remove it.
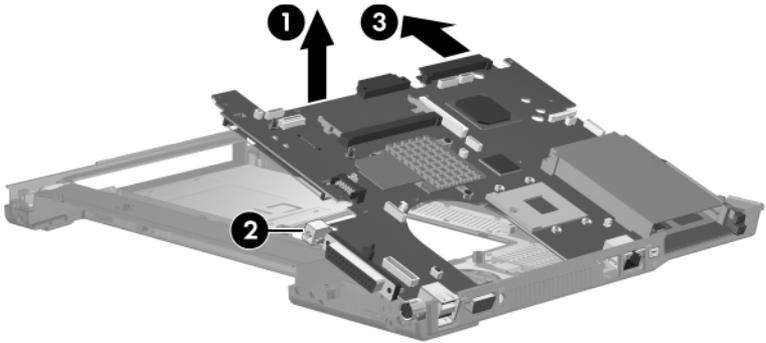
Removing the System Board

Reverse the above procedures to install the system board.

6.25 Serial Connector Module

✎ This section applies only to full-featured models.

Serial Connector Module Spare Part Number Information

Serial connector module (includes serial connector module cable)	378227-001

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

      a. Hard drive (Section 6.4)

      b. Bluetooth board (Section 6.6)

      c. Optical drive (Section 6.9)

      d. Keyboard (Section 6.10)

      e. Switch cover (Section 6.11)

      f. Fan (Section 6.13)

      g. Heat sink (Section 6.14)

      h. RTC battery (Section 6.18)

      i. Display assembly (Section 6.19)

      j. Top cover (Section 6.20)

      k. Speaker (Section 6.21)

      l. Digital media board (Section 6.22)

      m. USB/audio board (Section 6.23)

2. Remove the 2 HM5.0×9.0 screw locks ❶ on each side of the serial connector.

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

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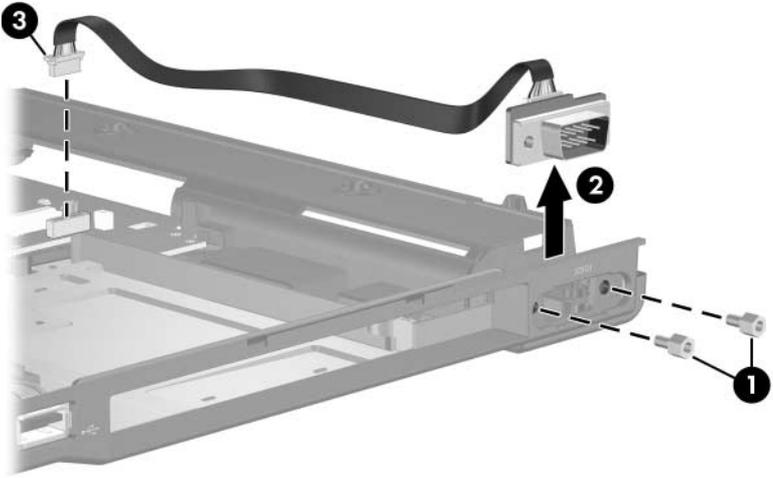
Removing the Serial Connector Module

7

Specifications

This chapter provides physical and performance specifications.

Table 7-1

Computer

Dimensions	Metric	U.S.
Height	32.8 cm	12.91
Width	26.7 cm	10.51
Depth	3.1 cm	1.22
Weight		
Full-featured model with 15.0-inch display, optical drive, and 6-cell battery pack	2.86 kg	6.31 lbs
Defeatured model with 14.1-inch display, optical drive, and 6-cell battery pack	2.72 kg	5.99 lbs
Input Power		
Operating voltage	18.5 V dc @ 3.5 A - 65 W	
Operating current	3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F

Table 7-1

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 7-2

15.0-inch, SXGA+WVA, TFT Display

Dimensions		
Height	30.0 cm	11.8 in
Width	22.9 cm	9.0 in
Diagonal	38.1 cm	15.0 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1	
Brightness	150 nits typical	
Pixel resolution		
Pitch	0.264 $\times$ 0.264 mm	
Format	1400 $\times$ 1050	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 $\times$ 25	
Total power consumption	5.5 W	
Viewing angle	+/-35° horizontal, +15/-35° vertical typical	

Table 7-3

15.0-inch, XGA, TFT Display

Dimensions		
Height	30.0 cm	11.8 in
Width	22.9 cm	9.0 in
Diagonal	38.1 cm	15.0 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1	
Brightness	150 nits typical	
Pixel resolution		
Pitch	0.264 × 0.264 mm	
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	5.5 W	
Viewing angle	+/-35° horizontal, +15/-35° vertical typical	

Table 7-4

14.1-inch, XGA, TFT Display

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

Table 7-5

Hard Drives

	80-GB*	60-GB*	60-GB*
Dimensions			
Height	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm
Weight	99 g	99 g	102 g
Interface type	ATA-5	ATA-5	ATA-5
Transfer rate			
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms
Logical blocks[†]	156,301,488	156,301,488	117,210,240
Disc rotational speed	4200 rpm	4200 rpm	5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)		

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

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

Table 7-5

Hard Drives *(Continued)*

	60-GB*	40-GB*	30-GB*
Dimensions			
Height	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm
Weight	102 g	99 g	99 g
Interface type	ATA-5	ATA-5	ATA-5
Transfer rate			
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	3 ms	3 ms	2.5 ms
Average	13 ms	13 ms	12 ms
Maximum	24 ms	24 ms	23 ms
Logical blocks[†]	117,210,240	78,140,160	58,605,120
Disc rotational speed	4200 rpm	4200 rpm	4200 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)		

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

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

Table 7-6

Primary 6-cell, Li-Ion Battery Pack

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

Table 7-7

DVD-ROM Drive

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

Access time	CD	DVD
Random	< 100 ms	< 125 ms
Full stroke	< 175 ms	< 225 ms

Audio output level	Line-out, 0.7 Vrms
Cache buffer	512 KB
Data transfer rate	
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)
CD-ROM (24X)	3600 KB/s (150 KB/s at 1X CD rate)
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD rate)
Multiword DMA mode 2	16.6 MB/s
Startup time	< 10 seconds
Stop time	< 3 seconds

Table 7-8

DVD/CD-RW Combo Drive

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

Table 7-8

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

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

Table 7-9

DVD±RW and CD-RW Combo Drive

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

Table 7-9

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

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

Table 7-10

CD-ROM Drive

Applicable disc	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)

Table 7-10

CD-ROM Drive *(Continued)*

Track pitch	1.6 µm	
Access time	CD media	DVD media
Random	< 110 ms	< 125 ms
Full stroke	< 220 ms	< 225 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	128 KB/s	
Data transfer rate		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 8 seconds	
Stop time	< 4 seconds	

Table 7-11

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 7-12

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 7-12

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 7-13

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 7-13

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 7-13

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 7-14

System Memory Map

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

A

Connector Pin Assignments

Table A-1

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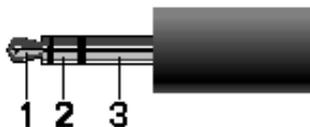
Pin	Signal	Pin	Signal
1	Audio out, left channel	3	Ground
2	Audio out, right channel		

Table A-2

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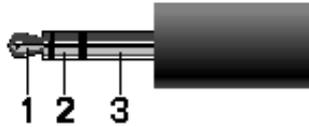
Pin	Signal	Pin	Signal
1	Audio signal in	3	Ground
2	Audio signal in		

Table A-3

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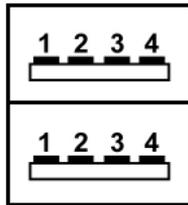
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data –	4	Ground

Table A-4

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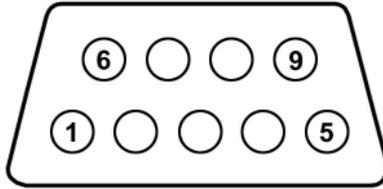
Pin	Signal	Pin	Signal
1	Carrier detect	6	Data set ready
2	Receive data	7	Ready to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Ground		

Table A-5

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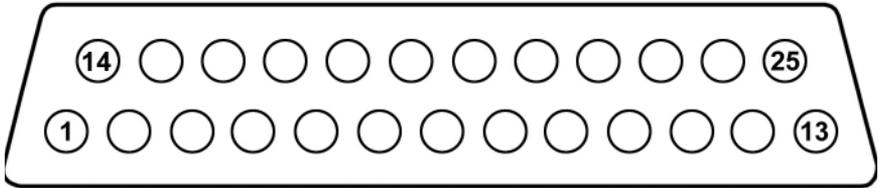
Pin	Signal	Pin	Signal
1	Strobe	14	Auto linefeed
2	Data bit 0	15	Error
3	Data bit 1	16	Initialize printer
4	Data bit 2	17	Select in
5	Data bit 3	18	Ground
6	Data bit 4	19	Ground
7	Data bit 5	20	Ground
8	Data bit 6	21	Ground
9	Data bit 7	22	Ground
10	Acknowledge	23	Ground
11	Busy	24	Ground
12	Paper end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

Table A-6

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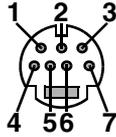
Pin	Signal	Pin	Signal
1	S-VHS color (C) signal	5	TV-CD
2	Composite video signal	6	S-VHS intensity ground
3	S-VHS intensity (Y) signal	7	Composite video ground
4	S-VHS color ground		

Table A-7

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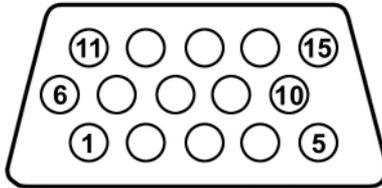
Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC 2B clock
8	Ground analog		

Table A-8

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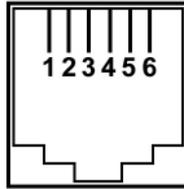
Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-9

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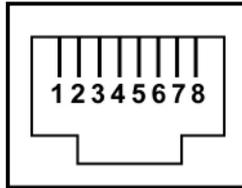
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit –	6	Receive –
3	Receive +	7	Unused
4	Unused	8	Unused

B

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the 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	KE A	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.

C

Screw Listing

This appendix provides specification and reference information for the screws and screw locks used in the computer. All screws and screw locks listed in this appendix are available in the Screw Kit, spare part number 378235-001.

Table C-1

Phillips PM2.0×4.0 Screw
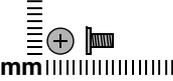
	Color	Qty.	Length	Thread	Head Width
mm	Black	3	4.0 mm	2.0 mm	4.0 mm

Where used:

❶ Two screws that secure the hard drive cover to the computer (screws are captured on the cover by C clips; documented in Section 6.4)

❷ One screw that secures the memory module/Mini PCI compartment cover to the computer (screw is captured on the cover by a C clip; documented in Section 6.7)
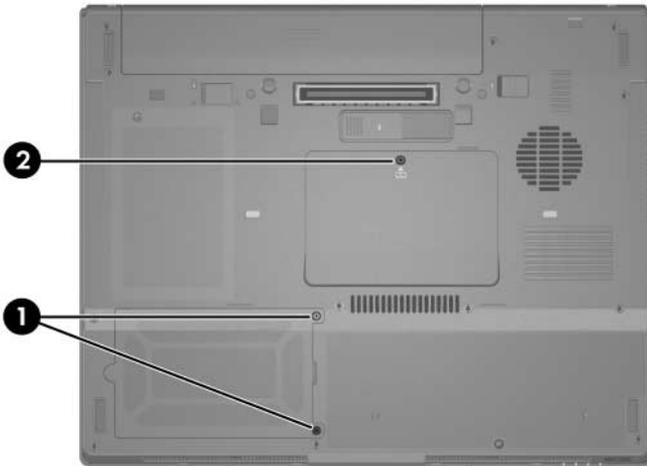
Phillips PM2.0×4.0 Screw Locations

Table C-2

Phillips PM2.5×13.0 Spring-loaded Hard Drive Retention Screw
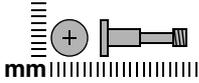
mm	Color	Qty.	Length	Thread	Head Width
	Silver	1	13.0 mm	2.5 mm	5.5 mm

Where used:

One screw that secures the hard drive to the computer (screw is captured on the hard drive frame by a C clip; documented in Section 6.4)
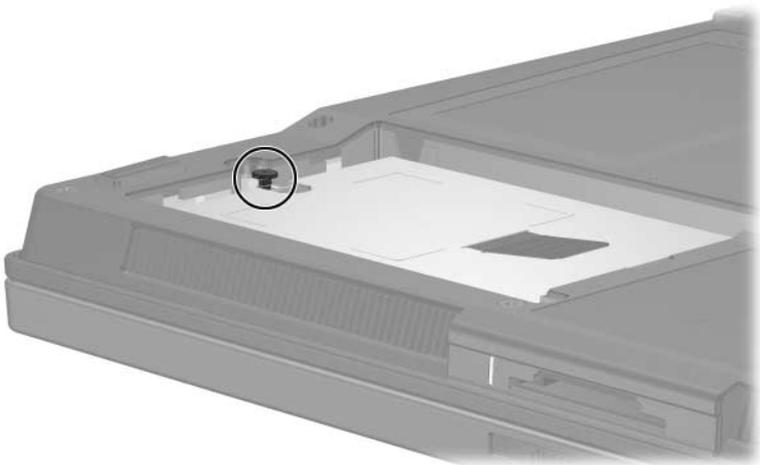
Phillips PM2.5×13.0 Screw Location

Table C-3

Phillips PM2.5×4.0 Shoulder Screw, Phillips PM2.5×4.0 Screw, and Phillips PM1.5×3.5 Screw

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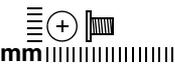
mm ⊕ ▯	Color	Qty.	Length	Thread	Head Width
	Silver	2	4.0 mm	2.5 mm	4.5 mm
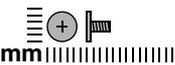
mm ⊕ ▭	Color	Qty.	Length	Thread	Head Width
	Black	2	3.5 mm	1.5 mm	4.5 mm

Where used:

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

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

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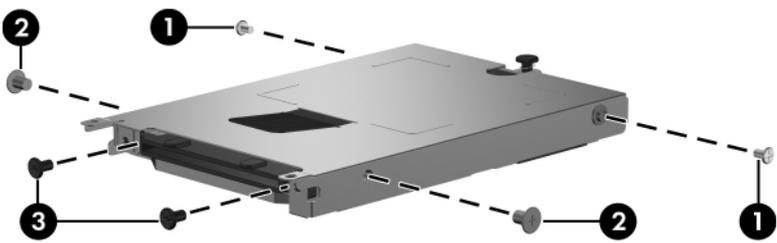
Phillips PM2.5×4.0 Shoulder Screw, Phillips PM2.5×4.0 Screw, and Phillips PM1.5×3.5 Screw Locations

Table C-4
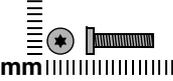
Torx8 T8M2.0×9.0 Screw

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

Where used:

One screw that secures the optical drive to the computer (documented in Section 6.9)
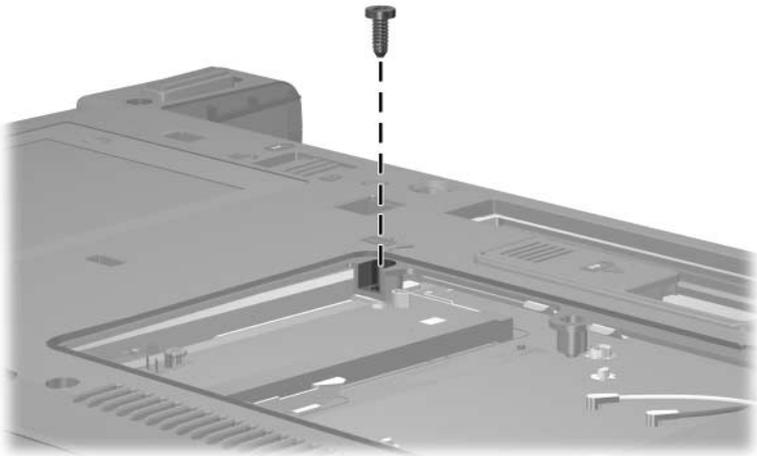
Torx8 T8M2.0×9.0 Screw Location

Table C-4

Torx8 T8M2.0×9.0 Screw *(Continued)*
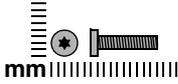
mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

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

Torx8 T8M2.0×9.0 Screw Locations

Table C-4

Torx8 T8M2.0×9.0 Screw *(Continued)*

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

Where used:

2 screws that secure the display assembly to the computer (documented in Section 6.19)

Torx8 T8M2.0×9.0 Screw Locations

Table C-4

Torx8 T8M2.0×9.0 Screw *(Continued)*
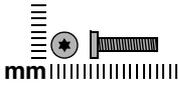
mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

4 screws that secure the display assembly to the computer (documented in Section 6.19)

Torx8 T8M2.0×9.0 Screw Locations

Table C-4

Torx8 T8M2.0×9.0 Screw *(Continued)*

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

Where used:

13 screws that secure the top cover to the computer (documented in Section 6.20)
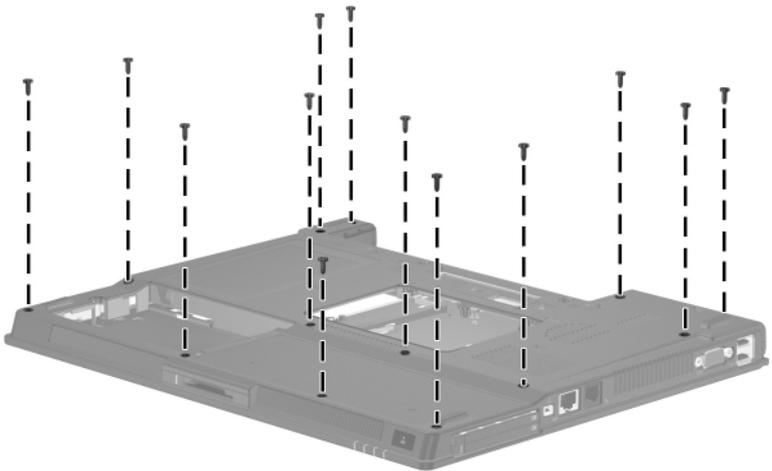
Torx8 T8M2.0×9.0 Screw Locations

Table C-4

Torx8 T8M2.0×9.0 Screw *(Continued)*
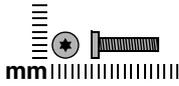
mm	Color	Qty.	Length	Thread	Head Width
	Black	24	9.0 mm	2.0 mm	4.0 mm

Where used:

2 screws that secure the top cover to the computer (documented in Section 6.20)
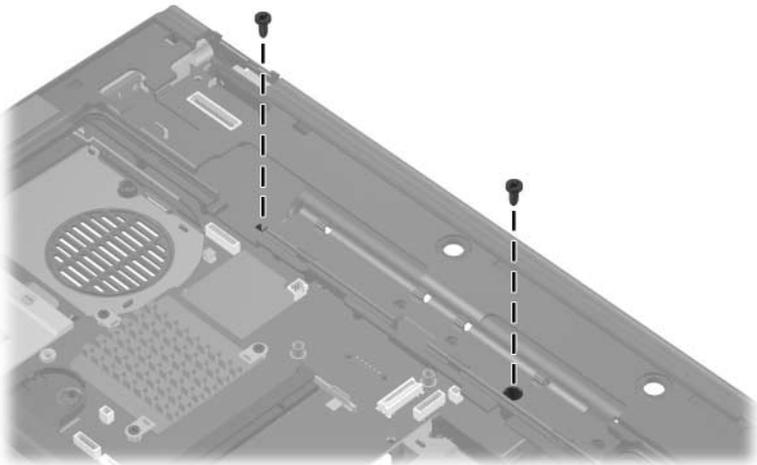
Torx8 T8M2.0×9.0 Screw Locations

Table C-5

Torx8 T8M2.0×2.0 Screw
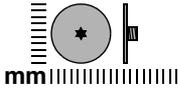
	Color	Qty.	Length	Thread	Head Width
	Black	2	2.0 mm	2.0 mm	6.0 mm

Where used:

2 screws that secure the switch cover to the computer (documented in Section 6.11)
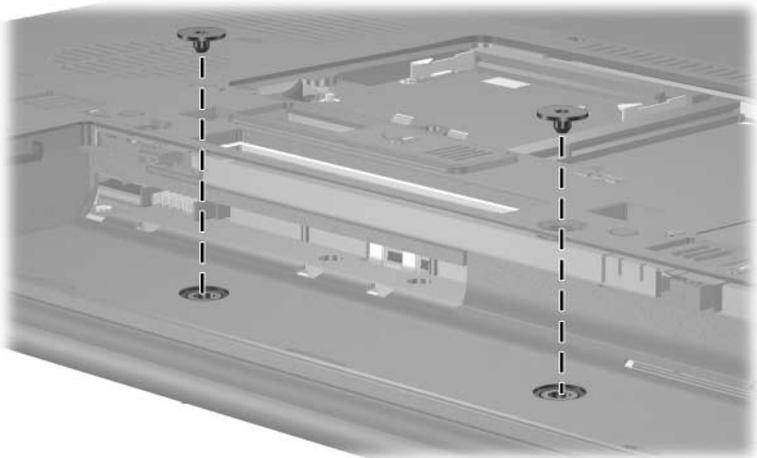
Torx8 T8M2.0×2.0 Screw Locations

Table C-6

Phillips PM1.5×4.0 Screw
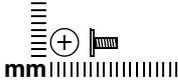
mm	Color	Qty.	Length	Thread	Head Width
	Silver	4	4.0 mm	1.5 mm	4.0 mm

Where used:

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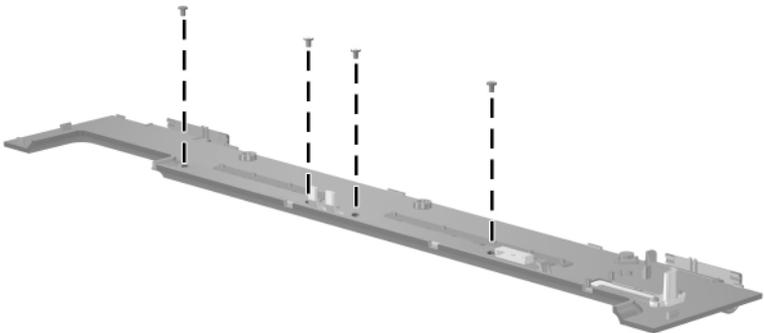
Phillips PM1.5×4.0 Screw Locations

Table C-7

Phillips PM2.0×7.0 Screw
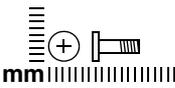
mm	Color	Qty.	Length	Thread	Head Width
	Silver	2	7.0 mm	2.0 mm	4.5 mm

Where used:

2 screws that secure the fan to the computer (screws are captured on the fan assembly by an O clip; documented in Section 6.13)
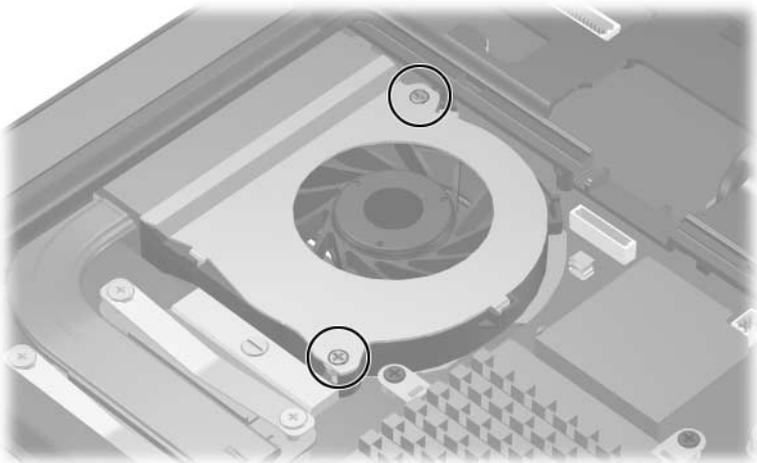
Phillips PM2.0×7.0 Screw Locations

Table C-8

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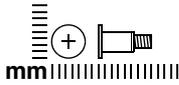
	Color	Qty.	Length	Thread	Head Width
	Silver	4	8.0 mm	2.0 mm	5.0 mm

Where used:

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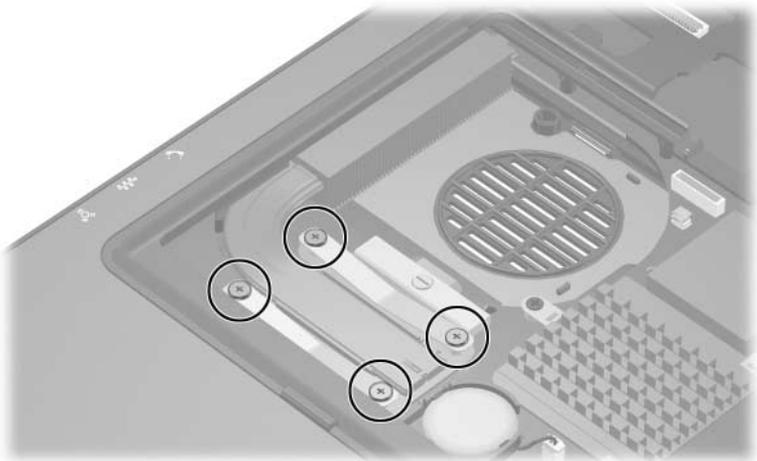
Phillips PM2.0×8.0 Shoulder Screw Locations

Table C-9

Phillips PM2.0×3.0 Screw
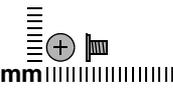
mm	Color	Qty.	Length	Thread	Head Width
	Black	2	3.0 mm	2.0 mm	4.0 mm

Where used:

2 screws that secure the modem board to the computer (documented in Section 6.16)
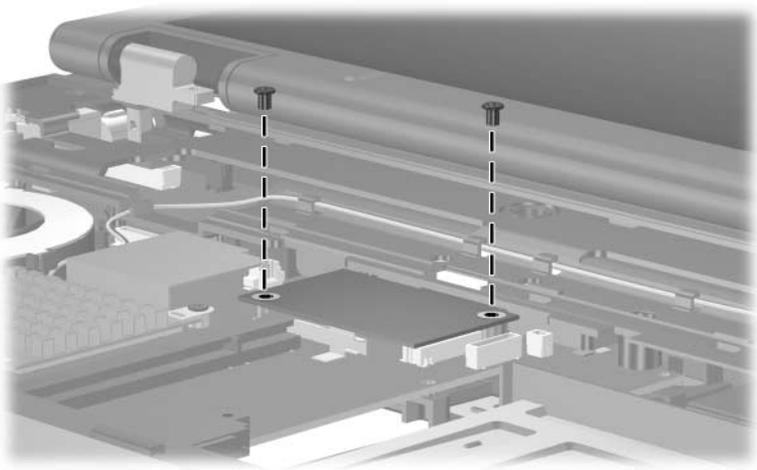
Phillips PM2.0×3.0 Screw Locations
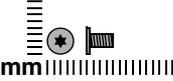
Table C-10

Torx8 T8M2.0×4.0 Screw

	Color	Qty.	Length	Thread	Head Width
mm	Black	6	4.0 mm	2.0 mm	4.0 mm

Where used:

4 screws that secure the speaker to the computer (documented in Section 6.21)
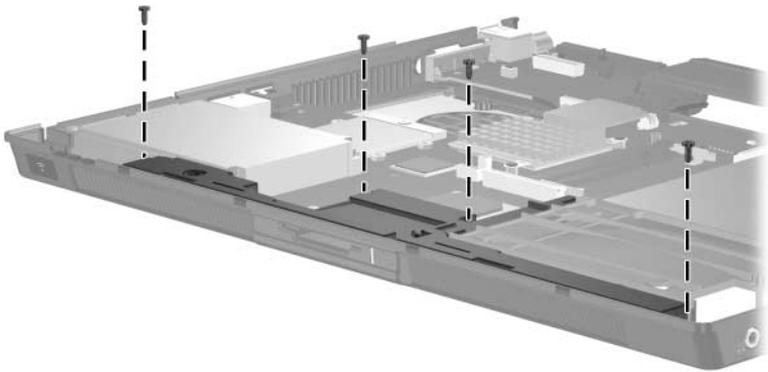
Torx8 T8M2.0×4.0 Screw Locations
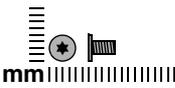
Table C-10

Torx8 T8M2.0×4.0 Screw *(Continued)*

mm	Color	Qty.	Length	Thread	Head Width
	Black	6	4.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the USB/audio board the computer (documented in Section 6.23)
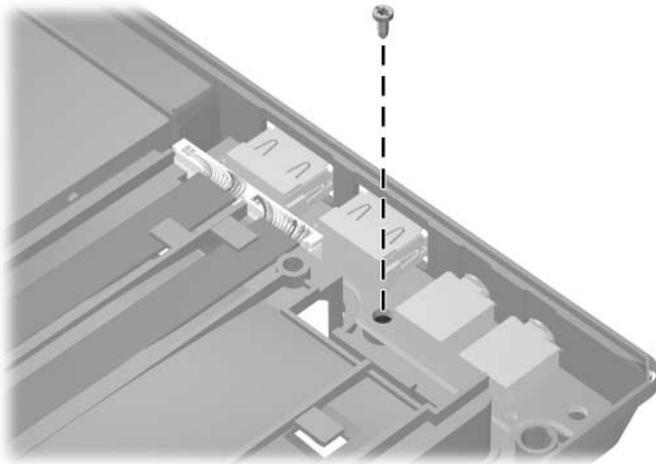
Torx8 T8M2.0×4.0 Screw Location

Table C-10

Torx8 T8M2.0×4.0 Screw *(Continued)*
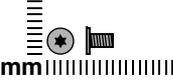
mm	Color	Qty.	Length	Thread	Head Width
	Black	6	4.0 mm	2.0 mm	4.0 mm

Where used:

One screw that secures the system board the computer (documented in Section 6.24)
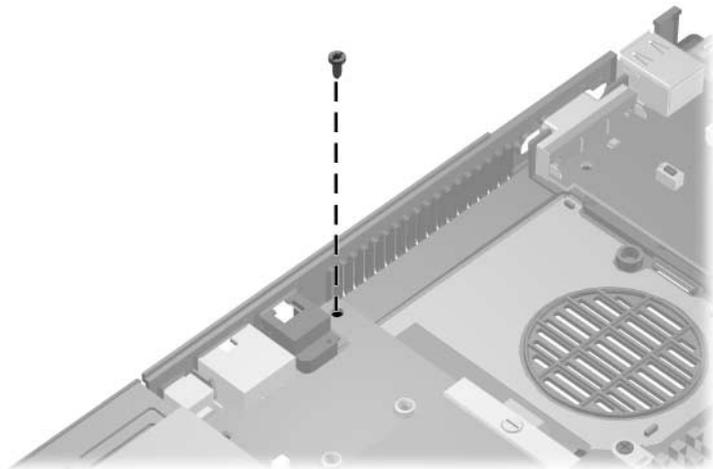
Torx8 T8M2.0×4.0 Screw Location

Table C-11

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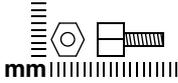
mm	Color	Qty.	Length	Thread	Head Width
	Silver	6	9.0 mm	2.5 mm	5.0 mm

Where used:

❶ Two screw locks that secure the system board to the computer only on HP Compaq nc6110 and nc6120 computer models (documented in Section 6.24)

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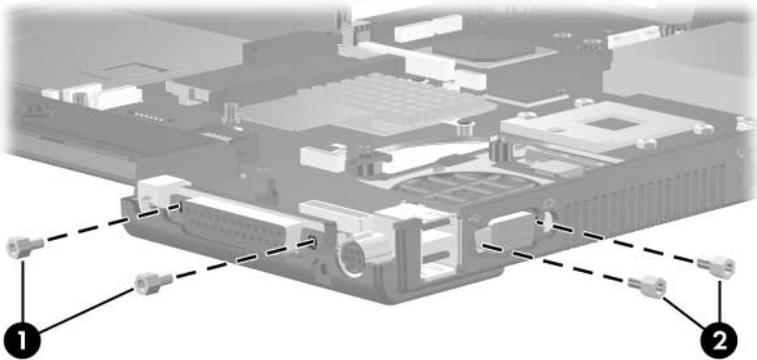
Hex Socket HM5.0×9.0 Screw Lock Locations

Table C-11

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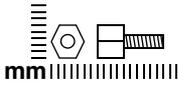
mm	Color	Qty.	Length	Thread	Head Width
	Silver	6	9.0 mm	2.5 mm	5.0 mm

Where used:

2 screw locks that secure the serial connector board to the system board (documented in Section 6.25)
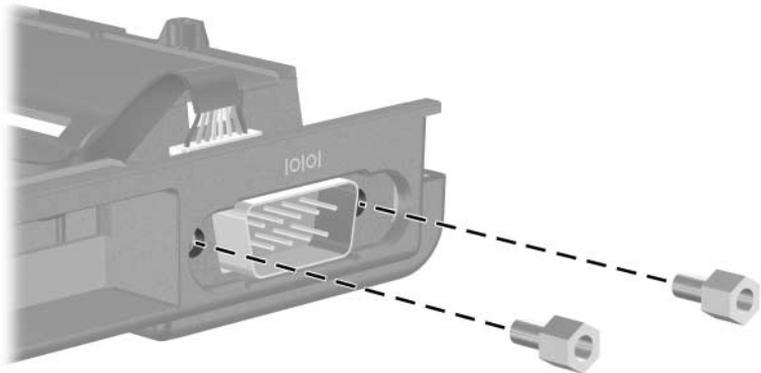
Hex Socket HM5.0×9.0 Screw Lock Locations

D

Display Component Recycling

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

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

✎ **Materials Disposal**

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

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

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

✎ Disassembly procedures differ from one display assembly to another. The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

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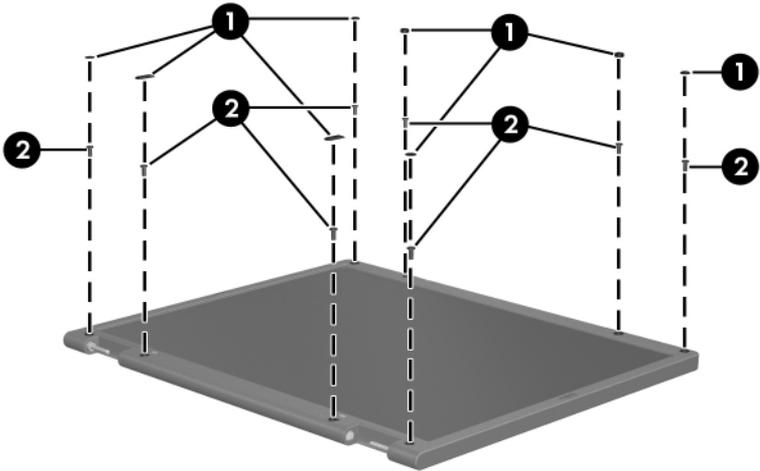
Removing the Display Bezel Screw Covers and Screws

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

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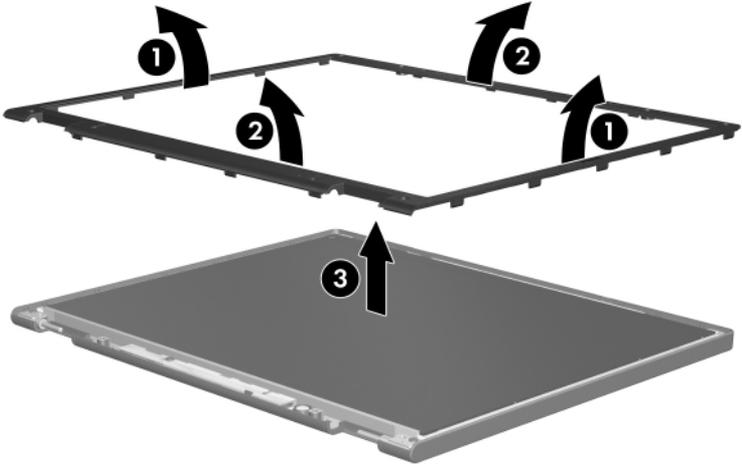
Removing the Display Bezel

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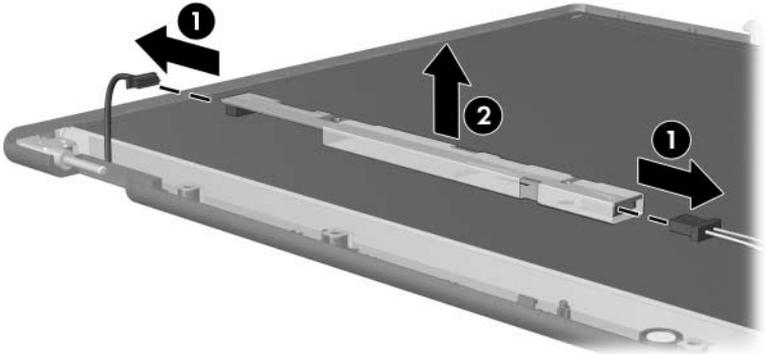
Removing the Display Inverter

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

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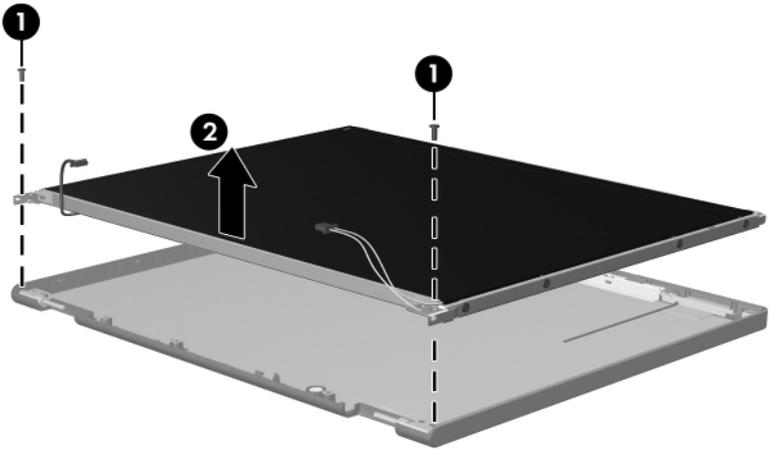
Removing the Display Panel Assembly

7. Turn the display panel assembly upside down.

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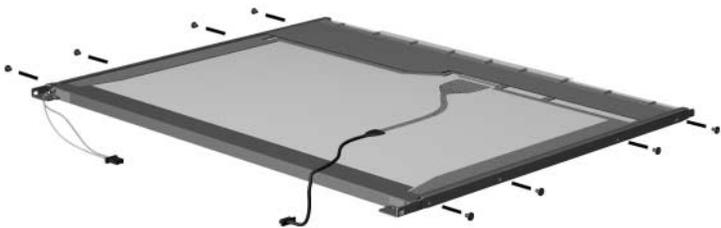
Removing the Display Panel Frame Screws

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

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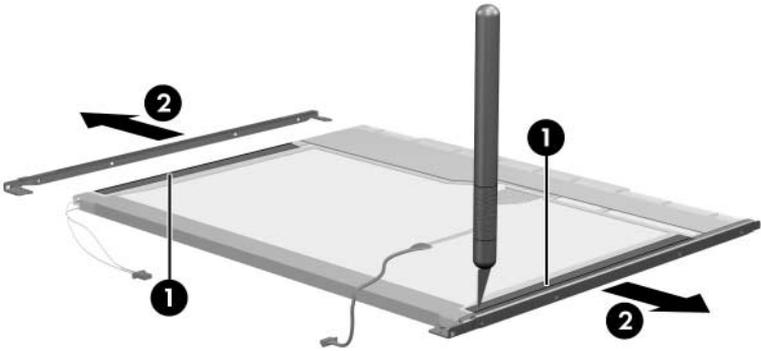
Removing the Display Frame

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

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

13. Remove the backlight cover.
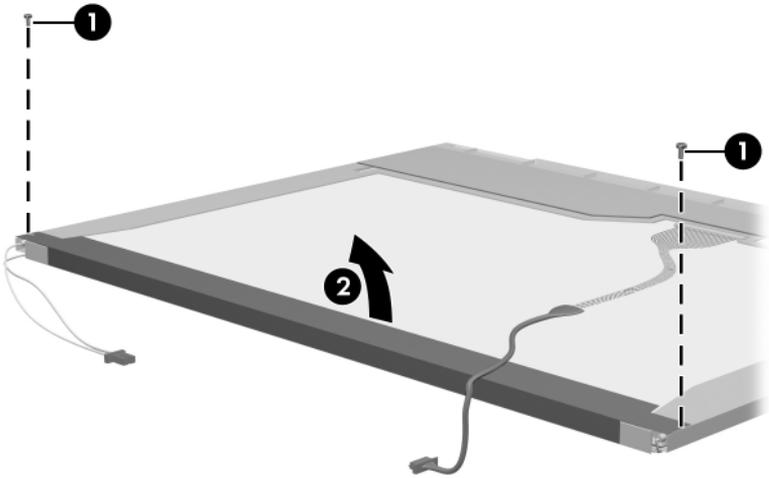
Removing the Backlight Cover

14. Turn the display panel right-side up.

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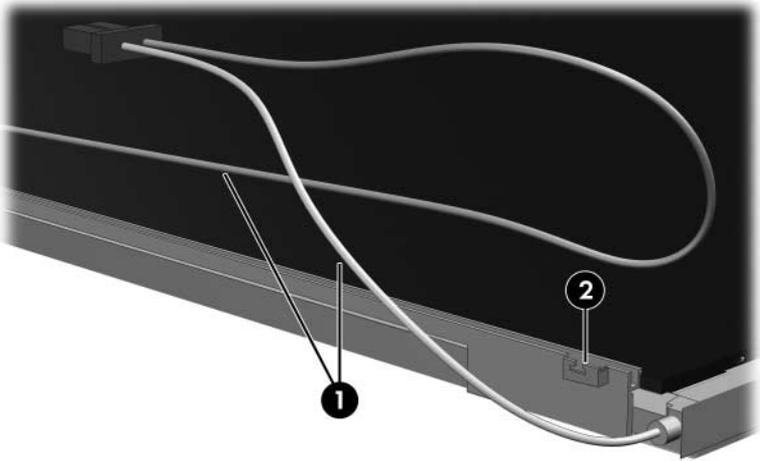
Releasing the Backlight Cables

16. Turn the display panel upside down.

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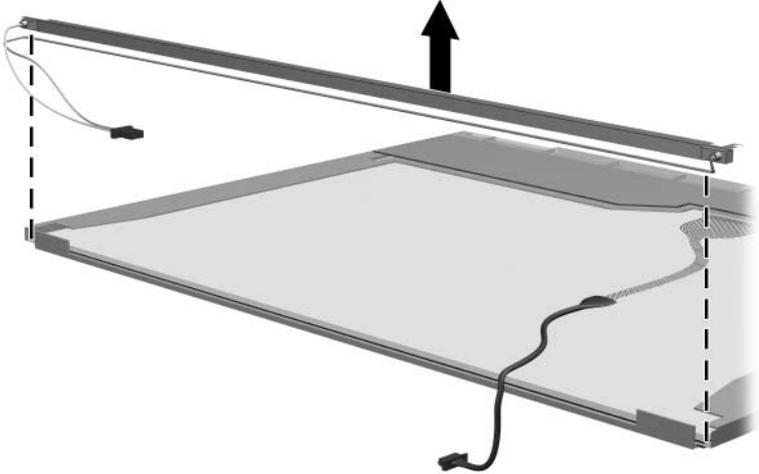
Removing the Backlight Frame

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

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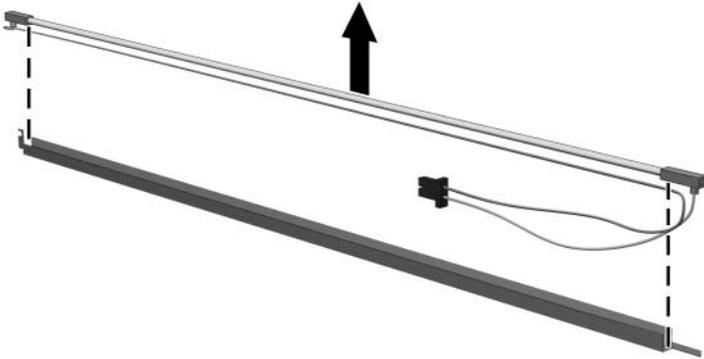
Removing the Backlight

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

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

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

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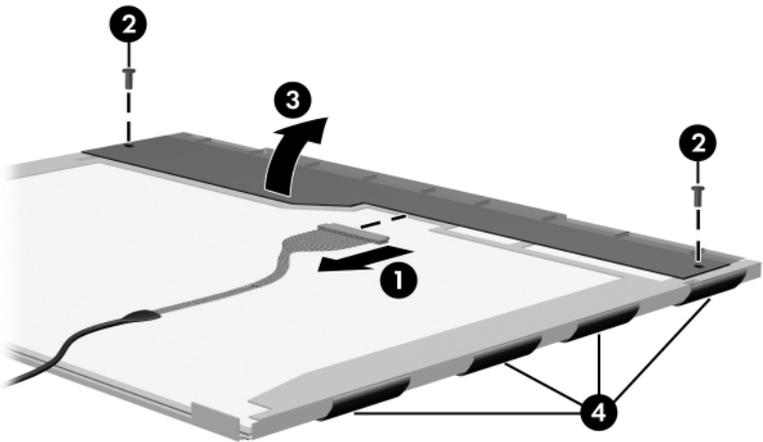
Releasing the LCD Panel

23. Remove the LCD panel.
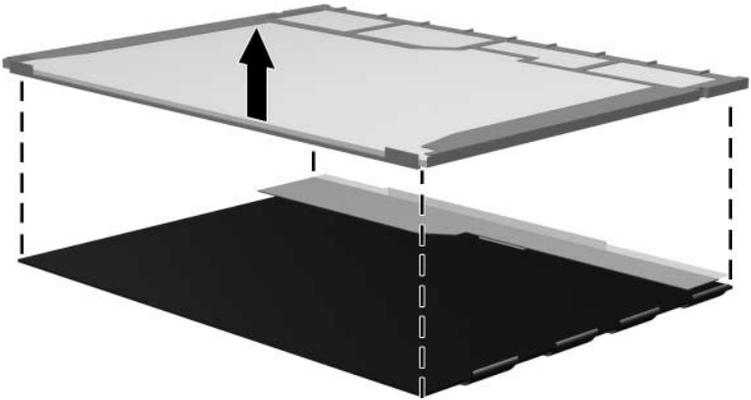
Removing the LCD Panel

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